Shakhnoza S. Azimova
Editor

Natural Compounds

Triterpene Glycosides

Plant Sources, Structure and Properties

With 1400 Figures and 1523 Tables

Springer

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Dedicated to the memory of academician N.K. Abubakirov

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Introduction

Dedicated to the Memory of academician
N. K. Abubakirov

Triterpene glycosides are widely distributed among natural compounds and possess a broad spectrum of biological activity such as hemolytic, immunomodulating, antitumor, anti-inflammatory, antidiabetic, antimicrobial, antiviral, adaptogenic, sedative, and many others. Well-known drugs and biologically active additives are based on triterpene glycosides from plants of the genera *Panax*, *Eleutheroccocus*, *Glycyrrhiza*, *Aesculus*, *Aralia*, *Quillaja* and others (for example Ginsenoside and Glycyrrhisin).

Triterpene glycosides are complex compounds consisting of a triterpene aglycon, from which they get their name, and a carbohydrate bound to it. The C skeleton of the aglycon is constructed from six isoprene units. The carbohydrate part incorporates from one to 12–13 monosaccharides, forming carbohydrate chains that can be bonded to one or several hydroxyls of the aglycon. The carbohydrate components can also be bound to the aglycon through a carboxylic acid. The carbohydrate part consists mainly of glucuronic acid, glucose, galactose, fucose, rhamnose, quinovose, xylose, and arabinose.

Triterpene glycosides are divided into groups according to the structure of the aglycon, i.e., oleanene, ursene, dammarane, lanostane, gopane, lupane, holostane types and subgroups such as glycosides of oleanolic, echinocystic and other acids, hederagenin, soyasapogenols A, B, C, and E, etc.

Triterpene glycosides are widely distributed in the plant world and in marine organisms such as holothuria. They are produced in plants in flowers, fruit, leaves, stems, and roots. The glycoside content depends on the plant species, its organs, development phase, and habitat. Glycosides are present in plants mainly as complex mixtures. Triterpene glycosides sometimes have esters in their structures that include acetic, angelic, tiglic, isobutanoic, and other acids. Glycosides containing sulfo-groups in the aglycon or carbohydrate part have also been isolated.

The role of triterpene glycosides in plants has not yet been investigated. It could be a protective function because certain glycosides possess antifeedant activity or it could be a growth-regulating role.

Triterpene glycosides from over 600 plants belonging to 72 families have currently been studied. Of these, more than 1,500 compounds of known structure have been isolated.

The goal of the present handbook is to generalize scattered literature data. The handbook consists of two volumes, each of which consists in turn of two parts. The first part of each volume presents in alphabetic order a list of 291 plants belonging to 46 families and compounds isolated from them. Literature references are given at the end of each family.

The second part presents structures of glycosides with an indication of the physicochemical constants, spectral data (IR-, UV-, mass-, ^{1}H and ^{13}C NMR), and pharmacological and biological properties. The names of compounds, their structural formulas and stereochemistry also names of plants are the same as those given in the original articles.

The handbook is structured based on literature data regarding the six main groups of triterpene glycosides that have been published in the journals Chemistry of Natural Compounds (Khimiya Prirodnykh Soedinenii), Chem. Pharm. Bull., J. Nat. Prod., Phytochemistry, Planta Med., Helv. Chim. Acta, Tetrahedron Lett., Liebigs Ann. Chem., Plant Med. Phytother., J. Chem. Soc., J. Chem. Soc. Perkin Trans. I, Pharmazie, Fitoterapia, Izv. Akad. Nauk SSSR, ser. khim., and Bioorg. Chem.

Of course the handbook will in the future be supplemented with new data on this particular topic.

This book is intended for a wide range of researchers: chemists, technicians, biologists, pharmacologists, and managers of pharmaceutical and other companies specializing in screening and producing medicinal preparations and other useful products based on natural compounds.

Occurrence of Triterpene Glycosides in Plant Species

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Family *Amaranthaceae*

***Achyranthes bidentata* Blume**
CHIKUSETSUSAPONIN V METHYL ESTER [1]
BIDENTATOSIDE I [1]
BIDENTATOSIDE II [1]

***Achyranthes fauriei* H.Lév. & Vaniot**
ACHYRANTHOSIDE C [2]
ACHYRANTHOSIDE D [2]

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Family *Apocynaceae*

***Trachelospermum asiaticum* Nakai**
ARJUNGLUCOSIDE I [1]
COMPOUND XII [1]
COMPOUND XIV [1]
COMPOUND XV [1]

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Family *Aquifoliaceae*

***Ilex paraquariensis* A.St.-Hil.**
GLYCOSIDE L-E_1 [1]

***Ilex rotunda* Thunb.**
ILEXOSIDE XLVIII (QUINOA-SAPONIN 9) [2]
ILEXOSIDE XLIX (UDOSAPONIN F) [2]

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Family *Araliaceae*

***Acanthopanax hypoleucus* Makino**
HYPOLEUCOSIDE B [1]
SAPONIN F [1]

***Acanthopanax nipponicus* Makino**
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Family *Asclepiadaceae*

***Gymnema alternifolium* (Lour.) Merr.**
ALTERNOSIDE I [1]
ALTERNOSIDE II [1]
ALTERNOSIDE III [1]
ALTERNOSIDE IV [1]
ALTERNOSIDE V [1]
ALTERNOSIDE VI [1]
ALTERNOSIDE VII [1]
ALTERNOSIDE VIII [1]
ALTERNOSIDE IX [1]
ALTERNOSIDE X [1]
ALTERNOSIDE XI [2]
ALTERNOSIDE XII [2]
ALTERNOSIDE XIII [2]
ALTERNOSIDE XIV [2]
ALTERNOSIDE XV [2]
ALTERNOSIDE XVI [2]
ALTERNOSIDE XVII [2]
ALTERNOSIDE XVIII [2]
ALTERNOSIDE XIX [2]
SITAKISOSIDE XVII [2]

***Gymnema sylvestre* R.Br.**
COMPOUND 2 [3]
COMPOUND 4 [3]
GYMNEMIC ACID GA-VIII [4]
GYMNEMIC ACID GA-IX [4]
GYMNEMIC ACID I [5]
GYMNEMIC ACID II [5]
GYMNEMIC ACID III [5]
GYMNEMIC ACID IV [5]
GYMNEMIC ACID V [6]
GYMNEMIC ACID VI [6]
GYMNEMIC ACID VII [6]
GYMNEMIC ACID XV [7]
GYMNEMIC ACID XVI [7]
GYMNEMIC ACID XVII [7]
GYMNEMIC ACID XVIII [7]
GYMNEMOSIDE-a [8]
GYMNEMOSIDE-b [8]
GYMNEMOSIDE-c [9]
GYMNEMOSIDE-d [9]

***Stephanotis lutchuensis* Koidz.**
SITAKISOSIDE I [10]
SITAKISOSIDE II [10]
SITAKISOSIDE III [10]
SITAKISOSIDE IV [10]
SITAKISOSIDE V [10]
SITAKISOSIDE VI [11]
SITAKISOSIDE VII [11]
SITAKISOSIDE IX [11]
SITAKISOSIDE X [11]
SITAKISOSIDE XI [12]
SITAKISOSIDE XII [12]
SITAKISOSIDE XIII [12]
SITAKISOSIDE XIV [12]
SITAKISOSIDE XV [12]
SITAKISOSIDE XVI [12]
SITAKISOSIDE XVII [12]
SITAKISOSIDE XVIII [12]
SITAKISOSIDE XIX [12]
SITAKISOSIDE XX [12]

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Family *Asteraceae*

***Aster auriculatus* Franch.**
SCABEROSIDE B_3(AURICULATUSAPONIN D) [1]

***Aster scaber* Thunb.**
SCABEROSIDE A_1 [2]
SCABEROSIDE A_2 [2]
SCABEROSIDE A_3 [2]
SCABEROSIDE A_4 [2]
SCABEROSIDE B_1 [3]
SCABEROSIDE B_2 [3]
SCABEROSIDE B_3 (AURICULATUSAPONIN D) [1]
SCABEROSIDE B_4 [3]
SCABEROSIDE B_5 [3]
SCABEROSIDE B_6 [3]
SCABEROSIDE Ha [4]
SCABEROSIDE Hb_1 [4]
SCABEROSIDE Hb_2 [4]
SCABEROSIDE Hc_1 [4]
SCABEROSIDE Hc_2 [5]
SCABEROSIDE Hd [5]
SCABEROSIDE Hf [5]
SCABEROSIDE Hg [5]
SCABEROSIDE Hh [5]
SCABEROSIDE Hi [5]

***Aster tataricus* L.f.**
ASTERSAPONIN B [6]
ASTERSAPONIN D [6]
ASTERSAPONIN Ha [7]
ASTERSAPONIN Hb [7]
ASTERSAPONIN Hc [7]
ASTERSAPONIN Hd [7]
FOETIDISSIMOSIDE A [7]

Bellis perennis
BELLISAPONIN BA_1 [8]
BELLISAPONIN BA_2 [8]

***Calendula arvensis* L.**
CALENDULOSIDE H (SAPONOSIDE C) [9]

***Calendula officinalis* L.**
CALENDULOSIDE A [10, 11]
CALENDULOSIDE B [12]
CALENDULOSIDE C [13]
CALENDULOSIDE D [13]
CALENDULOSIDE G [14]
CALENDULOSIDE H (SAPONOSIDE C) [9, 15]
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [16, 17]
HEDEROSIDE A_2 (ANDROSEPTOSIDE A, GLEDITSHIOSIDE A, VITALBOSIDE A) [18, 19]
LADYGINOSIDE A [18]

***Conyza blinii* Lévl.**
CONYZASAPONIN A [20]
CONYZASAPONIN B [20]
CONYZASAPONIN C [20]
CONYZASAPONIN G [20]

***Cynara cardunculus* L.**
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [21]
CYNARASAPONIN H [21]

***Eclipta alba* Hasgk (syn. Prostrata L.)**
ECLALBASAPONIN I [22]
ECLALBASAPONIN III [22]
ECLALBASAPONIN IV [22]
ECLALBASAPONIN V [22]
ECLALBASAPONIN VI [22]
GLEDITSEHIOSIDE B (ECLALBASAPONIN II) [22]

***Helianthus annuus* L.**
HELIANTHOSIDE A [23]
HELIANTHOSIDE B [24]
HELIANTHOSIDE C [25]

***Silphium perfoliatum* L.**
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [26]
SILPHIOSIDE A [27]
SILPHIOSIDE B (LUCIOSIDE H) [28]
SILPHIOSIDE C [29]
SILPHIOSIDE E [29, 30]

***Solidago canadensis* L.**
CANADENSISSAPONIN 1 [31, 32]
CANADENSISSAPONIN 2 [31]
CANADENSISSAPONIN 3 [31, 32]
CANADENSISSAPONIN 4 [31]

***Solidago virga-aurea* L.**
SOLIDAGOSAPONIN I [33]
SOLIDAGOSAPONIN II [33]
SOLIDAGOSAPONIN III [33]

SOLIDAGOSAPONIN IV [33]
SOLIDAGOSAPONIN V [33]
SOLIDAGOSAPONIN VI [33]
SOLIDAGOSAPONIN VII [33]
SOLIDAGOSAPONIN VIII [33]
SOLIDAGOSAPONIN IX [33]
VIRGAUREASAPONIN 1 [34]
VIRGAUREASAPONIN 2 [35]
VIRGAUREASAPONIN 3 [36]

***Tragopogon porrifolius* L.**
TRAGOPOGONSAPONIN A [37]
TRAGOPOGONSAPONIN B [37]
TRAGOPOGONSAPONIN C [37]
TRAGOPOGONSAPONIN D [37]
TRAGOPOGONSAPONIN E [37]
TRAGOPOGONSAPONIN F [37]
TRAGOPOGONSAPONIN G [37]
TRAGOPOGONSAPONIN H [37]
TRAGOPOGONSAPONIN I [37]
TRAGOPOGONSAPONIN J [37]
TRAGOPOGONSAPONIN K [37]
TRAGOPOGONSAPONIN L [37]
TRAGOPOGONSAPONIN M [37]
TRAGOPOGONSAPONIN N [37]
TRAGOPOGONSAPONIN O [37]
TRAGOPOGONSAPONIN P [37]
TRAGOPOGONSAPONIN Q [37]
TRAGOPOGONSAPONIN R [37]

***Vicoa indica* (L.) DC.**
VICOSIDE A [38]

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Family *Basellaceae*

***Basella rubra* L.**
BASELLASAPONIN A [1]
BASELLASAPONIN B [1]
BETAVULGAROSIDE I [1]
SPINACOSIDE C [1]

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Family *Berberidaceae*

***Caulophyllum robustum* Maxim.**
AKEBOSIDE Std (CAULOSIDE C_1, CALTOSIDE D, CAULOSAPONIN B, TAUROSIDE D_2, AKEBIA-SAPONIN C) [1]
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [2]
CAULOSIDE D (GLYCOSIDE G, KIZUTASAPONIN 10) [2]
CAULOSIDE G (GLYCOSIDE M) [3]
HEDEROSIDE C (CAULOSIDE B, SAPINDOSIDE A, DIPSACOSIDE A, GLYCOSIDE L-E_1, SAPONIN K6, SAPONIN P_D) [4]

***Leontice eversmannii* Bunge**
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [5]
LEONTOSIDE B [5, 6]
LEONTOSIDE C [6, 7]
LEONTOSIDE D [8]
LEONTOSIDE E [9]

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Family Boraginaceae

***Anchusa officinalis* L.**
SILPHIOSIDE B (LUCYOSIDE H) [1]

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Family *Buddlejaceae*

***Buddleja japonica* Hemsl.**
BUDDLEJASAPONIN I [1]
BUDDLEJASAPONIN II [1]
BUDDLEJASAPONIN III [1]
BUDDLEJASAPONIN IV [1]

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Family *Campanulaceae*

***Codonopsis lanceolata* (Sieb et Zucc.) Benth et Hook**
CODONOSIDE B [1]

***Platycodon grandiflorum* A.DC.**
PLATYCOSIDE D [2]
POLYGALACIN D_2 [3]
SAPONIN 8 [3]
SAPONIN 9 [3]
SAPONIN 11 [3]
SAPONIN 12 [3]

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Family *Caprifoliaceae*

***Lonicera bournei* Hemsl.**
HEDEROSIDE I [1]

***Lonicera japonica* Thunb.**
COMPOUND 9 [2]
COMPOUND 11 [2]
FATSIASIDE C_1 (SAPONIN P_E) [2]

***Lonicera nigra* L.**
AKEBOSIDE Std (CAULOSIDE C_1, CALTOSIDE D, CAULOSAPONIN B, TAUROSIDE D_2, AKEBIA-SAPONIN C) [3]
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [3]
FATSIASIDE C_1 (SAPONIN P_E) [3]
SAPONIN F [3]

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Family *Caryophyllaceae*

***Acanthophyllum gypsophiloides* Regel**
ACANTHOPHYLLOSIDE B [1–3]
ACANTHOPHYLLOSIDE C [1–3]

***Gypsophila acutifolia* Steven ex Spreng.**
ACUTIFOLIOSIDE [4]

***Gypsophila patrinii* Ser.**
PHYLOSIDE A [5]
PHYLOSIDE B [6]

***Gypsophila trichotoma* Wend.**
TRICHOSIDE A [7]
TRICHOSIDE B [8]
TRICHOSIDE D [9]

***Dianthus deltoides* L.**
DIANTHOSIDE C [10]

***Saponaria officinalis* L.**
SAPONASIDE A [11]
SAPONASIDE C [12]

***Silene nutans* L.**
NUTANOSIDE [13]

***Vaccaria segetalis* Neck.**
VACSEGOSIDE B [14]
VACSEGOSIDE C [15]

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Family *Chenopodiaceae*

***Beta vulgaris* L.**
BETAVULGAROSIDE I [1, 2]
BETAVULGAROSIDE II [1]
BETAVULGAROSIDE III [1]
BETAVULGAROSIDE IV [1]
BETAVULGAROSIDE V [3]
BETAVULGAROSIDE VI [3]
BETAVULGAROSIDE VII [3]
BETAVULGAROSIDE IX [3]
HEDEROSIDE A_2 (ANDROSEPTOSIDE A, GLEDITSHIOSIDE A, VITALBOSIDE A) [4]

***Boussingaultia baselloides* Kunth**
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [5]

***Chenopodium quinoa* Willd.**
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [6]
HEDEROSIDE A_2 (ANDROSEPTOSIDE A, GLEDITSHIOSIDE A, VITALBOSIDE A) [7]
HN-SAPONIN F [8]
ILEXOSIDE XLVIII (QUINOA-SAPONIN 9) [6]
MOMORDIN IIc (QUINOSIDE D) [6, 7]
QUINOA-SAPONIN 1 [8]
QUINOA-SAPONIN 2 [8]
QUINOA-SAPONIN 7 [6]
QUINOA-SAPONIN 10 [6]
QUINOSIDE A [9]

***Climacoptera aralensis* (Iljin) Botsch.**
MOMORDIN IId [10]

***Climacoptera lanata* (Pall.) Botsch.**
MOMORDIN IId [10]

***Climacoptera transoxana* Botsch.**
COPTEROSIDE C [11]
COPTEROSIDE D [12]
COPTEROSIDE E [13]
COPTEROSIDE F [13]
GLYCOSIDE ST-F_1 [11]

***Kochia scoparia* Schrad.**
MOMORDIN IIc (QUINOSIDE D) [14]
***Salsola micranthera* Botsch.**
SALSOLOSIDE C [15]
SALSOLOSIDE D [15]

***Spinacia oleracea* L.**
KALOPANAX SAPONIN E (SPINASAPONIN A) [16]

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Family *Combretaceae*

***Terminalia arjuna* Wight et Arn.**
ARJUNGLUCOSIDE I [1]

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Family *Cucurbitaceae*

***Actinostemma lobatum* Maxim.**
LOBATOSIDE A [1]
LOBATOSIDE B [2]
LOBATOSIDE C [1]
LOBATOSIDE D [1]
LOBATOSIDE E [2]
LOBATOSIDE F [2]
LOBATOSIDE G [2]
LOBATOSIDE H (TUBEIMOSIDE I) [1]

***Bolbostemma paniculatum* (Maxim.) Franquet**
LOBATOSIDE H (TUBEIMOSIDE I) [3–5]

***Cucurbita foetidissima* H.B.K.**
FOETIDISSIMOSIDE A [6]

***Hemsleya chinensis* Cogn.**
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [7]
COMPOUND 3 [7]
HEMSLOSIDE H_1 [8]
HEMSLOSIDE Ma3 [7]
HEMSLOSIDE MaI [7]

***Hemsleya graciliflora* (Harms) Cogn.**
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [9]
COMPOUND 3 [9]
HEMSLOSIDE G1 [9]
HEMSLOSIDE G2 [9]
HEMSLOSIDE H_1 [9]
HEMSLOSIDE Ma3 [9]
HEMSLOSIDE MaI [9]

***Hemsleya macrosperma* C.Y.Wu**
COMPOUND 3 [7]
HEMSLOSIDE Ma2 (MOMORDIN IIe) [7]
HEMSLOSIDE Ma3 [7]
HEMSLOSIDE MaI [7]

***Luffa acutangula* Roxb.**
ACUTOSIDE B [10]
ACUTOSIDE D [10]
ACUTOSIDE E [10]
ACUTOSIDE F [10]
ACUTOSIDE G [10]
ACUTOSIDE H [11]
ACUTOSIDE I [11]
HEDEROSIDE E_2 [10]

***Luffa cylindrica* Roem.**
HEDEROSIDE A_2 (ANDROSEPTOSIDE A, GLEDITSHIOSIDE A, VITALBOSIDE A) [12]

HEDEROSIDE B [12]
LUCYOSIDE P [13]

***Luffa operculata* Cogn.**
LUPEROSIDE I [14]
LUPEROSIDE J [14]

***Momordica charantia* L.**
GOYASAPONIN I [15]
GOYASAPONIN II [15]
GOYASAPONIN III [15]

***Momordica cochinchinensis* (Lour.) Spreng.**
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [16]
HEMSLOSIDE Ma2 (MOMORDIN IIe) [16]
HEMSLOSIDE MaI [16, 17]
MOMORDICASAPONIN I [18]
MOMORDIN IIc (QUINOSIDE D) [16]
MOMORDIN IId [16]

***Sechium pittieri* Cogn.**
TACACOSIDE A_1 [19]
TACACOSIDE A_2 [19]
TACACOSIDE B_1 [19]
TACACOSIDE B_2 [19]
TACACOSIDE B_3 [19]
TACACOSIDE C [19]

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Family *Dipsacaceae*

***Cephalaria giganthea* (Led). E.Bobr**
GIGANTEOSIDE D [1]
GIGANTEOSIDE E [2]
GIGANTEOSIDE G [1]
GIGANTEOSIDE H [2]

***Cephalaria kotschyi* Boiss et Hoch**
HEDEROSIDE C (CAULOSIDE B, SAPINDOSIDE A, DIPSACOSIDE A, GLYCOSIDE L-E_1, SAPONIN K6, SAPONIN P_D) [3]

***Dipsacus azureus* Schrenk**
HEDEROSIDE C (CAULOSIDE B, SAPINDOSIDE A, DIPSACOSIDE A, GLYCOSIDE L-E_1, SAPONIN K6, SAPONIN P_D) [4]

***Scabiosa soongorica* Schrenk**
SONGOROSIDE A [5, 6]
SONGOROSIDE C [6]
SONGOROSIDE G [6]

SONGOROSIDE I [6]
SONGOROSIDE M [6]
SONGOROSIDE O [6]

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Family *Eupteleaceae*

***Euptelea polyandra* Siebold & Zucc.**
EUPTELEASAPONIN XI [1]
EUPTELEASAPONIN XII [1]

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Family *Hippocastanaceae*

***Aesculus chinensis* Bunge**
AESCULIOSIDE A [1]
AESCULIOSIDE B [1]
AESCULIOSIDE C [1]
AESCULIOSIDE D [1]
AESCULIOSIDE E [1]
AESCULIOSIDE F [1]
AESCULIOSIDE G [1]
AESCULIOSIDE H [1]
ESCIN Ia [1]
ESCIN Ib [1]
ESCIN IVg [2]
ESCIN IVh [2]
ESCIN VIb [2]
ISOESCIN Ia [1]
ISOECIN Ib [1]

***Aesculus hippocastanum* L.**
ESCIN Ia [3]
ESCIN Ib [3]
ESCIN IIa [3, 4]
ESCIN IIb [3, 4]
ESCIN IIIa [3]
ESCIN IV [5]
ESCIN V [5]
ESCIN VI [5]
ISOESCIN Ia [5]
ISOESCIN Ib [5]
ISOESCIN V [5]

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Family *Iridaceae*

***Crocosmia crocosmiiflora* (Montbretia) N.E.Br.**
CROCOSMIOSIDE A [1, 2]
CROCOSMIOSIDE B [1, 2]
CROCOSMIOSIDE C [3]
CROCOSMIOSIDE D [3]

CROCOSMIOSIDE E [3]
CROCOSMIOSIDE F [3]
CROCOSMIOSIDE G [3]
CROCOSMIOSIDE H [1]
CROCOSMIOSIDE I [3]

***Crocosmia masonorum* (L.Bolus) N.E.Br.**
DESACYLMASONOSIDE 1 [1, 4]
DESACYLMASONOSIDE 2 [1, 4]
DESACYLMASONOSIDE 3 [1, 4]

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Family *Labiatae*

***Clinopodium chinense* (Benth) O.Kuntze**
CLINOPOSAPONIN XII [1]

***Clinopodium vulgare* L.**
CLINOPOSAPONIN XV [1]

***Stachys riederi* Benth.**
STACHYSSAPONIN I [2]
STACHYSSAPONIN II [2]
STACHYSSAPONIN III [2]
STACHYSSAPONIN IV [2]
STACHYSSAPONIN V [2]
STACHYSSAPONIN VI [2]
STACHYSSAPONIN VII [2]
STACHYSSAPONIN VIII [2]

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Family *Lardizabalaceae*

***Akebia quinata* Decne**
AKEBOSIDE Std (CAULOSIDE C_1, CALTOSIDE D, CAULOSAPONIN B, TAUROSIDE D_2, AKEBIA-SAPONIN C) [1–3]
AKEBOSIDE ST_J [3]
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [1]
ELEUTHEROSIDE K (TAUROSIDE C, β-HEDERIN, SAPONIN P_b, GLYCOSIDE B_1) [1]
ELEUTHEROSIDE M (HEDERASAPONIN B, HEDERACOLCHISIDE C, GLYCOSIDE F_1) [1]
FATSIASIDE C_1 (SAPONIN P_E) [1]
GLYCOSIDE ST_K (AKEBOSIDE ST_K) [3]
HEDEROSIDE C (CAULOSIDE B, SAPINDOSIDE A, DIPSACOSIDE A, GLYCOSIDE L-E_1, SAPONIN K6, SAPONIN P_D) [1]
HEDEROSIDE H (HEDERASAPONIN C, KIZUTASAPONIN K_{12}, AKEBOSIDE ST_H, KALOPANAX SAPONIN B, PERICARPSAPONIN P_k) [1]
SAPINDOSIDE B [1]
SAPONIN B FROM *AKEBIA QUINATA* [2]
SAPONIN E [4]
SAPONIN F [4]
SAPONIN G [4]

***Holboellia fargesii* Reaub**
FARGOSIDE E [5]

***Stauntonia hexaphylla* Decne**
ELEUTHEROSIDE I (MUBENIN B) [6]

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Family *Leguminosae*

***Abrus cantoniensis* Hance**
ABRISAPONIN SB [1]
SOYASAPONIN A_3 [2]
SOYASAPONIN I [3]

***Albizia chinensis* Merr.**
GLEDITSCHIOSIDE B (ECLALBASAPONIN II) [4]

***Albizia subdimidiata* (Splitg.) Barneby & J.W.Grimes**
ALBIZZIATRIOSIDE A [5]
SAPONIN 2 [5]

***Astragalus membranaceus* Bunge**
ASTRAGALOSIDE VIII [6]
SOYASAPONIN I [7]

***Calliandra anomala* (Kunth) Macbr.**
CALLIANDRA SAPONIN A [8, 9]
CALLIANDRA SAPONIN B [9]
CALLIANDRA SAPONIN C [9]
CALLIANDRA SAPONIN D [9]
CALLIANDRA SAPONIN E [8, 9]
CALLIANDRA SAPONIN F [9]
CALLIANDRA SAPONIN G [10]
CALLIANDRA SAPONIN H [10]
CALLIANDRA SAPONIN I [10]
CALLIANDRA SAPONIN J [10]
CALLIANDRA SAPONIN K [10]
CALLIANDRA SAPONIN L [10]
CALLIANDRA SAPONIN M [11]
CALLIANDRA SAPONIN N [11]
CALLIANDRA SAPONIN O [11]

***Crotalaria albida* Heyne.**
COMPOUND 7 [12]
SOYASAPONIN I [12]
SOYASAPONIN III [12]

***Desmodium styracifolium* (Osbek) Merr.**
SOYASAPONIN I [13]

***Dolichos kilimandscharicus* Taub.**
HEDEROSIDE B [14]

***Dolichos lablab* L.**
LABLABOSIDE A [15]

***Entada phaseoloides* Merr.**
ENTADA SAPONIN II (ES-II) [16]

***Galega officinalis* L.**
SAPONIN FROM *GALEGA OFFICINALIS* [17]

***Gleditsia japonica* Miq.**
GLEDITSIA SAPONIN B [18]
GLEDITSIA SAPONIN C [18]
GLEDITSIA SAPONIN D_2 [19]
GLEDITSIA SAPONIN G [19]
GLEDITSIA SAPONIN I [19]

***Gleditsia sinensis* Lam.**
GLEDITSIA SAPONIN B [20]
GLEDITSIA SAPONIN C [20]
GLEDITSIOSIDE E [20]
GLEDITSIOSIDE F [20]
GLEDITSIOSIDE G [20]

***Gleditsia triacanthos* L.**
GLEDITSCHIOSIDE B (ECLALBASAPONIN II) [18]
HEDEROSIDE A_2 (ANDROSEPTOSIDE A, GLEDITSHIOSIDE A, VITALBOSIDE A) [21]
TRIACANTHOSIDE A_1 [22]
TRIACANTHOSIDE C [23, 24]
TRIACANTHOSIDE G [22, 25]

***Glycine max* (L) Merr.**
ACETYLSOYASAPONIN A_1 [26]
ACETYLSOYASAPONIN A_2 [26]
ACETYLSOYASAPONIN A_3 [26]
ACETYLSOYASAPONIN A_4 [27]
ACETYLSOYASAPONIN A_5 [27]
ACETYLSOYASAPONIN A_6 [27]
SOYASAPONIN A_1 [28]
SOYASAPONIN A_2 [29]
SOYASAPONIN A_3 [30]
SOYASAPONIN I [31]
SOYASAPONIN II [32, 33]
SOYASAPONIN III [32]

***Lathyrus palustris* L. var. pilosus**
MONOGLUCURONIDE [34]

***Medicago hispida* Gaertn.**
SOYASAPONIN III [35]

***Medicago polymorpha* L.**
COMPOUND 9 [36]
COMPOUND 11 [36]
HEDEROSIDE C (CAULOSIDE B, SAPINDOSIDE A, DIPSACOSIDE A, GLYCOSIDE L-E_1, SAPONIN K6, SAPONIN P_D) [36]
MEDICAGO-SAPONIN P_1 [36]
MEDICAGO-SAPONIN P_2 [36]

***Medicago sativa* L.**
AKEBOSIDE Std (CAULOSIDE C_1, CALTOSIDE D, CAULOSAPONIN B, TAUROSIDE D_2, AKEBIA-SAPONIN C) [37]
MEDICOSIDE C [37]
MEDICOSIDE E [38]
MEDICOSIDE F [38]
MEDICOSIDE I [39]
SOYASAPONIN I [40]

***Melilotus officinalis* (L.) Lam.**
ASTRAGALOSIDE VIII [41]
MELILOTUS-SAPONIN O_1 [42]
SOYASAPONIN I [41]

***Phaseolus vulgaris* L.**
SOYASAPONIN I [43]

***Pisum sativum* L.**
PISUMSAPONIN I [44]

***Pithecellobium racemosum* Ducke**
SAPONIN 2 [45]

***Pueraria lobata* (Willd.) Ohwi**
KUDZUSAPONIN SA_1 [46]
KUDZUSAPONIN SA_2 [46]
KUDZUSAPONIN SA_3 [46]
KUDZUSAPONIN SA_4 [47]
KUDZUSAPONIN SB_1 [47]
SOYASAPONIN A_3 [47]
SOYASAPONIN I [47]

***Pueraria thomsonii* Benth.**
ACETYLSOYASAPONIN I [48]
SOYASAPONIN I [48]

***Russell lupine* (L. polyphyllus x L. arboreus hybrid)**
LUPINOSIDE PA_1 [49]
LUPINOSIDE PA_2 [49]
LUPINOSIDE PA_4 [49]
LUPINOSIDE PA_5 [49]
SOYASAPONIN I [49]

***Sophora flavescens* Ait.**
SOPHORAFLAVOSIDE I [50]
SOYASAPONIN I [50]

***Sophora japonica* L.**
SOYASAPONIN I [51]

***Glycine max* (L) Merr.**
SOYASAPONIN VI [52]

Swartzia simplex
CHIKUSETSUSAPONIN IVa (CALENDULOSIDE F, MOMORDIN IIb) [53]

***Vigna angularis* (Willd) Ohwi et Ohashi**
AZUKISAPONIN II [54]
AZUKISAPONIN V [55]

***Wisteria brachybotrys* Siebold & Zucc.**
ASTRAGALOSIDE VIII [56]
SOYASAPONIN I [56]
WISTARIASAPONIN C [57]

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Family *Molluginaceae*

***Clinus lotoides* L.**
LOTOIDOSIDE D [1]

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Family *Polygalaceae*

***Polygala fallax* Hemsl.**
POLYGALASAPONIN XXXIII [1]
POLYGALASAPONIN XXXIV [1]
POLYGALASAPONIN XXXV [1]
POLYGALASAPONIN XXXVI [1]
POLYGALASAPONIN XXXVII [1]
POLYGALASAPONIN XXXVIII [1]
POLYGALASAPONIN XXXIX [1]
POLYGALASAPONIN XL [1]
POLYGALASAPONIN XLI [1]
REINIOSIDE B [1]
REINIOSIDE C [1]
REINIOSIDE D [1]
REINIOSIDE E [1]
REINIOSIDE F [1]

***Polygala japonica* Houtt.**
HEDEROSIDE F [2]
LOBATOSIDE B [3]
POLYGALASAPONIN I [3]
POLYGALASAPONIN II [3]
POLYGALASAPONIN III [3]
POLYGALASAPONIN IV [3]
POLYGALASAPONIN V [3]
POLYGALASAPONIN VI [3]
POLYGALASAPONIN VII [3]
POLYGALASAPONIN VIII [3]
POLYGALASAPONIN IX [3]
POLYGALASAPONIN X [4]
POLYGALASAPONIN XI [4]
POLYGALASAPONIN XII [4]
POLYGALASAPONIN XIII [4]
POLYGALASAPONIN XIV [4]
POLYGALASAPONIN XV [4]
POLYGALASAPONIN XVI [4]
POLYGALASAPONIN XVII [4]
POLYGALASAPONIN XVIII [4]
POLYGALASAPONIN XIX [4]
POLYGALASAPONIN XXIV [2]
POLYGALASAPONIN XXVIII [5]
POLYGALASAPONIN XXIX [5]
POLYGALASAPONIN XXX [5]
POLYGALASAPONIN XXXI [5]
POLYGALASAPONIN XXXII [5]

***Polygala reinii* Franch. & Sav.**
REINIOSIDE A [6]
REINIOSIDE B [6]
REINIOSIDE C [6]
REINIOSIDE D [6]
REINIOSIDE E [6]
REINIOSIDE F [6]

***Polygala senega (senega radix)* L.**
E-SENEGASAPONIN a [7, 8]
E-SENEGASAPONIN b [7, 8]
E-SENEGASAPONIN c [9]
E-SENEGIN II [10, 11]
ONJISAPONIN B (SENEGIN III) [10]
ONJISAPONIN E [12]
SENEGIN IV [9, 13]
Z-SENEGASAPONIN a [7, 8]
Z-SENEGASAPONIN b [7, 8]
Z-SENEGASAPONIN c [9]
Z-SENEGIN II [9]
Z-SENEGIN III [9]
Z-SENEGIN IV [9]

***Polygala tenuifolia* Willd.**
ONJISAPONIN A [14, 15]
ONJISAPONIN B (SENEGIN III) [14]
ONJISAPONIN C [14, 15]
ONJISAPONIN E [14]
ONJISAPONIN G [15]
POLYGALASAPONIN XXXI (ONJISAPONIN F) [12, 15]

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Family *Portulacaceae*

***Talinum tenuissimum* Dinter**
MOMORDIN IIc (QUINOSIDE D) [1]

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Family *Primulaceae*

***Anagallis arvensis* L.**
ANAGALLOSAPONIN I [1]
ANAGALLOSAPONIN II [1]
ANAGALLOSAPONIN III [1]
ANAGALLOSAPONIN IV [1]
ANAGALLOSAPONIN V [1]
ANAGALLOSIDE A [1, 2]
ANAGALLOSIDE B [1, 2]
ANAGALLOSIDE C [1, 2]
DESGLUCOANAGALLOSIDE A [1, 2]
DESGLYCOANAGALLOSIDE B [1, 2]
METHYLANAGALLOSAPONIN I [1]

***Androsace septentrionalis* L.**
ANDROSEPTOSIDE C [3]
ANDROSEPTOSIDE C_1 [4]
HEDEROSIDE A_2 (ANDROSEPTOSIDE A, GLEDITSHIOSIDE A, VITALBOSIDE A) [3]

***Naumburgia thyrsiflora* Rchb.**
SAPONIN A [5]
SAPONIN B [6]

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Family *Ranunculaceae*

***Anemone anhuiensis* Y.K.Yang, N.Wang, and W.C.Ye**
ANHUIENOSIDE C [1]
ANHUIENOSIDE D [1]
ANHUIENOSIDE E [1]
ANHUIENOSIDE F [1]
CUSSONOSIDE B [1]
FLACCIDOSIDE II [1, 2]
FLACCIDOSIDE III [1, 3]

***Anemone hupensis* Hort. Ex Boynton**
CLEMASTANOSIDE B [4]
HUZHANGOSIDE B [4]

***Anemone raddeana* Regel**
RADDEANOSIDE R_8 [5]

***Anemone rivularis* Buch.-Ham. ex DC.**
CLEMASTANOSIDE B [6]

CLEMATOSIDE S [6]
HUZHANGOSIDE B [6]
HUZHANGOSIDE C [6]
HUZHANGOSIDE D [6]

***Caltha palustris* L.**
HEDEROSIDE C (CAULOSIDE B, SAPINDOSIDE A, DIPSACOSIDE A, GLYCOSIDE L-E_1, SAPONIN K6, SAPONIN P_D) [9]

***Caltha polypetala* Hochst.**
AKEBOSIDE Std (CAULOSIDE C_1, CALTOSIDE D, CAULOSAPONIN B, TAUROSIDE D_2, AKEBIA-SAPONIN C) [7]
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [7]
CAULOSIDE D (GLYCOSIDE G, KIZUTASAPONIN 10) [8]
CAULOSIDE G (GLYCOSIDE M) [8]
GLYCOSIDE A [7]
GLYCOSIDE E [7]
GLYCOSIDE F [7]

***Caltha silvestris* Vorosch.**
AKEBOSIDE Std (CAULOSIDE C_1, CALTOSIDE D, CAULOSAPONIN B, TAUROSIDE D_2, AKEBIA-SAPONIN C) [10]

***Clematis chinensis* Osb.**
SAPONIN V [11]

***Clematis grata* Wall.**
HEDEROSIDE A_2 (ANDROSEPTOSIDE A, GLEDITSHIOSIDE A, VITALBOSIDE A) [12]
CLEMATOSIDE S [12]

***Clematis* manschurica Rupr.**
CLEMATOSIDE A_1 [13]
CLEMATOSIDE B [14, 15]
CLEMATOSIDE C [16, 17]

***Clematis songarica* Bunge**
SONGOROSIDE B (SAPONIN B) [18, 19]

***Clematis stans* Siebold & Zucc.**
CLEMASTANOSIDE A [20]
CLEMASTANOSIDE B [20]
CLEMASTANOSIDE C [20]
CLEMASTANOSIDE D [20]
CLEMASTANOSIDE E [20]
CLEMASTANOSIDE F [20]
CLEMASTANOSIDE G [20]
ELEUTHEROSIDE M (HEDERASAPONIN B, HEDERACOLCHISIDE C, GLYCOSIDE F_1) [20]
HEDEROSIDE H (HEDERASAPONIN C, KIZUTASAPONIN K_{12}, AKEBOSIDE ST_H, KALOPANAX SAPONIN B, PERICARPSAPONIN P_k) [20]
HUZHANGOSIDE B [20]
HUZHANGOSIDE C [20]
HUZHANGOSIDE D [20]

***Clematis terniflora* DC.**
CLEMATERNOSIDE A [21]
CLEMATERNOSIDE B [21]
CLEMATERNOSIDE C [21]
CLEMATERNOSIDE D [21]
CLEMATERNOSIDE E [21]
CLEMATERNOSIDE F [21]
CLEMATERNOSIDE G [21]
CLEMATERNOSIDE H [21]
CLEMATERNOSIDE I [21]
CLEMATERNOSIDE J [21]
CLEMATERNOSIDE K [21]

***Clematis tibetana* Kuntz**
CAULOSIDE D (GLYCOSIDE G, KIZUTASAPONIN 10) [22]
CLEMATIBETOSIDE A [22]
CLEMATIBETOSIDE B [22]
CLEMATIBETOSIDE C [22]
CLEMATOSIDE S [22]
ELEUTHEROSIDE M (HEDERASAPONIN B, HEDERACOLCHISIDE C, GLYCOSIDE F_1) [22]
HEDEROSIDE H (HEDERASAPONIN C, KIZUTASAPONIN K_{12}, AKEBOSIDE ST_H, KALOPANAX SAPONIN B, PERICARPSAPONIN P_k) [22]
HUZHANGOSIDE D [22]
KALOPANAX SAPONIN G (CUSSONOSIDE A, NH-SAPONIN H) [22]

***Clematis vitalba* L.**
HEDEROSIDE A_2 (ANDROSEPTOSIDE A, GLEDITSHIOSIDE A, VITALBOSIDE A) [23]
HEDEROSIDE B [23]

VITALBOSIDE D [24]
VITALBOSIDE F [25]
VITALBOSIDE G [26]
VITALBOSIDE H [27]
VITALBOSIDE J [27]

***Pulsatilla campanella* Fisch. ex Regel**
AKEBOSIDE Std (CAULOSIDE C_1, CALTOSIDE D, CAULOSAPONIN B, TAUROSIDE D_2, AKEBIA-SAPONIN C) [28]
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [28]
CAULOSIDE D (GLYCOSIDE G, KIZUTASAPONIN 10) [28]
CAULOSIDE G (GLYCOSIDE M) [28]
KALOPANAX SAPONIN G (CUSSONOSIDE A, NH-SAPONIN H) [28]
LEONTOSIDE B [28]
LEONTOSIDE D [28]
PULSATILOSIDE A [28]
PULSATILOSIDE B [28]

***Pulsatilla cernua* Spreng.**
HEDERACOLCHISIDE F (SAPONIN III) [29]
HEDEROSIDE H (HEDERASAPONIN C, KIZUTASAPONIN K_{12}, AKEBOSIDE ST_H, KALOPANAX SAPONIN B, PERICARPSAPONIN P_k) [29]
PULSATILLA-SAPONIN D [29]

***Pulsatilla chinensis* (Bunge) Regel**
HEDERACOLCHISIDE F (SAPONIN III) [29]

***Pulsatilla davurica* Spreng.**
AKEBOSIDE Std (CAULOSIDE C_1, CALTOSIDE D, CAULOSAPONIN B, TAUROSIDE D_2, AKEBIA-SAPONIN C) [30]
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [30]
CAULOSIDE D (GLYCOSIDE G, KIZUTASAPONIN 10) [30]

***Pulsatilla koreana* (Y.Yabe ex Nakai) T.Mori**
HEDERACOLCHISIDE F (SAPONIN III) [29]

***Thalictrum foetidum* L.**
FOETOSIDE C [31]

***Thalictrum minus* L.**
FATSIASIDE A_1 [32]
GLYCOSIDE IV [32]
GLYCOSIDE V (GUAIACIN B) [32]
GLYCOSIDE L-B_1 [32]
GLYCOSIDE L-E_1 [32]
TALICOSIDE B [33]
TALICOSIDE D [34]

***Thalictrum squarrosum* Stephan ex Willd.**
SQUARROSIDE II [35]
SQUARROSIDE III [35]
SQUARROSIDE IV [35]

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Family *Rubiaceae*

***Randia uliginosa* DC.**
COMPOUND 1 [1]
COMPOUND 2 FROM *RANDIA ULIGINOSA* [1]
COMPOUND 3 FROM *RANDIA ULIGINOSA* [1]

***Xeromphis spinosa* (syn. *R. dumetorum*) (Thunb.) Keay**
SONGOROSIDE A [2]

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Family *Sapindaceae*

***Koelreuteria paniculata* Laxm.**
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [1]

***Lecaniodiscus cupanioides* Planch.**
SAPINDOSIDE B [2]

***Sapindus delavayi* Gaertn.**
GLYCOSIDE 6 [3]
HEDEROSIDE C (CAULOSIDE B, SAPINDOSIDE A, DIPSACOSIDE A, GLYCOSIDE L-E_1, SAPONIN K6, SAPONIN P_D) [3]
HISHOUSHI SAPONIN A [3]
HISHOUSHI SAPONIN Ee [3]
MUKUROZI-SAPONIN E_1 [3]
MUKUROZI-SAPONIN G [3]
MUKUROZI-SAPONIN Y_1 [3]
MUKUROZI-SAPONIN Y_2 [3]
SAPINDOSIDE B [3]
SAPONIN [3]
SAPONIN S-4 [3]
SAPONIN V [3]

***Sapindus emarginatus* Hort.Alger.**
GLYCOSIDE 4 [4]
GLYCOSIDE 6 [4]
GLYCOSIDE 7 [4]
GLYCOSIDE 9 [4]
MUKUROZI-SAPONIN E_1 [4]
SAPONIN V [4]

***Sapindus mukorossi* Gaertn.**
HEDEROSIDE C (CAULOSIDE B, SAPINDOSIDE A, DIPSACOSIDE A, GLYCOSIDE L-E_1, SAPONIN K6, SAPONIN P_D) [5]
MUKUROZI-SAPONIN E_1 [6]
MUKUROZI-SAPONIN G [6]
MUKUROZI-SAPONIN X (COMPOUND 10, TAUROSIDE ST-G_3) [6]
MUKUROZI-SAPONIN Y_1 [6]
MUKUROZI-SAPONIN Y_2 [6]
SAPINDOSIDE B [5, 6]
SAPONIN S-4 [6]

***Sapindus rarak* DC.**
GLYCOSIDE 6 [7]

***Serjania salzmanniana* Seem.**
HEDERACOLCHISIDE A′ [8]
PULSATILLA-SAPONIN D [8]

***Thinouia coriacea* Britton**
GLYCOSIDE L-B_1 [9]
HEDERACOLCHISIDE A′ [9]

***Xanthoceras sorbifolia* Bunge**
BUNKANKASAPONIN A [10]
BUNKANKASAPONIN B [10]
BUNKANKASAPONIN C [10]
BUNKANKASAPONIN D [10]

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Family *Scrophulariaceae*

***Celsia roripifolia* (syn. *Verbascum roripifolia*) Halácsy**
MULLEINSAPONIN III [1]

***Digitalis ciliata* Trautv.**
DIGITOSIDE A [2]
DIGITOSIDE B [2]

***Verbascum sinaiticum* Benth.**
MULLEINSAPONIN III [1]
MULLEINSAPONIN VII [1]

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Family *Theaceae*

***Camellia japonica* L.**
CAMELLIASAPONIN A_1 [1]
CAMELLIASAPONIN A_2 [1]
CAMELLIASAPONIN B_1 [1, 2]
CAMELLIASAPONIN B_2 [1, 2]
CAMELLIASAPONIN C_1 [1, 2]
CAMELLIASAPONIN C_2 [1, 2]
CAMELLIDIN II [3]

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Family *Tiliaceae*

***Corchorus acutangulus* Lam.**
CORCHORUSIN A [1]
CORCHORUSIN B [1]

CORCHORUSIN D [1]
CORCHORUSIN D_2 [2]

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Family *Umbelliferae*

***Astrantia major* L.**
ELEUTHEROSIDE K (TAUROSIDE C, β-HEDERIN, SAPONIN P_b, GLYCOSIDE B_1) [1]

***Bupleurum falcatum* L.**
3-O-ACETYLSAIKOSAPONIN d [2]
6-O-ACETYLSAIKOSAPONIN a [2]
6-O-ACETYLSAIKOSAPONIN b_4 [2]
6-O-ACETYLSAIKOSAPONIN d [2]
6″-0-MALONYLSAIKOSAPONIN a [3]
6″-0-MALONYLSAIKOSAPONIN d [3]
23-O-ACETYLSAIKOSAPONIN a [2]
SAIKOSAPONIN a [4]
SAIKOSAPONIN b_3 [5]
SAIKOSAPONIN b_4 [5]
SAIKOSAPONIN c [4]
SAIKOSAPONIN d [4, 6]
SAIKOSAPONIN e [2]
SAIKOSAPONIN f [2]

***Bupleurum longeradiatum* Turcz.**
CHIKUSAIKOSIDE I [7]
CHIKUSAIKOSIDE II [7]
SAIKOSAPONIN a [7]
SAIKOSAPONIN c [7]
SAIKOSAPONIN d [7]

***Bupleurum marginatum* Wall. ex DC.**
3-OAc-SAIKOSAPONIN a [8]
3-OAc-SAIKOSAPONIN d [8]
6-OAc-SAIKOSAPONIN a [8]
6-OAc-SAIKOSAPONIN d [8]
CHIKUSAIKOSIDE I [8]
CHIKUSAIKOSIDE II [8]
DESGLUCOSAPONIN a [8]
SAIKOSAPONIN 15 [8]
SAIKOSAPONIN 16 [8]
SAIKOSAPONIN 17 [8]
SAIKOSAPONIN 19 [8]
SAIKOSAPONIN a [8]
SAIKOSAPONIN b_3 [8]
SAIKOSAPONIN b_4 [8]
SAIKOSAPONIN c [8]
SAIKOSAPONIN d [8]
SAIKOSAPONIN e [8]

***Bupleurum rockii* H.Wolff.**
2-O-ACETYLSAIKOSAPONIN a [8]
3-O-ACETYLSAIKOSAPONIN a [8]
3-O-ACETYLSAIKOSAPONIN d [8]
6-O-ACETYLSAIKOSAPONIN a [8]
6-O-ACETYLSAIKOSAPONIN d [8]
SAIKOSAPONIN 23 [8]
SAIKOSAPONIN 24 [8]
SAIKOSAPONIN 25 [8]
SAIKOSAPONIN 26 [8]
SAIKOSAPONIN 27 [8]
SAIKOSAPONIN a [8]
SAIKOSAPONIN b_2 [8]
SAIKOSAPONIN c [8]
SAIKOSAPONIN d [8]

***Bupleurum rotundifolium* L.**
ROTUNDIOSIDE A [9]
ROTUNDIOSIDE B [9]
ROTUNDIOSIDE C [9]

***Ladyginia bucharica* Lipsky**
LADYGINOSIDE A [10]
LADYGINOSIDE C [11, 12]
LADYGINOSIDE E [11]

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Family *Valerianaceae*

***Patrinia scabiosaefolia* Fisch.**
CAULOSIDE A (KOELREUTERII-SAPONIN A, TAUROSIDE B) [1]
ELEUTHEROSIDE K (TAUROSIDE C, β-HEDERIN, SAPONIN P_b, GLYCOSIDE B_1) [2]
GLYCOSIDE L-E_1 [2]
HISHOUSHI SAPONIN A [3]
PATRINIA-GLYCOSIDE B-II [2]
SULFAPATRINOSIDE II [4]

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Family *Zygophyllaceae*

***Fagonia arabica* L.**
COMPOUND 4 FROM *FAGONIA ARABICA* [1]
ELATOSIDE E (COMPOUND 3) [1]
ELATOSIDE F [1]
GUAIACIN F (COMPOUND 2) [1]

***Fagonia cretica* L.**
MEDICOSIDE F [2]
SAPONIN 3 FROM *FAGONIA CRETICA* [2]

***Fagonia indica* Burm.f.**
INDICASAPONIN B [3]

***Guaiacum officinale* L.**
GLYCOSIDE V (GUAIACIN B) [4]

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Physico-chemical and Pharmacological Properties of Triterpene Glycosides

S.S. Azimova, (ed.), *Natural Compounds – Triterpene Glycosides*,
DOI 10.1007/978-1-4614-0541-2,

Glycosides of Aglycones of Oleanene Type

Glycosides of Oleanolic Acid

Achyranthoside C

See Figure Achyranthoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Achyranthes fauriei* [1]

$C_{50}H_{78}O_{20}$: 998.508

$[\alpha]_D$ + 13.7° (MeOH) [1]

FAB-MS *m/z*: 1021 $[M + Na]^+$ [1]

^{13}C NMR (C_5D_5N) (Me esters): [1]

Table 1

C-1	39.1	C-16	24.3	GlcUA-1	106.8	Glc-1	95.7
2	27.0	17	47.4	2	74.9	2	74.2
3	89.8	18	42.2	3	84.9	3	78.9
4	39.9	19	46.6	4	72.2	4	71.1
5	56.1	20	31.2	5	77.1	5	79.3
6	19.0	21	34.5	6	170.0	6	62.2
7	33.6	22	33.0	OMe	51.9		
8	40.3	23	28.6	1″	172.0		
9	48.4	24	17.4	OMe	52.0		
10	37.4	25	16.0	2″	74.1		
11	23.9	26	18.0	3″	104.8		
12	122.8	27	26.6	4″	64.5		
13	144.0	28	176.2	5″	170.9		
14	42.5	29	33.6	OMe	52.4		
15	28.7	30	24.1				

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Achyranthoside D

See Figure Achyranthoside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Achyranthes fauriei* [1]

$C_{56}H_{88}O_{25}$: 1160.561

$[\alpha]_D$ + 5.0° (MeOH) [1]

FAB-MS *m/z*: 1183 $[M + Na]^+$ [1]

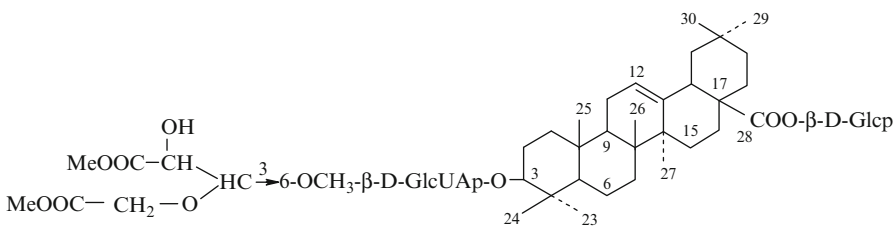
^{13}C NMR (C_5D_5N) (Me esters): [1]

Table 1

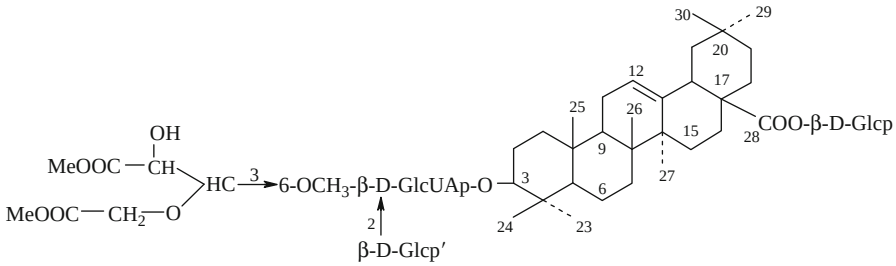
C-1	39.1	C-16	24.3	GlcUA-1	104.9	Glc″-1	103.5
2	27.0	17	47.4	2	78.3	2	76.2
3	89.5	18	42.2	3	82.6	3	78.2
4	39.9	19	46.6	4	72.3	4	72.5
5	56.1	20	31.2	5	76.5	5	78.1
6	19.0	21	34.5	6	170.0	6	63.1
7	33.6	22	33.0	OMe	51.8	Glc-1	95.7
8	40.3	23	28.6	1″	172.3	2	74.2
9	48.4	24	17.4	OMe	52.0	3	78.9
10	37.4	25	16.0	2″	72.5	4	71.1
11	23.9	26	18.0	3″	104.1	5	79.3
12	122.8	27	26.6	4″	64.4	6	62.2
13	144.0	28	176.4	5″	171.0		
14	42.5	29	33.6	OMe	51.3		
15	28.7	30	24.1				

References

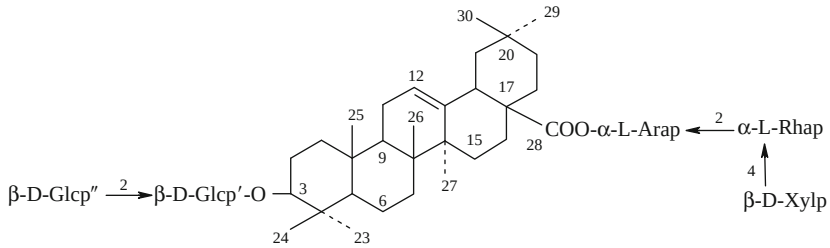
1. Y. Ida, Y. Satoh, M. Katsumata, M. Nagasao, J. Shoji, Chem. Pharm. Bull. **43**(5), 896 (1995)



Achyranthoside C



Achyranthoside D



Acutoside B

Acutoside B

CAS Registry Number: 135545-77-6
See Figure Acutoside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Luffa acutangula* [1]

$C_{58}H_{94}O_{25}$: 1190.608

Mp: 225–250°C [1]

$[\alpha]_D^{24}$ − 18.3° (c 1.0, 80% MeOH) [1]

FAB-MS *m/z*: negative 1189; positive 1213.5980 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.40 ca (H_2-1), 1.80, 2.19 ca (H_2-2), 3.27 ca (H-3), 0.73 (d, J = 11, H-5), 1.50 ca (H_2-6), 1.60 ca (H-9), 1.87 ca (H-11), 5.45 (t, J = 4, H-12), 3.27 ca (H-18), 1.23, 1.80 ca (H-19), 1.17, 1.35 ca (H-21), 1.29 (s, CH_3-23), 1.10 (s, CH_3-24), 0.84 (s, CH_3-25), 1.06 (s, CH_3-26), 1.27 (s, CH_3-27), 0.93 (s, CH_3-29), 0.99 (s, CH_3-30)

β-D-Glcp′: 4.90 (d, J = 8, H-1), 4.20 (dd, J = 8, 9, H-2), 4.30 (t, J = 9, H-3), 4.29 (t, J = 9, H-4), 3.9 (m, H-5), 4.33 (dd, J = 6, 12, H-6), 4.52 (dd, J = 3, 12, H-6)

β-D-Glcp″: 5.35 (d, J = 8, H-1), 4.09 (dd, J = 8, 9, H-2), 4.21 (t, J = 9, H-3), 4.13 (t, J = 9, H-4), 3.9 (m, H-5), 4.43 (dd, J = 4, 12, H-6), 4.47 (dd, J = 3, 12, H-6)

α-L-Arap: 6.45 (d, J = 3, H-1), 4.55 (dd, J = 3, 5, H-2), 3.90, 4.50 ca (H_2-5)

α-L-Rhap: 5.78 (s, H-1), 4.57 ca (H-2), 4.35 ca (H-4), 4.38 ca (H-5), 1.78 (d, J = 6, CH_3-6)

β-D-Xylp: 5.10 (d, J = 7, H-1), 4.03 ca (H-2), 3.50 (t, J = 11, H-5), 4.21 ca (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.2	Glc′-1	105.0	Ara-1	93.5
2	26.6	17	47.3	2	83.5	2	75.1
3	89.0	18	41.7	3	78.3	5	63.1
4	39.5	19	46.3	4	71.7	Rha-1	101.0
5	55.8	20	30.9	5	78.1	4	84.3
6	18.5	21	34.1	6	62.9	5	68.5
7	33.2	22	33.2	Glc″-1	106.0	6	18.3
8	39.9	23	28.2	2	77.0	Xyl-1	107.2
9	48.0	24	16.8	3	77.9	5	67.4

(*continued*)

Table 1 (continued)

10	36.9	25	15.5	4	71.6
11	23.8	26	17.4	5	77.9
12	122.9	27	26.0	6	62.8
13	144.2	28	176.2		
14	42.1	29	33.1		
15	28.3	30	23.7		

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Hanazono, H. Okabe, Chem. Pharm. Bull. **39**(3), 599 (1991)

Acutoside D

CAS Registry Number: 135575-16-5

See Figure Acutoside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Luffa acutangula* [1]

$C_{63}H_{102}O_{29}$: 1322.650

Mp: 260–265°C [1]

$[\alpha]_D^{24}$ −21.4° (c 1.0, 80% MeOH) [1]

FAB-MS *m/z*: negative 1321, positive 1345.6400 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.40 ca (H_2-1), 1.80, 2.19 ca (H_2-2), 3.27 ca (H-3), 0.73 (d, 11, H-5), 1.50 ca (H_2-6), 1.60 ca (H-9), 1.87 ca (H_2-11), 5.45 (t, 4, H-12), 3.27 ca (H-18), 1.23, 1.80 ca (H_2-19), 1.17, 1.35 ca (H_2-21), 1.29 (s, CH_3-23), 1.10 (s, CH_3-24), 0.84 (s, CH_3-25), 1.06 (s, CH_3-26), 1.27 (s, CH_3-27), 0.93 (s, CH_3-29), 0.99 (s, CH_3-30)

β-D-Glcp′: 4.90 (d, J = 8, H-1), 4.20 (dd, J = 8, 9, H-2), 4.30 (t, J = 9, H-3), 4.29 (t, J = 9, H-4), 3.9 (m, H-5), 4.33 (dd, J = 6, 12, H-6), 4.52 (dd, J = 3, 12, H-6)

β-D-Glcp″: 5.35 (d, J = 8, H-1), 4.09 (dd, J = 8, 9, H-2), 4.21 (t, J = 9, H-3), 4.13 (t, J = 9, H-4), 3.9 (m, H-5), 4.43 (dd, J = 4, 12, H-6), 4.47 (dd, J = 3, 12, H-6)

α-L-Arap: 6.48 (brs, H-1), 4.53 ca (H-2), 3.90, 4.50 ca (H_2-5)

α-L-Rhap: 5.71 (d, J = 1, H-1), 4.51 ca (H-2), 4.35 ca (H-3), 4.32 ca (H-5), 1.74 (d, J = 5, H-6)

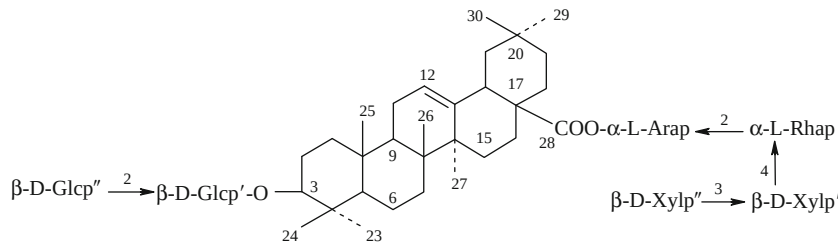
β-D-Xylp′: 5.13 (d, J = 7, H-1), 4.02 ca (H-2), 4.03 ca (H-3), 3.45 ca (H-5), 4.20 ca (H-5)

β-D-Xylp″: 5.20 (d, J = 8, H-1), 4.02 (H-2), 3.66 (t, J = 11, H-5), 4.30 ca (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.2	Glc′-1	105.0	Ara-1	93.3
2	26.6	17	47.3	2	83.5	2	75.2
3	89.0	18	41.7	3	78.3	5	62.8
4	39.5	19	46.3	4	71.7	Rha-1	100.9
5	55.8	20	30.9	5	78.1	4	83.8
6	18.5	21	34.1	6	62.9	5	68.4
7	33.2	22	33.2	Glc″-1	106.0	6	18.3
8	39.9	23	28.2	2	77.0	Xyl′-1	106.4
9	48.0	24	16.8	3	77.9	3	87.0
10	36.9	25	15.5	4	71.6	5	66.8
11	23.8	26	17.4	5	77.9	Xyl″-1	105.9
12	122.9	27	26.0	6	62.8	5	67.2
13	144.2	28	176.2				
14	42.1	29	33.1				
15	28.3	30	23.7				



Acutoside D

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Hanazono, H. Okabe, Chem. Pharm. Bull. **39**(3), 599 (1991)

Acutoside E

CAS Registry Number: 135575-17-6
See Figure Acutoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Luffa acutangula* [1]

$C_{63}H_{102}O_{29}$: 1322.650

Mp: 246–251°C [1]

$[\alpha]_D^{24}$ −14.2° (c 1.0, 80% MeOH) [1]

FAB-MS *m/z*: negative 1321; positive 1345, 6390 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.85, 1.40 ca (H_2-1), 1.80, 2.19 ca (H_2-2), 3.27 ca (H-3), 0.73 (d, 11, H-5), 1.50 ca (H_2-6), 1.60 ca (H-9), 1.87 ca (H_2-11), 5.45 (t, 4, H-12), 3.27 ca (H-18), 1.23, 1.80 ca (H_2-19), 1.17, 1.35 ca (H_2-21), 1.29 (CH_3-23), 1.10 (s, CH_3-24), 0.84 (s, CH_3-25), 1.06 (s, CH_3-26), 1.27 (s, CH_3-27), 0.93 (s, CH_3-29), 0.99 (s, CH_3-30)

β-D-Glcp′: 4.90 (d, 8, H-1), 4.20 (dd, 8, 9, H-2), 4.30 (t, 9, H-3), 4.29 (t, 9, H-4), 3.9 (m, H-5), 4.33 (dd, 6, 12, H-6), 4.52 (dd, 3, 12, H-6)

β-D-Glcp″: 5.35 (d, 8, H-1), 4.09 (dd, 8, 9, H-2), 4.21 (t, 9, H-3), 4.13 (t, 9, H-4), 3.9 (m, H-5), 4.43 (dd, 4, 12, H-6), 4.47 (dd, 3, 12, H-6)

α-L-Arap′: 6.48 (s, H-1), 4.54 ca (H-2)

α-L-Rhap: 5.73 (s, H-1), 4.54 ca (H-2), 4.35 ca (H-4), 4.40 ca (H-5), 1.74 (d, 5, CH_3-6)

β-D-Xylp: 5.09 (d, 8, H-1), 3.90 ca (H-2), 4.05 ca (H-3), 3.43 (t,11, H-5), 4.20 ca (H-5)

α-L-Arap″: 5.21 (d, 3, H-1), 4.50 ca (H-2), 3.77 (t, 11, H-5), 4.30 ca (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

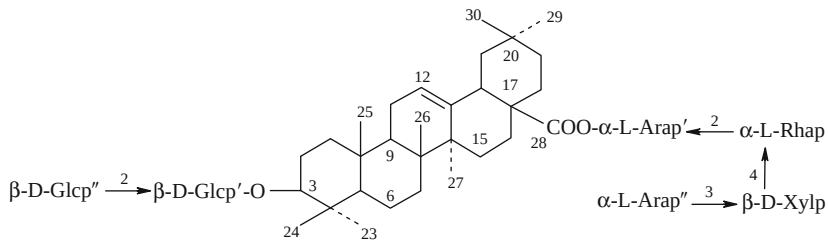
C-1	38.8	C-16	23.2	Glc′-1	105.0	Ara′-1	93.3
2	26.6	17	47.3	2	83.5	2	75.2
3	89.0	18	41.7	3	78.3	5	62.8
4	39.5	19	46.3	4	71.7	Rha-1	100.9
5	55.8	20	30.9	5	78.1	4	83.9
6	18.5	21	34.1	6	62.9	5	68.4
7	33.2	22	33.2	Glc″-1	106.0	6	18.3
8	39.9	23	28.2	2	77.0	Xyl-1	106.4
9	48.0	24	16.8	3	77.9	3	86.3
10	36.9	25	15.5	4	71.6	5	66.8
11	23.8	26	17.4	5	77.9	Ara″-1	105.5
12	122.9	27	26.0	6	62.8	5	67.1
13	144.2	28	176.2				
14	42.1	29	33.1				
15	28.3	30	23.7				

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Hanazono, H. Okabe, Chem. Pharm. Bull. **39**(3), 599 (1991)

Acutoside F

CAS Registry Number: 135545-78-7
See Figure Acutoside F



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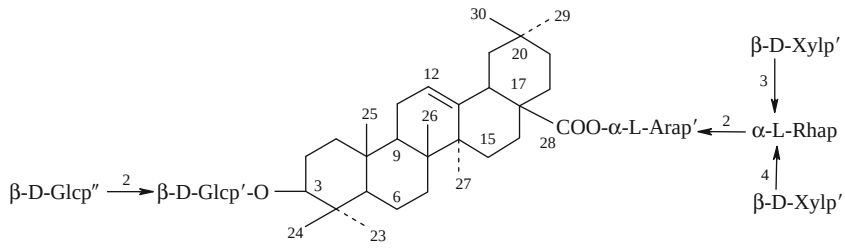


Acutoside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Luffa acutangula* [1]

$C_{63}H_{102}O_{29}$: 1322.650

Mp: 215–223°C [1]

$[\alpha]_D^{24}$ − 25.3° (c 1.0, 80% MeOH) [1]

FAB-MS *m/z*: 1321 (negative), 1345.6410 (positive) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.40 (H_2-1), 1.80,2.19 (H_2-2), 3.27 (H-3), 0.73 (d, J = 11, H-5), 1.50 (H-6), 1.60 (H-9), 1.87 (H-11), 5.45 (t, J = 4, H-12), 3.27 (H-18), 1.23, 1.80 (H_2-19), 1.17, 1.35 (H_2-21), 1.23 (s, CH_3-23), 1.10 (s, CH_3-24), 0.84 (s, CH_3-25), 1.06 (s, CH_3-26), 1.27 (s, CH_3-27), 0.93 (s, CH_3-29), 0.99 (s, CH_3-30)

β-D-Glcp: 4.90 (d, J = 8, H-1), 4.20 (dd, J = 8.9, H-2); 4.30 (t, J = 9, H-3), 4.29 (t, J = 9, H-4), 3.9 (m, H-5), 4.33 (dd, J = 6, 12, H-6), 4.52 (dd, J = 3, 12, H-6)

β-D-Glcp′: 5.35 (d, J = 8, H-1), 4.09 (dd, 8.9, H-2); 4.21 (t, J = 9, H-3), 4.13 (t, J = 9, H-4), 3.9 (m, H-5), 4.43 (dd, J = 4.12, H-6), 4.47 (dd, J = 3.12, H-6)

α-L-Arap: 6.52 (d, J = 2, H-1), 4.55 (H-2), 3.90, 4.50 (H_2-5)

α-L-Rhap: 5.71 (d, J = 1, H-1), 4.77 (dd, J = 1.3, H-2), 4.59 (dd, J = 3.10, H-3), 4.51 (H-4), 4.44 (H-5), 1.79 (d, J = 6, CH_3-6)

β-D-Xylp: 5.14 (d, J = 7, H-1), 3.90 (H-2), 3.40 (t, J = 10, H-5) 4.4 (H-5)

β-D-Xylp′: 5.41 (d, J = 8, H-1), 3.90 (H-2), 3.44 (t, J = 11, H-5) 4.06 (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.2	Glc-1	105.0	Ara-1	93.3
2	26.6	17	47.3	2	83.5	5	62.5
3	89.0	18	41.7	3	78.3	Rha-1	100.6
4	39.5	19	46.3	4	71.7	2	71.5
5	55.8	20	30.9	5	78.1	3	82.3
6	18.5	21	34.1	6	62.9	4	78.3
7	33.2	22	33.2	Glc′-1	106.0	5	68.7
8	39.9	23	28.2	2	77.0	6	18.6
9	48.0	24	16.8	3	77.9	Xyl-1	105.8
10	36.9	25	15.5	4	71.6	5	67.1
11	23.8	26	17.4	5	77.9	Xyl′-1	105.2
12	122.9	27	26.0	6	62.8	5	67.0
13	144.2	28	176.2				
14	42.1	29	33.1				
15	28.3	30	23.7				

(*continued*)

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Hanazono, H. Okabe, Chem. Pharm. Bull. **39**(3), 599 (1991)

Acutoside G

CAS Registry Number: 135545-79-8

See Figure Acutoside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

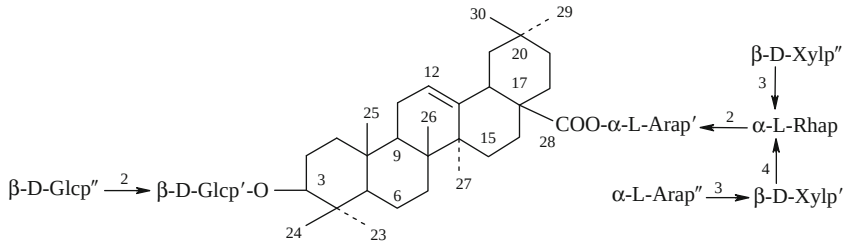
Biological sources: *Luffa acutangula* [1]

$C_{68}H_{110}O_{33}$: 1454.692

Mp: 250–252°C [1]

$[\alpha]_D^{24}$ −22.5° (c 1.0, H_2O) [1]

FAB-MS *m/z*: negative 1453, positive 1477.6810 [1]



Acutoside G

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.85, 1.40 ca (H_2-1), 1.80, 2.19 ca (H_2-2), 3.27 (H-3), 0.73 (d, 11, H-5), 1.50 ca (H_2-6), 1.60 ca (H-9), 1.87 ca (H_2-11), 5.45 (t, 4, H-12), 3.27 ca (H-18), 1.23, 1.80 ca (H_2-19), 1.17, 1.35 ca (H_2-21), 1.29 (s, CH_3-23), 1.10 (s, CH_3-24), 0.84 (s, CH_3-25), 1.06 (s, CH_3-26), 1.27 (s, CH_3-27), 0.93 (s, CH_3-29), 0.99 (s, CH_3-30)

β-D-Glcp′: 4.90 (d, J = 8, H-1), 4.20 (dd, J = 8, 9, H-2), 4.30 (t, J = 9, H-3), 4.29 (t, J = 9, H-4), 3.9 (m, H-5), 4.33 (dd, J = 6, 12, H-6), 4.52 (dd, J = 3, 12, H-6)

β-D-Glcp″: 5.35 (d, J = 8, H-1), 4.09 (dd, J = 8, 9, H-2), 4.21 (t, J = 9, H-3), 4.13 (t, J = 9, H-4), 3.9 (m, H-5), 4.43 (dd, J = 4, 12, H-6), 4.47 (dd, J = 3, 12, H-6)

α-L-Arap′: 6.53 (d, J = 2, H-1), 4.52 ca (H-2), 3.90, 4.50 ca (H_2-5)

α-L-Rhap: 5.66 (brs, H-1), 4.79 (dd, J = 1, 2, H-2), 4.57 ca (H-3), 4.50 ca (H-4), 4.40 ca (H-5), 1.74 (d, J = 6, H-6)

β-D-Xylp′: 5.11 (d, J = 7, H-1), 4.05 ca (H-3), 3.43 (t, J = 12, H-5), 4.08 ca (H-5)

α-L-Xylp″: 5.45 (d, J = 8, H-1), 3.90 ca (H-2), 3.38 (t, J = 12, H-5)

α-L-Arap″: 5.17 (d, J = 7, H-1), 3.51 (dd, J = 1, 12, H-5), 4.20 ca (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.2	Glc′-1	105.0	Ara′-1	93.2
2	26.6	17	47.3	2	83.5	2	75.3
3	89.0	18	41.7	3	78.3	5	62.3
4	39.5	19	46.3	4	71.7	Rha-1	100.7
5	55.8	20	30.9	5	78.1	2	71.4
6	18.5	21	34.1	6	62.9	3	82.3
7	33.2	22	33.2	Glc″-1	106.0	5	68.6
8	39.9	23	28.2	2	77.0	6	18.6
9	48.0	24	16.8	3	77.9	Xyl′-1	105.7
10	36.9	25	15.5	4	71.6	3	86.7
11	23.8	26	17.4	5	77.9	5	67.0
12	122.9	27	26.0	6	62.8	Xyl″-1	104.6
13	144.2	28	176.2			5	66.5
14	42.1	29	33.1			Ara″-1	105.5
15	28.3	30	23.7			5	66.7

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Hanazono, H. Okabe, Chem. Pharm. Bull. **39**(3), 599 (1991)

Acutoside H

See Figure Acutoside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Luffa acutangula* [1]

$C_{68}H_{108}O_{33}$: 1452.677

Mp: 235–238°C (80% MeOH) [1]

$[\alpha]_D^{24}$ −53.1° (c 0.58, 50% MeOH) [1]

FAB-MS *m/z*: 1475.6700 $[M + Na]^+$ [1]

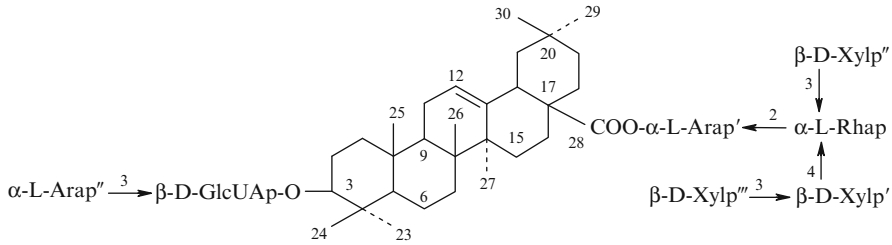
FAB-MS *m/z*: 1451 $[M-H]^-$ [1]

^{1}H NMR (J/Hz) : 0.83, 0.93, 0.97, 1.01, 1.06, 1.28, 1.29 (s, CH_3 × 7), 5.44 (t-like-12)

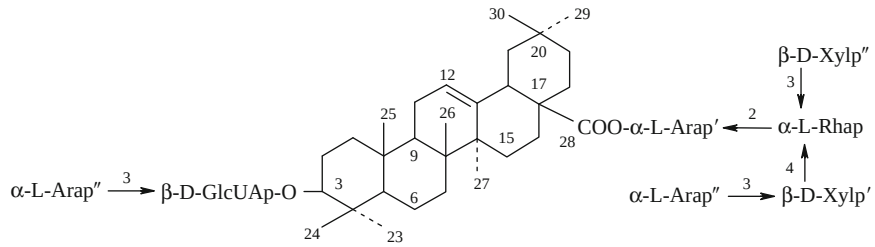
Sugar moiety: 4.91 (d, J = 8, H-1), 5.09 (d, J = 7, H-1), 5.15 (d, J = 7, H-1), 5.28 (d, J = 7, H-1)

5.45 (d, J = 8, H-1), 5.67 (brs, H-1 of Rha), 6.53 (d, J = 2, H-1 of Ara) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]



Acutoside H



Acutoside I

Table 1

C-1	38.6	C-16	23.7	GlcUA-1	104.5
2	26.5	17	47.3	Ara′-1	106.7
3	89.3	18	41.7	Ara″-1	93.2
4	39.5	19	46.3	Rha-1	100.7
5	55.8	20	30.9	Xyl′-1	105.7
6	18.5	21	34.1	Xyl″-1	105.85
7	32.7	22	33.1	Xyl‴-1	105.9
8	39.9	23	28.1		
9	48.0	24	16.9		
10	36.9	25	15.5		
11	23.7	26	17.5		
12	122.8	27	26.0		
13	144.1	28	176.2		
14	42.1	29	33.1		
15	28.1	30	23.7		

References

1. T. Nagao, R. Tanaka, H. Okabe, Chem. Pharm. Bull. **39**(4), 889 (1991)

Acutoside I

See Acutoside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Luffa acutangula* [1]

$C_{68}H_{108}O_{33}$: 1452.677

Mp: 234–237°C [1]

$[\alpha]_D$-28.7° (c 2.0, 50% MeOH) [1]

FAB-MS *m/z*: 1475 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz): 0.83, 0.93, 0.97, 1.01, 1.06, 1.28, 1.29 (s, $CH_3 \times 7$), 5.43 (t-like, H-12)

Sugar moiety: 4.92 (d, J = 8, H-1), 5.11 (d, J = 8, H-1), 5.17 (d, J = 7, H-1), 5.28 (d, J = 7, H-1), 5.44 (d, J = 8, H-1), 5.67 (brs, H-1 of Rha), 6.52 (d, J = 2, H-1 of Ara′)

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.4	GlcUA-1	104.6
2	26.5	17	46.9	Ara″-1	93.2
3	89.3	18	41.8	Ara″-1	106.7
4	39.5	19	46.1	Rha-1	100.7
5	55.7	20	30.8	Xyl′-1	105.6
6	18.4	21	33.9	Xyl″-1	105.9
7	32.8	22	33.0	Ara‴-1	105.5
8	39.8	23	28.0		
9	47.9	24	16.8		
10	36.9	25	15.4		
11	23.6	26	17.1		
12	122.8	27	26.1		
13	144.1	28	177.9		
14	41.9	29	33.1		
15	28.0	30	23.6		

References

1. T. Nagao, R. Tanaka, H. Okabe, Chem. Pharm. Bull. **39**(4), 889 (1991)

Akeboside ST$_J$

CAS Registry Number: 52038-15-0

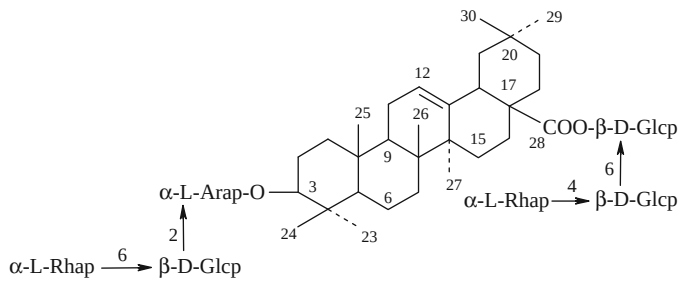
See Figure Akeboside ST$_J$

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Akebia quinata* [1]

$C_{65}H_{106}O_{30}$: 1366.676

$[\alpha]_D^{25}$ −11.1° (c 0.6, H_2O) [1]

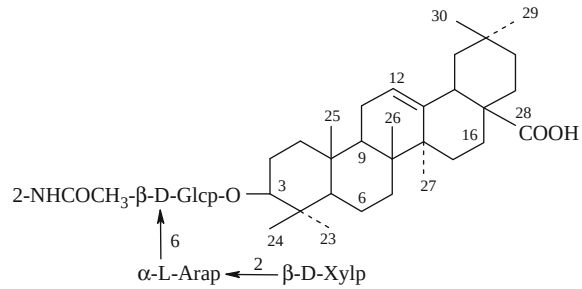


Akeboside ST$_J$

References

1. Y. Kumekawa, H. Itokawa, M. Fujita, Chem. Pharm. Bull. **22**(10), 2294 (1974)

Albizziatrioside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Albizia subdimidiata* [1]

$C_{48}H_{77}NO_{16}$: 923.524

Mp: 272–274°C [1]

$[\alpha]_D^{26}$ + 30° (c 1.0, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3373, 2942, 1658, 1642, 1550 [1]

FAB-MS (positive ion mode) *m/z*: 946.514 (M + Na)$^+$ [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 0.75 (s, CH_3-26), 0.86 (s, CH_3-25), 0.88 (s, CH_3-29), 0.94 (s, CH_3-30), 0.94 (s, CH_3-24), 0.96 (s, CH_3-23), 1.15 (s, CH_3-27), 5.21 (s, H-12)

β-D-GlcpNAc: 4.44 (d, J = 7.5, H-1), 1.95 (s, $NHCOCH_3$)

α-L-Arap: 4.52 (d, J = 5.5, H-1)
β-D-Xylp: 4.44 (d, J = 7.5, H-1) [1]
^{13}C NMR (100 MHz, CD_3OD): [1]

Table 1

C-1	39.99	C-16	24.53	GlcNAc-1	104.85	Xyl-1	106.47
2	27.05	17	47.71	2	57.72	2	75.69
3	90.27	18	43.11	3	76.59	3	77.50
4	39.65	19	47.76	4	72.24	4	71.05
5	56.92	20	31.71	5	75.68	5	67.20
6	19.35	21	34.06	6	69.59		
7	29.05	22	34.10	$NHCOCH_3$	173.47		
8	40.53	23	28.57	$NHCOCH_3$	23.16		
9	49.13	24	15.97	Ara-1	103.32		
10	37.93	25	18.02	2	81.26		
11	24.57	26	17.07	3	73.10		
12	122.99	27	26.56	4	68.49		
13	145.96	28	184.68	5	65.40		
14	42.91	29	33.80				
15	35.24	30	24.22				

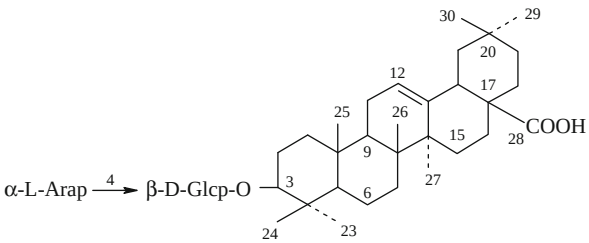
Pharm./Biol.: Albizziatrioside A showed significant cytotoxicity against the A2780 cell line [1]

References

1. M. Abdel-Kader, J. Hoch, J.M. Berger, R. Evans, J.S. Miller, J.H. Wisse, S.W. Mamber, J.M. Dalton, D.G.I. Kingston, J. Nat. Prod. **64**(4), 536 (2001)

Androseptoside C

CAS Registry Number: 77537-95-2



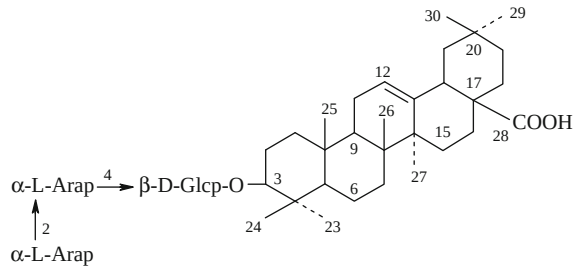
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Androsace septentrionalis* [1]
$C_{41}H_{66}O_{12}$: 750.455
Mp: 175–176°C [1]
$[\alpha]_D^{20}$ −10.5° (c 1.5, MeOH) [1]

References

1. P.K. Kintya, N.M. Pirozhkova, Chem. Nat. Comp. **18**(4), 499 (1982)

Androseptoside C_1

CAS Registry Number: 84882-98-4



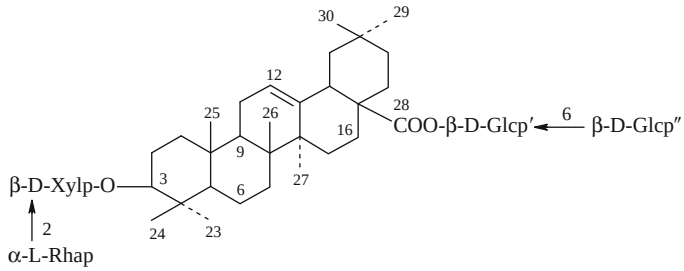
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Androsace septentrionalis* [1]
$C_{46}H_{74}O_{16}$: 882.497
Mp: 208–210°C [1]
$[\alpha]_D^{17}$ −50.0° (c 1.0, MeOH) [1]

References

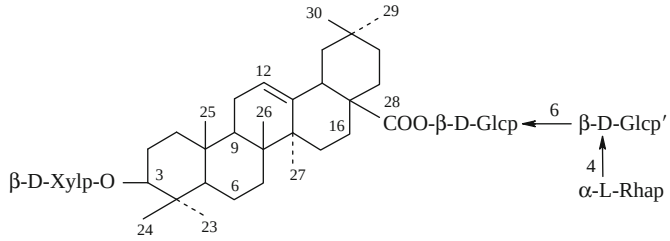
1. P.K. Kintya, N.M. Pirozhkova, Chem. Nat. Comp. **18**(5), 626 (1982)

Anhuienoside C

See Figure Anhuienoside C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid



Anhuienoside C



Achyranthoside D

Biological sources: *Anemone anhuiensis* [1]
$C_{53}H_{86}O_{21}$: 1058.566
Mp: 238–241°C [1]
$[\alpha]_D^{20}$ −8.6°(c 0.42, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 2940, 1734, 1634, 1388, 1076, 581 [1]
FAB-MS *m/z*: 1059 $[M + H]^+$, 1081 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.86, 0.88, 0.88, 1.08, 1.17, 1.24, 1.24 (s, CH_3-25, 29, 30, 24, 26, 23, 27), 3.29 (dd, J = 11.6, 4.0, H-3), 5.37 (brs, H-12) [1]
β-D-Xylp: 4.80 (d, J = 7.6, H-1)
α-L-Rhap: 6.50 (brs, H-1), 1.69 (d, J = 5.6, CH_3-6)
β-D-Glcp: 6.24 (d, J = 8.0, H-1)
β-D-Glcp′: 5.01 (d, J = 7.6, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.4	C-16	24.2	Xyl-1	106.3	Glc-1	95.8
2	28.7	17	46.6	2	79.8	2	74.2
3	88.3	18	42.1	3	78.4	3	78.9
4	39.9	19	47.4	4	71.8	4	71.0
5	56.5	20	31.1	5	67.2	5	78.2
6	19.0	21	34.4	Rha-1	102.2	6	69.6
7	33.5	22	32.9	2	72.6	Glc′-1	105.3
8	40.3	23	28.4	3	72.8	2	75.4
9	48.4	24	17.5	4	74.4	3	78.6
10	37.4	25	16.1	5	70.1	4	71.7
11	23.8	26	17.9	6	19.1	5	78.7
12	123.0	27	26.5			6	62.8
13	144.3	28	176.7				
14	42.5	29	33.5				
15	27.2	30	24.1				

Pharm./Biol.: Rhizomes of this plant are used in folk medicine for the treatment of rheumatism and phlebitis [1]

References

1. W.-C. Ye, Q.-W. Zhang, Sh-X. Zhao, Ch-T. Che, Chem. Pharm. Bull. **49**(5), 632 (2001)

Anhuienoside D

See Figure Anhuienoside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Anemone anhuiensis* [1]
$C_{53}H_{86}O_{21}$: 1058.566
Mp: 251–253°C [1]
$[\alpha]_D^{20}$ −63.6°(c 0.33, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3412, 2941, 1734, 1635, 1386, 1075, 580 [1]
FAB-MS *m/z*: 1059 $[M + H]^+$, 1081 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.87, 0.87, 0.88, 0.98, 1.08, 1.23, 1.28 (s, CH_3-29, 30, 25, 26, 24, 23, 27), 3.33 (dd, J = 11.6, 3.6, H-3), 5.40 (brs, H-12)
β-D-Xylp: 4.81 (d, J = 7.6, H-1)
α-L-Rhap: 5.83 (brs, H-1), 1.68 (d, J = 6.4, CH_3-6)
β-D-Glcp: 6.22 (d, J = 8.0, H-1)
β-D-Glcp′: 4.97 (d, J = 7.6, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.1	C-16	24.2	Xyl-1	107.8	Glc-1	95.8
2	28.6	17	46.5	2	75.7	2	74.0
3	88.8	18	41.9	3	78.8	3	78.9
4	39.9	19	47.3	4	71.5	4	71.0
5	56.1	20	31.1	5	67.4	5	78.2
6	19.5	21	34.3	Rha-1	102.9	6	69.4
7	33.4	22	32.8	2	72.8	Glc′-1	105.0
8	40.2	23	28.5	3	73.0	2	75.6
9	48.4	24	17.3	4	74.2	3	76.7
10	37.4	25	16.0	5	70.6	4	78.4
11	23.7	26	17.9	6	18.8	5	77.4
12	123.0	27	26.4			6	61.5
13	144.2	28	176.6				
14	42.4	29	33.5				
15	27.1	30	24.2				

Pharm./Biol.: Rhizomes of this plant are used in folk medicine for the treatment of rheumatism and phlebitis [1]

References

1. W.-C. Ye, Q.-W. Zhang, Sh-X. Zhao, Ch-T. Che, Chem. Pharm. Bull. **49**(5), 632 (2001)

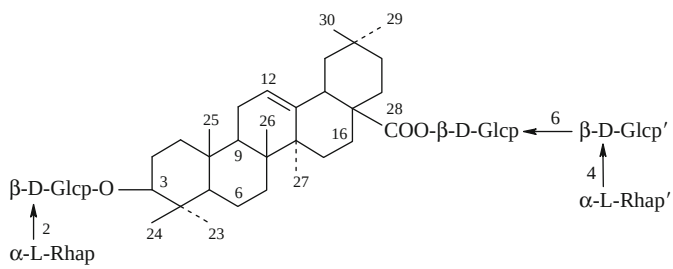
Anhuienoside E

CAS Registry Number: 349654-95-1
See Figure Anhuienoside E
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Anemone anhuiensis* [1]
$C_{60}H_{98}O_{26}$: 1234.634
Mp: 224–226°C [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 2940, 1734, 1636, 1388, 1076, 580 [1]
FAB-MS *m/z*: 1235 $[M + H]^+$, 1257 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.84, 0.86, 0.87, 1.06, 1.18, 1.22, 1.23 (s, CH_3-25, 29, 30, 24, 26, 23, 27), 3.34 (dd, J = 11.6, 4.0, H-3), 5.39 (brs, H-12)
α-L-Rhap: 6.56 (brs, H-1), 1.70 (d, J = 5.2, CH_3-6)
α-L-Rhap′: 5.76 (brs, H-1), 1.68 (d, J = 6.0, CH_3-6)
β-D-Glcp: 4.85 (d, J = 7.8, H-1)
β-D-Glcp′: 6.14 (d, J = 8.0, H-1)
β-D-Glcp″: 4.90 (d, J = 7.6, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.4	C-16	24.1	Rha-1	101.9	Glc-1	105.6	Glc″-1	105.0
2	28.6	17	46.6	2	72.6	2	80.1	2	75.6
3	89.2	18	42.0	3	72.8	3	78.0	3	76.7
4	39.8	19	47.3	4	74.4	4	72.4	4	78.4
5	56.4	20	31.1	5	69.9	5	78.3	5	77.4
6	19.1	21	34.3	6	19.1	6	69.4	6	61.5

(*continued*)



Anhuienoside E

Table 1 (continued)

7	33.5	22	32.8	Rha′-1	102.9	Glc′-1	95.8
8	40.2	23	28.4	2	72.8	2	74.1
9	48.3	24	17.5	3	73.0	3	78.9
10	37.3	25	16.0	4	74.2	4	71.0
11	23.7	26	17.9	5	70.6	5	78.3
12	123.0	27	26.4	6	18.9	6	69.4
13	144.2	28	176.6				
14	42.5	29	33.5				
15	27.1	30	24.0				

Pharm./Biol.: Rhizomes of this plant are used in folk medicine for the treatment of rheumatism and phlebitis [1]

References

1. W.-C. Ye, Q.-W. Zhang, Sh-X. Zhao, Ch-T. Che, Chem. Pharm. Bull. **49**(5), 632 (2001)

Anhuienoside F

CAS Registry Number: 349655-29-4

See Figure Anhuienoside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Anemone anhuiensis* [1]

$C_{65}H_{106}O_{30}$: 1366.676

Mp: 235–236°C [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 2942, 1734, 1635, 1385, 1073, 579 [1]

FAB-MS *m/z*: 1367 $[M + H]^+$, 1389 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.86, 0.88, 0.90, 1.07, 1.19, 1.25, 1.37 (s, CH_3-25, 29, 30, 24, 26, 23, 27), 3.30 (dd, J = 10.6, 4.0, H-3), 5.42 (brs, H-12)

α-L-Rhap: 6.39 (brs, H-1), 1.63 (d, J = 6.0, CH_3-6)

α-L-Rhap′: 5.79 (brs, H-1), 1.68 (d, J = 6.0, CH_3-6)

β-D-Glcp: 5.43 (d, J = 8.0, H-1)

β-D-Xylp: 4.78 (d, J = 5.6, H-1)

β-D-Glcp′: 6.21 (d, J = 8.0, H-1)

β-D-Glcp″: 5.00 (d, J = 7.6, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

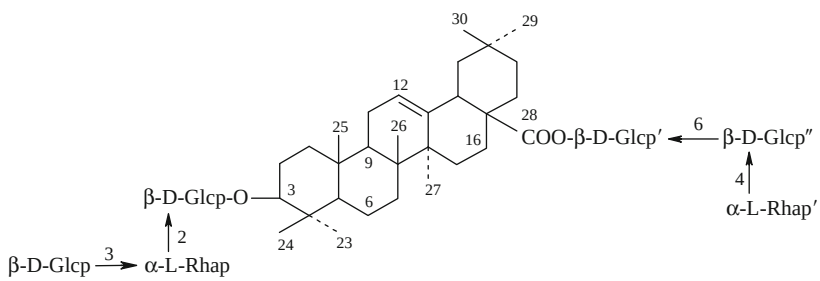
Table 1

C-1	39.5	C-16	24.4	Rha-1	101.9	Glc-1	106.7	Glc″-1	105.0
2	28.8	17	46.8	2	71.8	2	76.1	2	75.7
3	89.2	18	42.2	3	83.3	3	78.8	3	76.9
4	40.2	19	47.6	4	73.1	4	71.8	4	78.8
5	56.6	20	31.3	5	70.3	5	78.9	5	77.4
6	19.1	21	34.5	6	19.3	6	62.9	6	61.7
7	33.6	22	33.0	Rha′-1	103.1	Glc′-1	96.0	Xyl-1	106.6
8	40.4	23	28.8	2	72.9	2	74.3	2	79.6
9	48.6	24	17.8	3	73.1	3	78.9	3	78.4
10	37.6	25	16.3	4	74.3	4	71.0	4	71.9
11	23.9	26	18.1	5	70.8	5	78.4	5	67.3
12	123.2	27	26.7	6	19.1	6	69.4		
13	144.5	28	177.0						
14	42.7	29	33.7						
15	27.4	30	24.3						

Pharm./Biol.: Rhizomes of this plant are used in folk medicine for the treatment of rheumatism and phlebitis [1]

References

1. W.-C. Ye, Q.-W. Zhang, Sh-X. Zhao, Ch-T. Che, Chem. Pharm. Bull. **49**(5), 632 (2001)



Anhuienoside F

Araloside A (Saponin B, Chikusetsusaponin IV)

See Figure Araloside A (Saponin B, Chikusetsusaponin IV)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia mandschurica* [1], *P. japonicus C.A. Meyer* [2], *Panax pseudoginseng* [3]

$C_{47}H_{74}O_{18}$: 926.487

Mp: 195–196°C [1]

$[\alpha]_D^{20}$–26.7° (MeOH) [1]

References

1. N.K. Kochetkov, A.Ya, Khorlin, V.E. Vaskovskii, Izv. Akad. Nauk SSSR, ser. Khim. 1398 (1963)
2. N. Kondo, J. Shoji, N. Naguno, N. Komatsu, Yakugaku Zasshi **89**, 846 (1969) [Chem. Abstr. **71**: 102180s (1969)]
3. N. Kondo, J. Shoji, Chem. Pharm. Bull. **23**(12), 3282 (1975)

Araloside B

CAS Registry Number: 7518-23-2

See Figure Araloside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia mandschurica* [1]

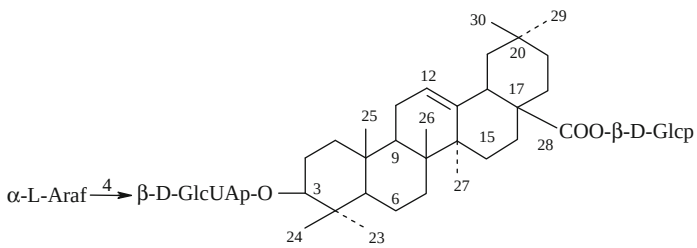
$C_{52}H_{82}O_{22}$: 1058.529

Mp: 195–196°C [1]

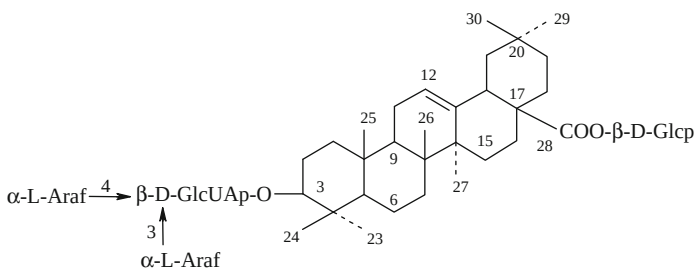
$[\alpha]_D^{20}$−26.7° (MeOH) [1]

References

1. N.K. Kochetkov, A.Ya, Khorlin, V.E. Vaskovskii. Tetrahedron Lett. **16**, 713 (1962)



Araloside A (Saponin B, Chikusetsusaponin IV)



Araloside B

Araloside C

See Figure Araloside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia mandschurica* [1]

$C_{53}H_{84}O_{23}$: 1088.540

$[\alpha]_D^{20}$ −1° [1]

References

1. N.K. Kochetkov, A.Ya, Khorlin, V.E. Vaskovskii, Izv. Akad. Nauk SSSR, ser. Khim. 1398 (1963)

Betavulgaroside I

CAS Registry Number: 158511-55-8

See Figure Betavulgaroside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Beta vulgaris* [1, 2], *Basella rubra* [3]

$C_{47}H_{70}O_{20}$: 954.446

Mp: 215–217°C [1]

$[\alpha]_D^{28}$ + 49.5° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3453, 3429, 1740, 1736, 1078 [1]

FAB-MS (negative ion mode) *m/z*: 953.4375 $(M\text{-}H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 977.4369 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.80, 0.88, 1.07, 1.26, 1.28 (s, CH_3-25, 30, 26, 23, 27), 0.92 (s, CH_3-24, 29), 3.16 (dd-like, H-18), 3.23 (dd-like, H-3), 5.41 (brs, H-12)

β-D-GlcUAp: 5.00 (d, J = 7.3, H-1), 4.23 (m, H-2), 4.85 (m, H-3), 5.38 (dd-like, H-4), 4.72 (m, H-5), 4.80 (m, H_2-2‴), 5.99 (s, H-3″)

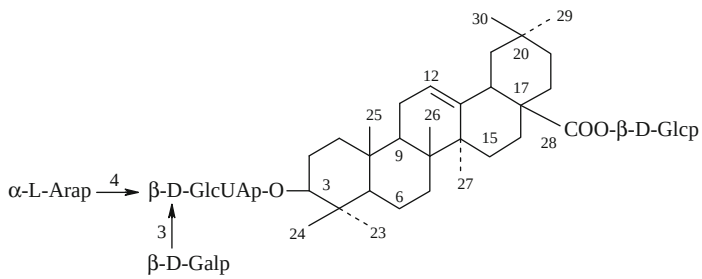
β-D-Glcp: 6.32 (d, J = 7.9, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

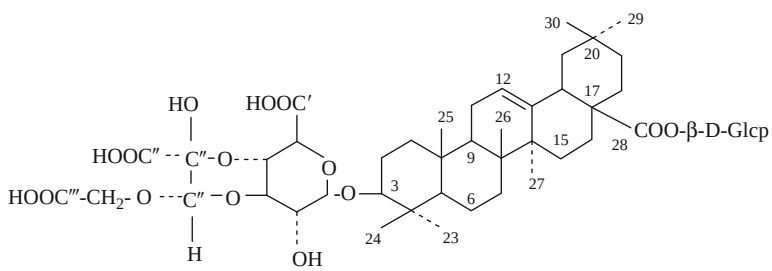
Table 1

C-1	38.4	C-16	23.6	GlcUA′-1	107.4	Glc-1	95.7
2	26.4	17	46.8	2	71.9	2	74.0

(*continued*)



Araloside C



Betavulgaroside I

Table 1 (continued)

3	89.2	18	41.6	3	72.4	3	78.7
4	39.3	19	46.0	4	70.0	4	70.9
5	55.5	20	30.6	5	75.1	5	79.1
6	18.3	21	33.8	6	171.4	6	62.0
7	33.0	22	32.4	C″-1	171.0		
8	39.7	23	27.9	2	93.8		
9	47.8	24	16.7	3	97.9		
10	36.7	25	15.3	C‴-1	172.2		
11	23.4	26	17.3	2	64.7		
12	122.7	27	26.0				
13	144.0	28	176.3				
14	42.0	29	33.0				
15	28.1	30	23.5				

Pharm./Biol.: Betavulgaroside I was found to exhibit hypoglycemic activity in oral glucose tolerance test in rats [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, H. Matsuda, O. Muraoka, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(6), 1212 (1996)
2. M. Yoshikawa, T. Murakami, M. Kadoya, H. Matsuda, J. Yamahara, O. Muraoka, N. Murakami, Heterocycles **41**, 1621 (1995)
3. T. Murakami, K. Hirano, M. Yoshikawa, Chem. Pharm. Bull. **49**, 776 (2001)

Betavulgaroside II

CAS Registry Number: 168010-05-7

See Figure Betavulgaroside II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Beta vulgaris* [1]

$C_{41}H_{60}O_{15}$: 792.393

Mp: 173–174°C [1]

$[\alpha]_D^{28}$ + 70.1° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1741, 1731, 1080 [1]

FAB-MS (negative ion mode) *m/z*: 791.3859 $(M\text{-}H)^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.77, 0.92, 1.01, 1.27, 1.32 (s, CH_3-25, 24, 30, 23, 27), 0.96 (s, CH_3-26, 29), 3.27 (m, H-18), 3.27 (m, H-3), 5.45 (brs, H-12)

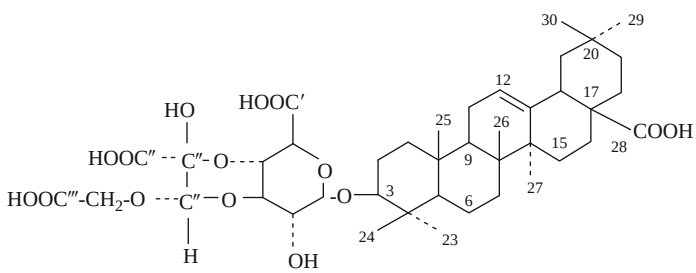
β-D-GlcUAp: 5.00 (d, J = 7.3, H-1), 4.24 (m, H-2), 4.85 (m, H-3), 5.38 (dd-like, H-4), 4.73 (m, H-5), 4.80 (m, H_2-2‴), 5.99 (s, H-3″) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.5	C-16	23.8	GlcUA′-1	107.6
2	26.5	17	46.6	2	72.1
3	89.3	18	42.0	3	72.5
4	39.5	19	46.4	4	70.1
5	55.7	20	31.0	5	75.3
6	18.4	21	34.2	6	171.6
7	33.3	22	33.2	C″-1	171.2
8	39.7	23	28.1	2	94.0
9	47.9	24	16.9	3	98.1
10	36.9	25	15.4	C‴-1	172.3
11	23.8	26	17.3	2	64.9
12	122.5	27	26.2		
13	144.8	28	180.1		
14	42.1	29	33.3		
15	28.3	30	23.8		

Pharm./Biol.: Betavulgaroside II was found to exhibit hypoglycemic activity in oral glucose tolerance test in rats [1]



Betavulgaroside II

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, H. Matsuda, O. Muraoka, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(6), 1212 (1996)

Betavulgaroside III

CAS Registry Number: 168111-48-6
See Figure Betavulgaroside III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Beta vulgaris* [1]

$C_{47}H_{72}O_{20}$: 956.461

Mp: 212–214°C [1]

$[\alpha]_D^{28}$ + 10.8° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3429, 1742, 1736, 1076 [1]

FAB-MS (negative ion mode) *m/z*: 955.4514 $(M\text{-}H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 979 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.82, 0.89, 0.91, 0.96, 1.08 (s, CH_3-25, 30, 29, 24, 26), 1.28 (s, CH_3-23, 27), 3.18 (dd-like, H-18), 3.34 (dd-like, H-3), 5.40 (brs, H-12)

β-D-GlcUAp: 4.99 (d, J = 7.6, H-1), 4.17 (m, H-2), 4.51 (m, H-3), 4.65 (m, H-4), 4.63 (m, H-5), 5.06, 5.35 (ABq, J = 16.5, H_2-2‴), 5.34 (d, J = 3.3, H-2″), 6.30 (d, J = 3.3, H-3″)

β-D-Glcp: 6.32 (d, J = 6.9, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.7	GlcUA′-1	106.7	Glc-1	95.7
2	26.6	17	47.0	2	74.8	2	74.1
3	89.2	18	41.7	3	85.4	3	78.8
4	39.5	19	46.2	4	72.3	4	71.1
5	55.7	20	30.7	5	77.5	5	79.3
6	18.5	21	34.0	6	172.4	6	62.2
7	33.1	22	32.5	C″-1	174.8		
8	39.9	23	28.1	2	74.2		
9	48.0	24	16.9	3	105.4		
10	36.9	25	15.5	C‴-1	173.9		
11	23.4	26	17.4	2	65.1		
12	122.8	27	26.1				
13	144.1	28	176.4				
14	42.1	29	32.1				
15	28.2	30	23.6				

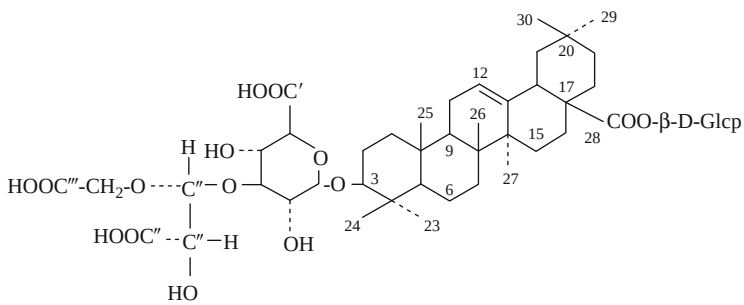
Pharm./Biol.: Betavulgaroside III was found to exhibit hypoglycemic activity in oral glucose tolerance test in rats [1]

References

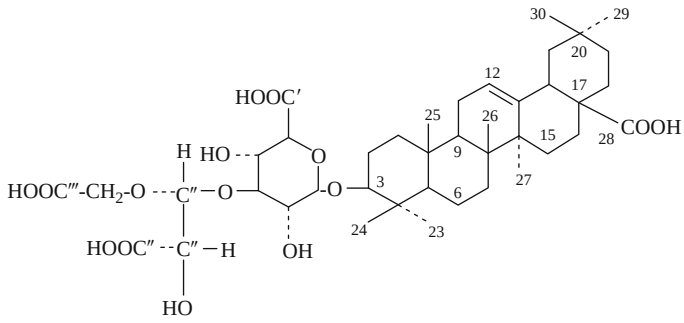
1. M. Yoshikawa, T. Murakami, M. Kadoya, H. Matsuda, O. Muraoka, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(6), 1212 (1996)

Betavulgaroside IV

CAS Registry Number: 168010-06-8
See Figure Betavulgaroside IV



Betavulgaroside III



Betavulgaroside IV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Beta vulgaris* [1]

$C_{41}H_{62}O_{15}$: 794.408

Mp: 186–187°C [1]

$[\alpha]_D^{28}$ + 10.4° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3434, 1740, 1736, 1076 [1]

FAB-MS (negative ion mode) *m/z*: 793.4023 $(M\text{-}H)^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.80, 1.01, 1.28, 1.32 (s, CH_3-25, 30, 23, 27), 0.96 (s, CH_3-24, 26, 29), 3.28 (dd-like, H-18), 3.37 (dd-like, H-3), 5.46 (brs, H-12)

β-D-GlcUAp: 5.00 (d, J = 5.9, H-1), 4.17 (m, H-2), 4.52 (m, H-3), 4.68 (m, H-4), 4.65 (m, H-5), 5.07, 5.38 (ABq, J = 16.7, H_2-2‴), 5.34 (brs, H-2″), 6.29 (d-like, H-3″) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.8	GlcUA′-1	106.8
2	26.6	17	46.7	2	74.8
3	89.2	18	42.0	3	85.5
4	39.5	19	46.4	4	72.4
5	55.7	20	31.0	5	77.6
6	18.4	21	34.2	6	172.4
7	33.1	22	32.1	C″-1	174.6
8	39.7	23	28.2	2	74.2
9	48.0	24	16.9	3	105.4
10	36.9	25	15.4	C‴-1	173.9
11	23.4	26	17.4	2	64.3
12	122.5	27	26.2		
13	144.8	28	180.2		
14	42.2	29	33.1		
15	28.3	30	23.8		

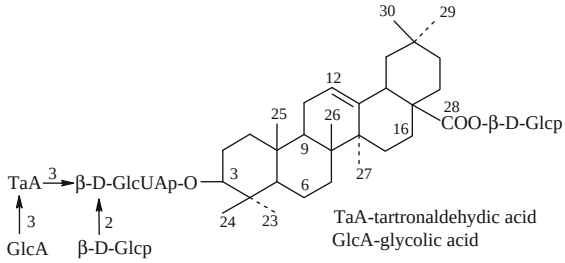
Pharm./Biol.: Betavulgaroside IV was found to exhibit hypoglycemic activity in oral glucose tolerance test in rats [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, H. Matsuda, O. Muraoka, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(6), 1212 (1996)

Betavulgaroside V

CAS Registry Number: 168009-91-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Beta vulgaris* [1]

$C_{53}H_{82}O_{25}$: 1118.514

Mp: 205–206°C [1]

$[\alpha]_D^{30}$ +12.5° (c 0.6, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1740, 1736, 1076 [1]

FAB-MS (negative ion mode) *m/z*: 1117 $(M\text{-}H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1141 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.80, 0.89, 0.91, 1.17, 1.18, 1.23, 1.26 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 3.18 (dd-like, H-18), 3.27 (dd-like, H-3), 5.40 (brs, H-12), 4.95, 5.20 (d, J = 16.2, H_2-2 of glycolic acid), 5.35 (brs, H-2 of tartronaldehydic acid), 6.35 (brs, H-3 of tartronaldehydic acid)
β-D-GlcUAp: 4.99 (d, J = 7.3, H-1), 4.46 (m, H-3), 4.49 (m, H-4)
β-D-Glcp: 6.33 (d, J = 8.4, H-1)
β-D-Glcp′: 5.72 (d, J = 7.3, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.6	GlcUA-1	105.1	Glc-1	95.7
2	26.4	17	47.0	2	78.3	2	74.1
3	89.5	18	41.7	3	83.9	3	78.8
4	39.5	19	46.2	4	72.9	4	71.8
5	55.8	20	30.7	5	77.2	5	79.2
6	18.5	21	34.0	6	172.2	6	62.9
7	33.1	22	32.5	TaA-1	174.5	Glc′-1	103.6
8	39.9	23	28.0	2	73.0	2	76.3
9	48.0	24	16.7	3	105.2	3	78.1
10	36.9	25	15.5	GlcA-1	173.7	4	72.4
11	23.4	26	17.4	2	65.7	5	77.8
12	122.8	27	26.1			6	63.2
13	144.1	28	176.4				
14	42.1	29	33.1				
15	28.2	30	23.4				

Pharm./Biol.: Inhibitory effect on the increase of serum glucose levels in glucose-loaded rats [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1758 (1998)

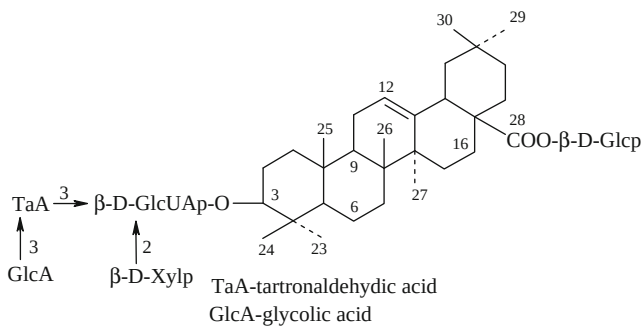
Betavulgaroside IX

CAS Registry Number: 184288-94-6
See Figure Betavulgaroside IX
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Beta vulgaris* [1]
$C_{52}H_{80}O_{24}$: 1088.503
Mp: 213–214°C [1]
$[\alpha]_D^{26}$ + 17.0° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1740, 1736, 1075 [1]
FAB-MS (negative ion mode) *m/z*: 1087 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1111 $(M + Na)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.82, 0.89, 0.91, 1.06, 1.09, 1.24, 1.27 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 3.18 (dd-like, H-18), 3.26 (dd-like, H-3), 4.96, 5.20 (d, J = 16.4, H_2-2 of glycolic acid), 6.37 (d, J = 2.0, H-3 of tartronaldehydic acid) 5.41 (brs, H-12), 5.43 (d, J = 2.0, H-2 of tartronaldehydic acid)
β-D-Glcp: 6.33 (d, J = 8.2, H-1)
β-D-GlcUAp: 4.98 (d, J = 7.9, H-1), 4.47 (m, H-2), 4.49 (m, H-3), 4.71 (m, H-4)
β-D-Xylp: 5.57 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.8	GlcUA-1	105.3	Glc-1	95.8
2	26.6	17	47.0	2	78.4	2	74.2
3	89.7	18	41.8	3	83.8	3	78.9
4	39.6	19	46.3	4	73.0	4	71.2
5	55.9	20	30.8	5	77.3	5	79.3

(*continued*)



Betavulgaroside IX

Table 1 (continued)

6	18.5	21	34.1	6	172.2	6	62.3
7	33.1	22	32.6	TaA-1	174.5	Xyl-1	104.6
8	39.9	23	27.9	2	73.0	2	76.2
9	48.1	24	16.5	3	105.2	3	78.3
10	37.0	25	15.6	GlcA-1	173.6	4	71.4
11	23.5	26	17.5	2	65.8	5	67.3
12	122.9	27	26.1				
13	144.1	28	176.4				
14	42.2	29	33.2				
15	28.3	30	23.7				

Pharm./Biol.: Inhibitory effect on the increase of serum glucose levels in glucose-loaded rats [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1758 (1998)

Bidentatoside I

CAS Registry Number: 330808-27-0

See Figure Bidentatoside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Achyranthes bidentata* [1]

$C_{47}H_{70}O_{20}$: 954.446

$[\alpha]_D^{25}$ + 44.0° (c 0.05, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3419, 2926, 1736, 1707, 1630, 1440, 1090 [1]

FAB-MS (negative): *m/z* 953 $(M-H)^-$ [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 3.22 (H-3), 5.28 (brs, H-12), 2.84 (H-18), 1.07 (s, CH_3-23), 0.86 (s, CH_3-24), 0.96 (s, CH_3-25), 0.79(s, CH_3-26), 1.17 (s, CH_3-27), 0.92 (s, CH_3-29), 0.94 (s, CH_3-30)

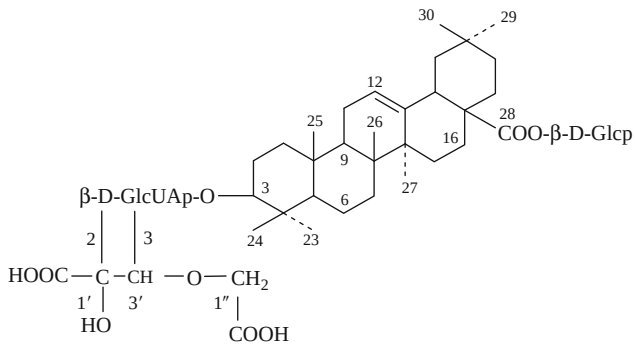
β-D-GlcUAp: 4.51 (d, J = 7.5, H-1), 3.49 (dd, J = 7.5, 2.0, H-2), 4.12 (dd, J = 8.5, 2.0, H-3), 4.03 (H-4), 3.45 (H-5); 4.87 (s, H-3′), 4.20 (d, J = 14.0, H-2′), 3.94 (d, J = 14.0, H-2′)

β-D-Glcp: 5.40 (d, J = 7.5, H-1), 3.41 (H-2), 3.50 (H-3), 3.41 (H-4), 3.45 (m, H-5), 3.86 (dd, J = 12.5, 2.5, H-6), 3.72 (H-6) [1]

^{13}C NMR (150 MHz, CD_3OD): [1]

Table 1

C-1	39.3	C-18	42.5	GlcUA-1	106.3
2	26.6	19	46.5	2	72.2
3	91.6	20	31.0	3	73.1
4	39.5	21	34.0	4	71.0
5	56.6	22	34.2	5	78.0
6	19.1	23	27.8	6	175.9
7	33.1	24	16.4	C-1′	174.5
8	40.0	25	15.6	2′	100.1
9	48.2	26	17.3	3′	96.8
10	37.1	27	25.9	1″	177.1
11	24.3	28	178.7	2″	67.3
12	123.4	29	33.2	Glc-1	95.5
13	144.5	30	24.1	2	73.2
14	42.4			3	77.4
15	28.1			4	70.6
16	24.2			5	78.0
17	47.0			6	61.4



Bidentatoside I

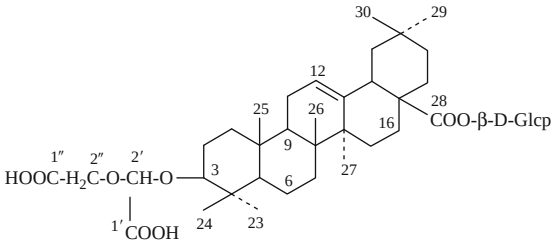
Pharm./Biol.: Bidentatoside I did not show any potentiation of the in vitro cytotoxicity of cisplatin in the HT 29 human colon cancer cell line [1]

References

1. A.-C. Mitaine-Offer, A. Marouf, C. Pizza, T. Cong Khanh, B. Chauffert, M.-A. Lacaille-Dubois, J. Nat. Prod. **64**, 243 (2001)

Bidentatoside II

CAS Registry Number: 386253-62-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Achyranthes bidentata* [1]

$C_{40}H_{62}O_{13}$: 750.419

$[\alpha]_D^{25}$ + 6.0° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 2926, 1741, 1718, 1619, 1422, 1077 [1]

ESI-MS (negative) *m/z*: 749 $[M-H]^-$, 731 $[M-H_2O]^-$, 772 [M + Na-H]$^-$, 793 [M + 2Na-3H]$^-$, 587 [(M-H)-162]$^-$, 631 [(M + 2Na-3 H)-162]$^-$, 455 [(M-H)-162-132)]$^-$ [1]

^{1}H NMR (500 MHz, J/Hz, DMSO-D_6): 1.50 (H-1), 3.00 (H-3), 0.70 (H-5), 1.49 (H-9), 5.17 (brs, H-12), 1.50 (H-16), 2.75 (H-18), 1.05, 1.63 (H_2-19), 0.99 (s, CH_3-23), 0.76 (s, CH_3-24), 0.90 (s, CH_3-25), 0.70 (s, CH_3-26), 1.09 (s, CH_3-27), 0.88 (s, CH_3-29), 0.88 (s, CH_3-30), 5.17 (s, H-2′), 3.6 (d, J = 14.0, H-2″)

β-D-Glcp: 5.25 (d, J = 7.5, H-1), 3.12 (H-2), 3.25 (H-3), 3.15 (H-4), 3.15 (H-5), 3.72 (H-6), 3.40 (H-6) [1]

^{13}C NMR (150 MHz, DMSO-D_6): [1]

Table 1

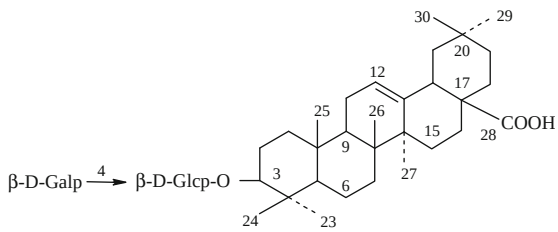
C-1	38.1	C-18	40.5	C-1′	171.0
2	25.4	19	45.1	2′	100.7
3	88.5	20	30.2	1″	173.0
4	38.5	21	33.0	2″	69.5
5	55.0	22	31.5	Glc-1	94.0
6	17.6	23	27.8	2	72.3
7	32.0	24	16.5	3	76.5
8	38.9	25	15.1	4	69.5
9	46.9	26	17.1	5	77.4
10	36.1	27	25.9	6	60.5
11	22.3	28	175.6		
12	122.0	29	32.6		
13	143.4	30	23.5		
14	41.0				
15	27.3				
16	24.1				
17	45.8				

References

1. A.-C. Mitaine-Offer, A. Marouf, B. Hanquet, N. Birlirakis, M.-A. Lacaille-Dubois, Chem. Pharm. Bull. **49**, 1492 (2001)

Calenduloside A

CAS Registry Number: 32725-74-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calendula officinalis* [1]
$C_{42}H_{68}O_{13}$: 780.465
Mp: 260–262°C (dec) [1]
$[\alpha]_D^{20}$ +71° (c 0.1, H_2O) [1]

References

1. L.P. Vecherko, E.P. Zinkevich, N.I. Libizov, A.I. Bankovskii, Chem. Nat. Comp. **5**(1), 51 (1969)
2. L.P. Vecherko, E.P. Zinkevich, N.I. Libizov, A.I. Bankovskii, Chem. Nat. Comp. **7**(1), 19 (1971)

Calenduloside B

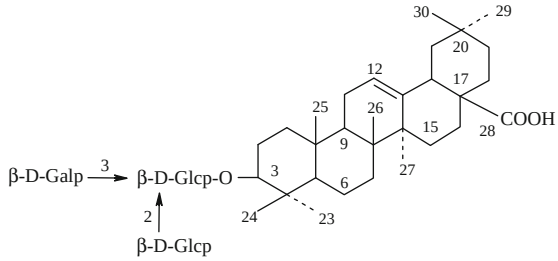
CAS Registry Number: 34381-98-1
See Figure Calenduloside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calendula officinalis* [1]
$C_{48}H_{78}O_{18}$: 942.518
Mp: 232–234°C (MeOH) [1]
$[\alpha]_D^{20}$ + 57.2° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 1740 [1]

References

1. L.P. Vecherko, V.S. Kabanov, E.P. Zinkevich, Chem. Nat. Comp. **7**(4), 516 (1971)

Calenduloside C

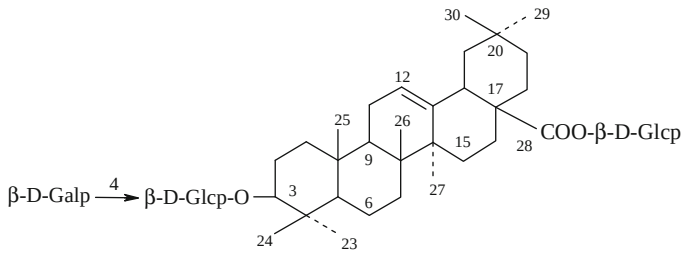
CAS Registry Number: 58231-97-3



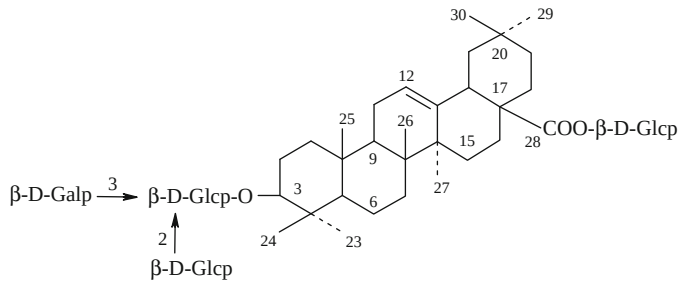
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calendula officinalis* [1]
$C_{48}H_{78}O_{18}$: 942.518
Mp: 226–228°C [1]
$[\alpha]_D^{27}$ +32° (c 0.5, MeOH) [1]

References

1. L.P. Vecherko, A.F. Sviridov, E.P. Zinkevich, L.M. Kogan, Chem. Nat. Comp. **11**(3), 379 (1975)



Calenduloside B



Calenduloside D

Calenduloside D

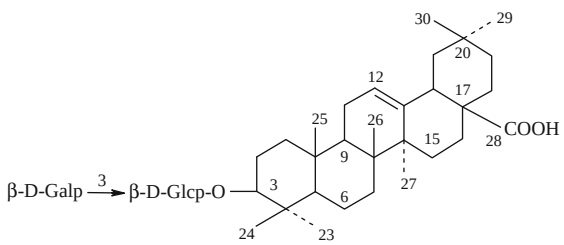
CAS Registry Number: 58231-98-4
See Figure Calenduloside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calendula officinalis* [1]
$C_{54}H_{88}O_{23}$: 1104.571
Mp: 245–247°C [1]
$[\alpha]_D^{27}$ +16° (c 0.5, MeOH) [1]

References

1. L.P. Vecherko, A.F. Sviridov, E.P. Zinkevich, L.M. Kogan, Chem. Nat. Comp. **11**(3), 379 (1975)

Calenduloside G

CAS Registry Number: 26020-15-5



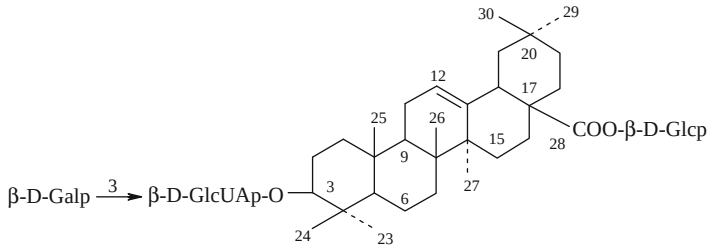
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calendula officinalis* [1]
$C_{42}H_{66}O_{14}$: 794.445
Mp: 205–210°C (dihydrate) [1]
$[\alpha]_D^{20}$ +24.1° (MeOH) [1]

References

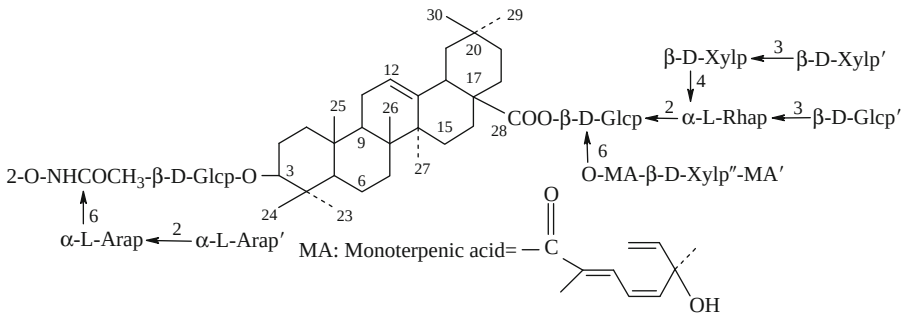
1. L.P. Vecherko, A.F. Sviridov, E.P. Zinkevich, L.M. Kogan, Chem. Nat. Comp. **10**(4), 548 (1974)

Calenduloside H (Saponoside C)

CAS Registry Number: 26020-29-1
See Figure Calenduloside H (Saponoside C)
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calendula officinalis* [1, 2], *C. arvensis* [3]
$C_{48}H_{76}O_{19}$: 956.498
Mp: 198–203°C [1]
$[\alpha]_D^{20}$ + 22.1° (MeOH) [2]
FAB-MS *m/z*: 955 $(M\text{-}H)^-$, 795 $(M\text{-}H\text{-}162)^-$, 631 $(M\text{-}H\text{-}2 \times 162)^-$, 455 $(M\text{-}H\text{-}324\text{-}176)^-$ [3]



Calenduloside H (Saponoside C)



Calliandra Saponin J

^{1}H NMR (250 MHz, J/Hz, CD_3OD): 0.827, 0.860, 0.943, 0.962, 0.974, 1.072, 1.184 (s, CH_3 × 7), 5.28 (m, H-12)
β-D-Galp: 4.41 (d, J = 7.5, H-1)
β-D-GlcUAp: 4.61 (d, J = 7.6, H-1)
β-D-Glcp: 5.4 (d, J = 7.5, H-1) [3]
^{13}C NMR (250 MHz, CD_3OD): [3]

Table 1

C-1	39.9	16	24.1	Gal-1	106.3	Glc-1	95.8
2	26.9	17	48.1	2	72.8	2	74.1
3	90.6	C-18	42.7	3	75.1	3	78.5
4	40.2	19	47.3	4	70.6	4	71.4
5	57.1	20	31.5	5	77.1	5	78.4
6	19.4	21	35.0	6	62.7	6	62.4
7	33.2	22	34.1	GlcUA-1	105.2		
8	40.8	23	28.6	2	74.9		
9	48.1	24	17.0	3	86.2		
10	37.9	25	16.0	4	72.5		
11	24.6	26	17.9	5	77.2		
12	123.9	27	26.3	6	176.4		
13	144.8	28	178.2				
14	43.0	29	33.4				
15	28.9	30	24.0				

References

1. Z. Kasprzyk, Z. Wojciechowski, Phytochemistry **6**, 69 (1967)
2. L.P. Vecherko, A.F. Sviridov, E.P. Zinkevich, L.M. Kogan, Chem. Nat. Comp. **10**(4), 548 (1974)
3. C. Pizza, Z. Zhong-Liang, N. De Tommasi, J. Nat. Prod. **50**, 927 (1987)

Calliandra Saponin J

CAS Registry Number: 176050-21-8
See Figure Calliandra Saponin J
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calliandra anomala* [1]
$C_{101}H_{159}NO_{46}$: 2122.013
$[\alpha]_D^{27}$ −11.1° (c 0.3, MeOH) [1]

Table 1

C-1	38.31	C-21	33.52	3	72.01	Glc′-1	104.31	MA-6	79.15
2	25.92	22	31.42	4	66.80	2	74.56	7	142.01
3	88.74	23	27.63	5	63.73	3	77.31	8	115.06
4	38.70	24	16.44	Ara′-1	105.21	4	70.82	9	11.86
5	55.36	25	15.01	2	74.47	5	77.31	10	23.48
6	18.08	26	16.97	3	76.77	6	61.89	Xyl-1	97.26
7	32.67	27	25.47	4	70.00	Xyl-1	103.79	2	74.66
8	39.46	28	175.89	5	66.31	2	77.82	3	75.40
9	47.54	29	32.56	Glc-1	94.21	3	87.31	4	70.47
10	36.50	30	23.34	2	77.76	4	68.78	5	66.08
11	23.30	GlcNAc-1	103.84	3	76.89	5	65.60	MA′-1	166.91
12	122.33	2	57.04	4	70.67	Xyl′-1	105.02	2	127.42
13	143.46	3	74.62	5	75.05	2	74.38	3	143.05
14	41.66	4	72.15	6	63.89	3	76.73	4	23.11
15	27.56	5	75.30	Rha-1	101.30	4	69.92	5	40.91
16	22.22	6	68.72	2	69.74	5	66.19	6	71.74
17	46.66	$NHCOCH_3$	171.07	3	81.80	MA-1	167.64	7	145.58
18	41.23	$NHCOCH_3$	22.86	4	77.52	2	127.42	8	111.36
19	45.89	Ara-1	101.73	5	68.37	3	142.52	9	12.00
20	30.15	2	79.55	6	18.19	4	23.45	10	23.30
						5	40.36		

FAB-MS *m/z*: 2144 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N:D_2O (9:1)): 0.77 (s, CH_3-29), 0.79 (s, CH_3-25), 0.86 (s, CH_3-30), 0.88 (s, CH_3-24), 0.94 (s, CH_3-26), 1.13 (s, CH_3-23), 1.21 (s, CH_3-27), 5.51 (brs, 12-H), 1.59 (d, J = 6.7, Me-6 of Rha), 2.12 (s, $NHCOCH_3$), 4.81 (d, J = 7.3, H-1 of Ara′), 4.92 (d, J = 7.9, H-1 of GlcNAc), 4.93 (d, J = 5.5, H-1 of Ara), 5.04 (d, J = 7.3, H-1 of Xyl′), 5.17 (d, J = 8.5, H-1 of Glc′), 5.29 (d, J = 6.7, H-1 of Xyl), 5.72 (brs, H-1 of Rha), 5.92 (d, J = 7.3, H-1 of Glc), 4.61, 4.82 (m, H-6 of Glc); Monoterpene glycoside moiety: 1.40 (s, CH_3-10′), 1.42 (s, CH_3-10), 1.81 (s, CH_3-9), 1.85 (s, CH_3-9′), 4.75 (d, J = 7.3, H-1 of Xyl), 5.09 (d, J = 11.0, Ha-8′), 5.22 (d, J = 11.0, Ha-8), 5.27 (d, J = 17.7, Hb-8), 5.43 (d, J = 16.5, Hb-8′), 5.46 (d, J = 7.3, H-2 of Xyl), 5.86 (dd, J = 10.4, J = 17.7, H-7), 6.05 (dd, J = 10.4, J = 17.4, H-7′), 6.80 (t, H-3), 7.01 (t, H-3′) [1]

^{13}C NMR (C_5D_5N:D_2O (9:1)): [1] Table 1

Pharm./Biol.: Aqueous extracts of the branches of this plant are used as an antimalarial and antifebrile agent in Mexico [1]

References

1. Ch. Tani, Y. Ogihara, M. Mutuga, T. Nakamura, T. Takeda, Chem. Pharm. Bull. **44**, 816 (1996)

Calliandra Saponin L

CAS Registry Number: 176050-22-9

See Figure Calliandra Saponin L

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

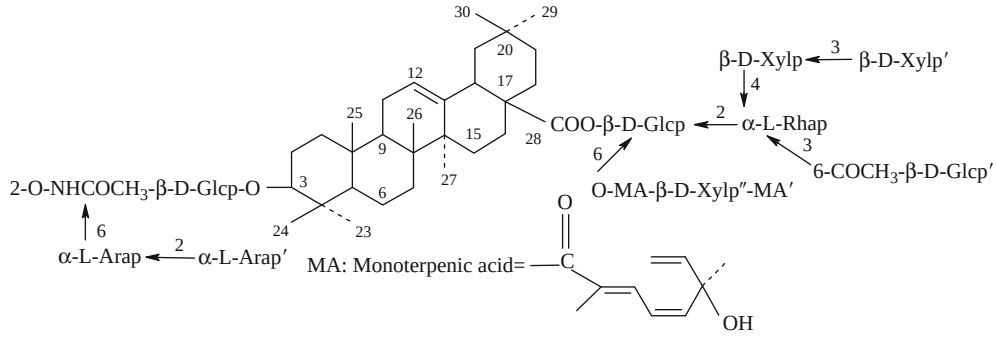
Biological sources: *Calliandra anomala* [1]

$C_{103}H_{161}NO_{47}$: 2164.023

$[\alpha]_D^{27}$ −17.8° (c 1.1, MeOH) [1]

FAB-MS *m/z*: 2186 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N:D_2O (9:1)): 0.82 (s, CH_3-25, 29), 0.90 (s, CH_3-24, 30), 1.00 (s, CH_3-26), 1.18 (s,



Calliandra Saponin L

Table 1

C-1	38.34	C-21	33.52	3	72.01	Glc′-1	104.33	MA-5	40.39
2	25.94	22	31.42	4	66.81	2	74.60	6	79.15
3	88.82	23	27.65	5	63.60	3	77.30	7	142.01
4	38.72	24	16.48	Ara′-1	105.25	4	70.73	8	115.09
5	55.40	25	15.09	2	74.49	5	74.49	9	11.87
6	18.10	26	16.99	3	76.79	6	63.74	10	23.48
7	32.67	27	25.47	4	70.02	Ac-1	170.7	Xyl-1	97.28
8	39.47	28	175.94	5	66.32	2	20.3	2	74.69
9	47.55	29	32.56	Glc-1	94.22	Xyl-1	103.83	3	75.42
10	36.51	30	23.33	2	77.65	2	73.87	4	70.48
11	23.30	GlcNAc-1	103.90	3	76.89	3	87.32	5	66.10
12	122.35	2	57.09	4	70.73	4	68.76	MA′-1	166.91
13	143.52	3	74.64	5	75.08	5	65.62	2	127.49
14	41.67	4	72.10	6	63.80	Xyl′-1	105.02	3	143.05
15	27.56	5	75.30	Rha-1	101.31	2	74.40	4	23.11
16	22.22	6	68.74	2	69.80	3	76.76	5	40.91
17	46.66	$NHCOCH_3$	171.08	3	81.81	4	69.92	6	71.71
18	41.36	$NHCOCH_3$	22.87	4	77.65	5	66.21	7	145.60
19	45.88	Ara-1	101.73	5	68.21	MA-1	167.64	8	111.36
20	30.15	2	79.58	6	18.21	2	127.45	9	12.01
						3	142.51	10	27.55
						4	23.44		

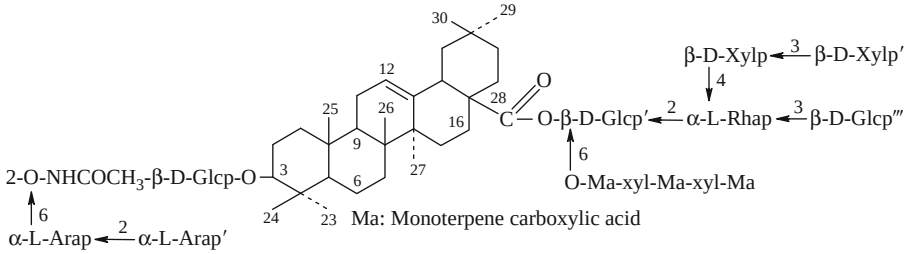
CH_3-23), 1.26 (s, CH_3-27), 5.50 (brs, 12-H), 1.61 (d, J = 6.1, CH_3-6 of Rha), 2.02 (s, Glc′ $COCH_3$), 2.09 (s, $NHCOCH_3$), 4.81 (d, J = 6.7, H-1 of Ara′), 4.91 (d, J = 7.9, H-1 of GlcNAc), 4.94 (d, J = 5.5, H-1 of Ara), 5.01 (d, J = 7.3, H-1 of Xyl′), 5.18 (d, J = 8.5, H-1 of Glc′), 5.28 (d, J = 7.9, H-1 of Xyl), 5.72 (brs, H-1 of Rha), 5.92 (d, J = 7.9, H-1 of Glc); Monoterpene glycoside moiety: 1.40 (s, CH_3-10, 10′), 1.82 (s, CH_3-9), 1.88 (s, CH_3-9′), 4.77 (d, J = 7.9, H-1 of Xyl), 5.10 (d, J = 10.4, Ha-8′), 5.22 (d, J = 10.4, Ha-8), 5.26 (d, J = 17.7, Hb-8), 5.41 (d, J = 17.1, Hb-8′), 5.88 (dd, J = 10.4, 17.7, H-7), 6.05 (dd, J = 10.7, 17.4, H-7), 6.82 (t, H-3), 7.02 (t, H-3′) [1]

^{13}C NMR (C_5D_5N:D_2O (9:1)): [1] Table 1

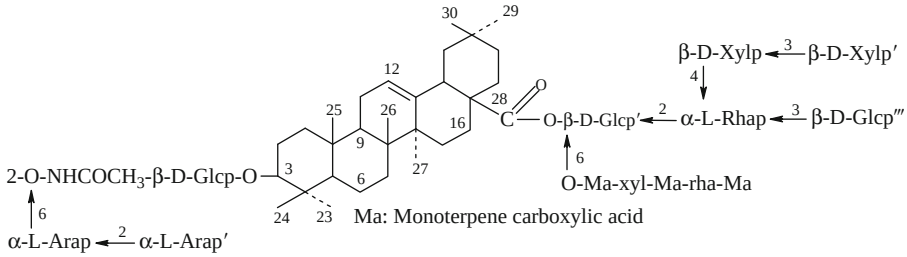
Pharm./Biol.: Aqueous extracts of the branches of this plant are used as an antimalarial and antifebrile agent in Mexico [1]

References

1. Ch. Tani, Y. Ogihara, M. Mutuga, T. Nakamura, T. Takeda, Chem. Pharm. Bull. **44**, 816 (1996)



Calliandra Saponin N



Calliandra Saponin O

Calliandra Saponin N

CAS Registry Number: 207801-01-2
See Figure Calliandra Saponin N
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calliandra anomala* [1]
$C_{116}H_{181}NO_{52}$: 2420.154
$[\alpha]_D^{22} -28.0°$ (c 0.002, MeOH) [1]
FAB-MS *m/z*: 2444 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N:D_2O = 9:1): 0.88 (s, CH_3-29), 0.89 (s, CH_3-25), 0.93 (s, CH_3-30), 0.95 (s, CH_3-24), 1.01 (s, CH_3-26), 1.25 (s, CH_3-23), 1.33 (s, CH_3-27), 1.67 (d, J = 6.1, CH_3-6 of Rha), 2.21 (s, $NHCOCH_3$).
Monoterpene glycoside moiety: 1.51 (s, CH_3-10, CH_3-10″), 1.53 (s, CH_3-10′), 1.93 (s, CH_3-9), 1.99 (s, CH_3-9′, CH_3-9″) [1]
Pharm./Biol.: Aqueous extracts of the branches of this plant are used as an antimalarial and antifebrile agent in Mexico [1]

References

1. Ch. Tani, Y. Ogihara, T. Takeda, Chem. Pharm. Bull. **46**(4), 723 (1998)

Calliandra Saponin O

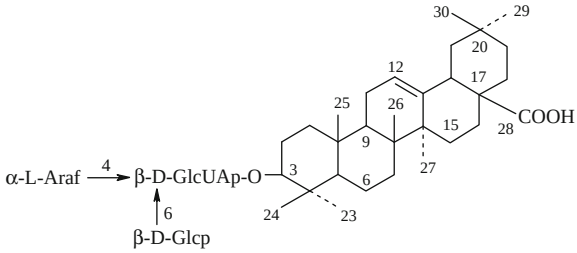
CAS Registry Number: 207801-02-3
See Figure Calliandra Saponin O
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Calliandra anomala* [1]
$C_{117}H_{183}NO_{52}$: 2434.170
$[\alpha]_D^{22}$ −26.0° (c 0.004, MeOH) [1]
FAB-MS *m/z*: 2458 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N:D_2O = 9:1): 0.88 (s, CH_3-29), 0.89 (s, CH_3-25), 0.93 (s, CH_3-30), 0.95 (s, CH_3-24), 1.01 (s, CH_3-26), 1.25 (s, CH_3-23), 1.35 (s, CH_3-27), 1.67 (d, J = 5.8, CH_3-6 of Rha), 2.21 (s, $NHCOCH_3$)
Monoterpene glycoside moiety: 1.50, 1.51 (s, CH_3-10, CH_3-10″), 1.53 (s, CH_3-10′), 1.58 (s, 5.2, CH_3-6 of Qui), 1.93 (s, CH_3-9), 1.98 (s, CH_3-9′, CH_3-9″) [1]
Pharm./Biol.: Aqueous extracts of the branches of this plant are used as an antimalarial and antifebrile agent in Mexico [1]

References

1. Ch. Tani, Y. Ogihara, T. Takeda, Chem. Pharm. Bull. **46**(4), 723 (1998)

Chikusetsusaponin Ib



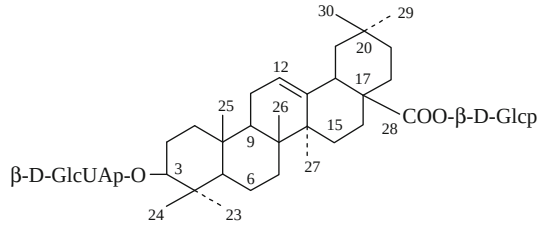
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Panax japonicus* [1]
$C_{47}H_{74}O_{18}$: 926.487
Mp: 177°C ($(CH_3)_2CO$) [1]
$[\alpha]_D^{24}$ −17.98° (c 1.02, MeOH)
IR (KBr) ν_{max} cm^{-1}: 3400, 1730, 1630 [1]

References

1. T.D. Lin, N. Kondo, J. Shoji, Chem. Pharm. Bull. **24**, 253 (1976)

Chikusetsusaponin IVa (Calenduloside F, Momordin IIb)

CAS Registry Number: 51415-02-2 (CALENDULOSIDE F)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Hemsleya chinensis* [1], *Panax japonicus* [2], *Swartzia simplex* [3], *Calendula officinalis* [4, 5], *Chenopodium quinoa* [6], *Boussingaultia baselloides* [7], *Cynara cardunculus* [8], *Aralia elata* [9, 10], *Hemsleya graciliflora* [11], *Aralia cordata* [12], *Momordica cochinchinensis* [13], *Panax* sp [14], *Silphium perfoliatum* [15], *Bassela rubra* [16]
$C_{42}H_{66}O_{14}$: 794.445
Mp: 218-220°C (MeOH-H_2O) [1]
$[\alpha]_D^{17}$ + 6.9° (c 0.97, MeOH) [2]
IR (nujol) ν_{max} cm^{-1}: 3400, 1750 [1]
^{13}C NMR (C_5D_5N): [10]

Table 1

C-1	38.6	C-16	23.3	GlcUA-1	107.0
2	26.5	17	46.9	2	75.3
3	89.0	18	41.6	3	77.9
4	39.4	19	46.1	4	73.2
5	55.7	20	30.7	5	77.5
6	18.4	21	33.9	6	172.7
7	33.0	22	32.4	Glc-1	95.5
8	39.8	23	28.1	2	73.9
9	47.9	24	16.9	3	78.6
10	36.9	25	15.5	4	71.0
11	23.7	26	17.3	5	79.0
12	122.8	27	26.0	6	62.1
13	144.0	28	176.6		
14	42.0	29	33.1		
15	28.1	30	23.6		

Pharm./Biol.: Inhibitory effect on Ethanol absorption [10]

References

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3. C. Borel, M.P. Gupta, K. Hostettmann, Phytochemistry **26**, 2685 (1987)
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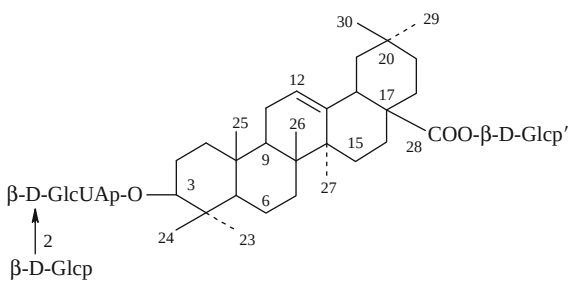
Chikusetsusaponin V

CAS Registry Number: 34367-04-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Panax japonicus* [1], *P. ginseng* [2], *P. pseudogiseng* [3]

$C_{48}H_{76}O_{19}$: 956.498

Mp: 240–241°C [1]

$[\alpha]_D^{22}$ + 2.85° (c 2.01, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3300, 1742, 1725 [1]

^{1}H NMR (J/Hz): β-D-GlcUAp: 4.35 (d, J = 7.0, H-1); β-D-Glcp: 4.65 (d, J = 7.0, H-1); β-D-Glcp′: 5.55 (d, J = 9.0, H-1) [1]

References

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Chikusetsusaponin V Methyl Ester

CAS Registry Number: 34291-22-0

See Figure Chikusetsusaponin V Methyl Ester

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Achyranthes bidentata* [1]

$C_{49}H_{78}O_{19}$: 970.513

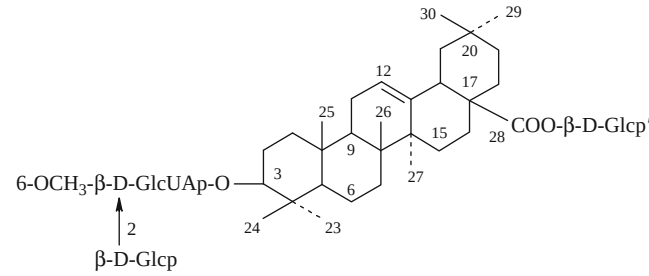
$[\alpha]_D^{25}$ + 6.0° (c 0.07, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3409, 2924, 1736, 1653, 1458, 1072 [1]

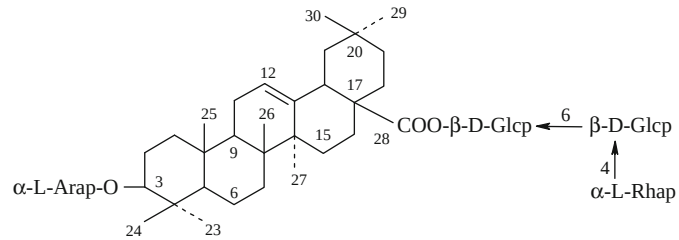
ESI-MS *m/z*: 993 $[M + Na]^+$, 831 $[(M + Na)-162]^+$ [1]

FAB-MS *m/z*: 971$[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, DMSO-D_6): 1.09, 1.35 (H_2-1), 3.00 (H-3), 0.72 (H-5), 1.47 (H-9), 5.16 (brs, H-12), 2.75 (H-18), 1.08, 1.65 (H_2-19), 0.98 (s, CH_3-23), 0.75 (s, CH_3-24), 0.86 (s, CH_3-25), 0.69 (s, CH_3-26), 1.08 (s, CH_3-27), 0.89 (s, CH_3-29), 0.88 (s, CH_3-30)



Chikusetsusaponin V Methyl Ester



Ciwujianoside C_3

β-D-GlcUAp: 4.45 (d, J = 7.3, H-1), 3.41 (H-2,3), 3.37 (H-4), 3.80 (H-5), 3.70 (OCH_3)
β-D-Glcp: 4.48 (d, J = 7.7, H-1), 3.00 (H-2), 3.15 (H-3), 3.05 (H-4), 3.04 (H-5), 3.42, nd (H-6)
β-D-Glcp′: 5.25 (d, J = 7.5, H-1), 3.10 (H-2), 3.22 (H-3), 3.12 (H-4), 3.07 (H-5), 3.38, nd (H-6)
^{13}C NMR (150 MHz, DMSO-D_6): [1]

Table 1

C-1	38.0	C-18	40.6	GlcUA-1	103.5
2	26.5	19	45.4	2	80.5
3	88.3	20	30.2	3	75.6
4	38.8	21	33.1	4	71.3
5	54.9	22	31.5	5	74.7
6	17.5	23	27.3	6	169.3
7	32.1	24	16.0	OCH_3	51.7
8	39.0	25	15.0	Glc-1	103.5
9	47.0	26	16.5	2	75.0
10	36.1	27	25.3	3	77.6
11	22.0	28	175.0	4	69.4
12	121.5	29	32.6	5	76.7
13	143.3	30	23.2	6	60.5
14	41.1			Glc′-1	93.9
15	27.0			2	72.2
16	24.3			3	76.0
17	45.8			4	68.8
				5	76.5
				6	60.8

References

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Ciwujianoside C_3

See Figure Ciwujianoside C_3
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Schefflerop sis angkae* [1], *Acanthopanax senticosus* [2]
$C_{53}H_{86}O_{21}$: 1058.566
$[\alpha]_D^{18}$ −7.68° (c 0.52, MeOH) [2]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.97 (s, $CH_3 \times 3$), 0.98 (s, CH_3), 1.12 (s, CH_3), 1.24 (s, $CH_3 \times 2$), 5.42 (s, H-12)
α-L-Arap: 4.96 (d, J = 7.0, H-1)
β-D-Glcp: 6.28 (d, J = 7.0, H-1)
β-D-Glcp′: 5.02 (d, J = 7.0, H-1)

α-L-Rhap: 5.48 (s, H-1), 1.72 (d, J = 6.0, CH_3-6) [2]
^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	16	23.4	Ara-1	107.0	Glc-1	104.5
2	26.5	17	47.0	2	72.7	2	75.1
3	88.8	18	41.7	3	74.4	3	76.4
4	39.5	19	46.3	4	69.2	4	78.5
5	55.9	20	30.7	5	66.3	5	76.9
6	18.5	21	34.0	Glc′-1	95.5	6	61.4
7	33.1	22	32.5	2	73.8	Rha-1	102.6
8	39.9	23	28.3	3	78.6	2	72.3
9	48.1	24	16.9	4	70.8	3	72.6
10	37.0	25	15.6	5	77.8	4	73.8
11	23.7	26	17.5	6	69.2	5	70.2
12	122.6	27	26.0			6	18.3
13	144.1	28	176.5				
14	42.1	29	33.1				
15	28.3	30	23.7				

References

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2. C.-J. Shao, R. Kasai, J.D. Xu, O. Tanaka, Chem. Pharm. Bull. **36**(2), 601 (1988)

Ciwujianoside C_4

See Figure Ciwujianoside C_4

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

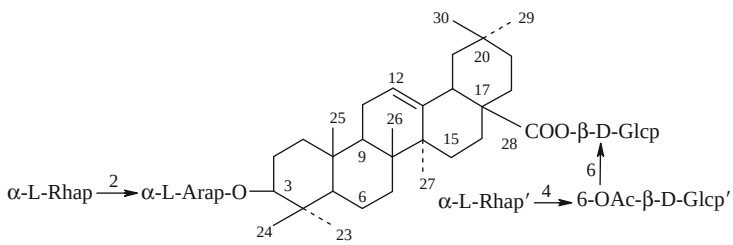
Biological sources: *Acanthopanax senticosus* [1]
$C_{61}H_{98}O_{26}$: 1246.634
$[\alpha]_D^{18}$ −23.67° (c 0.51, MeOH) [1]
^{1}H NMR (J/Hz, C_5D_5N): 5.42 (s, 12-H), 1.08, 1.16, 0.89, 1.08, 1.25, 0.92, 0.89 (s, CH_3-23, 24, 25, 26, 27, 29, 30)
α-L-Arap: 4.92 (d, J = 7.0, H-1); α-L-Rhap: 5.53 (s, H-1), 1.63 (d, J = 6.0, CH_3-6)
β-D-Glcp: 6.22 (d, J = 7.0, H-1); β-D-Glcp′: 5.01 (d, J = 7.0, H-1); 1.94 (s, OAc, H-6)
α-L-Rhap′: 5.82 (s, H-1), 1.70 (d, J = 6.0, CH_3-6) [1]
^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.7	Ara-1	104.6	Glc′-1	104.6
2	26.4	17	47.0	2	75.9	2	75.0
3	88.8	18	41.6	3	73.7	3	76.3
4	39.4	19	46.2	4	68.5	4	79.1
5	55.9	20	30.7	5	64.4	5	73.7
6	18.5	21	34.2	Rha-1	101.7	6	63.6
7	33.1	22	32.6	2	72.3	CH_3COO-1	170.6
8	39.9	23	28.2	3	72.5	2	20.6
9	48.0	24	16.9	4	73.7	Rha′-1	102.8
10	37.0	25	15.6	5	69.3	2	72.3
11	23.7	26	17.4	6	18.5	3	72.3
12	122.9	27	26.0	Glc-1	95.7	6	18.5
13	144.0	28	176.4	2	73.7		
14	42.1	29	33.1	3	78.6		
15	28.1	30	23.7	4	70.8		
				5	78.0		
				6	69.8		

References

1. C.-J. Shao, R. Kasai, J.-D. Xu, O. Tanaka, Chem. Pharm. Bull. **36**(2), 601 (1988)



Ciwujianoside C_4

Clemastanoside A

CAS Registry Number: 172670-44-9
See Figure Clemastanoside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis stans* [1]

$C_{66}H_{106}O_{30}$: 1378.676

$[\alpha]_D^{26}$ −39.3° (c 0.61, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 1740, 1064 [1]

HR-FAB-MS *m/z*: 1401.6656 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.27 (dd, J = 12.0, 4.0, H-3), 1.30 (s, CH_3-23), 1.15 (s, CH_3-24), 0.87 (s, CH_3-25), 1.07 (s, CH_3-26), 1.25 (s, CH_3-27), 0.89 (s, CH_3-29), 0.89 (s, CH_3-30); α-L-Arap: 4.83 (d, J = 6.0, H-1), 4.58 (dd, J = 7.0, 6.0, H-2), 4.25 (H-3), 4.22 (H-4), 3.80, 4.28 (d, J = 10.5, H_2-5); α-L-Rhap: 6.29 (brs, H-1), 4.91 (brs, H-2), 4.74 (dd, J = 9.5, 3, H-3), 4.43 (t, J = 9.5, H-4), 4.63 (dq, J = 9.5, 6, H-5), 1.53 (d, J = 6, CH_3-6); β-D-Ribp: 5.95 (d, J = 4.5, H-1), 4.31 (H-2), 4.51 (m, H-3), 4.16 (m, H-4), 4.16, 4.33 (m, H_2-5); β-D-Glcp: 6.23 (d, J = 8, H-1), 4.11 (dd, J = 9.0, 8.0, H-2), 4.19 (H-3), 4.29 (H-4), 4.11 (H-5), 4.32, 4.67 (brd, J = 9.0, 5.0, H_2-6); β-D-Glcp′: 5.01 (d, J = 7.5, H-1), 3.92 (dd, J = 9, 7.5, H-2), 4.15 (H-3), 4.45 (t, J = 9.5, H-4), 3.65 (brd, J = 9.5, H-5), 4.06 (dd, J = 12.0, 3.0, H-6), 4.19 (H-6); α-L-Rhap′: 5.89 (brs, H-1), 4.65 (brs, H-2), 4.57 (dd, J = 9.5, 3, H-3), 5.81 (t, J = 9.5, H-4), 5.04 (dq, J = 9.5, 6.0, H-5), 1.43 (d, J = 6, CH_3-6), 2.01 (s, Ac) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

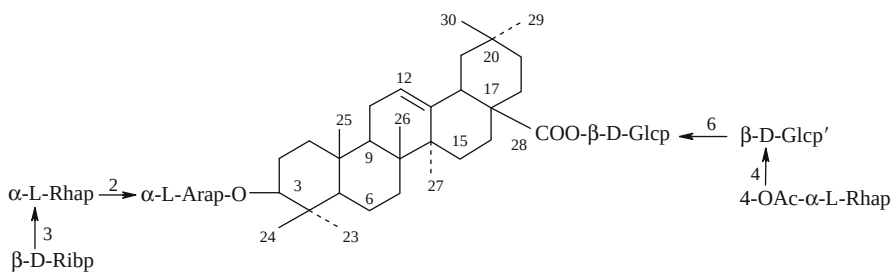
C-1	38.9	C-19	46.2	Rha-1	101.4	Glc′-1	104.9
2	26.7	20	30.8	2	72.1	2	75.5
3	88.7	21	34.0	3	81.3	3	76.4
4	39.6	22	32.5	4	72.9	4	77.4
5	56.0	23	28.2	5	69.9	5	77.2
6	18.5	24	17.2	6	18.4	6	61.2
7	33.05	25	15.7	Rib-1	104.7	Rha′-1	102.1
8	39.9	26	17.5	2	72.8	2	72.5
9	48.0	27	26.1	3	69.0	3	70.3
10	37.0	28	176.5	4	70.3	4	76.0
11	23.8	29	33.11	5	65.3	5	67.4
12	122.9	30	23.7	Glc-1	95.6	6	17.9
13	144.1	Ara-1	105.3	2	73.9	Ac	170.7
14	42.1	2	75.3	3	78.7		21.1
15	28.3	3	74.9	4	70.9		
16	23.4	4	69.5	5	78.1		
17	47.0	5	65.8	6	69.2		
18	41.7						

References

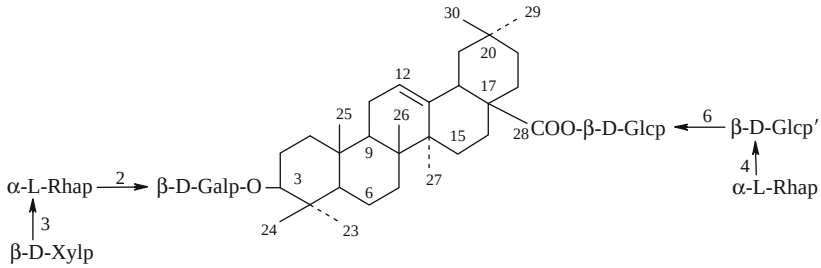
1. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)

Clemastanoside B

CAS Registry Number: 172670-45-0
See Figure Clemastanoside B



Clemastanoside A



Clemastanoside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis stans* [1], *Anemone hupensis* [2], *A. rivularis* [3]

$C_{65}H_{106}O_{30}$: 1366.676

$[\alpha]_D^{26}$ −29.8° (c 1.26, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3416, 1735, 1062 [1]

HR-FAB-MS *m/z*: 1389.6665 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.36 (dd, J = 12.0, 4.0, H-3), 1.39 (s, CH_3-23), 1.24 (s, CH_3-24), 0.86 (s, CH_3-25), 1.06 (s, CH_3-26), 1.25 (s, CH_3-27), 0.88 (s, CH_3-29), 0.88 (s, CH_3-30); β-D-Galp: 4.67 (d, J = 8, H-1), 4.66 (H-2), 4.24 (dd, J = 9.0, 3.0, H-3), 4.47 (brs, H-4), 4.05 (H-5), 4.42, 4.42 (H_2-6); α-L-Rhap: 6.56 (brs, H-1), 4.98 (brs, H-2), 4.82 (dd, J = 9.5, 3, H-3), 4.49 (t, J = 9.5, H-4), 4.74 (dq, J = 9.5, 6.0, H-5), 1.50 (d, J = 6.0, CH_3-6); β-D-Xylp: 5.40 (d, J = 7.5, H-1), 4.08 (dd, J = 9.0, 7.5, H-2), 4.19 (H-3), 4.21 (H-4), 3.76, 4.40 (t, J = 10.5, H_2-5); β-D-Glcp: 6.20 (d, J = 8, H-1), 4.09 (H-2), 4.18 (H-3), 4.28 (H-4), 4.07 (H-5), 4.30, 4.63 (H_2-6); β-D-Glcp′: 4.97 (d, J = 8.0, H-1), 3.91 (dd, J = 9, 8.0, H-2), 4.12 (H-3), 4.38 (t, J = 9.0, H-4), 3.62 (m, H-5), 4.06, 4.17 (H_2-6); α-L-Rhap′: 5.82 (brs, H-1), 4.65 (brs, H-2), 4.54 (dd, J = 9.5, 3.5, H-3), 4.30 (H-4), 4.93 (dq, J = 9.5, 6.0, H-5), 1.66 (d, J = 6, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-17	47.0	Gal-1	105.8	Xyl-1	107.6	Glc′-1	104.8
2	26.9	18	41.6	2	74.8	2	75.6	2	75.3
3	88.6	19	46.2	3	77.0	3	78.5	3	76.5
4	39.6	20	30.7	4	71.0	4	71.1	4	78.2
5	56.0	21	34.0	5	76.7	5	67.5	5	77.1
6	18.5	22	32.5	6	62.1	Glc-1	95.6	6	61.2
7	33.0	23	28.2	Rha-1	101.2	2	73.9	Rha′-1	102.7
8	39.8	24	17.39	2	72.1	3	78.7	2	72.6
9	48.0	25	15.6	3	82.9	4	70.8	3	72.7
10	37.0	26	17.42	4	73.0	5	78.0	4	74.0
11	23.7	27	26.1	5	69.4	6	69.2	5	70.3
12	122.8	28	176.5	6	18.4			6	18.5
13	144.1	29	33.1						
14	42.1	30	23.6						
15	28.3								
16	23.3								

References

1. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)
2. W. Mingkui, W. Fenge, Ch. Yiaozu, Phytochemistry **34**, 1395 (1993)
3. K. Mizutani, K. Ohtani, J.-X. Wei, R. Kasai, O. Tanaka, Planta Med. **50**, 327 (1984)

Clemastanoside C

CAS Registry Number: 172670-46-1

See Figure Clemastanoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

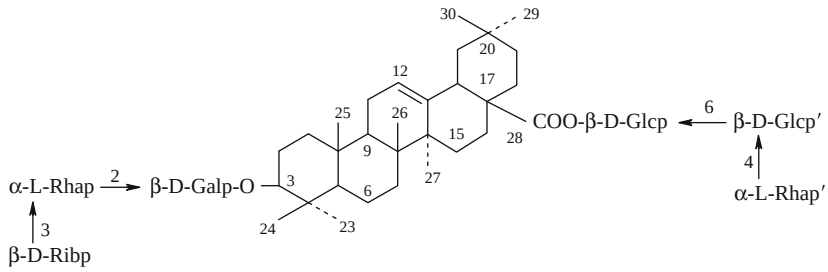
Biological sources: *Clematis stans* [1]

$C_{65}H_{106}O_{30}$: 1366.676

$[\alpha]_D^{27}$ −38.6° (c 0.17, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3436, 1740, 1062 [1]

HR-FAB-MS *m/z*: 1389.6665 $[M + Na]^+$ [1]



Clemastanoside C

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.35 (dd, J = 12.0, 4.0, H-3), 1.39 (s, CH_3-23), 1.23 (s, CH_3-24), 0.85 (s, CH_3-25), 1.06 (s, CH_3-26), 1.25 (s, CH_3-27), 0.88 (s, CH_3-29), 0.88 (s, CH_3-30); β-D-Galp: 4.88 (d, J = 8, H-1), 4.66 (dd, J = 9.0, 8.0, H-2), 4.27 (dd, J = 9.0, 2.5, H-3), 4.48 (brs, H-4), 4.09 (H-5), 4.43, 4.43 (H_2-6); α-L-Rhap: 6.56 (brs, H-1), 4.98 (brs, H-2), 4.82 (dd, J = 9.5, 3, H-3), 4.45 (t, J = 9.5, H-4), 4.74 (dq, J = 9.0, 6.0, H-5), 1.51 (d, J = 7.0, CH_3-6); β-D-Ribp: 5.99 (d, J = 5.0, H-1), 4.33 (H-2), 4.54 (brs, H-3), 4.19 (m, H-4), 4.19, 4.37 (H_2-5); β-D-Glcp: 6.20 (d, J = 8, H-1), 4.09 (H-2), 4.18 (t, H-3), 4.28 (H-4), 4.07 (H-5), 4.30, 4.63 (brd, J = 9.5, H_2-6); β-D-Glcp′: 4.97 (d, J = 8.0, H-1), 3.91 (dd, J = 9.0, 8.0, H-2), 4.12 (H-3), 4.38 (t, J = 9.0, H-4), 3.62 (m, H-5), 4.06, 4.19 (H_2-6)
α-L-Rhap′: 5.82 (brs, H-1), 4.65 (brs, H-2), 4.54 (dd, J = 9.5, 3.5, H-3), 4.30 (H-4), 4.93 (dq, J = 9.5, 6.0, H-5), 1.66 (d, J = 6, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-19	46.2	Gal-1	105.8	Glc-1	95.7
2	26.9	20	30.8	2	75.0	2	73.9
3	88.8	21	34.0	3	77.0	3	78.7
4	39.6	22	32.5	4	71.0	4	70.9
5	56.1	23	28.3	5	76.7	5	78.1
6	18.5	24	17.3	6	62.1	6	69.2
7	33.07	25	15.7	Rha-1	101.3	Glc′-1	104.9
8	39.9	26	17.5	2	72.2	2	75.4
9	48.0	27	26.1	3	81.3	3	76.5
10	37.0	28	176.5	4	72.9	4	78.2
11	23.74	29	33.1	5	69.7	5	77.2
12	122.9	30	23.6	6	18.4	6	61.3
13	144.1	Rib-1	104.8	Rha′-1	102.8		
14	42.1	2	72.8	2	72.6		
15	28.3	3	69.0	3	72.8		
16	23.4	4	70.3	4	74.0		
17	47.0	5	65.3	5	70.3		
18	41.7			6	18.5		

References

1. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)

Clematernoside A

CAS Registry Number: 220456-69-9
See Figure Clematernoside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

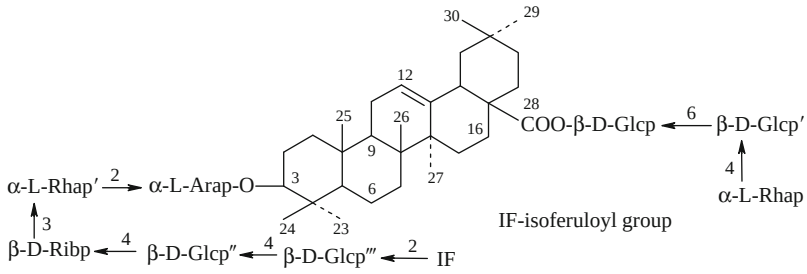
$C_{86}H_{132}O_{42}$: 1836.819

$[\alpha]_D^{28}$ −54.5°(c 0.53, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3436, 2946, 1720, 1514, 1266, 1060 [1]

UV λ_{max} nm (log ε): 216 (4.33), 244 (4.19), 297 (4.31), 326 (4.38) [1]

FAB-MS (negative ion mode) *m/z*: 1835.8 $[M-H]^-$, 1659.8 $[(M\text{-isoferuloyl-H})^-]$, 1365.7 $[(M\text{-Rha-Glc-Glc-H})^-]$, 1189.6, 1027.6, 865.5, 733.5, 587.4 [1]



Clematernoside A

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.21 (d, J = 8.0, H-1), 4.08 (dd, J = 9.0, 8.0, H-2), 4.20 (H-3), 4.29 (H-4), 4.10 (H-5), 4.32 (H-6), 4.65 (H-6); β-D-Glcp′: 4.98 (d, J = 8.0, H-1), 3.92 (dd, J = 9.0, 8.0, H-2), 4.13 (dd, J = 9.0, 9.0, H-3), 4.39 (dd, J = 9.0, 9.0, H-4), 3.66 (m, H-5), 4.05 (H-6), 4.19 (H-6);

α-D-Rhap: 5.83 (brs, H-1), 4.65 (H-2), 4.53 (H-3), 4.33 (dd, J = 9.0, 9.0, H-4), 4.94 (m, H-5), 1.68 (d, J = 6.5, H-6); α-L-Arap: 4.81 (d, J = 6.0, H-1), 4.54 (dd, J = 6.5, 6.5, H-2), 4.21 (H-3), 4.18 (H-4), 3.81 (brd, J = 11.0, H-5), 4.28 (H-5); α-L-Rhap′: 6.23 (brs, H-1), 4.85 (brs, H-2), 4.65 (H-3), 4.39 (dd, J = 9.0, 9.0, H-4), 4.59 (H-5), 1.50 (d, J = 6.0, H-6); β-D-Ribp: 5.80 (d, J = 5.5, H-1), 4.07 (H-2), 4.65 (H-3), 4.30 (H-4), 4.28 (H-5), 4.28 (H-5); β-D-Glcp″: 4.90 (d, J = 7.5, H-1), 3.89 (dd, J = 8.0, 7.5, H-2), 4.17 (H-3), 4.27 (H-4), 3.64 (m, H-5), 4.14 (H-6), 4.22 (H-6); β-D-Glcp‴: 5.38 (d, J = 8.0, H-1), 5.77 (dd, J = 9.0, 8.0, H-2), 4.33 (H-3), 4.18 (H-4), 4.05 (m, H-5), 4.21 (H-6), 4.54 (H-6); Isoferuloyl group: 6.75 (d, J = 16.0, H-2), 8.07 (d, J = 16.0, H-3), 7.53 (d, J = 2.0, H-5), 6.90 (d, J = 8.5, H-8), 7.09 (dd, J = 8.5, 2.0, H-9), OMe (3.73, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-11	23.7	C-21	33.9
2	26.6	12	122.8	22	32.5
3	88.6	13	144.1	23	28.1
4	39.5	14	42.0	24	17.1
5	56.0	15	28.2	25	15.6
6	18.4	16	23.3	26	17.4
7	33.1	17	47.0	27	26.0
8	39.8	18	41.6	28	176.5
9	48.0	19	46.1	29	33.1
10	37.0	20	30.7	30	23.6

(*continued*)

Table 1 (continued)

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	95.6	Rha-1	102.6	Rib-1	104.6	IF-1	166.7
2	73.8	2	72.5	2	72.5	2	116.2
3	78.6	3	72.7	3	69.6	3	145.8
4	70.8	4	73.9	4	76.3	4	128.4
5	78.0	5	70.2	5	61.5	5	115.3
6	69.1	6	18.4	Glc″-1	102.8	6	148.4
Glc′-1	104.8	Rha′-1	101.4	2	74.2	7	150.9
2	75.3	2	71.9	3	76.4	8	112.0
3	76.4	3	82.0	4	81.2	9	121.4
4	78.2	4	72.7	5	76.3	OMe	55.8
5	77.0	5	69.7	6	60.7		
6	61.2	6	18.4	Glc‴-1	102.5		
Ara-1	105.2			2	75.2		
2	75.4			3	76.3		
3	74.6			4	71.9		
4	69.3			5	78.6		
5	65.6			6	62.4		

Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematernoside B

CAS Registry Number: 220456-79-1

See Figure Clematernoside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

$C_{86}H_{132}O_{42}$: 1836.819

$[\alpha]_D^{28}$ −32.8°(c 0.61, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3452, 2940, 1710, 1634, 1516, 1266, 1060 [1]

UV λ_{max} nm (log ε): 216 (4.18), 243 (4.02), 296 (4.14), 325 (4.20) [1]

FAB-MS (negative ion mode) *m/z*: 1835.8 $[M-H]^-$, 1659.8 $[(M\text{-acyl-H})^-]$, 1365.7 $[(M\text{-Rha-Glc-Glc-H})^-]$, 1189.6, 1027.5, 865.5, 733.4 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.81 (d, J = 6.0, H-1 of Ara), 4.96 (d, J = 8.0, H-1 of Glc″), 4.98 (d, J = 7.5, H-1 of Glc′), 5.27 (d, J = 8.0, H-1 of Glc‴), 5.81 (d, J = 6.0, H-1 of Rib), 5.83 (brs, H-1 of Rha), 5.99 (dd, J = 9.0, 8.0, H-3 of Glc‴), 6.21 (d, J = 8.0, H-1 of Glc), 6.25 (brs, H-1 of Rha′)

Isoferuloyl group: 6.55 (d, J = 16.0, H-2), 7.85 (d, J = 16.0, H-3), 7.42 (d, J = 2.0, H-5), 6.89 (d, J = 8.5, H-8), 6.99 (dd, J = 8.5, 2.0, H-9), OMe (3.71, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-11	23.6	C-21	33.8
2	26.5	12	122.7	22	32.4
3	88.6	13	144.0	23	28.0
4	39.4	14	42.0	24	17.0
5	55.9	15	28.1	25	15.5
6	18.4	16	23.2	26	17.3
7	33.0	17	46.9	27	25.9
8	39.7	18	41.5	28	176.4
9	47.9	19	46.1	29	33.0
10	36.9	20	30.6	30	23.5

(*continued*)

Table 1 (continued)

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

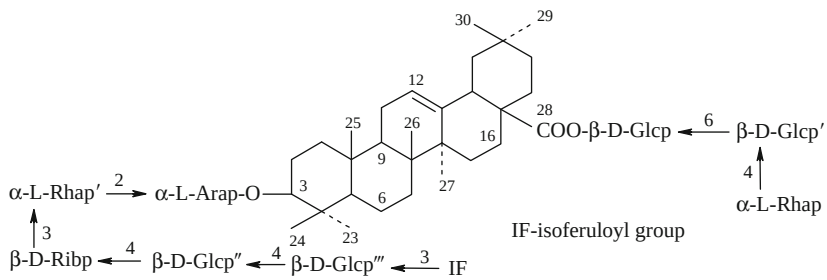
Table 2

Glc-1	95.5	Rha-1	102.6	Glc″-1	103.0	IF-1	166.7
2	73.7	2	72.4	2	74.1	2	116.5
3	78.5	3	72.7	3	76.5	3	145.2
4	70.7	4	73.8	4	79.7	4	128.2
5	77.9	5	70.1	5	76.2	5	115.1
6	69.0	6	18.4	6	61.3	6	148.2
Glc′-1	104.7	Rha′-1	101.2	Glc‴-1	104.3	7	150.7
2	75.2	2	71.8	2	72.5	8	111.9
3	76.3	3	82.0	3	78.9	9	121.2
4	78.1	4	72.6	4	69.1	OMe	55.6
5	77.0	5	69.6	5	78.1		55.7
6	61.1	6	18.3	6	61.7		
Ara-1	105.1	Rib-1	104.5				
2	75.2	2	72.4				
3	74.6	3	69.6				
4	69.1	4	76.3				
5	65.5	5	61.6				

Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)



Clematernoside B

Clematernoside E

CAS Registry Number: 220456-85-9

See Figure Clematernoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

$C_{98}H_{152}O_{51}$: 2144.930

$[\alpha]_D^{28}$ −65.0°(c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3456, 2928, 1714, 1634, 1514, 1262, 1050 [1]

UV λ_{max} nm (log ε): 215 (4.09), 244 (3.94), 298 (4.08), 326 (4.16) [1]

FAB-MS (negative ion mode) *m/z*: 2143.9 $[M-H]^-$, 1673.7 $[(M\text{-Rha-Glc-Glc-H})^-]$, 1189.6, 1027.5, 865.5, 733.5 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.22 (d, J = 8.0, H-1), 4.11 (H-2), 4.20 (dd, J = 9.0, 9.0, H-3), 4.29 (H-4), 4.06 (H-5), 4.32 (H-6), 4.65 (H-6); β-D-Glcp′: 4.98 (d, J = 8.0, H-1), 3.93 (dd, J = 9.0, 8.0, H-2), 4.14 (dd, J = 9.0, 9.0, H-3), 4.41 (dd, J = 9.0, 9.0, H-4), 3.65 (m, H-5), 4.07 (H-6), 4.20 (H-6);

α-L-Rhap: 5.85 (d, J = 1.5, H-1), 4.67 (H-2), 4.54 (dd, J = 9.0, 3.5, H-3), 4.32 (dd, J = 9.0, 9.0, H-4), 4.97 (dq, J = 9.0, 6.0, H-5), 1.69 (d, J = 6.0, H-6); α-L-Arap: 4.82 (d, J = 6.0, H-1), 4.56 (H-2), 4.24 (H-3), 4.21 (H-4), 3.81 (brd, J = 10.5, H-5), 4.31 (H-5); α-L-Rhap′: 6.25 (brs, H-1), 4.86 (brs, H-2), 4.68 (H-3), 4.40 (dd, J = 9.0, 9.0, H-4), 4.65 (H-5), 1.50 (d, J = 6.0, H-6); β-D-Ribp: 5.81 (d, J = 6.0, H-1), 4.09 (H-2), 4.64 (H-3), 4.30 (H-4), 4.29 (H-5), 4.29 (H-5); β-D-Glcp″: 4.90 (d, J = 8.0, H-1), 3.86 (dd, J = 8.0, 8.0, H-2), 4.14 (H-3), 4.27 (H-4), 3.65 (m, H-5), 4.09 (H-6), 4.39 (H-6); β-D-Glcp‴: 5.31 (d, J = 8.0, H-1), 5.76 (dd, J = 9.0, 8.0, H-2), 4.20 (dd, J = 9.0, 9.0, H-3), 4.02 (dd, J = 9.0, 9.0, H-4), 3.94 (H-5), 4.13 (H-6), 4.23 (H-6); β-D-Glcp⁗: 4.91 (d, J = 8.0, H-1), 3.87 (dd, J = 9.0, 9.0, H-2), 4.04 (H-3), 3.87 (dd, J = 9.0, 8.0, H-4), 4.14 (dd, J = 9.0, 9.0, H-5), 3.91 (H-6), 4.67 (H-6); α-L-Rhap″: 5.41 (d, J = 1.5, H-1), 4.73 (dd, J = 3.0, 1.5, H-2), 4.57 (dd, J = 9.0, 3.0, H-3), 4.27 (H-4), 4.30 (H-5), 1.60 (d, J = 6.0, H-6)

Isoferuloyl group: 6.90 (d, J = 16.0, H-2), 8.10 (d, J = 16.0, H-3), 7.54 (d, J = 2.0, H-5), 6.87 (d, J = 8.5, H-8), 7.08 (dd, J = 8.5, 2.0, H-9), OMe (3.74, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

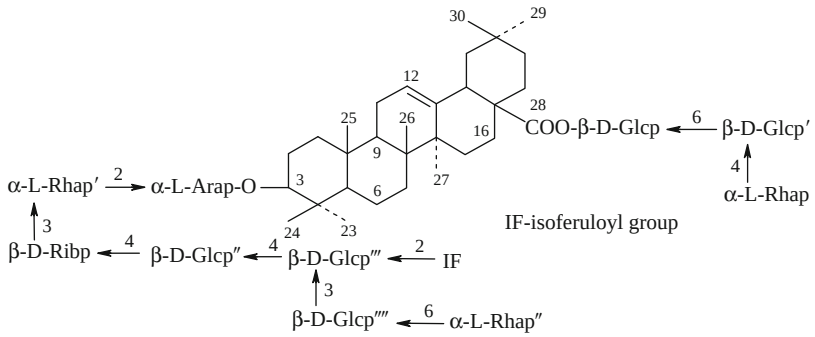
C-1	38.9	C-11	23.8	C-21	34.0
2	26.6	12	122.8	22	32.5
3	88.7	13	144.2	23	28.1
4	39.5	14	42.1	24	17.1
5	56.0	15	28.2	25	15.6
6	18.5	16	23.3	26	17.4
7	33.1	17	47.0	27	26.0
8	39.8	18	41.6	28	176.5
9	48.0	19	46.2	29	33.1
10	37.0	20	30.7	30	23.7

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	95.6	Rha′-1	101.4	Glc⁗-1	105.7	Rib-1	104.7
2	73.8	2	71.9	2	74.4	2	72.5
3	78.6	3	82.1	3	78.2	3	69.6

(*continued*)



Clematernoside E

Table 2 (continued)

4	70.8	4	72.7	4	71.8	4	76.3
5	78.0	5	69.7	5	76.4	5	61.5
6	69.2	6	18.4	6	68.9	IF-1	166.7
Glc′-1	104.8	Glc″-1	102.9	Rha″-1	102.8	2	116.4
2	75.3	2	74.2	2	71.9	3	145.7
3	76.3	3	76.6	3	72.6	4	128.6
4	78.2	4	81.1	4	74.0	5	115.4
5	77.1	5	76.2	5	69.9	6	148.4
6	61.2	6	60.7	6	18.6	7	150.9
Rha-1	102.7	Glc‴-1	102.2	Ara-1	105.2	8	112.1
2	72.5	2	72.9	2	75.3	9	121.5
3	72.7	3	86.7	3	74.7	OMe	55.8
4	73.9	4	70.2	4	69.4		
5	70.3	5	77.8	5	65.7		
6	18.5	6	62.1				

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematernoside F

CAS Registry Number: 220456-86-0

See Figure Clematernoside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

$C_{87}H_{134}O_{42}$: 1850.834

$[\alpha]_D^{30}$ −63.5°(c 0.57, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3468, 2940, 1716, 1632, 1516, 1262, 1064 [1]

UV λ_{max} nm (log ε): 216 (4.45), 235 (4.36), 298 (4.45), 324 (4.56) [1]

FAB-MS (negative ion mode) *m/z*: 1849.8 $[M-H]^-$, 1659.8 $[(M-3,4\text{-dimethoxycinnamoyl-H})^-]$, 1379.7 $[(M-Rha-Glc-Glc-H)^-]$, 1189.6, 1027.5, 865.5, 733.4 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.82 (d, J = 6.0, H-1 of Ara), 4.93 (d, J = 7.5, H-1 of Glc″), 4.99 (d, J = 7.5, H-1 of Glc′), 5.39 (d, J = 8.0, H-1 of Glc‴), 5.81 (dd, J = 9.0, 8.0, H-2 of Glc‴), 5.81 (d, J = 5.0, H-1 of Rib), 5.85 (s, H-1 of Rha), 6.21 (d, J = 8.0, H-1 of Glc), 6.25 (brs, H-1 of Rha′)

3,4-dimethoxycinnamoyl group: 6.80 (d, J = 16.0, H-2), 8.07 (d, J = 16.0, H-3), 7.22 (d, J = 2.0, H-5), 6.89 (d, J = 8.5, H-8), 7.18 (dd, J = 8.5, 2.0, H-9), OMe (3.74, s, 6H) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

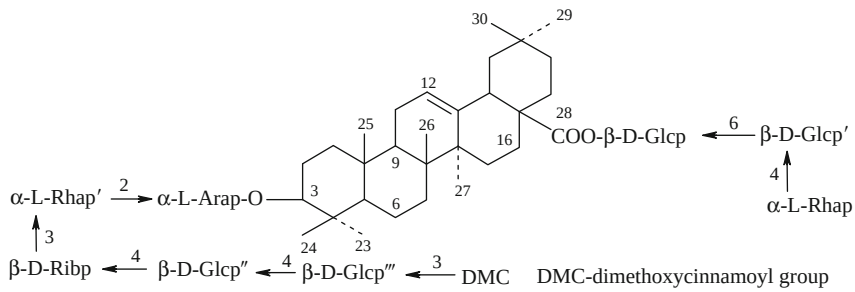
C-1	38.9	C-11	23.7	C-21	33.9
2	26.6	12	122.8	22	32.4
3	88.6	13	144.0	23	28.1
4	39.5	14	42.0	24	17.0
5	55.9	15	28.2	25	15.8
6	18.4	16	23.3	26	17.4
7	33.0	17	46.9	27	26.0
8	39.8	18	41.6	28	176.4
9	48.0	19	46.1	29	33.0
10	36.9	20	30.6	30	23.6

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	95.6	Rha-1	102.7	Glc″-1	102.8	DMC-1	166.6
2	73.8	2	72.5	2	74.1	2	116.4
3	78.6	3	72.7	3	76.4	3	145.5

(*continued*)



Clematernoside F

Table 2 (continued)

4	70.7	4	73.9	4	81.3	4	127.8
5	78.0	5	70.2	5	76.3	5	111.9
6	69.1	6	18.4	6	60.9	6	149.9
Glc′-1	104.8	Rha′-1	101.4	Glc‴-1	102.5	7	151.9
2	75.3	2	71.9	2	75.3	8	111.0
3	76.3	3	82.0	3	76.4	9	122.7
4	78.1	4	72.7	4	71.9	OMe	55.7
5	77.1	5	69.7	5	78.5		
6	61.2	6	18.4	6	62.4		
Ara-1	105.2	Rib-1	104.6				
2	75.3	2	72.5				
3	74.7	3	69.4				
4	69.3	4	76.2				
5	65.7	5	61.4				

Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematernoside G

CAS Registry Number: 220456-88-2

See Figure Clematernoside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

$C_{104}H_{162}O_{56}$: 2306.982

$[\alpha]_D^{30}$ −48.5°(c 0.84, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3436, 2928, 1708, 1630, 1512, 1262, 1066 [1]

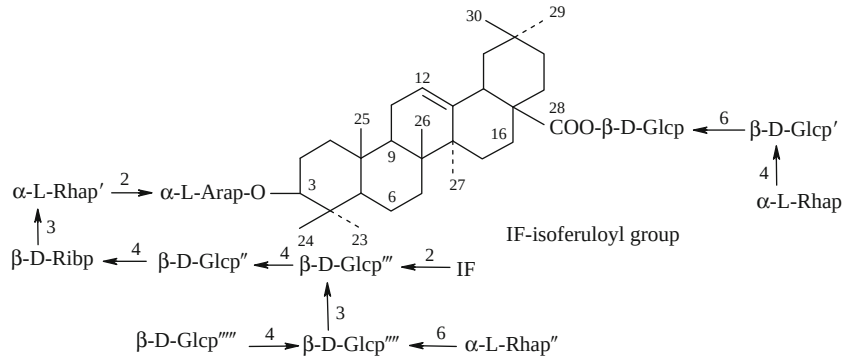
UV λ_{max} nm (log ε): 216 (4.28), 244 (4.13), 297 (4.25), 326 (4.33) [1]

FAB-MS (negative ion mode) *m/z*: 2306.0 $[M-H]^-$, 1835.7 $[(M-Rha-Glc-Glc-H)^-]$, 1659.8, 1189.6, 1027.5, 865.5, 733.5 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.23 (d, J = 8.0, H-1), 4.11 (H-2), 4.20 (H-3), 4.30 (H-4), 4.11 (H-5), 4.33 (H-6), 4.67 (H-6); β-D-Glcp′: 4.99 (d, J = 8.0, H-1), 3.94 (dd, J = 9.0, 8.0, H-2), 4.14 (H-3), 4.42 (dd, J = 9.0, 9.0, H-4), 3.66 (m, H-5), 4.09 (H-6), 4.20 (H-6); α-L-Rhap: 5.86 (brs, H-1), 4.67 (H-2), 4.55 (dd, J = 9.0, 3.0, H-3), 4.33 (dd, J = 9.0, 9.0, H-4), 4.98 (m, H-5), 1.70 (d, J = 6.0, H-6)

α-L-Arap: 4.83 (d, J = 6.0, H-1), 4.56 (H-2), 4.25 (H-3), 4.21 (H-4), 3.81 (brd, J = 10.0, H-5), 4.27 (H-5)

α-L-Rhap′: 6.24 (brs, H-1), 4.86 (brs, H-2), 4.68 (dd, J = 9.0, 3.0, H-3), 4.41 (dd, J = 9.0, 9.0, H-4), 4.61 (H-5), 1.52 (d, J = 6.0, H-6); β-D-Ribp: 5.82 (d, J = 5.5, H-1), 4.10 (H-2), 4.67 (H-3), 4.29 (H-4), 4.30 (H-5), 4.30 (H-5); β-D-Glcp″: 4.90 (d, J = 8.0, H-1), 3.87 (dd, J = 8.0, 8.0, H-2), 4.15 (H-3), 4.26 (H-4), 3.65 (m, H-5), 4.08 (H-6), 4.37 (H-6); β-D-Glcp‴: 5.30 (d, J = 8.5, H-1), 5.75 (dd, J = 9.0, 8.5, H-2), 4.16 (H-3), 3.99 (dd, J = 9.0, 9.0, H-4), 3.94 (H-5), 4.14 (H-6), 4.23 (H-6); β-D-Glcp⁗: 4.90 (d, J = 8.0, H-1), 3.90 (dd, J = 9.0, 8.0, H-2), 4.15 (H-3), 3.92 (dd, J = 9.0, 9.0, H-4), 4.13



Clematernoside G

(H-5), 4.05 (H-6), 4.88 (H-6); α-L-Rhap″: 5.48 (d, J = 1.5, H-1), 4.73 (m, H-2), 4.53 (dd, J = 9.0, 3.0, H-3), 4.24 (H-4), 4.32 (H-5), 1.65 (d, J = 6.0, H-6); Isoferuloyl group: 6.90 (d, J = 16.0, H-2), 8.10 (d, J = 16.0, H-3), 7.54 (d, J = 2.0, H-5), 6.87 (d, J = 8.5, H-8), 7.08 (dd, J = 8.5, 2.0, H-9), OMe (3.74, s); β-D-Glcp‴′: 4.94 (d, J = 8.0, H-1), 3.98 (dd, J = 9.0, 8.0, H-2), 4.14 (H-3), 4.10 (dd, J = 9.0, 9.0, H-4), 3.97 (H-5), 4.23 (H-6), 4.52 (H-6)

Isoferuloyl group: 6.91 (d, J = 16.0, H-2), 8.12 (d, J = 16.0, H-3), 7.54 (d, J = 2.0, H-5), 6.88 (d, J = 8.5, H-8), 7.09 (dd, J = 8.5, 2.0, H-9), OMe (3.73, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-11	23.8	C-21	34.0
2	26.7	12	122.8	22	32.5
3	88.7	13	144.1	23	28.1
4	39.6	14	42.1	24	17.1
5	56.0	15	28.3	25	15.6
6	18.5	16	23.3	26	17.5
7	33.1	17	47.0	27	26.0
8	39.9	18	41.6	28	176.5
9	48.0	19	46.2	29	33.1
10	37.0	20	30.7	30	23.7

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	95.6	Rha′-1	101.5	Glc‴″-1	105.3	Rib-1	104.7
2	73.9	2	71.9	2	73.8	2	72.5
3	78.7	3	82.1	3	76.4	3	69.6
4	70.9	4	72.8	4	82.0	4	76.5
5	78.1	5	69.8	5	74.8	5	61.6
6	69.2	6	18.4	6	68.1	Glc‴″-1	105.1
Glc′-1	104.8	Glc″-1	102.9	Rha″-1	102.7	2	74.7
2	75.4	2	74.2	2	72.1	3	78.4
3	76.5	3	76.5	3	72.7	4	71.7
4	78.2	4	81.2	4	74.1	5	78.5
5	77.2	5	76.3	5	69.8	6	62.7
6	61.3	6	60.7	6	18.6	IF-1	166.6
Rha-1	102.7	Glc‴-1	102.3	Ara-1	105.2	2	116.4
2	72.6	2	72.8	2	75.4	3	145.6
3	72.8	3	86.5	3	74.7	4	128.6
4	74.0	4	70.1	4	69.4	5	115.5
5	70.3	5	77.8	5	65.7	6	148.5
6	18.5	6	62.1			7	150.9
						8	112.1
						9	121.5
						OMe	55.8

(*continued*)

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematernoside H

CAS Registry Number: 220456-90-6

See Figure Clematernoside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

$C_{104}H_{162}O_{55}$: 2290.987

$[\alpha]_D^{28}$ −42.5°(c 0.45, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3500, 2900, 1710, 1630, 1050 [1]

UV λ_{max} nm (log ε): 204 (4.08), 227 (4.00), 255 (3.97), 2.62 (3.90), 311 (4.25) [1]

FAB-MS (negative ion mode) *m/z*: 2289.9 $[M-H]^-$, 1819.5 $[(M\text{-Rha-Glc-Glc-H})^-]$, 1659.5, 1027.5, 865.3, 733.2 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.83 (d, J = 6.0, H-1 of Ara), 4.91 (d, J = 7.5, H-1 of Glc″), 4.91 (d, J = 8.0, H-1 of Glc‴″), 4.93 (d, J = 7.5, H-1 of Glc″), 4.99 (d, J = 8.0, H-1of Glc′), 5.31 (d, J = 8.0, H-1 of Glc‴′), 5.49 (d, J = 1.5, H-1 of Rha″), 5.76 (dd, J = 9.0, 7.5, H-2 of Glc‴′), 5.82 (d, J = 5.5, H-1 of Rib), 5.86 (d, J = 1.5, H-1 of Rha), 6.23 (d, J = 8.5, H-1 of Glc), 6.25 (brs, H-1 of Rha′)

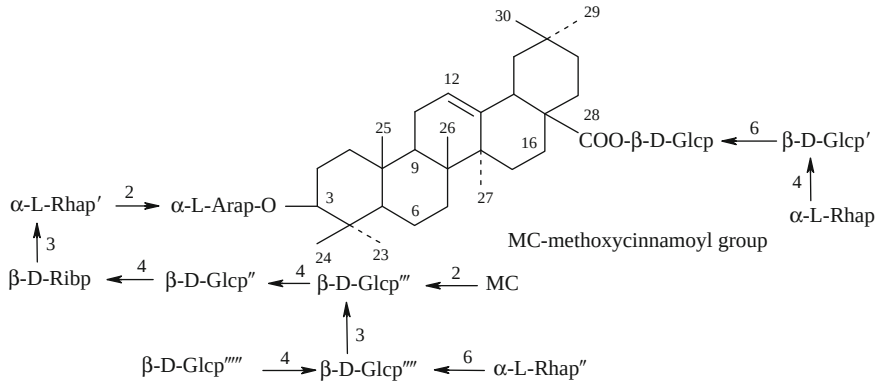
4-methoxycinnamoyl group: 6.90 (d, J = 16.0, H-2), 8.09 (d, J = 16.0, H-3), 7.52 (m, H-5), 6.99 (m, H-6), 6.99 (m, H-8), 7.52 (m, H-9), OMe (s, 3.75) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-11	23.8	C-21	34.0
2	26.6	12	122.8	22	32.5

(*continued*)



Clematernoside H

Table 1 (continued)

3	88.7	13	144.1	23	28.1
4	39.6	14	42.1	24	17.1
5	56.0	15	28.3	25	15.6
6	18.5	16	23.4	26	17.5
7	33.1	17	47.0	27	26.1
8	39.9	18	41.6	28	176.5
9	48.1	19	46.2	29	33.1
10	37.0	20	30.7	30	23.7

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	95.6	Rha′-1	101.5	Glc⁗-1	105.2	3	69.6
2	73.9	2	71.9	2	73.9	4	76.5
3	78.7	3	82.1	3	76.4	5	61.6
4	70.9	4	72.8	4	82.0	Glc⁗′-1	105.3
5	78.0	5	69.8	5	74.8	2	74.7
6	69.2	6	18.4	6	68.1	3	78.3
Glc′-1	104.8	Glc″-1	102.9	Rha″-1	102.7	4	71.6
2	75.4	2	74.2	2	71.9	5	78.5
3	76.5	3	76.5	3	72.7	6	62.6
4	78.2	4	81.2	4	73.9	MC-1	166.6
5	77.1	5	76.3	5	69.9	2	116.6
6	61.3	6	60.8	6	18.6	3	145.0
Rha-1	102.7	Glc‴-1	102.2	Ara-1	105.2	4	127.8
2	72.6	2	72.9	2	75.5	5	130.3
3	72.8	3	86.5	3	74.6	6	114.7
4	74.0	4	70.1	4	69.3	7	161.8
5	70.3	5	77.8	5	65.7	8	114.7
6	18.5	6	62.1	Rib-1	104.7	9	130.3
				2	72.6	OMe	55.3

Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematernoside I

CAS Registry Number: 220456-92-8

See Figure Clematernoside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

$C_{110}H_{172}O_{61}$: 2469.035

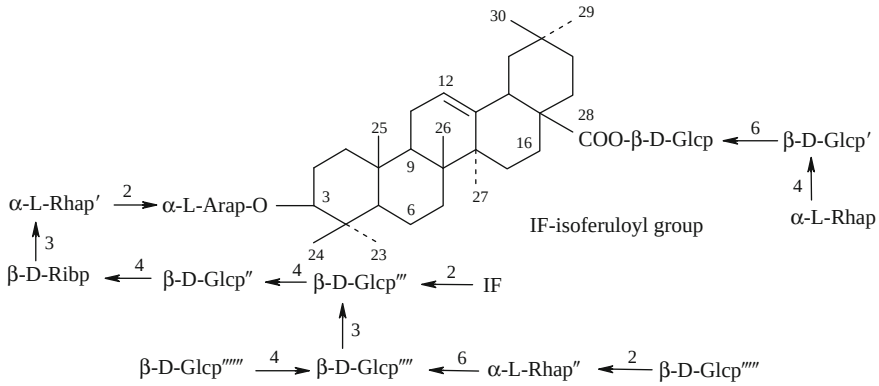
$[\alpha]_D^{28}$ −32.3°(c 0.60, MeOH-H_2O (9:1)) [1]

IR (KBr) ν_{max} cm^{-1}: 3500, 2950, 1740, 1610, 1510, 1265, 1060 [1]

UV λ_{max} nm (log ε): 215 (4.35), 243 (4.16), 298 (4.29), 326 (4.35) [1]

FAB-MS (negative ion mode) *m/z*: 2468.0 $[M-H]^-$, 1998.8 $[(M-Rha-Glc-Glc-H)^-]$, 1821.8, 1189.6, 1027.5, 865.5, 733.4 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.20 (d, J = 8.0, H-1), 4.10 (H-2), 4.19 (dd, J = 9.0, 9.0, H-3), 4.30 (H-4), 4.08 (H-5), 4.31 (H-6), 4.66



Clematernoside I

(H-6); β-D-Glcp′: 4.97 (d, J = 8.0, H-1), 3.92 (dd, J = 9.0, 8.0, H-2), 4.13 (dd, J = 9.0, 9.0, H-3), 4.39 (dd, J = 9.0, 9.0, H-4), 3.63 (m, H-5), 4.06 (H-6), 4.19 (H-6); α-L-Rhap: 5.82 (brs, H-1), 4.65 (H-2), 4.53 (dd, J = 9.0, 3.0, H-3), 4.31 (dd, J = 9.0, 9.0, H-4), 4.94 (m, H-5), 1.67 (d, J = 6.0, H-6); α-L-Arap: 4.81 (d, J = 6.0, H-1), 4.54 (H-2), 4.23 (H-3), 4.21 (H-4), 3.79 (brd, J = 10.0, H-5), 4.28 (H-5); α-L-Rhap′: 6.22 (brs, H-1), 4.85 (brs, H-2), 4.65 (H-3), 4.40 (dd, J = 9.0, 9.0, H-4), 4.58 (H-5), 1.50 (d, J = 6.0, H-6); β-D-Ribp: 5.80 (d, J = 6.0, H-1), 4.09 (H-2), 4.65 (H-3), 4.31 (H-4), 4.27 (H-5), 4.27 (H-5); β-D-Glcp″: 4.88 (d, J = 8.0, H-1), 3.86 (dd, J = 8.0, 8.0, H-2), 4.13 (H-3), 4.27 (H-4), 3.63 (m, H-5), 4.05 (H-6), 4.15 (H-6); β-D-Glcp‴: 5.29 (d, J = 8.0, H-1), 5.71 (dd, J = 9.0, 8.0, H-2), 4.11 (H-3), 3.97 (dd, J = 9.0, 9.0, H-4), 3.90 (H-5), 4.17 (H-6), 4.47 (brd, J = 11.0, H-6); β-D-Glcp⁗: 4.84 (d, J = 8.0, H-1), 3.89 (dd, J = 9.0, 8.0, H-2), 4.14 (dd, J = 9.0, 9.0, H-3), 3.91 (dd, J = 9.0, 9.0, H-4), 4.07 (H-5), 3.83 (H-6), 4.73 (brd, J = 10.0, H-6); α-L-Rhap″: 5.53 (brs, H-1), 4.78 (brd, J = 3.5, H-2), 4.53 (dd, J = 9.0, 3.5, H-3), 4.16 (H-4), 4.25 (H-5), 1.59 (d, J = 6.0, H-6); β-D-Glcp⁗: 4.90 (d, J = 8.0, H-1), 3.93 (H-2), 4.17 (dd, J = 9.0, 9.0, H-3), 4.08 (H-4), 3.99 (H-5), 4.25 (H-6), 4.48 (H-6); β-D-Glcp⁗: 5.31 (d, J = 8.0, H-1), 4.05 (dd, J = 9.0, 8.0, H-2), 4.19 (H-3), 4.16 (H-4), 3.99 (H-5), 4.30 (H-6), 4.50 (H-6); Isoferuloyl group: 6.89 (d, J = 16.0, H-2), 8.09 (d, J = 16.0, H-3), 7.54 (d, J = 2.0, H-5), 6.87 (d, J = 8.5, H-8), 7.09 (dd, J = 8.5, 2.0, H-9), OMe (3.73, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	11	23.7	21	33.9	IF-1	166.6
2	26.6	12	122.8	22	32.5	2	116.4
3	88.7	13	144.1	23	28.1	3	145.6
4	39.6	14	42.1	24	17.0	4	128.5
5	56.0	15	28.2	25	15.6	5	115.4
6	18.5	16	23.3	26	17.4	6	148.4
7	33.0	17	47.0	27	26.0	7	150.9
8	39.8	18	41.6	28	176.5	8	112.1
9	48.0	19	46.2	29	33.1	9	121.4
10	37.0	20	30.7	30	23.6	OMe	55.8

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	95.6	Rha′-1	101.4	Glc⁗-1	105.3	Rib-1	104.6
2	73.8	2	71.9	2	73.8	2	72.5
3	78.6	3	82.0	3	76.2	3	69.6
4	70.8	4	72.7	4	81.8	4	76.2
5	78.0	5	69.7	5	74.2	5	61.6
6	69.1	6	18.4	6	68.1	Glc⁗-1	105.1
Glc′-1	104.7	Glc″-1	102.8	Rha″-1	101.2	2	74.7
2	75.3	2	74.2	2	82.1	3	78.3
3	76.4	3	76.4	3	72.7	4	71.5
4	78.3	4	81.0	4	74.4	5	78.4
5	77.1	5	76.2	5	69.6	6	62.5
6	61.2	6	60.7	6	18.5	Glc⁗-1	107.3
Rha-1	102.7	Glc‴-1	102.2	Ara-1	105.1	2	75.9
2	72.5	2	72.7	2	75.4	3	78.3
3	72.7	3	87.1	3	74.6	4	71.4
4	73.9	4	70.0	4	69.3	5	78.4
5	70.2	5	77.7	5	65.6	6	62.6
6	18.5	6	62.0				

Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematernoside J

CAS Registry Number: 220456-97-3

See Figure Clematernoside J

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

$C_{110}H_{172}O_{61}$: 2469.035

$[\alpha]_D^{28}$ −37.6° (c 0.55, MeOH-H_2O (9:1))

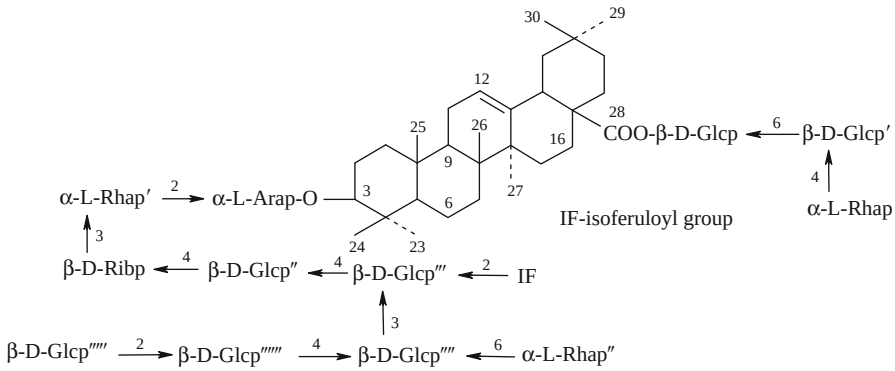
IR (KBr) ν_{max} cm^{-1}: 3500, 2950, 1720, 1610, 1510, 1265, 1060 [1]

UV λ_{max} nm (log ε): 216 (4.45), 243 (4.28), 299 (4.41), 326 (4.47) [1]

FAB-MS (negative ion mode) *m/z*: 2468.0 $[M-H]^-$, 1998.8 $[(M\text{-}Rha\text{-}Glc\text{-}Glc\text{-}H)^-]$, 1821.8, 1189.6, 1027.5, 865.5, 733.4 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.21 (d, J = 8.0, H-1), 4.09 (H-2), 4.19 (H-3), 4.29 (H-4), 4.08 (H-5), 4.30 (H-6), 4.64 (H-6); β-D-Glcp′: 4.98 (d, J = 8.0, H-1), 3.94 (dd, J = 9.0, 8.0, H-2), 4.13 (dd, J = 9.0, 9.0, H-3), 4.40 (H-4), 3.64 (m, H-5), 4.06 (H-6), 4.19 (H-6); α-L-Rhap: 5.83 (brs, H-1), 4.66 (H-2), 4.53 (dd, J = 9.0, 3.0, H-3), 4.31 (dd, J = 9.0, 9.0, H-4), 4.94 (m, H-5), 1.67 (d, J = 6.0, H-6); α-L-Arap: 4.81 (d, J = 6.0, H-1), 4.54 (H-2), 4.26 (H-3), 4.21 (H-4), 3.80 (brd, J = 10.0, H-5), 4.28 (H-5); α-L-Rhap′: 6.22 (brs, H-1), 4.85 (brs, H-2), 4.65 (H-3), 4.39 (dd, J = 9.0, 9.0, H-4), 4.58 (H-5), 1.50 (d, J = 6.0, H-6); β-D-Ribp: 5.80 (d, J = 5.5, H-1), 4.08 (H-2), 4.63 (H-3), 4.30 (H-4), 4.27 (H-5), 4.27 (H-5); β-D-Glcp″: 4.88 (d, J = 8.0, H-1), 3.86 (dd, J = 8.0, 8.0, H-2), 4.13 (H-3), 4.25 (H-4), 3.63 (m, H-5), 4.01 (H-6), 4.24 (H-6); β-D-Glcp‴: 5.27 (d, J = 8.0, H-1), 5.72 (dd, J = 9.0, 8.0, H-2), 4.15 (H-3), 3.96 (H-4), 3.93 (H-5), 4.06 (H-6), 4.38 (H-6); β-D-Glcp⁗: 4.91 (d, J = 8.0, H-1), 3.86 (dd, J = 9.0, 8.0, H-2), 4.13 (dd, J = 9.0, 9.0, H-3), 3.92 (dd, J = 9.0, 9.0, H-4), 4.30 (H-5), 4.32 (H-6), 4.92 (H-6); α-L-Rhap″: 5.63 (brs, H-1), 4.71 (m, H-2), 4.53 (dd, J = 9.0, 3.5, H-3), 4.20 (dd, J = 9.0, 9.0, H-4), 4.46 (m, H-5), 1.64 (d, J = 6.0, H-6); β-D-Glcp‴′: 4.97 (d, J = 8.0, H-1), 3.99 (dd, J = 9.0, 8.0, H-2), 4.17 (dd, J = 9.0, 9.0, H-3), 4.04 (dd, J = 9.0, 9.0, H-4), 3.93 (H-5), 4.13 (H-6), 4.44 (H-6); β-D-Glcp‴″: 5.22 (d, J = 7.5, H-1), 4.12 (dd, J = 9.0, 7.5, H-2), 4.17 (dd, J = 9.0, 9.0, H-3), 4.22 (H-4), 3.86 (H-5), 4.38 (H-6), 4.55 (H-6); Isoferuloyl group: 6.90 (d, J = 16.0, H-2), 8.11 (d, J = 16.0, H-3), 7.54 (d, J = 2.0, H-5), 6.88 (d, J = 8.5, H-8), 7.11 (dd, J = 8.5, 2.0, H-9), OMe (3.73, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]



Clematernoside J

Table 1

C-1	38.9	11	23.7	21	33.9	IF-1	166.6
2	26.6	12	122.8	22	32.5	2	116.4
3	88.7	13	144.1	23	28.1	3	145.7
4	39.5	14	42.1	24	17.1	4	128.5
5	56.0	15	28.2	25	15.6	5	115.4
6	18.4	16	23.3	26	17.4	6	148.4
7	33.0	17	47.0	27	26.0	7	150.9
8	39.8	18	41.6	28	176.5	8	112.1
9	48.0	19	46.2	29	33.1	9	121.5
10	37.0	20	30.7	30	23.6	OMe	55.8

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	95.6	Rha′-1	101.4	Glc‴′-1	105.2	Rib-1	104.6
2	73.8	2	71.9	2	73.9	2	72.5
3	78.6	3	82.0	3	76.4	3	69.6
4	70.8	4	72.7	4	81.7	4	76.4
5	78.0	5	69.8	5	74.7	5	61.5
6	69.1	6	18.4	6	67.9	Glc⁗-1	102.4
Glc′-1	104.7	Glc″-1	102.9	Rha″-1	102.7	2	84.4
2	75.3	2	74.1	2	71.9	3	78.0
3	76.4	3	76.4	3	72.5	4	71.1
4	78.2	4	81.1	4	74.1	5	78.8
5	77.1	5	76.3	5	69.8	6	62.2
6	61.2	6	60.7	6	18.7	Glc⁗′-1	106.7
Rha-1	102.7	Glc‴-1	102.2	Ara-1	105.2	2	76.0
2	72.5	2	72.9	2	75.4	3	78.2
3	72.7	3	86.0	3	74.6	4	71.6
4	73.9	4	70.0	4	69.3	5	78.2
5	70.2	5	77.7	5	65.6	6	63.0
6	18.5	6	62.0				

Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematernoside K

CAS Registry Number: 220456-99-5

See Figure Clematernoside K

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis terniflora* [1]

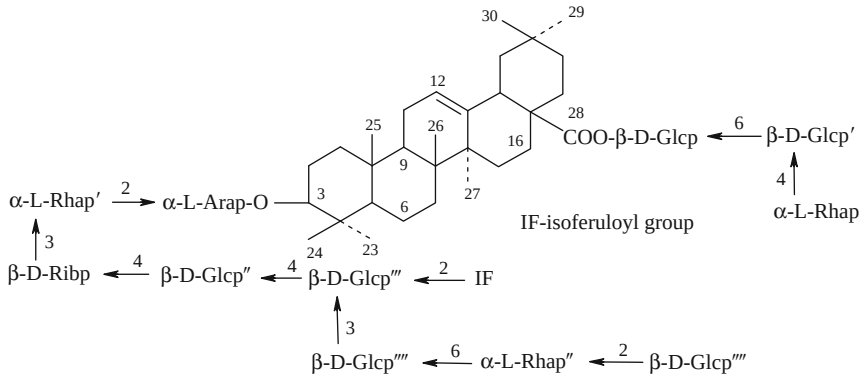
$C_{104}H_{162}O_{56}$: 2306.982

$[\alpha]_D^{28}$ −45.4°(c 0.48, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3500, 2920, 1740, 1610, 1510, 1270, 1060 [1]

UV λ_{max} nm (log ε): 214 (4.49), 243 (4.33), 299 (4.44), 326 (4.51) [1]

FAB-MS (negative ion mode) *m/z*: 2305.9 $[M-H]^-$, 1835.6 $[(M\text{-Rha-Glc-Glc-H})^-]$, 1659.6, 1189.5, 1027.5, 865.5, 733.3 [1]



Clematernoside K

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.22 (d, J = 8.0, H-1), 4.11 (H-2), 4.20 (dd, J = 9.0, 9.0, H-3), 4.31 (H-4), 4.08 (H-5), 4.32 (H-6), 4.66 (H-6); β-D-Glcp′: 4.98 (d, J = 8.0, H-1), 3.93 (dd, J = 9.0, 8.0, H-2), 4.14 (dd, J = 9.0, 9.0, H-3), 4.40 (dd, J = 9.0, 9.0, H-4), 3.64 (m, H-5), 4.06 (H-6), 4.20 (H-6); α-L-Rhap: 5.84 (brs, H-1), 4.67 (H-2), 4.54 (dd, J = 9.0, 3.0, H-3), 4.32 (dd, J = 9.0, 9.0, H-4), 4.96 (m, H-5), 1.69 (d, J = 6.0, H-6); α-L-Arap: 4.83 (d, J = 6.0, H-1), 4.54 (H-2), 4.25 (H-3), 4.22 (H-4), 3.80 (brd, J = 10.0, H-5), 4.28 (H-5); α-L-Rhap′: 6.23 (brs, H-1), 4.86 (brs, H-2), 4.68 (H-3), 4.40 (dd, J = 9.0, 9.0, H-4), 4.63 (H-5), 1.51 (d, J = 6.0, H-6); β-D-Ribp: 5.81 (d, J = 6.0, H-1), 4.09 (H-2), 4.64 (H-3), 4.30 (H-4), 4.32 (H-5), 4.32 (H-5); β-D-Glcp″: 4.90 (d, J = 8.0, H-1), 3.87 (dd, J = 8.0, 8.0, H-2), 4.16 (H-3), 4.26 (H-4), 3.64 (m, H-5), 4.11 (H-6), 4.22 (H-6); β-D-Glcp‴: 5.31 (d, J = 8.5, H-1), 5.74 (dd, J = 9.0, 8.5, H-2), 4.14 (H-3), 4.05 (dd, J = 9.0, 9.0, H-4), 3.93 (H-5), 4.22 (H-6), 4.47 (brd, J = 10.0, H-6); β-D-Glcp⁗: 4.86 (d, J = 8.0, H-1), 3.88 (dd, J = 9.0, 8.0, H-2), 4.08 (dd, J = 9.0, 9.0, H-3), 3.82 (dd, J = 9.0, 9.0, H-4), 4.06 (H-5), 3.69 (brd, J = 10.0, H-6), 4.59 (H-6); α-L-Rhap″: 5.46 (d, J = 1.5, H-1), 4.79 (brd, J = 3.5, H-2), 4.58 (dd, J = 9.0, 3.5, H-3), 4.18 (dd, J = 9.0, 9.0, H-4), 4.25 (H-5), 1.56 (d, J = 6.0, H-6); β-D-Glcp⁗′: 5.32 (d, J = 8.0, H-1), 4.07 (H-2), 4.22 (H-3), 4.25 (H-4), 3.98 (H-5), 4.35 (dd, J = 12.0, 5.0, H-6), 4.49 (dd, J = 12.0, 2.5, H-6); Isoferuloyl group: 6.90 (d, J = 16.0, H-2), 8.09 (d, J = 16.0, H-3), 7.53 (d, J = 2.0, H-5), 6.88 (d, J = 8.5, H-8), 7.09 (dd, J = 8.5, 2.0, H-9), OMe (3.74, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	11	23.8	21	34.0	IF-1	166.7
2	26.6	12	122.8	22	32.5	2	116.4
3	88.7	13	144.1	23	28.1	3	145.7
4	39.6	14	42.1	24	17.1	4	128.6
5	56.0	15	28.2	25	15.6	5	115.4
6	18.4	16	23.3	26	17.5	6	148.4
7	33.0	17	47.0	27	26.0	7	150.9
8	39.9	18	41.6	28	176.5	8	112.1
9	48.0	19	46.2	29	33.1	9	121.5
10	37.0	20	30.7	30	23.7	OMe	55.9

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

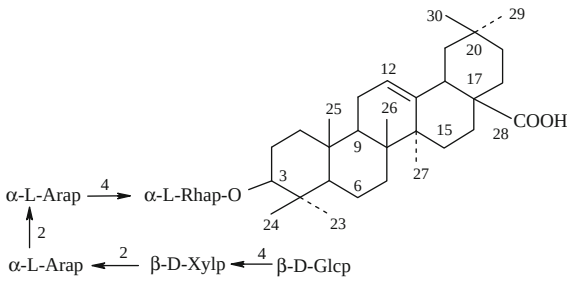
Glc-1	95.6	Rha′-1	101.4	Glc⁗-1	105.8	3	69.6
2	73.8	2	71.9	2	74.4	4	76.3
3	78.7	3	82.0	3	78.2	5	61.6
4	70.8	4	72.7	4	71.9	Glc⁗′-1	107.3
5	78.0	5	69.8	5	76.3	2	76.0
6	69.2	6	18.4	6	68.9	3	78.4
Glc′-1	104.8	Glc″-1	102.8	Rha″-1	101.4	4	71.2
2	75.3	2	74.2	2	82.0	5	78.6
3	76.5	3	76.4	3	72.6	6	62.4
4	78.2	4	81.1	4	74.5		
5	77.1	5	76.1	5	69.7		
6	61.3	6	60.7	6	18.5		
Rha-1	102.7	Glc‴-1	102.2	Ara-1	105.2		
2	72.5	2	72.8	2	75.4		
3	72.7	3	87.4	3	74.7		
4	74.0	4	70.1	4	69.3		
5	70.3	5	77.8	5	65.7		
6	18.5	6	62.0	Rib-1	104.7		
				2	72.5		

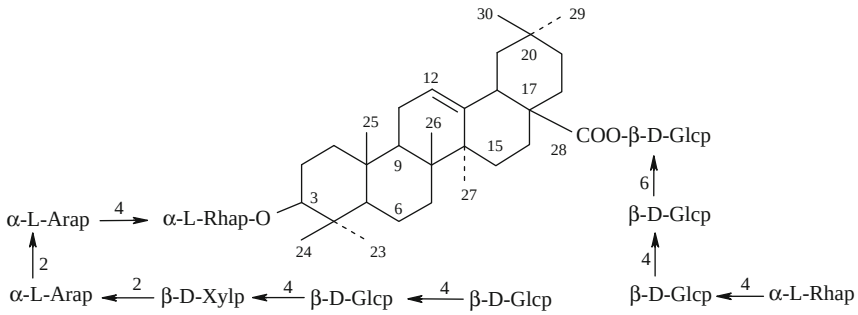
Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

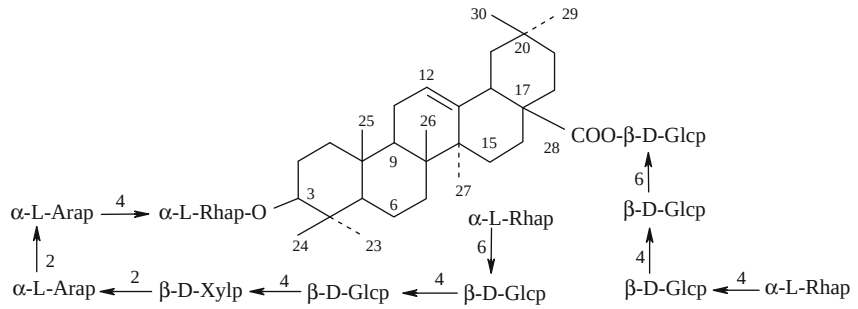
1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematoside A_1





Clematoside B



Clematoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Clematis* manschurica [1]
$C_{57}H_{94}O_{24}$: 1162.613
Mp: 176–179°C [1]
$[\alpha]_D^{20}$ −31.0° (c 5.0, MeOH) [1]

References

1. V.Ya. Chirva, V.P. Konyukhov, Chem. Nat. Comp. **5**(1), 53 (1969)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Clematis* manschurica [1, 2]
$C_{87}H_{142}O_{48}$: 1954.867
Mp: 200–202°C [1]

References

1. V. Ya. Chirva, V.P. Konyukhov, Chem. Nat. Comp. **4**(2), 122 (1968)
2. V.Ya. Chirva, A.I. Usova, V.P. Konyukhov, Izv. Akad. Nauk SSSR, ser. Khim. 2336 (1968) [in Russian]

Clematoside B

CAS Registry Number: 20751-05-7
See Figure Clematoside B

Clematoside C

CAS Registry Number: 18463-37-1
See Figure Clematoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clematis* manschurica [1, 2]

$C_{88}H_{144}O_{48}$: 1968.882

Mp: 213–215°C [1]

$[\alpha]_D^{20}$ −50° (c 4.2, CH_3OH) [1]

References

1. A.Ya. Khorlin, V.Ya. Chirva, N.K. Kochetkov, Izv. Akad. Nauk SSSR, ser. Khim. 1306 (1967) (in Russian)
2. A.Ya. Khorlin, V.Ya. Chirva, N.K. Kochetkov, Izv. Akad. Nauk SSSR, ser. Khim. 811 (1965) (in Russian)

Colchiside B

CAS Registry Number: 354530-25-9

See Figure Colchiside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hedera colchica* [1]

$C_{60}H_{96}O_{27}$: 1248.613

Mp: 180°C [1]

$[\alpha]_D^{25}$ + 15° (MeOH) [1]

FAB-MS (negative ion mode) *m/z*: 1247 $[M-H]^-$, 1101 $[M-H-146]^-$, 777 $[M-H-146-2 \times 162]^-$ [1]

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

C-1	39.8	C-16	24.04	GlcUA-1	106.83	4	70.95
2	26.9	17	48.07	2	75.37	5	78.06
3	91.2	18	42.55	3	83.59	6	69.41
4	40.73	19	47.25	4	71.85	Glc′-1	104.27
5	57.02	20	31.57	5	76.71	2	75.31
6	17.90	21	34.91	6	176.06	3	76.84
7	33.28	22	33.95	Rha-1	102.72	4	78.18
8	40.19	23	28.54	2	72.26	5	76.71
9	48.81	24	17.05	3	72.36	6	61.87
10	37.92	25	16.13	4	74.04	Rha′-1	102.94
11	24.59	26	17.87	5	69.94	2	72.23
12	123.85	27	26.34	6	17.87	3	72.43
13	144.85	28	178.10	Glc-1	95.76	4	73.76
14	42.94	29	33.52	2	73.84	5	70.65
15	28.95	30	24.15	3	79.52	6	17.87

Pharm./Biol.: In Georgian traditional medicine as a bronchospasmolytic, secretolytic, and anti-inflammatory remedy [1]

References

1. V. Mshvildadze, R. Elias, R. Faure, L. Debrauwer, G. Dekanosidze, E. Kemertelidze, G. Balansard, Chem. Pharm. Bull. **49**(6), 752 (2001)

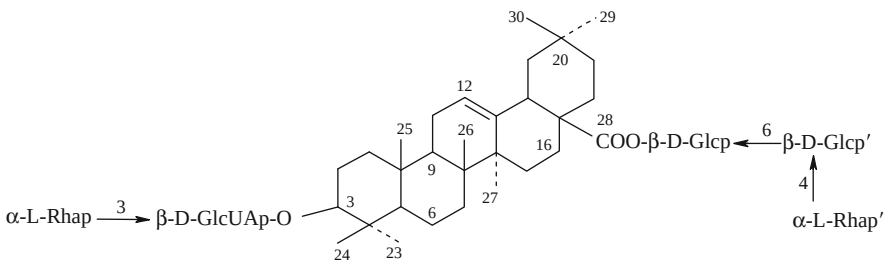
Compound R-1a

See Figure Compound R-1a

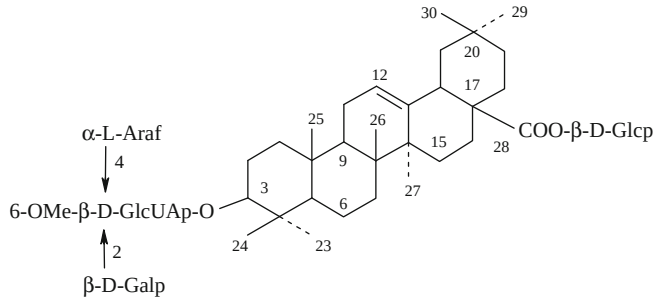
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Tetrapanax papyriferum* [1]

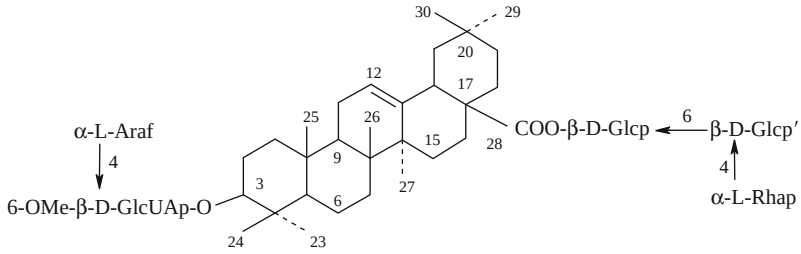
$C_{54}H_{86}O_{23}$: 1102.555



Colchiside B



Compound R-1a



Compound R-1b

Mp: 226–228°C (MeOH) [1]
$[\alpha]_D^{22}$ −21.8° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3600–3200, 1735 [1]
^{1}H NMR (100 MHz, J/Hz, CD_3OD): 3.82 (s, COOMe-GlcUA), 5.28 (m), 5.41 (d, J = 8.0, H-1 of Glc) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-3	89.5	GlcUA-1	106.3	Araf-1	108.6
13	144.0	2	82.5	2	82.3
28	176.5	3	74.1	3	76.7
		4	79.0	4	86.9
		5	74.6	5	62.4
		6	170.0	Glc-1	95.6
		Me	52.4	2	73.9
		Gal-1	104.8	3	78.3
		2	74.2	4	71.0
		3	75.4	5	78.6
		4	69.4	6	62.3
		5	74.7		
		6	61.3		

References

1. S. Takabe, T. Takeda, Y. Chen, Y. Ogihara, Chem. Pharm. Bull. **33**(11), 4701 (1985)

Compound R-1b

See Figure Compound R-1b
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Tetrapanax papyriferum* [1]
$C_{60}H_{96}O_{27}$: 1248.613
Mp: 203–205°C (MeOH) [1]
$[\alpha]_D^{22}$ −27.0° (c 0.6, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3600–3160, 1735 [1]
^{1}H NMR (J/Hz, CD_3OD) (Me ester): 3.79 (s, COOMe), 4.39 (d, J = 7.5), 4.85 (brs, H-1 of Rha), 5.24 (m), 5.33 (d, J = 8.0, H-1 of Glc), 4.92 (brs) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-3	89.3	GlcUA-1	106.7	Glc-1	95.4	Rha-1	102.4
13	144.0	2	74.9	2	73.6	2	72.4
28	176.5	3	75.7	3	78.3	3	72.3
		4	78.3	4	70.6	4	73.5
		5	74.9	5	76.7	5	70.2

(*continued*)

Table 1 (continued)

6	170.2	6	69.0	6	18.4
Me	52.4	Glc′-1	104.4		
Araf-1	108.6	2	74.9		
2	82.5	3	76.3		
3	77.1	4	78.3		
4	86.9	5	77.7		
5	62.5	6	61.1		

References

1. S. Takabe, T. Takeda, Y. Chen, Y. Ogihara, Chem. Pharm. Bull. **33**(11), 4701 (1985)

Compound R-1c (Udosaponin B)

See Figure Compound R-1c (Udosaponin B)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Tetrapanax papyriferum* [1], *Aralia cordata* [2]

$C_{49}H_{78}O_{19}$: 970.513

Mp: 190–193°C [1]

$[\alpha]_D^{22}$ −8.7° (c 0.5, MeOH) [2]

IR (KBr) ν_{max} cm^{-1}: 3600–3150, 1730 [1]

FAB-MS *m/z*: 969 $[M-H]^-$ [2]

^{1}H NMR (100 MHz, J/Hz, CD_3OD): 3.77 (s, COOMe-GlcUA), 5.24 (m), 5.38 (d, J = 7.5, H-1 of Glc) [1]

^{13}C NMR (100 MHz, C_5D_5N): [2]

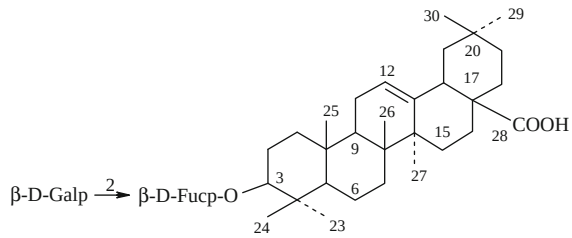
Table 1

C-3	89.2	GlcUA-1	107.1	Gal-1	105.2	Glc-1	95.7
13	144.1	2	83.7	2	74.6	2	74.1
28	176.5	3	76.9	3	76.7	3	78.8
		4	72.8	4	69.4	4	71.1
		5	74.9	5	77.4	5	79.2
		6	170.0	6	61.3	6	62.2
		Me	52.0				

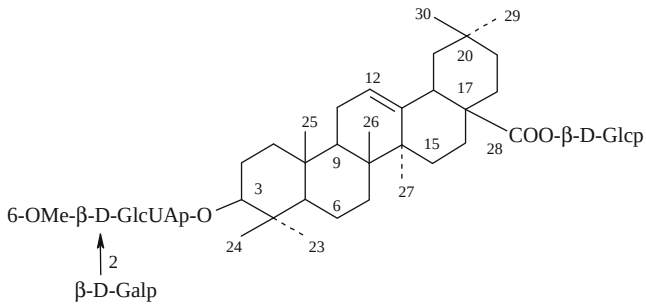
References

1. S. Takabe, T. Takeda, Y. Chen, Y. Ogihara, Chem. Pharm. Bull. **33**(11), 4701 (1985)
2. H. Kawai, M. Nishida, Y. Tashiro, M. Kuroyanagi, A. Ueno, M. Satake, Chem. Pharm. Bull. **37**(9), 2318 (1989)

Compound R-4b



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid



Compound R-1c (Udosaponin B)

Biological sources: *Tetrapanax papyriferum* [1]
$C_{42}H_{68}O_{12}$: 764.471
Mp: 149–152°C [1]
$[\alpha]_D^{22}$ + 33.1° (c 0.2, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3600–3200, 1730 [1]
^{1}H NMR (100 MHz, J/Hz, CD_3OD): 4.21 (d, J = 7.0), 4.37 (d, J = 7.0), 5.32 (m, H-12) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

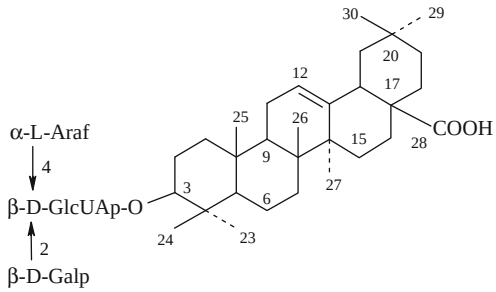
Table 1

C-3	89.2	Fuc-1	105.2	Gal-1	106.6
13	144.5	2	83.2	2	74.6
28	179.8	3	76.6	3	76.5
		4	74.2	4	69.3
		5	72.4	5	77.2
		6	17.3	6	61.3

References

1. S. Takabe, T. Takeda, Y. Chen, Y. Ogihara, Chem. Pharm. Bull. **33**(11), 4701 (1985)

Compound R-2b (R-1d)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Tetrapanax papyriferum* [1, 2], *Cussonia spicata* [3]
$C_{47}H_{74}O_{18}$: 926.487
Mp: 285–295°C [3]
FAB-MS *m/z*: 925 $[M-H]^-$, 793 $[M-H-132]^-$, 763 $[M-H-162]^-$, 631 $[M-H-294]^-$, 455 $[925–470]^-$ [3]
^{13}C NMR (100 MHz, C_5D_5N): [2]

Table 1

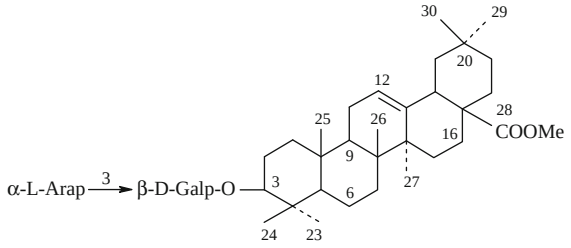
C-3	89.2	GlcUA-1	106.3	Gal-1	104.6	Ara-1	108.4
13	144.5	2	82.9	2	74.2	2	82.3
28	176.6	3	75.7	3	75.4	3	76.5
		4	78.5	4	69.4	4	87.2
		5	74.6	5	76.2	5	62.5
		6	171.8	6	61.2		

Pharm./Biol.: Molluscicidal saponins [1]

References

1. S. Takabe, T. Takeda, Y. Ogihara, K. Yamasaki, J. Chem. Res. (5), 16 (1981) [Chem. Abstr. **95**: 7680s (1981)]
2. S. Takabe, T. Takeda, Y. Chen, Y. Ogihara, Chem. Pharm. Bull. **33**(11), 4701 (1985)
3. J. Gunziger, J.D. Msonthi, K. Hostettman, Phytochemisrty **25**, 2501 (1986)

Compound 1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Randia uliginosa* [1]
$C_{42}H_{68}O_{12}$: 764.471
Mp: 180–185°C (MeOH) [1]
FAB-MS (negative ion) *m/z*: 763, 631, 469, 455, 437, 365, 297 [1]
^{1}H NMR (400 MHz, J/Hz, CD_3OD): 0.74, 0.80, 0.86, 0.91, 1.00, 1.1, 1.18 (s, CH_3 × 7), 5.11 (brs, H-12)
β-D-Galp: 5.25 (d, J = 7.0, H-1)
α-L-Arap: 4.41 (d, J = 6.5, H-1) [1]
^{13}C NMR (100 MHz, CD_3OD): [1]

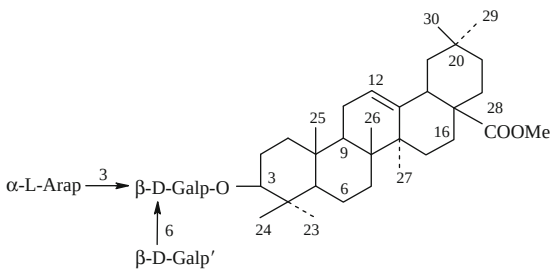
Table 1

C-1	39.7	C-16	23.9	Gal-1	106.4
2	28.53	17	47.2	2	74.7
3	91.04	18	42.6	3	86.8
4	40.1	19	47.6	4	71.1
5	56.9	20	31.5	5	78.1
6	19.2	21	34.8	6	62.5
7	33.5	22	33.7	Ara-1	104.5
8	40.5	23	28.8	2	71.5
9	48.1	24	16.9	3	75.0
10	37.8	25	15.9	4	70.1
11	23.9	26	17.7	5	67.5
12	123.6	27	26.4		
13	145.09	28	181.7		
14	42.8	29	33.9	OMe	51.5
15	28.6	30	24.4		

References

1. O.P. Sati, S. Bahuguna, S. Uniyal, D.S. Bhakuni, Phytochemistry **28**(2), 575 (1989)

Compound 2 from *Randia uliginosa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Randia uliginosa* [1]

$C_{48}H_{78}O_{17}$: 926.523

Mp: 210–215°C (MeOH) [1]

FAB-MS (negative ion) *m*/*z*: 925, 763, 631, 469, 455, 437, 365, 255 [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 0.68, 0.72, 0.80, 0.83, 0.91, 1.02, 1.12 (s, $CH_3 \times 7$), 5.19 (brs, H-12)

β-D-Galp: 5.32 (d, J = 8.0, H-1)

β-D-Galp′: 4.52 (d, J = 8.0, H-1)

α-L-Arap: 4.38 (d, J = 7.0, H-1) [1]

^{13}C NMR (100 MHz, CD_3OD): [1]

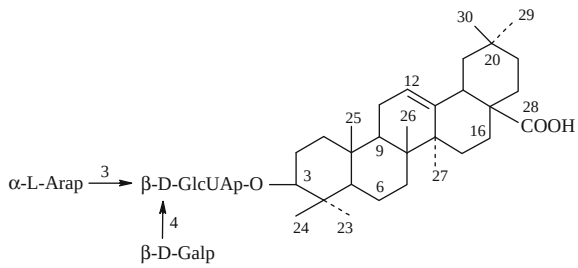
Table 1

C-1	39.8	C-16	24.5	Gal-1	95.6	Ara-1	105.6
2	28.6	17	47.9	2	71.1	2	73.8
3	91.1	18	42.5	3	86.6	3	74.6
4	40.1	19	47.2	4	70.8	4	71.1
5	57.0	20	31.4	5	78.2	5	67.0
6	19.2	21	34.8	6	71.6		
7	33.5	22	33.9	Gal′-1	106.3		
8	40.7	23	28.6	2	71.6		
9	48.3	24	17.0	3	75.0		
10	37.8	25	16.0	4	70.8		
11	24.0	26	17.7	5	78.2		
12	123.7	27	29.4	6	62.5		
13	144.7	28	178.08				
14	42.9	29	33.0	OMe	51.6		
15	28.8	30	24.02				

References

1. O.P. Sati, S. Bahuguna, S. Uniyal, D.S. Bhakuni, Phytochemistry **28**(2), 575 (1989)

Compound 3 from *Randia uliginosa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Randia uliginosa* [1]

$C_{47}H_{74}O_{18}$: 926.487

Mp: 240–245°C (MeOH) [1]

FAB-MS (negative ion) *m/z*: 925, 763, 631, 469, 455, 437, 365, 255 [1]
^{1}H NMR (400 MHz, J/Hz, CD_3OD): 0.71, 0.76, 0.84, 0.88, 0.90, 1.08, 1.20 (s, $CH_3 \times 7$), 5.19 (brs, H-12)
β-D-GlcUAp: 5.31 (d, J = 8.0, H-1)
β-D-Galp′: 4.43 (d, J = 8.0, H-1)
α-L-Arap: 4.38 (d, J = 6.5, H-1) [1]
^{13}C NMR (100 MHz, CD_3OD): [1]

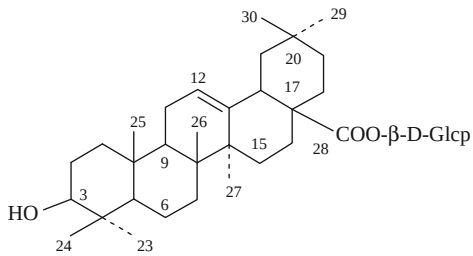
Table 1

C-1	39.7	C-16	23.9	GlcUA-1	95.6	Ara-1	105.7
2	28.5	17	47.9	2	74.4	2	73.8
3	91.1	18	42.5	3	86.8	3	76.1
4	40.05	19	47.2	4	78.4	4	71.1
5	56.9	20	31.4	5	78.2	5	66.9
6	19.2	21	34.8	6	170.9		
7	33.05	22	33.9	Gal-1	106.4		
8	40.06	23	30.5	2	75.0		
9	48.3	24	16.9	3	77.4		
10	37.8	25	15.9	4	70.9		
11	23.9	26	17.7	5	77.8		
12	123.6	27	26.3	6	62.4		
13	144.7	28	177.9				
14	42.8	29	33.4				
15	28.7	30	24.4				

References

1. O.P. Sati, S. Bahuguna, S. Uniyal, D.S. Bhakuni, Phytochemistry **28**(2), 575 (1989)

Compound 3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hemsleya macrosperma*, *H. chinensis* [1], *H. graciliflora* [2]
$C_{36}H_{58}O_8$: 618.413
Mp: 245–247°C (MeOH) [1]
$[\alpha]_D^{21}$ + 42.0° (c 1.00, MeOH) [1]
^{13}C NMR (25.15 MHz, C_5D_5N): [1]

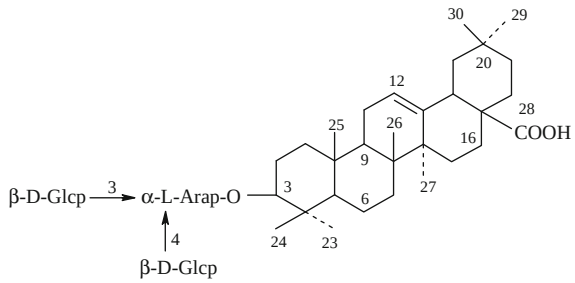
Table 1

C-1	39.0	C-16	23.7	Glc-1	95.6
2	28.1	17	47.0	2	74.0
3	78.1	18	41.7	3	78.8
4	39.3	19	46.3	4	71.1
5	55.8	20	30.8	5	79.1
6	18.8	21	34.1	6	62.2
7	33.2	22	32.5		
8	39.9	23	28.7		
9	48.1	24	16.5		
10	37.4	25	15.6		
11	23.7	26	17.5		
12	122.9	27	26.1		
13	144.1	28	176.3		
14	42.1	29	33.2		
15	28.1	30	23.7		

References

1. R.L. Nie, T. Morita, R. Kasai, J. Zhou, C.-Y. Wu, O. Tanaka, Planta Med. **50**(4), 322 (1984)
2. R. Kasai, T. Tanaka, R.-L. Nie, M. Miyakoshi, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **38**(5), 1320 (1990)

Compound 4 from *Fagonia arabica*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Fagonia arabica* [1]

$C_{47}H_{76}O_{17}$: 912.508

$[\alpha]_D^{25}$ + 31.7° (c 0.52, MeOH) [1]

FAB-MS *m/z*: 935 $[M + Na]^+$, 890, 802, 688, 477, 439, 391, 317, 261, 189 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.83, 0.96, 0.99, 1.02, 1.08, 1.27, 1.29 (s, CH_3 × 7), 3.26 (H-3, H-18), 5.46 (t, J = 2.5, H-12)

α-L-Arap: 4.78 (d, J = 7.5, H-1), 4.72 (dd, J = 6.8, 8.8, H-2), 4.31 (H-3), 4.48 (H-4), 3.66 (brd, J = 11.7, H-5), 4.17 (H-5)

β-D-Glcp: 5.29 (d, J = 7.8, H-1), 3.99 (t, J = 8.0, H-2), 4.20 (H-3), 4.31 (H-4), 3.92 (m, H-5), 4.19, 4.39 (H_2-6)

β-D-Glcp′: 5.50 (d, J = 7.8, H-1), 4.04 (t, J = 8.0, H-2), 4.18 (H-3), 4.27 (H-4), 3.70 (m, H-5), 4.17, 4.47 (H_2-6)

β-D-Glcp″: 6.30 (d, J = 8.0, H-1), 4.15 (t, J = 8.0, H-2), 4.29 (H-3), 4.31 (H-4), 4.01 (m, H-5), 4.39, 4.46 (H_2-6) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.8	Ara-1	105.5	Glc′-1	104.4
2	26.7	17	46.7	2	77.5	2	76.2
3	89.0	18	42.2	3	83.3	3	78.5
4	39.8	19	46.6	4	68.8	4	72.5
5	56.0	20	31.0	5	65.9	5	77.4
6	18.5	21	34.3	Glc-1	105.0	6	63.3
7	33.2	22	33.3	2	75.3		
8	39.8	23	28.1	3	78.7		
9	48.1	24	15.5	4	71.6		
10	37.1	25	16.8	5	78.4		
11	23.9	26	17.5	6	62.6		
12	122.5	27	26.2				
13	145.0	28	n.d.				
14	42.1	29	33.3				
15	28.4	30	23.8				

(*continued*)

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. T. Miyase, F.R. Melek, O.D. El-Gindi, S.M. Abdel-Khalik, M.R. El-Gindi, M.Y. Haggag, S.H. Hilal, Phytochemistry **41**, 1175 (1996)

Compound 11

See Figure Compound 11

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Lonicera japonica* [1], *Medicago polymorpha* [2], *Aralia elata* [3]

$C_{53}H_{86}O_{21}$: 1058.566

$[\alpha]_D^{30}$ −11.1° (c 0.41, MeOH) [2]

IR (KBr)ν_{max} cm^{-1}: 3340, 1735 [1]

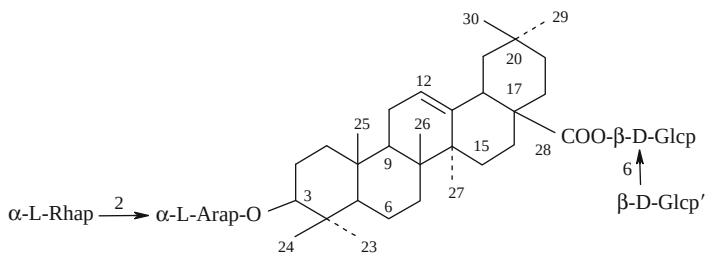
FAB-MS *m/z*: 1081 $[M + Na]^+$ [2]

^{1}H NMR (J/Hz, C_5D_5N): 3.24 (dd, J = 12.1, 4.0, H-3), 5.43 (brs, H-12), 3.21 (d, J = 13.9, H-18), 0.89, 0.89, 0.89, 1.07, 1.11, 1.17, 1.26 (s, CH_3 × 7)

α-L-Arap: 4.91 (d, J = 5.1, H-1)

α-L-Rhap: 6.12 (s, H-1), 1.64 (d, J = 6.2, CH_3-6)

β-D-Glcp: 6.27 (d, J = 8.1, H-1)



Compound 11

β-D-Glcp′: 5.04 (d, J = 7.7, H-1) [2]

^{13}C NMR (C_5D_5N): [2]

Table 1

C-1	38.8	C-16	23.3	Ara-1	104.6	Glc-1	95.5
2	26.4	17	46.9	2	75.8	2	73.8
3	88.7	18	41.6	3	73.9	3	78.3
4	39.4	19	46.1	4	69.8	4	70.7
5	55.8	20	30.6	5	64.3	5	77.8
6	18.4	21	33.9	Rha-1	101.6	6	69.2
7	33.0	22	32.4	2	72.2	Glc′-1	105.1
8	39.8	23	15.5	3	72.4	2	75.0
9	47.9	24	28.0	4	73.4	3	78.3
10	36.9	25	16.8	5	68.4	4	71.4
11	23.7	26	17.4	6	18.4	5	78.5
12	122.7	27	25.9			6	62.5
13	144.0	28	176.4				
14	42.0	29	33.0				
15	28.2	30	23.5				

References

1. H. Kawai, M. Kuroyanagi, K. Umehara, A. Ueno, M. Satake, Chem. Pharm. Bull. **36**, 4769 (1988)
2. J. Kinjo, H. Uemura, M. Nakamura, T. Nohara, Chem. Pharm. Bull. **42**(6), 1339 (1994)
3. S. Saito, S. Sumita, N. Tamura, Y. Nagamura, K. Nishida, M. Ito, I. Ishiguro, Chem. Pharm. Bull. **38**, 411 (1990)

Copteroside E

CAS Registry Number: 86438-29-1

See Figure Copteroside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Climacoptera transoxana* [1]

$C_{52}H_{82}O_{22}$: 1058.529

Mp: 236–240°C [1]

$[\alpha]_D^{20}$ + 10.0° (c 1.4, 65% MeOH) [1]

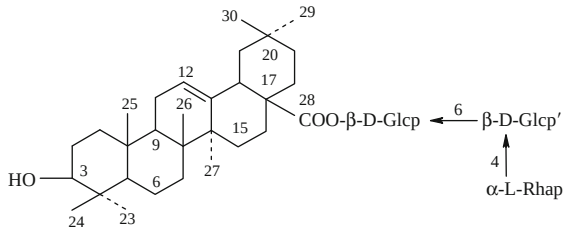
IR (KBr) ν_{max} cm^{-1}: 1740, 3600–3200 [1]

References

1. Ch. Annaev, M.I. Isaev, N.K. Abubakirov, Chem. Nat. Comp. **19**(5), 560 (1983)

Cussonoside B

CAS Registry Number: 30688-36-9

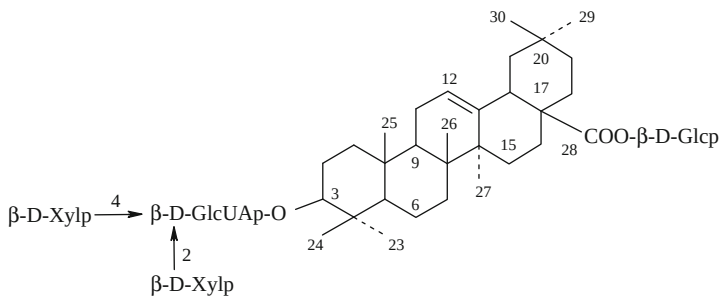


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Anemone anhuiensis* [1], *Cussonia barteri* [2]

$C_{48}H_{78}O_{17}$: 926.523

Mp: 195–200°C [1]



Copteroside E

IR (KBr) ν_{max} cm^{-1}: 3600–3200, 1730, 1590, 1410, 1390 [1]

FAB-MS *m/z*: 926 (60), 762 (10), 704 (7), 652 (8), 590 (7), 519 (12), 455 (100), 413 (60) [1]

^{1}H NMR (J/Hz, DMSO-D_6 + CF_3COOD): 5.23 (m, H-12); β-D-Glcp: 5.28 (d, J = 7.0, H-1); β-D-Glcp′: 4.30 (d, J = 7.0, H-1); α-L-Rhap: 4.88 (d, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

Glc-1	95.7	Glc′-1	105.0	Rha-1	102.7
2	73.9	2	75.4	2	72.5
3	78.0	3	76.6	3	72.2
4	70.4	4	78.8	4	73.9
5	76.6	5	77.2	5	70.4
6	69.7	6	61.5	6	18.8

References

1. W.-C. Ye, Q.-W. Zhang, S.-X. Zhao, C.-T. Che, Chem. Pharm. Bull. **49**(5), 632 (2001)
2. M.A. Dubois, M. Ilyas, H. Wagner, Planta Med. **52**(2), 80 (1986)

Cynarasaponin H

CAS Registry Number: 114006-82-5

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

See Figure Cynarasaponin H

Biological sources: *Cynara carduncul*us [1]

$C_{47}H_{74}O_{18}$: 926.487

$[\alpha]_D^{21}$ + 0.68° (c 1.48, MeOH) [1]

^{1}H NMR (89.55 MHz, J/Hz, C_5D_5N): 5.44 (brs, H-12) [1]

β-D-GlcUAp: 5.01(d, J = 7.0 ,H-1), 3.75 (s, COOMe) [1]

α-L-Arap: 5.20 (d, J = 7.0, H-1) [1]

β-D-Glcp: 6.34 (d, J = 7.0, H-1) [1]

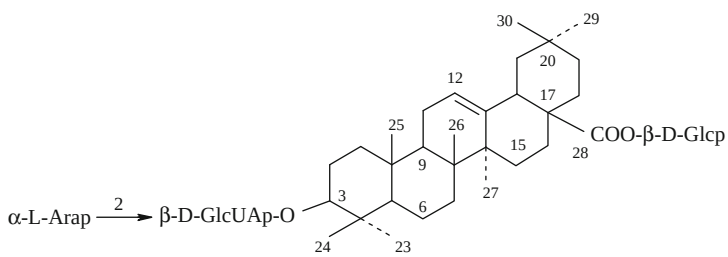
^{13} C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.8	C-16	23.7	GlcUA-1	105.3	Glc-1	95.7
2	26.7	17	47.0	2	83.3	2	74.2
3	89.3	18	41.8	3	76.7	3	79.2
4	39.6	19	46.3	4	73.7	4	71.2
5	55.9	20	30.8	5	77.3	5	78.9
6	18.5	21	34.1	6	170.4	6	62.3
7	33.2	22	32.6	Me	52.1		
8	39.9	23	28.0	Ara-1	106.6		
9	48.1	24	15.6	2	72.8		
10	37.0	25	16.4	3	74.2		
11	23.7	26	17.5	4	69.1		
12	122.9	27	26.2	5	67.0		
13	144.2	28	176.4				
14	42.2	29	33.2				
15	28.3	30	23.7				

References

1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)



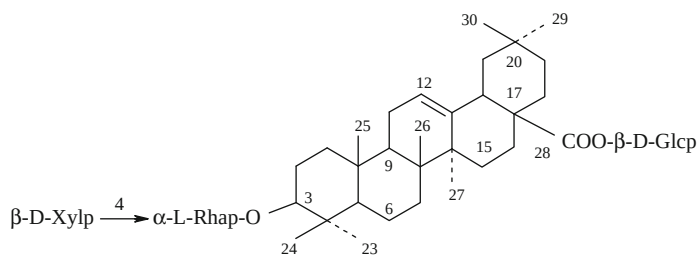
Cynarasaponin H

Digitoside A

CAS Registry Number: 140208-79-3
See Figure Digitoside A
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Digitalis ciliata* [1]
$C_{47}H_{76}O_{16}$: 896.513
Mp: 220–221°C [1]
$[\alpha]_D^{20}$ −3.0° (c 1.0, EtOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1755, 1650 [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.73 (3H, s), 0.79 (3H, s), 0.82 (3H, s), 0.86 (3H, s), 1.00 (3H, s), 1.11 (3H, s), 1.14 (3H, s), 1.53 (d, J = 6.0, CH_3-6 of Rha), 5.33 (brs, H-12) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	22.8	Rha-1	101.1	Glc-1	95.4
2	26.1	17	46.6	2	71.9	2	73.8
3	88.0	18	41.8	3	71.5	3	78.2
4	38.7	19	45.9	4	78.1	4	71.0
5	55.8	20	30.2	5	69.1	5	79.0
6	18.1	21	33.6	6	17.9	6	62.1
7	32.7	22	31.9	Xyl-1	105.0		
8	39.4	23	27.7	2	73.4		
9	47.7	24	16.4	3	77.4		
10	36.6	25	15.1	4	70.8		
11	23.3	26	16.9	5	66.1		
12	122.3	27	25.4				
13	143.7	28	176.0				
14	41.8	29	32.5				
15	27.7	30	23.2				



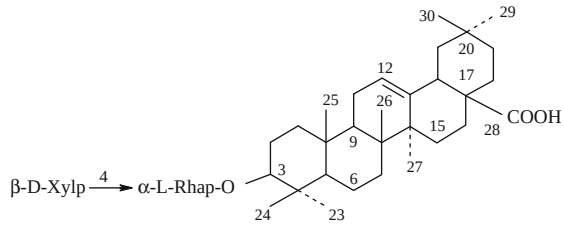
Digitoside A

References

1. E.P. Kemertelidze, L.N. Gvazava, M.D. Alaniya, V.S. Kikoladze, Chem. Nat. Comp. **27**(2), 212 (1991)

Digitoside B

CAS Registry Number: 140208-80-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Digitalis ciliata* [1]
$C_{41}H_{66}O_{11}$: 734.460
Mp: 268–270°C [1]
$[\alpha]_D^{20}$ −5.1° (c 1.0, EtOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1700, 1650 [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.72 (3H, s), 0.80 (3H, s), 0.86 (3H, s), 1.10 (3H, s), 1.14 (3H, s), 1.52 (d, J = 6.0, CH_3-6 of Rha), 5.31 (brs, H-12) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.3	Rha-1	101.1
2	26.1	17	46.1	2	71.9

(*continued*)

Table 1 (continued)

3	87.9	18	41.6	3	71.5
4	38.5	19	46.1	4	78.2
5	55.6	20	30.2	5	69.1
6	17.9	21	33.8	6	17.9
7	32.5	22	32.5	Xyl-1	105.1
8	39.2	23	27.7	2	73.5
9	47.5	24	16.3	3	77.5
10	36.5	25	14.9	4	70.8
11	23.2	26	16.8	5	66.0
12	121.8	27	25.4		
13	144.3	28	178.7		
14	41.6	29	32.5		
15	27.5	30	23.2		

References

1. E.P. Kemertelidze, L.N. Gvazava, M.D. Alaniya, V.S. Kikoladze, Chem. Nat. Comp. **27**(2), 212 (1991)

Elatoside A

CAS Registry Number: 155836-04-7

See Figure Elatoside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia elata* [1]

$C_{47}H_{74}O_{18}$: 926.487

Mp: 198.5–200.5°C ($CHCl_3$-MeOH) [1]

$[\alpha]_D^{20}$ + 14.1° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 2944, 1698, 1636, 1076 [1]

FAB-MS (positive ion mode) *m/z*: 949.4773 $(M + Na)^+$ [1]

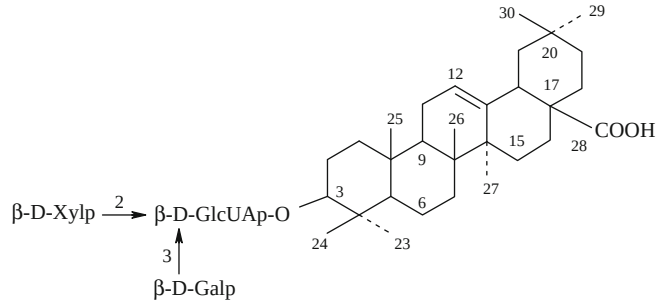
^{1}H NMR (J/Hz, C_5D_5N): 0.79, 1.01, 1.06, 1.27, 1.32 (s, CH_3-25, 30, 24, 23, 27), 0.97 (s, CH_3-26, 29), 3.25 (dd-like, H-18), 3.26 (dd-like, H-3), 4.95 (d-like, H-1 of GlcUA), 5.32 (d, J = 7.6, H-1 of Gal), 5.45 (brs, H-12), 5.54 (d, J = 7.2, H-1 of Xyl) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-18	42.0	GlcUA-1	105.3
2	26.6	19	46.5	2	79.0
3	89.8	20	31.0	3	87.8
4	39.7	21	34.2	4	71.8
5	55.8	22	33.2	5	77.2
6	18.5	23	27.7	6	171.8
7	33.2	24	16.4	Xyl-1	104.7
8	39.7	25	15.4	2	76.1
9	48.0	26	17.4	3	78.9
10	36.9	27	26.2	4	71.3
11	23.8	28	180.2	5	67.1
12	122.5	29	33.3	Gal-1	105.2
13	144.8	30	23.8	2	72.9
14	42.1			3	75.3
15	28.3			4	70.1
16	23.8			5	77.3
17	46.6			6	62.0

Pharm./Biol.: Elatoside A showed potent inhibitors activity on ethanol absorption and hypoglycemic activity [2]



Elatoside A

References

1. M. Yoshikawa, T. Murakami, E. Harada, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1915 (1996)
2. M. Yoshikawa, T. Murakami, E. Harada, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1923 (1996)

Elatoside B

CAS Registry Number: 156856-38-1

See Figure Elatoside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia elata* [1]

$C_{48}H_{76}O_{19}$: 956.498

Mp: 186.0–187.0°C ($CHCl_3$-MeOH) [1]

$[\alpha]_D^{21}$ + 15.3° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3430, 2946, 1698, 1638, 1078 [1]

FAB-MS (positive ion mode) *m/z*: 979.4879 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.77, 1.00, 1.11 (s, CH_3-25, 30, 24), 0.96, 1.31 (s, CH_3-26, 29, 23, 27), 3.27 (dd-like, H-3, 18), 4.94 (d, J = 7.3, H-1 of GlcUA), 5.31 (d, J = 7.6, H-1 of Gal′), 5.45 (brs, H-12), 5.53 (d, J = 7.6, H-1 of Gal) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-19	46.5	GlcUA-1	105.3
2	26.6	20	31.0	2	79.3
3	89.6	21	34.2	3	87.6
4	39.6	22	33.2	4	71.9
5	55.8	23	28.1	5	77.1
6	18.5	24	16.7	6	172.2
7	33.2	25	15.4	Gal-1	104.6
8	39.7	26	17.4	2	73.7
9	47.9	27	26.2	3	75.3
10	36.9	28	180.2	4	69.8
11	23.8	29	33.3	5	76.6
12	122.6	30	23.8	6	61.6
13	144.8			Gal′-1	105.2
14	42.2			2	72.9
15	28.3			3	75.3
16	23.8			4	70.2
17	46.7			5	77.3
18	42.0			6	62.0

Pharm./Biol.: Elatoside B showed potent inhibitors activity on ethanol absorption and hypoglycemic activity [1]

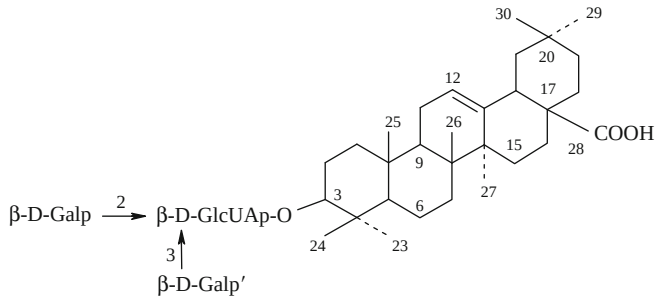
References

1. M. Yoshikawa, T. Murakami, E. Harada, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1915 (1996)

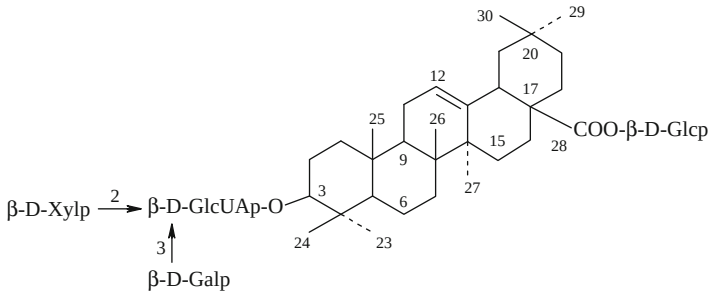
Elatoside C

CAS Registry Number: 156856-39-2

See Figure Elatoside C



Elatoside B



Elatoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia elata* [1]

$C_{53}H_{84}O_{23}$: 1088.540

Mp: 208.5–209.5°C ($CHCl_3$-MeOH) [1]

$[\alpha]_D^{21}$ −1.6° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3389, 2946, 1734, 1076 [1]

FAB-MS (positive ion mode) *m/z*: 1111.5302 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.82, 0.88, 0.92, 1.07, 1.08, 1.26, 1.29 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 3.19 (dd-like, H-18), 3.24 (dd-like, H-3), 4.93 (d-like, H-1 of GlcUA), 5.31 (d, J = 7.6, H-1 of Gal), 5.41 (brs, H-12), 5.54 (d, J = 7.2, H-1 of Xyl), 6.33 (d, J = 7.9, H-1 of Glc) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.4	GlcUA-1	105.3	Gal-1	105.3
2	26.6	17	47.0	2	79.0	2	72.9
3	89.8	18	41.7	3	88.1	3	75.3
4	39.7	19	46.2	4	71.9	4	70.1
5	55.8	20	30.8	5	77.2	5	77.5
6	18.5	21	34.0	6	171.8	6	61.9
7	33.1	22	32.5	Xyl-1	104.7	Glc-1	95.7
8	39.9	23	27.7	2	76.1	2	74.1
9	48.0	24	16.4	3	79.0	3	78.9
10	36.9	25	15.5	4	71.3	4	71.1
11	23.6	26	17.4	5	67.1	5	79.3
12	122.9	27	26.1			6	62.2
13	144.1	28	176.4				
14	42.1	29	33.1				
15	28.2	30	23.6				

Pharm./Biol.: Elatoside C showed potent inhibitors activity on ethanol absorption and hypoglycemic activity [1]

References

1. M. Yoshikawa, T. Murakami, E. Harada, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1915 (1996)

Elatoside D

CAS Registry Number: 156856-40-5

See Figure Elatoside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia elata* [1]

$C_{54}H_{86}O_{24}$: 1118.550

Mp: 188.5–189.5°C ($CHCl_3$-MeOH) [1]

$[\alpha]_D^{22}$ + 6.9° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3386, 2946, 1734, 1078 [1]

FAB-MS (positive ion mode) *m/z*: 1141 $(M + Na)^+$ [1]

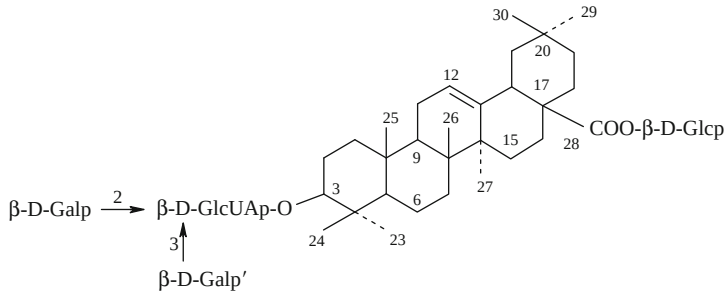
^{1}H NMR (J/Hz, C_5D_5N): 0.66, 0.75, 0.78, 0.94, 0.99, 1.13, 1.16 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 3.05 (dd-like, H-18), 3.14 (dd-like, H-3), 4.82 (d, J = 7.3, H-1 of GlcUA), 5.16 (d, J = 7.6, H-1 of Gal′), 5.27 (brs, H-12), 5.39 (d, J = 7.6, H-1 of Gal), 6.19 (d, J = 7.6, H-1 of Glc) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.5	GlcUA-1	105.3	Gal′-1	105.2
2	26.6	17	47.0	2	79.3	2	73.0
3	89.6	18	41.8	3	87.7	3	75.4
4	39.6	19	46.2	4	71.9	4	70.2

(*continued*)



Elatoside D

Table 1 (continued)

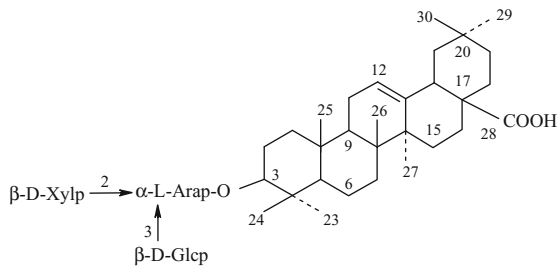
5	55.7	20	30.8	5	77.2	5	77.4
6	18.5	21	34.0	6	172.2	6	62.0
7	33.2	22	32.6	Gal-1	104.7	Glc-1	95.8
8	39.9	23	27.9	2	73.8	2	74.2
9	48.0	24	16.7	3	75.4	3	78.9
10	36.9	25	15.5	4	69.8	4	71.1
11	23.8	26	17.5	5	76.6	5	79.3
12	122.9	27	26.1	6	61.6	6	62.2
13	144.1	28	176.3				
14	42.2	29	33.2				
15	28.2	30	23.6				

References

1. M. Yoshikawa, T. Murakami, E. Harada, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1915 (1996)

Elatoside E (Compound 3)

CAS Registry Number: 156980-30-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia elata* [1, 2], *Fagonia arabica* [3]

$C_{46}H_{74}O_{16}$: 882.497

Mp: 192.5–194°C (aq. AcOH) [1]

$[\alpha]_D^{23}$ + 43.6° (c 1.0, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 2943, 1698, 1076 [1]

FAB-MS *m/z*: 905 $[M + Na]^+$, 860, 772, 578, 439, 391, 289, 248, 203 [3]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 0.96, 0.99, 1.02, 1.09, 1.28, 1.30 (s, CH_3 × 7), 3.26 (H-3, H-18), 5.46 (t, J = 2.5, H-12)

α-L-Arap: 4.75 (d, J = 7.1, H-1), 4.65 (dd, J = 9.7, 8.5, H-2), 4.31 (H-3), 4.48 (H-4), 3.66 (brd, J = 11.0, H-5), 4.17 (H-5)

β-D-Xylp: 5.37 (d, J = 7.6, H-1), 4.0 (t, J = 8.0, H-2), 4.09 (t, J = 8.0, H-3), 4.2 (H-4), 3.44 (t, J = 10.0, H-5)

β-D-Glcp: 5.26 (d, J = 7.8, H-1), 3.98 (t, J = 8.5, H-2), 4.20 (H-3), 4.31 (t, J = 8.0, H-4), 3.91 (m, H-5), 4.45 (dd, J = 12.0, 2.5, H-6), 4.39 (H-6) [3]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-18	42.0	Ara-1	105.7
2	26.7	19	46.5	2	77.4
3	89.2	20	31.0	3	83.7
4	39.7	21	34.2	4	69.0
5	56.0	22	33.2	5	66.2
6	18.5	23	27.8	Xyl-1	105.1
7	33.3	24	16.5	2	76.0
8	39.8	25	15.5	3	79.1
9	48.1	26	17.4	4	71.5
10	37.1	27	26.2	5	67.1

(*continued*)

Table 1 (continued)

11	23.8	28	180.2	Glc-1	105.1
12	122.6	29	33.3	2	75.3
13	144.8	30	23.8	3	78.4
14	42.2			4	71.4
15	28.3			5	78.5
16	23.7			6	62.6
17	46.7				

Pharm./Biol.: Elatoside E showed hypoglycemic activity [2]

References

1. M. Yoshikawa, T. Murakami, E. Harada, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1923 (1996)
2. M. Yoshikawa, H. Matsuda, E. Harada, T. Murakami, N. Warishi, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **42**, 1354 (1994)
3. T. Miyase, F.R. Melek, O.D. El-Gindi, S.M. Abdel-Khalik, M.R. El-Gindi, M.Y. Haggag, S.H. Hilal, Phytochemistry **41**, 1175 (1996)

Elatoside F

CAS Registry Number: 144118-18-3

See Figure Elatoside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia elata* [1], *Fagonia arabica* [2]

$C_{52}H_{84}O_{21}$: 1044.550

Mp: 212.5–214.0°C ($CHCl_3$-MeOH-aq. AcOH) [1]

$[\alpha]_D^{24}$ + 24.3° (c 1.0, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 2944, 1734, 1638, 1076 [1]

FAB-MS *m/z*: 1067 $[M + Na]^+$, 905, 860, 467, 440, 391, 287, 248, 203 [2]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.88, 0.89, 0.92, 1.09, 1.09, 1.26, 1.27 (s, CH_3 × 7), 3.19 (dd, J = 14.5, 2.6, H-18), 3.35 (dd, J = 12.0, 4.5, H-3), 5.43 (t, J = 3.0, H-12)

α-L-Arap: 4.75 (d, J = 7.5, H-1), 4.64 (dd, J = 9.0, 7.0, H-2), 4.27 (H-3), 4.48 (m, H-4), 3.66 (d, J = 11.0, H-5), 4.16 (H-5)

β-D-Glcp: 5.26 (d, J = 8.0, H-1), 3.98 (t, J = 8.0, H-2), 4.2 (H-3), 4.30 (H-4), 3.91 (m, H-5), 4.24, 4.44 (H_2-6)

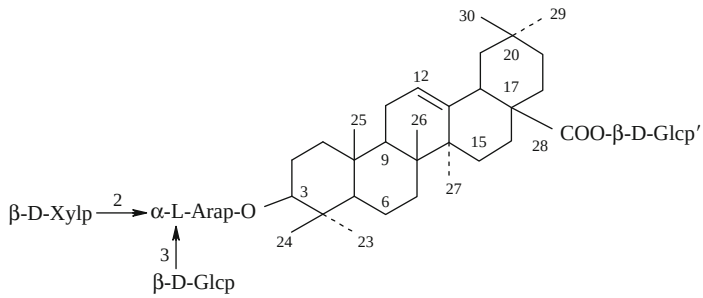
β-D-Xylp: 5.37 (d, J = 7.5, H-1), 4.0 (t, J = 8.0, H-2), 4.08 (t, J = 8.0, H-3), 4.2 (H-4), 3.43 (brt, J = 10.0, H_2-5)

β-D-Glcp′: 6.3 (d, J = 8.0, H-1), 4.18 (t, J = 8.0, H-2), 4.26 (H-3), 4.30 (H-4), 4.01 (m, H-5), 4.38 (dd, J = 12.0, 4.5, H-6), 4.44 (H-6) [2]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.4	Ara-1	105.7	Xyl-1	105.2
2	26.7	17	47.0	2	77.4	2	76.0
3	89.2	18	41.8	3	83.7	3	79.1
4	39.8	19	46.2	4	69.0	4	71.6
5	56.0	20	30.8	5	66.2	5	67.1
6	18.6	21	34.0	Glc-1	105.2	Glc′-1	95.8
7	33.2	22	32.5	2	75.3	2	74.2
8	39.9	23	27.9	3	78.4	3	78.9
9	48.1	24	16.5	4	71.4	4	71.1
10	37.1	25	15.6	5	78.5	5	79.4
11	23.8	26	17.5	6	62.6	6	62.2
12	122.9	27	26.1				
13	144.1	28	176.5				
14	42.2	29	33.2				
15	28.3	30	23.7				



Elatoside F

References

1. M. Yoshikawa, T. Murakami, E. Harada, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1923 (1996)
2. T. Miyase, F.R. Melek, O.D. El-Gindi, S.M. Abdel-Khalik, M.R. El-Gindi, M.Y. Haggag, S.H. Hilal, Phytochemistry **41**, 1175 (1996)

Elatoside I

CAS Registry Number: 52657-00-8
See Figure Elatoside I
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Aralia elata* [1]
$C_{48}H_{76}O_{19}$: 956.498
Mp: 262.8–265.1°C (H_2O-MeOH) [1]
$[\alpha]_D^{29}$ + 17.4° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1721, 1701, 1648, 1078 [1]
FAB-MS *m/z*: 955.4918 $[M-H]^-$ [1]
FAB-MS *m/z*: 955 $[M-H]^-$, 793 $[M-C_6H_{11}O_5]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.77, 1.01, 1.07, 1.25, 1.31 (s, CH_3-25, 30, 24, 23, 27), 0.96 (s, CH_3-26, 29), 3.30 (dd-like, 3, H-18), 5.43 (brs, H-12)
β-D-GlcUAp: 4.97 (d, J = 6.9, H-1)
β-D-Glcp: 5.40 (d, J = 8.2, H-1); β-D-Glcp′: 5.72 (d, J = 7.6, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

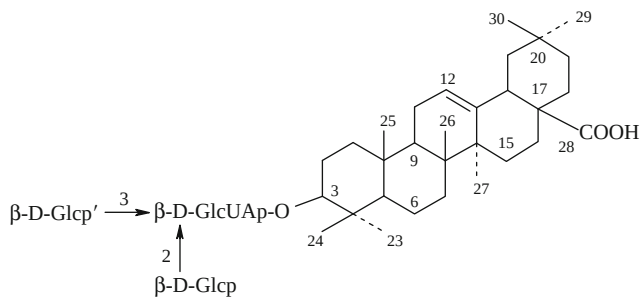
C-1	38.5	C-16	23.7	GlcUA-1	105.2	Glc′-1	104.6
2	26.5	17	44.6	2	78.9	2	75.4
3	89.6	18	41.9	3	87.4	3	78.5
4	39.6	19	46.4	4	71.8	4	71.5
5	55.7	20	30.9	5	77.2	5	78.5
6	18.4	21	34.2	6	171.9	6	63.3
7	33.3	22	33.3	Glc-1	103.8		
8	39.7	23	27.6	2	76.3		
9	47.9	24	16.6	3	78.5		
10	36.9	25	15.4	4	72.5		
11	23.7	26	17.3	5	77.9		
12	122.5	27	26.2	6	62.3		
13	144.8	28	180.2				
14	42.1	29	33.3				
15	28.3	30	23.7				

References

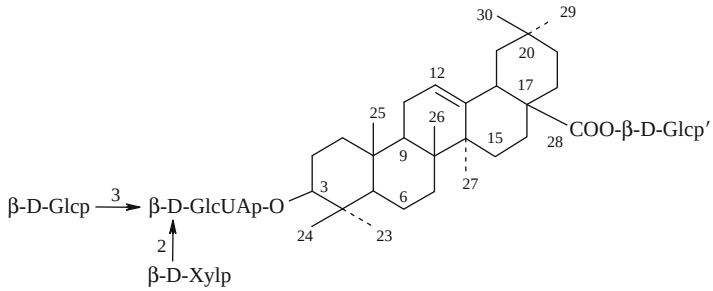
1. M. Yoshikawa, S. Yoshizumi, T. Ueno, H. Matsuda, T. Murakami, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(11), 1878 (1995)

Elatoside K

CAS Registry Number: 91204-06-7
See Figure Elatoside K
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides



Elatoside I



Elatoside K

of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia elata* [1]

$C_{53}H_{84}O_{23}$: 1088.540

Mp: 219.2–222.4°C (H_2O-MeOH) [1]

$[\alpha]_D^{26}$ + 2.0° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1728, 1638, 1075 [1]

FAB-MS *m/z*: 1133 $[M + 2Na + H]^+$, 1111 $[M + Na]^+$ [1]

FAB-MS *m/z*: 1087 $[M-H]^-$, 955 $[M-C_5H_9O_4]^-$, 925 $[M-C_6H_{11}O_5]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.82, 0.88, 0.91, 1.27, 1.28 (s, CH_3-25, 30, 29, 23, 27), 1.08 (s, CH_3-24, 26), 3.24 (dd-like, H-3), 3.25 (dd-like, H-18), 5.40 (brs, H-12)

β-D-GlcUAp: 4.96 (d-like, H-1)

β-D-Glcp: 5.40 (1H, d, J = 7.3, H-1); β-D-Glcp′: 6.32 (1H, d, J = 7.9, H-1)

β-D-Xylp: 5.59 (1H, d, J = 7.3, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

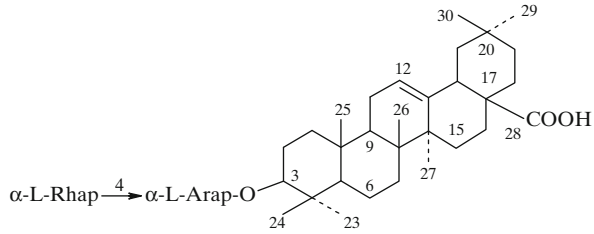
Table 1

C-1	38.6	C-16	23.4	GlcUA-1	105.3	Glc-1	104.7
2	26.6	17	47.0	2	79.1	2	75.4
3	89.8	18	41.7	3	87.9	3	78.9
4	39.7	19	46.2	4	71.9	4	71.6
5	55.8	20	30.8	5	77.2	5	78.6
6	18.5	21	34.0	6	171.8	6	62.2
7	33.1	22	33.1	Xyl-1	104.7	Glc′-1	95.8
8	39.9	23	27.7	2	76.2	2	74.1
9	48.0	24	16.4	3	78.6	3	78.9
10	36.9	25	15.5	4	71.4	4	71.1
11	23.6	26	17.4	5	67.2	5	79.3
12	122.5	27	26.1			6	62.2
13	144.1	28	176.4				
14	42.1	29	33.1				
15	28.2	30	23.6				

References

1. M. Yoshikawa, S. Yoshizumi, T. Ueno, H. Matsuda, T. Murakami, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(11), 1878 (1995)

Eleutheroside I (Mubenin B)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Eleutherococcus senticosus*. [1, 2], *Stauntonia hexaphylla* [3]

$C_{41}H_{66}O_{11}$: 734.460

Mp: 238–246°C [1]

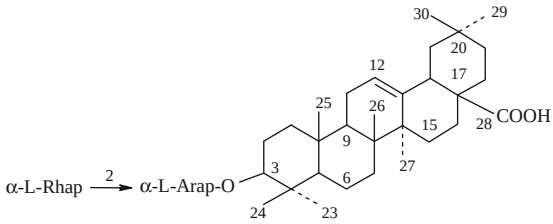
$[\alpha]_D^{20}$ + 30.7° (MeOH) [1]

References

1. G.M. Frolova, Yu.S. Ovodov, Chem. Nat. Comp. **7**(5), 601 (1971)
2. G.M. Frolova, Yu.S. Ovodov, N.I. Suprunov, Chem. Nat. Comp. **7**(5), 597 (1971)
3. T. Takemoto, K. Kometani, Justus Liebigs Ann. Chem. **685**, 237 (1965)

Eleutheroside K (Tauroside C, β-Hederin, Saponin P_b, Glycoside B_1)

CAS Registry Number: 35790-95-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Akebia quinata* [1], *Eleutheroccocus sentcosus* [2], *Hedera helix* [3], *H. nepalensis* [4], *H. taurica* [5], *Patrinia scabiosaefolia* [6], *Tupidanthus calyptratus* [7], *Astrantia major* [8]

$C_{41}H_{66}O_{11}$: 734.460

Mp: 222–225°C [1]

$[\alpha]_D^{15-25}$ + 9.0° [4]

IR (KBr) ν_{max} cm^{-1}: 3350, 1690 [4]

FAB-MS *m/z*: 733 $[M-H]^-$ (100), 587 $[M-H-146]^-$(18), 455 $[M-H-146-132]^-$(34) [7]

^{1}H NMR (J/Hz) (Me ester): 3.20 (dd, J = 4.5, 12.0, H-3), 5.34 (brt, H-12), 1.20, 1.14, 1.03, 0.90, 0.83, 0.80 (s, CH_3×7) [2]

α-L-Arap: 4.85 (d, J = 6.0, H-1), 4.50 (t, J = 6.0, H-2), 4.1–4.4 (m, H-3, H-4, He-5), 3.6-3.9 (m, Ha-5, O-CH_3)

α-L-Rhap: 6.06 (d, J = 1.8, H-1), 4.69 (dd, J = 3.5, H-2), 4.57 (dd, J = 9.5, H-3), 4.25 (t, J = 9.5, H-4), 4.53 (dd, J = 6.0, H-5), 1.58 (d, J = 6, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.0	C-12	122.5	C-23	28.2	Ara-1	104.1
2	26.4	13	144.7	24	16.8	2	76.1
3	88.8	14	42.2	25	15.6	3	72.8
4	39.4	15	28.2	26	17.3	4	67.8
5	55.9	16	23.7	27	26.2	5	63.6
6	18.5	17	46.7	28	180.0	Rha-1	101.5
7	33.2	18	41.9	29	33.3	2	72.0
8	39.8	19	46.5	30	23.7	3	72.3
9	48.0	20	30.9			4	73.7
10	37.1	21	34.3			5	69.7
11	23.7	22	33.3			6	18.2

(*continued*)

References

1. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **24**(5), 1021 (1976)
2. G.M. Frolova, Yu.S. Ovodov, Chem. Nat. Comp. **7**(5), 597 (1971)
3. V.I. Grishkovets, A.E. Kondratenko, N.V. Tolkacheva, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **30**(6), 742 (1994)
4. H. Kizu, S. Kitagawa, F. Nakatani, T. Tomimori, T. Namba, Chem. Pharm. Bull. **33**, 3324 (1985)
5. A.A. Loloyko, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **24**(3), 320 (1988)
6. T. Nakanishi, K. Tanaka, H. Murata, M. Somekawa, A. Inada, Chem. Pharm. Bull. **41**, 183 (1993)
7. V.I. Grishkovets, Chem. Nat. Comp. **35**(5), 547 (1999)
8. K. Hiller, C. Adler, G. Galetska, P. Franke, E. Grundemann, J. Hille, Pharmazie **40**(5), 342 (1985)

Eleutheroside L

See Figure Eleutheroside L

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Eleutherococcus senticosus* [1, 2]

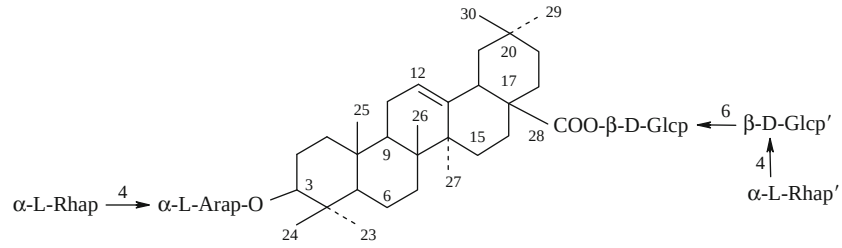
$C_{59}H_{96}O_{25}$: 1204.624

Mp: 200–202°C (i-PrOH) [1]

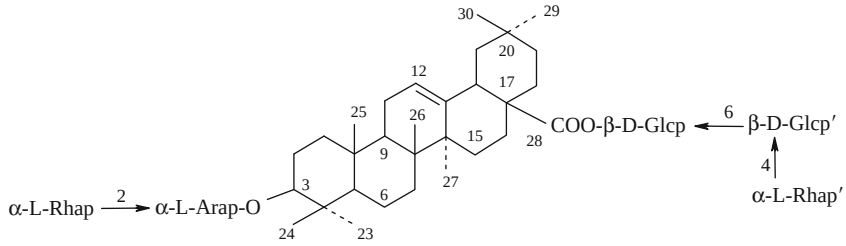
$[\alpha]_D^{20}$−21.0° (EtOH) [1]

References

1. G.M. Frolova, Yu.S. Ovodov, Chem. Nat. Comp. **7**(5), 601 (1971)
2. G.M. Frolova, Yu.S. Ovodov, N.I. Suprunov, Chem. Nat. Comp. **7**(5), 597 (1971)



Eleutheroside L



Eleutheroside M (Hederasaponin B, Hederacolchiside C, Glycoside F_1)

Eleutheroside M (Hederasaponin B, Hederacolchiside C, Glycoside F_1)

See Figure Eleutheroside M (Hederasaponin B, Hederacolchiside C, Glycoside F_1)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Tupidanthus calyptratus* [1], *Hedera taurica* [2], *Eleutherococcus senticosus* [3], *Hedera colchica* [4], *H. helix* [5], *Clematis tibetana* [6], *C. stans* [7], *Kalopanax pictus* [8], *Acanthopanax senticosus* [9], *Akebia quinata* [10], *Kalopanax septemlobus* [11]

$C_{59}H_{96}O_{25}$: 1204.624

$[\alpha]_D^{20}$ −28.8° (c 4.9, MeOH) [2]

^{1}H NMR (J/Hz, C_5D_5N): 3.18 (dd, J = 4.0, 12.0, H-3), 5.36 (brt, J = 3.8, H-12), 1.19, 1.10, 1.03, 1.00, 0.84, 0.83, 0.81 (s, CH_3 × 7)

α-L-Arap: 4.84 (d, J = 5.3, H-1), 4.48 (dd, J = 7.0, H-2), 4.21–4.30 (m, H-3,-4,-5), 3.78 (d, J = 8.9, H-5)

α-L-Rhap: 6.01 (d, J = 1.5, H-1), 4.67 (dd, J = 3.3, H-2), 4.55 (dd, J = 9.5, H-3), 4.25 (m, H-4), 4.50 (d, J = H-5), 1.58 (d, J = 6.0, CH_3-6)

β-D-Glcp: 6.16 (d, J = 8.1, H-1), 4.07 (t, J = 8.5, H-2), 4.17 (t, J = 8.5, H-3)

β-D-Glcp′: 4.92 (d, J = 7.9, H-1), 3.87 (dd, J = 8.9, H-2), 4.06 (t, J = 9.0, H-3), 4.30 (t, J = 9.0, H-4), 3.57 (H-5), 4.12 (Ha-6), 4.20 (Hb-6)

α-L-Rhap′: 5.74 (d, J = 1.5, H-1), 4.60 (dd, J = 3.3, H-2), 4.48 (dd, J = 9.2, H-3), 4.27 (t, J = 9.5, H-4), 4.85 (d, H-5), 1.64 (d, J = 6.1, CH_3-6) [2]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.0	C-13	144.0	C-25	15.5	Rha-1	101.5	Glc′-1	104.4
2	26.3	14	42.1	26	17.4	2	72.0	2	75.0
3	88.9	15	28.1	27	25.9	3	72.3	3	76.3
4	39.3	16	23.3	28	176.5	4	73.8	4	78.4
5	55.9	17	47.0	29	33.0	5	69.8	5	76.8
6	18.5	18	41.6	30	23.6	6	18.2	6	61.3
7	33.0	19	46.2	Ara-1	104.2	Glc-1	95.5	Rha′-1	102.5
8	39.9	20	30.6	2	76.0	2	73.7	2	72.2
9	48.0	21	34.0	3	72.8	3	78.6	3	72.5
10	37.0	22	32.5	4	67.9	4	70.8	4	73.7

(*continued*)

Table 1 (continued)

11	23.6	23	28.1	5	63.7	5	77.7	5	70.2
12	122.5	24	16.8			6	69.2	6	18.3

References

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10. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **24**(5), 1021 (1976)
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Entada Saponin II (ES-II)

CAS Registry Number: 102191-02-6

See Figure Entada Saponin II (ES-II)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Entada phaseoloides* [1]

$C_{88}H_{139}NO_{42}$: 1881.877

Mp: 214–216°C (dec.) [1]

$[\alpha]_D^{25} -15.2°$ (c 0.66, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1725, 1640, 1550 [1]

FAB-MS *m/z*: 1920 $[M + K]^+$, 1904 (M + Na) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.77, 0.87, 0.95, 0.93, 1.26, 0.95, 0.91 (s, CH_3-23, 24, 25, 26, 27, 29, 30)

β-D-GlcNAcp: 2.16 (s, CH_3–CONH), 9.20 (NH); β-D-Glcp: 2.03 (s, OAc)

Terpenyl part: 1.95 (s, CH_3-2), 1.47 (s, CH_3-6) [1]

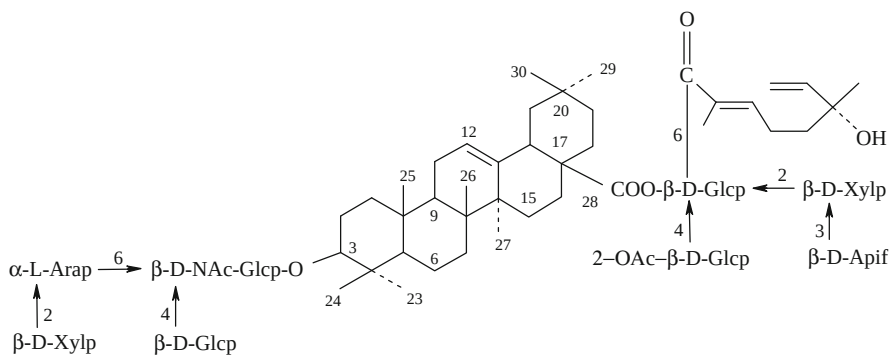
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

GlcNAc-1	104.2	Ara-1	103.3	Sugar part of 28-O-C	78.6	1	167.5
2	58.3	2	81.5	62.7	78.9	2	128.0
3	73.2	3	73.6	63.5	80.3	3	144.1
4	82.3	4	68.7	66.1	81.2	4	24.3
5	75.1	5	65.9	66.9	85.4	5	41.7
6	68.3	Xyl-1	106.9	69.9	93.3	6	72.4
CH3CONH	23.7	2	76.0	72.4	102.5	7	146.8
CH3CONH	170.2	3	78.1	73.8	105.3	8	111.8
Glc-1	104.7	4	71.0	75.1	111.6	CH_3-C-2	12.7
2	75.1	5	67.3	75.2		CH_3-C-6	28.5
3	78.1			75.6	OAc-1	170.2	
4	72.0			76.5	2	20.7	
5	78.6			76.7			
6	62.8			78.1			

References

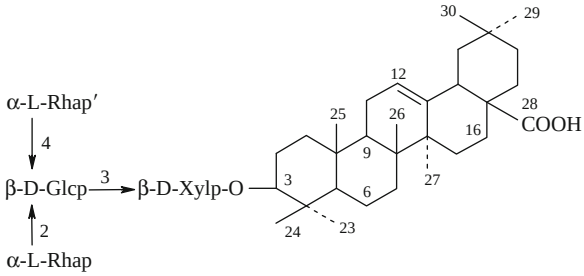
1. Y. Okada, S. Shibata, A.M.J. Javellana, O. Kamo, Chem. Pharm. Bull. **36**, 1264 (1988)



Entada Saponin II (ES-II)

Eupteleasaponin XI

CAS Registry Number: 290809-57-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Euptelea polyandra* [1]

$C_{53}H_{86}O_{20}$: 1042.571

Mp: 241–245°C [1]

$[\alpha]_D^{26}$ +11.6° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1705, 1085 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.86, 0.96, 1.00, 1.02, 1.11, 1.18, 1.31 (s, CH_3-25, 29, 26, 30, 24, 23, 27), 3.28 (dd-like, H-18), 3.30 (dd-like, H-3), 5.47 (brs, H-12)

β-D-Xylp: 4.84 (d, J = 5.5, H-1)

β-D-Glcp: 5.00 (d, J = 7.9, H-1)

α-L-Rhap: 6.01 (brs, H-1), 1.62 (d, J = 6.1, CH_3-6)

α-L-Rhap′: 5.76 (brs, H-1), 1.67 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	23.8	Xyl-1	104.8	Rha-1	101.9
2	26.6	17	46.7	2	74.9	2	72.4
3	88.3	18	42.0	3	81.8	3	72.6
4	39.6	19	46.5	4	68.1	4	74.0
5	56.1	20	31.0	5	64.8	5	70.1
6	18.6	21	34.3	Glc-1	104.4	6	18.6
7	33.3	22	33.3	2	75.1	Rha′-1	102.7
8	39.8	23	28.2	3	76.4	2	72.5
9	48.1	24	17.0	4	78.4	3	72.8
10	37.1	25	15.6	5	77.3	4	74.0
11	23.8	26	17.4	6	61.4	5	70.4
12	122.6	27	26.2			6	18.4
13	144.8	28	180.1				
14	42.2	29	33.3				
15	28.4	30	23.8				

Pharm./Biol.: Gastroprotective activity [1]

References

1. T. Murakami, H. Oominami, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 741 (2001)

Eupteleasaponin XII

See Figure Eupteleasaponin XII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Euptelea polyandra* [1]

$C_{52}H_{82}O_{21}$: 1042.534

Mp: 175–177°C [1]

$[\alpha]_D^{25}$ +33.9° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3348, 1745, 1655, 1076 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.88, 0.98, 1.08, 1.25, 1.30 (s, CH_3-25, 24, 26, 23, 27), 3.16 (dd, J = 4.6, 13.2, H-18), 3.36 (dd, J = 4.3, 11.9, H-3), 4.69, 4.75 (s, H_2-29), 5.44 (brs, H-12)

β-D-Glcp: 4.73 (d, J = 7.6, H-1)

α-L-Arap: 5.28 (d, J = 7.9, H-1)

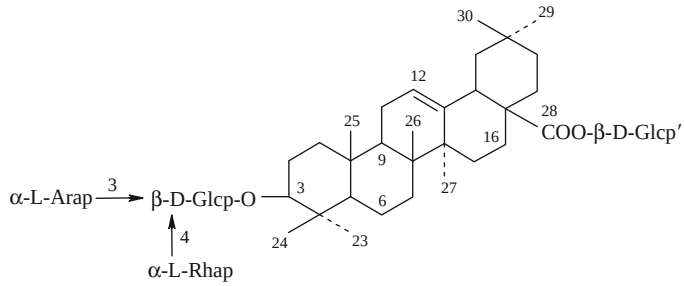
β-D-Glcp′: 6.24 (d, J = 7.9, H-1)

α-L-Rhap: 5.81 (brs, H-1), 1.67 (d, J = 6.3, CH_3-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.8	Glc-1	107.3	Rha-1	102.7
2	26.7	17	47.4	2	71.9	2	72.5
3	88.8	18	47.7	3	84.5	3	72.8
4	39.6	19	41.7	4	78.5	4	74.0
5	56.0	20	148.5	5	77.3	5	70.4
6	18.6	21	30.2	6	61.5	6	18.5
7	33.2	22	37.7	Ara-1	106.1	Glc′-1	95.8
8	40.0	23	28.2	2	75.9	2	74.1
9	48.1	24	17.0	3	76.5	3	78.8
10	37.0	25	15.6	4	69.3	4	71.3
11	23.6	26	17.5	5	66.9	5	79.2
12	122.7	27	26.1			6	62.4
13	143.5	28	175.7				
14	42.2	29	107.3				
15	28.2	30	–				



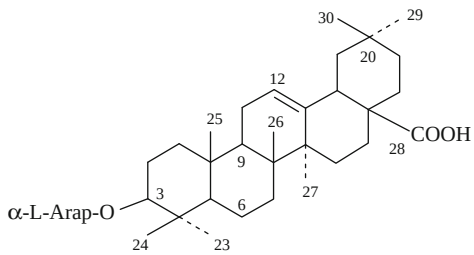
Eupteleasaponin XII

Pharm./Biol.: Gastroprotective activity [1]

References

1. T. Murakami, H. Oominami, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 741 (2001)

Fatsiaside A_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Schefflerópsis angkae* [1], *Thalictrum minus* [2], *Fatsia japonica* [3–5], *Thinouia coriacea* [6], *Tetrapanax papyriferum* [7], *Hedera canariensis* [8]

$C_{35}H_{56}O_7$: 588.402

Mp: 234–239°C

$[\alpha]_D^{20}$ +56.1° (MeOH, c 1.0) [3]

^{1}H NMR (300 MHz, J/Hz, C_5D_5N): 5.35 (t, J = 7, H-12)

α-L-Arap: 4.65 (d, J = 7.0, H-1), 4.30 (t, J = 7.0, H-2), 4.05 (dd, J = 1.5, H-3), 4.21 (m, H-4), 4.19, 3.70 (dd, J = 2.5, 13.5, H_2-5) [1]

^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-13	144.8	C-25	15.7
2	26.6	14	42.2	26	17.4
3	88.8	15	28.4	27	26.2
4	39.6	16	23.8	28	180.2
5	56.0	17	46.7	29	33.3
6	18.6	18	42.0	30	23.9
7	33.3	19	46.6	Ara-1	107.1
8	39.9	20	31.0	2	72.8
9	48.1	21	34.3	3	74.5
10	37.2	22	33.3	4	69.3
11	23.8	23	28.3	5	66.4
12	122.6	24	16.9		

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1. A.S. Stolyarenko, V.I. Grishkovets, N.N. Arnautov, S.V. Iksanova, V.Ya. Chirva, Chem. Nat. Comp. **36**(2), 173 (2000)
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5. V.I. Grishkovets, E.A. Sobolev, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(5), 501 (2000)
6. E.P. Schenkel, W. Werner, K.G. Schulte, Planta Med. **57**, 463 (1991)
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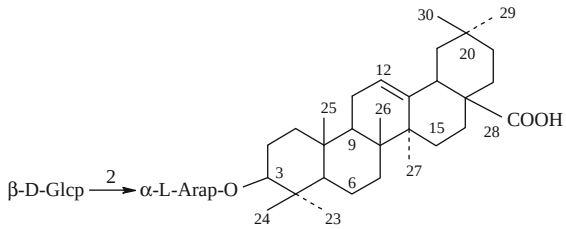
Fatsiaside C_1 (Saponin P_E)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Fatsia japonica* [1, 2], *Lonicera nigra* [3], *L. japonica* [4], *Akebia quinata* [5]

$C_{41}H_{66}O_{12}$: 750.455

Mp: 269–271°C [3]

$[\alpha]_D^{20}$ + 41.6° (c 0.33, C_5H_5N) [1]

^{13}C NMR (75 MHz, C_5D_5N): [2]

Table 1

C-1	38.8	C-16	23.9	Ara-1	104.9
2	26.5	17	46.7	2	80.8
3	89	18	42.0	3	73.5
4	39.6	19	46.5	4	68.4
5	55.9	20	31.0	5	65.1
6	18.6	21	34.3	Glc-1	105.9
7	33.2	22	33.2	2	76.4
8	39.8	23	28.3	3	78.2
9	48.1	24	16.8	4	71.6
10	37.0	25	15.5	5	78.2
11	23.9	26	17.5	6	62.6
12	122.6	27	26.2		
13	144.9	28	180.3		
14	42.2	29	33.2		
15	28.3	30	23.9		

Pharm./Biol.: Molluscicidal and hemolytic activity [3, 4]

References

1. V.I. Grishkovets, E.A. Sobolev, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(5), 501 (2000)
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4. H. Kawai, M. Kuroyanagi, K. Umehara, A. Ueno, M. Satake, Chem. Pharm. Bull. **36**(12), 4769 (1988)
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Flaccidoside II

CAS Registry Number: 140694-19-5

See Figure Flaccidoside II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Anemone anhuiensis* [1, 2]

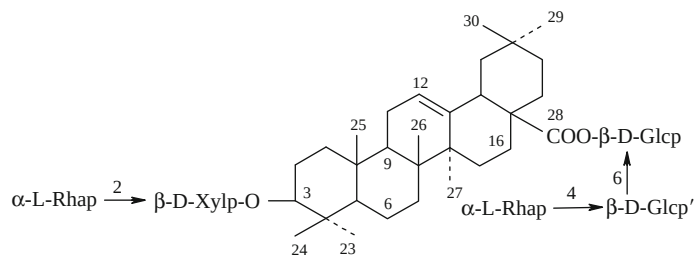
$C_{59}H_{96}O_{25}$: 1204.624

Mp: 195–197°C [1]

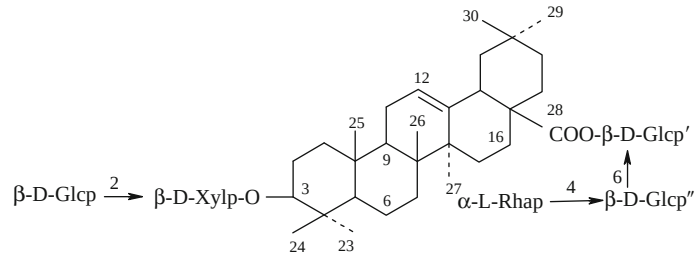
$[\alpha]_D^{20}$ −28.5° (c 0.23, MeOH) [1]

References

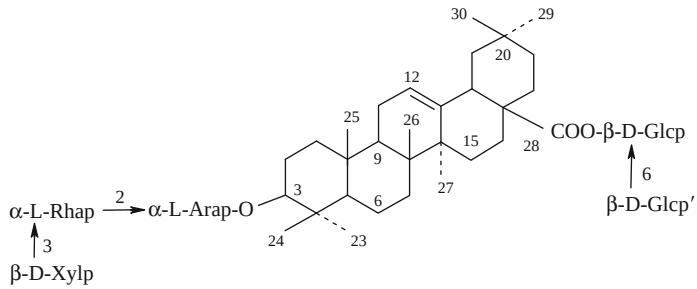
1. W.-C. Ye, Q.-W. Zhang, S.-X. Zhao, C.-T. Che, Chem. Pharm. Bull. **49**(5), 632 (2001)
2. M.K. Wang, F.E. Wu, Y.Z. Chen, Phytochemistry **34**, 1385 (1993)



Flaccidoside II



Flaccidoside III



Foetoside C

Flaccidoside III

See Figure Flaccidoside III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Anemone anhuiensis* [1, 2]

$C_{59}H_{96}O_{26}$: 1220.618

Mp: 218–221°C [1]

$[\alpha]_D^{16}$ −16.3° (c 0.19, C_5H_5N) [1]

References

1. W.-C. Ye, Q.-W. Zhang, S.-X. Zhao, C.-T. Che, Chem. Pharm. Bull. **49**(5), 632 (2001)
2. L. Zhao, W.M. Chen, Q.C. Fang, Planta Med. **57**, 572 (1991)

Foetoside C

CAS Registry Number: 94483-11-1

See Figure Foetoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Thalictrum foetidum* [1]

$C_{58}H_{94}O_{25}$: 1190.608

Mp: 212–214°C (aq. BuOH) [1]

$[\alpha]_D^{22}$ −23.5° (c 1.36, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3500–3290, 1740, 1255 [1]

Pharm./Biol.: Cytotoxic activity [2]

References

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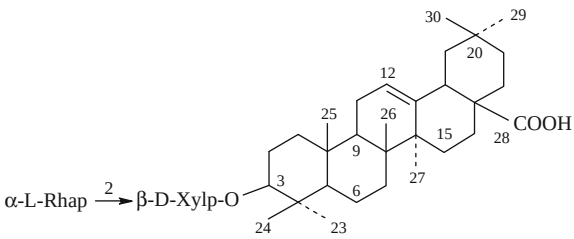
Giganteoside D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Cephalaria giganthea* [1]

$C_{41}H_{66}O_{11}$: 734.460

Mp: 248–252°C [1]

$[\alpha]_D^{20}$ 0° (c 1.0, MeOH) [1]

IR (oil) ν_{max} cm^{-1}: 1705 [1]

^{13}C NMR (60 MHz, DMSO): [1]

Table 1

Xyl-1	104.8	Rha-1	100.2
2	77.8	2	70.0
3	76.7	3	70.5
4	70.4	4	72.2
5	65.7	5	68.2
		6	17.8

Pharm./Biol.: Antiepileptic [1]

References

1. L.D. Zviadadadze, G.E. Dekanosidze, O.D. Djikya, E.P. Kemertelidze, Bioorg. Chem. **7**(5), 736 (1981) in Russian

Giganteoside G

See Figure Giganteoside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Cephalaria giganthea* [1]

$C_{47}H_{76}O_{16}$: 896.513

Mp: 210–215°C [1]

$[\alpha]_D^{20}$ −10.0° (c 1.0, MeOH) [1]

IR (oil) ν_{max} cm^{-1}: 1740 [1]

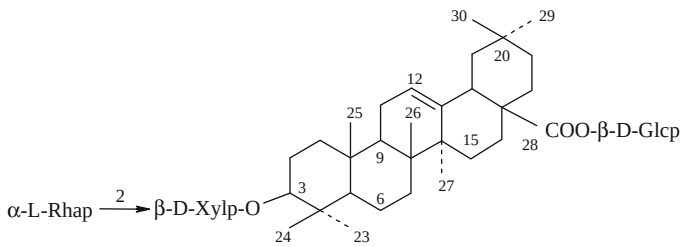
^{13}C NMR (60 MHz, DMSO): [1]

Table 1

Xyl-1	104.7	Rha-1	100.2	Glc-1	103.15
2	77.8	2	70.0	2	73.65
3	76.9	3	70.4	3	76.9
4	70.4	4	72.25	4	70.2
5	65.6	5	68.3	5	76.9
		6	17.85	6	61.6

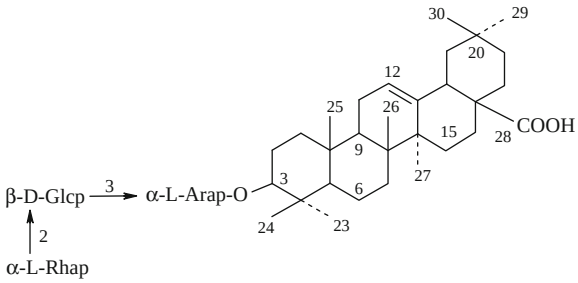
References

1. L.D. Zviadadadze, G.E. Dekanosidze, O.D. Djikya, E.P. Kemertelidze, Bioorg. Chem. **7**(5), 736 (1981). in Russian



Giganteoside G

Glycoside IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Thalictrum minus* [1]

$C_{47}H_{76}O_{16}$: 896.513

Mp: 249–250°C [1]

^{13}C NMR (22.49 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	42.1	Ara-1	106.9
2	26.5	19	46.6	2	74.6
3	89.3	20	31.0	3	78.9
4	39.5	21	34.4	4	71.9
5	56.0	22	33.3	5	65.1
6	18.6	23	28.3	Glc-1	104.9
7	33.3	24	16.9	2	78.4
8	39.9	25	15.5	3	78.4
9	48.2	26	17.5	4	72.9
10	37.1	27	26.2	5	78.2
11	23.8	28	180.1	6	62.8
12	122.5	29	33.3	Rha-1	101.9
13	144.8	30	23.8	2	72.0
14	42.3			3	72.4
15	27.9			4	73.7
16	23.8			5	70.0
17	46.7			6	18.6

(*continued*)

References

1. A.S. Gromova, V.I. Lutskii, A.L. Vereshchagin, A.A. Semenov, Chem. Nat. Comp. **23**(1), 90 (1987)

Glycoside V (Guaiacin B)

See Figure Glycoside V (Guaiacin B)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Thalictrum minus* [1], *Guaiacum officinale* [2]

$C_{47}H_{76}O_{17}$: 912.508

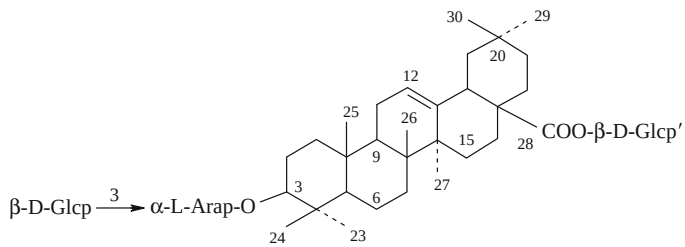
Mp: 219–220°C [1]

^{13}C NMR (22.49 MHz, CD_3OD): [1]

Table 1

C-1	40.1	C-18	42.9	Ara-1	107.5
2	27.2	19	O.S.	2	74.6
3	91.2	20	31.8	3	79.9
4	40.5	21	35.2	4	71.6
5	57.3	22	33.8	5	66.5
6	19.7	23	29.2	Glc-1	106.5
7	33.5	24	17.3	2	75.7

(*continued*)



Glycoside V (Guaiacin B)

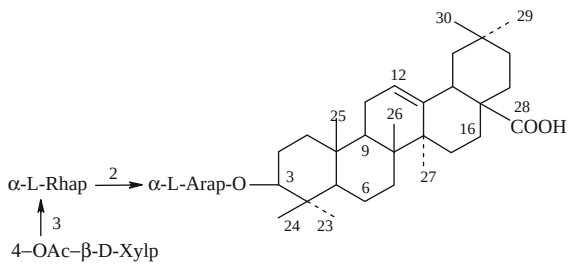
Table 1 (continued)

8	41.1	25	16.3	3	78.5
9	O.S.	26	18.0	4	73.5
10	38.2	27	26.6	5	78.4
11	24.3	28	178.4	6	62.9
12	124.1	29	33.9	Glc′-1	96.1
13	145.1	30	24.3	2	74.3
14	43.2			3	78.3
15	28.9			4	71.6
16	24.9			5	78.3
17				6	62.8

References

1. A.S. Gromova, V.I. Lutskii, A.L. Vereshchagin, A.A. Semenov, Chem. Nat. Comp. **23**(1), 90 (1987)
2. V.U. Ahmad, S. Perween, S. Bano, Planta Med. **55**, 307 (1989)

Glycoside 9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Sapindus emarginatus* [1]

$C_{48}H_{76}O_{16}$: 908.513

$[\alpha]_D^{22}$ −20.2° (c 3.8, MeOH) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.29, 1.09, 0.82, 0.96, 1.28, 0.94, 0.99 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.20 (H-3), 5.45 (brs, H-12), 3.20 (dd, J = 11.2, 3.4, H-18)

α-L-Arap: 4.85 (d, J = 6.1, H-1)

α-L-Rhap: 6.20 (brs, H-1)

β-D-Xylp: 5.33 (d, J = 8.1, H-1), 1.92 (s, Ac-4) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.9	Ara-1	105.1
2	26.6	19	46.4	2	75.7
3	88.7	20	30.9	3	74.8
4	39.5	21	34.2	4	69.2
5	56.0	22	33.2	5	65.5
6	18.5	23	28.2	Rha-1	101.5
7	33.2	24	17.1	2	71.8
8	39.7	25	15.5	3	82.6
9	48.0	26	17.3	4	72.9
10	37.0	27	26.1	5	69.6
11	23.7	28	180.2	6	18.4
12	122.5	29	33.6	Xyl-1	107.0
13	144.6	30	23.7	2	75.5
14	42.1			3	74.4
15	28.3			4	72.8
16	23.7			5	63.4
17	46.6			Ac-1	170.5
				2	20.8

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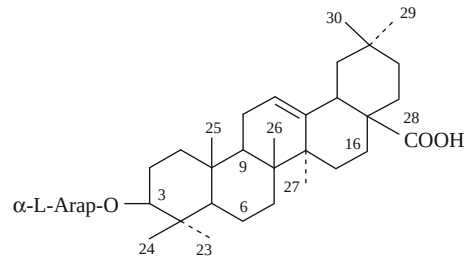
Glycoside L-B_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Scheffleropsis angkae* [1], *Thalictrum minus* [2], *Fatsia japonica* [3–5], *Thinouia coriacea* [6], *Tetrapanax papyriferum* [7], *Hedera canariensis* [8], *H. colchica* [9]

$C_{35}H_{56}O_7$: 588.402

Mp: 234–239°C [1]

$[\alpha]_D^{20}$ +56.1° (c 1.0, MeOH) [3]

^{1}H NMR (300 MHz, J/Hz, C_5D_5N): 5.35 (t, J = 7, H-12)

α-L-Arap: 4.65 (d, J = 7.0, H-1), 4.30 (t, J = 7.0, H-2), 4.05 (dd, J = 1.5, H-3), 4.21 (m, H-4), 4.19, 3.70 (dd, J = 2.5, 13.5, H_2-5) [1]

^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-13	144.8	C-25	15.7	Ara-1	107.1
2	26.6	14	42.2	26	17.4	2	72.8
3	88.8	15	28.4	27	26.2	3	74.5
4	39.6	16	23.8	28	180.2	4	69.3
5	56.0	17	46.7	29	33.3	5	66.4
6	18.6	18	42.0	30	23.9		
7	33.3	19	46.6				
8	39.9	20	31.0				
9	48.1	21	34.3				
10	37.2	22	33.3				
11	23.8	23	28.3				
12	122.6	24	16.9				

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1. A.S. Stolyarenko, V.I. Grishkovets, N.N. Arnautov, S.V. Iksanova, V.Ya. Chirva, Chem. Nat. Comp. **36**(2), 173 (2000)
2. A.S. Gromova, V.I. Lutskiy, A.L. Vereshchagin, A.A. Semenov, Chem. Nat. Comp. **23**(1), 90 (1987)
3. Z.S. Kemoklidze, G.E. Dekanosidze, O.D. Dzhikiya, M.M. Vugal'ter, E.P. Kemertelidze, Chem. Nat. Comp. **18**(6), 757 (1982)
4. T. Aoki, T. Suga, Phytochemistry **17**, 771 (1978)
5. V.I. Grishkovets, E.A. Sobolev, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(5), 501 (2000)
6. E.P. Schenkel, W. Werner, K.G. Schulte, Planta Med. **57**, 463 (1991)
7. V.S. Strigunov, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **37**(5), 462 (2001)
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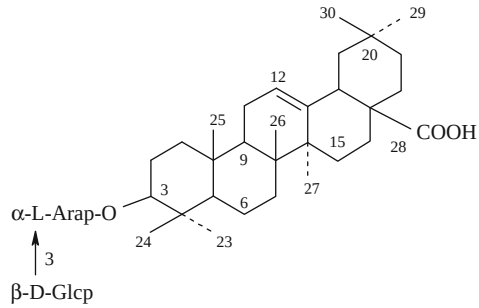
Glycoside L-E$_1$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Scheffleropsis angkae* [1], *Thalictrum minus* [2], *Ilex paraquariensis* [3], *Tetrapanax papyriferum* [4], *Patrinia scabiosaefolia* [5]

$C_{41}H_{66}O_{12}$: 750.455

Mp: 262–264°C [2]

IR (KBr) ν_{max} cm^{-1}: 3410, 2920, 1690, 1075 [5]

FAB-MS *m/z*: 749 $[M-H]^-$(100), 587 $[M-H-162]^-$(16), 455 $[M-H-162-132]^-$(9) [5]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.34 (dd, J = 4.0, 11.5, H-3), 3.24 (dd, J = 4.0, 13.5, H-18), 5.45 (t, J = 7.5, H-12)

α-L-Arap: 4.67 (d, J = 6.0, H-1), 4.41 (dd, J = 9.0, H-2), 4.12 (dd, J = 3.5, H-3), 4.38 (m, H-4), 4.16 (dd, J = 2.0, H-5), 3.69 (d, J = 11.5, H-5)

β-D-Glcp: 5.15 (d, J = 8.0, H-1), 3.91 (t, J = 8.5, H-2), 4.07 (t, J = 9.0, H-3), 4.00 (t, J = 9.0, H-4), 3.84 (m, H-5), 4.36 (dd, J = 3.0, 11.5, H-6), 4.18 (dd, J = 5.5, H-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-13	144.8	C-25	15.6	Ara-1	107.0
2	26.6	14	42.2	26	17.4	2	71.6
3	88.7	15	28.2	27	26.1	3	83.9
4	39.6	16	23.7	28	180.0	4	69.1
5	56.0	17	46.7	29	33.2	5	66.6
6	18.5	18	42.1	30	23.8	Rha-1	105.8
7	33.2	19	46.5			2	75.5
8	39.8	20	30.9			3	78.2
9	48.0	21	34.3			4	71.7

(*continued*)

Table 1 (continued)

10	37.1	22	33.2	5	78.4
11	23.7	23	28.2	6	62.7
12	122.5	24	17.0		

Pharm./Biol.: Used in China as diuretic and for "Qing Re Jie Du" (treatment of fever and inflammation along with detoxication), "Huo Xue Hua Yu" (mobilization of blood circulation and treatment of stasis) [5]

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4. V.S. Strigunov, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **37**(5), 462 (2001)
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Glycoside L-K$_1$

See Figure Glycoside L-K$_1$

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Scheffleropsis angkae* [1]

$C_{59}H_{96}O_{26}$: 1220.618

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 5.30 (t, J = 5.5, H-12)

α-L-Arap: 4.62 (d, J = 6, H-1)

β-D-Glcp: 5.22 (d, J = 7.5, H-1)

β-D-Glcp′: 6.30 (d, J = 8, H-1)

β-D-Glcp″: 4.81 (d, J = 8, H-1)

α-L-Rhap: 5.69 (s, H-1), 1.54 (d, J = 5.5, CH_3-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

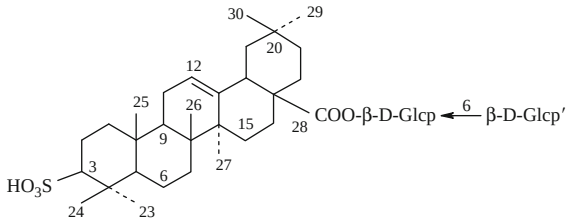
Table 1

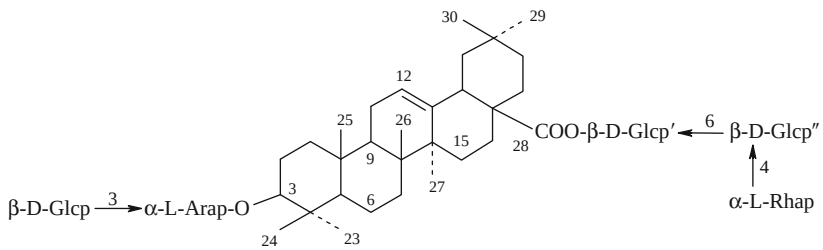
C-1	38.9	C-16	23.4	Ara-1	107.0	Glc′-5	78.4
2	26.6	17	47.0	2	71.5	6	62.6
3	88.7	18	41.7	3	83.9	Glc″-1	104.6
4	39.5	19	46.3	4	69.0	2	75.1
5	55.9	20	30.7	5	66.6	3	76.4
6	18.5	21	34.0	Glc-1	95.5	4	78.5
7	33.1	22	32.5	2	73.7	5	77.0
8	39.9	23	28.2	3	78.5	6	61.4
9	48.1	24	16.9	4	70.8	Rha-1	102.6
10	37.0	25	15.6	5	77.9	2	72.4
11	23.7	26	17.5	6	69.1	3	72.6
12	122.6	27	26.0	Glc′-1	105.8	4	73.8
13	144.1	28	176.5	2	75.5	5	70.2
14	42.1	29	33.1	3	78.1	6	18.3
15	28.2	30	23.7	4	71.7		

References

1. A.S. Stolyarenko, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(3), 295 (2000)

Glycoside L-8$_a$





Glycoside L-K$_1$

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hedera helix* [1]

$C_{42}H_{69}SO_{15}$: 845.435

^{13}C NMR (62.9 MHz, C_5D_5N): [1]

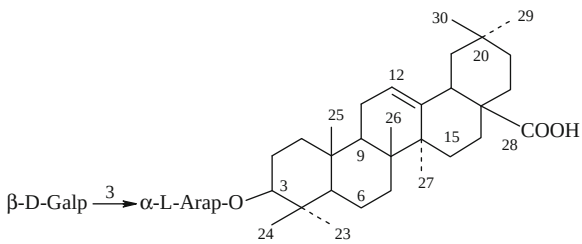
Table 1

C-1	38.9	C-16	23.8	Glc-1	95.8
2	25.1	17	47.2	2	74.0
3	85.2	18	41.8	3	78.8
4	39.1	19	46.4	4	71.4
5	56.5	20	30.9	5	77.9
6	18.5	21	34.1	6	69.9
7	33.3	22	32.5	Glc′-1	105.3
8	40.0	23	29.0	2	75.3
9	48.1	24	17.4	3	78.3
10	37.3	25	15.5	4	71.7
11	23.5	26	17.1	5	78.4
12	123.0	27	26.2	6	63.0
13	144.5	28	176.8		
14	42.2	29	33.3		
15	28.3	30	23.9		

References

1. V.I. Grishkovets, A.E. Kondratenko, A.S. Shashkov, V.Ya. Chirva. Chem. Nat. Comp. **35**(1), 70 (1999)

Glycoside ST-C_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Tetrapanax papyriferum* [1]

$C_{41}H_{66}O_{12}$: 750.455

^{13}C NMR (125 MHz, C_5D_5N): [1]

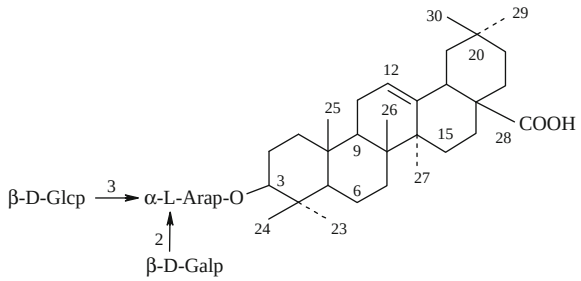
Table 1

C-1	39.0	C-16	23.6	Ara-1	104.6
2	26.5	17	47.1	2	81.2
3	88.9	18	41.7	3	73.3
4	39.7	19	46.4	4	68.2
5	56.0	20	30.6	5	64.1
6	18.6	21	33.9	Glc-1	106.6
7	33.1	22	32.5	2	73.7
8	40.1	23	28.2	3	75.2
9	48.2	24	16.6	4	69.7
10	37.2	25	15.6	5	76.8
11	23.9	26	17.5	6	61.6
12	122.9	27	25.8		
13	144.2	28	176.4		
14	42.2	29	32.9		
15	28.2	30	23.7		

References

1. V.S. Strigunov, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **37**(5), 462 (2001)

Glycoside ST-E_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Tetrapanax papyriferum* [1]

$C_{47}H_{76}O_{17}$: 912.508

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.8	Ara-1	104.7
2	26.4	17	46.6	2	77.4
3	88.8	18	42.0	3	82.6
4	39.5	19	46.5	4	68.0
5	55.9	20	30.9	5	65.1
6	18.6	21	34.3	Gal-1	104.5
7	33.3	22	33.4	2	73.1
8	39.9	23	28.1	3	75.2
9	48.2	24	17.0	4	69.6
10	37.1	25	15.6	5	76.2
11	23.7	26	17.4	6	61.8
12	122.5	27	26.2	Glc-1	104.5
13	144.8	28	180.1	2	75.0
14	42.2	29	33.2	3	77.9
15	28.3	30	23.9	4	71.5
				5	78.0
				6	62.6

References

1. V.S. Strigunov, V.I. Grishkovets, N.V. Tolkacheva, A.S. Shashkov, Chem. Nat. Comp. **37**(2), 173 (2001)

Glycoside ST-F_2 from *Hedera taurica*

See Figure Glycoside ST-F_2 from *Hedera taurica*

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hedera taurica* [1], *Aralia cordata* [2]

$C_{42}H_{66}O_{14}$: 794.445

$[\alpha]_D$−23.7° (c 0.9, MeOH) [2], $[\alpha]_D$−10° (c 0.5, C_5H_5N) [1]

^{13}C NMR (Me ester) (C_5D_5N): [2]

Table 1

C-3	89.1	GlcUA-1	105.2	Gal-1	106.9
28	177.8	2	83.5	2	72.6
Me	51.6	3	76.7	3	74.7
		4	74.4	4	69.4
		5	77.3	5	76.6
		6	170.2	6	61.2
		O-CH_3	51.9		

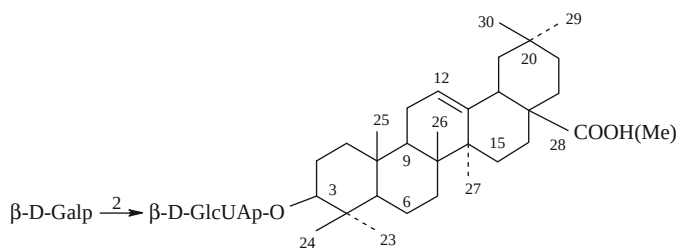
References

1. V.I. Grishkovets, S.V. Godin, O.Ya. Tsvetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 316 (1997)
2. H. Kawai, M. Nishida, Y. Toshiro, M. Kuroyanagi, A. Ueno, M. Sataka, Chem. Pharm. Bull. **37**, 2318 (1989)
3. S. Takabe, T. Takeda, Y. Chen, Y. Ogihara, Chem. Pharm. Bull. **33**, 4701 (1985)

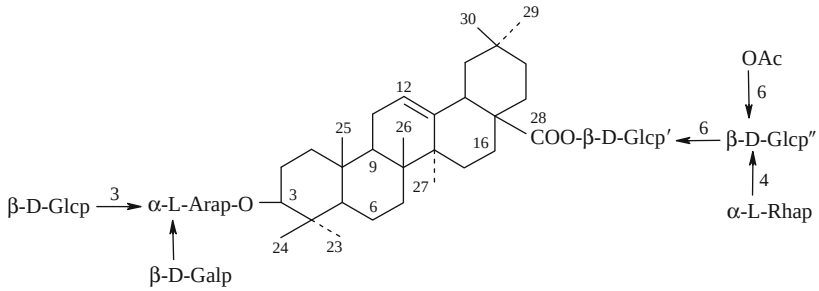
Glycoside ST-H_2

See Figure Glycoside ST-H_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid



Glycoside ST-F_2 from *Hedera taurica*



Glycoside ST-H_2

Biological sources: *Tetrapanax papyriferum* [1]

$C_{66}H_{108}O_{32}$: 1412.682

^{1}H NMR (MHz, J/Hz, C_5D_5N): 0.76 (H-5), 0.89 (CH_3-25,CH_3-29), 0.93 (CH_3-30), 1.02 (CH_3-26), 1.06 (CH_3-24), 1.23 (CH_3-23), 1.22 (CH_3-27), 1.47, 1.30 (H-6), 1.45, 1.30 (H-7), 1.53, 0.93 (H-1), 1.59 (H-9), 1.98, 1.80 (H-2), 1.75, 1.22 (H-19), 1.93, 1.76 (H-22), 2.06, 1.88 (H-16), 2.18, 1.14 (H-15), 2.06, 1.88 (H-16), 3.24 (H-3), 3.15 (H-18), 5.39 (H-12)

α-L-Arap: 4.70 (H-1), 4.58 (H-2), 4.27 (H-3), 4.44 (H-4), 3.65, 4.15 (H_2-5)

β-D-Galp: 5.20 (H-1), 4.32 (H-2), 3.99 (H-3), 4.42 (H-4), 3.80 (H-5), 4.20, 4.30 (H_2-6)

β-D-Glcp: 5.08 (H-1), 3.89 (H-2), 4.04 (H-3), 4.01 (H-4), 3.81 (H-5), 4.16, 4.33 (H_2-6)

β-D-Glcp′: 6.06 (H-1), 4.01 (H-2), 4.07 (H-3), 4.07 (H-4), 4.01 (H-5), 4.22, 4.55 (H_2-6)

β-D-Glcp″: 4.87 (H-1), 3.81 (H-2), 4.00 (H-3), 3.90 (H-4), 3.76 (H-5), 4.42, 4.57 (H_2-6), 1.90 (CH_3CO)

α-L-Rhap: 5.38 (H-1), 4.45 (H-2), 4.32 (H-3), 4.13 (H-4), 4.56 (H-5), 1.50 (CH_3-6) [1]

^{13}C NMR: [1]

Table 1

C-1	39.0	C-16	23.5	Ara-1	104.8	Glc′-1	95.5
2	26.4	17	47.1	2	77.3	2	73.7
3	89.0	18	41.7	3	82.5	3	78.4
4	39.6	19	46.4	4	68.0	4	71.1
5	56.1	20	30.7	5	65.0	5	77.7
6	18.6	21	34.1	Gal-1	104.8	6	69.4
7	33.2	22	32.6	2	73.2	Glc″-1	104.4
8	40.0	23	28.2	3	75.1	2	74.8
9	48.1	24	16.7	4	69.7	3	76.3
10	37.1	25	15.5	5	76.2	4	79.6
11	23.8	26	17.5	6	61.7	5	73.6
12	122.9	27	25.9	Glc-1	104.5	6	63.7
13	144.1	28	176.4	2	75.0	Ac-1	170.6
14	42.2	29	33.0	3	77.9	2	20.4
15	28.2	30	23.7	4	71.5	Rha-1	102.6
				5	78.1	2	72.0
				6	62.5	3	72.4
						4	73. 6
						5	70.5
						6	18.1

(*continued*)

References

1. V.I. Grishkovets, V.G. Strigunov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **37**(2), 167 (2001)

Glycoside ST-I_3

CAS Registry Number: 203514-04-9

See Figure Glycoside ST-I_3

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

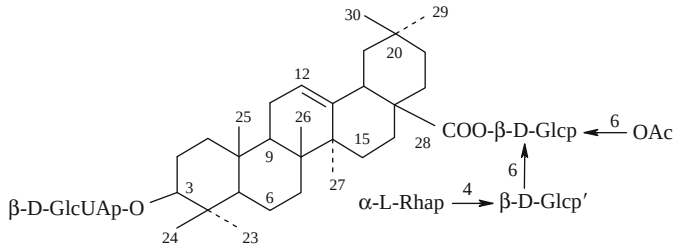
Biological sources: *Hedera taurica* [1]

$C_{56}H_{88}O_{24}$: 1144.566

$[\alpha]_D - 7°$ (c 0.5, C_5H_5N) (Me ester) [1]

^{1}H NMR (J/Hz, C_5D_5N): 3.33 (dd, J = 4.0, 12.0, H-3), 3.15 (dd, J = 4.0, 13.0, H-18), 1.27, 1.23, 1.05, 0.96, 0.90, 0.88, 0.82 (s, CH_3 × 7)

β-D-GlcUAp (Me ester): 4.97 (d, J = 8.0, H-1), 4.08 (t, J = 8.5, H-2), 4.18 (t, J = 9.0, H-3), 4.48 (t, J = 9.0, H-4), 4.54 (d, J = H-5), 3.72 (s, OCH_3)



Glycoside ST-I_3

β-D-Glcp: 6.21 (d, J = 8.0, H-1), 4.05–4.20 (m, H-2, -3,-4), 4.04 (m, H-5), 4.66 (dd, J = 2.0, 12.0, Ha-6), 4.33 (dd, J = 5.0, Hb-6)

β-D-Glcp′: 4.98 (d, J = 8.0, H-1), 3.93 (t, J = 8.0, H-2), 4.05–4.15 (m, H-3,-4), 3.81 (m, H-5), 4.62 (Ha-6), 4.50 (Hb-6), 1.90 (s, O–CO–CH_3)

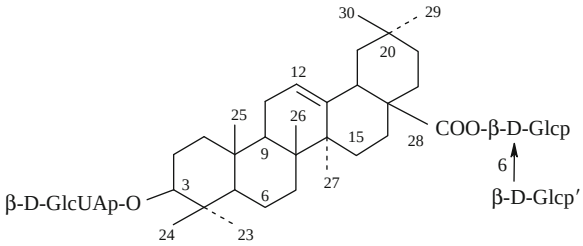
α-L-Rhap: 5.51 (d, J = 1.5, H-1), 4.61 (dd, J = 3.0, H-2), 4.49 (dd, J = 9.0, H-3), 4.31 (t, J = 9.0, H-4), 4.85 (d, J = H-5), 1.69 (d, J = 6.0, CH_3-6) [1]

References

1. V.I. Grishkovets, O.Ya. Tsvetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 310 (1997)

Glycoside ST-I_{4a}

CAS Registry Number: 203514-06-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hedera taurica* [1]

$C_{48}H_{76}O_{19}$: 956.498

$[\alpha]_D$ +12° (c 0.3, $CHCl_3$) (Me ester of acetate) [1]

Me ester of acetate

^{1}H NMR (J/Hz, $CDCl_3$): 5.31 (brt, J = 3.5, H-12), 3.10 (H-3), 2.80 (H-18), 1.26, 1.11, 0.93, 0.91, 0.75, 0.75 (s, CH_3 × 7)

β-D-GlcUAp: 4.59 (d, J = 8.0, H-1), 5.06 (t, J = 9.0, H-2), 5.26 (t, J = 9.5, H-3), 5.19 (t, J = 9.5, H-4), 4.01 (d, H-5)

β-D-Glcp: 5.55 (d, J = 8.5, H-1), 5.12 (dd, J = 9.5, H-2), 5.23 (t, J = 9.5, H-3), 4.97 (t, J = 10.0, H-4), 3.75 (m, H-5), 3.87 (dd, J = 2.5, 12.0, Ha-6), 3.59 (dd, J = 5.5, Hb-6)

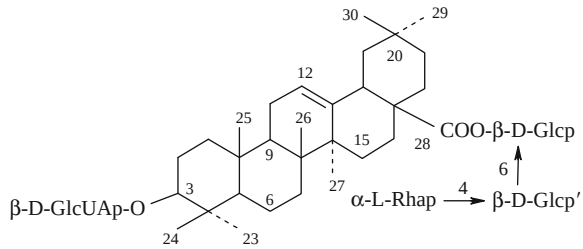
β-D-Glcp′: 4.54 (d, J = 8.0, H-1), 4.96 (t, J = 9.5, H-2), 5.17 (t, J = 9.5, H-3), 5.05 (t, J = 9.5, H-4), 3.63 (m, H-5), 4.27 (dd, J = 4.5, 12.5, Ha-6), 4.10 (dd, J = 2.5, Hb-6) [1]

References

1. V.I. Grishkovets, O.Ya. Tsvetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 310 (1997)

Glycoside ST-J

CAS Registry Number: 203513-88-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hedera taurica* [1], *H. canariensis* [2]

$C_{54}H_{86}O_{23}$: 1102.555

$[\alpha]_D -5°$ (c 2.3, C_5H_5N) (Me ester) [1]

^{13}C NMR (Me ester) (C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.4	GlcUA-1	107.4	Glc′-1	104.9
2	26.7	17	47.1	2	75.3	2	75.4
3	89.3	18	41.7	3	78.0	3	76.6
4	39.6	19	46.3	4	73.2	4	78.4
5	55.8	20	30.8	5	77.3	5	77.2
6	18.2	21	34.1	6	171.0	6	61.3
7	33.2	22	32.6	O-CH_3	52.1	Rha-1	102.8
8	40.0	23	28.4	Glc-1	95.7	2	72.6
9	48.2	24	16.2	2	73.9	3	72.8
10	37.0	25	15.6	3	78.7	4	74.0
11	23.7	26	17.6	4	70.9	5	70.4
12	123.0	27	26.1	5	78.0	6	18.6
13	144.3	28	176.6	6	69.5		
14	42.2	29	33.2				
15	28.4	30	23.7				

References

1. V.I. Grishkovets, O.Ya. Tsvetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 310 (1997)
2. L.A. Yakovishin, V.I. Grishkovets, N.V. Tolkacheva, Chem. Nat. Comp. **37**(6), 573 (2001)

Glycoside ST-J_2

See Figure Glycoside ST-J_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

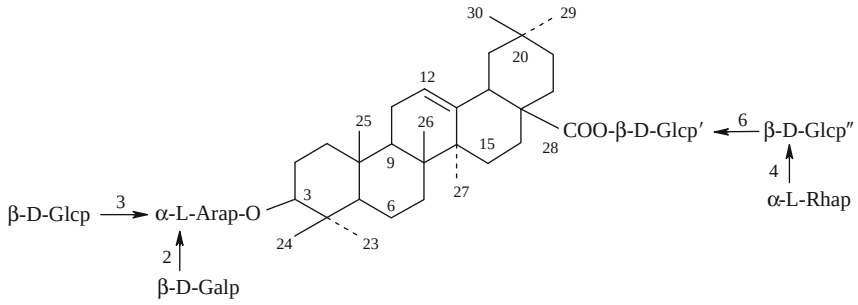
Biological sources: *Tetrapanax papyriferum* [1]

$C_{65}H_{106}O_{31}$: 1382.671

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.4	Ara-1	104.8	Glc′-1	95.5
2	26.5	17	47.1	2	77.3	2	73.8
3	88.9	18	41.8	3	82.5	3	78.6
4	39.6	19	46.2	4	68.1	4	70.8
5	59.0	20	30.7	5	64.9	5	77.8
6	18.5	21	33.9	Gal-1	104.6	6	69.3
7	33.1	22	32.8	2	73.3	Glc″-1	104.5
8	40.0	23	28.2	3	75.1	2	75.1
9	48.0	24	16.8	4	69.8	3	76.4
10	36.9	25	15.5	5	76.3	4	78.5
11	23.5	26	17.7	6	61.7	5	77.0
12	122.8	27	26.0	Glc-1	104.5	6	61.4
13	144.2	28	176.5	2	75.1	Rha-1	102.6
14	42.1	29	33.0	3	77.9	2	72.3
15	28.2	30	23.8	4	71.5	3	72.5
				5	78.0	4	73.9
				6	62.5	5	70.2
						6	18.3



Glycoside ST-J_2

References

1. V.S. Strigunov, V.I. Grishkovets, N.V. Tolkacheva, A.S. Shashkov, Chem. Nat. Comp. **37**(2), 173 (2001)

Glycoside ST-K_1

See Figure Glycoside ST-K_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

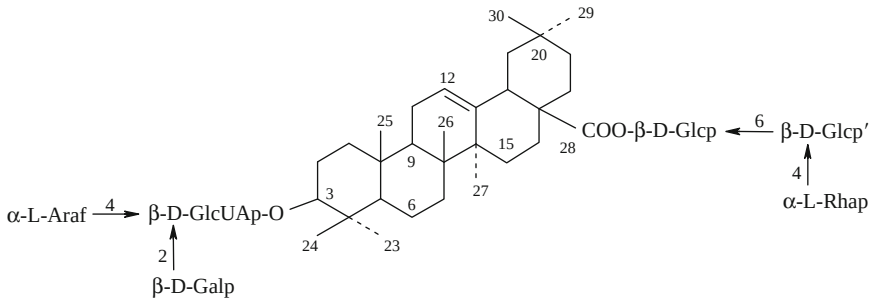
Biological sources: *Tetrapanax papyriferum* [1]

$C_{65}H_{104}O_{32}$: 1396.651

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.4	C-18	41.7	GlcUA-1	105.0	Glc-1	95.7
2	26.5	19	46.3	2	83.1	2	73.9
3	89.2	20	30.7	3	75.6	3	78.6
4	39.6	21	34.0	4	76.4	4	71.0
5	55.8	22	32.5	5	76.9	5	77.9
6	18.6	23	28.2	6	170.3	6	69.4
7	33.2	24	16.6	Ara-1	108.7	Glc′-1	104.5
8	40.1	25	15.6	2	82.6	2	75.0
9	48.0	26	17.5	3	78.7	3	76.4
10	37.1	27	26.1	4	87.4	4	78.4
11	23.9	28	176.6	5	62.6	5	76.9
12	122.7	29	32.9	Gal-1	106.7	6	61.5
13	144.2	30	23.7	2	74.4	Rha-1	102.7
14	42.2			3	74.9	2	72.5
15	28.3			4	69.5	3	72.7
16	23.5			5	76.9	4	74.1
17	47.1			6	63.0	5	70.3
						6	18.2



Glycoside ST-K_1

References

1. V.S. Strigunov, V.I. Grishkovets, A.S. Shashkov, V.V. Kachala, N.V. Tolkacheva, Chem. Nat. Comp. **40**(1), 35 (2004)

Goyasaponin III

CAS Registry Number: 333333-27-0

See Figure Goyasaponin III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Momordica charantia* [1]

$C_{49}H_{76}O_{19}$: 968.498

$[\alpha]_D^{24}$ −1.9° (c 0.5, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1734, 1715, 1076, 1048 [1]

HR-FAB-MS *m/z*: 991.4879 $[M + Na]^+$ [1]

FAB-MS *m/z*: 967 $(M\text{-}H)^-$, 925 $(M\text{-}C_2H_3O)^-$, 835 $(M\text{-}C_6H_{11}O_4)^-$, 455 $(M\text{-}C_{19}H_{29}O_{16})^-$

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.80, 0.95, 0.97, 1.0, 1.03, 1.14, 1.30 (s, CH_3-25, 29, 26, 30, 24, 23, 27), 2.45 (s, Ac), 3.18 (dd, J = 4.3, 11.9, H-3), 3.27 (dd, J = 4.6, 14.0, H-18), 5.44 (brs, H-12)

β-D-GlcUAp: 4.90 (d, J = 7.3, H-1)

β-D-Glcp: 5.20 (d, J = 7.6, H-1)

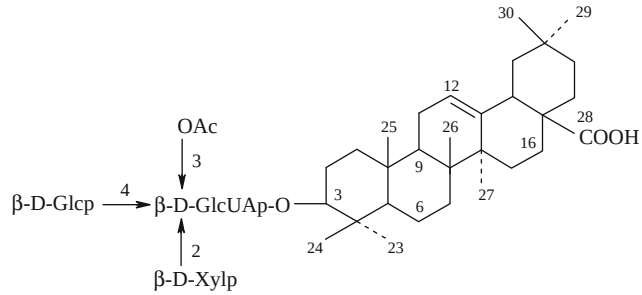
β-D-Xylp: 4.97 (d, J = 7.3, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

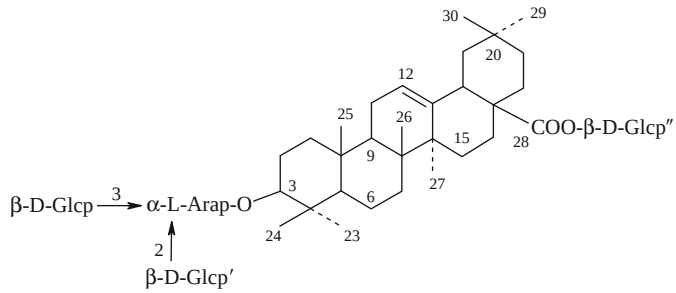
Table 1

C-1	38.6	C-16	23.8	GlcUA-1	104.9	Glc-1	104.6
2	26.5	17	46.7	2	78.3	2	75.2
3	90.0	18	42.0	3	75.1	3	78.2

(*continued*)



Goyasaponin III



Guaiacin F (Compound 2)

Table 1 (continued)

4	39.6	19	46.5	4	78.0	4	71.8
5	55.8	20	31.0	5	76.1	5	78.2
6	18.5	21	34.3	6	171.8	6	63.0
7	33.2	22	33.2	Ac-1	170.8		
8	39.8	23	27.8	2	21.6		
9	48.0	24	16.4	Xyl-1	105.5		
10	37.1	25	15.4	2	75.1		
11	23.8	26	17.4	3	78.4		
12	122.6	27	26.2	4	71.1		
13	144.9	28	180.1	5	67.2		
14	42.2	29	33.3				
15	28.4	30	23.8				

Pharm./Biol.: In Chinese, Indian Ayurvedic, and Indonesian Jamu traditional medicines, the fruit of this plant has been used as a bitter stomachic, a laxative, an antidiabetic, and an anthelmintic for children [1]

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Guaiacin F (Compound 2)

See Figure Guaiacin F (Compound 2)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Guaiacum officinale* [1], *Fagonia arabica* [2]

$C_{53}H_{86}O_{22}$: 1074.561

$[\alpha]_D^{25}$ + 25.4° (c 0.59, MeOH) [2]

FAB-MS *m/z*: 1097 $[M + Na]^+$, 935, 890, 740, 497, 439, 393, 317, 189 [2]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.90, 0.92, 1.09, 1.09, 1.25, 1.26 (s, $CH_3 \times 7$), 3.20 (dd, J = 14.5, 2.5, H-18), 3.24 (dd, J = 12.0, 4.5, H-3), 5.43 (t, J = 3.0, H-12)

α-L-Arap: 4.78 (d, J = 7.1, H-1), 4.71 (dd, J = 7.1, 8.5, H-2), 4.31 (H-3), 4.48 (H-4), 3.66 (d, J = 10.7, H-5), 4.17 (H-5)

β-D-Glcp: 5.28 (d, J = 7.8, H-1), 3.99 (t, J = 8.0, H-2), 4.20 (H-3), 4.31 (H-4), 3.92 (m, H-5), 4.19, 4.39 (H_2-6)

β-D-Glcp′: 5.50 (d, J = 7.8, H-1), 4.04 (t, J = 8.0, H-2), 4.18 (H-3), 4.27 (H-4), 3.70 (m, H-5), 4.17, 4.47 (H_2-6)
β-D-Glcp″: 6.30 (d, J = 8.0, H-1), 4.15 (t, J = 8.0, H-2), 4.29 (H-3), 4.31 (H-4), 4.01 (m, H-5), 4.39, 4.46 (H_2-6) [2]
^{13}C NMR (100.40 MHz, C_5D_5N): [2]

Table 1

C-1	38.9	C-16	23.5	Ara-1	105.4	Glc′-1	104.4
2	26.6	17	47.1	2	77.5	2	76.2
3	89.0	18	41.8	3	83.3	3	78.5
4	39.7	19	46.3	4	68.8	4	72.5
5	56.0	20	30.8	5	65.9	5	77.4
6	18.6	21	34.1	Glc-1	105.0	6	63.3
7	33.2	22	32.6	2	75.3	Glc″-1	95.8
8	40.0	23	28.1	3	78.7	2	74.2
9	48.1	24	15.6	4	71.6	3	79.3
10	37.1	25	16.8	5	78.4	4	71.3
11	23.9	26	17.5	6	62.6	5	78.7
12	123.0	27	26.1			6	62.3
13	144.1	28	176.4				
14	42.2	29	33.2				
15	28.3	30	23.7				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [2]

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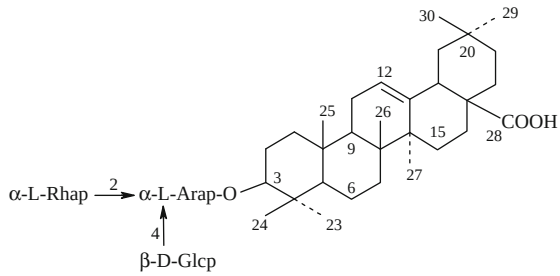
Hederacolchiside A′



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Hedera colchica* [1], *Thinouia coriacea* [2], *Serjania salzmanniana* [3]
$C_{47}H_{76}O_{16}$: 896.513
Mp: 222–226°C [1]
IR (KBr) ν_{max} cm^{-1}: 3600, 3400, 1700 [1]
^{1}H NMR (250 MHz, J/Hz, C_5D_5N): α-L-Arap: 4.76 (d, J = 5.7, H-1), 4.34 (d, J = 7.5, H-2), 4.21 (d, J = 2.7, H-3), 4.25 (d, J = 1.8, H-4), 3.77 (d, J = 10.5, H-5), 4.37 (d, J = 2.0, H-5)
α-L-Rhap: 5.87 (d, J = 1.4, H-1), 4.56 (d, J = 3.2, H-2), 4.43 (d, J = 9.5, H-3), 4.12 (d, J = 9.5, H-4), 4.43 (d, J = 6.1, H-5), 1.55 (CH_3-6)
β-D-Glcp: 4.98 (d, J = 8.0, H-1), 3.88 (d, J = 9.7, H-2), 4.05 (d, J = 9.0, H-3), 4.05 (d, J = 9.0, H-4), 3.79 (d, J = 2.6, H-5), 4.38 (d, J = 11.6, Ha-6), 4.21 (d, J = 4.8, Hb-6) [1]
^{13}C NMR (300 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	24.0	Ara-1	105.0	Glc-1	106.4
2	26.3	17	46.6	2	76.5	2	75.5
3	88.9	18	42.1	3	73.7	3	78.6
4	39.0	19	46.6	4	79.5	4	71.4
5	56.2	20	31.1	5	64.5	5	78.5
6	18.7	21	34.4	Rha-1	101.7	6	62.68
7	33.3	22	33.3	2	72.4		
8	41.0	23	28.2	3	72.6		
9	48.2	24	17.2	4	74.1		
10	37.2	25	15.7	5	70.0		
11	24.0	26	17.5	6	18.7		
12	122.7	27	26.7				
13	145.0	28	180.4				
14	42.3	29	33.3				
15	28.2	30	24.0				

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Hederacolchiside E

CAS Registry Number: 33783-82-3
See Figure Hederacolchiside E
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Hedera colchica* [1, 2]
$C_{65}H_{106}O_{30}$: 1366.676
Mp: 215–225° [1]
$[\alpha]_D^{23}$ −22.28° (c 0.9, MeOH) [1]

References

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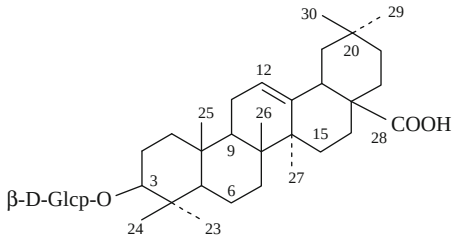
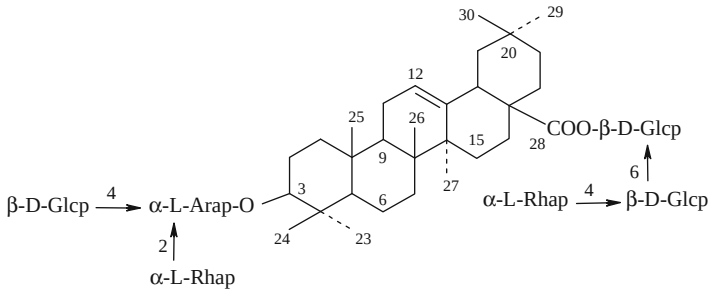
Hederoside A_2 (Androseptoside A, Gleditshioside A, Vitalboside A)

CAS Registry Number: 17184-21-3





Hederacolchiside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Hedera taurica* [1], *Androsace septentrionalis* [2], *Beta vulgaris* [3], *Chenopodium quinoa* [4], *Calendula officinalis* [5, 6], *Gleditsia triacanthos* [7], *Luffa cylindrica* [8], *Clematis grata* [9], *Fatsia japonica* [10], *Clematis vitalba* [11]
$C_{36}H_{58}O_8$: 618.413
Mp: 245–250°C [1]
$[\alpha]_D^{20}$ +52° (c 3.2, C_5H_5N) [1]
UV λ_{max}^{EtOH} nm (ε): 204–206 (4514) [6]
IR (oil) ν_{max} cm^{-1}: 3440, 1700 [6]
FAB-MS *m/z*: 617, 455, 438, 369, 248, 203 [9]
^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 3.38 (dd, J = 4.5, 12.0, H-3), 5.47 (brt, J = 3.8, H-12), 0.7-1.4 (m, CH_3, CH_2, CH-aglycons), 0.72, 0.76 (each 3H), 0.87 (6H), 0.98, 1.09, 1.24 (each CH_3); β-D-Glcp: 4.94 (d, J = 8.0, H-1), 4.09 (t, J = 8.5, H-2), 4.14–4.29 (m, H-3, H-4), 3.69 (m, H-5), 4.59 (dd, J = 2.5, 12.0, Ha-6), 4.41 (dd, J = 5.5, Hb-6) [9]
^{13}C NMR (100 MHz, C_5D_5N): [9]

Table 1

C-1	38.1	C-11	22.6	C-21	33.4	Glc-1	105.2
2	27.1	12	121.3	22	32.3	2	73.8
3	87.8	13	143.9	23	27.6	3	76.7
4	38.6	14	41.2	24	16.4	4	70.0
5	55.0	15	28.2	25	15.0	5	76.4
6	17.7	16	22.8	26	16.8	6	61.1
7	32.1	17	45.4	27	25.5		
8	39.6	18	40.8	28	178.7		
9	47.0	19	45.7	29	32.8		
10	36.2	20	30.1	30	23.3		

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Hederoside E_2

See Figure Hederoside E_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hedera taurica* [1, 2], *Hedera colchica* [3], *Fatsia japonica* [4], *Luffa acutangula* [5]

$C_{42}H_{68}O_{13}$: 780.465

$[\alpha]_D^{20}$ +4° (c 2.2, C_5H_5N)

FAB-MS *m/z*: 779 $[M-H]^-$

HR-FAB-MS *m/z*: 803.4543 $[M + Na]^+$

^{1}H NMR (Me ester) (250 MHz, J/Hz, C_5D_5N): 3.28 (dd, J = 4.5, 12.0, H-3), 5.36 (brt, J = 3.5, H-12), 3.69 (s, O-CH_3), 1.20, 1.14, 1.03, 0.90, 0.89, 0.83, 0.80 (s, CH_3 × 7)

β-D-Glcp: 4.89 (d, J = 7.5, H-1), 4.20 (dd, J = 9.0, H-2), 4.28 (m, H-3, H-4), 3.90 (m, H-5), 4.42 (dd, J = 2.0, Ha-6), 4.32 (dd, J = 5.3, 11.5, Hb-6)

β-D-Glcp: 5.34 (d, J = 8.0, H-1), 4.08 (brt, J = 9.0, H-2), 4.21 (t, J = 9.0, H-3) 4.12 (t, J = 9.5, H-4), 3.90 (m, H-5), 4.51 (dd, J = 2.5, Ha-6), 4.46 (dd, J = 3.0, 12.0, Hb-6)

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.8	Glc-1	105.0
2	26.7	17	46.2	2	83.6
3	89.1	18	42.0	3	78.0
4	39.6	19	47.1	4	71.9
5	56.0	20	31.0	5	78.0
6	18.6	21	34.1	6	62.9
7	32.9	22	32.9	Glc′-1	106.1
8	39.8	23	28.3	2	77.0
9	48.0	24	16.9	3	78.4
10	37.1	25	15.6	4	71.7
11	23.6	26	17.3	5	78.1
12	122.9	27	26.2	6	62.9
13	144.3	28	178.0		
14	42.1	29	33.2	O-CH_3	51.6
15	28.2	30	23.8		

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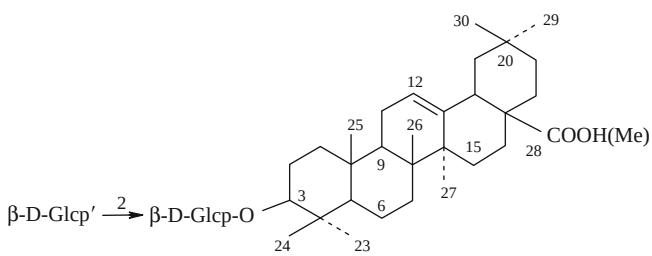

Hederoside E_2

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Hederoside H_2

See Figure Hederoside H_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hedera taurica* [1], *Fatsia japonica* [2]

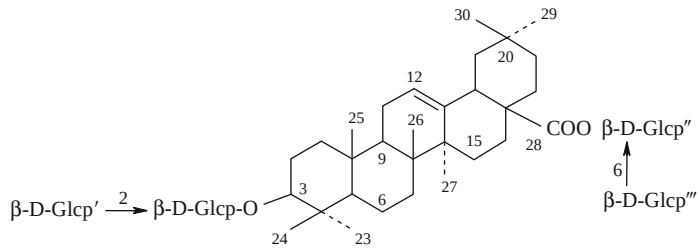
$C_{54}H_{88}O_{23}$: 1104.571

$[\alpha]_D^{20}$ +4.0° (c 2.2, C_5D_5N) [1]

^{13}C NMR (C_5D_5N): [1]

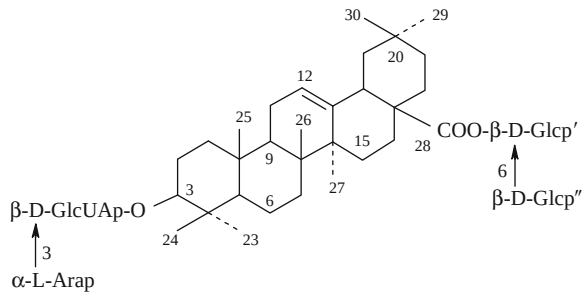
Table 1

C-1	39.0	C-16	23.8	Glc-1	105.0	Glc″-1	95.8
2	26.7	17	46.5	2	83.5	2	74.0
3	89.3	18	41.9	3	78.0	3	78.3
4	39.6	19	47.2	4	72.0	4	71.2
5	56.1	20	30.8	5	78.0	5	78.0
6	18.7	21	34.2	6	63.0	6	69.8
7	33.4	22	32.8	Glc′-1	106.0	Glc‴-1	105.3
8	40.1	23	28.4	2	76.9	2	75.2
9	48.2	24	16.9	3	78.3	3	78.7
10	37.1	25	15.7	4	71.8	4	71.8
11	23.6	26	17.7	5	78.0	5	78.3
12	123.0	27	26.1	6	63.0	6	63.0
13	144.3	28	176.5				
14	42.3	29	33.2				
15	28.4	30	23.8				



Hederoside H_2

Hemsloside G1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hemsleya graciliflora* [1]

$C_{53}H_{84}O_{23}$: 1088.540

$[\alpha]_D$ +7.6° (c 0.9, MeOH) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.00 (d, J = 7.6), 5.03 (d, J = 8.3), 5.37 (d, J = 7.0), 6.25 (d, J = 7.9) – all H-1 of sugars

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.9	GlcUA-1	106.6	Glc′-1	95.7
2	26.5	17	47.2	2	74.4	2	74.0
3	89.5	18	41.8	3	86.1	3	78.7

(*continued*)

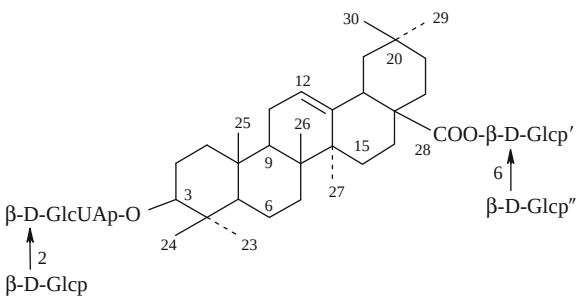
Table 1 (continued)

4	39.6	19	46.5	4	72.7	4	71.4
5	56.0	20	30.8	5	77.9	5	77.3
6	18.6	21	34.2	6	171.9	6	69.7
7	33.3	22	32.7	Ara-1	105.6	Glc″-1	105.1
8	40.1	23	28.3	2	71.3	2	75.2
9	48.2	24	17.0	3	74.6	3	78.4
10	37.1	25	15.6	4	69.2	4	71.9
11	23.6	26	17.6	5	67.1	5	78.7
12	123.0	27	26.1			6	62.9
13	144.2	28	176.5				
14	42.3	29	33.1				
15	28.4	30	23.8				

References

1. R. Kasai, T. Tanaka, R.-L. Nie, M. Miyakoshi, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **38**(5), 1320 (1990)

Hemsloside G2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hemsleya graciliflora* [1]

$C_{54}H_{86}O_{24}$: 1118.550

$[\alpha]_D^{18}$ −6.1° (c 0.9, MeOH) [1]

^{1}H-NMR (400 MHz, J/Hz, C_5D_5N): 5.02 (d, J = 8.8), 5.04 (d, J = 7.8), 5.42 (d, J = 7.8), 6.26 (d, J = 8.3) – all anomeric proton (H-1), of sugars [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.7	GlcUA-1	105.4	Glc″-1	95.7
2	26.6	17	47.0	2	82.8	2	73.9
3	89.2	18	41.7	3	77.7	3	78.4
4	39.5	19	46.2	4	73.2	4	70.9
5	55.8	20	30.8	5	77.9	5	77.9
6	18.5	21	34.0	6	172.5	6	69.4
7	33.1	22	32.5	Glc′-1	106.0	Glc‴-1	105.3
8	39.9	23	28.1	2	77.1	2	75.2
9	48.0	24	16.7	3	78.3	3	78.4
10	36.9	25	15.6	4	71.5	4	71.7
11	23.4	26	17.5	5	77.9	5	78.7
12	122.9	27	26.1	6	62.7	6	62.6
13	144.2	28	176.5				
14	42.1	29	33.1				
15	28.3	30	23.7				

References

1. R. Kasai, T. Tanaka, R.-L. Nie, M. Miyakoshi, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **38**(5), 1320 (1990)

Hemsloside H_1

CAS Registry Number: 102146-27-0

See Figure Hemsloside H_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hemsleya chinensis, H. graciliflora* [1]

$C_{59}H_{94}O_{28}$: 1250.593

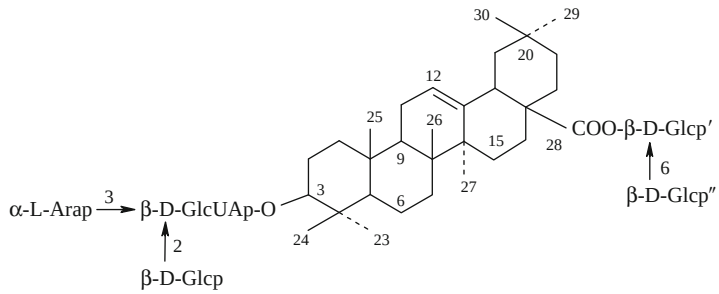
$[\alpha]_D^{27}$ +2.9° (c 1.32, MeOH) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

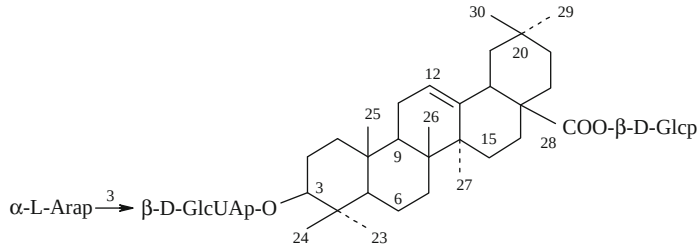
Table 1

C-1	38.7	C-16	23.7	GlcUA-1	105.4	4	71.5
2	26.6	17	47.0	2	79.2	5	78.7
3	89.6	18	41.7	3	86.1	6	69.4
4	39.6	19	46.3	4	72.9	Ara-1	105.2
5	55.8	20	30.8	5	77.3	2	71.5
6	18.5	21	34.0	6	171.9	3	74.7
7	33.1	22	32.5	Glc-1	103.8	4	69.6
8	39.9	23	28.3	2	76.5	5	67.8
9	48.0	24	16.7	3	78.4	Glc″-1	105.3

(*continued*)



Hemsloside H_1



Hemsloside MaI

Table 1 (continued)

10	36.9	25	15.5	4	72.5	2	73.9
11	23.7	26	17.5	5	77.8	3	78.0
12	122.8	27	26.1	6	63.3	4	70.9
13	144.1	28	176.5	Glc′-1	95.7	5	78.6
14	42.1	29	33.1	2	75.2	6	62.6
15	27.9	30	23.4	3	78.4		

References

1. T. Morita, R.-L. Nie, H. Fujino, K. Ito, N. Matsufuji, R. Kasai, J. Zhou, C.-Y. Wu, N. Yata, O. Tanaka, Chem. Pharm. Bull. **34**(1), 401 (1986)

Hemsloside MaI

See Figure Hemsloside MaI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hemsleya macrosperma*, *H. chinensis* [1], *Momordica cochinchinensis* [2, 3], *Hemsleya graciliflora* [4]

$C_{47}H_{74}O_{18}$: 926.487

Mp: 230–233°C (MeOH-H_2O) [1]

$[\alpha]_D^{21}$ + 15.8° (c 1.03, MeOH) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.6	GlcUA-1	105.1	Glc-1	95.5
2	26.3	17	46.8	2	74.2	2	73.9
3	89.1	18	41.6	3	85.7	3	78.5
4	39.3	19	46.2	4	72.5	4	71.0
5	55.6	20	30.7	5	77.2	5	78.9
6	18.3	21	33.7	6	172.0	6	62.0
7	33.1	22	32.5	Ara-1	106.5		
8	39.7	23	28.0	2	71.3		
9	47.9	24	16.8	3	74.5		
10	36.8	25	15.4	4	69.0		
11	23.6	26	17.3	5	67.0		
12	122.5	27	26.0				
13	144.0	28	176.3				
14	41.9	29	33.1				
15	28.0	30	23.6				

References

1. R.-L. Nie, T. Morita, R. Kasai, J. Zhou, C.-Y. Wu, O. Tanaka, Planta Med. **50**(4), 322 (1984)
2. N. Kawamura, H. Watanabe, H. Oshio, Phytochemistry **27**(11), 3585 (1988)
3. M. Iwamoto, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **33**(1), 1 (1985)
4. R. Kasai, T. Tanaka, R.-L. Nie, M. Miyakoshi, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **38**(5), 1320 (1990)

Hemsloside Ma2 (Momordin IIe)

See Figure Hemsloside Ma2 (Momordin IIe)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hemsleya macrosperma* [1], *Momordica cochinchinensis* [2]

$C_{52}H_{82}O_{22}$: 1058.529

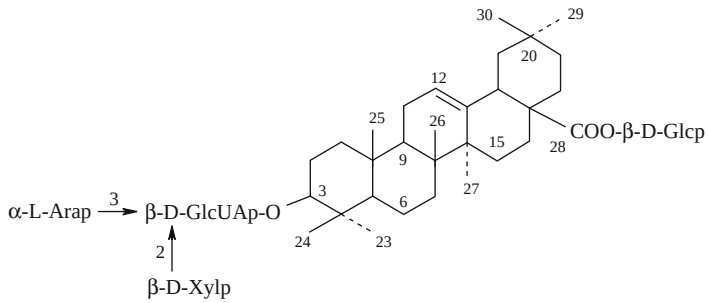
$[\alpha]_D$ +15.4° (c 1.03, MeOH) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.6	GlcUA-1	105.1	Xyl-1	104.5
2	26.5	17	46.9	2	79.1	2	76.0
3	89.7	18	41.6	3	86.2	3	77.1
4	39.5	19	46.2	4	72.7	4	71.2
5	55.7	20	30.7	5	78.7	5	67.8
6	18.4	21	33.6	6	171.8	Glc-1	95.6
7	33.1	22	32.5	Ara-1	105.1	2	74.0
8	39.8	23	28.2	2	71.2	3	78.7
9	48.0	24	16.3	3	74.6	4	71.0
10	36.8	25	15.4	4	69.5	5	79.1
11	23.6	26	17.3	5	67.5	6	62.0
12	122.5	27	26.0				
13	144.0	28	176.3				
14	42.0	29	33.1				
15	27.6	30	23.6				

(*continued*)



Hemsloside Ma2 (Momordin IIe)

References

1. R.L. Nie, T. Morita, R. Kasai, J. Zhou, C.-Y. Wu, O. Tanaka, Planta Med. **50**(4), 322 (1984)
2. N. Kawamura, H. Watanabe, H. Oshio, Phytochemistry **27**(11), 3585 (1988)

Hemsloside Ma3

See Figure Hemsloside Ma3

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hemsleya macrosperma*, *H. chinensis* [1], *Panax vietnamensis* [2], *Hemsleya graciliflora* [3]

$C_{53}H_{84}O_{23}$: 1088.540

Mp: 249–252°C (MeOH-H_2O) [1]

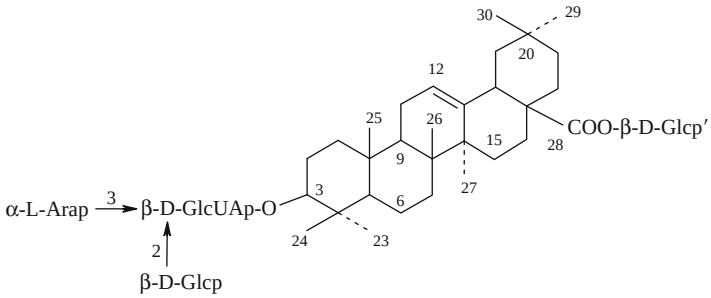
$[\alpha]_D^{21}$ +16.0° (c 1.00, MeOH) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.7	GlcUA-1	105.2	Glc-1	103.7
2	26.4	17	47.0	2	79.1	2	76.3

(*continued*)



Hemsloside Ma3

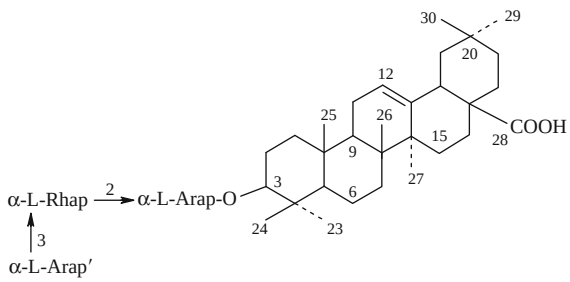
Table 1 (continued)

3	89.6	18	41.7	3	86.1	3	78.8
4	39.5	19	46.4	4	72.8	4	72.5
5	55.7	20	30.8	5	77.2	5	77.8
6	18.5	21	34.1	6	171.7	6	63.3
7	33.2	22	32.5	Ara-1	105.2	Glc′-1	95.6
8	39.9	23	28.0	2	71.4	2	74.1
9	48.0	24	16.6	3	74.6	3	78.8
10	36.9	25	15.5	4	69.6	4	71.1
11	23.7	26	17.4	5	67.8	5	79.1
12	122.5	27	26.1			6	62.2
13	144.1	28	176.3				
14	42.1	29	33.2				
15	28.0	30	23.7				

References

1. R.L. Nie, T. Morita, R. Kasai, J. Zhou, C.-Y. Wu, O. Tanaka, Planta Med. **50**(4), 322 (1984)
2. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)
3. R. Kasai, T. Tanaka, R.-L. Nie, M. Miyakoshi, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **38**(5), 1320 (1990)

Hishoushi Saponin A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Sapindus delavayi* [1], *Patrinia scabiosaefolia* [2]

$C_{46}H_{74}O_{15}$: 866.502

$[\alpha]_D^{21}$ +3.1° (c 1.47, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

Ara-1	105.5	Ara-1	107.0
2	75.3	2	73.0
3	74.3	3	74.3
4	69.3	4	69.3
5	65.3	5	66.7
Rha-1	101.4		
2	71.9		
3	82.5		
4	73.0		
5	69.6		
6	18.4		

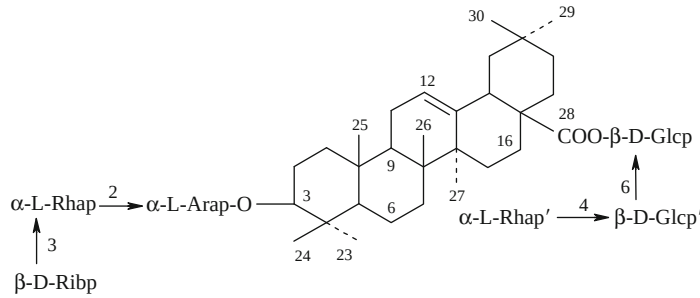
References

1. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, J. Zhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)
2. J.S. Choi, W.S. Woo, Planta Med. **53**, 62 (1987)

Huzhangoside B

CAS Registry Number: 94795-70-7

See Figure Huzhangoside B



Huzhangoside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Anemone rivularis* [1], *A. hupensis* [2], *Clematis stans* [3]

$C_{64}H_{104}O_{29}$: 1336.666

Mp: 224–225°C [1]

$[\alpha]_D^{14}$ −3.0° (c 2.4, MeOH) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.27 (dd, J = 12.4, H-3), 1.30 (s, CH_3-23), 1.15 (s, CH_3-24), 0.87 (s, CH_3-25), 1.07 (s, CH_3-26), 1.25 (s, CH_3-27), 0.89 (s, CH_3-29), 0.89 (s, CH_3-30); α-L-Arap: 4.83 (d, J = 6.0, H-1), 4.58 (dd, J = 7.6, H-2), 4.25 (H-3), 4.22 (H-4), 3.80, 4.28 (H_2-5); α-L-Rhap: 6.29 (brs, H-1), 4.91 (H-2), 4.74 (dd, J = 9.5, 3.0, H-3), 4.43 (H-4), 4.63 (H-dq, J = 9.5, 6.0, 5), 1.53 (d, CH_3-6); β-D-Ribp: 5.95 (d, J = 4.5, H-1), 4.31 (H-2), 4.51 (m, H-3), 4.16 (H-4), 4.16, 4.33 (H_2-5); β-D-Glcp: 6.20 (d, J = 8.0, H-1), 4.09 (H-2), 4.18 (H-3), 4.28 (t, J = 19.0, H-4), 4.07 (H-5), 4.30, 4.63 (H_2-6); β-D-Glcp′: 4.97 (d, J = 8.0, H-1), 3.91 (H-2), 4.12 (H-3), 4.38 (H-4), 3.62 (H-5), 4.06, 4.17 (H_2-6)

α-L-Rhap′: 5.82 (brs, H-1), 4.65 (H-2), 4.54 (H-3), 4.30 (H-4), 4.93 (H-5), 1.66 (d, J = 6.0, CH_3-6) [3]

^{13}C NMR (100 MHz, C_5D_5N): [3]

Table 1

C-1	38.9	C-19	46.2	Ara-1	105.3	Glc-3	78.7
2	26.6	20	30.7	2	75.3	4	70.8
3	88.7	21	33.9	3	74.8	5	78.0
4	39.5	22	32.5	4	69.4	6	69.1
5	56.0	23	28.16	5	65.6	Glc′-1	104.8
6	18.5	24	17.1	Rha-1	101.3	2	75.3
7	33.0	25	15.6	2	72.0	3	76.4
8	39.8	26	17.4	3	81.2	4	78.1
9	48.0	27	26.0	4	72.8	5	77.1
10	37.0	28	176.5	5	69.8	6	61.2
11	23.7	29	33.1	6	18.5	Rha′-1	102.6
12	122.8	30	23.6	Rib-1	104.6	2	72.5
13	144.1			2	72.7	3	72.7
14	42.0			3	68.8	4	73.9
15	28.2			4	70.1	5	70.2
16	23.3			5	65.2	6	18.4
17	47.0			Glc-1	95.6		
18	41.6			2	73.8		

(continued)

References

1. K. Mizutani, K. Ohtani, J-X. Wei, R. Kasai, O. Tanaka. Planta Med. **50**, 327 (1984)
2. W. Mingkui, W. Fenge, Ch. Yiaozu, Phytochemistry **34**, 1395 (1993)
3. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)

Huzhangoside C

CAS Registry Number: 96315-52-5

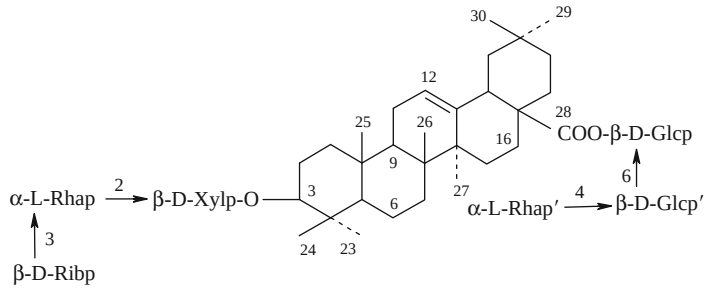
See Figure Huzhangoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Anemone rivularis* [1], *Clematis stans* [2]

$C_{64}H_{104}O_{29}$: 1336.666

$[\alpha]_D^{24}$ −33.3° (c 1.00, MeOH) [2]



Huzhangoside C

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.31 (dd, J = 11.5, 4.0, H-3), 1.36 (s, CH_3-23), 1.22 (s, CH_3-24), 0.86 (s, CH_3-25), 1.06 (s, CH_3-26), 1.23 (s, CH_3-27), 0.88 (s, CH_3-29), 0.88 (s, CH_3-30); β-D-Xylp: 4.83 (d, J = 7.5, H-1), 4.26 (H-2), 4.20 (H-3), 4.17 (H-4), 3.71, 4.33 (t, J = 10.5, H_2-5); α-L-Rhap: 6.60 (brs, H-1), 4.98 (brs, H-2), 4.80 (dd, J = 9.5, 3, H-3), 4.48 (t, J = 9.5, H-4), 4.77 (dq, J = 9.5, 6, H-5), 1.63 (d, CH_3-6); β-D-Ribp: 5.98 (d, J = 4.5, H-1), 4.34 (H-2), 4.54 (brs, H-3), 4.18 (m, H-4), 4.18, 4.33 (m, H_2-5); β-D-Glcp: 6.20 (d, J = 8, H-1), 4.09 (H-2), 4.18 (t, J = 19, H-3), 4.28 (H-4), 4.07 (H-5), 4.30, 4.63 (H_2-6)
β-D-Glcp′: 4.97 (d, J = 8.0, H-1), 3.91 (d, J = 9.8, H-2), 4.12 (H-3), 4.38 (t, J = 9, H-4), 3.62 (m, H-5), 4.06, 4.17 (H_2-6); α-L-Rhap′: 5.82 (brs, H-1), 4.65 (H-2), 4.54 (dd, H-3), 4.30 (H-4), 4.93 (dq, J = 9.5, 6, H-5), 1.66 (d, J = 6, CH_3-6) [2]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-19	46.2	Xyl-1	106.1	Glc-3	78.7
2	26.9	20	30.7	2	77.0	4	70.8
3	88.6	21	34.0	3	79.9	5	78.0
4	39.6	22	32.5	4	71.5	6	69.2
5	56.1	23	28.2	5	67.0	Glc′-1	104.8
6	18.5	24	17.2	Rha-1	101.4	2	75.3
7	33.0	25	15.7	2	72.0	3	76.5
8	39.9	26	17.5	3	81.2	4	78.2
9	48.0	27	26.1	4	72.0	5	77.1
10	37.0	28	176.5	5	69.9	6	61.2
11	23.7	29	33.1	6	18.6	Rha′-1	102.7
12	122.8	30	23.7	Rib-1	104.6	2	72.6
13	144.1			2	72.7	3	71.7
14	42.1			3	69.9	4	74.0
15	28.3			4	70.2	5	70.3
16	23.7			5	65.2	6	18.5
17	47.0			Glc-1	95.6		
18	41.6			2	73.8		

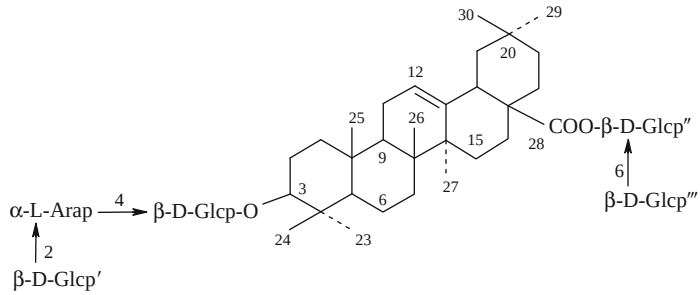
(*continued*)

References

1. K. Mizutani, K. Ohtani, J.-X. Wei, R. Kasai, O. Tanaka, Planta Med. **50**, 327 (1984)
2. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)

Hypoleucoside B

CAS Registry Number: 133557-54-7
See Figure Hypoleucoside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Acanthopanax hypoleucus* [1]
$C_{59}H_{96}O_{27}$: 1236.613
$[\alpha]_D^{16}$ +2.1° (c 0.34, C_5H_5N) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.38 (t-like, H-12), 0.83, 0.87, 1.06, 1.06, 1.21, 1.22, 0.86 (s, CH_3-23, 24, 25, 26, 27, 29, 30)
β-D-Glcp: 4.80 (d, J = 6.96, H-1)
α-L-Arap: 5.00 (d, J = 7.69, H-1)
β-D-Glcp′: 5.27 (d, J = 7.33, H-1)
β-D-Glcp″: 5.48 (d, J = 7.69, H-1)
β-D-Glcp‴: 6.22 (d, J = 7.88, H-1) [1]
^{13}C NMR (C_5D_5N): [1]



Hypoleucoside B

Table 1

C-1	38.75	C-16	23.72	Glc-1	104.24	Glc′-5	78.35
2	26.50	17	46.92	2	76.00	6	63.12
3	88.93	18	41.60	3	77.35	Glc″-1	95.57
4	39.59	19	46.19	4	78.17	2	73.79
5	55.82	20	30.65	5	77.29	3	78.59
6	18.43	21	33.92	6	62.45	4	71.44
7	33.03	22	32.44	Ara-1	105.27	5	78.26
8	39.81	23	27.97	2	83.21	6	69.31
9	47.97	24	16.64	3	72.29	Glc‴-1	105.09
10	36.92	25	15.50	4	68.62	2	75.03
11	23.31	26	17.41	5	65.81	3	77.85
12	122.77	27	25.95	Glc′-1	104.84	4	70.86
13	144.04	28	176.42	2	75.16	5	78.26
14	42.05	29	33.03	3	78.49	6	62.55
15	28.19	30	23.59	4	71.44		

References

1. H. Kohda, S. Tanaka, Y. Yamaoka, Chem. Pharm. Bull. **38**(12), 3380 (1990)

Indicasaponin B

CAS Registry Number: 244778-69-6

See Figure Indicasaponin B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Fagonia indica* [1]

$C_{52}H_{84}O_{21}$: 1044.550

$[\alpha]_D^{25}$ +24° (c 0.16, MeOH) [1]

LSI-MS (negative ion mode) *m/z*: 1043 $[M-H]^-$ (58), 881 $[M-H-Glc]^-$ (14), 719 $[M-H-2 \times Glc]^-$ (10), 587 $[M-H-2 \times Glc-Ara]^-$ (10) and 455 $[M-H-2 \times Glc-2 \times Ara]^-$ (12) [1]

^{1}H NMR (500.13 MHz, J/Hz, CD_3OD): 0.99 (Hα-1), 1.62 (Hβ-1), 1.72 (Hα-2), 1.82 (Hβ-2), 3.10 (H-3), 0.76 (H-5), 1.40 (Hα-6), 1.53 (Hβ-6), 1.67 (Hα-7), 1.31 (Hβ-7), 1.55 (H-9), 1.91 (Hα-11), 1.91 (Hβ-11), 5.25 (H-12), 1.73 (Hα-15), 1.06 (Hβ-15), 2.09 (Hα-16), 1.71 (Hβ-16), 2.85 (dd, J = 4.2, 14.2, H-18), 2.09 (H-19), 1.71 (H-19), 1.99 (Hα-21), 1.21 (Hβ-21), 1.62 (Hα-22), 1.59 (Hβ-22), 1.04 (s, CH_3-23), 0.83 (s, CH_3-24), 0.94 (s, CH_3-25), 0.79 (s, CH_3-26), 1.14 (s, CH_3-27), 0.92 (s, CH_3-29), 0.90 (s, CH_3-30)

α-L-Arap: 4.43 (d, J = 7.1, H-1), 3.91 (H-2), 3.77 (H-3), 4.10 (H-4), 3.85, 3.53 (H_2-5)

β-D-Glcp: 4.56 (d, J = 7.6, H-1), 3.30 (H-2), 3.30–3.32 (H-3), 3.30–3.32 (H-4), 3.30–3.32 (H-5), 3.82, 3.64 (H_2-6)

α-L-Arap′: 4.69 (d, J = 7.8, H-1), 3.12 (H-2), 3.26 (H-3), 3.39 (H-4), 3.80, 3.10 (H_2-5)

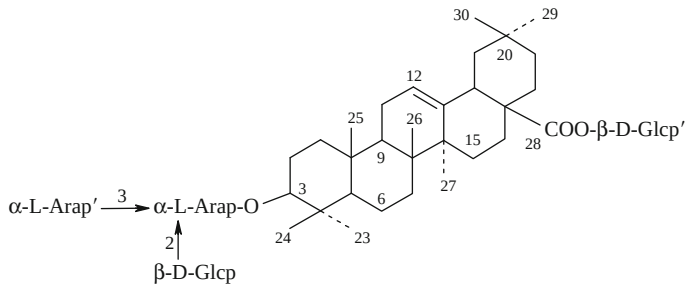
β-D-Glcp′: 5.37 (d, J = 8.2, H-1), 3.31 (H-2), 3.30–3.33 (H-3), 3.30–3.33 (H-4), 3.30–3.33 (H-5), 3.82, 3.65 (H_2-6) [1]

^{13}C NMR (125.76 MHz, CD_3OD): [1]

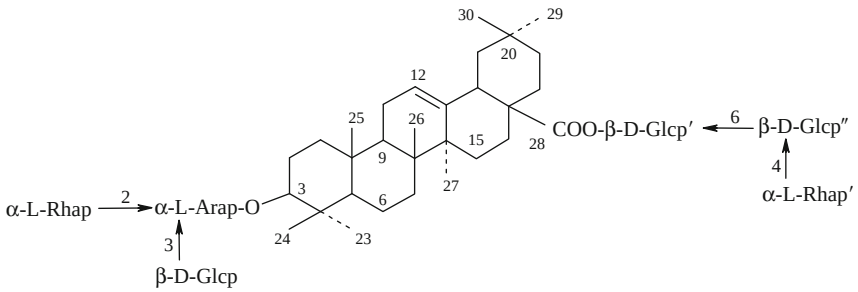
Table 1

C-1	39.9	C-16	24.6	Ara-1	106.1	Ara′-1	104.9
2	27.2	17	48.0	2	78.0	2	71.1
3	91.2	18	42.6	3	84.1	3	75.2
4	40.5	19	47.2	4	69.7	4	71.0
5	57.1	20	31.5	5	65.4	5	66.5
6	19.3	21	34.6	Glc-1	105.1	Glc′-1	95.7
7	33.5	22	33.1	2	76.0	2	73.9
8	40.7	23	28.3	3	78.3	3	78.7
9	48.9	24	16.7	4	71.2	4	71.5
10	37.9	25	16.0	5	78.1	5	78.4
11	24.0	26	17.7	6	62.1	6	62.4

(*continued*)



Indicasaponin B



Kalopanax Saponin D

Table 1 (continued)

12	123.8	27	26.3
13	144.8	28	178.0
14	42.9	29	33.5
15	28.9	30	24.0

Pharm./Biol.: In folk medicine it is used for treatment of various skin lesions. Additionally, the plant is claimed to be a remedy for cancer in its early stages [1]

References

1. K.H. Shaker, M. Bernhardt, M.H.A. Elgamal, K. Seifert, Phytochemistry **51**, 1049 (1999)

Kalopanax Saponin D

See Figure Kalopanax Saponin D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Kalopanax septemlobus* [1]

$C_{65}H_{106}O_{30}$: 1366.676

Mp: 235–236°C (MeOH) [1]

$[\alpha]_D^{22}$ −24.6° (c 0.57, MeOH) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.07, 1.25, 1.07, 0.91, 1.17, 0.91, 0.91 (s, CH_3-23, 24, 25, 26, 27, 30), 5.48 (s, H-12), 4.99 (H-1 of Ara), 5.66 (s, H-1 of Rha), 1.55 (d, J = 5.0, CH_3-6 of Rha), 4.91 (d, J = 6.0, H-1 of Glc), 6.12 (d, J = 7.0, H-1 of Glc′), 4.91 (H-1 of Glc″), 5.92 (s, H-1 of Rha′), 1.62 (d, J = 5.0, CH_3-6 of Rha′) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-18	41.6	Ara-1	104.6	Glc′-1	95.6
2	26.5	19	46.6	2	74.6	2	73.8
3	88.2	20	30.7	3	81.9	3	78.1
4	39.5	21	33.7	4	68.1	4	70.7
5	56.0	22	32.9	5	64.7	5	76.4
6	18.5	23	28.1	Rha-1	101.8	6	70.0
7	33.1	24	17.0	2	72.4	Glc″-1	104.6
8	39.9	25	15.7	3	72.4	2	75.3
9	48.1	26	17.5	4	73.8	3	76.4
10	37.0	27	26.1	5	70.0	4	78.3
11	23.7	28	176.5	6	18.5	5	77.1

(*continued*)

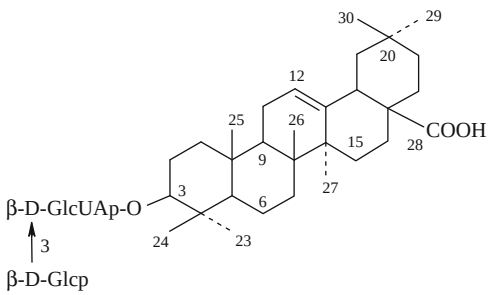
Table 1 (continued)

12	122.5	29	33.1	Glc-1	104.5	6	61.2
13	144.1	30	23.7	2	74.8	Rha-1	102.6
14	42.1			3	78.1	2	72.4
15	28.1			4	71.4	3	72.4
16	23.7			5	78.3	4	73.8
17	47.0			6	62.5	5	70.2
						6	18.5

References

1. C.-J. Shao, R. Kasai, J.D. Xu, O. Tanaka, Chem. Pharm. Bull. **37**(2), 311 (1989)

Kalopanax Saponin E (Spinasaponin A)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Spinacia oleracea* [1], *Kalopanax septemlobus* [2], *Aralia elata* [3]

$C_{42}H_{66}O_{14}$: 794.445

$[\alpha]_D^{20}$ + 54° (MeOH) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.41 (s, H-12), 1.28, 0.97, 0.84, 0.97, 1.28, 1.28, 0.97 (s, CH_3-23, 24, 25, 26, 27, 29, 30)

β-D-GlcUAp: 5.16 (d, J = 7.0, H-1)

β-D-Glcp: 4.92 (d, J = 7.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.8	GlcUA-1	106.4
2	26.5	17	46.7	2	74.2
3	89.3	18	42.1	3	87.9
4	39.5	19	46.7	4	71.7
5	55.9	20	30.9	5	77.2
6	18.6	21	34.4	6	172.0
7	33.2	22	33.2	Glc-1	105.7
8	39.9	23	28.2	2	75.4
9	48.1	24	16.9	3	78.1
10	37.1	25	15.4	4	71.6
11	23.8	26	17.4	5	78.5
12	122.6	27	26.2	6	62.6
13	144.8	28	180.0		
14	42.3	29	33.2		
15	28.2	30	23.8		

Pharm./Biol.: Inhibitory activity on Ethanol Absorption [3]

References

1. R. Tschesche, H. Rehkaemper, G. Wulff, Justus Liebigs Ann. Chem. **726**, 125 (1969)
2. C.-J. Shao, R. Kasai, J.-D. Xu, O. Tanaka, Chem. Pharm. Bull. **37**(2), 311 (1989)
3. M. Yoshikawa, T. Murakami, E. Harada, N. Murakami, I. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1915 (1996)

Kalopanax Saponin F

See Figure Kalopanax Saponin F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Kalopanax septemlobus* [1]

$C_{53}H_{84}O_{23}$: 1088.540

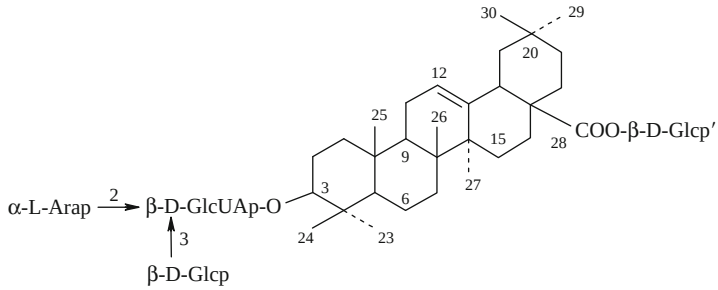
$[\alpha]_D^{24}$ +7.1° (c 0.70, H_2O) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

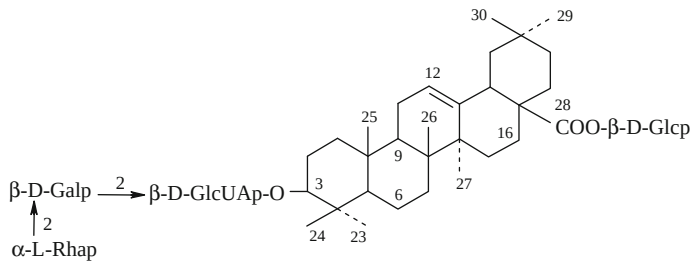
Table 1

C-1	38.6	C-16	23.6	GlcUA-1	105.1	Glc-1	104.6
2	26.1	17	46.9	2	78.8	2	76.0

(*continued*)



Kalopanax Saponin F



Lablaboside A

Table 1 (continued)

3	89.7	18	41.7	3	87.7	3	77.2
4	39.6	19	46.9	4	72.8	4	71.8
5	55.7	20	30.7	5	77.2	5	78.8
6	18.5	21	34.0	6	172.0	6	61.9
7	33.1	22	33.1	Ara-1	105.1	Glc′-1	95.7
8	39.6	23	27.7	2	71.3	2	74.0
9	48.0	24	16.3	3	75.2	3	78.8
10	36.8	25	15.5	4	70.0	4	71.0
11	23.6	26	17.4	5	67.0	5	78.8
12	122.6	27	26.1			6	61.9
13	144.1	28	176.8				
14	42.1	29	33.1				
15	27.7	30	23.6				

References

1. C.-J. Shao, R. Kasai, J.D. Xu, O. Tanaka, Chem. Pharm. Bull. **37**(2), 311 (1989)

Lablaboside A

CAS Registry Number: 209802-26-6

See Figure Lablaboside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Dolichos lablab* [1]

$C_{54}H_{86}O_{23}$: 1102.555

Mp: 184.0–185.5°C [1]

$[\alpha]_D^{26}$ −9.3° (c 1.2, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3419, 2943, 1736, 1716, 1676, 1076 [1]

FAB-MS (negative ion mode) *m*/*z*: 1101 $(M\text{-}H)^-$, 939 $(M\text{-}C_6H_{11}O_5)^-$, 793 $(M\text{-}C_{12}H_{21}O_9)^-$

HR-FAB-MS (positive ion mode) *m*/*z*: 1125 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.82, 0.88, 0.91, 1.06, 1.13, 1.25, 1.36 (s, CH_3-25, 30, 29, 26, 24, 27,

23), 3.17 (dd, J = 3.1, 14.7, H-18), 3.30 (dd, J = 4.6, 12.2, H-3), 5.39 (brs, H-12)
α-L-Rhap: 6.25 (brs, H-1), 1.74 (d, J = 5.8, CH_3-6)
β-D-GlcUAp: 5.03 (d, J = 7.3, H-1)
β-D-Galp: 5.66 (d, J = 7.7, H-1)
β-D-Glcp: 6.28 (d, J = 8.0, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.8	GlcUA-1	105.3	Rha-1	102.0
2	26.5	17	47.0	2	79.4	2	72.4
3	90.0	18	41.8	3	78.8	3	72.7
4	39.7	19	46.2	4	73.4	4	74.4
5	56.0	20	30.8	5	77.4	5	69.5
6	18.6	21	34.1	6	172.5	6	18.9
7	33.2	22	32.6	Gal-1	102.8	Glc-1	95.8
8	40.0	23	28.5	2	76.7	2	74.2
9	48.1	24	16.8	3	76.1	3	78.9
10	37.0	25	15.5	4	70.6	4	71.3
11	23.5	26	17.5	5	76.3	5	79.2
12	122.9	27	26.1	6	62.0	6	62.4
13	144.1	28	176.4				
14	42.2	29	33.1				
15	28.3	30	23.7				

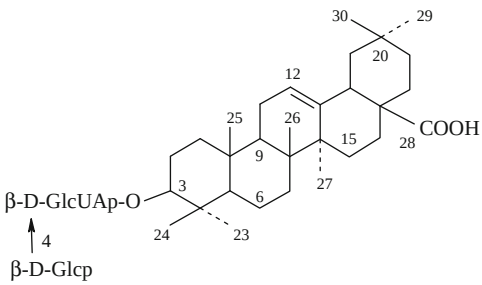
Pharm./Biol.: Adjuvant activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Komatsu, H. Matsuda, Chem. Pharm. Bull. **46**(5), 812 (1998)

Ladyginoside A

CAS Registry Number: 38424-95-2

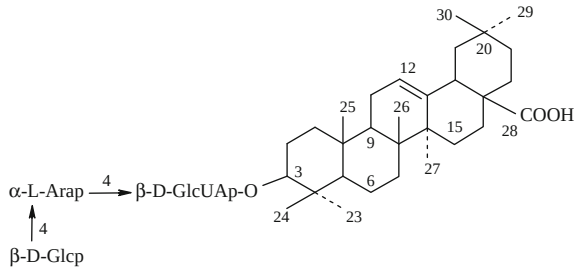


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Calendula officinalis* [1], *Ladyginia bucharica* [2]
$C_{42}H_{66}O_{14}$: 794.445
Mp: 240–242°C (EtOH) [1]
$[\alpha]_D^{20}$ +17.5° (c 0.8, MeOH) [2]

References

1. J. Lutomski, Pharmazie in unserer Zeit **12**, 149 (1983)
2. M. Patkhullaeva, L.G. Mzhelskaya, N.K. Abubakirov, Chem. Nat. Comp. **8**(4), 462 (1972)

Ladyginoside C

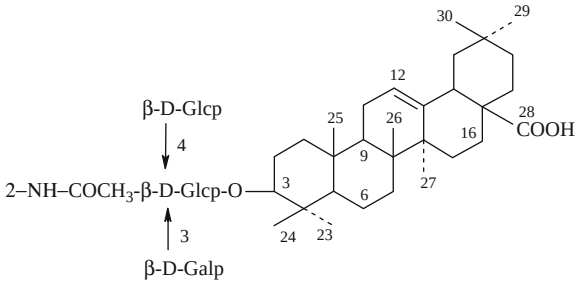


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Ladyginia bucharica* [1, 2]
$C_{47}H_{74}O_{18}$: 926.487
Mp: 224–226°C [1]
$[\alpha]_D^{20}$ −17.1° (c 1.8, MeOH) [1]

References

1. M. Patkhullaeva, L.G. Mzhelskaya, N.K. Abubakirov, Chem. Nat. Comp. **9**(1), 31 (1973)
2. M. Patkhullaeva, L.G. Mzhelskaya, N.K. Abubakirov, Chem. Nat. Comp. **6**(4), 504 (1970)

Lotoidoside D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Clinus lotoides* [1]

$C_{50}H_{81}NO_{18}$: 983.545

$[\alpha]_D^{22}$ +24.6° (c 0.5, MeOH) [1]

ESI-MS *m/z*: 984 $[M + H]^+$, 822 $[(M + H)\text{-}162]^+$, 660 $[(M + H)\text{-}162\text{-}162]^+$ [1]

HR-ESI-MS *m/z*: 984.5532 $[M + H]^+$ [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 5.28 (brt, J = 3.0, H-12), 3.13 (dd, J = 11.0, 4.5, H-3), 1.19 (s, CH_3-27), 0.99 (s, CH_3-23), 0.97 (6H, s, CH_3-25, 30), 0.94 (s, CH_3-29), 0.84 (s, CH_3-26), 0.80 (s, CH_3-24)

N-Ac-β-D-Glcp: 4.50 (d, J = 7.5, H-1), 3.93 (dd, J = 7.5, 9.0, H-2), 4.13 (dd, J = 9.0, 9.0, H-3), 4.99 (dd, J = 9.0, 9.0, H-4), 3.45 (m, H-5), 3.89 (dd, J = 4.5, 12.0, H-6), 3.96 (dd, J = 2.5, 12.0, H-6), 2.00 (s, COMe)

β-D-Galp: 4.50 (d, J = 7.5, H-1), 3.93 (dd, J = 7.5, 9.0, H-2), 4.13 (dd, J = 9.0, 9.0, H-3), 4.99 (dd, J = 9.0, 9.0, H-4), 3.45 (m, H-5), 3.89 (dd, J = 4.5, 12.0, H-6), 3.96 (dd, J = 2.5, 12.0, H-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	39.5	C-16	24.6	N-Ac-Glc-1	104.9	Glc-1	102.4
2	26.8	17	47.5	2	56.9	2	74.3
3	91.3	18	42.1	3	76.6	3	78.1
4	39.9	19	47.2	4	73.4	4	71.0
5	56.8	20	31.5	5	77.1	5	77.7
6	18.8	21	34.6	6	61.7	6	62.3
7	33.6	22	33.8	Ac-1	173.6		
8	40.5	23	28.6	2	23.2		
9	48.8	24	16.8	Gal-1	103.2		
10	37.6	25	15.7	2	71.6		
11	23.6	26	17.6	3	74.4		
12	123.6	27	26.2	4	69.9		
13	145.2	28	181.6	5	77.3		
14	42.8	29	33.5	6	62.3		
15	28.6	30	23.8				

Pharm./Biol.: Showed significant cytotoxicity against the three cancer cell lines with IC_{50} values ranging from 0.018 to 0.62 μM [1]

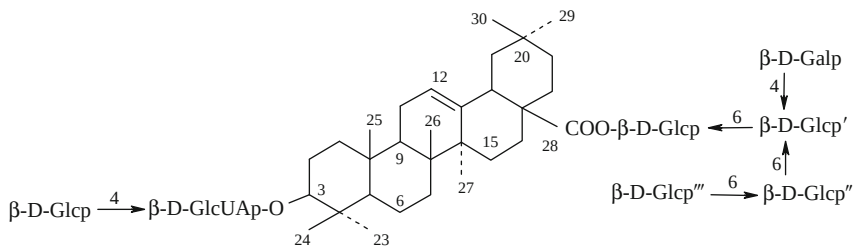
References

1. A.I. Hamed, S. Piacente, C. Autore, S. Marzocco, C. Pizza, W. Oleszek, Planta Med. **71**, 554 (2005)

Ladyginoside E

See Figure Ladyginoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid



Ladyginoside E

Biological sources: *Ladyginia bucharica* [1]
$C_{72}H_{116}O_{39}$: 1604.709
Mp: 200–202°C [1]
$[\alpha]_D^{20}$ +6.0° (MeOH) [1]

References

1. M. Patkhullaeva, L.G. Mzhelskaya, N.K. Abubakirov, Chem. Nat. Comp. **9**(1), 31 (1973)

Momordin IId

CAS Registry Number: 119617-28-6
See Figure Momordin IId
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Climacoptera aralensis, C. lanata* [1], *Momordica cochinchinensis* [2]
$C_{52}H_{82}O_{22}$: 1058.529
Mp: 230–232°C [1]
$[\alpha]_D^{20}$−7.8° [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1725 [1]
FAB-MS *m/z*: 1057 $[M-H]^-$, 925 $[M-H-132]^-$, 895 [M-H-162-132], 881 [M-H-176-162-132], 455 [M-H-2 × 132-162-176] [2]
^{1}H NMR (500 MHz, J/Hz, CD_3OD): 0.78-1.14 (s, CH_3x7), 5.24 (brs, H-12), 2.86 (dd, J = 2.6, 13.1, H-18), 3.13 (dd. J = 4.6, 10.6, H-28), anomeric H: 5.38, 4.83, 4.61, 4.47 (d, J = 6.5-8.0) [2]
^{13}C NMR (75 MHz, CD_3OD): [2]

Table 1

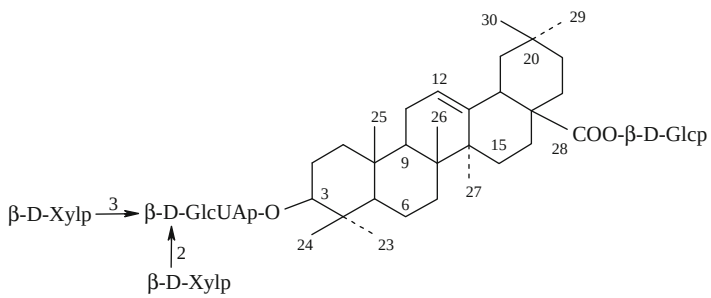
C-1	39.9	C-16	24.04	GlcUA-1	105.5	Xyl-1	104.9
2	27.1	17	48.1	2	79.7	2	75.2
3	91.6	18	42.6	3	87.2	3	78.3
4	40.4	19	47.3	4	72.2	4	71.0
5	57.2	20	31.6	5	78.0	5	66.9
6	19.3	21	35.0	6	168.1	Glc-1	95.7
7	34.0	22	33.1	Xyl-1	104.4	2	73.9
8	40.4	23	28.2	2	76.4	3	78.2
9	48.1	24	17.0	3	78.0	4	71.0
10	37.9	25	16.1	4	71.2	5	78.0
11	24.6	26	16.6	5	67.4	6	62.5
12	123.8	27	26.3				
13	144.8	28	178.1				
14	42.9	29	33.4				
15	28.9	30	23.9				

References

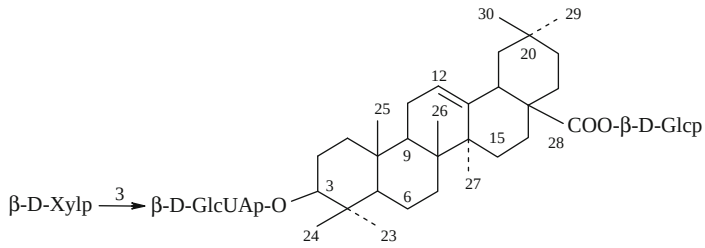
1. B.K. Eskalieva, A. Akhmed, G.Sh. Burasheva, Jh.A. Abilov, V.U. Ahmad, Chem. Nat. Comp. **40**(1), 87 (2004)
2. N. Kawamura, H. Watanabe, H. Oshio, Phytochemistry **27**(11), 3585 (1988)

Momordin IIc (Quinoside D)

CAS Registry Number: 96990-19-1
See Figure Momordin IIc (Quinoside D)
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid



Momordin IId



Momordin IIc (Quinoside D)

Biological sources: *Chenopodium quinoa* [1, 2], *Kochia scoparia* [3], *Momordica cochinchinensis* [4], *Talinum tenuissimum* [5]
$C_{47}H_{74}O_{18}$: 926.487
Mp: 258°C [1]
$[\alpha]_D^{17}$ + 5.4° (c 1.12, MeOH) [2]
IR (KBr) ν_{max} cm^{-1}: 3400, 2900, 1725, 1680 [1, 3]
FAB-MS *m/z*: 965 $[M + K]^+$, 949 $[M + Na]^+$, 927 $[M-H]^-$, 817 $[M + Na\text{-}Glc]^+$, 787 $[M + Na\text{-}Xyl]^+$, 757, 455, 439, 248 [1, 3]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.28 (H-3), 5.42 (H-12), 1.30, 1.29, 1.09, 0.99, 0.92, 0.89, 0.82, (s, CH_3x7)
β-D-GlcUAp: 5.02 (d, J = 7.8, H-1)
β-D-Xylp: 5.37 (d, J = 7.9, H-1)
β-D-Glcp: 6.33 (d, J = 7.9, H-1) [4]
^{13}C NMR (100 MHz, C_5D_5N): [2]

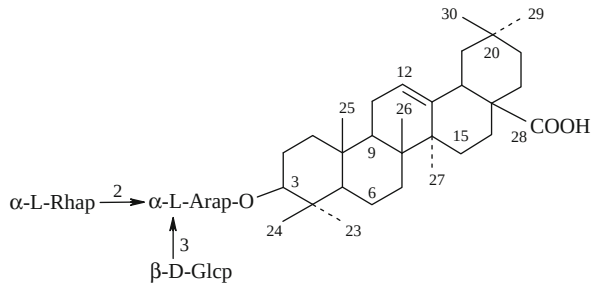
Table 1

C-1	38.8	C-16	23.7	GlcUA-1	106.4	Glc-1	95.7
2	26.4	17	47.0	2	74.4	2	74.0
3	89.3	18	41.8	3	86.5	3	78.7
4	39.5	19	46.3	4	71.4	4	71.4
5	55.9	20	30.7	5	77.7	5	78.9
6	18.6	21	34.1	6	172.4	6	62.5
7	33.1	22	33.1	Xyl-1	105.7		
8	40.0	23	28.2	2	74.8		
9	48.1	24	16.9	3	78.9		
10	37.0	25	15.5	4	70.7		
11	23.7	26	17.5	5	67.1		
12	122.9	27	26.1				
13	144.1	28	176.4				
14	42.2	29	33.1				
15	28.2	30	23.7				

References

1. W.-W. Ma, P.F. Heinstein, F.L. Mc Langhlin, J. Nat. Prod. **52**, 1132 (1989)
2. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **38**(2), 375 (1990)
3. Y. Wen, Y. Chen, Z.P. Cui, J. Li, Z. Wang, Planta Med. **61**, 450 (1995)
4. N. Kawamura, H. Watanabe, H. Oshio, Phytochemistry **27**(11), 3585 (1988)
5. F. Gafner, J.D. Msonthi, K. Hostettmann, Helv. Chim. Acta. **68**(3), 555 (1985)

Patrinia-Glycoside B-II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Patrinia scabiosaefolia* [1]
$C_{47}H_{76}O_{16}$: 896.513
Mp: 259–262°C (MeOH) [1]
$[\alpha]_D$ −2.9° (c 0.29, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3380, 2910, 1690, 1075 [1]

FAB-MS *m/z*: 895(100), 749 (24), 733 (30), 587 (19), 455 (34) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.96, 0.99, 1.02, 1.12, 1.21, 1.31 (s, CH_3 × 7), 3.28-3.35 (m, Hα-3 – Hβ-18), 5.47 (brs, H-12), 4.85 (d, J = 5.1, H-1 of Ara), 5.08 (d, J = 7.7, H-1 of Glc), 6.11 (brs, H-1of Rha) 1.62 (d, J = 6.2, CH_3-6 of Rha) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	23.8	Ara-1	104.8	Glc-1	104.7
2	26.6	17	46.7	2	74.8	2	74.9
3	88.2	18	42.1	3	82.2	3	78.2
4	39.6	19	46.8	4	68.1	4	71.4
5	56.1	20	31.0	5	64.9	5	78.5
6	18.6	21	34.4	Rha-1	101.9	6	62.5
7	33.4	22	33.2	2	72.3		
8	39.8	23	28.1	3	72.5		
9	48.1	24	17.1	4	73.9		
10	37.1	25	15.6	5	70.0		
11	23.8	26	17.5	6	18.6		
12	122.3	27	26.2				
13	145.2	28	181.2				
14	42.2	29	33.4				
15	28.4	30	23.9				

Pharm./Biol.: Used in China as diuretic and for "Qing Re Jie Du" (treatment of fever and inflammation along with detoxication), "Huo Xue Hua Yu" (mobilization of blood circulation and treatment of stasis) [1]

References

1. T. Nakanishi, K. Tanaka, H. Murata, M. Somekawa, A. Inada, Chem. Pharm. Bull. **41**(1), 183 (1993)

Pseudoginsenoside RP_1

CAS Registry Number: 96158-07-5

See Figure Pseudoginsenoside RP_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Panax pseudoginseng* [1]

$C_{41}H_{64}O_{13}$: 764.434

Mp: 230–232°C (MeOH) [1]

$[\alpha]_D^{20}$ +2.1° (c 1.00, MeOH) [1]

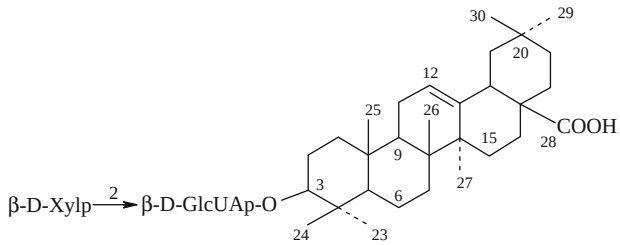
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.8	GlcUA-1	105.2
2	26.7	17	46.7	2	83.5
3	89.3	18	42.0	3	77.8
4	39.6	19	46.5	4	73.2
5	55.9	20	31.0	5	78.1
6	18.5	21	34.3	6	172.2
7	33.3	22	33.3	Xyl-1	106.9
8	39.7	23	27.9	2	76.6
9	48.0	24	16.4	3	77.3
10	37.0	25	15.5	4	71.1
11	23.8	26	17.4	5	67.5
12	122.5	27	26.2		
13	144.8	28	180.1		
14	42.2	29	33.3		
15	28.4	30	23.8		

References

1. O. Tanaka, T. Morita, R. Kasai, J. Kinouchi, S. Sanada, Y. Ida, Chem. Pharm. Bull. **33**(6), 2323 (1985)



Pseudoginsenoside RP_1

Quinoa-Saponin 7

See Figure Quinoa-Saponin 7

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Chenopodium quinoa* [1]

$C_{53}H_{86}O_{22}$: 1074.561

Mp: 241–243°C (MeOH-H_2O) [1]

$[\alpha]_D^{24}$ +26.9° (c 0.87, C_5H_5N) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): α-L-Arap: 5.03 (d, J = 6.4, H-1)

β-D-Glcp: 4.64 (d, J = 7.8, H-1)

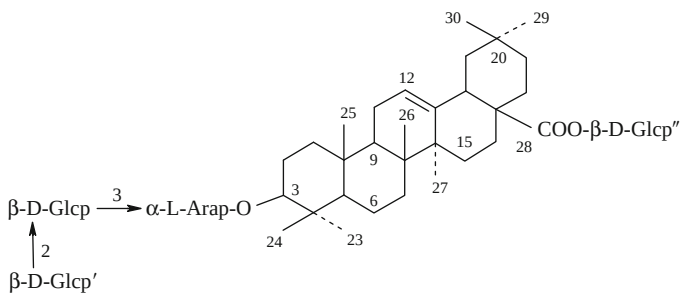
β-D-Glcp′: 5.07 (d, J = 7.3, H-1)

β-D-Glcp″: 6.20 (d, J = 7.3, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.9	Ara-1	106.9	Glc′-1	107.2
2	26.8	17	47.0	2	71.4	2	76.5
3	89.1	18	41.8	3	86.1	3	78.9
4	39.6	19	46.2	4	69.1	4	71.2
5	55.9	20	30.8	5	67.0	5	78.4
6	18.6	21	34.1	Glc-1	104.5	6	62.6
7	33.4	22	33.4	2	86.1	Glc″-1	95.8
8	40.0	23	28.1	3	79.1	2	74.2
9	48.1	24	16.9	4	71.2	3	78.9
10	37.0	25	15.5	5	77.8	4	70.6
11	23.9	26	17.5	6	62.2	5	79.3
12	122.9	27	26.1			6	62.2
13	144.1	28	176.4				
14	42.2	29	33.2				
15	28.3	30	23.7				



Quinoa-Saponin 7

References

1. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **38**(2), 375 (1990)

Raddeanoside R_8

See Figure Raddeanoside R_8

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Anemone raddeana* [1]

$C_{65}H_{106}O_{30}$: 1366.676

$[\alpha]_D$−27.7° (c 1.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 1720, 1150-1000 [1]

FAB-MS *m/z*: 1389 $[M + Na]^+$, 1225, 1109, 919, 873, 741, 671, 603, 493, 439, 311, 279, 221 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.41 (brt, H-12), 1.08 (s, CH_3-23), 1.09 (s, CH_3-24), 0.90 (s, CH_3-25), 1.07 (s, CH_3-26), 1.25 (s, CH_3-27), 0.91 (s, CH_3-29), 0.90 (s, CH_3-30);

α-L-Arap: 4.78 (d, J = 6.0, H-1)

β-D-Glcp: 4.97 (d, J = 7.0, H-1)

α-L-Rhap: 5.80 (s, H-1), 1.60 (d, J = 6.0, CH_3-6)

β-D-Glcp′: 6.20 (d, J = 8.0, H-1)

β-D-Glcp″: 5.11 (d, J = 8.0, H-1)

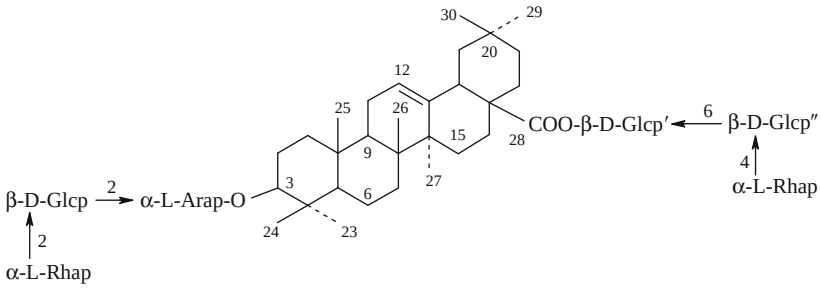
α-L-Rhap′: 6.08 (s, H-1), 1.67 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

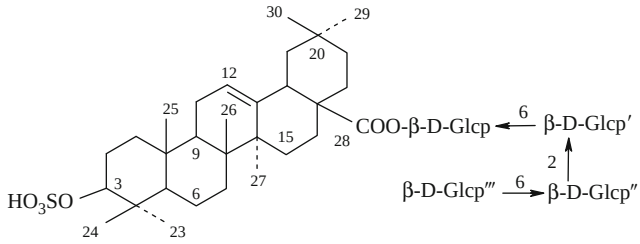
Table 1

C-1	38.9	C-16	23.8	Ara-1	104.9	Rha-1	101.7	Glc″-1	104.8
2	26.5	17	46.3	2	76.4	2	72.4	2	76.5
3	88.7	18	41.7	3	72.5	3	72.2	3	78.4
4	39.5	19	47.0	4	69.3	4	74.0	4	79.2

(*continued*)



Raddeanoside R_8



Rotundioside B

Table 1 (continued)

5	56.0	20	30.7	5	64.2	5	69.8	5	77.1
6	19.1	21	33.1	Glc-1	106.2	6	18.5	6	61.3
7	33.1	22	32.5	2	78.6	Glc′-1	95.6	Rha′-1	102.7
8	39.9	23	28.0	3	75.3	2	75.4	2	72.6
9	48.1	24	16.9	4	71.3	3	78.7	3	72.7
10	37.0	25	15.6	5	78.4	4	70.9	4	73.9
11	23.4	26	17.5	6	62.4	5	78.0	5	70.3
12	122.9	27	26.0			6	70.3	6	18.4
13	144.1	28	176.4						
14	42.1	29	33.1						
15	28.3	30	23.8						

References

1. F.-E. Wu, K. Koike, T. Ohmoto, W.-X. Chen, Chem. Pharm. Bull. **37**(9), 2445 (1989)

Rotundioside B

CAS Registry Number: 99633-18-8

See Figure Rotundioside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Bupleurum rotundifolium* [1]

$C_{54}H_{88}O_{26}S$: 1184.528

Mp: 205–207°C [1]

$[\alpha]_D^{20}$ −1.6° (c 1.92, MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N) (Desulfoside): 4.39 (dd, J = 10.5, H-3), 5.43 (brs, H-12)

β-D-Glcp: 6.12 (d, J = 7.0, H-1), β-D-Glcp′: 4.83 (d, J = 7.0, H-1), β-D-Glcp″: 4.90 (d, J = 7.0, H-1), β-D-Glcp‴: 5.12 (d, J = 7.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.8	Glc-1	95.6	Glc″-1	105.4
2	24.8	17	46.7	2	74.1	2	75.2
3	85.2	18	42.0	3	78.2	3	78.2
4	38.6	19	46.6	4	71.1	4	71.4
5	56.2	20	30.9	5	77.1	5	78.0
6	18.7	21	34.2	6	69.6	6	69.9
7	33.3	22	33.3	Glc′-1	102.7	Glc‴-1	105.7
8	39.7	23	28.7	2	83.6	2	76.1
9	47.9	24	17.1	3	76.9	3	78.6
10	37.1	25	15.4	4	71.1	4	72.0
11	23.8	26	17.4	5	78.2	5	78.3
12	122.6	27	26.2	6	62.6	6	63.1
13	144.8	28	176.4				
14	42.1	29	33.3				
15	28.3	30	23.8				

References

1. E. Akai, T. Takeda, Y. Kobayashi, Y. Ogihara, Chem. Pharm. Bull. **33**(9), 3715 (1985)

Rotundioside C

CAS Registry Number: 99633-19-9

See Figure Rotundioside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Bupleurum rotundifolium* [1]

$C_{54}H_{88}O_{26}S$: 1184.528

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.39 (dd, J = 10.0, 5.0, H-3), 5.46 (brs, H-12)

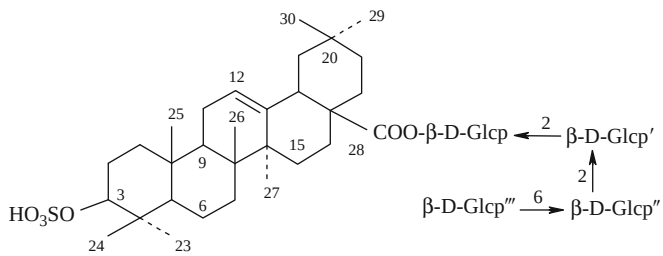
β-D-Glcp: 6.16 (d, J = 7.0, H-1), β-D-Glcp′: 4.94 (d, J = 8.0, H-1), β-D-Glcp″: 5.31 (d, J = 8.0, H-1), β-D-Glcp‴: 5.77 (d, J = 7.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.8	Glc-1	93.6	Glc″-1	104.8
2	24.8	17	46.7	2	78.9	2	74.8
3	85.2	18	42.0	3	76.5	3	78.2
4	38.6	19	46.6	4	70.4	4	71.9
5	56.2	20	30.9	5	77.9	5	77.6
6	18.7	21	34.2	6	62.2	6	69.5
7	33.3	22	33.3	Glc′-1	102.0	Glc‴-1	104.8
8	39.7	23	28.7	2	84.6	2	76.1
9	47.9	24	17.1	3	77.3	3	78.2
10	37.1	25	15.4	4	71.3	4	72.6
11	23.8	26	17.4	5	78.2	5	78.2
12	122.6	27	26.2	6	63.0	6	63.6
13	144.8	28	176.5				
14	42.1	29	33.3				
15	28.3	30	23.8				

(*continued*)

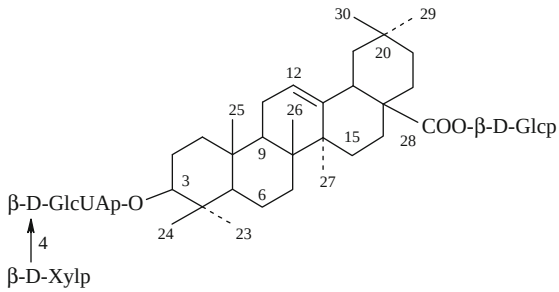


Rotundioside C

References

1. E. Akai, T. Takeda, Y. Kobayashi, Y. Ogihara, Chem. Pharm. Bull. **33**(9), 3715 (1985)

Salsoloside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Salsola micranthera* [1], *Aralia cordata* [2]

$C_{47}H_{74}O_{18}$: 926.487

Mp: 214–220°C [1]

$[\alpha]_D^{20}$ +16.0° (c 1.0, MeOH) [1]

^{13}C NMR (C_5D_5N): [2]

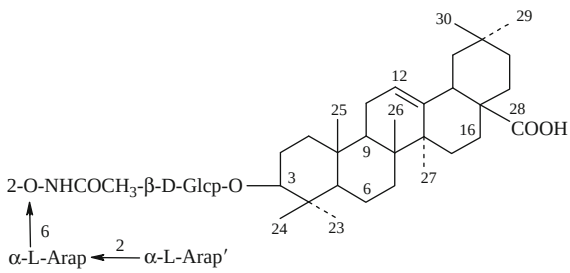
Table 1

C-3	89.1	GlcUA-1	106.5	Glc-1	95.4
28	176.2	2	73.8	2	73.8
		3	74.8	3	78.5
		4	80.9	4	70.4
		5	74.8	5	78.9
		6	169.6	6	62.0
		Me	52.2		
		Xyl-1	104.9		
		2	75.5		
		3	77.6		
		4	70.9		
		5	67.0		

References

1. Ch. Annaev, M. Isamukhamedova, N.K. Abubakirov, Chem. Nat. Comp. **19**(6), 691 (1983)
2. H. Kawai, M. Nishida, Y. Tashiro, M. Kuroyanagi, A. Ueno, M. Satake, Chem. Pharm. Bull. **37**(9), 2318 (1989)

Saponin 2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Albizia subdimidiata* [1], *Pithecellobium racemosum* [2]

$C_{48}H_{77}NO_{16}$: 923.524

Mp: 275°C [1]

$[\alpha]_D^{26}$ +39° (c 1.0, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3376, 2940, 1670, 1639, 1551 [1]

FAB-MS (positive ion mode) *m*/*z*: 946.515 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.21 (s, H-12), 0.96 (s, CH_3-23), 0.93 (s, CH_3-24), 0.85 (s, CH_3-25), 0.75 (s, CH_3-26), 1.15 (s, CH_3-27), 0.88 (s, CH_3-29), 0.94 (s, CH_3-30)

β-D-GlcpNAc: 4.43 (d, J = 8.4, H-1), 1.95 (s, $NHCOCH_3$)

α-L-Arap: 4.55 (d, J = 5.8, H-1)

α-L-Arap′: 4.49 (d, J = 6.7, H-1) [1]

^{13}C NMR (100 MHz, CD_3OD): [1]

Table 1

C-1	39.93	C-16	24.54	GlcNAc-1	104.93	Ara′-1	105.84
2	27.00	17	47.72	2	57.63	2	71.95
3	90.64	18	43.12	3	76.34	3	73.41
4	39.69	19	47.78	4	72.96	4	69.65
5	56.85	20	31.72	5	75.67	5	67.11
6	19.38	21	34.08	6	69.47		
7	29.05	22	34.91	$NHCOCH_3$	173.47		
8	40.53	23	28.56	$NHCOCH_3$	23.19		
9	49.11	24	16.00	Ara-1	103.37		
10	37.92	25	18.06	2	80.43		
11	24.59	26	17.11	3	74.16		
12	122.96	27	26.53	4	68.75		
13	146.02	28	184.70	5	65.72		
14	42.94	29	33.82				
15	35.25	30	24.22				

Pharm./Biol.: Showed significant cytotoxicity against the A2780 cell line [1]

References

1. M. Abdel-Kader, J. Hoch, J.M. Berger, R. Evans, J.S. Miller, J.H. Wisse, S.W. Mamber, J.M. Dalton, D.G.I. Kingston, J. Nat. Prod. **64**(4), 536 (2001)
2. I.A. Khan, A.M. Clark, J.D. McChesney, Pharm. Res. **14**, 358 (1997)

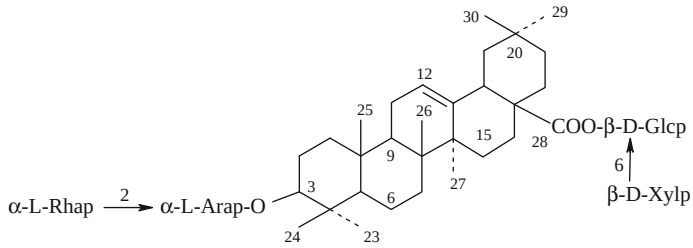
Saponin 2 from *Aralia elata*

See Figure Saponin 2 from *Aralia elata*

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia elata* [1]

$C_{52}H_{84}O_{20}$: 1028.555



Saponin 2 from *Aralia elata*

Mp: 208–212°C [1]
$[\alpha]_D^{18}$ −12.7° (c 0.86, MeOH) [1]
IR (Nujol)ν_{max} cm^{-1}: 1740 [1]
FAB-MS *m/z*: 1067 $[M + K]^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 5.39 (brs, H-12), 0.88, 0.89, 0.89, 1.02, 1.06, 1.13, 1.24 (s, CH_3 × 7)
α-L-Arap: 4.87 (d, J = 5.1, H-1)
α-L-Rhap: 6.16 (s, H-1), 1.57 (d, J = 6.2, CH_3-6)
β-D-Glcp: 6.21 (d, J = 7.7, H-1)
β-D-Xylp: 4.85 (d, J = 7.3, H-1) [1]
^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

Ara-1	105.4	Glc-1	95.4
2	75.8	2	73.3
3	73.8	3	78.1
4	68.2	4	70.9
5	64.2	5	77.8
Rha-1	101.6	6	69.0
2	72.1	Xyl-1	104.5
3	72.4	2	73.7
4	73.7	3	74.5
5	69.8	4	70.9
6	18.4	5	65.8

References

1. S. Saito, S. Sumita, N. Tamura, Y. Nagamura, K. Nishida, M. Ito, I. Ishiguro, Chem. Pharm. Bull. **38**(2), 411 (1990)

Saponin 3 from *Fagonia cretica*

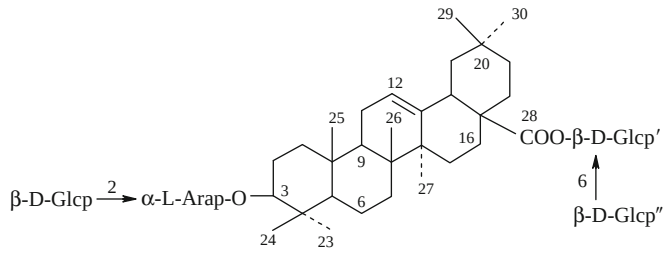
See Figure Saponin 3 from *Fagonia cretica*

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Fagonia cretica* [1]
$C_{53}H_{86}O_{23}$: 1090.555
$[\alpha]_D^{23}$ +7.0° (c 1.48, MeOH) [1]
FAB-MS *m/z*: 1097 $[C_{53}H_{86}O_{22} + Na]^+$, 964, 774, 439, 307 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.73 (brd, J = 12.0, H-5), 0.90 (s, CH_3-29), 0.90 (s, CH_3-30), 0.90 (s, CH_3-25), 0.89, 1.52 (H_2-1), 1.04 (s, CH_3-24), 1.10 (s, CH_3-26), 1.10, 1.28 (H_2-21), 1.22 (s, CH_3-23), 1.24 (s, CH_3-27), 1.83, 2.08 (H_2-2), 1.26, 1.78 (H_2-19), 1.31 (H-7), 1.32, 1.45 (H_2-6), 1.16 (brd, J = 14.0), 2.31 (dt, J = 14.0, 3.3, H_2-15), 1.75, 1.94 (H_2-22), 1.92 (H-11), 1.60 (dd, J = 12.0, 7.5, H-9), 1.97, 2.10 (H_2-16), 3.20 (dd, J = 12.7, 4.0, H-3), 3.20 (dd, J = 12.7, 4.0, H-18), 5.42 (t, J = 3.3, H-12); α-L-Arap: 4.96 (d, J = 6.0, H-1), 4.57 (t, J = 6.0, H-2), 4.35 (H-3), 4.37 (H-4), 3.78 (d, J = 10), 4.28 (H_2-5); β-D-Glcp: 5.17 (d, J = 8.0, H-1), 4.07 (t, J = 8.0, H-2), 4.17 (t, J = 9.0, H-3), 4.30 (t, J = 8.3, H-4), 3.8 (m, H-5), 4.41 (d, J = 3.3, H_2-6); β-D-Glcp′: 6.24 (d, J = 8.5, H-1), 4.13 (t, J = 8.0, H-2), 4.20 (t, J = 8.5, H-3), 4.31 (t, J = 8.5, H-4), 4.11 (m, H-5), 4.36 (dd, J = 11.0, 3.0, H-6), 4.70 (dd, J = 11.0, 1.5, H-6); β-D-Glcp″: 5.02 (d, J = 8.0, H-1), 3.99 (t, J = 8.7, H-2), 4.17 (t, J = 8.5, H-3), 4.19 (t, J = 9.0, H-4), 3.88 (m, H-5), 4.35 (dd, J = 12.0, 2.0, H-6), 4.47 (dd, J = 12.0, 2.0, H-6)
^{13}C NMR: [1]

Table 1

C-1	38.8	C-16	23.5	Ara-1	104.8	Glc′-1	95.7
2	26.5	17	47.1	2	81.0	2	74.0
3	88.9	18	41.8	3	73.4	3	78.8
4	39.6	19	46.3	4	68.2	4	71.1
5	55.9	20	30.8	5	64.8	5	78.0

(*continued*)



Saponin 3 from *Fagonia cretica*

Table 1 (continued)

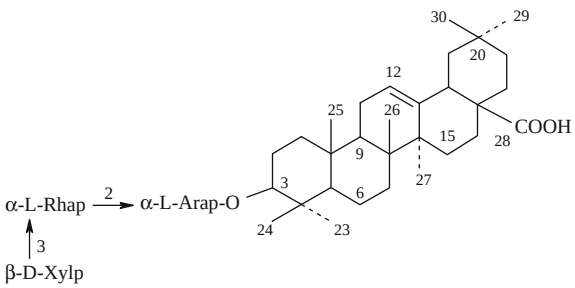
6	18.6	21	34.1	Glc-1	106.0	6	69.6
7	33.2	22	32.6	2	76.4	Glc″-1	105.3
8	40.0	23	28.3	3	78.2	2	75.2
9	48.1	24	16.8	4	71.7	3	78.5
10	37.0	25	15.7	5	78.0	4	71.7
11	23.9	26	17.6	6	62.7	5	78.5
12	123.3	27	26.1			6	62.8
13	144.2	28	176.6				
14	42.2	29	33.2				
15	28.3	30	23.7				

Pharm./Biol.: The saponin-containing fraction showed significant anti-inflammatory activity and considerable analgesic and antipyretic effects [2]

References

1. S.M. Abdel Khalik, T. Miyase, H.A. El-Ashaal, F.R. Melek, Phytochemistry **54**, 853 (2000)
2. O.A. El-Shabrawy, O.D. El-Gindi, F.R. Melek, S.M. Abdel-Khalik, M.Y. Haggag, Fitoterapia **68**, 219 (1997)

Saponin V



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Sapindus delavayi* [1], *S. emarginatus* [2], *Clematis chinensis* [3]

$C_{46}H_{74}O_{15}$: 866.502

$[\alpha]_D^{21}$ −6.7° (c 0.98, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

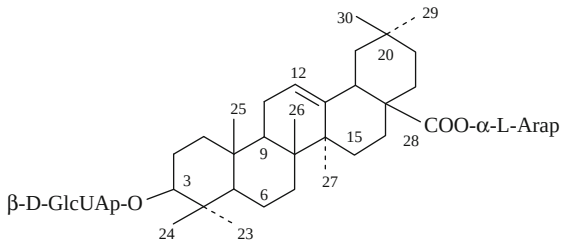
Ara-1	105.0	Xyl-1	106.9
2	75.3	2	75.3
3	74.2	3	78.0
4	69.1	4	70.8
5	65.3	5	67.1
Rha-1	101.2		
2	71.6		
3	82.4		
4	72.7		
5	69.5		
6	18.3		

Pharm./Biol.: Molluscicidal activity [4]

References

1. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, J. Zhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)
2. T. Kamchamapoom, R. Kasai, K. Yamasaki, Chem. Pharm. Bull. **49**, 1195 (2001)
3. H. Kizu, T. Tomimori, Chem. Pharm. Bull. **28**, 2827 (1980)
4. K. Hostettmann, H. Kizu, T. Tomimori, Planta Med. **44**, 34 (1982)

Scaberoside B_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aster scaber* [1]

$C_{42}H_{66}O_{13}$: 778.450

Mp: 193–195°C [1]

$[\alpha]_D^{28}$ +8.4° (c 2.5, MeOH) [1]

FAB-MS *m/z* (Me ester): 779, 456 $[M-H]^+$ [1]

FAB-MS *m/z*: 777 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, Me ester): 3.36 (dd, J = 4, 12, H-3), 5.43 (dd, J = 3, 3, H-12), 3.25 (dd, J = 4, 14, H-18), 1.30 (s, CH_3-23), 0.98 (s, CH_3-24), 0.84 (s, CH_3-25), 1.02 (s, CH_3-26), 1.26 (s, CH_3-27), 0.92 (s, CH_3-29), 0.96 (s, CH_3-30)

β-D-GlcUAp: 4.96 (d, J = 8, H-1), 4.06 (dd, J = 8, 9, H-2), 4.23 (dd, J = 9, 9, H-3), 4.44 (dd, J = 9, 9, H-4), 4.56 (d, J = 9, H-5), 3.73 (COOMe)

α-L-Arap:6.27 (d, J = 6, H-1), 4.57 (dd, J = 6, 7, H-2), 4.35 (dd, J = 3, 7, H-3), ca 4.45 (H-4), 3.91 (dd, J = 2, 11, H-5), 4.40 (dd, J = 5, 11, H-5) [1]

^{13}C NMR (Me ester): [1]

Table 1

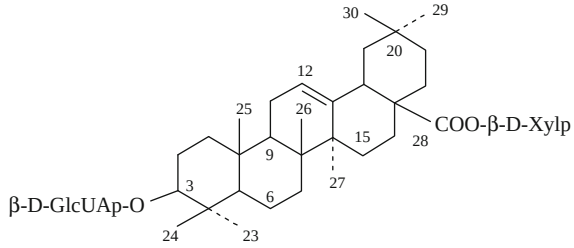
C-1	38.7	C-16	23.2	GlcUA-1	107.2
2	26.5	17	47.2	2	75.4
3	89.2	18	41.7	3	77.9
4	39.5	19	46.2	4	73.1
5	55.8	20	30.8	5	77.2
6	18.5	21	34.1	6	170.7
7	33.1	22	32.7	COOMe	52.0
8	39.9	23	28.2	Ara-1	95.8
9	48.0	24	16.9	2	71.3
10	36.9	25	15.5	3	73.8
11	23.8	26	17.4	4	67.9
12	122.9	27	26.0	5	66.0
13	144.2	28	176.5		
14	42.1	29	33.1		
15	28.2	30	23.6		

(*continued*)

References

1. T. Nagao, R. Tanaka, H. Okabe, Chem. Pharm. Bull. **39**(7), 1699 (1991)

Scaberoside B_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aster scaber* [1]

$C_{42}H_{66}O_{13}$: 778.450

$[\alpha]_D^{27}$ +3.1° (c 0.8, MeOH) [1]

FAB-MS *m/z* (Me ester): 779, 456 $[M + H]^+$ [1]

FAB-MS *m/z*: 777 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, Me ester): 3.37 (dd, J = 4, 12, H-3), 5.44 (dd, J = 3, 3, H-12), 3.24 (dd, J = 4, 14, H-18), 1.30 (s, CH_3-23), 0.98 (s, CH_3-24), 0.84 (s, CH_3-25), 1.06 (s, CH_3-26), 1.26 (s, CH_3-27), 0.92 (s, CH_3-29), 0.94 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.07 (dd, J = 8, 9, H-2), 4.25 (dd, J = 9, 9, H-3), 4.45 (dd, J = 9, 9, H-4), 4.57 (d, J = 9, H-5), 3.74 (COOMe)

β-D-Xylp: 6.22 (d, J = 7, H-1), ca 4.18 (H-2), ca 4.21 (H-3), ca 4.21 (H-4), 3.81 (dd, 9, 12, H-5), 4.37 (dd, J = 4, 12, H-5) [1]

^{13}C NMR (Me ester): [1]

Table 1

C-1	38.7	C-16	23.2	GlcUA-1	107.2
2	26.5	17	47.2	2	75.3

(*continued*)

Table 1 (continued)

3	89.2	18	41.7	3	77.9
4	39.5	19	46.2	4	73.1
5	55.8	20	30.8	5	77.1
6	18.5	21	34.1	6	170.7
7	33.1	22	32.7	COOMe	51.9
8	39.9	23	28.2	Xyl-1	96.2
9	48.0	24	16.9	2	73.6
10	36.9	25	15.5	3	78.1
11	23.8	26	17.4	4	70.8
12	122.9	27	26.0	5	67.6
13	144.2	28	176.5		
14	42.1	29	33.1		
15	28.1	30	23.6		

References

1. T. Nagao, R. Tanaka, H. Okabe, Chem. Pharm. Bull. **39**(7), 1699 (1991)

Scaberoside B_3(Auriculatusaponin D)

See Figure Scaberoside B_3(Auriculatusaponin D)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aster auriculatus* [1], *Aster scaber* [2]

$C_{48}H_{76}O_{17}$: 924.508

$[\alpha]_D^{26}$ −37.9° (c 1.3, MeOH) [2]

FAB-MS *m/z* (Me ester): 923 $[M-H]^-$ [2]

^{1}H NMR (J/Hz, Me ester): 3.35 (dd, J = 4, 12, H-3), 5.44 (dd, J = 3, 3, H-12), 3.26 (dd, J = 4, 14, H-18), 1.27 (s, CH_3-23), 0.95 (s, CH_3-24), 0.84 (s, CH_3-25), 1.04 (s, CH_3-26), 1.27 (s, CH_3-27), 0.93 (s, CH_3-29), 0.99 (s, CH_3-30)

β-D-GlcUAp: 4.96 (d, J = 8, H-1), 4.06 (dd, J = 8, 9, H-2), 4.23 (dd, J = 9, 9, H-3), 4.44 (dd, J = 9, 9, H-4), 4.56 (d, J = 9, H-5), 3.73 (COOMe)

α-L-Arap: 6.46 (d, J = 3, H-1), 4.60 (dd, J = 3, 4, H-2), ca 4.52 (H-3), ca 4.40 (H-4), 3.91, ca 4.47 (dd, J = 4, 11, H_2-5)

α-L-Rhap: 5.83 (d, J = 2, H-1), ca 4.57 (H-2), 4.47 (H-3), 4.25 (dd, J = 9, 9, H-4), ca 4.40 (H-5), 1.71 (d, J = 6, CH_3-6) [2]

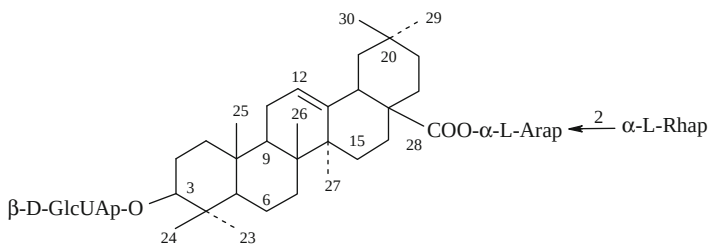
^{13}C NMR (Me ester): [2]

Table 1

C-1	38.7	C-16	23.2	GlcUA-1	107.2	Rha-1	101.3
2	26.5	17	47.2	2	75.3	2	72.3
3	89.2	18	41.7	3	77.9	3	72.6
4	39.5	19	46.2	4	73.1	4	73.8
5	55.8	20	30.8	5	77.1	5	70.3
6	18.5	21	34.1	6	170.7	6	18.5
7	33.1	22	32.7	COOMe	51.9		
8	39.9	23	28.2	Ara-1	93.5		
9	48.0	24	16.9	2	75.0		
10	36.9	25	15.5	3	70.4		
11	23.8	26	17.4	4	66.3		
12	122.9	27	26.0	5	63.2		
13	144.2	28	176.5				
14	42.1	29	33.1				
15	28.2	30	23.6				

References

1. Ch.Z. Wang, Q. De Yu, Planta Med. **64**(1), 50 (1998)
2. T. Nagao, R. Tanaka, H. Okabe, Chem. Pharm. Bull. **39**(7), 1699 (1991)



Scaberoside B_3(Auriculatusaponin D)

Scaberoside B_4

See Figure Scaberoside B_4

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aster scaber* [1]

$C_{48}H_{76}O_{17}$: 924.508

$[\alpha]_D^{27}$ −24.2° (c 1.7, MeOH) [1]

FAB-MS *m/z* (Me ester): 947, 505 $[M + Na]^+$ [1]

FAB-MS *m/z*: 923 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, Me ester): 3.35 (dd, J = 4, 12, H-3), 5.45 (dd, J = 3, 3, H-12), 3.18 (dd, J = 4, 14, H-18), 1.24 (s, CH_3-23), 0.94 (s, CH_3-24), 0.84 (s, CH_3-25), 1.06 (s, CH_3-26), 1.29 (s, CH_3-27), 0.92 (s, CH_3-29), 0.94 (s, CH_3-30)

β-D-GlcUAp: 4.96 (d, J = 8, H-1), 4.06 (dd, J = 8, 9, H-2), 4.24 (dd, J = 9, 9, H-3), 4.45 (dd, J = 9, 9, H-4), 4.57 (d, J = 9, H-5), 3.73 (COOMe)

β-D-Xylp: 6.16 (d, J = 7, H-1), 4.40 (dd, J = 7, 8, H-2), ca 4.26 (H-3), ca 4.16 (H-4), 3.79 (dd, J = 9, 12, H-5), 4.33 (dd, J = 4, 12, H-5)

α-L-Rhap: 6.44 (brs, H-1), 4.75 (brs, H-2), 4.51 (dd, J = 3, 9, H-3), ca 4.24 (H-4), ca 5.50 (H-5), 1.76 (d, J = 6, CH_3-6) [1]

^{13}C NMR (Me ester): [1]

Table 1

C-1	38.7	C-16	23.2	GlcUA-1	107.2	Rha-1	101.5
2	26.5	17	47.2	2	75.4	2	72.2
3	89.2	18	41.7	3	77.9	3	72.5
4	39.5	19	46.2	4	73.1	4	73.8
5	55.8	20	30.8	5	77.2	5	69.9
6	18.5	21	34.1	6	170.7	6	18.7
7	33.1	22	32.7	COOMe	51.9		
8	39.9	23	28.2	Xyl-1	95.3		
9	48.0	24	16.9	2	75.5		
10	36.9	25	15.5	3	78.0		
11	23.8	26	17.4	4	70.9		
12	122.9	27	26.0	5	67.2		
13	144.2	28	176.5				
14	42.1	29	33.1				
15	28.2	30	23.6				

References

1. T. Nagao, R. Tanaka, H. Okabe, Chem. Pharm. Bull. **39**(7), 1699 (1991)

Scaberoside B_5

See Figure Scaberoside B_5

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aster scaber* [1]

$C_{53}H_{84}O_{21}$: 1056.550

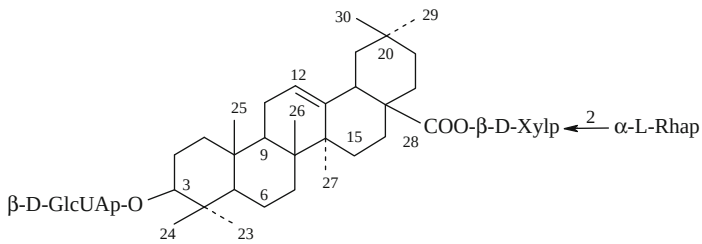
Mp: 217–220°C (aq. MeOH) [1]

$[\alpha]_D^{23}$ −33.3° (c 1.0, MeOH) [1]

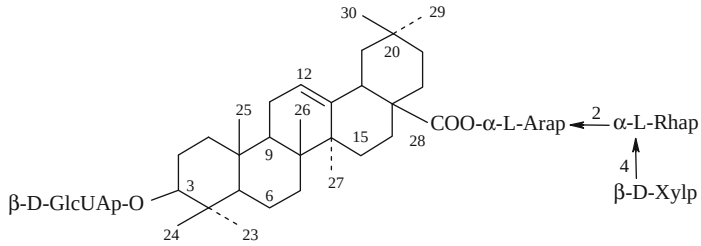
FAB-MS *m/z* (Me ester): 1079, 543 $[M + Na]^+$ [1]

FAB-MS *m/z*: 1055 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, Me ester): 3.36 (dd, J = 4, 12, H-3), 5.43 (dd, J = 3, 3, H-12), 3.26 (dd, J = 4, 14, H-18), 1.29 (s, CH_3-23), 0.96 (s, CH_3-24), 0.83



Scaberoside B_4



Scaberoside B_5

(s, CH_3-25), 1.05 (s, CH_3-26), 1.28 (s, CH_3-27), 0.93 (s, CH_3-29), 1.00 (s, CH_3-30)

β-D-GlcUAp: 4.95 (d, J = 8, H-1), 4.06 (dd, J = 8, 9, H-2), 4.23 (dd, J = 9, 9, H-3), 4.45 (dd, J = 9, 9, H-4), 4.56 (d, J = 9, H-5), 3.73 (COOMe)

α-L-Arap: 6.45 (d, J = 3, H-1), 4.55 (dd, J = 3, 4, H-2), ca 4.50 (H-3), ca 4.40 (H-4), 3.94, ca 4.50 (dd, J = 4, 11, H_2-5)

α-L-Rhap: 5.77 (brs, H-1), 4.56 (brs, H-2), ca 4.55 (H-3), 4.34 (dd, J = 9, 9, H-4), ca 4.40 (H-5), 1.77 (d, J = 6, CH_3-6)

β-D-Xylp: 5.09 (d, J = 7, H-1), 4.01 (dd, J = 7, 8, H-2), 4.03 (dd, J = 8, 8, H-3), 4.13 (brm, H-4), 3.50 (dd, J = 10, 11, H-5), 4.21 (dd, J = 5, 11, H-5) [1]

^{13}C NMR (Me ester): [1]

Table 1

C-1	38.7	C-16	23.2	GlcUA-1	107.2	Rha-1	101.3
2	26.5	17	47.2	2	75.4	2	71.8
3	89.2	18	41.7	3	77.9	3	72.6
4	39.5	19	46.2	4	73.1	4	84.3
5	55.8	20	30.8	5	77.1	5	68.5
6	18.5	21	34.1	6	170.7	6	18.3
7	33.1	22	32.7	COOMe	52.0	Xyl-1	107.2
8	39.9	23	28.2	Ara-1	93.4	2	76.0
9	48.0	24	16.9	2	75.2	3	78.5
10	36.9	25	15.5	3	70.1	4	70.9
11	23.8	26	17.4	4	66.2	5	67.4
12	122.9	27	26.0	5	63.1		
13	144.2	28	176.5				
14	42.1	29	33.1				
15	28.2	30	23.6				

References

1. T. Nagao, R. Tanaka, H. Okabe, Chem. Pharm. Bull. **39**(7), 1699 (1991)

Scaberoside B_6

See Figure Scaberoside B_6

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aster scaber* [1]

$C_{53}H_{84}O_{21}$: 1056.550

Mp: 214–216°C (aq. MeOH) [1]

$[\alpha]_D^{24}$ −27.0° (c 1.0, MeOH) [1]

FAB-MS *m/z* (Me ester): 1079, 548 $[M + Na]^+$ [1]

FAB-MS *m/z*: 1055 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, Me ester): 3.36 (dd, J = 4, 12, H-3), 5.45 (dd, J = 3, 3, H-12), 3.18 (dd, J = 4, 14, H-18), 1.29 (s, CH_3-23), 0.93 (s, CH_3-24), 0.81 (s, CH_3-25), 1.07 (s, CH_3-26), 1.30 (s, CH_3-27), 0.91 (s, CH_3-29), 0.93 (s, CH_3-30)

β-D-GlcUAp: 4.94 (d, J = 8, H-1), 4.05 (dd, J = 8, 9, H-2), 4.22 (dd, J = 9, 9, H-3), 4.44 (dd, J = 9, 9, H-4), 4.55 (d, J = 9, H-5), 3.73 (COOMe)

β-D-Xylp: 6.14 (d, J = 7, H-1), ca 4.31 (H-2), ca 4.23 (H-3), 4.14 (brm, H-4), 3.77, ca 4.25 (dd, J = 9, 11, H_2-50)

α-L-Rhap: 6.34 (d, J = 2, H-1), 4.77 (dd, J = 2, 3, H-2), 4.64 (d, J = 3, 9, H-3), 4.34 (dd, 9, 9, H-4), 4.46 (dq, J = 9, 6, H-5), 1.86 (d, J = 6, CH_3-6)

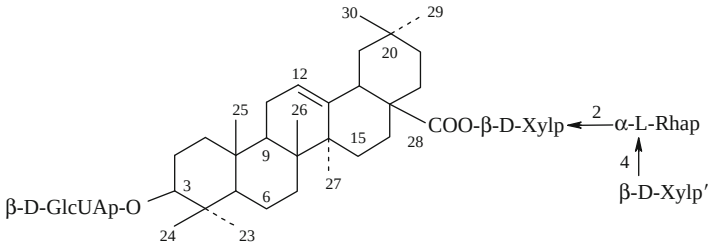
β-D-Xylp′: 5.04 (d, J = 7, H-1), 4.02 (dd, J = 7, 8, H-2), ca 4.06 (H-3), 4.14 (brm, H-4), 3.53, ca 4.22 (dd, J = 10, 11, H_2-5)

^{13}C NMR: [1]

Table 1

C-1	38.7	C-16	23.2	GlcUA-1	107.1	Rha-1	101.3
2	26.5	17	47.2	2	75.3	2	71.7

(*continued*)



Scaberoside B_6

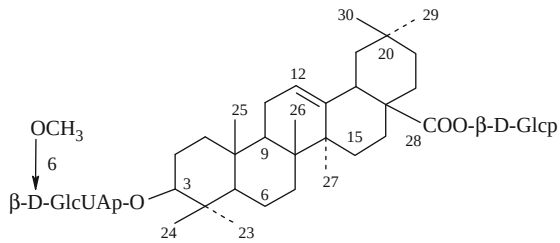
Table 1 (continued)

3	89.2	18	41.7	3	77.9	3	72.5
4	39.5	19	46.2	4	73.1	4	85.2
5	55.8	20	30.8	5	77.1	5	68.3
6	18.5	21	34.1	6	170.7	6	18.5
7	33.1	22	32.7	COOMe	51.9	Xyl′-1	107.6
8	39.9	23	28.2	Xyl-1	95.2	2	76.1
9	48.0	24	16.9	2	76.1	3	78.6
10	36.9	25	15.5	3	77.7	4	70.8
11	23.8	26	17.4	4	70.9	5	67.5
12	122.9	27	26.0	5	67.1		
13	144.2	28	176.5				
14	42.1	29	33.1				
15	28.2	30	23.6				

References

1. T. Nagao, R. Tanaka, H. Okabe, Chem. Pharm. Bull. **39**(7), 1699 (1991)

Silphioside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Silphium perfoliatum* [1]

$C_{43}H_{68}O_{14}$: 808.460

Mp: 197–199°C [1]

$[\alpha]_D^{25}$ +4.5° (c 1.0, MeOH) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 0.85, 0.88, 0.89, 0.96, 1.07, 1.25 (s, CH_3 × 7)

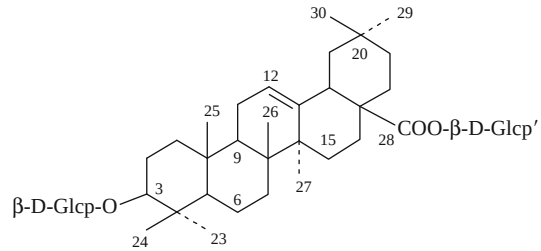
β-D-GlcUAp: 4.92 (d, J = 7.5, H-1), 4.00 (t, J = 7.5, H-2), 4.17 (t, J = 8.5, H-3), 4.38 (t, J = 8.5, H-4), 4.47 (d, J = 8.5, H-5), 3.72 (s, OCH_3)

β-D-Glcp: 6.23 (d, J = 7.5, H-1), 4.11 (t, J = 7.5, 8.5, H-2), 4.18 (t, J = 8.5, H-3), 4.23 (q, J = 7.0, 8.0, H-4), 3.95 (m, H-5), 4.39 (q, J = 3.0, 12.0, Ha-6), 4.29 (q, J = 4.5, 10.5, Hb-6) [1]

References

1. E.S. Davidyants, Zh.M. Putieva, V.A. Bandyukova, N.K. Abubakirov, Chem. Nat. Comp. **22**(1), 58 (1986)

Silphioside B (Lucyoside H)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Silphium perfoliatum* [1], *Anchusa officinalis* [2]

$C_{42}H_{68}O_{13}$: 780.465

Mp: 200–201°C (aq. MeOH) [1]
$[\alpha]_D^{24}$ +24.3° (c 1.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 1740, 1240 [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.72 (d, J = 8.0, H-1 of Glc), 6.06 (d, J = 7.5, H-1 of Glc′) [1]
Pharm./Biol.: Hemolytic and surface activity [2]

References

1. E.S. Davidyants, Zh.M. Putieva, V.A. Bandyukova, N.K. Abubakirov, Chem. Nat. Comp. **20**(1), 121 (1984)
2. G. Romussi, S. Caffagi, G. Bignardi, Pharmazie **35**, 498 (1993)

Silphioside C

CAS Registry Number: 90452-91-8
See Figure Silphioside C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Silphium perfoliatum* [1]
$C_{50}H_{80}O_{19}$: 984.529
Mp: 207–210°C (aq. MeOH) [1]
$[\alpha]_D^{25}$ +19.3° (c 0.88, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3570–3240, 1730, 1260 [1]
^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 0.90–1.27 (s, CH_3 × 7), 3.18–3.29 (2H, d), 5.41 (t, H-12)
β-D-Glcp: 4.83 (d, J = 7.5, H-1), 4.17 (t, H-2), 3.92 (m, H-5), 4.75, 4.87 (dd, J = 10.0, 4.0, H_2-6), 2.05 ($OCOCH_3$)
β-D-Glcp′: 5.34 (d, J = 7.5, H-1), 4.08 (t, H-2), 4.05 (t, H-5)
β-D-Glcp″: 6.29 (d, J = 7.5, H-1) [1]
^{13}C NMR (60.9 MHz, C_5D_5N): [1]

Table 1

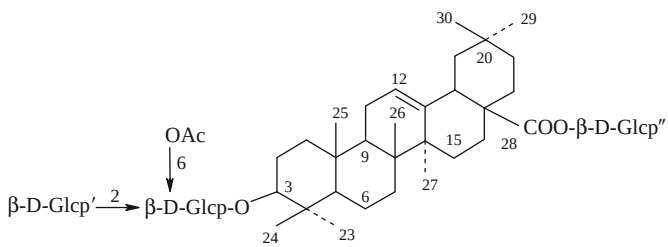
Glc-1	104.90	Glc″-1	95.75
2	83.20	2	74.15
3	78.10	3	78.85
4	71.55	4	71.40
5	74.60	5	79.10
6	64.50	6	62.50
Glc′-1	105.90	Ac-1	170.70
2	76.90	2	20.75
3	78.00		
4	71.90		
5	78.10		
6	62.90		

References

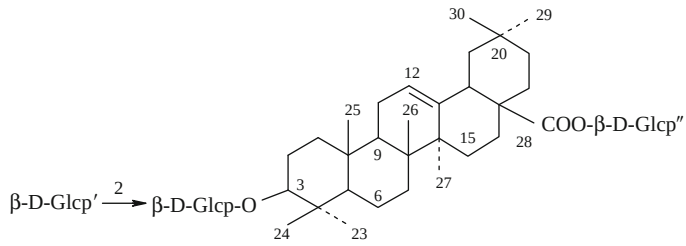
1. E.S. Davidyants, Zh.M. Putieva, A.S. Shashkov, V.A. Bandyukova, N.K. Abubakirov, Chem. Nat. Comp. **21**(4), 486 (1986)

Silphioside E

See Figure Silphioside E
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Silphium perfoliatum* [1, 2]
$C_{42}H_{68}O_{13}$: 780.465
Mp: 218–221°C (BuOH-H_2O) [1]
$[\alpha]_D$ +20.0° (c 0.88, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3240–3560, 1750, 1240 [1]
^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 0.70–1.11 (CH_3 × 7), 5.23 (H-12), 4.65, 5.10, 6.04 (H-1-3 of Glc) [1]



Silphioside C



Silphioside E

^{13}C NMR (60.9 MHz, C_5D_5N): [2]

Table 1

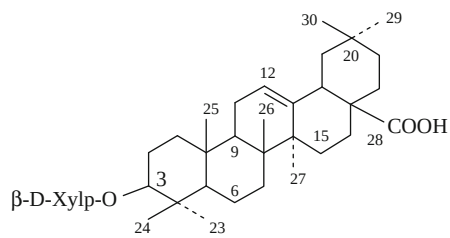
Glc-1	104.90	Glc″-1	95.70
2	83.35	2	74.10
3	78.00	3	78.85
4	71.75	4	71.40
5	78.40	5	79.50
6	62.90	6	62.50
Glc′-1	105.85		
2	76.90		
3	78.00		
4	71.90		
5	80.00		
6	62.90		

References

1. E.S. Davidyants, Zh.M. Putieva, V.A. Bandyukova, N.K. Abubakirov, Chem. Nat. Comp. **20**(6), 708 (1985)
2. E.S. Davidyants, Zh.M. Putieva, A.S. Shashkov, V.A. Bandyukova, N.K. Abubakirov, Chem. Nat. Comp. **21**(4), 486 (1986)

Songoroside A

CAS Registry Number: 61617-29-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Scabiosa soongorica* [1, 2], *Xeromphis spinosa* [3]

$C_{35}H_{56}O_7$: 588.402

Mp: 226–230°C (EtOH) [1]

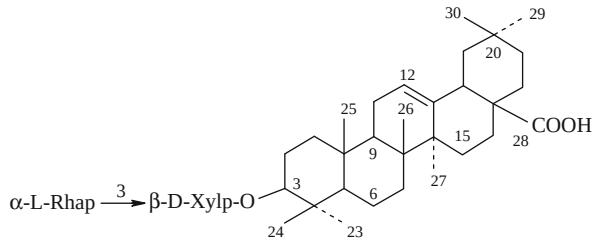
$[\alpha]_D$ +35° (c 0.8, MeOH) [1]

References

1. A.A. Akimaliev, Zh.M. Putieva, P.K. Alimbaeva, N.K. Abubakirov, Chem. Nat. Comp. **24**(6), 758 (1988)
2. A.A. Akimaliev, P.K. Alimbaeva, L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **12**(4), 415 (1976)
3. A.K. Saluja, D.D. Santani, Planta Med. **51**, 72 (1986)

Songoroside C

CAS Registry Number: 61286-95-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Scabiosa soongorica* [1]

$C_{41}H_{66}O_{11}$: 734.460

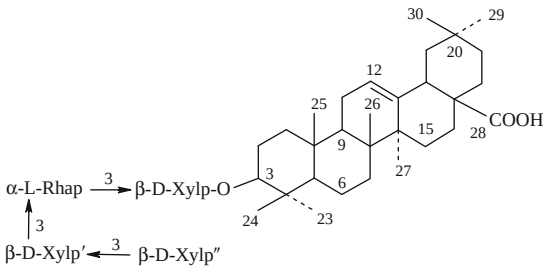
Mp: 218–220°C [1]
$[\alpha]_D^{20}$ +9.0° (c 1.4, MeOH) [1]

References

1. A.A. Akimaliev, P.K. Alimbaeva, L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **12**(4), 415 (1976)

Songoroside G

CAS Registry Number: 61286-96-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Scabiosa soongorica* [1]
$C_{51}H_{82}O_{19}$: 998.545
Mp: 251–254°C (EtOH) [1]
$[\alpha]_D^{20}$−28.1° (c 1.1, MeOH) [1]

References

1. A.A. Akimaliev, P.K. Alimbaeva, L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **12**(4), 415 (1976)

Songoroside I

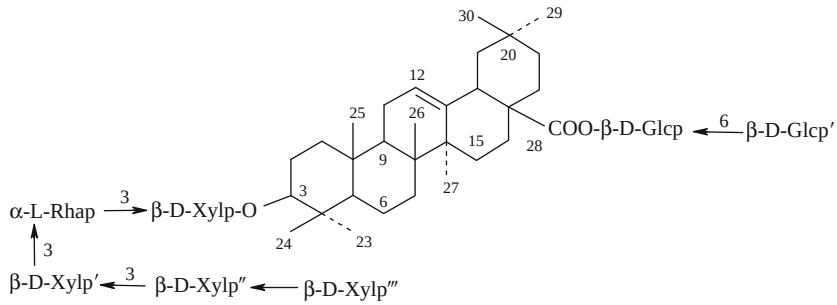
CAS Registry Number: 61286-92-8
See Figure Songoroside I
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Scabiosa soongorica* [1]
$C_{56}H_{90}O_{23}$: 1130.587
Mp: 230–233°C (EtOH) [1]
$[\alpha]_D^{20}$−22.8° (c 1.6, MeOH) [1]

References

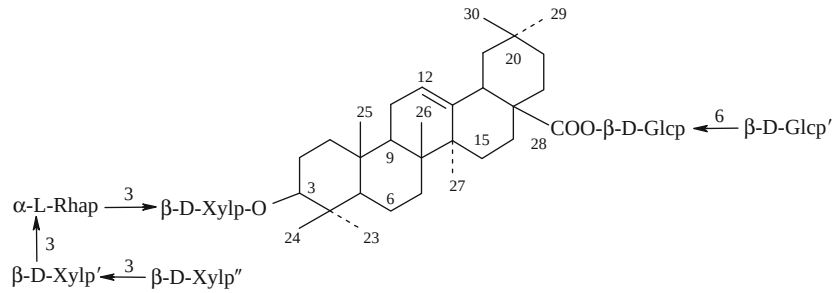
1. A.A. Akimaliev, P.K. Alimbaeva, L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **12**(4), 415 (1976)

Songoroside M

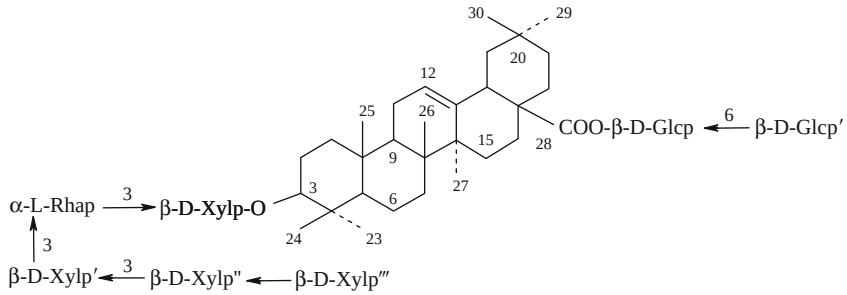
CAS Registry Number: 61288-70-8
See Figure Songoroside M
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Scabiosa soongorica* [1]
$C_{63}H_{102}O_{29}$: 1322.650
Mp: 207–209°C [1]
$[\alpha]_D^{20}$−30.4° (c 1.8, MeOH) [1]



Songoroside I



Songoroside M



Songoroside O

References

1. A.A. Akimaliev, P.K. Alimbaeva, L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **12**(4), 415 (1976)

Songoroside O

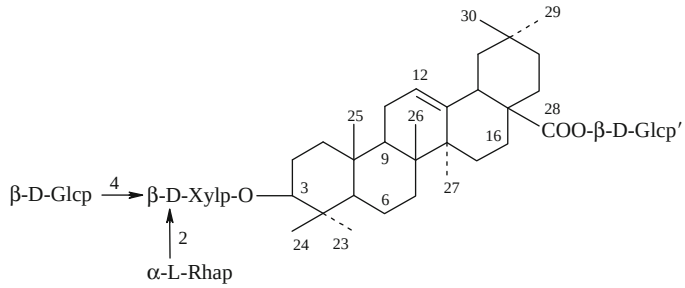
CAS Registry Number: 61286-97-3
See Figure Songoroside O
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Scabiosa soongorica* [1]
$C_{68}H_{110}O_{33}$: 1454.692
Mp: 202–204°C [1]
$[\alpha]_D^{20}$ −41.0° (c 1.7, MeOH) [1]

References

1. A.A. Akimaliev, P.K. Alimbaeva, L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **12**(4), 415 (1976)

Squarroside II

CAS Registry Number: 288840-55-1
See Figure Squarroside II
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Thalictrum squarrosum* [1]
$C_{53}H_{86}O_{21}$: 1058.566
$[\alpha]_D^{25}$ −4.8° (c 0.90, MeOH) [1]
FAB-MS *m/z*: 1057 $[M-H]^-$, 895 $[M-H\text{-hexose}]^-$, 733 $[M-H\text{-hexose-hexose}]^-$, 587 $[M-H\text{-hexose-hexose-deoxyhexose}]^-$, 455 $[M-H\text{-hexose-hexose-deoxyhexose-pentose}]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.87, 0.89, 0.92, 1.08, 1.08, 1.16, 1.25 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 3.19 (dd, J = 11.4, 4.6, H-3), 5.43 (brs, H-12)
β-D-Xylp: 4.76 (d, J = 6.1, H-1), 4.47 (H-2), 4.25 (H-3), 4.27 (m, H-4), 3.80 (brd, J = 10.4, H-5), 4.18 (H-5)



Squarroside II

α-L-Rhap: 6.12 (brs, H-1), 4.70 (brs, H-2), 4.57 (brd, J = 9.2, H-3), 4.27 (dd, J = 9.2, 9.2, H-4), 4.59 (m, H-5), 1.63 (d, J = 6.1, H-6)

β-D-Glcp: 5.12 (d, J = 7.9, H-1), 4.10 (dd, J = 7.9, 8.6, H-2), 4.19 (H-3), 4.21 (H-4), 3.89 (m, H-5), 4.37 (H-6), 4.48 (H-6)

β-D-Glcp′: 6.24 (d, J = 7.9, H-1), 4.18 (dd, J = 7.9, 8.5, H-2), 4.34 (H-3), 4.37 (H-4), 4.01 (m, H-5), 4.37 (H-6), 4.48 (H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.4	Xyl-1	104.9	Glc-1	106.3
2	26.6	17	47.0	2	76.4	2	75.4
3	88.7	18	41.7	3	73.9	3	78.8
4	39.5	19	46.2	4	79.4	4	71.3
5	56.0	20	30.8	5	64.4	5	78.7
6	18.5	21	34.0	Rha-1	101.7	6	62.5
7	32.5	22	33.1	2	72.2	Glc′-1	95.7
8	39.9	23	28.1	3	72.5	2	74.0
9	48.1	24	17.0	4	74.1	3	78.5
10	37.0	25	15.6	5	69.8	4	71.1
11	23.8	26	17.5	6	18.6	5	79.3
12	122.9	27	26.1			6	62.2
13	144.1	28	176.4				
14	42.1	29	33.1				
15	28.2	30	23.7				

Pharm./Biol.: In Chinese traditional medicine it is used as an antacid [1]

References

1. H. Yoshimitsu, M. Nishida, Z.-Z. Qian, Z.-H. Lei, T. Nohara, Chem. Pharm. Bull. **48**, 828 (2000)

Squarroside III

CAS Registry Number: 288840-56-2

See Figure Squarroside III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Thalictrum squarrosum* [1]

$C_{59}H_{96}O_{26}$: 1220.618

$[\alpha]_D^{25}$ −14.1° (c 0.55, MeOH) [1]

FAB-MS *m/z*: 1219 $[M-H]^-$, 1057 $[M-H\text{-hexose}]^-$, 895 $[M-H\text{-hexose-hexose}]^-$, 733 $[M-H\text{-hexose-hexose-hexose}]^-$, 587 $[M-H\text{-hexose-hexose-hexose-deoxyhexose}]^-$, 455 $[M-H\text{-hexose-hexose-hexose-deoxyhexose-pentose}]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.89, 0.89, 0.89, 1.09, 1.09, 1.16, 1.25 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 3.20 (brd, 15.2, H-3), 5.42 (brs, H-12) [1]

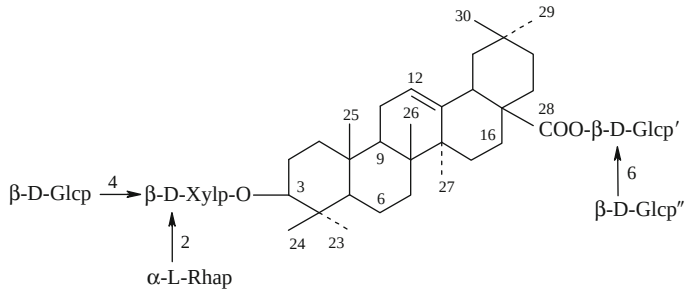
β-D-Xylp: 4.76 (d, J = 6.1, H-1), 4.47 (H-2), 4.25 (H-3), 4.27 (m, H-4), 3.80 (brd, J = 10.4, H-5), 4.39 (brd, J = 11.6, H-5)

α-L-Rhap: 6.12 (brs, H-1), 4.70 (brs, H-2), 4.57 (brd, J = 9.2, H-3), 4.27 (H-4), 4.58 (m, H-5), 1.63 (d, J = 6.1, H-6)

β-D-Glcp: 5.12 (d, J = 7.9, H-1), 4.01 (dd, J = 7.9, 8.5, H-2), 4.18 (H-3), 4.17 (H-4), 3.87 (m, H-5), 4.34 (H-6), 4.50 (brd, J = 11.6, H-6)

β-D-Glcp′: 6.24 (d, J = 7.9, H-1), 4.13 (dd, J = 7.9, 8.6, H-2), 4.25 (H-3), 4.27 (H-4), 4.10 (m, H-5), 4.35 (H-6), 4.69 (brd, J = 9.2, H-6)

β-D-Glcp″: 5.01 (d, J = 7.9, H-1), 3.98 (dd, J = 7.9, 8.6, H-2), 4.16 (H-3), 4.17 (H-4), 3.88 (m, H-5), 4.33 (H-6), 4.46 (H-6) [1]



Squarroside III

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.4	Xyl-1	104.9	5	78.7
2	26.6	17	47.0	2	76.4	6	62.5
3	88.7	18	41.7	3	73.8	Glc′-1	95.7
4	39.5	19	46.3	4	79.5	2	74.0
5	56.0	20	30.8	5	64.3	3	78.4
6	18.5	21	34.0	Rha-1	101.8	4	71.0
7	32.6	22	33.1	2	72.2	5	78.0
8	39.9	23	28.1	3	72.5	6	69.4
9	48.1	24	17.0	4	73.9	Glc″-1	105.3
10	37.0	25	15.7	5	69.8	2	75.1
11	23.8	26	17.5	6	18.6	3	78.4
12	122.9	27	26.1	Glc-1	106.3	4	71.5
13	144.1	28	176.5	2	75.4	5	78.7
14	42.1	29	33.1	3	78.5	6	62.6
15	28.3	30	23.7	4	71.3		

Pharm./Biol.: In Chinese traditional medicine it is used as an antacid [1]

References

1. H. Yoshimitsu, M. Nishida, Z.-Z. Qian, Z.-H. Lei, T. Nohara, Chem. Pharm. Bull. **48**, 828 (2000)

Squarroside IV

CAS Registry Number: 288840-57-3

See Figure Squarroside IV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Thalictrum squarrosum* [1]

$C_{59}H_{96}O_{26}$: 1220.618

$[\alpha]_D^{25}$ −4.2° (MeOH, c 0.85) [1]

FAB-MS *m/z*: 1219 $[M-H]^-$, 1057 $[M-H\text{-hexose}]^-$, 895 $[M-H\text{-hexose-hexose}]^-$, 733 $[M-H\text{-hexose-hexose-hexose}]^-$, 587 $[M-H\text{-hexose-hexose-hexose-deoxyhexose}]^-$, 455 $[M-H\text{-hexose-hexose-hexose-deoxyhexose-pentose}]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.87, 0.90, 0.92, 1.10, 1.15, 1.27, 1.33 (s, CH_3-25, 30, 29, 26, 24, 27, 23), 3.25 (brd, J = 15.8, H-3), 5.44 (brs, H-12)

β-D-Xylp: 4.71 (d, J = 6.7, H-1), 4.42 (dd, J = 6.7, 8.6, H-2), 4.18 (H-3), 4.23 (m, H-4), 3.74 (brd, J = 11.0, H-5), 4.41 (H-5)

α-L-Rhap: 6.14 (brs, H-1), 4.97 (brs, H-2), 4.81 (dd, J = 3.7, 9.2, H-3), 4.48 (H-4), 4.64 (m, H-5), 1.56 (d, J = 6.1, H-6)

β-D-Glcp: 5.13 (d, J = 7.9, H-1), 4.03 (dd, J = 7.9, 9.2, H-2), 4.22 (H-3), 4.21 (H-4), 3.90 (m, H-5), 4.36 (H-6), 4.50 (H-6)

β-D-Glcp′: 6.33 (d, J = 7.9, H-1), 4.22 (H-2), 4.29 (dd, J = 9.2, 9.2, H-3), 4.36 (H-4), 4.03 (m, H-5), 4.42 (H-6), 4.48 (brd, J = 9.2, H-6)

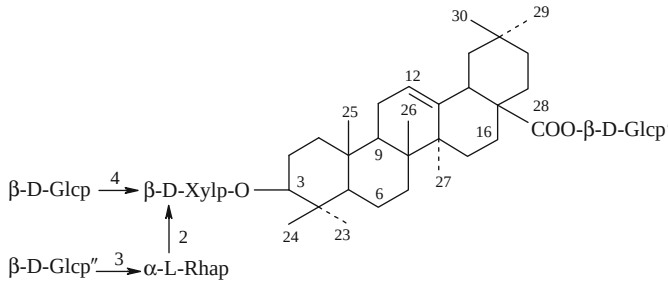
β-D-Glcp″: 5.45 (d, J = 7.9, H-1), 4.09 (dd, J = 7.9, 8.5, H-2), 4.22 (H-3), 4.21 (H-4), 3.97 (m, H-5), 4.36 (H-6), 4.50 (H-6) [1]

^{13}C NMR (C_5D_5N): [1]

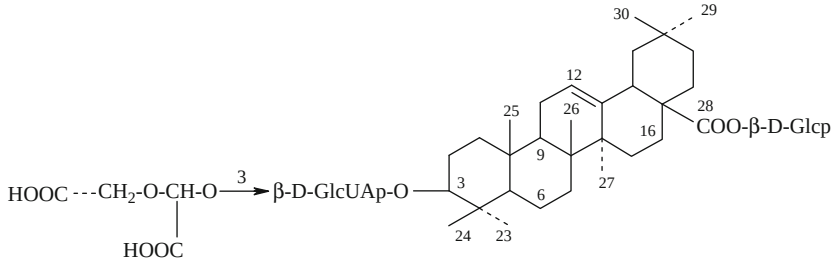
Table 1

C-1	38.9	C-16	23.4	Xyl-1	105.4	5	78.7
2	26.7	17	47.0	2	76.2	6	62.5
3	88.7	18	41.7	3	74.4	Glc′-1	95.8
4	39.6	19	46.2	4	80.1	2	74.1
5	56.0	20	30.8	5	65.4	3	78.4
6	18.5	21	34.0	Rha-1	101.5	4	71.1
7	32.5	22	33.1	2	71.6	5	79.3

(*continued*)



Squarroside IV



Spinacoside C

Table 1 (continued)

8	39.9	23	28.1	3	83.2	6	62.2
9	48.0	24	17.2	4	62.9	Glc″-1	106.9
10	37.0	25	15.6	5	69.8	2	75.9
11	23.8	26	17.5	6	18.6	3	78.5
12	122.9	27	26.1	Glc-1	106.6	4	71.5
13	144.1	28	176.4	2	75.5	5	78.5
14	42.1	29	33.1	3	78.9	6	62.6
15	28.2	30	23.7	4	71.3		

Pharm./Biol.: In Chinese traditional medicine it is used as an antacid [1]

References

1. H. Yoshimitsu, M. Nishida, Z.-Z. Qian, Z.-H. Lei, T. Nohara, Chem. Pharm. Bull. **48**, 828 (2000)

Spinacoside C

CAS Registry Number: 182322-57-2
See Figure Spinacoside C

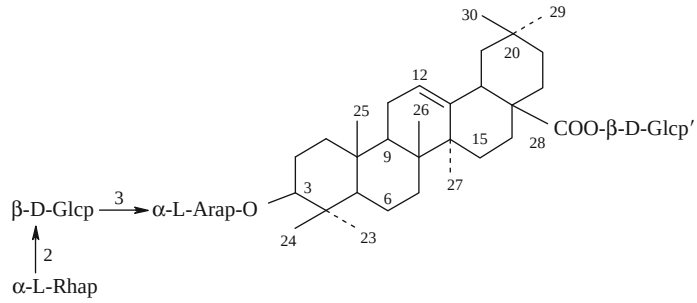
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Basella rubra* [1]
$C_{46}H_{70}O_{19}$: 926.451
Mp: 220–222°C [1]
$[\alpha]_D^{24}$ +10.2° (MeOH) [1]

References

1. T. Murakami, K. Hirano, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 776 (2001)

Talicoside B

See Figure Talicoside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid



Talicoside B

Biological sources: *Thalictrum minus* [1]
$C_{53}H_{86}O_{21}$: 1058.566
Mp: 213–216°C [1]
$[\alpha]_D^{20}$ +10.49° (c 3.58, C_5D_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3500, 1740 [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.75, 0.80, 0.83, 0.84, 0.99, 1.12, 1.15 (s, CH_3 × 7), 5.33 (m, H-12), 1.55 (d, J = 6.1, CH_3-6 of Rha), 4.65 (2H, m, H-anomeric), 4.84 (1H, m, H-anomeric), 5.05 (d, J = 6.1, H-anomer)
^{13}C NMR (200 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	23.8	Ara-1	106.5	Rha-1	101.7
2	26.3	17	47.1	2	74.4	2	72.0
3	89.1	18	41.9	3	78.8	3	72.3
4	39.6	19	46.4	4	71.9	4	73.4
5	56.0	20	30.7	5	64.7	5	69.9
6	18.6	21	34.1	Glc-1	104.4	6	18.4
7	32.6	22	33.1	2	78.7	Glc′-1	95.7
8	40.1	23	28.3	3	78.7	2	74.1
9	48.2	24	16.8	4	72.8	3	77.8
10	37.1	25	15.5	5	78.4	4	71.5
11	23.6	26	17.5	6	62.8	5	77.8
12	122.6	27	26.1			6	62.7
13	144.1	28	176.3				
14	42.3	29	33.3				
15	28.3	30	23.8				

References

1. A.S. Gromova, V.I. Lutskii, A.A. Semenov, R.B. Valeev, G. A. Kalabin, Yu.N. El'kin, Chem. Nat. Comp. **21**(5), 629 (1985)

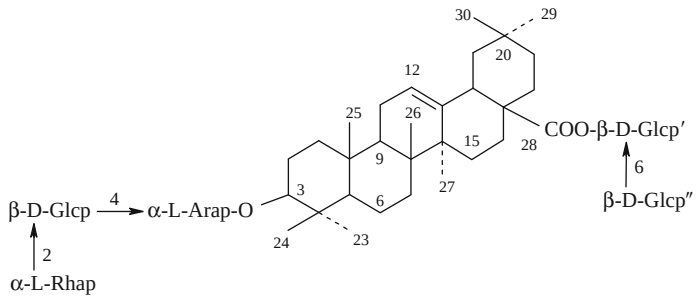
Talicoside D

See Figure Talicoside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid
Biological sources: *Thalictrum minus* [1]
$C_{59}H_{96}O_{26}$: 1220.618
Mp: 218–220°C [1]
$[\alpha]_D^{20}$−0.8° (c 5.0, H_2O) [1]
SI-MS *m/z*: 1243 [(M + Na)$^+$, 80], 1259 (M + K$^+$), 1225 (6), 1097 (4), 1081 (5), 1079 (5), 935 (7), 919 (24), 873 (15), 803 (7), 671 (7), 595 (13), 481 (15), 479 (14), 463 (14), 439 (38), 393 (20), 365 (16), 363 (15), 347 (100) [1]
^{1}H NMR (499.84 MHz, J/Hz, C_5D_5N): 3.07 (dd, J = 11.7, 4.5, H-3), 5.27 (brt, J = 3.7, H-12), 0.73, 0.75, 0.76, 0.80, 0.94, 1.06, 1.10 (s, CH_3 × 7), 1.52 (d, J = 6.1, CH_3-6 of Rha)
α-L-Arap: 4.58 (d, J = 5.8, H-1)
β-D-Glcp: 4.96 (d, J = 7.7, H-1)
α-L-Rhap: 6.03 (d, J = 1.8, H-1), 1.52 (d, J = 6.1, H-6)
β-D-Glcp′: 6.05 (d, J = 7.9, H-1)
β-D-Glcp″: 4.84 (d, J = 7.7, H-1) [1]
^{13}C NMR (125.5 MHz, C_5D_5N): [1]

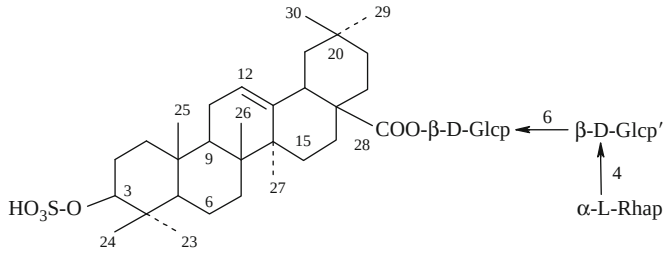
Table 1

C-1	39.28	C-16	24.14	Ara-1	106.54	Rha-5	70.14
2	26.60	17	46.77	2	73.03	6	18.90
3	89.44	18	42.10	3	73.63	Glc′-1	95.87
4	39.73	19	46.77	4	77.81	2	74.13
5	57.67	20	31.00	5	64.94	3	78.44
6	18.92	21	34.46	Glc-1	104.5	4	71.53

(*continued*)



Talicoside D



Tauroside I

Table 1 (continued)

7	32.90	22	33.58	2	78.79	5	77.94
8	40.36	23	28.65	3	78.88	6	69.88
9	48.49	24	17.12	4	72.14	Glc″-1	105.11
10	37.43	25	15.84	5	78.01	2	75.25
11	23.85	26	17.88	6	63.11	3	78.79
12	123.08	27	26.29	Rha-1	101.89	4	72.27
13	144.38	28	176.60	2	72.07	5	78.19
14	42.58	29	33.33	3	72.59	6	63.03
15	28.62	30	24.07	4	74.62		

References

1. A.S. Gromova, A.A. Semenov, V.I. Lutskii, S.V. Zinchenko, N.N. Trofimova, Ya.V. Rashkes, Chem. Nat. Comp. **30**(3), 363 (1994)

Tauroside I

See Figure Tauroside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Hedera taurica* [1], *H. helix* [2]

$C_{48}H_{78}O_{20}S$: 1006.480

$[\alpha]_D^{20}$ −6° (c 0.64, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 1390, 1230 [1]

^{1}H NMR (J/Hz, CD_3OD): 3.87 (dd, J = 4.5, 12.0, H-3), 5.18 (t, J = 3.3, H-12), 0.73, 0.76, 0.84, 0.87, 0.89, 0.97, 1.08 (s, CH_3 × 7), 0.6–2.1 (CH, CH_2, skeletal)

β-D-Glcp: 5.30 (d, J = 7.9, H-1), 3.31 (t, J = 8.5, H-2), 3.35-3.40 (m, H-3, H-4), 3.45-3.53 (m, H-5), 4.04 (dd, J = 12.0, 1.5, Ha-6), 3.75 (dd, J = 5.0, Hb-6)

β-D-Glcp′: 4.37 (d, J = 8.4, H-1), 3.19 (t, J = 8.4, H-2), 3.43 (t, J = 8.7, H-3) 3.50 (t, J = 8.7, H-4), 3.43 (m, H-5), 3.76 (dd, J = 12.0, 2.0, Ha-6), 3.61 (dd, J = 5.0, Hb-6)

α-L-Rhap: 4.81 (d, J = 1.7, H-1), 3.81 (dd, J = 3.4, H-2), 3.61 (dd, J = 9.5, H-3), 3.36 (t, J = 9.5, H-4), 3.93 (d, J = 6.2, H-5), 1.22 (d, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.8	Glc-1	95.8	Rha-1	102.8
2	25.1	17	47.1	2	73.9	2	72.7
3	85.0	18	41.7	3	78.8	3	72.8
4	39.0	19	46.2	4	70.9	4	74.1

(*continued*)

Table 1 (continued)

5	56.4	20	30.8	5	78.1	5	70.4
6	18.6	21	34.1	6	69.3	6	18.8
7	33.2	22	32.6	Glc′-1	105.0		
8	39.9	23	28.9	2	75.5		
9	48.0	24	17.5	3	76.6		
10	37.2	25	15.6	4	78.3		
11	23.4	26	17.2	5	77.2		
12	122.9	27	26.2	6	61.3		
13	144.3	28	176.7				
14	42.2	29	33.2				
15	28.3	30	23.8				

References

1. V.I. Grishkovets, N.V. Tolkacheva, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **28**(6), 593 (1992)
2. R. Elias, A.M. Diaz Lanza, E. Vidal-Oliver, G. Balansard, R. Faure, A. Babadjamian, J. Nat. Prod. **54**, 98 (1991)

Triacanthoside C

CAS Registry Number: 41678-22-2

See Figure Triacanthoside C

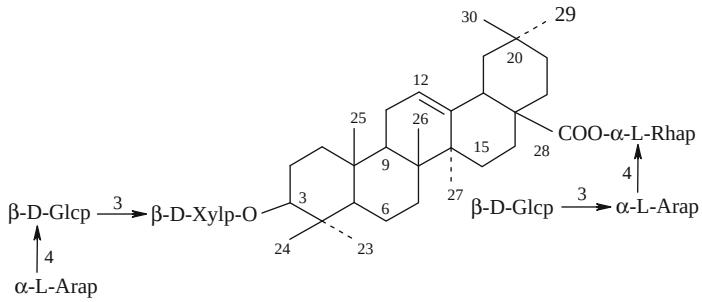
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Gleditsia triacanthos* [1, 2]

$C_{63}H_{102}O_{29}$: 1322.650

Mp: 230–234°C [1]

$[\alpha]_D^{20}$ −14° (c 0.8, 70% MeOH) [1]



Triacanthoside C

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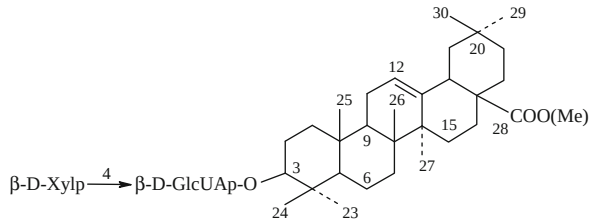
1. T.A. Badalbaeva, E.S. Kondratenko, L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **8**(6), 722 (1972)
2. T.A. Badalbaeva, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **9**(5), 600 (1973)

Udosaponin A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia cordata* [1]

$C_{43}H_{68}O_{13}$: 792.465

Mp: 135–137°C (MeOH) [1]

$[\alpha]_D$ −11.2° (c 1.2, MeOH) [1]

^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

C-3	89.3	GlcUA-1	106.7	Xyl-1	105.1
28	176.2	2	73.9	2	75.7
OMe	51.5	3	74.9	3	77.8
		4	81.1	4	70.5
		5	75.0	5	67.2
		6	169.7		
		OMe	52.3		

References

1. H. Kawai, M. Nishida, Y. Tashiro, M. Kuroyanagi, A. Ueno, M. Satake, Chem. Pharm. Bull. **37**(9), 2318 (1989)

Udosaponin C

See Figure Udosaponin C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Oleanolic Acid

Biological sources: *Aralia cordata* [1]

$C_{54}H_{86}O_{23}$: 1102.555

$[\alpha]_D -8.2°$ (c 0.8, MeOH) [1]

FAB-MS *m*/*z*: 1101 $[M-H]^-$ [1]

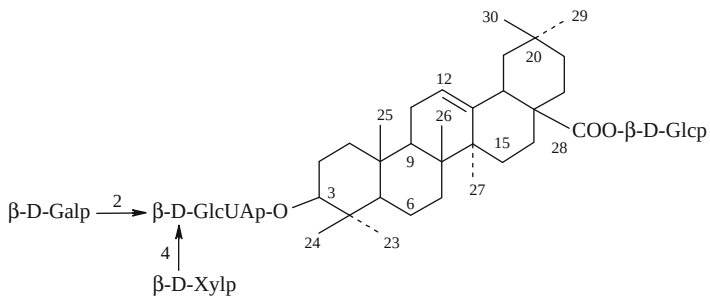
^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

C-3	89.3	GlcUA-1	104.8	Xyl-1	104.8	Glc-1	95.5
28	176.2	2	81.9	2	75.2	2	74.2
		3	73.9	3	77.7	3	78.6
		4	80.2	4	70.5	4	70.9
		5	73.9	5	67.1	5	79.0
		6	169.4	Gal-1	106.2	6	62.1
		OMe	52.3	2	73.9		
				3	74.6		
				4	69.3		
				5	76.7		
				6	61.2		

References

1. H. Kawai, M. Nishida, Y. Tashiro, M. Kuroyanagi, A. Ueno, M. Satake, Chem. Pharm. Bull. **37**(9), 2318 (1989)



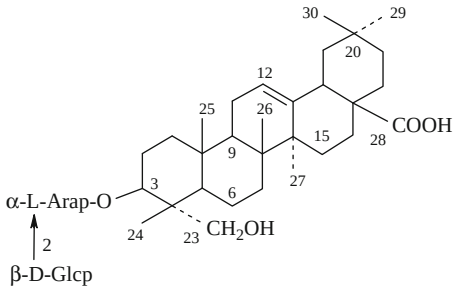
Udosaponin C

Glycosides of Aglycones of Oleanene Type

Glycosides of Hederagenin

Akeboside Std (Cauloside C_1, Caltoside D, Caulosaponin B, Tauroside D_2, Akebia-Saponin C)

CAS Registry Number: 20853-58-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Akebia quinata* [1–3], *Lonicera nigra* [4], *Polyscias dichroostachya* [5], *Pulsatilla campanella* [6], *Fatsia japonica* [7, 8], *Pulsatilla davurica* [9], *Hedera taurica* [10], *Caltha polypetala* [11], *Caulophyllum robustum* [12], *Caltha silvestris* [13], *Medicago sativa* [14]

$C_{41}H_{66}O_{13}$: 766.450

Mp: 248–250°C (dec.) [1]

$[\alpha]_D$ +4°(C_5H_5N) [1]

FD-MS *m/z*: 789 $[M]^+(C_{41}H_{66}O_{13})^+Na$ [6]

FAB-MS *m/z*: 859 $[(M + H) + 92]^+$, 767 $(M + H)^+$, 455, 437, 409; 765 $[M-H]^-$, 603 $[M-H-162]^-$ [4]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.87 (d, J = 7.2, H-1 of Ara), 5.20 (d, J = 8.0, H-1 of Glc) [6]

^{13}C NMR (100 MHz, C_5D_5N): [6]

Table 1

C-1	38.8	C-11	23.7	C-21	34.3	Ara-1	103.7
2	26.0	12	122.6	22	33.3	2	81.0
3	82.2	13	144.8	23	64.7	3	73.4
4	43.4	14	42.2	24	13.5	4	68.1
5	47.7	15	28.3	25	16.1	5	64.7
6	18.2	16	23.8	26	17.5	Glc-1	105.6
7	32.9	17	46.5	27	26.2	2	76.0
8	39.8	18	42.0	28	180.1	3	78.1
9	48.2	19	46.7	29	33.3	4	71.4
10	37.0	20	30.9	30	23.7	5	78.1
						6	62.5

Pharm./ Biol.: Molluscicidal activity [15]

References

1. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **24**(5), 1021 (1976)
2. R. Higuchi, R. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **20**(9), 1935 (1972)
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6. X.-C. Li, D.-Z. Wang, S.-G. Wu, C.-R. Yang, Phytochemistry **29**, 595 (1990)
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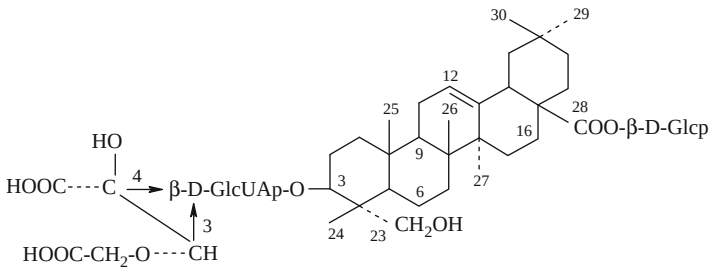
Basellasaponin A

CAS Registry Number: 354552-00-4
See Figure Basellasaponin A
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Basella rubra* [1]
$C_{47}H_{70}O_{21}$: 970.440
Mp: 228–230°C [1]
$[\alpha]_D^{24}$ +30.1° (c 1.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3403, 1736, 1076, 1036 [1]
RH-FAB-MS *m/z*: 993.4307 $[M + Na]^+$, 969 $[M-H]^-$, 809 $[M-C_5H_5O_6]^-$, 807 $[M-C_6H_{11}O_5]$
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 4.22 (m, H-3), 5.40 (dd-like, H-12), 3.16 (d-like, H-18), 3.65 (d, J = 11.2, H-23), 4.20 (m, H-23), 0.88 (s, CH_3-24, 25, 29, 30), 1.09, 1.22 (s, CH_3-26, 27) β-D-GlcUAp: 5.17 (d, J = 7.6, H-1); 3-oxoperuvic acid: 5.91 (s, H-3″), glycolic acid: 4.75 (s, H-2‴) β-D-Glcp: 6.27 (d, =7.6, H-1) [1]
^{13}C NMR: [1]

Table 1

C-1	38.6	C-11	23.5	C-21	34.1	GlcUA-1	106.5	GA-1	172.3
2	25.9	12	122.7	22	32.8	2	72.0	2	65.1
3	82.4	13	144.1	23	64.5	3	72.6	Glc-1	95.7
4	43.4	14	42.2	24	13.5	4	70.0	2	74.1
5	47.6	15	28.3	25	16.1	5	75.2	3	78.9
6	18.2	16	23.9	26	17.6	6	171.6	4	71.3
7	32.9	17	47.0	27	26.1	3-oxo-PA-1	171.2	5	79.3
8	40.0	18	41.8	28	176.4	2	94.0	6	62.4
9	48.1	19	46.2	29	33.1	3	98.2		
10	36.9	20	30.8	30	23.7				



Basellasaponin A

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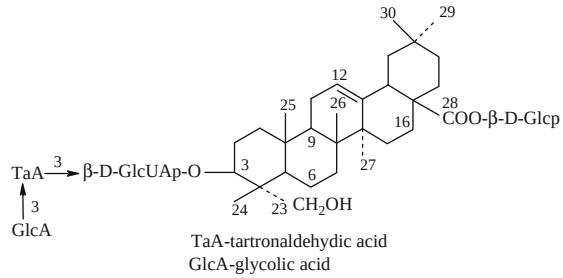
1. T. Murakami, H. Hirano, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 776 (2001)

Betavulgaroside VI

CAS Registry Number: 178535-50-7



TaA-tartronaldehydic acid
GlcA-glycolic acid

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Beta vulgaris* [1]
$C_{47}H_{72}O_{21}$: 972.456
Mp: 210–212°C [1]
$[\alpha]_D^{30}$ +14.8° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3451, 1751, 1735, 1075 [1]
FAB-MS (negative ion mode) *m/z*: 971 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 995 $(M + Na)^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.87, 0.87, 1.11, 1.22 (s, CH_3-29, 30, 26, 27), 0.92 (s, CH_3-24, 25), 3.17 (dd-like, H-18), 3.68, 4.32 (ABq, J = 11.4, H_2-23), 3.69 (dd-like, H-3), 5.03, 5.38 (d, J = 16.5, H_2-2 of glycolic acid), 5.30 (d, J = 3.3, H-2 of

tartronaldehydic acid), 5.41 (brs, H-12), 6.25 (d, J = 3.3, H-3 of tartronaldehydic acid)
β-D-GlcUAp: 5.20 (d, J = 7.6, H-1), 4.35 (m, H-3)
β-D-Glcp: 6.31 (d, J = 7.9, H-1) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.8	GlcUA-1	106.0	Glc-1	95.8
2	26.1	17	47.0	2	74.7	2	74.2
3	82.0	18	41.7	3	85.4	3	78.9
4	43.5	19	46.1	4	72.4	4	71.1
5	47.4	20	30.8	5	77.6	5	79.3
6	18.2	21	34.0	6	172.4	6	62.6
7	33.1	22	32.6	TaA-1	174.8		
8	39.9	23	64.1	2	74.2		
9	48.1	24	13.7	3	105.3		
10	36.8	25	16.1	GlcA-1	173.9		
11	23.4	26	17.5	2	64.8		
12	122.8	27	26.1				
13	144.1	28	176.4				
14	42.1	29	33.1				
15	28.3	30	23.7				

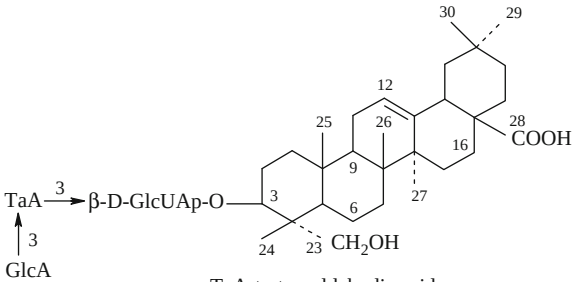
Pharm./ Biol.: Inhibitory effect on the increase of serum glucose levels in glucose-loaded rats [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1758 (1998)

Betavulgaroside VII

CAS Registry Number: 178535-51-8



TaA-tartronaldehydic acid
GlcA-glycolic acid

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Beta vulgaris* [1]
$C_{41}H_{62}O_{16}$: 810.403
Mp: 190–192°C [1]
$[\alpha]_D^{30}$ +59.4° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3451, 1751, 1736, 1085 [1]
FAB-MS (negative ion mode) *m/z*: 809 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 833 $(M + Na)^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.89, 1.27 (s, CH_3-25, 27), 0.93, 1.00 (s, CH_3-24, 29, 26, 30), 3.28 (dd-like, H-18), 3.71, 4.34 (d, J = 9.9, H-23), 4.33 (dd-like, H-3), 5.03, 5.40 (d, J = 17.5, H_2-2 of glycolic acid), 5.30 (d, J = 3.3, H-2 of tartronaldehydic acid), 5.45 (brs, H-12), 6.27 (d-like, H-3 of tartronaldehydic acid)
β-D-GlcUAp: 5.29 (d, J = 7.6, H-1), 4.34 (m, H-3) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

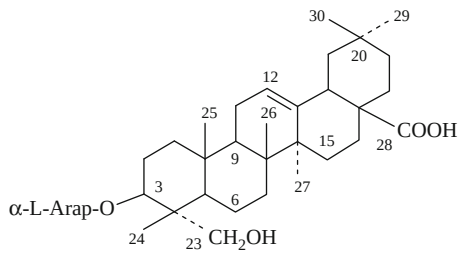
C-1	38.6	C-16	23.8	GlcUA-1	106.0
2	26.2	17	46.6	2	74.7
3	82.0	18	42.0	3	85.4
4	43.0	19	46.4	4	72.4
5	47.4	20	30.9	5	77.6
6	18.1	21	34.2	6	172.4
7	33.2	22	32.9	TaA-1	174.8
8	39.8	23	64.2	2	74.2
9	48.1	24	13.7	3	105.4
10	36.8	25	16.0	GlcA-1	173.9
11	23.8	26	17.4	2	64.9
12	122.6	27	26.2		
13	144.8	28	180.2		
14	42.2	29	33.2		
15	28.4	30	23.8		

Pharm./Biol.: Inhibitory effect on the increase of serum glucose levels in glucose-loaded rats [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1758 (1998)

Cauloside A (Koelreuterii-Saponin A, Tauroside B)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Fatsia japonica* [1, 2], *Pulsatilla davurica* [3], *Hedera helix* [4], *H. rhombea* [5], *H. taurica* [6], *Caltha polypetala* [7], *Koelreuteria paniculata* [8], *H. canariensis* [9], *H. nepalensis* [10], *Pulsatilla campanella* [11], *Polyscias dichroostachya* [12], *Patrinia scabeosaefolia* [13], *Caulophyllum robustum* [14], *Leontice eversmannii* [15], *Lonicera nigra* [16], *Hedera pastuchovii* [17], *Akebia quinata* [18]

$C_{35}H_{56}O_8$: 604.397

Mp: 224–228°C [1]

$[\alpha]_D^{20}$ +44.2° (c 0.55, DMSO) [3]

IR (KBr) ν_{max} cm^{-1}: 3414, 1696 [3]

^{1}H NMR (300 MHz, J/Hz, C_5D_5N): 4.99 (d, J = 7.33, H-1 of Ara), 4.44 (dd, J = 7.33, 9.16, H-2), 4.07 (dd, J = 9.16, 3.16, H-3), 4.26 (m, H-4), 3.72 (dd, J = 10.69, 3.67, Ha-5), 4.31 (m, H-5) [1]

^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-9	48.1	C-17	47.0	C-25	16.1	Ara-1	106.3
2	26.0	10	36.9	18	42.0	26	17.5	2	72.9
3	82.0	11	23.3	19	46.6	27	25.8	3	74.5
4	43.3	12	122.8	20	30.8	28	180.3	4	69.4
5	47.6	13	144.0	21	34.0	29	33.0	5	66.7
6	18.1	14	42.1	22	33.3	30	23.6		
7	32.5	15	28.2	23	64.6				
8	39.9	16	23.8	24	13.5				

Pharm./Biol.: Molluscicidal activity [1]

References

1. V.I. Grishkovets, E.A. Sobolev, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(5), 501 (2000)
2. Z.S. Kemoklidze, G.E. Dekanosidze, O.D. Dzhikiya, M.M. Vugal'ter, E.P. Kemertelidze, Chem. Nat. Comp. **18**(6), 757 (1982)
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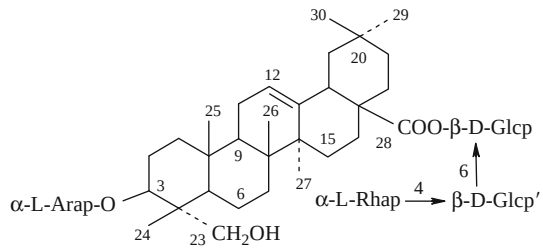
Cauloside D (Glycoside G, Kizutasaponin 10)

CAS Registry Number: 12672-45-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Fatsia japonica* [1], *Hedera canariensis* [2], *H. taurica* [3, 4], *Pulsatilla davurica* [5], *Caltha polypetala* [6], *Hedera nepalensis* [7], *H. helix* [8], *Kalopanax pictus* [9], *Hedera rhombea* [10], *Pulsatilla campanella* [11], *Caulophyllum robustum* [12], *Clematis tibetana* [13]

$C_{53}H_{86}O_{22}$: 1074.561

Mp: 205–209°C [1]

$[\alpha]_D^{20}$ +4.8° (c 0.51, DMSO) [5]

IR (KBr) ν_{max} cm^{-1}: 3416, 1740 [5]

^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-13	144.2	C-25	16.2	Ara-1	106.3	Glc′-1	104.6
2	26.1	14	42.2	26	17.6	2	73.0	2	75.2
3	82.2	15	28.3	27	26.1	3	74.6	3	76.5
4	43.4	16	23.4	28	176.6	4	69.4	4	78.5
5	47.6	17	47.1	29	33.1	5	66.6	5	77.0
6	18.2	18	41.7	30	23.7	Glc-1	95.6	6	61.4
7	32.8	19	46.3			2	73.8	Rha′-1	102.6
8	40.0	20	30.7			3	78.5	2	72.4
9	48.2	21	34.0			4	70.8	3	72.6
10	37.0	22	32.5			5	77.9	4	73.8
11	23.9	23	64.6			6	69.2	5	70.3
12	123.4	24	13.5					6	18.4

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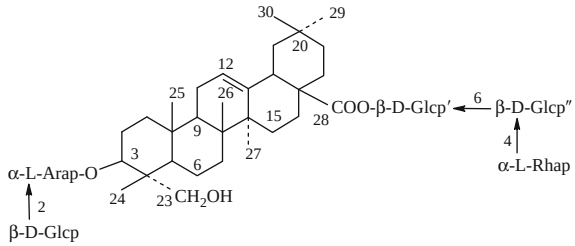
13. Y. Kawata, H. Kizu, Y. Miyaichi, T. Tomimori, Chem. Pharm. Bull. **49**(5), 635 (2001)

Cauloside G (Glycoside M)

CAS Registry Number: 60454-69-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Fatsia japonica* [1–3], *Caltha polypetala* [4], *Caulophyllum robustum* [5], *Hedera canariensis* [6], *Pulsatilla campanella* [7], *Cussonia paniculata* [8]

$C_{59}H_{96}O_{27}$: 1236.613

Mp: 218–220°C [5]

$[\alpha]_D^{22}$ −3° (c 1.0, MeOH) [5]

IR (KBr) ν_{max} cm^{-1}: 1740 [4]

FD-MS *m/z*: 1259 $[M + Na]^+$, 1114 $[1259\text{-Rha}]^+$, 790 $[1259\text{-Rha-2} \times \text{Glc}]^+$ [7]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-13	144.2	C-25	16.2	Glc-1	105.7	Glc″-1	104.7
2	26.0	14	42.2	26	17.6	2	76.1	2	75.3
3	82.3	15	28.4	27	26.1	3	78.3	3	76.6
4	43.6	16	23.5	28	176.6	4	71.8	4	78.6
5	47.6	17	47.1	29	33.1	5	78.4	5	77.0
6	18.5	18	41.8	30	23.8	6	62.7	6	61.5
7	32.9	19	46.3	Ara-1	104.7	Glc′-1	95.7	Rha-1	102.8
8	40.0	20	30.8	2	81.0	2	73.7	2	72.5

(*continued*)

Table 1 (continued)

9	48.2	21	34.0	3	73.6	3	78.7	3	72.7
10	37.0	22	32.6	4	68.3	4	70.9	4	73.9
11	23.9	23	64.9	5	64.9	5	78.0	5	70.3
12	122.9	24	13.5			6	69.3	6	18.5

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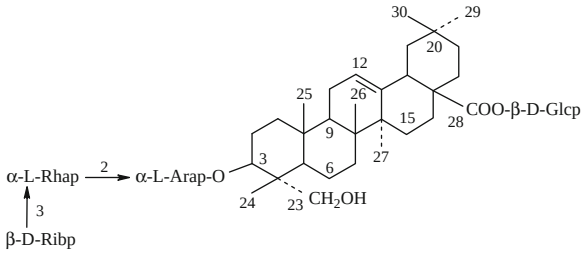
Clemastanoside D

CAS Registry Number: 172671-38-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis stans* [1]

$C_{52}H_{84}O_{21}$: 1044.550

$[\alpha]_D$ −16.2° (c 2.61, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3448, 1736, 1060 [1]

HR-FABMS *m/z*: 1067.5388 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.26 (H-3), 3.91, 4.28 (m, H-23), 1.12 (s, CH_3-24), 0.94 (s, CH_3-25), 1.08 (s, CH_3-26), 1.16 (s, CH_3-27), 0.84 (s, CH_3-29), 0.85 (s, CH_3-30)

α-L-Arap: 5.03 (d, J = 6.5, H-1), 4.56 (dd, J = 8, 6.5, H-2), 3.99 (dd, J = 8, 4, H-3), 4.11 (H-4), 3.64, 4.22 (brd, J = 9.5, H_2-5)

α-L-Rhap: 6.33 (brs, H-1), 4.87 (brs, H-2), 4.74 (dd, J = 9.5, 3, H-3), 4.40 (t, J = 9.5, H-4), 4.68 (dq, J = 9.5, 6, H-5), 1.50 (d, J = 6, CH_3-6)

β-D-Ribp: 5.93 (d, J = 4.5, H-1), 4.28 (H-2), 4.50 (m, H-3), 4.14 (m, H-4), 4.14, 4.27 (m, H_2-5)

β-D-Glcp: 6.33 (d, J = 8, H-1), 4.19 (dd, J = 9, 8, H-2), 4.73 (t, J = 9, H-3), 4.36 (H-4), 4.02 (ddd, J = 9, 4.5, 2.5, H-5), 4.40 (dd, J = 12, 4.5), 4.46 (dd, J = 12, 4.5, H_2-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	23.3	Ara-1	104.6	Rib-1	104.6
2	26.3	17	46.9	2	75.1	2	72.2
3	81.0	18	41.6	3	75.3	3	68.9
4	43.5	19	46.1	4	69.8	4	70.2
5	47.6	20	30.7	5	66.4	5	65.2
6	18.1	21	33.9	Rha-1	101.2	Glc-1	95.7
7	32.7	22	32.5	2	72.0	2	74.1
8	39.9	23	63.9	3	81.2	3	78.8
9	48.1	24	14.1	4	72.8	4	71.0
10	36.8	25	16.1	5	69.7	5	79.2
11	23.8	26	17.5	6	18.4	6	62.1
12	122.9	27	26.0				
13	144.0	28	176.4				
14	42.0	29	33.0				
15	28.2	30	23.6				

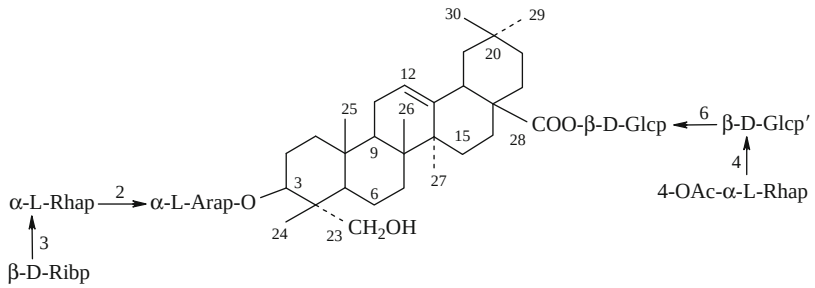
References

1. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)

Clemastanoside E

CAS Registry Number: 172670-48-3

See Figure Clemastanoside E



Clemastanoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis stans* [1]

$C_{66}H_{106}O_{31}$: 1394.671

$[\alpha]_D^{21}$ −30.1° (c 1.46, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3448, 1734, 1040 [1]

HR-FABMS *m/z*: 1417.6603 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.26 (H-3), 3.91, 4.28 (m, H-23), 1.12 (s, CH_3-24), 0.94 (s, CH_3-25), 1.08 (s, CH_3-26), 1.16 (s, CH_3-27), 0.84 (s, CH_3-29), 0.85 (s, CH_3-30);

α-L-Arap: 5.03 (d, J = 6.5, H-1), 4.56 (dd, J = 8, 6.5, H-2), 3.99 (dd, J = 8, 4, H-3), 4.11 (H-4), 3.64, 4.22 (d, J = 9.5, H_2-5); α-L-Rhap: 6.33 (brs, H-1), 4.87 (brs, H-2), 4.74 (dd, J = 9.5, 3, H-3), 4.40 (t, J = 9.5, H-4), 4.68 (dq, J = 9.5, 6, H-5), 1.50 (d, J = 6, CH_3-6); β-D-Ribp: 5.93 (d, J = 4.5, H-1), 4.28 (H-2), 4.50 (m, H-3), 4.14 (m, H-4), 4.14, 4.27 (m, H_2-5); β-D-Glcp: 6.20 (d, J = 8, H-1), 4.09 (H-2), 4.18 (H-3), 4.28 (H-4), 4.07 (H-5), 4.30, 4.63 (d, J = 9.5, H_2-6); β-D-Glcp′: 4.97 (d, J = 8, H-1), 3.91 (dd, J = 9, 8, H-2), 4.12 (H-3), 4.38 (t, J = 9, H-4), 3.62 (m, H-5), 4.06, 4.17 (H_2-6); α-L-Rhap′: 5.82 (brs, H-1), 4.65 (brs, H-2), 4.54 (dd, J = 9.5, 3.5, H-3), 4.30 (H-4), 4.93 (dq, J = 9.5, 6, H-5), 1.66 (d, J = 6, CH_3-6), 2.01 (s, Ac) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-19	46.2	Ara-1	104.7	Glc-3	78.6
2	26.4	20	30.7	2	75.1	4	70.8
3	81.1	21	34.0	3	75.3	5	78.1
4	43.6	22	32.5	4	69.7	6	69.0
5	47.8	23	64.0	5	66.4	Glc′-1	104.7
6	18.2	24	14.1	Rha-1	101.2	2	75.4
7	32.8	25	16.2	2	72.0	3	76.3
8	39.9	26	17.5	3	81.2	4	77.3
9	48.2	27	26.1	4	72.8	5	77.1
10	36.9	28	176.5	5	69.8	6	61.1
11	23.8	29	33.1	6	18.4	Rha′-1	102.0
12	122.9	30	23.7	Rib-1	104.6	2	72.4
13	144.1			2	72.7	3	70.2
14	42.1			3	68.8	4	75.9
15	28.3			4	70.2	5	67.3
16	23.4			5	65.2	6	17.9
17	47.0			Glc-1	95.5	Ac	170.7
18	41.7			2	73.8		21.1

(*continued*)

References

1. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)

Clemastanoside F

CAS Registry Number: 172670-49-4

See Figure Clemastanoside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

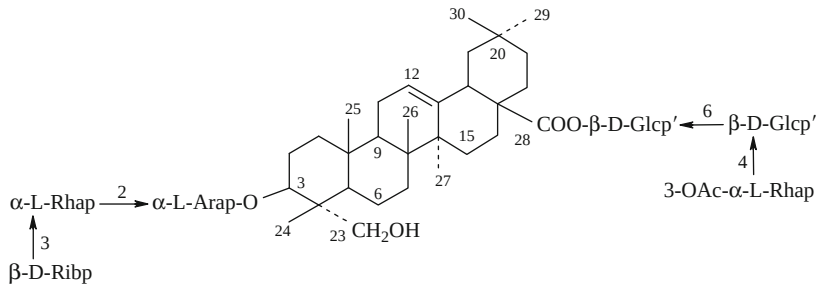
Biological sources: *Clematis stans* [1]

$C_{66}H_{106}O_{31}$: 1394.671

$[\alpha]_D^{28}$ −24.0° (c 0.38, C_5D_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 1735, 1040 [1]

HR-FABMS *m/z*: 1417.6608 $[M + Na]^+$ [1]



Clemastanoside F

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.26 (H-3), 3.91, 4.28 (m, H-23), 1.12 (s, CH_3-24), 0.94 (s, CH_3-25), 1.08 (s, CH_3-26), 1.16 (s, CH_3-27), 0.84 (s, CH_3-29), 0.85 (s, CH_3-30);
α-L-Arap: 5.03 (d, J = 6.5, H-1), 4.56 (dd, J = 8, 6.5, H-2), 3.99 (dd, J = 8, 4, H-3), 4.11 (H-4), 3.64, 4.22 (d, J = 9.5, H_2-5); α-L-Rhap: 6.33 (brs, H-1), 4.87 (brs, H-2), 4.74 (dd, J = 9.5, 3, H-3), 4.40 (t, J = 9.5, H-4), 4.68 (dq, J = 9.5, 6, H-5), 1.50 (d, J = 6, CH_3-6); β-D-Ribp: 5.93 (d, J = 4.5, H-1), 4.28 (H-2), 4.50 (m, H-3), 4.14 (m, H-4), 4.14, 4.27 (m, H_2-5); β-D-Glcp: 6.25 (d, J = 8, H-1), 4.13 (H-2), 4.22 (t, J = 9, H-3), 4.34 (H-4), 4.09 (H-5), 4.32, 4.66 (d, J = 9.5, H_2-6); β-D-Glcp′: 4.94 (d, J = 8, H-1), 3.91 (dd, J = 9, 8, H-2), 4.11 (H-3), 4.46 (t, J = 9, H-4), 3.52 (m, H-5), 4.09, 4.20 (H_2-6); α-L-Rhap′: 5.87 (brs, H-1), 4.84 (brs, H-2), 5.88 (dd, J = 9.5, 3, H-3), 4.53 (t, J = 9.5, H-4), 5.14 (dq, J = 9.5, 6, H-5), 1.71 (d, J = 6, CH_3-6), 1.94 (s, Ac) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-19	46.2	Ara-1	104.7	Glc-3	78.8
2	26.4	20	30.7	2	75.2	4	70.8
3	81.1	21	34.0	3	75.4	5	78.0
4	43.6	22	32.5	4	69.8	6	69.3
5	47.8	23	64.0	5	66.4	Glc′-1	105.1
6	18.2	24	14.1	Rha-1	101.4	2	75.5
7	32.8	25	16.2	2	72.1	3	76.3
8	39.9	26	17.5	3	81.3	4	77.7
9	48.2	27	26.1	4	72.9	5	77.1
10	36.9	28	176.5	5	69.8	6	61.2
11	23.8	29	33.1	6	18.5	Rha′-1	102.4
12	122.9	30	23.7	Rib-1	104.7	2	70.2
13	144.1			2	72.8	3	76.4
14	42.1			3	68.9	4	70.2
15	28.3			4	70.3	5	70.4
16	23.4			5	65.3	6	18.4
17	47.0			Glc-1	95.7	Ac	170.8
18	41.7			2	73.9		21.1

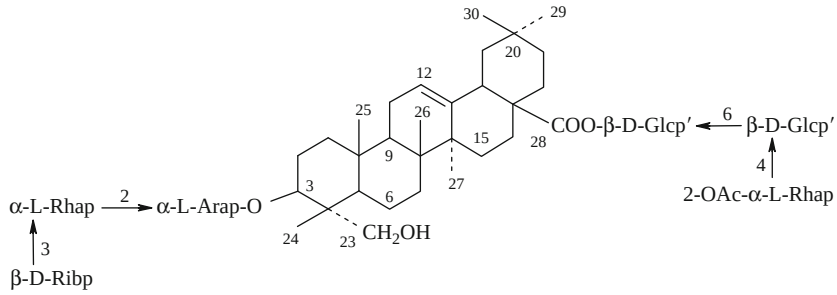
(continued)

References

1. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)

Clemastanoside G

See Figure Clemastanoside G
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Clematis stans* [1]
$C_{66}H_{106}O_{31}$: 1394.671
$[\alpha]_D^{30}$ −23.4° (c 0.33, C_5D_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3450, 1736, 1042 [1]
HR-FABMS *m/z*: 1417.6609 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, JHz, C_5D_5N): 4.26 (H-3), 3.91, 4.28 (m, H_2-23), 1.12 (s, CH_3-24), 0.94 (s, CH_3-25), 1.08 (s, CH_3-26), 1.16 (s, CH_3-27), 0.84 (s, CH_3-29), 0.85 (s, CH_3-30);
α-L-Arap: 5.03 (d, J = 6.5, H-1), 4.56 (dd, J = 8, 6.5, H-2), 3.99 (dd, J = 8, 4, H-3), 4.11 (H-4), 3.64, 4.22 (d, J = 9.5, H_2-5); α-L-Rhap: 6.33 (brs, H-1), 4.87 (brs, H-2), 4.74 (dd, J = 9.5, 3, H-3), 4.40 (t, J = 9.5, H-4), 4.68 (dq, J = 9.5, 6, H-5), 1.50



Clemastanoside G

(d, J =, CH_3-6); β-D-Ribp: 5.93 (d, J = 4.5, H-1), 4.28 (H-2), 4.50 (m, H-3), 4.14 (m, H-4), 4.14, 4.27 (m, H_2-5); β-D-Glcp: 6.23 (d, J = 8, H-1), 4.11 (H-2), 4.19 (t, J = 9, H-3), 4.26 (H-4), 4.11 (H-5), 4.32, 4.67 (H_2-6); β-D-Glcp′: 5.00 (d, J = 7.5, H-1), 3.93 (dd, J = 9, 7.5, H-2), 4.15 (t, J = 9, H-3), 4.52 (t, J = 9, H-4), 3.66 (H-5), 4.29, 4.29 (H_2-6); α-L-Rhap′: 5.79 (brs, H-1), 5.88 (brd, J = 4, H-2), 4.70 (dd, J = 10, 4, H-3), 4.23 (t, J = 10, H-4), 5.12 (dq, J = 10, 6, H-5), 1.74 (d, J = 6, CH_3-6), 1.93 (s, Ac) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-19	46.2	Ara-1	104.8	Glc-3	78.8
2	26.4	20	30.8	2	75.4	4	70.9
3	81.1	21	34.0	3	75.3	5	78.1
4	43.6	22	32.6	4	69.8	6	69.2
5	47.8	23	64.0	5	66.4	Glc′-1	104.9
6	18.2	24	14.1	Rha-1	101.4	2	75.5
7	32.8	25	16.2	2	72.1	3	76.3
8	39.9	26	17.6	3	81.3	4	76.9
9	48.2	27	26.0	4	72.9	5	77.2
10	36.9	28	176.5	5	69.8	6	61.0
11	23.8	29	33.1	6	18.5	Rha′-1	99.0
12	123.0	30	23.7	Rib-1	104.8	2	74.4
13	144.1			2	72.8	3	70.5
14	42.0			3	68.9	4	74.2
15	28.3			4	70.3	5	70.1
16	23.4			5	65.3	6	18.5
17	47.0			Glc-1	95.6	Ac	170.8
18	41.7			2	73.9		21.0

References

1. H. Kizu, H. Shimana, T. Tomimori, Chem. Pharm. Bull. **43**(12), 2187 (1995)

Clematernoside C

CAS Registry Number: 220456-80-4

See Figure Clematernoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis terniflora* [1]

$C_{86}H_{132}O_{43}$: 1852.814

$[\alpha]_D^{28}$ −43.1° (c 0.61, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3460, 2936, 1720, 1634, 1514, 1266, 1068 [1]

UV λ_{max} nm (log ε): 216 (4.11), 243 (3.95), 297 (4.10), 326 (4.15) [1]

FAB-MS (negative ion mode) *m/z*: 1851.8 $[M-H]^-$, 1675.8 $[(M\text{-isoferuloyl-H})^-]$, 1381.8 $[(M\text{-Rha-Glc-Glc-H})^-]$, 1205.9, 1043.8, 881.6, 749.5, 603.4 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.87 (d, J = 7.5, H-1 of Glc″), 4.98 (d, J = 8.0, H-1 of Glc′), 5.04 (d, J = 6.5, H-1 of Ara), 5.38 (d, J = 7.5, H-1 of Glc‴), 5.78 (dd, J = 8.0, 8.0, H-2 of Glc‴), 5.79 (d, J = 5.5, H-1 of Rib), 5.84 (brs, H-1 of Rha), 6.21 (d, J = 8.0, H-1 of Glc), 6.29 (brs, H-1 of Rha′)

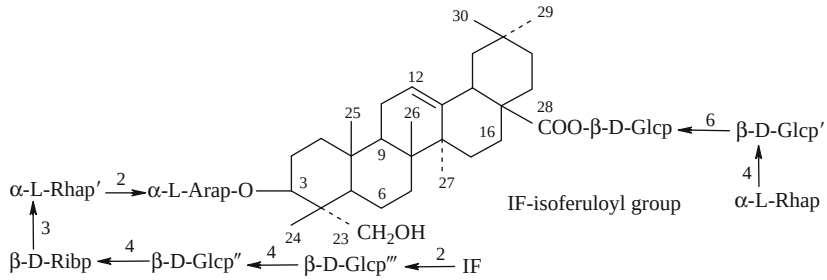
Isoferuloyl group: 6.75 (d, J = 16.0, H-2), 8.07 (d, J = 16.0, H-3), 7.53 (d, J = 2.0, H-5), 6.90 (d, J = 8.5, H-8), 7.09 (dd, J = 8.5, 2.0, H-9), OMe (3.73, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

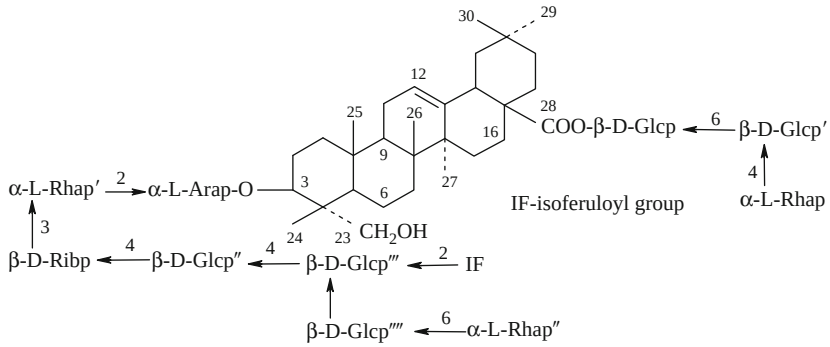
Table 1

C-1	39.0	C-23	63.8	Ara-1	104.7	Glc″-1	102.8
2	26.3	24	14.0	2	75.3	2	74.1
3	80.9	25	16.1	3	75.2	3	76.4
4	43.5	26	17.5	4	69.6	4	81.2
5	47.6	27	26.0	5	66.3	5	76.4

(*continued*)



Clematernoside C



Clematernoside D

Table 1 (continued)

6	18.1	28	176.5	Rha-1	102.7	6	60.7
7	32.7	29	33.0	2	72.5	Glc‴-1	102.5
8	39.8	30	23.6	3	72.7	2	75.2
9	48.1	Glc-1	95.6	4	73.9	3	76.3
10	36.8	2	73.8	5	70.2	4	71.9
11	23.8	3	78.6	6	18.5	5	78.6
12	122.9	4	70.8	Rha′-1	101.3	6	62.4
13	144.0	5	78.0	2	71.9	IF-1	166.7
14	42.0	6	69.1	3	82.0	2	116.2
15	28.2	Glc′-1	104.8	4	72.8	3	145.8
16	23.3	2	75.3	5	69.8	4	128.4
17	46.9	3	76.3	6	18.4	5	115.3
18	41.6	4	78.1	Rib-1	104.7	6	148.4
19	46.1	5	77.1	2	72.5	7	150.9
20	30.7	6	61.2	3	69.5	8	112.0
21	33.9			4	76.3	9	121.4
22	32.5			5	61.5	OMe	55.7

Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematernoside D

CAS Registry Number: 220456-83-7

See Figure Clematernoside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis terniflora* [1]

$C_{98}H_{152}O_{52}$: 2160.924

$[\alpha]_D^{28}$ −50.2° (c 0.67, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3496, 2932, 1708, 1632, 1510, 1266, 1060 [1]

UV λ_{max} nm (log ε): 215 (4.23), 244 (4.07), 298 (4.16), 326 (4.25) [1]

FAB-MS (negative ion mode) *m/z*: 2159.9 $[M-H]^-$, 1689.7 $[(M-Rha-Glc-Glc-H)^-]$, 1513.6, 1043.5, 881.4, 749.4 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.87 (d, J = 7.5, H-1 of Glc″), 4.92 (d, J = 8.0, H-1 of Glc‴′), 4.99 (d, J = 8.0, H-1 of Glc′), 5.06 (d, J = 6.5, H-1 of Ara), 5.32 (d, J = 8.5, H-1 of Glc‴), 5.42 (d, J = 1.5, H-1 of Rha″), 5.76 (dd, J = 8.0, 8.0, H-2 of Glc‴), 5.82 (d, J = 5.5, H-1 of Rib), 5.85 (d, J = 1.5, H-1 of Rha), 6.23 (d, J = 8.0, H-1 of Glc), 6.29 (brs, H-1 of Rha′); Isoferuloyl group: 6.91 (d, J = 16.0, H-2), 8.11 (d, J = 16.0, H-3), 7.54 (d, J = 2.0, H-5), 6.88 (d, J = 8.5, H-8), 7.09 (dd, J = 8.5, 2.0, H-9), OMe (3.75, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-21	34.0	Glc′-5	77.1	Glc‴-1	102.2	Ara-1	104.7
2	26.4	22	32.5	6	61.3	2	72.9	2	75.3
3	81.0	23	63.8	Rha-1	102.7	3	86.7	3	75.2
4	43.6	24	14.1	2	72.5	4	70.2	4	69.7
5	47.6	25	16.2	3	72.8	5	77.9	5	66.4
6	18.1	26	17.5	4	74.0	6	62.1	Rib-1	104.7
7	32.7	27	26.0	5	70.3	Glc‴′-1	105.7	2	72.5
8	39.9	28	176.5	6	18.5	2	74.4	3	69.5
9	48.2	29	33.1	Rha′-1	101.4	3	78.2	4	76.3
10	36.9	30	23.7	2	71.9	4	71.9	5	61.6
11	23.8	Glc-1	95.6	3	82.1	5	76.5	IF-1	166.7
12	123.0	2	73.9	4	72.8	6	68.9	2	116.4
13	144.1	3	78.7	5	69.8	Rha″-1	102.8	3	145.7
14	42.1	4	70.8	6	18.4	2	71.9	4	128.6
15	28.3	5	78.0	Glc″-1	102.9	3	72.6	5	115.4
16	23.3	6	69.2	2	74.2	4	74.0	6	148.5
17	47.0	Glc′-1	104.8	3	76.6	5	69.9	7	150.9
18	41.6	2	75.3	4	81.1	6	18.6	8	112.1
19	46.2	3	76.3	5	76.3			9	121.5
20	30.7	4	78.2	6	60.7			OMe	55.9

Pharm./Biol.: The roots of this plants are regarded as a substitute of a traditional Chinese drug "Wei Ling Xian" and are used in the same way as "Wei Ling Xian" [1]

References

1. Y. Kawata, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **46**(12), 1891 (1998)

Clematibetoside A

See Figure Clematibetoside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis tibetana* [1]

$C_{85}H_{130}O_{43}$: 1838.798

$[\alpha]_D$ −59.2° (c 0.33, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3440, 2931, 1700, 1633, 1527 [1]

FAB-MS m/z: 1837.8 $[M-H]^-$, 1659.8 [M-caffeouloxy-H]$^-$, 1365.7 [M-Rha-Glc-Glc-H]$^-$, 1189.6, 1027.6, 865.5, 733.5, 587.4 [1]

UV λ_{max} nm (log ε): 216 (4.33), 244 (4.19), 297 (4.31), 326 (4.38) [1]

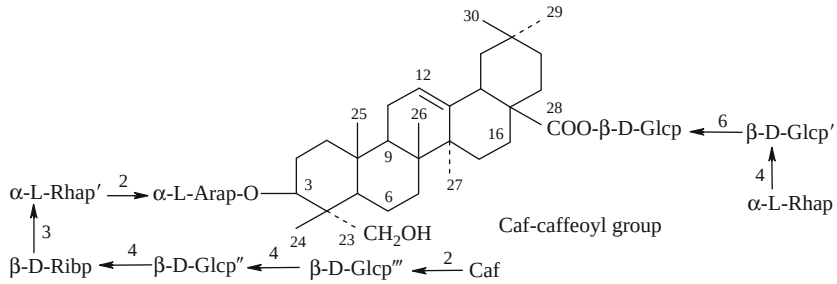
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): α-L-Arap: 5.05(d, J = 6.5, H-1), 4.54 (dd, J = 6.5, 6.5, H-2), 4.02 (m, H-3), 4.11 (H-4), 3.67, 4.27 (brd, H_2-5); α-L-Rhap: 6.28 (brs, H-1), 4.84 (m, H-2), 4.68 (H-3), 4.40 (dd, J = 9.0, 9.0, H-4), 4.65 (H-5), 1.53 (d, J = 6.0, CH_3-6); β-D-Ribp: 5.80 (d, J = 5.5, H-1), 4.07 (H-2), 4.64 (H-3), 4.28 (H-4), 4.20, 4.26 (H_2-5); β-D-Glcp: 4.87 (d, J = 8.0, H-1), 3.88 (dd, J = 9.0, 8.0, H-2), 4.10 (dd, J = 9.0, 9.0, H-3), 4.29 (dd, J = 9.0, 9.0, H-4), 3.64 (H-5), 4.14, 4.23 (H_2-6); β-D-Glcp′: 5.35 (d, J = 8.0, H-1), 5.77 (dd, J = 8.0, 8.0, H-2), 4.32 (dd, J = 9.0, 8.0, H-3), 4.18 (dd, J = 9.0, 9.0, H-4), 4.06 (m, H-5), 4.22, 4.55 (H_2-6); β-D-Glcp″: 6.22 (d, J = 8.0, H-1), 4.10(dd, J = 9.0, 8.0, H-2), 4.18 (dd, J = 9.0, 9.0, H-3), 4.29 (dd, J = 9.0, 9.0, H-4), 4.09 (H-5), 4.33, 4.67 (H_2-6); β-D-Glcp‴: 4.98 (d, J = 8.0, H-1), 3.93 (dd, J = 9.0, 8.0, H-2), 4.16 (dd, J = 9.0, 9.0, H-3), 4.40 (dd, J = 9.0, 9.0, H-4), 3.65 (m, H-5), 4.07, 4.20 (H_2-6); α-L-Rhap′: 5.81 (brs, H-1), 4.63 (m, H-2), 4.51 (dd, J = 9.0, 3.5, H-3), 4.29 (dd, J = 9.0, 9.0, H-4), 4.91 (m, H-5), 1.65 (d, J = 6.5, CH_3-6); Caffeoyl: 6.70 (d, J = 16), 7.11 (brd, J = 8), 7.19 (brd, J = 8), 7.56 (brs), 8.08 (d, J = 16) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-11	23.8	C-21	33.9
2	26.4	12	122.9	22	35.5

(*continued*)



Clematibetoside A

Table 1 (continued)

3	80.0	13	144.1	23	63.8
4	43.5	14	42.1	24	14.0
5	47.6	15	28.3	25	16.2
6	18.1	16	23.3	26	17.5
7	32.7	17	47.0	27	26.0
8	39.9	18	41.6	28	176.5
9	48.2	19	46.1	29	33.0
10	36.8	20	30.7	30	23.6

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

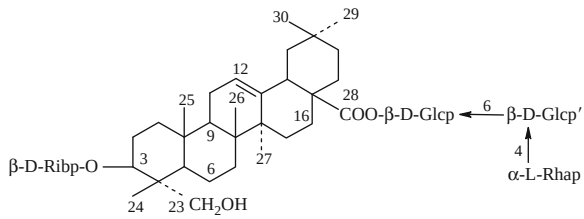
Table 2

Ara-1	104.6	Glc-1	102.8	Glc‴-1	104.8	Caffeoyl-1	166.9
2	75.3	2	74.2	2	75.3	2	115.0
3	75.1	3	76.4	3	76.5	3	146.3
4	69.7	4	81.2	4	78.2	4	126.9
5	66.3	5	76.3	5	77.1	5	115.8
Rha-1	101.4	6	60.7	6	61.3	6	147.6
2	71.9	Glc′-1	102.6	Rha′-1	102.7	7	150.4
3	82.0	2	75.1	2	72.5	8	116.8
4	72.8	3	76.4	3	72.7	9	122.0
5	69.7	4	71.9	4	73.9		
6	18.4	5	78.6	5	70.3		
Rib-1	104.6	6	62.4	6	18.5		
2	75.5	Glc″-1	95.6				
3	69.5	2	73.8				
4	76.4	3	78.7				
5	61.5	4	70.8				
		5	78.0				
		6	69.2				

References

1. Y. Kawata, H. Kizu, Y. Miyaichi, T. Tomimori, Chem. Pharm. Bull. **49**(5), 635 (2001)

Clematibetoside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis tibetana* [1]

$C_{53}H_{86}O_{22}$: 1074.561

$[\alpha]_D$ −13.0° (c 0.51, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3456 , 2939, 1747, 1639, 1550 [1]

FAB-MS m/z: 1073.5 [$(M\text{-}H)^-$], 603.4 [(M-Rha-Glc-Glc-H)$^-$] [1]

HR-FAB-MS *m/z*: 1073.5531 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.23 (d, J = 8.0, H-1), 4.11 (dd, J = 9.0, 8.0, H-2), 4.19 (dd, J = 9.0, 9.0, H-3), 4.30 (dd, J = 9.0, 9.0, H-4), 4.07 (H-5), 4.32 (H-6), 4.66 (H-6)

β-D-Glcp′: 4.98 (d, J = 8.0, H-1), 3.93 (dd, J = 9.0, 8.0, H-2), 4.14 (dd, J = 9.0, 9.0, H-3), 4.41 (dd, J = 9.0, 9.0, H-4), 3.64 (m, H-5), 4.08 (dd, J = 12.0, 12.0, H-6), 4.20 (H-6)

α-L-Rhap: 5.85 (d, J = 1.5, H-1), 4.67 (m, H-2), 4.64 (dd, J = 9.0, 3.5, H-3), 4.32 (dd, J = 9.0, 9.0, H-4), 4.96 (m, H-5), 1.69 (d, J = 6.0, H-6)

β-D-Ribp: 5.59 (d, J = 4.0, H-1), 4.24 (H-2), 4.42 (dd, J = 4.0, 3.0, H-3), 4.26 (m, H-4), 4.14 (brd, J = 12.0, H-5), 4.22 (brd, J = 12.0, H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

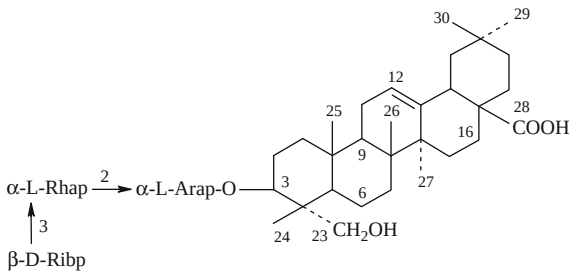
C-1	38.7	C-16	23.3	Glc-1	95.6	Rha-1	102.7
2	25.7	17	47.0	2	73.8	2	72.5
3	81.4	18	41.5	3	78.7	3	72.8
4	43.4	19	46.2	4	70.9	4	74.0
5	47.3	20	30.7	5	78.0	5	70.3
6	18.2	21	34.0	6	69.2	6	18.5
7	32.7	22	32.5	Glc′-1	104.8	Rib-1	104.2
8	40.0	23	64.4	2	75.3	2	72.9
9	48.1	24	13.5	3	76.5	3	68.4
10	37.0	25	16.2	4	78.2	4	70.6
11	23.8	26	17.5	5	77.1	5	65.0
12	122.9	27	26.0	6	61.3		
13	144.1	28	176.5				
14	42.1	29	33.1				
15	28.3	30	23.7				

References

1. Y. Kawata, H. Kizu, Y. Miyaichi, T. Tomimori, Chem. Pharm. Bull. **49**(5), 635 (2001)

Clematoside S

CAS Registry Number: 72629-76-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis grata* [1], *C. tibetana* [2], *Anemone rivularis* [3]

$C_{46}H_{74}O_{16}$: 882.497

Mp: 210–213°C [1]

FAB-MS (negative ion) *m/z*: 881, 749, 603, 471, 423, 297 [1]

^{1}H NMR (400 MHz, C_5D_5N): 1.07, 1.54 (m, H_2-1), 1.98, 2.20 (m, H_2-2), 4.35 (m, H-3), 1.72 (m, H-5), 1.72, 1.32 (m, H_2-6), 1.62, 1.25 (brt, m, H_2-7), 1.78 (m, H-9), 1.93 (m, H_2-11), 5.45 (t, J = 2.5, H-12), 1.13 (brd, J = 13.0, H_2-15), 1.92 (m, H-16), 3.26 (dd, J = 13.5, 4.0, H-18), 1.77, 1.22 (dd, J = 13.5, 2.5, m, H_2-19), 1.20, 1.43 (m, td, J = 13.0, 3.5, H_2-21, H_2-22), 4.23, 3.88 (d, J = 10.5, H_2-23), 1.08 (s, CH_3-24), 0.92 (s, CH_3-25), 1.00 (s, CH_3-26), 1.25 (s, CH_3-27), 0.93 (s, CH_3-29), 1.00 (s, CH_3-30)

α-L-Arap: 5.02 (d, J = 6.5, H-1), 4.52 (dd, J = 8.0, 6.5, H-2), 4.00 (dd, J = 8.0, 3.0, H-3), 4.11 (m, H-4), 4.22, 3.65 (dd, J = 11.3, brd, 3.0, H_2-5)

α-L-Rhap: 6.26 (s, H-1), 4.86 (brs, H-2), 4.20 (dd, J = 9.5, 3.0, H-3), 4.37 (t, J = 9.5, H-4), 4.66 (dt, J = 9.5, 6.0, H-5), 1.53 (d, J = 6.0, CH_3-6)

β-D-Ribp: 5.90 (d, J = 4.5, H-1), 4.27 (m, H-2), 4.47 (t, J = 2.0, H-3), 4.12 (m, H-4), 4.29, 4.08 (d, J = 6.0, t, J = 6.0, H_2-6) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

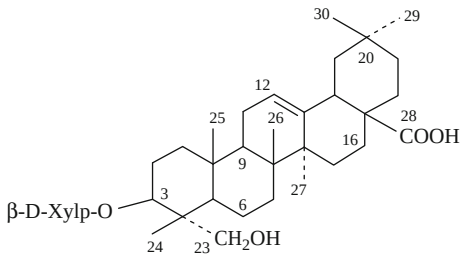
C-1	38.9	C-16	23.6	Ara-1	104.5	Rib-1	104.5
2	26.2	17	46.5	2	75.2	2	72.6
3	81.0	18	41.8	3	75.1	3	68.6
4	43.4	19	46.3	4	69.5	4	70.1
5	47.6	20	30.8	5	66.1	5	65.1
6	18.0	21	34.1	Rha-1	101.2		
7	32.7	22	33.1	2	71.8		
8	39.6	23	63.8	3	81.1		
9	48.0	24	13.9	4	72.7		
10	36.7	25	16.0	5	69.6		
11	23.7	26	17.3	6	18.3		
12	122.4	27	26.0				
13	144.7	28	180.1				
14	42.0	29	33.2				
15	28.2	30	23.7				

References

1. O.P. Sati, S.K. Uniyal, S. Bahuguna, T.I. Kikuchi, Phytochemistry **29**(11), 3676 (1990)

2. Y. Kawata, H. Kizu, Y. Miyaichi, T. Tomimori, Chem. Pharm. Bull. **49**(5), 635 (2001)
3. K. Mizutani, K. Ohtani, J.-X. Wei, R. Kasai, O. Tanaka, Planta Med. **50**, 327 (1984)

Colchiside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera colchica* [1]

$C_{35}H_{56}O_8$: 604.397

$[\alpha]_D^{25}$ +12.6° (MeOH) [1]

FAB-MS (negative ion mode) *m/z*: 603[M-H]$^-$ [1]

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

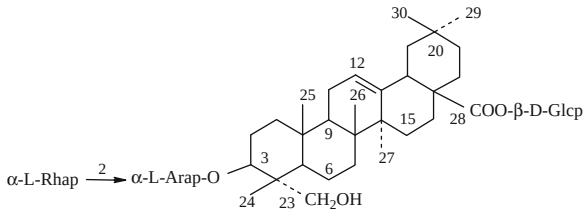
C-1	39.52	C-11	24.15	C-21	34.98	Xyl-1	106.30
2	26.31	12	123.70	22	33.50	2	75.55
3	83.45	13	145.28	23	65.02	3	78.14
4	43.90	14	43.00	24	13.51	4	71.26
5	49.03	15	28.85	25	16.49	5	66.84
6	18.95	16	24.67	26	17.87		
7	33.80	17	47.70	27	26.57		
8	40.60	18	42.80	28	182.15		
9	48.24	19	47.35	29	33.63		
10	37.73	20	31.60	30	24.07		

Pharm./Biol.: In Georgian traditional medicine as a bronchospasmolytic, secretolytic and anti-inflammatory remedy [1]

References

1. V. Mshvildadze, R. Elias, R. Faure, L. Debrauwer, G. Dekanosidze, E. Kemertelidze, G. Balansard, Chem. Pharm. Bull. **49**(6), 752 (2001)

Compound 9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Lonicera japonica* [1], *Polyscias dichroostachya* [2], *Medicago polymorpha* [3]

$C_{47}H_{76}O_{17}$: 912.508

$[\alpha]_D^{30}$ +7.0° (c 0.49, MeOH) [3]

IR (KBr)ν_{max} cm^{-1}: 3415, 1735 [3]

FAB-MS *m/z*: 935 (M + Na)$^+$ [3]; 911 [M-H]$^-$, 749 [(M-H)-162]$^-$, 603 [(M-H)-308]$^-$, 471 [M-162-146-132-11] [2]

^{1}H NMR (J/Hz, C_5D_5N): 4.12 (m, H-3), 5.42 (brs, H-12), 3.18 (d, J = 10.3, H-18), 0.88, 0.89, 0.96, 1.06, 1.12, 1.19 (s, CH_3 × 6)

α-L-Arap: 5.11 (d, J = 5.9, H-1)

α-L-Rhap: 6.21 (s, H-1), 1.63 (d, J = 5.9, CH_3-6)

β-D-Glcp: 6.31 (d, J = 8.1, H-1) [3]

^{13}C NMR (MHz, C_5D_5N): [3]

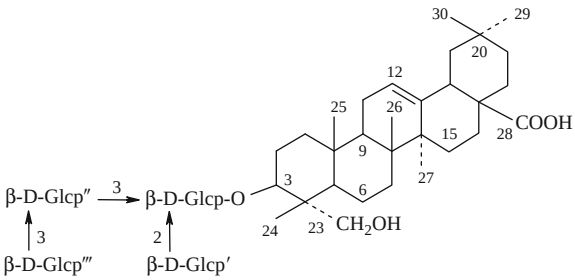
Table 1

C-1	38.9	C-16	23.2	Ara-1	104.1	Glc-1	95.6
2	26.0	17	46.8	2	75.7	2	74.0
3	80.9	18	41.6	3	74.4	3	79.1
4	43.3	19	46.0	4	69.5	4	71.0
5	47.5	20	30.6	5	65.3	5	78.7
6	18.2	21	33.8	Rha-1	101.5	6	62.0
7	32.6	22	32.4	2	72.1		
8	39.8	23	63.8	3	72.4		
9	48.0	24	13.8	4	73.9		
10	36.7	25	16.0	5	69.1		
11	23.7	26	17.4	6	18.3		
12	122.8	27	25.9				
13	143.9	28	176.3				
14	42.0	29	33.0				
15	28.1	30	23.5				

References

1. H. Kawai, M. Kuroyanagi, K. Umehara, A. Ueno, M. Satake, Chem. Pharm. Bull. **36**, 4769 (1988)
2. N. Gopalsamy, J. Gueho, H.R. Julien, A.W. Owadally, K. Hostettmann, Phytochemistry **29**, 793 (1990)
3. J. Kinjo, H. Uemura, M. Nakamura, T. Nohara, Chem. Pharm. Bull. **42**(6), 1339 (1994)

Congmuyenoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Aralia elata* [1]

$C_{54}H_{88}O_{24}$: 1120.566

Mp: 283–284°C [1]

$[\alpha]_D$ +30.0° (C_5H_5N) [1]

FAB-MS *m/z*: 1143 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.86, 0.91, 0.98, 0.99, 1.04, 1.22 (s, $CH_3 \times 6$), 5.45 (t-like, H-12), 4.98 (d, J = 7.8, H-1 of Glc), 5.14 (d, J = 7.8, H-1 of Glc‴), 5.29 (d, J = 7.9, H-1 of Glc″), 5.64 (d, J = 7.8, H-1 of Glc′) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

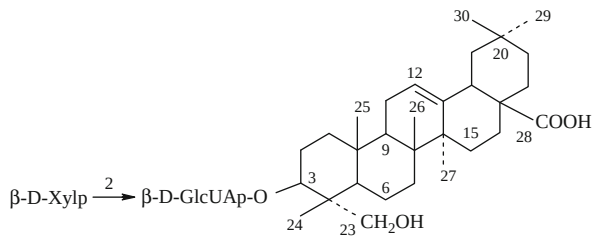
C-1	38.7	C-16	23.8	Glc-1	103.8	Glc″-1	104.1
2	26.2	17	46.5	2	79.3	2	74.1
3	83.1	18	42.2	3	88.9	3	87.7
4	42.2	19	46.7	4	70.0	4	69.9
5	48.1	20	31.0	5	77.6	5	78.0
6	18.3	21	34.3	6	62.5	6	63.2
7	33.0	22	33.2	Glc′-1	103.6	Glc‴-1	105.2
8	39.8	23	65.0	2	76.3	2	75.0
9	48.0	24	13.4	3	78.6	3	78.5
10	36.9	25	16.0	4	72.2	4	71.6
11	23.8	26	17.5	5	77.6	5	78.0
12	122.6	27	26.0	6	62.1	6	62.5
13	144.9	28	180.9				
14	42.0	29	33.2				
15	28.4	30	23.8				

(*continued*)

References

1. H.-K. Kuang, H. Sun, N. Zhang, Y. Okada, T. Okuyama, Chem. Pharm. Bull. **44**(11), 2183 (1996)

Copteroside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Climacoptera transoxana* [1]

$C_{41}H_{64}O_{14}$: 780.429

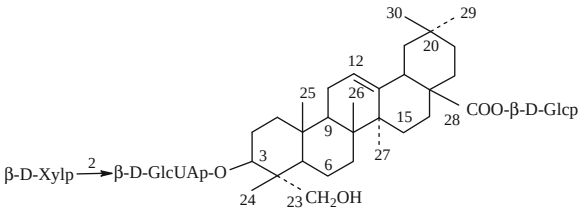
Mp: 218–221°C (EtOH) [1]

$[\alpha]_D^{20}$ +16° (c 0.8, MeOH) [1]

References

1. Ch. Annaev, M. Isamukhamedova, N.K. Abubakirov, Chem. Nat. Comp. **19**(2), 190 (1983)

Copteroside D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Climacoptera transoxana* [1]
$C_{47}H_{74}O_{19}$: 942.482
Mp: 234–236°C [1]
$[\alpha]_D^{20}$ +14.0° (c 1.1, 30% MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 36400–3250, 1740 [1]

References

1. Ch. Annaev, M. Isamuchkamedova, N.K. Abubakirov, Chem. Nat. Comp. **19**(5), 425 (1983)

Copteroside F

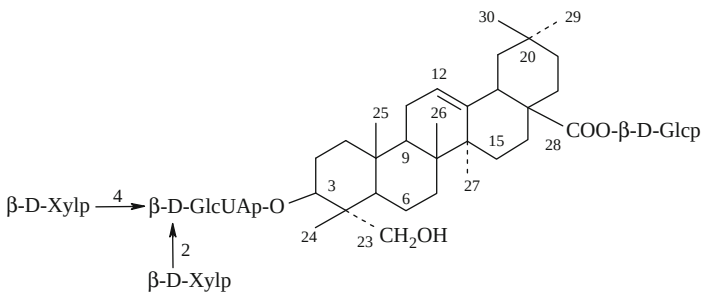
See Figure Copteroside F
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Climacoptera transoxana* [1]
$C_{52}H_{82}O_{23}$: 1074.524
Mp: 230–232°C [1]
$[\alpha]_D^{20}$ +28.0° (c 1.14, 50% MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3600–3200, 1730 [1]

References

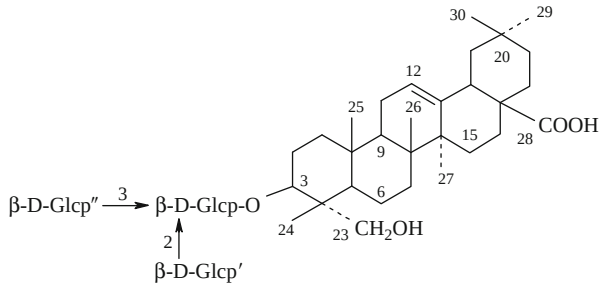
1. Ch. Annaev, M.I. Isaev, N.K. Abubakirov, Chem. Nat. Comp. **19**(5), 560 (1983)

Elatoside J (Congmuyenoside A)

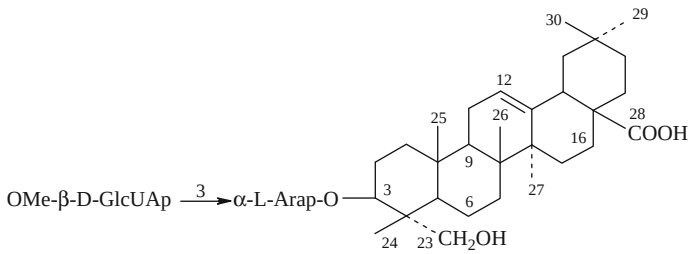
CAS Registry Number: 171828-79-8
See Figure Elatoside J (Congmuyenoside A)
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Aralia elata* [1, 2]
$C_{48}H_{78}O_{19}$: 958.513
Mp: 231–236°C (H_2O-MeOH) [1]
$[\alpha]_D^{25}$ +25.7° (c 0.1, $CHCl_3$-MeOH-H_2O (6:4:1)) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1702, 1638, 1078 [1]
FAB-MS *m/z*: 981.5035 $[M + Na]^+$ [1]
FAB-MS *m/z*: 957 $[M-H]^-$, 795 $[M-C_6H_{11}O_5]^-$, 633 $[M-C_{12}H_{22}O_{10}]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.89, 0.93, 1.06, 1.24 (s, CH_3-25, 29, 24, 27), 1.00 (s, CH_3-26, 30),



Copteroside F



Elatoside J (Congmuyenoside A)



Fargoside E

3.27 (dd-like, H-18), 4.10 (dd-like, H-3), 5.46 (brs, H-12)

β-D-Glcp: 5.00 (d, J = 7.9, H-1); β-D-Glcp′: 5.71 (d, J = 7.9, H-1); β-D-Glcp″:5.28 (d, J = 7.6, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.8	Glc-1	103.9	Glc″-1	104.6
2	26.0	17	46.5	2	79.4	2	75.5
3	83.2	18	42.0	3	89.0	3	78.7
4	43.6	19	46.7	4	70.0	4	71.7
5	48.1	20	31.0	5	77.7	5	78.6
6	18.3	21	34.3	6	63.3	6	62.6
7	33.3	22	33.0	Glc′-1	103.8		
8	39.8	23	64.6	2	76.3		
9	48.2	24	13.4	3	78.7		
10	36.9	25	16.0	4	72.3		
11	23.8	26	17.5	5	77.7		
12	122.6	27	26.2	6	62.4		
13	144.9	28	180.1				
14	42.2	29	33.3				
15	28.4	30	23.8				

References

1. M. Yoshikawa, S. Yoshizumi, T. Ueno, H. Matsuda, T. Murakami, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(11), 1878 (1995)
2. H.-K. Kuang, H. Sun, N. Zhang, Y. Okada, T. Okuyama, Chem. Pharm. Bull. **44**(11), 2183 (1996)

Fargoside E

See Figure Fargoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Holboellia fargesii* [1]

$C_{42}H_{66}O_{14}$: 794.445

$[\alpha]_D^{25}$ +18.3° (c 0.8, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3397, 2944, 1739, 1692, 1444, 1384, 1136, 1057 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.30 (H-3), 1.73 (d, J = 10.6, H-5), 5.48 (brs, J = 3.2, H-12), 3.30 (dd, J = 13.9, 4.1, H-18), 3.74, 4.36 (d, J = 10.5, H_2-23), 0.94 (s, CH_3-24, 25, 29), 1.03 (s, CH_3-26), 1.25 (s, CH_3-27), 1.01 (s, CH_3-30)

α-L-Arap: 4.98 (d, J = 7.6, H-1), 4.60 (dd, J = 7.6, 7.4, H-2), 4.07 (H-3), 4.35 (H-4), 3.65, 4.17 (brd, J = 11.0, 2.0, dd, J = 11.2, 2.1, H_2-5)

β-D-GlcUAp: 5.44 (d, J = 7.8, H-1), 4.04 (dd, J = 9.0, 7.8, H-2), 3.29 (t, J = 9.2, H-3), 4.46 (t, J = 9.2, H-4), 4.58 (d, J = 9.2, H-5), 3.72 (s, OCH_3) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.9	Ara-1	106.7
2	26.3	17	46.7	2	72.1
3	81.8	18	42.0	3	84.1
4	43.6	19	46.4	4	69.4
5	47.6	20	31.0	5	67.3
6	18.2	21	34.2	GlcUA-1	106.8
7	32.9	22	33.3	2	75.4
8	39.8	23	64.2	3	77.6
9	48.2	24	13.7	4	73.2
10	37.0	25	16.1	5	77.4
11	23.7	26	17.5	6	170.6
12	122.6	27	26.2	CH_3O	52.0
13	144.8	28	180.2		
14	42.2	29	33.3		
15	28.4	30	23.8		

References

1. H. Fu, K. Koike, Q. Zheng, K.-S. Mitsunaga, Z. Jia, T. Nikaido, W. Lie, D. Guo, Z. Zhang, Chem. Pharm. Bull. **49**(8), 999 (2001)

Giganteoside E

CAS Registry Number: 75026-26-5

See Figure Giganteoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Cephalaria giganthea* [1]

$C_{52}H_{84}O_{20}$: 1028.555

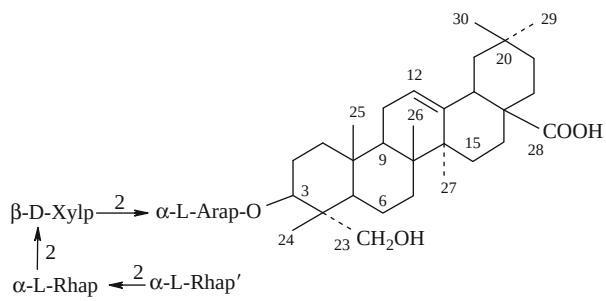
Mp: 228–232°C [1]

$[\alpha]_D^{20}$ +0° [1]

IR (KBr) ν_{max} cm^{-1}: 1700 [1]

References

1. L.D. Zviadadze, G.E. Dekanosidze, O.D. Dzhikiya, E.P. Kemertelidze, Chem. Nat. Comp. **19**(1), 43 (1983)



Giganteoside E

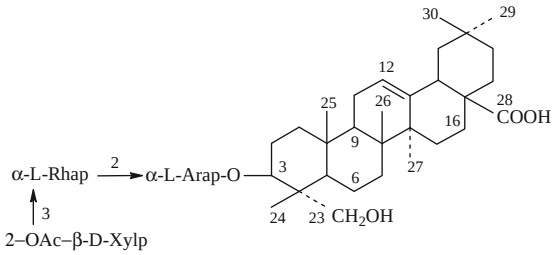
Giganteoside H

CAS Registry Number: 75026-29-8
See Figure Giganteoside H
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Cephalaria giganthea* [1]
$C_{58}H_{94}O_{25}$: 1190.608
Mp: 214–218°C [1]
$[\alpha]_D^{20}$ −10° [1]
IR (KBr) ν_{max} cm^{-1}: 1740 [1]

References

1. L.D. Zviadadze, G.E. Dekanosidze, O.D. Dzhikiya, E.P. Kemertelidze, Chem. Nat. Comp. **19**(1), 43 (1983)

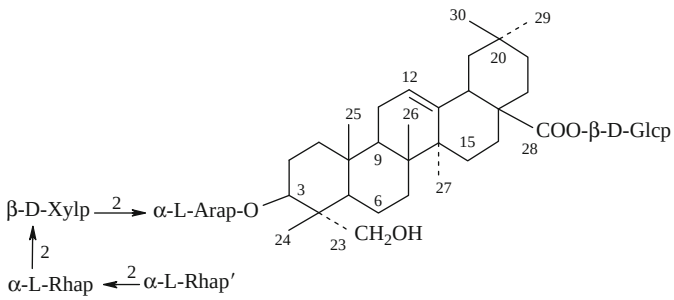
Glycoside 4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Sapindus emarginatus* [1]
$C_{48}H_{76}O_{17}$: 924.508
$[\alpha]_D^{22}$ +5.9° (c 3.7, MeOH) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.09, 0.92, 1.00, 1.22, 0.91, 0.98 (s, CH_3-24, 25, 26, 27, 29, 30), 4.27 (m, H-3), 5.45 (brs, H-12), 3.26 (dd, J = 13.7, 3.7, H-18), 4.27, 3.90 (d, J = 10.7, H_2-23)
α-L-Arap: 5.05 (d, J = 6.6, H-1)
α-L-Rhap: 6.26 (brs, H-1)
β-D-Xylp: 5.31 (d, J = 7.8, H-1), 2.00 (s, Ac-2) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-18	42.0	Ara-1	104.5
2	26.3	19	46.4	2	75.5
3	81.3	20	30.9	3	75.3
4	43.6	21	34.2	4	69.5
5	47.8	22	32.9	5	66.0
6	18.1	23	64.1	Rha-1	101.1
7	33.2	24	14.0	2	71.6
8	39.2	25	16.0	3	82.3
9	48.1	26	17.4	4	72.1
10	36.9	27	26.1	5	70.0
11	23.8	28	180.2	6	18.4
12	122.6	29	33.2	Xyl-1	104.5
13	144.8	30	23.7	2	76.2
14	42.1			3	74.9
15	28.3			4	71.1
16	23.7			5	67.1
17	46.6			Ac-1	170.5
				2	21.2

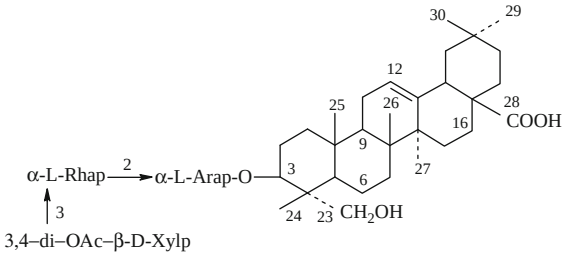


Giganteoside H

References

1. T. Kamchamapoom, R. Kasai, K. Yamasaki, Chem. Pharm. Bull. **49**, 1195 (2001)

Glycoside 6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Sapindus emarginatus* [1], *S. rarak* [2], *S. delavayi* [3]

$C_{50}H_{78}O_{18}$: 966.518

^{13}C NMR (25 MHz, C_5D_5N): [3]

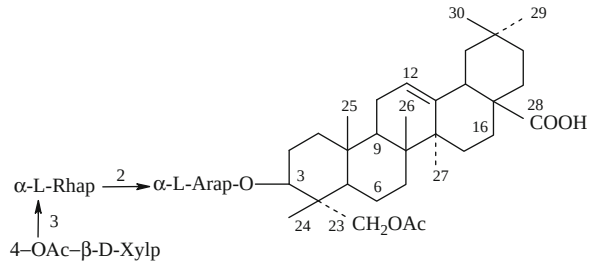
Table 1

Ara-1	104.7	2	73.0
2	75.3	3	75.3
3	75.3	4	70.2
4	69.7	5	62.9
5	66.4	Ac-1	170.3
Rha-1	101.2	2	20.8
2	72.0	Ac′-1	170.3
3	81.8	2	20.6
4	73.0		
5	69.7		
6	18.2		

References

1. T. Kamchamapoom, R. Kasai, K. Yamasaki, Chem. Pharm. Bull. **49**, 1195 (2001)
2. M. Hamburger, J. Slacanin, K. Hostettmann, D. Sutrajadi, Phytochem. Anal. **3**, 231 (1998)
3. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, I. Zhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)

Glycoside 7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Sapindus emarginatus* [1]

$C_{50}H_{78}O_{18}$: 966.518

$[\alpha]_D^{22}$ −10.4° (c 0.7, MeOH) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.11, 0.87, 0.99, 1.29, 0.92, 0.99 (s, CH_3-24, 25, 26, 27, 29, 30), 3.93 (dd, J = 11.7, 3.9, H-3), 5.45 (brs, H-12), 3.28 (dd, J = 13.7, 3.7, H-18), 4.55 (H-23), 1.91 (OAc-23)

α-L-Arap: 4.90 (d, J = 6.6, H-1)

α-L-Rhap: 6.32 (brs, H-1)

β-D-Xylp: 5.50 (d, J = 7.8, H-1), 2.05 (s, Ac-4) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

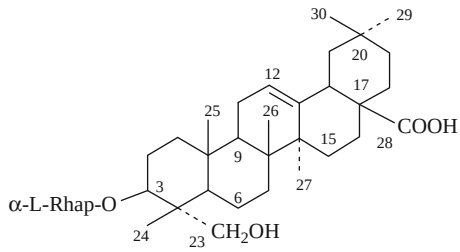
Table 1

C-1	38.7	C-16	23.6	Ara-1	105.2	Xyl-1	107.2
2	26.2	17	46.7	2	75.3	2	76.0
3	82.3	18	42.0	3	75.0	3	74.9
4	42.4	19	46.4	4	69.5	4	73.0
5	48.6	20	30.9	5	66.3	5	63.4
6	18.4	21	34.2	Rha-1	101.5	Ac-1	170.7
7	33.2	22	33.0	2	71.7	2	20.9
8	39.7	23	66.0	3	83.4	Ac′-1	170.6
9	48.3	24	13.5	4	72.9	2	20.8
10	36.9	25	15.9	5	69.6		
11	23.7	26	17.4	6	18.4		
12	122.5	27	25.9				
13	144.8	28	180.2				
14	42.1	29	33.2				
15	28.2	30	23.7				

References

1. T. Kamchamapoom, R. Kasai, K. Yamasaki, Chem. Pharm. Bull **49**, 1195 (2001)

Glycoside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Caltha polypetala* [1], *Hedera pastuchovii* [2]

$C_{36}H_{58}O_8$: 618.413

Mp: 238–239° [1]

References

1. M.M. Vugalter, G.E. Dekanosidze, O.D. Dzhikiya, E.P. Kemertelidze, Chem. Nat. Comp. **22**(6), 665 (1986)
2. G.B. Iskenderov, Chem. Nat. Comp. **6**(3), 384 (1970)

Glycoside D_2

See Figure Glycoside D_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Fatsia japonica* [1]

$C_{41}H_{66}O_{13}$: 766.450

Mp: 238–239°C [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N):

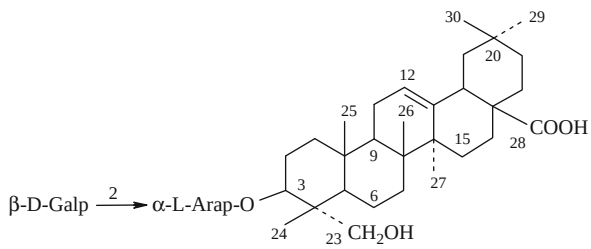
α-Arap: 5.14 (H-1), 4.55 (H-2), 4.25 (H-3, 4.30 (H-4), 4.22, 3.64 (H_2-5)

β-Galp: 5.05 (H-1), 4.50 (H-2), 4.09 (H-3), 4.55 (H-4), 3.95 (H-5), 4.42, 4.34, (H_2-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-11	23.8	C-21	34.2	Ara-1	103.8
2	25.8	12	122.3	22	33.2	2	81.0
3	81.9	13	144.9	23	64.6	3	73.5
4	43.4	14	42.2	24	13.5	4	68.3
5	47.5	15	28.3	25	16.0	5	64.3
6	18.1	16	23.7	26	17.5	Gal-1	106.2
7	32.8	17	46.7	27	26.2	2	73.6
8	39.7	18	42.0	28	180.5	3	75.0
9	48.1	19	46.5	29	33.3	4	69.7
10	36.9	20	30.9	30	23.8	5	76.8
						6	61.6

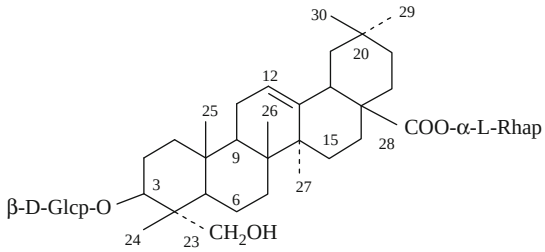


Glycoside D_2

References

1. E.A. Sobolev, V.V. Kachala, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **37**(3), 259 (2001)

Glycoside E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Caltha polypetala* [1]

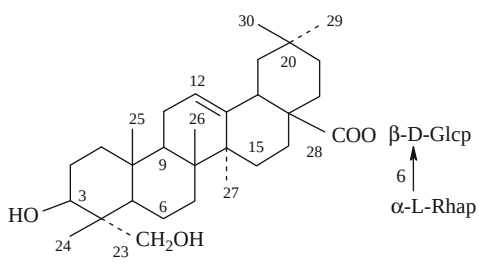
$C_{42}H_{68}O_{13}$: 780.465

Mp: 199–200°C [1]

References

1. M.M. Vugalter, G.E. Dekanosidze, O.D. Dzhikiya, E.P. Kemertelidze, Chem. Nat. Comp. **22**(6), 665 (1986)

Glycoside F



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Caltha polypetala* [1]

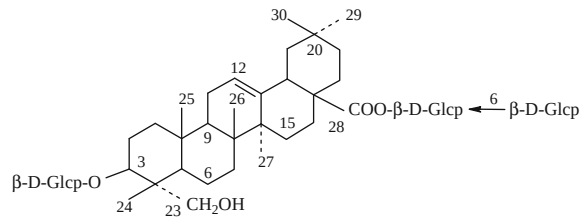
$C_{42}H_{68}O_{13}$: 780.465

Mp: 139–140°C [1]

References

1. M.M. Vugalter, G.E. Dekanosidze, O.D. Dzhikiya, E.P. Kemertelidze, Chem. Nat. Comp. **22**(6), 665 (1986)

Glycoside H



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Fatsia japonica* [1]

$C_{48}H_{78}O_{19}$: 958.513

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.5	Glc-1	105.6
2	25.9	17	47.2	2	75.8
3	82.7	18	41.8	3	77.6
4	43.4	19	46.4	4	71.8
5	47.9	20	30.8	5	77.2
6	18.4	21	34.2	6	62.9
7	33.0	22	32.6	Glc′-1	95.7
8	40.1	23	65.1	2	73.9

(*continued*)

Table 1 (continued)

9	48.3	24	13.6	3	78.0
10	37.1	25	16.3	4	71.1
11	23.9	26	17.7	5	77.8
12	123.0	27	26.2	6	69.5
13	144.4	28	176.7	Glc″-1	105.0
14	42.3	29	33.2	2	75.1
15	28.4	30	23.8	3	78.3
				4	71.8
				5	78.0
				6	62.8

References

1. V.I. Grishkovets, E.A. Sobolev, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(2), 166 (2000)

Glycoside K

See Figure Glycoside K

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Fatsia japonica* [1]

$C_{60}H_{98}O_{28}$: 1266.624

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.5	Glc-1	103.7	Glc″-4	71.1
2	25.9	17	47.2	2	83.6	5	78.1
3	83.2	18	41.8	3	77.8	6	69.4
4	43.5	19	46.4	4	71.5	Glc‴-1	104.7
5	48.2	20	30.7	5	77.9	2	75.2
6	18.4	21	34.1	6	62.7	3	76.6
7	32.6	22	33.1	Glc′-1	105.6	4	78.4
8	40.0	23	65.4	2	76.6	5	77.0
9	48.2	24	13.4	3	78.6	6	61.6
10	37.0	25	16.2	4	71.5	Rha-1	102.7
11	23.8	26	17.6	5	78.2	2	72.4
12	123.0	27	26.1	6	62.7	3	72.7
13	144.3	28	176.7	Glc″-1	95.7	4	73.9
14	42.3	29	33.1	2	73.9	5	70.4
15	28.4	30	23.8	3	78.9	6	18.4

References

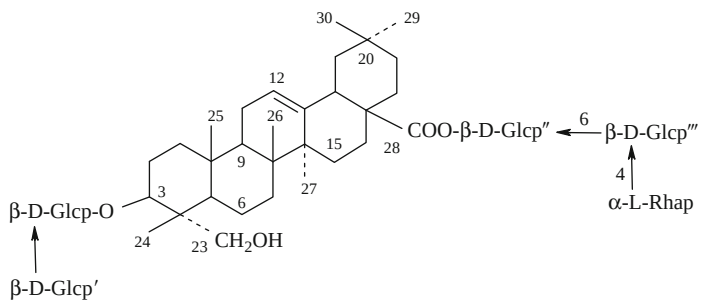
1. V.I. Grishkovets, E.A. Sobolev, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(2), 166 (2000)

Glycoside L-G$_4$

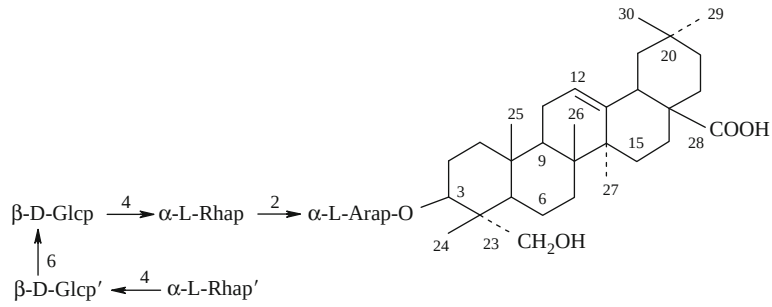
CAS Registry Number: 172659-10-8

See Figure Glycoside L-G$_4$

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin



Glycoside K



Glycoside L-G_4

Biological sources: *Hedera canariensis* [1], *H. helix* [2]

$C_{59}H_{96}O_{26}$: 1220.618

$[\alpha]_D$ 0° (c 0.2, C_5H_5N) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N) (Me ester): 4.24 (dd, J = 4.0, 11.5, H-3), 3.71 (d, J = 11.5, Ha-23), 4.08 (d, Hb-23)

α-L-Arap: 5.10 (d, J = 6.2, H-1), 4.47 (dd, J = 8.0, H-2), 4.07 (dd, J = 3.8, H-3), 4.15 (H-4), 3.69 (dd, J = 2.2, 12.0, Ha-5a), 4.24 (dd, J = 4.2, He-5)

α-L-Rhap: 6.06 (d, J = 1.5, H-1), 4.67 (dd, J = 3.3, H-2), 4.71 (dd, J = 9.0, H-3), 4.36 (t, J = 9.2, H-4), 4.6 (dq, H-5), 1.76 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.13 (d, J = 7.5, H-1), 3.98 (dd, J = 9.7, H-2), 4.01–4.09 (m, H-3-4), 3.84 (H-5), 4.61 (dd, J = 2.5, 12.0, Ha-6), 4.20 (dd, J = 6.8, Hb-6)

β-D-Glcp′: 4.94 (d, J = 7.7, H-1), 3.90 (dd, J = 9.3, H-2), 4.10 (t, J = 9.5, H-3), 4.33 (t, J = 9.5 3.84 (H-5), 4.61 (dd, J = 2.5, 12.0, Ha-6), 4.20 (dd, J = 6.8, Hb-6) [2]

^{13}C NMR (62.9 MHz,C_5D_5N): [1]

Table 1

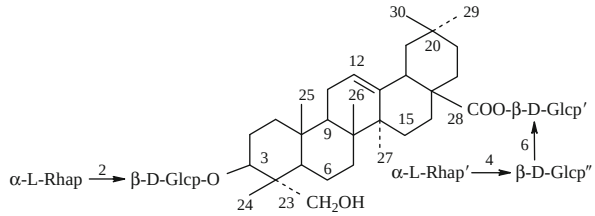
C-1	38.9	C-16	23.8	Ara-1	104.4	Glc-5	77.3
2	26.0	17	46.7	2	76.1	6	70.2
3	82.0	18	42.0	3	74.5	Glc′-1	105.3
4	43.5	19	46.5	4	69.3	2	75.5
5	47.2	20	30.9	5	65.7	3	76.4
6	18.3	21	34.3	Rha-1	101.4	4	78.2
7	33.0	22	33.2	2	71.9	5	77.2
8	39.8	23	64.4	3	72.6	6	61.4
9	48.2	24	13.7	4	85.0	Rha′-1	102.7
10	36.9	25	16.1	5	68.2	2	72.6
11	23.8	26	17.4	6	18.7	3	72.8
12	122.8	27	26.2	Glc-1	106.4	4	74.0
13	144.8	28	180.2	2	75.9	5	70.4
14	42.1	29	33.2	3	78.6	6	18.6
15	28.3	30	23.8	4	71.4		

References

1. V.I. Grishkovets, Yu. Sidorov, L.A. Yakovishin, N.N. Arnautov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **32**(3), 360 (1996)
2. A.S. Shashkov, V.I. Grishkovets, A.E. Kondratenko, V.Ya. Chirva, Chem. Nat. Comp. **30**(6), 693 (1994)

Glycoside L-I_1

CAS Registry Number: 166547-54-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides

of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera canariensis* [1], *H. taurica* [2]

$C_{60}H_{98}O_{27}$: 1250.629

$[\alpha]_D$ −11° (c 0.5, C_5H_5N) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N) (Me ester): 4.10 (dd, H-3), 3.09 (dd, H-18), 5.36 (brt, J = 3.6, H-12), 0.82, 0.86, 0.91, 1.00, 1.15 (s, CH_3 × 6)

β-D-Glcp: 4.98 (d, J = 7.5, H-1), 4.00 (dd, J = 9.0, H-2), 4.00–4.10 (m, H-3-4), 3.68 (H-5), 4.25 (dd, J = 2.7, 11.0, Ha-6), 4.14 (dd, J = 5.0, Hb-6)

α-L-Rhap: 6.20 (d, J = 1.5, H-1), 4.62 (dd, J = 3.7, H-2), 4.49 (dd, J = 9.5, H-3), 4.12 (t, J = 9.5, H-4), 4.58 (dq, H-5), 1.57 (d, J = 6.5, CH_3-6)

β-D-Glcp′: 6.02 (d, J = 8.0, H-1), 3.98 (dd, J = 9.0, H-2), 4.00–4.10 (m, H-3-4), 3.68 (m, H-5), 4.50 (Ha-6), 4.18 (Hb-6)

β-D-Glcp″: 4.83 (d, J = 8.0, H-1), 3.77 (t, J = 8.5, H-2), 3.96 (t, 9.0, H-3), 4.09 (t, J = 9.8, H-4), 3.55 (m, H-5), 4.18 (dd, J = 5.0, 12.5, Ha-6), 3.94 (dd, J = 4.5, Hb-6) [2]

^{13}C NMR (62.9 MHz, C_5D_5N): [1]

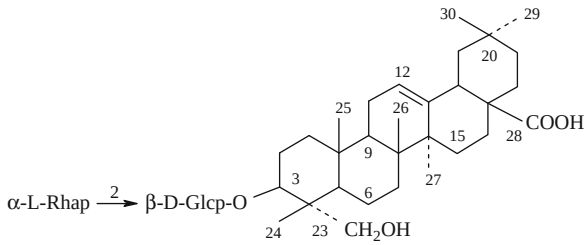
Table 1

C-1	38.9	C-16	23.5	Glc-1	104.7	4	70.8
2	26.0	17	47.1	2	79.8	5	78.1
3	82.1	18	41.8	3	77.7	6	69.3
4	43.5	19	46.3	4	72.2	Glc′-1	104.9
5	47.7	20	30.8	5	78.0	2	75.4
6	18.3	21	34.1	6	62.8	3	76.5
7	32.9	22	32.6	Rha-1	101.7	4	78.4
8	40.0	23	64.6	2	72.3	5	77.2
9	48.3	24	13.8	3	72.6	6	61.4
10	37.0	25	16.3	4	74.2	Rha′-1	102.8
11	23.9	26	17.6	5	69.7	2	72.6
12	122.9	27	26.2	6	18.8	3	72.8
13	144.2	28	176.6	Glc-1	95.8	4	73.9
14	42.2	29	33.2	2	74.0	5	70.4
15	28.4	30	23.8	3	78.7	6	18.6

References

1. V.I. Grishkovets, D.Yu. Sidorov, L.A. Yakovishin, N.N. Arnautov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **32**(3), 360 (1996)
2. V.I. Grishkovets, O.Ya. Tsvetkov, A.S. Shashkov, V.Ya. Chirva, Bioorg. Chem. **21**(6), 468 (1995)

Glycoside ST-D_2 from *Hedera taurica*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1]

$C_{42}H_{68}O_{13}$: 780.465

$[\alpha]_D$ +11° (c 4.5, C_5H_5N) [1]

^{1}H NMR (acetate) (MHz, J/Hz, $CDCl_3$): 5.28 (brt, J = 3.5, H-12), 2.77 (H-18), 4.19 (d, J = 12.0, Ha-23), 3.91 (d, Hb-23), 3.76 (s, O-CH_3)

β-D-Glcp (acetate): 4.48 (d, J = 8.0, H-1), 3.69 (t, J = 8.5, H-2), 5.20 (t, J = 9.0, H-3), 4.98 (t, J = 10.0, H-4), 3.67 (m, H-5), 4.10 (dd, J = 2.5, 12.5, Ha-6), 4.24 (dd, J = 5.0, Hb-6)

α-L-Rhap (acetate): 5.01 (d, J = 1.5, H-1), 5.11 (dd, J = 3.0, H-2), 5.16 (dd, J = 10.0, H-3), 5.01 (t, J = 10.0, H-4), 4.11 (d, H-5), 1.19 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (acetate): [1]

Table 1

C-1	39.3	C-16	24.0	Glc-1	104.7
2	26.5	17	47.2	2	79.8
3	81.6	18	42.0	3	77.7
4	43.7	19	46.3	4	72.1
5	48.0	20	30.9	5	78.0
6	18.1	21	34.1	6	62.8
7	32.7	22	33.2	Rha-1	101.6
8	40.0	23	64.1	2	72.3
9	48.3	24	14.8	3	72.5
10	37.0	25	16.4	4	74.1
11	23.5	26	17.6	5	69.7
12	123.1	27	26.3	6	18.8
13	144.3	28	178.1		

(*continued*)

Table 1 (continued)

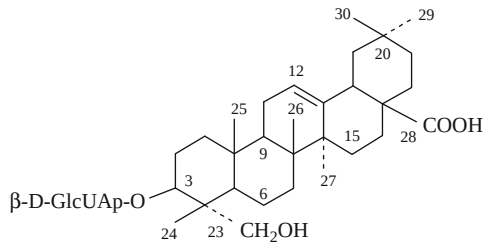
14	42.3	29	33.2		
15	28.5	30	24.0		

Pharm./Biol.: Molluscicidal activity [2]

References

1. V.I. Grishkovets, S.V. Godin, O.Ya. Svetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 316 (1997)
2. K. Hostetmann, H. Kizu, T. Tomimori, Planta Med. **44**, 34 (1982)

Glycoside ST-F_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1], *H. canariensis* [2], *H. nepalensis* [3], *Schefflera impressa* [4], *Climacoptera transoxana* [5], *Aralia elata* [6]

$C_{36}H_{56}O_{10}$: 648.387

Mp: 190–193°C [1]

$[\alpha]_D$ +20° (c1.5, MeOH) [1]

^{13}C NMR (Me ester) (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.9	GlcUA-1	106.4
2	26.1	17	47.0	2	75.4
3	82.4	18	41.9	3	77.8
4	43.5	19	46.2	4	73.1
5	47.5	20	30.7	5	77.0
6	18.2	21	34.0	6	170.9

(*continued*)

Table 1 (continued)

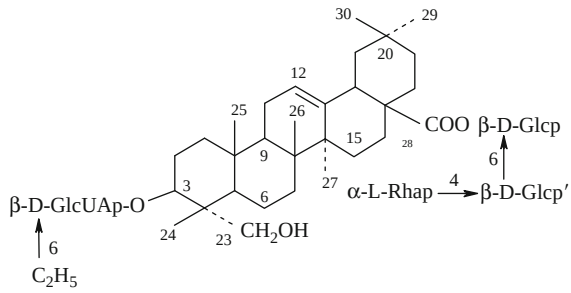
7	32.6	22	33.3	O-CH_3	52.1
8	39.9	23	64.3	O-CH_3	51.6
9	48.1	24	13.6		
10	36.9	25	16.1		
11	23.3	26	17.5		
12	122.9	27	26.1		
13	144.2	28	178.0		
14	42.1	29	33.1		
15	28.3	30	23.7		

Pharm./Biol.: Molluscicidal activity [1]

References

1. V.I. Grishkovets, S.V. Godin, O.Ya. Svetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 316 (1997)
2. L.A. Yakovishin, V.I. Grishkovets, N.N. Arnautov, V.Ya. Chirva, Chem. Nat. Comp. **35**(5), 587 (1999)
3. H. Kizu, S. Kitayama, F. Nakatami, T. Tomimori, T. Namba, Chem. Pharm. Bull. **33**, 3324 (1985)
4. S.K. Srivastava, D.L. Join, Phytochemistry **28**, 644 (1989)
5. Ch. Annaev, M. Isamukchamedova, N.K. Abubakirov, Chem. Nat. Comp. **19**(2), 190 (1983)
6. M. Yoshikawa, S. Yoshizumi, T. Ueno, H. Matsuda, T. Murakami, J. Yamachara, N. Murakami, Chem. Pharm. Bull. **43**, 1878 (1995)

Glycoside ST-G_{0-2}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1]

$C_{56}H_{90}O_{24}$: 1146.582

$[\alpha]_D$−5.0° (c 0.5, C_5H_5N) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

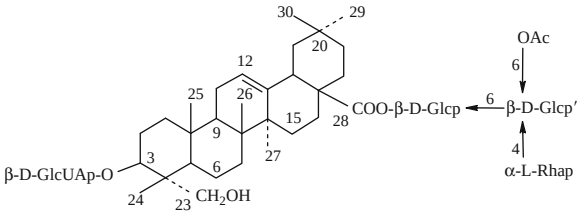
C-1	38.8	C-16	23.9	GlcUA-1	106.4	Glc′-1	104.9
2	26.2	17	47.1	2	75.4	2	75.3
3	82.4	18	41.7	3	77.8	3	76.5
4	43.5	19	46.3	4	73.2	4	78.4
5	47.6	20	30.8	5	77.3	5	77.2
6	18.3	21	34.1	6	170.9	6	61.3
7	32.6	22	33.0	O-$\underline{C}H_2$-CH_3	61.7	Rha-1	102.8
8	40.0	23	64.4	O-CH_2-$\underline{C}H_3$	9.3	2	72.5
9	48.2	24	13.7	Glc-1	95.7	3	72.7
10	37.0	25	16.3	2	73.8	4	74.0
11	23.4	26	17.6	3	78.7	5	70.4
12	123.0	27	26.3	4	70.8	6	18.6
13	144.3	28	176.6	5	78.1		
14	42.2	29	33.2	6	69.2		
15	28.4	30	24.0				

References

1. V.I. Grishkovets, O.Ya. Tsvetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 310 (1997)

Glycoside ST-I_5

CAS Registry Number: 203514-05-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1]

$C_{56}H_{88}O_{25}$: 1160.561

$[\alpha]_D$ −10° (c 1.1, C_5H_5N) (Me ester) [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.10 (dd, J = 4.0, 13.0, H-3), 3.11 (dd, J = 4.0, 14.0, H-18), 5.34 (brt, J = 3.5, H-12), 1.14, 1.05, 0.90, 0.89, 0.86, 0.83 (s, CH_3x6)

β-D-GlcUAp (Me ester): 5.16 (d, J = 7.5, H-1), 4.03 (dd, J = 9.5, H-2), 4.13 (t, J = 9.0, H-3), 4.38 (t, J = 9.8, H-4), 4.44 (d, J = H-5), 3.66 (s, OCH_3)

β-D-Glcp : 6.16 (d, J = 8.0, H-1), 4.00–4.12 (m, H-2, -4), 4.18 (t, J = 9.0, H-3), 3.65 (m, H-5), 4.62 (dd, J = 2.0, 10.5, Ha-6), 4.29 (dd, J = 6.0, Hb-6)

β-D-Glcp′: 4.95 (d, J = 8.0, H-1), 3.89 (t, J = 8.0, H-2), 3.97–4.12 (m, H-3,-4), 3.78 (m, H-5), 4.59 (dd, J = 2.5, 12.0, Ha-6), 4.48 (dd, J = 4.5, Hb-6), 1.88 (s, O-CO-CH_3)

α-L-Rhap: 5.48 (d, J = 1.5, H-1), 4.57 (dd, J = 3.5, H-2), 4.45 (dd, J = 9.5, H-3), 4.27 (t, J = 9.5, H-4), 4.81 (d, J = H-5), 1.65 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.8	GlcUA-1	106.4	Glc′-1	104.7
2	26.1	17	47.1	2	75.4	2	75.0
3	82.5	18	41.7	3	77.8	3	76.3
4	43.5	19	46.3	4	73.1	4	79.3
5	47.6	20	30.8	5	77.3	5	73.7
6	18.3	21	34.1	6	170.7	6	63.7
7	32.7	22	32.9	Glc-1	95.6	Ac-1	170.7
8	40.0	23	64.5	2	73.8	2	20.7
9	48.2	24	13.8	3	78.7	Rha-1	103.0
10	37.0	25	16.2	4	71.0	2	72.3
11	23.4	26	17.6	5	78.1	3	72.6
12	123.0	27	26.1	6	69.4	4	73.8
13	144.2	28	176.5			5	70.7
14	42.2	29	33.2			6	18.5
15	28.4	30	23.8				

References

1. V.I. Grishkovets, O.Ya. Tsvetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 310 (1997)

Glycoside ST_K (Akeboside ST_K)

See Figure Glycoside ST_K (Akeboside ST_K)

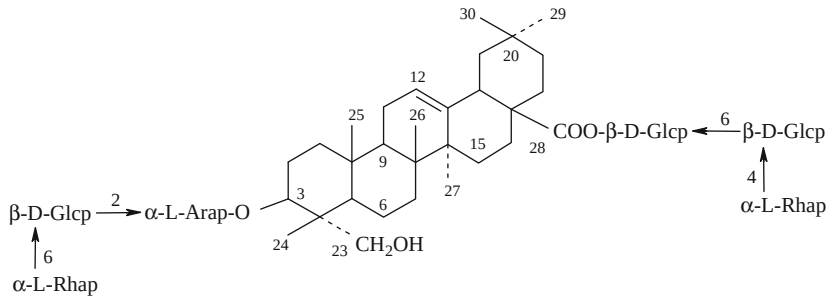
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Akebia quinata* [1]

$C_{65}H_{106}O_{31}$: 1382.671

Mp: 220–222°C (dec.) [1]

$[\alpha]_D^{25}$ −16.0° (c 0.5, H_2O) [1]



Glycoside ST_K (Akeboside ST_K)

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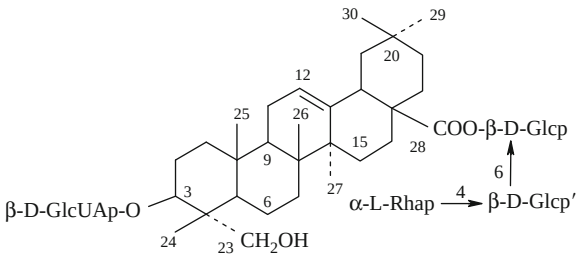
1. Y. Kumekawa, H. Itokawa, M. Fujita, Chem. Pharm. Bull. **22**(10), 2294 (1974)

Glycoside ST-K

CAS Registry Number: 133405-28-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1], *H. helix* [2], *H. canariensis* [3]

$C_{54}H_{86}O_{24}$: 1118.550

$[\alpha]_D - 7°$ (c 1.1, C_5D_5N) (Me ester) [1]

^{13}C NMR (Me ester) (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.9	GlcUA-1	106.4	Glc′-1	104.9
2	26.2	17	47.1	2	75.4	2	75.3
3	82.4	18	41.7	3	77.8	3	76.5
4	43.5	19	46.3	4	73.2	4	78.4
5	47.6	20	30.8	5	77.3	5	77.2
6	18.3	21	34.1	6	170.9	6	61.3
7	32.6	22	33.0	OCH_3	52.1	Rha-1	102.8
8	40.0	23	64.4	Glc-1	95.7	2	72.5
9	48.2	24	13.7	2	73.8	3	72.7
10	37.0	25	16.3	3	78.7	4	74.0
11	23.4	26	17.6	4	70.8	5	70.4
12	123.0	27	26.3	5	78.1	6	18.6
13	144.3	28	176.6	6	69.2		
14	42.2	29	33.2				
15	28.4	30	24.0				

References

1. V.I. Grishkovets, O.Ya. Tsvetkov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **33**(3), 305 (1997)
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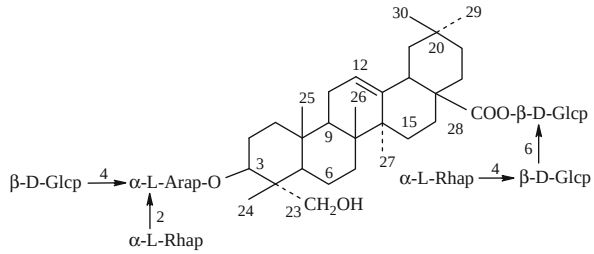
Hederacolchiside F (Saponin III)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera colchica* [1, 2], *Pulsatilla cernua*, *P. koreana*, *P. chinensis* [3]

$C_{65}H_{106}O_{32}$: 1398.666

Mp: 182–184°C [1]

$[\alpha]_D^{20}$ −0.0° (c 1.12, MeOH) [1], $[\alpha]_D$ −9.0° (C_5H_5N) [2]

IR (KBr) ν_{max} cm^{-1}: 3350, 1720 [1]

References

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2. G.E. Dekanosidze, Chem. Nat. Comp. **15**(2), 205 (1979)
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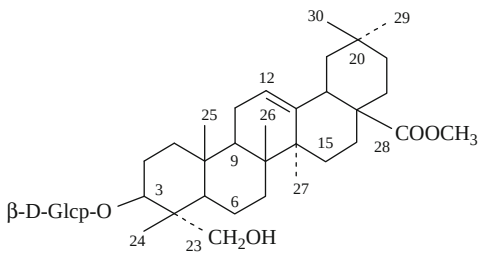
Hederoside A_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1, 2]

$C_{37}H_{60}O_9$: 648.423

$[\alpha]_D^{20}$ +40.0° (c 5.0, C_5H_5N) [1]

^{1}H NMR (MHz, J/Hz, C_5D_5N) (Me ester): 3.03 (d, H-3), 5.33 (brt, H-12), 3.67 (s, O-CH_3), 1.15, 0.92, 0.90, 0.88, 0.86, 0.81 (s, CH_3 × 6)

β-D-Glcp: 5.04 (d, J = 8.0, H-1), 3.95 (t, J = 8.0, H-2), 4.09 (t, J = 9.0, H-3), 4.15 (dd, J = 7.0, H-4), 3.85 (ddd, H-5), 4.42 (dd, J = 2.6, H-6), 4.29 (dd, J = 5.0, H-6) [2]

^{13}C NMR (C_5D_5N) (Me ester): [1]

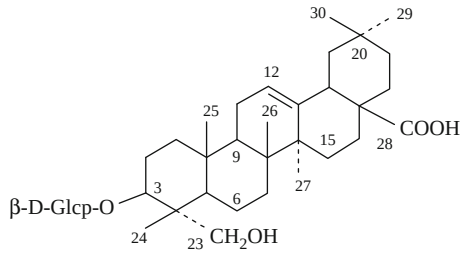
Table 1

C-1	38.8	C-16	23.9	Glc-1	105.8
2	25.9	17	46.1	2	75.8
3	82.3	18	41.9	3	78.7
4	43.5	19	47.0	4	71.7
5	47.7	20	30.9	5	78.3
6	18.3	21	34.1	6	62.9
7	32.9	22	33.2		
8	39.8	23	64.8		
9	48.1	24	13.8		
10	37.0	25	16.2		
11	23.5	26	17.3		
12	122.9	27	26.3		
13	144.3	28	178.1		
14	42.1	29	33.2		
15	28.2	30	23.8		
		OCH_3	51.7		

References

1. A.A. Loloiko, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **24**(5), 614 (1988)
2. A.A. Loloiko, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **26**(2), 184 (1990)

Hederoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera helix* [1], *Fatsia japonica* [2], *Clematis vitalba* [3], *H. nepalensis* [4],

Luffa cylindrica [5], *Dolichos kilimandscharicus* [6], *Hedera taurica* [7]

$C_{36}H_{58}O_8$: 618.413

Mp: 230–231°C [3]

$[\alpha]_D$ +61.0° (MeOH) [3]

^{1}H NMR (J/Hz, C_5D_5N): 3.03 (dd, H-3), 5.33 (brt, H-12), 3.67 (s, O-CH_3), 1.15, 0.92, 0.90, 0.88, 0.86, 0.81 (s, CH_3 × 6) [7]

β-D-Glcp: 5.04 (d, J = 8.0, H-1), 3.95 (t, J = 8.0, H-2), 4.09 (t, J = 9.0, H-3), 4.15 (dd, J = 7.0, H-4), 3.85 (ddd, H-5), 4.42 (dd, J = 2.6, H-6), 4.29 (dd, J = 5.0, H-6) [7]

^{13}C NMR (C_5D_5N): [7]

Table 1

C-1	38.8	C-16	23.9	Glc-1	105.9
2	26.0	17	46.2	2	75.9
3	82.4	18	41.9	3	78.7
4	43.5	19	47.1	4	71.7
5	47.8	20	31.0	5	78.3
6	18.3	21	34.1	6	62.9
7	33.0	22	33.3		
8	39.9	23	64.9		
9	48.2	24	13.8		
10	37.1	25	16.3		
11	23.6	26	17.4		
12	123.0	27	26.3		
13	144.3	28	178.1		
14	42.1	29	33.3		
15	28.2	30	23.8		
		OCH_3	51.7		

Pharm./Biol.: Molluscicidal and fungicidal activity [1, 6]

References

1. K. Hostettmann, Helv. Chim. Acta **63**, 606 (1980)
2. V.I. Grishkovets, E.A. Sobolev, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(2), 166 (2000)
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4. H. Kizu, S. Kitayama, F. Nakatani, T. Tomimori, T. Namba, Chem. Pharm. Bull. **33**, 3324 (1985)
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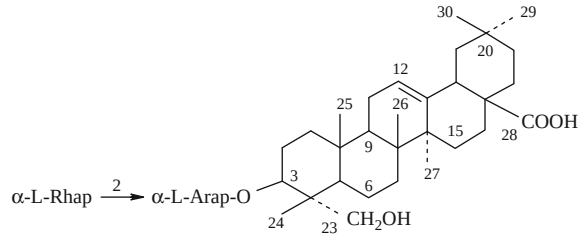
Hederoside C (Cauloside B, Sapindoside A, Dipsacoside A, Glycoside L-E_1, Saponin K6, Saponin P_D)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Akebia quinata* [1], *Caltha palustris* [2], *Caulophyllum robustum* [3], *Cephalaria kotschyi* [4], *Dipsacus azureus* [5], *Hedera canariensis* [6, 7], *H. nepalensis* [8], *H. rhombea* [9, 10], *H. taurica* [11, 12], *Kalopanax pictus* [13], *K. septemlobus* [14], *Medicago polymorpha* [15], *Polyscias dichroostcahya* [16], *Sapindus delavayi* [17], *S. mukorossi* [18]

$C_{41}H_{66}O_{12}$: 750.455

Mp: 244–250°C [11]

$[\alpha]_D$ +9° (c 1.0, EtOH) [6]

^{1}H NMR (J/Hz, C_5D_5N): 3.14 (dd, J = 12.7, H-3), 3.61 (d, J = 10.5, H-23), 5.33 (brs, H-12)

α-L-Arap: 4.98 (d, J = 6.0, H-1), 4.44 (dd, J = 7.0, H-2, 3), 4.0–4.2 (H-4, 5), 3.59 (dd, J = 2.9, H-5)

α-L-Rhap: 6.12 (d, J = 1.4, H-1), 4.60 (dd, J = 3.3, H-2), 4.52 (dd, J = 8.8, H-3), 4.16 (t, J = 8.8, H-4), 4.54 (H-5), 1.52 (d, J = 6.0, CH_3-6) [9]

^{13}C NMR (C_5D_5N): [6]

Table 1

C-1	38.9	C-13	144.8	C-25	16.1	Ara-1	104.3
2	26.0	14	42.1	26	17.4	2	75.9
3	82.0	15	28.3	27	26.2	3	74.5
4	43.5	16	23.8	28	180.2	4	69.4
5	47.2	17	46.7	29	33.2	5	65.6
6	18.3	18	42.0	30	23.8	Rha-1	101.7
7	33.0	19	46.5			2	72.4
8	39.8	20	30.9			3	72.6
9	48.2	21	34.3			4	74.2
10	36.9	22	33.2			5	69.8
11	23.8	23	64.4			6	18.5
12	122.8	24	13.7				

Pharm./Biol.: Molluscicidal activity [19]

References

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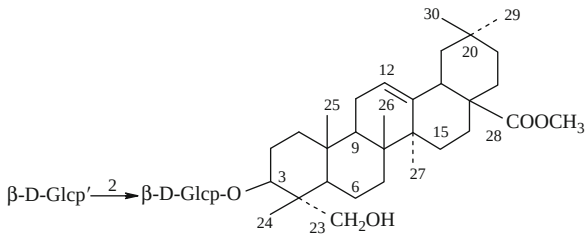
Hederoside D_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1]

$C_{43}H_{70}O_{14}$: 810.476

$[\alpha]_D^{20}$ +32° (c 4.0, C_5H_5N) [1]

^{13}C NMR (250 MHz, C_5D_5N): [1]

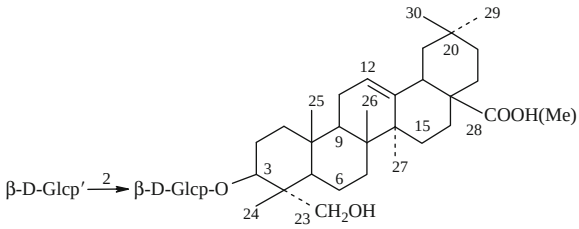
Table 1

C-1	38.7	C-16	23.8	Glc-1	103.7
2	25.9	17	46.1	2	84.1
3	83.0	18	41.9	3	77.9
4	43.5	19	47.0	4	74.4
5	48.1	20	30.8	5	78.0
6	18.3	21	34.0	6	62.8
7	32.9	22	32.9	Glc′-1	105.9
8	39.8	23	65.4	2	76.7
9	48.3	24	13.5	3	78.5
10	37.0	25	16.1	4	71.4
11	23.5	26	17.3	5	78.2
12	122.9	27	26.2	6	62.6
13	144.2	28	178.1		
14	42.0	29	33.1	OCH_3	51.5
15	28.2	30	23.7		

References

1. A.A. Loloiko, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **26**(2), 184 (1990)

Hederoside F



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1, 2], *Fatsia japonica* [3], *Polygala japonica* [4]

$C_{42}H_{68}O_{14}$: 796.460

$[\alpha]_D^{20}$ +22° (c 2.4, C_5H_5N) [4]

^{1}H NMR (Me ester) (250 MHz, J/Hz, C_5D_5N): 3.05 (dd, J = 4.5, 14.0, H-3), 5.35 (brt, J = 3.5, H-12), 4.33 (d, J = 10.5, Ha-23), 3.75 (d, Hb-23), 3.69 (s, O-CH_3), 1.14, 0.92, 0.90, 0.88, 0.86, 0.80 (s, CH_3 × 6)

β-D-Glcp: 5.03 (d, J = 7.5, H-1), 4.10 (dd, J = 8.5, H-2), 4.18 (t, J = 8.5, H-3), 4.11 (t, J = 8.5, H-4), 3.77 (ddd, H-5), 4.43 (dd, J = 2.5, Ha-6), 4.28 (dd, J = 5.0, Hb-6)

β-D-Glcp′: 5.34 (d, J = 8.0, H-1), 4.07 (brt, J = 8.0, H-2), 4.17 (t, J = 8.8, H-3), 4.24 (t, J = 8.8, H-4), 3.77 (ddd, H-5), 4.45 (dd, J = 3.0, Ha-6), 4.38 (dd, J = 4.0, Hb-6) [2]

^{13}C NMR (C_5D_5N): [2]

Table 1

C-1	38.8	C-16	23.9	Glc-1	103.8
2	25.9	17	46.2	2	84.1
3	83.0	18	41.9	3	78.0
4	43.5	19	47.0	4	71.4
5	48.1	20	30.9	5	78.1
6	18.4	21	34.1	6	62.8
7	32.9	22	32.9	Glc′-1	105.9
8	39.8	23	65.4	2	76.7
9	48.4	24	13.5	3	78.5
10	37.0	25	16.1	4	71.4
11	23.5	26	17.3	5	78.3
12	122.9	27	26.2	6	62.6
13	144.3	28	178.0		
14	42.1	29	33.2		
15	28.2	30	23.7		
		O-CH_3	51.6		

(*continued*)

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Hederoside H (Hederasaponin C, Kizutasaponin K_{12}, Akeboside ST_H, Kalopanax Saponin B, Pericarpsaponin P_k)

CAS Registry Number: 14216-03-6

See Figure Hederoside H (Hederasaponin C, Kizutasaponin K_{12}, Akeboside ST_H, Kalopanax Saponin B, Pericarpsaponin P_k

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera canariensis* [1], *H. taurica* [2–4], *H. rhombea* [5], *H. nepalensis* [6], *Clematis tibetana* [7], *C. stans* [8], *Pulsatilla cernua* [9], *Akebia quinata* [10], *Kalopanax septemlobus* [11], *Kalopanax pictus* [12]

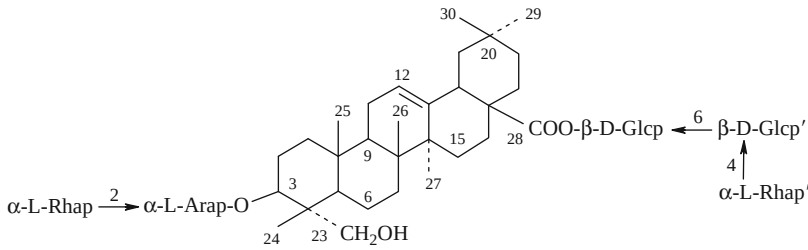
$C_{59}H_{96}O_{26}$: 1220.618

Mp: 215–216°C [6]

$[\alpha]_D$ −8.0° [9]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730 [9]

^{1}H NMR (100 MHz, C_5D_5N): 4.26 (dd, J = 12.0, 4.0, H-3), 3.91, 4.28 (m, H-23), 1.12 (s, CH_3-24), 0.94 (s, CH_3-25), 1.08 (s, CH_3-26), 1.16 (s, CH_3-27), 0.84 (s, CH_3-29), 0.85 (s, CH_3-30); α-L-Arap: 5.03 (d, J = 6.5, H-1), 4.56 (dd, J = 8.0, 6.5, H-2), 3.99 (dd, J = 8.0, 4.0, H-3), 4.11 (H-4), 3.64, 4.22 (d, J = 9.5, H_2-5); α-L-Rhap: 6.33 (brs, H-1), 4.87 (brs, H-2), 4.74 (dd, J = 9.5, 3, H-3),



Hederoside H (Hederasaponin C, Kizutasaponin K_{12}, Akeboside ST_H, Kalopanax Saponin B, Pericarpsaponin P_k)

4.40 (t, J = 9.5, H-4), 4.68 (dq, J = 9.5, 6, H-5), 1.50 (d, J = 6, CH_3-6); β-D-Glcp: 6.20 (d, J = 8, H-1), 4.09 (H-2), 4.18 (t, H-3), 4.28 (H-4), 4.07 (H-5), 4.30, 4.63 (brd, J = 9.5, H_2-6); β-D-Glcp′: 4.97 (d, J = 8.0, H-1), 3.91 (dd, J = 9, 8.0, H-2), 4.12 (H-3), 4.38 (t, J = 9.0, H-4), 3.62 (m, H-5), 4.06, 4.17 (H_2-6); α-L-Rhap′: 5.82 (brs, H-1), 4.65 (brs, H-2), 4.54 (dd, J = 9.5, 3.5, H-3), 4.30 (H-4), 4.93 (dq, J = 9.5, 6.0, H-5), 1.66 (d, J = 6, CH_3-6) [5]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.5	Ara-1	104.3	Glc-1	95.8	Rha′-1	102.8
2	26.0	17	47.1	2	75.9	2	74.0	2	72.6
3	82.1	18	41.8	3	74.5	3	78.7	3	72.8
4	43.5	19	46.3	4	69.4	4	70.8	4	73.9
5	47.7	20	30.8	5	65.6	5	78.1	5	70.4
6	18.3	21	34.1	Rha-1	101.7	6	69.3	6	18.6
7	32.9	22	32.6	2	72.4	Glc′-1	104.9		
8	40.0	23	64.6	3	72.6	2	75.4		
9	48.3	24	13.8	4	74.2	3	76.5		
10	37.0	25	16.3	5	69.8	4	78.4		
11	23.9	26	17.6	6	18.5	5	77.2		
12	122.9	27	26.2			6	61.4		
13	144.2	28	176.6						
14	42.2	29	33.2						
15	28.4	30	23.8						

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2. A.S. Shashkov, V.I. Grishkovets, O.Ya. Tsvetkov, V.Ya. Chirva, Chem. Nat. Comp. **29**(4), 502 (1993)
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Hederoside I

See Figure Hederoside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1], *Lonicera bournei* [2], *Fatsia japonica* [3]

$C_{54}H_{88}O_{24}$: 1120.566

Mp: 146–148°C [2]

$[\alpha]_D^{20}$ +15.0° (c 4.1 C_5H_5N) [1]

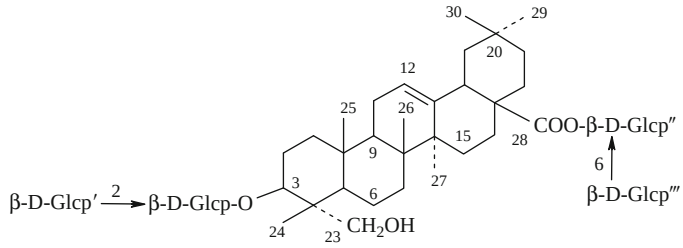
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): anomeric protons: 5.41 (d, J = 7.1), 5.04 (d, J = 7.6), 5.08 (d, J = 7.0), 6.27 (d, J = 7.9) [3]

^{13}C NMR (62.9 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.9	Glc-1	103.7	Glc″-1	95.7
2	26.1	17	46.4	2	84.0	2	73.9
3	83.2	18	41.8	3	78.0	3	78.2
4	43.5	19	47.2	4	71.4	4	71.1
5	48.3	20	30.8	5	78.0	5	78.0

(*continued*)



Hederoside I

Table 1 (continued)

6	18.4	21	34.2	6	62.8	6	69.7
7	32.7	22	33.0	Glc′-1	105.8	Glc‴-1	105.2
8	40.1	23	65.5	2	76.6	2	75.1
9	48.4	24	13.6	3	78.4	3	78.6
10	37.0	25	16.2	4	71.4	4	71.7
11	23.6	26	17.7	5	78.2	5	78.2
12	123.0	27	25.9	6	62.8	6	62.6
13	144.3	28	176.6				
14	42.3	29	33.2				
15	28.4	30	23.8				

References

1. V.I. Grishkovets, A.A. Loloiko, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **26**(6), 663 (1990)
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$[\alpha]_D^{26}$ −2.9° (c 1.01, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

Ara-1	104.5	Xyl-1	106.9
2	75.0	2	73.2
3	74.6	3	79.0
4	69.5	4	69.0
5	66.2	5	67.0
Rha-1	101.1	Ac-1	170.6
2	71.8	2	21.1
3	82.3		
4	72.7		
5	69.5		
6	18.3		

References

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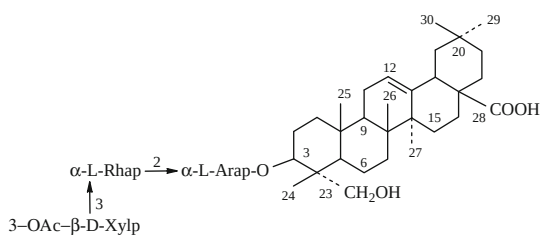
Hishoushi Saponin Ee



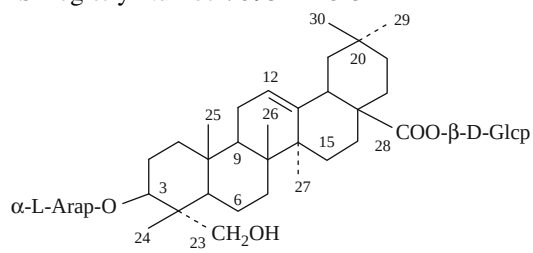
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Sapindus delavayi* [1]

$C_{48}H_{76}O_{17}$: 924.508

HN-Saponin F

CAS Registry Number: 39524-13-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera nepalensis* [1], *Chenopodium quinoa* [2]

$C_{41}H_{66}O_{13}$: 766.450
Mp: 202–205°C (dil. MeOH) [1]
$[\alpha]_D$ +36.0° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3380, 1720, 1070 [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 5.44 (brs, H-12), 1.4, 0.89, 0.89, 1.19, 0.97, 0.89 (s, CH_3-24, 25, 26, 27, 29, 30) [1]
α-L-Arap: 4.98 (d, J = 6.8, H-1), β-D-Glcp: 6.33 (d, J = 7.1, H-1)
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-18	41.8	Ara-1	106.8
2	26.1	19	46.3	2	73.2
3	82.1	20	30.8	3	74.8
4	43.6	21	34.1	4	69.8
5	47.7	22	32.6	5	66.8
6	18.3	23	64.6	Glc-1	95.9
7	33.0	24	13.6	2	74.3
8	40.1	25	16.3	3	79.4
9	48.3	26	17.6	4	71.3
10	37.1	27	26.1	5	79.1
11	24.0	28	176.7	6	62.4
12	123.1	29	33.2		
13	144.3	30	23.7		
14	42.2				
15	28.3				
16	23.5				
17	47.1				

References

1. H. Kizu, S. Kitayama, F. Nakatani, T. Tomimori, T. Namba, Chem. Pharm. Bull. **33**, 3324 (1985)
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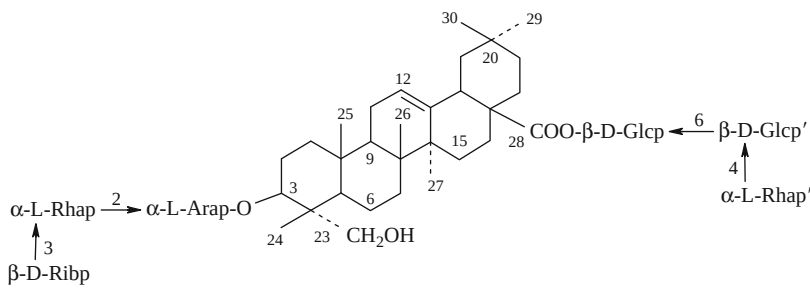
Huzhangoside D

See Figure Huzhangoside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Clematis stans* [1], *Anemone rivularis* [2], *Clematis tibetana* [3]
$C_{64}H_{104}O_{30}$: 1352.661
$[\alpha]_D{}^{14}$ −29.6° (c 2.73, MeOH) [2]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.26 (H-3), 3.91, 4.28 (CH_2-23), 1.12 (s, CH_3-24), 0.94 (s, CH_3-25), 1.08 (s, CH_3-26), 1.16 (s, CH_3-27), 0.84 (s, CH_3-29), 0.85 (s, CH_3-30)
α-L-Arap: 5.03 (d, J = 6.5, H-1), 4.56 (dd, J = 8.0, 6.5, H-2), 3.99 (dd, J = 8.0, 4.0, H-3), 4.11 (H-4), 3.64, 4.22 (brd, J = 9.5, H_2-5)
α-L-Rhap: 6.33 (brs, H-1), 4.87 (H-2), 4.74 (dd, J = 9.5, 3.0, H-3), 4.40 (t, J = 9.5, H-4), 4.68 (dq, J = 9.5, 6.0, H-5), 1.50 (d, CH_3-6)
β-D-Ribp: 5.93 (d, J = 4.5, H-1), 4.28 (H-2), 4.50 (m, H-3), 4.14 (H-4), 4.14, 4.27 (H_2-5)
β-D-Glcp: 6.20 (d, J = 8, H-1), 4.09 (H-2), 4.18 (t, J = 19.0, H-3), 4.28 (H-4), 4.07 (H-5), 4.30, 4.63 (brd, J = 9.5, H_2-6)
β-D-Glcp′: 4.97 (d, J = 8.0, H-1), 3.91 (dd, J = 9.0, 8.0, H-2), 4.12 (H-3), 4.38 (t, J = 9.0, H-4), 3.62 (H-5), 4.06, 4.17 (H_2-6)
α-L-Rhap′: 5.82 (brs, H-1), 4.65 (H-2), 4.54 (dd, J = 9.5, 3.5, H-3), 4.30 (H-4), 4.93 (dq, J = 9.5, 6.0, H-5), 1.66 (d, J = 6.0, CH_3-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]



Huzhangoside D

Table 1

C-1	39.1	C-19	46.1	Ara-1	104.8	Glc-1	95.5
2	26.3	20	30.7	2	75.0	2	73.8
3	81.0	21	33.9	3	75.3	3	78.6
4	43.5	22	32.4	4	68.8	4	70.7
5	47.6	23	63.9	5	66.4	5	78.0
6	18.1	24	14.1	Rha-1	101.2	6	69.1
7	32.7	25	16.1	2	72.0	Glc′-1	104.7
8	39.8	26	17.5	3	81.1	2	75.23
9	48.1	27	26.0	4	72.8	3	76.4
10	36.8	28	176.5	5	69.7	4	78.1
11	23.7	29	33.0	6	18.4	5	77.0
12	122.8	30	23.6	Rib-1	104.8	6	61.2
13	144.0			2	72.7	Rha′-1	102.6
14	42.0			3	68.8	2	72.5
15	28.2			4	70.1	3	72.7
16	23.3			5	65.2	4	73.9
17	46.9					5	70.2
18	41.6					6	18.4

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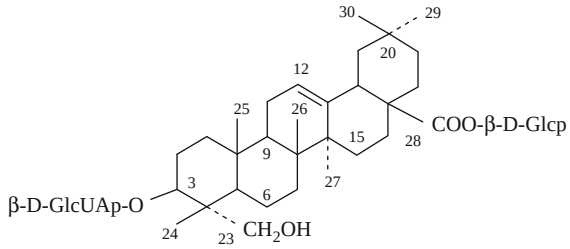
Ilexoside XLVIII (Quinoa-Saponin 9)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Ilex rotunda* [1], *Chenopodium quinoa* [2]

$C_{42}H_{66}O_{15}$: 810.440

Mp: 200–201°C (MeOH) [1]

$[\alpha]_D$ +19.3° (c 7.2, MeOH) [1]

FAB-MS *m/z*: 809 $[M-H]^-$ [1]

EI-MS *m/z*: 454 (4), 410 (25), 248 (30), 224 (10), 206 (33), 203 (40), 175 (48), 146 (100) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 0.89, 0.92, 0.94, 1.12, 1.22 (s, $CH_3 \times 6$), 5.42 (brt, H-12)

β-D-GlcUAp: 5.21 (d, J = 7.5, H-1)

β-D-Glcp: 6.30 (d, J = 8, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	24.0	GlcUA-1	106.3
2	26.1	17	47.1	2	75.5
3	81.8	18	41.8	3	78.1
4	43.6	19	46.3	4	73.5
5	47.6	20	30.9	5	78.1
6	18.3	21	34.1	6	172.8
7	32.7	22	32.9	Glc-1	95.8
8	40.1	23	64.4	2	74.1
9	48.2	24	13.8	3	78.8
10	37.0	25	16.3	4	71.1
11	23.5	26	17.7	5	79.4
12	123.0	27	26.3	6	62.2
13	144.3	28	176.7		
14	42.3	29	33.3		
15	28.4	30	23.8		

References

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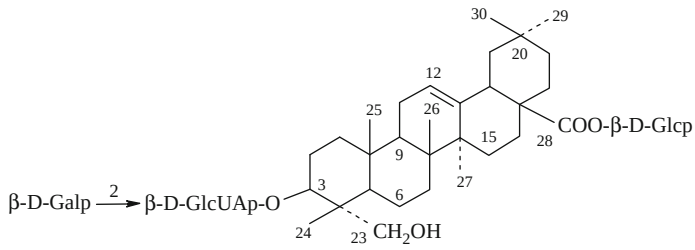
Ilexoside XLIX (Udosaponin F)

See Figure Ilexoside XLIX (Udosaponin F)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin



Ilexoside XLIX (Udosaponin F)

Biological sources: *Ilex rotunda* [1], *Aralia cordata* [2]
$C_{48}H_{76}O_{20}$: 972.492
$[\alpha]_D^{22}$ +18.9° (c 1.1, MeOH) [1]
FAB-MS *m/z*: 971 $[M-H]^-$ [1]
EI-MS *m/z*: 454 (2), 410 (20), 248 (35), 224 (15), 206 (28), 203 (50), 175 (40), 146 (100) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.83, 0.85, 0.88, 1.02, 1.08, 1.19 (s, $CH_3 \times 6$), 5.39 (brt, H-12)
β-D-GlcUAp: 5.21 (d, J = 7.5, H-1)
β-D-Galp: 5.19 (d, J = 6.5, H-1)
β-D-Glcp: 6.28 (d, J = 8, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	24.0	GlcUA-1	104.4	Glc-1	95.8
2	26.1	17	47.2	2	83.4	2	74.1
3	82.4	18	41.9	3	77.4	3	78.8
4	43.6	19	46.3	4	73.0	4	71.1
5	48.2	20	30.8	5	77.8	5	79.4
6	18.3	21	34.1	6	172.6	6	62.2
7	32.7	22	32.9	Gal-1	106.7		
8	40.4	23	64.3	2	74.4		
9	47.7	24	13.7	3	75.0		
10	36.9	25	16.2	4	69.6		
11	23.6	26	17.7	5	77.2		
12	122.6	27	26.3	6	61.5		
13	144.3	28	176.8				
14	42.3	29	33.2				
15	28.4	30	23.8				

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 77 (1993)
2. H. Kawai, M. Nishida, Y. Tashiro, M. Kuroyanagi, A. Ueno, M. Satake, Chem. Pharm. Bull. **37**(9), 2318 (1989)

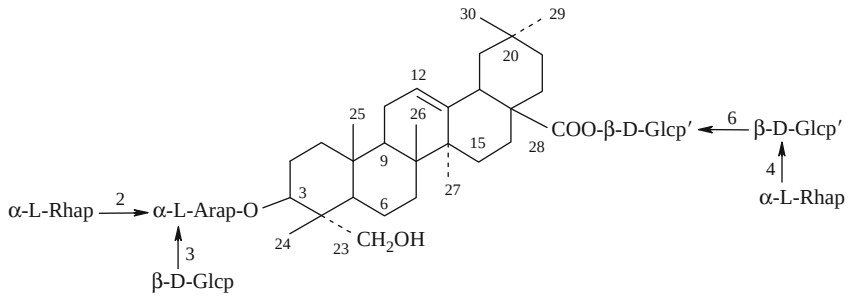
Kalopanax Saponin C

See Figure Kalopanax Saponin C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Kalopanax septemlobus* [1]
$C_{65}H_{106}O_{31}$: 1382.671
$[\alpha]_D^{22}$ −19.3° (c 0.88, MeOH) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.40 (t-like, H-12), 1.04, 0.88, 0.88, 1.17, 0.88, 0.96 (CH_3-24, 25, 26, 27, 29, 30)
α-L-Arap: 5.06 (d, J = 7.0, H-1)
α-L-Rhap: 5.68 (s, H-1), 1.62 (d, J = 6.0, CH_3-6); α-L-Rhap′: 6.01 (s, H-1), 1.62 (d, J = 6.0, CH_3-6)
β-D-Glcp: 4.90 (d, J = 7.0, H-1); β-D-Glcp′: 6.13 (d, J = 7.0, H-1); β-D-Glcp″: 4.98 (d, J = 7.0, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	23.6	Ara-1	104.6	Glc′-1	95.6
2	26.0	17	46.9	2	74.8	2	73.8
3	81.0	18	41.7	3	83.0	3	78.3
4	47.7	19	46.6	4	68.7	4	70.6
5	43.4	20	30.7	5	65.5	5	76.4
6	18.4	21	34.2	Rha-1	101.6	6	70.2
7	33.1	22	33.1	2	72.4	Glc″-1	104.6
8	39.8	23	63.8	3	72.4	2	75.3
9	48.3	24	13.9	4	73.8	3	76.4
10	36.8	25	16.2	5	69.8	4	78.3
11	23.6	26	17.4	6	18.4	5	77.0
12	122.6	27	26.1	Glc-1	104.2	6	61.2
13	144.0	28	176.5	2	74.8	Rha′-1	102.6

(*continued*)



Kalopanax Saponin C

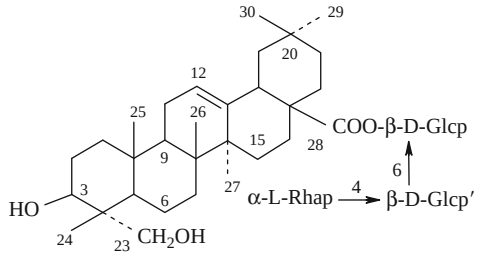
Table 1 (continued)

14	42.1	29	33.1	3	78.3	2	72.4
15	28.3	30	23.6	4	71.2	3	72.4
				5	78.3	4	73.8
				6	62.4	5	70.2
						6	18.4

References

1. C.-J. Shao, R. Kasai, J.-D. Xu, O. Tanaka, Chem. Pharm. Bull. **37**(2), 311 (1989)

Kalopanax Saponin G (Cussonoside A, NH-Saponin H, Pulsatiloside C)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera nepalensis* [1], *Cussonia barteri* [2], *Acanthopanax nipponicus* [3], *Clematis tibetana* [4], *Kalopanax pictus* [5], *Pulsatilla campanella* [6]

$C_{48}H_{78}O_{18}$: 942.518

Mp 213–215°C (aq. EtOH) [5]

$[\alpha]_D$ −2.8° (c 0.3, MeOH) [5]

IR (KBr) ν_{max} cm^{-1}: 3300, 1725 [5]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 5.42 (brs, H-12), 0.87, 0.87, 1.01, 1.05, 1.13, 1.17 (CH_3 × 6)

β-D-Glcp: 6.22 (d, J = 6.8, H-1); β-D-Glcp′: 4.96 (d, J = 7.1, H-1)

α-L-Rhap: 5.84 (H-1), 1.65 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (25 MHz, C_5D_5N): [5]

Table 1

C-1	38.9	C-16	23.5	Glc-1	95.6
2	27.7	17	47.0	2	75.3
3	73.5	18	41.7	3	78.3
4	42.9	19	46.2	4	70.3
5	48.7	20	30.7	5	76.5
6	18.7	21	34.1	6	70.9
7	32.6	22	32.9	Glc′-1	104.8
8	39.9	23	67.9	2	73.9
9	48.2	24	13.1	3	78.0
10	37.3	25	16.1	4	78.7
11	23.8	26	17.6	5	77.1
12	122.9	27	26.1	6	61.3
13	144.1	28	176.5	Rha-1	102.7
14	42.2	29	33.1	2	72.5
15	28.4	30	23.7	3	72.7
				4	73.8
				5	69.2
				6	18.5

References

1. H. Kizu, S. Kitayama, F. Nakatani, T. Tomimori, T. Namba, Chem. Pharm. Bull. **33**, 3324 (1985)
2. M.A. Dubois, M. Ilyas, H. Wagner, Planta Med. **52**(2), 80 (1986)

3. M. Miyakoshi, K. Shirasuna, Y. Hirai, K. Shingu, S. Isoda, J. Shoji, Y. Ida, T. Shimizu, J. Nat. Prod. **62**, 445 (1999)
4. Y. Kawata, H. Kizu, Y. Miyaichi, T. Tomimori, Chem. Pharm. Bull. **49**(5), 635 (2001)
5. K. Sano, S. Sanada, Y. Ida, J. Shoji, Chem. Pharm. Bull. **39**(4), 865 (1991)
6. X.-C. Li, D.-Z. Wang, S.-G. Wu, C.-R. Yang, Phytochemistry **29**, 595 (1990)

Kalopanax Saponin JLa

See Figure Kalopanax Saponin JLa

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Kalopanax pictus* [1]

$C_{63}H_{100}O_{28}$: 1304.640

$[\alpha]_D^{24}$ −19.1° (c 0.89, MeOH) [1]

FAB-MS *m/z* (negative): 1303 $[M-H]^-$, 1157 [M-Rha-H]$^-$, 1115 [M-Ac(Rha)-H]$^-$, 1025 [M-(Rha-Ara)-H]$^-$, 911 [M-((Rha-Glc)Ac_2)-H]$^-$, 749 [911-Glc]$^-$, 603 [749-Rha]$^-$, 471 [aglycone-H]$^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.38 (t-like, H-12), 1.11, 0.98, 1.07, 1.17, 0.93, 0.90 (s, CH_3-24, 25, 26, 27, 29, 30)

α-L-Arap: 4.98 (d, J = 7.0, H-1)

α-L-Rhap: 6.22 (s, H-1), 1.64 (d, J = 5.9, CH_3-6)

β-D-Glcp: 6.22 (H-1), β-D-Glcp′: 5.07 (d, J = 7.0, H-1)

α-L-Rhap′: 5.50 (s, H-1), 1.74 (d, J = 5.9, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	81.2	Ara-1	104.2	Glc-1	95.6	Rha′-1	99.4
23	64.2	2	76.3	2	74.0	2	74.0

(*continued*)

Table 1 (continued)

28	176.7	3	74.2	3	78.7	3	70.3
		4	69.2	4	70.8	4	74.0
		5	65.4	5	78.2	5	70.5
		Rha-1	101.7	6	69.8	6	18.6
		2	72.3	Glc′-1	104.6	CH_3CO	171.2
		3	72.5	2	75.3		170.9
		4	74.0	3	76.3	CH_3CO	20.9
		5	69.8	4	78.9		21.1
		6	18.6	5	74.0		
				6	63.6		

References

1. C.-I. Shao, R. Kasai, K. Ohtani, O. Tanaka, H. Kohda, Chem. Pharm. Bull. **38**(4), 1087 (1990)

Kalopanax Saponin JLb

See Figure Kalopanax Saponin JLb

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Kalopanax pictus* [1]

$C_{63}H_{100}O_{28}$: 1304.640

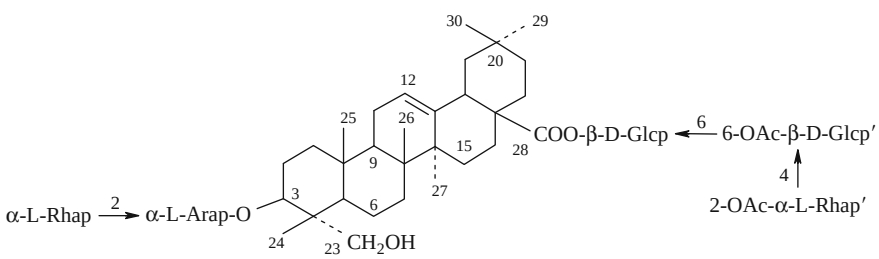
$[\alpha]_D^{24}$ −12.4° (c 0.47, MeOH) [1]

FAB-MS *m/z* (negative): 1303, 1157, 1025, 911, 749, 603, 471 [1]

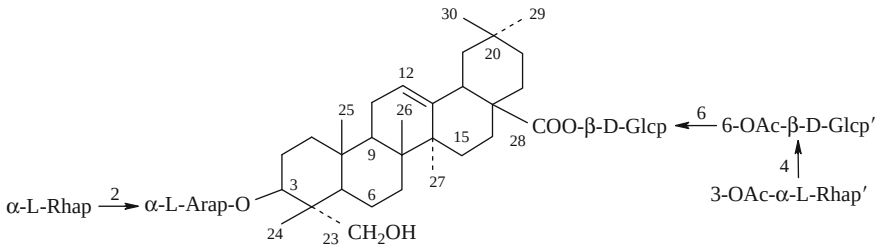
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.42 (t-like, H-12), 1.12, 0.98, 1.07, 1.17, 0.90, 0.90 (s, CH_3-24, 25, 26, 27, 29, 30), 2.02 (s, CH_3CO)

α-L-Arap: 4.95 (d, J = 6.0, H-1)

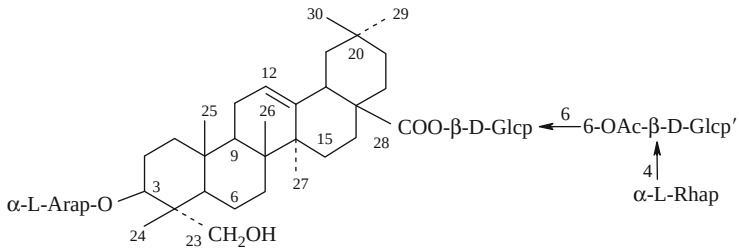
α-L-Rhap: 6.23 (s, H-1), 1.64 (d, J = 5.9, CH_3-6)



Kalopanax Saponin JLa



Kalopanax Saponin JLb



Kizuta-Saponin K_8

β-D-Glcp: 6.25 (H-1), β-D-Glcp′: 5.74 (d, J = 7.0, H-1); 1.94 (CH_3CO-6)
α-L-Rhap′: 5.53 (s, H-1), 1.72 (d, J = 5.9, CH_3-6); 2.02 (CH_3CO-3) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	81.1	Ara-1	104.2	Glc-1	95.6	Rha′-1	102.7
23	64.1	2	75.9	2	73.9	2	69.9
28	176.6	3	74.4	3	78.7	3	76.2
		4	69.2	4	70.9	4	70.9
		5	65.4	5	78.0	5	70.7
		Rha-1	101.7	6	69.8	6	18.6
		2	72.3	Glc′-1	104.8	CH_3CO	171.0
		3	72.5	2	75.2		170.7
		4	74.1	3	76.2	CH_3CO	20.7
		5	69.5	4	78.8		21.2
		6	18.6	5	73.7		
				6	63.6		

References

1. C.-I. Shao, R. Kasai, K. Ohtani, O. Tanaka, H. Kohda, Chem. Pharm. Bull. **38**(4), 1087 (1990)

Kizuta-Saponin K_8

CAS Registry Number: 97240-01-2
See Figure Kizuta-Saponin K_8
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Hedera rhombea* [1]
$C_{55}H_{88}O_{23}$: 1116.571
Mp: 192–195°C (MeOH-AcOEt) [1]
$[\alpha]_D^{25}$ −2.0° (c 2.4, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3380, 1725, 1100–1000 [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.40 (brs, H-12), 1.06, 0.91, 0.91, 1.17, 0.98, 0.91 (s, CH_3-24, 25, 26, 27, 29, 30)
α-L-Rhap: 5.53 (s, H-1), 1.70 (d, J = 6.1, CH_3-6)
β-D-Glcp: 6.23 (d, J = 6.8, H-1), 1.92 (s, CH_3COO) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	82.1	Ara-1	106.7	Glc-1	95.7
23	64.6	2	73.1	2	73.8

(*continued*)

Table 1 (continued)

28	176.7	3	74.8	3	78.8
		4	69.7	4	71.0
		5	67.0	5	78.1
		Rha-1	103.0	6	69.4
		2	72.4	CH_3COO-Ac-1	170.8
		3	72.7	2	20.6
		4	73.8	Glc′-1	104.8
		5	70.7	2	75.1
		6	18.5	3	76.4
				4	79.3
				5	73.8
				6	63.7

References

1. H. Kizu, S. Hirabayashi, M. Suzuki, T. Tomimori, Chem. Pharm. Bull. **33**, 3473 (1985)

Kizuta-Saponin K_{11}

CAS Registry Number: 97240-03-4

See Figure Kizuta-Saponin K_{11}

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera rhombea* [1], *H. nepalensis* [2], *Kalopanax pictus* [3]

$C_{61}H_{98}O_{27}$: 1262.629

Mp: 187–191°C (MeOH-$(CH_2)_2CO$) [3]

$[\alpha]_D^{24}$ −21.5° (c 0.7, MeOH) [1]

FAB-MS *m/z* (negative): 1261 $[M-H]^-$, 1115 [M-Rha-H]$^-$, 911 [M-(Rha-Glc)-Ac-H]$^-$, 749 [911-Glc], 471 [749-Rha-Ara]$^-$ [3]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.39 (brs, H-12), 1.11, 0.87, 0.90, 1.17, 1.07, 0.98 (s, CH_3-24, 25, 26, 27, 29, 30)

α-L-Arap: 5.10 (d, J = 6.7, H-1)

α-L-Rhap: 6.22 (s, H-1), 1.62 (d, J = 6.0, CH_3-6)

β-D-Glcp: 6.20 (H-1); β-D-Glcp′: 4.99 (d, J = 7.5, H-1)

α-L-Rhap′: 5.52 (s, H-1), 1.69 (d, J = 6.0, CH_3-6), 1.93 (s, CH_3CO) [3]

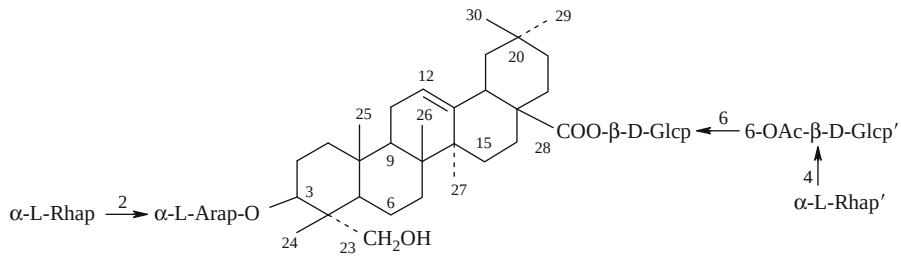
^{13}C NMR (400 MHz, C_5D_5N): [3]

Table 1

C-3	81.1	Rha-1	101.6	Glc-4	70.9	Rha′-1	102.9
23	64.0	2	72.3	5	78.0	2	72.3
28	176.5	3	72.6	6	69.7	3	72.6
Ara-1	104.2	4	74.0	Glc′-1	104.6	4	73.8
2	75.8	5	69.7	2	75.0	5	70.6
3	74.5	6	18.5	3	76.3	6	18.5
4	69.2	Glc-1	95.5	4	79.1	CH_3CO	170.6
5	65.4	2	73.8	5	73.8		20.6
		3	78.6	6	63.6		

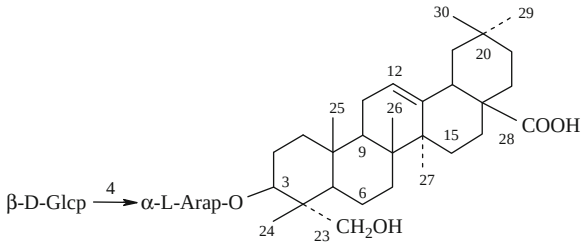
References

1. H. Kizu, S. Hirabayashi, M. Suzuki, T. Tomimori, Chem. Pharm. Bull. **33**, 3473 (1985)
2. H. Kizu, S. Kitayama, F. Nakatani, T. Tomimori, T. Namba, Chem. Pharm. Bull. **33**, 3324 (1985)
3. C.-J. Shao, R. Kasai, K. Ohtani, O. Tanaka, H. Kohda, Chem. Pharm. Bull. **38**(4), 1087 (1990)



Kizuta-Saponin K_{11}

Leontoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Leontice eversmannii* [1, 2], *Pulsatilla campanella* [3]

$C_{41}H_{66}O_{13}$: 766.450

Mp: 242–244°C [1]

$[\alpha]_D^{20}$ +49.8° (MeOH) [1]

FD-MS *m/z*: 789 $[M]^+$ [3]

EI-MS *m/z*: 331 $[Glc\ (Ac)_4]^+$, 547 $[Glc\ (Ac)_4 + Ara\ (Ac)_2]^+$ [3]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.20 (d, J = 8.0, H-1 of Glc), 4.87 (d, J = 7.2, H-1 of Ara) [3]

^{13}C NMR (400 MHz, C_5D_5N): [3]

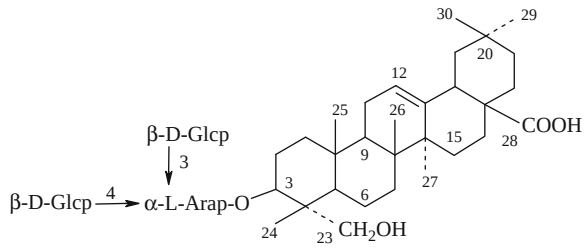
Table 1

C-1	38.8	16	23.8	Ara-1	106.7
2	26.0	17	46.5	2	73.6
3	82.2	18	42.0	3	74.6
4	43.4	19	46.7	4	79.7
5	47.7	20	30.9	5	66.2
6	18.2	21	34.3	Glc-1	106.3
7	32.9	22	33.3	2	75.7
8	39.9	23	64.7	3	78.6
9	48.2	24	13.5	4	71.4
10	37.0	25	16.1	5	78.3
11	23.7	26	17.5	6	62.6
12	122.8	27	26.2		
13	144.8	28	180.1		
14	42.2	29	33.3		
15	28.3	30	23.7		

References

1. L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **3**(2), 84 (1967)
2. L.G. Mzhel'skaya, V.K. Yatsin, N.K. Abubakirov, Chem. Nat. Comp. **2**(6), 345 (1966)
3. X.-C. Li, D.-Z. Wang, S.-G. Wu, C.-R. Yang, Phytochemistry **29**, 595 (1990)

Leontoside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Leontice eversmannii* [1, 2]

$C_{47}H_{76}O_{18}$: 928.503

Mp: 222–224°C [1]

$[\alpha]_D$ +22° (MeOH) [1]

References

1. L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **3**(3), 181 (1967)
2. L.G. Mzhel'skaya, V.K. Yatsin, N.K. Abubakirov, Chem. Nat. Comp. **2**(6), 345 (1966)

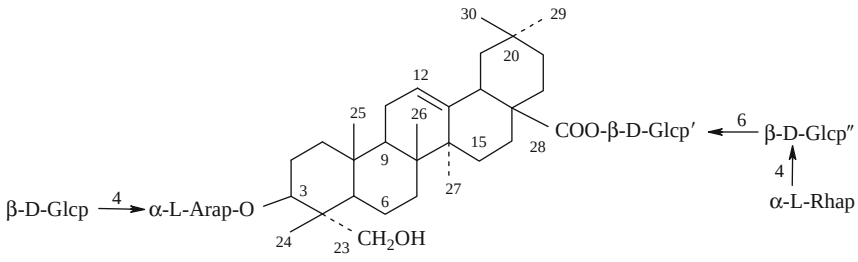
Leontoside D

CAS Registry Number: 20830-84-6

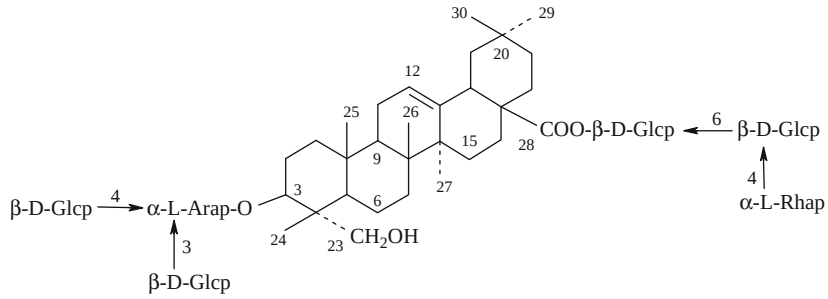
See Figure Leontoside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Leontice eversmannii* [1], *Pulsatilla campanella* [2]



Leontoside D



Leontoside E

$C_{59}H_{96}O_{27}$: 1236.613
Mp: 202–204°C [1]
$[\alpha]_D^{20}$ 0 ± 2° (c 1.51, MeOH) [1]
FD-MS *m/z*: 1259 {$[M]^+$+Na}$^+$, 1114 [1259-Rha]$^+$, 952 [1259-Rha-Glc]$^+$, 789 [952-Glc]$^+$ [2]
^{13}C NMR (400 MHz, C_5D_5N): [2]

Table 1

C-1	38.8	C-16	23.8	Ara-1	106.5	Glc-1	95.5	Rha-1	102.6
2	25.9	17	46.2	2	73.5	2	73.8	2	72.5
3	82.3	18	41.7	3	74.5	3	78.5	3	72.4
4	43.4	19	47.0	4	79.6	4	70.8	4	73.8
5	47.6	20	30.7	5	66.2	5	77.0	5	70.2
6	18.2	21	34.0	Glc-1	106.2	6	69.1	6	18.4
7	32.5	22	32.8	2	75.6	Glc′-1	104.6		
8	39.9	23	64.6	3	78.5	2	75.2		
9	48.2	24	13.4	4	71.3	3	76.4		
10	36.9	25	16.2	5	78.2	4	78.5		
11	23.3	26	17.6	6	62.6	5	77.9		
12	122.9	27	26.0			6	61.3		
13	144.1	28	176.5						
14	42.1	29	33.1						
15	28.3	30	23.7						

References

1. L.G. Mzhel'skaya, N.K. Abubakirov, Chem. Nat. Comp. **4**(3), 132 (1968)
2. X.-C. Li, D.-Z. Wang, S.-G. Wu, C.-R. Yang, Phytochemistry **29**, 595 (1990)

Leontoside E

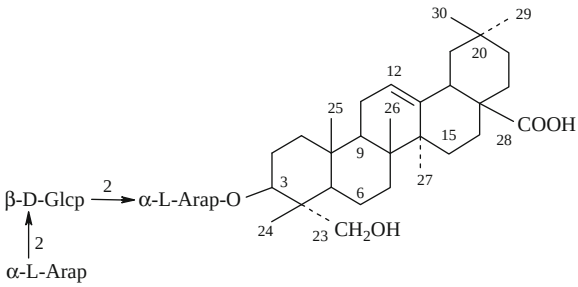
CAS Registry Number: 23558-06-7
See Figure Leontoside E
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Leontice eversmannii* [1]
$C_{65}H_{106}O_{32}$: 1398.666
Mp: 186–195°C [1]
$[\alpha]_D^{20}$ 0 ± 3° (c 1.25, MeOH) [1]

References

1. L.G. Mzhelskaya, N.K. Abubakirov, Chem. Nat. Comp. **4**(4), 186 (1968)

Medicoside C

CAS Registry Number: 102349-43-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Medicago sativa* [1]

$C_{46}H_{74}O_{17}$: 898.492

Mp: 227–229°C [1]

$[\alpha]_D^{21}$ +34.0° (c 0.41, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3200–3590, 1710 [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.06 (m, H-3), 5.25 (m, H-12), 4.04 (d, J = 10.0, H-23), 0.79 (9H), 0.82 (6H), 1.05 (3H)

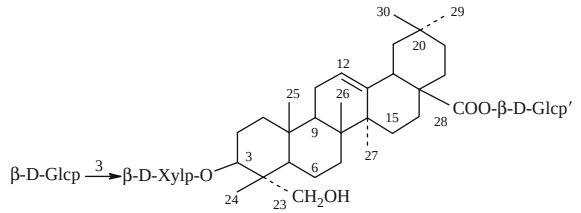
α-L-Arap: 5.05 (d, 6.3, H-1); α -L-Arap′: 5.05 (d, J = 6.3, H-1)

β-D-Glcp: 4.29 (d, 5.0, H-1) [1]

References

1. A.E. Timbekova, N.K. Abubakirov, Chem. Nat. Comp. **21**(6), 763 (1985)

Medicoside E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Medicago sativa* [1]

$C_{47}H_{76}O_{18}$: 928.503

$[\alpha]_D^{24}$ +51.9° (c 1.31, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3600–3200, 3000–2870, 1740, 1640, 1470, 1385, 1270 [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 0.85, 0.87, 0.90, 0.94, 1.08, 1.18 (s, CH_3 × 6), 5.4 (t, J = 3.15, H-12), 3.15 (dd, J = 4.5, 14.0, H-18)

β-D-Xylp: 4.93 (d, J = 7.0, H-1), 3.95 (t, J = 7.0, H-2), 3.97 (t, J = 7.0, H-3), 4.21 (dd, J = 5.0, 10.5, H-4), 3.51 (t, J = 10.5, Ha-5), 4.01 (t, J = Hb-5)

β-D-Glcp: 5.17 (d, J = 8.0, H-1), 4.00 (t, J = 8.0, H-2), 4.18 (t, J = 8.0, H-3), 4.09 (dd, J = 8.8, H-4), 3.96 (H-5), 4.47 (dd, J = 11.8, 2.5, H-6), 4.24 (H-6)

β-D-Glcp′: 6.24 (d, J = 8.0, H-1), 4.13 (t, J = 8.0, H-2), 4.18 (t, J = 8.0, H-3), 4.25 (dd, J = 6.5, H-4), 3.97 (H-5), 4.40 (dd, J = 12.0, 2.1, H-6), 4.32 (dd, J = 12.0, 4.4, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.5	Xyl-1	106.5	Glc′-1	95.9
2	26.2	17	47.1	2	74.4	2	74.2
3	81.9	18	41.8	3	88.4	3	79.4
4	43.6	19	46.3	4	69.7	4	71.2
5	47.6	20	30.9	5	66.6	5	79.0
6	18.2	21	34.1	Glc-1	105.8	6	62.3
7	32.9	22	32.6	2	75.6		

(*continued*)

Table 1 (continued)

8	40.1	23	64.2	3	78.8
9	48.3	24	13.7	4	71.7
10	37.0	25	16.3	5	78.4
11	24.0	26	17.6	6	62.6
12	123.1	27	26.2		
13	144.3	28	176.6		
14	42.2	29	33.2		
15	28.4	30	23.8		

References

1. A.E. Timbekova, A.S. Shashkov, N.K. Abubakirov, Chem. Nat. Comp. **29**(5), 622 (1993)

Medicoside F

CAS Registry Number: 141492-08-2

See Figure Medicoside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Medicago sativa* [1], *Fagonia cretica* [2]

$C_{47}H_{76}O_{18}$: 928.503

$[\alpha]_D^{23}$ +30.0° (c 2.37, MeOH) [2]

IR (KBr) ν_{max} cm^{-1}: 3600–3200, 3000–2860, 1740, 1650, 1465, 1390, 1260 [1]

FAB-MS *m/z*: 951 $[C_{47}H_{76}O_{18} + Na]^+$, 789 (951-Glc), 743, 437, 248, 203 [2]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.03, 1.56 (H_2-1), 1.97, 2.16 (H_2-2), 4.14 (H-3), 1.58 (H-5), 1.36, 1.70 (H_2-6), 1.27 (H-7), 1.75 (H-9), 1.93 (H-11), 5.43 (t, J = 3.3, H-12), 1.10, 2.31 (brd, J = 13.3, dt, J = 13.3, 3.5, H_2-15), 1.96, 2.04 (dt, J = 13.3, 3.0, H_2-16), 3.19 (dd, J = 14.7, 4.0, H-18), 1.23, 1.75 (H_2-19), 1.08, 1.33 (H_2-21), 1.73, 1.84 (H_2-22), 3.73, 4.20 (d, 10.0, H_2-23), 1.02, 0.97, 1.12, 1.18, 0.90, 0.89 (s, CH_3 × 6)

α-L-Arap: 5.15 (d, J = 6.0, H-1), 4.55 (t, J = 6.3, H-2), 4.24 (H-3), 4.29 (H-4), 3.70 (H-5), 4.27 (d, J = 11.3, H-5)

β-D-Glcp: 5.17 (d, J = 8.0, H-1), 4.05 (t, J = 8.8, H-2), 4.15 (t, J = 9.0, H-3), 4.20 (t, J = 8.0, H-4), 3.8 (m, H-5), 4.34 (dd, J = 10.7, 3.0, H-6), 4.44 (brd, J = 10.7, H-6)

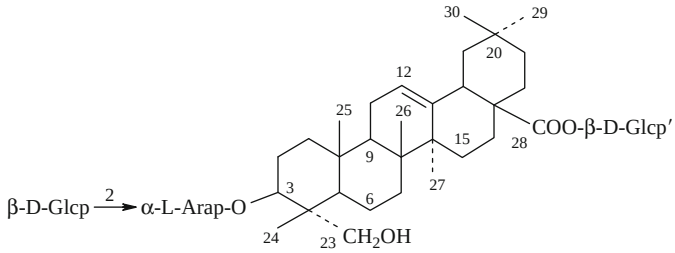
β-D-Glcp′: 6.31 (d, J = 8.0, H-1), 4.17 (t, J = 8.0, H-2), 4.25 (t, J = 9.0, H-3), 4.33 (t, H-4), 4.01 (m, H-5), 4.37 (dd, J = 10.7, 3.0, H-6), 4.45 (dd, J = 11.0, 2.0, H-6) [2]

^{13}C NMR (C_5D_5N): [2]

Table 1

C-1	38.9	C-16	23.5	Ara-1	103.9	Glc′-1	95.8
2	26.1	17	47.0	2	81.4	2	74.2
3	82.3	18	41.8	3	73.7	3	78.9
4	43.5	19	46.3	4	68.3	4	71.3
5	48.0	20	30.8	5	65.0	5	79.3
6	18.3	21	34.1	Glc-1	106.0	6	62.4
7	32.9	22	32.6	2	76.2		
8	40.0	23	65.0	3	78.3		

(*continued*)



Medicoside F

Table 1 (continued)

9	48.2	24	13.4	4	71.5
10	37.0	25	16.2	5	78.3
11	23.9	26	17.6	6	62.6
12	123.0	27	26.0		
13	144.2	28	176.4		
14	42.2	29	33.1		
15	28.3	30	23.7		

References

1. A.E. Timbekova, A.S. Shashkov, N.K. Abubakirov, Chem. Nat. Comp. **29**(5), 622 (1993)
2. S.M. Abdel-Khalik, T. Miyase, H.A. El-Ashaal, F.L. Melek, Phytochemistry **54**, 853 (2000)

Medicoside I

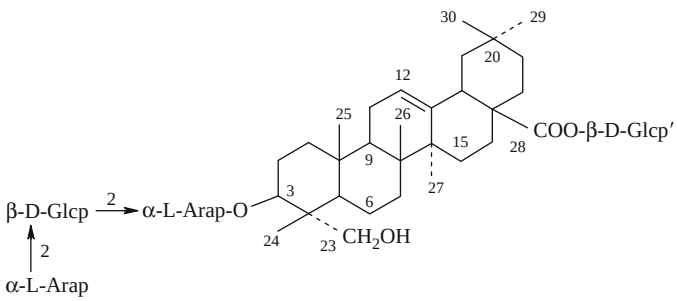
CAS Registry Number: 107241-23-6
See Figure Medicoside I
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Medicago sativa* [1]
$C_{52}H_{84}O_{22}$: 1060.545
Mp: 210–212°C [1]
$[\alpha]_D^{21}$ +38.2° (c 1.48, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3580–3240, 1740, 1265 [1]

References

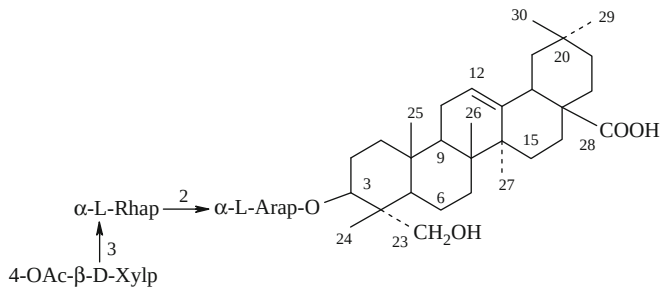
1. A.E. Timbekova, N.K. Abubakirov, Chem. Nat. Comp. **22**(5), 571 (1986)

Mukurozi-Saponin E_1

CAS Registry Number: 87733-78-6
See Figure Mukurozi-Saponin E
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Sapindus mukurossi* [1], *S. emarginatus* [2], *S. delavayi* [3]



Medicoside I



Mukurozi-Saponin E

$C_{48}H_{76}O_{17}$: 924.508
$[\alpha]_D^{23}$ −6.2° (c 1.0, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

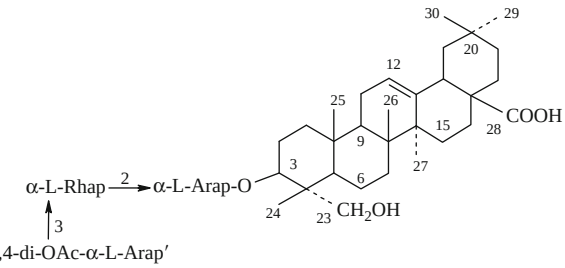
Table 1

C-1	38.9	C-16	23.7	Ara-1	104.4	Xyl-1	106.7
2	26.1	17	46.6	2	75.4	2	75.1
3	81.2	18	42.0	3	74.6	3	74.6
4	43.5	19	46.6	4	69.4	4	72.7
5	47.6	20	30.9	5	65.8	5	63.3
6	18.2	21	34.2	Rha-1	101.2	Ac-1	170.4
7	33.2	22	33.2	2	71.7	2	20.7
8	39.6	23	63.9	3	82.3		
9	48.1	24	14.0	4	72.7		
10	36.8	25	16.0	5	69.4		
11	23.7	26	17.4	6	18.2		
12	122.5	27	26.1				
13	144.6	28	180.1				
14	42.0	29	33.2				
15	28.2	30	23.7				

References

1. H. Kimata, T. Nakashima, S. Kokubun, K. Nakayama, Y. Mitoma, T. Kitahara, N. Yata, O. Tanaka, Chem. Pharm. Bull. **31**(6), 1998 (1983)
2. T. Kamchamapoom, R. Kasai, K. Yamasaki, Chem. Pharm. Bull. **49**, 1195 (2001)
3. K. Nakayama, H. Fujiko, R. Kasai, O. Tanaka, J. Zhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)

Mukurozi-Saponin G



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Sapindus mukurossi* [1], *S. delavayi* [2]
$C_{50}H_{78}O_{18}$: 966.518
$[\alpha]_D^{23}$ +24.0° (c 0.96, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.8	Ara-1	104.5	Ara′-1	106.7
2	26.2	17	46.7	2	75.3	2	70.1
3	81.3	18	42.2	3	74.9	3	73.9
4	43.6	19	46.7	4	69.6	4	69.6
5	47.7	20	31.0	5	66.0	5	64.2
6	18.3	21	34.2	Rha-1	101.2	Ac-1	170.6
7	33.2	22	33.2	2	71.8	2	20.9
8	39.8	23	64.2	3	82.1		
9	48.1	24	14.1	4	72.9		
10	36.9	25	16.1	5	69.3		
11	23.8	26	17.6	6	18.3		
12	122.5	27	26.2				
13	144.8	28	180.5				
14	42.2	29	33.2				
15	28.3	30	23.8				

Pharm./Biol.: Crude saponin 100 and 200 mg/kg p.o. showed significant anti-inflammatory activity on carrageenin edema [3]

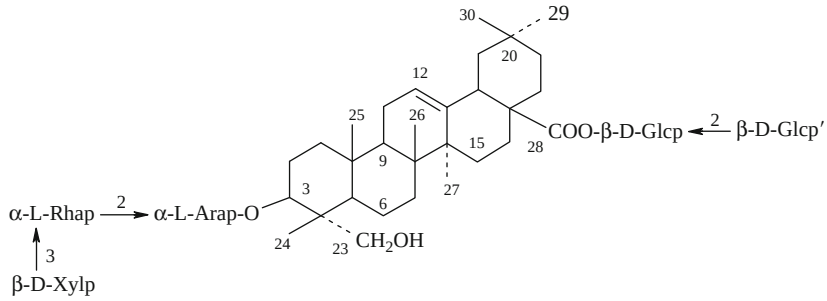
References

1. H. Kimata, T. Nakashima, S. Kokubun, K. Nakayama, Y. Mitoma, T. Kitahara, N. Yata, O. Tanaka, Chem. Pharm. Bull. **31**(6), 1998 (1983)
2. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, J. Zhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)
3. K. Takagi, E.-H. Park, H. Kato, Chem. Pharm. Bull. **28**(4), 1183 (1980)

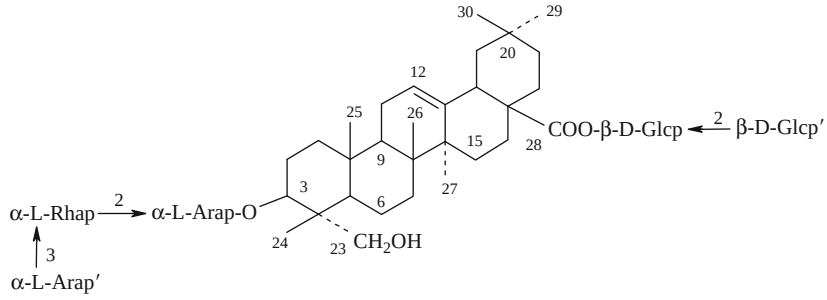
Mukurozi-Saponin Y_1

CAS Registry Number: 87733-76-4
See Figure Mukurozi-Saponin Y_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin



Mukurozi-Saponin Y_1



Mukurozi-Saponin Y_2

Biological sources: *Sapindus mukurossi* [1], *S. delavayi* [2]
$C_{58}H_{94}O_{26}$: 1206.603
$[\alpha]_D^{21}$ −10.1 (c 0.98, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	23.0	Ara-1	104.5	Glc-1	93.6
2	26.2	17	47.0	2	75.5	2	78.9
3	81.0	18	41.7	3	75.0	3	78.3
4	43.6	19	46.1	4	69.6	4	70.7
5	47.5	20	30.7	5	66.2	5	78.3
6	18.4	21	34.0	Rha-1	101.3	6	63.9
7	33.1	22	32.3	2	71.9	Glc′-1	104.5
8	40.0	23	63.9	3	82.9	2	75.5
9	48.2	24	14.2	4	72.5	3	78.3
10	36.8	25	16.1	5	69.6	4	72.8
11	23.8	26	17.5	6	18.4	5	78.9
12	122.5	27	26.2	Xyl-1	107.4	6	61.9
13	144.4	28	176.2	2	75.5		
14	42.0	29	33.1	3	78.3		
15	29.1	30	23.8	4	71.1		
				5	67.3		

References

1. H. Kimata, T. Nakashima, S. Kokubun, K. Nakayama, Y. Mitoma, T. Kitahara, N. Yata, O. Tanaka, Chem. Pharm. Bull. **31**(6), 1998 (1983)
2. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, J. Zhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)

Mukurozi-Saponin Y_2

CAS Registry Number: 87781-65-5
See Figure Mukurozi-Saponin Y_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Sapindus mukurossi* [1], *S. delavayi* [2]
$C_{58}H_{94}O_{26}$: 1206.603
$[\alpha]_D^{21}$ −4.8° (c 1.0, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	22.9	Ara-1	104.3	Glc-1	93.4
2	25.9	17	46.8	2	75.2	2	78.6
3	80.9	18	41.9	3	74.7	3	77.9
4	43.4	19	45.9	4	69.2	4	70.5
5	47.4	20	30.5	5	65.7	5	78.6
6	18.2	21	33.9	Rha-1	101.2	6	63.6
7	32.9	22	32.0	2	71.7	Glc′-1	104.3
8	39.8	23	63.6	3	82.8	2	75.5
9	48.0	24	13.8	4	72.7	3	77.9
10	36.7	25	15.9	5	69.2	4	72.7
11	23.6	26	17.3	6	18.2	5	78.6
12	122.5	27	25.9	Ara′-1	107.1	6	61.7
13	144.2	28	176.2	2	72.7		
14	41.9	29	32.9	3	74.3		
15	28.9	30	23.6	4	69.2		
				5	66.8		

References

1. H. Kimata, T. Nakashima, S. Kokubun, K. Nakayama, Y. Mitoma, T. Kitahara, N. Yata, O. Tanaka, Chem. Pharm. Bull. **31**(6), 1998 (1983)
2. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, J. Zhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)

Mukurozy-Saponin X (Compound 10, Tauroside ST-G_3)

See Figure Mukurozy-Saponin X (Compound 10, Tauroside ST-G_3)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Sapindus mukurossi* [1]

$C_{53}H_{86}O_{22}$: 1074.561

$[\alpha]_D^{17}$ −3.7° (c 1.1, MeOH) [1]

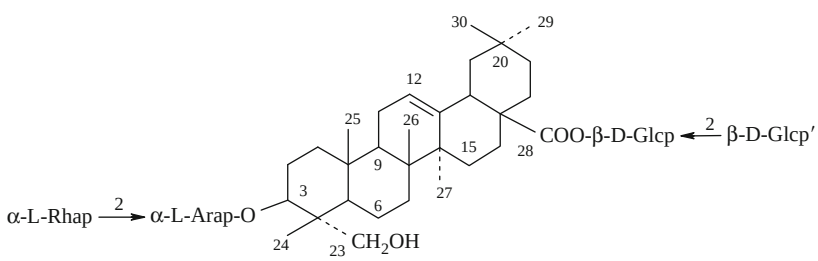
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	22.9	Ara-1	104.5	Glc-1	93.6
2	26.2	17	47.0	2	75.9	2	79.0
3	81.0	18	41.8	3	75.1	3	78.2
4	43.5	19	46.1	4	69.6	4	70.7
5	47.6	20	30.7	5	66.0	5	78.2
6	18.5	21	33.9	Rha-1	101.5	6	64.0
7	33.1	22	32.4	2	72.5	Glc′-1	104.5
8	40.0	23	64.0	3	72.5	2	75.5
9	48.2	24	14.1	4	74.1	3	78.2
10	36.8	25	16.1	5	69.9	4	72.5
11	23.8	26	17.5	6	18.5	5	79.0
12	122.5	27	26.2			6	62.0
13	144.4	28	176.5				
14	42.0	29	33.1				
15	29.3	30	23.8				

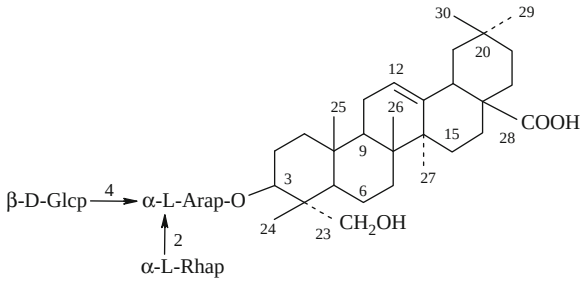
References

1. H. Kimata, T. Nakashima, S. Kokubun, K. Nakayama, Y. Mitoma, T. Kitahara, N. Yata, O. Tanaka, Chem. Pharm. Bull. **31**(6), 1998 (1983)



Mukurozy-Saponin X (Compound 10,Tauroside ST-G_3)

Pulsatilla-Saponin D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Pulsatilla cernua* [1], *Serjania salzmanniana* [2]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 239–242°C (MeOH-AcOEt, dec.) [1]

$[\alpha]_D^{24}$ +14.9° (C_5H_5N) [1]

HR-FABMS *m/z*: 913.5158 $[M + H]^+$ [2]

FAB-MS *m/z*: 912 $[M]^-$ (100), 766 $[M\text{-Rha}]^-$ (15), 750 $[M\text{-Glc}]^-$ (31), 603 $[M\text{-Rha-Glc}]^-$ (17.8), 470 $[M\text{-Glc-Rha-Ara}]^-$ (32) [2]

^{1}H NMR (300 MHz, J/Hz, C_5D_5N):

α-L-Arap: 4.99 (d, J = 6.8, H-1), 4.47–4.55 (m, H-2), 4.06 (dd, J = 4.0, H-3), 4.1–4.26 (m, H-4), 3.66 (d, J = 11.6, H-5), 4.47–4.55 (m, H-5)

α-L-Rhap: 6.28 (s, H-1), 4.78–4.96 (m, H-2), 4.64 (dd, J = 3.2, 6.3, H-3), 4.31 (dd, 9.2, 9.2, H-4), 4.72–4.76 (m, H-5), 1.65 (d, J = 6.1, CH_3-6)

β-D-Glcp: 5.13 (d, J = 7.7, H-1), 4.02 (dd, J = 8.3, 8.3, H-2), 4.13–4.19 (m, H-3), 4.16–4.25 (m, H-4), 3.88–3.92 (m, H-5), 4.36–4.40 (m, H-6), 4.47–4.55 (m, H-6) [2]

^{13}C NMR (75 MHz, C_5D_5N): [2]

Table 1

Ara-1	104.35	Glc-1	106.60
2	76.07	2	75.28
3	74.85	3	78.25
4	80.38	4	71.02
5	65.42	5	78.64
Rha-1	101.50	6	62.29
2	72.11		
3	72.15		
4	73.85		
5	69.57		
6	18.57		

(*continued*)

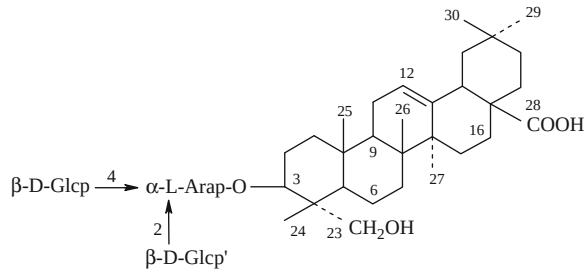
Pharm./Biol.: Antifungal and molluscicidal activity [1]

References

1. M. Shimizu, K.-I. Shingyouchi, N. Morita, H. Kizu, T. Tomimori, Chem. Pharm. Bull. **26**(6), 1666 (1978)
2. O.A. Ekabo, N.R. Farnsworth, Th.O. Henderson, R. Mukherjee, J. Nat. Prod. **59**, 431 (1996)

Pulsatiloside A

CAS Registry Number: 126778-78-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Pulsatilla campanella* [1]

$C_{47}H_{76}O_{18}$: 928.503

Mp: 248–250°C [1]

$[\alpha]_D^{26}$ +28.7°(c 0.871, C_5H_5N) [1]

FD-MS *m/z*: 951 {$[M]^+$+Na}, 789 $[951\text{-Glc}]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N):

β-D-Glcp: 5.13 (H-1); β-D-Glcp′: 5.08 (d, J = 7.7, H-1)

α-L-Arap: 5.14 (H-1), 4.52 (t, H-2), 4.35 (H-3), 4.43 (H-4) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.8	Ara-1	103.4	Glc′-1	105.3
2	25.7	17	46.5	2	80.7	2	75.5
3	82.4	18	42.0	3	72.6	3	78.1
4	43.4	19	46.7	4	77.0	4	71.4
5	47.8	20	30.9	5	63.6	5	78.0
6	18.2	21	34.3	Glc-1	105.4	6	62.5

(*continued*)

Table 1 (continued)

7	32.9	22	33.2	2	75.8
8	39.8	23	64.9	3	78.3
9	48.1	24	13.3	4	71.4
10	36.9	25	16.0	5	78.0
11	23.7	26	17.4	6	62.6
12	122.5	27	261.1		
13	144.8	28	180.1		
14	42.2	29	33.2		
15	28.3	30	23.7		

References

1. X.-C. Li, D.-Z. Wang, S.-G. Wu, C.-R. Yang, Phytochemistry **29**, 595 (1990)

Pulsatiloside B

See Figure Pulsatiloside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Pulsatilla campanella* [1]

$C_{65}H_{106}O_{32}$: 1398.666

Mp: 218–220°C [1]

$[\alpha]_D^{26}$ +3.5° (c 0.993, C_5H_5N) [1]

FD-MS *m*/*z*: 1421 $[M + Na]^+$, 1275 $[1421\text{-Rha}]^+$, 1114 $[1275\text{-Glc}]^+$, 952 $[1114\text{-Glc}]^+$, 789 $[952\text{-Glc}]^+$

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-19	47.1	Ara-1	103.4	Glc″-1	95.6
2	25.9	20	30.7	2	80.9	2	73.9
3	82.3	21	34.1	3	72.7	3	78.4
4	43.4	22	32.8	4	77.1	4	70.9
5	47.9	23	64.9	5	63.8	5	77.0
6	18.3	24	13.4	Glc-1	105.5	6	69.4
7	32.5	25	16.2	2	75.9	Glc‴-1	104.7
8	39.9	26	17.6	3	78.2	2	75.2
9	48.2	27	26.0	4	71.5	3	76.5
10	36.9	28	176.5	5	78.1	4	78.6
11	23.4	29	33.1	6	62.6	5	77.9
12	122.9	30	23.7	Glc′-1	105.5	6	61.4
13	144.1			2	75.6	Rha-1	102.7
14	42.2			3	78.2	2	72.7
15	28.3			4	71.4	3	72.4
16	23.8			5	78.0	4	73.8
17	46.2			6	62.6	5	70.3
18	41.7					6	18.4

(*continued*)

References

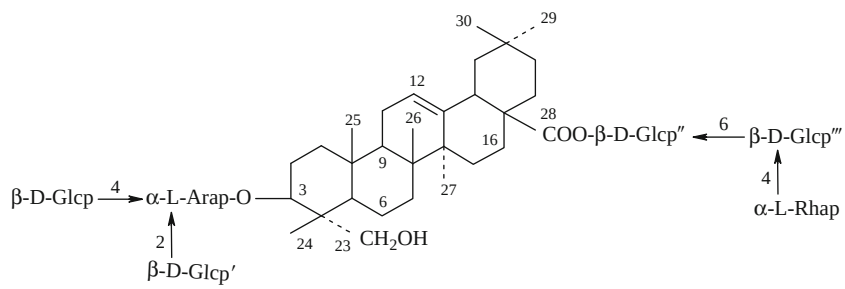
1. X.-C. Li, D.-Z. Wang, S.-G. Wu, C.-R. Yang, Phytochemistry **29**, 595 (1990)

Quinoa-Saponin 1

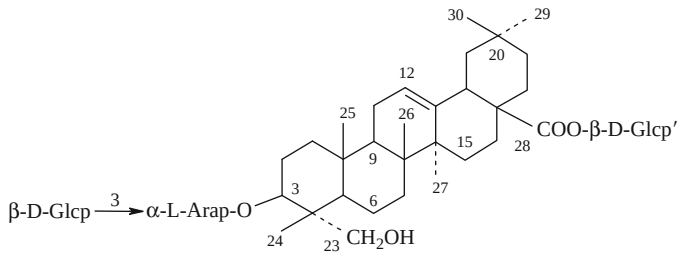
See Figure Quinoa-Saponin 1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Chenopodium quinoa* [1], *Aralia elata* [2]



Pulsatiloside B



Quinoa-Saponin 1

$C_{47}H_{76}O_{18}$: 928.503
$[\alpha]_D^{17}$ +31.1° (c 1.00, MeOH) [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): α-L-Arap: 4.93 (d, J = 7.0, H-1); β-D-Glcp: 5.27 (d, J = 7.4, H-1); β-D-Glcp′: 6.29 (d, J = 7.0, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

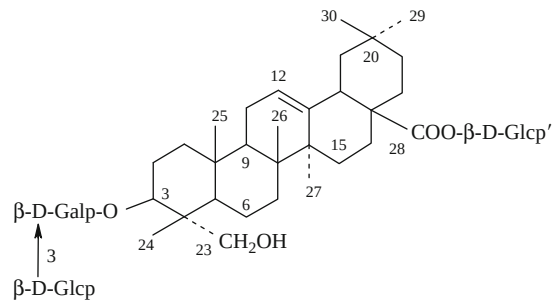
Table 1

C-1	38.7	C-18	41.7	Ara-1	106.5
2	26.1	19	46.1	2	71.9
3	81.8	20	30.8	3	84.2
4	43.5	21	34.0	4	69.3
5	47.5	22	33.1	5	67.1
6	18.1	23	64.1	Glc-1	106.3
7	32.9	24	13.6	2	75.6
8	39.9	25	16.2	3	78.3
9	48.2	26	17.5	4	71.5
10	36.9	27	26.1	5	78.7
11	23.6	28	176.4	6	62.6
12	123.5	29	33.1	Glc′-1	95.7
13	144.1	30	23.3	2	74.1
14	42.1			3	79.2
15	28.2			4	71.1
16	23.5			5	78.8
17	46.9			6	62.2

References

1. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **36**, 1415 (1988)
2. S.-J. Song, N. Nakamura, C.-M. Ma, M. Hattori, S. Xu, Chem. Pharm. Bull. **48**(6), 838 (2000)

Quinoa-Saponin 2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Chenopodium quinoa* [1]
$C_{48}H_{78}O_{19}$: 958.513
$[\alpha]_D^{24}$ +46.9° (c 0.97, C_5H_5N) [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): β-D-Galp: 4.98 (d, J = 7.2, H-1); β-D-Glcp: 5.25 (d, J = 7.7, H-1); β-D-Glcp′: 6.24 (d, J = 6.8, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.9	Gal-1	106.0
2	26.2	19	46.4	2	72.2
3	82.6	20	30.8	3	85.2
4	43.5	21	34.1	4	69.9
5	47.9	22	33.1	5	76.5
6	18.4	23	65.0	6	62.4
7	32.7	24	13.6	Glc-1	106.4

(*continued*)

Table 1 (continued)

8	40.1	25	16.2	2	75.8
9	48.3	26	17.7	3	78.5
10	37.1	27	26.2	4	71.4
11	23.9	28	176.4	5	78.4
12	123.0	29	33.1	6	62.8
13	144.3	30	23.8	Glc′-1	95.8
14	42.3			2	74.2
15	28.4			3	79.1
16	23.9			4	71.7
17	47.1			5	78.9
				6	62.5

References

1. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **36**, 1415 (1988)

Quinoa-Saponin 10

See Figure Quinoa-Saponin 10

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Chenopodium quinoa* [1]

$C_{47}H_{74}O_{19}$: 942.482

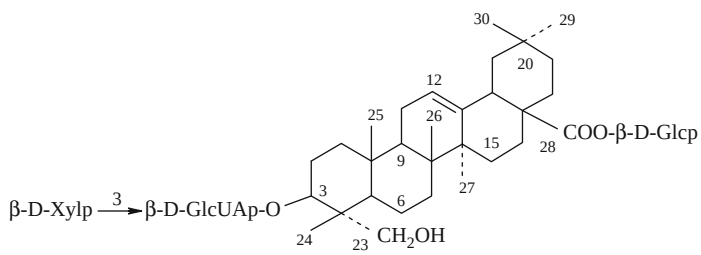
$[\alpha]_D^{19}$ +8.7° (c 0.8, C_5H_5N) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-GlcUAp: 5.22 (d, J = 7.1, H-1)

β-D-Xylp: 5.28 (d, J = 7.3, H-1)

β-D-Glcp: 6.31 (d, J = 8.1, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]



Quinoa-Saponin 10

Table 1

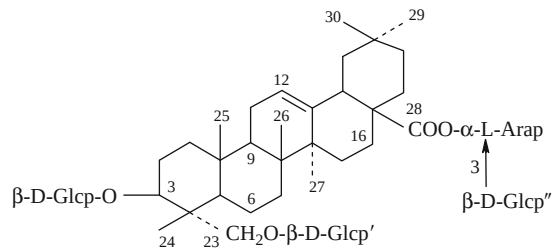
C-1	38.6	C-16	23.6	GlcUA-1	106.2	Glc-1	95.7
2	26.1	17	47.0	2	74.5	2	74.1
3	82.1	18	41.7	3	86.5	3	78.9
4	43.5	19	46.2	4	71.4	4	70.9
5	47.4	20	30.8	5	77.8	5	79.2
6	18.2	21	34.0	6	172.2	6	62.2
7	32.7	22	33.1	Xyl-1	105.9		
8	39.9	23	64.1	2	75.3		
9	48.1	24	13.6	3	78.0		
10	36.8	25	16.1	4	71.1		
11	23.6	26	17.5	5	67.4		
12	122.9	27	26.1				
13	144.1	28	176.4				
14	42.1	29	33.1				
15	28.3	30	23.6				

References

1. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **38**(2), 375 (1990)

Quinoside A

CAS Registry Number: 123597-11-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Chenopodium quinoa* [1]
$C_{53}H_{86}O_{23}$: 1090.555

References

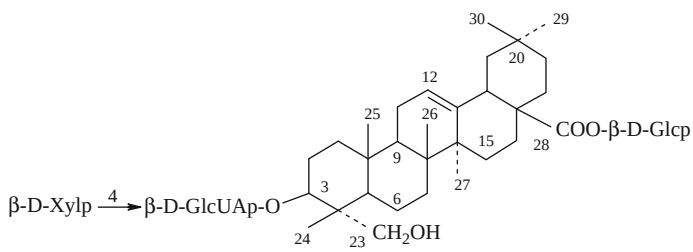
1. B.H. Meyer, P.F. Heinstein, M. Burnouf-Radosevich, N.-E. Delfel, J.L. Mc Laughlin, J. Agric. Food. Chem. **38**, 205 (1990)

Salsoloside D

See Figure Salsoloside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Salsola micranthera* [1], *Aralia cordata* [2]
$C_{47}H_{74}O_{19}$: 942.482
Mp: 228–230°C [1]
$[\alpha]_D^{20}$ +18.6° (c 1.2, MeOH) [1]
^{13}C NMR (C_5D_5N) (Me ester): [2]

Table 1

C-3	82.3	GlcUA-1	104.8	Xyl-1	105.7	Glc-1	95.4
28	176.2	2	73.7	2	75.4	2	73.7
		3	74.8	3	77.5	3	78.5
		4	80.8	4	70.8	4	70.3
		5	74.8	5	66.9	5	78.8
		6	169.5			6	61.9
		Me	52.1				



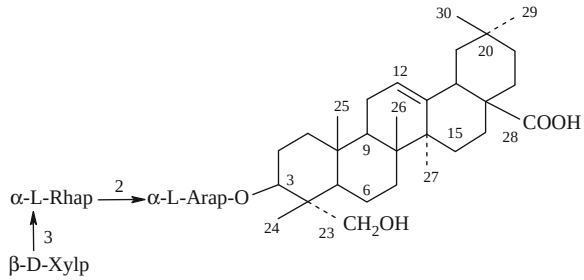
Salsoloside D

References

1. Ch. Annaev, M. Isamukhamedova, N.K. Abubakirov, Chem. Nat. Comp. **19**(6), 691 (1983)
2. H. Kawai, M. Nishida, Y. Tashiro, M. Kuroyanagi, A. Ueno, M. Satake, Chem. Pharm. Bull. **37**(9), 2318 (1989)

Sapindoside B

CAS Registry Number: 30994-75-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Sapindus mukurossi* [1, 2], *S. delavayi* [3], *Akebia quinata* [4], *Lecaniodiscus cupanioides* [5]
$C_{47}H_{74}O_{16}$: 894.497
Mp: 276–278°C [1]
$[\alpha]_D^{20}$ +17.5° (c2.85, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [2]

Table 1

C-1	38.9	C-16	23.7	Ara-1	104.3	Xyl-1	107.1
2	26.1	17	46.5	2	75.4	2	75.2

(*continued*)

Table 1 (continued)

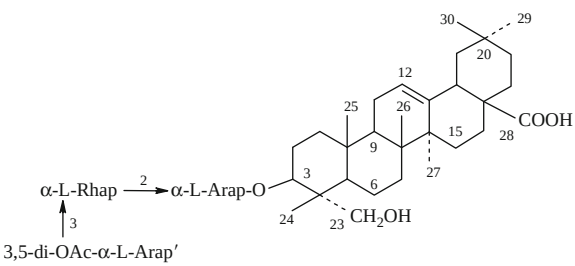
3	80.9	18	41.8	3	74.8	3	78.1
4	43.5	19	46.5	4	69.4	4	70.8
5	47.5	20	30.8	5	65.9	5	67.1
6	18.4	21	34.1	Rha-1	101.1		
7	33.2	22	33.2	2	71.7		
8	39.6	23	63.9	3	82.6		
9	48.1	24	14.1	4	72.7		
10	36.8	25	16.1	5	69.4		
11	23.7	26	17.4	6	18.3		
12	122.3	27	26.1				
13	144.4	28	179.8				
14	42.0	29	33.2				
15	28.2	30	23.7				

Pharm./Biol.: Molluscicidal activity [6]

References

1. V.Ya. Chirva, P.K. Kintya, V.A. Sosnovskii, P.E. Krivenchuk, N.Ya. Zykova, Chem. Nat. Comp. **6**(2), 213 (1970)
2. H. Kimata, T. Nakashima, S. Kokubun, K. Nakayama, Y. Mitoma, T. Kitahara, N. Yata, O. Tanaka, Chem. Pharm. Bull. **31**(6), 1998 (1983)
3. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, J. Jhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)
4. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **24**(5), 1021 (1976)
5. R. Encarnacion, L. Kenne, G. Samuelsson, F. Sandberg, Phytochemistry **20**(8), 1939 (1981)
6. K. Hostettmann, H. Kizu, T. Tomimori, Planta Med. **44**, 34 (1981)

Saponin



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Sapindus delavayi* [1]

$C_{50}H_{78}O_{14}$: 902.539

^{13}C NMR (25 MHz, C_5D_5N): [1]

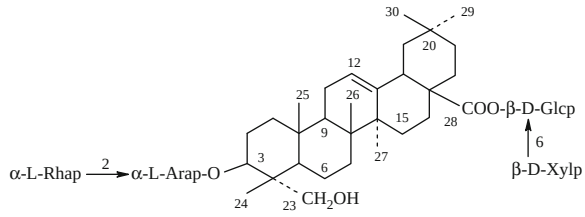
Table 1

Ara-1	104.6	Ara′-1	111.2
2	75.3	2	80.9
3	75.3	3	80.6
4	69.7	4	81.2
5	66.3	5	64.6
Rha-1	101.2	Ac-1	170.7
2	72.0	2	20.7
3	79.7	Ac′-1	170.7
4	72.5	2	20.7
5	69.7		
6	18.4		

References

1. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, J. Jhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)

Saponin 1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Aralia elata* [1]

$C_{52}H_{84}O_{21}$: 1044.550

Mp: 209–213°C [1]

$[\alpha]_D^{18}$ −5.7° (c 0.88, MeOH) [1]

IR (Nujol)ν_{max} cm^{-1}: 1740 [1]

FAB-MS *m/z*: 1083 $[M + K]^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 5.40 (1H, brs, H-12), 0.88, 0.88, 0.95, 0.95, 1.16, 1.19 (s, $CH_3 \times 6$)
α-L-Arap: 5.11 (d, J = 5.5, H-1)
α-L-Rhap: 6.21 (s, H-1), 1.43 (d, J = 5.9, CH_3-6)
β-D-Glcp: 6.26 (d, J = 7.0, H-1)
β-D-Xylp: 4.92 (d, J = 7.3, H-1) [1]
^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

Ara-1	105.6	Glc-1	95.6
2	75.9	2	73.9
3	74.7	3	78.7
4	67.0	4	71.0
5	64.0	5	77.3
Rha-1	101.7	6	69.2
2	72.3	Xyl-1	104.2
3	72.5	2	74.1
4	74.5	3	74.7
5	69.7	4	70.9
6	18.5	5	65.5

References

1. S. Saito, S. Sumita, N. Tamura, Y. Nagamura, K. Nishida, M. Ito, I. Ishiguro, Chem. Pharm. Bull. **38**(2), 411 (1990)

Saponin 3

See Figure Saponin 3

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

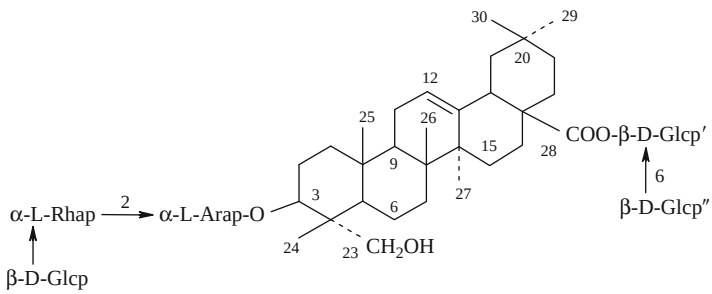
Biological sources: *Aralia elata* [1]
$C_{59}H_{96}O_{27}$: 1236.613
Mp: 219–221°C (n-BuOH) [1]
$[\alpha]_D^{20}$ −6.9° (c 1.44, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 1735 [1]
FAB-MS *m/z* (negative): 1275 $[M + K]^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 5.41 (brs, H-12), 1.19, 1.16, 1.13, 0.99, 0.87, 0.87 (s, CH_3-24, 25, 26, 27, 29, 30)
α-L-Arap: 5.00 (d, J = 5.9, H-1)
α-L-Rhap: 6.30 (s, H-1), 1.55 (d, J = 6.2, H-6)
β-D-Glcp′: 5.52 (d, J = 7.7, H-1), β-D-Glcp″: 6.28 (d, J = 8.1, H-1), β-D-Glcp: 5.05 (d, J = 7.3, H-1) [1]
^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

Ara-1	104.6	Glc-1	106.4	Glc″-1	104.9
2	75.6	2	75.3	2	74.9
3	74.6	3	78.4	3	78.2
4	69.6	4	71.3	4	71.1
5	66.0	5	78.1	5	78.1
Rha-1	101.2	6	62.4	6	62.6
2	71.4	Glc′-1	96.3		
3	82.7	2	73.7		
4	72.6	3	78.3		
5	69.4	4	70.6		
6	18.3	5	77.7		
		6	69.2		

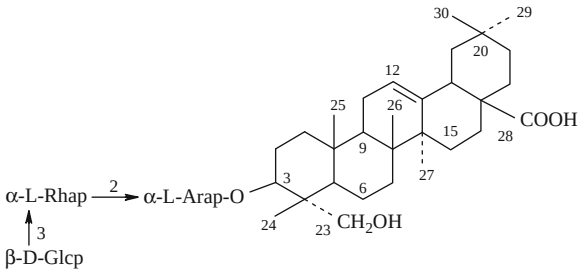
References

1. S. Saito, S. Sumita, N. Tamura, Y. Nagamura, K. Nishida, M. Ito, I. Ishiguro, Chem. Pharm. Bull. **38**(2), 411 (1990)



Saponin 3

Saponin 4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Aralia elata* [1]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 240–245°C [1]

$[\alpha]_D^{22}$ +7.6° (c 1.34, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 1690 [1]

FAB-MS *m/z* (negative): 951 $[M + K]^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 5.40 (brs, H-12), 1.19, 1.05, 0.95, 0.95, 0.88, 0.87 (s, CH_3-24, 25, 26, 27, 29, 30)

α-L-Arap: 4.95 (d, J = 6.6, H-1)

α-L-Rhap: 6.15 (s, H-1), 1.43 (d, J = 5.9, CH_3-6)

β-D-Glcp: 5.39 (d, J = 7.7, H-1) [1]

^{13}C NMR (67.8 MHz, C_5D_5N):

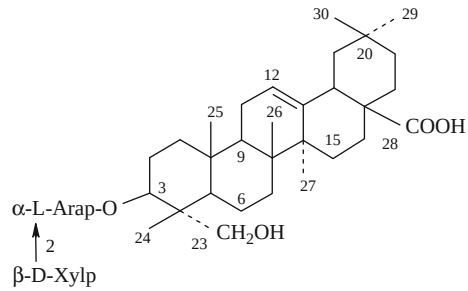
Table 1

Ara-1	104.8	Rha-1	101.4	Glc-1	106.5
2	75.6	2	71.6	2	75.6
3	74.8	3	82.8	3	78.4
4	69.6	4	72.8	4	71.6
5	66.2	5	69.7	5	78.3
		6	18.4	6	62.5

References

1. S. Saito, S. Sumita, N. Tanamura, Y. Nagamura, K. Nishida, M. Ito, I. Ishiguro, Chem. Pharm. Bull. **38**(2), 411 (1990)

Saponin B from *Akebia quinata*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Akebia quinata* [1]

$C_{40}H_{64}O_{12}$: 736.439

Mp: 249.5–250.5°C [1]

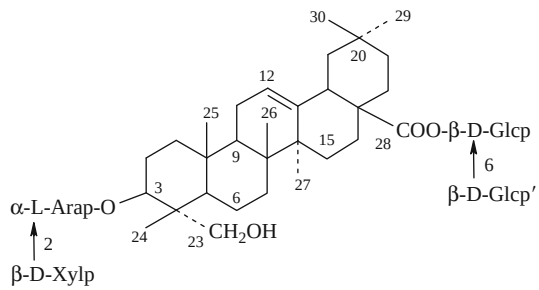
$[\alpha]_D$ +37.0° (c 1.05, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3350, 1690 [1]

References

1. R. Higuchi, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **20**(9), 1935 (1972)

Saponin E

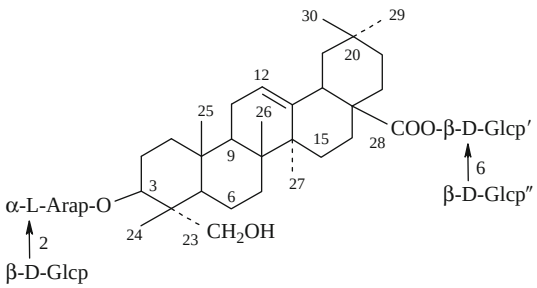


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Akebia quinata* [1]
$C_{52}H_{84}O_{22}$: 1060.545
Mp: 210–214°C (dec. MeOH) [1]
$[\alpha]_D$ +6.0° (c 1.8, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3350, 1755, 1740, 1725 [1]

References

1. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **20**(10), 2143 (1972)

Saponin F



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Akebia quinata* [1], *Lonicera nigra* [2], *Acanthopanax hypoleucus* [3]
$C_{53}H_{86}O_{23}$: 1090.555
Mp: 211–214°C (dec. MeOH) [1]
$[\alpha]_D$−4° (c 2.65, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3350, 1755, 1740, 1725 [1]
FD-MS *m/z*: 1129 $[M + K]^+$, 1113 $[M + Na]^+$, 951 $[(M + Na)-162]^+$, 789 $[(M + Na)-324]^+$, $[(627 + Na)-486]^+$, 495 $[(M + Na)-618]^+$ [2]
^{13}C NMR (400 MHz, C_5D_5N): [3]

Table 1

C-1	38.61	C-16	23.69	Ara-1	103.64	Glc′-1	95.46
2	25.74	17	46.86	2	80.94	2	73.68
3	82.07	18	41.51	3	73.37	3	78.47
4	43.30	19	46.07	4	68.05	4	71.22
5	47.70	20	30.55	5	64.70	5	78.16
6	18.07	21	33.81	Glc-1	105.59	6	69.20
7	32.61	22	32.37	2	75.96	Glc″-1	104.96
8	39.74	23	64.70	3	78.05	2	74.92
9	47.98	24	13.24	4	71.35	3	77.72
10	36.74	25	16.02	5	77.98	4	70.73
11	47.98	26	17.40	6	62.36	5	78.16
12	122.70	27	25.88			6	62.45
13	143.99	28	176.38				
14	41.97	29	32.92				
15	28.12	30	23.52				

References

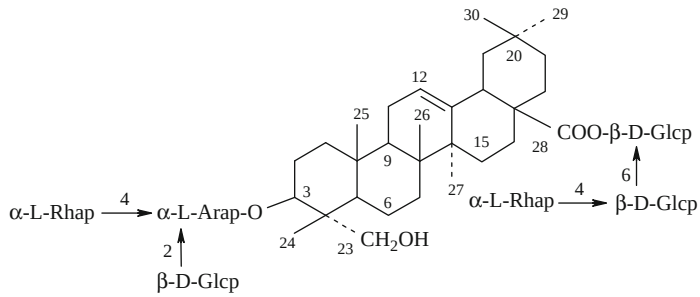
1. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **20**(10), 2143 (1972)
2. B. Domon, K. Hostettmann, Helv. Chim. Acta **66**, 422 (1983)
3. H. Kohda, S. Tanaka, Y. Yamaoka, Chem. Pharm. Bull. **38**(12), 3380 (1990)

Saponin G

See Figure Saponin G
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Akebia quinata* [1]
$C_{65}H_{106}O_{31}$: 1382.671
Mp >218°C (dec. MeOH) [1]
$[\alpha]_D$ −19.0° (c 4.4, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3350, 1755, 1740, 1725 [1]

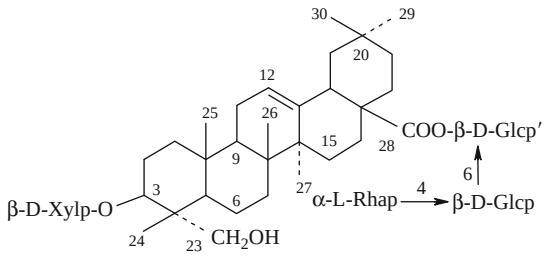
References

1. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **20**(10), 2143 (1972)



Saponin G

Saponin Hcst-B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera colchica* [1]

$C_{53}H_{86}O_{22}$: 1074.561

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 1.09, 1.62 (H_2-1), 2.23, 2.01 (H-2), 4.24 (H-3), 1.65 (H-5), 1.66, 1.37 (H_2-6), 1.66, 1.37 (H_2-7), 1.76 (H-9), 1.95, 1.95 (H_2-11), 5.41 (H-12), 2.28, 1.10 (H_2-15), 2.03, 1.91 (H_2-16), 3.18 (H-18), 1.72, 1.22 (H_2-19), 1.33, 1.13 (H_2-21), 1.77, 1.90 (H_2-22), 3.70, 4.27 (H_2-23), 0.96, 1.00, 1.11, 1.10, 0.88, 0.91 (s, CH_3-24, 25, 25, 26, 27, 29, 30)

β-D-Xylp: 5.01 (d, J = 7.3, H-1), 3.97 (H-2), 4.03 (H-3), 4.17 (H-4), 3.63, 4.30 (H_2-5)

β-D-Glcp: 6.19 (d, J = 7.8, H-1), 4.09 (H-2), 4.17 (H-3), 4.23 (H-4), 4.08 (H-5), 4.64, 4.30 (H_2-6)

β-D-Glcp′: 4.96 (d, J = 7.4, H-1), 3.9 (H-2), 4.11 (H-3), 4.34 (H-4), 3.67 (H-5), 4.07, 4.20 (H_2-6)

α-L-Rhap: 5.77 (H-1), 4.61 (H-2), 4.48 (H-3), 4.26 (H-4), 4.85 (H-5), 1.67 (CH_3-6) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

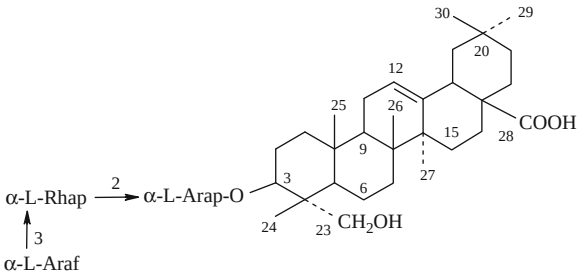
Table 1

C-1	39.0	C-16	23.4	Xyl-1	106.8	Glc′-1	104.9
2	26.1	17	47.3	2	75.6	2	75.5
3	82.3	18	41.8	3	78.6	3	76.6
4	43.6	19	46.4	4	71.1	4	78.7
5	47.8	20	30.9	5	67.2	5	77.2
6	18.3	21	34.1	Glc-1	95.8	6	61.6
7	33.0	22	32.7	2	74.0	Rha-1	102.8
8	40.4	23	64.9	3	78.8	2	72.5
9	48.2	24	13.6	4	71.1	3	72.8
10	37.1	25	16.2	5	78.1	4	74.1
11	23.4	26	17.7	6	69.5	5	70.4
12	123.0	27	26.1			6	18.5
13	144.2	28	176.2				
14	42.2	29	33.1				
15	28.4	30	23.8				

References

1. V. Mshvildadze, O. Kunert, G. Dekanosidze, E. Kemertelidze, E. Haslinger, Chem. Nat. Comp. **40**(6), 561 (2004)

Saponin S-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Lecaniodiscus cupanioides* [1], *Sapindus mukurossi* [2], *S. delavayi* [3]

$C_{46}H_{74}O_{16}$: 882.497

$[\alpha]_D^{25}$ +12.0° (c 0.5, EtOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [2]

Table 1

C-1	38.8	C-16	23.7	Ara-1	104.4	Ara′-1	110.8
2	26.1	17	46.6	2	75.4	2	82.2
3	81.3	18	42.0	3	74.6	3	78.7
4	43.4	19	46.6	4	69.4	4	87.2
5	47.8	20	30.9	5	65.8	5	62.7
6	18.3	21	34.2	Rha-1	101.2		
7	33.2	22	33.2	2	71.6		
8	39.7	23	64.1	3	79.2		
9	48.1	24	13.9	4	72.3		
10	36.8	25	16.0	5	69.4		
11	23.7	26	17.4	6	18.3		
12	122.6	27	26.1				
13	144.7	28	180.2				
14	42.0	29	33.2				
15	28.3	30	23.7				

(*continued*)

References

1. R. Encarnacion, L. Kenne, G. Samuelsson, F. Sandberg, Phytochemistry **20**(8), 1939 (1981)
2. H. Kimata, T. Nakashima, S. Kokubun, K. Nakayama, Y. Mitoma, T. Kitahara, N. Yata, O. Tanaka, Chem. Pharm. Bull. **31**(6), 1998 (1983)
3. K. Nakayama, H. Fujino, R. Kasai, O. Tanaka, J. Zhou, Chem. Pharm. Bull. **34**(5), 2209 (1986)

Songoroside B (Saponin B)

See Figure Songoroside B (Saponin B)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis songarica* [1, 2]

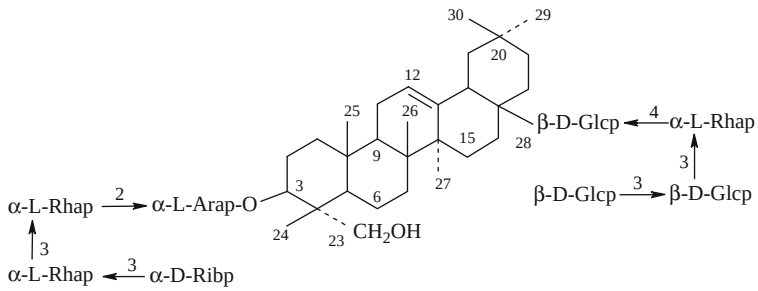
$C_{76}H_{124}O_{33}$: 1564.802

Mp: 240–242°C [1]

$[\alpha]_D^{18}$ −27° (c 2.2, DMFA) [1]

References

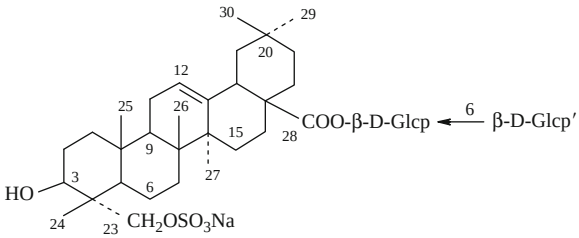
1. V.V. Krokhmalyuk, P.K. Kintya, V.Ya. Chirva, Chem. Nat. Comp. **11**(5), 629 (1975)
2. V.V. Krokhmalyuk, P.K. Kintya, V.Ya. Chirva, Z.I. Boschko, Chem. Nat. Comp. **11**(4), 488 (1975)



Songoroside B (Saponin B)

Sulfapatrinoside II

CAS Registry Number: 120204-05-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Patrinia scabiosaefolia* [1]

$C_{42}H_{67}NaO_{17}S$: 898.399

Mp: 242–244°C (EtOH) [1]

$[\alpha]_D^{20}$ +25.3° (c 0.33, C_5D_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 1720, 1230, 1050, 825 [1]

FAB-MS *m/z*: 897 ($[M-H]^-$, 3), 875 [$(M-Na)^-$ 47], 713 [$(M-Na-162)^-$, 1], 551 [$(M-Na-324)^-$, 10] , 507 (9), 297 (100) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.20-4.30 (H-3α), 5.39 (H-12), 3.13 (dd, J = 10.1, 3.5, H-18β), 4.20, 4.67 (d, 10.3, H_2-23), 0.85 (s, CH_3-24), 0.85 (s, CH_3-25), 0.87 (s, CH_3-26), 0.90 (s, CH_3-27), 1.04 (s, CH_3-29), 1.10 (s, CH_3-30), 4.95 (d, 7.8), 6.14 (d, J = 8.2, H of 2 × Glc) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.86	C-16	23.72	Glc-1	95.76
2	26.98	17	47.06	2	73.85
3	71.58	18	41.66	3	78.35
4	42.89	19	46.21	4	71.07
5	48.00	20	30.74	5	77.94
6	18.42	21	33.98	6	69.53
7	32.59	22	32.75	Glc′-1	105.21
8	39.90	23	70.26	2	75.16
9	47.90	24	12.97	3	78.73
10	37.27	25	16.26	4	71.71
11	23.41	26	17.58	5	78.44
12	122.73	27	26.12	6	62.64
13	144.40	28	176.68		
14	42.12	29	33.07		
15	28.18	30	23.72		

Pharm./Biol.: Used in China as a diuretic and for "Qing Re Jie Du" (treatment of fever and inflammation along with detoxication), "Huo Xue Hua Yu" (mobilization of blood circulation and treatment of stasis) [1]

References

1. A. Inada, M. Yamada, H. Murata, M. Kobayashi, H. Toya, Y. Kato, T. Nakanishi, Chem. Pharm. Bull. **36**(11), 4269 (1988)

Tauroside ST-H_1

CAS Registry Number: 153118-56-0

See Figure Tauroside ST-H_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Hedera taurica* [1]

$C_{54}H_{88}O_{23}$: 1104.571

$[\alpha]_D$ +4.5° (c 4.3, C_5H_5N) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N):

β-D-Glcp: 5.06 (d, J = 7.8, H-1), 3.97 (t, J = 8.6, H-2), 4.11 (t, J = 7.2, H-3), 4.18 (t, J = 9.0, H-4), 3.83 (m, H-5), 4.45 (dd, J = 2.0, 3.0, Ha-6), 4.32 (dd, J = 4.5, 12.5, Hb-6)

β-D-Glcp′: 6.18 (d, J = 8.0, H-1), 4.05 (t, J = 9.0, H-2), 4.15 (t, J = 8.5, H-3) 4.24 (t, J = 9.5, H-4), 4.04 (Ha-6), 4.25 (Hb-6)

β-D-Glcp″: 4.93 (d, J = 8.0, H-1), 3.87 (t, J = 8.5, H-2), 4.08 (t, 9J = .5, H-3), 4.34 (t, 9.5, H-4), 3.59 (m, H-5), 4.15 (dd, J = 3.8, Ha-6), 4.02 (dd, J = 5.5, 14.0, Hb-6)

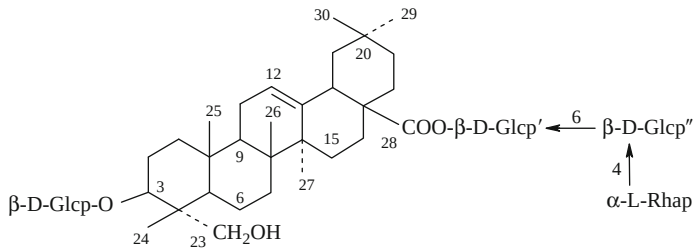
α-L-Rhap: 5.79 (d, J = 1.5, H-1), 4.61 (dd, J = 3.4, H-2), 4.48 (dd, J = 9.5, H-3), 4.28 (t, J = 9.5, H-4), 4.88 (d, J = 6.5, H-5), 1.65 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (250 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.7	Glc-1	105.7	Glc″-1	104.7
2	26.0	17	46.2	2	75.6	2	75.1
3	82.3	18	41.6	3	78.4	3	76.3

(*continued*)



Tauroside ST-H$_1$

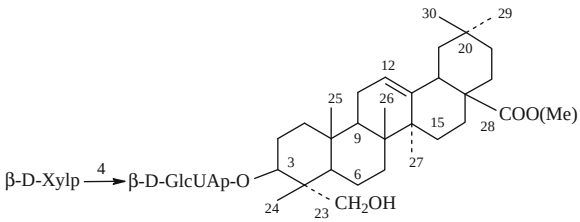
Table 1 (continued)

4	43.3	19	47.0	4	71.5	4	78.1
5	47.7	20	30.7	5	78.1	5	77.0
6	18.2	21	34.0	6	62.7	6	61.2
7	32.5	22	32.8	Glc′-1	95.5	Rha-1	102.6
8	39.8	23	64.7	2	73.8	2	72.3
9	48.1	24	13.5	3	78.4	3	72.5
10	36.9	25	16.2	4	70.7	4	73.8
11	23.3	26	17.5	5	77.9	5	70.2
12	122.9	27	25.8	6	69.2	6	18.4
13	144.1	28	176.5				
14	42.1	29	33.0				
15	28.3	30	23.7				

References

1. A.S. Shashkov, V.I. Grishkovets, O.Ya. Tsvetkov, V.Ya. Chirva, Chem. Nat. Comp. **29**(4), 502 (1993)

Udosaponin D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Aralia cordata* [1]

$C_{41}H_{64}O_{14}$: 780.429

$[\alpha]_D$ −4.7° (c 1.0, MeOH) (Me ester) [1]

FAB-MS *m/z*: 987 $[M + H]^+$ [1]

^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

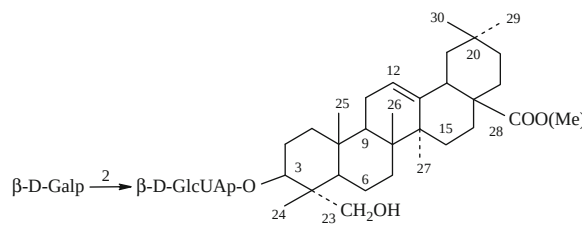
Table 1

C-3	82.5	GlcUA-1	105.1	Xyl-1	105.9
28	177.8	2	73.8	2	75.6
OMe	51.4	3	74.8	3	77.7
		4	81.0	4	70.5
		5	74.8	5	67.1
		6	169.6		
		OMe	52.2		

References

1. H. Kawai, M. Nishida, Y. Tashiro, M. Kuroyanagi, A. Ueno, M. Satake, Chem. Pharm. Bull. **37**(9), 2318 (1989)

Udosaponin E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Aralia cordata* [1]

$C_{42}H_{66}O_{15}$: 810.440
$[\alpha]_D$−12.3° (c 1.0, MeOH) (Me ester) [1]
^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

C-3	82.0	GlcUA-1	104.2	Gal-1	106.4
28	177.8	2	82.9	2	72.4
OMe	51.4	3	76.7	3	74.7
		4	74.2	4	69.4
		5	77.3	5	76.5
		6	170.2	6	61.3
		OMe	51.7		

References

1. H. Kawai, M. Nishida, Y. Tashiro, M. Kuroyanagi, A. Ueno, M. Satake, Chem. Pharm. Bull. **37**(9), 2318 (1989)

Vitalboside D

CAS Registry Number: 53915-38-1
See Figure Vitalboside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Clematis vitalba* [1]
$C_{52}H_{84}O_{21}$: 1044.550
Mp: 180–182°C [1]
$[\alpha]_D^{20}$−53° (c 1.14, MeOH) [1]

References

1. P.K. Kintya, V.N. Melnikov, V.Ya. Chirva, Chem. Nat. Comp. **10**(6), 833 (1974)

Vitalboside F

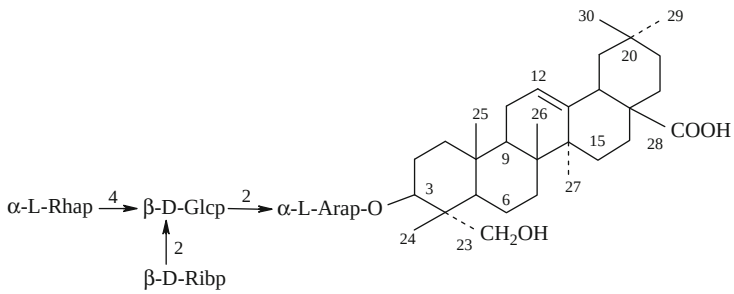
CAS Registry Number: 38358-51-9
See Figure Vitalboside F
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Clematis vitalba* [1]
$C_{58}H_{94}O_{26}$: 1206.603
Mp: 208–210°C [1]
$[\alpha]_D^{20}$−19.4° (c 1.27, MeOH) [1]

References

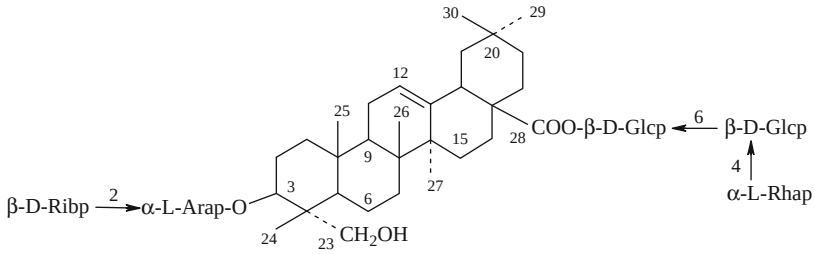
1. V.Ya. Chirva, P.K. Kintya, V.N. Melnikov, Chem. Nat. Comp. **8**(4), 468 (1972)

Vitalboside G

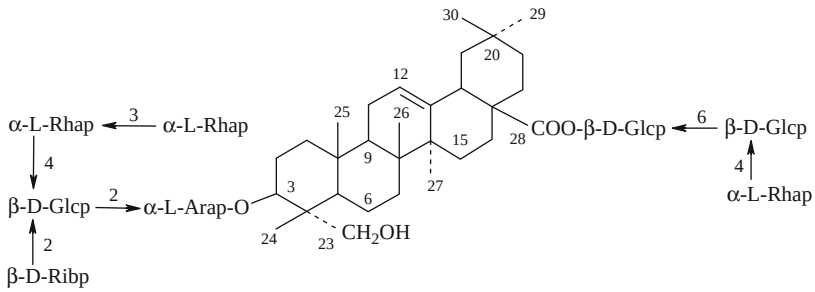
CAS Registry Number: 54004-75-0
See Figure Vitalboside G



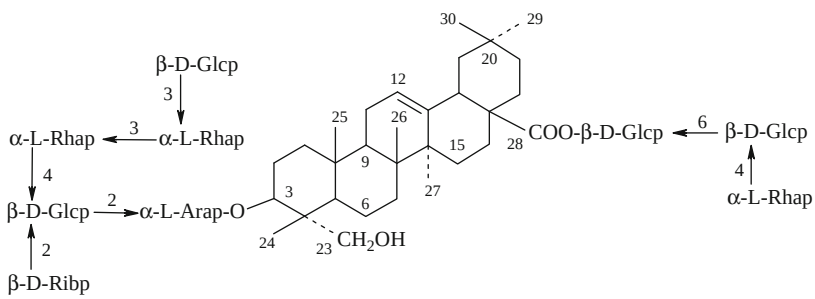
Vitalboside D



Vitalboside F



Vitalboside G



Vitalboside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis vitalba* [1]

$C_{76}H_{124}O_{39}$: 1660.771

Mp: 192–194°C [1]

$[\alpha]_D^{20}$ +60° (c 0.67, MeOH) [1]

References

1. P.K. Kintya, V.N. Melnikov, V.Ya. Chirva, Chem. Nat. Comp. **10**(6), 831 (1974)

Vitalboside H

CAS Registry Number: 54004-76-1

See Figure Vitalboside H

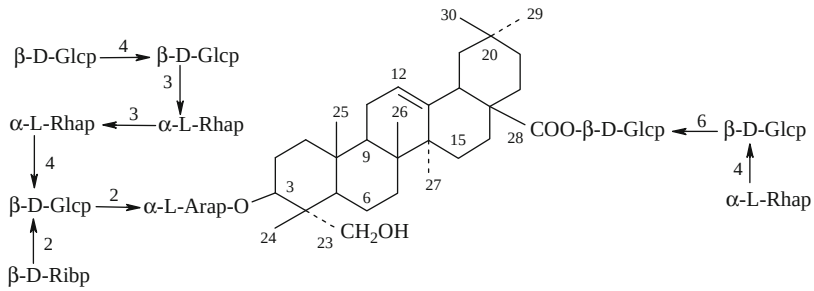
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin

Biological sources: *Clematis vitalba* [1]

$C_{82}H_{134}O_{44}$: 1822.824

Mp: 178–180°C [1]

$[\alpha]_D$ +35° (MeOH) [1]



Vitalboside J

References

1. V.Ya. Chirva, P.K. Kintya, V.N. Melnikov, Dokl. AN. SSSR **217**(4), 969 (1974) (in Russian)

Vitalboside J

CAS Registry Number: 54004-77-2
See Figure Vitalboside J
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Hederagenin
Biological sources: *Clematis vitalba* [1]
$C_{88}H_{144}O_{49}$: 1984.877
Mp: 230–232°C [1]
$[\alpha]_D$ +45° (MeOH) [1]

References

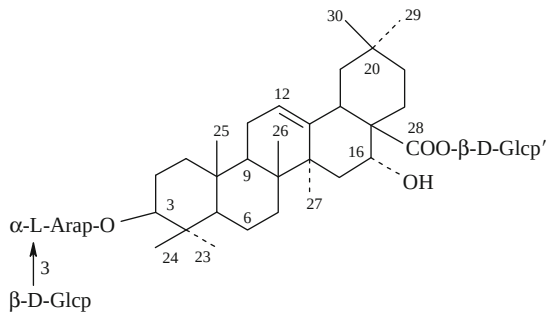
1. V.Ya. Chirva, P.K. Kintya, V.N. Melnikov, Dokl. AN. SSSR **217**(4), 969 (1974) (in Russian)

Glycosides of Aglycones of Oleanene Type

Glycosides of Echinocystic Acid

Aralia-Saponin I

CAS Registry Number: 289649-54-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aralia elata* [1]

$C_{47}H_{76}O_{18}$: 928.503

$[\alpha]_D$ −28.9° (c 0.15, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2950, 2880, 1740, 1640, 1464, 1394, 1300, 1278, 1030, 995 [1]

HR-FAB-MS *m/z*: 951.4910 $[M + Na]^+$ [1]

ESI-MS (positive ion mode) *m/z*: 951 $[M + Na]^+$, 789 $[M + Na\text{-}Glc]^+$ [1]

ESI-MS (negative ion mode) *m/z*: 927 $[M\text{-}H]^-$, 765 $[M\text{-}H\text{-}Glc]^-$, 603 $[M\text{-}H\text{-}Glc\text{-}Glc]^-$, 461 $[M\text{-}H\text{-}Glc\text{-}Glc\text{-}Ara]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.34 (dd, J = 4.0, 11.5, H-3), 5.59 (brs, H-12), 5.31 (brs, H-16), 3.51 (dd, J = 4.5, 14.0, H-18), 1.26, 0.96, 0.87, 1.12, 1.84, 0.99, 1.02 (s, CH_3-23, 24, 25, 26, 27, 29, 30)

α-L-Arap: 4.73 (d, J = 7.5, H-1), 4.58 (H-2), 4.20 (H-3), 4.42 (H-4), 3.59 (d, J = 11.5, H-5), 4.13 (d, J = 11.0, H-5); β-D-Glcp: 5.39 (d, J = 8.0, H-1), 4.02 (H-2), 3.98 (H-3), 4.21 (H-4), 3.95 (H-5), 4.45 (H_2-6); β-D-Glcp′: 6.33 (d, J = 8.0, H-1), 4.13 (H-2), 4.24 (H-3), 4.30 (H-4), 4.00 (H-5), 4.53 (H_2-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Ara-1	107.3
2	26.7	19	47.2	2	71.8
3	88.5	20	30.8	3	84.0
4	39.6	21	36.1	4	69.2
5	55.9	22	32.2	5	66.9
6	18.5	23	28.1	Glc-1	106.2
7	33.4	24	16.9	2	75.6
8	40.1	25	15.7	3	78.3
9	47.2	26	17.6	4	71.5
10	37.1	27	27.2	5	78.6
11	23.8	28	175.9	6	62.2
12	122.7	29	33.2	Glc′-1	95.7
13	144.4	30	24.6	2	74.4
14	42.1			3	78.8
15	35.9			4	71.1
16	74.1			5	79.3
17	49.1			6	62.6

Pharm./Biol.: Used as a folk medicine for rheumatism, diabetes and as a tonic [1]

References

1. S.-J. Song, N. Nakamura, C.-M. Ma, M. Hattori, S. Xu, Chem. Pharm. Bull. **48**(6), 838 (2000)

Aralia-Saponin IV

CAS Registry Number: 289649-67-8

See Figure Aralia-Saponin IV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aralia elata* [1]

$C_{54}H_{88}O_{24}$: 1120.566

$[\alpha]_D$ −18.8° (c 0.2, C_5H_5N) [1]

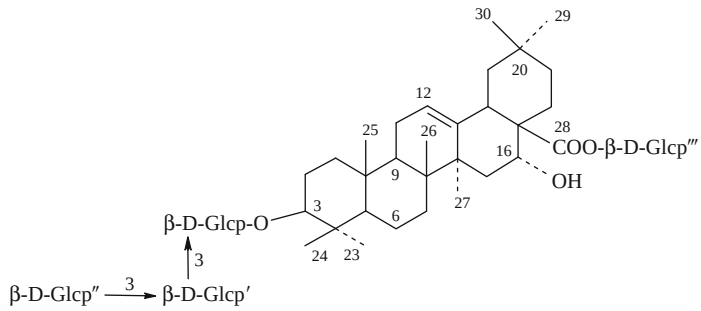
IR (KBr) ν_{max} cm^{-1}: 3400, 2860, 2850, 1738, 1628, 1450, 1394, 1310, 1210, 1040, 890 [1]

HR-FAB-MS *m/z*: 1143.5583 $[M + Na]^+$ [1]

ESI-MS (positive ion mode) *m/z*: 1143 $[M + Na]^+$, 981 $[M + Na\text{-}Glc]^+$ [1]

ESI-MS (negative ion mode) *m/z*: 1119 $[M\text{-}H]^-$, 957 $[M\text{-}H\text{-}Glc]^-$, 795 $[M\text{-}H\text{-}Glc\text{-}Glc]^-$, 633 $[M\text{-}H\text{-}Glc\text{-}Glc\text{-}Glc]^-$, 471 $[M\text{-}H\text{-}Glc\text{-}Glc\text{-}Glc\text{-}Glc]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.35 (dd, J = 4.0, 11.5, H-3), 5.59 (brs, H-12), 5.31 (brs, H-16), 3.51



Aralia-Saponin IV

(dd, J = 4.0, 12.0, H-18), 1.26, 0.98, 0.85, 1.12, 1.84, 0.98, 1.02 (s, CH_3-23, 24, 25, 26, 27, 29, 30) β-D-Glcp: 4.85 (d, J = 8.0, H-1), 4.02 (H-2), 4.19 (H-3), 3.92 (H-4), 4.05 (H-5), 4.52 (H_2-6); β-D-Glcp′: 5.28 (d, J = 8.0, H-1), 4.06 (H-2), 4.22 (H-3), 4.16 (H-4), 4.42 (H-5), 4.43 (H-6); β-D-Glcp″: 5.31 (d, J = 8.0, H-1), 4.04 (H-2), 4.21 (H-3), 3.92 (H-4), 4.42 (H-5), 4.52 (H_2-6); β-D-Glcp‴: 6.35 (d, J = 8.0, H-1), 4.14 (H-2), 4.25 (H-3), 4.28 (H-4), 4.01 (H-5), 4.43 (H_2-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	74.5	Glc-1	106.3	Glc″-1	105.2
2	27.2	17	49.1	2	74.5	2	75.6
3	88.9	18	41.3	3	88.2	3	78.7
4	39.5	19	47.5	4	69.8	4	71.6
5	55.8	20	30.8	5	78.2	5	77.8
6	18.5	21	36.9	6	62.2	6	62.5
7	33.2	22	32.1	Glc′-1	105.8	Glc‴-1	95.9
8	40.0	23	28.1	2	74.4	2	74.3
9	47.1	24	17.0	3	88.4	3	78.9
10	36.9	25	15.6	4	69.8	4	71.1
11	23.8	26	17.5	5	78.1	5	79.3
12	122.7	27	27.2	6	62.2	6	62.5
13	144.4	28	175.9				
14	42.0	29	33.2				
15	36.1	30	24.5				

Pharm./Biol.: Used as a folk medicine for rheumatism, diabetes and as a tonic [1]

References

1. S.-J. Song, N. Nakamura, C.-M. Ma, M. Hattor, S. Xu, Chem. Pharm. Bull. **48**(6), 838 (2000)

Astersaponin B

See Figure Astersaponin B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster tataricus* [1]

$C_{67}H_{108}O_{33}$: 1440.677

$[\alpha]_D^{23}$ −63.7° (c 0.8, MeOH) [1]

FAB-MS *m/z*: 1463 $[M + Na]^+$, 1439 $[M-H]^-$ [1]

^{1}H NMR: 5.60 (brdd, H-12), 1.25 (s, CH_3-23), 1.02 (s, CH_3-24), 0.88 (s, CH_3-25), 1.08 (s, CH_3-26), 1.80 (s, CH_3-27), 1.02 (s, CH_3-29), 1.12 (s, CH_3-30)

β-D-Glcp: 4.84 (d, J = 7.0, H-1)

α-L-Arap: 4.95 (d, J = 7.0, H-1)

β-D-Xylp: 6.25 (d, J = 5.0, H-1)

α-L-Rhap: 6.00 (brs, H-1), 1.72 (d, J = 6.0, H-6)

β-D-Apif: 5.34 (d, J = 8.0, H-1)

α-L-Arap′: 5.95 (d, J = 4.0, H-1)

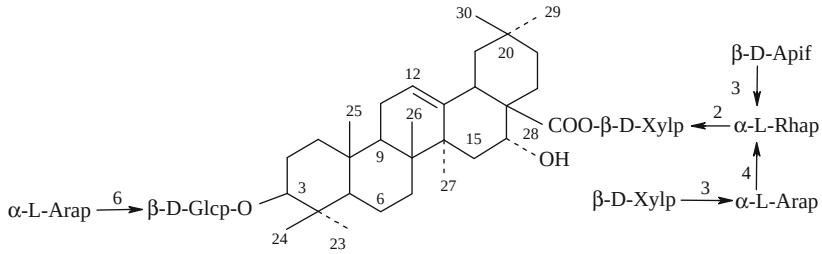
β-D-Xylp′: 5.16 (d, J = 7.0, H-1) [1]

^{13}C NMR: [1]

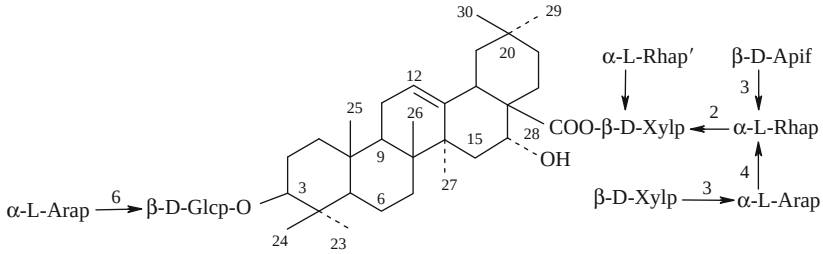
Table 1

C-1	38.9	C-16	74.1	Glc-1	104.7
2	26.7	17	49.5	Ara-1	105.9
3	89.1	18	41.5	Xyl-1	95.2
4	39.5	19	47.4	Rha-1	101.6
5	56.0	20	30.8	6	18.9
6	18.6	21	36.0	Api-1	111.7
7	33.5	22	31.9	3	79.7
8	40.1	23	28.2	Ara′-1	106.8
9	47.1	24	17.1	Xyl′-1	105.2
10	37.0	25	15.7		

(*continued*)



Astersaponin B



Astersaponin D

Table 1 (continued)

11	23.8	26	17.6
12	122.7	27	27.1
13	144.3	28	176.0
14	42.1	29	33.2
15	36.1	30	24.7

References

1. T. Nagao, S. Hachiyama, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **37**(8), 1977 (1989)

Astersaponin D

See Figure Astersaponin D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster tataricus* [1]

$C_{73}H_{118}O_{37}$: 1586.735

$[\alpha]_D^{27}$ −70.2° (c 1.4, MeOH) [1]

FAB-MS *m/z*: 1609 $[M + Na]^+$, 1585 $[M-H]^-$ [1]

^{1}H NMR: 5.59 (brdd, H-12), 1.24 (s, CH_3-23), 0.98 (s, CH_3-24), 0.86 (s, CH_3-25), 1.02 (s, CH_3-26), 1.74 (s, CH_3-27), 1.02 (s, CH_3-29), 1.17 (s, CH_3-30)

β-D-Glcp: 4.94 (d, J = 7.0, H-1)

α-L-Arap: 5.94 (d, J = 4.0, H-1)

β-D-Xylp: 4.94 (d, J = 7.0, H-1)

α-L-Rhap: 5.65 (brs, H-1), 1.64 (d, J = 6.0, CH_3-6)

β-D-Apif: 5.29 (d, J = 8.0, H-1)

α-L-Arap′: 6.50 (d, J = 4.0, H-1)

β-D-Xylp′: 5.21 (d, J = 8.0, H-1)

α-L-Rhap′: 5.61 (brs, H-1), 1.59 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR: [1]

Table 1

C-1	38.9	C-16	74.0	Glc-1	104.8
2	26.7	17	49.4	Ara-1	105.8
3	89.1	18	41.5	Xyl-1	93.9
4	39.4	19	47.1	Rha-1	101.7
5	55.9	20	30.8	6	18.5
6	18.5	21	35.9	Api-1	111.8
7	33.5	22	32.1	3	79.8
8	40.0	23	28.2	Ara′-1	105.2
9	47.1	24	17.0	Xyl′-1	106.8

(*continued*)

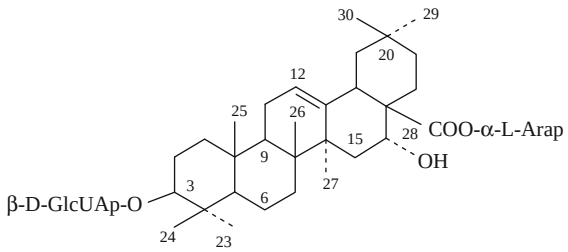
Table 1 (continued)

10	37.0	25	15.6	Rha′-1	101.0
11	23.8	26	17.6	6	18.5
12	122.9	27	27.1		
13	144.2	28	175.8		
14	42.0	29	33.2		
15	36.0	30	24.8		

References

1. T. Nagao, S. Hachiyama, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **37**(8), 1977 (1989)

Astersaponin Ha



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster tataricus* [1]

$C_{41}H_{64}O_{14}$: 780.429

$[\alpha]_D$ −19.3° (c 1.9, MeOH) [1]

FAB-MS *m/z* (Me ester): 817 $[M + Na]^+$ [1]

^{1}H NMR (Me ester): 5.61 (brdd, H-12), 1.28 (s, CH_3-23), 1.05 (s, CH_3-24), 0.98 (s, CH_3-25), 0.88 (s, CH_3-26), 1.81 (s, CH_3-27), 1.02 (s, CH_3-29), 1.13 (s, CH_3-30)

β-D-GlcUAp: 4.98 (d, J = 8, H-1), 4.07 (dd, J = 8, 9, H-2), 4.24 (dd, J = 9, 9, H-3), ca 4.45 (H-4), 4.57 (d, J = 10, H-5), 3.74 (s, COOMe)

α-L-Arap: 6.32 (d, J = 5, H-1), 4.55 (dd, J = 5, 6, H-2), 4.39 (dd, J = 3, 6, H-3), ca 4.47 (H-4), 3.92, ca 4.43 (dd, J = 3, 11, H_2-5) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.2
2	26.6	17	49.5	2	75.3
3	89.1	18	41.3	3	77.9
4	39.5	19	47.1	4	73.1
5	55.9	20	30.8	5	77.1
6	18.5	21	36.0	6	170.7
7	33.4	22	32.0	COOMe	52.0
8	40.0	23	28.1	Ara-1	95.8
9	47.1	24	16.9	2	71.3
10	37.0	25	15.6	3	73.6
11	23.8	26	17.5	4	67.5
12	122.7	27	27.1	5	65.6
13	144.4	28	175.8		
14	42.0	29	33.2		
15	36.0	30	24.7		

References

1. R. Tanaka, T. Nagao, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **38**(5), 1153 (1990)

Astersaponin Hb

See Figure Astersaponin Hb

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster tataricus* [1]

$C_{47}H_{74}O_{18}$: 926.487

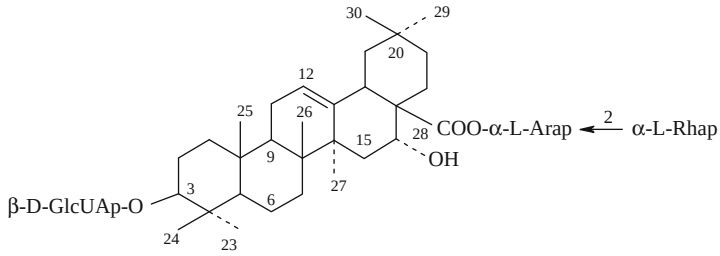
$[\alpha]_D$ −54.3° (c 2.0, MeOH) [1]

FAB-MS (Me ester) *m/z* : 963 $[M + Na]^+$ [1]

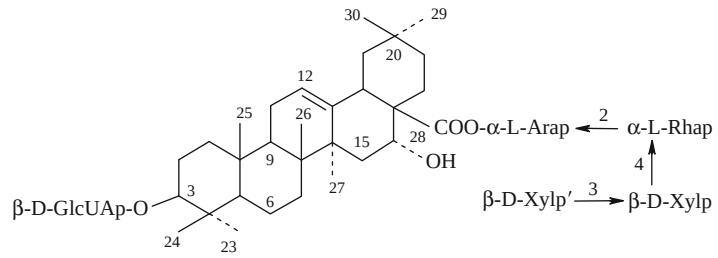
^{1}H NMR (Me ester): 5.61 (dd, J = 3, 3, H-12), 1.27 (s, CH_3-23), 1.08 (s, CH_3-24), 0.96 (s, CH_3-25), 0.88 (s, CH_3-26), 1.80 (s, CH_3-27), 1.03 (s, CH_3-29), 1.16 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.07 (dd, J = 8, 8, H-2), 4.24 (dd, J = 8, 9, H-3), 3.74 (s, COOMe)

α-L-Arap: 6.50 (d, J = 2, H-1), 3.93 (dd, J = 4, 11, H-5)



Astersaponin Hb



Astersaponin Hc

α-L-Rhap: 5.77 (brs, H-1), 1.68 (d, J = 6, CH_3-6) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.2	Rha-1	101.4
2	26.6	17	49.5	2	75.3	2	72.3
3	89.1	18	41.3	3	77.9	3	72.6
4	39.5	19	47.1	4	73.1	4	73.8
5	55.9	20	30.8	5	77.2	5	70.4
6	18.5	21	36.0	6	170.7	6	18.5
7	33.4	22	32.0	COOMe	51.9		
8	40.0	23	28.1	Ara-1	93.5		
9	47.1	24	16.9	2	75.4		
10	37.0	25	15.6	3	70.0		
11	23.8	26	17.5	4	66.0		
12	122.7	27	27.1	5	62.9		
13	144.4	28	175.8				
14	42.0	29	33.2				
15	36.0	30	24.7				

References

1. R. Tanaka, T. Nagao, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **38**(5), 1153 (1990)

Astersaponin Hc

See Figure Astersaponin Hc

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster tataricus* [1]

$C_{58}H_{92}O_{26}$: 1204.587

Mp: 227–228°C (aq. MeOH) [1]

$[\alpha]_D$ −47.3° (c 2.0, MeOH) [1]

FAB-MS *m/z*: 1227 $[M + Na]^-$ [1]

^{1}H NMR: 5.61 (brdd, H-12), 1.28 (s, CH_3-23), 1.07 (s, CH_3-24), 0.97 (s, CH_3-25), 0.86 (s, CH_3-26), 1.81 (s, CH_3-27), 1.02 (s, CH_3-29), 1.16 (s, CH_3-30), 4.97 (d, J = 8, H-1-GlcUA), 3.74 (s, COOMe), 6.48 (brs, H-1 of Ara), 5.68 (d, J = 3, H-1 of Rha), 1.71 (d, J = 6, CH_3-6 of Rha), 5.15 (H-1 of Xyl), 5.19 (H-1 of Xyl′) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.2
2	26.6	17	49.5	COOMe	51.9

(*continued*)

Table 1 (continued)

3	89.1	18	41.3	Ara-1	93.4
4	39.5	19	47.1	Rha-1	101.0
5	55.9	20	30.8	6	18.3
6	18.5	21	36.0	Xyl-1	106.2
7	33.4	22	32.0	Xyl′-1	105.9
8	40.0	23	28.1		
9	47.1	24	16.9		
10	37.0	25	15.6		
11	23.8	26	17.5		
12	122.7	27	27.1		
13	144.4	28	175.8		
14	42.0	29	33.2		
15	36.0	30	24.7		

References

1. R. Tanaka, T. Nagao, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **38**(5), 1153 (1990)

Astersaponin Hd

See Figure Astersaponin Hd

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster tataricus* [1]

$C_{63}H_{100}O_{30}$: 1336.629

Mp: 235–237°C (aq. MeOH) [1]

$[\alpha]_D$ −62.8° (c 1.8, MeOH) [1]

FAB-MS (Me ester) *m/z*: 1359 $[M + Na]^+$ [1]

^{1}H NMR (Me ester): 5.61 (brdd, H-12), 1.28 (s, CH_3-23), 1.07 (s, CH_3-24), 0.98 (s, CH_3-25), 0.87 (s, CH_3-26), 1.80 (s, CH_3-27), 1.03 (s, CH_3-29), 1.18 (s, CH_3-30), 4.97 (d, J = 8, H-1 of GlcUA), 3.74 (s, COOMe), 6.55 (brs, H-1 of Ara), 5.56 (s, H-1 of Rha), 1.69 (CH_3-6 of Rha), 5.22 (d, J = 8.0, H-1 of Xyl), 5.31 (d, J = 8.0, H-1 of Xyl′), 5.92 (d, J = 4.0, H-1 of Api) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.2
2	26.6	17	49.5	COOMe	51.9
3	89.1	18	41.3	Ara-1	93.1
4	39.5	19	47.1	Rha-1	101.0
5	55.9	20	30.8	6	18.5
6	18.5	21	36.0	Xyl-1	105.8
7	33.4	22	32.0	Xyl′-1	104.7
8	40.0	23	28.1	Api-1	111.9
9	47.1	24	16.9	3	79.7
10	37.0	25	15.6		
11	23.8	26	17.5		
12	122.7	27	27.1		
13	144.4	28	175.8		
14	42.0	29	33.2		
15	36.0	30	24.7		

References

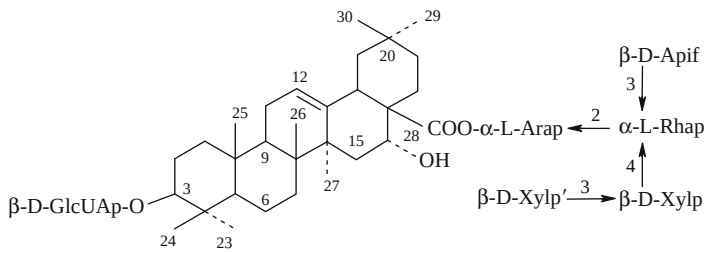
1. R. Tanaka, T. Nagao, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **38**(5), 1153 (1990)

Calliandra Saponin A

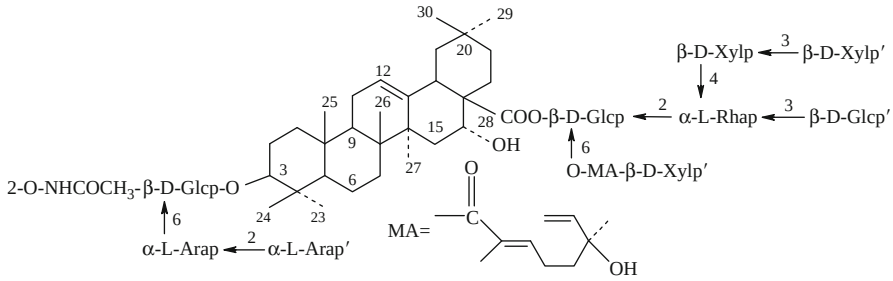
CAS Registry Number: 155740-06-0

See Figure Calliandra Saponin A

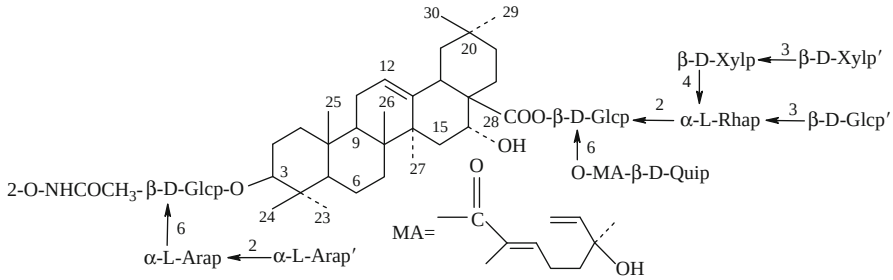
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid



Astersaponin Hd



Calliandra Saponin A



Calliandra Saponin B

Biological sources: *Calliandra anomala* [1, 2]
$C_{91}H_{145}NO_{45}$: 1971.908
^{13}C NMR (C_5D_5N-D_2O (9:1)): [2]

Table 1

C-1	38.70	C-26	17.32	Glc-1	94.53	Xyl′-1	105.35
2	26.24	27	26.94	2	77.97	2	74.77
3	89.21	28	175.82	3	77.19	3	77.07
4	39.01	29	32.89	4	70.98	4	70.24
5	55.80	30	24.61	5	75.40	5	66.52
6	18.32	GlcNAc-1	104.15	6	64.19	Terpene-1	168.03
7	33.34	2	57.41	Rha-1	101.70	2	127.59
8	39.93	3	75.02	2	70.15	3	143.15
9	46.99	4	72.16	3	82.17	4	23.46
10	36.84	5	75.58	4	77.97	5	40.15
11	23.65	6	69.10	5	68.76	6	79.47
12	122.51	Ac-1	171.32	6	18.53	7	143.45
13	144.03	2	23.19	Glc′-1	104.67	8	114.90
14	41.85	Ara-1	102.00	2	74.92	9	12.19
15	35.76	2	79.81	3	77.63	10	23.46
16	73.93	3	72.01	4	71.12	Xyl″-1	99.64
17	49.17	4	67.08	5	77.63	2	74.53
18	41.19	5	63.96	6	62.21	3	77.63
19	46.99	Ara′-1	105.51	Xyl-1	104.04	4	70.59
20	30.48	2	74.71	2	74.13	5	66.23
21	35.66	3	77.13	3	87.56		
22	31.40	4	70.35	4	69.10		
23	27.95	5	66.66	5	65.95		
24	16.80						
25	15.47						

(*continued*)

Table 1 (continued)

References

1. T. Takeda, T. Nakamura, S. Takashima, O. Yano, Y. Ogihara, Chem. Pharm. Bull. **41**, 2132 (1993)
2. T. Nakamura, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **42**(5), 1111 (1994)

Calliandra Saponin B

CAS Registry Number: 156979-62-3
See Figure Calliandra Saponin B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Table 1

C-1	38.69	C-21	35.63	GlcNAc-1	104.13	Rha-4	77.97	Terp.-3	143.26
2	26.20	22	31.35	2	57.31	5	68.73	4	23.44
3	89.22	23	27.93	3	74.95	6	18.51	5	40.11
4	38.97	24	16.77	4	72.04	Glc′-1	104.60	6	79.41
5	55.76	25	15.44	5	75.50	2	74.85	7	143.55
6	18.39	26	17.28	6	69.10	3	77.56	8	114.78
7	33.31	27	26.92	Ac-1	171.45	4	71.05	9	12.22
8	39.90	28	175.82	2	23.15	5	77.56	10	23.47
9	47.10	29	32.85	Ara-1	105.43	6	62.14	Qui-1	98.69
10	36.81	30	24.60	2	74.72	Xyl-1	104.00	2	74.88
11	23.65			3	77.17	2	74.07	3	77.65
12	122.45			4	70.29	3	87.51	4	76.28
13	144.02			5	66.60	4	69.08	5	72.11
14	41.82			Ara′-1	101.97	5	65.95	6	18.39
15	35.71			2	79.74	Xyl′-1	105.31	Glc-1	94.49
16	73.89			3	71.95	2	74.67	2	78.07
17	49.12			4	67.05	3	76.99	3	77.15
18	41.16			5	63.93	4	70.19	4	70.94
19	47.10			Rha-1	101.70	5	66.47	5	75.35
20	30.44			2	70.12	Terp.-1	168.05	6	64.15
				3	82.08	2	127.51		

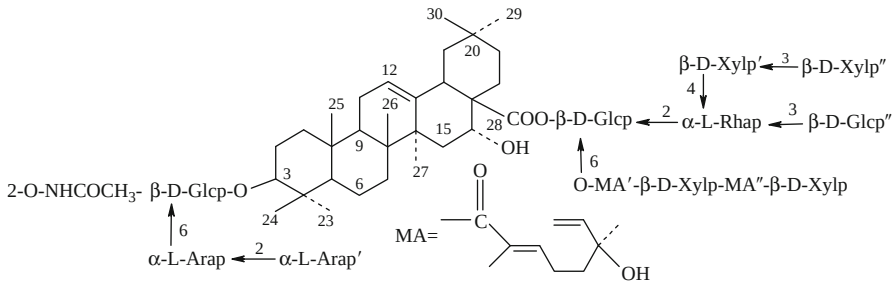
Biological sources: *Calliandra anomala*
$C_{92}H_{147}NO_{45}$: 1985.924
Mp: 220–226°C
$[\alpha]_D^{20}$ −9.8° (c 1.3, MeOH)
FAB-MS *m/z*: 2009 $[M + Na]^+$, 1987 $[M + H]^+$
^{1}H NMR (J/Hz, C_5D_5N-D_2O (9:1)): 0.79 (s, CH_3-25), 0.83 (s, CH_3-29), 0.85 (s, CH_3-24), 0.93 (s, CH_3-26), 0.97 (s, CH_3-30), 1.06 (s, CH_3-23), 1.64 (s, CH_3-27), 5.45 (brs, H-12); α-L-Rhap: 5.67 (H-1), 1.51 (d, J = 7.3, CH_3-6); α-L-Arap: 4.89 (d, J = 4.9, H-1); 4.76 (d, J = 7.3, H-1 of Ara′); β-D-GlcpNAc: 4.87 (d, J = 8.4, H-1), 2.06 (CH_3-OAc); β-D-Glcp′: 5.85 (d, J = 8.0, H-1); β-D-Glcp″: 5.07 (d, J = 8.0, H-1); β-D-Xylp: 5.26 (d, J = 7.9, H-1); β-D-Xylp′: 4.94 (d, J = 7.4, H-1); β-D-Quip: 4.66 (d, J = 7.9, H-1), 1.41 (CH_3-6); monoterpene glycosid moiety: 1.41 (CH_3-10), 1.74 (CH_3-9), 5.14 (d, J = 11.0, Ha-8), 5.29 (d, J = 17.7, Hb-8), 6.05 (dd, J = 11.0, 17.7, H-7), 6.83 (t, H-3)
^{13}C NMR (C_5D_5N:D_2O, 9:1): Table 1

References

1. T. Nakamura, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **42**(5), 1111 (1994)

Calliandra Saponin C

CAS Registry Number: 156979-63-4
See Figure Calliandra Saponin C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Calliandra anomala* [1]
$C_{106}H_{167}NO_{51}$: 2270.050
Mp: 192–195°C [1]
$[\alpha]_D^{20}$ −10.2° (c 0.25, MeOH) [1]
FAB-MS *m/z*: 2293 $[M + Na]^+$, 2271 $[M + H]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N-D_2O (9:1)): α-L-Arap: 4.90 (d, J = 4.8, H-1); α-L-Arap′: 4.77 (d, J = 7.3, H-1); β-D-GlcpNAc: 4.88 (d, J = 8.5, H-1 GlcNAc); β-D-Glcp: 5.85 (d, J = 7.3, H-1), β-D-Glcp': 5.08 (d, J = 8.0, H-1); β-D-Xylp: 5.26 (d, J = 7.9, H-1); β-D-Xylp′: 4.95 (d, J = 7.3, H-1); α-L-Rhap: 5.67 (H-1); monoterpene glycoside moiety: 1.35 (CH_3-10), 1.40 (CH_3-10′), 1.78 (CH_3-9), 1.81 (CH_3-9′), 4.66 (d, J = 7.9, H-1 Xyl′), 4.72 (d, J = 8.0, H-1



Calliandra Saponin C

Table 1

C-1	38.72	C-21	35.68	Ara-1	102.00	Glc′-1	104.66	Terp.-8	115.40
2	26.24	22	31.39	2	79.80	2	74.91	9	12.21
3	89.22	23	27.96	3	72.02	3	77.63	10	23.77
4	39.02	24	16.81	4	67.08	4	71.12	Xyl″-1	97.58
5	55.80	25	15.47	5	63.98	5	77.63	2	75.00
6	18.39	26	17.31	Ara′-1	105.50	6	62.20	3	75.73
7	33.34	27	26.95	2	74.76	Xyl-1	104.05	4	70.81
8	39.94	28	175.77	3	77.12	2	74.11	5	66.42
9	47.00	29	32.90	4	70.34	3	87.57	Terp.-1	167.24
10	36.86	30	24.63	5	66.65	4	69.11	2	127.88
11	23.65	GlcNAc-1	104.17	Glc-1	94.53	5	65.95	3	143.10
12	122.47	2	57.38	2	78.02	Xyl′-1	105.36	4	23.30
13	144.06	3	74.97	3	77.19	2	74.71	5	40.31
14	41.86	4	72.16	4	70.98	3	77.06	6	79.49
15	35.77	5	75.55	5	75.41	4	70.24	7	143.35
16	73.92	6	69.07	6	64.20	5	66.53	8	114.99
17	49.14	Ac-1	171.34	Rha-1	101.70	Terp.-1	167.98	9	12.36
18	41.19	2	23.19	2	70.13	2	127.77	10	23.50
19	47.13			3	82.17	3	142.86	Xyl‴-1	99.65
20	30.49			4	77.99	4	23.44	2	74.53
				5	68.75	5	40.15	3	77.79
				6	18.54	6	79.50	4	70.59
						7	142.35	5	66.23

Xyl), 5.13 (d, J = 11.0, Ha-8′), 5.17 (d, J = 11.0, Ha-8), 5.22 (d, J = 17.7, Hb-8), 5.27 (d, J = 17.5, Hb-8′), 5.81 (dd, J = 11.0, 17.7, H-7), 6.06 (dd, J = 11.0, 17.5, H-7′), 6.78 (t, H-3), 6.91 (t, H-3′) [1]

^{13}C NMR (C_5D_5N-D_2O (9:1)): [1] Table 1

References

1. T. Nakamura, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **42**(5), 1111 (1994)

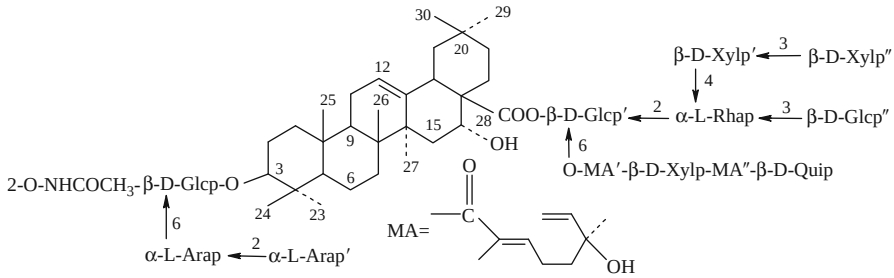
Calliandra Saponin D

CAS Registry Number: 156979-64-5

See Figure Calliandra Saponin D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Calliandra anomala* [1]



Calliandra Saponin D

Table 1

C-1	38.69	C-22	31.37	5	63.96	Glc′-5	77.58	Xyl″-1	97.56
2	26.20	23	27.94	Ara′-1	105.45	6	62.15	2	74.95
3	89.22	24	16.78	2	74.73	Xyl-1	104.01	3	75.69
4	38.99	25	15.45	3	77.08	2	74.07	4	70.77
5	55.80	26	17.29	4	70.30	3	87.52	5	66.38
6	18.34	27	26.92	5	66.61	4	69.09	Terp.-1	167.24
7	33.32	28	175.77	Glc-1	94.49	5	65.90	2	127.79
8	39.91	29	32.87	2	78.04	Xyl′-1	105.32	3	143.24
9	46.98	30	24.61	3	77.17	2	74.67	4	23.43
10	36.83	GlcNAc-1	104.13	4	70.96	3	77.00	5	40.27
11	23.63	2	57.32	5	75.36	4	70.20	6	79.48
12	122.46	3	74.93	6	64.19	5	66.49	7	143.46
13	144.03	4	72.07	Rha-1	101.69	Terp.-1	167.98	8	114.86
14	41.84	5	75.50	2	70.11	2	127.74	9	12.39
15	35.73	6	69.02	3	82.12	3	142.86	10	23.53
16	73.88	Ac-1	171.44	4	77.98	4	23.72	Qui-1	98.71
17	49.12	2	23.16	5	68.73	5	40.12	2	74.90
18	41.16	Ara-1	101.97	6	18.52	6	79.44	3	77.68
19	47.12	2	79.76	Glc′-1	104.61	7	142.30	4	76.29
20	30.46	3	71.98	2	74.87	8	115.41	5	72.12
21	35.64	4	67.06	3	77.58	9	12.19	6	18.39
				4	71.07	10	23.74		

$C_{107}H_{169}NO_{51}$: 2284.066

Mp: 194–196°C [1]

$[\alpha]_D^{20}$ −14.6° (c 0.55, MeOH) [1]

FAB-MS *m/z*: 2307 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N-D_2O (9:1)): α-L-Arap: 4.89 (d, J = 4.9, H-1); α-L-Arap′: 4.77 (d, J = 7.3, H-1); β-D-GlcpNAc: 4.88 (d, J = 8.6, H-1); β-D-Glcp: 5.84 (d, J = 7.4, H-1); β-D-Glcp': 5.07 (d, J = 8.0, H-1); β-D-Xylp: 5.26 (d, J = 7.9, H-1); β-D-Xylp′: 4.94 (d, J = 7.4, H-1); α-L-Rhap: 5.67 (H-1); β-D-Quip: 4.67 (d, J = 7.3, H-1), 1.41 (CH_3-6); monoterpene glycoside moiety: 1.35 (s, CH_3-10), 1.41 (s, CH_3-10′), 1.76 (s, CH_3-9), 1.80 (s, CH_3-9′), 4.71 (d, J = 7.9, H-1 of Xyl), 5.12 (d, J = 11.0, Ha-8′), 5.17 (d, J = 11.0, Ha-8), 5.23 (d, J = 17.7, Hb-8), 5.29 (d, J = 17.7, Hb-8′), 5.81 (dd, J = 11.0, 17.7, H-7), 6.06 (dd, J = 11.0, 17.7, H-7′), 6.77 (t, H-3), 6.91 (t, H-3′) [1]

^{13}C NMR (C_5D_5N-D_2O (9:1)): [1] Table 1

References

1. T. Nakamura, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **42**(5), 1111 (1994)

Calliandra Saponin E

CAS Registry Number: 155740-07-1
See Figure Calliandra Saponin E
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Calliandra anomala* [1, 2]
$C_{101}H_{159}NO_{47}$: 2138.008
^{13}C NMR (C_5D_5N-D_2O (9:1)): [2]

Table 1

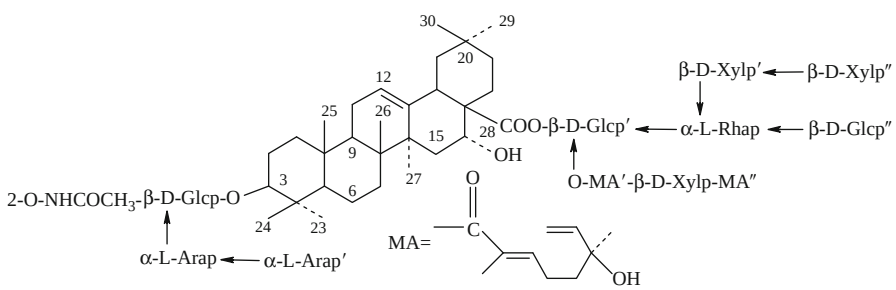
C-1	38.54	C-26	17.15	Glc-3	76.94	Terpene-1	168.01
2	25.99	27	26.76	4	70.72	2	127.52
3	89.25	28	175.77	5	75.07	3	142.90
4	38.79	29	32.70	6	64.05	4	23.02
5	55.61	30	24.51	Rha-1	101.47	5	40.54
6	18.23	GlcNAc-1	103.89	2	70.00	6	79.44
7	33.13	2	56.99	3	81.76	7	144.95
8	39.73	3	74.62	4	77.91	8	115.53
9	46.81	4	71.55	5	68.55	9	12.04
10	36.65	5	75.35	6	18.33	10	23.63
11	23.48	6	68.75	Glc′-1	104.29	Xyl″-1	97.36
12	122.34	Ac-1	171.93	2	74.54	2	74.69
13	143.81	2	22.96	3	77.22	3	77.35
14	41.66	Ara-1	101.80	4	70.69	4	70.48
15	35.49	2	79.51	5	77.22	5	66.07
16	73.69	3	71.75	6	61.79	Terpene′-1	167.28
17	49.10	4	66.94	Xyl-1	103.76	2	127.52
18	41.03	5	63.83	2	73.82	3	143.47
19	46.81	Ara′-1	105.08	3	87.19	4	23.58
20	30.28	2	74.50	4	68.92	5	40.93
21	35.49	3	76.74	5	65.62	6	72.12
22	31.08	4	70.03	Xyl′-1	105.02	7	145.41
23	27.75	5	66.32	2	74.43	8	111.76
24	16.61	Glc-1	94.22	3	76.66	9	12.16
25	15.28	2	78.05	4	69.94	10	27.54
				5	66.19		

References

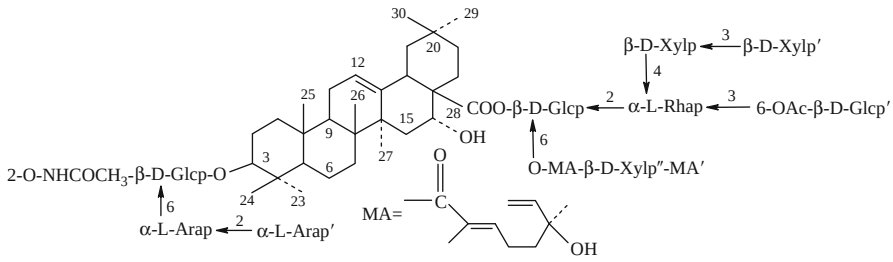
1. T. Takeda, T. Nakamura, S. Takashima, O. Yano, Y. Ogihara, Chem. Pharm. Bull. **41**, 2132 (1993)
2. T. Nakamura, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **42**(5), 1111 (1994)

Calliandra Saponin F

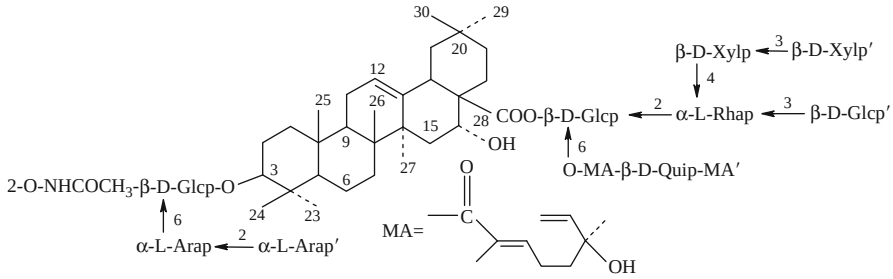
CAS Registry Number: 156979-65-6
See Figure Calliandra Saponin F
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Calliandra anomala* [1]
$C_{103}H_{161}NO_{48}$: 2180.018
Mp: 186–189°C [1]
$[\alpha]_D^{20}$ −3.6° (c 0.1, MeOH) [1]
FAB-MS *m/z*: 2181 $[M + H]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N-D_2O (9:1)): α-L-Arap: 4.89 (d, J = 5.5, H-1); α-L-Arap′: 4.77 (d, J = 7.3, H-1); β-D-GlcpNAc: 4.87 (d, J = 8.4, H-1); β-D-Glcp: 5.89 (d, J = 7.5, H-1); β-D-Glcp': 5.01 (d, J = 8.0, H-1); β-D-Xylp: 5.22 (d, J = 8.6, H-1); β-D-Xylp′: 4.92 (d, J = 7.3, H-1); α-L-Rhap: 5.92 (brs, H-1); monoterpene glycosid moiety: 1.35 (6H, s, CH_3-10, 10′), 1.78 (s, CH_3-9), 1.83 (s, CH_3-9′), 4.71 (d, J = 7.9, H-1-Xyl″), 5.04 (d, J = 11.0, Ha-8′), 5.17 (d, J = 11.0, Ha-8), 5.23 (d, J = 17.0, Hb-8), 5.38 (d, J = 17.0, Hb-8′), 5.83 (dd, J = 11.0, 17.0, H-7), 6.01 (dd, J = 11.0, 17.0, H-7′), 6.77 (t, H-3), 6.97 (t, H-3′) [1]
^{13}C NMR (C_5D_5N-D_2O (9:1)): [1]



Calliandra Saponin E



Calliandra Saponin F



Calliandra Saponin G

Table 1

C-1	38.74	C-27	26.96	Glc-5	75.52	Terpene-1	167.96
2	26.25	28	175.77	6	64.18	2	127.79
3	89.26	29	32.87	Rha-1	100.97	3	142.83
4	39.04	30	24.56	2	70.35	4	23.78
5	55.84	GlcNAc-1	104.14	3	82.41	5	40.73
6	18.55	2	57.42	4	78.00	6	79.46
7	33.50	3	75.02	5	68.35	7	142.35
8	39.94	4	72.19	6	18.48	8	115.44
9	47.01	5	75.55	Glc′-1	104.51	9	12.22
10	36.89	6	69.07	2	74.74	10	23.82
11	23.67	Ac-1	171.31	3	77.46	Xyl″-1	97.61
12	122.46	2	23.21	4	71.05	2	74.98
13	144.07	Ara-1	102.00	5	74.79	3	75.76
14	41.92	2	79.82	6	64.06	4	70.82
15	35.80	3	72.07	Ac-1	171.09	5	66.44
16	73.86	4	67.11	2	20.68	Terpene-1	167.24
17	49.12	5	63.99	Xyl-1	104.10	2	127.79
18	41.27	Ara′-1	105.53	2	74.11	3	143.39
19	47.20	2	74.79	3	87.56	4	23.19
20	30.47	3	77.16	4	69.07	5	41.26
21	35.71	4	70.35	5	66.00	6	72.04
22	31.35	5	66.99	Xyl′-1	105.35	7	145.06
23	27.98	Glc-1	94.45	2	74.67	8	111.69
24	16.83	2	77.86	3	77.08	9	12.36
25	15.52	3	76.82	4	70.24	10	27.91
26	17.37	4	71.05	5	66.55		

References

1. T. Nakamura, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **42**(5), 1111 (1994)

Calliandra Saponin G

CAS Registry Number: 175993-03-0

See Figure Calliandra Saponin G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Calliandra anomala* [1]

$C_{102}H_{161}NO_{47}$: 2152.023

$[\alpha]_D^{27} -15.6°$ (c 3.5, MeOH) [1]

FAB-MS *m/z*: 2176 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N:D_2O (9:1)): 0.84 (s, CH_3-25), 0.89 (s, CH_3-24, 29), 0.98 (s, CH_3-26), 1.02

Table 1

C-1	38.39	C-25	15.13	Glc-1	94.19	Xyl-1	103.71	Qui-1	96.27
2	25.90	26	16.98	2	77.66	2	73.78	2	74.91
3	88.89	27	26.61	3	76.88	3	87.23	3	75.10
4	38.68	28	175.43	4	70.67	4	68.77	4	76.20
5	55.47	29	32.56	5	75.07	5	65.61	5	72.09
6	18.08	30	24.29	6	63.86	Xyl′-1	105.02	6	17.98
7	33.00	GlcNAc-1	103.82	Rha-1	101.36	2	74.37	MA′-1	166.95
8	39.60	2	57.04	2	69.80	3	76.72	2	127.43
9	46.66	3	74.66	3	81.83	4	69.90	3	143.00
10	36.52	4	71.81	4	77.66	5	66.19	4	23.12
11	23.34	5	75.20	5	68.40	MA-1	167.65	5	40.89
12	122.13	6	68.72	6	18.20	2	127.43	6	71.74
13	143.73	NHAc-1	171.02	Glc′-1	104.32	3	142.51	7	145.58
14	41.53	NHAc-2	22.85	2	74.57	4	23.46	8	111.36
15	35.45	Ara-1	101.66	3	77.29	5	39.81	9	12.01
16	73.58	2	79.46	4	70.78	6	79.07	10	27.53
17	48.80	3	71.68	5	77.29	7	142.15		
18	40.91	4	66.75	6	61.86	8	114.96		
19	46.82	5	63.64			9	11.87		
20	30.15	Ara′-1	105.16			10	23.48		
21	35.35	2	74.43						
22	31.42	3	76.79						
23	27.62	4	70.00						
24	16.47	5	66.31						

(s, CH_3-30), 1.11 (s, CH_3-23), 1.69 (s, CH_3-27), 5.50 (brs, 12-H); α-L-Arap: 4.93 (d, J = 5.5, H-1); α-L-Arap′: 4.81 (d, J = 7.3, H-1); β-D-GlcpNAc: 4.91 (d, J = 8.0, H-1), 2.10 (s, NHCO$\underline{CH_3}$); β-D-Glcp: 5.88 (d, J = 7.3, H-1); β-D-Glcp': 5.18 (d, J = 8.0, H-1); β-D-Xylp: 5.30 (d, J = 7.4, H-1); β-D-Xylp′: 4.98 (d, J = 8.0, H-1); α-L-Rhap: 5.71 (brs, H-1), 1.56 (d, J = 6.1, CH_3-6); β-D-Quip: 4.75 (d, J = 7.9, H-1), 5.45 (t, J = 7.9, H-2), 1.47 (d, J = 5.5, CH_3-6); monoterpene glycoside moiety: 1.40 (s, CH_3-10′), 1.41 (s, CH_3-10), 1.82 (s, CH_3-9), 1.87 (s, CH_3-9′), 5.10 (d, J = 10.6, Ha-8′), 5.21 (d, J = 11.0, Ha-8), 5.30 (d, J = 17.7, Hb-8), 5.37 (d, J = 17.7, Hb-8′), , 5.89 (dd, J = 10.6, 17.3, H-7), 6.05 (dd, J = 10.5, 17.3, H-7′), 6.82 (t, H-3), 7.01 (t, H-3′) [1]

^{13}C NMR (C_5D_5N-D_2O (9:1)): [1] Table 1

References

1. Ch. Tani, Y. Ogihara, M. Mutuga, T. Nakamura, T. Takeda, Chem. Pharm. Bull. **44**, 816 (1996)

Calliandra Saponin H

CAS Registry Number: 175993-04-1

See Figure Calliandra Saponin H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

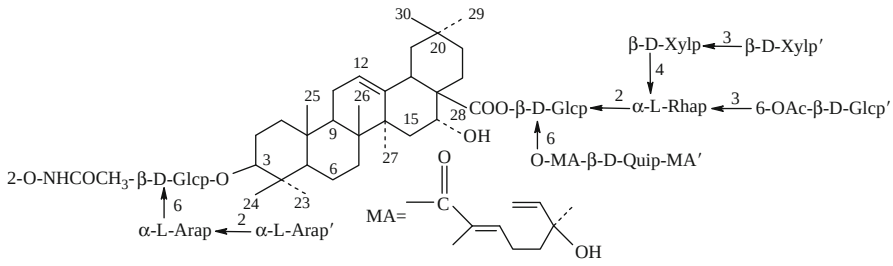
Biological sources: *Calliandra anomala* [1]

$C_{104}H_{163}NO_{48}$: 2194.034

$[\alpha]_D^{27}$ −12.8° (c 0.1, MeOH) [1]

FAB-MS *m/z*: 2218 $[M + H]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N-D_2O (9:1)): 0.88 (s, CH_3-25), 0.92 (s, CH_3-24, 29), 0.96 (s, CH_3-26), 1.02 (s, CH_3-30), 1.13 (s, CH_3-23), 1.71 (s, CH_3-27), 5.52 (brs, H-12); α-L-Arap: 4.95 (d, J = 4.9, H-1); α-L-Arap′: 4.82 (d, J = 7.3, H-1); β-D-GlcpNAc: 4.91 (d, J = 7.3, H-1), 2.09 (s, NHCOC$\underline{H_3}$); β-D-Glcp: 5.89 (d, J = 6.1, H-1); β-D-Glcp': 5.18 (d, J = 8.6, H-1), 4.69, 4.40 (m, H_2-6), 2.01 (s, Glc′ COC$\underline{H_3}$); β-D-Xylp: 5.27 (d, J = 7.3, H-1); β-D-Xylp′: 4.97 (d, J = 7.3, H-1); α-L-Rhap: 5.72 (brs, H-1), 1.48



Calliandra Saponin H

Table 1

C-1	38.41	C-24	16.49	Ara′-1	105.19	Xyl-1	103.76	Qui-1	96.28
2	25.61	25	15.18	2	74.39	2	73.78	2	74.92
3	88.90	26	17.04	3	76.81	3	87.20	3	75.11
4	38.70	27	26.63	4	70.01	4	68.73	4	76.20
5	55.60	28	174.89	5	66.32	5	65.63	5	72.00
6	18.08	29	32.53	Glc-1	94.20	Xyl′-1	105.01	6	17.98
7	33.17	30	24.26	2	77.72	2	74.34	MA′-1	166.96
8	39.61	$\underline{C}OCH_3$	170.80	3	76.84	3	76.72	2	127.47
9	46.68	$CO\underline{C}H_3$	20.33	4	70.70	4	69.89	3	143.00
10	36.55	GlcNAc-1	103.80	5	75.01	5	66.20	4	23.12
11	23.34	2	57.09	6	63.85	MA-1	167.65	5	40.90
12	122.02	3	74.67	Rha-1	101.40	2	127.40	6	71.74
13	144.58	4	71.90	2	69.80	3	142.51	7	145.59
14	41.59	5	75.20	3	81.91	4	23.46	8	111.36
15	35.45	6	68.70	4	77.55	5	39.80	9	12.02
16	73.60	NHAc-1	171.01	5	68.48	6	79.07	10	27.55
17	48.87	NHAc-2	22.69	6	18.13	7	142.15		
18	40.92	Ara-1	101.92	Glc′-1	104.40	8	114.98		
19	46.80	2	79.48	2	74.45	9	11.94		
20	30.13	3	71.74	3	77.30	10	23.48		
21	35.36	4	66.86	4	70.70				
22	31.42	5	63.70	5	74.45				
23	27.65			6	63.77				

(d, J = 6.1, CH_3-6); β-D-Quip: 4.75 (d, J = 7.9, H-1), 5.45 (t, J = 7.9, H-2), 1.47 (d, J = 5.5, CH_3-6); monoterpene glycoside moiety: 1.40 (s, CH_3-10′), 1.42 (s, CH_3-10), 1.82 (s, CH_3-9), 1.88 (s, CH_3-9′), 5.07 (d, J = 11.6, Ha-8′), 5.23 (d, J = 11.0, Ha-8), 5.32 (d, J = 17.1, Hb-8), 5.44 (d, J = 17.7, Hb-8′), 5.89 (dd, J = 11.0, 17.1, H-7), 6.05 (dd, J = 11.0, 17.1, H-7′), 6.83 (t, H-3), 7.02 (t, H-3′) [1]

^{13}C NMR (C_5D_5N-D_2O (9:1)): [1] Table 1

References

1. Ch. Tani, Y. Ogihara, M. Mutuga, T. Nakamura, T. Takeda, Chem. Pharm. Bull. **44**, 816 (1996)

Calliandra Saponin I

CAS Registry Number: 175993-05-2

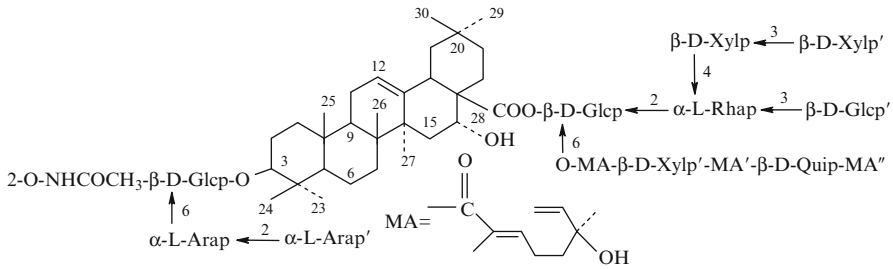
See Figure Calliandra Saponin I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Calliandra anomala* [1]

$C_{117}H_{183}NO_{53}$: 2450.165

$[\alpha]_D^{20}$ + 3.1° (c 0.6, MeOH) [1]



Calliandra Saponin I

FAB-MS *m/z*: 2473 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N-D_2O (9:1)): 0.84 (s, CH_3-25), 0.90 (s, CH_3-24, 29), 0.98 (s, CH_3-26), 1.01 (s, CH_3-30), 1.11 (s, CH_3-23), 1.67 (s, CH_3-27), 5.50 (brs, H-12); α-L-Arap: 4.93 (d, J = 5.5, H-1); α-L-Arap′: 4.81 (d, J = 6.7, H-1); β-D-GlcpNAc: 4.91 (d, J = 7.4, H-1), 2.10 (s, $NHCOCH_3$); β-D-Glcp: 5.84 (d, J = 7.3, H-1); β-D-Glcp': 5.18 (d, J = 7.3, H-1); β-D-Xylp: 5.28 (d, J = 7.3, H-1); β-D-Xylp′: 4.99 (d, J = 7.3, H-1); α-L-Rhap: 5.71 (brs, H-1), 1.56 (d, J = 6.1, CH_3-6); β-D-Quip: 4.78 (d, J = 8.0, H-1), 5.45 (t, J = 8.0, H-2), 1.47 (d, J = 6.1, CH_3-6); monoterpene glycoside moiety: 1.40 (s, CH_3-10, 10″), 1.42 (s, CH_3-10′), 1.82 (s, CH_3-9), 1.87 (s, CH_3-9″), 1.88 (s, CH_3-9′), 4.76 (d, J = 8.6, H-1 of Xyl), 5.09 (d, 11.0, Ha-8″), 5.22 (d, J = 11.0, Ha-8), 5.24 (d, J = 11.0, Ha-8′), 5.27 (d, J = 17.7, Hb-8), 5.29 (d, J = 17.7, Hb-8′), 5.43 (d, J = 17.7, Hb-8″), 5.82-5.89 (m, H-7, H-7′), 6.05 (dd, J = 10.7, 17.7, H-7″), 6.82 (t, H-3), 6.90 (t, H-3′), 7.02 (t, H-3″)

^{13}C NMR (C_5D_5N-D_2O (9:1)): [1]

Table 1

C-1	38.41	C-11	23.25	C-21	35.35
2	25.89	12	122.11	22	31.41
3	88.89	13	143.73	23	27.61
4	38.68	14	41.52	24	16.46
5	55.47	15	35.44	25	15.13
6	18.07	16	73.58	26	16.96
7	32.99	17	48.83	27	26.60
8	39.59	18	40.85	28	175.41
9	46.66	19	46.80	29	32.56
10	36.51	20	30.14	30	24.28

^{13}C NMR (C_5D_5N:D_2O (9:1)) (sugar part): [1] Table 2

Table 2

GlcNAc-1	103.94	Glc-1	94.18	Xyl-1	103.70	Xyl″-1	97.21	Qui-1	96.28
2	57.02	2	77.66	2	73.75	2	74.66	2	74.91
3	74.59	3	76.86	3	87.22	3	75.35	3	75.06
4	71.74	4	70.66	4	68.77	4	70.43	4	76.19
5	75.17	5	75.06	5	65.59	5	66.08	5	72.09
6	68.75	6	63.81	Xyl′-1	105.01	MA′-1	166.81	6	17.97
NHAc-1	170.80	Rha-1	101.35	2	74.36	2	127.69	MA″-1	166.99
NHAc-2	22.86	2	69.75	3	76.70	3	143.02	2	127.46
Ara-1	101.65	3	82.82	4	69.89	4	23.18	3	143.55
2	79.44	4	77.66	5	66.18	5	40.55	4	22.92
3	71.68	5	68.41	MA-1	167.63	6	79.11	5	40.89
4	66.75	6	18.20	2	127.41	7	143.15	6	71.78
5	63.64	Glc′-1	104.30	3	142.50	8	114.52	7	145.56
Ara′-1	105.65	2	74.57	4	23.40	9	11.99	8	111.36
2	74.42	3	77.28	5	40.36	10	23.30	9	12.06
3	76.78	4	70.77	6	79.19			10	27.53
4	69.98	5	77.28	7	142.03				
5	66.31	6	61.85	8	114.99				
				9	11.86				
				10	23.48				

References

1. Ch. Tani, Y. Ogihara, M. Mutuga, T. Nakamura, T. Takeda, Chem. Pharm. Bull. **44**, 816 (1996)

Calliandra Saponin K

CAS Registry Number: 175993-06-3
See Figure Calliandra Saponin K

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Calliandra anomala* [1]

$C_{119}H_{185}NO_{54}$: 2492.176

$[\alpha]_D^{20}$ +7.7° (c 1.2, MeOH) [1]

FAB-MS *m/z*: 2515 $[M + Na]^+$ [1]

^{1}H NMR (JHz, C_5D_5N:D_2O (9:1)): 0.88 (s, CH_3-25), 0.92 (s, CH_3-24, 29), 0.98 (s, CH_3-26), 1.01 (s, CH_3-30), 1.13 (s, CH_3-23), 1.71 (s, CH_3-27), 5.52 (brs, H-12); α-L-Arap: 4.94 (d, J = 4.9, H-1); α-L-Arap′: 4.81 (d, J = 7.3, H-1); β-D-GlcpNAc: 4.91 (d, J = 7.4, H-1), 2.09 (s, $NHCOCH_3$); β-D-Glcp: 5.90 (d, J = 7.3, H-1); β-D-Glcp': 5.13 (d, J = 7.9, H-1), 2.01 (s, $COCH_3$); β-D-Xylp: 5.28 (d, J = 7.3, H-1); β-D-Xylp′: 4.99 (d, J = 7.3, H-1); α-L-Rhap: 5.71 (brs, H-1), 1.56 (d, J = 6.1, CH_3-6); β-D-Quip: 4.81 (d, J = 7.9, H-1), 5.45 (t, J = 8.0, H-2), 1.47 (d, J = 5.5, CH_3-6); monoterpene glycoside moiety: 1.40 (s, CH_3-10, 10″), 1.42 (s, CH_3-10′), 1.82 (s, CH_3-9), 1.87 (s, CH_3-9″), 1.88 (s, CH_3-9′), 4.76 (d, J = 7.9, H-1 of Xyl), 5.10 (d, J = 10.4, Ha-8″), 5.21 (d, J = 10.4, Ha-8), 5.25 (d, J = 10.4, Ha-8'), 5.27 (d, J = 17.7, Hb-8), 5.29 (d, J = 17.7, Hb-8′), 5.43 (d, J = 17.1, Hb-8″), 5.82-5.94 (m, H-7, H-7′), 6.05 (dd, J = 11.0, 17.1, H-7″), 6.81 (t, H-3), 6.90 (t, H-3′), 7.02 (t, H-3″) [1]

^{13}C NMR (JHz, C_5D_5N:D_2O (9:1)): [1]

Table 1

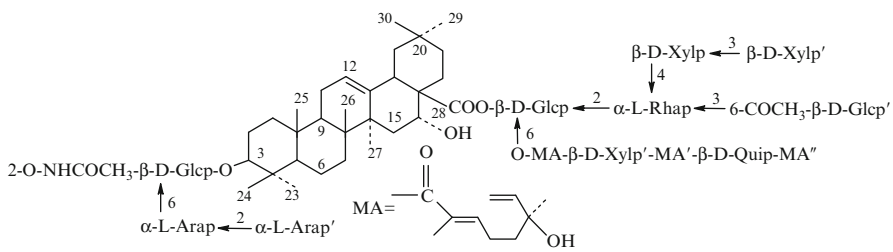
C-1	38.40	C-11	23.35	C-21	35.41
2	25.86	12	122.09	22	31.41
3	88.90	13	143.73	23	27.64
4	38.69	14	41.57	24	16.48
5	55.49	15	35.47	25	15.17
6	18.11	16	73.50	26	17.02
7	33.17	17	48.83	27	26.62
8	39.59	18	40.87	28	175.43
9	46.66	19	46.85	29	32.52
10	36.51	20	30.12	30	24.25
				$COCH_3$	170.80
				$COCH_3$	21.81

^{13}C NMR (C_5D_5N:D_2O (9:1)) (sugar part): [1]

Table 2

GlcNAc-1	103.85	Rha-1	101.35	MA-1	167.63	Qui-1	96.29
2	57.04	2	69.75	2	127.41	2	74.92
3	74.60	3	81.80	3	142.50	3	75.07
4	71.74	4	77.49	4	23.39	4	76.19
5	75.17	5	68.40	5	40.37	5	72.09
6	68.72	6	18.20	6	79.13	6	17.97
NHAc-1	171.05	Glc′-1	104.31	7	142.02	MA″-1	166.99
NHAc-2	22.85	2	74.57	8	115.07	2	127.46
Ara-1	101.65	3	77.27	9	11.86	3	143.46
2	79.47	4	70.68	10	23.48	4	22.93
3	71.68	5	74.43	Xyl-1	97.22	5	40.90
4	66.76	6	63.71	2	74.67	6	71.79
5	63.64	Xyl-1	103.75	3	75.35	7	145.56
Ara′-1	105.21	2	73.75	4	70.43	8	111.35
2	74.43	3	87.22	5	66.07	9	12.06
3	76.78	4	68.73	MA′-1	166.81	10	27.53
4	69.98	5	65.62	2	127.69		
5	66.30	Xyl′-1	104.98	3	142.80		
Glc-1	94.14	2	74.37	4	23.20		

(*continued*)



Calliandra Saponin K

Table 2 (continued)

2	77.68	3	76.70	5	40.56
3	76.80	4	69.88	6	79.11
4	70.67	5	66.19	7	143.02
5	75.07			8	114.99
6	63.81			9	11.99
				10	27.53

References

1. Ch. Tani, Y. Ogihara, M. Mutuga, T. Nakamura, T. Takeda, Chem. Pharm. Bull. **44**, 816 (1996)

Calliandra Saponin M

CAS Registry Number: 207801-00-1

See Figure Calliandra Saponin M

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Calliandra anomala* [1]

$C_{116}H_{181}NO_{53}$: 2436.149

$[\alpha]_D^{22}$ −19.1° (c 0.002, MeOH) [1]

FAB-MS *m/z*: 2460 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N:D_2O = 9:1): 0.95 (s, CH_3-25), 1.0 (s, CH_3-24, 29), 1.09 (s, CH_3-26), 1.12 (s, CH_3-30), 1.28 (s, CH_3-23), 1.80 (s, CH_3-27), 1.66 (d, J = 6.1, CH_3-6 of Rha), 2.20 (s, $NHCOCH_3$)

Monoterpene glycoside moiety: 1.50, 1.51 (s, CH_3-10, CH_3-10″), 1.53 (s, CH_3-10′), 1.92 (s, CH_3-9), 1.97 (s, CH_3-9″), 1.98 (s, CH_3-9′) [1]

Pharm./Biol.: Aqueous extracts of the branches of this plant are used as an antimalarial and antifebrile agent in Mexico [1]

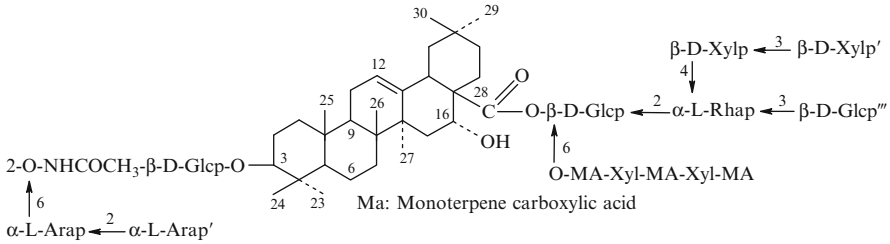
References

1. Ch. Tani, Y. Ogihara, T. Takeda, Chem. Pharm. Bull. **46**(4), 723 (1998)

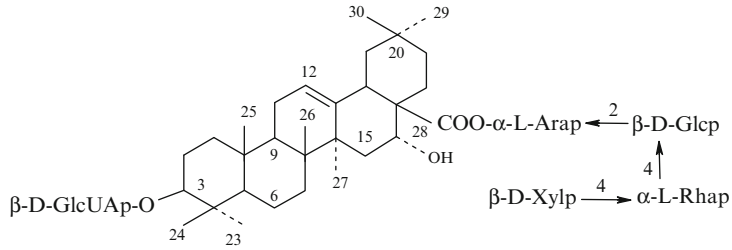
Codonoside B

See Figure Codonoside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid



Calliandra Saponin M



Codonoside B

Biological sources: *Codonopsis lanceolata* [1]
$C_{58}H_{92}O_{27}$: 1220.582
Mp: 250–256°C (aq. BuOH) [1]
$[\alpha]_D^{20}$ −54.4° (c 0.57, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 2600-2800, 1730, 1614 [1]
^{13}C NMR (250 MHz, J/Hz, DMSO-d_6) (anomeric carbons): 105.1 (C-1 of Glc), 104.4 (C-1 of GlcUA), 104.1 (C-1 of Xyl), 99.1 (C-1 of Rha), 91.8 (C-1 of Ara) [1]

Table 1

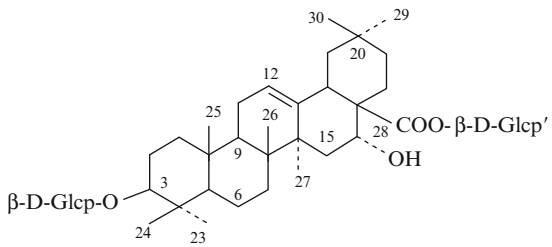
C-1	38.6	C-16	74.0	Glc-1	106.5
2	26.3	17	48.8	2	75.4
3	88.6	18	41.0	3	79.0
4	39.2	19	46.9	4	71.4
5	55.7	20	30.6	5	78.3
6	18.3	21	35.7	6	62.6
7	33.2	22	32.0	Glc′-1	95.6
8	39.8	23	28.0	2	73.8
9	46.9	24	16.8	3	78.4
10	36.8	25	15.5	4	70.7
11	23.6	26	17.3	5	77.9
12	122.4	27	27.0	6	61.9
13	144.2	28	175.7		
14	41.8	29	33.0		
15	35.8	30	24.4		

References

1. N.G. Alad'yna, Yu.N. El'kin, E.A. Chezhina, Chem. Nat. Comp. **25**(3), 317 (1989)

Eclalbasaponin I

CAS Registry Number: 52440-26-3



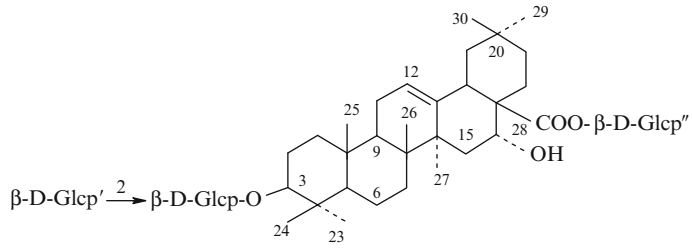
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Eclipta alba* [1]
$C_{42}H_{68}O_{14}$: 796.460
Mp: 252–254°C (MeOH) [1]
$[\alpha]_D^{28}$ +1.0° (c 1.27, MeOH) [1]
FAB-MS *m/z*: 795 $[M-H]^-$, 633 $[M-Glc]^-$, 471 [633-Glc]$^-$, 453 [471-H_2O]$^-$ [1]
FAB-MS *m/z*: 819.4501 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.89, 1.00, 1.01, 1.05, 1.13, 1.29, 1.85 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.41 (dd, J = 4.3, 11.4, H-3), 5.31 (brs, H-16), 5.62 (brs, H-12)
β-D-Glcp: 4.94 (d, J = 7.7, H-1), 4.05 (1H, m, H-2); β-D-Glcp′: 6.32 (d, J = 8.4, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

References

1. Sh. Yahara, N. Ding, T. Nohara, Chem. Pharm. Bull. **42**(6), 1336 (1994)

Eclalbasaponin III

CAS Registry Number: 158511-60-5
See Figure Eclalbasaponin III
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Eclipta alba* [1]
$C_{48}H_{78}O_{19}$: 958.513
$[\alpha]_D^{29}$ −3.1° (c 1.33, MeOH) [1]
FAB-MS *m/z*: 957 $[M-H]^-$, 795 $[M-Glc]^-$, 633 [795-Glc]$^-$, 471 [633-Glc]$^-$, 453 [471-H_2O]$^-$ [1]
FAB-MS *m/z*: 981.5032 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.88, 1.00, 1.04, 1.09, 1.12, 1.25, 1.82 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.29 (dd, J = 4.0, 11.7, H-3), 5.30 (brs, H-16), 5.61 (brs, H-12)
β-D-Glcp: 4.89 (d, J = 7.7, H-1); β-D-Glcp′: 5.36 (d, J = 7.4, H-1); β-D-Glcp″: 6.30 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]



Eclalbasaponin III

Table 1

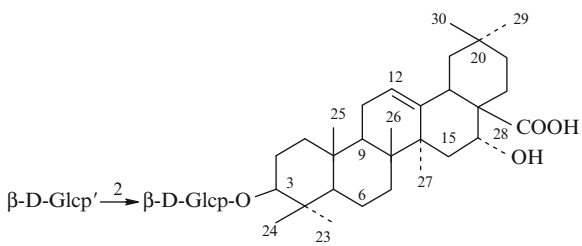
C-1	38.8	C-16	74.3	Glc-1	104.9	Glc″-1	95.7
2	26.5	17	49.0	2	83.1	2	74.0
3	89.0	18	41.2	3	78.2	3	79.2
4	39.4	19	47.1	4	71.5	4	70.1
5	55.9	20	30.1	5	77.8	5	78.7
6	18.5	21	36.0	6	62.6	6	62.1
7	33.4	22	32.1	Glc′-1	105.8		
8	40.0	23	28.1	2	76.9		
9	47.1	24	16.8	3	78.1		
10	36.8	25	15.6	4	71.4		
11	23.7	26	17.5	5	77.7		
12	122.6	27	27.2	6	62.6		
13	144.4	28	175.9				
14	42.0	29	33.1				
15	35.9	30	24.6				

References

1. Sh. Yahara, N. Ding, T. Nohara, Chem. Pharm. Bull. **42**(6), 1336 (1994)

Eclalbasaponin IV

CAS Registry Number: 158511-61-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Eclipta alba* [1]

$C_{42}H_{68}O_{14}$: 796.460

$[\alpha]_D^{29}$ +6.3° (c 1.45, MeOH) [1]

FAB-MS *m/z*: 795 $[M-H]^-$, 633 $[M-Glc]^-$, 471 $[633-Glc]^-$, 453 $[471-H_2O]^-$ [1]

FAB-MS *m/z*: 819.4514 $[M + H]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.86, 1.03, 1.07, 1.10, 1.19, 1.27, 1.85 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.31 (dd, J = 4.4, 11.7, H-3), 5.25 (brs, H-16), 5.65 (s, H-12)

β-D-Glcp: 4.92 (d, J = 7.3, H-1), β-D-Glcp′: 5.37 (d, J = 7.7, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

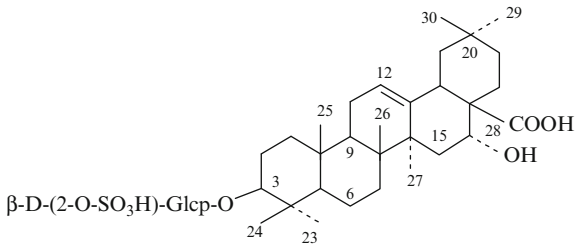
C-1	38.7	C-16	74.6	Glc-1	104.9
2	26.5	17	48.7	2	83.2
3	88.9	18	41.3	3	78.2
4	39.4	19	47.2	4	71.5
5	55.8	20	30.9	5	77.9
6	18.4	21	36.1	6	62.6
7	33.4	22	32.7	Glc′-1	105.8
8	39.8	23	28.6	2	76.9
9	47.0	24	16.7	3	78.1
10	36.8	25	15.5	4	71.4
11	23.7	26	17.3	5	77.8
12	122.2	27	27.1	6	62.6
13	145.0	28	179.9		
14	42.0	29	33.2		
15	36.0	30	24.6		

References

1. Sh. Yahara, N. Ding, T. Nohara, Chem. Pharm. Bull. **42**(6), 1336 (1994)

Eclalbasaponin V

CAS Registry Number: 158511-62-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Eclipta alba* [1]

$C_{36}H_{58}O_{12}S$: 714.364

$[\alpha]_D^{22}$ −9.3° (c 1.7, MeOH) [1]

FAB-MS *m/z*: 713 $[M-H]^-$, 633 $[M-SO_3H]^-$, 471 $[633-Glc]^-$, 453 $[471-H_2O]^-$ [1]

FAB-MS *m/z*: 759.3361 $[M-H-2Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.80, 0.99, 1.06, 1.17, 1.18, 1.43, 1.84 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.34 (dd, J = 4.0, 11.3, H-3), 5.24 (brs, H-16), 5.63 (brs, H-12)

β-D-Glcp: 4.99 (d, J = 7.7, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	74.6	Glc-1	104.1
2	26.3	17	48.9	2	81.0
3	89.5	18	41.4	3	78.1
4	39.5	19	47.2	4	71.6
5	55.8	20	30.9	5	77.6
6	18.3	21	36.0	6	62.6
7	33.4	22	32.6		
8	39.8	23	28.2		
9	47.0	24	17.0		
10	36.9	25	15.4		
11	23.7	26	17.4		
12	122.2	27	27.2		
13	145.0	28	180.5		
14	42.0	29	33.3		
15	36.0	30	24.8		

(*continued*)

References

1. Sh. Yahara, N. Ding, T. Nohara, Chem. Pharm. Bull. **42**(6), 1336 (1994)

Eclalbasaponin VI

CAS Registry Number: 158511-63-8

See Figure Eclalbasaponin VI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Eclipta alba* [1]

$C_{42}H_{68}O_{17}S$: 876.417

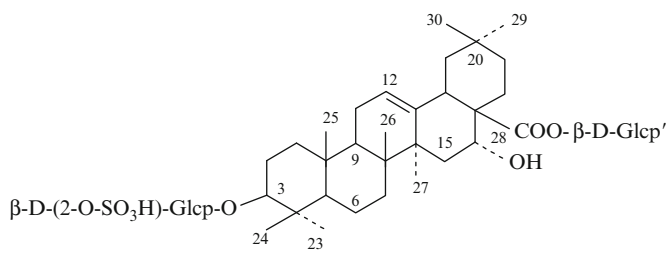
$[\alpha]_D^{22}$ +0.5° (c 1.43, C_5H_5N) [1]

FAB-MS *m/z*: 875 $[M-H]^-$, 795 $[M-SO_3H]^-$, 713 $[M-Glc]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.83, 1.01, 1.04, 1.10, 1.17, 1.43, 1.83 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.35 (brd, J = 11.0, H-3), 5.31 (brs, H-16), 5.60 (brs, H-12)

β-D-Glcp: 4.99 (d, J = 7.7, H-1-Glc); β-D-Glcp′: 6.32 (d, J = 8.0, H-1) [1]

^{13}C NMR (C_5D_5N): [1]



Eclalbasaponin VI

Table 1

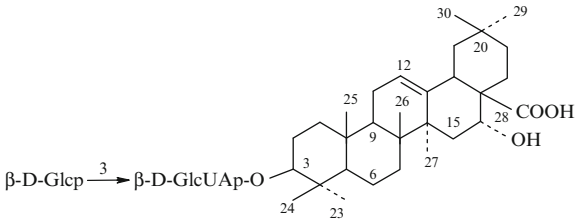
C-1	38.7	C-16	74.4	Glc-1	104.2
2	26.4	17	49.1	2	81.0
3	89.6	18	41.2	3	78.1
4	39.5	19	47.1	4	71.7
5	55.8	20	30.8	5	77.6
6	18.4	21	36.1	6	62.6
7	33.4	22	32.2	Glc′-1	95.8
8	40.1	23	28.3	2	74.1
9	47.1	24	17.0	3	79.3
10	37.0	25	15.6	4	71.1
11	23.8	26	17.5	5	78.8
12	122.7	27	27.2	6	62.2
13	144.5	28	175.9		
14	42.0	29	33.2		
15	35.9	30	24.6		

References

1. Sh. Yahara, N. Ding, T. Nohara, Chem. Pharm. Bull. **42**(6), 1336 (1994)

Elatoside H

CAS Registry Number: 171828-78-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aralia elata* [1]

$C_{42}H_{66}O_{15}$: 810.440

Mp: 214.8–217.3°C (H_2O-MeOH) [1]

$[\alpha]_D^{29}$ −2.4° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1719, 1702, 1649, 1078 [1]

HR-FAB-MS *m/z*: 833.4277 $[M + Na]^-$, 809 $[M-H]^-$, 647 $[M-Glc]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.89, 0.99, 1.03, 1.07, 1.19, 1.29, 1.90 (s, CH_3-25, 24, 26, 29, 30, 23, 27), 3.40 (dd-like, H-3), 3.65 (dd-like, H-18), 5.28 (ets, H-16), 5.64 (brs, H-12)

β-D-GlcUAp: 5.03 (d, H-1)

β-D-Glcp: 5.39 (d, J = 7.9, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.7	C-16	74.8	GlcUA-1	106.8
2	26.6	17	48.9	2	74.3
3	89.2	18	41.4	3	87.6
4	39.6	19	47.3	4	71.8
5	55.8	20	31.1	5	77.2
6	18.5	21	36.5	6	172.2
7	33.5	22	32.9	Glc-1	105.9
8	39.9	23	28.1	2	75.7
9	47.2	24	17.0	3	78.8
10	37.0	25	15.6	4	71.6
11	23.8	26	17.5	5	78.3
12	122.4	27	27.3	6	62.5
13	145.1	28	180.0		
14	42.1	29	33.4		
15	36.2	30	24.7		

References

1. M. Yoshikawa, S. Yoshizumi, T. Ueno, H. Matsuda, T. Murakami, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(11), 1878 (1995)

Foetidissimoside A

See Figure Foetidissimoside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster tataricus* [1], *Cucurbita foetidissima* [2]

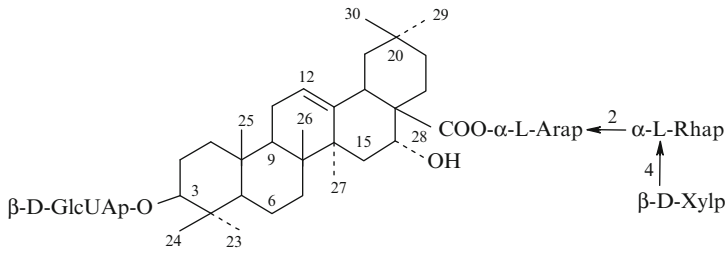
$C_{52}H_{82}O_{22}$: 1058.529

Mp: 220–222°C (aq. MeOH) [1]

$[\alpha]_D$ −47.7° (c 2.2, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3500–3300, 2930, 1750, 1610, 1450, 1390, 1360 [1]

FAB-MS *m/z*: 1095 $[M + Na]^+$ (Me ester) [1]



Foetidissimoside A

FAB-MS *m/z*: 1057 $[M-H]^-$ (100), 925 (6), 779 (6), 647 (38), 601 (30), 585 (14), 471 (9), 453 (13), 337 (35) [2]

^{1}H NMR (J/Hz): 5.61 (brs, H-12), 1.28 (s, CH_3-23), 1.08 (s, CH_3-24), 0.97 (s, CH_3-25), 0.86 (s, CH_3-26), 1.80 (s, CH_3-27), 1.02 (s, CH_3-29), 1.14 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.06 (dd, J = 8, 8, H-2), 4.25 (dd, J = 8, 8, H-3), 4.44 (dd, J = 8, 9, H-4), 4.56 (d, J = 9, H-5), 3.73 (COOMe)

α-L-Arap: 6.44 (d, J = 3, H-1)

α-L-Rhap: 5.78 (brs, H-1), 1.74 (d, J = 6, CH_3-6)

β-D-Xylp: 5.15 (d, J = 7, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

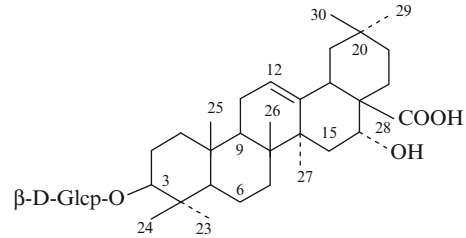
Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.1
2	26.6	17	49.5	COOMe	52.0
3	89.1	18	41.3	Ara-1	93.6
4	39.5	19	47.1	Rha-1	101.0
5	55.9	20	30.8	6	18.3
6	18.5	21	36.0	Xyl-1	106.8
7	33.4	22	32.0		
8	40.0	23	28.1		
9	47.1	24	16.9		
10	37.0	25	15.6		
11	23.8	26	17.5		
12	122.7	27	27.1		
13	144.4	28	175.8		
14	42.0	29	33.2		
15	36.0	30	24.7		

References

1. R. Tanaka, T. Nagao, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **38**(5), 1153 (1990)
2. M.-A. Dubois, R. Bauer, M.R. Cagiotti, H. Wagner, Phytochemistry **27**(3), 881 (1988)

Gleditschioside B (Eclalbasaponin II)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Albizia chinensis* [1], *Eclipta alba* [2], *Gleditsia triacanthos* [3]

$C_{36}H_{58}O_9$: 634.408

Mp: 265–268°C [1]

$[\alpha]_D^{20}$ +16.5° (c 0.54, MeOH) [3]

FAB-MS *m/z*: 633 $[M-H]^-$, 471 $[M-Glc]^-$, 453 $[471-H_2O]^-$ [2]

^{1}H NMR (J/Hz, C_5D_5N): 0.89, 1.00, 1.01, 1.04, 1.17, 1.30, 1.77 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.41 (brd, J = 11.0, H-3), 5.10 (brs, H-16), 5.63 (brs, H-12)

β-D-Glcp: 4.92 (d, J = 7.7, H-1), 4.03 (m, H-2) [2]

^{13}C NMR (C_5D_5N): [2]

Table 1

C-1	38.8	C-16	74.6	Glc-1	106.7
2	26.5	17	49.0	2	75.6
3	88.7	18	42.1	3	78.6
4	39.4	19	47.2	4	71.7
5	55.8	20	30.8	5	78.0

(*continued*)

Table 1 (continued)

6	18.4	21	36.0	6	62.8
7	33.3	22	33.3		
8	39.9	23	28.2		
9	47.2	24	16.9		
10	36.9	25	15.7		
11	23.7	26	17.6		
12	122.0	27	27.9		
13	145.1	28	181.1		
14	41.7	29	33.3		
15	36.0	30	28.1		

Pharm./Biol.: Spermicidal activity [1]

References

1. M.S.M. Rawat, D.S. Negi, G. Pant, M.S. Panwar, Fitoterapia **60**, 168 (1989)
2. Sh. Yahara, N. Ding, T. Nohara, Chem. Pharm. Bull. **42**(6), 1336 (1994)
3. T.A. Badalbaeva, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **9**(5), 600 (1973)

Gleditsioside E

CAS Registry Number: 225529-54-4

See Figure Gleditsioside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Gleditsia sinensis* [1]

$C_{94}H_{148}O_{43}$: 1964.939

Mp: 200–201°C [1]

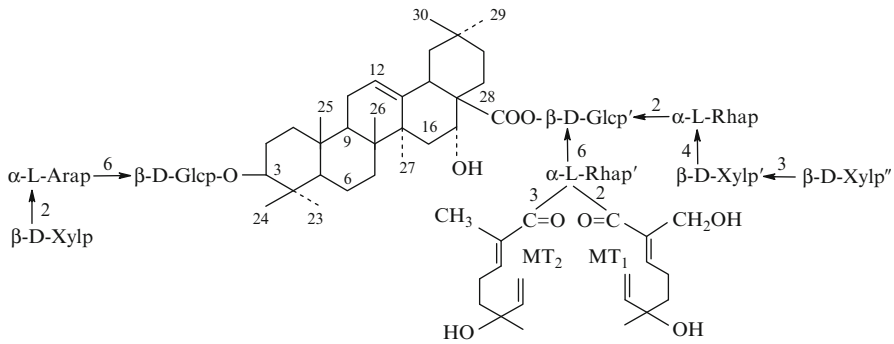
$[\alpha]_D^{21}$ −23.0° (c 0.10, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3409, 2950, 1710, 1646, 1078 [1]

MALDI-TOF-MS *m/z*: 1987 $(M + Na)^+$, 2003 $(M + K)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.87, 1.34, 1.16, 1.13, 1.01, 0.97, 0.89 (s, CH_3-27, 23, 30, 26, 24, 29, 25), 3.45 (m, H-3), 5.19 (brs, H-16), 5.63 (brs, H-12); β-D-Glcp: 4.88 (d, J = 7.6, H-1), 4.03 (H-2), 4.20 (H-3), 4.15 (m, H-4), 4.06 (m, H-5), 4.22 (m, H-6), 4.64 (m, H-6); α-L-Arap: 5.15 (H-1), 4.51 (H-2), 4.40 (H-3), 4.41 (H-4), 3.75 (H-5), 4.31 (H-5); β-D-Xylp: 4.99 (d, J = 7.0, H-1), 4.03 (H-2), 4.05 (H-3), 4.12 (H-4), 3.57 (H-5), 4.40 (H-5); β-D-Glcp: 6.05 (d, J = 7.9, H-1), 4.28 (H-2), 4.16 (H-3), 4.31 (m, H-4), 3.96 (m, H-5), 4.20 (m, H-6), 4.38 (m, H-6); α-L-Rhap: 6.29 (brs, H-1), 4.80 (H-2), 4.75 (H-3), 4.40 (m, H-4), 4.48 (m, H-5), 1.71 (d, J = 6.1, H-6); β-D-Xylp′: 5.19 (d, J = 7.0, H-1), 4.04 (H-2), 4.02 (H-3), 4.05 (H-4), 3.44 (H-5), 4.20 (H-5); β-D-Xylp″: 5.15 (H-1), 4.03 (H-2), 4.21 (H-3), 4.12 (H-4), 3.61 (H-5), 4.28 (H-5); α-L-Rhap: 5.25 (brs, H-1), 5.91 (H-2), 5.93 (H-3), 4.12 (m, H-4), 4.39 (m, H-5), 1.68 (d, J = 6.1, H-6); MT_1: 7.35 (t, J = 7.6, H-3), 2.65 (H-4), 1.75 (H-5), 6.06 (dd, J = 17.1, 10.8, H-7), 5.12 (dd, J = 10.8, 1.8, H-8), 5.48 (dd, J = 17.1, 1.8, H-8), 4.74 (H-9), 1.42 (H-10); MT_2: 7.03 (t, J = 7.6, H-3), 2.45 (H-4), 1.70 (H-5), 6.11 (dd, J = 17.1, 10.8, H-7), 5.15 (dd, J = 10.8, 1.8, H-8), 5.53 (dd, J = 17.1, 1.8, H-8), 1.86 (H-9), 1.45 (H-10) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]



Gleditsioside E

Table 1

C-1	38.9	C-11	23.8	C-21	35.9
2	26.7	12	122.4	22	31.8
3	88.8	13	144.3	23	28.3
4	39.5	14	42.1	24	17.0
5	56.0	15	36.0	25	15.7
6	18.6	16	74.0	26	17.4
7	33.4	17	49.4	27	27.0
8	40.0	18	41.3	28	175.9
9	47.1	19	47.5	29	33.1
10	37.0	20	30.7	30	24.7

^{13}C NMR (125 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	106.7	Glc′-1	94.6	Xyl″-1	105.9	MT_1-6	72.1
2	75.5	2	76.7	2	75.0	7	146.4
3	78.2	3	78.9	3	78.0	8	111.5
4	72.2	4	71.4	4	70.7	9	56.1
5	76.0	5	77.1	5	67.2	10	28.4
6	69.5	6	66.8	Rha′-1	98.2	MT_2-1	167.4
Ara-1	102.1	Rha-1	101.3	2	70.9	2	127.5
2	80.3	2	71.6	3	73.1	3	143.6
3	72.5	3	72.4	4	70.8	4	23.9
4	67.4	4	83.7	5	69.7	5	41.3
5	64.3	5	68.4	6	18.4	6	72.1
Xyl-1	106.2	6	18.4			7	146.4
2	75.3	Xyl′-1	106.2	MT_1-1	166.7	8	111.7
3	77.8	2	74.8	2	132.8	9	12.5
4	70.7	3	87.4	3	147.1	10	28.5
5	67.2	4	68.9	4	24.1		
		5	66.8	5	41.8		

Pharm./Biol.: In traditional Chinese medicine the plant is used for the treatment of apoplexy, as an expectorant and a pesticide [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(3), 388 (1999)

Gleditsioside F

CAS Registry Number: 225524-86-7
See Figure Gleditsioside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Gleditsia sinensis* [1]

$C_{94}H_{148}O_{42}$: 1948.944

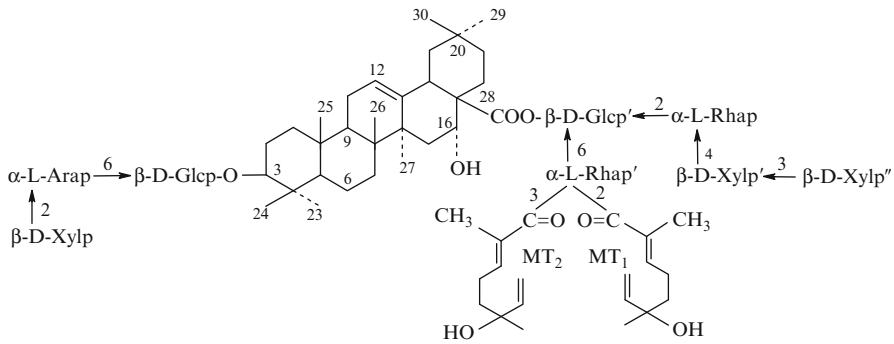
Mp: 195–196°C [1]

$[\alpha]_D^{21}$ −20.0° (c 0.10, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3423, 2931, 1710, 1646, 1080 [1]

MALDI-TOF MS *m/z*: 1971 $(M + Na)^+$, 1987 $(M + K)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.83, 1.32, 1.15, 1.10, 1.00, 0.96, 0.89 (s, CH_3-27, 23, 30, 26, 24, 29, 25), 3.43 (m, H-3), 5.20 (brs, H-16), 5.63 (brs, H-12) β-D-Glcp: 4.88 (d, J = 7.6, H-1), 4.03 (H-2), 4.23 (H-3), 4.16 (H-4), 4.08 (H-5), 4.23 (H-6), 4.64 (H-6) α-L-Arap: 5.15 (H-1), 4.53 (H-2), 4.40 (H-3), 4.41 (H-4), 3.75 (H-5), 4.32 (H-5); β-D-Xylp: 4.99 (d, J = 6.9, H-1), 4.04 (H-2), 4.06 (H-3), 4.12 (H-4), 3.58 (H-5), 4.35 (H-5); β-D-Glcp′: 6.07 (d, J = 7.8, H-1), 4.23 (H-2), 4.16 (H-3), 4.28 (H-4), 3.96 (H-5), 4.20 (H-6), 4.39 (m, H-6); α-L-Rhap: 6.30 (brs, H-1), 4.80 (H-2), 4.75 (H-3), 4.40 (H-4), 4.50



Gleditsioside F

(H-5), 1.72 (d, J = 6.1, H-6); β-D-Xylp′: 5.20 (d, J = 7.2, H-1), 4.03 (H-2), 4.02 (H-3), 4.05 (H-4), 3.45 (H-5), 4.19 (H-5); β-D-Xylp″: 5.15 (H-1), 4.04 (H-2), 4.21 (H-3), 4.12 (H-4), 3.65 (H-5), 4.28 (H-5); α-L-Rhap′: 5.31 (brs, H-1), 5.89 (H-2), 5.92 (H-3), 4.12 (m, H-4), 4.40 (m, H-5), 1.72 (d, J = 6.1, H-6); MT_1: 7.21 (t, J = 7.5, H-3), 2.42 (H-4), 1.80 (H-5), 6.14 (dd, J = 17.1, 10.8, H-7), 5.19 (dd, J = 10.8, 2.0, H-8), 5.56 (dd, J = 17.1, 2.0, H-8), 2.00 (H-9), 1.49 (H-10); MT_2: 6.96 (t, J = 7.5, H-3), 2.60 (H-4), 1.70 (H-5), 6.08 (dd, J = 17.2, 10.8, H-7), 5.15 (dd, J = 10.8, 2.0, H-8), 5.52 (dd, J = 17.2, 2.0, H-8), 1.83 (H-9), 1.45 (H-10) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-11	23.9	21	36.1
2	26.8	12	122.6	22	32.0
3	88.9	13	144.4	23	28.4
4	39.6	14	42.2	24	17.1
5	56.1	15	36.3	25	15.8
6	18.8	16	74.0	26	17.5
7	33.5	17	49.5	27	27.1
8	40.1	18	41.5	28	175.9
9	47.2	19	47.6	29	33.3
10	37.1	20	30.9	30	24.8

^{13}C NMR (125 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	106.8	Glc′-1	94.6	Xyl″-1	106.1	MT_1-6	72.1
2	75.7	2	76.7	2	75.1	7	146.5
3	78.2	3	79.1	3	78.2	8	111.7
4	72.3	4	71.5	4	70.9	9	12.7
5	76.0	5	77.4	5	67.3	10	28.6
6	69.6	6	66.8	Rha′-1	98.3	MT_2-1	167.2
Ara-1	102.3	Rha-1	101.4	2	71.0	2	127.8
2	80.5	2	71.7	3	73.2	3	143.5
3	72.6	3	72.5	4	70.9	4	24.2
4	67.5	4	83.9	5	69.7	5	41.6
5	64.3	5	68.4	6	18.7	6	72.1
Xyl-1	106.3	6	18.7			7	146.5
2	75.4	Xyl′-1	106.3	MT_1-1	167.4	8	111.8
3	77.9	2	74.9	2	127.7	9	12.4
4	70.8	3	87.4	3	144.2	10	28.5
5	67.0	4	68.9	4	24.0		
		5	66.9	5	41.6		

Pharm./Biol.: In traditional Chinese medicine the plant is used for the treatment of apoplexy, as an expectorant and a pesticide [1]

References

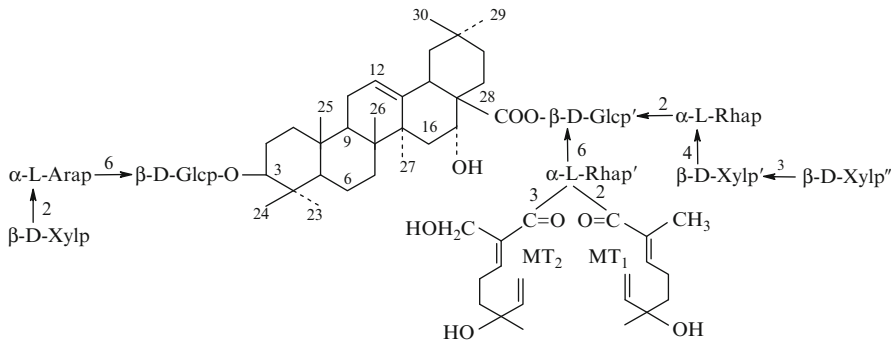
1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(3), 388 (1999)

Gleditsioside G

CAS Registry Number: 225529-55-5

See Figure Gleditsioside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid



Gleditsioside G

Biological sources: *Gleditsia sinensis* [1]
$C_{94}H_{148}O_{42}$: 1948.944
Mp: 202–203°C [1]
$[\alpha]_D^{21}$ −10.0° (c 0.10, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3405, 2933, 1714, 1644, 1080 [1]
MALDI-TOF-MS *m/z*: 1971 $(M + Na)^+$, 1987 $(M + K)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.87, 1.34, 1.15, 1.14, 1.01, 0.96, 0.88 (s, CH_3-27, 23, 30, 26, 24, 29, 25), 3.50 (m, H-3), 5.20 (brs, H-16), 5.64 (brs, H-12) β-D-Glcp: 4.87 (d, J = 7.8, H-1), 4.03 (H-2), 4.20 (H-3), 4.14 (H-4), 4.06 (H-5), 4.21 (H-6), 4.64 (H-6); α-L-Arap: 5.15 (d, J = 5.1, H-1), 4.52 (H-2), 4.39 (H-3), 4.41 (H-4), 3.75 (H-5), 4.30 (H-5); β-D-Xylp: 4.98 (d, J = 6.8, H-1), 4.05 (H-2), 4.05 (H-3), 4.13 (H-4), 3.57 (H-5), 4.40 (H-5); β-D-Glcp′: 6.08 (d, J = 7.3, H-1), 4.30 (H-2), 4.19 (H-3), 4.28 (H-4), 3.98 (H-5), 4.20 (H-6), 4.39 (H-6); α-L-Rhap: 6.34 (brs, H-1), 4.86 (H-2), 4.74 (H-3), 4.38 (H-4), 4.49 (H-5), 1.78 (d, J = 5.9, H-6); β-D-Xylp′: 5.08 (d, J = 7.1, H-1), 4.05 (H-2), 4.03 (H-3), 4.10 (H-4), 3.50 (H-5), 4.22 (H-5); β-D-Xylp″: 5.19 (d, J = 7.6, H-1), 4.05 (H-2), 4.23 (H-3), 4.13 (H-4), 3.68 (H-5), 4.30 (H-5); α-L-Rhap′: 5.30 (brs, H-1), 5.90 (H-2), 5.94 (H-3), 4.13 (m, H-4), 4.38 (m, H-5), 1.68 (d, J = 5.9, H-6); MT_1: 7.20 (t, J = 7.6, H-3), 2.43 (H-4), 1.80 (H-5), 6.11 (dd, J = 17.3, 10.5, H-7), 5.18 (dd, J = 10.5, 1.8, H-8), 5.56 (dd, J = 17.3, 1.8, H-8), 1.99 (H-9), 1.48 (H-10); MT_2: 7.10 (t, J = 7.6, H-3), 2.65 (H-4), 1.70 (H-5), 6.04 (dd, J = 17.3, 10.5, H-7), 5.14 (dd, J = 10.5, 1.8, H-8), 5.48 (dd, J = 17.3, 1.8, H-8), 4.73 (H-9), 1.42 (H-10) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-11	23.9	C-21	34.1
2	26.8	12	122.8	22	32.5
3	88.7	13	144.1	23	28.3
4	39.6	14	42.3	24	17.1
5	56.0	15	28.6	25	15.7
6	18.8	16	23.3	26	17.5
7	33.2	17	47.3	27	26.0
8	40.0	18	41.8	28	176.5
9	48.1	19	46.4	29	33.2
10	37.1	20	30.8	30	23.9

^{13}C NMR (125 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	106.8	Glc′-1	94.6	Xyl″-1	105.9	MT_1-6	72.2
2	75.7	2	76.8	2	75.2	7	146.5
3	78.4	3	79.1	3	78.1	8	111.7
4	72.2	4	71.4	4	70.9	9	12.7
5	76.2	5	77.3	5	67.3	10	28.6
6	69.6	6	66.7	Rha′-1	98.1	MT_2-1	167.1
Ara-1	102.3	Rha-1	101.5	2	71.1	2	132.9
2	80.6	2	71.5	3	73.3	3	146.7
3	72.6	3	72.5	4	70.9	4	24.1
4	67.5	4	85.1	5	69.7	5	41.9
5	64.3	5	68.3	6	18.6	6	72.2
Xyl-1	106.4	6	18.6			7	146.4
2	75.5	Xyl′-1	106.9	MT_1-1	167.3	8	111.8
3	77.9	2	75.1	2	127.6	9	56.3
4	70.8	3	87.3	3	144.3	10	28.5
5	67.2	4	69.0	4	24.0		
		5	66.9	5	41.5		

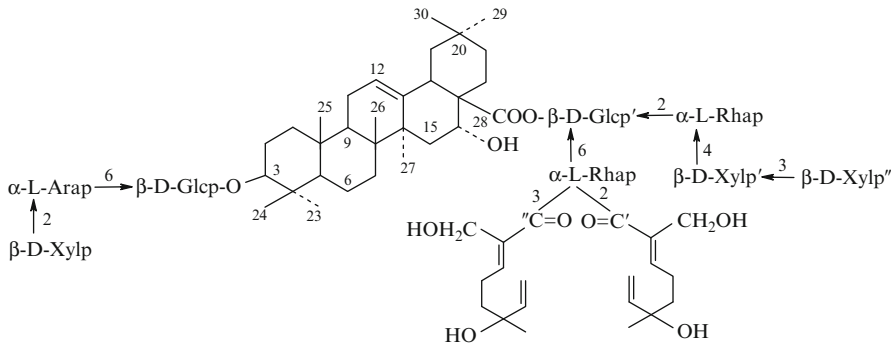
Pharm./Biol.: In traditional Chinese medicine the plant is used for the treatment of apoplexy, as an expectorant and a pesticide [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(3), 388 (1999)

Gleditsia Saponin B

CAS Registry Number: 84105-23-7
See Figure Gleditsia Saponin B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Gleditsia sinensis* [1], *G. japonica* [2]
$C_{94}H_{148}O_{44}$: 1980.934
Mp: 226–227°C (MeOH) [1]
$[\alpha]_D^{21}$ −20.0° (c 0.10, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 2930, 1712, 1646, 1079 [1]
MALDI-TOF MS *m/z*: 2003 $(M + Na)^+$, 2019 $(M + K)^+$ [1]



Gleditsia Saponin B

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 5.64 (brs, H-12), 5.20 (brs, H-16), 3.50 (m, H-3), 1.87, 1.34, 1.15, 1.14, 1.01, 0.96, 0.88 (s, CH_3-27, 23, 30, 26, 24, 29, 25); β-D-Glcp: 4.88 (d, J = 7.6, H-1), 4.03 (H-2), 4.23 (H-3), 4.15 (H-4), 4.07 (H-5), 4.22, 4.63 (H_2-6); α-L-Arap: 5.15 (H-1), 4.52 (H-2), 4.40 (H-3), 4.41 (H-4), 3.75, 4.30 (H_2-5); β-D-Xylp: 4.95 (d, J = 7.0, H-1), 4.04 (H-2), 4.06 (H-3), 4.13 (H-4), 3.59, 4.40 (H_2-5); β-D-Glcp′: 6.07 (d, J = 7.4, H-1), 4.28 (H-2), 4.18 (H-3), 4.30 (H-4), 3.98 (H-5), 4.19, 4.38 (H_2-6); α-L-Rhap: 6.34 (brs, H-1), 4.86 (H-2), 4.74 (H-3), 4.38 (H-4), 4.49 (H-5), 1.78 (d, J = 5.9, CH_3-6); β-D-Xylp′: 5.08 (d, J = 7.1, H-1), 4.05 (H-2), 4.03 (H-3), 4.10 (H-4), 3.50, 4.22 (H_2-5); β-D-Xylp″: 5.15 (H-1), 4.04 (H-2), 4.21 (H-3), 4.13 (H-4), 3.69, 4.30 (H_2-5); α-L-Rhap′: 5.25 (brs, H-1), 5.90 (H-2), 5.93 (H-3), 4.13 (H-4), 4.39 (H-5), 1.69 (d, J = 5.3, CH_3-6); MT_1: 7.34 (t, J = 7.6, H-3), 2.65 (H-4), 1.81 (H-5), 6.05 (dd, 17.1, 10.8, H-7), 5.08 (dd, J = 10.8, 1.8, H-8), 5.47 (dd, J = 17.1, 1.8, H-8), 4.79 (H-9), 1.39 (H-10); MT_2: 7.18 (t, J = 8.0, H-3), 2.45 (H-4), 1.70 (H-5), 6.09 (dd, J = 17.1, 10.8, H-7), 5.13 (dd, J = 10.8, 1.8, H-8), 5.52 (dd, J = 17.1, 1.8, H-8), 4.97 (H-9), 1.44 (H-10) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	11	23.9	21	36.1
2	26.8	12	122.6	22	32.0
3	88.9	13	144.5	23	28.3
4	39.6	14	42.3	24	17.1
5	56.1	15	36.3	25	15.8
6	18.8	16	74.0	26	17.5

(*continued*)

Table 1 (continued)

7	33.5	17	49.5	27	27.1
8	40.1	18	41.5	28	176.0
9	47.2	19	47.6	29	33.2
10	37.1	20	30.9	30	24.8

^{13}C NMR (125 MHz, C_5D_5N) (sugar part): [1]

Table 2

C-1	39.0	C-19	47.6	Xyl-1	106.4	Xyl″-1	105.1	MT_2-1	167.2
2	26.8	20	30.9	2	75.5	2	75.2	2	132.9
3	88.9	21	36.1	3	77.9	3	78.2	3	147.0
4	39.6	22	32.0	4	70.8	4	70.9	4	24.2
5	56.1	23	28.3	5	67.3	5	67.3	5	41.9
6	18.8	24	17.1	Glc′-1	94.7	Rha′-1	98.3	6	72.2
7	33.5	25	15.8	2	76.8	2	71.1	7	146.5
8	40.1	26	17.5	3	79.1	3	73.4	8	111.8
9	47.2	27	27.1	4	71.4	4	70.9	9	56.2
10	37.1	28	176.0	5	77.2	5	69.7	10	28.6
11	23.9	29	33.2	6	66.7	6	18.7		
12	122.6	30	24.8	Rha-1	101.5	MT_1-1	167.0		
13	144.5	Glc-1	106.8	2	71.7	2	132.8		
14	42.3	2	75.7	3	72.5	3	147.4		
15	36.3	3	78.4	4	83.9	4	24.0		
16	74.0	4	72.3	5	68.4	5	41.8		
17	49.5	5	76.2	6	18.7	6	72.2		
18	41.5	6	69.6	Xyl′-1	106.4	7	146.5		
		Ara-1	102.3	2	75.0	8	111.7		
		2	80.5	3	87.5	9	56.2		
		3	72.6	4	69.1	10	28.5		
		4	67.4	5	66.9				
		5	64.3						

Pharm./Biol.: In traditional Chinese medicine the plant is used for the treatment of apoplexy, as an expectorant and a pesticide [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(3), 388 (1999)
2. T. Konoshima, T. Sawada, Chem. Pharm. Bull. **30**(8), 2747 (1982)

Gleditsia Saponin C

CAS Registry Number: 84105-24-8

See Figure Gleditsia Saponin C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Gleditsia sinensis* [1], *G. japonica* [2]

$C_{94}H_{148}O_{43}$: 1964.939

Mp: 197–198° C (MeOH) [1]

$[\alpha]_D^{21}$ −21.0° (c 0.10, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3411, 2931, 1711, 1645, 1078 [1]

MALDI-TOF MS *m/z*: 1987 $(M + Na)^+$, 2003 $(M + K)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 5.63 (brs, H-12), 5.20 (brs, H-16), 3.43 (m, H-3), 1.83, 1.33, 1.16, 1.14, 1.01, 0.99, 0.89 (s, CH_3-27, 23, 30, 26, 24, 29, 25); β-D-Glcp: 4.88 (d, J = 7.6, H-1), 4.04 (H-2), 4.21 (H-3), 4.15 (H-4), 4.09 (H-5), 4.23, 4.63 (H_2-6); α-L-Arap: 5.16 (H-1), 4.50 (H-2), 4.40 (H-3), 4.42 (H-4), 3.74, 4.31 (H_2-5); β-D-Xylp: 4.99 (d, J = 7.0, H-1), 4.04 (H-2), 4.06 (H-3), 4.13 (H-4), 3.57, 4.35 (H_2-5); β-D-Glcp′: 6.09 (d, J = 7.8, H-1), 4.25 (H-2), 4.16 (H-3), 4.26 (H-4), 3.98 (H-5), 4.21, 4.40 (H_2-6); α-L-Rhap: 6.29 (brs, H-1), 4.80 (H-2), 4.73 (H-3), 4.40 (H-4), 4.48 (H-5), 1.72 (d, J = 6.7, CH_3-6); β-D-Xylp′: 5.20 (d, J = 7.0, H-1), 4.04 (H-2), 4.01 (H-3), 4.05 (H-4), 3.45, 4.19 (H_2-5)

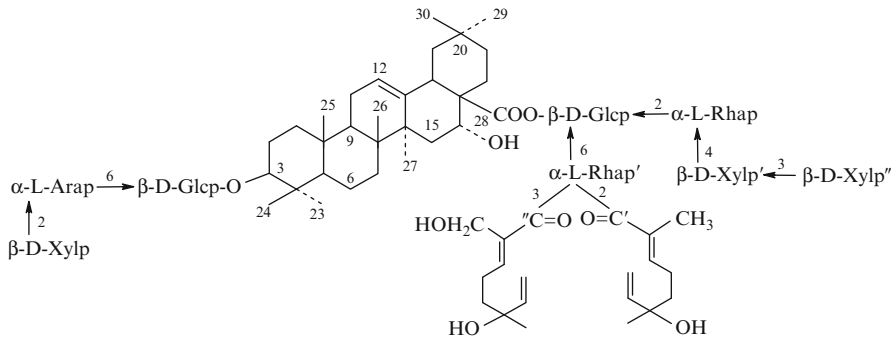
β-D-Xylp″: 5.16 (H-1), 4.04 (H-2), 4.22 (H-3), 4.12 (H-4), 3.69, 4.25 (H_2-5); α-L-Rhap′: 5.30 (brs, H-1), 5.92 (H-2), 5.95 (H-3), 4.13 (m, H-4), 4.38 (m, H-5), 1.70 (d, J = 6.7, CH_3-6); MT_1: 7.20 (t, J = 7.6, H-3), 2.45 (H-4), 1.75 (H-5), 6.10 (dd, J = 17.1, 10.8, H-7), 5.16 (dd, J = 10.8, 1.8, H-8), 5.51 (dd, J = 17.1, 1.8, H-8), 1.98 (H-9), 1.49 (H-10); MT_2: 7.10 (t, J = 7.6, H-3), 2.65 (H-4), 1.70 (H-5), 6.04 (dd, J = 17.1, 10.8, H-7), 5.11 (dd, J = 10.8, 1.8, H-8), 5.48 (dd, J = 17.1, 1.8, H-8), 4.70 (H-9), 1.42 (H-10) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-11	23.9	C-21	35.1
2	26.7	12	122.6	22	32.0
3	88.9	13	144.4	23	28.3
4	39.6	14	42.2	24	17.1
5	56.1	15	36.3	25	15.8
6	18.8	16	74.0	26	17.0
7	33.5	17	49.5	27	27.1
8	40.1	18	41.5	28	175.9
9	47.2	19	47.6	29	33.2
10	37.1	20	30.9	30	24.8

^{13}C NMR (125 MHz, C_5D_5N) (sugar part): [1]



Gleditsia Saponin C

Table 2

Glc-1	106.8	Glc′-1	94.6	Xyl″-1	106.1	MT_2-1	167.1
2	75.7	2	76.7	2	75.1	2	132.9
3	78.4	3	79.1	3	78.1	3	146.7
4	72.3	4	71.4	4	70.9	4	24.1
5	76.0	5	77.3	5	67.3	5	41.9
6	69.6	6	66.7	Rha′-1	98.2	6	72.1
Ara-1	102.3	Rha-1	101.5	2	71.1	7	146.4
2	80.5	2	71.7	3	73.4	8	111.8
3	72.6	3	72.5	4	70.9	9	56.3
4	67.5	4	83.9	5	69.7	10	28.5
5	64.3	5	68.4	6	18.7		
Xyl-1	106.3	6	18.7	MT_1-1	167.3		
2	75.4	Xyl′-1	106.3	2	127.7		
3	77.9	2	75.0	3	144.3		
4	70.8	3	87.5	4	24.0		
5	67.3	4	69.1	5	41.5		
		5	66.9	6	72.1		
				7	146.5		
				8	111.7		
				9	12.7		
				10	28.6		

Pharm./Biol.: In traditional Chinese medicine the plant is used for the treatment of apoplexy, as an expectorant and a pesticide [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(3), 388 (1999)
2. T. Konoshima, T. Sawada, Chem. Pharm. Bull. **30**(8), 2747 (1982)

Gleditsia Saponin D_2

CAS Registry Number: 84981-43-1

See Figure Gleditsia Saponin D_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Gleditsia japonica* [1]

$C_{89}H_{140}O_{39}$: 1832.897

Mp: 200–204°C (MeOH-Et_2O) [1]

$[\alpha]_D^{23}$ −17.4° (c 0.85, MeOH) [1]

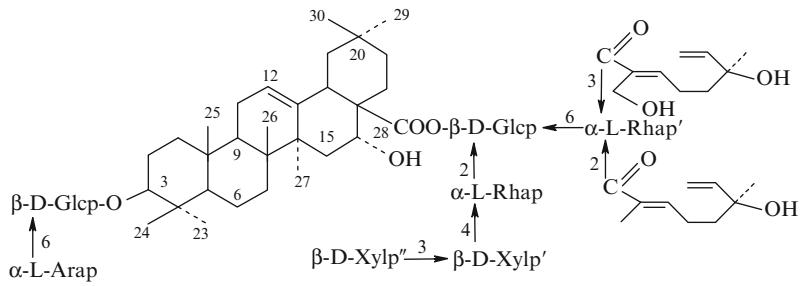
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1725 [1]

UV λ_{max}^{EtOH} nm (ε): 215 (21000) [1]

^{13}C NMR (50 MHz, C_5D_5N): [1]

Table 1

Glc-1	106.7	Rha-1	101.3	Rha′-1	98.0	Monoterp″-1	167.0
2	75.4	2	71.6	2	71.3	2	132.7
3	78.3	3	72.3	3	73.2	3	146.7
4	71.7	4	83.9	4	71.0	4	24.1
5	75.4	5	68.3	5	69.5	5	41.8
6	69.7	6	18.5	6	18.6	6	72.1
Ara-1	105.1	Xyl-1	106.2	Monoterp′-1	167.2	7	146.3
2	72.1	2	74.8	2	127.5	8	111.8
3	74.1	3	87.4	3	144.3	9	56.1
4	68.9	4	68.9	4	23.9	10	28.4
5	66.1	5	67.1	5	41.4		
Glc′-1	94.4	Xyl′-1	105.8	6	72.1		
2	78.9	2	74.9	7	146.2		
3	77.3	3	77.9	8	111.8		
4	70.9	4	70.6	9	12.6		
5	76.6	5	66.7	10	28.5		
6	66.6						



Gleditsia Saponin D_2

References

1. T. Konoshima, T. Sawada, Chem. Pharm. Bull. **30**(11), 4082 (1982)

Gleditsia Saponin G

CAS Registry Number: 84954-99-4
See Figure Gleditsia Saponin G
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Gleditsia japonica* [1]
$C_{83}H_{130}O_{34}$: 1670.844
Mp: 201–203°C [1]
$[\alpha]_D^{23}$ −27.5° (c 0.77, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1725 [1]
UV λ_{max} nm (ε): 215 (24000) [1]
^{13}C NMR (50 MHz, C_5D_5N): [1]

Table 1

Glc-1	106.6	6	18.6	Monoterp′-1	167.2	Monoterp″-1	167.1
2	75.6	Xyl-1	106.2	2	127.6	2	132.8
3	78.6	2	74.8	3	144.3	3	146.7
4	71.8	3	87.4	4	23.9	4	24.1
5	78.0	4	68.9	5	41.4	5	41.7
6	62.8	5	67.1	6	72.2	6	72.2
Glc′-1	94.4	Xyl′-1	105.7	7	146.3	7	146.4
2	78.9	2	74.9	8	111.8	8	111.8
3	77.3	3	77.8	9	12.6	9	56.1
4	70.9	4	70.6	10	28.4	10	28.3
5	76.7	5	66.7				
6	66.6	Rha′-1	98.0				
Rha-1	101.2	2	71.3				

(*continued*)

Table 1 (continued)

2	71.6	3	73.2
3	72.4	4	71.0
4	83.9	5	69.5
5	68.3	6	18.7

References

1. T. Konoshima, T. Sawada, Chem. Pharm. Bull. **30**(11), 4082 (1982)

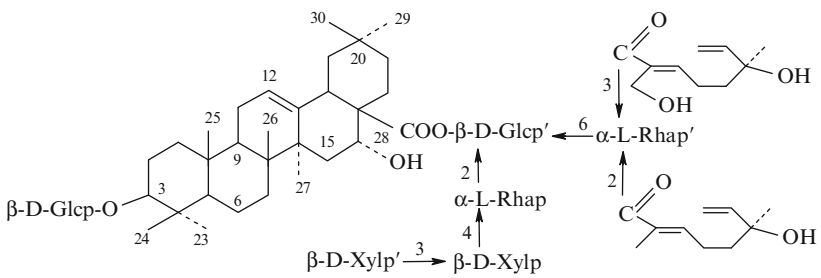
Gleditsia Saponin I

CAS Registry Number: 84954-98-3
See Figure Gleditsia Saponin I
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Gleditsia japonica* [1]
$C_{83}H_{130}O_{34}$: 1670.844
Mp: 201–203°C [1]
$[\alpha]_D^{23}$ −27.5° (c 0.77, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1725 [1]
UV λ_{max}^{EtOH} nm (ε): 215 (25000) [1]
^{13}C NMR (50 MHz, C_5D_5N): [1]

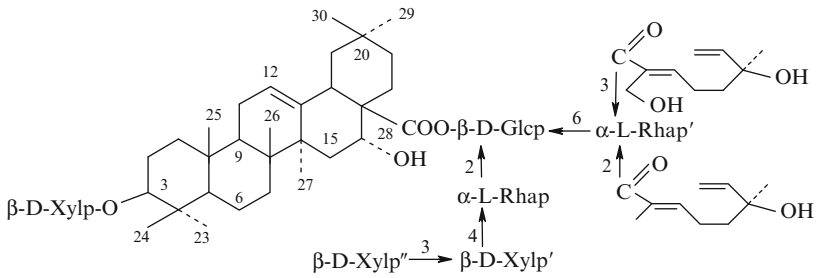
Table 1

Xyl-1	106.6	Xyl′-1	106.3	Monoterp′-1	167.3	Monoterp″-1	167.1
2	75.9	2	74.9	2	127.6	2	132.8
3	78.2	3	87.4	3	144.3	3	146.8
4	70.9	4	69.0	4	24.0	4	24.2
5	66.7	5	67.2	5	41.5	5	41.9
Glc-1	94.5	Xyl″-1	105.9	6	72.2	6	72.2

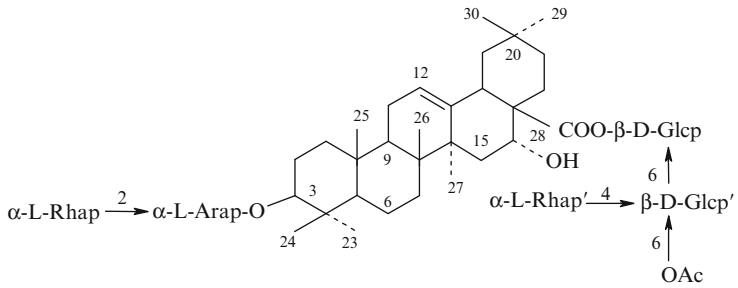
(*continued*)



Gleditsia Saponin G



Gleditsia Saponin I



Glycoside L-G$_0$

Table 1 (continued)

2	78.9	2	75.0	7	146.3	7	146.4
3	77.4	3	78.0	8	111.8	8	111.8
4	70.9	4	70.7	9	12.7	9	56.1
5	76.7	5	66.7	10	28.6	10	28.5
6	66.6	Rha′-1	98.1				
Rha-1	101.4	2	71.3				
2	71.6	3	73.3				
3	72.4	4	71.0				
4	83.9	5	69.6				
5	68.4	6	18.8				
6	18.7						

References

1. T. Konoshima, T. Sawada, Chem. Pharm. Bull. **30**(11), 4082 (1982)

Glycoside L-G$_0$

CAS Registry Number: 256417-14-8
See Figure Glycoside L-G$_0$

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Hedera canariensis* [1]

$C_{61}H_{98}O_{27}$: 1262.629

$[\alpha]_D$ −42° (c 1.0, C_5H_5N) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 3.28 (dd, J = 3.5, 12.0, H-3), 5.22 (t, J = 3.5, H-12), 5.50 (t, J = 3.5, H-16), 3.14 (dd, J = 4.0, 13.5, H-18), 1.70, 1.05, 1.00, 0.97, 0.94, 0.88, 0.80 (s, CH_3 × 7)

α-L-Arap: 4.80 (d, J = 5.5, H-1), 4.4 (t, J = 6.5, H-2), 4.20-4.27 (m, H-3-4-5), 3.75 (m, H-5); α-L-Rhap: 5.91 (d, J = 1.5, H-1), 4.63 (dd, J = 3.5, H-2), 4.5 (dd, J = 9.5, H-3), 4.23 (t, J = 9.5, H-4), 4.5 (m, H-5), 1.58 (d, J = 6.5, CH_3-6); β-D-Glcp: 6.08 (d, J = 8.0, H-1), 3.96 (t, J = 8.5, H-2), 4.01 (t, J = 9.0, H-3), 4.17 (t, J = 9.0, H-4), 4.00 (m, H-5), 4.53, 4.23 (H_2-6)

β-D-Glcp′: 4.87 (d, J = 8.0, H-1), 3.83 (t, J = 8.5, H-2), 3.92–4.09 (m, H-3-4), 3.66 (m, H-5), 4.50 (H-6), 4.39 (H_2-6); 1.90 (s, $COCH_3$); α-L-Rhap′: 5.39 (d, J = 1.5, H-1), 4.51 (dd, J = 3.5, H-2), 4.41 (dd, J = 9.0, H-3), 4.23 (t, J = 9.5, H-4), 4.7 (dq, J = 6.5, H-5), 1.52 (d, CH_3-6) [1]

^{13}C NMR (250 MHz, C_5D_5N): [1]

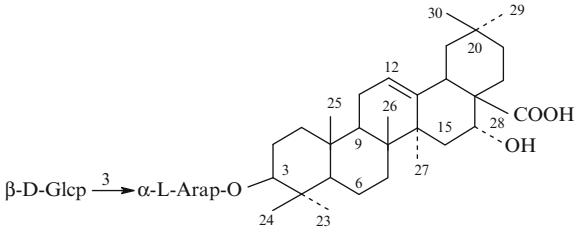
Table 1

C-1	39.5	C-16	74.1	Ara-1	105.0	5	78.3
2	27.0	17	49.7	2	76.5	6	69.6
3	89.4	18	41.8	3	74.1	Glc′-1	104.9
4	40.0	19	47.7	4	68.6	2	75.3
5	56.5	20	31.2	5	64.5	3	76.5
6	18.6	21	36.4	Rha-1	102.1	4	79.6
7	33.8	22	32.4	2	72.5	5	73.9
8	40.5	23	28.6	3	72.7	6	64.1
9	47.7	24	17.4	4	74.5	Ac-1	171.6
10	37.5	25	16.2	5	70.4	2	21.2
11	24.3	26	18.0	6	18.8	Rha′-1	103.1
12	123.1	27	27.7	Glc-1	96.1	2	72.5
13	145.0	28	176.7	2	74.0	3	72.7
14	42.5	29	33.6	3	78.6	4	74.0
15	36.4	30	25.2	4	71.0	5	70.9
						6	18.9

References

1. L.A. Yakovishin, V.I. Grishkovets, I.N. Shipanova, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **35**(1), 65 (1999)

Glycoside ST-D$_1$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tetrapanax papyriferum* [1]

$C_{41}H_{66}O_{13}$: 766.450

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	74.3	Ara-1	107.1
2	26.5	17	49.4	2	71.6

(*continued*)

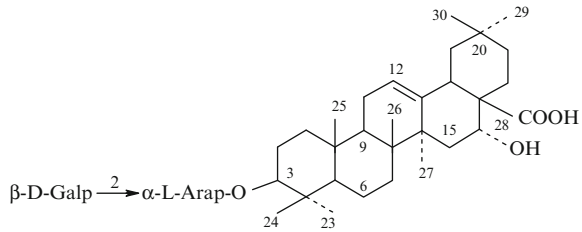
Table 1 (continued)

3	89.0	18	41.3	3	83.8
4	39.6	19	47.1	4	69.0
5	56.0	20	30.6	5	66.6
6	18.5	21	35.8	Glc-1	105.7
7	33.4	22	31.9	2	75.5
8	40.2	23	28.1	3	78.2
9	47.3	24	16.7	4	71.7
10	37.0	25	15.6	5	78.5
11	24.0	26	17.6	6	62.7
12	122.6	27	27.0		
13	144.3	28	178.9		
14	41.9	29	33.0		
15	36.1	30	24.9		

References

1. V.S. Strigunov, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **37**(5), 462 (2001)

Glycoside ST-D$_2$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tetrapanax papyriferum* [1]

$C_{41}H_{66}O_{13}$: 766.450

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	74.2	Ara-1	104.8
2	26.5	17	49.3	2	81.1
3	89.0	18	41.3	3	73.5
4	39.6	19	47.1	4	68.4
5	56.1	20	30.7	5	64.1

(*continued*)

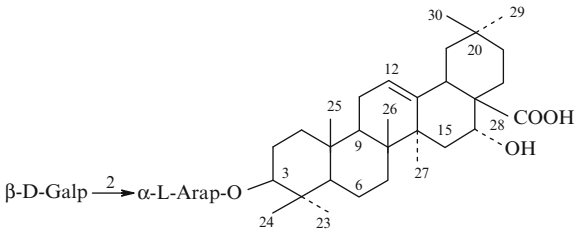
Table 1 (continued)

6	18.6	21	35.8	Gal-1	106.8
7	33.3	22	31.8	2	73.5
8	40.1	23	28.1	3	75.3
9	47.2	24	16.7	4	69.7
10	37.0	25	15.6	5	76.7
11	23.8	26	17.7	6	61.5
12	122.6	27	27.1		
13	144.3	28	179.0		
14	42.0	29	33.0		
15	36.0	30	24.8		

References

1. V.S. Strigunov, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **37**(5), 462 (2001)

Glycoside ST-F_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tetrapanax papyriferum* [1]

$C_{47}H_{76}O_{18}$: 928.503

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	74.8	Ara-1	104.8
2	26.3	17	48.9	2	77.3
3	88.8	18	41.4	3	82.7
4	39.3	19	47.4	4	68.0
5	56.2	20	31.0	5	65.0
6	18.5	21	36.3	Gal-1	104.6
7	33.4	22	32.6	2	73.2
8	39.8	23	28.1	3	75.3
9	47.2	24	16.9	4	69.7
10	37.1	25	15.5	5	76.2
11	23.8	26	17.5	6	61.6
12	122.6	27	27.5	Glc-1	104.5
13	144.7	28	180.4	2	75.2
14	42.1	29	33.3	3	78.0
15	36.3	30	24.7	4	71.4
				5	78.1
				6	62.4

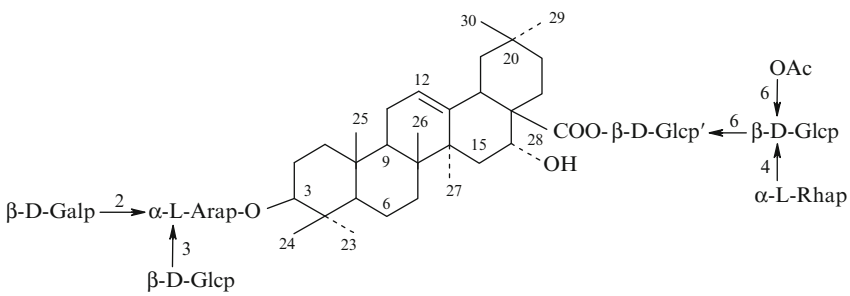
References

1. V.S. Strigunov, V.I. Grishkovets, N.V. Tolkacheva, A.S. Shashkov, Chem. Nat. Comp. **37**(2), 173 (2001)

Glycoside ST-I_2

See Figure Glycoside ST-I_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid



Glycoside ST-I_2

Biological sources: *Tetrapanax papyriferum* [1]

$C_{67}H_{108}O_{33}$: 1440.677

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.77 (H-5), 0.90 (CH_3-25, 29), 0.95 (CH_3-30), 1.05 (CH_3-26), 1.07 (CH_3-24), 1.22(CH_3-23),1.71(CH_3-27), 1.45, 1.30 (H_2-6), 1.55, 0.95 (H_2-1), 1.72 (H-9), 2.00, 1.82 (H_2-2), 2.66, 1.30(H_2-19), 3.25 (H-3), 3.43 (H-18), 5.55 (H-12)

α-L-Arap: 4.70 (H-1), 4.60 (H-2), 4.28 (H-3), 4.45 (H-4), 3.66, 4.14 (H_2-5)

β-D-Galp: 5.20 (H-1), 4.32 (H-2), 3.99 (H-3), 4.42 (H-4), 3.80 (H-5), 4.20, 4.30 (H_2-6)

β-D-Glcp: 5.10 (H-1), 3.90 (H-2), 4.08 (H-3), 4.03 (H-4), 3.83 (H-5), 4.18, 4.35 (H_2-6)

β-D-Glcp′: 6.06 (H-1), 3.97 (H-2), 4.08 (H-3), 4.08 (H-4), 4.03 (H-5), 4.23, 4.55 (H_2-6)

β-D-Glcp″: 4.87 (H-1), 3.83 (H-2), 4.02 (H-3), 3.91 (H-4), 3.76 (H-5), 4.44, 4.58 (H_2-6), 1.90 (OAc)

α-L-Rhap: 5.40 (H-1), 4.47 (H-2), 4.36 (H-3), 4.16 (H-4), 4.60 (H-5), 1.58 (CH_3-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	74.2	Ara-1	104.9	Glc′-1	95.6
2	26.5	17	49.3	2	77.3	2	73.8
3	89.0	18	41.3	3	82.7	3	78.4
4	39.6	19	47.1	4	68.1	4	70.9
5	56.1	20	30.6	5	65.1	5	77.8
6	18.5	21	35.8	Gal-1	104.9	6	69.4
7	33.4	22	31.8	2	73.2	Glc″-1	104.4
8	40.1	23	28.1	3	75.2	2	74.8
9	47.2	24	16.7	4	69.7	3	76.3
10	37.0	25	15.6	5	76.2	4	79.4
11	23.8	26	17.5	6	61.6	5	73.6
12	122.6	27	27.1	Glc-1	104.5	6	63.6
13	144.3	28	175.9	2	75.1	Ac-1	170.6
14	42.0	29	33.0	3	78.0	2	20.5
15	36.0	30	24.8	4	71.5	Rha-1	102.7
				5	78.2	2	72.1
				6	62.4	3	72.4
						4	73. 6
						5	70.5
						6	18.2

(*continued*)

References

1. V.I. Grishkovets, V.G. Strigunov, A.S. Shashkov, Chem. Nat. Comp. **37**(2), 167 (2001)

Glycoside ST-K_2

See Figure Glycoside ST-K_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tetrapanax papyriferum* [1]

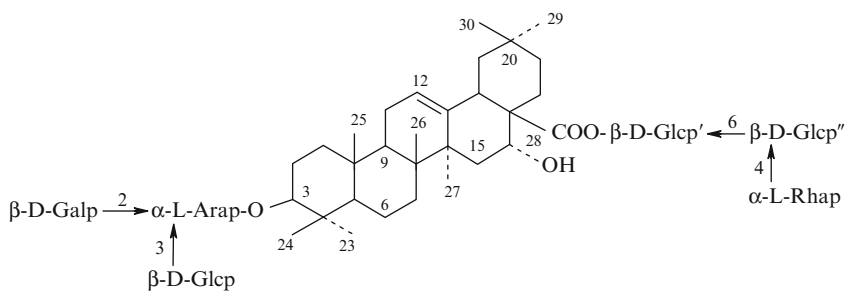
$C_{65}H_{106}O_{30}$: 1366.676

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	74.3	Ara-1	104.8	Glc′-1	95.7
2	26.5	17	49.2	2	77.4	2	73.9
3	89.1	18	41.1	3	82.6	3	78.6
4	39.5	19	47.2	4	68.0	4	70.8
5	59.2	20	30.8	5	65.1	5	77.9
6	18.5	21	36.1	Gal-1	104.5	6	69.4
7	33.3	22	32.2	2	73.1	Glc″-1	104.4
8	40.2	23	28.0	3	75.3	2	75.0

(*continued*)



Glycoside ST-K_2

Table 1 (continued)

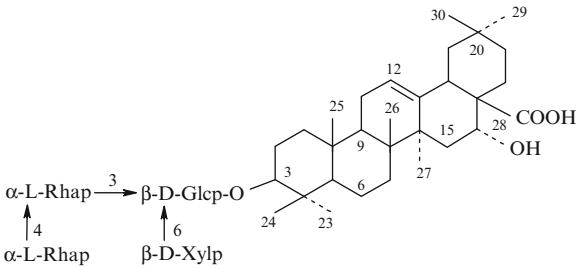
9	47.1	24	16.9	4	69.7	3	76.5
10	37.0	25	15.7	5	76.2	4	78.4
11	23.9	26	17.5	6	61.7	5	76.9
12	122.9	27	27.2	Glc-1	104.6	6	61.5
13	144.6	28	176.1	2	75.1	Rha-1	102.8
14	42.0	29	33.1	3	78.1	2	72.4
15	36.1	30	24.6	4	71.5	3	72.6
				5	78.1	4	74.0
				6	62.5	5	70.4
						6	18.3

References

1. V.S. Strigunov, V.I. Grishkovets, N.V. Tolkacheva, A.S. Shashkov, Chem. Nat. Comp. **37**(2), 173 (2001)

Helianthoside A

CAS Registry Number: 139164-70-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Helianthus annuus* [1]

$C_{53}H_{86}O_{21}$: 1058.566

Mp: 258–260°C [1]

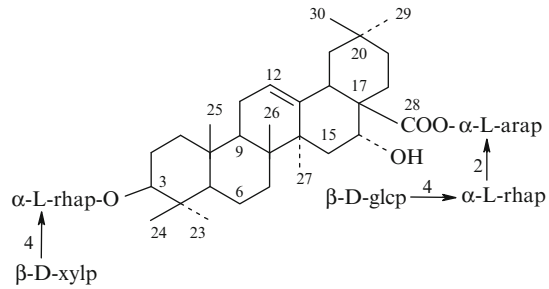
$[\alpha]_D^{20}$ +12° (c 0.1, H_2O) [1]

References

1. P.L. Cheban, V.Ya. Chirva, G.V. Lazur'evskii, Chem. Nat. Comp. **5**(1), 51 (1969)

Helianthoside B

CAS Registry Number: 29108-67-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Helianthus annuus* [1]

$C_{58}H_{94}O_{25}$: 1190.608

Mp: 164–166°C [1]

$[\alpha]_D^{20}$ +4.7° (c 0.1, H_2O) [1]

References

1. P.L. Cheban, V.Ya. Chirva, Chem. Nat. Comp. **5**(4), 277 (1969)

Helianthoside C

CAS Registry Number: 25503-42-8

See Figure Helianthoside C

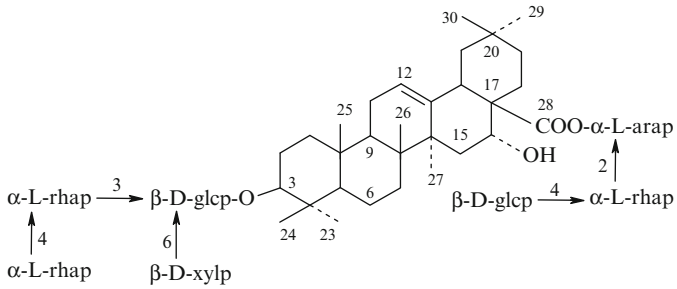
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Helianthus annuus* [1]

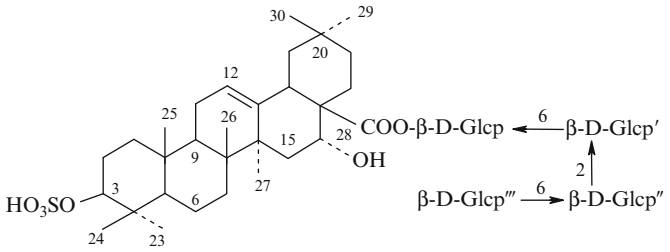
$C_{70}H_{114}O_{34}$: 1498.719

Mp: 215–217°C [1]

$[\alpha]_D^{20}$ +2.5° (c 0.1, H_2O) [1]



Helianthoside C



Rotundioside A

References

1. P.L. Cheban, V.Ya. Chirva, G.V. Lazur'evskii, Chem. Nat. Comp. **5**(2), 112 (1969)

Rotundioside A

CAS Registry Number: 99633-17-7

See Figure Rotundioside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Bupleurum rotundifolium* [1]

$C_{54}H_{88}O_{27}S$: 1200.523

Mp: 232–237° [1]

$[\alpha]_D^{23}$ −11.6° (c 0.78, MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.41 (dd, J = 10.0, 4.0, H-3), 5.56 (brs, H-12), 5.10 (brs, H-16)

β-D-Glcp: 6.16 (d, J = 8.0, H-1); β-D-Glcp′: 4.82 (d, J = 8.0, H-1); β-D-Glcp″: 4.85 (d, J = 8.0, H-1); β-D-Glcp‴: 5.07 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	74.6	Glc-1	95.8	Glc″-1	105.0
2	24.8	17	48.8	2	73.9	2	75.1
3	85.6	18	41.4	3	78.1	3	78.1
4	38.6	19	47.0	4	71.2	4	71.3
5	56.0	20	30.9	5	77.1	5	78.1
6	18.6	21	36.0	6	69.8	6	69.8
7	33.3	22	32.4	Glc′-1	102.9	Glc‴-1	105.7
8	39.7	23	28.5	2	83.9	2	76.0
9	47.0	24	17.0	3	76.8	3	78.5
10	37.0	25	15.5	4	71.3	4	71.3
11	23.7	26	17.3	5	78.1	5	78.5
12	122.5	27	27.2	6	62.5	6	62.5
13	145.0	28	176.0				
14	42.0	29	33.3				
15	36.0	30	24.8				

References

1. E. Akai, T. Takeda, Y. Kobayashi, Y. Ogihara, Chem. Pharm. Bull. **33**(9), 3715 (1985)

Scaberoside A_1

See Figure Scaberoside A_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{53}H_{84}O_{22}$: 1072.545

$[\alpha]_D^{29}$ −60.6° (c 2.25, MeOH) [1]

FAB-MS *m/z* (Me ester): 1095.532 $[M + Na]^+$ [1]

FAB-MS *m/z*: 1071 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N) (Me ester): 3.38 (dd, J = 5, 5, H-3), 5.62 (brs, H-12), 5.24 (brs, H-16), 1.27 (s, CH_3-23), 1.10 (s, CH_3-24), 0.98 (s, CH_3-25), 0.89 (s, CH_3-26), 1.81 (s, CH_3-27), 1.02 (s, CH_3-29), 1.15 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.06 (dd, J = 8, 8, H-2), 4.25 (dd, J = 8, 8, H-3), 4.44 (dd, J = 8, 9, H-4), 4.56 (d, J = 9, H-5), 3.73 (COOMe)

α-L-Arap: 6.49 (d, J = 2, H-1), ca 4.55 (H-2), ca 4.50 (H-3), ca 4.45 (H-4), 3.90, ca 4.50 (dd, J = 4, 11, H_2-5)

α-L-Rhap: 5.72 (s, H-1), 4.73 (dd, J = 2, 2, H-2), ca 4.45 (H-3), ca 4.24 (H-4), ca 4.30 (H-5), 1.68 (d, J = 4, CH_3-6)

β-D-Apif: 6.07 (d, J = 3, H-1), 4.71 (d, J = 3, H-2), 4.24, ca 4.55 (d, J = 9, H_2-4), 4.10 (s, H_2-5) [1]

^{13}C NMR (C_5D_5N) (Me ester): [1]

Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.2	Rha-1	101.5
2	26.6	17	49.6	2	75.4	2	71.7
3	89.2	18	41.3	3	77.9	3	80.3
4	39.5	19	47.1	4	73.1	4	73.6
5	55.9	20	30.9	5	77.1	5	71.7
6	18.5	21	36.1	6	170.7	6	18.5
7	33.5	22	32.0	COOMe	52.0	Api-1	111.9
8	40.0	23	28.2	Ara-1	93.4	2	77.9
9	47.1	24	15.6	2	75.6	3	80.0
10	37.0	25	16.9	3	70.0	4	75.0
11	23.8	26	17.6	4	65.9	5	65.5
12	122.8	27	27.2	5	62.8		
13	144.4	28	175.9				
14	42.0	29	33.2				
15	36.0	30	24.8				

References

1. T. Nagao, R. Tanaka, H. Shimokawa, H. Okabe, Chem. Pharm. Bull. **39**(7), 1719 (1991)

Scaberoside A_2

CAS Registry Number: 138822-76-1

See Figure Scaberoside A_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

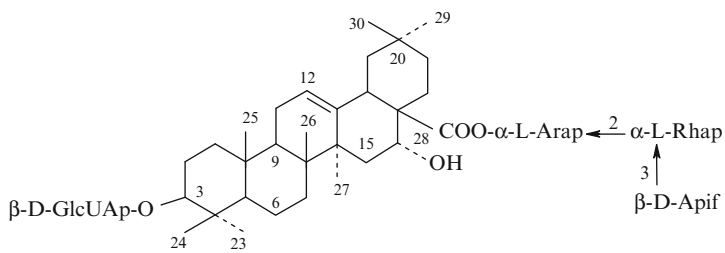
$C_{53}H_{84}O_{22}$: 1072.545 (Me ester)

$[\alpha]_D^{29}$ −42.9° (c 2.25, MeOH) [1]

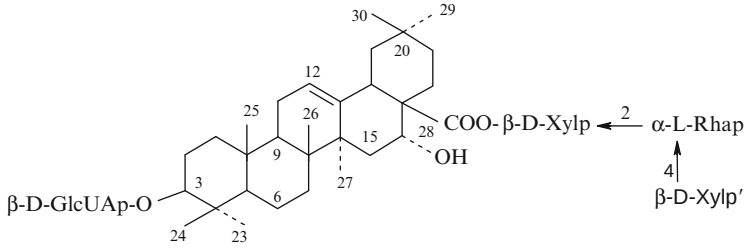
FAB-MS *m/z* (Me ester): 1095.538 $[M + Na]^+$ [1]

FAB-MS *m/z*: 1071 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 3.38 (dd, J = 5, 5, H-3), 5.62 (brs, H-12), 5.24 (brs, H-16), 1.27 (s, CH_3-23), 1.10 (s, CH_3-24), 0.98 (s, CH_3-25), 0.89



Scaberoside A_1



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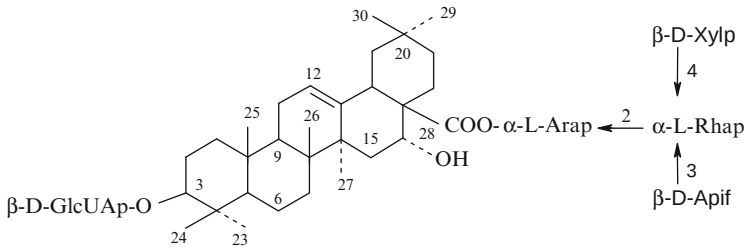


Scaberoside A_3

(s, CH_3-26), 1.81 (s, CH_3-27), 1.02 (s, CH_3-29), 1.15 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.06 (dd, J = 8, 8, H-2), 4.25 (dd, J = 8, 8, H-3), 4.44 (dd, J = 8, 9, H-4), 4.56 (d, J = 9, H-5), 3.73 (COOMe)

β-D-Xylp: 6.14 (d, J = 7, H-1), ca 4.32 (H-2), ca 4.20 (H-3), 4.12 (m, H-4), 3.78, ca 4.35 (dd, J = 10, 11, H_2-5)

α-L-Rhap: 6.32 (d, J = 1, H-1), 4.73 (s, H-2), 4.65 (dd, J = 3, 8, H-3), ca 4.40 (H-4), ca 4.44 (H-5), 1.75 (d, J = 6, CH_3-6)

β-D-Xylp′: 5.18 (d, J = 7, H-1), ca 4.07 (H-2), 3.98 (dd, J = 8, 8, H-3), 4.12 (m, H-4), 3.47, ca 4.20 (dd, J = 11, 11, H_2-5) [1]

^{13}C NMR (C_5D_5N) (Me ester): [1]

Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.2	Rha-1	101.2
2	26.6	17	49.6	2	75.4	2	71.9
3	89.2	18	41.3	3	77.9	3	72.5
4	39.5	19	47.1	4	73.1	4	83.6
5	55.9	20	30.9	5	77.1	5	68.4
6	18.5	21	36.1	6	170.7	6	18.6
7	33.5	22	32.0	COOMe	52.0	Xyl′-1	106.8
8	40.0	23	28.2	Xyl-1	95.2	2	76.0
9	47.1	24	15.6	2	75.7	3	78.6
10	37.0	25	16.9	3	77.7	4	71.0
11	23.8	26	17.6	4	70.7	5	67.4
12	122.8	27	27.2	5	67.2		
13	144.4	28	175.9				
14	42.0	29	33.2				
15	36.0	30	24.8				

References

1. T. Nagao, R. Tanaka, H. Shimokawa, H. Okabe, Chem. Pharm. Bull. **39**(7), 1719 (1991)

Scaberoside A_3

See Figure Scaberoside A_3

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{58}H_{92}O_{26}$: 1204.587

$[\alpha]_D$ −64.1° (c 2.0, MeOH) [1]

FAB-MS *m/z*: 1227.578 $[M + Na]^+$ [1]
FAB-MS *m/z*: 1203 $[M-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N) (Me ester): 3.38 (dd, 5, 5, H-3), 5.62 (brs, H-12), 5.24 (brs, H-16), 1.27 (s, CH_3-23), 1.10 (s, CH_3-24), 0.98 (s, CH_3-25), 0.89 (s, CH_3-26), 1.81 (s, CH_3-27), 1.02 (s, CH_3-29), 1.15 (s, CH_3-30)
β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.06 (dd, J = 8, 8, H-2), 4.25 (dd, J = 8, 8, H-3), 4.44 (dd, J = 8, 9, H-4), 4.56 (d, J = 9, H-5), 3.73 (COOMe)
α-L-Arap: 6.51 (d, J = 2, H-1), ca 4.48 (H-2), ca 4.48 (H-3), ca 4.40 (H-4), 3.95, ca 4.57 (dd, J = 4, 10, H_2-5)
α-L-Rhap: 5.60 (s, H-1), 4.71 (dd, J = 2, 4, H-2), 4.44 (dd, J = 4, 8, H-3), ca 4.50 (H-4), ca 4.17 (H-5), 1.72 (d, J = 6, CH_3-6)
β-D-Apif: 5.98 (d, J = 4, H-1), 4.74 (d, J = 4, H-2), 4.17, ca 4.55 (d, J = 9, H_2-4), 3.95, ca 4.55 (H_2-5)
β-D-Xylp: 5.34 (d, J = 8, H-1), ca 4.00 (H-2), ca 4.05 (H-3), ca 4.24 (H-4), 3.38, ca 4.17 (dd, J = 10, 12, H_2-5) [1]
^{13}C NMR(C_5D_5N) (Me ester): [1]

Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.2	Rha-4	77.9
2	26.6	17	49.6	2	75.4	5	71.2
3	89.2	18	41.3	3	77.9	6	18.5
4	39.5	19	47.1	4	73.1	Api-1	111.7
5	55.9	20	30.9	5	77.1	2	77.5
6	18.5	21	36.1	6	170.7	3	79.5
7	33.5	22	32.0	COOMe	52.0	4	74.5
8	40.0	23	28.2	Ara-1	93.6	5	62.2
9	47.1	24	15.6	2	75.7	Xyl-1	105.1
10	37.0	25	16.9	3	75.5	2	75.5
11	23.8	26	17.6	4	65.0	3	78.2
12	122.8	27	27.2	5	63.2	4	73.1
13	144.4	28	175.9	Rha-1	101.0	5	67.2
14	42.0	29	33.2			2	71.6
15	36.0	30	24.8			3	82.3

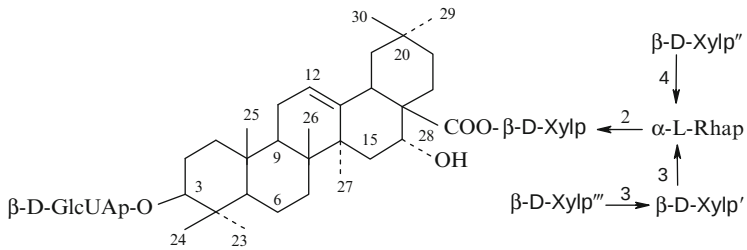
(*continued*)

References

1. T. Nagao, R. Tanaka, H. Shimokawa, H. Okabe, Chem. Pharm. Bull. **39**(7), 1719 (1991)

Scaberoside A_4

See Figure Scaberoside A_4
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Aster scaber* [1]
$C_{63}H_{100}O_{30}$: 1336.629
$[\alpha]_D^{29}$ −46.2° (c 2.25, MeOH) [1]
FAB-MS *m/z* (Me ester): 1359.617 $[M + Na]^+$ [1]
FAB-MS *m/z*: 1335 $[M-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N) (Me ester): 3.38 (dd, J = 5, 5, H-3), 5.62 (brs, H-12), 5.24 (brs, H-16), 1.27 (s, CH_3-23), 1.10 (s, CH_3-24), 0.98 (s, CH_3-25), 0.89 (s, CH_3-26), 1.81 (s, CH_3-27), 1.02 (s, CH_3-29), 1.15 (s, CH_3-30)
β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.06 (dd, J = 8, 8, H-2), 4.25 (dd, J = 8, 8, H-3), 4.44 (dd, J = 8, 9, H-4), 4.56 (d, J = 9, H-5), 3.73 (COOMe)
β-D-Xylp: 6.13 (d, J = 7, H-1)
β-D-Xylp′: 5.20 (d, J = 8, H-1)
β-D-Xylp″: 5.35 (d, J = 8, H-1)
β-D-Xylp‴: 5.07 (d, J = 7, H-1)



Scaberoside A_4

α-L-Rhap: 6.15 (d, J = 2, H-1), 4.94 (bts, H-2), 4.72 (dd, 3, 9, H-3), ca 4.54 (H-4), ca 4.52 (H-5), 1.75 (d, J = 6, CH_3-6) [1]

^{13}C NMR (C_5D_5N) (Me ester): [1]

Table 1

C-1	38.8	C-16	74.0	GlcUA-1	107.2	Xyl-1	95.4
2	26.6	17	49.6	2	75.4	Xyl′-1	105.5
3	89.2	18	41.3	3	77.9	Xyl″-1	105.0
4	39.5	19	47.1	4	73.1	Xyl‴-1	105.9
5	55.9	20	30.9	5	77.1		
6	18.5	21	36.1	6	170.7		
7	33.5	22	32.0	COOMe	52.0		
8	40.0	23	28.2	Rha-1	101.2		
9	47.1	24	15.6	2	71.2		
10	37.0	25	16.9	3	82.5		
11	23.8	26	17.6	4	78.1		
12	122.8	27	27.2	5	68.8		
13	144.4	28	175.9	6	18.7		
14	42.0	29	33.2				
15	36.0	30	24.8				

References

1. T. Nagao, R. Tanaka, H. Shimokawa, H. Okabe, Chem. Pharm. Bull. **39**(7), 1719 (1991)

Scaberoside Ha

See Figure Scaberoside Ha

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{54}H_{86}O_{22}$: 1086.561

$[\alpha]_D^{25}$ −68.9° (c 2.0, MeOH) [1]

HR-FAB-MS *m/z* (Me ester): 1109.550 $[M + Na]^+$, 447.147 [Xyl + 2Rha + Na]$^+$ [1]

FAB-MS *m/z*: 1085 $[M-H]^-$, 661 $[M-H-Xyl-2Rha]^-$ [1]

^{1}H NMR: 3.37 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.19 (brs, H-16), 3.44 (dd, J = 4, 14, H-18), 1.26 (s, CH_3-23), 0.95 (s, CH_3-24), 0.86 (s, CH_3-25), 1.03 (s, CH_3-26), 1.78 (s, CH_3-27), 0.99 (s, CH_3-29), 1.13 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.06 (dd, J = 8, 9, H-2), 4.24 (dd, J = 9, 9, H-3), 4.45 (dd, J = 9, 9, H-4), 4.57 (d, J = 9, H-5), 3.73 (COOMe)

β-D-Xylp: 6.48 (d, J = 4, H-1), 4.29 (dd, J = 4, 4, H-2), 4.38 (dd, J = 4, 4, H-3), 4.27 (H-4), 3.91, 4.36 (dd, J = 6, 12, H_2-5)

α-L-Rhap: 5.76 (d, J = 2, H-1), 4.58 (brs, H-2), 4.43 (dd, J = 3, 9, H-3), 4.22 (dd, J = 9, 9, H-4), ca 4.33 (H-5), 1.66 (d, J = 6, CH_3-6)

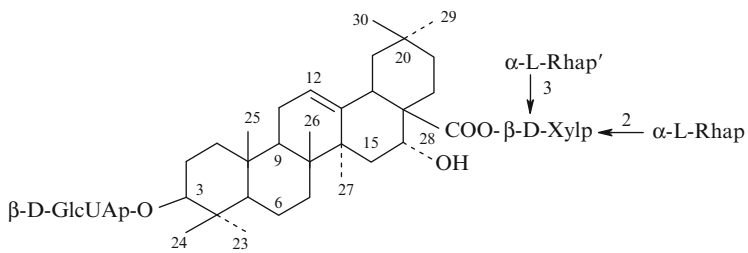
α-L-Rhap′: 5.67 (d, J = 2, H-1), 4.73 (brs, H-2), 4.52 (dd, J = 3, 9, H-3), 4.30 (dd, J = 9, 9, H-4), ca 4.58 (H-5), 1.59 (d, J = 6, CH_3-6) [1]

^{13}C NMR (Me ester): [1]

Table 1

C-1	38.8	C-16	73.9	GlcUA-1	107.2	Rha-1	101.4
2	26.6	17	49.4	2	75.3	2	72.1
3	89.1	18	41.4	3	77.8	3	72.4
4	39.5	19	47.1	4	73.1	4	73.6
5	55.9	20	30.8	5	77.1	5	70.7
6	18.4	21	35.9	6	170.7	6	18.6
7	33.5	22	32.1	COOMe	51.9	Rha′-1	101.9
8	40.0	23	28.1	Xyl-1	94.0	2	72.3
9	47.1	24	16.9	2	74.8	3	72.5
10	36.9	25	15.6	3	79.5	4	73.7
11	23.8	26	17.4	4	68.3	5	70.5

(*continued*)



Scaberoside Ha

Table 1 (continued)

12	122.7	27	27.0	5	65.2	6	18.3
13	144.3	28	175.7				
14	42.0	29	33.1				
15	36.1	30	24.6				

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(4), 659 (1993)

Scaberoside Hb_1

See Figure Scaberoside Hb_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{59}H_{94}O_{26}$: 1218.603

$[\alpha]_D^{28}$ −71.0° (c 0.9, MeOH) [1]

HR-FAB-MS (Me ester) *m/z*: 1241.593 $[M + Na]^+$, 579.190 $[2Xyl + 2Rha + Na]^+$ [1]

FAB-MS *m/z*: 1217 $[M-H]^-$, 661 $[M-H-2Xyl-2Rha]^-$ [1]

^{1}H NMR: 3.36 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.19 (brs, H-16), 3.44 (dd, J = 4, 14, H-18), 1.27 (s, CH_3-23), 0.96 (s, CH_3-24), 0.83 (s, CH_3-25), 1.03 (s, CH_3-26), 1.77 (s, CH_3-27), 0.99 (s, CH_3-29), 1.13 (s, CH_3-30)

β-D-GlcUAp: 4.96 (d, J = 8, H-1), 4.05 (dd, J = 8, 9, H-2), 4.24 (dd, J = 9, 9, H-3), 4.45 (dd, J = 9, 9, H-4), 4.57 (d, J = 9, H-5), 3.73 (COOMe)

β-D-Xylp: 6.44 (d, J = 4, H-1), 4.25 (dd, J = 4, 4, H-2), 4.36 (dd, J = 4, 4, H-3), ca 4.25 (H-4), 3.91 (dd, J = 6, 12), ca 4.35 (H_2-5)

α-L-Rhap: 5.73 (d, J = 2, H-1), 4.56 (brs, H-2), 4.51 (dd, J = 3, 9, H-3), 4.32 (dd, J = 9, 9, H-4), ca 4.25 (H-5), 1.72 (d, J = 6, CH_3-6)

α-L-Rhap′: 5.64 (d, J = 2, H-1), 4.72 (brs, H-2), 4.54 (dd, J = 3, 9, H-3), 4.27 (dd, J = 9, 9, H-4), ca 4.50 (H-5), 1.59 (d, J = 6, CH_3-6)

β-D-Xylp′: 5.10 (d, J = 7, H-1), 3.99 (dd, J = 7, 9, H-2), 4.06 (dd, J = 9, 9, H-3), 4.12 (m, H-4), 3.49 (dd, J = 10, 11), 4.20 (dd, J = 5, 11, H_2-5) [1]

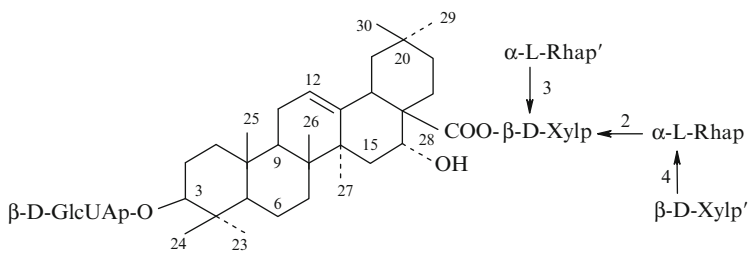
^{13}C NMR (Me ester): [1]

Table 1

C-1	38.8	C-16	73.9	GlcUA-1	107.2	Rha-4	83.8
2	26.6	17	49.4	2	75.3	5	68.8
3	89.1	18	41.4	3	77.9	6	18.4
4	39.5	19	47.1	4	73.1	Rha′-1	102.0
5	55.9	20	30.8	5	77.1	2	72.3
6	18.4	21	35.9	6	170.7	3	72.5
7	33.5	22	32.1	COOMe	51.9	4	73.7
8	40.0	23	28.1	Xyl-1	94.0	5	70.6
9	47.1	24	16.9	2	74.5	6	18.3
10	36.9	25	15.6	3	79.5	Xyl′-1	106.9
11	23.8	26	17.4	4	68.3	2	75.8
12	122.7	27	27.0	5	65.2	3	78.5
13	144.3	28	175.7	Rha-1	100.9	4	70.9
14	42.0	29	33.1	2	72.5	5	67.4
15	36.1	30	24.6	3	71.6		

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(4), 659 (1993)



Scaberoside Hb_1

Scaberoside Hb_2

See Figure Scaberoside Hb_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{64}H_{102}O_{30}$: 1350.645

Mp: 270°C (MeOH-H_2O) [1]

$[\alpha]_D^{25}$ −64° (c 0.7, MeOH) [1]

HR-FAB-MS (Me ester) *m/z*: 1373.635 $[M + Na]^+$, 711 [3Xyl + 2Rha + Na]$^+$ [1]

FAB-MS *m/z*: 1349 $[M-H]^-$, 661 [M-H-3Xyl-2Rha]$^-$ [1]

^{1}H NMR: 3.36 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.18 (brs, H-16), 1.28 (s, CH_3-23), 0.97 (s, CH_3-24), 0.82 (s, CH_3-25), 1.01 (s, CH_3-26), 1.77 (s, CH_3-27), 0.99 (s, CH_3-29), 1.14 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.05 (dd, J = 8, 9, H-2), 4.24 (dd, J = 9, 9, H-3), 4.45 (dd, J = 9, 9, H-4), 4.57 (d, J = 9, H-5), 3.73 (COOMe); β-D-Xylp: 6.48 (d, J = 4, H-1), 4.24 (dd, J = 4, 4, H-2), 4.38 (dd, J = 4, 4, H-3), ca 4.30 (H-4), 3.94 (dd, J = 6, 12), 4.36 (dd, J = 5, 12, H_2); α-L-Rhap: 5.69 (d, J = 2, H-1), 4.54 (brs, H-2), 4.48 (dd, J = 3, 9, H-3), 4.32 (dd, J = 9, 9, H-4), ca 4.20 (H-5), 1.68 (d, J = 6, CH_3-6); α-L-Rhap′: 5.64 (d, J = 2, H-1), 4.70 (dd, J = 2, 3, H-2), 4.51 (dd, J = 3, 9, H-3), 4.27 (dd, J = 9, 9, H-4), ca 4.50 (H-5), 1.58 (d, J = 6, CH_3-6); β-D-Xylp′: 5.12 (d, J = 7, H-1), 4.00 (dd, J = 7, 9, H-2), ca 4.02 (H-3), ca 4.00 (H-4), ca 3.45, 4.16 (dd, J = 5, 10, H-5); β-D-Xylp″: 5.20 (d, J = 8, H-1), 4.00 (dd, J = 8, 9, H-2), 4.11 (dd, J = 9, 9, H-3), ca 4.15 (H-4), 3.66, ca 4.30 (dd, J = 10, 11, H_2-5) [1]

^{13}C NMR (Me ester): [1]

Table 1

C-1	38.8	C-19	47.1	Xyl-1	93.8	Xyl′-1	106.2
2	26.6	20	30.8	2	74.6	2	74.7
3	89.1	21	35.9	3	78.5	3	86.9
4	39.5	22	32.1	4	68.1	4	68.9
5	55.9	23	28.1	5	65.0	5	66.7
6	18.4	24	16.9	Rha-1	100.9	Xyl″-1	105.9
7	33.5	25	15.6	2	72.5	2	75.2
8	40.0	26	17.4	3	71.6	3	78.0
9	47.1	27	27.0	4	83.5	4	70.8
10	36.9	28	175.7	5	68.7	5	67.2
11	23.8	29	33.1	6	18.4		
12	122.7	30	24.6	Rha′-1	101.8		
13	144.3	GlcUA-1	107.2	2	72.2		
14	42.0	2	75.3	3	72.5		
15	36.1	3	77.8	4	73.7		
16	73.9	4	73.1	5	70.5		
17	49.4	5	77.1	6	18.3		
18	41.4	6	170.7				
		COOMe	51.9				

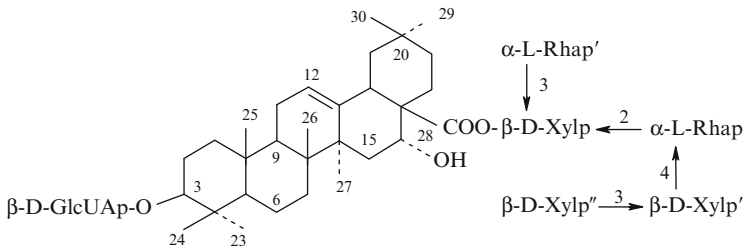
References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(4), 659 (1993)

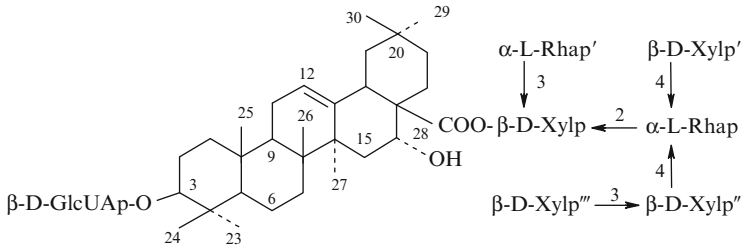
Scaberoside Hc_1

See Figure Scaberoside Hc_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid



Scaberoside Hb_2



Scaberoside Hc_1

Biological sources: *Aster scaber* [1]
$C_{69}H_{110}O_{34}$: 1482.687
Mp: 238–240°C (MeOH-H_2O) [1]
$[\alpha]_D^{22}$ −74.7° (c 1.0, MeOH) [1]
HR-FAB-MS *m/z*: 1505.676 $[M + Na]^+$, 843.274 $[4Xyl + 2Rha + Na]^+$ [1]
FAB-MS *m/z*: 1481 $[M-H]^-$, 661 $[M-H-4Xyl-2Rha]^-$ [1]
^{1}H NMR: 3.37 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.17 (brs, H-16), 3.44 (dd, J = 4, 14, H-18), 1.28 (s, CH_3-23), 0.98 (s, CH_3-24), 0.85 (s, CH_3-25), 1.04 (s, CH_3-26), 1.77 (s, CH_3-27), 0.99 (s, CH_3-29), 1.15 (s, CH_3-30)
β-D-GlcUAp: 4.97 (d, J = 8, H-1), 4.06 (dd, J = 8, 9, H-2), 4.24 (dd, J = 9, 9, H-3), 4.45 (dd, J = 9, 9, H-4), 4.57 (d, J = 9, H-5), 3.73 (COOMe)
β-D-Xylp: 6.48 (d, J = 4, H-1), 4.28 (dd, J = 4, 4, H-2)
α-L-Rhap: 5.70 (d, J = 2, H-1), 4.72 (brs, H-2), 4.54 (dd, J = 3, 9, H-3)
α-L-Rhap′: 5.65 (d, J = 2, H-1), 4.67 (brs, H-2), 4.51 (dd, J = 3, 9, H-3)
β-D-Xylp′: 5.31 (d, J = 8, H-1), 3.91 (dd, J = 8, 9, H-2)
β-D-Xylp″: 5.17 (d, J = 7, H-1), 3.97 (dd, J = 7, 9, H-2), ca 4.00 (H-3); β-D-Xylp‴: 5.08 (d, J = 7, H-1) [1]
^{13}C NMR: [1]

Table 1

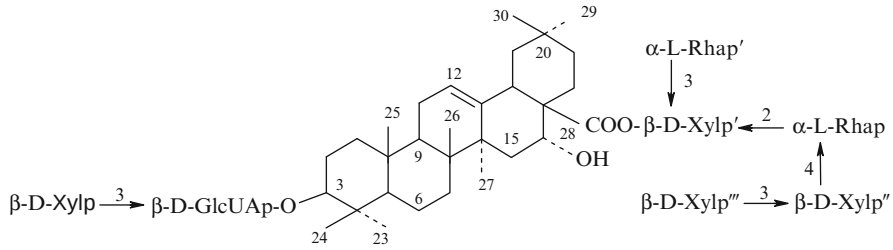
C-1	38.8	C-16	73.9	GlcUA-1	107.1	Xyl′-1	105.1
2	26.6	17	49.4	2	75.3	2	75.5
3	89.1	18	41.4	3	77.8	Xyl″-1	105.1
4	39.5	19	47.1	4	73.0	2	73.8
5	55.9	20	30.8	5	77.1	3	86.4
6	18.4	21	35.9	6	170.7	Xyl‴-1	105.8
7	33.5	22	32.1	COOMe	51.9		
8	40.0	23	28.1	Xyl-1	94.0		
9	47.1	24	16.9	2	75.2		
10	36.9	25	15.6	Rha-1	100.8		
11	23.8	26	17.4	2	71.2		
12	122.7	27	27.0	3	82.1		
13	144.3	28	175.7	Rha′-1	101.8		
14	42.0	29	33.1	2	72.3		
15	36.1	30	24.6	3	72.5		

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(4), 659 (1993)

Scaberoside Hc_2

See Figure Scaberoside Hc_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Aster scaber* [1]
$C_{69}H_{110}O_{34}$: 1482.687
$[\alpha]_D^{23}$ −67.4° (c 1.0, MeOH) [1]
FAB-MS (Me ester) *m/z*: 1505 $[M + Na]^+$, 711 $[2Rha + 3Xyl + Na]^+$ [1]
HR-FAB-MS *m/z*: 1505.679 $[M + Na]^+$ [1]
FAB-MS *m/z*: 1481 $[M-H]^-$, 793 $[M-H-2Rha-3Xyl]^-$, 661 $[793-Xyl]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.34 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.18 (brs, H-16), 1.26 (s, CH_3-23), 0.97 (s, CH_3-24), 0.81 (s, CH_3-25),



Scaberoside Hc$_2$

1.00 (s, CH_3-26), 1.77 (s, CH_3-27), 1.00 (s, CH_3-29), 1.13 (s, CH_3-30)

β-D-GlcUAp: 4.95 (d, J = 8, H-1); β-D-Galp: 5.18 (d, J = 8, H-1); β-D-Xylp: 5.30 (d, J = 8, H-1); β-D-Xylp′: 6.48 (d, J = 4, H-1); β-D-Xylp″: 5.11 (d, J = 7, H-1), 4.23 (dd, J = 4, 4, H-2); β-D-Xylp‴: 5.20 (d, J = 8.0, H-1)

α-L-Rhap: 5.69 (d, J = 2, H-1); α-L-Rhap′: 5.64 (d, J = 2, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.7	C-21	35.9	Xyl-1	106.2	Rha′-1	101.8
2	26.5	22	32.2	2	75.2	2	72.2
3	89.4	23	28.0	3	78.0	3	72.5
4	39.5	24	16.9	4	70.8	4	73.7
5	55.8	25	15.5	5	67.3	5	70.5
6	18.5	26	17.5	Xyl′-1	93.9	6	18.3
7	33.4	27	27.0	2	74.5	Xyl″-1	106.3
8	40.0	28	175.8	3	78.5	2	74.7
9	47.1	29	33.2	4	68.1	3	87.0
10	36.9	30	24.7	5	65.0	4	69.0
11	23.8	GlcUA-1	106.7	Rha-1	100.9	5	66.8
12	122.8	2	74.4	2	72.5	Xyl‴-1	105.9
13	144.3	3	86.2	3	71.6	2	75.2
14	42.0	4	71.1	4	83.5	3	78.0
15	36.1	5	76.7	5	68.7	4	70.8
16	73.9	6	170.2	6	18.4	5	67.2
17	49.4	COOMe	52.1				
18	41.4						
19	47.1						
20	30.8						

References

1. T. Nagao, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(9), 1562 (1993)

Scaberoside Hd

See Figure Scaberoside Hd

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{74}H_{118}O_{38}$: 1614.730

$[\alpha]_D^{26}$ −73.6° (c 0.9, MeOH) [1]

FAB-MS (Me ester) *m/z*: 1637 $[M + Na]^+$, 843 [2Rha + 4Xyl + Na]$^+$ [1]

HR-FAB-MS *m/z*: 1637.719 $[M + Na]^+$ [1]

FAB-MS *m/z*: 1613 $[M-H]^-$, 793 [M-H-2Rha-4Xyl]$^-$, 661 [793-Xyl]$^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.35 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.18 (brs, H-16), 1.27 (s, CH_3-23), 0.98 (s, CH_3-24), 0.84 (s, CH_3-25), 1.04 (s, CH_3-26), 1.77 (s, CH_3-27), 0.99 (s, CH_3-29), 1.15 (s, CH_3-30)

β-D-GlcUAp: 4.95 (d, J = 8, H-1); β-D-Xylp: 5.29 (d, J = 8, H-1); β-D-Xylp′: 6.48 (d, J = 4, H-1), 4.23 (dd, J = 4, 4, H-2); β-D-Xylp″: 5.31 (d, J = 8, H-1); β-D-Xylp‴: 5.17 (d, J = 7, H-1); β-D-Xylp⁗: 5.08 (d, J = 7, H-1)

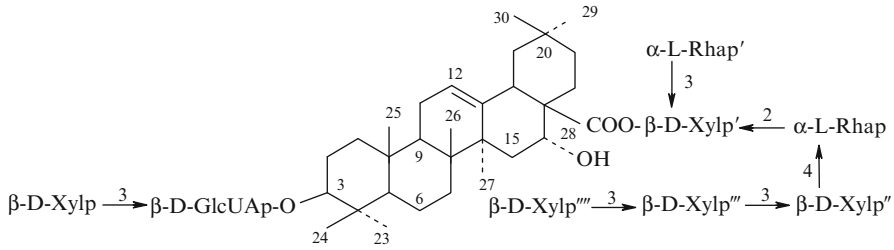
α-L-Rhap: 5.70 (s, J = 2, H-1); α-L-Rhap′: 5.65 (s, J = 2, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.7	C-21	35.9	Xyl-1	106.2
2	26.5	22	32.2	2	75.2
3	89.4	23	28.0	3	78.0
4	39.5	24	16.9	4	70.8

(*continued*)



Scaberoside Hd

Table 1 (continued)

5	55.8	25	15.5	5	67.3
6	18.5	26	17.5	Xyl′-1	94.0
7	33.4	27	27.0	2	75.2
8	40.0	28	175.8	Rha-1	100.8
9	47.1	29	33.2	2	71.3
10	36.9	30	24.7	3	82.1
11	23.8	GlcUA-1	106.7	Rha′-1	101.8
12	122.8	2	74.4	2	72.3
13	144.3	3	86.2	3	72.5
14	42.0	4	71.1	Xyl″-1	105.1
15	36.1	5	76.7	2	75.6
16	73.9	6	170.2	Xyl‴-1	105.1
17	49.4	COOMe	52.1	2	73.8
18	41.4			3	86.5
19	47.1			Xyl⁗-1	105.8
20	30.8				

References

1. T. Nagao, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(9), 1562 (1993)

Scaberoside Hf

See Figure Scaberoside Hf

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{64}H_{104}O_{31}$: 1368.656

$[\alpha]_D^{25}$ −67.7° (c 1.1, MeOH) [1]

FAB-MS (Me ester)*m/z*: 1403 $[M + Na]^+$, 579 [2Rha + 2Xyl + Na]$^+$ [1]

HR-FAB-MS *m/z*: 1403.645 [1]

FAB-MS *m/z*: 1379 $[M-H]^-$, 823 [M-H-2Rha-2Xyl]$^-$, 661 [823-Gal]$^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.28 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.20 (brs, H-16), 3.44 (dd, J = 4, 14, H-18), 1.28 (s, CH_3-23), 1.09 (s, CH_3-24), 0.84 (s, CH_3-25), 1.03 (s, CH_3-26), 1.76 (s, CH_3-27), 1.00 (s, CH_3-29), 1.12 (s, CH_3-30)

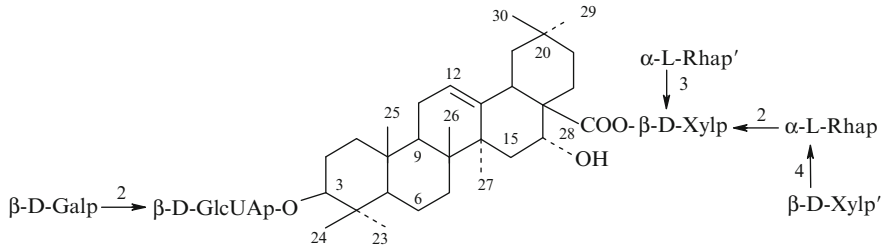
β-D-GlcUAp: 4.96 (d, J = 8, H-1); β-D-Galp: 5.18 (d, J = 8, H-1); β-D-Xylp: 6.45 (d, J = 4, H-1); β-D-Xylp′: 5.11 (d, J = 7, H-1), 4.25 (dd, J = 4, 4, H-2)

α-L-Rhap: 5.74 (d, J = 2, H-1); α-L-Rhap′: 5.65 (d, J = 2, H-1) [1]

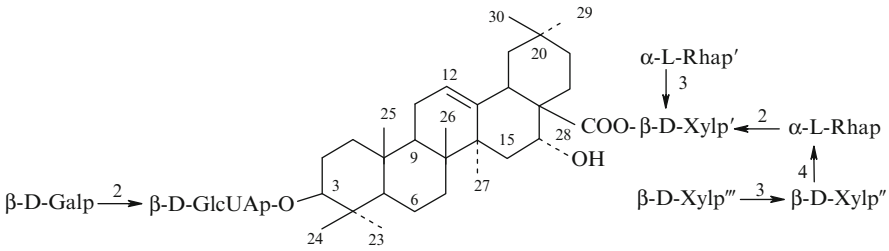
^{13}C NMR (100 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.8	C-21	35.9	Gal-1	107.1	Rha′-1	102.0
2	26.6	22	32.2	2	74.6	2	72.3
3	89.2	23	28.1	3	74.8	3	72.5
4	39.5	24	16.7	4	69.5	4	73.7
5	55.9	25	15.6	5	76.8	5	70.6
6	18.5	26	17.5	6	61.3	6	18.3
7	33.5	27	27.0	Xyl-1	94.0	Xyl′-1	106.9
8	40.0	28	175.7	2	74.3	2	75.8
9	47.1	29	33.1	3	79.2	3	78.4
10	36.9	30	24.6	4	68.3	4	70.9
11	23.8	GlcUA-1	105.3	5	65.1	5	67.4
12	122.8	2	83.7	Rha-1	100.8		
13	144.3	3	77.4	2	72.5		
14	42.0	4	72.8	3	71.6		
15	36.1	5	76.6	4	83.8		
16	73.9	6	170.4	5	68.8		
17	49.4	COOMe	52.0	6	18.4		
18	41.4						
19	47.1						
20	30.8						



Scaberoside Hf



Scaberoside Hg

References

1. T. Nagao, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(9), 1562 (1993)

Scaberoside Hg

See Figure Scaberoside Hg

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{70}H_{112}O_{35}$: 1512.698

Mp: 260–261°C (H_2O-MeOH) [1]

$[\alpha]_D^{25}$ −67.3° (c 1.0, MeOH) [1]

HR-FAB-MS (Me ester) *m/z*: 1535 $[M + Na]^+$, 711 $[2Rha + 3Xyl + Na]^+$ [1]

FAB-MS *m/z*: 1511 $[M-H]^-$, 823 $[M-H-2Rha-3Xyl]^-$, 661 $[823-Gal]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.28 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.20 (brs, H-16), 1.28 (s, CH_3-23), 1.09 (s, CH_3-24), 0.83 (s, CH_3-25), 1.02 (s, CH_3-26), 1.76 (s, CH_3-27), 0.99 (s, CH_3-29), 1.13 (s, CH_3-30)

β-D-GlcUAp: 4.96 (d, J = 8, H-1); β-D-Galp: 5.18 (d, J = 8, H-1); β-D-Xylp: 6.48 (d, J = 4, H-1), 4.24 (dd, J = 4, 4, H-2); β-D-Xylp′: 5.11 (d, J = 7, H-1), β-D-Xylp″:5.21 (d, J = 8, H-1)

α-L-Rhap: 5.70 (s, H-1); α-L-Rhap′: 5.64 (s, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.8	C-21	35.9	Gal-1	107.1	Rha′-1	101.8
2	26.6	22	32.2	2	74.6	2	72.3
3	89.2	23	28.1	3	74.8	3	72.5
4	39.5	24	16.7	4	69.5	4	73.7
5	55.9	25	15.6	5	76.8	5	70.6
6	18.5	26	17.5	6	61.3	6	18.3
7	33.5	27	27.0	Xyl-1	93.9	Xyl′-1	106.3
8	40.0	28	175.7	2	74.6	2	74.8
9	47.1	29	33.1	3	78.6	3	86.9
10	36.9	30	24.6	4	68.1	4	69.0
11	23.8	GlcUA-1	105.3	5	65.0	5	66.8
12	122.8	2	83.7	Rha-1	100.9	Xyl″-1	105.9
13	144.3	3	77.4	2	72.5	2	75.2
14	42.0	4	72.8	3	71.6	3	78.0
15	36.1	5	76.6	4	83.5	4	70.8

(*continued*)

Table 1 (continued)

16	73.9	6	170.4	5	68.7	5	67.2
17	49.4	COOMe	52.0	6	18.4		
18	41.4						
19	47.1						
20	30.8						

References

1. T. Nagao, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(9), 1562 (1993)

Scaberoside Hh

See Figure Scaberoside Hh

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{75}H_{120}O_{39}$: 1644.740

$[\alpha]_D^{24}$ −56.9° (c 0.9, MeOH) [1]

FAB-MS *m/z*: 1667 $[M + Na]^+$, 711 [2Rha + 3Xyl + $Na]^+$ [1]

FAB-MS *m/z*: 1643 $[M-H]^-$, 955 [M-H-2Rha-3Xyl]$^-$, 823 [955-Xyl]$^-$, 793 [955-Gal]$^-$, 661 [955-Xyl-Gal]$^-$ [1]

HR-FAB-MS *m/z*: 1667.730 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.27 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.18 (brs, H-16), 1.29 (s, CH_3-23), 1.09 (s, CH_3-24), 0.80 (s, CH_3-25), 1.00 (s, CH_3-26), 1.75 (s, CH_3-27), 0.99 (s, CH_3-29), 1.13 (s, CH_3-30)

β-D-GlcUAp: 4.95 (d, J = 8, H-1); β-D-Galp: 5.52 (d, J = 8, H-1); β-D-Xylp: 5.29 (d, J = 8, H-1); β-D-Xylp′:6.47 (d, J = 4, H-1), 4.24 (dd, J = 4, 4, H-2); β-D-Xylp″: 5.11 (d, J = 7, H-1); β-D-Xylp‴: 5.20 (d, J = 8, H-1)

α-L-Rhap: 5.71 (s, H-1); α-L-Rhap′: 5.65 (s, H-1) [1]

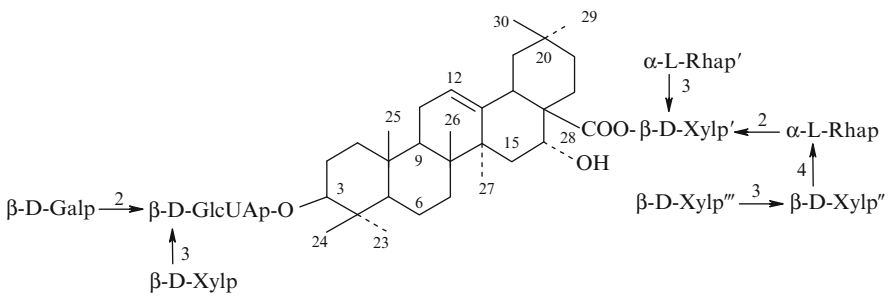
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-21	35.9	Gal-3	75.1	Rha′-1	101.8
2	26.5	22	32.2	4	69.7	2	72.3
3	89.7	23	28.0	5	76.5	3	72.5
4	39.6	24	16.7	6	61.5	4	73.7
5	55.9	25	15.5	Xyl-1	104.9	5	70.5
6	18.5	26	17.5	2	75.1	6	18.3
7	33.4	27	27.0	3	78.4	Xyl″-1	106.3
8	39.9	28	175.7	4	70.7	2	74.8
9	47.0	29	33.1	5	67.2	3	86.9
10	36.9	30	24.6	Xyl′-1	93.9	4	69.0
11	23.7	GlcUA-1	105.4	2	74.5	5	66.7
12	122.8	2	79.4	3	78.8	Xyl‴-1	105.8
13	144.3	3	85.6	4	68.1	2	75.1
14	42.0	4	71.2	5	65.0	3	78.0
15	36.1	5	76.3	Rha-1	100.9	4	70.8
16	73.9	6	169.9	2	72.5	5	67.2
17	49.3	COOMe	52.1	3	71.6		
18	41.4	Gal-1	104.5	4	83.5		
19	47.0	2	73.7	5	68.7		
20	30.8			6	18.4		

References

1. T. Nagao, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(9), 1562 (1993)



Scaberoside Hh

Scaberoside Hi

See Figure Scaberoside Hi

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Aster scaber* [1]

$C_{75}H_{120}O_{39}$: 1644.740

$[\alpha]_D^{23}$ −64.4° (c 0.8, MeOH) [1]

FAB-MS (Me ester) *m/z*: 1667 $[M + Na]^+$, 843 [2Rha + 4Xyl + Na]$^+$ [1]

HR-FAB-MS (Me ester) *m/z*: 1667.730 [1]

FAB-MS *m/z*: 1643 $[M-H]^-$, 823 $[M-H-2Rha-4Xyl]^-$, 661 $[823-Gal]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.28 (dd, J = 4, 12, H-3), 5.60 (dd, J = 3, 3, H-12), 5.17 (brs, H-16), 1.29 (s, CH_3-23), 1.10 (s, CH_3-24), 0.85 (s, CH_3-25), 1.04 (s, CH_3-26), 1.75 (s, CH_3-27), 0.99 (s, CH_3-29), 1.14 (s, CH_3-30)

β-D-GlcUAp: 4.96 (d, J = 8, H-1); β-D-Galp: 5.19 (d, J = 8, H-1); β-D-Xylp: 6.50 (d, J = 4, H-1), 4.28 (dd, J = 4, 4, H-2); β-D-Xylp′: 5.31 (d, J = 8, H-1); β-D-Xylp″: 5.17 (d, J = 7, H-1); β-D-Xylp‴: 5.08 (d, J = 8, H-1)

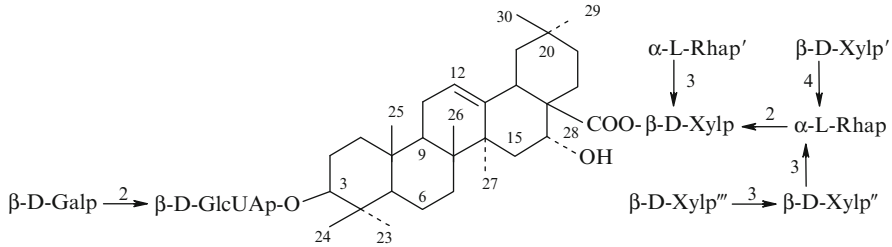
α-L-Rhap: 5.70 (s, H-1); α-L-Rhap′: 5.65 (s, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.8	C-16	73.9	GlcUA-1	105.3	Xyl-1	94.0
2	26.6	17	49.4	2	83.7	2	75.2
3	89.2	18	41.4	3	77.4	Rha-1	100.6
4	39.5	19	47.1	4	72.8	2	71.2
5	55.9	20	30.8	5	76.6	3	82.1
6	18.5	21	35.9	6	170.4	Rha′-1	101.8
7	33.5	22	32.2	COOMe	52.0	2	72.3
8	40.0	23	28.1	Gal-1	107.1	3	72.5
9	47.1	24	16.7	2	74.6	Xyl′-1	105.1
10	36.9	25	15.6	3	74.8	2	75.5
11	23.8	26	17.5	4	69.5	Xyl″-1	105.1
12	122.8	27	27.0	5	76.8	2	73.8
13	144.3	28	175.7	6	61.3	3	86.4
14	42.0	29	33.1			Xyl‴-1	105.8
15	36.1	30	24.6				

(*continued*)

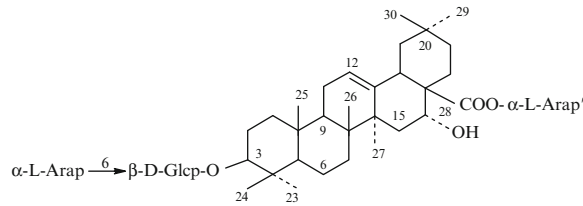


Scaberoside Hi

References

1. T. Nagao, Y. Iwase, H. Okabe, Chem. Pharm. Bull. **41**(9), 1562 (1993)

Stachyssaponin I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Stachys riederi* [1]

$C_{46}H_{74}O_{17}$: 898.492

$[\alpha]_D^{26}$ −8.1° (c 0.74, MeOH) [1]

FAB-MS *m/z*: 921 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.25, 0.90, 0.99, 1.06, 1.79, 1.04, 1.15 (s, CH_3-23, 24, 25, 26, 27, 29,

30), 3.34 (dd, J = 12.5, 4.0, H-3), 0.78 (d, J = 11.5, H-5), 5.60 (t-like, J = 3.0, H-12), 5.24 (brs, H-16), 3.58 (dd, J = 14.0, 4.0, H-18), 2.78 (t, J = 14.0, H-19)
β-D-Glcp: 4.86 (d, J = 8.0, H-1), 3.98 (t, J = 8.0, H-2), 4.18 (H-3), 4.09 (H-4), 4.09 (H-5), 4.27 (dd, J = 11.05, 5.0, H-6), 4.84 (brd, J = 11.5, H-6)
α-L-Arap: 4.96 (d, J = 6.5, H-1), 4.46 (t, J = 7.0, H-2), 4.18 (H-3), 4.32 (H-4), 3.77 (d, J = 11.0, H-5), 4.30 (H-5)
α-L-Arap′: 6.33 (d, J = 6.0, H-1), 4.56 (t, J = 6.0, H-2), 4.39 (dd, J = 6.0, 3.0, H-3), 4.49 (H-4), 3.93 (dd, J = 11.0, 3.0, H-5), 4.43 (H-5) [1]

^{13}C NMR (125.65 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Glc-1	107.0
2	26.8	19	47.2	2	75.7
3	89.1	20	31.0	3	78.7
4	39.6	21	36.0	4	72.1
5	56.0	22	32.1	5	76.7
6	18.6	23	28.3	6	70.0
7	33.5	24	15.8	Ara-1	105.3
8	40.1	25	17.1	2	72.3
9	47.2	26	17.6	3	74.2
10	37.1	27	27.3	4	69.0
11	23.9	28	176.2	5	66.3
12	122.9	29	33.3	Ara′-1	95.9
13	144.4	30	24.9	2	71.4
14	42.1			3	73.7
15	36.2			4	67.6
16	74.1			5	65.7
17	49.5				

References

1. R. Yamamoto, T. Miyase, A. Ueno, Chem. Pharm. Bull. **42**(6), 1291 (1994)

Stachyssaponin II

See Figure Stachyssaponin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Stachys riederi* [1]

$C_{52}H_{84}O_{21}$: 1044.550

$[\alpha]_D^{24}$ −38.2° (c 1.40, MeOH) [1]

FAB-MS *m/z*: 1068 $[M + Na]^+$ [1]

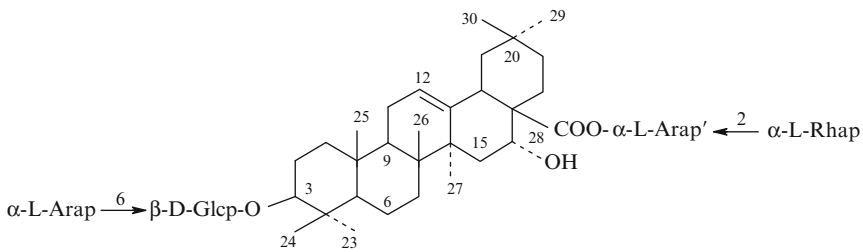
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.20, 0.86, 0.94, 1.04, 1.75, 1.01, 1.13 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.30 (dd, J = 11.5, 4.0, H-3), 0.74 (brd, J = 11.5, H-5), 5.57 (t-like, J = 3.0, H-12), 5.22 (brs, H-16), 3.55 (dd, J = 14.0, 4.5, H-18), 2.75 (t, J = 13.5, H-19)
β-D-Glcp: 4.82 (d, J = 8.0, H-1), 3.94 (t, J = 8.0, H-2), 4.15 (t, J = 8.0, H-3), 4.09 (H-4), 4.09 (H-5), 4.23 (dd, J = 11.0, 5.0, H-6), 4.80 (brd, J = 11.0, H-6)
α-L-Arap: 4.92 (d, J = 6.5, H-1), 4.42 (t, J = 6.5, H-2), 4.14 (H-3), 4.28 (H-4), 3.73 (d, J = 10.0, H-5), 4.25 (H-5)
α-L-Arap′: 6.48 (d, J = 3.0, H-1), 4.54 (H-2), 4.53 (t, J = 3.5, H-3), 4.42 (brs, H-4), 3.90 (dd, J = 11.0, 4.5, H-5), 4.48 (H-5)
α-L-Rhap: 5.74 (brs, H-1), 4.54 (H-2), 4.45 (dd, J = 9.5, 3.0, H-3), 4.21 (t, J = 9.5, H-4), 4.41 (H-5), 1.65 (d, J = 6.5, H-6) [1]

^{13}C NMR (125.65 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Glc-1	107.0	Rha-1	101.5
2	26.8	19	47.2	2	75.7	2	72.4
3	89.1	20	31.0	3	78.7	3	72.6
4	39.6	21	36.0	4	72.1	4	73.9
5	56.0	22	32.1	5	76.7	5	70.1

(*continued*)



Stachyssaponin II

Table 1 (continued)

6	18.6	23	28.3	6	70.0	6	18.4
7	33.5	24	15.8	Ara-1	105.3		
8	40.1	25	17.1	2	72.3		
9	47.2	26	17.6	3	74.3		
10	37.1	27	27.3	4	69.0		
11	23.9	28	176.2	5	66.3		
12	122.9	29	33.3	Ara′-1	93.6		
13	144.4	30	24.9	2	75.4		
14	42.1			3	70.5		
15	36.8			4	66.1		
16	74.1			5	63.0		
17	49.5						

References

1. R. Yamamoto, T. Miyase, A. Ueno, Chem. Pharm. Bull. **42**(6), 1291 (1994)

Stachyssaponin III

See Figure Stachyssaponin III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Stachys riederi* [1]

$C_{52}H_{84}O_{21}$: 1044.550

$[\alpha]_D^{24}$ −15.6° (c 0.48, MeOH) [1]

FAB-MS *m*/*z*: 1068 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.22, 0.88, 0.97, 1.06, 1.77, 1.05, 1.16 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.34 (dd, J = 11.5, 4.0, H-3), 0.75 (brd, J = 11.5, H-5), 5.58 (H-12), 5.25 (brs, H-16), 3.58 (dd, J = 15.0, 4.0, H-18), 2.78 (t, J = 15.0, H-19)

β-D-Glcp: 4.87 (d, J = 8.0, H-1), 3.97 (t, J = 8.5, H-2), 4.16 (H-3), 4.09 (H-4), 4.09 (H-5), 4.33 (dd, J = 11.0, 5.0, H-6), 4.85 (brd, J = 11.0, H-6)

β-D-Xylp: 5.01 (d, J = 7.0, H-1), 4.02 (t, J = 7.5, H-2), 4.12 (H-3), 4.19 (H-4), 3.68 (t, J = 11.0, H-5), 4.32 (H-5)

α-L-Arap: 6.51 (d, J = 1.5, H-1), 4.57 (H-2), 4.56 (H-3), 4.42 (H-4), 3.93 (dd, J = 11.0, 4.0, H-5), 4.51 (H-5)

α-L-Rhap: 5.78 (s, H-1), 4.57 (H-2), 4.49 (dd, J = 10.0, 3.0, H-3), 4.25 (t, J = 9.5, H-4), 4.44 (H-5), 1.68 (d, J = 6.5, CH_3-6) [1]

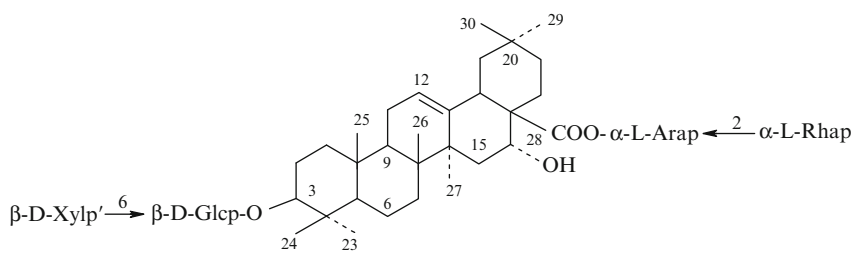
^{13}C NMR (125.65 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Glc-1	107.0	Rha-1	101.5
2	26.8	19	47.2	2	75.7	2	71.9
3	89.1	20	31.0	3	78.7	3	72.6
4	39.6	21	36.0	4	72.4	4	73.9
5	56.0	22	32.1	5	76.9	5	69.0
6	18.6	23	28.3	6	70.1	6	18.6
7	33.5	24	15.8	Xyl-1	105.8		
8	40.1	25	17.1	2	75.4		
9	47.2	26	17.6	3	78.2		
10	37.1	27	27.3	4	71.2		
11	23.9	28	176.2	5	67.1		
12	122.9	29	33.3	Ara-1	93.6		
13	144.4	30	24.9	2	74.9		
14	42.1			3	70.5		
15	36.2			4	66.1		
16	74.1			5	63.0		
17	49.5						

References

1. R. Yamamoto, T. Miyase, A. Ueno, Chem. Pharm. Bull. **42**(6), 1291 (1994)



Stachyssaponin III

Stachyssaponin IV

See Figure Stachyssaponin IV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Stachys riederi* [1]

$C_{57}H_{92}O_{25}$: 1176.592

$[\alpha]_D^{24}$ −41.3° (c 1.50, MeOH) [1]

FAB-MS *m/z*: 1199 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.24, 0.88, 0.98, 1.08, 1.77, 1.04, 1.15 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.32 (dd, J = 12.0, 4.0, H-3), 0.76 (d, J = 12.0, H-5), 5.59 (t-like, J = 3.0, H-12), 5.25 (brs, H-16), 3.56 (brdd, J = 14.0, 4.0, H-18), 2.77 (t, J = 14.0, H-19)

β-D-Glcp: 4.84 (d, J = 8.0, H-1), 3.96 (t, J = 8.5, H-2), 4.17 (H-3), 4.09 (H-4), 4.09 (H-5), 4.25 (dd, J = 11.0, 5.0, H-6), 4.82 (brd, J = 11.0, H-6)

α-L-Arap: 4.94 (d, J = 7.0, H-1), 4.44 (dd, J = 8.0, 7.0, H-2), 4.16 (dd, J = 8.0, 4.5, H-3), 4.31 (H-4), 3.76 (d, J = 11.0, H-5), 4.29 (H-5)

α-L-Arap′: 6.44 (d, J = 2.5, H-1), 4.54 (H-2), 4.50 (H-3), 4.38 (H-4), 3.93 (dd, J = 11.0, 3.5, H-5), 4.49 (H-5)

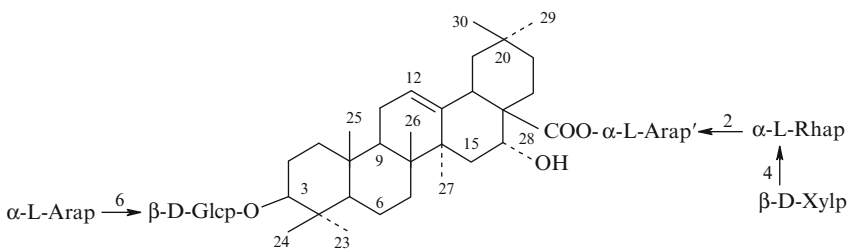
α-L-Rhap: 5.76 (H-1), 4.54 (H-2), 4.56 (dd, J = 9.0, 3.0, H-3), 4.36 (t, J = 9.0, H-4), 4.38 (H-5), 1.73 (d, J = 6.0, CH_3-6)

β-D-Xylp: 5.15 (d, J = 7.5, H-1), 4.0 (t, J = 7.5, H-2), 4.05 (t, J = 8.0, H-3), 4.12 (H-4), 3.47 (t, J = 10.5, H-5), 4.19 (dd, J = 10.5, 5.0, H-5) [1]

^{13}C NMR (125.65 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Glc-1	107.0	Rha-1	101.1
2	26.8	19	47.2	2	75.7	2	72.0
3	89.1	20	31.0	3	78.7	3	72.7
4	39.6	21	36.0	4	72.1	4	83.7
5	56.0	22	32.1	5	76.7	5	68.6
6	18.6	23	28.3	6	70.0	6	18.4
7	33.5	24	15.8	Ara-1	105.3	Xyl-1	106.9
8	40.1	25	17.1	2	72.3	2	76.1
9	47.2	26	17.6	3	74.3	3	78.6
10	37.1	27	27.3	4	69.0	4	71.1
11	23.9	28	176.2	5	66.3	5	67.5
12	122.9	29	33.3	Ara′-1	93.7		
13	144.4	30	24.9	2	75.1		
14	42.1			3	70.3		
15	36.2			4	66.3		
16	74.1			5	63.3		
17	49.5						



Stachyssaponin IV

References

1. R. Yamamoto, T. Miyase, A. Ueno, Chem. Pharm. Bull. **42**(6), 1291 (1994)

Stachyssaponin V

See Figure Stachyssaponin V

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

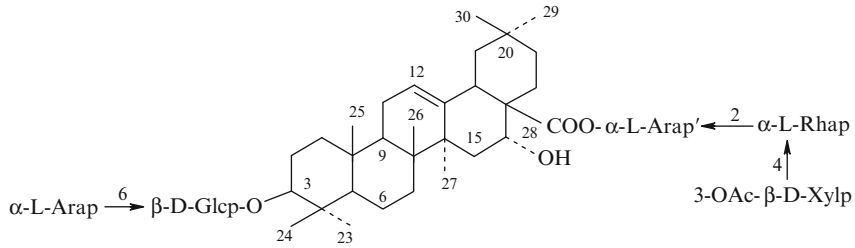
Biological sources: *Stachys riederi* [1]

$C_{59}H_{94}O_{26}$: 1218.603

$[\alpha]_D^{23}$ −60.0° (c 0.70, MeOH) [1]

FAB-MS *m/z*: 1242 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.26, 0.90, 1.00, 1.08, 1.77, 1.04, 1.14 (s, CH_3-23, 24, 25,



Stachyssaponin V

26, 27, 29, 30), 3.33 (dd, J = 11.0, 5.4, H-3), 0.76 (brd, J = 11.9, H-5), 5.59 (H-12), 5.25 (brs, H-16), 3.55 (dd, J = 15.0, 5.0, H-18), 2.77 (t, J = 14.5, H-19)

β-D-Glcp: 4.86 (H-1), 3.97 (t, J = 10.0, H-2), 4.17 (H-3), 4.10 (H-4), 4.10 (H-5), 4.26 (dd, J = 11.5, 5.0, H-6), 4.83 (H-6)

α-L-Arap: 4.95 (d, J = 7.0, H-1), 4.45 (t, J = 7.5, H-2), 4.17 (H-3), 4.32 (H-4), 3.76 (d, J = 11.5, H-5), 4.30 (H-5)

α-L-Arap′: 6.39 (d, J = 3.5, H-1), 4.54 (H-2), 4.52 (H-3), 4.35 (H-4), 3.92 (dd, J = 11.5, 4.0, H-5), 4.49 (H-5)

α-L-Rhap: 5.81 (H-1), 4.54 (H-2), 4.52 (H-3), 4.37 (H-4), 4.47 (H-5), 1.71 (d, J = 5.0, CH_3-6)

β-D-Xylp: 5.20 (d, J = 8.5, H-1), 4.01 (dd, J = 9.5, 8.5, H-2), 5.64 (t, J = 9.5, H-3), 4.15 (H-4), 3.44 (t, J = 10.0, H-5), 4.19 (H-5), 1.93 (s, Ac) [1]

^{13}C NMR (125.65 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Glc-1	107.0	Rha-1	101.1
2	26.8	19	47.2	2	75.6	2	72.0
3	89.1	20	31.0	3	78.7	3	72.6
4	39.6	21	36.0	4	72.1	4	83.0
5	56.0	22	32.1	5	76.7	5	68.5
6	18.6	23	28.3	6	70.0	6	18.4
7	33.5	24	15.8	Ara-1	105.3	Xyl-1	106.3
8	40.1	25	17.1	2	72.3	2	73.7
9	47.2	26	17.6	3	74.3	3	79.3
10	37.1	27	27.3	4	69.0	4	69.0
11	23.9	28	176.2	5	66.3	5	67.1
12	122.9	29	33.3	Ara′-1	93.7	Ac-1	170.7
13	144.4	30	24.9	2	75.0	2	21.1
14	42.1			3	70.7		
15	36.2			4	66.5		
16	74.1			5	63.6		
17	49.5						

References

1. R. Yamamoto, T. Miyase, A. Ueno, Chem. Pharm. Bull. **42**(6), 1291 (1994)

Stachyssaponin VI

See Figure Stachyssaponin VI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Stachys riederi* [1]

$C_{59}H_{94}O_{26}$: 1218.603

$[\alpha]_D^{26}$ −46.3° (c 1.23, MeOH) [1]

FAB-MS *m/z*: 1242 $[M + Na]^+$ [1]

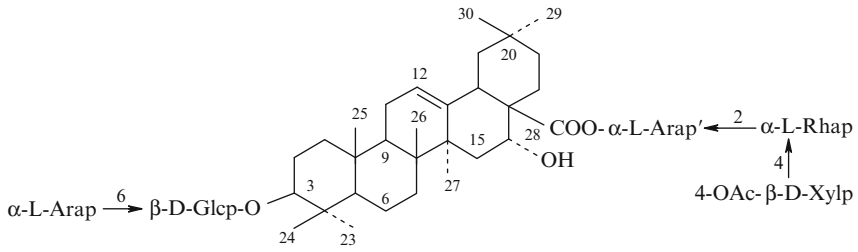
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.25, 0.89, 0.99, 1.07, 1.77, 1.04, 1.15 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.32 (dd, J = 11.5, 4.0, H-3), 0.77 (d, J = 11.5, H-5), 5.59 (t-like, J = 3.0, H-12), 5.24 (brs, H-16), 3.56 (dd, J = 13.5, 4.5, H-18), 2.78 (t, J = 13.5, H-19)

β-D-Glcp: 4.85 (d, J = 7.5, H-1), 3.96 (t, J = 7.5, H-2), 4.16 (H-3), 4.09 (H-4), 4.09 (H-5), 4.26 (d, J = 11.0, H-6), 4.83 (d, J = 11.0, H-6)

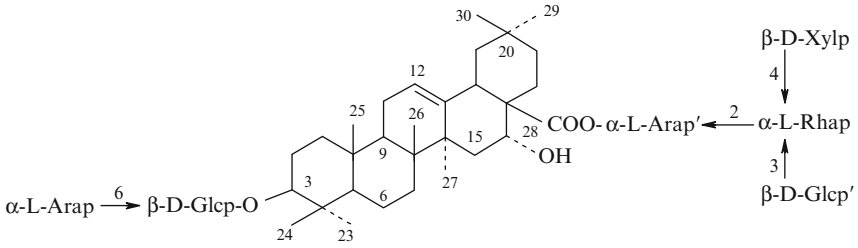
α-L-Arap: 4.95 (d, J = 7.0, H-1), 4.44 (t, J = 6.5, H-2), 4.17 (H-3), 4.31 (H-4), 3.76 (d, J = 10.0, H-5), 4.30 (H-5)

α-L-Arap′: 6.44 (d, J = 1.5, H-1), 4.54 (H-2), 4.50 (H-3), 4.37 (H-4), 3.93 (dd, J = 12.0, 4.0, H-5), 4.49 (H-5)

α-L-Rhap: 5.76 (H-1), 4.54 (H-2), 4.57 (H-3), 4.35 (H-4), 4.39 (H-5), 1.7 (d, J = 6.0, CH_3-6)



Stachyssaponin VI



Stachyssaponin VII

β-D-Xylp: 5.19 (d, J = 7.0, H-1), 4.01 (t, J = 7.5, H-2), 4.16 (H-3), 5.29 (H-4), 3.32 (t, J = 9.5, H-5), 4.20 (H-5), 1.90 (s, Ac) [1]

^{13}C NMR (125.65 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Glc-1	107.0	Rha-1	101.1
2	26.8	19	47.2	2	75.7	2	72.0
3	89.1	20	31.0	3	78.7	3	72.7
4	39.6	21	36.0	4	72.1	4	83.3
5	56.0	22	32.1	5	76.7	5	68.4
6	18.6	23	28.3	6	70.0	6	18.4
7	33.5	24	15.8	Ara-1	105.3	Xyl-1	106.4
8	40.1	25	17.1	2	72.3	2	76.0
9	47.2	26	17.6	3	74.3	3	75.2
10	37.1	27	27.3	4	69.0	4	72.9
11	23.9	28	176.2	5	66.3	5	63.5
12	122.9	29	33.3	Ara′-1	93.7	Ac-1	170.5
13	144.4	30	24.9	2	75.0	2	20.8
14	42.1			3	70.4		
15	36.2			4	66.3		
16	74.1			5	63.3		
17	49.5						

References

1. R. Yamamoto, T. Miyase, A. Ueno, Chem. Pharm. Bull. **42**(6), 1291 (1994)

Stachyssaponin VII

See Figure Stachyssaponin VII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Stachys riederi* [1]

$C_{63}H_{102}O_{30}$: 1338.645

$[\alpha]_D^{23}$ −58.3° (c 1.60, MeOH) [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.25, 0.90, 0.99, 1.07, 1.78, 1.04, 1.16 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.33 (dd, J = 11.5, 4.0, H-3), 0.78 (d, J = 12.0, H-5), 5.59 (t-like, J = 3.0, H-12), 5.22 (brs, H-16), 3.56 (dd, J = 14.0, 4.0, H-18), 2.77 (t, J = 13.5, H-19)

β-D-Glcp: 4.85 (d, J = 8.0, H-1), 3.98 (t, J = 8.5, H-2), 4.16 (H-3), 4.10 (H-4), 4.10 (H-5), 4.27 (H-6), 4.83 (d, J = 10.0, H-6)

α-L-Arap: 4.96 (d, J = 6.5, H-1), 4.45 (H-2), 4.18 (H-3), 4.32 (brs, H-4), 3.76 (d, J = 11.0, H-5), 4.29 (H-5)

α-L-Arap′: 6.42 (brs, H-1), 4.47 (H-2), 4.47 (H-3), 4.42 (brs, H-4), 3.92 (dd, J = 11.0, 3.5, H-5), 4.50 (H-5)

α-L-Rhap: 5.62 (brs, H-1), 4.88 (m, H-2), 4.65 (dd, J = 9.0, 3.0, H-3), 4.48 (H-4), 4.42 (H-5), 1.73 (d, J = 6.0, CH_3-6)

β-D-Xylp: 5.42 (d, J = 8.0, H-1), 3.95 (H-2), 4.10 (H-3), 4.14 (H-4), 3.44 (t, J = 10.0, H-5), 4.18 (H-5)
β-D-Glcp′: 5.21 (d, J = 8.0, H-1), 3.99 (t, J = 8.5, H-2), 4.13 (H-3), 4.14 (H-4), 3.78 (m, H-5), 4.21 (dd, J = 12.0, 5.5, H-6), 4.39 (dd, J = 12.0, 2.0, H-6) [1]
^{13}C NMR (125.65 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Glc′-1	106.9	Rha-1	101.1
2	26.8	19	47.2	2	75.7	2	71.2
3	89.1	20	31.0	3	78.7	3	82.8
4	39.6	21	36.0	4	72.1	4	78.3
5	56.0	22	32.1	5	76.7	5	68.8
6	18.6	23	28.3	6	70.0	6	18.6
7	33.5	24	15.8	Ara′-1	105.3	Xyl-1	105.3
8	40.1	25	17.1	2	72.3	2	75.7
9	47.2	26	17.6	3	74.3	3	79.0
10	37.1	27	27.3	4	69.0	4	71.3
11	23.9	28	176.2	5	66.3	5	67.3
12	122.9	29	33.3	Ara″-1	93.7	Glc′-1	105.1
13	144.4	30	24.9	2	75.5	2	75.5
14	42.1			3	69.8	3	78.4
15	36.2			4	66.1	4	71.7
16	74.1			5	63.2	5	78.1
17	49.5					6	62.7

References

1. R. Yamamoto, T. Miyase, A. Ueno, Chem. Pharm. Bull. **42**(6), 1291 (1994)

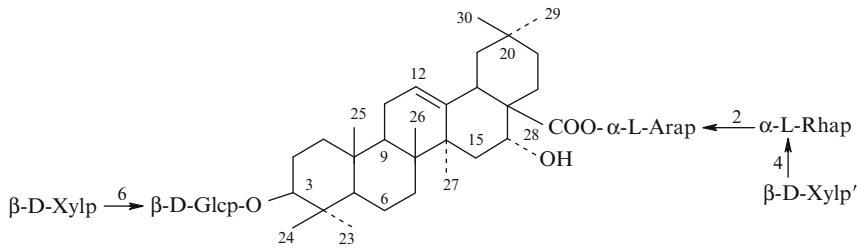
Stachyssaponin VIII

See Figure Stachyssaponin VIII
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Stachys riederi* [1]
$C_{57}H_{92}O_{25}$: 1176.592
$[\alpha]_D^{24}$ −33.2° (c 0.98, MeOH) [1]
FAB-MS *m/z*: 1199 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.23, 0.87, 0.98, 1.07, 1.77, 1.04, 1.15 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.33 (dd, J = 11.5, 4.0, H-3), 0.75 (d, J = 13.0, H-5), 5.58 (t-like, J = 4.0, H-12), 5.25 (brs, H-16), 3.56 (brdd, J = 15.0, 4.0, H-18), 2.78 (t, J = 14.5, H-19)
β-D-Glcp: 4.85 (d, J = 8.5, H-1), 3.97 (t, J = 9.0, H-2), 4.18 (H-3), 4.09 (H-4), 4.09 (H-5), 4.33 (dd, J = 11.5, 5.5, H-6), 4.84 (brd, J = 11.5, H-6)
β-D-Xylp: 5.00 (d, J = 7.0, H-1), 4.01 (t, J = 7.0, H-2), 4.16 (H-3), 4.29 (H-4), 3.68 (t, J = 11.0, H-5), 4.31 (H-5)
α-L-Arap: 6.44 (d, J = 2.5, H-1), 4.55 (H-2), 4.50 (H-3), 4.39 (H-4), 3.93 (dd, J = 11.5, 4.0, H-5), 4.49 (H-5)
α-L-Rhap: 5.76 (H-1), 4.55 (H-2), 4.58 (dd, J = 9.0, 2.5, H-3), 4.36 (t, J = 9.0, H-4), 4.38 (H-5), 1.74 (d, J = 6.0, CH_3-6)
β-D-Xylp′: 5.15 (d, J = 8.5, H-1), 4.00 (t, J = 8.5, H-2), 4.05 (t, J = 9.0, H-3), 4.12 (H-4), 3.48 (t, J = 11.5, H-5), 4.20 (H-5) [1]
^{13}C NMR (125.65 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-18	41.3	Glc-1	107.0	Rha-1	101.1
2	26.8	19	47.2	2	75.7	2	72.0
3	89.1	20	31.0	3	78.7	3	72.7
4	39.6	21	36.0	4	71.9	4	83.7
5	56.0	22	32.1	5	76.3	5	68.6
6	18.6	23	28.3	6	70.3	6	18.4
7	33.5	24	15.8	Xyl-1	105.8	Xyl′-1	105.3
8	40.1	25	17.1	2	75.1	2	76.1
9	47.2	26	17.6	3	78.1	3	78.6

(*continued*)



Stachyssaponin VIII

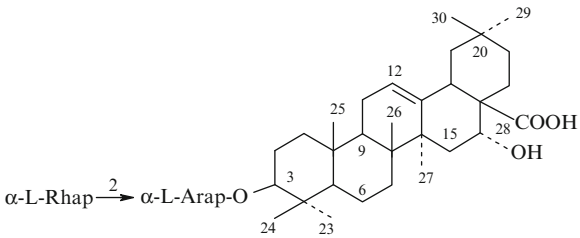
Table 1 (continued)

10	37.1	27	27.3	4	71.2	4	71.1
11	23.9	28	176.2	5	67.1	5	67.5
12	122.9	29	33.3	Ara-1	93.7		
13	144.4	30	24.9	2	74.9		
14	42.1			3	70.3		
15	36.2			4	66.2		
16	74.1			5	63.9		
17	49.5						

References

1. R. Yamamoto, T. Miyase, A. Ueno, Chem. Pharm. Bull. **42**(6), 1291 (1994)

Tauroside D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Hedera canariensis* [1], *H. taurica* [2], *H. helix* [3]

$C_{41}H_{66}O_{12}$: 750.455

$[\alpha]_D -25°$ (c 1.2, C_5D_5N) [1]

^{13}C NMR (62.9 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	74.8	Ara-1	104.8
2	26.4	17	48.9	2	76.0
3	88.9	18	41.3	3	73.8
4	39.3	19	47.2	4	68.7
5	56.2	20	30.9	5	64.7
6	18.6	21	36.1	Rha-1	101.8
7	33.4	22	32.5	2	72.4
8	39.8	23	28.1	3	72.6
9	47.2	24	16.9	4	74.0

(*continued*)

Table 1 (continued)

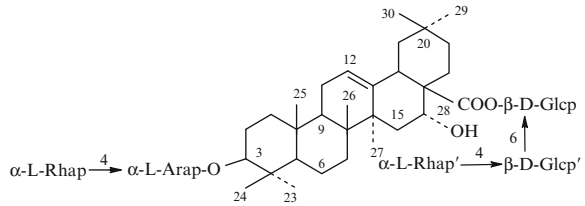
10	37.1	25	15.5	5	69.9
11	23.8	26	17.4	6	18.6
12	122.6	27	27.2		
13	144.7	28	180.3		
14	42.1	29	33.2		
15	36.1	30	24.6		

References

1. V.I. Grishkovets, D.Yu. Sidorov, L.A. Yakovishin, N.N. Arnautov, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **32**(3), 360 (1996)
2. V.I. Grishkovets, N.V. Tolkacheva, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **27**(5), 603 (1991)
3. V.I. Grishkovets, A.E. Kondratenko, N.V. Tolkacheva, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **30**(6), 689 (1994)

Tauroside H_1

CAS Registry Number: 170663-66-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Hedera taurica* [1], *H. canariensis* [2]

$C_{59}H_{96}O_{26}$: 1220.618

$[\alpha]_D^{20} -34.9°$ (c 3.5, C_5H_5N) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 3.24 (dd, J = 4.0, 12.0, H-3), 5.27 (nt, H-12), 5.57 (brt, J = 3.0, H-16), 0.7–2.9 (skelet CH, CH_2 aglycons), 1.12, 1.10, 1.04, 1.01, 0.96, 0.88, 0.85 ($CH_3 \times 7$)

α-L-Arap: 4.88 (d, J = 5.3, H-1), 4.52 (t, J = 6.0 H-2), 4.25 (H-3)

α-L-Rhap: 6.09 (d, J = 1.5, H-1), 4.71 (dd, J = 3.3, H-2), 4.60 (dd, J = 9.3, H-3), 4.28 (t, J = 9.3, H-4), 4.56 (dq, H-5), 1.59 (d, J = 6.1, CH_3-6)

β-D-Glcp: 6.21 (d, J = 8.0, H-1), 4.03 (t, J = 8.6, H-2), 4.17 (t, J = 8.6, H-3)

β-D-Glcp′: 4.94 (d, J = 8.0, H-1) 3.90 (dd, J = 9.0, H-2), 4.11 (t, J = 9.0, H-3), 4.38 (t, J = 9.0, H-4), 3.62 (H-5)

α-L-Rhap: 5.82 (d, J = 1.5, H-1), 4.65 (dd, J = 3.3, H-2), 4.53 (dd, J = 9.4, H-3), 4.30 (t, J = 9.4, H-4), 4.94 (dq, H-5), 1.67 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (300 MHz, C_5D_5N): [1]

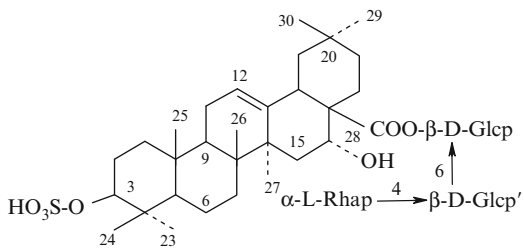
Table 1

C-1	39.2	C-16	74.4	Ara-1	104.9	Glc-1	95.9
2	26.7	17	49.3	2	76.1	2	74.0
3	89.0	18	41.4	3	73.7	3	78.7
4	39.6	19	47.3	4	68.6	4	70.9
5	56.2	20	30.9	5	64.6	5	78.2
6	18.7	21	36.1	Rha-1	101.9	6	69.4
7	33.6	22	32.3	2	72.4	Glc′-1	105.0
8	40.2	23	28.2	3	72.6	2	75.4
9	47.3	24	17.1	4	74.1	3	76.5
10	37.2	25	15.9	5	70.0	4	78.5
11	24.0	26	17.7	6	18.6	5	77.2
12	122.9	27	27.3	Rha′-1	102.9	6	61.4
13	144.6	28	176.2	2	72.6		
14	42.2	29	33.3	3	72.8		
15	36.2	30	24.8	4	74.0		
				5	70.4		
				6	18.6		

References

1. V.I. Grishkovets, N.V. Tolkacheva, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **28**(5), 455 (1992)
2. L.A. Yakovishin, V.I. Grishkovets, N.N. Arnautov, V.Ya. Chirva, Chem. Nat. Comp. **35**(5), 587 (1999)

Tauroside J



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Hedera taurica* [1]

$C_{48}H_{78}O_{20}S$: 1006.480

$[\alpha]_D^{20}$ −15° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 1390, 1220 [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.52 (dd, H-3), 5.53 (t, J = 3.5, H-12), 5.27 (t, J = 4.0, H-16), 3.45 (dd, J = 4.0, 13.8, H-18), 0.85, 0.94, 0.96, 0.99, 1.07, 1.32, 1.75 (s, CH_3 × 7), 0.7–2.8 (CH, CH_2, skeletal)

β-D-Glcp: 6.20 (d, J = 8.0, H-1), 4.02 (t, J = 8.3, H-2), 4.16 (t, J = 8.5, H-3), 4.26 (t, J = 8.6, H-4), 4.04 (H-5)

β-D-Glcp′: 4.94 (d, J = 7.6, H-1), 3.90 (t, J = 8.2, H-2), 4.11 (t, J = 9.0, H-3) 4.38 (t, J = 9.0, H-4), 3.60 (ddd, H-5), 4.0–4.2 (H_2-6)

α-L-Rhap: 5.83 (d, J = 1.3, H-1), 4.66 (dd, J = 3, 4, H-2), 4.54 (dd, J = 9, 2, H-3), 4.31 (t, J = 9.2, H-4), 4.95 (d, H-5), 1.67 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

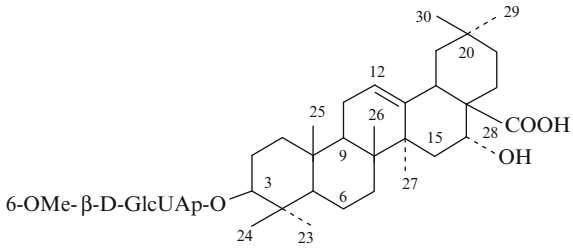
C-1	39.0	C-16	74.4	Glc-1	95.9	Rha-1	102.8
2	25.1	17	49.2	2	73.9	2	72.6
3	85.0	18	41.3	3	78.7	3	72.8
4	39.0	19	47.2	4	70.8	4	74.0
5	56.5	20	30.9	5	78.1	5	70.4
6	18.8	21	36.0	6	69.3	6	18.6
7	33.5	22	32.3	Glc′-1	105.0		
8	40.1	23	28.8	2	75.4		
9	47.2	24	17.2	3	76.5		
10	37.3	25	15.8	4	78.3		
11	23.9	26	17.6	5	77.2		
12	122.8	27	27.3	6	61.3		
13	144.6	28	176.2				
14	42.1	29	33.2				
15	36.1	30	24.7				

References

1. V.I. Grishkovets, N.V. Tolkacheva, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **28**(6), 593 (1992)

Tragopogonsaponin A

CAS Registry Number: 134361-64-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{36}H_{56}O_{10}$: 648.387

$[\alpha]_D^{25}$ −8.2° (c, 0.90, MeOH) [1]

FAB-MS *m/z* (Me ester): 663 $[M + H]^+$, 685 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N) (Me ester): 3.40 (dd, J = 12.4, 5, H-3), 5.64 (t, J = 3.5, H-12), 5.26 (brs, H-16), 3.62 (dd, J = 14, 4, H-18), 2.84 (t, J = 14, H-19), 1.30 (s, CH_3-23), 0.98 (s, CH_3-24), 0.85 (s, CH_3-25), 1.07 (s, CH_3-26), 1.87 (s, CH_3-27), 1.03 (s, CH_3-29), 1.19 (s, CH_3-30)

β-D-GlcUAp: 5.01 (d, J = 8.5, H-1), 4.09 (t, J = 8.5, H-2), 4.27 (t, J = 8.5, H-3), 4.48 (t, J = 8.5, H-4), 4.61 (d, J = 9, H-5), 3.74 (s, OMe) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.7	C-16	74.8	GlcUA-1	107.3
2	26.7	17	48.9	2	75.4
3	89.2	18	41.5	3	77.9
4	39.6	19	47.3	4	73.2
5	55.9	20	31.1	5	77.2
6	18.5	21	36.2	6	170.9
7	33.5	22	32.9	OMe	52.0
8	39.9	23	28.2		
9	47.2	24	17.0		
10	37.0	25	15.6		
11	23.8	26	17.5		
12	122.4	27	27.3		
13	145.2	28	180.0		
14	42.1	29	33.4		
15	36.2	30	24.8		

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin B

CAS Registry Number: 134361-65-2

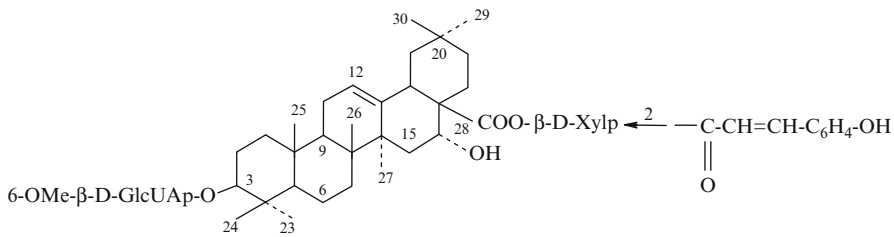
See Figure Tragopogonsaponin B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{51}H_{72}O_{16}$: 940.482 (Me ester)

$[\alpha]_D^{25}$ +24.9° (c, 1.27, MeOH) [1]



Tragopogonsaponin B

UV λ_{max} nm (log ε): 212 (4.11), 229 (4.04), 301 (4.25), 317 (4.34) [1]

FAB-MS *m/z* (Me ester): 963 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N) (Me ester): 3.34 (dd, J = 12, 4, H-3), 5.56 (t, J = 3, H-12), 5.25 (brs, H-16), 3.45 (dd, J = 14, 4, H-18), 2.75 (t, J = 14, H-19), 1.27 (s, CH_3-23), 0.95 (s, CH_3-24), 0.87 (s, CH_3-25), 1.02 (s, CH_3-26), 1.73 (s, CH_3-27), 0.99 (s, CH_3-29), 1.04 (s, CH_3-30)

β-D-GlcUAp: 4.96 (d, J = 8.5, H-1), 4.05 (d, J = 8.5, H-2), 4.23 (t, J = 8.5, H-3), 4.44 (t, J = 8.5, H-4), 4.57 (d, J = 9, H-5), 3.73 (s, OMe)

β-D-Xylp: 6.17 (d, J = 8, H-1), 5.81 (t, J = 8, H-2), 4.30 (t, J = 8, H-3), 4.24 (H-4), 3.85 (t, J = 11, H-5), 4.33 (dd, J = 11, 5.5, H-5)

Ester part: 6.61 (d, J = 16, β), 7.92 (d, J = 16, γ), 7.55 (d, J = 8, H-2), 7.16 (d, J = 8, H-3), 7.16 (d, J = 8, H-5), 7.55 (d, J = 8, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	Ester part-α	166.9
2	26.9	17	49.3	2	75.4	β	114.9
3	89.5	18	41.2	3	77.9	γ	146.4
4	39.8	19	47.3	4	73.3	1	126.1
5	56.1	20	31.1	5	77.3	2	131.2
6	18.5	21	36.2	6	171.2	3	116.9
7	33.2	22	32.6	OMe	52.4	4	161.9
8	40.2	23	28.4	Xyl-1	93.6	5	116.9
9	47.3	24	17.2	2	73.6	6	131.2
10	37.2	25	15.9	3	76.1		
11	24.0	26	17.3	4	71.0		
12	123.1	27	27.3	5	68.0		
13	144.5	28	175.9				
14	42.3	29	33.4				
15	36.4	30	24.7				

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin C

CAS Registry Number: 13436-66-3

See Figure Tragopogonsaponin C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{52}H_{74}O_{17}$: 970.492 (Me ester)

$[\alpha]_D^{25}$ +24.3° (c, 0.90, MeOH) [1]

UV λ_{max} nm (log ε): 217 (4.10), 237 (3.98), 301 (4.08), 328 (4.25) [1]

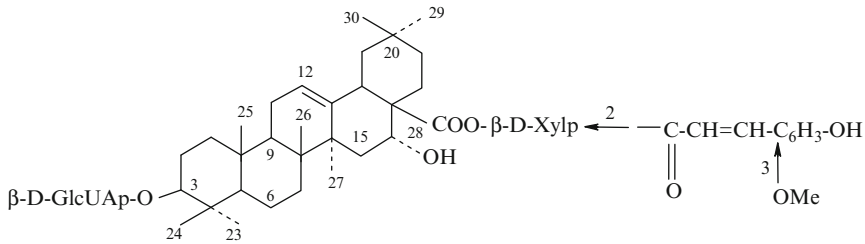
FAB-MS *m/z*: 993 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.33 (dd, J = 12, 4, H-3), 5.56 (t, J = 3, H-12), 5.24 (brs, H-16), 3.44 (dd, J = 14, 4, H-18), 2.75 (t, J = 14, H-19), 1.26 (s, CH_3-23), 0.97 (s, CH_3-24), 0.88 (s, CH_3-25), 1.02 (s, CH_3-26), 1.74 (s, CH_3-27), 0.99 (s, CH_3-29), 1.05 (s, CH_3-30)

β-D-GlcUAp: 4.95 (d, J = 8.5, H-1), 4.06 (t, J = 8.5, H-2), 4.27 (t, J = 8.5, H-3), 4.44 (t, J = 8.5, H-4), 4.56 (d, J = 9, H-5), 3.75 (s, OMe)

β-D-Xylp: 6.18 (d, J = 8.5, H-1), 5.81 (t, J = 8.5, H-2), 4.36 (t, J = 8.5, H-3), 4.30 (H-4), 3.88 (t, J = 11, H-5), 4.37 (dd, J = 11, 5, H-5)

Ester part: 6.66 (d, J = 16, β), 7.94 (d, J = 16, γ), 7.26 (d, J = 1.5, H-2), 7.23 (d, J = 8, H-5), 7.17 (dd, J = 8, 1.5, H-6), 3.87 (s, OMe) [1]



Tragopogonsaponin C

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	Ester part-α	166.9
2	26.9	17	49.3	2	75.4	β	115.0
3	89.5	18	41.2	3	77.9	γ	146.7
4	39.8	19	47.3	4	73.3	1	126.5
5	56.1	20	31.1	5	77.3	2	111.9
6	18.5	21	36.2	6	171.1	3	151.6
7	33.2	22	32.6	OMe	52.4	4	149.3
8	40.2	23	28.4	Xyl-1	94.0	5	116.8
9	47.3	24	17.2	2	73.6	6	124.7
10	37.2	25	15.9	3	76.1	OMe	56.3
11	24.0	26	17.3	4	71.0		
12	123.1	27	27.3	5	68.0		
13	144.5	28	175.9				
14	42.3	29	33.4				
15	36.4	30	24.7				

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin D

CAS Registry Number: 134361-67-4

See Figure Tragopogonsaponin D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{58}H_{84}O_{22}$: 1132.545 (Me ester)

$[\alpha]_D^{25}$ −4.4° (c, 0.60, MeOH) [1]

UV λ_{max} nm (log ε): 217 (4.12), 231 (4.02), 296 (4.20), 317 (4.20), 317 (4.22) [1]

FAB-MS *m/z* (Me ester): 1155 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N) (Me ester): 3.33 (dd, J = 12, 4, H-3), 5.59 (t, J = 3, H-12), 5.20 (brs, H-16), 3.45 (dd, J = 14, 4, H-18), 2.76 (t, J = 14, H-19), 1.27 (s, CH_3-23), 0.93 (s, CH_3-24), 0.88 (s, CH_3-25), 1.02 (s, CH_3-26), 1.76 (s, CH_3-27), 1.01 (s, CH_3-29), 1.08 (s, CH_3-30)

β-D-GlcUAp: 4.93 (d, J = 8.5, H-1), 4.04 (t, J = 8.5, H-2), 4.21 (d, J = 8.5, H-3), 4.43 (t, J = 8.5, H-4), 4.54 (d, J = 9, H-5), 3.72 (s, OMe)

β-D-Xylp: 6.18 (d, J = 8.5, H-1), 5.80 (t, J = 8.5, H-2), 4.31 (t, J = 8.5, H-3), 4.24 (H-4), 3.85, 4.35 (t, J = 11, H-5)

Ester part: 6.68 (d, J = 16, β), 7.90 (d, J = 16, γ), 7.26 (d, J = 1.5, H-2), 7.60 (d, J = 8, H-5), 7.15 (dd, J = 8, 1.5, H-6), 3.80 (OMe)

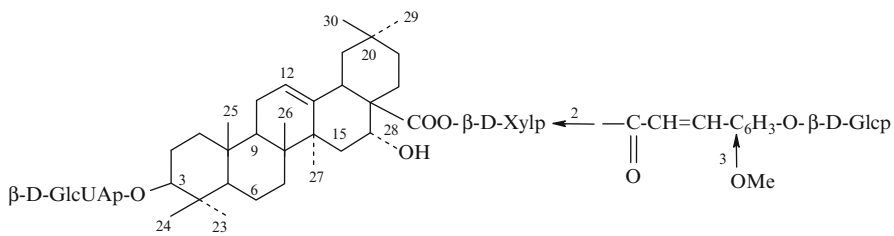
β-D-Glcp: 5.63 (d, J = 8.5, H-1), 4.29 (t, J = 8.5, H-2), 4.31 (t, J = 8.5, H-3), 4.26 (t, J = 8.5, H-4), 4.12 (m, H-5), 4.35 (dd, J = 12, 5, H-6), 4.52 (dd, J = 12, 2, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	1	128.7
2	26.9	17	49.3	2	75.4	2	111.8
3	89.5	18	41.2	3	77.9	3	150.6
4	39.8	19	47.3	4	73.2	4	149.4
5	56.1	20	31.1	5	77.2	5	116.3
6	18.5	21	36.2	6	170.9	6	124.2
7	33.2	22	32.6	OMe	52.0	OMe	56.1
8	40.2	23	28.4	Xyl-1	93.8	Glc-1	102.3
9	47.3	24	17.2	2	73.6	2	74.7
10	37.2	25	15.9	3	76.1	3	79.0
11	24.0	26	17.3	4	70.9	4	71.3

(*continued*)



Tragopogonsaponin D

Table 1 (continued)

12	123.1	27	27.3	5	67.9	5	78.5
13	144.5	28	175.9	Ester part-α	166.4	6	62.5
14	42.3	29	33.4	β	116.1		
15	36.4	30	24.7	γ	145.8		

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin E

CAS Registry Number: 134453-40-0

See Figure Tragopogonsaponin E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{58}H_{84}O_{22}$: 1132.545 (Me ester)

$[\alpha]_D^{25}$ +7.3° (c, 1.10, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 215 (4.12), 235 (3.99), 296 (4.13), 321 (4.18) [1]

FAB-MS *m/z*: 1155 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N) (Me ester): 3.34 (dd, J = 12, 4, H-3), 5.58 (t, J = 3, H-12), 5.19 (brs, H-16), 3.49 (dd, J = 14, 4.5, H-18), 2.75 (t, J = 14, H-19), 1.27 (s, CH_3-23), 1.00 (s, CH_3-24), 0.88 (s, CH_3-25), 1.02 (s, CH_3-26), 1.75 (s, CH_3-27), 1.02 (s, CH_3-29), 1.03 (s, CH_3-30)

β-D-GlcUAp: 4.93 (d, J = 8.5, H-1), 4.05 (t, J = 8.5, H-2), 4.22 (d, J = 8.5, H-3), 4.44 (t, J = 8.5, H-4), 4.55 (t, J = 9, H-5), 3.72 (s, OMe)

α-L-Arap: 6.21 (d, J = 8.0, H-1), 6.10 (t, J = 8.0, H-2), 4.41 (H-3), 4.38 (brs, H-4), 3.96, 4.42 (d, J = 10, H_2-5)

β-D-Glc: 5.65 (d, J = 8.5, H-1), 4.32 (t, J = 8.5, H-2), 4.32 (t, J = 8.5, H-3), 4.27 (t, J = 8.5, H-4), 4.12 (m, H-5), 4.35 (dd, J = 12, 5.5), 4.52 (dd, J = 12, 2, H_2-6)

Ester part: 6.64 (d, J = 16, Hβ), 7.85 (d, J = 16, Hγ), 7.23 (d, J = 1.5, H-2), 7.59 (d, J = 8, H-5), 7.13 (dd, J = 8, 2.0, H-6), 3.79 (s, OMe) [1]

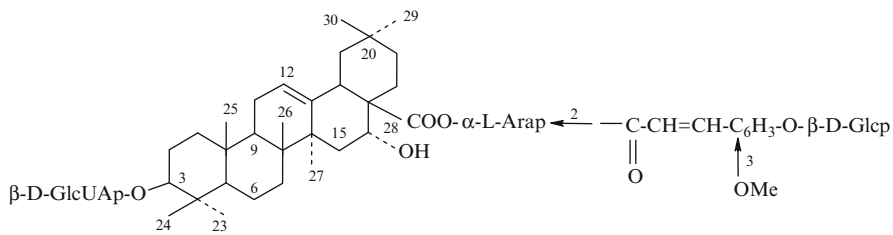
^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.2	1	128.7
2	26.9	17	49.3	2	75.4	2	111.8
3	89.5	18	41.2	3	77.9	3	150.5
4	39.8	19	47.3	4	73.2	4	149.1
5	56.1	20	31.1	5	77.2	5	116.4
6	18.5	21	36.2	6	170.9	6	124.0
7	33.2	22	32.6	OMe	52.0	OMe	56.1
8	40.2	23	28.4	Ara-1	93.4	Glc-1	102.2
9	47.3	24	17.2	2	71.3	2	74.8
10	37.2	25	15.9	3	72.3	3	79.0
11	24.0	26	17.3	4	68.8	4	71.7
12	123.1	27	27.3	5	67.1	5	78.5
13	144.5	28	175.9	Ester part-α	166.4	6	62.4
14	42.3	29	33.4	β	116.1		
15	36.4	30	24.7	γ	145.7		

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)



Tragopogonsaponin E

Tragopogonsaponin F

CAS Registry Number: 134361-68-5
See Figure Tragopogonsaponin F
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Tragopogon porrifolius* [1]
$C_{57}H_{82}O_{21}$: 1102.534 (Me ester)
$[\alpha]_D$ +20.9° (c 1.29, MeOH) [1]
UV λ_{max} nm (log ε): 211 (4.05), 230 (3.98), 303 (4.22), 318 (4.32) [1]
FAB-MS *m/z*: 1125 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.34 (dd, J = 12, 4, H-3), 5.58 (t, J = 3, H-12), 5.21 (brs, H-16), 3.44 (dd, J = 14, 4, H-18), 2.75 (t, J = 14, H-19), 1.26 (s, CH_3-23), 1.00 (s, CH_3-24), 0.91 (s, CH_3-25), 1.00 (s, CH_3-26), 1.74 (s, CH_3-27), 1.01 (s, CH_3-29), 1.05 (s, CH_3-30)
β-D-GlcUAp: 4.95 (d, J = 8.5, H-1), 4.06 (t, J = 8.5, H-2), 4.22 (t, J = 8.5, H-3), 4.43 (t, J = 8.5, H-4), 4.55 (d, J = 9, H-5), 3.72 (s, OMe)
β-D-Xylp: 6.12 (d, J = 8.5, H-1), 5.82 (t, J = 8.5, H-2), 4.29 (t, J = 8.5, H-3), 4.13 (H-4), 3.74 (t, 12), 4.27 (dd, J = 12, 6, H-5)
β-D-Glcp: 5.07 (d, J = 8, H-1), 3.94 (t, J = 8, H-2), 4.12 (t, J = 8, H-3), 4.07 (t, J = 9, H-4), 4.03 (m, H-5), 4.22 (dd, J = 12, 5.5, H-6), 4.55 (dd, J = 12, 2.5, H-6)
Ester part: 6.72 (d, J = 16, β), 7.94 (d, J = 16, γ), 7.49 (d, J = 8.5, H-2), 7.11 (d, J = 8.5, H-3), 7.11 (d, J = 8.5, H-5), 7.49 (d, J = 8.5, H-6) [1]
^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

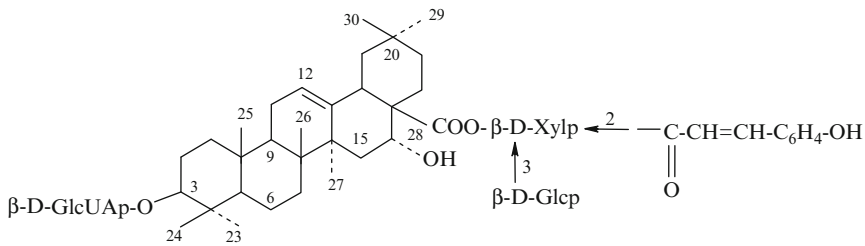
C-1	38.9	C-16	74.0	GlcUA-1	107.3	Glc-1	105.3
2	26.9	17	49.3	2	75.4	2	74.7
3	89.5	18	41.2	3	77.9	3	78.7
4	39.8	19	47.3	4	73.2	4	71.7
5	56.1	20	31.1	5	77.1	5	78.5
6	18.5	21	36.2	6	170.9	6	62.7
7	33.2	22	32.6	OMe	52.0	Ester part-α	166.6
8	40.2	23	28.4	Xyl-1	93.5	β	115.1
9	47.3	24	17.2	2	71.1	γ	145.9
10	37.2	25	15.9	3	85.5	1	126.0
11	24.0	26	17.3	4	69.4	2	131.0
12	123.1	27	27.3	5	67.1	3	116.7
13	144.5	28	175.9			4	161.7
14	42.3	29	33.4			5	116.7
15	36.4	30	24.7			6	131.0

References

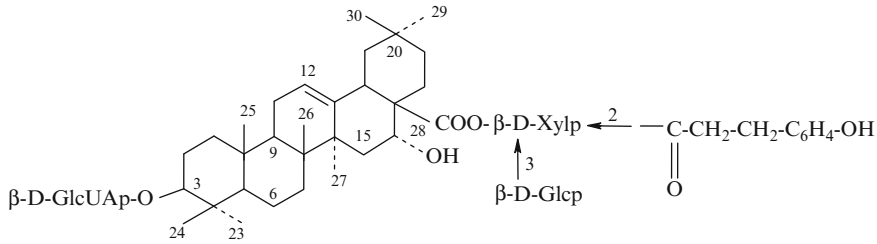
1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin G

CAS Registry Number: 134361-69-6
See Figure Tragopogonsaponin G
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Tragopogon porrifolius* [1]
$C_{57}H_{84}O_{21}$: 1104.550 (Me ester)
$[\alpha]_D^{25}$ −11.7° (c 0.95, MeOH) [1]



Tragopogonsaponin F



Tragopogonsaponin G

UV λ_{max} nm (log ε): 223 (3.95), 283 (3.49), 317 (3.42) [1]

FAB-MS *m/z* (Me ester): 1127 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N) (Me ester): 3.39 (dd, J = 12, 4.5, H-3), 5.60 (t, J = 3, H-12), 5.15 (brs, H-16), 3.43 (dd, J = 14, 4, H-18), 2.73 (t, J = 14, H-19), 1.28 (s, CH_3-23), 0.98 (s, CH_3-24), 0.92 (s, CH_3-25), 1.07 (s, CH_3-26), 1.83 (s, CH_3-27), 1.01 (s, CH_3-29), 1.07 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8.5, H-1), 4.06 (t, J = 8.5, H-2), 4.23 (t, J = 8.5, H-3), 4.45 (t, J = 8.5, H-4), 4.57 (d, J = 9, H-5), 3.74 (s, OMe)

β-D-Xylp: 6.06 (d, J = 8.5, H-1), 5.70 (t, J = 8.5, H-2), 4.16 (t, J = 8.5, H-3), 4.08 (H-4), 3.72 (t, J = 11, H-5), 4.26 (dd, J = 11, 5.5, H-5)

β-D-Glcp: 4.98 (d, J = 8, H-1), 3.93 (t, J = 8, H-2), 4.17 (t, J = 8, H-3), 4.06 (t, J = 8, H-4), 4.04 (H-5), 4.23 (dd, J = 12, 5.5, H-6), 4.53 (dd, J = 12, 1.5, H-6)

Ester part: 2.98 (m, β), 3.30 (m, β′), 3.14 (m, γ), 3.21 (m, γ′), 7.18 (H-2), 7.08 (d, J = 8.5, H-3), 7.08 (d, J = 8.5, H-5), 7.18 (H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	Glc-1	105.7
2	26.9	17	49.3	2	75.4	2	74.6
3	89.5	18	41.2	3	77.9	3	78.6
4	39.8	19	47.3	4	73.2	4	71.7
5	56.1	20	31.1	5	77.2	5	78.6
6	18.5	21	36.2	6	170.9	6	62.7
7	33.2	22	32.6	OMe	52.1	Ester part-α	172.2
8	40.2	23	28.4	Xyl-1	93.3	β	36.7
9	47.3	24	17.2	2	71.4	γ	30.3
10	37.2	25	15.9	3	86.1	1	131.3
11	24.0	26	17.3	4	69.3	2	129.9
12	123.1	27	27.3	5	67.1	3	116.3
13	144.5	28	175.9			4	157.4
14	42.3	29	33.4			5	116.3
15	36.4	30	24.7			6	129.9

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin H

CAS Registry Number: 134522-27-3

See Figure Tragopogonsaponin H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{57}H_{82}O_{21}$: 1102.534 (Me ester)

$[\alpha]_D^{25}$ +7.2° (c, 0.65, MeOH) [1]

UV λ_{max} nm (log ε): 200 (4.16), 212 (4.08), 230 (4.01), 301 (4.22), 318 (4.33) [1]

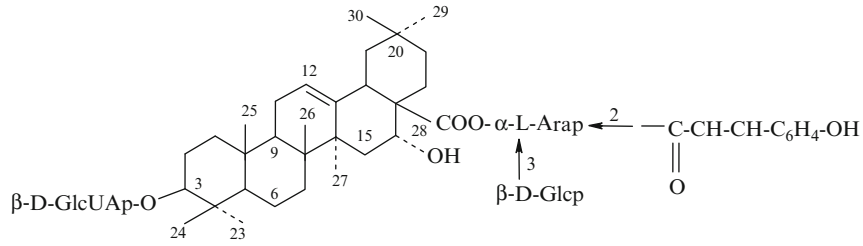
FAB-MS *m/z* (Me ester): 1125 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N) (Me ester): 3.34 (dd, J = 12, 4, H-3), 5.57 (t, J = 3, H-12), 5.20 (brs, H-16), 3.44 (dd, J = 14, 4, H-18), 2.74 (t, J = 14, H-19), 1.25 (s, CH_3-23), 0.99 (s, CH_3-24), 0.92 (s, CH_3-25), 1.02 (s, CH_3-26), 1.73 (s, CH_3-27), 1.01 (s, CH_3-29), 1.04 (s, CH_3-30)

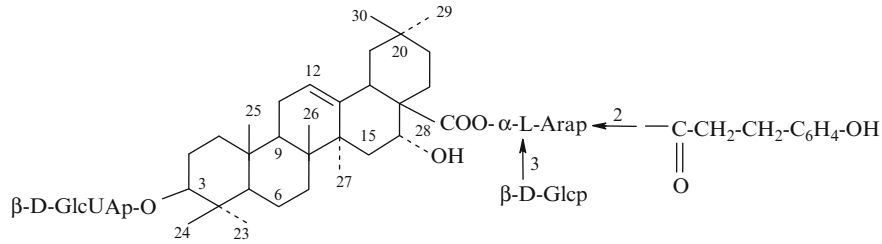
β-D-GlcUAp: 4.94 (d, J = 8.5, H-1), 4.03 (t, J = 8.5, H-2), 4.21 (t, J = 8.5, H-3), 4.42 (t, J = 8.5, H-4), 4.54 (d, J = 9, H-5), 3.72 (s, OMe)

α-L-Arap: 6.11 (d, J = 8.5, H-1), 6.28 (dd, J = 9, 8.5, H-2), 4.45 (dd, J = 9, 3, H-3), 4.53 (brs, H-4), 3.82, 4.17 (dd, J = 12, H-5)

β-D-Glcp: 5.14 (d, J = 8, H-1), 3.87 (t, J = 8, H-2), 4.11 (H-3), 4.11 (H-4), 3.98 (m, H-5), 4.32 (dd, J = 12, 5.5, H-6), 4.52 (dd, J = 12, 2.5, H-6)



Tragopogonsaponin H



Tragopogonsaponin I

Ester part: 6.67 (d, J = 16, β), 7.78 (d, J = 16, γ), 7.45 (d, J = 8.5, H-2), 7.09 (d, J = 8.5, H-3), 7.09 (d, J = 8, H-5), 7.45 (d, J = 8.5, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	Glc-1	106.2
2	26.9	17	49.3	2	75.4	2	74.6
3	89.5	18	41.2	3	77.9	3	78.6
4	39.8	19	47.3	4	73.2	4	71.5
5	56.1	20	31.1	5	77.2	5	78.3
6	18.5	21	36.2	6	170.9	6	62.8
7	33.2	22	32.6	OMe	52.2	Ester part-α	166.7
8	40.2	23	28.4	Ara-1	93.7	β	115.3
9	47.3	24	17.2	2	70.3	γ	145.7
10	37.2	25	15.9	3	80.7	1	126.2
11	24.0	26	17.3	4	69.1	2	131.0
12	123.1	27	27.3	5	68.1	3	116.8
13	144.5	28	175.9			4	161.7
14	42.3	29	33.4			5	116.8
15	36.4	30	24.7			6	131.0

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin I

CAS Registry Number: 134522-28-4

See Figure Tragopogonsaponin I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{57}H_{84}O_{21}$: 1104.550 (Me ester)

FAB-MS *m/z*: 1127 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.39 (dd, J = 12, 4, H-3), 5.59 (brs, H-12), 5.16 (brs, H-16), 3.44 (dd, J = 14, 4, H-18), 2.76 (t, J = 14, H-19), 1.22 (s, CH_3-23), 0.98 (s, CH_3-24), 0.92 (s, CH_3-25), 1.06 (s, CH_3-26), 1.82 (s, CH_3-27), 1.00 (s, CH_3-29), 1.09 (s, CH_3-30)

β-D-GlcUAp: 5.08 (d, J = 8, H-1), 3.88 (t, J = 8, H-2), 4.12 (t, J = 8, H-3), 4.44 (t, J = 8.5, H-4), 4.57 (d, J = 9, H-5), 3.74 (s, OMe)

α-L-Arap: 6.04 (d, J = 8, H-1), 6.16 (dd, J = 9, 8, H-2), 4.34 (dd, J = 9, 3, H-3), 4.50 (brs, H-4), 3.81, 4.16 (d, J = 11.5, H_2-5)

β-D-Glcp: 4.94 (d, J = 8, H-1), 4.06 (t, J = 8, H-2), 4.21 (t, J = 8, H-3), 4.12 (t, J = 8, H-4), 3.98 (m, H-5), 4.33 (dd, J = 12, 5.5, H-6), 4.51 (dd, J = 12, 2, H-6)

Ester part: 2.93 (m, β), 3.26 (m, β′), 3.11 (m, γ), 3.20 (m, γ′), 7.18 (d, J = 8.5, H-2), 7.08 (d, J = 8.5, H-3), 7.08 (d, J = 8.5, H-5), 7.18 (d, J = 8.5, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	Glc-1	106.6
2	26.9	17	49.3	2	75.4	2	74.5
3	89.5	18	41.2	3	77.9	3	78.5
4	39.8	19	47.3	4	73.2	4	71.6
5	56.1	20	31.1	5	77.2	5	78.5
6	18.5	21	36.2	6	170.9	6	62.8
7	33.2	22	32.6	OMe	52.1	Ester part-α	172.2
8	40.2	23	28.4	Ara-1	93.4	β	36.8
9	47.3	24	17.2	2	70.6	γ	30.4
10	37.2	25	15.9	3	80.6	1	131.4
11	24.0	26	17.3	4	69.1	2	129.9
12	123.1	27	27.3	5	68.1	3	116.3
13	144.5	28	175.9			4	157.4
14	42.3	29	33.4			5	116.3
15	36.4	30	24.7			6	129.9

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin J

CAS Registry Number: 134361-70-9

See Figure Tragopogonsaponin J

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{58}H_{86}O_{22}$: 1134.561 (Me ester)

FAB-MS *m/z* (Me ester): 1134 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.39 (dd, J = 12, 4, H-3), 5.59 (brs, H-12), 5.16 (brs, H-16), 3.44 (dd, J = 14, 4, H-18), 2.76 (t, J = 14, H-19), 1.29 (s, CH_3-23), 0.98 (s, CH_3-24), 0.92 (s, CH_3-25), 1.06 (s, CH_3-26), 1.82 (s, CH_3-27), 1.00 (s, CH_3-29), 1.09 (s, CH_3-30)

β-D-GlcUAp: 4.94 (d, J = 8.5, H-1), 4.03 (t, J = 8.5, H-2), 4.21 (t, J = 8.5, H-3), 4.42 (t, J = 8.5, H-4), 4.54 (d, J = 9, H-5), 3.72 (s, OMe)

α-L-Arap: 6.11 (d, J = 8.5, H-1), 6.28 (dd, J = 9, 8.5, H-2), 4.45 (dd, J = 9, 3, H-3), 4.53 (brs, H-4), 3.82, 4.17 (dd, J = 12, H_2-5)

β-D-Glcp: 5.14 (d, J = 8, H-1), 3.87 (t, J = 8, H-2), 4.11 (H-3), 4.11 (H-4), 3.98 (m, H-5), 4.32 (dd, J = 12, 5.5, H-6), 4.52 (dd, J = 12, 2.5, H-6)

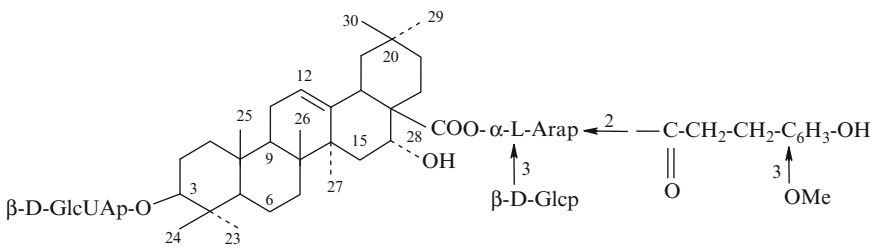
Ester part: 2.93 (m, β), 3.26 (m, β′), 3.11 (m, γ), 3.20 (m, γ′), 6.92 (d, J = 1.5, H-2), 7.11 (d, J = 8, H-5), 6.84 (d, J = 8, 1.5, H-6), 3.74 (s, OMe) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	4	71.6
2	26.9	17	49.3	2	75.4	5	78.5
3	89.5	18	41.2	3	77.9	6	62.8
4	39.8	19	47.3	4	73.2	Ester part-α	172.3
5	56.1	20	31.1	5	77.2	β	36.8
6	18.5	21	36.2	6	170.9	γ	30.4
7	33.2	22	32.6	OMe	52.1	1	132.2
8	40.2	23	28.4	Ara-1	93.4	2	113.0
9	47.3	24	17.2	2	70.6	3	148.7
10	37.2	25	15.9	3	80.6	4	146.7

(*continued*)



Tragopogonsaponin J

Table 1 (continued)

11	24.0	26	17.3	4	69.1	5	116.5
12	123.1	27	27.3	5	68.1	6	121.4
13	144.5	28	175.9	Glc-1	106.6	OMe	56.0
14	42.3	29	33.4	2	74.5		
15	36.4	30	24.7	3	78.5		

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin K

See Figure Tragopogonsaponin K

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{50}H_{72}O_{15}$: 912.487

$[\alpha]_D$ +59.4° (c, 0.90, MeOH) [1]

UV λ_{max} nm (log ε): 213 (4.09), 229 (4.00), 301 (4.20), 318 (4.30) [1]

FAB-MS *m/z*: 935 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.41 (brd, J = 12, H-3), 5.61 (t, J = 2.5, H-12), 5.22 (brs, H-16), 3.47 (dd, J = 14, 4, H-18), 2.76 (t, J = 14, H-19), 1.18 (s, CH_3-23), 1.01 (s, CH_3-24), 0.99 (s, CH_3-25), 1.05 (s, CH_3-26), 1.72 (s, CH_3-27), 1.05 (s, CH_3-29), 1.08 (s, CH_3-30)

α-L-Arap: 6.13 (d, J = 8, H-1), 6.31 (dd, J = 9, 8, H-2), 4.48 (dd, J = 9, 3, H-3), 4.56 (brs, H-4), 3.84, 4.19 (dd, J = 12, H_2-5)

β-D-Glcp: 5.17 (d, J = 8, H-1), 3.90 (t, J = 8, H-2), 4.13 (H-3), 4.13 (H-4), 4.01 (m, H-5), 4.33, 4.56 (dd, J = 12, 4.5, H_2-6)

Ester part: 6.70 (d, J = 16, β), 7.90 (d, J = 16, γ), 7.48 (d, J = 8, H-2), 7.14 (d, J = 8, H-3), 7.14 (d, J = 8, H-5), 7.48 (d, J = 8, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	73.9	Ara-1	93.6	Ester part-α	166.6
2	28.2	17	49.1	2	70.2	β	114.7
3	78.1	18	41.0	3	80.6	γ	145.6
4	39.4	19	47.2	4	69.1	1	126.1
5	55.9	20	30.8	5	68.0	2	130.9
6	18.6	21	35.9	Glc-1	106.3	3	116.6
7	33.2	22	32.3	2	74.6	4	161.6
8	40.0	23	28.8	3	78.6	5	116.6
9	47.2	24	16.6	4	71.5	6	130.9
10	37.5	25	15.7	5	78.3		
11	23.8	26	17.1	6	62.8		
12	123.1	27	27.0				
13	144.4	28	175.6				
14	42.1	29	33.2				
15	36.4	30	24.4				

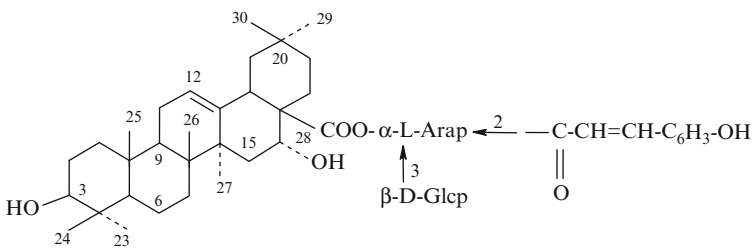
References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

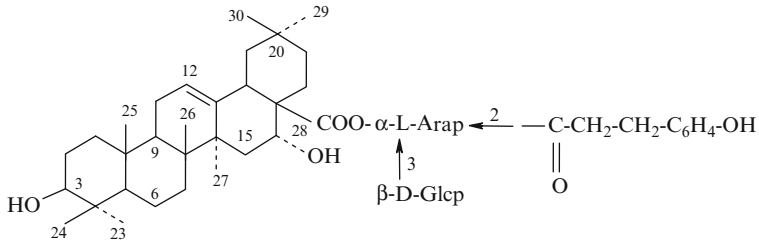
Tragopogonsaponin L

See Figure Tragopogonsaponin L

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid



Tragopogonsaponin K



Tragopogonsaponin L

Biological sources: *Tragopogon porrifolius* [1]
$C_{50}H_{74}O_{15}$: 914.502
FAB-MS *m/z*: 937 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.46 (H-3), 5.63 (brs, H-12), 5.17 (brs, H-16), 3.46 (H-18), 2.77 (t, J = 14, H-19), 1.21 (s, CH_3-23), 1.02 (s, CH_3-24), 1.00 (s, CH_3-25), 1.16 (s, CH_3-26), 1.81 (s, CH_3-27), 1.03 (s, CH_3-29), 1.14 (s, CH_3-30)
α-L-Arap: 6.13 (d, J = 8, H-1), 6.31 (dd, J = 9.5, 8, H-2), 4.48 (dd, J = 9.5, 2.5, H-3), 4.56 (brs, H-4), 3.84, 4.19 (dd, J = 12, H_2-5)
β-D-Glcp: 5.17 (d, J = 8, H-1), 3.90 (t, J = 8, H-2), 4.13 (H-3), 4.13 (H-4), 4.01 (m, H-5), 4.33, 4.56 (dd, J = 12, 4.5, H_2-6)
Ester part: 2.96 (m, β), 3.25 (m, β′), 3.12 (m, γ), 3.20 (m, γ′), 7.19 (d, J = 8, H-2), 7.10 (d, J = 8, H-3), 7.10 (d, J = 8, H-5), 7.19 (d, J = 8, H-6) [1]
^{13}C NMR (67.5 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	73.9	Ara-1	93.5	Ester part-α	172.3
2	28.2	17	49.1	2	70.6	β	36.8
3	78.1	18	41.0	3	80.7	γ	30.4
4	39.4	19	47.2	4	69.1	1	131.4
5	55.9	20	30.8	5	68.1	2	129.9
6	18.6	21	35.9	Glc-1	106.6	3	116.3
7	33.2	22	32.3	2	74.5	4	157.4
8	40.0	23	28.8	3	78.6	5	116.3
9	47.2	24	16.6	4	71.6	6	129.9
10	37.5	25	15.7	5	78.1		
11	23.8	26	17.1	6	62.8		
12	123.1	27	27.0				
13	144.4	28	175.6				
14	42.1	29	33.2				
15	36.4	30	24.4				

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

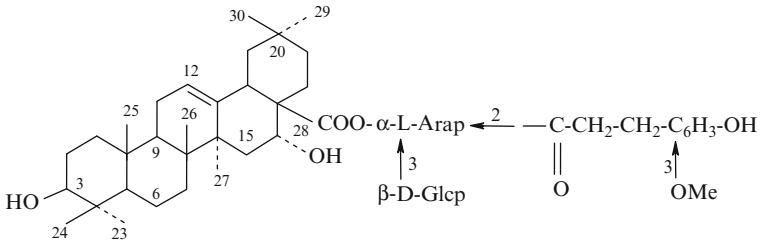
Tragopogonsaponin M

See Figure Tragopogonsaponin M
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid
Biological sources: *Tragopogon porrifolius* [1]
$C_{51}H_{76}O_{16}$: 944.513
FAB-MS *m/z*: 967 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.46 (H-3), 5.63 (brs, H-12), 5.17 (brs, H-16), 3.46 (H-18), 2.77 (t, J = 14, H-19), 1.22 (s, CH_3-23), 1.02 (s, CH_3-24), 1.00 (s, CH_3-25), 1.16 (s, CH_3-26), 1.81 (s, CH_3-27), 1.04 (s, CH_3-29), 1.14 (s, CH_3-30)
α-L-Arap: 6.13 (d, J = 8, H-1), 6.31 (dd, J = 9.5, 8, H-2), 4.48 (dd, J = 9.5, 2.5, H-3), 4.56 (brs, H-4), 3.84, 4.19 (dd, J = 12, H_2-5)
β-D-Glcp: 5.17 (d, J = 8, H-1), 3.90 (t, J = 8, H-2), 4.13 (H-3), 4.13 (H-4), 4.01 (m, H-5), 4.33, 4.56 (dd, J = 12, 4.5, H_2-6)
Ester part: 2.96 (m, β), 3.25 (m, β′), 3.12 (m, γ), 3.20 (m, γ′), 6.93 (brs, H-2), 7.14 (d, J = 8, H-5), 6.85 (d, J = 12, H-6), 3.75 (s, OMe) [1]
^{13}C NMR (67.5 MHz, C_5D_5N): [1]

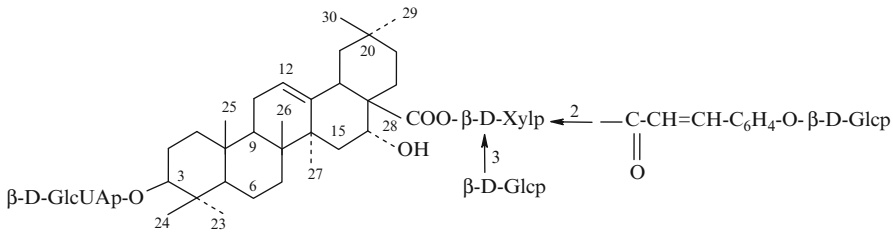
Table 1

C-1	39.0	C-16	73.9	Ara-1	93.5	Ester part-α	172.3
2	28.2	17	49.1	2	70.6	β	36.8
3	78.1	18	41.0	3	80.7	γ	30.4
4	39.4	19	47.2	4	69.1	1	132.1
5	55.9	20	30.8	5	68.1	2	112.9
6	18.6	21	35.9	Glc-1	106.6	3	148.7
7	33.2	22	32.3	2	74.5	4	146.8
8	40.0	23	28.8	3	78.6	5	116.6
9	47.2	24	16.6	4	71.6	6	121.4

(*continued*)



Tragopogonsaponin M



Tragopogonsaponin N

Table 1 (continued)

10	37.5	25	15.7	5	78.1	OMe	56.0
11	23.8	26	17.1	6	62.8		
12	123.1	27	27.0				
13	144.4	28	175.6				
14	42.1	29	33.2				
15	36.4	30	24.4				

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin N

CAS Registry Number: 134361-74-3

See Figure Tragopogonsaponin N

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{63}H_{92}O_{26}$: 1264.587 (Me ester)

$[\alpha]_D^{25}$ −6.7° (c 0.50, MeOH) [1]

UV λ_{max} nm (log ε): 225 (4.03), 299 (4.26), 308 (4.28) [1]

FAB-MS *m/z* (Me ester): 1287 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N) (Me ester): 3.33 (dd, J = 11, 4, H-3), 5.59 (t, J = 2.5, H-12), 5.17 (brs, H-16), 3.44 (dd, J = 14, 4, H-18), 2.75 (t, J = 14, H-19), 1.26 (s, CH_3-23), 0.99 (s, CH_3-24), 0.91 (s, CH_3-25), 1.03 (s, CH_3-26), 1.74 (s, CH_3-27), 1.03 (s, CH_3-29), 1.06 (s, CH_3-30)

β-D-GlcUAp: 4.93 (d, J = 8.5, H-1), 4.05 (t, J = 8.5, H-2), 4.21 (t, J = 8.5, H-3), 4.44 (t, J = 8.5, H-4), 4.55 (d, J = 9, H-5), 3.72 (s, OMe)

β-D-Xylp: 6.13 (d, J = 8.5, H-1), 5.82 (t, J = 8.5, H-2), 4.27 (H-3), 4.12 (H-4), 3.76, 4.28 (t, J = 10, H_2-5)

β-D-Glcp: 5.05 (d, J = 8, H-1), 3.94 (t, J = 8, H-2), 4.11 (t, J = 8, H-3), 4.06 (t, J = 8, H-4), 4.05 (H-5), 4.22 (dd, J = 12, 5, H-6), 4.55 (dd, J = 12, 2, H-6)

Ester part: 6.76 (d, J = 16, β), 7.86 (d, J = 16, γ), 7.45 (d, J = 8, H-2), 7.30 (d, J = 8, H-3), 7.30 (d, J = 8, H-5), 7.45 (d, J = 8, H-6)

β-D-Glcp′: 5.60 (d, J = 8.5, H-1), 4.27 (t, J = 8, H-2), 4.32 (t, J = 8.5, H-3), 4.30 (t, J = 8.5, H-4), 4.11 (H-5), 4.39 (dd, J = 12, 5, H-6), 4.53 (dd, J = 12, 2, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.2	Glc-1	105.5	Glc′-1	102.3
2	26.9	17	49.3	2	75.4	2	74.8	2	74.6
3	89.5	18	41.2	3	77.9	3	78.7	3	78.5
4	39.8	19	47.3	4	73.2	4	71.7	4	71.3
5	56.1	20	31.1	5	77.2	5	78.5	5	78.4
6	18.5	21	36.2	6	170.9	6	62.7	6	62.4
7	33.2	22	32.6	OMe	52.0	Ester part-α	166.4		
8	40.2	23	28.4	Xyl-1	93.5	β	116.8		
9	47.3	24	17.2	2	71.3	γ	145.8		
10	37.2	25	15.9	3	85.8	1	128.6		
11	24.0	26	17.3	4	69.4	2	130.5		
12	123.1	27	27.3	5	67.1	3	117.1		
13	144.5	28	175.9			4	160.6		
14	42.3	29	33.4			5	117.1		
15	36.4	30	24.7			6	130.5		

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin O

CAS Registry Number: 134361-75-4

See Figure Tragopogonsaponin O

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{63}H_{94}O_{26}$: 1266.603 (Me ester)

$[\alpha]_D^{25}$ 0° (c 0.40, MeOH) [1]

UV λ_{max} nm (log ε): 221 (4.06), 281 (3.56), 309 (3.64) [1]

FAB-MS *m/z*: 1289 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.39 (dd, J = 12, 4, H-3), 5.61 (t, J = 2.5, H-12), 5.14 (brs, H-16), 3.44 (dd, J = 14, 4, H-18), 2.77 (t, J = 14, H-19), 1.30 (s, CH_3-23), 0.99 (s, CH_3-24), 0.92 (s, CH_3-25), 1.09 (s, CH_3-26), 1.83 (s, CH_3-27), 1.02 (s, CH_3-29), 1.09 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8.5, H-1), 4.07 (H-2), 4.24 (t, J = 8.5, H-3), 4.46 (t, J = 8.5, H-4), 4.58 (d, J = 9, H-5), 3.74 (s, OMe)

β-D-Xylp: 6.07 (d, J = 8.5, H-1), 5.70 (t, J = 8.5, 8, H-2), 4.17 (t, J = 8.5, H-3), 4.07 (H-4), 3.73, 4.27 (dd, J = 11.5, 5.5, H_2-5)

β-D-Glcp: 4.96 (d, J = 8, H-1), 3.93 (t, J = 8, H-2), 4.15 (t, J = 8, H-3), 4.07 (H-4), 4.07 (H-5), 4.23 (dd, J = 12, 4.5, H-6), 4.55 (brd, J = 12, H-6)

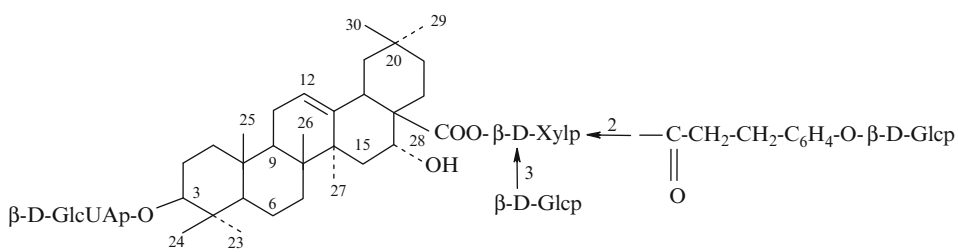
Ester part: 2.97 (m, β), 3.23 (β′), 3.14 (γ), 3.14 (γ′), 7.18 (d, J = 8, H-2), 7.26 (d, J = 8, H-3), 7.26 (d, J = 8, H-5), 7.18 (d, J = 8, H-6)

β-D-Glcp′: 5.55 (d, J = 8, H-1), 4.27 (t, J = 8, H-2), 4.32 (H-3), 4.32 (H-4), 4.07 (H-5), 4.39 (dd, J = 12, 4.9, H-6), 4.55 (brd, J = 12, H-6)

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	Glc-1	105.7	Glc′-1	102.4
2	26.9	17	49.3	2	75.5	2	74.6	2	75.0
3	89.5	18	41.2	3	77.9	3	78.8	3	78.8
4	39.8	19	47.3	4	73.2	4	71.7	4	71.3
5	56.1	20	31.1	5	77.2	5	78.5	5	78.4
6	18.5	21	36.2	6	170.9	6	62.7	6	62.4
7	33.2	22	32.6	OMe	52.0	Ester part-α	172.1		
8	40.2	23	28.4	Xyl-1	93.4	β	36.4		
9	47.3	24	17.2	2	71.5	γ	30.3		
10	37.2	25	15.9	3	86.0	1	134.4		
11	24.0	26	17.3	4	69.3	2	129.9		
12	123.1	27	27.3	5	67.2	3	117.0		
13	144.5	28	175.9			4	157.2		
14	42.3	29	33.4			5	117.0		
15	36.4	30	24.7			6	129.9		



Tragopogonsaponin O

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin P

CAS Registry Number: 134453-41-1

See Figure Tragopogonsaponin P

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{63}H_{94}O_{26}$: 1266.603 (Me ester)

$[\alpha]_D - 7.2°$ (c 0.90, MeOH) [1]

UV λ_{max} nm (log ε): 220 (4.07), 273 (3.29), 280 (3.26) [1]

FAB-MS *m/z*: 1289 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.38 (dd, J = 12, 4.5, H-3), 5.59 (t, J = 2.5, H-12), 5.15 (brs, H-16), 3.44 (dd, J = 14, 4.5, H-18), 2.76 (t, J = 14, H-19), 1.29 (s, CH_3-23), 0.99 (s, CH_3-24), 0.92 (s, CH_3-25), 1.07 (s, CH_3-26), 1.82 (s, CH_3-27), 1.00 (s, CH_3-29), 1.10 (s, CH_3-30)

β-D-GlcUAp: 4.97 (d, J = 8.5, H-1), 4.06 (t, J = 8.5, H-2), 4.24 (t, J = 8.5, H-3), 4.45 (t, J = 8.5, H-4), 4.57 (d, J = 9, H-5), 3.74 (s, OMe)

α-L-Arap: 6.07 (d, J = 8, H-1), 6.14 (dd, J = 2.5, 8, H-2), 4.35 (dd, J = 9.5, 3, H-3), 4.49 (brs, H-4), 3.82 (d, J = 12, H-5), 4.16 (d, J = 12, 2, H-5)

β-D-Glcp: 5.08 (d, J = 8, H-1), 3.88 (t, J = 8, H-2), 4.14 (t, J = 8, H-3), 4.13 (t, J = 8, H-4), 3.98 (m, H-5), 4.35, 4.53 (dd, J = 12, 2, H_2-6)

Ester part: 2.90 (m, β), 3.10 (β′), 3.10 (γ), 3.10 (γ′), 7.16 (d, J = 8.5, H-2), 7.25 (d, J = 8.5, H-3), 7.25 (d, J = 8.5, H-5), 7.16 (d, J = 8.5, H-6)

β-D-Glcp′: 4.55 (d, J = 8.5, H-1), 4.26 (t, J = 8.5, H-2), 4.33 (t, J = 8.5, H-3), 4.31 (t, J = 8.5, H-4), 4.06 (m, H-5), 4.38 (dd, J = 12, 5.5, H-6), 4.50 (dd, J = 12, 2, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	74.0	GlcUA-1	107.3	Glc-1	106.5	Glc′-1	102.3
2	26.9	17	49.3	2	75.5	2	75.0	2	74.4
3	89.5	18	41.2	3	77.9	3	78.8	3	78.5
4	39.8	19	47.3	4	73.2	4	71.5	4	71.3
5	56.1	20	31.1	5	77.2	5	78.5	5	78.4
6	18.5	21	36.2	6	170.6	6	62.8	6	62.4
7	33.2	22	32.6	OMe	52.1	Ester part-α	172.1		
8	40.2	23	28.4	Ara-1	93.4	β	36.5		
9	47.3	24	17.2	2	70.8	γ	30.4		
10	37.2	25	15.9	3	80.3	1	134.5		
11	24.0	26	17.3	4	69.0	2	129.7		
12	123.1	27	27.3	5	67.9	3	117.0		
13	144.5	28	175.9			4	157.2		
14	42.3	29	33.4			5	117.0		
15	36.4	30	24.7			6	129.7		

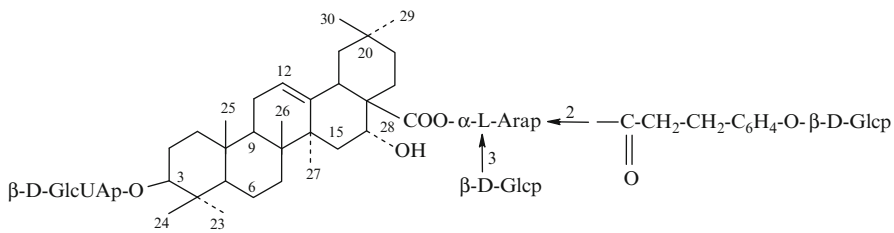
References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

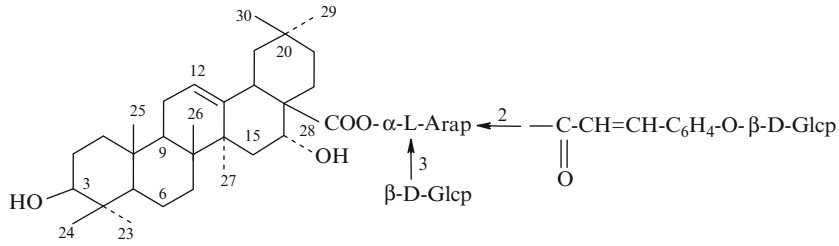
Tragopogonsaponin Q

See Figure Tragopogonsaponin Q

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides



Tragopogonsaponin P



Tragopogonsaponin Q

of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

$C_{56}H_{84}O_{20}$: 1076.555

$[\alpha]_D^{22}$ + 25.4° (c, 0.40, MeOH) [1]

UV λ_{max} nm (log ε): 224 (3.96), 299 (4.13), 307 (4.15) [1]

FAB-MS *m/z*: 1097 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.40 (dd, J = 11, 4.5, H-3), 5.61 (t, J = 2, H-12), 5.20 (brs, H-16), 3.47 (dd, J = 14, 4, H-18), 2.76 (t, J = 14, H-19), 1.24 (s, CH_3-23), 1.02 (s, CH_3-24), 0.99 (s, CH_3-25), 1.11 (s, CH_3-26), 1.72 (s, CH_3-27), 1.06 (s, CH_3-29), 1.12 (s, CH_3-30)

α-L-Arap: 6.15 (d, J = 8, H-1), 6.31 (dd, J = 9.5, 8, H-2), 4.49 (dd, J = 9.5, 3, H-3), 4.57 (brs, H-4), 3.86, 4.20 (dd, J = 12, 2, H_2-5)

β-D-Glcp: 5.17 (d, J = 8, H-1), 3.90 (t, J = 8, H-2), 4.13 (H-3), 4.13 (H-4), 4.00 (m, H-5), 4.33 (dd, J = 12, 5, H-6), 4.54 (dd, J = 2, H-6)

Ester part: 6.72 (d, J = 16, β), 7.82 (d, J = 16, γ), 4.44 (d, J = 8, H-2), 7.32 (d, J = 8, H-3), 7.32 (d, J = 8, H-5), 7.44 (d, J = 8, H-6)

β-D-Glcp′: 5.63 (d, J = 8, H-1), 4.29 (t, J = 8, H-2), 4.35 (t, J = 8, H-3), 4.30 (t, J = 8, H-4), 4.13 (H-5), 4.38 (dd, J = 12, 5.5, H-6), 4.56 (dd, J = 12, 2, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	73.9	Ara-1	93.6	Ester part-α	166.4
2	28.2	17	49.1	2	70.4	β	117.0
3	78.1	18	41.0	3	80.6	γ	144.8
4	39.4	19	47.2	4	69.1	1	128.6
5	55.9	20	30.8	5	68.0	2	130.4
6	18.6	21	35.9	Glc-1	106.4	3	117.0
7	33.2	22	32.3	2	74.8	4	160.4
8	40.0	23	28.8	3	79.2	5	117.0
9	47.2	24	16.6	4	71.5	6	130.4
10	37.5	25	15.7	5	78.5	Glc′-1	102.2
11	23.8	26	17.1	6	62.8	2	74.6
12	123.1	27	27.0			3	78.6
13	144.4	28	175.6			4	71.2
14	42.1	29	33.2			5	78.3
15	36.4	30	24.4			6	62.4

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Tragopogonsaponin R

CAS Registry Number: 134361-77-6

See Figure Tragopogonsaponin R

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Tragopogon porrifolius* [1]

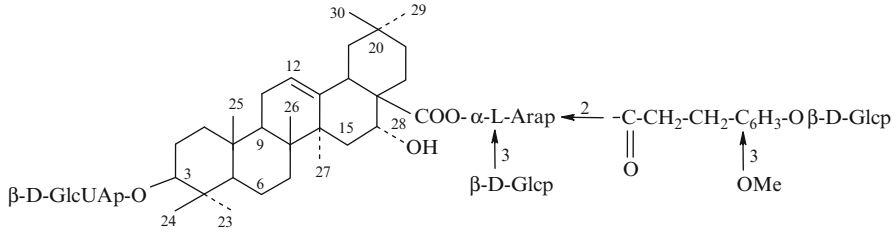
$C_{64}H_{96}O_{27}$: 1296.613 (Me ester)

$[\alpha]_D^{25}$ −12.3° (c 0.50, MeOH) [1]

UV λ_{max} nm (log ε): 219 (4.02), 275 (3.36), 280 (3.39), 310 (3.29) [1]

FAB-MS *m/z*: 1319 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.38 (dd, J = 12, 4.5, H-3), 5.60 (t, J = 2, H-12), 5.15 (brs, H-16), 3.45 (dd, J = 14, 4.5, H-18), 2.76 (t, J = 14, H-19), 1.30 (s, CH_3-23), 0.99 (s, CH_3-24), 0.92 (s, CH_3-25), 1.07 (s, CH_3-26), 1.84 (s, CH_3-27), 1.01 (s, CH_3-29), 1.10 (s, CH_3-30)



Tragopogonsaponin R

β-D-GlcUAp: 4.97 (d, J = 8.5, H-1), 4.07 (t, J = 8.5, H-2), 4.24 (t, J = 8.5, H-3), 4.46 (t, J = 8.5, H-4), 4.58 (d, J = 9, H-5), 3.74 (s, OMe)

α-L-Arap: 6.07 (d, J = 8, H-1), 6.15 (dd, J = 9, 8, H-2), 4.38 (dd, J = 9, 3, H-3), 4.49 (brs, H-4), 3.82, 4.16 (d, J = 11.5, H_2-5)

β-D-Glcp: 5.10 (d, J = 8.5, H-1), 3.89 (t, J = 8.5, H-2), 4.13 (t, J = 8.5, H-3), 4.12 (t, J = 8.5, H-4), 3.97 (m, H-5), 4.33 (dd, J = 12, 4, H-6), 4.52 (dd, J = 12, 2, H-6)

Ester part: 2.94 (m, β), 3.13 (β′), 3.13 (γ), 3.13 (γ′), 6.94 (d, J = 2, H-2), 7.43 (d, J = 8, H-5), 6.81 (dd, J = 8, 2, H-6), 3.73 (s, OMe)

β-D-Glcp′: 5.58 (d, J = 8, H-1), 4.30 (H-2), 4.30 (H-3), 4.30 (H-4), 4.06 (H-5), 4.37 (dd, J = 12, 4.5, H-6), 4.48 (dd, J = 12, 2, H-6) [1]

^{13}C NMR (67.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

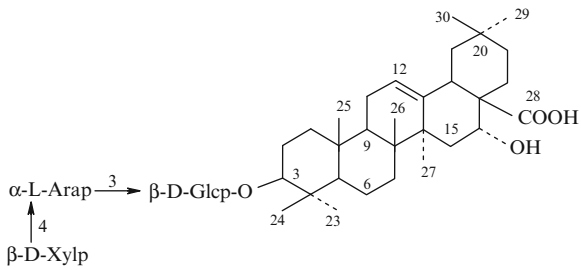
C-1	38.9	C-16	74.0	GlcUA-1	107.2	Glc-1	106.3	OMe	56.3
2	26.9	17	49.3	2	75.4	2	74.9	Glc″-1	102.6
3	89.5	18	41.2	3	77.9	3	78.7	2	74.3
4	39.8	19	47.3	4	73.2	4	71.6	3	78.5
5	56.1	20	31.1	5	77.2	5	78.5	4	71.3
6	18.5	21	36.2	6	170.8	6	62.8	5	78.4
7	33.2	22	32.6	OMe	52.0	Ester part-α	172.2	6	62.5
8	40.2	23	28.4	Ara-1	93.4	β	36.5		
9	47.3	24	17.2	2	70.9	γ	30.8		
10	37.2	25	15.9	3	80.1	1	135.8		
11	24.0	26	17.3	4	68.8	2	113.8		
12	123.1	27	27.3	5	67.8	3	150.3		
13	144.5	28	175.9			4	146.7		
14	42.3	29	33.4			5	116.8		
15	36.4	30	24.7			6	121.1		

References

1. T. Warashina, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(2), 388 (1991)

Triacanthoside A_1

CAS Registry Number: 50657-08-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Gleditsia triacanthos* [1]

$C_{46}H_{74}O_{17}$: 898.492

Mp: 214–216°C [1]

$[\alpha]_D^{20}$ −16.8° (c 1.3, MeOH) [1]

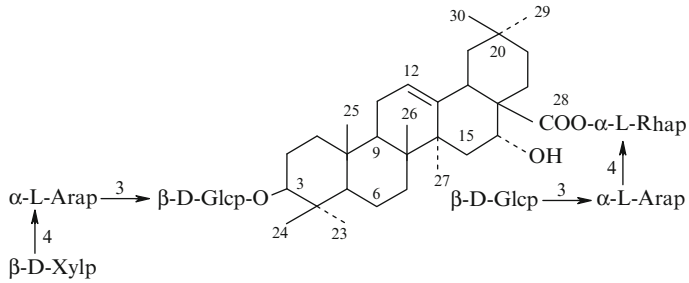
References

1. T.A. Badalbaeva, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **9**(3), 298 (1973)

Triacanthoside G

CAS Registry Number: 40291-80-3

See Figure Triacanthoside G



Triacanthoside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Echinocystic Acid

Biological sources: *Gleditsia triacanthos* [1, 2]

$C_{63}H_{102}O_{30}$: 1338.645

References

1. T.A. Badalbaeva, E.S. Kondratenko, L.G. Mzhel'skya, N.K. Abubakirov, Chem. Nat. Comp. **8**(6), 725 (1972)
2. T.A. Badalbaeva, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **9**(3), 298 (1973)

Glycosides of Aglycones of Oleanene Type

Glycosides of Presenegenin

E-Senegasaponin a

CAS Registry Number: 162762-97-2

See Figure E-Senegasaponin a

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala senega* [1, 2]

$C_{74}H_{110}O_{35}$: 1558.682

Mp: 228–231°C [1]

$[\alpha]_D$ −12.9° (MeOH) [1]

FAB-MS *m/z*: 1557 $[M\text{-}H]^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1750, 1717, 1707, 1637 [1]

^{1}H NMR (J/Hz, C_5D_5N): β-D-Glcp: 5.10 (d, J = 7.6, H-1); β-D-Fucp: 6.21 (d, J = 8.3, H-1); α-L-Rhap: 6.31 (brs, H-1); β-D-Apif: 6.08 (d-like, H-1); β-D-Xylp: 5.31 (d, J = 7.6, H-1); β-D-Glcp: 4.96 (d, J = 7.9, H-1); E-4-OM-Cinnamoy group 6.51 (d, J = 15.8, H-2), 7.94 (d, J = 15.8, H-3), 7.00, 7.44 (d, J = 8.9, aromatic Hx4) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-16	24.1	Glc-1	105.4	Rha-4	78.8	Api-1	111.8
2	70.3	17	47.9	2	75.0	5	68.4	2	77.5
3	85.9	18	42.0	3	78.4	6	19.1	3	79.6
4	52.9	19	45.4	4	71.6	Xyl-1	104.8	4	74.5
5	52.6	20	30.8	5	78.4	2	75.0	5	64.6
6	21.5	21	33.8	6	62.7	3	77.4	Cin-1	167.7
7	33.8	22	32.4	Fuc-1	94.5	4	78.6	2	116.2
8	41.1	23	180.9	2	75.9	5	64.7	3	145.2
9	49.3	24	14.3	3	74.2	Gal-1	104.5	1′	127.5
10	37.1	25	17.5	4	74.7	2	71.8	2′	130.4
11	23.6	26	18.9	5	70.8	3	75.0	3′	114.8
12	127.8	27	64.4	6	16.6	4	70.1	4′	161.9
13	139.0	28	176.7	Rha-1	102.3	5	76.6	5′	114.8
14	47.0	29	33.0	2	71.8	6	62.3	6′	130.4
15	24.5	30	24.1	3	82.4			4-OMe	55.3

(*continued*)

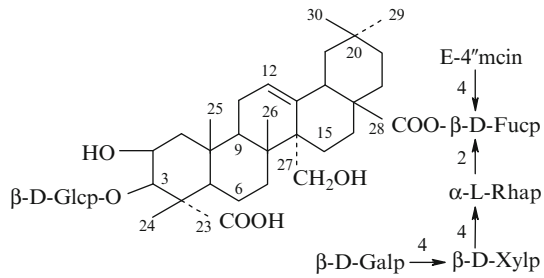
Pharm./Biol.: Exhibited a potent inhibitory effect on ethanol absorption and hypoglycemic activity [2]

References

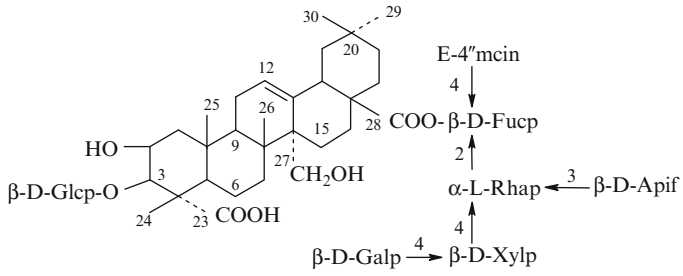
1. M. Yoshikawa, T. Murakami, T. Ueno, M. Kadoya, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(2), 350 (1995)
2. M. Yoshikawa, T. Murakami, T. Ueno, M. Kadoya, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(12), 2115 (1995)

E-Senegasaponin b

CAS Registry Number: 162870-58-8



E-4″mcin=E-4″methoxycinnamoyl group



E-4″mcin=E-4″methoxycinnamoyl group

E-Senegasaponin a

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala senega* [1, 2]

$C_{69}H_{102}O_{31}$: 1426.640

Mp: 251–254°C [1]

$[\alpha]_D$ + 7.4° (MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1750, 1717, 1708, 1636 [1]

^{1}H NMR (J/Hz, C_5D_5N): β-D-Glcp: 5.09 (d, J = 7.6, H-1)

β-D-Fucp: 6.21 (d, J = 8.3, H-1)

α-L-Rhap: 6.40 (brs, H-1)

β-D-Galp: 4.99 (d, J = 7.9, H-1)

cinnamoyl group: 6.50 (d, J = 15.8, H-2-Cin), 7.92 (d, J = 15.8, H-3-Cin) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	24.0	Glc-1	105.4	Rha-4	85.2	Cin-1	167.6
2	70.3	17	48.0	2	75.2	5	68.4	2	116.1
3	85.9	18	42.0	3	78.3	6	18.7	3	145.2
4	52.8	19	45.3	4	71.5	Xyl-1	107.0	1′	127.4
5	52.5	20	30.8	5	78.3	2	75.1	2′	130.4
6	21.6	21	33.8	6	62.7	3	77.3	3′	114.7
7	33.5	22	32.4	Fuc-1	94.6	4	78.3	4′	161.9
8	41.1	23	180.7	2	74.6	5	65.0	5′	114.7
9	49.3	24	14.2	3	74.4	Gal-1	104.5	6′	130.4
10	37.0	25	17.5	4	74.8	2	71.8	4-OMe	55.0
11	23.6	26	18.7	5	70.9	3	75.7		
12	127.8	27	64.4	6	16.6	4	70.1		
13	138.9	28	176.8	Rha-1	101.9	5	76.7		
14	47.0	29	33.0	2	71.8	6	62.2		
15	24.5	30	24.0	3	72.5				

Pharm./Biol.: Exhibited a potent inhibitory effect on ethanol absorption and hypoglycemic activity [2]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, M. Kadoya, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(2), 350 (1995)
2. M. Yoshikawa, T. Murakami, T. Ueno, M. Kadoya, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(12), 2115 (1995)

E-Senegasaponin c

CAS Registry Number: 180387-69-3

See Figure E-Senegasaponin c

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala senega* [1]

$C_{77}H_{114}O_{37}$: 1630.703

Mp: 230–232°C [1]

$[\alpha]_D^{29}$ + 11.4° (c 0.1, MeOH) [1]

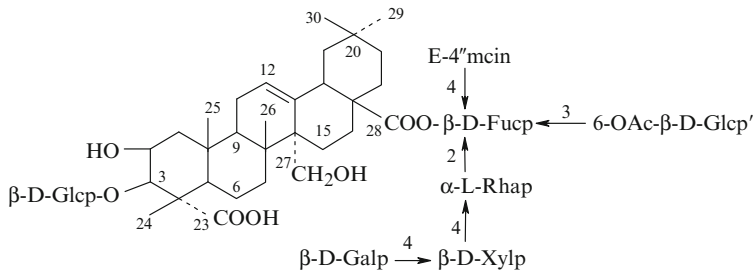
IR (KBr) ν_{max} cm^{-1}: 3453, 1750, 1719, 1707, 1638, 1605, 1516, 1076 [1]

UV λ_{max}^{MeOH} nm (log ε): 226 (4.0), 310 (4.3) [1]

FAB-MS (negative ion mode) *m/z*: 1629.6995 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1653 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.77, 0.92, 1.15, 1.54, 1.97 (s, CH_3-29, 30, 26, 25, 24), 3.24 (dd-like, H-18), 4.60 (m, H-3), 5.85 (brs, H-12); β-D-Fucp: 6.20 (d-like, H-1), 6.00 (brs, H-4), 1.32 (d-like, CH_3-6); β-D-Glcp: 5.04 (d, J = 7.3, H-1), 4.74, 5.01



E-4″mcin = E-4″methoxycinnamoyl group

E-Senegasaponin c

(m, CH_2-6); β-D-Glcp': 5.04 (d, J = 7.3, H-1), 2.08 (s, OAc); β-D-Galp: 4.95 (d, J = 7.5, H-1); β-D-Xylp: 4.98 (d, J = 7.9, H-1); α-L-Rhap: 6.32 (brs, H-1), 1.74 (d-like, CH_3-6); cinnamoyl group: 3.69 (s, 4″-OCH_3), 6.48, 7.84 (d, J = 15.8, H-2′, 3′), 6.98, 7.39 (d, J = 8.6, H-3″, 5″, 2″, 6″) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

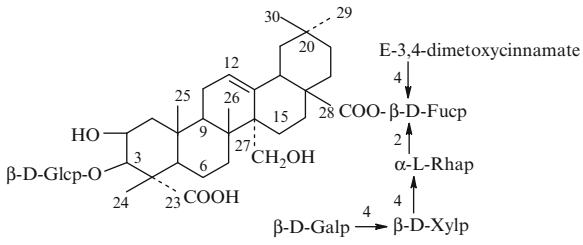
C-1	44.2	C-17	48.0	Glc-1	105.4	Rha-5	68.5	Gal-1	104.5
2	70.3	18	42.0	2	75.0	6	18.7	2	71.7
3	85.9	19	45.3	3	78.1	Glc′-1	105.5	3	75.0
4	52.9	20	30.8	4	71.6	2	75.2	4	70.1
5	52.5	21	33.9	5	78.3	3	78.3	5	77.3
6	21.4	22	32.4	6	62.7	4	71.0	6	62.2
7	33.6	23	180.8	Fuc-1	94.6	5	75.2	Cin-1′	167.1
8	41.2	24	14.2	2	73.1	6	64.0	2′	116.2
9	49.3	25	17.5	3	82.8	Ac-1	171.0	3′	144.9
10	37.0	26	18.9	4	74.0	2	21.0	1″	127.6
11	23.6	27	64.4	5	71.0	Xyl-1	106.9	2″	130.4
12	127.8	28	176.8	6	17.0	2	75.6	3″	114.8
13	138.9	29	33.0	Rha-1	101.6	3	76.6	4″	162.0
14	47.1	30	24.0	2	71.8	4	78.2	5″	114.8
15	24.5			3	72.3	5	65.0	6″	130.4
16	24.0			4	84.8			4″-OCH_3	55.4

Pharm./Biol.: E-Senegasaponin c was found to exhibit hypoglycemic activity in the oral D-glucose tolerance test [1]

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, T. Ueno, M. Kadoya, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(7), 1305 (1996)

E-Senegin II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala senega* [1, 2]

$C_{70}H_{104}O_{32}$: 1456.651

Mp: 247–248°C (BuOH-AcOH-H_2O) [1]

$[\alpha]_D^{20}$ −6.2° (c 2.0, MeOH) [2]

UV λ_{max}^{EtOH} nm (log ε): 317 (4.28) [2]

IR (nujol) ν_{max} cm^{-1}: 3500–3300, 1750, 1730, 1710, 1635, 1610, 1515 [2]

HI (hemolytic index): 43478 [2]

References

1. J. Shoji, S. Kawanishi, Y. Tsukitani, Chem. Pharm. Bull. **19**, 1740 (1971)
2. Y. Tsukitani, J. Shoji, Chem. Pharm. Bull. **21**(4), 791 (1973)

Onjisaponin A

CAS Registry Number: 82410-33-1

See Figure Onjisaponin A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala tenuifolia* [1, 2]

$C_{80}H_{120}O_{39}$: 1704.740

Mp: 253–254°C (EtOH) [1]

$[\alpha]_D^{17}$ −18.4° (c 1.24, MeOH) [1]

UV λ_{max}^{EtOH} nm (log ε): 316 (4.19) [1]

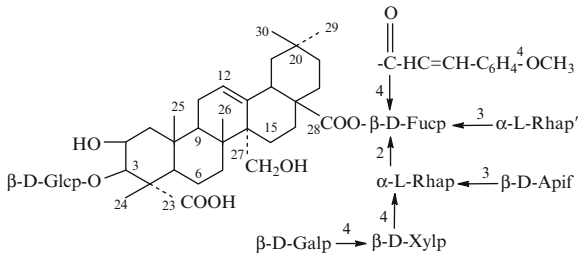
IR (KBr) ν_{max} cm^{-1}: 3500–3300, 1750, 1730 (COOR), 1710 (COOH), 1635 (C = C), 1610, 1515 [1]

^{13}C NMR (100 MHz, C_5D_5N): [1, 2]

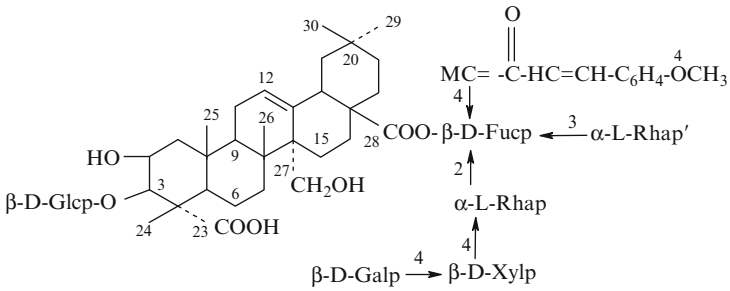
Table 1

C-1	44.3	C-16	24.2	Glc-1	105.0	Xyl-1	104.8	Api-1	111.6
2	70.1	17	48.2	2	75.2	2	74.7	2	77.7
3	86.1	18	42.1	3	78.2	3	75.2	3	79.6
4	52.9	19	45.8	4	71.7	4	78.2	4	65.0
5	52.4	20	30.8	5	78.2	5	64.7	5	74.7
6	21.3	21	33.1	6	62.9	Gal-1	104.2	Cinnamoyl-1	167.0
7	34.1	22	32.4	Fuc-1	95.0	2	71.8	2	116.0
8	41.3	23	180.8	2	77.2	3	74.9	3	145.5
9	49.5	24	14.1	3	79.8	4	70.1	1′	127.7

(*continued*)



Onjisaponin A



Onjisaponin B (Senegin III)

Table 1 (continued)

10	37.1	25	17.6	4	78.2	5	76.3	2′	130.3
11	24.2	26	19.3	5	70.7	6	62.3	3′	114.9
12	127.8	27	64.7	6	16.9	Rha′-1	104.5	4′	162.1
13	139.3	28	176.4	Rha-1	101.9	2	72.4	5′	114.9
14	47.1	29	33.1	2	71.8	3	72.4	6′	130.3
15	25.6	30	24.2	3	82.1	4	73.3	4-OCH_3	55.3
				4	83.9	5	70.1		
				5	68.8	6	18.5		
				6	18.5				

References

1. S. Sakuma, J. Shoji, Chem. Pharm. Bull. **30**(3), 810 (1982)
2. S. Sakuma, J. Shoji, Chem. Pharm. Bull. **29**(9), 2431 (1981)

Onjisaponin B (Senegin III)

CAS Registry Number: 35906-36-6
See Figure Onjisaponin B (Senegin III)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala tenuifolia* [1], *P. senega* [2]

$C_{75}H_{112}O_{35}$: 1572.698

Mp: 249–251°C (EtOH) [1]

$[\alpha]_D^{17} -10.2°$ (c 1.08, MeOH) [1]

UV λ_{max}^{EtOH} nm (logε): 316 (4.17) [1]

IR (KBr) ν_{max} cm^{-1}: 3500–3300, 1750, 1730 (COOR), 1710 (COOH), 1635 (C = C), 1610, 1515 [1]

^{13}C NMR (100 MHz, C_5D_5N): [1, 2]

Table 1

C-1	44.3	C-16	24.1	Glc-1	105.0	Xyl-1	106.6	Cinnamoyl-1	167.0
2	70.3	17	48.2	2	75.2	2	74.9	2	116.6
3	86.0	18	42.0	3	78.1	3	75.5	3	145.4
4	52.9	19	45.8	4	71.7	4	78.1	1′	127.6
5	52.4	20	30.8	5	78.1	5	64.9	2′	130.3
6	21.5	21	33.7	6	62.9	Gal-1	104.2	3′	114.9
7	34.0	22	32.5	Fuc-1	94.9	2	72.1	4′	162.1
8	41.3	23	180.7	2	77.0	3	74.9	5′	114.9
9	49.3	24	14.1	3	80.4	4	70.1	6′	130.3
10	37.1	25	17.5	4	78.1	5	76.4	OCH_3	55.5
11	24.1	26	19.0	5	70.5	6	62.3		

(*continued*)

Table 1 (continued)

12	127.8	27	64.5	6	16.9	Rha′-1	104.5
13	139.1	28	176.3	Rha-1	101.8	2	72.2
14	47.1	29	33.0	2	72.2	3	72.2
15	25.4	30	24.1	3	71.8	4	73.6
				4	84.4	5	70.1
				5	68.0	6	18.4
				6	18.4		

Pharm./Biol.: Exhibited inhibitory effect on c AMP phosphodiesterase [3]

References

1. S. Sakuma, J. Shoji, Chem. Pharm. Bull. **30**(3), 810 (1982)
2. J. Shoji, S. Kawanishi, Y. Tsukitaki, Chem. Pharm. Bull. **19**, 1740 (1971)
3. T. Nikaido, T. Ohmoto, H. Saitoh, U. Sankawa, S. Sakuma, J. Shoji, Chem. Pharm. Bull. **30**(6), 2020 (1982)

Onjisaponin C

See Figure Onjisaponin C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala tenuifolia* [1, 2]

$C_{70}H_{104}O_{32}$: 1456.651

Mp: 264–266°C (aq. EtOH) [1]

$[\alpha]_D^{17}$ −19.3° (c 1.63, MeOH) [1]

UV λ_{max}^{EtOH} nm: 316 [2]

IR (KBr) ν_{max} cm^{-1}:3500–3300, 1750, 1730, 1710, 1635, 1610, 1515 [2]

Pharm./Biol.: Showed inhibitory activity against beef heart phosphodiesterase [3]

References

1. S. Sakuma, I. Shoji, Chem. Pharm. Bull. **29**(9), 2431 (1981)
2. S. Sakuma, I. Shoji, Chem. Pharm. Bull. **30**, 810 (1982)
3. T. Nikaido, T. Ohmoto, H. Saitoh, U. Sankawa, S. Sakuma, J. Shoji, Chem. Pharm. Bull. **30**(6), 2020 (1982)

Onjisaponin E

CAS Registry Number: 82410-35-3

See Figure Onjisaponin E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala tenuifolia* [1], *Polygala senega* [2]

$C_{71}H_{106}O_{33}$: 1486.661

Mp: 245–247°C (EtOH) [1]

$[\alpha]_D^{17}$ −6.5° (c 1.00, MeOH) [1]

UV λ_{max}^{EtOH} nm (log ε): 232 (4.21), 312 (4.21) [1]

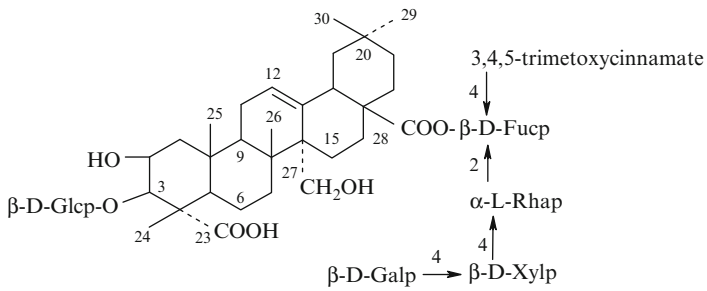
IR (KBr) ν_{max} cm^{-1}: 3500–3300, 1750, 1730, 1710, 1635(C = C), 1580, 1500 [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

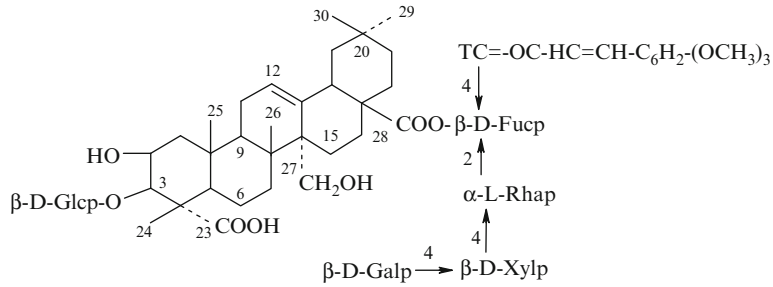
Table 1

C-1	44.3	C-16	24.1	Glc-1	105.0	Xyl-1	106.7	Cinnamoyl-1	167.4
2	70.3	17	48.3	2	75.3	2	75.0	2	117.9
3	86.0	18	42.0	3	78.1	3	75.6	3	145.7
4	52.9	19	45.8	4	71.7	4	78.0	1′	130.4
5	52.3	20	30.8	5	78.1	5	65.0	2′	107.5
6	21.5	21	33.7	6	63.0	Gal-1	104.1	3′	139.2
7	34.1	22	32.5	Fuc-1	94.8	2	72.1	4′	154.9
8	41.3	23	180.6	2	77.0	3	75.0	5′	139.2

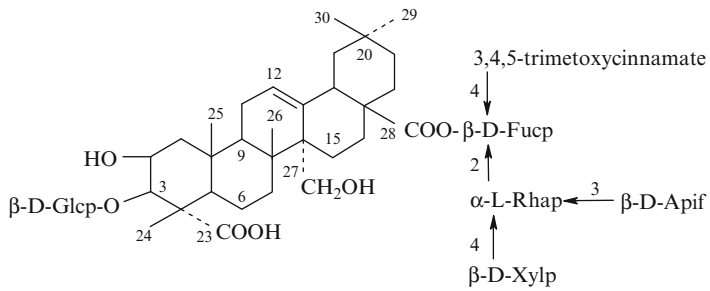
(*continued*)



Onjisaponin C



Onjisaponin E



Onjisaponin G

Table 1 (continued)

9	49.5	24	14.0	3	73.4	4	70.1	6′	107.5
10	37.1	25	17.5	4	78.1	5	76.5	3-OCH_3	56.8
11	24.0	26	18.9	5	70.9	6	62.3	4-OCH_3	60.7
12	127.9	27	64.6	6	16.6			5-OCH_3	56.8
13	139.2	28	176.4	Rha-1	101.6				
14	47.1	29	33.0	2	72.3				
15	24.6	30	24.1	3	71.9				
				4	84.7				
				5	68.4				
				6	18.5				

Pharm./Biol.: Showed inhibitory activity against beef heart phosphodiesterase [2]

References

1. S. Sakuma, J. Shoji, Chem. Pharm. Bull. **30**(3), 810 (1982)
2. T. Nikaido, T. Ohmoto, H. Saitoh, U. Sankawa, S. Sakuma, J. Shoji, Chem. Pharm. Bull. **30**(6), 2020 (1982)

Onjisaponin G

CAS Registry Number: 80722-15-2
See Figure Onjisaponin G
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin
Biological sources: *Polygala tenuifolia* [1]
$C_{70}H_{104}O_{32}$: 1456.651
Mp: 245–247°C (EtOH) [1]
$[\alpha]_D^{17}$ −15.0° (c 1.33, MeOH) [1]
UV λ_{max} nm (log ε): 232 (4.22), 312 (4.22) [1]
IR (KBr) ν_{max} cm^{-1}: 3500–3300, 1750, 1730, 1710, 1635, 1580, 1500 [1]
^{13}C NMR (C_5D_5N): 94.9, 101.3, 105.3, 105.3, 111.6 (five anomeric carbons) [1]
Pharm./Biol.: Showed inhibitory activity against beef heart phosphodiesterase [2]

References

1. S. Sakuma, J. Shoji, Chem. Pharm. Bull. **29**(9), 2431 (1981)
2. T. Nikaido, T. Ohmoto, H. Saitoh, U. Sankawa, S. Sakuma, J. Shoji, Chem. Pharm. Bull. **30**(6), 2020 (1982)

Polygalasaponin XXIV

CAS Registry Number: 173967-53-8

See Figure Polygalasaponin XXIV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala japonica* [1]

$C_{58}H_{92}O_{28}$: 1236.577

$[\alpha]_D^{20}$ + 1.1° (c 0.92, C_5H_5N) [1]

FAB-MS (positive ion mode) *m/z*: 1276 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.70 (m, H-2), 4.58 (d, J = 3.0, H-3), 5.80 (t-like, H-12), 3.22 (dd, J = 14.0, 4.0, H-18), 1.94 (s, CH_3-24), 1.54 (s, CH_3-25), 1.12 (s, CH_3-26), 3.78, 4.06 (brd, J = 12.0, H_2-27), 0.80 (s, CH_3-29), 0.94 (s, CH_3-30)

β-D-Glcp: 5.04 (d, J = 8.0, H-1), 3.92 (H-2), 4.15 (H-3), 4.16 (H-4), 3.95 (m, H-5), 4.31 (H-6), 4.46 (dd, J = 12.0, 2.0, H-6)

β-D-Fucp: 6.06 (d, J = 8.0, H-1), 4.63 (1H, t, J = 8.5, H-2), 4.00 (H-3), 4.15 (H-4), 3.86 (H-5), 1.49 (3H, J = d, CH_3-6)

α-L-Rhap: 6.37 (d, J = 1.5, H-1), 4.79 (H-2), 4.66 (dd, J = 9.0, 3.0, H-3), 4.28 (t, J = 9.0, H-4), 4.43 (m, H-5), 1.65 (d, J = 6.0, CH_3-6)

β-D-Apif: 6.14 (d, J = 2.5, H-1), 4.79 (d, J = 2.5, H-2), 4.29, 4.70 (d, J = 9.5, H_2-4), 4.16, 4.16 (H_2-5)

β-D-Xylp: 4.93 (d, J = 7.5, H-1), 4.02 (H-2), 4.02 (H-3), 4.04 (H-4), 3.40 (t, 11.0, H-5), 4.18 (H-5) [1]

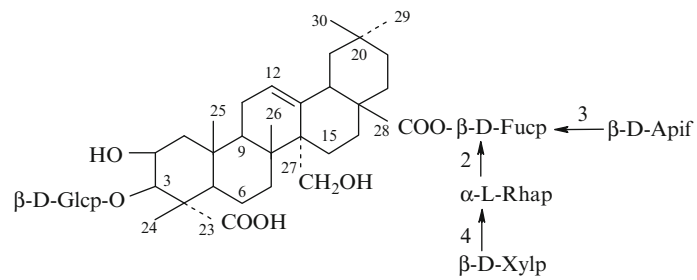
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	24.1	Glc-1	105.3	Rha-4	85.3
2	70.3	17	46.9	2	75.3	5	68.3
3	86.0	18	42.0	3	78.4	6	18.8
4	52.9	19	45.3	4	71.6	Xyl-1	107.3
5	52.5	20	30.8	5	78.4	2	76.7
6	21.4	21	33.8	6	62.8	3	75.4
7	33.6	22	32.4	Fuc-1	94.8	4	69.3
8	41.2	23	180.8	2	74.3	5	67.0
9	49.3	24	14.2	3	85.2	Api -1	111.2
10	37.0	25	17.5	4	72.5	2	77.8
11	23.5	26	18.6	5	73.2	3	80.4
12	122.9	27	64.5	6	16.9	4	75.2
13	144.1	28	176.7	Rha-1	101.3	5	65.5
14	48.0	29	33.1	2	71.8		
15	24.5	30	24.1	3	72.4		

References

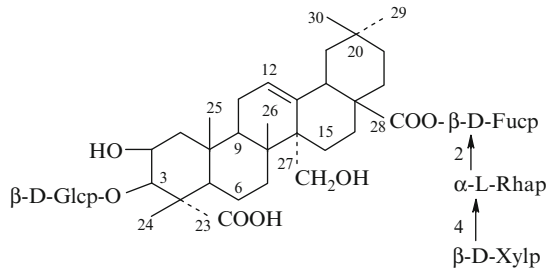
1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(1), 173 (1996)



Polygalasaponin XXIV

Polygalasaponin XXVIII

CAS Registry Number: 176182-01-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala japonica* [1]

$C_{53}H_{84}O_{24}$: 1104.535

$[\alpha]_D^{30}$ −1.0° (c 0.52, MeOH) [1]

FAB-MS *m/z*: 1103.5275 $(M-H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.71 (m, H-2), 4.60 (d, J = 3.0, H-3), 5.79 (t-like, H-12), 3.22 (dd, J = 14.0, 4.0, H-18), 1.95 (s, CH_3-24), 1.57 (s, CH_3-25), 1.13 (s, CH_3-26), 3.79 (d, 12.0, H-27), 4.05 (d, 12.0, H-27), 0.79 (s, CH_3-29), 0.94 (s, CH_3-30)

β-D-Glcp: 5.06 (d, J = 8.0, H-1), 3.92 (H-2), 4.15 (H-3), 4.16 (H-4), 3.91 (H-5), 4.26 (dd, J = 12.0, 5.0, H-6), 4.45 (dd, J = 12.0, 2.0, H-6)

β-D-Fucp: 6.06 (d, J = 8.0, H-1), 4.64 (t, J = 8.5, H-2), 4.18 (H-3), 3.95 (H-4), 3.90 (H-5), 1.50 (3H, d, J = 6.0, CH_3-6)

α-L-Rhap: 6.40 (brs, H-1), 4.79 (brs, H-2), 4.69 (H-3), 4.31 (t, J = 9.5, H-4), 4.46 (H-5), 1.67 (d, J = 6.0, CH_3-6)

β-D-Xylp: 5.40 (d, J = 7.0, H-1), 4.02 (H-2), 4.02 (H-3), 4.14 (H-4), 3.50 (t, J = 11.0, H-5), 4.23 (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-16	24.1	Glc-1	105.4	Rha-1	101.2
2	70.3	17	46.9	2	75.3	2	71.8
3	86.0	18	42.0	3	78.4	3	72.5
4	52.9	19	45.4	4	71.6	4	85.1
5	52.5	20	30.8	5	78.4	5	68.3
6	21.4	21	33.8	6	62.7	6	18.6
7	33.6	22	32.4	Fuc-1	94.8	Xyl-1	107.4
8	41.2	23	180.8	2	74.0	2	76.2
9	49.4	24	14.2	3	76.7	3	78.8
10	37.1	25	17.5	4	73.2	4	70.9
11	23.6	26	18.8	5	72.5	5	67.5
12	127.9	27	64.5	6	16.9		
13	138.9	28	176.7				
14	48.0	29	33.1				
15	24.6	30	24.1				

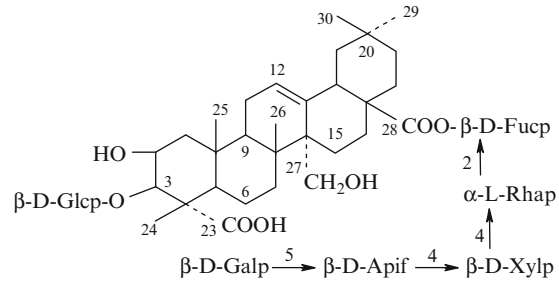
(*continued*)

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(4), 810 (1996)

Polygalasaponin XXIX

CAS Registry Number: 176182-02-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala japonica* [1]

$C_{64}H_{102}O_{33}$: 1398.630

$[\alpha]_D^{25}$ −11.2° (c 2.82, MeOH) [1]

FAB-MS (positive ion) *m/z*: 1422 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.71 (m, H-2), 4.58 (d, J = 3.0, H-3), 5.80 (t-like, H-12), 3.22 (dd, J = 14.0, 4.0, H-18), 1.94 (s, CH_3-24), 1.53 (s, CH_3-25), 1.12 (s, CH_3-26), 3.78 (d, J = 12.0, H-27), 4.06 (d, J = 12.0, H-27), 0.79 (s, CH_3-29), 0.92 (s, CH_3-30)

β-D-Glcp: 5.03 (d, J = 8.0, H-1), 3.90 (H-2), 4.14 (H-3), 4.14 (H-4), 3.91 (H-5), 4.27 (H-6), 4.47 (dd, J = 12.0, 2.0, H-6)

β-D-Fucp: 6.05 (d, J = 8.0, H-1), 4.62 (t, J = 8.5, H-2), 4.14 (H-3), 3.94 (H-4), 3.89 (H-5), 1.48 (d, J = 6.0, CH_3-6)
α-L-Rhap: 6.34 (brs, H-1), 4.78 (brs, H-2), 4.64 (dd, J = 9.5, 3.0, H-3), 4.21 (t, J = 9.5, H-4), 4.42 (H-5), 1.62 (d, J = 6.0, CH_3-6)
β-D-Xylp: 4.85 (d, J = 7.5, H-1), 4.03 (H-2), 4.03 (H-3), 4.26 (t, J = 8.5, H-4), 3.33 (t, J = 11.0, H-5), 4.34 (H-5)
β-D-Apif: 6.34 (brs, H-1), 4.39 (brs, H-2), 4.17 (H-3), 5.03 (d, J = 9.5, H-4), 4.18 (d, J = 12.0, H-5), 4.63 (d, J = 12.0, H-5)
β-D-Galp: 4.82 (d, J = 8.0, H-1), 4.38 (H-2), 4.36 (H-3), 4.48 (d, J = 3.0, H-4), 4.00 (H-5), 4.36 (dd, J = 12.0, 5.0, H-6), 4.42 (dd, J = 12.0, 2.0, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

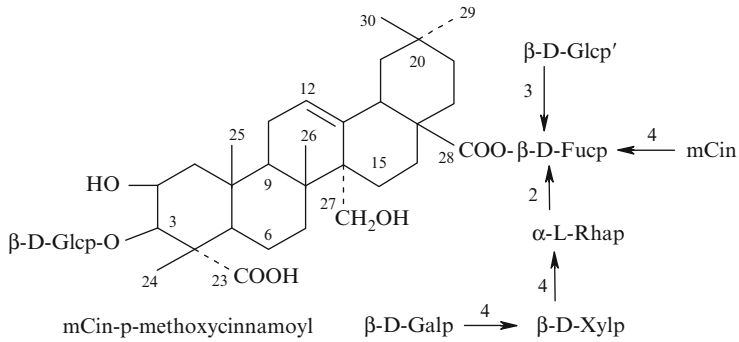
C-1	44.2	C-18	42.0	Glc-1	105.4	Rha-1	101.4
2	70.3	19	45.3	2	75.3	2	71.9
3	86.1	20	30.8	3	78.3	3	72.4
4	52.9	21	33.9	4	71.6	4	85.1
5	52.5	22	32.4	5	78.3	5	68.3
6	21.4	23	180.8	6	62.8	6	18.8
7	33.6	24	14.2	Fuc-1	94.8	Api-1	109.6
8	41.2	25	17.5	2	74.5	2	77.8
9	49.3	26	18.5	3	76.6	3	81.2
10	37.0	27	64.5	4	73.2	4	76.1
11	23.5	28	176.7	5	72.4	5	67.5
12	127.9	29	33.1	6	16.9	Gal-1	103.1
13	138.9	30	24.0	Xyl-1	107.2	2	72.3
14	48.1			2	75.2	3	73.3
15	24.5			3	76.8	4	70.1
16	24.0			4	78.1	5	77.0
17	46.9			5	64.7	6	62.1

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(4), 810 (1996)

Polygalasaponin XXX

CAS Registry Number: 176182-03-9
See Figure Polygalasaponin XXX
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin
Biological sources: *Polygala japonica* [1]
$C_{75}H_{112}O_{36}$: 1588.693
$[\alpha]_D^{30}$ −1.1° (c 0.46, MeOH) [1]
UV λ_{max} nm (log ε): 225 (4.08), 299 (4.23), 311 (4.29) [1]
FAB-MS (positive ion mode) *m/z*: 1612 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.70 (m, H-2), 4.59 (d, J = 3.0, H-3), 5.84 (t-like, H-12), 3.23 (dd, J = 14.0, 4.0, H-18), 1.95 (s, CH_3-24), 1.52 (s, CH_3-25), 1.14 (s, CH_3-26), 3.82 (d, J = 12.0, H-27), 4.06 (d, J = 12.0, H-27), 0.80 (s, CH_3-29), 0.93 (s, CH_3-30); β-D-Glcp: 5.03 (d, J = 8.0, H-1), 3.91 (H-2), 4.14 (H-3), 4.15 (H-4), 3.92 (H-5), 4.29 (H-6), 4.45 (H-6); β-D-Fucp: 6.16 (d, J = 8.0, H-1), 4.77 (1H, t, J = 8.5, H-2), 4.50 (H-3), 6.07 (d, J = 3.0, H-4), 4.10 (H-5), 1.28 (3H, J = d, 6.0, CH_3-6); α-L-Rhap: 6.44 (1H, brs, H-1), 4.83 (brs, H-2), 4.65 (dd, J = 9.5, 3.0, H-3), 4.26 (t, J = 9.5, H-4), 4.49 (H-5),



Polygalasaponin XXX

1.75 (d, J = 6.0, CH_3-6); β-D-Glcp′: 5.10 (d, J = 8.0, H-1), 3.94 (t, J = 8.5, H-2), 4.11 (H-3), 4.12 (H-4), 3.90 (H-5), 4.28 (H-6), 4.45 (H-6); β-D-Xylp: 4.97 (d, J = 7.5, H-1), 4.02 (H-2), 4.03 (H-3), 4.28 (H-4), 3.45 (t, J = 11.0, H-5), 4.28 (H-5); β-D-Galp: 4.95 (d, J = 8.0, H-1), 4.45 (H-2), 4.10 (H-3), 4.47 (d, J = 3.0, H-4), 4.08 (H-5), 4.35 (dd, J = 12.0, 5.0, H-6), 4.42 (H-6); Cinn: 7.38 (d, J = 8.5, H-2), 6.96 (d, J = 8.5, H-3), 6.96 (d, J = 8.5, H-5), 7.38 (d, J = 8.5, H-6), 7.89 (d, J = 16.0, H-7), 6.52 (d, J = 16.0, H-8); OMe: 3.67 (3H, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

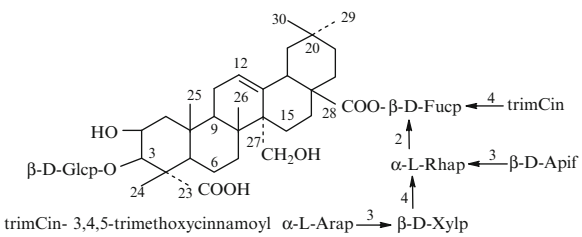
Table 1

C-1	44.3	C-13	138.9	C-24	14.2	Glc-1	105.4	Rha-1	101.6
2	70.3	14	48.0	25	17.5	2	75.3	2	71.9
3	86.0	15	24.5	26	18.8	3	78.3	3	72.3
4	52.9	16	24.0	27	64.4	4	71.6	4	84.9
5	52.5	17	47.1	28	176.7	5	78.3	5	68.5
6	21.6	18	42.1	29	33.0	6	62.7	6	18.8
7	33.6	19	45.4	30	24.0	Fuc-1	94.6	Glc′-1	105.8
8	41.2	20	30.8	Cinn-1	127.4	2	73.3	2	75.1
9	49.3	21	33.9	2	130.5	3	83.3	3	78.3
10	37.0	22	32.4	3	114.8	4	74.3	4	71.2
11	23.6	23	180.8	4	162.1	5	70.8	5	78.3
12	127.8			5	114.8	6	16.7	6	62.8
				6	130.5	Xyl-1	106.9	Gal-1	104.5
				7	145.8	2	75.6	2	71.7
				8	116.0	3	76.6	3	75.0
				9	167.9	4	78.2	4	70.1
				OMe	55.4	5	65.0	5	77.3
								6	62.2

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(4), 810 (1996)

Polygalasaponin XXXI (Onjisaponin F)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala japonica* [1], *P. tenuifolia* [2]

$C_{75}H_{112}O_{36}$: 1588.693

$[\alpha]_D^{30}$ −12.0° (c 0.25, MeOH) [1]

UV λ_{max} nm (log ε): 229 (4.15), 308 (4.12) [1]

IR (KBr) ν_{max} cm^{-1}: 3500–3300, 1750, 1730, 1710, 1635, 1580, 1500 [2]

FAB-MS *m/z*: 1587.6895 $(M-H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.68 (m, H-2), 4.61 (d, J = 3.0, H-3), 5.78 (t-like, H-12), 3.23 (dd, 14.0, 4.0, H-18), 1.97 (s, CH_3-24), 1.55 (s, CH_3-25), 1.10 (s, CH_3-26), 3.80 (H-27), 4.06 (d, J = 12.0, H-27), 0.80 (s, CH_3-29), 0.93 (s, CH_3-30);

β-D-Glcp: 5.05 (d, J = 8.0, H-1), 3.92 (H-2), 4.15 (H-3), 4.16 (H-4), 3.89 (H-5), 4.29 (dd, J = 12.0, 5.0, H-6), 4.45 (H-6); β-D-Fucp: 6.14 (d, J = 8.0, H-1), 4.69 (t, J = 8.5, H-2), 4.49 (H-3), 5.76 (d, J = 3.0, H-4), 4.18 (H-5), 1.39 (3H, d, J = 6.0, CH_3-6); α-L-Rhap: 6.29 (brs, H-1), 5.01 (brs, H-2), 4.59 (dd, J = 9.5, 3.0, H-3), 4.50 (H-4), 4.50 (H-5), 1.75 (d, J = 6.0, CH_3-6); β-D-Xylp: 5.30 (d, J = 7.5, H-1), 3.98 (t, J = 8.5, H-2), 4.13 (t, J = 9.5, H-3), 4.04 (H-4), 3.42 (t, J = 11.0, H-5), 4.19 (H-5); β-D-Apif: 6.01 (d, J = 4.0, H-1), 4.80 (t, J = 4.0, H-2), 4.18 (H-3), 4.52 (H-4), 4.05 (H-5), 4.05 (H-5); α-D-Arap: 5.15 (d, J = 7.0, H-1), 4.47 (H-2), 4.06 (H-3), 4.20 (H-4), 3.61 (brd, J = 12.0, H-5), 4.22 (H-5);

Cinn: 6.85 (s, H-2), 6.85 (s, H-6), 7.95 (d, J = 16.0, H-7), 6.62 (d, J = 16.0, H-8); OMe: 3.81 (6H, s), 3.90 (3H, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	24.0	Cinn-1	130.4	4	71.6	Rha-1	102.3
2	70.3	17	47.0	2	106.5	5	78.3	2	71.7
3	85.8	18	42.0	3	141.2	6	62.7	3	82.3
4	52.9	19	45.4	4	154.1	Fuc-1	94.6	4	78.5
5	52.7	20	30.8	5	141.2	2	75.8	5	68.4
6	21.2	21	33.7	6	106.5	3	74.2	6	18.9
7	33.9	22	32.4	7	145.9	4	74.6	Api-1	111.8
8	41.2	23	180.8	8	117.8	5	70.8	2	78.1
9	49.3	24	14.3	9	167.6	6	16.7	3	79.7
10	37.0	25	17.5	OMe	56.4	Xyl-1	104.8	4	74.2

(*continued*)

Table 1 (continued)

11	23.6	26	19.0		56.4	2	75.0	5	64.8
12	127.9	27	64.5		60.7	3	86.3	Ara-1	105.6
13	139.0	28	176.6	Glc-1	105.4	4	69.3	2	72.7
14	48.0	29	33.1	2	75.3	5	66.6	3	74.8
15	24.5	30	24.0	3	78.3			4	69.2
								5	67.2

Pharm./Biol.: Exhibited a prolongation effect on hexabarbital sleeping time [3]

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(4), 810 (1996)
2. S. Sakuma, I. Shoji, Chem. Pharm. Bull. **29**(9), 2431 (1981)
3. T. Nikaido, T. Ohmoto, H. Saitoh, U. Sankawa, S. Sakuma, J. Shoji, Chem. Pharm. Bull. **30**(6), 2020 (1982)

Polygalasaponin XXXII

CAS Registry Number: 176182-04-0

See Figure Polygalasaponin XXXII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala japonica* [1]

$C_{79}H_{118}O_{38}$: 1674.730

$[\alpha]_D^{26}$ −6.6° (c 0.48, MeOH) [1]

UV λ_{max} nm (log ε): 227 (4.08), 299 (4.24), 311 (4.30) [1]

FAB-MS (positive ion mode) *m/z*: 1698 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.66 (m, H-2), 4.59 (d, J = 3.0, H-3), 5.88 (t-like, H-12), 3.26 (dd, J = 14.0, 4.0, H-18), 1.94 (s, CH_3-24), 1.57 (s, CH_3-25), 1.14 (s, CH_3-26), 3.83 (d, 12.0, H-27), 4.06 (H-27), 0.80 (s, CH_3-29), 1.04 (s, CH_3-30);

β-D-Glcp: 5.04 (d, J = 8.0, H-1), 3.89 (H-2), 4.15 (H-3), 4.16 (H-4), 3.89 (H-5), 4.28 (H-6), 4.45 (H-6); β-D-Fucp: 6.08 (d, J = 8.0, H-1), 4.64 (t, J = 8.5, H-2), 4.44 (H-3), 5.87 (d, J = 3.5, H-4), 4.15 (H-5), 1.33 (J = d, 6.0, CH_3-6); α-L-Rhap: 5.81 (brs, H-1), 4.77 (brs, H-2), 4.41 (H-3), 4.44 (H-4), 4.28 (H-5), 1.68 (d, J = 6.0, CH_3-6); α-L-Rhap′: 5.56 (brs, H-1), 4.78 (H-2), 4.41 (H-3), 4.29 (H-4), 4.48 (H-5), 1.75 (d, J = 6.0, CH_3-6);

β-D-Xylp: 5.26 (d, J = 7.5, H-1), 3.99 (H-2), 4.14 (H-3), 4.04 (H-4), 3.41 (t, J = 11.0, H-5), 4.20 (H-5); β-D-Apif: 6.09 (d, J = 3.0, H-1), 4.79 (H-2), 4.30 (H-3), 4.49 (H-4), 4.03 (H-5), 4.03 (H-5); α-D-Arap: 5.16 (d, J = 7.0, H-1), 4.46 (H-2), 4.07 (H-3), 4.22 (H-4), 3.62 (brd, J = 12.0, H-5), 4.24 (H-5);

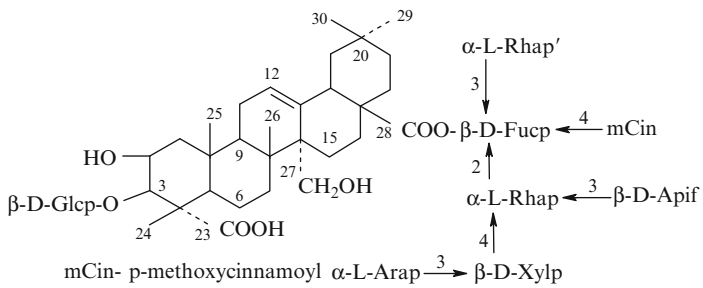
Cinn: 7.41 (d, J = 8.5, H-2), 6.98 (d, J = 8.5, H-3), 6.98 (d, J = 8.5, H-5), 7.41 (d, J = 8.5, H-6), 7.94 (d, J = 16.0, H-7), 6.56 (d, J = 16.0, H-8); OMe: 3.64 (3H, s) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	24.1	Cinn-1	127.5	Fuc-1	95.0	5	70.9
2	70.3	17	47.0	2	130.5	2	76.8	6	18.7
3	86.1	18	42.1	3	114.8	3	79.9	Xyl-1	104.8
4	52.9	19	45.6	4	162.0	4	73.4	2	74.6
5	52.5	20	30.9	5	114.8	5	70.8	3	85.9
6	21.2	21	34.0	6	130.5	6	16.9	4	69.3
7	34.0	22	32.2	7	145.6	Rha-1	102.2	5	66.5
8	41.2	23	180.8	8	115.8	2	71.7	Api-1	111.9
9	49.3	24	14.3	9	167.2	3	82.6	2	77.8

(*continued*)



Polygalasaponin XXXII

Table 1 (continued)

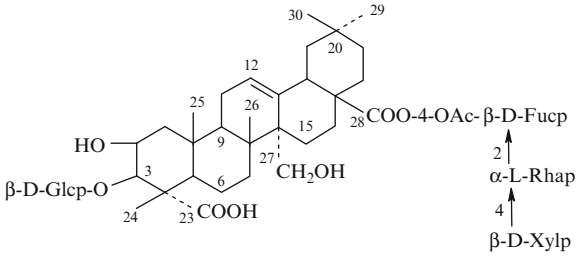
10	37.1	25	17.6	OMe	55.4	4	78.1	3	80.0
11	23.6	26	19.2	Glc-1	105.4	5	68.8	4	74.4
12	127.8	27	64.5	2	75.3	6	18.7	5	64.3
13	139.0	28	176.5	3	78.3	Rha′-1	104.9	Ara-1	105.5
14	48.0	29	33.1	4	71.6	2	72.2	2	72.5
15	24.6	30	24.1	5	78.3	3	72.8	3	74.3
				6	62.8	4	73.7	4	69.2
								5	67.1

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(4), 810 (1996)

Polygalasaponin XXXIII

CAS Registry Number: 184479-26-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala fallax* [1]

$C_{55}H_{86}O_{25}$: 1146.545

$[\alpha]_D^{25}$ −4.9° (c 0.44, MeOH) [1]

FAB-MS *m*/*z*: 1170 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.72 (m, H-2), 4.61 (d, J = 3.0, H-3), 5.82 (t-like, H-12), 3.23 (dd, J = 14.0, 4.0, H-18), 1.96 (s, CH_3-24), 1.57 (s, CH_3-25), 1.13, 0.79, 0.95 (s, CH_3-26, 29, 30), 3.80, 4.06 (d, J = 12.0, H_2-27)

β-D-Glcp: 5.06 (d, J = 8.0, H-1), 3.92 (H-2), 4.15 (H-3), 4.15 (H-4), 3.92 (m, H-5), 4.29 (dd, J = 12.5, H-6), 4.46 (dd, J = 12, 2, H-6)

β-D-Fucp: 6.10 (d, J = 8.0, H-1), 4.58 (t, J = 8.5, H-2), 4.38 (dd, J = 9.5, 3.0, H-3), 5.53 (d, J = 3.0, H-4), 4.03 (H-5), 1.27 (d, J = 6.0, CH_3-6), 1.96 (CH_3CO)

α-L-Rhap: 6.31 (d, J = 1, H-1), 4.79 (m, H-2), 4.68 (dd, J = 9.5, 3, H-3), 4.34 (t, J = 9.5, H-4), 4.52 (H-5), 1.80 (d, J = 6.0, CH_3-6)

β-D-Xylp: 5.06 (d, J = 8.0, H-1), 4.04 (H-2), 4.04 (H-3), 4.14 (H-4), 3.52 (t, J = 11.0, H-5), 4.24 (dd, J = 11.5, H-5)

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

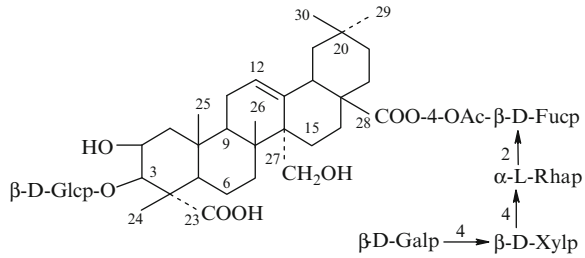
C-1	44.3	C-16	24.0	Glc-1	105.4	Rha-1	101.8
2	70.4	17	47.0	2	75.3	2	71.8
3	86.0	18	42.0	3	78.4	3	72.5
4	52.9	19	45.4	4	71.7	4	85.0
5	52.5	20	30.8	5	78.4	5	68.6
6	21.4	21	33.8	6	62.8	6	18.7
7	33.6	22	32.4	Fuc-1	94.6	Xyl-1	107.4
8	41.2	23	180.8	2	74.1	2	76.3
9	49.3	24	14.3	3	74.4	3	78.8
10	37.1	25	17.5	4	74.8	4	71.0
11	23.7	26	18.9	5	70.6	5	67.5
12	127.9	27	64.5	6	16.5		
13	138.9	28	176.7	Ac-1	171.1		
14	48.0	29	33.1	2	20.8		
15	24.5	30	24.1				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Polygalasaponin XXXIV

CAS Registry Number: 184479-27-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides

of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala fallax* [1]

$C_{61}H_{96}O_{30}$: 1308.598

$[\alpha]_D^{25}$ + 1.6° (c 0.64, MeOH) [1]

FAB-MS *m/z*: 1332 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.72 (m, H-2), 4.60 (d, J = 3.0, H-3), 5.83 (t-like, H-12), 3.24 (dd, J = 14.0, 4.0, H-18), 1.97, 1.53, 1.13 (s, CH_3-24, 25, 26), 3.81, 4.06 (d, J = 12.0, H_2-27), 1.13, 0.79, 0.94 (s, CH_3-29, 30)

β-D-Glcp: 5.05 (d, J = 8.0, H-1), 3.91 (H-2), 4.15 (H-3), 4.15 (H-4), 3.91 (m, H-5), 4.29, 4.47 (H_2-6)

β-D-Fucp: 6.09 (d, J = 8.0, H-1), 4.56 (t, J = 8.5, H-2), 4.35 (dd, J = 9.5, 3.0, H-3), 5.52 (d, J = 3.0, H-4), 4.02 (d, J = 6, H-5), 1.26 (d, J = 6.0, CH_3-6), 1.97 (CH_3CO)

α-L-Rhap: 6.27 (brs, H-1), 4.79 (brs, H-2), 4.66 (dd, J = 9.5, 3, H-3), 4.27 (t, J = 9.5, H-4), 4.48 (H-5), 1.74 (d, J = 6.0, CH_3-6)

β-D-Xylp: 4.99 (d, J = 7.5, H-1), 4.01 (H-2), 4.05 (H-3), 4.28 (H-4), 3.46 (t, J = 11.0, H-5), 4.28 (H-5)

β-D-Galp: 4.94 (d, J = 8.0, H-1), 4.44 (H-2), 4.13 (H-3), 4.47 (H-4), 4.12 (m, H-5), 4.30, 4.42 (H_2-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-16	24.0	Glc-1	105.4	Rha-1	101.8
2	70.4	17	47.0	2	75.3	2	71.8
3	86.0	18	42.0	3	78.3	3	72.5
4	52.5	19	45.4	4	71.7	4	85.2
5	52.5	20	30.8	5	78.3	5	68.5
6	21.5	21	33.9	6	62.8	6	18.8
7	33.6	22	32.4	Fuc-1	94.6	Xyl-1	107.0
8	41.2	23	180.8	2	74.1	2	75.7
9	49.4	24	14.2	3	74.7	3	76.7
10	37.0	25	17.5	4	74.8	4	78.3
11	23.7	26	18.7	5	70.6	5	65.0
12	127.9	27	64.5	6	16.5	Gal-1	104.5
13	139.0	28	176.7	Ac-1	171.1	2	71.8
14	48.1	29	33.1	2	20.7	3	75.1
15	24.5	30	24.0			4	70.1
						5	77.3
						6	62.3

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Polygalasaponin XXXV

CAS Registry Number: 184479-28-5

See Figure Polygalasaponin XXXV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala fallax* [1]

$C_{63}H_{98}O_{31}$: 1350.609

$[\alpha]_D^{25}$ −2.1° (c 0.74, MeOH) [1]

FAB-MS *m/z*: 1374 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.72 (m, H-2), 4.61 (d, J = 3.0, H-3), 5.81 (t-like, H-12), 3.21 (dd, J = 14.0, 4.0, H-18), 1.97, 1.55, 1.12 (s, CH_3-24, 25, 26), 3.81, 4.06 (d, J = 12.0, H_2-27), 0.80, 0.95 (s, CH_3-29, 30)

β-D-Glcp: 5.05 (d, J = 8.0, H-1), 3.91 (t, J = 8.5, H-2), 4.15 (H-3), 4.13 (H-4), 3.91 (m, H-5), 4.29, 4.46 (H_2-6)

β-D-Fucp: 6.16 (d, J = 8.0, H-1), 4.56 (t, J = 8.5, H-2), 5.56 (dd, J = 9.5, 3.0, H-3), 5.58 (H-4), 4.11 (H-5), 1.19 (d, J = 6.0, CH_3-6), 2.05 (CH_3CO), 2.05 (CH_3CO)

α-L-Rhap: 5.67 (brs, H-1), 4.53 (brs, H-2), 4.46 (H-3), 4.22 (t, J = 9.5, H-4), 4.31 (H-5), 1.69 (d, J = 6.0, CH_3-6)

β-D-Xylp: 4.97 (d, J = 7.5, H-1), 3.98 (t, J = 8.0, H-2), 4.06 (H-3), 4.27 (H-4), 3.45 (t, J = 11.0, H-5), 4.28 (H-5)

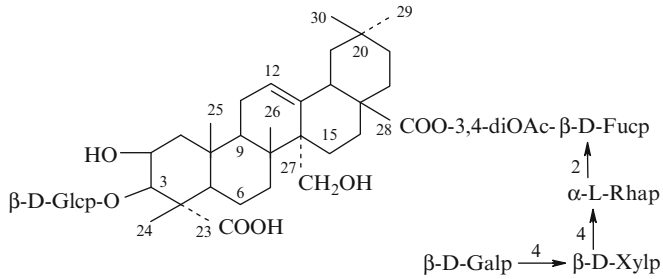
β-D-Galp: 4.94 (d, J = 8.0, H-1), 4.45 (H-2), 4.10 (H-3), 4.47 (d, J = 3.0, H-4), 4.11 (H-5), 4.34, 4.41 (H_2-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

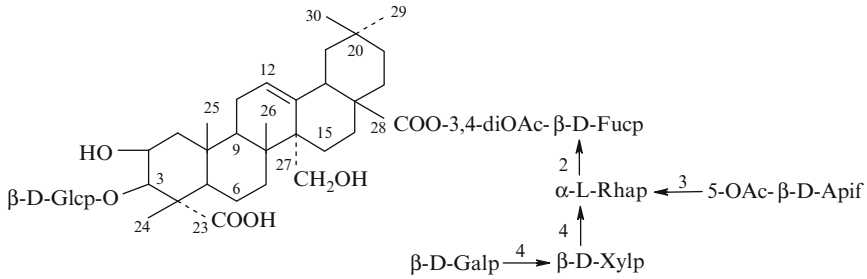
Table 1

C-1	44.3	C-16	23.9	Glc-1	105.4	Rha-1	102.1
2	70.4	17	47.1	2	75.3	2	71.4
3	86.0	18	41.9	3	78.3	3	72.4
4	52.9	19	45.4	4	71.7	4	84.7
5	52.5	20	30.8	5	78.3	5	69.0
6	21.5	21	33.9	6	62.8	6	18.8
7	33.5	22	32.4	Fuc-1	94.2	Xyl-1	106.8
8	41.2	23	180.7	2	73.0	2	75.6
9	49.3	24	14.2	3	74.6	3	76.6
10	37.0	25	17.5	4	71.2	4	78.2

(*continued*)



Polygalasaponin XXXV



Polygalasaponin XXXVI

Table 1 (continued)

11	23.7	26	18.6	5	70.1	5	65.0
12	127.8	27	64.4	6	16.1	Gal-1	104.5
13	138.9	28	176.4	Ac-1	170.1	2	71.8
14	48.0	29	33.0	2	20.6	3	75.1
15	24.5	30	23.9	Ac-1	170.8	4	70.0
				2	20.4	5	77.3
						6	62.3

References

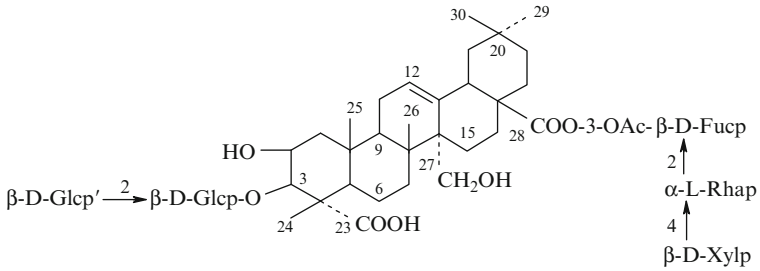
1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Polygalasaponin XXXVI

CAS Registry Number: 184479-29-6
See Figure Polygalasaponin XXXVI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala fallax* [1]
$C_{70}H_{108}O_{36}$: 1524.662
$[\alpha]_D^{25}$ −12.1° (c 0.40, MeOH) [1]
HR-FAB-MS *m/z*: 1547.6549 ($C_{70}H_{108}NaO_{36}$:1547.6511) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.73 (m, H-2), 4.63 (d, J = 3.0, H-3), 5.79 (t-like, H-12), 3.22 (dd, J = 14.0, 4.0, H-18), 2.00, 1.60, 1.10 (s, CH_3-24, 25, 26), 3.82, 4.06 (d, J = 12.0, H_2-27), 0.80, 1.00 (s, CH_3-29, 30);
β-D-Glcp: 5.07 (d, J = 8.0, H-1), 3.92 (t, J = 8.5, H-2), 4.15 (H-3), 4.16 (H-4), 3.93 (m, H-5), 4.29, 4.47 (H_2-6); β-D-Fucp: 6.16 (d, J = 8.0, H-1), 4.53 (t, J = 8.5, H-2), 5.56 (dd, J = 9.5, 3.0, H-3), 5.61 (d, J = 3.0, H-4), 4.13 (H-5), 1.22 (d, J = 6.0, CH_3-6), 2.11 (CH_3CO), 2.07 (CH_3CO); α-L-Rhap: 5.64 (d, J = 1.5, H-1), 4.64 (H-2), 4.37 (H-3), 4.38 (H-4), 4.27 (H-5), 1.65 (d, J = 6.0, CH_3-6); β-D-Xylp: 5.23 (d, J = 8.0, H-1), 3.90 (t, J = 8.5, H-2), 4.10 (H-3), 4.24 (H-4), 3.45 (t, J = 11.0, H-5), 4.24 (H-5); β-D-Apif: 5.98 (d, J = 4.0, H-1), 4.44 (d, J = 4.0, H-2), 4.17 (H-3), 4.29 (H-4), 4.44 (d, J = 11.0, H-5), 4.54 (d, J = 11.0, H-5), 1.89 (CH_3CO); β-D-Galp: 4.93 (d, J = 8.0, H-1), 4.47 (H-2), 4.12 (H-3), 4.49 (H-4), 4.11 (H-5), 4.37, 4.43 (H_2-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]



Polygalasaponin XXXVII

Table 1

C-1	44.3	C-16	23.9	Glc-1	105.4	5	69.1
2	70.3	17	47.0	2	75.3	6	18.8
3	86.0	18	41.9	3	78.4	Xyl-1	104.8
4	52.9	19	45.4	4	71.6	2	75.0
5	52.5	20	30.8	5	78.4	3	76.5
6	21.3	21	33.9	6	62.8	4	78.5
7	33.7	22	32.3	Fuc-1	94.3	5	64.8
8	41.2	23	180.8	2	74.5	Api-1	111.3
9	49.3	24	14.3	3	74.1	2	78.1
10	37.0	25	17.5	4	71.2	3	77.4
11	23.6	26	19.0	5	70.2	4	74.3
12	127.8	27	64.5	6	16.1	5	67.0
13	138.8	28	176.4	Ac-1	170.1	Ac-1	170.7
14	47.9	29	33.1	2	20.6	2	20.6
15	24.5	30	24.1	Ac-1	170.8	Gal-1	104.4
				2	20.4	2	71.7
				Rha-1	102.3	3	75.0
				2	71.5	4	70.0
				3	81.8	5	77.6
				4	78.1	6	62.3

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Polygalasaponin XXXVII

CAS Registry Number: 184479-32-1

See Figure Polygalasaponin XXXVII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala fallax* [1]

$C_{61}H_{96}O_{30}$: 1308.598

$[\alpha]_D^{25}$ + 19.2° (c 0.46, MeOH) [1]

FAB-MS *m/z*: 1332 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.70 (m, H-2), 4.60 (d, J = 3.0, H-3), 5.81 (t-like, H-12), 3.21 (dd, J = 14.0, 4.0, H-18), 1.98 (s, CH_3-24), 1.55 (s, CH_3-25), 1.12, 0.79, 0.94 (s, CH_3-26, 29, 30), 3.76, 4.01 (d, J = 12.0, H_2-27)

β-D-Glcp: 5.09 (d, J = 8.0, H-1), 4.00 (H-2), 4.19 (t, J = 9.0, H-3), 4.10 (t, J = 9.0, H-4), 3.85 (m, H-5), 4.23 (dd, J = 12.5, H-6), 4.42 (dd, J = 12, 2, H-6)

β-D-Glcp′: 5.20 (d, J = 8.0, H-1), 3.96 (t, J = 8.5, H-2), 4.15 (t, J = 8.5, H-3), 4.08 (t, J = 8.5, H-4), 4.03 (H-5), 4.34 (dd, J = 12, 5, H-6), 4.61 (H-6)

β-D-Fucp: 6.14 (d, J = 8.0, H-1), 4.80 (dd, J = 9.5, 8.0, H-2), 5.40 (dd, J = 9.5, 3.0, H-3), 4.26 (d, J = 3.0, H-4), 3.96 (H-5), 1.44 (d, J = 6.0, CH_3-6), 1.99 (CH_3CO)

α-L-Rhap: 5.73 (d, J = 1.5, H-1), 4.60 (H-2), 4.53 (dd, J = 9.5, 3.0, H-3), 4.29 (t, J = 9.5, H-4), 4.37 (H-5), 1.70 (d, J = 6.0, CH_3-6)

β-D-Xylp: 5.05 (d, J = 7.5, H-1), 4.02 (H-2), 4.01 (H-3), 4.17 (H-4), 3.51 (t, J = 11.0, H-5), 4.22 (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.1	C-16	24.1	Glc-1	102.8	4	69.8
2	70.2	17	47.0	2	83.9	5	72.1
3	85.5	18	41.9	3	78.1	6	16.7
4	52.7	19	45.4	4	71.1	Ac-1	170.4
5	52.5	20	30.8	5	78.3	2	20.9
6	21.2	21	33.8	6	62.6	Rha-1	101.9
7	33.5	22	32.3	Glc′-1	106.2	2	71.5
8	41.1	23	180.4	2	76.9	3	72.4
9	49.4	24	14.2	3	77.9	4	84.7
10	37.0	25	17.5	4	71.2	5	68.9

(*continued*)

Table 1 (continued)

11	23.6	26	18.7	5	78.3	6	18.7
12	127.9	27	64.4	6	62.6	Xyl -1	107.2
13	138.8	28	176.4	Fuc-1	94.6	2	76.1
14	48.0	29	33.1	2	72.6	3	78.7
15	24.5	30	24.0	3	78.1	4	70.9
						5	67.5

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Polygalasaponin XXXVIII

CAS Registry Number: 184479-43-4

See Figure Polygalasaponin XXXVIII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala fallax* [1]

$C_{67}H_{106}O_{35}$: 1470.651

$[\alpha]_D^{25}$ + 3.7° (c 0.50, MeOH) [1]

FAB-MS *m/z*: 1494 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.69 (m, H-2), 4.60 (d, J = 3.0, H-3), 5.82 (t-like, H-12), 3.23 (dd, J = 14.0, 4.0, H-18), 1.97 (s, CH_3-24), 1.52 (s, CH_3-25), 1.11, 0.79, 0.94 (s, CH_3-26, 29, 30), 3.79, 4.01 (d, J = 12.0, H_2-27);

β-D-Glcp: 5.09 (d, J = 8.0, H-1), 4.05 (t, J = 8.5, H-2), 4.19 (t, J = 9.0, H-3), 4.10 (H-4), 3.85 (m, H-5), 4.24 (dd, J = 12, 5, H-6), 4.43 (H-6); β-D-Glcp′: 5.22 (d, J = 8.0, H-1), 3.99 (t, J = 8.5, H-2), 4.15 (t, J = 8.5, H-3), 4.07 (H-4), 4.07 (H-5), 4.35, 4.61 (H_2-6); β-D-Fucp: 6.09 (d, J = 8.0, H-1), 4.57 (t, J = 8.5, H-2), 4.38 (H-3), 5.22 (d, J = 3.0, H-4), 4.02 (H-5), 1.26 (t, J = 6.0, CH_3-6), 1.96 (CH_3CO); α-L-Rhap: 6.29 (d, J = 1.0, H-1), 4.77 (H-2), 4.66 (dd, J = 9.5, 3.0, H-3), 4.27 (t, J = 9.5, H-4), 4.49 (H-5), 1.73 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.99 (d, J = 7.5, H-1), 3.97 (t, J = 8.0, H-2), 4.06 (H-3), 4.23 (H-4), 3.45 (t, J = 11.0, H-5), 4.27 (H-5); β-D-Galp: 4.94 (d, J = 8.0, H-1), 4.45 (H-2), 4.15 (H-3), 4.48 (H-4), 4.12 (H-5), 4.36, 4.44 (H_2-6) [1]

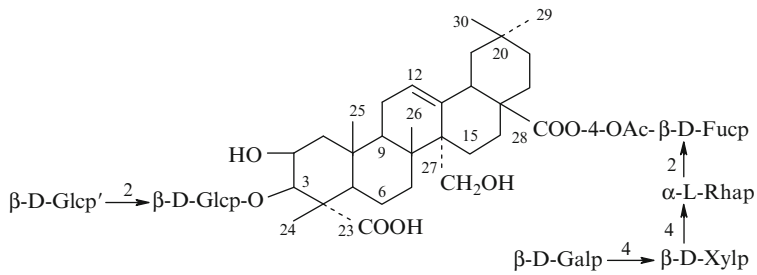
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.1	C-16	24.0	Glc-1	102.6	Rha-1	101.7
2	70.1	17	47.0	2	83.6	2	71.7
3	85.4	18	42.0	3	78.2	3	72.4
4	52.6	19	45.4	4	71.2	4	85.0
5	52.5	20	30.8	5	78.1	5	68.4
6	21.2	21	33.9	6	62.5	6	18.7
7	33.6	22	32.4	Glc′-1	106.1	Xyl-1	106.9
8	41.1	23	180.4	2	76.9	2	75.7
9	49.3	24	14.1	3	77.9	3	76.7
10	37.0	25	17.5	4	71.2	4	78.4
11	23.6	26	18.7	5	78.5	5	65.0
12	127.8	27	64.4	6	62.7	Gal-1	104.5
13	138.9	28	176.7	Fuc-1	94.6	2	71.8
14	48.0	29	33.0	2	74.3	3	75.0
15	24.5	30	24.0	3	74.0	4	70.2
				4	74.8	5	77.3
				5	70.6	6	62.3
				6	16.5		
				Ac-1	171.1		
				2	20.8		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)



Polygalasaponin XXXVIII

Polygalasaponin XXXIX

CAS Registry Number: 184479-50-3
See Figure Polygalasaponin XXXIX
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin
Biological sources: *Polygala fallax* [1]
$C_{67}H_{106}O_{34}$: 1454.656
$[\alpha]_D^{25}$ −0.8° (c 0.55, MeOH) [1]
FAB-MS *m/z*: 1478 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.71 (m, H-2), 4.60 (d, J = 3.0, H-3), 5.82 (t-like, H-12), 3.20 (dd, J = 14.0, 4.0, H-18), 1.98 (s, CH_3-24), 1.54 (s, CH_3-25), 1.10, 0.78, 0.96 (s, CH_3-26, 29, 30), 3.76, 4.01 (d, J = 12.0, H_2-27);
β-D-Glcp: 5.09 (d, J = 8.0, H-1), 4.02 (t, J = 8.5, H-2), 4.19 (t, J = 9.0, H-3), 4.10 (H-4), 3.85 (m, H-5), 4.23 (H-6), 4.43 (dd, J = 12, 2, H-6); β-D-Glcp′: 5.20 (d, J = 8.0, H-1), 3.97 (t, J = 8.5, H-2), 4.15 (H-3), 4.07 (H-4), 4.03 (H-5), 4.34 (dd, J = 12, 5, H-6), 4.61 (dd, J = 12, 2, H-6); β-D-Fucp: 6.06 (d, J = 8.0, H-1), 4.54 (t, J = 8.5, H-2), 4.41 (dd, J = 9.5, 3.0, H-3), 5.66 (d, J = 3.0, H-4), 4.04 (H-5), 1.24 (d, J = 6.0, CH_3-6), 1.94 (CH_3CO); α-L-Rhap: 5.89 (brs, H-1), 4.64 (brs, H-2), 4.57 (dd, J = 9.5, 3.0, H-3), 4.28 (t, J = 9.5, H-4), 4.37 (H-5), 1.74 (d, J = 6.0, CH_3-6); α-L-Rhap′: 5.64 (brs, H-1), 4.81 (brs, H-2), 4.41 (dd, J = 9.0, 3.0, H-3), 4.26 (t, J = 9.0, H-4), 4.29 (H-5), 1.69 (d, J = 6.0, CH_3-6); β-D-Xylp: 5.04 (d, J = 7.0, H-1), 4.03 (H-2), 4.02 (H-3), 4.16 (H-4), 3.51 (t, J = 11.0, H-5), 4.23 (H-5) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

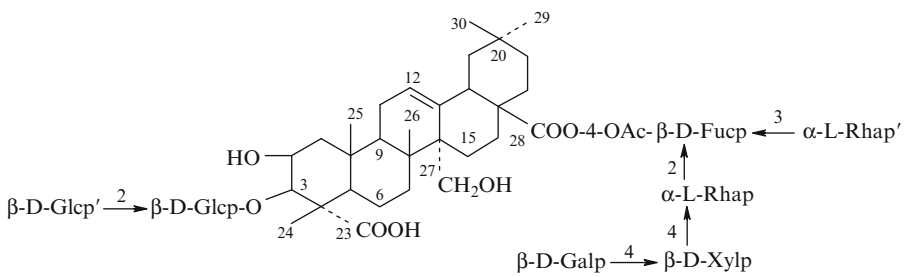
C-1	44.2	C-16	24.0	Glc-1	102.9	Ac-1	170.6
2	70.2	17	47.0	2	83.8	2	20.6
3	85.5	18	42.0	3	78.3	Rha-1	102.0
4	52.6	19	45.5	4	71.1	2	71.7
5	52.5	20	30.8	5	78.1	3	72.5
6	21.2	21	33.9	6	62.6	4	84.6
7	33.6	22	32.3	Glc′-1	106.2	5	68.8
8	41.1	23	180.4	2	76.9	6	18.6
9	49.3	24	14.2	3	77.9	Rha′-1	104.8
10	37.0	25	17.5	4	71.2	2	72.3
11	23.8	26	18.9	5	78.3	3	72.6
12	127.8	27	64.4	6	62.6	4	73.6
13	138.9	28	176.6	Fuc-1	94.7	5	70.9
14	48.0	29	33.0	2	74.8	6	18.6
15	24.5	30	24.0	3	80.6	Xyl-1	107.2
				4	73.7	2	76.1
				5	70.9	3	78.7
				6	16.8	4	70.4
						5	67.5

References

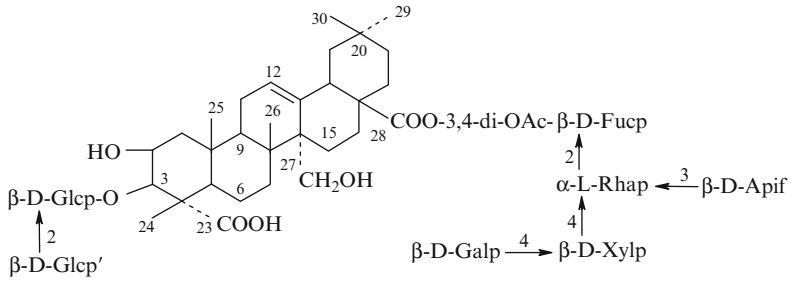
1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Polygalasaponin XL

CAS Registry Number: 184479-51-4
See Figure Polygalasaponin XL
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin



Polygalasaponin XXXIX



Polygalasaponin XL

Biological sources: *Polygala fallax* [1]
$C_{74}H_{116}O_{40}$: 1644.704
$[\alpha]_D^{25}$ −6.9° (c 0.45, MeOH) [1]
FAB-MS *m/z*: 1668 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.71 (m, H-2), 4.62 (d, J = 3.0, H-3), 5.78 (t-like, H-12), 3.21 (dd, J = 14.0, 4.0, H-18), 2.01 (s, CH_3-24), 1.58 (s, CH_3-25), 1.08, 0.80, 1.00 (s, CH_3-26, 29, 30), 3.78, 4.01 (d, J = 12.0, H_2-27);
β-D-Glcp: 5.10 (d, J = 8.0, H-1), 4.03 (H-2), 4.20 (t, J = 9.0, H-3), 4.11 (H-4), 3.85 (m, H-5), 4.24 (H-6), 4.43 (H-6); β-D-Glcp′: 5.22 (d, J = 8.0, H-1), 3.98 (t, J = 8.5, H-2), 4.15 (H-3), 4.07 (H-4), 4.05 (H-5), 4.35 (dd, J = 12, 5, H-6), 4.60 (dd, J = 12, 2, H-6); β-D-Fucp: 6.15 (d, J = 8.0, H-1), 4.53 (t, J = 8.5, H-2), 5.56 (dd, J = 9.5, 3, H-3), 5.61 (d, J = 3.0, H-4), 4.12 (H-5), 1.22 (d, J = 6.0, CH_3-6), 2.06 (CH_3CO), 2.11 (CH_3CO); α-L-Rhap: 5.65 (brs, H-1), 4.66 (brs, H-2), 4.37 (H-3), 4.37 (H-4), 4.26 (H-5), 1.65 (d, J = 6.0, CH_3-6);
β-D-Xylp: 5.24 (d, J = 7.5, H-1), 3.89 (t, J = 8.0, H-2), 4.07 (H-3), 4.24 (H-4), 3.39 (t, J = 11.0, H-5), 4.24 (H-5); β-D-Apif: 5.98 (d, J = 4.5, H-1), 4.68 (d, J = 4.5, H-2), 4.19 (d, J = 9.5, H-3), 4.54 (d, J = 9.5, H-4), 4.01 (H-5), 4.05 (H-5); β-D-Galp: 4.92 (d, J = 8.0, H-1), 4.47 (H-2), 4.13 (H-3), 4.49 (H-4), 4.11 (H-5), 4.35, 4.44 (H_2-6)
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

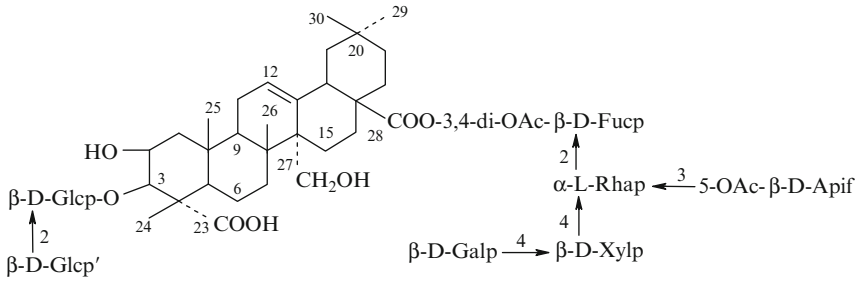
C-1	44.2	C-16	23.9	Glc-1	102.7	Ac-1	170.2	Api-1	111.7
2	70.0	17	47.0	2	83.7	2	20.6	2	77.5
3	85.3	18	41.9	3	78.1	Ac-1	170.8	3	79.5
4	52.7	19	45.4	4	71.1	2	20.4	4	74.4
5	52.5	20	30.8	5	78.3	Rha-1	102.3	5	64.5
6	21.1	21	33.8	6	62.6	2	71.4	Gal-1	104.4
7	33.7	22	32.3	Glc′-1	106.1	3	82.0	2	71.8
8	41.1	23	180.4	2	76.9	4	78.0	3	75.0
9	49.3	24	14.2	3	77.9	5	69.1	4	70.2
10	37.0	25	17.5	4	71.1	6	18.8	5	77.4
11	23.6	26	18.9	5	78.3	Xyl-1	104.7	6	62.3
12	127.9	27	64.5	6	62.6	2	75.0		
13	138.9	28	176.3	Fuc-1	94.3	3	76.5		
14	47.9	29	33.1	2	74.6	4	78.5		
15	24.5	30	24.1	3	74.0	5	64.8		
				4	71.2				
				5	70.2				
				6	16.1				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Polygalasaponin XLI

CAS Registry Number: 184479-53-6
See Figure Polygalasaponin XLI
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin
Biological sources: *Polygala fallax* [1]
$C_{76}H_{118}O_{41}$: 1686.714
$[\alpha]_D^{25}$ −6.5° (c 0.54, MeOH) [1]
FAB-MS *m/z*: 1710 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.70 (m, H-2), 4.62 (d, J = 3.0, H-3), 5.78 (t-like, H-12), 3.20 (dd, J = 14.0, 4.0, H-18), 2.00 (s, CH_3-24), 1.57 (s, CH_3-25), 1.08, 0.80, 1.00 (s, CH_3-26, 29, 30), 3.77, 4.01 (d, J = 12.0, H_2-27)



Polygalasaponin XLI

β-D-Glcp: 5.10 (d, J = 8.0, H-1), 4.03 (H-2), 4.19 (t, J = 9.0, H-3), 4.10 (H-4), 3.84 (m, H-5), 4.24 (H-6), 4.43 (H-6); β-D-Glcp′: 5.21 (d, J = 8.0, H-1), 3.98 (t, J = 8.5, H-2), 4.15 (H-3), 4.07 (H-4), 4.06 (H-5), 4.35, 4.61 (H_2-6); β-D-Fucp: 6.15 (d, J = 8.0, H-1), 4.51 (t, J = 8.5, H-2), 5.55 (dd, J = 9.5, 3, H-3), 5.60 (d, J = 3.0, H-4), 4.11 (H-5), 1.22 (d, J = 6.0, CH_3-6), 2.11 (CH_3CO), 2.07 (CH_3CO); α-L-Rhap: 5.63 (brs, H-1), 4.63 (brs, H-2), 4.37 (H-3), 4.37 (H-4), 4.24 (H-5), 1.64 (d, J = 6.0, CH_3-6); β-D-Xylp: 5.23 (d, J = 8.0, H-1), 3.89 (t, J = 8.5, H-2), 4.10 (H-3), 4.24 (H-4), 3.45 (t, J = 11.0, H-5), 4.25 (H-5); β-D-Apif: 5.98 (d, J = 4.0, H-1), 4.44 (H-2), 4.16 (H-3), 4.29 (H-4), 4.45 (d, J = 11.0, H-5), 4.55 (d, J = 11.0, H-5), 1.89 (CH_3CO); β-D-Galp: 4.92 (d, J = 8.0, H-1), 4.46 (t, J = 8.5, H-2), 4.15 (H-3), 4.49 (d, J = 3.0, H-4), 4.11 (H-5), 4.37, 4.44 (H_2-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

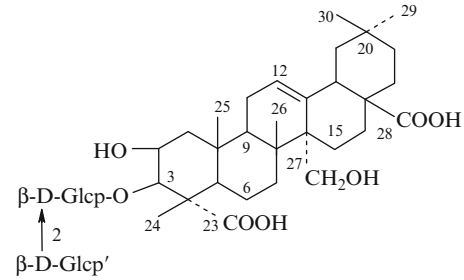
C-1	44.1	C-16	23.9	Glc-1	102.7	Ac-1	170.2	Api-1	111.2
2	70.2	17	47.0	2	83.7	2	20.7	2	78.1
3	85.3	18	42.0	3	78.1	Ac-1	170.8	3	77.4
4	52.6	19	45.4	4	71.2	2	20.4	4	74.5
5	52.5	20	30.8	5	78.3	Rha-1	102.4	5	67.0
6	21.1	21	33.8	6	62.5	2	71.5	Ac-1	170.7
7	33.6	22	32.4	Glc′-1	106.1	3	81.8	2	20.7
8	41.2	23	180.4	2	76.9	4	78.1	Gal-1	104.4
9	49.3	24	14.2	3	77.9	5	69.1	2	71.8
10	37.0	25	17.5	4	71.2	6	18.8	3	75.0
11	23.6	26	18.9	5	78.3	Xyl-1	104.8	4	70.2
12	127.9	27	64.5	6	62.6	2	75.0	5	77.6
13	138.8	28	176.4	Fuc-1	94.3	3	76.5	6	62.3
14	47.9	29	33.1	2	74.6	4	78.5		
15	24.5	30	24.1	3	74.0	5	64.8		
				4	71.2				
				5	69.9				
				6	16.1				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Reinioside A

CAS Registry Number: 167324-05-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala reinii* [1]

$C_{42}H_{66}O_{17}$: 842.430

$[\alpha]_D^{25}$ + 25.2° (c 1.05, MeOH) [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.69 (m, H-2), 4.59 (d, J = 2, H-3), 5.86 (t, like, H-12), 1.98 (s, CH_3-24), 1.50 (s, CH_3-25), 1.04 (s, CH_3-26), 3.74, 4.00 (d, J = 12, H_2-27), 0.87 (s, CH_3-29), 1.01 (s, CH_3-30)

β-D-Glcp: 5.09 (d, J = 8, H-1), 4.01 (H-2), 4.19 (t, J = 9, H-3), 4.09 (t, J = 9, H-4), 3.86 (m, H-5), 4.23 (dd, J = 11.5, 5), 4.42 (dd, J = 11.5, 1.5, H_2-6)

β-D-Glcp′: 5.21 (d, J = 8, H-1), 3.96 (brt, J = 8.5, H-2), 4.15 (brt, J = 8.5, H-3), 4.09 (brt, J = 9, H-4), 4.03 (H-5), 4.35 (dd, J = 11.5, 4.5), 4.60 (dd, J = 11.5, 1.5, H_2-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

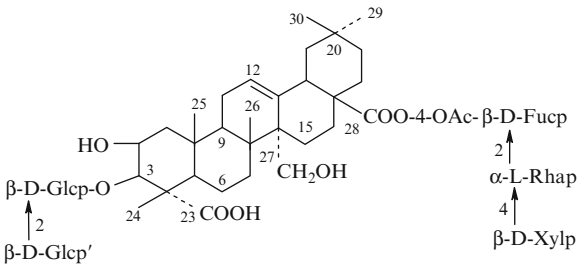
C-1	44.0	C-16	24.1	Glc-1	102.8
2	70.2	17	46.5	2	83.7
3	85.4	18	41.8	3	77.9
4	52.6	19	45.5	4	71.1
5	52.4	20	31.0	5	78.1
6	21.0	21	34.1	6	62.6
7	33.4	22	33.2	Glc′-1	106.1
8	40.8	23	180.3	2	76.9
9	49.4	24	14.1	3	78.3
10	37.0	25	17.3	4	71.2
11	23.7	26	18.7	5	78.3
12	127.1	27	64.5	6	62.6
13	139.7	28	180.1		
14	48.1	29	33.2		
15	24.6	30	23.9		

References

1. T. Miyase, H. Saitoh, K.-I. Shiokawa, A. Ueno, Chem. Pharm. Bull. **43**(3), 466 (1995)

Reinioside B

CAS Registry Number: 167324-06-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala reinii* [1], *P. fallax* [2]

$C_{61}H_{96}O_{30}$: 1308.598

$[\alpha]_D^{25}$ + 3.6° (c 0.97, MeOH) [1]

FAB-MS *m/z*: 1332 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.70 (m, H-2), 4.59 (d, J = 2, H-3), 5.81 (t, like, H-12), 1.99 (s, CH_3-24), 1.50 (s, CH_3-25), 1.04 (s, CH_3-26), 3.74, 4.00 (d, J = 12, H_2-27), 0.87 (s, CH_3-29), 1.01 (s, CH_3-30)

β-D-Glcp: 5.07 (d, J = 8, H-1), 4.00 (H-2), 4.18 (brt, J = 9.5, H-3), 4.09 (t, J = 9.5, H-4), 3.85 (H-5), 4.22 (dd, J = 11.5, 6), 4.42 (dd, J = 11.5, 1.5, H_2-6)

β-D-Glcp′: 5.18 (d, J = 8, H-1), 3.95 (t, J = 8, H-2), 4.14 (t, J = 8.5, H-3), 4.07 (t, J = 8.5, H-4), 4.00 (H-5), 4.33 (dd, J = 11, 2), 4.58 (H_2-6)

β-D-Fucp: 6.09 (d, J = 8, H-1), 4.56 (t, J = 8, H-2), 4.37 (dd, J = 9.5, 3, H-3), 5.52 (d, J = 3, H-4), 4.03 (H-5), 1.26 (d, J = 6.5, CH_3-6), 1.97 (s, OAc)

α-L-Rhap: 6.29 (s, H-1), 4.78 (brs, H-2), 4.66 (dd, J = 9.5, 3, H-3), 4.32 (t, J = 9.5, H-4), 4.51 (m, H-5), 1.78 (d, J = 6, CH_3-6)

β-D-Xylp: 5.05 (d, J = 7, H-1), 4.01 (H-2), 4.01 (H-3), 4.21 (H-4), 3.50 (brt, J = 11), 4.15 (H_2-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

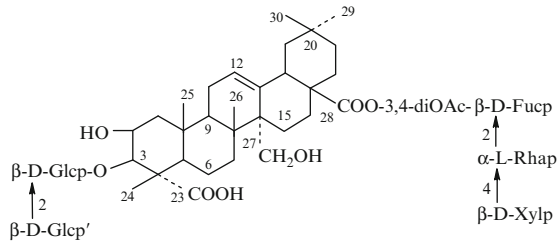
C-1	44.0	C-16	23.9	Glc-1	102.8	Fuc-1	94.5	Xyl-1	107.3
2	70.1	17	46.9	2	83.7	2	74.0	2	76.1
3	85.4	18	41.9	3	77.9	3	74.1	3	78.6
4	52.6	19	45.3	4	71.1	4	74.7	4	70.8
5	52.4	20	30.7	5	78.0	5	70.5	5	67.4
6	21.1	21	33.7	6	62.5	6	16.4		
7	33.5	22	32.3	Glc′-1	106.0	Ac-1	171.0		
8	41.0	23	180.3	2	76.8	2	20.7		
9	49.2	24	14.1	3	78.2	Rha-1	101.7		
10	36.9	25	17.4	4	70.9	2	71.6		
11	23.5	26	18.7	5	78.2	3	72.4		
12	127.8	27	64.3	6	62.5	4	84.9		
13	138.8	28	176.6			5	68.4		
14	47.9	29	33.0			6	19.1		
15	24.4	30	23.9						

References

1. T. Miyase, H. Saitoh, K.-I. Shiokawa, A. Ueno, Chem. Pharm. Bull. **43**(3), 466 (1995)
2. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Reinioside C

CAS Registry Number: 167324-07-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala reinii* [1], *P. fallax* [2]

$C_{63}H_{98}O_{31}$: 1350.609

$[\alpha]_D^{25}$ + 10.4° (c 1.4, MeOH) [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.71 (m, H-2), 4.60 (H-3), 5.81 (t, like, H-12), 1.98 (s, CH_3-24), 1.55 (s, CH_3-25), 1.09 (s, CH_3-26), 3.77, 4.02 (d, J = 12, H_2-27), 0.79 (s, CH_3-29), 0.94 (s, CH_3-30)

β-D-Glcp: 5.09 (d, J = 8, H-1), 4.02 (H-2), 4.19 (t, J = 9.5, H-3), 4.08 (t, J = 8.5, H-4), 3.85 (m, H-5), 4.23 (dd, J = 12.5, 5.5), 4.42 (dd, J = 12, 1.5, H_2-6)

β-D-Glcp′: 5.20 (d, J = 8, H-1), 3.96 (brt, J = 8, H-2), 4.15 (t, J = 8.5, H-3), 4.08 (t, J = 8.5, H-4),4.02 (H-5), 4.34, 4.60 (H_2-6)

β-D-Fucp: 6.16 (d, J = 8, H-1), 4.57 (H-2), 5.58 (H-3), 5.59 (brs, H-4), 4.12 (H-5), 1.20 (d, J = 6.5, CH_3-6), 2.04 (s, 3-OAc), 2.04 (s, 4-OAc)

α-L-Rhap: 5.69 (brs, H-1), 4.54 (brs, H-2), 3.48 (dd, J = 9.5, 2.5, H-3), 4.29 (brt, J = 9.5, H-4), 4.34 (H-5), 1.74 (d, J = 6, CH_3-6)

β-D-Xyl: 5.06 (d, J = 6.5, H-1), 4.02 (H-2), 4.02 (H-3), 4.20 (H-4), 3.51, 4.16 (H_2-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

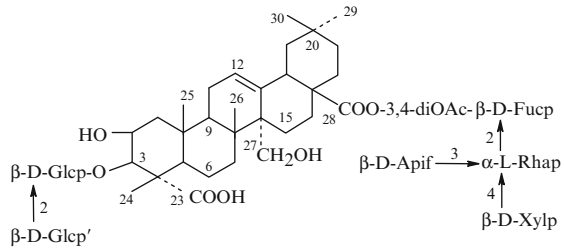
C-1	44.1	C-16	23.9	Glc-1	102.8	Fuc-1	94.2	Xyl-1	107.2
2	70.0	17	47.0	2	83.3	2	72.8	2	76.0
3	85.4	18	41.8	3	77.9	3	74.6	3	78.7
4	52.6	19	45.3	4	71.1	4	71.4	4	70.8
5	52.4	20	30.7	5	78.1	5	70.1	5	67.5
6	21.1	21	33.8	6	62.5	6	16.0		
7	33.5	22	32.3	Glc′-1	106.1	3-OAc-1	170.0		
8	41.1	23	180.3	2	76.8	2	20.6		
9	49.3	24	14.1	3	78.2	4-OAc-1	170.7		
10	37.0	25	17.4	4	71.1	2	20.3		
11	23.7	26	18.7	5	78.2	Rha-1	102.0		
12	127.8	27	64.4	6	62.5	2	71.0		
13	138.8	28	176.3			3	72.3		
14	47.9	29	33.0			4	84.5		
15	24.5	30	23.9			5	69.0		
						6	18.6		

References

1. T. Miyase, H. Saitoh, K.-I. Shiokawa, A. Ueno, Chem. Pharm. Bull. **43**(3), 466 (1995)
2. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Reinioside D

CAS Registry Number: 167324-08-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala reinii* [1], *P. fallax* [2]

$C_{68}H_{106}O_{35}$: 1482.651

$[\alpha]_D^{25}$−5.4° (c 0.93, MeOH) [1]

FAB-MS *m/z*: 1506 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.71 (m, H-2), 4.61 (d, J = 3, H-3), 5.79 (t, like, H-12), 2.02 (s, CH_3-24), 1.58 (s, CH_3-25), 1.08 (s, CH_3-26), 3.78 (d, 12), 4.02 (H_2-27), 0.80 (s, CH_3-29), 1.00 (s, CH_3-30)

β-D-Glcp: 5.09 (d, J = 8, H-1), 4.02 (H-2), 4.20 (brt, J = 9, H-3), 4.13 (H-4), 3.85 (m, H-5), 4.24, 4.42 (dd, J = 11.5, H_2-6)

β-D-Glcp′: 5.21 (d, J = 7.5, H-1), 3.97 (brt, J = 8, H-2), 4.10 (brt, J = 9, H-3), 4.02 (H-5), 4.34 (dd, J = 11.5, 4.5), 4.59 (d, J = 11.5, H_2-6)
β-D-Fucp: 6.15 (d, J = 8, H-1), 4.52 (dd, J = 9.5, 8, H-2), 5.56 (dd, J = 9.5, 3, H-3), 5.60 (d, J = 3, H-4), 4.12 (H-5), 1.22 (d, J = 6.5, CH_3-6), 2.13 (3-OAc), 2.06 (4-OAc)
α-L-Rhap: 5.66 (brs, H-1), 4.68 (dd, J = 3, 1.5, H-2), 4.39 (dd, J = 9.5, 3, H-3), 4.46 (brt, J = 9.5, H-4), 4.28 (m, H-5), 1.69 (d, J = 6, CH_3-6)
β-D-Xyl: 5.31 (d, J = 7.5, H-1), 3.95 (t, J = 8, H-2), 4.13 (t, J = 8.5, H-3), 4.20 (H-4), 3.45 (t, J = 10), 4.19 (d, J = 10, H_2-5)
β-D-Apif: 6.00 (d, J = 4.5, H-1), 4.70 (d, J = 4.5, H-2), 4.19, 4.55 (d, J = 10, H_2-4), 4.02, 4.02 (H_2-5) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	23.9	Glc-1	102.9	Fuc-1	94.4	Xyl-1	105.1
2	70.0	17	47.0	2	83.8	2	74.6	2	75.7
3	85.4	18	41.9	3	77.9	3	74.1	3	78.6
4	52.8	19	45.5	4	71.2	4	71.3	4	71.3
5	52.5	20	30.8	5	78.1	5	70.2	5	67.2
6	21.1	21	33.8	6	62.5	6	16.1	Apif-1	111.8
7	33.7	22	32.8	Glc′-1	106.2	3-OAc-1	170.2	2	77.7
8	41.1	23	180.5	2	76.9	2	20.7	3	79.6
9	49.3	24	14.2	3	78.3	4-OAc-1	170.8	4	74.6
10	37.1	25	17.5	4	71.0	2	20.4	5	64.6
11	23.8	26	18.9	5	78.3	Rha-1	102.4		
12	127.9	27	64.5	6	62.5	2	71.5		
13	138.9	28	176.4			3	82.0		
14	47.9	29	33.1			4	78.0		
15	24.6	30	24.1			5	69.3		
						6	19.0		

References

1. T. Miyase, H. Saitoh, K.-I. Shiokawa, A. Ueno, Chem. Pharm. Bull. **43**(3), 466 (1995)
2. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

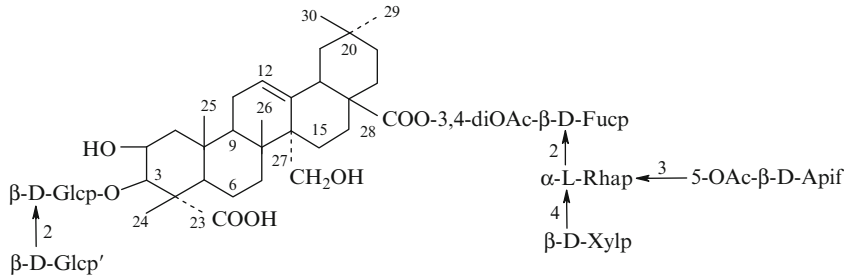
Reinioside E

CAS Registry Number: 167324-09-6
See Figure Reinioside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin
Biological sources: *Polygala reinii* [1], *P. fallax* [2]
$C_{70}H_{108}O_{36}$: 1524.662
$[\alpha]_D^{25}$ −4.5° (c 1.34, MeOH) [1]
FAB-MS *m/z*: 1548 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.71 (m, H-2), 4.62 (d, J = 2, H-3), 5.79 (t, like, H-12), 2.02 (s, CH_3-24), 1.58 (s, CH_3-25), 1.08 (s, CH_3-26), 3.77 (brd, J = 12, H-27), 3.99 (H-27), 0.80 (s, CH_3-29), 1.00 (s, CH_3-30)
β-D-Glcp: 5.10 (d, J = 8, H-1), 4.02 (t, J = 8, H-2), 4.20 (H-3), 4.11 (t, J = 9.5, H-4), 3.86 (m, H-5), 4.24 (dd, J = 12.5, 3.5), 4.43 (dd, J = 12.5, 5.5, H_2-6)
β-D-Glcp′: 5.21 (d, J = 8, H-1), 3.97 (brt, J = 8, H-2), 4.15 (brt, J = 8, H-3), 4.03 (H-5), 4.35, 4.60 (dd, J = 12.5, 12, H_2-6)
β-D-Fucp: 6.15 (d, J = 8, H-1), 4.53 (dd, J = 9.5, 8, H-2), 5.55 (dd, J = 9.5, 3, H-3), 5.60 (d, J = 3, H-4), 4.12 (H-5), 1.22 (d, J = 6.5, CH_3-6), 2.12 (3-OAc), 2.07 (4-OAc)
α-L-Rhap: 5.64 (brs, H-1), 4.65 (brs, H-2), 4.37 (dd, J = 9.5, 3, H-3), 4.45 (brt, J = 9.5, H-4), 4.26 (m, H-5), 1.68 (d, J = 6, CH_3-6)
β-D-Xylp: 5.30 (d, J = 8, H-1), 3.96 (brt, J = 8, H-2), 4.09 (brt, J = 8.5, H-3), 4.15 (H-4), 3.52, 4.20 (brt, J = 11, H_2-5)
β-D-Apif: 5.98 (d, J = 4, H-1), 4.48 (d, J = 4, H-2), 4.16, 4.29 (d, J = 9.5, H_2-4), 4.42, 4.55 (d, J = 11.5, H_2-5), 1.88 (s, OAc) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	44.1	C-16	23.9	Glc-1	102.8	Fuc-1	94.3	Xyl-1	105.2
2	70.0	17	47.0	2	83.6	2	74.7	2	75.6
3	85.3	18	41.9	3	78.0	3	74.1	3	78.5
4	52.7	19	45.4	4	71.2	4	71.2	4	71.2
5	52.5	20	30.8	5	78.1	5	70.2	5	67.2
6	21.1	21	33.8	6	62.6	6	16.1	Apif-1	111.3
7	33.8	22	32.3	Glc′-1	106.2	3-OAc-1	170.1	2	77.6
8	41.1	23	180.6	2	76.9	2	20.6	3	78.1
9	49.3	24	14.2	3	78.3	4-OAc-1	170.8	4	74.5
10	37.0	25	17.5	4	71.2	2	20.4	5	67.0
11	23.7	26	18.9	5	78.3	Rha-1	102.4	Ac-1	170.8
12	127.9	27	64.5	6	62.6	2	71.6	2	20.7
13	138.8	28	176.4			3	81.9		
14	47.9	29	33.1			4	78.1		
15	24.5	30	24.1			5	69.2		
						6	19.0		



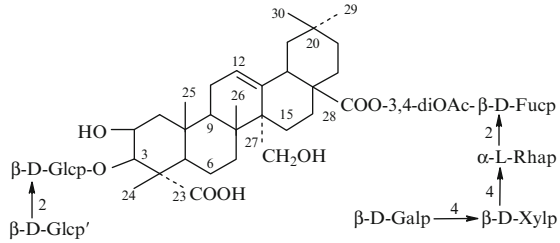
Reinioside E

References

1. T. Miyase, H. Saitoh, K.-I. Shiokawa, A. Ueno, Chem. Pharm. Bull. **43**(3), 466 (1995)
2. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Reinioside F

CAS Registry Number: 167394-72-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala reinii* [1], *P. fallax* [2]

$C_{69}H_{108}O_{36}$: 1512.662

$[\alpha]_D^{25}$ + 5.2° (c 0.87, MeOH) [1]

FAB-MS *m/z*: 1536 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.69 (m, H-2), 4.59 (d, J = 3, H-3), 5.8(t, like, H-12), 1.98 (s, CH_3-24), 1.54 (s, CH_3-25), 1.09 (s, CH_3-26), 3.78, 4.01 (d, J = 12, H_2-27), 0.79 (s, CH_3-H), 0.95 (s, CH_3-30)

β-D-Glcp: 5.08 (d, J = 8, H-1), 4.05 (t, J = 8.5, H-2), 4.20 (t, J = 9, H-3), 4.08 (t, J = 8.5, H-4), 3.85 (m, H-5), 4.23, 4.42 (d, J = 12.5, H-6)

β-D-Glcp′: 5.22 (d, J = 7.5, H-1), 3.98 (dd, J = 8.5, 7.5, H-2), 4.17 (brt, J = 8.5, H-3), 4.07 (H-5), 4.35, 4.62 (d, J = 11, H_2-6)

β-D-Fucp: 6.15 (d, J = 8, H-1), 4.55 (H-2), 5.57 (H-3), 5.58 (H-4), 4.13 (H-5), 1.20 (d, J = 6.5 CH_3-6), 2.04 (3-OAc), 2.04 (4-OAc)

α-L-Rhap: 5.67 (d, J = 1.5, H-1), 4.53 (brs, H-2), 4.48 (dd, J = 9, 3, H-3), 4.22 (H-4), 4.32 (H-5), 1.69 (d, J = 6, CH_3-6)

β-D-Xylp: 4.98 (d, J = 7.5, H-1), 3.95 (dd, J = 8.5, 7.5, H-2), 4.05 (brt, J = 8.5, H-3), 4.22 (H-4), 3.45, 4.27 (brt, J = 11, H_2-5)

β-D-Galp: 4.94 (d, J = 8, H-1), 4.45 (H-2), 4.15 (H-3), 4.22 (H-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	44.1	C-16	24.0	Glc-1	102.7	Fuc-1	94.2	Xyl-1	106.8
2	70.0	17	47.0	2	83.6	2	72.7	2	75.5
3	85.4	18	41.9	3	77.9	3	74.6	3	76.7
4	52.6	19	45.4	4	71.2	4	71.2	4	78.1
5	52.5	20	30.8	5	78.2	5	70.1	5	65.0
6	21.2	21	33.9	6	62.5	6	16.1	Gal-1	104.5
7	33.5	22	32.4	Glc′-1	106.1	3-OAc-1	170.1	2	71.8
8	41.1	23	180.4	2	76.9	2	20.6	3	75.0
9	49.3	24	14.2	3	78.4	4-OAc-1	170.8	4	70.2
10	37.0	25	17.5	4	71.2	2	20.4	5	77.4
11	23.8	26	18.7	5	78.4	Rha-1	102.0	6	62.3
12	127.8	27	64.4	6	62.7	2	71.3		
13	138.9	28	176.4			3	72.3		
14	48.0	29	33.0			4	84.5		
15	24.5	30	24.0			5	69.0		
						6	18.6		

References

1. T. Miyase, H. Saitoh, K.-I. Shiokawa, A. Ueno, Chem. Pharm. Bull. **43**(3), 466 (1995)
2. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, H. Noguchi, Chem. Pharm. Bull. **44**(11), 2092 (1996)

Senegin IV

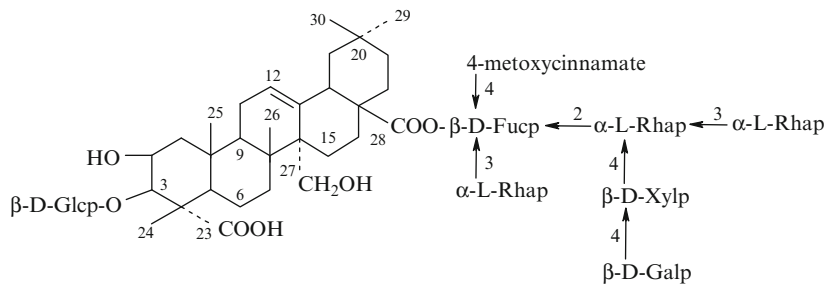
CAS Registry Number: 51005-46-0
See Figure Senegin IV
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin
Biological sources: *Polygala senega* [1, 2]
$C_{81}H_{122}O_{39}$: 1718.756
Mp: 249–250°C (EtOH) [1]
$[\alpha]_D^{20}$ −20.2° (c 2.0, MeOH) [1]
UV λ_{max}^{EtOH} nm (log ε): 315 (4.30) [1]
IR (nujol) ν_{max} cm^{-1}: 3500–3300, 1750, 1730, 1710, 1635, 1610, 1515 [1]
H.I. (haemolytic index): 22910 [1]
Pharm./Biol.: Inhibit the evelation of plazma glucose level [2]

References

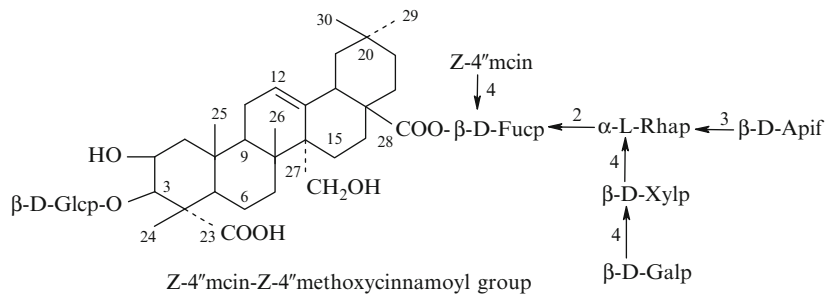
1. Y. Tsukitani, I. Shoji, Chem. Pharm. Bull. **21**(7), 1564 (1973)
2. M. Yoshikawa, T. Murakami, H. Matsuda, T. Ueno, M. Kadoya, I. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(7), 1305 (1996)

Z-Senegasaponin a

CAS Registry Number: 162613-72-1
See Figure Z-Senegasaponin a
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin
Biological sources: *Polygala senega* [1, 2]
$C_{74}H_{110}O_{35}$: 1558.682
Mp: 237–240°C [1]
$[\alpha]_D$ −22.0° (MeOH) [1]
FAB-MS *m/z*: 1557 $[M-H]^-$ [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1750, 1719, 1708, 1639 [1]
^{1}H NMR (J/Hz, C_5D_5N): β-D-Glcp: 5.10 (d, J = 7.9, H-1); β-D-Fucp: 6.16 (d, J = 7.9, H-1)
α-L-Rhap: 6.26 (brs, H-1)



Senegin IV



Z-4″mcin-Z-4″methoxycinnamoyl group

Z-Senegasaponin a

β-D-Apif:6.08 (d, J = 5, H-1); β-D-Xylp: 5.30 (d, J = 7.9, H-1)
β-D-Galp: 4.96 (d, J = 7.9, H-1)
Cinnamoyl group: 6.00 (d, J = 12.9, H-2), 6.85 (d, J = 12.9, H-3) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-16	24.1	Glc-1	105.4	4	78.8	Api-1	111.7
2	70.3	17	47.9	2	75.2	5	68.4	2	77.5
3	85.9	18	42.0	3	78.4	6	19.0	3	79.6
4	52.9	19	45.4	4	71.6	Xyl-1	104.8	4	74.5
5	52.6	20	30.8	5	78.4	2	75.1	5	64.5
6	21.3	21	33.8	6	62.7	3	77.4	Cin-1	166.8
7	33.8	22	32.4	Fuc-1	94.5	4	78.6	2	117.1
8	41.1	23	180.9	2	75.9	5	64.7	3	143.9
9	49.3	24	14.3	3	73.9	Gal-1	104.5	1′	127.9
10	37.0	25	17.5	4	74.5	2	71.8	2′	133.2
11	23.6	26	18.9	5	70.6	3	75.1	3′	113.9
12	127.9	27	64.4	6	16.6	4	70.1	4′	161.0
13	139.0	28	176.7	Rha-1	102.3	5	76.7	5′	113.9
14	47.0	29	33.0	2	71.6	6	62.3	6′	133.2
15	24.5	30	24.1	3	82.4			4-OMe	55.2

Pharm./Biol.: Exhibited a potent inhibitory effect on ethanol absorption and hypoglycemic activity [2]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, M. Kadoya, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(2), 350 (1995)
2. M. Yoshikawa, T. Murakami, T. Ueno, M. Kadoya, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(12), 2115 (1995)

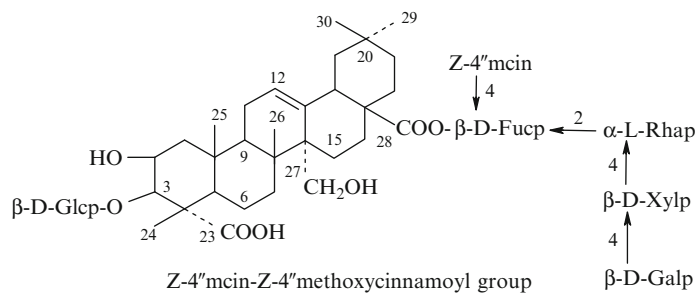
Z-Senegasaponin b

CAS Registry Number: 162613-71-0
See Figure Z-Senegasaponin b
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin
Biological sources: *Polygala senega* [1, 2]
$C_{69}H_{102}O_{31}$: 1426.640
Mp: 252–255°C [1]
$[\alpha]_D$ −13.2° (MeOH) [1]
FAB-MS *m/z*: 1425 $[M-H]^-$ [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1750, 1717, 1707, 1636 [1]
^{1}H NMR (J/Hz, C_5D_5N): β-D-Glcp: 5.10 (d, J = 7.6, H-1); β-D-Fucp: 6.16 (d, J = 8.2, H-1)
α-L-Rhap: 6.34 (brs, H-1)
β-D-Xylp:5.02 (d-like, H-1); β-D-Galp:4.99 (d, J = 8.3, H-1)
Cinnamoyl group: 5.94 (d, J = 12.9, H-2), 6.84 (d, J = 12.9, H-3) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-16	24.0	Glc-1	105.5	Rha-4	85.2	Cin-1	166.7
2	70.3	17	48.0	2	75.2	5	68.4	2	117.1
3	85.9	18	42.0	3	78.4	6	18.7	3	144.0
4	52.9	19	45.4	4	71.6	Xyl-1	107.0	1′	127.9
5	52.5	20	30.8	5	78.4	2	75.1	2′	133.2
6	21.5	21	33.9	6	62.7	3	77.3	3′	113.9
7	33.5	22	32.4	Fuc-1	94.6	4	78.3	4′	161.1
8	41.1	23	180.8	2	74.6	5	65.0	5′	113.9

(*continued*)



Z-Senegasaponin b

Table 1 (continued)

9	49.3	24	14.2	3	74.2	Gal-1	104.5	6′	133.2
10	37.0	25	17.5	4	74.7	2	71.8	4-OMe	55.2
11	23.6	26	18.7	5	70.7	3	75.7		
12	127.9	27	64.4	6	16.6	4	70.1		
13	138.9	28	176.8	Rha-1	101.9	5	76.7		
14	47.0	29	33.0	2	71.7	6	62.2		
15	24.5	30	24.0	3	72.5				

Pharm./Biol.: Exhibited a potent inhibitory effect on ethanol absorption and hypoglycemic activity [2]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, M. Kadoya, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(2), 350 (1995)
2. M. Yoshikawa, T. Murakami, T. Ueno, M. Kadoya, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(12), 2115 (1995)

Z-Senegasaponin c

CAS Registry Number: 180684-11-1

See Figure Z-Senegasaponin c

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala senega* [1]

$C_{77}H_{114}O_{37}$: 1630.703

Mp: 229–232°C [1]

$[\alpha]_D^{29}$ −4.1° (c 0.1, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 308 (4.1) [1]

IR (KBr) ν_{max} cm^{-1}: 3435, 1750, 1719, 1707, 1637, 1605, 1518, 1075 [1]

FAB-MS (negative ion mode) *m*/*z*: 1629.6980 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m*/*z*: 1653 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.79, 0.93, 1.15, 1.54, 1.98 (s, CH_3-29, 30, 26, 25, 24), 3.21 (dd-like, H-18), 4.62 (m, H-3), 5.82 (brs, H-12)

β-D-Fucp: 6.12 (d-like, H-1), 6.00 (brs, H-4), 1.32 (d-like, CH_3-6)

β-D-Glcp: 5.04 (d, J = 7.3, H-1); β-D-Glcp′: 5.04 (d, J = 7.3, H-1), 4.74, 5.01 (both m, H_2-6), 2.08 (s, OAc)

β-D-Galp: 4.95 (d, J = 7.6, H-1); β-D-Xylp: 4.98 (d, J = 7.9, H-1)

α-L-Rhap: 6.42 (brs, H-1), 1.74 (d-like, CH_3-6)

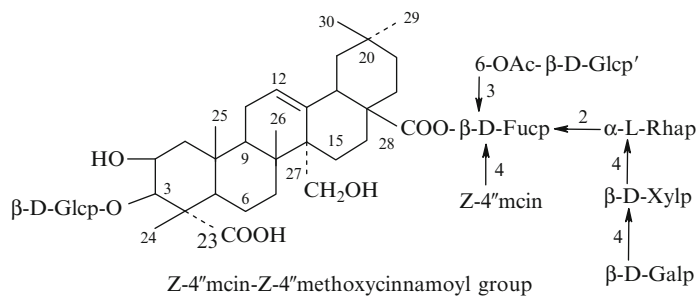
Cinnamoyl group: 3.64 (s, OCH_3 -4″), 5.91, 6.80 (d, J = 13.2, H-2′, 3′), 6.98, 7.95 (d, J = 8.6, H-3″, 5″, 2″, 6″) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-17	48.0	Glc-1	105.4	5	68.4	Gal-1	104.5
2	70.3	18	42.0	2	75.0	6	18.7	2	71.7
3	85.9	19	45.4	3	78.1	Glc′-1	105.7	3	75.0
4	52.9	20	30.7	4	71.6	2	75.2	4	70.1
5	52.9	21	33.9	5	78.3	3	78.3	5	77.3
6	21.6	22	32.3	6	62.7	4	71.1	6	62.2
7	33.6	23	180.7	Fuc-1	94.6	5	75.2	Cin-1′	165.9
8	41.2	24	14.2	2	73.5	6	64.0	2′	117.1
9	49.3	25	17.5	3	82.6	Ac-1	170.9	3′	143.3
10	37.0	26	18.8	4	74.2	2	20.9	1″	127.8
11	23.6	27	64.4	5	71.1	Xyl-1	106.8	2″	133.1
12	127.8	28	176.8	6	16.9	2	75.6	3″	114.0
13	138.9	29	33.0	Rha-1	101.6	3	76.6	4″	161.0
14	47.1	30	24.0	2	71.8	4	78.2	5″	114.0

(*continued*)



Z-Senegasaponin c

Table 1 (continued)

15	24.5	3	72.3	5	65.0	6″	133.1
16	24.0	4	84.8			4″-OCH_3	55.2

Pharm./Biol.: Z-Senegasaponin c was found to exhibit hypoglycemic activity in the oral D-glucose tolerance test [1]

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, T. Ueno, M. Kadoya, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(7), 1305 (1996)

Z-Senegin II

CAS Registry Number: 162681-52-9

See Figure Z-Senegin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala senega* [1]

$C_{70}H_{104}O_{32}$: 1456.651

Mp: 238–242°C [1]

$[\alpha]_D^{28}$ −24.0° (c 0.1, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 321 (4.2) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1750, 1719, 1707, 1630, 1601, 1516, 1073 [1]

FAB-MS (negative ion mode) *m/z*: 1455 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1479 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.79, 0.95, 1.15, 1.54, 1.98 (s, CH_3-29, 30, 26, 25, 24), 3.26 (dd-like, H-18), 4.63 (m, H-3), 5.83 (brs, H-12)

β-D-Fucp: 6.16 (d, J = 8.2, H-1), 1.33 (d, J = 5.9, CH_3-6)

β-D-Galp: 4.98 (d, J = 7.9, H-1); β-D-Glcp: 5.08 (d, J = 7.9, H-1)

β-D-Xylp: 5.01 (d-like, H-1)

α-L-Rhap: 6.33 (brs, H-1), 1.77 (d-like, CH_3-6)

Cinnamoyl group: 3.73, 3.81 (s, 3″, 4″-OCH_3), 5.97, 6.86 (d, J = 12.5, H-2′, 3′), 6.90 (d, J = 8.3, H-5″), 7.46 (dd-like, H-6″), 8.03 (brs, H-2″) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

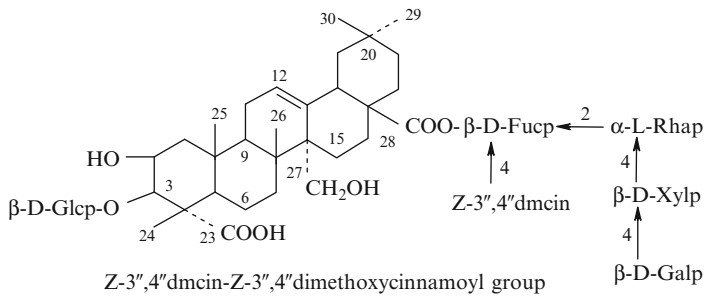
Table 1

C-1	44.2	C-16	24.0	Glc-1	105.4	Rha-4	85.1	Cin-1′	166.8
2	70.3	17	48.0	2	75.2	5	68.4	2′	116.9
3	85.9	18	42.0	3	78.4	6	18.7	3′	144.6
4	52.9	19	45.4	4	71.6	Xyl-1	106.9	1″	128.2
5	52.5	20	30.8	5	78.4	2	75.7	2″	114.8
6	21.5	21	33.9	6	62.7	3	76.7	3″	150.5
7	33.5	22	32.4	Fuc-1	94.6	4	78.4	4″	151.2
8	41.1	23	180.8	2	74.6	5	65.0	5″	111.4
9	49.3	24	14.2	3	74.1	Gal-1	104.5	6″	125.8
10	37.0	25	17.5	4	74.8	2	71.8	3″-OCH_3	55.8
11	23.6	26	18.7	5	70.7	3	75.1	4″-OCH_3	55.7
12	127.8	27	64.4	6	16.6	4	70.1		
13	139.0	28	176.8	Rha-1	101.9	5	77.3		
14	47.0	29	33.0	2	71.8	6	62.2		
15	24.5	30	24.0	3	72.5				

Pharm./Biol.: Z-Senegasaponin c was found to exhibit hypoglycemic activity in the oral D-glucose tolerance test [1]

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, T. Ueno, M. Kadoya, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(7), 1305 (1996)



Z-Senegin II

Z-Senegin III

CAS Registry Number: 162681-53-0

See Figure Z-Senegin III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala senega* [1]

$C_{75}H_{112}O_{35}$: 1572.698

Mp: 243–246°C [1]

$[\alpha]_D^{27}$ −17.0° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3453, 1750, 1719, 1707, 1637, 1605, 1509, 1069 [1]

UV λ_{max}^{MeOH} nm (log ε): 309 (4.2) [1]

FAB-MS (negative ion mode) *m/z*: 1571.6906 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1595 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.80, 0.97, 1.13, 1.56, 1.98 (s, CH_3-29, 30, 26, 25, 24), 3.34 (dd-like, H-18), 4.62 (m, H-3), 5.83 (brs, H-12)

β-D-Fucp: 6.09 (d, J = 7.6, H-1), 1.29 (d-like, CH_3-6); β-D-Glcp: 5.08 (d, J = 7.6, H-1); β-D-Galp: 4.98 (d, J = 7.9, H-1); β-D-Xylp: 4.99 (d-like, H-1)

α-L-Rhap: 5.91 (brs, H-1), 1.72 (d-like, CH_3-6); α-L-Rhap′: 5.70 (brs, H-1), 1.72 (d-like, CH_3-6)

Cinnamoyl group: 3.64 (s, OCH_3-4″), 5.91, 6.86 (d, J = 12.9, H-2′, 3′), 7.04, 8.01 (d, J = 8.9, H-3″, 5″, 2″, 6″) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-16	24.0	Glc-1	105.4	Rha-4	84.8	Gal-1	104.5
2	70.3	17	48.0	2	75.2	5	68.6	2	71.8
3	85.9	18	42.0	3	78.4	6	18.7	3	75.1
4	52.9	19	45.5	4	71.6	Rha′-1	105.1	4	70.1
5	52.5	20	30.8	5	78.4	2	72.3	5	77.3
6	21.4	21	33.9	6	62.7	3	73.6	6	62.2
7	33.6	22	32.3	Fuc-1	94.8	4	72.6	Cin-1′	166.3
8	41.1	23	180.7	2	74.9	5	70.9	2′	116.4
9	49.3	24	14.2	3	80.9	6	18.6	3′	144.8
10	37.0	25	17.5	4	73.4	Xyl-1	106.8	1″	127.7
11	23.8	26	18.9	5	70.8	2	75.5	2″	133.3
12	127.7	27	64.3	6	16.9	3	76.6	3″	114.1
13	138.9	28	176.7	Rha-1	102.0	4	78.4	4″	161.1
14	47.1	29	33.1	2	71.6	5	64.4	5″	114.1
15	24.5	30	24.0	3	72.5			6″	133.3
								4″-OCH_3	55.2

Pharm./Biol.: Z-Senegin III was found to exhibit hypoglycemic activity in the oral D-glucose tolerance test [1]

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, T. Ueno, M. Kadoya, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(7), 1305 (1996)

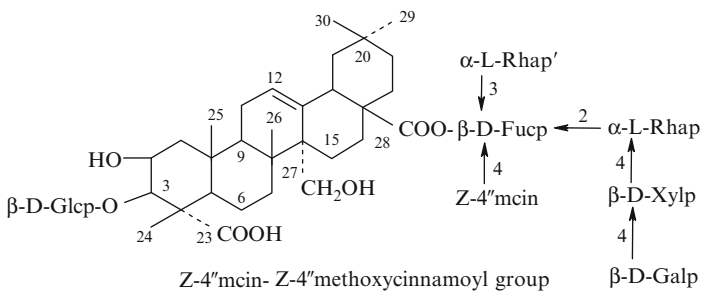
Z-Senegin IV

See Figure Z-Senegin IV

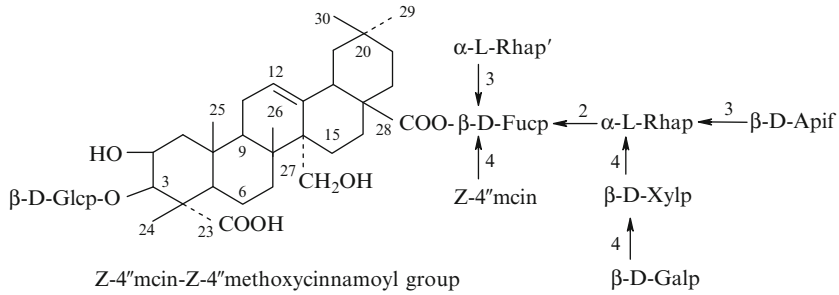
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Presenegenin

Biological sources: *Polygala senega* [1]

$C_{80}H_{120}O_{39}$: 1704.740



Z-Senegin III



Z-Senegin IV

Mp: 247–248°C [1]

$[\alpha]_D^{26}$ −23.1° (c 0.1, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 311 (4.3) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1750, 1719, 1707, 1636, 1605, 1512, 1071 [1]

FAB-MS (negative ion mode) *m/z*: 1703 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1727.7269 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.81, 1.05, 1.13, 1.63, 2.01 (s, CH_3-29, 30, 26, 25, 24), 3.19 (dd-like, H-18), 4.65 (m, H-3), 5.82 (brs, H-12)

β-D-Fucp: 6.04 (d, J = 9.2, H-1), 1.28 (d-like, CH_3-6); β-D-Glcp: 5.08 (d, J = 7.6, H-1); β-D-Galp: 4.94 (d, J = 7.6, H-1); β-D-Xylp: 5.23 (d, J = 7.6, H-1); β-D-Apif: 6.12 (brs, H-1)

α-L-Rhap: 5.75 (brs, H-1), 1.67 (d-like, CH_3-6); α-L-Rhap′: 5.53 (brs, H-1), 1.72 (d-like, CH_3-6)

Cinnamoyl group: 3.65 (s, OCH_3-4″), 5.99, 6.91 (d, J = 12.9, H-2′, 3′), 7.06, 8.01 (d, J = 8.9, H-3″, 5″, 2″, 6″) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-18	42.0	Glc-1	105.3	Rha-6	18.7	Api-1	111.9
2	70.3	19	45.7	2	75.2	Rha′-1	105.0	2	77.3
3	86.0	20	30.8	3	78.4	2	72.1	3	79.8
4	52.9	21	33.9	4	71.5	3	73.6	4	74.3
5	52.6	22	32.2	5	78.4	4	72.5	5	64.4
6	21.3	23	180.9	6	62.7	5	70.9	Cin-1′	166.3
7	33.9	24	14.3	Fuc-1	95.0	6	18.6	2′	116.4
8	41.2	25	17.6	2	76.7	Xyl-1	104.7	3′	144.8
9	49.3	26	19.2	3	79.8	2	75.0	1″	127.7
10	37.0	27	63.8	4	73.2	3	76.4	2″	133.3
11	23.6	28	176.6	5	70.6	4	78.0	3″	114.1
12	127.7	29	33.1	6	16.9	5	64.7	4″	161.1
13	139.0	30	24.1	Rha-1	102.2	Gal-1	104.4	5″	114.1
14	47.0			2	71.6	2	71.8	6″	133.3
15	24.6			3	82.7	3	75.0	4″-CH_3	55.2
16	24.1			4	78.4	4	70.1		
17	48.0			5	68.8	5	77.4		

Pharm./Biol.: Z-Senegin IV was found to exhibit hypoglycemic activity in the oral D-glucose tolerance test [1]

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, T. Ueno, M. Kadoya, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(7), 1305 (1996)

Glycosides of Aglycones of Oleanene Type

Glycosides of Bayogenin

Canadensissaponin 1

See Figure Canadensissaponin 1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Solidago canadensis* [1, 2]

$C_{75}H_{122}O_{39}$: 1646.756

Mp: 251–254° [1]

FAB-MS *m/z*: 1646 $[M]^+$, 1484 $[M\text{-hex}]^+$, 1322 $[M\text{-2hex}]^+$, 488 [aglycone], 650 $[agl + hex]^-$, 812 $[agl + 2hex]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, CD_3OD): β-D-Glcp: 4.49 (d, J = 8, H-1), 3.47 (d, J = 9.1, H-2), 3.55 (d, J = 8.8, H-3), 3.47 (d, J = 9.1, H-4), 3.32 (dd, J = 4.2, 2.3, H-5), 3.71, 3.81 (d, J = 12.0, H_2-6); β-D-Glcp′: 4.57 (d, J = 7.7, H-1), 3.28 (d, J = 9.1, H-2), 3.38 (d, J = 9.1, H-3), 3.27 (d, J = 9.1, H-4), 3.32 (dd, J = 6.5, 3.2, H-5), 3.63, 3.88, (dd, J = 11.8, H_2-6); α-L-Quip: 5.49 (d, J = 7.5, H-1), 3.71 (d, J = 8.4, H-2), 3.63 (d, J = 8.4, H-3), 3.16 (d, J = 9.7, H-4), 3.41 (H-5), 1.23 (CH_3-6); α-L-Rhap: 5.24 (d, J = 1.6, H-1), 4.11 (d, J = 3.9, H-2), 3.85 (d, J = 9.8, H-3), 3.65 (d, J = 9.8, H-4), 3.82 (H-5), 1.25 (CH_3-6); β-D-Xylp: 4.68 (d, J = 8, H-1), 3.18 (d, J = 9.2, H-2), 3.38 (d, J = 9.0, H-3), 3.5 (dd, J = 10.5, 5.2, H-4), 3.18, 3.84 (d, J = 11.0, H_2-5); α-L-Rhap′: 5.16 (d, J = 1.6, H-1), 3.96 (d, J = 3.1, H-2), 3.71 (d, J = 9.8, H-3), 3.39 (d, J = 9.8, H-4), 4.0 (H-5), 1.24 (CH_3-6); α-L-Apif: 5.14 (d, J = 3.3, H-1), 3.99 (d, J = 3.3, H-2), 3.83 (d, J = 9.5, H-3), 4.15 (H-4), 3.56, 3.59 (d, J = 11.5, H_2-5); β-D-Xylp′: 4.57 (d, J = 7.7, H-1), 3.27 (H-2), 3.28 (H-3), 3.49 (dd, J = 10.0, 5.9, H-4), 3.23, 3.89 (d, J = 10.9, H_2-5) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

Glc-1	105.1	Glc′-1	105.1	Qui-1	94.6	Rha′-1	101.4
2	74.7	2	75.3	2	77.1	2	72.1
3	88.0	3	77.8	3	87.7	3	81.2
4	69.6	4	71.6	4	75.3	4	79.1
5	78.2	5	77.4	5	73.4	5	69.0
6	62.2	6	62.6	6	17.9	6	18.6
Xyl-1	105.1	Rha-1	102.7	Api-1	111.4	Xyl′-1	105.9
2	76.3	2	72.2	2	78.0	2	75.5
3	84.8	3	72.2	3	80.3	3	78.2
4	70.2	4	74.0	4	75.1	4	71.1
5	67.0	5	70.0	5	64.7	5	67.1
		6	18.2				

Pharm./Biol.: Diuretic, hemolytic (HJ 50 000) [3, 4]

References

1. G. Reznicek, J. Jurentisch, M. Plasun, S. Korhammer, E. Haslinger, K. Hiller, W. Kubelka, Phytochemistry **30**(5), 1629 (1991)
2. G. Reznicek, J. Jurentisch, W. Kubelka, S. Korhammer, E. Haslinger, K. Hiller, Planta Med. **56**(6), 554 (1990)
3. H. Schilcher, P. May, J. Sokeland, Urologie **28B**, 265 (1988)
4. H. Schilcher, H. Rau, Urologie **28B**, 274 (1988)

Canadensissaponin 2

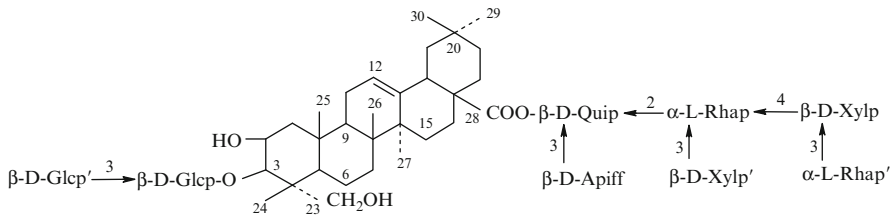
See Figure Canadensissaponin 2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

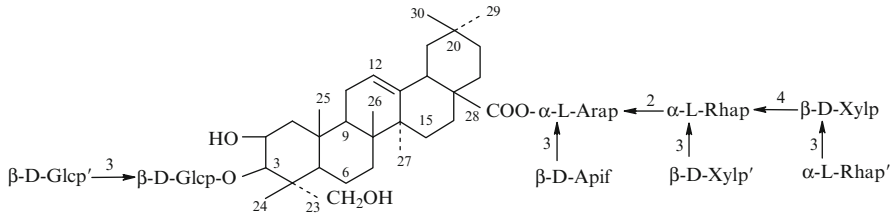
Biological sources: *Solidago canadensis* [1]

$C_{74}H_{120}O_{39}$: 1632.740

Mp: 234–236°C [1]



Canadensissaponin 1



Canadensissaponin 2

FAB-MS *m/z*: 1632 $[M]^+$, 1470 [M-hex], 1308 $[M\text{-}2hex]^+$, 488 $[aglycone]^+$, 650 $[agl + hex]^+$, 812 $[agl + 2hex]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, CD_3OD): β-D-Glcp: 4.51 (d, J = 7.9, H-1), 3.49 (d, J = 9.4, H-2), 3.60 (d, J = 8.8, H-3), 3.49 (d, J = 9.1, H-4), 3.35 (dd, J = 4.7, 2.2, H-5), 3.71, 3.81 (d, J = 12.5, H_2-6)

β-D-Glcp′: 4.60 (d, J = 7.7, H-1), 3.3 (d, J = 9.4, H-2), 3.42 (d, J = 9.4, H-3), 3.3 (d, J = 9.5, H-4), 3.36 (dd, J = 6.3, 2.8, H-5), 3.64, 3.89 (d, J = 12.1, H_2-6)

α-L-Arap: 5.69 (d. J = 4.4, H-1), 3.71 (d, J = 5.4, H-2), 3.76 (d, J = 6.3, H-3), 3.75 (H-4), 3.47, 4.0 (H_2-5)

α-L-Rhap: 5.10 (d, J = 1.6, H-1), 4.10 (d, J = 3.2, H-2), 3.90 (d, J = 9.4, H-3), 3.69 (d, J = 9.7, H-4), 3.69 (H-5), 1.26 (CH_3-6)

β-D-Xylp: 4.70 (d, J = 7.9, H-1), 3.22 (d, J = 9.4, H-2), 3.41 (d, J = 8.8, H-3), 3.53 (dd, J = 10.0, 5.3, H-4), 3.22, 3.85 (d, J = 11.6, H_2-5)

α-L-Rhap′: 5.14 (d, J = 1.6, H-1), 3.97 (d, J = 3.4, H-2), 3.72 (d, J = 9.7, H-3), 3.40 (d, J = 9.4, H-4), 4.0 (H-5), 1.24 (CH_3-6)

α-L-Apif: 5.13 (d, J = 3.1, H-1), 3.97 (d, J = 3.0, H-2), 3.84 (d, J = 9.8, H-3), 4.08 (H-4), 3.58, 3.60 (d, J = 11.5, H_2-5)

β-D-Xylp′: 4.57 (d, J = 7.6, H-1), 3.31 (d, J = 8.9, H-2), 3.3 (d, J = 8.8, H-3), 3.52 (dd, J = 10.3, 5.3, H-4), 3.24, 3.89 (d, J = 11.6, H_2-5) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

Glcp-1	105.0	Glcp′-1	104.9	Arap-1	94.6	Rhap-1	100.5
2	74.6	2	75.3	2	74.2	2	71.7
3	87.5	3	77.5	3	80.4	3	81.8
4	69.5	4	71.4	4	68.8	4	78.9
5	77.1	5	77.9	5	64.9	5	69.1
6	62.1	6	62.4	Apif-1	110.8	6	18.5
Xylp-1	104.8	Rhap′-1	102.5	2	78.2	Xylp′-1	105.7
2	76.1	2	72.1	3	80.4	2	75.1
3	84.3	3	72.0	4	75.1	3	78.0
4	70.1	4	73.8	5	64.9	4	70.9
5	66.7	5	70.0			5	66.9
		6	17.9				

(*continued*)

Pharm./Biol.: Diuretic, hemolytic (HJ 50 000) [1]

References

1. G. Reznicek, J. Jurentisch, M. Plasun, S. Korhammer, E. Haslinger, K. Hiller, W. Kubelka, Phytochemistry **30**(5), 1629 (1991)

Canadensissaponin 3

See Figure Canadensissaponin 3

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Solidago canadensis* [1, 2]

$C_{76}H_{124}O_{39}$: 1660.771

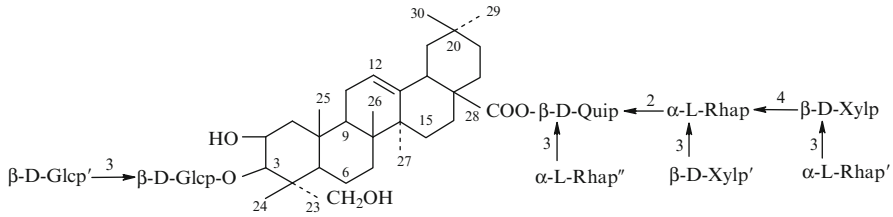
Mp: 267–269°C [2]

FAB-MS *m/z*: 1660 $[M]^+$, 1498 $[M\text{-}hex]^+$, 1336 $[M\text{-}2hex]^+$, 488 $[aglycone]^+$, 650 $[agl + hex]^+$, 812 $[agl + 2hex]^+$ [2]

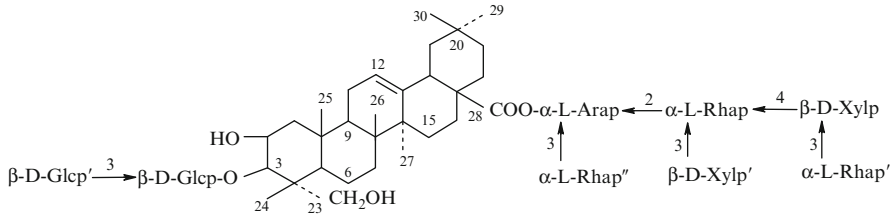
^{1}H NMR (500 MHz, J/Hz, CD_3OD): [2]

β-D-Glcp: 4.49 (d, J = 7.8, H-1), 3.47 (d, J = 8.8, H-2), 3.55 (d, J = 9.1, H-3), 3.47 (d, J = 9.3, H-4), 3.31 (dd, J = 4.7, 3.2, H-5), 3.71, 3.81 (d, J = 12.8, H_2-6)

β-D-Glcp′: 4.57 (d, J = 7.7, H-1), 3.28 (d, J = 9.2, H-2), 3.38 (d, J = 9.2, H-3), 3.27 (d, J = 9.5, H-4),



Canadensissaponin 3



Canadensissaponin 4

3.32 (dd, J = 6.6, 2.9, H-5), 3.62, 3.88 (d, J = 12.6, H_2-6)

α-L-Quip: 5.64 (d, J = 6.1, H-1), 3.7 (d, J = 6.3, H-2), 3.66 (d, J = 7.5, H-3), 3.32 (d, J = 8.8, H-4), 3.49 (H-5), 1.24 (CH_3-6)

α-L-Rhap: 5.05 (d, J = 1.5, H-1), 4.02 (d, J = 3.9, H-2), 3.86 (d, J = 9.2, H-3), 3.66 (d, J = 8.9, H-4), 3.76 (H-5), 1.24 (CH_3-6)

β-D-Xylp: 4.70 (d, J = 8.0, H-1), 3.19 (d, J = 8.8, H-2), 3.39 (d, J = 9.5, H-3), 3.50 (dd, J = 10.0, 5.0, H-4), 3.18, 3.84 (d, J = 11.3, H_2-5)

α-L-Rhap′: 5.15 (d, J = 1.6, H-1), 3.94 (d, J = 3.9, H-2), 3.70 (d, J = 9.7, H-3), 3.38 (d, J = 9.5, H-4), 4.0 (H-5), 1.23 (CH_3-6)

α-L-Rhap″: 4.91 (d, J = 1.2, H-1), 3.87 (d, J = 3.3, H-2), 3.68 (d, J = 9.5, H-3), 3.42 (d, J = 8.8, H-4), 3.93 (H-5), 1.26 (CH_3-6)

β-D-Xylp′: 4.57 (d, J = 7.7, H-1), 3.28 (H-2), 3.30 (H-3), 3.48 (dd, J = 10.0, 5.8, H-4), 3.25, 3.88 (d, J = 11.3, H_2-5)

^{13}C NMR (CD_3OD): [2]

Table 1

Glc-1	105.1	Glc′-1	105.3	Qui-1	94.5	Rha-1	100.9
2	74.7	2	75.3	2	77.7	2	72.2
3	88.1	3	77.8	3	84.8	3	82.1
4	69.6	4	71.6	4	78.1	4	78.9
5	78.2	5	77.4	5	73.1	5	69.2
6	62.2	6	62.7	6	17.9	6	18.6
Xyl-1	105.0	Rha″-1	102.7	Rha′-1	101.9	Xyl′-1	105.9
2	76.2	2	72.3	2	72.4	2	75.5
3	84.6	3	72.2	3	72.2	3	75.2
4	70.2	4	74.0	4	73.8	4	71.1
5	67.0	5	70.0	5	70.6	5	67.0
		6	18.9	6	18.9		

Pharm./Biol.: Diuretic, hemolytic (HJ 55 000) [1]

References

1. G. Reznicek, J. Jurentisch, M. Plasun, S. Korhammer, E. Haslinger, Phytochemistry **30**(5), 1629 (1991)
2. G. Reznicek, J. Jurentisch, W. Kubelka, S. Korhammer, E. Haslinger, K. Hiller, Planta Med. **56**, 554 (1990)

Canadensissaponin 4

See Figure Canadensissaponin 4

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Solidago canadensis* [1]
$C_{75}H_{122}O_{39}$: 1646.756
Mp: 241–244°C [1]
FAB-MS *m/z*: 1646 $[M]^+$, 1484 $[M\text{-hex}]^+$, 1322 $[M\text{-2hex}]^+$, 488 $[aglycone]^+$, 650 $[agl + hex]^+$, 812 $[agl + 2hex]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, CD_3OD): β-D-Glcp: 4.49 (d, J = 7.7, H-1), 3.47 (d, J = 9.1, H-2), 3.56 (d, J = 9.1, H-3), 3.48 (d, J = 9.1, H-4), 3.32 (dd, J = 5.5, 3.6, H-5), 3.71, 3.81 (d, J = 11.8, H_2-6)
β-D-Glcp′: 4.56 (d, J = 7.7, H-1), 3.29 (d, J = 9.5, H-2), 3.39 (d, J = 9.1, H-3), 3.27 (d, J = 9.1, H-4), 3.33 (dd, J = 6.4, 2.3, H-5), 3.63, 3.88 (d, J = 11.8, H_2-6)
α-L-Arap: 5.83 (d, J = 3.1, H-1), 3.68 (d, J = 4.7, H-2), 3.83 (d, J = 5.9, H-3), 3.74 (dd, J = 4.6, 3, H-4), 3.52, 4.0 (d, J = 11.8, H_2-5)
α-L-Rhap: 4.98 (d, J = 1.6, H-1), 4.05 (d, J = 3.6, H-2), 3.91 (d, J = 9.1, H-3), 3.68 (d, J = 10, H-4), 3.65 (H-5), 1.25 (CH_3-6)
β-D-Xylp: 4.70 (d, J = 8.0, H-1), 3.22 (d, J = 9.6, H-2), 3.39 (d, J = 9.1, H-3), 3.5 (dd, J = 10, 5.5, H-4), 3.18, 3.84 (d, J = 11.4, H_2-5)
α-L-Rhap′:5.13 (d, J = 1.5, H-1), 3.94 (d, J = 3.6, H-2), 3.70 (d, J = 9.1, H-3), 3.39 (d, J = 10.0, H-4), 4.0 (H-5), 1.23 (CH_3-6)
α-L-Rhap″: 4.89 (d, J = 1.3, H-1), 3.87 (d, J = 3.6, H-2), 3.66 (d, J = 9.1, H-3), 3.42 (d, J = 10, H-4), 3.74 (H-5), 1.27 (CH_3-6)
β-D-Xylp′: 4.56 (d, J = 7.7, H-1), 3.27 (H-2), 3.28 (H-3), 3.48 (dd, J = 10.0, 5.0, H-4), 3.23, 3.86 (d, J = 11.4, H_2-5) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

Glc-1	105.1	Glc′-1	105.3	Ara-1	94.2	Rha-1	100.2
2	74.7	2	75.3	2	73.5	2	71.9
3	88.1	3	77.8	3	76.9	3	82.2
4	69.6	4	71.6	4	68.7	4	78.8
5	78.2	5	77.4	5	64.6	5	69.3
6	62.2	6	62.6	Rha′-1	101.6	6	18.5
Xyl-1	104.9	Rha″-1	102.7	2	72.3	Xyl-1	105.9
2	76.2	2	72.2	3	72.4	2	75.5
3	84.5	3	72.3	4	73.8	3	78.2
4	70.3	4	74.0	5	70.7	4	71.1
5	66.9	5	70.0	6	17.9	5	67.0
		6	17.9				

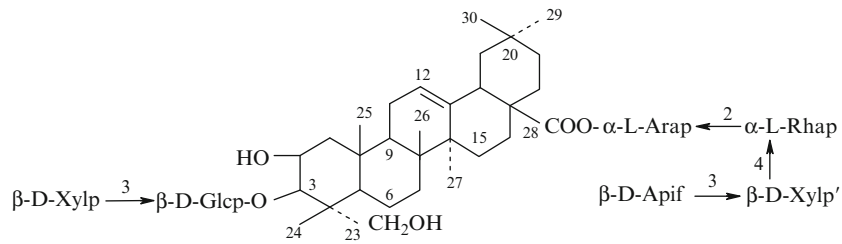
Pharm./Biol.: Diuretic, hemolytic (HJ 60 000) [1]

References

1. G. Reznicek, J. Jurentisch, M. Plasun, S. Korhammer, E. Haslinger, K. Hiller, W. Kubelka, Phytochemistry **30**(5), 1629 (1991)

Conyzasaponin A

CAS Registry Number: 317816-98-1
See Figure Conyzasaponin A
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Conyza blinii* [1]
$C_{62}H_{100}O_{30}$: 1324.629
Mp: 219–220°C [1]
$[\alpha]_D^{25}$ −13° (c 0.94, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3402, 2924, 1739, 1640, 1036 [1]
FAB-MS (positive ion mode) *m/z*: 1347 $(M + Na)^+$ [1]



Conyzasaponin A

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.90, 0.98, 1.13, 1.24, 1.33, 1.53 (s, CH_3-29, 30, 26, 27, 24, 25), 3.27 (dd, J = 13.3, 3.7, H-18), 3.71, 4.35 (d, J = 10.3, H_2-23), 4.32 (d, J = 4.4, H-3), 4.80 (brs, H-2), 5.46 (brs, H-12);
β-D-Glcp: 5.15 (d, J = 7.2, H-1), 4.02 (H-2), 4.06 (H-3), 4.08 (H-4), 3.85 (H-5), 4.27, 4.40 (H_2-6); β-D-Xylp: 5.20 (d, J = 7.3, H-1), 4.00 (H-2), 4.16 (H-3), 4.18 (H-4), 3.70, 4.32 (H_2-5); α-L-Arap: 6.46 (d, J = 2.8, H-1), 4.55 (H-2), 4.53 (H-3), 4.40 (H-4), 3.95, 4.51 (H_2-5); α-L-Rhap: 5.78 (brs, H-1), 4.57 (H-2), 4.56 (H-3), 4.35 (H-4), 4.36 (H-5), 1.75 (d, J = 6.0, CH_3-6); β-D-Xylp′: 5.05 (d, J = 7.4, H-1), 4.01 (H-2), 4.05 (H-3), 4.04 (H-4), 3.40, 4.18 (H_2-5); β-D-Apif: 6.22 (d, J = 2.3, H-1), 4.80 (d, J = 2.3, H-2), 4.32 (H-4), 4.73 (H-4), 4.18 (H-5) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-18	41.7	Glc-1	105.4	Rha-1	101.0
2	70.8	19	46.2	2	74.3	2	71.9
3	83.0	20	30.9	3	87.7	3	72.7
4	42.9	21	34.1	4	69.4	4	84.0
5	47.4	22	32.7	5	77.9	5	68.5
6	18.0	23	65.1	6	62.2	6	18.4
7	33.0	24	15.0	Xyl-1	106.3	Xyl′-1	106.8
8	40.1	25	17.3	2	75.3	2	75.2
9	48.5	26	17.6	3	78.2	3	84.8
10	37.0	27	26.1	4	70.7	4	69.4
11	24.1	28	176.3	5	67.4	5	66.9
12	123.1	29	33.1	Ara-1	93.4	Api-1	111.2
13	144.2	30	23.7	2	75.2	2	77.7
14	42.3			3	70.0	3	80.4
15	28.2			4	66.1	4	75.1
16	23.2			5	63.0	5	65.4
17	47.4						

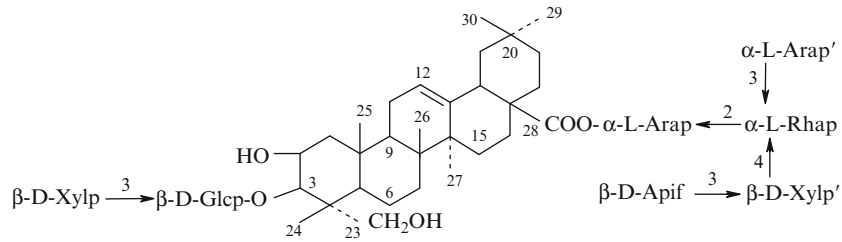
Pharm./Biol.: Aerial parts of this plant are used in folk medicine for the treatment of chronic bronchitis and other inflammatory diseases. Preliminary pharmacological and clinical tests have shown that its polar extracts possess antibacterial, anti-inflammatory, antitussive, antiulcer, and expectorant effects [1]

References

1. Y. Su, D. Guo, H. Guo, J. Liu, J. Zheng, K. Koike, T. Nikaido, J. Nat. Prod. **64**(1), 32 (2001)

Conyzasaponin B

CAS Registry Number: 317816-99-2
See Figure Conyzasaponin B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Conyza blinii* [1]
$C_{67}H_{108}O_{34}$: 1456.672
Mp: 233–234°C [1]
$[\alpha]_D^{25}$ + 6° (c 0.63, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3404, 2936, 1746, 1637, 1037 [1]
FAB-MS (positive ion mode) *m/z*: 1479 $(M + Na)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.90, 1.00, 1.16, 1.24, 1.34, 1.57 (s, CH_3-29, 30, 26, 27, 24, 25), 3.29 (dd, J = 13.8, 4.2, H-18), 3.71, 4.35 (d, J = 10.5, H_2-23), 4.33 (d, J = 3.5, H-3), 4.78 (brs, H-2), 5.47 (brs, H-12); β-D-Glcp: 5.15 (d, J = 7.6, H-1), 4.03 (H-2), 4.08 (H-3), 4.11 (H-4), 3.84 (H-5), 4.26, 4.42 (H_2-6); β-D-Xylp: 5.20 (d, J = 7.8, H-1), 4.01 (H-2), 4.16 (H-3), 4.15 (H-4), 3.70, 4.31 (H_2-5);



Conyzasaponin B

α-L-Arap: 6.52 (brs, H-1), 4.55 (H-2), 4.55 (H-3), 4.43 (H-4), 3.92, 4.53 (H_2-5); α-L-Rhap: 5.70 (d, J = 0.9, H-1), 4.82 (H-2), 4.57 (H-3), 4.50 (H-4), 4.41 (H-5), 1.76 (d, J = 6.0, CH_3-6); β-D-Xylp′: 5.36 (d, J = 7.8, H-1), 3.94 (H-2), 4.01 (H-3), 4.01 (H-4), 3.18, 4.08 (H_2-5); β-D-Apif: 6.18 (d, J = 2.3, H-1), 4.78 (H-2), 4.27 (H-4), 4.71 (H-4), 4.15 (H-5); α-L-Arap′: 5.06 (d, J = 7.6, H-1), 4.44 (H-2), 4.00 (H-3), 4.15 (H-4), 3.52, 4.09 (H_2-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-18	41.7	Glc-5	78.0	Rha-6	18.6
2	70.8	19	46.2	6	62.3	Xyl′-1	104.8
3	83.0	20	30.9	Xyl-1	106.4	2	75.1[b]
4	42.9	21	34.2	2	75.3[b]	3	85.4
5	47.4	22	32.8	3	78.2	4	69.7
6	18.0	23	65.2	4	70.9	5	66.5
7	33.0	24	15.0	5	67.4	Api-1	111.3
8	40.1	25	17.3	Ara-1	93.3	2	77.7
9	48.5	26	17.6	2	75.3	3	80.4
10	37.0	27	26.2	3	69.1	4	75.1
11	24.1	28	176.3	4	65.7	5	65.5
12	123.1	29	33.2	5	62.5	Ara′-1	106.1
13	144.2	30	23.8	Rha-1	100.9	2	73.0
14	42.3	Glc-1	105.5	2	71.7	3	74.4
15	28.2	2	74.4	3	82.3	4	69.6
16	23.2	3	87.7	4	78.1	5	67.2
17	47.4	4	69.4	5	68.7		

Pharm./Biol.: Aerial parts of this plant are used in folk medicine for the treatment of chronic bronchitis and other inflammatory diseases. Preliminary pharmacological and clinical tests have shown that its polar extracts possess antibacterial, anti-inflammatory, antitussive, antiulcer, and expectorant effects [1]

References

1. Y. Su, D. Guo, H. Guo, J. Liu, J. Zheng, K. Koike, T. Nikaido, J. Nat. Prod. **64**(1), 32 (2001)

Conyzasaponin C

CAS Registry Number: 317817-01-9

See Figure Conyzasaponin C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Conyza blinii* [1]

$C_{68}H_{110}O_{34}$: 1470.687

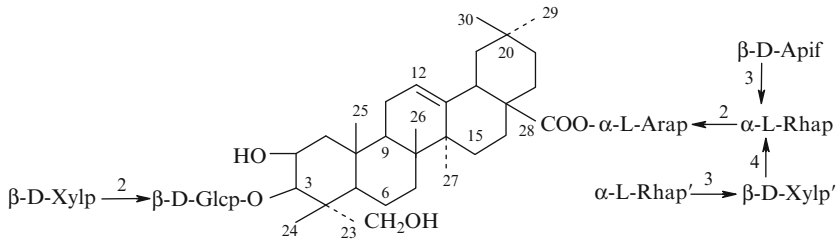
Mp: 225–226°C [1]

$[\alpha]_D^{25}$ −20° (c 0.59, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3404, 2936, 1746, 1637, 1037 [1]

FAB-MS (positive ion mode) *m/z*: 1470 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.91, 1.02, 1.55, 1.13, 1.23, 1.33 (s, CH_3-29, 30, 26, 27, 24, 25), 3.30 (dd, J = 13.5, 3.9, H-18), 3.69, 4.32 (d, J = 10.1, H_2-23), 4.32 (d, H-3), 4.77 (brs, H-2), 5.46 (brs, H-12); β-D-Glcp: 5.13 (d, J = 7.6, H-1), 4.04 (H-2), 4.05 (H-3), 4.12 (H-4), 3.83 (H-5), 4.28, 4.41 (H_2-6); β-D-Xylp: 5.19 (d, J = 7.2, H-1), 4.02 (H-2), 4.13 (H-3), 4.14 (H-4), 3.70, 4.32 (H_2-5); α-L-Arap: 6.55 (brs, H-1), 4.48 (H-2), 4.58 (H-3), 4.36 (H-4), 3.96, 4.56 (H_2-5); α-L-Rhap: 5.57 (brs, H-1), 4.72 (H-2), 4.37 (H-3), 4.48 (H-4), 4.30 (H-5), 1.73 (d, J = 6.2, CH_3-6); β-D-Xylp′: 5.27 (d, J = 7.8, H-1), 3.93 (H-2), 4.24 (H-3), 4.10 (H-4), 3.39, 4.09 (H_2-5); β-D-Apif: 5.89 (d, J = 4.4, H-1), 4.77 (H-2), 4.17 (H-4), 4.56 (H-4), 4.04 (H-5); α-D-Rhap′: 6.15 (brs, H-1), 4.73 (H-2), 4.55 (H-3), 4.27 (H-4), 4.92 (H-5), 1.64 (d, J = 6.2, CH_3-6) [1]



Conyzasaponin C

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-18	41.7	Glc-5	78.0	Rha-6	18.6
2	70.8	19	46.2	6	62.3	Xyl′-1	104.9
3	82.9	20	30.9	Xyl-1	106.3	2	75.8[b]
4	42.9	21	34.2	2	75.3[b]	3	83.5
5	47.7	22	32.8	3	78.2	4	69.6
6	18.1	23	65.1	4	70.9	5	67.1
7	33.1	24	15.1	5	67.4	Api-1	112.0
8	40.1	25	17.3	Ara-1	93.0	2	77.5
9	48.6	26	17.7	2	75.7	3	79.8
10	37.0	27	26.2	3	68.7	4	74.7
11	24.0	28	176.3	4	65.2	5	64.4
12	123.2	29	33.2	5	61.9	Rha′-1	102.8
13	144.2	30	23.7	Rha-1	101.0	2	72.5
14	42.3	Glc-1	105.5	2	71.6	3	72.7
15	28.3	2	74.4	3	82.5	4	74.2
16	23.2	3	87.7	4	77.7	5	69.9
17	47.4	4	69.4	5	68.8	6	18.6

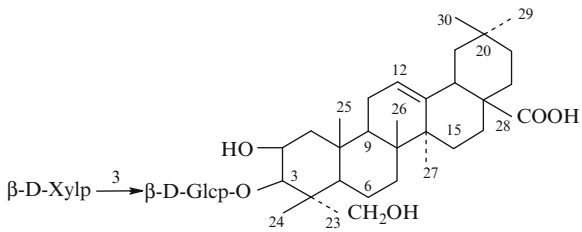
Pharm./Biol.: Aerial parts of this plant are used in folk medicine for the treatment of chronic bronchitis and other inflammatory diseases. Preliminary pharmacological and clinical tests have shown that its polar extracts possess antibacterial, anti-inflammatory, antitussive, antiulcer, and expectorant effect [1]

References

1. Y. Su, D. Guo, H. Guo, J. Liu, J. Zheng, K. Koike, T. Nikaido, J. Nat. Prod. **64**(1), 32 (2001)

Conyzasaponin G

CAS Registry Number: 317818-08-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Conyza blinii* [1]

$C_{41}H_{66}O_{14}$: 782.445

Mp: 214–216°C [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 2923, 1692, 1039 [1]

FAB-MS *m/z*: 781 $(M\text{-}H)^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.91, 0.98, 1.06, 1.25, 1.33, 1.54 (s, CH_3-29, 30, 26, 27, 24, 25), 3.28 (dd, J = 14.0, 3.5, H-18), 3.69, 4.31 (d, J = 10.5, H_2-23), 4.80 (brs, H-2), 5.48 (brs, H-12)

β-D-Glcp: 5.17 (d, J = 7.5, H-1), 3.84 (m, H-5)

β-D-Xylp: 5.20 (d, J = 8.0, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

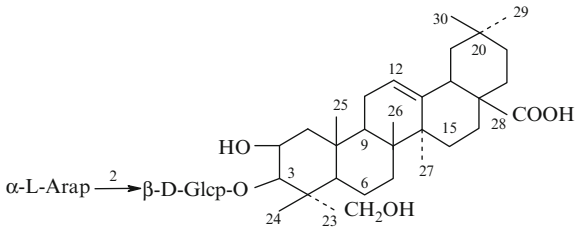
C-1	44.1	C-16	23.6	Glc-1	105.5
2	70.8	17	46.6	2	74.3
3	82.7	18	41.9	3	87.6
4	42.8	19	46.3	4	69.3
5	47.5	20	30.9	5	77.9
6	17.9	21	34.1	6	62.1
7	32.9	22	33.2	Xyl-1	106.3
8	39.8	23	64.8	2	75.3
9	48.5	24	15.0	3	78.2
10	36.9	25	17.1	4	70.8
11	23.9	26	17.4	5	67.4
12	122.7	27	26.2		
13	144.8	28	180.1		
14	42.2	29	33.2		
15	28.2	30	23.7		

Pharm./Biol.: Aerial parts of this plant are used in folk medicine for the treatment of chronic bronchitis and other inflammatory diseases. Preliminary pharmacological and clinical tests have shown that its polar extracts possess antibacterial, anti-inflammatory, antitussive, antiulcer, and expectorant effects [1]

References

1. Y. Su, D. Guo, H. Guo, J. Liu, J. Zheng, K. Koike, T. Nikaido, J. Nat. Prod. **64**(1), 32 (2001)

Lobatoside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Actinostemma lobatum* [1]

$C_{41}H_{66}O_{14}$: 782.445

Mp: 249–252°C (aq.MeOH) [1]

$[\alpha]_D^{24}$ + 49.4° (c 0.53, MeOH) [1]

FAB-MS *m/z*: 805 $[M + Na]^+$, 781 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N/D_2O): 4.78 (brs, H-2), 4.18 (d, J = 3, H-3), 5.48 (brs, H-12), 3.24 (dd, J = 4, 14, H-18), 3.62, 4.35 (d, J = 12, H_2-23), 1.33 (s, CH_3-24), 1.50 (s, CH_3-25), 1.03 (s, CH_3-26), 1.28 (s, CH_3-27), 0.94 (s, CH_3-29), 1.00 (s, CH_3-30)

β-D-Glcp: 5.08 (d, J = 8, H-1), 4.04 (dd, J = 8, 9, H-2), 4.21 (t, J = 9, H-3), 4.08 (t, J = 9, H-4), 3.82 (ddd, J = 2, 6, 9, H-5), 4.20 (dd, J = 6, 12, H-6), 4.38 (dd, J = 2, 12, H-6)

α-L-Arap: 5.14 (d, J = 7, H-1), 4.50 (dd, J = 7, 9, H-2), 4.15 (dd, J = 3, 9, H-3), 4.31 (brs, H-4), 3.75, 4.36 (brd, J = 12, H-5) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.0	C-16	24.0	Glc-1	103.5
2	70.5	17	46.7	2	83.5
3	82.6	18	42.0	3	78.0
4	42.7	19	46.4	4	71.3
5	47.7	20	30.9	5	77.9
6	17.9	21	34.3	6	62.5
7	33.3	22	33.0	Ara-1	106.5
8	39.9	23	64.7	2	73.8
9	48.6	24	14.6	3	74.3
10	36.9	25	17.2	4	69.2
11	23.7	26	17.5	5	67.2
12	122.7	27	26.3		

(*continued*)

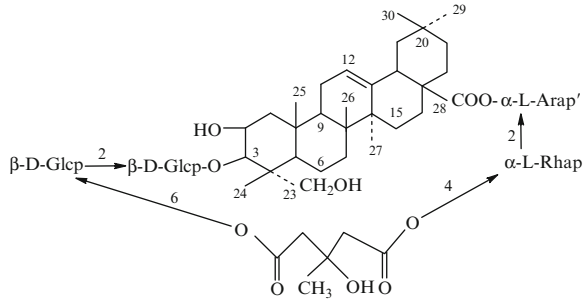
Table 1 (continued)

13	144.9	28	180.1
14	42.3	29	33.3
15	28.3	30	23.8

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, S. Hachiyama, H. Okabe, T. Yamauchi, K. Mihashi, Chem. Pharm. Bull. **37**(7), 1770 (1989)

Lobatoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Actinostemma lobatum* [1], *Polygala japonica* [2]

$C_{59}H_{92}O_{26}$: 1216.587

Mp: 274–278° (MeOH) [1]

$[\alpha]_D^{22}$ + 31.5° (c 0.59, C_5H_5N) [1]

FAB-MS *m/z*: 1239 $[M + Na]^+$, 1215 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.78 (brs, H-2), 4.17 (d, J = 3.5, H-3), 5.47 (brs, H-12), 3.15 (dd, J = 4, 14, H-18), 3.52, 4.34 (d, J = 12, H_2-23), 1.35 (s, CH_3-24), 1.53 (s, CH_3-25), 1.13 (s, CH_3-26), 1.32 (s, CH_3-27), 0.98 (s, CH_3-29), 0.88 (s, CH_3-30); Dicrotalic acid: 2.89, 3.19 (d, J = 17, H-2(4)), 2.90, 3.52 (d, J = 15, H-4(2)), 1.77 (s, CH_3-6); β-D-Glcp: 5.04 (d, J = 8, H-1), 4.07 (dd, J = 8, 9, H-2), 4.25 (t, J = 9, H-3), 4.12 (t, J = 9, H-4), 3.87 (ddd, J = 3, 6, 9, H-5), 4.24 (dd, J = 6, 12, H-6), 4.42 (dd, J = 3, 12, H-6); β-D-Glcp′: 5.29 (d, J = 8, H-1), 4.08 (dd, J = 8, 9, H-2), 4.20 (t, J = 9, H-3), 4.13 (t, J = 9, H-4), 4.00 (brd, J = 9, H-5), 4.69 (dd, J = 4, 12, H-6),

4.93 (brd, J = 12, H-6); α-L-Arap: 5.89 (d, J = 8, H-1), 4.68 (dd, J = 8, 9, H-2), 4.23 (dd, J = 3, 9, H-3), ca 4.29 (H-4), 3.88, 4.27 (brd, J = 12, H_2-5); α-L-Rhap: 6.35 (brs, H-1), 4.87 (dd, J = 1.5, 3, H-2), 4.52 (dd, J = 3, 10, H-3), 5.88 (t, J = 10, H-4), 4.42 (dq, J = 10, 6, H-5), 1.52 (d, J = 6, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

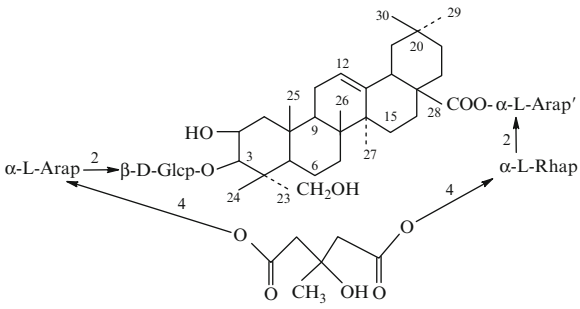
Table 1

C-1	44.1	C-16	22.6	Dic.acid-1	172.0	Glc′-1	105.8	Rha-1	102.2
2	69.4	17	47.3	2	46.1	2	76.7	2	72.4
3	83.1	18	41.5	3	70.1	3	77.7	3	76.6
4	42.2	19	46.2	4	46.4	4	70.4	4	76.0
5	48.7	20	30.7	5	171.7	5	75.5	5	67.3
6	18.0	21	34.1	6	26.5	6	64.2	6	18.2
7	33.7	22	32.3	Glc-1	102.4	Ara-1	94.8		
8	40.1	23	64.0	2	85.3	2	75.7		
9	47.7	24	15.0	3	78.5	3	75.8		
10	36.9	25	17.3	4	70.0	4	70.5		
11	24.0	26	17.4	5	78.3	5	67.9		
12	122.9	27	26.2	6	62.5				
13	144.2	28	176.3						
14	42.1	29	33.1						
15	29.3	30	23.6						

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, S. Hachiyama, H. Okabe, T. Yamauchi, K. Mihashi, Chem. Pharm. Bull. **37**(9), 2355 (1989)
2. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

Lobatoside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Actinostemma lobatum* [1]

$C_{58}H_{90}O_{25}$: 1186.577

Mp: 262–266° (aq. MeOH) [1]

$[\alpha]_D^{24}$ + 17.1° (c 0.63, C_5H_5N) [1]

FAB-MS *m/z*: 1209 $[M + Na]^+$, 1185 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N/D_2O): 4.60 (brs, H-2), 4.32 (d, J = 3, H-3), 5.47 (brs, H-12), 3.15 (dd, J = 4, 14, H-18), 3.55 (d, J = 11), 4.18 (H_2-23), 1.48 (s, CH_3-24), 1.56 (s, CH_3-25), 1.03 (s, CH_3-26), 1.25 (s, CH_3-27), 0.92 (s, CH_3-29), 0.94 (s, CH_3-30);

Dicrotalic acid: 3.06, 3.24 (d, J = 16, H-2(4)), 3.13, 3.20 (d, J = 15, H-4(2)), 1.91 (s, CH_3-6); β-D-Glcp: 5.06 (d, J = 7.5, H-1), 4.23 (dd, J = 7.5, 9, H-2), 4.29 (t, J = 9, H-3), 4.09 (t, J = 9, H-4), 3.85 (ddd, J = 2, 6, 9, H-5), 4.22 (dd, J = 6, 12, H-6), 4.41 (dd, J = 2, 12, H-6);

α-L-Arap: 5.43 (d, J = 7.5, H-1), 4.38 (dd, J = 7.5, 10, H-2), 4.25 (dd, J = 3, 10, H-3), 5.55 (brs, H-4), 3.67, 4.15 (brd, J = 13, H_2-5); α-L-Arap′: 6.14 (brs, H-1), 4.58 (brs, H-2), ca 4.41 (H-3), ca 4.45 (H-4), ca 3.97, 4.46 (H_2-5); α-L-Rhap: 5.96 (brs, H-1), 4.68 (dd, J = 1.5, 3, H-2), 4.44 (dd, J = 3, 10, H-3), 5.83 (t, J = 10, H-4), 4.20 (dq, J = 10, 6, H-5), 1.53 (d, J = 6, CH_3-6)

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.4	C-16	22.9	Dic.acid-1	171.3	Ara-4	72.4
2	68.9	17	47.0	2	46.9	5	64.4
3	84.0	18	41.5	3	70.0	Ara′-1	94.3
4	43.4	19	46.0	4	47.8	2	74.9
5	47.0	20	30.7	5	171.3	3	71.4
6	18.8	21	34.0	6	26.4	4	67.6
7	33.1	22	32.2	Glc-1	103.2	5	64.9
8	40.1	23	65.8	2	80.3	Rha-1	100.6
9	48.5	24	15.8	3	78.9	2	72.4
10	37.3	25	17.8	4	71.4	3	70.2
11	23.9	26	17.6	5	78.2	4	75.5
12	123.2	27	26.3	6	62.5	5	67.8
13	144.1	28	176.1	Ara-1	104.7	6	18.4
14	42.0	29	33.1	2	73.7		
15	28.9	30	23.6	3	72.5		

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, S. Hachiyama, H. Okabe, T. Yamauchi, K. Mihashi, Chem. Pharm. Bull. **37**(7), 1770 (1989)

Lobatoside D

See Figure Lobatoside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Actinostemma lobatum* [1]

$C_{64}H_{100}O_{30}$: 1348.629

Mp: 240–244°C (aq. MeOH) [1]

$[\alpha]_D^{22}$ + 12.4° (c 0.91, C_5H_5N) [1]

FAB-MS *m/z*: 1371 $[M + Na]^+$, 1347 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N/D_2O): 4.61 (brs, H-2), 4.30 (d, J = 3, H-3), ca 5.45 (H-12), 3.14 (dd, J = 4, 14, H-18), 3.67 (d, J = 11, H-23), ca 4.28 (H-23), 1.52 (s, CH_3-24), 1.59 (s, CH_3-25), 1.11 (s, CH_3-26), 1.26 (s, CH_3-27), 0.91 (s, CH_3-29), 0.93 (s, CH_3-30);

Dicrotalic acid: 3.09, 3.41 (dd, J = 16, H-2(4)), 3.10, 3.22 (d, J = 16, H-4(2)), 1.98 (s, CH_3-6); β-D-Glcp: 5.02 (d, J = 8, H-1), 4.21 (dd, J = 8, 9, H-2), 4.13 (t, J = 9, H-3), 4.07 (t, J = 9, H-4), ca 3.80 (H-5), ca 4.20, 4.40 (H_2-6); α-L-Arap: 5.42 (d, J = 8, H-1), 4.38 (dd, J = 8, 10, H-2), 4.23 (dd, J = 3, 10, H-3), 5.52 (brd, J = 3, H-4), 3.62, 4.13 (brd, J = 12, H_2-5); α-L-Arap′: 6.13 (d, J = 4, H-1), 4.58 (dd, J = 4, 5, H-2), ca 4.52 (H-3), ca 4.34 (H-4), ca 3.88, 4.35 (H_2-5); α-L-Rhap: 5.96 (brs, H-1), 5.01 (dd, J = 1.5, 3, H-2), 4.55 (dd, J = 3, 10, H-3), 5.96 (t, J = 10, H-4), 4.29 (dq, J = 10, 6, H-5), 1.51 (d, J = 6, CH_3-6); β-D-Glcp′: 5.02 (d, J = 8, H-1), 3.82 (dd, J = 8, 9, H-2), 4.23 (t, J = 9, H-3), 4.07 (t, J = 9, H-4), ca 3.80 (H-5), ca 4.20, 4.40 (H_2-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.3	C-16	22.8	Dic.acid-1	171.2	Ara-1	104.7	Rha-1	100.7
2	68.8	17	47.1	2	46.5	2	73.8	2	72.1
3	83.5	18	41.4	3	70.2	3	72.5	3	79.0
4	43.3	19	46.1	4	47.8	4	72.3	4	73.3
5	47.3	20	30.8	5	171.4	5	64.4	5	67.9
6	18.8	21	34.0	6	26.2	Ara′-1	94.2	6	18.3
7	33.1	22	32.3	Glc-1	103.1	2	75.1	Glc′-1	105.8
8	40.1	23	65.4	2	80.3	3	71.2	2	74.9
9	48.6	24	15.6	3	78.9	4	67.6	3	78.1
10	37.3	25	17.8	4	71.4	5	64.8	4	71.5
11	24.0	26	17.6	5	78.1			5	77.7
12	123.3	27	26.4	6	62.5			6	62.6
13	144.2	28	176.1						
14	42.0	29	33.1						
15	28.9	30	23.7						

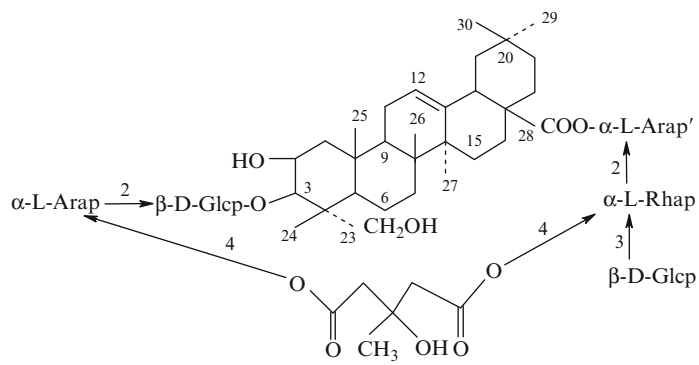
References

1. T. Fujioka, M. Iwamoto, Y. Iwase, S. Hachiyama, H. Okabe, T. Yamauchi, K. Mihashi, Chem. Pharm. Bull. **37**(7), 1770 (1989)

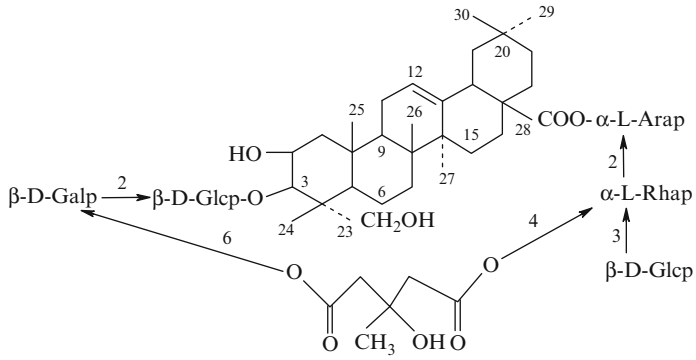
Lobatoside E

See Figure Lobatoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin



Lobatoside D



Lobatoside E

Biological sources: *Actinostemma lobatum* [1]
$C_{65}H_{102}O_{31}$: 1378.640
Mp: 255–260°C [1]
$[\alpha]_D^{22}$ + 11.0° (c 0.48, C_5H_5N) [1]
FAB-MS *m/z*: 1401 $[M + Na]^+$, 1377 $[M-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.85 (brs, H-2), 4.31 (d, J = 3, H-3), ca 5.45 (H-12), 3.12 (dd, J = 4, 14, H-18), 3.91, 4.41 (d, J = 11, H_2-23), 1.53 (s, CH_3-24), 1.65 (CH_3-25), 1.23 (CH_3-26), 1.35 (CH_3-27), 0.92 (CH_3-29), 0.88 (CH_3-30);
Dicrotalic acid: 3.01, 3.30 (d, J = 16, H-2(4)), 3.19, 3.32 (d, J = 17, H-4(2)), 2.01 (s, CH_3-6); β-D-Glcp: 5.12 (d, J = 8, H-1), 4.25 (dd, J = 8, 9, H-2), 4.18 (t, J = 9, H-3), 4.02 (t, J = 9, H-4), 3.79 (ddd, J = 3, 6, 9, H-5), 4.20 (dd, J = 6, 12, H-6), 4.38 (dd, J = 3, 12, H-6); β-D-Galp: 5.07 (d, J = 7.5, H-1), 4.51 (dd, J = 7.5, 9, H-2), 4.06 (dd, J = 3, 9, H-3), 4.28 (brd, J = 3, H-4), ca 4.08 (H-5), 4.73 (dd, J = 2, 12, H-6), 4.82 (dd, J = 7, 12, H-6); α-L-Arap: 6.01 (d, J = 6, H-1), 4.60 (t, J = 6, H-2), ca 4.32 (H-3), ca 4.28 (H-4), ca 3.83, 4.26 (H_2-5);
α-L-Rhap: 6.09 (brs, H-1), 5.15 (dd, J = 1.5, 3, H-2), 4.61 (dd, J = 3, 10, H-3), 6.00 (t, J = 10, H-4), 4.41 (dq, J = 10, 6, H-5), 1.70 (d, J = 6, CH_3-6); β-D-Glcp′: 5.02 (d, J = 8, H-1), 3.83 (dd, J = 8, 9, H-2), 4.09 (t, J = 9, H-3), 4.01 (t, J = 9, H-4), 3.75 (ddd, J = 3, 6, 9, H-5), 4.20 (dd, J = 6, 12, H-6), 4.32 (dd, J = 3, 12, H-6) [1]
^{13}C NMR (C_5D_5N): [1]

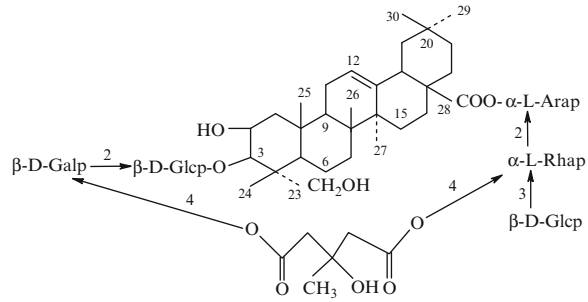
Table 1

C-1	44.2	C-16	22.9	Dic.acid-1	171.3	Gal-1	106.1	Rha-1	101.9
2	70.7	17	47.2	2	47.0	2	75.0	2	72.1
3	83.2	18	41.6	3	70.3	3	73.4	3	78.1
4	42.7	19	46.2	4	47.5	4	70.9	4	73.2
5	48.5	20	30.7	5	170.9	5	75.1	5	67.9
6	18.8	21	34.1	6	26.1	6	66.6	6	18.4
7	33.4	22	32.3	Glc-1	105.0	Ara-1	94.5	Glc′-1	105.7
8	40.0	23	64.7	2	82.3	2	76.6	2	74.9
9	47.6	24	15.4	3	77.2	3	73.6	3	77.9
10	37.0	25	17.4	4	71.6	4	68.8	4	71.7
11	24.0	26	17.7	5	77.6	5	66.5	5	77.7
12	123.2	27	25.6	6	62.5			6	62.7
13	144.1	28	176.2						
14	42.3	29	33.1						
15	28.9	30	23.5						

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, S. Hachiyama, H. Okabe, T. Yamauchi, K. Mihashi, Chem. Pharm. Bull. **37**(9), 2355 (1989)

Lobatoside F



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Actinostemma lobatum* [1]

$C_{65}H_{102}O_{31}$: 1378.640

Mp: 227–235°C [1]

$[\alpha]_D^{22}$ + 7.04° (c 0.27, C_5H_5N) [1]

FAB-MS *m/z*: 1401 $[M + Na]^+$, 1377 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.61 (brs, H-2), 4.33 (d, J = 3, H-3), 5.41 (brs, H-12), 3.14 (dd, J = 5, 14, H-18), 3.72, 4.41 (d, H_2-23), 1.63 (s, CH_3-24), 1.63 (s, CH_3-25), 1.09 (s, CH_3-26), 1.23 (s, CH_3-27), 0.91 (s, CH_3-29), 0.91 (s, CH_3-30);

Dicrotalic acid: 3.06, 3.42 (d, J = 16, H-2(4)), 3.14, 3.22 (d, J = 15, H-4(2)), 2.10 (s, CH_3-6); β-D-Glcp: 5.07 (d, J = 8, H-1), 4.44 (dd, J = 8, 9, H-2), 4.18 (t, J = 9, H-3), ca 4.06 (H-4), ca 3.80 (H-5), ca 4.20, 4.35 (H_2-6); β-D-Galp: 5.75 (d, J = 7, H-1), 4.47 (dd, J = 7, 9, H-2), 4.30 (dd, J = 3, 9, H-3), 6.01 (brd, J = 3, H-4), 4.05 (brt, J = 6, H-5), ca 4.15, 4.30 (H_2-6); α-L-Arap: 6.17 (d, J = 4, H-1), 4.59 (dd, J = 4, 5, H-2), 4.53 (dd, J = 3, 5, H-3), ca 4.30 (H-4), ca 3.87, 4.30 (H_2-5); α-L-Rhap: 5.98 (brs, H-1), 5.08 (dd, J = 1.5, 3, H-2), 4.62 (dd, J = 3, 9, H-3), 6.02 (t, J = 9, H-4), 4.31 (dq, J = 9, 6, H-5), 1.51 (d, J = 6, CH_3-6);

β-D-Glcp′: 5.09 (d, J = 8, H-1), 3.80 (dd, J = 8, 9, H-2), 4.10 (t, J = 9, H-3), ca 4.06 (H-4), ca 3.80 (H-5), ca 4.20, 4.35 (H_2-6) [1]

^{13}C NMR (C_5D_5N): [1]

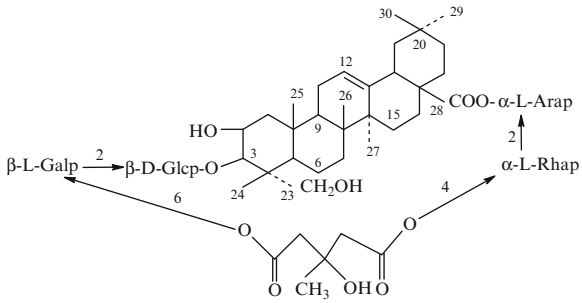
Table 1

C-1	44.0	C-16	22.8	Dic.acid-1	170.9	Gal-1	103.8	Rha-1	100.5
2	70.0	17	47.0	2	46.8	2	73.8	2	72.0
3	83.4	18	41.5	3	70.2	3	73.2	3	78.9
4	43.4	19	45.9	4	48.9	4	71.5	4	73.2
5	48.4	20	30.8	5	171.4	5	74.9	5	68.1
6	18.7	21	34.0	6	26.3	6	61.5	6	18.5
7	32.9	22	32.3	Glc-1	104.1	Ara-1	94.1	Glc′-1	105.8
8	40.0	23	65.3	2	78.4	2	75.4	2	74.8
9	47.1	24	16.0	3	78.9	3	70.3	3	78.1
10	37.2	25	17.7	4	71.4	4	67.2	4	71.6
11	23.9	26	17.9	5	78.1	5	64.3	5	77.7
12	124.0	27	26.1	6	62.5			6	62.5
13	144.1	28	176.1						
14	41.8	29	33.2						
15	28.8	30	23.7						

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, S. Hachiyama, H. Okabe, T. Yamauchi, K. Mihashi, Chem. Pharm. Bull. **37**(9), 2355 (1989)

Lobatoside G



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Actinostemma lobatum* [1]

$C_{59}H_{92}O_{26}$: 1216.587

Mp: 250–254°C [1]

$[\alpha]_D^{22}$ + 8.64° (c 0.44, C_5H_5N) [1]

FAB-MS *m/z*: 1239 $[M + Na]^+$, 1215 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.60 (brs, H-2), 4.32 (d, J = 3, H-3), 5.44 (brs, H-12), 3.15 (dd, J = 4, 13, H-18), 3.60, 4.29 (d, J = 11, H_2-23), 1.54 (s, CH_3-24), 1.58 (s, CH_3-25), 1.05 (s, CH_3-26), 1.25 (s, CH_3-27), 0.93 (s, CH_3-29), 0.92 (s, CH_3-30);

Dicrotalic acid: 3.00, 3.19 (d, J = 16, H-2(4)), 3.18 (s-like, H-4(2)), 1.98 (s, CH_3-6); β-D-Glcp: 5.04 (d, J = 8, H-1), 4.48 (dd, J = 8, 9, H-2), 4.25 (t, J = 9, H-3), 4.05 (t, J = 9, H-4), 3.81 (ddd, J = 3, 6, 9, H-5), 4.22 (dd, J = 6, 12, H-6), 4.42 (dd, J = 3, 12, H-6); β-D-Galp: 5.73 (d, J = 7.5, H-1), 4.40 (dd, J = 7.5, 9, H-2), 4.27 (dd, J = 3, 9, H-3), 5.97 (brd, J = 3, H-4), 4.04 (brt, J = 6, H-5), 4.12 (dd, J = 6, 12, H-6), ca 4.24 (H-6); α-L-Arap: 6.13 (d, J = 4, H-1), 4.60 (dd, J = 4, 6, H-2), 4.52 (dd, J = 3, 6, H-3), ca 4.38 (H-4), ca 3.93, 4.38 (H_2-5);

α-L-Rhap: 6.03 (brs, H-1), 4.70 (dd, J = 1.5, 3, H-2), 4.45 (dd, J = 3, 10, H-3), 5.83 (t, J = 10, H-4), 4.22 (dq, J = 10, 6, H-5), 1.50 (d, J = 6, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.4	C-16	22.9	Dic.acid-1	171.0	Gal-1	103.7	Rha-1	100.4
2	69.0	17	47.2	2	47.3	2	73.7	2	72.4

(*continued*)

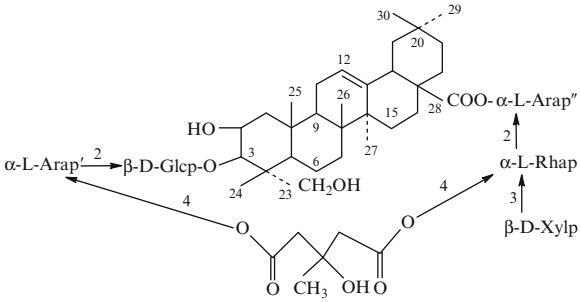
Table 1 (continued)

3	84.2	18	41.6	3	70.1	3	73.1	3	70.2
4	43.5	19	46.1	4	48.7	4	71.5	4	75.3
5	48.5	20	30.7	5	171.1	5	74.9	5	67.8
6	19.0	21	34.1	6	26.1	6	61.3	6	18.3
7	33.1	22	32.3	Glc-1	103.7	Ara-1	94.3		
8	40.1	23	66.0	2	78.4	2	74.8		
9	47.0	24	16.2	3	79.1	3	71.4		
10	37.4	25	17.6	4	71.5	4	67.7		
11	23.9	26	18.1	5	78.2	5	65.0		
12	123.2	27	26.2	6	62.5				
13	144.0	28	176.2						
14	42.1	29	33.1						
15	28.9	30	23.6						

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, S. Hachiyama, H. Okabe, T. Yamauchi, K. Mihashi, Chem. Pharm. Bull. **37**(9), 2355 (1989)

Lobatoside H (Tubeimoside I)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Actinostemma lobatum* [1], *Bolbostemma paniculatum* [2–4]

$C_{63}H_{98}O_{29}$: 1318.619

Mp: 235–240°C (aq. MeOH) [1]

$[\alpha]_D^{22}$ + 15.5° (c 0.61, C_5H_5N) [1]

FAB-MS *m/z*: 1341 $[M + Na]^+$, 1317 $[M\text{-}H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N/D_2O): 4.62 (brs, H-2), 4.30 (d, J = 3, H-3), 5.43 (brs, H-12), 3.15 (dd, J = 4, 14, H-18), 3.67 (d, 12, H-23), ca 4.27 (H-23), 1.52 (CH_3-24), 1.62 (s, CH_3-25), 1.12 (s, CH_3-26), 1.27 (s, CH_3-27), 0.92 (s, CH_3-29), 0.93 (s, CH_3-30);

Dicrotalic acid: 3.08, 3.43 (dd, J = 15, H-2(4)), 3.12, 3.28 (d, J = 15, H-4(2)), 2.01 (s, CH_3-6); β-D-Glcp: 5.03 (d, J = 7, H-1), 4.23 (dd, J = 7, 9, H-2), 4.08 (t, J = 9, H-3), ca 4.05 (H-4), ca 3.81 (H-5), ca 4.20, 4.40 (H_2-6); α-L-Arap: 5.48 (d, J = 8, H-1), 4.39 (dd, J = 8, 9, H-2), 4.22 (dd, J = 3, 9, H-3), 5.52 (brs, H-4), 3.63, 4.13 (brd, J = 12, H_2-5); α-L-Arap′: 6.13 (d, J = 4, H-1), 4.61 (dd, J = 4, 5, H-2), ca 4.49 (H-3), ca 4.40 (H-4), ca 3.84, 4.40 (H_2-5); α-L-Rhap: 6.05 (brs, H-1), 4.89 (dd, J = 1.5, 3, H-2), 4.53 (dd, J = 3, 10, H-3), 6.01 (t, J = 10, H-4), ca 4.30 (H-5), 1.52 (d, J = 6, CH_3-6); β-D-Xylp: 4.98 (d, 8, H-1), 3.81 (dd, 8, 9, H-2), 4.24 (t, 9, H-3), ca 4.10 (H-4), ca 3.60, 4.05 (H_2-5) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

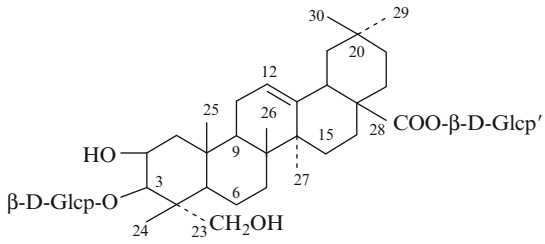
C-1	44.2	C-15	29.2	C-29	33.1	Ara-1	104.5	Rha-5	67.9
2	69.2	16	22.8	30	23.7	2	73.7	6	18.2
3	83.1	17	47.1	DA-1	171.2	3	72.5	Xyl-1	106.5
4	43.1	18	41.3	2	46.4	4	72.4	2	74.7
5	47.4	19	46.0	3	70.1	5	64.3	3	78.0
6	18.6	20	30.7	4	47.8	Ara′-1	94.1	4	70.9
7	33.2	21	34.0	5	171.4	2	74.7	5	66.9
8	40.1	22	32.2	6	26.0	3	70.9		
9	48.6	23	64.7	Glc-1	102.9	4	67.6		
10	37.2	24	15.5	2	80.0	5	64.7		
11	23.9	25	17.7	3	78.9	Rha-1	100.6		
12	123.2	26	17.7	4	71.4	2	72.3		
13	144.2	27	26.4	5	78.2	3	78.6		
14	41.9	28	176.0	6	62.5	4	73.2		

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, S. Hachiyama, H. Okabe, T. Yamauchi, K. Mihashi, Chem. Pharm. Bull. **37**(7), 1770 (1989)
2. R. Kasai, M. Miyakoshi, K. Matsumoto, R.-L. Nie, J. Zhou, T. Morita, O. Tanaka, Chem. Pharm. Bull. **34**, 3974 (1986)
3. R. Kasai, M. Miyakoshi, R.-L. Nie, J. Zhou, K. Matsumoto, T. Morita, M. Nishi, K. Miyahara, O. Tanaka, Phytochemistry **27**, 1439 (1988)
4. F.-H. Kong, D.Y. Zhu, R.-S. Xu, Z.-C. Fu, L.-Y. Zhou, T. Iwashita, H. Komura, Tetrahedron Lett. **27**, 5765 (1986)

Polygalasaponin I

CAS Registry Number: 162901-83-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Polygala japonica* [1]

$C_{42}H_{68}O_{15}$: 812.455

$[\alpha]_D^{27}$ + 25.7° (c 1.07, MeOH) [1]

FAB-MS *m/z*: 835 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.78 (m, H-2), 4.29 (d, J = 3, H-3), 5.44 (t-like, H-12), 3.18 (dd, J = 14, 4, H-18), 3.66, 4.30 (d, J = 11, H_2-23), 1.33 (s, CH_3-24), 1.56 (s, CH_3-25), 1.16 (s, CH_3-26), 1.22 (s, CH_3-27), 0.89 (s, CH_3-29), 0.88 (s, CH_3-30)

β-D-Glcp:5.12 (d, J = 8, H-1), 3.98 (t, J = 8.5, H-2), 4.12 (t, J = 8.5, H-3), 4.18 (t, J = 9, H-4), 3.88 (m, H-5), 4.29, 4.39 (dd, J = 12.5, H_2-6)

β-D-Glcp′: 6.29 (d, J = 8, H-1), 4.16 (t, J = 8.5, H-2), 4.25 (t, J = 9, H-3), 4.29 (t, J = 9, H-4), 3.99 (H-5), 4.37, 4.42 (brd, J = 12, H_2-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	23.5	Glc-1	105.7
2	70.6	17	47.1	2	75.5
3	83.1	18	41.8	3	78.6
4	42.4	19	46.2	4	71.7
5	47.8	20	30.8	5	78.3
6	18.1	21	34.1	6	62.7
7	32.6	22	33.0	Glc′-1	95.8
8	40.1	23	65.7	2	74.2
9	48.6	24	15.1	3	78.9
10	37.0	25	17.4	4	71.2
11	24.1	26	17.7	5	79.3
12	123.2	27	26.2	6	62.3
13	144.2	28	176.5		
14	42.8	29	33.2		
15	28.3	30	23.7		

Pharm./Biol.: Expectorant, anti-inflammatory (for pharingits), antibacterial [1]

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

Polygalasaponin II

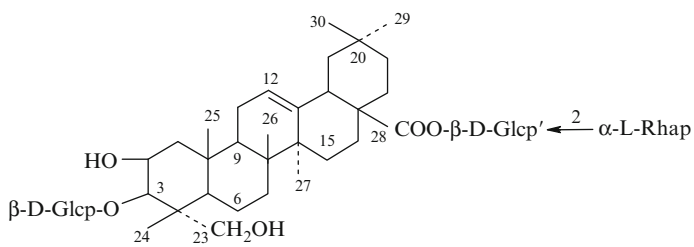
CAS Registry Number: 162857-62-7

See Figure Polygalasaponin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Polygala japonica* [1]

$C_{48}H_{78}O_{19}$: 959.140



Polygalasaponin II

$[\alpha]_D^{27}$ 0° (c 0.85, MeOH) [1]
FAB-MS *m/z*: 982 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.77 (m, H-2), 4.27 (d, J = 3, H-3), 5.47 (t-like, H-12), 3.11 (dd, J = 14, 4, H-18), 3.60, 4.30 (dd, J = 11, H_2-23), 1.30 (s, CH_3-24), 1.56 (s, CH_3-25), 1.15 (s, CH_3-26), 1.23 (s, CH_3-27), 0.86 (s, CH_3-29), 0.81 (s, CH_3-30)
β-D-Glcp: 5.11 (d, J = 8, H-1), 4.01 (t, J = 8.5, H-2), 4.13 (t, J = 8.5, H-3), 4.18 (t, J = 9, H-4), 3.88 (H-5), 4.30, 4.43 (H_2-6)
β-D-Glcp′: 6.17 (d, J = 2, H-1), 4.43 (H-2), 4.29 (H-3), 4.30 (H-4), 3.96 (H-5), 4.30, 4.38 (brd, J = 12, H_2-6)
α-L-Rhap: 6.53 (brs, H-1), 4.77 (brs, H-2), 4.54 (H-3), 4.23 (H-4), 4.52 (m, H-5), 1.74 (d, J = 6.5, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	23.5	Glc-1	105.7	Rha-1	101.5
2	70.6	17	47.1	2	75.5	2	72.3
3	83.1	18	41.8	3	78.6	3	72.6
4	42.4	19	46.2	4	71.7	4	73.9
5	47.8	20	30.8	5	78.3	5	69.8
6	18.1	21	34.1	6	62.7	6	18.8
7	32.6	22	33.0	Glc′-1	94.9		
8	40.1	23	65.7	2	75.9		
9	48.6	24	15.1	3	79.7		
10	37.0	25	17.4	4	71.5		
11	24.1	26	17.7	5	78.9		
12	123.2	27	26.2	6	62.2		
13	144.2	28	176.5				
14	42.8	29	33.2				
15	28.3	30	23.7				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

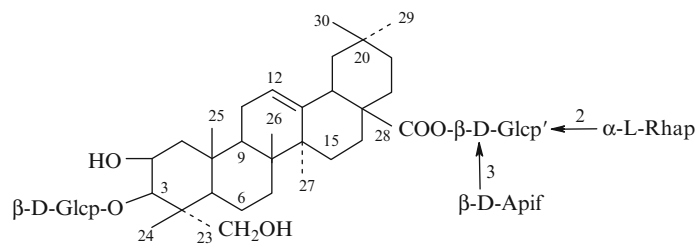
Polygalasaponin III

CAS Registry Number: 162857-63-8
See Figure Polygalasaponin III
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Polygala japonica* [1]
$C_{53}H_{86}O_{23}$: 1091.250
$[\alpha]_D^{27}$ −11.5° (c 0.3, MeOH) [1]
FAB-MS *m/z*: 1114 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.78 (m, H-2), 4.29 (d, J = 3, H-3), 5.47 (t-like, H-12), 3.10 (dd, J = 14, 4, H-18), 3.61, 4.31 (d, J = 11, H_2-23), 1.31 (s, CH_3-24), 1.58 (s, CH_3-25), 1.15 (s, CH_3-26), 1.22 (s, CH_3-27), 0.86 (s, CH_3-29), 0.83 (s, CH_3-30)
β-D-Glcp: 5.13 (d, J = 8, H-1), 4.01 (t, J = 8.5, H-2), 4.14 (t, J = 8.5, H-3), 4.20 (t, J = 9, H-4), 3.88 (m, H-5), 4.31, 4.44 (d, J = 12.2, H_2-6)
β-D-Glcp′: 6.18 (d, J = 7, H-1), 4.33 (t, J = 8, H-2), 4.14 (t, J = 8.5, H-3), 4.26 (H-4), 3.93 (m, H-5), 4.26, 4.30 (H_2-6)
α-L-Rhap: 6.03 (brs, H-1), 4.69 (brs, H-2), 4.47 (dd, J = 9.5, 3, H-3), 4.26 (t, J = 9.5, H-4), 4.40 (m, H-5), 1.72 (d, J = 6.5, CH_3-6)
β-D-Apif: 5.81 (d, J = 3, H-1), 4.76 (d, J = 3, H-2), 4.09, 4.10 (d, J = 11, H_2-4), 4.29, 4.65 (d, J = 9.5, H_2-5) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

Glc-1	105.7	Rha-1	101.7
2	75.5	2	72.0

(*continued*)



Polygalasaponin III

Table 1 (continued)

3	78.5	3	72.5
4	71.7	4	73.7
5	78.3	5	70.4
6	62.7	6	18.8
Glc′-1	94.3	Apif-1	111.2
2	75.5	2	78.0
3	87.4	3	80.2
4	69.3	4	75.2
5	78.2	5	64.7
6	61.9		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

Polygalasaponin IV

CAS Registry Number: 162857-64-9

See Figure Polygalasaponin IV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Polygala japonica* [1]

$C_{58}H_{94}O_{27}$: 1223.370

$[\alpha]_D^{27} -10.8°$ (c 0.51, MeOH) [1]

FAB-MS *m/z*: 1246 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.79 (m, H-2), 4.32 (d, J = 3, H-3), 5.47 (t-like, H-12), 3.10 (dd, J = 14, 4, H-18), 3.74, 4.36 (d, J = 11, H_2-23), 1.32 (s, CH_3-24), 1.56 (s, CH_3-25), 1.16 (s, CH_3-26), 1.21 (s, CH_3-27), 0.84 (s, CH_3-29), 0.82 (s, CH_3-30)

β-D-Glcp: 5.17 (d, J = 8, H-1), 4.03 (t, J = 8.5, H-2), 4.18 (t, J = 8.5, H-3), 4.24 (t, J = 9, H-4), 3.91 (m, H-5), 4.36, 4.42 (H_2-6)

β-D-Glcp: 6.23 (d, J = 7, H-1), 4.34 (t, J = 8, H-2), 4.16 (t, J = 8.5, H-3), 4.26 (H-4), 3.96 (H-5), 4.34, 4.48 (d, J = 12, H_2-6)

α-L-Rhap: 6.03 (brs, H-1), 4.70 (brs, H-2), 4.62 (t, J = 9.5, H-3), 4.35 (t, J = 9.5, H-4), 4.42 (m, H-5), 1.81 (d, J = 6.5, CH_3-6)

β-D-Apif: 5.82 (d, J = 3, H-1), 4.79 (d, J = 3, H-2), 4.12, 4.14 (d, J = 11, H_2-4), 4.30, 4.68 (d, J = 9.5, H_2-5)

β-D-Xylp: 5.08 (d, J = 7, H-1), 4.09 (H-2), 4.07 (H-3), 4.18 (H-4), 3.53, 4.24 (t, J = 11, H_2-5) [1]

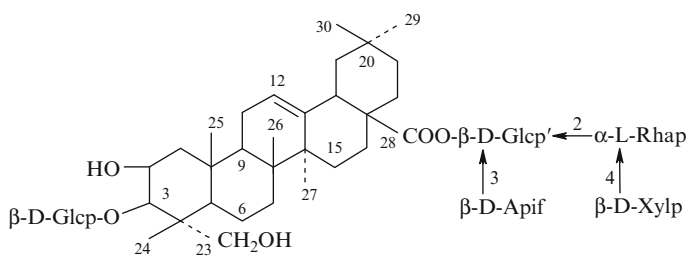
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

Glc-1	105.8	Rha-1	101.4	Xyl-1	107.5
2	75.5	2	71.6	2	76.2
3	78.6	3	72.4	3	78.7
4	71.6	4	84.7	4	71.0
5	78.3	5	68.7	5	67.5
6	62.7	6	18.6		
Glc′-1	94.1	Apif-1	111.0		
2	75.7	2	78.0		
3	87.2	3	80.3		
4	69.2	4	75.3		
5	78.1	5	64.7		
6	61.8				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)



Polygalasaponin IV

Polygalasaponin V

CAS Registry Number: 162857-65-0
See Figure Polygalasaponin V
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Polygala japonica* [1]
$C_{58}H_{94}O_{27}$: 1223.370
$[\alpha]_D^{27}$ −16.7° (c 0.48, MeOH) [1]
FAB-MS *m/z*: 1246 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.78 (m, H-2), 4.29 (d, J = 3, H-3), 5.45 (t-like, H-12), 3.11 (dd, J = 14, 4, H-18), 3.75, 4.32 (d, J = 11, H_2-23), 1.34 (s, CH_3-24), 1.56 (s, CH_3-25), 1.17 (s, CH_3-26), 1.23 (s, CH_3-27), 0.88 (s, CH_3-29), 0.85 (s, CH_3-30)
β-D-Glcp: 5.13 (d, J = 8, H-1), 4.01 (t, J = 8.5, H-2), 4.14 (t, J = 8.5, H-3), 4.20 (t, J = 9, H-4), 3.88 (m, H-5), 4.32, 4.44 (dd, J = 12.2, H_2-6)
β-D-Glcp′: 6.22 (d, J = 7, H-1), 4.26 (t, J = 8, H-2), 4.29 (t, J = 8.5, H-3), 4.27 (H-4), 3.96 (m, H-5), 4.34, 4.39 (d, J = 12.2, H_2-6)
α-L-Rhap: 6.20 (brs, H-1), 5.03 (brs, H-2), 4.66 (dd, J = 9.5, 3, H-3), 4.52 (t, J = 9.5, H-4), 4.48 (m, H-5), 1.78 (d, J = 6.5, CH_3-6)
β-D-Apif: 6.05 (d, J = 3, H-1), 4.78 (d, J = 3, H-2), 4.03, 4.06 (d, J = 11, H_2-4), 4.18, 4.58 (d, J = 9.5, H_2-5)
β-D-Xylp: 5.32 (d, J = 7, H-1), 3.99 (t, J = 8.5, H-2), 4.09 (t, J = 8.5, H-3), 4.17 (H-4), 3.51, 4.23 (t, J = 11, H_2-5) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

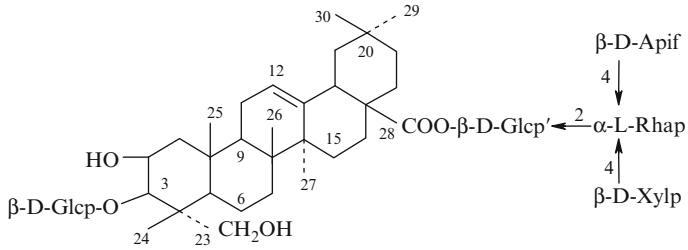
Glc-1	105.7	Rha-1	101.9	Xyl-1	105.4
2	75.2	2	71.4	2	75.8
3	78.6	3	82.2	3	78.7
4	71.7	4	78.9	4	71.3
5	78.3	5	68.6	5	67.2
6	62.7	6	19.1		
Glc′-1	94.8	Apif-1	111.6		
2	78.5	2	77.7		
3	78.7	3	79.6		
4	71.4	4	74.6		
5	78.7	5	64.7		
6	62.5				

References

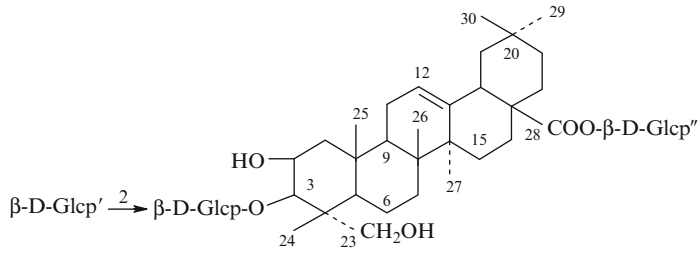
1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

Polygalasaponin VI

CAS Registry Number: 162857-66-1
See Figure Polygalasaponin VI
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Polygala japonica* [1]
$C_{48}H_{78}O_{20}$: 974.508
$[\alpha]_D^{27}$ + 28.3° (c 1.15, MeOH) [1]
FAB-MS *m/z*: 997 $[M + Na]^+$ [1]



Polygalasaponin V



Polygalasaponin VI

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.71 (m, H-2), 4.15 (d, J = 3, H-3), 5.41 (t-like, H-12), 3.16 (dd, J = 14, 4, H-18), 3.69, 4.31 (d, J = 11, H_2-23), 1.40 (s, CH_3-24), 1.53 (s, CH_3-25), 1.14 (s, CH_3-26), 1.18 (s, CH_3-27), 0.87 (s, CH_3-29), 0.86 (s, CH_3-30)

β-D-Glcp: 5.06 (d, J = 8, H-1), 4.08 (t, J = 8.5, H-2), 4.19 (t, J = 9, H-3), 4.10 (t, J = 9, H-4), 3.80 (m, H-5), 4.23, 4.39 (H_2-6)

β-D-Glcp′: 5.32 (d, J = 8, H-1), 4.06 (t, J = 8.5, H-2), 4.17 (t, J = 9, H-3), 4.19 (t, J = 9, H-4), 3.89 (m, H-5), 4.37, 4.47 (dd, J = 12.2, H-6)

β-D-Glcp″: 6.28 (d, J = 8, H-1), 4.15 (t, J = 8.5, H-2), 4.23 (t, J = 9, H-3), 4.30 (t, J = 9, H-4), 3.99 (m, H-5), 4.34, 4.41 (dd, J = 12.2, H_2-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

Glc-1	103.0	Glc″-1	95.8
2	83.7	2	74.2
3	78.1	3	78.9
4	71.1	4	71.3
5	78.1	5	79.3
6	62.5	6	62.3
Glc′-1	105.8		
2	76.8		
3	78.4		
4	71.4		
5	78.4		
6	62.6		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

Polygalasaponin VII

CAS Registry Number: 162857-67-2

See Figure Polygalasaponin VII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Polygala japonica* [1]

$C_{54}H_{88}O_{24}$: 1121.280

$[\alpha]_D^{27}$ + 1.2° (c 0.84, MeOH) [1]

FAB-MS *m/z*: 1144 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.72 (m, H-2), 4.13 (d, J = 3, H-3), 5.46 (t-like, H-12), 3.10 (dd, J = 14, 4, H-18), 3.62, 4.37 (d, J = 11, H_2-23), 1.37 (s, CH_3-24), 1.55 (s, CH_3-25), 1.14 (s, CH_3-26), 1.21 (s, CH_3-27), 0.86 (s, CH_3-29), 0.81 (s, CH_3-30)

β-D-Glcp: 5.06 (d, J = 8, H-1), 4.08 (t, J = 8.5, H-2), 4.19 (t, J = 9, H-3), 4.10 (t, J = 9, H-4), 3.81 (m, H-5), 4.23, 4.41 (dd, J = 12.5, H_2-6)

β-D-Glcp′: 5.32 (d, J = 8, H-1), 4.07 (t, J = 8.5, H-2), 4.17 (t, J = 9, H-3), 4.24 (t, J = 9, H-4), 3.90 (m, H-5), 4.39, 4.48 (dd, J = 12.2, H_2-6)

β-D-Glcp″: 6.16 (d, J = 8, H-1), 4.44 (t, J = 8.5, H-2), 4.29 (t, J = 9, H-3), 4.32 (t, J = 9, H-4), 3.96 (m, H-5), 4.31; 4.37 (dd, J = 12.2, H_2-6)

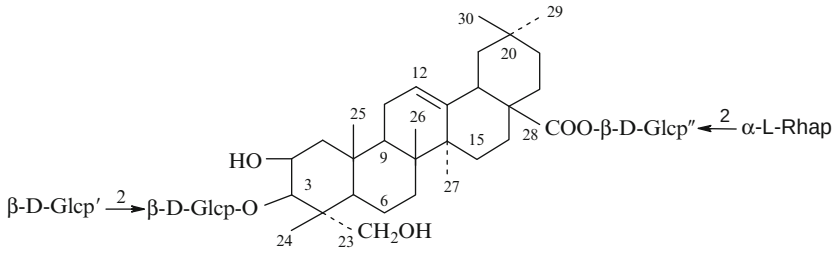
α-L-Rhap: 6.55 (brs, H-1), 4.77 (brs, H-2), 4.52 (dd, J = 9.5, 3, H-3), 4.29 (H-4), 4.51 (m, H-5), 1.74 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

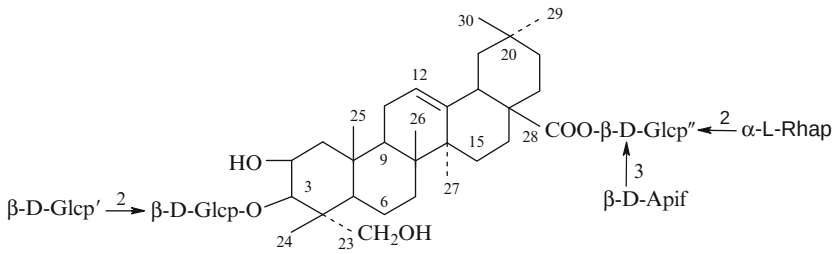
Table 1

Glc-1	103.0	Glc″-1	94.9
2	83.8	2	75.9

(*continued*)



Polygalasaponin VII



Polygalasaponin VIII

Table 1 (continued)

3	78.0	3	79.8
4	71.1	4	71.5
5	78.0	5	78.9
6	62.5	6	62.2
Glc′-1	105.9	Rha-1	101.5
2	76.8	2	72.3
3	78.4	3	72.6
4	71.3	4	73.9
5	78.4	5	69.8
6	62.6	6	18.8

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

Polygalasaponin VIII

CAS Registry Number: 162857-68-3
See Figure Polygalasaponin VIII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Polygala japonica* [1]

$C_{59}H_{96}O_{28}$: 1253.390

$[\alpha]_D^{25}$ + 10.6° (c 1.04, C_5H_5N) [1]

FAB-MS *m/z*: 1276 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.73 (m, H-2), 4.14 (d, 3, H-3), 5.47 (t-like, H-12), 3.10 (dd, J = 14, 4, H-18), 3.65, 4.31 (dd, J = 11, CH_2-23), 1.39 (s, CH_3-24), 1.57 (s, CH_3-25), 1.15 (s, CH_3-26), 1.20 (s, CH_3-27), 0.86 (s, CH_3-29), 0.82 (s, CH_3-30)

β-D-Glcp: 5.07 (d, J = 8, H-1), 4.10 (t, J = 8.5, H-2), 4.21 (t, J = 9, H-3), 4.13 (t, J = 9, H-4), 3.82 (m, H-5), 4.23, 4.39 (H_2-6)

β-D-Glcp′: 5.34 (d, J = 8, H-1), 4.09 (H-2), 4.19 (t, J = 9, H-3), 4.23 (H-4), 3.91 (m, H-5), 4.39, 4.50 (dd, J = 12.2, H_2-6)

β-D-Glcp″: 6.18 (H-1), 4.33 (t, J = 8, H-2), 4.15 (t, J = 8.5, H-3), 4.26 (H-4), 3.93 (m, H-5), 4.23, 4.28 (H_2-6)

α-L-Rhap: 6.05 (brs, H-1), 4.69 (brs, H-2), 4.47 (dd, J = 9.5, 3, H-3), 4.26 (H-4), 4.41 (m, H-5), 1.72 (d, J = 6.5, CH_3-6)

β-D-Apif: 5.81 (d, J = 3, H-1), 4.76 (d, J = 3, H-2), 4.08, 4.11 (dd, J = 11, H_2-4), 4.29, 4.65 (J = 9.5, H_2-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

Glc-1	102.9	Glc-1	94.3	Apif-1	111.2
2	83.8	2	75.4	2	77.9
3	78.0	3	87.6	3	80.2
4	71.1	4	69.3	4	75.2
5	78.0	5	78.2	5	64.7
6	62.5	6	61.9		
Glc′-1	105.9	Rha-1	101.7		
2	76.8	2	72.0		
3	78.4	3	72.5		
4	71.3	4	73.6		
5	78.4	5	70.4		
6	62.6	6	18.8		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

Polygalasaponin IX

CAS Registry Number: 162857-69-4

See Figure Polygalasaponin IX

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Polygala japonica* [1]

$C_{59}H_{96}O_{28}$: 1253.390

$[\alpha]_D^{27}$ −1.3° (c 0.38, MeOH) [1]

FAB-MS *m/z*: 1276 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.73 (m, H-2), 4.16 (d, J = 3, H-3), 5.45 (t-like, H-12), 3.10 (dd, J = 14, 4, H-18), 3.75, 4.29 (d, J = 11, H_2-23), 1.38 (s, CH_3-24), 1.53 (s, CH_3-25), 1.16 (s, CH_3-26), 1.21 (s, CH_3-27), 0.84 (s, CH_3-29), 0.83 (s, CH_3-30)

β-D-Glcp: 5.07 (d, J = 8, H-1), 4.09 (t, J = 8.5, H-2), 4.21 (t, J = 9, H-3), 4.12 (t, J = 9, H-4), 3.82 (m, H-5), 4.25, 4.41 (dd, J = 12.2, H_2-6)

β-D-Glcp′: 5.33 (d, J = 8, H-1), 4.08 (t, J = 8.5, H-2), 4.18 (t, J = 9, H-3), 4.22 (t, J = 9, H-4), 3.90 (m, H-5), 4.38, 4.50 (dd, J = 12.2, H_2-6)

β-D-Glcp″: 6.18 (d, J = 8, H-1), 4.38 (t, J = 8.5, H-2), 4.28 (t, J = 9, H-3), 4.29 (H-4), 3.95 (m, H-5), 4.31, 4.38 (H_2-6)

α-L-Rhap: 6.45 (brs, H-1), 4.83 (brs, H-2), 4.70 (dd, J = 9.5, 3, H-3), 4.35 (t, J = 9.5, H-4), 4.53 (m, H-5), 1.81 (d, J = 6.5, CH_3-6)

β-D-Xylp: 5.05 (d, J = 7, H-1), 4.07 (H-2), 4.06 (H-3), 4.16 (H-4), 4.22, 5.53 (t, J = 11, H_2-5) [1]

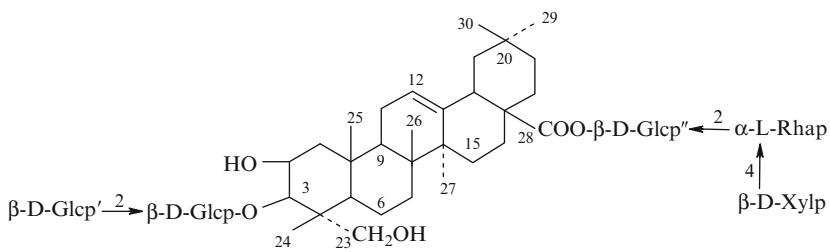
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

Glc-1	103.0	Glc″-1	94.8	Xyl-1	107.7
2	83.8	2	76.7	2	76.3
3	78.0	3	79.5	3	78.8
4	71.1	4	71.4	4	70.9
5	78.0	5	78.9	5	67.5
6	62.5	6	62.2		
Glc′-1	105.8	Rha-1	101.4		
2	76.7	2	71.9		
3	78.3	3	72.6		
4	71.3	4	85.5		
5	78.3	5	68.3		
6	62.6	6	18.6		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)



Polygalasaponin IX

Polygalasaponin X

CAS Registry Number: 162857-77-4
See Figure Polygalasaponin X
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Polygala japonica* [1]
$C_{64}H_{104}O_{32}$: 1385.510
$[\alpha]_D^{25}$ + 17.2° (c 0.32, C_5H_5N) [1]
FAB-MS *m/z*: 1408 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.73 (m, H-2), 4.15 (d, J = 3, H-3), 5.45 (t-like, H-12), 3.09 (dd, 14, 4, H-18), 3.75, 4.30 (d, J = 11, H_2-23), 1.38 (s, CH_3-24), 1.53 (s, CH_3-25), 1.14 (s, CH_3-26), 1.20 (s, CH_3-27), 0.85 (0s, CH_3-29), 0.83 (s, CH_3-30)
β-D-Glcp: 5.08 (d, J = 8, H-1), 4.09 (t, J = 8.5, H-2), 4.22 (t, J = 9, H-3), 4.12 (t, J = 9, H-4), 3.82 (m, H-5), 4.23, 4.41 (d, J = 12.2, H_2-6)
β-D-Glcp′: 5.33 (d, J = 8, H-1), 4.08 (H-2), 4.20 (t, J = 9, H-3), 4.23 (H-4), 3.91 (m, H-5), 4.39, 4.50 (d, J = 12.2, H_2-6)
β-D-Glcp″: 6.19 (d, J = 7, H-1), 4.30 (t, J = 8, H-2), 4.13 (t, J = 8.5, H-3), 4.26 (H-4), 3.93 (m, H-5), 4.26, 4.31 (H_2-6)
α-L-Rhap: 5.98 (brs, H-1), 4.69 (brs, H-2), 4.60 (dd, J = 9.5, 3, H-3), 4.30 (t, J = 9.5, H-4), 4.39 (m, H-5), 1.79 (d, J = 6.5, CH_3-6)
β-D-Apif: 5.80 (d, J = 3, H-1), 4.76 (d, J = 3, H-2), 4.08, 4.11 (H_2-4), 4.30, 4.66 (d, J = 9.5, H_2-5)
β-D-Xylp: 5.05 (d, J = 7, H-1), 4.08 (H-2), 4.05 (H-3), 4.16 (H-4), 3.51, 4.23 (t, J = 11, H_2-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

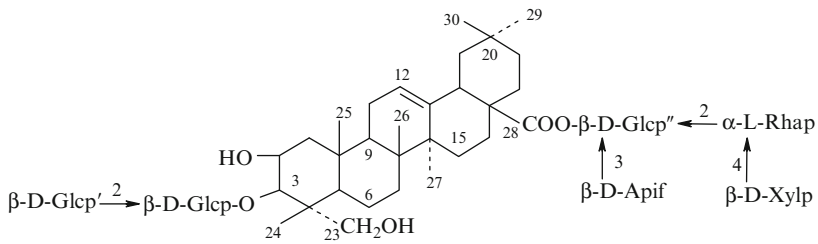
Glc-1	103.0	Glc″-1	94.2	Apif-1	111.0
2	83.6	2	75.9	2	78.0
3	78.1	3	87.2	3	80.2
4	71.1	4	69.3	4	75.3
5	78.1	5	78.2	5	64.8
6	62.3	6	62.0	Xyl-1	107.4
Glc′-1	105.8	Rha-1	101.5	2	76.2
2	76.7	2	71.5	3	78.7
3	78.4	3	72.4	4	70.9
4	71.4	4	84.6	5	67.5
5	78.4	5	68.8		
6	62.6	6	18.6		

References

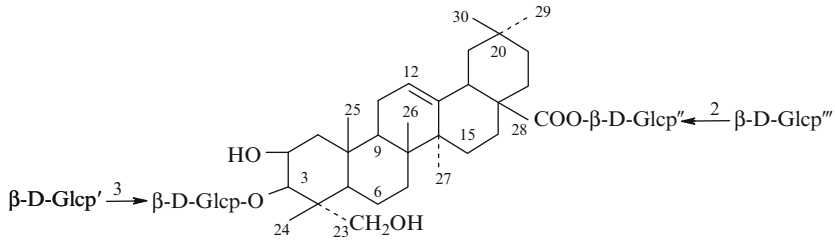
1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(1), 115 (1995)

Polygalasaponin XI

CAS Registry Number: 168570-26-1
See Figure Polygalasaponin XI
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Polygala japonica* [1]
$C_{54}H_{88}O_{25}$: 1137.280
$[\alpha]_D^{21}$ + 30.6° (c 0.62, MeOH) [1]
FAB-MS *m/z*: 1160 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.73 (m, H-2), 4.17 (d, J = 3, H-3), 5.44 (t-like, H-12), 3.13 (dd, J = 14, 4, H-18),



Polygalasaponin X



Polygalasaponin XI

3.63, 4.29 (d, J = 11, H_2-23), 1.35 (d, J = 11, CH_3-24), 1.48 (s, CH_3-25), 1.08 (s, CH_3-26), 1.18 (s, CH_3-27), 0.86 (s, CH_3-29), 0.86 (s, CH_3-30)
β-D-Glcp: 5.10 (d, J = 8, H-1), 4.11 (t, J = 8.5, H-2)
β-D-Glcp′: 5.36 (d, J = 8, H-1); β-D-Glcp″: 6.18 (d, J = 8, H-1), 4.44 (t, J = 8.5, H-2); β-D-Glcp‴: 5.69 (d, J = 8, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.0	C-16	23.2	Glc-1	103.0	Glc″-1	93.7
2	70.3	17	47.0	2	83.6	2	78.9
3	83.0	18	41.9	3	78.1	3	79.0
4	42.3	19	46.3	4	71.1	4	70.8
5	48.2	20	30.8	5	78.1	5	79.2
6	18.1	21	34.1	6	62.5	6	62.1
7	32.3	22	33.2	Glc′-1	105.8	Glc‴-1	104.7
8	40.1	23	65.8	2	76.8	2	76.0
9	48.6	24	14.8	3	78.4	3	78.4
10	36.9	25	17.2	4	71.4	4	73.0
11	24.0	26	17.6	5	78.4	5	78.1
12	122.8	27	26.2	6	62.6	6	64.0
13	144.5	28	176.5				
14	42.7	29	33.2				
15	29.1	30	23.8				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

Tacacoside A_1

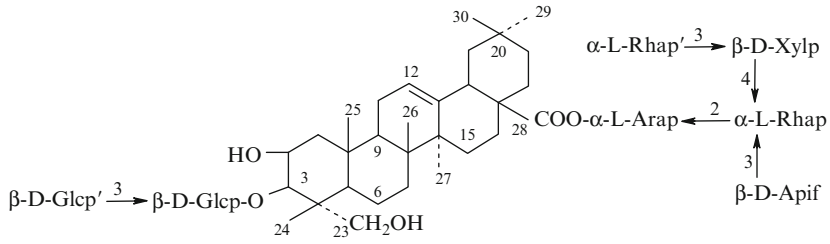
CAS Registry Number: 188640-77-9
See Figure Tacacoside A_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Sechium pittieri* [1]
$C_{69}H_{112}O_{35}$: 1500.698
$[\alpha]_D^{26}$ −36.6° (c 1.16, MeOH) [1]
FAB-MS *m/z*: 1499 $[M-H]^-$, 1367 $[M-H-Api]^-$, 1353 $[M-H-Rha]^-$, 1337 $[M-H-Glc]^-$, 1221 [1353-Api]$^-$, 1175 [1337-Glc]$^-$, 811, 765, 649, 631, 487 $[agl-H]^-$, 469 $[agl-H-H_2O]^-$ [1]
HR-FAB-MS *m/z*: 1523.6879 $[M + Na]^+$, 789.4409 $[C_{41}H_{66}NaO_{15}]^+$, 711.2361 $[C_{27}H_{44}NaO_{20}]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.76 (H-2), 4.30 (H-3), 5.46 (brs, H-12), 3.30 (dd, J = 4.0, 14.0, H-18), 3.68 (d, J = 10.0, H-23), 4.30 (H-23), 1.33 (s, CH_3-24), 1.55 (s, CH_3-25), 1.13 (s, CH_3-26), 1.23 (s, CH_3-27), 0.91 (s, CH_3-29), 1.01 (s, CH_3-30)
β-D-Glcp: 5.10 (d, J = 7.0, H-1); β-D-Glcp′: 5.20 (d, J = 8.0, H-1); α-L-Arap:6.54 (brs, H-1); α-L-Rhap: 5.57 (d, J = 2.0, H-1); α-L-Rhap′: 6.13 (d, J = 2.0, H-1); β-D-Xylp:5.26 (d, J = 8.0, H-1); β-D-Apif:5.88 (d, J = 5.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

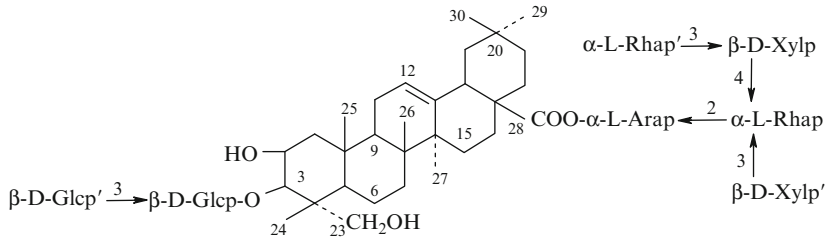
Table 1

C-1	44.1	C-16	23.1	Glc-1	105.4
2	70.7	17	47.3	Glc′-1	105.9
3	82.9	18	41.6	Ara-1	92.9
4	42.8	19	46.1	Rha-1	100.9
5	47.6	20	30.9	Rha′-1	102.7
6	17.9	21	34.1	Xyl-1	104.9
7	32.9	22	32.7	Api-1	112.0
8	40.0	23	65.1		
9	48.4	24	15.0		
10	36.9	25	17.2		
11	24.0	26	17.6		
12	123.0	27	26.1		

(*continued*)



Tacacoside A_1



Tacacoside A_2

Table 1 (continued)

13	144.1	28	176.2
14	42.2	29	33.1
15	28.1	30	23.7

Pharm./Biol.: This saponin showed moderate antiproliferative activity (ED_{50}:10-74 μg/ml) against MK-1, HeLa and B16F10 cells [1]

References

1. V.H. Castro, E. Ramirez, G.A. Mora, Y. Iwase, T. Nagao, H. Okabe, H. Matsunaga, M. Katano, M. Mori, Chem. Pharm. Bull. **45**(2), 349 (1997)

Tacacoside A_2

CAS Registry Number: 188640-78-0
See Figure Tacacoside A_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Sechium pittieri* [1]
$C_{69}H_{112}O_{35}$: 1500.698
$[\alpha]_D^{26}$ −28.3° (c 1.12, MeOH) [1]
FAB-MS *m/z*: 1499 $[M-H]^-$, 1367 [M-H-Xyl]$^-$, 1353 [M-H-Rha]$^-$, 1337 [M-H-Glc]$^-$, 1221 [1353-Xyl]$^-$, 1175 [1337-Glc]$^-$, 811, 765 [811-HCOOH]$^-$, 649, 487 [1]
HR-FAB-MS *m/z*: 1523.6887 $[M + Na]^+$, 835.4448 $[C_{42}H_{68}NaO_{13}]^+$, 789.4398 $[C_{41}H_{66}NaO_{15}]^+$, 711.2354 $[C_{27}H_{44}NaO_{20}]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.76 (brs, H-2), 4.30 (H-3), 5.45 (brs, H-12), 3.28 (dd, J = 5.0, 14.0, H-18), 3.67 (d, J = 10.0, H-23), 4.27 (H-23), 1.33 (s, CH_3-24), 1.55 (s, CH_3-25), 1.15 (s, CH_3-26), 1.24 (s, CH_3-27), 0.90 (s, CH_3-29), 1.00 (s, CH_3-30)
β-D-Glcp: 5.09 (d, J = 8.0, H-1); β-D-Glcp′: 5.20 (d, J = 8.0, H-1); α-L-Arap: 6.51 (d, J = 2.0, H-1); α-L-Rhap: 5.68 (brs, H-1); α-L-Rhap: 6.16 (d, J = 2.0, H-1); β-D-Xylp: 5.38 (d, J = 8.0, H-1); β-D-Xylp′: 5.07 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.1	C-16	23.1	Glc-1	105.3
2	70.6	17	47.3	Glc′-1	105.9
3	82.9	18	41.7	Ara-1	93.2
4	42.8	19	46.2	Rha-1	100.7
5	47.6	20	30.8	Rha′-1	102.6
6	18.0	21	34.1	Xyl-1	104.7
7	33.0	22	32.7	Xyl′-1	105.8

(*continued*)

Table 1 (continued)

8	40.0	23	65.1
9	48.5	24	15.0
10	36.9	25	17.2
11	24.0	26	17.6
12	123.1	27	26.1
13	144.1	28	176.2
14	42.2	29	33.1
15	28.1	30	23.7

Pharm./Biol.: This saponin showed moderate antiproliferative activity (ED_{50}:10-74 μg/ml) against MK-1, HeLa and B16F10 cells [1]

References

1. V.H. Castro, E. Ramirez, G.A. Mora, Y. Iwase, T. Nagao, H. Okabe, H. Matsunaga, M. Katano, M. Mori, Chem. Pharm. Bull. **45**(2), 349 (1997)

Tacacoside B_1

CAS Registry Number: 188640-79-1

See Figure Tacacoside B_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin

Biological sources: *Sechium pittieri* [1]

$C_{63}H_{102}O_{30}$: 1338.645

$[\alpha]_D^{26}$ −36.7° (c 1.10, MeOH) [1]

FAB-MS *m/z*: 1337 $[M-H]^-$, 1205 $[M-H-Api]^-$, 1191 $[M-H-Rha]^-$, 1175 $[M-H-Glc]^-$, 1059 $[M-Api-Rha]^-$, 649, 487 [1]

HR-FAB-MS *m/z*: 1361.6353 $[M + Na]^+$, 711.2361, 673.3925, 627.3874 [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.76 (H-2), 4.30 (H-3), 5.46 (brs, H-12), 3.30 (dd, J = 4.0, 14.0, H-18), 3.68 (d, J = 10.0, H-23), 4.30 (H-23), 1.33 (s, CH_3-24), 1.55 (s, CH_3-25), 1.13 (s, CH_3-26), 1.23 (s, CH_3-27), 0.91 (s, CH_3-29), 1.01 (s, CH_3-30)

β-D-Glcp: 5.13 (d, J = 8.0, H-1); α-L-Arap: 6.53 (s, H-1); α-L-Rhap:5.56 (d, J = 2.0, H-1); α-L-Rhap′: 6.13 (d, J = 2.0, H-1); β-D-Xylp: 5.26 (d, J = 8.0, H-1); β-D-Apif: 5.88 (d, J = 4.0, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

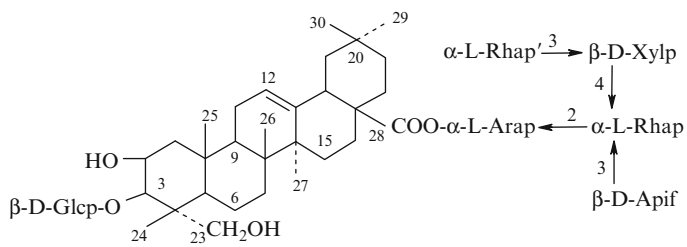
Table 1

C-1	44.1	C-16	23.1	Glc-1	105.6
2	70.7	17	47.3	Ara-1	92.9
3	82.9	18	41.6	Rha-1	100.9
4	42.8	19	46.1	Rha′-1	102.7
5	47.6	20	30.9	Xyl-1	104.9
6	17.9	21	34.1	Api-1	111.9
7	32.9	22	32.7		
8	40.0	23	65.1		
9	48.4	24	15.0		
10	36.9	25	17.2		
11	24.0	26	17.6		
12	123.0	27	26.1		
13	144.1	28	176.2		
14	42.2	29	33.1		
15	28.1	30	23.7		

Pharm./Biol.: This saponin showed moderate antiproliferative activity (ED_{50}:10-74 μg/ml) against MK-1, HeLa and B16F10 cells [1]

References

1. V.H. Castro, E. Ramirez, G.A. Mora, Y. Iwase, T. Nagao, H. Okabe, H. Matsunaga, M. Katano, M. Mori, Chem. Pharm. Bull. **45**(2), 349 (1997)



Tacacoside B_1

Tacacoside B_2

CAS Registry Number: 188640-80-4
See Figure Tacacoside B_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Sechium pittieri* [1]
$C_{63}H_{102}O_{30}$: 1338.645
$[\alpha]_D^{26}$ −26.6° (c 1.15, MeOH) [1]
FAB-MS *m/z*: 1337 $[M-H]^-$, 1205 $[M-H-Xyl]^-$, 1191 $[M-H-Rha]^-$, 1175 $[M-H-Glc]^-$, 1059 $[M-Xyl-Rha]^-$, 649, 487 [1]
HR-FAB-MS *m/z*: 1361.6353 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.76 (H-2), 4.30 (H-3), 5.46 (brs, H-12), 3.30 (dd, J = 4.0, 14.0, H-18), 3.68 (d, J = 10.0, H-23), 4.30 (H-23), 1.33 (s, CH_3-24), 1.55 (s, CH_3-25), 1.13 (s, CH_3-26), 1.23 (s, CH_3-27), 0.91 (s, CH_3-29), 1.01 (s, CH_3-30)
β-D-Glcp: 5.12 (d, J = 8.0, H-1); α-L-Arap: 6.50 (d, J = 2.0, H-1); α-L-Rhap: 5.68 (d, J = 2.0, H-1); α-L-Rhap′: 6.16 (d, J = 2.0, H-1); β-D-Xylp: 5.37 (d, J = 8.0, H-1); β-D-Xylp′: 5.07 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.1	C-16	23.1	Glc-1	105.6
2	70.7	17	47.3	Ara-1	93.2
3	82.9	18	41.6	Rha-1	100.7
4	42.8	19	46.1	Rha′-1	102.6
5	47.6	20	30.9	Xyl-1	104.7
6	17.9	21	34.1	Xyl′-1	105.8
7	32.9	22	32.7		
8	40.0	23	65.1		
9	48.4	24	15.0		
10	36.9	25	17.2		
11	24.0	26	17.6		
12	123.0	27	26.1		
13	144.1	28	176.2		
14	42.2	29	33.1		
15	28.1	30	23.7		

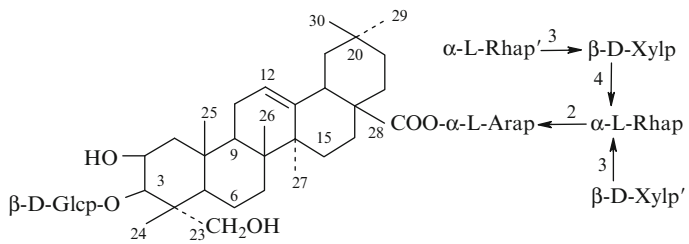
Pharm./Biol.: This saponin showed moderate antiproliferative activity (ED_{50}:10-74 μg/ml) against MK-1, HeLa and B16F10 cells [1]

References

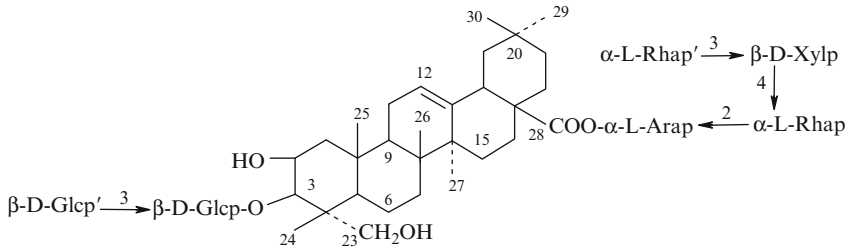
1. V.H. Castro, E. Ramirez, G.A. Mora, Y. Iwase, T. Nagao, H. Okabe, H. Matsunaga, M. Katano, M. Mori, Chem. Pharm. Bull. **45**(2), 349 (1997)

Tacacoside B_3

CAS Registry Number: 188640-82-6
See Figure Tacacoside B_3
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Sechium pittieri* [1]
$C_{64}H_{104}O_{31}$: 1368.656
$[\alpha]_D^{26}$ −16.7° (c 1.18, MeOH) [1]
FAB-MS *m/z*: 1367 $[M-H]^-$, 1221 $[M-H-Rha]^-$, 1205 $[M-H-Glc]^-$, 1043 $[M-H-Glc-Glc]^-$, 811, 649, 487 [1]
HR-FAB-MS *m/z*: 1391.6454 $[M + Na]^+$, 835.4463 $[C_{42}H_{68}NaO_{15}]^+$, 789.4401 $[C_{41}H_{66}NaO_{15}]^+$, 579.1904 $[C_{22}H_{36}NaO_{16}]^+$ [1]



Tacacoside B_2



Tacacoside B_3

^{1}H NMR (J/Hz, C_5D_5N): 4.76 (H-2), 4.30 (H-3), 5.46 (brs, H-12), 3.30 (dd, J = 4.0, 14.0, H-18), 3.68 (d, J = 10.0, H-23), 4.30 (H-23), 1.33 (s, CH_3-24), 1.55 (s, CH_3-25), 1.13 (s, CH_3-26), 1.23 (s, CH_3-27), 0.91 (s, CH_3-29), 1.01 (s, CH_3-30)
β-D-Glcp: 5.09 (d, J = 8.0, H-1); β-D-Glcp′: 5.21 (d, J = 8.0, H-1); α-L-Arap: 6.44 (d, J = 3.0, H-1); α-L-Rhap: 5.76 (brs, H-1); α-L-Rhap: 6.18 (d, J = 2.0, H-1); β-D-Xylp: 5.04 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.1	C-16	23.1	Glc-1	105.3
2	70.7	17	47.3	Glc′-1	105.9
3	82.9	18	41.6	Ara-1	93.4
4	42.8	19	46.1	Rha-1	101.0
5	47.6	20	30.9	Rha′-1	102.6
6	17.9	21	34.1	Xyl-1	106.8
7	32.9	22	32.7		
8	40.0	23	65.1		
9	48.4	24	15.0		
10	36.9	25	17.2		
11	24.0	26	17.6		
12	123.0	27	26.1		
13	144.1	28	176.2		
14	42.2	29	33.1		
15	28.1	30	23.7		

Pharm./Biol.: This saponin showed moderate antiproliferative activity (ED_{50}:10-74 µg/ml) against MK-1, HeLa and B16F10 cells [1]

References

1. V.H. Castro, E. Ramirez, G.A. Mora, Y. Iwase, T. Nagao, H. Okabe, H. Matsunaga, M. Katano, M. Mori, Chem. Pharm. Bull. **45**(2), 349 (1997)

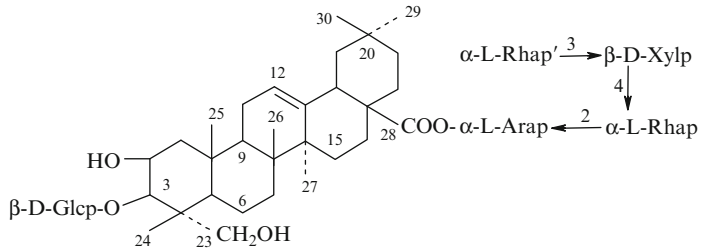
Tacacoside C

CAS Registry Number: 188640-89-3
See Figure Tacacoside C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Bayogenin
Biological sources: *Sechium pittieri* [1]
$C_{58}H_{94}O_{26}$: 1206.603
$[\alpha]_D^{26}$ −4.5° (c 1.24, MeOH) [1]
FAB-MS *m/z*: 1205 $[M-H]^-$, 1059 [M-H-Rha]$^-$, 1043 [M-H-Glc]$^-$, 649, 489 [agl-H]$^-$ [1]
HR-FAB-MS *m/z*: 1229.5953 $[M + Na]^+$, 673.3932 $[C_{35}H_{58}NaO_{10}]^+$, 627.3878 $[C_{35}H_{56}NaO_8]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.76 (H-2), 4.30 (H-3), 5.46 (brs, H-12), 3.30 (dd, J = 4.0, 14.0, H-18), 3.68 (d, J = 10.0, H-23), 4.30 (H-23), 1.33 (s, CH_3-24), 1.55 (s, CH_3-25), 1.13 (s, CH_3-26), 1.23 (s, CH_3-27), 0.91 (s, CH_3-29), 1.01 (s, CH_3-30)
β-D-Glcp: 5.12 (d, J = 8.0, H-1); α-L-Arap: 6.44 (d, J = 3.0, H-1); α-L-Rhap: 5.76 (s, H-1); α-L-Rhap: 6.17 (d, J = 2.0, H-1); β-D-Xylp: 5.08 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.1	C-16	23.1	Glc-1	105.6
2	70.7	17	47.3	Ara-1	93.4
3	82.9	18	41.6	Rha-1	101.0
4	42.8	19	46.1	Rha′-1	102.6
5	47.6	20	30.9	Xyl-1	106.8
6	17.9	21	34.1		
7	32.9	22	32.7		
8	40.0	23	65.1		
9	48.4	24	15.0		

(*continued*)



Tacacoside C

Table 1 (continued)

10	36.9	25	17.2
11	24.0	26	17.6
12	123.0	27	26.1
13	144.1	28	176.2
14	42.2	29	33.1
15	28.1	30	23.7

Pharm./Biol.: This saponin showed moderate antiproliferative activity (ED_{50}:10-74 μg/ml) against MK-1, HeLa and B16F10 cells [1]

References

1. V.H. Castro, E. Ramirez, G.A. Mora, Y. Iwase, T. Nagao, H. Okabe, H. Matsunaga, M. Katano, M. Mori, Chem. Pharm. Bull. **45**(2), 349 (1997)

Glycosides of Aglycones of Oleanene Type

Glycosides of Polygalacic Acid

Bellisaponin BA_1

See Figure Bellisaponin BA_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Bellis perennis* [1]

$C_{63}H_{100}O_{27}$: 1288.645

Mp: 222–225°C [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 2.07 (d, J = 3.0, H-1), 1.24 (d, J = 3.0, H-1), 4.25 (d, J = 3.7, H-2), 3.73 (d, J = 3.7, H-3), 1.28 (H-5), 1.6-1.2 (H_2-6), 1.45 (H-7), 1.6-1.2 (H-7), 1.69 (dd, J = 12.0, 7.5H-9), 2.04 (d, J = 3.8, H-11), 1.99 (d, J = 3.8, H-11), 5.39 (H-12), 1.75 (d, J = 14.8, H-15), 1.50 (d, J = 3.5, H-15), 4.52 (H-16), 2.99 (d, J = 14.3, 4.0, H-18), 2.35 (d, J = 12.9, H-19), 1.11 (d, J = 12.9, H-19), 1.23 (H_2-21), 1.97, 1.83 (H_2-22), 4.92, 4.84 (H_2-23), 0.96 (CH_3-24), 1.38 (CH_3-25), 0.85 (CH_3-26), 1.44 (CH_3-27), 0.93 (CH_3-29), 1.01 (CH_3-30)

α-L-Rhap: 5.18 (d, J = 1.7, H-1), 4.00 (d, J = 3.4, H-2), 3.75 (d, J = 9.5, H-3), 3.44 (d, J = 9.6, H-4), 4.05 (d, 6.2, H-5), 1.29 (CH_3-6)

β-D-Fucp: 5.43 (d, J = 8.1, H-1), 3.79 (d, J = 5.3, H-2), 3.93 (d, J = 4.0, H-3), 5.17 (d, J = 1.0, H-4), 3.89 (d, J = 6.4, H-5), 1.09 (CH_3-6)

α-L-Rhap′: 5.34 (d, J = 1.8, H-1), 3.97 (d, J = 3.2, H-2), 3.86 (d, J = 9.5, H-3), 3.57 (d, J = 9.5, H-4), 3.83 (d, J = 6.2, H-5), 1.37 (CH_3-6)

α-L-Rhap″: 4.91 (d, J = 1.6, H-1), 3.96 (d, J = 3.3, H-2), 3.82 (d, J = 9.4, H-3), 3.42 (d, J = 9.5, H-4), 3.86 (d, J = 6.2, H-5), 1.28 (CH_3-6)

β-D-Xylp: 4.54 (d, J = 7.8, H-1), 3.41 (d, 8.9, H-2), 3.51 (d, J = 8.9, H-3), 3.58 (dd, J = 5.4, 10.4, H-4), 3.91, 3.26 (d, J = 11.5, H_2-5)

Ester part: 7.10 (d, J = 15.5, H-2), 6.05 (d, J = 1.8, H-3), 1.97 (d, J = 6.9, H-4) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	45.0	C-16	74.6	Rha-1	104.1	Rha″-1	102.4	Xyl-1	107.0
2	71.8	17	50.2	2	72.2	2	72.2	2	76.3
3	82.4	18	42.3	3	72.2	3	72.2	3	84.2
4	43.4	19	47.9	4	73.9	4	73.9	4	68.9
5	47.9	20	31.2	5	70.3	5	69.9	5	67.1
6	18.9	21	36.4	6	17.8	6	17.9	Ester-1	167.9
7	33.6	22	31.8	Rha′-1	101.6	Fuc-1	94.9	2	123.2
8	40.8	23	65.7	2	72.2	2	75.5	3	146.9
9	48.3	24	14.8	3	72.2	3	74.6	4	18.1
10	37.7	25	18.0	4	84.4	4	74.8		
11	24.6	26	17.9	5	69.8	5	71.2		
12	123.5	27	27.1	6	18.3	6	16.5		
13	144.6	28	177.3						
14	42.9	29	33.3						
15	36.3	30	24.9						

References

1. Th Schoepke, V. Wray, B. Rzazevska, K. Hiller, Phytochemistry **30**, 627 (1991)

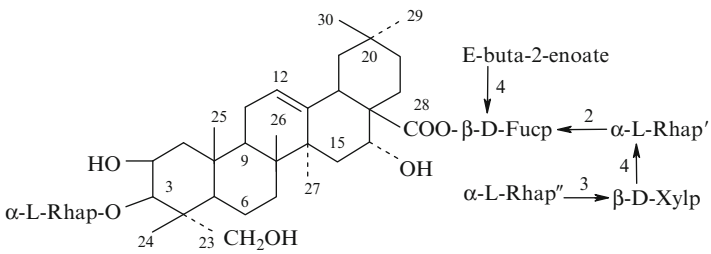
Bellisaponin BA_2

See Figure Bellisaponin BA_2

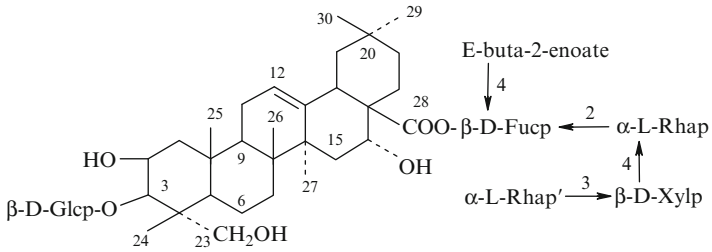
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Bellis perennis* [1]

$C_{63}H_{100}O_{28}$: 1304.640



Bellisaponin BA_1



Bellisaponin BA_2

Mp: 223–225°C [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 2.07 (d, J = 3.0, H-1), 1.24 (d, J = 3.0, H-1), 4.25 (d, J = 3.7, H-2), 3.73 (d, J = 3.7, H-3), 1.28 (H-5), 1.6-1.2 (H_2-6), 1.45 (H-7), 1.6-1.2 (H-7), 1.69 (dd, J = 12.0, 7.5H-9), 2.04 (d, J = 3.8, H-11), 1.99 (d, J = 3.8, H-11), 5.39 (H-12), 1.75 (d, J = 3.5, H-15), 1.50 (d, J = 3.0, H-15), 4.52 (H-16), 2.99 (d, J = 14.3, 4.0, H-18), 2.35 (d, J = 12.9, H-19), 1.11 (d, J = 12.9, H-19), 1.23 (H_2-21), 1.97, 1.83 (H_2-22), 4.92, 4.84 (H_2-23), 0.96 (CH_3-24), 1.38 (CH_3-25), 0.85 (CH_3-26), 1.44 (CH_3-27), 0.93 (CH_3-29), 1.01 (CH_3-30)

β-D-Glcp: 4.48 (H-1), 3.33 (H-2), 3.33-3.45 (H-3-4), 3.34 (H-5), 3.85, 3.75 (H_2-6)

β-D-Fucp: 5.43 (H-1), 3.79 (H-2), 3.93 (H-3), 5.17 (H-4), 3.89 (H-5), 1.09 (CH_3-6)

α-L-Rhap: 5.34 (d, J = 1.8, H-1), 3.97 (d, J = 3.2, H-2), 3.86 (d, J = 9.5, H-3), 3.57 (d, J = 9.5, H-4), 3.83 (d, J = 6.2, H-5), 1.37 (CH_3-6)

α-L-Rhap′: 4.91 (d, J = 1.6, H-1), 3.96 (d, J = 3.3, H-2), 3.82 (d, J = 9.4, H-3), 3.42 (d, J = 9.5, H-4), 3.86 (d, J = 6.2, H-5), 1.28 (CH_3-6)

β-D-Xylp: 4.54 (d, J = 7.8, H-1), 3.41 (d, 8.9, H-2), 3.51 (d, J = 8.9, H-3), 3.58 (dd, J = 5.4, 10.4, H-4), 3.91, 3.26 (d, J = 11.5, H_2-5)

Ester part: 7.10 (H-2), 6.05 (H-3), 1.97 (H-4) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	44.4	C-16	74.6	Glc-1	105.3	Rha′-1	102.4	Xyl-1	107.0
2	71.8	17	50.2	2	75.3	2	72.2	2	76.3
3	83.98	18	42.3	3	77.6	3	72.2	3	84.3
4	43.1	19	47.9	4	71.0	4	73.9	4	68.8
5	48.1	20	31.2	5	78.0	5	69.9	5	67.1
6	18.9	21	36.3	6	62.2	6	17.8	Ester-1	167.9
7	33.6	22	31.9	Rha-1	101.6	Fuc-1	94.9	2	123.2
8	40.8	23	65.9	2	72.1	2	75.3	3	146.9
9	48.10	24	14.8	3	72.1	3	74.6	4	18.1
10	37.5	25	17.9	4	84.5	4	74.8		
11	24.6	26	17.8	5	69.8	5	71.0		
12	123.4	27	27.1	6	18.4	6	16.5		
13	144.6	28	177.2						
14	42.9	29	33.3						
15	36.5	30	24.9						

(*continued*)

Table 1 (continued)

References

1. Th Schoepke, V. Wray, B. Rzazevska, K. Hiller, Phytochemistry **30**, 627 (1991)

Crocosmioside A

See Figure Crocosmioside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1, 2]

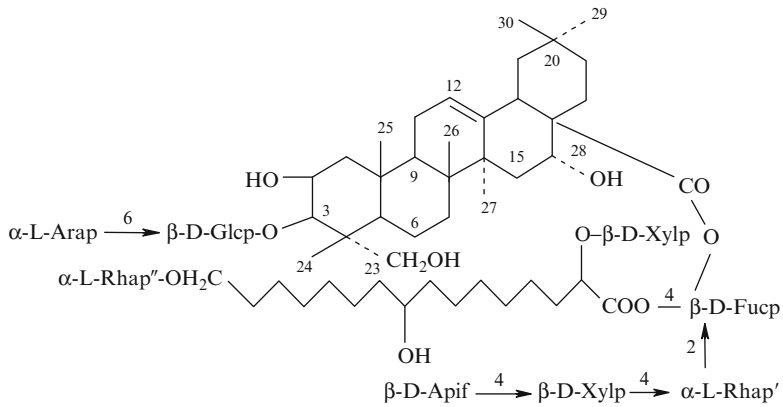
$C_{90}H_{150}O_{43}$: 1918.955

$[\alpha]_D^{25}$ −33.6° (c 0.80, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 2940, 1735, 1635 [1]

FAB-MS *m/z*: 1917 $(M-H)^-$, 1353, 1221, 1089, 797, 665, 503, 449 [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.34 (dd, J = 3.0, 3.0, H-12), 4.46 (brs, H-16), 2.95 (dd, J = 13.5, 3.5, H-18), 2.31 (dd, J = 13.5, 13.5, H-19), 0.79, 0.88, 0.93, 0.97, 1.28, 1.39 (s, CH_3 × 6); β-D-Glcp: 4.43 (d, J = 7.8, H-1); α-L-Arap: 4.25 (d, J = 6.5, H-1); β-D-Fucp: 5.38 (d, J = 8.0, H-1), 3.74 (dd, J = 9.5, 8.0, H-2), 3.90 (dd, J = 9.5, 3.5, H-3), 5.09 (d, J = 3.5, H-4), 1.09 (d, J = 6.5, CH_3-6); α-L-Rhap′: 5.35 (d, J = 1.5, H-1), 3.92 (dd, J = 3.0, 1.5,



Crocosmioside A

H-2), 1.32 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.49 (d, J = 7.8, H-1); β-D-Apif: 5.05 (d, J = 3.0, H-1), 3.89 (d, J = 3.0, H-2), 3.57 (s, H_2-4), 3.78 (d, J = 10, H-5a), 4.10 (d, J = 10.0, H-5b); β-D-Xylp′: 4.33 (d, J = 7.0, H-1); α-L-Rhap″: 4.65 (d, J = 1.5, H-1), 1.25 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

C-1	44.7	C-19	48.4	7	27.1	3	74.4	4	77.6
2	70.9	20	31.7	8	38.7	4	69.8	5	65.1
3	84.4	21	36.9	9	72.8	5	67.1	Api-1	109.6
4	43.4	22	32.3	10	38.8	Fuc-1	95.2	2	78.3
5	48.4	23	65.9	11	27.1	2	75.4	3	80.7
6	19.2	24	15.3	12	31.2	3	75.2	4	65.4
7	34.1	25	18.4	13	30.9	4	76.2	5	75.4
8	41.3	26	18.1	14	27.6	5	71.3	Xyl′-1	105.6
9	48.7	27	27.6	15	30.9	6	17.0	2	75.0
10	37.9	28	177.7	16	68.9	Rha′-1	101.8	3	77.9
11	25.1	29	33.8	Glc-1	105.0	2	72.3	4	71.4
12	124.0	30	25.5	2	75.6	3	72.6	5	67.4
13	144.9	CA-1	174.7	3	78.6	4	84.7	Rha″-1	101.9
14	43.3	2	79.9	4	72.3	5	69.2	2	72.7
15	36.7	3	34.1	5	76.8	6	18.8	3	72.8
16	75.1	4	26.1	6	70.1	Xyl-1	107.2	4	74.3
17	50.5	5	30.9	Ara-1	105.2	2	76.3	5	70.1
18	42.8	6	31.0	2	72.8	3	76.8	6	18.4

Pharm./Biol.: Antitumor activity [3]

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(8), 2139 (1989)
2. T. Furuya, T. Ueoka, Y. Asada, Chem. Pharm. Bull. **36**(1), 444 (1988)
3. N. Nagamoto, H. Noguchi, A. Itokawa, K. Nakata, K. Namba, H. Nishimura, M. Matsui, M. Mizuno, Planta Med. **54**, 305 (1988)

Crocosmioside B

See Figure Crocosmioside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1, 2]

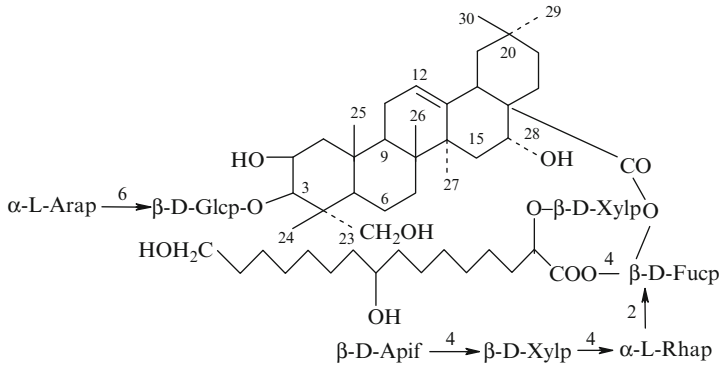
$C_{84}H_{140}O_{39}$: 1772.897

$[\alpha]_D^{25}$ −31.2° (c 0.52, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2940, 1735, 1635 [1]

FAB-MS *m/z*: 1771 $(M\text{-}H)^-$, 1353, 1221, 1089, 797, 665, 503, 303 [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.34 (dd, J = 3.0, 3.0, H-12), 4.46 (brs, H-16), 2.95 (dd, J = 13.5, 3.5, H-18), 2.3 (dd, J = 13.5, 13.5, H-19), 0.88, 0.93, 0.79, 0.97, 1.28, 1.39 (s, CH_3 × 6); β-D-Glcp: 4.43 (d, J = 7.8, H-1); α-L-Arap: 4.25 (d, J = 6.5, H-1); β-D-Fucp: 5.38 (d, J = 8.0, H-1), 3.74 (dd, J = 9.5, 8.0, H-2), 3.90 (dd, J = 9.5, 3.5, H-3), 5.08 (d, J = 3.5, H-4), 1.09 (d, J = 6.5, CH_3-6); α-L-Rhap: 5.35 (d, J = 1.5, H-1), 3.91 (dd, J = 3.0, 1.5, H-2), 1.32 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.49 (d, J = 7.8, H-1); β-D-Apif: 5.05 (d, J = 3.0, H-1), 3.89 (d, J = 3.0, H-2), 3.56 (s, H_2-4), 3.79 (d, J = 10, Ha-5), 4.10 (d, J = 10.0, Hb-5); β-D-Xylp′: 4.32 (d, J = 7.0, H-1) [1]



Crocosmioside B

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

C-1	44.7	C-19	48.3	CA-7	27.0	Ara-3	74.4	Xyl-4	77.6
2	70.9	20	31.7	8	38.7	4	69.8	5	65.0
3	84.4	21	36.9	9	72.8	5	67.0	Api-1	109.6
4	43.4	22	32.3	10	38.8	Fuc-1	95.2	2	78.3
5	48.3	23	65.9	11	27.1	2	75.3	3	80.7
6	19.1	24	15.2	12	31.2	3	75.2	4	65.3
7	34.1	25	18.3	13	30.9	4	76.2	5	75.4
8	41.2	26	18.1	14	27.2	5	71.3	Xyl′-1	105.6
9	48.7	27	27.5	15	34.0	6	17.0	2	75.0
10	37.8	28	177.7	16	63.3	Rha-1	101.7	3	77.9
11	25.1	29	33.7	Glc-1	105.0	2	72.3	4	71.4
12	123.9	30	25.4	2	75.6	3	72.5	5	67.3
13	144.9	CA-1	174.7	3	78.6	4	84.7		
14	43.3	2	79.9	4	72.3	5	69.2		
15	36.7	3	34.1	5	76.8	6	18.8		
16	75.1	4	26.1	6	70.1	Xyl-1	107.2		
17	50.5	5	30.9	Ara-1	105.2	2	76.3		
18	42.7	6	31.0	2	72.8	3	76.8		

Pharm./Biol.: Antitumor activity [3]

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(8), 2139 (1989)
2. T. Furuya, T. Ueoka, Y. Asada, Chem. Pharm. Bull. **36**(1), 444 (1988)
3. N. Nagamoto, H. Noguchi, A. Itokawa, K. Nakata, K. Namba, H. Nishimura, M. Matsui, M. Mizuno, Planta Med. **54**, 305 (1988)

Crocosmioside C

See Figure Crocosmioside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1]

$C_{90}H_{148}O_{44}$: 1932.934

$[\alpha]_D^{30}$ −16.8° (c 0.88, MeOH) [1]

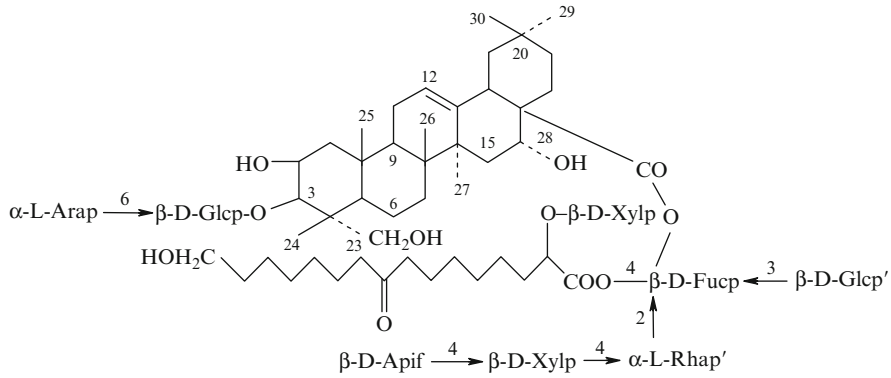
IR (KBr) ν_{max} cm^{-1}: 3400, 1740 [1]

FAB-MS *m/z*: 1955 $(M + Na)^+$, 1157, 821 (Agl-Glc-Ara + Na)$^+$ [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.34 (dd, J = 3.0, 3.0, H-12), 4.46 (brs, H-16), 2.95 (dd, J = 13.5, 4.0, H-18), 2.31 (dd, J = 13.5, 13.5, H-19), 0.88, 0.79, 0.93, 0.97, 1.28, 1.39 (s, CH_3 × 6), 3.58 (t, J = 6.5, CA-16), 4.22 (dd, J = 6.5, 6.0, CA-2)

β-D-Glcp: 4.43 (d, J = 8.0, H-1); α-L-Arap: 4.24 (d, J = 6.8, H-1); β-D-Fucp: 5.44 (d, J = 8.0, H-1), 3.91 (dd, J = 9.0, 8.0, H-2), 4.03 (dd, J = 9.0, 3.5, H-3), 5.43 (d, J = 3.5, H-4), 1.08 (d, J = 6.5, CH_3-6); α-L-Rhap: 5.39 (d, J = 1.5, H-1), 3.96 (dd, J = 3.5, 1.5, H-2), 1.33 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.49 (d, J = 7.8, H-1); β-D-Apif: 5.05 (d, J = 3.0, H-1), 3.89 (d, J = 3.0, H-2), 3.79 (d, J = 10.0, Ha-5), 4.10 (d, J = 10.0, Hb-5); β-D-Glcp′: 4.48 (d, J = 7.8, H-1), 3.16 (dd, J = 9.0, 8.0, H-2); β-D-Xylp′: 4.29 (d, J = 7.0, H-1) [1]

^{13}C NMR (400 MHz, CD_3OD): [1]



Crocosmioside C

Table 1

C-1	44.7	C-19	48.4	CA-7	25.2	Fuc-1	95.1	Api-1	109.5
2	70.8	20	31.7	8	43.8	2	74.1	2	78.2
3	84.3	21	36.9	9	214.6	3	83.9	3	80.6
4	43.4	22	32.2	10	43.8	4	75.5	4	65.3
5	48.4	23	65.8	11	25.2	5	71.2	5	75.3
6	19.2	24	15.3	12	30.7	6	17.0	Glc′-1	105.9
7	34.1	25	18.4	13	30.7	Rha-1	101.7	2	75.8
8	41.2	26	18.1	14	27.1	2	72.1	3	78.2
9	48.7	27	27.6	15	33.9	3	72.4	4	71.3
10	37.8	28	177.5	16	63.2	4	84.5	5	78.4
11	25.1	29	33.8	Glc-1	105.0	5	69.2	6	62.9
12	123.9	30	25.4	2	75.5	6	18.9	Xyl-1	105.5
13	144.9	CA-1	174.7	3	78.5	Xyl′-1	107.2	2	74.9
14	43.3	2	79.6	4	72.2	2	76.1	3	77.8
15	36.7	3	34.4	5	76.7	3	76.7	4	71.3
16	74.9	4	26.1	6	70.0	4	77.5	5	67.2
17	50.5	5	30.5	Ara-1	105.2	5	65.0		
18	42.8	6	30.7	2	72.7				
				3	74.3				
				4	69.7				
				5	67.0				

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **38**(1), 142 (1990)

Crocosmioside D

See Figure Crocosmioside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1]

$C_{90}H_{150}O_{44}$: 1934.949

$[\alpha]_D^{30}$ −16.9° (c 2.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1740 [1]

FAB-MS *m/z*: 1957 $(M + Na)^+$, 1159, 821 (Agl-Glc-Ara + $Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.34 (dd, J = 3.0, 3.0, H-12), 4.45 (brs, H-16), 2.95 (dd, J = 13.5, 4.0, H-18), 2.30 (dd, J = 13.5, 13.5, H-19), 0.79, 0.88, 0.93, 0.97, 1.28, 1.39 (s, CH_3 × 6), 3.54 (t, J = 6.5, CA-16), 4.22 (dd, J = 7.0, 6.0, CA-2);

β-D-Glcp: 4.43 (d, J = 8.0, H-1); α-L-Arap: 4.24 (d, J = 6.5, H-1);

β-D-Fucp: 5.43 (d, J = 8.0, H-1), 3.91 (dd, J = 9.0, 8.0, H-2), 4.03 (dd, J = 9.0, 3.5, H-3), 5.43 (d, J = 3.5, H-4), 1.08 (d, J = 6.5, CH_3-6); α-L-Rhap: 5.39 (d, J = 1.5, H-1), 3.96 (dd, J = 3.5, 1.5, H-2), 1.33 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.49 (d, J = 7.8, H-1); β-D-Apif: 5.05 (d, J = 3.0, H-1), 3.89 (d, J = 3.0, H-2), 3.79 (d, J = 10.0, Ha-5), 4.10 (d, J = 10.0, Hb-5);

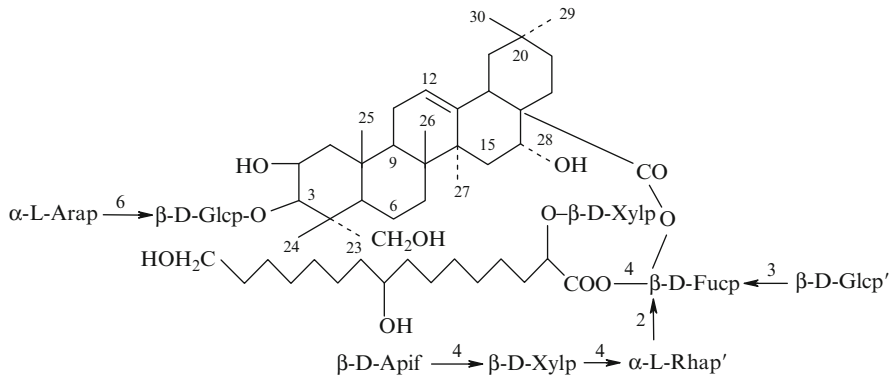
β-D-Glcp′: 4.48 (d, J = 7.8, H-1), 3.16 (dd, J = 9.0, 8.0, H-2); β-D-Xylp′: 4.29 (d, J = 7.0, H-1)

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

C-1	44.7	C-19	48.4	CA-7	27.2	Fuc-1	95.2	Api-1	109.6
2	70.9	20	31.8	8	38.7	2	74.1	2	78.2
3	84.3	21	36.9	9	72.8	3	83.9	3	80.7
4	43.4	22	32.2	10	38.8	4	75.5	4	65.3
5	48.4	23	65.9	11	27.2	5	71.2	5	75.4
6	19.2	24	15.3	12	31.3	6	17.1	Glc′-1	105.9

(*continued*)



Crocosmioside D

Table 1 (continued)

7	34.1	25	18.4	13	31.0	Rha-1	101.7	2	75.8
8	41.3	26	18.2	14	27.3	2	72.1	3	78.2
9	48.7	27	27.6	15	34.0	3	72.4	4	71.4
10	37.9	28	177.6	16	63.3	4	84.5	5	78.4
11	25.2	29	33.8	Glc-1	105.0	5	69.3	6	62.9
12	123.9	30	25.5	2	75.5	6	19.0	Xyl-1	105.6
13	144.9	CA-1	174.8	3	78.5	Xyl′-1	107.2	2	74.9
14	43.3	2	79.6	4	72.2	2	76.2	3	77.8
15	36.7	3	34.5	5	76.8	3	76.8	4	71.4
16	74.9	4	26.3	6	70.1	4	77.5	5	67.3
17	50.6	5	30.9	Ara-1	105.2	5	65.0		
18	42.9	6	31.1	2	72.8				
				3	74.3				
				4	69.8				
				5	67.0				

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **38**(1), 142 (1990)

Crocosmioside E

See Figure Crocosmioside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1]

$C_{85}H_{142}O_{40}$: 1802.907

$[\alpha]_D^{21}$ −15.4° (c 0.8, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1740 [1]

FAB-MS *m/z*: 1825 $(M + Na)^+$, 1027, 821 (Agl-Glc-Ara + Na)$^+$ [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.33 (dd, J = 3.0, 3.0, H-12), 4.45 (brs, H-16), 2.94 (dd, J = 13.5, 3.5, H-18), 2.30 (dd, J = 13.5, 13.5, H-19), 0.78, 0.88, 0.93, 0.96, 1.27, 1.39 (s, CH_3 × 6), 3.54 (t, J = 6.5, CA-16), 4.23 (dd, J = 7.5, 5.0, CA-2);

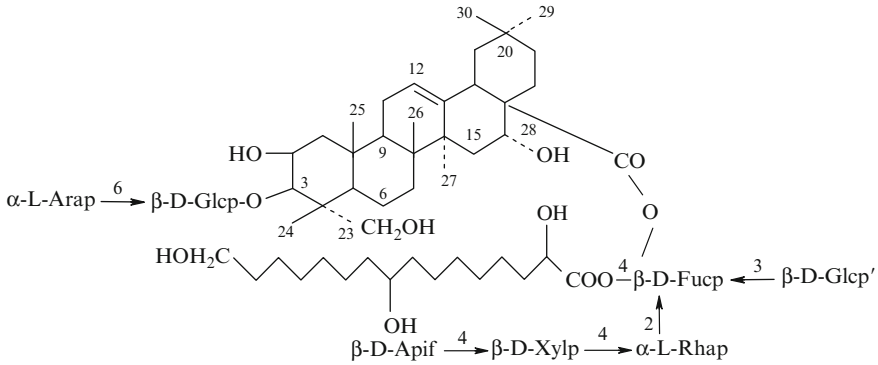
β-D-Glcp: 4.43 (d, J = 7.8, H-1); α-L-Arap: 4.24 (d, J = 6.5, H-1); β-D-Fucp: 5.44 (d, J = 8.0, H-1), 3.92 (dd, J = 9.5, 8.0, H-2), 4.05 (dd, J = 9.5, 3.5, H-3), 5.40 (d, J = 3.5, H-4), 1.07 (d, J = 6.5, CH_3-6); α-L-Rhap: 5.40 (d, J = 1.5, H-1), 3.96 (dd, J = 3.5, 1.5, H-2), 1.32 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.49 (d, J = 7.8, H-1); β-D-Apif: 5.05 (d, J = 3.0, H-1), 3.89 (d, J = 3.0, H-2), 3.79 (d, J = 9.5, Ha-5), 4.10 (d, J = 9.5, Hb-5); β-D-Glcp′: 4.48 (d, J = 7.8, H-1), 3.15 (dd, J = 9.0, 7.8, H-2) [1]

^{13}C NMR (400 MHz, CD_3OD): [1]

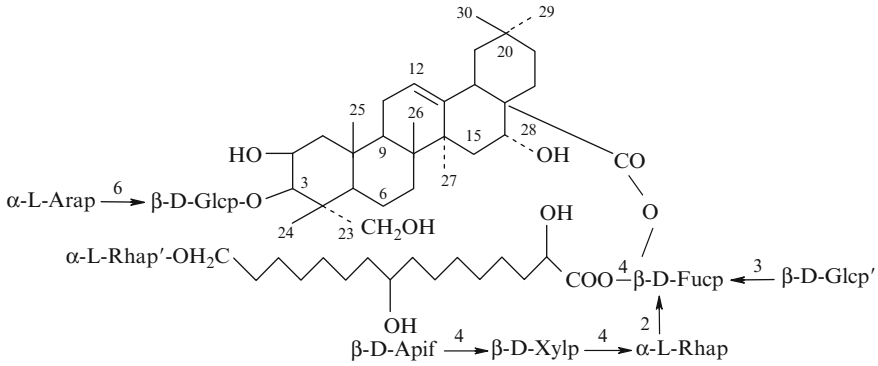
Table 1

C-1	44.7	C-19	48.1	CA-7	27.8	Fuc-1	95.1	Api-1	109.6
2	70.9	20	31.7	8	38.7	2	74.1	2	78.2
3	84.3	21	36.9	9	72.8	3	83.8	3	80.7
4	43.4	22	32.1	10	38.8	4	75.5	4	65.3
5	48.4	23	65.9	11	27.1	5	71.2	5	75.4
6	19.2	24	15.2	12	31.2	6	17.2	Glc′-1	105.7
7	34.1	25	18.3	13	30.9	Rha-1	101.7	2	75.6
8	41.2	26	18.1	14	27.2	2	72.1	3	78.4
9	48.7	27	27.6	15	34.0	3	72.4	4	71.4
10	37.8	28	177.5	16	63.3	4	84.5	5	78.5
11	25.0	29	33.7	Glc-1	105.0	5	69.3	6	62.8

(*continued*)



Crocosmioside E



Crocosmioside F

Table 1 (continued)

12	123.9	30	25.4	2	75.5	6	18.8
13	144.9	CA-1	176.5	3	78.5	Xyl-1	107.2
14	43.3	2	72.2	4	72.2	2	76.2
15	36.7	3	35.9	5	76.8	3	76.8
16	74.9	4	26.6	6	70.1	4	77.5
17	50.5	5	30.9	Ara-1	105.2	5	65.0
18	42.8	6	31.1	2	72.8		
				3	74.3		
				4	69.8		
				5	67.0		

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **38**(1), 142 (1990)

Crocosmioside F

See Figure Crocosmioside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1]

$C_{91}H_{152}O_{44}$: 1948.965

$[\alpha]_D^{21} -20.4°$ (c 0.83, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1740 [1]

FAB-MS *m/z*: 1971 $(M + Na)^+$, 1173, 821 (Agl-Glc-Ara + $Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.33 (dd, J = 3.0, 3.0, H-12), 4.46 (brs, H-16), 2.94 (dd, J = 13.5, 4.0,

H-18), 2.30 (dd, J = 13.5, 13.5, H-19), 0.79, 0.88, 0.93, 0.96, 1.27, 1.39 (s, CH_3 × 6), 4.23 (dd, J = 7.5, 5.0, CA-2);

β-D-Glcp: 4.43 (d, J = 7.8, H-1); α-L-Arap: 4.25 (d, J = 6.5, H-1); β-D-Fucp: 5.44 (d, J = 8.0, H-1), 3.92 (dd, J = 9.5, 8.0, H-2), 4.05 (dd, J = 9.5, 3.5, H-3), 5.39 (d, J = 3.5, H-4), 1.07 (d, J = 6.5, CH_3-6); α-L-Rhap: 5.40 (d, J = 1.5, H-1), 3.96 (dd, J = 3.5, 1.5, H-2), 1.32 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.50 (d, J = 7.8, H-1); β-D-Apif: 5.05 (d, J = 3.0, H-1), 3.89 (d, J = 3.0, H-2), 3.79 (d, J = 9.5, Ha-5), 4.10 (d, J = 9.5, Hb-5); β-D-Glcp′: 4.48 (d, J = 7.8, H-1), 3.15 (dd, J = 9.0, 7.8, H-2); α-L-Rhap′: 4.65 (d, J = 1.5, H-1), 1.26 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

C-1	44.7	C-19	48.4	CA-7	27.2	Fuc-1	95.1	Api-1	109.6
2	70.9	20	31.7	8	38.7	2	74.2	2	78.3
3	84.4	21	36.9	9	72.8	3	83.8	3	80.7
4	43.4	22	32.1	10	38.7	4	75.5	4	65.4
5	48.4	23	65.9	11	27.1	5	71.2	5	75.4
6	19.2	24	15.2	12	31.1	6	17.2	Glc′-1	105.7
7	34.1	25	18.3	13	30.9	Rha-1	101.7	2	75.6
8	41.2	26	18.1	14	27.6	2	72.2	3	78.3
9	48.7	27	27.6	15	30.8	3	72.4	4	71.4
10	37.8	28	177.6	16	68.9	4	84.5	5	78.5
11	25.0	29	33.8	Glc-1	105.0	5	69.3	6	62.8
12	123.9	30	25.4	2	75.5	6	18.8	Rha′-1	101.9
13	144.9	CA-1	176.5	3	78.5	Xyl-1	107.2	2	72.7
14	43.3	2	72.2	4	72.2	2	76.2	3	72.8
15	36.7	3	35.9	5	76.8	3	76.8	4	74.3
16	74.9	4	26.5	6	70.0	4	77.6	5	70.0
17	50.5	5	30.8	Ara-1	105.2	5	65.0	6	18.4
18	42.8	6	31.1	2	72.8				
				3	74.3				
				4	69.8				
				5	67.0				

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **38**(1), 142 (1990)

Crocosmioside G

See Figure Crocosmioside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1]

$C_{96}H_{158}O_{48}$: 2078.992

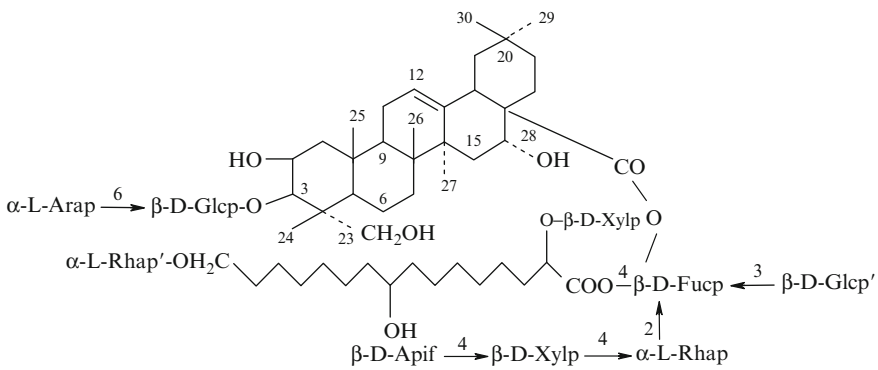
$[\alpha]_D^{20}$ −20.8° (c 0.48, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1740, 1710 [1]

FAB-MS: *m/z* 2101 $(M + Na)^+$, 1303, 821 (Agl-Glc-Ara + Na)$^+$ [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.34 (dd, J = 3.0, 3.0, H-12), 4.46 (brs, H-16), 2.95 (dd, J = 13.5, 3.5, H-18), 2.30 (dd, J = 13.5, 13.5, H-19), 0.79, 0.88, 0.93, 0.97, 1.27, 1.39 (s, CH_3 × 6), 4.22 (dd, J = 7.0, 5.5, CA-2);

β-D-Glcp: 4.43 (d, J = 7.8, H-1); α-L-Arap: 4.25 (d, J = 6.5, H-1); β-D-Fucp: 5.44 (d, J = 8.0, H-1), 3.91 (dd, J = 9.0, 8.0, H-2), 4.02 (dd, J = 9.0, 3.5, H-3), 5.44 (d, J = 3.5, H-4), 1.08 (d, J = 6.5, CH_3-6); α-L-Rhap: 5.40 (d, J = 1.5, H-1), 3.96 (dd, J = 3.0, 1.5, H-2), 1.32 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.49 (d, J = 7.8, H-1); β-D-Apif: 5.05 (d, J = 3.0, H-1), 3.89 (d, J = 3.0, H-2), 3.79 (d, J = 9.5, Ha-5),



Crocosmioside G

4.10 (d, J = 10.0, Hb-5); β-D-Glcp′: 4.49 (d, J = 7.8, H-1), 3.16 (dd, J = 9.5, 7.8, H-2); α-L-Rhap′: 4.65 (d, J = 1.5, H-1), 1.25 (d, J = 6.0, CH_3-6); β-D-Xylp′: 4.30 (d, J = 7.0, H-1) [1]

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

C-1	44.7	C-19	48.3	CA-7	25.2	Fuc-1	95.2	Api-5	75.4
2	70.9	20	31.7	8	43.8	2	74.1	Glc′-1	105.9
3	84.4	21	36.8	9	214.7	3	84.0	2	75.9
4	43.4	22	32.1	10	43.8	4	75.5	3	78.3
5	48.4	23	65.9	11	25.2	5	71.3	4	71.4
6	19.2	24	15.2	12	30.9	6	17.0	5	78.5
7	34.1	25	18.3	13	30.6	Rha-1	101.7	6	62.9
8	41.2	26	18.1	14	27.5	2	72.2	Xyl′-1	105.6
9	48.7	27	27.6	15	30.6	3	72.4	2	75.0
10	37.9	28	177.6	16	68.8	4	84.6	3	77.9
11	25.1	29	33.7	Glc-1	105.0	5	69.3	4	71.4
12	124.0	30	25.4	2	75.5	6	18.9	5	67.3
13	144.9	CA-1	174.8	3	78.6	Xyl-1	107.2	Rha′-1	101.9
14	43.3	2	79.6	4	72.2	2	76.2	2	72.7
15	36.7	3	34.4	5	76.8	3	76.8	3	72.8
16	75.0	4	26.1	6	70.1	4	77.6	4	74.3
17	50.5	5	30.5	Ara-1	105.2	5	65.0	5	70.0
18	42.8	6	30.6	2	72.8	Api-1	109.6	6	18.4
				3	74.4	2	78.3		
				4	69.8	3	80.7		
				5	67.1	4	65.4		

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **38**(1), 142 (1990)

Crocosmioside H

See Figure Crocosmioside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1]

$C_{85}H_{142}O_{39}$: 1786.912

$[\alpha]_D^{25}$ −20.0° (c 0.53, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2930, 1740, 1635 [1]

FAB-MS *m/z*: 1809 $(M + Na)^+$, 821 [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.34 (dd, J = 3.0, 3.0, H-12), 4.46 (brs, H-16), 2.95 (dd, J = 13.5, 3.5, H-18), 2.30 (dd, J = 13.5, 13.5, H-19), 0.79, 0.88, 0.92, 0.97, 1.27, 1.39 (s, CH_3 × 6);

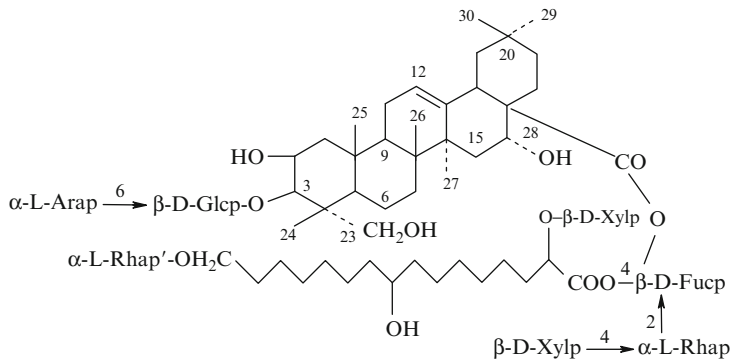
β-D-Glcp: 4.43 (d, J = 7.8, H-1); α-L-Arap: 4.24 (d, J = 6.5, H-1); β-D-Fucp: 5.38 (d, J = 8.0, H-1), 3.74 (dd, J = 9.5, 8.0, H-2), 3.90 (dd, J = 9.5, 3.5, H-3), 5.09 (d, J = 3.5, H-4), 1.09 (d, J = 6.5, CH_3-6); α-L-Rhap: 5.36 (d, J = 1.5, H-1), 3.91 (dd, J = 3.0, 1.5, H-2), 1.32 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.48 (d, J = 7.8, H-1); β-D-Xylp′: 4.32 (d, J = 7.0, H-1); α-L-Rhap′: 4.65 (d, J = 1.5, H-1), 3.78 (dd, J = 3.5, 1.5, H-2), 1.25 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

C-1	44.7	C-19	48.3	CA-7	27.1	Ara-3	74.3	Xyl-3	78.5
2	70.9	20	31.7	8	38.7	4	69.8	4	71.4
3	84.3	21	36.8	9	72.8	5	67.1	5	67.6

(*continued*)



Crocosmioside H

Table 1 (continued)

4	43.4	22	32.3	10	38.7	Fuc-1	95.2	Xyl′-1	105.6
5	48.4	23	65.8	11	27.1	2	75.1	2	75.0
6	19.0	24	15.2	12	31.1	3	75.1	3	77.9
7	34.1	25	18.4	13	30.9	4	76.1	4	71.4
8	41.2	26	18.1	14	27.6	5	71.3	5	67.4
9	48.7	27	27.6	15	30.9	6	17.0	Rha′-1	101.9
10	37.8	28	177.6	16	68.9	Rha-1	101.7	2	72.7
11	25.1	29	33.8	Glc-1	105.0	2	72.2	3	72.8
12	123.9	30	25.4	2	75.5	3	72.5	4	74.3
13	144.9	CA-1	174.7	3	78.5	4	84.6	5	70.0
14	43.3	2	79.9	4	72.2	5	69.2	6	18.4
15	36.7	3	34.1	5	76.8	6	18.8		
16	75.1	4	26.1	6	70.1	Xyl-1	107.4		
17	50.4	5	31.0	Ara-1	105.2	2	76.4		
18	42.8	6	30.9	2	72.8				

Pharm./Biol.: Antitumor activity [2]

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(8), 2139 (1989)
2. N. Nagamoto, H. Noguchi, A. Itokawa, K. Nakata, K. Namba, H. Nishimura, M. Matsui, M. Mizuno, Planta Med. **54**, 305 (1988)

Crocosmioside I

See Figure Crocosmioside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia crocosmiiflora* [1]

$C_{86}H_{144}O_{40}$: 1816.923

$[\alpha]_D^{20}$ −0.5° (c 0.42, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 1735 [1]

FAB-MS *m/z*: 1839 $(M + Na)^+$, 1041, 821 (Agl-Glc-Ara + Na)$^+$ [1]

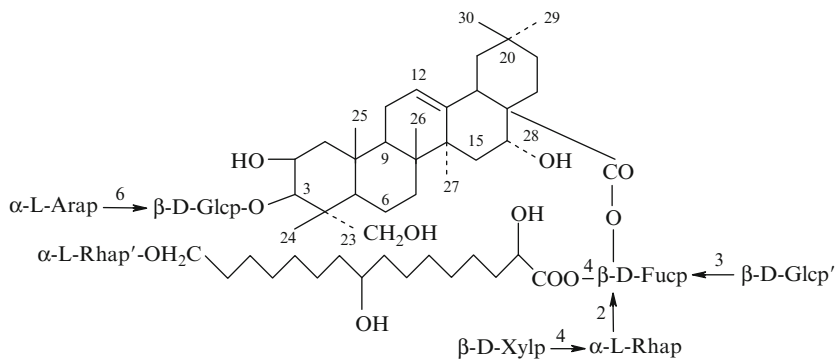
^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.33 (dd, J = 3.0, 3.0, H-12), 4.45 (brs, H-16), 2.95 (dd, J = 13.5, 3.5, H-18), 2.30 (dd, J = 13.5, 13.5, H-19), 0.78, 0.88, 0.92, 0.97, 1.27, 1.39 (s, CH_3 × 6), 4.23 (dd, J = 7.5, 5.0, CA-2);
β-D-Glcp: 4.43 (d, J = 8.0, H-1); α-L-Arap: 4.25 (d, J = 6.5, H-1); β-D-Fucp: 5.43 (d, J = 8.0, H-1), 3.93 (dd, J = 9.0, 8.0, H-2), 4.05 (dd, J = 9.0, 3.5, H-3), 5.40 (d, J = 3.5, H-4), 1.07 (d, J = 6.5, CH_3-6); α-L-Rhap: 5.41 (d, J = 1.5, H-1), 3.95 (dd, J = 3.5, 1.5, H-2), 1.32 (d, J = 6.0, CH_3-6); β-D-Xylp: 4.48 (d, J = 7.8, H-1), β-D-Glcp′: 4.48 (d, J = 7.8, H-1), 3.15 (dd, J = 9.0, 7.8, H-2); α-L-Rhap′: 4.65 (d, J = 1.5, H-1), 3.78 (dd, J = 3.5, 11, H-2), 1.25 (d, J = 6.0, CH_3-6)

^{13}C NMR (400 MHz, CD_3OD): [1]

Table 1

C-1	44.7	C-19	48.4	CA-7	27.2	Fuc-1	95.2	Glc′-1	105.7
2	70.9	20	31.7	8	38.8	2	74.1	2	75.7
3	84.4	21	36.9	9	72.8	3	83.7	3	78.5
4	43.4	22	32.1	10	38.8	4	75.6	4	71.4
5	48.4	23	65.9	11	27.1	5	71.3	5	78.6
6	19.1	24	15.2	12	31.1	6	17.2	6	62.8
7	34.1	25	18.3	13	31.0	Rha-1	101.7	Rha″-1	101.9
8	41.2	26	18.1	14	27.7	2	72.2	2	72.7
9	48.7	27	27.6	15	30.8	3	72.5	3	72.8
10	37.9	28	177.6	16	68.9	4	84.4	4	74.3
11	25.1	29	33.8	Glc-1	105.0	5	69.3	5	70.1

(*continued*)



Crocosmioside I

Table 1 (continued)

12	124.0	30	25.4	2	75.6	6	18.8	6	18.4
13	144.9	CA-1	176.5	3	78.6	Xyl-1	107.4		
14	43.3	2	72.2	4	72.2	2	76.4		
15	36.7	3	35.9	5	76.8	3	78.4		
16	75.0	4	26.6	6	70.1	4	71.4		
17	50.5	5	30.8	Ara-1	105.2	5	67.6		
18	42.9	6	31.1	2	72.8				
				3	74.4				
				4	69.8				
				5	67.0				

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **38**(1), 142 (1990)

Desacylmasonoside 1

See Figure Desacylmasonoside 1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia masonorum* [1, 2]

$C_{69}H_{112}O_{36}$: 1516.693

$[\alpha]_D^{22}$ −20.8° (c 0.97, C_5D_5N) [2]

IR (KBr) ν_{max} cm^{-1}: 3400, 1740 [2]

FAB-MS *m/z*: 1539 $(M + Na)^+$, 843, 821, 741, 609 [2]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.47 (dd, J = 3.0, 3.0, H-12), 5.08 (brs, H-16), 3.25 (dd, J = 13.5, 3.5, H-18), 2.64 (dd, J = 13.5, 13.5, H-19), 0.81, 0.83, 1.08, 1.20, 1.42, 1.60 (s, CH_3 × 6);
β-D-Glcp: 4.89 (d, J = 8.0, H-1); α-L- Arap: 4.68 (d, J = 6.0, H-1); β-D-Fucp: 5.36 (d, J = 8.0, H-1), 1.23 (d, J = 6.5, CH_3-6); α-L-Rhap: 6.31 (brs, H-1), 1.47 (d, J = 6.0, CH_3-6);
β-D-Xylp: 4.97 (d, J = 7.2, H-1); β-D-Apif: 5.59 (d, J = 3.0, H-1); β-D-Glcp′: 5.00 (d, J = 7.8, H-1) [2]

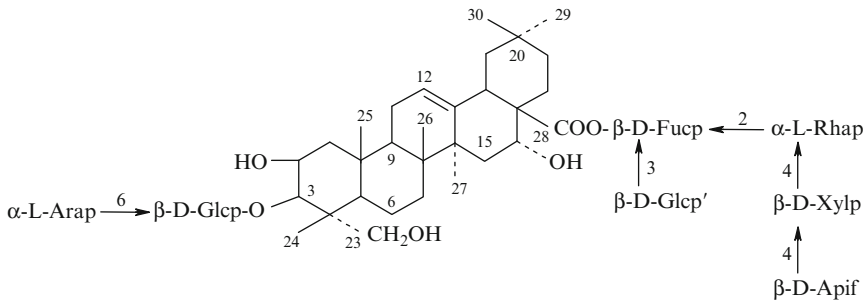
^{13}C NMR (400 MHz, C_5D_5N): [2]

Table 1

C-1	44.4	C-16	74.1	Glc-1	105.6	Fuc-4	72.5	Api-1	109.1
2	70.1	17	49.6	2	75.5	5	72.2	2	77.7
3	84.5	18	41.9	3	78.4	6	17.0	3	80.5
4	43.0	19	47.7	4	72.2	Rha-1	101.3	4	65.3
5	48.0	20	30.9	5	76.7	2	72.1	5	75.4
6	18.5	21	36.2	6	69.8	3	72.6	Glc′-1	105.8
7	33.3	22	32.0	Ara-1	105.1	4	83.7	2	75.1
8	40.4	23	66.3	2	72.6	5	68.5	3	78.7
9	47.7	24	15.4	3	74.4	6	18.5	4	71.7
10	37.2	25	17.8	4	69.2	Xyl-1	106.6	5	78.7
11	24.2	26	17.7	5	66.6	2	76.1	6	62.7
12	122.8	27	27.3	Fuc-1	95.0	3	76.4		
13	144.6	28	176.3	2	72.5	4	76.5		
14	42.5	29	33.3	3	85.6	5	64.5		
15	36.4	30	24.6						

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(8), 2139 (1989)
2. Y. Asada, M. Ikeno, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(10), 2747 (1989)



Desacylmasonoside 1

Desacylmasonoside 2

See Figure Desacylmasonoside 2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia masonorum* [1, 2]

$C_{64}H_{104}O_{32}$: 1384.651

$[\alpha]_D^{22}$ −25.4° (c 0.89, C_5D_5N) [2]

IR (KBr) ν_{max} cm^{-1}: 3420, 1735 [2]

FAB-MS *m/z*: 1407 $(M + Na)^+$, 741, 711, 689 [2]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.51 (dd, J = 3.0, 3.0, H-12), 5.09 (brs, H-16), 3.26 (dd, J = 13.5, 3.5, H-18), 2.59 (dd, J = 13.5, 13.5, H-19), 0.80, 0.83, 1.10, 1.21, 1.46, 1.63 (s, CH_3 × 6)

β-D-Glcp: 5.05 (d, J = 8.0, H-1)

β-D-Fucp: 5.87 (d, J = 8.0, H-1), 1.23 (d, J = 6.5, CH_3-6)

α-L-Rhap: 6.31 (d, J = 1.0, H-1), 1.47 (d, J = 6.0, CH_3-6)

β-D-Xylp: 4.98 (d, J = 7.0, H-1), β-D-Apif: 5.59 (d, J = 3.0, H-1)

β-D-Glcp′: 5.00 (d, J = 7.8, H-1) [2]

^{13}C NMR (400 MHz, C_5D_5N): [2]

Table 1

C-1	44.5	C-16	74.0	Glc-1	105.8	Rha-1	101.3	Api-1	109.1
2	70.7	17	49.5	2	75.6	2	72.2	2	77.7
3	83.3	18	41.9	3	78.7	3	72.5	3	80.4
4	43.0	19	47.6	4	71.7	4	83.6	4	65.3
5	48.2	20	30.9	5	78.4	5	68.5	5	75.3
6	18.4	21	36.2	6	62.7	6	18.6	Glc′-1	105.7
7	33.5	22	32.0	Fuc-1	94.9	Xyl-1	106.6	2	75.1
8	40.4	23	65.9	2	72.5	2	76.0	3	78.7
9	47.7	24	15.2	3	85.5	3	76.4	4	71.7
10	37.2	25	17.7	4	72.4	4	76.5	5	78.7
11	24.2	26	17.6	5	72.1	5	64.5	6	62.7
12	122.7	27	27.3	6	17.0				
13	144.7	28	176.2						
14	42.5	29	33.3						
15	36.4	30	24.6						

(*continued*)

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(8), 2139 (1989)
2. Y. Asada, M. Ikeno, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(10), 2747 (1989)

Desacylmasonoside 3

See Figure Desacylmasonoside 3

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Crocosmia masonorum* [1, 2]

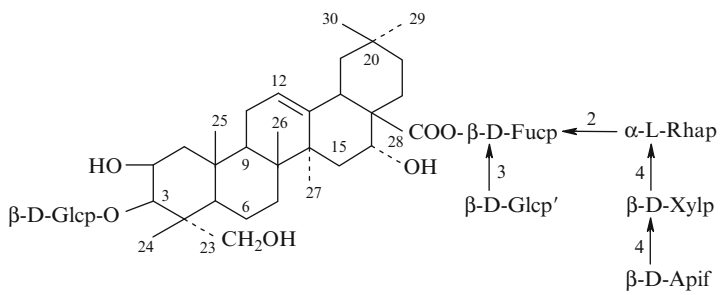
$C_{64}H_{104}O_{32}$: 1384.651

$[\alpha]_D^{22}$ −4.7° (c 0.9, C_5D_5N) [2]

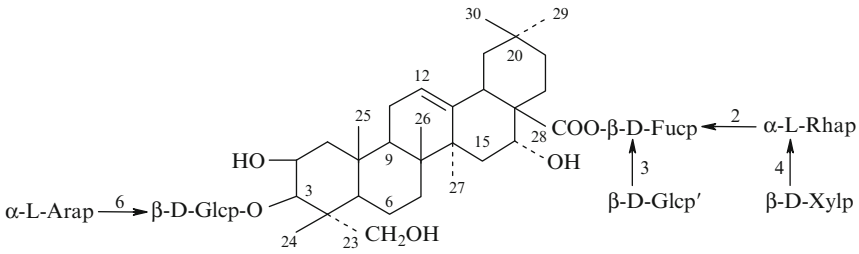
IR (KBr) ν_{max} cm^{-1}: 3410, 1740 [2]

FAB-MS *m/z*: 1407 $(M + Na)^+$, 741, 711, 689 [2]

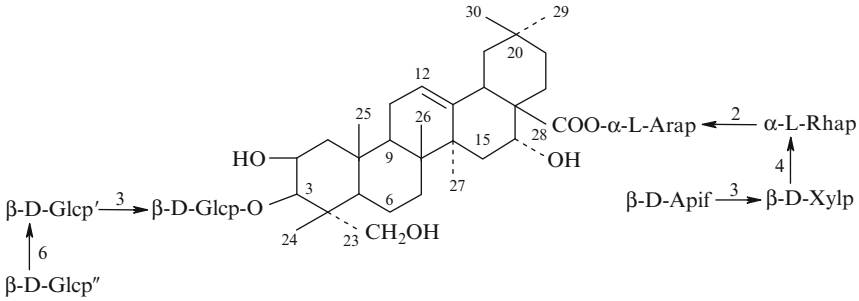
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.42 (dd, J = 3.0, 3.0, H-12), 5.11 (brs, H-16), 3.26 (dd, J = 13.5, 3.5,



Desacylmasonoside 2



Desacylmasonoside 3



Platycoside D

H-18), 2.61 (dd, J = 13.5, 13.5, H-19), 0.80, 0.83, 1.10, 1.21, 1.44, 1.60 (s, CH_3 × 6)
β-D-Glcp: 4.90 (d, J = 8.0, H-1)
β-D-Fucp: 5.87 (d, J = 8.0, H-1), 1.23 (d, J = 6.5, CH_3-6)
α-L-Rhap: 6.35 (d, J = 1.0, H-1), 1.51 (d, J = 6.0, CH_3-6)
β-D-Xylp: 5.07 (d, J = 7.2, H-1), β-D-Glcp′: 5.01 (d, J = 7.8, H-1) [2]
^{13}C NMR (400 MHz, C_5D_5N): [2]

Table 1

C-1	44.4	C-16	74.1	Glc-1	105.6	Fuc-5	72.1	Glc′-1	105.7
2	70.1	17	49.5	2	75.4	6	17.0	2	75.1
3	84.4	18	41.9	3	78.7	Rha-1	101.3	3	78.7
4	43.0	19	47.7	4	72.2	2	72.3	4	71.7
5	47.9	20	30.9	5	76.7	3	72.5	5	78.7
6	18.5	21	36.2	6	69.7	4	83.4	6	62.7
7	33.5	22	32.0	Ara-1	105.0	5	68.6		
8	40.4	23	66.3	2	72.6	6	18.7		
9	47.7	24	15.4	3	74.3	Xyl-1	106.8		
10	37.2	25	17.7	4	69.2	2	76.2		
11	24.2	26	17.7	5	66.5	3	78.7		
12	122.8	27	27.2	Fuc-1	94.9	4	71.1		
13	144.6	28	176.2	2	72.4	5	67.5		
14	42.5	29	33.3	3	85.6				
15	36.4	30	24.6	4	72.4				

References

1. Y. Asada, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(8), 2139 (1989)
2. Y. Asada, M. Ikeno, T. Ueoka, T. Furuya, Chem. Pharm. Bull. **37**(10), 2747 (1989)

Platycoside D

See Figure Platycoside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid
Biological sources: *Platycodon grandiflorum* [1]
$C_{69}H_{112}O_{37}$: 1532.688
$[\alpha]_D^{24}$ −17.9° (c 0.16, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3402, 2927, 1739, 1637, 1038 [1]
ESI-MS (negative ion mode) *m*/*z*: 1531 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.01, 1.15, 1.17, 1.36, 1.55, 1.73 (s, CH_3-29, 26, 30, 25, 24, 27),

3.92, 4.51 (m, H_2-23), 4.53 (m, H-3), 4.55 (m, H-2), 5.25 (brs, H-16), 5.56 (brs, H-12)
α-L-Rhap: 5.75 (brs, H-1), 1.73 (d, J = 6.1, CH_3-6)
β-D-Glcp: 5.08 (d, J = 7.6, H-1); β-D-Glcp′: 4.76 (d, J = 8.2, H-1), β-D-Glcp″: 4.89 (d, J = 7.7, H-1)
β-D-Xylp: 5.08 (d, J = 6.9, H-1); β-D-Apif: 6.25 (brs, H-1); α-L-Arap: 6.49 (brs, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.1	C-21	36.0	Glc-1	105.5	Ara-3	71.4
2	69.4	22	32.2	2	74.7	4	66.0
3	84.3	23	66.1	3	78.4	5	62.9
4	42.8	24	15.3	4	71.9	Rha-1	101.1
5	47.7	25	17.6	5	76.7	2	72.1
6	18.4	26	17.5	6	70.6	3	72.7
7	33.2	27	27.2	Glc′-1	105.1	4	83.7
8	40.2	28	176.0	2	75.2	5	68.6
9	47.6	29	33.3	3	78.5	6	18.4
10	37.0	30	24.8	4	71.5	Xyl-1	106.7
11	24.0			5	77.0	2	75.2
12	123.1			6	70.1	3	84.7
13	144.3			Glc″-1	105.2	4	69.7
14	42.2			2	74.8	5	67.0
15	36.1			3	78.6	Api-1	111.2
16	74.1			4	70.8	2	78.1
17	49.6			5	77.7	3	80.4
18	41.3			6	62.6	4	75.2
19	47.1			Ara-1	93.5	5	65.4
20	30.9			2	75.3		

References

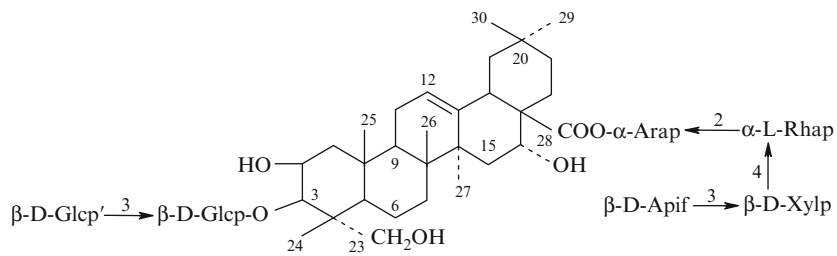
1. T. Nikaido, K. Koike, K. Mitsunaga, T. Saeki, Chem. Pharm. Bull. **47**(6), 903 (1999)

Polygalacin D_2

See Figure Polygalacin D_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid
Biological sources: *Platycodon grandiflorum* [1]
$C_{63}H_{102}O_{32}$: 1370.635
Mp: 229–236°C [1]
$[\alpha]_D^{23}$ −35.5° (MeOH) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.77 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.95, 1.00, 1.09, 1.35, 1.61, 1.75 (s, CH_3 × 6) [1]
^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	74.2	Glc-1	105.6	Rha-1	101.1
2	70.4	17	50.1	2	74.2	2	72.0
3	83.7	18	41.6	3	88.8	3	72.5
4	42.9	19	47.0	4	70.0	4	83.7
5	48.2	20	30.8	5	77.7	5	68.7
6	18.3	21	36.0	6	62.7	6	18.1
7	33.5	22	31.3	Glc′-1	105.0	Xyl-1	106.6
8	40.3	23	66.2	2	75.4	2	75.0
9	47.8	24	14.8	3	78.4	3	85.6
10	37.2	25	17.4	4	72.0	4	69.5
11	24.2	26	17.3	5	78.2	5	66.8
12	122.5	27	27.3	6	62.8	Api-1	111.3
13	144.7	28	175.8	Ara-1	93.7	2	77.9
14	42.2	29	33.1	2	75.7	3	80.0
15	36.1	30	24.8	3	65.8	4	75.0
				4	70.2	5	65.8
				5	62.9		



Polygalacin D_2

References

1. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**(671), 674 (1978)

Saponin 8

See Figure Saponin 8

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Platycodon grandiflorum* [1]

$C_{59}H_{94}O_{28}$: 1250.593

Mp: 223–227°C [1]

$[\alpha]_D^{23}$ −33.2° (MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.78 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.97, 1.00, 1.09, 1.36, 1.62, 1.75 (s, CH_3 × 5) [1]

^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	74.2	Glc-1	105.2	Rha-5	68.7
2	70.3	17	50.1	2	75.5	6	18.3
3	83.8	18	41.6	3	78.6	Xyl-1	106.4
4	42.8	19	47.0	4	72.0	2	75.0
5	48.3	20	30.8	5	78.0	3	85.7
6	18.3	21	36.0	6	63.0	4	69.5
7	33.5	22	31.3	Ara-1	93.6	5	66.7
8	40.3	23	66.5	2	76.3	Api-1	111.2
9	47.8	24	14.8	3	65.8	2	77.9
10	37.2	25	17.4	4	70.3	3	80.0
11	24.2	26	17.3	5	62.9	4	75.0
12	122.5	27	27.3	Rha-1	98.4	5	65.8
13	144.7	28	175.8	2	73.6		
14	42.2	29	33.1	3	70.3		
15	36.1	30	24.8	4	83.4		

(*continued*)

References

1. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**(671), 674 (1978)

Saponin 9

See Figure Saponin 9

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Platycodon grandiflorum* [1]

$C_{59}H_{94}O_{28}$: 1250.593

Mp: 219–225°C [1]

$[\alpha]_D^{23}$ −41.2° (MeOH) [1]

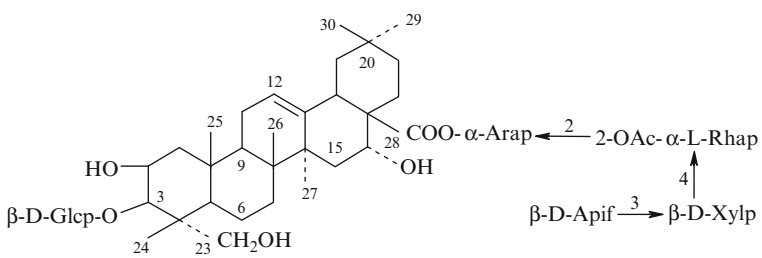
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.78 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.97, 1.00, 1.09, 1.36, 1.62, 1.75 (s, CH_3 × 6) [1]

^{13}C NMR (15 MHz, C_5D_5N): [1]

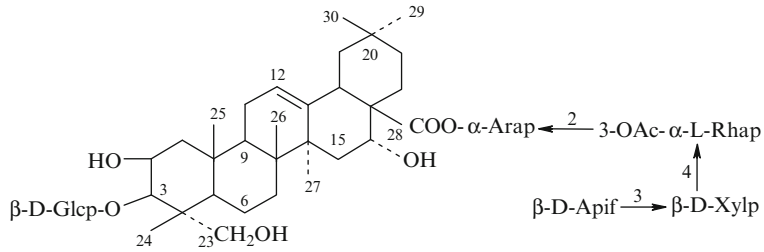
Table 1

C-1	44.2	C-16	74.2	Glc-1	105.2	Rha-5	68.7
2	70.3	17	50.1	2	75.5	6	18.3
3	83.8	18	41.7	3	78.6	Ac-1	170.7
4	42.8	19	47.0	4	72.0	2	21.4
5	48.3	20	30.8	5	78.0	Xyl-1	105.4
6	18.3	21	36.0	6	63.0	2	75.0
7	33.5	22	31.3	Ara-1	93.6	3	85.7

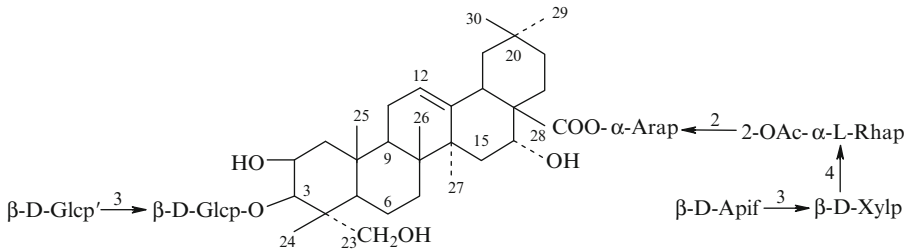
(*continued*)



Saponin 8



Saponin 9



Saponin 11

Table 1 (continued)

8	40.3	23	66.5	2	76.3	4	69.5
9	47.8	24	14.8	3	65.8	5	66.7
10	37.2	25	17.3	4	70.3	Api-1	111.2
11	24.2	26	17.8	5	62.9	2	77.9
12	122.5	27	27.3	Rha-1	101.6	3	80.0
13	144.7	28	175.8	2	70.3	4	75.0
14	42.2	29	33.1	3	75.3	5	65.8
15	36.1	30	24.8	4	77.6		

References

1. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**(671), 674 (1978)

Saponin 11

See Figure Saponin 11

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Platycodon grandiflorum* [1]

$C_{65}H_{104}O_{33}$: 1412.645

Mp: 229–235°C [1]

$[\alpha]_D^{23}$ −32.0° (MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.77 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.95, 1.00, 1.09, 1.35, 1.61, 1.75 (s, CH_3 × 6) [1]

^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	74.2	Glc-1	105.6	Rha-1	98.4
2	70.4	17	50.1	2	74.2	2	73.6
3	83.7	18	41.7	3	88.8	3	70.3
4	42.9	19	47.0	4	70.0	4	83.4
5	48.2	20	30.8	5	77.7	5	68.7
6	18.3	21	36.0	6	62.7	6	18.3
7	33.5	22	31.3	Glc′-1	105.0	Xyl-1	106.4
8	40.3	23	66.2	2	75.4	2	75.0
9	47.8	24	14.8	3	78.4	3	85.7
10	37.2	25	17.4	4	72.0	4	69.5
11	24.2	26	17.3	5	78.2	5	66.7
12	122.5	27	27.3	6	62.8	Api-1	111.2
13	144.7	28	175.8	Ara-1	93.6	2	77.9
14	42.2	29	33.1	2	76.3	3	80.0
15	36.1	30	24.8	3	65.8	4	75.0
				4	70.3	5	65.8
				5	62.9		

References

1. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**(671), 674 (1978)

Saponin 12

See Figure Saponin 12

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Platycodon grandiflorum* [1]

$C_{65}H_{104}O_{33}$: 1412.645

Mp: 226–233°C [1]

$[\alpha]_D^{23}$ −40.6° (MeOH) [1]

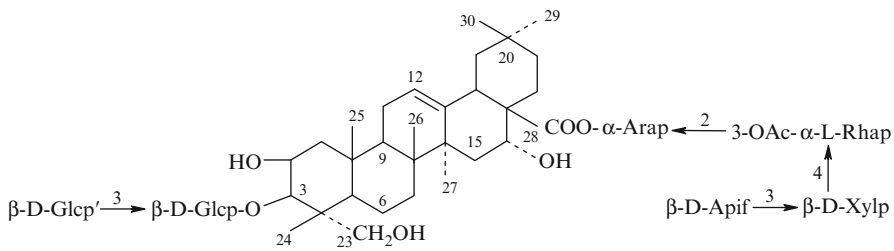
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.77 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.95, 1.00, 1.09, 1.35, 1.61, 1.75 (s, $CH_3 \times 6$) [1]

^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	74.1	Glc-1	105.6	Rha-1	101.6
2	70.4	17	50.1	2	74.2	2	70.3
3	83.7	18	41.7	3	88.8	3	75.3
4	42.9	19	47.0	4	70.0	4	77.6
5	48.2	20	30.8	5	77.7	5	68.7
6	18.3	21	36.0	6	62.7	6	18.3
7	33.5	22	31.3	Glc′-1	105.0	Ac-1	170.7
8	40.3	23	66.2	2	75.4	2	21.4
9	47.8	24	14.8	3	78.4	Xyl-1	105.4
10	37.2	25	17.4	4	72.0	2	75.0
11	24.2	26	17.3	5	78.2	3	85.7
12	122.5	27	27.3	6	62.8	4	69.5
13	144.7	28	175.9	Ara-1	93.6	5	66.7
14	42.2	29	33.1	2	76.3	Api-1	111.2
15	36.1	30	24.8	3	65.8	2	77.9
				4	70.3	3	80.0
				5	62.9	4	75.0
						5	65.8

(*continued*)

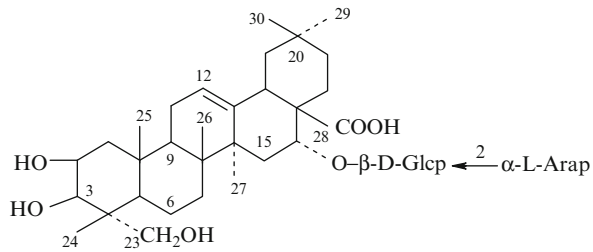


Saponin 12

References

1. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**(671), 674 (1978)

Solidagosaponin I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{41}H_{66}O_{15}$: 798.440

$[\alpha]_D^{18}$ + 6.9° (c 0.97, MeOH) [1]

FAB-MS *m/z*: 821 $[M + Na]^+$, 799 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.48 (dd, J = 4, 3, H-2), 4.18 (d, J = 3.5, H-3), 5.57 (t-like, H-12),

Saponin 12

5.39 (brs, H-16), 3.53 (dd, J = 14, 4, H-18), 2.89 (t, J = 14, H-19), 3.68, 4.11 (d, J = 11, H-23), 1.33 (s, CH_3-24), 1.55 (s, CH_3-25), 1.03 (s, CH_3-26), 1.77 (s, CH_3-27), 1.14 (s, CH_3-29), 1.14 (s, CH_3-30)

β-D-Glcp: 4.95 (d, J = 8, H-1), 4.17 (t, J = 9, H-2), 4.40 (t, J = 9, H-3), 4.17 (t, J = 9, H-4), 3.96 (m, H-5), 4.32 (dd, J = 12, 5.5, H-6), 4.54 (dd, J = 12, 2, H-6)

α-L-Arap: 5.28 (d, J = 8, H-1), 4.45 (t, J = 8, H-2), 4.11 (dd, J = 9, 3.5, H-3), 4.22 (brs, H-4), 3.65 (d, J = 12, H-5), 4.24 (brd, J = 12, H-5) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

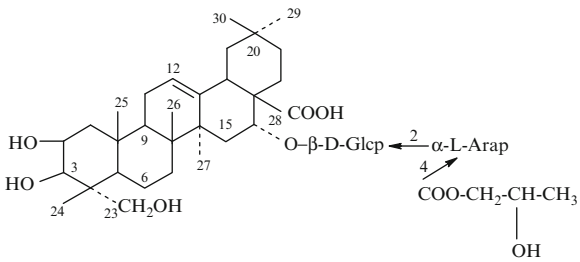
Table 1

C-1	44.7	C-16	77.8	Glc-1	98.5
2	71.6	17	48.4	2	82.9
3	73.0	18	41.2	3	79.3
4	42.4	19	45.3	4	71.9
5	48.3	20	31.0	5	78.2
6	18.2	21	36.5	6	62.9
7	33.0	22	32.4	Ara-1	106.3
8	39.9	23	68.0	2	73.5
9	47.6	24	14.5	3	74.8
10	37.2	25	17.2	4	69.6
11	23.9	26	17.4	5	67.5
12	122.2	27	27.0		
13	145.1	28	179.6		
14	41.4	29	33.4		
15	29.6	30	25.1		

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Solidagosaponin II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{45}H_{72}O_{17}$: 884.476

$[\alpha]_D^{18}$ + 24.3° (c 1.51, MeOH) [1]

FAB-MS *m/z*: 907 $[M + Na]^+$, 885 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.52 (dd, J = 4, 3, H-2), 4.22 (d, J = 3.5, H-3), 5.62 (t-like, H-12), 5.36 (brs, H-16), 3.58 (dd, J = 4, 14, H-18), 2.92 (t, J = 13.5, H-19), 3.70, 4.15 (d, J = 11, H-23), 1.36 (s, CH_3-24), 1.60 (s, CH_3-25), 1.06 (s, CH_3-26), 1.77 (s, CH_3-27), 1.10 (s, CH_3-29), 1.14 (s, CH_3-30), Ester moiety: 2.76 (dd, J = 5, 15, H-2), 2.88 (dd, J = 8, 15, H-2), 4.64 (m, H-3), 1.48 (d, J = 6, CH_3-4)

β-D-Glcp: 4.91 (d, J = 8, H-1), 4.29 (t, J = 8.5, H-2), 4.42 (t, J = 9, H-3), 4.16 (t, J = 10, H-4), 3.96 (m, H-5), 4.33 (dd, J = 3.5, 12.5, H-6), 4.57 (dd, J = 2, 12.5, H-6)

α-L-Arap: 5.49 (d, J = 8, H-1), 4.34 (t, J = 8.5, H-2), 4.20 (dd, J = 3.5, 9, H-3), 5.48 (brs, H-4), 3.62 (d, J = 13, H-5), 4.27 (brd, J = 12, H-5) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

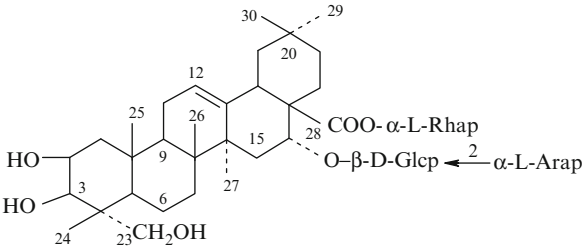
Table 1

C-1	44.8	C-16	78.2	Ester moiety-1	172.3
2	71.6	17	48.4	2	45.3
3	73.4	18	41.1	3	64.5
4	42.4	19	45.3	4	24.2
5	48.4	20	31.0	Glc-1	98.8
6	18.3	21	36.5	2	80.4
7	33.1	22	32.6	3	79.6
8	39.9	23	68.2	4	72.3
9	47.7	24	14.6	5	78.2
10	37.3	25	17.3	6	63.0
11	24.0	26	17.5	Ara-1	105.3
12	122.2	27	27.0	2	73.1
13	145.5	28	179.8	3	72.7
14	41.4	29	33.3	4	72.7
15	29.9	30	25.1	5	64.2

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Solidagosaponin III



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{47}H_{76}O_{19}$: 944.498

$[\alpha]_D^{18}$ −9.2° (c 0.85, MeOH) [1]

FAB-MS *m/z*: 967 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.50 (dd, J = 4, 3, H-2), 4.23 (d, J = 3.5, H-3), 5.60 (t-like, H-12), 5.31 (brs, H-16), 3.42 (dd, J = 14, 4, H-18), 2.86 (t, J = 14, H-19), 3.71, 4.15 (d, J = 10, H-23), 1.37 (s, CH_3-24), 1.64 (s, CH_3-25), 1.00 (s, CH_3-26), 1.74 (s, CH_3-27), 1.03 (s, CH_3-29), 1.10 (s, CH_3-30)

β-D-Glcp: 4.91 (d, J = 8, H-1), 4.16 (t, J = 8, H-2), 4.36 (t, J = 9, H-3), 4.18 (t, J = 9, H-4), 3.87 (m, H-5), 4.33, 4.58 (dd, J = 12, 3, H_2-6)

α-L-Arap: 5.26 (d, J = 8, H-1), 4.46 (t, J = 8, H-2), 4.11 (dd, J = 9.5, 3.5, H-3), 4.20 (brs, H-4), 3.65 (d, J = 12, H-5), 4.23 (brd, J = 12, H-5)

α-L-Rhap: 6.76 (brs, H-1), 4.56 (H-2), 4.57 (H-3), 4.36 (t, J = 9, H-4), 4.43 (m, H-5), 1.71 (d, J = 6, CH_3-6) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

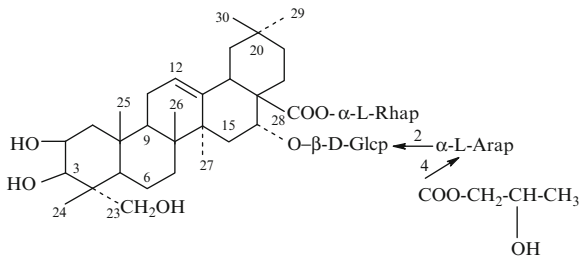
C-1	44.8	C-16	77.1	Glc-1	98.4	Rha-1	95.3
2	71.6	17	49.1	2	83.0	2	72.6
3	73.4	18	41.3	3	79.4	3	72.8
4	42.4	19	45.0	4	71.8	4	73.1
5	48.3	20	30.8	5	78.3	5	71.5
6	18.2	21	36.8	6	62.9	6	18.8
7	33.1	22	32.1	Ara-1	106.5		
8	40.0	23	68.1	2	73.6		
9	47.5	24	14.6	3	74.9		
10	37.2	25	17.3	4	69.6		
11	24.1	26	17.8	5	67.6		
12	122.7	27	26.9				
13	144.3	28	175.4				
14	41.4	29	33.2				
15	29.6	30	24.7				

(*continued*)

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Solidagosaponin IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{51}H_{82}O_{21}$: 1030.534

$[\alpha]_D^{18}$ + 18.3° (c 0.51, MeOH) [1]

FAB-MS *m/z*: 1054 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.53 (dd, J = 4, 3, H-2), 4.25 (d, J = 3, H-3), 5.62 (t-like, H-12), 5.23 (brs, H-16), 3.43 (t, J = 14, H-18), 2.85 (t, J = 14, H-19), 3.72, 4.17 (d, J = 10, H-23), 1.39 (s, CH_3-24), 1.67 (s, CH_3-25), 1.06 (s, CH_3-26), 1.74 (s, CH_3-27), 1.09 (s, CH_3-29), 1.00 (s, CH_3-30); Ester moiety: 2.70 (dd, J = 5.5, 15, H-2), 2.82 (dd, J = 8, 15, H-2), 4.62 (m, H-3), 1.46 (d, J = 6, CH_3-4)

β-D-Glcp: 4.85 (d, J = 8, H-1), 4.23 (t, J = 8, H-2), 4.37 (t, J = 9, H-3), 4.16 (t, J = 9, H-4), 3.86 (m, H-5), 4.38, 4.57 (H_2-6)

α-L-Arap: 5.55 (d, J = 8, H-1), 4.32 (t, J = 8, H-2), 4.19 (dd, J = 9, 3.5, H-3), 5.50 (brd, J = 2, H-4), 3.62 (d, J = 13, H-5), 4.22 (brd, J = 13, H-5)

α-L-Rhap: 6.77 (brs, H-1), 4.56 (H-2), 4.57 (H-3), 4.36 (t, J = 9, H-4), 4.43 (m, H-5), 1.72 (d, J = 6, CH_3-6) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

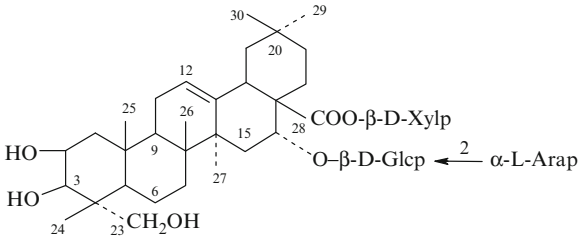
Table 1

C-1	44.9	C-16	77.5	Ester moiety-1	172.2	Ara-1	105.4
2	71.6	17	49.0	2	45.3	2	73.1
3	73.4	18	41.2	3	64.5	3	72.6
4	42.4	19	44.9	4	24.3	4	72.6
5	48.3	20	30.8	Glc-1	98.7	5	64.3
6	18.3	21	36.1	2	80.5	Rha-1	95.3
7	33.1	22	32.2	3	79.6	2	72.6
8	40.0	23	68.1	4	72.2	3	72.9
9	47.6	24	14.6	5	78.3	4	73.4
10	37.3	25	17.3	6	63.0	5	71.5
11	24.1	26	17.8			6	18.8
12	122.7	27	26.9				
13	144.5	28	175.5				
14	41.4	29	33.1				
15	29.8	30	24.7				

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Solidagosaponin V



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{46}H_{74}O_{19}$: 930.482

$[\alpha]_D^{18}$ −8.9° (c 0.76, MeOH) [1]

FAB-MS *m/z*: 953 $[M + Na]^+$, 931 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.49 (H-2), 4.24 (H-3), 5.60 (t-like, H-12), 5.46 (brs, H-16), 3.54 (dd, J = 14, 4, H-18), 2.89 (t, J = 14, H-19), 3.71, 4.15 (d, J = 10, H-23), 1.36 (s, CH_3-24), 1.61 (s, CH_3-25), 1.15 (s, CH_3-26), 1.77 (s, CH_3-27), 1.12 (s, CH_3-29), 1.09 (s, CH_3-30)

β-D-Glcp: 4.90 (d, J = 8, H-1), 4.20 (H-2), 4.36 (t, J = 9, H-3), 4.18 (H-4), 3.81 (m, H-5), 4.29 (dd, J = 12, 5.5, H-6), 4.48 (H-6)

α-L-Arap: 5.29 (d, J = 7, H-1), 4.47 (d, J = 7.5, H-2), 4.11 (dd, J = 9.5, 3.3, H-3), 4.20 (H-4), 3.66, 4.25 (dd, J = 12, 2, H_2-5)

β-D-Xylp: 6.24 (d, J = 7, H-1), 4.20 (H-2), 4.20 (H-3), 4.18 (H-4), 3.82, 4.39 (dd, J = 12, 5, H_2-5) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

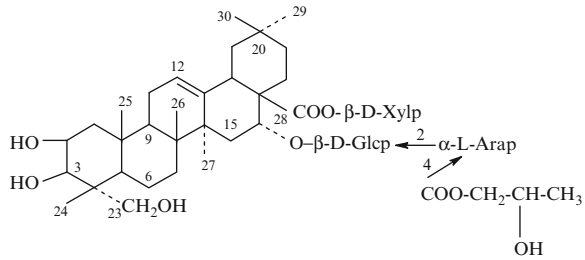
Table 1

C-1	44.8	C-16	77.5	Glc-1	98.4	Xyl-1	96.4
2	71.6	17	48.9	2	83.0	2	73.5
3	73.1	18	41.0	3	79.4	3	77.3
4	42.4	19	45.2	4	71.7	4	70.6
5	48.3	20	30.9	5	78.2	5	67.3
6	18.3	21	36.3	6	62.8		
7	33.0	22	31.8	Ara-1	106.4		
8	40.1	23	68.0	2	73.6		
9	47.6	24	14.6	3	79.4		
10	37.2	25	17.3	4	69.6		
11	24.0	26	17.6	5	67.5		
12	122.8	27	27.0				
13	144.3	28	175.9				
14	41.5	29	33.2				
15	29.6	30	25.0				

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Solidagosaponin VI



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{50}H_{80}O_{21}$: 1016.519

$[\alpha]_D^{18}$ + 6.1° (c 0.99, MeOH) [1]

FAB-MS *m/z*: 1039 $[M + Na]^+$, 1017 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.51 (H-2), 4.20 (d, J = 3, H-3), 5.62 (t-like, H-12), 5.40 (brs, H-16), 3.56 (dd, J = 5.4, 14, H-18), 2.90 (t, J = 14, H-19), 3.70, 4.16 (d, J = 10, H-23), 1.38 (s, CH_3-24), 1.64 (s, CH_3-25), 1.17 (s, CH_3-26), 1.76 (s, CH_3-27), 1.08 (s, CH_3-29), 1.07 (s, CH_3-30); Ester moiety: 2.72 (dd, J = 5, 14.5), 2.82 (dd, J = 8, 14.5, H-2), 4.62 (m, H-3), 1.46 (d, J = 6, CH_3-4)

β-D-Glcp: 4.83 (d, J = 8, H-1), 4.23 (t, J = 8.5, H-2), 4.34 (t, J = 9, H-3), 4.17 (H-4), 3.80 (m, H-5), 4.15, 4.49 (H_2-6)

α-L-Arap: 5.47 (d, J = 8, H-1), 4.30 (t, J = 8, H-2), 4.19 (H-3), 5.48 (brs, H-4), 3.61 (d, J = 12.5), 4.24 (H-5)

β-D-Xylp: 6.24 (d, J = 6.5, H-1), 4.18 (H-2), 4.20 (H-3), 4.17 (H-4), 3.82 (dd, J = 12, 8.5, H-5), 4.39 (dd, J = 12, 5, H-5) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

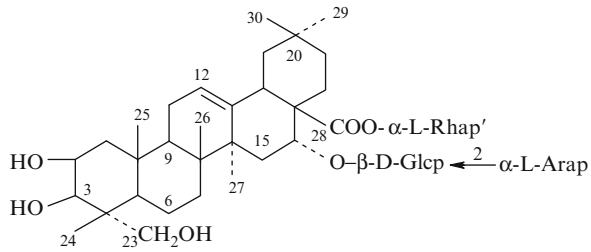
Table 1

C-1	44.8	C-16	77.6	Ester moiety-1	172.3	Ara-1	105.1
2	71.4	17	48.7	2	45.1	2	73.2
3	73.2	18	40.8	3	64.4	3	72.5
4	42.3	19	45.2	4	24.1	4	72.7
5	48.3	20	30.8	Glc-1	98.5	5	64.1
6	18.3	21	36.2	2	80.3	Xyl-1	96.4
7	33.1	22	32.0	3	79.4	2	73.2
8	40.1	23	68.0	4	71.9	3	77.3
9	47.6	24	14.5	5	78.0	4	70.4
10	37.3	25	17.3	6	62.7	5	67.2
11	24.0	26	17.6				
12	122.7	27	27.0				
13	144.6	28	176.0				
14	41.4	29	33.1				
15	29.9	30	24.9				

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Solidagosaponin VII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{46}H_{74}O_{19}$: 930.482

$[\alpha]_D^{18}$ −2.0° (c 0.93, MeOH) [1]

FAB-MS *m/z*: 953 $[M + Na]^+$, 931 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.50 (H-2), 4.22 (d, J = 3.5, H-3), 5.59 (t-like, H-12), 5.48 (brs, H-16), 3.56 (dd, J = 13.5, 4, H-18), 2.90 (t, J = 13.5, H-19), 3.70, (d, J = 10), 4.20 (H-23), 1.37 (s, CH_3-24), 1.61 (s, CH_3-25), 1.09 (s, CH_3-26), 1.77 (s, CH_3-27), 1.13 (s, CH_3-29), 1.12 (s, CH_3-30)

β-D-Glcp: 4.92 (d, J = 8, H-1), 4.19 (t, J = 8, H-2), 4.35 (t, J = 9, H-3), 4.16 (t, J = 9, H-4), 3.81 (m, H-5), 4.25 (dd, J = 12.5, 3, H-6), 4.50 (H-6)

α-L-Arap: 5.28 (d, J = 7, H-1), 4.47 (dd, J = 9, 7, H-2), 4.12 (dd, J = 9.5, 3, H-3), 4.20 (H-4), 3.67 (d, J = 12, H-5), 4.25 (brd, J = 12, H-5)

α-L-Arap′: 6.40 (d, J = 3.5, H-1), 4.52 (t, J = 3.5, H-2), 4.49 (H-3), 4.58 (H-4), 3.96, 4.42 (dd, J = 11.3, H-5) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	44.7	C-16	77.2	Glc-1	98.4	Ara′-1	95.5
2	71.4	17	48.9	2	82.7	2	71.1
3	73.0	18	40.9	3	79.1	3	72.9
4	42.3	19	45.3	4	71.6	4	66.8
5	48.3	20	30.9	5	78.1	5	64.6
6	18.2	21	36.4	6	62.8		
7	33.0	22	31.9	Ara-1	106.2		
8	40.0	23	67.8	2	73.3		
9	47.5	24	14.5	3	74.6		
10	37.2	25	17.3	4	69.4		

(*continued*)

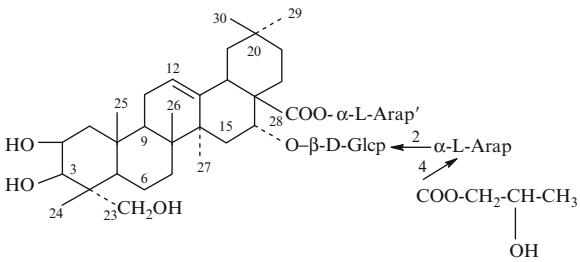
Table 1 (continued)

11	24.0	26	17.5	5	67.4
12	122.7	27	26.9		
13	144.4	28	175.9		
14	41.4	29	33.3		
15	29.6	30	25.0		

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Solidagosaponin VIII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{50}H_{80}O_{21}$: 1016.519

$[\alpha]_D^{18}$ + 9.1° (c 1.35, MeOH) [1]

FAB-MS *m/z*: 1039 $[M + Na]^+$, 1017 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.50 (H-2), 4.19 (d, J = 3.5, H-3), 5.61 (t-like, H-12), 5.39 (brs, H-16), 3.55 (dd, J = 4, 14, H-18), 2.87 (t, J = 14, H-19), 3.68, 4.11 (dd, J = 11, H-23), 1.36 (s, CH_3-24), 1.61 (s, CH_3-25), 1.09 (s, CH_3-26), 1.75 (s, CH_3-27), 1.07 (s, CH_3-29), 1.11 (s, CH_3-30), Ester moiety: 2.72 (dd, J = 5.5, 15, H-2), 2.84 (dd, J = 8, 15, H-2), 4.60 (m, H-3), 1.46 (d, J = 6, CH_3-4)

β-D-Glcp: 4.84 (d, J = 8, H-1), 4.21 (t, J = 8, H-2), 4.34 (t, J = 9, H-3), 4.10 (t, J = 9, H-4), 3.81 (m, H-5), 4.24, 4.46 (H_2-6)

α-L-Arap: 5.41 (d, J = 7.5, H-1), 4.30 (d, J = 9.8, H-2), 4.18 (dd, J = 9, 3.5, H-3), 5.47 (brs, H-4), 3.61 (d, J = 13), 4.23 (H-5)

α-L-Arap′: 6.36 (d, J = 4, H-1), 4.55 (d, J = 4.5, H-2), 4.47 (H-3), 4.55 (brs, H-4), 3.94 (dd, J = 3, 12, H-5), 4.51 (d, J = 12, H-5) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

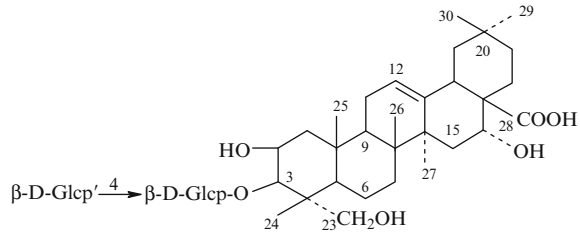
Table 1

C-1	44.8	C-16	77.6	Ester moiety-1	172.3	Ara-1	105.1
2	71.5	17	48.8	2	45.1	2	73.1
3	73.2	18	40.8	3	64.4	3	72.5
4	42.4	19	45.2	4	24.2	4	72.7
5	48.3	20	30.9	Glc-1	98.6	5	64.1
6	18.3	21	36.3	2	80.4	Ara′-1	95.5
7	33.1	22	32.1	3	79.4	2	71.1
8	40.0	23	68.0	4	72.0	3	73.0
9	47.6	24	14.5	5	78.1	4	66.8
10	37.3	25	17.3	6	62.8	5	64.7
11	24.0	26	17.6				
12	122.7	27	27.0				
13	144.7	28	175.9				
14	41.4	29	33.2				
15	29.8	30	24.9				

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Solidagosaponin IX



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{42}H_{68}O_{16}$: 828.450

$[\alpha]_D^{18}$ + 8.8° (c 1.01, MeOH) [1]

FAB-MS *m/z*: 851 $[M + Na]^+$, 829 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.74 (dd, J = 4, 3, H-2), 4.27 (d, J = 3, H-3), 5.65 (t-like, H-12), 5.22 (brs, H-16), 3.61 (dd, J = 14, 3, H-18), 2.80 (t, J = 14, H-19), 3.66, 4.32 (d, J = 10, H-23), 1.33 (s, CH_3-24), 1.58 (s, CH_3-25), 1.11 (s, CH_3-26), 1.81 (s, CH_3-27), 1.04 (s, CH_3-29), 1.17 (s, CH_3-30)

β-D-Glcp: 5.09 (d, J = 8, H-1), 3.99 (t, J = 8.5, H-2), 4.18 (t, J = 9, H-3), 4.29 (t, J = 9, H-4), 3.85 (m, H-5), 4.37 (dd, J = 12, 2, H-6), 4.49 (brd, J = 12, H-6)

β-D-Glcp′: 5.16 (d, J = 8, H-1), 4.06 (t, J = 8.5, H-2), 4.18 (dd, J = 9, H-3), 4.16 (m, H-4), 3.97 (H-5), 4.27, 4.49 (brd, J = 12, H_2-6) [1]

^{13}C NMR(67.8 MHz, C_5D_5N): [1]

Table 1

C-1	44.2	C-16	74.7	Glc-1	105.4
2	70.6	17	48.9	2	75.0
3	83.1	18	41.5	3	76.8
4	42.8	19	47.3	4	81.0
5	48.0	20	31.0	5	76.4
6	18.1	21	36.3	6	62.1
7	33.3	22	32.8	Glc′-1	104.9
8	40.1	23	65.6	2	74.7
9	47.7	24	15.0	3	78.2
10	37.1	25	17.3	4	71.5
11	24.1	26	17.6	5	78.4
12	122.6	27	27.3	6	62.4
13	145.2	28	180.0		
14	42.3	29	33.3		
15	36.2	30	24.8		

References

1. Y. Inose, T. Miyase, A. Ueno, Chem. Pharm. Bull. **39**(8), 2037 (1991)

Vicoside A

CAS Registry Number: 137578-66-6

See Figure Vicoside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Vicoa indica* [1]

$C_{36}H_{58}O_{11}$: 666.397

$C_{48}H_{68}O_{17}$: 916.445 (peracetate)

Mp: 160–162°C [1] (peracetate)

$[\alpha]_D$ + 55° (MeOH) [1] (peracetate)

IR (KBr) ν_{max} cm^{-1}: 3400, 1720 [1] (peracetate)

^{1}H NMR (300 MHz, J/Hz, $CDCl_3$) (for peracetate): 0.92, 0.98, 1.12, 1.26 (CH_3 × 6), 2.49 (brd, J = 12.5, H-18), 3.50 (brs, J = 5, H-3), 3.80 (ABq, 11.5, H_2-23), 4.22 (brs, J = 9, H-2), 5.37 (brt, H-12), 5.40 (m, H-16), 8.4 (s, OCHO), 2.02 (2 × OAc), 2.05 (2 × OAc), 2.08 (2 × OAc)

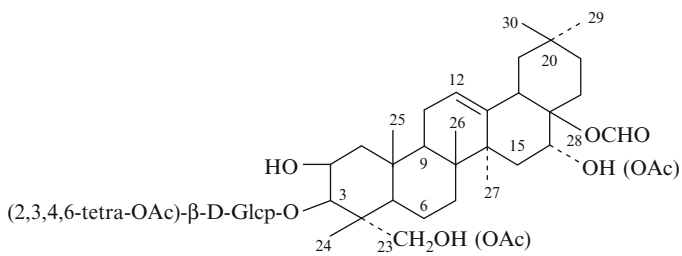
Sugar acetate protons: 4.59 (d, J = 7.8, H-1), 5.07 (m, H-2), 5.23 (t, J = 9.1, H-3), 5.04 (m, H-4), 3.70 (m, H-5), 4.11 (d, J = 11.8, H_2-6) [1]

^{13}C NMR (75 MHz, $CDCl_3$) (for peracetate): [1]

Table 1

C-1	42.8	C-16	69.6	Glc-1	101.7
2	69.1	17	73.1	2	71.4
3	84.0	18	49.2	3	72.6
4	43.5	19	47.3	4	68.5
5	47.6	20	30.6	5	71.8
6	17.6	21	35.5	6	61.9
7	32.5	22	30.9	6xOAc	168.3-170.4
8	39.7	23	66.1		20.4-21.0
9	47.4	24	14.0	OCHO	160.4

(*continued*)



Vicoside A

Table 1 (continued)

10	36.2	25	16.4
11	23.6	26	17.0
12	124.2	27	26.2
13	141.9	29	32.4
14	40.8	30	24.0
15	31.3		

References

1. S. Vasanth, A.B. Kundu, S.K. Panda, A. Patra, Phytochemistry **30**(9), 3053 (1991)

Virgaureasaponin 1

CAS Registry Number: 112515-98-7

See Figure Virgaureasaponin 1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{59}H_{96}O_{27}$: 1236.613

Mp: 219–222°C [1]

$[\alpha]_D^{22}$ + 19.5 [1]

FAB-MS *m/z*: 1259 $(M + Na)^+$, 1113 (1259-Rha), 981 (1113-Xyl), 835 (981-Rha), 689 (835-Fuc), 641 (M + 2Na):2, 593 (Rha + Xyl + Rha-Fuc + Na), 527 (689-Glc) [1]

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 5.35 (d, J = 8.1, H-1), 4.53 (d, J = 7.5, H-1), 4.48 (d, J = 7.7), 5.42 (d, J = 1.8), 5.19, 6.28 (d, J = 1.8) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	44.5	C-16	75.0	Glc-1	105.3	Rha-1	101.3	Rha′-1	102.4
2	69.9	17	50.2	2	76.3	2	72.0	2	72.25
3	84.5	18	42.3	3	78.15	3	72.6	3	73.5
4	42.9	19	46.0	4	72.25	4	84.1	4	74.0
5	48.6	20	31.2	5	77.7	5	68.8	5	71.0
6	17.8	21	36.5	6	62.4	6	18.9	6	18.35
7	33.3	22	31.8	Fuc-1	95.1	Xyl-1	107.1		
8	40.9	23	67.1	2	76.6	2	75.4		
9	48.0	24	14.8	3	74.5	3	84.3		
10	37.5	25	23.1	4	72.23	4	70.0		
11	24.6	26	17.7	5	71.23	5	66.1		
12	123.6	27	27.2	6	16.45				
13	144.6	28	177.3						
14	43.1	29	33.7						
15	36.5	30	24.9						

Pharm./Biol.: Inhibits the growth of *Candida albicans* and other yeasts [1]

References

1. K. Hiller, G. Bader, H.-R. Schulten, Pharmazie **42**(8), 541 (1987)

Virgaureasaponin 2

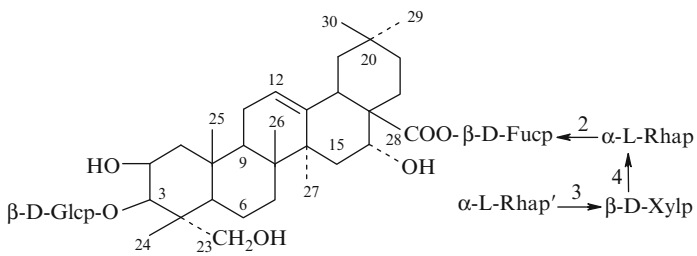
CAS Registry Number: 112509-53-2

See Figure Virgaureasaponin 2

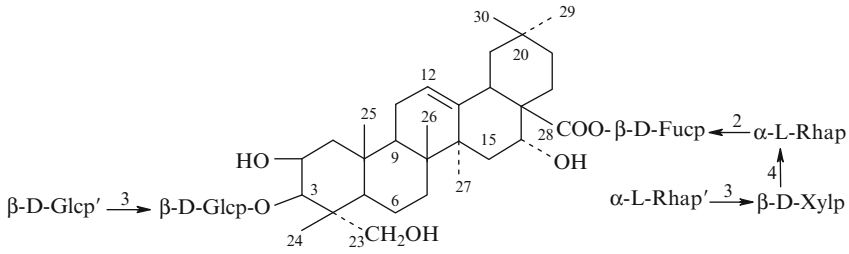
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

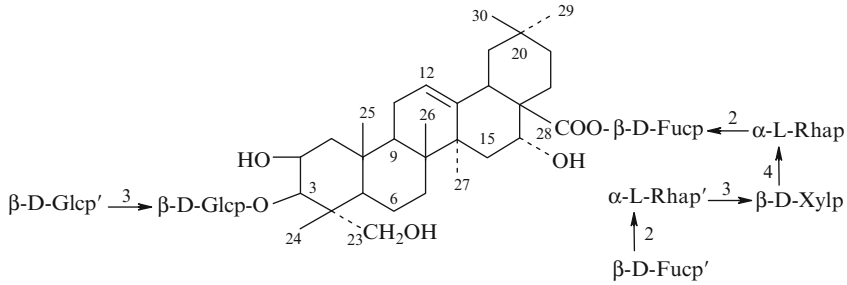
$C_{65}H_{106}O_{32}$: 1398.666



Virgaureasaponin 1



Virgaureasaponin 2



Virgaureasaponin 3

FAB-MS *m/z*: 1398 (M), 827 (M-H-Fuc-Rha-Xyl-Rha), 665 (827-Glc), 503 (665-Glc) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	44.5	C-16	75.0	Glc-1	104.9	Fuc-1	95.1	Rha-1	101.2
2	69.85	17	50.2	2	74.7	2	76.5	2	71.95
3	84.5	18	42.3	3	87.95	3	74.5	3	72.55
4	42.9	19	46.1	4	70.95	4	72.3	4	84.1
5	48.6	20	31.2	5	77.3	5	71.5	5	67.1
6	17.85	21	36.5	6	62.3	6	16.4	6	18.9
7	33.3	22	31.7	Glc′-1	105.1	Xyl-1	106.95	Rha′-1	102.3
8	40.9	23	66.5	2	76.25	2	75.4	2	72.3
9	47.9	24	14.8	3	78.0	3	84.3	3	73.5
10	37.6	25	23.1	4	72.3	4	69.95	4	74.0
11	24.6	26	17.7	5	77.7	5	66.3	5	68.8
12	123.5	27	27.3	6	62.5			6	18.3
13	144.6	28	177.3						
14	43.1	29	33.7						
15	36.5	30	25.0						

References

1. K. Hiller, G. Bader, G. Dube, Pharmazie **42**(11), 744 (1987)

Virgaureasaponin 3

See Figure Virgaureasaponin 3

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Polygalacic Acid

Biological sources: *Solidago virga-aurea* [1]

$C_{71}H_{116}O_{36}$: 1545.676

^{1}H NMR (400 MHz, J/Hz, CD_3OD): 0.83, 0.92, 0.99, 1.02, 1.35, 1.43 (s, $CH_3 \times 6$), 5.37 (brt, J = 3.5,

Table 1

C-1	44.5	C-16	74.5	Glc-1	105.19	Fuc-4	73.6	Rha-1	101.57
2	71.2	17	50.2	2	75.18	5	72.6	2	71.97
3	84.2	18	42.3	3	87.98	6	16.5	3	72.4
4	43.2	19	48.0	4	69.61	Fuc′-1	107.3	4	85.00
5	48.4	20	31.3	5	77.40	2	72.8	5	68.8
6	19.0	21	36.6	6	62.33	3	76.8	6	18.4
7	33.7	22	32.1	Glc′-1	105.26	4	73.1	Rha′-1	102.5
8	40.9	23	66.1	2	75.55	5	72.14	2	82.6
9	48.4	24	15.0	3	78.23	6	16.85	3	72.2
10	37.6	25	17.7	4	71.60	Xyl-1	107.3	4	74.5
11	24.6	26	17.8	5	77.84	2	76.3	5	69.9
12	123.6	27	27.3	6	62.66	3	84.8	6	17.9
13	144.8	28	177.4	Fuc-1	95.1	4	69.9		
14	43.0	29	33.4	2	75.1	5	67.2		
15	36.6	30	24.9	3	74.7				

H-12), 2.99 (dd, J = 4.5, 19, H-18), 1.26 (d, J = 6.4, CH_3 of Fuc), 1.27 (d, J = 6.3, CH_3 of Rha), 1.30 (d, J = 6.5, CH_3 of Fuc′), 1.37 (d, J = 6.2, CH_3 of Rha′)

Anomeric protons: 4.42 (d, J = 7.7), 4.52 (d, J = 7.6), 4.54 (d, J = 7.9), 4.62 (d, J = 7.8), 5.35 (d, J = 8.2), 5.41 (d, J = 1.7), 5.50 (d, J = 1.4) [1]

^{13}C NMR (CD_3OD): [1]

See Table 1

References

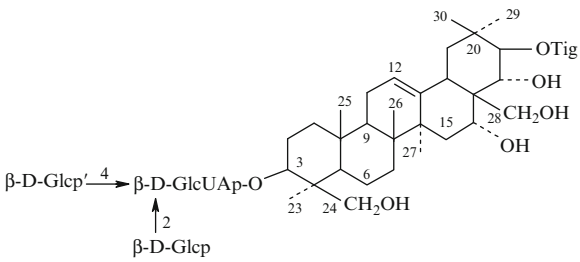
1. G. Bader, V. Wray, K. Hiller, Phytochemistry **31**(2), 621 (1992)

Glycosides of Aglycones of Oleanene Type

Glycosides of Protoaescigenin

Aesculioside A

CAS Registry Number: 254896-53-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{53}H_{84}O_{23}$: 1088.540

Mp: 254–255°C (dec. MeOH) [1]

$[\alpha]_D^{25}$ −23.0° (c 0.12, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3414, 2927, 2825, 1716, 1655, 1248, 1074 [1]

MALDI-TOF-MS *m/z*: 1111 $[M + Na]^+$, 1127 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.43 (d, J = 10.2, H-21), 5.38 (brs, H-12), 4.86 (m, H-16), 4.84 (d, J = 10.2, H-22), 4.28 (d, J = 9.7, H_2-24), 3.96, 3.68 (d, J = 9.9, H_2-28), 3.41 (m, H-3), 3.33 (d, J = 9.7, H_2-24), 2.94 (m, H-18), 1.83, 1.34, 1.33, 1.11, 0.81, 0.67 (s, CH_3-27, 30, 23, 29, 26, 25); β-D-GlcUAp: 4.92 (d, J = 7.8, H-1), 4.30 (H-2), 4.36 (H-3), 4.60 (H-4), 4.63 (H-5); β-D-Glcp: 5.62 (d, J = 7.8, H-1), 4.10 (H-2), 4.19 (H-3), 4.50 (H-4), 3.70 (H-5), 4.36, 4.46 (H_2-6); β-D-Glcp′: 5.22 (d, J = 7.8, H-1), 4.04 (H-2), 4.19 (H-3), 4.20 (H-4), 4.00 (H-5), 4.26, 4.48 (H_2-6); Tigloyl: 7.01 (dq, J = 7.1, 1.5, H-3), 1.60 (dd, J = 7.1, 1.1, CH_3-4), 1.87 (s, CH_3-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	67.9	GlcUA-1	104.6	Glc′-1	104.7
2	26.6	17	48.2	2	79.7	2	74.9
3	91.1	18	40.4	3	76.5	3	78.1
4	43.7	19	47.9	4	81.7	4	71.5
5	56.1	20	36.4	5	75.7	5	78.5
6	18.5	21	82.0	6	171.9	6	62.4
7	33.2	22	72.9	Glc-1	104.3	Tigloyl-1	168.6
8	39.9	23	22.5	2	75.7	2	129.9
9	46.8	24	63.3	3	78.1	3	135.9
10	36.4	25	15.6	4	69.8	4	14.2
11	24.0	26	16.7	5	78.3	5	12.4
12	123.1	27	27.4	6	61.6		
13	143.6	28	65.9				
14	41.8	29	29.9				
15	34.4	30	20.3				

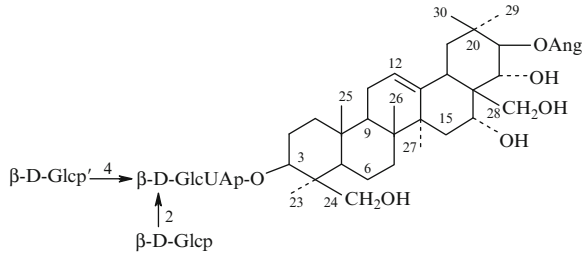
Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)

Aesculioside B

CAS Registry Number: 106310-33-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{53}H_{84}O_{23}$: 1088.540

Mp: 236–237°C (dec. MeOH) [1]

$[\alpha]_D^{25}$ −32.0° (c 0.12, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3414, 2927, 2866, 1715, 1654, 1259, 1074 [1]

MALDI-TOF-MS *m/z*: 1111 $[M + Na]^+$, 1127 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.46 (d, J = 10.1, H-21), 5.37 (brs, H-12), 4.87 (brs, H-16), 4.80 (d, J = 10.1, H-22), 4.28 (d, J = 10.3, H_2-24), 3.94 (d, J = 10.4, H-28), 3.66 (d, J = 10.4, H_2-28), 3.40 (m, H-3), 3.33 (d, J = 10.3, H_2-24), 2.95 (m, H-18), 1.83, 1.33, 1.33, 1.11, 0.80, 0.66 (s, CH_3-27, 30, 23, 29, 26, 25)

β-D-GlcUAp: 4.92 (d, J = 7.7, H-1), 4.29 (H-2), 4.35 (H-3), 4.59 (H-4), 4.62 (H-5)

β-D-Glcp: 5.63 (d, J = 7.7, H-1), 4.10 (H-2), 4.18 (H-3), 4.49 (H-4), 3.69 (H-5), 4.34, 4.44 (H_2-6)

β-D-Glcp′: 5.23 (d, J = 7.7, H-1), 4.03 (H-2), 4.18 (H-3), 4.19 (H-4), 4.00 (H-5), 4.27, 4.47 (H_2-6)

Angeloyl: 5.89 (dq, J = 7.1, 1.5, H-3), 2.05 (dd, J = 7.1, 1.5, CH_3-4), 1.99 (s, CH_3-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	67.9	GlcUA-1	104.6	Glc′-1	104.7
2	26.6	17	48.2	2	79.7	2	74.9
3	91.1	18	40.4	3	76.5	3	78.1
4	43.7	19	47.9	4	81.8	4	71.5
5	56.1	20	36.2	5	75.5	5	78.5
6	18.5	21	81.7	6	172.0	6	62.4
7	33.2	22	73.0	Glc-1	104.3	Angeloyl-1	168.7
8	39.9	23	22.5	2	75.7	2	129.6
9	46.7	24	63.3	3	78.0	3	136.1
10	36.4	25	15.6	4	69.7	4	15.9
11	24.0	26	16.7	5	78.4	5	21.1
12	123.0	27	27.4	6	61.6		
13	143.5	28	65.9				
14	41.8	29	29.9				
15	34.4	30	20.4				

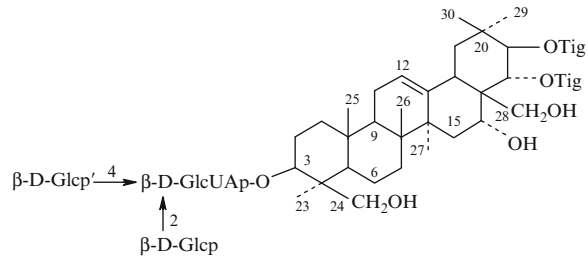
Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)

Aesculioside C

CAS Registry Number: 254896-65-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{58}H_{90}O_{24}$: 1170.582

Mp: 249–250°C (dec. MeOH) [1]

$[\alpha]_D^{25}$ −42.0° (c 0.11, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 2926, 2867, 1733, 1698, 1654, 1274, 1073 [1]

MALDI-TOF-MS *m/z*: 1193 $[M + Na]^+$, 1209 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.73 (d, J = 10.1, H-21), 6.33 (d, J = 10.1, H-22), 5.42 (brs, H-12), 4.50 (m, H-16), 4.25 (d, J = 10.5, H_2-24), 3.63 (d, J = 11.9, H-28), 3.42 (m, H-3), 3.40 (d, J = 11.9, H-28), 3.34 (d, J = 10.5, H_2-24), 3.11 (m, H-18), 1.83, 1.36, 1.35, 1.13, 0.80, 0.66 (s, CH_3-27, 30, 23, 29, 26, 25); β-D-GlcUAp: 4.93 (d, J = 7.7, H-1), 4.30 (H-2), 4.39 (H-3), 4.61 (H-4), 4.63 (H-5); β-D-Glcp: 5.64 (d, J = 7.7, H-1), 4.10 (H-2), 4.20 (H-3), 4.50 (H-4), 3.70 (H-5), 4.34, 4.45 (H_2-6); β-D-Glcp′: 5.24 (d, J = 7.7, H-1), 4.03 (H-2), 4.20 (H-3), 4.20 (H-4), 4.01 (H-5), 4.27, 4.48 (H_2-6); C_{21}-Tigloyl: 7.05 (dq, J = 7.1, 1.5, H-3), 1.61 (dd, J = 7.1, 1.1, CH_3-4), 1.92 (s, CH_3-5); C_{22}-Tigloyl: 6.93 (dq, J = 7.1, 1.5, H-3), 1.43 (dd, J = 7.1, 1.1, CH_3-4), 1.85 (s, CH_3-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	68.5	GlcUA-1	104.6	Glc′-4	71.5
2	26.6	17	48.3	2	79.7	5	78.5
3	91.1	18	40.3	3	76.5	6	62.4

(*continued*)

Table 1 (continued)

4	43.7	19	47.3	4	81.8	C_{21}Tigloyl-1	168.1
5	56.1	20	36.3	5	75.8	2	129.9
6	18.5	21	79.2	6	171.9	3	136.7
7	33.2	22	74.0	Glc-1	104.3	4	14.2
8	40.0	23	22.5	2	75.8	5	12.4
9	46.7	24	63.3	3	78.1	C_{22}Tigloyl-1	168.4
10	36.5	25	15.6	4	69.7	2	129.2
11	24.0	26	16.7	5	78.4	3	137.2
12	123.0	27	27.5	6	61.6	4	14.0
13	142.8	28	63.4	Glc′-1	104.7	5	12.3
14	41.7	29	29.6	2	74.9		
15	34.9	30	20.1	3	78.2		

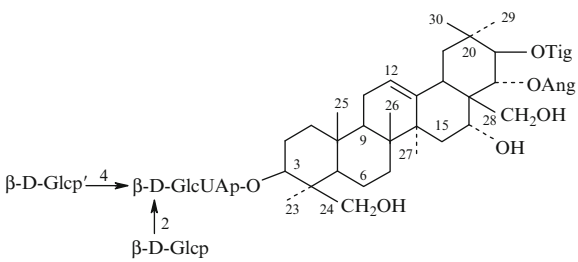
Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)

Aesculioside D

CAS Registry Number: 254896-66-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{58}H_{90}O_{24}$: 1170.582

Mp: 225–226°C (dec. MeOH) [1]

$[\alpha]_D^{25}$ −52.0° (c 0.10, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3431, 2926, 2873, 1700, 1672, 1654, 1268, 1071 [1]

MALDI-TOF-MS *m/z*: 1193 $[M + Na]^+$, 1209 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.74 (d, J = 10.1, H-21), 6.37 (d, J = 10.1, H-22), 5.42 (brs, H-12), 4.53 (brs, H-16), 4.28 (d, J = 10.6, H_2-24), 3.66 (d, J = 10.5, H_2-28), 3.44 (d, J = 10.5, H_2-28), 3.42 (m, H-3), 3.34 (d, J = 10.6, H_2-24), 3.11 (m, H-18), 1.85, 1.35, 1.33, 1.12, 0.81, 0.67 (s, CH_3-27, 30, 23, 29, 26, 25)

β-D-GlcUAp: 4.93 (d, J = 7.8, H-1), 4.31 (H-2), 4.38 (H-3), 4.60 (H-4), 4.62 (H-5)

β-D-Glcp: 5.63 (d, J = 7.6, H-1), 4.12 (H-2), 4.20 (H-3), 4.50 (H-4), 3.69 (H-5), 4.35, 4.45 (H_2-6)

β-D-Glcp′: 5.23 (d, J = 7.8, H-1), 4.04 (H-2), 4.20 (H-3), 4.20 (H-4), 4.01 (H-5), 4.28, 4.50 (H_2-6)

C_{21}-Tigloyl: 7.07 (dq, J = 7.2, 1.5, H-3), 1.62 (dd, J = 7.1, 1.1, CH_3-4), 1.95 (s, CH_3-5)

C_{22}-Angeloyl: 5.84 (dq, J = 7.2, 1.5, H-3), 2.02 (dd, J = 7.2, 1.4, CH_3-4), 1.89 (s, CH_3-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	68.6	GlcUA-1	104.6	Glc′-4	71.5
2	26.6	17	48.0	2	79.7	5	78.5
3	91.1	18	40.1	3	76.5	6	62.4
4	43.7	19	47.3	4	81.8	C_{21}Tigloyl-1	167.9
5	56.1	20	36.4	5	75.8	2	129.5
6	18.5	21	79.2	6	171.9	3	136.8
7	33.2	22	73.7	Glc-1	104.3	4	14.2
8	40.0	23	22.5	2	75.8	5	12.4
9	46.7	24	63.3	3	78.1	C_{22}Angeloyl-1	168.3
10	36.6	25	15.6	4	69.7	2	129.2
11	24.0	26	16.7	5	78.4	3	136.6
12	123.0	27	27.5	6	61.6	4	15.7
13	142.8	28	63.6	Glc′-1	104.7	5	20.8
14	41.7	29	29.6	2	74.9		
15	34.9	30	20.2	3	78.2		

Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)

Aesculioside E

CAS Registry Number: 254896-68-9

See Figure Aesculioside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{59}H_{92}O_{24}$: 1184.597

Mp: 217–218°C (dec. MeOH) [1]

$[\alpha]_D^{25}$ −20.0° (c 0.40, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3407, 2929, 2867, 1716, 1681, 1653, 1273, 1143, 1073 [1]

MALDI-TOF-MS *m/z*: 1207 $[M + Na]^+$, 1213 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.72 (d, J = 10.1, H-21), 6.32 (d, J = 10.1, H-22), 5.43 (brs, H-12), 4.53 (brs, H-16), 4.28 (d, J = 11.2, H_2-24), 3.65 (d, J = 10.7, H_2-28), 3.42 (m, H-3), 3.40 (d, J = 10.7, H_2-28), 3.34 (d, J = 11.2, H_2-24), 3.12 (m, H-18), 1.83, 1.36, 1.34, 1.13, 0.81, 0.68 (s, CH_3-27, 30, 23, 29, 26, 25); β-D-GlcUAp: 4.90 (d, J = 7.6, H-1), 4.25 (H-2), 4.32 (H-3), 4.45 (H-4), 4.53 (H-5), 3.92 (OCH_3); β-D-Glcp: 5.62 (d, J = 7.8, H-1), 4.07 (H-2), 4.17 (H-3), 4.47 (H-4), 3.70 (H-5), 4.35, 4.45 (H_2-6); β-D-Glcp′: 5.02 (d, J = 7.8, H-1), 3.97 (H-2), 4.17 (H-3), 4.18 (H-4), 3.98 (H-5), 4.29, 4.49 (H_2-6);

C_{21}-Tigloyl: 7.05 (dq, J = 7.1, 1.4, H-3), 1.61 (dd, J = 7.1, 1.1, CH_3-4), 1.92 (s, CH_3-5);

C_{22}-Tigloyl: 6.93 (dq, J = 7.2, 1.4, H-3), 1.44 (dd, J = 7.0, 1.1, CH_3-4), 1.83 (s, CH_3-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

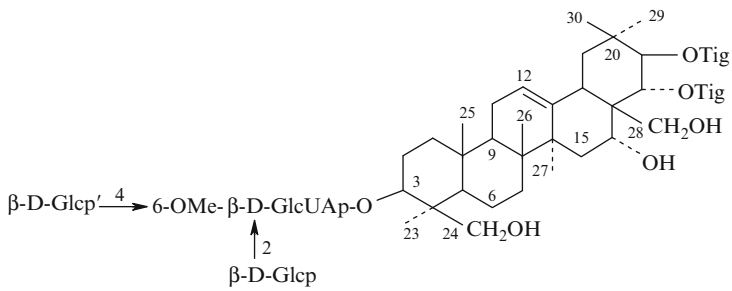
Table 1

C-1	38.5	C-16	68.5	GlcUA-1	104.7	Glc′-3	78.2
2	26.6	17	48.3	2	79.5	4	71.5
3	91.1	18	40.1	3	76.2	5	78.5
4	43.8	19	47.3	4	81.8	6	62.4
5	56.2	20	36.4	5	75.0	C_{21}Tigloyl-1	168.1
6	18.6	21	79.2	6	169.5	2	129.5
7	33.2	22	74.1	OCH_3	52.7	3	136.6
8	40.0	23	22.5	Glc-1	104.3	4	14.2
9	46.8	24	63.3	2	75.7	5	12.4
10	36.5	25	15.6	3	78.1	C_{22}Tigloyl-1	168.5
11	24.1	26	16.7	4	69.8	2	129.3
12	123.1	27	27.5	5	78.4	3	137.1
13	142.9	28	63.5	6	61.6	4	14.0
14	41.7	29	29.6	Glc′-1	105.1	5	12.3
15	34.9	30	20.2	2	74.5		

Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)



Aesculioside E

Aesculioside F

CAS Registry Number: 254896-69-0

See Figure Aesculioside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{59}H_{92}O_{24}$: 1184.597

Mp: 231–232°C [1]

$[\alpha]_D^{25}$ −23.0° (c 0.38, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3414, 2928, 2875, 1725, 1680, 1646, 1267, 1145, 1073 [1]

MALDI-TOF-MS *m/z*: 1207 $[M + Na]^+$, 1213 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.68 (d, J = 10.1, H-21), 6.38 (d, J = 10.1, H-22), 5.43 (brs, H-12), 4.51 (brs, H-16), 4.27 (d, J = 11.2, H_2-24), 3.66 (d, J = 10.8, H_2-28), 3.44 (d, J = 10.7, H_2-28), 3.40 (m, H-3), 3.33 (d, J = 11.2, H_2-24), 3.12 (m, H-18), 1.84, 1.37, 1.33, 1.13, 0.81, 0.68 (s, CH_3-27, 30, 23, 29, 26, 25); β-D-GlcUAp: 4.89 (d, J = 7.5, H-1), 4.26 (H-2), 4.33 (H-3), 4.46 (H-4), 4.54 (H-5), 3.92 (OCH_3); β-D-Glcp: 5.63 (d, J = 7.9, H-1), 4.08 (H-2), 4.18 (H-3), 4.48 (H-4), 3.71 (H-5), 4.36, 4.46 (H_2-6); β-D-Glcp′: 5.03 (d, J = 7.9, H-1), 3.98 (H-2), 4.18 (H-3), 4.19 (H-4), 4.00 (H-5), 4.30, 4.51 (H_2-6);

C_{21}-Tigloyl: 7.07 (dq, J = 7.2, 1.5, H-3), 1.63 (dd, J = 7.0, 1.1, CH_3-4), 1.95 (s, CH_3-5);

C_{22}-Angeloyl: 5.84 (dq, J = 7.2, 1.5, H-3), 2.02 (dd, J = 7.1, 1.5, CH_3-4), 1.89 (s, CH_3-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

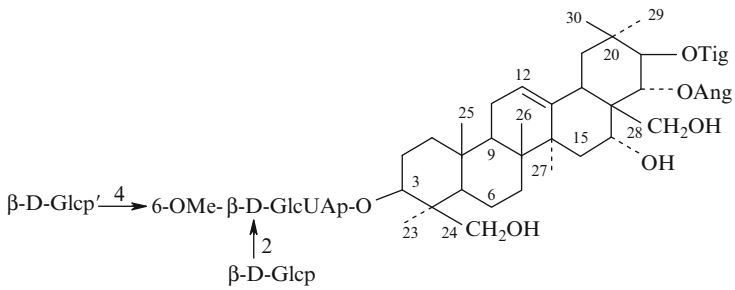
Table 1

C-1	38.5	C-16	68.5	GlcUA-1	104.7	Glc′-3	78.1
2	26.6	17	48.0	2	79.5	4	71.5
3	91.2	18	40.1	3	76.4	5	78.5
4	43.7	19	47.3	4	81.7	6	62.4
5	56.1	20	36.4	5	75.0	C_{21}Tigloyl-1	167.9
6	18.5	21	79.2	6	169.5	2	129.5
7	33.2	22	73.6	OCH_3	52.7	3	136.8
8	40.0	23	22.5	Glc-1	104.3	4	14.2
9	46.7	24	63.2	2	75.7	5	12.4
10	36.6	25	15.6	3	78.0	C_{22}Tigloyl-1	168.3
11	24.0	26	16.7	4	69.8	2	129.2
12	123.0	27	27.5	5	78.3	3	136.6
13	142.8	28	63.6	6	61.6	4	15.7
14	41.7	29	29.6	Glc′-1	105.1	5	20.8
15	34.8	30	20.2	2	74.5		

Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)



Aesculioside F

Aesculioside G

CAS Registry Number: 254896-70-3
See Figure Aesculioside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{56}H_{88}O_{24}$: 1144.566

Mp: 239–240°C (dec. MeOH) [1]

$[\alpha]_D^{25}$ −18.0° (c 0.12, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3411, 2924, 2858, 1751, 1680, 1655, 1266, 1072 [1]

MALDI-TOF-MS *m/z*: 1167 $[M + Na]^+$, 1183 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.45 (d, J = 9.9, H-21), 5.46 (brs, H-12), 4.76 (brs, H-16), 4.52 (brs, H-22), 4.29 (m, H_2-28), 4.23 (d, J = 11.2, H_2-24), 3.35 (m, H-3), 3.30 (d, J = 11.2, H_2-24), 2.84 (m, H-18), 1.83, 1.34, 1.31, 1.11, 0.96, 0.68 (s, CH_3-27, 30, 23, 29, 26, 25); β-D-GlcUAp: 4.87 (d, J = 7.7, H-1), 4.22 (H-2), 4.29 (H-3), 4.43 (H-4), 4.52 (H-5), 3.92 (OCH_3); β-D-Glcp: 5.60 (d, J = 7.7, H-1), 4.06 (H-2), 4.16 (H-3), 4.46 (H-4), 3.68 (H-5), 4.32, 4.43 (H_2-6); β-D-Glcp′: 5.00 (d, J = 7.7, H-1), 3.94 (H-2), 4.16 (H-3), 4.17 (H-4), 3.96 (H-5), 4.26, 4.49 (H_2-6); C_{21}-Tigloyl: 7.02 (dq, J = 7.1, 1.5, H-3), 1.61 (dd, J = 7.1, 1.1, CH_3-4), 1.87 (s, CH_3-5); C_{28}-Acetyl: 2.04 (s, CH_3-2) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	67.6	GlcUA-1	104.7	Glc′-1	105.2
2	26.6	17	47.1	2	79.4	2	74.5
3	91.2	18	40.6	3	76.2	3	78.2
4	43.7	19	47.3	4	81.8	4	71.5
5	56.1	20	36.4	5	74.9	5	78.5
6	18.7	21	81.6	6	169.5	6	62.3
7	33.2	22	71.7	OCH_3	52.7	C_{21}Tigloyl-1	168.5
8	39.9	23	22.4	Glc-1	104.2	2	129.8
9	46.8	24	63.2	2	75.7	3	136.3
10	36.5	25	15.6	3	78.1	4	14.2
11	24.0	26	16.7	4	69.7	5	12.4
12	123.8	27	27.4	5	78.4		
13	142.8	28	66.4	6	61.6	Ac-1	170.7
14	41.8	29	29.9			2	20.7
15	34.6	30	20.1				

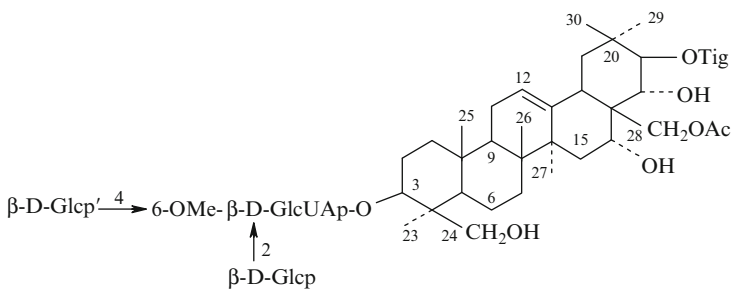
Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

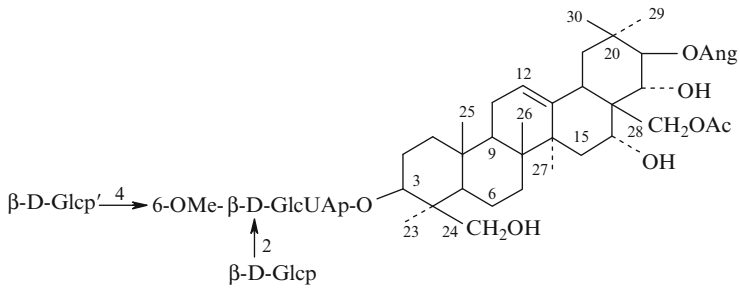
1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)

Aesculioside H

CAS Registry Number: 254896-72-5
See Figure Aesculioside H



Aesculioside G



Aesculioside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{56}H_{88}O_{24}$: 1144.566

Mp: 230–231°C (aq. MeOH) [1]

$[\alpha]_D^{25}$ −17.0° (c 0.18, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3402, 2924, 2849, 1742, 1695, 1656, 1264, 1069 [1]

MALDI-TOF-MS *m/z*: 1167 $[M + Na]^+$, 1183 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.49 (d, J = 10.8, H-21), 5.45 (brs, H-12), 4.75 (brs, H-16), 4.52 (brs, H-22), 4.30 (m, H_2-28), 4.24 (d, J = 11.6, H_2-24), 3.35 (m, H-3), 3.31 (d, J = 11.6, H_2-24), 2.83 (m, H-18), 1.80, 1.31, 1.31, 1.13, 0.94, 0.68 (s, CH_3-27, 30, 23, 29, 26, 25); β-D-GlcUAp: 4.87 (d, J = 7.5, H-1), 4.24 (H-2), 4.30 (H-3), 4.44 (H-4), 4.54 (H-5), 3.92 (OCH_3); β-D-Glcp: 5.61 (d, J = 7.7, H-1), 4.06 (H-2), 4.17 (H-3), 4.49 (H-4), 3.69 (H-5), 4.36, 4.47 (H_2-6); β-D-Glcp′: 5.01 (d, J = 7.7, H-1), 3.97 (H-2), 4.17 (H-3), 4.18 (H-4), 4.00 (H-5), 4.27, 4.50 (H_2-6); C_{21}-Angeloyl: 5.90 (dq, J = 7.1, 1.5, H-3), 2.05 (dd, J = 7.1, 1.1, CH_3-4), 1.99 (s, CH_3-5); C_{28}-Acetyl: 2.04 (s, CH_3-2) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-13	142.7	25	15.6	GlcUA-1	104.7	Glc′-1	105.1
2	26.6	14	41.8	26	16.9	2	79.4	2	74.5
3	91.2	15	34.6	27	27.4	3	76.2	3	78.2
4	43.7	16	67.6	28	66.4	4	81.8	4	71.5
5	56.1	17	47.1	29	29.8	5	74.9	5	78.5
6	18.5	18	40.6	30	20.2	6	169.5	6	62.3
7	33.2	19	47.3			OCH_3	52.7	C_{21}Angel.-1	168.6
8	39.9	20	36.1			Glc-1	104.3	2	129.5
9	46.8	21	81.2			2	75.7	3	136.2
10	36.4	22	71.1			3	78.1	4	15.9
11	24.1	23	22.4			4	69.7	5	21.0
12	123.8	24	63.2			5	78.4	Ac-1	170.7
						6	61.6	2	21.0

Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)

Bunkankasaponin A

CAS Registry Number: 97380-28-4

See Figure Bunkankasaponin A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Xanthoceras sorbifolia* [1]

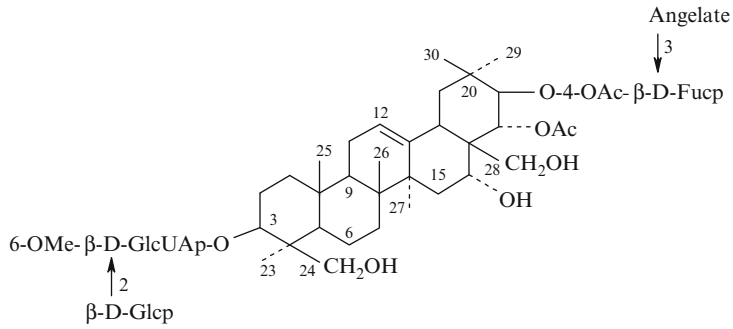
$C_{58}H_{90}O_{24}$: 1170.582 (Me ester)

Mp: 261–264°C [1]

$[\alpha]_D^{20}$ −14.2° (c 0.9, C_5H_5N) [1]

UV λ_{max}^{MeOH} nm (Me ester): 215 [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 2950, 2920, 2870, 1745, 1720, 1635, 1460, 1440, 1383, 1255, 1160, 1075, 1045, 1025, 970, 800 [1]



Bunkankasaponin A

FAB-MS *m/z*: 667 (0.1), 501 (3.0), 453 (1.6), 335 (13.3), 271 (11.2), 171 (10.7), 169 (83.0), 111 (13), 83 (100), 55 (55.0), 43 (44.0) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N) (Me ester): 5.40 (m, H-12), 1.37, 1.37, 0.71, 1.84, 1.37, 0.81 (s, $CH_3 \times 6$), 2.03 (s, OAc)

Angeloyl: 1.92 (Me-α), 2.00 (Me-β), 5.92 (d, J = 7.0, H-3)

β-D-GlcUAp: 3.79 (s, COOMe)

β-D-Fucp: 1.20 (d, J = 7.0, CH_3-6), 2.39 (s, 4-OAc) [1]

^{13}C NMR (67.80 MHz, C_5D_5N) (Me ester):

Table 1

C-1	38.6	C-16	68.8	GlcUA-1	105.1	Fuc-1	105.2
2	26.6	17	47.8	2	81.6	2	70.0
3	90.8	18	39.9	3	78.0	3	74.2
4	43.8	19	47.8	4	72.6	4	71.6
5	56.2	20	37.7	5	77.0	5	68.8
6	18.5	21	85.1	6	170.3	6	16.7
7	33.3	22	74.2	Me	52.1	Ac-1	171.9
8	39.4	23	22.5	Glc-1	104.8	2	21.9
9	46.7	24	63.2	2	75.8	Angeloyl-1	167.4
10	36.4	25	15.9	3	78.5	2	128.2
11	24.1	26	16.7	4	69.9	3	138.0
12	123.8	27	27.4	5	78.2	4	20.6
13	143.1	28	64.0	6	61.5	5	15.6
14	41.6	29	30.2				
15	34.8	30	20.1				
		Ac-1	170.6				
		2	20.5				

References

1. Y. Chen, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **33**(4), 1387 (1985)

Bunkankasaponin B

CAS Registry Number: 97380-27-3

See Figure Bunkankasaponin B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Xanthoceras sorbifolia* [1]

$C_{61}H_{94}O_{24}$: 1210.613 (Me ester)

Mp: 262–265°C (MeOH) [1]

$[\alpha]_D^{19}$ −0.41° (c 1.2, C_5H_5N) [1]

UV λ_{max}^{MeOH} nm (Me ester): 215 [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 2950, 2920, 2850, 1745, 1720, 1640, 1460, 1382, 1260, 1160, 1070, 1040, 978, 855 [1]

FAB-MS *m/z*: 637 (0.1), 513 (2.5), 508 (1.6), 495 (4.2), 493 (1.5), 482 (1.8), 353 (10.0), 311 (75), 211 (66), 205 (13.2), 191 (78), 111 (53.1), 83 (100), 55 (49.2), 43 (84.4) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N) (Me ester): 5.40 (m, H-12), 0.69, 0.79, 1.39, 1.39, 1.39, 1.88 ($CH_3 \times 6$), 2.34 (s, OAc)

Angeloyl: 1.87, 1.97 (brs, 2 Me-α), 1.98, 2.04 (d, J = 7.0, 2 Me-β), 5.91, 5.97 (q, J = 7.0, 2H-β)

β-D-GlcUAp: 3.78 (s, COOMe)

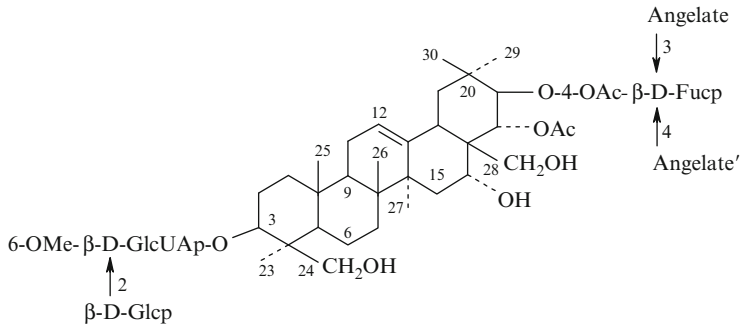
β-D-Fucp: 1.19 (d, J = 7.0, CH_3-6)

^{13}C NMR (67.80 MHz, C_5D_5N) (Me ester): [1]

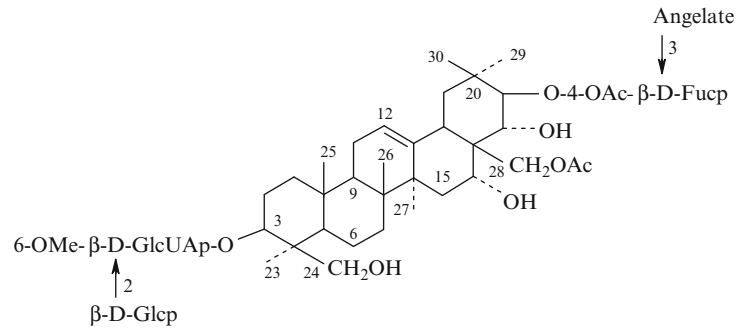
Table 1

C-1	38.5	C-16	68.7	GlcUA-1	105.1	Fuc-1	105.4
2	26.6	17	47.8	2	81.5	2	70.2

(*continued*)



Bunkankasaponin B



Bunkankasaponin C

Table 1 (continued)

3	90.8	18	40.0	3	78.0	3	74.0
4	43.8	19	47.8	4	72.6	4	71.4
5	56.1	20	37.8	5	77.0	5	68.9
6	18.6	21	85.7	6	170.3	6	16.7
7	33.2	22	74.4	Me	52.1	Angeloyl-1	167.4
8	40.0	23	22.5	Glc-1	104.8	2	127.9
9	46.6	24	63.3	2	75.7	3	138.1
10	36.4	25	16.1	3	78.5	4	20.6
11	24.1	26	16.9	4	69.9	5	15.5
12	123.8	27	27.4	5	78.2	Angeloyl′-1	167.4
13	143.1	28	63.9	6	61.6	2	128.2
14	41.6	29	30.1			3	138.9
15	34.8	30	20.0			4	20.8
		Ac-1	171.6			5	15.9
		2	22.0				

References

1. Y. Chen, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **33**(4), 1387 (1985)

Bunkankasaponin C

CAS Registry Number: 97380-26-2

See Figure Bunkankasaponin C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Xanthoceras sorbifolia* [1]

$C_{58}H_{90}O_{24}$: 1170.582 (Me ester)

Mp: 260–263°C (MeOH) [1]

$[\alpha]_D^{19}$ −20.2° (c 0.9, C_5H_5N) [1]

UV λ_{max}^{MeOH} nm: 215 [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 2920, 2860, 1743, 1720, 1630, 1450, 1383, 1240, 1160, 1070, 978, 855 [1]

FAB-MS *m/z* : 599 (0.1), 521 (0.9), 501 (3.6), 496 (2.2), 479 (2.2), 453 (5.2), 435 (5.6), 353 (1.5), 335

(17.2), 271 (30.4), 171 (34.8), 169 (71.9), 111 (57.4), 83 (100), 55 (48.0), 43 (80.1) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 5.45 (m, H-12), 0.93, 0.93, 1.36, 1.36, 1.49, 1.83 (s, $CH_3 \times 6$), 2.11 (OAc)

Angeloyl: 1.89 (Me-α), 1.99 (d, J = 7.0, Me-β), 5.92 (q, J = 7.0, H-β)

β-D-GlcUAp: 3.79 (s, COOMe)

β-D-Fucp: 1.12 (d, J = 7.0, CH_3-6), 2.06 (s, 4-OAc) [1]

^{13}C NMR (67.80 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	67.9	GlcUA-1	105.1	Fuc-1	106.2
2	26.7	17	46.6	2	81.6	2	69.8
3	90.8	18	40.5	3	78.0	3	74.2
4	43.8	19	47.8	4	72.6	4	71.4
5	56.1	20	37.1	5	77.0	5	69.3
6	18.6	21	92.3	6	170.3	6	16.8
7	33.2	22	74.2	Me	52.1	Ac-1	170.7
8	40.0	23	22.5	Glc-1	104.8	2	20.8
9	46.7	24	63.3	2	75.7	Angeloyl-1	167.3
10	36.4	25	16.2	3	78.5	2	128.0
11	24.2	26	16.8	4	69.8	3	138.4
12	123.7	27	27.5	5	78.3	4	20.6
13	142.9	28	66.4	6	61.7	5	15.8
14	41.8	29	29.8				
15	34.7	30	20.2				
		Ac-1	170.6				
		2	20.6				

References

1. Y. Chen, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **33**(4), 1387 (1985)

Bunkankasaponin D

CAS Registry Number: 97380-25-1

See Figure Bunkankasaponin D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Xanthoceras sorbifolia* [1]

$C_{61}H_{94}O_{24}$: 1210.613 (Me ester)

Mp: 253–256°C (MeOH) [1]

$[\alpha]_D^{20}$ + 5.2° (c 1.7, C_5H_5N) [1]

UV λ_{max}^{MeOH} nm: 215 [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 2950, 2920, 2850, 1740, 1720, 1640, 1460, 1384, 1365, 1235, 1155, 1065, 1042, 978, 848, 752 [1]

FAB-MS *m/z*: 733 (0.1), 596 (0.1), 522 (1.4), 513 (2.2), 495 (2.9), 479 (3.9), 453 (9.6), 437 (10.7), 353 (3.8), 311 (70.8), 211 (78.2), 171 (36.8), 169 (77.6), 111 (13.9), 83 (100), 55 (51.5), 43 (45.2) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 5.44 (m, H-12), 0.72, 0.96, 1.34, 1.34, 1.52, 1.88 (s, $CH_3 \times 6$), 1.97 (s, OAc)

Angeloyl: 1.87, 1.87 (brs, 2Me-α), 2.00, 2.00 (d, J = 7.0, 2Me-β), 5.92, 5.92 (q, J = 7.0, 2H-β)

β-D-GlcUAp: 3.78 (s, COOMe)

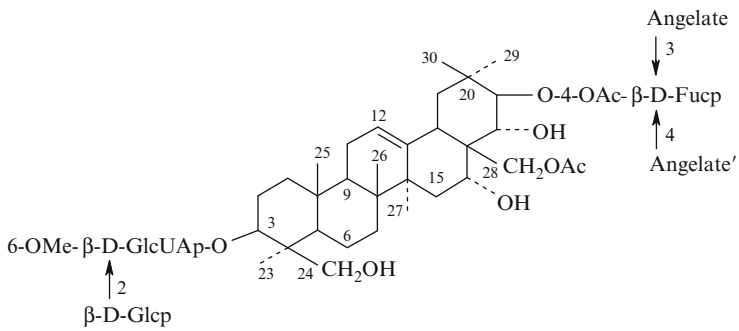
β-D-Fucp: 1.16 (s, CH_3-6) [1]

^{13}C NMR (67.80 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	67.9	GlcUA-1	105.1	Fuc-1	106.2
2	26.6	17	46.6	2	81.6	2	72.5

(*continued*)



Bunkankasaponin D

Table 1 (continued)

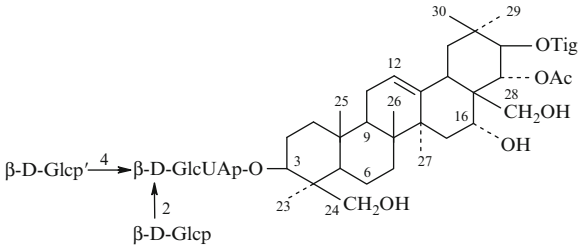
3	90.8	18	40.4	3	78.0	3	75.4
4	43.7	19	47.7	4	72.6	4	72.7
5	56.1	20	37.1	5	77.0	5	71.6
6	18.5	21	92.0	6	170.3	6	17.1
7	33.2	22	74.3	Me	52.1	Angeloyl-1	167.3
8	40.0	23	22.5	Glc-1	104.8	2	127.8
9	46.7	24	63.3	2	75.7	3	138.4
10	36.4	25	16.3	3	78.5	4	20.5
11	24.1	26	16.8	4	69.9	5	15.6
12	123.8	27	27.5	5	78.2	Angeloyl′-1	167.3
13	142.9	28	66.4	6	61.6	2	128.0
14	41.8	29	29.8			3	138.8
15	34.8	30	20.2			4	20.7
		Ac-1	170.6			5	15.9
		2	20.7				

References

1. Y. Chen, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **33**(4), 1387 (1985)

Escin Ia

CAS Registry Number: 123748-68-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus hippocastanum* [1], *A. chinensis* [2]

$C_{55}H_{86}O_{24}$: 1130.550

Mp: 224.9–226.7°C ($CHCl_3$–MeOH) [1]

$[\alpha]_D^{25}$ −22.2° (c 0.6, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3453, 1731, 1719, 1653, 1649, 1638, 1075 [1]

FAB-MS (positive ion mode) *m/z*: 1153.5406 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.69, 0.82, 1.09, 1.32, 1.34, 1.81 (s, CH_3-25, 26, 29, 30, 23, 27), 3.06 (m, H-18), 3.42 (dd-like, H-3), 4.42 (m, H-16), 6.21 (d, J = 10.2, H-22), 6.56 (d, J = 10.2, H-21)

β-D-GlcUAp: 4.91 (d, J = 7.3, H-1)

β-D-Glcp: 5.57 (d, J = 7.3, H-1)

β-D-Glcp′: 5.18 (d, J = 7.9, H-1)

C_{21}-Tigloyl: 1.66 (d, J = 6.9, CH_3-4), 1.96 (s, CH_3-5), 7.10 (dq-like, H-3)

C_{22}-Acetyl: 1.91 (s, CH_3-2) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	68.1	GlcUA-1	104.6	Glc′-1	104.6
2	26.6	17	48.0	2	79.9	2	74.9
3	91.2	18	40.2	3	76.5	3	78.1
4	43.8	19	47.5	4	81.6	4	71.6
5	56.2	20	36.5	5	75.8	5	78.5
6	18.6	21	79.4	6	171.8	6	62.5
7	33.3	22	74.5	Glc-1	104.4	C_{21}Tigloyl-1	168.0
8	40.0	23	22.5	2	75.8	2	129.6
9	46.8	24	63.4	3	78.2	3	136.8
10	36.5	25	15.6	4	69.9	4	14.2
11	24.1	26	16.8	5	78.4	5	12.4
12	122.7	27	27.4	6	61.6		
13	142.9	28	64.0				
14	41.8	29	29.6	Ac-1	171.1		
15	34.7	30	20.1	2	20.9		

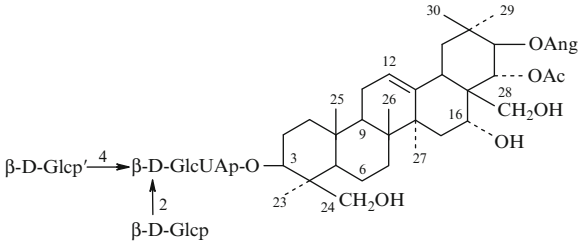
Pharm./Biol.: Escin Ia showed week inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, I. Kitagawa, Chem. Pharm. Bull. **44**(8), 1454 (1996)
2. Z. Zang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)

Escin Ib

CAS Registry Number: 26339-90-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus hippocastanum* [1], *A. chinensis* [2]

$C_{55}H_{86}O_{24}$: 1130.550

Mp: 186.8–189.3°C ($CHCl_3$–MeOH) [1]

$[\alpha]_D^{25}$ −23.1° (c 0.6, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1731, 1719, 1653, 1649, 1638, 1075 [1]

FAB-MS (positive ion mode) *m/z*: 1153.5407 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.69, 0.82, 1.09, 1.31, 1.34, 1.81 (s, CH_3-25, 26, 29, 30, 23, 27), 3.07 (m, H-18), 3.40 (dd-like, H-3), 4.48 (m, H-16), 6.17 (d, J = 10.2, H-22), 6.69 (d, J = 10.2, H-21)

β-D-GlcUAp: 4.91 (d, J = 7.3, H-1)

β-D-Glcp: 5.57 (d, J = 7.3, H-1)

β-D-Glcp′: 5.18 (d, J = 7.9, H-1)

C_{21}-Angeloyl: 2.02 (s, CH_3-5), 2.11 (d, J = 7.2, CH_3-4), 5.95 (dq-like, H-3)

C_{22}-Acetyl: 1.91 (s, CH_3-2) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	68.1	GlcUA-1	104.6	Glc′-1	104.6
2	26.6	17	48.1	2	79.9	2	74.9
3	91.2	18	40.2	3	76.5	3	78.1
4	43.8	19	47.3	4	81.6	4	71.6
5	56.2	20	36.3	5	75.8	5	78.5
6	18.6	21	79.0	6	171.8	6	62.5
7	33.3	22	74.5	Glc-1	104.4	C_{21}Angeloyl-1	167.9
8	40.0	23	22.5	2	75.8	2	129.1
9	46.8	24	63.4	3	78.2	3	137.0
10	36.5	25	15.6	4	69.9	4	15.9
11	24.1	26	16.8	5	78.4	5	21.0
12	122.6	27	27.4	6	61.6		
13	142.9	28	64.0			Ac-1	171.0
14	41.7	29	29.5			2	20.9
15	34.7	30	20.3				

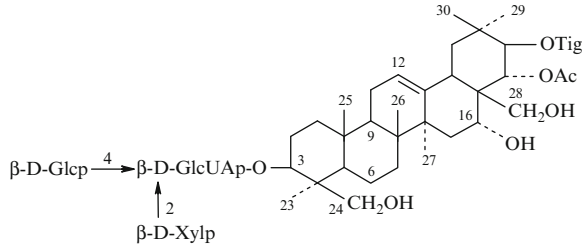
Pharm./Biol.: Escin Ib showed inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, I. Kitagawa, Chem. Pharm. Bull. **44**(8), 1454 (1996)
2. Z. Zang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)

Escin IIa

CAS Registry Number: 158732-55-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus hippocastanum* [1, 2]

$C_{54}H_{84}O_{23}$: 1100.540

Mp: 206.5–208.6°C ($CHCl_3$–MeOH) [1]

$[\alpha]_D^{25}$ −35.5° (c 0.6, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3453, 1733, 1719, 1653, 1647, 1638, 1075 [1]

FAB-MS (positive ion mode) *m/z*: 1123.5301 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.77, 0.84, 1.09, 1.32, 1.38, 1.83 (s, CH_3-25, 26, 29, 30, 23, 27), 3.02 (m, H-18), 3.38 (dd-like, H-3), 4.43 (m, H-16), 6.21 (d, J = 10.2, H-22), 5.56 (d, J = 10.2, H-21)

β-D-GlcUAp: 4.94 (d, J = 6.9, H-1)

β-D-Xylp: 5.44 (d, J = 6.9, H-1)

β-D-Glcp: 5.16 (d, J = 7.6, H-1)
C_{21}-Tigloyl: 1.66 (d, J = 7.3, CH_3-4), 1.96 (s, CH_3-5), 7.10 (dq-like, H-3),
C_{22}-Acetyl: 1.91 (s, CH_3-2) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	68.1	GlcUA-1	104.8	Glc-1	104.7
2	26.6	17	48.0	2	79.0	2	74.9
3	90.7	18	40.2	3	76.3	3	78.1
4	44.3	19	47.3	4	82.2	4	71.6
5	56.4	20	36.5	5	75.6	5	78.4
6	18.8	21	79.4	6	171.8	6	62.5
7	33.4	22	74.4	Xyl-1	104.8	C_{21}Tigloyl-1	168.0
8	40.1	23	22.7	2	75.7	2	129.5
9	46.8	24	62.9	3	78.4	3	136.8
10	36.6	25	15.5	4	70.8	4	14.2
11	24.1	26	16.8	5	67.1	5	12.4
12	122.7	27	27.4			Ac-1	171.1
13	142.9	28	63.9			2	20.9
14	41.8	29	29.5				
15	34.7	30	20.1				

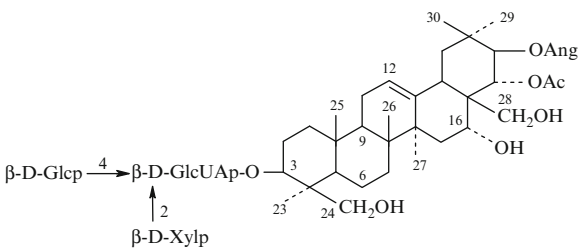
Pharm./Biol.: Escin IIa showed week inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, E. Harada, T. Murakami, H. Matsuda, N. Wariishi, Y. Yamahara, N. Murakami, I. Kitagawa, Chem. Pharm. Bull. **42**(6), 1357 (1994)
2. M. Yoshikawa, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, I. Kitagawa, Chem. Pharm. Bull. **44**(8), 1454 (1996)

Escin IIb

CAS Registry Number: 158800-83-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus hippocastanum* [1, 2]
$C_{54}H_{84}O_{23}$: 1100.540
Mp: 197.3–199.0°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D^{25}$ −19.4° (c 0.6, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1736, 1719, 1658, 1649, 1630, 1076 [1]
FAB-MS (positive ion mode) *m/z*: 1123.5301 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.77, 0.84, 1.08, 1.30, 1.38, 1.82 (s, CH_3-25, 26, 29, 30, 23, 27), 3.02 (m, H-18), 3.42 (dd-like, H-3), 4.42 (m, H-16), 6.15 (d, J = 10.2, H-22), 6.58 (d, J = 10.2, H-21)
β-D-GlcUAp: 4.93 (d, J = 5.9, H-1)
β-D-Xylp: 5.44 (d, J = 6.9, H-1)
β-D-Glcp: 5.16 (d, J = 7.6, H-1)
C_{21}-Angeloyl: 2.02 (s, CH_3-5), 2.10 (d, J = 7.2, CH_3-4), 5.98 (dq-like, H-3)
C_{22}-Acetyl: 1.92 (s, CH_3-2) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	68.1	GlcUA-1	104.9	Glc-1	104.6
2	26.6	17	48.1	2	79.0	2	74.9
3	90.7	18	40.2	3	76.3	3	78.0
4	44.3	19	47.3	4	82.2	4	71.6
5	56.4	20	36.3	5	75.6	5	78.6
6	18.8	21	78.9	6	171.8	6	62.5
7	33.4	22	74.5	Xyl-1	104.9	C_{21}Angeloyl-1	167.8
8	40.1	23	22.7	2	75.7	2	129.0
9	46.8	24	62.9	3	78.6	3	137.0
10	36.6	25	15.8	4	70.8	4	15.5
11	24.1	26	16.8	5	67.2	5	21.0
12	122.7	27	27.4			Ac-1	171.0
13	142.9	28	64.0			2	20.8
14	41.8	29	29.5				
15	34.6	30	20.2				

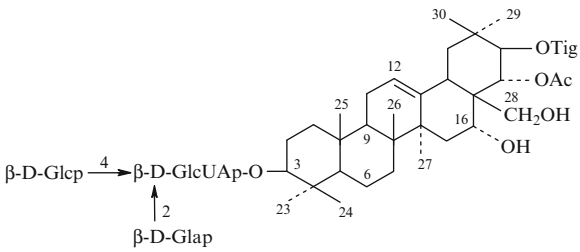
Pharm./Biol.: Escin IIb showed week inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, E. Harada, T. Murakami, H. Matsuda, N. Wariishi, Y. Yamahara, N. Murakami, I. Kitagawa, Chem. Pharm. Bull. **42**(6), 1357 (1994)
2. M. Yoshikawa, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, I. Kitagawa, Chem. Pharm. Bull. **44**(8), 1454 (1996)

Escin IIIa

CAS Registry Number: 158800-84-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus hippocastanum* [1]

$C_{55}H_{86}O_{23}$: 1114.555

Mp: 194.1-196.5°C ($CHCl_3$–MeOH) [1]

$[\alpha]_D^{25}$ −17.2° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1734, 1719, 1655, 1649, 1630, 1076 [1]

FAB-MS (positive ion mode) *m/z*: 1137 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.86, 0.89, 1.29, 1.33, 1.84 (s, CH_3-25, 26, 23, 30, 27), 1.10 (s, CH_3-24, 29), 3.03 (m, H-18), 3.30 (dd-like, H-3), 4.63 (m, H-16), 6.21 (d, J = 10.2, H-22), 6.57 (d, J = 10.2, H-21)

β-D-GlcUAp: 4.97 (d, J = 7.3, H-1)

β-D-Galp: 5.21 (d, J = 7.6, H-1)

β-D-Glcp: 5.15 (d, J = 7.6, H-1)

C_{21}-Tigloyl: 7.10 (dq-like, H-3), 1.66 (d, J = 6.9, CH_3-4), 1.96 (s, CH_3-5)

C_{22}-Acetyl: 1.91 (s, CH_3-2) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	68.2	GlcUA-1	105.1	Glc-1	104.6
2	26.6	17	48.1	2	82.3	2	74.8
3	89.3	18	40.2	3	76.0	3	78.1
4	39.6	19	47.3	4	81.7	4	71.6
5	55.8	20	36.5	5	75.4	5	78.6
6	18.5	21	79.4	6	172.0	6	62.6
7	33.2	22	74.6	Gal-1	106.6	C_{21}Tigloyl-1	168.0
8	40.1	23	28.1	2	74.6	2	129.6
9	47.0	24	16.8	3	74.8	3	136.8
10	36.8	25	15.7	4	69.6	4	14.2
11	23.9	26	17.0	5	76.9	5	12.4
12	122.7	27	27.5	6	61.6		
13	143.0	28	64.0			Ac-1	171.1
14	41.8	29	29.6			2	20.9
15	34.7	30	20.2				

(*continued*)

Table 1 (continued)

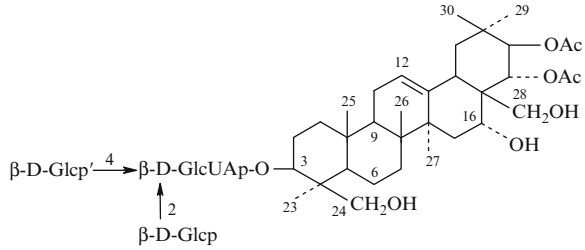
Pharm./Biol.: Escin IIIa showed week inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, I. Kitagawa, Chem. Pharm. Bull. **44**(8), 1454 (1996)

Escin IV

CAS Registry Number: 219944-22-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus hippocastanum* [1]

$C_{52}H_{82}O_{24}$: 1090.519

Mp: 226.9–228.1°C (CH_3Cl–MeOH) [1]

$[\alpha]_D^{26}$ −15.8° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3421, 1737, 1719, 1655, 1638, 1074 [1]

FAB-MS (negative ion mode) *m/z*: 1089 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1113 $(M + Na)^+$, 1135 $(M + 2Na-H)^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.68, 0.81, 1.06, 1.27, 1.34, 1.80 (s, CH_3-25, 26, 29, 30, 23, 27), 3.03 (m, H-18), 3.36, 3.60 (m, H_2-28), 3.36, 4.31 (m, H_2-24), 3.42 (dd-like, H-3), 4.43 (brs, H-16), 5.38 (brs, H-12), 6.14 (d, J = 9.9, H-22), 6.45 (d, J = 9.9, H-21)

β-D-GlcUAp: 4.91 (d, J = 7.6, H-1)

β-D-Glcp: 5.18 (d, J = 7.6, H-1)

β-D-Glcp′: 5.57 (d, J = 7.6, H-1)
C_{21}-Acetyl: 2.12 (s, CH_3-2)
C_{22}-Acetyl: 1.98 (s, CH_3-2) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	68.1	GlcUA-1	104.6	Glc′-1	104.6
2	26.6	17	48.0	2	79.9	2	74.9
3	91.2	18	40.2	3	76.5	3	78.2
4	43.8	19	47.3	4	81.6	4	71.6
5	56.2	20	36.2	5	75.7	5	78.4
6	18.6	21	79.5	6	171.8	6	62.5
7	33.3	22	74.5	Glc-1	104.4	21-O-Ac-1	171.1
8	40.0	23	22.5	2	75.7	2	21.0
9	46.8	24	63.3	3	78.2	22-O-Ac-1	170.9
10	36.4	25	15.6	4	69.9	2	20.9
11	24.1	26	16.8	5	78.4		
12	122.8	27	27.4	6	61.6		
13	142.9	28	64.0				
14	41.7	29	29.4				
15	34.7	30	20.0				

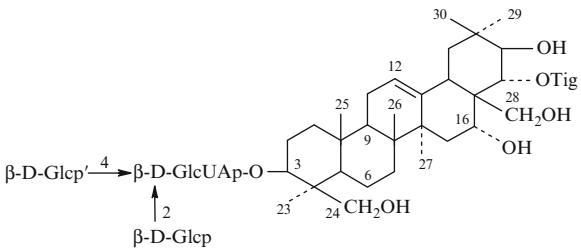
Pharm./Biol.: Saponin mixture from the seeds of these plants show inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, T. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1764 (1998)

Escin IVg

CAS Registry Number: 257878-89-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]
$C_{53}H_{84}O_{23}$: 1088.540
$[\alpha]_D^{25}$ −25.0° (c 1.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3423, 2922, 1710, 1604, 1407, 1273, 1076, 1040, 617 [1]
MALDI-TOF-MS *m/z*: 1111 $[M + Na]^+$, 1127 $[M + K]^+$ [1]
HR-SI-MS (negative-ion mode) *m/z*: 1087.5291 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.62, 0.77, 1.26, 1.31, 1.40, 1.82 (s, CH_3-25, 26, 23, 29, 30, 27), 0.65 (d, J = 12.5, H-5), 1.21 (H_2-7), 1.55 (d, J = 14.5, H-9), 3.02 (t, J = 13.5, Hb-19), 3.11 (m, H-18), 3.34, 3.60 (d, J = 11.0, 11.5, H_2-28), 3.28, 4.21 (d, J = 11.5, H_2-24), 3.30 (dd-like, H-3), 4.47 (brs, H-16), 5.07 (d, J = 9.5, H-21), 5.42 (brs, H-12), 6.16 (d, J = 9.5, H-22)
β-D-GlcUAp: 4.71 (d, J = 8.0, H-1)
β-D-Glcp: 5.77 (d, J = 8.0, H-1)
β-D-Glcp′: 5.21 (d, J = 8.0, H-1)
C_{22}-Tigloyl group: 1.44 (d, J = 7.0, CH_3-4), 1.80 (s, CH_3-5), 6.99 (dq-like, H-3) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.3	C-16	68.9	GlcUA-1	104.2	Glc′-1	104.2
2	26.2	17	48.0	2	79.5	2	74.8
3	90.9	18	41.4	3	76.5	3	77.9
4	43.4	19	47.5	4	82.7	4	71.2
5	55.9	20	36.8	5	75.4	5	77.8
6	18.4	21	76.5	6	175.0	6	61.9
7	33.0	22	77.4	Glc-1	104.1	22-O-Tig-1	169.3
8	39.7	23	22.3	2	75.4	2	129.4
9	46.5	24	63.1	3	78.1	3	136.7
10	36.2	25	15.4	4	69.6	4	13.9
11	23.9	26	16.5	5	77.4	5	12.2
12	123.2	27	27.3	6	61.4		
13	143.1	28	63.9				
14	40.2	29	30.1				
15	34.6	30	19.2				

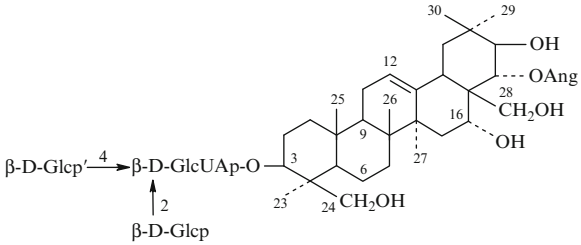
Pharm./Biol.: Anti human immunodeficiency virus (HIV) – 1 protease activity [2]

References

1. J. Zhao, X.W. Yang, M. Hattori, Chem. Pharm. Bull. **49**(5), 626 (2001)
2. X.W. Yang, J. Zhao, Y.X. Cui, X.H. Lin, C.M. Ma, M. Hattori, L.U. Zhang, J. Nat. Prod. **62**, 1510 (1999)

Escin IVh

CAS Registry Number: 257879-58-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1]

$C_{53}H_{84}O_{23}$: 1088.540

$[\alpha]_D^{25}$ −60.0° (c 1.05, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3409, 2922, 1713, 1609, 1411, 1242, 1164, 1074, 1040, 612 [1]

MALDI-TOF-MS *m/z*: 1111 $[M + Na]^+$, 1127 $[M + K]^+$ [1]

HR-SI-MS(negative-ion mode) *m/z*: 1087.5308 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.60, 0.77, 1.24, 1.27, 1.38, 1.80 (s, CH_3-25, 26, 23, 29, 30, 27), 1.34 (m, Ha-19), 1.56 (d, J = 14.5, H-9), 3.02 (t, J = 13.5, Hb-19), 3.07 (m, H-18), 3.38, 3.61 (d, J = 9.5 H_2-28), 3.27, 4.40 (d, J = 11.5, H_2-24), 3.28 (brs, H-3), 4.48 (brs, H-16), 5.02 (d, J = 9.0, Ha-21), 5.42 (brs, H-12), 6.16 (d, J = 9.0, H-22)

β-D-GlcUAp: 4.73 (d, J = 8.0, H-1)

β-D-Glcp: 5.21 (d, J = 8.0, H-1)

β-D-Glcp′: 5.51 (d, J = 8.0, H-1)

C_{22}-Angeloyl group: 1.94 (s, CH_3-5), 2.03 (d, J = 6.0, CH_3-4), 5.85 (d-like, H-3) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.1	C-16	69.0	GlcUA-1	104.2	Glc′-1	104.3
2	26.2	17	47.7	2	79.6	2	74.8
3	90.9	18	41.4	3	76.4	3	78.2
4	43.4	19	47.5	4	82.7	4	71.1
5	55.9	20	36.9	5	75.5	5	77.8
6	18.3	21	76.6	6	175.1	6	61.9
7	33.0	22	77.1	Glc-1	103.9	22-O-Ang-1	169.4
8	39.7	23	22.3	2	75.5	2	129.3
9	46.5	24	63.1	3	78.2	3	136.5
10	36.2	25	15.4	4	69.6	4	15.8
11	23.9	26	16.5	5	77.4	5	20.8
12	123.0	27	27.4	6	61.4		
13	143.1	28	64.1				
14	40.2	29	30.1				
15	34.6	30	19.2				

Pharm./Biol.: Anti human immunodeficiency virus (HIV) – 1 protease activity [2]

References

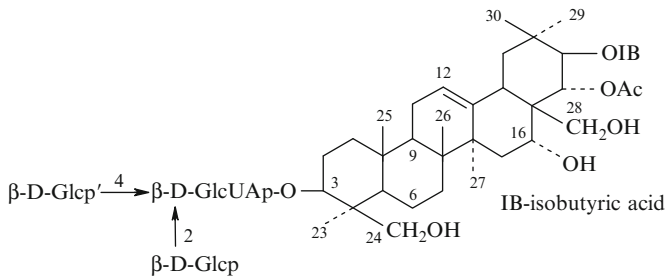
1. J. Zhao, X.W. Yang, M. Hattori, Chem. Pharm. Bull. **49**(5), 626 (2001)
2. X.W. Yang, J. Zhao, Y.X. Cui, X.H. Lin, C.M. Ma, M. Hattori, L.U. Zhang, J. Nat. Prod. **62**, 1510 (1999)

Escin V

CAS Registry Number: 219944-26-0

See Figure Escin V

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin



Escin V

Biological sources: *Aesculus hippocastanum* [1]
$C_{54}H_{86}O_{24}$: 1118.550
Mp: 215.8–217.1°C [1]
$[\alpha]_D^{24}$ −12.9° (c 0.2, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1736, 1719, 1655, 1638, 1074 [1]
FAB-MS (negative ion mode) *m/z*: 1117 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1141 $(M + Na)^+$, 1163 $(M + 2Na-H)^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.69, 0.81, 1.05, 1.27, 1.34, 1.80 (s, CH_3-25, 26, 29, 30, 23, 27), 3.00 (m, H-18), 3.30, 4.25 (m, CH_2-24), 3.33, 3.71 (m, CH_2-8), 3.41 (dd-like, H-3), 4.42 (m, H-16), 5.39 (brs, H-12), 6.14 (d, J = 10.9, H-22), 6.46 (d, J = 10.9, H-21)
β-D-GlcUAp: 4.91 (d, J = 7.6, H-1)
β-D-Glcp: 5.18 (d, J = 7.9, H-1)
β-D-Glcp′: 5.57 (d, J = 7.3, H-1)
C_{21}-Isobutyryl group: 1.24 (d, J = 7.3, CH_3-3, 4), 2.67 (m, H-2)
C_{22}-Acetyl: 1.95 (s, CH_3-2) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	68.1	GlcUA-1	104.7	Glc′-1	104.7
2	26.6	17	48.1	2	79.9	2	74.8
3	91.2	18	40.2	3	76.4	3	78.1
4	43.8	19	47.3	4	81.6	4	71.6
5	56.2	20	36.4	5	75.7	5	78.5
6	18.6	21	78.9	6	171.8	6	62.5
7	33.3	22	74.3	Glc-1	104.4	21-O-IB-1	176.7
8	40.0	23	22.5	2	75.7	2	34.9
9	46.8	24	63.4	3	78.2	3	19.5
10	36.4	25	15.6	4	69.8	4	19.3
11	24.1	26	16.8	5	78.5	22-O-Ac-1	171.0
12	122.7	27	27.4	6	61.6	2	21.0
13	142.9	28	64.0				
14	41.7	29	29.5				
15	34.6	30	20.1				

(*continued*)

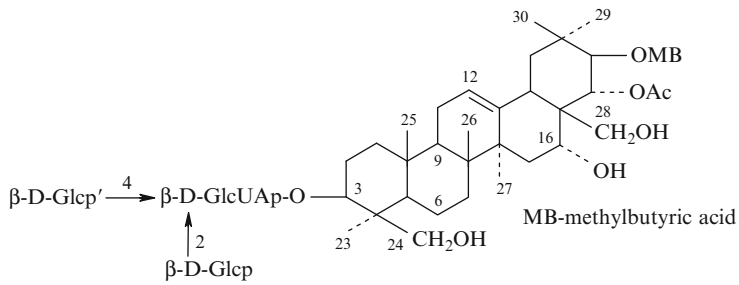
Pharm./Biol.: Saponin mixture from the seeds of this plant show inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, T. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**, 1764 (1998)

Escin VI

CAS Registry Number: 219944-33-9
See Figure Escin VI
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin
Biological sources: *Aesculus hippocastanum* [1]
$C_{55}H_{88}O_{24}$: 1132.566
Mp: 220.5–222.3°C [1]
$[\alpha]_D^{26}$ −19.8° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3424, 1736, 1719, 1655, 1639, 1075 [1]
FAB-MS (negative ion mode) *m/z*: 1131 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1155 $(M + Na)^+$, 1177 $(M + 2Na-H)^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.69, 0.82, 1.07, 1.28, 1.39, 1.80 (s, CH_3-25, 26, 29, 30, 23, 27), 3.00 (m, H-18), 3.33, 4.27 (m, H_2-24), 3.38, 3.60



Escin VI

(m, H_2-28), 3.42 (dd-like, H-3), 4.43 (m, H-16), 5.39 (brs, H-12), 6.15 (d, J = 10.9, H-22), 6.48 (d, J = 10.9, H-21)
β-D-GlcUAp: 4.91 (d, J = 7.3, H-1)
β-D-Glcp: 5.18 (d, J = 7.6, H-1)
β-D-Glcp′: 5.57 (d, J = 7.6, H-1)
C_{21}-Methylbutyryl group: 0.95 (t, J = 7.0, CH_3-4), 1.23 (d, J = 7.0, CH_3-5), 1.79 (m, H-3), 2.50 (m, H-2)
C_{22}-Acetyl: 1.96 (s, CH_3-2) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	68.0	GlcUA-1	104.6	Glc′-1	104.6
2	26.5	17	48.1	2	79.9	2	74.8
3	91.1	18	40.2	3	76.5	3	78.0
4	43.8	19	47.2	4	81.6	4	71.6
5	56.2	20	36.3	5	75.7	5	78.4
6	18.6	21	79.9	6	171.8	6	62.4
7	33.3	22	74.4	Glc-1	104.4	21-O-MB-1	176.3
8	40.0	23	22.5	2	75.7	2	41.9
9	46.8	24	63.3	3	78.1	3	27.1
10	36.4	25	15.6	4	69.8	4	12.0
11	24.0	26	16.7	5	78.4	5	17.0
12	122.7	27	27.4	6	61.6	22-O-Ac-1	171.0
13	142.9	28	64.0			2	21.0
14	41.7	29	29.6				
15	34.6	30	20.1				

Pharm./Biol.: Saponin mixture from the seeds of this plant show inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, T. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**, 1764 (1998)

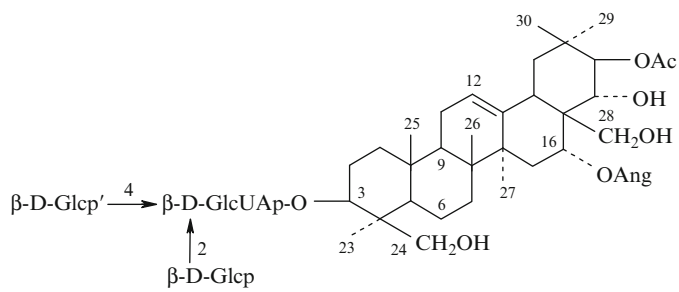
Escin VIb

CAS Registry Number: 257637-08-4
See Figure Escin VIb
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin
Biological sources: *Aesculus chinensis* [1]
$C_{55}H_{86}O_{24}$: 1130.550
$[\alpha]_D^{25}$ −55° (c 1.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3408, 2923, 1711, 1570, 1421, 1260, 1075, 1044, 659 [1]
MALDI-TOF-MS (positive ion mode) *m/z*: 1153 $(M + Na)^+$. 1153.5432 [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.65, 0.65, 1.10, 1.26, 1.26, 1.47 (s, CH_3-25, 26, 29, 30, 23, 27), 1.22 (d, J = 13.5, Ha-19), 2.69 (t, J = 10.0, Hb-19), 2.94 (m, H-18), 3.24 (dd-like, H-3), 4.51 (d, J = 10.0, Hb-22), 5.95 (d, J = 10.0, Ha-21), 5.57 (brs, H-12), 5.90 (m, H-16)
β-D-GlcUAp: 4.79 (d, J = 7.5, H-1)
β-D-Glcp: 5.31 (d, J = 7.5, H-1)
β-D-Glcp′: 5.67 (d, J = 7.5, H-1)
C_{16}-Methylbutyryl group: 1.98 (t, J = 7.0, CH_3-4), 1.90 (d, J = 7.0, CH_3-5), 5.87 (m, H-3)
C_{21}-Acetyl: 2.50 (s, CH_3-2) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.4	C-16	71.5	GlcUA-1	104.7	Glc′-1	104.7
2	26.4	17	47.6	2	79.4	2	73.9
3	91.2	18	39.9	3	76.7	3	78.4
4	43.6	19	47.2	4	82.4	4	71.5
5	56.0	20	36.0	5	75.8	5	77.9

(*continued*)



Escin VIb

Table 1 (continued)

6	18.4	21	79.8	6	172.9	6	62.2
7	33.1	22	71.0	Glc-1	104.1	21-O-Ac-1	170.0
8	39.9	23	22.4	2	75.6	2	22.2
9	46.7	24	63.2	3	78.2	16-O-Ang-1	168.3
10	36.3	25	15.5	4	69.8	2	129.2
11	23.9	26	16.6	5	78.0	3	136.0
12	123.2	27	27.0	6	61.6	4	15.9
13	141.8	28	64.8			5	21.0
14	41.3	29	30.0				
15	30.9	30	20.1				

Pharm./Biol.: Anti human immunodeficiency virus (HIV) – 1 protease activity [2]

References

1. J. Zhao, X.W. Yang, M. Hattori, Chem. Pharm. Bull. **49**(5), 626 (2001)
2. X.W. Yang, J. Zhao, Y.X. Cui, X.H. Lin, C.M. Ma, M. Hattori, L.U. Zhang, J. Nat. Prod. **62**, 1510 (1999)

Isoescin Ia

See Figure Isoescin Ia

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1], *Aesculus hippocastanum* [2]

$C_{55}H_{86}O_{24}$: 1130.550

Mp: 197–198°C (dec. MeOH) [1]

$[\alpha]_D^{25}$ −12.0° (c 0.13, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3416, 2926, 1723, 1686, 1268, 1079 [1]

MALDI-TOF-MS *m/z*: 1153 $[M + Na]^+$, 1169 $[M + K]^+$ [1]

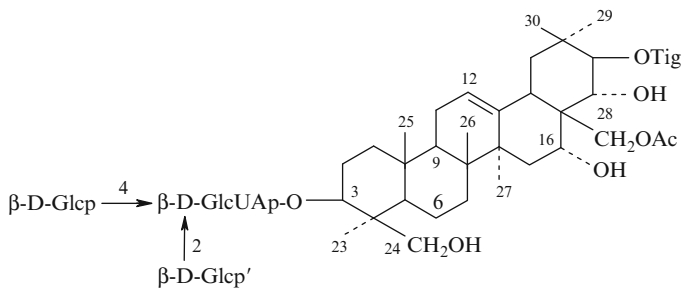
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.46 (d, J = 10.7, H-21), 5.46 (brs, H-12), 4.73 (brs, H-16), 4.56 (brs, H-22), 4.32 (m, H_2-28), 4.26 (d, J = 10.9, H_2-24), 3.36 (m, H-3), 3.33 (d, J = 10.9, H_2-24), 2.84 (m, H-18), 1.83, 1.32, 1.30, 1.12, 0.93, 0.69 (s, CH_3-27, 30, 23, 29, 26, 25); β-D-GlcUAp: 4.92 (d, J = 7.5, H-1); β-D-Glcp: 5.61 (d, J = 7.8, H-1); β-D-Glcp′: 5.23 (d, J = 7.7, H-1); C_{21}-Tigloyl: 7.05 (dq, J = 7.1, 1.5, H-3), 1.62 (dd, J = 7.1, 1.1, CH_3-4), 1.88 (s, CH_3-5); C_{28}-Acetyl: 2.03 (s, CH_3-2) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	67.6	GlcUA-1	104.6	Glc′-1	104.7
2	26.6	17	47.1	2	79.7	2	74.9
3	91.1	18	40.1	3	76.4	3	78.1
4	43.7	19	47.3	4	81.7	4	71.5
5	56.1	20	36.4	5	75.7	5	78.5
6	18.5	21	81.2	6	171.9	6	62.4
7	33.2	22	71.1	Glc-1	104.3	C_{21}Tigloyl-1	168.1
8	39.9	23	22.5	2	75.7	2	129.5
9	46.7	24	63.3	3	78.0	3	136.9
10	36.5	25	15.6	4	69.7	4	14.2
11	24.0	26	16.7	5	78.4	5	12.4
12	123.0	27	27.4	6	61.6		
13	142.9	28	66.4			Ac-1	171.0
14	41.7	29	29.5			2	20.9
15	34.6	30	20.1				

Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]



Isoescin Ia

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)
2. M. Yoshikawa, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, I. Kitagawa, Chem. Pharm. .Bull. **46**(11), 1764 (1998)

Isoescin Ib

See Figure Isoescin Ib

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus chinensis* [1], *Aesculus hippocastanum* [2]

$C_{55}H_{86}O_{24}$: 1130.550

Mp: 215–216°C (MeOH)

$[\alpha]_D^{25}$ −16.0° (c 0.10, MeOH)

IR (KBr) ν_{max} cm^{-1}: 3426, 2925, 1711, 1695, 1246, 1037 [1]

MALDI-TOF-MS *m/z*: 1153 $[M + Na]^+$, 1169 $[M + K]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 6.48 (d, J = 10.1, H-21), 5.44 (brs, H-12), 4.75 (brs, H-16), 4.60 (brs, H-22), 4.30 (m, H_2-28), 4.25 (d, J = 11.3, H_2-24), 3.36 (m, H-3), 3.32 (d, J = 11.3, H_2-24), 2.81 (m, H-18), 1.81, 1.33, 1.30, 1.19, 0.96, 0.67 (s, CH_3-27, 30, 23, 29, 26, 25); β-D-GlcUAp: 4.91 (d, J = 7.5, H-1); β-D-Glcp: 5.61 (d, J = 7.3, H-1); β-D-Glcp′: 5.22 (d, J = 7.5, H-1); C_{21}-Angeloyl: 5.90 (dq, J = 7.1, 1.5, H-3), 2.05 (dd, J = 7.1, 1.5, CH_3-4), 1.99 (s, CH_3-5); C_{28}-Acetyl: 2.00 (s, CH_3-2) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

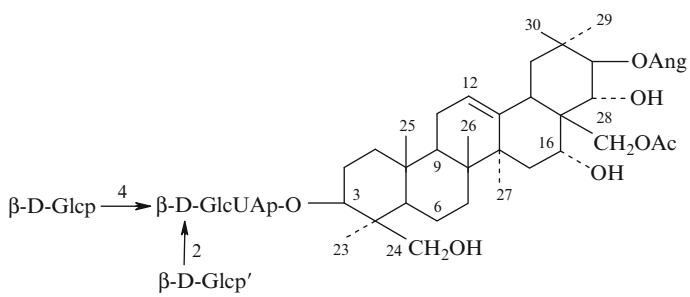
Table 1

C-1	38.5	C-16	67.6	GlcUA-1	104.6	Glc′-1	104.7
2	26.6	17	47.1	2	79.7	2	74.9
3	91.1	18	40.5	3	76.4	3	78.1
4	43.7	19	47.3	4	81.7	4	71.5
5	56.1	20	36.1	5	75.7	5	78.5
6	18.5	21	81.2	6	171.9	6	62.4
7	33.2	22	71.1	Glc-1	104.3	C_{21}Angeloyl-1	168.6
8	39.9	23	22.5	2	75.7	2	129.5
9	46.8	24	63.3	3	78.0	3	136.2
10	36.4	25	15.6	4	69.7	4	15.9
11	24.1	26	16.7	5	78.4	5	21.0
12	123.0	27	27.4	6	61.6		
13	142.7	28	66.4			Ac-1	170.7
14	41.8	29	29.8			2	20.7
15	34.6	30	20.2				

Pharm./Biol.: In traditional medicine of China the plant used for the treatment of distension, malaria, dysentery and heart diseases [1]

References

1. Z. Zhang, K. Koike, Z. Jia, T. Nikaido, D. Guo, J. Zheng, Chem. Pharm. Bull. **47**(11), 1515 (1999)
2. M. Yoshikawa, T. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1764 (1998)



Isoescin Ib

Isoescin V

CAS Registry Number: 219944-53-3

See Figure Isoescin V

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Protoaescigenin

Biological sources: *Aesculus hippocastanum* [1]

$C_{54}H_{86}O_{24}$: 1118.550

Mp: 198.8–200.7°C [1]

$[\alpha]_D^{26}$ −5.3° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3425, 1736, 1719, 1655, 1638, 1075 [1]

FAB-MS (negative ion mode) *m/z*: 1117 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1141 $(M + Na)^+$, 1163 $(M + 2Na-H)^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.69, 0.94, 1.09, 1.28, 1.33, 1.79 (s, CH_3-25, 26, 29, 30, 23, 27), 2.80 (dd-like, H-18), 3.33, 4.31 (m, CH_2-24), 3.43 (dd-like, H-3), 4.24 (m, CH_2-28), 4.45 (d-like, H-22), 4.67 (brs, H-16), 5.43 (brs, H-12), 6.32 (d, J = 9.9, H-21)

β-D-GlcuAp: 4.90 (d, J = 7.6, H-1)

β-D-Glcp: 5.18 (d, J = 7.6, H-1)

β-D-Glcp′: 5.57 (d, J = 7.6, H-1)

C_{21}-Isobutyryl group: 1.25 (d, J = 7.3, CH_3-4), 1.20 (d, J = 7.3, CH_3-3), 2.64 (m, H-2)

C_{28}-Acetyl: 1.98 (s, CH_3-2) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

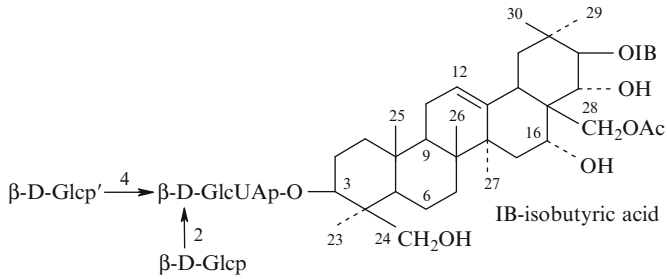
Table 1

C-1	38.6	C-16	67.7	GlcUA-1	104.6	Glc′-1	104.6
2	26.6	17	47.1	2	79.9	2	74.9
3	91.2	18	40.6	3	76.5	3	78.1
4	43.8	19	47.4	4	81.6	4	71.6
5	56.3	20	36.2	5	75.8	5	78.5
6	18.6	21	81.2	6	171.8	6	62.5
7	33.3	22	71.3	Glc-1	104.4	21-O-IB-1	177.3
8	40.0	23	22.6	2	75.8	2	34.8
9	46.8	24	63.3	3	78.1	3	19.7
10	36.5	25	15.6	4	69.8	4	19.2
11	24.2	26	16.9	5	78.5	28-O-Ac-1	170.6
12	122.8	27	27.4	6	61.6	2	20.6
13	143.0	28	66.5				
14	41.9	29	29.8				
15	34.6	30	20.0				

Pharm./Biol.: Saponin mixture from the seeds of this plant show inhibitory effects on the increase of serum glucose levels in glucose-loaded rats and on ethanol absorption in rats [1]

References

1. M. Yoshikawa, T. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1764 (1998)



Isoescin V

Glycosides of Aglycones of Oleanene Type

Glycosides of Chichipegenin

Sitakisoside I

CAS Registry Number: 163633-28-1
See Figure Sitakisoside I
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Stephanotis lutchuensis* [1]
$C_{55}H_{85}NO_{19}$: 1063.571
Mp: 206–208°C [1]
$[\alpha]_D^{20}$ −12.4° (c 1.9, MeOH) [1]
UV λ_{max}^{EtOH} nm (log ε): 222 (4.36), 255 (3.87), 356 (3.68) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1680 [1]
FAB-MS *m/z*: 1062 $[M-H]^-$, 930 $[M-H-C_5H_8O_4]^-$, 911 $[M-H-C_8H_9NO_2]^-$, 767 $[M-H-C_5H_8O_4-C_6H_{10}O_5]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.83 (CH_3-25), 0.93 (CH_3-26), 1.00 (CH_3-24), 1.02 (CH_3-29), 1.27 (CH_3-23), 1.29 (CH_3-30), 1.39 (CH_3-27), 3.32 (dd, J = 12.0, 4.5, H-3), 4.07, 4.49 (d, J = 10.7, H_2-28), 5.10 (dd, J = 12.5, 4.5, H-16), 5.33 (m, H-12), 6.35 (dd, J = 11.5, 4.7, H-22);
β-D-Glcp: 4.87 (d, J = 7.8, H-1); β-D-Glcp′: 5.06 (d, J = 7.8, H-1); β-D-Xylp: 4.96 (d, J = 7.5, H-1);
Acyl part: 2.79 (d, J = 4.9, N-CH_3), 6.64 (ddd, J = 8.4, 8.4, 1.5, H-5), 6.65 (dd, J = 8.4, 1.5, H-3), 7.38 (ddd, J = 8.4, 8.4, 1.5, H-4), 8.45 (dd, J = 8.4, 1.5, H-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	65.7	Glc-1	106.9	Xyl-1	106.0
2	26.7	17	46.0	2	75.0	2	74.9
3	89.1	18	44.2	3	78.4	3	78.1
4	39.6	19	46.3	4	71.6	4	71.2
5	55.8	20	32.4	5	77.0	5	67.1
6	18.5	21	39.6	6	70.4	Acyl moiety-1	111.5
7	33.0	22	73.7	Glc′-1	105.4	2	151.9
8	40.4	23	28.3	2	75.6	3	112.2
9	47.1	24	17.1	3	78.6	4	134.8
10	36.8	25	15.8	4	71.6	5	114.7
11	23.9	26	17.0	5	77.0	6	133.0
12	124.0	27	27.6	6	69.9	7	168.5
13	142.4	28	59.9			9	29.7
14	43.1	29	33.3				
15	37.2	30	25.6				

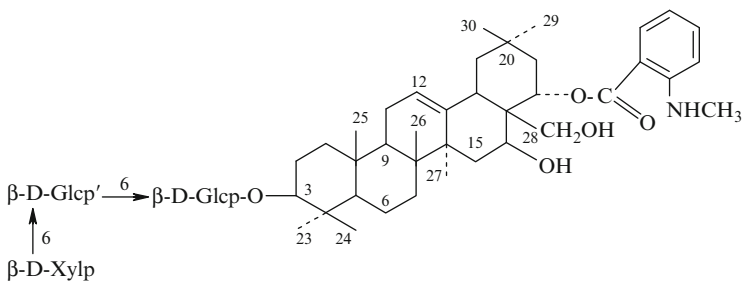
Pharm./Biol.: Antisweet activity [1]

References

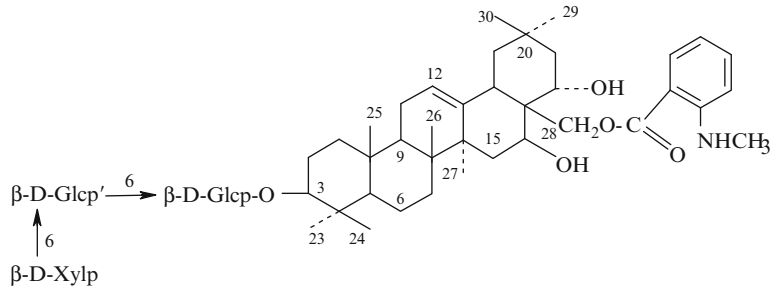
1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(10), 2023 (1994)

Sitakisoside III

CAS Registry Number: 163633-30-5
See Figure Sitakisoside III
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Stephanotis lutchuensis* [1]
$C_{55}H_{85}NO_{19}$: 1063.571
Mp: 200–202°C [1]



Sitakisoside I



Sitakisoside III

$[\alpha]_D$−9.5° (c 7.7, MeOH) [1]
UV λ_{max}^{EtOH} nm (log ε): 222 (3.96), 255 (3.55), 349 (3.17) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1680 [1]
FAB-MS *m/z*: 1062 $[M-H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.82 (CH_3-25), 0.97 (CH_3-24), 1.04 (CH_3-29), 1.11 (CH_3-26), 1.16 (CH_3-30), 1.26 (CH_3-23), 1.37 (CH_3-27), 3.30 (dd, J = 12.0, 4.5, H-3), ca 4.83 (H-22), 4.84, 5.32 (d, J = 10.7, H_2-28), 5.14 (dd, J = 12.0, 4.5, H-16), 5.30 (m, H-12)
β-D-Glcp: 4.83 (d, J = 8.1, H-1); β-D-Glcp′: 5.03 (d, J = 7.6, H-1); β-D-Xylp: 4.91 (d, J = 7.4, H-1);
Acyl part: 2.67 (N-CH_3), 6.70 (ddd, J = 8.0, 8.0, 1.3, H-5), 6.65 (dd, J = 8.0, 1.3, H-3), 7.42 (ddd, J = 8.0, 8.0, 1.3, H-4), 8.22 (dd, J = 8.0, 1.3, H-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	66.5	Glc-1	106.9	Xyl-1	105.9
2	26.8	17	44.6	2	75.0	2	74.9
3	89.1	18	44.0	3	78.4	3	78.1
4	39.6	19	46.3	4	71.4	4	71.2
5	55.8	20	32.3	5	77.0	5	67.1
6	18.6	21	44.1	6	69.9	Acyl moiety-1	110.7
7	33.1	22	69.9	Glc′-1	105.4	2	152.5
8	40.5	23	28.4	2	75.5	3	111.5
9	47.2	24	17.3	3	78.5	4	134.9
10	36.9	25	15.9	4	71.6	5	114.8
11	24.0	26	17.2	5	77.0	6	131.4
12	123.9	27	27.8	6	69.9	7	169.0
13	142.1	28	62.6			9	29.4
14	42.6	29	33.6				
15	36.3	30	25.1				

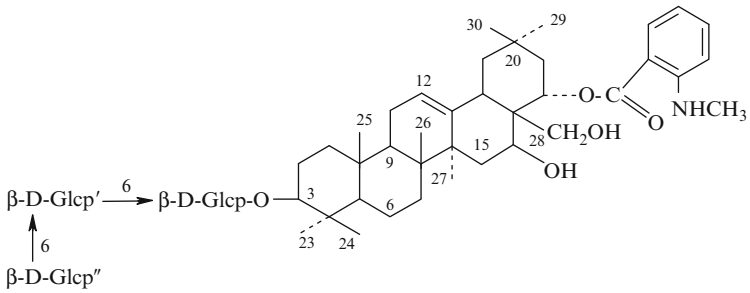
Pharm./Biol.: Antisweet activity [1]

References

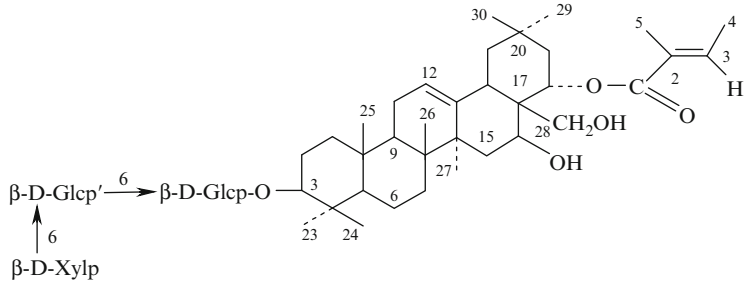
1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(10), 2023 (1994)

Sitakisoside IV

CAS Registry Number: 163633-31-6
See Figure Sitakisoside IV
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Stephanotis lutchuensis* [1]
$C_{56}H_{87}NO_{20}$: 1093.582
Mp: 198–200°C [1]
$[\alpha]_D^{20}$−11.5° (c 2.0, MeOH) [1]
UV λ_{max} nm (log ε): 222 (4.06), 255 (3.63), 349 (3.19) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1680 [1]
FAB-MS *m/z*: 1092 $[M-H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.83 (CH_3-25), 0.93 (CH_3-26), 1.00 (CH_3-24), 1.01 (CH_3-29), 1.26 (CH_3-23), 1.29 (CH_3-30), 1.39 (CH_3-27), 3.32 (dd, J = 12.0, 4.5, H-3), 4.06, 4.47 (d, J = 10.7, H_2-28), 5.08 (dd, J = 11.0, 4.8, H-16), 5.32 (m, H-12), 6.33 (dd, J = 11.0, 4.6, H-22);
β-D-Glcp: 4.86 (d, J = 7.8, H-1); β-D-Glcp′: 5.03 (d, J = 8.5, H-1); β-D-Glcp″: 5.05 (d, J = 8.3, H-1); Acyl part: 2.78 (d, J = 4.9, N-CH_3), 6.64 (ddd, J = 8.0, 8.0, 1.2, H-5), 6.65 (dd, J = 8.0, 1.2, H-3), 7.38 (ddd, J = 8.0, 8.0, 1.2, H-4), 8.44 (dd, J = 8.0, 1.2, H-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]



Sitakisoside IV



Sitakisoside V

Table 1

C-1	39.0	C-16	65.8	Glc-1	107.0	Glc″-1	105.4
2	26.8	17	46.1	2	75.1	2	75.7
3	89.2	18	44.3	3	78.3	3	78.3
4	39.7	19	46.4	4	71.7	4	71.8
5	55.9	20	32.6	5	77.1	5	78.6
6	18.6	21	39.6	6	70.6	6	62.8
7	33.1	22	73.9	Glc′-1	105.4	Acyl moiety-1	111.6
8	40.5	23	28.4	2	75.2	2	152.0
9	47.3	24	17.2	3	78.4	3	112.2
10	36.9	25	15.9	4	71.7	4	134.9
11	24.1	26	17.1	5	77.1	5	114.9
12	123.9	27	27.8	6	70.1	6	133.1
13	142.5	28	60.3			7	168.6
14	43.2	29	33.4			9	29.8
15	37.2	30	25.7				

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(10), 2023 (1994)

Sitakisoside V

CAS Registry Number: 163633-32-7

See Figure Sitakisoside V

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{52}H_{84}O_{19}$: 1012.560

Mp: 202–204°C [1]

$[\alpha]_D$ −10.0° (c 6.6, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1680 [1]

FAB-MS *m/z*: 1011 $[M-H]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.83 (CH_3-25), 0.94 (CH_3-26), 0.99 (CH_3-24), 1.02 (CH_3-29), 1.20 (CH_3-30), 1.26 (CH_3-23), 1.36 (CH_3-27), 3.32 (dd, J = 12.0, 4.5, H-3), ca 4.00, 4.34 (d, J = 10.7, H_2-28), 5.01 (dd, J = 11.0, 4.8, H-16), 5.29 (m, H-12), 6.16 (dd, J = 11.0, 4.6, H-22);

β-D-Glcp: 4.85 (d, J = 7.6, H-1); β-D-Glcp′: 5.02 (d, J = 7.8, H-1); β-D-Xylp: 4.93 (d, J = 7.3, H-1);

Acyl part: 1.56 (d, J = 7.2, CH_3-4), 1.89 (s, CH_3-5), 7.04 (q, J = 7.2, H-3) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	66.4	Glc-1	106.9	Xyl-1	105.9
2	26.8	17	45.9	2	74.9	2	74.9
3	89.1	18	44.0	3	78.3	3	78.1
4	39.6	19	46.5	4	71.5	4	71.2
5	55.8	20	32.3	5	77.0	5	67.1
6	18.7	21	39.4	6	70.3	Acyl moiety-1	167.5
7	32.9	22	74.4	Glc′-1	105.4	2	129.6
8	40.4	23	28.4	2	75.6	3	137.5
9	47.2	24	17.2	3	78.5	4	14.5
10	36.9	25	15.9	4	71.5	5	12.6
11	24.2	26	17.2	5	77.0		
12	123.9	27	27.6	6	69.9		
13	142.4	28	60.4				
14	43.0	29	33.3				
15	36.2	30	25.8				

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(10), 2023 (1994)

Sitakisoside XVI

CAS Registry Number: 187811-10-5

See Figure Sitakisoside XVI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{52}H_{84}O_{19}$: 1012.560

Mp: 220–222°C (MeOH) [1]

$[\alpha]_D^{20}$ −10.0° (c 3.4, MeOH) [1]

UV λ_{max}^{EtOH} nm (log ε): 222 (4.36), 255 (3.87), 356 (3.68) [1]

IR (film) ν_{max} cm^{-1}: 3455, 1680, 1050 [1]

FAB-MS *m/z*: 1011 $[M-H]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.81, 0.97, 1.05, 1.05, 1.14, 1.26, 1.37 (s, CH_3-25, 24, 26, 29, 30, 23, 27), 2.87 (dd, J = 14.0, 4.5, H-18), 3.30 (dd, J = 11.5, 4.5, H-3), 4.72 (dd, J = 12.5, 4.5, H-22), 4.71, 5.23 (d, J = 11.0, H_2-28), 5.12 (dd, J = 11.0, 5.0, H-16), 5.35 (m, H-12)

β-D-Glcp: 4.84 (d, J = 7.5, H-1), 4.32 (m, H-6), 4.88 (dd, J = 10.5, 2.5, H-6)

β-D-Glcp′: 5.04 (d, J = 8.0, H-1), 4.30 (m, H-6), 4.77 (dd, J = 10.5, 2.0, H-6)

β-D-Xylp: 4.94 (d, J = 7.5, H-1)

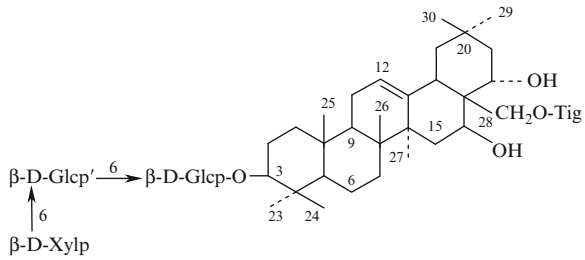
Tigloyl: 1.60 (dq, J = 7.0, 1.0, CH_3-4), 1.84 (brs, CH_3-5), 7.03 (qq, J = 7.0, 1.0, H-3) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	66.3	Glc-1	106.9	Xyl-1	106.0
2	26.7	17	44.4	2	75.0	2	74.9
3	89.0	18	43.8	3	78.3	3	78.1
4	39.5	19	46.2	4	71.6	4	71.2
5	55.7	20	32.2	5	76.9	5	67.1
6	18.5	21	44.1	6	70.4		
7	32.9	22	69.5	Glc′-1	105.4	Tig-1	168.1

(*continued*)



Sitakisoside XVI

Table 1 (continued)

8	40.3	23	28.2	2	75.6	2	129.4
9	47.1	24	17.2	3	78.6	3	137.1
10	36.8	25	15.7	4	71.6	4	14.2
11	24.0	26	17.1	5	77.0	5	12.3
12	123.9	27	27.7	6	69.9		
13	142.1	28	62.6				
14	42.6	29	33.4				
15	36.1	30	24.9				

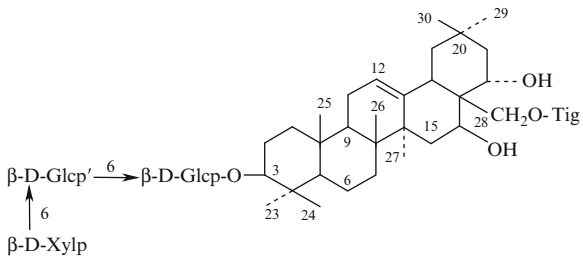
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Sitakisoside XVII

CAS Registry Number: 163456-79-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Stephanotis lutchuensis* [1], *Gymnema alternifolium* [2]

$C_{47}H_{78}O_{18}$: 930.518

$[\alpha]_D^{20}$ −7.0° (c 9.3, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 3250 [1]

FAB-MS *m/z*: 929 $[M-H]^-$, 797 $(M-H-C_5H_8O_4)^-$, 635 $(M-H-C_5H_8O_4-C_6H_{10}O_5)^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.82, 0.93, 0.99, 1.02, 1.11, 1.26, 1.37 (s, CH_3-25, 26, 24, 29, 30, 23, 27), 3.31 (dd, J = 11.7, 4.4, H-3), 4.12, 4.85 (d, J = 10.0, H_2-28), 5.10 (dd, J = 11.5, 5.0, H-16), 5.08 (dd, J = 12.0, 4.5, H-22), 5.29 (m, H-12)

β-D-Glcp: 4.85 (d, J = 7.5, H-1)

β-D-Glcp′: 5.03 (d, J = 8.0, H-1)

β-D-Xylp: 4.94 (d, J = 7.5, H-1) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	67.0	Glc-1	107.0	Xyl-1	106.0
2	26.7	17	45.2	2	75.0	2	74.9
3	89.1	18	43.2	3	78.3	3	78.1
4	39.6	19	46.7	4	71.5	4	71.2
5	55.8	20	32.3	5	77.0	5	67.1
6	18.5	21	44.2	6	70.4		
7	33.0	22	69.6	Glc′-1	105.4		
8	40.4	23	28.3	2	75.6		
9	47.2	24	17.2	3	78.5		
10	36.8	25	15.8	4	71.5		
11	24.0	26	17.1	5	77.0		
12	124.1	27	27.7	6	69.9		
13	143.0	28	58.9				
14	42.7	29	33.7				
15	36.0	30	25.2				

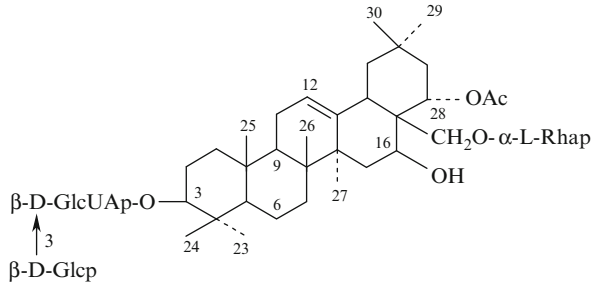
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)
2. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H. Chang, J. Wang, Chem. Pharm. Bull. **47**(11), 1598 (1999)

Alternoside I

CAS Registry Number: 212775-19-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{50}H_{80}O_{20}$: 1000.524
Mp: 241–243°C [1]
$[\alpha]_D^{25}$ + 1.2° (c 1.3, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3420, 1730, 1660, 1245, 1165 [1]
FAB-MS m/z: 999 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84, 0.93, 1.00, 1.00, 1.19, 1.29, 1.39 (s, CH_3-25, 23, 24, 30, 26, 23, 27), 2.95 (dd, J = 13.0, 4.5, H-18), 3.34 (dd, J = 11.5, 4.0, H-3), 4.95 (dd, J = 11.0, 5.5, H-16), 4.24, 3.86 (d, J = 9.0, H_2-28), 5.43 (m, H-12), 5.99 (dd, J = 12.5, 4.0, H-22)
β-D-GlcUAp: 4.99 (d, J = 8.5, H-1)
β-D-Glcp: 5.37 (d, J = 7.5, H-1)
α-L-Rhap: 5.25 (s, H-1), 1.70 (CH_3-6)
Acetyl: 1.97 (H-2) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	65.3	GlcUA-1	106.8	Rha-1	102.1
2	26.7	17	45.3	2	74.4	2	72.4
3	89.1	18	44.0	3	87.3	3	73.2
4	39.5	19	46.0	4	71.7	4	73.8
5	55.6	20	32.2	5	77.4	5	69.9
6	18.4	21	39.5	6	172.3	6	18.9
7	33.0	22	73.2	Glc-1	105.9		
8	40.3	23	28.1	2	75.6	Ac-1	169.5
9	47.1	24	17.0	3	78.2	2	21.1
10	36.7	25	15.7	4	71.6		
11	24.1	26	17.2	5	78.7		
12	123.2	27	27.5	6	62.4		
13	142.0	28	65.2				
14	42.7	29	33.0				
15	36.1	30	24.9				

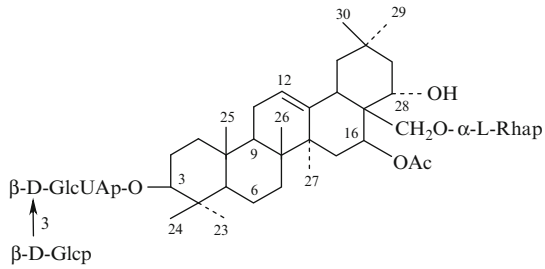
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside II

CAS Registry Number: 212775-23-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{50}H_{80}O_{20}$: 1000.524
Mp: 230–232°C [1]
$[\alpha]_D^{25}$ + 2.3° (c 2.4, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1730, 1665, 1240, 1160 [1]
FAB-MS *m/z*: 999 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.92, 0.94, 1.00, 1.19, 1.29, 1.44 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 2.98 (dd, J = 13.5, 4.0, H-18), 3.36 (dd, J = 11.5, 4.0, H-3), 4.30 (s, H_2-28), 4.66 (dd, J = 12.5, 4.0, H-22), 5.44 (m, H-12), 6.36 (dd, J = 11.5, 5.5, H-16)
β-D-GlcUAp: 5.00 (d, J = 8.5, H-1)
β-D-Glcp: 5.37 (d, J = 7.5, H-1)
α-L-Rhap: 5.29 (s, H-1), 1.71 (d, J = 6.0, CH_3-6)
Acetyl: 2.12 (H-2) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	67.8	GlcUA-1	106.7	Rha-1	101.8
2	26.6	17	45.4	2	74.4	2	72.6
3	89.1	18	44.1	3	87.6	3	73.2
4	39.6	19	46.7	4	71.8	4	74.0
5	55.6	20	31.9	5	77.4	5	70.0
6	18.4	21	43.5	6	172.0	6	19.0
7	33.1	22	67.4	Glc-1	105.9		
8	40.4	23	28.1	2	75.6	Ac-1	170.8
9	47.1	24	17.0	3	78.3	2	22.1
10	36.8	25	15.7	4	71.6		

(*continued*)

Table 1 (continued)

11	24.1	26	17.4	5	78.7
12	123.1	27	27.6	6	62.5
13	142.0	28	65.2		
14	43.1	29	33.4		
15	33.8	30	25.2		

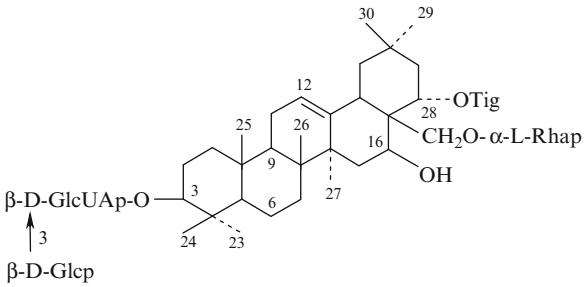
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside III

CAS Registry Number: 212775-27-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Gymnema alternifolium* [1]

$C_{53}H_{84}O_{20}$: 1040.555

Mp: 205–207°C [1]

$[\alpha]_D^{25}$ + 5.8° (c 0.9, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1720, 1655, 1160 [1]

FAB-MS *m/z*: 1039 $[M-H]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84, 0.95, 0.98, 1.04, 1.15, 1.27, 1.41 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.34 (dd, J = 11.5, 4.0, H-3), 5.45 (m, H-12), 4.93 (dd, J = 11.0, 5.0, H-16), 2.95 (dd, J = 13.0, 4.5, H-18), 6.05 (dd, J = 12.0, 4.5, H-22)

β-D-GlcUAp: 5.00 (d, J = 7.5, H-1)

β-D-Glcp: 5.37 (d, J = 7.5, H-1)

α-L-Rhap: 5.23 (s, H-1), 1.69 (d, J = 6.0, CH_3-6)

Tigloyl: 7.00 (J = 7.0, H-3), 1.53 (J = 7.0, CH_3-4), 1.83 (s, CH_3-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	65.3	GlcUA-1	106.8	Rha-1	102.2
2	26.5	17	45.6	2	74.4	2	72.4
3	89.0	18	44.3	3	87.2	3	73.2
4	39.6	19	45.9	4	71.5	4	73.8
5	55.6	20	32.3	5	77.4	5	69.9
6	18.5	21	39.6	6	172.0	6	18.9
7	33.0	22	73.2	Glc-1	105.9	Tig-1	167.1
8	40.3	23	28.1	2	75.5	2	129.3
9	47.1	24	17.0	3	78.2	3	137.3
10	36.7	25	15.7	4	71.7	4	14.3
11	24.1	26	17.2	5	78.7	5	12.4
12	-	27	27.6	6	62.4		
13	142.0	28	64.9				
14	42.8	29	33.1				
15	36.2	30	25.2				

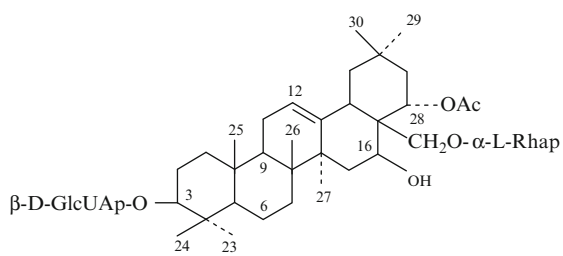
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch. Chang, J-D. Wang. Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside IV

CAS Registry Number: 212775-40-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{44}H_{70}O_{15}$: 838.471
Mp: 242–244°C [1]
$[\alpha]_D^{25}$ + 5.0° (c 0.9, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3420, 1730, 1660, 1240, 1155 [1]
FAB-MS *m/z*: 837 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.92, 0.98, 1.00, 1.15, 1.31, 1.38 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 2.95 (dd, J = 13.0, 4.5, H-18), 3.36 (dd, J = 11.0, 5.0, H-3), 4.24, 3.86 (d, J = 10.0, H_2-28), 4.96 (dd, J = 11.0, 5.0, H-16), 5.44 (m, H-12), 6.00 (dd, J = 12.0, 4.5, H-22)
β-D-GlcUAp: 5.04 (d, J = 7.0, H-1)
α-L-Rhap: 5.27 (s, H-1), 1.70 (d, J = 6.0, CH_3-6)
Acetyl: 1.97 (H-2) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	65.3	GlcUA-1	107.2
2	26.6	17	45.3	2	74.5
3	89.0	18	44.0	3	78.2
4	39.6	19	45.9	4	73.5
5	55.7	20	32.2	5	77.6
6	18.4	21	39.6	6	172.2
7	33.0	22	73.1	Rha-1	102.1
8	40.3	23	28.2	2	72.4
9	47.1	24	17.0	3	73.2
10	36.7	25	15.7	4	73.8
11	24.1	26	17.2	5	69.9
12	–	27	27.5	6	18.9
13	142.0	28	64.6	Ac-1	169.5
14	42.7	29	33.0	2	21.1
15	36.1	30	25.0		

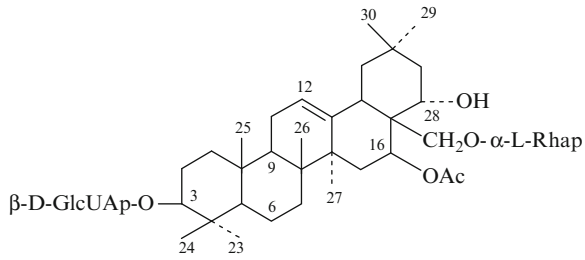
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside V

CAS Registry Number: 212775-43-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{44}H_{70}O_{15}$: 838.471
Mp: 246–248°C [1]
$[\alpha]_D^{25}$ + 5.4° (c 0.6, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3460, 1710, 1660, 1160 [1]
FAB-MS *m/z*: 837 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 0.92, 0.94, 1.01, 1.18, 1.31, 1.44 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 2.98 (dd, J = 13.0, 4.5, H-18), 3.38 (dd, J = 11.0, 5.0, H-3), 4.30 (s, H_2-28), 4.68 (dd, J = 12.0, 4.5, H-22), 5.44 (m, H-12), 6.37 (dd, J = 11.0, 5.5, H-16)
β-D-GlcUAp: 5.05 (d, J = 7.5, H-1)
α-L-Rhap: 5.31 (s, H-1), 1.72 (d, J = 6.0, CH_3-6)
Acetyl: 2.13 (H-2) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	67.4	GlcUA-1	106.8
2	26.6	17	45.4	2	75.4
3	88.8	18	44.1	3	78.2
4	39.5	19	46.6	4	73.5
5	55.7	20	31.8	5	77.5
6	18.4	21	43.4	6	172.2
7	33.0	22	67.8	Rha-1	101.8
8	40.4	23	28.1	2	72.5
9	47.0	24	17.0	3	73.2
10	36.7	25	15.7	4	73.9

(*continued*)

Table 1 (continued)

11	24.1	26	17.3	5	70.0
12	–	27	27.5	6	19.0
13	142.0	28	65.1	Ac-1	170.7
14	43.0	29	33.4	2	22.1
15	33.7	30	25.2		

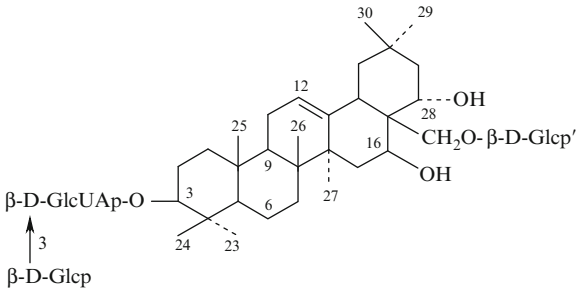
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch. Chang, J-D. Wang. Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside VI

CAS Registry Number: 212775-45-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Gymnema alternifolium* [1]

$C_{48}H_{78}O_{20}$: 974.508

Mp: 219–221°C [1]

$[\alpha]_D^{25}$ + 3.5° (c 2.0, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1735, 1655, 1160 [1]

FAB-MS *m/z*: 973 $[M-H]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.77, 0.93, 0.97, 1.28, 0.97, 1.09, 1.41, (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.03 (dd, J = 13.0, 4.5, H-18), 3.34 (dd, J = 11.5, 4.0, H-3), 4.44, 4.77 (d, J = 10.0, H_2-28), 5.08 (dd, J = 11.0, 5.0, H-16), 5.12 (dd, J = 12.0, 5.0, H-22), 5.36 (m, H-12)

β-D-GlcUAp: 5.00 (d, J = 8.0, H-1)

β-D-Glcp: 5.37 (d, J = 8.5, H-1)

β-D-Glcp′: 5.13 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	66.5	GlcUA-1	106.8	Glc′-1	105.8
2	26.6	17	45.2	2	74.3	2	75.5
3	89.1	18	43.6	3	87.6	3	78.7
4	39.5	19	46.4	4	71.6	4	71.7
5	55.5	20	32.2	5	77.5	5	78.1
6	18.4	21	44.1	6	172.1	6	62.7
7	32.8	22	69.6	Glc-1	105.9		
8	40.3	23	28.0	2	75.6		
9	47.0	24	16.9	3	78.2		
10	36.7	25	15.6	4	71.7		
11	23.8	26	17.1	5	78.7		
12	123.2	27	27.7	6	62.5		
13	142.7	28	68.2				
14	42.6	29	33.5				
15	36.0	30	25.2				

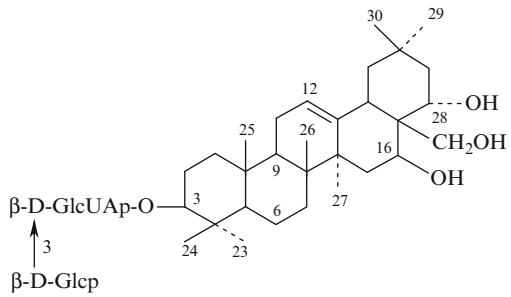
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside VII

CAS Registry Number: 212775-47-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{42}H_{68}O_{15}$: 812.455
Mp: 213–215°C [1]
$[\alpha]_D^{25}$ + 9.1°(c 4.5, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3460, 1720, 1655, 1155 [1]
FAB-MS *m/z*: 811 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.78, 0.93, 0.98, 1.00, 1.10, 1.29, 1.43 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 3.08 (dd, J = 13.0, 4.5, H-18), 3.34 (dd, J = 11.5, 4.0, H-3), 4.44, 4.75 (d, J = 9.0, H_2-28), 5.08 (dd, J = 12.0, 5.0, H-22), 5.11 (dd, J = 12.0, 5.0, H-16), 5.30 (m, H-12)
β-D-GlcUAp: 5.01 (d, J = 8.0, H-1)
β-D-Glcp: 5.39 (d, J = 8.0, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	66.9	GlcUA-1	106.6
2	26.6	17	45.1	2	74.4
3	89.1	18	43.2	3	87.5
4	39.6	19	46.6	4	71.6
5	55.6	20	32.2	5	77.4
6	18.4	21	44.2	6	172.2
7	32.9	22	69.6	Glc-1	105.9
8	40.3	23	28.1	2	75.6
9	47.1	24	17.0	3	78.2
10	36.7	25	15.7	4	71.8
11	23.9	26	17.0	5	78.7
12	–	27	27.7	6	62.4
13	143.1	28	58.9		
14	42.7	29	33.6		
15	36.0	30	25.0		

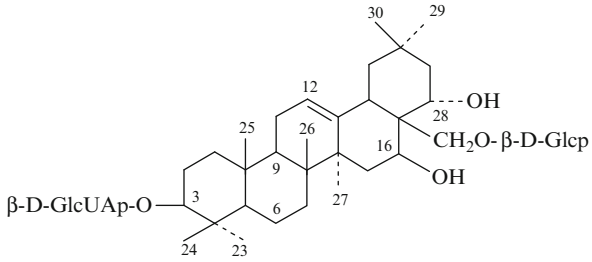
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside VIII

CAS Registry Number: 212775-48-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{42}H_{68}O_{15}$: 812.455
Mp: 198–200°C [1]
$[\alpha]_D^{25}$ + 9.5° (c 2.8, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3455, 1720, 1660, 1155 [1]
FAB-MS *m/z*: 811 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.78, 0.94, 0.97, 0.97, 1.08, 1.30, 1.40 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 3.02 (dd, J = 13.0, 4.5, H-18), 3.37 (dd, J = 11.0, 5.0, H-3), 4.75, 4.45 (d, J = 10.0, H_2-28), 5.08 (dd, J = 11.0, 5.5, H-16), 5.10 (dd, J = 12.0, 5.5, H-22), 5.36 (m, H-12)
β-D-GlcUAp: 5.03 (d, J = 8.0, H-1)
β-D-Glcp: 5.12 (d, J = 8.0, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	66.6	GlcUA-1	107.2
2	26.7	17	45.2	2	75.5
3	89.1	18	43.7	3	78.2
4	39.6	19	46.5	4	73.5
5	55.7	20	32.2	5	77.7
6	18.5	21	44.1	6	172.3
7	32.9	22	69.7	Glc-1	105.8
8	40.4	23	28.2	2	75.5
9	47.2	24	17.0	3	78.7

(*continued*)

Table 1 (continued)

10	36.8	25	15.7	4	71.8
11	23.9	26	17.2	5	78.2
12	–	27	27.7	6	62.8
13	142.7	28	68.3		
14	42.7	29	33.6		
15	36.0	30	25.3		

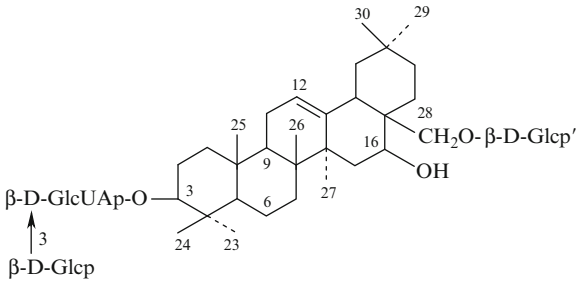
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside IX

CAS Registry Number: 212775-50-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Gymnema alternifolium* [1]

$C_{48}H_{78}O_{19}$: 958.513

Mp: 208–210°C [1]

$[\alpha]_D^{25}$ −8.3° (c 3.2, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3450, 1715, 1660, 1155 [1]

FAB-MS *m/z*: 957 $[M-H]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.81, 0.91, 0.93, 0.94, 1.28, 0.99, 1.35 (s, CH_3-25, 30, 29, 24, 26, 23, 27), 2.74 (dd, J = 13.0, 5.0, H-18), 3.35 (dd, J = 11.0, 5.0, H-3), 4.05 (s, H_2-28), 4.55 (H-16), 5.19 (m, H-12)

β-D-GlcUAp: 4.96 (d, J = 7.5, H-1)

β-D-Glcp: 5.39 (d, J = 8.0, H-1)

β-D-Glcp′: 4.99 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	66.3	GlcUA-1	106.6	Glc′-1	105.9
2	26.6	17	41.3	2	74.5	2	75.1
3	89.2	18	44.8	3	87.5	3	78.7
4	39.6	19	46.8	4	71.6	4	71.7
5	55.7	20	31.1	5	77.2	5	78.7
6	18.5	21	34.2	6	172.1	6	62.8
7	32.8	22	26.7	Glc-1	105.9		
8	40.1	23	28.1	2	75.6		
9	47.1	24	17.0	3	78.2		
10	36.8	25	15.8	4	71.7		
11	23.8	26	17.1	5	78.7		
12	123.0	27	27.2	6	62.4		
13	143.5	28	78.1				
14	44.0	29	33.5				
15	37.0	30	24.1				

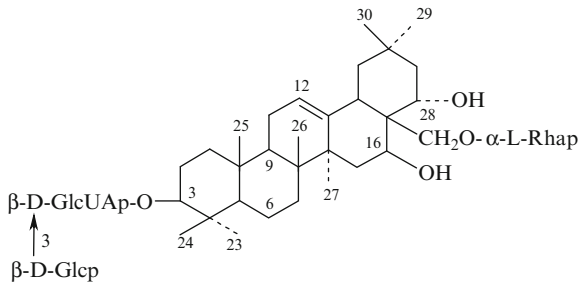
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside X

CAS Registry Number: 212775-51-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{48}H_{78}O_{19}$: 958.513
Mp: 223–225°C [1]
$[\alpha]_D^{25}$ + 4.1° (c 4.1, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3420, 1720, 1660, 1155 [1]
FAB-MS *m/z*: 957 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84, 0.94, 0.94, 0.96, 1.19, 1.28, 1.42 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.00 (dd, J = 13.0, 4.5, H-18), 3.34 (dd, J = 11.5, 4.0, H-3), 4.65 (d, J = 9.0, H_2-28), 5.08 (dd, J = 12.0, 5.0, H-22), 5.11 (dd, J = 12.0, 5.0, H-16), 5.45 (m, H-12)
β-D-GlcUAp: 4.99 (d, J = 7.0, H-1)
β-D-Glcp: 5.38 (d, J = 7.0, H-1)
α-L-Rhap: 5.28 (H-1), 1.70 (d, J = 6.0, CH_3-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	66.5	GlcUA-1	106.9	Rha-1	101.9
2	26.8	17	44.8	2	74.5	2	72.7
3	89.2	18	43.7	3	87.6	3	73.4
4	39.7	19	46.5	4	71.9	4	74.1
5	55.7	20	32.3	5	77.6	5	70.1
6	18.6	21	43.3	6	172.3	6	19.2
7	33.2	22	69.2	Glc-1	106.0		
8	40.5	23	28.2	2	75.8		
9	47.2	24	17.1	3	78.4		
10	36.9	25	15.9	4	71.7		
11	24.3	26	17.5	5	78.8		
12	–	27	27.7	6	62.6		
13	142.7	28	64.4				
14	42.8	29	33.6				
15	36.2	30	24.9				

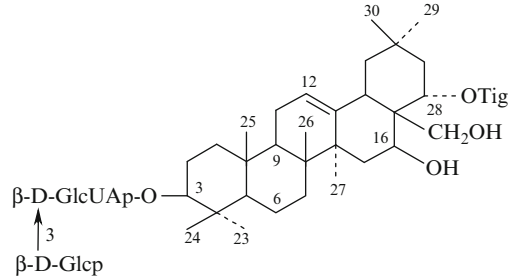
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Ogata, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **46**, 1102 (1998)

Alternoside XI

CAS Registry Number: 256509-77-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{47}H_{74}O_{16}$: 894.497
Mp: 203–205°C [1]
$[\alpha]_D^{25}$ + 14.9° (c 5.2, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1730, 1660, 1245, 1160 [1]
FAB-MS *m/z*: 893 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.81, 0.95, 0.99, 1.01, 1.19, 1.30, 1.43, (s, CH_3-25, 29, 30, 24, 26, 23, 27), 3.35 (dd, J = 11.5, 4.0, H-3), 5.32 (m, H-12), 5.03 (dd, J = 11.5, 5.5, H-16), 2.88 (dd, J = 14.0, 4.0, H-18), 6.15 (dd, J = 12.5, 4.0, H-22), 4.34, 4.00 (d, J = 10.5, H_2-28)
β-D-GlcUAp: 4.99 (d, J = 7.0, H-1)
β-D-Glcp: 5.36 (d, J = 8.0, H-1)
Tigloyl: 7.04 (q, d = 7.0, H-3), 1.56 (d, J = 7.0, CH_3-4), 1.87 (s, CH_3-5) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	66.2	GlcUA-1	106.7	Tigloyl-1	167.5
2	26.5	17	45.7	2	74.4	2	129.5
3	89.1	18	43.7	3	87.5	3	137.2
4	39.5	19	46.2	4	71.5	4	14.1
5	55.5	20	32.1	5	77.4	5	12.3
6	18.3	21	39.1	6	172.2		
7	33.0	22	74.2	Glc-1	105.9		
8	40.1	23	27.9	2	75.6		
9	47.0	24	16.8	3	78.2		

(*continued*)

Table 1 (continued)

10	36.6	25	15.5	4	71.7
11	23.7	26	16.8	5	78.7
12	124.0	27	27.3	6	62.4
13	142.4	28	60.0		
14	42.8	29	33.0		
15	36.1	30	25.5		

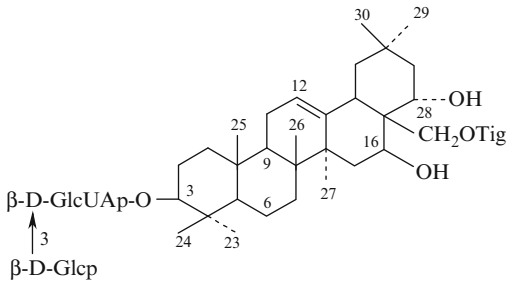
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Alternoside XII

CAS Registry Number: 256509-82-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Gymnema alternifolium* [1]

$C_{47}H_{74}O_{16}$: 894.497

Mp: 204–206°C [1]

$[\alpha]_D^{25}$ + 15.9° (c 3.6, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1730, 1665, 1240, 1160 [1]

FAB-MS *m/z*: 893 $[M-H]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.79, 0.97, 1.03, 1.06, 1.13, 1.29, 1.43, (s, CH_3-25, 29, 30, 24, 26, 23, 27), 3.34 (dd, J = 11.5, 4.5, H-3), 5.36 (m, H-12), 5.13 (dd, J = 11.0, 5.5, H-16), 2.87 (dd, J = 13.5, 4.5, H-18), 4.74 (dd, J = 12.5, 4.0, H-22), 5.24, 4.71 (d, J = 11.0, H_2-28)

β-D-GlcUAp: 4.98 (d, J = 8.0, H-1)

β-D-Glcp: 5.37 (d, J = 8.0, H-1)

Tigloyl: 6.99 (q, J = 7.5, H-3), 1.56 (d, J = 7.5, CH_3-4), 1.84 (s, CH_3-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	66.2	GlcUA-1	106.7	Tigloyl-1	168.1
2	26.4	17	44.2	2	74.2	2	129.3
3	89.1	18	43.6	3	87.5	3	137.0
4	39.4	19	46.0	4	71.5	4	14.0
5	55.4	20	32.0	5	77.3	5	12.1
6	18.2	21	44.0	6	172.3		
7	32.7	22	69.4	Glc-1	105.8		
8	40.2	23	27.9	2	75.5		
9	46.9	24	16.8	3	78.2		
10	36.6	25	15.5	4	71.7		
11	23.7	26	17.0	5	78.7		
12	124.1	27	27.6	6	62.4		
13	142.2	28	62.4				
14	42.5	29	33.2				
15	36.0	30	24.7				

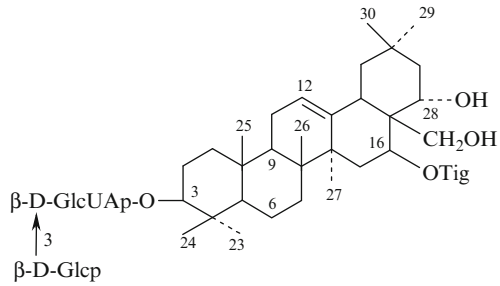
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Alternoside XIII

CAS Registry Number: 256509-83-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{47}H_{74}O_{16}$: 894.497
Mp: 192–194°C [1]
$[\alpha]_D^{25}$ + 5.4° (c 1.0, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1730, 1665, 1245, 1165 [1]
FAB-MS *m/z*: 893 $[M-H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.80, 0.92, 0.98, 0.99, 1.04, 1.28, 1.50 (s, CH_3-25, 26, 29, 24, 30, 23, 27), 3.36 (dd, J = 11.5, 4.0, H-3), 5.38 (m, H-12), 6.47 (dd, J = 10.5, 5.0, H-16), 2.80 (dd, J = 13.0, 4.5, H-18), 4.73 (dd, J = 12.0, 4.5, H-22), 4.74, 4.07 (d, J = 10.5, H_2-28)
β-D-GlcUAp: 4.97 (d, J = 7.5, H-1)
β-D-Glcp: 5.37 (d, J = 8.0, H-1)
Tigloyl: 7.13 (q, J = 7.5, H-3), 1.56 (d, J = 7.5, CH_3-4), 1.94 (s, CH_3-5) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	69.1	GlcUA-1	106.7	Tigloyl-1	167.6
2	26.8	17	45.9	2	74.6	2	130.2
3	89.1	18	44.8	3	87.7	3	136.7
4	39.8	19	46.9	4	71.3	4	14.5
5	55.7	20	32.2	5	77.4	5	12.7
6	18.7	21	43.7	6	172.6		
7	34.0	22	72.0	Glc-1	106.0		
8	40.6	23	28.3	2	75.8		
9	47.2	24	17.2	3	78.4		
10	37.0	25	15.9	4	71.7		
11	24.1	26	17.3	5	78.8		
12	–	27	27.9	6	62.6		
13	142.2	28	63.6				
14	43.5	29	33.8				
15	34.0	30	25.9				

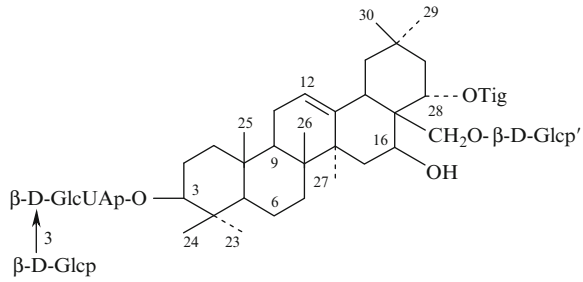
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Alternoside XIV

CAS Registry Number: 256509-85-0



Biological sources: *Gymnema alternifolium* [1]
$C_{53}H_{84}O_{21}$: 1056.550
Mp: 186–188°C [1]
$[\alpha]_D^{25}$ + 2.8° (c 0.6, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1735, 1660, 1240, 1160 [1]
FAB-MS *m/z*: 1055 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.78, 0.94, 0.96, 1.01, 1.09, 1.25, 1.36 (s, CH_3-25, 29, 24, 26, 30, 23, 27), 3.30 (dd, J = 11.5, 4.5, H-3), 5.25 (m, H-12), 4.95 (m, H-16), 2.66 (dd, J = 13.0, 4.5, H-18), 6.01 (dd, J = 11.0, 4.0, H-22), 4.32, 4.20 (d, J = 10.5, H_2-28)
β-D-GlcUAp: 4.96 (d, J = 8.0, H-1)
β-D-Glcp: 5.34 (d, J = 8.0, H-1)
β-D-Glcp′: 4.74 (d, J = 8.0, H-1)
Tigloyl: 7.11 (q, J = 7.0, H-3), 1.49 (d, J = 7.0, CH_3-4), 1.89 (s, CH_3-5) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	66.3	GlcUA-1	106.9	Glc′-1	105.3
2	26.9	17	45.8	2	74.5	2	75.3
3	89.2	18	44.6	3	87.7	3	78.5
4	39.8	19	46.2	4	71.8	4	71.9
5	55.8	20	32.4	5	77.7	5	78.9
6	18.7	21	39.5	6	172.1	6	63.1
7	33.2	22	74.9	Glc-1	106.0	Tigloyl-1	167.8
8	40.5	23	28.3	2	75.8	2	129.6
9	47.3	24	17.3	3	78.5	3	137.4
10	37.0	25	16.1	4	71.9	4	14.5
11	24.1	26	17.4	5	78.7	5	12.8

(*continued*)

Table 1 (continued)

12	–	27	28.3	6	62.7
13	141.7	28	70.4		
14	43.3	29	33.2		
15	37.0	30	26.1		

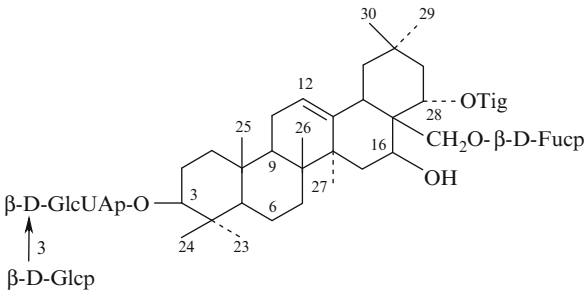
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Alternoside XV

CAS Registry Number: 256509-89-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Gymnema alternifolium* [1]

$C_{53}H_{84}O_{20}$: 1040.555

Mp: 192–194°C [1]

$[\alpha]_D^{25}$ + 8.9° (c 1.4, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3460, 1725, 1655, 1240, 1160 [1]

FAB-MS *m/z*: 1039 $[M-H]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.85, 0.97, 1.00, 1.10, 1.10, 1.30, 1.41, (s, CH_3-25, 29, 24, 26, 30, 23, 27), 3.35 (dd, J = 12.0, 4.5, H-3), 5.29 (m, H-12), 5.00 (m, H-16), 2.85 (dd, J = 13.0, 4.0, H-18), 6.09 (dd, J = 11.5, 4.0, H-22), 4.35, 4.20 (d, J = 10.5, H_2-28)

β-D-GlcUAp: 5.00 (d, J = 8.0, H-1)

β-D-Glcp: 5.39 (d, J = 8.0, H-1)

β-D-Fucp: 4.55 (d, J = 8.5, H-1), 1.54 (d, J = 6.5, CH_3-6)

Tigloyl: 7.13 (q, J = 6.5, H-3), 1.54 (d, J = 6.5, CH_3-4), 1.92 (s, CH_3-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	66.0	GlcUA-1	106.9	Fuc-1	105.4
2	26.9	17	45.8	2	74.6	2	72.3
3	89.3	18	44.3	3	87.7	3	75.3
4	39.8	19	46.1	4	71.9	4	72.7
5	55.8	20	32.5	5	77.7	5	72.0
6	18.8	21	39.5	6	172.1	6	17.2
7	33.3	22	74.2	Glc-1	106.0	Tigloyl-1	167.7
8	40.6	23	28.4	2	75.8	2	129.6
9	47.3	24	17.2	3	78.5	3	137.5
10	37.0	25	15.9	4	71.8	4	14.6
11	24.2	26	16.9	5	78.9	5	12.8
12	124.0	27	27.7	6	62.7		
13	141.7	28	68.7				
14	43.2	29	33.3				
15	36.8	30	26.1				

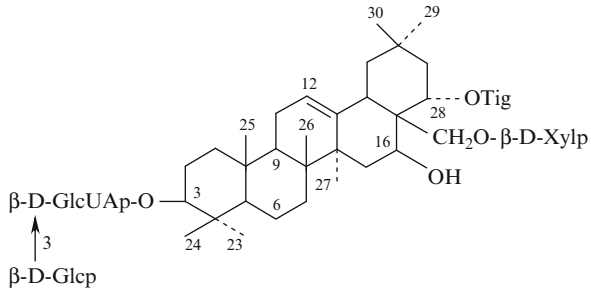
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Alternoside XVI

CAS Registry Number: 256509-93-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{52}H_{82}O_{20}$: 1026.539
Mp: 180–182°C [1]
$[\alpha]_D^{25}$ + 3.2° (c 0.5, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1730, 1660, 1240, 1155 [1]
FAB-MS *m/z*: 1025 $[M-H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.83, 0.98, 1.00, 1.07, 1.15, 1.29, 1.42 (s, CH_3-25, 29, 24, 26, 30, 23, 27), 3.35 (dd, J = 11.5, 4.0, H-3), 5.36 (m, H-12), 4.96 (dd, J = 11.0, 5.5, H-16), 2.84 (dd, J = 13.0, 4.5, H-18), 6.07 (dd, J = 11.8, 4.0, H-22), 4.34, 4.21 (d, J = 11.0, H_2-28)
β-D-GlcUAp: 5.00 (d, J = 8.0, H-1)
β-D-Glcp: 5.39 (d, J = 8.0, H-1)
β-D-Xylp: 4.71 (d, J = 7.0, H-1)
Tigloyl: 7.13 (q, J = 7.0, H-3), 1.54 (d, J = 7.0, CH_3-4), 1.92 (s, CH_3-5) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	66.1	GlcUA-1	106.9	Xyl-1	105.7
2	26.9	17	45.8	2	74.5	2	74.9
3	89.3	18	44.6	3	87.7	3	78.1
4	39.8	19	46.3	4	71.8	4	71.2
5	55.8	20	32.5	5	77.7	5	67.2
6	18.8	21	39.6	6	172.1	Tigloyl-1	167.7
7	33.3	22	74.7	Glc-1	106.0	2	129.6
8	40.6	23	28.3	2	75.8	3	137.3
9	47.3	24	17.3	3	78.5	4	14.5
10	37.0	25	16.0	4	71.8	5	12.8
11	24.2	26	17.4	5	78.9		
12	–	27	27.8	6	62.7		
13	141.9	28	69.6				
14	43.2	29	33.3				
15	36.8	30	25.9				

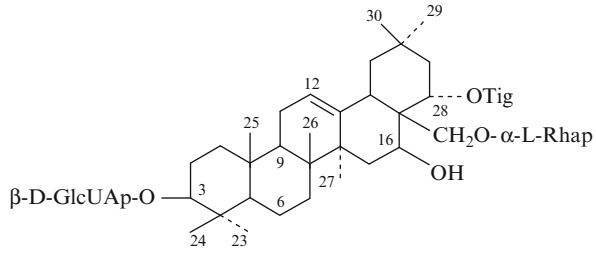
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Alternoside XVII

CAS Registry Number: 256509-97-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin
Biological sources: *Gymnema alternifolium* [1]
$C_{47}H_{74}O_{15}$: 878.502
Mp: 199–201°C [1]
$[\alpha]_D^{25}$ + 8.6° (c 1.0, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1735, 1665, 1245, 1160 [1]
FAB-MS *m/z*: 877 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 0.95, 1.01, 1.05, 1.17, 1.31, 1.42 (s, CH_3-25, 29, 30, 24, 26, 23, 27), 3.37 (dd, J = 11.5, 4.0, H-3), 5.45 (m, H-12), 4.97 (dd, J = 11.0, 5.5, H-16), 2.98 (dd, J = 13.0, 4.5, H-18), 6.06 (dd, J = 12.0, 4.5, H-22), 4.29, 3.92 (d, J = 10.0, H_2-28)
β-D-GlcUAp: 5.00 (d, J = 7.5, H-1)
α-L-Rhap: 5.23 (brs, H-1), 1.71 (d, J = 6.0, CH_3-6)
Tigloyl: 7.03 (q, J = 7.0, H-3), 1.54 (d, J = 7.0, CH_3-4), 1.84 (s, CH_3-5) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	65.5	GlcUA-1	107.3	Tigloyl-1	167.0
2	26.9	17	45.8	2	75.7	2	129.3
3	89.1	18	44.5	3	78.4	3	137.2
4	39.8	19	46.1	4	73.7	4	14.6
5	55.9	20	32.6	5	77.2	5	12.8
6	18.8	21	39.6	6	172.2		
7	33.3	22	73.4	Rha-1	102.3		
8	40.6	23	28.5	2	72.6		

(*continued*)

Table 1 (continued)

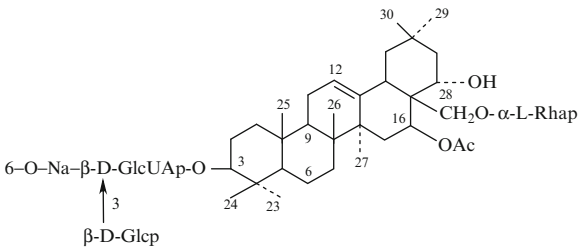
9	47.3	24	17.3	3	73.4
10	37.0	25	16.0	4	74.0
11	24.4	26	17.5	5	70.0
12	–	27	27.9	6	19.2
13	142.0	28	65.5		
14	43.0	29	33.3		
15	36.5	30	25.5		

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Compound 4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Chichipegenin

Biological sources: *Gymnema sylvestre* [1]

$C_{50}H_{78}NaO_{20}$: 1021.498

Mp: 294–296°C [1]

$[\alpha]_D^{20}$ + 1.5° (c 0.19, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3418, 2948, 1738, 1713, 1621, 1430, 1374, 1266, 1076, 1031 [1]

FAB-MS *m/z*: 1023 $[(M\text{-}Na) + H]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84 (s, CH_3-25), 0.93 (s, CH_3-29), 0.94 (s, CH_3-24), 0.98 (s, CH_3-26), 1.18 (s, CH_3-30), 1.25 (s, CH_3-23), 1.44 (s, CH_3-27), 2.13 (s, Ac), 3.30 (m, H-3α), 4.28 (d, J = 10.0, H-28a), 4.96 (d, J = 10.0, H-28b), 4.52 (m, H-I6α), 5.31 (brs, H-12)

β-D-GlcUAp: 4.81 (H-1), 4.03 (H-2), 4.26 (H-3), 4.29 (H-4), 4.41 (H-5)

β-D-Glcp: 5.25 (d, J = 7.2, H-1), 4.02 (H-2), 4.22 (H-3), 4.21 (H-4), 4.09 (H-5), 4.03, 4.28 (H_2-6)

α-L-Rhap: 5.31 (brs, H-1), 4.46 (brs, H-2), 4.40 (H-3), 4.32 (H-4), 4.12 (m, H-5), 1.70 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	67.9	GlcUA-1	106.0	Rha-1	101.7
2	26.5	17	45.4	2	74.5	2	72.4
3	88.7	18	44.1	3	87.0	3	73.1
4	39.5	19	46.7	4	72.0	4	73.9
5	55.6	20	31.9	5	76.6	5	69.9
6	18.5	21	43.4	6	175.6	6	19.0
7	33.1	22	67.5	Glc-1	105.3		
8	40.4	23	28.1	2	75.6		
9	47.0	24	17.1	3	78.2		
10	36.8	25	15.8	4	71.5		
11	24.1	26	17.4	5	78.7		
12	123.0	27	27.6	6	62.4		
13	141.8	28	65.1	Ac-1	170.6		
14	43.1	29	33.4	2	22.1		
15	33.8	30	25.2				

Pharm./Biol.: Showed antisweet activity [1]

References

1. W. Ye, X. Liu, Q. Zhang, C.-T. Che, Sh Zhao, J. Nat. Prod. **64**(2), 232 (2001)

Glycosides of Aglycones of Oleanene Type

Glycosides of Gymnemagenin

Gymnemic Acid GA-VIII

See Figure Gymnemic Acid GA-VIII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

Biological sources: *Gymnema sylvestre* [1]

$C_{47}H_{74}O_{18}$: 926.487

Mp: 218–220°C [1]

$[\alpha]_D$ + 17.4° (c 0.74, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3500, 1730 [1]

FAB-MS *m/z*: 925 $[M\text{-}H]^-$, 765 [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-2	26.0	Tigloyl-1	176.6	GlcUA-1	106.3
3	82.1	2	42.0	2	72.1
4	42.6	3	27.2	3	73.8
15	36.2	4	12.0	4	69.6
16	68.0	5	17.1	5	75.2
17	47.0			6	171.5
18	42.0			Sec.-Sugr.-1	97.0
19	46.2			2	93.8
20	36.4			3	79.7
21	79.0			4	69.5
22	71.2			5	79.4
23	64.1			6	62.8
24	13.6				
28	58.1				

(*continued*)

References

1. F. Kiuchi, H.-M. Liu, Y. Tsuda, Chem. Pharm. Bull. **38**(8), 2326 (1990)

Gymnemic Acid GA-IX

See Figure Gymnemic Acid GA-IX

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

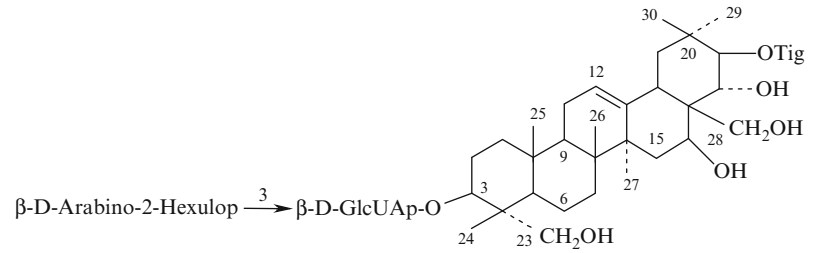
Biological sources: *Gymnema sylvestre* [1]

$C_{47}H_{72}O_{18}$: 924.471

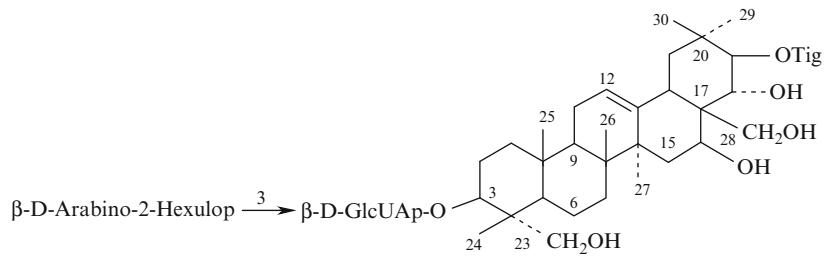
Mp: 222–224°C [1]

$[\alpha]_D$ + 11.4° (c 0.7, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730 1700 [1]



Gymnemic Acid GA-VIII



Gymnemic Acid GA-IX

FAB-MS *m/z*: 923 $[M-H]^-$, 763 [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

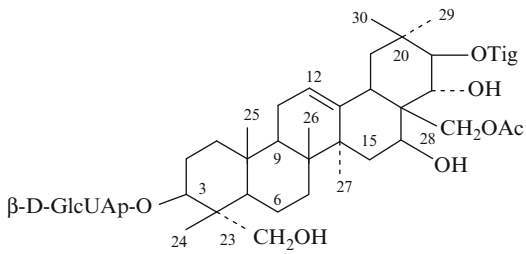
C-2	25.9	Tigloyl-1	168.5	GlcUA-1	105.9
3	81.8	2	129.6	2	71.8
4	42.5	3	136.8	3	73.7
15	35.9	4	12.4	4	69.5
16	68.0	5	14.2	5	75.0
17	47.0			6	172.2
18	41.9			Sec.-Sugr.-1	96.8
19	46.2			2	93.7
20	36.5			3	79.4
21	79.6			4	69.3
22	71.1			5	78.9
23	64.0			6	62.5
24	13.5				
28	58.0				

References

1. F. Kiuchi, H.-M. Liu, Y. Tsuda, Chem. Pharm. Bull. **38**(8), 2326 (1990)

Gymnemic Acid I

CAS Registry Number: 122168-40-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin
Biological sources: *Gymnema sylvestre* [1]
$C_{43}H_{66}O_{14}$: 806.445
Mp: 211–212°C [1]
$[\alpha]_D$ + 36.7° (c 2.4, MeOH) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 5.14 (dd, J = 11.5, 5.0, H-16), 5.78 (d, J = 10.5, H-21), 4.59 (d, J = 10.5, H-22), 3.71, 4.37 (d, J = 10.5, H_2-23), 4.65, 5.08 (d, J = 11.0, H_2-28)
Acyl moiety: 1.64 (d, J = 6.5, CH_3-4), 1.91 (s, CH_3-5), 7.07 (q, J = 6.5, H-3)
β-D-GlcUAp: 5.29 (d, J = 7.5, H-1) [1]
^{13}C NMR (C_5D_5N-D_2O): [1]

Table 1

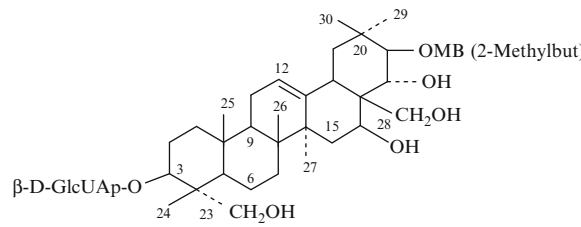
C-2	26.3	GlcUA-1	106.3
3	82.3	2	75.5
4	43.7	3	78.1
15	36.4	4	73.5
16	67.7	5	77.8
17	45.9	6	173.1
20	36.9	Tigloyl-1	168.5
21	79.1	2	129.7
22	71.7	3	137.3
23	64.4	4	12.7
24	13.9	5	14.6
28	62.6	Ac-1	171.4
		2	21.1

Pharm./Biol.: Antisweet activity [2]

References

1. K. Yoshikawa, K. Amimoto, S. Arihara, K. Matsuura, Tetrahedron Lett. **30**, 1103 (1989)
2. M. Maeda, T. Ywashita, Y. Kurihara, Tetrahedron Lett. **30**, 1547 (1989)

Gymnemic Acid II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin
Biological sources: *Gymnema sylvestre* [1]
$C_{43}H_{68}O_{14}$: 808.460
Mp: 212–213°C [1]

$[\alpha]_D$ + 36.3° (c 1.5, MeOH) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 5.10 (dd, J = 10.0, 5.0, H-16), 5.68 (d, J = 10.5, H-21), 4.54 (d, J = 10.5, H-22), 3.70, 4.36 (d, J = 11.0, H_2-23), 4.61, 5.02 (d, J = 11.0, H_2-28)
2-Me-Bu: 0.98 (t, J = 7.0, CH_3-4), 1.26 (d, J = 7.0, CH_3-5), 1.54 (J = 7.0, H-2), 1.97 (s), 2.59 (J = 7.0)
β-D-GlcUAp: 5.27 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

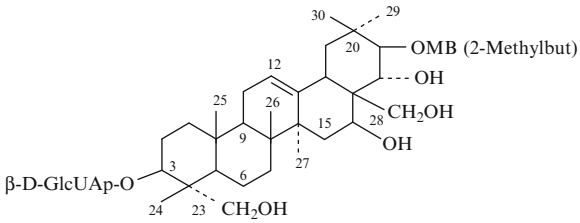
C-2	26.1	GlcUA-1	106.3	$CH_3\underline{C}O$	170.9
3	81.9	2	75.5	$\underline{CH_3}CO$	20.7
4	43.5	3	78.1		
15	36.4	4	73.4		
16	67.5	5	78.0		
17	45.6	6	172.9		
20	36.4	2-Me-Bu-1	176.6		
21	78.4	2	42.1		
22	71.4	3	27.3		
23	64.3	4	12.1		
24	13.6	5	17.2		
28	62.3				

Pharm./Biol.: Antisweet action [2]

References

1. K. Yoshikawa, K. Amimoto, S. Arihara, K. Matsuura, Tetrahedron Lett. **30**, 1103 (1989)
2. M. Maeda, T. Ywashita, Y. Kurihara, Tetrahedron Lett. **30**, 1547 (1989)

Gymnemic Acid III



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin
Biological sources: *Gymnema sylvestre* [1]
$C_{41}H_{66}O_{13}$: 766.450
Mp: 218–219°C [1]
$[\alpha]_D$ + 7.6° (c 2.9, MeOH) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 5.09 (dd, J = 10.5, J = 5.0, H-16), 5.70 (d, J = 10.5, H-21), 4.94 (d, J = 10.5, H-22), 3.71, 4.35 (d, J = 11.0, H_2-23), 4.06, 4.67 (d, J = 10.5, H_2-28)
2-Me-Bu: 0.99 (t, J = 7.0, CH_3-4), 1.27 (d, J = 7.0, CH_3-5), 1.54 (q, J = 7.0, H_2-3), 2.58 (q, J = 7.0, H-2)
β-D-GlcUAp: 5.27 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

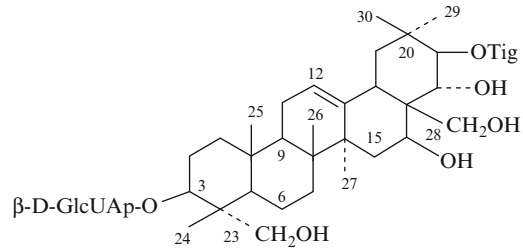
Table 1

C-2	26.1	GlcUA-1	106.3
3	81.9	2	75.5
4	43.5	3	78.1
15	36.4	4	73.5
16	68.0	5	77.9
17	47.1	6	172.9
22	71.2	2-Me-Bu-1	176.6
23	64.4	2	42.1
24	13.6	3	27.3
28	58.1	4	12.1
		5	17.2

References

1. K. Yoshikawa, K. Amimoto, S. Arihara, K. Matsuura, Tetrahedron Lett. **30**, 1103 (1989)
2. M. Maeda, T. Ywashita, Y. Kurihara, Tetrahedron Lett. **30**, 1547 (1989)

Gymnemic Acid IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin
Biological sources: *Gymnema sylvestre* [1]

$C_{41}H_{64}O_{13}$: 764.434
Mp: 220–221°C [1]
$[\alpha]_D$ + 8.8° (C 5.4, MeOH) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.12 (dd, J = 11.5, J = 5.0, H-16), 5.79 (d, J = 10.5, H-21), 5.03 (d, J = 10.5, H-22), 3.71, 4.35 (d, J = 10.0, H_2-23), 4.08, 4.70 (d, J = 10.0, H_2-28)
Tigloyl: 1.64 (d, J = 7.5, CH_3-4), 1.90 (s, CH_3-5), 7.08 (q, J = 7.5, H-3)
β-D-GlcUAp: 5.27 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-2	26.1	GlcUA-1	106.3
3	81.9	2	75.5
4	43.5	3	78.1
15	36.3	4	73.5
16	68.1	5	77.9
17	47.2	6	172.9
20	36.8	Tigloyl-1	168.3
21	79.7	2	129.7
22	71.3	3	136.6
23	64.4	4	12.5
24	13.7	5	14.3
28	58.2		

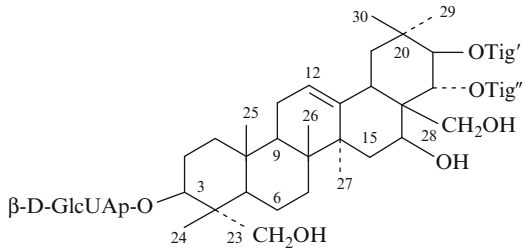
Pharm./Biol.: Antisweet action [2]

References

1. K. Yoshikawa, K. Amimoto, S. Arihara, K. Matsuura, Tetrahedron Lett. **30**, 1103 (1989)
2. M. Maeda, T. Ywashita, Y. Kurihara, Tetrahedron Lett. **30**, 1547 (1989)

Gymnemic Acid V

CAS Registry Number: 121903-99-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin
Biological sources: *Gymnema sylvestre* [1]
$C_{46}H_{70}O_{14}$: 846.476
Mp: 202–203°C [1]
$[\alpha]_D$ + 2.2° (c 3.6, MeOH) [1]
FAB-MS *m/z*: 892 $[M + 2Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 5.04 (dd, J = 11.0, 5.0, H-16), 6.33 (d, J = 11.5, H-21), 5.81 (d, J = 11.5, H-22), 3.71, 4.35 (d, J = 11.0, H_2-23), 4.02, 4.23 (d, J = 11.0, H_2-28)
Tigloyl moiety: 1.61 (d, J = 7.5, CH_3-4′), 1.47 (d, J = 7.5, CH_3-4″), 1.87 (s, CH_3-5′), 1.81 (s, CH_3-5″), 7.01 (q, J = 7.5, H-3′), 7.01 (q, J = 7.5, H-3″)
β-D-GlcUAp: 5.26 (d, J = 7.5, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-2	26.1	Tigl′-1	167.7	GlcUA-1	106.3
3	82.0	2	129.0	2	75.5
15	36.7	3	137.8	3	78.1
16	67.1	4	12.3	4	73.5
17	48.1	5	14.3	5	77.9
20	36.7	Tig′-1	167.9	6	172.9
21	76.6	2	129.0		
22	74.6	3	138.1		
23	64.4	4	12.4		
24	13.7	5	14.3		
28	59.9				

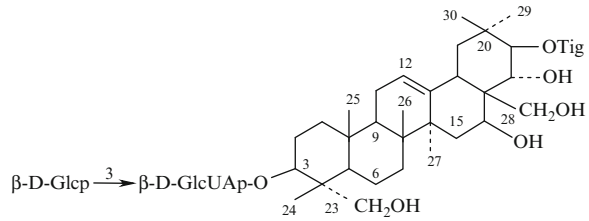
Pharm./Biol.: Complete suppression of sweetness induced by 0.4 mM sucrose [1]

References

1. K. Yoshikawa, K. Amimoto, S. Arihara, K. Matsuura, Chem. Pharm. Bull. **37**(3), 852 (1989)

Gymnemic Acid VI

CAS Registry Number: 121903-98-8
See Figure Gymnemic Acid VI



Gymnemic Acid VI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

Biological sources: *Gymnema sylvestre* [1]

$C_{47}H_{74}O_{18}$: 926.487

Mp: 225–226°C [1]

$[\alpha]_D$ + 11.7° (c 1.1, MeOH) [1]

FAB-MS *m/z*: 972 $(M + 2Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 5.12 (dd, J = 11.0, 5.0, H-16), 5.79 (d, J = 10.5, H-21), 5.03 (d, J = 10.5, H-22), 3.72 (d, J = 10.5, H_2-23), 4.72 (d, J = 11.0, H_2-28)

Tigloyl: 1.63 (d, J = 7.5, CH_3-4), 1.89 (s, CH_3-5), 7.02 (q, J = 7.5, H-3)

β-D-GlcUAp: 5.26 (d, J = 8.0, H-1)

β-D-Glcp: 5.33 (d, J = 8.0, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

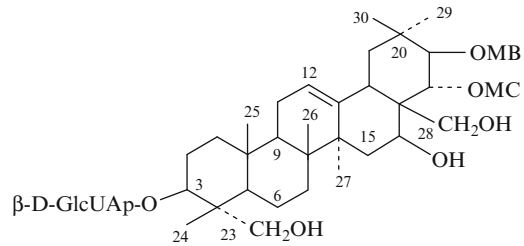
C-2	26.1	Tig-1	168.2	GlcUA-1	106.0
3	81.9	2	129.7	2	74.3
15	36.3	3	136.5	3	87.6
16	68.0	4	12.4	4	71.7
17	47.2	5	14.2	5	77.5
20	36.7			6	172.1
21	79.7			Glc-1	106.0
22	71.2			2	75.6
23	64.0			3	78.8
24	13.6			4	71.6
28	58.1			5	78.3
				6	62.5

References

1. K. Yoshikawa, K. Amimoto, S. Arihara, K. Matsuura, Chem. Pharm. Bull. **37**(3), 852 (1989)

Gymnemic Acid XV

CAS Registry Number: 154977-74-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

Biological sources: *Gymnema sylvestre* [1]

$C_{46}H_{72}O_{14}$: 848.492

$[\alpha]_D$ + 7.2° (c 1.52, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1740, 1720, 1610 (C = C), 1040 (OH) [1]

FAB-MS *m/z*: 847 $[M-H]^-$, 747 $[M-H-C_5H_8O_2]^-$, 745 $[M-H-2C_5H_8O_2]^-$, 645 $[M-H-C_5H_8O_2-C_5H_{10}O_8]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.00 (dd, J = 11.3, 5.2, H-16), 5.74 (d, J = 11.3, H-21), 6.28 (d, J = 11.3, H-22), 3.71, 4.36 (d, J = 10.8, H_2-23), 4.01, 4.21 (d, J = 11.0, H_2-28)

OMB: 2.42 (tq, J = 7.0, 7.0, H-2), 1.43 (m, H-3), 1.75 (m, H-3), 0.89 (t, J = 7.0, CH_3-4), 1.13 (d, J = 7.0, CH_3-5)

OMC: 7.12 (q, J = 7.0, H-3), 1.53 (d, J = 7.0, CH_3-4), 1.89 (s, CH_3-5)

β-D-GlcUAp: 5.25 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	66.9	GlcUA-1	106.1
2	26.1	17	48.1	2	75.4
3	81.7	18	42.7	3	78.2
4	43.5	19	45.8	4	73.4
5	47.4	20	36.8	5	77.8
6	18.1	21	76.1	6	172.9
7	32.5	22	74.4	OMB-1	176.2
8	40.2	23	64.4	2	41.6
9	47.1	24	13.6	3	27.0
10	36.7	25	16.2	4	11.8
11	23.9	26	16.9	5	16.6
12	124.2	27	27.4	OMC-11	167.4
13	141.5	28	60.1	2	129.0
14	42.7	29	29.2	3	138.4
15	36.6	30	19.8	4	14.2
				5	12.3

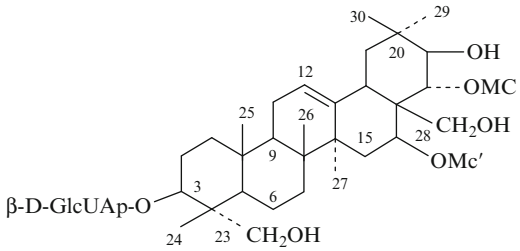
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, Y. Kondo, S. Arihara, K. Matsuura, Chem. Pharm. Bull. **41**(10), 1730 (1993)

Gymnemic Acid XVI

CAS Registry Number: 154977-75-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

Biological sources: *Gymnema sylvestre* [1]

$C_{46}H_{70}O_{14}$: 846.476

Mp: 203–205°C (MeOH) [1]

$[\alpha]_D$ + 6.8° (c 2.96, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3380 (OH), 1740 (C = O), 1720 (C = O), 1605 (C = C), 1060 (OH) [1]

FAB-MS *m/z*: 845 $[M\text{-}H]^-$, 745 $[M\text{-}H\text{-}C_5H_8O_2]^-$, 645 $[M\text{-}H\text{-}2C_5H_8O_2]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 6.43 (dd, J = 11.4, 5.7, H-16), 4.34 (d, J = 10.8, H-21), 5.84 (d, J = 10.8, H-22), 3.70, 4.36 (d, J = 10.8, H_2-23), 4.05 (s, H_2-28)

OMc′: 6.96 (q, J = 7.0, H-3), 1.64 (d, J = 7.0, CH_3-4), 1.84 (s, CH_3-5)

OMc: 6.79 (q, J = 7.0, H-3), 1.41 (d, J = 7.0, CH_3-4), 1.77 (s, CH_3-5)

β-D-GlcUAp: 5.25 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	68.9	GlcUA-1	106.1
2	26.0	17	47.9	2	75.4
3	81.8	18	42.6	3	78.1
4	43.5	19	46.2	4	73.4
5	47.4	20	37.3	5	77.8
6	18.0	21	74.1	6	172.9
7	32.5	22	75.6	OMC-1	167.0
8	40.4	23	64.4	2	129.6
9	47.1	24	13.6	3	137.4
10	36.6	25	16.2	4	14.3
11	23.9	26	17.0	5	12.2
12	124.4	27	27.5	OMC′-1	170.1
13	141.1	28	59.0	2	128.7
14	42.8	29	29.9	3	138.0
15	33.9	30	18.9	4	14.0
				5	12.2

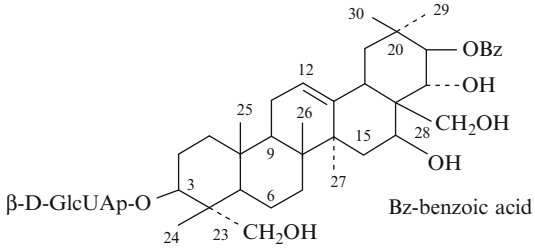
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, Y. Kondo, S. Arihara, K. Matsuura, Chem. Pharm. Bull. **41**(10), 1730 (1993)

Gymnemic Acid XVII

CAS Registry Number: 154977-76-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

Biological sources: *Gymnema sylvestre* [1]

$C_{43}H_{62}O_{13}$: 786.419

Mp: 211–213°C [1]

$[\alpha]_D$ + 7.1° (c 2.96, MeOH) [1]

UV λ_{max}^{MeOH} nm: 230, 273 [1]

IR (KBr) ν_{max} cm^{-1}: 3450 (OH), 1700 (C = O), 1650 (C = C), 1050 (OH) [1]

FAB-MS *m/z*: 785 $[M-H]^-$, 663 $[M-H-Bz]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.16 (dd, J = 11.5, 5.0, H-16), 5.98 (d, J = 10.5, H-21), 5.15 (d, J = 10.5, H-22), 3.74, 4.35 (d, J = 10.5, H_2-23), 4.08, 4.75 (d, J = 10.0, H_2-28)

Bz: 8.28 (dd, J = 8.0, 1.0, H-2), 7.44 (dt, J = 1.0, 8.0, H-3), 7.56 (tt, J = 8.0, 1.0, H-4)

β-D-GlcUAp: 5.30 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	68.0	GlcUA-1	106.1
2	26.1	17	47.2	2	75.4
3	81.7	18	42.0	3	78.1
4	43.5	19	46.2	4	73.4
5	47.4	20	36.7	5	77.8
6	18.1	21	80.7	6	173.0
7	32.6	22	71.2	OBz-1	131.8
8	40.3	23	64.4	2	130.0
9	47.2	24	13.6	3	128.8
10	36.7	25	16.3	4	133.1
11	24.0	26	17.0	α	167.0
12	124.2	27	27.4		
13	142.2	28	58.1		
14	42.6	29	29.5		
15	36.3	30	19.9		

(continued)

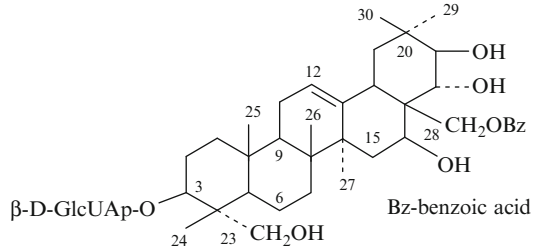
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, Y. Kondo, S. Arihara, K. Matsuura, Chem. Pharm. Bull. **41**(10), 1730 (1993)

Gymnemic Acid XVIII

CAS Registry Number: 154977-77-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

Biological sources: *Gymnema sylvestre* [1]

$C_{43}H_{62}O_{13}$: 786.419

Mp: 201–203°C (MeOH) [1]

$[\alpha]_D$ + 6.4° (c 1.71, MeOH) [1]

UV λ_{max}^{MeOH} nm: 230, 273 [1]

IR (KBr) ν_{max} cm^{-1}: 3400 (OH), 1700 (C = O), 1650 (C = C), 1040 (OH) [1]

FAB-MS *m/z*: 785 $[M-H]^-$, 633 $[M-H-Bz]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.13 (dd, J = 12.4, 5.0, H-16), 4.10 (d, J = 10.2, H-21), 4.66 (d, J = 10.2, H-22), 3.70, 4.39 (d, J = 11.0, H_2-23), 4.92, 5.40 (d, J = 11.0, H_2-28)
Bz: 8.18 (dd, J = 8.0, 1.0, H-2), 7.36 (dt, J = 1.0, 8.0, H-3), 7.50 (tt, J = 8.0, 1.0, H-4)
β-D-GlcUAp: 5.27 (d, J = 8.0, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

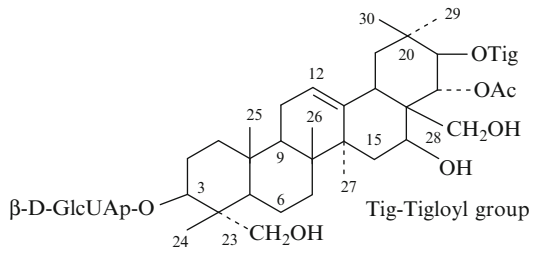
C-1	38.8	C-16	67.8	GlcUA-1	106.1
2	26.0	17	45.8	2	75.4
3	81.8	18	43.1	3	78.1
4	43.5	19	46.2	4	73.5
5	47.4	20	36.8	5	77.8
6	18.1	21	76.8	6	173.0
7	32.6	22	74.1	OBz-1	131.1
8	40.3	23	64.4	2	129.6
9	47.2	24	13.6	3	128.9
10	36.6	25	16.2	4	133.2
11	24.0	26	17.2	α	166.7
12	124.2	27	27.5		
13	141.8	28	63.4		
14	42.6	29	30.2		
15	36.1	30	19.1		

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, Y. Kondo, S. Arihara, K. Matsuura, Chem. Pharm. Bull. **41**(10), 1730 (1993)

Gymnemoside-a



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin
Biological sources: *Gymnema sylvestre* [1]
$C_{43}H_{66}O_{14}$: 806.445
Mp: 207.0–208.5°C (aq. MeOH) [1]
$[\alpha]_D^{29}$ + 4.7° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1721, 1649, 1040 [1]
FAB-MS (negative ion mode) *m/z*: 805 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 829.4350 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.90, 0.94, 0.98, 1.03, 1.27, 1.30 (s, CH_3-25, 26, 24, 29, 30, 27), 1.67 (d, J = 6.9, CH_3-4-Tig), 1.95 (brs, CH_3-5-Tig, Ac-CH_3), 3.08 (dd-like, H-18), 3.73, 4.37 (d, J = 10.9, H_2-23), 4.01, 4.25 (ABq, J = 10.9, H_2-28), 4.36 (m, H-3), 5.03 (dd-like, H-16), 5.28 (d, J = 7.3, H-1 of GlcUA), 5.36 (brs, H-12), 5.77 (d, J = 11.2, H-21), 6.26 (d, J = 11.2, H-22), 7.12 (dq-like, H-3 of Tig) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

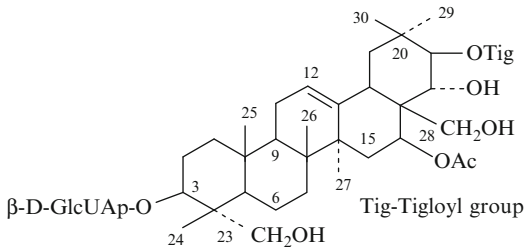
C-1	38.7	C-16	67.0	Tig-1	167.8
2	26.1	17	47.9	2	128.9
3	81.9	18	42.6	3	137.9
4	43.5	19	45.8	4	14.3
5	47.4	20	36.6	5	12.3
6	18.0	21	76.6	Ac-1	170.1
7	32.5	22	74.6	2	20.9
8	40.2	23	64.4	GlcUA-1	106.3
9	47.1	24	13.6	2	75.5
10	36.8	25	16.2	3	78.1
11	23.9	26	16.9	4	73.5
12	124.3	27	27.4	5	78.0
13	141.5	28	59.9	6	172.8
14	42.6	29	29.2		
15	36.6	30	19.7		

Pharm./Biol.: Inhibitory effect on glucose absorption [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, Y. Li, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **45**(10), 1671 (1997)

Gymnemoside-b



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

Biological sources: *Gymnema sylvestre* [1]

$C_{43}H_{66}O_{14}$: 806.445

Mp: 211.5–213.0°C (aq. MeOH) [1]

$[\alpha]_D^{29}$ + 6.6° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3445, 1718, 1649, 1044 [1]

FAB-MS (negative ion mode) *m/z*: 805 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 829.4350 $(M + Na)^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.90, 0.93, 1.21, 1.39 (s, CH_3-25, 26, 30, 27), 0.98 (s, CH_3-24, 29), 1.56 (d, J = 7.3, CH_3-4-Tig), 1.78 (s, CH_3-5-Tig), 2.07 (Ac), 3.15 (dd-like, H-18), 3.73, 4.37 (both d, J = 10.9, H_2-23), 4.07, 4.65 (both d, J = 10.2, H_2-28), 4.34 (m, H-3), 4.88 (d, J = 10.9, H-22), 5.27 (d, J = 7.6, H-1 of GlcUA), 5.35 (brs, H-12), 5.75 (d, J = 10.9, H-21), 6.40 (dd-like, H-16), 6.92 (dq-like, H-3 of Tig) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	69.3	Tig-1	167.9
2	26.1	17	47.4	2	129.6
3	81.9	18	42.6	3	136.3
4	43.5	19	46.2	4	14.1
5	47.4	20	36.7	5	12.3
6	18.0	21	78.8	Ac-1	170.3
7	32.5	22	70.4	2	21.9
8	40.3	23	64.4	GlcUA-1	106.3
9	47.1	24	13.6	2	75.5
10	36.6	25	16.2	3	78.1
11	23.8	26	16.9	4	73.4
12	124.3	27	27.4	5	77.9
13	141.5	28	59.7	6	172.8
14	42.9	29	29.7		
15	33.6	30	20.1		

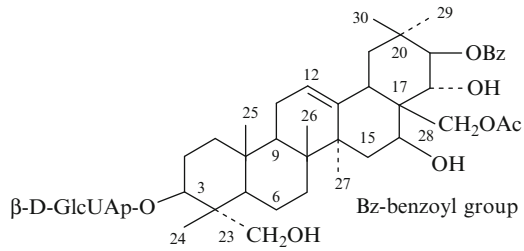
(*continued*)

Pharm./Biol.: Inhibitory effect on glucose absorption [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, Y. Li, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **45**(10), 1671 (1997)

Gymnemoside-c



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Gymnemagenin

Biological sources: *Gymnema sylvestre* [1]

$C_{45}H_{64}O_{14}$: 828.429

Mp: 211.5–213.0°C (aq. MeOH) [1]

$[\alpha]_D^{29}$ + 6.6° (c 0.1, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 228 (4.3) [1]

IR (KBr) ν_{max} cm^{-1}: 3445, 1718, 1649, 1044 [1]

FAB-MS (negative ion mode) *m/z*: 827 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 851 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.92, 0.97, 1.01, 1.08, 1.29, 1.33 (s, CH_3-25, 24, 29, 26, 30, 27), 2.07 (OAc), 2.94 (dd-like, H-18), 3.73, 4.38 (both d, J = 10.6, H_2-23), 4.28 (m, H-3), 4.67 (d, J = 10.9, H-22),

4.71, 5.10 (both d, J = 10.9, H_2-28), 5.19 (dd-like, H-16), 5.28 (d, J = 7.6, H-1 of GlcUA), 5.43 (brs, H-12), 5.96 (d, J = 10.9, H-21), 7.43 (dd, J = 6.9, 7.3, H-3, H-5 of Bz), 7.53 (d, J = 7.3, H-4 of Bz), 8.30 (d, J = 6.9, H-2, H-6 of Bz) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	67.5	Bz -1′	166.8
2	26.1	17	45.8	1	131.5
3	81.9	18	42.7	2	130.0
4	43.5	19	45.7	3	128.9
5	47.4	20	36.6	4	133.2
6	18.0	21	79.8	5	128.9
7	32.5	22	71.6	6	130.0
8	40.3	23	64.4	Ac-1	170.9
9	47.1	24	13.6	2	20.8
10	36.6	25	16.2	GlcUA-1	106.3
11	24.0	26	17.1	2	75.5
12	124.7	27	27.5	3	78.1
13	141.2	28	62.3	4	73.5
14	42.5	29	29.3	5	77.9
15	36.3	30	19.8	6	172.8

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, Chem. Pharm. Bull. **45**(12), 2034 (1997)

Glycosides of Aglycones of Oleanene Type

Glycosides of Other Aglycones

Anagalloside A

CAS Registry Number: 114318-81-9

See Figure Anagalloside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Anagalligenin A

Biological sources: *Anagallis arvensis* [1, 2]

$C_{60}H_{98}O_{29}$: 1282.619

Mp: 263–264°C [1]

$[\alpha]_D$ −15.5° (c 3.87, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1715, 1255, 1070, 1040 [1]

FAB-MS *m/z*: 1281 $[M\text{-}H]^-$, 1149 $[M\text{-}H\text{-}Xyl]^-$, 1119 $[M\text{-}H\text{-}Glc]^-$, 987 $[M\text{-}H\text{-}Xyl\text{-}Glc]^-$, 825 $[M\text{-}H\text{-}Xyl\text{-}2Glc]^-$, 663 $[M\text{-}H\text{-}Xyl\text{-}3Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87 (CH_3-25), 1.10 (CH_3-24), 1.11 (CH_3-29), 1.15 (CH_3-30), 1.22 (CH_3-23), 1.42 (CH_3-26), 1.61 (CH_3-27), 1.99 (Ac), 2.20 (brd, J = 11.5, H-18), 2.80 (dd, J = 11.5, 11.5, H_α-21), 2.88 (dd, J = 12.0, 11.5, H-19), 3.17 (dd, J = 11.7, 5.0, H-3), 5.10 (m, H-16), 5.26 (s, H-28), 6.06 (dd, J = 11.5, 6.0, H-22), 4.80 (d, J = 6.0, H-1 of Ara), 5.47 (d, J = 7.0, H-1 of Glc), 4.91 (d, J = 7.0, H-1 of Glc′), 4.91 (d, J = 7.0, H-1 of Xyl), 5.13 (d, J = 8.0, H-1 of Glc″) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

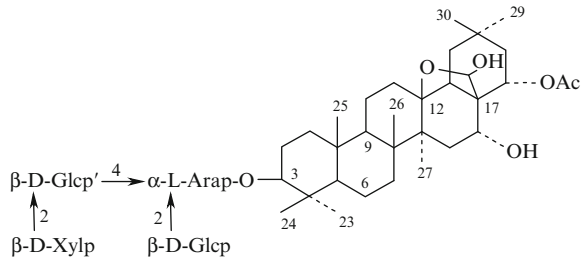
C-1	39.3	C-16	69.7	Ara-1	104.7	Glc′-1	103.9	Glc″-1	104.9
2	26.6	17	54.5	2	79.6	2	83.9	2	75.8
3	89.1	18	47.3	3	73.2	3	74.8	3	78.2
4	39.8	19	38.4	4	78.5	4	80.4	4	71.5
5	55.8	20	33.3	5	64.1	5	76.4	5	78.4
6	18.1	21	41.7	Glc-1	104.8	6	61.7	6	62.4
7	34.4	22	73.0	2	76.2	Xyl-1	107.3	Ac	170.2
8	42.8	23	28.1	3	77.4	2	76.1		21.4
9	50.4	24	16.7	4	71.9	3	77.4		
10	36.9	25	16.5	5	78.0	4	70.7		
11	19.3	26	18.7	6	63.1	5	67.3		
12	33.3	27	19.7						
13	87.6	28	97.8						
14	44.0	29	33.4						
15	36.8	30	25.7						

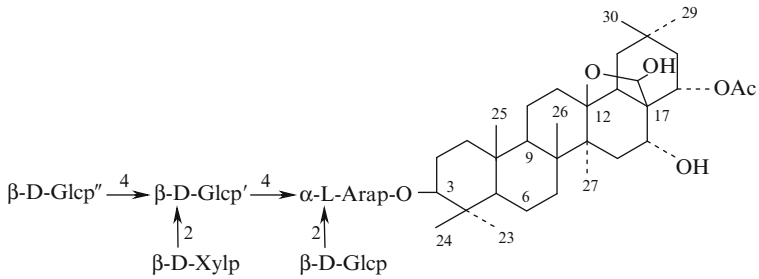
(*continued*)

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)
2. K.W. Glombitza, H. Kurth, Planta Med. **53**, 548 (1987)

Desglucoanagalloside A





Anagalloside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Anagalligenin A

Biological sources: *Anagallis arvensis* [1, 2]

$C_{54}H_{88}O_{24}$: 1120.566

Mp: 252–253°C [1]

$[\alpha]_D$ −6.4° (c 1.16, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1715, 1250, 1070, 1040 [1]

FAB-MS *m/z*: 1119 $[M-H]^-$, 987 $[M-H-Xyl]^-$, 957 $[M-H-Glc]^-$, 825 $[M-H-Xyl-Glc]^-$, 663 $[M-H-Xyl-2Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86 (CH_3-25), 1.10 (CH_3-24), 1.10 (CH_3-29), 1.15 (CH_3-30), 1.22 (CH_3-23), 1.36 (CH_3-26), 1.61 (CH_3-27), 2.20 (brd, J = 11.5, H-18), 1.99 (Ac), 2.82 (dd, J = 11.5, 11.5, Hα-21), 2.88 (dd, J = 12.5, 11.5, Hα-19), 3.17 (dd, J = 11.5, 4.5, H-3), 5.08 (m, H-16), 5.26 (s, H-28), 6.06 (dd, J = 11.5, 5.7, H-22), 4.80 (d, J = 5.5, H-1 of Ara), 5.50 (d, J = 7.6, H-1 of Glc), 5.00 (d, J = 7.8, H-1 of Glc′), 4.91 (d, J = 6.1, H-1 of Xyl) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	69.7	Ara-1	104.7	Glc′-1	104.2
2	26.6	17	51.5	2	79.7	2	85.5
3	89.1	18	47.3	3	73.3	3	77.6
4	39.9	19	38.3	4	78.7	4	71.1
5	55.7	20	33.3	5	64.3	5	78.4
6	18.0	21	41.6	Glc-1	104.9	6	62.3
7	34.3	22	72.9	2	76.3	Xyl-1	107.7
8	42.7	23	28.1	3	78.3	2	76.2
9	50.3	24	16.7	4	71.9	3	77.9
10	36.9	25	16.4	5	78.0	4	70.7
11	19.3	26	18.7	6	63.1	5	67.5
12	33.4	27	19.7			Ac	170.4
13	87.6	28	97.8				21.3
14	43.9	29	33.4				
15	36.8	30	25.6				

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)
2. K.W. Glombitza, H. Kurth, Planta Med. **53**, 548 (1987)

Anagallosaponin I

CAS Registry Number: 162762-99-4

See Figure Anagallosaponin I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Anagalligenin A

Biological sources: *Anagallis arvensis* [1]

$C_{58}H_{96}O_{28}$: 1240.608

Mp: >300°C (MeOH) [1]

$[\alpha]_D^{20}$ −11.1° (c 1.93, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3360, 1070, 1040 [1]

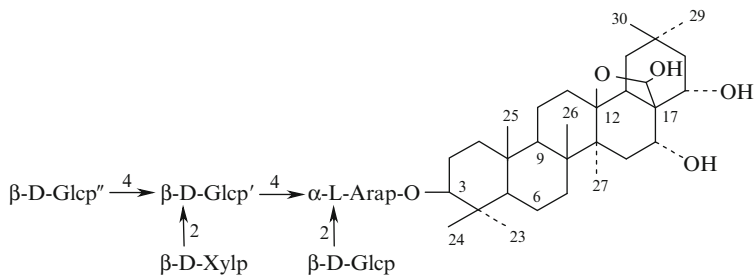
FAB-MS *m/z*: 1239 $[M-H]^-$, 1107 $[M-H-Xyl]^-$, 1077 $[M-H-Glc]^-$, 945 $[M-H-Xyl-Glc]^-$, 783 $[M-H-Xyl-2Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85 (CH_3-25), 1.07 (CH_3-24), 1.14 (CH_3-29), 1.14 (CH_3-30), 1.20 (CH_3-23), 1.35 (CH_3-26), 1.62 (CH_3-27), 2.20 (brd, J = 11.5, H-18), 2.90 (dd, J = 13.0, 11.5, Hα-19), 2.92 (dd, J = 12.5, 12.0, Hα-21), 3.15 (dd, J = 11.0, 5.0, H-3), 5.04 (dd, J = 12.0, 5.0, H-22), 5.08 (m, H-16), 5.44 (s, H-28)

α-L-Arap: 4.79 (d, J = 5.7, H-1), 4.47 (m, H-2), 4.45 (m, H-4)

β-D-Glcp: 5.46 (d, J = 8.3, H-1); β-D-Glcp′: 4.90 (d, J = 7.2, H-1), 4.29 (dd, J = 8.5, 8.5, H-4)

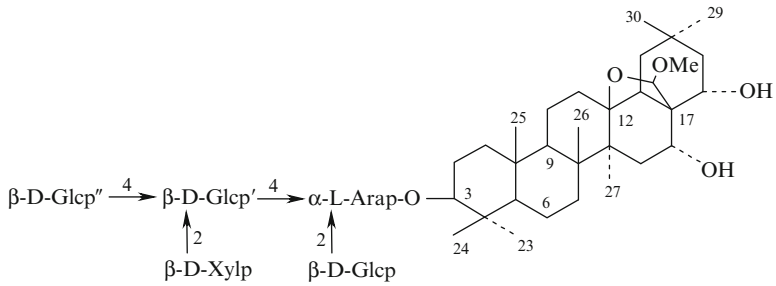
β-D-Xylp: 4.91 (d, J = 8.0, H-1)



Anagallosaponin I

Table 1

C-1	39.5	C-16	69.9	Ara-1	104.9	Glc′-1	104.1	Glc″-1	105.1
2	26.9	17	53.1	2	80.0	2	84.2	2	76.0
3	89.4	18	47.6	3	73.4	3	75.1	3	78.6
4	40.0	19	38.9	4	78.9	4	80.6	4	71.7
5	56.0	20	33.5	5	64.3	5	76.7	5	78.8
6	18.2	21	46.9	Glc-1	105.1	6	61.9	6	62.6
7	39.7	22	68.4	2	76.2	Xyl-1	107.5		
8	43.0	23	28.4	3	78.5	2	76.3		
9	50.7	24	16.9	4	72.1	3	77.6		
10	37.2	25	16.7	5	78.2	4	70.9		
11	19.7	26	18.9	6	63.3	5	67.5		
12	33.6	27	19.7						
13	87.7	28	98.9						
14	44.4	29	34.1						
15	37.0	30	26.3						



Methylanagallosaponin I

β-D-Glcp″: 5.14 (d, J = 7.8, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1] Table 1

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)

Methylanagallosaponin I

See Figure Methylanagallosaponin I
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Anagalligenin A
Biological sources: *Anagallis arvensis* [1]
$C_{59}H_{98}O_{28}$: 1254.624
Mp: 256–258°C (MeOH) [1]
$[\alpha]_D^{20}$ −13.6° (c 3.09, C_5H_5N) [1]
IR (film) ν_{max} cm^{-1}: 3410, 1115, 1080, 1040 [1]
FAB-MS *m/z*: 1253 $[M-H]^-$, 1121 $[M-H-Xyl]^-$, 1091 $[M-H-Glc]^-$, 959 $[M-H-Xyl-Glc]^-$, 797 $[M-H-Xyl-2Glc]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86 (CH_3-25), 1.07 (CH_3-24), 1.08 (CH_3-29 or CH_3-30), 1.10 (CH_3-30 or CH_3-29), 1.20 (CH_3-23), 1.32 (CH_3-26), 1.58 (CH_3-27), 2.15 (brd, J = 11.5, H-18), 2.82 (dd, J = 12.0, 11.5, H_α-21), 2.86 (dd, J = 13.0, 11.5, H-19), 3.15 (dd, J = 11.0, 4.5, H-3), 3.45 (O-Me), 4.66 (s, H-28), 5.01 (m, H-16)
α-L-Arap: 4.78 (d, J = 6.0, H-1)
β-D-Glcp: 5.46 (d, J = 7.3, H-1); β-D-Glcp′: 4.90 (d, J = 7.0, H-1); β-D-Glcp″: 5.13 (d, J = 7.8, H-1)
β-D-Xylp: 4.90 (d, J = 7.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	69.3	Ara-1	104.7	Glc′-1	103.9	Glc″-1	104.8
2	26.7	17	47.7	2	79.6	2	83.9	2	75.8
3	89.1	18	53.0	3	73.2	3	74.8	3	78.2
4	39.8	19	38.5	4	78.5	4	80.4	4	71.5
5	55.7	20	33.7	5	64.1	5	76.4	5	78.4
6	18.0	21	46.5	Glc-1	104.8	6	61.7	6	62.3
7	34.4	22	67.3	2	76.2	Xyl-1	107.3		
8	42.7	23	28.1	3	78.2	2	76.1		
9	50.4	24	16.7	4	71.9	3	77.4		
10	36.9	25	16.5	5	78.0	4	70.7		
11	19.4	26	18.7	6	63.0	5	67.3		
12	33.3	27	19.7						
13	88.2	28	104.7						
14	44.2	29	33.1						
15	36.8	30	26.0						
		OMe	54.9						

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)

Anagalloside B

CAS Registry Number: 114318-82-0

See Figure Anagalloside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Anagalligenin B

Biological sources: *Anagallis arvensis* [1, 2]

$C_{58}H_{96}O_{27}$: 1224.613

Mp: 256–257°C [1]

$[\alpha]_D$ −0.2° (c 0.90, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1075, 1050 [1]

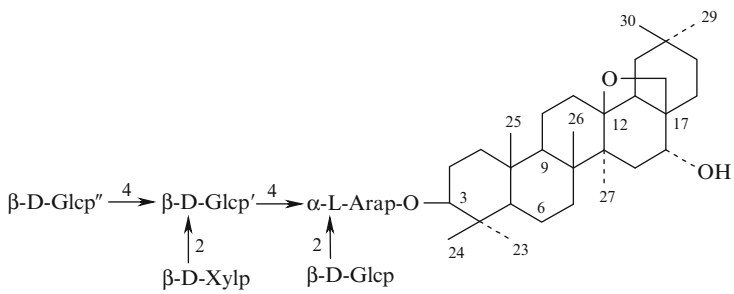
FAB-MS *m/z*: 1223 $[M-H]^-$, 1091 $[M-H-Xyl]^-$, 1061 $[M-H-Glc]^-$, 929 $[M-H-Xyl-Glc]^-$, 767 $[M-H-Xyl-2Glc]^-$, 605 $[M-H-Xyl-3Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.95 (CH_3-25), 0.96 (CH_3-30), 1.05 (CH_3-24), 1.05 (CH_3-29), 1.36 (CH_3-26), 1.46 (CH_3-27), 2.73 (dd, J = 13.0, 12.0, Hα-19), 3.71, 4.21 (d, J = 10.0, Hα-23); 4.94 (d, J = 5.6, H-1 of Ara); 5.45 (d, J = 8.0, H-1 of Glc); 5.03 (d, J = 5.1, H-1 of Glc′); 4.90 (d, J = 8.0, H-1 of Xyl); 5.14 (d, J = 8.0, H-1 of Glc″)

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	77.3	Ara-1	103.8	Glc′-1	103.8	Glc″-1	105.0
2	26.1	17	44.7	2	80.1	2	83.9	2	75.8
3	82.6	18	51.7	3	73.3	3	74.9	3	78.2
4	43.8	19	39.1	4	78.4	4	80.3	4	71.6
5	47.9	20	31.9	5	64.1	5	76.5	5	78.3
6	17.8	21	37.0	Glc-1	104.8	6	61.6	6	62.4
7	34.3	22	31.9	2	76.2	Xyl-1	107.3		
8	42.6	23	64.9	3	78.4	2	76.1		
9	50.7	24	13.4	4	71.6	3	77.5		
10	37.0	25	17.2	5	78.2	4	70.7		
11	19.4	26	18.7	6	62.9	5	67.3		
12	33.0	27	19.7						
13	86.6	28	78.1						
14	44.7	29	33.9						
15	37.1	30	24.9						

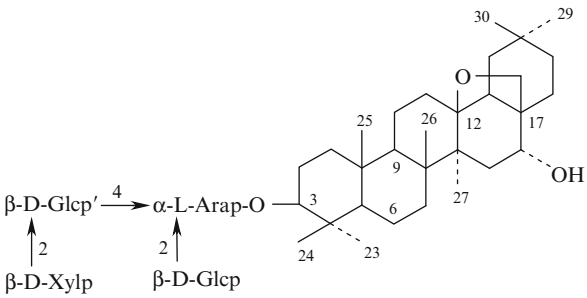


Anagalloside B

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)
2. K.W. Glombitza, H. Kurth, Planta Med. **53**, 548 (1987)

Desglucoanagalloside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Anagalligenin B

Biological sources: *Anagallis arvensis* [1]

$C_{52}H_{86}O_{22}$: 1062.561

Mp: 243–245°C [1]

$[\alpha]_D$ −0.6° (c 2.5, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1080, 1045 [1]

FAB-MS *m/z*: 1061 $[M\text{-}H]^-$, 929 $[M\text{-}H\text{-}Xyl]^-$, 899 $[M\text{-}H\text{-}Glc]^-$, 767 $[M\text{-}H\text{-}Xyl\text{-}Glc]^-$, 605 $[M\text{-}H\text{-}Xyl\text{-}2Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.95 (CH_3-25), 0.96 (CH_3-30), 1.05 (CH_3-29), 1.06 (CH_3-24), 1.36 (CH_3-26), 1.47 (CH_3-27), 2.73 (dd, J = 13.0, 12.0, Hα-19), 3.70, 4.22 (d, J = 10.5, H_2-23); 4.99 (d, J = 6.0, H-1 of Ara); 5.49 (d, J = 8.0, H-1 of Glc); 5.03 (d, J = 6.0, H-1 of Glc′); 4.95 (d, J = 6.6, H-1 of Xyl) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	77.3	Ara-1	104.1	Glc′-1	103.8
2	26.1	17	44.7	2	80.2	2	85.4
3	82.5	18	51.7	3	73.4	3	77.6
4	43.8	19	39.1	4	78.5	4	71.1
5	47.9	20	31.9	5	64.3	5	78.3
6	17.8	21	36.9	Glc-1	105.0	6	62.4
7	34.2	22	31.9	2	76.2	Xyl-1	107.7
8	42.6	23	64.9	3	78.3	2	76.2
9	50.7	24	13.3	4	71.5	3	77.9
10	36.9	25	17.1	5	78.2	4	70.8
11	19.4	26	18.7	6	62.8	5	67.5
12	33.0	27	19.7				
13	86.6	28	78.1				
14	44.7	29	33.9				
15	37.1	30	24.9				

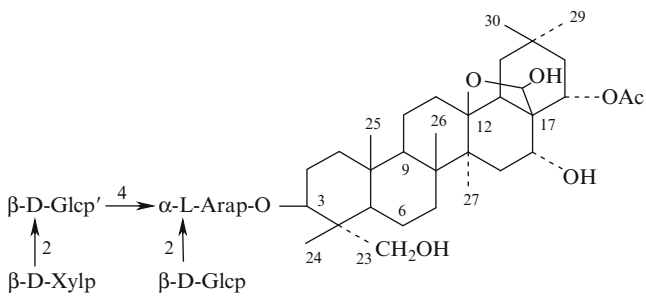
References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)
2. K.W. Glombitza, H. Kurth, Planta Med. **53**, 548 (1987)

Anagallosaponin II

CAS Registry Number: 162763-00-0

See Figure Anagallosaponin II



Anagallosaponin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 23-Hydroxy-Anagallogenin A
Biological sources: *Anagallis arvensis* [1]
$C_{54}H_{88}O_{25}$: 1136.561
Mp: 255–257°C (MeOH) [1]
$[\alpha]_D^{20}$ −4.5° (c 3.55, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1715, 1250, 1080, 1040 [1]
FAB-MS *m/z*: 1135 $[M-H]^-$, 1003 $[M-H-Xyl]^-$, 973 $[M-H-Glc]^-$, 841 $[M-H-Xyl-Glc]^-$, 679 $[M-H-Xyl-2Glc]^-$, 547 $[M-H-Xyl-Ara-2Glc]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.95 (s, CH_3-25), 1.10 (s, CH_3-29), 1.10 (s, CH_3-24), 1.13 (s, CH_3-30), 1.38 (s, CH_3-26), 1.53 (CH_3-27), 1.97 (s, Ac), 2.17 (brd, J = 11.5, H-18), 2.77 (dd, J = 12.5, 11.5, H-21), 2.83 (dd, J = 13.2, 11.5, H-19), 3.70, 4.22 (d, J = 10.5, H_2-23), 4.12 (m, H-3), 4.75 (m, H-16), 6.04 (dd, J = 11.5, 5.5, H-22);
α-L-Arap: 5.00 (d, J = 5.6, H-1); β-D-Glcp: 5.50 (d, J = 8.0, H-1); β-D-Glcp′: 5.00 (d, J = 7.3, H-1); β-D-Xylp: 4.95 (d, J = 6.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

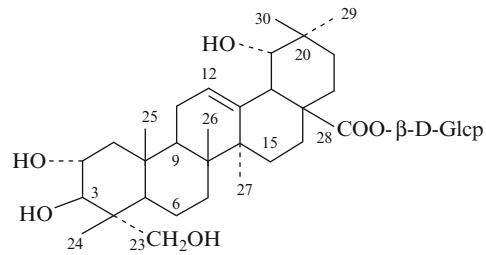
C-1	39.2	C-16	69.7	Ara-1	104.1	Glc′-1	103.7
2	26.1	17	51.5	2	80.3	2	85.5
3	82.5	18	47.4	3	73.5	3	77.7
4	43.8	19	38.3	4	78.1	4	71.1
5	47.9	20	33.3	5	64.3	5	78.4
6	17.8	21	41.6	Glc-1	105.1	6	62.4
7	34.1	22	73.0	2	76.2	Xyl-1	107.7
8	42.8	23	65.0	3	78.4	2	76.2
9	50.5	24	13.3	4	71.5	3	77.9
10	36.9	25	17.1	5	78.3	4	70.7
11	19.4	26	18.6	6	62.8	5	67.5
12	33.4	27	19.7				
13	87.7	28	97.8				
14	44.0	29	33.4				
15	36.9	30	25.7				
		Ac	170.4				
			21.4				

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)

Arjunglucoside I

CAS Registry Number: 62319-70-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Arjungenin (2α,3β,19α,23-Tetrahydroxy-olean-12-en-28-oic Acid)
Biological sources: *Terminalia arjuna* [1], *Trachelospermum asiaticum* [2]
$C_{36}H_{58}O_{11}$: 666.397
Mp: 238–242°C (MeOH) [1]
$[\alpha]_D^{31}$ + 4.6° (c 0.75, MeOH) [1]
FAB-MS *m/z*: 689 $(M + Na)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 5.50 (brs, H-12), 3.53 (brs, H-18), 3.55 (brd, J = 6.0, H-19), 5.98 (d, J = 6.0, HO-19), 1.21, 1.09, 1.14, 1.14, 1.55, 0.98 (s, CH_3 × 6)
β-D-Glcp: 6.40 (d, J = 8.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	47.6	C-16	28.0	Glc-1	95.9
2	68.9	17	46.5	2	74.2
3	78.4	18	44.6	3	79.0
4	43.7	19	81.1	4	71.2
5	48.5	20	35.5	5	79.3
6	18.8	21	29.0	6	62.3
7	33.1	22	32.9		
8	40.4	23	66.7		
9	48.2	24	14.2		
10	38.6	25	17.8		
11	24.3	26	17.4		
12	123.5	27	24.9		

(*continued*)

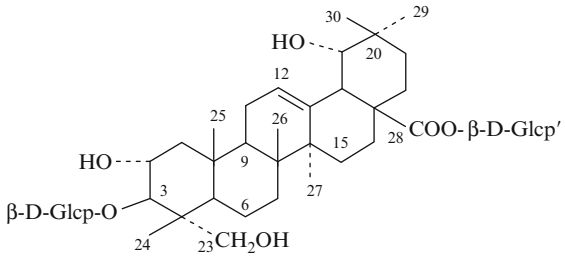
Table 1 (continued)

13	144.4	28	177.3		
14	42.2	29	28.7		
15	29.1	30	24.7		

References

1. T. Honda, T. Murae, T. Tsuyuki, T. Takahashi, M. Sawai, Bull. Chem. Soc. Jpn. **49**, 3213 (1976)
2. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**, 1833 (1987)

Compound XII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Arjungenin (2α,3β,19α,23-Tetrahydroxy-olean-12-en-28-oic Acid)

Biological sources: *Trachelospermum asiaticum* [1], *Symplocos spicata* [2]

$C_{42}H_{68}O_{16}$: 828.450

Mp: 240–246°C (MeOH) [1]

$[\alpha]_D^{25}$ + 1.1° (c 0.35, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3350, 1752 [2]

FAB-MS *m/z*: 851 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 5.49 (brs, H-12), 3.53 (brs, H-18), 3.56 (brt, J = 5.0, H-19), 6.00 (d, J = 6.0, HO-19), 1.03, 1.07, 1.14, 0.98, 1.55, 1.18 (s, CH_3 × 6)

β-D-Glcp: 5.19 (d, J = 7.0, H-1)

β-D-Glcp′: 6.38 (d, J = 8.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	47.2	C-16	28.0	Glc-1	105.8
2	67.1	17	46.5	2	75.5
3	88.6	18	44.7	3	78.0

(*continued*)

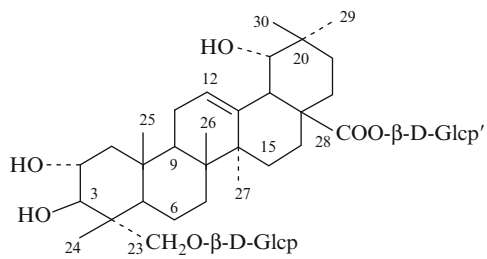
Table 1 (continued)

4	44.6	19	81.0	4	71.5
5	47.5	20	35.5	5	78.4
6	18.5	21	29.0	6	62.5
7	33.1	22	32.8	Glc′-1	95.9
8	40.3	23	64.0	2	74.2
9	48.5	24	14.6	3	79.0
10	38.1	25	17.7	4	71.2
11	24.3	26	17.4	5	79.3
12	123.5	27	24.9	6	62.2
13	144.3	28	177.3		
14	42.2	29	28.7		
15	29.1	30	24.7		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**, 1833 (1987)
2. R. Higuchi, T. Kawasaki, M. Biswas, V.B. Pandey, B. Dasgupta, Phytochemistry **21**, 907 (1982)

Compound XIV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Arjungenin (2α,3β,19α,23-Tetrahydroxy-olean-12-en-28-oic Acid)

Biological sources: *Trachelospermum asiaticum* [1]

$C_{42}H_{68}O_{16}$: 828.450

$[\alpha]_D^{30}$ + 2.2° (c 0.95, MeOH) [1]

FAB-MS *m/z*: 851 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.48 (brs, H-12), 3.51 (brs, H-18), 3.52 (brd, J = 6.0, H-19), 5.83 (d, J = 6.0, HO-19), 0.96, 1.02, 1.08, 1.11, 1.15, 1.50 (s, CH_3 × 6)

β-D-Glcp: 4.89 (d, J = 8.0, H-1)

β-D-Glcp′: 6.36 (d, J = 8.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

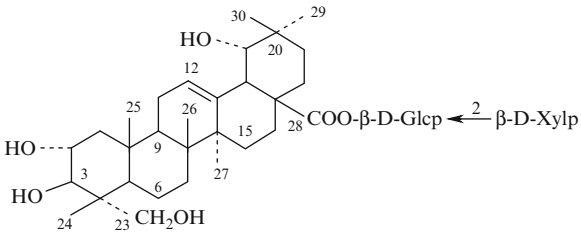
Table 1

C-1	47.1	C-16	27.9	Glc-1	105.2
2	68.7	17	46.4	2	75.1
3	77.7	18	44.5	3	78.6
4	43.5	19	81.0	4	71.8
5	48.3	20	35.5	5	78.3
6	18.7	21	28.9	6	63.0
7	33.0	22	32.9	Glc′-1	95.8
8	40.3	23	74.0	2	74.1
9	48.5	24	14.3	3	78.9
10	38.5	25	17.7	4	71.1
11	24.2	26	17.4	5	79.2
12	123.5	27	25.0	6	62.2
13	144.5	28	177.2		
14	42.1	29	28.7		
15	28.9	30	24.6		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**, 1833 (1987)

Compound XV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Arjungenin (2α,3β,19α,23-Tetrahydroxy-olean-12-en-28-oic Acid)

Biological sources: *Trachelospermum asiaticum* [1]

$C_{41}H_{66}O_{15}$: 798.440

Mp: 245–253°C [1]

$[\alpha]_D^{30}$ + 3.9° (c 0.65, MeOH) [1]

FAB-MS *m/z*: 821 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.50 (brs, H-12), 3.48 (brs, H-18), 3.54 (brt, J = 6.0, H-19), 5.83 (d, J = 6.0, HO-19), 0.97, 1.01, 1.04, 1.09, 1.13, 1.55 (s, CH_3 × 6)

β-D-Glcp: 6.26 (d, J = 8.0, H-1)

β-D-Xylp: 5.47 (d, J = 8.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

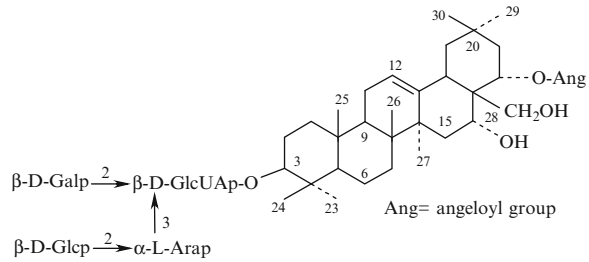
C-1	47.5	C-16	27.7	Glc-1	93.7
2	68.9	17	46.6	2	80.1
3	78.2	18	44.7	3	78.4
4	43.6	19	81.1	4	71.1
5	48.5	20	35.5	5	79.0
6	18.7	21	29.0	6	62.0
7	32.9	22	32.9	Xyl-1	105.8
8	40.3	23	67.3	2	75.9
9	48.0	24	14.2	3	78.8
10	38.5	25	17.7	4	70.7
11	24.5	26	17.4	5	67.3
12	123.5	27	24.8		
13	144.4	28	177.2		
14	42.2	29	28.7		
15	29.5	30	24.7		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**, 1833 (1987)

Camelliasaponin A_1

CAS Registry Number: 183020-18-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Camelliagenin A (3β,16α, 22α,28-Tetra-OH-olean-12-ene)
Biological sources: *Camellia japonica* [1]
$C_{58}H_{92}O_{25}$: 1188.592
Mp: 185.8–187.0°C (aq. MeOH) [1]
$[\alpha]_D^{25}$ + 22.9° (c 0.2, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1730, 1662, 1647, 1078 [1]
FAB-MS (positive ion mode) *m/z*: 1211.5826 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.83, 0.90, 1.05, 1.10, 1.28, 1.29, 1.86 (s, CH_3-25, 26, 29, 24, 30, 23, 27), 1.97 (s, CH_3-5 of Ang), 2.09 (d, J = 7.1, CH_3-4 of Ang), 6.18 (dd, J = 5.6, 12.2, H-22), 4.94 (d, J = 6.8, H-1 of GlcUA), 5.12 (d, J = 6.9, H-1 of Glc), 5.65 (d, J = 7.1, H-1 of Gal), 5.75 (d, J = 6.0, H-1 of Ara), 5.92 (dq-like, Ang-CH_3-3) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	39.6	C-16	70.3	GlcUA-1	105.6	Glc-1	105.9
2	26.6	17	44.9	2	79.2	2	75.7
3	84.3	18	41.1	3	89.6	3	78.4
4	40.2	19	47.5	4	71.3	4	71.4
5	55.9	20	32.1	5	77.3	5	78.4
6	18.5	21	41.8	6	171.9	6	62.6
7	33.3	22	73.2	Ara-1	101.8	Ang-1	168.1
8	40.2	23	28.1	2	81.3	2	129.6
9	47.0	24	16.8	3	72.6	3	136.4
10	36.9	25	15.7	4	67.7	4	15.8
11	23.9	26	16.9	5	65.0	5	20.9
12	122.7	27	27.6	Gal-1	103.7		
13	143.8	28	63.9	2	73.9		
14	41.8	29	33.5	3	75.0		
15	35.2	30	25.2	4	69.9		
				5	76.5		
				6	62.0		

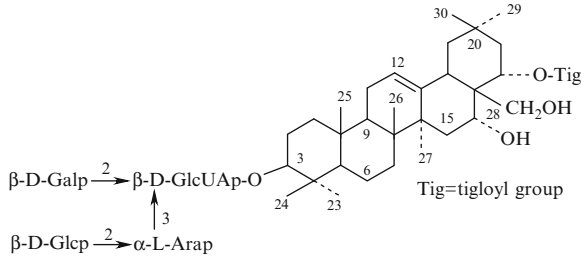
Pharm./Biol.: Camelliasaponin A_1 showed inhibitor activity on ethanol absorption [1]

References

1. M. Yoshikawa, T. Murakami, S. Yoshizumi, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1899 (1996)

Camelliasaponin A_2

CAS Registry Number: 183183-15-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Camelliagenin A (3β,16α, 22α,28-Tetra-OH-olean-12-ene)
Biological sources: *Camellia japonica* [1]
$C_{58}H_{92}O_{25}$: 1188.592
Mp: 215.3–217.2°C (aq. MeOH) [1]
$[\alpha]_D^{25}$ + 8.0° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1736, 1686, 1647, 1076 [1]
FAB-MS (positive ion mode) *m/z*: 1211.5825 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.84, 0.90, 1.05, 1.11, 1.27, 1.29, 1.86 (s, CH_3-25, 26, 29, 24, 30, 23, 27), 1.56 (d, J = 6.9, CH_3-4 of Tig), 1.88 (s, CH_3-5 of Tig), 4.95 (d, J = 6.9, H-1 of GlcUA), 5.13 (d, J = 6.6, H-1 of Glc), 5.65 (d, J = 7.3, H-1 of Gal), 5.77 (d-like, H-1 of Ara), 6.13 (dd, J = 4.7, 12.6, H-22), 7.01 (dq-like, CH_3-3 of Tig) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	39.6	C-16	70.1	GlcUA-1	105.6	Glc-1	105.9
2	26.6	17	45.2	2	79.2	2	75.4
3	84.3	18	41.1	3	89.1	3	78.4
4	40.2	19	47.5	4	71.3	4	71.4
5	55.8	20	32.0	5	77.3	5	78.4
6	18.5	21	41.8	6	172.5	6	62.6
7	33.3	22	73.2	Ara-1	101.8	Tig-1	168.0
8	40.2	23	28.1	2	81.3	2	130.1
9	47.0	24	16.9	3	72.6	3	136.3
10	36.9	25	15.7	4	67.7	4	14.1
11	23.9	26	17.0	5	64.9	5	12.3
12	122.7	27	27.6	Gal-1	103.7		
13	143.8	28	63.9	2	74.0		

(*continued*)

Table 1 (continued)

14	41.9	29	33.5	3	75.0
15	35.2	30	25.2	4	70.0
				5	76.5
				6	62.0

Pharm./Biol.: Camelliasaponin A_2 showed inhibitor activity on ethanol absorption [1]

References

1. M. Yoshikawa, T. Murakami, S. Yoshizumi, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1899 (1996)

Camelliasaponin B_1

CAS Registry Number: 156250-57-6
See Figure Camelliasaponin B_1
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Camelliagenin B (23-al-Camelliagenin A)
Biological sources: *Camellia japonica* [1, 2]
$C_{58}H_{90}O_{26}$: 1202.572
Mp: 209.6–211.1°C (aq. MeOH) [1]
$[\alpha]_D^{25}$ + 23.7° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3430, 1735, 1719, 1660, 1650, 1078 [1]
FAB-MS (positive ion mode) *m/z*: 1247.5438 (M + 2Na-H)$^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.82, 0.85, 1.05, 1.28, 1.43, 1.81 (s, CH_3-25, 26, 29, 30, 24, 27), 1.96 (s, CH_3-5 of Ang), 2.08 (d, J = 7.3, CH_3-4 of Ang), 4.85 (d, J = 7.2, H-1 of GlcUA), 5.19 (d, J = 6.3, H-1 of Glc), 5.62 (d, J = 7.6, H-1 of Gal), 5.76 (d, J = 5.9, H-1 of Ara), 5.94 (dq-like, CH_3-3 of Ang), 6.15 (dd, J = 5.6, 12.2, H-22), 9.87 (s, H-23) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

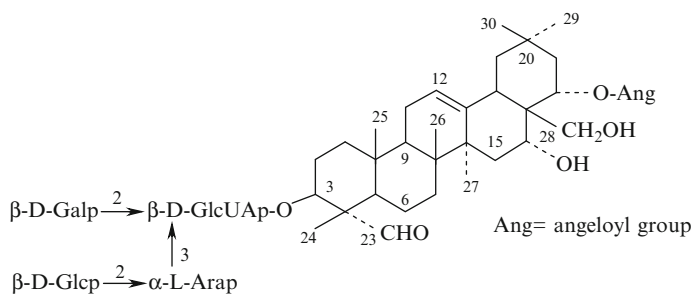
Table 1

C-1	38.3	C-16	70.2	GlcUA-1	104.1	Glc-1	106.0
2	25.2	17	44.9	2	78.5	2	75.9
3	84.2	18	41.1	3	84.5	3	78.4
4	55.1	19	47.5	4	71.0	4	71.6
5	48.5	20	32.1	5	77.3	5	78.4
6	20.4	21	41.8	6	171.8	6	62.7
7	32.5	22	73.2	Ara-1	101.7	Ang-1	168.0
8	40.4	23	209.7	2	81.3	2	129.6
9	46.9	24	11.0	3	72.4	3	136.4
10	36.1	25	15.8	4	67.6	4	15.8
11	23.8	26	16.9	5	64.9	5	20.9
12	122.4	27	27.6	Gal-1	103.6		
13	143.8	28	63.9	2	73.7		
14	41.7	29	33.5	3	75.2		
15	35.1	30	25.2	4	70.3		
				5	76.6		
				6	62.2		

Pharm./Biol.: Camelliasaponin B_1 showed inhibitor activity on ethanol absorption [1, 2]

References

1. M. Yoshikawa, T. Murakami, S. Yoshizumi, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1899 (1996)
2. M. Yoshikawa, E. Harada, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **42**, 742 (1994)



Camelliasaponin B_1

Camelliasaponin B_2

CAS Registry Number: 156317-50-9
See Figure Camelliasaponin B_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Camelliagenin B (23-al-Camelliagenin A)

Biological sources: *Camellia japonica* [1, 2]

$C_{58}H_{90}O_{26}$: 1202.572

Mp: 233.5–235.6°C (aq. MeOH) [1]

$[\alpha]_D^{25}$ + 20.7° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1740, 1721, 1686, 1647, 1078 [1]

FAB-MS (positive ion mode) *m/z*: 1225.5618 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.82, 0.85, 1.05, 1.26, 1.43, 1.86 (s, CH_3-25, 26, 29, 30, 24, 27), 1.59 (d, J = 7.0, CH_3-4 of Tig), 1.88 (s, CH_3-5 of Tig), 6.13 (dd, J = 5.6, 11.6, H-22), 9.87 (s, H-23), 4.85 (d, J = 7.6, H-1 of GlcUA), 5.11 (d-like, H-1 of Glc), 5.61 (d, J = 7.6, H-1 of Gal), 5.76 (d, J = 5.0, H-1 of Ara), 7.00 (dq-like, CH_3-3 of Tig) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.3	C-16	70.0	GlcUA-1	104.1	Glc-1	106.1
2	25.2	17	45.1	2	78.5	2	75.9
3	84.2	18	41.0	3	84.5	3	78.4
4	55.1	19	47.5	4	71.0	4	71.6
5	48.5	20	32.5	5	77.2	5	78.4
6	20.4	21	41.9	6	171.8	6	62.7
7	32.5	22	73.2	Ara-1	101.7	Tig-1	167.9
8	40.4	23	209.7	2	81.3	2	130.1
9	46.9	24	11.1	3	72.4	3	136.2
10	36.1	25	15.8	4	67.6	4	14.0
11	23.8	26	16.9	5	64.9	5	12.3
12	122.3	27	27.5	Gal-1	103.6		
13	143.9	28	63.8	2	73.7		
14	41.7	29	33.5	3	75.2		
15	35.1	30	25.7	4	70.3		
				5	76.6		
				6	62.2		

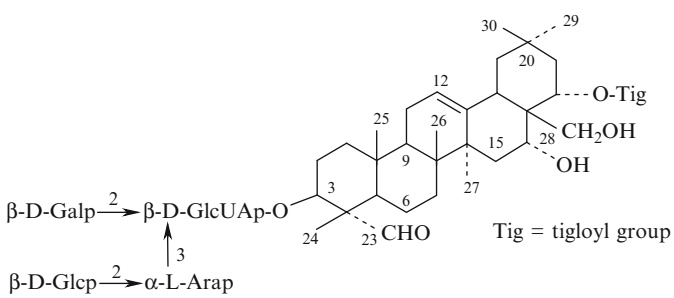
Pharm./Biol.: Camelliasaponin B_2 showed inhibitor activity on ethanol absorption [1, 2]

References

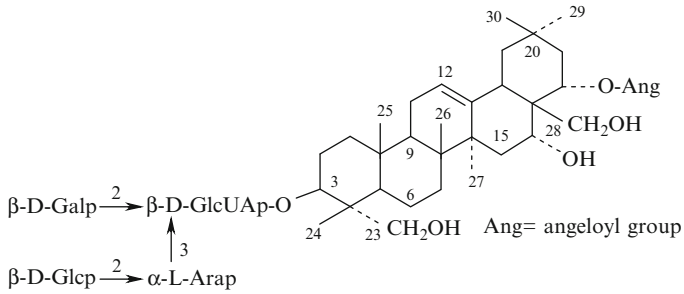
1. M. Yoshikawa, T. Murakami, S. Yoshizumi, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1899 (1996)
2. M. Yoshikawa, E. Harada, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **42**, 742 (1994)

Camelliasaponin C_1

CAS Registry Number: 156250-58-7
See Figure Camelliasaponin C_1



Camelliasaponin B_2



Camelliasaponin C_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Camelliagenin C (23-OH-Camelliagenin A)
Biological sources: *Camellia japonica* [1, 2]
$C_{58}H_{92}O_{26}$: 1204.587
Mp: 165.8–167.2°C (aq. MeOH) [1]
$[\alpha]_D^{25}$ + 4.3° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3416, 1730, 1686, 1648, 1078 [1]
FAB-MS (positive ion mode) *m/z*: 1227.5774 $(M + Na)^+$[1]
^{1}H NMR (J/Hz, C_5D_5N): 0.92, 1.03 (s, CH_3-25, 26, 24, 29), 1.27, 1.81 (s, CH_3-30, 27), 1.96 (s, CH_3-5 of Ang), 2.07 (d, J = 6.9, CH_3-4 of Ang), 6.16 (dd, J = 5.6, 11.5, H-22), 5.05 (d, J = 7.6, H-1 of GlcUA), 5.10 (d, J = 6.3, H-1 of Glc), 5.74 (d, J = 7.9, H-1 of Gal), 5.79 (d-like, H-1 of Ara), 5.95 (dq-like, CH_3-3 of Ang) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	69.9	GlcUA-1	104.1	Glc-1	105.9
2	25.5	17	44.9	2	78.7	2	75.8
3	83.1	18	41.0	3	85.1	3	78.4
4	43.6	19	47.5	4	71.2	4	71.6
5	48.3	20	32.0	5	77.2	5	78.4
6	18.2	21	41.7	6	171.8	6	62.7
7	32.9	22	73.2	Ara-1	101.8	Ang-1	168.0
8	40.2	23	64.9	2	81.2	2	129.6
9	47.1	24	13.5	3	72.4	3	136.4
10	36.8	25	16.2	4	67.6	4	15.8
11	23.9	26	17.0	5	64.9	5	20.9
12	122.7	27	27.6	Gal-1	103.5		
13	143.8	28	63.9	2	73.8		
14	41.7	29	33.4	3	75.1		
15	35.2	30	25.2	4	70.2		
				5	76.5		
				6	61.9		

(*continued*)

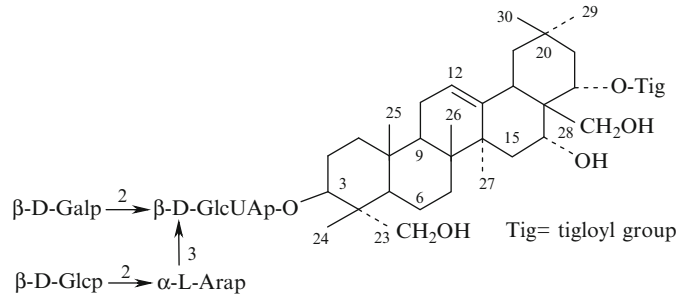
Pharm./Biol.: Camelliasaponin C_1 showed inhibitor activity on ethanol absorption [1, 2]

References

1. M. Yoshikawa, T. Murakami, S. Yoshizumi, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1899 (1996)
2. M. Yoshikawa, E. Harada, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **42**, 742 (1994)

Camelliasaponin C_2

CAS Registry Number: 156317-51-0
See Figure Camelliasaponin C_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Camelliagenin C (23-OH-Camelliagenin A)
Biological sources: *Camellia japonica* [1, 2]
$C_{58}H_{92}O_{26}$: 1204.587
Mp: 177.6–178.9°C (aq. MeOH) [1]
$[\alpha]_D^{25}$ + 8.8° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1736, 1686, 1647, 1078 [1]
FAB-MS (positive ion mode) *m/z*: 1227.5774 $(M + Na)^+$[1]



Camelliasaponin C_2

^{1}H NMR (J/Hz, C_5D_5N): 0.92, 0.93 (s, CH_3-25, 26), 1.03 (s, CH_3-24, 29), 1.26, 1.81 (s, CH_3-30, 27), 1.56 (d, J = 6.9, CH_3-4 of Tig), 1.86 (s, CH_3-5 of Tig), 6.14 (dd, J = 5.9, 11.9, H-22), 5.06 (d, J = 7.6, H-1 of GlcUA), 5.12 (d, J = 6.9, H-1 of Glc), 5.75 (d, J = 7.9, H-1 of Gal), 5.76 (d, J = 5.0, H-1 of Ara), 7.01 (dq-like, CH_3-3 of Tig) [1]

^{13}C NMR (68 MHz, C_5D_5N) [1]:

Table 1

C-1	38.8	C-16	70.0	GlcUA-1	104.2	5	76.6
2	25.6	17	45.1	2	78.7	6	62.0
3	83.1	18	41.0	3	85.1	Glc-1	105.9
4	43.5	19	47.5	4	71.2	2	75.8
5	48.3	20	32.0	5	77.3	3	78.4
6	18.2	21	41.8	6	172.0	4	71.6
7	32.9	22	73.2	Ara-1	101.8	5	78.4
8	40.2	23	64.9	2	81.2	6	62.7
9	47.1	24	13.6	3	72.5	Tig-1	168.0
10	36.8	25	16.2	4	67.6	2	130.1
11	23.9	26	17.0	5	64.9	3	136.3
12	122.7	27	27.6	Gal-1	103.5	4	14.1
13	143.8	28	63.9	2	73.8	5	12.3
14	41.9	29	33.5	3	75.1		
15	35.2	30	25.2	4	70.1		

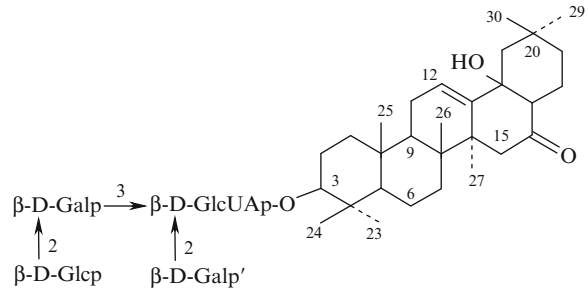
Pharm./Biol.: Camelliasaponin C_2 showed inhibitor activity on ethanol absorption [1, 2]

References

1. M. Yoshikawa, T. Murakami, S. Yoshizumi, N. Murakami, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **44**(10), 1899 (1996)
2. M. Yoshikawa, E. Harada, T. Murakami, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **42**, 742 (1994)

Camellidin II

CAS Registry Number: 96827-23-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Camellendiol (3β,18β-Dihydroxy-olean-12-ene-16-one)

Biological sources: *Camellia japonica* [1]

$C_{53}H_{84}O_{24}$: 1104.535

Mp: 215–218°C (dec.) [1]

^{1}H NMR (300 MHz, J/Hz, $CDCl_3$): β-D-GlcUAp: 4.45 (d, J = 7.4, H-1), 4.04 (dd, J = 8.7, 7.4, H-2), 3.94 (t, J = 8.7, H-3), 5.05 (dd, J = 9.4, 8.7, H-4), 3.96 (d, J = 9.4, H-5)

β-D-Galp: 4.72 (d, J = 7.5, H-1), 3.71 (dd, J = 10.0, 7.5, H-2), 4.93 (dd, J = 10.0, 3.7, H-3), 5.31 (brd, J = 3.7, H-4), 3.78 (brdd, J = 7.4, 6.6, H-5), 4.03 (dd, J = 10.9, 7.4, H-6), 4.13 (dd, J = 10.9, 6.6, H-6)

β-D-Glcp: 4.71 (d, J = 7.8, H-1), 4.93 (dd, J = 9.4, 7.8, H-2), 5.17 (t, J = 9.4, H-3), 5.15 (t, J = 9.4, H-4),

3.84 (m, H-5), 4.25 (dd, J = 12.5, 2.4, H-6), 4.33 (dd, J = 12.5, 3.6, H-6)

β-D-Galp′: 5.07 (d, J = 6.0, H-1), 5.18 (dd, J = 9.6, 6.0, H-2), 5.16 (dd, J = 9.6, 1.8, H-3), 5.48 (brd, J = 1.8, H-4), 4.11 (brd, J = 6.6, H-5), 4.20, 4.21 (dd, J = 6.6, 3.6, H_2-6) [1]

^{13}C NMR (75 MHz, $CDCl_3$): [1]

Table 1

GlcUA-1	103.77	Glc-1	99.73
2	77.22	2	71.32
3	78.71	3	73.03
4	69.88	4	68.37
5	72.55	5	71.82
Gal-1	101.19	6	61.76
2	76.80	Gal′-1	99.19
3	72.33	2	70.56
4	67.10	3	70.78
5	70.39	4	67.61
6	61.01	5	70.92
		6	61.06

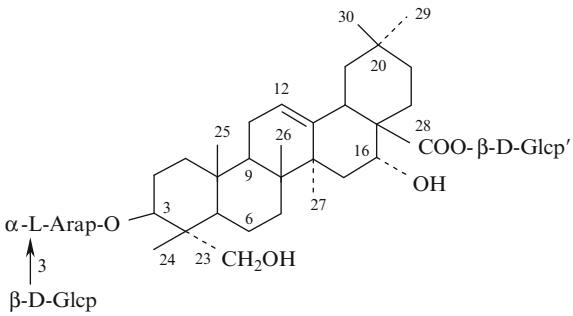
Pharm./Biol.: Antifeedant for the yellow butterfly larvae [1]

References

1. A. Nimata, A. Kitajima, T. Katsuno, K. Yamamoto, N. Nagahama, C. Takahashi, R. Fujiki, M. Nabae, Chem. Pharm. Bull. **35**, 3948 (1987)

Aralia-Saponin II

CAS Registry Number: 289649-65-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Caulophyllogenin

Biological sources: *Aralia elata* [1]

$C_{47}H_{76}O_{19}$: 944.498

$[\alpha]_D$ −39.4° (c 0.22, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2920, 1740, 1640, 1550, 1460, 1394, 1300, 1260, 1080, 1035, 995 [1]

HR-FAB-MS *m/z*: 967.4868 $[M + Na]^+$ [1]

ESI-MS (positive ion mode) *m/z*: 967 $[M + Na]^+$ [1]

ESI-MS (negative ion mode) *m/z*: 943 $[M-H]^-$, 781 $[M-H-Glc]^-$, 619 $[M-H-Glc-Glc]^-$, 487 $[M-H-Glc-Glc-Ara]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.25 (H-3), 5.58 (brs, H-12), 5.26 (brs, H-16), 3.48 (dd, J = 4.0, 14.0, H-18), 3.66 (d, J = 11.0, H-23), 4.27 (d, J = 11.0, H-23), 0.91, 0.96, 1.34, 1.75, 0.95, 1.00 (s, CH_3-24, 25, 26, 27, 29, 30);

α-L-Arap: 4.93 (d, J = 7.5, H-1), 4.56 (H-2), 4.05 (H-3), 4.35 (H-4), 3.59 (d, J = 11.5, H-5), 4.13 (d, J = 11.0, H-5); β-D-Glcp: 5.29 (d, J = 8.0, H-1), 4.01 (H-2), 4.25 (H-3), 4.35 (H-4), 4.26 (H-5), 4.44 (H_2-6); β-D-Glcp′: 6.31 (d, J = 8.0, H-1), 4.12 (H-2), 4.25 (H-3), 4.31 (H-4), 3.99 (H-5), 4.52 (H_2-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-18	41.1	Ara-1	107.3
2	26.2	19	47.0	2	71.9
3	81.9	20	30.7	3	84.1
4	43.5	21	35.9	4	69.2
5	47.8	22	32.2	5	67.0
6	18.1	23	64.1	Glc-1	106.3
7	32.2	24	13.6	2	75.8
8	41.9	25	16.3	3	78.8
9	47.3	26	17.5	4	71.4
10	36.9	27	27.1	5	78.3
11	23.8	28	175.9	6	62.1
12	122.7	29	33.1	Glc′-1	95.7
13	144.3	30	24.5	2	74.1
14	40.1			3	78.6
15	36.1			4	70.1
16	74.5			5	79.3
17	48.9			6	62.6

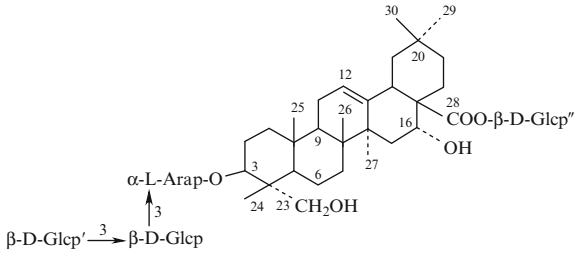
Pharm./Biol.: Used as a folk medicine for rheumatism, diabetes and as a tonic [1]

References

1. S.-J. Song, N. Nakamura, C.-M. Ma, M. Hattori, Sui-xu Xu, Chem. Pharm. Bull. **48**(6), 838 (2000)

Aralia-Saponin III

CAS Registry Number: 289649-66-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Caulophyllogenin

Biological sources: *Aralia elata* [1]

$C_{53}H_{86}O_{23}$: 1090.555

$[\alpha]_D$ −13.3° (c 0.2, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2920, 2850, 1740, 1640, 1550, 1464, 1380, 1310, 1080, 1030, 890 [1]

HR-FAB-MS *m/z*: 1113.5437 $[M + Na]^+$ [1]

ESI-MS (positive ion mode) *m/z*: 1113 $[M + Na]^+$, 951 $[M + Na\text{-Glc}]^+$ [1]

ESI-MS (negative ion mode) *m/z*: 1089 $[M\text{-H}]^-$, 927 $[M\text{-H-Glc}]^-$, 765 $[M\text{-H-Glc-Glc}]^-$, 603 $[M\text{-H-Glc-Glc-Glc}]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.34 (dd, J = 4.0, 11.5, H-3), 5.59 (brs, H-12), 5.31 (brs, H-16), 3.51 (dd, J = 4.0, 14.0, H-18), 1.28, 0.97, 0.88, 1.12, 1.83, 0.98, 1.02 (s, CH_3-23, 24, 25, 26, 27, 29, 30)

α-L-Arap: 4.70 (d, J = 7.5, H-1), 4.55 (H-2), 4.20 (H-3), 4.36 (H-4), 3.69 (dd, J = 11.5, 2.5, H_2-5)

β-D-Glcp: 5.39 (d, J = 8.0, H-1), 4.14 (H-2), 4.21 (H-3), 4.11 (H-4), 3.91 (H-5), 4.51 (H_2-6)

β-D-Glcp′: 5.28 (d, J = 8.0, H-1), 4.18 (H-2), 4.23 (H-3), 4.17 (H-4), 4.01 (H-5), 4.45 (H_2-6)

β-D-Glcp″: 6.32 (d, J = 8.0, H-1), 4.15 (H-2), 4.25 (H-3), 4.30 (H-4), 4.02 (H-5), 4.32 (H_2-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	74.5	Ara-1	107.4	Glc′-1	105.9
2	27.1	17	49.1	2	71.9	2	75.6
3	88.7	18	41.2	3	83.3	3	78.1
4	39.6	19	47.1	4	69.4	4	71.5
5	55.9	20	30.8	5	67.1	5	79.4
6	18.5	21	33.4	Glc-1	105.7	6	62.2
7	33.2	22	32.2	2	74.3	Glc″-1	95.8
8	40.1	23	28.0	3	88.3	2	74.0
9	49.1	24	16.9	4	69.6	3	78.3
10	37.0	25	15.7	5	78.2	4	70.9
11	23.8	26	17.5	6	62.1	5	78.1
12	122.7	27	27.2			6	62.5
13	144.4	28	175.9				
14	42.1	29	33.2				
15	36.1	30	24.5				

(*continued*)

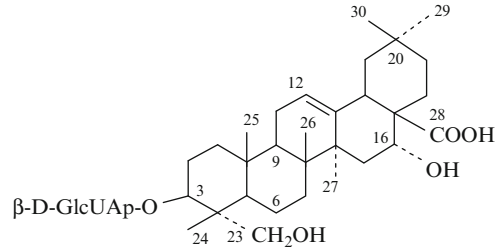
Pharm./Biol.:Used as a folk medicine for rheumatism, diabetes and as a tonic [1]

References

1. S.-J. Song, N. Nakamura, C.-M. Ma, M. Hattori, S.-X. Xu, Chem. Pharm. Bull. **48**(6), 838 (2000)

Elatoside G

CAS Registry Number: 171828-77-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Caulophyllogenin

Biological sources: *Aralia elata* [1]

$C_{36}H_{56}O_{11}$: 664.382

Mp: 246.8–249.2°C (H_2O–MeOH) [1]

$[\alpha]_D^{28}$ −5.1° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1719, 1701, 1649, 1080 [1]

HR-FAB-MS *m/z*: 687.3785 $[M + Na]^-$, 663 $[M\text{-H}]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.94, 0.97, 1.04, 1.05, 1.17, 1.82 (s, CH_3 × 6), 3.61 (dd-like, H-18), 5.26 (brs, H-16), 5.63 (brs, H-12)

β-D-GlcUAp: 5.29 (d-like, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.7	C-16	74.7	GlcUA-1	106.3
2	26.1	17	48.8	2	75.5
3	82.2	18	41.4	3	78.1
4	43.5	19	47.3	4	73.4
5	47.3	20	31.0	5	77.9
6	18.2	21	36.2	6	172.8
7	33.2	22	32.9		
8	39.9	23	64.5		
9	47.7	24	13.7		
10	37.0	25	16.2		
11	23.8	26	17.5		
12	122.4	27	27.2		
13	145.1	28	180.0		
14	42.1	29	33.3		
15	36.2	30	24.7		

References

1. M. Yoshikawa, S. Yoshizumi, T. Ueno, H. Matsuda, T. Murakami, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **43**(11), 1878 (1995)

Medicago-Saponin P_1

CAS Registry Number: 158511-57-0
See Figure Medicago-Saponin P_1
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Caulophyllogenin

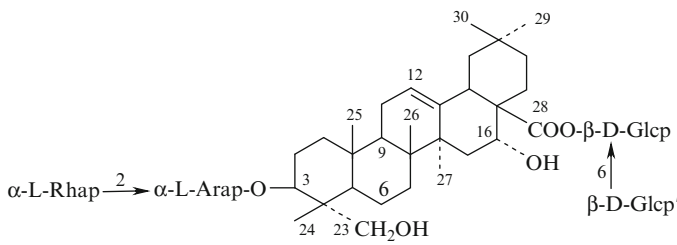
Biological sources: *Medicago polymorpha* [1]
$C_{53}H_{86}O_{23}$: 1090.555
$\alpha]_D^{28}$ −20.1° (c 0.30, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3390, 1735
FAB-MS *m/z*: 1089 $[M-H]^-$, 765 $[M-H-Glc-Glc]^-$, 619 $[M-H-2Glc-Rha]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.96, 1.03, 1.03, 1.07, 1.17, 1.76 (s, CH_3 × 6), 3.51 (brd, J = 13.9, H-18), 5.27 (brs, H-16), 5.60 (brs, H-12)
α-L-Arap: 5.11 (d, J = 5.9, H-1)
α-L-Rhap: 6.23 (s, H-1), 1.64 (d, J = 6.6, CH_3-6)
β-D-Glcp: 6.26 (d, J = 8.1, H-1); β-D-Glcp′: 5.02 (d, J = 8.1, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	74.1	Ara-1	104.0	Glc-1	95.6
2	26.0	17	48.9	2	75.6	2	73.8
3	80.9	18	41.0	3	74.2	3	78.2
4	43.3	19	46.0	4	69.5	4	70.6
5	47.1	20	30.5	5	65.3	5	77.7
6	18.0	21	35.7	Rha-1	101.4	6	69.1
7	32.9	22	31.9	2	72.1	Glc′-1	105.0
8	39.9	23	63.7	3	72.3	2	74.9
9	47.6	24	13.7	4	73.7	3	78.1
10	36.8	25	16.1	5	69.0	4	71.2
11	23.7	26	17.4	6	18.3	5	78.4
12	122.5	27	27.0			6	62.3
13	144.2	28	175.8				
14	41.8	29	33.0				
15	35.9	30	24.5				

References

1. J. Kinjo, H. Uemura, M. Nakamura, T. Nohara, Chem. Pharm. Bull. **42**(6), 1339 (1994)



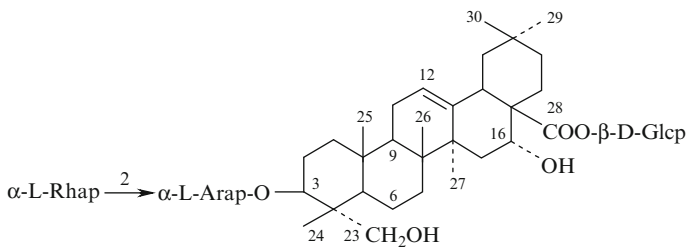
Medicago-Saponin P_1

Medicago-Saponin P_2

CAS Registry Number: 158511-58-1
See Figure Medicago-Saponin P_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Caulophyllogenin
Biological sources: *Medicago polymorpha* [1]
$C_{47}H_{76}O_{18}$: 928.503
$[\alpha]_D^{30}$ −4.1° (c 0.54, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 1735 [1]
FAB-MS *m/z*: 951 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.95, 0.96, 0.99, 1.01, 1.12, 1.76 (s, CH_3 × 6), 3.47 (brd, J = 13.0, H-18), 5.29 (brs, H-16), 5.61 (brs, H-12)
α-L-Arap: 5.13 (d, J = 5.9, H-1)
α-L-Rhap: 6.05 (s, H-1), 1.65 (d, J = 6.6, CH_3-6)
β-D-Glcp: 6.2 (d, J = 8.8, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	73.4	Ara-1	103.8	Glc-1	95.6
2	26.1	17	49.2	2	76.0	2	74.0
3	81.2	18	41.2	3	73.6	3	78.8
4	43.3	19	47.1	4	70.4	4	70.7
5	47.1	20	30.6	5	64.8	5	78.0
6	18.1	21	35.7	Rha-1	101.4	6	61.8
7	32.9	22	31.8	2	71.6		
8	40.0	23	63.8	3	71.9		
9	47.6	24	13.7	4	73.4		
10	36.8	25	16.2	5	68.6		
11	23.7	26	17.5	6	18.2		
12	122.6	27	27.1				
13	144.5	28	176.4				
14	42.0	29	33.0				
15	35.7	30	24.6				



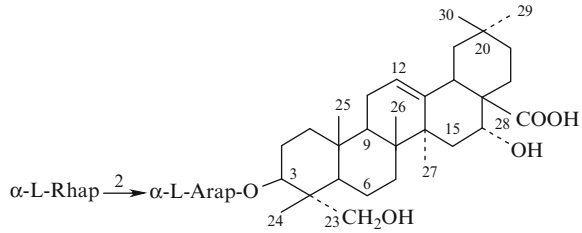
Medicago-Saponin P_2

References

1. J. Kinjo, H. Uemura, M. Nakamura, T. Nohara, Chem. Pharm. Bull. **42**(6), 1339 (1994)

Glycoside L-F_2

CAS Registry Number: 243857-99-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Caulophyllogenin
Biological sources: *Hedera canariensis* [1]
$C_{41}H_{66}O_{13}$: 766.450
^{1}H NMR (J/Hz, C_5D_5N): 4.2 (H-3), 5.23 (brt, J = 3.5, H-12), 5.54 (brt, J = 3.5, H-16), 3.42 (dd, J = 4.5, 14.0, H-18), 4.04 (d, J = 11.0, Ha-23), 3.70 (d, Hb-23), 1.70, 1.10. 1.01, 0.98, 0.95, 0.90 (s, CH_3 × 6)
α-L-Arap: 5.10 (d, J = 6.0, H-1), 4.50 (dd, J = 7.5, H-2), 4.10 (dd, J = 3.5, H-3), 4.18 (m, H-4), 3.69 (dd, J = 3.5, 11.0, Ha-5), 4.25 (dd, J = 4.5, Hb-5)
α-L-Rhap: 6.10 (d, J = 1.5, H-1), 4.67 (dd, J = 3.5, H-2), 4.58 (dd, J = 9.5, H-3), 4.25 (t, J = 9.5, H-4), 4.61 (d, H-5), 1.60 (d, J = 6.5, CH_3-6) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.3	C-16	74.6	Ara-1	104.5
2	26.5	17	49.3	2	76.1
3	81.4	18	41.7	3	74.1
4	43.7	19	47.6	4	69.2
5	47.5	20	31.1	5	65.4
6	18.6	21	36.4	Rha-1	101.9
7	33.4	22	32.9	2	72.3
8	40.3	23	64.2	3	72.6
9	48.0	24	14.2	4	74.4
10	37.2	25	16.5	5	70.1
11	24.1	26	17.9	6	18.7
12	122.7	27	27.4		
13	145.0	28	180.5		
14	42.3	29	33.4		
15	36.1	30	25.0		

References

1. V.I. Grishkovets, L.A. Yakovishin, I.N. Shchipanova, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **34**(6), 694 (1998)

Glycoside L-I_2

CAS Registry Number: 243858-02-8

See Figure Glycoside L-I_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Caulophyllogenin

Biological sources: *Hedera canariensis* [1]

$C_{59}H_{96}O_{27}$: 1236.613

^{1}H NMR (J/Hz, C_5D_5N): 4.20 (H-3), 5.21 (brt, J = 3.5, H-12), 5.53 (brt, J = 3.5, H-16), 3.41 (dd, J = 4.5, 14.0, H-18), 3.68 (d, J = 11.0, Hb-23), 4.03 (d, Ha-23), 1.68, 1.07, 0.98, 0.96, 0.92, 0.87 (s, CH_3 × 6)

α-L-Arap: 5.08 (d, J = 6.0, H-1), 4.48 (dd, J = 7.5, H-2), 4.09 (dd, J = 4.0, H-3), 4.16 (m, H-4), 3.68 (dd, J = 3.0, Ha-5), 4.22 (dd, J = 4.0, 11.0, Hb-5)

α-L-Rhap: 6.07 (d, J = 1.5, H-1), 4.56 (dd, J = 3.5, H-2), 4.56 (dd, J = 9.5, H-3), 4.22 (t, J = 9.5, H-4), 4.59 (d, H-5), 1.59 (d, J = 6.5, CH_3-6)

β-D-Glcp: 6.13 (d, J = 8.0, H-1), 3.99 (t, J = 9.0, H-2), 4.02 (t, J = 9.0, H-3), 4.18 (t, J = 9.0, H-4), 3.99 (m, H-5), 4.59 (Ha-6), 4.22 (Hb-6)

β-D-Glcp′: 4.90 (d, J = 8.0, H-1), 3.86 (t, J = 8.5, H-2), 3.50 (t, J = 9.0, H-3), 4.26 (t, J = 9.0, H-4), 3.55 (m, H-5), 4.11 (Ha-6), 4.00 (Hb-6)

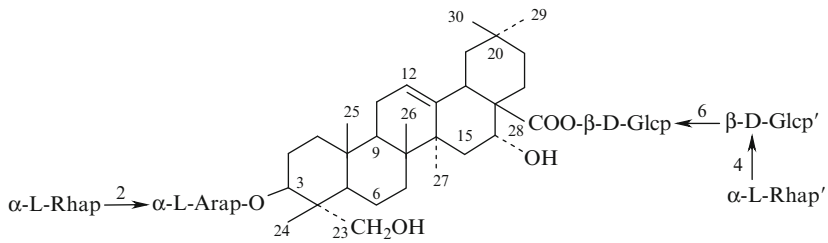
α-L-Rhap′: 5.72 (d, J = 1.5, H-1), 4.60 (dd, J = 4.0, H-2), 4.47 (dd, J = 9.5, H-3), 4.27 (t, J = 9.5, H-4), 4.82 (d, H-5), 1.63 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.4	C-18	41.6	Ara-1	104.4	Glc′-1	104.9
2	26.6	19	47.4	2	76.2	2	75.4
3	81.4	20	31.0	3	74.1	3	76.6
4	43.8	21	36.2	4	69.2	4	78.6
5	47.6	22	32.4	5	65.5	5	77.2
6	18.6	23	64.2	Rha-1	101.9	6	61.4
7	33.4	24	14.2	2	72.4	Rha′-1	102.9
8	40.4	25	16.6	3	72.6	2	72.6
9	48.1	26	17.9	4	74.4	3	72.8
10	37.2	27	27.5	5	70.1	4	74.0
11	24.1	28	176.6	6	18.8	5	70.6
12	123.0	29	33.4	Glc-1	96.0	6	18.8
13	144.9	30	25.0	2	74.0		
14	42.4			3	78.7		
15	36.2			4	70.6		

(*continued*)



Glycoside L-I_2

Table 1 (continued)

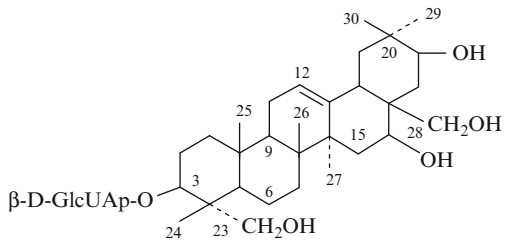
16	74.3	5	78.2
17	49.5	6	69.3

References

1. V.I. Grishkovets, L.A. Yakovishin, I.N. Shchipanova, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **34**(6), 694 (1998)

Gymnemic Acid VII

CAS Registry Number: 121903-97-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gymnestrogenin

Biological sources: *Gymnema sylvestre* [1]

$C_{36}H_{58}O_{11}$: 666.397

Mp: 222–223°C [1]

$[\alpha]_D$ + 9.6° (c 5.7, MeOH) [1]

FAB-MS *m/z*: 712 (M + 2Na) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 4.68 (dd, J = 11.0, 5.0, H-16), 4.14 (dd, J = 13.0, 4.5, H-21), 2.08 (dd, J = 13.0, 13.0, H-22), 3.24 (dd, J = 13.0, 4.5), 3.70, 4.35 (d, J = 11.0, H_2-23), 3.74, 4.41 (d, J = 10.5, H_2-28)

β-D-GlcUAp: 5.25 (d, J = 7.5, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

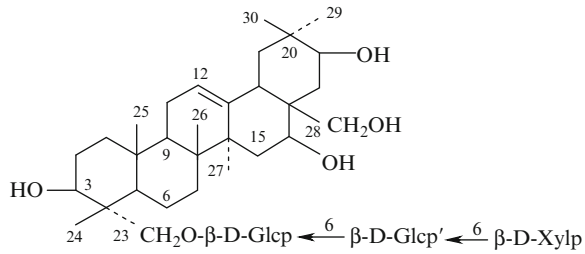
C-2	26.2	GlcUA-1	106.3
3	82.1	2	75.5
15	36.9	3	78.2
16	67.8	4	73.5
17	43.7	5	77.9
20	36.9	6	172.9
21	72.9		
22	35.1		
23	64.5		
24	13.7		
28	68.5		

(*continued*)

References

1. K. Yoshikawa, K. Amimoto, S. Arihara, K. Matsuura, Chem. Pharm. Bull. **37**(3), 852 (1989)

Gymnemoside-d



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gymnestrogenin

Biological sources: *Gymnema sylvestre* [1]

$C_{47}H_{78}O_{19}$: 946.513

Mp: 219.1–221.0°C (aq. MeOH) [1]

$[\alpha]_D^{29}$ + 13.4° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1044 [1]

FAB-MS (negative ion mode) *m/z*: 945 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 969 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.95, 1.00, 1.03, 1.27 (s, CH_3-25, 24, 26, 27), 1.24 (s, CH_3-29, 30), 2.03, 3.23 (dd-like, H_2-22), 2.56 (dd-like, H-18), 3.72, 4.48 (d, J = 10.6, H_2-28), 3.97 (m, H_2-23), 4.11 (m, H-21), 4.18 (m, H-3), 4.67 (dd-like, H-16), 4.83 (d, J = 7.6, H-1 of Glc), 4.92 (d, J = 7.3, H-1 of Xyl), 5.00 (d, J = 7.6, H-1 of Glc′), 5.32 (brs, H-12) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	67.8	Glc-1	104.8	Xyl-1	105.8
2	27.4	17	43.7	2	75.1	2	74.8
3	72.3	18	44.0	3	78.6	3	78.0
4	42.9	19	47.8	4	71.7	4	71.1
5	48.7	20	36.8	5	77.0	5	67.0
6	18.6	21	72.8	6	70.2		
7	32.9	22	35.0	Glc′-1	105.2		
8	40.2	23	74.8	2	75.0		
9	47.3	24	13.2	3	78.4		
10	37.0	25	16.2	4	71.7		
11	23.9	26	17.1	5	77.1		
12	123.0	27	27.1	6	70.0		
13	143.4	28	68.5				
14	43.9	29	30.0				
15	36.7	30	17.9				

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, Chem. Pharm. Bull. **45**(12), 2034 (1997)

Sitakisoside IX

See Figure Sitakisoside IX

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gymnestrogenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{61}H_{95}NO_{25}$: 1241.619

Mp: 209–211°C (MeOH) [1]

$[\alpha]_D^{20}$ −25.1° (c 0.8, MeOH) [1]

UV λ_{max}^{EtOH} nm (log ε): 203 (4.15), 222 (4.23), 255 (3.99), 349 (3.54) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1680 [1]

FAB-MS *m/z*: 1242 $[M + H]^+$; 1240 $[M-H]^-$, 1108 $[M-H-C_5H_8O_4]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.98, 0.93, 1.00, 1.25, 1.38, 1.20 (s, CH_3-24, 25, 26, 27, 29, 30), 3.70, 4.35 (d, J = 10.8, H_2-23), 4.24 (m, H-3), 5.24 (m, H-12), 4.62 (dd, J = 11.0, 4.5, H-16), 2.52 (dd, J = 11.5, 4.0, H-18), 4.14 (m, H-21), 2.06 (m, Hβ -22), 3.54 (dd, J = 12.0, 4.5, Hα-22), 3.68, 4.32 (d, J = 10.5, H_2-28)

β-D-Glcp: 5.08 (d, J = 7.6, H-1), 4.30, 4.81 (d, J = 10.5, H_2-6)

β-D-Glcp′: 5.02 (d, J = 7.8, H-1), 4.30, 4.78 (d, J = 10.5, H_2-6)

β-D-Xylp: 4.93 (d, J = 7.4, H-1)

β-D-Glcp″: 5.08 (d, J = 7.6, H-1), 4.89 (dd, J = 10.3, 4.5, H-6), 5.17 (d, J = 10.3, H-6)

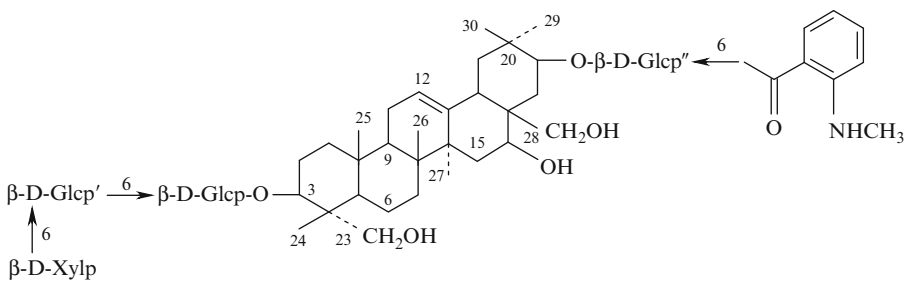
Acyl part: 6.56 (dd, J = 8.0, 1.2, H-3), 7.32 (ddd, J = 8.0, 8.0, 1.2, H-4), 6.65 (ddd, J = 8.0, 8.0, 1.2, H-5), 8.28 (dd, J = 8.0, 1.2, H-6), 2.67 (d, J = 4.2, N-CH_3), 7.82 (q, J = 4.2, NH) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	67.3	Glc-1	106.1	Xyl-1	106.0	Acyl-1	110.7
2	26.1	17	43.8	2	75.0	2	74.9	2	152.3
3	82.9	18	43.6	3	78.4	3	78.2	3	111.1
4	43.5	19	47.9	4	71.5	4	71.2	4	135.1
5	47.7	20	37.0	5	77.1	5	67.1	5	114.9
6	18.3	21	84.1	6	70.1	Glc″-1	106.4	6	132.6
7	32.8	22	33.3	Glc′-1	105.4	2	75.4	7	168.8
8	40.2	23	65.0	2	75.7	3	78.6	9	29.6
9	47.2	24	13.8	3	78.6	4	71.5		

(*continued*)



Sitakisoside IX

Table 1 (continued)

10	36.8	25	16.4	4	71.5	5	75.8
11	24.0	26	17.1	5	77.1	6	64.7
12	124.0	27	27.2	6	79.9		
13	143.1	28	68.2				
14	43.9	29	29.8				
15	36.8	30	18.8				

Pharm./Biol.: Complete suppression of the sensation of sweetness, induced by 0.2 M sucrose [1]

References

1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(12), 2455 (1994)

Acanthophylloside B

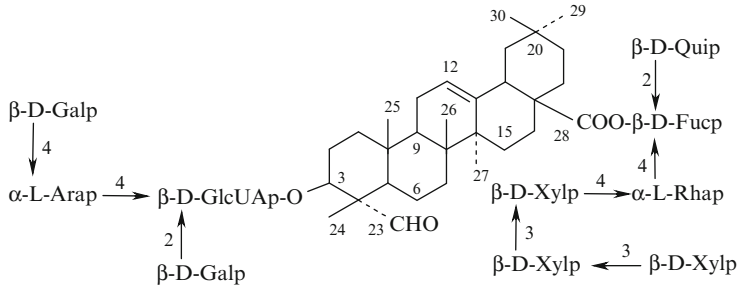
CAS Registry Number: 57606-20-9
See Figure Acanthophylloside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Acanthophyllum gypsophiloides* [1–3]
$C_{86}H_{136}O_{48}$: 1936.820
Mp: 240–242°C [1]
$[\alpha]_D^{20}$ + 40.3° (c 1.2, H_2O) [1]

References

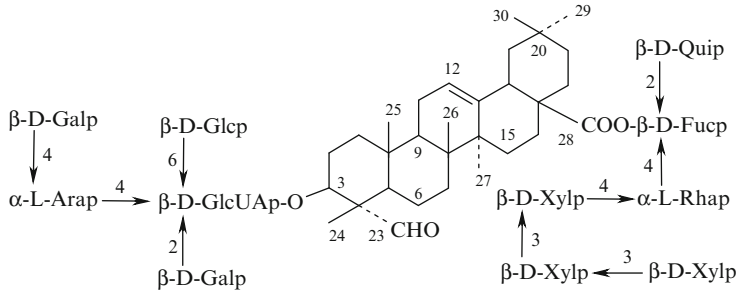
1. Zh.M. Putieva, L.G. Mzhelskaya, T.T. Gorovits, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **11**(6), 756 (1975)
2. Zh.M. Putieva, L.G. Mzhelskaya, T.T. Gorovits, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **11**(6), 765 (1975)
3. Zh.M. Putieva, T.T. Gorovits, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **15**(2), 148 (1979)

Acanthophylloside C

CAS Registry Number: 57579-58-5
See Figure Acanthophylloside C



Acanthophylloside B



Acanthophylloside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Acanthophyllum gypsophiloides* [1–3]
$C_{92}H_{146}O_{53}$: 2098.872
Mp: 241–246°C [1]
$[\alpha]_D^{30}$ −10.9° (c 0.92, H_2O) [1]

References

1. Zh.M. Putieva, L.G. Mzhelskaya, T.T. Gorovits, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **11**(6), 756 (1975)
2. Zh.M. Putieva, L.G. Mzhelskaya, T.T. Gorovits, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **11**(6), 765 (1975)
3. Zh.M. Putieva, T.T. Gorovits, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **15**(2), 148 (1979)

Acutifolioside

CAS Registry Number: 54044-93-8
See Figure Acutifolioside

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Gypsophila acutifolia* [1]
$C_{88}H_{140}O_{51}$: 2012.836

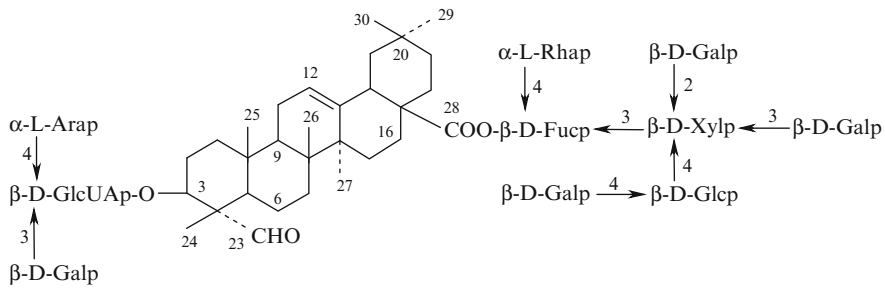
References

1. V.Ya. Chirva, P.K. Kintya, V.N. Mel'nikov, V.N. Paukov, Chem. Nat. Comp. **10**(3), 336 (1974)

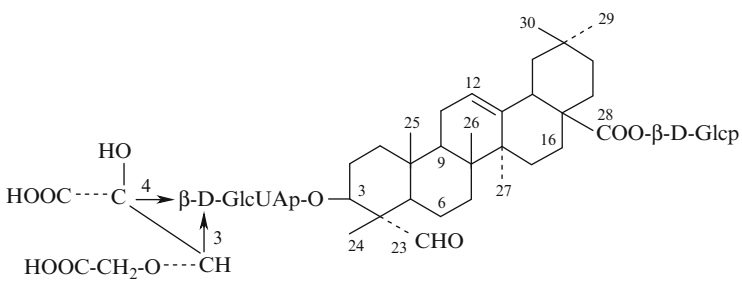
Basellasaponin B

CAS Registry Number: 354552-02-6
See Figure Basellasaponin B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin



Acutifolioside



Basellasaponin B

Biological sources: *Basella rubra* [1]
$C_{47}H_{68}O_{21}$: 968.425
Mp: 226–228°C [1]
$[\alpha]_D^{26}$ + 57.4° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3415, 1728, 1076, 1036 [1]
HR-FAB-MS *m/z*: 991.450 $[M + Na]^+$ [1]
FAB-MS (negative ion) *m/z*: 967 $[M-H]^-$, 807 $[M-C_5H_5O_6]^-$, 805 $[M-C_6H_{11}O_5]$ [1]
FAB-MS (positive) *m/z*: 991 $[M + Na]^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 4.10 (m, H-3), 5.40 (dd-like, H-12), 3.18 (d-like, H-18), 9.69 (s, CHO-23), 0.81, 0.89, 0.92, 1.04 (s, CH_3-25, 30, 29, 26), 1.26 (s, CH_3-24, 27);
β-D-GlcUAp: 4.88 (d, J = 7.6, H-1); 3-oxoperuvic acid: 5.96 (s, H-3″), glycolic acid: 4.79 (s, H-2‴); β-D-Glcp: 6.30 (d, J = 8.0, H-1) [1]
^{13}C NMR: [1]

Table 1

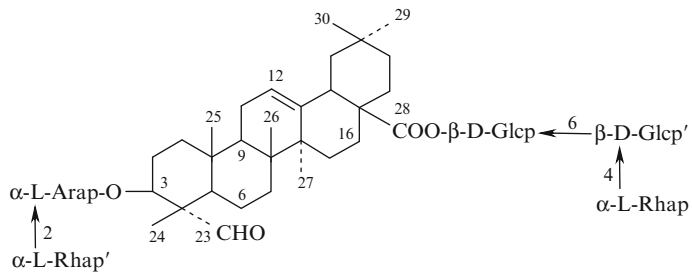
C-1	38.0	C-16	23.6	GlcUA-1	105.7
2	25.1	17	47.0	2	71.6
3	82.6	18	41.7	3	72.5
4	55.4	19	46.1	4	70.1
5	47.6	20	30.8	5	75.2
6	20.4	21	34.0	6	171.9
7	32.5	22	32.4	3-oxo-PA-1	171.3
8	40.2	23	206.6	2	94.1
9	47.9	24	10.3	3	98.1
10	36.0	25	15.6	GA-1	172.5
11	23.5	26	17.4	2	65.0
12	122.7	27	26.1	Glc-1	95.8
13	144.2	28	176.4	2	74.1
14	42.2	29	33.1	3	78.9
15	28.2	30	23.6	4	71.1
				5	79.4
				6	62.2

References

1. T. Murakami, H. Hirano, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 776 (2001)

Clematibetoside B

CAS Registry Number: 344590-74-5
See Figure Clematibetoside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Clematis tibetana* [1]
$C_{59}H_{94}O_{26}$: 1218.603
$[\alpha]_D^{28}$ −13.0° (c 0.51, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3500, 2939, 1722, 1645, 1550 [1]
FAB-MS *m/z*: 1217.6 $[M-H]^-$, 747.4 [M-Rha-Glc-Glc-H]$^-$, 1189.6, 1027.6, 865.5, 733.5, 587.4 [1]
^{1}H NMR (400 MHz, C_5D_5N): α-L-Arap: 4.70 (d, J = 5.5, H-1), 4.42 (dd, J = 6.0, 5.5, H-2), 4.15 (m, H-3), 4.17 (H-4), 3.70, 4.25 (brd, J = 11.0, H_2-5)
α-L-Rhap: 6.05 (brs, H-1), 4.63 (m, H-2), 4.56 (H-3), 4.20 (dd, J = 9.0, 9.0, H-4), 4.50 (H-5), 1.65 (d, J = 6.5, CH_3-6)
β-D-Glcp: 6.18 (d, J = 8.0, H-1), 4.07(dd, J = 9.0, 8.0, H-2), 4.18 (dd, J = 9.0, 9.0, H-3), 4.27 (dd, J = 9.0, 9.0, H-4), 4.05 (H-5), 4.30, 4.63 (H_2-6)
β-D-Glcp′: 4.95 (d, J = 8.0, H-1), 3.90 (dd, J = 9.0, 8.0, H-2), 4.10 (dd, J = 9.0, 9.0, H-3), 4.37 (dd, J = 9.0, 9.0, H-4), 3.62 (m, H-5), 4.03, 5.81 (brs, H_2-6)
α-L-Rhap′: 5.81 (brs, H-1), 4.63 (m, H-2), 4.51 (dd, J = 9.0, 3.5, H-3), 4.29 (dd, J = 9.0, 9.0, H-4), 4.91 (m, H-5), 1.65 (d, J = 6.5, CH_3-6) [1]



Clematibetoside B

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-16	23.2	Ara-1	102.0	Glc-1	95.5	Rha′-1	102.6
2	25.2	17	46.9	2	75.2	2	73.7	2	72.4
3	80.2	18	41.6	3	73.7	3	78.6	3	72.7
4	55.4	19	46.1	4	68.7	4	70.7	4	73.9
5	48.3	20	30.7	5	65.0	5	77.9	5	70.2
6	20.5	21	33.9	Rha-1	101.3	6	69.1	6	18.4
7	32.4	22	32.4	2	72.3	Glc′-1	104.7		
8	40.1	23	207.6	3	72.4	2	75.2		
9	47.9	24	10.6	4	74.1	3	76.4		
10	36.0	25	15.6	5	69.6	4	78.2		
11	23.6	26	17.4	6	18.4	5	77.0		
12	122.5	27	26.0			6	61.2		
13	144.1	28	176.4						
14	42.1	29	33.1						
15	28.1	30	23.6						

References

1. Y. Kawata, H. Kizu, Y. Miyaichi, T. Tomimori, Chem. Pharm. Bull. **49**(5), 635 (2001)

Dianthoside C

CAS Registry Number: 11077-01-3

See Figure Dianthoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Dianthus deltoides* [1]

$C_{81}H_{128}O_{44}$: 1804.777

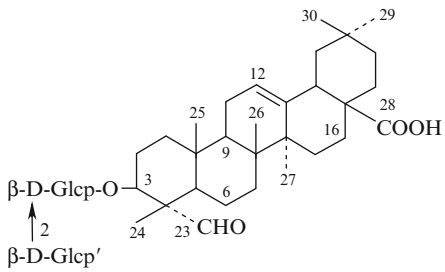
Mp: 270–275°C [1]

$[\alpha]_D^{20}$ + 28° (c 1.2, C_5H_5N) [1]

References

1. V.G. Bukharov, S.P. Shcherbak, Chem. Nat. Comp. **7**(4), 399 (1971)

Glycoside D_{3A}

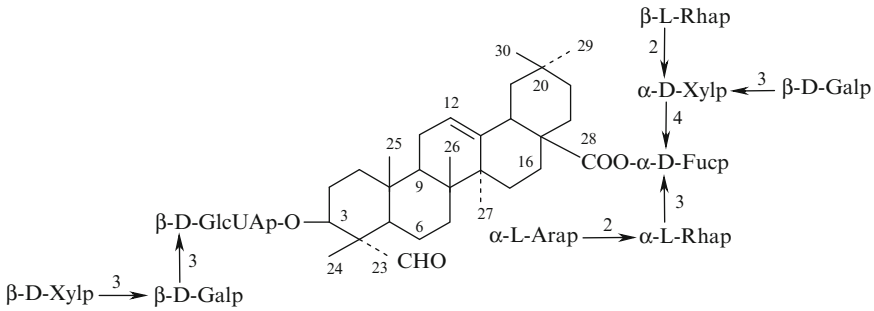


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Fatsia japonica* [1]

$C_{42}H_{66}O_{14}$: 794.445

^{1}H NMR (J/Hz, C_5D_5N): 1.60, 1.05 (H_2-1), 2.36, 2.01 (H_2-2), 4.20 (H-3), 1.48 (H-5), 1.56, 1.13 (H_2-6), 1.55, 1.13 (H_2-7), 1.83 (H-9), 2.03, 2.05 (H_2-11), 5.64 (m, J = 10, H-12), 2.25, 1.28 (H_2-15), 2.25, 2.10 (H_2-16), 3.43 (H-18), 1.96, 1.45 (H_2-19), 1.60, 1.36 (H_2-21), 2.17, 1.96 (H_2-22), 10.01 (H-23), 1.55, 0.96, 1.09, 1.45, 1.15, 1.19 (s, CH_3-24, 25, 26, 27, 29, 30)



Dianthoside C

β-D-Glcp: 4.79 (H-1), 4.06 (H-2), 4.25 (H-3), 4.06 (H-4), 3.86 (H-5), 4.47 (H-6), 4.26 (H-6)
β-D-Glcp′: 5.26 (H-1), 4.09 (H-2), 4.21 (H-3), 4.25 (H-4), 3.96 (H-5), 4.55 (H-6), 4.41 (H-6) [1]
^{13}C NMR (C_5D_5N): [1]

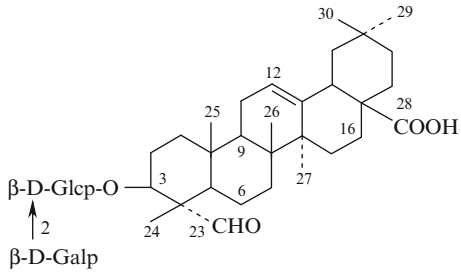
Table 1

C-1	38.0	C-18	42.0	Glc-1	102.7
2	24.6	19	46.5	2	82.5
3	83.0	20	30.9	3	78.3
4	55.1	21	34.2	4	71.1
5	47.8	22	32.4	5	78.1
6	20.2	23	208.8	6	62.5
7	33.1	24	10.6	Glc′-1	105.2
8	39.9	25	15.6	2	76.6
9	47.9	26	17.3	3	77.9
10	36.2	27	26.1	4	71.2
11	23.7	28	180.8	5	78.3
12	122.1	29	33.2	6	62.6
13	144.9	30	23.8		
14	42.1				
15	28.2				
16	23.6				
17	46.7				

References

1. V.I. Grishkovets, E.A. Sobolev, V.V. Kachala, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **38**(3), 264 (2002)

Glycoside D_{3B}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Fatsia japonica* [1]

$C_{42}H_{66}O_{14}$: 794.445
^{1}H NMR (J/Hz, C_5D_5N): 1.60, 1.05 (H_2-1), 2.36, 2.01 (H_2-2), 4.26 (H-3), 1.48 (H-5), 1.56, 1.13 (H_2-6), 1.55, 1.27 (H_2-7), 1.83 (H-9), 2.03, 2.05 (H_2-11), 5.64 (m, J = 10, H-12), 2.25, 1.28 (H_2-15), 2.25, 2.10 (H_2-16), 3.43 (H-18), 1.96, 1.45 (H_2-19), 1.60, 1.36 (H_2-21), 2.17, 1.96 (H_2-22), 10.09 (H-23), 1.57, 0.95, 1.09, 1.45, 1.15, 1.19 (s, CH_3-24, 25, 26, 27, 29, 30)
β-D-Glcp: 4.76 (H-1), 4.03 (H-2), 4.19 (H-3), 4.01 (H-4), 3.83 (H-5), 4.46 (H-6), 4.25 (H-6)
β-D-Galp: 5.15 (H-1), 4.48 (H-2), 4.10 (H-3), 4.53 (H-4), 3.79 (H-5), 4.49 (H-6), 4.26 (H-6) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

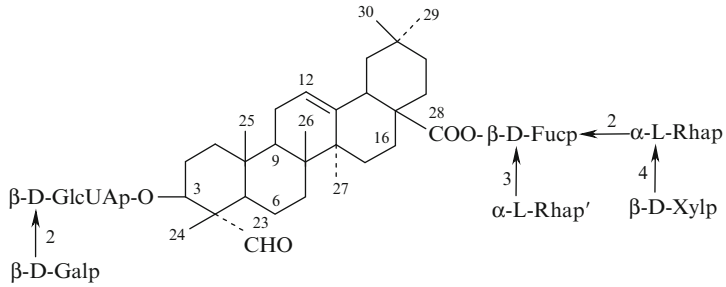
C-1	38.0	C-18	42.0	Glc-1	102.8
2	24.7	19	46.5	2	82.5
3	83.1	20	30.9	3	78.2
4	55.0	21	34.2	4	71.1
5	47.8	22	32.4	5	78.0
6	20.3	23	209.0	6	62.5
7	33.1	24	10.8	Gal-1	105.9
8	39.9	25	15.6	2	74.2
9	47.9	26	17.3	3	74.8
10	36.2	27	26.1	4	70.0
11	23.7	28	180.8	5	78.2
12	122.1	29	33.2	6	62.0
13	144.9	30	23.8		
14	42.1				
15	28.2				
16	23.6				
17	46.7				

References

1. V.I. Grishkovets, E.A. Sobolev, V.V. Kachala, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **38**(3), 264 (2002)

Goyasaponin I

CAS Registry Number: 333333-20-3
See Figure Goyasaponin I



Goyasaponin I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Momordica charantia* [1]

$C_{65}H_{102}O_{31}$: 1378.640

$[\alpha]_D^{24}$ −13.5° (c 0.5, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1717, 1684, 1078, 1046 [1]

HR-FAB-MS *m/z*: 1401.6303 $[M + Na]^+$ [1]

FAB-MS *m/z*: 1377 $(M-H)^-$, 1231 $(M-C_6H_{11}O_4)^-$, 1215 $(M-C_6H_{11}O_5)^-$, 1099 $(M-C_{11}H_{19}O_8)^-$, 1039 $(M-C_{12}H_{19}O_{11})^-$, 807 $(M-C_{23}H_{39}O_{16})^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.81, 0.90, 0.96, 0.98, 1.21, 1.41 (s, CH_3-25, 29, 26, 30, 27, 24), 3.11 (dd, J = 3.0, 13.3, H-18), 4.04 (dd-like, H-3), 5.38 (brs, H-12), 9.92 (s, H-23)

β-D-GlcUAp: 4.89 (d, J = 7.3, H-1)

β-D-Galp: 5.18 (d, J = 7.6, H-1)

β-D-Fucp: 6.27 (d, J = 5.5, H-1), 1.53 (d, J = 6.1, CH_3-6)

α-L-Rhap: 5.74 (brs, H-1), 1.71 (d, J = 5.2, CH_3-6)

α-L-Rhap′: 5.65 (brs, H-1), 1.61 (d, J = 6.1, CH_3-6)

β-D-Xylp: 5.05 (d, J = 7.3, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-16	23.7	GlcUA-1	103.4	Fuc-1	93.8	Rha′-1	101.7
2	25.1	17	47.1	2	85.2	2	76.7	2	72.4
3	83.6	18	42.0	3	77.7	3	83.7	3	72.9
4	55.0	19	46.3	4	72.6	4	72.6	4	70.5
5	48.6	20	30.8	5	77.3	5	74.4	5	73.8
6	20.5	21	34.0	6	172.6	6	18.9	6	18.4
7	32.6	22	32.4	Gal-1	106.4	Rha-1	100.9	Xyl-1	107.2
8	40.2	23	209.6	2	74.5	2	71.7	2	76.0
9	47.8	24	11.0	3	74.9	3	72.6	3	78.6
10	36.3	25	15.7	4	70.2	4	84.3	4	70.9
11	23.3	26	17.6	5	77.1	5	68.8	5	67.5
12	122.6	27	26.1	6	62.2	6	18.5		
13	144.1	28	176.2						
14	42.2	29	33.1						
15	28.2	30	23.8						

Pharm./Biol.: In Chinese, Indian Ayurvedic, and Indonesian Jamu traditional medicines, the fruit of this plant has been used as a bitter stomachic, a laxative, an antidiabetic, and an anthelmintic for children [1]

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Goyasaponin II

CAS Registry Number: 333333-23-6

See Figure Goyasaponin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

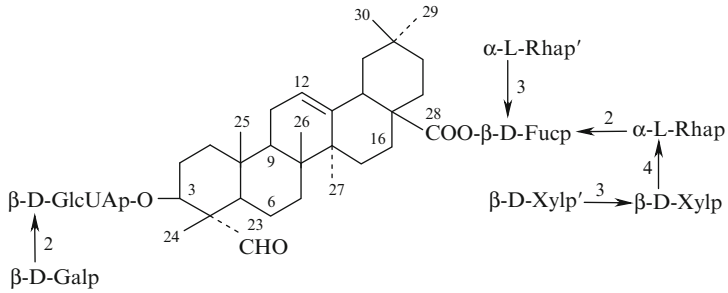
Biological sources: *Momordica charantia* [1]

$C_{70}H_{110}O_{35}$: 1510.682

$[\alpha]_D^{24}$ −18.5° (c 1.0, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1726, 1655, 1080, 1047 [1]

HR-FAB-MS *m/z*: 1533.6725 $[M + Na]^+$ [1]



Goyasaponin II

FAB-MS *m/z*: 1509 $(M\text{-}H)^-$, 1363 $(M\text{-}C_6H_{11}O_4)^-$, 1347 $(M\text{-}C_6H_{11}O_5)^-$, 1245 $(M\text{-}C_{10}H_{17}O_8)^-$, 1171 $(M\text{-}C_{12}H_{19}O_{11})^-$, 1099 $(M\text{-}C_{16}H_{27}O_{12})^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.81, 0.90, 0.96, 0.98, 1.21, 1.41 (s, CH_3-25, 29, 26, 30, 27, 24), 3.11 (dd-like, H-18), 4.04 (dd, J = 5.8, 15.0, H-3), 5.44 (brs, H-12), 9.93 (s, H-23); β-D-GlcUAp: 4.89 (d, J = 7.3, H-1); β-D-Galp: 5.20 (d, J = 7.3, H-1); β-D-Fucp: 6.28 (d, J = 5.5, H-1), 1.54 (d, J = 5.8, CH_3-6); α-L-Rhap: 5.73 (brs, H-1), 1.68 (d, J = 5.5, CH_3-6); α-L-Rhap′: 5.65 (brs, H-1), 1.61 (d, J = 6.1, CH_3-6); β-D-Xylp: 5.07 (d, J = 7.3, H-1); β-D-Xylp′: 5.18 (d, J = 7.3, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-16	23.7	GlcUA-1	103.4	Fuc-4	72.5	Xyl-1	106.4
2	25.1	17	47.0	2	82.3	5	74.4	2	75.0
3	83.7	18	42.0	3	77.7	6	18.9	3	86.9
4	55.0	19	46.3	4	72.6	Rha-1	100.9	4	69.0
5	48.5	20	30.8	5	77.4	2	71.7	5	66.8
6	20.4	21	34.0	6	172.2	3	72.6	Xyl′-1	105.8
7	32.6	22	32.4	Gal-1	106.2	4	83.9	2	75.2
8	40.2	23	209.6	2	74.3	5	68.7	3	78.1
9	47.8	24	11.0	3	74.9	6	18.5	4	70.9
10	36.3	25	15.7	4	70.2	Rha′-1	101.6	5	67.3
11	23.3	26	17.6	5	78.1	2	72.4		
12	122.6	27	26.0	6	62.2	3	72.9		
13	144.0	28	176.2	Fuc-1	93.8	4	70.4		
14	42.2	29	33.1	2	76.8	5	73.8		
15	28.2	30	23.8	3	83.4	6	18.4		

Pharm./Biol.: In Chinese, Indian Ayurvedic, and Indonesian Jamu traditional medicines, the fruit of this plant has been used as a bitter stomachic, a laxative, an antidiabetic, and an anthelmintic for children [1]

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Lucyoside P

See Figure Lucyoside P

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Luffa cylindrica* [1]

$C_{64}H_{100}O_{32}$: 1380.619

Mp: 228–230°C [1]

$[\alpha]_D$ −12.2° (c 6.5, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1725, 1630, 1060, 1040 [1]

FAB-MS *m/z*: 1379 $(M\text{-}H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.79 (s, CH_3-25), 0.93 (s, CH_3-29), 1.00 (s, CH_3-26), 1.00 (s, CH_3-30), 1.24 (s, CH_3-27), 1.43 (s, CH_3-24), 5.40 (m, H-12), 9.95 (s, CH_3-23)

β-D-GlcUAp: 4.93 (d, J = 7.0, H-1)

β-D-Galp: 5.23 (d, J = 7.0, H-1)

α-L-Arap: 6.45 (d, J = 3.0, H-1)

α-L-Rhap: 5.58 (brs, H-1), 1.75 (d, J = 5.5, CH_3-6)

β-D-Xylp: 5.21 (d, J = 7.0, H-1)

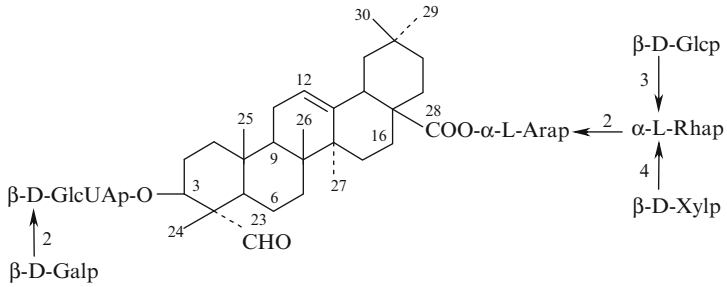
β-D-Glcp: 5.42 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

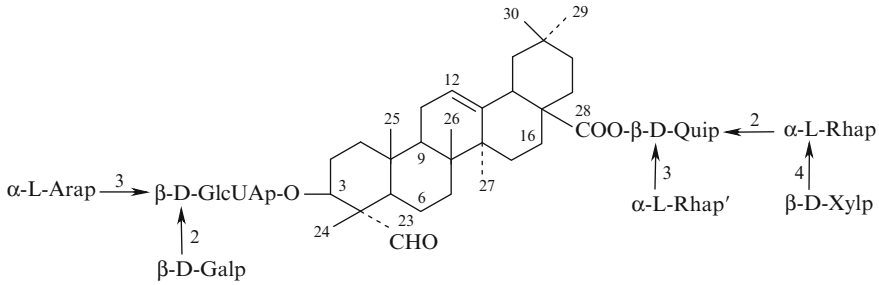
Table 1

C-1	38.0	C-16	23.7	GlcUA-1	103.4	Rha-1	100.8
2	24.9	17	47.8	2	83.6	2	71.6

(*continued*)



Lucyoside P



Luperoside I

Table 1 (continued)

3	82.3	18	41.6	3	77.4	3	82.6
4	55.0	19	46.2	4	72.6	4	79.0
5	48.5	20	30.9	5	77.7	5	68.8
6	20.4	21	34.1	6	172.5	6	18.7
7	32.7	22	32.5	Gal-1	106.4	Xyl-1	105.0
8	40.1	23	209.7	2	74.5	2	75.4
9	47.3	24	11.0	3	74.9	3	78.3
10	36.3	25	15.7	4	70.1	4	71.2
11	23.2	26	17.4	5	77.1	5	67.2
12	122.6	27	26.0	6	62.1	Glc-1	105.3
13	144.2	28	176.2	Ara-1	93.5	2	75.5
14	42.1	29	33.2	2	75.7	3	78.5
15	28.1	30	23.7	3	69.3	4	71.7
				4	65.9	5	78.1
				5	62.8	6	62.6

Pharm./Biol.: Fibrinolytic activity [1]

References

1. K. Yoshikawa, S. Arihara, J.D. Wang, T. Narui, T. Okuyama, Chem. Pharm. Bull. **39**(5), 1185 (1991)

Luperoside I

See Figure Luperoside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Luffa operculata* [1]

$C_{71}H_{112}O_{35}$: 1524.698

Mp: 242–245°C (MeOH) [1]

$[\alpha]_D^{27}$ −6.4° (c 1.30, 80% MeOH) [1]

FAB-MS *m/z* (Me ester): 1547 $[M + Na]^+$, 1523 $[M-H]^-$ [1]

^{1}H NMR (J/Hz, Me ester): 0.79, 0.90, 0.95, 0.98, 1.17, 1.42 (s, CH_3-25, 29, 30, 26, 27, 24), 5.37 (t-like, H-12), 9.92 (s, CHO-23)

β-D-GlcUAp: 4.82 (d, J = 7.0, H-1), 3.74 (s, $COOCH_3$-6)

α-L-Arap: 5.47 (d, J = 7.0, H-1)

β-D-Galp: 5.17 (d, J = 8.0, H-1)

β-D-Quip: 6.29 (d, J = 6.0, H-1), 1.73 (d, J = 6.0, CH_3-6)

α-L-Rhap: 5.76 (brs, H-1), 1.62 (d, J = 6.0, CH_3-6)
α-L-Rhap′: 5.67 (brs, H-1), 1.54 (d, J = 6.0, CH_3-6)
β-D-Xylp: 5.07 (d, J = 8.0, H-1) [1]
^{13}C NMR (Me ester): [1]

Table 1

C-1	38.0	C-16	23.6	GlcUA-1	103.9
2	25.2	17	47.0	$\underline{COO}CH_3$	169.8
3	84.3	18	42.0	$COO\underline{CH_3}$	52.1
4	54.9	19	46.2	Ara-1	104.2
5	48.8	20	30.8	Gal-1	107.1
6	20.5	21	33.9	Qui-1	93.7
7	32.5	22	32.3	6	18.9
8	40.1	23	210.1	Rha-1	101.6
9	47.7	24	11.1	6	18.5
10	36.2	25	15.6	Xyl-1	105.0
11	23.2	26	17.5	Rha′-1	100.8
12	122.5	27	25.9	6	18.4
13	144.0	28	176.1		
14	41.9	29	33.1		
15	28.1	30	23.8		

References

1. H. Okabe, T. Nagao, S. Hachiyama, T. Yamauchi, Chem. Pharm. Bull. **37**(4), 895 (1989)

Luperoside J

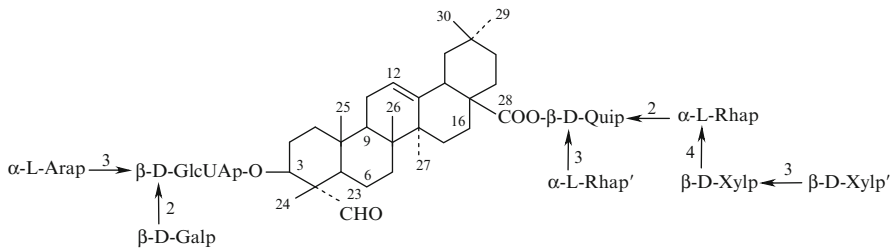
See Figure Luperoside J

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Luffa operculata* [1]
$C_{76}H_{120}O_{39}$: 1656.740
Mp: 237–240°C (MeOH) [1]
$[\alpha]_D^{28}$ −9.8° (c 1.1, 80% MeOH) [1]
FAB-MS *m/z* (Me ester): 1679 $[M + Na]^+$, 1655 $[M\text{-}H]^-$ [1]
^{1}H NMR (J/Hz, Me ester): 0.79, 0.90, 0.96, 0.98, 1.18, 1.42 (s, CH_3-25, 29, 26, 30, 27, 24), 5.38 (t-like, H-12), 9.88 (s, CHO-23)
β-D-GlcUAp: 4.88 (d, J = 8.0, H-1), 3.75 (s, $COO\underline{CH_3}$-6)
β-D-Xylp: 5.08 (d, J = 7.0, H-1)
β-D-Galp: 5.20 (d, J = 7.0, H-1)
β-D-Xylp′: 5.20 (d, J = 7.0, H-1)
α-L-Arap: 5.48 (d, J = 8.0, H-1)
α-L-Rhap: 5.66 (brs, H-1), 1.54 (d, J = 6.0, CH_3-6); α-L-Rhap′: 5.76 (brs, H-1), 1.62 (d, J = 6.0, CH_3-6)
β-D-Quip: 6.27 (d, J = 6.0, H-1), 1.69 (d, J = 5.0, CH_3-6) [1]
^{13}C NMR (Me ester): [1]

Table 1

C-1	38.0	C-16	23.6	GlcUA-1	103.9
2	25.2	17	47.0	$\underline{COO}CH_3$	169.8
3	84.3	18	42.0	$COO\underline{CH_3}$	52.1
4	54.9	19	46.2	Ara-1	104.1
5	48.8	20	30.8	Gal-1	106.4
6	20.5	21	33.9	Qui-1	93.7
7	32.5	22	32.3	6	18.9
8	40.1	23	210.1	Rha-1	101.7
9	47.7	24	11.1	6	18.4
10	36.2	25	15.6	Xyl-1	105.0
11	23.2	26	17.5	Xyl′-1	105.7
12	122.5	27	25.9	Rha′-1	100.8
13	144.0	28	176.1	6	18.4
14	41.9	29	33.1		
15	28.1	30	23.8		



Luperoside J

References

1. H. Okabe, T. Nagao, S. Hachiyama, T. Yamauchi, Chem. Pharm. Bull. **37**(4), 895 (1989)

Momordicasaponin I

CAS Registry Number: 96552-95-3

See Figure Momordicasaponin I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Momordica cochinchinensis* [1]

$C_{76}H_{120}O_{40}$: 1672.735

Mp: 241–244°C [1]

$[\alpha]_D^{19}$ −14.8° (c 0.7, MeOH-H_2O (1:1)) [1]

IR (KBr) ν_{max} cm^{-1}: 3600–3300, 2850, 1730, 1610, 1200–1100 [1]

References

1. M. Iwamoto, H. Okabe, T. Yamauchi, M. Tanaka, Y. Rokutani, S. Hara, K. Mihashi, R. Higuchi, Chem. Pharm. Bull. **33**(2), 464 (1985)

Nutanoside

See Figure Nutanoside

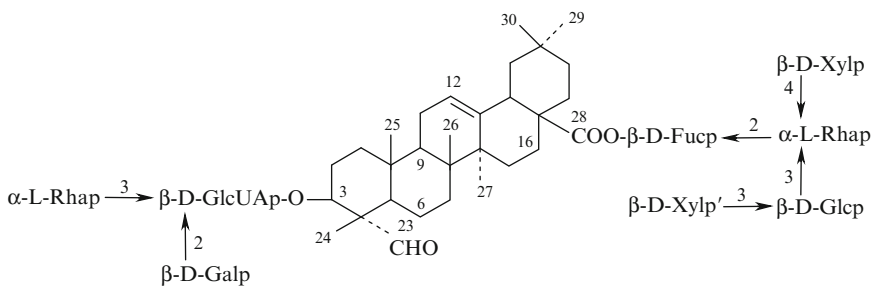
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Silene nutans* [1]

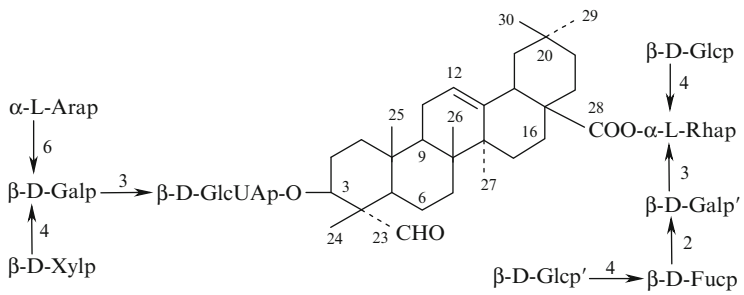
$C_{82}H_{130}O_{46}$: 1850.783

References

1. V.G. Bukharov, L.N. Karneeva, Chem. Nat. Comp. **7**(4), 392 (1971)



Momordicasaponin I



Nutanoside

Phyloside A

CAS Registry Number: 54928-13-1
See Figure Phyloside A
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Gypsophila patrinii* [1]
$C_{82}H_{130}O_{45}$: 1834.788
Mp: 258–262°C [1]
$[\alpha]_D$ −4.9° (c 1.1, C_5H_5N) [1]

References

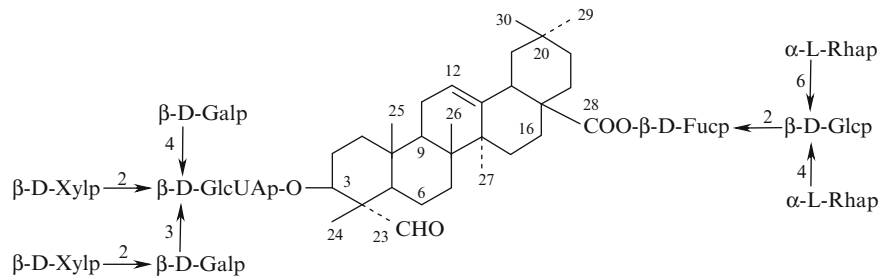
1. V.G. Bukharov, V.V. Karlin, I.L. Bukharova, L.N. Surkova, Chem. Nat. Comp. **10**(5), 607 (1974)

Phyloside B

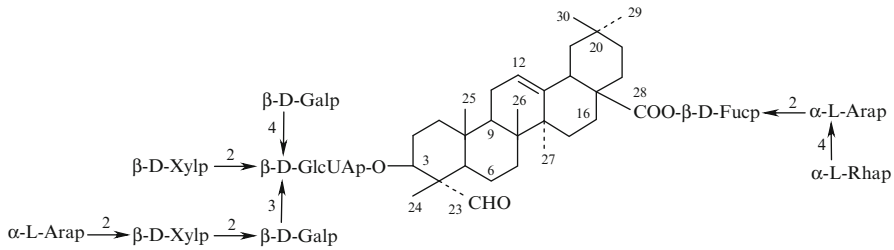
CAS Registry Number: 54967-99-6
See Figure Phyloside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Gypsophila patrinii* [1]
$C_{80}H_{126}O_{44}$: 1790.762
Mp: 232–235°C [1]
$[\alpha]_D$ 0° (c 2.8, H_2O-C_5H_5N) [1]

References

1. V.G. Bukharov, V.V. Karlin, I.L. Bukharova, L.N. Surkova, Chem. Nat. Comp. **10**(5), 612 (1974)



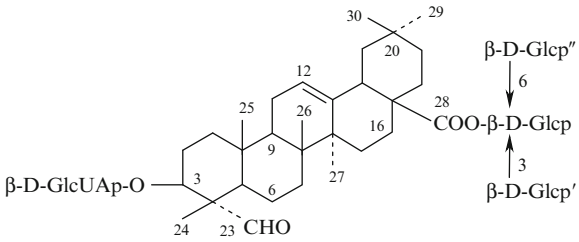
Phyloside A



Phyloside B

Saponaside A

CAS Registry Number: 26151-14-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Saponaria officinalis* [1]

$C_{54}H_{84}O_{25}$: 1132.530

Mp: 132–134°C [1]

$[\alpha]_D^{20}$ + 35° (c 2.0, MeOH) [1]

References

1. V.Ya. Chirva, P.K. Kintya, Chem. Nat. Comp. **5**(3), 162 (1969)

Saponaside C

See Figure Saponaside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin

Biological sources: *Saponaria officinalis* [1]

$C_{87}H_{138}O_{49}$: 1966.830

Mp: 241–244 °C

$[\alpha]_D^{20}$ + 40.0° (c 4.0, H_2O) [1]

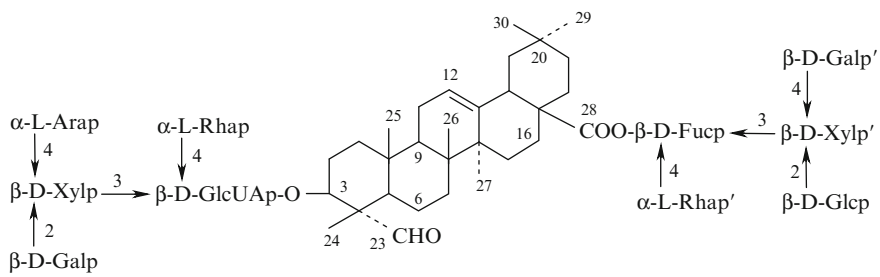
References

1. V.Ya. Chirva, P.K. Kintya, Chem. Nat. Comp. **6**(2), 209 (1970)

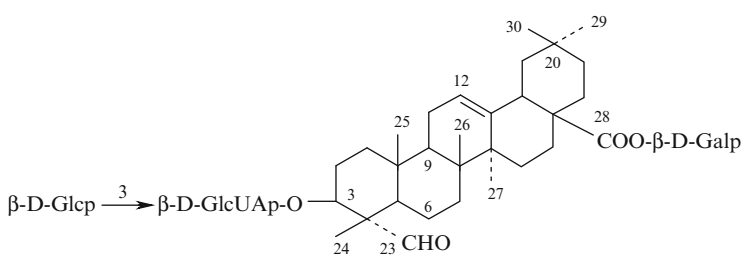
Trichoside A

CAS Registry Number: 33289-66-6

See Figure Trichoside A



Saponaside C



Trichoside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Gypsophila trichotoma* [1]
$C_{48}H_{74}O_{20}$: 970.477
Mp: 310–312°C (MeOH) [1]
$[\alpha]_D^{20}$ + 1.8° (c 3.2, H_2O-MeOH) [1]

References

1. V.N. Luchanskaya, E.S. Kondratenko, T.T. Gorovits, N.K. Abubakirov, Chem. Nat. Comp. **7**(2), 151 (1971)

Trichoside B

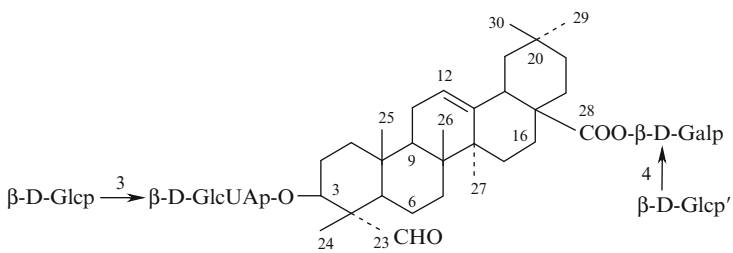
CAS Registry Number: 34383-24-9
See Figure Trichoside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Gypsophila trichotoma* [1]
$C_{54}H_{84}O_{25}$: 1132.530
Mp: 228–230°C (dec.) [1]
$[\alpha]_D^{20}$ + 12.3° (c 0.7, H_2O-MeOH) [1]

References

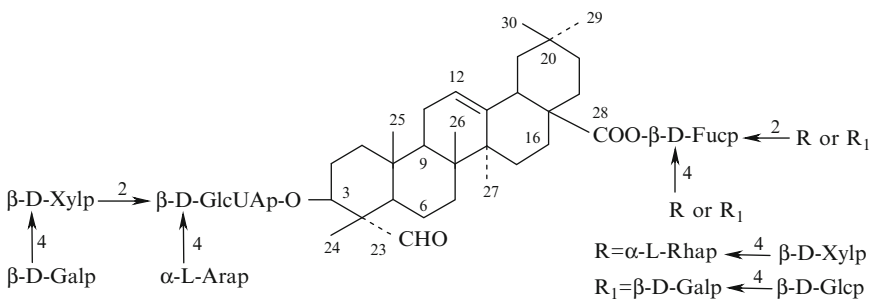
1. V.N. Luchanskaya, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **7**(4), 409 (1971)

Trichoside D

See Figure Trichoside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Gypsophila trichotoma* [1]
$C_{81}H_{128}O_{45}$: 1820.772
Mp: 231–235°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D^{20}$ 0° (H_2O) [1]



Trichoside B



Trichoside D

References

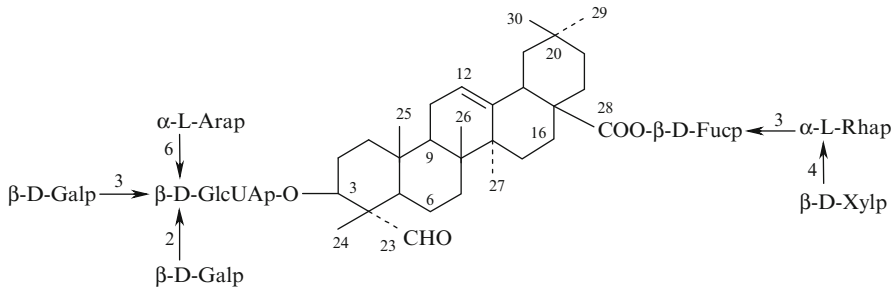
1. V.N. Luchanskaya, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **6** (4), 443 (1970); **8**(1), 63 (1972)

References

1. R.T. Baeva, M.O. Karryev, N.K. Abubakirov, Chem. Nat. Comp. **10**(6), 834 (1974)

Vacsegoside B

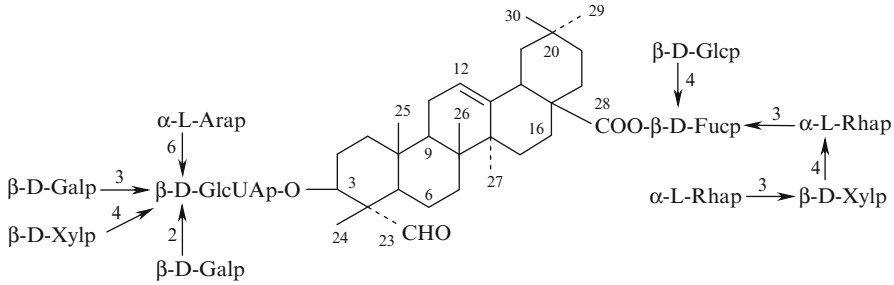
CAS Registry Number: 55169-24-9
See Figure Vacsegoside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Vaccaria segetalis* [1]
$C_{70}H_{110}O_{36}$: 1526.677
Mp: 250–251°C (dec) [1]
$[\alpha]_D^{25}$ + 23.9° (c 0.92, H_2O) [1]



Vacsegoside B

Vacsegoside C

CAS Registry Number: 53123-90-3
See Figure Vacsegoside C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Gypsogenin
Biological sources: *Vaccaria segetalis* [1]
$C_{87}H_{138}O_{49}$: 1966.830
Mp: 242–245°C (dec) [1]
$[\alpha]_D^{25}$ + 8.2° (c 1.14, H_2O) [1]



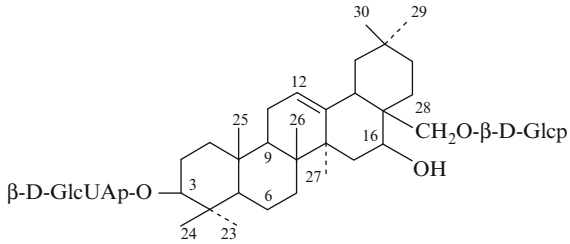
Vacsegoside C

References

1. R.T. Baeva, M.O. Karryev, N.K. Abubakirov, Chem. Nat. Comp. **11**(6), 693 (1975)

Alternoside XVIII

CAS Registry Number: 256510-00-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Longispinogenin

Biological sources: *Gymnema alternifolium* [1]

$C_{42}H_{68}O_{14}$: 796.460

Mp: 196–198°C [1]

$[\alpha]_D^{25}$ −10.7° (c 1.0, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3440, 1730, 1155, 1245, 1160 [1]

FAB-MS *m/z*: 795 $[M-H]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.83, 0.92, 0.93, 0.96, 1.01, 1.30, 1.35 (s, CH_3-25, 29, 30, 26, 24, 23, 27), 3.36 (dd, J = 11.5, 4.0, H-3), 5.20 (m, H-12), 4.58 (m, H-16), 2.27 (dd, J = 13.5, 4.0, H-18), 2.84, 2.25 (m, H_2-22), 4.23, 4.06 (d, J = 10.0, H_2-28)
β-D-GlcUAp: 4.96 (d, J = 8.0, H-1)
β-D-Glcp: 5.03 (d, J = 8.0, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	66.3	GlcUA-1	107.3
2	26.9	17	41.5	2	75.7
3	89.1	18	44.9	3	78.3
4	39.7	19	46.8	4	73.7
5	55.8	20	31.2	5	77.9
6	18.6	21	34.3	6	172.9
7	32.9	22	26.9	Glc-1	105.9
8	40.3	23	28.3	2	75.2
9	47.2	24	17.2	3	78.9
10	36.9	25	16.0	4	71.7
11	24.0	26	17.3	5	78.9
12	–	27	27.4	6	62.9
13	143.4	28	78.3		
14	44.1	29	33.6		
15	37.2	30	24.3		

(*continued*)

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch. Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Alternoside XIX

CAS Registry Number: 256510-01-7

See Figure Alternoside XIX

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Longispinogenin

Biological sources: *Gymnema alternifolium* [1]

$C_{53}H_{88}O_{22}$: 1076.576

Mp: 187–189°C [1]

$[\alpha]_D^{25}$ −23.4° (c 3.1, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3450, 1155 [1]

FAB-MS *m/z*: 1075 $[M-H]^-$ [1]

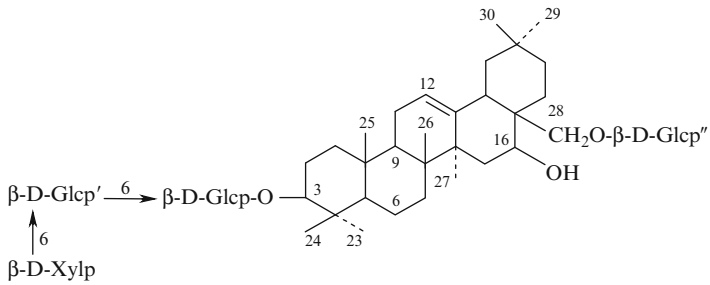
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.95, 0.95, 0.95 1.01, 1.26, 1.29 (s, CH_3-25, 26, 29, 30, 24, 23, 27), 3.30 (dd, J = 11.5, 4.0, H-3), 5.18 (m, H-12), 4.56 (m, H-16), 2.28 (dd, J = 13.0, 4.5, H-18), 2.82, 2.24 (m, H_2-22), 5.24, 4.71 (d, J = 11.0, H_2-28)
β-D-Glcp: 4.85 (d, J = 8.0, H-1)
β-D-Glcp′: 5.02 (d, J = 8.0, H-1)
β-D-Xylp: 4.93 (d, J = 7.0, H-1)
β-D-Glcp″: 4.95 (d, J = 7.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	66.1	Glc-1	106.9	Xyl-1	106.2
2	26.5	17	41.2	2	74.9	2	74.8
3	89.0	18	44.6	3	78.4	3	78.0

(*continued*)



Alternoside XIX

Table 1 (continued)

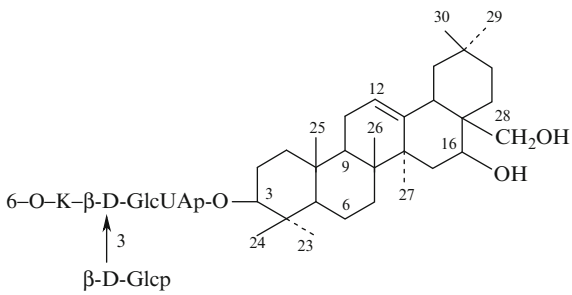
4	39.4	19	46.7	4	71.5	4	71.1
5	55.6	20	30.9	5	76.9	5	67.0
6	18.5	21	34.0	6	70.3	Glc″-1	105.3
7	32.6	22	26.5	Glc′-1	105.3	2	75.0
8	40.0	23	28.1	2	75.5	3	78.5
9	47.0	24	16.9	3	78.7	4	71.5
10	36.7	25	15.7	4	71.5	5	78.7
11	23.7	26	16.9	5	76.9	6	62.6
12	–	27	27.0	6	69.8		
13	143.3	28	78.3				
14	43.8	29	33.3				
15	37.0	30	24.0				

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, K. Takahashi, K. Matsuchika, S. Arihara, H-Ch. Chang, J.-D. Wang, Chem. Pharm. Bull. **47**, 1598 (1999)

Compound 2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Longispinogenin

Biological sources: *Gymnema sylvestre* [1]

$C_{42}H_{67}O_{14}K$: 834.416

Mp: 305–310°C [1]

$[\alpha]_D^{20}$ + 18.1° (c 0.08, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3440, 2948, 1636, 1420, 1078, 1028 [1]

HR-ESI-MS *m/z* 835.4065 $[(M{\cdot}K) + H]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.80 (s, CH_3-25), 0.95 (s, CH_3-29), 0.97 (s, CH_3-24), 0.98 (s, CH_3-26), 1.01 (s, CH_3-30), 1.26 (s, CH_3-23), 1.38 (s, CH_3-27), 3.30 (dd, J = 4.0, 12.1, H-3), 3.70 (d, J = 10.4, Ha-28), 4.56 (d, J = 10.4, Hb-28), 4.69 (m, H-16), 5.30 (brs, H-12)

β-D-GlcUAp: 4.82 (d, J = 7.2, H-1), 4.03 (H-2), 4.28 (H-3), 4.30 (H-4), 4.31 (H-5)

β-D-Glcp: 5.29 (d, J = 7.2, H-1), 4.05 (H-2), 4.22 (H-3), 4.12 (H-4), 4.05 (H-5), 4.28 (H-6), 4.56 (dd, J = 10.4, 4.0, H-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	67.0	GlcUA-1	106.3
2	26.7	17	41.3	2	74.7
3	89.3	18	44.7	3	87.2
4	39.8	19	47.3	4	72.2
5	55.9	20	31.4	5	76.6
6	18.7	21	34.6	6	176.3
7	33.2	22	26.4	Glc-1	105.6
8	40.4	23	28.5	2	75.5
9	47.4	24	17.2	3	78.3
10	36.9	25	16.0	4	71.7
11	24.2	26	17.4	5	78.9
12	122.9	27	27.5	6	62.6

(*continued*)

Table 1 (continued)

13	144.0	28	69.0		
14	44.1	29	33.8		
15	37.0	30	24.4		

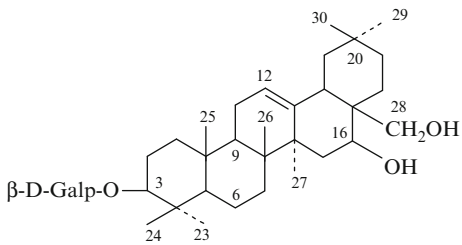
Pharm./Biol.: Antisweet activity [1]

References

1. W. Ye, X. Liu, Q. Zhang, Ch-Tao Che, Sh Zhao, J. Nat. Prod. **64**(2), 232 (2001)

Corchorusin A

CAS Registry Number: 108886-06-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Longispinogenin

Biological sources: *Corchorus acutangulus* [1]

$C_{36}H_{60}O_8$: 620.428

Mp: 282–284°C (MeOH) [1]

$[\alpha]_D$ + 22.5° (c 0.25, MeOH) [1]

^{1}H NMR (99.6 MHz, J/Hz, $CDCl_3$) (for permethylate): 0.84, 0.89, 0.92, 0.96, 1.00, 1.04, 1.16 (s, CH_3 × 7), 3.28, 3.36, 3.40, .3.52, 3.56, 3.64 (CH_3O × 6), 5.20 (t-like, H-12)

β-D-Galp: 4.20 (d, J = 7.0, H-1) [1]

^{13}C NMR (25.05 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	66.8	Gal-1	106.8
2	26.1	17	40.7	2	72.8
3	88.6	18	44.5	3	75.0
4	38.9	19	47.0	4	69.9
5	55.8	20	30.8	5	76.1

(*continued*)

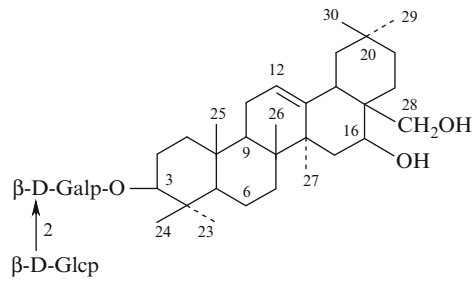
Table 1 (continued)

6	18.4	21	34.1	6	62.0
7	33.2	22	25.3		
8	40.0	23	28.1		
9	47.0	24	16.8		
10	36.7	25	15.5		
11	24.0	26	16.8		
12	122.3	27	26.9		
13	143.7	28	69.0		
14	43.8	29	32.9		
15	36.5	30	23.8		

References

1. S.B. Mahato, B.C. Pal, J. Chem. Soc. Perkin Trans. **1**, 629 (1987)

Corchorusin D_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Longispinogenin

Biological sources: *Corchorus acutangulus* [1]

$C_{42}H_{70}O_{13}$: 782.481

Mp: 222–224°C (MeOH) [1]

$[\alpha]_D$ + 24.8° (c 0.25, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.5	C-16	66.9	Gal-1	105.4
2	26.3	17	39.5	2	81.1
3	89.0	18	44.6	3	71.7
4	38.9	19	47.2	4	69.8
5	55.9	20	30.9	5	76.4

(*continued*)

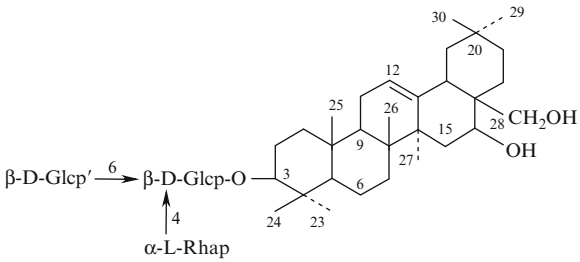
Table 1 (continued)

6	18.4	21	33.5	6	62.0
7	33.3	22	26.3	Glc-1	105.0
8	40.1	23	28.1	2	75.1
9	47.2	24	16.5	3	77.8
10	36.7	25	15.6	4	71.7
11	24.1	26	16.9	5	77.5
12	122.6	27	27.0	6	62.7
13	143.8	28	69.8		
14	43.9	29	33.0		
15	36.6	30	23.8		

References

1. S.B. Mahato, B.C. Pal, S.K. Sarkar, Phytochemistry **27**(5), 1433 (1988)

Saikosaponin f



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Longispinogenin

Biological sources: *Bupleurum falcatum* [1]

$C_{48}H_{80}O_{17}$: 928.539

Mp: 203–206° C (MeOH-Ester) [1]

$[\alpha]_D^{24}$ −16.9° (c 1.0, MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 1.30, 0.85, 1.00, 1.36, 1.02, 1.02, 0.96 (s, $CH_3 \times 6$)

α-L-Rhap: 1.65 (CH_3-6) [1]

^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	67.2	Glc-1	106.1	Rha-1	102.6
2	26.4	17	41.1	2	75.2	2	72.3

(*continued*)

Table 1 (continued)

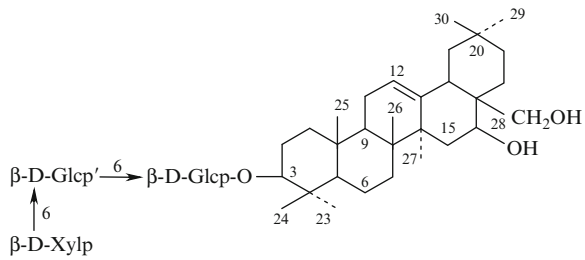
3	89.3	18	44.9	3	76.9	3	72.6
4	39.5	19	47.4	4	80.2	4	73.8
5	56.1	20	31.0	5	75.5	5	70.5
6	18.7	21	34.4	6	69.3	6	18.2
7	33.4	22	26.4	Glc′-1	104.8		
8	40.4	23	28.4	2	74.7		
9	47.4	24	17.0	3	78.3		
10	37.1	25	15.7	4	71.9		
11	24.0	26	17.1	5	78.0		
12	122.8	27	27.1	6	62.9		
13	144.0	28	69.3				
14	44.1	29	33.3				
15	36.8	30	24.3				

References

1. H. Ishii, M. Nakamura, S. Seo, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **28**(8), 2367 (1980)

Sitakisoside X

CAS Registry Number: 164177-55-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Longispinogenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{47}H_{78}O_{17}$: 914.523

Mp: 213–215°C (MeOH) [1]

$[\alpha]_D^{20}$ −16.7° (c 4.8, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1680 [1]

FAB-MS *m/z*: 915 $[M + H]^+$, 897 $(M + H\text{-}H_2O)^+$, 765 $[M + H\text{-}H_2O\text{-}C_5H_8O_4]$+, 603 $[M + H\text{-}H_20\text{-}C_5H_8O_4\text{-}C_6H_{10}O_5]^+$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 1.27, 1.00, 0.85, 0.96, 1.33, 1.00, 1.02 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.68, 4.42 (d, J = 10.4, H_2-28), 3.32 (dd, J = 11.5, 4.3, H-3), 5.23 (m, H-12), 1.75 (m, H-15a), 2.24 (dd, J = 12.2, 10.5, H-15b), 4.66 (dd, J = 10.5, 4.5, H-16), 2.81 (dd, J = 11.5, 4.0, H-18)
β-D-Glcp: 4.87 (d, J = 7.5, H-1)
β-D-Glcp′: 5.05 (d, J = 7.8, H-1)
β-D-Xylp: 4.95 (d, J = 7.5, H-1) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

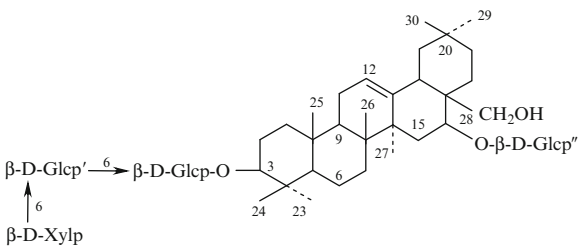
C-1	39.0	C-16	66.9	Glc-1	107.0
2	26.9	17	41.1	2	75.0
3	89.1	18	44.6	3	78.3
4	39.7	19	47.2	4	71.5
5	55.9	20	31.3	5	77.0
6	18.6	21	34.5	6	70.4
7	33.1	22	26.4	Glc′-1	105.4
8	40.3	23	28.4	2	75.6
9	47.2	24	17.2	3	78.6
10	36.9	25	15.9	4	71.5
11	24.0	26	17.1	5	77.0
12	123.9	27	27.3	6	69.9
13	143.9	28	69.1	Xyl-1	106.0
14	43.9	29	33.7	2	74.9
15	36.9	30	24.3	3	78.1
				4	71.2
				5	67.1

References

1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(12), 2455 (1994)

Sitakisoside XX

CAS Registry Number: 187811-12-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Longispinogenin
Biological sources: *Stephanotis lutchuensis* [1]
$C_{53}H_{88}O_{22}$: 1076.576
$[\alpha]_D^{20}$ −21.2° (c 2.2, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3460, 1090 [1]
FAB-MS *m/z*: 1099 $[M + Na]^+$, 1115 $(M + K)^+$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.76, 0.80, 0.93, 0.93, 1.04, 1.21, 1.27 (s, CH_3-25, 26, 24, 29, 30, 23, 27), 2.84 (dd, J = 13.5, 4.0, H-3), 3.26 (dd, J = 11.5, 4.5, H-3), 3.86, 4.21 (d, J = 10.0, H_2-28), 4.84 (dd, J = 13.0, 4.5, H-16), 5.20 (m, H-12)
β-D-Glcp: 4.86 (d, J = 7.5, H-1), 4.26 (dd, J = 11.0, 4.5, H-6), 4.87 (dd, J = 11.0, 2.5, H-6)
β-D-Glcp′: 5.06 (d, J = 8.0, H-1), 4.25 (dd, J = 11.0, 2.5, H-6), 4.76 (d, J = 10.0, 2.0, H-6)
β-D-Xylp: 4.95 (d, J = 8.5, H-1)
β-D-Glcp″: 5.12 (d, J = 8.0, H-1), 4.38 (dd, J = 11.0, 4.5, H-6), 4.52 (d, J = 11.0, 2.0, H-6) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	77.1	Glc-1	106.9	Xyl-1	106.0
2	26.7	17	42.7	2	75.0	2	74.9
3	89.1	18	43.5	3	78.4	3	78.1
4	39.6	19	47.2	4	71.5	4	71.2
5	55.9	20	31.2	5	77.0	5	67.1
6	18.5	21	35.1	6	70.3		
7	32.9	22	23.5	Glc′-1	105.4	Glc″-1	106.5
8	40.3	23	28.4	2	75.6	2	75.7
9	47.0	24	17.1	3	78.6	3	78.5
10	36.8	25	15.8	4	71.6	4	71.9
11	24.1	26	17.0	5	77.0	5	78.9
12	124.0	27	27.3	6	69.8	6	63.0
13	143.6	28	65.2				
14	43.7	29	33.5				
15	34.8	30	24.2				

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Sitakisoside II

CAS Registry Number: 163633-29-2
See Figure Marsglobiferin

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Marsglobiferin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{55}H_{85}NO_{20}$: 1079.566

Mp: 204–206° C [1]

$[\alpha]_D^{20}$ −8.2° (c 9.2, MeOH) [1]

UV λ_{max} nm (log ε): 222 (4.33), 253 (3.81), 349 (3.63) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1680 [1]

FAB-MS *m/z*: 1078 $[M-H]^-$, 946 $[M-H-C_5H_8O_4]^-$, 927 $[M-H-C_8H_9NO_2]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.82 (CH_3-25), 0.91 (CH_3-26), 1.00 (CH_3-24), 1.13 (CH_3-29), 1.28 (CH_3-23), 1.32 (CH_3-30), 1.34 (CH_3-27), 3.35 (dd, J = 11.5, 4.3, H-3), 4.13, 4.76 (d, J = 10.5, H_2-28), 5.17 (dd, J = 10.8, H-22), 5.20 (dd, J = 10.5, 4.5, H-16),5.33 (m, H-12), 5.98 (dd, J = 10.8, 4.5, H-21)

β-D-Glcp: 4.89 (d, J = 7.6, H-1); β-D-Glcp′: 5.05 (d, J = 7.8, H-1)

β-D-Xylp: 4.95 (d, J = 7.6, H-1)

Acyl part: 2.70 (d, J = 5.0, N-CH_3), 6.65 (ddd, J = 7.8, 7.8, 1.5, H-5), 6.68 (dd, J = 7.8, 1.7, H-3), 7.43 (ddd, J = 7.8, 7.8, 1.7, H-4), 8.21 (dd, J = 7.8, 1.7, H-6) [1]

^{13}C NMR (125 MHz C_5D_5N): [1]

Table 1

C-1	38.8	C-16	68.1	Glc-1	107.0	Xyl-1	106.0
2	26.7	17	47.3	2	75.0	2	74.9
3	89.0	18	42.0	3	78.4	3	78.1
4	39.5	19	46.4	4	71.6	4	71.2
5	55.7	20	36.8	5	77.0	5	67.1
6	18.4	21	79.6	6	70.4	Acyl moiety-1	111.2
7	32.9	22	71.2	Glc′-1	105.4	2	152.6
8	40.2	23	28.2	2	75.6	3	111.3
9	47.0	24	17.1	3	78.6	4	134.8
10	36.8	25	15.6	4	71.6	5	114.7
11	23.9	26	17.0	5	77.0	6	132.0
12	124.0	27	27.4	6	69.9	7	169.1
13	142.2	28	58.2			9	29.5
14	42.6	29	29.7				
15	36.2	30	20.1				

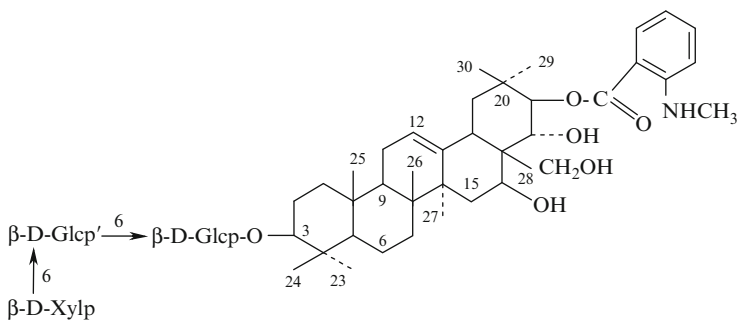
Pharm./Biol.: Antisweet activity [1]

References

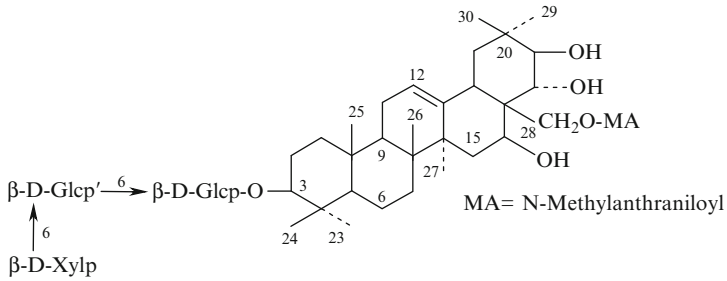
1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(10), 2023 (1994)

Sitakisoside XVIII

CAS Registry Number: 187811-11-6
See Figure Sitakisoside XVIII



Marsglobiferin



Sitakisoside XVIII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Marsglobiferin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{55}H_{85}NO_{20}$: 1079.566

Mp: 203–205°C (MeOH) [1]

$[\alpha]_D^{20}$ −12.0° (c 2.5, MeOH) [1]

UV λ_{max}^{EtOH} nm (log ε): 222 (4.36), 255 (3.87), 356 (3.68) [1]

IR (film) ν_{max} cm^{-1}: 3455, 1680, 1050 [1]

FAB-MS *m/z*: 1102 $[M + Na]^+$, 1118 $(M + K)^+$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.83, 0.97, 1.10, 1.26, 1.34, 1.37, 1.39 (s, CH_3-25, 24, 26, 23, 29, 27, 30), 3.31 (dd, J = 11.5, 4.5, H-3), 3.04 (dd, J = 14.0, 4.0, H-18), 4.12 (d, J = 10.5, H-21), 4.66 (d, J = 10.5, H-22), 4.86, 5.32 (d, J = 12.0, H_2-28), 5.15 (dd, J = 11.5, 5.5, H-16), 5.34 (m, H-12)

β-D-Glcp: 4.84 (d, J = 7.5, H-1), 4.32 (m, H-6), 4.88 (dd, J = 12.5, 2.0, H-6)

β-D-Glcp′: 5.04 (d, J = 8.0, H-1), 4.30 (m, H-6), 4.77 (dd, J = 11.0, 2.0, H-6)

β-D-Xylp: 4.94 (d, J = 7.5, H-1)

N-Methylanthraniloyl: 2.65 (d, J = 5.0, N-CH_3), 6.62 (dd, J = 8.5, 1.5, H-3), 7.37 (ddd, J = 8.5, 8.5, 1.5, H-4), 6.60 (ddd, J = 8.5, 8.5, 1.5, H-5), 8.15 (dd, J = 8.5, 1.5, H-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	67.9	Glc-1	106.9	Xyl-1	106.0
2	26.7	17	45.8	2	75.0	2	74.9
3	89.0	18	43.2	3	78.2	3	78.1
4	39.6	19	46.4	4	71.6	4	71.2
5	55.7	20	36.9	5	76.9	5	67.1
6	18.5	21	76.9	6	70.4		
7	33.0	22	74.3	Glc′-1	105.4	MA-1	111.5
8	40.3	23	28.3	2	75.6	2	152.5
9	47.1	24	17.2	3	78.5	3	110.6
10	36.8	25	15.8	4	71.6	4	135.1
11	24.0	26	17.1	5	77.0	5	114.8
12	124.4	27	27.6	6	69.9	6	131.4
13	141.8	28	62.7			7	169.0
14	42.6	29	30.4			9	29.4
15	36.2	30	19.1				

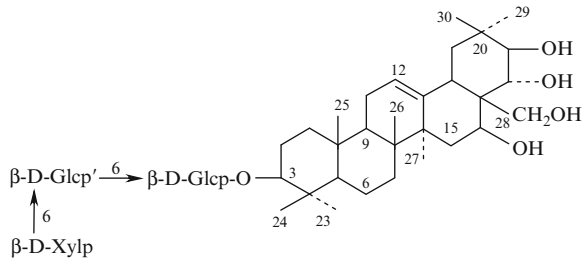
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Sitakisoside XIX

CAS Registry Number: 163456-80-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Marsglobiferin
Biological sources: *Stephanotis lutchuensis* [1]
$C_{47}H_{78}O_{19}$: 946.513
$[\alpha]_D^{20}$ −17.1° (c 1.6, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 3250 [1]
FAB-MS *m/z*: 945 $[M-H]^-$, 813 $(M-H-C_5H_8O_4)^-$, 651 $(M-H-C_5H_8O_4-C_6H_{10}O_5)^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.82, 0.93, 1.00, 1.27, 1.32, 1.34, 1.36 (s, CH_3-25, 26, 24, 23, 29, 27, 30), 3.33 (dd, J = 11.6, 4.4, H-3), 4.11, 4.76 (d, J = 10.5, H_2-28), 4.12 (H-21), 4.93 (d, J = 9.5, H-22), 5.12 (dd, J = 11.8, 5.2, H-16), 5.32 (m, H-12)
β-D-Glcp: 4.84 (d, J = 7.6, H-1), 4.32 (m, H-6), 4.88 (dd, J = 12.5, 2.0, H-6)
β-D-Glcp′: 5.04 (d, J = 8.0, H-1), 4.30 (m, H-6), 4.77 (dd, J = 11.0, 2.0, H-6)
β-D-Xylp: 4.94 (d, J = 7.5, H-1) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

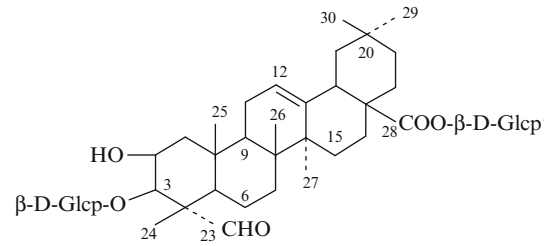
C-1	38.7	C-16	68.3	Glc-1	107.0	Xyl-1	106.1
2	26.7	17	46.6	2	75.0	2	74.9
3	88.9	18	42.1	3	78.5	3	78.2
4	39.5	19	46.8	4	71.6	4	71.1
5	55.6	20	36.7	5	77.1	5	67.1
6	18.4	21	77.3	6	70.5		
7	32.9	22	73.7	Glc′-1	105.4		
8	40.2	23	28.2	2	75.8		
9	47.0	24	17.0	3	78.6		
10	36.8	25	15.9	4	71.6		
11	23.8	26	16.9	5	77.1		
12	124.0	27	27.4	6	70.0		
13	142.7	28	58.5				
14	42.5	29	30.5				
15	36.0	30	19.1				

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Polygalasaponin XII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Polygalagenin
Biological sources: *Polygala japonica* [1]
$C_{42}H_{66}O_{15}$: 810.440
$[\alpha]_D^{24}$ + 39.6° (c 0.82, MeOH) [1]
FAB-MS *m/z*: 833 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.73 (m, H-2), 4.12 (d, J = 3, H-3), 5.43 (t-like, H-12), 3.18 (dd, J = 14, 4, H-18), 9.72 (s, H-23), 1.68 (s, CH_3-24), 1.48 (s, CH_3-25), 1.10 (s, CH_3-26), 1.24 (s, CH_3-27), 0.92 (s, CH_3-29), 0.89 (s, CH_3-30)
β-D-Glcp: 4.89 (d, J = 8, H-1), 3.87 (t, J = 8.5, H-2)
β-D-Glcp′: 6.29 (d, J = 8, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

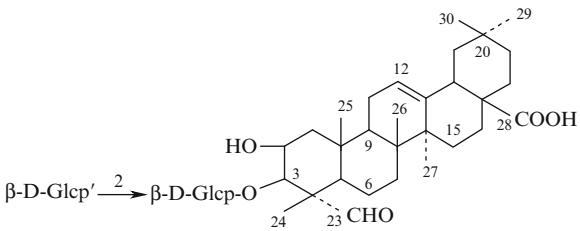
Table 1

C-1	43.8	C-16	23.4	Glc-1	104.7
2	69.3	17	47.0	2	75.0
3	83.0	18	41.8	3	78.5
4	54.6	19	46.2	4	71.6
5	48.3	20	30.8	5	78.5
6	20.4	21	34.1	6	62.7
7	32.6	22	32.6	Glc′-1	95.8
8	40.4	23	206.9	2	74.2
9	48.5	24	11.8	3	78.9
10	36.3	25	16.8	4	71.2
11	24.0	26	17.6	5	79.3
12	123.1	27	26.2	6	62.3
13	144.2	28	176.4		
14	42.4	29	33.2		
15	28.2	30	23.7		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

Polygalasaponin XIII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Polygalagenin

Biological sources: *Polygala japonica* [1]

$C_{42}H_{66}O_{15}$: 810.440

$[\alpha]_D^{24}$ + 69.6° (c 0.97, MeOH) [1]

FAB-MS *m/z*: 833 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.64 (m, H-2), 4.00 (d, J = 3, H-3), 5.46 (t-like, H-12), 3.27 (dd, J = 14, 4, H-18), 9.79 (s, H-23), 1.70 (s, CH_3-24), 1.41 (s, CH_3-25), 1.01 (s, CH_3-26), 1.27 (s, CH_3-27), 0.98 (s, CH_3-29), 0.96 (s, CH_3-30)

β-D-Glcp: 4.92 (d, J = 8, H-1), 4.00 (t, J = 8.5, H-2); β-D-Glcp′: 5.19 (d, J = 8, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

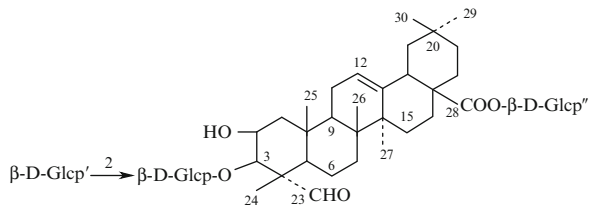
Table 1

C-1	43.5	C-16	23.7	Glc-1	101.8
2	69.0	17	46.7	2	83.2
3	82.7	18	42.1	3	78.0
4	54.3	19	46.6	4	71.2
5	48.2	20	31.0	5	78.2
6	20.3	21	34.3	6	62.5
7	32.7	22	33.3	Glc′-1	106.0
8	40.2	23	208.1	2	77.0
9	48.5	24	11.7	3	78.5
10	36.4	25	16.8	4	71.3
11	24.0	26	17.5	5	78.3
12	122.4	27	26.3	6	62.7
13	145.0	28	180.2		
14	42.4	29	33.4		
15	28.3	30	23.9		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

Polygalasaponin XIV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Polygalagenin

Biological sources: *Polygala japonica* [1]

$C_{48}H_{76}O_{20}$: 972.492

$[\alpha]_D^{24}$ + 48.6° (c 1.12, MeOH) [1]

FAB-MS *m/z*: 995 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.64 (m, H-2), 4.00 (d, J = 3, H-3), 5.42 (t-like, H-12), 3.18 (dd, J = 14, 4, H-18), 9.78 (s, H-23), 1.71 (s, CH_3-24), 1.44 (s, CH_3-25), 1.09 (s, CH_3-26), 1.24 (s, CH_3-27), 0.92 (s, CH_3-29), 0.89 (s, CH_3-30)

β-D-Glcp: 4.93 (d, J = 8, H-1), 4.02 (t, J = 8.5, H-2); β-D-Glcp′: 5.21 (d, J = 8, H-1)

β-D-Glcp″: 6.29 (d, J = 8, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	43.8	C-16	23.4	Glc-1	101.8	Glc″-1	95.8
2	69.3	17	47.0	2	83.2	2	74.2
3	83.0	18	41.8	3	78.2	3	78.9
4	54.6	19	46.2	4	71.1	4	71.2
5	48.3	20	30.8	5	78.3	5	79.3
6	20.4	21	34.1	6	62.5	6	62.3
7	32.6	22	32.6	Glc′-1	106.0		
8	40.4	23	208.1	2	77.0		
9	48.5	24	11.8	3	78.0		
10	36.3	25	16.8	4	71.3		
11	24.0	26	17.6	5	78.5		
12	123.1	27	26.2	6	62.7		
13	144.2	28	176.4				
14	42.4	29	33.2				
15	28.2	30	23.7				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

Polygalasaponin XV

See Figure Polygalasaponin XV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Polygalagenin

Biological sources: *Polygala japonica* [1]

$C_{54}H_{86}O_{25}$: 1135.260

$[\alpha]_D^{24}$ + 15.5° (c 1.10, C_5D_5N) [1]

FAB-MS *m/z*: 1158 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.63 (m, H-2), 3.96 (d, J = 3, H-3), 5.42 (t-like, H-12), 3.14 (dd, J = 14, 4, H-18), 9.76 (s, H-23), 1.65 (s, CH_3-24), 1.37 (s, CH_3-25), 1.01 (s, CH_3-26), 1.23 (s, CH_3-27), 0.90 (s, CH_3-29), 0.88 (s, CH_3-30)

β-D-Glcp: 4.92 (d, J = 8, H-1), 4.03 (t, J = 8.5, H-2); β-D-Glcp′: 5.22 (d, J = 8, H-1)

β-D-Glcp″: 6.18 (d, J = 8, H-1), 4.45 (t, J = 8.5, H-2), 4.27 (t, J = 9, H-3); β-D-Glcp‴: 5.68 (d, J = 8, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	43.8	C-16	23.4	Glc-1	101.8	Glc″-1	93.6
2	69.3	17	47.0	2	83.1	2	78.8
3	83.0	18	41.8	3	78.2	3	79.0
4	54.6	19	46.2	4	71.1	4	70.8
5	48.3	20	30.8	5	78.2	5	79.1
6	20.4	21	34.1	6	62.5	6	62.1
7	32.6	22	32.6	Glc′-1	105.9	Glc‴-1	104.6
8	40.4	23	208.1	2	77.0	2	75.9
9	48.5	24	11.8	3	77.9	3	78.4
10	36.3	25	16.8	4	71.3	4	72.8
11	24.0	26	17.6	5	78.4	5	78.1
12	123.1	27	26.2	6	62.7	6	63.9
13	144.2	28	176.4				
14	42.4	29	33.2				
15	28.2	30	23.7				

(*continued*)

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

Polygalasaponin XVI

See Figure Polygalasaponin XVI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Polygalagenin

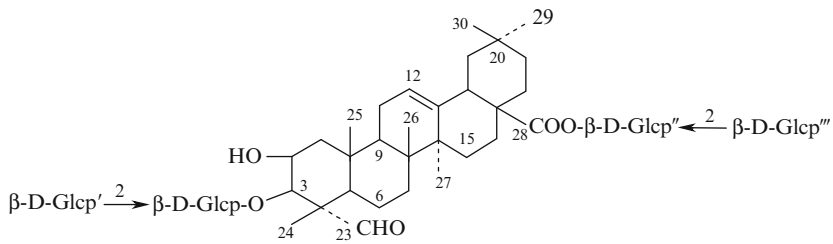
Biological sources: *Polygala japonica* [1]

$C_{59}H_{94}O_{29}$: 1267.380

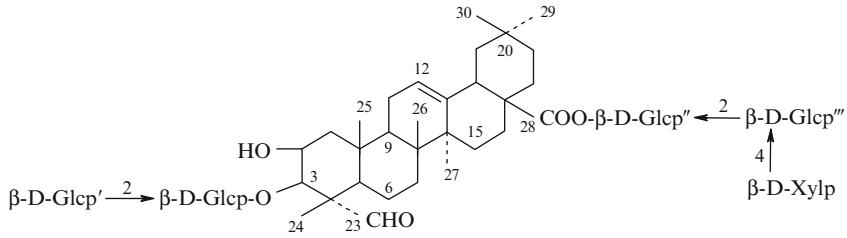
$[\alpha]_D^{24}$ + 31.9° (c 0.83, MeOH) [1]

FAB-MS *m/z*: 1290 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.63 (m, H-2), 3.97 (d, J = 3, H-3), 5.42 (t-like, H-12), 3.13 (dd, J = 14, 4, H-18), 9.74 (s, H-23), 1.67 (s, CH_3-24), 1.38 (s, CH_3-25), 1.01 (s, CH_3-26), 1.24 (s, CH_3-27), 0.91 (s, CH_3-29), 0.89 (s, CH_3-30)



Polygalasaponin XV



Polygalasaponin XVI

β-D-Glcp: 4.91 (d, J = 8, H-1), 4.02 (t, J = 8.5, H-2); β-D-Glcp′: 5.22 (d, J = 8, H-1)
β-D-Glcp″: 6.17 (d, J = 8, H-1), 4.39 (t, J = 8.5, H-2), 4.31 (t, J = 9, H-3)
β-D-Glcp‴: 5.63 (d, J = 8, H-1), 4.23 (t, J = 9, H-4)
β-D-Xylp: 5.06 (d, J = 7.5, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	43.8	C-16	23.4	Glc-1	101.8	Glc″-1	93.8	Xyl-1	105.8
2	69.3	17	47.0	2	83.2	2	78.9	2	76.4
3	83.0	18	41.8	3	78.3	3	79.2	3	78.5
4	54.6	19	46.2	4	71.2	4	70.8	4	70.9
5	48.3	20	30.8	5	78.3	5	79.5	5	67.4
6	20.4	21	34.1	6	62.7	6	62.1		
7	32.7	22	32.6	Glc′-1	105.9	Glc‴-1	104.6		
8	40.2	23	208.1	2	77.0	2	74.9		
9	48.5	24	11.8	3	78.0	3	75.7		
10	36.3	25	16.8	4	71.3	4	82.7		
11	24.0	26	17.6	5	78.3	5	76.4		
12	123.1	27	26.2	6	62.7	6	63.0		
13	144.2	28	176.4						
14	42.4	29	33.2						
15	28.2	30	23.7						

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

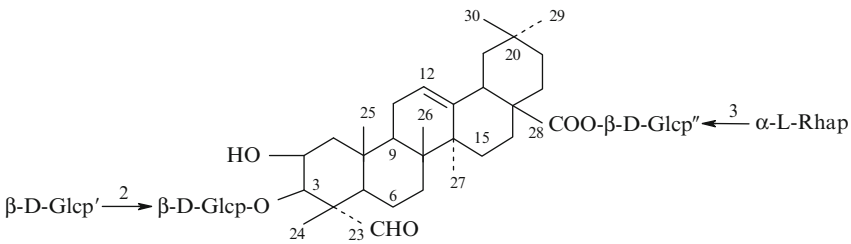
Polygalasaponin XVII

See Figure Polygalasaponin XVII
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Polygalagenin
Biological sources: *Polygala japonica* [1]
$C_{54}H_{86}O_{24}$: 1119.260
$[\alpha]_D^{24}$ + 12.0° (c 0.50, MeOH) [1]
FAB-MS *m/z*: 1142 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 4.65 (m, H-2), 3.96 (d, J = 3, H-3), 5.46 (t-like, H-12), 3.11 (dd, J = 14, 4, H-18), 9.71 (s, H-23), 1.67 (s, CH_3-24), 1.44 (s, CH_3-25), 1.08 (s, CH_3-26), 1.25 (s, CH_3-27), 0.90 (s, CH_3-29), 0.82 (s, CH_3-30)
β-D-Glcp: 4.92 (d, J = 8, H-1), 4.02 (t, J = 8.5, H-2); β-D-Glcp′: 5.21 (d, J = 8, H-1)
β-D-Glcp″: 6.17 (d, J = 8, H-1), 4.48 (t, J = 8.5, H-2), 4.21 (t, J = 9, H-3)
α-L-Rhap: 6.61 (brs, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	43.8	C-16	23.4	Glc-1	101.8	Glc″-1	94.9
2	69.3	17	47.0	2	83.3	2	75.5

(*continued*)



Polygalasaponin XVII

Table 1 (continued)

3	83.0	18	41.8	3	78.2	3	80.0
4	54.6	19	46.2	4	71.2	4	71.1
5	48.3	20	30.8	5	78.2	5	79.0
6	20.4	21	34.1	6	62.5	6	62.2
7	32.6	22	32.6	Glc′-1	106.0	Rha-1	101.3
8	40.4	23	208.1	2	77.0	2	72.4
9	48.5	24	11.8	3	78.0	3	72.6
10	36.3	25	16.8	4	71.4	4	73.9
11	24.0	26	17.6	5	78.5	5	69.7
12	123.1	27	26.2	6	62.7	6	18.7
13	144.2	28	176.4				
14	42.4	29	33.2				
15	28.2	30	23.7				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

Polygalasaponin XVIII

See Figure Polygalasaponin XVIII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Polygalagenin

Biological sources: *Polygala japonica* [1]

$C_{59}H_{94}O_{28}$: 1251.380

$[\alpha]_D^{24}$ + 0.8° (c 1.19, C_5D_5N) [1]

FAB-MS *m/z*: 1274 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.65 (m, H-2), 4.01 (d, J = 3, H-3), 5.45 (t-like, H-12), 3.11 (dd, J = 14, 4, H-18), 9.75 (s, H-23), 1.70 (s, CH_3-24), 1.43 (s, CH_3-25), 1.09 (s, CH_3-26), 1.27 (s, CH_3-27), 0.88 (s, CH_3-29), 0.85 (s, CH_3-30)

β-D-Glcp: 4.91 (d, J = 8, H-1), 4.01 (t, J = 8.5, H-2); β-D-Glcp′: 5.21 (d, J = 8, H-1)

β-D-Glcp″: 6.18 (d, J = 8, H-1), 4.39 (t, J = 8, H-2), 4.28 (t, J = 9, H-3)

α-L-Rhap: 6.45 (brs, H-1), 4.34 (t, J = 9.5, H-4)

β-D-Xylp: 5.04 (d, J = 7.5, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

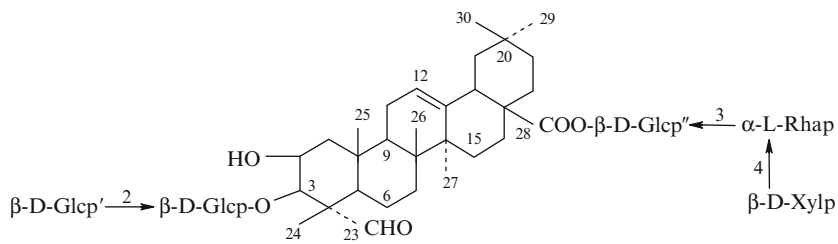
C-1	43.8	C-16	23.4	Glc-1	102.0	Glc″-1	94.8	Xyl-1	107.6
2	69.3	17	47.0	2	83.2	2	76.4	2	76.3
3	83.0	18	41.8	3	78.0	3	79.5	3	78.7
4	54.6	19	46.2	4	71.1	4	71.4	4	70.9
5	48.3	20	30.8	5	78.3	5	78.9	5	67.5
6	20.4	21	34.1	6	62.5	6	62.2		
7	32.6	22	32.6	Glc′-1	106.0	Rha-1	101.3		
8	40.4	23	208.1	2	76.9	2	71.9		
9	48.5	24	11.8	3	78.4	3	72.6		
10	36.3	25	16.8	4	71.3	4	85.3		
11	24.0	26	17.6	5	78.6	5	68.3		
12	123.1	27	26.2	6	62.7	6	18.6		
13	144.2	28	176.4						
14	42.4	29	33.2						
15	28.2	30	23.7						

References

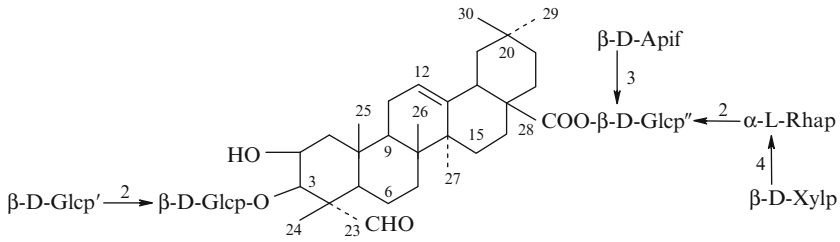
1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

Polygalasaponin XIX

See Figure Polygalasaponin XIX



Polygalasaponin XVIII



Polygalasaponin XIX

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Polygalagenin

Biological sources: *Polygala japonica* [1]

$C_{64}H_{102}O_{32}$: 1383.490

$[\alpha]_D^{24}$ −10.6° (c 0.71, C_5H_5N) [1]

FAB-MS *m/z*: 1406 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 4.64 (m, H-2), 4.01 (d, J = 3, H-3), 5.44 (t-like, H-12), 3.09 (dd, J = 14, 4, H-18), 9.77 (s, H-23), 1.70 (s, CH_3-24), 1.43 (s, CH_3-25), 1.07 (s, CH_3-26), 1.25 (s, CH_3-27), 0.88 (s, CH_3-29), 0.86 (s, CH_3-30)

β-D-Glcp: 4.91 (d, J = 8, H-1), 3.99 (t, J = 8.5, H-2); β-D-Glcp′: 5.20 (d, J = 8, H-1)

β-D-Glcp″: 6.22 (d, J = 7, H-1), 4.31 (t, J = 8, H-2), 4.15 (t, J = 8.5, H-3)

α-L-Rhap: 5.97 (brs, H-1), 4.30 (t, J = 9.5, H-4)

β-D-Xylp: 5.05 (d, J = 7, H-1)

β-D-Apif: 5.79 (d, J = 3, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

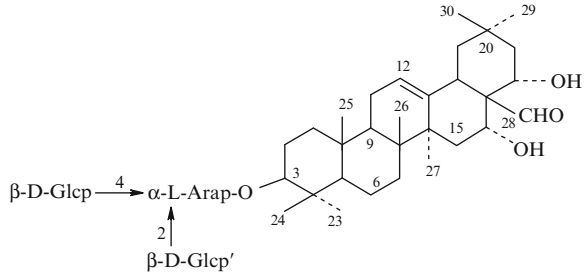
Table 1

C-1	43.8	C-16	23.4	Glc-1	101.9	Glc″-1	94.1	Xyl-1	107.3
2	69.3	17	47.0	2	83.3	2	75.7	2	76.2
3	83.0	18	41.8	3	78.0	3	86.9	3	78.7
4	54.6	19	46.2	4	71.1	4	69.3	4	70.9
5	48.3	20	30.8	5	78.3	5	78.0	5	67.5
6	20.4	21	34.1	6	62.5	6	62.0	Api-1	110.9
7	32.6	22	32.6	Glc′-1	106.0	Rha-1	101.3	2	77.9
8	40.4	23	208.1	2	77.0	2	71.6	3	80.2
9	48.5	24	11.8	3	78.2	3	72.4	4	75.3
10	36.3	25	16.8	4	71.3	4	84.5	5	64.8
11	24.0	26	17.6	5	78.5	5	68.8		
12	123.1	27	26.2	6	62.7	6	18.6		
13	144.2	28	176.4						
14	42.4	29	33.2						
15	28.2	30	23.7						

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **43**(6), 966 (1995)

Saponin A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Priverogenin A

Biological sources: *Naumburgia thyrsiflora* [1]

$C_{47}H_{76}O_{18}$: 928.503

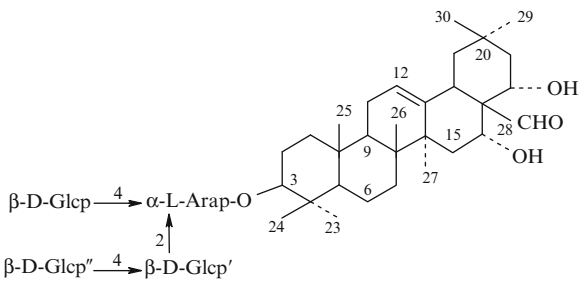
Mp: 248–250°C [1]

$[\alpha]_D^{20}$ −8.0° (c 1.0, MeOH) [1]

References

1. V.I. Karpova, P.K. Kintya, V.Ya. Chirva, Chem. Nat. Comp. **11**(3), 377 (1975)

Saponin B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Priverogenin A

Biological sources: *Naumburgia thyrsiflora* [1]

$C_{53}H_{86}O_{23}$: 1090.555

Mp: 224–226°C [1]

$[\alpha]_D^{20}$ −20° (c 1.5, MeOH) [1]

References

1. P.K. Kintya, V.I. Karpova, V.Ya. Chirva, Chem. Nat. Comp. **11**(4), 544 (1975)

Anagalloside C

CAS Registry Number: 114318-83-1

See Figure Anagalloside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Priverogenin B

Biological sources: *Anagallis arvensis* [1, 2]

$C_{60}H_{98}O_{28}$: 1266.624

Mp: 245–246°C [1]

$[\alpha]_D^{20}$ −10.4° (c 0.79, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1715, 1250, 1070, 1040 [1]

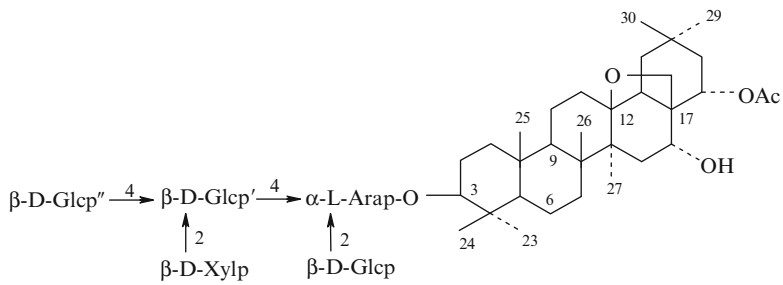
FAB-MS *m/z*: 1265 $[M-H]^-$, 1133 $[M-H-Xyl]^-$, 1103 $[M-H-Glc]^-$, 971 $[M-H-Xyl-Glc]^-$, 809 $[M-H-Xyl-2Glc]^-$, 647 $[M-H-Xyl-3Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84 (CH_3-25), 1.30 (CH_3-30), 1.08 (CH_3-24), 1.08 (CH_3-29), 1.20 (CH_3-23), 1.30 (CH_3-26), 1.55 (CH_3-27), 1.76 (brd, J = 11.5, H-18), 2.07 (Ac), 2.78 (dd, J = 11.5, 11.5, Hα-21), 2.85 (dd, J = 12.0, 11.5, Hα-19), 3.18 (dd, J = 11.0, 5.0, H-3), 3.70 (s, H_2-28), 4.55 (m, H-16), 6.03 (dd, J = 11.5, 5.0, H-22), 4.76 (d, J = 6.0, H-1 of Ara), 5.42 (d, J = 7.5, H-1 of Glc), 4.82 (d, J = 7.5, H-1 of Glc′), 4.88 (d, J = 7.5, H-1 of Xyl), 5.12 (d, J = 7.3, H-1 of Glc″) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-16	70.8	Ara-1	104.8	Glc′-1	104.8	Glc″-1	104.9
2	26.8	17	49.0	2	79.6	2	84.0	2	75.8
3	89.4	18	51.5	3	73.5	3	75.0	3	78.2
4	39.9	19	38.2	4	79.0	4	80.2	4	71.6
5	55.9	20	33.4	5	64.5	5	76.5	5	78.2
6	18.2	21	42.2	Glc-1	104.8	6	61.6	6	62.4
7	34.6	22	77.5	2	76.3	Xyl-1	107.3	Ac	171.0
8	42.8	23	28.2	3	78.4	2	76.1		21.4
9	50.6	24	16.8	4	72.0	3	77.5		
10	37.1	25	16.6	5	78.1	4	70.8		
11	19.4	26	18.8	6	63.2	5	67.4		
12	33.1	27	19.9						
13	86.5	28	77.0						
14	45.2	29	33.5						
15	36.7	30	25.7						

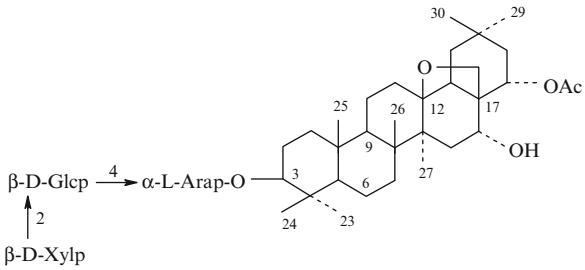


Anagalloside C

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)
2. K.W. Glombitza, H. Kurth, Planta Med. **53**, 548 (1987)

Anagallosaponin III



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Priverogenin B

Biological sources: *Anagallis arvensis* [1]

$C_{48}H_{78}O_{18}$: 942.518

Mp: 246–247°C (MeOH) [1]

$[\alpha]_D^{21}$ −17.3° (c 2.07, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1730, 1250, 1080, 1045 [1]

FAB-MS *m/z*: 941 $[M-H]^-$, 809 $[M-H-Xyl]^-$, 779 $[M-H-Glc]^-$, 647 $[M-H-Xyl-Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.89 (CH_3-25), 1.02 (CH_3-30), 1.03 (CH_3-24), 1.09 (CH_3-29), 1.29 (s, CH_3-23), 1.32 (CH_3-26), 1.57 (CH_3-27), 1.78 (dd, J = 12.0, 4.0, H-18), 2.04 (CH_3COO^-), 2.80 (dd, J = 12.0, 10.0, Hα-21), 2.85 (dd, J = 14.0, 12.0, Hα-19), 3.33 (dd, J = 12.0, 4.5, H-3), 3.74 (d, J = 8.0, H_2-28), 4.56 (m, H-16), 5.27 (dd, J = 12.0, 5.0, H-22)

α-L-Arap: 4.67 (d, J = 7.3, H-1), 4.14 (m, H-4)

β-D-Glcp: 5.03 (d, J = 8.0, H-1)

β-D-Xylp: 4.90 (d, J = 7.8, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

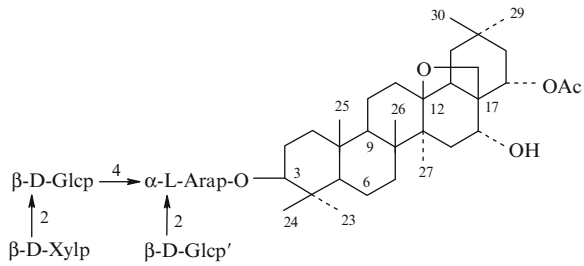
C-1	39.3	C-16	70.7	Ara-1	107.6	Xyl-1	108.1
2	26.9	17	48.9	2	73.8	2	76.4
3	88.9	18	51.3	3	74.5	3	78.0
4	39.8	19	38.2	4	81.3	4	70.5
5	55.8	20	33.3	5	66.5	5	67.3
6	18.0	21	42.1	Glc-1	105.4		
7	34.4	22	77.4	2	86.3		
8	42.7	23	28.1	3	77.7		
9	50.5	24	16.8	4	71.7		
10	37.0	25	16.5	5	78.4		
11	19.3	26	18.6	6	62.4		
12	33.0	27	19.8				
13	86.4	28	76.9				
14	45.1	29	33.3				
15	36.6	30	25.5				
		Ac	170.6				
			21.1				

(*continued*)

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)

Anagallosaponin IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Priverogenin B

Biological sources: *Anagallis arvensis* [1]

$C_{54}H_{88}O_{23}$: 1104.571

Mp: 237–239°C (MeOH) [1]

$[\alpha]_D^{20}$ −19.4° (c 1.39, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1715, 1250, 1070, 1045 [1]

FAB-MS *m/z*: 1103 $[M-H]^-$, 971 $[M-H-Xyl]^-$, 941 $[M-H-Glc]^-$, 809 $[M-H-Xyl-Glc]^-$, 647 $[M-H-Xyl-2Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85 (CH_3-25), 1.02 (CH_3-30), 1.09 (CH_3-29), 1.10 (CH_3-24), 1.22 (CH_3-23), 1.33 (CH_3-26), 1.57 (CH_3-27), 1.76 (dd, J = 12.0, 4.0, H-18), 2.03 (Ac), 2.80 (dd, J = 12.0, 12.0, Hα-21), 2.85 (dd, J = 13.0, 12.0, Hα-19), 3.16 (dd, J = 11.0, 5.5, H-3), 3.67, 3.70 (d, J = 8.0, H_2-28), 5.27 (dd, J = 12.0, 5.0, H-22)
α-L-Arap: 4.79 (d, J = 5.6, H-1)
β-D-Glcp: 5.50 (d, J = 7.5, H-1); β-D-Glcp′: 5.00 (d, J = 7.5, H-1)
β-D-Xylp: 4.92 (d, J = 7.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	70.6	Ara-1	104.8	Glc′-1	104.2
2	26.6	17	48.8	2	79.7	2	85.5
3	89.0	18	51.3	3	73.3	3	77.6
4	39.8	19	38.2	4	78.6	4	71.1
5	55.7	20	33.3	5	64.2	5	78.4
6	18.0	21	42.1	Glc-1	104.9	6	62.3
7	34.4	22	77.3	2	76.3	Xyl-1	107.7
8	42.6	23	28.1	3	78.3	2	76.2
9	50.4	24	16.7	4	71.9	3	77.9
10	36.9	25	16.4	5	78.0	4	70.7
11	19.2	26	18.6	6	63.0	5	67.5
12	33.0	27	19.7				
13	86.3	28	76.9				
14	45.1	29	33.3				
15	36.6	30	25.5				
		Ac	170.5				
			21.1				

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)

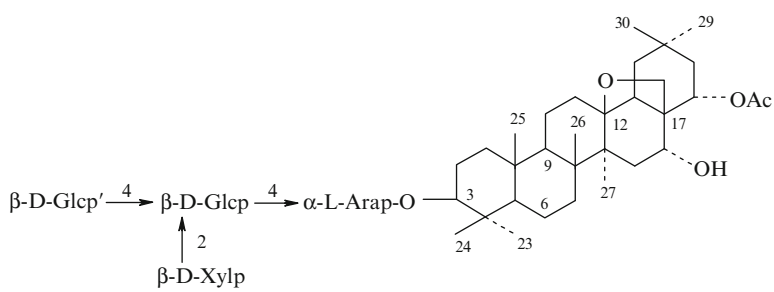
Anagallosaponin V

See Figure Anagallosaponin V
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Priverogenin B
Biological sources: *Anagallis arvensis* [1]
$C_{54}H_{88}O_{23}$: 1104.571
Mp: 253–255°C (MeOH) [1]
$[\alpha]_D^{20}$ −26.2° (c 2.51, C_5H_5N) [1]
IR (film) ν_{max} cm^{-1}: 3390, 1730, 1250, 1070, 1045 [1]
FAB-MS *m/z*: 1103 $[M-H]^-$, 971 $[M-H-Xyl]^-$, 941 $[M-H-Glc]^-$, 809 $[M-H-Xyl-Glc]^-$, 647 $[M-H-Xyl-2Glc]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.88 (CH_3-25), 1.01 (CH_3-30), 1.02 (CH_3-24), 1.08 (CH_3-29), 1.29 (CH_3-23), 1.32 (CH_3-26), 1.60 (CH_3-27), 1.77 (dd, J = 12.0, 4.0, H-18), 2.04 (Ac), 2.80 (dd, J = 12.0, 11.5, Hα-21), 2.85 (dd, J = 13.0, 12.0, Hα-19), 3.42 (dd, J = 12.0, 5.0, H-3), 3.71, 3.74 (d, J = 8.0, H_2-28), 4.56 (m, H-16), 5.27 (dd, J = 11.5, 5.5, H-22)
α-L-Arap: 4.65 (d, J = 7.8, H-1)
β-D-Glcp: 4.86 (d, J = 6.5, H-1); β-D-Glcp′: 5.15 (d, J = 7.4, H-1)
β-D-Xylp: 4.93 (d, J = 7.5, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	70.7	Ara-1	107.6	Xyl-1	107.8
2	26.9	17	48.9	2	73.8	2	76.3
3	88.9	18	51.3	3	74.5	3	77.6
4	39.8	19	38.1	4	81.4	4	70.3
5	55.8	20	33.3	5	66.4	5	67.2
6	18.0	21	42.1	Glc-1	104.8	Glc′-1	105.1

(*continued*)



Anagallosaponin V

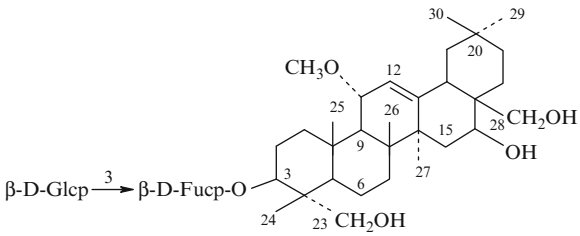
Table 1 (continued)

7	34.4	22	77.4	2	84.9	2	75.8
8	42.7	23	28.1	3	74.9	3	78.2
9	50.5	24	16.8	4	80.2	4	71.5
10	37.0	25	16.5	5	76.4	5	78.4
11	19.2	26	18.6	6	61.7	6	62.3
12	33.0	27	19.8				
13	86.3	28	76.9				
14	45.1	29	33.3				
15	36.6	30	25.5				
		Ac	170.5				
			21.1				

References

1. N. Shoji, A. Umeyama, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **42**(9), 1750 (1994)

Saikosaponin b_3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum marginatum* [1], *B. falcatum* [2]

$C_{43}H_{72}O_{14}$: 812.492

Mp: 260–260.5°C [1]

$[\alpha]_D^{25}$ 0° (c 0.42, MeOH) [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	40.0	C-16	66.2	Fuc-1	105.9
2	26.2	17	43.6	2	71.7
3	81.7	18	43.9	3	85.1
4	43.6	19	46.9	4	71.7

(*continued*)

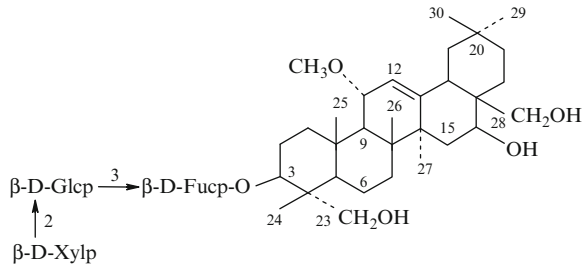
Table 1 (continued)

5	47.5	20	31.0	5	70.9
6	18.3	21	34.2	6	17.1
7	33.2	22	25.9	Glc-1	106.3
8	40.9	23	64.1	2	75.6
9	52.0	24	13.5	3	78.2
10	38.0	25	17.9	4	72.0
11	75.9	26	18.3	5	78.6
12	122.5	27	26.2	6	62.6
13	148.2	28	68.6		
14	43.8	29	33.2		
15	36.7	30	24.0		
		CH_3O	54.0		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. A. Shimaoka, S. Seo, H. Minato, J. Chem. Soc. Perkin Trans. **I**(20), 2043 (1975)

Saikosaponin 15



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum marginatum* [1]

$C_{48}H_{80}O_{18}$: 944.534

$[\alpha]_D^{24}$ + 2.4° (c 2.5, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	40.1	C-16	66.2	Fuc-1	105.1
2	26.3	17	43.7	2	71.3

(*continued*)

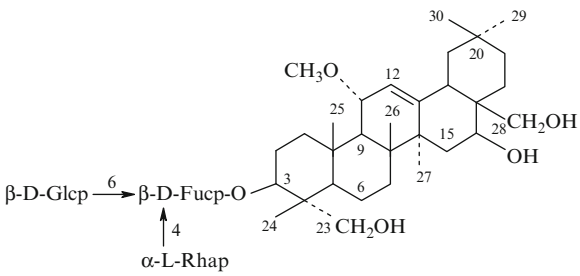
Table 1 (continued)

3	81.7	18	43.8	3	85.8
4	43.7	19	47.0	4	71.7
5	47.6	20	31.1	5	70.9
6	18.3	21	34.2	6	17.3
7	33.2	22	25.9	Glc-1	104.4
8	41.0	23	64.4	2	86.8
9	52.1	24	13.5	3	77.5
10	38.1	25	17.9	4	70.9
11	76.1	26	18.3	5	78.3
12	122.5	27	26.3	6	62.1
13	148.3	28	68.5	Xyl-1	107.8
14	43.8	29	33.2	2	75.9
15	36.7	30	24.0	3	77.7
		CH_3O	54.1	4	70.4
				5	67.5

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin 16



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum marginatum* [1]

$C_{49}H_{82}O_{18}$: 958.550

$[\alpha]_D^{24}$ −26.9° (c 1.3, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	39.9	C-16	66.2	Glc-1	105.7	Rha-1	102.9
2	26.3	17	43.6	2	75.0	2	72.5

(*continued*)

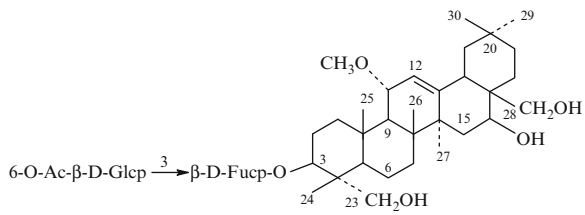
Table 1 (continued)

3	82.0	18	43.9	3	76.7	3	72.5
4	43.6	19	46.9	4	79.7	4	73.7
5	47.6	20	31.1	5	75.4	5	70.5
6	18.4	21	34.2	6	68.7	6	18.4
7	33.3	22	25.9	Glc′-1	105.2		
8	40.9	23	64.4	2	74.7		
9	52.0	24	13.6	3	78.2		
10	38.1	25	17.9	4	71.4		
11	76.0	26	18.4	5	78.3		
12	122.5	27	26.3	6	62.5		
13	148.2	28	68.5				
14	43.8	29	33.3				
15	36.7	30	24.0				
		CH_3O	54.1				

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin 19



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum marginatum* [1]

$C_{45}H_{74}O_{15}$: 854.502

$[\alpha]_D^{18}$ 0° (c 3.0, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	40.1	C-16	66.2	Fuc-1	106.0
2	25.8	17	43.6	2	71.4
3	81.8	18	43.8	3	85.2
4	43.6	19	46.9	4	71.4

(*continued*)

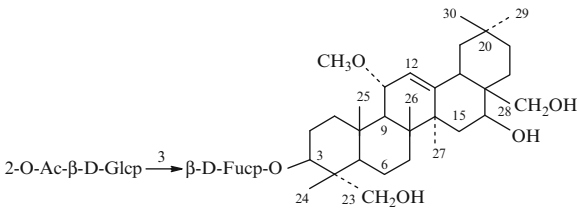
Table 1 (continued)

5	47.6	20	31.0	5	70.9
6	18.3	21	34.2	6	17.3
7	33.3	22	25.9	Glc-1	106.0
8	40.9	23	64.2	2	75.2
9	52.0	24	13.5	3	78.0
10	38.0	25	17.9	4	71.9
11	75.9	26	18.3	5	75.3
12	122.5	27	26.2	6	64.7
13	148.2	28	68.6	Ac-1	170.8
14	43.8	29	33.3	2	20.8
15	36.7	30	24.0		
		CH_3O	54.0		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin 24



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum rockii* [1]

$C_{45}H_{74}O_{15}$: 854.502

$[\alpha]_D^{18}$ 0° (c 1.0, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	39.9	C-16	66.2	Fuc-1	105.9
2	26.2	17	43.5	2	71.5
3	81.8	18	43.8	3	84.2
4	43.5	19	46.8	4	71.5
5	47.5	20	31.0	5	70.5
6	18.3	21	34.0	6	17.2
7	33.2	22	25.8	Glc-1	103.3
8	40.8	23	64.1	2	75.9

(*continued*)

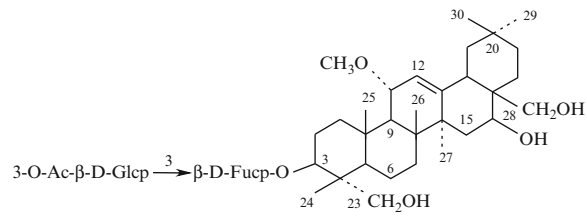
Table 1 (continued)

9	51.9	24	13.5	3	75.3
10	38.1	25	17.8	4	71.5
11	75.9	26	18.3	5	78.3
12	122.5	27	26.2	6	62.2
13	148.2	28	68.6	Ac-1	170.2
14	43.8	29	33.2	2	21.5
15	36.6	30	24.0		
		CH_3O	53.9		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin 27



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum rockii* [1]

$C_{45}H_{74}O_{15}$: 854.502

$[\alpha]_D^{18}$ 0° (c 1.9, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	40.0	C-16	66.2	Fuc-1	105.9
2	26.2	17	43.6	2	71.5
3	81.8	18	43.7	3	84.8
4	43.6	19	46.9	4	71.9
5	47.5	20	31.0	5	70.8
6	18.3	21	34.2	6	17.2
7	33.2	22	25.9	Glc-1	105.9
8	40.8	23	64.0	2	73.4
9	51.9	24	13.5	3	79.0

(*continued*)

Table 1 (continued)

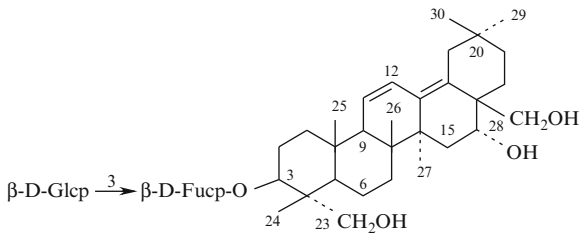
10	38.0	25	17.9	4	69.1
11	75.9	26	18.3	5	78.2
12	122.6	27	26.2	6	61.9
13	148.2	28	68.7	Ac-1	170.8
14	43.7	29	33.2	2	21.2
15	36.7	30	24.0		
		CH_3O	53.9		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikogenin D

Saikosaponin b_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum rockii* [1]

$C_{42}H_{68}O_{13}$: 780.465

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	38.4	C-16	67.6	Fuc-1	105.8
2	26.0	17	45.2	2	71.4
3	81.7	18	133.0	3	85.0
4	43.6	19	39.0	4	72.0
5	47.3	20	32.3	5	70.9
6	18.2	21	35.4	6	17.2
7	31.8	22	24.4	Glc-1	106.2
8	41.0	23	64.0	2	75.6
9	54.0	24	13.1	3	78.5
10	36.5	25	18.8	4	71.7

(*continued*)

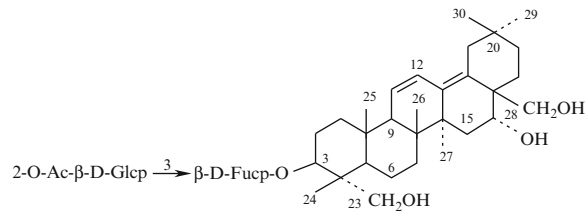
Table 1 (continued)

11	126.2	26	17.2	5	78.2
12	126.2	27	21.8	6	62.5
13	136.0	28	64.6		
14	41.8	29	25.1		
15	32.6	30	32.6		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin 23



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum rockii* [1]

$C_{44}H_{70}O_{14}$: 822.476

$[\alpha]_D^{18}$ −8.8° (c 1.4, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N):

Table 1

C-1	38.4	C-16	67.6	Fuc-1	106.3
2	26.1	17	45.2	2	71.7
3	81.7	18	133.0	3	84.2
4	43.6	19	39.0	4	71.7
5	47.3	20	32.2	5	70.6
6	18.2	21	35.4	6	17.2
7	31.8	22	24.4	Glc-1	103.4
8	41.0	23	64.0	2	76.1
9	54.0	24	13.0	3	75.4
10	36.5	25	18.8	4	71.7
11	126.2	26	17.2	5	78.5
12	126.2	27	21.8	6	62.3
13	136.0	28	64.7	Ac-1	170.5

(*continued*)

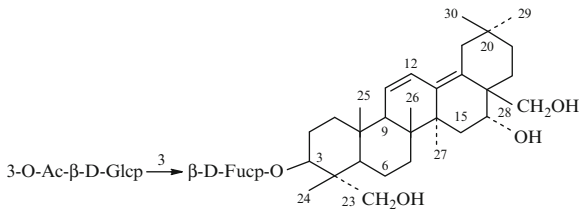
Table 1 (continued)

14	41.8	29	25.1	2	21.5
15	32.6	30	32.6		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin 25



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum rockii* [1]

$C_{44}H_{70}O_{14}$: 822.476

$[\alpha]_D^{18}$ −4.6° (c 1.5, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

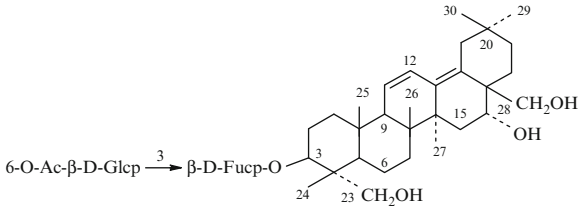
Table 1

C-1	38.4	C-16	67.6	Fuc-1	106.0
2	26.1	17	45.2	2	71.5
3	81.7	18	133.0	3	84.8
4	43.6	19	38.9	4	72.0
5	47.3	20	32.3	5	70.9
6	18.2	21	35.4	6	17.2
7	31.8	22	24.3	Glc-1	106.0
8	41.0	23	64.0	2	73.4
9	54.0	24	13.1	3	79.1
10	36.5	25	18.8	4	69.2
11	126.2	26	17.2	5	78.3
12	126.2	27	21.8	6	61.9
13	136.0	28	64.7	Ac-1	170.8
14	41.8	29	25.1	2	21.2
15	32.6	30	32.6		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin 26



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-olean-12-ene-3β,16β,23,28-tetraol

Biological sources: *Bupleurum rockii* [1]

$C_{44}H_{70}O_{14}$: 822.476

$[\alpha]_D^{18}$ −13.7° (c 1.6, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

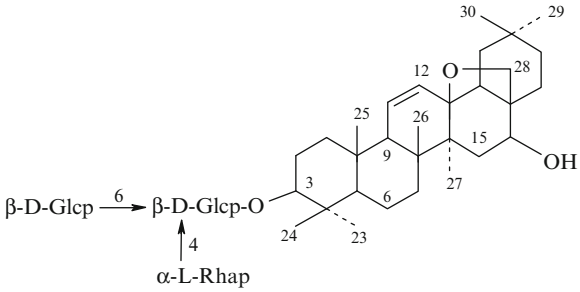
C-1	38.4	C-16	67.6	Fuc-1	105.9
2	26.0	17	45.2	2	71.4
3	81.7	18	133.0	3	85.2
4	43.6	19	39.0	4	71.4
5	47.3	20	32.2	5	70.9
6	18.2	21	35.4	6	17.9
7	31.8	22	24.3	Glc-1	106.0
8	41.0	23	64.1	2	75.1
9	54.0	24	13.1	3	77.9
10	36.5	25	18.8	4	71.9
11	126.2	26	17.3	5	75.3
12	126.2	27	21.8	6	64.6
13	136.0	28	64.6	Ac-1	170.8
14	41.8	29	25.1	2	20.7
15	32.6	30	32.6		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin c

CAS Registry Number: 20736-08-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin E

Biological sources: *Bupleurum marginatum*, *B. rockii* [1], *B. falcatum* [2], *B. longeradiatum* [3]

$C_{48}H_{78}O_{17}$: 926.523

Mp: 202–210°C [1]

$[\alpha]_D$ + 4.3° (c 2.0, EtOH) [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

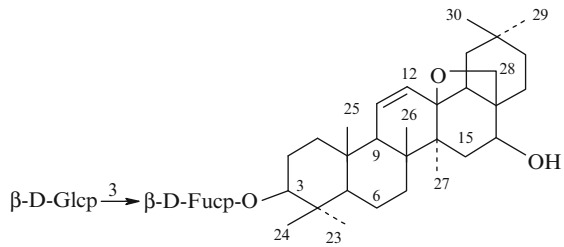
C-1	38.4	C-16	64.1	Glc-1	106.6	Rha-1	102.7
2	26.4	17	46.9	2	75.0	2	72.4
3	89.0	18	52.1	3	76.7	3	72.4
4	39.5	19	37.7	4	79.5	4	73.6
5	55.2	20	31.5	5	75.4	5	70.4
6	18.4	21	34.7	6	69.0	6	18.4
7	31.5	22	25.7	Glc-1	104.9		
8	42.1	23	27.8	2	74.6		
9	52.7	24	16.3	3	78.2		
10	36.2	25	18.1	4	71.4		
11	132.1	26	19.9	5	78.2		
12	131.1	27	20.9	6	62.4		
13	83.9	28	72.9				
14	45.5	29	33.7				
15	35.9	30	23.8				

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. T. Kubota, H. Hinoh, Tetrahedron Lett. **24**, 303 (1968)
3. H. Kimata, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4373 (1982)

Saikosaponin E

CAS Registry Number: 64340-44-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin E

Biological sources: *Bupleurum marginatum* [1], *B. falcatum* [2]

$C_{42}H_{68}O_{12}$: 764.471

Mp: 227–230°C (MeOH-Et_2O) [1]

$[\alpha]_D^{24}$ + 40.8° (c 1.05, MeOH) [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

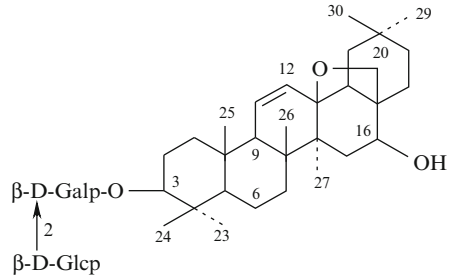
C-1	38.6	C-16	64.0	Fuc-1	106.8
2	26.6	17	47.0	2	71.5
3	88.7	18	52.1	3	85.1
4	39.8	19	37.8	4	71.9
5	55.4	20	31.6	5	71.0
6	18.2	21	34.7	6	17.3
7	31.9	22	25.8	Glc-1	106.6
8	42.2	23	27.8	2	75.8
9	52.9	24	16.3	3	78.4
10	36.4	25	18.1	4	72.1
11	132.0	26	20.0	5	78.7
12	131.3	27	20.9	6	62.7
13	84.0	28	73.0		
14	45.7	29	33.7		
15	36.1	30	23.8		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. H. Ishii, M. Nakamura, S. Seo, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **28**(8), 2367 (1980)

Corchorusin D

CAS Registry Number: 108886-04-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin E

Biological sources: *Corchorus acutangulus* [1]

$C_{42}H_{68}O_{13}$: 780.465

Mp: 210–212°C [1]

$[\alpha]_D$ + 40° (c 1.2, MeOH) [1]

FAB-MS *m/z*: 765 (5), 764 (12), 763 $[MH\text{-}H_2O]^+$ (21), 762 (4), 761 (4), 747 (2), 746 (5), 745 $[MH\text{-}2H_2O]^+$ (10), 658 (1), 657 (2), 655 (1), 583 [MH-Glc + $2H_2O]^+$ (5), 513 (12), 455 (14), 453 (21), 451 (12), 441 (19), 440 (38), 439 [MH-Glc + Gal + $H_2O]^+$ (100), 438 (19), 437 (30), 436 (9), 435 (16), 423 (28), 422 (37), 421 [MH-Gal + Glc + $2H_2O]^+$ (93), 419 (23), 403 [MH-Glc + Gal + $3H_2O]^+$ (26) [1]

FAB-MS *m/z*: 872 (42), 871 $[M\text{-}H + Glc]^-$ (84), 781 (25), 780 (50), 779 $[M\text{-}H]^-$(100), 778 (8), 777 (16), 709 (12), 671 (12), 655 (12), 653 (8), 619 (12), 617 $[M\text{-}H\text{-}Gal]^-$(16), 531 (16), 367 (25), 365 (21), 363 (29) [1]

^{1}H NMR (99.6 MHz, J/Hz, $CDCl_3$) (for permethylate): 0.80, 0.92, 0.92, 1.00, 1.04, 1.08 (s, $CH_3 \times 6$), 3.18, 3.92 (d, J = 8.0, H_2-28), 3.36, 3.40, .3.42, 3.48, 3.50, 3.56, 3.60, 3.64 ($CH_3O \times 8$), 5.40 (dd, J = 10.0, 2.0, H-11), 5.88 (d, J = 10, H-12)

β-D-Galp: 4.28 (d, J = 7.0, H-1)

β-D-Glcp: 4.72 (d, J = 7.0, H-1) [1]

^{13}C NMR (25.05 MHz, C_5D_5N): [1]

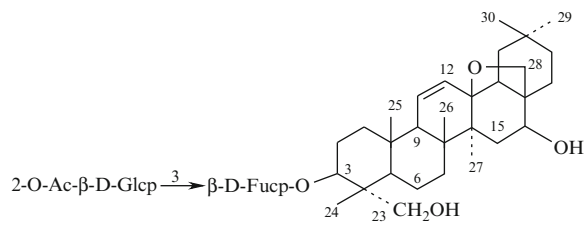
Table 1

C-1	38.7	C-16	64.2	Gal-1	105.6
2	25.7	17	46.9	2	81.5
3	88.9	18	52.2	3	71.8
4	39.7	19	37.9	4	69.9
5	55.5	20	31.5	5	76.5
6	17.9	21	34.8	6	62.0
7	31.9	22	26.5	Glc-1	105.8
8	42.2	23	27.9	2	75.2
9	53.0	24	16.0	3	77.8
10	36.3	25	18.0	4	71.8
11	132.0	26	19.8	5	77.6
12	131.0	27	20.8	6	62.8
13	83.9	28	72.8		
14	45.7	29	33.6		
15	36.0	30	23.8		

References

1. S.B. Mahato, B.C. Pal, J. Chem. Soc. Perkin Trans. **I**(3), 629 (1987)

2-O-Acetylsaikosaponin a



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Bupleurum rockii* [1]

$C_{44}H_{70}O_{14}$: 822.476

$[\alpha]_D^{18}$ + 41.7° (c 2.1, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	64.0	Fuc-1	106.0
2	26.0	17	46.9	2	71.4
3	81.5	18	52.1	3	84.2
4	43.6	19	37.7	4	71.4

Table 1 (continued)

5	47.2	20	31.5	5	70.6
6	17.2	21	34.6	6	17.2
7	31.5	22	25.7	Glc-1	103.4
8	42.1	23	64.0	2	76.0
9	53.0	24	12.9	3	75.4
10	36.2	25	18.7	4	71.7
11	132.1	26	20.0	5	78.5
12	131.1	27	20.8	6	62.3
13	83.9	28	73.0	Ac-1	170.5
14	45.6	29	33.6	2	21.1
15	36.2	30	23.8		

Pharm./Biol.: Anti-exudative, anti-inflammatory action [2]

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. M. Yamamoto, A. Kumagai, Y. Yamamura, Arzneim.-Forsch. (Drug Res.) **25**, 1021 (1975)

3-O-Acetylsaikosaponin a

See Figure 3-O-Acetylsaikosaponin a

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Bupleurum marginatum*, *B. rockii* [1]

$C_{44}H_{70}O_{14}$: 822.476

$[\alpha]_D^{18}$ + 63.7° (c 2.0, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	64.0	Fuc-1	106.1
2	26.1	17	47.0	2	71.5
3	81.6	18	52.1	3	84.8
4	43.7	19	37.7	4	72.1
5	47.2	20	31.5	5	70.9
6	17.2	21	34.7	6	17.2
7	31.5	22	25.7	Glc-1	106.1
8	42.2	23	64.0	2	73.5
9	53.0	24	13.0	3	79.1
10	36.2	25	18.7	4	69.2
11	132.2	26	20.0	5	78.4
12	131.1	27	20.8	6	62.0
13	84.0	28	73.0	Ac-1	170.8
14	45.6	29	33.6	2	21.2
15	36.2	30	23.6		

Pharm./Biol.: Anti-exudative, anti-inflammatory action [2]

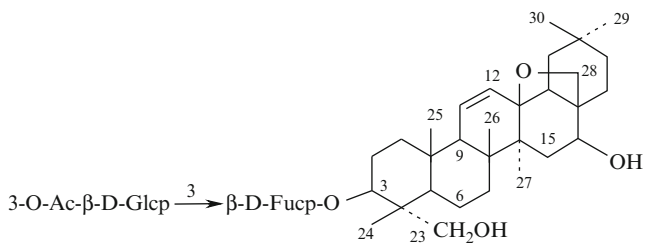
References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. M. Yamamoto, A. Kumagai, Y. Yamamura, Arzneim.-Forsch. (Drug Res.) **25**, 1021 (1975)

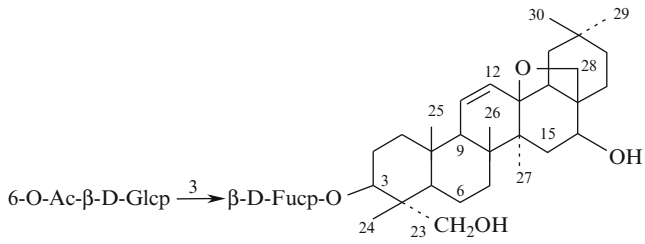
6-O-Acetylsaikosaponin a

See Figure 6-O-Acetylsaikosaponin a

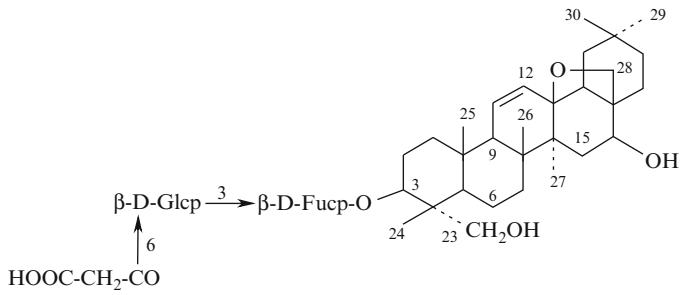
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides



3-O-Acetylsaikosaponin a



6-O-Acetylsaikosaponin a



6″-O-Malonylsaikosaponin a

of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Bupleurum marginatum*, *B. rockii* [1], *B. falcatum* [2]

$C_{44}H_{70}O_{14}$: 822.476

Mp: 217–224°C [1]

$[\alpha]_D^{24}$ + 44.9° (MeOH) [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	64.0	Fuc-1	105.8
2	25.8	17	46.9	2	71.4
3	81.6	18	52.1	3	85.1
4	43.6	19	37.9	4	71.4
5	47.2	20	31.5	5	70.7
6	17.3	21	34.6	6	17.3
7	31.5	22	25.8	Glc-1	105.8
8	42.1	23	64.0	2	75.2
9	53.0	24	12.9	3	77.9
10	36.2	25	18.7	4	71.8
11	132.2	26	20.0	5	75.2
12	131.1	27	20.8	6	64.6
13	83.9	28	73.0	Ac-1	170.9
14	45.5	29	33.6	2	20.8
15	36.2	30	23.8		

Pharm./Biol.: Anti-exudative, anti-inflammatory action [3]

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. H. Ishii, M. Nakamura, S. Seo, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **28**, 2367 (1980)
3. M. Yamamoto, A. Kumagai, Y. Yamamura, Arzneim.-Forsch. (Drug Res.) **25**, 1021 (1975)

6″-O-Malonylsaikosaponin a

See Figure 6″-O-Malonylsaikosaponin a

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Bupleurum falcatum* [1]
$C_{45}H_{70}O_{16}$: 866.466
$[\alpha]_D^{26}$ + 42.8° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3416, 2944, 1730, 1592, 1386, 974, 906 [1]
FAB-MS *m/z*: 905 $[M + K]^+$, 889 $[M + Na]^+$, 861, 455, 437 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.70, 0.92, 0.95, 0.98, 1.04, 1.09 (s, CH_3 × 6), 1.28 (d, J = 6.4, CH_3), 4.25 (dd, J = 12.0, 6.1), 4.47 (dd, J = 12.0, 2.0), 5.38 (dd, J = 10.5, 3.0), 5.95 (d, J = 10.5) [1]
^{13}C NMR (CD_3OD): [1]

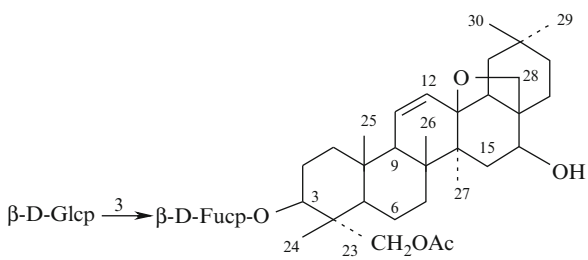
Table 1

C-3	83.2	Fuc-1	105.3
16	65.4	2	72.0
23	64.9	3	84.9
		4	72.4
		5	71.4
		6	–
		Glc-1	105.6
		2	75.4
		3	77.6
		4	71.6
		5	75.3
		6	65.0

References

1. N. Ebata, K. Nakajima, H. Taguchi, H. Mitsuhashi, Chem. Pharm. Bull. **38**(5), 1432 (1990)

23-O-Acetylsaikosaponin a



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F
Biological sources: *Bupleurum falcatum* [1]
$C_{44}H_{70}O_{14}$: 822.476
Mp: 223–231°C [1]
$[\alpha]_D^{24}$ + 47.6° (c 1.01, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3420, 1715, 1250, 1075 [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.87, 0.96, 1.34, 1.12, 0.94, 0.91 (s, CH_3 × 6), 2.12 (Ac-1)
β-D-Fucp: 1.46 (CH_3-6) [1]
^{13}C NMR (15 MHz, C_5D_5N): [1]

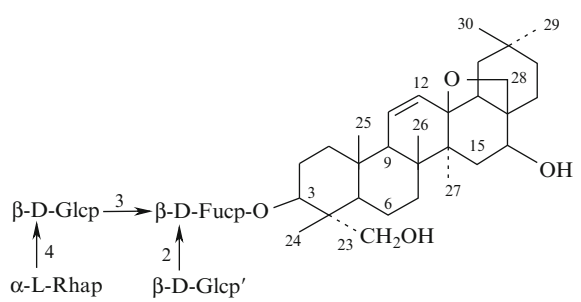
Table 1

C-1	38.7	C-16	64.4	Fuc-1	106.0
2	26.0	17	47.1	2	71.6
3	82.1	18	52.4	3	85.3
4	42.8	19	38.2	4	72.1
5	48.9	20	31.7	5	71.0
6	18.1	21	35.0	6	17.0
7	32.1	22	25.8	Glc-1	106.0
8	42.5	23	66.4	2	75.7
9	53.4	24	12.6	3	78.3
10	36.7	25	18.4	4	72.1
11	131.8	26	20.0	5	78.3
12	131.4	27	20.8	6	63.1
13	84.1	28	73.1	Ac-1	170.5
14	46.0	29	33.7	2	20.8
15	36.2	30	23.9		

References

1. H. Ishii, M. Nakamura, S. Seo, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **28**(8), 2367 (1980)

Buddlejasaponin I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Buddleja japonica* [1]

$C_{54}H_{88}O_{22}$: 1088.576

$[\alpha]_D^{25}$ + 34.4° (c 0.91, MeOH) [1]

FAB-MS *m/z*: 1111 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz,, J/Hz, C_5D_5N): 4.14 (dd, J = 12, 5, H-3), 5.97 (brd, J = 10, H-11), 5.65 (dd, J = 10, 3, H-12), 4.49 (H-16), 3.68 (d, J = 10, H-23), 4.36 (d, J = 10, H-23), 1.05 (s, CH_3-24), 0.97 (s, CH_3-25), 1.37 (s, CH_3-26), 1.09 (s, CH_3-27), 3.33 (bd, J = 7, H-28), 4.39 (d, J = 7, H-28), 0.94 (s, CH_3-29), 0.90 (s, CH_3-30)

β-D-Fucp: 4.94 (d, J = 8, H-1); β-D-Glcp: 5.21 (d, J = 8, H-1); β-D-Glcp′: 5.56 (d, J = 8, H-1); α-L-Rhap: 5.77 (brs, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	82.6	Fuc-1	104.1	Glc′-1	104.0
11	132.2	2	77.2	2	76.3
12	131.2	3	84.8	3	78.9
16	64.1	4	72.0	4	72.2
23	64.7	5	70.5	5	77.5
28	73.0	6	17.2	6	63.2
		Glc-1	105.0	Rha-1	102.8
		2	75.5	2	72.6
		3	76.5	3	72.8
		4	78.3	4	74.0
		5	77.3	5	70.4
		6	61.4	6	18.5

References

1. A. Yamamoto, T. Miyase, A. Ueno, T. Maeda, Chem. Pharm. Bull. **39**(10), 2764 (1991)

Buddlejasaponin II

See Figure Buddlejasaponin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Buddleja japonica* [1]

$C_{53}H_{86}O_{22}$: 1074.561

$[\alpha]_D^{25}$ + 28.2° (c 0.97, C_5H_5N) [1]

FAB-MS *m/z*: 1097 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.14 (dd, J = 12, 5, H-3), 5.98 (brd, J = 10, H-11), 5.64 (dd, J = 10, 3, H-12), 4.49 (H-16), 3.71 (d, J = 11, H-23), 4.36 (d, J = 11, H-23), 1.06 (s, CH_3-24), 0.98 (s, CH_3-25), 1.38 (s, CH_3-26), 1.10 (s, CH_3-27), 3.33 (d, J = 8, H-28), 4.36 (H-28), 0.94 (s, CH_3-29), 0.90 (s, CH_3-30)

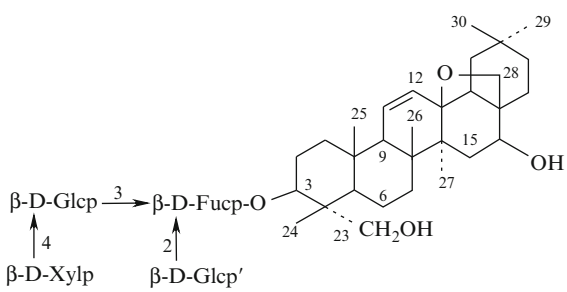
β-D-Fucp: 4.91 (d, J = 8, H-1); β-D-Glcp: 5.24 (d, J = 8, H-1); β-D-Glcp′: 5.56 (d, J = 8, H-1); β-D-Xylp: 5.10 (d, J = 8, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	82.6	Fuc-1	104.1	Glc′-1	104.1
11	132.2	2	77.1	2	76.3
12	131.2	3	85.0	3	78.8

(*continued*)



Buddlejasaponin II

Table 1 (continued)

16	64.1	4	72.1	4	72.2
23	64.6	5	70.5	5	77.6
28	73.0	6	17.2	6	63.2
		Glc-1	105.0	Xyl-1	105.5
		2	75.1	2	75.0
		3	76.3	3	78.4
		4	80.8	4	70.8
		5	76.6	5	67.4
		6	61.7		

References

1. A. Yamamoto, T. Miyase, A. Ueno, T. Maeda, Chem. Pharm. Bull. **39**(10), 2764 (1991)

Buddlejasaponin III

See Figure Buddlejasaponin III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Buddleja japonica* [1]

$C_{47}H_{76}O_{17}$: 912.508

$[\alpha]_D^{25}$ + 38.1° (c 0.97, MeOH) [1]

FAB-MS *m/z*: 935 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.26 (dd, J = 12, 5, H-3), 5.98 (brd, J = 10, H-11), 5.64 (dd, J = 10, 3, H-12), 4.49 (H-16), 3.69 (d, J = 11, H-23), 4.35 (d, J = 11, H-23), 1.01 (s, CH_3-24), 0.94 (s, CH_3-25), 1.40 (s, CH_3-26), 1.10 (s, CH_3-27), 3.33 (d, J = 7, H-28), 4.38 (d, J = 7, H-28), 0.92 (s, CH_3-29), 0.90 (s, CH_3-30) β-D-Fucp: 4.95 (d, J = 8, H-1); β-D-Glcp: 5.24 (d, J = 8, H-1); β-D-Xylp: 5.10 (d, J = 8, H-1) [1]

^{13}C NMR: [1]

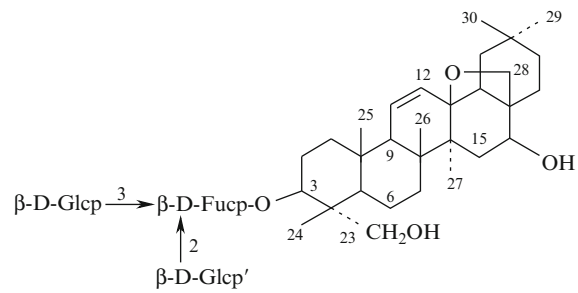
Table 1

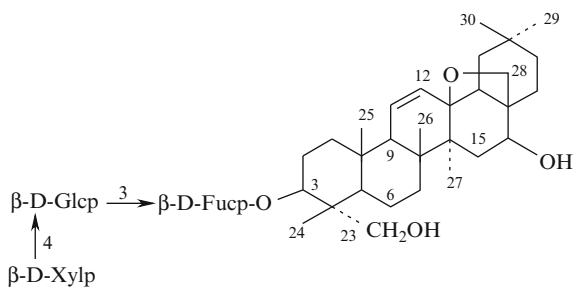
C-3	81.8	Fuc-1	106.0	Xyl-1	105.6
11	132.2	2	71.8	2	75.0
12	131.2	3	85.6	3	78.4
16	64.1	4	72.2	4	70.8
23	64.2	5	71.1	5	67.4
28	73.1	6	17.3		
		Glc-1	106.4		
		2	75.5		
		3	76.3		
		4	80.9		
		5	76.8		
		6	61.8		

References

1. A. Yamamoto, T. Miyase, A. Ueno, T. Maeda, Chem. Pharm. Bull. **39**(10), 2764 (1991)

Buddlejasaponin IV





Buddlejasaponin III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Buddleja japonica* [1]

$C_{48}H_{78}O_{18}$: 942.518

$[\alpha]_D^{25}$ + 54.2° (c 0.99, MeOH) [1]

FAB-MS *m/z*: 965 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.13 (dd, J = 12, 5.4, H-3), 5.97 (brd, J = 10, H-11), 5.64 (dd, J = 10, 2.5, H-12), 4.49 (dd, J = 10, 6, H-16), 3.70 (d, J = 11, H-23), 4.36 (d, J = 11, H-23), 1.06 (s, CH_3-24), 0.97 (s, CH_3-25), 1.38 (s, CH_3-26), 1.10 (s, CH_3-27), 3.33 (d, J = 7, H-28), 4.37 (d, J = 7, H-28), 0.94 (s, CH_3-29), 0.90 (s, CH_3-30)

β-D-Fucp: 4.91 (d, J = 8, H-1); β-D-Glcp: 5.27 (d, J = 8, H-1); β-D-Glcp′: 5.56 (d, J = 8, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	82.7	Fuc-1	104.1	Glc′-1	104.1
11	132.2	2	77.2	2	76.3
12	131.2	3	84.9	3	78.8
16	64.1	4	72.0	4	72.3
23	64.7	5	70.5	5	77.5
28	73.1	6	17.2	6	63.2
		Glc-1	105.2		
		2	75.4		
		3	78.4		
		4	71.7		
		5	78.5		
		6	62.6		

References

1. A. Yamamoto, T. Miyase, A. Ueno, T. Maeda, Chem. Pharm. Bull. **39**(10), 2764 (1991)

Chikusaikoside I

CAS Registry Number: 84954-97-2

See Figure Chikusaikoside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Bupleurum marginatum* [1], *B. longeradiatum* [2]

$C_{47}H_{76}O_{17}$: 912.508

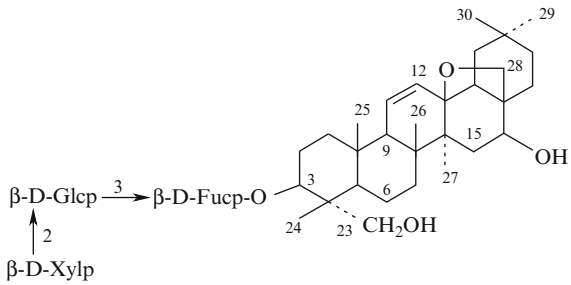
$[\alpha]_D^{24}$ + 51.7° (MeOH) [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	64.0	Fuc-1	104.9
2	25.7	17	46.9	2	71.2
3	81.5	18	52.1	3	85.7
4	43.5	19	37.7	4	71.6
5	47.2	20	31.5	5	70.8
6	17.2	21	34.6	6	17.2
7	31.5	22	25.7	Glc-1	104.3
8	42.1	23	64.0	2	86.7
9	53.0	24	12.9	3	77.6

(*continued*)



Chikusaikoside I

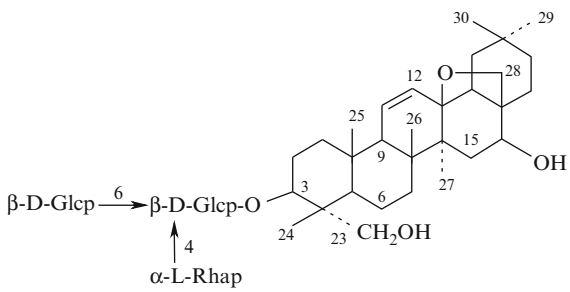
Table 1 (continued)

10	36.2	25	18.7	4	70.8
11	132.2	26	20.0	5	78.1
12	131.1	27	20.8	6	62.1
13	83.9	28	73.0	Xyl-1	107.6
14	45.6	29	33.6	2	76.0
15	36.2	30	23.8	3	77.6
				4	70.3
				5	67.4

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. H. Kimata, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4373 (1982)

Chikusaikoside II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Bupleurum marginatum* [1], *B. longeradiatum* [2]

$C_{48}H_{78}O_{18}$: 942.518

$[\alpha]_D^{21}$ −5.6° (MeOH) [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	38.4	C-16	64.0	Glc-1	105.7
2	25.8	17	46.9	2	75.0
3	82.0	18	52.1	3	76.7

(*continued*)

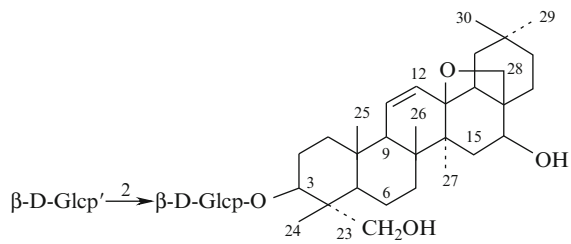
Table 1 (continued)

4	43.6	19	37.7	4	79.7
5	47.2	20	31.5	5	75.4
6	17.5	21	34.7	6	68.7
7	31.5	22	25.8	Glc-1	105.0
8	42.1	23	64.0	2	74.6
9	52.9	24	13.0	3	78.2
10	36.2	25	18.7	4	71.4
11	132.2	26	20.0	5	78.3
12	131.0	27	20.8	6	62.5
13	83.9	28	72.9	Rha-1	102.8
14	45.6	29	33.6	2	72.4
15	36.2	30	23.8	3	72.4
				4	73.7
				5	70.5
				6	18.4

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. H. Kimata, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4373 (1982)

Clinoposaponin XII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Clinopodium chinense* [1]

$C_{42}H_{68}O_{14}$: 796.460

$[\alpha]_D^{23}$ + 34.3° (c 1.90, MeOH) [1]
SI-MS (positive) *m/z*: 819.4503 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.16 (H-3), 5.97 (brd, J = 10.0, H-11), 5.65 (dd, J = 10.0, 3.0, H-12), 4.51 (m, H-16), 3.78, 4.40 (d, J = 10.0, H_2-23), 1.10 (s, CH_3-24), 0.98 (s, CH_3-25), 1.39 (s, CH_3-26), 1.10 (s, CH_3-27), 3.33 (brd, J = 7.0, H-28), 4.39 (d, J = 7.0, H-28), 0.94 (s, CH_3-29), 0.90 (s, CH_3-30)
β-D-Glcp: 5.07 (d, J = 7.5, H-1), 4.15 (dd, J = 8.0, 7.5, H-2), 4.18 (H-3), 4.17 (H-4), 3.79 (m, H-5), 4.43, 4.45 (H_2-6)
β-D-Glcp′: 5.37 (d, J = 7.5, H-1), 4.11 (dd, J = 9.0, 7.5, H-2), 4.21 (dd, J = 9.0, 9.0, H-3), 4.29 (dd, J = 9.0, 9.0, H-4), 4.33 (dd, J = 11.5, 5.0, H-6), 4.49 (H-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

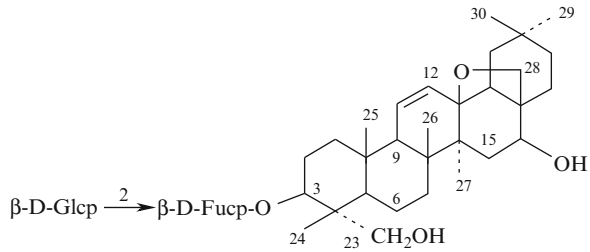
C-1	38.6	C-16	64.1	Glc-1	103.9
2	25.9	17	47.0	2	84.2
3	82.6	18	52.2	3	78.5
4	43.7	19	37.8	4	71.3
5	48.0	20	31.6	5	78.0
6	17.7	21	34.8	6	62.7
7	31.7	22	25.8	Glc′-1	106.0
8	42.3	23	64.9	2	76.9
9	53.1	24	12.9	3	78.1
10	36.3	25	18.7	4	71.5
11	132.2	26	20.1	5	78.3
12	131.2	27	20.9	6	62.8
13	84.0	28	73.0		
14	45.7	29	33.7		
15	36.2	30	23.9		

Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

Clinoposaponin XV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F
Biological sources: *Clinopodium vulgare* [1]
$C_{42}H_{68}O_{13}$: 780.465
$[\alpha]_D^{23}$ + 47.7° (c 0.32, MeOH) [1]
FAB-MS (positive) *m/z*: 803 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.12 (H-3), 5.98 (brd, J = 10.5, H-11), 5.63 (dd, J = 10.5, 2.5, H-12), 4.48 (H-16), 3.75, 4.37 (d, J = 10.0, H_2-23), 1.07 (s, CH_3-24), 0.99 (s, CH_3-25), 1.38 (s, CH_3-26), 1.07 (s, CH_3-27), 3.31, 4.36 (d, J = 7.0, H_2-28), 0.91 (s, CH_3-29), 0.88 (s, CH_3-30)
β-D-Fucp: 4.90 (d, J = 8.0, H-1), 4.46 (dd, J = 9.5, 8.0, H-2), 4.03 (dd, J = 9.5, 3.0, H-3), 3.95 (brd, J = 3.0, H-4), 3.66 (q, J = 6.5, H-5), 1.48 (d, J = 6.5, CH_3-6)
β-D-Glcp: 5.21 (d, J = 8.0, H-1), 4.08 (H-2), 4.12 (H-3), 4.24 (dd, J = 9.0, 9.0, H-4), 3.74 (H-5), 4.38, 4.38 (H_2-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	64.1	Fuc-1	104.0
2	26.0	17	47.0	2	82.5
3	82.3	18	52.2	3	75.0

(*continued*)

Table 1 (continued)

4	43.8	19	37.8	4	72.4
5	48.1	20	31.6	5	71.0
6	17.7	21	34.7	6	17.3
7	31.7	22	25.8	Glc-1	106.2
8	42.3	23	65.0	2	76.8
9	53.1	24	12.8	3	78.2
10	36.3	25	18.7	4	71.4
11	132.2	26	20.0	5	78.1
12	131.2	27	20.8	6	62.5
13	84.0	28	73.0		
14	45.7	29	33.6		
15	36.3	30	23.8		

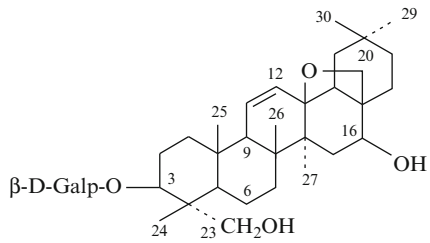
Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

Corchorusin B

CAS Registry Number: 108894-47-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Corchorus acutangulus* [1]

$C_{36}H_{58}O_9$: 634.408

Mp: 278–280°C [1]

$[\alpha]_D$ + 74.3° (c 0.6, MeOH)

FAB-MS *m/z*: 727 $[MH + glc]^+$ (4, 657 $[M + Na]^+$ (6), 635 $[M + H]^+$ (18), 617 $[M + H\text{-}H_2O]^+$ (100), 599 $[M + H\text{-}2H_2O]^+$ (29), 455 $[617\text{-}Gal]^+$ (10), 437 $[455\text{-}H_2O]^+$ (58), 419 $[437\text{-}H_2O]^+$ (20) [1]

FAB-MS *m/z*: 725 $[M\text{-}H + glc]^-$ (22), 633 $[M\text{-}H]^-$(100), 471 $[633\text{-}Gal]^-$ [1]

^{1}H NMR (99.6 MHz, J/Hz, $CDCl_3$) (for permethylate): 0.70, 0.89, 0.89, 1.00, 1.09, 1.27 (s, CH_3 × 6), 3.17, 3.22 (d, J = 8.0, H_2-28), 3.32, 3.36, 3.40, .3.52, 3.56, 3.60 (CH_3Ox6), 5.40 (dd, J = 10.0, 3.0, H-11), 5.88 (d, J = 10, H-12) [1]

^{13}C NMR (25.05 MHz, C_5D_5N): [1]

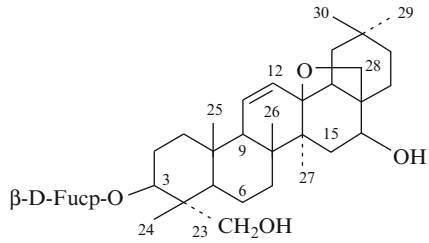
Table 1

C-1	38.4	C-16	64.2	Gal-1	105.7
2	25.6	17	46.7	2	73.0
3	82.1	18	52.0	3	74.9
4	43.3	19	37.7	4	69.9
5	47.3	20	31.4	5	76.0
6	17.4	21	35.7	6	62.0
7	31.4	22	25.6		
8	42.0	23	64.2		
9	52.9	24	12.7		
10	36.2	25	18.5		
11	132.2	26	19.7		
12	130.7	27	20.7		
13	84.0	28	72.8		
14	45.6	29	33.5		
15	36.2	30	23.8		

References

1. S.B. Mahato, B.C. Pal, J. Chem. Soc. Perkin Trans. **I**(3), 629 (1987)

Desglucosaponin a



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Bupleurum marginatum* [1]

$C_{36}H_{58}O_8$: 618.413

$[\alpha]_D^{18}$ + 68.3° (c 1.2, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

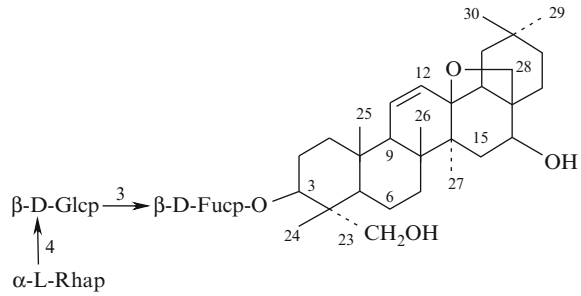
Table 1

C-1	38.7	C-16	64.1	Fuc-1	106.3
2	26.0	17	47.0	2	72.4
3	81.7	18	52.2	3	75.5
4	43.5	19	37.8	4	73.0
5	47.5	20	31.6	5	71.3
6	17.6	21	34.7	6	17.5
7	31.6	22	25.8		
8	42.2	23	64.4		
9	53.1	24	13.0		
10	36.4	25	18.8		
11	132.2	26	20.1		
12	131.2	27	20.9		
13	84.0	28	73.0		
14	45.5	29	33.7		
15	36.2	30	23.8		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Mulleinsaponin III



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Verbascum sinaiticum*, *Celsia roripifolia* (syn. *V. roripifolium*) [1]

$C_{48}H_{78}O_{17}$: 926.523

$[\alpha]_D^{23}$ + 18.7° (c 2.08, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 949.5132 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.27 (dd, J = 12.0, 2.5, H-3), 6.01 (d, J = 10.0, H-7), 5.65 (dd, J = 10.0, 2.5, H-12), 4.51 (H-16), 3.71 (d, J = 10.0, H-23), 4.38 (d, J = 10.0, H-23), 1.01 (s, CH_3-24), 0.94 (s, CH_3-25), 1.40 (s, CH_3-26), 1.11 (s, CH_3-27), 3.34, 4.38 (d, J = 7.0, H_2-28, 0.93 (s, CH_3-29), 0.90 (s, CH_3-30)

β-D-Fucp: 4.96 (d, J = 8.0, H-1), 4.32 (dd, J = 9.0, 8.0, H-2), 3.99 (dd, J = 9.0, 3.5, H-3), 4.09 (d, J = 3.0, H-4), 3.69 (m, H-5), 1.45 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.25 (d, J = 8.0, H-1), 3.96 (dd, J = 9.0, 8.0, H-2), 4.21 (dd, J = 9.0, 9.0, H-3), 4.41 (dd, J = 8.5, 8.5, H-4), 3.81 (m, H-5), 4.14 (dd, J = 11.0, 3.0, H-6), 4.40 (H-6)

α-L-Rhap: 5.86 (brs, H-1), 4.68 (dd, J = 3.5, 1.5, H-2), 4.54 (dd, J = 9.5, 3.5, H-3), 4.32 (dd, J = 9.5, 9.5, H-4), 4.92 (m, H-5), 1.70 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

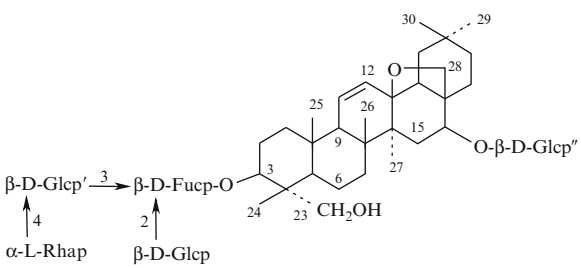
Table 1

C-1	38.7	C-16	64.1	Fuc-1	106.5	Rha-1	102.8
2	26.1	17	47.0	2	71.8	2	72.8
3	81.7	18	52.2	3	85.4	3	72.6
4	43.8	19	37.8	4	72.2	4	74.0
5	47.4	20	31.6	5	71.0	5	70.4
6	17.6	21	34.7	6	17.2	6	18.5
7	31.6	22	25.8	Glc-1	106.0		
8	42.3	23	64.1	2	76.0		
9	53.1	24	13.0	3	76.6		
10	36.3	25	18.8	4	78.4		
11	132.2	26	20.0	5	77.4		
12	131.2	27	20.8	6	61.5		
13	84.0	28	73.0				
14	45.7	29	33.6				
15	36.2	30	23.8				

References

1. T. Miyase, C. Horikoshi, S. Yabe, S. Miyasaka, F.R. Melek, G. Kusano, Chem. Pharm. Bull. **45**(12), 2029 (1997)

Mulleinsaponin VII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Verbascum sinaiticum* [1]

$C_{60}H_{98}O_{27}$: 1250.629

$[\alpha]_D^{25}$ + 14.3° (c 1.04, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 1273 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.12 (H-3), 5.95 (d, J = 10.0, H-11), 5.59 (dd, J = 10.0, 2.0, H-12), 4.59 (dd, J = 9.5, 3.0, H-16), 3.68, 4.35 (d, J = 10.5, H_2-23), 1.03 (s, CH_3-24), 0.93 (s, CH_3-25), 1.10 (s, CH_3-26), 1.25 (s, CH_3-27), 3.27 (d, J = 7.0, 28-H), 4.28 (28-H), 0.93 (s, CH_3-29), 0.87 (s, CH_3-30)

β-D-Fucp: 4.91 (d, J = 8.0, H-1), 4.64 (dd, J = 8.0, 8.0, H-2), 4.07 (H-3), 3.61 (q, J = 6.5, H-5), 1.39 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.58 (d, J = 7.5, H-1), 4.09 (H-2), 4.19 (H-3), 4.26, 4.36 (H_2-6)

β-D-Glcp′: 5.25 (d, J = 8.0, H-1), 3.93 (dd, J = 8.0, 8.0, H-2), 3.65 (H-3), 4.38 (dd, J = 9.0, 9.0, H-4), 3.73 (m, H-5), 4.08, 4.19 (H_2-6)

α-L-Rhap: 5.83 (brs, H-1), 4.66 (H-2), 4.34 (dd, J = 9.0, 9.0, H-4), 4.94 (m, H-5), 1.73 (d, J = 6.0, CH_3-6)

β-D-Glcp″: 5.04 (d, J = 7.0, H-1), 4.06 (H-2), 4.05 (H-3), 4.32 (H-4), 3.96 (m, H-5), 4.43 (dd, J = 12.0, 4.0, H-6), 4.52 (dd, J = 12.0, 2.5, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

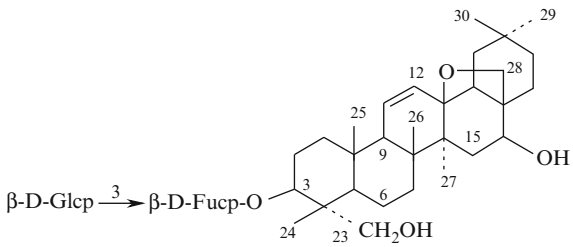
C-1	38.7	C-16	75.8	Fuc-1	104.0	4	78.5
2	26.0	17	47.2	2	77.3	5	77.3
3	82.5	18	52.3	3	84.8	6	61.4
4	43.8	19	37.8	4	72.0	Rha-1	102.8
5	47.8	20	31.7	5	70.5	2	72.8
6	17.6	21	35.2	6	17.2	3	72.6
7	31.5	22	25.5	Glc-1	104.0	4	74.0
8	42.2	23	64.6	2	76.3	5	70.4
9	53.1	24	12.7	3	78.9	6	18.5
10	36.3	25	18.6	4	72.3	Glc″-1	106.6
11	132.3	26	20.7	5	76.5	2	75.8
12	131.0	27	19.9	6	63.2	3	78.8
13	83.9	28	73.6	Glc′-1	105.0	4	71.8
14	45.6	29	33.5	2	75.6	5	78.1
15	35.5	30	23.9	3	77.5	6	63.0

References

1. T. Miyase, C. Horikoshi, S. Yabe, S. Miyasaka, F.R. Melek, G. Kusano, Chem. Pharm. Bull. **45**(12), 2029 (1997)

Saikosaponin a

CAS Registry Number: 20736-09-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin F

Biological sources: *Bupleurum marginatum*, *B. rockii* [1], *B. falcatum* [2], *B. longeradiatum* [3]

$C_{42}H_{68}O_{13}$: 780.465

Mp: 225–232°C [1]

$[\alpha]_D$ + 46.0° (EtOH) [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	64.0	Fuc-1	105.9
2	26.0	17	46.9	2	71.4
3	81.6	18	52.1	3	85.0
4	43.7	19	37.7	4	72.0
5	47.2	20	31.6	5	71.0
6	17.5	21	34.7	6	17.3
7	31.6	22	25.7	Glc-1	106.3
8	42.2	23	64.0	2	75.6
9	53.0	24	13.0	3	78.3
10	36.2	25	18.7	4	71.7
11	132.2	26	20.0	5	78.3
12	131.1	27	20.9	6	62.6
13	84.0	28	73.0		
14	45.6	29	33.6		
15	36.2	30	23.8		

Pharm./Biol.: Molluscicidal activity [4], anti-exudative and anti-inflammatory action [5]

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. T. Kubota, H. Hinoh, Tetrahedron lett. **24**, 303 (1968)
3. H. Kimata, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4373 (1982)
4. M. Nose, S. Amagaya, Y. Ogihara, Chem. Pharm. Bull. **37**, 3306 (1989)
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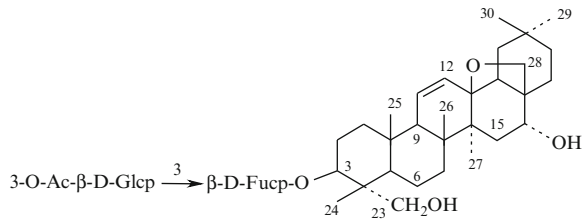
3-O-Acetylsaikosaponin d



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin G

Biological sources: *Bupleurum marginatum*, *B. rockii* [1], *B. falcatum* [2]

$C_{44}H_{70}O_{14}$: 822.476

Mp: 219–225°C (MeOH) [1]

$[\alpha]_D^{21}$ + 47.5° (c 1.03, MeOH) [2]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730, 1250, 1075 [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	77.1	Fuc-1	106.1
2	26.1	17	45.3	2	71.6
3	81.7	18	51.3	3	84.9
4	43.7	19	38.4	4	72.1
5	47.3	20	31.9	5	71.0

(*continued*)

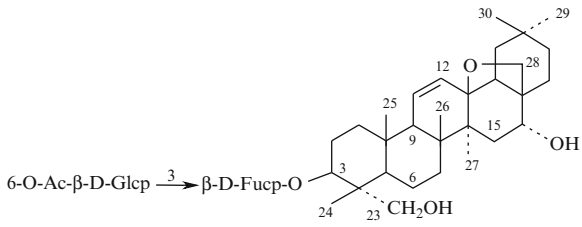
Table 1 (continued)

6	17.2	21	36.8	6	17.2
7	31.9	22	31.3	Glc-1	106.2
8	41.9	23	63.9	2	73.5
9	53.0	24	13.0	3	79.2
10	36.3	25	18.8	4	69.2
11	132.0	26	19.5	5	78.5
12	132.0	27	18.1	6	62.0
13	84.9	28	77.8	Ac-1	170.8
14	43.6	29	33.7	2	21.2
15	35.4	30	24.4		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. H. Ishii, M. Nakamura, S. Seo, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **28**, 2367 (1980)

6-O-Acetylsaikosaponin d



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin G

Biological sources: *Bupleurum marginatum*, *B. rockii* [1], *B. falcatum* [2]

$C_{44}H_{70}O_{14}$: 822.476

Mp: 196–205°C (MeOH-ether) [1]

$[\alpha]_D^{24}$ + 43.5° (c 1.01, MeOH) [2]

IR (KBr) ν_{max} cm^{-1}: 3420, 1735, 1245, 1070 [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

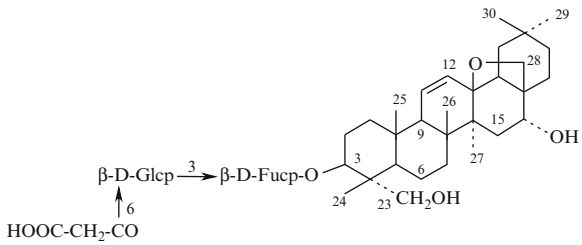
Table 1

C-1	38.5	C-16	77.0	Fuc-1	105.9
2	26.0	17	45.2	2	71.4
3	81.7	18	51.3	3	85.2
4	43.6	19	38.3	4	71.4
5	47.2	20	31.8	5	70.8
6	17.3	21	36.7	6	17.4
7	31.8	22	31.2	Glc-1	106.0
8	41.8	23	64.0	2	75.1
9	52.9	24	13.0	3	77.9
10	36.2	25	18.8	4	71.9
11	131.9	26	19.5	5	75.3
12	131.8	27	18.0	6	64.6
13	84.8	28	77.9	Ac-1	170.8
14	43.5	29	33.7	2	20.7
15	35.3	30	24.4		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. H. Ishii, M. Nakamura, S. Seo, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **28**, 2367 (1980)

6″-O-Malonylsaikosaponin d



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin G

Biological sources: *Bupleurum falcatum* [1]

$C_{45}H_{70}O_{16}$: 866.466

$[\alpha]_D^{25}$ + 29.6° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3416, 2948, 1730, 1596, 1384, 910, 890 [1]
FAB-MS *m/z*: 905 $[M+K]^+$, 889 $[M+Na]^+$, 862, 455 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.70, 0.92, 0.94, 0.95, 1.04, 1.30 (s, CH_3 × 6), 1.27 (d, J = 6.4, CH_3), 4.22 (dd, J = 11.8, 6.4), 4.46 (dd, J = 11.8, 1.8), 5.36 (dd, J = 10.5, 3.0), 5.94 (d, J = 10.5) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

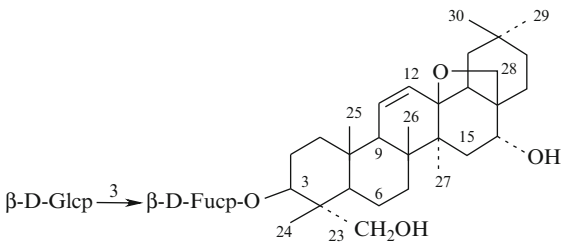
C-3	83.4	Fuc-1	105.3
16	77.5	2	71.5
23	65.0	3	85.3
		4	72.4
		5	71.4
		6	–
		Glc-1	105.6
		2	75.4
		3	78.0
		4	71.9
		5	75.3
		6	65.0

References

1. N. Ebata, K. Nakajima, H. Taguchi, H. Mitsuhashi, Chem. Pharm. Bull. **38**(5), 1432 (1990)

Saikosaponin d

CAS Registry Number: 20874-52-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Saikogenin G
Biological sources: *Bupleurum marginatum*, *B. rockii* [1], *B. falcatum* [2, 3], *B. longeradiatum* [4]
$C_{42}H_{68}O_{13}$: 780.465

Mp: 212–218°C [1]
$[\alpha]_D$ + 37° (EtOH) [2]
^{13}C NMR (67.8 MHz, C_5D_5N): [1]

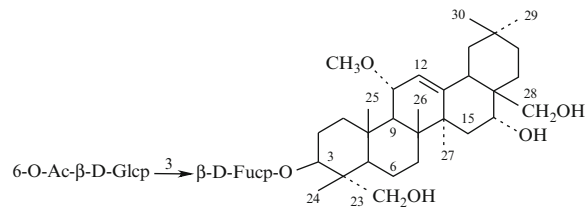
Table 1

C-1	38.6	C-16	77.0	Fuc-1	105.9
2	26.1	17	45.3	2	71.4
3	81.7	18	51.3	3	85.0
4	43.7	19	38.4	4	72.0
5	47.3	20	31.9	5	70.9
6	17.3	21	36.7	6	17.3
7	31.9	22	31.2	Glc-1	106.3
8	41.8	23	64.0	2	75.6
9	53.0	24	13.0	3	78.6
10	36.2	25	18.8	4	71.7
11	132.0	26	19.5	5	78.2
12	131.9	27	18.1	6	62.6
13	84.9	28	77.8		
14	43.5	29	33.7		
15	35.4	30	24.4		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. T. Kubota, H. Hinoh, Tetrahedron Lett. **24**, 303 (1968)
3. T. Kubota, H. Hinoh, Tetrahedron Lett. **46**, 4167 (1976)
4. H. Kimata, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4373 (1982)

6-O-Acetylsaikosaponin b_4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-3β,16α,23,28-tetrahydroxy-olean-12-ene

Biological sources: *Bupleurum falcatum* [1]
$C_{45}H_{74}O_{15}$: 854.502
Mp: 209–217°C [1]
$[\alpha]_D^{24.5}$ −6.4° (c 0.1, MeOH) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.89, 1.11, 1.15, 1.85, 1.00, 0.94 (s, $CH_3 \times 6$), 3.27 (OMe)
β-D-Fucp: 1.45 (CH_3-6)
6-O-Ac-β-D-Glcp: 1.95 (MeCO) [1]
^{13}C NMR (15 MHz, C_5D_5N): [1]

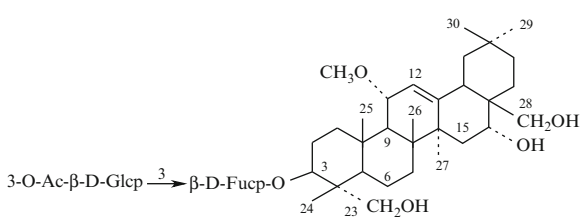
Table 1

C-1	40.2	C-16	74.3	Fuc-1	105.6
2	26.3	17	43.8	2	71.6
3	82.8	18	42.3	3	85.4
4	43.8	19	48.5	4	71.7
5	48.5	20	31.2	5	71.0
6	18.6	21	35.2	6	17.0
7	33.8	22	30.0	Glc-1	105.6
8	41.0	23	65.6	2	75.3
9	51.8	24	13.4	3	78.1
10	38.6	25	17.9	4	72.0
11	76.3	26	18.8	5	75.3
12	122.7	27	26.5	6	64.6
13	149.8	28	70.2	Ac-1	170.7
14	42.3	29	33.2	2	20.6
15	37.1	30	25.0		
		OMe	53.5		

References

1. H. Ishii, M. Nakamura, S. Seo, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **28**(8), 2367 (1980)

Saikosaponin 17



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-3β,16α,23,28-tetrahydroxy-olean-12-ene
Biological sources: *Bupleurum marginatum* [1]
$C_{45}H_{74}O_{15}$: 854.502
$[\alpha]_D^{24}$ 0° (c 1.0, MeOH) [1]
^{13}C NMR (67.8 MHz, C_5D_5N): [1]

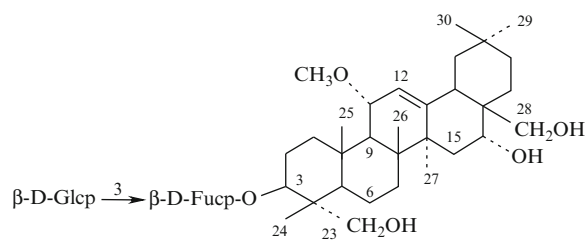
Table 1

C-1	40.1	C-16	74.1	Fuc-1	106.1
2	26.4	17	43.4	2	71.5
3	81.9	18	42.0	3	84.9
4	43.8	19	47.7	4	72.1
5	48.4	20	31.3	5	71.0
6	18.6	21	35.0	6	17.3
7	33.8	22	30.9	Glc-1	106.2
8	40.7	23	64.2	2	73.6
9	51.7	24	13.6	3	79.2
10	38.2	25	17.9	4	69.2
11	76.0	26	18.3	5	78.4
12	122.5	27	26.4	6	62.0
13	149.8	28	70.1	Ac-1	170.8
14	42.0	29	33.4	2	21.2
15	37.2	30	24.6		
		CH_3O	53.8		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Saikosaponin b_4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – 11α-Methoxy-3β,16α,23,28-tetrahydroxy-olean-12-ene

Biological sources: *Bupleurum marginatum* [1], *B. falcatum* [2]

$C_{43}H_{72}O_{14}$: 812.492

Mp: 245–250°C (MeOH, $(C_2H_5)_2O$ [1]

$[\alpha]_D^{25}$ −5.7° (c 0.284) [2]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	40.1	C-16	74.1	Fuc-1	105.8
2	26.4	17	43.4	2	71.4
3	81.9	18	41.9	3	84.9
4	43.7	19	47.7	4	72.0
5	48.3	20	31.3	5	70.8
6	18.4	21	34.9	6	17.2
7	33.4	22	30.9	Glc-1	106.2
8	40.6	23	64.3	2	75.6
9	51.6	24	13.6	3	78.2
10	38.2	25	17.9	4	72.0
11	76.0	26	18.4	5	78.5
12	122.6	27	26.3	6	62.5
13	149.8	28	70.1		
14	41.9	29	33.4		
15	37.2	30	24.6		
		CH_3O	53.7		

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)
2. A. Shimaoka, S. Seo, H. Minato, J. Chem. Soc. Perkin Trans. I. **20**, 2043 (1975)

Sitakisoside VI

CAS Registry Number: 164177-53-1

See Figure Sitakisoside VI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Sitakisogenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{61}H_{95}NO_{24}$: 1225.624

$[\alpha]_D^{20}$ −30.1° (c 7.7, MeOH) [1]

UV λ_{max} nm (log ε): 204 (4.11), 222 (4.27), 255 (3.86), 353 (3.61) [1]

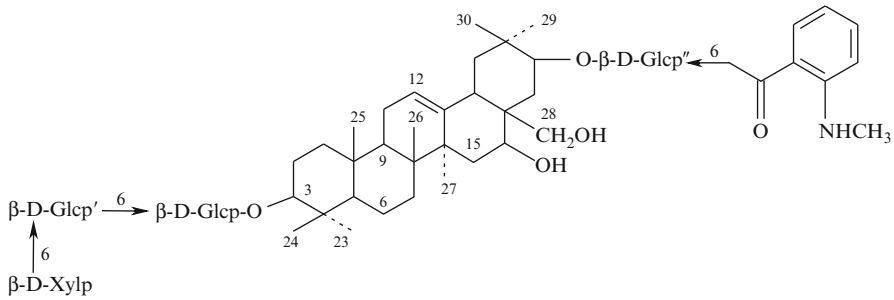
IR (film) ν_{max} cm^{-1}: 3460, 1680, 1090 [1]

FAB-MS *m/z*: 1226 $[M + H]^+$, 1094 $(M + H\text{-}C_8H_8NO_2)^+$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 1.28, 0.99, 0.84, 0.97, 1.34, 1.43, 1.22 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.69, 4.34 (d, J = 11.0, H_2-28), 3.32 (dd, J = 11.5, 4.5, H-3), 5.24 (m, H-12), 1.72 (dd, J = 12.5, 4.3, H-15), 2.21 (dd, J = 12.5, 11.0, H-15), 4.67 (dd, J = 11.0, 4.3, H-16), 2.52 (dd, J = 11.5, 4.0, H-18), 4.18 (m, H-21), 2.06 (dd, J = 12.5, 12.5, Hβ-22), 3.56 (dd, J = 12.5, 4.5, Hα-22); β-D-Glcp: 4.86 (d, J = 7.8, H-1), 4.30, 4.89 (brd, J = 11.0, H_2-6); β-D-Glcp′: 5.04 (d, J = 7.6, H-1), 4.30, 4.77 (brd, J = 10.5, H_2-6); β-D-Xylp: 4.94 (d, J = 7.6, H-1); β-D-Glcp″: 5.09 (d, J = 7.8, H-1), 4.87, 5.17 (brd, J = 10.5, H_2-6);

Acyl part: 6.56 (dd, J = 8.0, 1.2, H-3), 7.33 (ddd, J = 8.0, 8.0, 1.2, H-4), 6.67 (ddd, J = 8.0, 8.0, 1.2, H-5), 8.29 (dd, J = 8.0, 1.2, H-6), 2.67 (d, J = 4.1, N-CH_3), 7.82 (q, J = 4.1, NH) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]



Sitakisoside VI

Table 1

C-1	38.9	C-16	67.6	Glc-1	107.0	Xyl-4	71.1
2	26.8	17	43.8	2	75.0	5	67.1
3	89.1	18	43.6	3	78.4	Glc″-1	106.5
4	39.6	19	48.0	4	71.5	2	75.8
5	55.8	20	37.0	5	77.1	3	78.6
6	18.5	21	84.1	6	70.4	4	71.5
7	33.0	22	33.5	Glc′-1	105.4	5	75.3
8	40.2	23	28.3	2	75.6	6	64.6
9	47.2	24	17.2	3	78.6	Acyl-1	110.7
10	36.9	25	15.8	4	71.5	2	152.3
11	24.0	26	17.0	5	77.1	3	111.2
12	124.0	27	27.2	6	69.9	4	135.1
13	143.1	28	68.2	Xyl-1	106.1	5	115.0
14	43.9	29	29.9	2	74.9	6	132.6
15	36.8	30	18.9	3	78.2	7	168.8
						9	29.6

Pharm./Biol.: Complete suppression of the sensation of sweetness, induced by 0.2 M sucrose [1]

References

1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(12), 2455 (1994)

Sitakisoside VII

CAS Registry Number: 164288-27-1

See Figure Sitakisoside VII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Sitakisogenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{61}H_{95}NO_{24}$: 1225.624

Mp: 214–216°C (MeOH) [1]

$[\alpha]_D^{20}$ −36.0° (c 6.5, MeOH) [1]

UV λ_{max}^{EtOH} nm (log ε): 222 (4.34), 254 (3.86), 356 (3.70) [1]

IR (film) ν_{max} cm^{-1}: 3460, 1680, 1090 [1]

FAB-MS *m/z*: 1226 $[M + H]^+$, 1094 $(M + H\text{-}C_8H_8NO_2)^+$ [1]

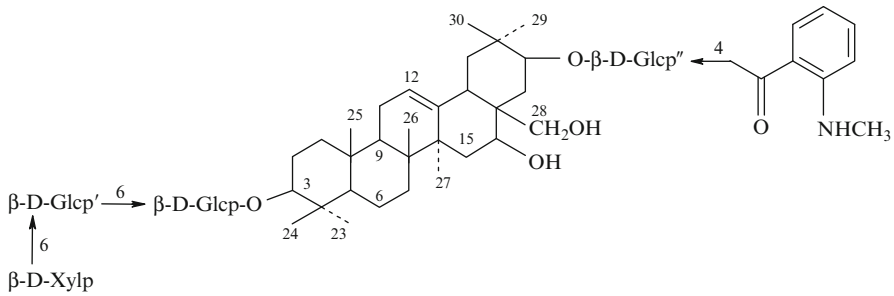
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 1.26, 0.99, 0.84, 0.94, 1.24, 1.40, 1.20 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.73, 4.33 (d, J = 10.3, H_2-28), 3.34 (dd, J = 11.4, 4.3, H-3), 5.22 (m, H-12), 1.67 (dd, J = 12.1, 4.3, H-15), 2.16 (dd, J = 12.1, 12.1, H-15), 4.66 (dd, J = 12.1, 4.3, H-16), 2.53 (dd, J = 11.4, 4.3, H-18), 4.20 (m, H-21), 2.09 (dd, J = 12.8, 12.8, Hβ-22), 3.54 (dd, J = 12.8, 4.0, Hα-22); β-D-Glcp: 4.88 (d, J = 7.5, H-1), 4.31, 4.91 (brd, J = 11.0, H_2-6); β-D-Glcp′: 5.06 (d, J = 7.8, H-1), 4.31, 4.91 (brd, J = 11.0, H_2-6); β-D-Xylp: 4.96 (d, J = 7.3, H-1); β-D-Glcp″: 5.17 (d, J = 7.8, H-1), 4.48 (dd, J = 9.5, 9.0, H-4), 5.66 (dd, J = 9.5, 9.5, H-6); Acyl part: 6.61 (dd, J = 8.0, 1.5, H-3), 7.38 (ddd, J = 8.0, 8.0, 1.5, H-4), 6.59 (ddd, J = 8.0, 8.0, 1.5, H-5), 8.11 (dd, J = 8.0, 1.5, H-6), 2.65 (d, J = 4.9, N-CH_3), 7.81 (q, J = 4.9, NH) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	67.9	Glc-1	107.0	Xyl-4	71.1
2	26.7	17	43.9	2	75.0	5	67.1
3	88.9	18	43.5	3	78.4	Glc″-1	106.5
4	39.5	19	47.7	4	71.5	2	75.8
5	55.7	20	36.7	5	77.0	3	76.2
6	18.4	21	83.0	6	70.4	4	72.9
7	32.8	22	33.9	Glc′-1	105.4	5	76.4
8	40.1	23	28.2	2	75.6	6	63.2

(*continued*)



Sitakisoside VII

Table 1 (continued)

9	47.0	24	17.1	3	78.6	Acyl-1	110.2
10	36.8	25	15.7	4	71.6	2	152.6
11	23.9	26	16.9	5	77.0	3	111.2
12	123.9	27	27.0	6	69.8	4	135.7
13	142.7	28	67.9	Xyl-1	106.1	5	114.6
14	43.8	29	29.2	2	74.9	6	132.0
15	36.2	30	18.4	3	78.2	7	168.3
						9	29.4

Pharm./Biol.: Complete suppression of the sensation of sweetness, induced by 0.2 M sucrose [1]

References

1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(12), 2455 (1994)

Sitakisoside XI

CAS Registry Number: 187811-06-9

See Figure Sitakisoside XI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Sitakisogenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{58}H_{94}O_{24}$: 1174.613

Mp: 218–220°C (MeOH) [1]

$[\alpha]_D^{20}$ −21.8° (c 1.5, MeOH) [1]

UV λ_{max}^{EtOH} nm (log ε): 221 (4.07), 254 (3.66), 350 (3.20) [1]

IR (film) ν_{max} cm^{-1}: 3460, 1680, 1090 [1]

FAB-MS *m/z*: 1197 $[M + Na]^+$, 1213 $(M + K)^+$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.86, 0.97, 1.01, 1.21, 1.30, 1.30, 1.40 (s, CH_3-25, 26, 24, 30, 23, 27, 29), 2.02 (dd, J = 13.0, 12.0, Hβ-22), 2.52 (dd, J = 11.5, 4.0, H-18), 3.32 (dd, J = 11.5, 4.5, H-3), 3.43 (dd, J = 13.0, 4.0, Hα-22), 3.72, 4.28 (d, J = 11.0, H_2-28), ca. 4.20 (m, H-21), 4.68 (dd, J = 12.0, 4.5, H-16), 5.24 (m, H-12)

β-D-Glcp: 4.85 (d, J = 7.5, H-1), 4.32 (m, H-6), 4.89 (dd, J = 11.0, 2.5, H-6)

β-D-Glcp′: 5.02 (d, J = 7.5, H-1), 4.32 (m, H-6), 4.74 (dd, J = 10.0, 2.5, H-6)

β-D-Xylp: 4.91 (d, J = 7.5, H-1)

β-D-Glcp″: 5.13 (d, J = 8.0, H-1), 5.48 (t, J = 9.4, 4-H), 4.10 (m, H-6), 4.61 (dd, J = 11.0, 2.5, H-6)

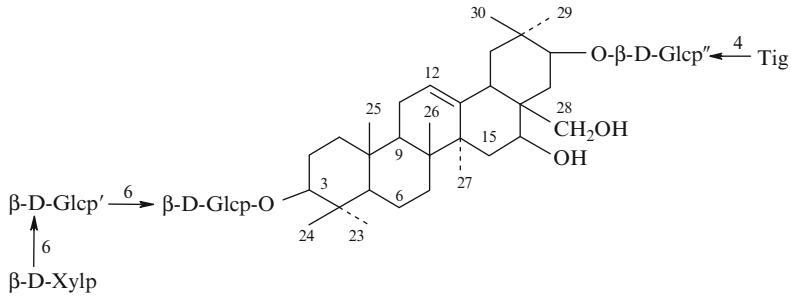
Tigloyl: 1.58 (d, J = 7.0, CH_3-4), 1.78 (s, CH_3-5), 6.92 (q, J = 7.0, H-3) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	68.1	Glc-1	107.0	4	71.2
2	26.8	17	44.0	2	75.0	5	67.1
3	89.1	18	43.6	3	78.3	Glc″-1	106.4
4	39.6	19	47.8	4	71.5	2	76.0
5	55.8	20	36.9	5	77.0	3	76.2
6	18.6	21	83.0	6	70.4	4	73.3
7	33.0	22	33.9	Glc′-1	105.4	5	76.5
8	40.2	23	28.3	2	75.7	6	63.2
9	47.1	24	17.2	3	78.5	Tig-1	167.8
10	36.9	25	15.8	4	71.5	2	129.0
11	24.0	26	17.0	5	77.0	3	138.1
12	124.0	27	27.2	6	69.9	4	14.4
13	142.8	28	68.1	Xyl-1	106.0	5	12.4
14	43.8	29	29.4	2	74.9		
15	36.3	30	18.6	3	78.1		

Pharm./Biol.: Antisweet activity [1]



Sitakisoside XI

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Sitakisoside XII

CAS Registry Number: 187811-07-0
See Figure Sitakisoside XII
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Sitakisogenin
Biological sources: *Stephanotis lutchuensis* [1]
$C_{64}H_{104}O_{29}$: 1336.666
Mp: 210–212°C (MeOH) [1]
$[\alpha]_D^{20}$ −24.9° (c 2.9, MeOH) [1]
UV λ_{max}^{EtOH} nm (log ε): 220 (4.09), 255 (3.64), 349 (3.19) [1]
IR (film) ν_{max} cm^{-1}: 3420, 1685, 1080 [1]
FAB-MS *m/z*: 1359 $[M + Na]^+$, 1375 $(M + K)^+$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.84, 0.97, 1.00, 1.21, 1.28, 1.33, 1.41 (s, CH_3-25, 26, 24, 30, 23, 27, 29), 2.02 (dd, J = 13.0, 13.0, Hβ-22), 2.52 (dd, J = 11.5, 4.0, H-18), 3.33 (dd, J = 11.5, 4.0, H-3), 3.43 (dd, J = 13.0, 4.0, Hα-22), 3.68, 4.29 (d, J = 9.5, H_2-28), ca. 4.10 (m, H-21), 4.60 (dd, J = 12.0, 4.0, H-16), 5.23 (m, H-12)
β-D-Glcp: 4.87 (d, J = 8.0, H-1), 4.33 (m, H-6), 4.90 (dd, J = 11.0, 2.5, H-6); β-D-Glcp′: 5.06 (d, J = 8.0, H-1), 4.30 (m, H-6), 4.78 (dd, J = 10.0, 4.0, H-6); β-D-Xylp: 4.95 (d, J = 7.5, H-1); β-D-Glcp″: 5.02 (d, J = 8.0, H-1), 4.16 (m, H-4), 4.84 (dd, J = 11.0, 4.5, H-6), 5.27 (dd, J = 11.0, 2.0, H-6); β-D-Glcp‴: 5.05 (d, J = 8.0, H-1), 4.28 (m, H-6), 4.58 (dd, J = 9.5, 2.0, H-6); Tigloyl : 1.58 (d, J = 7.0, CH_3-4), 1.81 (s, CH_3-5), 7.03 (q, J = 7.0, H-3) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-18	43.6	Glc-1	107.0	Glc″-1	106.8
2	26.9	19	48.1	2	75.0	2	75.1
3	89.4	20	37.1	3	78.4	3	76.9
4	39.7	21	84.2	4	71.5	4	81.9
5	56.0	22	33.5	5	77.0	5	73.6
6	18.7	23	28.5	6	70.4	6	64.7
7	33.2	24	17.3	Glc′-1	105.4	Glc‴-1	105.2
8	40.3	25	16.0	2	75.6	2	74.7
9	47.3	26	17.2	3	78.4	3	78.6
10	37.1	27	27.3	4	71.5	4	71.8
11	24.1	28	68.2	5	77.0	5	78.7
12	124.0	29	30.0	6	69.9	6	62.8
13	143.1	30	19.0	Xyl-1	105.9	Tig-1	168.4
14	43.9			2	74.9	2	129.0
15	36.8			3	78.2	3	138.2
16	67.7			4	71.3	4	14.6
17	44.0			5	67.2	5	12.5

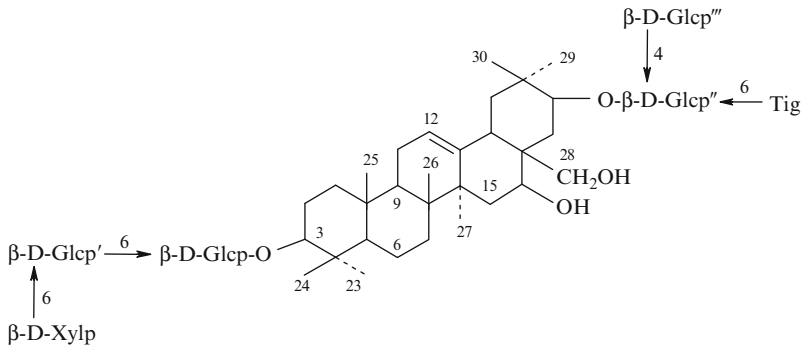
Pharm./Biol.: Antisweet activity [1]

References

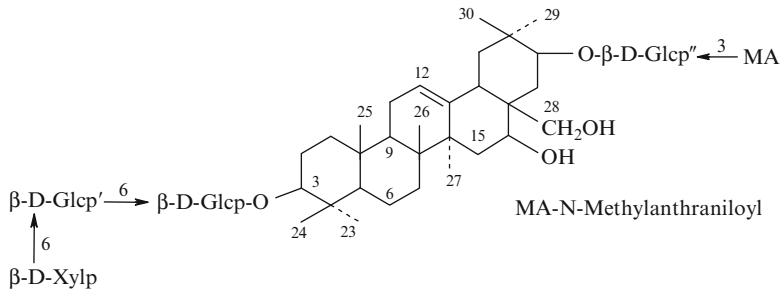
1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Sitakisoside XIII

CAS Registry Number: 187811-08-1
See Figure Sitakisoside XIII



Sitakisoside XII



Sitakisoside XIII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Sitakisogenin

Biological sources: *Stephanotis lutchuensis*

$C_{61}H_{95}NO_{24}$: 1225.624

Mp: 208–210°C (MeOH)

$[\alpha]_D^{20}$ −21.1° (c 3.4, MeOH)

UV λ_{max}^{EtOH} nm (log ε): 222 (4.36), 255 (3.87), 356 (3.68)

IR (film) ν_{max} cm^{-1}: 3455, 1680, 1050

FAB-MS *m/z*: 1248 $[M + Na]^+$, 1264 $(M + K)^+$

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.84, 0.95, 1.00, 1.19, 1.27, 1.27, 1.34 (s, CH_3-25, 26, 24, 30, 23, 27, 29), 2.12 (t, J = 13.0, Hβ-22), 2.54 (dd, J = 14.0, 4.0, H-18), 3.35 (dd, J = 11.5, 4.5, H-3), 3.54 (dd, J = 13.0, 4.0, Hα-22), 3.74, 4.34 (d, J = 10.5, H_2-28), ca. 4.14 (m, H-21), 4.68 (m, H-16), 5.24 (m, H-12)

β-D-Glcp: 4.88 (d, J = 7.5, H-1), 4.32 (m, H-6), 4.91 (dd, J = 9.5, 2.5, H-6)

β-D-Glcp′: 5.06 (d, J = 8.0, H-1), 4.30 (m, H-6), 4.78 (dd, J = 9.5, 2.0, H-6)

β-D-Xylp: 4.95 (d, J = 7.5, H-1)

β-D-Glcp″: 5.14 (d, J = 8.0, H-1), 6.10 (dd, J = 9.5, 9.5, H-3), 4.18 (m, H-6), 4.57 (dd, J = 10.5, 2.0, H-6)

N-Methylanthraniloyl: 2.59 (d, J = 5.0, N-CH_3), 6.55 (dd, J = 8.5, 1.5, H-3), 7.35 (ddd, J = 8.0, 8.0, 1.5, H-4), 6.57 (ddd, J = 8.0, 8.0, 1.5, H-5), 7.93 (q, J = 5.0, NH), 8.13 (dd, J = 8.0, 1.5, H-6)

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-17	43.9	Glc-1	107.0	Xyl-5	67.1
2	26.7	18	43.5	2	75.0	Glc″-1	106.2
3	89.0	19	47.8	3	78.3	2	73.8
4	39.6	20	36.8	4	71.5	3	79.2
5	55.7	21	81.1	5	77.0	4	70.4
6	18.5	22	33.6	6	70.4	5	78.4
7	32.9	23	28.2	Glc′-1	105.4	6	63.4
8	40.1	24	17.1	2	75.7		
9	47.1	25	15.7	3	78.6	Ma-1	111.1
10	36.8	26	16.9	4	71.5	2	152.5
11	23.9	27	27.1	5	77.0	3	111.0
12	124.0	28	67.8	6	69.9	4	134.8
13	142.8	29	29.4	Xyl-1	106.0	5	114.5
14	43.8	30	18.5	2	74.9	6	132.1
15	36.3			3	78.2	7	168.8
16	67.9			4	71.2	9	29.3

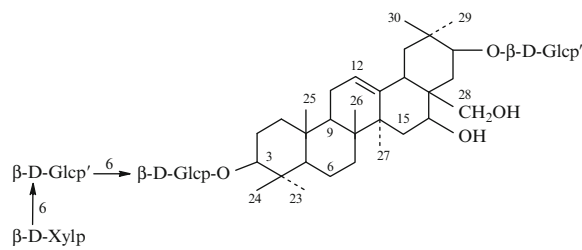
Pharm./Biol.: Antisweet activity

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Sitakisoside XIV

CAS Registry Number: 164177-56-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Sitakisogenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{53}H_{88}O_{23}$: 1092.571

$[\alpha]_D^{20}$ −16.4° (c 5.3, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 3250 [1]

FAB-MS *m/z*: 1091 $[M-H]^-$, 959 $(M-H-C_5H_8O_4)^-$, 797 $(M-H-C_5H_8O_4-C_6H_{10}O_5)^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.84, 0.95, 0.99, 1.20, 1.26, 1.26, 1.36 (s, CH_3-25, 26, 24, 30, 23, 27, 29), 1.68 (dd, 12.5, 4.3, Hα-15), 2.06 (m, Hβ-22), 2.17 (dd, 12.5, 12.5, Hβ-15), 2.52 (dd, J = 11.5, 4.0, H-18), 3.34 (dd, J = 11.5, 4.5, H-3), 3.53 (dd, J = 12.5, 4.5, Hα-22), 3.73, 4.34 (d, J = 11.0, H_2-28), 4.16 (m, H-21), 4.68 (dd, J = 12.5, 4.3, H-16), 5.24 (m, H-12)

β-D-Glcp: 4.86 (d, J = 8.0, H-1), 4.30 (m, H-6), 4.90 (dd, J = 11.0, 2.0, H-6)

β-D-Glcp′: 5.05 (d, J = 7.5, H-1), 4.30 (m, H-6), 4.78 (dd, J = 11.0, 2.5, H-6)

β-D-Xylp: 4.94 (d, J = 7.5, H-1)

β-D-Glcp″: 5.08 (d, J = 7.5, H-1), 4.10 (brd, J = 9.5, H-6), 4.61 (dd, J = 9.5, 2.0, H-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	68.0	Glc-1	107.0	Xyl-1	106.1
2	26.8	17	44.0	2	75.0	2	75.0
3	89.1	18	43.6	3	78.4	3	78.2
4	39.6	19	47.8	4	71.5	4	71.2
5	55.8	20	37.1	5	77.1	5	67.2
6	18.3	21	82.8	6	70.5	Glc″-1	106.6
7	33.0	22	34.1	Glc′-1	105.4	2	76.0
8	40.2	23	28.3	2	75.6	3	78.8
9	47.1	24	17.1	3	78.6	4	72.7
10	37.1	25	15.8	4	71.5	5	78.6
11	23.9	26	17.0	5	77.1	6	64.1
12	124.0	27	27.2	6	69.9		
13	142.8	28	68.1				
14	43.8	29	29.4				
15	36.3	30	18.6				

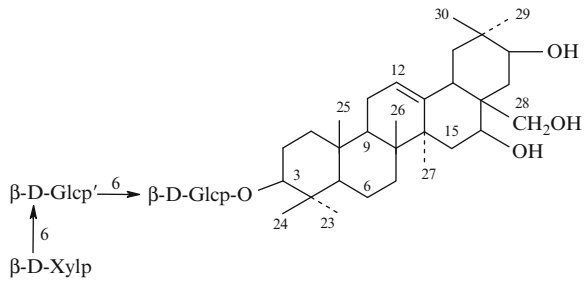
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Sitakisoside XV

CAS Registry Number: 187811-09-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Sitakisogenin

Biological sources: *Stephanotis lutchuensis* [1]

$C_{47}H_{78}O_{18}$: 930.518

Mp: 231–232°C (MeOH) [1]

$[\alpha]_D^{20}$ −15.1° (c 2.2, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 3250 [1]

FAB-MS *m/z*: 953 $[M + Na]^+$, 969 $(M + K)^+$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.86, 1.00, 1.00, 1.27, 1.27, 1.34 (s, CH_3-25, 26, 24, 30, 23, 27), 2.50 (dd, J = 11.5, 4.0, H-18), 3.35 (dd, J = 11.5, 4.5, H-3), 4.18 (dd, J = 13.0, 4.0, H-21), 3.80, 4.43 (d, J = 11.0, H_2-28), 4.74 (dd, J = 12.0, 5.0, H-16), 5.30 (m, H-12)

β-D-Glcp: 4.87 (d, J = 8.0, H-1)

β-D-Glcp′: 5.06 (d, J = 8.0, H-1)

β-D-Xylp: 4.96 (d, J = 7.5, H-1) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	68.0	Glc-1	107.0	Xyl-1	105.9
2	26.9	17	44.0	2	75.1	2	75.0
3	89.1	18	44.0	3	78.4	3	78.2
4	39.7	19	48.0	4	71.6	4	71.3
5	56.0	20	37.0	5	77.0	5	67.2
6	18.7	21	73.1	6	70.4		
7	33.1	22	35.0	Glc′-1	105.4		
8	40.3	23	28.4	2	75.8		
9	47.3	24	17.3	3	78.7		
10	37.0	25	15.9	4	71.6		
11	24.1	26	17.1	5	77.1		
12	124.0	27	27.3	6	70.0		

(*continued*)

Table 1 (continued)

13	143.2	28	68.5
14	43.9	29	30.2
15	36.8	30	18.2

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, A. Mizutani, Y. Kan, S. Arihara, Chem. Pharm. Bull. **45**(1), 62 (1997)

Acetylsoyasaponin A_1

CAS Registry Number: 118194-13-1
See Figure Acetylsoyasaponin A_1
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)
Biological sources: *Glycine max* [1]
$C_{67}H_{104}O_{33}$: 1436.645
Mp: 263–265°C (EtOH) [1]
$[\alpha]_D^{16}$ + 17.0° (c 0.6, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3420, 2923, 1746, 1607, 1229 [1]
SI-MS (glycerol matrix) *m/z*: 1459 $(M + Na)^+$, 371, 331, 311; 1475 $(M + K)^+$, 387, 327, 387, 327 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N + D_2O 10:1): 5.30 (brs, H-12), 0.67, 0.89, 1.23, 1.26, 1.32, 1.32, 1.43 (CH_3 × 7)
β-D-GlcUAp: 5.19 (d, J = 8.6, H-1)
β-D-Galp: 5.55 (d, J = 7.9, H-1)
β-D-Glcp: 5.06 (d, J = 7.3, H-1)
α-L-Arap: 4.88 (d, J = 7.6, H-1)
β-D-Glcp′: 5.52 (d, J = 7.4, H-1); 5.45 (dd, J = 7.9, 9.4, H-2); 5.37 (dd, J = 9.4, 9.4, H-3); 5.44 (dd, J = 9.4, 9.7, H-4); 4.65 (H-5); 4.23, 4.48 (H_2-6), 1.98, 2.06, 2.10, 2.10 (s, OAc × 4) [1]
^{13}C NMR (125MHz, C_5D_5N-D_2O (5:1)): [1]

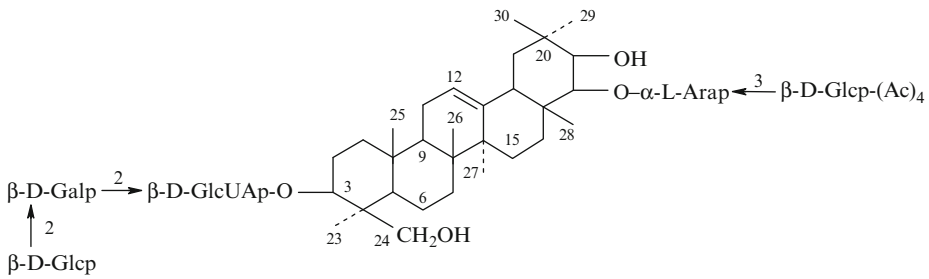
Table 1

C-3	89.4	GlcUA-1	102.8	Glc-1	104.5	Glc′-1	101.1
12	121.3	2	79.2	2	74.6	2	70.7
13	143.0	3	75.2	3	75.9	3	71.0
21	74.4	4	71.4	4	69.5	4	67.7
22	91.1	5	75.9	5	76.1	5	72.6
24	62.3	6	174.0	6	61.2	6	60.7
		Gal-1	101.5	Ara-1	107.1	OAc	169.1
		2	81.6	2	71.2		170.0
		3	72.9	3	83.4		170.1
		4	68.8	4	67.7		170.6
		5	77.1	5	65.9		19.5
		6	60.8				19.5
							19.6
							19.6

Pharm./Biol.: Exhibited bitter and astringent tastes [1]

References

1. I. Kitagawa, T. Taniyama, Y. Nagahama, K. Okubo, F. Yamauchi, M. Yoshikawa, Chem. Pharm. Bull. **36**(8), 2819 (1988)



Acetylsoyasaponin A_1

Acetylsoyasaponin A_2

CAS Registry Number: 117230-32-7
See Figure Acetylsoyasaponin A_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)
Biological sources: *Glycine max* [1]
$C_{61}H_{94}O_{28}$: 1274.593
Mp: 276–278°C (EtOH) [1]
$[\alpha]_D^{18}$ + 18.8° (c 0.3, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3401, 2921, 1745, 1609, 1226 [1]
SI-MS (glycerol matrix) *m/z*: 1297 $(M + Na)^+$, 959, 735, 503, 371, 331, 311 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O (10:1)): 5.26 (brs, J = 9.5, H-12), 0.68, 0.87, 1.22, 1.23, 1.28, 1.30, 1.34 (s, CH_3 × 7)
β-D-GlcUAp: 4.84 (d, J = 7.0, H-1)
β-D-Galp: 5.39 (d, J = 7.6, H-1)
α-L-Arap: 4.90 (d, J = 7.6, H-1)
β-D-Glcp: 5.52 (d, J = 8.2, H-1); 5.43 (dd, J = 8.2, 9.4, H-2); 5.67 (dd, J = 9.4, 9.4, H-3); 5.40 (dd, J = 9.4, 9.8, H-4); 4.60 (H-5); 4.25, 4.43 (H_2-6), 2.09, 2.13, 2.17, 2.18 (OAc × 4) [1]
^{13}C NMR (125MHz, C_5D_5N-D_2O (5:1)): [1]

Table 1

C-3	89.8	GlcUA-1	103.0	Ara-1	107.2	OAc	169.6
12	121.4	2	78.7	2	71.3		169.9
13	143.0	3	75.4	3	83.4		170.0
21	74.3	4	71.6	4	67.9		170.4
22	91.2	5	76.5	5	65.9		19.5
24	62.1	6	174.9	Glc-1	101.1		19.5
		Gal-1	103.0	2	70.8		19.7

(*continued*)

Table 1 (continued)

	2	71.6	3	71.0	19.7
	3	73.4	4	67.9	
	4	69.2	5	72.6	
	5	75.4	6	61.0	
	6	61.3			

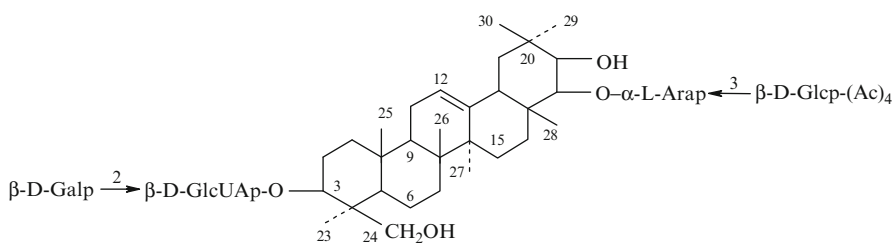
Pharm./Biol.: Exhibited bitter and astringent tastes [1]

References

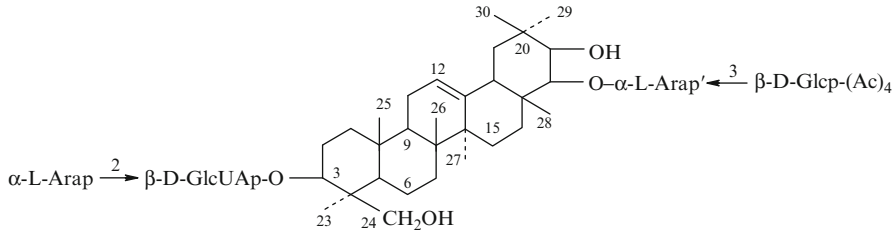
1. I. Kitagawa, T. Taniyama, Y. Nagahama, K. Okubo, F. Yamauchi, M. Yoshikawa, Chem. Pharm. Bull. **36**(8), 2819 (1988)

Acetylsoyasaponin A_3

CAS Registry Number: 117210-16-9
See Figure Acetylsoyasaponin A_3
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)
Biological sources: *Glycine max* [1]
$C_{60}H_{92}O_{27}$: 1244.582
Mp: 257–260°C (EtOH) [1]
$[\alpha]_D^{20}$ + 23.6° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3404, 2924, 1743, 1606, 1223 [1]
SI-MS (glycerol matrix) *m/z*: 1267 $(M + Na)^+$, 959, 735, 503, 371, 331 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O (10:1)): 5.26 (brs, J = 9.0, H-12), 0.67, 0.87, 1.22, 1.23, 1.28, 1.30, 1.35 (s, CH_3 × 7)
β-D-GlcUAp: 4.82 (d, J = 7.6, H-1)



Acetylsoyasaponin A_2



Acetylsoyasaponin A_3

α-L-Arap: 5.24 (d, J = 7.6, H-1)
α-L-Arap′: 4.90 (d, J = 7.6, H-1)
β-D-Glcp: 5.52 (d, J = 8.0, H-1); 5.42 (dd, J = 8.0, 9.4, H-2); 5.67 (dd, J = 9.4, 9.4, H-3); 5.40 (dd, J = 9.4, 9.7, H-4); 4.59 (H-5); 4.27, 4.43 (H_2-6), 2.08, 2.13, 2.17, 2.18 (OAc × 4) [1]
^{13}C NMR (125MHz, C_5D_5N-D_2O (5:1)): [1]

Table 1

C-3	89.5	GlcUA-1	103.2	Ara′-1	107.3	OAc	169.1
12	121.5	2	78.9	2	71.8		170.0
13	143.1	3	75.4	3	83.5		170.1
21	74.4	4	71.9	4	67.9		170.6
22	91.2	5	76.6	5	66.1		19.5
24	62.1	6	174.8	Glc-1	101.2		19.5
		Ara-1	103.5	2	70.9		19.6
		2	71.4	3	71.1		19.6
		3	73.2	4	67.9		
		4	68.6	5	72.7		
		5	66.1	6	61.4		

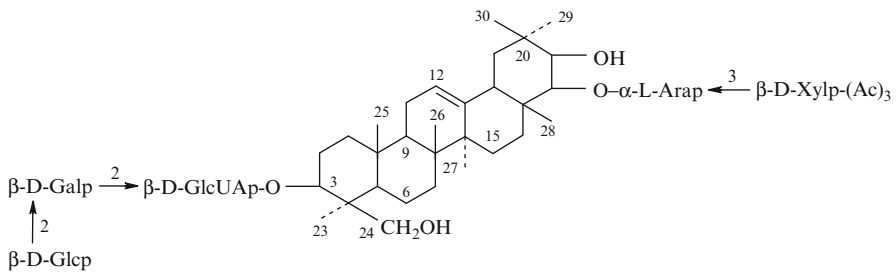
Pharm./Biol.: Exhibited bitter and astringent tastes [1]

References

1. I. Kitagawa, T. Taniyama, Y. Nagahama, K. Okubo, F. Yamauchi, M. Yoshikawa, Chem. Pharm. Bull. **36**(8), 2819 (1988)

Acetylsoyasaponin A_4

CAS Registry Number: 117230-33-8
See Figure Acetylsoyasaponin A_4
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)
Biological sources: *Glycine max* [1]
$C_{64}H_{100}O_{31}$: 1364.624
Mp: 255–258°C (EtOH) [1]
$[\alpha]_D^{16}$ + 13.5° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3420, 2921, 1739, 1228 [1]
SI-MS (glycerol matrix) *m/z*: 1387 $(M + Na)^+$, 140375 $(M + K)^+$ [1]
FAB-MS *m/z*: 259 (Ac_3Xylp) [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O (10:1)): 5.24 (brs, J = 9.0, H-12), 0.65, 0.84, 1.18, 1.20, 1.25, 1.26, 1.43 (CH_3 × 7)
β-D-GlcUAp: 5.19 (d, J = 7.6, H-1)
β-D-Galp: 5.47 (d, J = 7.6, H-1)
β-D-Glcp: 5.02 (d, J = 7.6, H-1)
α-L-Arap: 4.84 (d, J = 7.6, H-1)
β-D-Xylp: 5.37 (d, J = 7.9, H-1), 5.35 (dd, J = 7.9, 8.5, H-2), 5.55 (dd, J = 8.5, 8.5, H-3), 5.18 (ddd,



Acetylsoyasaponin A_4

J = 5.5, 8.2, 8.7, H-4), 3.74, 4.35 (H_2-5), 2.06, 2.09, 2.11 (OAc × 3) [1]

^{13}C NMR (125MHz, C_5D_5N-D_2O (5:1)): [1]

Table 1

C-3	89.4	GlcUA-1	102.9	Glc-1	104.5	Xyl-1	101.2
12	121.4	2	79.2	2	74.7	2	70.7
13	143.0	3	75.3	3	76.0	3	71.1
21	74.4	4	71.2	4	69.5	4	68.3
22	91.1	5	76.0	5	76.1	5	61.1
24	62.3	6	174.0	6	60.7	OAc	170.0
		Gal-1	101.5	Ara-1	107.1		170.0
		2	81.6	2	71.4		170.1
		3	73.0	3	82.5		19.5
		4	68.8	4	67.8		19.5
		5	77.2	5	66.0		19.6
		6	60.8				

Pharm./Biol.: Have bitter and astringent tastes [1]

References

1. T. Taniyama, Y. Nagahama, M. Yoshikawa, I. Kitagawa, Chem. Pharm. Bull. **36**(8), 2829 (1988)

Acetylsoyasaponin A_5

CAS Registry Number: 117230-34-9

See Figure Acetylsoyasaponin A_5

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)

Biological sources: *Glycine max* [1]

$C_{58}H_{90}O_{26}$: 1202.572

Mp: 260–264°C (EtOH) [1]

$[\alpha]_D^{16}$ + 9.7° (c 0.7, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 2921, 1749, 1228 [1]

SI-MS (glycerol matrix) *m/z*: 1225 $(M + Na)^+$, 1241 $(M + K)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O (10:1)): 5.27 (brs, J = 9.0, H-12), 0.68, 0.88, 1.21, 1.22, 1.28, 1.30, 1.35 (s, CH_3 × 7)

β-D-GlcUAp: 4.85 (d, J = 7.0, H-1)

β-D-Galp: 5.40 (d, J = 7.0, H-1)

α-L-Arap: 4.88 (d, J = 7.0, H-1)

β-D-Xylp: 5.41 (d, J = 7.0, H-1), 5.38 (dd, J = 7.0, 8.5, H-2), 5.57 (dd, J = 8.2, 8.5, H-3), 5.19 (ddd, J = 5.5, 8.2, 8.5, H-4), 3.78, 4.38 (H_2-5), 2.10, 2.13, 2.14 (OAcx3) [1]

^{13}C NMR (125MHz, C_5D_5N-D_2O (5:1)): [1]

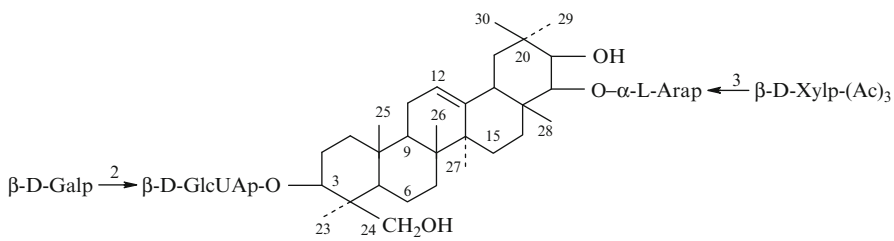
Table 1

C-3	89.5	GlcUA-1	103.0	Ara-1	107.1
12	121.3	2	78.8	2	71.0
13	142.8	3	75.1	3	82.5
21	74.2	4	71.7	4	67.7
22	91.0	5	76.6	5	65.9
24	62.1	6	174.7	Xyl-1	101.3
		Gal-1	103.2	2	70.7
		2	71.6	3	71.1
		3	73.5	4	68.2
		4	69.2	5	61.0
		5	75.5	OAc	169.9
		6	60.9		169.9
					170.0
					19.7
					19.8
					19.8

Pharm./Biol.: Have bitter and astringent tastes [1]

References

1. T. Taniyama, Y. Nagahama, M. Yoshikawa, I. Kitagawa, Chem. Pharm. Bull. **36**(8), 2829 (1988)



Acetylsoyasaponin A_5

Acetylsoyasaponin A_6

CAS Registry Number: 117230-35-0
See Figure Acetylsoyasaponin A_6
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)
Biological sources: *Glycine max* [1]
$C_{57}H_{88}O_{25}$: 1172.561
Mp: 240–244°C (EtOH) [1]
$[\alpha]_D^{16}$ + 14.2° (c 0.2, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3380, 2908, 1745, 1229 [1]
SI-MS (glycerol matrix) *m/z*: 1195 $(M + Na)^+$, 1211 $(M + K)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O (10:1)): 5.26 (brs, J = 9.0, H-12), 0.68, 0.87, 1.21, 1.22, 1.28, 1.29, 1.35 (s, CH_3 × 7)
β-D-GlcUAp: 4.83 (d, J = 7.6, H-1)
α-L-Arap: 5.24 (d, J = 7.6, H-1)
α-L-Arap′: 4.88 (d, J = 7.6, H-1)
β-D-Xylp: 5.40 (d, J = 7.6, H-1), 5.37 (dd, J = 7.6, 8.2, H-2), 5.57 (dd, J = 8.2, 8.6, H-3), 5.19 (ddd, J = 5.2, 8.6, 8.9, H-4), 3.78, 4.40 (H_2-5), 2.10, 2.14, 2.15 (s, OAc × 3) [1]
^{13}C NMR (125MHz, C_5D_5N-D_2O (5:1)): [1]

Table 1

C-3	89.5	GlcUA-1	103.2	Ara′-1	107.3	OAc	169.9
12	121.5	2	79.0	2	71.3		170.0
13	143.1	3	75.5	3	82.7		170.1
21	74.5	4	72.0	4	68.0		19.6
22	91.3	5	76.7	5	66.1		19.7
24	62.2	6	174.6	Xyl-1	101.4		19.7
		Ara-1	103.6	2	70.9		

(*continued*)

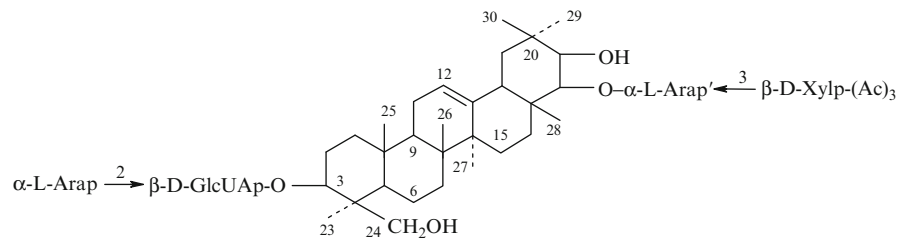
Table 1 (continued)

2	71.8	3	71.2
3	73.3	4	68.5
4	68.8	5	61.2
5	66.1		

Pharm./Biol.: Have bitter and astringent tastes [1]

References

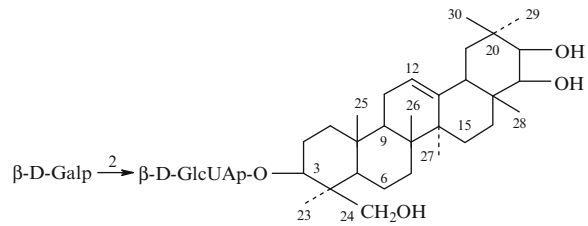
1. T. Taniyama, Y. Nagahama, M. Yoshikawa, I. Kitagawa, Chem. Pharm. Bull. **36**(8), 2829 (1988)



Acetylsoyasaponin A_6

Kudzusaponin SA_1

CAS Registry Number: 168288-04-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)
Biological sources: *Pueraria lobata* [1]
$C_{42}H_{68}O_{15}$: 812.455
$[\alpha]_D^{25}$ + 12.1° (c 0.38, C_5H_5N-H_2O, (1:1)) [1]
HR-FAB-MS *m/z*: 811.4481$[M-H]^-$, 649 $[M-H-Gal]^-$, 473 $[M-H-Gal-GlcUA]^-$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N-D_2O): 0.72, 0.94, 1.25, 1.27, 1.27, 1.36, 1.45 (s, CH_3 × 7), 4.99 (d, J = 7.3, H-1 of GlcUA), 5.57 (d, J = 7.6, H-1 of Gal) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	27.4	GlcUA-1	105.4
2	26.5	17	39.2	2	80.9
3	90.7	18	43.9	3	75.5
4	43.8	19	47.2	4	73.7
5	56.0	20	36.4	5	78.2
6	18.6	21	74.7	6	172.4
7	32.9	22	79.6	Gal-1	105.0
8	40.1	23	22.7	2	73.0
9	47.7	24	63.5	3	77.8
10	36.6	25	15.7	4	71.1
11	24.1	26	16.8	5	77.3
12	122.5	27	26.7	6	62.6
13	144.5	28	22.3		
14	42.0	29	31.6		
15	26.5	30	21.4		

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **43**(7), 1176 (1995)

Kudzusaponin SA_2

CAS Registry Number: 168288-05-9

See Figure Kudzusaponin SA_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)

Biological sources: *Pueraria lobata* [1]

$C_{47}H_{76}O_{19}$: 944.498

$[\alpha]_D^{25}$ + 1.6° (c 0.11, DMSO) [1]

FAB-MS *m/z*: 943.4903 $[M-H]^-$, 781 $[M-H-Gal]^-$, 605 $[M-H-Gal-GlcUA]^-$ [1]

FAB-MS *m/z*: 983 $[M + K]^+$, 967 $[M + Na]^+$, 945 $[M + H]^+$ [1]

^{1}H NMR (270 MHz, J/Hz, $C_5D_5N + D_2O$): 0.67, 0.90, 1.24, 1.26, 1.33, 1.35, 1.38 (s, $CH_3 \times 7$), 5.28 (s, H-12), 4.88 (d, J = 7.3, H-1 of GlcUA), 5.52 (d, J = 7.3, H-1 of Gal) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.5	C-16	27.7	GlcUA-1	104.4	Ara-1	108.4
2	26.5	17	39.2	2	80.9	2	73.1
3	90.9	18	44.4	3	75.4	3	74.9
4	43.6	19	47.2	4	73.5	4	69.6
5	56.1	20	36.3	5	78.0	5	67.4
6	18.6	21	73.1	6	177.1		
7	32.8	22	92.3	Gal-1	104.3		
8	40.3	23	23.1	2	73.5		
9	47.6	24	63.3	3	75.7		
10	36.7	25	15.6	4	69.9		
11	24.0	26	16.7	5	77.9		
12	122.5	27	26.7	6	61.6		
13	144.2	28	22.7				
14	41.8	29	31.4				
15	26.4	30	21.3				

References

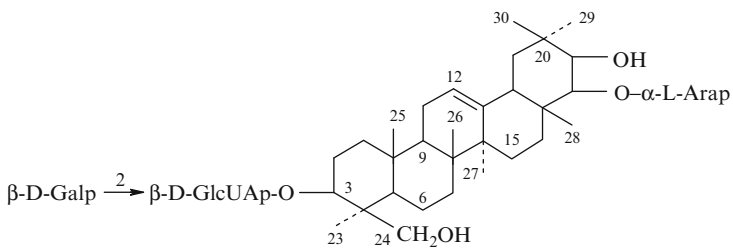
1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **43**(7), 1176 (1995)

Kudzusaponin SA_3

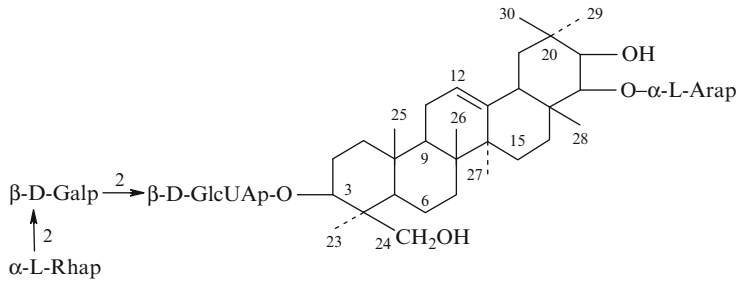
CAS Registry Number: 168288-06-0

See Figure Kudzusaponin SA_3

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of



Kudzusaponin SA_2



Kudzusaponin SA_3

Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)

Biological sources: *Pueraria lobata* [1]

$C_{53}H_{86}O_{23}$: 1090.555

$[\alpha]_D^{25}$ −2.8° (c 0.74, DMSO) [1]

FAB-MS *m/z*: 1089.5479 $[M-H]^-$, 943 $[M-H-Rha]^-$, 781 $[M-H-Rha-Gal]^-$, 605 $[M-H-Rha-Gal-GlcUA]^-$. HR-FAB-MS *m/z*: 1113 $[M + Na]^+$, 1091 $[M + H]^+$ [1]

^{1}H NMR (270 MHz, J/Hz, $C_5D_5N + D_2O$): 0.66, 0.89, 1.26, 1.31, 1.39, 1.43, 1.43 (s, $CH_3 \times 6$), 5.32 (s, H-12), 1.80 (d, J = 6.2, CH_3-6 of Rha), 4.91 (d, J = 7.3, H-1 of GlcUA), 4.99 (d, J = 6.6, H-1 of Ara), 6.35 (s, H-1 of Rha) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	27.9	GlcUA-1	105.5	Rha-1	101.8
2	26.7	17	39.3	2	78.5	2	72.5
3	91.2	18	44.4	3	75.8	3	72.8
4	43.9	19	47.2	4	73.9	4	74.4
5	56.0	20	36.4	5	77.9	5	69.5
6	18.5	21	72.5	6	172.4	6	19.0
7	32.8	22	92.7	Gal-1	102.5	Ara-1	108.8
8	40.2	23	23.1	2	77.7	2	73.9
9	47.8	24	63.6	3	76.5	3	75.4
10	36.9	25	15.8	4	71.2	4	70.0
11	24.1	26	16.7	5	76.7	5	67.7
12	122.5	27	26.7	6	61.6		
13	144.4	28	23.0				
14	41.8	29	31.5				
15	26.7	30	21.4				

(*continued*)

Table 1 (continued)

References

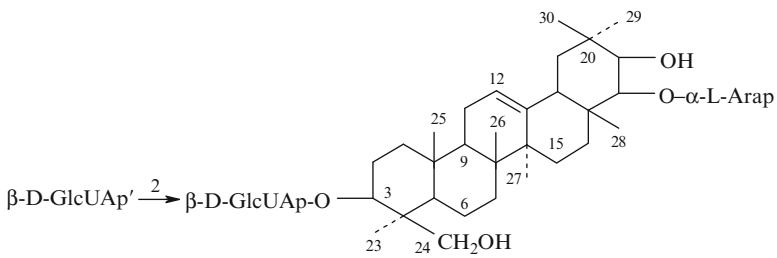
1. T. Arao, J. Kinjo, T. Nohara, R. Osobe, Chem. Pharm. Bull. **43**(7), 1176 (1995)

Kudzusaponin SA_4

CAS Registry Number: 179910-78-2

See Figure Kudzusaponin SA_4

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)



Kudzusaponin SA_4

Biological sources: *Pueraria lobata* [1]
$C_{47}H_{74}O_{20}$: 958.477
$[\alpha]_D^{25}$ + 5.2° (c 0.60, C_5H_5N-H_2O (1:1)) [1]
FAB-MS (positive ion mode) *m/z*: 981.4700 $(M + Na)^+$, 805 $(M + Na\text{-GlcUA})^+$, 673 $(M + Na\text{-GlcUA-ara})^+$, 629 $(M + Na\text{-GlcUA-GlcUA})^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.76, 0.91, 1.23, 1.28, 1.35, 1.39, 1.43 (s, $CH_3 \times 7$), 4.87 (d, J = 8.0, H-1 of GlcUA), 5.02 (d, J = 7.0, H-1 of GlcUA), 5.33 (s, H-12) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-19	47.2	GlcUA-1	104.7
2	26.6	20	36.5	2	80.6
3	90.0	21	73.7	3	75.5
4	44.0	22	92.6	4	72.9
5	56.2	23	23.1	5	77.6
6	19.0	24	63.2	6	172.5
7	33.0	25	15.5	GlcUA′-1	108.7
8	40.2	26	16.7	2	75.7
9	47.8	27	26.7	3	77.8
10	36.8	28	22.9	4	72.9
11	24.1	29	31.5	5	77.6
12	122.9	30	21.4	6	172.2
13	144.3			Ara-1	104.6
14	41.8			2	73.7
15	26.6			3	75.2
16	27.8			4	69.8
17	39.3			5	67.6
18	44.4				

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

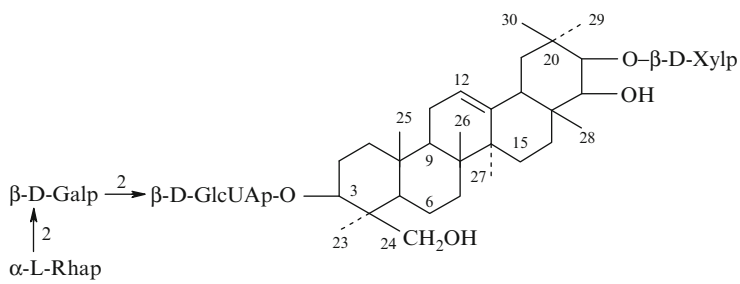
1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **45**(2), 362 (1997)

Lupinoside PA_1

See Figure Lupinoside PA_1
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)
Biological sources: *Russell lupine* [1]
$C_{53}H_{86}O_{23}$: 1090.555
$[\alpha]_D^{25}$ −15.3° (c 0.52, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3405, 1730 [1]
FAB-MS *m/z*: 1089 $[M\text{-}H]^-$, 943 $[M\text{-}H\text{-}Rha]^-$, 781 $[M\text{-}H\text{-}Rha\text{-}Gal]^-$, 605 $[M\text{-}H\text{-}Rha\text{-}Gal\text{-}GlcUA]^-$ [1]
HR-FAB-MS *m/z*: 1113.5471 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.68, 0.92, 1.29, 1.33, 1.37, 1.44, 1.49 ($CH_3 \times 7$), 5.27 (s, H-12), 6.25 (s, H-1 of Rha), 1.80 (d, J = 5.6, CH_3-6 of Rha) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	27.5	GlcUA-1	105.4	Rha-1	102.3
2	26.6	17	39.0	2	78.2	2	72.3
3	91.2	18	43.7	3	76.5	3	72.6
4	43.8	19	47.4	4	73.8	4	74.3
5	56.2	20	36.4	5	77.7	5	69.3
6	18.5	21	85.7	6	172.9	6	18.9
7	32.9	22	78.2	Gal-1	101.7	Xyl-1	107.0
8	40.1	23	22.9	2	76.6	2	75.2
9	47.7	24	63.5	3	76.4	3	78.2
10	36.6	25	15.7	4	71.0	4	71.0
11	24.1	26	16.8	5	77.5	5	67.1
12	122.5	27	26.6	6	61.5		
13	144.4	28	22.1				
14	42.0	29	31.2				
15	26.6	30	22.1				



Lupinoside PA_1

References

1. J. Kinjo, F. Kishida, K. Watanabe, F. Hashimoto, T. Nohara, Chem. Pharm. Bull. **42**(9), 1874 (1994)

Lupinoside PA_2

CAS Registry Number: 162558-96-5

See Figure Lupinoside PA_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β,22β,24-Tetra-OH-olean-12-ene)

Biological sources: *Russell lupine* [1]

$C_{47}H_{76}O_{19}$: 944.498

$[\alpha]_D^{25}$ −1.6° (c 0.45, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730 [1]

FAB-MS *m/z*: 943 $[M-H]^-$, 781 $[M-H-Gal]^-$ [1]

HR-FAB-MS *m/z*: 967.4880 $[M + Na]^+$ [1]

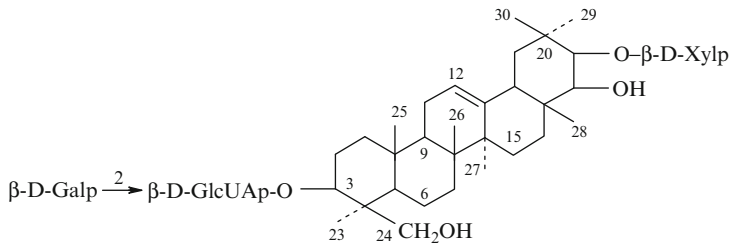
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.71, 0.91, 1.27, 1.29, 1.36, 1.37, 1.49 ($CH_3 \times 7$), 3.45 (dd, J = 12.7, 4.2, H-3), 5.28 (H-12) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	27.5	GlcUA-1	104.8	Xyl-1	106.8
2	26.4	17	39.1	2	80.3	2	75.1
3	90.8	18	43.8	3	77.0	3	78.3
4	43.7	19	47.4	4	73.3	4	70.8
5	56.1	20	36.4	5	77.9	5	66.9
6	18.7	21	85.8	6	173.2		
7	32.9	22	77.9	Gal-1	104.8		
8	40.2	23	22.7	2	72.8		
9	47.7	24	63.4	3	75.1		
10	36.6	25	15.7	4	70.6		
11	24.0	26	16.9	5	77.3		
12	122.6	27	26.6	6	62.1		
13	144.5	28	22.1				
14	42.0	29	31.3				
15	26.4	30	22.1				

(*continued*)



Lupinoside PA_2

References

1. J. Kinjo, F. Kishida, K. Watanabe, F. Hashimoto, T. Nohara, Chem. Pharm. Bull. **42**(9), 1874 (1994)

Soyasaponin A_1

CAS Registry Number: 78693-94-4

See Figure Soyasaponin A_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β,22β,24-Tetra-OH-olean-12-ene)

Biological sources: *Glycine max* [1, 2]

$C_{59}H_{96}O_{29}$: 1268.603

Mp: 240–242°C (aq. MeOH) [1]

$[\alpha]_D^{26}$ + 23.2° (c 0.91, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3390, 2918, 1737, 1074 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O (10:1)) [2]: 5.30 (brs, J = 9, H-12)

β-D-GlcUAp: 5.19 (d, J = 7.3, H-1)

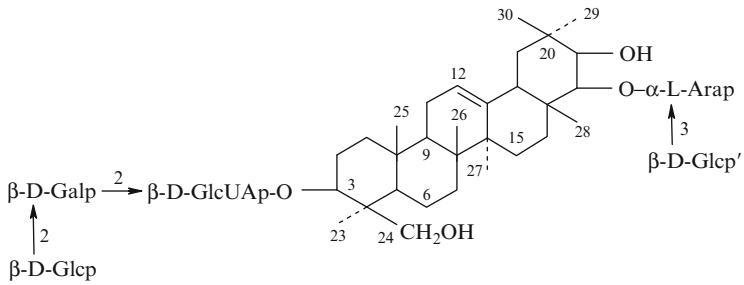
β-D-Galp: 5.59 (d, J = 7.6, H-1)

β-D-Glcp: 5.12 (d, J = 7.6, H-1)

α-L-Arap: 4.87 (d, J = 7.6, H-1)

β-D-Glcp′: 5.20 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]



Soyasaponin A_1

Table 1

C-3	90.5	GlcUA-1	104.5	Glc-1	106.6	Glc′-1	105.8
12	122.5	2	80.7	2	75.3	2	75.3
13	144.0	3	76.3	3	78.1	3	78.1
21	72.6	4	72.4	4	71.2	4	71.2
22	92.6	5	76.3	5	78.8	5	78.1
24	63.5	6	172.1	6	62.3	6	62.3
		Gal-1	102.9	Ara-1	108.1		
		2	84.2	2	69.0		
		3	74.4	3	85.0		
		4	70.3	4	67.1		
		5	77.6	5	63.5		
		6	62.3				

Pharm./Biol.: An inhibitory effect on lipid-oxidatin, liver-lesion generation and improving effect on hypercholesterinemia [2]

References

1. I. Kitagawa, M. Saito, T. Taniyama, M. Yoshikawa, Chem. Pharm. Bull. **33**, 1069 (1985)
2. I. Kitagawa, T. Taniyama, Y. Nagahama, K. Okubo, F. Yamauchi, M. Yoshikawa, Chem. Pharm. Bull. **36**(8), 2819 (1988)

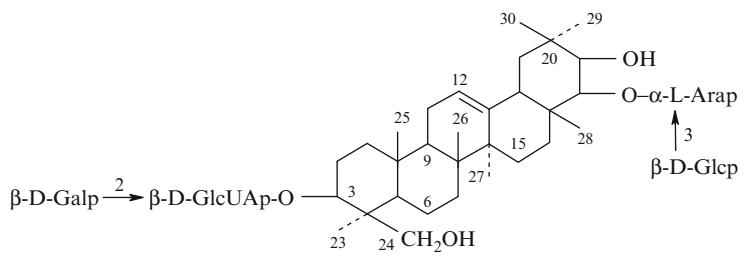
Soyasaponin A_2

CAS Registry Number: 78693-93-3
See Figure Soyasaponin A_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β, 22β,24-Tetra-OH-olean-12-ene)
Biological sources: *Glycine max* [1]
$C_{53}H_{86}O_{24}$: 1106.550
Mp: 231–232°C (aq. MeOH) [1]
$[\alpha]_D^{26}$ + 25.3° (c 1.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3350, 2925, 1740 [1]
IR (nujol) ν_{max} cm^{-1}: 3350, 1710 [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-3	90.6	GlcUA-1	104.7	Ara-1	108.3
12	122.6	2	80.8	2	69.1
13	144.0	3	75.5	3	85.2
21	72.6	4	73.4	4	67.2
22	92.7	5	77.0	5	64.3

(*continued*)



Soyasaponin A_2

Table 1 (continued)

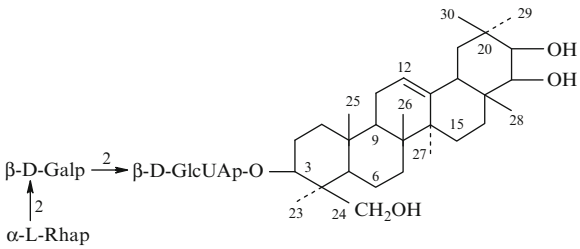
24	64.3	6	172.0	Glc-1	106.0
		Gal-1	105.3	2	75.5
		2	72.6	3	78.2
		3	75.5	4	71.3
		4	70.9	5	78.4
		5	77.0	6	62.5
		6	62.5		

References

1. I. Kitagawa, M. Saito, T. Taniyama, M. Yoshikawa, Chem. Pharm. Bull. **33**(2), 598 (1985)

Soyasaponin A_3

CAS Registry Number: 114077-04-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol A (3β,21β,22β,24-Tetra-OH-olean-12-ene)

Biological sources: *Pueraria lobata* [1], *Abrus cantoniensis* [2], *Glycine max* [3]

$C_{48}H_{78}O_{19}$: 958.513

$[\alpha]_D^{25}$ + 0.7° (c 0.42, C_5H_5N-H_2O (1:1)) [1]

FAB-MS *m/z*: 957 $[M-H]^-$, 811 $[M-H-Rha]^-$, 649 $[M-H-Rha-Gal]^-$, 473 $[M-H-Rha-Gal-GlcUA]^-$ [3]

FAB-MS *m/z*: 959 $[M + H]^+$, 981 $[M + H + Na]^+$, 813 $[M + H-Rha]^+$, 651 $[M + H-Rha-Gal]^-$, 474 [aglycone], 457, 439, 421 [3]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.69, 0.89, 1.23, 1.23, 1.26, 1.37, 1.41 (s, $CH_3 \times 7$), 5.27 (s, H-12), 5.49 (d, J = 7.0, H-1 of Gal), 5.96 (s, H-1 of Rha), 1.77 (d, J = 6.0, CH_3-6 of Rha) [1]

^{13}CNMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	27.4	GlcUA-1	105.0	Rha-1	102.1
2	26.6	17	38.8	2	78.1	2	71.9
3	91.5	18	44.0	3	77.0	3	72.0
4	43.9	19	47.5	4	73.9	4	73.8
5	56.2	20	36.5	5	78.1	5	69.5
6	18.7	21	75.0	6	176.2	6	18.7
7	33.1	22	79.4	Gal-1	101.8		
8	39.3	23	23.0	2	77.3		
9	47.9	24	63.6	3	75.8		
10	36.5	25	15.9	4	71.0		
11	24.2	26	17.1	5	76.5		
12	122.7	27	26.9	6	61.9		
13	144.6	28	22.3				
14	42.2	29	31.7				
15	26.6	30	21.5				

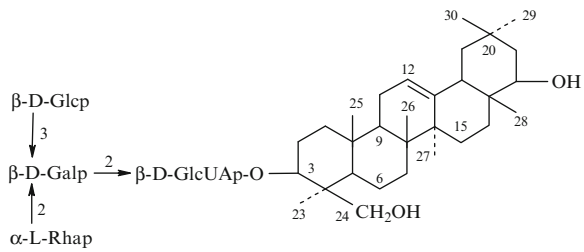
Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **45**(2), 362 (1997)
2. S. Sakamoto, M. Kuroyanagi, A. Ueno, S. Sekita, Phytochemistry **31**, 1339 (1992)
3. C.L. Curl, K.R. Price, G.R. Fenwick, J. Nat. Prod. **51**, 122 (1988)

Abrisaponin SB

CAS Registry Number: 178439-02-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Abrus cantoniensis* [1]
$C_{54}H_{88}O_{23}$: 1104.571
$[\alpha]_D^{27}$ −8.9° (c 0.40, C_5H_5N) [1]
FAB-MS *m/z*: 1103 $[M-H]^-$, 941 $[M-H-Glc]^-$, 795 $[941-Rha]^-$, 633 $[795-Gal]^-$ [1]
HR-FAB-MS *m/z*: 1105.5756 [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.73, 0.98, 1.00, 1.23, 1.29, 1.29, 1.45 (s, CH_3 × 7), 1.72 (d, J = 6.2, CH_3-6 of Rha), 4.98 (d, J = 6.6, H-1 of GlcUA), 5.16 (d, J = 7.7, H-1 of Glc), 5.30 (s, H-12), 5.78 (d, J = 7.3, H-1 of Gal), 6.20 (s, H-1 of Rha) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.5	C-16	28.6	GlcUA-1	105.4	Rha-1	102.9
2	26.4	17	38.0	2	78.4	2	72.4
3	91.4	18	45.2	3	76.5	3	72.8
4	43.8	19	46.7	4	73.8	4	74.3
5	56.1	20	30.8	5	78.3	5	69.3
6	18.6	21	42.3	6	172.3	6	19.0
7	33.2	22	75.5	Gal-1	101.5	Glc-1	105.9
8	39.9	23	23.0	2	77.2	2	75.0
9	47.7	24	63.6	3	83.6	3	78.2
10	36.4	25	15.8	4	71.1	4	71.6
11	24.0	26	16.9	5	75.5	5	77.7
12	122.3	27	25.6	6	61.7	6	62.6
13	144.8	28	21.1				
14	42.2	29	33.2				
15	26.6	30	28.6				

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

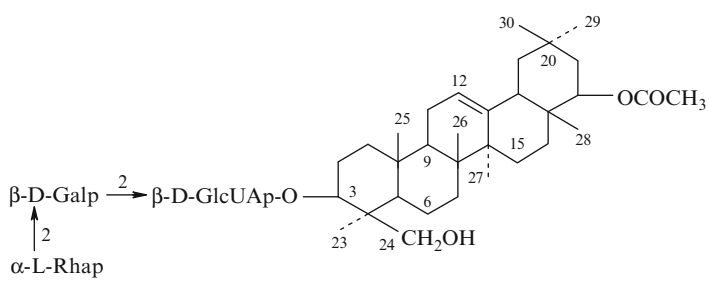
1. H. Miyao, Y. Sakai, T. Takeshita, Y. Ito, I. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1228 (1996)

Acetylsoyasaponin I

See Figure Acetylsoyasaponin I
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)
Biological sources: *Pueraria thomsonii* [1]
$C_{50}H_{80}O_{19}$: 984.529
$[\alpha]_D^{25}$ −9.7° (c 0.95, C_5H_5N) [1]
FAB-MS (positive ion mode) *m/z*: 1007.5192 $(M + Na)^+$, 986 $(M + H)^+$ [1]
FAB-MS *m/z*: 983 $(M-H)^-$, 675 $(M-H-Rha-Gal)^-$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N)[1]: 0.70, 0.93, 1.07, 1.25, 1.25, 1.25, 1.43 (s, CH_3 × 7), 1.78 (d, J = 6.0, CH_3-6 of Rha), 2.08 (s, Ac), 5.27 (s, H-12), 6.28 (s, H-1 of Rha) [1]
^{13}C NMR (270 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	30.0	GlcUA-1	105.5	Rha-1	102.4
2	26.2	17	36.4	2	78.4	2	72.4
3	91.1	18	44.7	3	76.6	3	72.8
4	43.6	19	46.1	4	73.9	4	74.4
5	56.1	20	30.1	5	77.7	5	69.4
6	18.5	21	38.5	6	172.3	6	19.0
7	32.9	22	77.7	Gal-1	101.7		
8	40.0	23	23.0	2	77.7		
9	47.7	24	63.6	3	76.4		
10	36.6	25	15.8	4	71.1		
11	24.0	26	16.8	5	76.6		
12	122.8	27	26.3	6	61.6		
13	144.1	28	27.1				
14	41.9	29	33.6	Ac-1	170.1		
15	26.6	30	21.2	2	21.2		



Acetylsoyasaponin I

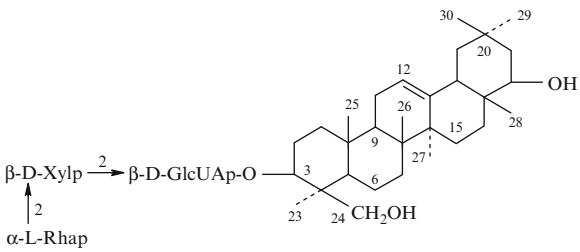
Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, T. Indzu, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **44**(10), 1970 (1996)

Astragaloside VIII

CAS Registry Number: 86361-64-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Melilotus officinalis* [1], *Wisteria brachybotrys* [2], *Astragalus membranaceus* [3]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 223–224°C [3]

$[\alpha]_D^{25}$ −10.5° (c 0.50, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1725 [2]

FAB-MS *m/z*: 911 $[M-H]^-$ [2]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.77, 0.97, 1.00, 1.22, 1.29, 1.31, 1.54 (s, CH_3 × 7), 5.31 (s, H-12), 6.37 (s, H-1 of Rha), 1.82 (d, J = 5.1, CH_3-6 of Rha) [2]

^{13}C NMR (C_5D_5N): [2]

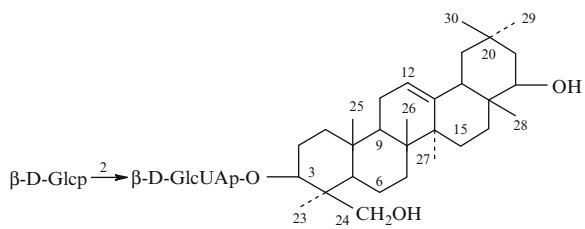
Table 1

C-1	38.8	C-16	28.6	GlcUA-1	105.3	Rha-1	102.3
2	26.4	17	38.0	2	78.4	2	72.3
3	91.0	18	45.3	3	77.4	3	72.7
4	44.3	19	46.7	4	73.9	4	74.2
5	56.3	20	30.8	5	77.7	5	69.4
6	18.6	21	42.2	6	172.9	6	18.6
7	33.2	22	75.5	Xyl-1	102.5		
8	40.0	23	23.0	2	79.5		
9	47.7	24	62.8	3	78.4		
10	36.5	25	15.6	4	70.8		
11	24.0	26	17.0	5	66.8		
12	122.4	27	25.7				
13	144.8	28	28.6				
14	42.4	29	33.2				
15	26.5	30	21.1				

References

1. T. Hirakawa, M. Okawa, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **48**(1), 286 (2000)
2. J. Kinjo, Y. Fujishima, K. Saino, R-h Tian, T. Nohara, Chem. Pharm. Bull. **43**(4), 636 (1995)
3. I. Kitagawa, H.K. Wang, M. Yoshikawa, Chem. Pharm. Bull. **31**(2), 716 (1983)

Azukisaponin II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Vigna angularis* [1]

$C_{42}H_{68}O_{14}$: 796.460

Mp: 216–217°C [1]

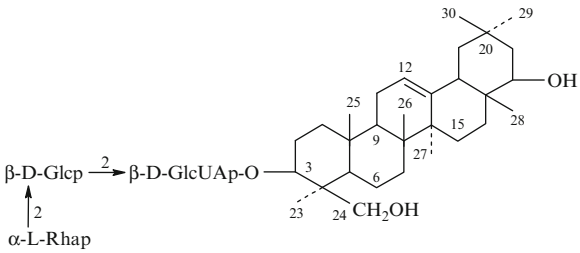
$[\alpha]_D^{25}$ + 27.5° (c 0.2, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1730, 1045 [1]

References

1. I. Kitagawa, H.K. Wang, M. Saito, M. Yoshikawa, Chem. Pharm. Bull. **31**(2), 674 (1983)

Azukisaponin V

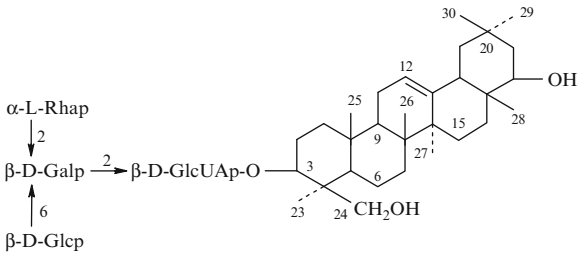


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)
Biological sources: *Vigna angularis* [1]
$C_{48}H_{78}O_{18}$: 942.518
Mp: 228–229°C (MeOH) [1]
$[\alpha]_D^{28}$ + 0.4° (c 1.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3386, 1726 [1]

References

1. I. Kitagawa, H.K. Wang, M. Saito, M. Yoshikawa, Chem. Pharm. Bull. **31**(2), 683 (1983)

Compound 7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)
Biological sources: *Crotalaria albida* [1]
$C_{54}H_{88}O_{23}$: 1104.571
$[\alpha]_D^{29}$ −11.1° (c 0.57, MeOH) [1]
FAB-MS *m/z*: 1270 $[M\text{-}NBA\text{-}H]^-$, 1117 $[M\text{-}H]^-$, 457 $[aglycon]^-$ (Me ester) [1]
^{13}C NMR (400 MHz, C_5D_5N) (Me ester): [1]

Table 1

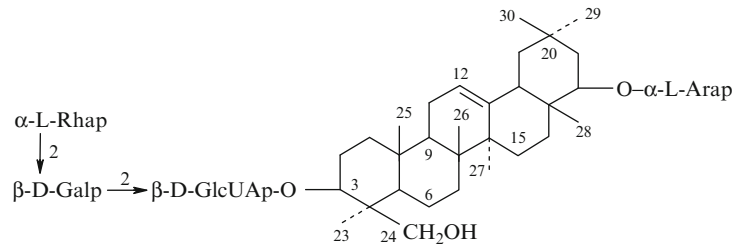
C-1	38.6	C-16	28.6	GlcUA-1	105.5	Rha-1	101.6
2	26.7	17	38.0	2	78.6	2	72.3
3	91.4	18	45.2	3	76.4	3	72.7
4	43.8	19	46.7	4	74.3	4	73.7
5	56.1	20	30.9	5	77.6	5	69.3
6	18.5	21	42.3	6	170.6	6	18.9
7	33.2	22	75.5	OMe	52.1	Glc-1	105.3
8	39.9	23	23.0	Gal-1	102.5	2	75.0
9	47.8	24	63.5	2	77.0	3	78.3
10	36.4	25	15.8	3	75.0	4	70.5
11	24.0	26	16.9	4	71.5	5	78.1
12	122.3	27	25.6	5	76.0	6	62.7
13	144.8	28	28.6	6	68.1		
14	42.2	29	33.3				
15	26.4	30	21.1				

References

1. Y. Ding, J. Kinjo, C.-R. Yang, T. Nohara, Chem. Pharm. Bull. **39**(2), 496 (1991)

Kudzusaponin SB_1

See Figure Kudzusaponin SB_1
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)
Biological sources: *Pueraria lobata* [1]
$C_{53}H_{86}O_{22}$: 1074.561
$[\alpha]_D^{25}$ −8.5° (c 0.73, C_5H_5N-H_2O (1:1)) [1]
FAB-MS (positive ion mode) *m/z*: 1097 $(M + Na)^+$, 951 $(M + Na\text{-}Rha)^+$, 613 $(M + Na\text{-}Rha\text{-}Gal\text{-}GlcUA)^+$ [1]
FAB-MS *m/z*: 1073 $(M\text{-}H)^-$, 941 $(M\text{-}H\text{-}Rha)^-$, 927 $[M\text{-}H\text{-}Rha]^-$, 765 $(927\text{-}Gal)^-$, 589 $(765\text{-}GlcUA)^-$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.73, 0.84, 1.05, 1.11, 1.18, 1.18, 1.43 (s, $CH_3 \times 6$), 1.80 (d, J = 6.0, CH_3-6 of Rha), 4.76 (d, J = 5.0, H-1 of Ara), 4.88



Kudzusaponin SB_1

(d, J = 8.0, H-1 of GlcUA), 5.17 (s, H-12), 5.75 (d, J = 8.0, H-1 of Gal), 5.66 (s, H-1 of Rha) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	28.9	GlcUA-1	104.8	Rha-1	102.0
2	26.2	17	37.6	2	78.0	2	71.8
3	91.7	18	46.0	3	77.2	3	72.0
4	44.0	19	46.8	4	73.7	4	73.9
5	56.4	20	30.7	5	77.2	5	68.8
6	18.7	21	37.1	6	176.2	6	18.5
7	33.5	22	82.9	Gal-1	102.0	Ara-1	102.0
8	39.9	23	23.0	2	77.2	2	73.7
9	48.0	24	63.6	3	76.6	3	75.6
10	36.6	25	16.0	4	71.0	4	69.6
11	24.2	26	17.2	5	76.6	5	66.1
12	123.6	27	25.5	6	62.1		
13	144.4	28	21.2				
14	42.5	29	32.4				
15	26.5	30	28.9				

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **45**(2), 362 (1997)

Lupinoside PA_4

CAS Registry Number: 162587-46-4

See Figure Lupinoside PA_4

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Russell lupine* [1]

$C_{54}H_{88}O_{22}$: 1088.576

$[\alpha]_D^{25}$ −21.9° (c 0.52, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3405, 1730 [1]

FAB-MS *m/z*: 1087 $[M-H]^-$, 941 $[M-H-Rha]^-$, 779 $[M-H-Rha-Gal]^-$, 603 $[M-H-Rha-Gal-GlcUA]^-$ [1]

HR-FAB-MS *m/z*: 1089.5839 $[M + Na]^+$ [1]

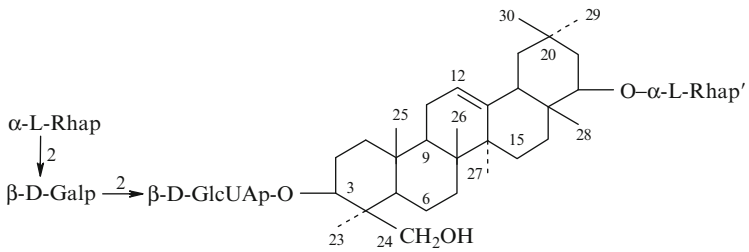
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.72, 0.86, 0.95, 1.02, 1.04, 1.25, 1.45 (s, CH_3 × 7), 3.40 (dd, J = 13.0, 6.5, H-3), 5.22 (H-12), 6.24 (s, H-1 of Rha), 1.72 (d, J = 5.5, CH_3-6 of Rha′), 5.40 (s, H-1 of Rha′), 1.78 (d, J = 5.5, CH_3-6 of Rha′)

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.4	C-16	28.1	GlcUA-1	105.2	Rha-1	102.2
2	25.9	17	37.3	2	78.1	2	72.2

(*continued*)



Lupinoside PA_4

Table 1 (continued)

3	91.0	18	44.9	3	76.4	3	72.4
4	43.7	19	46.2	4	73.6	4	74.2
5	55.8	20	30.2	5	77.6	5	69.1
6	18.3	21	35.4	6	172.6	6	18.7
7	32.9	22	79.2	Gal-1	101.5	Rha′-1	97.9
8	39.8	23	22.8	2	77.4	2	72.5
9	47.5	24	63.4	3	76.2	3	72.8
10	36.2	25	15.6	4	70.9	4	73.6
11	23.8	26	16.6	5	77.4	5	70.1
12	122.3	27	25.7	6	61.3	6	18.4
13	144.2	28	27.5				
14	41.8	29	32.8				
15	26.4	30	21.3				

References

1. J. Kinjo, F. Kishida, K. Watanabe, F. Hashimoto, T. Nohara, Chem. Pharm. Bull. **42**(9), 1874 (1994)

Lupinoside PA_5

See Figure Lupinoside PA_5

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Russell lupine* [1]

$C_{60}H_{98}O_{27}$: 1250.629

$[\alpha]_D^{25}$ −23.0° (c 0.52, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3395, 1730 [1]

FAB-MS *m/z*: 1249 $[M-H]^-$, 1103 [M-H-Rha]$^-$, 1087 [M-H-Glc]$^-$, 941 [M-H-Rha-Gal]$^-$, 765 [M-H-Rha-Gal-GlcUA]$^-$ [1]

HR-FAB-MS *m/z*: 1273.6189 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.74, 0.85, 1.00, 1.01, 1.03, 1.26, 1.46 (s, CH_3 × 7), 3.42 (brd, J = 11.6, H-3), 5.27 (s, H-12), 6.24 (s, H-1 of Rha), 1.80 (d, J = 5.9, CH_3-6 of Rha), 5.35 (s, H-1 of Rha′), 1.76 (d, J = 6.2, CH_3-6 of Rha′) [1]

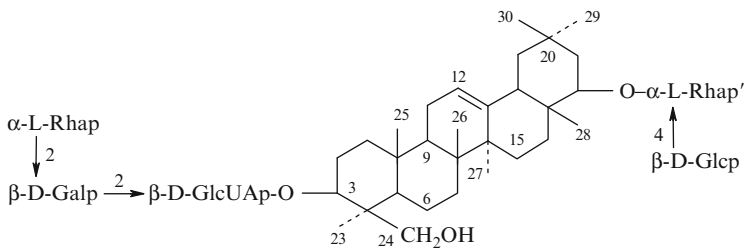
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.3	C-16	27.9	GlcUA-1	105.1	Rha′-1	97.5
2	25.9	17	37.2	2	78.0	2	72.0
3	90.9	18	44.7	3	76.3	3	70.7
4	43.6	19	46.0	4	73.4	4	84.5
5	55.7	20	30.1	5	77.9	5	68.3
6	18.2	21	35.2	6	172.3	6	18.1
7	32.8	22	79.4	Gal-1	101.4	Glc-1	106.3
8	39.7	23	22.6	2	77.2	2	76.0
9	47.4	24	63.2	3	76.1	3	78.0
10	36.1	25	15.5	4	71.0	4	71.7
11	23.7	26	16.5	5	77.5	5	78.0
12	122.3	27	25.6	6	61.2	6	62.2
13	144.1	28	27.4	Rha-1	102.1		
14	41.7	29	32.7	2	72.3		
15	26.3	30	21.3	3	72.4		
				4	74.0		
				5	68.9		
				6	18.6		

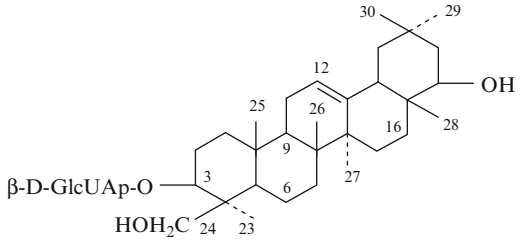
References

1. J. Kinjo, F. Kishida, K. Watanabe, F. Hashimoto, T. Nohara, Chem. Pharm. Bull. **42**(9), 1874 (1994)



Lupinoside PA_5

Monoglucuronide



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Lathyrus palustris* [1]

$C_{36}H_{58}O_9$: 634.408

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.7	C-16	28.7	GlcUA-1	106.5
2	26.4	17	38.0	2	75.4
3	89.0	18	45.3	3	78.1
4	44.4	19	46.8	4	73.5
5	56.1	20	30.9	5	78.1
6	18.9	21	42.3	6	172.4
7	33.4	22	75.6		
8	40.0	23	23.3		
9	47.8	24	63.3		
10	36.6	25	15.5		
11	24.1	26	17.1		
12	122.5	27	25.7		
13	144.8	28	21.2		
14	42.4	29	33.3		
15	26.9	30	28.7		

References

1. M. Udayama, M. Ohkawa, N. Yoshida, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **46**(9), 1412 (1998)

Melilotus-Saponin O_1

See Figure Melilotus-Saponin O_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Melilotus officinalis* [1]

$C_{53}H_{86}O_{22}$: 1074.561

$[\alpha]_D^{25}$ + 5.7° (c 0.50, MeOH) [1]

HR-FAB-MS *m/z*: 1097.5519 [1]

FAB-MS *m/z*: 1073 $[M-H]^-$, 941 $[M-H-Ara]^-$, 927 $[M-H-Rha-]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.72, 0.96, 1.01, 1.22, 1.26, 1.26, 1.44 (s, $CH_3 \times 7$), 5.30 (s, H-12)

α-L-Rhap: 5.99 (brs, H-1), 1.72 (d, J = 4.3, CH_3-6)

α-L-Arap: 4.92 (d, J = 6.7, H-1)

β-D-GlcUAp: 4.89 (d, J = 5.9, H-1)

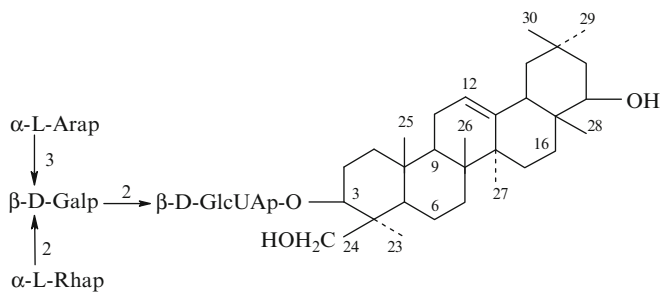
β-D-Galp: 5.60 (d, J = 7.7, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	28.7	GlcUA-1	104.8	Rha-1	102.2
2	26.3	17	37.8	2	76.5	2	71.8
3	91.2	18	45.4	3	73.5	3	72.0
4	43.7	19	46.6	4	73.9	4	73.7

(*continued*)



Melilotus-Saponin O_1

Table 1 (continued)

5	56.0	20	30.6	5	77.9	5	69.0
6	18.4	21	41.8	6	175.3	6	18.6
7	33.0	22	76.1	Gal-1	101.4	Ara-1	106.0
8	39.7	23	22.8	2	76.1	2	71.9
9	47.6	24	63.3	3	83.5	3	75.9
10	36.3	25	15.7	4	68.7	4	70.6
11	23.9	26	16.9	5	76.5	5	66.1
12	122.4	27	25.3	6	61.5		
13	144.5	28	20.7				
14	42.2	29	32.8				
15	26.1	30	28.6				

Pharm./Biol.: Used not only as food and forage but also as a medicine. The preventive effect of its extract on experimental atherosclerosis in rabbits was reported [1]

References

1. M. Udayama, J. Kinjo, N. Yoshida, T. Nohara, Chem. Pharm. Bull. **46**(3), 526 (1998)

Pisumsaponin I

CAS Registry Number: 333334-36-4

See Figure Pisumsaponin I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Pisum sativum* [1]

$C_{51}H_{80}O_{21}$: 1028.519

$[\alpha]_D^{24}$ + 5.8° (c 0.9, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3453, 2948, 1719, 1076 [1]

FAB-MS m/z: 1027 $[M-H]^-$, 881 $[M-C_6H_{11}O_4]^-$, 719 $[M-C_{12}H_{21}O_9]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.70, 0.87, 0.91, 1.05, 1.15, 1.23, 1.44 (s, CH_3-25, 26, 30, 28, 29, 27, 23), 2.34 (dd-like, H-18), 3.42 (dd, J = 7.6, 11.6, H-3), 3.78 (s, H-2-CH_2COOH), 4.22, 3.22 (d, J = 11.3, H_2-24), 5.02 (dd-like, H-22), 5.20 (brs, H-12)

β-D-GlcUAp: 4.97 (d, J = 7.3, H-1)

β-D-Galp: 5.75 (d, J = 7.6, H-1)

α-L-Rhap: 6.26 (brs, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

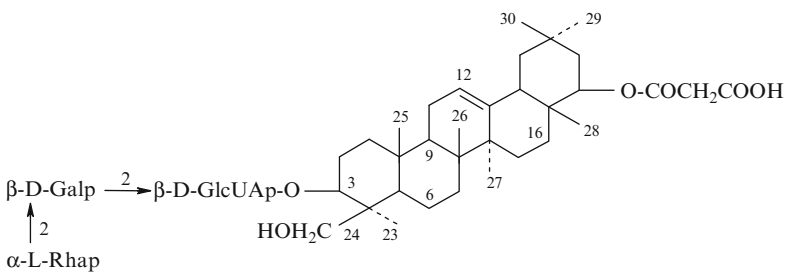
Table 1

C-1	38.7	C-16	27.4	GlcUA-1	105.5	Rha-1	102.4
2	26.7	17	36.9	2	78.5	2	72.4
3	91.3	18	44.9	3	76.9	3	72.8
4	44.0	19	46.3	4	73.8	4	74.5
5	56.1	20	30.6	5	77.7	5	69.5
6	18.6	21	38.7	6	172.3	6	19.0
7	33.0	22	79.5	Gal-1	101.9	$CH_2(COOH)_2$-1	167.2
8	40.1	23	23.1	2	77.8	2	43.3
9	47.8	24	63.6	3	76.6	3	169.6
10	36.5	25	15.8	4	71.3		
11	24.1	26	16.8	5	76.5		
12	122.9	27	26.2	6	61.8		
13	144.1	28	21.0				
14	42.0	29	33.5				
15	26.7	30	27.3				

Pharm./Biol.: Seeds have been prescribed for diuretic, anti-inflammatory, and stomachic purposes [1]

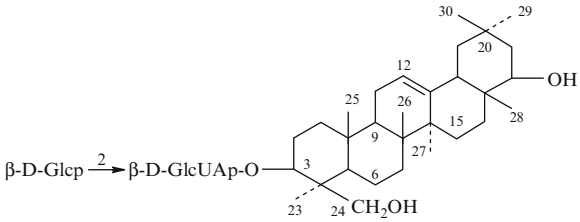
References

1. T. Murakami, K. Kohno, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 73 (2001)



Pisumsaponin I

Saponin from *Galega officinalis*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Galega officinalis* [1]

$C_{42}H_{68}O_{14}$: 796.460

Mp: 285–287°C ($CHCl_3$–MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3385, 2945, 1600, 1163, 1074, 1034 [1]

FD-MS *m/z*: 835 $(M + K)^+$ [1]

EI-MS *m/z*: 440 (1), 234 (100) [1]

CI-MS *m/z*: 441 (23), 234 (65), 113 (100) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.74, 0.97, 1.05, 1.23, 1.33, 1.35, 1.37 (s, $CH_3 \times 7$) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	28.7	GlcUA-1	104.9
2	26.5	17	38.0	2	81.7
3	90.9	18	45.4	3	75.7
4	43.7	19	46.9	4	73.2
5	56.3	20	30.9	5	78.2
6	18.7	21	42.4	6	177.2
7	33.3	22	75.6	Glc-1	104.2
8	40.0	23	22.8	2	76.3
9	47.7	24	63.4	3	78.4
10	36.5	25	15.8	4	70.0
11	24.1	26	17.1	5	78.2
12	122.5	27	25.8	6	61.7
13	144.9	28	28.7		
14	42.4	29	33.4		
15	26.5	30	21.2		

References

1. T. Fukunaga, K. Nishiya, K. Takeya, H. Itokawa, Chem. Pharm. Bull. **35**(4), 1610 (1987)

Sophoraflavoside I

CAS Registry Number: 100201-60-3

See Figure Sophoraflavoside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Sophora flavescens* [1]

$C_{59}H_{96}O_{27}$: 1236.613

Mp: 217–218°C [1]

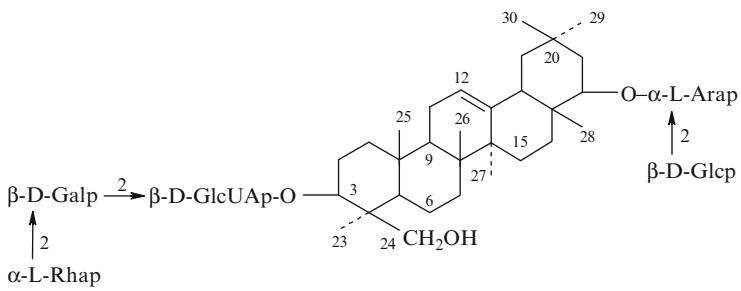
$[\alpha]_D^{20}$ −22.0° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2920, 1714 [1]

^{13}C NMR (25 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-3	91.5	GlcUA-1	105.4	Rha-1	102.2	Glc-1	105.6
12	122.8	2	77.8	2	72.0	2	75.6



Sophoraflavoside I

Table 1 (continued)

13	144.3	3	76.5	3	72.3	3	78.3
22	80.9	4	72.8	4	73.4	4	71.8
24	63.0	5	77.2	5	69.4	5	78.1
		6	170.2	6	18.9	6	63.0
		OMe	52.1	Ara-1	98.3		
		Gal-1	102.2	2	80.1		
		2	77.6	3	71.8		
		3	74.4	4	66.8		
		4	71.3	5	63.7		
		5	76.9				
		6	62.1				

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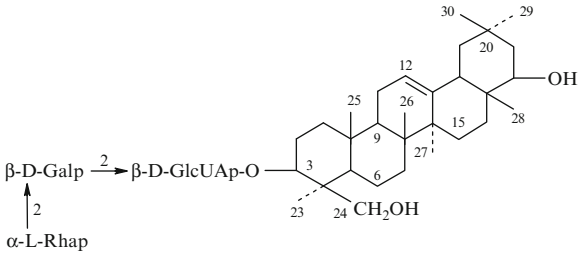
Soyasaponin I

CAS Registry Number: 51330-27-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Abrus cantoniensis* [1], *Astragalus membranaceus* [2], *Crotalaria albida* [3], *Desmodium styracifolium* [4], *Glycine max* [5], *Medicago sativa* [6], *Melilotus officinalis* [7], *Phaseolus vulgaris* [8], *Pueraria lobata* [9], *P. thomsonii* [10], *Russel lupine* [11], *Sophora flavescens* [12], *S. japonica* [13], *Wisteria brachybotrys* [14]

$C_{48}H_{78}O_{18}$: 942.518

Mp: 238–240°C [1]

$[\alpha]_D^{25}$ −8.5° (c 1.0, MeOH) [14]

IR (KBr) ν_{max} cm^{-1}: 3405, 1610 [14]

FAB-MS *m/z*: 941 $[M\text{-}H]^-$, 795 $[M\text{-}H\text{-}Rha]^-$, 633 $[M\text{-}H\text{-}Rha\text{-}Gal]^-$ [9]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.73, 0.95, 1.00, 1.22, 1.30, 1.30, 1.54 (s, CH_3 × 7), 5.30 (s, H-12), 5.98 (d, J = 7, H-1 of Gal), 6.39 (s, H-1-Rha), 1.83 (d, J = 6.0, CH_3-6) [9]

^{13}C NMR (C_5D_5N): [9]

Table 1

C-1	38.8	11	24.0	21	41.9	GlcUA-1	104.9	Gal-5	76.2
2	26.2	12	122.6	22	75.6	2	78.5	6	61.6
3	90.7	13	144.7	23	23.0	3	76.8	Rha-1	102.1
4	44.1	14	42.4	24	63.0	4	73.7	2	71.9
5	56.3	15	26.5	25	15.7	5	77.5	3	72.1
6	18.6	16	28.9	26	17.0	6	173.2	4	74.1
7	33.4	17	37.9	27	25.4	Gal-1	101.8	5	69.4
8	39.8	18	45.5	28	20.9	2	77.6	6	18.8
9	47.7	19	46.7	29	32.9	3	76.1		
10	36.5	20	30.7	30	20.7	4	70.9		

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Soyasaponin II

See Figure Soyasaponin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Glycine max* [1, 2]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 212–215°C (MeOH) [1]

$[\alpha]_D^{29}$ −9.6° (c 0.5, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3400, 1720 [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1733 [1]

^{1}H NMR (C_5D_5N): 0.70, 0.95, 0.95, 1.19, 1.19, 1.19, 1.35 (s, CH_3 × 7) [1]

References

1. I. Kitagawa, M. Yoshikawa, I. Yosioka, Chem. Pharm. Bull. **24**(1), 121 (1976)
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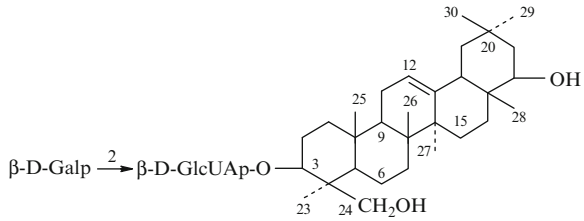
Soyasaponin III

CAS Registry Number: 55304-02-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Glycine max* [1], *Medicago hispida* [2], *Crotalaria albida* [3]

$C_{42}H_{68}O_{14}$: 796.460

Mp: 215–216°C (MeOH) [1]

$[\alpha]_D^{29}$ + 15.0° (c 0.5, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3350, 1710 [1]

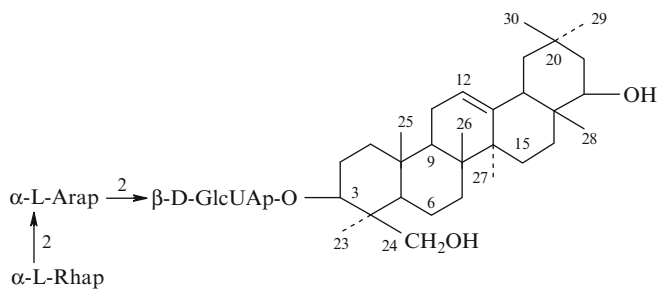
IR (KBr) ν_{max} cm^{-1}: 3400, 1734 [1]

^{13}C NMR (400 MHz, C_5D_5N): [3]

Table 1

C-1	38.5	C-16	28.6	GlcUA-1	105.3
2	26.6	17	38.0	2	80.7
3	90.7	18	45.2	3	77.2
4	43.8	19	46.7	4	73.6
5	56.1	20	30.8	5	77.9

(*continued*)



Soyasaponin II

Table 1 (continued)

6	18.6	21	42.2	6	170.3
7	33.2	22	75.5	COOMe	52.1
8	39.8	23	28.6	Gal-1	104.9
9	47.7	24	63.4	2	72.7
10	36.4	25	15.7	3	75.4
11	24.0	26	16.9	4	71.0
12	122.3	27	25.7	5	76.9
13	144.8	28	28.6	6	62.6
14	42.2	29	33.2		
15	26.4	30	21.1		

References

1. I. Kitagawa, M. Yoshikawa, I. Yosioka, Chem. Pharm. Bull. **24**(1), 121 (1976)
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Soyasaponin VI

See Figure Soyasaponin VI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Glycine max* [1]

$C_{54}H_{82}O_{20}$: 1050.539

Mp: 280°C [1]

$[\alpha]_D$ + 1°(c 0.13, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3397, 1728, 1626, 1383, 1074, 1045 [1]

UV λ_{max}^{MeOH} nm: 204, 288 [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.99 (H-2), 3.4 (H-3), 5.2 (H-12), 2.09 (H-18), 3.47 (H-22), 1.25 (s, CH_3-23), 3.21-4.13 (s, CH_3-24), 0.89 (s, CH_3-25), 0.98 (s, CH_3-26), 1.16 (s, CH_3-27), 0.83 (s, CH_3-28), 0.9 (s, CH_3-29), 0.98 (s, CH_3-30)

β-D-GlcUAp: 4.47 (d, J = 7.5, H-1), 3.78 (dd, J = 9.0, 7.5, H-2), 3.59 (t, J = 9.0, H-3), 3.46 (t, J = 9.0, H-4), 3.72 (t, J = 9.0, H-5)

β-D-Galp: 4.86 (d, J = 7.0, H-1), 3.64 (dd, J = 7.0, 9.6, H-2), 3.54 (dd, J = 3.4, 9.6, H-3), 3.73 (m, H-4), 3.49 (m, H-5), 3.68, 3.80 (m, H_2-6)

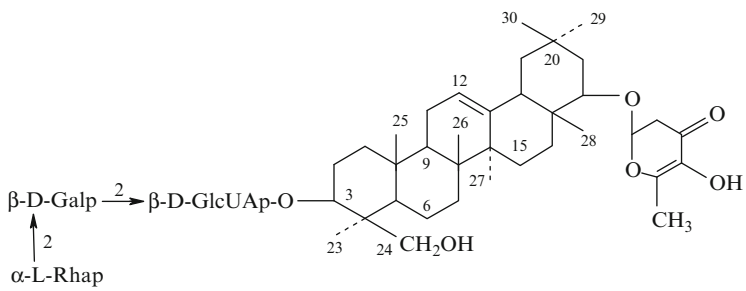
α-L-Rhap: 5.13 (d, J = 1.5, H-1), 3.91 (dd, J = 1.5, 3.1, H-2), 3.71 (dd, J = 3.1, 9.5, H-3), 3.39 (t, J = 9.5, H-4), 4.08 (dq, J = 9.5, 6.7, H-5), 1.26 (d, J = 6.7, CH_3-6)

Dehydromaltol: 5.39 (t, J = 3.3, H-1), 2.51 (dd, J = 3.3, 16.5, H-2), 2.92 (dd, J = 3.3, 16.5, H-2), 2.0 (H-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

C-1	41.5	C-16	30	GlcUA-1	106.5	Rha-1	103
2	28.2	17	40	2	78.1	2	73.2
3	94.5	18	47.5	3	79.2	3	73.3
4	47	19	48.7	4	74.9	4	75.2
5	58.6	20	33.5	5	77.9	5	70.6
6	nd	21	39	6	nd	6	20
7	35.6	22	85	Gal-1	103.5	Dehydromal.-1	99
8	42.5	23	24.5	2	79.2	2	43.5
9	50.3	24	66	3	77.4	3	190.5
10	39	25	17.3	4	72.5	4	137
11	25.8	26	18.7	5	77.6	5	158.5
12	125	27	27.6	6	63.3	6	16.7
13	147.5	28	22.3				
14	45	29	34.2				
15	28.4	30	29.7				



Soyasaponin VI

References

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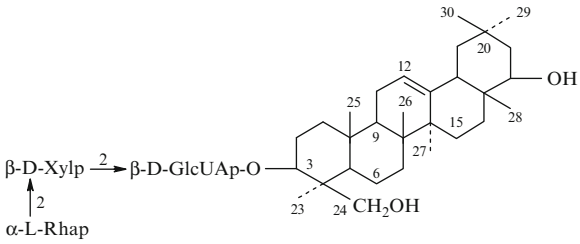
Wistariasaponin C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycosides of Other Aglycones – Soyasapogenol B (3β,22β,24-Trihydroxy-olean-12-ene)

Biological sources: *Wisteria brachybotrys* [1]

$C_{48}H_{78}O_{17}$: 926.523

$[\alpha]_D^{20}$ −14.9° (c 0.71, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1710 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 5.32 (t-like, H-12), 1.53, 1.30, 1.29, 1.22, 1.00, 0.98, 0.78 (s, CH_3 × 7)

β-D-GlcUAp: 5.00 (d, J = 7.6, H-1), 3.76 (s, COOMe)

β-D-Xylp: 5.68 (d, J = 7.6, H-1)

α-L-Rhap: 6.36 (d, J = 1.2, H-1), 1.18 (d, J = 6.2, CH_3-6) [1]

^{13}C NMR (75 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.88	C-16	28.67	GlcUA-1	105.49	Rha-1	102.3
2	26.69	17	38.02	2	78.65	2	72.37
3	91.18	18	45.37	3	76.83	3	72.71
4	44.35	19	46.77	4	73.64	4	74.34
5	56.42	20	30.89	5	77.58	5	69.42
6	18.67	21	42.28	6	170.46	6	18.93
7	33.26	22	75.57	COOMe	52.15		
8	39.96	23	22.97	Xyl-1	102.58		
9	47.81	24	62.87	2	79.45		
10	36.57	25	15.63	3	78.11		
11	24.05	26	17.05	4	70.86		
12	122.43	27	25.68	5	66.83		
13	144.83	28	28.67				
14	42.42	29	33.26				
15	26.41	30	21.16				

Pharm./Biol.: Antitumor promoter [2]

References

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Occurrence of Triterpene Glycosides in Plant Species

S.S. Azimova, (ed.), *Natural Compounds – Triterpene Glycosides*,
DOI 10.1007/978-1-4614-0541-2,

Family *Amaranthaceae*

***Alternanthera repens* (L.) Link**
COMPOUND 1 FROM *ALTERNANTHERA REPENS* [1]
COMPOUND 2 FROM *ALTERNANTHERA REPENS* [1]
COMPOUND 3 FROM *ALTERNANTHERA REPENS* [1]
COMPOUND 4 FROM *ALTERNANTHERA REPENS* [1]

***Amaranthus hypochondriacus* L.**
AMARANTHUS-SAPONIN I [2]
AMARANTHUS-SAPONIN II [2]
AMARANTHUS-SAPONIN III [2]
AMARANTHUS-SAPONIN IV [2]

References

1. R. Sanoko, G. Speranza, C. Pizza, N. De Tommasi, Phytochemistry **51**, 1043 (1999)
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Family *Aphloiaceae*

***Aphloia madagascariensis* Clos**
28-O-GLUCOPYRANOSYL-6β,23-DIHYDROXY-TORMENTIC ACID [1]

***Aphloia theiformis* Benn.**
ROSAMULTIN [2]

References

1. M.G. Dijoux, C. Lavaud, G. Massiot, L.L. Men-Olivier, D.M. Sheeley, Phytochemistry **34**, 497 (1993)
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Family *Apiaceae*

***Centella asiatica* (L.) Urb.**
CENTELLASAPONIN A [1, 2]
CENTELLASAPONIN B [2]
CENTELLASAPONIN C [2]
CENTELLASAPONIN D [2]

References

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Family *Apocynaceae*

***Stephanotis lutchuensis* Koidz.**
SITAKISOSIDE VIII [1]

References

1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(12), 2455 (1994)

Family *Trachelospermum asiaticum* Nakai

3-O-GLUCOPYRANOSIDE OF SUAVISSIMOSIDE RI [1]
COMPOUND VIII [1]
COMPOUND XIV [2]
COMPOUND XV [2]
SUAVISSIMOSIDE RI [1]
TRACHELOSPEROSIDE A-1 [1]
TRACHELOSPEROSIDE B-1 [1]
TRACHELOSPEROSIDE B-2 [1]
TRACHELOSPEROSIDE C-1 [1]

TRACHELOSPEROSIDE C-2 [1]
TRACHELOSPEROSIDE D-1 [2]
TRACHELOSPEROSIDE D-2 [2]
TRACHELOSPEROSIDE E-1 [2]
TRACHELOSPEROSIDE F-2 [2]

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)
2. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1833 (1987)

Family *Aquifoliaceae*

***Ilex brevicuspis* Reissek**
Brevicuspisaponin 1 [1]
Brevicuspisaponin 2 [1]

***Ilex chinensis* Sims**
ILEXOSIDE A [2]
ILEXOSIDE B METHYL ESTER [2]

***Ilex kudingcha* C.J.Tseng**
KUDINOSIDE A [3]
KUDINOSIDE B [3]
KUDINOSIDE C [3]

***Ilex latifolia* Thunb.**
LATIFOLOSIDE A [4]
LATIFOLOSIDE B [4]
LATIFOLOSIDE C [4, 5]
LATIFOLOSIDE D [4]
LATIFOLOSIDE E [4, 5]
LATIFOLOSIDE F [6]
LATIFOLOSIDE G [6]
LATIFOLOSIDE H [6]
LATIFOLOSIDE I [5]
LATIFOLOSIDE J [5]
LATIFOLOSIDE L [7]

***Ilex paraguariensis* A.St.-Hil.**
GLYCOSIDE L-E_2 [8]

***Ilex pubescens* Hook. & Arn.**
ILEXSAPONIN A_1 [9]
ILEXSAPONIN B_1 [10]
ILEXSAPONIN B_2 [10]
ILEXSAPONIN B_3 [10]

***Ilex rotunda* Thunb.**
ILEXOSIDE XLI [12]
ILEXOSIDE XLII [12]
ILEXOSIDE XLIII [12]
ILEXOSIDE XLIV [12]
ILEXOSIDE XLV [12]
ILEXOSIDE XLVI [11]
ILEXOSIDE XLVII [11]
ILEXOSIDE L [11]
ILEXOSIDE LI [11]

References

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Family *Araliaceae*

***Acanthopanax chiisanensis* Nakai**
CHIISANOSIDE [1]
ISOCHIISANOSIDE [1]
METHYL-ESTER ISOCHIISANOSIDE [1]

***Acanthopanax divaricatus* Seem.**
CHIISANOSIDE [2]
DIVAROSIDE [2]
ISOCHIISANOSIDE [2]
METHYL-ESTER ISOCHIISANOSIDE [2]

***Acanthopanax koreanum* Nakai**
ACANKOREANOSIDE A [3]
ACANKOREANOSIDE B [3]

***Acanthopanax senticosus* Harms**
CIWUJIANOSIDE B [4]
CIWUJIANOSIDE C_1 (YEMUOSIDE YM_{14}) [4]
CIWUJIANOSIDE C_2 [4]
CIWUJIANOSIDE D_2 [4]
CIWUJIANOSIDE E [4]

***Hedera canariensis* Willd.**
GLYCOSIDE L-E_2 FROM *HEDERA CANARIENSIS* [5]
GLYCOSIDE L-G_1 [6]
GLYCOSIDE L-G_{1B} [6]
GLYCOSIDE L-H_3 [5]

***Hedera colchica* K.Koch**
SAPONIN HCST-A [7]

***Hedera rhombea* Bean**
KIZUTA-SAPONIN K_4 [8]
KIZUTA-SAPONIN K_5 [8]
KIZUTA-SAPONIN K_7 [8]
KIZUTA-SAPONIN K_{7a} [9]
KIZUTA-SAPONIN K_{7b} [9]
KIZUTA-SAPONIN K_{7c} [8]
KIZUTA-SAPONIN K_9 [9]
KIZUTA-SAPONIN K_{13} [9]

***Hedera taurica* Carr.**
HEDEROSIDE E_1 [10]

***Kalopanax septemlobus* (Thunb.) Koidz**
KALOPANAX-SAPONIN La [11]
KALOPANAX-SAPONIN Lb [11]
KALOPANAX-SAPONIN Lc [11]

***Nothopanax delavayi* (Franch.) Harms**
LIANGWANOSIDE I [12]
LIANGWANOSIDE II [12]

***Panax ginseng* C.A.Meyer**
20-GLUCOGINSENOSIDE-Rf [13]
CHIKUSETSUSAPONIN I (GINSENOSIDE Rg_2) [14]
GINSENOSIDE F_1 (CHIKUSETSUSAPONIN L_{10}) [15]
GINSENOSIDE F_2 [13]
GINSENOSIDE F_3 [15]
GINSENOSIDE La [16]
GINSENOSIDE-Ra_1 [17]
GINSENOSIDE-Ra_2 [17]
GINSENOSIDE-Ra_3 [18]
GINSENOSIDE-Rb_2 [14, 19]
GINSENOSIDE-Rb_3 [13]
GINSENOSIDE-Rc [19]
GINSENOSIDE-Rd [15]
GINSENOSIDE-Re [14, 15]
GINSENOSIDE-Rf [14]
GINSENOSIDE-Rg_7 (GINSENOSIDE Ib) [20]
GINSENOSIDE-Rh_5 [20]
GINSENOSIDE-Rh_6 [20]
GINSENOSIDE-Rh_7 [20]
GINSENOSIDE-Rh_8 [20]
GINSENOSIDE-Rh_9 [20]
GINSENOSIDE RS_1 [19]
GINSENOSIDE RS_2 [19]
MALONYL-GINSENOSIDE Rb_1 [21]
MALONYL-GINSENOSIDE Rb_2 [21]
MALONYL-GINSENOSIDE Rc [21]
MALONYL-GINSENOSIDE Rd [21]

***Panax japonicus* C.A.Meyer**
24(R)-PSEUDOGINSENOSIDE RT_2 [22]
CHIKUSETSUSAPONIN I (GINSENOSIDE Rg_2) [23]
CHIKUSETSUSAPONIN Ia [23]
CHIKUSETSUSAPONIN L_5 [24]
CHIKUSETSUSAPONIN L_{9A} [24]
CHIKUSETSUSAPONIN LN_4 [25]
CHIKUSETSUSAPONIN LT_5 [25]
CHIKUSETSUSAPONIN LT_8 [25]
GINSENOSIDE F_1 (CHIKUSETSUSAPONIN L_{10}) [24]
GINSENOSIDE-Rc [26, 27]
GINSENOSIDE-Re [22]
GYPENOSIDE XVII [27]
NOTOGINSENOSIDE-R1 [22]
NOTOGINSENOSIDE-R2 [28]
MAJONOSIDE R1 [28]
MAJONOSIDE R2 [28]

***Panax notoginseng* (Burkill) F.H.Chen ex C.Y.Wu & K.M.Feng**
20(R)-GINSENOSIDE Rh_1 [29]
CHIKUSETSUSAPONIN I (GINSENOSIDE Rg_2) [29]
GINSENOSIDE F_2 [30]
GINSENOSIDE-Rb_2 [30]
GINSENOSIDE-Rb_3 [31]
GINSENOSIDE-Rc [30]
GINSENOSIDE-Rd [30, 31]
NOTOGINSENOSIDE A [32]
NOTOGINSENOSIDE B [32]
NOTOGINSENOSIDE C [32]
NOTOGINSENOSIDE D [32]
NOTOGINSENOSIDE E [33]
NOTOGINSENOSIDE G [33]
NOTOGINSENOSIDE H [33]
NOTOGINSENOSIDE I [33]
NOTOGINSENOSIDE J [33]
NOTOGINSENOSIDE-R1 [29]
NOTOGINSENOSIDE-R2 [29]
NOTOGINSENOSIDE-R3 [34]
NOTOGINSENOSIDE-R4 [34]
NOTOGINSENOSIDE-R6 [34]

***Panax pseudoginseng* Wall.**
CHIKUSETSUSAPONIN VI [35]
GINSENOSIDE-Rb_3 [36]
GINSENOSIDE-Rd [36]
GYPENOSIDE XVII [22]
MALONYL-GINSENOSIDE Rb_1 [37]
NOTOGINSENOSIDE-R2 [22]
PSEUDOGINSENOSIDE RC_1 [37]
PSEUDOGINSENOSIDE RS_1 [37]

Panax pseudoginseng* subsp. *himalaicus
24(R)-PSEUDOGINSENOSIDE F_{11} [36, 37]
24(R)-PSEUDOGINSENOSIDE RT_2 [38]
GINSENOSIDE F_2 [38]
GINSENOSIDE-Re [36]
GYPENOSIDE XVII [37]
PSEUDOGINSENOSIDE RT_3 [38]
PSEUDOGINSENOSIDE RT_4 [38]
PSEUDOGINSENOSIDE RT_5 [38]

Panax pseudoginseng* var. *elegantior
24(R)-PSEUDOGINSENOSIDE RT_2 [22]
GINSENOSIDE-Re [22]
NOTOGINSENOSIDE-R1 [22]

***Panax quinquefolium* L.**
24(R)-PSEUDOGINSENOSIDE F_{11} [39]
24(S)-PSEUDOGINSENOSIDE F_{11} [40]
GINSENOSIDE F_2 [40]
GINSENOSIDE-Rb_2 [39, 40]
GINSENOSIDE-Rd [39]
GINSENOSIDE-Re [39, 40]
GYPENOSIDE XVII [40]
QUINQUENOSIDE I [41]
QUINQUENOSIDE II [41]
QUINQUENOSIDE III [41]
QUINQUENOSIDE IV [41]
QUINQUENOSIDE V [41]
QUINQUENOSIDE R_1 [40]

Panax* sp. *var. pseudoginseng
24(S)-PSEUDOGINSENOSIDE F_{11} [37]
MAJONOSIDE R1 [37]
MAJONOSIDE R2 [37]

***Panax trifolius* L.**
GINSENOSIDE-Rb_3 [42]
GINSENOSIDE-Rc [42]
GINSENOSIDE-Rf [43]

***Panax vietnamensis* Ha & Grushv.**
20(R)-GINSENOSIDE Rh_1 [44]
24(S)-PSEUDOGINSENOSIDE F_{11} [44]
GINSENOSIDE-Rb_2 [44]
GINSENOSIDE-Re [44]
GINSENOSIDE Rh_5 [45]
MAJONOSIDE R1 [44]
MAJONOSIDE R2 [44]
NOTOGINSENOSIDE-R1 [44]
PSEUDOGINSENOSIDE RS_1 [44]
PSEUDOGINSENOSIDE RT_4 [44]
VINA-GINSENOSIDE-R1 [44]
VINA-GINSENOSIDE-R2 [44]
VINA-GINSENOSIDE R_{25} [45]

***Polyscias fulva* (Hiern) Harms**
POLYSCIASOSIDE A [46]

***Scheffleropsis angkae* Grushv. & N.Skvorts.**
GLYCOSIDE L-C_2 [47]
GLYCOSIDE L-E_2 [48]
GLYCOSIDE L-H_2 [49]
GLYCOSIDE L-K_2 [48]

***Tetrapanax papyriferum* K.Koch**
PAPYRIOSIDE LA [50]
PAPYRIOSIDE LB [50]
PAPYRIOSIDE LC [50]
PAPYRIOSIDE LD [50]
PAPYRIOSIDE LE [51]
PAPYRIOSIDE LF [51]
PAPYRIOSIDE LG [51]
PAPYRIOSIDE LH [51]

***Tupidanthus calyptratus* Hook.f. & Thomson**
COMPOUND 1 FROM *TUPIDANTHUS CALYPTRATUS* [52]
COMPOUND 2 FROM *TUPIDANTHUS CALYPTRATUS* [52]
COMPOUND 3 FROM *TUPIDANTHUS CALYPTRATUS* [52]
COMPOUND 4 FROM *TUPIDANTHUS CALYPTRATUS* [52]
COMPOUND 5 FROM *TUPIDANTHUS CALYPTRATUS* [52]
GLYCOSIDE F_2 [53]

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Family *Asclepiadaceae*

***Gymnema sylvestre* R.Br.**
COMPOUND 1 FROM *GYMNEMA SYLVESTRE* [1]
COMPOUND 3 FROM *GYMNEMA SYLVESTRE* [1]
GYMNEMASAPONIN I [2]
GYMNEMASAPONIN II [2]
GYMNEMASAPONIN III [2]
GYMNEMASAPONIN V [2]
GYMNEMASIDE I [3]
GYMNEMASIDE II [3]
GYMNEMASIDE III [3]
GYMNEMASIDE IV [3]
GYMNEMASIDE V [3]
GYMNEMASIDE VI [3]
GYMNEMASIDE VII [3]
GYMNEMOSIDE-e [4]
GYMNEMOSIDE-f [4]

***Stelmacrypton khasianum* Baill.**
STELMATOTRITERPENOSIDE E [5]
STELMATOTRITERPENOSIDE F [5]
STELMATOTRITERPENOSIDE G [5]
STELMATOTRITERPENOSIDE H [5]

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Family *Asteraceae*

***Aster tataricus* L.f.**
ASTERSAPONIN A [1]
ASTERSAPONIN C [1]

***Calendula officinalis* L.**
CALENDASAPONIN A [2]
CALENDASAPONIN B [2]
CALENDASAPONIN C [2]
CALENDASAPONIN D [2]

***Cynara cardunculus* L.**
CYNARASAPONIN A [3]
CYNARASAPONIN B [3]
CYNARASAPONIN C [3]
CYNARASAPONIN D [3]
CYNARASAPONIN E [3]
CYNARASAPONIN F [3]
CYNARASAPONIN G [3]
CYNARASAPONIN I [3]
CYNARASAPONIN J [3]

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Family *Balsaminaceae*

***Impatiens balsamina* L.**
HOSENKOSIDE F [1]
HOSENKOSIDE G [1]
HOSENKOSIDE H [1]
HOSENKOSIDE I [1]
HOSENKOSIDE J [1]
HOSENKOSIDE K [1]

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Family *Basellaceae*

***Basella rubra* L.**
BASELLASAPONIN C [1]
BASELLASAPONIN D [1]

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Family *Basidiomycetes*

***Hebeloma vinosophyllum* Hongo**
HEBEVINOSIDE I [1]
HEBEVINOSIDE II [1]
HEBEVINOSIDE III [1]
HEBEVINOSIDE IV [1]
HEBEVINOSIDE V [1]
HEBEVINOSIDE VI [2]
HEBEVINOSIDE VII [2]
HEBEVINOSIDE VIII [2]
HEBEVINOSIDE IX [2]
HEBEVINOSIDE X [2]
HEBEVINOSIDE XI [2]
HEBEVINOSIDE XII [3]
HEBEVINOSIDE XIII [3]
HEBEVINOSIDE XIV [3]

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Family *Betulaceae*

***Betula ermanii* Cham.**
COMPOUND 2 FROM *BETULA ERMANII* [1]
COMPOUND 3 FROM *BETULA ERMANII* [1]
COMPOUND 4 FROM *BETULA ERMANII* [1]
COMPOUND 6 FROM *BETULA ERMANII* [1]

***Betula maximowicziana* Regel**
BETULAMAXIMOSIDE A [2]
BETULAMAXIMOSIDE B [2]

***Betula schmidtii* Regel**
BETULA-SCHMIDTOSIDE A [3]

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Family *Campanulaceae*

***Platycodon grandiflorum* A.DC.**
PLATYCODIN A [1–3]
PLATYCODIN C [1–3]
PLATYCODIN D [1–3]
PLATYCOSIDE E [4]
SAPONIN 5 [2]
SAPONIN 6 [2]

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Family *Caprifoliaceae*

***Lonicera bournei* Hemsl.**
BOURNEIOSIDE A [1]
BOURNEIOSIDE B [1]

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Family *Caryophyllaceae*

***Acanthophyllum gypsophiloides* Regel**
ACANTHOPHYLLOSIDE D [1]

***Acanthophyllum paniculatum* Regel & Herder**
PANICULATOSIDE C [2]

***Dianthus deltoides* L.**
DIANTHOSIDE A (DIANTHUSSAPONIN D) [3]
DIANTHOSIDE B [3]

***Dianthus superbus* L.**
DIANTHOSIDE A (DIANTHUSSAPONIN D) [3]

***Herniaria glabra* L.**
GLABROSIDE B [4]
GLABROSIDE C [4]

***Sinocrassula asclepiadea* Franch.**
SINOCRASSULOSIDE I [5]
SINOCRASSULOSIDE II [5]
SINOCRASSULOSIDE III [5]
SINOCRASSULOSIDE IV [5]
SINOCRASSULOSIDE V [5]
SINOCRASSULOSIDE VI [5]
SINOCRASSULOSIDE VII [5]
SINOCRASSULOSIDE VIII [5]
SINOCRASSULOSIDE IX [5]
SINOCRASSULOSIDE X [5]
SINOCRASSULOSIDE XI [5]

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Family *Celastraceae*

***Bhesa paniculata* Arn.**
GLYCOSIDE 10 [1]
GONGGANOSIDE A [1]
GONGGANOSIDE B [1]

GONGGANOSIDE C [1]
GONGGANOSIDE D [2]
GONGGANOSIDE E [2]
GONGGANOSIDE F [2]
GONGGANOSIDE G [2]

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Family *Chenopodiaceae*

***Beta vulgaris* L.**
BETAVULGAROSIDE VIII [1]
BETAVULGAROSIDE X [1]

***Boussingaultia baselloides* Kunth**
BOUSSINGOSIDE A_1 [2]

***Chenopodium quinoa* Willd.**
QUINOA-SAPONIN 3 [3]
QUINOA-SAPONIN 4 [3]
QUINOA-SAPONIN 5 [3]
QUINOA-SAPONIN 6 [4]

***Climacoptera transoxana* Botsch.**
COPTEROSIDE G [5]
COPTEROSIDE H [5]

***Kochia scoparia* Schrad.**
KOCHIANOSIDE I [6]
KOCHIANOSIDE II [6]
KOCHIANOSIDE III [6]
KOCHIANOSIDE IV [6]
SCOPARIANOSIDE A [7]
SCOPARIANOSIDE B [7]
SCOPARIANOSIDE C [7]

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Family *Combretaceae*

***Combretum nigricans* Leprieur ex Guill. & Perr.**
COMBREGLUCOSIDE [1]

***Combretum quadrangulare* Kurz**
28-O-GLUCOPYRANOSYL-6β,23-DIHYDROXY-TORMENTIC ACID [2]
CHEBULOSIDE II [2]
COMBREGLUCOSIDE [2]
QUADRANOSIDE VI [2]
QUADRANOSIDE VII [2]
QUADRANOSIDE VIII [2]
QUADRANOSIDE IX [2]
QUADRANOSIDE X [2]
QUADRANOSIDE XI [2]
ROSAMULTIN [2]

***Terminalia arjuna* Wight et Arn.**
ARJUNOSIDE III [3]
ARJUNOSIDE IV [3]

***Terminalia chebula* L.**
CHEBULOSIDE I [4]
CHEBULOSIDE II [4]

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Family *Cucurbitaceae*

***Actinostemma lobatum* Maxim.**
ACTINOSTEMMOSIDE A [1]
ACTINOSTEMMOSIDE B [1]
ACTINOSTEMMOSIDE C [1]
ACTINOSTEMMOSIDE D [1]
ACTINOSTEMMOSIDE E [2]
ACTINOSTEMMOSIDE F [2]
ACTINOSTEMMOSIDE G [3]
ACTINOSTEMMOSIDE H [3]

***Cayaponia tayuya* Cogn.**
CAYAPONOSIDE A [4]
CAYAPONOSIDE A_1 [5]
CAYAPONOSIDE A_3 [4]
CAYAPONOSIDE A_4 [4]
CAYAPONOSIDE A_5 [6]
CAYAPONOSIDE A_6 [4]
CAYAPONOSIDE B [4]
CAYAPONOSIDE B_2 [4]
CAYAPONOSIDE B_3 [4]
CAYAPONOSIDE B_4 [4]
CAYAPONOSIDE B_5 [6]
CAYAPONOSIDE B_{6a} [5]
CAYAPONOSIDE B_{6b} [5]
CAYAPONOSIDE C [4]
CAYAPONOSIDE C_2 [4]
CAYAPONOSIDE C_3 [5]
CAYAPONOSIDE C_4 [6]
CAYAPONOSIDE C_{5a} [4]
CAYAPONOSIDE C_{5b} [6]
CAYAPONOSIDE D [4]
CAYAPONOSIDE D_1 [4]
CAYAPONOSIDE D_2 [6]
CAYAPONOSIDE D_{3a} [5]
CAYAPONOSIDE D_{3b} [5]

***Gynostemma pentaphyllum* (Thunb.) Makino**
GYNOSAPONIN TN-1 [7]
GYNOSAPONIN TN-2 [7]
GYPENOSIDE XVII [8]
MALONYL-GINSENOSIDE Rb_1 [9]
MALONYL-GINSENOSIDE Rd [9]

***Hemsleya panacis-scandens* C.Y. Wu & Z.L. Chen**
GLYCOSIDE FROM *HEMSLEYA PANACIS-SCANDENS* [10]
SCANDENOSIDE R_1 [10]
SCANDENOSIDE R_2 [10]
SCANDENOSIDE R_3 [10]
SCANDENOSIDE R_4 [10]
SCANDENOSIDE R_5 [10]
SCANDENOSIDE R_6 [10]
SCANDENOSIDE R_7 [10]

***Luffa acutangula* Roxb.**
ACUTOSIDE C [11]

***Luffa cylindrica* Roem.**
LUCYOSIDE N [12]

***Luffa operculata* Cogn.**
LUPEROSIDE K [13]
LUPEROSIDE L [13]

***Momordica charantia* L.**
GOYAGLYCOSIDE-a [14]
GOYAGLYCOSIDE-b [14]
GOYAGLYCOSIDE-c [14]
GOYAGLYCOSIDE-d [14]
GOYAGLYCOSIDE-e [14]
GOYAGLYCOSIDE-f [14]
GOYAGLYCOSIDE-g [14]
GOYAGLYCOSIDE-h [14]
MOMORDICOSIDE A [15]
MOMORDICOSIDE B [15]
MOMORDICOSIDE C [16]
MOMORDICOSIDE D [16]
MOMORDICOSIDE E [16]
MOMORDICOSIDE F_1 [17]
MOMORDICOSIDE F_2 [17]
MOMORDICOSIDE G [17]
MOMORDICOSIDE I [17]
MOMORDICOSIDE K [18]
MOMORDICOSIDE L [18]

***Momordica cochinchinensis* (Lour.) Spreng.**
MOMORDICASAPONIN II [19]
MOMORDIN III [20]

***Siraitia grosvenorii* (Swingle) C. Jeffrey ex A.M. Lu & Zhi Y. Zhang**
MOGROSIDE III [21]
MOGROSIDE IV [21]

***Thladiantha dubia* Bunge**
DUBIOSIDE A [22]
DUBIOSIDE B [22]
DUBIOSIDE C [22]
DUBIOSIDE D [23]
DUBIOSIDE E [23]
DUBIOSIDE F [23]

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Family *Dipsacaceae*

***Scabiosa rotata* M.Bieb.**
SCABRIOSIDE A [1]
SCABRIOSIDE B [1]
SCABRIOSIDE C [1]
SCABRIOSIDE D [1]

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Family *Eupteleaceae*

***Euptelea polyandra* Siebold & Zucc.**
EUPTELEASAPONIN I [1]
EUPTELEASAPONIN II [1]
EUPTELEASAPONIN III [1]
EUPTELEASAPONIN IV [1]
EUPTELEASAPONIN V [1]
EUPTELEASAPONIN V ACETATE [1]
EUPTELEASAPONIN VI [2]
EUPTELEASAPONIN VI ACETATE [2]
EUPTELEASAPONIN VII [2]
EUPTELEASAPONIN VIII [2]
EUPTELEASAPONIN IX [2]
EUPTELEASAPONIN X [2]

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Family *Fagaceae*

***Castanopsis cuspidata* Schottky**
CASTANOPSININ A_1 [1]
CASTANOPSININ A_2 [1]
CASTANOPSININ B_1 [1]
CASTANOPSININ B_2 [1]
CASTANOPSININ C_1[1]
CASTANOPSININ C_2 [1]
CASTANOPSININ D_1 [1]
CASTANOPSININ D_2 [1]
CASTANOPSININ E_1 [1]
CASTANOPSININ E_2 [1]
CASTANOPSININ F_1 [1]
CASTANOPSININ F_2 [1]
CASTANOPSININ G_1 [1]
CASTANOPSININ G_2 [1]
CASTANOPSININ H_1 [1]
CASTANOPSININ H_2 [1]

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Family *Labiatae*

***Clinopodium chinense* (Benth) O.Kuntze**
CLINOPOSAPONIN XIII [1]
CLINOPOSAPONIN XIV [1]
CLINOPOSAPONIN XVII [1]
CLINOPOSAPONIN XIX [1]

***Clinopodium vulgare* L.**
CLINOPOSAPONIN XVI [1]
CLINOPOSAPONIN XVIII [1]
CLINOPOSAPONIN XX [1]

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Family *Lardizabalaceae*

***Akebia quinata* Decne**
SAPONIN P_H [1]
SAPONIN P_{JI} [1]

***Holboellia fargesii* Reaub**
FARGOSIDE A [2]
FARGOSIDE B [2]
FARGOSIDE C [2]
FARGOSIDE D [2]

***Stauntonia chinensis* DC.**
CIWUJIANOSIDE C_1 (YEMUOSIDE YM_{14}) [3]

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Family *Lauraceae*

***Persea mexicana* Hemsl.**
PERSEAPICROSIDE A [1]

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Family *Leguminosae*

***Abrus cantoniensis* Hance**
ABRISAPONIN A [1]
ABRISAPONIN D_1 [1]
ABRISAPONIN D_2 [2]
ABRISAPONIN D_3 [2]
ABRISAPONIN Ca [1]
ABRISAPONIN F [2]
ABRISAPONIN L [1]
ABRISAPONIN So_1 [2]
ABRISAPONIN So_2 [2]
DEHYDROSOYASAPONIN I [1]
PHASEOSIDE IV [1]
KAIKASAPONIN III [1]
KUDZUSAPONIN A_3 [1]
ROBINIOSIDE E [1]
SAPONIN 2 [1]
SOPHORAFLAVOSIDE II [1]
SUBPROSIDE I [1]
SUBPROSIDE IV [1]
SUBPROSIDE V [1]
WISTARIASAPONIN B_2 [1]

***Abrus precatorius* L.**
PHASEOSIDE IV [3]
KAIKASAPONIN III [3]
KAIKASAPONIN III METHYL ESTER [3, 4]

***Crotalaria albida* Heyne.**
KAIKASAPONIN III [5]
KAIKASAPONIN III METHYL ESTER [5]
NON NAME (*CROTALARIA ALBIDA)* [5]

***Cylicodiscus gabunensis* Harms**
NON-NAME [6]
SAPONIN S_1 [6]
SAPONIN S_2 [6]
SAPONIN S_5 [6]

***Desmodium styracifolium* (Osbek) Merr.**
DEHYDROSOYASAPONIN I [7]

***Dalbergia hupeana* Hance**
KAIKASAPONIN III [8]
SAPONIN 2 [8]

***Dolichos lablab* L.**
LABLABOSIDE B [9]
LABLABOSIDE C [9]

***Glycyrrhiza glabra* L.**
GLYCYRRHIZIN [10]

***Glycyrrhiza inflata* Batalin**
APIOGLYCYRRHIZIN [11, 12]
ARABOGLYCYRRHIZIN [11, 12]
GLYCYRRHIZIN [11]
LICORICE-SAPONIN A3 [13]
LICORICE-SAPONIN G2 [11]
LICORICE-SAPONIN H2 [14]

***Glycyrrhiza uralensis* Fisch. ex DC.**
GLYCYRRHIZIN [15, 16]
LICORICE-SAPONIN A3 [16]
LICORICE-SAPONIN B2 [16]
LICORICE-SAPONIN C2 [16]
LICORICE-SAPONIN D3 [14]
LICORICE-SAPONIN E2 [14]
LICORICE-SAPONIN F3 [14, 17]
LICORICE-SAPONIN G2 [14, 17]
LICORICE-SAPONIN H2 [14, 17]
LICORICE-SAPONIN J2 [17]
LICORICE-SAPONIN K2 [17]
LICORICE-SAPONIN L3 [18]

***Gymnocladus chinensis* Baill.**
GYMNOCLADUS-SAPONIN A [19]
GYMNOCLADUS-SAPONIN B [19]
GYMNOCLADUS-SAPONIN C [19]
GYMNOCLADUS-SAPONIN D [20]
GYMNOCLADUS-SAPONIN D_1 [21]
GYMNOCLADUS-SAPONIN E [21]
GYMNOCLADUS-SAPONIN F_1 [21]
GYMNOCLADUS-SAPONIN F_2 [21]
GYMNOCLADUS-SAPONIN G [22]

***Lathyrus palustris* L.**
PALUSTROSIDE I [23]
PALUSTROSIDE II [23]
PALUSTROSIDE III [23]

***Medicago sativa* L.**
MEDICOSIDE J [24, 25]
DEHYDROSOYASAPONIN I [26]

***Melilotus officinalis* (L.) Lam.**
MELILOTUS-SAPONIN O_2 [27]

***Phaseolus vulgaris* L.**
DEHYDROSOYASAPONIN I [28]
PHASEOLOSIDE D [29]
PHASEOLOSIDE E [30]
SANDOSAPONIN A [28]
SANDOSAPONIN B [28]

***Pisum sativum* L.**
PISUMSAPONIN II [31]

***Pueraria lobata* (Willd.) Ohwi**
KAIKASAPONIN III [32]
KAIKASAPONIN III METHYL ESTER [32]
KUDZUSAPONIN A_1 [33]
KUDZUSAPONIN A_2 [33]
KUDZUSAPONIN A_3 [33]
KUDZUSAPONIN A_4 [33]
KUDZUSAPONIN A_5 [33]
KUDZUSAPONIN C_1 [34]

***Pueraria thomsonii* Benth.**
ACETYL-KAIKASAPONIN III [35]
KUDZUSAPONIN B_1 [35]
SUBPROSIDE V [35]

***Robinia pseudoacacia* L.**
ROBINIOSIDE E [36]
ROBINIOSIDE F [36]
ROBINIOSIDE G [36]
ROBINIOSIDE H [36]
ROBINIOSIDE I [36]
ROBINIOSIDE J [36]

***Russell lupine* (*L. polyphyllus* × *L. arboreus* hybrid)**
DEHYDROSOYASAPONIN I [37]
KUDZUSAPONIN A_3 [37]

***Sophora flavescens* Ait.**
SOPHORAFLAVOSIDE II [38]

***Sophora japonica* L.**
KAIKASAPONIN III [39]

***Vigna angularis* (Willd) Ohwi et Ohashi**
AZUKISAPONIN I [40]
AZUKISAPONIN III [40]
AZUKISAPONIN IV [40]
AZUKISAPONIN VI [41]

***Wisteria brachybotrys* Siebold & Zucc.**
ROBINIOSIDE I [42]
SUBPROSIDE V [42]
WISTARIASAPONIN A [43]
WISTARIASAPONIN A_2 [42]
WISTARIASAPONIN A_3 [42]
WISTARIASAPONIN B_1 [43]
WISTARIASAPONIN B_2 [43]
WISTARIASAPONIN B_3 [42]
WISTARIASAPONIN YC_1 [42]
WISTARIASAPONIN YC_2 [42]

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Family *Liliaceae*

***Scilla scilloides* Druce**
SCILLASCILLOSIDE D-1 [1]
SCILLASCILLOSIDE E-1 [1]
SCILLASCILLOSIDE E-2 [1]
SCILLASCILLOSIDE E-3 [1]
SCILLASCILLOSIDE E-4 [1]
SCILLASCILLOSIDE E-5 [1]
SCILLASCILLOSIDE G-1 [1]

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Family *Lycopodiaceae*

***Lycopodium inundatum* L.**
INUNDOSIDE A [1]
INUNDOSIDE B [1]
INUNDOSIDE D_1 [1]
INUNDOSIDE D_2 [1]
INUNDOSIDE E [1]
INUNDOSIDE F [1]

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Family *Meliaceae*

***Dysoxylum cumingianum* C.DC.**
CUMINGIANOSIDE G [1]
CUMINGIANOSIDE H [1]
CUMINGIANOSIDE I [1]
CUMINGIANOSIDE J [1]

CUMINGIANOSIDE K [1]
CUMINGIANOSIDE L [1]
CUMINGIANOSIDE M [1]
CUMINGIANOSIDE N [1]
CUMINGIANOSIDE O [1]
CUMINGIANOSIDE P [2]
CUMINGIANOSIDE Q [2]

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Family *Molluginaceae*

***Clinus lotoides* L.**
LOTOIDOSIDE A [1]
LOTOIDOSIDE B [1]
LOTOIDOSIDE C [1]

***Mollugo spergula* L.**
SPERGULACIN [2]
SPERGULACIN A [2]
SPERGULIN A [2]
SPERGULIN B [2]

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Family *Myrsinaceae*

***Ardisia crenata* Sims**
ARDISICRENOSIDE C [1]
ARDISICRENOSIDE D [1]
ARDISICRENOSIDE G [2]
ARDISICRENOSIDE H [2]

***Ardisia mamillata* Hance**
ARDISIMAMILLOSIDE C [3]
ARDISIMAMILLOSIDE D [3]
ARDISIMAMILLOSIDE E [3]
ARDISIMAMILLOSIDE F [3]

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Family *Phytolaccaceae*

***Phytolacca americana* L.**
COMPOUND 1 FROM *PHYTOLACCA AMERICANA* [1]
PHYTOLACCASAPONIN B [1, 2]
PHYTOLACCASAPONIN E [1, 2]
PHYTOLACCASAPONIN G [2]

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Family *Polygalaceae*

***Polygala japonica* Houtt.**
POLYGALASAPONIN XX [1]
POLYGALASAPONIN XXI [1]
POLYGALASAPONIN XXII [1]
POLYGALASAPONIN XXIII [1]
POLYGALASAPONIN XXV [1]
POLYGALASAPONIN XXVI [1]
POLYGALASAPONIN XXVII [1]

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Family *Polyporaceae*

***Laetiporus versisporus* (Lloyd) Imaz.**
LAETIPOSIDE E [1]
LAETIPOSIDE F [1]
LAETIPOSIDE G [1]

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Family *Primulaceae*

***Anagallis arvensis* L.**
ARVENIN I [1]
ARVENIN II [1]
ARVENIN III [1]
ARVENIN IV [1]

***Androsace septentrionalis* L.**
ANDROSEPTOSIDE B [2]
ANDROSEPTOSIDE D [2]
ANDROSEPTOSIDE D_1 [3]
ANDROSEPTOSIDE F [4]

***Naumburgia thyrsiflora* Rchb.**
SAPONIN B [5]

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Family *Rhamnaceae*

Hovenia dulcis* var. *tomentella-Makino
HODULOSIDE VI [1]
HODULOSIDE VII [1]
HODULOSIDE VIII [1]
HODULOSIDE IX [1]
HODULOSIDE X [1]
HOVENIDULCIOSIDE A_1 [2]
HOVENIDULCIOSIDE A_2 [2]
HOVENIDULCIOSIDE B_1 [2]
HOVENIDULCIOSIDE B_2 [2]
ZIZYPHUS-SAPONIN II (SAPONIN C_2) [3]

***Zizyphus jujuba* Mill.**
ACETYLJUJUBOSIDE B [4]
COMPOUND II FROM *ZIZYPHUS JUJUBA* [5]
JUJUBOSIDE A_1 [4]
JUJUBOSIDE B [5]
JUJUBOSIDE C [4]
PROTOJUJUBOSIDE A [6]
PROTOJUJUBOSIDE B [6]
PROTOJUJUBOSIDE B_1 [6]
ZIZYPHUS-SAPONIN I [5]
ZIZYPHUS-SAPONIN II (SAPONIN C_2) [5]
ZIZYPHUS-SAPONIN III [5]

***Zizyphus jujuba* var. spinosa**
JUJUBOSIDE B [7]

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Family *Rhoipteleaceae*

***Rhoiptelea chiliantha* Diels & Hand.-Mazz.**
CHILIANOSIDE A [1]
CHILIANOSIDE B [1]
CHILIANOSIDE C [1]
CHILIANOSIDE D [1]
CHILIANOSIDE E [1]
CHILIANOSIDE F [1]
CHILIANOSIDE G [1]
CHILIANOSIDE H [1]
CHILIANOSIDE I [1]
CHILIANOSIDE J [1]
CHILIANOSIDE K [1]
CHILIANOSIDE L [1]

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Family *Rosaceae*

***Rosa laevigata* Michx.**
ROSAMULTIN [1]

***Rosa multiflora* Thunb.**
ROSAMULTIN [2]

***Rubus coreanus* Miq.**
COREANOSIDE F1 [3]
SUAVISSIMOSIDE RI [3]

***Rubus suavissimus* S.K. Lee**
SUAVISSIMOSIDE RI [4]

***Sanguisorba alpina* Bunge**
ROSAMULTIN [5]
ZIYU-GLYCOSIDE II [5]

***Sanguisorba officinalis* L.**
ZIYU-GLYCOSIDE I [6]
ZIYU-GLYCOSIDE II [6]

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Family *Rubiaceae*

***Isertia haenkeana* DC.**
GLYCOSIDE 10 [1]

***Mussaenda pubescens* Ait. f.**
MUSSAENDOSIDE R [2]
MUSSAENDOSIDE S [2]
MUSSAENDOSIDE V [3]

***Uncaria tomentosa* DC.**
GLYCOSIDE 10 [4]

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Family *Sapotaceae*

***Tridesmostemon claessensii* De Wild.**
TRIDESMOSAPONIN A [1]
TRIDESMOSAPONIN B [1]

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Family *Scrophulariaceae*

***Picrorhiza kurrooa* Royle**
COMPOUND 1 [1, 2]
COMPOUND 2 [1]
COMPOUND 2 FROM *PICRORHIZA KURROOA* [3]
COMPOUND 3 [1]
COMPOUND 3 FROM *PICRORHIZA KURROOA* [3]
COMPOUND 4 [1]
COMPOUND 5 FROM *PICRORHIZA KURROOA* [1]
COMPOUND 6 FROM *PICRORHIZA KURROOA* [1]
COMPOUND 8 FROM *PICRORHIZA KURROOA* [1]

***Scrophularia kakudensis* Franch.**
SCROPHULASAPONIN II [4]
SCROPHULASAPONIN III [4]
SCROPHULASAPONIN IV [4]

***Verbascum fruticulosum* Post**
MULLEINSAPONIN IV [5]
MULLEINSAPONIN V [5]

***Verbascum sinaiticum* Benth.**
MULLEINSAPONIN I [5]
MULLEINSAPONIN II [5]
MULLEINSAPONIN VI

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Family *Sponge*

***Erylus nobilis* Thiele**
ERYLOSIDE G [1]
ERYLOSIDE H [1]
ERYLOSIDE I [1]
ERYLOSIDE J [1]

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Family *Styracaceae*

***Styrax japonica* Z.Ying Zhang**
JEGOSAPONIN A [1]
JEGOSAPONIN B [1]
JEGOSAPONIN C [1]
JEGOSAPONIN D [1]

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Family *Symplocaceae*

***Symplocos spicata* Roxb.**
COMPOUND VIII [1]

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Family *Theaceae*

***Camellia sinensis* L.**
ASSAMSAPONIN A [1]
ASSAMSAPONIN B [1]
ASSAMSAPONIN C [1]
ASSAMSAPONIN D [1]
ASSAMSAPONIN E [1]
ASSAMSAPONIN F [2]
ASSAMSAPONIN G [2]
ASSAMSAPONIN H [2]
ASSAMSAPONIN I [2]
ASSAMSAPONIN J [2]
THEASAPONIN E_1 [3]
THEASAPONIN E_2 [3]

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Family *Tiliaceae*

***Corchorus acutangulus* Lam.**
CORCHORUSIN C [1]
CORCHORUSIN C_1 [2]
CORCHORUSIN D_1 [2]
CORCHORUSIN D_3 [2]

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Family *Umbelliferae*

***Bupleurum falcatum* L.**
SAIKOSAPONIN b_1 [1, 2]

***Bupleurum marginatum* Wall. ex DC.**
SAIKOSAPONIN 14 [3]

***Bupleurum rockii* H. Wolff**
SAIKOSAPONIN 14 [3]

***Bupleurum rotundifolium* L.**
ROTUNDIOSIDE E [4]
ROTUNDIOSIDE D [5]
ROTUNDIOSIDE F [4]
ROTUNDIOSIDE G [5]

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Family *Urticaceae*

***Musanga cecropioides* R.Br.apud Tedlie**
KALAIC ACID [1]
ROSAMULTIN [2]

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Family *Valerianaceae*

***Patrinia scabiosaefolia* Fisch.**
GLYCOSIDE 3 [1]
GLYCOSIDE L-E_2 [1]
PATRINIA-GLYCOSIDE A-I [1]
PATRINIA-GLYCOSIDE B-I [1]
SULFAPATRINOSIDE I [2]

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Family *Woodsiaceae*

***Diplazium subsinuatum* (Hook. & Grev.) Tagawa**
2″-O-ACETYL GLYCOSIDE B [1]
5″-O-ACETYL GLYCOSIDE C [1]
6′-O-ACETYL GLYCOSIDE B [1]
DIPLAZIOSIDE I [2]
DIPLAZIOSIDE II [2]
DIPLAZIOSIDE III [1]
DIPLAZIOSIDE IV [1]
DIPLAZIOSIDE VI [3]
DIPLAZIOSIDE VII [3]
GLYCOSIDE A [4]
GLYCOSIDE B [4]
GLYCOSIDE C [2, 4]

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Family *Zygophyllaceae*

***Fagonia arabica* L.**
COMPOUND 5 FROM *FAGONIA ARABICA* [1]
COMPOUND 6 FROM *FAGONIA ARABICA* [1]
COMPOUND 7 FROM *FAGONIA ARABICA* [1]

***Fagonia cretica* L.**
SAPONIN 2 FROM *FAGONIA CRETICA* [2]
SAPONIN 4 [2]

***Fagonia glutinosa* Delile**
COMPOUND 6 FROM *FAGONIA GLUTINOSA* [3]
COMPOUND 8A FROM *FAGONIA GLUTINOSA* [3]
COMPOUND 9 FROM *FAGONIA GLUTINOSA* [3]
COMPOUND 10 FROM *FAGONIA GLUTINOSA* [3]
COMPOUND 11 FROM *FAGONIA GLUTINOSA* [3]
COMPOUND 12 FROM *FAGONIA GLUTINOSA* [3]

***Fagonia indica* Burm.f.**
INDICASAPONIN A [4]

***Guaiacum officinale* L.**
GUAIACIN C [5]
GUAIACIN D [5]
GUAIACIN E [5]

***Zygophyllum album* L.f.**
ZYGOPHYLOSIDE F [6]

***Zygophyllum coccineum* L.**
ZYGOPHYLOSIDE F [6]
ZYGOPHYLOSIDE G [7]
ZYGOPHYLOSIDE H [7]

***Zygophyllum decumbens* Delile**
ZYGOPHYLOSIDE I [8]
ZYGOPHYLOSIDE J [8]

***Zygophyllum dumosum* Boiss.**
ZYGOPHYLOSIDE F [6]
ZYGOPHYLOSIDE G [7]
ZYGOPHYLOSIDE H [7]

***Zygophyllum eichwaldii* C.A.Mey.**
ZIYU-GLYCOSIDE I [9]
ZIYU-GLYCOSIDE II [9]
ZYGOEICHWALOSIDE G [10]
ZYGOEICHWALOSIDE H [11]
ZYGOEICHWALOSIDE I [9]
ZYGOEICHWALOSIDE K [11]

***Zygophyllum gaetulum* Emb. & Maire**
ZYGOPHYLOSIDE I*[12]
ZYGOPHYLOSIDE L [12]

***Zygophyllum oxianum* Boriss.**
ZYGOPHYLOSIDE E [13]

***Zygophyllum propinquum* Decne.**
ZYGOPHYLOSIDE C [14]
ZYGOPHYLOSIDE D [15]
ZYGOPHYLOSIDE E [15]

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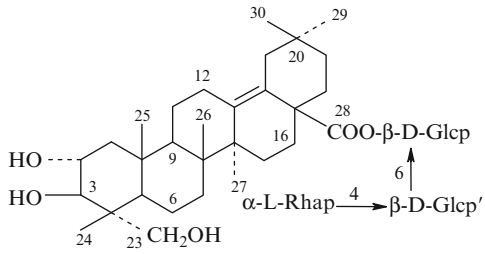
Glycosides of Aglycones of Oleanene Type

Centellasaponin A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23-Trihydroxy-olean-13(18)-en-28-oic Acid

Biological source: *Centella asiatica* [1, 2]

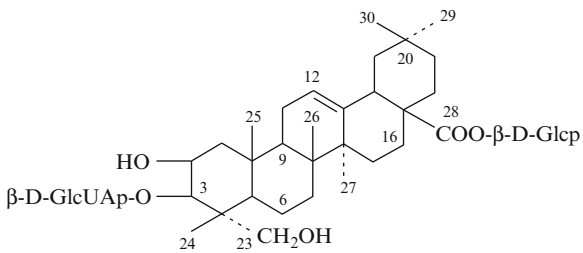
$C_{48}H_{76}O_{19}$: 956.498

References

1. H. Matsuda, T. Morikawa, H. Ueda, M. Yoshikawa, Heterocycles **55**, 1499 (2001)
2. H. Matsuda, T. Morikawa, H. Ueda, M. Yoshikawa, Chem. Pharm. Bull. **49**(10), 1368 (2001)

Zygophyloside I

CAS Registry Number: 212055-69-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,3β,23-Trihydroxy-olean-12-en-28-oic Acid

Biological source: *Zygophyllum decumbens* [1]

$C_{42}H_{66}O_{16}$: 826.435

Mp: 186–191° [1]

^{1}H NMR (500.13 MHz, J/Hz, CD_3OD): 0.93 (Hα-1), 1.97 (Hβ-1), 3.86 (Hα-2), 3.67 (d, J = 9.5, H-3), 1.38 (H-5), 1.23 (Hα-6), 1.44 (Hβ-6), 1.53 (Hα-7), 1.17 (Hβ-7), 1.62 (H-9), 1.81 (Hα-11), 1.81 (Hβ-11), 5.20 (H-12), 1.88 (Hα-15), 0.98 (Hβ-15), 1.92 (Hα-16), 1.69 (Hβ-16), 2.87 (dd, J = 4.2, 13.2, H-18), 1.62 (Hα-19), 1.10 (Hβ-19), 1.27 (Hα-21), 1.04 (Hβ-21), 1.65 (Hα-22), 1.58 (Hβ-22), 3.90 (d, J = 11.3, H-23), 3.26 (d, J = 11.3, H-23), 0.70 (s, CH_3-24), 0.89 (s, CH_3-25), 0.80 (s, CH_3-26), 1.06 (s, CH_3-27), 0.82 (s, CH_3-29), 0.80 (s, CH_3-30); β-D-GlcUAp: 4.60 (d, J = 7.8, H-1), 3.51 (H-2), 3.57 (H-3), 3.56 (H-4), 3.71 (H-5); β-D-Glcp: 5.63 (d, J = 8.1, H-1), 3.56 (H-2), 3.37 (H-3), 3.61 (H-4), 3.50 (H-5), 3.83 (dd, J = 4.8, 12.0, H-6), 3.95 (dd, J = 2.1, 12.0, H-6) [1]

^{13}C NMR (125.76 MHz, CD_3OD): [1]

Table 1

C-1	47.9	C-16	24.0	GlcUA-1	105.1
2	68.1	17	47.7	2	75.1
3	87.2	18	42.4	3	78.1
4	45.3	19	47.0	4	73.7
5	47.8	20	30.6	5	75.6
6	18.8	21	34.7	6	-
7	33.1	22	33.2	Glc-1	95.9
8	40.6	23	64.1	2	74.1
9	47.0	24	14.7	3	78.7
10	38.5	25	17.7	4	71.3
11	24.6	26	17.9	5	79.1
12	123.4	27	26.4	6	62.5
13	145.0	28	177.5		
14	42.9	29	33.5		
15	28.8	30	24.0		

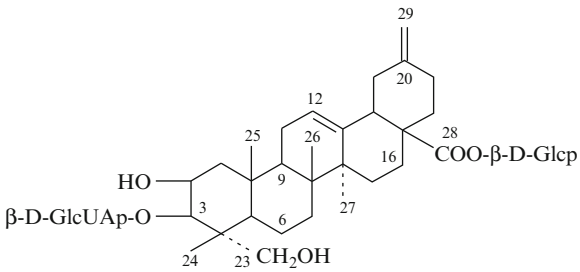
Pharm./Biol.: The aqueous extract of this plant shows hypotensive, antipyretic, spasmolytic, diuretic and local anesthetic effects in animal tests [1]

References

1. K. Poellmann, K. Schaller, U. Schweizer, M.H.A. Elgamal, K.H. Shaker, K. Seifert, Phytochemistry **48**, 875 (1998)

Zygophyloside J

CAS Registry Number: 212068-01-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,3β,23-Trihyrdoxy-30-nor-olean-12,20(29)-dien-28-oic Acid

Biological source: *Zygophyllum decumbens* [1]

$C_{41}H_{62}O_{16}$: 810.403

Mp: 184–188°C [1]

^{1}H NMR (500.13 MHz, J/Hz, CD_3OD): 0.98 (Hα-1), 1.98 (Hβ-1), 3.92 (Hα-2), 3.85 (d, J = 9.7, H-3), 1.43 (H-5), 1.14 (Hα-6), 1.43 (Hβ-6), 1.43 (Hα-7), 1.14 (Hβ-7), 1.58 (H-9), 1.75 (Hα-11), 1.75 (Hβ-11), 5.21 (H-12), 1.98 (Hα-15), 0.98 (Hβ-15), 1.98 (Hα-16), 1.80 (Hβ-16), 2.80 (dd, J = 5.2, 13.7, H-18), 2.38 (Hα-19), 1.98 (Hβ-19), 2.05 (Hα-21), 1.99 (Hβ-21), 1.40 (Hα-21), 1.80 (Hβ-21), 3.34 (d, J = 11.0, H-23), 4.6 (d, J = 11.0, H-23), 0.72 (s, CH_3-24), 0.83 (s, CH_3-25), 0.81 (s, CH_3-26), 0.99 (s, CH_3-27), 4.52 (s, CH_3-29), 4.57 (s, CH_3-29); β-D-GlcUAp: 4.77 (d, J = 7.5, H-1), 3.67 (H-2), 3.74 (H-3), 3.74 (H-4), 3.78 (H-5); β-D-Glcp: 5.79 (d, J = 8.2, H-1), 3.74 (H-2), 3.83 (H-3), 3.82 (H-4), 3.62 (H-5), 3.96 (dd, J = 4.7, 12.0, H-6), 4.06 (dd, J = 2.5, 12.0, H-6) [1]

^{13}C NMR (125.76 MHz, CD_3OD): [1]

Table 1

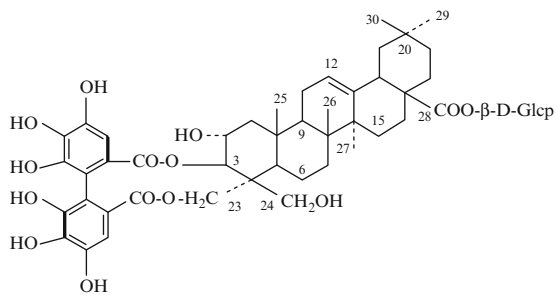
C-1	48.0	C-15	28.6	C-29	107.7
2	67.8	16	23.9	30	-
3	86.9	17	47.9	GlcUA-1	105.1
4	45.3	18	48.2	2	75.1
5	47.5	19	42.2	3	78.2
6	18.7	20	149.0	4	73.8
7	33.0	21	30.6	5	75.5
8	40.4	22	38.1	6	-
9	48.5	23	63.81	Glc-1	96.0
10	38.3	24	14.9	2	74.2
11	24.4	25	17.8	3	78.8
12	123.4	26	17.7	4	71.2
13	144.1	27	26.4	5	79.3
14	42.2	28	177.5	6	62.4

Pharm./Biol.: The aqueous extract of this plant shows hypotensive, antipyretic, spasmolytic, diuretic and local anesthetic effects in animal tests [1]

References

1. K. Poellmann, K. Schaller, U. Schweizer, M.H.A. Elgamal, K.H. Shaker, K. Seifert, Phytochemistry **48**, 875 (1998)

Castanopsinin A_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23,24-Tetrahydroxy-olean-12-en-28-oic Acid
Biological source: *Castanopsis cuspidata* [1]
$C_{50}H_{64}O_{19}$: 968.404
$[\alpha]_D^{20}$ + 70.8° (c 0.40, MeOH) [1]
FAB-MS *m/z*: 967 $(M-H)^-$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.18, 7.28 (s, HHDP-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

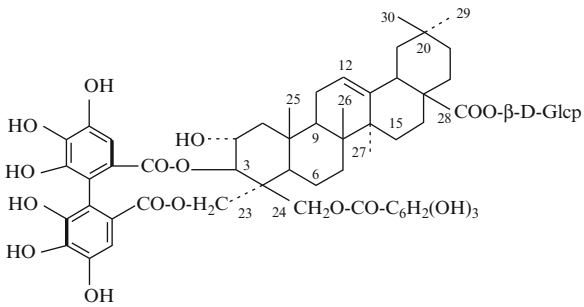
Table 1

C-1	47.7	Glc-1	95.7	HHDP-5	137.6
2	68.3	2	74.1		(2C)
3	78.8	3	78.8	COO-	169.4
4	48.8	4	71.2		169.6
5	57.4	5	79.1		
6	20.0	6	62.2		
7	33.8	HHDP-1	116.4		
8	39.7		(2C)		
9	47.6	2	127.4		
10	38.1		127.6		
12	122.8	3	107.3		
13	144.1		108.3		
23	71.2	4,6	146.0		
24	62.2		(2C)		
28	176.4		146.4		
			146.6		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin B_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23,24-Tetrahydroxy-olean-12-en-28-oic Acid
Biological source: *Castanopsis cuspidata* [1]
$C_{57}H_{68}O_{23}$: 1120.415
$[\alpha]_D^{18}$ + 35.1° (c 0.49, MeOH) [1]
FAB-MS *m/z*: 1119 $(M-H)^-$
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.08, 7.54 (s, HHDP-H), 8.01 (s, galloyl-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

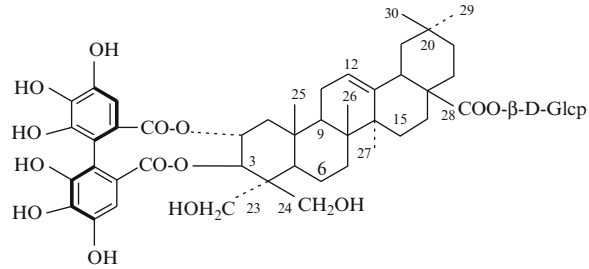
Table 1

C-1	48.6	Glc-1	95.9	HHDP-5	137.8
2	66.6	2	74.1		(2C)
3	78.9	3	79.3	COO-	169.7
4	48.6	4	71.0		169.0
5	57.4	5	78.8	Galloyl-1	121.3
6	19.9	6	62.1	2,6	111.9
7	30.8	HHDP-1	116.7	3,5	146.7
8	39.2		(2C)	4	141.6
9	47.6	2	126.8	COO-	167.4
10	38.2		127.4		
12	122.9	3	107.5		
13	144.3		108.6		
23	69.9	4,6	145.9		
24	61.8		(2C)		
28	176.6		146.5		
			146.7		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin C_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23,24-Tetrahydroxy-olean-12-en-28-oic Acid

Biological source: *Castanopsis cuspidata* [1]

$C_{50}H_{64}O_{19}$: 968.404

$[\alpha]_D^{16}$ + 13.5° (c 0.85, MeOH) [1]

FAB-MS *m/z*: 967 $(M\text{-}H)^-$

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.12, 7.78 (s, HHDP-H) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	48.2	Glc-1	95.7	HHDP-5	137.8
2	67.3	2	74.3		(2C)
3	79.1	3	79.3	COO-	168.8
4	48.5	4	71.1		170.7
5	56.4	5	78.9		
6	20.0	6	62.4		
7	30.9	HHDP-1	118.2		
8	39.7		118.4		
9	47.9	2	126.7		
10	38.1		127.1		
12	123.1	3	106.6		
13	144.1		108.0		
23	67.1	4,6	146.0		
24	61.1		(2C)		
28	176.6		146.5		
			146.7		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23,24-Tetrahydroxy-olean-12-en-28-oic Acid

Biological source: *Castanopsis cuspidata* [1]

$C_{50}H_{64}O_{19}$: 968.404

$[\alpha]_D^{20}$ + 52.8° (c 0.48, MeOH) [1]

FAB-MS *m/z*: 967 $(M\text{-}H)^-$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.18, 7.28 (s, HHDP-H) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

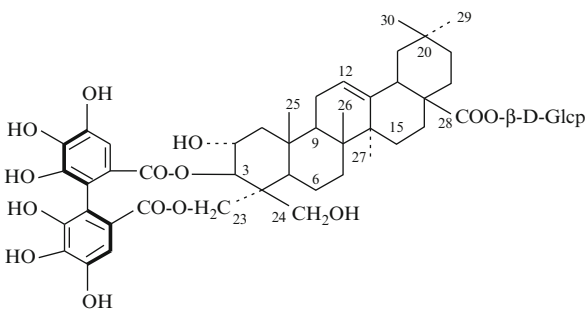
Table 1

C-1	47.6	Glc-1	95.7	HHDP-5	137.7
2	67.7	2	74.2		(2C)
3	84.8	3	78.9	COO-	169.4
4	48.6	4	71.1		169.6
5	57.6	5	79.1		
6	20.0	6	62.3		
7	33.0	HHDP-1	116.8		
8	39.2		(2C)		
9	48.0	2	127.5		
10	38.6		(2C)		
12	122.8	3	107.5		
13	144.9		108.2		
23	71.6	4,6	146.4		
24	63.6		(2C)		
28	176.4		146.5		
			146.7		

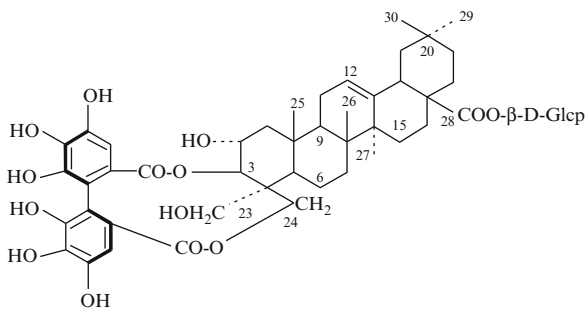
References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin D_1



Castanopsinin E_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23,24-Tetrahydroxy-olean-12-en-28-oic Acid
Biological source: *Castanopsis cuspidata* [1]
$C_{50}H_{64}O_{19}$: 968.404
$[\alpha]_D^{20}$ + 6.5° (c 0.88, MeOH) [1]
FAB-MS *m/z*: 967 $(M-H)^-$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.22 (s, HHDP-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

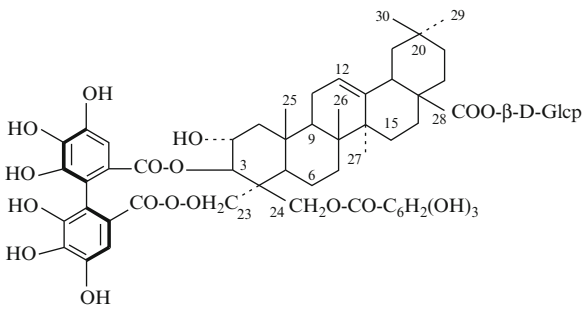
Table 1

C-1	47.9	Glc-1	95.6	HHDP-5	137.2
2	67.6	2	74.1		137.7
3	77.2	3	78.9	COO-	169.3
4	48.6	4	71.2		(2C)
5	57.6	5	78.9		
6	20.1	6	62.3		
7	30.8	HHDP-1	115.2		
8	40.1		116.5		
9	48.0	2	126.8		
10	38.6		128.2		
12	123.1	3	108.1		
13	144.1		(2C)		
23	64.5	4,6	146.3		
24	65.0		(2C)		
28	176.3		146.5		
			147.0		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin F_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23,24-Tetrahydroxy-olean-12-en-28-oic Acid
Biological source: *Castanopsis cuspidata* [1]
$C_{57}H_{68}O_{23}$: 1120.415
$[\alpha]_D^{28}$ + 102.5° (c 0.33, MeOH) [1]
FAB-MS *m/z*: 1119 $(M-H)^-$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 6.87, 7.14 (s, HHDP-H), 7.92 (s, galloyl-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

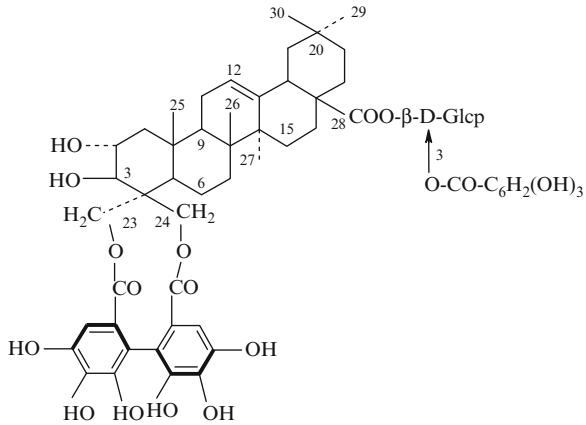
Table 1

C-1	47.9	Glc-1	95.8	HHDP-5	137.0
2	65.3	2	74.1		137.8
3	84.8	3	79.3	COO-	169.9
4	47.9	4	71.1		169.9
5	50.8	5	78.9	Galloyl-1	121.4
6	20.8	6	62.3	2,6	110.5
7	30.8	HHDP-1	116.2	3,5	147.4
8	40.0		116.7	4	140.7
9	48.6	2	126.7	COO-	168.0
10	38.9		127.1		
12	123.0	3	106.9		
13	144.2		108.1		
23	69.6	4,6	145.9		
24	63.0		(2C)		
28	176.6		146.5		
			146.7		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin G_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23,24-Tetrahydroxy-olean-12-en-28-oic Acid
Biological source: *Castanopsis cuspidata* [1]
$C_{57}H_{68}O_{23}$: 1120.415
$[\alpha]_D^{20}$ + 43.2° (c 0.56, MeOH) [1]
FAB-MS *m/z*: 1119 $(M-H)^-$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.15, 7.27 (s, HHDP-H), 7.85 (s, galloyl-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

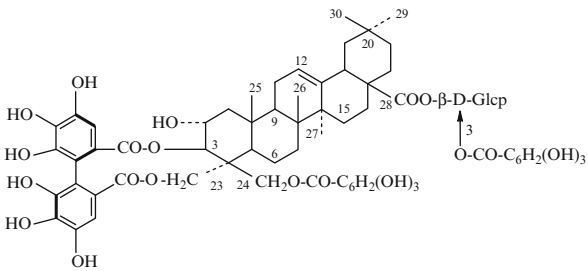
Table 1

C-1	47.6	Glc-1	95.4	HHDP-5	137.8
2	68.3	2	72.3		138.3
3	78.9	3	80.0	COO-	167.3
4	48.6	4	69.0	Galloyl-1	121.7
5	57.4	5	78.9	2,6	110.5
6	19.8	6	62.6	3,5	147.4
7	30.9	HHDP-1	116.5	4	140.7
8	39.7		116.5	COO-	169.7
9	47.6	2	127.5		
10	38.1		127.6		
12	123.1	3	107.3		
13	144.5		108.3		
23	71.5	4,6	146.0		
24	61.8		(2C)		
28	176.5		146.5		
			146.8		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin H_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23,24-Tetrahydroxy-olean-12-en-28-oic Acid
Biological source: *Castanopsis cuspidata* [1]
$C_{64}H_{72}O_{27}$: 1272.426
$[\alpha]_D^{20}$ + 30.0° (c 0.60, MeOH) [1]
FAB-MS *m/z*: 1359 $(M-H)^-$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.08, 7.53 (s, HHDP-H), 7.86, 8.02 (s, 2 x galloyl-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

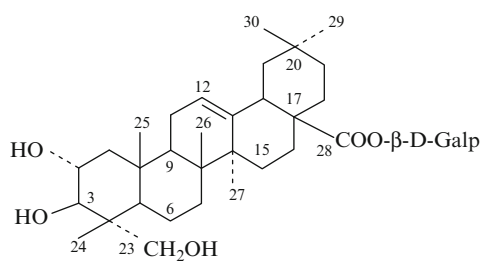
Table 1

C-1	47.6	Glc-1	95.4	HHDP-5	137.7
2	66.5	2	72.2		137.9
3	79.0	3	80.1	Galloyl-1	121.3
4	48.6	4	68.9		121.6
5	57.3	5	79.0	2,6	110.5
6	20.0	6	62.5		111.9
7	30.8	HHDP-1	116.7	3,5	147.1
8	39.4		(2C)		147.4
9	47.6	2	126.7	4	140.7
10	38.1		127.4		141.5
12	123.0	3	107.6	COO-	167.2
13	144.0		108.6		169.0
23	71.1	4,6	145.9		
24	61.7		(2C)		
28	176.3		146.5		
			146.8		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Chebuloside I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,23-Trihydroxy-olean-12-en-28-oic Acid
Biological source: *Terminalia chebula* [1]
$C_{36}H_{58}O_{10}$: 650.402
Mp: 238–240°C (MeOH) [1]
$[\alpha]_D$ + 42° (c 0.25, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3500–3200, 1730, 1635, 1450, 1060 [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

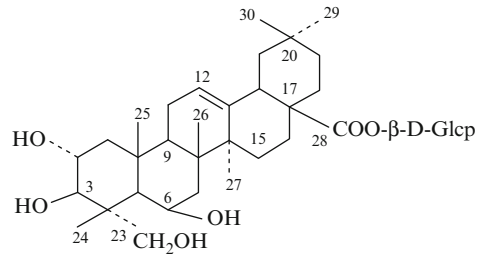
Table 1

C-1	47.3	C-16	23.5	Gal-1	96.0
2	68.8	17	47.1	2	71.7
3	78.7	18	41.8	3	75.3
4	43.5	19	46.3	4	69.1
5	48.5	20	30.6	5	76.4
6	18.7	21	34.1	6	61.6
7	33.1	22	33.3		
8	40.2	23	67.2		
9	48.4	24	14.1		
10	38.6	25	17.4		
11	23.8	26	17.1		
12	123.4	27	26.2		
13	144.1	28	176.4		
14	42.0	29	29.2		
15	28.2	30	23.9		

References

1. A.P. Kundu, S.B. Mahato, Phytochemistry **32**(4), 999 (1993)

Chebuloside II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,6β,23-Tetrahydroxy-olean-12-en-28-oic Acid
Biological source: *Combretum quadrangulare* [1], *Terminalia chebula* [2]
$C_{36}H_{58}O_{11}$: 666.397
Mp: 215°C (MeOH) [2]
$[\alpha]_D$ + 25° (c 0.75, MeOH) [2]
IR (KBr) ν_{max} cm^{-1}: 3500–3200, 1730, 1635, 1450, 1060 [2]
LSI-MS *m/z*: 705 $[M + K]^+$, 689 $[M + Na]^+$ [2]
^{13}C NMR (100 MHz, C_5D_5N): [2]

Table 1

C-1	50.0	C-16	24.0	Glc-1	95.6
2	69.0	17	47.0	2	74.0
3	78.3	18	41.8	3	79.1
4	42.3	19	47.0	4	71.1
5	48.8	20	30.7	5	78.6
6	67.6	21	34.0	6	62.1
7	41.0	22	32.5		

(*continued*)

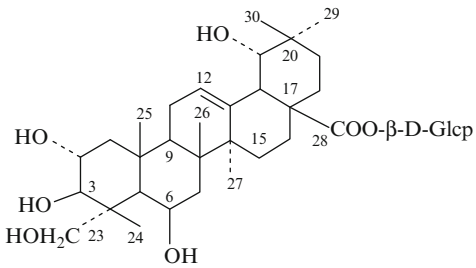
Table 1 (continued)

8	41.0	23	66.1
9	48.8	24	15.9
10	38.1	25	18.8
11	22.6	26	19.0
12	123.5	27	26.1
13	143.5	28	176.4
14	42.8	29	33.1
15	28.2	30	23.6

References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, S. Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)
2. A.P. Kundu, S.B. Mahato, Phytochemistry **32**(4), 999 (1993)

Combreglucoside



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,6β,19α,24-Pentahydroxy-olean-12-en-28-oic Acid

Biological source: *Combretum quadrangulare* [1], *C. nigricans* [2]

$C_{36}H_{58}O_{12}$: 682.392

Mp: 260°C (MeOH) [2]

$[\alpha]_D^{21}$ + 0° (c 1.0, C_5H_5N) [2]

IR (KBr) ν_{max} cm^{-1}: 3394, 2934, 1730, 1644, 1595, 1381, 1137, 1098, 591 [2]

CI-MS *m/z*: 538 $[M\text{-Glc} + NH_4]^+$, 521 $[M\text{-Glc} + H]^+$ [2]

FAB-MS *m/z*: 705 $[M + Na]^+$ (27), 503 (12), 429 (19), 391 (9), 360 (8), 321 (17), 269 (26), 252 (75), 237 (84), 215 (100) [1]

^{1}H NMR (300 MHz, J/Hz, C_5D_5N): 0.92, 1.10, 1.51, 1.69, 1.70, 1.75 (s, CH_3-30, 29, 27, 24, 26, 25), 1.00 (brt, H-21), 1.39 (brt, J = 13.0, H-1), 1.25 (brd, J-13.0, H-15), 1.90 (m, H-22), 1.93 (brs, H-5), 1.97 (m, H-21), 2.00 (m, H_2-7, H-22), 2.10 (m, H-16), 2.15 (m, H-11), 2.16 (m, H-9), 2.30 (dd, J = 13.0, 4.0, H-1), 2.34 (m, H-11), 2.45 (brt, J = 13, H-15), 2.78 (brt, J = 13.0, H-16), 3.46 (brs, H-18), 3.55 (d, J = 4.0, H-19), 3.93 (m, H-3), 4.03 (d, J = 11, Hβ-23), 4.35 (d, J = 11, Hα-23), 4.40 (m, H-2), 5.01 (brs, H-6)

β-D-Glcp: 6.25 (d, J = 8.0, H-1), 4.14 (t, J = 9.0, H-2), 4.20 (t, J = 9.0, H-3), 4.29 (t, J = 9.0, H-4), 4.20 (m, H-5), 4.35 (m, H_2-6) [2]

^{13}C NMR (75 MHz, C_5D_5N): [2]

Table 1

C-1	49.5	C-16	28.0	Glc-1	95.7
2	68.9	17	46.3	2	73.8
3	78.9	18	44.4	3	78.4
4	44.3	19	80.9	4	70.9
5	49.1	20	35.4	5	78.4
6	67.6	21	28.9	6	61.9

(*continued*)

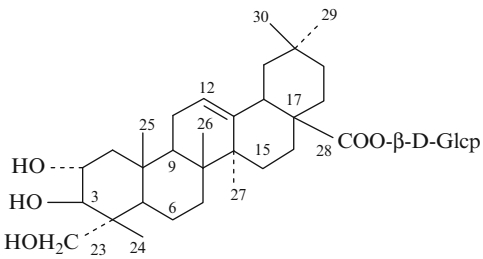
Table 1 (continued)

7	41.1	22	32.8
8	39.5	23	66.3
9	48.8	24	15.7
10	38.1	25	18.7
11	24.2	26	18.4
12	123.8	27	24.7
13	143.5	28	177.1
14	42.6	29	28.6
15	28.9	30	24.7

References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, S. Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)
2. A. Jossang, M. Seuleiman, E. Maidou, B. Bodo, Phytochemistry **41**, 591 (1996)

Quadranoside X



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2α,3β,6β,19α,24-Pentahydroxy-olean-12-en-28-oic Acid

Biological source: *Combretum quadrangulare* [1]

$C_{36}H_{58}O_{10}$: 650.402

$[\alpha]_D^{25}$ + 15.6° (c 0.030, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3500, 1740, 1660 [1]

HR-FAB-MS *m/z*: 673.3896 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.35 (m, H-1), 2.42 (dd, J = 12.7, 4.6, H-1), 4.28 (m, H-2), 4.20 (m, H-3), 1.77 (m, H-5), 1.84 (m, H-6), 2.74 (dd, J = 12.9, 4.8, H-6), 1.29 (m, H-7), 1.72 (m, H-9), 1.68 (m, H-11), 1.58 (m, H-12), 1.01, 2.08 (m, H_2-15), 1.55, 2.25 (m, H_2-16), 2.19 (d, J = 13.4, H-19), 2.54 (d, J = 13.4, H-19), 1.35, 2.52 (m, H_2-21), 1.22, 1.62 (m, H_2-22), 3.71 (d, J = 10.2, H-23), 4.23 (d, J = 10.2, H-23), 1.05 (s, CH_3-24), 0.98 (s, CH_3-25), 1.13 (s, CH_3-26), 1.09 (s, CH_3-27), 0.90 (s, CH_3-29), 0.78 (s, CH_3-30)

β-D-Glcp: 6.34 (d, J = 8.0, H-1), 4.16 (dd, J = 8.8, 8.0, H-2), 4.25 (dd, J = 9.0, 8.8, H-3), 4.32 (dd, J = 9.0, 8.9H-4), 4.01 (ddd, J = 8.9, 4.7, 2.2, H-5), 4.35 (dd, J = 11.7, 2.2, H-6), 4.43 (dd, J = 11.7, 4.7, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	48.1	C-16	33.3	Glc-1	96.2
2	69.1	17	48.9	2	74.2
3	78.3	18	128.3	3	79.0
4	43.6	19	41.4	4	71.3
5	48.1	20	32.9	5	79.4
6	25.5	21	36.1	6	62.4
7	34.9	22	37.1		
8	44.7	23	66.5		
9	51.1	24	14.3		
10	38.7	25	18.0		
11	18.5	26	18.5		
12	22.1	27	21.2		
13	138.7	28	175.8		
14	41.9	29	32.2		
15	27.5	30	24.4		

Pharm./Biol.: The seeds, leaves and stem bark of the plant have been used in Vietnamese folk medicine as an anthelmintic, antipyretic, antidysenteric and antihepatitis agent [1]

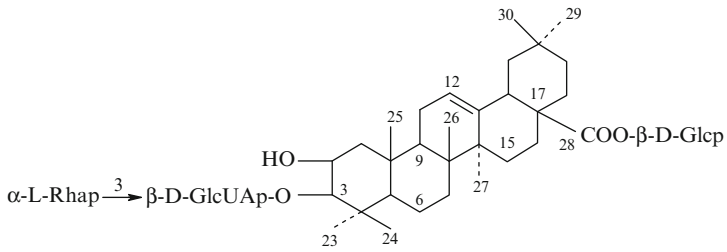
References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, Sh. Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)

Amaranthus-Saponin I

CAS Registry Number: 139742-09-9

See Figure Amaranthus-Saponin I



Amaranthus-Saponin I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β-Oleanolic Acid
Biological source: *Amaranthus hypochondriacus* [1]
$C_{48}H_{76}O_{19}$: 956.498
$[\alpha]_D$ + 23.3° (c 0.43, C_5H_5N) [1]
FAB-MS *m/z*: 955 $[M\text{-}H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.85, 0.89, 1.12, 1.22, 1.29, 1.30, 1.49 (s, $CH_3 \times 7$), 5.43 (H-12)
β-D-GlcUAp: 4.78 (d, J = 7.8, H-1)
α-L-Rhap: 6.24 (s, H-1), 1.71 (d, CH_3-6)
β-D-Glcp: 6.28 (d, J = 7.9, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	45.1	C-16	24.0	GlcUA-1	104.6	Glc-1	95.7
2	69.6	17	47.0	2	75.6	2	74.1
3	90.5	18	41.7	3	81.7	3	79.2
4	38.8	19	46.2	4	71.8	4	71.1
5	56.0	20	30.7	5	76.1	5	78.8
6	18.5	21	34.0	6	176.1	6	62.2
7	33.1	22	32.6	Rha-1	102.4		
8	40.1	23	29.9	2	72.5		
9	48.4	24	18.5	3	72.8		
10	37.1	25	16.8	4	74.2		
11	23.4	26	17.7	5	69.6		
12	123.3	27	26.1	6	18.6		
13	144.0	28	176.4				
14	42.3	29	33.1				
15	28.1	30	23.6				

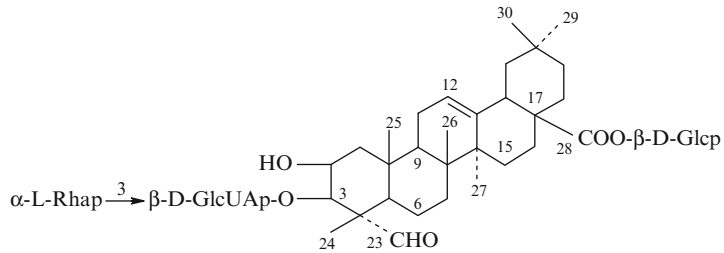
(*continued*)

References

1. H. Kohda, S. Tanaka, Y. Yamaoka, Y. Ohhara, Chem. Pharm. Bull. **39**(10), 2609 (1991)

Amaranthus-Saponin II

CAS Registry Number: 139742-10-2
See Figure Amaranthus-Saponin II



Amaranthus-Saponin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,3β-Dihydroxy-olean-12-en-23-al-28-oic Acid
Biological source: *Amaranthus hypochondriacus* [1]
$C_{48}H_{74}O_{20}$: 970.477
$[\alpha]_D$ + 9.2° (c 0.87, MeOH) [1]
FAB-MS *m/z*: 969 $[M-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.85, 0.89, 1.08, 1.19, 1.51, 1.56 (s, CH_3 × 6), 5.40 (brs, H-12), 9.60 (s, CHO)
β-D-GlcUAp: 4.74 (d, J = 7.9, H-1)
α-L-Rhap: 6.18 (s, H-1), 1.66 (d, CH_3-6)
β-D-Glcp: 6.27 (d, J = 7.9, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	45.0	C-16	24.0	GlcUA-1	103.7	Glc-1	95.7
2	67.9	17	46.9	2	74.9	2	74.1
3	84.6	18	41.7	3	81.5	3	79.2
4	54.4	19	46.1	4	71.6	4	71.1
5	49.6	20	30.7	5	76.1	5	78.8
6	20.1	21	33.9	6	176.4	6	62.2
7	32.4	22	32.5	Rha-1	102.4		
8	40.2	23	206.2	2	72.5		
9	48.4	24	11.3	3	72.7		
10	36.4	25	17.1	4	74.2		
11	23.3	26	17.6	5	69.6		
12	122.8	27	26.1	6	18.6		
13	144.1	28	176.4				
14	42.3	29	33.1				
15	28.1	30	23.6				

References

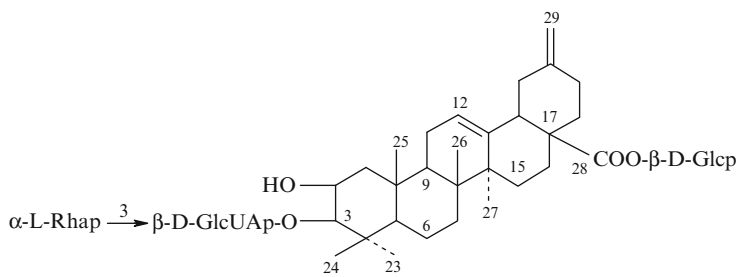
1. H. Kohda, S. Tanaka, Y. Yamaoka, Y. Ohhara, Chem. Pharm. Bull. **39**(10), 2609 (1991)

Amaranthus-Saponin III

CAS Registry Number: 139742-11-3
See Figure Amaranthus-Saponin III
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,3β-Dihydroxy-30-nor-olean-12,20(29)-dien-28-oic Acid
Biological source: *Amaranthus hypochondriacus* [1]
$C_{47}H_{72}O_{19}$: 940.466
$[\alpha]_D$ + 22.0° (c 0.41, C_5H_5N) [1]
FAB-MS *m/z*: 939 $[M-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 1.09, 1.24, 1.27, 1.34, 1.44 (s, CH_3 × 5), 4.74 (brs, CH_2=), 5.39 (t, H-12)
β-D-GlcUAp: 4.97 (d, J = 8.0, H-1)
α-L-Rhap: 6.31 (s, H-1), 1.71 (d, CH_3-6)
β-D-Glcp: 6.26 (d, J = 8.1, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.2	C-16	23.8	GlcUA-1	106.7	Glc-1	95.8
2	69.8	17	47.3	2	75.5	2	74.0
3	89.6	18	47.6	3	82.1	3	79.3
4	39.0	19	41.6	4	71.6	4	72.5
5	56.0	20	148.5	5	77.6	5	78.8
6	18.2	21	30.1	6	175.7	6	62.2
7	33.1	22	37.6	Rha-1	102.9		
8	40.0	23	29.4	2	71.1		
9	48.3	24	18.5	3	72.8		
10	37.0	25	16.4	4	74.1		
11	23.5	26	17.5	5	69.8		
12	122.9	27	26.1	6	18.6		
13	143.4	28	175.7				
14	42.2	29	107.3				
15	28.1						



Amaranthus-Saponin III

References

1. H. Kohda, S. Tanaka, Y. Yamaoka, Y. Ohhara, Chem. Pharm. Bull. **39**(10), 2609 (1991)

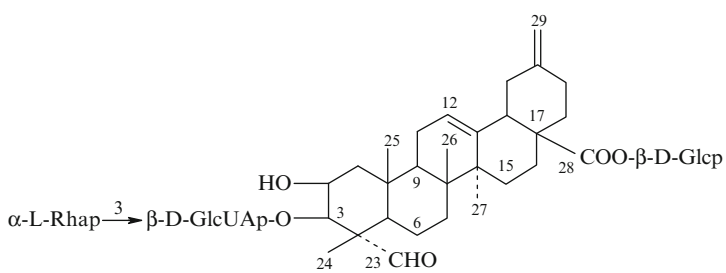
Amaranthus-Saponin IV

CAS Registry Number: 139742-12-4
See Figure Amaranthus-Saponin IV
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,3β-Dihydroxy-30-nor-olean-12,20(29)-dien-23-al-28-oic Acid
Biological source: *Amaranthus hypochondriacus* [1]
$C_{47}H_{70}O_{20}$: 954.446
$[\alpha]_D$ + 71.9° (c 0.32, MeOH) [1]
FAB-MS *m/z*: 953 $[M-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 1.06, 1.16, 1.50, 1.56 (s, CH_3 × 4), 4.73 (CH_2=), 5.40 (brs, H-12), 9.63 (s, CHO)
β-D-GlcUAp: 4.79 (d, J = 7.9, H-1)
α-L-Rhap: 6.22 (s, H-1), 1.71 (d, CH_3-6)
β-D-Glcp: 6.24 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	44.9	C-16	23.9	GlcUA-1	103.8	Glc-1	95.8
2	68.0	17	47.2	2	74.2	2	74.0
3	84.5	18	47.5	3	81.5	3	79.2
4	53.3	19	41.6	4	71.6	4	71.1
5	48.3	20	148.3	5	76.2	5	78.8
6	20.1	21	30.0	6	175.6	6	62.3
7	32.4	22	37.6	Rha-1	102.4		
8	40.2	23	206.2	2	72.5		
9	47.9	24	11.3	3	72.8		
10	36.3	25	17.0	4	74.2		
11	23.4	26	17.6	5	69.6		
12	122.4	27	26.0	6	18.6		
13	143.3	28	175.7				
14	42.2	29	107.3				
15	28.0						

(*continued*)



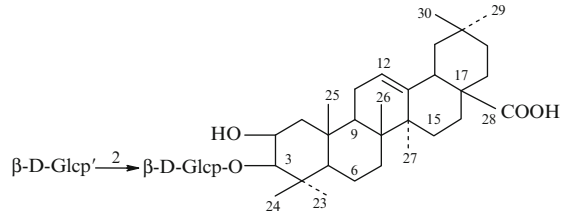
Amaranthus-Saponin IV

References

1. H. Kohda, S. Tanaka, Y. Yamaoka, Y. Ohhara, *Chem. Pharm. Bull.* **39** (10), 2609 (1991)

Polygalasaponin XX

CAS Registry Number: 173938-31-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,3β-Dihydroxy-olean-12-en-28-oic Acid
Biological source: *Polygala japonica* [1]
$C_{42}H_{68}O_{14}$: 796.460
$[\alpha]_D^{20}$ + 33.5° (c 1.04, C_5H_5N) [1]
FAB-MS (positive ion mode) *m/z*: 819 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.96 (s, CH_3-29), 1.02 (s, CH_3-30), 1.05 (s, CH_3-26), 1.31 (s, CH_3-27), 1.35 (s, CH_3-23), 1.45 (s, CH_3-24), 1.45 (s, CH_3-25), 3.30 (d, J = 3.0, H-3), 3.30 (H-18), 4.63 (m, H-2), 5.49 (t-like, H-12)
β-D-Glcp: 4.93 (d, J = 8.0, H-1), 4.10 (dd, J = 8.0, 8.5, H-2), 4.27 (H-3), 4.12 (H-4), 3.91 (m, H-5), 4.25, 4.46 (H_2-6)
β-D-Glcp′: 5.31 (d, J = 8.0, H-1), 4.09 (dd, J = 8.0, 8.5, H-2), 4.20 (H-3), 4.28 (H-4), 3.91 (m, H-5), 4.42, 4.47 (H_2-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

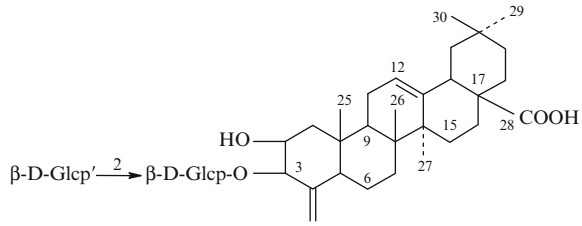
C-1	44.0	C-16	23.8	Glc-1	104.4
2	70.2	17	46.7	2	83.2
3	89.5	18	42.1	3	78.3
4	38.9	19	46.6	4	71.5
5	56.3	20	31.0	5	78.2
6	18.4	21	34.3	6	62.6
7	33.3	22	33.4	Glc′-1	106.0
8	39.9	23	29.8	2	77.1
9	48.5	24	18.5	3	78.1
10	37.0	25	16.5	4	71.8
11	24.0	26	17.5	5	78.0
12	122.7	27	26.3	6	62.8
13	144.9	28	180.2		
14	42.4	29	33.3		
15	28.3	30	23.8		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(1), 173 (1996)

Polygalasaponin XXVII

CAS Registry Number: 173933-39-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,3β-Dihydroxy-24-nor-olean-4(23),12-dien-28-oic Acid
Biological source: *Polygala japonica* [1]
$C_{41}H_{64}O_{14}$: 780.429
$[\alpha]_D^{25}$ + 47.6° (c 1.23, C_5H_5N) [1]
FAB-MS (positive ion mode) *m/z*: 803 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.97 (s, CH_3-29), 1.01 (s, CH_3-30), 1.04 (s, CH_3-26), 1.21 (s, CH_3-25), 1.29 (s, CH_3-27), 3.29 (dd, J = 14.0, 4.0, H-18), 4.52 (m, H-2), 4.57 (d, J = 3.0, H-3), 5.46 (t-like, H-12), 5.01, 6.09 (brs, H_2-23)
β-D-Glcp: 5.17 (d, J = 8.0, H-1), 4.11 (dd, J = 8.0, 8.5, H-2), 4.32 (t, J = 8.5, H-3), 4.20 (t, J = 9.0, H-4), 3.92 (m, H-5), 4.50 (H-6), 4.54 (dd, J = 12.0, 2.0, H-6)
β-D-Glcp′: 5.27 (d, J = 7.5, H-1), 4.11 (dd, J = 7.5, 8.5, H-2), 4.16 (t, J = 8.5, H-3), 4.16 (t, J = 9.0, H-4), 3.90 (m, H-5), 4.33 (dd, J = 12.0, 5.0, H-6), 4.46 (dd, J = 12.0, 2.0, H-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.9	C-16	23.8	Glc-1	101.0
2	70.9	17	46.1	2	84.6
3	81.4	18	42.2	3	78.4
4	146.5	19	46.8	4	71.6

(*continued*)

Table 1 (continued)

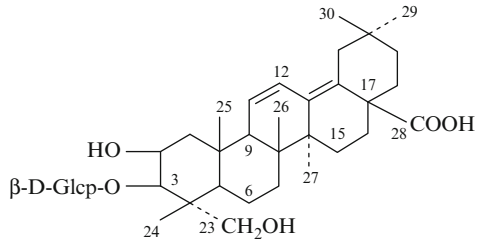
5	51.5	20	31.0	5	77.9
6	21.4	21	34.2	6	62.6
7	31.9	22	33.2	Glc′-1	106.8
8	40.0	23	107.3	2	76.5
9	46.5	25	15.7	3	78.6
10	40.0	26	17.5	4	71.4
11	24.8	27	26.3	5	78.2
12	122.7	28	180.2	6	62.8
13	145.1	29	33.3		
14	42.4	30	23.8		
15	28.2				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(1), 173 (1996)

Polygalasaponin XXV

CAS Registry Number: 173938-32-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,3β,23-Trihydroxy-olean-11,13(18)-dien-28-oic Acid

Biological source: *Polygala japonica* [1]

$C_{36}H_{56}O_{10}$: 648.387

$[\alpha]_D^{21}$ −70.6° (c 0.86, C_5H_5N) [1]

FAB-MS (positive ion mode) *m/z*: 671 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.90 (s, CH_3-30), 0.94 (s, CH_3-29), 1.07 (s, CH_3-27), 1.14 (s, CH_3-26), 1.33 (s, CH_3-24), 1.63 (s, CH_3-25), 4.37 (d, J = 3.0, H-3), 3.69, 4.39 (d, J = 11.0, H_2-23), 4.88 (m, H-2), 5.91 (brd, J = 11, H-11), 6.65 (dd, J = 11.0, 2.5, H-12)

β-D-Glcp: 5.18 (d, J = 8.0, H-1), 4.03 (t, J = 8.5, H-2), 4.16 (t, J = 8.5, H-3), 4.21 (t, J = 8.5, H-4), 3.91 (m, H-5), 4.33 (dd, J = 12.0, 5.0, H-6), 4.47 (dd, J = 12.0, 2.0, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

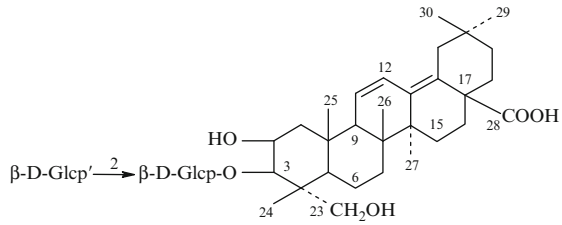
C-1	43.8	C-16	25.7	Glc-1	105.8
2	70.6	17	48.7	2	75.5
3	83.0	18	133.2	3	78.6
4	42.7	19	41.0	4	71.7
5	47.5	20	32.8	5	78.3
6	18.1	21	37.5	6	62.8
7	33.3	22	32.7		
8	41.3	23	65.4		
9	55.5	24	14.5		
10	36.8	25	20.1		
11	127.4	26	17.1		
12	126.0	27	20.2		
13	136.7	28	178.9		
14	43.0	29	32.4		
15	36.3	30	24.5		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(1), 173 (1996)

Polygalasaponin XXVI

CAS Registry Number: 173938-33-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides

of Aglycones of Oleanene Type – 2β,3β,23-Trihydroxy-olean-11,13(18)-dien-28-oic Acid

Biological source: *Polygala japonica* [1]

$C_{42}H_{66}O_{15}$: 810.440

$[\alpha]_D^{20}$ + 52.1° (c 0.98, C_5H_5N) [1]

FAB-MS (positive ion mode) *m/z*: 833 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.90 (s, CH_3-30), 0.94 (s, CH_3-29), 1.05 (H- 27), 1.13 (s, CH_3-26), 1.41 (s, CH_3-24), 1.61 (s, CH_3-25), 3.74, 4.39 (d, J = 11.0, H_2-23), 4.26 (d, J = 3.0, H-3), 4.83 (m, H-2), 5.89 (d, J = 11, H-11), 6.64 (brd, J = 11.0, H-12)

β-D-Glcp: 5.13 (d, J = 8.0, H-1), 4.11 (t, J = 8.5, H-2), 4.22 (t, J = 8.5, H-3), 4.13 (t, J = 9.0, H-4), 3.84 (m, H-5), 4.27, 4.44 (H_2-6)

β-D-Glcp′: 5.34 (d, J = 8.0, H-1), 4.09 (t, J = 8.5, H-2), 4.19 (t, J = 8.5, H-3), 4.23 (t, J = 9.0, H-4), 3.92 (m, H-5), 4.39 (H-6), 4.51 (dd, J = 12.0, 2.0, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	43.6	C-16	25.7	Glc-1	103.2
2	70.5	17	48.8	2	83.7
3	82.8	18	133.3	3	78.1
4	42.7	19	41.0	4	71.1
5	47.9	20	32.8	5	78.1
6	18.2	21	37.5	6	62.5
7	33.6	22	32.7	Glc′-1	105.9
8	41.3	23	65.6	2	76.8
9	55.5	24	14.3	3	78.4
10	36.8	25	20.0	4	71.5
11	127.4	26	17.2	5	78.3
12	126.0	27	20.2	6	62.7
13	136.7	28	179.0		
14	42.9	29	32.5		
15	36.3	30	24.5		

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(1), 173 (1996)

Gymnocladus-Saponin D

CAS Registry Number: 100830-55-5

See Figure Gymnocladus-Saponin D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic Acid

Biological source: *Gymnocladus chinensis* [1]

$C_{89}H_{142}O_{41}$: 1866.902

Mp: 196–200°C [1]

$[\alpha]_D^{25}$ − 6.4° (MeOH, c 1.0) [1]

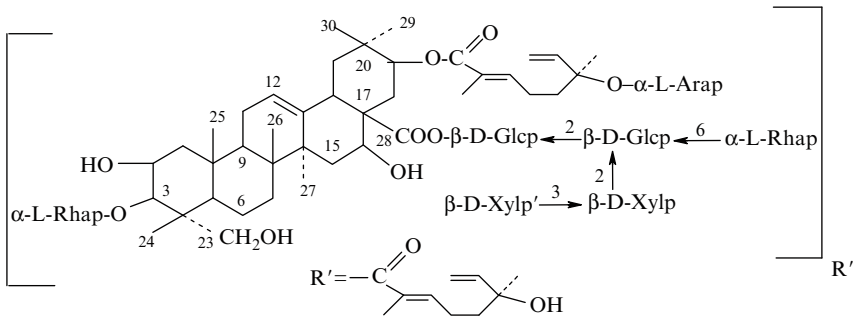
UV λ_{max}^{EtOH} nm (ε): 212 (10000), 217 (12000) [1]

IR (KBr) ν_{max} cm^{-1}: 3400–3500, 1730 [1]

^{13}C NMR (80 MHz, C_5D_5N): [1]

Table 1

C-12	123.8	MA-1	168.1	Gly-MA-1	167.8	Rha-1	100.0
13	143.2	2	128.1	2	128.7	Glc-1	95.6
28	174.5	3	143.5	3	143.1	Rha′-1	101.9
		7	146.5	7	142.1	Ara-1	103.9
		8	111.6	8	115.0	Glc′-1	104.5
		9	12.6	9	12.5	Xyl-1	105.1
						Xyl′-1	105.9



Gymnocladus-Saponin D

References

1. T. Konoshima, T. Sawada, T. Kimura, Chem. Pharm. Bull. **33**(11), 4732 (1985)

Gymnocladus-Saponin D_1

CAS Registry Number: 110172-55-9
See Figure Gymnocladus-Saponin D_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic Acid

Biological source: *Gymnocladus chinensis* [1]

$C_{94}H_{148}O_{41}$: 1932.949

$[\alpha]_D^{23}$ + 28° (c 1.01, MeOH) [1]

UV λ_{max}^{EtOH} nm (ε): 212 (10000), 217 (18000) [1]

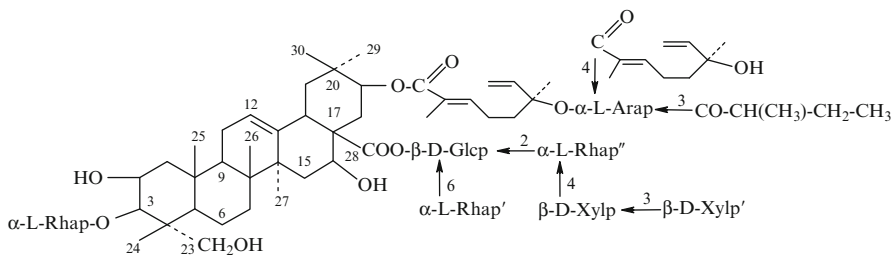
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1680, 1720 [1]

^{13}C NMR (75 MHz, C_5D_5N): [1]

See Table 1

References

1. T. Konoshima, M. Kozuka, T. Kimura, Chem. Pharm. Bull. **35**(5), 1982 (1987)



Gymnocladus-Saponin D_1

Table 1

C-1	44.8	C-16	73.4	Rha-1	104.1	MT′-1	168.2	Rha′-1	101.5
2	71.1	17	51.8	2	72.7	2	128.0	2	71.6
3	81.5	18	40.9	3	72.4	3	143.8	3	72.4
4	42.9	19	47.8	4	73.9	4	23.9	4	84.4
5	47.6	20	35.4	5	70.3	5	41.3	5	68.4
6	18.3	21	77.0	6	18.6	6	72.9	6	18.6
7	33.2	22	36.5	MT-1	167.9	7	146.4	Xyl-1	106.4
8	40.2	23	65.2	2	128.6	8	111.7	2	75.1
9	47.9	24	14.8	3	142.3	9	12.15	3	87.7
10	37.1	25	17.5	4	23.5	10	28.5	4	68.9
11	24.1	26	17.6	5	40.5	2-Me-Bu-1	176.6	5	67.4
12	123.9	27	27.1	6	79.7	2	41.3	Xyl′-1	106.0
13	143.3	28	174.8	7	143.9	3	27.1	2	75.2
14	42.3	29	29.2	8	115.2	4	11.7	3	78.1
15	35.9	30	19.2	9	12.7	5	16.7	4	70.8
				10	23.6	Glc-1	95.0	5	67.3
				Ara-1	100.0	2	78.9	Rha″-1	102.0
				2	72.1	3	77.9	2	72.1
				3	77.0	4	71.5	3	72.6
				4	76.3	5	76.8	4	73.9
				5	66.5	6	66.8	5	69.6
								6	18.6

Gymnocladus-Saponin E

CAS Registry Number: 110065-67-3
See Figure Gymnocladus-Saponin E
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic Acid
Biological source: *Gymnocladus chinensis* [1]
$C_{90}H_{144}O_{44}$: 1928.903
$[\alpha]_D^{23}$ −5.4° (c 0.76, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1680, 1720 [1]
UV λ_{max}^{EtOH} nm (ε): 217 (18000) [1]
^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	44.8	C-16	73.3	Rha-1	104.1	Glc-1	106.1	Rha′-1	101.5
2	71.1	17	51.8	2	72.7	2	75.6	2	71.8
3	81.5	18	40.9	3	72.5	3	78.3	3	72.5
4	42.9	19	47.9	4	73.9	4	71.7	4	84.3
5	47.6	20	35.4	5	70.2	5	78.2	5	68.4
6	18.3	21	77.0	6	18.6	6	63.0	6	18.6
7	33.2	22	36.5	MT-1	167.8	2-Me-Bu-1	176.8	Xyl-1	106.4
8	40.2	23	65.2	2	128.6	2	41.2	2	75.1
9	47.9	24	14.9	3	142.2	3	27.0	3	87.7
10	37.1	25	17.5	4	23.6	4	11.5	4	68.9
11	24.1	26	17.7	5	40.3	5	16.6	5	67.4
12	123.9	27	27.1	6	79.9	Glc′-1	95.0	Xyl′-1	106.0
13	143.4	28	174.8	7	143.8	2	78.9	2	75.2
14	42.2	29	29.2	8	115.2	3	77.9	3	78.2
15	36.0	30	19.2	9	12.7	4	71.4	4	70.8
				10	23.7	5	76.8	5	67.3
				Ara-1	99.8	6	66.9	Rha″-1	102.0
				2	71.7			2	72.0
				3	81.2			3	72.6
				4	71.6			4	73.9
				5	64.2			5	69.6
								6	18.6

References

1. T. Konoshima, M. Kozuka, T. Kimura, Chem. Pharm. Bull. **35**(5), 1982 (1987)

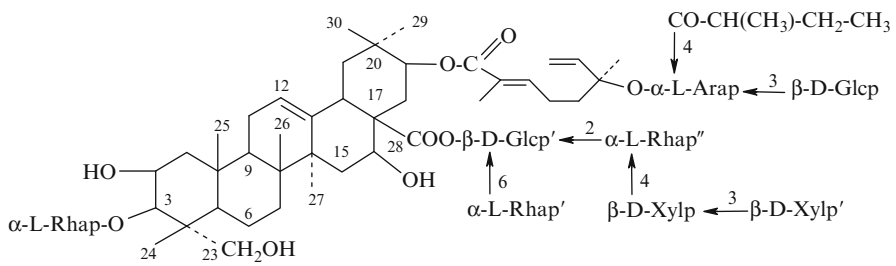
Gymnocladus-Saponin F_1

CAS Registry Number: 110065-68-4
See Figure Gymnocladus-Saponin F_1
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic Acid
Biological source: *Gymnocladus chinensis* [1]
$C_{99}H_{156}O_{49}$: 2128.971
$[\alpha]_D^{23}$ −2.0° (c 0.71, MeOH) [1]
UV λ_{max}^{EtOH} nm (ε): 212 (10000), 217 (18000) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1680, 1720 [1]
^{13}C NMR (75 MHz, C_5D_5N): [1]

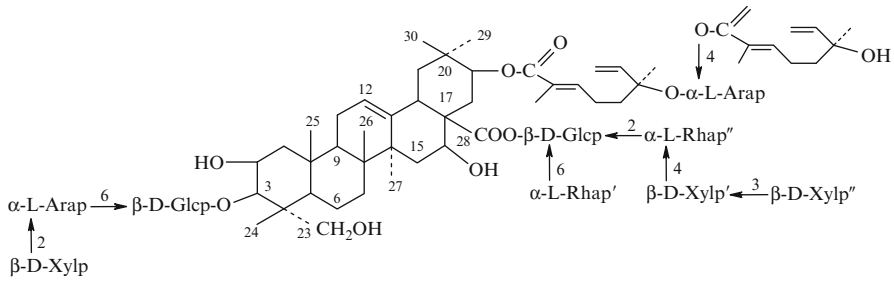
Table 1

C-1	44.1	C-16	73.5	Glc-1	105.7	MT′-4	23.9	Rha-1	101.4
2	70.4	17	51.8	2	75.4	5	41.3	2	71.7
3	83.5	18	40.9	3	78.1	6	72.1	3	72.5
4	42.7	19	47.9	4	71.6	7	146.5	4	84.2
5	47.5	20	35.4	5	76.0	8	111.7	5	68.3
6	18.3	21	77.0	6	68.4	9	12.5	6	18.7
7	33.2	22	36.5	MT-1	167.8	10	28.5	Xyl′-1	106.3
8	40.2	23	65.6	2	128.6	Ara′-1	100.2	2	75.0
9	47.8	24	15.0	3	142.2	2	72.5	3	87.8
10	37.0	25	17.3	4	23.6	3	73.0	4	68.9
11	24.1	26	17.5	5	40.3	4	72.8	5	67.1
12	123.9	27	27.2	6	79.9	5	64.4	Xyl″-1	106.0

(*continued*)



Gymnocladus-Saponin E



Gymnocladus-Saponin F_1

Table 1 (continued)

13	143.4	28	174.7	7	143.9	Glc′-1	95.0	2	75.1
14	42.2	29	29.2	8	115.2	2	79.0	3	78.1
15	36.0	30	19.2	9	12.7	3	78.0	4	70.8
				10	23.7	4	71.5	5	67.3
				Ara-1	101.5	5	76.6	Rha″-1	102.0
				2	79.3	6	66.9	2	72.0
				3	72.3	Xyl-1	105.8	3	72.6
				4	67.4	2	75.0	4	73.9
				5	63.6	3	78.0	5	69.7
				MT′-1	168.2	4	70.8	6	18.6
				2	128.0	5	67.0		
				3	143.6				

References

1. T. Konoshima, M. Kozuka, T. Kimura, Chem. Pharm. Bull. **35**(5), 1982 (1987)

Gymnocladus-Saponin F_2

CAS Registry Number: 110065-69-5
See Figure Gymnocladus-Saponin F_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic Acid

Biological source: *Gymnocladus chinensis* [1]

$C_{96}H_{154}O_{50}$: 2106.950

$[\alpha]_D^{23}$ −3.6° (c 0.77, MeOH) [1]

UV λ_{max}^{EtOH} nm (ε): 217 (18000) [1]

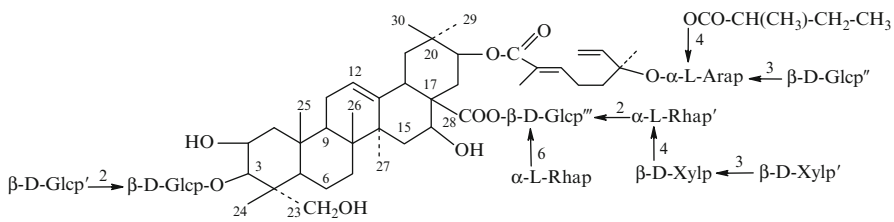
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1680, 1720 [1]

^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	44.1	C-16	73.4	Glc-1	103.1	MT-7	143.8	Rha-1	101.3
2	70.2	17	51.7	2	83.1	8	115.2	2	71.9
3	83.2	18	40.9	3	76.3	9	12.7	3	72.5
4	42.6	19	48.0	4	70.9	10	23.7	4	84.1
5	47.5	20	35.3	5	77.7	2-Me-Bu-1	176.7	5	68.3
6	18.3	21	76.9	6	62.3	2	41.2	6	18.5
7	33.2	22	36.5	Glc′-1	105.6	3	27.0	Xyl-1	106.3
8	40.2	23	65.9	2	75.2	4	11.5	2	75.0
9	47.9	24	14.9	3	78.3	5	16.5	3	87.9
10	37.0	25	17.4	4	71.1	Glc″-1	106.1	4	68.8
11	24.0	26	17.5	5	78.0	2	75.6	5	67.4
12	123.9	27	27.1	6	62.5	3	78.2	Xyl′-1	106.0
13	143.4	28	174.7	Ara-1	99.8	4	71.7	2	75.1
14	42.2	29	29.1	2	71.8	5	78.1	3	78.2
15	35.9	30	19.2	3	81.2	6	63.0	4	70.7
				4	71.6	Glc‴-1	95.0	5	67.3
				5	64.2	2	79.0	Rha′-1	102.0
				MT-1	167.7	3	77.8	2	72.0

(*continued*)



Gymnocladus-Saponin F_2

Table 1 (continued)

2	128.6	4	71.4	3	72.6
3	142.1	5	76.6	4	73.9
4	23.6	6	66.8	5	69.6
5	40.3			6	18.6
6	79.9				

References

1. T. Konoshima, M. Kozuka, T. Kimura, Chem. Pharm. Bull. **35**(5), 1982 (1987)

Gymnocladus-Saponin G

CAS Registry Number: 108886-09-5

See Figure Gymnocladus-Saponin G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic Acid

Biological source: *Gymnocladus chinensis* [1]

$C_{100}H_{160}O_{53}$: 2208.982

$[\alpha]_D^{27}$ −4.8° (c 1.20, MeOH) [1]

UV λ_{max}^{EtOH} nm (ε): 217 (18000) [1]

IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1680, 1730 [1]

^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	44.1	C-16	73.4	Glc-1	105.6	Ara′-1	99.8	Rha-1	101.4
2	70.4	17	51.7	2	75.4	2	71.7	2	71.8
3	83.5	18	40.8	3	78.1	3	81.2	3	72.4
4	42.7	19	48.0	4	71.5	4	71.7	4	84.1
5	47.5	20	35.3	5	75.9	5	64.2	5	68.2
6	18.3	21	77.0	6	68.3	2-Me-Bu-1	176.6	6	18.6
7	33.2	22	36.5	Ara-1	101.5	2	41.2	Xyl′-1	106.2
8	40.2	23	65.6	2	79.3	3	27.0	2	74.9
9	47.7	24	15.0	3	72.2	4	11.5	3	87.7
10	37.0	25	17.3	4	67.3	5	16.5	4	68.9
11	24.1	26	17.5	5	63.6	Glc′-1	106.1	5	67.1
12	123.9	27	27.1	Xyl-1	105.7	2	75.6	Xyl″-1	106.0
13	143.3	28	174.7	2	74.9	3	78.3	2	75.1
14	42.2	29	29.1	3	77.9	4	71.6	3	78.1
15	35.9	30	19.2	4	70.7	5	78.2	4	70.7
				5	67.0	6	63.0	5	67.2
				MT-1	167.8	Glc″-1	95.0	Rha′-1	101.9
				2	128.6	2	78.9	2	72.0
				3	142.2	3	77.9	3	72.6
				4	23.6	4	71.4	4	73.9
				5	40.3	5	76.5	5	69.6
				6	79.9	6	66.8	6	18.6
				7	143.7				
				8	115.2				
				9	12.7				
				10	23.7				

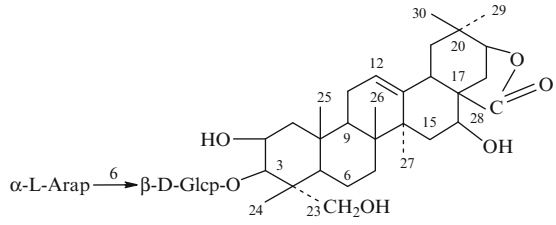
(*continued*)

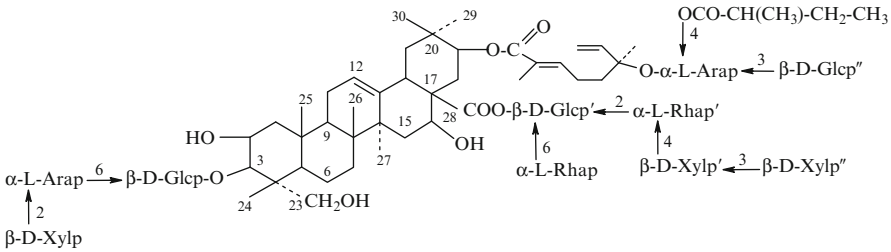
References

1. T. Konoshima, M. Kozuka, T. Sawada, T. Kimura, Chem. Pharm. Bull. **35**(1), 46 (1987)

Gymnocladus-Saponin A

CAS Registry Number: 95753-65-4





Gymnocladus-Saponin G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic acid-21,28-lactone
Biological source: *Gymnocladus chinensis* [1]
$C_{41}H_{64}O_{15}$: 796.424
Mp: 214–217°C (MeOH-Et_2O) [1]
$[\alpha]_D^{25}$ + 0.6° (c 0.72, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3500–3600, 1760 [1]
^{13}C NMR (80 MHz, C_5D_5N): [1]

Table 1

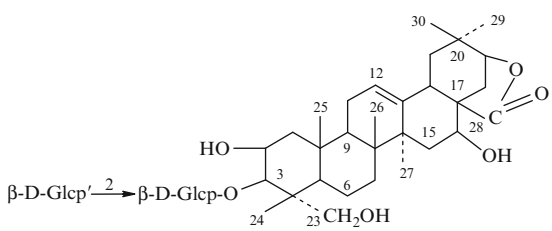
C-1	43.8	C-16	66.7	Glc-1	105.0	Ara-1	104.6
2	70.7	17	49.9	2	75.1	2	72.2
3	83.2	18	41.7	3	78.3	3	73.9
4	42.6	19	42.9	4	71.8	4	68.7
5	48.3	20	34.1	5	76.3	5	66.1
6	18.2	21	83.6	6	69.7		
7	32.3	22	27.1				
8	40.5	23	65.6				
9	47.8	24	15.0				
10	37.1	25	16.2				
11	23.9	26	17.3				
12	124.7	27	28.5				
13	140.2	28	181.1				
14	43.4	29	28.8				
15	38.1	30	24.3				

References

1. T. Konoshima, T. Sawada, T. Kimura, Chem. Pharm. Bull. **32**, 4833 (1984)

Gymnocladus-Saponin B

CAS Registry Number: 95732-67-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic acid-21,28-lactone
Biological source: *Gymnocladus chinensis* [1]
$C_{42}H_{66}O_{16}$: 826.435
Mp: 227–229°C [1]
$[\alpha]_D^{25}$ + 6.7° (c 0.89, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1760 [1]
^{13}C NMR (80 MHz, C_5D_5N): [1]

Table 1

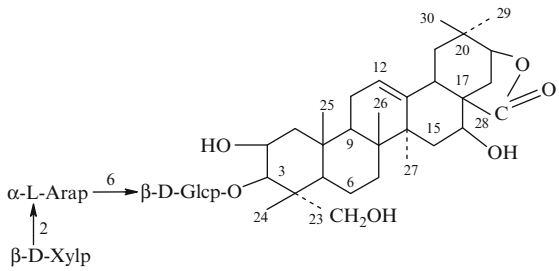
C-1	43.8	C-16	66.7	Glc-1	103.0
2	70.3	17	49.9	2	83.3
3	82.8	18	41.7	3	76.6
4	42.6	19	42.9	4	71.0
5	48.3	20	34.1	5	78.0
6	18.2	21	83.4	6	62.5
7	32.3	22	27.1	Glc′-1	105.7
8	40.5	23	65.7	2	74.7
9	47.8	24	14.7	3	78.3
10	37.1	25	16.2	4	71.2
11	23.9	26	17.3	5	77.9
12	124.7	27	28.5	6	62.4
13	140.2	28	181.2		
14	43.4	29	28.8		
15	38.1	30	24.3		

References

1. T. Konoshima, T. Sawada, T. Kimura, Chem. Pharm. Bull. **32**, 4833 (1984)

Gymnocladus-Saponin C

CAS Registry Number: 95732-68-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides

of Aglycones of Oleanene Type – 2β,23-Dihydroxy-acacic acid-21,28-lactone

Biological source: *Gymnocladus chinensis* [1]

$C_{46}H_{72}O_{19}$: 928.466

Mp: 187–189°C [1]

$[\alpha]_D^{33}$ − 10.0° (c 0.98, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1760 [1]

^{13}C NMR (80 MHz, C_5D_5N): [1]

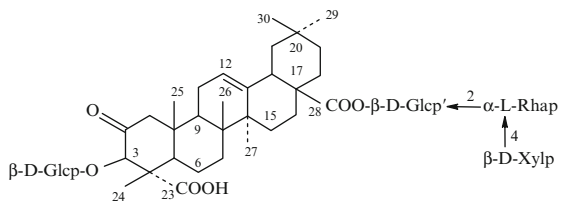
Table 1

C-1	43.8	C-16	66.7	Glc-1	105.4
2	70.3	17	49.9	2	75.4
3	83.2	18	41.7	3	78.1
4	42.5	19	42.9	4	71.6
5	48.3	20	34.0	5	76.1
6	18.2	21	83.5	6	68.4
7	32.3	22	27.1	Ara-1	101.7
8	40.5	23	65.7	2	79.2
9	47.8	24	14.8	3	72.3
10	37.1	25	16.2	4	67.1
11	23.9	26	17.3	5	63.8
12	124.7	27	28.5	Xyl-1	105.5
13	140.2	28	181.2	2	74.8
14	43.4	29	28.8	3	77.7
15	38.1	30	24.3	4	70.7
				5	67.1

References

1. T. Konoshima, T. Sawada, T. Kimura, Chem. Pharm. Bull. **32**, 4833 (1984)

Polygalasaponin XXIII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 2-Oxo-3β-hydroxy-olean-12-en-23,28-dioic Acid

Biological source: *Polygala japonica* [1]

$C_{53}H_{82}O_{24}$: 1102.519

$[\alpha]_D^{20}$ + 20.6° (c 0.85, C_5H_5N) [1]

FAB-MS (positive ion mode) *m/z*: 1126 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.74 (s, H-3), 5.41 (t-like, H-12), 3.11 (dd, J = 14.0, 4.0, H-18), 1.51 (s, CH_3-24), 0.97 (s, CH_3-25), 1.05 (s, CH_3-26), 1.24 (s, CH_3-27), 0.85 (s, CH_3-29), 0.85 (s, CH_3-30)

β-D-Glcp: 5.13 (d, J = 7.5, H-1), 4.03 (H-2), 4.10 (t, J = 9.0, H-3), 4.14 (t, J = 9.0, H-4), 3.83 (m, H-5), 4.25 (H-6), 4.39 (H-6)

β-D-Glcp′: 6.19 (d, J = 6.5, H-1), 4.35 (H-2), 4.27 (H-3), 4.28 (H-4), 3.95 (m, H-5), 4.26, 4.34 (H_2-6)

α-L-Rhap: 6.40 (brs, H-1), 4.81 (brs, H-2), 4.67 (dd, J = 9.0, 3.0, H-3), 4.33 (H-4), 4.49 (m, H-5), 1.78 (d, J = 6.0, CH_3-6)

β-D-Xylp: 5.04 (d, J = 7.0, H-1), 4.05 (H-2), 4.06 (H-3), 4.19 (H-4), 3.53 (t, J = 11.0, H-5), 4.25 (H-5) [1]

^{13}CNMR (100 MHz, C_5D_5N): [1]

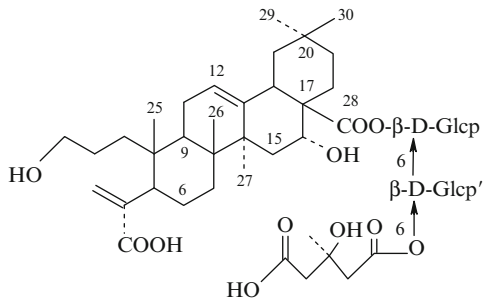
Table 1

C-1	54.7	C-16	23.4	Glc-1	103.9	Rha-1	101.4
2	207.5	17	47.1	2	75.0	2	71.8
3	85.3	18	42.1	3	78.6	3	72.6
4	58.2	19	46.3	4	71.5	4	85.5
5	52.4	20	30.8	5	78.1	5	68.4
6	21.0	21	34.0	6	62.7	6	18.7
7	32.3	22	32.8	Glc′-1	94.8	Xyl-1	107.6
8	40.0	23	180.8	2	76.8	2	76.3
9	48.0	24	13.6	3	79.4	3	78.8
10	43.3	25	16.7	4	71.4	4	70.9
11	23.8	26	17.1	5	78.9	5	67.6
12	122.1	27	26.0	6	62.3		
13	144.2	28	176.5				
14	42.4	29	33.1				
15	28.5	30	23.8				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(1), 173 (1996)

Sinocrassuloside IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3,16α-Dihydroxy-3,4-seco-olean-4(24),12-dien-23,28-dioic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{48}H_{74}O_{20}$: 970.477

$[\alpha]_D^{26}$ + 30.4° (c 0.023, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3421, 2924, 1720, 1462, 1061, 710, 517, 424 [1]

FAB-MS *m/z*: 971 $[M + H]^+$ and 993 $[M + Na]^+$ [1]

HR-FAB-MS *m/z*: 993.4697 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.10 (td, J = 12.5, 4.5, H-1), 1.55 (t, J = 12.5, H-1), 1.72, 2.38 (H_2-2), 3.74, 3.89 (H_2-3), 3.22 (d, J = 12.5, H-5), 1.35 (d, J = 10.5, H-6), 1.84 (d, J = 13.0, H-6), 1.28, 1.60 (H_2-7), 2.33 (H-9), 2.04, 2.04 (H_2-11), 5.56 (t, J = 4.0, H-12), 1.70, 2.45 (d, J = 12.0, H_2-15), 5.25 (brs, H-16), 3.47 (dd, J = 14.0, 4.0, H-18), 2.73 (t, J = 14.0, H-19), 1.30 (H-19), 1.25, 2.33 (H_2-21), 2.12 (td, J = 15.0, 5.0, H-22), 2.36 (H-22), 6.50, 5.54 (s, H_2-24), 0.93 (s, CH_3-25), 1.18 (s, CH_3-26), 1.73 (s, CH_3-27), 0.94 (s, CH_3-29), 1.00 (s, CH_3-30); β-D-Glcp: 6.19 (d, J = 9.0, H-1), 4.01 (t, J = 9.0, H-2), 4.16 (t, J = 9.0, H-3), 4.27 (t, J = 9.0, H-4), 4.03 (H-5), 4.71 (d, J = 11.0, H-6), 4.31 (dd, J = 11.0, 5.0, H-6); β-D-Glcp′: 4.95 (d, J = 8.5, H-1), 3.95 (t, J = 8.5, H-2), 4.12 (t, J = 8.5, H-3), 3.99 (t, J = 8.5, H-4), 3.96 (H-5), 4.69 (dd, J = 11.0, 6.0, H-6), 4.93 (d, J = 11.0, H-6);

3-Hydroxy-3-methyl-glutaryl group (HMG): 3.08 (d, J = 14.5, H-2), 3.12 (d, J = 14.5, H-2), 3.14 (brs, H-4), 1.71 (s, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

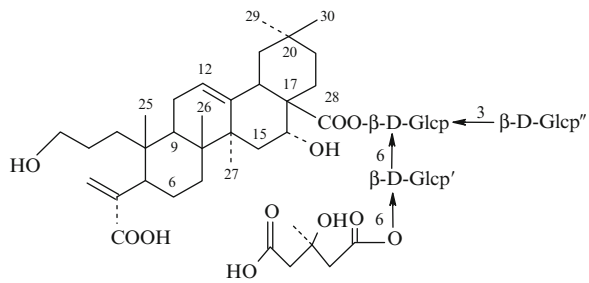
C-1	37.2	C-11	24.4	C-21	35.9	Glc-1	95.7	HMG-1	171.7
2	27.6	12	122.8	22	32.2	2	73.9	2	46.6
3	63.3	13	144.4	23	171.5	3	78.7	3	70.0
4	146.2	14	42.7	24	124.3	4	71.0	4	46.4
5	43.6	15	36.1	25	19.1	5	78.0	5	174.6
6	26.0	16	74.3	26	17.7	6	69.5	6	28.2
7	32.4	17	49.2	27	27.2	Glc′-1	105.1		
8	39.8	18	41.4	28	176.0	2	75.0		
9	37.5	19	47.3	29	33.2	3	78.1		
10	39.8	20	30.8	30	24.7	4	71.5		
						5	75.2		
						6	64.7		

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Sinocrassuloside V



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3,16α-Dihydroxy-3,4-seco-olean-4(24),12-dien-23,28-dioic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{54}H_{84}O_{25}$: 1132.530

$[\alpha]_D^{26}$ + 39.7° (c 0.026, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3429, 2924, 1720, 1381, 1068, 717, 517, 447 [1]

FAB-MS *m/z*: 1133 $[M + H]^+$ and 1155 $[M + Na]^+$ [1]

HR-FAB-MS *m/z*: 1133.5380 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.58, 1.14 (H_2-1), 2.40, 1.77 (H_2-2), 3.91, 3.78 (H_2-3), 3.26 (d, J = 13.0, H-5), 1.83, 1.34 (H_2-6), 1.61, 1.27 (H_2-7), 2.36 (H-9), 2.11, 2.06 (H_2-11), 5.58 (brs, H-12), 2.39, 2.09 (H_2-15), 5.22 (brs, H-16), 3.48 (dd, J = 14.0, 4.0, H-18), 2.76 (t, J = 14.0, H-19), 1.32 (H-19), 2.38, 1.22 (H_2-21), 2.39, 2.09 (H_2-22), 6.54, 5.57 (s, s, H_2-24), 0.98 (s, CH_3-25), 1.19 (s, CH_3-26), 1.76 (s, CH_3-27), 0.97 (s, CH_3-29), 1.02 (s, CH_3-30)

β-D-Glcp: 6.18 (d, J = 9.0, H-1), 4.04 (t, J = 9.0, H-2), 4.18 (t, J = 9.0, H-3), 4.27 (t, J = 9.0, H-4), 4.00 (H-5), 4.64 (d, J = 10.5, H-6), 4.29 (H-6)

β-D-Glcp′: 4.96 (d, J = 7.5, H-1), 3.96 (H-2), 4.15 (H-3), 4.00 (H-4), 3.96 (H-5), 4.73 (dd, J = 11.0, 6.0, H-6), 4.97 (d, J = 11.0, H-6)

3-Hydroxy-3-methyl-glutaryl group (HMG): 3.11 (d, J = 14.0, H-2), 3.15 (d, J = 14.0, H-2), 3.18 (brs, H-4), 1.74 (s, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

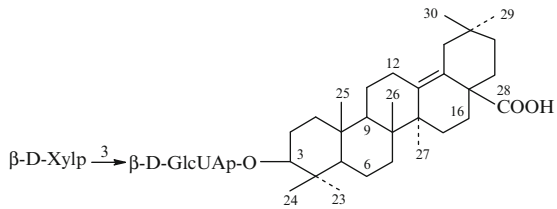
C-1	37.2	C-16	74.2	Glc-1	95.2	Glc′-1	105.7
2	27.6	17	49.2	2	72.7	2	75.4
3	63.3	18	41.4	3	88.6	3	78.3
4	146.3	19	47.3	4	68.9	4	71.6
5	43.6	20	30.9	5	77.6	5	78.6
6	26.0	21	35.9	6	68.8	6	62.3
7	32.4	22	32.2	Glc″-1	105.2	HMG-1	171.8
8	39.8	23	171.7	2	75.0	2	46.6
9	37.5	24	124.0	3	78.1	3	70.0
10	39.8	25	19.1	4	71.6	4	46.3
11	24.4	26	17.7	5	75.2	5	174.6
12	122.9	27	27.2	6	64.7	6	28.2
13	144.3	28	175.8				
14	42.6	29	33.2				
15	36.1	30	24.7				

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Scoparianoside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β-Hydroxy-olean-13(18)-en-28-oic Acid

Biological source: *Kochia scoparia* [1]

$C_{41}H_{64}O_{13}$: 764.434

Mp: 207–209°C ($CHCl_3$–MeOH) [1]

$[\alpha]_D^{27}$ − 7.7° (c 0.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3456, 2940, 2908, 1736, 1719, 1655, 1038 [1]

FAB-MS (negative ion mode) *m/z*: 763 $(M\text{-}H)^-$, 631 $(M\text{-}C_5H_9O_4)^-$, 455 $(M\text{-}C_{11}H_{17}O_{10})^-$ [1]

HR-FAB-MS (positive ion mode) *m/z*: 787.4245 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.81, 0.86, 1.11 (s, CH_3-25, 29, 26), 0.96, 1.30 (s, CH_3-24, 30, 23, 27), 3.41 (dd, J = 5.2, 12.2, H-3)

β-D-GlcUAp: 5.02 (d, J = 7.9, H-1)

β-D-Xylp: 5.31 (d, J = 7.3, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	33.7	GlcUA-1	106.9
2	26.8	17	48.9	2	74.6
3	89.4	18	129.4	3	86.6
4	39.6	19	41.6	4	71.4

(*continued*)

Table 1 (continued)

5	55.9	20	33.0	5	77.5
6	18.5	21	37.5	6	172.1
7	35.5	22	22.1	Xyl-1	106.2
8	41.9	23	28.1	2	75.3
9	51.1	24	16.9	3	78.1
10	37.3	25	16.6	4	71.0
11	28.1	26	18.1	5	67.4
12	36.5	27	21.3		
13	137.9	28	179.0		
14	44.9	29	24.5		
15	27.9	30	32.4		

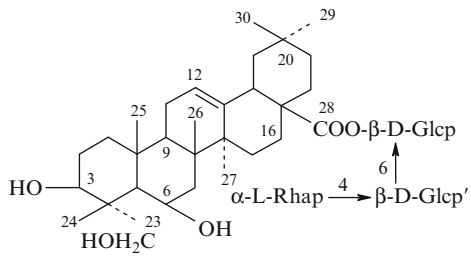
Pharm./Biol.: *Kochiae Fructus* has been used as a tonic, diuretic, analgesic, and antidote and for the treatment of and cutaneous pruritus in traditional Chinese and Japanese preparations [1]

References

1. M. Yoshikawa, H. Shimada, T. Morikawa, S. Yoshizumi, N. Matsumura, T. Murakami, H. Matsuda, K. Hori, J. Yamahara, Chem. Pharm. Bull. **45**(8), 1300 (1997)

Centellasaponin D

CAS Registry Number: 386223-77-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,6β,23-Trihydroxy-olean-12-en-28-oic Acid

Biological source: *Centella asiatica* [1]

$C_{48}H_{78}O_{19}$: 958.513

Mp: 202–203°C [1]

$[\alpha]_D^{25}$ − 12.4° (c 0.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 2932, 1739, 1655, 1062 [1]

FAB-MS *m/z*: 981.5035 $[M + Na]^+$; 957 [M-H]−, 811 $[M\text{-}C_6H_{11}O_4]^-$, 487 $[M\text{-}C_{18}H_{31}O_{14}]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.88, 0.90, 1.21, 1.68, 1.69, 1.71 (s, CH_3 × 6), 3.21 (dd, J = 4.6, 13.7, H-18), 4.00, 4.34 (d, J = 10.3, H_2-23), 4.20 (m, H-3), 4.99 (brs, H-6), 5.52 (dd, J = 3.4, 3.6, H-12)

β-D-Glcp: 6.15 (d, J = 8.2, H-1)

β-D-Glcp′: 4.94 (d, J = 7.9, H-1)

α-L-Rhap: 5.77 (brs, H-1), 1.66 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

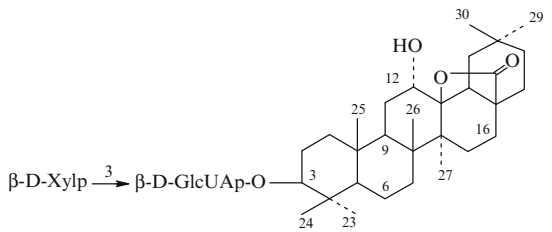
Table 1

C-1	41.3	C-16	23.6	Glc-1	95.8	Rha-1	102.7
2	28.0	17	47.1	2	73.9	2	72.5
3	73.6	18	41.8	3	78.5	3	72.7
4	44.0	19	46.4	4	71.1	4	74.0
5	49.6	20	30.8	5	77.9	5	70.3
6	67.7	21	34.1	6	69.4	6	18.5
7	41.2	22	32.6	Glc′-1	104.8		
8	39.4	23	67.7	2	75.3		
9	48.8	24	14.7	3	76.5		
10	37.0	25	17.6	4	78.5		
11	24.0	26	18.9	5	77.1		
12	123.3	27	26.1	6	61.4		
13	143.5	28	176.5				
14	42.8	29	33.1				
15	28.4	30	23.7				

References

1. H. Matsuda, T. Morikawa, H. Ueda, M. Yoshikawa, Chem. Pharm. Bull. **49**(10), 1368 (2001)

Kochianoside III



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of

Aglycones of Oleanene Type – 3β,12α-Dihydroxy-olean-28,13β-olid

Biological source: *Kochia scoparia* [1]

$C_{41}H_{64}O_{14}$: 780.429

Mp: 224–225°C ($CHCl_3$-MeOH) [1]

$[\alpha]_D^{26}$ + 47.9° (c 0.6, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3456, 2932, 2900, 1736, 1719, 1655, 1040 [1]

FAB-MS (negative ion mode) *m/z*: 779 $(M-H)^-$, 647 $(M-C_5H_9O_4)^-$, 471 $(M-C_{11}H_{17}O_{10})^-$ [1]

FAB-MS (positive ion mode) *m/z*: 803.4194 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.80, 0.82, 0.92, 0.98, 1.28, 1.29, 1.62 (s, CH_3-25, 30, 29, 24, 27, 23, 26), 2.28 (m, H-18), 3.29 (dd, J = 3.9, 11.6, H-3), 4.12 (m, H-12)

β-D-GlcUAp:4.95 (d, J = 7.9, H-1)

β-D-Xylp:5.30 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-18	51.8	GlcUA-1	106.9
2	26.7	19	39.7	2	74.6
3	89.4	20	31.8	3	86.6
4	39.6	21	34.6	4	71.4
5	55.8	22	28.4	5	77.5
6	18.0	23	28.0	6	172.0
7	34.5	24	16.7	Xyl-1	106.2
8	42.8	25	16.6	2	75.2
9	45.0	26	18.8	3	78.1
10	36.5	27	19.0	4	71.0
11	29.3	28	179.6	5	67.4
12	75.8	29	33.3		
13	91.4	30	23.9		
14	42.7				
15	28.3				
16	21.8				
17	45.0				

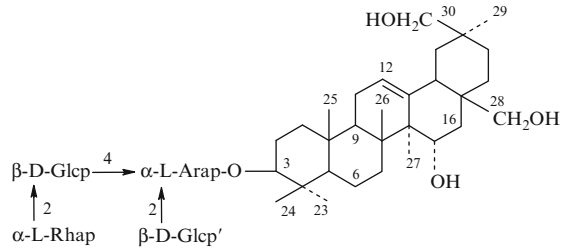
Pharm./Biol.: The methanol extract and glycosidic fraction of *Kochiae Fructus* have inhibitory effects on the cutaneous pruritus induced by Compound 48/80 or serotonin in mice [1]

References

1. M. Yoshikawa, Y. Dai, H. Shimada, T. Morikawa, N. Matsumura, S. Yoshizumi, H. Matsuda, H. Matsuda, M. Kubo, Chem. Pharm. Bull. **45**(6), 1052 (1997)

Ardisimamilloside D

CAS Registry Number: 310396-64-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,15α,28,30-Tetrahydroxy-olean-12-ene

Biological source: *Ardisia mamillata* [1]

$C_{53}H_{88}O_{22}$: 1076.576

$[\alpha]_D^{25}$ −21.6° (c 0.15, MeOH) [1]

HR-FAB-MS *m/z*: 1099.5671 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.69 (H-5), 0.86, 1.04, 1.08, 1.17, 1.22 (s, CH_3-25, 24, 26, 23, 29), 1.64 (s, H-27), 4.74 (H-15), 2.62 (H-18), 3.17 (dd, J = 10.0, 4.0, H-3), 3.87 (s, H_2-28), 3.89 (H_2-30)

α-L-Rhap: 6.41 (brs, H-1), 1.80 (d, J = 13.2, CH_3-6)

α-L-Arap: 4.95 (brs, H-1)

β-D-Glcp: 5.38 (d, J = 7.6, H-1)

β-D-Glcp′: 5.25 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.6	C-16	36.7	Ara-1	104.5	Glc′-1	103.2
2	26.4	17	34.8	2	80.8	2	78.1
3	89.0	18	43.1	3	74.7	3	79.5
4	39.4	19	42.2	4	74.9	4	71.9
5	55.5	20	36.2	5	62.8	5	78.4
6	18.8	21	30.1	Glc-1	105.4	6	62.6
7	31.2	22	36.2	2	76.4	Rha-1	101.6
8	41.5	23	28.1	3	77.3	2	72.4
9	48.1	24	16.7	4	71.7	3	72.7
10	37.0	25	15.7	5	78.0	4	74.9
11	24.0	26	17.6	6	62.8	5	69.4
12	123.1	27	20.9			6	19.0
13	146.6	28	69.0				
14	48.2	29	28.5				
15	66.5	30	65.9				

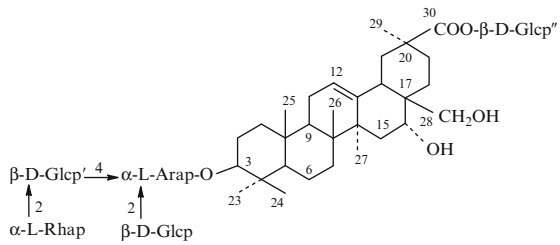
Pharm./Biol.: Roots have been traditionally (China) used to treat respiratory tract infections and menstrual disorders [1]

References

1. J. Huang, Y. Ogihara, H. Zhang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **48**, 1413 (2000)

Ardisicrenoside C

CAS Registry Number: 163047-19-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α,28-Trihydroxy-olean-12-en-30-oic Acid

Biological source: *Ardisia crenata* [1]

$C_{59}H_{96}O_{28}$: 1252.608

Mp: 234–236°C (dec) [1]

$[\alpha]_D^{24}$ + 4.80° (c 1.0, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 2928, 2871, 1733, 1635, 1457, 1374, 1075 [1]

FAB-MS *m/z*: 1275 $[M + Na]^+$, 1253 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.12 (dd, J = 11.6, 4.3, H-3), 0.67 (d, J = 10.9, H-5), 5.58 (brt, H-12), 4.58 (brs, H-16), 2.65 (dd, J = 16.8, 1.5, H-18), 2.68 (dd, J = 13.5, 12.6, H_2-19), 1.11 (s, CH_3-23), 0.96 (s, CH_3-24), 0.79 (s, CH_3-25), 0.85 (s, CH_3-26), 1.73 (s, CH_3-27), 3.54, 3.63 (d, J = 10.7, H_2-28), 1.34 (s, CH_3-29); α-L-Arap: 4.87 (d, J = 4.6, H-1), 4.46 (dd, H-2), 4.40 (H-3), 4.51 (m, H-4), 3.76, 4.33 (H_2-5); β-D-Glcp: 5.25 (d, J = 7.7, H-1), 3.94 (H-2), 4.19 (H-3), 4.10 (H-4), 3.94 (H-5), 4.25, 4.38 (dd, J = 11.6, 2.7, H_2-6); β-D-Glcp′: 5.12 (d, J = 7.6, H-1), 4.14 (H-2), 4.08 (H-3), 3.99 (dd, J = 8.8, 9.5, H-4), 3.71 (m, H-5), 4.18 (H-6), 4.34 (H-6); α-L-Rhap: 6.24 (s, H-1), 4.16 (H-2), 4.54 (H-3), 4.54 (dd, J = 9.1, 3.3, H-4), 4.13 (H-5), 1.72 (d, J = 6.1, CH_3-6); β-D-Glcp″: 6.34 (d, J = 8.0, H-1), 4.11 (H-2), 4.19 (H-3), 4.21 (H-4), 3.93 (H-5), 4.24 (H-6), 4.34 (H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-13	144.3	C-25	15.4	Glc-1	104.9	Rha-1	101.3
2	26.1	14	41.5	26	16.7	2	75.9	2	71.9
3	88.9	15	34.6	27	27.1	3	77.5	3	72.2
4	39.2	16	73.7	28	69.8	4	71.3	4	74.3
5	55.5	17	40.1	29	28.3	5	77.7	5	69.2
6	18.2	18	43.0	30	176.9	6	62.4	6	18.3
7	32.9	19	44.3	Ara-1	104.1	Glc′-1	102.8	Glc″-1	95.5
8	39.8	20	44.4	2	80.2	2	77.2	2	74.0
9	46.8	21	33.3	3	71.8	3	79.0	3	78.2
10	36.6	22	31.5	4	74.5	4	71.5	4	70.9
11	23.5	23	27.9	5	63.2	5	77.9	5	78.9
12	122.8	24	16.4			6	62.2	6	62.0

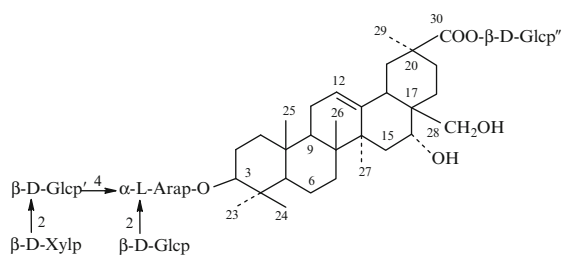
Pharm./Biol.: Inhibitory activity on cAMP Phosphodiesterase [1]

References

1. Z. Jia, K. Koike, T. Nikaido, T. Ohmoto, M. Ni, Chem. Pharm. Bull. **42**(11), 2309 (1994)

Ardisicrenoside D

CAS Registry Number: 163047-20-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α,28-Trihydroxy-olean-12-en-30-oic Acid
Biological source: *Ardisia crenata* [1]
$C_{58}H_{94}O_{28}$: 1238.593
Mp: 213–216°C (dec.) [1]
$[\alpha]_D^{28}$ + 23.4° (c 1.00, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3407, 2929, 2878, 1733, 1653, 1635, 1457, 1374, 1074, 1042 [1]
FAB-MS *m/z*: 1261 $[M + Na]^+$, 1239 $[M + H]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.15 (dd, J = 11.5, 4.2H-3), 0.72 (d, J = 11.6, H-5), 5.63 (brt, H-12), 2.19 (d, J = 11.3, H_2-15), 4.64 (brs, H-16), 2.76 (dd, J = 16.4, 1.0, H-18), 2.84 (dd, J = 13.4, 12.5H_2-19), 1.20 (s, CH_3-23), 1.07 (s, CH_3-24), 0.82 (s, CH_3-25), 0.88 (s, CH_3-26), 1.79 (s, CH_3-27), 1.38 (s, CH_3-29); α-L-Arap: 4.76 (d, J = 5.8, H-1), 4.52 (H-2), 4.24 (H-3), 4.21 (H-4), 3.64 (H-5), 4.58 (dd, J = 12.2, 3.8, H-5); β-D-Glcp: 5.45 (d, J = 7.6H-1), 4.04 (H-2), 4.21 (H-3), 4.20 (H-4), 3.98 (H-5), 4.40 (H-6), 4.52 (H-6); β-D-Glcp′: 4.98 (d, J = 7.7, H-1), 3.91 (dd, J = 8.6, 8.2, H-2), 4.18 (H-3), 4.17 (H-4), 3.98 (H-5), 4.25, 4.42 (H_2-6); β-D-Xylp: 4.90 (d, J = 6.7, H-1), 3.99 (H-2), 4.01 (H-3), 4.11 (m, H-4), 3.69, 4.53 (H_2-5); β-D-Glcp″: 6.44 (d, J = 7.9, H-1), 4.21 (H-2), 4.29 (H-3), 4.30 (H-4), 4.01 (H-5), 4.34 (dd, J = 12.5, 4.0, H-6), 4.43 (H-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	74.1	Ara-1	104.6	Xyl-1	107.5
2	26.3	17	40.3	2	79.7	2	75.9
3	88.9	18	43.2	3	73.2	3	77.7
4	39.5	19	44.5	4	78.5	4	70.6
5	55.8	20	44.6	5	64.2	5	67.3
6	18.4	21	33.5	Glc-1	104.8	Glc″-1	95.8
7	33.1	22	31.7	2	76.1	2	74.3
8	39.9	23	28.1	3	78.1	3	78.5
9	47.0	24	16.7	4	71.0	4	71.2
10	36.8	25	15.6	5	77.8	5	79.2
11	23.7	26	16.9	6	62.9	6	62.3
12	122.9	27	27.3	Glc′-1	104.1		
13	144.5	28	69.9	2	85.2		
14	41.7	29	28.6	3	77.4		
15	34.8	30	177.0	4	71.8		
				5	78.2		
				6	62.3		

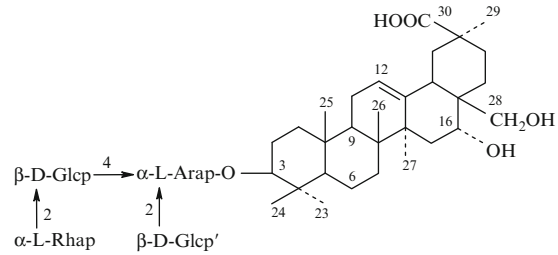
Pharm./Biol.: Inhibitory activity on cAMP Phosphodiesterase [1]

References

1. Z. Jia, K. Koike, T. Nikaido, T. Ohmoto, M. Ni, Chem. Pharm. Bull. **42**(11), 2309 (1994)

Ardisicrenoside G

CAS Registry Number: 222169-04-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α,28-Trihydroxy-olean-12-en-30-oic Acid
Biological source: *Ardisia crenata* [1]
$C_{53}H_{86}O_{23}$: 1090.555
$[\alpha]_D^{22}$ + 27.0° (c 0.26, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3413, 2931, 1680, 1073 [1]
MALDI-TOF-MS *m/z*: 1113 $[M + Na]^+$, 1129 $[M + K]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.96, 1.04, 1.18, 1.53, 1.88 (s, CH_3-25, 26, 24, 23, 29, 27), 2.65 (dd, J = 16.8, 1.5, H-18), 3.16 (dd, J = 11.0, 4.3, H-3), 3.57, 3.84 (d, J = 10.4, H_2-28), 4.84 (brs, H-16), 5.62 (brt, H-12)
α-L-Rhap: 6.43 (brs, H-1), 1.81 (d, J = 5.9, CH_3-6)
α-L-Arap: 4.94 (d, J = 4.7, H-1)
β-D-Glcp: 5.27 (d, J = 7.7, H-1)
β-D-Glcp′: 5.39 (d, J = 7.7, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	73.8	Ara-1	104.5	Glc-1	103.1
2	26.4	17	40.5	2	80.8	2	77.3
3	89.1	18	44.2	3	72.5	3	79.6

(*continued*)

Table 1 (continued)

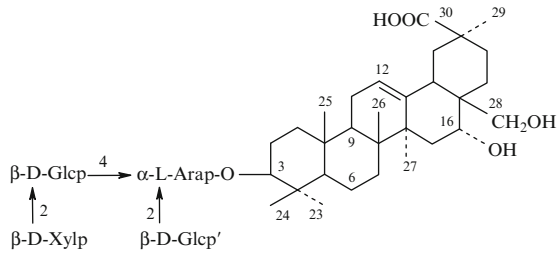
4	39.5	19	44.8	4	74.8	4	71.8
5	55.7	20	44.6	5	63.6	5	78.4
6	18.5	21	33.9	Glc′-1	105.5	6	62.6
7	33.2	22	32.6	2	76.4	Rha-1	101.5
8	40.1	23	27.4	3	78.3	2	72.4
9	47.1	24	16.6	4	71.8	3	72.7
10	36.9	25	15.5	5	78.1	4	74.7
11	23.8	26	17.0	6	62.9	5	69.4
12	122.5	27	27.4			6	18.9
13	145.1	28	70.9				
14	41.9	29	29.4				
15	34.9	30	180.5				

References

1. K. Koike, Z. Jia, S. Ohura, S. Mochida, T. Nikaido, Chem. Pharm. Bull. **47**, 434 (1999)

Ardisicrenoside H

CAS Registry Number: 222169-09-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α,28-Trihydroxy-olean-12-en-30-oic Acid

Biological source: *Ardisia crenata* [1]

$C_{52}H_{84}O_{23}$: 1076.540

$[\alpha]_D^{22}$ + 64.0° (c 0.16, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3414, 2929, 1680, 1074 [1]

MALDI-TOF-MS *m/z*: 1099 $[M + Na]^+$, 1115 $[M + K]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 0.96, 1.10, 1.23, 1.53, 1.90 (s, CH_3-25, 26, 24, 23, 29, 27), 3.17 (dd, J = 11.5, 4.0, H-3), 4.85 (brs, H-16), 5.63 (brt, H-12)

α-L-Arap: 4.79 (d, J = 5.9, H-1)

β-D-Xylp: 4.92 (d, J = 6.5, H-1)

β-D-Glcp: 5.51 (d, J = 7.5, H-1)

β-D-Glcp′: 5.02 (d, J = 7.7, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

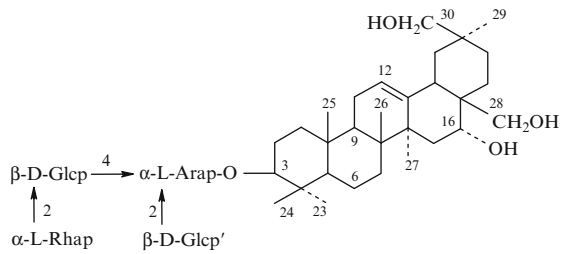
Table 1

C-1	38.8	C-16	73.8	Ara-1	104.7	Glc-1	104.3
2	26.4	17	40.5	2	79.8	2	85.5
3	88.9	18	44.2	3	73.3	3	77.6
4	39.6	19	44.8	4	78.7	4	71.9
5	55.9	20	44.6	5	64.3	5	78.4
6	18.4	21	33.9	Glc′-1	104.9	6	62.4
7	33.2	22	32.6	2	76.2	Xyl-1	107.7
8	40.1	23	28.1	3	78.2	2	76.1
9	47.1	24	16.9	4	71.2	3	77.9
10	36.9	25	15.7	5	78.0	4	70.9
11	23.8	26	17.1	6	63.0	5	67.5
12	122.8	27	26.4				
13	145.1	28	70.9				
14	41.9	29	29.4				
15	34.9	30	180.4				

References

1. K. Koike, Z. Jia, S. Ohura, S. Mochida, T. Nikaido, Chem. Pharm. Bull. **47**, 434 (1999)

Ardisimamilloside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α,28,30-Tetrahydroxy-olean-12-ene

Biological source: *Ardisia mamillata* [1]

$C_{53}H_{88}O_{22}$: 1076.576

$[\alpha]_D^{25}$ −28.5° (c 0.31, MeOH) [1]
HR-FAB-MS *m/z*: 1099.5696 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.72 (H-5), 0.85, 0.94, 1.04, 1.17, 1.33 (s, CH_3-25, 24, 26, 23, 29), 1.81 (s, CH_3-27), 2.62 (H-18), 3.16 (dd, J = 9.8, 4.2, H-3), 3.82 (s, H_2-28), 4.14, 4.31 (H_2-30), 4.95 (H-16)
α-L-Rhap: 6.42 (brs, H-1), 1.77 (d, J = 13.2, CH_3-6)
α-L-Arap: 4.94 (brs, H-1)
β-D-Glcp: 5.38 (d, J = 7.6, H-1)
β-D-Glcp: 5.26 (d, J = 7.5, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	73.8	Ara-1	104.4	Glc′-1	103.1
2	26.4	17	41.3	2	80.8	2	78.1
3	89.1	18	42.3	3	74.7	3	79.6
4	39.5	19	43.1	4	74.9	4	71.9
5	55.8	20	36.3	5	62.9	5	78.4
6	18.5	21	28.4	Glc-1	105.5	6	62.6
7	33.3	22	32.0	2	76.4	Rha-1	101.6
8	39.5	23	28.1	3	77.3	2	72.4
9	47.1	24	16.7	4	71.7	3	72.7
10	36.9	25	15.8	5	78.0	4	74.9
11	23.8	26	17.2	6	62.9	5	69.4
12	122.5	27	27.4			6	19.0
13	144.9	28	69.6				
14	42.1	29	28.2				
15	34.7	30	67.2				

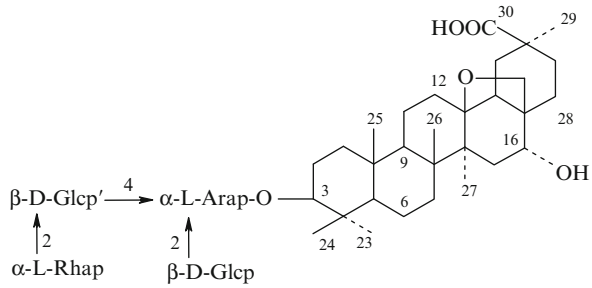
Pharm./Biol.: Roots have been traditionally (China) used to treat respiratory tract infections and menstrual disorders [1]

References

1. J. Huang, Y. Ogihara, H. Zhang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **48**, 1413 (2000)

Ardisimamilloside F

CAS Registry Number: 310396-66-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α-Dihydroxy-13β,28-epoxy-olean-30-oic Acid
Biological source: *Ardisia mamillata* [1]
$C_{53}H_{86}O_{23}$: 1090.555
$[\alpha]_D^{25}$ −18.6° (c 0.63, MeOH) [1]
HR-FAB-MS *m/z*: 1113.5450 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.65 (H-5), 0.84, 1.02, 1.17, 1.33, 1.54 (s, CH_3-25, 24, 23, 26, 29), 1.60 (s, CH_3-27), 2.62 (H-18), 3.15 (dd, J = 9.6, 4.2, H-3), 3.15, 3.29 (d, J = 7.3, H_2-28), 4.08 (m, H-16)
α-L-Rhap: 6.41 (brs, H-1), 1.81 (d, J = 13.2, CH_3-6)
α-L-Arap: 4.96 (brs, H-1)
β-D-Glcp: 5.37 (d, J = 7.6, H-1)
β-D-Glcp′: 5.23 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	76.4	Ara-1	104.4	Glc′-1	103.2
2	26.6	17	44.3	2	80.7	2	78.1
3	89.1	18	53.6	3	74.6	3	79.6
4	39.6	19	33.3	4	74.8	4	71.9
5	55.6	20	36.3	5	62.8	5	78.4
6	18.0	21	32.9	Glc-1	105.4	6	62.6
7	34.5	22	30.0	2	76.4	Rha-1	101.6

(*continued*)

Table 1 (continued)

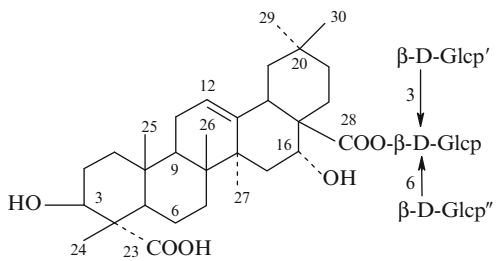
8	42.5	23	28.0	3	77.1	2	72.4
9	50.5	24	16.5	4	71.7	3	72.7
10	37.0	25	16.5	5	78.0	4	74.9
11	19.2	26	18.6	6	62.8	5	69.4
12	32.9	27	19.6			6	18.9
13	86.6	28	78.1				
14	44.6	29	29.4				
15	36.9	30	181.0				

Pharm./Biol.: Roots have been traditionally (China) used to treat respiratory tract infections and menstrual disorders [1]

References

1. J. Huang, Y. Ogihara, H. Zhang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **48**, 1413 (2000)

Sinocrassuloside I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α-Dihydroxy-olean-12-en-23,28-dioic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{48}H_{76}O_{21}$: 988.487

$[\alpha]_D^{26}$ + 17.6° (c 0.051, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 2936, 1752, 1654, 1459, 1381, 1265, 1064, 699, 511, 419 [1]

FAB-MS *m/z*: 989 $[M + H]^+$ and 1011 $[M + Na]^+$ [1]

HR-FAB-MS *m/z*: 989.4922 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.21, 1.63 (H_2-1), 1.93, 1.96 (H_2-2), 4.68 (dd, J = 10.5, 6.0, H-3), 2.02 (H-5), 1.50, 1.69 (H_2-6), 1.00, 1.29 (H_2-7), 1.94 (H-9), 2.04, 1.96 (H_2-11), 5.59 (brs, H-12), 1.65, 2.40 (H_2-15), 5.20 (brs, H-16), 3.47 (dd, J = 14.0, 4.0, H-18), 2.74 (t, J = 14.0, H-19), 1.32 (H-19), 1.22, 2.34 (H_2-21), 2.08, 2.32 (H_2-22), 1.63 (s, CH_3-24), 1.03 (s, CH_3-25), 1.12 (s, CH_3-26), 1.74 (s, CH_3-27), 0.91 (s, CH_3-29), 0.98 (s, CH_3-30); β-D-Glcp: 6.18 (d, J = 9.0, H-1), 4.04 (t, J = 9.0, H-2), 4.18 (H-3), 4.24 (H-4), 4.00 (H-5), 4.58 (d, J = 11.0, H-6), 4.24 (H-6); β-D-Glcp′: 5.22 (d, J = 7.5, H-1), 3.95 (H-2), 4.13 (H-3), 4.14 (H-4), 3.94 (H-5), 4.48 (dd, J = 11.5, 2.0, H-6), 4.25 (H-6); β-D-Glcp″: 4.98 (d, J = 7.5, H-1), 3.95 (H-2), 4.19 (H-3), 4.20 (H-4), 3.85 (H-5), 4.45 (dd, J = 12.0, 2.0, H-6), 4.33 (dd, J = 12.0, 5.0, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

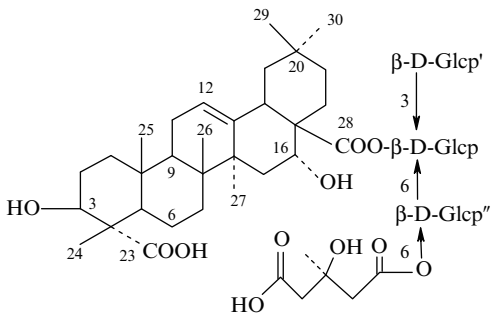
C-1	39.2	C-16	74.2	Glc-1	95.2	Glc″-1	105.3
2	27.9	17	49.0	2	72.7	2	75.4
3	75.5	18	41.3	3	88.4	3	78.3
4	54.5	19	47.1	4	69.0	4	71.6
5	52.1	20	30.8	5	77.6	5	78.4
6	21.8	21	35.9	6	68.9	6	62.6
7	33.3	22	32.3	Glc′-1	105.6		
8	40.5	23	180.6	2	75.1		
9	47.5	24	12.2	3	78.4		
10	36.9	25	16.3	4	71.6		
11	23.9	26	17.5	5	78.6		
12	122.6	27	27.2	6	62.4		
13	144.4	28	175.8				
14	42.1	29	33.1				
15	36.1	30	24.6				

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Sinocrassuloside II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α-Dihydroxy-olean-12-en-23,28-dioic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{54}H_{84}O_{25}$: 1132.530

$[\alpha]_D^{26}$ + 13.9° (c 0.074, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3422, 2935, 1736, 1718, 1702, 1214, 1164, 1074, 912, 512, 419 [1]

FAB-MS *m/z*: 1133 $[M + H]^+$ and 1155 $[M + Na]^+$ [1]

HR-FAB-MS *m/z*: 1133.5421 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.19, 1.63 (H_2-1), 1.92, 1.94 (H_2-2), 4.64 (dd, J = 10.0, 6.5, H-3), 1.99 (H-5), 1.46, 1.67 (H_2-6), 0.96, 1.27 (H_2-7), 1.93 (H-9), 2.01, 2.04 (H_2-11), 5.55 (brs, H-12), 1.63, 2.36 (H_2-15), 5.17 (brs, H-16), 3.44 (dd, J = 14.0, 4.0, H-18), 2.70 (t, J = 14.0, H-19), 1.29 (H-19), 1.21, 2.34 (H_2-21), 2.04, 2.29 (H_2-22), 1.60 (s, CH_3-24), 1.02 (s, CH_3-25), 1.08 (s, CH_3-26), 1.70 (s, CH_3-27), 0.89 (s, CH_3-29), 0.98 (s, CH_3-30); β-D-Glcp: 6.14 (d, J = 9.0, H-1), 3.99 (t, J = 9.0, H-2), 4.13 (t, J = 9.0, H-3), 4.23 (H-4), 3.98 (H-5), 4.59 (d, J = 10.5, H-6), 4.21 (H-6); β-D-Glcp′: 5.18 (d, J = 8.0, H-1), 3.92 (H-2), 4.09 (H-3), 4.08 (H-4), 3.91 (H-5), 4.44 (dd, J = 11.5, 2.5, H-6), 4.20 (H-6); β-D-Glcp″: 4.92 (d, J = 7.5, H-1), 3.92 (H-2), 4.11 (H-3), 3.95 (H-4), 3.92 (H-5), 4.68 (dd, J = 11.5, 6.0, H-6), 4.93 (d, J = 10.5, H-6); 3-Hydroxy-3-methyl-glutaryl group (HMG): 3.08 (d, J = 14.5, H-2), 3.11 (d, J = 14.5, H-2), 3.10 (d, J = 15.0, H-4), 3.15 (d, J = 15.0, H-4), 1.70 (s, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

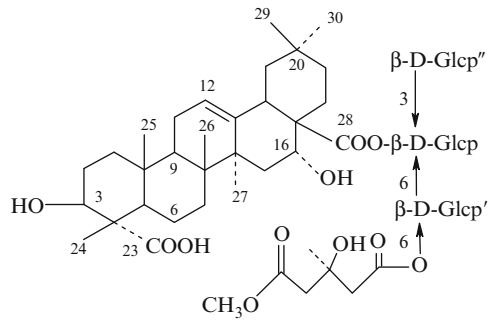
C-1	39.1	C-13	144.3	C-25	16.2	Glc-1	95.1	Glc″-1	105.1
2	27.8	14	42.0	26	17.4	2	72.5	2	74.9
3	75.3	15	36.0	27	27.1	3	88.5	3	78.0
4	54.4	16	74.1	28	175.7	4	68.9	4	71.5
5	52.0	17	49.0	29	33.1	5	77.5	5	75.1
6	21.7	18	41.2	30	24.6	6	68.7	6	64.6
7	33.2	19	47.1			Glc′-1	105.6	HMG-1	171.7
8	40.4	20	30.7			2	75.1	2	46.5
9	47.5	21	35.8			3	78.2	3	70.0
10	36.8	22	32.1			4	71.5	4	46.4
11	23.8	23	180.5			5	78.5	5	174.6
12	122.6	24	12.2			6	62.3	6	28.2

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Sinocrassuloside III



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16α-Dihydroxy-olean-12-en-23,28-dioic Acid
Biological source: *Sinocrassula asclepiadea* [1]
$C_{55}H_{86}O_{25}$: 1146.545
$[\alpha]_D^{26}$ + 30.4° (c 0.023, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3421, 2939, 1720, 1651, 1539, 1458, 1399, 1072, 520 [1]
FAB-MS *m/z*: 1147 $[M + H]^+$ and 1169 $[M + Na]^+$ [1]
HR-FAB-MS *m/z*: 1169.5352 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.21, 1.64 (H_2-1), 1.93, 1.96 (H_2-2), 4.68 (dd, J = 11.0, 6.0, H-3), 2.03 (H-5), 1.50, 1.70 (H_2-6), 1.00, 1.30 (H_2-7), 1.97 (H-9), 1.98, 2.04 (H_2-11), 5.58 (brs, H-12), 1.64, 2.41 (H_2-15), 5.19 (brs, H-16), 3.47 (dd, J = 13.5, 3.0, H-18), 2.74 (t, J = 13.5, H-19), 1.28 (H-19), 1.22, 2.37 (H_2-21), 2.10, 2.34 (H_2-22), 1.64 (s, CH_3-24), 1.05 (s, CH_3-25), 1.12 (s, CH_3-26), 1.74 (s, CH_3-27), 0.92 (s, CH_3-29), 1.01 (s, CH_3-30); β-D-Glcp: 6.18 (d, J = 9.0, H-1), 4.01 (t, J = 9.0, H-2), 4.17 (t, J = 9.0, H-3), 4.25 (t, J = 9.0, H-4), 4.00 (H-5), 4.61 (d, J = 10.5, H-6), 4.26 (H-6); β-D-Glcp′: 5.20 (d, J = 8.0, H-1), 3.96 (H-2), 4.12 (H-3), 4.12 (H-4), 3.92 (H-5), 4.47 (d, J = 10.0, H-6), 4.23 (H-6); β-D-Glcp″: 4.94 (d, J = 8.0, H-1), 3.94 (H-2), 4.14 (H-3), 3.98 (H-4), 3.95 (H-5), 4.71 (dd, J = 11.5, 6.0, H-6), 4.94 (d, J = 9.0, H-6); 3-Hydroxy-3-methyl-glutaryl group (HMG): 3.02 (brs, H-2), 3.06 (d, J = 14.5, H-4), 3.00 (d, J = 14.5, H-4), 1.65 (s, CH_3-6), 3.58 (s, OMe) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-13	144.3	C-25	16.3	Glc-1	95.1	Glc″-1	105.2
2	27.9	14	42.0	26	17.5	2	72.6	2	75.0
3	75.5	15	36.1	27	27.2	3	88.5	3	78.1
4	54.5	16	74.1	28	175.7	4	68.8	4	71.5
5	52.1	17	49.1	29	33.1	5	77.6	5	75.1
6	21.8	18	41.2	30	24.6	6	68.9	6	64.7
7	33.2	19	47.1			Glc′-1	105.7	HMG-1	171.9
8	40.4	20	30.8			2	75.4	2	46.3
9	47.5	21	35.9			3	78.3	3	69.9
10	36.9	22	32.2			4	71.6	4	46.6
11	23.9	23	180.6			5	78.6	5	171.6
12	122.7	24	12.3			6	62.4	6	28.2
								OMe	51.3

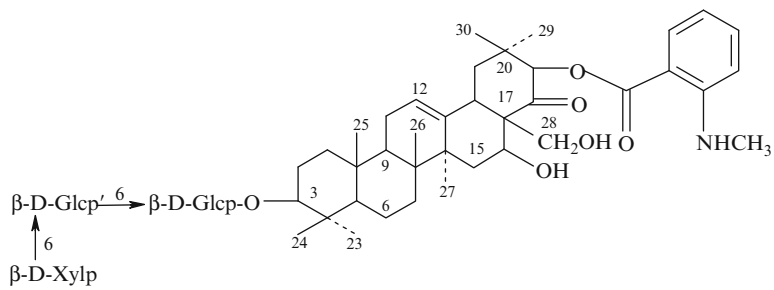
Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Sitakisoside VIII

CAS Registry Number: 164230-63-1
See Figure Sitakisoside VIII
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides



Sitakisoside VIII

of Aglycones of Oleanene Type – 3β,16β,21β,28-Tetrahydroxy-olean-12-en-22-one

Biological source: *Stephanotis lutchuensis* [1]

$C_{55}H_{84}NO_{20}$: 1078.558

$[\alpha]_D^{20}$ −8.0° (c 2.5, MeOH) [1]

UV λ_{max} nm (log ε): 224 (4.41), 254 (3.92), 349 (3.70) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1700, 1680 [1]

FAB-MS *m/z*: 1076 $[M-H]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 1.30, 1.01, 0.86, 0.95, 1.42, 1.22, 1.24 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 4.08, 4.75 (d, 11.0, H_2-28), 3.38 (dd, J = 12.0, 4.5, H-3), 5.44 (m, H-12), 5.16 (dd, J = 11.0, 4.8, H-16), 3.36 (dd, J = 12.0, 5.0, H-18), 6.20 (s, H-21); β-D-Glcp: 4.89 (d, J = 7.8, H-1); β-D-Glcp′: 5.07 (d, J = 7.8, H-1); β-D-Xylp: 4.96 (d, J = 7.8, H-1); Acyl part: 6.68 (dd, J = 7.8, 1.7, H-3), 7.44 (ddd, J = 7.8, 7.8, 1.7, H-4), 6.74 (ddd, J = 7.8, 7.8, 1.7, H-5), 8.35 (dd, J = 7.8, 1.7, H-6), 2.66 (d, J = 5.4, N-CH_3), 7.87 (q, J = 5.4, NH) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

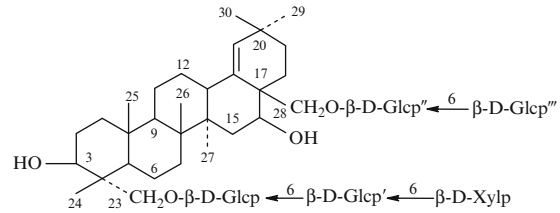
C-1	38.8	C-13	142.2	C-25	15.7	Glc-1	106.9	Xyl-1	106.0
2	26.7	14	43.7	26	16.9	2	75.0	2	74.9
3	89.0	15	36.5	27	26.8	3	78.4	3	78.1
4	39.6	16	68.6	28	60.3	4	71.6	4	71.2
5	55.8	17	59.3	29	28.5	5	77.0	5	67.1
6	18.4	18	44.0	30	20.1	6	70.4	Acyl-1	110.5
7	32.9	19	46.0			Glc″-1	105.4	2	152.6
8	40.1	20	39.2			2	75.6	3	111.4
9	47.0	21	81.3			3	78.5	4	135.3
10	36.8	22	206.6			4	71.6	5	114.8
11	23.9	23	28.2			5	77.0	6	132.2
12	123.9	24	17.1			6	69.9	7	168.0
								9	29.4

Pharm./Biol.: Complete suppression of the sensation of sweetness, induced by 0.2M sucrose [1]

References

1. K. Yoshikawa, H. Taninaka, Y. Kan, S. Arihara, Chem. Pharm. Bull. **42**(12), 2455 (1994)

Gymnemoside-f



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,16β,23,28-Tetrahydroxy-olean-18-ene

Biological source: *Gymnema sylvestre* [1]

$C_{59}H_{98}O_{28}$: 1254.624

Mp: 201.3–203.2°C (aq. MeOH) [1]

$[\alpha]_D^{26}$ − 8.9° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3431, 1044 [1]

FAB-MS (negative ion mode) *m/z*: 1253.6167 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1277 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.76, 0.87, 0.96, 0.99, 1.06, 1.08 (s, CH_3-27, 25, 24, 29, 30, 26), 1.72 (m), 2.34 (dd-like, H_2-15), 1.92, 2.45 (m, H_2-22), 2.55 (dd-like, H-13), 3.82 (m, H-16), 3.90 (m, H_2-28), 4.15 (m, H_2-23), 4.19 (m, H-3), 4.82 (d, J = 7.6, H-1 of Glc″), 4.86 (d, J = 7.9, H-1 of Glc), 4.92 (d, J = 7.3, H-1 of Xyl), 4.99 (d, J = 7.6, H-1 of Glc′), 5.00 (d, J = 7.9, H-1 of Glc‴), 5.25 (brs, H-19) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	75.9	Glc-1	104.9	Glc″-1	105.7
2	27.5	17	44.4	2	75.0	2	74.6
3	73.0	18	139.5	3	78.5	3	78.4
4	42.9	19	133.7	4	71.7	4	71.5
5	48.9	20	32.1	5	76.9	5	77.0
6	18.4	21	33.4	6	70.0	6	69.9
7	34.7	22	28.7	Glc′-1	105.0	Glc‴-1	105.1
8	42.9	23	74.5	2	74.9	2	75.1
9	50.8	24	12.9	3	78.2	3	78.2
10	37.2	25	17.2	4	71.5	4	71.6
11	21.1	26	16.3	5	76.9	5	78.1
12	26.3	27	16.0	6	70.0	6	62.7
13	38.9	28	74.6	Xyl-1	105.7		

(*continued*)

Table 1 (continued)

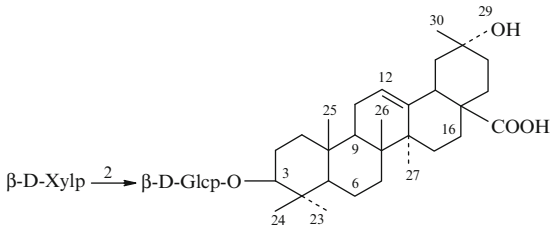
14	41.0	29	29.9	2	74.7
15	38.3	30	30.4	3	77.9
				4	71.0
				5	66.9

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, Chem. Pharm. Bull. **45**(12), 2034 (1997)

Fargoside A

CAS Registry Number: 365541-51-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,20α-Dihydroxy-29-nor-olean-12-en-28-oic Acid

Biological source: *Holboellia fargesii* [1]

$C_{40}H_{64}O_{13}$: 752.434

$[\alpha]_D^{25}$ + 24.4° (c 1.0, MeOH) [1]

MALDI-TOF-MS *m/z*: 775 $[M + Na]^+$, 791 $[M + K]^+$ [1]

HR-FAB-MS (negative ion) *m/z*: 751.4263 $[M-H]^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3423, 2925, 1685, 1466, 1388, 1202, 1045 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.32 (dd, J = 11.9, 4.1, H-3), 0.74 (d, J = 11.0, H-5), 5.54 (brt, 3.2, H-12), 3.36 (dd, J = 13.7, 4.1, H-18), 1.31 (s, CH_3-23), 1.10, 0.84, 1.00, 1.28, 1.58 (s, CH_3-24, 25, 26, 27, 30)

β-D-Glcp: 4.92 (d, J = 7.8, H-1), 4.15 (H-2), 4.31 (t, J = 8.7, H-3), 4.17 (H-4), 3.93 (m, H-5), 4.35 (dd, J = 12.0, 6.5, H-6), 4.54 (dd, J = 12.0, 2.0, H-6)

β-D-Xylp: 5.27 (d, J = 6.9, H-1), 4.12 (H-2), 4.13 (H-3), 4.24 (m, H-4), 3.70 (dd, J = 11.0, 10.5, H-5), 4.39 (dd, J = 11.0, 5.0, H_2-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

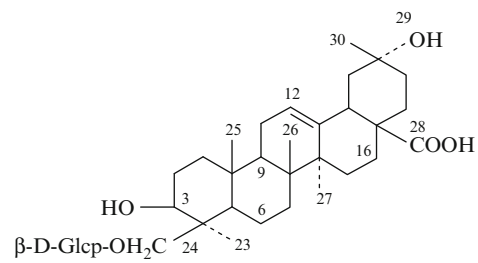
C-1	38.8	C-16	23.8	Glc-1	105.0
2	26.7	17	46.8	2	84.0
3	89.1	18	44.4	3	78.5
4	39.6	19	48.1	4	71.7
5	55.9	20	69.9	5	78.1
6	18.5	21	36.2	6	62.9
7	33.2	22	35.2	Xyl-1	107.0
8	39.8	23	27.9	2	76.6
9	48.0	24	16.5	3	78.2
10	37.0	25	15.5	4	71.1
11	23.9	26	17.4	5	67.6
12	122.7	27	26.1		
13	144.4	28	180.0		
14	42.2	29			
15	28.3	30	25.7		

References

1. H. Fu, K. Koike, Q. Zheng, K.-S. Mitsunaga, Z. Jia, T. Nikaido, W. Lin, D. Guo, L. Zhang, Chem. Pharm. Bull. **49**(8), 999 (2001)

Eupteleasaponin VIII

CAS Registry Number: 354802-18-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,20α-Dihydroxy-29-nor-olean-12-en-28-oic Acid

Biological source: *Euptelea polyandra* [1]
$C_{35}H_{56}O_{10}$: 636.387
Mp: 199–201°C [1]
$[\alpha]_D^{26}$ + 73.9° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1709, 1078 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.83, 0.92, 1.22, 1.36, 1.38 (s, CH_3-25, 26, 27, 23, 30), 3.32 (m, H-18), 3.51 (dd-like, H-3), 4.30, 4.48 (m, H_2-24), 5.51 (brs, H-12)
β-D-Glcp: 4.90 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	23.7	Glc-1	105.6
2	28.1	17	46.6	2	75.0
3	79.4	18	44.2	3	78.2
4	43.0	19	47.8	4	71.5
5	56.6	20	69.8	5	78.3
6	19.2	21	35.9	6	61.5
7	33.4	22	34.9		
8	39.6	23	23.3		
9	48.0	24	73.2		
10	37.0	25	15.6		
11	23.8	26	17.0		
12	122.4	27	25.8		
13	144.1	28	179.8		
14	41.9	29	-		
15	28.2	30	25.4		

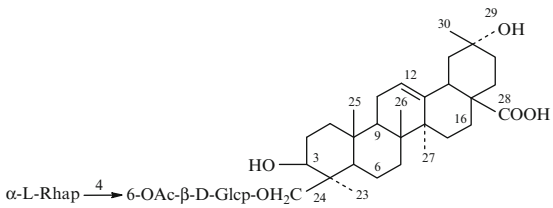
Pharm./Biol.: Gastroprotective activity [1]

References

1. T. Murakami, H. Ominami, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 741 (2001)

Eupteleasaponin IX

CAS Registry Number: 290809-42-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,20α-Dihydroxy-29-nor-olean-12-en-28-oic Acid
Biological source: *Euptelea polyandra* [1]
$C_{43}H_{68}O_{15}$: 824.455
Mp: 221–225°C [1]
$[\alpha]_D^{26}$ + 34.9° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1730, 1042 [1]
HR-FAB-MS (positive ion) *m/z*: 825.4637 $(M + H)^+$, 847 $(M + Na)^+$ [1]
FAB-MS (negative ion mode) *m/z*: 823 $(M-H)^-$, 781 $(M-C_2H_3O)^-$, 677 $(M-C_6H_{11}O_4)^-$, 635 $(C_8H_{13}O_5)^-$, 473 $(M-C_{14}H_{23}O_9)^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.91, 0.97, 1.22, 1.48, 1.56 (s, CH_3-25, 26, 27, 23, 30), 1.89 (s, Ac-2), 3.32 (dd-like, H-18), 3.51 (dd, J = 5.3, 10.2, H-3), 4.55, 4.62 (m, H_2-24), 5.51 (brs, H-12)
β-D-Glcp: 4.79 (d, J = 7.6, H-1)
α-L-Rhap: 5.52 (brs, H-1), 1.66 (d, J = 5.9, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	23.9	Glc-1	105.2
2	28.3	17	46.8	2	75.1
3	79.3	18	44.4	3	76.5
4	43.2	19	48.1	4	79.2
5	56.7	20	70.0	5	73.7
6	19.6	21	36.2	6	63.6
7	33.6	22	35.1	Rha-1	102.8
8	39.8	23	28.5	2	72.3
9	48.2	24	73.0	3	72.6
10	37.3	25	15.7	4	73.7
11	23.9	26	17.2	5	70.7
12	122.7	27	26.0	6	18.4
13	144.3	28	179.9		
14	42.1	29	-	Ac-1	170.5
15	28.4	30	25.7	2	20.6

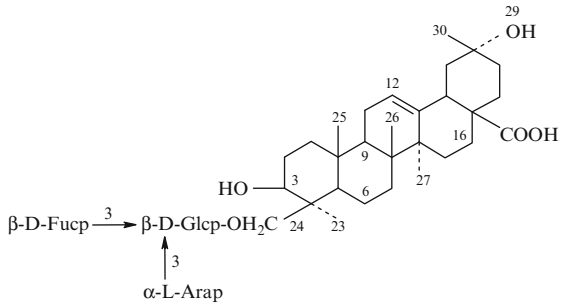
Pharm./Biol.: Gastroprotective activity [1]

References

1. T. Murakami, H. Ominami, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 741 (2001)

Fargoside B

CAS Registry Number: 365541-52-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,20α-Dihydroxy-29-nor-olean-12-en-28-oic Acid

Biological source: *Holboellia fargesii* [1]

$C_{46}H_{74}O_{18}$: 914.487

$[\alpha]_D^{22}$ + 39.6° (c 1.0, MeOH) [1]

MALDI-TOF-MS *m/z*: 937 $[M + Na]^+$, 953 $[M + K]^+$ [1]

HR-FAB-MS (negative ion) *m/z*: 913.4787 $[M-H]^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3414, 2930, 1689, 1459, 1380, 1165, 1061 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.35 (H-3), 0.83 (d, J = 12.6, H-5), 5.53 (brt, J = 3.3, H-12), 3.35 (H-18), 1.46 (s, CH_3-23), 4.12 (H_2-24), 0.71, 0.90, 1.20, 1.58 (s, CH_3-25, 26, 27, 30)

β-D-Glcp: 4.80 (d, J = 7.4, H-1), 4.23 (H-2), 4.21 (H-3), 4.09 (H-4), 3.82 (m, H-5), 4.28, 4.44 (dd, J = 10.4, 1.6, H_2-6)

β-D-Fucp: 5.50 (d, J = 7.5, H-1), 4.32 (dd, J = 9.7, 7.5, H-2), 3.96 (dd, J = 9.7, 3.0, H-3), 3.91 (d, J = 3.0, H-4), 3.66 (q, J = 6.4, H-5), 1.51 (d, J = 6.4, CH_3-6)

α-L-Arap: 5.21 (d, J = 7.5, H-1), 4.47 (dd, J = 8.2, 7.5, H-2), 4.11 (H-3), 4.25 (H-4), 3.77 (brd, J = 10.3, H-5), 4.26 (H-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

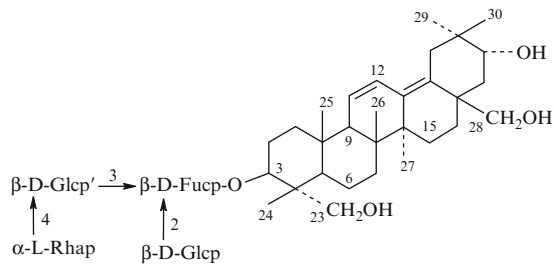
C-1	38.8	C-16	24.0	Glc-1	103.5	Ara-1	105.5
2	28.1	17	46.8	2	77.3	2	73.0
3	79.9	18	44.4	3	87.0	3	74.8
4	42.7	19	48.1	4	69.5	4	69.7
5	56.6	20	69.9	5	78.4	5	67.8
6	19.0	21	36.2	6	62.2		
7	33.5	22	35.1	Fuc-1	103.2		
8	39.7	23	23.3	2	73.5		
9	48.0	24	73.2	3	76.0		
10	37.1	25	15.9	4	73.5		
11	23.8	26	17.3	5	71.2		
12	122.5	27	25.9	6	17.1		
13	144.3	28	179.9				
14	42.1	29					
15	28.1	30	25.7				

References

1. H. Fu, K. Koike, Q. Zheng, K.-S. Mitsunaga, Z. Jia, T. Nikaido, W. Lin, D. Guo, L. Zhang, Chem. Pharm. Bull. **49**(8), 999 (2001)

Scrophulasaponin III

CAS Registry Number: 155762-35-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,21α,23,28-Tetrahydroxy-olean-11,13(18)-diene

Biological source: *Scrophularia kakudensis* [1]

$C_{54}H_{88}O_{22}$: 1088.576

$[\alpha]_D^{25}$ −9.7° (c 0.98, MeOH) [1]

FAB-MS *m/z*: 1112 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.17 (dd, J = 12.0, 5.0, H-3), 5.72 (brd, J = 10.0, H-11), 6.65 (brd, J = 10.0, H-12), 3.72, 4.38 (d, J = 11.0, H_2-23), 0.83, 0.98, 1.05, 1.07, 1.11, 1.29 (CH_3 × 6)

β-D-Fucp: 4.94 (d, J = 8.0, H-1), 4.66 (brt, J = 8.5, H-2), 4.08 (dd, J = 9.0, 3.0, H-3), 4.16 (H-4), 3.63 (m, H-5), 1.42 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.58 (d, J = 8.0, H-1)
β-D-Glcp′: 5.25 (d, J = 8.0, H-1), 3.92 (t, J = 8.5, H-2), 4.16 (t, J = 8.5, H-3), 4.37 (t, J = 9.0, H-4), 3.75 (m, H-5), 4.10, 4.18 (H_2-6)
α-L-Rhap: 5.82 (brs, H-1), 1.73 (d, J = 6.5, CH_3-6) [1]
^{13}C NMR (67.80 MHz, C_5D_5N): [1]

Table 1

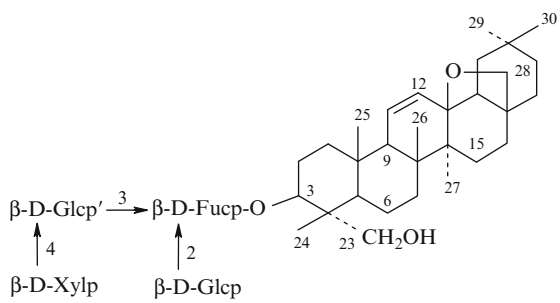
C-1	38.4	C-16	24.6	Fuc-1	104.2	Glc′-1	105.1
2	26.1	17	42.6	2	77.2	2	75.6
3	82.8	18	134.8	3	84.8	3	76.5
4	42.7	19	38.3	4	72.1	4	78.5
5	47.9	20	38.3	5	70.5	5	77.3
6	18.4	21	72.9	6	17.2	6	61.4
7	32.5	22	41.4	Glc-1	104.1	Rha-1	102.8
8	40.6	23	64.8	2	76.3	2	72.6
9	54.9	24	12.8	3	78.9	3	72.8
10	36.6	25	18.8	4	72.3	4	74.0
11	126.8	26	17.0	5	77.6	5	70.4
12	126.0	27	20.8	6	63.2	6	18.6
13	136.8	28	64.3				
14	43.8	29	18.1				
15	29.6	30	29.2				

References

1. A. Yamamoto, T. Miyase, A. Ueno, T. Maeda, Chem. Pharm. Bull. **41**(10), 1780 (1993)

Scrophulasaponin II

CAS Registry Number: 155762-34-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,23-Dihydroxy-olean-11-en-13,28-epoxyd
Biological source: *Scrophularia kakudensis* [1]
$C_{53}H_{86}O_{21}$: 1058.566
$[\alpha]_D^{25}$ + 44.9° (c 1.07, MeOH) [1]
FAB-MS *m/z*: 1082 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.12 (dd, J = 12.0, 5.0, H-3), 5.94 (brd, J = 10.0, H-11), 5.53 (dd, J = 10.0, 3.0, H-12), 3.72, 4.36 (d, J = 11.0, H_2-23), 3.32, 3.71 (brd, J = 7.0, H_2-28), 0.82, 0.92, 0.97, 0.97, 1.07, 1.33 (CH_3 × 6)
β-D-Fucp: 4.90 (d, J = 8.0, H-1), 4.66 (dd, J = 9.5, 8.0, H-2), 4.03 (dd, J = 9.5, 3.0, H-3), 3.60 (m, H-5), 1.39 (d, J = 6.5, CH_3-6)
β-D-Glcp: 5.57 (d, J = 8.0, H-1)
β-D-Glcp′: 5.24 (d, J = 8.0, H-1), 4.00 (t, J = 8.5, H-2), 4.21 (t, J = 8.5, H-3), 4.28 (t, J = 9.0, H-4), 3.89 (m, H-5), 4.49 (dd, J = 12.0, 3.0, H_2-6)
β-D-Xylp: 5.10 (d, J = 8.0, H-1) [1]
^{13}C NMR (67.80 MHz, C_5D_5N): [1]

Table 1

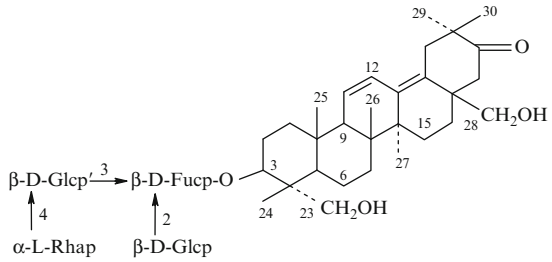
C-1	38.7	C-16	26.0	Fuc-1	104.1	Glc′-1	105.0
2	25.7	17	42.0	2	77.0	2	75.1
3	82.6	18	51.5	3	85.0	3	76.3
4	43.8	19	37.4	4	72.1	4	80.8
5	47.9	20	31.7	5	70.5	5	76.6
6	17.7	21	35.1	6	17.2	6	61.7
7	31.5	22	31.1	Glc-1	104.1	Xyl-1	105.5
8	41.7	23	64.7	2	76.3	2	74.9
9	53.7	24	12.7	3	78.8	3	78.4
10	36.3	25	18.8	4	72.2	4	70.8
11	132.0	26	19.6	5	77.5	5	67.4
12	131.7	27	19.9	6	63.2		
13	84.9	28	77.2				
14	44.2	29	33.6				
15	25.9	30	23.6				

References

1. A. Yamamoto, T. Miyase, A. Ueno, T. Maeda, Chem. Pharm. Bull. **41**(10), 1780 (1993)

Scrophulasaponin IV

CAS Registry Number: 155739-96-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 3β,23,28-Trihydroxy-olean-11,13(18)-dien-16-one

Biological source: *Scrophularia kakudensis* [1]

$C_{54}H_{86}O_{22}$: 1086.561

$[\alpha]_D^{25}$ + 27.1° (c 1.67, MeOH) [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.17 (dd, J = 12.0, 5.0, H-3), 5.76 (brd, J = 10.0, H-11), 6.59 (dd, J = 10.0, 3.0, H-12), 3.73, 4.39 (d, J = 11.0, H_2-23), 3.79, 3.88 (d, J = 11.0, H_2-28), 0.80, 0.96, 1.02, 1.06, 1.14, 1.19 (CH_3 × 6)

β-D-Fucp: 4.92 (d, J = 8.0, H-1), 4.66 (brt, J = 8.5, H-2), 4.06 (dd, J = 9.0, 3.0, H-3), 4.16 (H-4), 3.62 (m, H-5), 1.42 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.58 (d, J = 8.0, H-1)

β-D-Glcp′: 5.25 (d, J = 8.0, H-1), 3.93 (t, J = 8.5, H-2), 4.16 (t, J = 8.5, H-3), 3.8 (t, J = 9.0, H-4), 3.74 (m, H-5), 4.10, 4.18 (H_2-6)

α-L-Rhap: 5.82 (brs, H-1), 1.72 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (67.80 MHz, C_5D_5N): [1]

Table 1

C-1	38.4	C-16	25.2	Fuc-1	104.2	Glc′-1	105.0
2	26.1	17	45.0	2	77.3	2	75.6
3	82.6	18	132.5	3	84.8	3	76.5
4	42.7	19	39.6	4	72.1	4	78.5
5	47.8	20	46.2	5	70.5	5	77.3
6	18.3	21	214.9	6	17.2	6	61.4
7	31.3	22	48.2	Glc-1	104.0	Rha-1	102.8
8	40.7	23	64.7	2	76.3	2	72.6
9	54.9	24	12.8	3	78.9	3	72.8
10	36.6	25	18.8	4	72.3	4	74.0
11	128.0	26	17.0	5	77.5	5	70.4
12	125.5	27	20.8	6	63.2	6	18.5
13	137.9	28	67.5				
14	43.8	29	25.0				
15	29.2	30	25.2				

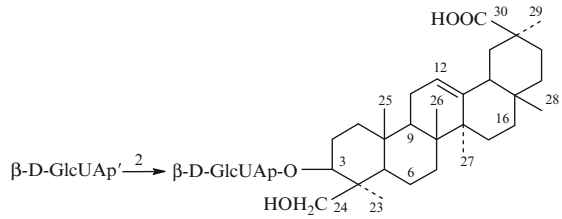
(*continued*)

References

1. A. Yamamoto, T. Miyase, A. Ueno, T. Maeda, Chem. Pharm. Bull. **41**(10), 1780 (1993)

Licorice-Saponin J2

CAS Registry Number: 134250-13-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11-Deoxo-24-hydroxy-glycyrrhetic Acid

Biological source: *Glycyrrhiza uralensis* [1]

$C_{42}H_{64}O_{16}$: 824.419

Mp: 263–265°C [1]

$[\alpha]_D^{25}$ + 21° (MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3405, 1729, 1615 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 5.00 (d, J = 7.6, H-1 of GlcUA), 5.65 (d, J = 7.0, H-1 of GlcUA′) [1]

^{13}C NMR (22.5 MHz, C_5D_5N) (for methyl derivate): [1]

Table 1

C-3	89.8	GlcUA-1	104.0	GlcUA′-1	104.7
11	47.5	2	81.1	2	76.6
12	122.2	3	76.3	3	77.0

(*continued*)

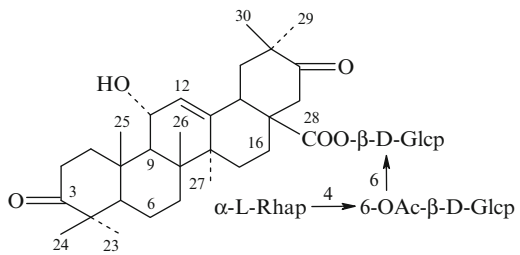
Table 1 (continued)

13	144.3	4	72.1	4	72.1
18	48.2	5	77.4	5	77.4
22	36.2	6	169.6	6	169.6
24	62.8				
29	28.1				
30	177.0				

References

1. I. Kitagawa, J.L. Zhou, M. Sakagami, E. Uchida, M. Yoshikawa, Chem. Pharm. Bull. **39**(1), 244 (1991)

Papyrioside LA



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Hydroxy-3,21-dioxo-olean-12-en-28-oic Acid

Biological source: *Tetrapanax papyriferum* [1]

$C_{50}H_{76}O_{20}$: 996.492

$[\alpha]_D^{27}$ −21.5° (c 4.7, MeOH) [1]

FAB-MS *m*/*z*: 1020 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.19, 1.09, 1.22, 1.18, 1.28, 1.16, 1.05 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.64 (brd, H-18), 4.57 (dd, J = 3.7, 9.2, H-11), 5.89 (d, J = 3.7, H-12).

β-D-Glcp: 6.23 (d, J = 7.9, H-1), 4.11 (H-2), 4.22 (t, J = 8.5, H-3), 4.26 (brd, H-4), 4.14 (m, H-5), 4.34 (H-6), 4.73 (brd, H-6)

β-D-Glcp′: 4.97 (d, J = 7.9, H-1), 3.95 (t, J = 7.9, H-2), 4.11 (H-3), 4.09 (H-4), 3.80 (t, J = 4.9, H-5), 4.54 (brd, H-6), 4.62 (H-6), 1.93 (s, CH_3OCO)

α-L-Rhap: 5.53 (brs, H-1), 4.63 (H-2), 4.51 (dd, J = 3.1, 9.2, H-3), 4.33 (t, J = 9.2, H-4), 4.85 (m, H-5), 1.71 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

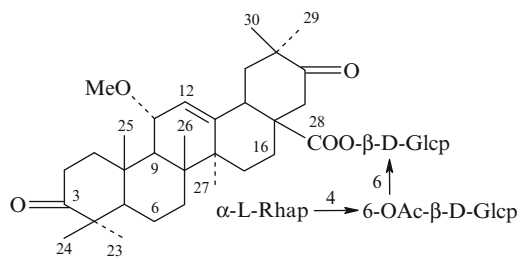
Table 1

C-1	34.6	C-16	25.7	Glc-1	96.0	Rha-1	102.8
2	41.5	17	45.3	2	76.2	2	72.3
3	216.6	18	40.7	3	78.5	3	72.5
4	47.7	19	46.7	4	70.7	4	73.7
5	55.8	20	50.8	5	78.0	5	70.6
6	19.9	21	212.2	6	69.4	6	18.4
7	33.2	22	46.2	Glc′-1	104.8		
8	38.0	23	26.6	2	74.9		
9	54.9	24	21.5	3	73.7		
10	43.2	25	16.2	4	79.1		
11	66.8	26	18.7	5	73.6		
12	129.4	27	25.6	6	63.5		
13	142.9	28	173.8	Ac-1	170.5		
14	42.1	29	24.4	2	20.5		
15	28.0	30	25.0				

References

1. K. Kojima, I. Saracoglu, M. Mutsuga, Y. Ogihara, Chem. Pharm. Bull. **44**(11), 2107 (1996)

Papyrioside LB



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Hydroxy-3,21-dioxo-olean-12-en-28-oic Acid

Biological source: *Tetrapanax papyriferum* [1]

$C_{51}H_{78}O_{20}$: 1010.508

$[\alpha]_D^{27}$ −23.9° (c 2.3, MeOH) [1]

FAB-MS *m/z*: 1034 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.17, 1.07, 1.12, 1.12, 1.25, 1.23, 1.10 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.71 (dd, J = 4.3, 14.0, H-18), 3.93 (dd, J = 3.7, 8.6, H-11), 5.86 (d, J = 3.7, H-12), 3.27 (OMe)

β-D-Glcp: 6.25 (d, J = 7.9, H-1), 4.10 (H-2), 4.22 (t, J = 9.2, H-3), 4.28 (brd, H-4), 4.14 (H-5), 4.34 (H-6), 4.71 (brd, H-6)

β-D-Glcp′: 4.95 (d, J = 7.9, H-1), 3.95 (t, J = 7.9, H-2), 4.10 (H-3), 4.10 (H-4), 3.81 (t, J = 4.9, H-5), 4.54 (brd, H-6), 4.62 (H-6), 1.93 (s, CH_3OCO)

α-L-Rhap: 5.54 (brs, H-1), 4.62 (H-2), 4.50 (H-3), 4.32 (H-4), 4.85 (m, H-5), 1.71 (d, J = 6.7, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

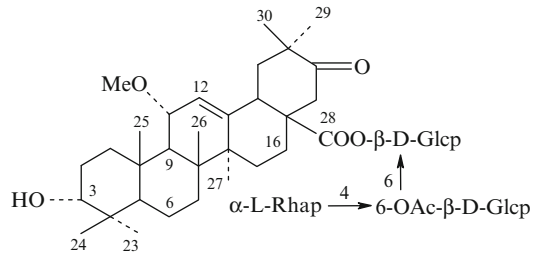
Table 1

C-1	34.6	C-16	25.6	Glc-1	96.1	Rha-1	102.9
2	40.5	17	45.5	2	76.3	2	72.3
3	216.3	18	40.9	3	78.6	3	72.6
4	47.7	19	47.2	4	70.8	4	73.7
5	55.5	20	50.9	5	78.0	5	70.7
6	19.9	21	212.0	6	69.6	6	18.5
7	32.9	22	46.2	Glc′-1	105.0		
8	38.1	23	26.5	2	75.0		
9	51.2	24	21.5	3	73.7		
10	43.1	25	16.5	4	79.2		
11	76.1	26	18.9	5	73.7		
12	123.0	27	25.3	6	63.6		
13	146.0	28	173.9	Ac-1	170.5		
14	42.1	29	24.6	2	20.6		
15	28.1	30	25.0				
		OMe	54.4				

References

1. K. Kojima, I. Saracoglu, M. Mutsuga, Y. Ogihara, Chem. Pharm. Bull. **44**(11), 2107 (1996)

Papyrioside LC



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Hydroxy-3,21-dioxo-olean-12-en-28-oic Acid

Biological source: *Tetrapanax papyriferum* [1]

$C_{51}H_{80}O_{20}$: 1012.524

$[\alpha]_D^{27}$ –34.1° (c 1.6, MeOH) [1]

FAB-MS *m/z*: 1036 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.23, 0.94, 1.12, 1.13, 1.18, 1.21, 1.05 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.63 (brs, H-3), 3.69 (brd, H-18), 3.87 (dd, J = 3.7, 8.5, H-11), 5.85 (d, J = 4.3, H-12), 3.29 (OMe)

β-D-Glcp: 6.24 (d, J = 8.5, H-1), 4.10 (H-2), 4.22 (t, J = 9.2, H-3), 4.27 (brd, H-4), 4.14 (m, H-5), 4.34 (H-6), 4.71 (brd, H-6)

β-D-Glcp′: 4.95 (d, J = 7.9, H-1), 3.95 (t, J = 7.9, H-2), 4.10 (H-3), 4.08 (H-4), 3.80 (t, J = 4.9, H-5), 4.54 (brd, H-6), 4.62 (H-6), 1.93 (s, CH_3OCO)

α-L-Rhap: 5.53 (brs, H-1), 4.62 (H-2), 4.50 (dd, J = 3.7, 9.2, H-3), 4.33 (t, J = 9.3, H-4), 4.85 (m, H-5), 1.71 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	34.5	C-16	25.6	Glc-1	96.1	Rha-1	102.9
2	26.5	17	45.5	2	76.3	2	72.4
3	75.3	18	40.7	3	78.7	3	72.7
4	38.9	19	47.5	4	70.9	4	73.8
5	49.2	20	50.8	5	78.1	5	70.7
6	18.8	21	212.2	6	69.7	6	18.5
7	33.4	22	46.4	Glc′-1	105.0		
8	38.1	23	29.5	2	75.0		
9	53.6	24	22.7	3	73.8		
10	43.6	25	17.4	4	79.2		
11	76.0	26	19.3	5	73.8		

(*continued*)

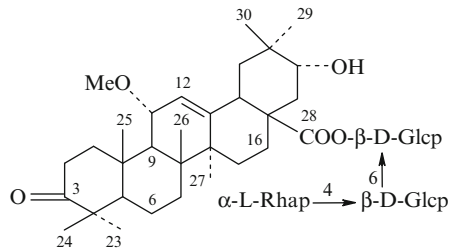
Table 1 (continued)

12	123.8	27	25.5	6	63.7
13	146.4	28	174.0	Ac-1	170.6
14	42.1	29	24.7	2	20.6
15	28.2	30	25.0		
		OMe	54.6		

References

1. K. Kojima, I. Saracoglu, M. Mutsuga, Y. Ogihara, Chem. Pharm. Bull. **44**(11), 2107 (1996)

Papyrioside LD



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Hydroxy-3,21-dioxo-olean-12-en-28-oic Acid

Biological source: *Tetrapanax papyriferum* [1]

$C_{49}H_{78}O_{19}$: 970.513

$[\alpha]_D^{27}$–24.5° (c 0.7, MeOH) [1]

FAB-MS *m/z*: 994 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.16, 1.08, 1.14, 1.19, 1.40, 1.17, 1.03 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.48 (dd, J = 4.3, 14.0, H-18), 3.70 (d, J = 3.7, H-21), 3.96 (dd, J = 3.7, 8.5, H-11), 5.79 (d, J = 3.7, H-12), 3.26 (OMe)

β-D-Glcp: 6.31 (d, J = 7.9, H-1), 4.14 (dd, J = 4.3, 9.2, H-2), 4.22 (t, J = 8.5, H-3), 4.29 (brd, H-4), 4.13 (H-5), 4.41 (m, H-6), 4.70 (brd, H-6)

β-D-Glcp′: 4.98 (d, J = 7.9, H-1), 3.95 (t, J = 7.9, H-2), 4.13 (H-3), 4.41 (t, J = 9.2, H-4), 3.67 (brd, H-5), 4.11 (H-6), 4.21 (m, H-6)

α-L-Rhap: 5.84 (brs, H-1), 4.67 (brd, H-2), 4.55 (brd, H-3), 4.32 (H-4), 4.96 (m, H-5), 1.71 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

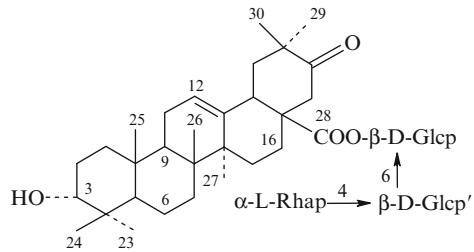
C-1	34.7	C-16	26.9	Glc-1	95.8	Rha-1	102.7
2	40.6	17	47.3	2	76.5	2	72.6
3	216.5	18	41.6	3	78.8	3	72.8
4	47.8	19	41.1	4	70.9	4	74.0
5	55.7	20	35.8	5	78.1	5	70.4
6	20.0	21	73.4	6	69.3	6	18.5
7	33.2	22	39.5	Glc′-1	105.0		
8	38.2	23	26.7	2	75.3		
9	50.0	24	21.6	3	73.9		
10	43.0	25	16.6	4	78.3		
11	76.3	26	19.1	5	77.2		
12	122.5	27	24.9	6	61.3		
13	149.4	28	176.6				
14	42.8	29	28.4				
15	28.8	30	24.9				
		OMe	54.1				

References

1. K. Kojima, I. Saracoglu, M. Mutsuga, Y. Ogihara, Chem. Pharm. Bull. **44**(11), 2107 (1996)

Papyrioside LE

CAS Registry Number: 189307-16-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Hydroxy-3,21-dioxo-olean-12-en-28-oic Acid

Biological source: *Tetrapanax papyriferum* [1]

$C_{48}H_{76}O_{18}$: 940.503

$[\alpha]_D^{25}$ −25.7° (c 1.0, MeOH) [1]

HR-FAB-MS *m/z*: 964.965 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.20, 0.90, 0.98, 1.11, 1.06, 1.21, 1.09 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.61 (H-3), 2.00 (brd, J = 10.0, H-11), 5.63 (d, J = 4.0, H-12), 3.61 (H-18)

β-D-Glcp: 6.22 (d, J = 9.0, H-1), 4.13 (H-2), 4.21 (t, J = 9.0, H-3), 4.32 (H-4), 4.13 (H-5), 4.31 (H-6), 4.68 (brd, J = 10.0, H-6)

β-D-Glcp′: 4.96 (d, J = 8.0, H-1), 3.94 (t, J = 8.0, H-2), 4.11 (H-3), 4.39 (t, J = 9.0, H-4), 3.66 (brd, H-5), 4.10, 4.19 (H_2-6)

α-L-Rhap: 5.84 (brs, H-1), 4.67 (H-2), 4.55 (brd, H-3), 4.30 (dd, J = 6.0, 11.0, H-4), 4.96 (H-5), 1.71 (d, J = 7.0, CH_3-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

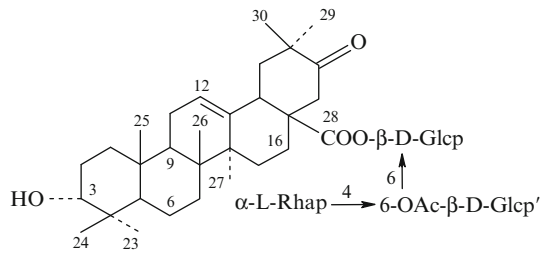
C-1	33.6	C-16	25.9	Glc-1	96.1	Rha-1	102.8
2	26.3	17	45.5	2	76.5	2	72.6
3	75.3	18	41.3	3	78.6	3	72.8
4	40.1	19	47.5	4	70.9	4	74.0
5	49.3	20	51.1	5	78.1	5	70.4
6	18.6	21	212.5	6	69.5	6	18.5
7	33.1	22	46.5	Glc′-1	105.1		
8	37.9	23	29.3	2	75.2		
9	47.9	24	22.7	3	73.7		
10	37.5	25	15.6	4	78.4		
11	23.8	26	17.5	5	77.2		
12	124.4	27	26.0	6	61.4		
13	141.9	28	174.0				
14	41.9	29	24.6				
15	28.1	30	25.2				

References

1. M. Mutsuga, K. Kojima, I. Saracoglu, Y. Ogihara, Chem. Pharm. Bull. **45**(3), 552 (1997)

Papyrioside LF

CAS Registry Number: 189307-17-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Hydroxy-3,21-dioxo-olean-12-en-28-oic Acid

Biological source: *Tetrapanax papyriferum* [1]

$C_{50}H_{78}O_{19}$: 982.513

$[\alpha]_D^{27}$ −14.4° (c 1.9, MeOH) [1]

HR-FAB-MS *m/z*: 1005.5001 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N: 1.21, 0.90, 0.98, 1.10, 1.06, 1.22, 1.09 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.62 (brs, H-3), 1.97 (brd, J = 10.0, H_2-11), 5.62 (d, J = 14.0, H-12), 3.61 (brd, J = 14.0, H-18)

β-D-Glcp: 6.21 (d, J = 8.0, H-1), 4.11 (dd, J = 7.0, 14.0, H-2), 4.19 (t, J = 9.0, H-3), 4.27 (t, J = 9.0, H-4), 4.13 (H-5), 4.33, 4.69 (brd, H_2-6)

β-D-Glcp′: 4.96 (d, J = 8.0, H-1), 3.94 (H-2), 4.10 (H-3), 4.07 (H-4), 3.81 (H-5), 4.54 (dd, J = 5.0, 12.0, H-6), 4.63 (H-6), 1.93 (3H, s, $OCO\underline{CH_3}$)

α-L-Rhap: 5.53 (s, H-1), 4.62 (H-2), 4.50 (H-3), 4.32 (H-4), 4.85 (dd, J = 6.0, 9.0, H-5), 1.71 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

C-1	33.6	C-16	25.9	Glc-1	96.0	Rha-1	103.0
2	26.3	17	45.5	2	76.3	2	72.4
3	75.1	18	41.2	3	78.7	3	72.7
4	37.9	19	47.5	4	70.9	4	73.8
5	49.3	20	51.6	5	78.1	5	70.7
6	18.6	21	212.5	6	69.6	6	18.5
7	33.1	22	46.5	Glc′-1	105.0		
8	37.5	23	29.3	2	75.0		

(*continued*)

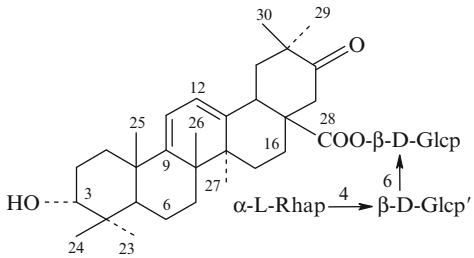
Table 1 (continued)

9	47.9	24	22.7	3	73.8
10	41.9	25	15.6	4	79.3
11	23.8	26	17.5	5	73.7
12	124.4	27	26.0	6	63.7
13	141.8	28	174.0	Ac-1	170.6
14	40.1	29	24.7	2	20.6
15	28.1	30	25.2		

References

1. M. Mutsuga, K. Kojima, I. Saracoglu, Y. Ogihara, Chem. Pharm. Bull. **45**(3), 552 (1997)

Papyrioside LG



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Hydroxy-3,21-dioxo-olean-12-en-28-oic Acid

Biological source: *Tetrapanax papyriferum* [1]

$C_{48}H_{74}O_{18}$: 938.487

$[\alpha]_D^{25}$ + 12.5° (c 1.0, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 282 (2.57) [1]

HR-FAB-MS *m/z*: 961 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.23, 0.92, 1.27, 1.41, 1.08, 1.18, 1.06 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.62 (brs, H-3), 5.83 (H-11), 5.83 (H-12), 3.76 (dd, J = 4.0, 14.0, H-18)

β-D-Glcp: 6.24 (d, J = 8.0, H-1), 4.13 (H-2), 4.20 (H-3), 4.31 (H-4), 4.11 (H-5), 4.29, 4.67 (brd, H_2-6)

β-D-Glcp′: 4.96 (d, J = 8.0, H-1), 3.93 (t, J = 8.0, H-2), 4.11 (H-3), 4.39 (t, J = 9.0, H-4), 3.66 (brd, H-5), 4.12, 4.19 (H_2-6)

α-L-Rhap: 5.83 (s, H-1), 4.66 (H-2), 4.54 (brd, H-3), 4.30 (H-4), 4.94 (H-5), 1.70 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

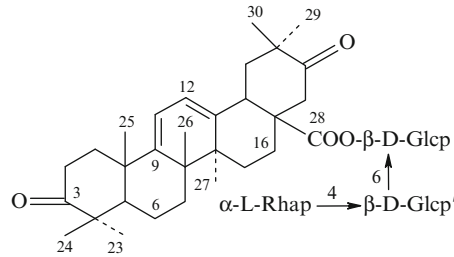
Table 1

C-1	32.4	C-16	26.4	Glc-1	96.1	Rha-1	102.8
2	27.0	17	50.6	2	76.5	2	72.6
3	74.6	18	39.6	3	78.6	3	72.8
4	38.3	19	47.5	4	70.9	4	74.0
5	45.3	20	45.5	5	78.1	5	70.3
6	18.5	21	212.1	6	69.5	6	18.5
7	32.4	22	46.2	Glc′-1	105.0		
8	39.5	23	29.3	2	75.3		
9	156.8	24	22.8	3	73.8		
10	43.1	25	25.3	4	78.4		
11	115.3	26	21.1	5	77.2		
12	122.2	27	20.5	6	61.4		
13	142.5	28	174.1				
14	41.1	29	24.6				
15	27.4	30	25.0				

References

1. M. Mutsuga, K. Kojima, I. Saracoglu, Y. Ogihara, Chem. Pharm. Bull. **45**(3), 552 (1997)

Papyrioside LH



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Hydroxy-3,21-dioxo-olean-12-en-28-oic Acid

Biological source: *Tetrapanax papyriferum* [1]

$C_{48}H_{72}O_{18}$: 936.471

$[\alpha]_D^{25}$ + 30.2° (c 0.5, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 282 (2.66) [1]

HR-FAB-MS *m/z*: 959.4617 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.15, 1.08, 1.21, 1.38, 1.08, 1.20, 1.10 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 5.75 (d, J = 7.0, H-11), 5.83 (d, J = 7.0, H-12), 3.77 (brd, H-18)

β-D-Glcp: 6.24 (d, J = 8.0, H-1), 4.13 (H-2), 4.21 (H-3), 4.32 (H-4), 4.13 (H-5), 4.31, 4.68 (brd, H_2-6)

β-D-Glcp′: 4.96 (d, J = 8.0, H-1), 3.94 (H-2), 4.10 (dd, J = 5.0, 8.0, H-3), 4.39 (t, J = 9.0, H-4), 3.67 (brd, H-5), 4.11, 4.19 (H_2-6)

α-L-Rhap: 5.84 (s, H-1), 4.67 (H-2), 4.55 (brd, H-3), 4.31 (brd, H-4), 4.97 (H-5), 1.70 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

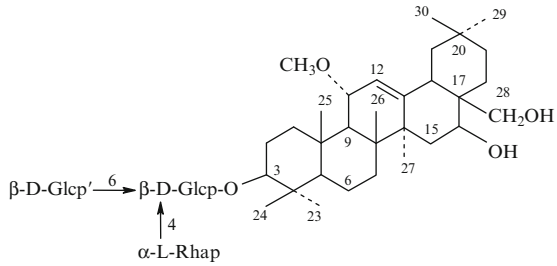
Table 1

C-1	34.7	C-16	26.3	Glc-1	96.5	Rha-1	102.0
2	37.8	17	50.6	2	76.5	2	72.6
3	216.1	18	39.6	3	78.6	3	72.8
4	47.3	19	47.5	4	70.9	4	74.0
5	51.9	20	45.5	5	78.1	5	70.4
6	19.7	21	212.0	6	69.5	6	18.5
7	31.6	22	46.1	Glc′-1	105.1		
8	38.6	23	27.0	2	75.3		
9	154.1	24	21.5	3	73.8		
10	43.2	25	25.2	4	78.4		
11	117.5	26	20.5	5	77.2		
12	122.0	27	20.2	6	61.4		
13	143.3	28	174.1				
14	40.9	29	24.6				
15	27.4	30	25.1				

References

1. M. Mutsuga, K. Kojima, I. Saracoglu, Y. Ogihara, Chem. Pharm. Bull. **45**(3), 552 (1997)

Saikosaponin 14



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α-Methoxy-longispinogenin

Biological source: *Bupleurum marginatum*,*B. rockii* [1]

$C_{49}H_{82}O_{17}$: 942.555

$[\alpha]_D^{24}$ −33.0° (c 0.94, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

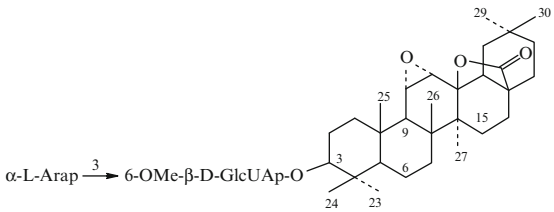
Table 1

C-1	39.8	C-16	66.2	Glc-1	106.6
2	26.3	17	43.5	2	75.1
3	88.9	18	43.8	3	76.7
4	39.8	19	46.9	4	79.8
5	55.7	20	31.1	5	75.4
6	18.3	21	33.6	6	68.5
7	33.3	22	26.3	Glc′-1	105.1
8	41.0	23	28.2	2	74.7
9	52.0	24	17.0	3	78.2
10	38.1	25	17.3	4	71.3
11	76.0	26	18.5	5	78.2
12	122.6	27	26.3	6	62.5
13	148.1	28	69.1	Rha-1	102.8
14	43.8	29	33.3	2	72.4
15	36.7	30	24.0	3	72.4
		CH_3O	54.2	4	73.7
				5	70.5
				6	18.2

References

1. J.-K. Ding, H. Fujino, R. Kasai, N. Fujimoto, O. Tanaka, J. Zhou, H. Matsuura, T. Fuwa, Chem. Pharm. Bull. **34**(3), 1158 (1986)

Momordin III



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 11α,12α-Epoxy-olean-13,18-olid

Biological source: *Momordica cochinchinensis* [1]

$C_{42}H_{60}O_{14}$: 788.398

Mp: 232–235°C [1]

IR (KBr) ν_{max} cm^{-1}: 3400–3500, 1770, 1740, 870 [1]

FD-MS *m/z*: 815 $(M + Na)^+$

^{1}H NMR (J/Hz): 3.06 (brd, J = 4.0, H-11), 3.24 (d, J = 4.0, H-12), 0.83, 0.89, 0.92, 0.94, 1.13, 1.26, 1.26 (s, CH_3 × 7)

β-D-GlcUAp: 4.92 (d, J = 7.0, H-1), 3.79 (s, OMe-6)

α-L-Arap: 5.27 (H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

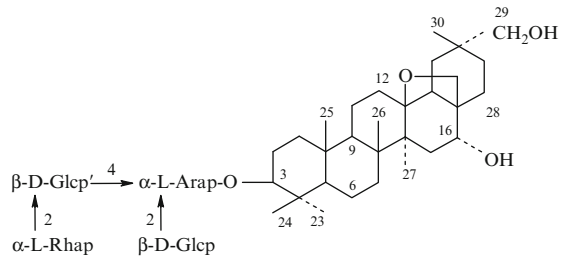
C-3	89.1	GlcUA-1	105.7
4	39.5	6	169.9
8/14	41.0	OMe	52.0
10	36.5	Ara-1	106.6
11	52.6		
12	57.3		
13	87.5		
14/8	41.7		
17	44.1		
20	31.5		
28	178.5		

References

1. M. Iwamoto, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **33**, 1 (1985)

Ardisimamilloside E

CAS Registry Number: 310396-65-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 13β,28-Epoxy-3β,16α,29-trihydroxy-olean

Biological source: *Ardisia mamillata* [1]

$C_{53}H_{88}O_{22}$: 1076.576

$[\alpha]_D^{25}$ −25.1° (c 0.24, MeOH) [1]

HR-FAB-MS *m/z*: 1099.5679 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.66 (H-5), 0.85, 1.03, 1.17, 1.36, 1.56, 1.59 (s, CH_3-25, 24, 23, 26, 30, 27), 2.62 (H-18), 3.14 (dd, J = 9.5, 4.0, H-3), 3.45, 3.66 (d, J = 7.3, H_2-28), 3.81, 4.08 (d, J = 9.2, H_2-29), 4.14 (m, H-16)

α-L-Rhap: 6.41 (brs, H-1), 1.81 (d, J = 13.2, CH_3-6)

α-L-Arap: 4.95 (brs, H-1)

β-D-Glcp: 5.38 (d, J = 7.6, H-1)

β-D-Glcp′: 5.25 (d, J = 7.5, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	76.4	Ara-1	104.4	Glc′-1	103.1
2	26.6	17	44.4	2	80.7	2	78.1
3	89.0	18	50.1	3	74.7	3	79.5
4	39.6	19	36.6	4	74.8	4	71.8
5	55.7	20	36.8	5	62.8	5	78.4
6	18.0	21	32.8	Glc-1	105.4	6	62.6

(*continued*)

Table 1 (continued)

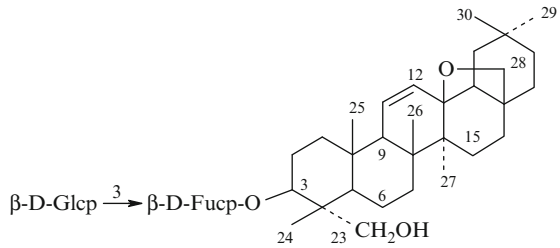
7	34.5	22	31.5	2	76.4	Rha-1	101.6
8	42.5	23	28.0	3	77.3	2	72.4
9	50.5	24	16.5	4	71.7	3	72.7
10	37.0	25	16.4	5	78.0	4	74.9
11	19.3	26	18.6	6	62.8	5	69.4
12	32.8	27	19.7			6	18.9
13	86.6	28	78.0				
14	44.7	29	69.8				
15	36.9	30	32.8				

Pharm./Biol.: Roots have been traditionally (China) used to treat respiratory tract infections and menstrual disorders [1]

References

1. J. Huang, Y. Ogihara, H. Zhang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **48**, 1413 (2000)

Mulleinsaponin I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16-Deoxysaikogenin F

Biological source: *Verbascum sinaiticum* [1]

$C_{42}H_{68}O_{12}$: 764.471

$[\alpha]_D^{25}$ + 57.2° (c 0.56, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 765 $(M + H)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.27 (dd, J = 12.0, 3.0, H-3), 5.97 (d, J = 10.0, H-7), 5.56 (dd, J = 10.0, 3.0, H-12), 3.72 (d, J = 9.0, H-23), 4.36 (d, J = 9.0, H-23), 0.93 (s, CH_3-24), 1.00 (s, CH_3-25), 1.34 (s, CH_3-26), 0.99 (s, CH_3-27), 3.33, 3.72 (d, J = 7.0, H_2-28), 0.92 (s, CH_3-29), 0.82 (s, CH_3-30)

β-D-Fucp: 4.96 (d, J = 8.0, H-1), 4.51 (dd, J = 9.0, 8.0, H-2), 4.03 (dd, J = 9.0, 3.5, H-3), 4.14 (d, J = 3.0, H-4), 3.68 (q, J = 6.5, H-5), 1.44 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.31 (d, J = 8.0, H-1), 4.02 (dd, J = 8.0, 8.0, H-2), 4.00 (m, H-3), 4.20 (dd, J = 8.5, 8.5, H-4), 4.26 (m, H-5), 4.37 (dd, J = 11.5, 5.5, H-6), 4.54 (dd, J = 11.5, 2.5, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N):

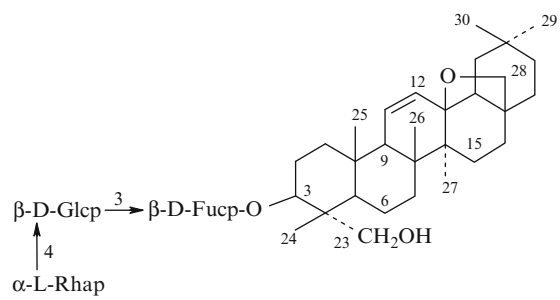
Table 1

C-1	38.7	C-16	26.0	Fuc-1	105.9
2	25.6	17	42.0	2	71.6
3	81.7	18	51.4	3	85.3
4	43.7	19	37.3	4	71.8
5	47.4	20	31.5	5	71.0
6	17.6	21	35.0	6	17.2
7	31.7	22	31.0	Glc-1	106.6
8	41.7	23	64.1	2	75.8
9	53.7	24	13.0	3	78.7
10	36.3	25	18.7	4	72.1
11	131.9	26	19.5	5	78.4
12	131.7	27	19.8	6	62.7
13	84.9	28	77.0		
14	44.1	29	33.6		
15	25.8	30	23.5		

References

1. T. Miyase, C. Horikoshi, S. Yabe, S. Miyasaka, F.R. Melek, G. Kusano, Chem. Pharm. Bull. **45**(12), 2029 (1997)

Mulleinsaponin II



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16-Deoxy-saikogenin F

Biological source: *Verbascum sinaiticum* [1]

$C_{48}H_{78}O_{16}$: 910.528

$[\alpha]_D^{25}$ + 25.1° (c 0.37, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 933.5183 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.27 (H-3), 5.98 (d, J = 10.5, H-7), 5.56 (dd, J = 10.5, 3.0, H-12), 3.72 (d, J = 10.0, H-23), 4.36 (d, J = 10.0, H-23), 0.93 (s, CH_3-24), 1.00 (s, CH_3-25), 1.34 (s, CH_3-26), 0.99 (s, CH_3-27), 3.33, 3.72 (d, J = 6.5, H_2-28), 0.92 (s, CH_3-29), 0.82 (s, CH_3-30)

β-D-Fucp: 4.95 (d, J = 8.0, H-1), 4.49 (dd, J = 9.0, 8.0, H-2), 4.00 (dd, J = 9.0, 3.5, H-3), 4.10 (d, J = 3.0, H-4), 3.96 (q, J = 6.5, H-5), 1.44 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.25 (d, J = 8.0, H-1), 3.97 (dd, J = 9.0, 8.0, H-2), 4.20 (dd, J = 9.0, 9.0, H-3), 4.40 (dd, J = 9.0, 9.0, H-4), 3.80 (m, H-5), 4.14 (dd, J = 11.0, 3.0, H-6), 4.27 (H-6)

α-L-Rhap: 5.86 (brs, H-1), 4.67 (H-2), 4.54 (dd, J = 9.5, 3.0, H-3), 4.32 (dd, J = 9.5, 9.5, H-4), 4.93 (m, H-5), 1.69 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

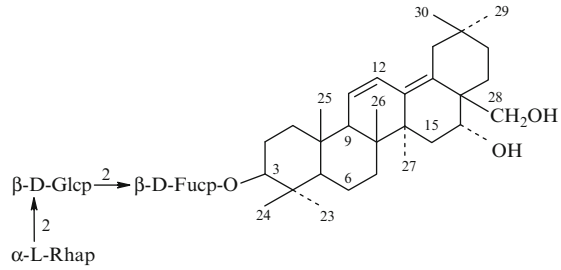
C-1	38.7	C-16	26.0	Fuc-1	105.9	Rha-1	102.7
2	25.6	17	42.0	2	71.8	2	72.8
3	81.7	18	51.4	3	85.3	3	72.5
4	43.7	19	37.3	4	72.1	4	74.0
5	47.4	20	31.7	5	71.0	5	70.4
6	17.6	21	35.0	6	17.2	6	18.5
7	31.5	22	31.0	Glc-1	106.4		
8	41.7	23	64.1	2	76.0		
9	53.1	24	13.0	3	76.5		
10	36.3	25	18.7	4	78.4		
11	131.9	26	19.5	5	77.4		
12	131.7	27	19.8	6	61.4		
13	84.9	28	77.0				
14	44.1	29	33.6				
15	25.8	30	23.5				

References

1. T. Miyase, C. Horikoshi, S. Yabe, S. Miyasaka, F.R. Melek, G. Kusano, Chem. Pharm. Bull. **45**(12), 2029 (1997)

Rotundioside E

CAS Registry Number: 73548-39-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16-epi-saikogenin C

Biological source: *Bupleurum rotundifolium* [1]

$C_{48}H_{78}O_{16}$: 910.528

Mp: 258–260°C (aq. MeOH) [1]

$[\alpha]_D^{20}$ − 42.2° (c 0.31, MeOH) [1]

UV λ_{max}^{MeOH} nm (ε): 246 (sh), 252 (43000), 262 (30000) [1]

^{1}H NMR (J/Hz, C_5D_5N): 5.61 (d, J = 10.0, H-11), 6.56 (d, J = 10.0, H-12), 4.02, 3.66 (ABq, 11.0, H_2-28)

β-D-Fucp: 4.04 (d, J = 8.0, H-1)

β-D-Glcp: 4.56 (d, J = 7.0, H-1)

α-L-Rhap: 5.93 (brs, H-1) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	67.7	Fuc-1	105.3
2	26.6	17	45.3	2	78.0
3	89.6	18	133.1	3	76.2
4	39.9	19	38.5	4	72.8
5	55.6	20	32.6	5	70.9
6	18.9	21	35.6	6	17.4
7	32.6	22	24.5	Glc-1	101.8
8	41.1	23	28.2	2	79.5
9	53.9	24	16.3	3	77.2
10	36.6	25	18.3	4	72.8
11	126.2	26	17.4	5	77.2
12	126.2	27	21.8	6	63.3
13	136.0	28	64.8	Rha-1	102.2

(*continued*)

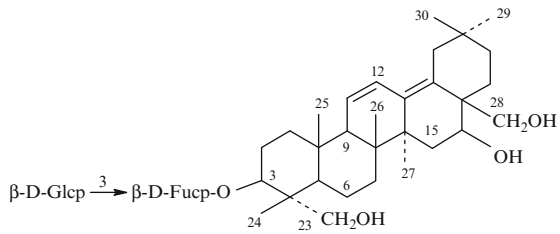
Table 1 (continued)

14	41.9	29	25.1	2	72.8
15	31.9	30	32.6	3	72.8
				4	74.3
				5	69.5
				6	18.7

References

1. Y. Kobayashi, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **29**(8), 2222 (1981)

Saikosaponin b_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16-epi-saikogenin D

Biological source: *Bupleurum falcatum* [1, 2]

$C_{42}H_{68}O_{13}$: 780.465

Mp: 237–241°C (MeOH–Et_2O) [2]

$[\alpha]_D^{24.5}$ − 9.1° (c 1.03, MeOH) [2]

UV λ_{max}^{EtOH} nm (ε): 242.5 (23700), 251 (27600), 260.5 (17400) [2]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.87, 0.98, 0.98, 1.09, 0.92, 0.87 (s, CH_3-24, 25, 26, 27, 29, 30)

β-D-Fucp: 1.46 (CH_3-6) [1]

^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	76.5	Fuc-1	105.5
2	25.8	17	44.8	2	71.8
3	82.4	18	133.6	3	85.2
4	43.7	19	38.7	4	72.1

(*continued*)

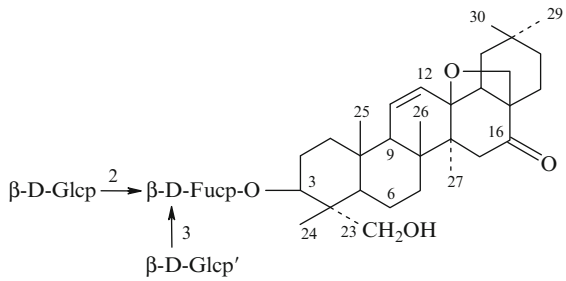
Table 1 (continued)

5	48.1	20	32.8	5	71.0
6	18.8	21	35.4	6	17.0
7	32.2	22	30.2	Glc-1	106.0
8	40.8	23	65.2	2	75.7
9	54.7	24	12.9	3	78.3
10	36.9	25	18.5	4	72.1
11	127.1	26	17.3	5	78.3
12	125.7	27	22.1	6	63.1
13	136.8	28	64.1		
14	44.6	29	25.0		
15	35.1	30	32.8		

References

1. H. Ishii, M. Nakamura, S. Seo, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **28**(8), 2367 (1980)
2. A. Shimaoka, S. Seo, H. Minato, J. Chem. Soc. Perkin Trans. I. **20**, 2043 (1975)

Clinoposaponin XVIII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16-Keto-saikogenin F

Biological source: *Clinopodium vulgare* [1]

$C_{48}H_{76}O_{18}$: 940.503

$[\alpha]_D^{23}$ + 24.3° (c 0.52, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 963 $(M + Na)^+$ [1]

CD (c 0.42, MeOH): −118400 (298), −105000 (307), −52400 (317) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.82, 0.87, 0.97, 1.02, 1.07, 1.37 (s, CH_3-30, 29, 25, 24, 27, 26), 3.50, 3.92 (d, J = 8.0, H_2-28), 3.72, 4.37 (d, J = 11.0, H_2-23), 4.14 (dd, J = 12.0, 4.5, H-3), 5.68 (dd, J = 10.5, 2.5, H-12), 6.04 (brd, J = 10.5, H-11)
β-D-Fucp: 4.91 (d, J = 7.5, H-1), 4.66 (dd, J = 8.0, 7.5, H-2), 4.10 (H-3), 4.24 (brs, H-4), 1.41 (d, J = 6.5, CH_3-6)
β-D-Glcp: 5.59 (d, J = 7.5, H-1), 4.10 (H-2), 4.20 (H-3), 4.20 (H-4), 3.65 (m, H-5)
β-D-Glcp′: 5.30 (d, J = 7.5, H-1), 4.00 (dd, J = 8.0, 7.5, H-2), 4.22 (H-3), 4.22 (H-4), 3.95 (m, H-5) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	212.2	Fuc-1	104.1	Glc′-1	105.2
2	26.0	17	56.4	2	77.2	2	75.4
3	82.4	18	55.1	3	84.8	3	78.4
4	43.8	19	39.0	4	72.0	4	71.7
5	47.8	20	31.6	5	70.5	5	78.5
6	17.5	21	35.9	6	17.2	6	62.6
7	31.4	22	24.5	Glc-1	104.1		
8	42.1	23	64.6	2	76.3		
9	52.8	24	12.7	3	78.9		
10	36.2	25	18.5	4	72.3		
11	133.2	26	19.8	5	77.4		
12	129.4	27	20.2	6	63.2		
13	84.3	28	75.5				
14	49.8	29	33.3				
15	44.8	30	23.1				

Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

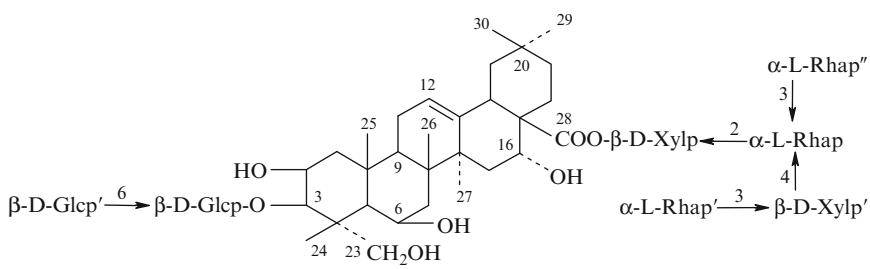
Tridesmosaponin A

CAS Registry Number: 133137-61-8
See Figure Tridesmosaponin A
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16α-Hydroxy-protobassic Acid
Biological source: *Tridesmostemon claessensii* [1]
$C_{70}H_{114}O_{37}$: 1546.703
$[\alpha]_D$ −52° (c 0.5, MeOH) [1]
^{1}H NMR (300 MHz, J/Hz, $CDCl_3$)(for peracetate): 0.94, 0.99, 0.99, 1.19, 1.31, 1.61 (s, CH_3-29, 27, 30, 26, 24, 25), 1.12, 2.22 (H_2-1), 1.14 (H-5), 1.22, 2.20 (H_2-19), 1.40, 1.60 (H_2-7), 1.45, 1.80 (H_2-15), 1.58 (H-9), 2.05, 2.15 (H_2-11), 3.10 (H-18), 3.44 (H-3), 3.78, 4.04 (H_2-23), 4.19 (H-2), 4.26 (H-6), 5.52 (H-12), 5.59 (H-16); β-D-Glcp: 4.57 (H-1), 5.02 (H-2), 5.19 (H-3), 4.89 (H-4), 3.70 (m, H-5), 3.80, 3.62 (H_2-6); β-D-Glcp′: 4.57 (H-1), 4.96 (H-2), 5.17 (H-3), 5.06 (H-4), 3.69 (m, H-5), 4.24, 4.12 (H_2-6); β-D-Xylp: 6.06 (H-1), 3.61 (H-2), 5.01 (H-3), 4.80 (H-4), 4.07, 3.70 (H_2-5); α-L-Rhap: 4.86 (H-1), 5.01 (H-2), 3.99 (H-3), 3.65 (H-4), 3.76 (H-5), 1.23 (CH_3-6); β-D-Xylp′: 4.77 (H-1), 4.94 (H-2), 4.02 (H-3), 4.94 (H-4), 3.34, 4.08 (H_2-5); α-L-Rhap′: 4.86 (H-1), 5.06 (H-2), 5.09 (H-3), 5.00 (H-4), 3.90 (H-5), 1.15 (CH_3-6); α-L-Rhap″: 4.91 (H-1), 5.46 (H-2), 5.16 (H-3), 5.06 (H-4), 3.80 (H-5), 1.40 (CH_3-6) [1]
^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

C-1	46.6	C-19	47.8	Glc-1	104.4	Xyl-1	104.3
2	-	20	31.2	2	75.2	2	74.7

(*continued*)



Tridesmosaponin A

Table 1 (continued)

3	83.9	21	37.1	3	78.2	3	84.6
4	43.9	22	31.2	4	71.7	4	69.4
5	-	23	66.5	5	77.9	5	66.9
6	-	24	16.4	6	62.8	Rha-1	102.6
7	40.0	25	18.5	Xyl-1	95.5	2	72.4
8	41.5	26	17.9	2	76.7	3	72.3
9	-	27	27.3	3	76.3	4	74.0
10	36.3	28	177.0	4	71.6	5	70.4
11	24.6	29	33.2	5	65.7	6	17.3
12	124.0	30	25.1	Rha-1	104.1	Rha-1	101.4
13	143.9	Glc-1	105.2	2	70.9	2	72.3
14	43.5	2	75.3	3	77.9	3	72.2
15	31.5	3	78.0	4	81.0	4	74.1
16	-	4	72.1	5	68.8	5	70.6
17	50.4	5	76.5	6	17.1	6	17.4
18	42.5	6	69.9				

References

1. G. Massiot, C. Lavaud, C. Delaude, G.V. Binst, S.P.F. Miller, H.M. Fales, Phytochemistry **29**(10), 3291 (1990)

Tridesmosaponin B

CAS Registry Number: 133137-62-9

See Figure Tridesmosaponin B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16α-Hydroxy-protobassic Acid

Biological source: *Tridesmostemon claessensii* [1]

$C_{64}H_{104}O_{31}$: 1368.656

$[\alpha]_D - 71^\circ$ (c 1.1, MeOH) [1]

^{1}H NMR (300 MHz, J/Hz, $CDCl_3$)(for peracetate): 0.93, 0.99, 0.99, 1.20, 1.41, 1.66 (s, CH_3-29, 30, 27, 26, 24, 25), 1.12 (H-5), 1.15, 2.10 (H_2-1), 1.22, 2.18 (H_2-19), 1.40, 1.60 (H_2-7), 1.45, 1.80 (H_2-15), 1.58 (H-9), 2.00, 2.15 (H_2-11), 3.10 (H-18), 3.55 (H-3), 3.93, 4.16 (H_2-23), 4.24 (H-2), 4.35 (H-6), 5.50 (H-12), 5.60 (H-16)

α-L-Rhap: 4.84 (H-1), 5.23 (H-2), 5.31 (H-3), 5.08 (H-4), 4.02 (H-5), 1.20 (CH_3-6)

β-D-Xylp: 6.10 (H-1), 3.61 (H-2), 5.02 (H-3), 4.79 (H-4), 4.07, 3.73 (H_2-5)

α-L-Rhap′: 4.85 (H-1), 5.15 (H-2), 5.15 (H-3), 3.65 (H-4), 3.92 (H-5), 1.26 (CH_3-6)

β-D-Xylp′: 4.61 (H-1), 4.89 (H-2), 3.83 (H-3), 3.88 (H-4), 4.17, 3.36 (H_2-5)

α-L-Rhap″: 5.05 (H-1), 5.20 (H-2), 5.22 (H-3), 5.10 (H-4), 4.05 (H-5), 1.26 (CH_3-6)

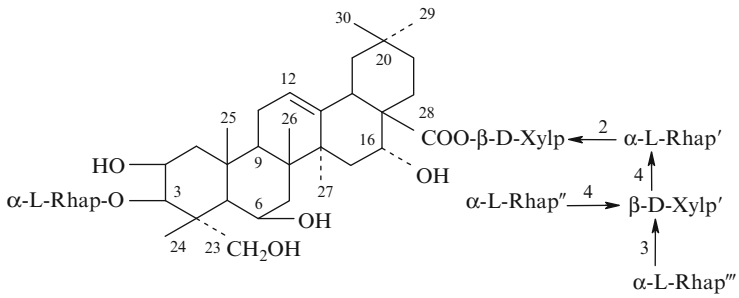
α-L-Rhap‴: 4.85 (H-1), 5.15 (H-2), 5.18 (H-3), 5.08 (H-4), 4.17 (H-5), 1.25 (CH_3-6) [1]

^{13}C NMR: (75 MHz, CD_3OD): [1]

Table 1

C-1	47.2	C-16	-	Rha-1	103.9	Xyl′-1	106.9
2	69.9	17	50.4	2	72.4	2	77.5
3	82.5	18	42.3	3	72.1	3	81.1
4	37.4	19	47.8	4	74.0	4	77.7
5	49.0	20	31.2	5	70.4	5	63.7
6	-	21	36.5	6	-	Rha″-1	98.4
7	40.0	22	31.2	Xyl-1	95.5	2	72.3
8	41.5	23	66.7	2	77.1	3	72.0
9	-	24	16.3	3	76.6	4	74.6
10	43.4	25	19.4	4	71.7	5	69.4

(*continued*)



Tridesmosaponin B

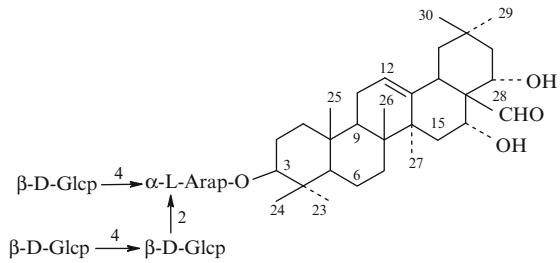
Table 1 (continued)

11	24.6	26	19.0	5	65.8	6	-
12	124.0	27	27.3	Rha′-1	101.3	Rha‴-1	100.9
13	143.9	28	177.1	2	72.4	2	72.3
14	44.2	29	33.2	3	71.0	3	72.1
15	-	30	25.0	4	82.5	4	74.1
				5	68.9	5	69.1
				6	-	6	-

References

1. G. Massiot, C. Lavaud, C. Delaude, G.V. Binst, S.P.F. Miller, H.M. Fales, Phytochemistry **29**(10), 3291 (1990)

Saponin B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16α,22α-Dihydroxy-28-al-olean-12-ene

Biological source: *Naumburgia thyrsiflora* [1]

$C_{53}H_{86}O_{23}$: 1090.555

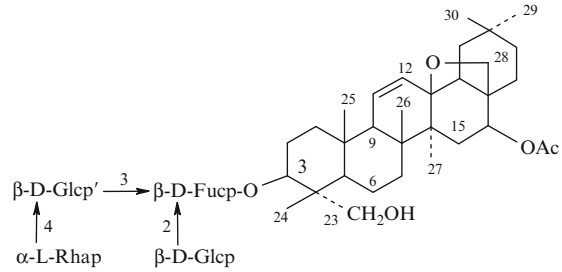
Mp: 224–226°C [1]

$[\alpha]_D^{20}$ −20° (c 1.5, MeOH) [1]

References

1. P.K. Kintya, V.I. Karpova, V.Ya. Chirva, Chem. Nat. Comp. **11**(4), 544 (1975)

Mulleinsaponin VI



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 16β-Acetoxy-saikogenin F

Biological source: *Verbascum sinaiticum* [1]

$C_{56}H_{90}O_{23}$: 1130.587

$[\alpha]_D^{25}$ + 36.2° (c 1.04, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 1153.5765 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.16 (H-3), 5.97 (d, J = 10.0, H-11), 5.57 (dd, J = 10.0, 4.0, H-12), 5.71 (dd, J = 10.0, 6.0, H-16), 3.70, 4.37 (H_2-23), 1.05 (s, CH_3-24), 0.96 (s, CH_3-25), 1.32 (s, CH_3-26), 1.08 (s, CH_3-27), 3.32 (d, J = 7.0, 28-H), 0.89 (s, CH_3-29), 0.85 (s, CH_3-30), 2.11 (s, Ac)

β-D-Fucp: 4.90 (d, J = 7.5, H-1), 4.64 (dd, J = 8.0, 7.5, H-2), 4.05 (dd, J = 8.0, 3.5, H-3), 4.15 (H-4), 3.61 (q, J = 7.0, H-5), 1.41 (d, J = 7.0, CH_3-6)

β-D-Glcp: 5.57 (d, J = 7.0, H-1), 4.19 (H-3)

β-D-Glcp′: 5.24 (d, J = 8.0, H-1), 3.92 (dd, J = 8.0, 8.0, H-2), 3.64 (H-3), 4.37 (dd, J = 9.0, 9.0, H-4), 3.73 (m, H-5), 4.08 (H-6), 4.18 (dd, J = 10.0, 2.5, H-6)

α-L-Rhap: 5.82 (brs, H-1), 4.66 (dd, J = 3.0, 1.5, H-2), 4.52 (dd, J = 9.0, 3.0, H-3), 4.32 (dd, J = 9.0, 9.0, H-4), 4.92 (m, H-5), 1.72 (d, J = 6.5, CH_3-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	68.9	Fuc-1	104.1	Glc′-1	105.0
2	26.0	17	45.6	2	77.3	2	75.6
3	82.5	18	52.1	3	84.8	3	77.5
4	43.8	19	37.6	4	72.3	4	78.5

(*continued*)

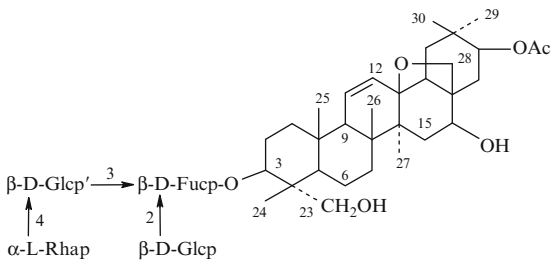
Table 1 (continued)

5	47.8	20	31.5	5	70.5	5	77.2
6	17.6	21	34.7	6	17.2	6	61.4
7	31.6	22	25.7	Glc-1	104.0	Rha-1	102.8
8	42.3	23	64.7	2	76.3	2	72.8
9	53.0	24	12.7	3	78.8	3	72.6
10	36.3	25	18.5	4	72.0	4	74.0
11	132.7	26	20.0	5	76.5	5	70.4
12	130.4	27	20.6	6	63.2	6	18.6
13	84.0	28	73.3				
14	45.7	29	33.3				
15	32.4	30	23.7				
		OAc-1	170.6				
		2	21.1				

References

1. T. Miyase, C. Horikoshi, S. Yabe, S. Miyasaka, F.R. Melek, G. Kusano, Chem. Pharm. Bull. **45**(12), 2029 (1997)

Mulleinsaponin V



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-Acetoxy-saikogenin

Biological source: *Verbascum fruticulosum* [1]

$C_{56}H_{90}O_{24}$: 1146.582

$[\alpha]_D^{25}$ + 33.7° (c 1.49, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 1169.5714 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.15 (H-3), 6.00 (d, J = 10.0, H-7), 5.66 (dd, J = 10.0, 2.0, H-12), 4.51 (H-16), 5.35 (dd, J = 12.0, 4.0, H-21), 3.70 (d, J = 10.0, H-23), 4.37 (d, J = 10.0, H-23), 1.07 (s, CH_3-24), 0.98 (s, CH_3-25), 1.37 (s, CH_3-26), 1.06 (s, CH_3-27), 3.39, 4.35 (d, J = 7.0, H_2-28), 0.99 (s, CH_3-29), 1.03 (s, CH_3-30), 2.05 (s, Ac)

β-D-Fucp: 4.93 (d, J = 8.0, H-1), 4.67 (dd, J = 8.0, 8.0, H-2), 4.07 (dd, J = 9.0, 3.0, H-3), 3.62 (q, J = 6.0, H-5), 1.41 (d, J = 6.0, CH_3-6)

β-D-Glcp: 5.59 (d, J = 7.0, H-1), 4.20 (H-2), 4.20 (H-3), 4.17 (H-5), 4.29 (dd, J = 11.0, 5.0, H-6), 4.35 (dd, J = 11.0, 3.5, H-6)

β-D-Glcp′: 5.25 (d, J = 8.0, H-1), 3.95 (dd, J = 8.0, 8.0, H-2), 3.67 (H-3), 4.38 (dd, J = 9.0, 9.0, H-4), 3.74 (m, H-5), 4.10 (dd, J = 10.0, 4.0, H-6), 4.19 (H-6)

α-L-Rhap: 5.83 (brs, H-1), 4.06 (H-2), 4.54 (dd, J = 9.0, 3.0, H-3), 4.34 (dd, J = 9.0, 9.0, H-4), 4.92 (m, H-5), 1.73 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	65.0	Fuc-1	104.1	Glc′-1	104.9
2	26.0	17	49.0	2	77.2	2	75.5
3	82.6	18	51.2	3	84.8	3	77.5
4	43.8	19	37.2	4	72.3	4	78.4
5	47.8	20	35.9	5	70.5	5	77.1
6	17.6	21	76.1	6	17.2	6	61.4
7	31.6	22	31.0	Glc-1	104.0	Rha-1	102.8
8	42.2	23	64.6	2	76.2	2	72.8
9	53.0	24	12.7	3	78.8	3	72.6
10	36.2	25	18.5	4	72.0	4	73.9
11	132.5	26	19.9	5	76.4	5	70.4
12	130.7	27	20.5	6	63.2	6	18.6
13	83.7	28	72.3				
14	45.6	29	29.5				
15	36.4	30	18.7				
		OAc-1	170.4				
		2	21.0				

References

1. T. Miyase, C. Horikoshi, S. Yabe, S. Miyasaka, F.R. Melek, G. Kusano, Chem. Pharm. Bull. **45**(12), 2029 (1997)

Acutoside C

CAS Registry Number: 135575-15-4
See Figure Acutoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-Hydroxyoleanolic Acid

Biological source: *Luffa acutangula* [1]

$C_{58}H_{94}O_{26}$: 1206.603

Mp: 220–225°C [1]

$[\alpha]_D^{24}$ − 15.5° (c 0.5, 80% MeOH) [1]

FAB-MS *m/z*: 1229. 5980 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.45 ca (H_2-1), 1.80, 2.19 ca (H_2-2), 3.35 (dd, J = 4, 12, H-3), 0.75 (d, J = 12, H-5), 1.52 ca (H_2-6), 1.45 ca (H_2-7), 1.60 ca (H-9), 1.89 ca (H_2-11), 5.50 (t, J = 3, H-12), 1.28, 2.03 ca (H_2-15), 2.19 ca (H-16), 3.43 (dd, J = 4, 14, H-18), 1.44, 2.02 ca (H_2-19), 3.90 ca (H-21), 2.31 (d, J = 8, H_2-22), 1.29 (s, CH_3-23), 1.10 (s, CH_3-24), 0.85 (s, CH_3-25), 1.25 (s, CH_3-26), 1.29 (s, CH_3-27), 1.25 (s, CH_3-29), 1.06 (s, CH_3-30)

β-D-Glcp: 4.90 (d, J = 8, H-1), 4.20 (dd, J = 8, 9, H-2), 4.30 (t, J = 9, H-3), 4.29 (t, J = 9, H-4), 3.9 (m, H-5), 4.33 (dd, J = 6, 12, H-6), 4.52 (dd, J = 3, 12, H-6)

β-D-Glcp′: 5.35 (d, J = 8, H-1), 4.04 (dd, J = 8, 9, H-2), 4.21 (t, J = 9, H-3), 4.13 (t, J = 9, H-4), 3.9 (m, H-5), 4.43 (dd, J = 4, 12, H-6), 4.47 (dd, J = 13, 12, H-6)

α-L-Arap: 6.45 (d, J = 3, H-1), 4.55 (dd, J = 3, 5, H-2), 3.90, 4.50 ca (H_2-5)

α-L-Rhap: 5.78 (s, H-1), 4.35 ca (H-4), 4.39 ca (H-5), 1.78 (d, J = 6, CH_3-6)

β-D-Xylp: 5.10 (d, J = 7, H-1), 4.03 ca (H-2), 3.50 (t, J = 11, H-5), 4.20 ca (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

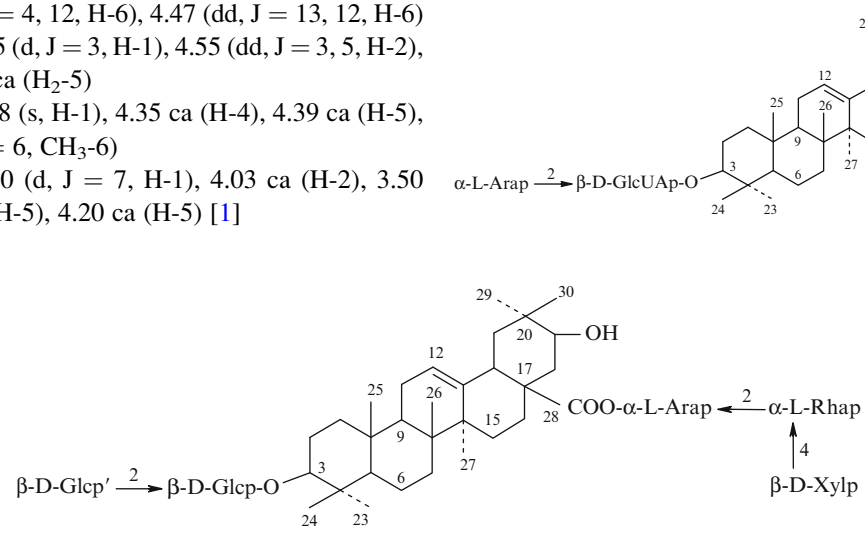
Table 1

C-1	38.8	C-16	24.6	Glc-1	105.0	Ara-1	93.5
2	26.6	17	49.2	2	83.5	2	75.1
3	89.0	18	41.4	3	78.3	5	63.2
4	39.5	19	47.1	4	71.7	Rha-1	101.0
5	55.9	20	36.8	5	78.1	4	84.2
6	18.6	21	72.4	6	62.9	5	68.5
7	33.2	22	41.1	Glc′-1	106.0	6	18.3
8	39.8	23	28.2	2	77.0	Xyl-1	107.1
9	48.0	24	16.8	3	77.9	5	67.4
10	37.0	25	15.5	4	71.6		
11	23.8	26	17.7	5	77.9		
12	122.9	27	25.9	6	62.8		
13	143.4	28	175.4				
14	42.2	29	29.7				
15	28.5	30	17.4				

References

1. T. Nagao, R. Tanaka, Y. Iwase, H. Hanazono, H. Okabe, Chem. Pharm. Bull. **39**(3), 599 (1991)

Cynarasaponin I



Acutoside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-Hydroxy-oleanolic Acid

Biological source: *Cynara cardunculus* [1]

$C_{43}H_{68}O_{14}$: 808.460

$[\alpha]_D^{25}$ + 21.0° (c 0.9, MeOH) [1]

^{1}H NMR (89.55 MHz, J/z, C_5D_5N): 5.46 (brs, H-12), 3.67 (s, $COOCH_3$-28)

β-D-GlcUAp: (overlapped H-1), 3.72 (s, COOMe)

α-L-Arap: 5.18 (d, J = 7.0, H-1) [1]

^{13}C NMR (22.5 MHz, C_5D_5N) (di-Me ester): [1]

Table 1

C-1	38.8	C-16	25.0	GlcUA-1	105.4
2	26.7	17	48.9	2	83.4
3	89.3	18	41,6	3	76.8
4	39.6	19	47,1	4	73.8
5	55.9	20	37,0	5	77.4
6	18.5	21	72.2	6	170.5
7	33.2	22	41.4	Me	52.1
8	39.7	23	28.0	Ara-1	106.8
9	48.0	24	15.5	2	72.9
10	36.8	25	16.5	3	74.3
11	23.8	26	17.2	4	69.2
12	123.3	27	26,1	5	67.1
13	143.5	28	177.2		
14	42.1	29	29,8		
15	28.3	30	17.5		
		COOMe	51.7		

References

1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)

Cynarasaponin J

CAS Registry Number: 117804-15-6

See Figure Cynarasaponin J

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-Hydroxy-oleanolic Acid

Biological source: *Cynara cardunculus* [1]

$C_{48}H_{76}O_{19}$: 956.498 (Me ester)

$[\alpha]_D^{25}$ + 15.6° (c 0.95, MeOH) [1]

^{1}H NMR (89.55 MHz, J/Hz, C_5D_5N): 5.42 (brs, H-12)

β-D-GlcUAp: 4.98 (d, J = 7.0, H-1), 3.71 (s, COOMe)

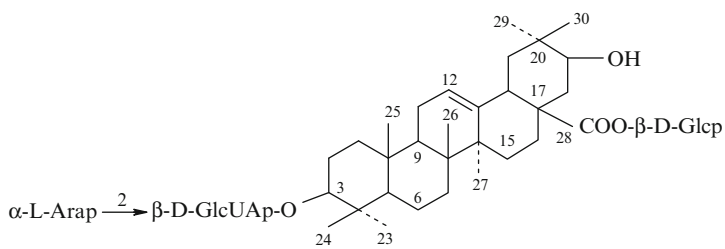
α-L-Arap: 5.18 (d, J = 7.0, H-1)

β-D-Glcp: 6.32 (d, J = 7.0, H-1) [1]

^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.9	C-16	25.0	GlcUA-1	105.4	Glc-1	96.0
2	26.8	17	49.0	2	83.4	2	74.3
3	89.3	18	41.6	3	76.8	3	79.4
4	39.6	19	47.2	4	73.7	4	71.2
5	56.0	20	37.1	5	77.4	5	78.9
6	18.6	21	72.4	6	170.4	6	62.3
7	33.4	22	41.1	Me	52.1		
8	40.0	23	28.0	Ara-1	106.7		
9	48.1	24	15.7	2	72.9		
10	36.8	25	16.5	3	74.3		
11	23.9	26	17.6	4	69.2		
12	123.3	27	26.1	5	67.1		
13	143.5	28	175.7				
14	42.3	29	29.8				
15	28.5	30	17.7				

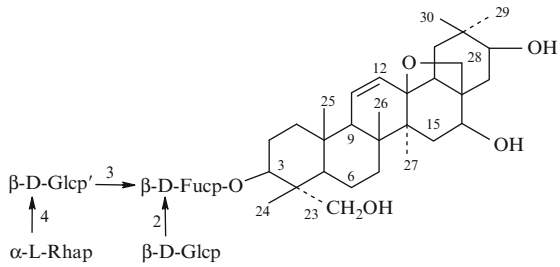


Cynarasaponin J

References

1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)

Mulleinsaponin IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-Hydroxy-saikogenin F

Biological source: *Verbascum fruticulosum* [1]

$C_{54}H_{88}O_{23}$: 1104.571

$[\alpha]_D^{25}$ + 31.5° (c 1.15, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 1127.5609 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.15 (H-3), 6.01 (d, J = 10.5, H-7), 5.71 (dd, J = 10.5, 3.0, H-12), 4.58 (m, H-16), 3.73 (d, J = 11.0, H-23), 4.38 (d, J = 11.0, H-23), 1.07 (s, CH_3-24), 0.99 (s, CH_3-25), 1.40 (s, CH_3-26), 1.13 (s, CH_3-27), 3.43 (d, J = 7.0, H-28), 4.39 (H-28), 1.27 (s, CH_3-29), 1.16 (s, CH_3-30)

β-D-Fucp: 4.92 (d, J = 8.0, H-1), 4.66 (dd, J = 8.0, 8.0, H-2), 4.08 (dd, J = 9.0, 3.0, H-3), 4.16 (H-4), 3.62 (q, J = 6.0, H-5), 1.40 (d, J = 6.0, CH_3-6)

β-D-Glcp: 5.59 (d, J = 8.0, H-1), 4.10 (H-2), 4.21 (H-3), 4.17 (H-5), 4.29 (dd, J = 11.0, 5.0, H-6), 4.35 (dd, J = 11.0, 3.5, H-6)

β-D-Glcp′: 5.26 (d, J = 8.0, H-1), 3.95 (dd, J = 8.0, 8.0, H-2), 3.66 (H-3), 4.39 (dd, J = 9.0, 9.0, H-4), 3.75 (m, H-5), 4.11 (dd, J = 10.0, 3.0, H-6), 4.21 (H-6)

α-L-Rhap: 5.84 (d, H-1), 4.67 (H-2), 4.54 (dd, J = 9.0, 3.0, H-3), 4.33 (dd, J = 9.0, 9.0, H-4), 4.93 (m, H-5), 1.73 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

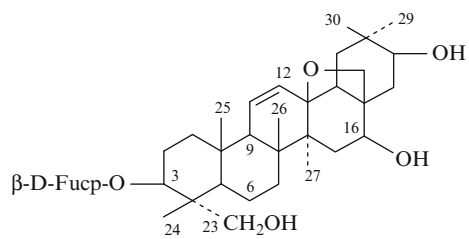
C-1	38.6	C-16	65.5	Fuc-1	104.0	Glc′-1	104.9
2	26.0	17	49.3	2	77.2	2	75.5
3	82.6	18	51.7	3	84.7	3	77.5
4	43.8	19	37.4	4	72.2	4	78.4
5	47.9	20	37.1	5	70.5	5	77.2
6	17.6	21	73.2	6	17.2	6	61.3
7	31.6	22	34.9	Glc-1	104.0	Rha-1	102.8
8	42.1	23	64.7	2	76.2	2	72.8
9	53.1	24	12.7	3	78.8	3	72.6
10	36.3	25	18.6	4	72.0	4	73.9
11	132.2	26	20.0	5	76.4	5	70.4
12	131.1	27	20.7	6	63.1	6	18.5
13	83.7	28	72.6				
14	45.7	29	30.5				
15	36.3	30	18.0				

References

1. T. Miyase, C. Horikoshi, S. Yabe, S. Miyasaka, F.R. Melek, G. Kusano, Chem. Pharm. Bull. **45**(12), 2029 (1997)

Clinoposaponin XIII

CAS Registry Number: 197632-88-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-Hydroxy-saikogenin F

Biological source: *Clinopodium chinense* [1]

$C_{36}H_{58}O_9$: 634.408

$[\alpha]_D^{23}$ + 70.5° (c 0.28, MeOH) [1]

SI-MS (positive ion mode) *m/z*: 657.3975 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.94, 1.03, 1.13, 1.16, 1.27 1.41, (s, CH_3-24, 25, 27, 29, 30, 26),

3.43, 4.40 (d, J = 7.0, H_2-28), 3.71, 4.35 (brd, J = 11.0, H_2-23), 4.10 (brdd, J = 11.0, 3.0, H-21), 4.29 (dd, J = 12.0, 4.5, H-3), 4.58 (m, H-16), 5.72 (dd, J = 10.5, 3.0, H-12), 6.04 (brd, J = 10.5, H-11)

β-D-Fucp: 4.95 (d, J = 8.0, H-1), 4.34 (dd, J = 8.0, 8.0, H-2), 3.99 (H-3), 4.00 (H-4), 3.78 (q, J = 6.5, H-5), 1.54 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	65.5	Fuc-1	106.3
2	26.0	17	49.3	2	73.0
3	81.7	18	51.7	3	72.8
4	43.7	19	37.4	4	75.5
5	47.5	20	37.1	5	71.3
6	17.6	21	73.2	6	17.4
7	31.7	22	34.9		
8	42.2	23	64.5		
9	53.1	24	13.0		
10	36.3	25	18.8		
11	132.2	26	20.0		
12	131.2	27	20.7		
13	83.8	28	72.7		
14	45.7	29	30.5		
15	36.3	30	18.0		

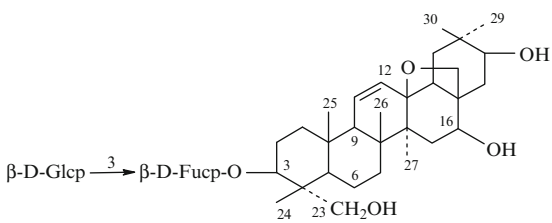
Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

Clinoposaponin XIV

CAS Registry Number: 197632-90-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-Hydroxy-saikogenin F

Biological source: *Clinopodium chinense* [1]

$C_{42}H_{68}O_{14}$: 796.460

$[\alpha]_D^{23}$ + 53.3° (c 0.83, MeOH) [1]

SI-MS (positive ion mode) *m/z*: 819.4503 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.29 (dd, J = 12.0, 5.0, H-3), 6.04 (brd, J = 10.0, H-11), 5.73 (dd, J = 10.0, 2.5, H-12), 4.59 (m, H-16), 4.11 (brd, J = 11.0, H-21), 3.72, 4.37 (brd, 11.0, H_2-23), 0.94 (s, CH_3-24), 1.02 (s, CH_3-25), 1.41 (s, CH_3-26), 1.15 (s, CH_3-27), 3.44, 4.41 (d, 7.0, H_2-28), 1.28 (s, CH_3-29), 1.17 (s, CH_3-30)

β-D-Fucp: 4.97 (d, J = 8.0, H-1), 4.53 (dd, J = 9.5, 8.0, H-2), 4.05 (dd, J = 9.5, 3.5, H-3), 4.15 (brs, H-4), 3.69 (H-5), 1.46 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.33 (d, J = 8.0, H-1), 4.04 (dd, J = 9.0, 8.0, H-2), 4.22 (dd, J = 9.0, 9.0, H-3), 4.27 (dd, J = 9.0, 9.0, H-4), 4.01 (m, H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	65.5	Fuc-1	106.0
2	26.1	17	49.3	2	71.7
3	81.7	18	51.7	3	85.3
4	43.8	19	37.4	4	71.9
5	47.4	20	37.1	5	71.1
6	17.6	21	73.2	6	17.2
7	31.7	22	34.9	Glc-1	106.7
8	42.2	23	64.2	2	75.9
9	53.1	24	13.0	3	78.8
10	36.4	25	18.8	4	72.2
11	132.2	26	20.0	5	78.5
12	131.2	27	20.7	6	62.8
13	83.8	28	72.7		
14	45.7	29	30.5		
15	36.4	30	18.0		

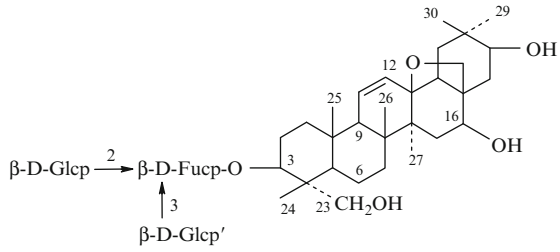
Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

Clinoposaponin XVI

CAS Registry Number: 197633-44-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-Hydroxy-saikogenin F

Biological source: *Clinopodium vulgare* [1]

$C_{48}H_{78}O_{19}$: 958.513

$[\alpha]_D^{23}$ + 48.9° (c 1.35, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 981 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.09 (H-3), 6.00 (brd, J = 10.0, H-11), 5.69 (dd, J = 10.0, 3.0, H-12), 4.56 (brdd, J = 9.0, 5.5, H-16), 4.09 (H-21), 3.71, 4.36 (d, J = 11.0, H_2-23), 1.06 (s, CH_3-24), 0.98 (s, CH_3-25), 1.38 (s, CH_3-26), 1.12 (s, CH_3-27), 3.41, 4.38 (d, J = 7.0, H_2-28), 1.26 (s, CH_3-29), 1.15 (s, CH_3-30)

β-D-Fucp: 4.91 (d, J = 7.5, H-1), 4.65 (dd, J = 9.5, 7.5, H-2), 4.09 (H-3), 4.24 (H-4), 3.62 (q, J = 6.5, H-5), 1.40 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.57 (d, J = 8.0, H-1), 4.08 (H-2), 4.17 (H-3), 4.17 (H-4), 3.63 (H-5), 4.29, 4.32 (H_2-6)

β-D-Glcp′: 5.28 (d, J = 8.0, H-1), 3.99 (dd, J = 8.0, 8.0, H-2), 4.21 (dd, J = 9.0, 8.0, H-3), 4.18 (dd, J = 9.0, 9.0, H-4), 3.93 (m, H-5), 4.30 (H-6), 4.49 (dd, J = 11.5, 2.5, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

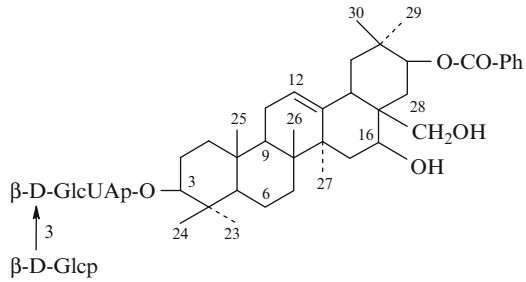
C-1	38.7	C-16	65.5	Fuc-1	104.1	Glc′-1	105.2
2	26.0	17	49.3	2	77.2	2	75.4
3	82.7	18	51.7	3	84.9	3	78.4
4	43.9	19	37.5	4	72.0	4	71.7
5	47.9	20	37.1	5	70.5	5	78.5
6	17.7	21	73.2	6	17.2	6	62.6
7	31.7	22	34.9	Glc-1	104.1		
8	42.2	23	64.7	2	76.3		
9	53.1	24	12.7	3	78.8		
10	36.3	25	18.7	4	72.3		
11	132.2	26	20.0	5	77.5		
12	131.1	27	20.7	6	63.2		
13	83.8	28	72.7				
14	45.7	29	30.5				
15	36.3	30	18.1				

Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

Compound 1 from *Gymnema sylvestre*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 21β-O-Benzoyl-sitakisogenin

Biological source: *Gymnema sylvestre* [1]

$C_{49}H_{72}O_{16}$: 916.482

Mp: 226–228°C [1]

$[\alpha]_D^{20}$ + 15.4° (c 0.16, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3422, 2948, 1702, 1636, 1460, 1388, 1282, 1160, 1076, 1026 [1]

FAB-MS (positive ion mode) *m/z*: 917 $(M + H)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.84 (s, CH_3-25), 0.97 (s, CH_3-24), 0.98 (s, CH_3-26), 1.01 (s, CH_3-30), 1.30 (s, CH_3-23), 1.32 (s, CH_3-29), 1.37 (s, CH_3-27), 3.17 (dd, J = 4.5, 13.3, Hα-3), 3.37 (d, J = 10.0, Ha-28), 4.40 (d, J = 10.0, Hb-28), 4.66 (m, Hα-16), 5.37 (brs, H-12), 5.70 (dd, J = 4.6, 12.2, Hα-21), 7.49 (overlapped, H-3′, -4′, and -5′), 8.26 (dd, J = 1.3, 7.2, H-2′ and -6′)

β-D-GlcUAp: 4.84 (d, J = 7.2, H-1), 4.05 (H-2), 4.26 (H-3), 4.27 (H-4), 4.46 (H-5)

β-D-Glcp: 5.25 (d, J = 7.2, H-1), 4.01 (H-2), 4.21 (H-3), 4.10 (H-4), 4.05 (H-5), 4.27 (H-6), 4.57 (dd, J = 10.4, 4.0, H-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

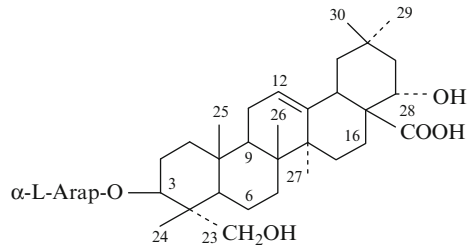
C-1	38.7	C-16	66.4	Ph-CO-1	131.5	GlcUA-1	106.6
2	26.5	17	43.7	2	129.9	2	74.4
3	89.0	18	44.2	3	128.9	3	87.4
4	39.5	19	47.2	4	133.2	4	71.8
5	55.6	20	36.0	5	128.9	5	77.3
6	18.4	21	75.6	6	129.9	6	172.2
7	32.9	22	33.3	7	166.3	Glc-1	105.9
8	40.1	23	28.1			2	75.6
9	47.0	24	16.9			3	78.2
10	36.7	25	15.7			4	71.6
11	23.9	26	17.0			5	78.7
12	123.1	27	27.0			6	62.4
13	142.6	28	66.7				
14	43.7	29	29.2				
15	36.7	30	18.8				

Pharm./Biol.: Antisweet activity [1]

References

1. W. Ye, X. Liu, Q. Zhang, Ch. Tao Che, S. Zhao, J. Nat. Prod **64**(2), 232 (2001)

Kalopanax-Saponin La



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 22α-Hydroxy-hederagenin

Biological source: *Kalopanax septemlobus* [1]

$C_{35}H_{56}O_9$: 620.392

$[\alpha]_D^{20}$ + 40.4° (c 0.42, MeOH) [1]

FAB-MS *m/z*: 643 $(M + Na)^+$, 621 $(M + H)^+$, 489 $(M + H\text{-Ara})^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.49 (t-like, H-12), 1.29, 1.07, 1.00, 1.12, 0.93, 0.94 (s, CH_3-24, 25, 26, 27, 29, 30)

α-L-Arap: 4.99 (d, J = 7.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

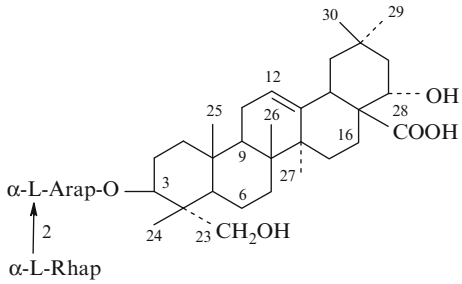
Table 1

C-1	38.79	C-16	16.90	Ara-1	106.6
2	26.10	17	53.10	2	73.14
3	81.91	18	43.53	3	74.68
4	42.56	19	45.95	4	69.58
5	47.61	20	31.53	5	66.92
6	18.19	21	43.28		
7	32.77	22	71.52		
8	40.02	23	64.53		
9	48.15	24	13.59		
10	36.94	25	16.07		
11	23.89	26	17.44		
12	122.88	27	26.71		
13	144.19	28	179.40		
14	42.56	29	33.38		
15	27.98	30	25.16		

References

1. C.J. Shao, R. Kasai, K. Ohtani, J.D. Xu, O. Tanaka, Chem. Pharm. Bull. **37**(12), 3251 (1989)

Kalopanax-Saponin Lb



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 22α-Hydroxy-hederagenin

Biological source: *Kalopanax septemlobus* [1]

$C_{41}H_{66}O_{13}$: 766.450

$[\alpha]_D^{20}$ + 49.3° (c 0.55, MeOH) [1]

FAB-MS *m/z*: 789 $(M + Na)^+$, 767 $(M + H)^+$, 621 $(M + H\text{-Rha})^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.48 (t-like, H-12), 1.12, 1.07, 1.07, 1.28, 0.94, 0.99 (s, CH_3-24, 25, 26, 27, 29, 30)

α-L-Arap: 5.16 (d, J = 7.0, H-1)

α-L-Rhap: 6.27 (s, H-1); 1.64 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.65	C-16	17.01	Ara-1	104.30
2	26.22	17	53.08	2	75.79
3	81.05	18	43.52	3	74.67
4	42.55	19	46.98	4	69.69
5	47.67	20	31.48	5	65.78
6	18.52	21	43.52	Rha-1	101.67
7	32.80	22	71.55	2	72.52
8	39.96	23	64.50	3	72.38
9	48.15	24	13.99	4	74.13
10	36.85	25	16.03	5	69.30
11	23.75	26	17.45	6	18.52
12	122.77	27	26.71		

(*continued*)

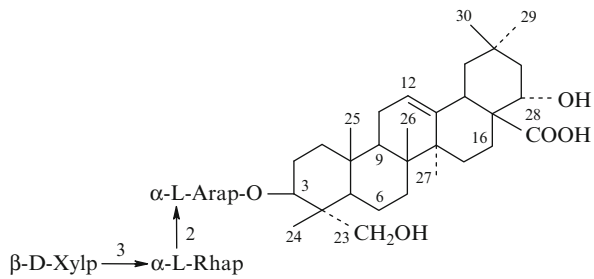
Table 1 (continued)

13	144.26	28	179.60
14	42.55	29	33.39
15	27.98	30	25.20

References

1. C.J. Shao, R. Kasai, K. Ohtani, J.D. Xu, O. Tanaka, Chem. Pharm. Bull. **37**(12), 3251 (1989)

Kalopanax-Saponin Lc



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 22α-Hydroxy-hederagenin

Biological source: *Kalopanax septemlobus* [1]

$C_{46}H_{74}O_{17}$: 898.492

$[\alpha]_D^{20}$ + 45.6° (c 0.4, MeOH) [1]

FAB-MS *m/z*: 921 $(M + Na)^+$, 899 $(M + H)^+$, 767 $(M + H\text{-Xyl})^+$, 621 $(M + H\text{-Xyl-Rha})^+$, 489 $(621\text{-Ara})^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.38 (t-like, H-12), 1.06, 1.03, 0.97, 1.27, 0.92, 0.97 (s, CH_3-24, 25, 26, 27, 29, 30) [1]

α-L-Arap: 5.01 (d, J = 7.0, H-1)

α-L-Rhap: 5.98 (s, H-1); 1.66 (d, J = 6.0, CH_3-6)

β-D-Xylp: 5.12 (d, J = 7.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.23	C-16	17.49	Ara-1	104.25
2	26.37	17	53.17	2	75.88
3	81.44	18	43.67	3	74.32
4	42.89	19	46.70	4	69.16
5	48.01	20	31.58	5	65.36

(*continued*)

Table 1 (continued)

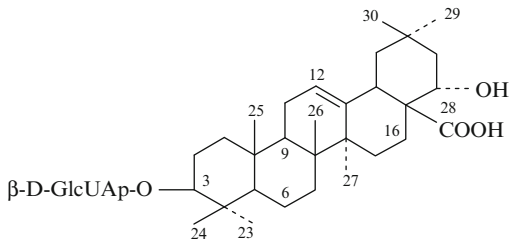
6	18.47	21	43.77	Rha-1	101.52
7	33.04	22	71.94	2	71.94
8	40.16	23	64.53	3	83.10
9	48.39	24	14.04	4	73.01
10	37.14	25	16.28	5	69.79
11	23.93	26	17.79	6	18.47
12	122.62	27	26.66	Xylp-1	107.17
13	144.51	28	180.05	2	75.54
14	42.88	29	33.53	3	78.27
15	28.27	30	25.29	4	71.16
				5	67.31

References

1. C.J. Shao, R. Kasai, K. Ohtani, J.D. Xu, O. Tanaka, Chem. Pharm. Bull. **37**(12), 3251 (1989)

Kochianoside I

CAS Registry Number: 193894-08-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 22α-Hydroxy-oleanolic Acid

Biological source: *Kochia scoparia* [1]

$C_{36}H_{56}O_{10}$: 648.387

Mp: 172–175°C ($CHCl_3$−MeOH) [1]

$[\alpha]_D^{24}$ + 84.4° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 2932, 2876, 1726, 1701, 1665, 1081 [1]

FAB-MS (negative ion mode) *m*/*z*: 647 $(M\text{-}H)^-$, 471 $(M\text{-}C_6H_9O_6)^-$ [1]

FAB-MS (positive ion mode) *m*/*z*: 671.3772 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.82, 0.98, 1.02, 1.02, 1.12, 1.31, 1.36 (s, CH_3-25, 24, 26, 29, 30, 23, 27), 3.34 (m, H-18), 3.40 (dd, J = 4.6, 11.9, H-3), 4.53 (dd, J = 4.6, 10.7, H-22), 5.46 (brs, H-12)

β-D-GlcUAp: 5.01 (d, J = 7.7, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

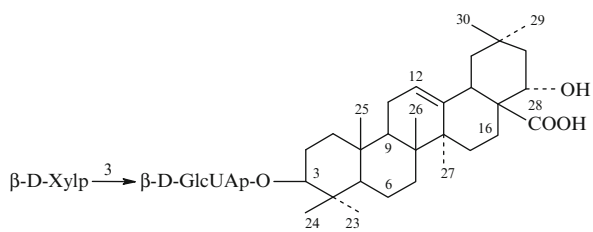
C-1	38.7	C-16	17.0	GlcUA-1	107.2
2	26.6	17	53.1	2	75.6
3	89.1	18	43.5	3	78.2
4	39.6	19	46.1	4	73.4
5	55.8	20	31.5	5	77.8
6	18.5	21	43.3	6	172.7
7	33.1	22	71.5		
8	40.0	23	28.3		
9	48.0	24	17.0		
10	37.0	25	15.4		
11	23.8	26	17.4		
12	122.9	27	26.8		
13	144.2	28	179.4		
14	42.6	29	33.4		
15	28.0	30	25.2		

Pharm./Biol.: The methanol extract and glycosidic fraction of *Kochiae Fructus* have inhibitory effects on the cutaneous pruritus induced by Compound 48/80 or serotonin in mice [1]

References

1. M. Yoshikawa, Y. Dai, H. Shimada, T. Morikawa, N. Matsumura, S. Yoshizumi, H. Matsuda, H. Matsuda, M. Kubo, Chem. Pharm. Bull. **45**(6), 1052 (1997)

Scoparianoside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 22α-Hydroxy-oleanolic Acid

Biological source: *Kochia scoparia* [1]

$C_{41}H_{64}O_{14}$: 780.429

Mp: 204–206°C [1]

$[\alpha]_D^{24}$ + 17.1° (c 1.7, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3438, 2926, 2887, 1726, 1719, 1655, 1036 [1]

FAB-MS (negative ion mode) *m/z*: 779 $(M\text{-}H)^-$, 647 $(M\text{-}C_5H_9O_4)^-$, 471 $(M\text{-}C_{11}H_{17}O_{10})^-$ [1]

HR-FAB-MS (positive ion mode) *m/z*: 803.4191 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.79, 0.99, 1.03, 1.03, 1.13, 1.32, 1.38 (s, CH_3-25, 24, 26, 29, 30, 23, 27), 3.36 (m, H-3, 18), 4.57 (m, H-22), 5.47 (brs, H-12)

β-D-GlcUAp: 5.05 (d, J = 7.7, H-1)

β-D-Xylp: 5.38 (d, J = 7.2, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.4	C-16	16.8	GlcUA-1	106.8
2	26.4	17	53.0	2	74.5
3	89.1	18	43.4	3	86.3
4	39.4	19	45.8	4	71.4
5	55.5	20	31.4	5	77.4
6	18.3	21	43.1	6	172.1
7	32.9	22	71.3	Xyl-1	106.1
8	39.8	23	27.9	2	75.2
9	47.8	24	16.8	3	77.9
10	36.8	25	15.2	4	70.8
11	23.6	26	17.2	5	67.2
12	122.7	27	26.6		
13	144.0	28	179.3		
14	42.4	29	33.3		
15	27.8	30	25.0		

(*continued*)

Pharm./Biol.: *Kochiae Fructus* has been used as a tonic, diuretic, analgesic, and antidote and for the treatment of and cutaneous pruritus in traditional Chinese and Japanese preparations [1]

References

1. M. Yoshikawa, H. Shimada, T. Morikawa, S. Yoshizumi, N. Matsumura, T. Murakami, H. Matsuda, K. Hori, J. Yamahara, Chem. Pharm. Bull. **45**(8), 1300 (1997)

Licorice-Saponin L3

See Figure Licorice-Saponin L3

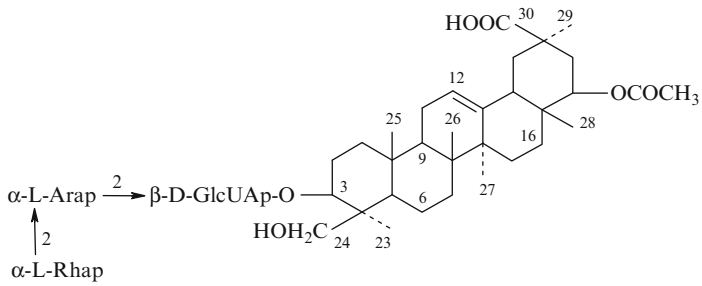
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 22β-Acetoxy-3β,24-dihydroxy-olean-12-en-30-oic Acid

Biological source: *Glycyrrhiza uralensis* [1]

$C_{49}H_{76}O_{20}$: 984.492

Mp: 233–234°C (MeOH) [1]

$[\alpha]_D^{25}$ + 3.7° (c 0.3, MeOH) [1]



Licorice-Saponin L3

IR (KBr) ν_{max} cm^{-1}: 3650-3100; 2912, 1704, 1658, 1622, 1382, 1048 [1]
HR-FAB-MS *m/z*: 1007.4840 $[M + Na]^+$ [1]
FAB-MS *m/z*: 1007 $[M + Na]^+$, 985 $[M + H]^+$, 993 $[M + Li]^+$ [1]
FAB-MS *m/z*: 983 [M-H], 837, 705, 529 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O): 0.92, 0.93, 0.99, 1.32, 1.33, 1.44, (s, CH_3 × 6), 2.02 (Ac-22), 3.42 (dd, J = 3.6, 12, H-3), 5.54 (brs, H-12)
β-D-GlcUAp: 4.95 (d, J = 7.6, H-1)
α-L-Arap: 5.52 (d, J = 7.3, H-1)
α-L-Rhap: 6.15 (brs, H-1), 1.74 (d, J = 6.1, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N-D_2O): [1]

Table 1

C-1	38.7	C-16	27.8	GlcUA-1	105.4	Rha-1	101.8
2	26.3	17	37.5	2	78.1	2	72.3
3	91.0	18	44.2	3	75.8	3	73.9
4	44.0	19	40.8	4	72.6	4	74.4
5	56.1	20	29.8	5	77.6	5	69.4
6	18.8	21	41.7	6	172.2	6	18.5
7	32.9	22	78.1	Ara-1	102.2		
8	40.1	23	22.9	2	78.1		
9	47.7	24	63.4	3	76.7		
10	36.2	25	15.7	4	70.7		
11	24.0	26	16.8	5	66.8		
12	124.7	27	26.3				
13	144.1	28	26.6				
14	41.9	29	29.8				
15	26.6	30	179.4				
		Ac-1	170.3				
		2	21.4				

References

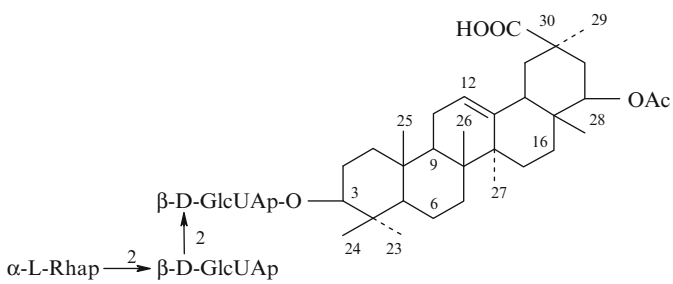
1. I. Kitagawa, K. Hori, E. Uchida, W.-Z. Chen, M. Yoshikawa, J. Ren, Chem. Pharm. Bull **41**(9), 1567 (1993)

Licorice-Saponin D3

See Figure Licorice-Saponin D3
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 22β-Acetoxy-olean-12-en-30-oic Acid
Biological source: *Glycyrrhiza uralensis* [1]
$C_{50}H_{76}O_{21}$: 1012.487
$[\alpha]_D^{20}$–5.0° (c 0.15, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3700–3200, 2940, 1730, 1712, 1410, 1065 [1]
^{1}H NMR (500 MHz, J/Hz, $C_5D_5N + D_2O$): 0.89, 0.91, 0.99, 1.13, 1.21, 1.28, 1.38, (s, CH_3 × 7), 2.16 (s, OAc), 3.28 (dd, J = 4.2, 11.0, Hα-3), 4.59 (dd, J = 2.6, 3.4, Hα-22), 5.44 (brs, H-12)
β-D-GlcUAp: 5.02 (d, J = 7.4, H-1)
β-D-GlcUAp: 5.34 (d, J = 7.6, H-1)
α-L-Rhap: 6.30 (brs, H-1), 1.79 (d, J = 5.7, CH_3-6) [1]
^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-3	89.9	GlcUA-1	104.7	GlcUA-1	102.4	Rha-1	101.6
4	23.6	2	79.1	2	78.2	2	71.9
12	122.2	3	76.2	3	76.7	3	72.9
13	143.6	4	72.2	4	72.9	4	73.9
18	44.0	5	77.9	5	77.5	5	69.2
22	77.5	6	169.6	6	169.8	6	18.5
24	16.4						
29	29.1						
30	177.2						

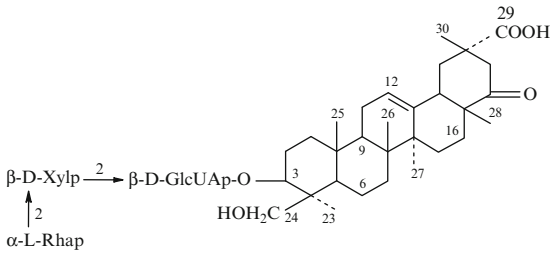


Licorice-Saponin D3

References

1. I. Kitagawa, K. Hori, M. Sakagami, J.-L. Zhou, M. Yoshikawa, Chem. Pharm. Bull **41**(8), 1337 (1993)

Melilotus-Saponin O_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 22-Oxo-24-hydroxy-olean-12-en-29-oic Acid

Biological source: *Melilotus officinalis* [1]

$C_{47}H_{72}O_{19}$: 940.466

$[\alpha]_D^{14}$ −45.7° (c 0.50, C_5D_5N) [1]

FAB-MS: *m/z* 939 $[M-H]^-$, 793 $[M-H-Rha]^-$, 661 $[M-H-Rha-Xyl]^-$, 485 $[M-H-Rha-Xyl-GlcUA]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.69, 0.85, 1.19, 1.28, 1.45, 1.46 (s, CH_3 × 6), 5.27 (s, H-12)

α-L-Rhap: 6.23 (s, H-1), 4.71 (dd, J = 3.1, 9.2, H-3), 1.82 (d, J = 6.1, CH_3-6)

β-D-Xylp: 4.08 (t, J = 8.4, H-3)

β-D-GlcUAp: 4.93 (d, J = 7.9, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	27.4	GlcUA-1	104.9
2	26.3	17	48.2	2	78.2
3	90.9	18	47.4	3	76.4
4	44.0	19	42.0	4	73.8
5	56.3	20	45.2	5	77.8
6	18.5	21	47.1	6	175.7
7	33.0	22	216.8	Xyl-1	102.4
8	39.7	23	22.7	2	78.9
9	47.5	24	62.8	3	78.0
10	36.4	25	15.5	4	70.6
11	23.9	26	16.7	5	66.5
12	123.2	27	25.4	Rha-1	101.7
13	141.6	28	20.9	2	72.0
14	42.0	29	181.0	3	72.0
15	25.4	30	21.9	4	73.9
				5	69.2
				6	18.6

(*continued*)

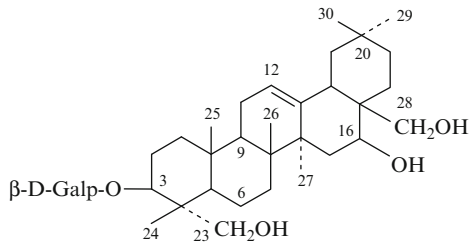
Pharm./Biol.: Preventive effect of extract on experimental atherosclerosis in rabbits, also was evaluated on dermatological diseases [1]

References

1. T. Hirakawa, M. Ohkawa, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **48**(2), 286 (2000)

Corchorusin C

CAS Registry Number: 108886-05-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-longispinogenin

Biological source: *Corchorus acutangulus* [1]

$C_{36}H_{60}O_9$: 636.423

Mp: 220–222°C (MeOH) [1]

$[\alpha]_D$ + 25.6° (c 0.6, MeOH) [1]

^{1}H NMR (99.6 MHz, J/Hz, $CDCl_3$) (for permethylate): 0.72, 0.88, 0.89, 0.93, 0.96, 1.20 (s, CH_3 × 6), 3.28, 3.32, 3.33, .3.37, 3.52, 3.53, 3.58 (CH_3O × 7), 5.28 (t-like, H-12)

β-D-Galp: 4.20 (d, J = 7.0, H-1) [1]

^{13}C NMR (25.05 MHz, C_5D_5N): [1]

Table 1

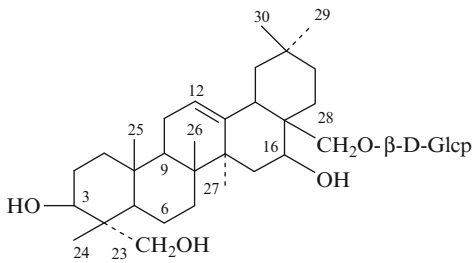
C-1	38.6	C-16	66.7	Gal-1	105.7
2	25.5	17	40.6	2	72.8
3	82.3	18	44.4	3	74.9
4	43.0	19	46.9	4	69.7
5	47.4	20	30.7	5	76.0
6	17.9	21	33.9	6	61.9
7	32.4	22	25.9		
8	40.0	23	64.7		
9	46.9	24	13.1		
10	36.5	25	16.0		
11	23.6	26	16.8		
12	122.3	27	26.9		
13	143.6	28	68.9		
14	43.7	29	33.0		
15	36.3	30	23.9		

References

1. S.B. Mahato, B.C. Pal, J. Chem. Soc. Perkin Trans. I (3), 629 (1987)

Gymnemasaponin I

CAS Registry Number: 133629-80-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-longispinogenin

Biological source: *Gymnema sylvestre* [1]

$C_{36}H_{60}O_9$: 636.423

Mp: 184–185°C [1]

$[\alpha]_D$ + 9.3° (c 3.5, MeOH) [1]

FAB-MS *m/z*: 659 $[M + 2Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): β-D-Glcp: 4.92 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-2	27.7	Glc-1	105.8
3	73.4	2	75.0
4	42.9	3	78.7
15	37.0	4	71.7
16	66.3	5	78.6
17	41.3	6	62.8
23	67.9		
24	13.1		
28	78.0		

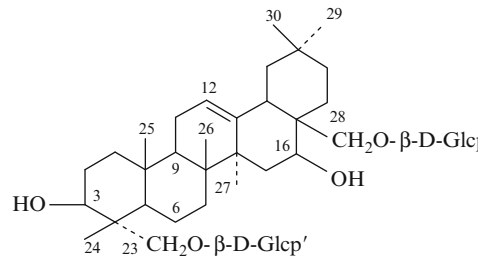
Pharm./Biol.: Complete suppression of sweetness induced by 0.4 MM Sucrose [1]

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, Tetrahedron Lett. **32**, 789 (1991)

Gymnemasaponin II

CAS Registry Number: 133629-81-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-longispinogenin

Biological source: *Gymnema sylvestre* [1]

$C_{47}H_{70}O_{14}$: 858.476

Mp: 190–192°C [1]

$[\alpha]_D$ + 1.9° (c 2.6, MeOH) [1]

FAB-MS *m/z*: 821 $[M + 2Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): β-D-Glcp: 4.92 (d, J = 8.0, H-1);
β-D-Glcp′: 4.95 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

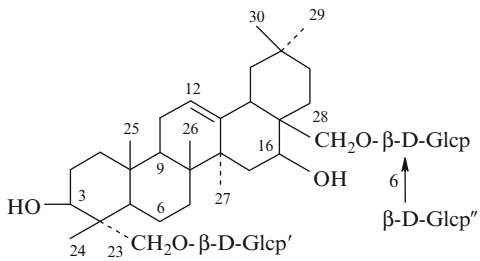
C-2	27.4	Glc-1	105.8	Glc′-1	105.2
3	72.3	2	75.0	2	75.3
4	42.9	3	78.7	3	78.7
15	36.9	4	71.7	4	71.8
16	66.1	5	78.7	5	78.4
17	41.3	6	62.8	6	63.0
23	75.0				
24	13.2				
28	78.0				

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, Tetrahedron Lett. **32**, 789 (1991)

Gymnemasaponin III

CAS Registry Number: 133629-82-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-longispinogenin
Biological source: *Gymnema sylvestre* [1]
$C_{48}H_{80}O_{19}$: 960.529
Mp: 203–205°C [1]
$[\alpha]_D$ + 11.6° (c 1.1, MeOH) [1]
FAB-MS *m/z*: 983 $[M + Na]^+$ [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-2	27.4	Glc-1	105.2	Glc′-1	105.7	Glc″-1	105.4
3	72.3	2	75.3	2	75.1	2	74.8
4	42.9	3	78.7	3	78.6	3	78.4
15	36.9	4	71.9	4	71.6	4	71.4
16	66.3	5	78.4	5	77.3	5	78.4
17	41.4	6	63.0	6	69.8	6	62.8
23	75.1						
24	13.2						
28	77.9						

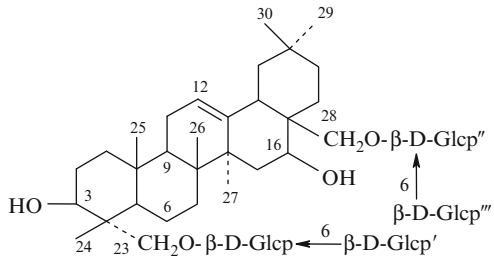
Pharm./Biol.: Antisweet action [1]

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, Tetrahedron Lett. **32**, 789 (1991)

Gymnemasaponin V

CAS Registry Number: 133629-84-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-longispinogenin
Biological source: *Gymnema sylvestre*[1]
$C_{54}H_{90}O_{24}$: 1122.582
Mp: 186–188°C [1]
$[\alpha]_D$ + 6.2° (c 1.9, MeOH) [1]
FAB-MS *m/z*: 1145 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): β-D-Glcp: 4.84 (d, J = 8.5, H-1); β-D-Glcp′: 4.87 (d, J = 8.5, H-1); β-D-Glcp″: 5.06 (d, J = 8.0, H-1); β-D-Glcp‴: 5.10 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

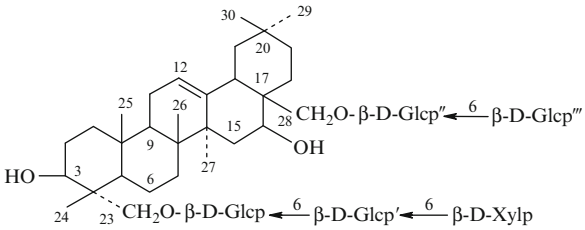
C-2	27.4	Glc-1	105.4	Glc′-1	104.9	Glc″-1	105.9	Glc‴-1	105.4
3	72.1	2	75.2	2	74.6	2	75.2	2	74.8
4	43.0	3	78.6	3	78.4	3	78.5	3	78.4
15	36.9	4	71.6	4	71.6	4	71.6	4	71.3
16	66.3	5	77.2	5	78.4	5	77.3	5	78.4
17	41.4	6	70.2	6	62.7	6	69.8	6	62.7
23	75.1								
24	13.3								
28	77.9								

Pharm./Biol.: Antisweet action [1]

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, Tetrahedron Lett. **32**, 789 (1991)

Gymnemoside-e



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-longispinogenin

Biological source: *Gymnema sylvestre* [1]

$C_{59}H_{98}O_{28}$: 1254.624

Mp: 202.8–204.1°C (aq. MeOH) [1]

$[\alpha]_D^{29}$ + 14.8° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1044 [1]

FAB-MS (negative ion mode) *m*/*z*: 1253.6167 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m*/*z*: 1277 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.89, 1.00, 1.02, 1.23 (s, CH_3-29, 24, 26, 27), 0.96 (s, CH_3-25, 30), 1.71 (m), 2.76 (dd-like, H_2-22), 1.75 (m), 2.19 (dd-like, H_2-15), 2.33 (dd-like, H-18), 4.04 (m, H_2-23), 4.16 (m, H-3), 4.21 (m, H_2-28), 4.51 (dd-like, H-16), 4.81 (d, J = 7.6, H-1 of Glc″), 4.83 (d, J = 6.9, H-1 of Glc), 4.92 (d, J = 7.3, H-1 of Xyl), 5.00 (d, J = 7.9, H-1 of Glc′), 5.03 (d, J = 7.9, H-1 of Glc‴), 5.25 (brs, H-12) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

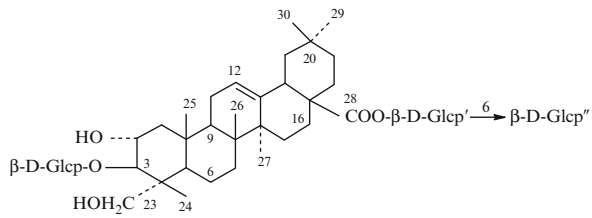
Table 1

C-1	38.8	C-16	66.3	Glc-1	104.9	Glc″-1	105.7
2	27.4	17	41.4	2	75.1	2	74.8
3	72.4	18	44.9	3	78.6	3	78.6
4	42.9	19	46.8	4	71.7	4	71.5
5	48.8	20	31.0	5	77.0	5	77.2
6	18.6	21	34.2	6	70.3	6	69.9
7	32.7	22	26.5	Glc′-1	105.2	Glc‴-1	105.3
8	40.2	23	75.0	2	75.0	2	75.1
9	47.2	24	13.2	3	78.4	3	78.4
10	37.0	25	16.3	4	71.7	4	71.7
11	23.9	26	17.3	5	77.0	5	78.4
12	122.9	27	27.2	6	69.9	6	62.8
13	143.7	28	77.8	Xyl-1	105.8		
14	44.0	29	33.4	2	74.8		
15	36.9	30	24.2	3	78.0		
				4	71.0		
				5	67.0		

References

1. M. Yoshikawa, T. Murakami, H. Matsuda, Chem. Pharm. Bull. **45**(12), 2034 (1997)

Stelmatotriterpenoside E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-longispinogenin

Biological source: *Stelmacrypton khasianum* [1]

$C_{48}H_{78}O_{20}$: 974.508

Mp: 226–229°C (dec) [1]
$[\alpha]_D^{25}$ − 43.5° (c 0.18, MeOH) [1]
HR-SI-MS *m/z*: 973.5006 $[M-H]^+$, 649.3939 $[M-2Glc]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.82 (s, CH_3-29), 0.83 (s, CH_3-30), 0.99 (s, CH_3-24), 1.02 (s, CH_3-25), 1.10 (s, CH_3-26), 1.12 (s, CH_3-27), 3.14 (dd, J = 12.5, 3.0, H-18), 3.67 (d, J = 10.0), 4.54 (H_2-23), 4.23 (H-2), 4.25 (H-3), 5.36 (t-like, H-12)
β-D-Glcp: 5.16 (d, J = 7.0, H-1), 4.10 (H-2), 4.24 (H-3), 4.21 (H-4), 3.90 (H-5), 4.32 (H-6), 4.50 (H-6)
β-D-Glcp′: 6.25 (d, J = 8.0, H-1), 4.10 (H-2), 4.21 (H-3), 4.34 (H-4), 4.10 (H-5), 4.36 (H-6), 4.71 (H-6)
β-D-Glcp″: 5.02 (d, J = 8.0, H-1), 4.00 (t, J = 8.0, H-2), 4.21 (H-3), 4.10 (H-4), 3.87 (H-5), 4.36 (H-6), 4.48 (H-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	46.93	C-16	23.86	Glc-1	105.73	Glc″-1	105.26
2	66.96	17	47.23	2	75.10	2	75.39
3	88.48	18	41.55	3	78.68	3	78.34
4	44.62	19	46.05	4	70.82	4	71.29
5	48.05	20	30.65	5	78.34	5	78.43
6	18.19	21	33.87	6	62.52	6	62.25
7	32.61	22	32.50	Glc′-1	95.59		
8	39.87	23	63.84	2	73.80		
9	47.23	24	14.70	3	78.51		
10	37.78	25	17.51	4	71.41		
11	23.77	26	17.40	5	77.92		
12	122.74	27	25.97	6	69.29		
13	144.07	28	176.47				
14	42.07	29	32.99				
15	28.19	30	23.57				

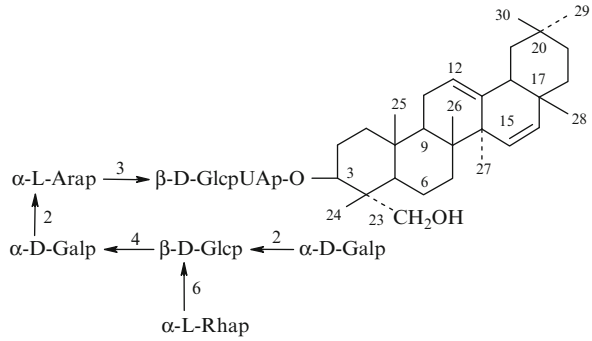
Pharm./Biol.: In Chinese folk medicine has been used for the treatment of colds, tracheitis, stomachaches, and rheumatic aches. The preliminary screening test for anti-cancer activity in vitro showed that the crude extracts of *S. khasianum* had significant cytotoxic activity against some human cancer cell lines [1]

References

1. Q. Zhang, Y. Zhao, B. Wang, G. Tu, Chem. Pharm. Bull. **51**(5), 574 (2003)

Phaseoloside D

CAS Registry Number: 30937-16-7



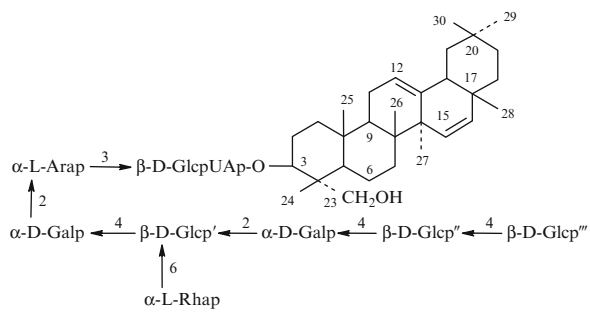
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-olean-12,15-diene
Biological source: *Phaseolus vulgaris* [1]
$C_{65}H_{104}O_{31}$: 1380.656
Mp: 218–220°C (MeOH) [1]
$[\alpha]_D$ + 38° (c 1.05, MeOH) [1]

References

1. V.Ya. Chirva, L.G. Kretsu, P.K. Kintya, Chem. Nat. Comp. **6**(5), 575 (1970)

Phaseoloside E

CAS Registry Number: 30915-09-4

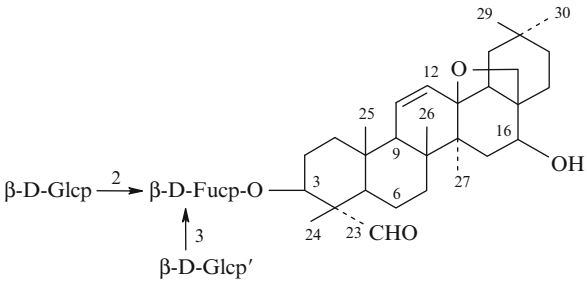


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Hydroxy-olean-12,15-diene
Biological source: *Phaseolus vulgaris* [1]
$C_{77}H_{124}O_{41}$: 1704.761

References

1. V.Ya. Chirva, P.K. Kintya, L.G. Kretsu, Chem. Nat. Comp. **6**(5), 579 (1970)

Clinoposaponin XVII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 23-Oxo-saikogenin F
Biological source: *Clinopodium chinense* [1]
$C_{48}H_{76}O_{18}$: 940.503
$[\alpha]_D^{23}$ + 70.4° (c 1.09, MeOH) [1]
SI-MS (positive ion mode) *m/z*: 963.4924 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.89, 0.92, 0.96, 1.12, 1.31, 1.40 (s, CH_3-25, 30, 29, 27, 26, 24), 3.33, 4.37 (d, J = 7.0, H_2-28), 4.05 (H-3), 4.52 (m, H-16), 5.66 (dd, J = 10.0, 3.0, H-12), 5.93 (brd, J = 10.0, H-11), 9.81 (s, H-23)
β-D-Fucp: 4.63 (d, J = 7.5, H-1), 4.56 (dd, J = 9.5, 7.5, H-2), 4.18 (H-3), 3.69 (m, H-5), 1.43 (d, J = 6.5, CH_3-6)
β-D-Glcp: 5.54 (d, J = 8.0, H-1), 4.05 (H-2), 4.30 (H-4), 3.63 (m, H-5), 4.31, 4.31 (H_2-6)
β-D-Glcp′: 5.30 (d, J = 8.0, H-1), 3.98 (dd, J = 9.0, 8.0, H-2), 4.20 (H-3), 4.18 (H-4), 3.93 (m, H-5), 4.30, 4.45 (H_2-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

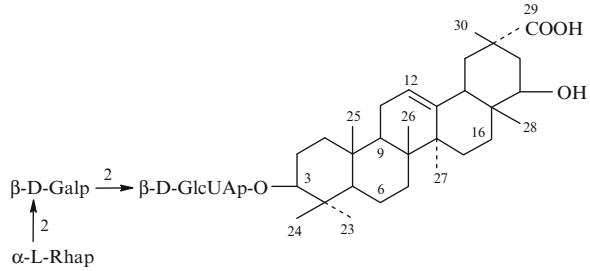
C-1	38.0	C-16	64.0	Fuc-1	103.0	Glc′-1	105.2
2	24.9	17	47.0	2	76.6	2	75.4
3	83.3	18	52.2	3	85.0	3	78.5
4	55.3	19	37.8	4	71.7	4	71.7
5	48.0	20	31.6	5	70.8	5	78.5
6	20.0	21	34.7	6	17.2	6	62.6
7	31.3	22	25.7	Glc-1	104.0		
8	42.6	23	209.1	2	76.1		
9	52.8	24	10.1	3	78.8		
10	35.8	25	18.2	4	71.9		
11	131.5	26	20.0	5	77.6		
12	131.5	27	20.9	6	62.9		
13	83.9	28	73.1				
14	45.7	29	33.7				
15	36.1	30	23.9				

Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

Saponin 2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 24-Deoxy-oxytrogenin
Biological source: *Abrus cantoniensis* [1], *Dalbergia hupeana* [2]
$C_{48}H_{76}O_{19}$: 956.498
$[\alpha]_D^{28}$ −16.6° (c 0.41, C_5H_5N) [1]
FAB-MS *m/z*: 955 $[M-H]^-$, 809 $[M-H-Rha]^-$, 647 $[M-H-Rha-Gal]^-$, 471 $[647-GlcUA]^-$

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 0.96, 1.22, 1.22, 1.24, 1.34, 1.34 (s, CH_3 × 6), 5.32 (s, H-12)
α-L-Rhap: 6.12 (s, H-1), 1.72 (d, J = 5.5, CH_3-6)
β-D-Galp: 5.49 (d, J = 7.4, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

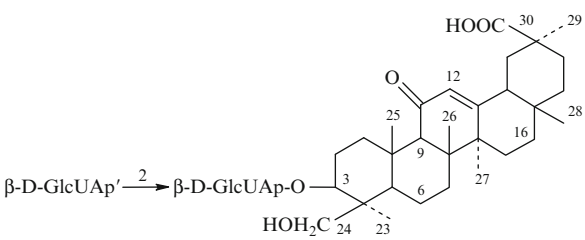
C-1	38.7	C-16	28.8	GlcUA-1	105.2	Rha-1	102.6
2	26.4	17	37.9	2	79.1	2	72.3
3	89.8	18	44.5	3	76.6	3	72.6
4	39.6	19	41.4	4	73.4	4	74.3
5	55.7	20	42.5	5	77.4	5	69.4
6	18.4	21	37.6	6	172.6	6	18.9
7	33.1	22	75.3	Gal-1	102.0		
8	39.9	23	28.3	2	78.7		
9	47.8	24	16.8	3	76.1		
10	36.8	25	15.6	4	70.4		
11	23.7	26	17.1	5	76.2		
12	122.7	27	25.4	6	61.8		
13	144.2	28	20.9				
14	42.3	29	181.4				
15	26.3	30	24.8				

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)
2. S. Yahara, S. Emura, H. Feng, T. Nohara, Chem. Pharm. Bull. **37**(8), 2136 (1989)

Licorice-Saponin G2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 24-Hydroxyglycyrrhetic Acid
Biological source: *Glycyrrhiza uralensis* [1, 2], *G. inflata* [3]
$C_{42}H_{62}O_{17}$: 838.398
Mp: 229–230°C [1]
$[\alpha]_D^{20}$ + 34° (c 0.12, MeOH) [1]
IR (KBr) ν_{max} cm^{-1} (Me ester): 3500–3000, 2910, 1720, 1648, 1385, 1040 [2]
UV λ_{max}^{MeOH} nm (ε): 249 (10600) [1]
FAB-MS *m/z* (Me ester): 861 $(M + Na)^+$, 839 $(M + H)^+$, 663, 487, 469 (positive), 837, 661, 485 (negative) [2]
^{1}H NMR (500 MHz, J/Hz, $C_5D_5N + D_2O$): 0.78, 1.05, 1.20, 1.34, 1.43, 1.48 (s, CH_3 × 6), 2.99 (brd, J = 14.0, H-18), 3.52 (dd, J = 4.8, 11.0, H-3), 4.58, 4.68 (d, J = 10.6, H_2-24), 5.94 (s, H-12), 5.34 (d, J = 7.7, H-1 of GlcUA), 5.64 (d, J = 6.7, H-1 of GlcUA′) [2]
^{13}C NMR (22.5 MHz, C_5D_5N) (for methyl derivate): [1]

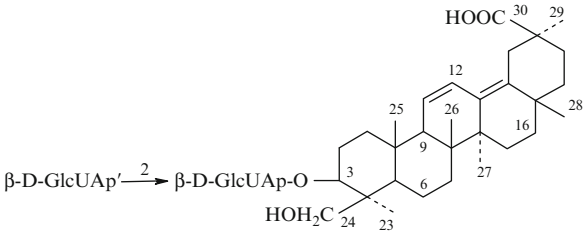
Table 1

C-3	89.9	GlcUA-1	104.1	GlcUA′-1	105.5
11	198.9	2	81.9	2	76.5
12	128.6	3	75.2	3	76.8
13	168.7	4	72.2	4	72.2
18	44.2	5	77.2	5	77.2
22	38.2	6	169.6	6	169.6
24	63.1				
29	28.0				
30	176.5				

References

1. I. Kitagawa, J.L. Zhou, M. Sakagami, E. Uchida, M. Yoshikawa, Chem. Pharm. Bull. **39**(1), 244 (1991)
2. I. Kitagawa, K. Hori, M. Sakagami, J.L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(8), 1337 (1993)
3. I. Kitagawa, K. Hori, M. Sakagami, F. Hashiuchi, M. Yoshikawa, J. Ren, Chem. Pharm. Bull. **41**(8), 1350 (1993)

Licorice-Saponin K2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 24-Hydroxy-olean-11,13(18)-dien-30-oic Acid

Biological source: *Glycyrrhiza uralensis* [1]

$C_{42}H_{62}O_{16}$: 822.403

Mp: 207–209°C [1]

$[\alpha]_D^{25}$ + 28° (MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3500-3100, 2928, 1690, 1395, 1050 [2]

UV λ_{max}^{MeOH} nm (ε): 241 (13000), 249 (15000), 259 (9200) [2]

FAB-MS *m/z*: 845 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.72, 0.88, 1.07, 1.33, 1.37, 1.45, 1.47 (CH_3 × 6), 3.50 (dd, J = 4.2, 9.6, Hα-3), 4.48, 4.58 (d, J = 9.8, H_2-24), 5.54 (brd, J = 12.0, H-11), 6.52 (brd, J = 12.0, H-12), 5.04 (d, J = 7.6, H-1 of GlcUA), 5.64 (d, J = 6.1, H-1 of GlcUA′), 5.54 (brd, H-11), 6.52 (brd, H-12) [1, 2]

^{13}C NMR (22.5 MHz, C_5D_5N) (for methyl derivate): [1]

Table 1

C-3	89.8	GlcUA-1	104.0	GlcUA′-1	104.5
11	125.3	2	80.8	2	76.6
12	126.4	3	76.6	3	77.0
13	135.2	4	72.1	4	72.1
18	135.2	5	77.7	5	77.4
22	36.2	6	169.8	6	169.8
24	62.4				
29	28.1				
30	178.2				

References

1. I. Kitagawa, J.L. Zhou, M. Sakagami, E. Uchida, M. Yoshikawa, Chem. Pharm. Bull. **39**(1), 244 (1991)
2. I. Kitagawa, K. Hori, J.-L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(8), 1337 (1993)

Saponin 4

See Figure Saponin 4

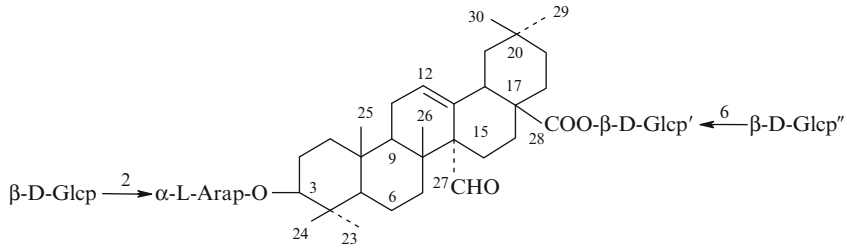
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 27-Al-oleanolic Acid

Biological source: *Fagonia cretica* [1]

$C_{53}H_{84}O_{23}$: 1088.540

$[\alpha]_D^{23}$ + 42.3° (c 0.70, MeOH) [1]

FAB-MS *m/z*: 1111 $[M + Na\text{-}H_2]^+$, 1083, 774, 439, 307 [1]



Saponin 4

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.56 (brd, J = 12.0, H-5), 0.76 (s, CH_3-29), 0.85 (s, CH_3-25), 0.85 (s, CH_3-30), 0.85, 1.52 (H_2-1), 0.98 (s, CH_3-24), 1.09 (s, CH_3-23), 1.10 (s, CH_3-26), 1.02, 1.18 (H_2-21), 1.06, 1.20 (H_2-19), 1.22, 1.36 (H_2-6), 1.21, 1.56 (H_2-7), 1.70, 1.85 (dt, J = 15.0, 4.0, H_2-22), 1.72 (H-9), 1.78, 2.06 (H_2-2), 1.98, 2.15 (H_2-16), 2.08 (H-11), 2.17, 2.27 (brd, J = 14.7, H-15), 3.11 (dd, J = 11.7, 3.9, H-3), 3.22 (dd, J = 14.3, 3.9, H-18), 5.94 (t, J = 3.5, H-12), 9.90 (s, CH_3-27); α-L-Arap: 4.90 (d, J = 5.9, H-1), 4.55 (t, J = 6.5, H-2), 4.35 (H-3), 4.37 (H-4), 3.78, 4.28 (d, J = 10.0, H_2-5); β-D-Glcp: 5.16 (d, J = 7.8, H-1), 4.07 (t, J = 9.0, H-2), 4.17 (t, J = 9.5, H-3), 4.29 (t, J = 9.0, H-4), 3.38 (m, H-5), 4.39 (d, J = 3.3, H-6); β-D-Glcp′: 6.27 (d, J = 8.0, H-1), 4.13 (t, J = 8.3, H-2), 4.21 (t, J = 9.0, H-3), 4.32 (t, J = 9.0, H-4), 4.13 (m, H-5), 4.35 (dd, 11.7, 3.0, H-6), 4.72 (dd, 11.7, 1.5, H-6); β-D-Glcp″: 5.03 (d, J = 8.0, H-1), 3.99 (t, J = 8.0, H-2), 4.17 (t, J = 8.5, H-3), 4.19 (t, J = 9.0, H-4), 3.88 (m, H-5), 4.35, 4.47 (H_2-6) [1]

^{13}C NMR: [1]

Table 1

C-1	38.5	C-13	136.9	C-25	16.2	Ara-1	104.8	Glc′-1	95.7
2	26.4	14	59.1	26	18.3	2	81.0	2	74.0
3	88.4	15	20.9	27	207.3	3	73.4	3	78.8
4	39.4	16	23.4	28	176.3	4	68.3	4	71.1
5	55.8	17	46.7	29	32.9	5	65.0	5	78.1
6	18.3	18	42.2	30	23.9	Glc-1	106.0	6	69.6
7	35.7	19	43.6			2	76.4	Glc″-1	105.3
8	41.9	20	30.6			3	78.2	2	75.2
9	49.7	21	33.6			4	71.7	3	78.5
10	37.4	22	32.0			5	78.0	4	71.7
11	24.1	23	28.0			6	62.7	5	78.5
12	128.4	24	16.7					6	62.7

(*continued*)

Pharm./Biol.: The saponin-containing fraction showed significant anti-inflammatory activity and considerable analgesic and antipyretic effects [2]

References

1. S.M. Abdel Khalik, T. Miyase, H.A. El-Ashaal, F.R. Melek, Phytochemistry **54**, 853 (2000)
2. O.A. El-Shabrawy, O.D. El-Gindi, F.R. Melek, S.M. Abdel-Khalik, M.Y. Haggag, Fitoterapia **68**, 219 (1997)

Saponin 2 from *Fagonia cretica*

See Figure Saponin 2 from *Fagonia cretica*

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 27-Hydroxy-oleanolic Acid

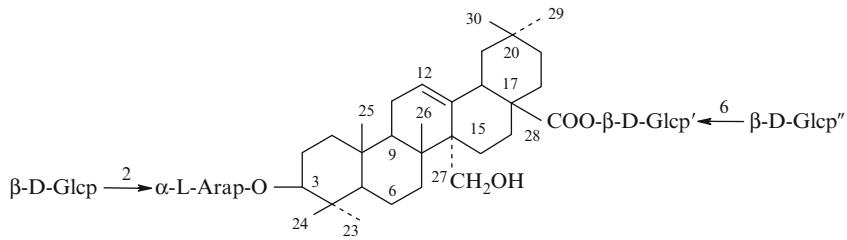
Biological source: *Fagonia cretica* [1]

$C_{53}H_{86}O_{23}$: 1090.555

$[\alpha]_D^{23}$ + 4.2° (c 1.46, MeOH) [1]

FAB-MS *m/z*: 1081, 926, 820, 750, 460 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.82 (H-5), 0.83 (s, CH_3-29), 0.90 (s, CH_3-25), 0.91 (s, CH_3-30), 0.92, 1.47 (H_2-1), 1.02 (s, CH_3-24), 1.10, 1.28 (H_2-21), 1.11 (s, CH_3-26), 1.16 (s, CH_3-23), 1.8, 2.01 (H_2-2), 1.32, 1.72 (H_2-19), 1.33, 1.44 (H_2-6), 1.44, 1.83 (H_2-7), 1.44, 2.3 (brd, J = 14.7, H-15),



Saponin 2 from *Fagonia cretica*

1.73, 1.94 (H_2-22), 1.95 (H-11), 1.96, 2.10 (H_2-16), 2.15 (H-9), 3.07 (dd, J = 12.0, 4.0, H-3), 3.28 (dd, J = 14.7, 3.3, H-18), 3.75, 4.01 (d, J = 10.4, H_2-27), 5.79 (t, J = 3.3, H-12); α-L-Arap: 4.92 (d, J = 6.0, H-1), 4.55 (t, J = 6.0, H-2), 4.35 (H-3), 4.37 (H-4), 3.84, 4.28 (d, J = 10.0, H_2-5); β-D-Glcp: 5.16 (d, J = 8.0, H-1), 4.07 (t, J = 8.7, H-2), 4.17 (t, J = 9.0, H-3), 4.31 (t, J = 9.5, H-4), 3.8 (m, H-5), 4.41 (d, J = 3.3, H-6);

β-D-Glcp′: 6.26 (d, J = 8.0, H-1), 4.14 (t, J = 8.0, H-2), 4.21 (t, J = 8.5, H-3), 4.31 (t, J = 8.5, H-4), 4.13 (m, H-5), 4.36, 4.70 (dd, J = 11.0, 1.5, H_2-6); β-D-Glcp″: 5.03 (d, J = 8.0, H-1), 3.99 (t, J = 8.0, H-2), 4.17 (t, J = 8.5, H-3), 4.19 (t, J = 9.0, H-4), 3.88 (m, H-5), 4.35, 4.47 (H_2-6) [1]

^{13}C NMR: [1]

Table 1

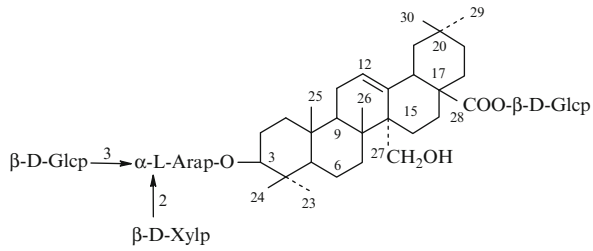
C-1	38.7	C-16	23.5	Ara-1	104.7	Glc′-1	95.8
2	26.4	17	46.9	2	80.9	2	73.9
3	88.8	18	41.5	3	73.4	3	78.8
4	39.5	19	45.4	4	68.2	4	71.1
5	55.7	20	30.8	5	64.8	5	78.0
6	18.7	21	33.9	Glc-1	106.0	6	69.5
7	33.6	22	32.6	2	76.3	Glc″-1	105.4
8	40.6	23	28.1	3	78.1	2	75.2
9	48.7	24	16.7	4	71.7	3	78.5
10	37.2	25	16.1	5	78.2	4	71.7
11	24.4	26	19.0	6	62.6	5	78.5
12	128.0	27	64.5			6	62.7
13	139.2	28	176.6				
14	48.0	29	33.1				
15	23.9	30	23.9				

Pharm./Biol.: The saponin-containing fraction showed significant anti-inflammatory activity and considerable analgesic and antipyretic effects [2]

References

1. S.M. Abdel Khalik, T. Miyase, H.A. El-Ashaal, F.R. Melek, Phytochemistry **54**, 853 (2000)
2. O.A. El-Shabrawy, O.D. El-Gindi, F.R. Melek, S.M. Abdel-Khalik, M.Y. Haggag, Fitoterapia **68**, 219 (1997)

Compound 5 from *Fagonia arabica*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 27-Hydroxy-oleanolic Acid

Biological source: *Fagonia arabica* [1]

$C_{52}H_{84}O_{22}$: 1060.545

$[\alpha]_D^{25}$ + 16.0° (c 0.50, MeOH) [1]

FAB-MS *m/z*: 1083 $[M + Na]^+$, 921, 840, 664, 576, 532, 437, 391, 307 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.88, 0.91, 1.09, 1.11, 1.23, (s, $CH_3 \times 6$), 3.13 (dd, J = 12.0, 4.5, H-3), 5.80 (t, J = 3.0, H-12)

α-L-Arap: 4.70 (d, J = 7.1, H-1), 4.64 (dd, J = 7.0, .8.8, H-2), 4.27 (H-3), 4.48 (m, H-4), 3.69 (d, J = 11.0, H-5), 4.16 (H-5)

β-D-Glcp: 5.26 (d, J = 7.8, H-1), 3.99 (t, J = 7.8, H-2), 4.2 (H-3), 4.30 (H-4), 3.92 (m, H-5), 4.24, 4.44 (H_2-6)

β-D-Xylp: 5.37 (d, J = 7.6, H-1), 4.0 (t, J = 8.0, H-2), 4.09 (t, J = 8.0, H-3), 4.2 (H-4), 3.44 (brt, J = 10.0, H_2-5)

β-D-Glcp′: 6.34 (d, J = 8.1, H-1), 4.18 (t, J = 8.0, H-2), 4.26 (H-3), 4.30 (H-4), 4.02 (m, H-5), 4.38 (dd, J = 12.0, 4.5, H-6), 4.44 (H-6) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.6	Ara-1	105.6	Xyl-1	105.1
2	26.7	17	48.0	2	77.5	2	76.0
3	89.1	18	41.6	3	83.7	3	78.5
4	39.8	19	46.9	4	68.9	4	71.6
5	55.9	20	30.8	5	66.1	5	67.1
6	18.6	21	33.9	Glc-1	105.1	Glc′-1	95.8

(*continued*)

Table 1 (continued)

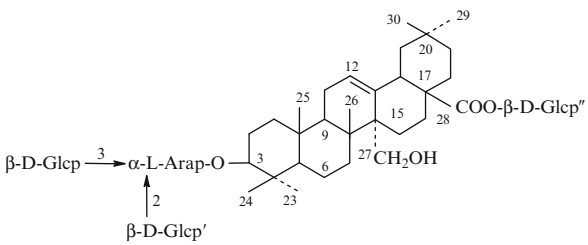
7	33.7	22	32.6	2	75.3	2	74.2
8	40.7	23	27.8	3	79.0	3	79.3
9	48.7	24	16.1	4	71.3	4	71.4
10	37.2	25	16.5	5	78.4	5	79.0
11	23.6	26	18.9	6	62.6	6	62.3
12	128.0	27	64.5				
13	139.2	28	176.5				
14	45.4	29	33.1				
15	24.4	30	23.8				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. T. Miyase, F.R. Melek, O.D. El-Gindi, S.M. Abdel-Khalik, M.R. El-Gindi, M.Y. Haggag, S.H. Hilal, Phytochemistry **41**, 1175 (1996)

Compound 12 from *Fagonia glutinosa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 27-Hydroxy-oleanolic Acid

Biological source: *Fagonia glutinosa* [1]

$C_{53}H_{86}O_{23}$: 1090.555

$[\alpha]_D^{23}$ + 21.8° (c 1.50, MeOH) [1]

FAB-MS *m/z*: 1113$[C_{53}H_{86}O_{23} + Na]^+$, 1081, 951, 531, 487, 399 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.94 (dt, J = 12.0, 2.4, Hα-1), 1.45 (brd, J = 12.0, Hβ-1), 1.97 (Hα-2), 1.78 (Hβ-2), 3.11 (dd, J = 12.7, 4.7, H-3), 0.85 (H-5), 1.50 (brd, J = 12.5, Hα-6), 1.32 (Hβ-6), 1.84 (Hα-7), 1.41 (brd, J = 12.0, Hβ-7), 2.17 (brd, J = 12.0, 8.6, H-9), 1.93 (H-11), 5.79 (t, J = 3.0, H-12), 1.45 (brd, J = 12.0, Hα-15), 2.33 (dt, J = 13.3, 4.0, Hβ-15), 2.11 (dt, J = 13.3, 2.7, Hα-16), 1.97 (brd, J = 12.0, Hβ-16), 3.28 (dd, J = 14.7, 4.0, H-18), 1.73 (brt, J = 13.3, Hα-19), 1.32 (brd, J = 13.3, Hβ-19), 1.29 (dt, J = 12.0, 4.0, Hα-21), 1.07 (Hβ-21), 1.73 (brd, J = 13.3, Hα-22), 1.86 (Hβ-22), 1.20 (s, CH_3-23), 1.07 (s, CH_3-24), 0.85 (s, CH_3-25), 1.10 (s, CH_3-26), 3.76 (d, J = 10.5, H-27), 4.03 (H-27), 0.85 (s, CH_3-29), 0.91 (s, CH_3-30); α-L-Arap: 4.74 (d, J = 6.8, H-1), 4.70 (t, J = 7.0, H-2), 4.31 (dd, J = 6.8, 3.5, H-3), 4.48 (m, H-4), 3.70 (d, J = 11.0, H-5), 4.18 (d, J = 11.0, H-5); β-D-Glcp: 5.27 (d, J = 8.0, H-1), 3.98 (t, J = 8.0, H-2), 4.20 (t, J = 8.0, H-3), 4.19 (t, J = 8.0, H-4), 3.92 (m, H-5), 4.31 (dd, J = 12.0, 4.0, H-6), 4.47 (dd, J = 12.0, 2.0, H-6); β-D-Glcp′: 5.49 (d, J = 8.0, H-1), 4.03 (t, J = 8.0, H-2), 4.19 (t, J = 8.0, H-3), 4.15 (t, J = 8.0, H-4), 3.70 (m, H-5), 4.25 (dd, J = 12.0, 4.0, H-6), 4.34 (d, J = 12.0, H-6); β-D-Glcp″: 6.34 (d, J = 8.1, H-1), 4.21 (t, J = 8.0, H-2), 4.28 (t, J = 8.0, H-3), 4.35 (t, J = 8.0, H-4), 4.03 (m, H-5), 4.38 (dd, J = 12.0, 4.0, H-6), 4.46 (d, J = 10.0, H-6) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

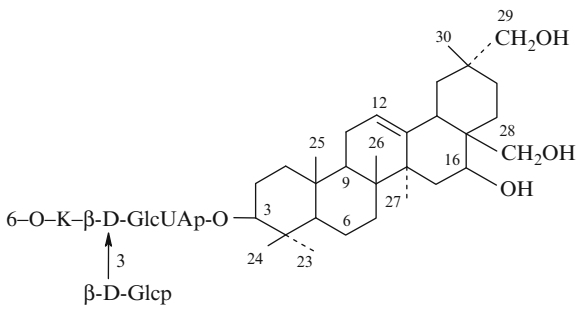
C-1	38.8	C-16	23.6	Ara-1	105.4	Glc′-1	104.5
2	26.6	17	46.9	2	77.5	2	76.1
3	88.9	18	41.6	3	83.3	3	78.5
4	39.7	19	45.4	4	68.7	4	72.5
5	55.8	20	30.8	5	65.9	5	77.4
6	18.6	21	33.9	Glc-1	105.0	6	63.3
7	33.7	22	32.6	2	75.3	Glc″-1	95.8
8	40.7	23	28.0	3	78.7	2	74.2
9	48.7	24	16.7	4	71.6	3	79.0
10	37.2	25	16.0	5	78.4	4	71.3
11	24.4	26	19.0	6	62.6	5	79.3
12	128.0	27	64.5			6	62.3
13	139.1	28	176.5				
14	48.0	29	33.1				
15	23.9	30	23.8				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. F.R. Melek, T. Miyase, M.R. El-Gindy, S.M. Abdel-Khalik, N.S. Ghaly, M. El-Kady, Pharmazie **55**, 772 (2000)

Compound 3 from *Gymnema sylvestre*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 29-Hydroxy-longispinogenin

Biological source: *Gymnema sylvestre* [1]

$C_{42}H_{67}O_{14}K$: 834.416

Mp: 290–293°C [1]

$[\alpha]_D^{20}$ + 10.3° (c 0.12, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3442, 2928, 1618, 1430, 1028 [1]

HR-ESI-MS *m/z*: 851 $[(M + K) + H]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.80 (s, CH_3-25), 0.96 (s, CH_3-24), 0.98 (s, CH_3-26), 1.01 (s, CH_3-30), 1.24 (s, CH_3-23), 1.46 (s, CH_3-27), 3.28 (m, H-3), 3.73 (d, J = 10.4, Ha-28), 4.45 (d, J = 10.4, Hb-28), 4.01 (d, J = 7.6, Ha-29), 4.06 (d, J = 7.6, Hb-29),4.79 (m, H-16), 5.30 (brs, H-12)

β-D-GlcUAp: 4.80 (d, J = 7.2, H-1), 4.02 (H-2), 4.27 (H-3), 4.26 (H-4), 4.40 (H-5)

β-D-Glcp: 5.24 (d, J = 7.2, H-1), 4.01 (H-2), 4.20 (H-3), 4.06 (H-4), 4.01 (H-5), 4.28 (H-6), 4.56 (dd, J = 10.4, 4.0, H-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	67.1	GlcUA-1	106.2
2	26.7	17	41.7	2	74.5
3	89.2	18	44.0	3	87.5
4	39.7	19	41.7	4	72.1
5	55.8	20	42.1	5	76.3
6	18.7	21	29.2	6	176.8
7	33.2	22	25.9	Glc-1	105.6
8	40.4	23	28.4	2	75.4
9	47.3	24	17.2	3	78.2
10	37.0	25	16.0	4	71.6
11	24.1	26	17.3	5	78.8
12	122.8	27	27.5	6	62.5
13	144.1	28	69.1		
14	44.1	29	74.2		
15	37.0	30	20.4		

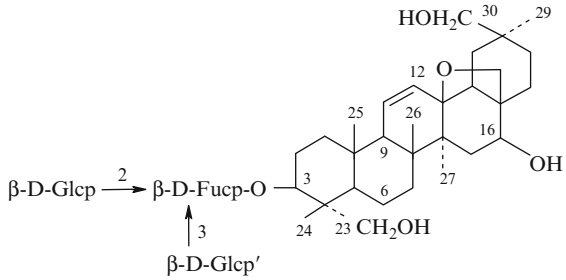
Pharm./Biol.: Showed antisweet activity [1]

References

1. W. Ye, X. Liu, Q. Zhang, Ch. Tao Che, S. Zhao, J. Nat. Prod. **64**(2), 232 (2001)

Clinoposaponin XIX

CAS Registry Number: 197633-85-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-Hydroxy-saikogenin F

Biological source: *Clinopodium chinense* [1]

$C_{48}H_{78}O_{19}$: 958.513

$[\alpha]_D^{23}$ + 26.5° (c 0.13, MeOH) [1]

SI-MS (positive ion mode) *m/z*: 981.5030 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.93 (brd, J = 10.5, H-11), 5.63 (dd, J = 10.5, 3.0, H-12), 1.07 (s, CH_3-24), 0.96 (s, CH_3-25), 1.38 (s, CH_3-26), 1.17 (s, CH_3-27), 1.20 (s, CH_3-29)

β-D-Fucp: 4.90 (d, J = 8.0, H-1), 1.40 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.58 (d, J = 8.0, H-1)

β-D-Glcp′: 5.29 (d, J = 8.0, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

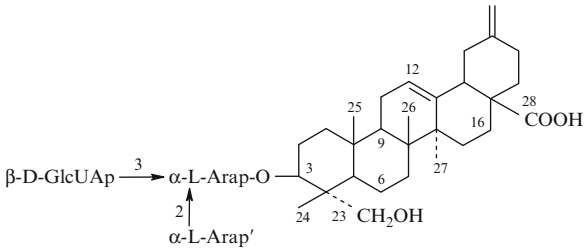
C-1	38.7	C-16	64.3	Fuc-1	104.1	Glc′-1	105.2
2	26.0	17	47.0	2	77.2	2	75.4
3	82.7	18	51.9	3	84.9	3	78.4
4	43.9	19	31.5	4	72.0	4	71.7
5	47.9	20	36.3	5	70.5	5	78.5
6	17.7	21	30.0	6	17.2	6	62.6
7	31.7	22	25.6	Glc-1	104.1		
8	42.3	23	64.3	2	76.3		
9	53.1	24	12.7	3	78.9		
10	36.6	25	18.7	4	72.3		
11	132.1	26	20.1	5	77.5		
12	131.2	27	21.0	6	63.2		
13	84.1	28	73.1				
14	45.8	29	29.0				
15	36.3	30	65.3				

Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

Fargoside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-hederagenin

Biological source: *Holboellia fargesii* [1]
$C_{45}H_{68}O_{18}$: 896.440
$[\alpha]_D^{23}$ + 54.0° (c 0.6, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3405, 2929, 1691, 1443, 1382, 1171, 1058 [1]
MALDI-TOF-MS *m/z*: 919 $[M + Na]^+$, 935 $[M + K]^+$ [1]
HR-FAB-MS *m/z* : 895.4313 $[M-H]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.19 (H-3), 1.68 (d, J = 9.6, H-5), 5.48 (brt, J = 3.2, H-12), 3.22 (dd, J = 13.1, 4.5, H-18), 3.76, 4.43 (d, J = 10.5, H-23), 1.09, 0.93, 1.00, 1.21 (s, CH_3-24, 25, 26, 27), 4.74, 4.79 (brs, H_2-29)
α-L-Arap: 4.96 (d, J = 7.2, H-1), 4.70 (dd, J = 7.4, 7.2, H-2), 4.12 (H-3), 4.47 (H-4), 3.52 (brd, J = 12.0, H-5), 4.12 (brd, J = 12.4, H-5)
β-D-GlcUAp: 5.38 (d, J = 7.8, H-1), 4.05 (H-2), 4.31 (t, J = 9.0, H-3), 4.53 (t, J = 9.0, H-4), 4.62 (d, J = 9.0, H-5)
α-L-Arap′: 5.32 (d, J = 7.5, H-1), 4.45 (dd, J = 8.2, 7.5, H-2), 4.06 (H-3), 4.17 (H-4), 3.47 (brd, J = 12.1, H-5), 4.18 (H-5) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

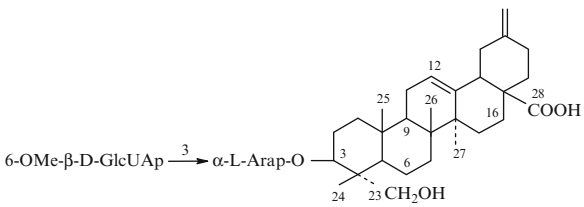
Table 1

C-1	38.9	C-16	23.8	Ara-1	104.5	Ara′-1	105.0
2	26.0	17	47.0	2	77.6	2	73.6
3	82.1	18	48.1	3	83.8	3	75.1
4	43.7	19	42.0	4	69.1	4	69.8
5	47.9	20	149.1	5	66.4	5	67.2
6	18.2	21	30.4	GlcUA-1	105.4		
7	32.9	22	38.4	2	75.1		
8	39.8	23	64.2	3	77.8		
9	48.0	24	13.5	4	73.4		
10	36.9	25	16.1	5	77.6		
11	23.8	26	17.4	6	172.7		
12	123.1	27	26.2				
13	144.2	28	179.4				
14	42.1	29	107.1				
15	28.3						

References

1. H. Fu, K. Koike, Q. Zheng, K.-S. Mitsunaga, Z. Jia, T. Nikaido, W. Lin, D. Guo, L. Zhang, Chem. Pharm. Bull. **49**(8), 999 (2001)

Fargoside D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-hederagenin

Biological source: *Holboellia fargesii* [1]

$C_{41}H_{62}O_{14}$: 778.413

$[\alpha]_D^{23}$ + 65.6° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3418, 2936, 1739, 1689, 1443, 1383, 1134, 1057 [1]

MALDI-TOF-MS *m/z*: 801 $[M + Na]^+$, 817 $[M + K]^+$ [1]

HR-FAB-MS *m/z* : 777.4055 $[M-H]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.31 (dd, J = 11.9, 4.6, H-3), 1.72 (d, J = 11.0, H-5), 5.49 (brt, J = 3.4, H-12), 3.23 (dd, J = 13.7, 5.0, H-18), 3.74, 4.35 (d, J = 10.5, H_2-23), 0.94, 0.92, 1.01, 1.21 (s, CH_3-24, 25, 26, 27), 4.75, 4.80 (brs, H_2-29)

α-L-Arap: 4.98 (d, J = 7.5, H-1), 4.60 (dd, J = 8.2, 7.5, H-2), 4.06 (H-3), 4.34 (H-4), 3.65 (brd, J = 12.1, H-5), 4.18 (dd, J = 12.1, 2.0, H-5)

β-D-GlcUAp: 5.44 (d, J = 7.8, H-1), 4.04 (dd, J = 9.2, 7.8, H-2), 4.29 (t, J = 9.2, H-3), 4.46 (t, J = 9.2, H-4), 4.58 (d, J = 9.2, H-5), 3.73 (s, OCH_3) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

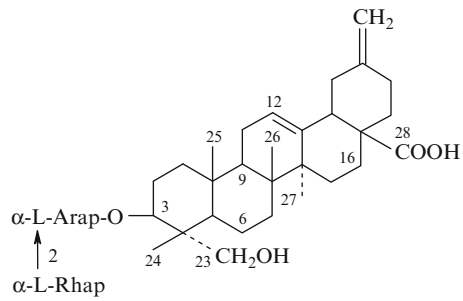
C-1	38.9	C-16	23.8	Ara-1	106.7
2	26.3	17	47.0	2	72.1
3	81.8	18	47.9	3	84.1
4	43.6	19	41.9	4	69.4
5	47.5	20	149.1	5	67.3
6	18.1	21	30.4	GlcUA-1	106.8
7	32.9	22	38.4	2	75.4
8	39.8	23	64.2	3	77.6
9	48.1	24	13.7	4	73.2
10	36.9	25	16.1	5	77.4
11	23.8	26	17.4	6	170.6
12	123.1	27	26.2	MeO	52.1
13	144.1	28	179.4		
14	42.1	29	107.1		
15	28.3				

(*continued*)

References

1. H. Fu, K. Koike, Q. Zheng, K.-S. Mitsunaga, Z. Jia, T. Nikaido, W. Lin, D. Guo, L. Zhang, Chem. Pharm. Bull. **49**(8), 999 (2001)

Glycoside L-E_2 from *Hedera canariensis*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-hederagenin

Biological source: *Hedera canariensis* [1]

$C_{40}H_{62}O_{12}$: 734.424

^{1}H NMR (J/Hz, C_5D_5N): 4.20 (dd, H-3), 5.39 (brt, J = 3.0, H-12), 3.10 (dd, J = 6.0, 14.0, H-18), 2.50 (t, J = 14.0, H-19), 2.05 (H-19), 4.05 (d, J = 11.0, Ha-23), 3.68 (Hb-23), 4.71 (m, Ha-29), 4.67 (m, Hb-29), 1.13, 0.95. 0.90, 0.82 (s, CH_3 × 4)

α-L-Arap: 5.07 (d, J = 6.0, H-1), 4.48 (dd, J = 8.0, H-2), 4.09 (dd, J = 3.5, H-3), 4.16 (m, H-4), 3.68 (dd, J = 2.5, 12.0, Ha-5), 4.22 (dd, J = 3.5, Hb-5)

α-L-Rhap: 6.09 (d, J = 1.5, H-1), 4.67 (dd, J = 3.5, H-2), 4.57 (dd, J = 9.5, H-3), 4.24 (t, J = 9.5, H-4), 4.59 (d, H-5), 1.56 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

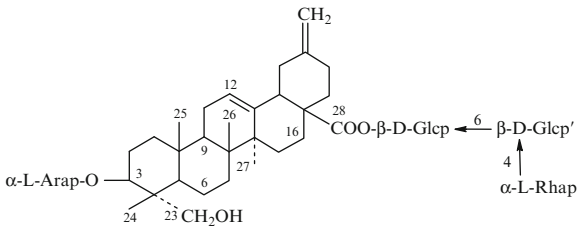
Table 1

C-1	39.2	C-16	24.0	Ara-1	104.5
2	26.7	17	47.3	2	76.1
3	81.3	18	48.1	3	74.1
4	43.7	19	42.2	4	69.4
5	47.8	20	149.3	5	65.4
6	18.4	21	30.2	Rha-1	101.9
7	33.0	22	38.6	2	72.4
8	40.0	23	64.1	3	72.6
9	48.3	24	14.2	4	74.4
10	37.1	25	16.3	5	70.1
11	24.0	26	17.7	6	18.8
12	123.3	27	26.5		
13	144.4	28	179.9		
14	42.4	29	107.5		
15	28.5				

References

1. A.S. Shashkov, V.I. Grishkovets, L.A. Yakovishin, I.N. Shchipanova, V.Ya. Chirva, Chem. Nat. Comp. **34**(6), 690 (1998)

Glycoside L-G$_1$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-hederagenin

Biological source: *Hedera canariensis* [1]

$C_{52}H_{82}O_{22}$: 1058.529

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.01 (dd, J = 3.8, 14.0, H-3), 5.39 (brt, J = 3.5, H-12), 3.03 (dd, J = 5.0, 13.5, H-18), 2.46 (t, J = 14.0, H-19), 4.1–4.3 (m, Ha-23), 3.6–3.75 (m, Hb-23), 4.70 (m, Ha-29), 4.65 (m, Hb-29), 1.12, 1.01, 0.91, 0.84 (s, CH_3 × 4)

α-L-Arap: 4.92 (d, J = 7.5, H-1), 4.38 (dd, J = 9.0, H-2), 4.02 (dd, J = 3.2, H-3), 4.1–4.3 (m, H-4), 4.23 (dd, J = 3.2, 10.5, Ha-5), 3.6–3.75 (m, Hb-5)

β-D-Glcp: 6.11 (d, J = 8.5, H-1), 4.08 (t, J = 9.0, H-2), 4.1-4.3 (m, H-3,-4), 4.00 (m, H-5), 4.63 (Ha-6), 4.28 (Hb-6)

β-D-Glcp′: 4.91 (d, J = 8.0, H-1), 3.90 (t, J = 9.0, H-2), 4.08 (t, J = 9.0, H-3), 4.29 (t, J = 9.0, H-4), 3.58 (m, H-5), 4.16 (Ha-6), 4.01 (Ha-6)

α-L-Rhap: 5.76 (d, J = 1.5, H-1), 4.65 (dd, J = 3.5, H-2), 4.53 (dd, J = 9.5, H-3), 4.29 (t, J = 9.5, H-4), 4.87 (H-5), 1.64 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (250 MHz, C_5D_5N): [1]

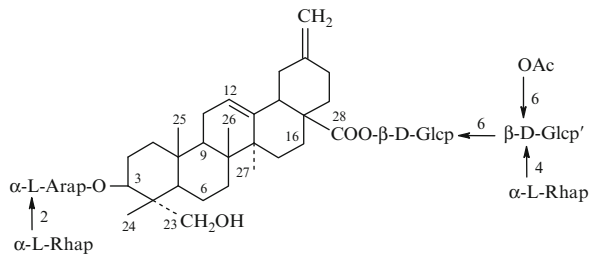
Table 1

C-1	39.3	C-16	24.0	Ara-1	106.7	Glc′-1	104.9
2	26.6	17	47.3	2	73.1	2	75.3
3	81.3	18	47.7	3	74.8	3	76.6
4	43.7	19	42.0	4	69.7	4	78.5
5	47.8	20	148.6	5	67.0	5	77.2
6	18.5	21	30.2	Glc-1	96.1	6	61.2
7	33.2	22	37.7	2	74.0	Rha-1	102.8
8	40.0	23	64.1	3	78.6	2	72.5
9	48.3	24	14.2	4	70.8	3	72.8
10	37.1	25	16.3	5	78.2	4	74.0
11	24.0	26	17.7	6	69.4	5	70.8
12	123.2	27	26.5			6	18.8
13	143.7	28	176.3				
14	42.4	29	107.6				
15	28.5						

References

1. L.A. Yakovishin, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **35**(5), 543 (1999)

Glycoside L-G$_{1B}$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-hederagenin

Biological source: *Hedera canariensis* [1]

$C_{60}H_{94}O_{27}$: 1246.598

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.38 (brt, J = 3.5, H-12), 3.04 (dd, J = 5.0, 13.5, H-18), 2.45 (t, J = 14.0, H-19), 3.71 (d, J = 11.0, Hb-23), 4.05 (d, J = Ha-23), 4.71 (m, Ha-29), 4.65 (m, Hb-29), 1.11, 0.99, 0.92, 0.83 (s, CH_3 × 4)

α-L-Arap: 5.10 (d, J = 6.0, H-1), 4.50 (dd, J = 7.0, H-2), 4.10 (dd, J = 3.5, H-3), 4.19 (m, H-4), 3.70 (dd, J = 2.0, Ha-5), 4.27 (dd, J = 4.0, 10.0, Hb-5)

α-L-Rhap: 6.12 (d, J = 1.5, H-1), 4.70 (dd, J = 3.5, H-2), 4.60 (dd, J = 9.5, H-3), 4.27 (t, J = 9.5, H-4), 4.62 (d, H-5), 1.59 (d, J = 6.5, CH_3-6)

β-D-Glcp: 6.08 (d, J = 8.0, H-1), 3.95 (t, J = 8.5, H-2), 4.01 (t, J = 9.0, H-3), 4.16 (t, J = 9.0, H-4), 4.00 (m, H-5), 4.55 (Ha-6), 4.23 (Hb-6)

β-D-Glcp′: 4.86 (d, J = 8.0, H-1), 3.83 (t, J = 8.5, H-2), 3.92–4.04 (m, H-3,-4), 3.67 (m, H-5), 4.49 (Ha-6), 4.39 (Hb-6)

α-L-Rhap′: 5.40 (d, J = 1.5, H-1), 4.50 (dd, J = 3.5, H-2), 4.40 (dd, J = 9.0, H-3), 4.23 (t, J = 9.5, H-4), 4.69 (d, J = 6.5, H-5), 1.52 (CH_3-6) [1]

^{13}C NMR (250 MHz, C_5D_5N): [1]

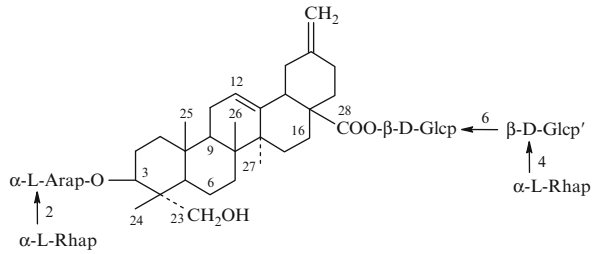
Table 1

C-1	39.2	C-16	24.0	Ara-1	104.5	Glc′-1	105.0
2	26.5	17	47.4	2	76.0	2	75.3
3	81.3	18	47.8	3	74.0	3	76.5
4	43.6	19	41.9	4	69.3	4	79.5
5	47.6	20	148.6	5	65.4	5	74.0
6	18.5	21	30.2	Rha-1	101.0	6	64.1
7	33.4	22	37.8	2	72.3	Ac-1	171.7
8	40.1	23	64.0	3	72.6	2	21.4
9	48.4	24	14.1	4	74.4	Rha′-1	103.0
10	37.1	25	16.4	5	70.0	2	72.6
11	24.1	26	17.8	6	18.8	3	72.7
12	123.1	27	26.4	Glc-1	96.0	4	74.0
13	143.7	28	176.4	2	74.1	5	71.0
14	42.4	29	107.6	3	78.7	6	18.8
15	28.6			4	71.0		
				5	78.3		
				6	69.6		

References

1. L.A. Yakovishin, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **35**(5), 543 (1999)

Glycoside L-H$_3$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-hederagenin

Biological source: *Hedera canariensis* [1]

$C_{58}H_{92}O_{26}$: 1204.587

^{1}H NMR (J/Hz, C_5D_5N): 5.38 (brt, J = 3.5, H-12), 3.03 (dd, J = 5.0, 13.5, H-18), 2.47 (t, J = 14.0, H-19), 3.71 (d, J = 11.0, Hb-23), 4.06 (d, Ha-23), 4.70 (m, Ha-29), 4.64 (m, Hb-29), 1.11, 1.00. 0.90, 0.84 (s, CH_3 × 4)

α-L-Arap: 5.11 (d, J = 6.0, H-1), 4.52 (dd, J = 7.0, H-2), 4.11 (dd, J = 3.5, H-3), 4.19 (m, H-4), 3.71 (dd, J = 2.0, Ha-5), 4.27 (dd, J = 4.0, 10.0, Hb-5)

α-L-Rhap: 6.13 (d, J = 1.5, H-1), 4.69 (dd, J = 3.5, H-2), 4.61 (dd, J = 9.5, H-3), 4.27 (t, J = 9.5, H-4), 4.62 (d, H-5), 1.60 (d, J = 6.5, CH_3-6)

β-D-Glcp: 6.12 (d, J = 8.5, H-1), 4.08 (t, J = 9.0, H-2), 4.1-4.3 (m, H-3-4), 4.01 (m, H-5), 4.62 (Ha-6), 4.28 (Hb-6)

β-D-Glcp′: 4.92 (d, J = 8.0, H-1), 3.90 (dd, J = 9.0, H-2), 4.08 (t, J = 9.0, H-3), 4.30 (t, J = 9.0, H-4), 3.58 (m, H-5), 4.15 (Ha-6), 4.01 (Hb-6)

α-L-Rhap′: 5.76 (d, J = 1.5, H-1), 4.64 (dd, J = 3.5, H-2), 4.51 (dd, J = 9.5, H-3), 4.30 (t, J = 9.5, H-4), 4.87 (d, H-5), 1.64 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.3	C-16	24.1	Ara-1	104.5	Glc′-1	104.9
2	26.4	17	47.3	2	76.1	2	75.3

(*continued*)

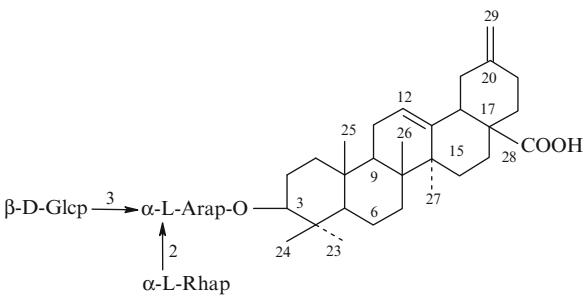
Table 1 (continued)

3	81.3	18	47.8	3	74.1	3	76.6
4	43.7	19	41.9	4	69.3	4	78.6
5	47.6	20	148.6	5	65.5	5	77.2
6	18.4	21	30.3	Rha-1	101.9	6	61.1
7	33.4	22	37.8	2	72.4	Rha′-1	102.9
8	40.1	23	64.1	3	72.6	2	72.6
9	48.4	24	14.2	4	74.4	3	72.8
10	37.1	25	16.4	5	70.0	4	74.0
11	24.1	26	17.8	6	18.7	5	70.6
12	123.1	27	26.3	Glc-1	96.0	6	18.7
13	143.8	28	176.3	2	74.0		
14	42.4	29	107.7	3	78.6		
15	28.5			4	70.7		
				5	78.1		
				6	69.3		

References

1. A.S. Shashkov, V.I. Grishkovets, L.A. Yakovishin, I.N. Shchipanova, V.Ya. Chirva, Chem. Nat. Comp. **34**(6), 690 (1998)

Guaiacin C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-olean-12,20(29)-dien-28-oic Acid

Biological source: *Guaiacum officinale* [1]

$C_{46}H_{72}O_{16}$: 880.482

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.83, 0.85, 0.94, 1.02, 1.19 (s, CH_3 × 5), 4.58 (brs, H_2-29), 5.29 (t, H-12)

α-L-Arap: 4.50 (d, J = 7.2, H-1)

β-D-Glcp: 4.48 (d, J = 7.4, H-1)

α-L-Rhap: 5.20 (d, J = 1.47, H-1), 1.21 (d, J = 6.27, CH_3-6) [1]

^{13}C NMR(75 MHz, CD_3OD): [1]

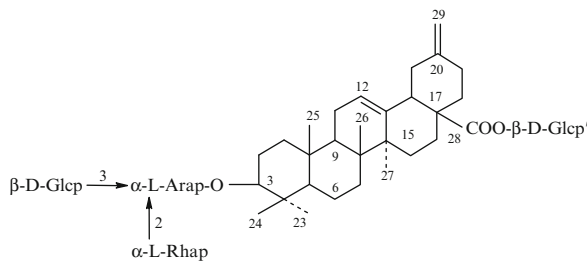
Table 1

C-1	40.12	C-16	24.54	Ara-1	105.02	Rha-1	101.99
2	27.17	17	48.72	2	75.34	2	72.2
3	89.69	18	49.28	3	81.93	3	72.2
4	40.39	19	42.97	4	68.39	4	73.91
5	57.24	20	150.16	5	64.49	5	70.3
6	19.35	21	39.35	Glc-1	104.28	6	17.99
7	14.07	22	31.13	2	75.09		
8	40.66	23	28.73	3	78.09		
9	48.72	24	17.90	4	71.3		
10	37.99	25	16.02	5	78.03		
11	24.36	26	17.29	6	62.49		
12	123.85	27	26.43				
13	145.03	28	-				
14	42.97	29	106.90				
15	29.01						

References

1. V.U. Ahmad, S. Perveen, S. Bano, Phytochemistry **29**(10), 3287 (1990)

Guaiacin D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-olean-12,20(29)-dien-28-oic Acid

Biological source: *Guaiacum officinale* [1]

$C_{52}H_{82}O_{21}$: 1042.534

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.80, 0.85, 0.95, 1.02, 1.19 (s, CH_3 × 5), 4.60 (brs, H_2-29), 5.31 (t, H-12)

α-L-Arap: 4.50 (d, J = 7.3, H-1)
β-D-Glcp: 4.47 (d, J = 7.6, H-1)
β-D-Glcp′: 5.36 (d, J = 8.0, H-1)
α-L-Rhap: 5.19 (d, J = 1.46, H-1), 1.21 (d, J = 6.18, CH_3-6) [1]
^{13}C NMR(75 MHz, CD_3OD): [1]

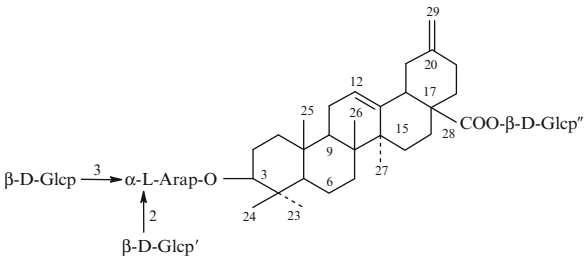
Table 1

C-1	40.16	C-16	24.55	Ara-1	105.09	Rha-1	101.97
2	27.19	17	48.68	2	75.4	2	72.25
3	89.66	18	49.29	3	84.38	3	72.34
4	40.39	19	42.61	4	68.48	4	73.83
5	57.21	20	149.44	5	64.82	5	69.82
6	19.33	21	38.45	Glc-1	104.28	6	17.90
7	33.94	22	30.90	2	73.91	Glc′-1	95.78
8	40.79	23	28.66	3	78.03	2	75.27
9	48.68	24	17.90	4	70.26	3	78.66
10	37.95	25	16.12	5	77.98	4	71.16
11	24.17	26	17.28	6	62.43	5	78.28
12	124.32	27	26.34			6	62.43
13	144.20	28	177.25				
14	42.91	29	107.34				
15	28.93						

References

1. V.U. Ahmad, S. Perveen, S. Bano, Phytochemistry **29**(10), 3287 (1990)

Guaiacin E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-nor-olean-12,20(29)-dien-28-oic Acid
Biological source: *Guaiacum officinale* [1]

$C_{52}H_{82}O_{22}$: 1058.529
^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.80, 0.86, 0.95, 1.06, 1.19 (s, CH_3 × 5), 4.60 (brs, H-29), 5.31 (t, H-12)
α-L-Arap: 4.59 (d, J = 7.3, H-1)
β-D-Glcp: 4.84 (d, J = 8.0, H-1)
β-D-Glcp′: 4.41 (d, J = 7.4, H-1)
β-D-Glcp″: 5.36 (d, J = 8.0, H-1) [1]
^{13}C NMR(75 MHz, CD_3OD): [1]

Table 1

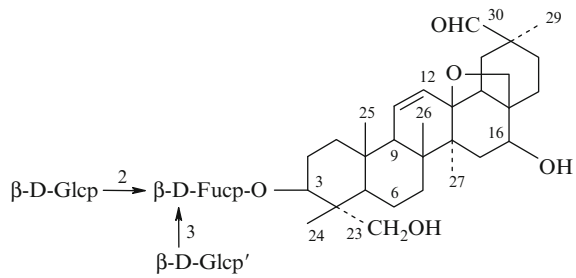
C-1	39.9	C-16	24.54	Ara-1	106.19	Glc′-1	105.17
2	27.15	17	48.64	2	78.66	2	73.90
3	91.87	18	49.29	3	84.4	3	77.93
4	40.1	19	42.61	4	69.82	4	70.11
5	57.0	20	149.49	5	66.67	5	76.58
6	19.3	21	38.41	Glc-1	103.7	6	62.24
7	33.9	22	30.88	2	73.9	Glc″-1	95.73
8	40.14	23	28.3	3	77.84	2	75.28
9	48.64	24	17.89	4	70.11	3	78.41
10	37.95	25	15.99	5	76.05	4	72.36
11	24.13	26	17.79	6	62.24	5	78.27
12	124.35	27	26.37			6	63.68
13	144.29	28	177.33				
14	42.62	29	107.43				
15	28.89						

References

1. V.U. Ahmad, S. Perveen, S. Bano, Phytochemistry **29**(10), 3287 (1990)

Clinoposaponin XX

CAS Registry Number: 197633-89-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – 30-Oxo-saikogenin F

Biological source: *Clinopodium vulgare* [1]

$C_{48}H_{76}O_{19}$: 956.498

$[\alpha]_D^{23}$ + 59.1° (c 0.48, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 979 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 4.14 (H-3), 5.98 (brd, J = 10.5, H-11), 5.66 (dd, J = 10.5, 3.0, H-12), 4.51 (m, H-16), 3.72, 4.37 (d, J = 10.0, H_2-23), 1.07 (s, CH_3-24), 0.96 (s, CH_3-25), 1.35 (s, CH_3-26), 1.12 (s, CH_3-27), 3.19 (brd, J = 7.0, H-28), 4.33 (H-28), 0.92 (s, CH_3-29), 9.56 (s, CH_3-30)

β-D-Fucp: 4.91 (d, J = 7.5, H-1), 4.66 (dd, J = 8.0, 7.5, H-2), 4.09 (H-3), 4.25 (m, H-4), 3.62 (H-5), 1.40 (d, J = 6.5, CH_3-6)

β-D-Glcp: 5.59 (d, J = 7.5, H-1), 4.09 (H-2), 4.16 (H-3), 4.19 (H-4), 3.64 (H-5), 4.27, 4.32 (H_2-6)

β-D-Glcp′: 5.30 (d, J = 7.5, H-1), 4.00 (dd, J = 9.0, 7.5, H-2), 4.22 (H-3), 4.22 (H-4), 3.94 (m, H-5), 4.32 (H-6), 4.46 (dd, J = 12.0, 2.5, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

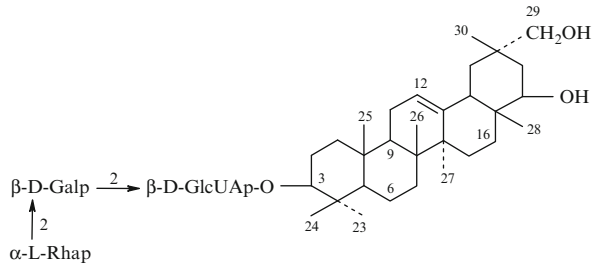
C-1	38.7	C-16	64.2	Fuc-1	104.1	Glc′-1	105.2
2	26.0	17	46.4	2	77.3	2	75.4
3	82.6	18	53.4	3	84.9	3	78.4
4	43.8	19	32.1	4	72.0	4	71.7
5	47.9	20	47.7	5	70.5	5	78.5
6	17.7	21	28.8	6	17.2	6	62.6
7	31.6	22	26.8	Glc-1	104.1		
8	42.3	23	64.7	2	76.3		
9	53.1	24	12.7	3	78.9		
10	36.3	25	18.6	4	72.3		
11	132.5	26	20.0	5	77.4		
12	130.7	27	20.9	6	63.2		
13	84.0	28	72.8				
14	45.8	29	24.1				
15	36.2	30	206.4				

Pharm./Biol.: This plant used as an important Chinese medicine to cure hepatitis [1]

References

1. T. Miyase, Y. Matsushima, Chem. Pharm. Bull. **45**(9), 1493 (1997)

Abrisaponin A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol A

Biological source: *Abrus cantoniensis* [1]

$C_{48}H_{76}O_{18}$: 940.503

$[\alpha]_D^{27}$ + 0.1° (c 0.53, C_5H_5N-H_2O (1:1)) [1]

FAB-MS (negative ion mode) *m/z*: 941 $[M-H]^-$, 633 [M-H-Rha-Gal]$^-$ [1]

HR-FAB-MS *m/z*: 987.4904 $[M-H + 2Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.88, 0.94, 1.20, 1.20, 1.22, 1.32, 1.36 (s, CH_3 × 7), 1.77 (d, J = 6.1, CH_3-6 of Rha), 4.86 (d, J = 6.7, H-1 of GlcUA), 5.29 (s, H-12), 5.41 (d, J = 7.3, H-1 of Gal), 6.07 (s, H-1 of Rha) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.1	C-16	29.2	GlcUA-1	104.8	Rha-1	102.4
2	26.4	17	38.3	2	78.3	2	71.9
3	91.4	18	45.2	3	76.7	3	71.9
4	39.9	19	41.5	4	73.6	4	73.7
5	56.1	20	36.3	5	77.1	5	69.4
6	18.5	21	36.6	6	176.7	6	18.5
7	33.4	22	75.5	Gal-1	101.7		
8	39.9	23	28.4	2	78.1		
9	48.1	24	16.8	3	75.9		
10	36.9	25	15.8	4	70.5		
11	23.9	26	17.4	5	76.6		
12	122.9	27	25.4	6	62.8		
13	144.8	28	20.8				
14	42.6	29	72.3				
15	26.3	30	24.5				

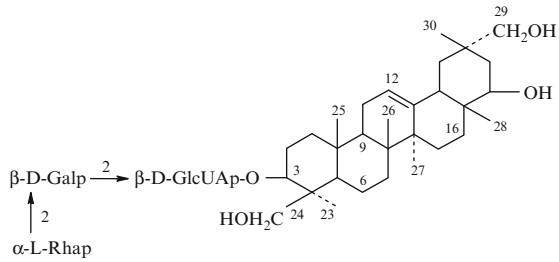
Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)

Robinioside E

CAS Registry Number: 149691-29-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol B

Biological source: *Abrus cantoniensis* [1], *Robinia pseudoacacia* [2]

$C_{48}H_{78}O_{19}$: 958.513

$[\alpha]_D^{26}$ −8.3° (c 0.39, C_5H_5N-H_2O (1:1)) [1]

FAB-MS *m/z*: 957 $[M-H]^-$, 811 $[M-H-Rha]^-$, 649 $[M-H-Rha-Gal]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.71, 0.89, 1.19, 1.22, 1.36, 1.41 (s, CH_3 × 6), 5.27 (s, H-12)

α-L-Rhap: 5.99 (s, H-1), 1.78 (d, J = 6.1, CH_3-6)

β-D-GlcUAp: 4.88 (d, J = 7.3, H-1)

β-D-Galp: 5.48 (d, J = 7.9, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	29.2	GlcUA-1	104.9	Rha-1	102.0
2	26.6	17	38.3	2	78.0	2	71.9
3	91.6	18	45.2	3	76.5	3	71.9
4	44.1	19	41.6	4	73.8	4	73.8
5	56.4	20	36.6	5	77.1	5	69.5
6	19.5	21	36.7	6	176.4	6	18.7
7	33.6	22	75.7	Gal-1	101.9		
8	39.9	23	23.0	2	77.1		
9	48.0	24	63.6	3	75.7		
10	36.6	25	16.0	4	71.0		
11	24.1	26	17.3	5	76.0		
12	122.8	27	25.4	6	62.0		
13	144.8	28	20.8				
14	42.6	29	72.5				
15	26.4	30	24.5				

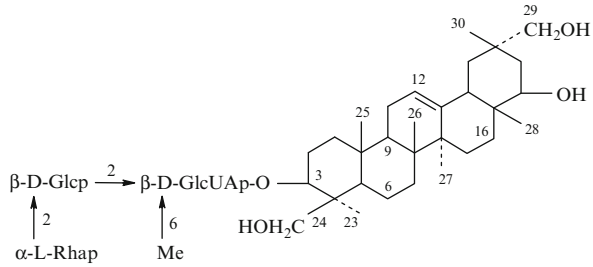
(*continued*)

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)
2. B. Cui, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **41**(3), 553 (1993)

Robinioside F



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol B

Biological source: *Robinia pseudoacacia* [1]

$C_{49}H_{80}O_{19}$: 972.529

$[\alpha]_D^{26}$ −11.2° (c 1.14, MeOH) [1]

FAB-MS (Me ester) *m/z*: 971 $[M-H]^-$, 825 $[M-Rha-H]^-$, 473 $[M-GlcUA(Me)-Glc-Rha-H]^-$

^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 0.70, 0.97, 1.26, 1.27, 1.46, 1.47 (s, CH_3 × 6), 5.36 (brs, H-12)

β-D-GlcUAp: 4.97 (d, J = 7.7, H-1), 3.78 (s, COOMe)

α-L-Rhap: 6.43 (brs, H-1), 1.79 (d, J = 5.5, CH_3-6)

β-D-Glcp: 5.88 (d, J = 7.7, H-1) [1]

^{13}C NMR (C_5D_5N) (Me ester): [1]

Table 1

C-1	38.4	C-16	28.8	GlcUA-1	105.1	Rha-1	101.9
2	26.3	17	38.2	2	78.2	2	72.2
3	91.6	18	44.7	3	76.6	3	72.6
4	43.6	19	41.4	4	73.4	4	74.3
5	56.2	20	36.4	5	77.6	5	69.4
6	18.5	21	37.2	6	170.3	6	18.9
7	33.2	22	75.6	COOMe	52.1		
8	39.8	23	22.7	Glc-1	102.0		
9	47.7	24	63.3	2	79.1		
10	36.4	25	15.6	3	78.0		
11	24.0	26	17.0	4	69.7		
12	122.3	27	25.5	5	78.3		
13	144.9	28	21.1	6	61.2		
14	42.3	29	73.0				
15	26.5	30	24.4				

References

1. B. Cui, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **41**(3), 553 (1993)

Robinioside G

See Figure Robinioside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol B

Biological source: *Robinia pseudoacacia* [1]

$C_{55}H_{90}O_{23}$: 1118.587

$[\alpha]_D^{26}$ −27.5° (c 1.20, MeOH) [1]

FAB-MS (Me ester) *m/z*: 1117 $[M-H]^-$, 971 [M-Rha-H]$^-$, 809 [M-Gal-Rha-H]$^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 0.72, 0.95, 1.07, 1.19, 1.24, 1.40, (s, CH_3 × 6), 5.26 (brs, H-12)

β-D-GlcUAp: 3.75 (s, COOMe)

β-D-Galp: 5.75 (d, J = 7.3, H-1)

α-L-Rhap: 6.31 (brs, H-1), 1.70 (d, J = 5.5, CH_3-6); α-L-Rhap′: 5.48 (brs, H-1), 1.73 (d, J = 6.2, CH_3-6) [1]

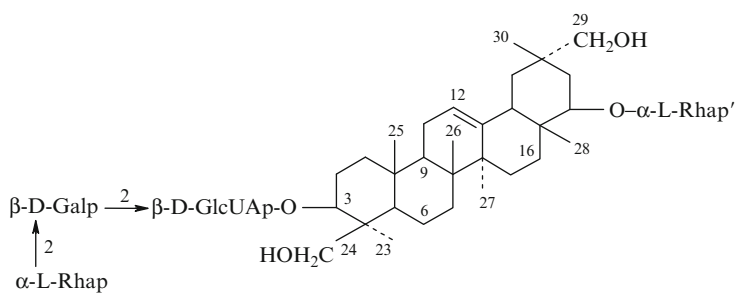
^{13}C NMR (C_5D_5N) (Me ester): [1]

Table 1

C-1	38.4	C-16	28.2	GlcUA-1	105.3	Rha-1	102.2
2	26.5	17	37.6	2	78.0	2	72.2
3	91.1	18	44.4	3	76.8	3	72.5
4	43.7	19	40.8	4	73.4	4	74.2
5	55.9	20	35.9	5	77.5	5	69.2
6	18.3	21	30.6	6	170.2	6	18.8
7	33.0	22	79.6	COOMe	52.0	Rha′-1	98.2
8	39.9	23	22.8	Gal-1	101.6	2	72.7
9	47.6	24	63.4	2	76.4	3	72.9
10	36.3	25	15.7	3	76.3	4	73.7
11	23.9	26	16.7	4	71.0	5	70.2
12	122.4	27	25.7	5	76.4	6	18.4
13	144.4	28	21.4	6	61.4		
14	41.9	29	72.7				
15	26.7	30	23.4				

References

1. B. Cui, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **41**(3), 553 (1993)



Robinioside G

Robinioside H

See Figure Robinioside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol B

Biological source: *Robinia pseudoacacia* [1]

$C_{55}H_{90}O_{23}$: 1118.587

$[\alpha]_D^{26}$ −28.4° (c 1.21, MeOH) [1]

FAB-MS (Me ester) *m/z*: 1117 $[M-H]^-$, 971 [M-Rha-H]$^-$, 809 [M-Glc-Rha-H]$^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 0.71, 0.95, 1.06, 1.19, 1.22, 1.44, (s, CH_3 × 6), 5.26 (brs, H-12)

β-D-GlcUAp: 4.94 (d, J = 7.7, H-1), 3.76 (s, COOMe)

β-D-Glcp: 5.84 (d, J = 7.7, H-1)

α-L-Rhap: 6.38 (brs, H-1), 1.76 (d, J = 6.2, CH_3-6)

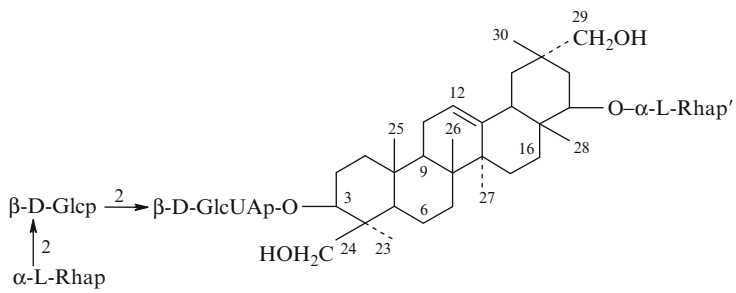
α-L-Rhap: 5.48 (brs, H-1), 1.70 (d, J = 5.5, CH_3-6) [1]

^{13}C NMR (C_5D_5N) (Me ester): [1]

Table 1

C-1	38.5	C-16	28.4	GlcUA-1	105.2	Rha-1	101.9
2	26.2	17	37.7	2	78.2	2	72.3
3	91.6	18	44.6	3	76.7	3	72.6
4	43.7	19	41.0	4	73.4	4	74.3
5	56.2	20	36.1	5	77.6	5	69.4
6	18.5	21	30.8	6	170.3	6	18.9
7	33.1	22	79.8	COOMe	52.1	Rha′-1	98.3
8	39.9	23	22.7	Glc-1	101.9	2	72.7
9	47.7	24	63.3	2	79.1	3	73.0
10	36.4	25	15.7	3	78.0	4	73.9
11	24.0	26	16.9	4	69.7	5	70.3
12	122.5	27	25.8	5	78.3	6	18.5
13	144.5	28	21.5	6	61.3		
14	42.1	29	72.8				
15	26.6	30	23.6				

(*continued*)



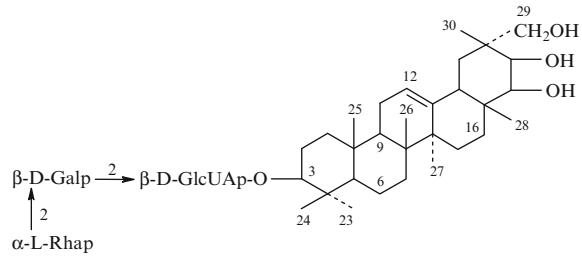
Robinioside H

References

1. B. Cui, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **41**(3), 553 (1993)

Subproside I

CAS Registry Number: 142750-15-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol C

Biological source: *Abrus cantoniensis*

$C_{48}H_{78}O_{19}$: 958.513

$[\alpha]_D^{27}$ −5.7° (c 0.43, C_5H_5N-H_2O (1:1)) [1]

FAB-MS *m/z*: 957 $(M-H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.94, 1.20, 1.27, 1.31, 1.33, 1.41 (s, CH_3 × 7), 5.30 (s, H-12)

α-L-Rhap: 6.04 (s, H-1), 1.74 (d, J = 6.1, CH_3-6)
β-D-GlcUAp: 4.88 (d, J = 6.7, H-1)
β-D-Galp: 5.43 (d, J = 7.9, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

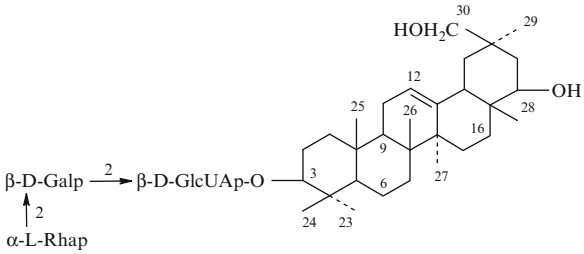
C-1	39.0	C-16	27.2	GlcUA-1	105.0	Rha-1	102.4
2	26.6	17	39.1	2	78.3	2	72.0
3	91.1	18	43.3	3	76.7	3	72.0
4	39.9	19	40.9	4	73.7	4	73.8
5	55.9	20	40.9	5	78.1	5	69.3
6	18.5	21	70.6	6	176.4	6	18.6
7	32.9	22	79.6	Gal-1	101.8		
8	40.3	23	28.3	2	78.1		
9	47.9	24	16.7	3	75.6		
10	36.8	25	15.6	4	70.1		
11	23.9	26	17.3	5	76.6		
12	122.7	27	26.8	6	62.7		
13	144.7	28	22.2				
14	42.1	29	70.8				
15	26.3	30	17.1				

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)

Abrisaponin D_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol D
Biological source: *Abrus cantoniensis* [1]
$C_{48}H_{78}O_{18}$: 942.518
$[\alpha]_D^{28}$ −0.3° (c 0.31, C_5H_5N) [1]
FAB-MS *m/z*: 965 $[M + Na]^+$, 819 $[M + Na + Rha]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84, 0.95, 1.17, 1.20, 1.20, 1.25, 1.34 (s, $CH_3 \times 7$), 1.72 (d, J = 5.5, CH_3-6 of Rha), 5.34 (s, H-12), 5.46 (d, J = 7.3, H-1 of Gal), 6.09 (s, H-1 of Rha) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

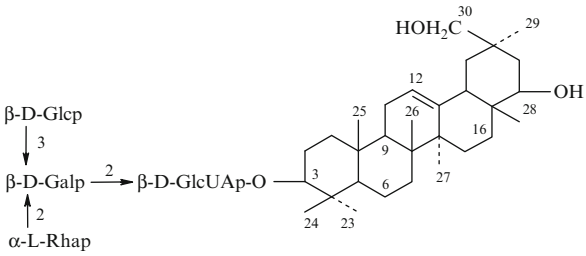
C-1	38.9	C-16	28.7	GlcUA-1	104.9	Rha-1	102.3
2	26.2	17	37.9	2	78.2	2	71.9
3	90.8	18	45.2	3	76.5	3	71.9
4	39.7	19	41.9	4	73.5	4	73.8
5	55.9	20	35.7	5	78.1	5	69.1
6	18.4	21	38.1	6	176.6	6	18.5
7	33.1	22	75.1	Gal-1	101.6		
8	39.8	23	28.2	2	78.1		
9	47.8	24	16.6	3	75.6		
10	36.7	25	15.5	4	70.4		
11	23.6	26	17.1	5	76.4		
12	122.9	27	25.5	6	62.4		
13	144.3	28	20.8				
14	42.3	29	27.9				
15	26.2	30	69.9				

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)

Abrisaponin D_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol D

Biological source: *Abrus cantoniensis* [1]

$C_{54}H_{88}O_{23}$: 1104.571

$[\alpha]_D^{27}$ + 0.9° (c 0.33, C_5H_5N-H_2O (1:1)) [1]

FAB-MS *m/z*: 1103 $[M-H]^-$, 941 $[M-H-Glc]^-$, 633 $[941-Rha-Gal]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 0.96, 1.16, 1.20, 1.20, 1.27, 1.38 (s, $CH_3 \times 7$), 1.75 (d, J = 6.1, CH_3-6 of Rha), 4.95 (d, J = 7.3, H-1 of GlcUA), 4.99 (d, J = 6.7, H-1 of Glc), 5.34 (s, H-12), 6.12 (s, H-1 of Rha) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

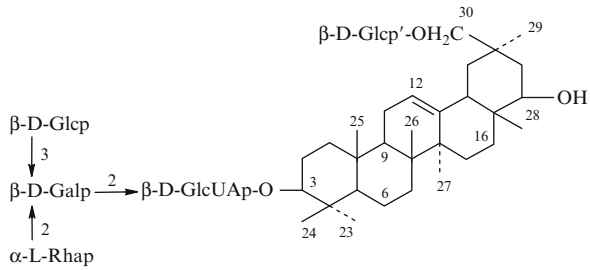
C-1	39.1	C-16	29.0	GlcUA-1	105.4	Rha-1	102.4
2	26.6	17	38.2	2	78.3	2	72.1
3	90.9	18	45.5	3	76.2	3	72.3
4	39.9	19	42.0	4	73.6	4	74.1
5	56.1	20	35.9	5	78.2	5	69.3
6	18.7	21	38.3	6	172.4	6	18.9
7	33.4	22	75.4	Gal-1	101.9	Glc-1	105.6
8	40.1	23	28.5	2	76.2	2	74.7
9	48.1	24	16.9	3	85.3	3	78.2
10	37.0	25	15.8	4	69.8	4	71.3
11	23.9	26	17.3	5	75.4	5	77.9
12	123.0	27	25.8	6	62.2	6	62.4
13	144.2	28	21.1				
14	42.6	29	28.2				
15	26.6	30	70.2				

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, Y. Ito, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1228 (1996)

Abrisaponin D_3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol D

Biological source: *Abrus cantoniensis* [1]

$C_{60}H_{98}O_{28}$: 1266.624

$[\alpha]_D^{27}$−85.2° (c 0.32, C_5H_5N-H_2O (1:1)) [1]

FAB-MS *m/z*: 1265 $[M-H]^-$, 1119 $[M-H-Rha]^-$, 1103 $[1265-Glc]^-$, 795 [agl + Glc-H]$^-$ [1]

HR-FAB-MS *m/z*: 1289.6169 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.96, 1.21, 1.25, 1.25, 1.38, 1.53 (s, $CH_3 \times 7$), 1.77 (d, J = 6.1, CH_3-6 of Rha), 5.37 (s, H-12), 5.55 (d, J = 7.9, H-1 of Gal), 6.15 (s, H-1 of Rha) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.2	C-16	28.6	GlcUA-1	105.3	Glc-1	105.5
2	26.6	17	38.1	2	78.7	2	74.8
3	91.0	18	45.0	3	76.3	3	78.4
4	40.0	19	42.2	4	74.0	4	71.6
5	56.2	20	35.2	5	78.4	5	78.1
6	18.7	21	37.4	6	176.1	6	62.7
7	33.4	22	75.6	Gal-1	102.1	Glc′-1	105.6
8	40.2	23	28.9	2	76.4	2	75.3
9	48.1	24	17.0	3	85.3	3	78.1

(*continued*)

Table 1 (continued)

10	37.0	25	15.8	4	70.1	4	71.5
11	24.0	26	17.4	5	75.6	5	78.4
12	123.3	27	26.1	6	62.4	6	62.7
13	144.5	28	21.3	Rha-1	102.5		
14	42.5	29	28.6	2	72.4		
15	26.6	30	77.9	3	72.4		
				4	74.3		
				5	69.4		
				6	19.0		

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, Y. Ito, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1228 (1996)

Subproside IV

CAS Registry Number: 148077-21-8

See Figure Subproside IV

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol D

Biological source: *Abrus cantoniensis* [1]

$C_{54}H_{88}O_{23}$: 1104.571

$[\alpha]_D^{27}$ + 0.4° (c 0.52, C_5H_5N-H_2O (1:1)) [1]

FAB-MS *m/z*: 1103 $[M-H]^-$, 957 $[M-H-Rha]^-$, 795 $[M-H-Rha-Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84, 0.97, 1.20, 1.20, 1.23, 1.26, 1.36 (s, CH_3 × 7), 5.32 (s, H-12)

β-D-GlcUAp: 4.90 (d, J = 7.3, H-1)

α-L-Rhap: 6.12 (s, H-1), 1.74 (d, J = 4.9, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.7	C-16	28.1	GlcUA-1	104.8	Rha-1	102.3
2	26.2	17	37.7	2	78.4	2	72.0
3	90.3	18	44.4	3	76.3	3	72.0
4	39.5	19	41.9	4	73.5	4	73.9
5	55.7	20	34.8	5	78.0	5	69.1
6	18.3	21	36.9	6	176.3	6	18.9
7	32.9	22	75.7	Gal-1	101.6	Glc-1	105.2
8	39.8	23	28.7	2	78.1	2	75.0
9	47.6	24	16.6	3	75.2	3	78.0
10	36.6	25	15.4	4	70.3	4	71.3
11	23.6	26	16.9	5	76.1	5	78.1
12	122.8	27	25.8	6	62.1	6	62.4
13	144.7	28	21.0				
14	42.1	29	28.1				
15	26.2	30	77.5				

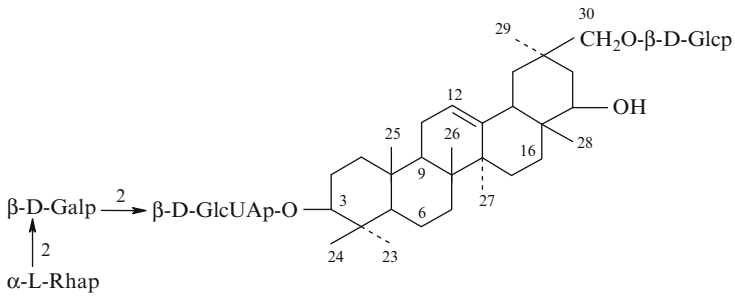
Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

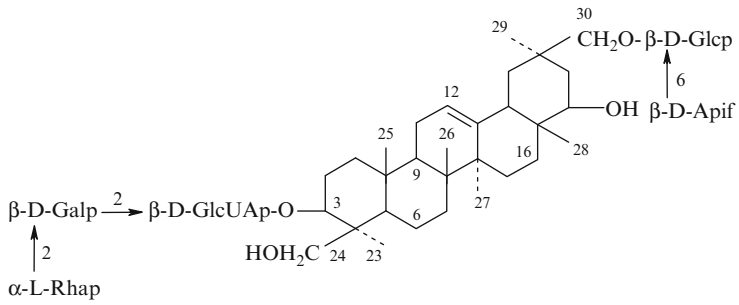
1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)

Robinioside I

See Figure Robinioside I



Subproside IV



Robinioside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol E

Biological source: *Robinia pseudoacacia* [1], *Wisteria brachybotrys* [2]

$C_{60}H_{98}O_{28}$: 1266.624

$[\alpha]_D^{26}$ −14.3° (c 0.99, MeOH) [1]

FAB-MS (Me ester) *m/z*: 1265 $[M-H]^-$, 1133 [M-Api-H]$^-$, 459 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 0.69, 0.92, 1.12, 1.18, 1.24, 1.40, (s, $CH_3 \times 6$), 5.33 (brs, H-12)

β-D-GlcUAp: 4.89 (d, J = 7.7, H-1), 3.75 (s, COOMe)

β-D-Galp: 5.71 (d, J = 7.7, H-1)

α-L-Rhap: 6.22 (brs, H-1), 1.73 (d, J = 6.2, CH_3-6)

β-D-Glcp: 4.58 (d, J = 7.7, H-1)

β-D-Apif: 5.74 (d, J = 2.2, H-1) [1]

^{13}C NMR (C_5D_5N) (Me ester): [1]

Table 1

C-1	38.6	C-19	42.2	Gal-1	101.8	Glc-1	105.6
2	26.4	20	35.0	2	76.6	2	75.5
3	91.3	21	37.1	3	76.5	3	78.7
4	43.9	22	75.4	4	71.2	4	71.8
5	56.1	23	23.0	5	76.6	5	77.2
6	18.5	24	63.6	6	61.6	6	68.9
7	33.1	25	15.8	Rha-1	102.4	Api-1	111.1
8	40.0	26	16.9	2	72.4	2	77.8
9	47.8	27	26.0	3	72.8	3	80.4
10	36.5	28	21.2	4	74.3	4	65.7
11	24.0	29	29.1	5	69.4	5	75.0
12	123.0	30	77.8	6	19.0		
13	144.4	GlcUA-1	105.5				
14	42.2	2	78.3				
15	26.7	3	76.9				
16	28.2	4	73.6				
17	37.9	5	77.7				
18	44.4	6	170.4				
		COOMe	52.1				

(*continued*)

References

1. B. Cui, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **41**(3), 553 (1993)
2. J. Kinjo, Y. Fujishima, K. Saino, R.-H. Tian, T. Nohara, Chem. Pharm. Bull. **43**(4), 636 (1995)

Robinioside J

See Figure Robinioside J

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol E

Biological source: *Robinia pseudoacacia* [1]

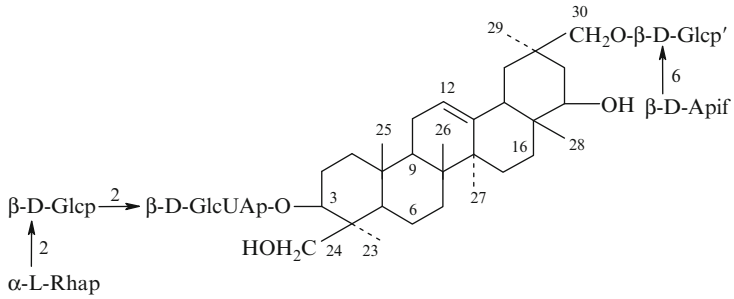
$C_{60}H_{98}O_{28}$: 1266.624

$[\alpha]_D^{26}$ −22.1° (c 0.70, MeOH) [1]

FAB-MS (Me ester) *m/z*: 1265 $[M-H]^-$, 1133 [M-Api-H]$^-$, 459 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 0.68, 0.93, 1.14, 1.20, 1.23, 1.46, (s, $CH_3 \times 6$), 5.34 (brs, H-12)

β-D-GlcUAp: 4.94 (d, J = 7.7, H-1), 3.77 (s, COOMe)



Robinioside J

β-D-Glcp: 5.87 (d, J = 7.7, H-1); β-D-Glcp′: (H-1) hidden by other signals
α-L-Rhap: 6.41 (brs, H-1), 1.78 (d, J = 6.2, CH_3-6)
β-D-Apif: 5.79 (d, J = 2.2, H-1) [1]
^{13}C NMR (C_5D_5N) (Me ester): [1]

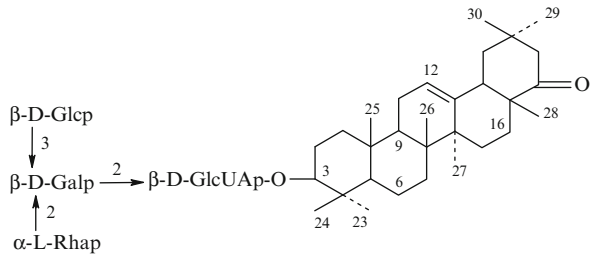
Table 1

C-1	38.5	C-19	42.1	Glc-1	101.8	Glc′-1	105.4
2	26.3	20	34.9	2	79.0	2	75.4
3	91.6	21	36.9	3	77.9	3	78.5
4	43.6	22	75.2	4	69.6	4	71.6
5	56.1	23	22.7	5	78.1	5	77.0
6	18.5	24	63.3	6	61.2	6	68.7
7	33.0	25	15.6	Rha-1	101.8	Api-1	110.9
8	39.9	26	16.9	2	72.1	2	77.5
9	47.6	27	25.9	3	72.5	3	80.4
10	36.3	28	20.9	4	74.1	4	65.5
11	24.0	29	28.9	5	69.3	5	74.9
12	122.7	30	77.7	6	18.8		
13	144.3	GlcUA-1	105.1				
14	42.1	2	78.1				
15	26.5	3	76.5				
16	28.1	4	73.3				
17	37.8	5	77.7				
18	44.4	6	170.2				
		COOMe	52.1				

References

1. B. Cui, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **41**(3), 553 (1993)

Abrisaponin F



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol F
Biological source: *Abrus cantoniensis* [1]
$C_{54}H_{86}O_{22}$: 1086.561
$[\alpha]_D^{27}$ −29.2° (c 0.37, C_5H_5N -H_2O (1:1)) [1]
FAB-MS *m/z*: 1109 [M + Na-Rha]$^+$, 963 [M + Na-Rha]$^+$, 947 [M + Na-Glc]$^+$ [1]
HR-FAB-MS *m/z*: 1131.5327 [M + 2Na]$^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 0.87, 0.92, 0.98, 1.17, 1.20, 1.30, 1.38 (s, CH_3 × 8), 1.74 (d, J = 6.1, CH_3-6 of Rha), 5.28 (s, H-12), 5.61 (d, J = 7.9, H-1 of Gal), 6.20 (s, H-1 of Rha) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	27.4	GlcUA-1	105.4	Rha-1	102.3
2	26.5	17	47.8	2	78.4	2	72.2
3	90.3	18	47.8	3	76.0	3	72.4

(*continued*)

Table 1 (continued)

4	39.7	19	46.6	4	73.5	4	74.2
5	55.9	20	34.2	5	78.2	5	69.8
6	18.5	21	50.9	6	173.5	6	18.9
7	32.9	22	216.4	Gal-1	102.0	Glc-1	105.5
8	39.9	23	28.4	2	77.0	2	74.7
9	47.9	24	16.8	3	84.9	3	78.2
10	36.8	25	15.6	4	69.2	4	71.4
11	23.8	26	16.9	5	75.6	5	78.1
12	123.1	27	25.5	6	62.1	6	62.3
13	141.8	28	20.9				
14	42.0	29	31.8				
15	26.5	30	25.3				

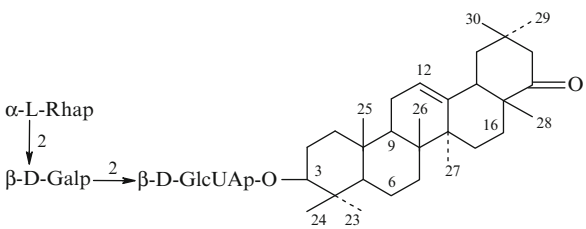
Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, Y. Ito, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1228 (1996)

Phaseoside IV

CAS Registry Number: 163597-20-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol F

Biological source: *Abrus cantoniensis* [1], *A. precatorius L.* [1]

$C_{48}H_{76}O_{17}$: 924.508

$[\alpha]_D^{27}$ −22.1° (c 0.49, C_5H_5N-H_2O (1:1)) [1]

FAB-MS *m/z* : 947 $[M + Na]^+$, 801 $[M + Na + Rha]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 0.86, 0.91, 0.97, 1.17, 1.19, 1.28, 1.42 (s, CH_3 × 8) [1]

α-L-Rhap: 6.31 (s, H-1), 1.77 (d, J = 6.1, CH_3-6)

β-D-GlcUAp: 5.06 (d, J = 7.3, H-1)

β-D-Galp: 5.72 (d, J = 7.3, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

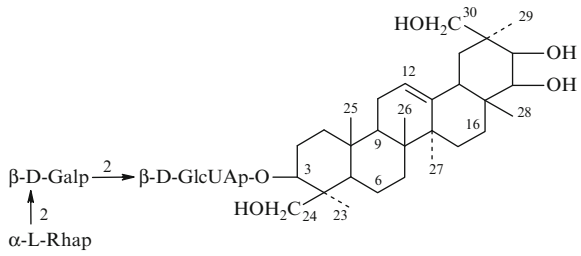
C-1	38.8	C-16	27.4	GlcUA-1	105.3	Rha-1	102.8
2	26.5	17	47.8	2	79.3	2	72.4
3	89.9	18	47.8	3	76.7	3	72.7
4	39.7	19	46.7	4	73.5	4	74.4
5	55.9	20	34.1	5	77.5	5	69.5
6	18.5	21	51.0	6	172.6	6	18.9
7	33.0	22	215.6	Gal-1	102.1		
8	39.9	23	28.4	2	78.8		
9	47.9	24	16.8	3	76.2		
10	36.9	25	15.6	4	70.5		
11	23.8	26	16.9	5	76.3		
12	123.1	27	25.5	6	62.0		
13	141.9	28	21.0				
14	42.1	29	31.9				
15	26.5	30	25.3				

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)
2. Ch. Ma, N. Nakamura, M. Hattori, Chem. Pharm. Bull. **46**(6), 982 (1998)

Abrisaponin L



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Abrisapogenol L
Biological source: *Abrus cantoniensis* [1]
$C_{48}H_{78}O_{20}$: 974.508
$[\alpha]_D^{27}$ −7.21° (c 0.32, C_5H_5N-H2O (9:1)) [1]
FAB-MS (negative ion mode) *m/z*: 973 $[M-H]^-$, 827 $[M-H-Rha]^-$, 665 $[M-H-Rha-Gal]^-$
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.65, 0.89, 1.26, 1.29, 1.42, 1.42 (s, CH_3 × 6), 5.38 (s, H-12), 1.80 (d, J = 6.2, CH_3-6 of Rha), 4.95 (d, J = 6.2, H-1 of GlcUA), 5.57 (d, J = 7.3, H-1 of Gal), 6.09 (s, H-1 of Rha) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	27.5	GlcUA-1	105.0	Rha-1	102.1
2	26.6	17	39.5	2	78.1	2	72.1
3	91.5	18	44.1	3	76.8	3	72.1
4	44.0	19	43.3	4	73.9	4	74.0
5	56.2	20	40.7	5	76.9	5	69.4
6	18.8	21	75.9	6	176.2	6	18.8
7	33.0	22	79.1	Gal-1	101.8		
8	40.2	23	23.0	2	77.3		
9	47.8	24	63.5	3	76.0		
10	36.5	25	15.8	4	71.0		
11	24.1	26	16.9	5	76.4		
12	123.2	27	26.8	6	61.8		
13	144.2	28	22.4				
14	42.1	29	26.9				
15	26.6	30	66.5				

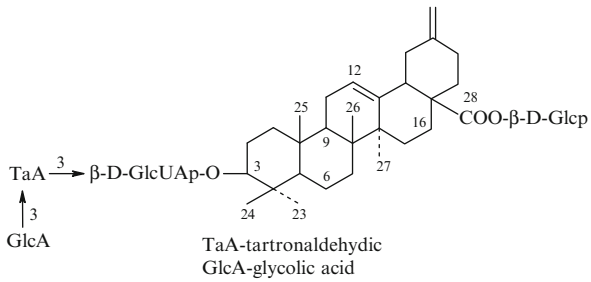
Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)

Betavulgaroside VIII

CAS Registry Number: 178535-52-9



TaA-tartronaldehydic
GlcA-glycolic acid

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid
Biological source: *Beta vulgaris* L. [1]
$C_{46}H_{68}O_{20}$: 940.430
Mp: 215–217°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D^{30}$ + 64.3° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3449, 1751, 1735, 1657, 1076, 889 [1]
FAB-MS (negative ion mode) *m/z*: 939 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 963 $(M + Na)^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.81, 0.96, 1.06, 1.25, 1.28 (s, CH_3-25, 24, 26, 27, 23), 3.12 (dd-like, H-18), 3.37 (dd-like, H-3), 4.69, 4.76 (s, H_2-29), 5.07, 5.41 (d, J = 16.5, H_2-2 of glycolic acid), 5.31 (d, J = 3.3, H-2 of tartronaldehydic acid), 5.42 (brs, H-12), 6.32 (d, J = 3.3, H-3 of tartronaldehydic acid)
β-D-Glcp: 6.27 (d, J = 7.6, H-1)
β-D-GlcUAp: 5.00 (d, J = 7.9, H-1), 4.50 (m, H-3) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.7	GlcUA-1	106.8	Glc-1	95.9
2	26.6	17	47.3	2	74.8	2	74.1
3	89.2	18	47.7	3	85.5	3	78.9
4	39.5	19	41.7	4	72.4	4	71.2
5	55.7	20	148.5	5	77.6	5	79.3
6	18.5	21	30.1	6	172.4	6	62.4
7	33.1	22	37.6	TaA-1	172.8		

(*continued*)

Table 1 (continued)

8	39.9	23	28.2	2	74.3
9	48.0	24	16.9	3	105.4
10	36.9	25	15.5	GlcA-1	173.9
11	23.5	26	17.4	2	65.1
12	122.3	27	26.1		
13	143.5	28	175.8		
14	42.1	29	107.3		
15	28.2	30	-		

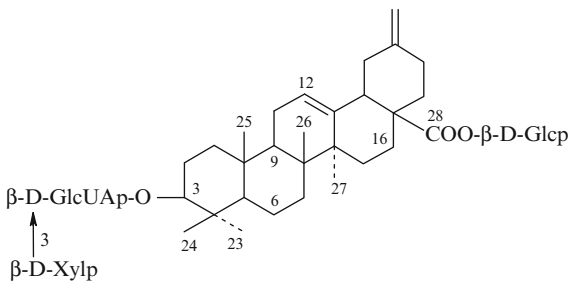
Pharm./Biol.: Inhibitory effect on the increase of serum glucose levels in glucose-loaded rats [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1758 (1998)

Betavulgaroside X

CAS Registry Number: 219805-92-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid

Biological source: *Beta vulgaris* L. [1]

$C_{46}H_{70}O_{18}$: 910.456

Mp: 211–213°C [1]

$[\alpha]_D^{26}$ + 46.9° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1740, 1736, 1076, 891 [1]

FAB-MS (negative ion mode) *m/z*: 909 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 933 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.81, 0.99, 1.07, 1.26, 1.31 (s, CH_3-25, 24, 26, 27, 23), 3.12 (dd, J = 4.7, 13.9, H-18), 3.38 (dd, J = 4.6, 11.9, H-3), 4.69, 4.76 (s, H_2-29), 5.43 (brs, H-12)

β-D-Glcp: 6.28 (d, J = 8.2, H-1)

β-D-GlcUAp:5.04 (d, J = 7.6, H-1), 4.18 (m, H-2), 4.39 (m, H-3), 4.57 (t, J = 9.5, H-4)

β-D-Xylp: 5.37 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

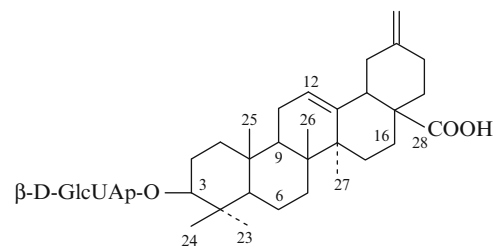
C-1	38.7	C-16	23.7	GlcUA-1	106.8	Glc-1	95.9
2	26.6	17	47.3	2	74.6	2	74.1
3	89.3	18	47.7	3	86.5	3	78.8
4	39.5	19	41.7	4	71.4	4	71.2
5	55.7	20	148.5	5	77.6	5	79.3
6	18.5	21	30.1	6	172.2	6	62.3
7	33.1	22	37.6	Xyl-1	106.3		
8	39.9	23	28.1	2	75.3		
9	48.0	24	16.9	3	78.1		
10	36.9	25	15.5	4	71.0		
11	23.6	26	17.5	5	67.4		
12	122.1	27	26.1				
13	143.5	28	175.8				
14	42.1	29	107.3				
15	28.2	30	-				

Pharm./Biol.: Inhibitory effect on the increase of serum glucose levels in glucose-loaded rats [1]

References

1. M. Yoshikawa, T. Murakami, M. Kadoya, J. Yamahara, H. Matsuda, Chem. Pharm. Bull. **46**(11), 1758 (1998)

Boussingoside A_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid
Biological source: *Boussingaultia baselloides* [1]
$C_{35}H_{52}O_9$: 616.361
Mp: 213–215°C [1]
FAB-MS (negative ion mode) *m/z*: 615 [$(M-H)^-$], 440 ([M-H-175]$^-$, 70) [1]
FAB-MS (positive ion mode) *m/z*: 683 ([M-2 H + 3Na)$^+$, 80), 661 ([M-H + 2Na-162)$^+$, 100), 507 ([M-2 H + 3Na-176)$^+$, 40) [1]
^{1}H NMR (298 MHz, J/Hz, C_5D_5N): 0.74, 0.91, 0.93, 1.25, 1.27 (s, CH_3-25, 24, 26, 27, 23), 1.55 (m, H-9), 1.72 (m, Hβ-11), 1.80 (m, Hβ-2), 2.04 (m, Hα-11), 2.16 (m, Hα-2), 2.20 (m, Hβ-19), 2.58 (dd, J = 13.7, 13.7, Hα-19), 3.17 (dd, J = 13.7, 4.9, H-18), 3.34 (dd, J = 4.0, 11.9, H-3), 4.71, 4.76 (brs, H_2-29), 5.43 (brs, H-12)
β-D-GlcUAp: 4.93 (d, J = 7.9, H-1), 4.05 (dd, J = 8.9, H-2), 4.28 (dd, J = 8.9, 8.9, H-3), 4.47 (dd, J = 8.9, 9.4, H-4), 4.55 (d, J = 9.4, H-5) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.5	C-16	23.5	GlcUA-1	106.9
2	26.3	17	46.9	2	75.2
3	90.0	18	47.7	3	77.9
4	38.1	19	41.9	4	73.3
5	55.6	20	149.0	5	77.2
6	18.2	21	39.3	6	179.4
7	32.9	22	30.2		
8	38.4	23	28.0		
9	47.7	24	16.7		
10	36.7	25	15.2		
11	23.5	26	17.1		
12	122.9	27	26.0		
13	144.1	28	179.4		
14	41.8	29	106.9		
15	28.0				

(*continued*)

Pharm./Biol.: Hypoglycemic action [1]

References

1. A. Espada, J. Rodriguez, M.C. Villaverde, R. Riguera, Can. J. Chem. **68**, 2039 (1990)

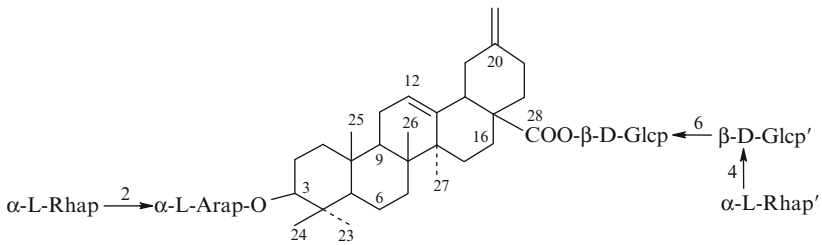
Ciwujianoside B

CAS Registry Number: 234753-04-9
See Figure Ciwujianoside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid
Biological source: *Acanthopanax senticosus* [1]
$C_{58}H_{92}O_{25}$: 1188.592
$[\alpha]_D^{17}$ + 1.32° (c 0.76, MeOH) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.90, 1.10, 1.10, 1.24, 1.24 (s, CH_3 × 5), 5.47 (s, H-12)
α-L-Arap: 4.95 (d, J = 7.0, H-1)
α-L-Rhap: 5.57 (s, H-1), 1.66 (d, J = 6.0, CH_3-6)
β-D-Glcp: 6.21 (d, J = 7.0, H-1)
β-D-Glcp′: 5.02 (d, J = 7.0, H-1)
α-L-Rhap′: 5.88 (s, H-1), 1.73 (d, J = 6.0, CH_3-6) [1]
^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.5	Ara-1	104.9	Glc′-1	104.8
2	26.4	17	47.3	2	75.9	2	75.3

(*continued*)



Ciwujianoside B

Table 1 (continued)

3	88.8	18	47.5	3	73.8	3	76.5
4	39.4	19	42.1	4	68.6	4	78.7
5	55.9	20	148.3	5	64.5	5	77.2
6	18.4	21	30.1	Rha-1	101.7	6	61.4
7	33.1	22	37.8	2	72.4	Rha′-1	102.7
8	39.9	23	28.1	3	72.6	2	72.6
9	48.0	24	17.0	4	73.8	3	72.8
10	37.0	25	15.6	5	69.9	4	73.9
11	23.5	26	17.5	6	18.6	5	70.3
12	122.6	27	26.0	Glc-1	95.8	6	18.5
13	143.4	28	175.7	2	73.9		
14	41.7	29	107.5	3	78.3		
15	28.1			4	70.3		
				5	78.1		
				6	69.9		

References

1. C.-J. Shao, R. Kasai, J.-D. Xu, O. Tanaka, Chem. Pharm. Bull. **36**(2), 601 (1988)

Ciwujianoside C_2

See Figure Ciwujianoside C_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid

Biological source: *Acanthopanax senticosus* [1]

$C_{60}H_{94}O_{26}$: 1230.603

$[\alpha]_D^{18}$ −6.93° (c 1.0, MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.89, 0.83, 0.97, 1.08, 1.24 (s, $CH_3 \times 5$) [1]

α-L-Arap: 4.92 (brs, H-1)

α-L-Rhap: 5.52 (s, H-1), 1.64 (d, J = 6.0, CH_3-6)

β-D-Glcp: 6.19 (d, J = 7.0, H-1)

β-D-Glcp′: 4.98 (H-1), 1.94 (s, OAc)

α-L-Rhap′: 5.83 (s, H-1), 1.70 (d, J = 6.0, CH_3-6) [1]

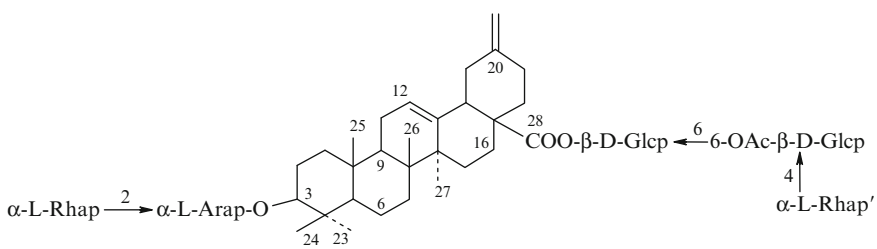
^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.8	Ara-1	104.7	Glc′-1	104.7
2	26.4	17	47.5	2	75.9	2	74.8
3	88.8	18	47.5	3	73.7	3	76.1
4	39.5	19	42.0	4	68.4	4	79.0
5	55.9	20	148.1	5	64.5	5	73.5
6	18.4	21	30.1	Rha-1	101.7	6	63.7
7	33.0	22	37.8	2	72.1	OAc-1	170.4
8	39.9	23	28.8	3	72.4	2	20.6
9	48.0	24	16.9	4	73.5	Rha′-1	102.9
10	36.9	25	15.6	5	69.6	2	72.1
11	23.6	26	17.4	6	18.4	3	72.4
12	122.5	27	26.0	Glc-1	95.5	4	73.5
13	143.3	28	175.6	2	73.5	5	70.4
14	41.6	29	107.4	3	78.5	6	18.4
15	28.1			4	70.4		
				5	77.9		
				6	69.6		

References

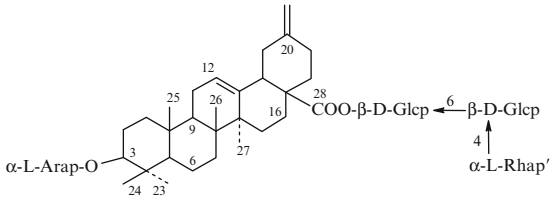
1. C.-J. Shao, R. Kasai, J.-D. Xu, O. Tanaka, Chem. Pharm. Bull. **36**(2), 601 (1988)



Ciwujianoside C_2

Ciwujianoside C_1 (Yemuoside YM_{14})

CAS Registry Number: 114906-73-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid

Biological source: *Acanthopanax senticosus* [1], *Stauntonia chinensis* [2]

$C_{52}H_{82}O_{21}$: 1042.534

Mp: 206–209°C [1]

$[\alpha]_D^{18}$ + 14.6° (c 1.03, MeOH) [2]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.89, 0.97, 1.08, 1.24, 1.28 (s, CH_3 × 5), 5.47 (s, H-12)

α-L-Arap: 4.92 (d, J = 7.0, H-1)

β-D-Glcp: 6.24 (d, J = 8.0, H-1)

β-D-Glcp′: 4.98 (d, J = 7.0, H-1)

α-L-Rhap: 5.86 (s, H-1), 1.73 (d, J = 6.8, CH_3-6) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

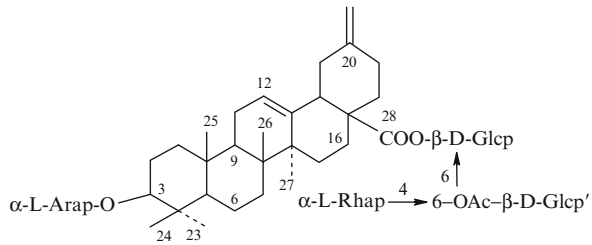
Table 1

C-1	38.9	C-16	23.5	Ara-1	107.4	Glc′-1	104.8
2	26.5	17	47.3	2	72.9	2	75.2
3	88.7	18	47.5	3	74.6	3	76.4
4	39.5	19	42.0	4	69.5	4	78.6
5	55.9	20	148.3	5	66.7	5	77.1
6	18.5	21	30.4	Glc-1	95.7	6	61.6
7	33.0	22	37.8	2	73.8	Rha-1	102.6
8	39.9	23	28.2	3	78.2	2	72.5
9	48.0	24	16.9	4	70.8	3	72.7
10	36.9	25	15.6	5	77.8	4	73.9
11	23.6	26	17.4	6	69.5	5	70.2
12	123.3	27	26.0			6	18.5
13	143.2	28	175.7				
14	41.6	29	107.4				
15	28.2						

References

1. C.-J. Shao, R. Kasai, J.-D. Xu, O. Tanaka, Chem. Pharm. Bull. **36**(2), 601 (1988)
2. H.-B. Wang, De-Q Yu, X.-T. Liang, N. Watanabe, M. Tamai, S. Omura, Planta Medica **55**(3), 303 (1989)

Ciwujianoside D_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid

Biological source: *Acanthopanax senticosus* [1]

$C_{54}H_{84}O_{22}$: 1084.545

$[\alpha]_D^{16}$ + 17.65° (c 0.51, MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 1.08, 1.24, 0.91, 0.98, 1.29 (s, CH_3-23, 24, 25, 26, 27), 5.46 (s, H-12)

α-L-Arap: 4.98 (H-1); β-D-Glcp: 6.20 (d, J = 7.0, H-1); 6-OAc-β-D-Glcp′: 1.92 (s, CH_3CO)

α-L-Rhap: 5.56 (s, H-1), 1.70 (d, J = 6.0,CH_3-6) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.7	Ara-1	107.5	Glc′-1	104.7
2	26.7	17	47.3	2	72.9	2	75.0
3	88.8	18	47.5	3	74.6	3	76.3
4	39.6	19	41.7	4	69.5	4	79.1
5	55.9	20	148.4	5	66.7	5	73.7
6	18.5	21	30.1	Glc-1	95.7	6	63.7
7	33.1	22	37.6	2	73.7	OAc-1	170.6
8	39.9	23	28.3	3	78.2	2	20.6
9	48.1	24	16.9	4	70.9	Rha-1	102.8
10	37.0	25	15.6	5	77.9	2	72.3
11	23.7	26	17.5	6	69.5	3	72.6

(*continued*)

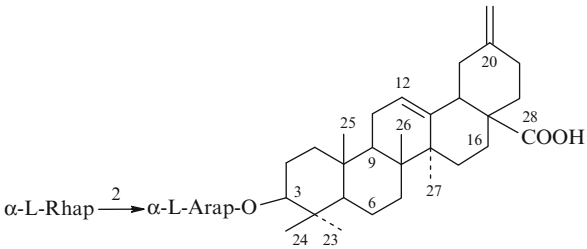
Table 1 (continued)

12	123.4	27	26.0	4	73.7
13	143.4	28	175.7	5	70.6
14	42.1	29	107.5	6	18.5
15	28.3				

References

1. C.-J. Shao, R. Kasai, J.-D. Xu, O. Tanaka, Chem. Pharm. Bull. **36**(2), 601 (1988)

Ciwujianoside E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid

Biological source: *Acanthopanax senticosus* [1]

$C_{40}H_{62}O_{11}$: 718.429

$[\alpha]_D^{23}$ + 55.81° (c 0.43, MeOH) [1]

^{1}H NMR (J/Hz, C_5D_5N): 1.07, 1.19, 0.84, 0.97, 1.28 (s, CH_3-23, 24, 25, 26, 27), 4.76 (s, H_2-29), 5.49 (s, H-12)

α-L-Arap: 4.92 (d, J = 6.0, H-1)

α-L-Rhap: 6.13 (s, H-1), 1.62 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.5	Ara-1	104.8
2	26.6	17	47.0	2	75.9
3	88.8	18	47.9	3	73.7
4	39.4	19	42.1	4	68.6
5	55.9	20	149.1	5	64.6
6	18.5	21	30.4	Rha-1	101.5

(*continued*)

Table 1 (continued)

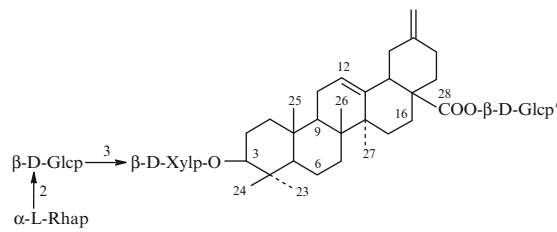
7	33.2	22	38.5	2	72.4
8	39.7	23	28.1	3	72.6
9	48.0	24	17.0	4	74.0
10	37.0	25	15.5	5	69.8
11	23.7	26	17.3	6	18.6
12	122.9	27	26.1		
13	144.3	28	179.4		
14	42.0	29	107.1		
15	28.1				

References

1. C.-J. Shao, R. Kasai, J.-D. Xu, O. Tanaka, Chem. Pharm. Bull. **36**(2), 601 (1988)

Eupteleasaponin I

CAS Registry Number: 290809-29-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid

Biological source: *Euptelea polyandra* [1]

$C_{52}H_{82}O_{21}$: 1042.534

Mp: 201–203°C [1]

$[\alpha]_D^{28}$ + 17.7° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1744, 1680, 1075 [1]

FAB-MS (negative ion mode) *m/z*: 1041 $(M\text{-}H)^-$, 895 $(M\text{-}C_6H_{11}O_4)^-$, 879 $(M\text{-}C_6H_{11}O_5)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1065 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.86, 1.06, 1.10, 1.20, 1.24 (s, CH_3-25, 26, 24, 23, 27), 1.61 (d, J = 5.8, CH_3-6‴), 3.10 (dd-like, H-18), 3.30

(dd, J = 3.5, 11.3, H-3), 4.68, 4.74 (s, H_2-29), 5.43 (brs, H-12)
β-D-Xylp: 4.87 (d, J = 5.2, H-1)
β-D-Glcp: 5.06 (d, J = 7.6, H-1)
β-D-Glcp′: 6.23 (d, J = 7.0, H-1)
α-L-Rhap: 6.05 (brs, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	23.7	Xyl-1	104.7	Rha-1	101.9
2	26.6	17	47.3	2	74.8	2	72.3
3	88.2	18	47.7	3	81.8	3	72.6
4	39.6	19	41.7	4	68.1	4	73.9
5	56.1	20	148.5	5	64.8	5	70.1
6	18.6	21	30.2	Glc-1	104.6	6	18.6
7	33.2	22	37.6	2	74.9	Glc′-1	95.8
8	40.0	23	28.2	3	78.2	2	74.0
9	48.1	24	17.0	4	71.3	3	78.5
10	37.1	25	15.7	5	79.2	4	71.5
11	23.6	26	17.5	6	62.4	5	78.8
12	123.8	27	26.1			6	62.6
13	143.4	28	175.7				
14	42.1	29	107.2				
15	28.2						

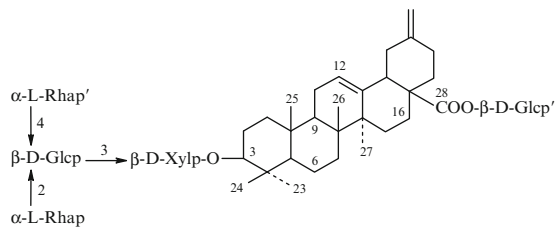
Pharm./Biol.: Gastroprotective activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Oominami, H. Matsuda, Chem. Pharm. Bull. **48**(7), 1045 (2000)

Eupteleasaponin II

CAS Registry Number: 290809-30-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid
Biological source: *Euptelea polyandra* [1]
$C_{58}H_{92}O_{25}$: 1188.592
Mp: 191–193°C [1]
$[\alpha]_D^{28}$ + 14.3° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 1736, 1655, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 1187 $(M-H)^-$, 1041 $(M-C_6H_{11}O_4)^-$, 1025 $(M-C_6H_{11}O_5)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1211 $(M + Na)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.87, 1.07, 1.11, 1.21, 1.24 (s, CH_3-25, 26, 24, 23, 27), 3.11 (dd, J = 4.5, 12.8, H-18), 3.31 (dd, J = 3.9, 11.9, H-3), 4.68, 4.75 (s, H_2-29), 5.44 (brs, H-12)
β-D-Xylp: 4.85 (d-like, H-1)
β-D-Glcp: 5.01 (d, J = 7.9, H-1)
β-D-Glcp′: 6.24 (d, J = 7.9, H-1)
α-L-Rhap: 6.05 (brs, H-1), 1.62 (d, J = 6.1, CH_3-6)
α-L-Rhap′: 5.77 (brs, H-1), 1.68 (d, J = 6.1, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	23.8	Xyl-1	104.7	Rha-5	70.1
2	26.6	17	47.4	2	74.9	6	18.5
3	88.3	18	47.7	3	81.8	Rha′-1	102.7
4	39.6	19	41.7	4	68.1	2	72.6
5	56.1	20	148.5	5	64.7	3	72.8
6	18.5	21	30.2	Glc-1	104.4	4	74.0
7	33.2	22	37.7	2	75.1	5	70.4
8	40.0	23	28.2	3	76.4	6	18.6
9	48.1	24	17.0	4	78.4	Glc′-1	95.9
10	37.1	25	15.7	5	77.3	2	74.1
11	23.6	26	17.5	6	61.4	3	78.8
12	123.8	27	26.1	Rha-1	102.0	4	71.3
13	143.4	28	175.5	2	72.3	5	79.2
14	42.2	29	107.2	3	72.6	6	62.4
15	28.2			4	73.9		

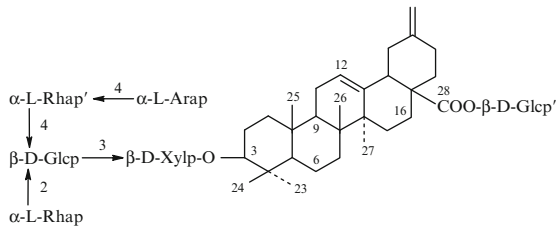
Pharm./Biol.: Gastroprotective activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Oominami, H. Matsuda, Chem. Pharm. Bull. **48**(7), 1045 (2000)

Eupteleasaponin III

CAS Registry Number: 290809-31-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid

Biological source: *Euptelea polyandra* [1]

$C_{63}H_{100}O_{29}$: 1320.635

Mp: 232–235°C [1]

$[\alpha]_D^{28}$ + 11.1° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1744, 1655, 1075 [1]

FAB-MS (negative ion mode) *m/z*: 1319 $(M\text{-}H)^-$, 1157 $(M\text{-}C_6H_{11}O_5)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1321 $(M + H)^+$, 1343 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.87, 1.07, 1.11, 1.21, 1.24 (s, CH_3-25, 26, 24, 23, 27), 3.11 (dd, J = 4.9, 13.1, H-18), 3.31 (dd, J = 3.9, 11.6, H-3), 4.70, 4.75 (s, H_2-29), 5.44 (brs, H-12); β-D-Xylp: 4.85 (d, J = 5.4, H-1); β-D-Glcp: 4.99 (d, J = 7.9, H-1); β-D-Glcp′: 6.24 (d, J = 7.9, H-1); α-L-Rhap: 6.03 (brs, H-1), 1.63 (d, J = 5.8, CH_3-6); α-L-Rhap′: 5.78 (brs, H-1), 1.64 (d, J = 6.2, CH_3-6); α-L-Arap: 5.20 (d, J = 7.4, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	23.8	Xyl-1	104.7	Rha′-1	102.4
2	26.6	17	47.4	2	74.9	2	72.6
3	88.3	18	47.7	3	81.6	3	72.9
4	39.7	19	41.7	4	68.1	4	83.0
5	56.1	20	148.5	5	64.7	5	70.1
6	18.6	21	30.2	Glc-1	104.4	6	18.6
7	33.2	22	37.7	2	75.2	Ara-1	107.2
8	40.0	23	28.2	3	76.3	2	73.2
9	48.1	24	17.0	4	77.5	3	74.5
10	37.1	25	15.7	5	77.3	4	69.4
11	23.6	26	17.5	6	61.3	5	67.0
12	123.8	27	26.1	Rha-1	102.0	Glc′-1	95.9
13	143.4	28	175.8	2	72.4	2	74.1
14	42.2	29	107.2	3	72.6	3	78.8
15	28.2			4	73.9	4	71.3
				5	70.2	5	79.2
				6	18.4	6	62.4

(*continued*)

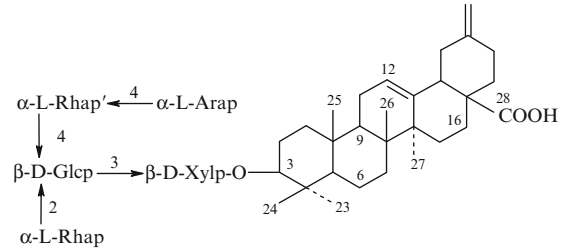
Pharm./Biol.: Gastroprotective activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Oominami, H. Matsuda, Chem. Pharm. Bull. **48**(7), 1045 (2000)

Eupteleasaponin IV

CAS Registry Number: 290809-32-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Akebonoic Acid

Biological source: *Euptelea polyandra* [1]

$C_{57}H_{90}O_{24}$: 1158.582

Mp: 177–179°C [1]

$[\alpha]_D^{28}$ + 14.6° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1736, 1655, 1075 [1]

FAB-MS (negative ion mode) *m/z*: 1157 $(M\text{-}H)^-$, 1025 $(M\text{-}C_5H_9O_4)^-$, 1011 $(M\text{-}C_6H_{11}O_4)^-$, 879 $(M\text{-}C_{11}H_{20}O_8)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1159 $(M + H)^+$, 1181 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.85, 0.98, 1.12, 1.23, 1.28 (s, CH_3-25, 26, 24, 23, 27), 3.22 (dd-like, H-18), 3.32 (dd, J = 4.0, 11.6, H-3), 4.75, 4.80 (s, CH_2-29), 5.48 (brs, H-12)

β-D-Xylp: 4.86 (d, J = 5.8, H-1)
β-D-Glcp: 5.00 (d, J = 7.6, H-1)
α-L-Rhap: 6.06 (brs, H-1), 1.64 (d, J = 6.2, CH_3-6)
α-L-Rhap′: 5.80 (brs, H-1), 1.65 (d, J = 6.2, CH_3-6)
α-L-Arap: 5.21 (d, J = 7.1, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

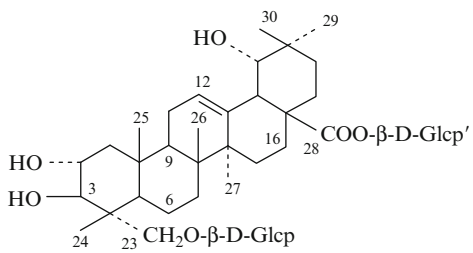
C-1	39.1	C-16	23.9	Xyl-1	104.8	Rha-5	70.2
2	26.6	17	47.1	2	75.0	6	18.4
3	88.3	18	48.0	3	81.9	Rha′-1	102.5
4	39.6	19	42.0	4	68.2	2	72.1
5	56.1	20	149.2	5	64.8	3	73.0
6	18.6	21	30.4	Glc-1	104.5	4	83.1
7	33.2	22	38.4	2	75.3	5	70.1
8	39.9	23	28.2	3	76.3	6	18.6
9	48.1	24	17.0	4	77.5	Ara-1	107.2
10	37.1	25	15.6	5	77.3	2	73.2
11	23.8	26	17.4	6	61.3	3	74.6
12	123.1	27	26.2	Rha-1	102.0	4	69.4
13	144.2	28	179.4	2	72.4	5	67.0
14	42.2	29	107.0	3	72.6		
15	28.4			4	74.0		

Pharm./Biol.: Gastroprotective activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Oominami, H. Matsuda, Chem. Pharm. Bull. **48**(7), 1045 (2000)

Compound XIV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Arjungenin

Biological source: *Trachelospermum asiaticum* [1]
$C_{42}H_{68}O_{16}$: 828.450
$[\alpha]_D^{30}$ + 2.2° (c 0.95, MeOH) [1]
FAB-MS *m/z*: 851 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.48 (brs, H-12), 3.51 (brs, H-18), 3.52 (brd, J = 6, H-19), 5.83 (d, J = 6, HO-19), 1.02 (CH_3-24), 1.08 (CH_3-25), 0.96 (CH_3-26), 1.15 (CH_3-27), 1.50 (CH_3-29), 1.11 (CH_3-30)
β-D-Glcp: 4.89 (d, J = 8, H-1)
β-D-Glcp′: 6.36 (d, J = 8, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

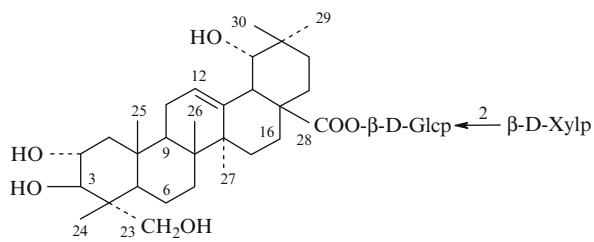
Table 1

C-1	47.1	C-11	24.2	C-21	28.9	Glc-1	105.2
2	68.7	12	123.5	22	32.9	2	75.1
3	77.7	13	144.5	23	74.0	3	78.6
4	43.5	14	42.1	24	14.3	4	71.8
5	48.3	15	28.9	25	17.7	5	78.3
6	18.7	16	27.9	26	17.4	6	63.0
7	33.0	17	46.4	27	25.0	Glc′-1	95.8
8	40.3	18	44.5	28	177.2	2	74.1
9	48.5	19	81.0	29	28.7	3	78.9
10	38.5	20	35.5	30	24.6	4	71.1
						5	79.2
						6	62.2

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1833 (1987)

Compound XV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Arjungenin

Biological source: *Trachelospermum asiaticum* [1]
$C_{41}H_{66}O_{15}$: 798.440
Mp: 245–253°C [1]
$[\alpha]_D^{25}$ + 3.9° (0.65, MeOH) [1]
FAB-MS *m/z*: 821 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.50 (brs, H-12), 3.48 (brs, H-18), 3.54 (brs, J = 6, Hβ-19), 5.83 (d, J = 6, HO-19), 1.14 (CH_3-29), 1.01 (CH_3-25), 0.97 (CH_3-26), 1.13 (CH_3-27), 1.55 (CH_3-29), 1.09 (CH_3-30)
β-D-Glcp: 6.26 (d, J = 8, H-1)
β-D-Xylp: 5.47 (d, J = 8, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

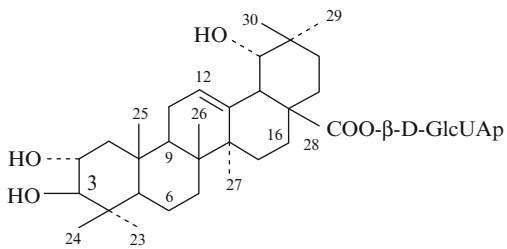
Table 1

C-1	47.5	C-11	24.5	C-21	29.0	Glc-1	93.7
2	68.9	12	123.5	22	32.9	2	80.1
3	78.2	13	144.4	23	67.3	3	78.4
4	43.6	14	42.2	24	14.2	4	71.1
5	48.5	15	29.5	25	17.7	5	79.0
6	18.7	16	27.7	26	17.4	6	62.0
7	32.9	17	46.6	27	24.8	Xyl-1	105.8
8	40.3	18	44.7	28	177.2	2	75.9
9	48.9	19	81.1	29	28.7	3	78.8
10	38.5	20	35.5	30	14.0	4	70.0
						5	67.3

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1833 (1987)

Arjunoside III



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Arjunic Acid

Biological source: *Terminalia arjuna* [1]
$C_{36}H_{56}O_{11}$: 664.382
Mp: 272–274°C ($CHCl_3$-MeOH) [1]
$[\alpha]_D$ + 20.3° (c 1.75, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3300, 1705, 1725, 1660, 820 [1]
^{13}C NMR (25.05 MHz, DMSO-d_6): [1]

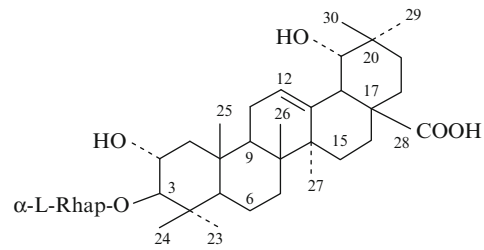
Table 1

C-1	47.23	C-16	24.04	GlcUA-1	93.99
2	67.05	17	45.12	2	69.42
3	82.19	18	43.05	3	72.27
4	38.80	19	79.96	4	76.56
5	54.83	20	36.81	5	77.50
6	16.14	21	28.24	6	181.49
7	31.70	22	34.67		
8	39.01	23	27.95		
9	47.23	24	16.58		
10	38.48	25	16.14		
11	23.19	26	16.91		
12	122.19	27	27.95		
13	143.05	28	175.66		
14	41.83	29	28.62		
15	28.24	30	24.39		

References

1. A.S.R. Anjaneyulu, A.V. Rama Prasad, Phytochemistry **21**, 2057 (1982)

Arjunoside IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Arjunic Acid

Biological source: *Terminalia arjuna* [1]
$C_{36}H_{58}O_9$: 634.408
Mp: 260–265°C [1]
$[\alpha]_D$ −10° (c 0.8, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3600–3400, 1710, 1650, 850 [1]
^{13}C NMR (25.05 MHz, DMSO-d_6) (for aglycone): [1]

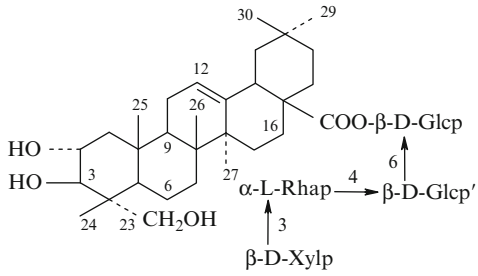
Table 1

C-1	47.17	C-11	23.16	C-21	28.42
2	67.07	12	122.06	22	34.79
3	82.19	13	143.37	23	27.12
4	38.81	14	41.89	24	16.76
5	54.83	15	28.42	25	16.11
6	16.94	16	24.04	26	16.94
7	32.38	17	46.64	27	28.68
8	38.95	18	43.12	28	179.00
9	47.17	19	80.02	29	28.68
10	38.54	20	36.87	30	24.42

References

1. A.S.R. Anjaneyulu, A.V. Rama Prasad, Phytochemistry **21**, 2057 (1982)

Saponin P_{JI}

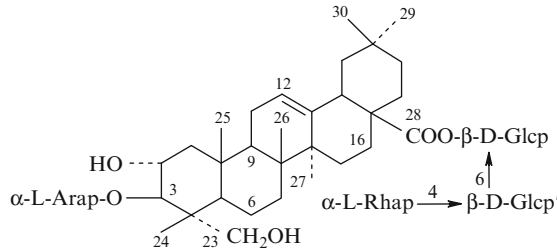


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Arjunolic Acid
Biological source: *Akebia quinata* [1]
$C_{67}H_{114}O_{23}$(permethylate): 1286.775 [1]
Mp: 110–113°C (permethylate) [1]
$[\alpha]_D$ −19° (c 3.31, $CHCl_3$) [1]
IR (nuyol) ν_{max} cm^{-1}: 1750 (permethylate) [1]
^{1}H NMR (J/Hz, $CDCl_3$): β-D-Glcp: 5.37 (d, J = 7.0, H-1) [1]

References

1. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **24**, 1314 (1976)

Saponin HCST-A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Arjunolic Acid
Biological source: *Hedera colchica* [1]
$C_{53}H_{86}O_{23}$: 1090.555
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 1.26, 2.32 (H_2-1), 4.18 (H-2), 4.18 (H-3), 1.79 (H-5), 1.68, 1.36 (H_2-6), 1.62, 1.32 (H_2-7), 1.84 (H-9), 2.01, 1.01 (H_2-11), 5.39 (H-12), 1.09, 2.25 (H_2-15), 2.02, 1.89 (H_2-16), 3.16 (H-18), 1.70, 1.22 (H_2-19), 1.31, 1.11 (H_2-21), 1.73, 1.88 (H_2-22), 3.64, 4.44 (H_2-23), 0.96, 1.06, 1.09, 1.15, 0.87, 0.90 (CH_3-24, 25, 25, 26, 27, 29, 30)
α-L-Arap: 4.94 (d, J = 7.6, H-1), 4.44 (H-2), 3.99 (H-3), 4.16 (H-4), 3.68, 4.20 (H_2-5)
β-D-Glcp: 6.17 (d, J = 7.6, H-1), 4.09 (H-2), 4.05 (H-3), 4.24 (H-4), 4.07 (H-5), 4.62, 4.29 (H_2-6)
β-D-Glcp′: 4.95 (d, J = 7.5, H-1), 3.9 (H-2), 4.09 (H-3), 4.29 (H-4), 3.64 (H-5), 4.05, 4.18 (H_2-6)

α-L-Rhap: 5.75 (H-1), 4.60 (H-2), 4.48 (H-3), 4.27 (H-4), 4.82 (H-5), 1.66 (CH_3-6) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	47.4	16	23.4	Ara-1	106.9	Glc′-1	105.2
2	67.1	17	n.d.	2	73.1	2	75.4
3	88.6	18	41.7	3	74.5	3	76.7
4	44.8	19	46.2	4	69.8	4	78.8
5	47.5	20	30.8	5	67.8	5	77.3
6	18.3	21	34.0	Glc-1	96.0	6	61.5
7	32.9	22	32.6	2	74.0	Rha-1	103.0
8	40.2	23	63.9	3	78.8	2	72.5
9	48.3	24	14.6	4	71.1	3	72.8
10	38.0	25	17.5	5	78.2	4	74.2
11	23.7	26	17.6	6	69.7	5	70.4
12	123.2	27	25.9			6	18.5
13	144.4	28	176.8				
14	42.3	29	33.1				
15	28.4	30	23.7				

References

1. V. Mshvildadze, O. Kunert, G. Dekanosidze, E. Kemertelidze, E. Haslinger, Chem. Nat. Comp. **40**(6), 561 (2004)

Astersaponin A

See Figure Astersaponin A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Asterogenic Acid

Biological source: *Aster tataricus* [1]

$C_{67}H_{108}O_{34}$: 1456.672

Mp: 223–224°C (aq. MeOH) [1]

$[\alpha]_D^{23}$ −44.4° (c 1.1, MeOH) [1]

FAB-MS *m/z*: 1479 $[M + Na]^+$, 1455 $[M-H]^-$ [1]

^{1}H NMR: 1.01 (s, CH_3-29), 1.11 (s, CH_3-26), 1.13 (s, CH_3-30), 1.28 (s, CH_3-23), 1.36 (s, CH_3-24), 1.45 (s, CH_3-25), 1.80 (s, CH_3-27), 5.59 (brdd, H-12)

β-D-Glcp: 4.77 (d, J = 7.0, H-1)

α-L-Arap: 4.85 (d, J = 8.0, H-1)

β-D-Xyl: 6.25 (d, J = 5.0, H-1)

α-L-Rhap: 6.00 (brs, H-1), 1.72 (d, J = 6.0, CH_3-6)

β-D-Apif: 5.34 (d, J = 8.0, H-1)

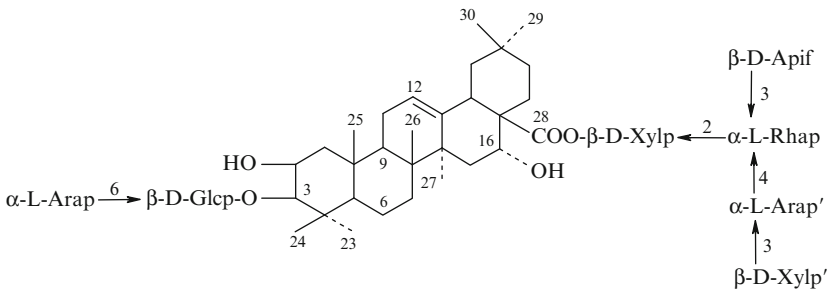
α-L-Arap′: 5.95 (d, J = 4.0, H-1)

β-D-Xylp′: 5.17 (d, J = 7.0, H-1) [1]

^{13}C NMR: [1]

Table 1

C-1	44.0	C-16	74.1	Glc-1	104.8
2	69.5	17	49.5	Ara-1	105.6
3	90.0	18	41.6	Xyl-1	95.2
4	38.6	19	47.4	Rha-1	101.6
5	55.9	20	30.8	6	18.9
6	18.5	21	36.0	Api-1	111.8
7	33.5	22	31.9	3	79.7
8	40.2	23	29.8	Ara′-1	104.7
9	47.5	24	18.8	Xyl′-1	105.8
10	37.0	25	16.7		
11	23.9	26	17.5		
12	122.8	27	27.1		
13	144.3	28	176.0		
14	42.3	29	33.1		
15	36.0	30	24.7		



Astersaponin A

References

1. T. Nagao, S. Hachiyama, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **37**(8), 1977 (1989)

Astersaponin C

See Figure Astersaponin C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Asterogenic Acid

Biological source: *Aster tataricus* [1]

$C_{73}H_{118}O_{38}$: 1602.730

Mp: 234–235°C (aq. MeOH) [1]

$[\alpha]_D^{24}$ − 61.2° (c 1.0, MeOH) [1]

FAB-MS *m/z*: 1625 $[M + Na]^+$, 1601 $[M\text{-}H]^-$ [1]

^{1}H NMR: 1.01 (s, CH_3-29), 1.06 (s, CH_3-26), 1.19 (s, CH_3-30), 1.26 (s, CH_3-23), 1.33 (s, CH_3-24), 1.43 (s, CH_3-25), 1.75 (s, CH_3-27), 5.57 (brdd, H-12)

β-D-Glcp: 4.83 (d, J = 8.0, H-1)

α-L-Arap: 5.95 (d, J = 4.0, H-1)

β-D-Xylp: 6.50 (d, J = 4.0, H-1)

α-L-Rhap: 5.69 (brs, H-1), 1.64 (d, J = 6.0, CH_3-6)

β-D-Apif: 5.29 (d, J = 8.0, H-1)

α-L-Arap′: 4.77 (d, J = 7.0, H-1)

β-D-Xylp′: 5.22 (d, J = 7.0, H-1)

α-L-Rhap: 5.61 (brs, H-1), 1.60 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR: [1]

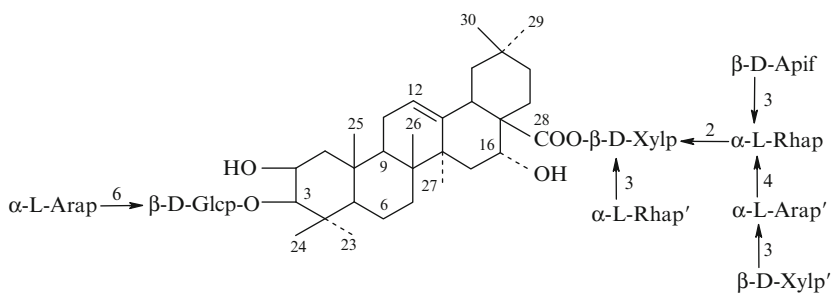
Table 1

C-1	43.9	C-16	74.1	Glc-1	104.8
2	69.5	17	49.4	Ara-1	105.6

(*continued*)

Table 1 (continued)

3	90.0	18	41.5	Xyl-1	94.0
4	38.6	19	47.1	Rha-1	101.7
5	55.9	20	30.8	6	18.4
6	18.5	21	35.9	Api-1	111.9
7	33.5	22	32.1	3	79.8
8	40.1	23	29.8	Ara′-1	104.7
9	47.4	24	18.8	Xyl′-1	105.8
10	37.0	25	16.6	Rha′-1	101.0
11	23.9	26	17.6	6	18.4
12	123.0	27	27.1		
13	144.2	28	175.9		
14	42.2	29	33.2		
15	35.9	30	24.8		

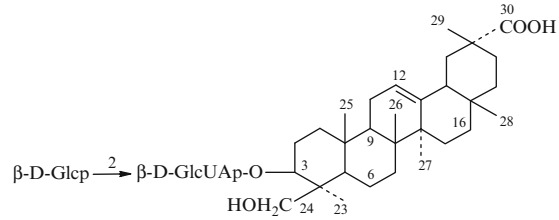


Astersaponin C

References

1. T. Nagao, S. Hachiyama, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **37**(8), 1977 (1989)

Azukisaponin III

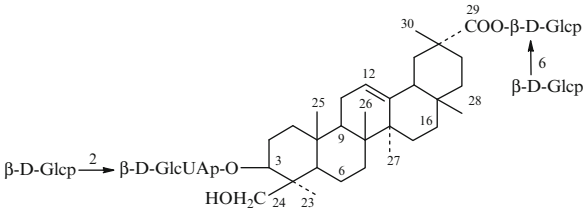


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Azukisapogenol
Biological source: *Vigna angularis* [1]
$C_{42}H_{70}O_{15}$: 814.471
Mp: 218–221°C (MeOH–H_2O) [1]
$[\alpha]_D^{28}$ + 2.5° (c 1.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1705, 1065, 1040 [1]

References

1. I. Kitagawa, H.K. Wang, M. Saito, M. Yoshikawa, Chem. Pharm. Bull. **31**(2), 674 (1983)

Azukisaponin VI



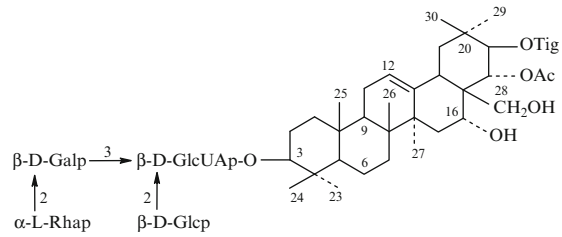
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Azukisapogenol
Biological source: *Vigna angularis* [1]
$C_{54}H_{86}O_{25}$: 1134.545
Mp: 223–226°C (MeOH) [1]
$[\alpha]_D^{20}$−5.9° (c 1.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1725, 1055 [1]
IR (nujol) ν_{max} cm^{-1}: 3400, 1733, 1718 [1]
^{13}C NMR (C_5D_5N): 95.0 (d), 103.7 (d), 104.0 (d), 104.0 (d), 170.8 (s), 176.3 (s) [1]

References

1. I. Kitagawa, H.K. Wang, M. Saito, M. Yoshikawa, Chem. Pharm. Bull. **31**(2), 683 (1983)

Jegosaponin A

CAS Registry Number: 290809-61-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Barringtogenol C
Biological source: *Styrax japonica* [1]
$C_{61}H_{96}O_{27}$: 1260.613
Mp: 246–248°C [1]
$[\alpha]_D^{25}$−24.6°(c 1.1, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1730, 1660, 1245, 1160 [1]
FAB-MS *m/z*: 1259 $[M-H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N-CD_3OD (1:1)): 3.29 (dd, J = 11.5, 4.0, H-3), 5.50 (m, H-12), 4.44 (m, H-16), 3.01 (dd, J = 13.5, 4.0, H-18), 6.43 (d, J = 10.2, H-21), 6.10 (d, J = 10.2, H-22), 1.20 (s, CH_3-23), 1.09 (s, CH_3-24), 0.96 (s, CH_3-25), 0.99 (s, CH_3-26), 1.82 (s, CH_3-27), 3.37, 3.61 (d, J = 10.9, H_2-28), 1.10 (s, CH_3-29), 1.34 (s, CH_3-30);
β-D-GlcUAp: 4.78 (d, J = 8.0, H-1), 4.56 (dd, J = 8.8, 8.0, H-2), 4.63 (dd, J = 9.1, 8.8, H-3); β-D-Galp: 5.97 (d, J = 7.7, H-1), 4.52 (dd, J = 8.5, 7.7, H-2); α-L-Rhap: 6.03 (brs, H-1), 1.44 (d, J = 6.0, CH_3-6); β-D-Glcp: 5.63 (d, J = 7.1, H-1), Tigloyl: 7.11 (q, J = 7.2, H-3), 1.83 (d, J = 7.2, CH_3-4), 2.02 (s, CH_3-5); 2.03 (s, Ac) [1]
^{13}C NMR (150 MHz, C_5D_5N-CD_3OD (1:1)): [1]

Table 1

C-1	39.2	C-17	48.3	GlcUA-1	105.8	Glc-1	102.8
2	26.8	18	40.4	2	79.1	2	76.4
3	90.3	19	47.5	3	81.7	3	78.3
4	40.1	20	36.8	4	71.9	4	72.8
5	56.0	21	79.7	5	77.0	5	78.3
6	18.9	22	74.6	6	172.2	6	63.8
7	33.5	23	28.2	Gal-1	101.2	Tigloyl-1	168.1
8	40.4	24	17.1	2	76.2	2	129.6
9	47.2	25	16.1	3	76.2	3	137.1

(*continued*)

Table 1 (continued)

10	37.1	26	17.3	4	71.6	4	14.7
11	24.3	27	27.9	5	77.2	5	12.9
12	124.7	28	63.9	6	62.6		
13	142.9	29	29.9	Rha-1	102.3		
14	42.0	30	20.6	2	72.8		
15	35.0	Ac-1	171.1	3	72.6		
16	68.4	Ac-2	21.3	4	73.9		
				5	70.1		
				6	18.4		

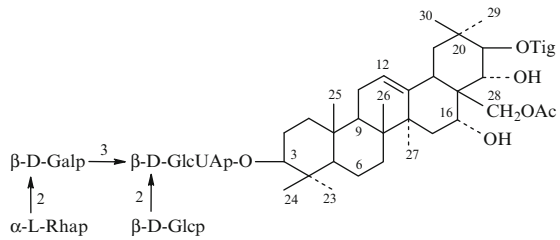
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Hirai, M. Tanaka, S. Arihara, Chem. Pharm. Bull. **48**(7), 1093 (2000)

Jegosaponin B

CAS Registry Number: 290809-68-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Barringtogenol C

Biological source: *Styrax japonica* [1]

$C_{61}H_{96}O_{27}$: 1260.613

Mp: 218–220°C [1]

$[\alpha]_D^{25}$ −8.2°(c 1.1, MeOH) [1]

IR (film) ν_{max} cm^{-1}: 3400, 1730, 1665, 1240, 1160 [1]

FAB-MS *m/z*: 1259 $[M-H]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 3.22 (dd, J = 11.5, 4.0, H-3), 5.46 (m, H-12), 4.76 (m, H-16), 2.86 (dd, J = 13.0, 4.5, H-18), 6.43 (d, J = 10.0, H-21), 4.51 (d, J = 10.0, H-22), 1.15 (s, CH_3-23), 1.06 (s, CH_3-24), 0.79 (s, CH_3-25), 0.97 (s, CH_3-26), 1.82 (s, CH_3-27), 4.21, 4.32 (d, J = 11.8, H_2-28), 1.10 (s, CH_3-29), 1.31 (s, CH_3-30); β-D-GlcUAp: 4.85 (d, J = 7.1, H-1), 4.75 (dd, J = 8.8, 7.1, H-2), 4.75 (dd, J = 9.1, 8.8, H-3); β-D-Galp: 6.21 (d, J = 7.0, H-1), 4.74 (dd, J = 8.5, 7.0, H-2); α-L-Rhap: 6.22 (brs, H-1), 1.40 (d, J = 6.0, CH_3-6); β-D-Glcp: 5.92 (d, J = 7.0, H-1); Tigloyl: 7.02 (q, J = 6.0, H-3), 1.60 (d, J = 6.0, CH_3-4), 1.86 (s, CH_3-5); 2.03 (s, Ac) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-17	47.2	GlcUA-1	105.5	Rha-5	69.9
2	26.6	18	40.7	2	79.5	6	18.3
3	90.1	19	47.5	3	82.6	Glc-1	102.8
4	39.8	20	36.4	4	71.4	2	76.5
5	55.9	21	81.8	5	77.5	3	78.2
6	18.5	22	71.4	6	172.4	4	72.7
7	33.3	23	28.1	Gal-1	101.4	5	78.5
8	40.2	24	17.2	2	76.3	6	63.7
9	47.1	25	15.8	3	76.1	Tigloyl-1	168.7
10	36.9	26	16.9	4	71.3	2	129.9
11	24.1	27	27.6	5	77.1	3	136.3
12	124.0	28	66.7	6	62.2	4	14.3
13	142.9	29	29.9	Rha-1	102.4	5	12.6
14	41.9	30	20.3	2	72.7		
15	34.8	Ac-1	170.9	3	72.7		
16	67.9	Ac-2	20.9	4	74.0		

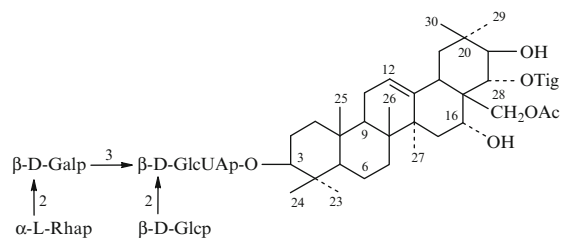
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Hirai, M. Tanaka, S. Arihara, Chem. Pharm. Bull. **48**(7), 1093 (2000)

Jegosaponin C

CAS Registry Number: 290809-69-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Barringtogenol C
Biological source: *Styrax japonica* [1]
$C_{61}H_{96}O_{27}$: 1260.613
Mp: 230–232°C [1]
$[\alpha]_D^{25}$ −26.6°(c 1.5, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1730, 1665, 1245, 1165 [1]
FAB-MS *m/z*: 1259 $[M-H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 3.17 (dd, J = 11.5, 4.5, H-3), 5.42 (m, H-12), 4.69 (m, H-16), 2.79 (dd, J = 13.5, 4.0, H-18), 5.00 (d, J = 9.6, H-21), 5.98 (d, J = 9.6, H-22), 1.16 (s, CH_3-23), 1.05 (s, CH_3-24), 0.78 (s, CH_3-25), 0.91 (s, CH_3-26), 1.84 (s, CH_3-27), 4.12 (s, H_2-28), 1.33 (s, CH_3-29), 1.38 (s, CH_3-30); β-D-GlcUAp: 4.85 (d, J = 7.1, H-1), 4.75 (dd, J = 8.8, 7.1, H-2), 4.73 (dd, J = 9.1, 8.8, H-3); β-D-Galp: 6.21 (d, J = 7.4, H-1), 4.73 (dd, J = 8.5, 7.4, H-2); α-L-Rhap: 6.26 (brs, H-1), 1.46 (d, J = 6.3, CH_3-6); β-D-Glcp: 5.93 (d, J = 7.0, H-1); Tigloyl: 6.97 (q, J = 6.3, H-3), 1.68 (d, J = 6.3, CH_3-4), 1.81 (s, CH_3-5); 2.09 (s, Ac) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-17	46.5	GlcUA-1	105.5	Rha-5	70.0
2	26.7	18	41.9	2	79.5	6	18.6
3	89.9	19	47.7	3	82.7	Glc-1	102.8
4	40.0	20	37.0	4	71.5	2	76.5
5	55.9	21	76.4	5	77.7	3	78.4
6	18.6	22	78.4	6	172.4	4	72.8
7	33.3	23	28.2	Gal-1	101.3	5	78.6
8	40.3	24	17.1	2	76.4	6	63.8
9	47.1	25	15.6	3	76.3	Tigloyl-1	168.2
10	37.1	26	17.3	4	71.5	2	129.9
11	24.2	27	27.8	5	77.2	3	136.3
12	124.0	28	68.9	6	62.2	4	14.3
13	142.5	29	30.4	Rha-1	102.4	5	12.7
14	42.0	30	19.9	2	72.8		
15	35.0	Ac-1	170.8	3	72.8		
16	68.2	Ac-2	21.2	4	74.1		

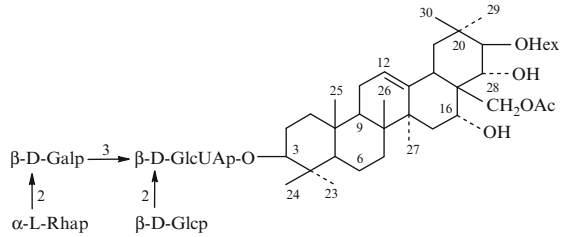
Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Hirai, M. Tanaka, S. Arihara, Chem. Pharm. Bull. **48**(7), 1093 (2000)

Jegosaponin D

CAS Registry Number: 290809-70-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Barringtogenol C
Biological source: *Styrax japonica* [1]
$C_{62}H_{98}O_{27}$: 1274.629
Mp: 213–215°C [1]
$[\alpha]_D^{25}$ −12.0°(c 1.5, MeOH) [1]
IR (film) ν_{max} cm^{-1}: 3400, 1735, 1660, 1240, 1160 [1]
FAB-MS *m/z*: 1273 $[M-H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 3.19 (dd, J = 11.5, 4.5, H-3), 5.43 (m, H-12), 4.74 (m, H-16), 2.84 (dd, J = 13.5, 4.5, H-18), 6.47 (d, J = 10.0, H-21), 4.48 (d, J = 10.0, H-22), 1.15 (s, CH_3-23), 1.05 (s, CH_3-24), 0.78 (s, CH_3-25), 0.96 (s, CH_3-26), 1.82 (s, CH_3-27), 4.21, 4.32 (d, J = 11.8, H_2-28), 1.10 (s, CH_3-29), 1.31 (s, CH_3-30); β-D-GlcUAp: 4.86 (d, J = 7.1, H-1), 4.75 (dd, J = 8.8, 7.1, H-2), 4.74 (dd, J = 9.1, 8.8, H-3); β-D-Galp: 6.23 (d, J = 8.0, H-1), 4.72 (dd, J = 8.5, 8.0, H-2); α-L-Rhap: 6.26 (brs, H-1), 1.42 (d, J = 6.0, CH_3-6); β-D-Glcp: 5.94 (d, J = 8.0, H-1); (2Z)-Hexenoyl: 6.06 (dt, 11.5, 1.4, H-2), 6.14 (td, J = 11.5, 7.4, H-3), 2.71 (dquint, J = 1.4, 7.4, H-4), 2.76 (dquint, J = 1.4, 7.4, H-4), 1.36 (sext, J = 7.4, CH_3-5), 0.83 (t, J = 7.4, CH_3-6); 1.99 (s, Ac) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-17	47.0	GlcUA-1	105.4	Glc-1	102.6
2	26.4	18	40.6	2	79.4	2	76.4
3	89.8	19	47.3	3	82.5	3	78.2
4	39.7	20	36.1	4	71.2	4	72.6
5	55.7	21	81.1	5	77.4	5	78.4
6	18.4	22	70.9	6	172.4	6	63.7
7	33.1	23	27.9	Gal-1	101.3	(2Z)-Hex-1	167.0

(*continued*)

Table 1 (continued)

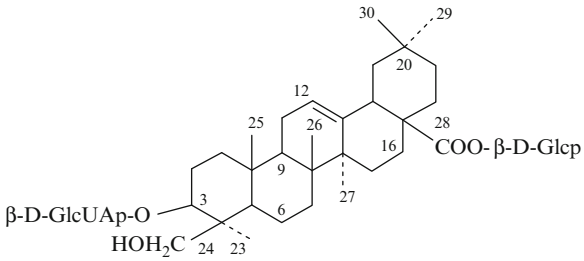
8	40.0	24	17.0	2	76.2	2	121.1
9	46.9	25	15.6	3	76.1	3	149.3
10	36.7	26	16.7	4	70.9	4	31.2
11	23.9	27	27.4	5	77.0	5	22.5
12	124.0	28	66.4	6	61.9	6	13.9
13	142.7	29	29.8	Rha-1	102.4		
14	41.8	30	20.1	2	72.6		
15	34.7	Ac-1	170.7	3	72.6		
16	67.7	Ac-2	20.7	4	73.9		
				5	69.8		
				6	18.3		

Pharm./Biol.: Antisweet activity [1]

References

1. K. Yoshikawa, H. Hirai, M. Tanaka, S. Arihara, Chem. Pharm. Bull. **48**(7), 1093 (2000)

Ilexoside L



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Bredemolic Acid

Biological source: *Ilex rotunda* [1]

$C_{42}H_{66}O_{15}$: 810.440

Mp: 250–252°C (MeOH) [1]

$[\alpha]_D^{22}$ + 5.3° (c 7.9, MeOH) [1]

FAB-MS *m/z*: 809 $[M-H]^-$ [1]

EI-MS *m/z*: 454 (3), 410 (18), 248 (36), 224 (16), 206 (28), 203 (42), 175 (52), 146 (100)

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.76, 0.88, 0.93, 1.06, 1.29, 1.53 (s, $CH_3 \times 6$), 3.60 (dd, J = 11.0, 4.0, H-3), 3.62, 4.35 (d, J = 11.0, H_2-24), 5.42 (brt, H-12)
β-D-GlcUAp: 5.13 (d, J = 7.5, H-1)
β-D-Glcp: 6.30 (d, J = 7, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	24.0	GlcUA-1	106.5
2	26.8	17	47.0	2	75.4
3	89.0	18	41.8	3	78.0
4	44.4	19	46.2	4	73.5
5	56.1	20	30.8	5	78.1
6	18.9	21	34.0	6	172.9
7	32.6	22	33.4	Glc-1	95.8
8	39.9	23	23.4	2	74.2
9	47.9	24	63.3	3	78.9
10	36.7	25	15.4	4	71.1
11	23.4	26	17.4	5	79.4
12	122.9	27	26.1	6	62.2
13	144.1	28	176.5		
14	42.2	29	33.2		
15	28.3	30	23.7		

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 77 (1993)

Lablaboside B

CAS Registry Number: 208390-12-9

See Figure Lablaboside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Bredemolic Acid

Biological source: *Dolichos lablab* [1]

$C_{54}H_{86}O_{24}$: 1118.550

Mp: 219.6–220.5°C [1]

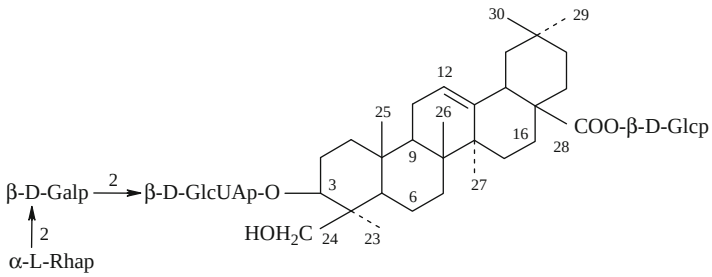
$[\alpha]_D^{25}$ −10.4° (c 2.2, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3409, 2942, 1736, 1716, 1676, 1075 [1]

FAB-MS (negative ion mode) *m/z*: 1117 $(M-H)^-$, 955 $(M-C_6H_{11}O_5)^-$, 809 $(M-C_{12}H_{21}O_9)^-$ [1]

HR-FAB-MS (positive ion mode) *m/z*: 1141 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.65, 0.88, 0.90, 1.01, 1.26, 1.41 (s, CH_3-25, 30, 29, 26, 27, 23), 3.15



Lablaboside B

(dd, J = 4.3, 13.8, H-18), 3.22, 4.22 (d, J = 11.3, H_2-24), 3.39 (dd, J = 4.0, 11.6, H-3), 5.38 (brs, H-12)
α-L-Rhap: 6.21 (brs, H-1), 1.75 (d, J = 6.1, CH_3-6)
β-D-GlcUAp: 4.96 (d, J = 7.4, H-1)
β-D-Galp: 5.72 (d, J = 7.4, H-1)
β-D-Glcp: 6.27 (d, J = 7.9, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.5	GlcUA-1	105.4	Rha-1	102.3
2	26.7	17	47.1	2	77.0	2	72.4
3	91.3	18	41.8	3	78.5	3	72.8
4	43.9	19	46.3	4	73.8	4	74.4
5	56.2	20	30.8	5	77.6	5	69.4
6	18.6	21	34.1	6	172.3	6	18.9
7	33.3	22	32.6	Gal-1	101.8	Glc-1	95.8
8	39.9	23	23.0	2	77.7	2	74.2
9	47.9	24	63.6	3	76.6	3	78.9
10	36.6	25	15.7	4	71.3	4	71.3
11	24.0	26	17.4	5	76.4	5	79.2
12	122.8	27	26.0	6	61.8	6	62.4
13	144.1	28	176.4				
14	42.2	29	33.1				
15	28.3	30	23.7				

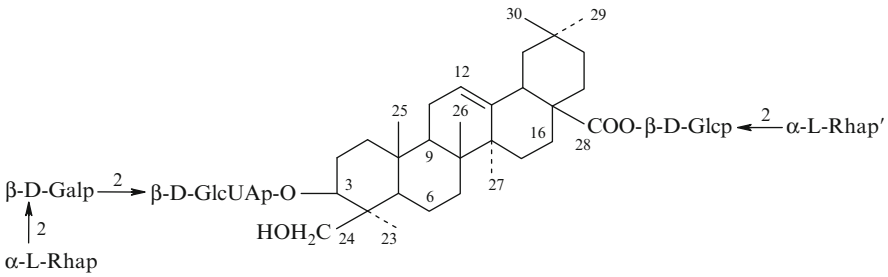
Pharm./Biol.: Adjuvant activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Komatsu, H. Matsuda, Chem. Pharm. Bull. **46**(5), 812 (1998)

Lablaboside C

CAS Registry Number: 209802-42-6
See Figure Lablaboside C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Bredemolic Acid
Biological source: *Dolichos lablab* [1]
$C_{60}H_{96}O_{28}$: 1264.608
Mp: 222.0–223.5°C (MeOH-H_2O) [1]
$[\alpha]_D^{24}$ −22.9° (c 0.97, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3409, 2940, 1736, 1718, 1676, 1076 [1]
FAB-MS (negative ion mode) *m/z*: 1263 $(M\text{-}H)^-$, 1117 $(M\text{-}C_6H_{11}O_4)^-$, 955 $(M\text{-}C_{12}H_{21}O_9)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1287 $(M + Na)^+$ [1]



Lablaboside C

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.63, 0.80, 0.89, 0.99, 1.28, 1.35 (s, CH_3-25, 30, 29, 26, 27, 23), 3.10 (dd, J = 4.9, 14.0, H-18), 3.13, 4.19 (d, J = 11.0, H_2-24), 3.34 (dd, J = 4.9, 12.2, H-3), 5.41 (brs, H-12)
α-L-Rhap: 6.28 (brs, H-1), 1.81 (d, J = 5.8, CH_3-6)
α-L-Rhap′: 6.66 (brs, H-1), 1.79 (d, J = 5.2, CH_3-6)
β-D-GlcUAp: 4.98 (d, J = 7.4, H-1)
β-D-Galp: 5.80 (d, J = 7.3, H-1)
β-D-Glcp: 6.27 (d, J = 7.9, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.4	GlcUA-1	105.6	Glc-1	94.9
2	26.7	17	47.1	2	76.6	2	75.6
3	91.3	18	41.8	3	78.5	3	79.9
4	43.9	19	46.3	4	73.9	4	71.4
5	56.2	20	30.8	5	77.7	5	79.0
6	18.6	21	34.1	6	172.4	6	62.1
7	33.3	22	32.6	Gal-1	101.7	Rha′-1	101.4
8	39.9	23	23.0	2	77.9	2	72.3
9	47.9	24	63.6	3	76.6	3	72.6
10	36.6	25	15.7	4	71.2	4	73.9
11	24.0	26	17.4	5	76.4	5	69.8
12	122.8	27	26.0	6	61.6	6	18.7
13	144.1	28	176.4	Rha-1	102.5		
14	42.2	29	33.1	2	72.5		
15	28.3	30	23.7	3	72.8		
				4	74.4		
				5	69.5		
				6	19.0		

Pharm./Biol.: Adjuvant activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Komatsu, H. Matsuda, Chem. Pharm. Bull. **46**(5), 812 (1998)

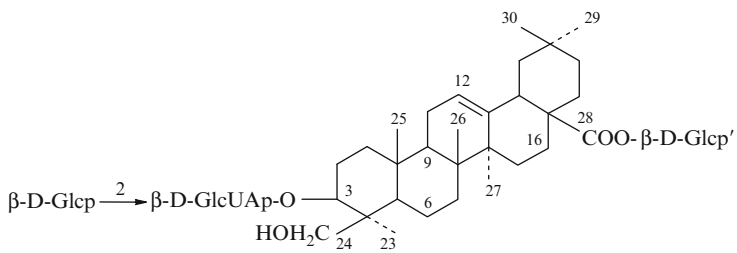
Palustroside III

CAS Registry Number: 214692-99-6
See Figure Palustroside III
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Bredemolic Acid
Biological source: *Lathyrus palustris* [1]
$C_{48}H_{76}O_{20}$: 972.492
$[\alpha]_D^{25}$ −4.6° (c 0.52, C_5H_5N-H_2O (1:1)) [1]
FAB-MS (negative ion mode) *m/z*: 971 $(M-H)^-$, 809 $(M-H-Glc)^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.62, 0.90, 0.95, 0.99, 1.24, 1.31 (s, CH_3 × 6), 5.41 (s, H-12)
β-D-Glcp: 5.47 (d, J = 7.0, H-1)
β-D-Glcp′: 6.18 (d, J = 9.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	23.3	GlcUA-1	104.3	Glc′-1	95.6
2	26.3	17	47.2	2	80.5	2	73.7
3	91.1	18	41.7	3	75.3	3	78.1
4	43.6	19	46.3	4	73.0	4	70.8
5	56.2	20	30.8	5	77.9	5	78.9
6	18.6	21	34.0	6	174.0	6	61.8
7	33.4	22	32.5	Glc-1	104.0		
8	39.8	23	22.6	2	75.3		
9	47.8	24	63.3	3	77.9		
10	36.5	25	15.4	4	70.1		
11	23.3	26	17.3	5	77.9		
12	122.8	27	26.1	6	61.6		
13	144.2	28	177.2				
14	42.1	29	33.2				
15	28.2	30	23.7				

Pharm./Biol.: Hepatoprotective activity [1]



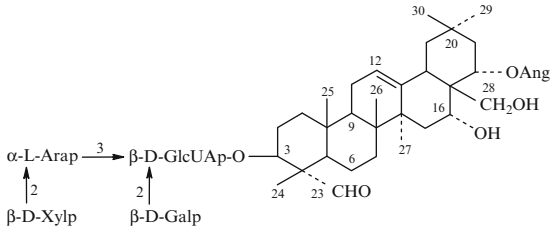
Palustroside III

References

1. M. Udayama, M. Ohkawa, N. Yoshida, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **46**(9), 1412 (1998)

Assamsaponin A

CAS Registry Number: 259747-95-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Camelligenin B

Biological source: *Camellia sinensis* [1]

$C_{57}H_{88}O_{25}$: 1172.551

Mp: 211.7–212.2°C ($CHCl_3$-MeOH) [1]

$[\alpha]_D^{26}$ −19.6° (c 0.1, MeOH) [1]

FAB-MS (negative) *m/z*: 1171 $[M-H]^-$, 1039 $[M-C_5H_9O_4]^-$, 907 $[M-C_{10}H_{17}O_8]^-$ [1]

FAB-MS (positive) *m/z*: 1195 $[M + Na]^+$ [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1721, 1655, 1078, 1048 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.82 (s, CH_3-25), 0.85 (s, CH_3-26), 1.04 (s, CH_3-29), 1.27 (s, CH_3-30), 1.43 (s, CH_3-24), 1.80 (s, CH_3-27), 3.00 (m, H-18), 3.15, 3.66 (d-like, CH_2-28), 4.0 (m, H-3), 4.59 (brs, H-16), 5.37 (brs, H-12), 6.12 (dd, like, H-22), 9.85 (s, CHO-23)

β-D-GlcUAp: 4.82 (d, J = 7.3, H-1)

β-D-Galp: 5.68 (d, J = 7.3, H-1)

α-L-Arap: 5.65 (d, J = 5.2, H-1)

β-D-Xylp: 4.98 (d, J = 7.2, H-1)

Angelic acid: 6.00 (dq-like, H-3), 2.08 (d, J = 6.9, CH_3-4), 1.96 (s, CH_3-5) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

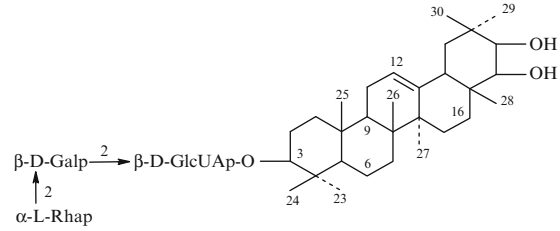
C-1	38.1	C-16	70.0	GlcUA-1	103.9	Ara-1	101.4
2	25.0	17	44.7	2	78.1	2	82.1
3	84.2	18	40.8	3	84.0	3	73.2
4	55.0	19	47.3	4	70.6	4	68.2
5	48.2	20	31.9	5	77.0	5	65.9
6	20.2	21	41.6	6	171.6	Xyl-1	106.8
7	32.3	22	72.9	Gal-1	103.0	2	75.6
8	40.2	23	209.6	2	73.5	3	78.0
9	46.7	24	10.8	3	75.1	4	70.6
10	35.9	25	15.6	4	70.3	5	67.2
11	23.6	26	16.7	5	76.3	Ang-1	167.9
12	124.1	27	27.4	6	61.9	2	129.4
13	143.6	28	63.7			3	136.3
14	41.6	29	33.3			4	15.6
15	34.9	30	25.0			5	20.7

Pharm./Biol.: Gastroprotective effect [1]

References

1. T. Murakami, J. Nakamura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **47**(12), 1759 (1999)

Abrisaponin Ca



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Cantoniensistriol

Biological source: *Abrus cantoniensis* [1]

$C_{48}H_{78}O_{18}$: 942.518

$[\alpha]_D^{27}$ -6.1^0 (c 0.38, C_5H_5N) [1]

FAB-MS *m/z*: 941 $[M-H]^-$, 795 $[M-H-Rha]^-$, 633 $[M-H-Rha-Gal]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 1.00, 1.20, 1.26, 1.29, 1.30, 1.43, 1.45 (s, CH_3 × 8), 1.78 (d, J = 5.9, CH_3-6 of Rha), 5.08 (d, J = 7.0, H-1 of GlcUA), 5.78 (d, J = 7.7, 1-H of Gal), 6.34 (s, H-1 of Rha) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	27.4	GlcUA-1	105.3	Rha-1	102.7
2	26.5	17	39.1	2	79.2	2	72.4
3	89.9	18	43.9	3	76.6	3	72.7
4	39.7	19	47.2	4	73.5	4	74.4
5	55.8	20	36.5	5	77.4	5	69.4
6	18.4	21	74.6	6	172.6	6	18.9
7	32.8	22	79.6	Gal-1	102.1		
8	40.2	23	28.4	2	78.8		
9	47.8	24	16.8	3	76.2		
10	36.8	25	15.6	4	70.5		
11	23.8	26	17.0	5	76.2		
12	122.6	27	26.6	6	61.9		
13	144.5	28	22.2				
14	42.0	29	31.5				
15	26.5	30	21.3				

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)

Calendasaponin B

CAS Registry Number: 358732-32-8

See Figure Calendasaponin B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Cochalic Acid

Biological source: *Calendula officinalis* [1]

$C_{48}H_{76}O_{20}$: 972.492

Mp: 245.6–247°C [1]

$[\alpha]_D^{27}$ + 6.4° (c 0.1, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 995.4828 $(M + Na)^+$ [1]

FAB-MS (negative ion mode) *m/z*: 971 $(M-H)^-$, 809 $(M-C_6H_{11}O_5)^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1736, 1075, 1032 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.35 (dd-like, H-3), 5.44 (brs, H-12), 4.55 (dd, J = 5.5, 10.4, H-16), 3.27 (dd-like, H-18), 0.84, 0.97, 1.07, 1.28, 1.37 (s, CH_3-25, 24, 26, 23, 27), 0.91 (s, CH_3-29, 30)

β-D-GlcUAp: 4.95 (d, J = 7.6, H-1)

β-D-Galp: 5.23 (d, J = 7.8, H-1)

β-D-Glcp: 6.19 (d, J = 7.9, H-1) [1]

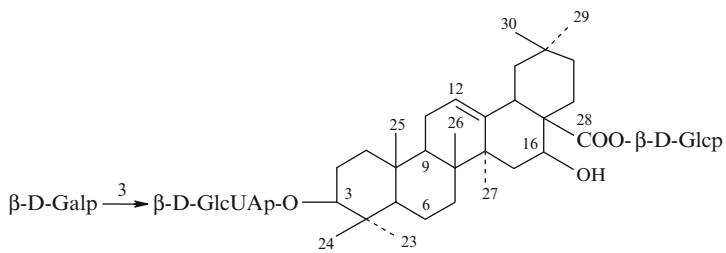
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	64.8	GlcUA-1	106.6	Glc-1	96.1
2	26.5	17	51.4	2	74.3	2	74.1
3	89.3	18	44.1	3	87.6	3	79.3
4	39.5	19	46.5	4	71.6	4	71.2
5	55.8	20	30.6	5	77.3	5	78.4
6	18.4	21	33.8	6	172.6	6	62.3
7	33.1	22	26.4	Gal-1	106.2		
8	39.9	23	28.1	2	73.0		
9	47.2	24	16.9	3	75.0		
10	36.9	25	15.6	4	70.2		
11	23.8	26	17.4	5	77.3		
12	122.9	27	26.9	6	62.2		
13	143.1	28	175.6				
14	44.5	29	23.9				
15	38.1	30	33.0				

References

1. M. Yoshikawa, T. Murakami, A. Kishi, T. Kageura, H. Matsuda, Chem. Pharm. Bull. **49**(7), 863 (2001)



Calendasaponin B

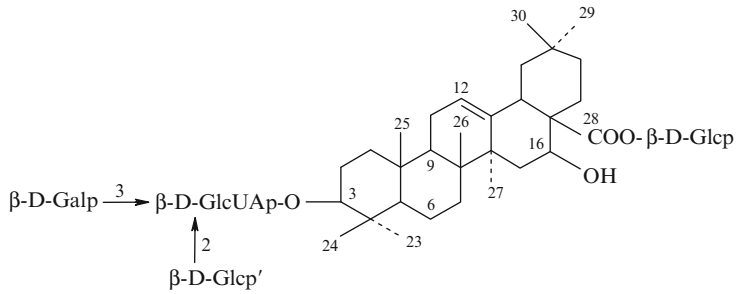
Calendasaponin C

CAS Registry Number: 358732-33-9
See Figure Calendasaponin C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Cochalic Acid
Biological source: *Calendula officinalis* [1]
$C_{54}H_{86}O_{25}$: 1134.545
Mp: 228.5–230.2°C [1]
$[\alpha]_D^{26}$ + 8.1° (c 1.0, MeOH) [1]
HR-FAB-MS (positive ion mode) *m/z*: 1157.5356 $(M + Na)^+$ [1]
FAB-MS (negative ion mode) *m/z*: 1133 $(M\text{-}H)^-$, 971 $(M\text{-}C_6H_{11}O_5)^-$, 809 $(M\text{-}C_{12}H_{21}O_{10})^-$ [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 1736, 1076, 1042 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.27 (dd, H-3, 18), 5.42 (brs, H-12), 4.54 (dd, J = 3.9, 11.9, H-16), 0.82, 1.06, 1.08, 1.24, 1.35 (s, CH_3-25, 26, 24, 23, 27), 0.91 (s, CH_3-29, 30)
β-D-GlcUAp: 4.92 (d, J = 7.9, H-1)
β-D-Galp: 5.27 (d, J = 7.9, H-1)
β-D-Glcp: 5.65 (d, J = 7.6, H-1)
β-D-Glcp′: 6.22 (d, J = 7.9, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	64.8	GlcUA-1	105.2	Gal-1	105.2
2	26.5	17	51.4	2	78.9	2	73.0
3	89.6	18	44.0	3	88.0	3	75.4
4	39.6	19	46.5	4	71.8	4	70.2
5	55.8	20	30.6	5	77.3	5	77.3
6	18.5	21	33.8	6	171.7	6	62.0
7	33.2	22	26.4	Glc-1	103.9	Glc′-1	96.1
8	39.9	23	28.0	2	76.3	2	74.2
9	47.2	24	16.7	3	77.6	3	79.4
10	36.9	25	15.6	4	72.7	4	71.3
11	23.8	26	17.4	5	78.6	5	78.5
12	122.9	27	26.9	6	63.5	6	62.4
13	143.1	28	175.5				
14	44.6	29	23.9				
15	38.3	30	33.0				

(*continued*)



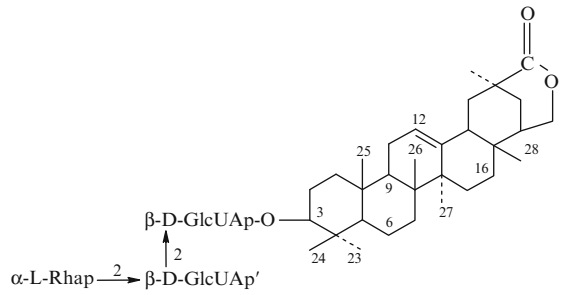
Calendasaponin C

Table 1 (continued)

References

1. M. Yoshikawa, T. Murakami, A. Kishi, T. Kageura, H. Matsuda, Chem. Pharm. Bull. **49**(7), 863 (2001)

Licorice-Saponin F3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Deoxoglabrolide
Biological source: *Glycyrrhiza uralensis* [1, 2]
$C_{48}H_{72}O_{19}$: 952.466
Mp: 215–217°C [1]
$[\alpha]_D^{20}$ −20° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1760, 1720 [1]
FAB-MS *m/z*: 1003 $(M + Na)^+$[1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.71, 0.75, 1.11, 1.14 ($CH_3 \times 4$), 1.26 ($CH_3 \times 2$), 3.27 (dd, J = 4.4, 10.8, Hα-3), 5.40 (H-12), 5.36 (d, J = 7.6, H-1 of GlcUA), 5.68 (d, J = 6.9, H-1 of GlcUA′), 6.10 (brs, H-1 of Rha) [1]
^{13}C NMR (22.5 MHz, C_5D_5N) (for methyl derivate): [1]

Table 1

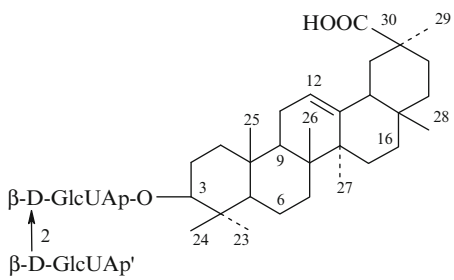
C-3	89.9	GlcUA-1	104.7	Rha-1	101.6
11	47.5	2	79.1	2	71.8
12	124.8	3	76.3	3	72.8
13	140.6	4	72.2	4	73.9
18	47.5	5	77.9	5	69.1
22	84.3	6	170.1	6	18.5
24	16.3	GlcUA′-1	102.4		
29	28.0	2	78.2		
30	180.1	3	76.6		
		4	72.8		
		5	77.6		
		6	169.8		

References

1. I. Kitagawa, J.L. Zhou, M. Sakagami, E. Uchida, M. Yoshikawa, Chem. Pharm. Bull. **39**(1), 244 (1991)
2. I. Kitagawa, K. Hori, M. Sakagami, J.L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(8), 1337 (1993)

Licorice-Saponin B2

CAS Registry Number: 118536-86-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Desoxoglycyrrhetic Acid
Biological source: *Glycyrrhiza uralensis* [1]
$C_{42}H_{64}O_{15}$: 808.424
Mp: 209–210°C (MeOH) [1]
$[\alpha]_D^{23}$ + 54.0° (c 0.3, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 3000–2800 (br), 1720, 1050 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O): 0.83, 0.89, 0.92, 1.20, 1.28, 1.36, 1.39 (s, $CH_3 \times 7$), 3.33 (dd, J = 4.6, 11.9, H-3), 5.49 (brs, H-12)
β-D-GlcUAp: 5.03 (d, J = 7.7, H-1)
β-D-GlcUAp′: 5.39 (d, J = 7.6, H-1) [1]
^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

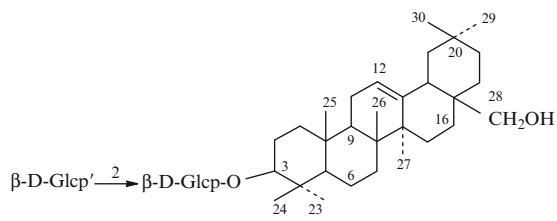
C-3	88.7	GlcUA-1	104.1
12	122.0	6	171.1
13	144.3	GlcUA′-1	105.7
18	48.8	6	172.6
30	178.3		

Pharm./Biol.: Exhibit hepatocytes function restoration-promoting activity against carbon tetrachloride induced liver cell injury in rat [1]

References

1. I. Kitagawa, K. Hori, T. Taniyama, J.-L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(1), 43 (1993)

Hederoside E_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Eritrodiol
Biological source: *Hedera taurica* [1]
$C_{42}H_{70}O_{12}$: 766.486
$[\alpha]_D^{20}$ + 5° (c 0.5, C_5H_5N) [1]
IR (film) ν_{max} cm^{-1}: 3400, 2925, 2870, 1645, 1540, 1455, 1365, 1300, 1160, 1070, 1025, 890, 820 [1]
FAB-MS *m/z*: 784 $[M + NH_4]^+$, 767 $[M + H]^+$, 622 $[M + NH_4\text{-}162]^+$, +605 $[M + H\text{-}162]^+$, 460 $[M + NH_4\text{-}162\text{-}162]^+$, 443 $[M + H\text{-}162\text{-}162]^+$, 342 $[Glc\text{-}Glc\text{-}NH_3]^+$, 180 $[Glc\text{-}NH_3]^+$ [1]
^{1}H NMR (250 MHz, J/Hz, C_5D_5N) (for peracetate): 3.11 (dd, J = 5.3, 11.5, H-3), 5.21 (brt, H-12), 3.72 (d, J = 11.0, Hb-28), 4.03 (d, Ha-28), 2.0–2.1 (s, Acx8)
β-D-Glcp: 4.46 (d, J = 7.7, H-1), 3.81 (dd, J = 9.5, H-2), 5.17 (t, J = 9.5, H-3), 4.92 (t, J = 9.5, H-4), 3.62–3.71 (m, H-5), 4.00–4.11 (m, Hb-6), 4.22–4.32 (m, Ha-6)
β-D-Glcp′: 4.71 (d, J = 8.0, H-1), 4.92 (dd, J = 9.7, H-2), 5.18–5.30 (m, H-3, H-4), 3.62–3.71 (m, H-5), 4.00–4.11 (m, Hb-6), 4.22–4.32 (m, Ha-6) [1]
^{13}C NMR (62.9 MHz, C_5D_5N): [1]

Table 1

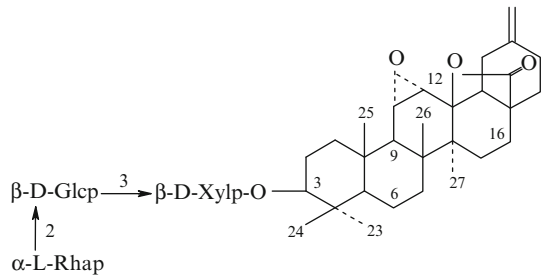
C-1	39.5	C-16	22.9	Glc-1	105.1
2	26.6	17	37.6	2	83.5
3	88.9	18	42.7	3	77.9
4	38.9	19	47.1	4	71.6
5	55.7	20	31.2	5	78.0
6	18.5	21	34.7	6	62.8
7	32.9	22	31.8	Glc′-1	106.1
8	40.1	23	28.2	2	77.1
9	47.9	24	16.8	3	78.3
10	36.8	25	15.7	4	71.6
11	23.9	26	16.8	5	78.2
12	122.5	27	26.1	6	62.7
13	145.1	28	68.6		
14	42.0	29	33.4		
15	26.1	30	23.9		

References

1. V.I. Grishkovets, A.A. Loloiko, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **26**(2), 186 (1990)

Eupteleasaponin V

CAS Registry Number: 290809-34-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Eupteleogenin
Biological source: *Euptelea polyandra* [1]
$C_{46}H_{70}O_{17}$: 894.461
Mp: 175–177°C [1]
$[\alpha]_D^{27}$ + 15.5° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1781, 1655, 1075 [1]
FAB-MS (negative ion mode) *m/z*: 893 $(M\text{-}H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 917 $(M + Na)^+$, 939 $(M + 2Na\text{-}H)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.92, 1.19, 1.20 (s, CH_3-25, 27, 23), 1.10 (s, CH_3-24, 26), 2.35 (dd, J = 3.1, 13.4, H-18), 3.05 (brs, H-11), 3.15 (d, J = 3.9, H-12), 3.30 (dd, J = 4.0, 11.9, H-3), 4.70, 4.73 (s, H_2-29)
β-D-Xylp: 4.87 (d, J = 4.7, H-1)
β-D-Glcp: 5.08 (d, J = 7.9, H-1)
α-L-Rhap: 6.09 (brs, H-1), 1.64 (d, J = 6.1, CH_3-6)
α-L-Arap: 5.21 (d, J = 7.1, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	32.3	Xyl-1	104.7	Rha-1	102.0
2	26.2	17	44.1	2	74.9	2	72.4
3	88.0	18	54.8	3	82.0	3	72.6
4	39.7	19	34.7	4	68.1	4	74.0
5	55.3	20	147.1	5	64.8	5	70.1
6	17.8	21	30.2	Glc-1	104.7	6	18.6
7	31.4	22	22.0	2	75.0		
8	41.7	23	27.8	3	78.3		
9	51.2	24	16.5	4	71.6		

(*continued*)

Table 1 (continued)

10	36.5	25	17.4	5	78.6
11	52.9	26	20.3	6	62.8
12	57.2	27	18.9		
13	87.0	28	178.2		
14	41.0	29	109.8		
15	27.0				

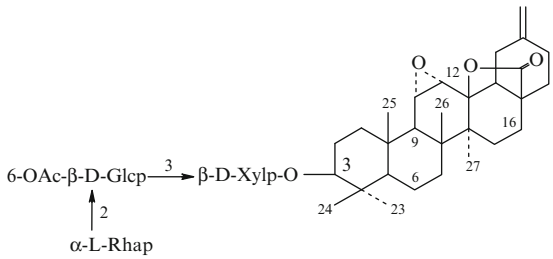
Pharm./Biol.: Gastroprotective activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Oominami, H. Matsuda, Chem. Pharm. Bull. **48**(7), 1045 (2000)

Eupteleasaponin V Acetate

CAS Registry Number: 290304-30-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Eupteleogenin

Biological source: *Euptelea polyandra* [1]

$C_{48}H_{72}O_{18}$: 936.463

Mp: 180–182°C [1]

$[\alpha]_D^{26}$ + 41.5° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1775, 1744, 1649, 1074 [1]

FAB-MS (negative ion mode) *m/z*: 935 $(M\text{-}H)^-$, 893 $(M\text{-}C_2H_3O)^-$, 789 $(M\text{-}C_6H_{11}O_4)^-$, 747 $(M\text{-}C_8H_{13}O_5)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 937 $(M + H)^+$, 959 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.93 (s, CH_3-25), 1.09, 1.20 (s, CH_3-24, 26, 23, 27), 2.07 (Ac-2), 2.35 (dd-like, H-18), 3.06 (brs, H-11), 3.15 (d, J = 3.6, H-12), 3.30 (dd, J = 4.0, 11.2, H-3), 4.70, 4.73 (s, H_2-29)

β-D-Xylp: 4.85 (d, J = 6.9, H-1)

β-D-Glcp: 5.01 (d, J = 7.9, H-1)

α-L-Rhap: 6.06 (brs, H-1), 1.62 (d, J = 6.3, CH_3-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-17	44.1	Xyl-1	104.8	Rha-1	102.0
2	26.2	18	54.8	2	74.9	2	72.4
3	88.1	19	34.7	3	82.3	3	72.6
4	39.6	20	147.0	4	68.2	4	73.9
5	55.3	21	30.2	5	64.5	5	70.0
6	17.8	22	22.0	Glc-1	104.7	6	18.6
7	31.4	23	27.8	2	74.7		
8	41.7	24	16.4	3	78.0		
9	51.2	25	17.4	4	71.5		
10	36.5	26	20.3	5	75.3		
11	52.8	27	18.9	6	64.9		
12	57.1	28	178.1				
13	87.0	29	109.8				
14	41.0	Ac-1	170.8				
15	27.1	Ac-2	20.7				
16	32.3						

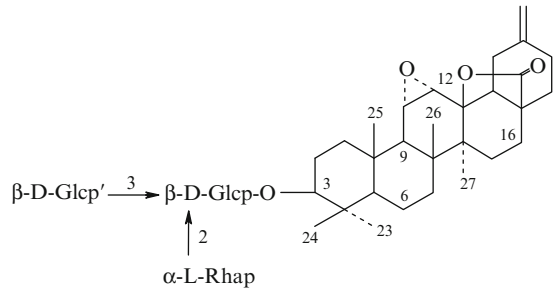
Pharm./Biol.: Gastroprotective activity [1]

References

1. M. Yoshikawa, T. Murakami, H. Oominami, H. Matsuda, Chem. Pharm. Bull. **48**(7), 1045 (2000)

Eupteleasaponin VI

CAS Registry Number: 290809-37-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Eupteleogenin
Biological source: *Euptelea polyandra* [1]
$C_{47}H_{72}O_{18}$: 924.471
Mp: 184–187°C [1]
$[\alpha]_D^{25}$ + 46.8° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1775, 1658, 1055 [1]
HR-FAB-MS *m/z*: 947.4616 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.90, 1.09, 1.12, 1.18, 1.23 (s, CH_3-25, 26, 24, 27, 23), 2.33 (dd-like, H-18), 3.03 (brs, H-11), 3.14 (d-like, H-12), 3.38 (dd-like, H-3), 4.73 (m, H_2-29)
β-D-Glcp: 4.80 (d-like, H-1)
β-D-Glcp′: 5.08 (d, J = 7.0, H-1)
α-L-Rhap: 6.36 (brs, H-1), 1.65 (d, J = 5.4, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-19	34.7	Glc-1	104.9
2	26.4	20	147.1	2	77.1
3	88.4	21	30.2	3	89.3
4	39.6	22	22.0	4	69.9
5	55.3	23	27.7	5	77.8
6	17.8	24	16.5	6	62.2
7	31.4	25	17.4	Rha-1	101.6
8	41.7	26	20.7	2	72.2
9	51.1	27	18.9	3	72.4
10	36.5	28	178.2	4	73.8
11	52.8	29	109.9	5	69.8
12	57.2			6	18.5
13	87.0			Glc′-1	104.0
14	41.0			2	75.1
15	27.1			3	78.5
16	32.3			4	71.4
17	44.1			5	78.2
18	54.8			6	62.7

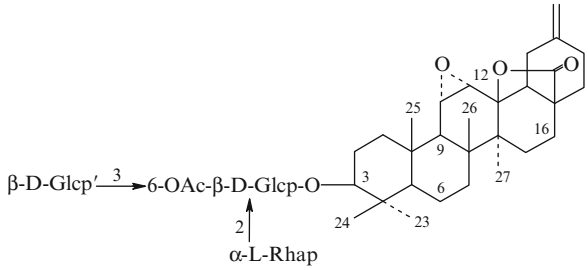
Pharm./Biol.: Gastroprotective activity [1]

References

1. T. Murakami, H. Oominami, H. Matsuda, M. Yoshikawa. Chem. Pharm. Bull. **49**(6), 741 (2001)

Eupteleasaponin VI Acetate

CAS Registry Number: 354527-11-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Eupteleogenin
Biological source: *Euptelea polyandra* [1]
$C_{49}H_{74}O_{19}$: 966.482
Mp: 180–184°C [1]
$[\alpha]_D^{26}$ + 31.9° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1761, 1658, 1060 [1]
FAB-MS (negative ion mode) *m/z*: 965 $(M-H)^-$, 923 $(M-C_2H_3O)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 989 $(M + Na)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.91, 1.09, 1.13, 1.17, 1.24 (s, CH_3-25, 26, 24, 27, 23), 2.17 (s, Ac-2), 2.32 (dd-like, H-18), 3.02 (brs, H-11), 3.14 (d-like, H-12), 3.40 (dd, J = 3.9, 11.0, H-3), 4.73 (m, H_2-29)
β-D-Glcp: 4.84 (d, J = 7.3, H-1)
β-D-Glcp′: 5.01 (d, J = 7.6, H-1)
α-L-Rhap: 6.37 (brs, H-1), 1.66 (d, J = 6.3, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-19	34.7	Glc-1	104.9
2	26.3	20	147.0	2	76.9
3	88.5	21	30.2	3	89.9
4	39.5	22	22.0	4	69.9
5	55.3	23	27.7	5	75.1
6	17.7	24	16.5	6	64.5
7	31.4	25	17.3	Rha-1	101.6
8	41.6	26	20.3	2	72.3
9	51.1	27	18.9	3	72.5
10	36.4	28	178.1	4	73.9
11	52.8	29	109.8	5	69.7

(*continued*)

Table 1 (continued)

12	57.2			6	18.6
13	87.0	Ac-1	170.8	Glc′-1	104.5
14	41.0	2	20.6	2	74.9
15	27.0			3	78.1
16	32.3			4	71.5
17	44.1			5	77.8
18	54.8			6	62.7

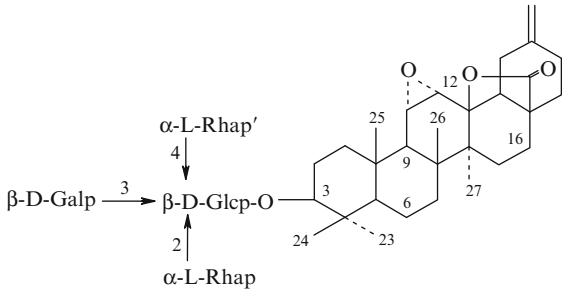
Pharm./Biol.: Gastroprotective activity [1]

References

1. T. Murakami, H. Ominami, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 741 (2001)

Eupteleasaponin VII

CAS Registry Number: 290809-40-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Eupteleogenin
Biological source: *Euptelea polyandra* [1]
$C_{53}H_{82}O_{22}$: 1070.529
Mp: 168–172°C ($CHCl_3$-MeOH) [1]
$[\alpha]_D^{26}$ + 14.6° (c 0.1, MeOH) [1]
IR (KBr) $\nu_{max}cm^{-1}$: 3432, 1775, 1654, 1068 [1]
FAB-MS (negative ion mode) *m/z*: 1069 $(M\text{-}H)^-$, 923 $(M\text{-}C_6H_{11}O_4)^-$, 761 $(M\text{-}C_{12}H_{23}O_9)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1093 $(M + Na)^+$, 1115 $(M + 2Na\text{-}H)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.90, 1.10, 1.13, 1.18, 1.25 (s, CH_3-25, 26, 24, 27, 23), 2.35 (dd, J = 3.7, 13.8, H-18), 3.01 (brs, H-11), 3.14 (d, J = 2.3, H-12), 3.38 (dd, J = 4.3, 11.9, H-3), 4.71, 4.74 (s, H_2-29)
β-D-Glcp: 4.83 (d, J = 7.3, H-1)
β-D-Galp: 5.04 (d, J = 7.9, H-1)
α-L-Rhap: 6.37 (brs, H-1), 1.67 (d, J = 6.1, CH_3-6)
α-L-Rhap′: 5.69 (brs, H-1), 1.69 (d, J = 6.1, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	32.3	Glc-1	104.9	Gal-1	103.7
2	26.4	17	44.1	2	77.3	2	75.3
3	88.5	18	54.8	3	89.1	3	76.5
4	39.5	19	34.7	4	78.2	4	69.9
5	55.3	20	147.1	5	77.8	5	77.2
6	17.8	21	30.2	6	61.5	6	62.7
7	31.4	22	22.0	Rha-1	101.8	Rha′-1	102.7
8	41.7	23	27.7	2	72.3	2	72.4
9	51.1	24	16.5	3	72.5	3	72.7
10	36.4	25	17.5	4	73.9	4	73.9
11	52.8	26	20.3	5	69.8	5	70.4
12	57.2	27	18.9	6	18.6	6	18.5
13	87.0	28	178.2				
14	41.0	29	109.8				
15	27.1						

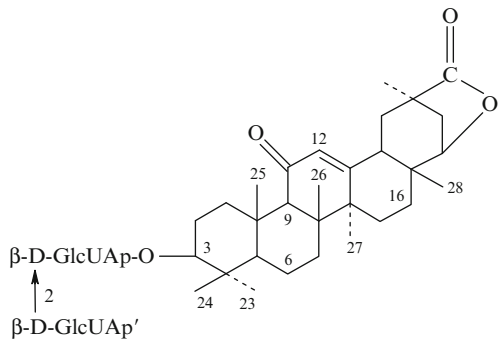
Pharm./Biol.: Gastroprotective activity [1]

References

1. T. Murakami, H. Ominami, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 741 (2001)

Licorice-Saponin E2

CAS Registry Number: 119418-01-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glabrolide
Biological source: *Glycyrrhiza uralensis* [1]
$C_{42}H_{60}O_{16}$: 820.388
Mp: 218–219°C (MeOH) [1]
$[\alpha]_D^{20}$ + 68.0° (c 0.2, MeOH) [1]
UV λ_{max}^{MeOH} nm (ε): 250 (12700) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3000 (br), 2929, 1780, 1724, 1645, 1385, 1010 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N-D_2O): 0.79, 1.06, 1.21, 1.22, 1.34, 1.40, 1.42 (s, CH_3 × 7), 3.02 (brd, J = 12, H-18), 3.35 (dd, J = 4.4, 11.2, H-3), 5.94 (s, H-12)
β-D-GlcUAp: 5.02 (d, J = 7.6, H-1)
β-D-GlcUAp′: 5.38 (d, J = 7.6, H-1) [1]
^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

C-3	89.0	GlcUA-1	104.6	GlcUA′-1	106.2
11	198.8	2	83.8	2	76.1
12	129.6	3	76.2	3	77.2
13	164.3	4	72.2	4	72.5
18	44.8	5	77.2	5	77.2
22	84.0	6	169.7	6	169.8
24	16.4				
29	28.0				
30	179.3				

References

1. I. Kitagawa, K. Hori, M. Sakagami, J.-L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(8), 1337 (1993)

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycyrrhetic Acid
Biological source: *Glycyrrhiza inflata* [1, 2]
$C_{41}H_{62}O_{14}$: 778.413
Mp: 193–195°C (MeOH) [1]
$[\alpha]_D^{23}$ + 43° (c 0.29, MeOH) [1]
UV λ_{max}^{MeOH} nm (ε): 249 (9300) [1]
IR (KBr) ν_{max} cm^{-1}: 3500–3100 (br), 2913, 1716, 1650, 1410, 1028 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N + D_2O): 0.89, 1.09, 1.12, 1.23, 1.43 (s, CH_3 × 5), 1.34 (s, CH_3 × 2), 3.03 (d, J = 14, H-18), 3.38 (dd, J = 4.2, 11.0, Hα-3), 5.95 (s, H-12)
β-D-GlcUAp: 4.96 (d, J = 7.7, H-1), 4.18 (dd, J = 7.7, 9.0, H-2), 4.28 (dd, J = 9.0, 9.0, H-3), 4.44 (dd, J = 9.0, 9.8, H-4), 4.51 (d, J = 9.8, H-5)
β-D-Apif: 6.38 (brs, H-1), 4.90 (brs, H-2), 4.37, 4.69 (Abq, J = 9.4, H_2-4), 4.25 (brs, H_2-5) [1]
^{13}C NMR (125 MHz, C_5D_5N-D_2O): [1]

Table 1

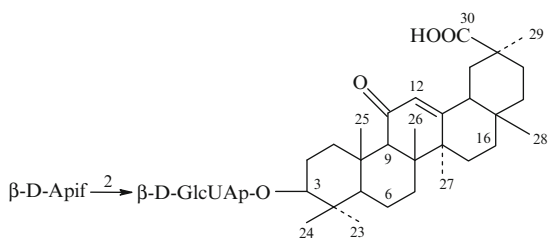
C-3	88.8	GlcUA-1	105.4	Api-1	110.9
11	199.1	2	79.4	2	77.6
12	128.4	3	79.0	3	80.1
13	169.7	4	73.0	4	75.2
30	178.8	5	77.8	5	65.3
		6	172.0		

References

1. I. Kitagawa, K. Hori, M. Sakagami, F. Hashiuchi, M. Yoshikawa, J. Ren, Chem. Pharm. Bull. **41**(8), 1350 (1993)
2. I. Kitagawa, M. Sakagami, F. Hashiuchi, J.-L. Zhou, M. Yoshikawa, J. Ren, Chem. Pharm. Bull. **37**, 551 (1989)

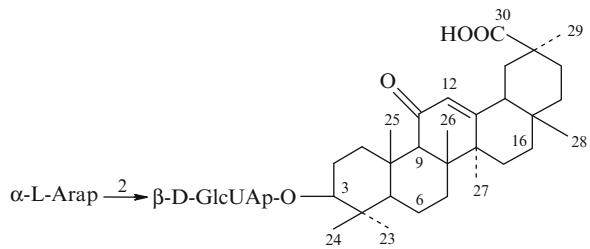
Apioglycyrrhizin

CAS Registry Number: 121709-66-8



Araboglycyrrhizin

CAS Registry Number: 121687-83-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycyrrhetic Acid
Biological source: *Glycyrrhiza inflata* [1,2]
$C_{41}H_{62}O_{14}$: 778.413
Mp: 237–238°C (MeOH) [1]
$[\alpha]_D^{23}$ −31° (c 0.25, MeOH) [1]
UV λ_{max}^{MeOH} nm (ε): 249 (9300) [1]
IR (KBr) ν_{max} cm^{-1}: 3500–3200, 2924, 1711, 1658, 1396, 1033 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N + D_2O): 1.10, 1.15, 1.26, 1.218, 1.35, 1.36, 1.42 (s, CH_3 × 7), 3.05 (brd, J = 13, H-18), 3.40 (dd, J = 5.0, 11.4, H_2-3), 5.99 (s, H-12)
β-D-GlcUAp: 5.03 (d, J = 7.6, H-1), 4.18 (dd, J = 7.6, 9.0, H-2), 4.30 (m, H-3), 4.40 (m, H-4), 4.54 (d, J = 9.0, H-5)
α-L-Arap: 4.61 (dd, J = 6.7, 8.5, H-2), 4.25 (dd, J = 3.4, 8.5, H-3), 4.30–4.40 (H-4), 3.82 (dd, J = 1.5, 12.2, H-5), 4.44 (dd, J = 3.1, 12.2, H-5) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

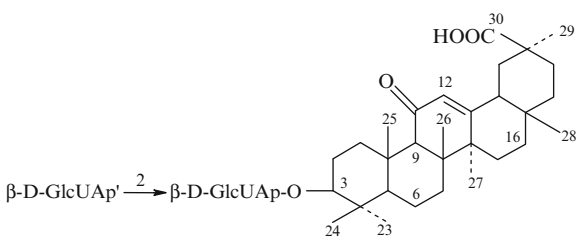
C-3	88.9	GlcUA-1	105.2	Ara-1	106.6
11	199.4	2	83.4	2	73.6
12	128.6	3	77.4	3	74.1
13	169.5	4	73.0	4	69.2
30	179.1	5	77.4	5	66.9
		6	172.3		

References

1. I. Kitagawa, K. Hori, M. Sakagami, F. Hashiuchi, M. Yoshikawa, J. Ren, Chem. Pharm. Bull. **41**(8), 1350 (1993)
2. I. Kitagawa, M. Sakagami, F. Hashiuchi, J.-L. Zhou, M. Yoshikawa, J. Ren, Chem. Pharm. Bull. **37**, 551 (1989)

Glycyrrhizin

CAS Registry Number: 1405-86-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycyrrhetic Acid
Biological source: *Glycyrrhiza glabra* [1], *G. uralensis* [2, 3], *G. inflata* [4]
$C_{42}H_{62}O_{16}$: 822.403
Mp: 220° [1]
$[\alpha]_D^{17}$ + 46.2 (c 1.5, EtOH) [1]
^{13}C NMR (125 MHz, C_5D_5N): [4]

Table 1

C-3	88.9	GlcUA-1	104.6	GlcUA′-1	106.2
11	199.3	2	83.9	2	76.2
12	128.8	3	76.2	3	77.1
13	169.4	4	72.7	4	72.7
30	178.8	5	77.1	5	77.1
		6	172.1	6	171.7

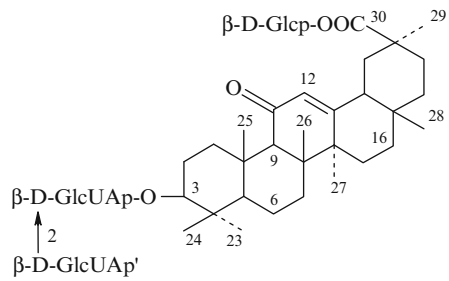
Pharm./Biol.: Inhibit aldose reductase activity [5]

References

1. B. Lythgoe, Trippett, J. Chem. Soc. 1983 (1950)
2. R. Zhang, J. Zhang, M. Wang, Yaoxue Huebao **21**, 510 (1986) [Chem. Abstr. **105**: 187603a (1986)]
3. I. Kitagawa, K. Hori, T. Taniyama, J.-L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(1), 43 (1993)
4. I. Kitagawa, K. Hori, M. Sakagami, F. Hashiuchi, M. Yoshikawa, J. Ren, Chem. Pharm. Bull. **41**(8), 1350 (1993)
5. J. Zhang, Y. Zhou, Zhongguo Zhongyao Zazhi **14**(9), 557 (1989) [Chem. Abstr. **111**: 225099z (1989)]

Licorice-Saponin A3

CAS Registry Number: 118325-22-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Glycyrrhetic Acid

Biological source: *Glycyrrhiza uralensis* [1], *G. inflata* [2]
$C_{48}H_{72}O_{21}$: 984.456
Mp: 196–199°C (MeOH-H_2O) [1]
$[\alpha]_D^{23}$ + 69.0° (c 1.1, MeOH) [1]
UV λ_{max}^{MeOH} nm (ε): 249 (8800) [1]
IR (KBr) ν_{max} cm^{-1}: 3360, 3000–2500 (br), 1741, 1716, 1650, 1041 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N + D_2O): 0.89, 1.01, 1.19, 1.21, 1.25, 1.34, 1.38 (s, CH_3 × 7), 3.00 (brd, J = 13.0, H-18), 3.35 (dd, J = 4.7, 11.8, H-3), 5.92 (s, H-12)
β-D-GlcUAp: 5.01 (d, J = 7.6, H-1)
β-D-GlcUAp′: 5.36 (d, J = 7.8, H-1)
β-D-Glcp: 6.30 (d, J = 8.2, H-1) [1]
^{13}C NMR (22.5 MHz, C_5D_5N): [1]

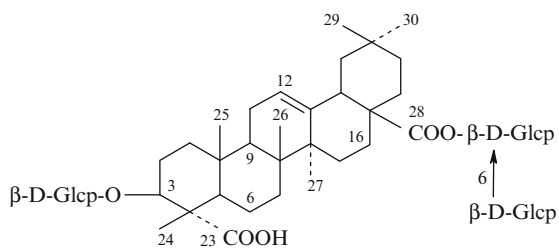
Table 1

C-3	89.0	GlcUA-1	104.5
11	199.3	6	171.6
12	128.4	GlcUA′-1	106.2
13	168.0	6	172.0
18	47.9	Glc-1	95.5
22	37.6	6	62.5
30	175.3		

References

1. I. Kitagawa, K. Hori, T. Taniyama, J.-L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(1), 43 (1993)
2. I. Kitagawa, J.-L. Zhou, M. Sakagami, T. Taniyama, M. Yoshikawa, Chem. Pharm. Bull. **36**, 3710 (1988)

Azukisaponin IV



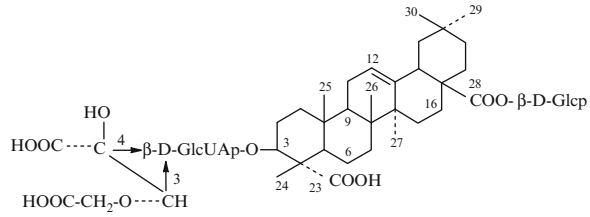
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Gypsogenic Acid
Biological source: *Vigna angularis* [1]
$C_{48}H_{76}O_{20}$: 972.492
Mp: 235–237°C (MeOH) [1]
$[\alpha]_D^{25}$ −1.8° (c 1.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1720, 1070 [1]

References

1. I. Kitagawa, H.K. Wang, M. Saito, M. Yoshikawa, Chem. Pharm. Bull. **31**(2), 674 (1983)

Basellasaponin C

CAS Registry Number: 354552-04-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Gypsogenic Acid
Biological source: *Basella rubra* [1]
$C_{47}H_{68}O_{22}$: 984.420
Mp: 230–232°C [1]
$[\alpha]_D^{25}$ + 42.1° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3426, 1737, 1076, 1036 [1]
RH-FAB-MS *m/z*: 1007.4132 $[M + Na]^+$, 983 $[M-H]^-$, 821 $[M-C_6H_{11}O_5]^-$[1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 4.62 (m, H-3), 5.40 (dd-like, H-12), 3.17 (dd-like, H-18), 0.86 (s, CH_3-25, 30), 0.89, 1.07, 1.23, 1.51 (s, CH_3-29, 26, 27, 24)
β-D-GlcUAp: 5.19 (d, J = 7.6, H-1); 3-oxoperuvic acid: 5.97 (s, H-3″), glycolic acid: 4.79 (s, H_2-2‴)
β-D-Glcp: 6.31 (d, J = 7.9, H-1) [1]
^{13}C NMR: [1]

Table 1

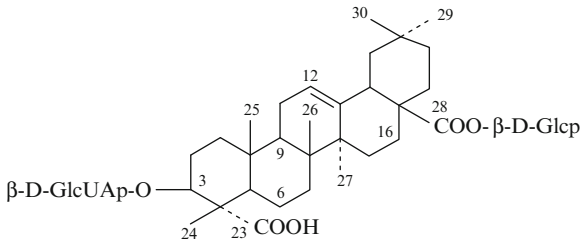
C-1	38.6	C-16	23.6	GlcUA-1	106.5
2	26.1	17	46.9	2	71.8
3	85.8	18	41.7	3	72.3
4	53.2	19	46.1	4	70.1
5	52.1	20	30.8	5	75.2
6	21.2	21	34.0	6	171.9
7	32.8	22	32.5	3-oxo-PA-1	171.4
8	40.2	23	180.1	2	94.1
9	48.0	24	12.6	3	97.9
10	36.6	25	15.9	GA-1	172.4
11	23.3	26	17.3	2	64.7
12	122.8	27	26.1	Glc-1	95.8
13	144.1	28	176.4	2	74.1
14	42.1	29	33.1	3	78.9
15	28.2	30	23.6	4	71.1
				5	79.4
				6	62.2

References

1. T. Murakami, H. Hirano, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 776 (2001)

Copteroside G

CAS Registry Number: 86438-31-5



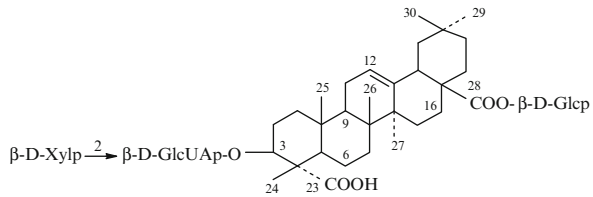
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Gypsogenic Acid
Biological source: *Climacoptera transoxana* [1]
$C_{42}H_{64}O_{16}$: 824.419
Mp: 214–218°C (dec) [1]
$[\alpha]_D^{20}$ + 28° (c 1.2, MeOH) [1]

References

1. Ch. Annaev, N.K. Abubakirov, Chem. Nat. Comp. **20**(1), 56 (1984)

Copteroside H

CAS Registry Number: 86438-32-6



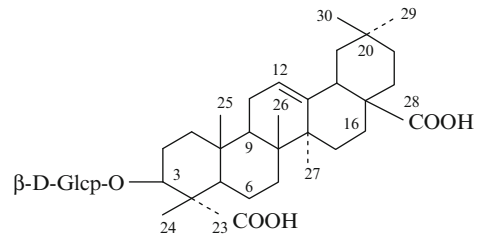
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Gypsogenic Acid
Biological source: *Climacoptera transoxana* [1]
$C_{47}H_{72}O_{20}$: 956.461
Mp: 240–244°C [1]
$[\alpha]_D^{20}$ + 32° (c 0.95, 50% MeOH) [1]

References

1. Ch. Annaev, N.K. Abubakirov, Chem. Nat. Comp. **20**(1), 56 (1984)

Dianthoside A (Dianthussaponin D)

CAS Registry Number: 31919-76-3



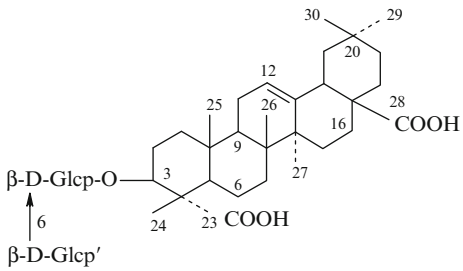
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Gypsogenic Acid
Biological source: *Dianthus deltoides, D. superbus* [1]
$C_{36}H_{56}O_{10}$: 648.387
Mp: 223–225°C [1]
$[\alpha]_D^{20}$ + 37° (c 1.1, C_5H_5N) [1]

References

1. V.G. Bukharov, S.P. Shcherbak, A.P. Beshchekova, Chem. Nat. Comp. **7**(1), 29 (1971)

Dianthoside B

CAS Registry Number: 31919-81-0

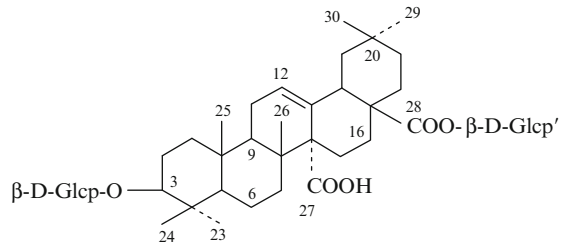


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Gypsogenic Acid
Biological source: *Dianthus deltoides* [1]
$C_{42}H_{66}O_{15}$: 810.440
Mp: 229–234°C [1]
$[\alpha]_D^{20}$ −18° (c 1.9, C_5H_5N) [1]

References

1. V.G. Bukharov, S.P. Shcherbak, A.P. Beshchekova, Chem. Nat. Comp. **7**(1), 29 (1971)

Mussaendoside S



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Gypsogenic Acid
Biological source: *Mussaenda pubescens* [1]
$C_{42}H_{66}O_{15}$: 810.440
$[\alpha]_D^{16}$ + 53.3° (c 0.12, C_5D_5N) [1]
FAB-MS *m/z*: 810 $[M]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.71, 0.85, 0.93, 1.11, 1.20 (s, CH_3 × 5), 3.34 (dd, J = 12.5, 4.3, H-3), 5.99 (brs, H-12)
β-D-Glcp: 4.75 (d, J = 6.3, H-1); β-D-Glcp′: 6.38 (d, J = 7.8, H-1) [1]
^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	25.0	Glc-1	106.9
2	25.5	17	48.2	2	75.9
3	89.0	18	44.3	3	79.4
4	39.6	19	44.1	4	72.1
5	56.1	20	31.0	5	78.9
6	18.8	21	34.1	6	63.2
7	37.5	22	32.4	Glc′-1	95.9
8	40.3	23	28.3	2	74.4
9	47.8	24	16.7	3	79.1
10	37.3	25	17.3	4	71.5
11	23.7	26	19.1	5	78.2
12	126.7	27	178.7	6	62.6
13	137.6	28	176.8		
14	56.9	29	33.3		
15	26.9	30	24.0		

Pharm./Biol.: in Chinese folk medicine used for treatment of laryngopharynitis, acute gastroenteritis and dysentery. The hydrophilic fraction of the extract of

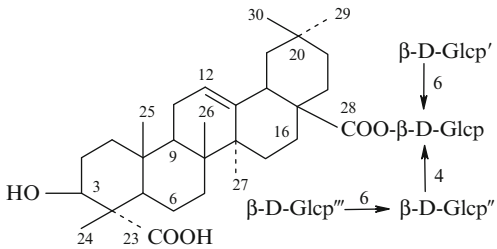
this plant showed significant antifertility activity in in vivo tests [1]

References

1. W. Zhao, J. Xu, G. Qin, R. Xu, Phytochemistry **39**, 191 (1995)

Paniculatoside C

CAS Registry Number: 52700-50-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Gypsogenic Acid

Biological source: *Acanthophyllum paniculatum* [1]

$C_{54}H_{86}O_{25}$: 1134.545

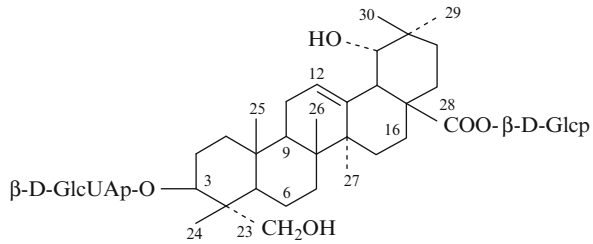
Mp: 220–230°C (dec) [1]

$[\alpha]_D^{20}$ + 5.3° (c 1.49, H_2O) [1]

References

1. Zh.M. Putieva, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **10**(1), 114 (1974)

Ilexoside XLVI



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Ilexosapogenin A

Biological source: *Ilex rotunda* Thunb. [1]

$C_{42}H_{66}O_{16}$: 826.435

$[\alpha]_D^{22}$ −0.6° (c 3.2, MeOH) [1]

FAB-MS *m/z*: 825 $[M-H]^-$ [1]

EI-MS *m/z*: 470 (5), 442 (22), 370 (8), 264 (25), 246 (54), 224 (15), 218 (33), 206 (31), 201 (50), 175 (46), 146 (100) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.95, 0.97, 0.98, 1.15, 1.15, 1.60 (s, $CH_3 \times 6$), 3.51 (brs, H-18), 3.55 (d, J = 2, H-19), 5.49 (brt, H-12)

β-D-GlcUAp: 5.29 (d, J = 8, H-1)

β-D-Glcp: 6.36 (d, J = 8, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-16	29.1	GlcUA-1	106.3
2	26.1	17	46.5	2	75.5
3	82.1	18	44.6	3	78.0
4	43.6	19	81.0	4	73.5
5	48.4	20	35.6	5	78.1
6	18.4	21	29.0	6	172.9
7	32.9	22	33.1	Glc-1	95.9
8	40.3	23	64.5	2	74.1
9	47.7	24	13.6	3	79.0
10	37.1	25	16.1	4	71.1

(*continued*)

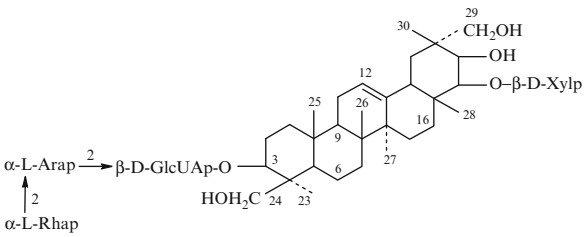
Table 1 (continued)

11	24.2	26	17.7	5	79.3
12	123.4	27	24.7	6	62.2
13	144.4	28	177.3		
14	42.1	29	28.8		
15	28.0	30	25.0		

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 77 (1993)

Kudzusaponin A_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Kudzusapogenol A
Biological source: *Pueraria lobata* [1]
$C_{52}H_{84}O_{23}$: 1076.540
$[\alpha]_D^{25}$ + 3.0 (c 0.75, C_5H_5N:H_2O 1:1) [1]
FAB-MS (positive ion mode) *m/z*: 1099.5301 (M + Na)$^+$, 645 (M + Na-Rha-Ara-GlcUA)$^+$ [1]
MS/MS *m/z*: 513 ([M + Na-Rha-Ara-GlcUA-Xyl]$^+$), 421 ([D/E ring + Xyl + Na]$^+$) [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.68, 0.92, 1.37, 1.39, 1.41, 1.43 (CH_3 × 6), 5.35 (s, H-12) [1]
α-L-Rhap: 6.17 (s, H-1), 1.80 (d, J = 6.0, CH_3-6) [1]
^{13}C NMR (C_5D_5N):

Table 1

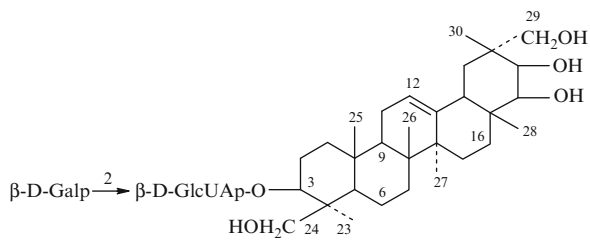
C-1	38.7	C-16	27.7	GlcUA-1	105.5	Rha-1	102.4
2	26.7	17	39.3	2	77.7	2	72.3
3	91.1	18	43.8	3	75.6	3	72.5
4	43.9	19	40.9	4	73.9	4	73.8
5	56.1	20	41.5	5	77.4	5	69.4
6	18.6	21	69.8	6	172.4	6	18.9
7	32.9	22	93.1	Ara-1	102.0	Xyl-1	108.7
8	40.2	23	23.2	2	76.8	2	74.3
9	47.8	24	63.4	3	75.2	3	78.0
10	36.5	25	15.8	4	70.5	4	70.5
11	24.1	26	16.8	5	67.0	5	67.7
12	122.5	27	26.8				
13	144.6	28	22.9				
14	41.8	29	70.3				
15	26.7	30	17.5				

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **45**(2), 362 (1997)

Kudzusaponin A_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Kudzusapogenol A
Biological source: *Pueraria lobata* [1]
$C_{42}H_{68}O_{16}$: 828.450

$[\alpha]_D^{25}$ + 5.0° (c 0.56, C_5H_5N:H_2O 1:1) [1]

FAB-MS (positive ion mode) *m/z*: 873 $(M + 2Na)^+$, 851.4405 $(M + Na)^+$, 711 $(M + 2Na\text{-}Gal)^+$, 513 $(M + Na\text{-}Gal\text{-}GlcUA)^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.73, 0.95, 1.31, 1.32, 1.35, 1.52 (s, CH_3 × 6), 5.34 (s, H-12)

β-D-GlcUAp: 4.96 (d, J = 7.0, H-1)

β-D-Galp: 5.54 (d, J = 7.0, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

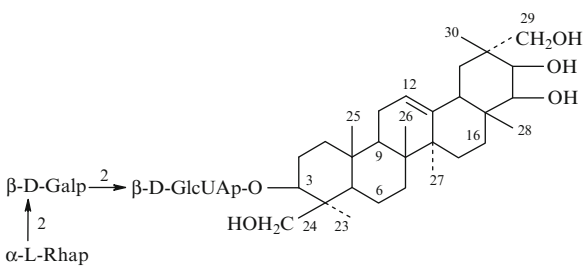
C-1	38.5	C-16	27.3	GlcUA-1	104.9
2	26.6	17	39.0	2	80.9
3	90.6	18	43.2	3	77.7
4	43.8	19	41.0	4	73.6
5	56.0	20	41.0	5	78.2
6	18.6	21	70.3	6	172.4
7	32.8	22	79.7	Gal-1	104.9
8	40.1	23	22.6	2	73.0
9	47.6	24	63.5	3	75.4
10	36.4	25	15.6	4	71.1
11	24.0	26	16.8	5	77.2
12	122.4	27	26.6	6	62.6
13	144.6	28	22.2		
14	41.9	29	71.9		
15	26.6	30	17.5		

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **45**(2), 362 (1997)

Kudzusaponin A_3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Kudzusapogenol A

Biological source: *Pueraria lobata* [1], *Abrus cantoniensis* [2], *Russell lupine* [3]

$C_{48}H_{78}O_{20}$: 974.508

$[\alpha]_D^{25}$-3.4° (c 0.68, C_5H_5N:H_2O 1:1) [1]

FAB-MS (positive ion mode) *m/z*: 998.4990 $(M + Na)^+$, 975 $(M + H)^+$, 829 $(M + H\text{-}Rha)^+$, 667 $(M + H\text{-}Rha\text{-}Gal)^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.69, 0.95, 1.30, 1.30, 1.34, 1.50 (s, CH_3 × 6), 5.33 (s, H-12)

α-L-Rhap: 6.27 (s, H-1), 1.77 (d, J = 6.0, CH_3-6)

β-D-GlcUAp: 4.96 (d, J = 6.0, H-1)

β-D-Galp: 5.78 (d, J = 7.0, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

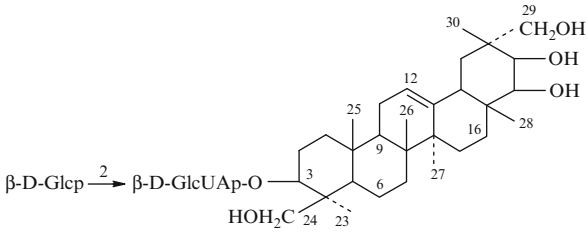
C-1	38.4	C-16	27.3	GlcUA-1	105.3	Rha-1	102.3
2	26.5	17	38.9	2	78.3	2	72.3
3	91.0	18	43.1	3	76.6	3	72.7
4	43.8	19	40.9	4	73.7	4	74.3
5	55.9	20	40.9	5	77.7	5	69.3
6	18.4	21	70.3	6	171.1	6	18.9
7	32.8	22	79.7	Gal-1	101.6		
8	40.1	23	22.9	2	77.5		
9	47.6	24	63.5	3	76.3		
10	36.3	25	15.7	4	71.0		
11	24.0	26	16.7	5	76.5		
12	122.3	27	26.5	6	61.5		
13	144.5	28	22.1				
14	41.9	29	71.5				
15	26.5	30	17.4				

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **45**(2), 362 (1997)
2. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**, 1222 (1996)
3. J. Kinjo, F. Kishida, K. Watanabe, F. Hashimoto, T. Nohara, Chem. Pharm. Bull. **42**, 1874 (1994)

Kudzusaponin A_4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Kudzusapogenol A

Biological source: *Pueraria lobata* [1]

$C_{42}H_{68}O_{16}$: 828.450

$[\alpha]_D^{25}$ + 9.5° (c 0.55, C_5H_5N:H_2O 1:1) [1]

FAB-MS (positive ion mode) *m/z*: 873 $(M + 2Na)^+$, 851.4411 $(M + Na)^+$, 711 $(M + 2Na\text{-}Glc)^+$, 513 $(M + Na\text{-}Glc\text{-}GlcUA)^+$ [1]

FAB-MS *m/z*: 827 $(M\text{-}H)^-$, 665 $(M\text{-}H\text{-}Glc)^-$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.71, 0.95, 1.31, 1.32, 1.36, 1.52 (s, CH_3 × 6), 5.34 (s, H-12)

β-D-GlcUAp: 4.96 (d, J = 8.0, H-1)

β-D-Glcp: 5.61 (d, J = 7.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

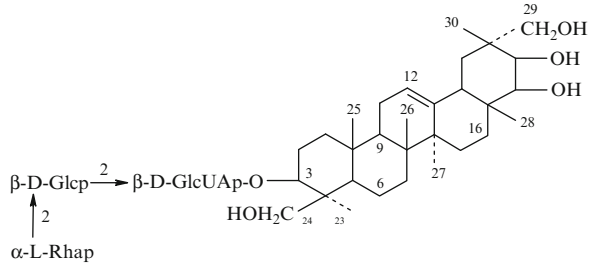
C-1	38.6	C-16	27.5	GlcUA-1	105.3
2	26.8	17	39.2	2	81.9
3	90.8	18	43.4	3	77.9
4	43.9	19	41.2	4	73.1
5	56.2	20	41.2	5	78.4
6	18.7	21	70.5	6	172.7
7	33.0	22	80.0	Glc-1	104.9
8	40.3	23	22.7	2	76.0
9	47.8	24	63.5	3	78.6
10	36.5	25	15.7	4	70.0
11	24.2	26	17.0	5	78.4
12	122.6	27	26.8	6	61.7
13	144.8	28	22.4		
14	42.2	29	71.7		
15	26.8	30	17.7		

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **45**(2), 362 (1997)

Kudzusaponin A_5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Kudzusapogenol A

Biological source: *Pueraria lobata* [1]

$C_{48}H_{78}O_{20}$: 974.508

$[\alpha]_D^{25}$ −7.5° (c 0.67, C_5H_5N:H_2O 1:1) [1]

FAB-MS (positive ion mode) *m/z*: 1019 $(M + 2Na)^+$, 997.4984 $(M + Na)^+$, 873 $(M + 2Na\text{-}rha)^+$, 711 $(M + Na\text{-}Rha\text{-}Glc)^+$, 513 $(997\text{-}Rha\text{-}Glc\text{-}GlcUA)^+$ [1]

FAB-MS *m/z*: 973 $(M\text{-}H)^-$, 827 $(M\text{-}H\text{-}Rha)^-$, 665 $(827\text{-}Gal)^-$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.67, 0.95, 1.30, 1.31, 1.33, 1.51 (s, CH_3 × 6), 5.32 (s, H-12)

α-L-Rhap: 6.39 (s, H-1), 1.79 (d, J = 6.0, CH_3-6)

β-D-GlcUAp: 4.98 (d, J = 7.0, H-1)

β-D-Glcp: 5.86 (d, J = 7.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	38.5	C-19	41.0	GlcUA-1	105.2
2	26.6	20	41.0	2	78.6
3	91.5	21	70.4	3	77.4
4	43.7	22	79.8	4	73.7
5	56.1	23	22.8	5	77.8
6	18.5	24	63.4	6	172.5
7	32.8	25	15.6	Glc-1	102.0
8	40.2	26	16.9	2	79.1

(*continued*)

Table 1 (continued)

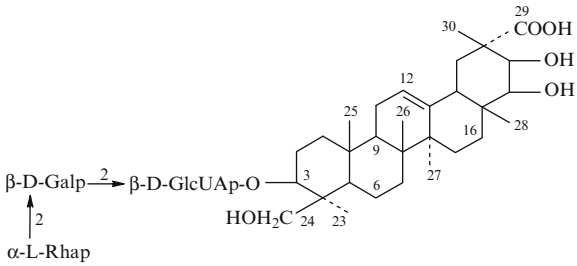
9	47.7	27	26.6	3	78.0
10	36.4	28	22.3	4	69.7
11	24.1	29	71.6	5	78.5
12	122.5	30	17.5	6	61.3
13	144.7			Rha-1	102.0
14	42.0			2	72.3
15	26.6			3	72.7
16	27.3			4	74.5
17	39.0			5	69.4
18	43.2			6	19.0

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **45**(2), 362 (1997)

Kudzusaponin B_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Kudzusapogenol B

Biological source: *Pueraria thomsonii* [1]

$C_{48}H_{76}O_{21}$: 988.487

$[\alpha]_D^{25}$ −8.7° (c 0.66, C_5H_5N:H_2O 1:1) [1]

FAB-MS (positive ion mode) *m/z*: 1011.4824 $(M + Na)^+$, 989 $(M + H)^+$, 865 $(M + Na\text{-}Rha)^+$, 843 $(M + H\text{-}Rha)^+$, 681 $(M + H\text{-}Rha\text{-}Gal)^+$ [1]

FAB-MS *m/z*: 987 $(M\text{-}H)^-$, 841 $(M\text{-}H\text{-}Rha)^-$, 679 $(M\text{-}H\text{-}Rha\text{-}Gal)^-$, 503 $(M\text{-}H\text{-}Rha\text{-}Gal\text{-}GlcUA)^-$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.71, 0.96, 1.29, 1.29, 1.41, 1.96 (s, $CH_3 \times 6$), 5.33 (brs, H-12)

α-L-Rhap: 6.17 (brs, H-1), 1.72 (d, J = 6.0, CH_3-6)

β-D-Galp: 5.68 (d, J = 8.0, H-1) [1]

^{13}C NMR (270 MHz, C_5D_5N): [1]

Table 1

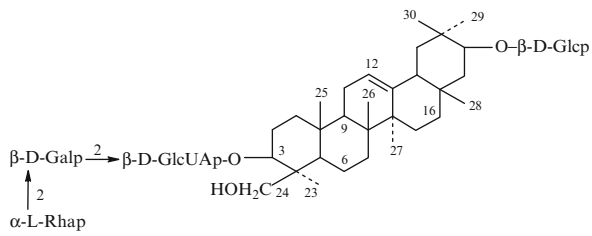
C-1	38.5	C-16	27.4	GlcUA-1	105.4	Rha-1	102.5
2	26.5	17	39.0	2	78.5	2	72.4
3	91.1	18	42.8	3	76.6	3	72.8
4	43.8	19	42.5	4	73.9	4	74.4
5	55.9	20	49.4	5	77.8	5	69.4
6	18.5	21	70.8	6	172.4	6	19.0
7	32.8	22	79.2	Gal-1	101.7		
8	40.1	23	22.9	2	77.9		
9	47.6	24	63.6	3	76.5		
10	36.4	25	15.7	4	71.1		
11	24.1	26	16.8	5	77.7		
12	123.1	27	26.5	6	61.5		
13	143.9	28	22.2				
14	42.0	29	181.0				
15	26.5	30	17.0				

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, T. Idzu, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **44**(10), 1970 (1996)

Kudzusaponin C_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Kudzusapogenol C
Biological source: *Pueraria lobata* [1]
$C_{54}H_{88}O_{23}$: 1104.571
$[\alpha]_D^{25}$ −8.0° (c 0.73, C_5H_5N:H_2O, 1:1) [1]
HR-FAB-MS *m/z*: 1127.5614 [1]
FAB-MS *m/z*: 1103 $[M-H]^-$, 957 $[M-H-Rha]^-$, 941 $[M-H-Glc]^-$, 795 [M-H-Rha-Gal or Glc]$^-$, 633 [M-H-Rha-Gal-Glc]$^-$, 619 [M-H-Rha-Gal-GlcUA]$^-$ [1]
FAB-MS *m/z*: 1127 $[M + Na]^+$, 981 $[1127\text{-}Rha]^+$, 965 $[1127\text{-}Glc]^+$, 819 [981-Gal or Glc]$^+$, 657 $[819\text{-}Glc]^+$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N-D_2O): 0.68, 0.83, 0.85, 1.12, 1.24, 1.36, 1.43 (s, CH_3 × 7), 5.20 (s, H-12)
α-L-Rhap: 6.28 (s, H-1), 1.78 (d, J = 6.2, CH_3-6)
β-D-GlcUAp: 4.88 (d, J = 7.8, H-1)
β-D-Galp: 5.79 (d, J = 7.4, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

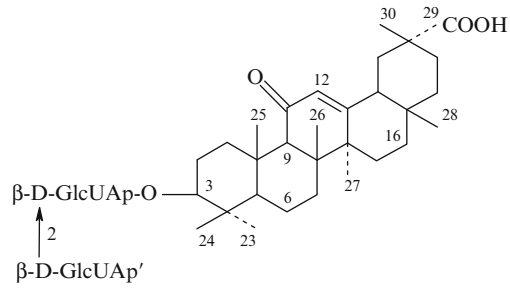
C-1	38.5	C-16	28.3	GlcUA-1	105.4	Rha-1	101.7
2	26.6	17	35.1	2	78.7	2	72.4
3	91.1	18	46.8	3	76.4	3	72.4
4	43.8	19	44.9	4	73.8	4	74.4
5	56.0	20	37.1	5	77.7	5	69.4
6	18.4	21	83.7	6	172.3	6	18.9
7	33.0	22	44.9	Gal-1	102.4	Glc-1	106.6
8	39.9	23	23.0	2	77.7	2	75.8
9	47.7	24	63.6	3	75.8	3	78.1
10	36.4	25	15.7	4	71.1	4	71.9
11	24.0	26	16.8	5	76.6	5	78.4
12	123.0	27	26.0	6	61.6	6	63.0
13	144.2	28	28.4				
14	41.8	29	29.6				
15	26.4	30	18.4				

References

1. T. Arao, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **43**(7), 1176 (1995)

Licorice-Saponin H2

CAS Registry Number: 135815-61-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Liquiritic Acid
Biological source: *Glycyrrhiza uralensis* [1, 2], *G. inflata* [3]
$C_{42}H_{62}O_{16}$: 822.403
Mp: 209–210°C [2]
$[\alpha]_D^{25}$ + 31° (c 0.21, MeOH) [2]
IR (KBr) ν_{max} cm^{-1}: 3500-3300, 2920, 1725, 1645, 1386, 1200, 1040 [2]
UV λ_{max}^{MeOH} nm (ε): 248 (10700) [1]
FAB-MS *m/z*: 861 $(M + K)^+$, 845 $(M + Na)^+$ [1]
FAB-MS (positive ion mode) *m/z*: 823 $[(M + H)^+]$, 647 $[(M + H)\text{-}GlcUA]^+$, 471 $[(647\text{-}GlcUA)^+]$, 453 $[(471\text{-}H_2O)^+]$ [2]
FAB-MS (negative ion mode) *m/z*: 821 $[(M-H)^-]$, 645 $[(M-H)\text{-}GlcUA]^-$, 469 [(M-H-2GlcUA)−] [2]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.87, 1.06, 1.19, 1.20, 1.35, 1.36, 1.38 (s, CH_3 × 7), 3.00 (brd, J = 13.0, H-18), 3.35 (dd, J = 4.0, 10.2, H-3), 5.79 (brs, H-12), 4.97 (d, J = 7.6, H-1 of GlcUA), 5.35 (d, J = 7.6, H-1 of GlcUA′) [2]
^{13}C NMR (22.5 MHz, C_5D_5N) (for methyl derivate): [1]

Table 1

C-3	89.2	GlcUA-1	104.9	GlcUA′-1	106.8
11	199.0	2	84.3	2	76.6
12	128.6	3	76.4	3	77.4

(*continued*)

Table 1 (continued)

13	168.4	4	72.5	4	72.9
18	46.3	5	77.3	5	77.6
22	37.1	6	170.1	6	170.2
24	16.2				
29	178.1				
30	19.3				

References

1. I. Kitagawa, J.L. Zhou, M. Sakagami, E. Uchida, M. Yoshikawa, Chem. Pharm. Bull. **39**(1), 244 (1991)
2. I. Kitagawa, K. Hori, M. Sakagami, J.L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(8), 1337 (1993)
3. I. Kitagawa, K. Hori, M. Sakagami, F. Hashiuchi, M. Yoshikawa, J. Ren, Chem. Pharm. Bull. **41**(8), 1350 (1993)

Calendasaponin D

CAS Registry Number: 358732-35-1

See Figure Calendasaponin D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Machaerinolic Acid

Biological source: *Calendula officinalis* [1]

$C_{54}H_{86}O_{25}$: 1134.545

Mp: 226.9–229°C (MeOH–H_2O) [1]

$[\alpha]_D^{24}$ + 33.0° (c 1.1, MeOH) [1]

HR-FAB-MS (positive ion mode) *m/z*: 1157.5356 $(M + Na)^+$ [1]

FAB-MS (negative ion mode) *m/z*: 1133 $(M\text{-}H)^-$, 971 $(M\text{-}C_6H_{11}O_5)^-$, 809 $(M\text{-}C_{12}H_{21}O_{10})^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3453, 1736, 1074, 1042 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.81, 1.06, 1.07, 1.15, 1.23, 1.24, 1.28 (s, CH_3-25, 24, 29, 30, 23, 27), 3.27 (dd-like, H-3, 18), 3.89 (dd, J = 4.6, 11.6, H-21), 5.45 (brs, H-12)

β-D-GlcUAp: 4.92 (d, J = 7.5, H-1)

β-D-Galp: 5.26 (d, J = 7.1, H-1)

β-D-Glcp: 5.64 (d, J = 7.8, H-1)

β-D-Glcp′: 6.28 (d, J = 8.1, H-1) [1]

^{13}C NMR: [1]

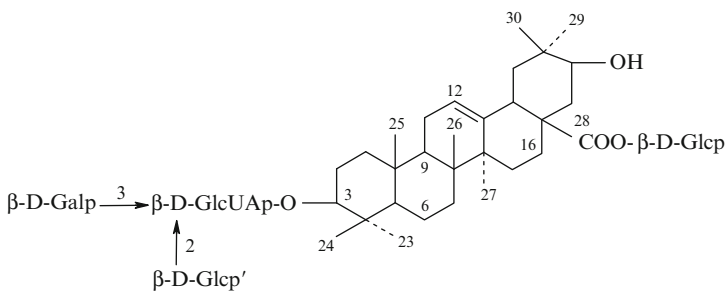
Table 1

C-1	38.6	C-16	36.7	GlcUA-1	105.0	Gal-1	105.0
2	26.5	17	41.5	2	78.7	2	72.8
3	89.5	18	48.8	3	87.8	3	75.2
4	39.6	19	47.1	4	71.6	4	70.0
5	55.7	20	38.2	5	77.2	5	77.2
6	18.5	21	72.2	6	171.4	6	61.9
7	33.2	22	24.9	Glc-1	103.7	Glc′-1	95.7
8	39.9	23	27.9	2	76.2	2	74.0
9	48.0	24	16.6	3	77.5	3	79.1
10	36.9	25	15.5	4	72.5	4	71.1
11	23.8	26	17.5	5	78.5	5	78.7
12	122.9	27	25.9	6	63.4	6	62.1
13	143.1	28	175.2				
14	42.2	29	29.6				
15	28.4	30	17.6				

Pharm./Biol.: Hypoglycemic activity, inhibitory activity on indometacin-induced gastric mucosal lesions in rats [1]

References

1. M. Yoshikawa, T. Murakami, A. Kishi, T. Kageura, H. Matsuda, Chem. Pharm. Bull. **49**(7), 863 (2001)



Calendasaponin D

Saponin S_1

See Figure Saponin S_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Maslinic Acid

Biological source: *Cylicodiscus gabunensis* [1]

$C_{64}H_{104}O_{31}$: 1368.656

$[\alpha]_D^{20}$ + 32.0° (c 2.26, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3670–3050, 2933, 2880, 1735, 1654, 1458, 1380, 1180, 1079, 672, 614 [1]

FAB-MS *m/z*: 1367 $[M-H]^-$ (72), 1235 $[M-H-132]^-$ (15), 1205 $[M-H-162]^-$(13), 1103 $[M-H-2 \times 132]^-$(10), 1073 $[1235-162]^-$(10), 1043 $[1205-162]^-$(10), 941 $[1073-132]^-$(11), 911 $[1043-132]^-$(13), 897 $[1043-146]^-$(100), 779 (11), 765 $[879-132]^-$ (58), 633 $[765-132]^-$(70), 471 $[633-162]^-$(45), 453 (28), 435 (25), 321 (25), 215 (77), 199 (75), 107 (98) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 0.82, 0.85, 0.89, 0.89, 0.95, 1.20, 1.30 (s, $CH_3 \times 7$), 3.10 (dd, H-18), 3.22 (d, J = 9.0, Ha-3), 5.40 (s, H-12)

α-L-Arap: 5.21 (d, J = 7.0, H-1); α-L-Arap′: 6.0 (d, J = 3.2, H-1)

β-D-Glcp: 4.86 (d, J = 7.0, H-1); β-D-Glcp′: 4.94 (d, J = 7.0, H-1); β-D-Glcp″: 5.30 (d, J = 7.5, H-1)

α-L-Rhap: 6.97 (s, H-1), 1.66 (d, J = 5.0, CH_3-6) [1]

^{13}C NMR (62.8 MHz, C_5D_5N): [1]

Table 1

C-1	47.34	C-16	23.49	Glc-1	105.69	Glc′-1	105.69
2	69.38	17	47.79	2	73.05	2	74.09
3	95.48	18	42.41	3	88.27	3	77.59
4	40.10	19	46.27	4	67.70	4	71.78
5	55.79	20	31.06	5	77.35	5	75.72
6	18.86	21	34.17	6	62.94	6	70.13
7	33.36	22	31.06	Ara-1	101.10	Rha-1	94.29
8	40.96	23	28.65	2	78.33	2	81.17
9	48.14	24	16.94	3	71.44	3	72.39
10	38.15	25	17.98	4	70.99	4	73.49
11	24.24	26	18.47	5	64.79	5	70.61
12	123.83	27	26.31	Ara′-1	106.01	6	18.86
13	144.13	28	176.18	2	70.61	Glc″-1	107.12
14	42.41	29	33.36	3	74.56	2	75.37
15	28.08	30	23.82	4	70.61	3	78.44
				5	67.00	4	71.44
						5	78.43
						6	62.61

References

1. H.P. Tchivounda, B. Koudogbo, Y. Besace, E. Casadevall, Phytochemistry **30**, 2711 (1991)

Saponin S_2

See Figure Saponin S_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Maslinic Acid

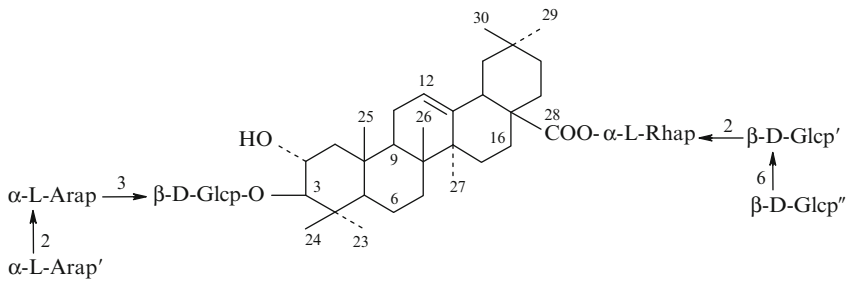
Biological source: *Cylicodiscus gabunensis* [1]

$C_{58}H_{94}O_{26}$: 1206.603

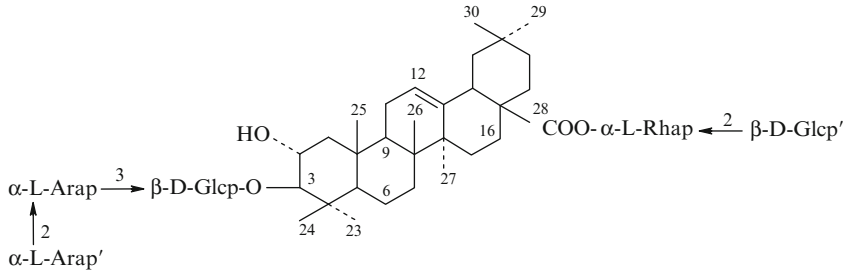
$[\alpha]_D^{20}$ + 33.0° (c 1.025, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3600–3100, 2940, 2875, 1745, 1640, 1380, 1370, 1260, 1250 [1]

FAB-MS *m/z*: 1205 $[M-H]^-$ (80), 1073 $[M-H-132]^-$ (10), 1043 $[M-H-162]^-$(10), 941 [M-H-



Saponin S_1



Saponin S_2

2x132]$^-$(8), 911 [1073-162]$^-$ (8), 897 [1043-146]$^-$ (58), 779 [941-162]$^-$ (10), 765 [897-132]$^-$ (42), 633 [765-132]$^-$ (99), 471 [633–162]$^-$ (99), 453 (75), 435 (20), 417 (10), 323 (97), 215 (95), 107 (100) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 0.83, 0.86, 0.86, 0.91, 0.94, 1.20, 1.30 (s, $CH_3 \times 7$), 3.10 (dd, H-18), 3.24 (d, J = 9.0, H-3), 5.39 (s, H-12)

α-L-Arap: 5.23 (d, J = 7.5, H-1); α-L-Arap′: 5.99 (d, J = 3.0, H-1)

β-D-Glcp: 4.86 (d, J = 7.5, H-1); β-D-Glcp′: 5.10 (d, J = 7.5, H-1)

α-L-Rhap: 7.24 (d, J = 1.0, H-1), 1.62 (d, J = 5.0, CH_3-6) [1]

^{13}C NMR (62.8 MHz, C_5D_5N): [1]

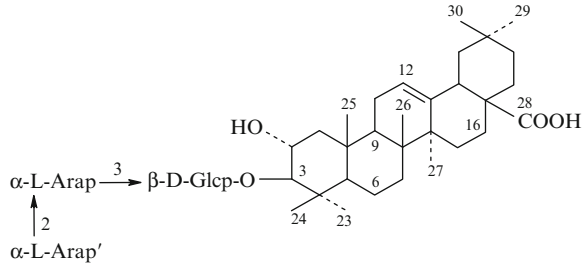
Table 1

C-1	47.28	C-16	23.44	Glc-1	105.58	Glc′-1	107.13
2	69.27	17	47.64	2	73.35	2	75.78
3	95.38	18	42.30	3	88.05	3	78.63
4	39.87	19	46.12	4	67.56	4	71.46
5	55.65	20	30.95	5	78.33	5	78.49
6	18.71	21	34.27	6	62.67	6	62.49
7	33.28	22	30.95	Ara-1	100.85	Rha-1	94.42
8	40.36	23	28.53	2	77.44	2	80.98
9	48.82	24	16.83	3	72.81	3	72.36
10	36.83	25	17.77	4	70.87	4	73.85
11	24.18	26	18.34	5	64.68	5	70.52
12	123.87	27	26.17	Ara′-1	105.87	6	18.71
13	143.92	28	176.05	2	70.52		
14	42.30	29	33.85	3	74.46		
15	28.06	30	23.79	4	70.02		
				5	66.93		

References

1. H.P. Tchivounda, B. Koudogbo, Y. Besace, E. Casadevall, Phytochemistry **30**, 2711 (1991)

Saponin S_5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Maslinic Acid

Biological source: *Cylicodiscus gabunensis* [1]

$C_{46}H_{74}O_{17}$: 898.492

$[\alpha]_D^{20}$ + 52.3° (c 1.00, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3700–3050, 2925–2880, 1697, 1643, 1480–1384, 1150, 1080, 1000, 809, 760, 635 [1]

FAB-MS *m/z*: 897 [M-H]$^-$ (80), 765 [M-H-132]$^-$ (37), 633 [765-132]$^-$ (70), 615 (87), 499 (47), 471 [633-162]$^-$ (100), 435 (68), 437 (50), 423 (30), 409 (23) [1]

^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 0.82, 0.84, 0.94, 0.94, 0.99, 1.28, 1.31 (s, $CH_3 \times 7$), 3.24 (d, J = 8.5, H-3), 3.28 (m, H-18), 5.45 (s, H-12)

α-L-Arap: 5.24 (d, J = 7.5, H-1), 3.65 (d, J = 9.0, H-5)

β-D-Glcp: 4.88 (d, J = 7.5, H-1)

α-L-Arap′: 6.02 (d, J = 3.2, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	46.65	C-16	23.66	Glc-1	105.49
2	69.05	17	47.12	2	73.33
3	95.26	18	41.95	3	88.65

(*continued*)

Table 1 (continued)

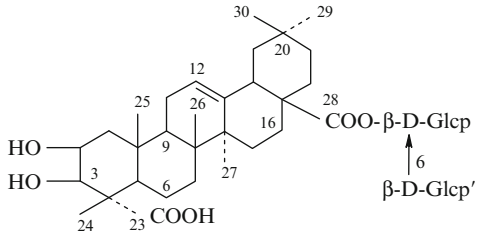
4	39.68	19	46.45	4	67.59
5	55.40	20	31.20	5	78.29
6	18.43	21	34.23	6	62.32
7	33.17	22	29.94	Ara-1	100.91
8	40.66	23	28.28	2	77.23
9	47.94	24	16.60	3	70.34
10	37.35	25	16.90	4	69.96
11	23.75	26	18.17	5	64.53
12	122.36	27	26.12	Ara-1′	105.94
13	144.84	28	180.00	2	69.96
14	42.18	29	33.26	3	74.30
15	26.80	30	23.47	4	69.39
				5	66.60

References

1. H.P. Tchivounda, B. Koudogbo, Y. Besace, E. Casadevall, Phytochemistry **30**, 2711 (1991)

Glabroside B

CAS Registry Number: 29774-77-4



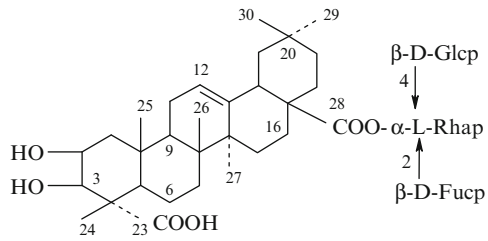
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Medicagenic Acid
Biological source: *Herniaria glabra* [1]
$C_{42}H_{66}O_{16}$: 826.435
Mp: 240–245°C (n-BuOH) [1]
$[\alpha]_D^{20}$ + 20° (c 1, C_5H_5N) [1]

References

1. V.G. Bukharov, S.P. Shcherbak, Chem. Nat. Comp. **6**(3), 308 (1970)

Glabroside C

CAS Registry Number: 29980-15-2



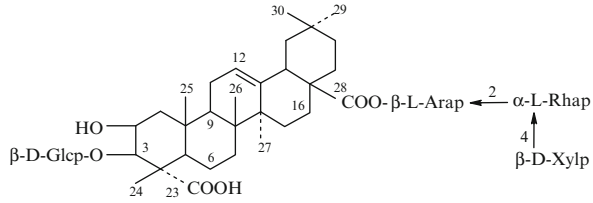
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Medicagenic Acid
Biological source: *Herniaria glabra* [1]
$C_{48}H_{76}O_{19}$: 956.498
Mp: 254–257°C (n-BuOH) [1]
$[\alpha]_D^{20}$ + 23° (c 1.45, C_5H_5N) [1]

References

1. V.G. Bukharov, S.P. Shcherbak, Chem. Nat. Comp. **6**(3), 308 (1970)

Medicoside J

CAS Registry Number: 107195-79-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Medicagenic Acid
Biological source: *Medicago sativa* [1, 2]
$C_{52}H_{82}O_{23}$: 1074.524
Mp: 234–236°C (MeOH) [1]
$[\alpha]_D^{27}$ 0±3° (c 0.41, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3530-3260, 1760, 1700, 1265 [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.78, 0.86, 0.96, 1.11, 1.38, 1.80 (s, CH_3 × 6), 5.31 (brs, H-12)
α-L-Rhap: 5.55 (brs, H-1), 1.60 (d, J = 4.0, CH_3-6)
β-D-Xylp: 4.93 (d, J = 6.0, H-1)
β-D-Glcp: 4.93 (d, J = 6.0, H-1)
α-L-Arap: 5.32 (d, J = 2.0, H-1) [1]
^{13}C NMR (75 MHz, $CDCl_3$) (for peracetate): [2]

Table 1

C-1	43.5	C-16	29.5	Glc-1	101.3	Rha-1	98.2
2	69.8	17	47.2	2	72.4	2	71.4
3	86.0	18	41.5	3	72.7	3	70.1
4	52.6	19	46.4	4	68.8	4	76.9
5	52.5	20	31.0	5	72.1	5	67.9
6	20.6	21	34.2	6	61.8	6	17.9
7	32.8	22	32.5	Ara-1	92.8	Xyl-1	101.8
8	40.1	23	180.5	2	74.5	2	71.3
9	48.5	24	13.2	3	72.4	3	71.3
10	36.4	25	16.4	4	66.8	4	69.5
11	23.4	26	17.0	5	62.7	5	62.2
12	122.5	27	26.0				
13	143.5	28	175.8				
14	42.3	29	33.1				
15	27.8	30	23.9				

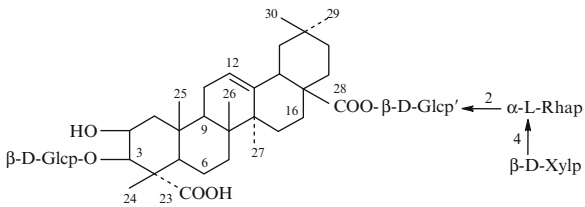
Pharm./Biol.: Molluseicidal and fungicidal activity [2]

References

1. A.E. Timbekova, N.K. Abubakirov, Chem. Nat. Comp. **22**(5), 574 (1986)
2. G. Massiot, C. Lavaud, V. Besson, L. Le Men-Oliver, G. Van Binst, J. Agric. Food. Chem. **39**, 78 (1991)

Polygalasaponin XXI

CAS Registry Number: 173933-36-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Medicagenic Acid
Biological source: *Polygala japonica* [1]
$C_{53}H_{84}O_{24}$: 1104.535
$[\alpha]_D^{21}$ + 31.3° (c 0.78, C_5H_5N) [1]
FAB-MS (positive ion mode) *m/z*: 1128 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85 (s, CH_3-29), 0.86 (s, CH_3-30), 1.14 (s, CH_3-26), 1.24 (s, CH_3-27), 1.54 (s, CH_3-25), 1.94 (s, CH_3-24), 3.12 (dd, J = 14.0, 4.0, H-18), 4.69 (d, J = 4.0, H-3), 4.79 (m, H-2), 5.45 (t-like, H-12)
β-D-Glcp: 5.08 (d, J = 8.0, H-1), 3.93 (d, J = 8.5, H-2), 4.14 (H-3), 4.15 (H-4), 3.91 (m, H-5), 4.28 (H-6), 4.46 (dd, J = 12.0, 2.5, H-6)
β-D-Glcp′: 6.19 (d, J = 8.0, H-1), 4.36 (H-2), 4.27 (H-3), 4.28 (H-4), 3.96 (m, H-5), 4.32 (H-6), 4.38 (dd, J = 12.0, 2.5, H-6)
α-L-Rhap: 6.39 (d, J = 1.5, H-1), 4.81 (dd, J = 3.0, 1.5, H-2), 4.69 (dd, J = 9.0, 3.0, H-3), 4.34 (H-4), 4.51 (m, H-5), 1.79 (d, J = 6.0, CH_3-6)
β-D-Xylp: 5.04 (d, J = 8.0, H-1), 4.05 (H-2), 4.05 (H-3), 4.18 (H-4), 3.53 (t, J = 11.0, H-5), 4.24 (H-5) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

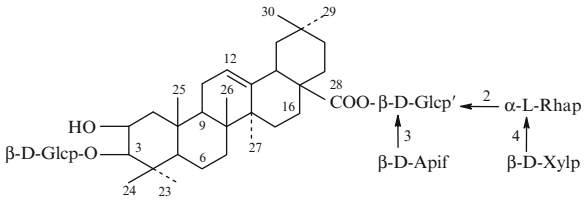
C-1	44.3	C-16	23.5	Glc-1	105.4	Rha-1	101.4
2	70.3	17	47.1	2	75.3	2	71.8
3	86.2	18	42.2	3	78.4	3	72.5
4	52.9	19	46.4	4	71.6	4	85.3
5	52.5	20	30.8	5	78.4	5	68.5
6	21.4	21	34.0	6	62.7	6	18.7
7	32.4	22	33.1	Glc′-1	94.8	Xyl-1	107.6
8	40.5	23	180.8	2	76.7	2	76.3
9	48.8	24	14.2	3	79.3	3	78.8
10	36.9	25	17.0	4	71.4	4	71.0
11	24.1	26	17.5	5	78.8	5	67.6
12	122.8	27	26.1	6	62.3		
13	144.1	28	176.5				
14	42.5	29	33.1				
15	28.4	30	23.8				

References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(1), 173 (1996)

Polygalasaponin XXII

CAS Registry Number: 173933-37-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Medicagenic Acid

Biological source: *Polygala japonica* [1]

$C_{58}H_{92}O_{28}$: 1236.577

$[\alpha]_D^{20}$ −1.1° (c 0.92, C_5H_5N) [1]

FAB-MS (positive ion mode) *m/z*: 1260 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85 (s, CH_3-29), 0.86 (s, CH_3-30), 1.12 (s, CH_3-26), 1.22 (s, CH_3-27), 1.59 (s, CH_3-25), 1.95 (s, CH_3-24), 3.10 (dd, J = 14.0, 4.0, H-18), 4.69 (d, J = 4.0, H-3), 4.79 (m, H-2), 5.45 (t-like, H-12)

β-D-Glcp: 5.08 (d, J = 8.0, H-1), 3.93 (t, J = 8.0, H-2), 4.14 (H-3), 4.15 (H-4), 3.92 (m, H-5), 4.28 (H-6), 4.46 (dd, J = 12.0, 2.0, H-6)

β-D-Glcp′: 6.23 (d, J = 8.0, H-1), 4.29 (H-2), 4.15 (H-3), 4.26 (H-4), 3.94 (m, H-5), 4.29, 4.30 (H_2-6)

α-L-Rhap: 5.92 (brs, H-1), 4.67 (H-2), 4.59 (dd, J = 9.0, 3.0, H-3), 4.31 (H-4), 4.36 (m, H-5), 1.76 (d, J = 6.0, CH_3-6)

β-D-Apif: 5.79 (d, J = 2.5, H-1), 4.74 (d, J = 2.5, H-2), 4.28, 4.66 (d, J = 9.5, H_2-4), 4.09 (d, J = 11.0, H-5), 4.12 (d, J = 11.0, H-5)

β-D-Xylp: 5.06 (d, J = 8.0, H-1), 4.03 (H-2), 4.03 (H-3), 4.17 (H-4), 3.50 (t, J = 11.0, H-5), 4.24 (H-5) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	44.3	C-16	23.4	Glc-1	105.4	4	84.4
2	70.3	17	47.1	2	75.3	5	68.9
3	86.1	18	42.1	3	78.4	6	18.6
4	52.9	19	46.3	4	71.6	Xyl-1	107.3
5	52.5	20	30.8	5	78.4	2	76.1
6	21.3	21	34.0	6	62.8	3	78.7
7	32.3	22	33.1	Glc′-1	94.2	4	71.0
8	40.4	23	180.7	2	76.0	5	67.5
9	48.8	24	14.2	3	86.5	Api-1	110.8
10	36.9	25	17.0	4	69.3	2	78.0
11	24.0	26	17.5	5	77.9	3	80.3
12	122.9	27	26.1	6	62.0	4	75.3
13	144.1	28	176.2	Rha-1	101.4	5	64.9
14	42.4	29	33.1	2	71.6		
15	28.3	30	23.8	3	72.4		

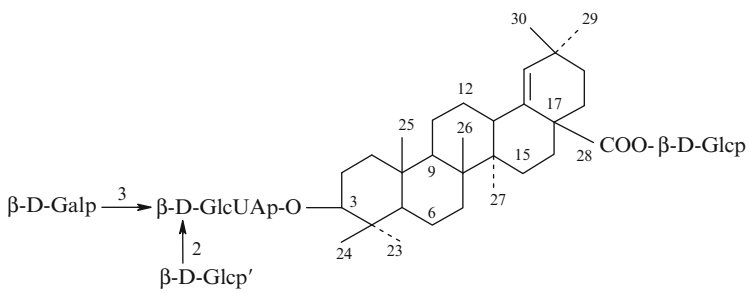
References

1. D. Zhang, T. Miyase, M. Kuroyanagi, K. Umehara, A. Ueno, Chem. Pharm. Bull. **44**(1), 173 (1996)

Calendasaponin A

CAS Registry Number: 358732-31-7

See Figure Calendasaponin A



Calendasaponin A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Morolic Acid
Biological source: *Calendula officinalis* [1]
$C_{54}H_{86}O_{24}$: 1118.550
Mp: 226.5–228.6°C [1]
$[\alpha]_D^{27}$ + 8.6° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1736, 1076, 1048 [1]
FAB-MS (positive ion mode) *m/z*: 1141.5407 $(M + Na)^+$ [1]
FAB-MS (negative ion mode) *m/z*: 1117 $(M-H)^-$, 955 $(M-C_6H_{11}O_5)^-$, 793 $(M-C_{12}H_{21}O_5)^-$, 631 $(M-C_{10}H_{31}O_{15})^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.25 (dd-like, H-3), 2.64 (brd, J = 12.0, H-13), 5.27 (brs, H-19), 0.71, 0.92, 1.01, 1.03, 1.05, 1.08, 1.22 (s, CH_3-25, 27, 30, 24, 29, 26, 23)
β-D-GlcUAp: 4.90 (d, J = 6.4, H-1)
β-D-Glcp: 5.63 (d, J = 8.0, H-1)
β-D-Galp: 5.27 (d-like, H-1)
β-D-Glcp′: 6.39 (d, J = 7.9, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

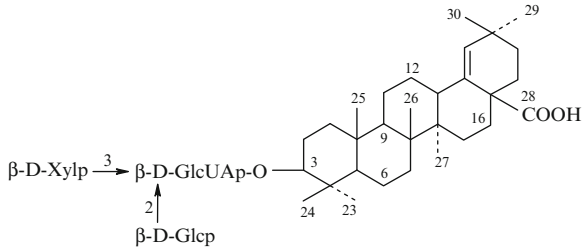
C-1	39.1	C-16	34.0	GlcUA-1	105.2	Gal-1	105.2
2	26.7	17	48.8	2	79.2	2	73.0
3	89.6	18	138.1	3	88.0	3	75.3
4	39.7	19	132.8	4	71.9	4	70.2
5	56.0	20	32.3	5	77.3	5	77.3
6	18.4	21	33.5	6	171.7	6	62.1
7	35.0	22	33.9	Glc-1	103.9	Glc′-1	96.0
8	41.1	23	27.9	2	76.4	2	74.3
9	51.4	24	16.6	3	77.6	3	79.2
10	37.1	25	16.7	4	72.7	4	71.4
11	21.2	26	16.3	5	78.6	5	79.0
12	26.3	27	15.3	6	63.5	6	62.5
13	41.4	28	175.4				
14	43.0	29	29.3				
15	29.8	30	30.6				

References

1. M. Yoshikawa, T. Murakami, A. Kishi, T. Kageura, H. Matsuda, Chem. Pharm. Bull. **49**(7), 863 (2001)

Kochianoside II

CAS Registry Number: 193894-13-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Morolic Acid
Biological source: *Kochia scoparia* [1]
$C_{47}H_{74}O_{18}$: 926.487
Mp: 203–204°C ($CHCl_3$-MeOH) [1]
$[\alpha]_D^{23}$ −9.6° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3436, 2940, 2891, 1736, 1701, 1655, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 925 $(M-H)^-$, 793 $(M-C_5H_9O_4)^-$, 763 $(M-C_6H_{11}O_5)^-$, 631 $(M-C_{11}H_{19}O_9)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 949.4773 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.71, 0.98, 0.98, 1.05, 1.07, 1.13, 1.23 (s, CH_3-25, 26, 27, 24, 30, 29, 23), 2.68 (dd-like, H-13), 3.30 (dd, J = 4.2, 11.9, H-3), 5.30 (brs, H-19)
β-D-GlcUAp:5.01 (d, J = 7.9, H-1)
β-D-Xylp:5.43 (d, J = 7.9, H-1)
β-D-Glcp:5.75 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-18	139.0	GlcUA-1	105.5
2	26.8	19	132.0	2	79.3
3	89.6	20	32.4	3	85.4
4	39.7	21	34.2	4	71.5
5	55.9	22	34.2	5	77.4
6	18.4	23	27.8	6	171.9

(*continued*)

Table 1 (continued)

7	35.0	24	16.5	Glc-1	103.8
8	41.0	25	16.8	2	76.5
9	51.4	26	16.3	3	78.5
10	37.0	27	15.3	4	72.4
11	21.3	28	179.1	5	78.0
12	26.5	29	30.8	6	63.3
13	41.6	30	29.3	Xyl-1	105.0
14	43.0			2	75.3
15	30.0			3	78.6
16	34.4			4	70.9
17	48.6			5	67.4

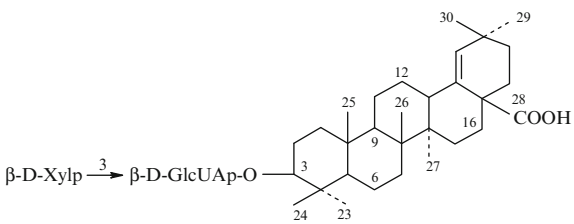
Pharm./Biol.: The methanol extract and glycosidic fraction of *Kochia Fructus* have inhibitory effects on the cutaneous pruritus induced by Compound 48/80 or serotonin in mice [1]

References

1. M. Yoshikawa, Y. Dai, H. Shimada, T. Morikawa, N. Matsumura, S. Yoshizumi, H. Matsuda, M. Hideaki, M. Kubo, Chem. Pharm. Bull. **45**(6), 1052 (1997)

Scoparianoside B

CAS Registry Number: 195971-47-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Morolic Acid

Biological source: *Kochia scoparia* [1]

$C_{41}H_{64}O_{13}$: 764.434

Mp: 211–214°C ($CHCl_3$-MeOH) [1]

$[\alpha]_D^{25}$ + 5.1° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3475, 2944, 2867, 1726, 1701, 1655, 1024 [1]

FAB-MS (negative ion mode) *m/z*: 763 $(M\text{-}H)^-$, 631 $(M\text{-}C_5H_9O_4)^-$, 455 $(M\text{-}C_{11}H_{17}O_{10})^-$ [1]

HR-FAB-MS (positive ion mode) *m/z*: 787 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N: 0.75, 0.95, 0.98, 1.00, 1.06, 1.12, 1.26 (s, CH_3-25, 24, 27, 26, 30, 29, 23), 2.68 (d-like, H-13), 3.36 (dd, J = 4.5, 11.9, H-3), 5.28 (brs, H-19)

β-D-GlcUAp: 4.97 (d, J = 7.6, H-1)

β-D-Xylp: 5.27 (d, J = 7.3, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

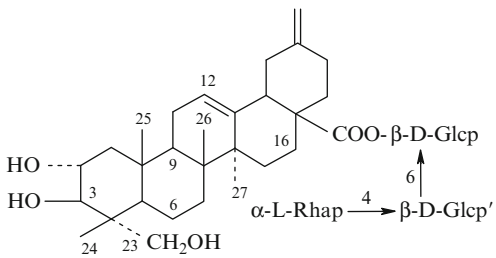
C-1	39.1	C-16	34.4	GlcUA-1	106.8
2	26.8	17	48.6	2	74.6
3	89.3	18	139.0	3	86.6
4	39.7	19	132.1	4	71.4
5	56.0	20	32.4	5	77.5
6	18.4	21	34.2	6	172.0
7	35.0	22	34.2	Xyl-1	106.2
8	41.1	23	28.0	2	75.2
9	51.4	24	16.8	3	78.0
10	37.1	25	16.8	4	70.9
11	21.3	26	16.3	5	67.3
12	26.5	27	15.3		
13	41.6	28	179.0		
14	43.1	29	30.8		
15	30.0	30	29.4		

Pharm./Biol.: *Kochia Fructus* has been used as a tonic, diuretic, analgesic, and antidote and for the treatment of and cutaneous pruritus in traditional Chinese and Japanese preparations [1]

References

1. M. Yoshikawa, H. Shimada, T. Morikawa, S. Yoshizumi, N. Matsumura, T. Murakami, H. Matsuda, K. Hori, J. Yamahara, Chem. Pharm. Bull. **45**(8), 1300 (1997)

Saponin P_H



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Norarjunolic Acid

Biological source: *Akebia quinata* [1]

$C_{47}H_{74}O_{19}$: 942.482

Mp: 207–210°C (dec.) [1]

$[\alpha]_D$ + 3° (c 2.72, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3350, 1735 [1]

References

1. R. Higuchi, T. Kawasaki, Chem. Pharm. Bull. **24**, 1314 (1976)

Biological source: *Glycyrrhiza uralensis* [1]

$C_{42}H_{62}O_{15}$: 806.408

Mp: 249–251°C (MeOH) [1]

$[\alpha]_D^{23}$ −120.0° (c 0.2, MeOH) [1]

UV λ_{max}^{MeOH} nm (ε): 241 (14100), 249 (15800), 259 (10200) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 3000–2850 (br), 1710, 1640, 1020 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N + D_2O): 0.80, 0.88, 0.92, 1.05, 1.25, 1.31, 1.38 (s, CH_3 × 7), 5.92 (brd, J = 11.0, H-3), 6.36 (brd, H-12)

β-D-GlcUAp: 5.00 (d, J = 7.3, H-1)

β-D-GlcUAp′: 5.37 (d, J = 7.4, H-1) [1]

^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

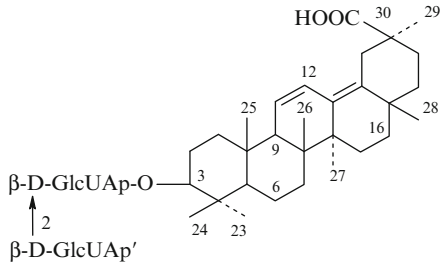
C-3	89.2	GlcUA-1	103.7
11	125.8	6	171.1
12	127.2	GlcUA′-1	105.8
13	135.2	6	171.4
18	135.9		
22	39.6		
30	179.3		

References

1. K. Kitagawa, T.T. Hori, J.-L. Zhou, M. Yoshikawa, Chem. Pharm. Bull. **41**(1), 43 (1993)

Licorice-Saponin C2

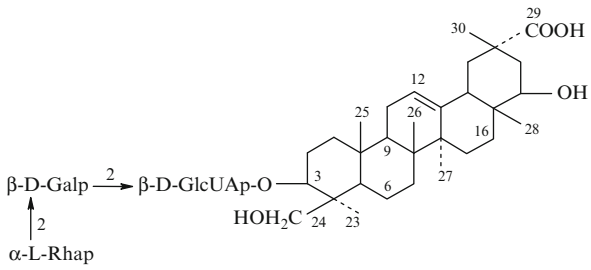
CAS Registry Number: 118525-49-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Olean-11,13(18)-dien-30-oic Acid

Sophoraflavoside II

CAS Registry Number: 147540-80-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Oxytrogenin

Biological source: *Abrus cantoniensis* [1], *Sophora flavescens* [2]

$C_{48}H_{76}O_{20}$: 972.492
$[\alpha]_D^{27}$ −8.6° (c 0.36, C_5H_5N-H_2O (1:1)) [1]
FAB-MS *m/z* : 971 $[M-H]^-$, 825 $[M-H-Rha]^-$, 487 $[M-H-Rha-Gal-GlcUA]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.67, 0.91, 1.18, 1.18, 1.21, 1.36 (s, CH_3 × 6), 5.30 (s, H-12)
α-L-Rhap: 6.02 (s, H-1), 1.72 (d, J = 5.5, CH_3-6)
β-D-Galp: 5.49 (d, J = 7.4, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

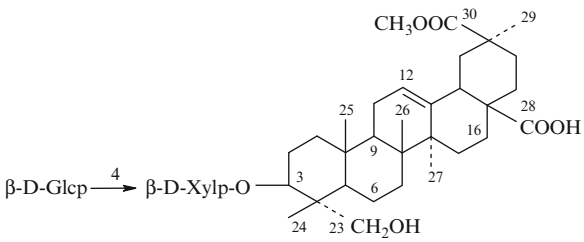
C-1	38.8	C-16	28.9	GlcUA-1	105.0	Rha-1	102.1
2	26.5	17	38.0	2	78.1	2	72.1
3	91.2	18	44.8	3	76.4	3	72.1
4	43.9	19	41.6	4	73.8	4	74.0
5	56.2	20	42.7	5	76.8	5	69.3
6	18.6	21	37.4	6	175.7	6	18.7
7	33.4	22	75.5	Gal-1	101.7		
8	39.9	23	22.9	2	77.4		
9	47.8	24	63.5	3	76.0		
10	36.5	25	15.9	4	71.0		
11	24.1	26	17.1	5	76.2		
12	123.2	27	25.4	6	61.8		
13	144.2	28	20.8				
14	42.5	29	182.4				
15	26.3	30	25.0				

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)
2. Y. Ding, R. Tiyan, J. Kinjo, T. Nohara, I. Kitagawa, Chem. Pharm. Bull. **40**(11), 2990 (1992)

Compound 1 from *Phytolacca americana*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Phytolaccagenic Acid
Biological source: *Phytolacca americana* [1]
$C_{42}H_{66}O_{15}$: 810.440
$[\alpha]_D^{21.8}$ + 46.1^0 (c 0.74, MeOH) [1]
HR-FAB_MS *m/z*: 833.4295 [1]
IR (KBr) cm^{-1} : 3387 (OH), 1712 (C = O) [1]
^{1}H NMR (600 MHz, J/Hz, $CDCl_3$): 0.71, 0.82, 0.97, 1.12, 1.17 (s, CH_3 × 5), 3.20 (3H, m), 3.27 (d, J = 11.5), 3.34 (t, J = 7.8), 3.48 (m), 3.50 (dd, J = 3.8, 9.0), 3.59 (m), 3.60 (dd, J = 6.0, 12.0), 3.68 (s), 3.71 (d, J = 11.5), 3.82 (dd, J = 2.2, 12.0), 3.83 (dd, J = 5.2, 10.2), 4.47 (d, J = 7.1), 4.67 (d, J = 7.7), 5.28 (brs) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

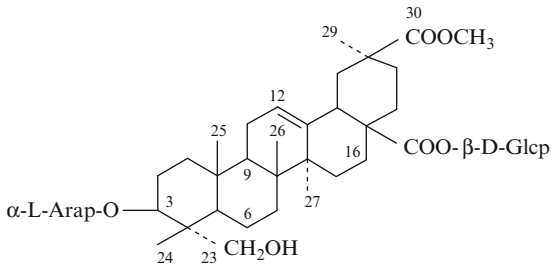
C-1	39.5	C-17	47.6	Xyl-1	104.5
2	26.6	18	44.3	2	81.2
3	83.9	19	43.8	3	78.1
4	44.1	20	45.1	4	71.0
5	48.2	21	31.6	5	66.6
6	18.9	22	35.4	Glc-1	105.1
7	33.5	23	64.6	2	76.1
8	40.5	24	13.4	3	77.8
9	49.3	25	16.4	4	71.7
10	37.7	26	18.1	5	78.3
11	24.5	27	26.4	6	63.0
12	123.5	28	184.2		
13	145.6	29	28.9		
14	42.9	30	179.0		
15	29.1	31	52.3		
16	24.5				

Pharm./Biol.: Its rhizome has been used as a traditional crude diuretic drug in spite of having strong toxicity [1]

References

1. H. Takahashi, Y. Namikawa, M. Tanaka, Y. Fukuyama, Chem. Pharm. Bull. **49**(2), 246 (2001)

Quinoa-Saponin 3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Phytolaccagenic Acid

Biological source: *Chenopodium quinoa* [1]

$C_{42}H_{66}O_{15}$: 810.440

$[\alpha]_D^{19}$ + 53.8° (c 1.00, MeOH) [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N):

α-L-Arap: 4.94 (d, J = 6.6, H-1)

β-D-Glcp: 6.27 (d, J = 6.8, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

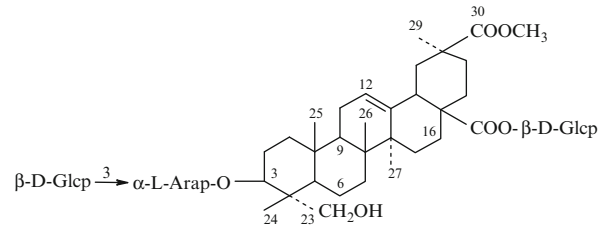
Table 1

C-1	38.6	C-11	23.7	C-21	30.5	Ara-1	106.6
2	26.1	12	123.5	22	33.9	2	73.1
3	81.9	13	143.7	23	64.5	3	74.7
4	43.5	14	42.0	24	13.5	4	69.6
5	47.6	15	28.3	25	16.2	5	66.9
6	18.1	16	23.7	26	17.5	Glc-1	95.7
7	32.8	17	46.5	27	26.1	2	74.1
8	39.9	18	43.2	28	176.9	3	79.2
9	48.2	19	42.5	29	28.3	4	70.9
10	36.9	20	44.0	30	175.9	5	78.9
				OCH_3	51.7	6	62.2

References

1. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **36**, 1415 (1988)

Quinoa-Saponin 4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Phytolaccagenic Acid

Biological source: *Chenopodium quinoa* [1]

$C_{48}H_{76}O_{20}$: 972.492

$[\alpha]_D^{17}$ + 48.1° (c 1.00, MeOH) [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N):

α-L-Arap: 4.96 (d, J = 7.6, H-1)

β-D-Glcp: 5.30 (d, J = 7.6, H-1)

β-D-Glcp′: 6.27 (d, J = 6.6, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

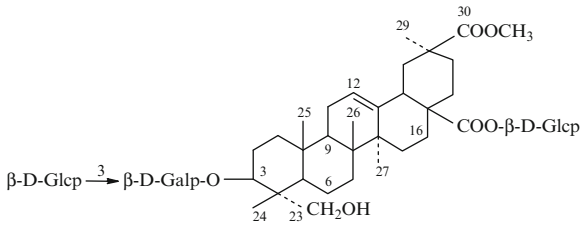
Table 1

C-1	38.8	C-16	23.7	Ara-1	106.4	Glc′-1	95.7
2	26.0	17	46.4	2	71.9	2	74.0
3	81.8	18	43.2	3	84.1	3	79.2
4	43.5	19	42.5	4	69.3	4	70.8
5	47.5	20	43.9	5	67.1	5	78.8
6	18.1	21	30.5	Glc-1	106.2	6	61.9
7	32.8	22	34.0	2	75.6		
8	39.9	23	64.1	3	78.3		
9	48.1	24	13.6	4	71.4		
10	36.8	25	16.1	5	78.6		
11	23.8	26	17.4	6	62.6		
12	123.5	27	26.0				
13	143.7	28	176.9				
14	42.0	29	28.3				
15	28.5	30	175.9				
		OCH_3	51.7				

References

1. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **36**, 1415 (1988)

Quinoa-Saponin 5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Phytolaccagenic Acid

Biological source: *Chenopodium quinoa* [1]

$C_{49}H_{78}O_{21}$: 1002.503

$[\alpha]_D^{24}$ + 53.8° (c 1.05, MeOH) [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N):

β-D-Galp: 4.91 (d, J = 7.4, H-1)

β-D-Glcp: 5.16 (d, J = 7.1, H-1)

β-D-Glcp′: 6.12 (d, J = 7.1, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

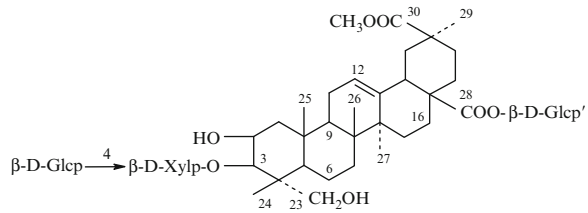
C-1	38.7	C-16	23.7	Gal-1	106.1	Glc′-1	95.7
2	26.1	17	46.4	2	72.2	2	74.0
3	82.1	18	43.1	3	85.0	3	79.2
4	43.4	19	42.3	4	69.7	4	71.4
5	47.5	20	43.9	5	76.4	5	78.8
6	18.1	21	30.6	6	61.8	6	62.2
7	32.8	22	33.9	Glc-1	106.4		
8	39.9	23	64.4	2	75.7		
9	48.1	24	13.6	3	78.3		
10	36.8	25	16.1	4	70.9		
11	23.7	26	17.4	5	78.6		
12	123.5	27	26.1	6	62.5		
13	143.8	28	176.0				
14	42.0	29	28.3				
15	28.3	30	176.9				
		OCH_3	51.7				

References

1. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **36**, 1415 (1988)

Phytolaccasaponin B

CAS Registry Number: 66656-92-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Phytolaccagenin

Biological source: *Phytolacca americana* [1, 2]

$C_{48}H_{76}O_{21}$: 988.487

Mp: 218–220°C (i-PrOH-AcOH) [1]

$[\alpha]_D^{29}$ + 38.31° (c 0.93, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1750 [1]

^{1}H NMR (C_5D_5N): 1.02, 1.10, 1.25, 1.32, 1.45 (s, CH_3 × 5), 3.60 (s, OCH_3), 5.55 (m, H-12) [1]

^{13}C NMR (CD_3OD): [2]

Table 1

C-1	44.5	C-16	24.1	Xyl-1	106.3	Glc′-1	95.7
2	71.5	17	47.4	2	75.1	2	73.9
3	83.4	18	43.9	3	76.3	3	78.3
4	43.1	19	43.3	4	78.5	4	71.0
5	48.1	20	44.9	5	64.6	5	78.7
6	18.6	21	31.3	Glc-1	103.4	6	62.3
7	33.4	22	34.4	2	74.6		
8	40.7	23	65.4	3	77.8		
9	49.4	24	14.7	4	71.6		
10	37.5	25	17.6	5	78.1		
11	24.7	26	17.7	6	62.6		
12	124.4	27	26.3				
13	144.5	28	177.5				
14	43.0	29	28.6				
15	28.8	30	178.7				
		OCH_3	52.4				

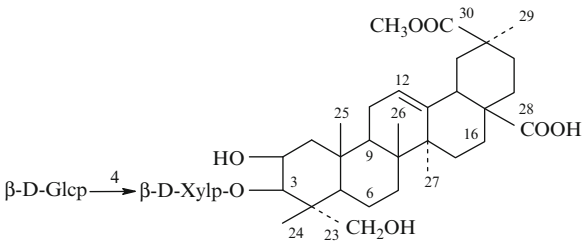
Pharm./Biol.: Acivity against edema and rheumatism [1]

References

1. Y. Suga, Y. Maruyama, S. Kawanishi, J. Shoji, Chem. Pharm. Bull. **26**(2), 520 (1978)
2. H. Takahashi, Y. Namikawa, M. Tanaka, Y. Fukuyama, Chem. Pharm. Bull. **49**(2), 246 (2001)

Phytolaccasaponin E

CAS Registry Number: 65497-07-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Phytolaccagenin
Biological source: *Phytolacca americana* [1, 2]
$C_{42}H_{66}O_{16}$: 826.435
Mp: 257–258°C (i-PrOH-AcOH) [1]
$[\alpha]_D^{21}$ + 51.26° (c 0.99, EtOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1730, 1710 [1]
^{1}H NMR (C_5D_5N): 1.10, 1.22, 1.25, 1.32, 1.55 (s, CH_3 × 5), 3.75 (s, OCH_3), 5.65 (m, H-12) [1]
^{13}C NMR (CD_3OD): [2]

Table 1

C-1	44.5	C-16	24.2	Xyl-1	106.3
2	71.5	17	47.0	2	75.1
3	83.4	18	44.0	3	76.3
4	43.1	19	43.3	4	78.5
5	48.0	20	45.0	5	64.6
6	18.5	21	31.3	Glc-1	103.5
7	33.4	22	35.0	2	74.6
8	40.6	23	65.3	3	78.1
9	49.3	24	14.7	4	71.6
10	37.5	25	17.5	5	77.8
11	24.6	26	17.8	6	62.6
12	124.2	27	26.4		
13	144.9	28	181.3		
14	43.0	29	28.7		
15	28.8	30	178.8		
		OCH_3	52.3		

(*continued*)

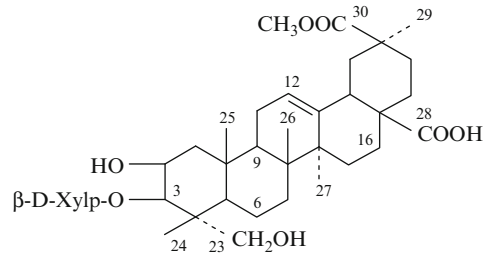
Pharm./Biol.: Acivity against edema and rheumatism [1]

References

1. Y. Suga, Y. Maruyama, S. Kawanishi, J. Shoji, Chem. Pharm. Bull. **26**(2), 520 (1978)
2. H. Takahashi, Y. Namikawa, M. Tanaka, Y. Fukuyama, Chem. Pharm. Bull. **49**(2), 246 (2001)

Phytolaccasaponin G

CAS Registry Number: 60820-94-2



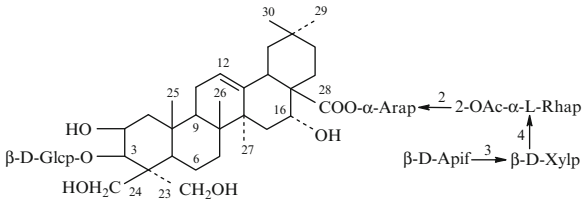
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Phytolaccagenin
Biological source: *Phytolacca americana* [1]
$C_{36}H_{56}O_{11}$: 664.382
Mp: 266–269°C (MeOH–H_2O) [1]
$[\alpha]_D^{26}$ + 67.27° (c 1.41, EtOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1730, 1690 [1]
^{1}H NMR (C_5D_5N): 1.12, 1.25, 1.30, 1.38, 1.62 (s, CH_3 × 5), 3.75 (s, OCH_3), 5.65 (m, H-12)
Pharm./Biol.: Molluscicidal activity [2]

References

1. Y. Suga, Y. Maruyama, S. Kawanishi, J. Shoji, Chem. Pharm. Bull. **26**(2), 520 (1978)
2. A.L. Johnson, Y. Shimizu, Tetrahedron **30**, 2033 (1974)

Platycodin A

CAS Registry Number: 66779-34-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Platycodigenin

Biological source: *Platycodon grandiflorum* [1–3]

$C_{59}H_{94}O_{29}$: 1266.588

Mp: 217–220°C [1]

$[\alpha]_D^{28}$ −26.6° (c 1.7, MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.95 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.92, 1.00, 1.09, 1.54, 1.72 (s, CH_3 × 5), 2.03 (OAc) [2]

^{13}C NMR (15 MHz, C_5D_5N): [2]

Table 1

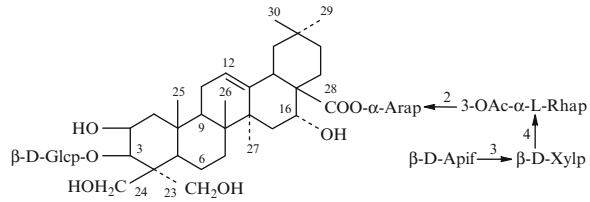
C-1	45.0	C-16	74.1 [3]	Glc-1	106.0 [2]	Ac-1	170.3 [1]
2	69.3	17	50.1	2	75.2	2	20.8
3	86.4	18	41.7	3	78.6	Xyl-1	106.4
4	48.0	19	47.0 [2]	4	72.0	2	75.0
5	48.0	20	30.8	5	78.2	3	85.7
6	19.6	21	36.0	6	62.9	4	69.5
7	33.5	22	31.3 [3]	Ara-1	93.6 [3]	5	66.7
8	40.3	23	63.8 [2]	2	76.3	Api-1	111.2 [3]
9	47.8	24	66.3	3	65.8	2	77.9
10	37.6	25	18.1	4	70.3	3	80.0
11	24.2	26	17.3	5	62.9	4	75.0
12	122.5	27	27.3	Rha-1	98.4	5	65.8
13	144.7	28	175.9 [3]	2	73.6		
14	42.2	29	33.1 [2]	3	70.3		
15	36.1	30	24.8	4	83.4		
				5	68.7		
				6	18.3		

References

1. T. Konishi, A. Tada, J. Shoji, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **26**, 668 (1978)
2. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 671 (1978)
3. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 674 (1978)

Platycodin C

CAS Registry Number: 66779-35-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Platycodigenin

Biological source: *Platycodon grandiflorum* [1–3]

$C_{59}H_{94}O_{29}$: 1266.588

Mp: 225–227°C (dec.) [2]

$[\alpha]_D^{28}$ −28.3° (c 1.14, MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.95 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.92, 1.00, 1.09, 1.54, 1.72 (s, CH_3 × 5), 2.05 (OAc) [2]

^{13}C NMR (15 MHz, C_5D_5N): [2]

Table 1

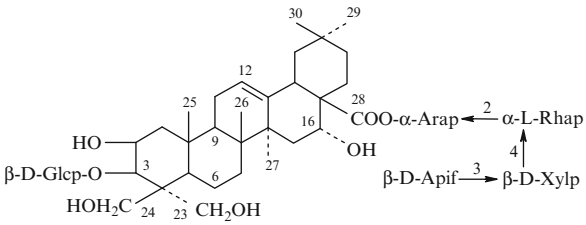
C-1	45.0	C-16	74.1 [3]	Glc-1	106.0	Ac-1	170.7
2	69.3	17	50.1	2	75.2	2	21.4
3	86.4	18	41.7	3	78.6 [1]	Xyl-1	105.4 [3]
4	48.0	19	47.0 [2]	4	72.0	2	75.0
5	48.0	20	30.8	5	78.2	3	85.7
6	19.6	21	36.0	6	62.9	4	69.5
7	33.5	22	31.3 [3]	Ara-1	93.6 [3]	5	66.7
8	40.3	23	63.8 [2]	2	76.3	Api-1	111.2 [3]
9	47.8	24	66.3	3	65.8	2	77.9
10	37.6	25	18.1	4	70.3	3	80.0
11	24.2	26	17.3	5	62.9	4	75.0
12	122.5	27	27.3	Rha-1	101.6 [3]	5	65.8
13	144.7	28	175.9 [3]	2	70.3		
14	42.2	29	33.1 [2]	3	75.4		
15	36.1	30	24.8	4	77.6		
				5	68.7		
				6	18.3		

References

1. T. Konishi, A. Tada, J. Shoji, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **26**, 668 (1978)
2. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 671 (1978)
3. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 674 (1978)

Platycodin D

CAS Registry Number: 58479-68-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Platycodigenin

Biological source: *Platycodon grandiflorum* [1–3]

$C_{57}H_{92}O_{28}$: 1224.577

Mp: 228–237°C [3]

$[\alpha]_D^{23}$ −30.5° (MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.95 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.92, 1.00, 1.09, 1.54, 1.72 (s, CH_3 × 5) [2]

^{13}C NMR (15 MHz, C_5D_5N): [2]

Table 1

C-1	45.0	C-16	74.1 [3]	Glc-1	106.0 [2]	Xyl-1	106.6 [3]
2	69.3	17	50.1	2	75.2	2	75.0
3	86.4	18	41.8	3	78.6	3	85.6
4	48.0	19	47.0 [2]	4	72.0	4	69.5
5	48.0	20	30.8	5	78.2	5	66.8
6	19.6	21	36.0	6	62.9	Api-1	111.2 [3]
7	33.5	22	31.3 [3]	Ara-1	93.7 [3]	2	77.9
8	40.3	23	63.8 [2]	2	75.6	3	80.0
9	47.8	24	66.3	3	65.9	4	75.0
10	37.6	25	18.1	4	70.4	5	65.7
11	24.2	26	17.3	5	62.9		
12	122.5	27	27.3	Rha-1	101.0 [3]		
13	144.7	28	175.8 [3]	2	72.0		
14	42.2	29	33.1 [2]	3	72.4		
15	36.1	30	24.8	4	83.7		
				5	68.6		
				6	18.1		

References

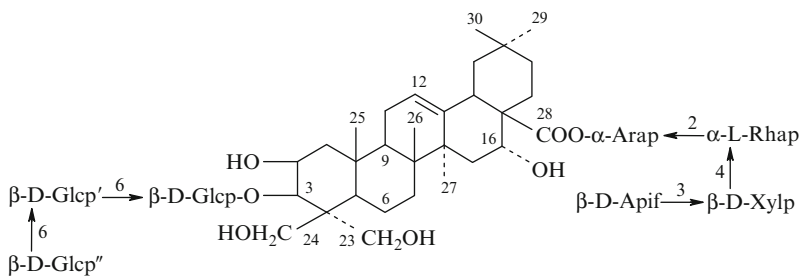
1. T. Konishi, A. Tada, J. Shoji, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **26**, 668 (1978)
2. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 671 (1978)
3. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 674 (1978)

Platycoside E

See Figure Platycoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Platycodigenin

Biological source: *Platycodon grandiflorum* [1]



Platycoside E

$C_{69}H_{112}O_{38}$: 1548.683
$[\alpha]_D^{26}$ −26.9° (c 0.20, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 2927, 1739, 1655, 1038 [1]
ESI-MS (negative ion mode) *m/z*: 1547 $[M-H]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.02, 1.09, 1.13, 1.38, 1.70 (s, CH_3-29, 26, 30, 25, 27), 3.91, 4.50 (m, H_2-23), 4.07, 4.55 (m, H_2-24), 4.54 (m, H-3), 4.56 (m, H-2), 5.24 (brs, H-16), 5.65 (brs, H-12)
α-L-Rhap: 5.80 (brs, H-1), 1.69 (d, J = 6.1, CH_3-6)
β-D-Glcp: 4.85 (d, J = 7.3, H-1); β-D-Glcp′: 4.76 (d, J = 8.2, H-1); β-D-Glcp″: 5.05 (d, J = 7.6, H-1)
β-D-Xylp: 5.05 (d, J = 6.9, H-1); β-D-Apif: 6.20 (brs, H-1)
α-L-Arap: 6.41 (brs, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	45.2	C-21	36.0	Glc-1	106.0	Ara-3	71.3
2	68.6	22	32.1	2	74.8	4	66.4
3	88.8	23	63.6	3	78.3	5	63.1
4	48.1	24	67.1	4	72.3	Rha-1	101.1
5	47.5	25	19.1	5	76.5	2	71.9
6	19.5	26	17.6	6	70.8	3	72.7
7	33.5	27	27.0	Glc′-1	104.9	4	83.9
8	40.5	28	176.0	2	75.3	5	68.5
9	45.0	29	33.2	3	78.4	6	18.3
10	37.9	30	24.7	4	71.3	Xyl-1	106.8
11	24.0			5	77.1	2	76.0
12	123.1			6	70.2	3	84.8
13	144.3			Glc″-1	105.6	4	69.4
14	42.4			2	75.2	5	66.9
15	36.1			3	78.6	Api-1	111.2
16	73.9			4	71.0	2	77.8
17	49.7			5	77.7	3	80.4
18	41.6			6	62.7	4	75.2
19	47.1			Ara-1	93.6	5	65.4
20	30.9			2	75.2		

References

1. T. Nikaido, K. Koike, K. Mitsunaga, T. Saeki, Chem. Pharm. Bull. **47**(6), 903 (1999)

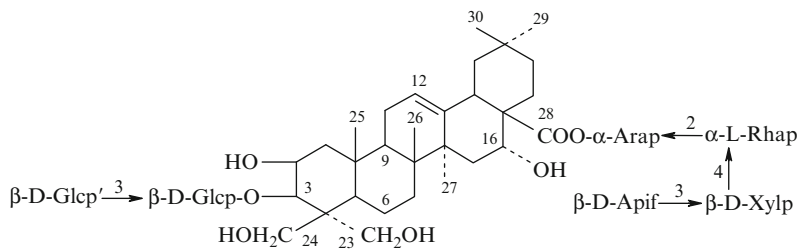
Saponin 5

See Figure Saponin 5
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Platycodigenin
Biological source: *Platycodon grandiflorum* [1]
$C_{65}H_{104}O_{34}$: 1428.640
Mp: 225–231°C [1]
$[\alpha]_D^{23}$ −25.0° (MeOH) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.96 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.92, 1.00, 1.09, 1.54, 1.72 (s, CH_3 × 5) [1]
^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	44.9	C-19	47.0	Glc-1	105.5	Rha-1	98.4
2	69.4	20	30.8	2	74.1	2	73.6
3	86.3	21	36.0	3	88.7	3	70.3
4	48.0	22	31.3	4	70.0	4	83.4
5	48.0	23	63.8	5	77.9	5	68.7
6	19.5	24	65.7	6	62.6	6	18.3
7	33.5	25	18.0	Glc′-1	105.5	Xyl-1	106.4
8	40.3	26	17.3	2	74.4	2	75.0
9	47.8	27	27.3	3	78.4	3	85.7
10	37.5	28	175.9	4	71.9	4	69.5
11	24.2	29	33.1	5	78.2	5	66.7
12	122.5	30	24.8	6	62.8	Api-1	111.2
13	144.7			Ara-1	93.6	2	77.9

(*continued*)



Saponin 5

Table 1 (continued)

14	42.2	2	76.3	3	80.0
15	36.1	3	65.8	4	75.0
16	74.1	4	70.3	5	65.8
17	50.1	5	62.9		
18	41.7				

References

1. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 671 (1978)

Saponin 6

See Figure Saponin 6

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Platycodigenin

Biological source: *Platycodon grandiflorum* [1]

$C_{65}H_{104}O_{34}$: 1428.640

Mp: 224–232°C [2]

$[\alpha]_D^{23}$ −35.3° (MeOH) [1]

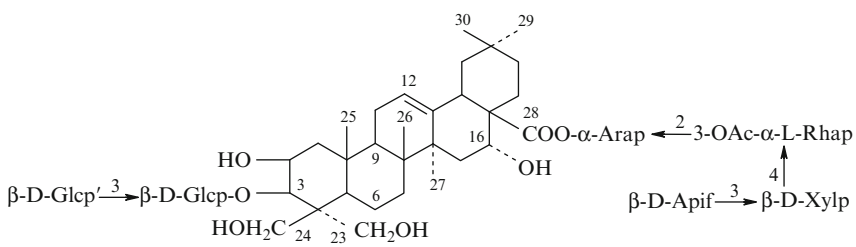
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.96 (Hα-2), 5.56 (H-12), 4.98 (Hβ-16), 0.92, 1.00, 1.09, 1.54, 1.72 (s, CH_3 × 5) [1]

^{13}C NMR (15 MHz, C_5D_5N): [1, 2]

Table 1

C-1	44.9	C-19	47.0	Glc-1	105.5	Rha-1	98.4
2	69.4	20	30.8	2	74.1	2	70.6
3	86.3	21	36.0	3	88.7	3	75.3
4	48.0	22	31.3	4	70.0	4	77.6
5	48.0	23	63.8	5	77.9	5	68.7
6	19.5	24	65.7	6	62.6	6	18.3
7	33.5	25	18.0	Glc′-1	105.5	Xyl-1	105.4
8	40.3	26	17.8	2	75.4	2	75.0
9	47.8	27	27.3	3	78.4	3	85.7
10	37.5	28	175.9	4	71.9	4	69.5
11	24.2	29	33.1	5	78.2	5	66.7
12	122.5	30	24.8	6	62.8	Api-1	111.2
13	144.7			Ara-1	93.6	2	77.9
14	42.2			2	76.3	3	80.0
15	36.1			3	65.8	4	75.0
16	74.1			4	70.3	5	65.8
17	50.1			5	62.9		
18	41.7						

(*continued*)

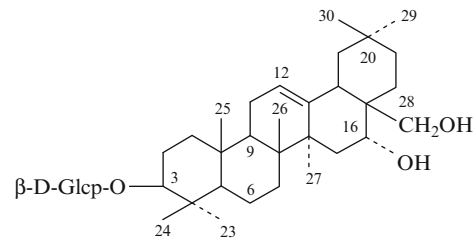


Saponin 6

References

1. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 671 (1978)
2. H. Ishii, K. Tori, T. Tozyo, Y. Yoshimura, Chem. Pharm. Bull. **26**, 674 (1978)

Androseptoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Primulagenin A

Biological source: *Androsace septentrionalis* [1]

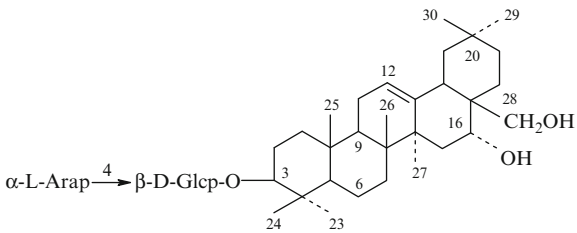
$C_{36}H_{60}O_8$: 620.428

Mp: 221–223°C [1]
$[\alpha]_D^{20}$ −80.0° (c 1.0, MeOH) [1]

References

1. P.K. Kintya, N.M. Pirozhkova, Chem. Nat. Comp. **18**(4), 499 (1982)

Androseptoside D

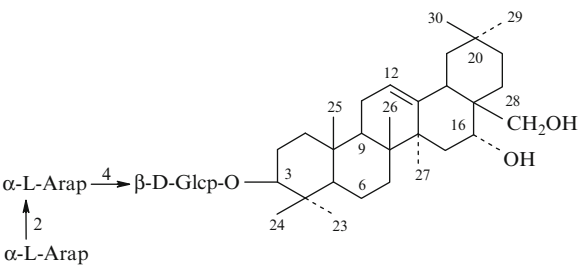


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Primulagenin A
Biological source: *Androsace septentrionalis* [1]
$C_{41}H_{68}O_{12}$: 752.471
Mp: 258–261°C [1]
$[\alpha]_D^{20}$ −12.0° (c 1.0, MeOH) [1]

References

1. P.K. Kintya, N.M. Pirozhkova, Chem. Nat. Comp. **18**(4), 499 (1982)

Androseptoside D_1

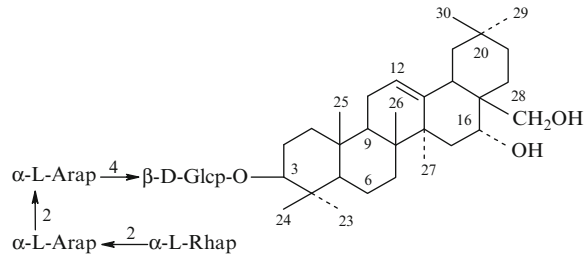


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Primulagenin A
Biological source: *Androsace septentrionalis* [1]
$C_{46}H_{76}O_{16}$: 884.513
Mp: 195–197°C [1]
$[\alpha]_D^{20}$ −19.5° (c 1.3, C_5H_5N) [1]

References

1. P.K. Kintya, N.M. Pirozhkova, Chem. Nat. Comp. **18**(5), 626 (1982)

Androseptoside F



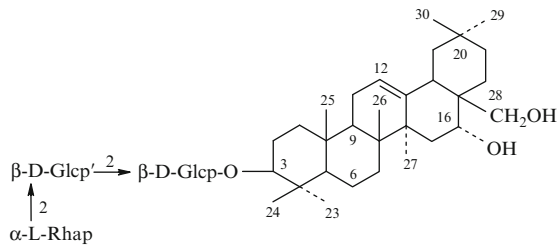
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Primulagenin A
Biological source: *Androsace septentrionalis* [1]
$C_{52}H_{86}O_{20}$: 1030.571
Mp: 197–200°C [1]
$[\alpha]_D^{17}$ −60.0° (c 1.3, C_5H_5N) [1]

References

1. N.M. Pirozhkova, P.K. Kintya, Chem. Nat. Comp. **18**(5), 627 (1982)

Rotundioside D

CAS Registry Number: 100665-38-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Primulagenin A

Biological source: *Bupleurum rotundifolium* [1]

$C_{48}H_{80}O_{17}$: 928.539

Mp: 207–210°C (MeOH–H_2O) [1]

$[\alpha]_D^{24}$ −14.1° (c 0.5) [1]

UV λ_{max} nm: 210 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 5.39 (brs, H-16), 5.65 (brs, H-12)

β-D-Glcp: 5.62 (d, J = 7.0, H-1); β-D-Glcp′: 5.70 (d, J = 7.0, H-1)

α-L-Rhap: 6.26 (brs, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	74.1	Glc-1	105.0	Rha-1	101.7
2	26.4	17	40.8	2	79.1	2	72.2
3	89.8	18	42.4	3	77.6	3	72.7
4	39.6	19	48.2	4	71.7	4	74.1
5	55.9	20	30.3	5	78.3	5	69.2
6	18.7	21	36.8	6	62.6	6	18.6
7	33.3	22	31.1	Glc′-1	101.7		
8	40.0	23	28.2	2	79.0		
9	47.0	24	16.7	3	77.6		
10	36.8	25	15.6	4	72.4		
11	23.8	26	17.1	5	78.3		
12	122.5	27	27.2	6	63.3		
13	145.1	28	70.2				
14	41.9	29	33.4				
15	34.6	30	24.8				

References

1. E. Akai, T. Takeda, Y. Kobayashi, Y. Chen, Y. Ogihara, Chem. Pharm. Bull. **33**(11), 4685 (1985)

Acanthophylloside D

CAS Registry Number: 71866-89-2

See Figure Acanthophylloside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

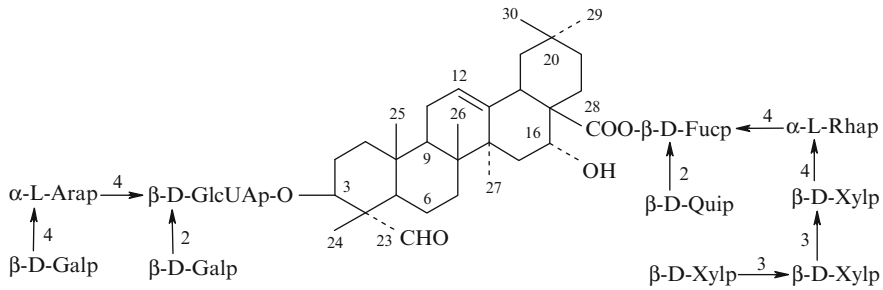
Biological source: *Acanthophyllum gypsophiloides* [1]

$C_{86}H_{136}O_{49}$: 1952.815

Mp: 235–237°C [1]

$[\alpha]_D^{20}$ −13° (c 1.5, H_2O) [1]

IR (KBr) ν_{max} cm^{-1}: 3520–3385, 2720, 1720, 1700 [1]



Acanthophylloside D

^{1}H NMR (C_5D_5N): 0.78, 0.9, 0.93, 1.05, 1.22, 1.7 (s, CH_3 × 6), 9.47 (s, CHO) [1]

References

1. Zh.M. Putieva, T.T. Gorovits, E.S. Kondratenko, N.K. Abubakirov, Chem. Nat. Comp. **15**(2), 148 (1979)

Dubioside A

CAS Registry Number: 122587-95-5
See Figure Dubioside A
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid
Biological source: *Thladiantha dubia* [1]
$C_{54}H_{84}O_{24}$: 1116.535 (Me ester)
Mp: 210–215°C [1]
$[\alpha]_D^{25}$ −31.9° (c 2.7, MeOH) [1]
FAB-MS *m/z*: 1139 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.03, 1.04, 1.15, 1.38, 1.77 (s, CH_3 × 6), 5.59 (t-like, H-12), 9.88 (s, CHO-23)
β-D-GlcUAp: 4.90 (d, J = 7.0, H-1), 3.71 (s, COOMe)
β-D-Galp: 5.21 (d, J = 8.0, H-1)
α-L-Arap: 6.48 (d, J = 3.0, H-1)
α-L-Rhap: 5.83 (s, H-1), 1.67 (d, J = 6.0, CH_3-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

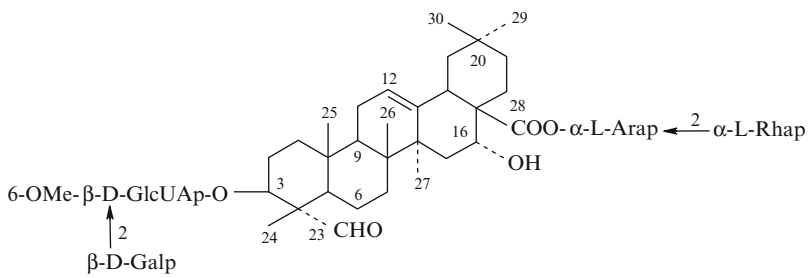
C-1	38.2	C-16	73.9	GlcUA-1	103.2	Ara-1	93.6
2	24.9	17	49.6	2	83.5	2	74.9
3	82.2	18	41.3	3	77.4	3	70.4
4	55.1	19	47.2	4	72.5	4	66.2
5	48.5	20	30.9	5	76.7	5	63.2
6	20.7	21	36.0	6	170.2	Rha-1	101.4
7	32.8	22	32.1	$COOCH_3$	52.0	2	72.3
8	40.3	23	209.3	Gal-1	106.3	3	72.5
9	47.1	24	10.9	2	74.3	4	73.8
10	36.3	25	15.8	3	75.3	5	70.4
11	23.8	26	17.5	4	70.1	6	18.5
12	122.4	27	27.2	5	77.1		
13	144.6	28	175.8	6	62.2		
14	42.1	29	33.3				
15	36.1	30	24.8				

References

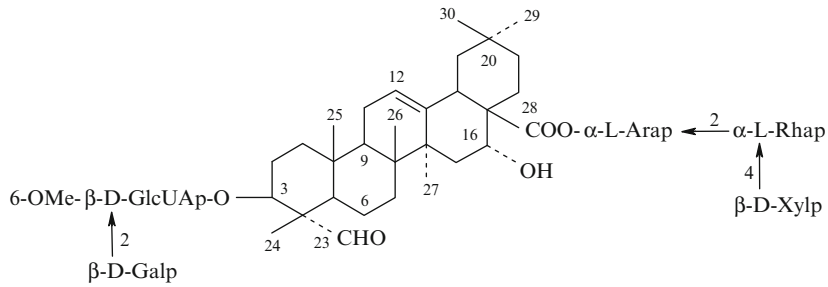
1. T. Nagao, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **37**(4), 925 (1989)

Dubioside B

CAS Registry Number: 122587-96-6
See Figure Dubioside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid
Biological source: *Thladiantha dubia* [1]
$C_{59}H_{92}O_{28}$: 1248.577 (Me ester)
Mp: 225–226°C (MeOH) [1]
$[\alpha]_D^{25}$ −26.1° (c 1.00, MeOH) [1]



Dubioside A



Dubioside B

FAB-MS *m/z*: 1271 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84, 1.02, 1.03, 1.14, 1.41, 1.75 (s, $CH_3 \times 6$), 5.59 (t-like, H-12), 9.89 (s, CHO-23)

β-D-GlcUAp: 4.89 (d, J = 7.0, H-1), 3.72 (s, COOMe)

β-D-Galp: 5.21 (d, J = 8.0, H-1)

α-L-Arap: 6.43 (d, J = 3.0, H-1)

α-L-Rhap: 5.80 (brs, H-1), 1.73 (d, J = 5.0, CH_3-6)

β-D-Xylp: 5.17 (d, J = 7.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.2	C-16	73.9	GlcUA-1	103.3	Ara-1	93.7
2	24.9	17	49.6	2	83.5	2	74.9
3	82.2	18	41.3	3	77.4	3	70.4
4	55.1	19	47.2	4	72.5	4	66.2
5	48.5	20	30.9	5	76.7	5	63.2
6	20.7	21	36.0	6	170.3	Rha-1	101.0
7	32.8	22	32.1	OCH_3	52.1	Xyl-1	106.8
8	40.3	23	209.3	Gal-1	106.3		
9	47.1	24	10.9	2	74.3		
10	36.3	25	15.8	3	75.3		
11	23.8	26	17.5	4	70.1		
12	122.4	27	27.2	5	77.1		
13	144.6	28	175.8	6	62.2		
14	42.1	29	33.3				
15	36.1	30	24.8				

(*continued*)

References

1. T. Nagao, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **37**(4), 925 (1989)

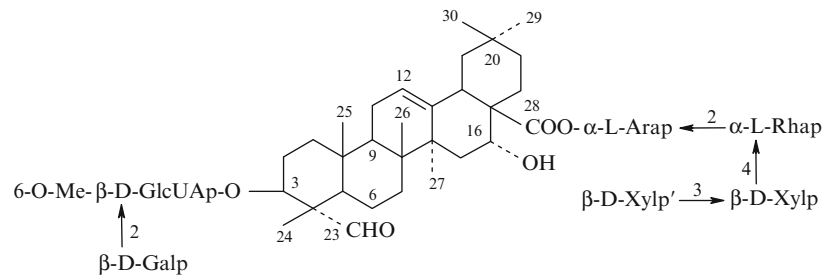
Dubioside C

CAS Registry Number: 122587-97-7

See Figure Dubioside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Thladiantha dubia* [1]



Dubioside C

$C_{64}H_{100}O_{32}$: 1380.619 (Me ester)
Mp: 229–231°C (MeOH) [1]
$[\alpha]_D^{24}$ −27.6° (c 0.80, 70% MeOH) [1]
FAB-MS *m/z*: 1403 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84, 1.02, 1.03, 1.15, 1.41, 1.76 (s, $CH_3 \times 6$), 5.59 (t-like, H-12), 9.89 (s, CHO-23)
β-D-GlcUAp: 4.89 (d, J = 8.0, H-1), 3.72 (s, COOMe)
β-D-Galp: 5.22 (d, J = 7.0, H-1)
α-L-Arap: 6.48 (brs, H-1)
α-L-Rhap: 5.71 (brs, H-1), 1.70 (d, J = 5.0, CH_3-6)
β-D-Xylp: 5.16 (d, J = 7.0, H-1), β-D-Xylp′: 5.22 (d, J = 7.0, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.2	C-16	73.9	GlcUA-1	103.2
2	24.9	17	49.6	6	170.2
3	82.2	18	41.3	$COOCH_3$	52.0
4	55.1	19	47.2	Gal-1	106.0
5	48.5	20	30.9	Ara-1	93.5
6	20.7	21	36.0	Rha-1	101.0
7	32.8	22	32.1	Xyl-1	106.2
8	40.3	23	209.3	Xyl′-1	106.2
9	47.1	24	10.9		
10	36.3	25	15.8		
11	23.8	26	17.5		
12	122.4	27	27.2		
13	144.6	28	175.8		
14	42.1	29	33.3		
15	36.1	30	24.8		

References

1. T. Nagao, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **37**(4), 925 (1989)

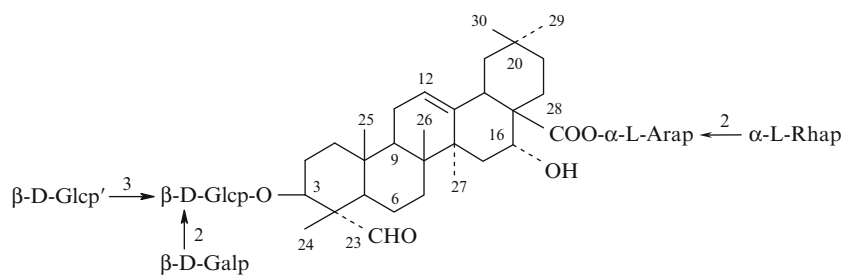
Dubioside D

CAS Registry Number: 128866-15-9
See Figure Dubioside D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid
Biological source: *Thladiantha dubia* [1]
$C_{59}H_{94}O_{28}$: 1250.593
$[\alpha]_D^{24}$ −20.0° (c 1.00, MeOH) [1]
FAB-MS *m/z*: 1273 $(M + Na)^+$, 1249 $(M-H)^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.59 (t-like, H-12), 5.22 (brs, H-16), 6.25 (brs, HO-16), 9.86 (s, CHO-23), 0.83, 1.03, 1.03, 1.14, 1.41, 1.74 (s, $CH_3 \times 6$)
β-D-Glcp: 4.71 (d, J = 8.0, H-1); β-D-Glcp′: 5.25 (d, J = 8.0, H-1)
β-D-Galp: 5.52 (d, J = 8.0, H-1)
α-L-Arap: 6.46 (d, J = 2.0, H-1)
α-L-Rhap: 5.79 (s, H-1), 1.66 (d, J = 6.0, CH_3-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-16	c	Glc-1	103.3
2	25.1	17	49.5	Glc′-1	104.6
3	83.9	18	41.2	Gal-1	104.2
4	55.1	19	47.1	Ara-1	93.6
5	48.4	20	30.9	Rha-1	101.4
6	20.4	21	36.1		
7	32.7	22	32.0		
8	40.3	23	209.8		
9	47.0	24	10.9		
10	36.3	25	15.8		
11	23.7	26	17.4		
12	122.4	27	27.1		

(*continued*)



Dubioside D

Table 1 (continued)

13	144.6	28	175.8
14	42.1	29	33.2
15	36.0	30	24.8

References

1. T. Nagao, R. Tanaka, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **38**(2), 378 (1990)

Dubioside E

CAS Registry Number: 128866-16-0
See Figure Dubioside E
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid
Biological source: *Thladiantha dubia* [1]
$C_{64}H_{102}O_{32}$: 1382.635
$[\alpha]_D^{24}$ −16.9° (c 1.0, MeOH) [1]
FAB-MS *m/z*: 1405 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.59 (t-like, H-12), 5.22 (brs, H-16), 6.25 (brs, OH-16), 9.87 (s, CHO-23), 0.83, 1.02, 1.02, 1.13, 1.44, 1.73 (s, $CH_3 \times 6$)
β-D-Glcp: 4.70 (d, J = 8.0, H-1); β-D-Glcp′: 5.25 (d, J = 8.0, H-1)
β-D-Galp: 5.25 (d, J = 8.0, H-1)
α-L-Arap: 6.41 (d, J = 3.0, H-1)
α-L-Rhap: 5.77 (brs, H-1), 1.71 (d, J = 6.0, H-6)
β-D-Xylp: 5.15 (d, J = 7.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

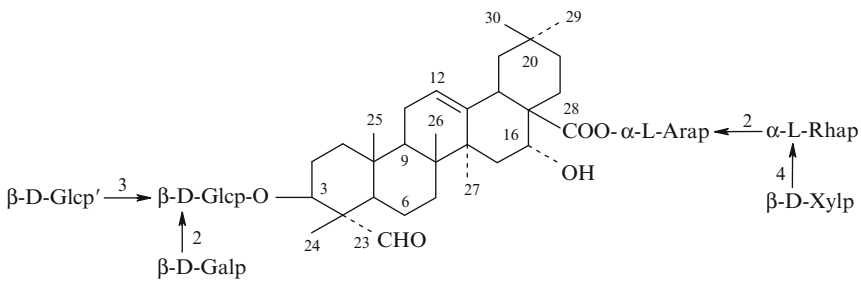
C-1	38.1	C-16	c	Glc-1	103.3
2	25.1	17	49.4	Glc′-1	104.7
3	83.8	18	41.2	Gal-1	104.2
4	55.0	19	47.1	Ara-1	93.6
5	48.4	20	30.8	Rha-1	101.4
6	20.4	21	36.1	Xyl-1	106.7
7	32.7	22	32.0		
8	40.2	23	209.8		
9	47.0	24	11.0		
10	36.2	25	15.7		
11	23.7	26	17.5		
12	122.4	27	27.1		
13	144.5	28	175.8		
14	42.0	29	33.2		
15	36.0	30	24.7		

References

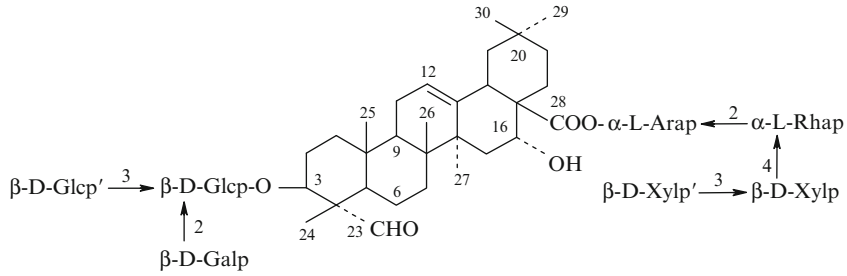
1. T. Nagao, R. Tanaka, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **38**(2), 378 (1990)

Dubioside F

CAS Registry Number: 128887-86-5
See Figure Dubioside F
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid



Dubioside E



Dubioside F

Biological source: *Thladiantha dubia* [1]

$C_{69}H_{110}O_{36}$: 1514.677

$[\alpha]_D^{22}$ −17.3° (c 1.0, MeOH) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.59 (t-like, H-12), 5.20 (brs, H-16), 9.88 (s, CHO-23), 0.82, 1.01, 1.02, 1.14, 1.43, 1.74 (s, $CH_3 \times 6$)

β-D-Glcp: 4.70 (d, J = 8.0, H-1), β-D-Glcp′: 5.25 (d, J = 8.0, H-1)

β-D-Galp: 5.25 (d, J = 8.0, H-1)

α-L-Arap: 6.44 (brs, H-1)

α-L-Rhap: 5.77 (brs, H-1)

β-D-Xylp: 5.18 (d, J = 7.0, H-1); β-D-Xylp′: 5.52 (d, J = 7.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.1	C-16	c	Glc-1	103.3
2	25.1	17	49.5	Glc′-1	104.6
3	83.9	18	41.2	Gal-1	104.2
4	55.1	19	47.0	Ara-1	93.5
5	48.4	20	30.9	Rha-1	100.9
6	20.4	21	35.9	Xyl-1	106.2
7	32.7	22	32.0	Xyl′-1	105.9
8	40.3	23	209.9		
9	47.0	24	11.0		
10	36.2	25	15.8		
11	23.7	26	17.5		
12	122.4	27	27.1		
13	144.5	28	175.8		
14	42.1	29	33.2		
15	36.1	30	24.7		

(*continued*)

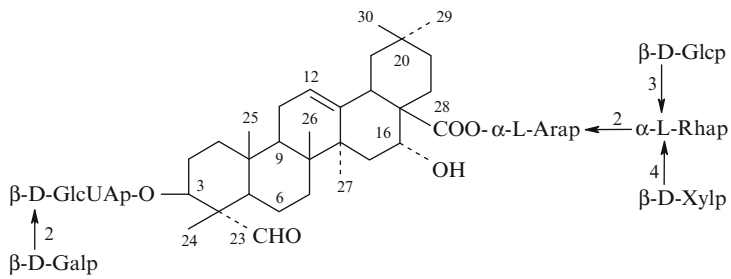
References

1. T. Nagao, R. Tanaka, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **38**, 378 (1990)

Lucyoside N

See Figure Lucyoside N

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid



Lucyoside N

Biological source: *Luffa cylindrica* [1]
$C_{64}H_{100}O_{33}$: 1396.614
Mp: 268–270°C [1]
$[\alpha]_D$ −36.1° (c 2.4, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1725, 1635, 1070, 1040 [1]
FAB-MS *m/z*: 1395 $(M-H)^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.83 (s, CH_3-25), 1.01 (s, CH_3-29), 1.04 (s, CH_3-26), 1.14 (s, CH_3-30), 1.36 (s, CH_3-24), 1.77 (s, CH_3-27), 5.24 (H-16), 5.58 (m, H-12), 9.90 (s, CHO-23)
β-D-GlcUAp: 4.93 (d, J = 7.5, H-1)
β-D-Galp: 5.23 (d, J = 7.0, H-1)
α-L-Arap: 6.45 (d, J = 3.0, H-1)
α-L-Rhap: 5.52 (d, J = 8.0, H-1), 1.73 (d, J = 5.3, CH_3-6)
β-D-Xylp: 5.20 (d, J = 7.0, H-1)
β-D-Glcp: 5.42 (d, J = 8, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.3	C-16	74.6	GlcUA-1	103.4	Rha-1	101.1
2	25.1	17	49.6	2	83.5	2	71.7
3	82.6	18	41.4	3	77.5	3	82.8
4	55.2	19	47.3	4	73.0	4	79.0
5	48.6	20	31.1	5	77.7	5	68.9
6	20.6	21	36.3	6	172.5	6	18.8
7	33.0	22	32.2	Gal-1	106.5	Xyl-1	105.2
8	40.4	23	209.5	2	74.6	2	75.5
9	47.2	24	11.1	3	74.9	3	78.4
10	36.4	25	16.0	4	70.2	4	71.3
11	23.9	26	17.7	5	77.2	5	67.3
12	122.6	27	27.4	6	62.2	Glc-1	105.3
13	144.6	28	175.9	Ara-1	93.8	2	75.5
14	42.2	29	33.4	2	75.7	3	78.4
15	36.2	30	24.9	3	69.6	4	71.3
				4	66.1	5	78.1
				5	63.1	6	62.7

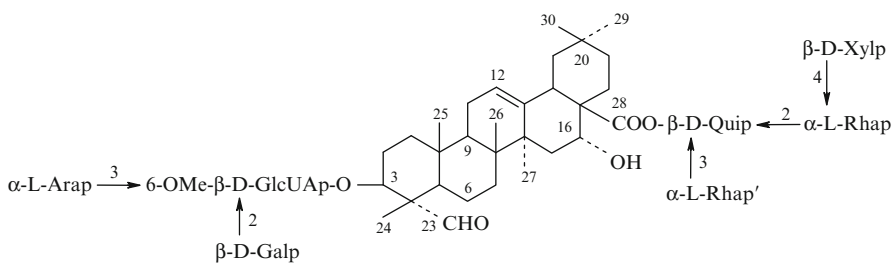
Pharm./Biol.: Fibrinolytic activity [1]

References

1. K. Yoshikawa, S. Arihara, J.D. Wang, T. Narui, T. Okuyama, Chem. Pharm. Bull. **39**(5), 1185 (1991)

Luperoside K

See Figure Luperoside K
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid
Biological source: *Luffa operculata* [1]
$C_{71}H_{112}O_{36}$: 1540.693
Mp: 242–244°C (EtOH) [1]
$[\alpha]_D^{28}$ −18.2° (c 1.30, 80 %MeOH) [1]
FAB-MS *m/z*: 1563 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, Me ester): 0.82, 0.98, 1.01, 1.12, 1.42, 1.71 (s, CH_3-25, 29, 26, 30, 24, 27), 5.53 (t-like, H-12), 9.88 (s, CHO-23)
β-D-GlcUAp: 4.84 (d, J = 7.0, H-1), 3.74 (s, COOMe-6)
α-L-Arap: 5.47 (d, J = 7.0, H-1)
β-D-Galp: 5.18 (d, J = 7.0, H-1)
β-D-Quip: 6.22 (d, J = 6.0, H-1), 1.69 (d, J = 5.0, CH_3-6)
α-L-Rhap: 5.67 (brs, H-1), 1.54 (d, J = 6.0, CH_3-6)
β-D-Xylp: 5.14 (d, J = 8.0, H-1)
α-L-Rhap′: 5.77 (brs, H-1), 1.61 (d, J = 6.0, CH_3-6) [1]



Luperoside K

^{13}C NMR (Me ester): [1]

Table 1

C-1	38.1	C-16	-	GlcUA-1	103.8
2	25.2	17	49.2	$\underline{C}OOCH_3$	169.8
3	84.3	18	41.5	$COO\underline{C}H_3$	52.1
4	55.0	19	47.2	Ara-1	104.2
5	48.8	20	30.8	Gal-1	106.8
6	20.5	21	36.0	Qui-1	94.1
7	32.8	22	31.8	6	18.7
8	40.3	23	209.8	Rha-1	101.9
9	46.9	24	11.1	6	18.4
10	36.2	25	15.7	Xyl-1	105.0
11	23.7	26	17.5	Rha′-1	100.9
12	122.2	27	27.0	6	18.4
13	144.4	28	175.9		
14	42.0	29	33.1		
15	35.8	30	24.7		

References

1. H. Okabe, T. Nagao, S. Hachiyama, T. Yamauchi, Chem. Pharm. Bull. **37**(4), 895 (1989)

Luperoside L

See Figure Luperoside L

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Luffa operculata* [1]

$C_{76}H_{120}O_{40}$: 1672.735

Mp: 246–248°C (EtOH) [1]

$[\alpha]_D^{28}$ −21.6° (c 1.40,70% MeOH) [1]

FAB-MS *m/z*: 1695 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, Me ester): 0.83, 0.98, 1.01, 1.13, 1.42, 1.72 (s, CH_3-25, 29, 26, 30, 24, 27), 5.54 (t-like, H-12), 9.89 (s, CHO-23)

β-D-GlcUAp: 4.83 (d, J = 7.0, H-1), 3.74 (s, CH_3-6)

α-L-Arap: 5.47 (d, J = 7.0, H-1)

β-D-Galp: 5.18 (d, H-1)

β-D-Quip: 6.22 (d, J = 5.0, H-1), 1.65 (d, J = 6.0, CH_3-6)

α-L-Rhap: 5.66 (brs, H-1), 1.54 (d, J = 6.0, CH_3-6)

β-D-Xylp: 5.15 (d, H-1)

β-D-Xylp: 5.22 (d, H-1)

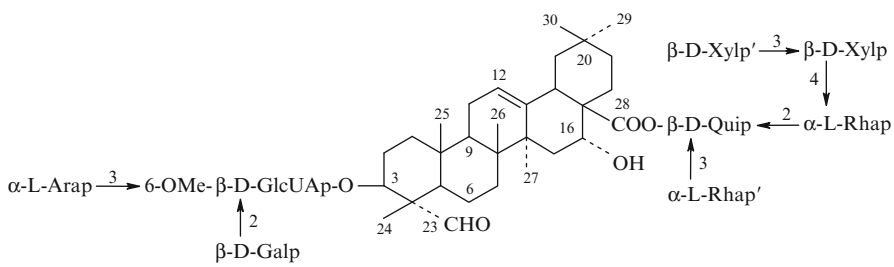
α-L-Rhap′: 5.73 (brs, H-1), 1.61 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (Me ester): [1]

Table 1

C-1	38.1	C-16	-	GlcUA-1	103.8
2	25.2	17	49.2	$\underline{C}OOCH_3$	169.8
3	84.3	18	41.5	$COO\underline{C}H_3$	52.1
4	55.0	19	47.2	Ara-1	104.1
5	48.8	20	30.8	Gal-1	106.2
6	20.5	21	36.0	Qui-1	94.1
7	32.8	22	31.8	6	18.7
8	40.3	23	209.8	Rha-1	101.8
9	46.9	24	11.1	6	18.4
10	36.2	25	15.7	Xyl-1	105.0
11	23.7	26	17.5	Xyl′-1	105.8
12	122.2	27	27.0	Rha′-1	101.1
13	144.4	28	175.9	6	18.4

(*continued*)



Luperoside L

Table 1 (continued)

14	42.0	29	33.1
15	35.8	30	24.7

References

1. H. Okabe, T. Nagao, S. Hachiyama, T. Yamauchi, Chem. Pharm. Bull. **37**(4), 895 (1989)

Momordicasaponin II

CAS Registry Number: 96552-96-4

See Figure Momordicasaponin II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Momordica cochinchinensis* [1]

$C_{76}H_{120}O_{41}$: 1688.730

Mp: 252–255°C [1]

$[\alpha]_D^{19}$ −28.5° (c 0.67, MeOH–H_2O (1:1)) [1]

IR (KBr) ν_{max} cm^{-1}: 3600–3300, 2850, 1730, 1610, 1200–1100 [1]

References

1. M. Iwamoto, H. Okabe, T. Yamauchi, M. Tanaka, Y. Rokutani, S. Hara, K. Mihashi, R. Higuchi, Chem. Pharm. Bull. **33**(2), 464 (1985)

Sinocrassuloside VI

See Figure Sinocrassuloside VI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{71}H_{102}O_{31}$: 1450.640

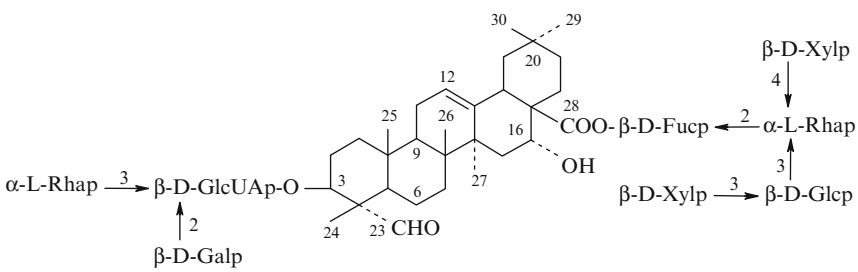
$[\alpha]_D^{26}$ + 18.4° (c 0.076, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3448, 2964, 1685, 1512, 1434, 1207, 1076, 802, 725, 521, 451, 420 [1]

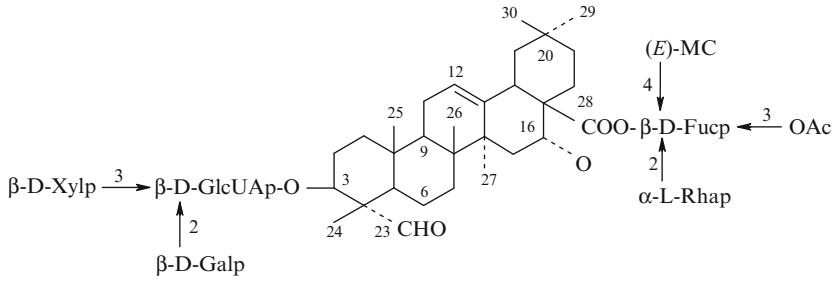
FAB-MS *m/z*: 1451 $[M + H]^+$ [1]

HR-FAB-MS *m/z*: 1473.6299 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.83, 1.36 (H_2-1), 1.80, 2.08 (d, J = 9.0, H_2-2), 3.95 (t, J = 9.0, H-3), 1.35 (H-5), 0.89, 1.36 (H_2-6), 1.50 (H-7), 1.77 (H-9), 1.90 (H-11), 5.58 (brs, H-12), 1.90, 2.18 (H_2-15), 5.21 (brs, H-16), 3.39 (d, J = 14.0, H-18), 2.74 (t, J = 14.0, H-19), 1.34 (H-19), 1.30, 2.40 (H_2-21), 2.21, 2.39 (H_2-22), 9.85 (s, H-23), 1.40 (s, CH_3-24), 0.81 (s, CH_3-25), 1.05 (s, CH_3-26), 1.75 (s, CH_3-27), 0.95 (s, CH_3-29), 1.00 (s, CH_3-30); β-D-GlcUAp: 4.88 (d, J = 9.0, H-1), 4.36 (t, J = 9.0, H-2), 4.28 (t, J = 9.0, H-3), 4.44 (H-4), 4.51 (H-5); β-D-Galp: 5.55 (d, J = 7.6, H-1), 4.46 (H-2), 4.14 (dd, J = 9.8, 3.4, H-3), 4.57 (H-4), 4.02 (H-5), 4.42, 4.51 (H_2-6); β-D-Xylp: 5.32 (d, J = 8.0, H-1), 3.95 (t, J = 8.0, H-2), 4.08 (H-3), 4.10 (H-4), 3.63, 4.22 (H_2-5); β-D-Fucp: 6.18 (d, J = 9.0, H-1), 4.71 (t, J = 9.0, H-2), 5.68 (dd, J = 9.0, 4.0, H-3), 5.76 (H-4), 4.20 (H-5), 1.24 (d, J = 6.0, CH_3-6); α-L-Rhap: 5.76 (s, H-1), 4.52 (H-2), 4.36 (H-3), 4.23 (H-4), 4.40 (H-5), 1.64 (d, J = 6.5, CH_3-6), 2.01 (OAc); para-methoxycinnamoyl group (MC): 6.60 (d, J =



Momordicasaponin II



Sinocrassuloside VI

15.5, H-2), 7.95 (d, J = 15.5, H-3), 7.53 (d, J = 9.0, H-5,9), 7.01 (d, J = 9.0, H-6,8), 3.67 (s, p-OCH_3) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-11	23.8	C-21	36.0
2	25.2	12	122.2	22	32.8
3	84.4	13	144.4	23	209.8
4	55.1	14	42.2	24	11.0
5	48.6	15	36.3	25	15.8
6	20.5	16	73.9	26	17.4
7	32.8	17	48.8	27	27.0
8	40.4	18	41.6	28	175.8
9	47.0	19	47.4	29	33.1
10	36.2	20	30.8	30	24.5

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

GlcUA-1	103.9	Fuc-1	94.3	(E)-MC-1	167.2
2	78.6	2	72.5	2	115.2
3	86.1	3	75.0	3	146.1
4	71.3	4	71.2	4	127.3
5	77.3	5	70.6	5	130.6
6	nd	6	16.2	6	114.8
Gal-1	104.3	Rha-1	102.3	7	162.2
2	73.8	2	72.0	p-OCH_3	55.3
3	75.6	3	72.3		
4	70.4	4	73.6		
5	76.8	5	70.8		
6	61.7	6	18.8		
Xyl-1	105.0	Ac-1	170.1		
2	75.3	2	20.7		
3	78.6				
4	70.8				
5	67.4				

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Sinocrassuloside VII

See Figure Sinocrassuloside VII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{71}H_{102}O_{31}$: 1450.640

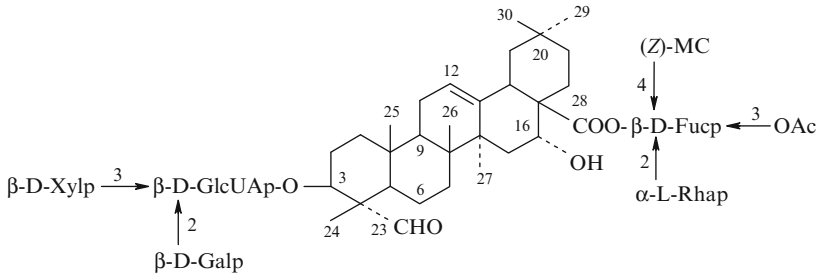
$[\alpha]_D^{26}$ + 8.3° (c 0.004, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3448, 2924, 1720, 1512, 1149, 1041, 706, 521, 420 [1]

FAB-MS *m/z*: 1451 $[M + H]^+$ [1]

HR-FAB-MS *m/z*: 1451.6462 $[M + H]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.84, 1.36 (H_2-1), 1.80, 2.08 (H_2-2), 3.95 (H-3), 1.35 (H-5), 0.89, 1.36 (H_2-6), 1.51 (H-7), 1.77 (H-9), 1.90 (H-11), 5.57 (brs, H-12), 1.89, 2.17 (H_2-15), 5.19 (brs, H-16), 3.38 (H-18), 2.75 (t, J = 13.2, H-19), 1.34 (H-19), 1.32, 2.41 (H_2-21), 2.20, 2.38 (H_2-22), 9.86



Sinocrassuloside VII

(s, H-23), 1.41 (s, CH_3-24), 0.85 (s, CH_3-25), 1.06 (s, CH_3-26), 1.77 (s, CH_3-27), 0.97 (s, CH_3-29), 1.02 (s, CH_3-30)

β-D-GlcUAp: 4.88 (d, J = 7.1, H-1), 4.35 (H-2), 4.27 (H-3), 4.44 (H-4), 4.50 (H-5)

β-D-Galp: 5.55 (d, J = 7.8, H-1), 4.45 (H-2), 4.14 (dd, J = 9.8, 3.4, H-3), 4.57 (H-4), 4.02 (H-5), 4.40, 4.50 (H_2-6)

β-D-Xylp: 5.31 (d, J = 7.8, H-1), 3.93 (t, J = 7.8, H-2), 4.08 (H-3), 4.10 (H-4), 3.63, 4.21 (H_2-5)

β-D-Fucp: 6.14 (d, J = 9.0, H-1), 4.62 (t, J = 9.0, H-2), 5.66 (dd, J = 9.0, 4.0, H-3), 5.76 (H-4), 4.21 (H-5), 1.21 (d, J = 6.3, CH_3-6)

α-L-Rhap: 5.74 (s, H-1), 4.53 (H-2), 4.36 (H-3), 4.23 (H-4), 4.40 (H-5), 1.64 (d, J = 5.8, CH_3-6), 2.00 (OAc)

para-methoxycinnamoyl group (MC): 5.93 (d, J = 12.9, H-2), 6.97 (d, J = 12.9, H-3), 7.98 (d, J = 8.3, H-5,9), 6.97 (d, J = 8.3, H-6,8), 3.66 (s, p-OCH_3) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-11	23.8	C-21	36.0
2	25.2	12	122.2	22	32.7
3	84.4	13	144.3	23	209.7
4	55.1	14	42.2	24	11.0
5	48.5	15	36.3	25	15.8
6	20.5	16	73.9	26	17.4
7	32.7	17	48.5	27	27.0
8	40.3	18	41.5	28	175.7
9	47.0	19	47.5	29	33.2
10	36.3	20	30.7	30	24.5

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

GlcUA-1	103.9	Rha-1	102.3
2	78.6	2	71.9
3	86.0	3	72.2
4	71.1	4	73.6
5	77.3	5	70.8
6	nd	6	18.8
Gal-1	104.3	Ac-1	170.1
2	73.7	2	20.7
3	75.6	(Z)-MC-1	166.3
4	70.4	2	116.0
5	76.8	3	145.0
6	61.7	4	127.7
Xyl-1	105.0	5	133.2
2	75.3	6	114.1
3	78.6	7	161.3
4	70.8	p-OCH_3	55.3
5	67.3		
Fuc-1	94.3		
2	72.4		
3	74.9		
4	71.2		
5	70.2		
6	16.1		

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shangha, 1977), p. 400

Sinocrassuloside VIII

See Figure Sinocrassuloside VIII

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{72}H_{104}O_{31}$: 1464.656

$[\alpha]_D^{26}$ + 12.1° (c 0.022, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3448, 2935, 1736, 1627, 1512, 1462, 1396, 1265, 1153, 1080, 517 [1]

FAB-MS *m/z*: 1487 $[M + Na]^+$ [1]

HR-FAB-MS *m/z*: 1487.6488 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.36 (H_2-1), 1.79, 2.02 (H_2-2), 4.09 (H-3), 1.35 (H-5), 0.89, 1.36 (H_2-6), 1.51 (H-7), 1.78 (H-9), 1.90 (H-11), 5.60 (brs, H-12), 1.94, 2.19 (H_2-15), 5.22 (brs, H-16), 3.40 (d, J = 14.0, H-18), 2.75 (t, J = 14.0, H-19), 1.36 (H-19), 1.31, 2.41 (H_2-21), 2.22, 2.40 (H_2-22), 9.85 (s, H-23), 1.39 (s, CH_3-24), 0.84 (s, CH_3-25), 1.07 (s, CH_3-26), 1.79 (s, CH_3-27), 0.97 (s, CH_3-29), 1.02 (s, CH_3-30)

β-D-GlcUAp: 4.86 (d, J = 7.1, H-1), 4.36 (H-2), 4.29 (H-3), 4.24 (H-4), 4.39 (H-5)

β-D-Galp: 5.54 (d, J = 7.8, H-1), 4.47 (H-2), 4.14 (dd, J = 9.8, 3.2, H-3), 4.56 (H-4), 4.02 (H-5), 4.41, 4.51 (H_2-6)

β-D-Xylp: 5.28 (d, J = 7.8, H-1), 3.93 (t, J = 7.8, H-2), 4.08 (H-3), 4.10 (H-4), 3.64, 4.21 (H_2-5)

β-D-Fucp: 6.18 (d, J = 9.0, H-1), 4.71 (t, J = 9.0, H-2), 5.68 (dd, J = 9.0, 2.7, H-3), 5.75 (H-4), 4.20 (H-5), 1.24 (d, J = 5.8, CH_3-6)

α-L-Rhap: 5.77 (s, H-1), 4.54 (H-2), 4.36 (H-3), 4.24 (H-4), 4.41 (H-5), 1.64 (d, J = 6.1, H-6), 2.02 (OAc)

para-methoxycinnamoyl group (MC): 6.60 (d, J = 16.1, H-2), 7.96 (d, J = 16.1, H-3), 7.54 (d, J = 7.8, H&-5), 7.02 (d, J = 7.8, H&-6), 3.69 (s, p-OCH_3), 3.72 (s, OCH_3-6′) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

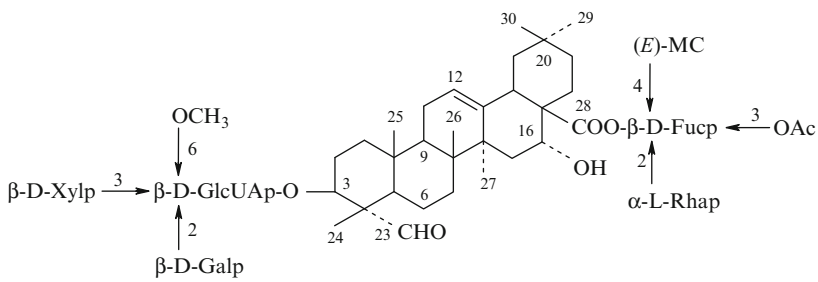
C-1	38.1	C-11	23.7	C-21	35.9
2	25.1	12	122.2	22	32.7
3	84.4	13	144.4	23	209.8
4	55.0	14	42.1	24	11.0
5	48.6	15	36.2	25	15.8
6	20.5	16	73.8	26	17.3
7	32.7	17	48.6	27	27.0
8	40.3	18	41.5	28	175.8
9	46.9	19	47.4	29	33.1
10	36.2	20	30.7	30	24.5

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

GlcUA-1	103.9	Rha-1	102.2
2	78.5	2	71.9
3	85.6	3	72.2
4	71.1	4	73.6
5	76.4	5	70.8
6	169.9	6	18.8
Gal-1	104.3	Ac-1	170.1
2	73.7	2	20.6
3	75.5	(E)-MC-1	167.2
4	70.2	2	115.2
5	76.8	3	146.0
6	61.7	4	127.3

(*continued*)



Sinocrassuloside VIII

Table 2 (continued)

Xyl-1	104.9	5	130.6
2	75.2	6	114.8
3	78.5	7	162.2
4	70.8	p-OCH_3	55.4
5	67.3	6′-OCH_3	52.2
Fuc-1	94.3		
2	72.4		
3	74.9		
4	71.1		
5	70.2		
6	16.1		

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Sinocrassuloside IX

See Figure Sinocrassuloside IX

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{72}H_{104}O_{31}$: 1464.656

$[\alpha]_D^{26}$ + 37.5° (c 0.016, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3448, 2935, 1735, 1627, 1511, 1461, 1396, 1265, 1153, 1079, 516 [1]

FAB-MS *m/z*: 1487 $[M + Na]^+$ [1]

HR-FAB-MS *m/z*: 1487.6462 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.37 (H_2-1), 1.80, 2.02 (H_2-2), 4.09 (H-3), 1.36 (H-5), 0.90, 1.37 (H_2-6), 1.51 (H-7), 1.77 (H-9), 1.91 (H-11), 5.58 (brs, H-12), 1.92, 2.19 (H_2-15), 5.19 (brs, H-16), 3.40 (H-18), 2.75 (t, J = 13.7, H-19), 1.37 (H-19), 1.32, 2.41 (H_2-21), 2.20, 2.38 (H_2-22), 9.85 (s, H-23), 1.40 (s, CH_3-24), 0.87 (s, CH_3-25), 1.07 (s, CH_3-26), 1.76 (s, CH_3-27), 0.98 (s, CH_3-29), 1.03 (s, CH_3-30)

β-D-GlcUAp: 4.86 (d, J = 7.3, H-1), 4.35 (H-2), 4.27 (H-3), 4.24 (H-4), 4.39 (H-5)

β-D-Galp: 5.52 (d, J = 7.8, H-1), 4.46 (H-2), 4.14 (dd, J = 10.0, 3.2, H-3), 4.56 (H-4), 4.02 (H-5), 4.41, 4.50 (H_2-6)

β-D-Xylp: 5.28 (d, J = 8.0, H-1), 3.93 (t, J = 8.0, H-2), 4.07 (H-3), 4.09 (H-4), 3.63, 4.21 (H_2-5)

β-D-Fucp: 6.14 (d, J = 9.0, H-1), 4.62 (t, J = 9.0, H-2), 5.66 (dd, J = 9.0, 3.2, H-3), 5.76 (H-4), 4.21 (H-5), 1.21 (d, J = 6.4, CH_3-6)

α-L-Rhap: 5.74 (s, H-1), 4.53 (H-2), 4.35 (H-3), 4.23 (H-4), 4.41 (H-5), 1.64 (d, J = 6.1, CH_3-6), 2.00 (OAc)

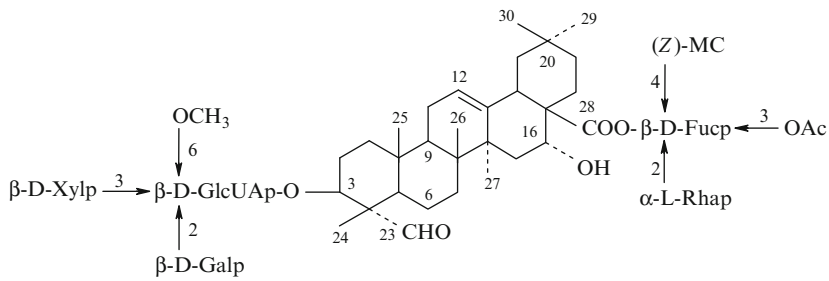
para-methoxycinnamoyl group (MC): 5.94 (d, J = 12.9, H-2), 6.96 (d, J = 12.9, H-3), 7.97 (d, J = 8.3, H-5,9), 6.97 (d, J = 8.3, H-6,8), 3.66 (s, p-OCH_3), 3.72 (s, OCH_3-6′) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-11	23.8	C-21	36.0
2	25.2	12	122.2	22	32.8

(*continued*)



Sinocrassuloside IX

Table 1 (continued)

3	84.4	13	144.5	23	209.8
4	55.1	14	42.2	24	11.0
5	48.7	15	36.3	25	15.8
6	20.5	16	73.9	26	17.4
7	32.8	17	48.7	27	27.0
8	40.4	18	41.6	28	175.8
9	47.0	19	47.5	29	33.2
10	36.3	20	30.8	30	24.5

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

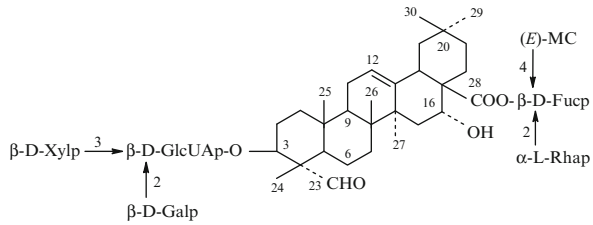
GlcUA-1	103.8	Rha-1	102.3
2	78.5	2	71.9
3	85.7	3	72.2
4	71.1	4	73.6
5	76.4	5	70.8
6	169.9	6	18.8
Gal-1	104.3	Ac-1	170.1
2	73.7	2	20.7
3	75.5	(E)-MC-1	166.3
4	70.2	2	116.0
5	76.8	3	145.2
6	61.8	4	127.7
Xyl-1	105.0	5	133.2
2	75.3	6	114.1
3	78.6	7	161.3
4	70.8	p-OCH_3	55.3
5	67.3	6′-OCH_3	52.2
Fuc-1	94.3		
2	72.4		
3	74.9		
4	71.1		
5	70.2		
6	16.1		

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Sinocrassuloside X



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{69}H_{100}O_{30}$: 1408.629

$[\alpha]_D^{26}$ + 38.5° (c 0.026, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3421, 2935, 1735, 1635, 1511, 1253, I157, 1041, 516 [1]

FAB-MS *m/z*: 1409 $[M + H]^+$ [1]

HR-FAB-MS *m/z*: 1409.6387 $[M + H]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.38 (H_2-1), 1.80, 2.10 (H_2-2), 3.93 (H-3), 1.31 (H-5), 0.87, 1.32 (H_2-6), 1.53 (H-7), 1.80 (H-9), 1.91 (H-11), 5.56 (brs, H-12), 1.92, 2.20 (H_2-15), 5.28 (brs, H-16), 3.39 (H-18), 2.74 (t, J = 12.4, H-19), 1.33 (H-19), 1.28, 2.41 (H_2-21), 2.20, 2.40 (H_2-22), 9.82 (s, H-23), 1.37 (s, CH_3-24), 0.80 (s, CH_3-25), 1.06 (s, CH_3-26), 1.75 (s, CH_3-27), 0.95 (s, s, CH_3-29), 0.99 (s, CH_3-30)

β-D-GlcUAp: 4.86 (d, J = 7.3, H-1), 4.32 (H-2), 4.23 (H-3), 4.41 (H-4), 4.48 (H-5)

β-D-Galp: 5.52 (d, J = 7.3, H-1), 4.46 (H-2), 4.14 (H-3), 4.57 (H-4), 4.01 (H-5), 4.40, 4.50 (H_2-6)

β-D-Xylp: 5.28 (d, J = 7.5, H-1), 3.93 (H-2), 4.08 (H-3), 4.10 (H-4), 3.63, 4.21 (H_2-5);

β-D-Fucp: 6.09 (d, J = 8.8, H-1), 4.75 (t, J = 8.8, H-2), 4.45 (H-3), 5.71 (H-4), 4.11 (H-5), 1.26 (d, J = 5.8, CH_3-6)

α-L-Rhap: 5.71 (s, H-1), 4.52 (H-2), 4.78 (H-3), 4.28 (H-4), 4.56 (H-5), 1.68 (d, J = 5.8, CH_3-6)

para-methoxycinnamoyl group (MC): 6.45 (d, J = 16.1, H-2), 7.86 (d, J = 16.1, H-3), 7.35 (d, J = 8.5, H-5,9), 6.96 (d, J = 8.5, H-6,8), 3.66 (s, p-OCH_3) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.1	C-11	23.7	C-21	36.0
2	25.2	12	122.0	22	32.7
3	84.3	13	145.1	23	209.7
4	55.1	14	42.2	24	10.9
5	48.5	15	36.2	25	15.8
6	20.5	16	73.9	26	17.3
7	32.7	17	48.5	27	26.9
8	40.3	18	41.6	28	176.0
9	47.0	19	47.5	29	33.1
10	36.2	20	30.7	30	24.5

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

GlcUA-1	103.7	Rha-1	101.9
2	78.6	2	72.2
3	86.0	3	72.3
4	71.3	4	73.8
5	77.3	5	70.0
6	nd	6	18.8
Gal-1	104.2	(E)-MC-1	167.6
2	73.6	2	116.1
3	75.3	3	145.1
4	70.2	4	127.4
5	76.6	5	130.3
6	61.7	6	114.7
Xyl-1	104.9	7	161.9
2	75.2	p-OCH_3	55.3
3	78.5		
4	70.7		
5	67.3		
Fuc-1	94.8		
2	73.6		
3	74.5		
4	74.7		
5	70.9		
6	16.6		

Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Sinocrassuloside XI

See Figure Sinocrassuloside XI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Quillaic Acid

Biological source: *Sinocrassula asclepiadea* [1]

$C_{72}H_{112}O_{38}$: 1584.683

$[\alpha]_D^{26}$ + 3.5° (c 0.019, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3425, 2927, 1735, 1377, 1045, 710, 521, 444 [1]

FAB-MS *m/z*: 1607 $[M + Na]^+$ [1]

HR-FAB-MS *m/z*: 1585.6886 $[M + H]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.80, 1.40 (H_2-1), 1.80, 2.10 (H_2-2), 4.02 (H-3), 1.28 (H-5), 0.90, 1.37 (H_2-6), 1.48 (H-7), 1.78 (H-9), 1.91 (H-11), 5.55 (brs, H-12), 1.99, 2.18 (H_2-15), 5.21 (H-16), 3.32 (dd, J = 13.9, 3.9, H-18), 2.70, 1.30 (H-19), 1.25, 2.40 (H_2-21), 2.12, 2.38 (H_2-22), 9.85 (s, H-23), 1.41 (s, CH_3-24), 0.78 (s, CH_3-25), 1.03 (s, CH_3-26), 1.71 (s, CH_3-27), 0.92 (s, CH_3-29), 0.94 (s, CH_3-30)

β-D-GlcUAp: 4.87 (d, J = 8.0, H-1), 4.35 (t, J = 8.0, H-2), 4.26 (H-3), 4.43 (H-4), 4.47 (H-5)

β-D-Galp: 5.54 (d, J = 6.4, H-1), 4.47 (H-2), 4.15 (H-3), 4.57 (H-4), 4.02 (H-5), 4.42, 4.52 (H_2-6)

β-D-Xylp: 5.31 (d, J = 8.0, H-1), 3.94 (t, J = 8.0, H-2), 4.06 (H-3), 4.07 (H-4), 3.64 (t, J = 12.0, H-5), 4.25 (H-5)

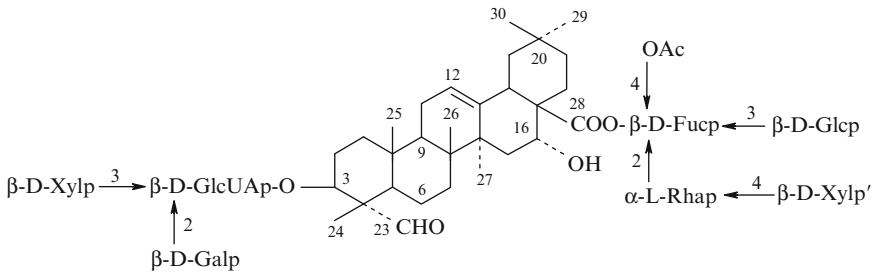
β-D-Fucp: 6.00 (d, J = 8.3, H-1), 4.65 (H-2), 4.40 (H-3), 5.86 (d, J = 3.7, H-4), 4.50 (H-5), 1.15 (d, J = 6.4, CH_3-6)

α-L-Rhap: 6.55 (s, H-1), 4.73 (s, H-2), 4.65 (H-3), 4.41 (H-4), 4.52 (H-5), 1.70 (d-like, CH_3-6)

β-D-Glcp: 5.04 (d, J = 7.6, H-1), 3.94 (H-2), 4.14 (H-3), 4.04 (H-4), 3.86 (H-5), 4.25, 4.43 (H_2-6)

β-D-Xylp′: 5.24 (d, J = 7.8, H-1), 3.99 (H-2), 4.07 (H-3), 4.13 (H-4), 3.41 (t, J = 9.0, H-5), 4.23 (H-5), 1.90 (OAc) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]



Sinocrassuloside XI

Table 1

C-1	38.1	C-11	23.7	C-21	36.0
2	25.2	12	122.0	22	31.9
3	84.2	13	144.6	23	209.8
4	55.1	14	42.1	24	11.1
5	48.6	15	36.2	25	15.8
6	20.6	16	73.9	26	17.4
7	32.8	17	49.3	27	27.0
8	40.2	18	41.6	28	175.9
9	46.9	19	47.5	29	33.1
10	36.2	20	30.7	30	24.4

^{13}C NMR (100 MHz, C_5D_5N) (sugar part): [1]

Table 2

GlcUA-1	103.9	Rha-1	100.9
2	78.7	2	72.0
3	86.0	3	72.3
4	71.4	4	82.4
5	77.3	5	68.5
6	nd	6	18.6
Gal-1	104.3	Glc-1	105.6
2	73.8	2	75.0
3	75.4	3	78.5
4	70.2	4	70.6
5	76.7	5	78.3
6	61.7	6	62.7
Xyl-1	105.0	Xyl′-1	106.3
2	75.3	2	76.1
3	78.5	3	78.5
4	70.8	4	71.0
5	67.3	5	67.3
Fuc-1	94.5	Ac-1	171.3
2	72.3	2	20.8
3	83.1		
4	74.3		
5	70.6		
6	16.5		

(*continued*)

Table 2 (continued)

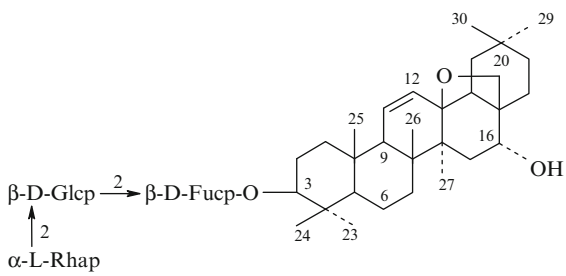
Pharm./Biol.: The roots of this plant are used as an analgesic for the treatment of rheumatic arthritis, stomachache, and fracture in traditional Chinese medicins [2]

References

1. J. Zhao, N. Nakamura, M. Hattori, X.-W. Yang, K. Komatsu, M.-H. Qiu, Chem. Pharm. Bull. **52**(2), 230 (2004)
2. Jiangsu New Medicinal College, *Dictionary of Chinese Materia Medica* (Shanghai Scientific and Technological Publisher, Shanghai, 1977), p. 400

Rotundioside F

CAS Registry Number: 73542-81-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Rotundiogenin A
Biological source: *Bupleurum rotundifolium* [1]
$C_{48}H_{78}O_{16}$: 910.528
Mp: 253–256°C (MeOH–H_2O) [1]
$[\alpha]_D^{20}$ + 6.1 (c 0.66, MeOH) [1]
^{1}H NMR (J/Hz, C_5D_5N): 6.00 (d, J = 12.0, H-11), 5.64 (d, J = 12.0, H-12), 3.58, 3.30 (ABq, J = 7.0, H_2-28)
β-D-Fucp: 4.03 (d, J = 8.0, H-1)
β-D-Glcp: 4.51 (d, J = 7.0, H-1)
α-L-Rhap: 6.32 (brs, H-1) [1]
^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

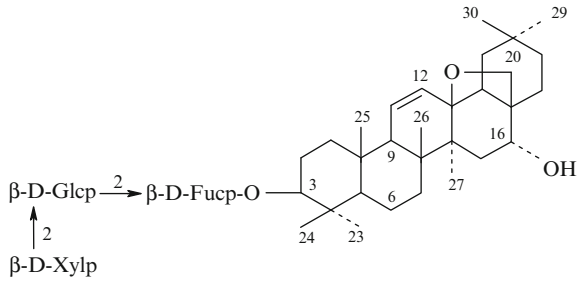
C-1	39.0	C-16	77.7	Fuc-1	105.7
2	26.9	17	45.7	2	78.4
3	89.9	18	51.8	3	76.6
4	40.4	19	39.0	4	72.9
5	55.9	20	31.8	5	71.2
6	18.3	21	36.8	6	17.8
7	32.4	22	31.8	Glc-1	102.3
8	42.3	23	28.5	2	79.8
9	53.3	24	16.6	3	77.7
10	36.8	25	18.7	4	72.9
11	132.4	26	19.4	5	77.7
12	132.4	27	18.3	6	63.7
13	85.3	28	77.7	Rha-1	102.5
14	44.0	29	34.2	2	72.9
15	36.8	30	24.9	3	72.9
				4	74.7
				5	69.9
				6	18.7

References

1. Y. Kobayashi, T. Takeda, Y. Ogihara, Chem. Pharm. Bull. **29**(8), 2222 (1981)

Rotundioside G

CAS Registry Number: 100665-39-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Rotundiogenin A
Biological source: *Bupleurum rotundifolium* [1]
$C_{47}H_{76}O_{16}$: 896.513
Mp: 192–195°C (MeOH–H_2O) [1]
$[\alpha]_D^{21}$ + 11.2° (c 0.8) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 5.73 (d, H-12), 5.98 (d, J = 11.0, H-11)
β-D-Fucp: 4.03 (d, J = 8.0, H-1)
β-D-Glcp: 4.42 (d, J = 8.0, H-1)
β-D-Xylp: 4.74 (d, J = 8.0, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.4	C-16	77.1	Fuc-1	104.9	Xyl-1	106.1
2	26.4	17	45.3	2	79.4	2	75.4
3	89.2	18	51.2	3	75.4	3	77.6
4	39.8	19	38.4	4	72.4	4	71.1
5	55.4	20	31.8	5	70.5	5	67.1
6	18.2	21	35.2	6	17.2		
7	31.8	22	31.8	Glc-1	102.6		
8	41.8	23	27.7	2	84.3		
9	52.8	24	16.1	3	77.1		
10	36.3	25	18.7	4	71.5		
11	131.8	26	19.4	5	77.6		

(*continued*)

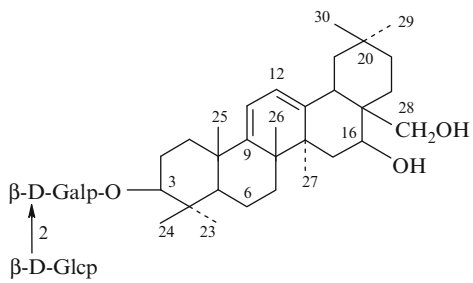
Table 1 (continued)

12	131.8	27	18.2	6	62.7
13	85.0	28	77.6		
14	43.5	29	33.7		
15	36.3	30	24.4		

References

1. E. Akai, T. Takeda, Y. Kobayashi, Y. Chen, Y. Ogihara, Chem. Pharm. Bull. **33**(11), 4685 (1985)

Corchorusin D_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Saikogenin B
Biological source: *Corchorus acutangulus* [1]
$C_{42}H_{68}O_8$: 700.491
Mp: 234–236°C (dec. MeOH) [1]
$[\alpha]_D$ + 176° (c 0.19, MeOH) [1]
UV λ_{max} nm (ε): 280 (8100) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

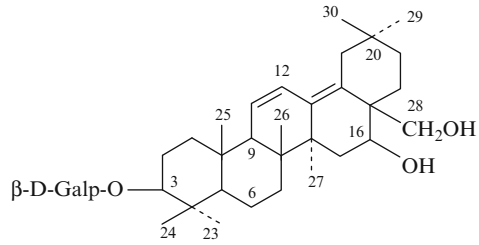
Table 1

C-1	37.7	C-16	67.1	Gal-1	105.5
2	27.1	17	40.5	2	81.4
3	88.9	18	42.3	3	71.8
4	39.7	19	47.1	4	69.8
5	52.0	20	31.0	5	76.5
6	18.4	21	34.2	6	62.1
7	33.2	22	26.1	Glc-1	105.1
8	43.2	23	28.4	2	75.2
9	154.9	24	16.8	3	77.9
10	38.4	25	21.0	4	71.8
11	116.0	26	21.4	5	77.6
12	121.2	27	25.4	6	62.8
13	145.3	28	69.6		
14	42.9	29	33.2		
15	36.0	30	24.2		

References

1. S.B. Mahato, B.C. Pal, S.K. Sarkar, Phytochemistry **27**(5), 1433 (1988)

Corchorusin C_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Saikogenin C
Biological source: *Corchorus acutangulus* [1]
$C_{36}H_{58}O_8$: 618.413

Mp: 253–255°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D$ −45° (c 0.25, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

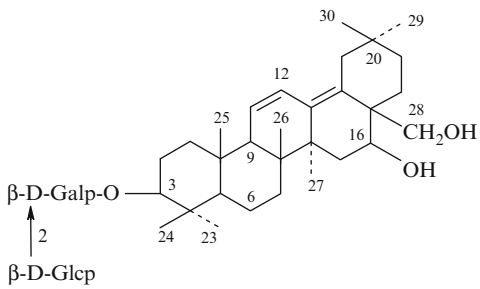
Table 1

C-1	38.4	C-16	76.2	Gal-1	105.7
2	26.5	17	44.4	2	72.7
3	89.0	18	133.3	3	74.9
4	39.6	19	39.5	4	69.7
5	55.4	20	32.3	5	76.0
6	18.5	21	34.9	6	61.9
7	32.7	22	29.9		
8	40.3	23	27.4		
9	54.4	24	16.0		
10	36.7	25	18.2		
11	127.0	26	17.1		
12	125.7	27	22.0		
13	136.5	28	63.9		
14	44.3	29	24.8		
15	35.2	30	32.2		

References

1. S.B. Mahato, B.C. Pal, S.K. Sarkar, Phytochemistry **27**(5), 1433 (1988)

Corchorusin D_3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Saikogenin C
Biological source: *Corchorus acutangulus* [1]
$C_{42}H_{68}O_{13}$: 780.465
Mp: 240–242°C (MeOH) [1]
$[\alpha]_D$ −19° (c 0.32, MeOH) [1]
UV λ_{max} nm (ε): 242 (22300), 251 (24600), 261 (16400) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

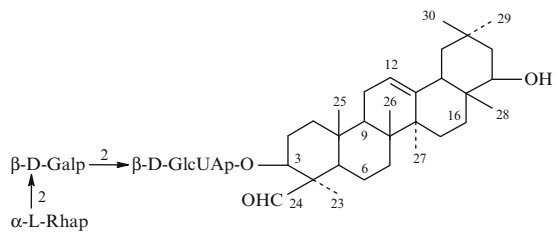
C-1	38.4	C-16	76.1	Gal-1	105.6
2	26.4	17	44.3	2	81.4
3	89.0	18	133.3	3	71.7
4	39.6	19	39.6	4	69.9
5	55.5	20	32.2	5	76.4
6	18.5	21	34.8	6	62.1
7	32.6	22	29.8	Glc-1	105.1
8	40.4	23	27.3	2	75.1
9	54.3	24	16.2	3	77.8
10	36.6	25	18.2	4	71.7
11	127.0	26	17.0	5	77.6
12	125.8	27	22.0	6	62.8
13	136.4	28	63.9		
14	44.3	29	24.9		
15	35.2	30	32.2		

References

1. S.B. Mahato, B.C. Pal, S.K. Sarkar, Phytochemistry **27**(5), 1433 (1988)

Pisumsaponin II

CAS Registry Number: 333334-37-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sandosapogenol
Biological source: *Pisum sativum* [1]
$C_{48}H_{76}O_{18}$: 940.503

$[\alpha]_D^{24}$ −2.2° (c 0.9, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3454, 2928, 1713, 1645, 1076 [1]
FAB-MS *m/z*: 939 $[M-H]^-$, 793 $[M-C_6H_{11}O_4]^-$, 631 $[M-C_{12}H_{21}O_9]^-$ [1]
^{1}H NMR (500 MHz, C_5D_5N): 0.75, 0.94, 1.00, 1.19, 1.23, 1.28, 1.67 (s, CH_3-25, 26, 30, 28, 27, 29, 23), 2.34 (dd-like, H-18), 3.57 (dd, J = 5.2, 12.2, H-3), 3.71 (dd-like, H-22), 5.30 (brs, H-12), 10.43 (H-24)
β-D-GlcUAp: 5.05 (d, J = 7.0, H-1)
β-D-Galp: 5.58 (d, J = 7.6, H-1)
α-L-Rhap: 6.25 (brs, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

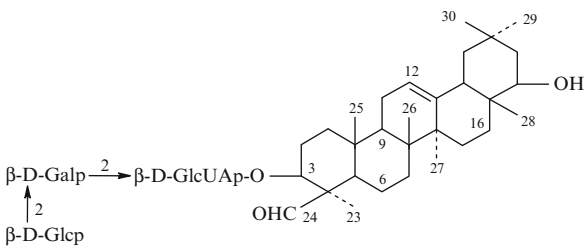
Table 1

C-1	38.1	C-16	28.8	GlcUA-1	105.0	Rha-1	103.0
2	27.1	17	38.1	2	79.5	2	72.3
3	87.2	18	45.5	3	77.5	3	72.8
4	53.6	19	46.8	4	73.3	4	74.4
5	57.4	20	30.9	5	78.5	5	69.6
6	19.2	21	42.4	6	172.4	6	18.9
7	33.2	22	75.6	Gal-1	102.2		
8	39.9	23	22.3	2	77.0		
9	46.7	24	207.2	3	76.5		
10	36.8	25	16.4	4	70.7		
11	24.3	26	17.1	5	76.3		
12	122.4	27	25.6	6	61.8		
13	144.9	28	21.1				
14	42.5	29	33.3				
15	26.4	30	28.7				

References

1. T. Murakami, K. Kohno, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 73 (2001)

Sandosaponin B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sandosapogenol
Biological source: *Phaseolus vulgaris* [1]
$C_{48}H_{76}O_{19}$: 956.498
Mp: 212–213°C (H_2O–MeOH) [1]
$[\alpha]_D^{28}$ + 34.8° (c 0.3, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 2924, 1736, 1725, 1076 [1]
FAB-MS (positive ion mode) *m/z*: 979.4878 $(M + Na)^+$ [1]
FAB-MS *m/z*: 955 $[M-H]^-$, 793 $[M-C_6H_{11}O_5]^-$, 631 $[M-C_{12}H_{21}O_{10}]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.73, 0.91, 0.97, 1.18, 1.21, 1.26, 1.62 (s, CH_3-25, 26, 29, 28, 27, 30, 23), 3.53 (dd, J = 5.2, 11.9, H-3), 3.71 (dd, J = 3.5, 6.6, H-22), 5.27 (brs, H-12), 10.44 (s, CHO-24)
β-D-GlcUAp: 5.08 (d, J = 7.9, H-1)
β-D-Galp: 5.31 (d, J = 7.6, H-1)
β-D-Glcp: 5.22 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.0	C-16	28.6	GlcUA-1	104.5	Glc-1	106.6
2	27.1	17	38.0	2	84.0	2	76.6
3	86.7	18	45.4	3	77.2	3	77.8
4	53.2	19	46.8	4	71.9	4	71.1
5	57.2	20	30.9	5	77.4	5	79.2
6	19.1	21	42.2	6	172.3	6	62.6
7	33.1	22	75.5	Gal-1	104.4		
8	39.7	23	22.0	2	84.5		
9	46.6	24	206.9	3	74.9		
10	36.8	25	16.4	4	69.2		
11	24.2	26	17.0	5	76.4		
12	122.3	27	25.6	6	61.6		
13	144.9	28	21.1				
14	42.4	29	33.1				
15	26.3	30	28.6				

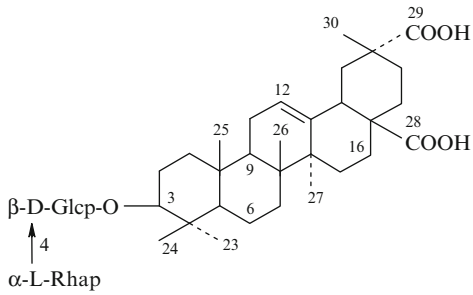
Pharm./Biol.: This saponin showed the most potent inhibitory activity on histamine release [1]

References

1. M. Yoshikawa, H. Shimada, H. Komatsu, T. Sakurama, N. Nishida, J. Yamahara, H. Shimoda, H. Matsuda, T. Tani, Chem. Pharm. Bull. **45**(5), 877 (1997)

Eupteleasaponin X

CAS Registry Number: 290809-56-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Serratagenic Acid

Biological source: *Euptelea polyandra* [1]

$C_{42}H_{66}O_{14}$: 794.445

Mp: 237–239°C [1]

$[\alpha]_D^{26}$ + 12.1° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3389, 1740, 1655, 1076 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.84, 0.98, 1.00, 1.57 (s, CH_3-25, 24, 26, 30), 1.30 (s, CH_3-23, 27), 3.33 (dd, J = 4.0, 11.6, H-3), 3.41 (dd, J = 4.0, 14.2, H-18), 5.53 (brs, H-12)

β-D-Glcp: 4.83 (d, J = 7.9, H-1)

α-L-Rhap: 5.82 (brs, H-1), 1.67 (d, J = 6.3, CH_3-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	23.8	Glc-1	106.6
2	26.5	17	46.6	2	75.9
3	89.0	18	41.1	3	77.0
4	39.5	19	41.1	4	78.7
5	55.9	20	42.6	5	77.0
6	18.5	21	29.3	6	61.8
7	33.2	22	32.4	Rha-1	102.8
8	39.8	23	28.3	2	72.6
9	48.0	24	17.0	3	72.8
10	37.1	25	15.5	4	74.0
11	23.8	26	17.4	5	70.3
12	122.7	27	26.1	6	18.5
13	144.4	28	180.9		
14	42.2	29	184.3		
15	28.3	30	20.0		

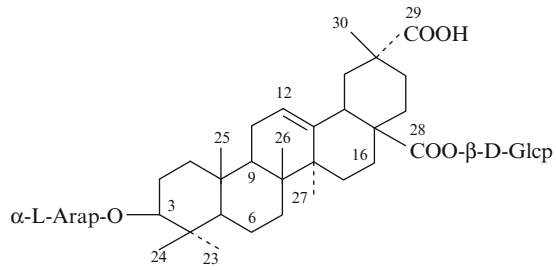
Pharm./Biol.: Gastroprotective activity [1]

References

1. T. Murakami, H. Oominami, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 741 (2001)

Liangwanoside I

CAS Registry Number: 109612-88-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Serratagenic Acid

Biological source: *Nothopanax delavayi* [1]

$C_{41}H_{64}O_{14}$: 780.429

$[\alpha]_D^{19}$ + 19.1° (c 1.89, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3400, 1720, (COOR), 1700 (COOH) [1]

^{1}H NMR (J/Hz, C_5D_5N): α-L-Arap: 4.75 (d, J = 7, H-1); β-D-Glcp: 6.30 (d, J = 6, H-1) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.8	Ara-1	106.3
2	26.3	17	47.0	2	72.6
3	88.9	18	40.8	3	73.8
4	39.4	19	40.8	4	68.6
5	56.1	20	42.2	5	65.7
6	18.6	21	29.1	Glc-1	95.5
7	33.3	22	31.7	2	74.0
8	40.0	23	28.3	3	78.4
9	48.1	24	16.8	4	71.4

(*continued*)

Table 1 (continued)

10	37.1	25	15.5	5	78.4
11	23.8	26	17.5	6	62.5
12	123.5	27	25.9		
13	143.5	28	176.0		
14	42.4	29	180.9		
15	28.3	30	19.9		

Pharm./Biol.: Leaves and leafstalks of this plant are used as an antipyretic and anti-inflammatory [1]

References

1. R. Kasai, T. Oinaka, C.-R. Yang, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **35**(4), 1486 (1987)

Liangwanoside II

CAS Registry Number: 109605-95-0

See Figure Liangwanoside II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Serratagenic Acid

Biological source: *Nothopanax delavayi* [1]

$C_{53}H_{84}O_{23}$: 1088.540

$[\alpha]_D^{20}$ −11.9° (c 1.59, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3400, 1720, 1690 [1]

^{1}H NMR (J/Hz, C_5D_5N): α-L-Arap: 4.66 (d, J = 6.0, H-1)

β-D-Glcp: 6.01 (d, J = 6.5, H-1)

β-D-Glcp′: 4.80 (d, J = 7.5, H-1)

α-L-Rhap: 5.50 (s, H-1) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	23.6	Ara-1	106.6	Glc′-1	104.4
2	26.5	17	46.9	2	72.1	2	74.9
3	88.8	18	40.7	3	74.1	3	76.3
4	39.3	19	40.7	4	68.0	4	78.3
5	55.9	20	42.0	5	65.9	5	77.5
6	18.5	21	29.1	Glc-1	95.5	6	61.4
7	33.1	22	31.6	2	73.6	Rha-1	102.4
8	39.8	23	28.2	3	78.6	2	72.4
9	48.0	24	16.8	4	70.7	3	72.4
10	36.9	25	15.5	5	76.7	4	73.6
11	23.6	26	17.4	6	69.2	5	70.1
12	123.6	27	25.9			6	18.1
13	143.4	28	176.2				
14	42.2	29	180.8				
15	28.2	30	19.8				

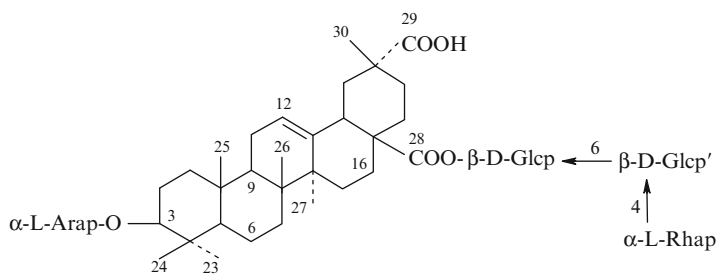
Pharm./Biol.: Leaves and leafstalks of this plant are used as an antipyretic and anti-inflammatory [1]

References

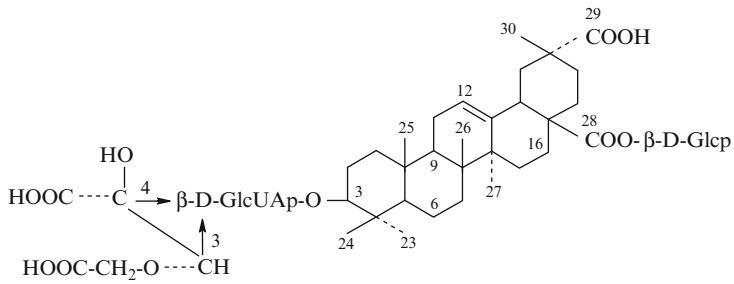
1. R. Kasai, T. Oinaka, C.-R. Yang, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **35**(4), 1486 (1987)

Basellasaponin D

CAS Registry Number: 354552-06-0



Liangwanoside II



Basellasaponin D

See Figure Basellasaponin D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Serratagenic Acid

Biological source: *Basella rubra* [1]

$C_{47}H_{68}O_{22}$: 984.420

Mp: 215–217°C (MeOH–H_2O) [1]

$[\alpha]_D^{27}$ + 24.0° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3426, 1732, 1076, 1036 [1]

RH-FAB-MS *m/z*: 1007.4112 $[M + Na]^+$, 983 $[M-H]^-$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 3.26 (dd, J = 4.0, 11.6, H-3), 5.46 (dd-like, H-12), 3.32 (dd-like, H-18), 0.80, 0.93, 1.08, 1.24, 1.28, 1.45 (s, CH_3-25, 24, 26, 23, 27, 30)

β-D-GlcUAp: 4.99 (d, J = 7.6, H-1); 3-oxoperuvic acid: 5.98 (s, H-3″), glycolic acid: 4.81 (s, H_2-2‴)

β-D-Glcp: 6.35 (d, J = 8.0, H-1) [1]

13C NMR: [1]

Table 1

C-1	38.5	C-16	46.9	GlcUA-1	107.5
2	26.5	17	40.8	2	72.1
3	89.3	18	40.8	3	72.6
4	39.5	19	42.4	4	70.2
5	55.6	20	29.1	5	75.2
6	18.5	21	31.7	6	171.9
7	33.0	22	28.1	3-oxo-PA-1	171.4
8	39.9	23	16.9	2	94.1
9	47.9	24	15.5	3	98.1
10	36.9	25	17.4	GA-1	172.4
11	23.5	26	17.4	2	65.0
12	123.1	27	26.1	Glc-1	95.8
13	143.6	28	176.2	2	74.2
14	42.1	29	180.8	3	78.9
15	28.2	30	19.9	4	71.1
				5	79.4
				6	62.3

References

1. T. Murakami, H. Hirano, M. Yoshikawa, Chem. Pharm. Bull. **49**(6), 776 (2001)

Ilexoside LI

See Figure Ilexoside LI

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Siaresinolic Acid

Biological source: *Ilex rotunda* [1]

$C_{48}H_{76}O_{20}$: 972.492

Mp: 207–209°C (MeOH) [1]

$[\alpha]_D^{22}$ −1.3° (c 0.8, MeOH) [1]

FAB-MS *m/z*: 971 $[M-H]^-$ [1]

EI-MS *m/z*: 454(6), 410 (25), 264 (3), 246 (87), 233 (74), 224 (10), 207 (60), 201 (100), 190 (70), 175 (32), 146 (100) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 0.99, 1.13, 1.13, 1.17, 1.31, 1.67 (s, CH_3 × 7), 2.36 (ddd, J = 11.0, 11.0, 3.0, Hβ-15), 2.87 (ddd, J = 11.0, 11.0, 3.0, Hα-16), 3.53 (brs, H-18), 3.59 (d, J = 2.5, H-19), 5.49 (brt, H-12)

β-D-GlcUAp: 5.24 (d, J = 8.0, H-1)

β-D-Galp: 5.02 (d, J = 7.5, H-1)

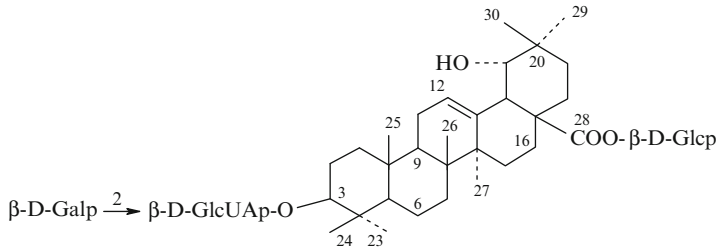
β-D-Glcp: 6.36 (d, J = 7, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	28.1	GlcUA-1	105.5	Glc-1	96.0
2	26.8	17	46.7	2	83.8	2	74.1
3	89.6	18	44.8	3	77.2	3	78.8
4	39.8	19	81.2	4	73.3	4	71.1

(*continued*)



Ilexoside LI

Table 1 (continued)

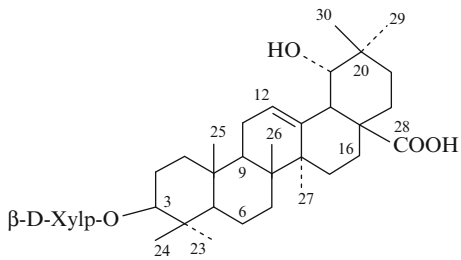
5	56.1	20	35.7	5	77.8	5	79.4
6	18.9	21	29.3	6	173.3	6	62.2
7	33.3	22	33.4	Gal-1	107.1		
8	40.4	23	28.4	2	74.6		
9	48.4	24	16.8	3	75.0		
10	37.2	25	15.7	4	69.5		
11	24.3	26	17.8	5	77.1		
12	123.4	27	24.9	6	61.4		
13	144.5	28	177.6				
14	42.3	29	29.0				
15	29.1	30	25.1				

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 77 (1993)

Ilexoside A

CAS Registry Number: 108529-23-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Siaresinolic Acid

Biological source: *Ilex chinensis* [1]

$C_{35}H_{56}O_8$: 604.397

Mp: 264–267°C (MeOH) [1]

$[\alpha]_D^{19}$ + 7.8° (c 0.20, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 1675, 1190, 1155, 1040 [1]

FD-MS *m/z*: 627 (M + Na, 56), 605 (M^++H, 100), 559 (39), 473 (M^++H-132, 5) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.89, 1.00, 1.06, 1.14, 1.22, 1.32, 1.69 (s, CH_3 × 7), 3.36 (dd, J = 11.8, 4.3, Hα-3), 3.65 (m, Hβ-19), 5.57 (m, H-12)

β-D-Xylp: 4.86 (d, J = 7.5, H-1), 4.04 (dd, J = 8.7, 7.5, H-2), 4.19 (t, J = 8.7, H-3), 4.25 (ddd, J = 10.1, 8.7, 4.9, H-4), 3.82 (dd, J = 11.1, 10.1, Ha-5), 4.42 (dd, J = 11.1, 4.9, Hb-5) [1]

^{13}C NMR (100.5 MHz, C_5D_5N) (methyl derivate):

Table 1

C-1	38.64	C-17	46.40	Xyl-1	107.70
2	26.72	18	44.66	2	75.53
3	88.70	19	80.98	3	78.58
4	39.61	20	35.61	4	71.23
5	56.00	21	28.95	5	67.12
6	18.65	22	33.27		
7	33.19	23	28.20		
8	39.94	24	16.88		
9	48.21	25	15.45		
10	37.18	26	17.28		
11	24.10	27	24.67		
12	123.76	28	178.71		
13	144.26	29	28.77		
14	41.97	30	24.84		
15	28.95	COOMe	51.68		
16	28.09				

Pharm./Biol.: Used in China as a remedy (when given internally) for bronchitis, pneumonia, and ulceration, and as an external treatment for scald, chilblain [1]

References

1. A. Inada, M. Kobayashi, H. Murata, T. Nakanishi, Chem. Pharm. Bull. **35**, 841 (1987)

Latifoloside B

CAS Registry Number: 55965-03-2
See Figure Latifoloside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Siaresinolic Acid
Biological source: *Ilex latifolia* [1]
$C_{47}H_{76}O_{17}$: 912.508
Mp: 225–228°C [1]
IR (KBr) ν_{max} cm^{-1}: 3404, 2935, 1730, 1643, 1450, 1380, 1072, 1030 [1]
FAB-MS *m/z*: 911 $[M-H]^-$, 749 $[M-H-162]^-$, 603 $[M-H-162-146]^-$, 453 $[M-H-162-146-132]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 0.97, 1.10, 1.12, 1.14, 1.19, 1.64 (s, CH_3 × 7), 3.29 (dd, J = 11.2, 4.5, Hα-3), 3.54 (t-like), 3.50 (brs, Hα-18), 5.50 (brs, H-12)
α-L-Arap: 4.86 (d, J = 5.5, H-1)
α-L-Rhap: 6.11 (brs, H-1), 1.61 (d, J = 6.2, CH_3-6)
β-D-Glcp: 6.30 (d, J = 7.9, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	28.1	Ara-1	104.9	Glc-1	96.0
2	26.7	17	46.6	2	76.1	2	73.7
3	89.2	18	44.7	3	74.2	3	79.0
4	39.7	19	81.1	4	68.7	4	71.3
5	56.2	20	35.7	5	64.7	5	79.3
6	18.9	21	29.0	Rha-1	101.9	6	62.2
7	33.1	22	33.3	2	72.4		
8	40.2	23	28.2	3	72.6		
9	48.4	24	17.0	4	74.1		
10	37.3	25	15.7	5	70.1		
11	24.2	26	17.6	6	18.7		
12	123.7	27	24.8				
13	144.4	28	177.5				
14	42.2	29	28.7				
15	29.2	30	25.0				

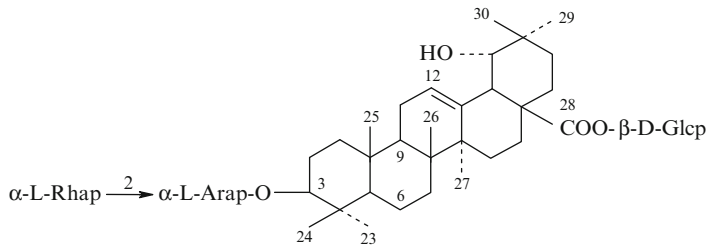
Pharm./Biol.: *Ilex latifolia* Thunb. used in China as a traditional beverage, known as Ku-Ding-Cha,. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

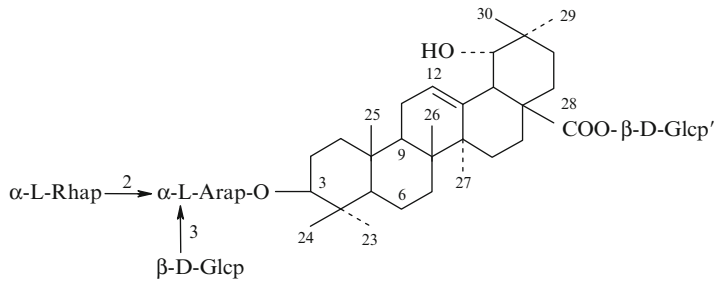
1. M.-A. Ouyang, H.-Q. Wang, Y.-Q. Liu, Ch.-R. Yang, Phytochemistry **45**(7), 1501 (1997)

Latifoloside C

CAS Registry Number: 194660-77-0
See Figure Latifoloside C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Siaresinolic Acid
Biological source: *Ilex latiolia* [1, 2]
$C_{53}H_{86}O_{22}$: 1074.561
Mp: 231–234°C [1]
$[\alpha]_D^{25}$ + 10.2° (c 0.69, MeOH) [1]



Latifoloside B



Latifoloside C

IR (KBr) ν_{max} cm^{-1}: 3420, 2930, 1731, 1637, 1454, 1386, 1070, 1026 [1]

FAB-MS: *m/z* 1073 $[M-1]^-$, 911 $[M-1-162]^-$, 749 $[M-1-2-162]^-$, 765 $[M-1-162-146]^-$, 603 $[M-1-146-2x162]^-$, 453 $[M-1-146-2 \times 162-132-H_2O]^-$

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 0.97, 1.10, 1.12, 1.14, 1.19, 1.64 (s, $CH_3 \times 7$), 3.30 (dd, J = 11.3, 4.3, Hα-3), 3.51 (brs, Hα-18), 5.50 (brs, H-12)
α-L-Arap: 4.86 (d, J = 5.7, H-1)
β-D-Glcp: 5.09 (d, J = 8.1, H-1)
α-L-Rhap: 6.16 (brs, H-1), 1.62 (d, J = 6.8, CH_3-6)
β-D-Glcp′: 6.36 (d, J = 7.5, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	28.1	Ara-1	104.9	Glc-1	104.7
2	26.7	17	46.6	2	74.7	2	75.1
3	88.3	18	44.7	3	82.3	3	78.3
4	39.7	19	81.1	4	68.3	4	71.5
5	56.2	20	35.7	5	64.6	5	78.6
6	18.8	21	29.0	Rha-1	102.0	6	62.6
7	33.1	22	33.3	2	72.6	Glc′-1	96.0
8	40.3	23	28.2	3	72.5	2	74.0
9	48.4	24	17.1	4	74.2	3	79.0
10	37.3	25	15.7	5	70.1	4	71.2
11	24.2	26	17.7	6	18.7	5	79.4
12	123.6	27	24.2			6	62.2
13	144.4	28	177.5				
14	42.2	29	28.8				
15	29.2	30	25.0				

(*continued*)

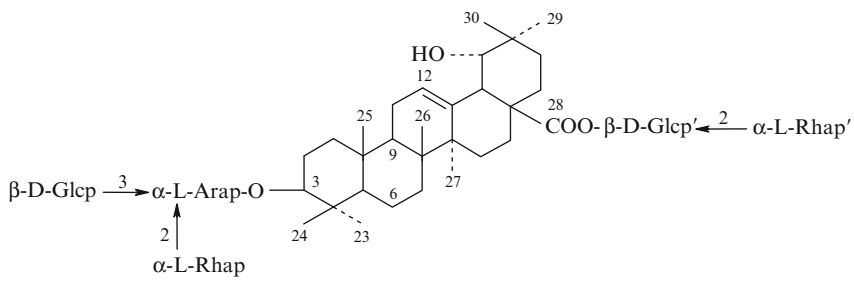
Pharm./Biol.: *Ilex latifolia* Thunb. used in China as a traditional beverage, known as Ku-Ding-Cha,. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

1. M.-An. Ouyang, H.-Q. Wang, Y.-Q. Liu, C.-R. Yang, Phytochemistry **45**, 1501 (1997)
2. J. Huang, X. Wang, Y. Ogihara, N. Shimizu, T. Takeda, T. Akiyama, Chem. Pharm. Bull. **49**(2), 239 (2001)

Latifoloside H

CAS Registry Number: 220997-52-4
See Figure Latifoloside H



Latifoloside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Siaresinolic Acid
Biological source: *Ilex latifolia* [1]
$C_{59}H_{96}O_{26}$: 1220.618
Mp: 227–231 C [1]
IR (KBr) $\nu_{max}cm^{-1}$: 3430, 2928, 1730, 1642 [1]
FAB-MS *m/z*: 1219 $[M-H]^-$, 1073 $[M-H-146]^-$, 911 $[M-H-146-162]^-$, 765 $[M-H-146 \times 2-162]^-$, 749 $[M-H-146-162 \times 2]^-$, 603 $[M-H-146 \times 2-162 \times 2]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.87, 0.97, 1.10, 1.12, 1.14, 1.19, 1.64 ($CH_3 \times 7$), 3.30 (dd, J = 4.3, 11.3, H-3)
α-L-Arap: 4.86 (d, J = 5.7, H-1)
α-L-Rhap: 6.16 (brs, H-1); α-L-Rhap′: 6.65 (brs, H-1)
β-D-Glcp: 5.09 (d, J = 8.1, H-1); β-D-Glcp′: 6.36 (d, J = 7.5, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

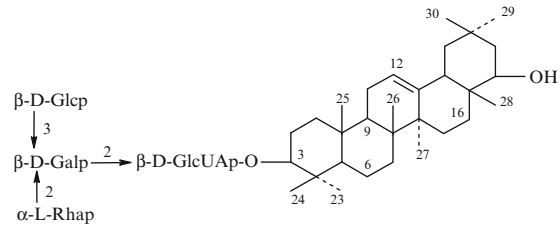
C-1	39.0	C-16	28.1	Ara-1	104.9	Glc′-1	95.5
2	26.7	17	46.6	2	74.7	2	76.2
3	88.3	18	44.7	3	82.3	3	79.8
4	39.7	19	81.1	4	68.3	4	71.7
5	56.2	20	35.7	5	64.6	5	79.2
6	18.8	21	29.0	Rha-1	102.0	6	62.4
7	33.1	22	33.3	2	72.6	Rha′-1	101.6
8	40.3	23	28.2	3	72.5	2	72.5
9	48.4	24	17.1	4	74.2	3	72.4
10	37.3	25	15.7	5	70.1	4	74.1
11	24.2	26	17.7	6	18.7	5	70.1
12	123.6	27	24.8	Glc-1	104.7	6	18.9
13	144.4	28	177.5	2	75.1		
14	42.2	29	28.8	3	78.3		
15	29.2	30	25.0	4	71.5		
				5	78.6		
				6	62.6		

Pharm./Biol.: *Ilex latifolia* Thunb. used in China as a traditional beverage, known as Ku-Ding-Cha. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

1. M.-A. Ouyang, Y.-Q. Liu, H.-Q. Wang, Ch.-R. Yang, Phytochemistry **49**, 2483 (1998)

Abrisaponin So_1

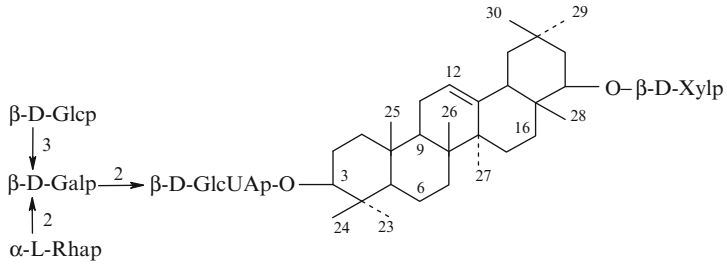


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sophoradiol
Biological source: *Abrus cantoniensis* [1]
$C_{54}H_{88}O_{22}$: 1088.576
$[\alpha]_D^{27}$ + 6.0° (c 0.32, MeOH–H_2O (1:1)) [1]
FAB-MS *m/z*: 1087 $[M-H]^-$, 941 $[M-H-Rha]^-$, 925 $[M-H-Glc]^-$, 779 $[925-Rha]^-$ [1]
HR-FAB-MS *m/z*: 1133.5468 $[M + 2Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87 (s, CH_3-25), 0.99 (s, CH_3-29), 1.00 (s, CH_3-26), 1.18 (s, CH_3-24), 1.21 (s, CH_3-28), 1.27 (s, CH_3-27), 1.27 (s, CH_3-30), 1.40 (s, CH_3-23), 3.30 (dd, J = 4.3, 11.6, H-3), 3.72 (brs, H-22), 5.31 (s, H-12)
β-D-GlcUAp: 5.02 (d, J = 7.3, H-1, 4.49 (t, J = 7.3, H-2)
β-D-Galp: 5.67 (d, J = 7.9, H-1), 4.63 (H-2), 4.16 (dd, J = 3.1, 9.8, H-3)
α-L-Rhap: 1.73 (d, J = 6.1, CH_3-6)
β-D-Glcp: 5.07 (d, J = 7.9, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	28.7	GlcUA-1	105.4	Rha-1	102.4
2	26.5	17	38.0	2	78.7	2	72.4
3	90.1	18	45.3	3	76.0	3	72.7
4	39.7	19	46.8	4	73.5	4	74.4
5	55.9	20	30.9	5	78.7	5	69.4
6	18.5	21	42.3	6	172.6	6	18.9
7	33.2	22	75.6	Gal-1	102.2	Glc-1	105.5
8	40.8	23	28.5	2	77.5	2	74.9
9	47.9	24	16.8	3	84.5	3	78.5
10	36.9	25	15.7	4	70.0	4	71.5
11	23.8	26	17.2	5	75.9	5	78.1
12	122.5	27	25.7	6	62.2	6	62.5

(*continued*)



Abrisaponin So_2

Table 1 (continued)

13	144.8	28	21.1
14	42.4	29	33.3
15	26.5	30	28.7

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, Y. Ito, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1228 (1996)

Abrisaponin So_2

See Figure Abrisaponin So_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sophoradiol

Biological source: *Abrus cantoniensis* [1]

$C_{59}H_{96}O_{26}$: 1220.618

$[\alpha]_D^{27}$ −4.8° (c 0.34, MeOH–H_2O (1:1)) [1]

FAB-MS *m/z*: 1219 $[M\text{-}H]^-$, 1087 $[M\text{-}H\text{-}Xyl]^-$, 1057 $[M\text{-}H\text{-}Glc]^-$, 911 $[1057\text{-}Rha]^-$, 749 $[911\text{-}Gal]^-$ [1]

HR-FAB-MS *m/z*: 1243.6074 $[M + 2Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 0.95, 1.01, 1.19, 1.24, 1.24, 1.25, 1.38 (s, $CH_3 \times 8$), 1.75 (d, J = 6.2, CH_3-6 of Rha), 5.27 (s, H-12), 5.54 (d, J = 7.3, H-1 of Gal), 6.13 (s, H-1 of Rha) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.1	C-16	28.7	GlcUA-1	105.2	Glc-1	105.3
2	26.1	17	37.4	2	78.4	2	74.6
3	90.9	18	45.8	3	76.2	3	77.9
4	39.8	19	46.6	4	73.8	4	71.2
5	56.0	20	30.6	5	77.9	5	77.9
6	18.5	21	36.9	6	175.6	6	62.6
7	33.2	22	82.4	Gal-1	101.8	Xyl-1	102.2
8	39.9	23	28.7	2	76.2	2	74.6
9	47.9	24	16.8	3	85.1	3	77.9
10	36.8	25	15.7	4	69.2	4	71.0
11	23.8	26	17.2	5	75.4	5	66.8
12	122.9	27	25.5	6	62.1		
13	144.3	28	21.1	Rha-1	102.6		
14	40.3	29	32.6	2	72.1		
15	26.3	30	28.4	3	72.1		
				4	74.0		
				5	69.9		
				6	18.7		

Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

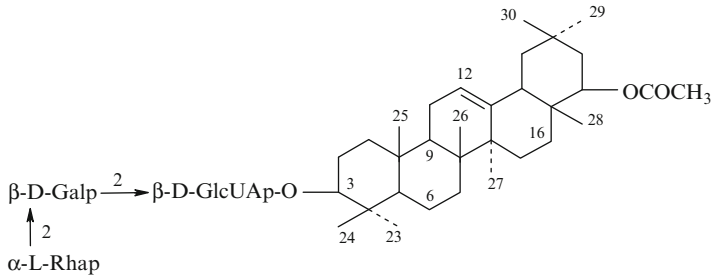
References

1. H. Miyao, Y. Sakai, T. Takeshita, Y. Ito, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1228 (1996)

Acetyl-kaikasaponin III

CAS Registry Number: 182929-04-0

See Figure Acetyl-kaikasaponin III



Acetyl-kaikasaponin III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sophoradiol
Biological source: *Pueraria thomsonii* [1]
$C_{50}H_{80}O_{18}$: 968.534
$[\alpha]_D^{25}$ + 3.6° (c 0.37, C_5H_5N) [1]
FAB-MS (positive ion mode) *m/z*: 991.5225 $(M + Na)^+$ [1]
FAB-MS *m/z*: 967 $(M-H)^-$, 821 $(M-H-Rha)^-$, 659 $(821-Gal)^-$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.85, 0.92, 0.94, 1.07, 1.19, 1.23, 1.42, 1.57 (s, $CH_3 \times 8$), 2.08 (s, Ac)
α-L-Rhap: 6.34 (s, H-1), 1.77 (d, J = 6.0, CH_3-6)
β-D-GlcUAp: 5.05 (d, J = 7.0, H-1)
β-D-Galp: 5.74 (d, J = 7.0, H-1) [1]
^{13}C NMR (270 MHz, C_5D_5N): [1]

Table 1

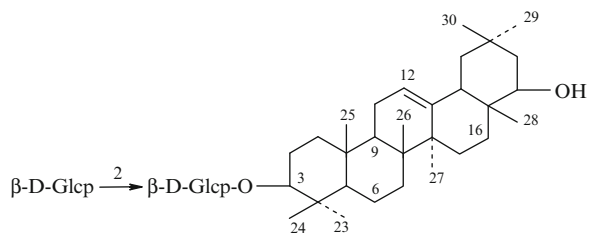
C-1	38.8	C-16	29.9	GlcUA-1	105.3	Rha-1	102.7
2	26.3	17	37.4	2	79.1	2	72.4
3	89.8	18	44.7	3	76.2	3	72.7
4	39.7	19	46.1	4	73.5	4	74.3
5	55.8	20	30.5	5	77.4	5	69.4
6	18.6	21	38.5	6	171.6	6	18.9
7	33.3	22	77.7	Gal-1	102.0		
8	39.7	23	28.4	2	78.8		
9	47.8	24	15.6	3	76.2		
10	36.5	25	16.8	4	70.5		
11	23.8	26	16.9	5	76.6		
12	123.4	27	26.2	6	61.9		
13	144.2	28	27.1				
14	41.9	29	33.6	Ac-1	170.0		
15	26.5	30	21.2	2	21.2		

Pharm./Biol.: The root of this plant used as perspiration, antipyretic, and antispasmodic agent [1]

References

1. T. Arao, T. Idzu, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **44**(10), 1970 (1996)

Azukisaponin I



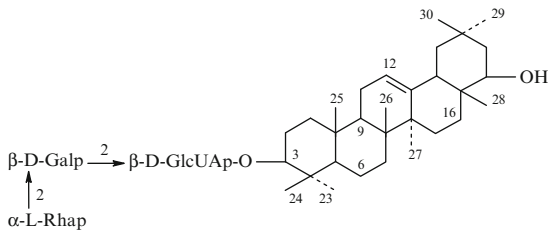
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sophoradiol
Biological source: *Vigna angularis* [1]
$C_{42}H_{68}O_{13}$: 780.465
Mp: 215–217°C [1]
$[\alpha]_D^{28}$ + 16.0° (c 0.3, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 2940, 1720, 1075, 1040 [1]

References

1. I. Kitagawa, H.K. Wang, M. Saito, M. Yoshikawa, Chem. Pharm. Bull. **31**(2), 674 (1983)

Kaikasaponin III

CAS Registry Number: 115330-90-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sophoradiol

Biological source: *Abrus cantoniensis* [1], *Sophora japonica* [2], *Crotalaria albida* [3], *Pueraria lobata* [4], *Dalbergia hupeana* [5], *Abrus precatorius* [6]

$C_{48}H_{78}O_{17}$: 926.523

$[\alpha]_D^{27}$ −6.7° (c 0.32, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3413, 1724 [1]

FAB-MS *m/z*: 925 $(M-H)^-$, 779 $[M-H-Rha]^-$, 617 $[M-H-Rha-Gal]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 1.01, 1.01, 1.21, 1.24, 1.28, 1.30, 1.43 (s, $CH_3 \times 8$), 5.32 (s, H-12)

α-L-Rhap: 6.34 (s, H-1), 1.78 (d, J = 6.2, CH_3-6)

β-D-GlcUAp: 5.08 (d, J = 7.9, H-1)

β-D-Galp: 5.75 (d, J = 7.7, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	28.6	GlcUA-1	105.3	Rha-1	102.7
2	26.4	17	38.0	2	79.1	2	72.4
3	89.9	18	45.2	3	76.6	3	72.7
4	39.7	19	46.7	4	73.5	4	74.4
5	55.8	20	30.9	5	77.5	5	69.5
6	18.5	21	42.3	6	172.7	6	18.9
7	33.3	22	75.5	Gal-1	102.1		
8	40.0	23	28.6	2	78.8		
9	47.9	24	16.8	3	76.2		
10	36.8	25	15.6	4	70.5		
11	23.8	26	17.1	5	76.2		
12	122.5	27	25.7	6	61.9		
13	144.8	28	21.1				
14	42.3	29	33.1				
15	26.4	30	28.4				

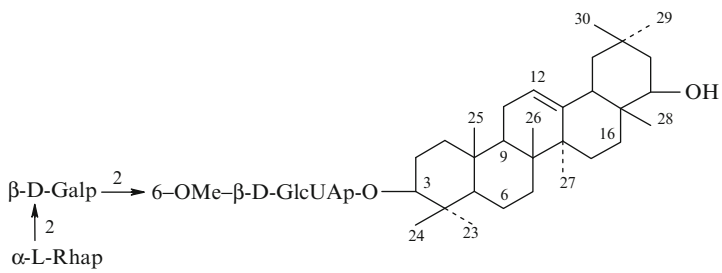
Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)
2. I. Kitagawa, T. Taniyama, W.W. Hong, K. Hori, M. Yoshikawa, Yakugaku Zasshi. **108**, 538 (1988) [Chem. Abstr. **109**, 196978m (1988)]
3. Y. Ding, J. Kinjo, C.-R. Yang, T. Nohara, Chem. Pharm. Bull. **39**(2), 496 (1991)
4. J. Kinjo, T. Takeshita, Y. Abe, N. Terada, H. Yamashita, M. Yamasaki, K. Takeuchi, K. Murakami, T. Tomimatsu, T. Nohara, Chem. Pharm. Bull. **36**(3), 1174 (1988)
5. S. Yahara, S. Emura, H. Feng, T. Nohara, Chem. Pharm. Bull. **37**(8), 2136 (1989)
6. Ch. Ma, N. Nakamura, M. Hattori, Chem. Pharm. Bull. **46**(6), 982 (1998)

Kaikasaponin III methyl ester

See Figure Kaikasaponin III methyl ester



Kaikasaponin III methyl ester

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sophoradiol

Biological source: *Abrus precatorius* [1, 2], *Pueraria lobata* [3], *Crotalaria albida* [4]

$C_{49}H_{80}O_{17}$: 940.539

$[\alpha]_D$ −4.4° (c 0.56, MeOH) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 1.00, 1.00, 1.16, 1.22, 1.26, 1.29, 1.39 (s, CH_3 × 8), 2.39 (d, J = 12.8, H-18), 3.29 (brd, J = 7.3, H-3), 3.72 (s, OMe), 5.01, 5.66, 6.27 (1H each, anomeric protons) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

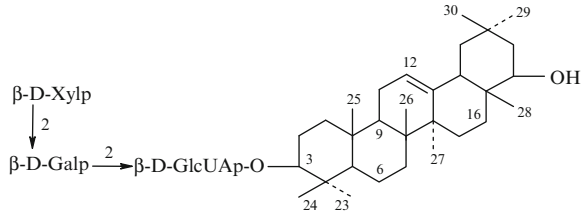
C-1	38.9	C-16	28.7	GlcUA-1	105.3	Rha-1	102.7
2	21.1	17	38.0	2	79.0	2	72.6
3	90.0	18	45.3	3	76.1	3	72.3
4	39.6	19	46.8	4	73.1	4	74.3
5	55.9	20	30.9	5	76.5	5	69.4
6	18.5	21	42.3	6	170.6	6	18.9
7	33.2	22	75.6	COOMe	52.0		
8	40.0	23	28.4	Gal-1	101.9		
9	47.9	24	15.7	2	78.4		
10	38.9	25	16.8	3	76.7		
11	23.8	26	17.2	4	70.4		
12	122.5	27	25.7	5	76.3		
13	144.8	28	28.2	6	61.9		
14	42.4	29	33.2				
15	26.4	30	21.1				

Pharm./Biol.: Effective for hepatic injury, induced by CCl_4 [1]

References

1. J. Kinjo, K. Matsumoto, M. Inoue, T. Takeshita, T. Nohara, Chem. Pharm. Bull. **39**(1), 116 (1991)
2. Ch. Ma, N. Nakamura, M. Hattori, Chem. Pharm. Bull. **46**(6), 982 (1998)
3. J. Kinjo, T. Takeshita, Y. Abe, N. Terada, H. Yamashita, M. Yamasaki, K. Takeuchi, K. Murakami, T. Tomimatsu, T. Nohara, Chem. Pharm. Bull. **36**(3), 1174 (1988)
4. Y. Ding, J. Kinjo, C.-R. Yang, T. Nohara, Chem. Pharm. Bull. **39**(2), 496 (1991)

Non name (*Crotalaria albida*)



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Sophoradiol

Biological source: *Crotalaria albida* [1]

$C_{47}H_{76}O_{17}$: 912.508

$[\alpha]_D^{29}$ + 161.8° (c 0.51, MeOH) [1]

FAB-MS *m/z*: 925 $[M-H]^-$, 793 $[M-H-Xyl]^-$ [1]

^{13}C NMR (400 MHz, C_5D_5N) (Me ester): [1]

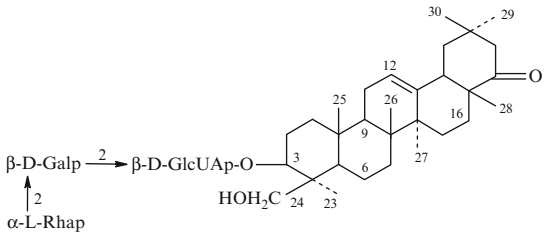
Table 1

C-1	38.9	C-16	28.7	GlcUA-1	104.9	Xyl-1	106.7
2	26.6	17	38.0	2	83.3	2	75.1
3	89.4	18	45.3	3	76.9	3	77.8
4	39.6	19	46.8	4	72.3	4	70.6
5	55.9	20	30.9	5	77.9	5	67.4
6	18.5	21	42.3	6	170.4		
7	33.2	22	75.6	OMe	52.4		
8	40.0	23	28.5	Gal-1	104.0		
9	47.9	24	15.8	2	83.1		
10	36.8	25	16.9	3	76.0		
11	23.8	26	17.2	4	69.1		
12	122.5	27	25.8	5	76.5		
13	144.9	28	28.2	6	61.4		
14	42.4	29	33.3				
15	26.5	30	21.2				

References

1. Y. Ding, J. Kinjo, C.-R. Yang, T. Nohara, Chem. Pharm. Bull. **39**(2), 496 (1991)

Dehydrosoyasaponin I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Soyasapogenol E

Biological source: *Abrus cantoniensis* [1], *Medicago sativa* [2], *Russell lupine* [3], *Desmodium styracifolium* [4], *Phaseolus vulgaris* [5]

$C_{48}H_{70}O_{18}$: 934.456

$[\alpha]_D^{27}$ −25.2° (C_5H_5N-H_2O (1:1), c 0.53) [1]

Mp: 272–280°C [4]

IR (KBr) ν_{max} cm^{-1}: 3420, 1700, 1620 [4]

FAB-MS *m/z*: 939 $(M\text{-}H)^-$, 793 $(M\text{-}H\text{-}Rha)^-$, 631 $(M\text{-}H\text{-}Rha\text{-}Gal)^-$, 455 $(631\text{-}GlcUA)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.71, 0.86, 0.87, 0.96, 1.17, 1.31, 1.45 (s, CH_3 × 7), 5.25 (s, H-12)

α-L-Rhap: 6.28 (s, H-1), 1.78 (d, J = 6.7, CH_3-6)

β-D-GlcUAp: 4.99 (d, J = 7.3, H-1)

β-D-Galp: 5.78 (d, J = 7.9, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.4	C-16	27.3	GlcUA-1	105.4	Rha-1	102.4
2	26.6	17	47.6	2	78.4	2	72.4
3	91.1	18	47.6	3	77.7	3	72.7
4	43.8	19	46.6	4	73.8	4	74.3
5	55.9	20	34.0	5	77.8	5	69.3
6	18.4	21	50.8	6	172.3	6	18.9
7	32.9	22	215.6	Gal-1	101.7		
8	39.7	23	22.9	2	78.1		
9	47.8	24	63.5	3	76.4		
10	36.4	25	15.7	4	71.1		
11	23.9	26	16.6	5	76.6		
12	122.9	27	25.4	6	61.5		
13	141.8	28	20.9				
14	41.9	29	31.8				
15	26.6	30	25.2				

(*continued*)

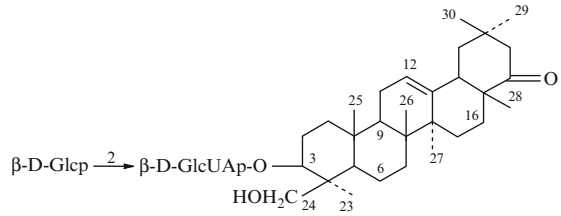
Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)
2. I. Kitagawa, T. Taniyama, T. Murakami, M. Yoshihara, M. Yoshikawa, Yakugaku Zasshi. **108**, 547 (1988) [Chem. Abstr. **109**, 196979n (1988)]
3. J. Kinjo, F. Kishida, K. Watanabe, F. Hashimoto, T. Nohara, Chem. Pharm. Bull. **42**, 1874 (1994)
4. T. Kubo, S. Hamada, T. Nohara, Z. Wang, H. Hirayama, K. Ikegami, K. Yasukawa, M. Takido, Chem. Pharm. Bull. **37**, 2229 (1989)
5. M. Yoshikawa, H. Shimada, H. Komatsu, T. Sakurama, N. Nishida, J. Yamahara, H. Shimoda, H. Matsuda, T. Tani, Chem. Pharm. Bull. **45**(5), 877 (1997)

Palustroside I

CAS Registry Number: 214692-84-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Soyasapogenol E

Biological source: *Lathyrus palustris* [1]

$C_{42}H_{66}O_{14}$: 794.445

$[\alpha]_D^{25}$ −9.8° (c 0.52, C_5H_5N:H_2O 1:1) [1]

HR-FAB-MS (negative ion mode) *m/z*: 793 $(M-H)^-$, 631 $(M-H-Glc)^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.72, 0.86, 0.96, 1.17, 1.22, 1.27, 1.38 (s, $CH_3 \times 7$), 5.24 (s, H-12)
β-D-Glcp: 5.59 (d, J = 7.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

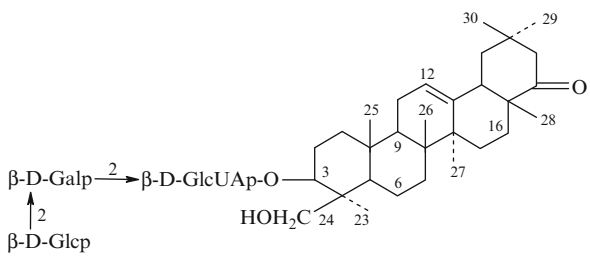
C-1	38.5	C-16	27.3	GlcUA-1	105.1
2	26.6	17	47.8	2	81.1
3	90.7	18	47.5	3	76.1
4	43.8	19	46.7	4	72.9
5	56.1	20	34.1	5	78.2
6	18.5	21	50.9	6	172.4
7	33.0	22	215.6	Glc-1	104.8
8	39.8	23	22.5	2	75.8
9	47.8	24	63.3	3	78.4
10	36.4	25	15.6	4	69.9
11	24.0	26	16.7	5	78.2
12	123.0	27	25.5	6	61.6
13	141.8	28	20.9		
14	42.0	29	31.8		
15	26.0	30	25.3		

Pharm./Biol.: Hepatoprotective activity [1]

References

1. M. Udayama, M. Ohkawa, N. Yoshida, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **46**(9), 1412 (1998)

Sandosaponin A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Soyasapogenol E
Biological source: *Phaseolus vulgaris* [1]
$C_{48}H_{76}O_{19}$: 956.498
Mp: 200–201°C (H_2O–MeOH) [1]
$[\alpha]_D^{23}$ −5.8° (c 0.8, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3411, 2926, 1736, 1701, 1076 [1]
FAB-MS (positive ion mode) *m/z*: 979.4878 $(M + Na)^+$ [1]
FAB-MS *m/z*: 955 $[M-H]^-$, 793 $[M-C_6H_4O_5]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.72, 0.85, 0.86, 0.96, 1.17, 1.28, 1.43 (s, CH_3-25, 30, 26, 29, 28, 27, 23), 2.15, 2.60 (d, J = 13.7, H_2-21), 3.41 (dd, J = 3.7, 12.2, H-3), 5.23 (brs, H-12)
β-D-GlcUAp: 5.10 (d, J = 7.6, H-1)
β-D-Galp: 5.65 (d, J = 7.6, H-1)
β-D-Glcp: 5.20 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

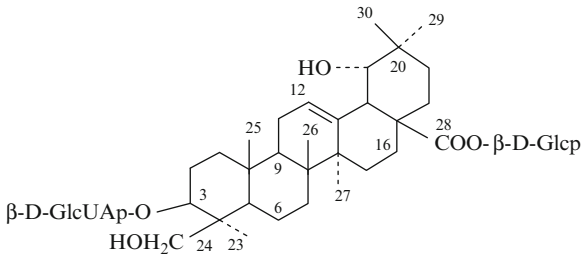
C-1	38.5	C-16	27.4	GlcUA-1	104.8	Glc-1	106.9
2	27.4	17	47.8	2	80.9	2	76.7
3	90.7	18	47.6	3	77.5	3	78.0
4	43.9	19	46.6	4	72.5	4	71.6
5	56.1	20	34.1	5	77.9	5	79.1
6	18.6	21	50.9	6	172.4	6	62.9
7	33.0	22	215.6	Gal-1	103.0		
8	39.8	23	22.9	2	84.7		
9	47.8	24	63.6	3	74.7		
10	36.4	25	15.7	4	70.5		
11	24.0	26	16.7	5	76.6		
12	122.8	27	25.5	6	62.5		
13	141.8	28	21.0				
14	42.0	29	31.9				
15	26.6	30	25.3				

Pharm./Biol.: This saponin showed the most potent inhibitory activity on histamine release [1]

References

1. M. Yoshikawa, H. Shimada, H. Komatsu, T. Sakurama, N. Nishida, J. Yamahara, H. Shimoda, H. Matsuda, T. Tani, Chem. Pharm. Bull. **45**(5), 877 (1997)

Ilexoside XLVII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Spathodic Acid

Biological source: *Ilex rotunda* [1]

$C_{42}H_{66}O_{16}$: 826.435

Mp: 238–239°C (MeOH) [1]

$[\alpha]_D^{22}$ −11.3° (c 0.7, MeOH) [1]

FAB-MS *m/z*: 825 $[M\text{-}H]^-$ [1]

EI-MS *m/z*: 470 (4), 442 (20), 370 (8), 264 (28), 246 (50), 224 (12), 218 (35), 206 (35), 201 (45), 175 (41), 146 (100) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.80, 0.98, 1.11, 1.15, 1.53, 1.66 (s, $CH_3 \times 6$), 2.39 (ddd, J = 11.0, 11.0, 3.0, Hβ-15), 2.85 (ddd, J = 11.0, 11.0, 3.0, Hα-16), 3.52 (brs, H-18), 3.58 (d, J = 2.5, H-19), 3.60 (dd, J = 11.0, 4.5, H-3), 3.64, 4.38 (d, J = 11.5, H_2-24), 5.47 (brt, H-12)

β-D-GlcUAp: 5.14 (d, J = 7.5, H-1)

β-D-Glcp: 6.36 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

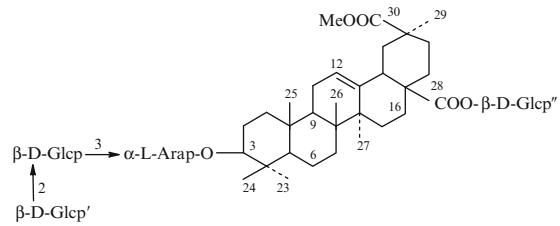
C-1	38.9	C-16	29.1	GlcUA-1	106.5
2	26.8	17	46.5	2	75.4
3	89.1	18	44.6	3	78.1
4	44.4	19	81.0	4	73.5
5	56.2	20	35.6	5	78.2
6	19.1	21	29.2	6	172.7
7	33.6	22	33.1	Glc-1	95.9
8	40.2	23	23.4	2	74.2
9	48.1	24	63.2	3	79.0
10	36.8	25	15.2	4	71.0
11	24.3	26	17.4	5	79.4
12	124.3	27	24.7	6	62.2
13	144.7	28	177.2		
14	42.1	29	28.8		
15	28.9	30	24.9		

(*continued*)

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 77 (1993)

Quinoa-Saponin 6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Spergulagenate

Biological source: *Chenopodium quinoa* [1]

$C_{54}H_{86}O_{24}$: 1118.550

$[\alpha]_D^{24}$ + 56.2° (c 0.93, C_5H_5N) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): α-L-Arap: 4.68 (d, J = 8.0, H-1)

β-D-Glcp: 5.06 (d, J = 7.0, H-1)

β-D-Glcp′: 5.10 (d, J = 7.3, H-1)

β-D-Glcp″: 6.21 (d, J = 7.2, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	23.6	Ara-1	106.6	Glc′-1	107.1
2	26.8	17	46.5	2	71.4	2	76.4
3	89.0	18	43.2	3	86.0	3	78.3
4	39.6	19	42.5	4	69.1	4	70.9
5	55.9	20	43.9	5	67.0	5	77.7
6	18.5	21	30.6	Glc-1	104.5	6	62.3
7	33.2	22	34.0	2	86.0	Glc″-1	95.7
8	39.9	23	28.1	3	79.1	2	74.0
9	48.1	24	16.8	4	70.9	3	78.8
10	37.0	25	15.5	5	77.7	4	70.5

(*continued*)

Table 1 (continued)

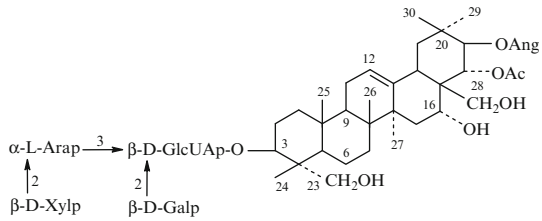
11	23.6	26	17.4	6	61.9	5	79.2
12	123.5	27	26.1			6	62.0
13	143.7	28	176.9				
14	42.0	29	28.3				
15	28.3	30	176.0				
		OCH_3	51.7				

References

1. F. Mizui, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **38**(2), 375 (1990)

Assamsaponin D

CAS Registry Number: 259748-69-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol A

Biological source: *Camellia sinensis* [1]

$C_{59}H_{92}O_{27}$: 1232.582

Mp: 190.6–191.2° [1]

$[\alpha]_D^{26}$ + 15.6° (c 0.1, MeOH) [1]

FAB-MS (negative) *m/z*: 1231 $[M-H]^-$, 1099 $[M-C_5H_9O_4]^-$, 967 $[M-C_{10}H_{17}O_8]^-$ [1]

FAB-MS (positive) *m/z*: 1255 $[M + Na]^+$ [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1719, 1649, 1078, 1046 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.12 (m, H-3), 5.35 (brs, H-12), 4.43 (brs, H-16), 3.02 (dd-like, H-18), 6.55 (d, J = 10.1, H-21), 6.15 (d, J = 10.1, H-22), 4.35 (d-like, H_2-23), 1.07 (s, CH_3-24), 0.91 (s, CH_3-25), 0.90 (s, CH_3-26), 1.79 (s, CH_3-27), 1.06 (s, CH_3-29), 1.30 (s, CH_3-30), 3.38, 3.62 (d, J = 11.0, H_2-28)

β-D-GlcUAp: 5.06 (d, J = 8.2, H-1)

β-D-Galp: 5.83 (d, J = 7.6, H-1)

α-L-Arap: 5.69 (d, J = 6.5, H-1)

β-D-Xylp: 5.01 (d, J = 7.6, H-1)

Angeloyl: 5.98 (dq-like, H-3), 2.09 (d, J = 7.0, CH_3-4), 2.01 (s, CH_3-5); 1.95 (OAc) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

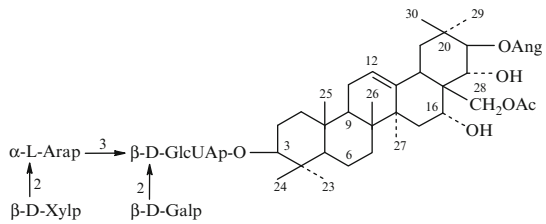
C-1	38.8	C-16	68.2	Ac-1	171.1	Ara-1	101.7
2	25.7	17	48.0	2	20.9	2	82.3
3	83.3	18	40.2	GlcUA-1	104.2	3	73.4
4	43.5	19	47.0	2	78.5	4	68.4
5	48.3	20	36.3	3	84.6	5	66.2
6	18.3	21	79.0	4	71.0	Xyl-1	107.0
7	32.9	22	74.6	5	77.3	2	75.9
8	40.2	23	65.0	6	171.9	3	78.2
9	47.2	24	13.5	Gal-1	103.1	4	70.8
10	36.8	25	16.2	2	73.8	5	67.4
11	23.9	26	17.0	3	75.2	Ang-1	167.9
12	122.7	27	27.5	4	70.2	2	129.0
13	142.9	28	64.0	5	76.5	3	137.0
14	41.7	29	29.4	6	62.0	4	15.6
15	34.6	30	20.3			5	21.0

References

1. T. Murakami, J. Nakamura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **47**(12), 1759 (1999)

Assamsaponin E

CAS Registry Number: 259748-74-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol B

Biological source: *Camellia sinensis* [1]
$C_{59}H_{92}O_{26}$: 1216.587
Mp: 189.4–190.4°C [1]
$[\alpha]_D^{27}$ + 23.8° (c 0.1, MeOH) [1]
FAB-MS (negative) *m/z*: 1215 $[M-H]^-$, 1083 $[M-C_5HO_4]^-$,1053 $[M-C_6H_{11}O_5]^-$, 951 $[M-C_{10}H_{17}O_8]$ [1]
FAB-MS (positive) *m/z*: 1239 $[M + Na]^+$ [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1718, 1649, 1080, 1048 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.29 (dd, J = 4.6, 11.9, H-3), 5.45 (brs, H-12), 4.72 (brs, H-16), 2.80 (dd-like, H-18), 6.43 (d, J = 10.1, H-21), 4.44 (d-like, H-22), 1.30 (s, CH_3-23), 1.12 (s, CH_3-24), 0.84 (s, CH_3-25), 0.87 (s, CH_3-26), 1.81 (s, CH_3-27), 4.25 (m, H_2-28), 1.10 (s, CH_3-29), 1.30 (s, CH_3-30)
β-D-GlcUAp: 4.94 (d, J = 7.4, H-1)
β-D-Galp: 5.74 (d, J = 7.6, H-1)
α-L-Arap: 5.73 (d, J = 6.0, H-1)
β-D-Xylp: 5.02 (d, J = 7.6, H-1)
Angelicacid: 5.90 (dq-like, H-3), 2.05 (d, J = 7.0, CH_3-4), 1.98 (s, CH_3-5); Ac: 1.99 (CH_3-2) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

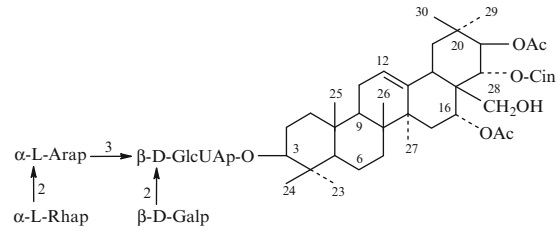
C-1	39.1	C-16	68.0	GlcUA-1	105.8	Ara-4	68.5
2	26.7	17	47.3	2	79.2	5	66.2
3	89.9	18	40.8	3	84.3	Xyl-1	107.1
4	39.8	19	47.6	4	71.2	2	75.9
5	56.1	20	36.3	5	77.5	3	78.4
6	18.6	21	81.6	6	172.1	4	71.0
7	33.4	22	71.7	Gal-1	103.7	5	67.7
8	40.3	23	28.3	2	74.0	Ang-1	168.8
9	47.2	24	17.0	3	75.3	2	129.8
10	37.0	25	16.0	4	70.3	3	136.0
11	24.1	26	17.3	5	76.6	4	15.9
12	124.1	27	27.6	6	62.2	5	21.1
13	142.9	28	66.8	Ara-1	101.9	Ac-1	170.9
14	42.0	29	30.0	2	82.2	2	20.9
15	34.9	30	20.4	3	73.6		

References

1. T. Murakami, J. Nakamura, H. Matsuda, M. Yoshikawa, Chem. Pharmx. Bull. **47**(12), 1759 (1999)

Assamsaponin J

CAS Registry Number: 316157-19-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol B
Biological source: *Camellia sinensis* [1]
$C_{66}H_{96}O_{27}$: 1320.613
Mp: 230.2–232.0°C [1]
$[\alpha]_D^{25}$ −32.2° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1718, 1653, 1075 [1]
FAB-MS (negative ion mode) *m/z*: 1319 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1343 $(M + Na)^+$, 1365 $(M + 2Na-H)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.77, 0.78, 1.07, 1.15, 1.27, 1.28, 1.50, 2.04, 2.56 (s, CH_3-26, 25, 29, 24, 23, 30, 27, Ac-2, Ac-2′), 3.07 (dd, J = 4.0, 14.4, H-18), 3.24 (dd, J = 5.2, 11.6, H-3), 3.48, 3.62 (d, J = 9.2, H_2-28), 5.43 (brs, H-16), 5.71 (brs, H-12), 5.87 (d, J = 10.4, H-21), 6.27 (d, J = 10.4, H-22); α-L-Rhap: 5.99 (brs, H-1), 1.51 (d, J = 6.4, CH_3-6); β-D-GlcUAp: 4.93 (d, J = 7.6, H-1); β-D-Galp: 5.63 (d, J = 7.6, H-1); α-L-Rhap: 6.04 (d, J = 5.8, H-1); Cinnamoyl: 6.73 (d, J = 16.2, H-2), 7.32 (m, H-3′, 4′, 5′), 7.64 (m, H-2′, 6′), 8.04 (d, J = 16.2, H-3) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-18	39.7	GlcUA-1	105.5	Rha-1	102.3
2	26.4	19	47.3	2	79.3	2	72.5
3	89.9	20	35.9	3	82.8	3	72.6
4	39.5	21	78.8	4	71.2	4	74.0
5	55.8	22	73.3	5	77.3	5	70.1
6	18.3	23	28.0	6	172.1	6	18.2
7	33.1	24	16.7	Gal-1	103.7	Cin-1	166.4

(*continued*)

Table 1 (continued)

8	40.1	25	15.6	2	73.5	2	118.6
9	46.9	26	16.8	3	75.2	3	145.5
10	36.8	27	27.0	4	70.0	1′	135.1
11	23.8	28	63.4	5	76.8	2′, 6′	128.6
12	125.3	29	29.3	6	62.5	3′, 5′	129.2
13	140.9	30	19.4	Ara-1	101.1	4′	130.6
14	41.2	16-Ac-1	170.3	2	76.9		
15	31.2	2	22.1	3	73.6		
16	71.7	21-Ac-1	171.1	4	69.0		
17	47.2	2	20.8	5	65.6		

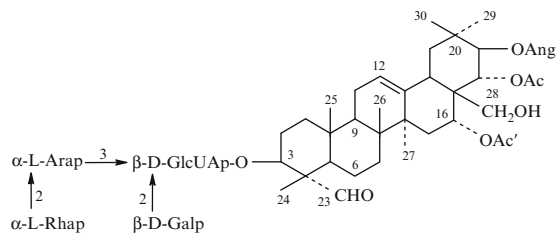
Pharm./Biol.: The saponin mixture from the seeds of the tea plant was found to exhibit inhibitory effect on gastric emptying and an accelerating effect on gastrointestinal transit in mice [1]

References

1. T. Murakami, J. Nakamura, T. Kageura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **48**(11), 1720 (2000)

Assamsaponin B

CAS Registry Number: 259748-07-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol E

Biological source: *Camellia sinensis* [1]

$C_{61}H_{92}O_{28}$: 1272.577

$[\alpha]_D^{26}$ + 21.6° (c 0.1, MeOH) [1]

FAB-MS (negative) *m/z*: 1271 $[M\text{-}H]^-$, 1139 $[M\text{-}C_5H_9O_4]^-$, 1109 $[M\text{-}C_6H_{11}O_5]^-$, 1007 $[M\text{-}C_{10}H_{17}O_8]^-$

FAB-MS (positive) *m/z*: 1295 $[M + Na]^+$ [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1725, 1655, 1078, 1048 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 5.98 (dd-like, H-3), 5.38 (brs, H-12), 5.58 (brs, H-16), 2.98 (dd, J = 4.9, 13.6, H-18), 5.85 (d, J = 10.4, H-21), 6.09 (d, J = 10.4, H-22), 9.93 (s, H-23), 1.46 (s, CH_3-24), 0.79 (s, CH_3-25), 0.74 (s, CH_3-26), 1.44 (s, CH_3-27), 3.46 (d, J = 11.0, H_2-28), 1.07 (s, CH_3-29), 1.26 (s, CH_3-30); β-D-GlcUAp: 4.81 (d, J = 7.3, H-1); β-D-Galp: 5.71 (d-like, H-1); α-L-Arap: 5.71 (d-like, H-1); β-D-Xylp: 5.00 (d, J = 7.6, H-1); Angeloyl: 5.90 (dq-like, H-3), 2.06 (d, J = 7.3, CH_3-4), 1.98 (s, CH_3-5); Ac: 2.03 (s); Ac′: 2.50 (s) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-18	39.6	GlcUA-1	104.2	Xyl-1	107.0
2	25.2	19	47.2	2	78.3	2	75.9
3	84.5	20	36.1	3	84.2	3	78.2
4	55.1	21	78.4	4	70.8	4	70.7
5	48.5	22	73.4	5	77.3	5	67.5
6	20.3	23	210.0	6	171.8	Ang-1	167.8
7	32.4	24	11.1	Gal-1	103.3	2	128.5
8	40.3	25	15.8	2	73.7	3	138.0
9	46.8	26	16.8	3	75.4	4	15.9
10	36.0	27	26.9	4	70.5	5	20.9
11	23.7	28	63.8	5	76.5	Ac-1	170.5
12	124.8	29	29.4	6	62.2	2	20.8
13	141.1	30	19.7	Ara-1	101.7	Ac-1′	169.8
14	41.2			2	82.3	2′	22.0
15	31.0			3	73.3		
16	71.3			4	68.4		
17	46.9			5	66.1		

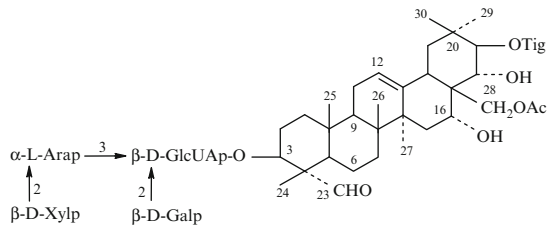
Pharm./Biol.: Gastroprotective effect [1]

References

1. T. Murakami, J. Nakamura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **47**(12), 1759 (1999)

Assamsaponin C

CAS Registry Number: 259748-14-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol E
Biological source: *Camellia sinensis* [1]
$C_{59}H_{90}O_{27}$: 1230.556
Mp: 201–202°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D^{28}$ + 21° (c 0.1, MeOH) [1]
FAB-MS (negative) *m/z*: 1229 $[M\text{-}H]^-$, 1097 $[M\text{-}C_5H_9O_4]^-$, 965 $[M\text{-}C_{10}H_{17}O_8]^-$ [1]
FAB-MS (positive) *m/z*: 1253 $[M + Na]^+$ [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 1721, 1656, 1078, 1048 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 4.00 (dd-like, H-3), 5.44 (brs, H-12), 4.70 (brs, H-16), 2.82 (brs, H-18), 6.38 (d, J = 9.6, H-21), 4.46 (d-like, H-22), 9.88 (s, H-23), 1.44 (s, CH_3-24), 0.83 (s, CH_3-25), 0.95 (s, CH_3-26), 1.76 (s, CH_3-27), 4.25 (m, H_2-28), 1.09 (s, CH_3-29), 1.31 (s, CH_3-30)
β-D-GlcUAp: 4.83 (d, J = 6.9, H-1)
β-D-Galp: 5.68 (H-1)
α-L-Arap: 5.65 (d-like, H-1)
β-D-Xylp: 4.99 (d, J = 6.9, H-1)
Tigloyl: 7.00 (dq-like, H-3), 1.61 (d, J = 6.3, CH_3-4), 1.86 (s, CH_3-5); Ac: 2.02 (CH_3) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-19	47.2	Gal-1	103.1	Tig-1	168.5
2	25.2	20	36.2	2	73.6	2	129.7
3	84.4	21	81.6	3	75.2	3	136.2
4	55.0	22	71.4	4	70.4	4	14.0
5	48.4	23	209.7	5	76.4	5	12.3
6	20.3	24	10.9	6	62.0	Ac-1	170.6
7	32.3	25	15.7	Ara-1	101.5	2	20.6
8	40.2	26	16.9	2	82.2		

(*continued*)

Table 1 (continued)

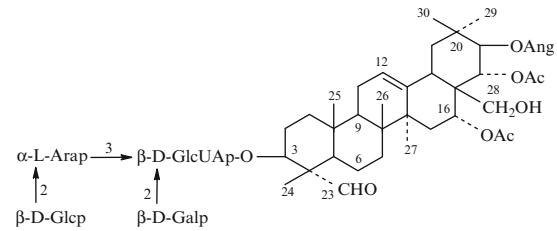
9	46.8	27	27.2	3	73.3
10	36.0	28	66.4	4	68.3
11	23.8	29	29.6	5	66.0
12	124.2	30	20.0	Xyl-1	106.9
13	142.6	GlcUA-1	104.0	2	75.8
14	41.7	2	78.1	3	78.0
15	34.4	3	84.0	4	70.6
16	67.6	4	70.7	5	67.3
17	47.0	5	77.2		
18	40.5	6	171.7		

References

1. T. Murakami, J. Nakamura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **47**(12), 1759 (1999)

Assamsaponin F

CAS Registry Number: 316157-15-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol E
Biological source: *Camellia sinensis* [1]
$C_{62}H_{94}O_{29}$: 1302.588
Mp: 209.8–210.3°C [1]
$[\alpha]_D^{26}$ + 8.8° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1721, 1649, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 1301 $(M\text{-}H)^-$, 1139 $(M\text{-}C_6H_{11}O_5)^-$, 1007 $(M\text{-}C_{11}H_{19}O_9)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1325 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.74, 0.78, 1.07, 1.26, 1.43, 1.45, 1.98, 2.03, 2.51 (s, CH_3-26, 25, 30, 29, 27, 24, Ang-5, Ac-2, Ac-2′), 2.05 (d, J = 7.6, CH_3-4 of Ang), 2.98 (dd-like, H-18), 3.45, 3.57 (d, J = 13.4, H_2-28), 3.99 (dd, J = 2.8, 9.8, H-3), 5.39 (brs, H-12), 5.58 (brs, H-16), 5.85 (d, J = 10.3, H-21), 5.98 (dq-like, H-3 of Ang), 6.09 (d, J = 10.3, H-22), 9.94 (s, H-23)
β-D-GlcUAp: 4.82 (d, J = 7.3, H-1); β-D-Galp: 5.61 (d, J = 7.7, H-1)
β-D-Glcp: 5.10 (d, J = 7.4, H-1); α-L-Arap: 5.77 (d, J = 5.1, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-18	39.6	GlcUA-1	104.1	Glc-1	106.0
2	25.3	19	47.2	2	78.4	2	75.9
3	84.4	20	36.1	3	84.4	3	78.3
4	55.0	21	78.5	4	71.0	4	71.6
5	48.5	22	73.4	5	77.2	5	78.4
6	20.5	23	210.1	6	171.8	6	62.7
7	32.4	24	11.1	Gal-1	103.6	Ang-1	167.8
8	40.3	25	15.8	2	73.7	2	128.5
9	46.8	26	16.8	3	75.1	3	138.0
10	36.0	27	27.0	4	70.3	4	15.9
11	23.7	28	63.9	5	76.6	5	20.9
12	124.9	29	29.4	6	62.2		
13	141.0	30	19.7	Ara-1	101.7		
14	41.2	16-Ac-1	169.8	2	81.3		
15	31.0	2	22.0	3	72.5		
16	71.3	22-Ac-1	170.5	4	67.7		
17	46.9	2	20.8	5	64.9		

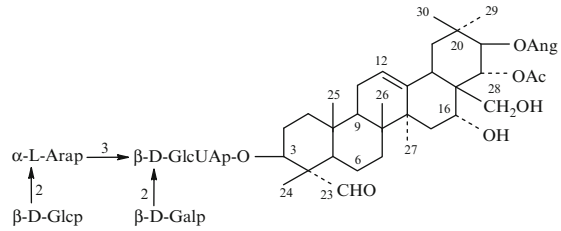
Pharm./Biol.: The saponin mixture from the seeds of the tea plant was found to exhibit inhibitory effect on gastric emptying and an accelerating effect on gastrointestinal transit in mice [1]

References

1. T. Murakami, J. Nakamura, T. Kageura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **48**(11), 1720 (2000)

Assamsaponin G

CAS Registry Number: 316157-16-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol E
Biological source: *Camellia sinensis* [1]
$C_{60}H_{92}O_{28}$: 1260.577
Mp: 187.7–188.5°C [1]
$[\alpha]_D^{26}$ + 14.9° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3454, 1719, 1655, 1076 [1]
FAB-MS (negative ion mode) *m/z*: 1259 $(M\text{-}H)^-$, 1097 $(M\text{-}C_6H_{11}O_5)^-$, 965 $(M\text{-}C_{11}H_{19}O_9)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1283 $(M + Na)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.82, 0.84, 1.08, 1.30, 1.44, 1.77, 1.94, 2.02 (s, CH_3-25, 26, 29, 30, 24, 27, Ac-2, Ang-5), 2.07 (d, J = 5.6, CH_3-4 of Ang), 3.03 (dd-like, H-18), 3.37, 3.59 (both d-like, H_2-28), 4.02 (m, H-3), 4.43 (brs, H-16), 5.39 (brs, H-12), 6.00 (dq-like, H-3 of Ang), 6.14 (d, J = 10.4, H-22), 6.56 (d, J = 10.4, H-21), 9.90 (s, H-23); β-D-GlcUAp: 4.86 (d, J = 7.3, H-1); β-D-Galp: 5.61 (d-like, H-1); β-D-Glcp: 5.10 (d, J = 7.0, H-1); α-L-Arap: 5.75 (d, J = 5.2, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.2	C-18	40.2	GlcUA-1	104.0	Glc-1	105.9
2	25.2	19	47.2	2	78.4	2	75.8
3	84.2	20	36.3	3	84.4	3	78.4
4	55.1	21	78.9	4	71.0	4	71.6
5	48.4	22	74.5	5	77.2	5	78.4
6	20.4	23	209.9	6	171.9	6	62.7
7	32.5	24	11.0	Gal-1	103.5	Ang-1	167.9
8	40.3	25	15.8	2	73.7	2	129.0
9	46.8	26	16.9	3	75.1	3	137.1
10	36.1	27	27.4	4	70.3	4	15.9

(*continued*)

Table 1 (continued)

11	23.8	28	64.0	5	76.6	5	20.9
12	124.0	29	29.5	6	62.2		
13	142.9	30	20.2	Ara-1	101.6		
14	41.7	22-Ac-1	171.1	2	81.3		
15	34.5	2	20.9	3	72.5		
16	68.1			4	67.7		
17	48.0			5	64.9		

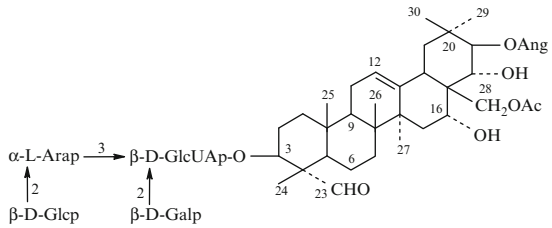
Pharm./Biol.: The saponin mixture from the seeds of the tea plant was found to exhibit inhibitory effect on gastric emptying and an accelerating effect on gastrointestinal transit in mice [1]

References

1. T. Murakami, J. Nakamura, T. Kageura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **48**(11), 1720 (2000)

Assamsaponin H

CAS Registry Number: 316157-17-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol E
Biological source: *Camellia sinensis* [1]
$C_{60}H_{92}O_{28}$: 1260.577
Mp: 206.3–207.6°C [1]
$[\alpha]_D^{26}$ + 41.0° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1719, 1655, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 1259 $(M\text{-}H)^-$, 1097 $(M\text{-}C_6H_{11}O_5)^-$, 965 $(M\text{-}C_{11}H_{19}O_9)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1283 $(M + Na)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.83, 0.95, 1.11, 1.29, 1.44, 1.76, 1.98, 1.99 (s, CH_3-25, 26, 29, 30, 24, 27, Ang-5, Ac-2), 2.04 (d, J = 7.4, CH_3-4 of Ang), 2.81 (dd-like, H-18), 4.04 (dd, J = 4.6, 11.6, H-3), 4.21 (m, H_2-28), 4.44 (d-like, H-22), 4.69 (brs, H-16), 5.43 (brs, H-12), 5.90 (dq-like, H-3 of Ang), 6.42 (d, J = 10.2, H-21), 9.90 (s, H-23)
β-D-GlcUAp: 4.85 (d, J = 7.3, H-1)
β-D-Galp: 5.62 (d, J = 7.6, H-1)
β-D-Glcp: 5.09 (d, J = 7.3, H-1)
α-L-Arap: 5.77 (d, J = 5.3, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.3	C-18	40.6	GlcUA-1	104.0	Glc-1	106.0
2	25.3	19	47.4	2	78.5	2	75.9
3	84.3	20	36.1	3	84.5	3	78.4
4	55.1	21	81.4	4	71.0	4	71.6
5	48.5	22	71.4	5	77.3	5	78.4
6	20.4	23	209.8	6	171.8	6	62.8
7	32.5	24	11.1	Gal-1	103.6	Ang-1	168.7
8	40.4	25	15.8	2	73.7	2	129.6
9	46.8	26	17.0	3	75.2	3	136.0
10	36.0	27	27.4	4	70.3	4	15.9
11	23.9	28	66.5	5	76.6	5	21.0
12	122.7	29	29.8	6	62.2		
13	142.8	30	20.2	Ara-1	101.7		
14	41.9	28-Ac-1	170.6	2	81.3		
15	34.6	2	20.9	3	72.4		
16	67.7			4	67.6		
17	47.1			5	64.9		

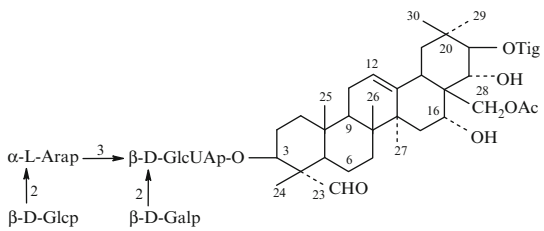
Pharm./Biol.: The saponin mixture from the seeds of the tea plant was found to exhibit inhibitory effect on gastric emptying and an accelerating effect on gastrointestinal transit in mice [1]

References

1. T. Murakami, J. Nakamura, T. Kageura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **48**(11), 1720 (2000)

Assamsaponin I

CAS Registry Number: 316157-18-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol E
Biological source: *Camellia sinensis* [1]
$C_{60}H_{92}O_{28}$: 1260.577
Mp: 208.2–209.5°C [1]
$[\alpha]_D^{26}$ + 35.6° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1719, 1655, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 1259 $(M-H)^-$, 1097 $(M-C_6H_{11}O_5)^-$, 965 $(M-C_{11}H_{19}O_9)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1283 $(M + Na)^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.83, 0.95, 1.10, 1.31, 1.43, 1.76, 1.86, 2.03 (s, CH_3-25, 26, 29, 30, 24, 27, Tig-5, Ac-2), 1.61 (d, J = 7.2, CH_3-4 of Tig), 2.83 (dd-like, H-18), 4.04 (m, H-3), 4.26 (m, H_2-28), 4.47 (m, H-22), 4.70 (brs, H-16), 5.50 (brs, H-12), 6.38 (d, J = 10.0, H-21), 7.00 (dq-like, H-3 of Tig), 9.89 (s, H-23)
β-D-GlcUAp: 4.85 (d, J = 7.2, H-1)
β-D-Galp: 5.60 (d, J = 7.2, H-1)
β-D-Glcp: 5.09 (d, J = 6.5, H-1)
α-L-Arap: 5.76 (d, J = 4.5, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.3	C-18	40.6	GlcUA-1	104.0	Glc-1	106.0
2	25.3	19	47.4	2	78.4	2	75.8
3	84.3	20	36.3	3	84.5	3	78.4
4	55.1	21	81.7	4	71.0	4	71.6
5	48.5	22	71.7	5	77.2	5	78.4
6	20.4	23	209.9	6	171.8	6	62.7
7	32.5	24	11.1	Gal-1	103.6	Tig-1	168.6
8	40.4	25	15.8	2	73.7	2	129.9
9	46.9	26	17.0	3	75.1	3	136.3
10	36.1	27	27.4	4	70.3	4	14.1
11	23.9	28	66.5	5	76.6	5	12.5
12	122.7	29	29.8	6	62.1		
13	142.8	30	20.1	Ara-1	101.7		
14	41.9	28-Ac-1	170.7	2	81.2		
15	34.6	2	20.7	3	72.4		
16	67.7			4	67.6		
17	47.1			5	64.9		

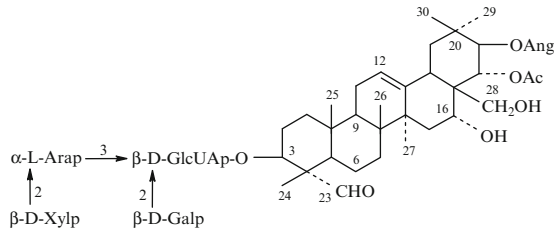
Pharm./Biol.: The saponin mixture from the seeds of the tea plant was found to exhibit inhibitory effect on gastric emptying and an accelerating effect on gastrointestinal transit in mice [1]

References

1. T. Murakami, J. Nakamura, T. Kageura, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **48**(11), 1720 (2000)

Theasaponin E_1

CAS Registry Number: 220114-28-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol E
Biological source: *Camellia sinensis* [1]
$C_{59}H_{90}O_{27}$: 1230.566
Mp: 246–248°C [1]
$[\alpha]_D^{25}$ + 8.9° (c 1.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3433, 2923, 1724, 1616, 1361, 1261, 1040 [1]
LSI-MS *m/z*: 1253 $(M + Na)^+$, 1269 $(M + K)^+$ [1]
^{1}H NMR (C_5D_5N): 0.83, 0.84, 1.08, 1.31, 1.46, 1.78 (s, CH_3-25, 26, 29, 30, 24, 27), 1.94 (s, Ac-CH_3-2), 2.02 (s, CH_3-5 of Ang), 2.10 (d, J = 7.0, CH_3-4 of Ang), 5.39 (brs, H-12), 5.99 (dq-like, H-3 of Ang), 6.16 (d, J = 10.1, H-22), 6.57 (d, J = 10.1, H-21), 9.89 (s, H-23)
β-D-GlcUAp: 4.84 (d, J = 7.3, H-1)
β-D-Galp: 5.72 (d, J = 7.6, H-1)
β-D-Xylp: 5.00 (d, J = 7.6, H-1)
α-L-Arap: 5.70 (d, J = 6.5, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.3	C-18	40.2	GlcUA-1	104.1	Xyl-1	107.0
2	25.2	19	47.2	2	78.4	2	75.9
3	84.5	20	36.3	3	84.2	3	78.2
4	55.2	21	78.9	4	70.8	4	70.8
5	48.4	22	74.5	5	77.3	5	67.5
6	20.4	23	209.8	6	171.8		

(*continued*)

Table 1 (continued)

7	32.5	24	11.0	Gal-1	103.2	Ang-1	167.9
8	40.4	25	15.8	2	73.7	2	129.0
9	46.8	26	16.9	3	75.3	3	137.0
10	36.1	27	27.4	4	70.5	4	15.9
11	23.8	28	64.0	5	76.5	5	21.0
12	123.1	29	29.5	6	62.1		
13	142.9	30	20.3	Ara-1	101.7		
14	41.8	22-Ac-1	171.1	2	82.3		
15	34.6	2	20.9	3	73.4		
16	68.1			4	68.4		
17	48.0			5	66.1		

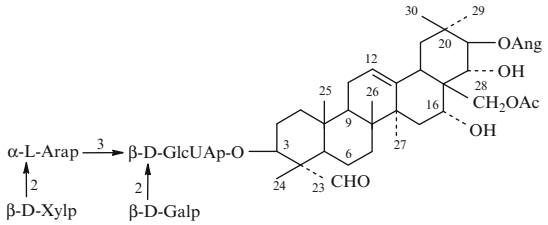
Pharm./Biol.: Antisweet activity [1]

References

1. I. Kitagawa, K. Hori, T. Motozawa, T. Murakami, M. Yoshikawa, Chem. Pharm. Bull. **46**(12), 1901 (1998)

Theasaponin E_2

CAS Registry Number: 220114-30-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Theasapogenol E

Biological source: *Camellia sinensis* [1]

$C_{59}H_{90}O_{27}$: 1230.556

Mp: 240–242°C [1]

$[\alpha]_D^{25}$ + 22.2° (c 1.2, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 2920, 1716, 1614, 1384 [1]

LSI-MS *m/z*: 1253 $(M + Na)^+$, 1269 $(M + K)^+$ [1]

^{1}H NMR (C_5D_5N): 0.86, 0.91, 1.07, 1.28, 1.44, 1.69 (s, CH_3-25, 26, 29, 30, 24, 27), 2.01 (s, CH_3-5 of Ang), 2.07 (d, J = 6.8, CH_3-4 of Ang), 2.11 (s, Ac-CH_3-2), 5.46 (brs, H-12), 6.03 (dq-like, H-3 of Ang), 6.28 (d, J = 8.8, H-21), 9.75 (s, H-23)
β-D-GlcUAp: 4.75 (d, J = 6.8, H-1)
β-D-Galp: 5.53 (d, J = 7.3, H-1)
β-D-Xylp: 5.06 (d, J = 6.8, H-1)
α-L-Arap: 5.61 (d, J = 5.6, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

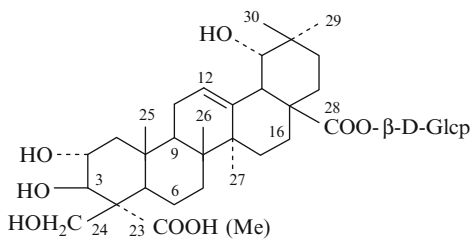
C-1	38.3	C-18	40.5	GlcUA-1	104.2	Xyl-1	107.0
2	25.3	19	47.3	2	78.3	2	75.9
3	84.5	20	36.5	3	84.4	3	78.1
4	55.3	21	81.5	4	70.9	4	70.9
5	48.4	22	71.4	5	77.3	5	67.5
6	20.5	23	209.8	6	171.8		
7	32.6	24	11.1	Gal-1	103.3	Ang-1	167.9
8	40.4	25	15.8	2	73.7	2	129.0
9	46.9	26	17.0	3	75.3	3	137.0
10	36.2	27	27.2	4	70.4	4	15.9
11	23.8	28	66.5	5	76.5	5	21.0
12	123.2	29	29.5	6	62.3		
13	142.9	30	20.3	Ara-1	101.7		
14	42.0	28-Ac-1	170.5	2	82.3		
15	34.8	2	20.6	3	73.5		
16	67.7			4	68.4		
17	47.2			5	66.2		

Pharm./Biol.: Antisweet activity [1]

References

1. I. Kitagawa, K. Hori, T. Motozawa, T. Murakami, M. Yoshikawa, Chem. Pharm. Bull. **46**(12), 1901 (1998)

Trachelosperoside D-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Trachelosperogenin D
Biological source: *Trachelospermum asiaticum* [1]
$C_{37}H_{58}O_{13}$: 710.387
$[\alpha]_D^{25}$ + 27.5° (c 1.7, MeOH) [1]
FAB-MS *m/z*: 733 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.50 (brs, H-12), 3.53 (brs, H-18), 3.56 (brd, J = 6.0, Hβ-19), 6.04 (d, J = 6.0, HO-19), 3.72 (s, COOMe), 0.99, 1.15, 1.19, 1.27, 1.57 (s, $CH_3 \times 5$)
β-D-Glcp: 6.38 (d, J = 8.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

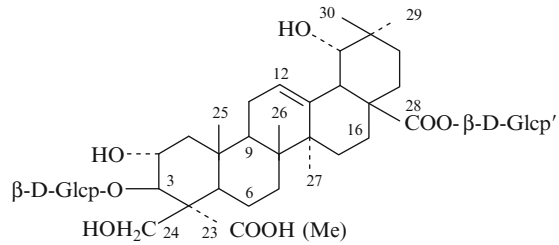
Table 1

C-1	47.9	C-16	27.9	Glc-1	95.8
2	68.3	17	46.4	2	74.1
3	81.8	18	44.5	3	78.9
4	59.1	19	80.9	4	71.0
5	53.1	20	35.5	5	79.3
6	22.6	21	28.9	6	62.3
7	33.4	22	33.0		
8	40.3	23	176.6		
9	48.9	24	62.1		
10	38.3	25	17.3		
11	24.4	26	17.2		
12	123.4	27	24.7		
13	144.3	28	177.1		
14	41.9	29	28.7		
15	29.0	30	24.6		
		OMe	51.8		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**, 1833 (1987)

Trachelosperoside D-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Trachelosperogenin D
Biological source: *Trachelospermum asiaticum* [1]
$C_{43}H_{68}O_{18}$: 872.440
$[\alpha]_D^{31}$ + 3.6° (c 0.95, MeOH) [1]
FAB-MS: *m/z* 895 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 5.49 (brs, H-12), 3.53 (brs, H-18), 3.58 (brd, J = 6.0, Hβ-19), 6.09 (d, J = 6.0, HO-19), 3.91 (s, COOMe), 0.99, 1.15, 1.18, 1.23, 1.60 (s, $CH_3 \times 5$)
β-D-Glcp: 4.95 (d, J = 8.0, H-1)
β-D-Glcp′: 6.37 (d, J = 8.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	47.3	C-16	27.9	Glc-1	105.8
2	66.4	17	46.4	2	74.8
3	92.0	18	44.6	3	78.7
4	59.2	19	80.9	4	71.5
5	53.3	20	35.5	5	78.3
6	22.7	21	28.9	6	62.5
7	33.5	22	33.0	Glc′-1	95.8
8	40.3	23	176.3	2	74.1
9	48.6	24	62.0	3	78.9

(*continued*)

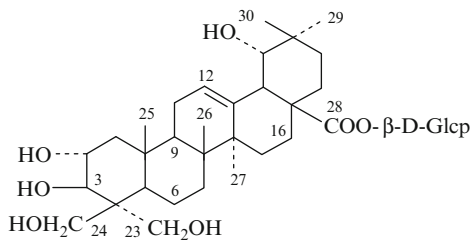
Table 1 (continued)

10	38.2	25	16.5	4	71.1
11	24.4	26	17.1	5	79.3
12	123.3	27	24.7	6	62.2
13	144.3	28	177.1		
14	42.0	29	28.7		
15	29.0	30	24.6		
		OMe	52.1		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**, 1833 (1987)

Trachelosperoside E-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Trachelosperogenin E

Biological source: *Trachelospermum asiaticum* [1]

$C_{36}H_{58}O_{12}$: 682.392

$[\alpha]_D^{31}$ + 15.5° (c 0.60, MeOH) [1]

FAB-MS *m/z*: 705 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.50 (brs, H-12), 3.52 (brs, H-18), 3.56 (brt, J = 5.0, Hβ-19), 6.00 (d, J = 5.0, HO-19), 4.01, 4.64 (d, J = 11.0, H_2-23), 4.27, 4.89 (d, J = 11.0, H_2-24), 0.98, 1.14, 1.18, 1.20, 1.56 (s, $CH_3 \times 5$)

β-D-Glcp: 6.39 (d, J = 8.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

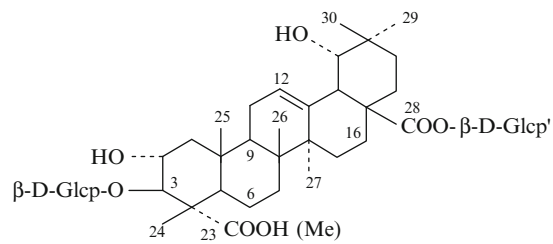
Table 1

C-1	47.6	C-16	28.0	Glc-1	95.8
2	69.0	17	46.4	2	74.1
3	79.8	18	44.6	3	78.9
4	47.9	19	81.0	4	71.1
5	48.6	20	35.5	5	79.2
6	19.4	21	28.9	6	62.2
7	33.3	22	33.0		
8	40.3	23	64.3		
9	48.4	24	62.9		
10	38.3	25	17.5		
11	24.5	26	17.2		
12	123.5	27	24.8		
13	144.3	28	177.1		
14	42.1	29	28.7		
15	29.0	30	24.6		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**, 1833 (1987)

Trachelosperoside F-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Trachelosperogenin F
Biological source: *Trachelospermum asiaticum* [1]
$C_{43}H_{68}O_{17}$: 856.445
$[\alpha]_D^{25}$ + 0.8° (c 0.52, MeOH) [1]
FAB-MS *m/z*: 879 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 5.48 (brs, H-12), 3.52 (brs, H-18), 3.57 (brt, J = 6.0, Hβ-19), 6.04 (d, J = 6.0, HO-19), 3.88 (s, COOMe), 0.98, 1.00, 1.12, 1.15, 1.50, 1.58 (s, $CH_3 \times 6$)
β-D-Glcp: 4.88 (d, J = 8.0, H-1)
β-D-Glcp′: 6.36 (d, J = 8.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

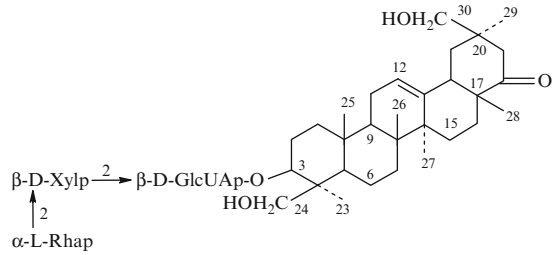
C-1	47.0	C-16	27.9	Glc-1	106.1
2	66.6	17	46.4	2	74.7
3	92.3	18	44.5	3	78.5
4	54.6	19	80.9	4	71.4
5	52.6	20	35.5	5	78.4
6	20.9	21	28.9	6	62.5
7	33.0	22	32.7	Glc′-1	95.8
8	40.2	23	177.1	2	74.1
9	48.5	24	13.5	3	78.9
10	38.1	25	17.4	4	71.1
11	24.1	26	17.2	5	79.2
12	123.3	27	24.8	6	62.2
13	144.3	28	177.3		
14	42.1	29	28.7		
15	28.9	30	24.6		
		OMe	52.2		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**, 1833 (1987)

Wistariasaponin A

CAS Registry Number: 126594-36-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Wistariasapogenol A
Biological source: *Wisteria brachybotrys* [1]
$C_{48}H_{76}O_{18}$: 940.503
$[\alpha]_D^{20}$ −18.8° (c 0.65, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1720, 1695 [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 5.33 (t like, H-12), 2.57 (brs, H_2-21)
β-D-GlcUAp: 5.00 (d, J = 7.6, H-1), 3.76 (s, $COOCH_3$)
β-D-Xylp: 5.70 (d, J = 7.7, H-1)
α-L-Rhap: 6.37 (d, J = 1.2, H-1), 1.81 (d, J = 6.1, CH_3-6) [1]
^{13}C NMR (75 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	38.76	C-16	27.31	GlcUA-1	105.47	Rha-1	102.31
2	26.64	17	47.78	2	78.63	2	72.34
3	91.12	18	47.39	3	76.81	3	72.67
4	44.30	19	42.84	4	73.61	4	74.30
5	56.35	20	38.87	5	77.55	5	69.38
6	18.60	21	46.99	6	170.44	6	18.91
7	33.13	22	216.24	OMe	52.14		
8	39.78	23	22.94	Xyl-1	102.55		

(*continued*)

Table 1 (continued)

9	47.62	24	62.84	2	79.41
10	36.54	25	15.52	3	78.06
11	23.95	26	16.83	4	70.84
12	123.62	27	25.35	5	66.80
13	142.17	28	21.29		
14	42.10	29	26.97		
15	25.44	30	68.21		

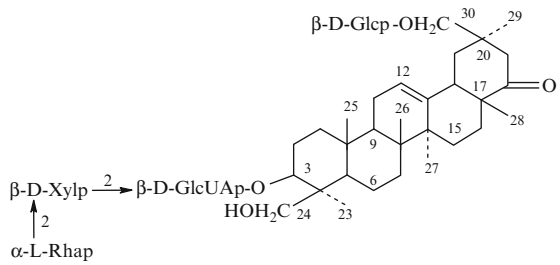
Pharm./Biol.: Anti-tumor promoter [2]

References

1. T. Konoshima, M. Kozuka, M. Haruna, K. Ito, T. Kimura, H. Tokuda, Chem. Pharm. Bull. **37**(10), 2731 (1989)
2. T. Konoshima, M. Takasaki, M. Kozuka, H. Tokuda, J. Nat. Prod. **50**, 1167 (1987)

Wistariasaponin A_2

CAS Registry Number: 167324-12-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Wistariasapogenol A

Biological source: *Wisteria brachybotrys* [1]

$C_{53}H_{84}O_{23}$: 1088.540

$[\alpha]_D$ −12.3° (c 0.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1695 [1]

FAB-MS *m/z*: 1087 $[M\text{-}H]^-$, 941 $[M\text{-}H\text{-}Rha]^-$, 809 $[M\text{-}H\text{-}Rha\text{-}Xyl]^-$, 471 $[M\text{-}H\text{-}Rha\text{-}Gal\text{-}GlcUA]^-$ [1]

HR-FAB-MS *m/z*: 1111.5267 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.74, 0.86, 1.10, 1.14, 1.27, 1.55 (s, CH_3 × 6), 5.40 (s, H-12), 6.37 (H-1 of Rha), 1.82 (d, J = 6.4, CH_3-6 of Rha) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

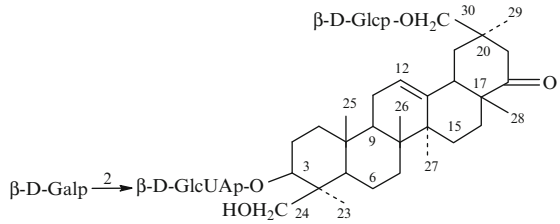
C-1	38.7	C-16	27.0	GlcUA-1	105.1	Rha-1	102.3
2	26.5	17	47.6	2	78.7	2	72.3
3	90.9	18	46.7	3	77.4	3	72.6
4	44.2	19	42.5	4	73.8	4	74.3
5	56.2	20	37.9	5	77.6	5	69.3
6	18.5	21	46.7	6	172.4	6	18.8
7	33.0	22	216.0	Xyl-1	102.4	Glc-1	105.4
8	39.7	23	22.9	2	79.3	2	75.0
9	47.4	24	62.7	3	77.8	3	78.3
10	36.4	25	15.4	4	70.8	4	71.5
11	23.8	26	16.7	5	66.7	5	78.5
12	124.1	27	25.1			6	62.7
13	141.7	28	21.0				
14	41.9	29	27.0				
15	25.1	30	75.6				

References

1. J. Kinjo, Y. Fujishima, K. Saino, R.-H. Tian, T. Nohara, Chem. Pharm. Bull. **43**(4), 636 (1995)

Wistariasaponin A_3

CAS Registry Number: 167324-13-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Wistariasapogenol A
Biological source: *Wisteria brachybotrys* [1]
$C_{48}H_{76}O_{20}$: 972.492 (Me ester)
$[\alpha]_D^{25}$ + 11.2° (c 0.38, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3390, 1695 [1]
FAB-MS *m/z*: 971 $[M\text{-}H]^-$, 809 $[M\text{-}H\text{-}Gal]^-$ [1]
HR-FAB-MS *m/z*: 973.5015 $[M + H]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.71, 0.84, 1.11, 1.14, 1.23, 1.37 (s, CH_3 × 6), 5.40 (brs, H-12) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

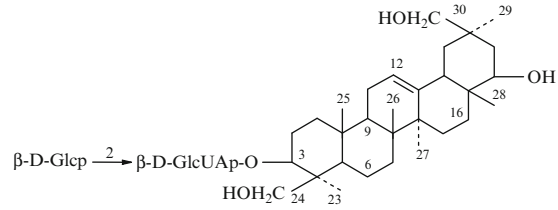
C-1	38.3	C-16	26.8	GlcUA-1	104.9	Glc-1	105.1
2	26.4	17	47.5	2	80.6	2	74.9
3	90.4	18	46.6	3	77.0	3	78.2
4	43.6	19	42.4	4	73.4	4	71.4
5	55.8	20	37.8	5	77.8	5	78.4
6	18.4	21	46.6	6	172.5	6	62.6
7	32.9	22	216.1	Gal-1	104.7		
8	39.5	23	22.5	2	72.8		
9	47.3	24	63.3	3	75.2		
10	36.2	25	15.4	4	70.7		
11	23.7	26	16.6	5	77.4		
12	123.9	27	25.1	6	62.3		
13	141.6	28	20.9				
14	41.7	29	26.9				
15	25.2	30	75.5				

References

1. J. Kinjo, Y. Fujishima, K. Saino, R.-H. Tian, T. Nohara, Chem. Pharm. Bull. **43**(4), 636 (1995)

Palustroside II

CAS Registry Number: 214692-91-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Wistariasapogenol B
Biological source: *Lathyrus palustris* [1]
$C_{42}H_{68}O_{15}$: 812.455
$[\alpha]_D^{25}$ + 0.5° (c 0.68, C_5H_5N) [1]
FAB-MS (negative ion mode) *m/z*: 811 $(M\text{-}H)^-$, 649 $(M\text{-}H\text{-}Glc)^-$
^{1}H NMR (J/Hz, C_5D_5N): 0.69, 0.91, 1.18, 1.21, 1.25, 1.35 (s, CH_3 × 6), 5.35 (s, H-12)
β-D-Glcp: 5.48 (d, J = 7.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.7	C-16	19.0	GlcUA-1	104.5
2	26.5	17	38.1	2	80.8
3	91.0	18	45.5	3	75.3
4	43.7	19	42.0	4	73.1
5	56.3	20	35.9	5	78.0
6	18.7	21	38.3	6	175.9
7	33.4	22	75.3	Glc-1	104.2
8	39.9	23	22.7	2	75.4
9	47.8	24	63.4	3	77.8
10	36.4	25	15.7	4	70.1
11	24.0	26	17.1	5	78.0

(*continued*)

Table 1 (continued)

12	123.0	27	25.6	6	61.7
13	144.4	28	21.0		
14	42.4	29	28.0		
15	26.3	30	70.1		

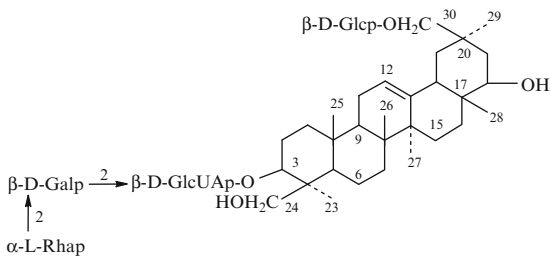
Pharm./Biol.: Hepatoprotective activity [1]

References

1. M. Udayama, M. Ohkawa, N. Yoshida, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **46**(9), 1412 (1998)

Subproside V

CAS Registry Number: 148077-22-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Wistariasapogenol B

Biological source: *Abrus cantoniensis* [1], *Wisteria brachybotrys* [2], *Pueraria thomsonii* [3]

$C_{54}H_{88}O_{24}$: 1120.566

$[\alpha]_D^{25}$ + 2.1° (c 0.4, MeOH) [2]

IR (KBr) ν_{max} cm^{-1}: 3400, 1735 [2]

FAB-MS *m/z*: 1119 $[M-H]^-$, 973 $[M-H-Rha]^-$, 811 $[973-Gal]^-$, 635 [M-H-Rha-Gal-GlcUA [2]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.70, 0.83, 1.13, 1.16, 1.23, 1.41 (s, CH_3 × 6), 1.78 (d, J = 5.9, CH_3-6 of Rha), 5.32 (s, H-12), 5.41 (d, J = 7.8, H-1 of Gal), 5.85 (s, H-1 of Rha) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.9	C-16	28.8	GlcUA-1	104.7	Rha-1	101.9
2	26.5	17	38.1	2	78.0	2	71.7
3	91.8	18	45.2	3	77.3	3	71.8
4	44.1	19	42.0	4	73.6	4	74.8
5	56.4	20	35.1	5	77.6	5	69.6
6	18.7	21	37.1	6	176.2	6	18.5
7	33.5	22	75.9	Gal-1	101.9	Glc-1	104.7
8	40.0	23	23.0	2	77.6	2	75.5
9	48.0	24	63.6	3	76.6	3	77.6
10	36.6	25	16.0	4	71.0	4	71.2
11	24.1	26	17.3	5	77.2	5	77.6
12	123.4	27	25.8	6	62.1	6	62.3
13	144.2	28	20.9				
14	42.5	29	28.3				
15	26.3	30	77.9				

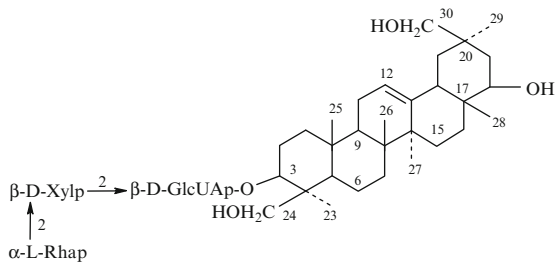
Pharm./Biol.: *Abrus cantoniensis* Hance used as a folk medicine for hepatitis in China [1]

References

1. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)
2. J. Kinjo, Y. Fujishima, K. Saino, R. Tian, T. Nohara, Chem. Pharm. Bull. **43**(4), 636 (1995)
3. T. Arao, T. Idzu, J. Kinjo, T. Nohara, R. Isobe, Chem. Pharm. Bull. **44**(10), 1970 (1996)

Wistariasaponin B_1

CAS Registry Number: 126594-45-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Wistariasapogenol B
Biological source: *Wisteria brachybotrys* [1]
$C_{48}H_{78}O_{18}$: 942.518 (Me ester)
$[\alpha]_D^{20}$ −10.9° (c 0.87, MeOH) (Me ester) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1710 [1]
FAB-MS *m/z*: 941 $(M-1)^-$, 795 $(M\text{-}Rha)^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 5.37 (t-like, J = 1.0, H-12), 1.52, 1.35, 1.23, 1.16, 1.05, 0.86 (s, CH_3 × 6), 4.34, 3.52 (d, J = 11.7, H_2-24), 3.80, 3.93 (d, J = 10.4, H_2-30)
β-D-GlcUAp: 4.92 (d, J = 7.8, H-1), 4.26 (dd, J = 8.9, 7.8, H-2), 4.42 (t, J = 8.9, H-3), 4.30 (dd, J = 9.5, 9.0, H-4), 4.43 (d, J = 9.5, H-5), 3.77 (s, COOMe)
β-D-Xylp: 5.49 (d, J = 7.6, H-1), 4.22 (dd, J = 9.0, 7.6, H-2), 4.02 (t, J = 9.0, H-3), 4.32 (dd, J = 9.7, 5.6, H-5), 3.48 (t, J = 10.4, H-5)
α-L-Rhap: 6.16 (d, J = 1.2, H-1), 4.63 (dd, J = 3.4, 1.7, H-2), 4.51 (dd, J = 9.3, 3.4, H-3), 4.16 (t, J = 9.3, H-4), 4.82 (dq, J = 6.5, 3.2, H-5), 1.72 (d, J = 6.4, CH_3-6) [1]
^{13}C NMR (75 MHz, C_5D_5N) (Me ester): [1]

Table 1

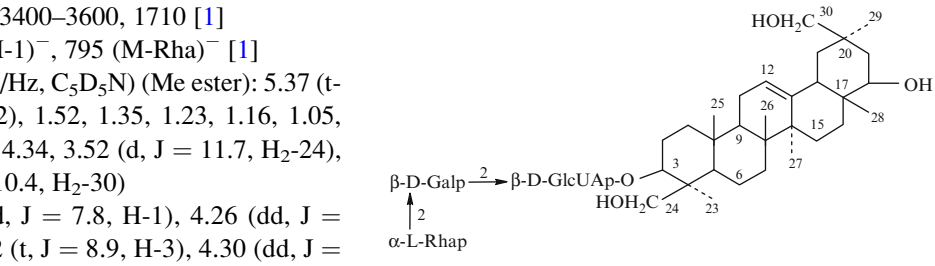
C-1	38.85	C-16	28.71	GlcUA-1	105.48	Rha-1	102.36
2	26.69	17	38.08	2	78.63	2	72.39
3	91.13	18	45.17	3	76.83	3	72.74
4	44.35	19	42.07	4	73.65	4	74.34
5	56.40	20	35.90	5	77.58	5	69.45
6	18.66	21	33.74	6	170.46	6	18.95
7	33.28	22	75.22	COOMe	52.13		
8	39.95	23	22.99	Xyl-1	102.58		
9	47.76	24	62.88	2	79.47		
10	36.55	25	15.60	3	78.17		
11	24.00	26	17.01	4	70.88		
12	122.74	27	25.79	5	66.86		
13	144.63	28	21.25				
14	42.40	29	28.52				
15	26.39	30	70.25				

References

1. T. Konoshima, M. Kozuka, M. Haruna, K. Ito, T. Kimura, H. Tokuda, Chem. Pharm. Bull. **37**(10), 2731 (1989)

Wistariasaponin B_2

CAS Registry Number: 126594-46-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Wistariasapogenol B
Biological source: *Wisteria brachybotrys* [1], *Abrus cantoniensis* [2]
$C_{48}H_{78}O_{19}$: 958.513
$[\alpha]_D^{20}$ −7.9° (c 1.21, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400–3600, 1710 [1]
FAB-MS *m/z*: 957 $[M-H]^-$, 811 $[M\text{-}Rha\text{-}H]^-$, 649 $[M\text{-}H\text{-}Rha\text{-}Gal]^-$ [2]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N) (Me ester): 0.70, 0.94, 1.18, 1.23, 1.31, 1.44 (s, CH_3 × 6), 5.29 (t-like, H-12)
β-D-GlcUAp: 4.97 (d, J = 7.8, H-1), 3.76 (s, COOMe)
β-D-Galp: 5.78 (d, J = 7.3, H-1)
α-L-Rhap: 6.29 (d, J = 1.2, H-1), 1.77 (d, J = 5.9, CH_3-6) [1]
^{13}C NMR (75 MHz, C_5D_5N) (Me ester): [1]

Table 1

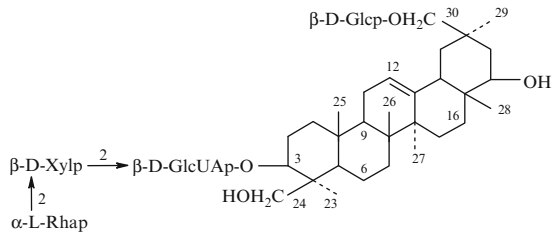
C-1	38.66	C-16	28.66	GlcUA-1	105.48	Rha-1	102.41
2	26.64	17	38.04	2	78.09	2	72.35
3	91.33	18	45.10	3	76.43	3	72.68
4	43.89	19	42.05	4	72.65	4	74.35
5	56.08	20	35.87	5	76.55	5	69.28
6	18.51	21	38.60	6	170.39	6	18.95
7	33.28	22	75.20	COOMe	52.18		
8	39.90	23	22.95	Gal-1	101.71		
9	47.78	24	63.56	2	77.76		
10	36.43	25	15.80	3	73.56		
11	23.98	26	16.94	4	71.08		
12	122.64	27	25.76	5	76.92		
13	144.64	28	21.19	6	61.56		
14	42.32	29	28.48				
15	26.38	30	70.23				

References

1. T. Konoshima, M. Kozuka, M. Haruna, K. Ito, T. Kimura, H. Tokuda, Chem. Pharm. Bull. **37**(10), 2731 (1989)
2. H. Miyao, Y. Sakai, T. Takeshita, J. Kinjo, T. Nohara, Chem. Pharm. Bull. **44**(6), 1222 (1996)

Wistariasaponin B_3

CAS Registry Number: 167324-11-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Wistariasapogenol B

Biological source: *Wisteria brachybotrys* [1]

$C_{53}H_{86}O_{23}$: 1090.555

$[\alpha]_D^{28}$ −2.0° (c 0.34, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3405, 1725 [1]

FAB-MS *m/z*: 1089 $[M\text{-}H]^-$, 943 [M-H-Rha]$^-$, 811 [M-H-Rha-Xyl]$^-$, 635 [M-H-Rha-Xyl-GlcUA]$^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.74, 0.95, 1.18, 1.22, 1.30, 1.50 (s, CH_3 × 6), 5.37 (s, H-12)

α-L-Rhap: 6.33 (brs, H-1), 1.80 (d, J = 5.0, CH_3-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.6	C-16	27.9	GlcUA-1	105.0	Rha-1	101.9
2	26.2	17	37.7	2	78.4	2	72.1
3	90.8	18	44.3	3	77.0	3	72.4
4	44.1	19	42.1	4	73.7	4	74.1
5	56.1	20	34.8	5	77.6	5	69.1
6	18.4	21	36.9	6	173.7	6	18.7
7	33.0	22	75.2	Xyl-1	102.3	Glc-1	105.5
8	39.8	23	22.8	2	79.2	2	75.2
9	47.5	24	62.7	3	78.2	3	78.2
10	36.3	25	15.4	4	70.6	4	71.4
11	23.8	26	16.8	5	66.6	5	78.4
12	122.7	27	25.9			6	62.5
13	144.2	28	21.1				
14	42.1	29	28.9				
15	26.4	30	77.6				

References

1. J. Kinjo, Y. Fujishima, K. Saino, R.-H. Tian, T. Nohara, Chem. Pharm. Bull. **43**(4), 636 (1995)

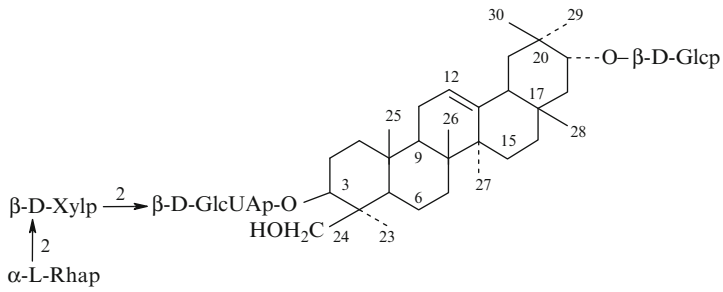
Wistariasaponin YC_1

CAS Registry Number: 167324-10-9

See Figure Wistariasaponin YC

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Yunganogenin C

Biological source: *Wisteria brachybotrys* [1]



Wistariasaponin YC_1

$C_{53}H_{86}O_{22}$: 1074.561
$[\alpha]_D^{25}$ −50.2° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3405, 1610 [1]
FAB-MS *m/z*: 1073 $[M-H]^-$, 927 $[M-H-Rha]^-$, 795 $[M-H-Rha-Xyl]^-$, 619 $[M-H-Rha-Xyl-GlcUA]^-$ [1]
HR-FAB-MS *m/z*: 1097.5508 [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.69, 0.87, 0.99, 1.08, 1.21, 1.24, 1.40 ($CH_3 \times 7$), 5.25 (H-12), 6.05 (H-1 of Rha), 1.81 (d, J = 5.5, CH_3-6 of Rha) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.2	C-16	30.5	GlcUA-1	104.9	Rha-1	101.4
2	26.6	17	33.2	2	78.6	2	71.9
3	91.3	18	47.3	3	76.8	3	72.0
4	44.1	19	43.6	4	73.8	4	73.8
5	56.5	20	35.4	5	77.7	5	69.5
6	18.6	21	80.9	6	176.3	6	18.6
7	33.3	22	38.9	Xyl-1	102.4	Glc-1	102.0
8	39.9	23	22.7	2	78.8	2	74.9
9	47.9	24	62.6	3	77.9	3	77.9
10	36.5	25	15.7	4	70.5	4	71.7
11	24.2	26	17.1	5	66.4	5	78.1
12	122.5	27	25.9			6	63.0
13	145.5	28	28.7				
14	42.3	29	28.4				
15	26.6	30	25.6				

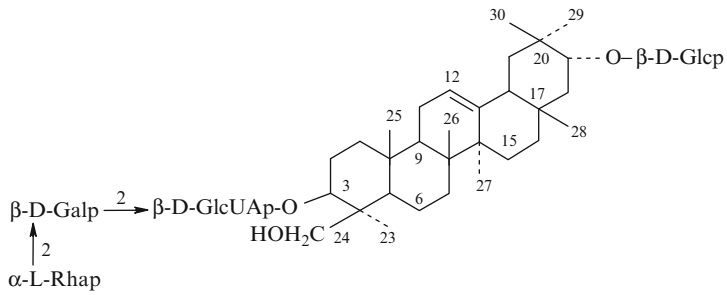
(*continued*)

References

1. J. Kinjo, Y. Fujishima, K. Saino, R.-H. Tian, T. Nohara, Chem. Pharm. Bull. **43**(4), 636 (1995)

Wistariasaponin YC_2

CAS Registry Number: 167359-43-5
See Figure Wistariasaponin YC_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Oleanene Type – Yunganogenin C
Biological source: *Wisteria brachybotrys* [1]
$C_{54}H_{88}O_{23}$: 1104.571
$[\alpha]_D$ −31.9° (c 0.35, C_5H_5N:H_2O, 1:1) [1]



Wistariasaponin YC_2

IR (KBr) ν_{max} cm^{-1}: 3400, 1610 [1]
HR-FAB-MS *m/z*: 1127.5614 $[M + Na]^+$ [1]
FAB-MS *m/z*: 1103 $[M-H]^-$, 957 $[M-H-Rha]^-$, 795 $[M-H-Rha-Gal]^-$, 619 $[M-H-Rha-Gal-GlcUA]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.70, 0.89, 0.99, 1.07, 1.22, 1.25, 1.39 (s, CH_3 × 7), 5.27 (H-12), 6.03 (H-1 of Rha), 1.80 (d, J = 5.9, CH_3-6 of Rha) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.2	C-16	30.5	GlcUA-1	105.0	Rha-1	101.8
2	26.6	17	33.2	2	78.2	2	72.0
3	91.5	18	47.3	3	76.5	3	72.1
4	44.0	19	43.6	4	73.8	4	73.9
5	56.3	20	35.4	5	77.9	5	69.5
6	18.7	21	80.7	6	176.1	6	18.7
7	33.4	22	38.8	Gal-1	101.5	Glc-1	102.1
8	39.9	23	23.0	2	77.0	2	75.0
9	48.0	24	63.6	3	75.9	3	77.9
10	36.5	25	15.9	4	71.0	4	71.8
11	24.2	26	17.1	5	77.4	5	78.0
12	122.5	27	25.9	6	61.9	6	62.7
13	145.5	28	28.7				
14	42.3	29	28.4				
15	26.6	30	25.6				

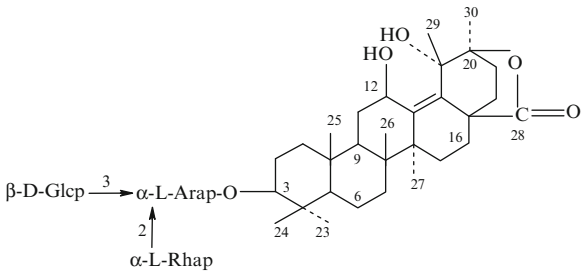
References

1. J. Kinjo, Y. Fujishima, K. Saino, R.-H. Tian, T. Nohara, Chem. Pharm. Bull. **43**(4), 636 (1995)

Glycosides of Aglycones of Ursene Type

Kudinoside A

CAS Registry Number: 181362-75-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – β-Kudinlactone

Biological source: *Ilex kudingcha* [1]

$C_{47}H_{74}O_{18}$: 926.487

Mp: 195–197°C [1]

$[\alpha]_D^{20}$ −67.8° (c 1.7, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3450–3200, 1730, 1640, 1450, 1380, 1070, 1040 [1]

FAB-MS m/z: 926 [M], 763 [M-1-162]$^-$, 701 [M-1-$H_2$0-CO_2-162]$^-$, 467 [M-1-H_2O-162-146-132]$^-$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.88, 0.92, 0.96, 1.29, 1.50, 1.61, 1.64 (s, CH_3 × 7)

α-L-Arap: 4.76 (d, J = 4.5, H-1)

α-L-Rhap: 6.40 (brs, H-1), 1.67 (d, J = 5.9, CH_3-6)

β-D-Glcp: 5.13 (d, J = 7.9, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	26.7	Ara-1	105.5	Rha-1	101.9
2	28.5	17	44.6	2	74.4	2	72.4
3	88.9	18	137.6	3	82.5	3	72.5
4	39.9	19	74.3	4	68.4	4	74.1
5	56.4	20	86.2	5	65.0	5	70.3
6	18.8	21	28.5	Glc-1	104.8	6	18.3
7	35.7	22	32.8	2	75.1		
8	41.9	23	28.3	3	78.2		
9	45.1	24	17.0	4	71.5		
10	37.3	25	16.7	5	78.7		
11	28.9	26	18.6	6	62.6		
12	66.5	27	23.7				
13	146.6	28	176.1				
14	44.3	29	25.4				
15	29.1	30	19.7				

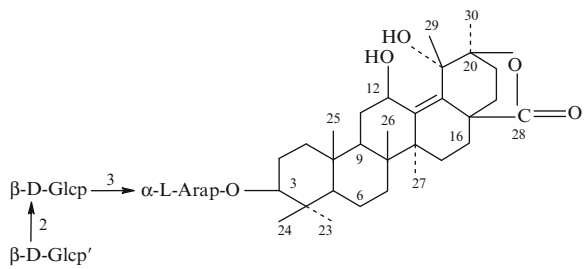
Pharm./Biol.: *Ilex kudingcha* C.J.Tseng is widely used as a traditional beverage, known as Ku-Ding-Cha, in southern China. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

1. M.-A. Ouyang, H.-Q. Wang, Z.-L. Chen, Ch.-R. Yang, Phytochemistry **43**(2), 443 (1996)

Kudinoside B

CAS Registry Number: 181362-76-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – β-Kudinlactone

Biological source: *Ilex kudingcha* [1]

$C_{47}H_{74}O_{19}$: 942.482

Mp: 218–221°C [1]

$[\alpha]_D^{20}$ −16.3° (c 0.19, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3450–3200, 1730, 1640, 1450, 1380, 1070, 1040 [1]

FAB-MS m/z: 942 $[M]^-$, 779 $[M\text{-}1\text{-}162]^-$, 717 $[M\text{-}1\text{-}H_20\text{-}CO_2\text{-}162]^-$, 555 $[M\text{-}1\text{-}H_2O\text{-}CO_2\text{-}(2 \times 162)]^-$, 423 $[M\text{-}1\text{-}H_2O\text{-}CO_2\text{-}(2 \times 162)\text{-}132]^-$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.85, 0.89, 1.14, 1.23, 1.50, 1.60, 1.64 (s, $CH_3 \times 7$)

α-L-Arap: 4.79 (d, J = 7.5, H-1)

β-D-Glcp: 5.17 (d, J = 7.9, H-1); β-D-Glcp′: 5.25 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	26.9	Ara-1	107.2	Glc′-1	106.8
2	28.6	17	44.7	2	71.6	2	76.4
3	89.5	18	137.7	3	86.0	3	77.7
4	39.9	19	74.5	4	69.2	4	70.7
5	56.4	20	86.3	5	67.3	5	77.8
6	18.7	21	28.6	Glc-1	104.7	6	62.2
7	35.6	22	32.9	2	86.2		
8	42.0	23	28.5	3	78.4		
9	45.0	24	17.1	4	70.9		
10	37.3	25	16.7	5	79.3		
11	28.9	26	18.4	6	62.2		
12	66.5	27	23.6				
13	146.7	28	176.2				
14	44.3	29	25.3				
15	28.9	30	19.8				

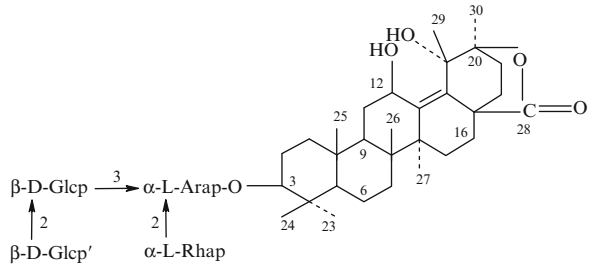
Pharm./Biol.: *Ilex kudingcha* C.J.Tseng is widely used as a traditional beverage, known as Ku-Ding-Cha, in southern China. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

1. M.-A. Ouyang, H.-Q. Wang, Z.-L. Chen, Ch.-R. Yang, Phytochemistry **43**(2), 443 (1996)

Kudinoside C

CAS Registry Number: 181362-77-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – β-Kudinlactone

Biological source: *Ilex kudingcha* [1]

$C_{53}H_{84}O_{23}$: 1088.540

Mp: 185–187°C [1]

$[\alpha]_D^{20}$ −31.0° (c 0.15, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3450–3200, 1728, 1640, 1450, 1380, 1070, 1040 [1]

FAB-MS m/z: 1095 $[M + Li]^+$, 1111 $[M + Na]^+$, 949 $[M + Li\text{-}146]^+$, 931 $[M + Li\text{-}162]^+$, 607 $[132 + 146 + (2 \times 162)]^+$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.85, 0.88, 1.16, 1.23, 1.49, 1.61, 1.64 (s, $CH_3 \times 7$)

α-L-Arap: 4.76 (d, J = 7.0, H-1)

α-L-Rhap: 6.40 (brs, H-1)

β-D-Glcp: 5.13 (d, J = 7.9, H-1), β-D-Glcp′: 5.24 (d, J = 8.0, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	26.8	Ara-1	105.1	Glc′-1	106.4
2	28.2	17	44.1	2	74.4	2	76.2
3	88.5	18	137.8	3	83.0	3	78.2
4	39.6	19	74.4	4	69.4	4	70.5
5	56.3	20	85.7	5	65.8	5	78.9
6	18.6	21	28.3	Glc-1	103.1	6	62.0

(*continued*)

Table 1 (continued)

7	35.5	22	32.9	2	84.9	Rha-1	101.0
8	41.7	23	28.2	3	78.4	2	72.4
9	44.9	24	17.2	4	70.9	3	72.6
10	37.1	25	16.8	5	78.4	4	74.0
11	28.9	26	18.2	6	62.5	5	69.8
12	66.1	27	23.5			6	18.3
13	146.4	28	175.4				
14	43.9	29	25.2				
15	28.9	30	19.5				

Pharm./Biol.: *Ilex kudingcha* C.J.Tseng is widely used as a traditional beverage, known as Ku-Ding-Cha, in southern China. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

1. M.-A. Ouyang, H.-Q. Wang, Z.-L. Chen, Ch.-R. Yang, Phytochemistry **43**(2), 443 (1996)

Stelmatotriterpenoside G

See Figure Stelmatotriterpenoside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,19α-Dihydroxy-ursolic Acid

Biological source: *Stelmacrypton khasianum* [1]

$C_{48}H_{78}O_{21}$: 990.503

Mp: 185–187°C [1]

$[\alpha]_D^{25}$ −138.0° (c 0.06, MeOH) [1]

TOF-MS *m/z*: 881.8 $[M + K]^+$, 865.8 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.91 (s, CH_3-25), 0.98 (s, CH_3-24), 1.07 (d, J = 7.0, CH_3-30), 1.08 (s, CH_3-26), 1.32 (s, CH_3-23), 1.40 (s, CH_3-29), 1.68 (s, CH_3-27), 2.91 (s, H-18), 4.01 (H-2), 3.23 (d, J = 9.2, H-3), 5.52 (t-like, H-12)

β-D-Glcp: 4.92 (d, J = 7.8, H-1), 4.08 (H-2), 4.25 (H-3), 4.21 (H-4), 4.09 (H-5), 4.33, 4.59 (H_2-6)

β-D-Glcp′: 6.19 (d, J = 8.2, H-1), 4.46 (t, J = 8.5, H-2), 4.30 (t, J = 8.5, H-3), 4.25 (H-4), 3.95 (H-5), 4.36, 4.43 (H_2-6)

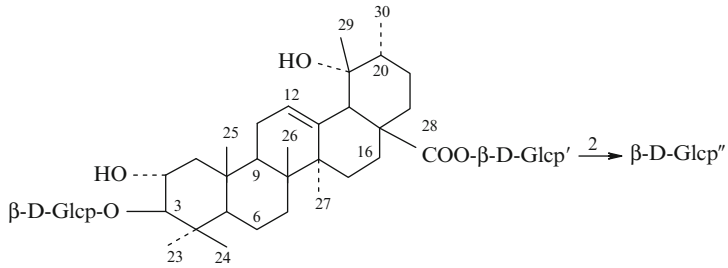
β-D-Glcp″: 5.67 (d, J = 7.7, H-1), 4.09 (H-2), 4.22 (H-3), 4.12 (H-4), 4.00 (H-5), 4.40, 4.62 (H_2-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	47.82	C-16	26.00	Glc-1	106.51	Glc″-1	104.90
2	66.75	17	48.67	2	75.65	2	76.00
3	95.65	18	54.60	3	78.78	3	78.52
4	40.79	19	72.94	4	71.76	4	72.94
5	55.84	20	42.23	5	78.37	5	78.14
6	18.72	21	26.82	6	62.70	6	63.94

(*continued*)



Stelmatotriterpenoside G

Table 1 (continued)

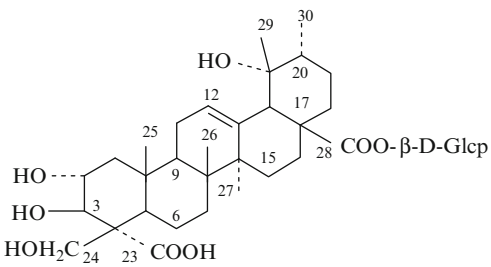
7	33.59	22	37.87	Glc′-1	93.77
8	40.66	23	28.61	2	79.44
9	47.64	24	18.17	3	79.09
10	37.48	25	16.82	4	70.99
11	24.18	26	17.39	5	79.10
12	128.28	27	24.68	6	62.37
13	139.47	28	179.96		
14	42.18	29	27.07		
15	29.86	30	16.69		

Pharm./Biol.: In Chinese folk medicine the plant has been used for the treatment of colds, tracheitis, stomachaches, and rheumatic aches. The preliminary screening test for anti-cancer activity in vitro showed that the crude extracts of *S. khasianum* had significant cytotoxic activity against some human cancer cell lines [1]

References

1. Q. Zhang, Y. Zhao, B. Wang, G. Tu, Chem. Pharm. Bull. **51**(5), 574 (2003)

Trachelosperoside C-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,19α,24-Tetrahydroxy-urs-12-en-23,28-dioic Acid

Biological source: *Trachelospermum asiaticum* [1]

$C_{36}H_{56}O_{13}$: 696.372

Mp: 235–250°C [1]

$[\alpha]_D^{18}$ + 22.7° (c 0.60, MeOH) [1]

FAB-MS *m/z*: 719 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.51 (brs, H-12), 2.92 (s, H-18), 1.23, 1.29, 1.38, 1.60 (s, $CH_3 \times 4$), 1.07 (d, J = 7.0, CH_3-30)

β-D-Glcp: 6.29 (d, J = 8.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

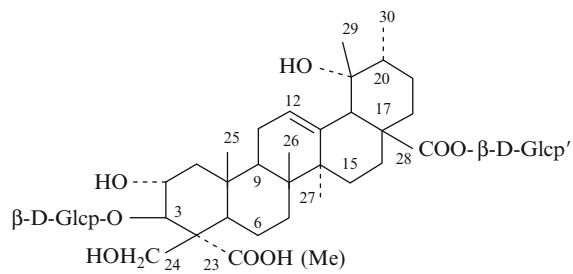
Table 1

C-1	48.6	C-16	26.1	Glc-1	95.9
2	68.6	17	48.6	2	74.1
3	82.2	18	54.4	3	78.9
4	58.6	19	72.7	4	71.2
5	53.0	20	42.0	5	79.3
6	22.7	21	27.0	6	62.3
7	33.9	22	37.7		
8	40.8	23	179.1		
9	48.4	24	63.0		
10	38.7	25	17.2		
11	24.4	26	17.5		
12	128.1	27	24.4		
13	139.2	28	176.9		
14	42.0	29	27.0		
15	29.2	30	16.8		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)

Trachelosperoside C-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,19α,24-Tetrahydroxy-urs-12-en-23,28-dioic Acid

Biological source: *Trachelospermum asiaticum* [1]

$C_{43}H_{68}O_{18}$: 872.440

$[\alpha]_D^{18}$ + 1.4° (c 1.40, MeOH) [1]

FAB-MS *m/z*: 895 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.53 (brs, H-12), 2.93 (s, H-18), 1.23, 1.25, 1.39, 1.66 (s, $CH_3 \times 4$), 1.08 (d, J = 7.0, CH_3-30), 3.89 (COOMe)

β-D-Glcp: 6.30 (d, J = 8.0, H-1)
β-D-Glcp″: 4.95 (d, J = 8.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

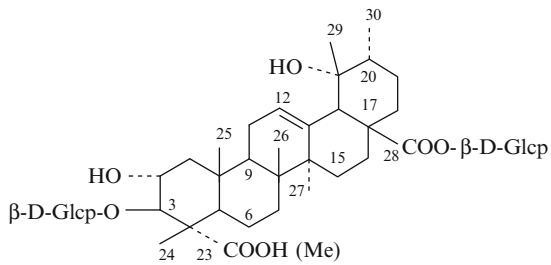
Table 1

C-1	47.7	C-16	26.1	Glc-1	95.8
2	66.5	17	48.6	2	74.0
3	92.0	18	54.4	3	78.9
4	59.3	19	72.6	4	71.2
5	53.3	20	42.1	5	79.2
6	22.6	21	26.7	6	62.4
7	33.8	22	37.6	Glc′-1	105.7
8	40.6	23	176.3	2	74.8
9	48.1	24	62.3	3	78.7
10	38.0	25	16.7	4	71.4
11	24.3	26	17.0	5	78.3
12	128.0	27	24.4	6	62.0
13	139.1	28	176.8		
14	42.0	29	27.0		
15	29.1	30	16.7		
		OMe	52.1		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)

3-O-Glucopyranoside of Suavissimoside RI



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,19α-Trihydroxy-urs-12-en-23,28-dioic Acid

Biological source: *Trachelospermum asiaticum* [1]
$C_{43}H_{68}O_{17}$: 856.445
$[\alpha]_D^{25}$ −2.6° (c 0.57, MeOH) [1]
FAB-MS *m/z*: 879 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.51 (brs, H-12), 2.92 (s, H-18), 1.01, 1.16, 1.38, 1.64, 1.50 (s, CH_3 × 5), 1.07 (d, J = 6.0, CH_3-30), 3.87 (COOMe)
β-D-Glcp: 4.88 (d, J = 8.0, H-1)
β-D-Glcp′: 6.29 (d, J = 8.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

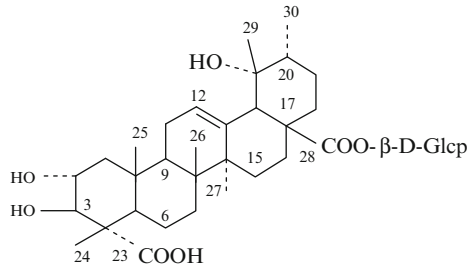
C-1	47.4	C-16	26.0	Glc-1	106.0
2	66.6	17	48.5	2	74.7
3	92.2	18	54.3	3	78.5
4	54.6	19	72.6	4	71.4
5	52.6	20	42.0	5	78.4
6	20.9	21	26.7	6	62.4
7	33.0	22	37.6	Glc′-1	95.8
8	40.6	23	176.8	2	74.0
9	47.9	24	13.5	3	78.9
10	37.9	25	17.3	4	71.3
11	24.0	26	17.2	5	79.1
12	128.0	27	24.4	6	62.4
13	139.1	28	177.3		
14	42.0	29	26.9		
15	29.1	30	16.6		
		COOMe	52.2		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)

Suavissimoside RI

CAS Registry Number: 95645-51-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,19α-Trihydroxy-urs-12-en-23,28-dioic Acid

Biological source: *Trachelospermum asiaticum* [1], *Rubus suavissimus* [2], *R. coreanus* [3]

$C_{36}H_{56}O_{12}$: 680.377

Mp: 260–265°C (MeOH) [1]

$[\alpha]_D^{18}$ + 16.7° (c 0.15, MeOH) [1]

FAB-MS *m/z*: 703 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.54 (brs, H-12), 2.92 (s, H-18), 1.16, 1.21, 1.38, 1.63, 1.72 (s, CH_3 × 5), 1.07 (d, J = 6.0, CH_3-30)

β-D-Glcp: 6.29 (d, J = 8.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

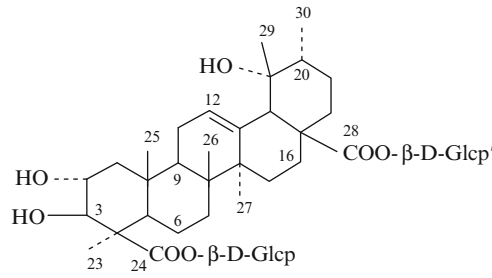
Table 1

C-1	48.3	C-16	26.1	Glc-1	95.8
2	68.7	17	48.6	2	74.0
3	81.0	18	54.4	3	78.9
4	54.8	19	72.7	4	71.3
5	52.3	20	42.1	5	79.2
6	21.5	21	26.7	6	62.4
7	33.3	22	37.7		
8	40.7	23	180.1		
9	48.2	24	13.4		
10	38.6	25	17.4		
11	24.2	26	17.5		
12	128.2	27	24.5		
13	139.2	28	176.9		
14	42.1	29	27.0		
15	29.1	30	16.7		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)
2. F. Gao, F.-H. Chen, T. Tanaka, R. Kasai, T. Seto, O. Tanaka, Chem. Pharm. Bull. **33**(1), 37 (1985)
3. K. Ohtani, C. Miyajima, T. Takahasi, R. Kasai, O. Tanaka, D.-R. Hahn, N. Naruhashi, Phytochemistry **29**(10), 3275 (1990)

Stelmatotriterpenoside H



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,19α-Trihydroxy-urs-12-en-24,28-dioic Acid

Biological source: *Stelmacrypton khasianum* [1]

$C_{42}H_{66}O_{17}$: 842.430

Mp: 219–221°C [1]

$[\alpha]_D^{25}$ + 200.0° (c 0.02, MeOH) [1]

TOF-MS *m/z*: 1013.8 $[M + K]^+$, 997.8 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.05 (d, J = 6.0, CH_3-30), 1.23 (s, CH_3-26), 1.34 (s, CH_3-25), 1.37 (s, CH_3-29), 1.65 (s, CH_3-27), 1.81 (s, CH_3-23), 2.90 (s, H-18), 3.44 (d, J = 9.5, H-3), 4.89 (H-2), 5.50 (t-like, H-12)

β-D-Glcp: 6.33 (d, J = 7.8, H-1), 4.19 (H-2), 4.24 (H-3), 4.29 (H-4), 4.03 (H-5), 4.28, 4.29 (H_2-6)

β-D-Glcp′: 6.24 (d, J = 8.0, H-1), 4.21 (H-2), 4.27 (H-3), 4.24 (H-4), 4.01 (H-5), 4.39, 4.47 (H_2-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	48.70	C-16	26.33	Glc-1	95.96
2	68.17	17	48.80	2	75.17
3	84.22	18	54.48	3	78.88
4	51.04	19	72.72	4	71.48
5	57.51	20	42.12	5	79.18

(*continued*)

Table 1 (continued)

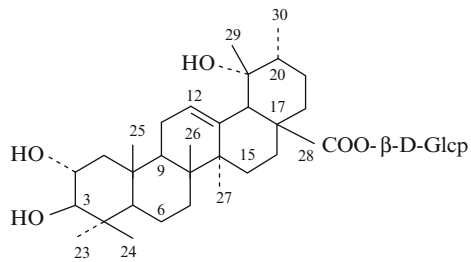
6	20.91	21	26.74	6	62.63
7	33.81	22	37.62	Glc′-1	95.84
8	40.54	23	24.82	2	74.12
9	47.49	24	175.87	3	78.91
10	39.05	25	15.56	4	71.39
11	24.42	26	17.25	5	79.18
12	128.49	27	24.38	6	62.50
13	139.14	28	176.86		
14	42.30	29	27.06		
15	29.15	30	16.69		

Pharm./Biol.: In Chinese folk medicine the plant has been used for the treatment of colds, tracheitis, stomachaches, and rheumatic aches. The preliminary screening test for anti-cancer activity in vitro showed that the crude extracts of *S. khasianum* had significant cytotoxic activity against some human cancer cell lines [1]

References

1. Q. Zhang, Y. Zhao, B. Wang, G. Tu, Chem. Pharm. Bull. **51**(5), 574 (2003)

Rosamultin



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,19α-Trihydroxy-ursolic Acid

Biological source: *Rosa multiflora* [1], *Aphloia theiformis* [2], *Musanga cecropioides* [3], *Rosa laevigata* [4], *Sanguisorba alpina* [5], *Combretum quadrangulare* [6]

$C_{36}H_{58}O_{10}$: 650.402

Mp: 207–209°C [1]

$[\alpha]_D^{25}$ + 15° (c 1.1, MeOH) [4]

EI-MS *m/z*: 488 $[M\text{-Glc}]^+$, 449, 370, 264, 246, 218, 201, 187, 146 [5]

^{13}C NMR (100 MHz, C_5D_5N): [5]

Table 1

C-1	47.9	C-16	26.1	Glc-1	95.8
2	68.6	17	48.6	2	74.0
3	83.9	18	54.4	3	78.9
4	38.5	19	72.7	4	71.3
5	56.0	20	42.1	5	79.2
6	19.1	21	27.0	6	62.4
7	33.5	22	37.7		
8	40.6	23	29.2		
9	48.0	24	17.5		
10	39.6	25	17.6		
11	24.2	26	17.0		
12	128.4	27	24.6		
13	139.3	28	176.9		
14	42.1	29	26.7		
15	29.4	30	16.7		

References

1. H. Du, T. Zha, M. Wang, Z. Wang, M. Yao, S. Yu, Yaoxue Xuebao **18**(4), 314 (1983) [Chem.Abstr. **100**, 48578e (1984)]
2. N. Gopalsamy, D. Vargas, J. Gueho, C. Ricaud, K. Hostettmann, Phytochemistry **27**, 3593 (1988)
3. D. Lontsi, B.L. Sondengam, J.F. Ayafor, M.G. Tsoupras, R. Tabacchi, Planta Medica **56**, 287 (1990)
4. J.-M. Fang, K.-C. Wang, Y.-S. Cheng, Phytochemistry **30**(10), 3383 (1991)

5. Z.J. Jia, X.Q. Liu, Z.M. Liu, Phytochemistry **32**(1), 155 (1993)
6. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, S. Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)

Compound 1 from *Tupidanthus calyptratus*

See Figure Compound 1 from *Tupidanthus calyptratus*

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,20β,23-Tetrahydroxy-urs-12-en-28-oic Acid

Biological source: *Tupidanthus calyptratus* [1]

$C_{52}H_{84}O_{24}$: 1092.535

$[\alpha]_D^{25}$ + 9° (c 1.0, MeOH) [1]

FAB-MS *m/z*: 1091 $[M-H]^-$, 929 $[M-H-162]^-$, 797 $[M-H-162-132]^-$, 635 $[M-H-2 \times 162-132]^-$, 503 $[M-H-2 \times 162-2 \times 132]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 0.74 (s, CH_3-24), 0.83 (s, CH_3-25), 0.95 (m, Hb-1), 0.95 (m, Hb-16), 0.96 (d, J = 6.2, H-29), 1.00 (s, CH_3-26), 1.09 (s, CH_3-30), 1.09 (m, H-15b), 1.13 (m, Ha-16), 1.20 (s, CH_3-27), 1.31 (brd, J = 11.0, H-5), 1.35 (m, Hb-7), 1.38 (m, Hb-6), 1.40 (s, H-19), 1.45 (m, Hb-21), 1.50 (m, Ha-6), 1.51 (m, Ha-21), 1.60 (m, Ha-7), 1.64 (s, H-9), 1.67 (m, Hb-22), 1.75 (m, Ha-22), 1.96 (m, Hb-11), 2.00 (m, Ha-11), 2.07 (m, Ha-15), 2.12 (m, Ha-1), 2.22 (d, J = 13.0, H-18), 3.07 (d, J = 12.0, Hb-23), 3.27 (d, J = 12.0, Ha-23), 3.40 (d, J = 11.0, H-3), 3.69 (ddd, J = 11.0, 9.0, 3.0, H-2), 5.27 (brs, H-12)

α-L-Arap: 4.37 (d, J = 7.6, H-1), 3.70 (dd, J = 7.6, 9.0, H-2), 3.88 (dd, J = 2.5, 9.0, H-3), 3.85 (m, H-4), 3.91 (dd, J = 2.0, 12.0, H-5), 3.62 (dd, J = 3.0, 12.0, H-5)

β-D-Glcp: 5.40 (d, J = 7.5, H-1), 3.50 (dd, J = 7.5, 9.0, H-2), 3.31 (t, J = 9.0, H-3), 3.43 (t, J = 9.0, H-4), 3.55 (m, H-5), 3.98 (dd, J = 3.0, 12.0, H-6), 3.76 (dd, J = 5.0, 12.0, H-6)

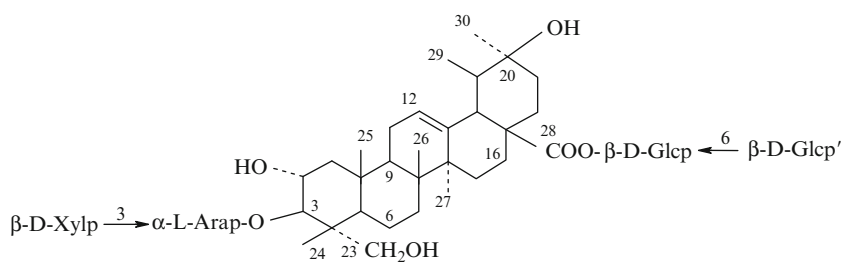
β-D-Xylp: 4.62 (d, J = 7.6, H-1), 3.20 (dd, J = 7.5, 9.5, H-2), 3.35 (t, J = 9.5, H-3), 3.39 (m, H-4), 3.80 (dd, J = 10.0, 5.0, H-5), 3.16 (dd, J = 10.0, 12.0, H-5)

β-D-Glcp′: 4.57 (d, J = 7.5, H-1), 3.35 (dd, J = 7.5, 9.5, H-2), 3.46 (t, J = 9.5, H-3), 3.38 (t, J = 9.5, H-4), 3.40 (m, H-5), 3.81 (dd, J = 3.0, 12.0, H-6), 3.66 (dd, J = 5.0, 12.0, H-6) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	46.5	C-16	24.0	Ara-1	105.5	Xyl-1	105.0
2	66.9	17	48.5	2	71.6	2	74.9
3	87.6	18	54.2	3	79.4	3	77.5
4	43.1	19	40.4	4	68.4	4	72.0
5	46.9	20	88.0	5	66.5	5	66.1
6	18.0	21	37.5	Glc-1	94.0	Glc′-1	104.6
7	32.7	22	31.7	2	73.6	2	74.0
8	40.9	23	63.0	3	77.4	3	78.0
9	47.2	24	14.4	4	70.5	4	71.5
10	37.1	25	17.6	5	77.0	5	77.9
11	24.5	26	17.9	6	68.0	6	62.0
12	127.0	27	25.3				
13	139.8	28	177.5				
14	44.0	29	21.5				
15	29.3	30	24.0				

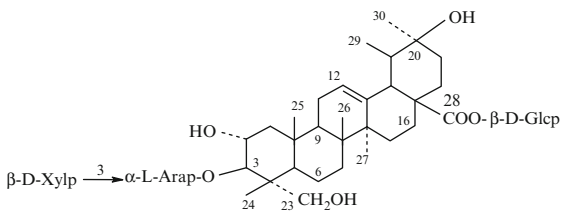


Compound 1 from *Tupidanthus calyptratus*

References

1. G. Cioffi, A. Bellino, C. Pizza, F. Venturella, N. De Tommasi, J. Nat. Prod. **64**(6), 750 (2001)

Compound 2 from *Tupidanthus calyptratus*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,20β,23-Tetrahydroxy-urs-12-en-28-oic Acid

Biological source: *Tupidanthus calyptratus* [1]

$C_{46}H_{74}O_{19}$: 930.482

$[\alpha]_D^{25}$ + 15° (c 1.0, MeOH) [1]

FAB-MS *m/z*: 929 $[M-H]^-$, 797 $[M-H-162]^-$, 635 $[M-H-162-132]^-$, 503 $[M-H-162-2 \times 132]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 0.74 (s, CH_3-24), 0.83 (s, CH_3-25), 0.95 (m, Hb-1), 0.95 (m, Hb-16), 0.96 (d, J = 6.2, H-29), 1.00 (s, CH_3-26), 1.09 (s, CH_3-30), 1.09 (m, Hb-15), 1.13 (m, Ha-16), 1.20 (s, CH_3-27), 1.31 (brd, J = 11.0, H-5), 1.35 (m, Hb-7), 1.38 (m, Hb-6), 1.40 (s, H-19), 1.45 (m, Hb-21), 1.50 (m, Ha-6), 1.51 (m, Ha-21), 1.60 (m, Ha-7), 1.64 (s, H-9), 1.67 (m, Hb-22), 1.75 (m, Ha-22), 1.96 (m, Hb-11), 2.00 (m, Ha-11), 2.07 (m, Ha-15), 2.12 (m, Ha-1), 2.22 (d, J = 13.0, H-18), 3.07 (d, J = 12.0, Hb-23), 3.27 (d, J = 12.0, Ha-23), 3.40 (d, J = 11.0, H-3), 3.69 (ddd, J = 11.0, 9.0, 3.0, H-2), 5.27 (brs, H-12)

α-L-Arap: 4.40 (H-1), 3.71 (H-2), 3.88 (H-3), 3.85 (H-4), 3.91, 3.62 (H_2-5)

β-D-Glcp: 5.39 (H-1), 3.49 (H-2), 3.31 (H-3), 3.43 (H-4), 3.35 (H-5), 3.76, 3.66 (H_2-6)

β-D-Xylp: 4.60 (H-1), 3.18 (H-2), 3.27 (H-3), 3.39 (H-4), 3.82, 3.15 (H_2-5) [1]

^{13}C NMR (CD_3OD): [1]

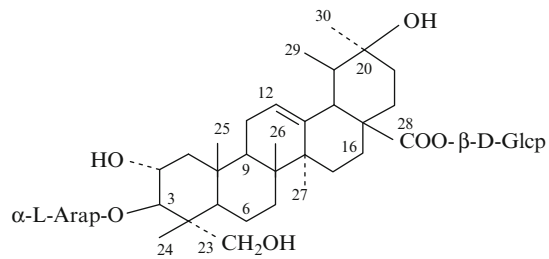
Table 1

C-1	46.5	C-16	24.0	Ara-1	105.4	Xyl-1	104.9
2	66.9	17	48.5	2	71.8	2	74.9
3	87.6	18	54.2	3	79.6	3	77.5
4	43.1	19	40.4	4	68.4	4	72.0
5	46.9	20	88.0	5	66.8	5	66.1
6	18.0	21	37.5	Glc-1	93.5		
7	32.7	22	31.7	2	73.5		
8	40.9	23	63.0	3	77.0		
9	47.2	24	14.4	4	70.2		
10	37.1	25	17.6	5	77.5		
11	24.5	26	17.9	6	62.3		
12	127.0	27	25.3				
13	139.8	28	177.5				
14	44.0	29	21.5				
15	29.3	30	24.0				

References

1. G. Cioffi, A. Bellino, C. Pizza, F. Venturella, N. De Tommasi, J. Nat. Prod. **64**(6), 750 (2001)

Compound 3 from *Tupidanthus calyptratus*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,20β,23-Tetrahydroxy-urs-12-en-28-oic Acid

Biological source: *Tupidanthus calyptratus* [1]
$C_{41}H_{66}O_{15}$: 798.440
$[\alpha]_D^{25}$ + 18° (c 1.0, MeOH) [1]
FAB-MS *m/z*: 797 $[M-H]^-$, 635 [M-H-162], 503 [M-H-162-132]$^-$ [1]
^{1}H NMR (600 MHz, J/Hz, CD_3OD): 0.74 (s, CH_3-24), 0.83 (s, CH_3-25), 0.95 (m, Hb-1), 0.95 (m, Hb-16), 0.96 (d, J = 6.2, CH_3-29), 1.00 (s, CH_3-26), 1.09 (m, Hb-15), 1.09 (s, CH_3-30), 1.13 (m, Ha-16), 1.20 (s, CH_3-27), 1.31 (brd, J = 11.0, H-5), 1.35 (m, Hb-7), 1.38 (m, Hb-6), 1.40 (s, H-19), 1.45 (m, Hb-21), 1.50 (m, Ha-6), 1.51 (m, Ha-21), 1.60 (m, Ha-7), 1.64 (s, H-9), 1.67 (m, Hb-22), 1.75 (m, Ha-22), 1.96 (m, Hb-11), 2.00 (m, Ha-11), 2.07 (m, Ha-15), 2.12 (m, Ha-1), 2.22 (d, J = 13.0, H-18), 3.07 (d, J = 12.0, Hb-23), 3.27 (d, J = 12.0, Ha-23), 3.40 (d, J = 11.0, H-3), 3.69 (ddd, J = 11.0, 9.0, 3.0, H-2), 5.27 (brs, H-12)
α-L-Arap: 4.84 (H-1), 3.82 (H-2), 3.55 (H-3), 3.87 (H-4), 3.63, 3.91 (H_2-5)
β-D-Glcp: 5.37 (H-1), 3.36 (H-2), 3.40 (H-3), 3.37 (H-4), 3.43 (H-5), 3.78, 3.64 (H_2-6) [1]
^{13}C NMR (CD_3OD): [1]

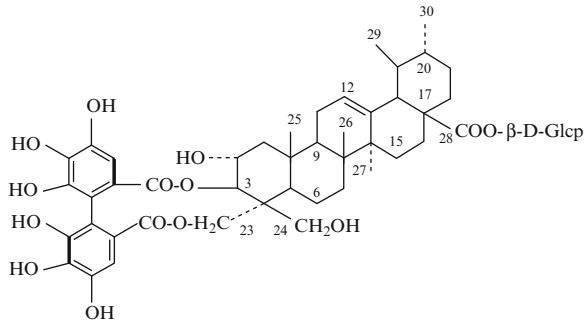
Table 1

C-1	46.5	C-16	24.0	Ara-1	106.04
2	66.9	17	48.5	2	73.09
3	87.6	18	54.2	3	74.8
4	43.1	19	40.4	4	70.3
5	46.9	20	88.0	5	64.4
6	18.0	21	37.5	Glc-1	95.8
7	32.7	22	31.7	2	73.8
8	40.9	23	63.0	3	78.4
9	47.2	24	14.4	4	71.3
10	37.1	25	17.6	5	78.7
11	24.5	26	17.9	6	62.6
12	127.0	27	25.3		
13	139.8	28	177.5		
14	44.0	29	21.5		
15	29.3	30	24.0		

References

1. G. Cioffi, A. Bellino, C. Pizza, F. Venturella, N. De Tommasi, J. Nat. Prod. **64**(6), 750 (2001)

Castanopsinin A_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23,24-Tetrahydroxy-urs-12-ene-28-oic Acid
Biological source: *Castanopsis cuspidata* [1]
$C_{50}H_{64}O_{19}$: 968.404
$[\alpha]_D^{20}$ + 75.9° (c 0.45, MeOH) [1]
FAB-MS *m/z*: 967 $(M-H)^-$[1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.18, 7.28 (s, HHDP-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

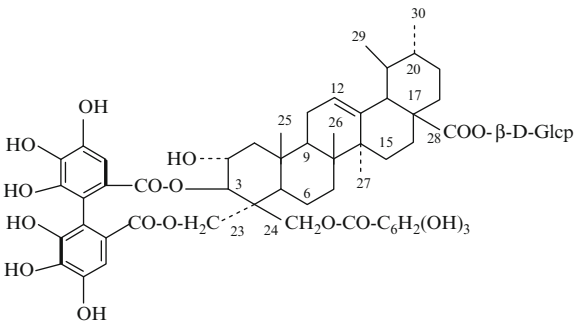
Table 1

C-1	46.2	Glc-1	95.7	HHDP-5	137.7
2	68.3	2	74.1		(2C)
3	78.8	3	78.8	COO-	169.4
4	48.8	4	71.2		169.0
5	57.3	5	79.1		
6	20.0	6	62.2		
7	33.8	HHDP-1	116.3		
8	40.2		(2C)		
9	47.6	2	127.5		
10	38.1		127.6		
12	125.7	3	107.3		
13	138.5		108.4		
23	71.3	4,6	146.0		
24	62.2		(2C)		
28	176.2		146.4		
			146.6		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin B_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23,24-Tetrahydroxy-urs-12-ene-28-oic Acid

Biological source: *Castanopsis cuspidata* [1]

$C_{57}H_{68}O_{23}$: 1120.415

$[\alpha]_D^{18}$ + 99.0° (c 0.60, MeOH) [1]

FAB-MS *m/z*: 1119 $(M-H)^-$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.08, 7.54 (s, HHDP-H), 8.01 (s, galloyl-H) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

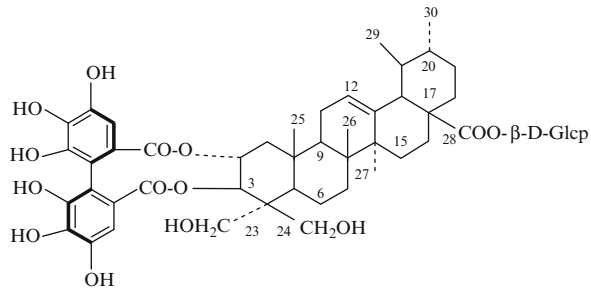
C-1	48.4	Glc-1	95.9	HHDP-5	137.8
2	66.6	2	74.1		(2C)
3	78.9	3	79.3	COO-	169.7
4	48.6	4	71.0		169.4
5	57.4	5	78.8	Galloyl-1	121.3
6	19.9	6	62.1	2,6	111.9
7	33.0	HHDP-1	116.7	3,5	146.7
8	39.7		(2C)	4	141.6
9	47.6	2	126.9	COO-	167.5
10	38.1		127.4		
12	125.6	3	107.5		
13	138.7		108.6		
23	69.8	4,6	145.9		
24	61.8		(2C)		
28	176.3		146.4		
			146.8		

(*continued*)

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin C_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23,24-Tetrahydroxy-urs-12-ene-28-oic Acid

Biological source: *Castanopsis cuspidata* [1]

$C_{50}H_{64}O_{19}$: 968.404

$[\alpha]_D^{18}$ + 10.5° (c 0.99, MeOH) [1]

FAB-MS *m/z*: 967 $(M-H)^-$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.12, 7.78 (s, HHDP-H) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	48.6	Glc-1	95.8	HHDP-5	137.8
2	67.3	2	74.0		(2C)
3	79.1	3	79.3	COO-	168.8
4	48.4	4	71.4		168.8
5	56.4	5	78.9		
6	19.9	6	62.4		
7	33.6	HHDP-1	118.1		

(*continued*)

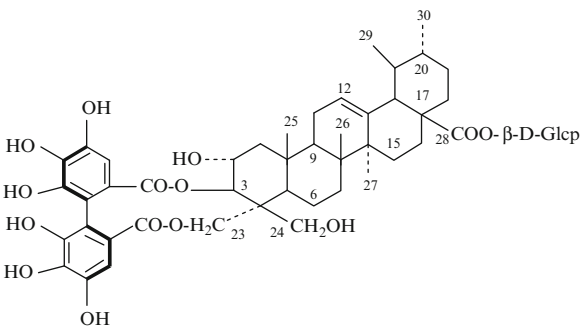
Table 1 (continued)

8	40.1		118.6		
9	48.5	2	127.1		
10	38.2		127.3		
12	125.6	3	106.6		
13	139.0		108.0		
23	67.1	4,6	145.9		
24	61.1		(2C)		
28	176.5		146.4		
			146.7		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin D_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23,24-Tetrahydroxy-urs-12-ene-28-oic Acid

Biological source: *Castanopsis cuspidata* [1]

$C_{50}H_{64}O_{19}$: 968.404

$[\alpha]_D^{20}$ + 50.6° (c 0.50, MeOH) [1]

FAB-MS *m/z*: 967 $(M\text{-}H)^-$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.18, 7.28 (s, HHDP-H) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	48.0	Glc-1	95.7	HHDP-5	137.5
2	67.7	2	74.2		(2C)

(*continued*)

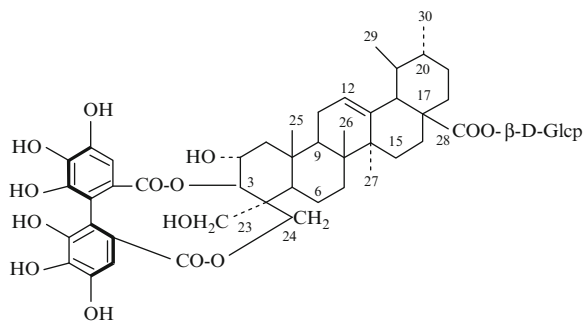
Table 1 (continued)

3	84.8	3	78.9	COO-1	169.3
4	48.6	4	71.1	COO-2	169.6
5	57.7	5	79.1		
6	20.3	6	62.3		
7	33.5	HHDP-1	116.5		
8	40.0		(2C)		
9	48.1	2	127.1		
10	38.5		(2C)		
12	125.3	3	107.5		
13	139.3		108.2		
23	71.6	4,6	146.4		
24	63.6		146.7		
28	176.1		146.5		
			146.8		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin E_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23,24-Tetrahydroxy-urs-12-ene-28-oic Acid

Biological source: *Castanopsis cuspidata* [1]

$C_{50}H_{64}O_{19}$: 968.404

$[\alpha]_D^{20}$ + 10.3° (c 0.76, MeOH) [1]

FAB-MS *m/z*: 967 $(M\text{-}H)^-$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.22 (s, HHDP-H) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

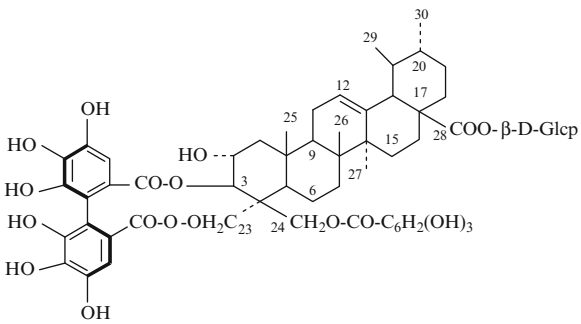
Table 1

C-1	47.8	Glc-1	95.6	HHDP-5	137.2
2	67.6	2	74.1		137.7
3	77.2	3	78.9	COO-	169.3
4	48.7	4	71.1		(2C)
5	57.6	5	78.9		
6	20.3	6	62.4		
7	33.5	HHDP-1	115.4		
8	40.1		116.4		
9	48.6	2	126.5		
10	38.6		128.3		
12	1256.1	3	107.9		
13	138.4		(2C)		
23	64.5	4,6	146.2		
24	65.0		(2C)		
28	176.1		146.5		
			147.1		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin F_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23,24-Tetrahydroxy-urs-12-ene-28-oic Acid

Biological source: *Castanopsis cuspidata* [1]

$C_{57}H_{68}O_{23}$: 1120.415

$[\alpha]_D^{22}$ + 82.3° (c 0.44, MeOH) [1]

FAB-MS *m/z*: 1119 $(M\text{-}H)^-$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 6.87, 7.14 (s, HHDP-H), 7.92 (s, galloyl-H) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

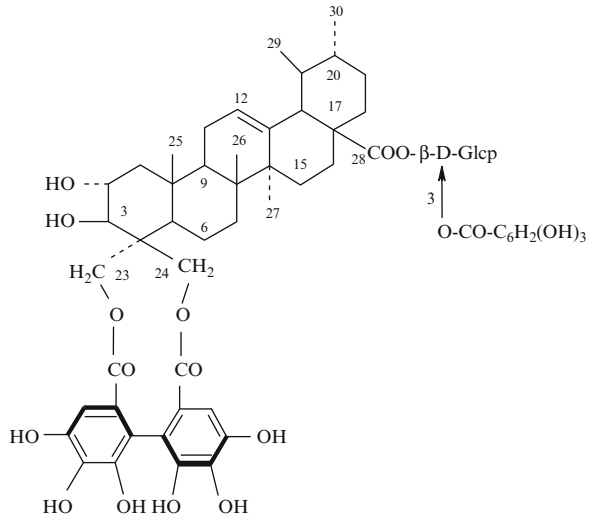
Table 1

C-1	48.4	Glc-1	95.8	HHDP-5	137.0
2	65.3	2	74.0		137.8
3	84.8	3	79.2	COO-	168.0
4	47.9	4	71.3		169.7
5	50.8	5	78.8	Galloyl-1	121.4
6	20.8	6	62.4	2,6	110.5
7	33.7	HHDP-1	116.4	3,5	147.4
8	40.2		116.8	4	140.7
9	48.6	2	126.8		
10	38.8		127.1		
12	125.6	3	106.9		
13	138.5		108.2		
23	69.8	4,6	146.0		
24	63.1		(2C)		
28	176.4		146.5		
			146.7		

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin G_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23,24-Tetrahydroxy-urs-12-ene-28-oic Acid

Biological source: *Castanopsis cuspidata* [1]
$C_{57}H_{68}O_{23}$: 1120.415
$[\alpha]_D^{20}$ + 39.8° (c 0.56, MeOH) [1]
FAB-MS *m/z*: 1119 $(M-H)^-$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.15, 7.27 (s, HHDP-H), 7.85 (s, galloyl-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	47.6	Glc-1	95.4	HHDP-5	137.7
2	68.3	2	72.3		138.3
3	78.9	3	80.0	COO-	167.5
4	48.6	4	69.0		169.8
5	57.4	5	78.9	Galloyl-1	121.7
6	19.9	6	62.6	2,6	110.5
7	33.3	HHDP-1	116.5	3,5	147.4
8	40.0		(2C)	4	140.7
9	47.6	2	127.5		
10	38.2		127.6		
12	125.6	3	107.3		
13	140.5		108.3		
23	71.5	4,6	146.0		
24	61.8		(2C)		
28	176.4		146.5		
			146.7		

References

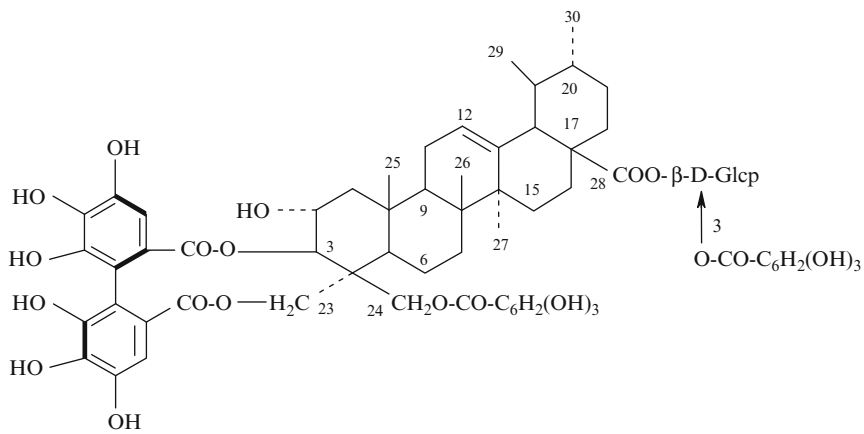
1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Castanopsinin H_2

See Figure Castanopsinin H_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23,24-Tetrahydroxy-urs-12-ene-28-oic Acid
Biological source: *Castanopsis cuspidata* [1]
$C_{64}H_{72}O_{27}$: 1272.426
$[\alpha]_D^{20}$ + 30.0° (c 0.60, MeOH) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 7.08, 7.53 (s, HHDP-H), 7.86, 8.02 (s, 2 × galloyl-H) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	47.6	Glc-1	95.4	HHDP-5	137.8
2	66.5	2	72.2		137.9
3	79.0	3	80.1	COO-	167.3
4	48.6	4	68.9		169.5
5	57.3	5	79.0	Galloyl-1	121.3
6	20.1	6	62.5		121.6
7	33.1	HHDP-1	116.8	2,6	110.5
8	39.7		(2C)		111.9
9	47.6	2	126.7	3,5	147.1
10	38.1		127.4		147.4
12	125.7	3	107.7	4	140.7
13	140.0		108.6		141.5
23	71.1	4,6	146.0		
24	61.7		(2C)		
28	176.0		146.4		
			146.8		

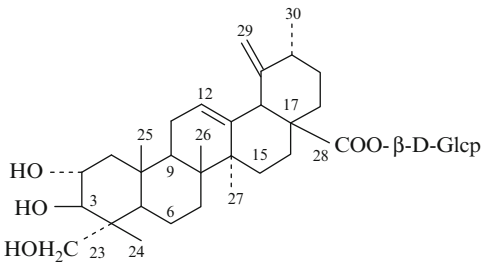


Castanopsinin H_2

References

1. M. Ageta, G.-I. Nonaka, I. Nishioka, Chem. Pharm. Bull. **36**(5), 1646 (1988)

Quadranoside VIII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,23-Trihydroxy-urs-12,19(29)-dien-28-oic Acid

Biological source: *Combretum quadrangulare* [1]

$C_{36}H_{50}O_{10}$: 642.340

$[\alpha]_D^{25}$ + 73.2° (c 0.028, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1710, 1640 [1]

HR-FAB-MS *m/z*: 671.3774 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.38 (m, H-1), 2.27 (dd, J = 12.5, 3.6, H-1), 4.18 (m, H-2), 4.17 (m, H-3), 1.81 (m, H-5), 1.68 (m, H-6), 1.36, 1.65 (m, H_2-7), 1.96 (m, H-9), 2.05 (m, H-11), 5.50 (t, J = 2.6, H-12), 1.38, 2.38 (m, H_2-15), 1.69, 1.86 (m, H_2-16), 3.76 (s, H-18), 1.79 (m, H-20), 1.25, 1.43 (m, H_2-21), 1.79, 1.97 (m, H_2-22), 3.69 (d, J = 9.6, H-23), 4.17 (d, J = 9.6, H-23), 1.05 (s, CH_3-24), 1.09 (s, CH_3-25), 1.15 (s, CH_3-26), 1.14 (s, CH_3-27), 5.00, 5.12 (brs, CH_2-29), 1.03 (d, J = 6.7, CH_3-30)

β-D-Glcp: 6.29 (d, J = 8.2, H-1), 4.18 (m, H-2), 4.27 (t, J = 9.2, H-3), 4.33 (t, J = 9.2, H-4), 4.02 (ddd, J = 9.2, 4.4, 2.6, H-5), 4.37 (m, H-6), 4.45 (m, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

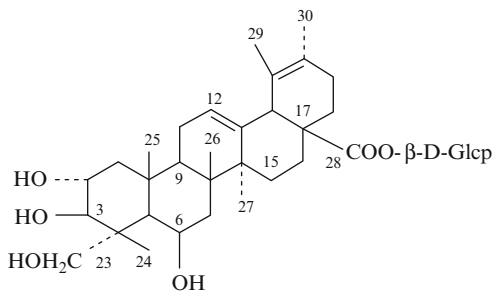
C-1	47.9	C-16	25.8	Glc-1	95.9
2	68.9	17	49.8	2	74.1
3	78.2	18	52.2	3	78.9
4	43.6	19	153.3	4	71.2
5	48.1	20	37.5	5	79.3
6	18.6	21	30.7	6	62.3
7	33.1	22	37.2		
8	39.9	23	66.5		
9	48.2	24	14.3		
10	38.5	25	17.6		
11	24.0	26	17.5		
12	128.5	27	26.2		
13	137.5	28	176.1		
14	42.9	29	110.4		
15	29.1	30	19.4		

Pharm./Biol.: The seeds, leaves and stem bark of the plant have been used in Vietnamese folk medicine as an anthelmintic, antipyretic, antidysenteric and antihepatitis agent [1]

References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, Sh Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)

Quadranoside VI



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides

of Aglycones of Ursene Type – 2α,3β,6β,23-Tetrahydroxy-urs-12,19-dien-28-oic Acid

Biological source: *Combretum quadrangulare* [1]

$C_{36}H_{56}O_{11}$: 664.382

$[\alpha]_D^{25}$ + 23.8° (c 0.036, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 1730, 1640 [1]

HR-FAB-MS *m/z*: 687.3712 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.47 (m, H-1), 2.42 (dd, J = 12.7, 5.5, H-1), 4.39 (m, H-2), 4.23 (d, J = 9.3, H-3), 1.98 (m, H-5), 5.43 (brs, H-6), 1.81, 2.01 (m, H_2-7), 1.87 (m, H-9), 2.15, 2.28 (m, H_2-11), 5.72 (t, J = 2.5, H-12), 1.26, 2.49 (m, H_2-15), 2.00 (m, H-16), 3.55 (s, H-18), 1.72, 1.75 (m, H_2-21), 1.93 (m, H-22), 4.03 (d, J = 10.5, H-23), 4.39 (d, J = 10.5, H-23), 1.73 (s, CH_3-24), 1.80 (s, CH_3-25), 1.69 (s, CH_3-26), 1.00 (s, CH_3-27), 1.63 (s, CH_3-29), 1.57 (s, CH_3-30)

β-D-Glcp: 6.31 (d, J = 8.1, H-1), 4.18 (dd, J = 8.8, 8.1, H-2), 4.27 (dd, J = 9.0, 8.8, H-3), 4.37 (m, H-4), 3.98 (m, H-5), 4.39 (m, H-6), 4.43 (m, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

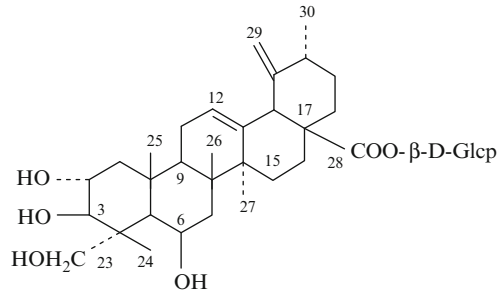
C-1	50.7	C-16	23.7	Glc-1	95.9
2	69.1	17	47.4	2	74.2
3	78.2	18	50.5	3	78.7
4	44.5	19	123.6	4	71.2
5	48.4	20	128.9	5	79.2
6	67.4	21	28.5	6	62.2
7	41.7	22	32.9		
8	44.3	23	66.2		
9	48.9	24	16.0		
10	38.1	25	19.5		
11	24.1	26	20.1		
12	128.1	27	22.2		
13	137.3	28	176.2		
14	39.3	29	17.3		
15	28.7	30	20.4		

Pharm./Biol.: The seeds, leaves and stem bark of the plant have been used in Vietnamese folk medicine as an anthelmintic, antipyretic, antidysenteric and antihepatitis agent [1]

References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, Sh. Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)

Quadranoside VII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,6β,23-Tetrahydroxy-urs-12,19(29)-dien-28-oic Acid

Biological source: *Combretum quadrangulare* [1]

$C_{36}H_{56}O_{11}$: 664.382

$[\alpha]_D^{25}$ + 80.4° (c 0.020, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 1730, 1645 [1]

HR-FAB-MS *m/z*: 687.3726 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.49 (m, H-1), 2.37 (dd, J = 12.5, 4.1, H-1), 4.42 (m, H-2), 4.25 (m, H-3), 1.97 (m, H-5), 5.08 (brs, H-6), 1.88, 1.98 (m, H_2-7), 2.13 (m, H-9), 2.15, 2.30 (m, H_2-11), 5.62 (t, J = 2.6, H-12), 1.15, 2.49 (m, H_2-15), 1.75, 1.85 (m, H_2-16), 3.81 (s, H-18), 1.81 (m, H-20), 1.43 (m, H-21), 1.81, 1.98 (m, H_2-22), 4.06 (d, J = 10.4, H-23), 4.39 (d, J = 10.4, H-23), 1.76 (s, CH_3-24), 1.82 (s, CH_3-25), 1.74 (s, CH_3-26), 1.18 (s, CH_3-27), 5.05, 5.20 (brs, CH_2-29), 1.05 (d, J = 5.8, CH_3-30)

β-D-Glcp: 6.28 (d, J = 8.0, H-1), 4.18 (dd, J = 8.7, 8.0, H-2), 4.26 (dd, J = 8.9, 8.7, H-3), 4.34 (dd, J = 9.2, 8.9, H-4), 4.02 (m, H-5), 4.35 (m, H-6), 4.45 (m, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	50.3	C-16	25.9	Glc-1	96.0
2	69.1	17	49.8	2	74.1
3	78.3	18	52.2	3	78.7
4	44.5	19	153.4	4	71.2
5	48.8	20	37.5	5	79.2

(*continued*)

Table 1 (continued)

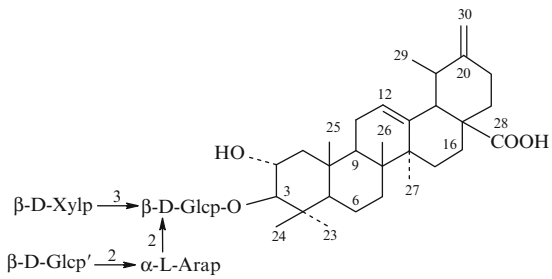
6	67.6	21	30.6	6	62.2
7	41.3	22	37.1		
8	39.3	23	66.2		
9	48.8	24	16.0		
10	38.2	25	19.2		
11	24.1	26	18.8		
12	128.9	27	26.2		
13	136.8	28	176.0		
14	43.5	29	110.5		
15	29.1	30	19.4		

Pharm./Biol.: The seeds, leaves and stem bark of the plant have been used in Vietnamese folk medicine as an anthelmintic, antipyretic, antidysenteric and antihepatitis agent [1]

References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, Sh. Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)

Compound 1 from *Alternanthera repens*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α-Hyrdoxy-30-nor-ursolic Acid

Biological source: *Alternanthera repens* [1]

$C_{52}H_{82}O_{22}$: 1058.529

$[\alpha]_D^{25}$ + 19.0° (c 1.0, MeOH) [1]

FAB-MS (negative) *m/z*: 1057 $[M-H]^-$, 925 [M–H-132]$^-$, 895 [M-H-162]$^-$, 763 [M-H-(132 + 162)]$^-$, 631 [M-H-(132 + 132 + 162)]$^-$, 469 [M-H-(162 + 132 + 132 + 162]$^-$ [1]

^{1}H NMR (599.19 MHz, J/Hz, CD_3OD): 1.20 (dd, J = 4.0, 11.0, H-1), 1.96 (dd, J = 12.5, 4.0, H-1), 3.84 (ddd, J = 10.0, 12.5, 4.0, H-2), 3.10 (d, J = 10.0, H-3), 0.90 (brdd, J = 9.0, H-5), 1.25, 1.48 (m, H_2-6), 1.26, 162 (m, H_2-7), 1.54 (brs, H-9), 1.90 (m, H-11), 5.28 (m, H-12), 1.08, 1.85 (m, H_2-15), 1.80. 155 (m, H_2-16), 2.42 (d, J = 13.0, H-18), 2.38 (dd, J = 13.0, 6.4, H-19), 1.60 (t, J = 12.5, H-21), 2.0 (m, H-21), 1.81, 1.52 (H_2-22), 1.0 (s, CH_3-23), 0.90 (s, CH_3-24), 1.02 (s, CH_3-25), 0.87 (s, CH_3-26), 1.22 (s, CH_3-27), 0.98 (d, J = 6.4, CH_3-29), 4.70, 4.76 (brs, CH_2-30); β-D-Glcp: 4.50 (d, J = 7.5, H-1), 3.43 (dd, J = 7.5, 9.5, H-2), 3.5 (t, J = 9.5, H-3), 3.32 (t, J = 9.5, H-4), 3.28 (m, H-5), 3.89 (dd, J = 12.0, 5.0, H-6), 3.65 (dd, J = 12.0, 3.5, H-6); β-D-Xylp: 4.47 (d, J = 7.5, H-1), 3.20 (dd, J = 7.5, 9.0, H-2), 3.38 (t, J = 9.0, H-3), 3.52 (m, H-4), 3.92 (dd, J = 10.0, 5.0, H-5), 3.16 (dd, J = 10.0, 2.0, H-5); α-L-Arap: 4.42 (d, J = 7.2, H-1), 3.78 (dd, J = 7.2, 9.0, H-2), 3.83 (dd, J = 9.0, 3.5, H-3), 4.00 (m, H-4), 4.03 (dd, J = 12.0, 3.0, H-5), 3.61 (dd, J = 12.0, 2.0, H-5); β-D-Glcp′: 4.60 (d, J = 7.6, H-1), 3.45 (dd, J = 7.6, 9.5, H-2), 3.55 (t, J = 9.5, H-3), 3.34 (t, J = 9.5, H-4), 3.30 (m, H-5), 3.87 (dd, J = 12.0, 5.0, H-6), 3.68 (dd, J = 12.0, 3.5, H-6) [1]

^{13}C NMR (150 MHz, CD_3OD): [1]

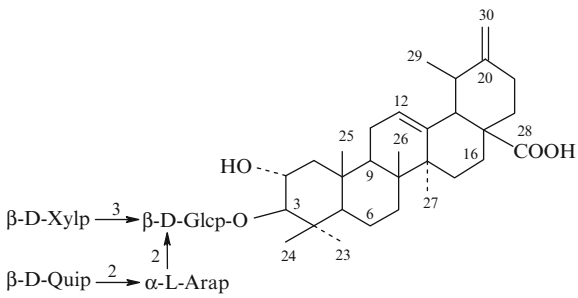
Table 1

C-1	48.0	C-15	28.2	C-29	16.5	Ara-1	104.8
2	68.5	16	24.5	30	105.9	2	81.5
3	90.6	17	48.0	Glc-1	105.7	3	74.0
4	40.5	18	55.0	2	82.9	4	68.5
5	48.7	19	37.2	3	83.5	5	65.0
6	18.5	20	153.0	4	70.2	Glc′-1	106.2
7	33.0	21	32.1	5	77.8	2	75.2
8	39.5	22	38.9	6	63.0	3	78.5
9	47.5	23	28.4	Xyl-1	105.2	4	71.7
10	38.0	24	21.7	2	75.5	5	78.7
11	23.5	25	16.6	3	77.8	6	62.8
12	126.5	26	16.8	4	72.4		
13	138.9	27	24.0	5	67.2		
14	42.0	28	181.0				

References

1. R. Sanoko, G. Speranza, C. Pizza, N. De Tommasi, Phytochemistry **51**, 1043 (1999)

Compound 2 from *Alternanthera repens*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α-Hyrdoxy-30-nor-ursolic Acid

Biological source: *Alternanthera repens* [1]

$C_{52}H_{82}O_{21}$: 1042.534

$[\alpha]_D^{25}$ + 19.0° (c 1.0, MeOH) [1]

FAB-MS (negative) *m/z*: 1041 $[M-H]^-$, 895 [M–H-146]$^-$, 763 [M-H-(146 + 132)]$^-$, 631 [M-H-(146 + 132 + 132)]$^-$, 469 [M-H-(146 + 132 + 132 + 162]$^-$ [1]

^{1}H NMR (599.19 MHz, J/Hz, CD_3OD): 1.20 (dd, J = 4.0, 11.0, H-1), 1.96 (dd, J = 12.5, 4.0, H-1), 3.84 (ddd, J = 10.0, 12.5, 4.0, H-2), 3.10 (d, J = 10.0, H-3), 0.90 (brdd, J = 9.0, H-5), 1.25, 1.48 (m, H_2-6), 1.26, 162 (m, H_2-7), 1.54 (brs, H-9), 1.90 (m, H-11), 5.28 (m, H-12), 1.08, 1.85 (m, H_2-15), 1.80. 155 (m, H_2-16), 2.42 (d, J = 13.0, H-18), 2.38 (dd, J = 13.0, 6.4, H-19), 1.60 (t, J = 12.5, H-21), 2.0 (m, H-21), 1.81, 1.52 (H_2-22), 1.0 (s, CH_3-23), 0.90 (s, CH_3-24), 1.02 (s, CH_3-25), 0.87 (s, CH_3-26), 1.22 (s, CH_3-27), 0.98 (d, J = 6.4, CH_3-29), 4.70, 4.76 (brs, CH_2-30)

β-D-Glcp: 4.48 (d, J = 7.5, H-1), 3.42 (dd, J = 7.5, 9.5, H-2), 3.48 (t, J = 9.5, H-3), 3.32 (t, J = 9.5, H-4), 3.30 (m, H-5), 3.88 (dd, J = 12.0, 5.0, H-6), 3.68 (dd, J = 12.0, 3.5, H-6)

β-D-Xylp: 4.50 (d, J = 7.5, H-1), 3.20 (dd, J = 7.5, 9.0, H-2), 3.44 (t, J = 9.0, H-3), 3.52 (m, H-4), 3.90 (dd, J = 10.0, 5.0, H-5), 3.16 (dd, J = 10.0, 2.0, H-5)

α-L-Arap: 4.38 (d, J = 7.0, H-1), 3.80 (dd, J = 7.0, 9.0, H-2), 3.85 (dd, J = 9.0, 3.5, H-3), 4.02 (m, H-4), 4.05 (dd, J = 12.0, 3.0, H-5), 3.63 (dd, J = 12.0, 2.0, H-5)

β-D-Quip: 4.28 (d, J = 7.5, H-1), 3.55 (dd, J = 7.6, 9.5, H-2), 3.45 (t, J = 9.5, H-3), 3.40 (t, J = 9.5, H-4), 3.60 (m, H-5), 1.30 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (150 MHz, CD_3OD): [1]

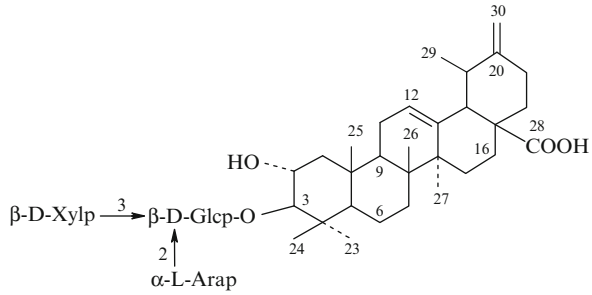
Table 1

C-1	48.0	C-16	24.5	Glc-1	105.6	Ara-1	104.6
2	68.5	17	48.0	2	82.7	2	81.3
3	90.6	18	55.0	3	84.0	3	73.9
4	40.5	19	37.2	4	70.4	4	68.5
5	48.7	20	153.0	5	77.8	5	64.8
6	18.5	21	32.1	6	62.8	Quip-1	104.4
7	33.0	22	38.9	Xyl-1	104.9	2	76.0
8	39.5	23	28.4	2	75.3	3	78.3
9	47.5	24	21.7	3	77.7	4	71.8
10	38.0	25	16.6	4	72.5	5	77.1
11	23.5	26	16.8	5	66.8	6	17.9
12	126.5	27	24.0				
13	138.9	28	181.0				
14	42.0	29	16.5				
15	28.2	30	105.9				

References

1. R. Sanoko, G. Speranza, C. Pizza, N. De Tommasi, Phytochemistry **51**, 1043 (1999)

Compound 3 from *Alternanthera repens*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α-Hyrdoxy-30-nor-ursolic Acid

Biological source: *Alternanthera repens* [1]

$C_{46}H_{72}O_{17}$: 896.476

$[\alpha]_D^{25}$ −28.0° (c 1.0, MeOH) [1]

FAB-MS (negative) *m/z*: 895 $[M-H]^-$, 763 [M-H-132]$^-$, 631 [M-H-(132 + 132)]$^-$, 469 [M-H-(132 + 132 + 162]$^-$ [1]

^{1}H NMR (599.19 MHz, J/Hz, CD_3OD): 1.20 (dd, J = 4.0, 11.0, H-1), 1.96 (dd, J = 12.5, 4.0, H-1), 3.84 (ddd, J = 10.0, 12.5, 4.0, H-2), 3.10 (d, J = 10.0, H-3), 0.90 (brdd, J = 9.0, H-5), 1.25, 1.48 (m, H_2-6), 1.26, 162 (m, H_2-7), 1.54 (brs, H-9), 1.90 (m, H-11), 5.28 (m, H-12), 1.08, 1.85 (m, H_2-15), 1.80. 155 (m, H_2-16), 2.42 (d, J = 13.0, H-18), 2.38 (dd, J = 13.0, 6.4, H-19), 1.60 (t, J = 12.5, H-21), 2.0 (m, H-21), 1.81, 1.52 (H_2-22), 1.0 (s, CH_3-23), 0.90 (s, CH_3-24), 1.02 (s, CH_3-25), 0.87 (s, CH_3-26), 1.22 (s, CH_3-27), 0.98 (d, J = 6.4, CH_3-29), 4.70, 4.76 (brs, CH_2-30)

β-D-Glcp: 4.52 (H-1), 3.35 (H-2), 3.42 (H-3), 3.50 (H-4), 3.30 (H-5), 3.85, 3.63 (H_2-6)

β-D-Xylp: 4.48 (H-1), 3.18 (H-2), 3.30 (H-3), 3.52 (H-4), 3.90, 3.15 (H_2-5)

α-L-Arap: 4.39 (H-1), 3.80 (H-2), 3.82 (H-3), 3.97 (H-4), 4.0, 3.64 (H_2-5) [1]

^{13}C NMR (150 MHz, CD_3OD): [1]

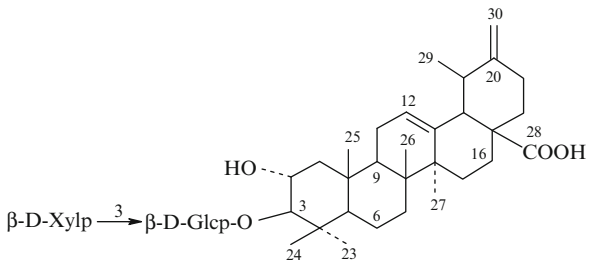
Table 1

C-1	48.0	C-16	24.5	Glc-1	105.4	Ara-1	104.8
2	68.5	17	48.0	2	82.7	2	74.0
3	90.6	18	55.0	3	83.3	3	74.6
4	40.5	19	37.2	4	70.4	4	69.4
5	48.7	20	153.0	5	78.0	5	65.2
6	18.5	21	32.1	6	63.0		
7	33.0	22	38.9	Xyl-1	105.0		
8	39.5	23	28.4	2	75.5		
9	47.5	24	21.7	3	78.0		
10	38.0	25	16.6	4	72.6		
11	23.5	26	16.8	5	67.0		
12	126.5	27	24.0				
13	138.9	28	181.0				
14	42.0	29	16.5				
15	28.2	30	105.9				

References

1. R. Sanoko, G. Speranza, C. Pizza, N. De Tommasi, Phytochemistry **51**, 1043 (1999)

Compound 4 from *Alternanthera repens*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α-Hyrdoxy-30-nor-ursolic Acid

Biological source: *Alternanthera repens* [1]

$C_{46}H_{72}O_{17}$: 896.476

$[\alpha]_D^{25}$ −28.0° (c 1.0, MeOH) [1]

FAB-MS (negative) *m/z*: 895 $[M-H]^-$, 763 [M-H-132]$^-$, 631 [M-H-(132 + 132)]$^-$, 469 [M-H-(132 + 132 + 162]$^-$ [1]

^{1}H NMR (599.19 MHz, J/Hz, CD_3OD): 1.20 (dd, J = 4.0, 11.0, H-1), 1.96 (dd, J = 12.5, 4.0, H-1), 3.84 (ddd, J = 10.0, 12.5, 4.0, H-2), 3.10 (d, J = 10.0, H-3), 0.90 (brdd, J = 9.0, H-5), 1.25, 1.48 (m, H_2-6), 1.26, 162 (m, H_2-7), 1.54 (brs, H-9), 1.90 (m, H-11), 5.28 (m, H-12), 1.08, 1.85 (m, H_2-15), 1.80. 155 (m, H_2-16), 2.42 (d, J = 13.0, H-18), 2.38 (dd, J = 13.0, 6.4, H-19), 1.60 (t, J = 12.5, H-21), 2.0 (m, H-21), 1.81, 1.52 (H_2-22), 1.0 (s, CH_3-23), 0.90 (s, CH_3-24), 1.02 (s, CH_3-25), 0.87 (s, CH_3-26), 1.22 (s, CH_3-27), 0.98 (d, J = 6.4, CH_3-29), 4.70, 4.76 (brs, CH_2-30)

β-D-Glcp: 4.52 (H-1), 3.35 (H-2), 3.42 (H-3), 3.50 (H-4), 3.30 (H-5), 3.85, 3.63 (H_2-6)

β-D-Xylp: 4.48 (H-1), 3.18 (H-2), 3.30 (H-3), 3.52 (H-4), 3.90, 3.15 (H_2-5)

α-L-Arap: 4.39 (H-1), 3.80 (H-2), 3.82 (H-3), 3.97 (H-4), 4.0, 3.64 (H_2-5) [1]

^{13}C NMR (150 MHz, CD_3OD): [1]

Table 1

C-1	48.0	C-16	24.5	Glc-1	105.4	Ara-1	104.8
2	68.5	17	48.0	2	82.7	2	74.0
3	90.6	18	55.0	3	83.3	3	74.6

(*continued*)

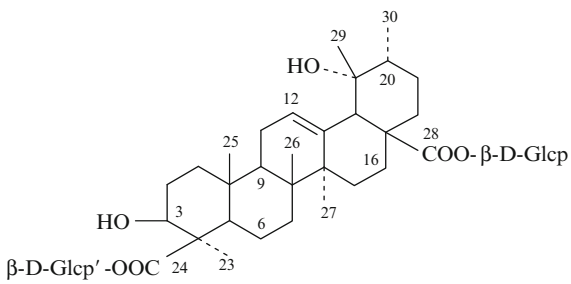
Table 1 (continued)

4	40.5	19	37.2	4	70.4	4	69.4
5	48.7	20	153.0	5	78.0	5	65.2
6	18.5	21	32.1	6	63.0		
7	33.0	22	38.9	Xyl-1	105.0		
8	39.5	23	28.4	2	75.5		
9	47.5	24	21.7	3	78.0		
10	38.0	25	16.6	4	72.6		
11	23.5	26	16.8	5	67.0		
12	126.5	27	24.0				
13	138.9	28	181.0				
14	42.0	29	16.5				
15	28.2	30	105.9				

References

1. R. Sanoko, G. Speranza, C. Pizza, N. De Tommasi, Phytochemistry **51**, 1043 (1999)

Mussaendoside V



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 3β,19α-Dihydroxy-urs-12-en-24,28-dioic Acid

Biological source: *Mussaenda pubescens* [1]

$C_{42}H_{66}O_{16}$: 826.435

$[\alpha]_D^{25}$ −22.8° (c 0.26, CH_3OH) [1]

FAB-MS (positive ion mode) *m/z*: 850 $[M + Na]^+$ [1]

FAB-MS (negative ion mode) *m/z*: 826 $[M-H]^-$, 633 $[M\text{-}Glc\text{-}H]^-$, 501 $[M\text{-}Glc\text{-}Glc\text{-}H]^-$ [1]

^{1}H NMR (200 MHz, J/Hz, C_5D_5N): 6.35 (d, J = 7.6), 6.26 (d, J = 7.4), 5.22 (brs), 3.40 (dd, J = 11.2, 4.0), 2.94 (brs), 1.77, 1.71, 1.42, 1.27, 1.27 (s, $CH_3 \times 5$), 1.08 (d, J = 6.4, CH_3) [1]

^{13}C NMR (50 MHz, C_5D_5N): [1]

Table 1

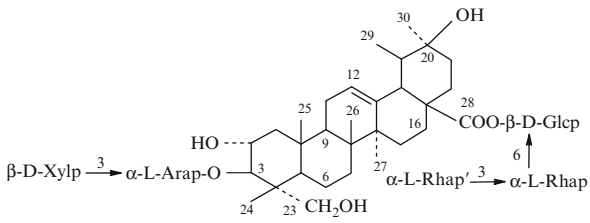
C-1	39.9	C-16	26.3	Glc-1	95.7
2	28.8	17	48.7	2	74.0
3	78.3	18	54.5	3	79.1
4	50.1	19	72.5	4	71.2
5	57.4	20	42.1	5	78.7
6	20.8	21	27.0	6	62.3
7	33.8	22	37.7	Glc′-1	95.7
8	40.4	23	24.5	2	74.0
9	47.3	24	176.1	3	79.1
10	37.9	25	14.2	4	71.0
11	24.3	26	17.2	5	78.7
12	128.3	27	24.7	6	62.2
13	139.0	28	176.8		
14	42.3	29	27.0		
15	29.2	30	16.7		

Pharm./Biol.: In Chinese folk medicine the plant used for treatment of common cold, diarrhea, laryngopharynitis, acute gastroenteritis. The hydrophilic fraction of the extract of this plant showed significant antifertility activity in in vivo tests [1]

References

1. W. Zhao, J.-L. Wolfender, K. Hostettmann, K. Cheng, R. Xu, G. Qin, Phytochemistry **45**, 1073 (1997)

Compound 4 from *Tupidanthus calyptratus*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,20β,23-Tetrahydroxy-urs-12-en-28-oic Acid

Biological source: *Tupidanthus calyptratus* [1]
$C_{58}H_{94}O_{26}$: 1206.603
$[\alpha]_D^{25}$ + 35° (c 1.0, MeOH) [1]
FAB-MS (positive ion mode) *m/z*: 1205 $[M\text{-}H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, CD_3OD): 0.72 (s, CH_3-24), 0.84 (s, CH_3-25), 0.97 (d, J = 6.2, CH_3-29), 0.98 (m, Hb-1), 0.98 (m, Hb-16), 1.00 (s, CH_3-26), 1.05 (m, H-15), 1.09 (s, CH_3-30), 1.10 (m, Ha-15), 1.15 (m, Ha-16), 1.19 (s, CH_3-27), 1.35 (m, Hb-21), 1.36 (m, Hb-7), 1.38 (m, Hb-6), 1.40 (m, H-19), 1.48 (m, Ha-6), 1.59 (m, Ha-21), 1.61 (m, Hb-2), 1.62 (s, H-9), 1.63 (m, Ha-1), 1.66 (s, H-5), 1.70 (s, H-22), 1.70 (m, Hb-7), 1.92 (m, Ha-2), 2.03 (m, Hb-11), 2.09 (m, Ha-11), 2.28 (d, J = 13.0, H-18), 3.20 (d, J = 11.0, Hb-23), 3.64 (dd, J = 11.0, 4.5, H-3), 3.65 (d, J = 11.0, Ha-23), 5.28 (s, H-12); α-L-Arap: 4.36 (d, J = 7.0, H-1), 3.73 (dd, J = 7.0, 9.0, H-2), 3.85 (dd, J = 3.0, 9.0, H-3), 3.87 (m, H-4), 3.91 (dd, J = 2.0, 12.0, H-5), 3.62 (dd, J = 3.5, 12.0, H-5); β-D-Glcp: 5.36 (d, J = 7.5, H-1), 3.36 (dd, J = 7.5, 9.0, H-2), 3.40 (t, J = 9.0, H-3), 3.39 (t, J = 9.0, H-4), 3.52 (m, H-5), 3.99 (dd, J = 3.0, 12.0, H-6), 3.84 (dd, J = 5.0, 12.0, H-6); β-D-Xylp: 4.64 (d, J = 7.5, H-1), 3.20 (dd, J = 7.5, 9.5, H-2), 3.32 (t, J = 9.5, H-3), 3.36 (m, H-4), 3.80 (dd, J = 10.0, 5.0, H-5), 3.16 (dd, J = 10.0, 12.0, H-5); α-L-Rhap: 4.75 (d, J = 1.5, H-1), 4.18 (dd, J = 1.5, 3.0, H-2), 3.95 (dd, J = 9.0, 3.0, H-3), 3.66 (t, J = 9.0, H-4), 3.84 (dd, J = 9.0, 6.2, H-5), 1.30 (d, J = 6.2, CH_3-6); α-L-Rhap′: 5.15 (d, J = 1.6, H-1), 3.90 (dd, J = 1.6, 3.5, H-2), 3.73 (dd, J = 9.0, 3.5, H-3), 3.50 (t, J = 9.0, H-4), 3.92 (dd, J = 9.0, 6.5, H-5), 1.28 (d, J = 6.5, CH_3-6) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

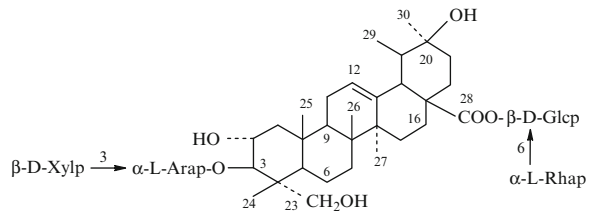
C-1	46.5	C-16	24.0	Ara-1	106.0	Rha-1	102.5
2	66.9	17	48.5	2	72.0	2	71.0
3	87.6	18	54.2	3	79.8	3	80.0
4	43.1	19	40.4	4	69.0	4	72.0
5	46.9	20	88.0	5	66.1	5	69.5
6	18.0	21	37.5	Xyl-1	105.0	6	18.0
7	32.7	22	31.7	2	74.7	Rha′-1	101.7
8	40.9	23	63.0	3	77.7	2	71.8
9	47.2	24	14.4	4	71.8	3	72.6
10	37.1	25	17.6	5	66.8	4	74.5
11	24.5	26	17.9	Glc-1	95.0	5	70.3
12	127.0	27	25.3	2	73.5	6	18.20
13	139.8	28	177.5	3	77.6		
14	44.0	29	21.5	4	70.4		
15	29.3	30	24.0	5	77.0		
				6	68.5		

(*continued*)

References

1. G. Cioffi, A. Bellino, C. Pizza, F. Venturella, N. De Tommasi, J. Nat. Prod. **64**(6), 750 (2001)

Compound 5 from *Tupidanthus calyptratus*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 2α,3β,20β,23-Tetrahydroxy-urs-12-en-28-oic Acid
Biological source: *Tupidanthus calyptratus* [1]
$C_{52}H_{84}O_{22}$: 1060.545
$[\alpha]_D^{25}$ + 27° (c 1.0, MeOH) [1]
FAB-MS *m/z*: 1059 $[M\text{-}H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, CD_3OD): 0.74 (s, CH_3-24), 0.83 (s, CH_3-25), 0.95 (m, Hb-1), 0.95 (m, Hb-16), 0.96 (d, J = 6.2, CH_3-29), 1.00 (s, CH_3-26), 1.09 (m, Hb-15), 1.09 (s, CH_3-30), 1.13 (m, Ha-16), 1.20 (s, CH_3-27), 1.31 (brd, J = 11.0, H-5), 1.35 (m, Hb-7), 1.38 (m, Hb-6), 1.40 (s, H-19), 1.45 (m, Hb-21), 1.50 (m, Ha-6), 1.51 (m, Ha-21), 1.64 (s, H-9), 1.67 (m, Hb-22), 1.70 (s, Ha-22), 1.70 (m, Ha-7), 1.92 (m, Ha-2), 2.09 (m, Ha-11), 2.28 (d, J = 13.0, H-18), 3.20 (d, J = 11.0, Hb-23), 3.64 (dd, J = 11.0, 4.5, H-3), 3.65 (d, J = 11.0, Ha-23), 5.28 (m, H-12)
α-L-Arap: 4.34 (H-1), 3.75 (H-2), 3.87 (H-3), 3.88 (H-4), 3.92, 3.62 (H_2-5)
β-D-Glcp: 5.40 (H-1), 3.36 (H-2), 3.41 (H-3), 3.39 (H-4), 3.55 (H-5), 3.98, 3.84 (H_2-6)
β-D-Xylp: 4.64 (H-1), 3.18 (H-2), 3.30 (H-3), 3.35 (H-4), 3.82, 3.15 (H_2-5)

α-L-Rhap: 5.12 (H-1), 3.90 (H-2), 3.74 (H-3), 3.50 (H-4), 3.93 (H-5), 1.28 (CH_3-6) [1]

^{13}C NMR (CD_3OD): [1]

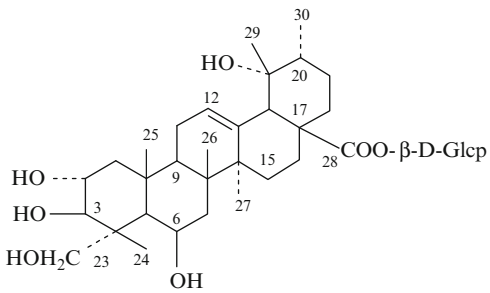
Table 1

C-1	46.5	C-16	24.0	Ara-1	105.4	Xyl-1	105.0
2	66.9	17	48.5	2	71.8	2	74.6
3	87.6	18	54.2	3	79.6	3	77.7
4	43.1	19	40.4	4	69.0	4	72.1
5	46.9	20	88.0	5	65.5	5	66.7
6	18.0	21	37.5	Glc-1	94.5	Rha-1	101.9
7	32.7	22	31.7	2	73.5	2	71.6
8	40.9	23	63.0	3	77.6	3	72.8
9	47.2	24	14.4	4	70.6	4	74.5
10	37.1	25	17.6	5	76.9	5	69.8
11	24.5	26	17.9	6	68.8	6	18.0
12	127.0	27	25.3				
13	139.8	28	177.5				
14	44.0	29	21.5				
15	29.3	30	24.0				

References

1. G. Cioffi, A. Bellino, C. Pizza, F. Venturella, N. De Tommasi, J. Nat. Prod. **64**(6), 750 (2001)

28-O-Glucopyranosyl-6β,23-dihydroxy-tormentic Acid



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 6β,23-Dihydroxy-tormentic Acid

Biological source: *Combretum quadrangulare* [1], *Aphloia madagascariensis* [2]

$C_{36}H_{58}O_{12}$: 682.392

Mp: 205–208°C [2]

$[\alpha]_D^{25}$ −8° (c 0.1, MeOH) [2]

CPD-MS *m/z*: 706 $[M + H + Na]^+$, 523 [M-Hexose + 4H]$^+$, 544 $[M + Na\text{-Hexose} + 2H]^+$ [2]

^{1}H NMR (300 MHz, J/Hz, C_5D_5N): 0.88 (brt, J = 12, H-1), 0.93 (d, J = 6.6, CH_3-30), 1.00 (m, H-15), 1.04 (s, CH_3-26), 1.06 (s, CH_3-24), 1.21 (s, CH_3-29), 1.25 (m, H-21), 1.31 (s, CH_3-27), 1.3 (m, H-5), 1.34 (m, H-20), 1.39 (s, CH_3-25), 1.48 (dd, J = 13.0, 2.0, H-7), 1.63 (m, H-16), 1.65 (m, H-22), 1.70 (m, H-21), 1.80 (m, H-22, H-9), 1.81 (brd, J = 13.0, H-7), 1.87 (m, H-15), 1.9 (dd, J = 12.0, 3.5, H-1), 2.08 (m, H-11), 2.1 (m, H-11), 2.53 (s, H-18), 2.6 (td, J = 13.3, 4.1, H-16), 3.3 (m, H-3), 3.44 (d, J = 11.1, H-23), 3.58 (d, J = 11.1, H-23), 3.74 (td, J = 11.0, 3.5, H-2), 4.4 (brs, H-6), 5.35 (t, J = 3.0, H-12)

β-D-Glcp: 5.31 (d, J = 7.9, H-1), 3.33 (m, H-2), 3.3 (m, H-3,4,5), 3.67 (dd, J = 12.0, 4.1, H-6), 3.8 (dd, J = 12.0, 2.0, H-6) [2]

^{13}C NMR (75 MHz, CD_3OD): [2]

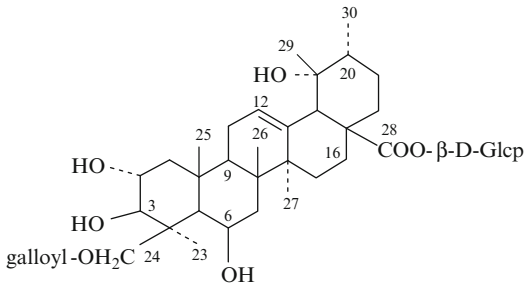
Table 1

C-1	50.1	C-16	26.5	Glc-1	95.9
2	69.7	17	49.5	2	73.9
3	78.5	18	55.0	3	78.3
4	44.8	19	73.4	4	71.2
5	48.9	20	42.9	5	78.3
6	68.7	21	27.2	6	62.4
7	40.4	22	38.5		
8	41.3	23	66.0		
9	48.9	24	15.2		
10	38.2	25	19.1		
11	24.7	26	18.7		
12	129.8	27	24.7		
13	139.0	28	178.5		
14	43.2	29	27.1		
15	29.6	30	16.6		

References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, S. Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)
2. M.G. Dijoux, C. Lavaud, G. Massiot, L.L. Men-Olivier, D.M. Sheeley, Phytochemistry **34**, 497 (1993)

Quadranoside IX



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 6β,23-Dihydroxy-tormentic Acid

Biological source: *Combretum quadrangulare* [1]

$C_{43}H_{62}O_{16}$: 834.403

$[\alpha]_D^{25}$ + 24.4° (c 0.045, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1710, 1645 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.11 (m, H-1), 2.29 (dd, J = 11.0, 3.6, H-1), 4.33 (m, H-2), 3.92 (d, J = 9.5, H-3), 1.88 (m, H-5), 4.86 (brs, H-6), 1.86, 2.07 (m, H_2-7), 2.02 (m, H-9), 2.09 (m, H-10), 5.59 (t, J = 2.5, H-12), 1.15 (m, H-15), 2.45 (td, J = 12.5, 4.6, H-15), 1.49 (m, H-16), 2.96 (td, J = 13.4, 4.6, H-16), 2.92 (s, H-18), 1.36 (m, H-20), 1.74 (m, H-21), 1.76, 2.03 (m, H_2-22), 4.73 (d, J = 11.2, H-23), 4.88 (d, J = 11.2, H-23), 1.73 (s, CH_3-24), 1.77 (s, CH_3-25), 1.72 (s, CH_3-26), 1.69 (s, CH_3-27), 1.38 (s, CH_3-29), 1.05 (d, J = 6.6, CH_3-30)

β-D-Glcp: 6.20 (d, J = 8.1, H-1), 4.15 (dd, J = 8.5, 8.1, H-2), 4.22 (dd, J = 8.8, 8.5, H-3), 4.30 (dd, J = 9.3, 8.8H-4), 3.97 (m, H-5), 4.35 (m, H-6), 4.42 (dd, J = 12.0, 2.4H-6)

Galloyl: 7.77 (s, H-2), 7.7 (s, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	50.1	C-16	26.3	Glc-1	95.9
2	68.5	17	48.6	2	74.0
3	78.1	18	54.6	3	78.7
4	43.8	19	72.7	4	71.3
5	49.8	20	42.1	5	79.1
6	67.9	21	26.7	6	62.3
7	41.7	22	37.5	Galloyl-1	121.5
8	40.0	23	67.2	2	110.0
9	48.6	24	15.6	3	147.6
10	38.0	25	19.1	4	140.9
11	24.8	26	18.7	5	147.6
12	128.7	27	24.9	6	110.0
13	138.6	28	176.8	7	167.2
14	42.7	29	27.1		
15	29.0	30	16.7		

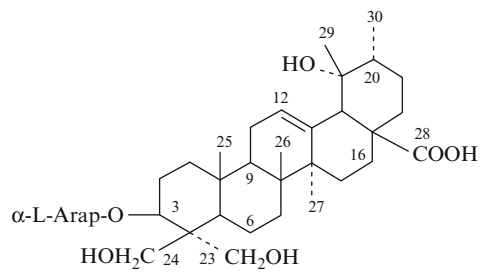
Pharm./Biol.: The seeds, leaves and stem bark of the plant have been used in Vietnamese folk medicine as an anthelmintic, antipyretic, antidysenteric and antihepatitis agent [1]

References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, Sh. Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)

Brevicuspisaponin 2

CAS Registry Number: 287716-32-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 19α,23,24-Trihydroxy-ursolic Acid

Biological source: *Ilex brevicuspis* [1]

$C_{35}H_{56}O_{10}$: 636.387

Mp: 203–204° [1]

$[\alpha]_{589}^{16}$ + 29.0°; $[\alpha]_{578}^{16}$ + 29.0°; $[\alpha]_{546}^{16}$ + 34.0°; $[\alpha]_{436}^{16}$ + 57.0° (c 0.64, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3550–3050, 2924–2854, 1718, 1684, 1454, 1377, 1260–1215, 1140 [1]

FAB-MS (positive-ion mode) *m/z*: 659.3 $[M + Na]^+$, 637 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.03, 1.59 (H_2-1), 2.14, 2.31 (H_2-2), 4.47 (dd, J = 13.0, 6.0, H-3), 1.88 (H-5), 1.51, 1.90 (t, J = 13.0, H_2-6), 1.37, 1.73 (dt, J = 10.0, 4.0, H_2-7), 1.88 (H-9), 1.97, 2.05 (H_2-11), 5.52 (s, H-12), 1.22, 2.24 (H_2-15), 2.05, 3.17 (dt, J = 13.0, 4.0, H_2-16), 3.26 (s, H-18), 2.00 (H-20), 1.27, 2.69 (tt, J = 10.0, 2.0, H_2-21), 1.94, 2.24 (H_2-22), 4.43 (d, J = 13.0), 4.90 (d, J = 13.0, H_2-23), 3.89 (d, J = 13.0) 4.59 (d, J = 13.0, H_2-24), 0.91 (s, CH_3-25), 1.08 (s, CH_3-26), 1.68 (s, CH_3-27), 1.40 (s, CH_3-29), 1.11 (d, J = 7.0, CH_3-30)

α-L-Arap: 5.05 (d, J = 8.0, H-1), 4.43 (t, J = 8.0, H-2), 4.07 (dd, J = 8.0, 4.0, H-3), 4.24 (H-4), 3.69 (d, J = 13.0), 4.31 (H_2-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	37.7	C-18	46.6	Ara-1	105.6
2	25.9	19	72.5	2	72.0
3	88.2	20	42.2	3	73.6
4	43.4	21	24.0	4	68.5
5	55.4	22	31.6	5	65.6
6	18.1	23	22.6		
7	32.9	24	62.5		
8	39.3	25	14.5		
9	46.7	26	16.3		
10	35.9	27	23.5		
11	23.3	28	179.9		
12	126.3	29	29.0		
13	138.6	30	15.3		
14	41.3				
15	28.4				
16	26.2				
17	47.1				

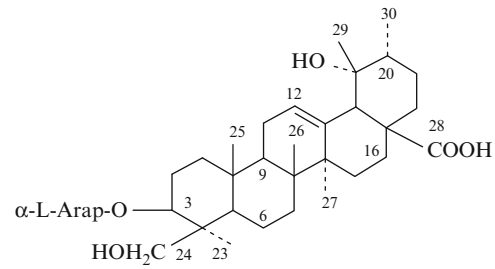
Pharm./Biol.: Used as a tonic [1]

References

1. A.T.C. Taketa, T. Schmittmann-Schlager, D. Guillaume, G. Gosmann, E.P. Schenkel, Phytochemistry **53**, 901 (2000)

Brevicuspisaponin 1

CAS Registry Number: 287716-72-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 19α,24-Dihydroxy-ursolic Acid

Biological source: *Ilex brevicuspis* [1]

$C_{35}H_{56}O_9$: 620.392

Mp: 237–238° [1]

$[\alpha]_{589}^{18}$ + 36.0°, $[\alpha]_{546}^{18}$ + 40.0° (c 1.346, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3550–3050, 2966–2875, 1685, 1654, 1455, 1378, 1235, 1134, 865 [1]

FAB-MS (positive-ion mode) *m/z*: 643.4 $[M + Na]^+$, 621.4 $[M + H]^+$, 487.4 $[M\text{-}C_5H_9O_4]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.89, 1.53 (H_2-1), 2.00, 2.20 (H_2-2), 3.51 (dd, J = 11.0, 5.00, H-3), 0.95 (H-5), 1.35, 1.61 (H_2-6), 1.35, 1.50 (H_2-7), 1.78 (H-9), 1.78, 2.00 (H_2-11), 5.50 (s, H-12), 1.25, 2.26 (H_2-15), 2.06, 3.25 (dt, J = 13.0, 4.0, H_2-16), 3.26 (s, H-18), 2.00 (H-20), 1.30, 2.70 (tt, J = 13.0, 4.0, H_2-21), 1.95, 2.20 (H_2-22), 1.48 (s, CH_3-23), 3.58 (d, J = 10.0), 4.35 (H_2-24), 0.81 (s, CH_3-25), 1.05 (s, CH_3-26), 1.73 (s, s, CH_3-27), 1.42 (s, CH_3-29), 1.11 (d, J = 6.0, CH_3-30)

α-L-Arap: 4.73 (d, J = 7.0, H-1), 4.40 (dd, J = 8.0, 7.0, H-2), 4.20 (dd, J = 8.0, 3.0, H-3), 4.35 (H-4), 3.85 (d, J = 10.0), 4.35 (H_2-5) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

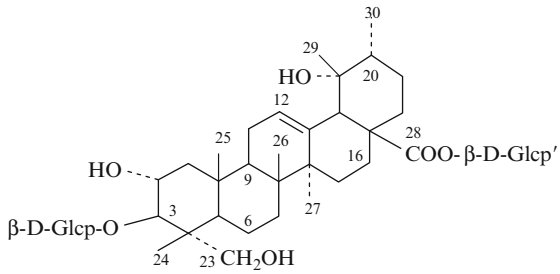
C-1	37.7	C-18	46.6	Ara-1	105.6
2	25.9	19	72.5	2	72.0
3	88.2	20	42.2	3	73.6
4	43.4	21	24.0	4	68.5
5	55.4	22	31.6	5	65.6
6	18.1	23	22.6		
7	32.9	24	62.5		
8	39.3	25	14.5		
9	46.7	26	16.3		
10	35.9	27	23.5		
11	23.3	28	179.9		
12	126.3	29	29.0		
13	138.6	30	15.3		
14	41.3				
15	28.4				
16	26.2				
17	47.1				

Pharm./Biol.: Used as a tonic [1]

References

1. A.T.C. Taketa, T. Schmittmann-Schlager, D. Guillaume, G. Gosmann, E.P. Schenkel, Phytochemistry **53**, 901 (2000)

Compound VIII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 19α-Hydroxyasiatic Acid

Biological source: *Symplocos spicata* [1], *Trachelospermum asiaticum* [2]

$C_{42}H_{68}O_{16}$: 828.450

Mp: 242–245°C (MeOH) [2]

$[\alpha]_D^{28}$ −5.9° (c 1.25, MeOH) [2]

IR (KBr) ν_{max} cm^{-1}: 3350, 1730 [1]

FAB-MS *m/z*: 851 $(M + Na)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.53 (brs, H-12), 2.92 (s, H-18), 1.03, 1.12, 1.21, 1.37, 1.61 (s, CH_3x5), 1.06 (d, J = 7.0, CH_3-30)

β-D-Glcp: 5.18 (d, J = 8.0, H-1)

β-D-Glcp′: 6.30 (d, J = 8.0, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [2]

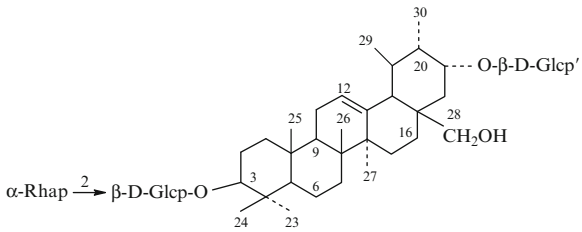
Table 1

C-1	47.6	C-16	26.2	Glc-1	105.8
2	67.1	17	48.6	2	75.5
3	88.6	18	54.4	3	78.6
4	44.7	19	72.7	4	71.5
5	47.4	20	42.2	5	78.4
6	18.5	21	26.7	6	62.4
7	33.2	22	37.7	Glc′-1	95.8
8	40.6	23	64.0	2	74.1
9	47.8	24	14.7	3	79.0
10	37.9	25	17.5	4	71.3
11	24.2	26	17.5	5	79.2
12	128.4	27	24.6	6	62.4
13	139.3	28	176.9		
14	42.2	29	27.0		
15	29.2	30	16.7		

References

1. R. Higuchi, T. Kawasaki, M. Biswas, V.B. Pandey, B. Dasgupta, Phytochemistry **21**, 907 (1982)
2. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)

Latifoloside I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 3β,21α,28-Trihydoxy-urs-12-ene

Biological source: *Ilex latifolia* [1]

$C_{48}H_{80}O_{17}$: 928.539

$[\alpha]_D^{25}$ + 36.7° (c 0.21, MeOH) [1]

HR-FAB- MS (negative-ion mode) *m/z*: 927.5375 [M-1]$^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.71 (dd, J = 11.3, 4.6, H-5), 0.86 (s, CH_3-25), 0.94 (s, CH_3-26), 0.96 (d, J = 6.7, CH_3-29), 1.12 (s, CH_3-27), 1.19 (s, CH_3-24), 1.23 (s, CH_3-23), 1.27 (d, J = 6.4, CH_3-30), 2.54 (d, J = 11.6, H-18), 3.22 (dd, J = 11.3, 4.0, H-3), 3.58 (d, J = 10.4, Ha -28), 3.88 (d, J = 10.4, Hb-28), 4.32 (m, H-21)

α-L-Rhap: 6.56 (brs, H-1), 1.72 (d, J = 6.1, CH_3-6)

β-D-Glcp: 4.96 (d, J = 7.5, H-1)

β-D-Glcp′: 5.08 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.4	C-16	26.5	Rha-1	101.6	Glc′-1	101.8
2	26.9	17	37.3	2	72.5	2	75.5
3	88.8	18	54.8	3	72.6	3	79.0
4	39.5	19	33.7	4	74.2	4	72.3
5	56.0	20	43.1	5	69.6	5	79.9
6	18.5	21	76.8	6	18.5	6	63.0
7	33.3	22	39.0	Glc-1	105.5		
8	42.6	23	28.1	2	77.9		
9	48.0	24	17.2	3	78.2		
10	36.8	25	16.0	4	72.2		
11	23.6	26	17.0	5	78.3		
12	125.1	27	23.0	6	63.2		
13	139.5	28	68.8				
14	40.1	29	17.8				
15	26.6	30	17.8				

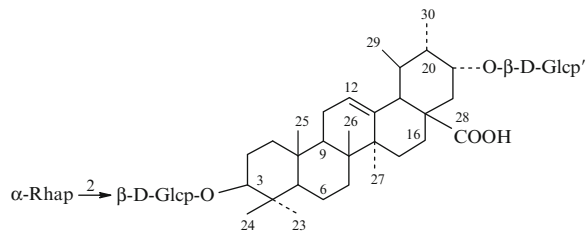
(*continued*)

Pharm./Biol.: Used in the tea Ku-ding-Cha, has been used in China as diuretic, remedy for sore throats, weight loss and for a relief of hypertension [1]

References

1. J. Huang, X. Wang, Y. Ogihara, N. Shimizu, T. Takeda, T. Akiyama, Chem. Pharm. Bull. **49**(2), 239 (2001)

Latifoloside J



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 21α-Hydoxy-ursolic Acid

Biological source: *Ilex latifolia* [1]

$C_{48}H_{78}O_{18}$: 942.518

$[\alpha]_D^{25}$ + 7.4° (c 0.67, MeOH) [1]

HR-FAB-MS (negative-ion mode) *m/z*: 941.5110 [M-1]$^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.71 (dd, J = 11.3, 4.6, H-5), 0.83 (s, CH_3-25), 1.01 (d, J = 6.7, CH_3-29), 1.02 (s, CH_3-26), 1.11 (s, CH_3-27), 1.17 (s, CH_3-24), 1.22 (s, CH_3-23), 1.26 (d, J = 6.4, CH_3-30), 2.78 (d, J = 11.3, H-18), 3.37 (dd, J = 11.2, 4.6, H-3), 4.28 (m, H-21)

α-L-Rhap: 6.55 (brs, H-1), 1.70 (d, J = 6.4, CH_3-6)

β-D-Glcp: 4.94 (d, J = 7.3, H-1)

β-D-Glcp′: 5.01 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	27.7	Rha-1	101.6	Glc′-1	101.7
2	26.9	17	48.5	2	72.4	2	75.4
3	88.9	18	54.3	3	72.5	3	78.9
4	39.5	19	33.6	4	74.1	4	72.2
5	56.2	20	42.9	5	69.6	5	79.8
6	18.5	21	76.9	6	18.5	6	62.9
7	33.6	22	39.1	Glc-1	105.4		
8	42.9	23	28.1	2	77.8		
9	48.0	24	17.2	3	78.2		
10	36.9	25	15.8	4	72.1		
11	23.6	26	17.6	5	78.3		
12	125.2	27	23.3	6	63.2		
13	139.6	28	180.6				
14	39.8	29	17.5				
15	29.2	30	17.8				

Pharm./Biol.: Used in the tea Ku-ding-Cha, has been used in China as diuretic, remedy for sore throats, weight loss and for a relief of hypertension [1]

References

1. J. Huang, X. Wang, Y. Ogihara, N. Shimizu, T. Takeda, T. Akiyama, Chem. Pharm. Bull. **49**(2), 239 (2001)

Cynarasaponin F

CAS Registry Number: 117804-12-3
See Figure Cynarasaponin F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 21β-Hydroxy-ursolic Acid

Biological source: *Cynara cardunculus* [1]

$C_{43}H_{68}O_{14}$: 808.460 (Me ester)

$[\alpha]_D^{25}$ + 23.4° (c 0.47, MeOH) [1]

^{1}H NMR (89.55 MHz, J/Hz, C_5D_5N) (Me ester): 5.43 (brs, H-12), 2,64 (d, J = 10.0, H-18), 3.68 (s, COOMe)

β-D-GlcUAp: (overlapped H-1), 3.72 (s, COOMe)

α-L-Arap: 5.18 (d, J = 6.0, H-1) [1]

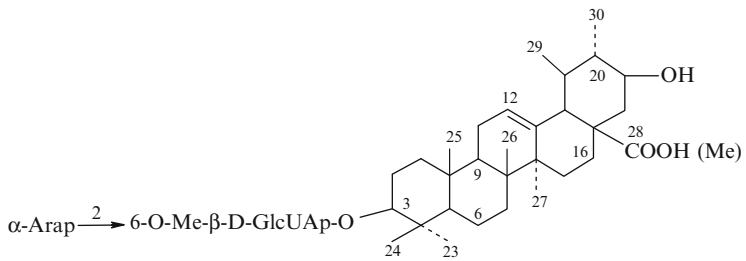
^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	25.8	GlcUA-1	105.4
2	26.7	17	49.4	2	83.4
3	89.3	18	53.2	3	76.8
4	39.6	19	38.6	4	73.8
5	55.9	20	47.7	5	77.4
6	18.5	21	70.3	6	170.5
7	33.4	22	46.4	Me	52.2
8	39.9	23	28.0	Ara-1	106.8
9	47.9	24	15.7	2	72.9
10	36.9	25	16.5	3	74.3
11	23.7	26	17.2	4	69.2
12	126.4	27	23.9	5	67.1
13	138.8	28	177.0		
14	42.4	29	17.8		
15	28.6	30	16.5		
		Me	51.6		

References

1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)



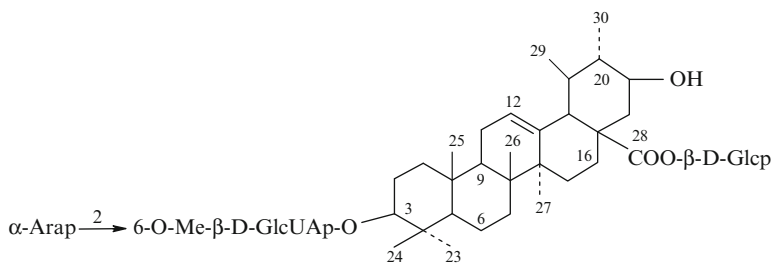
Cynarasaponin F

Cynarasaponin G

CAS Registry Number: 117804-13-4
See Figure Cynarasaponin G
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 21β-Hydroxy-ursolic Acid
Biological source: *Cynara cardunculus* [1]
$C_{48}H_{76}O_{19}$: 956.498 (Me ester)
$[\alpha]_D^{25}$ + 11.1° (c 0.85, MeOH) [1]
^{1}H NMR (89.55 MHz, J/z, C_5D_5N): 5.40 (brs, H-12), 2.54 (d, J = 10.0, H-18), 3.68 (s, CH_3O-28)
β-D-GlcUAp: 4.96 (d, J = 0, H-1), 3.76 (s, COOMe)
α-L-Arap: 5.14 (d, J = 0, H-1)
β-D-Glcp: 6.24 (d, J = 0, H-1) [1]
^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-1	39.1	C-16	26.	GlcUA-1	105.5	Glc-1	95.9
2	26.8	17	49.5	2	83.4	2	74.1
3	89.4	18	53.3	3	76.8	3	79,3
4	39.6	19	38.6	4	73.7	4	71.4
5	56.0	20	47.7	5	77.4	5	78.9
6	18.6	21	70.4	6	170.5	6	62.3
7	33.7	22	46.1	Me	52.2		
8	40.3	23	28.0	Ara-1	106.7		
9	48.1	24	15.8	2	72.9		
10	37.0	25	16.5	3	74.3		
11	23.8	26	17.8	4	69.2		
12	126.6	27	23.8	5	67.1		
13	138.5	28	175.5				
14	42.6	29	17.8				
15	28.9	30	16.5				

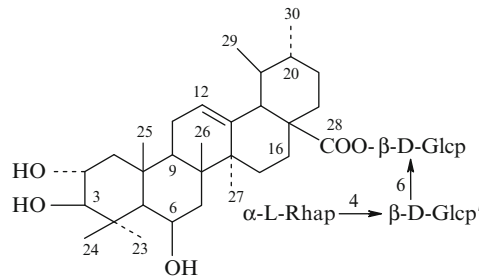


Cynarasaponin G

References

1. S. Shimizu, N. Shihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)

Centellasaponin C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 23-Deoxy-madecasic Acid
Biological source: *Centella asiatica* [1]
$C_{48}H_{78}O_{19}$: 958.513
Mp: 209–210°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D^{25}$ −9.0° (c 0.6, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3431, 2926, 1736, 1655, 1067 [1]
FAB-MS *m/z*: 981.5 $[M + Na]^+$; 957 $[M\text{-}H]^-$, 811 $[M\text{-}C_6H_{11}O_4]^-$, 487 $[M\text{-}C_{18}H_{31}O_{14}]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.90, 0.96 (d, J = 6.4, CH_3-29, 30), 1.17, 1.43, 1.67, 1.72, 1.73 (s, CH_3-27, 23, 26, 24, 25), 2.53 (d, J = 11.6, H-18), 3.38 (d, J = 10.4, H-3), 4.24 (m, H-2), 4.86 (m, H-6), 5.52 (dd, J = 3.4, 3.7, H-12)

β-D-Glcp: 6.11 (d, J = 8.2, H-1)
β-D-Glcp′: 4.94 (d, J = 7.9, H-1)
α-L-Rhap: 5.78 (d, J = 12.0, H-1), 1.66 (d, J = 6.1, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	50.5	C-16	24.8	Glc-1	95.8	Rha-1	102.7
2	68.8	17	48.5	2	73.8	2	72.5
3	84.2	18	53.4	3	78.6	3	72.7
4	40.7	19	39.5	4	71.2	4	74.0
5	56.5	20	39.2	5	77.9	5	70.3
6	67.7	21	30.9	6	69.6	6	18.5
7	41.6	22	36.9	Glc′-1	104.9		
8	39.7	23	29.3	2	75.3		
9	48.8	24	18.8	3	76.6		
10	38.3	25	19.3	4	78.5		
11	24.0	26	19.3	5	77.1		
12	126.5	27	23.8	6	61.5		
13	137.8	28	176.3				
14	43.2	29	17.4				
15	28.8	30	21.3				

References

1. H. Matsuda, T. Morikawa, H. Ueda, M. Yoshikawa, Chem. Pharm. Bull. **49**(10), 1368 (2001)

Cynarasaponin D

CAS Registry Number: 117804-10-1

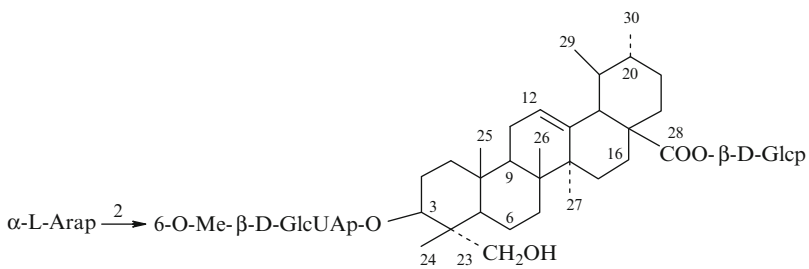
See Figure Cynarasaponin D
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 23-Hydroxy-ursolic Acid
Biological source: *Cynara cardunculus* [1]
$C_{48}H_{76}O_{19}$: 956.498 (Me ester)
$[\alpha]_D^{25}$ + 7.6° (c 1.16, MeOH) [1]
^{1}H NMR (89.55 MHz, J/Hz, C_5D_5N): 5.42 (brs, H-12), 2.48 (d, J = 10.0, H-18)
β-D-GlcUAp: (overlapped H-1), 3.68 (s, COOMe)
α-L-Arap: 5.18 (d, J = 6.0, H-1)
β-D-Glcp: 6.22 (d, J = 7.0, H-1) [1]
^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

C-1	39.4	C-16	24,8	GlcUA-1	104.5	Glc-1	95.8
2	28.8	17	48.5	2	83.3	2	74.3
3	82.0	18	53.5	3	76.8	3	79,2
4	43.6	19	39.2	4	73.7	4	71.4
5	47.5	20	39.2	5	77.4	5	78.9
6	18.2	21	31.0	6	170.4	6	62.5
7	33.4	22	36.8	Me	52.1		
8	40.3	23	63.8	Ara-1	106.6		
9	48.2	24	13.3	2	72.9		
10	36.8	25	16.4	3	74.1		
11	23.9	26	17.4	4	69.2		
12	126.3	27	23.9	5	67.1		
13	138.5	28	176.3				
14	42.6	29	17.8				
15	26.2	30	21.4				

References

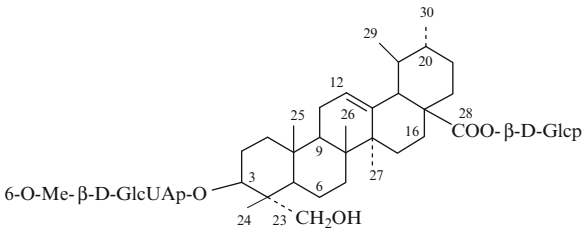
1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)



Cynarasaponin D

Cynarasaponin E

CAS Registry Number: 117804-11-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 23-Hydroxy-ursolic Acid

Biological source: *Cynara cardunculus* [1]

$C_{43}H_{68}O_{15}$: 824.455 (Me ester)

$[\alpha]_D^{25}$ + 3.7° (c 0.95, MeOH) [1]

^{1}H NMR (89.55 MHz, J/Hz, C_5D_5N): 5.42 (brs, H-12), 2,48 (d, J = 10.0, H-18)

β-D-GlcUAp: (overlapped H-1), 3.71 (s, COOMe)

β-D-Glcp: 6.22 (d, J = 8.0, H-1) [1]

^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

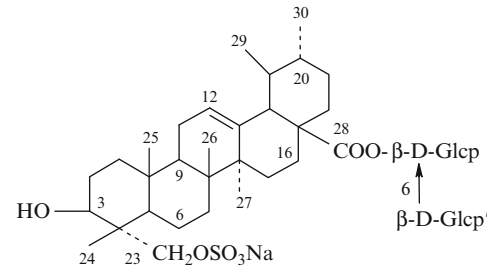
C-1	39.0	C-16	24.7	GlcUA-1	106.4	Glc-1	95.7
2	28.8	17	48.4	2	75.5	2	74.1
3	82.4	18	53.4	3	77.9	3	79,2
4	43.5	19	39.4	4	73.1	4	71.3
5	47.6	20	39.2	5	77.3	5	78.9
6	18.2	21	30.9	6	170.8	6	62.4
7	33.3	22	36.8	Me	52.1		
8	40.3	23	64.4				
9	48.2	24	13.7				
10	36.8	25	16.4				
11	23.9	26	17.4				
12	126.2	27	23.8				
13	138.4	28	176.2				
14	42.6	29	17.8				
15	26.1	30	21.3				

References

1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)

Sulfapatrinoside I

CAS Registry Number: 120190-30-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 23-Hydroxy-ursolic Acid

Biological source: *Patrinia scabiosaefolia* [1]

$C_{42}H_{67}NaO_{17}S$: 898.399

Mp: 239–242°C (EtOH) [1]

$[\alpha]_D^{20}$ + 19.2° (c 0.33, C_5D_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 1720, 1220, 1060, 825 [1]

FAB-MS *m/z*: 897 ($[M\text{-}H]^-$, 3), 875 ($[(M\text{-}Na)_2]^-$ 22], 713 ($[(M\text{-}Na\text{-}162)^-$, 2], 551 ($[(M\text{-}Na\text{-}324)^-$, 9], 507 (50), 297 (100) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85 (d, J = 6.4, CH_3-29), 0.87 (s, CH_3-24), 0.92 (s, CH_3-25), 0.93 (d, J = 6.4, CH_3-30), 0.99 (s, CH_3-26), 1.13 (s, CH_3-27), 2.49 (d, J = 11.6, Hβ-18), 4.20–4.30 (Hα-3), 4.25, 4.73 (d, J = 10.7, H_2-23), 5.41 (H-12), 5.04 (d, J = 7.9), 6.18 (d, J = 7.9, H-1 of 2xGlc) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.84	C-16	24.63	Glc-1	95.72
2	26.98	17	48.48	2	73.79
3	71.62	18	53.29	3	78.36
4	42.50	19	39.32	4	71.20
5	47.70	20	39.10	5	77.89
6	18.38	21	30.82	6	69.70
7	33.16	22	37.16	Glc′-1	105.25
8	40.12	23	70.12	2	75.20
9	47.92	24	12.95	3	78.71
10	36.85	25	16.44	4	71.62
11	23.63	26	17.32	5	78.46
12	125.81	27	23.68	6	62.69
13	138.61	28	176.46		

(*continued*)

Table 1 (continued)

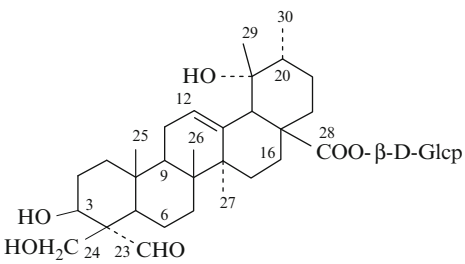
14	42.87	29	17.76
15	28.68	30	21.21

Pharm./Biol.: Used in China as a diuretic and for "Qing Re Jie Du" (treatment of fever and inflammation along with detoxication), "Huo Xue Hua Yu" (mobilization of blood circulation and treatment of stasis) [1]

References

1. A. Inada, M. Yamada, H. Murata, M. Kobayashi, H. Toya, Y. Kato, T. Nakanishi, Chem. Pharm. Bull. **36**(11), 4269 (1988)

Ilexoside XLII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 23-Oxorotungenic Acid

Biological source: *Ilex rotunda* [1]

$C_{36}H_{56}O_{11}$: 664.382

$[\alpha]_D^{22}$ + 30.8° (c 2.4, MeOH) [1]

FAB-MS *m/z*: 663 $[M-H]^-$, 501 $[M-H-Glc]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 1.02, 1.18, 1.40, 1.62 (s, CH_3 × 4), 1.07 (d, J = 6.6, CH_3), 2.42 (dt, J = 14.0, 3.0, Hβ-15), 2.92 (brs, H-18), 3.07 (dt, J = 14, 3, Hα-16), 4.39 (dd, J = 11, 4.5, H-3), 4.48, 4.80 (d, J = 11.7, H_2-24), 5.54 (dd, J = 4, 3.4, H-12), 10.3 (s, H-23)

β-D-Glcp: 6.28 (d, J = 8.0, H-1), 4.22 (dd, J = 8.0, 8.8, H-2), 4.31 (t, J = 8.8, H-3), 4.37 (dd, J = 9.0, 8.8, H-4), 4.06 (m, H-5), 4.41 (dd, J = 12, 2.7, H-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

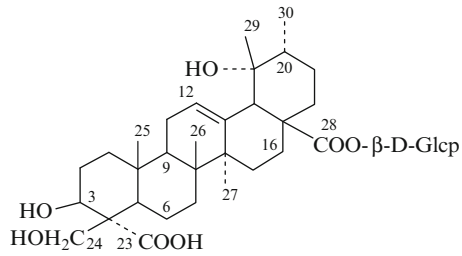
Table 1

C-1	38.6	C-16	26.1	Glc-1	95.8
2	27.9	17	48.6	2	74.0
3	74.6	18	54.5	3	79.0
4	59.0	19	72.6	4	71.3
5	50.9	20	42.1	5	79.3
6	21.4	21	26.7	6	62.4
7	33.3	22	37.7		
8	40.7	23	208.8		
9	47.6	24	61.0		
10	36.7	25	15.8		
11	24.2	26	17.3		
12	128.1	27	24.4		
13	139.3	28	176.9		
14	42.1	29	27.0		
15	29.2	30	16.7		

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 39 (1993)

Ilexoside XLV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 24-Oxy-rotundioic Acid

Biological source: *Ilex rotunda* [1]

$C_{36}H_{56}O_{12}$: 680.377

Mp: 267–269°C (MeOH) [1]

$[\alpha]_D^{22}$ + 24.7° (c 1.2, MeOH) [1]

FAB-MS *m/z*: 679 $[M-H]^-$, 517 $[M-H-Glc]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.08 (d, J = 6.5, CH_3), 1.09, 1.19, 1.43, 1.63 (s, CH_3 × 4), 2.42 (dt, J = 14, 3, Hβ-15), 2.93 (s, H-18), 3.06 (dt, J = 14,

3, Hα-16), 4.54, 4.83 (d, J = 10.5, H_2-23), 4.74 (dd, J = 11, 4.5, H-3), 5.57 (brt, H-12)
β-D-Glcp: 6.26 (d, J = 8.0, H-1), 4.23 (dd, J = 8.0, 8.0, H-2), 4.30 (m, H-3, 4), 4.08 (m, H-5), 4.40 (dd, J = 12.0, 4.0), 4.50 (dd, J = 12.0, 2.5, H_2-6) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

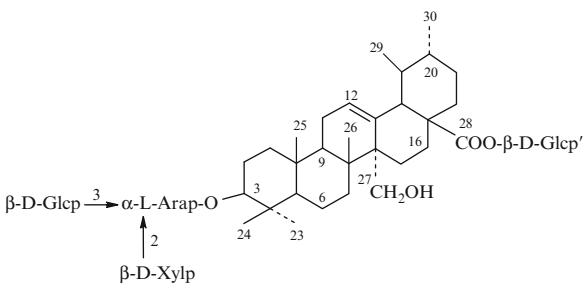
Table 1

C-1	39.3	C-16	26.1	Glc-1	95.9
2	28.5	17	48.6	2	74.1
3	77.1	18	54.5	3	79.0
4	58.0	19	72.7	4	71.3
5	52.7	20	42.0	5	79.3
6	22.7	21	26.8	6	62.2
7	33.9	22	37.7		
8	40.9	23	179.6		
9	48.3	24	62.4		
10	37.0	25	16.3		
11	24.4	26	17.2		
12	128.2	27	24.5		
13	139.3	28	177.0		
14	42.2	29	27.1		
15	29.3	30	16.8		

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 39 (1993)

Compound 7 from *Fagonia arabica*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 27-Hydroxy-ursolic Acid

Biological source: *Fagonia arabica* [1]
$C_{52}H_{84}O_{22}$: 1060.545
$[\alpha]_D^{25}$ + 6.3° (c 0.4, MeOH) [1]
FAB-MS *m/z*: 1083 $[M + Na]^+$, 921, 796, 664, 620, 532, 488, 487, 308 [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.83, 1.09, 1.17, 1.21 (s, $CH_3 \times 4$), 0.92, 1.05 (d, J = 6.0, $CH_3 \times 2$), 2.64 (d, J = 11.0, H-18), 3.16 (dd, J = 10.0, 4.0, H-3), 5.44 (t, J = 3.0, H-12)
α-L-Arap: 4.70 (d, J = 7.1, H-1), 4.64 (dd, J = 9.0, 7.0, H-2), 4.27 (H-3), 4.48 (m, H-4), 3.66 (d, J = 11.2, H-5), 4.16 (H-5)
β-D-Glcp: 5.26 (d, J = 7.8, H-1), 3.98 (t, J = 8.0, H-2), 4.08 (t, J = 8.0, H-3), 4.30 (H-4), 3.91 (m, H-5), 4.24, 4.44 (H_2-6)
β-D-Xylp: 5.37 (d, J = 7.5, H-1), 4.0 (t, J = 8.0, H-2), 4.08 (t, J = 8.0, H-3), 4.2 (H-4), 3.44 (t, J = 9.5, H-5)
β-D-Glcp′: 6.30 (d, J = 8.0, H-1), 4.18 (t, J = 8.0, H-2), 4.26 (H-3), 4.30 (H-4), 4.01 (m, H-5), 4.38 (dd, J = 12.0, 4.5, H-6), 4.44 (H-6) [1]
^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

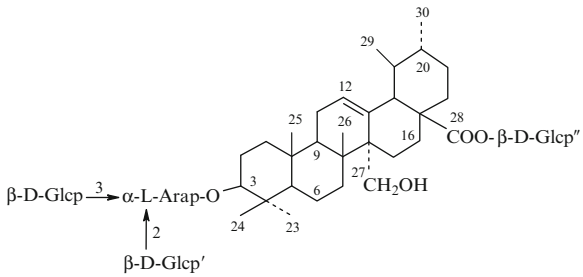
C-1	39.1	C-16	24.1	Ara-1	105.6	Xyl-1	105.1
2	26.8	17	48.4	2	77.5	2	76.0
3	89.1	18	53.4	3	83.7	3	78.5
4	39.2	19	39.3	4	68.9	4	71.6
5	56.0	20	39.8	5	66.1	5	67.1
6	18.7	21	30.6	Glc-1	105.2	Glc′-1	95.8
7	34.5	22	36.9	2	75.3	2	74.2
8	41.1	23	27.8	3	78.9	3	79.2
9	48.1	24	16.2	4	71.4	4	71.4
10	37.2	25	16.6	5	78.4	5	79.0
11	23.2	26	18.9	6	62.6	6	62.4
12	130.2	27	64.2				
13	n.d.	28	176.4				
14	48.6	29	18.0				
15	25.2	30	21.2				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. T. Miyase, F.R. Melek, O.D. El-Gindi, S.M. Abdel-Khalik, M.R. El-Gindi, M.Y. Haggag, S.H. Hilal, Phytochemistry **41**, 1175 (1996)

Compound 11 from *Fagonia glutinosa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 27-Hydroxy-ursolic Acid

Biological source: *Fagonia glutinosa* [1]

$C_{53}H_{86}O_{23}$: 1090.555

$[\alpha]_D^{23}$ + 12.6° (c 1.49, MeOH) [1]

FAB-MS *m/z*: 1113[$C_{53}H_{86}O_{23}$ + Na]$^+$, 1081, 951, 531, 487, 399 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.96 (dt, J = 13.7, 3.3, Hα-1), 1.53 (d, J = 12.0, Hβ-1), 2.01 (Hα-2), 1.83 (Hβ-2), 3.15 (dd, J = 12.0, 4.0, H-3), 0.90 (H-5), 1.53 (brd, J = 12.0, Hα-6), 1.32 (Hβ-6), 2.06 (Hα-7), 1.53 (brd, J = 12.0, Hβ-7), 2.11 (brt, J = 10.0, H-9), 2.00 (H-11), 5.74 (t, J = 3.0, H-12), 1.82 (Hα-15), 2.39 (dt, J = 13.3, 4.0, Hβ-15), 2.17 (dt, J = 13.5, 4.0, Hα-16), 2.04 (brd, J = 12.0, Hβ-16), 2.64 (d, J = 12.7, H-18), 1.47 (Hα-19), 1.25 (dt, J = 12.0, 2.7, Hα-21), 1.33 (brd, J = 11.0, Hβ-21), 1.91 (brd, J = 13.3, Hα-22), 1.75 (dt, J = 14.6, 4.7, Hβ-22), 1.19 (s, CH_3-23), 1.08 (s, CH_3-24), 0.90 (s, CH_3-25), 1.17 (s, CH_3-26), 4.02 (s, CH_3-27), 1.05 (d, J = 6.5, CH_3-29), 0.83 (d, J = 6.5, CH_3-30); α-L-Arap: 4.73 (d, J = 6.6, H-1), 4.69 (t, J = 7.0, H-2), 4.31 (dd, J = 6.8, 3.5, H-3), 4.48 (m, H-4), 3.66 (d, J = 11.0, H-5), 4.18 (H-5); β-D-Glcp: 5.27 (d, J = 8.0, H-1), 3.98 (t, J = 8.0, H-2), 4.20 (t, J = 8.0, H-3), 4.18 (t, J = 8.0, H-4), 3.92 (m, H-5), 4.30 (dd, J = 12.0, 4.5, H-6), 4.46 (dd, J = 12.0, 2.0, H-6); β -D-Glcp′: 5.48 (d, J = 8.0, H-1), 4.02 (t, J = 8.0, H-2), 4.18 (t, J = 8.0, H-3), 4.14 (t, J = 8.0, H-4), 3.70 (m, H-5), 4.25 (dd, J = 12.0, 4.0, H-6), 4.34 (d, J = 12.0, H-6); β-D-Glcp″: 6.30 (d, J = 8.0, H-1), 4.20 (t, J = 8.0, H-2), 4.30 (t, J = 8.0, H-3), 4.33 (t, J = 8.0, H-4), 4.03 (m, H-5), 4.38 (dd, J = 12.0, 4.5, H-6), 4.46 (d, J = 12.0, H-6) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

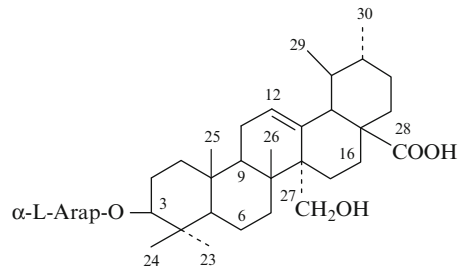
C-1	39.1	C-15	23.2	C-29	18.0	Glc′-1	104.4
2	26.7	16	25.3	30	21.3	2	76.1
3	88.9	17	48.2	Ara-1	105.3	3	78.5
4	39.7	18	53.4	2	77.5	4	72.5
5	55.9	19	39.2	3	83.3	5	77.4
6	18.9	20	39.2	4	68.7	6	63.3
7	34.5	21	30.6	5	65.9	Glc″-1	95.8
8	41.1	22	36.9	Glc-1	105.0	2	74.2
9	48.6	23	28.0	2	75.3	3	78.9
10	37.2	24	16.8	3	78.6	4	71.4
11	24.1	25	16.2	4	71.6	5	79.2
12	130.2	26	18.9	5	78.3	6	62.3
13	135.4	27	64.3	6	62.6		
14	48.4	28	176.4				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. F.R. Melek, T. Miyase, M.R. El-Gindy, S.M. Abdel-Khalik, N.S. Ghaly, M. El-Kady, Pharmazie **55**, 772 (2000)

Glycoside L-C_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 27-Hydroxy-ursolic Acid

Biological source: *Scheffleropsis angkae* [1]

$C_{35}H_{56}O_8$: 604.397

^{1}H NMR (MHz, J/Hz, C_5D_5N): 1.00, 1.56 (H_2-1), 2.13, 1.86 (H_2-2), 3.27 (H-3), 0.93 (H-5), 1.47, 1.30 (H_2-6), 2.12, 1.56 (H_2-7), 2.10 (H-9), 2.00 (H-11), 5.73 (H-12), 2.36, 1.88 (H_2-15), 2.21, 2.06 (H_2-16), 2.62 (H-18), 1.48 (H-19), 0.87 (H-20), 1.35, 1.20 (H_2-21),

1.92, 1.78 (CH_2-22), 1.18 (CH_3-23), 0.96 (CH_3-24), 0.94 (CH_3-25), 1.16 (CH_3-26), 4.04 (CH_2-27), 1.13 (CH_3-29), 0.82 (CH_3-30)

α-L-Arap: 4.71 (H-1), 4.38 (H-2), 4.21 (H-3), 4.32 (H-4), 4.28, 3.73 (H_2-5) [1]

^{13}C NMR (C_5D_5N): [1]

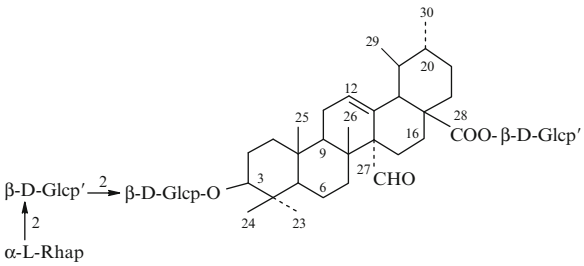
Table 1

C-1	39.1	C-16	25.5	Ara-1	107.1
2	26.6	17	48.0	2	72.8
3	88.8	18	53.7	3	74.5
4	39.6	19	39.3	4	69.3
5	55.9	20	39.3	5	66.4
6	18.7	21	30.8		
7	34.3	22	37.5		
8	41.0	23	28.3		
9	48.3	24	16.9		
10	37.0	25	16.0		
11	23.9	26	18.8		
12	129.0	27	64.3		
13	136.0	28	180.3		
14	48.1	29	18.1		
15	23.1	30	21.3		

References

1. V.V. Kachala, V.I. Grishkovets, A.S. Stolyarenko, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **37**(6), 520 (2001)

Gongganoside G



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – 27-Oxo-ursolic Acid

Biological source: *Bhesa paniculata* [1]

$C_{54}H_{86}O_{23}$: 1102.555

$[\alpha]_D^{18}$ + 40.7° (c 0.95 MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 2926, 1726, 1706, 1635, 1453, 1075 [1]

FAB-MS *m/z*: 1125.5463 $[M + Na]^+$; 1101 $[M-H]^-$, 939, 793, 631, 469 [1]

^{1}H NMR (J/Hz, CD_3OD): 0.84 (s, CH_3-24), 0.88 (brs, CH_3-26, 29), 0.97 (brs, CH_3-25, 30), 1.06 (s, CH_3-23), 2.28 (d, J = 10.9, H-18), 5.81 (brs, H-12), 9.84 (s, CHO-14)

β-D-Glcp: 4.38 (d, J = 7.7, H-1)

β-D-Glcp′: 5.37 (d, J = 7.9, H-1)

α-L-Rhap: 5.16 (d, J = 1.4, H-1) [1]

^{13}C NMR (CD_3OD): [1]

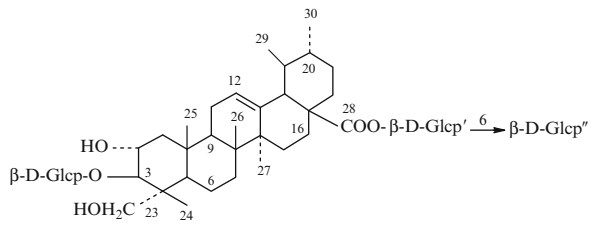
Table 1

C-1	39.9	C-16	25.2	Glc-1	105.7	Rha-1	102.0
2	27.0	17	49.6	2	78.2	2	72.2
3	91.9	18	54.4	3	78.8	3	72.1
4	40.5	19	37.5	4	72.1	4	74.2
5	56.8	20	40.5	5	77.8	5	69.5
6	19.2	21	31.0	6	62.9	6	18.3
7	36.8	22	37.2	Glc′-1	102.0	Glc″-1	95.6
8	42.1	23	28.6	2	79.6	2	73.9
9	50.4	24	16.9	3	79.3	3	78.2
10	38.2	25	16.9	4	72.6	4	71.1
11	24.5	26	18.8	5	78.2	5	78.6
12	133.3	27	208.8	6	63.7	6	62.4
13	132.6	28	177.5				
14	60.1	29	17.9				
15	21.6	30	21.4				

References

1. K. Ohashi, T. Tanikawa, Y. Okumura, K. Kawazoe, N. Tatara, M. Minato, H. Shibuya, I. Kitagawa, Chem. Pharm. Bull. **42**(9), 1791 (1994)

Stelmatotriterpenoside F



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type –Asiatic acid
Biological source: *Stelmatocrypton khasianum* [1]
$C_{48}H_{78}O_{20}$: 974.508
Mp: 217–220°C [1]
$[\alpha]_D^{25}$ − 14.9° (c 0.27, MeOH) [1]
TOF-MS *m/z*: 1012.6 $[M + K]^+$, 996.6 $[M + Na]^+$ [1]
HR-SI-MS*m/z*: 649.3935 $[M\text{-}2Glc]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.80 (d, J = 6.0, CH_3-30), 0.86 (d, J = 6.0, CH_3-29), 0.99 (s, CH_3-24), 1.03 (s, CH_3-25), 1.06 (s, CH_3-27), 1.14 (s, CH_3-26), 2.46 (d, J = 12.0, H-18), 4.21 (H-2), 4.25 (H-3), 3.67 (d, J = 10.0), 4.54 (H_2-23), 5.39 (t-like, H-12)
β-D-Glcp: 5.16 (d, J = 8.0, H-1), 4.10 (H-2), 4.12 (H-3), 4.20 (H-4), 3.90 (H-5), 4.31 (H-6), 4.54 (H-6)
β-D-Glcp′: 6.19 (d, J = 8.5, H-1), 4.08 (H-2), 4.21 (H-3), 4.34 (H-4), 4.08 (H-5), 4.32 (H-6), 4.70 (H-6)
β-D-Glcp″: 5.03 (d, J = 8.0, H-1), 4.00 (t, J = 8.0, H-2), 4.20 (H-3), 4.14 (H-4), 3.89 (H-5), 4.34 (H-6), 4.49 (H-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	47.98	C-16	24.50	Glc-1	105.72	Glc″-1	105.27
2	66.98	17	48.32	2	75.14	2	75.40
3	88.46	18	53.09	3	78.34	3	78.45
4	44.62	19	39.21	4	70.94	4	71.30
5	47.17	20	38.95	5	78.34	5	78.51
6	18.15	21	30.68	6	62.57	6	62.26
7	33.00	22	36.72	Glc′-1	95.56		
8	40.08	23	63.80	2	73.74		
9	47.54	24	14.74	3	78.66		
10	37.67	25	17.58	4	71.44		
11	23.68	26	17.67	5	77.87		
12	125.79	27	23.65	6	69.46		
13	138.37	28	176.23				
14	42.44	29	17.26				
15	28.64	30	21.17				

(*continued*)

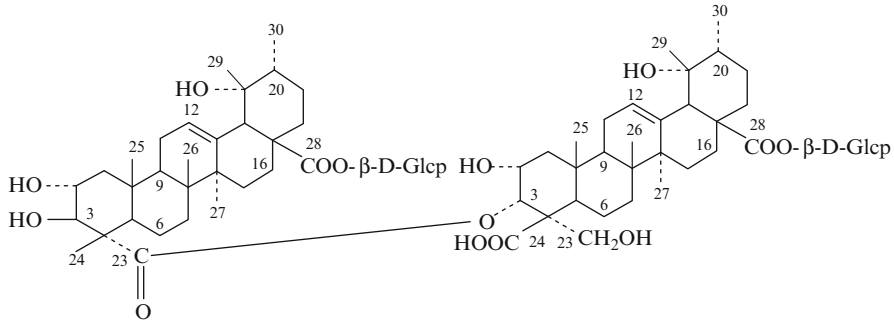
Pharm./Biol.: In Chinese folk medicine the plant has been used for the treatment of colds, tracheitis, stomachaches, and rheumatic aches. The preliminary screening test for anti-cancer activity in vitro showed that the crude extracts of *S. khasianum* had significant cytotoxic activity against some human cancer cell lines [1]

References

1. Q. Zhang, Y. Zhao, B. Wang, G. Tu, Chem. Pharm. Bull. **51**(5), 574 (2003)

Coreanoside F1

See Figure Coreanoside F1
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Coreanogenoic Acid
Biological source: *Rubus coreanus* [1]
$C_{72}H_{110}O_{24}$: 1358.738
Mp: 242–245°C [1]
$[\alpha]_D^{25}$ + 33.2° (c 0.56, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3460, 1726, 1712, 1686 [1]
FAB-MS *m/z*: 1381 $[M + Na]^+$, 1219 $[M + Na\text{-}Glc]^-$, 1357 $[M\text{-}H]^-$, 1195 $[M\text{-}H\text{-}Glc]^-$, 679, 517 $[679\text{-}Glc]^-$ [1]



Coreanoside F1

HR-FAB-MS *m/z*: 1381.7290 [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 6.28, 6.32 (d, J = 7.8, H-1 of Glc and Glc) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

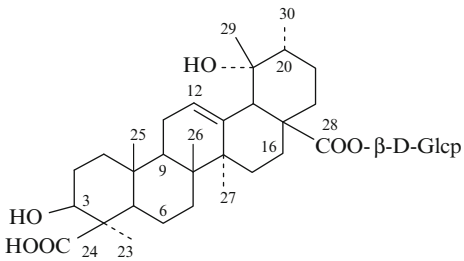
C-1	48.2	C-8′	40.2	C-16	26.2	C-23′	66.1	Glc-1	95.8
1′	44.7	9	48.3	16′	26.3	24	12.5	2	74.1
2	68.4	9′	48.1	17	48.3	24′	176.9	3	78.8
2′	66.1	10	38.2	17′	48.3	25	17.5	4	71.6
3	82.0	10′	39.2	18	54.6	25′	15.4	5	78.9
3′	74.1	11	24.2	18′	54.3	26	17.5	6	62.7
4	54.8	11′	24.4	19	73.0	26′	17.6	Glc′-1	95.7
4′	55.8	12	128.3	19′	73.0	27	24.5	2	74.1
5	51.3	12′	128.9	20	42.2	27′	24.6	3	78.8
5′	48.1	13	139.4	20′	42.3	28	176.8	4	71.5
6	21.9	13′	139.3	21	26.7	28′	176.8	5	78.9
6′	20.1	14	42.1	21′	26.7	29	27.2	6	62.7
7	33.1	14′	42.3	22	37.6	29′	27.3		
7′	34.0	15	29.1	22′	37.6	30	16.7		
8	40.7	15′	29.2	23	178.5	30′	16.6		

References

1. K. Ohtani, C. Miyajima, T. Takahasi, R. Kasai, O. Tanaka, D.-R. Hahn, N. Naruhashi, Phytochemistry **29**(10), 3275 (1990)

Ilexsaponin A_1

CAS Registry Number: 108524-93-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ilexgenin A
Biological source: *Ilex pubescens* [1]
$C_{36}H_{56}O_{11}$: 664.382
$[\alpha]_D^{20}$ + 25.5° (c 0.69, C_5D_5N) [1]
IR (nujol) ν_{max} cm^{-1}: 3400, 1720, 1685 [1]
EI-MS *m/z* (acetate): 331 $[Glc(Ac)_4]^+$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 1.18, 1.29, 1.44 (s, CH_3 × 3), 1.73 (s, CH_3 × 2), 1.09 (d, J = 6.1), 2.97 (s, H-18), 3.30 (dd, J = 4.0, 11.0, H-3), 5.21 (brs, HO-19), 5.61 (brt, H-12), 6.29 (d, J = 6.8, H-1 of Glc) [1]
^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

C-1	39.7	C-17	48.6	Glc-1	95.7
2	29.0	18	54.4	2	73.8
3	78.3	19	72.6	3	78.7
4	49.1	20	42.1	4	71.1
5	56.9	21	26.6	5	79.1
6	21.0	22	37.8	6	62.2
7	33.8	23	24.4		
8	40.3	24	181.0		
9	47.1	25	13.9		
10	37.8	26	17.3		
11	24.4	27	24.7		
12	128.4	28	177.1		
13	139.2	29	27.0		
14	42.1	30	16.7		
15	29.1				
16	26.0				

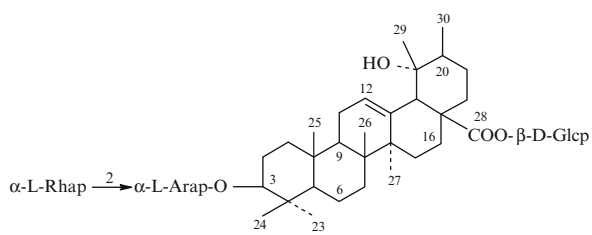
Pharm./Biol.: Used in China for the treatment of cardiovascular diseases and hypercholesterinemia [1]

References

1. K. Hidaka, M. Ito, Y. Matsuda, H. Kohda, K. Yamasaki, J. Yamahara, Phytochemistry **26**, 2023 (1987)

Latifoloside D

CAS Registry Number: 194660-83-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ilexgenin B

Biological source: *Ilex latifolia* [1]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 212–215°C [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 2930, 1733, 1641, 1450, 1387, 1074, 1026 [1]

FAB-MS *m/z*: 911 $[M-1]^-$, 749 $[M-1-162]^-$, 603 $[M-1-162-146]^-$, 471 $[M-1-162-146-132]^-$, 453 $[M-1-162-146-132-H_2O]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.88, 1.06, 1.13, 1.16, 1.40, 1.71 (s, $CH_3 \times 6$), 0.96 (dd, J = 6.6, 3H), 3.18 (dd, J = 11.4, 4.4, Hα-3), 3.16 (brs, Hα-18), 5.27 (s, HO-19), 5.49 (brs, H-12)

α-L-Arap: 4.88 (d, J = 5.1, H-1)

α-L-Rhap: 6.13 (brs, H-1), 1.60 (d, J = 5.7, CH_3-6)

β-D-Glcp: 6.30 (d, J = 7.9, H-1) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

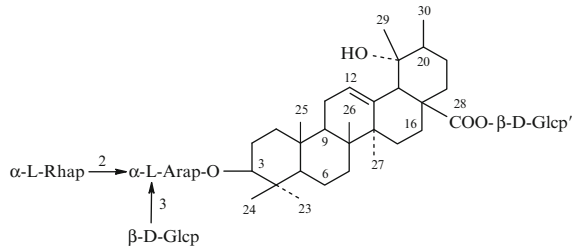
C-1	39.2	C-16	24.9	Ara-1	104.9	Glc-1	96.0
2	27.0	17	48.6	2	76.2	2	73.8
3	89.1	18	47.4	3	74.2	3	79.0
4	39.7	19	73.6	4	68.8	4	71.2
5	56.2	20	42.9	5	64.7	5	79.4
6	18.9	21	26.8	Rha-1	101.9	6	62.3
7	32.1	22	33.7	2	72.5		
8	40.6	23	28.3	3	72.5		
9	48.0	24	17.2	4	74.1		
10	37.2	25	15.9	5	70.1		
11	24.2	26	17.7	6	18.8		
12	127.8	27	24.5				
13	139.0	28	177.5				
14	42.3	29	29.9				
15	29.4	30	16.3				

Pharm./Biol.: *Ilex latifolia* Thunb. used in China as a traditional beverage, known as Ku-Ding-Cha,. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

1. M.-An. Ouyang, H.-Q. Wang, Y.-Q. Liu, Ch.-R. Yang, Phytochemistry **45**, 1501 (1997)

Latifoloside E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ilexgenin B

Biological source: *Ilex latiolia* [1, 2]

$C_{53}H_{86}O_{22}$: 1074.561

Mp: 228–230°C [1]

$[\alpha]_D^{25}$ + 16.4° (c 0.65, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3430, 2932, 1730, 1454, 1388, 1072 [1]

FAB-MS *m/z*: 1073 $[M-1]^-$, 911 $[M-1-162]^-$, 765 $[M-1-162-146]^-$, 749 $[M-1-2 \times 162]^-$, 603 $[M-1-146-2 \times 162]^-$, 471 $[M-1-146-2 \times 162-132]^-$, 453 $[M-1-146-2 \times 162-132-H_2O]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 1.12, 1.16, 1.17, 1.39, 1.71 (s, $CH_3 \times 6$), 0.96 (dd, J = 7.0, 3H), 3.27 (dd, J = 11.2, 4.3, Hα-3), 3.16 (s, Hα-18), 5.22 (s, HO-19), 5.50 (brs, H-12), 4.85 (d, J = 5.3, H-1 of Ara), 5.08 (d, J = 7.6, H-1 of Glc), 6.13 (brs, H-1 of Rha), 1.61 (d, J = 6.8, H-6 of Rha), 6.31 (d, J = 8.0, H-1 of Glc) [1]

^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	24.8	Ara-1	104.8	Glc-1	104.7
2	27.0	17	48.5	2	74.7	2	75.1
3	88.4	18	47.4	3	82.1	3	78.3
4	39.8	19	73.6	4	68.2	4	71.6
5	56.2	20	42.9	5	64.8	5	78.7
6	18.9	21	26.8	Rha-1	102.0	6	62.6
7	32.0	22	33.6	2	72.5	Glc′-1	96.0
8	40.6	23	28.3	3	72.6	2	74.0
9	48.0	24	17.2	4	74.2	3	79.0
10	37.2	25	15.9	5	70.2	4	71.2
11	24.2	26	17.6	6	18.7	5	79.4
12	127.8	27	24.5			6	62.3

(*continued*)

Table 1 (continued)

13	138.9	28	177.3
14	42.3	29	29.8
15	29.4	30	16.2

Pharm./Biol.: *Ilex latifolia* Thunb. used in China as a traditional beverage, known as Ku-Ding-Cha. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

1. M.-A. Ouyang, H.-Q. Wang, Y.-Q. Liu, Ch.-R. Yang, Phytochemistry **45**(7), 1501 (1997)
2. J. Huang, X. Wang, Y. Ogihara, N. Shimizu, T. Takeda, T. Akiyama, Chem. Pharm. Bull. **49**(2), 239 (2001)

Latifoloside F

See Figure Latifoloside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ilexgenin B

Biological source: *Ilex latifolia* [1]

$C_{59}H_{96}O_{26}$: 1220.618

Mp: 235–238°C [1]

IR (KBr) ν_{max} cm^{-1}: 3430, 2927, 1730, 1640 [1]

FAB-MS *m/z*: 1219 $[M-H]^-$, 1073 $[M-H-146]^-$, 911 $[M-H-146-162]^-$, 765 $[M-H-146 \times 2-162]^-$, 749 $[M-H-146-162 \times 2]^-$, 603 $[M-H-146 \times 2-162 \times 2]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.85 (s, CH_3-23), 0.87 (d, J = 6.5, CH_3-30),1.08 (s, CH_3-24), 1.10 (s, CH_3-25), 1.11 (s, CH_3-26), 1.33 (s, CH_3-27), 1.73 (s, CH_3-29), 3.22 (dd, J = 4.5, 11.5, H-3)

α-L-Arap: 4.83 (d, J = 6.0, H-1)

α-L-Rhap: 6.19 (brs, H-1); α-L-Rhap′: 6.69 (brs, H-1)

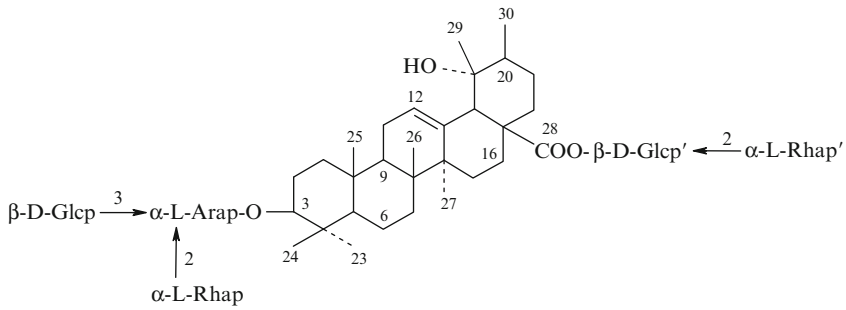
β-D-Glcp: 5.19 (d, J = 7.9, H-1); β-D-Glcp′: 6.21 (d, J = 7.8, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.5	C-16	26.9	Ara-1	105.0	5	78.3
2	26.9	17	48.7	2	74.7	6	62.7
3	88.7	18	47.8	3	82.5	Glc′-1	95.2
4	39.8	19	73.8	4	68.4	2	76.0
5	54.5	20	42.9	5	65.0	3	79.9
6	18.9	21	24.9	Rha-1	102.0	4	71.6
7	34.0	22	31.8	2	72.8	5	79.2
8	40.7	23	28.4	3	72.6	6	62.4
9	48.7	24	17.4	4	74.1	Rha′-1	101.7
10	37.3	25	16.1	5	70.2	2	72.5
11	24.3	26	17.7	6	18.8	3	72.4
12	127.7	27	24.4	Glc-1	104.7	4	74.0
13	139.1	28	177.3	2	75.0	5	70.1
14	42.6	29	30.0	3	78.6	6	18.9
15	29.8	30	16.3	4	71.6		

Pharm./Biol.: *Ilex latifolia* Thunb. used in China as a traditional beverage, known as Ku-Ding-Cha. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

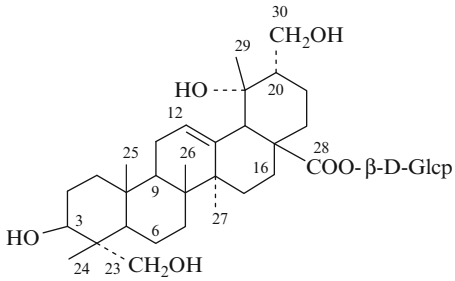


Latifoloside F

References

1. M.-A. Ouyang, Y.-Q. Liu, H.-Q. Wang, Ch.-R. Yang, Phytochemistry **49**, 2483 (1998)

Ilexoside XLIII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ilexosapogenin B

Biological source: *Ilex rotunda* [1]

$C_{36}H_{58}O_{11}$: 666.397

$[\alpha]_D^{22}$ + 9.5° (c 2.1, MeOH) [1]

FAB-MS *m/z*: 665 $[M-H]^-$, 503 $[M-H-Glc]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 1.04, 1.08, 1.24, 1.59, 1.65 (s, CH_3 × 5), 2.48 (dt, J = 13.5, 3.5, Hβ-15), 2.96 (brs, H-18), 3.16 (dt, J = 14.0, 3.0, Hα-16), 3.71, 4.17 (d, J = 10.5, H_2-23), 3.99 (dd, J = 11, 2.5, H-30), 4.19 (dd, J = 11, 4.5, H-3), 4.28 (dd, J = 11, 5, H-30), 5.59 (dd, J = 4, 3.5, H-12)

β-D-Glcp: 6.33 (d, J = 8.3, H-1), 4.24 (dd, J = 8.8, 8.8, H-2), 4.32 (dd, J = 9, 8.8, H-3), 4.38 (dd, J = 9.3, 9, H-4), 4.06 (m, H-5), 4.42 (dd, J = 12, 4), 4.48 (dd, J = 12, 2.5, H_2-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

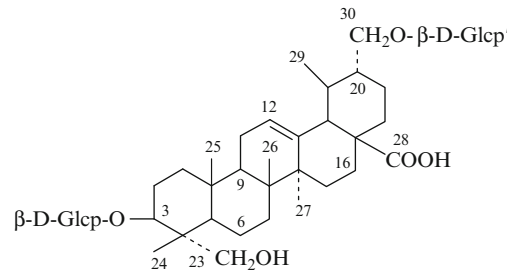
Table 1

C-1	39.0	C-16	26.3	Glc-1	95.9
2	27.8	17	48.6	2	74.0
3	73.8	18	54.4	3	79.0
4	42.9	19	74.0	4	71.3
5	48.6	20	48.2	5	79.3
6	18.9	21	22.4	6	62.4
7	33.4	22	37.7		
8	40.6	23	68.2		
9	47.9	24	13.1		
10	37.3	25	16.2		
11	24.2	26	17.6		
12	128.8	27	24.2		
13	138.8	28	177.0		
14	42.2	29	27.5		
15	29.3	30	64.9		

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 39 (1993)

Ilexoside XLIV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ilexosapogenin B

Biological source: *Ilex rotunda* [1]

$C_{42}H_{68}O_{15}$: 812.455

Mp: 225–227°C (MeOH) [1]

$[\alpha]_D^{22}$ + 5.8° (c 4.3, MeOH) [1]

FAB-MS *m/z*: 811 $[M-H]^-$, 649 $[M-H-Glc]^-$, 487 $[M-H-2Glc]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.89, 0.96, 1.01, 1.13 (s, CH_3 × 4), 0.98 (d, J = 6.5, CH_3), 2.62 (d, J = 11.4, H-18), 3.70, 4.33 (d, J = 11.0, H_2-23), 3.86 (dd, J = 9.4, 3.5, H-30), 4.00 (dd, J = 9.4, 5.0, H-30), 4.26 (dd, J = 11.0, 4.5, H-3), 5.44 (brt, H-12)

β-D-Glcp: 5.13 (d, J = 7.8, H-1), 4.04 (dd, J = 8.8, 8.5, H-2), 4.18 (dd, J = 8.8, 8.8, H-3), 4.23 (dd, J = 9.3, 8.8, H-4), 3.90 (m, H-5), 4.38 (dd, J = 11.7, 5.2), 4.52 (dd, J = 11.7, 2.2, H_2-6)
β-D-Glcp′: 4.87 (d, J = 7.5, H-1), 4.06 (dd, J = 8.8, 7.5, H-2), 4.29 (dd, J = 8.8, 8.8, H-3), 4.25 (dd, J = 8.8, 9.2, H-4), 4.05 (m, H-5), 4.42 (dd, J = 12.0, 5.5), 4.60 (dd, J = 12.0, 2.2, H_2-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

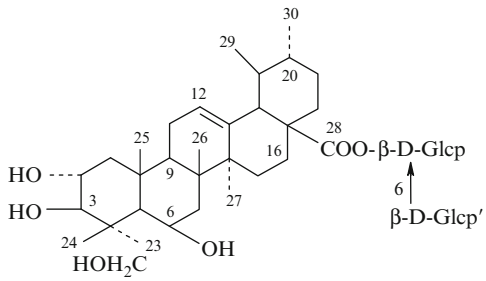
Table 1

C-1	38.9	C-16	25.1	Glc-1	105.9
2	26.0	17	48.1	2	75.8
3	82.4	18	53.7	3	78.6
4	43.5	19	34.7	4	71.8
5	48.1	20	45.1	5	78.6
6	18.4	21	26.0	6	62.9
7	33.3	22	37.3	Glc′-1	105.0
8	40.1	23	64.5	2	75.2
9	47.7	24	13.9	3	78.6
10	36.9	25	16.4	4	71.7
11	23.8	26	17.7	5	78.2
12	124.4	27	24.1	6	63.0
13	136.5	28	180.8		
14	42.7	29	17.4		
15	28.8	30	73.7		

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 39 (1993)

Centellasaponin B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Madecasic Acid
Biological source: *Centella asiatica* [1]
$C_{42}H_{68}O_{16}$: 828.450
Mp: 223–224°C ($CHCl_3$-H_2O) [1]
$[\alpha]_D^{25}$ + 13.2° (c 0.3, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 2928, 1736, 1655, 1073 [1]
FAB-MS *m/z*: 851.4 $[M + Na]^+$; 827 $[M\text{-}H]^-$, 503 $[M\text{-}C_{12}H_{21}O_{10}]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.85 (d, J = 6.9, CH_3-30), 0.92 (d, J = 6.7, CH_3-29), 1.11, 1.70, 1.71, 1.80 (s, CH_3-27, 26, 24, 25), 2.52 (d, J = 11.9, H-18), 4.02, 4.33 (d, J = 10.3, H_2-23), 4.15 (m, H-3), 4.37 (m, H-2), 5.02 (brs, H-6), 5.50 (dd, J = 3.4, 3.7, H-12)
β-D-Glcp: 6.12 (d, J = 8.2, H-1)
β-D-Glcp′: 5.00 (d, J = 7.9, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

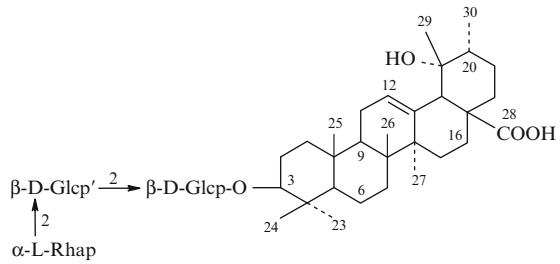
C-1	50.5	C-16	24.8	Glc-1	95.8
2	69.1	17	48.6	2	73.9
3	78.5	18	53.4	3	78.4
4	44.5	19	39.5	4	71.4
5	48.7	20	39.1	5	77.9
6	67.7	21	30.9	6	69.7
7	41.4	22	36.9	Glc′-1	105.3
8	39.7	23	66.5	2	75.3
9	48.8	24	15.9	3	78.6
10	38.1	25	19.4	4	71.7
11	24.0	26	19.3	5	78.4
12	126.5	27	23.8	6	62.8
13	137.9	28	176.3		
14	43.2	29	17.3		
15	28.8	30	21.2		

References

1. H. Matsuda, T. Morikawa, H. Ueda, M. Yoshikawa, Chem. Pharm. Bull. **49**(10), 1368 (2001)

Gongganoside D

CAS Registry Number: 164269-12-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Bhesa paniculata* [1]

$C_{48}H_{78}O_{18}$: 942.518

$[\alpha]_D^{23}$ −17.0° (c 1.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2934, 1696, 1652, 1453, 1076 [1]

FAB-MS *m/z*: 965.5062 $[M + Na]^+$; 941 $[M-H]^-$, 795, 633, 471 [1]

^{1}H NMR (J/Hz, CD_3OD): 0.79 (s, CH_3-26), 0.87 (s, CH_3-24), 0.93 (d, J = 6.7, CH_3-30), 0.95 (s, CH_3-25), 1.11 (s, CH_3-23), 1.18 (CH_3-29), 1.33 (CH_3-27), 2.49 (s, H-18), 5.28 (brs, H-12)

β-D-Glcp: 4.40 (d, J = 7.7, H-1)

α-L-Rhap: 5.17 (brs, H-1) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	39.7	C-16	26.6	Glc-1	105.7	Rha-1	101.9
2	27.0	17	49.8	2	78.1	2	72.1
3	92.2	18	55.0	3	78.8	3	72.1
4	40.4	19	73.5	4	72.0	4	74.1
5	56.9	20	43.0	5	77.7	5	69.4
6	19.4	21	27.2	6	62.8	6	18.3
7	34.1	22	38.9	Glc′-1	102.0		
8	41.0	23	28.7	2	79.5		
9	48.9	24	16.8	3	79.2		
10	37.8	25	15.9	4	72.6		
11	24.7	26	17.5	5	78.1		
12	129.4	27	24.8	6	63.6		
13	139.9	28	182.3				
14	42.5	29	27.1				
15	29.6	30	16.6				

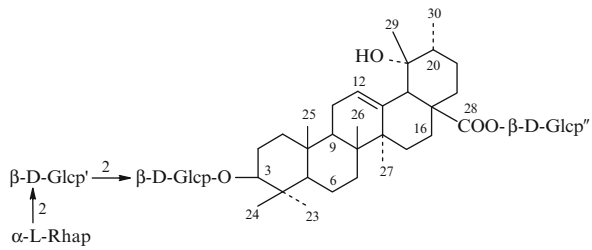
(*continued*)

References

1. K. Ohashi, T. Tanikawa, Y. Okumura, K. Kawazoe, N. Tatara, M. Minato, H. Shibuya, I. Kitagawa, Chem. Pharm. Bull. **42**(9), 1791 (1994)

Gongganoside E

CAS Registry Number: 164269-13-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Bhesa paniculata* [1]

$C_{54}H_{88}O_{23}$: 1104.571

$[\alpha]_D^{21}$ −26.6° (c 1.1, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3390, 2926, 1726, 1636, 1455, 1070 [1]

FAB-MS *m/z*: 1127.5586 $[M + Na]^+$; 1103 $[M-H]^-$, 941, 795, 633, 471 [1]

^{1}H NMR (J/Hz, CD_3OD): 0.77 (s, CH_3-26), 0.87 (s, CH_3-24), 0.93 (d, J = 6.6, CH_3-30), 0.96 (s, CH_3-25), 1.11 (s, CH_3-23), 1.19 (s, CH_3-29), 1.32 (s, CH_3-27), 2.51 (H-18), 5.30 (brs, H-12)

β-D-Glcp: 4.40 (d, J = 7.7, H-1)

β-D-Glcp′: 5.32 (d, J = 7.9, H-1)

α-L-Rhap: 5.17 (d, J = 1.5, H-1) [1]
^{13}C NMR (CD_3OD): [1]

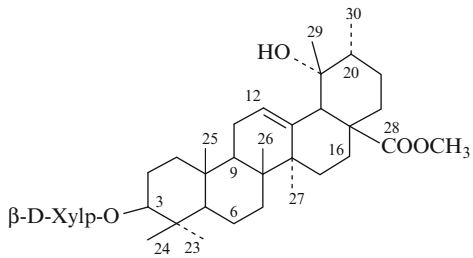
Table 1

C-1	39.9	C-16	26.5	Glc-1	105.7	Rha-1	102.0
2	27.1	17	49.4	2	78.2	2	72.2
3	92.3	18	54.9	3	78.9	3	72.1
4	40.5	19	73.6	4	72.1	4	74.2
5	57.0	20	42.9	5	77.8	5	69.5
6	19.5	21	27.2	6	62.9	6	18.3
7	34.2	22	38.3	Glc′-1	102.0	Glc″-1	95.8
8	41.3	23	28.8	2	79.6	2	73.8
9	48.6	24	16.9	3	79.3	3	78.3
10	37.8	25	16.0	4	72.7	4	71.1
11	24.7	26	17.6	5	78.2	5	78.5
12	129.7	27	24.7	6	63.7	6	62.4
13	139.6	28	178.5				
14	42.6	29	27.1				
15	29.7	30	16.6				

References

1. K. Ohashi, T. Tanikawa, Y. Okumura, K. Kawazoe, N. Tatara, M. Minato, H. Shibuya, I. Kitagawa, Chem. Pharm. Bull. **42**(9), 1791 (1994)

Ilexoside B methyl ester



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid
Biological source: *Ilex chinensis* [1]

$C_{35}H_{58}O_8$: 606.413
Mp: 155–158°C (MeOH) [1]
$[\alpha]_D^{19}$ + 15.9° (c 0.15, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 1720, 1200, 1145, 1030 [1]
EI-MS *m/z*: 618 (M^+, 2), 600 (M^+-H_2O, 2), 559 (3), 486 (M^+-132, 12), 468 (M^+-132-H_2O, 27), 278 (25), 201 (26), 179 (100) [1]
FD-MS *m/z*: 619 (M^++H, 100), 618 (M^+, 26) [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.88, 0.93, 1.03, 1.34, 1.40, 1.71 (s, CH_3 × 6), 3.37 (dd, J = 11.3, 4.3, Hα-3), 5.50 (m, H-12), 2.86 (s, Hβ-18), 5.25 (s, HO-19), 3.74 (s, $COOCH_3$), 1.10 (d, J = 6.7, CH_3-30)
β-D-Xylp: 4.86 (d, J = 7.6, H-1), 4.05 (dd, J = 8.5, 7.6, H-2), 4.20 (t, J = 8.5, H-3), 4.26 (ddd, J = 10.4, 8.5, 4.9, H-4), 3.81 (dd, J = 11.0, 10.4, Ha-5), 4.41 (dd, J = 11.0, 4.9, Hb-5) [1]
^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	38.83	C-17	48.61	Xyl-1	107.72
2	26.72	18	54.44	2	75.57
3	88.75	19	72.59	3	78.64
4	39.61	20	42.21	4	71.27
5	55.93	21	26.79	5	67.14
6	18.64	22	38.15		
7	33.38	23	28.24		
8	40.27	24	16.97		
9	47.62	25	15.56		
10	37.02	26	17.03		
11	23.96	27	24.67		
12	128.31	28	178.47		
13	139.45	29	26.99		
14	41.93	30	16.68		
15	29.04	COOMe	51.54		
16	26.04				

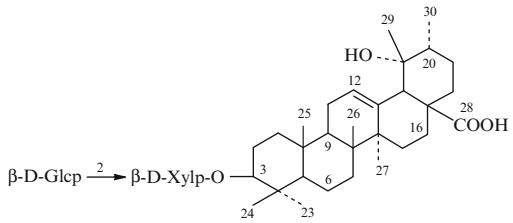
Pharm./Biol.: Used in China as a remedy (when given internally) for bronchitis, pneumonia, and ulceration, and as an external treatment for scald, chilblain [1]

References

1. A. Inada, M. Kobayashi, H. Murata, T. Nakanishi, Chem. Pharm. Bull. **35**, 841 (1987)

Ilexsaponin B_1

CAS Registry Number: 109008-27-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Ilex pubescens* [1]

$C_{41}H_{66}O_{13}$: 766.450

Mp: 246–248°C (MeOH) [1]

$[\alpha]_D^{20}$ − 9.6° (c 1.01, C_5H_5N) [1]

IR (nujol) ν_{max} cm^{-1}: 3300, 1690 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.90, 1.09, 1.10, 1.26, 1.13 (d, J = 7.3), 1.44, 1.75, (CH_3 × 7), 3.29 (s, H-18), 5.05 (s, HO-19), 5.56 (brt, H-12)

β-D-Xylp: 4.82 (d, J = 6.3, H-1); β-D-Glcp: 5.36 (d, J = 7.6, H-1) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

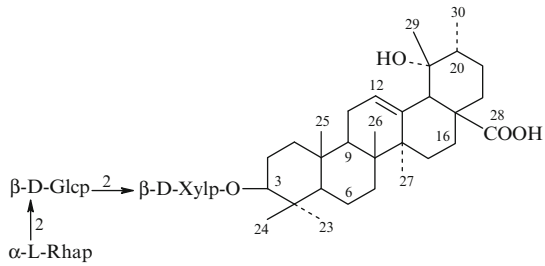
C-1	38.8	C-17	47.8	Xyl-1	105.7
2	27.0	18	47.3	2	82.8
3	88.9	19	73.4	3	77.8
4	39.5	20	42.8	4	71.5
5	55.9	21	23.9	5	66.5
6	18.6	22	32.3	Glc-1	105.8
7	33.5	23	28.0	2	76.8
8	40.2	24	15.5	3	78.1
9	47.7	25	16.1	4	70.8
10	36.9	26	17.2	5	77.8
11	24.8	27	24.3	6	62.6
12	127.2	28	180.7		
13	139.5	29	29.8		
14	42.0	30	16.6		
15	29.2				
16	26.6				

References

1. K. Hidaka, M. Ito, Y. Matsuda, H. Kohda, K. Yamasaki, J. Yamahara, T. Chisaka, Y. Kawakami, T. Sato, K. Kagei, Chem. Pharm. Bull. **35**(2), 524 (1987)

Ilexsaponin B_2

CAS Registry Number: 108906-69-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Ilex pubescens* [1]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 240–243°C (EtOH) [1]

$[\alpha]_D^{20}$−15.3° (c 1.20, C_5H_5N) [1]

IR (nujol) ν_{max} cm^{-1}: 3300, 1685 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.86, 1.08, 1.12 (d, J = 9.0), 1.35, 1.35, 1.43, 1.76, (CH_3 × 7), 3.30 (s, H-18), 5.08 (s, HO-19), 5.56 (brt, H-12)

β-D-Xylp: 4.91 (d, J = 5.4, H-1); β-D-Glcp: 5.83 (d, J = 7.1, H-1); α-L-Rhap: 6.41 (brs, H-1), 1.79 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-17	47.9	Xyl-1	105.9
2	27.0	18	47.4	2	79.0
3	89.7	19	73.4	3	77.8
4	39.7	20	43.0	4	71.3
5	56.0	21	23.9	5	66.6
6	18.6	22	32.5	Glc-1	102.3
7	33.5	23	28.4	2	79.4
8	40.2	24	15.4	3	79.0

(*continued*)

Table 1 (continued)

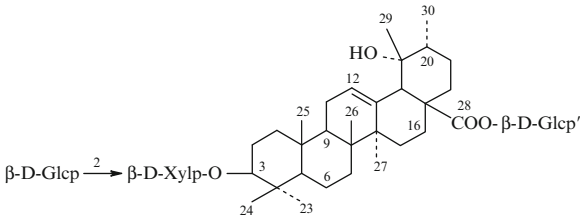
9	47.7	25	16.1	4	72.3
10	37.0	26	17.3	5	78.5
11	24.9	27	24.4	6	63.3
12	127.3	28	180.7	Rha-1	102.0
13	139.5	29	29.8	2	72.6
14	42.1	30	16.7	3	72.6
15	29.2			4	74.3
16	26.6			5	69.5
				6	18.9

References

1. K. Hidaka, M. Ito, Y. Matsuda, H. Kohda, K. Yamasaki, J. Yamahara, T. Chisaka, Y. Kawakami, T. Sato, K. Kagei, Chem. Pharm. Bull. **35**(2), 524 (1987)

Ilexsaponin B_3

CAS Registry Number: 109008-26-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Ilex pubescens* [1]

$C_{47}H_{76}O_{18}$: 928.503

$[\alpha]_D^{20}$ + 10.0° (c 0.40, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3300, 1720 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.95, 0.99 (d, J = 8.8), 1.13, 1.21, 1.26, 1.41, 1.72 ($CH_3 \times 7$), 3.20 (s, H-18), 5.19 (s, HO-19), 5.56 (brt, H-12)

β-D-Xylp: 4.82 (H-1); β-D-Glcp: 5.39 (d, J = 6.3, H-1); β-D-Glcp′: 6.37 (d, J = 6.8, H-1) [1]

^{13}C NMR (21.15 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-17	48.3	Xyl-1	105.8
2	26.8	18	47.1	2	83.0
3	88.8	19	73.4	3	77.5
4	39.6	20	42.6	4	71.5
5	55.9	21	23.8	5	66.7
6	18.7	22	31.7	Glc-1	105.8
7	33.5	23	28.1	2	76.9
8	40.3	24	15.6	3	78.3
9	47.7	25	16.0	4	70.9
10	36.9	26	17.4	5	77.9
11	24.6	27	24.3	6	62.6
12	127.5	28	177.1	Glc′-1	95.7
13	138.8	29	29.7	2	74.0
14	42.1	30	16.7	3	79.1
15	29.1			4	70.9
16	26.7			5	78.8
				6	62.1

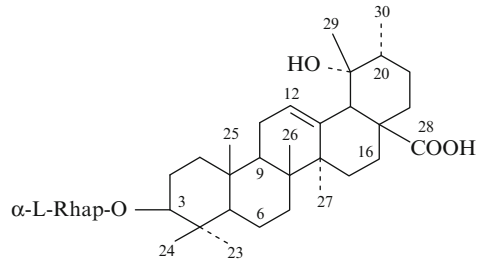
Pharm./Biol.: Antihypercholesterinemic activity [1]

References

1. K. Hidaka, M. Ito, Y. Matsuda, H. Kohda, K. Yamasaki, J. Yamahara, T. Chisaka, Y. Kawakami, T. Sato, K. Kagei, Chem. Pharm. Bull. **35**(2), 524 (1987)

Kalaic Acid

CAS Registry Number: 120396-52-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Musanga cecropioides* [1]

$C_{37}H_{60}O_8$: 632.428 (Me ester)

IR (KBr) ν_{max} cm^{-1}(Me ester): 3525, 1730, 1630, 1380–1370 [1]

^{1}H NMR (300 MHz, J/Hz, Me ester): 3.10 (dd, J = 11.0, 4.5, H-3), 1.93 (m, Hα-11), 1.93 (m, Hβ-11), 5.32 (sl, H-12), 1.60 (m, Hα-15), 1.00 (m, Hβ-15),

2.49 (m, Hα-16), 1.60 (m, Hβ-16), 2.56 (s, H-18), 0.88 (s, CH_3-23), 0.74 (s, CH_3-24), 0.89 (s, CH_3-25), 0.64 (s, CH_3-26), 1.22 (s, CH_3-27), 1.19 (s, CH_3-29), 0.92 (d, J = 6.6, CH_3-30), 3.58 (s, OMe)
α-L-Rhap: 4.78 (s, H-1), 3.91 (sl, H-2), 3.75 (m, H-3), 3.42 (dd, J = 9.2, 9.2, H-4), 3.75 (m, H-5), 1.24 (d, J = 6.4, CH_3-6) [1]
^{13}C NMR (75 MHz) (Me ester): [1]

Table 1

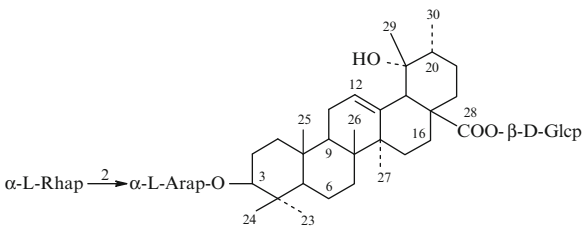
C-1	39.9	C-17	47.9	Rha-1	102.3
2	25.3	18	53.2	2	71.3
3	89.5	19	73.1	3	71.9
4	38.4	20	41.1	4	73.4
5	55.2	21	26.0	5	67.9
6	18.4	22	37.4	6	17.4
7	32.7	23	28.3		
8	39.9	24	15.2		
9	47.1	25	16.4		
10	36.5	26	16.6		
11	23.5	27	24.5		
12	129.1	28	178.4		
13	138.0	29	27.4		
14	41.1	30	16.1		
15	28.2	OMe	51.6		
16	25.4				

References

1. D. Lontsi, B.L. Sondengam, B. Bodo, M.T. Martin, Planta Med. **64**, 189 (1998)

Latifoloside A

CAS Registry Number: 55965-02-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid
Biological source: *Ilex latifolia* [1]
$C_{47}H_{76}O_{17}$: 912.508
Mp: 207–210°C [1]
IR (KBr) ν_{max} cm^{-1}: 3433, 2933, 1734, 1647, 1458, 1386, 1074, 1028 [1]
FAB-MS: *m/z* 911 $[M-H]^-$, 749 $[M-H-162]^-$, 603 $[M-H-162-146]^-$, 471 $[M-H-162-146-132]^-$, 453 $[M-H-162-146-132-H_2O]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.89, 1.07, 1.39, 1.75 (s, CH_3 × 4), 1.05 (d, J = 6.4, 3H), 2.92 (brs, Hβ-18), 3.23 (dd, J = 11.3, 4.2, Hα-3), 5.55 (brs, H-12)
α-L-Arap: 4.88 (d, J = 5.2, H-1)
α-L-Rhap: 6.11 (brs, H-1), 1.61 (d, J = 6.2, CH_3-6)
β-D-Glcp: 6.28 (d, J = 8.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	26.2	Ara-1	104.8	Glc-1	96.0
2	26.8	17	48.8	2	76.1	2	73.7
3	89.1	18	54.6	3	74.2	3	79.0
4	39.6	19	72.8	4	68.6	4	71.4
5	56.1	20	42.2	5	64.5	5	79.3
6	18.9	21	26.7	Rha-1	101.9	6	62.5
7	33.6	22	37.9	2	72.7		
8	40.7	23	28.3	3	72.8		
9	47.9	24	16.8	4	74.1		
10	37.1	25	15.8	5	70.0		
11	24.2	26	17.5	6	18.7		
12	128.5	27	24.7				
13	139.4	28	177.2				
14	42.2	29	27.2				
15	29.4	30	17.1				

Pharm./Biol.: *Ilex latifolia* Thunb. used in China as a traditional beverage, known as Ku-Ding-Cha,. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

1. M.-A. Ouyang, H.-Q. Wang, Y.-Q. Liu, Ch.-R. Yang, Phytochemistry **45**(7), 1501 (1997)

Latifoloside G

CAS Registry Number: 220997-51-3
See Figure Latifoloside G

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Ilex latifolia* [1]

$C_{59}H_{96}O_{26}$: 1220.618

Mp: 215–218°C [1]

IR (KBr) ν_{max} cm^{-1}: 3400–3100, 2932, 1734, 1640 [1]

FAB-MS *m/z*: 1219 $[M-H]^-$, 1073 $[M-H-146]^-$, 911 $[M-H-146-162]^-$, 765 $[M-H-146 \times 2-162]^-$, 749 $[M-H-146-162 \times 2]^-$, 603 $[M-H-146 \times 2-162 \times 2]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.89 (s, CH_3-23), 1.12 (s, CH_3-24), 1.16 (s, CH_3-25), 1.18 (s, CH_3-26), 1.39 (s, CH_3-27), 1.70 (s, CH_3-29), 1.05 (d, J = 6.4, s, CH_3-30), 3.27 (dd, J = 4.5, 11.5, H-3), 5.54 (brs, H-12)

α-L-Arap: 4.85 (d, J = 5.4, H-1)

α-L-Rhap: 6.14 (brs, H-1); α-L-Rhap′: 6.65 (brs, H-1)

β-D-Glcp: 5.80 (d, J = 7.7, H-1); β-D-Glcp′: 6.28 (d, J = 8.0, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

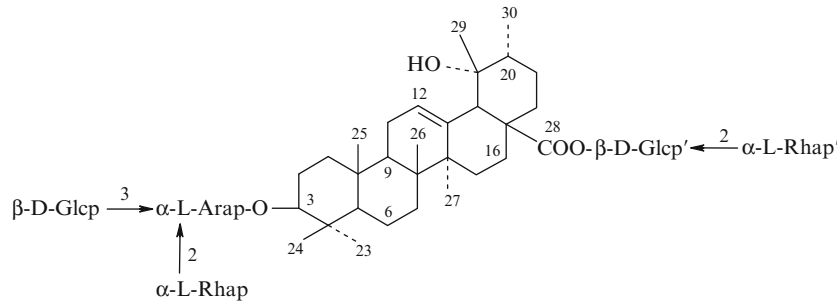
Table 1

C-1	39.2	C-16	26.2	Ara-1	104.8	Glc-5	78.8
2	26.8	17	48.8	2	74.7	6	62.6
3	89.1	18	54.6	3	82.1	Glc′-1	95.7
4	39.6	19	72.8	4	68.2	2	76.3
5	56.1	20	42.2	5	64.9	3	79.8
6	18.9	21	26.7	Rha-1	101.9	4	71.7
7	33.6	22	37.9	2	72.5	5	79.4
8	40.7	23	28.3	3	72.6	6	62.5
9	47.9	24	16.8	4	74.2	Rha′-1	101.7
10	37.1	25	15.8	5	70.2	2	72.4
11	24.2	26	17.5	6	18.7	3	72.4
12	128.5	27	24.7	Glc-1	104.6	4	73.9
13	139.4	28	177.2	2	75.1	5	70.0
14	42.2	29	27.2	3	78.3	6	18.8
15	29.4	30	17.1	4	71.3		

Pharm./Biol.: *Ilex latifolia* Thunb. used in China as a traditional beverage, known as Ku-Ding-Cha. It is also used in folk medicine as a diuretic and for the treatment of a sore throat, weight loss and hypertension [1]

References

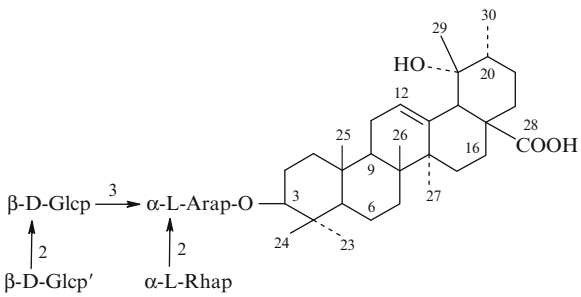
1. M.-A. Ouyang, Y.-Q. Liu, H.-Q. Wang, Ch.-R. Yang, Phytochemistry **49**, 2483 (1998)



Latifoloside G

Latifoloside L

CAS Registry Number: 354537-16-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Ilex latifolia* [1]

$C_{53}H_{86}O_{22}$: 1074.561

$[\alpha]_D^{25}$ + 7.46° (c 0.35, MeOH) [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.20 (dd, J = 11.6, 4.5, H-3), 0.80 (dd, J = 11.3, 4.0, H-5), 5.60 (m, H-12), 3.04 (s, H-18), 0.84 (s, CH_3-25), 1.07 (s, CH_3-24), 1.11 (s, CH_3-26), 1.137 (d, J = 6.4, CH_3-30), 1.18 (s, CH_3-23), 1.46 (s, CH_3-29), 1.74 (s, CH_3-27)

α-L-Arap: 4.90 (d, J = 4.2, H-1)

α-L-Rhap: 5.96 (brs, H-1), 1.64 (d, J = 6.1, CH_3-6)

β-D-Glcp: 5.12 (d, J = 7.6, H-1)

β-D-Glcp′: 5.38 (d, J = 7.3, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	37.0	C-16	26.3	Ara-1	104.2	Glc-1	103.5
2	26.5	17	48.3	2	74.9	2	85.9
3	88.6	18	54.5	3	82.9	3	78.4
4	39.5	19	72.6	4	67.9	4	71.1
5	56.0	20	42.1	5	68.3	5	78.1
6	18.7	21	26.9	Rha-1	101.5	6	62.3
7	33.5	22	38.5	2	72.2	Glc′-1	106.0
8	42.3	23	28.3	3	72.4	2	75.8
9	47.7	24	17.1	4	74.9	3	78.4
10	39.0	25	15.6	5	70.0	4	70.7
11	24.0	26	17.2	6	18.5	5	78.1
12	128.0	27	24.7			6	62.3
13	139.8	28	180.9				
14	40.3	29	27.0				
15	29.3	30	16.7				

(*continued*)

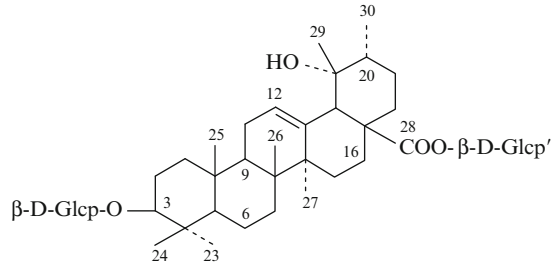
Table 1 (continued)

References

1. J. Huang, X. Wang, Y. Ogihara, N. Shimizu, T. Akiyama, T. Takeda, Chem. Pharm. Bull. **49**(6), 765 (2001)

Mussaendoside R

CAS Registry Number: 165198-40-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Mussaenda pubescens* [1]

$C_{42}H_{68}O_{14}$: 796.460

$[\alpha]_D^{16}$ + 4.6° (c 0.13, C_5D_5N) [1]

FAB-MS *m/z*: 794 $[M\text{-}H\text{-}H]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 1.00, 1.18, 1.29, 1.40 (s, CH_3 × 5), 1.06 (d, J = 6.5, CH_3-30),

1.70 (s, CH_3-29), 2.93 (brs, H-18), 3.37 (dd, J = 11.5, 4.1, H-3), 5.55 (brs, H-12)
β-D-Glcp: 4.94 (d, J = 7.8, H-1); β-D-Glcp′: 6.32 (d, J = 8.1, H-1) [1]
^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	38.7	C-16	26.0	Glc-1	106.8
2	26.5	17	48.5	2	75.6
3	88.9	18	54.3	3	79.1
4	39.4	19	72.5	4	71.7
5	55.8	20	42.0	5	78.6
6	18.5	21	26.5	6	62.9
7	33.4	22	37.6	Glc′-1	95.7
8	40.4	23	28.1	2	73.9
9	47.6	24	15.5	3	78.7
10	36.8	25	17.3	4	71.1
11	23.9	26	16.6	5	78.1
12	128.3	27	24.5	6	62.2
13	139.1	28	176.9		
14	42.0	29	26.9		
15	29.1	30	16.9		

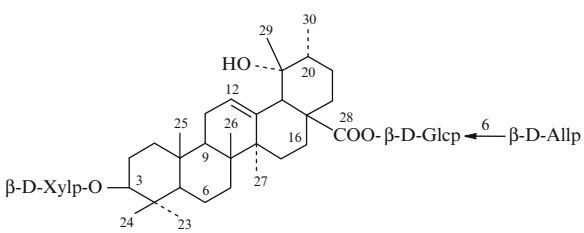
Pharm./Biol.: In Chinese folk medicine used for treatment of laryngopharynitis, acute gastroenteritis and dysentery. The hydrophilic fraction of the extract of this plant showed significant antifertility activity in in vivo tests [1]

References

1. W. Zhao, J. Xu, G. Qin, R. Xu, Phytochemistry **39**, 191 (1995)

Scabrioside A

CAS Registry Number: 199998-33-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid
Biological source: *Scabiosa rotata* [1]
$C_{47}H_{76}O_{18}$: 928.503
$[\alpha]_D^{20}$ −22.9° (c 0.38, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3420, 1740, 1635, 1070 [1]
FAB-MS *m/z*: 971 $[M + Na]^+$ [1]
^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.64, 1.00 (H_2-1), 1.80, 1.70 (H_2-2), 3.13 (H-3), 0.79 (H-5), 1.53, (H-6), 1.36, 1.34 (H_2-7), 1.70 (H-9), 1.98, 1.34 (H_2-11), 5.29 (brs, H-12), 1.85, 1.03 (H_2-15), 2.60 (m, H-16), 1.65 (H-16), 2.53 (s, H-18), 1.38 (H-20), 1.70 (H-21), 1.74 (H-22), 1.05 (s, CH_3-23), 0.84 (s, CH_3-24), 0.95 (s, CH_3-25), 0.78 (s, CH_3-26), 1.32 (s, CH_3-27), 1.20 (s, CH_3-29), 0.93 (d, J = 6.6, CH_3-30)
β-D-Xylp: 4.27 (d, J = 7.4, H-1), 3.18 (dd, J = 7.4, 8.8, H-2), 3.54 (H-3), 3.45 (H-4), 3.83, 3.20 (H_2-5)
β-D-Glcp: 5.28 (d, J = 7.9, H-1), 3.33 (H-2), 3.42 (H-3), 3.45 (H-4), 3.50 (H-5), 4.10 (brd, J = 11.2, H-6), 3.74 (dd, J = 11.2, 4.5, H-6)
β-D-Allp: 4.67 (d, J = 7.9, H-1), 3.30 (H-2), 4.04 (H-3), 3.49 (H-4), 3.68 (H-5), 3.83, 3.66 (H_2-6) [1]
^{13}C NMR (75.5 MHz, CD_3OH): [1]

Table 1

C-1	39.6	C-16	26.5	Xyl-1	107.2	All-1	102.5
2	28.5	17	48.7	2	75.5	2	72.4
3	90.8	18	54.8	3	78.0	3	72.7
4	40.2	19	73.7	4	71.2	4	68.9
5	57.0	20	42.8	5	67.0	5	75.5
6	19.5	21	28.5	Glc-1	95.9	6	63.1
7	34.1	22	38.2	2	73.8		
8	41.3	23	28.6	3	78.1		
9	47.8	24	17.7	4	71.0		
10	37.9	25	16.1	5	77.9		
11	24.7	26	17.0	6	69.6		
12	129.7	27	27.1				
13	139.6	28	178.6				
14	42.6	29	24.7				
15	29.7	30	16.6				

References

1. T. Baykal, T. Panayir, D. Tasdemir, O. Sticher, I. Çalis, Phytochemistry **48**, 867 (1998)

Scabrioside B

CAS Registry Number: 212068-03-6
See Figure Scabrioside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid
Biological source: *Scabiosa rotata* [1]
$C_{53}H_{86}O_{22}$: 1074.561
$[\alpha]_D^{20}$ −35.2° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3420, 2935, 1735, 1635, 1455, 1390, 1070 [1]
FAB-MS *m/z*: 1097 $[M + Na]^+$ [1]
^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.62, 0.98 (H_2-1), 1.80, 1.70 (H_2-2), 3.10 (dd, J = 11.4, 4.1, H-3), 0.78 (H-5), 1.53, (H-6), 1.33 (H-7), 1.68 (H-9), 1.97, 1.32 (H_2-11), 5.27 (brs, H-12), 1.85, 1.00 (H_2-15), 2.57 (m, H-16), 1.62 (H-16), 2.51 (s, H-18), 1.35 (H-20), 1.70 (H-21), 1.72 (H-22), 1.02 (s, CH_3-23), 0.84 (s, CH_3-24), 0.93 (s, CH_3-25), 0.75 (s, CH_3-26), 1.30 (s, CH_3-27), 1.19 (s, CH_3-29), 0.91 (d, J = 6.6, CH_3-30)
β-D-Xylp: 4.36 (d, J = 7.0, H-1), 3.42 (H-2), 3.45 (H-3), 3.43 (H-4), 3.85 (H-5), 3.16 (dd, J = 10.5, 9.0, H-5)
α-L-Rhap: 5.30 (H-1), 3.93 (dd, J = 1.7, 3.4, H-2), 3.72 (H-3), 3.40 (H-4), 3.92 (H-5), 1.18 (d, J = 6.2, CH_3-6)
β-D-Glcp: 5.26 (d, J = 7.8, H-1), 3.34 (H-2), 3.42 (H-3), 3.45 (H-4), 3.48 (H-5), 4.08 (brd, J = 11.2, H-6), 3.72 (dd, J = 11.2, 4.4, H-6)
β-D-Allp: 4.65 (d, J = 7.9, H-1), 3.32 (H-2), 4.02 (t, J = 2.9, H-3), 3.48 (H-4), 3.66 (H-5), 3.83, 3.65 (H_2-6) [1]
^{13}C NMR (75.5 MHz, CD_3OH): [1]

Table 1

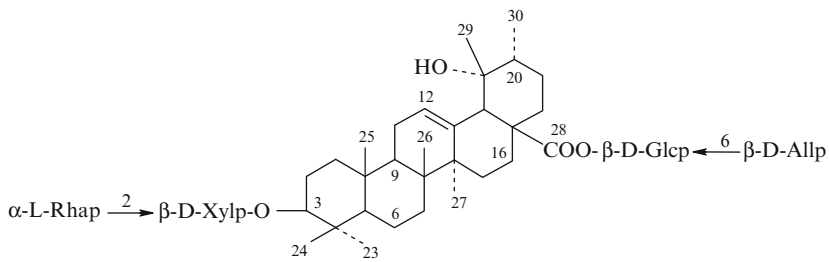
C-1	40.1	C-16	26.5	Xyl-1	106.2	Glc-1	95.9
2	27.2	17	48.8	2	78.8	2	73.7
3	90.2	18	54.9	3	78.6	3	78.2
4	40.3	19	73.7	4	71.6	4	71.0
5	57.3	20	42.8	5	66.4	5	77.9
6	19.5	21	27.2	Rha-1	102.0	6	69.6
7	34.1	22	38.2	2	72.0	All-1	102.5
8	41.3	23	28.5	3	72.1	2	72.5
9	47.8	24	17.7	4	74.0	3	72.8
10	37.9	25	16.2	5	70.1	4	68.9
11	24.7	26	17.2	6	18.0	5	75.5
12	129.7	27	27.1			6	63.1
13	139.6	28	178.6				
14	42.6	29	24.7				
15	29.7	30	16.6				

References

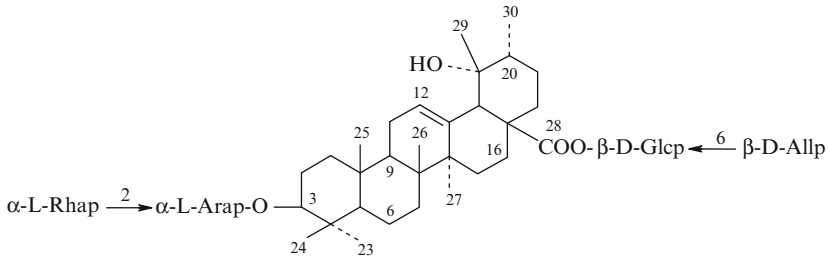
1. T. Baykal, T. Panayir, D. Tasdemir, O. Sticher, I. Çalis, Phytochemistry **48**, 867 (1998)

Scabrioside C

CAS Registry Number: 212068-04-7
See Figure Scabrioside C
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid
Biological source: *Scabiosa rotata* [1]
$C_{53}H_{86}O_{22}$: 1074.561
$[\alpha]_D^{20}$ −33.9° (c 0.54, MeOH) [1]



Scabrioside B



Scabrioside C

IR (KBr) ν_{max} cm^{-1}: 3420, 2935, 1735, 1635, 1455, 1390, 1070 [1]

FAB-MS *m/z*: 1097 $[M + Na]^+$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.64, 1.00 (H_2-1), 1.80, 1.70 (H_2-2), 3.12 (dd, J = 11.4, 4.1, H-3), 0.78 (H-5), 1.53 (H-6), 1.32 (H-7), 1.70 (H-9), 1.96, 1.30 (H_2-11), 5.29 (brs, H-12), 1.85, 1.02 (H_2-15), 2.61 (m, H-16), 1.62 (H-16), 2.52 (s, H-18), 1.40 (H-20), 1.70 (H-21), 1.75 (H-22), 1.02 (s, CH_3-23), 0.84 (s, CH_3-24), 0.96 (s, CH_3-25), 0.78 (s, CH_3-26), 1.32 (s, CH_3-27), 1.20 (s, CH_3-29), 0.93 (d, J = 6.6, CH_3-30)

α-L-Arap: 4.56 (d, J = 6.7, H-1), 3.77 (H-2), 3.75 (H-3), 3.80 (H-4), 3.82 (H-5), 3.48 (dd, J = 10.5, 9.0, H-5)

α-L-Rhap: 5.10 (d, J = 1.7, H-1), 3.88 (dd, J = 1.7, 3.4, H-2), 3.70 (H-3), 3.40 (H-4), 3.80 (H-5), 1.20 (d, J = 6.2, CH_3-6)

β-D-Glcp: 5.27 (d, J = 7.8, H-1), 3.35 (H-2), 3.40 (H-3), 3.45 (H-4), 3.49 (H-5), 4.10 (brd, J = 11.2, H-6), 3.74 (H-6)

β-D-Allp: 4.67 (d, J = 7.9, H-1), 3.33 (H-2), 4.04 (t, J = 2.9, H-3), 3.49 (H-4), 3.66 (H-5), 3.83, 3.67 (H_2-6) [1]

^{13}C NMR (75.5 MHz, CD_3OD): [1]

Table 1

C-1	40.0	C-16	26.5	Ara-1	104.7	Glc-1	95.9
2	27.2	17	48.8	2	76.8	2	73.8
3	90.7	18	54.9	3	73.0	3	78.2
4	40.3	19	73.7	4	70.2	4	71.0
5	57.0	20	42.8	5	63.6	5	77.9
6	19.5	21	27.2	Rha-1	102.0	6	69.6
7	34.1	22	38.2	2	72.2	All-1	102.5
8	41.3	23	28.7	3	72.2	2	72.4
9	47.8	24	17.7	4	73.9	3	72.8
10	37.9	25	16.2	5	68.3	4	68.9
11	24.7	26	17.1	6	18.0	5	75.5
12	129.7	27	27.7			6	63.1
13	139.6	28	178.6				
14	42.6	29	24.7				
15	29.7	30	16.6				

(*continued*)

References

1. T. Baykal, T. Panayir, D. Tasdemir, O. Sticher, I. Çalis, Phytochemistry **48**, 867 (1998)

Scabrioside D

CAS Registry Number: 212065-90-2

See Figure Scabrioside D

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Scabiosa rotata* [1]

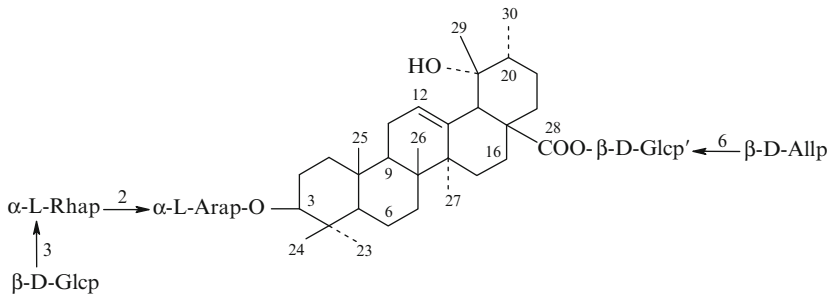
$C_{59}H_{96}O_{27}$: 1236.613

$[\alpha]_D^{20}$ −23° (c 0.5, MeOH) [1]

IR (KBr) $\nu_{max}cm^{-1}$: 3420, 2935, 1735, 1635, 1455, 1390, 1070 [1]

FAB-MS *m/z*: 1259 $[M + Na]^+$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.64, 1.00 (H_2-1), 1.80, 1.70 (H_2-2), 3.10 (dd, J = 11.4, 4.0, H-3), 0.78 (H-5), 1.53 (H-6), 1.33 (H-7), 1.68 (H-9), 1.96, 1.32 (H_2-11), 5.26 (brs, H-12), 1.85, 1.04 (H_2-15), 2.60 (m, H-16), 1.62 (H-16), 2.51 (s, H-18), 1.40 (H-20), 1.70 (H-21), 1.75 (H-22), 1.03 (s, CH_3-23), 0.84 (s, CH_3-24), 0.94 (s, CH_3-25), 0.78 (s, CH_3-26), 1.31 (s, CH_3-27), 1.18 (s, CH_3-29), 0.91 (d, J = 6.6, CH_3-30)



Scabrioside D

β-D-Xylp: 4.35 (d, J = 7.0, H-1), 3.33 (H-2), 3.40 (H-3), 3.48 (H-4), 3.84 (H-5), 3.16 (dd, J = 11.0, 9.7, H-5)

α-L-Rhap: 5.26 (H-1), 4.24 (dd, J = 1.7, 3.4, H-2), 3.91 (H-3), 3.57 (H-4), 3.94 (H-5), 1.22 (d, J = 6.2, CH_3-6)

β-D-Glcp: 4.47 (d, J = 7.2, H-1), 3.31 (H-2), 3.40 (H-3), 3.34 (H-4), 3.35 (H-5), 3.86 (brd, J = 11.2, H-6), 3.70 (H-6) [1]

β-D-Glcp′: 5.26 (d, J = 7.8, H-1), 3.32 (H-2), 3.40 (H-3), 3.45 (H-4), 3.48 (H-5), 4.10 (brd, J = 11.2, H-6), 3.74 (H-6)

β-D-Allp: 4.65 (d, J = 7.9, H-1), 3.32 (H-2), 4.02 (t, J = 2.9, H-3), 3.49 (H-4), 3.65 (H-5), 3.83, 3.66 (H-6)

^{13}C NMR (75.5 MHz, CD_3OD): [1]

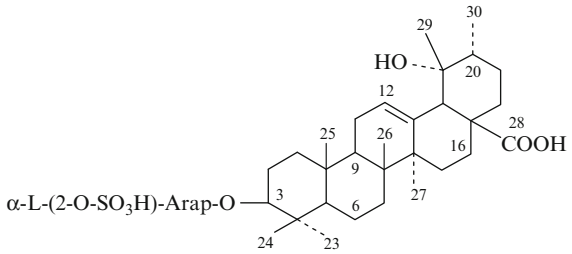
Table 1

C-1	40.1	C-16	26.5	Xyl-1	106.5	Glc′-5	77.8
2	27.2	17	48.8	2	78.9	6	69.6
3	90.4	18	54.9	3	78.4	All-1	102.5
4	40.3	19	73.8	4	71.7	2	72.5
5	57.2	20	42.8	5	66.5	3	72.8
6	19.5	21	27.1	Rha-1	101.7	4	68.9
7	34.1	22	38.2	2	70.9	5	75.5
8	41.3	23	28.6	3	82.9	6	63.1
9	47.8	24	17.7	4	72.6	Glc-1	105.8
10	37.9	25	16.1	5	70.1	2	75.4
11	24.7	26	17.1	6	18.2	3	77.9
12	129.7	27	27.1	Glc′-1	95.9	4	71.2
13	139.6	28	178.6	2	73.7	5	77.8
14	42.6	29	24.7	3	78.2	6	62.4
15	29.7	30	16.6	4	71.0		

References

1. T. Baykal, T. Panayir, D. Tasdemir, O. Sticher, I. Çalis, Phytochemistry **48**, 867 (1998)

Zygoeichwaloside G



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Zygophyllum eichwaldii* [1]

$C_{35}H_{56}O_{11}S$: 684.354

IR (KBr) $\nu_{max}cm^{-1}$: 3418, 2939, 1690, 1460, 1389, 1238, 1221, 1142, 1072, 836, 773, 649 [1]

ESI-MS *m/z*: 683.6 $[M-H]^-$, 639.5, 603.5, 471.4, 433.3, 341.6, 211.1 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.48, 0.84 (H_2-1), 2.05, 1.78 (H_2-2), 3.23 (H-3), 0.77 (H-5), 1.47, 1.27 (H_2-6), 1.55, 1.32 (H_2-7), 1.76 (H-9), 2.04, 1.96 (H_2-11), 5.58 (H-12), 2.32, 1.28 (H_2-15), 3.14, 2.06 (H_2-16), 3.05 (H-18), 4.96 (HO-19), 1.50 (H-20), 2.10, 1.35 (H_2-21), 2.16, 2.05 (H_2-22), 1.30, 1.03, 0.82, 1.06, 1.73, 1.44 (s, CH_3-23, 24, 25, 26, 27, 29), 1.13 (d, J = 6, CH_3-30)

α-L-(2-O-SO_3H)-Arap: 5.16 (H-1), 5.40 (H-2), 4.55 (H-3), 4.37 (H-4), 4.29, 3.79 (H_2-5) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	38.72	C-16	26.44	Ara-1	103.59
2	26.28	17	48.33	2	77.68

(*continued*)

Table 1 (continued)

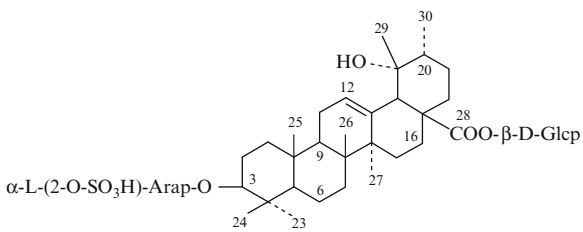
3	89.41	18	54.65	3	73.08
4	39.47	19	72.75	4	68.91
5	55.82	20	42.40	5	67.58
6	18.65	21	26.97		
7	33.54	22	38.52		
8	40.37	23	27.19		
9	47.67	24	16.79		
10	37.00	25	15.46		
11	24.03	26	17.19		
12	128.05	27	24.71		
13	139.99	28	180.68		
14	42.133	29	28.35		
15	29.31	30	16.90		

Pharm./Biol.: Antibacterial activity [2]

References

1. S.A. Sasmakov, Zh.M. Putieva, V.V. Kachala, Z. Saatov, A. S. Shashkov, Chem. Nat. Comp. **38**(6), 568 (2002)
2. S.A. Sasmakov, Zh.M. Putieva, Z. Saatov, U. Lindequist, Pharmazie **58**(8), 602 (2003)

Zygoeichwaloside H



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Zygophyllum eichwaldii* [1]

$C_{41}H_{66}O_{16}S$: 846.407

IR (KBr) $\nu_{max}cm^{-1}$: 3410, 2939, 1734, 1648, 1460, 1389, 1238, 1227, 1142, 1072, 836, 773, 649 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.35 (H-3), 5.57 (H-12), 2.96 (H-18), 5.16 (HO-19), 1.29, 0.96, 0.90, 1.20, 1.71, 1.41 (s, CH_3-23, 24, 25, 26, 27, 29), 1.08 (d, J = 6.2, CH_3-30)

α-L-(2-O-SO_3H)-Arap: 5.10 (H-1), 5.40 (H-2), 4.54 (H-3), 4.36 (H-4), 4.30, 3.80 (H_2-5)

β-D-Glcp: 6.32 (H-1), 4.26 (H-2), 4.38 (H-3), 4.49 (H-4), 4.06 (H-5), 4.50, 4.43 (H_2-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

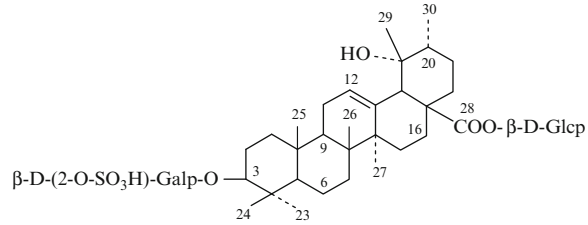
Table 1

C-1	38.60	C-16	25.83	Ara-1	103.60
2	26.28	17	48.35	2	77.68
3	89.41	18	54.14	3	73.09
4	39.47	19	72.40	4	68.90
5	55.82	20	41.80	5	67.58
6	18.40	21	26.40	Glc-1	95.50
7	33.21	22	37.45	2	73.69
8	40.27	23	27.90	3	78.66
9	47.46	24	16.60	4	70.96
10	36.72	25	15.30	5	78.96
11	23.76	26	17.10	6	62.06
12	128.05	27	24.30		
13	138.97	28	176.60		
14	41.83	29	26.76		
15	28.95	30	16.39		

References

1. S.A. Sasmakov, Zh.M. Putieva, U. Lindequist, Pharmazie **62**(12), 957 (2007)

Zygoeichwaloside I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Zygophyllum eichwaldii* [1]

$C_{42}H_{69}O_{17}S$: 877.425

Mp: 217°C [1]

$[\alpha]_D^{20}$ + 31.9±2° (c 0.9, C_5H_5N) [1]

IR (KBr) $\nu_{max}cm^{-1}$: 3422, 2974, 1734, 1648, 1458, 1390, 1264, 1231, 1170, 1074, 835, 774, 752, 619 [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.32 (H-3), 5.53 (H-12), 2.92 (H-18), 5.02 (HO-19), 1.46, 1.16, 0.86,

1.15, 1.68, 1.41 (s, CH_3-23, 24, 25, 26, 27, 29), 1.07 (d, J = 6.4, CH_3-30)
β-D-(2-O-SO_3H)-Galp: 4.93 (H-1), 5.41 (H-2), 4.32 (H-3), 4.49 (H-4), 4.01 (H-5), 4.37, 4.37 (H_2-6)
β-D-Glcp: 6.26 (H-1), 4.22 (H-2), 4.27 (H-3), 4.30 (H-4), 4.04 (H-5), 4.47, 4.40 (H_2-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

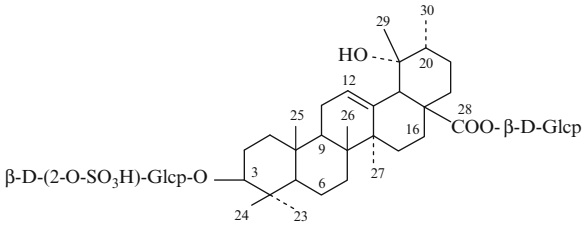
Table 1

C-1	38.20	C-16	25.48	Gal-1	104.2
2	25.83	17	48.20	2	78.69
3	89.06	18	53.79	3	74.57
4	38.95	19	72.70	4	69.31
5	55.26	20	41.45	5	75.33
6	18.00	21	26.03	6	61.70
7	32.87	22	37.03	Glc-1	95.18
8	39.89	23	27.71	2	73.39
9	47.02	24	16.31	3	78.22
10	36.31	25	14.90	4	70.70
11	23.38	26	16.72	5	78.46
12	127.80	27	23.92	6	61.79
13	138.61	28	176.33		
14	41.83	29	26.38		
15	28.54	30	15.99		

References

1. S.A. Sasmakov, Zh.M. Putieva, V.V. Kachala, Z. Saatov, A. S. Shashkov, Chem. Nat. Comp. **37**(4), 347 (2001)

Zygoeichwaloside K



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid
Biological source: *Zygophyllum eichwaldii* [1]
$C_{42}H_{69}O_{17}S$: 877.425
Mp: 212–214°C [1]
$[\alpha]_D^{22}$ + 32.3±2° (c 0.4, C_5H_5N) [1]
IR (KBr) $\nu_{max}cm^{-1}$: 3418, 2939, 1732, 1648, 1460, 1389, 1238, 1221, 1142, 1072, 836, 773, 649 [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 3.32 (H-3), 5.53 (H-12), 2.92 (H-18), 5.04 (HO-19), 1.44, 1.16, 0.86, 1.12, 1.70, 1.41 (s, CH_3-23, 24, 25, 26, 27, 29), 1.06 (d, J = 6.4, CH_3-30)
β-D-(2-O-SO_3H)-Glcp: 4.82 (H-1), 5.02 (H-2), 4.38 (H-3), 4.16 (H-4), 3.90 (H-5), 4.28, 4.48 (H_2-6)
β-D-Glcp′: 6.25 (H-1), 4.23 (H-2), 4.27 (H-3), 4.29 (H-4), 4.03 (H-5), 4.47, 4.40 (H_2-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

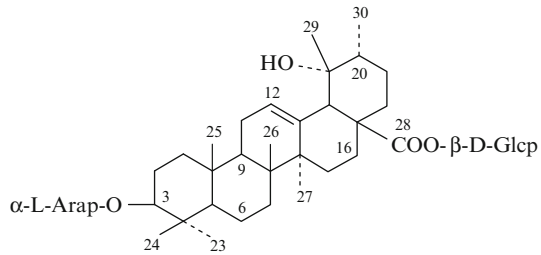
C-1	38.20	C-16	25.48	Glc-1	104.30
2	25.84	17	48.21	2	79.56
3	89.10	18	53.80	3	78.30
4	38.95	19	72.70	4	70.57
5	55.30	20	41.54	5	77.81
6	18.10	21	26.10	6	68.20
7	32.87	22	37.23	Glc′-1	95.20
8	39.89	23	27.72	2	73.40
9	47.08	24	16.31	3	78.25
10	36.31	25	14.90	4	70.75
11	23.38	26	16.72	5	78.56
12	127.82	27	23.96	6	61.72
13	138.62	28	176.38		
14	41.83	29	26.34		
15	28.55	30	15.95		

References

1. S.A. Sasmakov, Zh.M. Putieva, U. Lindequist, Pharmazie **62**(12), 957 (2007)

Ziyu-Glycoside I

CAS Registry Number: 35286-58-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Sanguisorba officinalis* [1], *Zygophyllum eichwaldii* [2]

$C_{41}H_{66}O_{13}$: 766.450

Mp: 256–260°C (MeOH) [1]

$[\alpha]_D^{20}$ + 18.0±2° (c 2.5; C_5H_5N) [1]

UV λ_{max}^{EtOH} nm (ε): 212 (6060) [1]

IR (KBr) ν_{max} cm^{-1}: 3407, 2938, 1734, 1648, 1457, 1389, 1227, 1138, 1073, 781, 650 [2]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.28, 0.98, 0.92, 1.21, 1.71, 1.41, 1.08 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 2.96 (H-18), 3.35 (H-3), 5.17 (HO-19), 5.57 (H-12)

α-L-Arap: 4.78 (d, J = 7.0, H-1), 4.45 (d, J = 8.8, H-2), 4.18 (d, J = 3.3, H-3), 4.34 (dd, J = 1.0, 2.3, H-4), 4.38, 3.85 (H_2-5)

β-D-Glcp: 6.33 (d, J = 8.3, H-1), 4.26 (d, J = 9.5, H-2), 4.39 (d, J = 9.6, H-3), 4.49 (d, J = 9.6, H-4), 4.07 (dd, J = 2.8, 6.7, H-5), 4.50, 4.43 (H_2-6) [2]

^{13}C NMR (125 MHz, C_5D_5N): [2]

Table 1

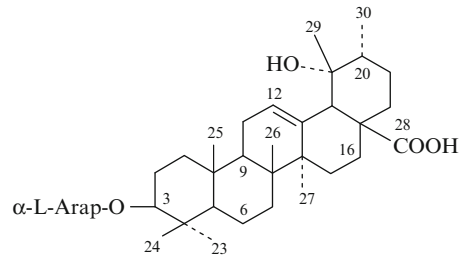
C-1	38.60	C-16	25.83	Ara-1	107.28
2	26.40	17	48.35	2	72.63
3	88.49	18	54.14	3	74.35
4	39.27	19	72.36	4	69.25
5	55.64	20	41.83	5	66.45
6	18.40	21	26.40	Glc-1	95.54
7	33.21	22	37.44	2	73.79
8	40.27	23	27.96	3	78.66
9	47.46	24	16.60	4	70.96
10	36.71	25	15.35	5	78.96
11	23.76	26	17.12	6	62.06
12	128.15	27	24.29		
13	138.97	28	176.67		
14	41.83	29	26.76		
15	28.95	30	16.39		

References

1. I. Yosioka, T. Sugawara, A. Ohsuka, I. Kitagawa, Chem. Pharm. Bull. **19**(8), 1700 (1971)
2. S.A. Sasmakov, Zh.M. Putieva, V.V. Kachala, Z. Saatov, A. S. Shashkov, Chem. Nat. Comp. **37**(4), 347 (2001)

Ziyu-Glycoside II

CAS Registry Number: 35286-59-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Pomolic Acid

Biological source: *Sanguisorba officinalis* [1], *S. alpina* [2], *Zygophyllum eichwaldii* [3]

$C_{35}H_{56}O_8$: 604.397

Mp: 243–245°C (MeOH) [1]

$[\alpha]_D^{20}$ + 25.0±2° (c 0.2; DMSO) [1]

IR (KBr) ν_{max} cm^{-1}: 3569, 2921, 1687, 1461, 1388, 1219, 1237, 1139, 1072, 992, 771, 652 [2]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.29, 0.97, 0.89, 1.10, 1.76, 1.46, 1.14 (s, CH_3-23, 24, 25, 26, 27, 29, 30), 3.07 (H-18), 3.35 (H-3), 5.10 (HO-19), 5.61 (H-12)

α-L-Arap: 4.78 (d, J = 7.1, H-1), 4.45 (d, J = 8.8, H-2), 4.18 (d, J = 3.3, H-3), 4.34 (dd, J = 1.0, 2.2, H-4), 4.34, 3.84 (H_2-5) [2]

^{13}C NMR (125 MHz, C_5D_5N): [2]

Table 1

C-1	38.52	C-16	26.10	Ara-1	107.23
2	26.38	17	48.00	2	72.63
3	88.48	18	54.31	3	74.34
4	39.26	19	72.41	4	69.23
5	55.64	20	42.08	5	66.43
6	18.34	21	26.65		
7	33.23	22	38.22		
8	40.07	23	27.95		
9	47.42	24	16.60		
10	36.72	25	15.23		
11	23.71	26	16.89		
12	127.73	27	24.40		
13	139.65	28	180.36		

(*continued*)

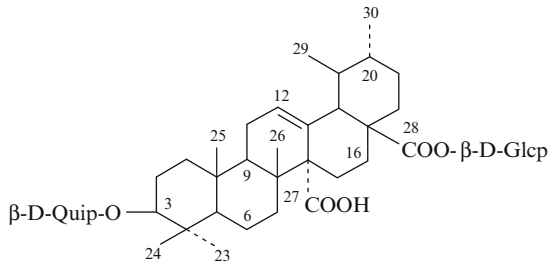
Table 1 (continued)

14	41.81	29	26.86
15	29.02	30	16.48

References

1. I. Yosioka, T. Sugawara, A. Ohsuka, I. Kitagawa, Chem. Pharm. Bull. **19**(8), 1700 (1971)
2. Z.-J. Jia, X.-Q. Liu, Z.-M. Liu, Phytochemistry **32**(1), 155 (1993)
3. S.A. Sasmakov, Zh.M. Putieva, V.V. Kachala, Z. Saatov, A. S. Shashkov, Chem. Nat. Comp. **37**(4), 347 (2001)

Glycoside 10



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid

Biological source: *Uncaria tomentosa* [1], *Isertia haenkeana* [2], *Bhesa paniculata* [3]

$C_{42}H_{66}O_{14}$: 794.445

Mp: 208–210°C [2]

$[\alpha]_D^{20}$ + 20.0° (c 1.0, EtOH) [2]

IR (KBr) ν_{max} cm^{-1}: 3400, 2925, 1730, 1690, 1630 [2]

FAB-MS *m/z*: 793 $[M-H]^-$, 647 $[M-H-146]^-$, 631 $[M-H-162]^-$, 615 $[M-H-178]^-$, 603 $[793-(44+146)]^-$, 587 $[793-(44+162)]^-$, 571 $[793-(44+178)]^-$, 441 $[603-162 \text{ or } 587-146]^-$, 425 $[603-178 \text{ or } 587-162]^-$ [1]

^{1}H NMR (250 MHz, J/Hz, CD_3OD): 0.85, 0.89, 0.96, 0.96, 1.04 (s, CH_3-23, 26, 29, 30, 25, 24), 5.59 (m, H-12)

β-D-Quip: 4.32 (d, J = 7.0, H-1), 1.30 (d, J = 6.0, CH_3-6)

β-D-Glcp: 5.42 (d, J = 7.5, H-1) [1]

^{13}C NMR (50.3 MHz, C_5D_5N) (aglicone moiety): [2]

Table 1

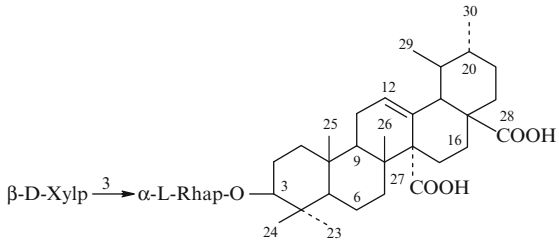
C-1	38.7	C-16	25.1	Qui-1	106.2
2	26.4	17	48.6	2	75.3
3	88.2	18	54.3	3	77.8
4	39.1	19	38.7	4	76.4
5	55.5	20	37.1	5	72.2
6	18.2	21	29.9	6	18.8
7	37.1	22	36.0	Glc-1	95.2
8	39.8	23	27.6	2	73.6
9	46.9	24	16.3	3	78.8
10	36.6	25	16.7	4	70.7
11	23.0	26	18.4	5	78.3
12	129.2	27	177.8	6	61.9
13	132.9	28	176.2		
14	56.3	29	17.7		
15	25.7	30	20.8		

References

1. R. Aquino, F. De Simone, C. Pizza, C. Conti, M.L. Stein, J. Nat. Prod. **52**, 679 (1989)
2. F.J. Arriaga, A. Rumbero, P. Vazquez, Phytochemistry **29**, 209 (1990)
3. K. Ohashi, H. Kojima, T. Tanikawa, Y. Okumura, K. Kawazoe, N. Tatara, H. Shibuya, I. Kitagawa, Chem. Pharm. Bull. **42**(8), 1596 (1994)

Gongganoside A

CAS Registry Number: 161161-63-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid

Biological source: *Bhesa paniculata* [1]

$C_{41}H_{64}O_{13}$: 764.434

$[\alpha]_D^{25}$ + 18.3° (c 1.04, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3430, 1686, 1636, 1453, 1055 [1]

FAB-MS *m/z*: 763 $[M-H]^-$, 719, 587, 441 [1]

^{1}H NMR (J/Hz, CD_3OD): 0.74 (CH_3-24), 0.89 (CH_3-26), 0.91 (CH_3-23, 29, 30), 0.98 (CH_3-25), 2.24 (d, J = 10.6, H-18), 3.06 (dd, J = 4.7, 10.6, H-3), 5.60 (brs, H-12)
α-L-Rhap: 4.70 (d, J = 1.2, H-1), 1.23 (d, J = 6.2, CH_3-6)
β-D-Xylp: 4.47 (d, J = 7.1, H-1) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

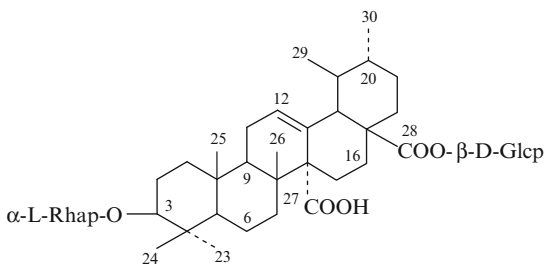
C-1	39.8	C-16	26.5	Rha-1	104.0
2	26.6	17	49.5	2	72.2
3	90.3	18	55.5	3	82.2
4	40.0	19	40.4	4	73.0
5	56.6	20	38.3	5	69.8
6	19.4	21	31.2	6	17.9
7	37.6	22	38.0	Xyl-1	106.6
8	40.6	23	28.7	2	75.2
9	48.0	24	17.1	3	77.6
10	37.9	25	16.9	4	71.1
11	23.8	26	19.1	5	66.9
12	130.4	27	179.0		
13	133.9	28	181.6		
14	57.3	29	18.2		
15	25.7	30	21.5		

References

1. K. Ohashi, H. Kojima, T. Tanikawa, Y. Okumura, K. Kawazoe, N. Tatara, H. Shibuya, I. Kitagawa, Chem. Pharm. Bull. **42**(8), 1596 (1994)

Gongganoside B

CAS Registry Number: 161161-64-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid
Biological source: *Bhesa paniculata* [1]
$C_{42}H_{66}O_{14}$: 794.445
$[\alpha]_D$ + 31.6° (c 1.13, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3430, 1730, 1684, 1638, 1458, 1055 [1]
FAB-MS *m/z*: 793 $[M-H]^-$, 631, 587, 441 [1]
^{1}H NMR (J/Hz, CD_3OD): 0.78 (CH_3-24), 0.88 (CH_3-26), 0.91 (CH_3-23, 29, 30), 0.97 (CH_3-25), 2.28 (d, J = 10, H-18), 3.05 (dd, J = 4.5, 10.9, H-3), 5.62 (brs, H-12)
α-L-Rhap: 4.70 (d, J = 1.1, H-1), 1.22 (d, J = 6.2, CH_3-6)
β-D-Glcp: 5.37 (d, J = 8, H-1) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

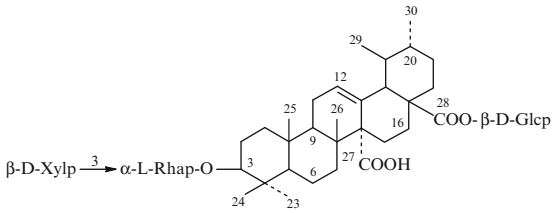
C-1	39.8	C-16	26.4	Rha-1	104.4
2	26.6	17	49.8	2	72.5
3	90.3	18	55.3	3	72.5
4	40.0	19	40.2	4	74.1
5	56.6	20	38.2	5	69.9
6	19.4	21	31.1	6	17.8
7	37.0	22	38.0	Glc-1	95.6
8	40.8	23	28.7	2	73.9
9	48.0	24	17.0	3	78.2
10	37.9	25	16.9	4	71.1
11	23.9	26	19.2	5	78.6
12	130.9	27	179.1	6	62.5
13	133.2	28	177.9		
14	57.2	29	18.1		
15	25.8	30	21.5		

References

1. K. Ohashi, H. Kojima, T. Tanikawa, Y. Okumura, K. Kawazoe, N. Tatara, H. Shibuya, I. Kitagawa, Chem. Pharm. Bull. **42**(8), 1596 (1994)

Gongganoside C

CAS Registry Number: 161161-65-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid

Biological source: *Bhesa paniculata* [1]

$C_{47}H_{74}O_{18}$: 926.487

$[\alpha]_D^{19}$ + 11.8° (c 1.19, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3430, 1730, 1692, 1638, 1457, 1075 [1]

FAB-MS *m/z*: 925 $[M-H]^-$, 763, 719, 587, 441 [1]

FAB-MS *m/z*: 949 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, CD_3OD): 0.78 (CH_3-24), 0.88 (CH_3-26), 0.91 (CH_3-23, 29, 30), 0.98 (CH_3-25), 2.28 (d, J = 9.8, H-18), 3.05 (dd, J = 4.7, 10.4, H-3), 5.62 (brs, H-12)

α-L-Rhap: 4.69 (d, J = 1.1, H-1), 1.23 (d, J = 6.1, CH_3-6)

β-D-Xylp: 4.47 (d, J = 7.0, H-1)

β-D-Glcp: 5.37 (d, J = 8, H-1) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	39.8	C-16	26.4	Rha-1	104.0	Glc-1	95.6
2	26.6	17	49.8	2	72.2	2	73.9
3	90.3	18	55.3	3	82.2	3	78.2
4	40.0	19	40.2	4	73.0	4	71.1
5	56.6	20	38.2	5	69.8	5	78.6
6	19.4	21	31.1	6	17.9	6	62.5
7	37.0	22	38.0	Xyl-1	106.5		
8	40.8	23	28.7	2	75.2		
9	48.0	24	17.1	3	77.5		
10	37.9	25	16.9	4	71.2		
11	23.9	26	19.2	5	66.9		
12	130.9	27	179.1				

(*continued*)

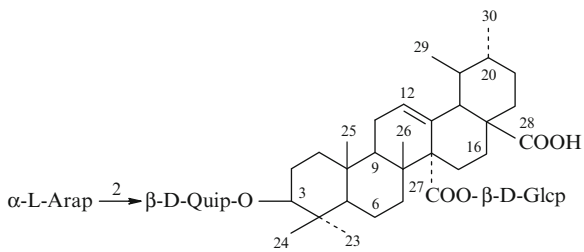
Table 1 (continued)

13	133.2	28	177.9
14	57.3	29	18.1
15	25.8	30	21.5

References

1. K. Ohashi, H. Kojima, T. Tanikawa, Y. Okumura, K. Kawazoe, N. Tatara, H. Shibuya, I. Kitagawa, Chem. Pharm. Bull. **42**(8), 1596 (1994)

Zygophyloside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid

Biological source: *Zygophyllum propinquum* [1]

$C_{47}H_{74}O_{18}$: 926.487

FAB-MS *m/z*: 925 $[M-H]^-$, 763 [M-H-Glc], 719 [M-H-Glc-CO_2], 587 [719-Ara], 441 [587-Qui] [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.81, 1.01, 0.96, 0.87 (s, CH_3 × 4), 0.91 (d, J = 5.70, CH_3-29, 30), 5.62 (m, H-12)

β-D-Quip: 4.37 (d, J = 7.44, H-1), 1.24 (d, J = 6.1, CH_3-6)

α-L-Arap: 4.45 (d, J = 6.76, H-1)

β-D-Glcp: 5.37 (d, J = 7.95, H-1) [1]

^{13}C NMR(75 MHz, CD_3OD): [1]

Table 1

C-1	40.0	C-16	26.4	Qui-1	105.2	Glc-1	95.6
2	27.3	17	–	2	84.1	2	73.9

(*continued*)

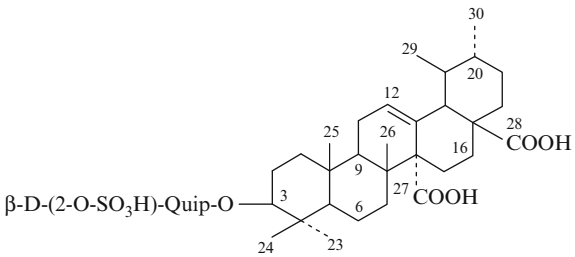
Table 1 (continued)

3	90.7	18	55.3	3	76.9	3	78.6
4	40.2	19	40.4	4	77.8	4	71.3
5	57.0	20	38.3	5	73.7	5	78.2
6	19.3	21	31.2	6	18.1	6	62.6
7	37.0	22	38.0	Ara-1	106.5		
8	40.8	23	19.2	2	72.7		
9	48.1	24	28.3	3	74.1		
10	37.8	25	16.7	4	69.6		
11	23.9	26	18.1	5	67.4		
12	130.9	27	178.0				
13	133.3	28	179.2				
14	57.3	29	16.9				
15	25.8	30	21.5				

References

1. V.U. Ahmad, G.S. Uddin, Phytochemistry **31**, 1051 (1992)

Zygophyloside D



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid

Biological source: *Zygophyllum propinquum* [1]

$C_{36}H_{56}O_{12}S$: 712.349

FAB-MS *m/z*: 711 $[M\text{-}H]^-$, 587 $[M\text{-}H\text{-}(CO_2 + SO_3)^-]$, 441 $[M\text{-}H\text{-}(CO_2 + SO_3)\text{-Qui}]^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 3.00 (m, H-3), 5.59 (m, H-12), 0.84 (s, CH_3-23), 1.04 (s, CH_3-24), 0.96 (s, CH_3-25), 0.89 (s, CH_3-26), 0.92 (d, J = 7.67, CH_3-29), 0.92 (d, J = 7.67, CH_3-30)

β-D-Quip: 4.43 (d, J = 7.72, H-1), 4.05 (t, J = 7.72, H-2), 3.60 (t, J = 9.04, H-3), 3.09 (t, J = 9.2, 9.2, H-4), 3.33 (m, H-5), 1.27 (d, J = 6.4, CH_3-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

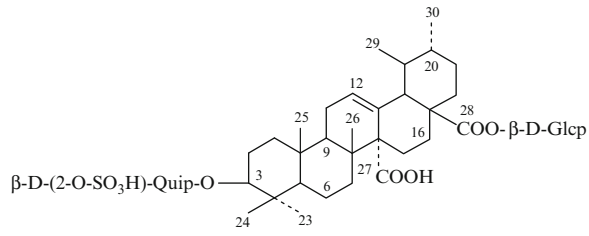
Table 1

C-1	39.9	C-16	26.5	Qui-1	104.1
2	27.1	17	-	2	82.0
3	91.3	18	55.6	3	77.5
4	40.2	19	40.4	4	76.8
5	56.9	20	38.4	5	72.6
6	19.3	21	31.3	6	18.1
7	37.7	22	38.1		
8	40.7	23	19.1		
9	48.0	24	28.5		
10	37.9	25	16.9		
11	23.9	26	18.2		
12	130.4	27	179.0		
13	133.9	28	181.7		
14	57.3	29	17.1		
15	25.8	30	21.6		

References

1. V.U. Ahmad, G.Sh. Uddin, M.Sh. Ali, Phytochemistry **33**, 453 (1993)

Zygophyloside E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid

Biological source: *Zygophyllum propinquum* [1], *Z. oxianum* [2]

$C_{42}H_{66}O_{17}S$: 874.402

Mp: 225–227°C [2]

$[\alpha]_D^{22}$ + 18.1±1° (c 0.01, MeOH) [2]

FAB-MS *m/z*: 873 $[M\text{-}H]^-$, 711 $[M\text{-}H\text{-Glc}]^-$, 587 $[M\text{-}H\text{-Glc-}(CO_2 + SO_3)]^-$ and 441 $[M\text{-}H\text{-Glc-}(CO_2 + SO_3)\text{- Qui}]^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 5.53 (m, H-12), 0.83 (s, CH_3-23), 1.03 (s, CH_3-24), 0.95 (s, CH_3-25), 0.86 (s, CH_3-26), 0.93 (d, J = 7.69, s, CH_3-29), 0.93 (d, J = 7.69, H-30).

β-D-Quip: 4.40 (d, J = 7.66, H-1), 4.03 (t, J = 7.69, H-2), 3.09 (t, J = 9.16, H-4), 3.34 (m, H-5), 1.25 (d, J = 6.13, H-6)
β-D-Glcp: 5.36 (d, J = 8.03, H-1), 3.2, 3.4–3.9 and 4.2 (m, H-3, H-3′, H-2 to H-6) [1]
^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

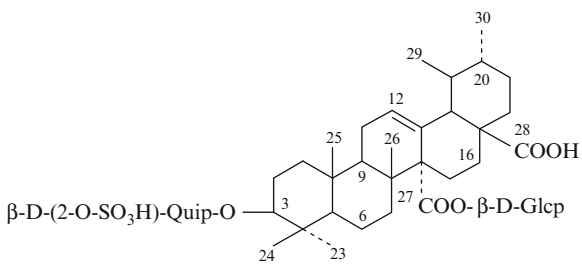
C-1	39.8	C-16	27.0	Qui-1	104.0
2	27.2	17	-	2	82.2
3	91.5	18	55.7	3	77.6
4	40.2	19	40.4	4	76.8
5	56.6	20	38.2	5	72.7
6	19.3	21	31.3	6	18.1
7	37.3	22	38.0	Glc-1	95.7
8	40.7	23	19.3	2	74.0
9	47.8	24	28.6	3	78.5
10	38.0	25	17.0	4	71.5
11	24.1	26	18.5	5	78.4
12	129.9	27	179.2	6	62.8
13	134.6	28	178.4		
14	57.6	29	17.1		
15	26.1	30	21.5		

References

1. V.U. Ahmad, G.Sh. Uddin, M. Shaiq Ali, Phytochemistry **33**, 453 (1993)
2. S.A. Sasmakov, Zh.M. Putieva, V.N. Syrov, F.N. Dzhakhangirov, U. Lindequist, *7th International Symposium. on the Chemistry of Natural Compands*, Tashkent, 16-18 October 2007, p. 182

Zygophyloside F

CAS Registry Number: 171980-77-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid
Biological source: *Zygophyllum coccineum*, *Z. album*, *Z. dumosum* [1]
$C_{42}H_{66}O_{17}S$: 874.402
$[\alpha]_D^{25}$ + 23° (c 0.25, MeOH) [1]
LSI-MS *m/z*: 873 $[M-H]^-$ (75), 711 $[M-H-Glc]^-$ (6), 667 $[M-H-Glc-CO_2]^-$ (4), 587 $[M-H-Glc-CO_2-SO_3]^-$ (2), 97 $[HSO_4]^-$ (78), 80 $[SO_3]^-$ (100) [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.76 (d, J = 5.9, H-30), 0.87 (s, CH_3-25), 0.90 (H-5, H-20), 1.08 (H-1), 1.12 (s, CH_3-24), 1.16 (d, J = 6.3, CH_3-29), 1.19 (s, CH_3-26), 1.22 (H-6), 1.28 (s, CH_3-23), 1.30 (H-21), 1.40 (H-19), 1.46 (H-6), 1.60 (H-1), 1.65 (H-22), 1.72 (H-7), 1.77 (H-22), 1.89 (H-2), 1.91 (H-7), 1.99-2.14 (H-11), 2.12 (H-2), 2.20 (H-15), 2.38 (H-16), 2.56 (H-15, H-16), 2.67 (H-18), 2.68 (H-9), 3.15 (dd, J = 4.2, 11.4, H-3)
β-D-Quip: 4.72 (d, J = 7.6, H-1), 4.96 (H-2), 4.27 (H-3), 3.61(H-4), 3.71 (H-5), 1.57 (d, J = 5.9, CH_3-6)
β-D-Glcp: 6.35 (d, J = 8.1, H-1), 4.21 (H-2), 4.30 (H-3), 4.32 (H-4), 4.04 (H-5), 4.35 (dd, J = 4.1, 11.9, H-6), 4.42 (H-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.6	C-16	25.5	Qui-1	104.1
2	26.7	17	48.9	2	81.2
3	89.2	18	54.7	3	78.2
4	40.2	19	37.5	4	76.7
5	55.8	20	39.1	5	72.2
6	18.5	21	30.3	6	18.5
7	36.4	22	37.5	Glc-1	95.7
8	40.2	23	28.1	2	74.1
9	47.2	24	17.1	3	78.9
10	37.0	25	16.5	4	71.3
11	23.4	26	19.2	5	79.2
12	129.6	27	176.5	6	62.4
13	133.2	28	178.0		
14	56.7	29	18.1		
15	26.1	30	21.2		

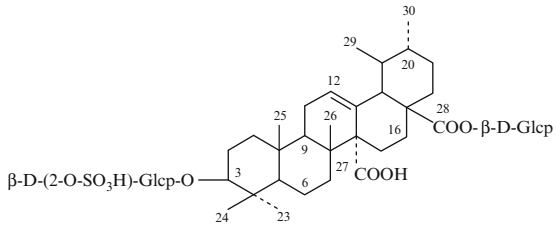
Pharm./Biol.: Leaves, stems and fruits of this plant are used in folk (Egypt and Sudan) medicine as the drug “Kammûn Quarâmâny”. This drug is active against rheumatism, gout, asthma and hypertension and is also used as a diuretic, anthelmintic and antidiabetic agent [1]

References

1. M.H.A. Elgamal, K.H. Shaker, K. Poellmann, K. Seifert, Phytochemistry **40**, 1233 (1995)

Zygophyloside G

CAS Registry Number: 188554-59-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid

Biological source: *Zygophyllum coccineum*, *Z. dumosum* [1]

$C_{42}H_{66}O_{18}S$: 890.396

Mp: 240–244°C [1]

$[\alpha]_D^{25}$ + 20° (c 0.16, MeOH) [1]

LSI-MS *m/z*: 889 $[M-H]^-$ (100), 845 $[M-H-CO_2]^-$ (10), 727 $[M-H-Glc]^-$ (25), 683 $[M-H-Glc-CO_2]^-$ (20), 603 $[M-H-Glc-CO_2-SO_3]^-$ (10), 97 $[HSO_4]^-$ (35), 80 $[SO_3]^-$ (30) [1]

^{1}H NMR (500.13 MHz, J/Hz, C_5D_5N): 0.73 (d, J = 6.3, CH_3-30), 0.80 (s, CH_3-25), 0.85 (H-5, H-20), 0.95 (H-1), 1.11 (s, CH_3-24), 1.14 (d, J = 6.2, CH_3-29), 1.16 (s, CH_3-26), 1.18 (H-6), 1.19-1.31 (H-21), 1.28 (s, CH_3-23), 1.35 (H-19), 1.42 (H-6), 1.42 (H-1), 1.59 (H-7), 1.70 (H-22), 1.75 (H-7), 1.77 (H-2), 1.83 (H-22), 1.92-2.10 (H-11), 2.10 (H-2), 2.18 (H-16), 2.37 (H-15), 2.50 (H-15, H-16), 2.59 (dd, J = 5.6, 10.4, H-9), 2.65 (d, J = 11.4, H-18), 3.12 (dd, J = 3.7, 11.5, H-3), 5.95 (H-12)

β-D-Glcp: 4.82 (d, J = 7.4, H-1), 5.01 (H-2), 4.38 (H-3), 4.13 (H-4), 3.90 (H-5), 4.28 (H-6), 4.48 (dd, J = 2.4, 11.9, H-6)

β-D-Glcp: 6.34 (d, J = 8.2, H-1), 4.21 (H-2), 4.30 (H-3), 4.36 (H-4), 4.03 (H-5), 4.40 (H-6), 4.46 (dd, J = 2.5, 12.0, H-6) [1]

^{13}C NMR (125.76 MHz, C_5D_5N): [1]

Table 1

C-1	39.6	C-16	26.2	Glc-1	104.3
2	26.6	17	49.0	2	81.0
3	89.5	18	54.7	3	78.3
4	40.2	19	37.5	4	71.8
5	55.8	20	39.1	5	77.5
6	18.5	21	30.3	6	62.8
7	37.5	22	36.5	Glc′-1	95.7
8	40.2	23	28.1	2	74.1
9	47.2	24	17.1	3	78.9
10	37.0	25	16.6	4	71.2
11	23.4	26	19.2	5	79.3
12	129.6	27	178.0	6	62.4
13	133.3	28	176.6		
14	56.8	29	18.2		
15	25.5	30	21.2		

Pharm./Biol.: *Zygophyllum coccineum* is used in folk medicine as part of a drug against rheumatism, gout, asthma and hypertension [1]

References

1. K. Poellmann, S. Gagel, M.H.A. Elgamal, K.H. Shaker, K. Seifert, Phytochemistry **44**, 485 (1997)

Zygophyloside H

CAS Registry Number: 188554-60-1

See Figure Zygophyloside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Quinovic Acid

Biological source: *Zygophyllum coccineum*, *Z. dumosum* [1]

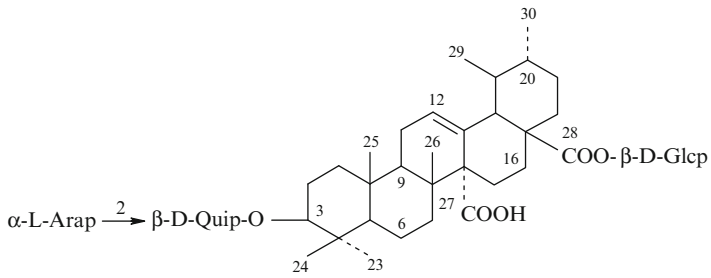
$C_{47}H_{74}O_{18}$: 926.487

Mp: 215–219°C [1]

$[\alpha]_D^{25}$ + 36° (c 0.17, MeOH) [1]

LSI-MS *m/z*: 925 $[M-H]^-$ (47), 763 $[M-H-Glc]^-$ (7), 719 $[M-H-Glc-CO_2]^-$ (15), 587 $[M-H-Glc-CO_2-Ara]^-$ (10) [1]

^{1}H NMR (500.13 MHz, J/Hz, C_5D_5N): 0.73 (d, J = 6.3, CH_3-30), 0.87 (H-20), 0.90 (H-5), 0.91 (s, CH_3-25), 1.04 (s, CH_3-25), 1.09 (H-1), 1.12 (s, CH_3-23),



Zygophyloside H

1.16 (d, J = 6.1, CH_3-29), 1.21 (s, CH_3-26), 1.23-1.30 (H-21), 1.27 (H-6), 1.35 (H-19), 1.48 (H-6), 1.58 (H-1), 1.66 (H-7), 1.73 (H-22), 1.82 (H-7), 1.86 (H-2), 1.86 (H-22), 2.00-2.10 (H-11), 2.10 (H-2), 2.20 (H-16), 2.42 (H-15), 2.53 (H-15, H-16), 2.68 (d, J = 11.3, H-18), 2.68 (H-9), 3.10 (dd, J = 4.3, 11.6, H-3), 5.99 (H-12)

β-D-Quip: 4.65 (d, J = 7.6, H-1), 4.03 (H-2), 4.14 (H-3), 3.64 (H-4), 3.66 (H-5), 1.59 (d, J = 5.5, CH_3-6)

α-L-Arap: 5.13 (d, J = 6.6, H-1), 4.53 (H-2), 4.19 (H-3), 4.29 (H-4), 3.75, 4.32 (H_2-5);

β-D-Glcp: 6.36 (d, J = 8.1, H-1), 4.23 (H-2), 4.30 (H-3), 4.36 (H-4), 4.03 (H-5), 4.40, 4.43 (H_2-6) [1]

^{13}C NMR (125.76 MHz, C_5D_5N): [1]

Table 1

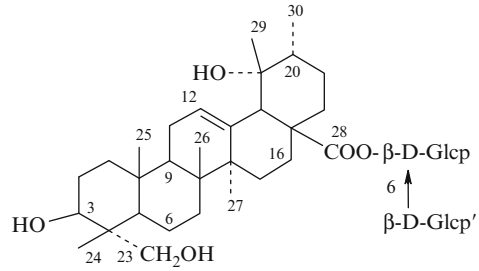
C-1	39.2	C-16	26.2	Qui-1	104.9	Glc-1	95.7
2	26.9	17	48.9	2	84.2	2	74.2
3	88.5	18	54.7	3	77.8	3	78.9
4	39.5	19	37.5	4	76.6	4	71.2
5	55.9	20	39.1	5	72.4	5	79.3
6	18.5	21	30.3	6	18.5	6	62.3
7	37.6	22	36.4	Ara-1	106.8		
8	40.2	23	27.7	2	73.8		
9	47.3	24	16.5	3	74.3		
10	37.0	25	16.7	4	69.1		
11	23.4	26	19.2	5	67.0		
12	129.6	27	178.0				
13	133.2	28	176.5				
14	56.8	29	18.1				
15	25.5	30	21.2				

Pharm./Biol.: *Zygophyllum coccineum* is used in folk medicine as part of a drug against rheumatism, gout, asthma and hypertension [1]

References

1. K. Poellmann, S. Gagel, M.H.A. Elgamal, K.H. Shaker, K. Seifert, Phytochemistry **44**, 485 (1997)

Ilexoside XLI



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Rotundic Acid

Biological source: *Ilex rotunda* [1]

$C_{42}H_{68}O_{15}$: 812.455

Mp: 198–200°C (MeOH) [1]

$[\alpha]_D^{22}$ + 47.0° (c 0.6, MeOH) [1]

FAB-MS *m/z*: 811 $[M-H]^-$, 649 $[M-H-Glc]^-$, 487 $[M-H-2Glc]^-$ [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N) : 1.07, 1.08, 1.24, 1.43, 1.65 (s, $CH_3 \times 5$), 1.04 (d, J = 6.5, CH_3), 2.48 (dt, J = 14.0, 3.0, Hβ-15), 2.96 (s, H-18), 3.02 (dt, J = 14.0, 3.0, Hα-16), 3.70, 4.17 (d, J = 10.5, H_2-23), 5.57 (brt, H-12)

β-D-Glcp: 6.24 (d, J = 6.5, H-1)

β-D-Glcp′: 5.44 (d, J = 3.5, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

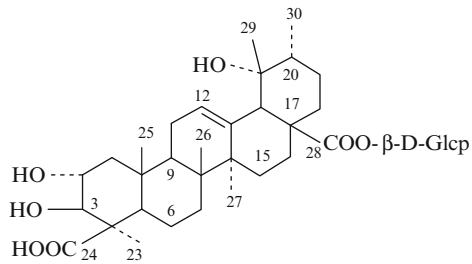
Table 1

C-1	38.9	C-16	26.0	Glc-1	95.6
2	27.7	17	48.7	2	73.8
3	73.6	18	54.3	3	78.9
4	42.9	19	72.6	4	71.7
5	48.6	20	42.0	5	77.1
6	18.8	21	26.7	6	68.1
7	38.2	22	37.7	Glc′-1	100.5
8	40.6	23	67.8	2	74.1
9	47.8	24	13.1	3	75.5
10	37.2	25	16.1	4	72.0
11	24.1	26	17.5	5	74.0
12	128.4	27	24.6	6	62.6
13	139.3	28	177.1		
14	42.1	29	26.9		
15	29.3	30	16.7		

References

1. K. Amimoto, K. Yoshikawa, S. Arihara, Chem. Pharm. Bull. **41**(1), 39 (1993)

Trachelosperoside A-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Trachelosperogenin A
Biological source: *Trachelospermum asiaticum* [1]
$C_{36}H_{56}O_{12}$: 680.377
$[\alpha]_D^{30}$ + 12.6° (c 0.35, MeOH) [1]
FAB-MS *m/z*: 703 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.56 (brs, H-12), 2.92 (s, H-18), 1.27, 1.27, 1.41, 1.70, 1.77 (s, CH_3 × 5), 1.07 (d, J = 6.0, CH_3-30)
β-D-Glcp: 6.26 (d, J = 7.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

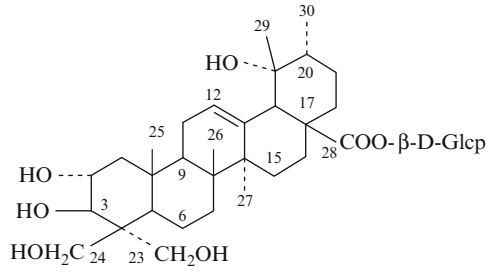
Table 1

C-1	48.5	C-16	26.2	Glc-1	95.8
2	68.7	17	48.7	2	74.0
3	84.4	18	54.5	3	78.9
4	50.0	19	72.7	4	71.3
5	57.2	20	42.1	5	79.2
6	21.2	21	26.7	6	62.4
7	33.9	22	37.6		
8	40.6	23	25.3		
9	47.3	24	180.1		
10	39.0	25	15.5		
11	24.5	26	17.4		
12	128.5	27	24.7		
13	139.3	28	177.0		
14	42.3	29	27.0		
15	29.2	30	16.7		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)

Trachelosperoside B-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Trachelosperogenin B
Biological source: *Trachelospermum asiaticum* [1]

$C_{36}H_{58}O_{12}$: 682.392
Mp: 226–230°C (MeOH) [1]
$[\alpha]_D^{18}$ + 9.8° (c 0.50, MeOH) [1]
FAB-MS *m/z*: 705 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.53 (brs, H-12), 2.91 (s, H-18), 3.99, 4.62 (d, J = 11.0, H_2-23), 4.26, 4.85 (d, J = 11.0, H_2-24), 1.17, 1.22, 1.37, 1.61 (s, CH_3 × 4), 1.06 (d, J = 7.0, CH_3-30)
β-D-Glcp: 6.28 (d, J = 8.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

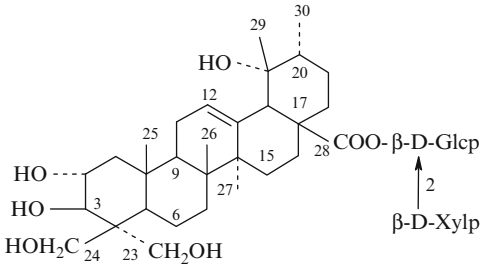
Table 1

C-1	48.0	C-16	26.1	Glc-1	95.8
2	69.1	17	48.6	2	74.0
3	79.8	18	54.4	3	78.9
4	47.8	19	72.6	4	71.2
5	48.3	20	42.1	5	79.2
6	19.4	21	26.7	6	62.3
7	33.5	22	37.7		
8	40.6	23	64.3		
9	48.0	24	62.9		
10	38.1	25	16.7		
11	24.4	26	17.4		
12	128.3	27	24.5		
13	139.2	28	176.9		
14	42.1	29	27.0		
15	29.2	30	17.4		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)

Trachelosperoside B-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Trachelosperogenin B
Biological source: *Trachelospermum asiaticum* [1]
$C_{41}H_{66}O_{16}$: 814.435
$[\alpha]_D^{30}$ + 3.7° (c 1.32, MeOH) [1]
FAB-MS *m/z*: 837 $(M + Na)^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 5.54 (brs, H-12), 2.90 (s, H-18), 1.10, 1.12, 1.39, 1.61 (s, CH_3 × 4), 1.07 (d, J = 7.0, CH_3-30)
β-D-Glcp: 6.16 (d, J = 8.0, H-1)
β-D-Xylp: 5.39 (d, J = 7.0, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

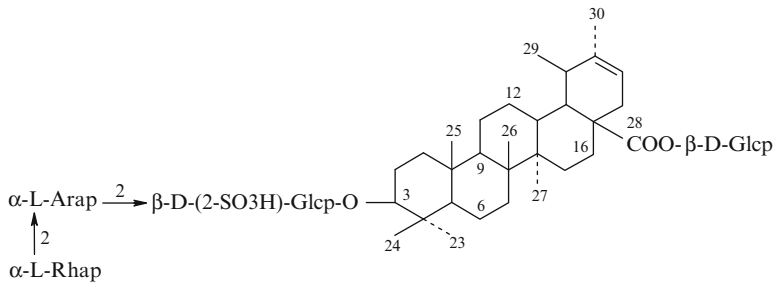
C-1	48.0	C-16	25.9	Glc-1	93.7
2	69.1	17	48.7	2	80.7
3	79.7	18	54.4	3	78.4
4	47.9	19	72.7	4	71.2
5	48.1	20	42.1	5	79.0
6	19.2	21	26.8	6	62.3
7	33.5	22	37.5	Xyl-1	106.1
8	40.7	23	64.4	2	76.0
9	48.1	24	62.6	3	78.7
10	38.1	25	16.7	4	71.0
11	24.5	26	17.4	5	67.4
12	128.1	27	24.5		
13	139.4	28	176.9		
14	42.1	29	27.1		
15	29.4	30	17.2		

References

1. F. Abe, T. Yamauchi, Chem. Pharm. Bull. **35**(5), 1748 (1987)

Zygophyloside I*

CAS Registry Number: 199794-93-9
See Figure Zygophyloside I*
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Urs-20-en-28-oic Acid
Biological source: *Zygophyllum gaetulum* [1]



Zygophyloside I*

$C_{53}H_{86}O_{24}S$: 1138.522

$[\alpha]_D^{25}$ + 15.5° (c 1.0, MeOH) [1]

FAB-MS (negative ion mode) *m/z*: 1137 $[M-H]^-$, 1057 $[(M-H)^-SO_3]^-$, 895 $[(M-H)-(SO_3+162)]^-$ [1]

^{1}H NMR (599.19 MHz, J/Hz, CD_3OD): 1.17, 1.88 (m, H_2-1), 1.08, 1.80 (m, H_2-2), 3.20 (dd, J = 11.1, 4.5, H-3), 0.75 (m, H-5), 1.35, 1.55 (m, H_2-6), 1.36, 1.53 (m, H_2-7), 1.37 (m, H-9), 1.73, 1.95 (m, H_2-11), 1.22, 1.32 (m, H_2-12), 2.42 (dt, J = 12.0, 3.4, H-13), 1.05, 1.11 (m, H_2-15), 1.36 (ddd, J = 13.0, 12.0, 5.0, H-16), 2.31 (ddd, J = 12.0, 5.0, 3.1, H-16), 1.23 (brs, H-18), 2.16 (dd, J = 11.5, 6.5, H-19), 5.27 (dd, J = 6.0, 1.5, H-21), 1.82 (dd, J = 12.0, 1.5, H-22), 2.36 (dd, J = 12.0, 6.0, H-22), 0.85 (s, CH_3-23), 1.08 (s, CH_3-24), 1.01 (s, CH_3-25), 0.90 (s, CH_3-26), 1.00 (s, CH_3-27), 1.04 (d, J = 6.5, CH_3-29), 1.63 (s, CH_3-30); β-D-Glcp: 4.49 (d, J = 7.8, H-1), 3.42 (dd, J = 9.0, 7.8, H-2), 3.63 (t, J = 9.0, H-3), 3.52 (t, J = 9.0, H-4), 3.64 (ddd, J = 9.0, 4.5, 3.0, H-5), 3.70 (dd, J = 12.0, 4.5, H-6), 3.85 (dd, J = 12.0, 3.0, H-6); α-L-Arap: 5.00 (d, J = 5.2, H-1), 3.92 (dd, J = 5.2, 8.5, H-2), 3.82 (dd, J = 8.5, 3.0, H-3), 3.80 (m, H-4), 3.45 (dd, J = 12.0, 3.0, H-5), 3.95 (dd, J = 12.0, 2.0, H-5); α-L-Rhap: 5.05 (d, J = 1.5, H-1), 3.88 (dd, J = 1.5, 2.0, H-2), 3.71 (dd, J = 2.0, 8.5, H-3), 3.45 (t, J = 8.5, H-4), 3.87 (dd, J = 8.5, 6.6, H-5), 1.30 (d, J = 6.6, CH_3-6); β-D-Glcp′: 5.52 (d, J = 7.6, H-1), 4.20 (dd, J = 9.0, 7.5, H-2), 3.76 (t, J = 9.0, H-3), 3.53 (t, J = 9.0, H-4), 3.40 (m, H-5), 3.73 (dd, J = 12.2, 5.0, H-6), 3.84 (dd, J = 12.2, 3.5, H-6) [1]

^{13}C NMR (150.85 MHz, CD_3OD): [1]

Table 1

C-1	40.09	C-13	40.21	C-25	16.40	Glc-1	105.65	Rha-1	102.15
2	27.06	14	42.80	26	16.91	2	79.46	2	72.09
3	91.47	15	28.61	27	15.24	3	76.56	3	71.82
4	40.34	16	33.02	28	176.33	4	73.38	4	73.65
5	57.16	17	50.57	29	23.84	5	76.64	5	69.86
6	19.16	18	50.26	30	21.98	6	61.88	6	17.96
7	33.08	19	38.31			Ara-1	101.41	Glc′-1	92.83
8	42.06	20	142.0			2	75.54	2	79.52
9	51.99	21	118.26			3	72.36	3	77.30
10	38.08	22	37.89			4	67.43	4	70.74
11	22.60	23	16.73			5	63.37	5	78.04
12	30.29	24	28.31					6	61.88

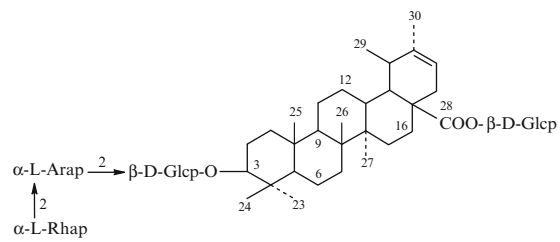
Pharm./Biol.: The aqueous extracts of the aerial parts are used in the indigenous system of medicine as an antispasmodic, antieczema, and antidiabetic drug, and as a remedy for stomach and liver pain [1]

References

1. O. Safir, S. Fkih-Tetouani, N. De Tommasi, R. Aquino, J. Nat. Prod. **61**, 130 (1998)

Zygophyloside L

CAS Registry Number: 199794-95-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Urs-20-en-28-oic Acid

Biological source: *Zygophyllum gaetulum* [1]

$C_{53}H_{86}O_{21}$: 1058.566

$[\alpha]_D^{25}$ + 18.1° (c 1.0, MeOH) [1]

FAB-MS (negative ion mode) *m/z*: 1057 $[M-H]^-$, 895 $[(M-H)^-$-162$]^-$ [1]

^{1}H NMR (599.19 MHz, J/Hz, CD_3OD): 1.02, 1.72 (m, H_2-1), 1.05, 1.78 (m, H_2-2), 3.20 (dd, J = 11.2, 4.5, H-3), 0.75 (m, H-5), 1.10, 1.55 (m, H_2-6), 1.32, 1.50 (m, H_2-7), 1.40 (m, H-9), 1.35, 1.92 (m, H_2-11), 1.27, 1.33 (m, H_2-12), 2.41 (dt, J = 12.2, 3.4, H-13), 1.05, 1.27 (m, H_2-15), 1.45 (br, H-16), 2.10 (ddd, J = 12.2, 5.2, 3.2, H-16), 1.26 (br, H-18), 2.15 (dd, J = 11.5, 6.5, H-19), 5.27 (dd, J = 6.0, 1.5, H-21), 1.87 (dd, J = 12.2, 1.5, H-22), 2.32 (dd, J = 12.2, 6.2, H-22), 0.85 (s, CH_3-23), 1.08 (s, CH_3-24), 1.00 (s, CH_3-25), 0.90 (s, CH_3-26), 1.03 (s, CH_3-27), 1.04 (d, J = 6.5, CH_3-29), 1.63 (s, CH_3-30); β-D-Glcp: 4.48 (d, J = 7.5, H-1), 3.43 (dd, J = 9.0, 7.5, H-2), 3.60 (t, J = 9.0, H-3), 3.51 (t, J = 9.0, H-4), 3.60 (ddd, J = 9.0, 4.5, 3.5, H-5), 3.72 (dd, J = 12.0, 4.5, H-6), 3.84 (dd, J = 12.0, 3.5, H-6); α-L-Arap: 5.03 (d, J = 5.2, H-1), 3.92 (dd, J = 5.2, 8.5, H-2), 3.83 (dd, J = 8.5, 3.0, H-3), 3.82 (m, H-4), 3.45 (dd, J = 12.0, 2.5, H-5), 3.97 (dd, J = 12.0, 2.0, H-5); α-L-Rhap: 5.05 (d, J = 1.5, H-1), 3.88 (dd, J = 1.5, 2.5, H-2), 3.71 (dd, J = 2.5, 8.6, H-3), 3.41 (t, J = 8.6, H-4), 3.88 (dd, J = 8.6, 6.5, H-5), 1.30 (d, J = 6.5, CH_3-6); β-D-Glcp′: 5.47 (d, J = 7.5, H-1), 3.30 (dd, J = 9.5, 7.5, H-2), 3.43 (t, J = 9.5, H-3), 3.57 (t, J = 9.5, H-4), 3.37 (m, H-5), 3.70 (dd, J = 12.2, 4.5, H-6), 3.85 (dd, J = 12.2, 3.5, H-6) [1]

^{13}C NMR (150.85 MHz, CD_3OD): [1]

Table 1

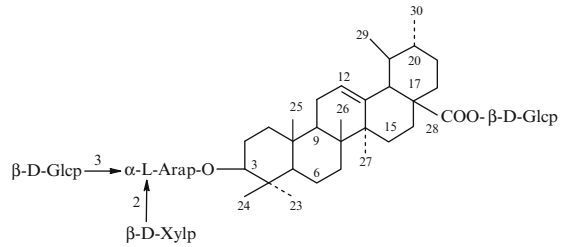
C-1	39.84	C-13	40.0	C-25	16.28	Glc-1	105.47	Rha-1	101.97
2	28.00	14	42.90	26	16.55	2	79.57	2	72.12
3	90.54	15	28.07	27	14.95	3	76.47	3	71.91
4	40.35	16	33.37	28	176.55	4	73.52	4	73.67
5	56.83	17	50.64	29	23.58	5	77.71	5	69.94
6	19.89	18	50.11	30	21.68	6	62.13	6	18.00
7	32.74	19	38.13			Ara-1	101.17	Glc′-1	94.89
8	43.0	20	141.98			2	75.69	2	73.98
9	51.71	21	117.94			3	72.32	3	78.07
10	38.01	22	38.04			4	67.41	4	70.98
11	23.57	23	16.38			5	63.30	5	78.33
12	30.68	24	28.07					6	62.13

Pharm./Biol.: The aqueous extracts of the aerial parts are used in the indigenous system of medicine as an antispasmodic, antieczema, and antidiabetic drug, and as a remedy for stomach and liver pain [1]

References

1. O. Safir, S. Fkih-Tetouani, N. De Tommasi, R. Aquino, J. Nat. Prod. **61**, 130 (1998)

Compound 6 from *Fagonia arabica*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Fagonia arabica* [1]

$C_{52}H_{84}O_{21}$: 1044.550

$[\alpha]_D^{25}$ + 14.8° (c 1.32, MeOH) [1]

FAB-MS *m/z*: 1067 $[M + Na]^+$, 905, 860, 740, 678, 439, 392, 307, 248 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.89, 1.09, 1.13, 1.21, 1.28 (s, CH_3 × 5), 0.91, 0.95 (d, CH_3 × 2), 2.52 (d, J = 11.0, H-18), 3.26 (dd, J = 10.0, 4.0, H-3), 5.44 (t, J = 3.0, H-12)

α-L-Arap: 4.75 (d, J = 7.0, H-1), 4.64 (dd, J = 9.0, 7.0, H-2), 4.27 (H-3), 4.48 (m, H-4), 3.66 (d, J = 11.2, H-5), 4.16 (H-5)

β-D-Glcp: 5.25 (d, J = 7.8, H-1), 3.98 (t, J = 8.0, H-2), 4.08 (t, J = 8.0, H-3), 4.30 (H-4), 3.91 (m, H-5), 4.24, 4.44 (H_2-6)

β-D-Xylp: 5.35 (d, J = 7.5, H-1), 4.0 (t, J = 8.0, H-2), 4.08 (t, J = 8.0, H-3), 4.2 (H-4), 3.43 (t, J = 9.5, H-5)

β-D-Glcp′: 6.24 (d, J = 8.0, H-1), 4.18 (t, J = 8.0, H-2), 4.26 (H-3), 4.30 (H-4), 4.01 (m, H-5), 4.38 (dd, J = 12.0, 4.5, H-6), 4.44 (H-6) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

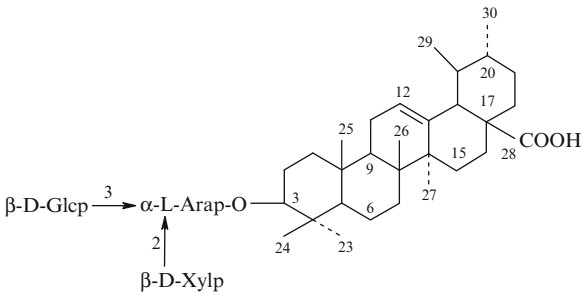
C-1	39.1	C-16	24.7	Ara-1	105.6	Xyl-1	105.1
2	26.8	17	48.4	2	77.5	2	76.0
3	89.3	18	53.4	3	83.7	3	78.5
4	39.2	19	39.4	4	68.9	4	71.6
5	56.1	20	39.8	5	66.1	5	67.1
6	18.6	21	30.9	Glc-1	105.1	Glc′-1	95.7
7	33.6	22	36.8	2	75.3	2	74.1
8	40.2	23	28.0	3	78.9	3	79.1
9	48.1	24	15.8	4	71.3	4	71.3
10	37.0	25	16.6	5	78.3	5	79.0
11	23.7	26	17.4	6	62.6	6	62.4
12	126.2	27	23.8				
13	138.5	28	176.2				
14	42.6	29	17.7				
15	28.7	30	21.3				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. T. Miyase, F.R. Melek, O.D. El-Gindi, S.M. Abdel-Khalik, M.R. El-Gindi, M.Y. Haggag, S.H. Hilal, Phytochemistry **41**, 1175 (1996)

Compound 6 from *Fagonia glutinosa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Fagonia glutinosa* [1]

$C_{46}H_{74}O_{16}$: 882.497

$[\alpha]_D^{23}$ + 14.1° (c 0.38, MeOH) [1]

FAB-MS *m/z*: 905[$C_{46}H_{74}O_{16}$ + Na]$^+$, 861, 725, 577, 413, 371, 392 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86 (Hα-1), 1.50 (Hβ-1), 2.10 (Hα-2), 1.87 (Hβ-2), 3.27 (dd, J = 12.0, 6.0, H-3), 0.79 (brd, J = 12.0, H-5), 1.33 (Hβ-6), 1.66 (dd, J = 12.0, 8.0, H-9), 1.90 (H-11), 5.45 (t, J = 3.0, H-12), 2.61 (d, J = 11.4, H-18), 1.47 (Hα-19), 1.28 (s, CH_3-23), 1.07 (s, CH_3-24), 1.00 (s, CH_3-25), 0.84 (s, CH_3-26), 1.23 (s, CH_3-27), 1.00 (d, J = 6.5, CH_3-29), 0.95 (d, J = 6.5, CH_3-30)

α-L-Arap: 4.77 (d, J = 6.8, H-1), 4.66 (t, J = 7.0, H-2), 4.28 (dd, J = 6.8, 3.5, H-3), 4.52 (m, H-4), 3.68 (d, J = 11.4, H-5), 4.18 (d, J = 11.4, H-5)

β-D-Glcp: 5.27 (d, J = 7.8, H-1), 4.00 (t, J = 8.0, H-2), 4.22 (t, J = 8.0, H-3), 4.18 (t, J = 8.0, H-4), 3.93 (m, H-5), 4.31 (dd, J = 12.0, 4.5, H-6), 4.47 (dd, J = 12.0, 2.0, H-6)

β-D-Xylp: 5.38 (d, J = 7.5, H-1), 4.02 (t, J = 7.5, H-2), 4.11 (t, J = 7.5, H-3), 4.22 (t, J = 7.5, H-4), 3.45 (d, J = 9.0, H-5), 4.22 (H-5) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

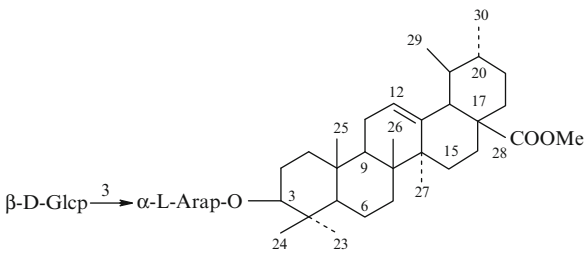
C-1	39.1	C-16	24.9	Ara-1	105.6	Xyl-1	105.1
2	26.8	17	48.1	2	77.5	2	76.0
3	89.3	18	53.6	3	83.7	3	78.5
4	39.8	19	39.4	4	68.9	4	71.7
5	56.0	20	39.1	5	66.1	5	67.2
6	18.6	21	31.0	Glc-1	105.1		
7	33.6	22	37.0	2	75.3		
8	40.0	23	27.9	3	79.0		
9	48.1	24	16.6	4	71.4		
10	37.1	25	15.7	5	78.4		
11	23.8	26	17.5	6	62.6		
12	125.7	27	23.9				
13	139.3	28	180.0				
14	42.5	29	17.5				
15	28.7	30	21.4				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. F.R. Melek, T. Miyase, M.R. El-Gindy, S.M. Abdel-Khalik, N.S. Ghaly, M. El-Kady, Pharmazie **55**, 772 (2000)

Compound 8A from *Fagonia glutinosa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Fagonia glutinosa* [1]

$C_{42}H_{68}O_{12}$: 764.471

$[\alpha]_D^{23}$ + 34.3° (c 0.22, MeOH) [1]

FAB-MS *m/z*: 787 $[C_{42}H_{68}O_{12} + Na]^+$, 453, 393, 307, 298, 262, 203 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.90 (Hα-1), 1.53 (Hβ-1), 2.12 (Hα-2), 1.82 (Hβ-2), 3.38 (dd, J = 13.3, 4.0, H-3), 0.83 (H-5), 1.53 (Hα-6), 1.34 (Hβ-6), 1.60 (dd, J = 12.0, 8.0, H-9), 1.90 (H-11), 5.38 (H-12), 1.12 (brd, J = 13.3, Hα-15), 2.43 (d, J = 12.7, H-18), 1.42 (Hα-19), 1.33 (s, CH_3-23), 1.01 (s, CH_3-24), 0.90 (s, CH_3-25), 0.84 (s, CH_3-26), 1.20 (s, CH_3-27), 3.70 (s, CH_3-28), 0.95 (d, J = 6.5, CH_3-29), 0.85 (d, J = 6.5, CH_3-30)

α-L-Arap: 4.75 (d, J = 6.8, H-1), 4.58 (t, J = 7.0, H-2), 4.22 (dd, J = 6.8, 3.5, H-3), 4.43 (m, H-4), 3.47 (d, J = 11.0, H-5), 4.21 (H-5)

β-D-Glcp: 5.37 (d, J = 8.0, H-1), 4.02 (t, J = 8.0, H-2), 4.24 (t, J = 8.0, H-3), 4.21 (t, J = 8.0, H-4), 3.98 (m, H-5), 4.37 (dd, J = 12.0, 4.5, H-6), 4.53 (dd, J = 12.0, 2.5, H-6) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

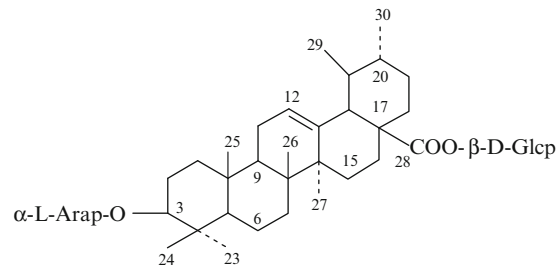
C-1	39.0	C-17	48.3	Ara-1	107.4
2	26.8	18	53.4	2	72.0
3	88.7	19	39.6	3	84.2
4	39.9	20	39.2	4	69.3
5	55.9	21	30.8	5	67.0
6	18.5	22	37.1	Glc-1	106.4
7	33.4	23	28.2	2	75.8
8	39.9	24	17.0	3	78.7
9	48.0	25	15.8	4	71.7
10	37.0	26	17.2	5	78.4
11	23.6	27	23.7	6	62.8
12	126.0	28	177.7		
13	138.8	29	17.4		
14	42.3	30	21.3		
15	28.4	OMe	51.4		
16	24.6				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. F.R. Melek, T. Miyase, M.R. El-Gindy, S.M. Abdel-Khalik, N.S. Ghaly, M. El-Kady, Pharmazie **55**, 772 (2000)

Compound 9 from *Fagonia glutinosa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Fagonia glutinosa* [1]

$C_{41}H_{66}O_{12}$: 750.455

$[\alpha]_D^{23}$ + 17.9° (c 2.25, MeOH) [1]

FAB-MS *m/z*: 773 $[C_{41}H_{66}O_{12} + Na]^+$, 623, 413, 307, 261 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.52 (d, J = 12.0, Hβ-1), 3.36 (dd, J = 13.3, 4.6, H-3), 0.82 (H-5), 1.51 (t, J = 12.0, Hα-7), 1.59 (dd, J = 12.0, 8.0, H-9), 5.46 (t, J = 3.0, H-12), 2.45 (dt, J = 13.3, 4.0, Hβ-15), 2.11 (dt, J = 13.3, 4.0, Hα-16), 2.54 (d, J = 12.0, H-18), 1.44 (Hα-16), 1.75 (dt, J = 13.3, 4.0, Hβ-22), 1.30 (s, CH_3-23), 0.98 (s, CH_3-24), 0.91 (s, CH_3-25), 1.15 (s, CH_3-26), 1.23 (s, CH_3-27), 0.96 (d, J = 6.5, CH_3-29), 0.92 (d, J = 6.5, CH_3-30)

α-L-Arap: 4.72 (d, J = 6.6, H-1), 4.52 (t, J = 7.0, H-2), 4.02 (dd, J = 6.8, 3.5, H-3), 4.49 (m, H-4), 3.74 (d, J = 11.0, H-5), 3.78 (d, J = 11.0, H-5)

β-D-Glcp: 6.26 (d, J = 8.0, H-1), 4.19 (t, J = 8.0, H-2), 4.27 (t, J = 8.0, H-3), 4.31 (t, J = 8.0, H-4), 4.02 (m, H-5), 4.38 (dd, J = 12.0, 4.5, H-6), 4.44 (dd, J = 12.0, 2.0, H-6) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

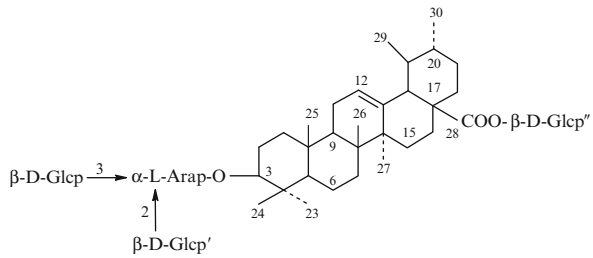
C-1	39.2	C-17	48.4	Ara-1	107.4
2	26.7	18	53.4	2	72.0
3	88.9	19	39.4	3	75.3
4	39.6	20	39.2	4	69.3
5	56.0	21	30.8	5	67.1
6	18.6	22	37.0	Glc-1	95.8
7	33.6	23	28.2	2	74.1
8	40.3	24	17.0	3	78.7
9	48.1	25	15.8	4	71.4
10	37.0	26	17.4	5	79.2
11	23.7	27	23.8	6	62.5
12	126.2	28	176.2		
13	138.5	29	17.7		
14	42.6	30	21.3		
15	28.7				
16	24.7				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. F.R. Melek, T. Miyase, M.R. El-Gindy, S.M. Abdel-Khalik, N.S. Ghaly, M. El-Kady, Pharmazie **55**, 772 (2000)

Compound 10 from *Fagonia glutinosa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Fagonia glutinosa* [1]

$C_{53}H_{86}O_{22}$: 1074.561

$[\alpha]_D^{23}$ + 16.3° (c 1.43, MeOH) [1]

FAB-MS *m/z*: 1097$[C_{53}H_{86}O_{22} + Na]^+$, 935, 890, 740, 497, 393, 317 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87 (Hα-1), 1.52 (d, J = 12.0, Hβ-1), 2.04 (Hα-2), 1.82 (Hβ-2), 3.26 (dd, J = 12.0, 4.0, H-3), 0.77 (d, J = 12.0, H-5), 1.49 (Hα-6), 1.30 (Hβ-6), 1.53 (t, J = 12.0, Hα-7), 1.34 (Hβ-7), 1.56 (dd, J = 12.0, 8.0, H-9), 1.93 (H-11), 5.45 (t, J = 3.0, H-12), 1.17 (Hα-15), 2.43 (dt, J = 14.6, 4.0, Hβ-15), 2.09 (dt, J = 13.6, 4.0, Hα-16), 1.98 (brd, J = 12.0, Hβ-16), 2.53 (d, J = 12.0, H-18), 1.43 (Hα-19), 1.50 (Hα-21), 1.38 (Hβ-21), 1.95 (brd, J = 12.0, Hα-22), 1.75 (dt, J = 14.7, 4.0, Hβ-22), 1.27 (s, CH_3-23), 1.09 (s, CH_3-24), 0.87 (s, CH_3-25), 1.13 (s, CH_3-26), 1.20 (s, CH_3-27), 0.95 (d, J = 6.5, CH_3-29), 0.92 (d, J = 6.5, CH_3-30); α-L-Arap: 4.79 (d, J = 6.6, H-1), 4.72 (t, J = 7.0, H-2), 4.31 (dd, J = 6.8, 3.5, H-3), 4.49 (m, H-4), 3.66 (d, J = 11.0, H-5), 4.18 (d, J = 11.0, H-5);

β-D-Glcp: 5.27 (d, J = 8.0, H-1), 3.98 (t, J = 8.0, H-2), 4.21 (t, J = 8.0, H-3), 4.18 (t, J = 8.0, H-4), 3.93 (m, H-5), 4.30 (dd, J = 12.0, 4.5, H-6), 4.47 (dd, J = 12.0, 2.0, H-6); β -D-Glcp′: 5.49 (d, J = 8.0, H-1), 4.03 (t, J = 8.0, H-2), 4.18 (t, J = 8.0, H-3), 4.15 (t, J = 8.0, H-4), 3.70 (m, H-5), 4.25 (dd, J = 12.0, 4.5, H-6), 4.34 (dd, J = 12.0, 2.0, H-6); β-D-Glcp″: 6.25 (d, J = 8.0, H-1), 4.19 (t, J = 8.0, H-2), 4.27 (t, J = 8.0, H-3), 4.33 (t, J = 8.0, H-4), 4.02 (m, H-5), 4.37 (dd, J = 12.0, 4.5, H-6), 4.44 (dd, J = 12.0, 2.0, H-6) [1]

^{13}C NMR (100.40 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	24.8	Ara-1	105.5	Glc′-1	104.4
2	26.7	17	48.5	2	77.5	2	76.2
3	89.1	18	53.4	3	83.3	3	78.5
4	39.7	19	39.4	4	68.8	4	72.5
5	56.0	20	39.2	5	65.9	5	77.5
6	18.6	21	30.9	Glc-1	105.0	6	63.3
7	33.6	22	36.8	2	75.3	Glc″-1	95.8
8	40.2	23	28.2	3	78.7	2	74.2
9	48.1	24	16.8	4	71.6	3	78.9
10	37.0	25	15.8	5	78.3	4	71.4
11	23.7	26	17.7	6	62.5	5	79.2
12	126.2	27	23.8			6	62.6
13	138.5	28	176.2				
14	42.6	29	17.5				
15	28.7	30	21.3				

Pharm./Biol.: In Egyptian folk medicine used for treatment of skin lesions [1]

References

1. F.R. Melek, T. Miyase, M.R. El-Gindy, S.M. Abdel-Khalik, N.S. Ghaly, M. El-Kady, Pharmazie **55**, 772 (2000)

Cynarasaponin A

CAS Registry Number: 117804-07-6
See Figure Cynarasaponin A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Cynara cardunculus* [1]

$C_{48}H_{76}O_{18}$: 940.503 (Me ester)

$[\alpha]_D^{25}$ + 4.1° (c 1.33, MeOH) [1]

^{1}H NMR (89.55 MHz, J/Hz, C_5D_5N): 5.42 (brs, H-12), 2.50 (d, J = 10.0, H-18)

β-D-GlcUAp: 4.97 (d, J = 6.0, H-1), 3.73 (s, COOMe)

α-L-Arap: 5.14 (d, J = 7.0, H-1)

β-D-Glcp: 6.22 (d, J = 7.0, H-1) [1]

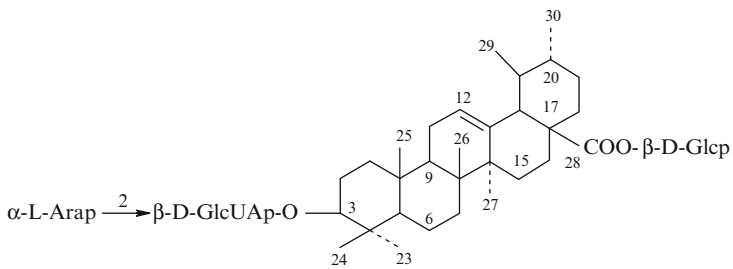
^{13}C NMR (22.5 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	24.8	GlcUA-1	105.4	Glc-1	95.7
2	26.8	17	48.4	2	83.4	2	74.1
3	89.3	18	53.4	3	76.8	3	79.2
4	39.4	19	39.6	4	73.7	4	71.4
5	56.0	20	39.6	5	77.4	5	78.9
6	18.5	21	30.9	6	170.4	6	62.4
7	33.6	22	36.9	OMe	52.2		
8	40.2	23	28.0	Ara-1	106.7		
9	48.1	24	15.8	2	72.9		
10	36.9	25	16.5	3	74.2		
11	23.8	26	17.4	4	69.1		
12	126.2	27	23.8	5	67.1		
13	138.5	28	176.2				
14	42.6	29	17.7				
15	28.8	30	21.4				

References

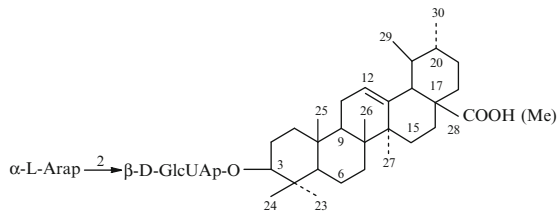
1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)



Cynarasaponin A

Cynarasaponin B

CAS Registry Number: 117804-08-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Cynara cardunculus* [1]

$C_{43}H_{68}O_{13}$: 792.465 (Me ester)

$[\alpha]_D^{21}$ + 9.7° (c 1.81, MeOH) [1]

^{1}H NMR (89.55 MHz, J/Hz, C_5D_5N): 5.36 (brs, H-12), 2,40 (d, J = 10.0, H-18), 3.68 (s, CH_3O-28)

β-D-GlcUAp: 4.98 (d, J = 7.0, H-1), 3.74 (s, COOMe)

α-L-Arap: 5.16 (d, J = 7.0, H-1) [1]

^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

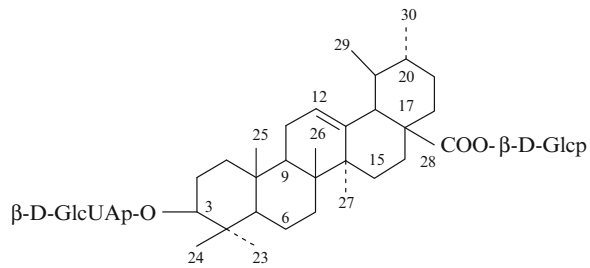
C-1	39.0	C-16	24.7	GlcUA-1	105.4
2	26.7	17	48.4	2	83.4
3	89.3	18	53.4	3	76.8
4	39.6	19	39.3	4	73.8
5	55.9	20	39.3	5	77.4
6	18.5	21	30.9	6	170.4
7	33.4	22	37.1	Me	52.1
8	39.9	23	28.0	Ara-1	106.8
9	47.9	24	15.7	2	72.9
10	36.9	25	16.5	3	74.3
11	23.6	26	17.2	4	69.2
12	126.0	27	23.9	5	67.1
13	138.8	28	177.7		
14	42.4	29	17.4		
15	28.5	30	21.3		
		Me	51.5		

References

1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)

Cynarasaponin C

CAS Registry Number: 117804-09-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Cynara cardunculus* [1]

$C_{43}H_{68}O_{14}$: 808.460 (Me ester)

$[\alpha]_D^{21}$ −7.5° (c 0.93, MeOH) [1]

^{1}H NMR (89.55 MHz, J/Hz, C_5D_5N): 5.42 (brs, H-12), 2,50 (d, J = 10.0, H-18)

β-D-GlcUAp: 4.96 (d, J = 7.0, H-1), 3.74 (s, COOMe)

β-D-Glcp: 6.22 (d, J = 7.0, H-1) [1]

^{13}C NMR (22.5 MHz, C_5D_5N): [1]

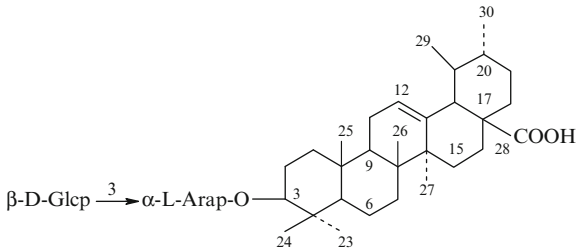
Table 1

C-1	39.2	C-16	24.8	GlcUA-1	107.3	Glc-1	95.7
2	26.7	17	48.4	2	75.4	2	74.1
3	89.2	18	53.4	3	77.9	3	79.0
4	39.4	19	39.6	4	73.1	4	71.3
5	55.9	20	39.6	5	77.2	5	78.8
6	18.5	21	30.9	6	170.7	6	62.4
7	33.6	22	36,9	Me	52.0		
8	40.2	23	28.2				
9	48.1	24	15.8				
10	36.9	25	17,0				
11	23.8	26	17.4				
12	126.1	27	23.8				
13	138.4	28	176.1				
14	42.5	29	17.7				
15	28.7	30	21.3				

References

1. S. Shimizu, N. Ishihara, K. Umehara, T. Miyase, A. Ueno, Chem. Pharm. Bull. **36**(7), 2466 (1988)

Glycoside 3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Patrinia scabiosaefolia* [1]

$C_{41}H_{66}O_{10}$: 718.465

Mp: 270–273°C [1]

$[\alpha]_D$ + 39.2° (c 0.075, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 2920, 1690, 1075 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 0.99, 1.04, 1.28, 1.34 (s, CH_3 × 5), 0.97, 1.01 (d, J = 6.2, CH_3 × 2), 2.67 (d, J = 10.5, Hβ-18), 3.39 (dd, J = 11.5, 4.3, Hα-3), 5.49 (m, H-12)

α-L-Arap: 4.77 (d, J = 7.3, H-1)

β-D-Glcp: 5.40 (d, J = 7.9, H-1) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

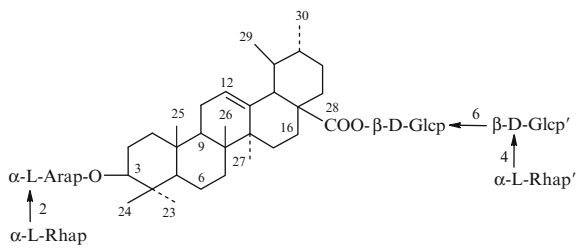
C-1	39.0	C-16	25.1	Ara-1	107.4
2	26.7	17	48.2	2	71.9
3	88.8	18	53.7	3	84.2
4	40.0	19	39.6	4	69.3
5	56.0	20	39.5	5	66.9
6	18.5	21	31.2	Glc-1	106.3
7	33.6	22	37.6	2	75.7
8	40.0	23	28.2	3	78.4
9	48.1	24	17.0	4	71.6
10	37.0	25	15.7	5	78.7
11	23.7	26	17.5	6	62.7
12	125.5	27	23.9		
13	139.5	28	180.5		
14	42.6	29	17.6		
15	28.8	30	21.5		

Pharm./Biol.: Used in China as diuretic and for "Qing Re Jie Du" (treatment of fever and inflammation along with detoxication), "Huo Xue Hua Yu" (mobilization of blood circulation and treatment of stasis) [1]

References

1. T. Nakanishi, K. Tanaka, H. Murata, M. Somekawa, A. Inada, Chem. Pharm. Bull. **41**(1), 183 (1993)

Glycoside F_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Tupidanthus calyptratus* [1]

$C_{59}H_{96}O_{25}$: 1204.624

^{1}H NMR (300 MHz, J/Hz, C_5D_5N): 1.23, 1.18, 1.14, 1.11, 1.04, 0.92, 0.920 (s, CH_3 × 7), 5.40 (m, H-12), 3.21 (m, H-3)

α-L-Arap: 4.88 (d, J = 5.0, H-1), 4.52 (m, H-2), 4.2, 4.3 (m, H-3,-4,-5), 3.82 (m, J = 11.0, H-5)

α-L-Rhap: 6.08 (d, J = 1.5, H-1), 4.73 (dd, J = 3.5, H-2), 4.60 (dd, J = 9.5, H-3), 4.2-4.3 (m, H-4), 4.59 (m, H-5), 1.60 (d, J = 6.0, CH_3-6)

β-D-Glcp: 6.15 (d, J = 8.0, H-1), 4.0-4.2 (m, H-2,-3)

β-D-Glcp′: 4.35 (d, J = 7.5, H-1), 3.92 (t, J = 8.0, H-2), 4.0–4.02 (m, H-3), 4.35 (t, J = 9.0, H-4), 3.59 (m, H-5)

α-L-Rhap′: 5.80 (d, J = 1.5, H-1), 4.65 (dd, J = 3.5, H-2), 4.52 (m, H-3), 4.30 (t, J = 9.5, H-4), 4.93 (m, H-5), 1.65 (d, J = 6.0, CH_3-6) [1]

^{13}C NMR (62.9 MHz, C_5D_5N): [1]

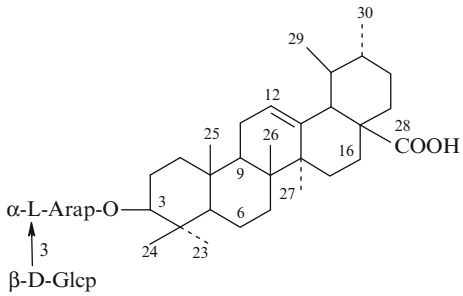
Table 1

C-1	39.0	C-16	24.6	Ara-1	104.2	Glc′-1	104.5
2	26.3	17	48.4	2	76.0	2	75.0
3	88.9	18	53.2	3	72.8	3	76.3
4	39.3	19	39.0	4	67.9	4	78.4
5	55.9	20	39.3	5	63.7	5	76.8
6	18.5	21	30.8	Rha-1	101.5	6	61.3
7	33.4	22	36.7	2	72.0	Rha′-1	102.5
8	40.0	23	28.1	3	72.3	2	72.2
9	48.0	24	16.8	4	73.8	3	72.5
10	36.9	25	15.5	5	69.8	4	73.7
11	23.6	26	17.6	6	18.2	5	70.2
12	126.0	27	23.6	Glc-1	95.5	6	18.3
13	138.3	28	176.2	2	73.7		
14	42.4	29	17.2	3	78.6		
15	28.6	30	21.1	4	70.9		
				5	77.6		
				6	69.4		

References

1. V.I. Grishkovets, Chem. Nat. Comp. **35**(5), 547 (1999)

Glycoside L-E$_2$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Schefflerοpsis angkae* [1], *Ilex paraguariensis* [2], *Patrinia scabiosaefolia* [3]

$C_{41}H_{66}O_{12}$: 750.455

Mp: 274–277°C (MeOH)

$[\alpha]_D$ + 27.2° (c 1.89, C_5H_5N) [3]

IR (KBr) ν_{max} cm^{-1}: 3410, 2920, 1690, 1075 [3]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.85, 0.99, 1.04, 1.28, 1.34 (s, CH_3 × 5), 0.97, 1.01(d, J = 6.2, CH_3 × 2), 2.67 (d, J = 10.5, H-18), 3.39 (dd, J = 11.5, 4.3, H-3), 5.49 (m, H-12)

α-L-Arap: 4.68 (d, J = 6.0, H-1), 4.41 (dd, J = 9.0, H-2), 4.12 (dd, J = 3.5, H-3), 4.38 (m, H-4), 4.16 (dd, J = 2, Ha-5), 3.69 (d, J = 11.5, Hb-5)

β-D-Glcp: 5.15 (d, J = 8.0, H-1), 3.91 (t, J = 8.5, H-2), 4.07 (t, J = 9.0, H-3), 4.00 (t, J = 9.0, H-4), 3.84 (m, H-5), 4.18 (dd, J = 5.5, Ha-6), 4.36 (dd, J = 3.0, 11.5, Hb-6) [3]

^{13}C NMR (125 MHz, C_5D_5N): [1]

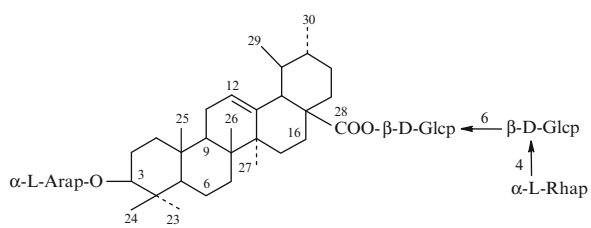
Table 1

C-1	39.0	C-11	23.6	C-21	31.1	Ara-1	107.0
2	26.6	12	125.6	22	37.4	2	71.6
3	88.7	13	139.2	23	28.2	3	83.9
4	39.6	14	42.5	24	17.0	4	69.1
5	56.0	15	28.7	25	15.6	5	66.6
6	18.5	16	24.9	26	17.4	Gal-1	105.8
7	33.5	17	48.1	27	23.9	2	75.5
8	40.0	18	53.6	28	179.8	3	78.2
9	48.0	19	39.5	29	17.5	4	71.7
10	36.9	20	39.4	30	21.4	5	78.4
						6	62.7

References

1. A.S. Stolyarenko, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(3), 295 (2000)
2. E.P. Schenkel, J.A. Montanha, G. Gosmann, *Saponin Used in Food and Agriculture* (Plenum, New York, 1996), p. 47
3. T. Nakanishi, K. Tanaka, H. Murata, M. Somekawa, A. Inada, Chem. Pharm. Bull. **41**(1), 183 (1993)

Glycoside L-H$_2$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid
Biological source: *Scheffleropsis angkae* [1]
$C_{53}H_{86}O_{21}$: 1058.566
^{1}H NMR (300 MHz, J/z, C_5D_5N): 5.29 (H-12), 6.02 (H-1 of Glc), 1.54 (d, J = 5, CH_3-6 of Rha) [1]
^{13}C NMR (75 MHz, C_5D_5N): [1]

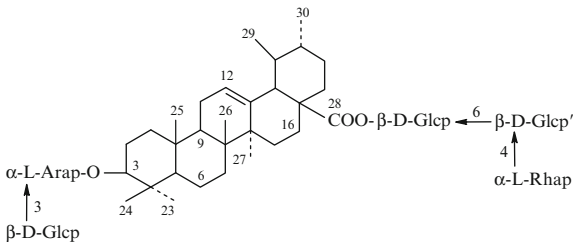
Table 1

C-1	39.1	C-16	24.6	Ara-1	107.0	Glc′-1	104.5
2	26.5	17	48.4	2	72.7	2	75.1
3	88.8	18	53.2	3	74.4	3	76.4
4	39.5	19	39.1	4	69.2	4	78.5
5	55.9	20	39.3	5	66.3	5	76.9
6	18.5	21	30.8	Glc-1	95.5	6	61.4
7	33.5	22	36.7	2	73.8	Rha-1	102.6
8	40.1	23	28.3	3	78.6	2	72.3
9	48.0	24	16.9	4	70.9	3	72.6
10	36.9	25	15.7	5	77.7	4	73.8
11	23.7	26	17.6	6	69.4	5	70.2
12	126.1	27	23.8			6	18.3
13	138.4	28	176.3				
14	42.5	29	17.3				
15	28.7	30	21.2				

References

1. A.S. Stolyarenko, V.I. Grishkovets, N.N. Arnautov, S.V. Iksanova, V.Ya. Chirva, Chem. Nat. Comp. **36**(2), 173 (2000)

Glycoside L-K_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid
Biological source: *Scheffleropsis angkae* [1]
$C_{59}H_{96}O_{26}$: 1220.618
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 5.30 (H-12)
α-L-Arap: 4.62 (d, J = 6, H-1)
β-D-Glcp: 5.22 (d, J = 7.5, H-1)
β-D-Glcp′: 6.30 (d, J = 8, H-1)
β-D-Glcp″: 4.81 (d, J = 8, H-1)
α-L-Rhap: 5.69 (s, H-1), 1.54 (d, J = 5.5, CH_3-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

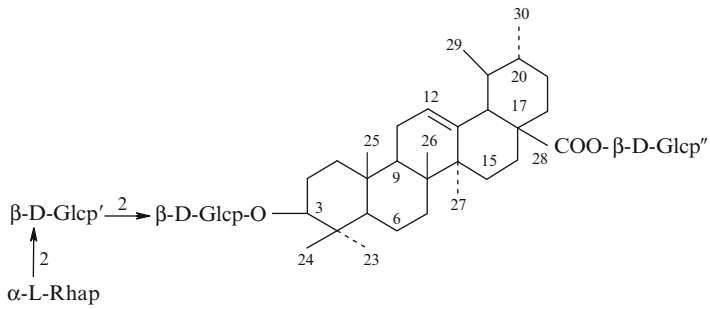
C-1	39.1	C-16	24.6	Ara-1	107.0	Glc″-1	104.7
2	26.6	17	48.4	2	71.5	2	75.1
3	88.7	18	53.2	3	83.9	3	76.4
4	39.5	19	39.1	4	69.0	4	78.5
5	55.9	20	39.1	5	66.6	5	77.0
6	18.5	21	30.8	Glc-1	105.8	6	61.4
7	33.5	22	36.8	2	75.5	Rha-1	102.6
8	40.1	23	28.2	3	78.1	2	72.4
9	48.1	24	16.9	4	71.7	3	72.6
10	36.9	25	15.7	5	78.4	4	73.8
11	23.7	26	17.6	6	62.6	5	70.2
12	126.1	27	23.7	Glc′-1	95.5	6	18.3
13	138.4	28	176.3	2	73.7		
14	42.5	29	17.3	3	78.5		
15	28.7	30	21.2	4	71.0		
				5	77.7		
				6	69.4		

References

1. A.S. Stolyarenko, V.I. Grishkovets, A.S. Shashkov, V.Ya. Chirva, Chem. Nat. Comp. **36**(3), 295 (2000)

Gongganoside F

CAS Registry Number: 164269-14-1
See Figure Gongganoside F
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid
Biological source: *Bhesa paniculata* [1]
$C_{54}H_{88}O_{22}$: 1088.576



Gongganoside F

$[\alpha]_D^{21}$ −15.6° (c 1.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 2926, 1728, 1633, 1452, 1078 [1]

FAB-MS *m/z*: 1111.5651 $[M + Na]^+$; 1087 $[M-H]^-$, 925, 779, 617, 455 [1]

^{1}H NMR (J/Hz, CD_3OD): 0.82 (s, CH_3-26), 0.86 (s, CH_3-24), 0.88 (d, J = 6.4, CH_3-29), 0.96 (s, CH_3-25, 30), 1.10 (s, CH_3-23, 27), 2.22 (d, J = 11.1, H-18), 5.23 (brs, H-12)

β-D-Glcp: 4.39 (d, J = 7.6, H-1); β-D-Glcp′: 5.34 (d, J = 7.9, H-1)

α-L-Rhap: 5.17 (brs, H-1) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	40.0	C-16	25.2	Glc-1	105.7	Rha-1	102.0
2	27.0	17	49.4	2	78.1	2	72.2
3	92.2	18	54.1	3	78.8	3	72.1
4	40.5	19	40.4	4	72.0	4	74.1
5	57.0	20	40.2	5	77.8	5	69.4
6	19.3	21	31.7	6	62.8	6	18.3
7	34.3	22	37.4	Glc′-1	102.0	Glc″-1	95.6
8	40.9	23	28.8	2	79.6	2	73.8
9	49.0	24	16.9	3	79.2	3	78.2
10	37.8	25	16.1	4	72.6	4	71.1
11	24.4	26	17.9	5	78.1	5	78.5
12	127.2	27	24.0	6	63.7	6	62.4
13	139.1	28	177.8				
14	43.2	29	17.7				
15	29.3	30	21.6				

References

1. K. Ohashi, T. Tanikawa, Y. Okumura, K. Kawazoe, N. Tatara, M. Minato, H. Shibuya, I. Kitagawa, Chem. Pharm. Bull. **42**(9), 1791 (1994)

Indicasaponin A

CAS Registry Number: 244778-68-5

See Figure Indicasaponin A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Fagonia indica* [1]

$C_{52}H_{84}O_{21}$: 1044.550

$[\alpha]_D^{25}$ + 23° (c 0.17, MeOH) [1]

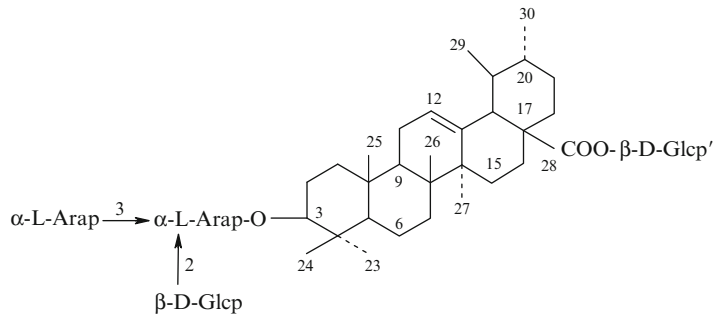
LSI-MS (negative ion mode) *m/z*: 1043 $[M-H]^-$ (60), 881 $[M-H-Glc]^-$ (12), 719 $[M-H-2 \times Glc-2]^-$ (8), 587 $[M-H-2 \times Glc-Ara]^-$ (10) and 455 $[M-H-2 \times Glc-2 \times Ara]^-$ (10)

^{1}H NMR (500.13 MHz, J/Hz, CD_3OD): 0.98 (Hα-1), 1.37 (Hβ-1), 1.73 (Hα-2), 1.82 (Hβ-2), 3.10 (H-3), 0.73 (H-5), 1.37 (Hα-6), 1.50 (Hβ-6), 1.50 (Hα-7), 1.37 (Hβ-7), 1.51 (H-9), 1.92 (Hα-11), 2.07 (Hβ-11), 5.23 (H-12), 1.91 (Hα-15), 1.10 (Hβ-15), 2.15 (Hα-16), 1.78 (β-16), 2.20 (d, J = 11.0, H-18), 1.40 (H-19), 0.99 (H-20), 1.26 (Hα-21), 1.38 (Hβ-21), 1.04 (s, CH_3-23), 0.83 (s, CH_3-24), 0.96 (s, CH_3-25), 0.82 (s, CH_3-26), 1.10 (s, CH_3-27), 0.89 (d, J = 6.6, CH_3-29), 1.32 (d, J = 6.1, CH_3-30)

α-L-Arap: 4.38 (d, J = 7.1, H-1), 3.86 (H-2), 3.76 (H-3), 4.02 (H-4), 3.85, 3.53 (H_2-5)

β-D-Glcp: 4.57 (d, J = 7.6, H-1), 3.30 (H-2), 3.30–3.32 (H-3), 3.30–3.32 (H-4), 3.30–3.32 (H-5), 3.82 (H-6), 3.65 (H-6)

α-L-Arap′: 4.67 (d, J = 7.8, H-1), 3.10 (H-2), 3.25 (H-3), 3.38 (H-4), 3.80, 3.08 (H_2-5)



Indicasaponin A

β-D-Glcp′: 5.32 (d, J = 8.2, H-1), 3.32 (H-2), 3.30-3.32 (H-3), 3.30-3.32 (H-4), 3.30-3.32 (H-5), 3.82, 3.65 (H_2-6) [1]

^{13}C NMR (125.76 MHz, CD_3OD): [1]

Table 1

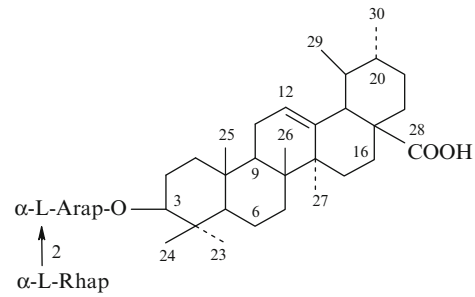
C-1	39.9	C-16	24.2	Ara-1	105.9	Ara′-1	104.6
2	27.1	17	49.0	2	77.7	2	70.9
3	91.0	18	54.0	3	83.9	3	75.1
4	40.1	19	40.2	4	69.6	4	70.8
5	56.9	20	40.3	5	66.7	5	66.4
6	19.1	21	30.7	Glc-1	104.9	Glc″-1	95.5
7	34.1	22	37.3	2	75.8	2	73.7
8	40.8	23	28.1	3	78.1	3	78.4
9	49.0	24	16.5	4	70.9	4	71.3
10	37.7	25	16.0	5	78.0	5	78.2
11	23.5	26	17.5	6	62.1	6	62.1
12	127.1	27	23.8				
13	138.9	28	177.8				
14	43.1	29	17.7				
15	29.1	30	21.4				

Pharm./Biol.: In folk medicine used for treatment of various skin lesions. Additionally, the plant is claimed to be a remedy for cancer in its early stages [1]

References

1. K.H. Shaker, M. Bernhardt, M.H.A. Elgamal, K. Seifert, Phytochemistry **51**, 1049 (1999)

Patrinia-Glycoside A-I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Patrinia scabiosaefolia* [1]

$C_{41}H_{66}O_{11}$: 734.460

Mp: 246–249°C (MeOH) [1]

$[\alpha]_D$ −5.8° (c 0.30, C_5D_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 2920, 1690, 1050 [1]

FAB-MS *m/z*: 733 ($[M-H]^-$, 100), 587 ($[M-H]^-$-146, 9), 455 ($[M-H]^-$-146-132, 10) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.86, 1.02, 1.07, 1.19, 1.27 (s, CH_3 × 5), 0.97, 1.01 (d, J = 6.0, 6.2, CH_3 × 2), 2.65 (d, J = 11.2, Hβ-18), 3.27 (dd, J = 11.5, 4.2, Hα-3), 5.47 (m, H-12)

α-L-Arap: 4.92 (d, J = 5.3, H-1)

α-L-Rhap: 6.10 (d, J = 0.9, H-1), 1.63 (d, J = 6.3, CH_3-6) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

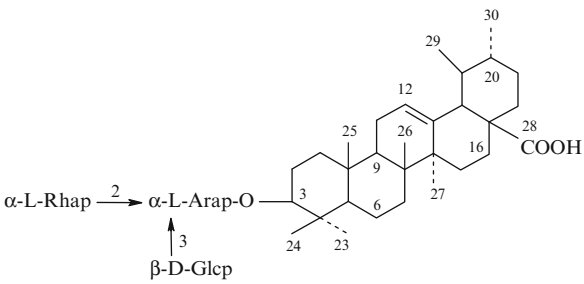
C-1	39.0	C-16	25.0	Ara-1	104.8
2	26.6	17	48.2	2	76.0
3	88.9	18	53.7	3	74.0
4	39.5	19	39.6	4	68.6
5	56.0	20	39.5	5	64.6
6	18.6	21	31.2	Rha-1	101.8
7	33.5	22	37.6	2	72.4
8	40.0	23	28.2	3	72.6
9	48.1	24	17.0	4	73.7
10	37.0	25	15.7	5	69.9
11	23.6	26	17.6	6	18.6
12	125.4	27	23.9		
13	139.5	28	180.7		
14	42.6	29	17.5		
15	28.8	30	21.5		

Pharm./Biol.: Used in China as diuretic and for "Qing Re Jie Du" (treatment of fever and inflammation along with detoxication), "Huo Xue Hua Yu" (mobilization of blood circulation and treatment of stasis) [1]

References

1. T. Nakanishi, K. Tanaka, H. Murata, M. Somekawa, A. Inada, Chem. Pharm. Bull. **41**(1), 183 (1993)

Patrinia-Glycoside B-I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Ursene Type – Ursolic Acid

Biological source: *Patrinia scabiosaefolia* [1]

$C_{47}H_{76}O_{16}$: 896.513

Mp: 260–263°C (MeOH) [1]

$[\alpha]_D$ −3.7° (c 0.27, C_5D_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 2910, 1690, 1075 [1]

FAB-MS *m/z*: 895(100), 749 (23), 733 (24), 587 (19), 455 (22) [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.85, 1.02, 1.11, 1.22, 1.26 (s, $CH_3 \times 5$), 0.97, 1.01 (d, J = 5.8, 6.8, $CH_3 \times 5$), 2.65 (d, J = 11.0, Hβ-18), 3.32 (dd, J = 11.2, 3.6, Hα-3), 5.48 (brs, H-12)

α-L-Arap: 4.86 (d, J = 5.2, H-1)

β-D-Glcp: 5.08 (d, J = 7.6, H-1)

α-L-Rhap: 6.11 (brs, H-1), 1.61 (d, J = 6.3, CH_3-6) [1]

^{13}C NMR (100.5 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	25.1	Ara-1	104.8	Glc-1	104.7
2	26.7	17	48.2	2	74.8	2	74.9
3	88.3	18	53.7	3	82.2	3	78.1
4	39.8	19	39.6	4	68.1	4	71.4
5	56.1	20	39.4	5	64.8	5	78.5
6	18.6	21	31.2	Rha-1	101.9	6	62.5
7	33.5	22	37.5	2	72.3		
8	40.0	23	28.2	3	72.5		
9	48.1	24	17.1	4	73.9		
10	37.0	25	15.8	5	70.0		
11	23.6	26	17.5	6	18.6		
12	125.5	27	23.9				
13	139.4	28	180.6				
14	42.5	29	17.6				
15	28.8	30	21.5				

Pharm./Biol.: Used in China as diuretic and for "Qing Re Jie Du" (treatment of fever and inflammation along with detoxication), "Huo Xue Hua Yu" (mobilization of blood circulation and treatment of stasis) [1]

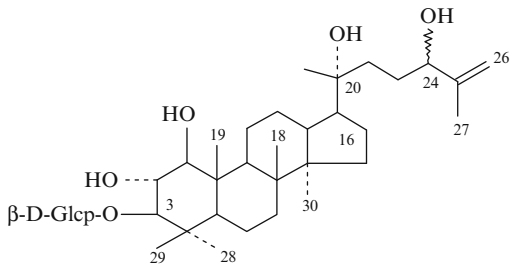
References

1. T. Nakanishi, K. Tanaka, H. Murata, M. Somekawa, A. Inada, Chem. Pharm. Bull. **41**(1), 183 (1993)

Glycosides of Aglycones of Dammarane Type

Chilianoside H

CAS Registry Number: 222541-60-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 1β,2α, 3β,20(R),24ξ-Pentahydroxy-dammar-25-ene

Biological source: *Rhoiptelea chiliantha* [1]

$C_{36}H_{62}O_{10}$: 654.434

$[\alpha]_D^{15}$ + 13.0° (c 1.0, MeOH) [1]

FAB-MS *m/z*: 677 $(M + Na)^+$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.00, 1.04, 1.08, 1.17, 1.39, 1.40,1.92 (s, CH_3-30, 29, 28, 21, 19, 18, 27), 3.38 (d, J = 9.0, H-3), 3.49 (d, J = 9.0, H-1), 3.85 (t, J = 9.0, H-2), 4.43 (t, J = 6.0, H-24), 4.88, 4.80 (s, H_2-26)

β-D-Glcp: 4.98 (d, J = 8.0, H-1), 4.09 (t, J = 8.0, H-2), 4.27 (dd, J = 8.0, 9.0, H-3), 4.18 (m, H-4-5), 4.66 (d, J = 11.0, Ha-6), 4.34 (dd, J = 6.0, 11.0, Hb-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

C-1	84.7	C-16	26.1	Glc-1	106.2
2	73.2	17	51.3,51.1	2	75.5
3	92.6	18	16.3	3	78.1
4	41.1	19	14.6	4	71.4
5	54.5	20	76.1,76.0	5	78.1
6	18.8	21	23.8,23.7	6	62.5
7	36.2	22	39.0		
8	42.3	23	29.9		
9	53.3	24	77.4		
10	44.3	25	148.9		
11	25.2	26	111.5, 111.4		
12	28.8	27	17.7, 17.6		
13	43.0	28	28.6		
14	51.2	29	17.6		
15	32.2	30	16.9		

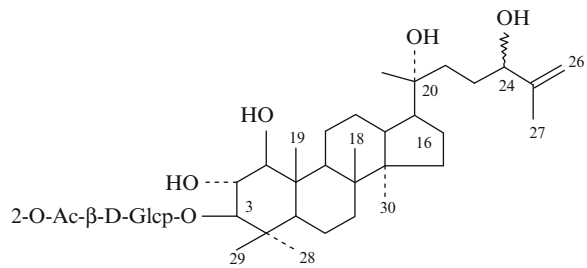
(*continued*)

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside I

CAS Registry Number: 222541-62-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 1β,2α, 3β,20(R),24ξ-Pentahydroxy-dammar-25-ene

Biological source: *Rhoiptelea chiliantha* [1]

$C_{38}H_{64}O_{11}$: 696.444

$[\alpha]_D^{15}$ + 22.0° (c 0.2, MeOH) [1]

FAB-MS *m/z*: 719 $(M + Na)^+$ [1]

^{1}H NMR (300 MHz, J/Hz, C_5D_5N): 0.97, 0.99, 1.02, 1.11, 1.12, 1.40, 1.92 (s, CH_3-30, 29, 28, 21, 19, 18, 27), 2.17 (s, Ac), 3.27 (d, J = 9.0, H-3), 3.45 (d, J = 9.0, H-1), 3.85 (t, J = 9.0, H-2), 4.43 (t, J = 6.0, H-24), 5.27, 5.25 (s, CH_2-26)

β-D-Glcp: 5.02 (d, J = 8.0, H-1), 5.63 (t, J = 8.0, H-2), 4.63 (d, J = 11.0, Ha-6) [1]

^{13}C NMR (75 MHz, C_5D_5N): [1]

Table 1

C-1	83.9	C-16	25.7	Glc-1	103.5
2	72.3	17	50.55, 50.48	2	75.6
3	92.3	18	16.2	3	75.4
4	40.4	19	14.6	4	72.0
5	53.6	20	74.5	5	78.9

(*continued*)

Table 1 (continued)

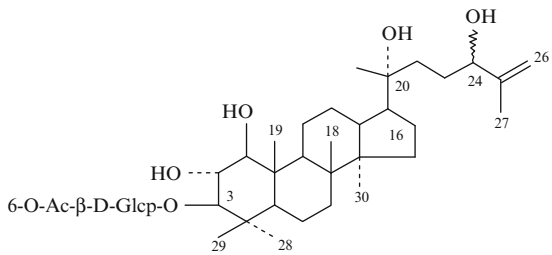
6	18.2	21	25.09, 25.04	6	62.5
7	35.7	22	39.40, 39.32	Ac-1	170.1
8	41.5	23	30.61, 30.51	2	21.4
9	52.5	24	76.27, 76.20		
10	43.4	25	149.6		
11	24.9	26	110.4, 110.2		
12	28.6	27	18.37, 18.27		
13	42.4	28	28.3		
14	50.7	29	17.6		
15	31.9	30	16.9		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside J

CAS Registry Number: 222541-64-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 1β,2α,3β,20(R),24ξ-Pentahydroxy-dammar-25-ene

Biological source: *Rhoiptelea chiliantha* [1]

$C_{38}H_{64}O_{11}$: 696.444

$[\alpha]_D^{15}$ + 16.7° (c 0.2, MeOH) [1]

FAB-MS *m/z*: 695 $(M\text{-}H)^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.89, 0.91, 0.98, 1.00, 1.08, 1.09, 1.71 (s, CH_3-30, 29, 28, 21, 19, 18, 27), 2.09 (s, Ac), 3.02 (d, J = 9.0, H-3), 3.14 (d, J = 9.0, H-1), 3.48 (t, J = 9.0, H-2), 3.94 (t, J = 6.0, H-24), 4.89, 4.79 (s, CH_2-26)

β-D-Glcp: 4.34 (d, J = 8.0, H-1), 4.43 (dd, J = 2.0, 12.0, Ha-6), 4.17 (dd, J = 6.0, 12.0, Hb-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

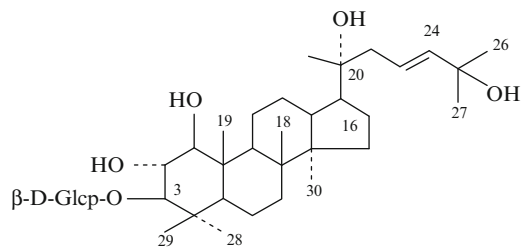
C-1	84.9	C-16	26.1	Glc-1	106.3
2	73.0	17	51.1	2	75.3
3	93.2	18	16.3	3	77.9
4	41.1	19	14.5	4	71.6
5	54.5	20	76.0	5	75.3
6	18.8	21	23.9, 23.7	6	64.6
7	36.3	22	38.9	Ac-1	172.8
8	42.3	23	30.0	2	20.8
9	53.3	24	77.4		
10	44.2	25	148.9		
11	25.2	26	111.37,111.30		
12	28.8	27	17.7		
13	43.0	28	28.5		
14	51.2	29	17.6		
15	32.2	30	16.9		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside K

CAS Registry Number: 222541-65-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 1β,2α,3β,20(R),25-Pentahydroxy-dammar-23-ene

Biological source: *Rhoiptelea chiliantha* [1]

$C_{36}H_{62}O_{10}$: 654.434

$[\alpha]_D^{15}$ + 10.3° (c 0.2, MeOH) [1]

FAB-MS *m/z*: 653 $(M\text{-}H)^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.89, 0.90, 0.98, 1.00, 1.08, 1.08, 1.27, 1.27 (s, CH_3-30, 29, 28, 21, 19, 18, 26, 27), 3.05 (d, J = 9.0, H-3), 3.16 (d, J =

9.0, H-1), 3.51 (t, J = 9.0, H-2), 5.59 (d, J = 16.0, H-24), 5.71 (dt, J = 16.0, 7.0, H-23)
β-D-Glcp: 4.33 (d, J = 8.0, H-1), 3.88 (dd, J = 2.0, 12.0, Ha-6), 3.66 (dd, J = 5.0, 12.0, Hb-6) [1]
^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

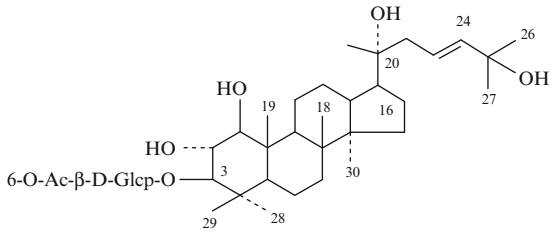
C-1	84.7	C-16	26.0	Glc-1	106.2
2	73.2	17	50.9	2	75.5
3	92.6	18	16.4	3	78.1
4	41.1	19	14.5	4	71.4
5	54.5	20	76.5	5	78.2
6	18.1	21	23.8	6	62.5
7	36.3	22	45.9		
8	42.3	23	123.8		
9	53.3	24	142.1		
10	44.3	25	71.2		
11	25.2	26	29.9		
12	28.8	27	30.0		
13	43.1	28	28.6		
14	51.2	29	17.6		
15	32.2	30	16.8		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside L

CAS Registry Number: 222541-66-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 1β,2α, 3β,20(R),25-Pentahydroxy-dammar-23-ene
Biological source: *Rhoiptelea chiliantha* [1]
$C_{38}H_{64}O_{11}$: 696.444
$[\alpha]_D^{15}$ + 14.2° (c 0.2, MeOH) [1]
FAB-MS *m/z*: 695 $(M-H)^-$ [1]
^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.89, 0.90, 0.98, 1.00, 1.08, 1.08, 1.27, 1.27 (s, CH_3-30, 29, 28, 21, 19, 18, 26, 27), 2.09 (s, Ac), 3.02 (d, J = 9.0, H-3), 3.14 (d, J = 9.0, H-1), 3.48 (t, J = 9.0, H-2), 5.60 (d, J = 16.0, H-24), 5.71 (dt, J = 16.0, 7.0, H-23)
β-D-Glcp: 4.33 (d, J = 8.0, H-1), 4.43 (dd, J = 2.0, 12.0, Ha-6), 4.17 (dd, J = 6.0, 12.0, Hb-6) [1]
^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

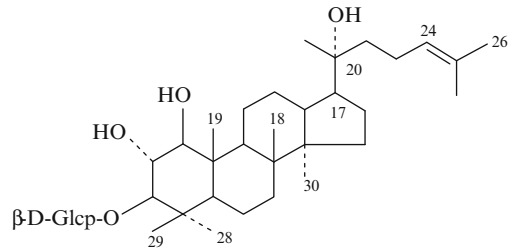
C-1	85.0	C-16	26.0	Glc-1	106.3
2	73.0	17	50.9	2	75.2
3	93.2	18	16.3	3	77.9
4	41.1	19	14.6	4	71.6
5	54.5	20	76.5	5	75.3
6	18.8	21	23.7	6	64.6
7	36.2	22	46.0	Ac-1	172.8
8	42.3	23	123.9	2	20.8
9	53.3	24	142.1		
10	44.2	25	71.2		
11	25.2	26	29.9		
12	28.8	27	30.0		
13	43.1	28	28.5		
14	51.2	29	17.6		
15	32.2	30	16.8		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside A

CAS Registry Number: 222541-46-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 1β,2α,3β,20(R)-Tetrahydroxy-dammar-24-ene

Biological source: *Rhoiptelea chiliantha* [1]

$C_{36}H_{62}O_9$: 638.439

$[\alpha]_D^{20}$ + 5.5° (c 0.3, C_5H_5N) [1]

FAB-MS *m/z*: 661 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, CD_3OD): 0.89 (m, H-5), 1.03 (s, CH_3-30), 1.04 (s, H-18), 1.07 (s, CH_3-29), 1.14 (d, J = 12.0, Ha-15), 1.17 (s, CH_3-19), 1.38 (s, CH_3-21, 28), 1.55, 1.27 (m, H_2-7), 1.60 (m, Hb-11), 1.62 (m, Hb-15), 1.62, 1.55 (m, H_2-6), 1.64 (s, CH_3-27), 1.70 (s, CH_3-26), 1.73 (m, H-9), 1.78, 1.76 (m, H_2-22), 1.86, 1.74 (m, H_2-16), 1.99 (m, H-17), 2.05 (m, H-13), 2.32, 1.53 (m, H_2-12), 2.54, 2.34 (m, H_2-23), 3.04 (dd, J = 3.0, 15.0, Ha-11), 3.37 (d, J = 9.0, H-3), 3.49 (d, J = 9.0, H-1), 3.94 (t, J = 9.0, H-2), 5.31 (t, J = 7.0, H-24)

β-D-Glcp: 4.96 (d, J = 8.0, H-1), 4.07 (t, J = 8.0, H-2), 4.25 (dd, J = 8.0, 9.0, H-3), 4.16 (t, J = 9.0, H-4), 4.12 (m, H-5), 4.64 (dd, J = 2.0, 12.0, Ha-6), 4.33 (dd, J = 6.0, 12.0, Hb-6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

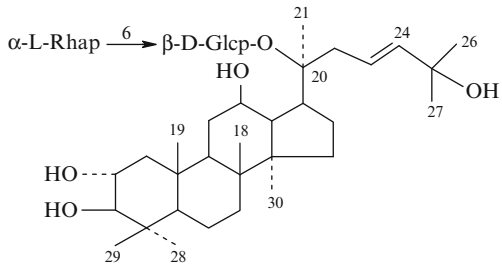
C-1	84.0	C-16	25.5	Glc-1	106.4
2	72.5	17	50.2	2	75.4
3	92.1	18	16.1	3	78.6
4	40.5	19	14.5	4	71.6
5	53.7	20	74.3	5	78.6
6	18.1	21	24.7	6	62.7
7	35.6	22	42.9		
8	41.4	23	23.2		
9	52.4	24	126.0		
10	43.3	25	130.7		
11	24.8	26	25.8		
12	28.5	27	17.8		
13	42.2	28	28.3		
14	50.6	29	17.6		
15	31.8	30	16.8		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Gymnemaside VI

CAS Registry Number: 141380-41-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 2α,3β,12β,20(S),25-Pentahydroxy-dammar-23-ene

Biological source: *Gymnema sylvestre* [1]

$C_{42}H_{72}O_{14}$: 800.492

Mp: 188–190°C [1]

$[\alpha]_D$ −8.7° (c 1.4, MeOH) [1]

FAB-MS *m/z*: 823 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.82, 0.99, 1.05, 1.07, 1.25, 1.57, 1.57, 1.57, (s, CH_3x7), 3.36 (d, J = 9.0, H-3), 6.07 (d, J = 15.5, H-24), 6.19 (dd, J = 15.5, 8.5, H-23), 5.14 (d, J = 7.5, H-1 of Glc), 5.40 (brs, H-1 of Rha) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

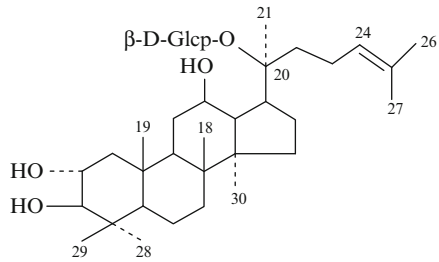
Table 1

C-1	48.3	C-11	30.4	C-21	23.0	Glc-1	98.3	Rha-1	101.5
2	68.7	12	70.5	22	39.9	2	73.3	2	72.2
3	83.7	13	49.4	23	122.7	3	79.0	3	72.9
4	39.9	14	51.5	24	142.4	4	71.3	4	74.5
5	56.5	15	30.8	25	69.9	5	76.7	5	69.3
6	18.8	16	26.4	26	30.6	6	66.6	6	18.7
7	35.0	17	52.0	27	30.7				
8	40.1	18	16.1	28	29.2				
9	50.3	19	17.2	29	17.6				
10	38.6	20	83.3	30	17.5				

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, T. Miyase, Phytochemistry **31**(1), 237 (1992)

Gynosaponin TN-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 2α-Hydroxy-20(S)-protopanaxadiol

Biological source: *Gynostemma pentaphyllum* [1]

$C_{36}H_{62}O_9$: 638.439

Mp: 168–173°C (EtOH-H_2O 1:1) [1]

$[\alpha]_D$ + 34.5° (c 0.9, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 1035 [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

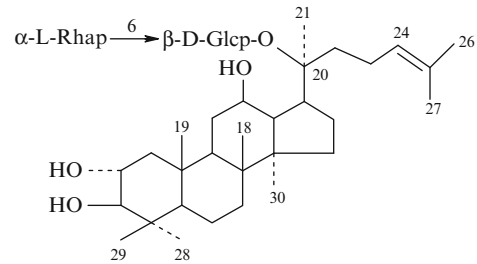
Table 1

C-4	39.8	Glc-1	98.0
8	40.0	2	74.8
10	38.4	3	79.0
17	51.5	4	71.4
20	83.1	5	77.9
21	22.2	6	62.7
22	36.2		
24	125.8		
25	130.7		

References

1. M. Nagai, K. Izawa, S. Nagumo, N. Sakurai, T. Inoue, Chem. Pharm. Bull. **29**(3), 779 (1981)

Gynosaponin TN-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 2α-Hydroxy-20(S)-protopanaxadiol

Biological source: *Gynostemma pentaphyllum* [1]

$C_{42}H_{72}O_{13}$: 784.497

Mp: 236–240°C (MeOH-$CHCl_3$-EtOAc (1:1:4)) [1]

$[\alpha]_D^{24}$ + 11.6° (c 1.0, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3370, 1035 [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

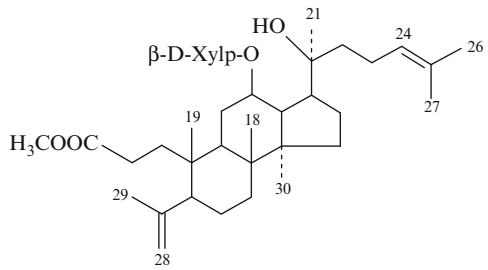
C-4	39.8	Glc-1	98.0	Rha-1	101.6
8	40.0	2	74.9	2	72.2
10	38.4	3	79.2	3	72.8
17	51.5	4	71.4	4	74.2
20	83.1	5	76.6	5	69.3
21	22.2	6	67.1	6	18.6
22	36.0				
24	125.8				
25	130.9				

References

1. M. Nagai, K. Izawa, S. Nagumo, N. Sakurai, T. Inoue, Chem. Pharm. Bull. **29**(3), 779 (1981)

Betula-Schmidtoside A

CAS Registry Number: 208711-89-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 2,3-Seco-12β,20(S)-dihydroxy-dammar-4(29),24-diene

Biological source: *Betula schmidtii* [1]

$C_{36}H_{60}O_8$: 620.428

$[\alpha]_D$ + 1.2° (c 0.5, MeOH) [1]

FAB-MS (negative ion mode) *m/z*: 619.420 $(M-H)^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.74, 0.87, 0.94, 1.33, 1.64, 1.64, 1.71 (s, CH_3x7), 3.78 (t, J = 11.0), 4.30 (dd, J = 11.0, 4.9), 4.76 (s), 4.92 (s), 5.18 (d, J = 7.6), 5.33 (t, J = 7.0) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

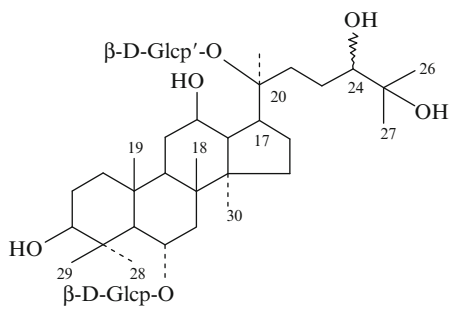
C-1	24.7	C-17	53.9	Xyl-1	100.6
2	28.6	18	15.5	2	75.0
3	174.3	19	20.2	3	78.8
4	147.5	20	72.7	4	70.7
5	40.5	21	27.0	5	67.4
6	28.7	22	34.4		
7	33.5	23	23.0		
8	39.7	24	126.6		
9	50.3	25	130.5		
10	39.7	26	17.7		
11	28.2	27	25.8		
12	76.5	28	114.0		
13	46.8	29	23.3		
14	52.8	30	17.3		
15	31.5	MeO	51.5		
16	27.2				

(*continued*)

References

1. H. Fuchino, T. Satoh, J. Hida, M. Terada, N. Tanaka, Chem. Pharm. Bull. **46**(6), 1051 (1998)

Notoginsenoside J



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,6α,12β,20(S),24,25-Hexahydroxy-dammarane

Biological source: *Panax notoginseng* [1]

$C_{42}H_{74}O_{16}$: 834.497

Mp: 205–207°C (aq. MeOH) [1]

$[\alpha]_D^{28}$ + 9.3° (c 0.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3403, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 833 $(M-H)^-$, 671 $(M-C_6H_{11}O_5)^-$, 509 $(M-C_{12}H_{21}O_{10})^-$ [1]
FAB-MS (positive ion mode) *m/z*: 857.4875 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.77, 1.03, 1.13, 1.53, 1.54, 1.57, 1.58, 2.03 (s, CH_3-30, 19, 18, 26, 27, 29, 21, 28), 3.49 (dd, J = 3.4, 11.6, H-3), 3.74 (dd-like, H-24), 4.47 (ddd-like, H-6)
β-D-Glcp: 4.98 (d, J = 7.6, H-1); β-D-Glcp′: 5.19 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

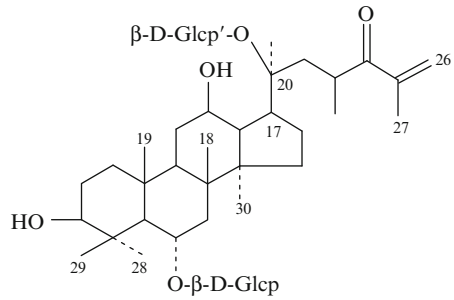
C-1	39.5	C-18	17.5	Glc-1	106.0
2	28.0	19	17.6	2	75.5
3	78.8	20	83.5	3	78.8
4	40.4	21	22.8	4	72.0
5	61.5	22	33.9	5	78.0
6	80.1	23	27.1	6	63.2
7	45.2	24	79.8	Glc′-1	98.3
8	41.2	25	72.9	2	75.4
9	50.0	26	26.0	3	78.8
10	39.8	27	26.5	4	71.8
11	30.9	28	31.8	5	78.8
12	70.5	29	16.4	6	63.4
13	49.0	30	17.1		
14	51.5				
15	31.2				
16	26.8				
17	52.8				

Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, N. Hirokawa, K. Yashiro, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45**(6), 1056 (1997)

Vina-Ginsenoside R_{25}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,6α,12β,20-Tetrahyrdoxy-24-oxo-dammar-26-ene
Biological source: *Panax vietnamensis* [1]
$C_{42}H_{70}O_{15}$: 814.471
$[\alpha]_D^{25}$ + 30.8° (c 0.6, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1660, 1635, 890 [1]
FAB-MS *m/z*: 813.4633 $(M-H)^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 1.71, 1.08 (m, H_2-1), 1.94, 1.88 (m, H_2-2), 3.48 (dd, J = 11.5, 4.4, H-3), 1.37 (d, J = 10.2, H-5), 4.37 (td, J = 10.2, 2.9, H-6), 2.43 (dd, J = 12.9, 2.9, H-7), 1.88 (m, H-7), 1.50 (m, H-9), 2.03 (m), 1.50 (m, H_2-11), 4.10 (m, H-12), 2.03 (m, H-13), 1.64, 1.06 (m, H_2-15), 1.73, 1.31 (m, H_2-16), 2.48 (m, H-17), 1.03 (s, CH_3-18), 1.13 (s, CH_3-19), 1.53 (s, CH_3-21), 2.65 (ddd, J = 14.4, 9.5, 4.7, H-22), 2.25, 2.08 (m, H_2-22), 3.30 (ddd, J = 16.6, 10, 4.7, H-23), 3.03 (ddd, J = 16.6, 9.5, 6.0, H-23), 6.20, 5.66 (brs, H_2-26), 1.85 (s, CH_3-27), 2.05 (s, CH_3-28), 1.60 (s, CH_3-29), 0.81 (s, CH_3-30)
β-D-Glcp: 4.98 (d, J = 7.8, H-1), 4.08 (t, J = 7.8, H-2), 4.22 (m, H-3), 4.20 (m, H-4), 3.89 (m, H-5), 4.46 (dd, J = 11.2, 2.0, H-6), 4.26 (dd, J = 11.2, 5.8, H-6)
β-D-Glcp′: 5.10 (d, J = 7.6, H-1), 3.95 (t, J = 7.6, H-2), 4.17 (m, H-3), 4.10 (m, H-4), 3.90 (m, H-5), 4.49 (dd, J = 11.5, 2.4, H-6), 4.33 (dd, J = 11.5, 5.3, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

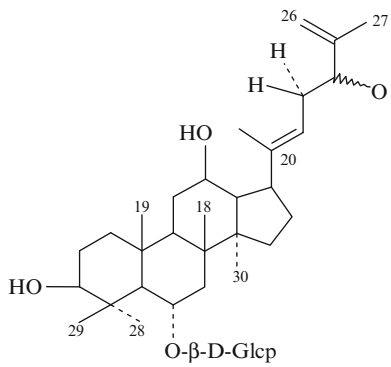
Table 1

C-1	39.4	C-16	26.7	Glc-1	105.9
2	27.9	17	52.0	2	75.4
3	78.6	18	17.5	3	79.3
4	40.3	19	17.4	4	71.8
5	61.4	20	83.1	5	78.1
6	80.1	21	21.9	6	62.9
7	45.1	22	29.8	Glc′-1	98.0
8	41.1	23	32.8	2	75.0
9	50.0	24	202.4	3	79.6
10	39.7	25	144.4	4	71.6
11	30.9	26	124.9	5	78.2
12	70.2	27	17.8	6	63.0
13	49.1	28	31.7		
14	51.4	29	16.3		
15	30.6	30	17.1		

References

1. Q. Tran, I.K. Adnyana, Y. Tezuka, T. Nagaoka, Q.K. Tran, Sh Kadota, J. Nat. Prod. **64**(4), 456 (2001)

Ginsenoside-Rh$_5$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,6α, 12β,24ξ-Tetrahydroxy-dammar-20(22),25-diene

Biological source: *Panax ginseng* [1]

$C_{36}H_{60}O_9$: 636.423

$[\alpha]_D^{21}$ + 20.8° (c 0.1, MeOH) [1]

HR-FAB-MS *m/z*: 659.4135 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.84, 1.06, 1.24, 1.62, 1.83, 1.88, 2.09 (s, CH_3-30, 19, 18, 29, 21, 27, 28), 2.41, 2.55 (m, H-23), 3.54 (dd, J = 5.0, 11.5, H-3), 3.95 (m, H-12), 4.37 (dd, J = 3.5, 8.5, H-24), 4.47 (dd, J = 3.0, 10.5, H-6), 5.28, 4.98 (brs, H_2-26), 5.69 (t-like, J = 7.5, H-22)

β-D-Glcp: 5.05 (d, J = 8.0, H-1), 4.12 (t, J = 8.0, H-2), 4.27 (t-like, J = 8.5, H-3), 4.23 (dd, J = 8.5, H-4), 4.39 (dd, J = 5.5, 11.0, H-6), 4.56 (dd, J = 2.5, 12.0, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

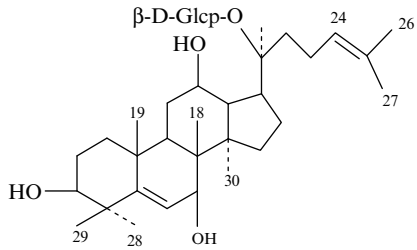
C-1	39.5	C-16	26.8	Glc-1	106.1
2	28.0	17	51.0	2	75.5
3	78.6	18	17.4	3	79.7
4	40.2	19	17.7	4	71.9
5	61.5	20	142.4	5	78.2
6	80.1	21	13.2	6	63.1
7	45.4	22	122.2		
8	41.4	23	35.3		
9	50.5	24	75.2		
10	39.8	25	149.9		
11	32.6	26	110.0		
12	72.6	27	18.5		
13	50.6	28	31.8		
14	50.7	29	16.4		
15	32.5	30	16.8		

References

1. D.-Q. Dou, Y.-J. Chen, L.-H. Liang, F.-G. Pang, F.-G. Pang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **49**(4), 442 (2001)

Ginsenoside-Rh$_7$

CAS Registry Number: 343780-68-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,7β, 12β,20(S)-Tetrahydroxy-dammar-5,24-diene

Biological source: *Panax ginseng* [1]

$C_{36}H_{60}O_9$: 636.423

$[\alpha]_D^{21}$ + 30.1° (c 0.1, MeOH) [1]

HR-FAB-MS *m/z*: 659.4135 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.13, 1.24, 1.33, 1.36, 1.45, 1.59, 1.61, 1.66 (s, CH_3-30, 19, 18, 29, 28, 26, 27, 21), 3.50 (dd, J = 4.5, 11.5, H-3), 4.15 (m, H-12), 4.74 (brs, H-7), 5.27 (dd, H-24), 5.93 (d, J = 1.5, H-6)

β-D-Glcp: 5.23 (d, J = 7.5, H-1), 4.05 (t, J = 8.0, H-2), 4.27 (t, J = 9.0, H-3), 4.14 (t like, J = 9.0, H-4), 4.02 (m, H-5), 4.35 (dd, J = 5.5, 11.5, H-6), 4.52 (dd, J = 2.0, 11.5, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

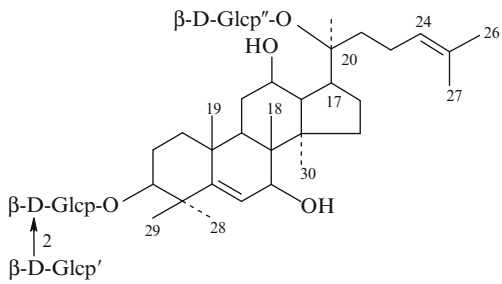
C-1	39.8	C-16	28.4	Glc-1	98.4
2	27.2	17	51.1	2	75.2
3	77.6	18	10.8	3	79.3
4	42.7	19	20.4	4	71.7
5	147.5	20	83.5	5	78.4
6	127.4	21	22.5	6	62.9
7	71.2	22	36.5		
8	42.4	23	23.3		
9	47.5	24	126.0		
10	38.4	25	130.9		
11	33.3	26	25.8		
12	69.8	27	17.8		
13	50.6	28	29.1		
14	51.0	29	23.5		
15	34.5	30	18.2		

(*continued*)

References

1. D.-Q. Dou, Y.-J. Chen, L.-H. Liang, F.-G. Pang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **49**(4), 442 (2001)

Notoginsenoside G



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,7β, 12β,20(S)-Tetrahydroxy-dammar-5,24-diene

Biological source: *Panax notoginseng* [1]

$C_{48}H_{80}O_{19}$: 960.529

Mp: 204–206°C (aq. MeOH) [1]

$[\alpha]_D^{21}$ + 39.2° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1637, 1078 [1]

FAB-MS (negative ion mode) *m/z*: 959 $(M-H)^-$, 797 $[M-C_6H_{11}O_5]^-$ [1]

FAB-MS (positive ion mode) *m/z*: 983.5191 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 1.13 (s, CH_3-19, 30), 1.26, 1.42, 1.49, 1.59, 1.60, 1.65 (s, CH_3-18, 29, 28, 26, 27, 21), 1.77 (m, H-9), 3.33 (dd, J = 4.6, 11.9, H-3), 4.09 (m, H-12), 4.70 (d, J = 2.1, H-7), 5.27 (dd-like, H-24), 5.83 (d, J = 2.1, H-6)

β-D-Glcp: 4.88 (d, J = 7.6, H-1); β-D-Glcp′: 5.34 (d, J = 7.6, H-1); β-D-Glcp″: 5.22 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

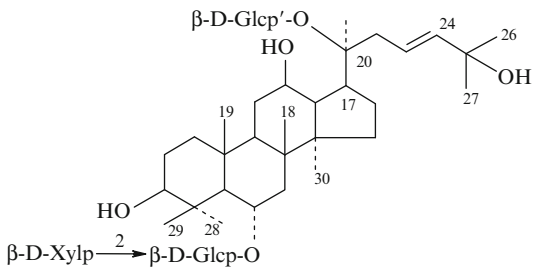
C-1	39.5	C-18	10.7	Glc-1	104.9	Glc″-1	98.4
2	27.1	19	18.2	2	83.5	2	75.2
3	88.0	20	82.5	3	78.2	3	79.1
4	42.7	21	22.6	4	71.6	4	71.5
5	147.1	22	36.4	5	78.3	5	78.1
6	127.5	23	23.3	6	62.8	6	62.8
7	71.2	24	125.9	Glc′-1	106.1		
8	42.3	25	131.0	2	77.1		
9	47.4	26	25.8	3	77.9		
10	38.1	27	17.8	4	71.6		
11	33.2	28	28.3	5	78.4		
12	69.8	29	23.9	6	62.7		
13	50.4	30	20.4				
14	51.0						
15	34.5						
16	27.0						
17	51.2						

Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, N. Hirokawa, K. Yashiro, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45**(6), 1056 (1997)

Notoginsenoside H



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,7β,12β,20(S)-Tetrahydroxy-dammar-5,24-diene

Biological source: *Panax notoginseng* [1]

$C_{47}H_{80}O_{19}$: 948.529

Mp: 201–203°C (aq. MeOH) [1]

$[\alpha]_D^{25}$ + 14.9° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1647, 1078 [1]

FAB-MS (negative ion mode) *m/z*: 947.5192 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 971 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.73, 0.99, 1.19, 1.48, 1.55, 2.08 (s, CH_3-30, 19, 18, 29, 26, 28), 1.56 (s, CH_3-21, 27), 3.50 (dd, J = 3.7, 10.4, H-3), 4.35 (m, H-6), 5.76 (brs, H-12), 6.04 (d, J = 15.6, H-24), 6.30 (ddd-like, H-23)

β-D-Glcp: 4.93 (d, J = 7.3, H-1); β-D-Xylp: 5.77 (d, J = 7.9, H-1); β-D-Glcp′: 5.19 (d, J = 7.3, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

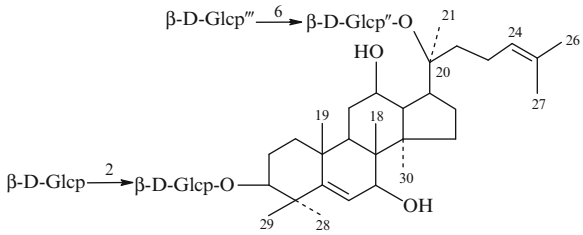
C-1	39.4	C-18	17.5	Glc-1	103.4
2	27.8	19	17.6	2	80.1
3	78.8	20	83.2	3	79.8
4	40.2	21	23.1	4	71.7
5	61.3	22	39.1	5	78.0
6	79.5	23	122.7	6	62.8
7	44.8	24	142.1	Xyl-1	104.8
8	41.1	25	70.0	2	75.9
9	49.8	26	30.6	3	78.7
10	39.6	27	30.9	4	71.3
11	30.9	28	31.7	5	67.2
12	70.6	29	16.7	Glc′-1	98.2
13	49.1	30	16.9	2	75.3
14	51.5			3	78.8
15	30.6			4	71.5
16	26.4			5	78.3
17	52.4			6	62.8

Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, N. Hirokawa, K. Yashiro, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45**(6), 1056 (1997)

Quinquenoside IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,7β, 12β,20(S)-Tetrahydroxy-dammar-5,24-diene

Biological source: *Panax quinquefolium* [1]

$C_{54}H_{90}O_{24}$: 1122.582

Mp: 190–192°C [1]

$[\alpha]_D^{28}$ + 39.1° (c 0.25, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3413, 1650, 1078 [1]

FAB-MS (negative ion mode) *m/z*: 1121 $(M-H)^-$, 959 $(M-C_6H_{11}O_5)^-$ [1]

HR-FAB-MS (positive ion mode) *m/z*: 1145 $(M + Na)^+$, 1167 $(M + 2Na-H)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.13, 1.16, 1.27, 1.41, 1.49, 1.61 (s, CH_3-30, 19, 18, 29, 28, 26), 1.67 (s, CH_3-21, 27), 2.08 (t-like, H-13), 3.33 (dd, J = 4.2, 11.3, H-3), 4.11 (m, H-12), 4.68 (d-like, H-7), 5.33 (t-like, H-24), 5.82 (d, J = 1.9, H-6)

β-D-Glcp: 4.85 (d, J = 7.4, H-1); β-D-Glcp′: 5.30 (d, J = 7.6, H-1); β-D-Glcp″: 5.12 (d, J = 7.6, H-1); β-D-Glcp‴: 5.06 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.7	C-18	10.8	Glc-1	104.9	Glc″-1	98.2
2	27.2	19	20.4	2	83.6	2	74.9
3	88.1	20	83.8	3	78.3	3	79.1
4	42.8	21	22.6	4	71.7	4	71.7
5	147.2	22	36.9	5	78.0	5	77.0
6	127.5	23	23.3	6	62.8	6	70.3
7	71.3	24	126.0	Glc′-1	106.1	Glc‴-1	105.3
8	42.4	25	131.1	2	77.0	2	75.3
9	47.5	26	25.8	3	78.0	3	78.4
10	38.1	27	18.0	4	71.9	4	71.8
11	33.2	28	28.4	5	78.2	5	78.3
12	69.8	29	23.9	6	62.9	6	62.9
13	50.5	30	18.2				
14	51.0						
15	34.4						
16	27.1						
17	51.2						

(*continued*)

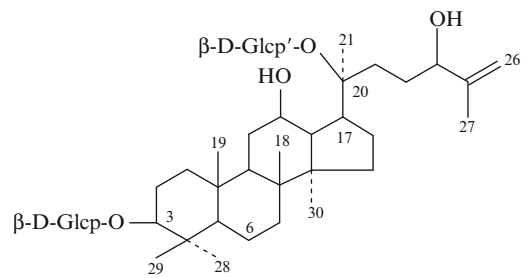
Pharm./Biol.: The methanolic extract and 1-butanol-soluble fraction of the roots of *Panax quinquefolium* L., were found to exhibit a protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, K. Yashiro, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **46**(4), 647 (1998)

Ginsenoside-Rg$_7$ (Ginsenoside Ib)

CAS Registry Number: 215720-23-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,12β, 20(S),24(R)-Tetrahydroxy-dammar-25-ene

Biological source: *Panax ginseng* [1]

$C_{42}H_{72}O_{14}$: 800.492

Mp: 187–188°C [1]

FAB-MS *m/z*: 823 $[M + Na]^+$, 800 $[M]^+$, 642 $[M + Na\text{-}Glc\text{-}H_2O]^+$, 420 $[M\text{-}2Glc\text{-}3H_2O]^+$

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): β-D-Glcp: 4.93 (d, J = 7.3, H-1); β-D-Glcp′: 5.22 (d, J = 7.9, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

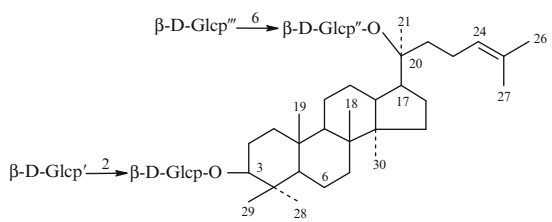
Table 1

C-1	39.2	C-16	26.8	Glc-1	107.0
2	26.8	17	52.4	2	75.8
3	88.8	18	16.3	3	78.8
4	39.7	19	15.9	4	72.0
5	56.4	20	83.3	5	78.7
6	18.3	21	22.8	6	63.2
7	35.1	22	32.8	Glc′-1	98.4
8	40.0	23	31.1	2	75.4
9	50.2	24	76.2	3	79.0
10	37.0	25	149.4	4	71.8
11	30.9	26	110.2	5	78.4
12	70.3	27	18.5	6	63.1
13	49.4	28	28.2		
14	51.5	29	16.8		
15	31.1	30	17.3		

References

1. D.-Q. Dou, Y.-J. Chen, L.-H. Liang, F.-G. Pang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **49**(4), 442 (2001)

Notoginsenoside I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3β,20(S)-Dihydroxy-dammar-24-ene

Biological source: *Panax notoginseng* [1]

$C_{54}H_{92}O_{22}$: 1092.608

Mp: 209–211°C (aq. MeOH) [1]

$[\alpha]_D^{24}$ + 0.8° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1637, 1078 [1]

FAB-MS (negative ion mode) *m/z*: 1091 $(M\text{-}H)^-$, 929 $(M\text{-}C_6H_{11}O_5)^-$, 767 $(M\text{-}C_{12}H_{21}O_{10})^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1115.5968 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.81, 0.98, 0.99, 1.12, 1.28, 1.53 (s, CH_3-19, 30, 18, 29, 28, 21), 1.72 (CH_3-26, 27), 3.23 (dd, J = 4.0, 11.3, H-3), 5.40 (brs, H-24) β-D-Glcp: 4.88 (d, J = 7.6, H-1); β-D-Glcp′: 5.34 (d, J = 7.6, H-1); β-D-Glcp″: 5.22 (d, J = 7.6, H-1); β-D-Glcp‴: 5.09 (d, J = 7.6, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

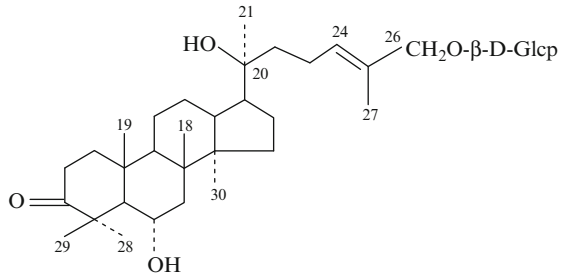
C-1	39.3	C-18	15.7	Glc-1	105.0	Glc″-1	98.6
2	26.1	19	16.4	2	83.2	2	75.4
3	89.0	20	82.4	3	78.2	3	78.8
4	39.7	21	21.3	4	71.7	4	71.5
5	56.3	22	40.4	5	78.0	5	76.7
6	18.4	23	23.2	6	62.8	6	70.4
7	35.6	24	126.1	Glc′-1	105.9	Glc‴-1	105.4
8	40.6	25	130.6	2	77.0	2	75.1
9	51.0	26	25.8	3	77.9	3	78.3
10	36.9	27	18.0	4	71.6	4	71.7
11	21.9	28	28.0	5	78.3	5	78.3
12	25.5	29	16.6	6	62.6	6	62.8
13	42.5	30	16.8				
14	50.6						
15	31.5						
16	28.0						
17	48.4						

Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, N. Hirokawa, K. Yashiro, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45**(6), 1056 (1997)

Kizuta-Saponin K_5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3-Oxo-20(S)-dammar-24-en-6α,20,26-triol

Biological source: *Hedera rhombea* [1]

$C_{36}H_{60}O_9$: 636.423

Mp: 133–135°C (dil. MeOH) [1]

$[\alpha]_D^{20}$ + 84.5° (c 1.04, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1690, 1100–1000 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.78 (s, CH_3-18), 0.99 (s, CH_3-19), 1.39 (s, CH_3-21), 5.73 (t-like, H-24), 1.82 (s, CH_3-27), 1.01 (s, CH_3-28), 1.66 (s, CH_3-29), 1.66 (s, CH_3-30)

β-D-Glcp: 4.87 (d, J = 7.3, H-1) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

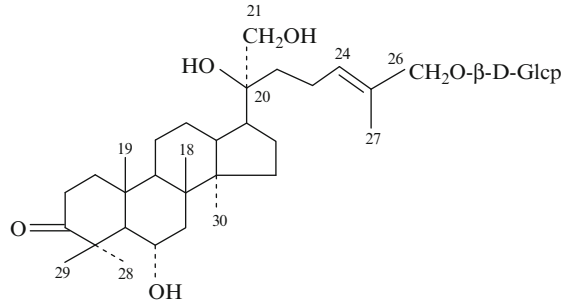
Table 1

C-1	40.2	C-16	28.1	Glc-1	103.5
2	33.4	17	50.4	2	75.2
3	218.6	18	17.7	3	78.6
4	47.8	19	16.1	4	72.0
5	59.6	20	74.3	5	78.2
6	66.9	21	26.0	6	63.1
7	45.9	22	41.5		
8	41.3	23	23.0		
9	49.6	24	129.4		
10	38.4	25	132.3		
11	22.9	26	75.2		
12	25.3	27	14.2		
13	42.4	28	32.2		
14	50.6	29	20.0		
15	31.6	30	16.7		

References

1. H. Kizu, M. Koshijima, M. Hayashi, T. Tomimori, Chem. Pharm. Bull. **33**(4), 1400 (1985)

Kizuta-Saponin K_{7a}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 3-Oxo-20(S)-dammar-24-ene-6α,20,21,26-tetraol

Biological source: *Hedera rhombea* [1]

$C_{36}H_{60}O_{10}$: 652.418

Mp: 181–185°C (dil. MeOH) [1]

$[\alpha]_D^{20}$ + 79.5° (c 1.00, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1690, 1100–1000 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 1.00 (s, CH_3-18), 1.02 (s, CH_3-19), 5.73 (brs, H-24), 1.81 (s, CH_3-27), 0.77 (s, CH_3-28), 1.66 (s, CH_3-29), 1.66 (s, CH_3-30)

β-D-Glcp: 4.86 (d, J = 7.1, H-1) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	40.1	C-16	28.0	Glc-1	103.5
2	33.4	17	46.1	2	75.2
3	219.1	18	17.8	3	78.6
4	47.7	19	16.0	4	72.0
5	59.2	20	76.6	5	78.4
6	66.8	21	66.8	6	62.8
7	45.8	22	36.2		
8	41.2	23	22.9		
9	49.6	24	129.5		

(*continued*)

Table 1 (continued)

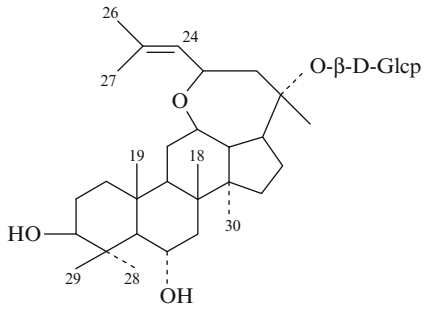
10	38.2	25	132.2
11	22.8	26	75.2
12	24.7	27	14.3
13	41.5	28	32.2
14	50.4	29	19.9
15	31.7	30	16.6

References

1. H. Kizu, M. Koshijima, T. Tomimori, Chem. Pharm. Bull. **33**(8), 3176 (1985)

Ginsenoside-Rh_9

CAS Registry Number: 343780-70-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 12β,23-Epoxy-dammar-24-en-3β,6α,20(S)-triol

Biological source: *Panax ginseng* [1]

$C_{36}H_{60}O_9$: 636.423

HR-FAB-MS *m/z*: 659.4135 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.02, 1.06, 1.09, 1.45, 1.50, 1.67, 1.80, 1.98 (s, CH_3-19, 30, 18, 29, 21, 26, 27, 28), 1.60 (t, J = 16.0, H-13), 2.08 (m, H-11), 2.23 (dd, J = 16.0, 9.5, H-22), 2.80 (brd, J = 16.0, H-22), 3.64 (m, H-12), 4.81 (t, J = 8.5, H-23), 5.53 (brd, J = 8.0, H-24)

β-D-Glcp: 5.12 (d, J = 8.0, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

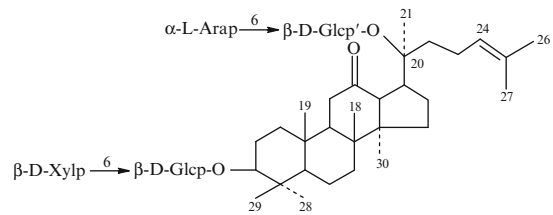
Table 1

C-1	39.6	C-16	25.5	Glc-1	99.3
2	28.1	17	46.9	2	75.4
3	78.4	18	16.5	3	79.0
4	40.4	19	16.8	4	72.0
5	61.9	20	81.9	5	78.2
6	67.7	21	24.6	6	63.1
7	47.5	22	51.8		
8	40.9	23	72.5		
9	50.3	24	129.2		
10	39.4	25	131.4		
11	30.1	26	25.7		
12	79.8	27	17.7		
13	49.3	28	31.9		
14	51.2	29	17.7		
15	32.5	30	17.1		

References

1. D.-Q. Dou, Y.-J. Chen, L.-H. Liang, F.-G. Pang, N. Shimizu, T. Takeda, Chem. Pharm. Bull **49**(4), 442 (2001)

Chikusetsusaponin LN_4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 12-Oxo-dammar-24-en-3β,20(S)-diol

Biological source: *Panax japonicus* [1]

$C_{52}H_{86}O_{21}$: 1046.566

$[\alpha]_D^{15}$ −12.3° (c 0.65, MeOH) [1]

CD (c 0.10, MeOH) $[\theta]_{nm}^{17}$: −3440 (284) negative max [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

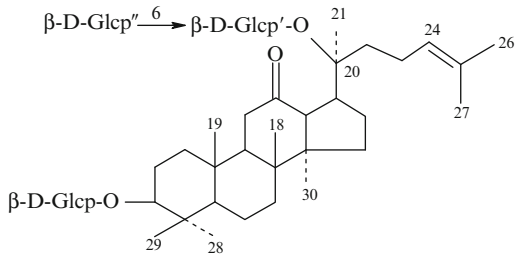
Table 1

C-1	40.4	C-16	24.4	Glc-1	106.4	Glc′-1	98.2
2	26.3	17	42.7	2	75.4	2	75.4
3	88.7	18	17.8	3	78.5	3	78.3
4	39.6	19	17.0	4	72.0	4	72.0
5	56.2	20	81.5	5	76.4	5	76.0
6	18.3	21	22.3	6	69.8	6	69.8
7	34.6	22	39.0	Xyl-1	105.2	Ara-1	104.2
8	40.9	23	23.9	2	74.3	2	72.0
9	56.2	24	125.8	3	77.5	3	73.8
10	37.5	25	130.8	4	70.9	4	68.3
11	40.2	26	25.7	5	66.6	5	65.4
12	211.3	27	16.5				
13	55.0	28	28.0				
14	56.2	29	16.3				
15	32.1	30	16.0				

References

1. S. Yahara, O. Tanaka, J. Nishioka, Chem. Pharm. Bull. **26**(10), 3010 (1978)

Chikusetsusaponin LT_5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 12-Oxo-dammar-24-en-3β,20(S)-diol

Biological source: *Panax japonicus* [1]

$C_{48}H_{80}O_{18}$: 944.534

Mp: 265–270°C (H_2O) [1]

$[\alpha]_D^{25}$ + 4.5° (c 0.53, MeOH) [1]

CD (c 0.09, MeOH) $[\theta]_{nm}^{17}$: −3683(284) negative max [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

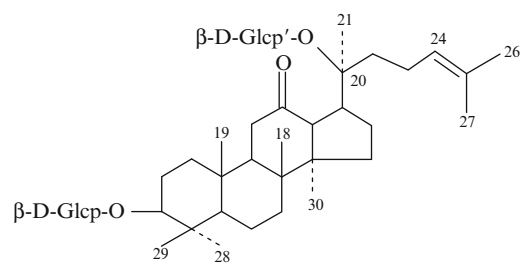
Table 1

C-1	40.4	C-16	24.4	Glc-1	106.4	Glc″-1	105.0
2	26.3	17	42.6	2	75.2	2	74.7
3	88.5	18	17.8	3	78.3	3	77.8
4	39.4	19	17.0	4	71.6	4	71.6
5	56.3	20	81.4	5	77.8	5	77.8
6	18.4	21	22.2	6	62.7	6	62.7
7	34.7	22	39.0	Glc′-1	98.2		
8	40.9	23	23.9	2	75.2		
9	56.1	24	125.8	3	77.8		
10	37.5	25	130.7	4	71.6		
11	40.0	26	25.6	5	76.3		
12	210.8	27	16.5	6	70.3		
13	54.8	28	28.0				
14	56.1	29	16.1				
15	32.2	30	15.9				

References

1. S. Yahara, O. Tanaka, J. Nishioka, Chem. Pharm. Bull. **26**(10), 3010 (1978)

Chikusetsusaponin LT_8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 12-Oxo-dammar-24-en-3β,20(S)-diol

Biological source: *Panax japonicus* [1]

$C_{42}H_{70}O_{13}$: 782.481

$[\alpha]_D^{25}$ + 16.9° (c 0.21, MeOH) [1]
CD (c 0.09, MeOH) $[\theta]_{nm}^{19}$: −3234(284) negative max [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

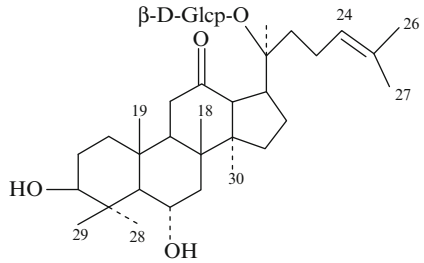
Table 1

C-1	40.9	C-16	24.6	Glc-1	106.9
2	26.5	17	42.6	2	75.7
3	88.3	18	17.9	3	79.1
4	39.7	19	17.0	4	71.8
5	56.1	20	81.3	5	78.4
6	18.6	21	22.4	6	63.0
7	34.8	22	38.8	Glc′-1	98.4
8	40.9	23	24.0	2	75.7
9	56.1	24	125.8	3	78.6
10	37.5	25	130.8	4	71.8
11	40.2	26	25.7	5	77.9
12	211.2	27	16.6	6	63.0
13	54.8	28	28.0		
14	56.1	29	16.3		
15	32.3	30	15.9		

References

1. S. Yahara, O. Tanaka, J. Nishioka, Chem. Pharm. Bull. **26**(10), 3010 (1978)

Ginsenoside-Rh$_8$



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 12-Oxo-dammar-24-en-3β,6α,20(S)-triol

Biological source: *Panax ginseng* [1]
$C_{36}H_{60}O_9$: 636.423
HR-FAB-MS *m/z*: 659.4135 $[M + Na]^+$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.93, 1.02, 1.45, 1.46, 1.58, 1.62, 1.64, 1.98 (s, CH_3-30, 19, 29, 18, 21, 26, 27, 28), 1.95 (m, H-9), 1.93, 2.40 (m, H_2-11), 2.93 (td, J = 10.5, H-17), 3.51 (dd, J = 10.5, 5.0, H-3), 3.69 (d, J = 10.0, H-13) [1]
^{13}C NMR (C_5D_5N): [1]

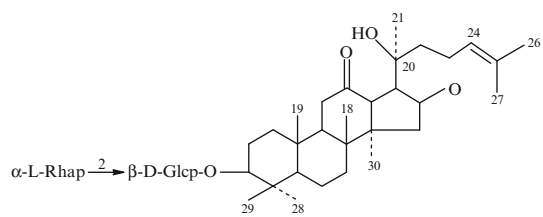
Table 1

C-1	40.5	C-16	24.6	Glc-1	98.5
2	27.9	17	42.6	2	75.7
3	78.2	18	17.8	3	78.2
4	40.4	19	17.5	4	71.9
5	61.5	20	81.3	5	78.0
6	67.7	21	22.6	6	63.0
7	47.0	22	39.5		
8	41.9	23	24.0		
9	54.4	24	125.8		
10	39.0	25	130.9		
11	40.3	26	25.8		
12	211.2	27	17.6		
13	56.1	28	31.8		
14	56.0	29	16.4		
15	32.3	30	17.1		

References

1. D.-Q. Dou, Y.-J. Chen, L.-H. Liang, F.-G. Pang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **49**((4), 442 (2001)

Polysciasoside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 12-Oxo-dammar-24-en-3β,16β,20(S)-triol

Biological source: *Polyscias fulva* [1]

$C_{42}H_{70}O_{13}$: 782.481

$[\alpha]_D^{25}$ −66° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3326, 2913, 1642, 1592, 1414, 1123, 1075, 1040, 853, 802 [1]

FAB-MS *m/z*: 805.4943 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, CD_3OD): 1.06, 1.56 (m, H_2-1), 1.70, 2.02 (m, H_2-2), 3.19 (dd, J = 4.5, 11.0, H-3), 0.84 (brd, J = 8.9, H-5), 1.57, 1.70 (H_2-6), 1.38 (dd, J = 2.4, 9.4, H-7), 1.58 (m, H-7), 1.79 (dd, J = 3.4, 12.4, H-9), 2.18 (dd, J = 3.6, 13.2, H-11), 2.37 (t, J = 13.3, H-11), 3.14 (d, J = 10.5, H-13), 1.28 (d, J = 13.3, H-15), 2.12 (m, H_2-15), 4.34 (dd, J = 4.0, 7.9, H-16), 2.30 (dd, J = 4.2, 10.5, H-17), 1.22 (s, CH_3-18), 1.00 (s, CH_3-19), 1.05 (s, CH_3-21), 2.12 (m, H-22), 1.54 (m, H-23), 5.14 (t, J = 7.0, H-24), 1.68 (s, CH_3-26), 1.64 (s, CH_3-27), 1.08 (s, CH_3-28), 0.90 (s, CH_3-29), 1.02 (s, CH_3-30)

β-D-Glcp: 4.43 (d, J = 7.5, H-1), 3.43 (dd, J = 7.4, 9.3, H-2), 3.46 (t, J = 8.7, H-3), 3.30 (t, J = 8.6, H-4), 3.26 (H-5), 3.84 (H-6), 3.65 (dd, J = 11.8, 4.0, H-6)

α-L-Rhap: 5.39 (d, J = 1.1, H-1), 3.97 (dd, J = 3.1, 1.5, H-2), 3.76 (dd, J = 9.5, 3.3, H-3), 3.39 (t, J = 9.8, H-4), 3.99 (m, H-5), 1.24 (d, J = 6.2, CH_3-6) [1]

^{13}C NMR (125 MHz, CD_3OD): [1]

Table 1

C-1	40.4	C-16	74.5	Glc-1	106.0
2	27.6	17	55.5	2	79.4
3	90.2	18	16.8	3	79.9
4	40.8	19	17.1	4	72.5
5	58.0	20	73.0	5	78.0
6	19.7	21	26.5	6	63.2
7	35.7	22	24.2	Rha-1	102.3
8	42.0	23	42.4	2	72.5
9	56.4	24	126.4	3	72.6
10	38.9	25	132.3	4	74.4
11	40.9	26	26.3	5	70.4
12	215.0	27	18.1	6	18.4
13	57.9	28	28.7		
14	55.8	29	17.3		
15	43.6	30	18.7		

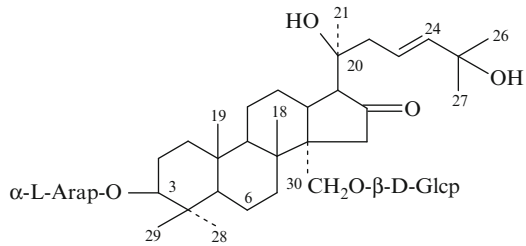
Pharm./Biol.: This plant has been used in traditional medicine for its wound-healing properties [1]

References

1. E. Bedir, N.J. Toyang, I.A. Khan, L.A. Walker, A.M. Clark, J. Nat. Prod. **64**(1), 95 (2001)

Hoduloside VI

CAS Registry Number: 154971-10-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 16-Oxo-dammar-23-en-3β,20(S),25,30-tetraol

Biological source: *Hovenia dulcis* [1]

$C_{41}H_{68}O_{14}$: 784.460

$[\alpha]_D$ −38.6° (c 2.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730 [1]

FAB-MS *m/z*: 783 $[M-H]^-$, 651 $[M-H-Ara]^-$, 621 $[M-H-Glc]^-$ [1]

^{1}H NMR (200 MHz, J/Hz, C_5D_5N): 0.79, 0.91, 1.04, 1.17, 1.50, 1.50, 1.53 (s, CH_3 × 7), 2.52, 2.78 (d, J = 16.3, H_2-15), ca 2.90 (H-22), 3.02 (dd, J = 13.5, 7.8, H-22), 3.30 (d, J = 11.4, H-17), ca 3.34 (H-3), 4.71 (H_2-30), 6.10 (d, J = 15.6, H-24), 6.47 (ddd, J = 15.6, 7.8, 7.8, H-23)

α-L-Arap: 4.86 (d, J = 7.2, H-1)

β-D-Glcp: 5.03 (d, J = 7.7, H-1) [1]

^{13}C NMR (50 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	220.6	Ara-1	107.6
2	26.6	17	58.0	2	73.0
3	88.5	18	17.1	3	74.7
4	39.7	19	16.7	4	69.6
5	56.1	20	75.0	5	66.9

(*continued*)

Table 1 (continued)

6	18.6	21	26.9	Glc-1	105.2
7	36.2	22	44.1	2	75.1
8	40.7	23	123.2	3	78.9
9	51.7	24	142.6	4	71.6
10	37.4	25	70.2	5	78.6
11	21.8	26	30.7	6	62.8
12	27.4	27	30.7		
13	41.8	28	27.9		
14	49.2	29	16.9		
15	45.4	30	71.5		

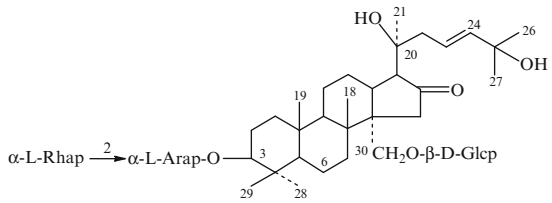
Pharm./Biol.: Sweetness-reducing activity [1]

References

1. K. Yoshikawa, Y. Nagai, M. Yoshida, S. Arihara, Chem. Pharm. Bull. **41**(10), 1722 (1993)

Hoduloside VII

CAS Registry Number: 154971-11-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 16-Oxo-dammar-23-en-3β,20(S),25,30-tetraol

Biological source: *Hovenia dulcis* [1]

$C_{47}H_{78}O_{18}$: 930.518

$[\alpha]_D - 52.1°$ (c 5.2, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730 [1]

FAB-MS *m/z*: 929 $[M-H]^-$, 783 $[M-H-Rha]^-$, 767 $[M-H-Glc]^-$ [1]

^{1}H NMR (200 MHz, J/Hz, C_5D_5N): 0.79, 1.04, 1.04, 1.08, 1.51, 1.51, 1.53 (s, CH_3 × 7), 3.12 (dd, J = 12.0, 5.5, H-3), 2.43, 2.64 (dd, J = 16.0, H_2-15), 3.21 (d, J = 11.4, H-17), 2.77 (m, H-22), 2.91 (dd, J = 13.5, 7.8, H-22), 4.30, 4.71 (dd, J = 10.3, CH_2-30), 6.01 (d, J = 15.6, H-24), 6.35 (ddd, J = 15.6, 7.8, 7.8, H-23)

α-L-Arap: 4.88 (d, J = 5.6, H-1)

α-L-Rhap: 6.15 (s, H-1), 1.63 (s, CH_3-6)

β-D-Glcp: 4.93 (d, J = 7.8, H-1) [1]

^{13}C NMR (50 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	220.5	Ara-1	105.0	Glc-1	105.2
2	26.9	17	57.9	2	76.0	2	75.1
3	88.3	18	17.1	3	74.1	3	78.9
4	39.7	19	16.6	4	68.9	4	71.5
5	56.0	20	75.0	5	64.9	5	78.5
6	18.5	21	26.9	Rha-1	101.8	6	62.8
7	36.1	22	44.1	2	72.5		
8	40.7	23	123.2	3	72.6		
9	51.6	24	142.7	4	74.1		
10	37.4	25	70.1	5	70.0		
11	21.9	26	30.7	6	18.7		
12	27.4	27	30.7				
13	41.8	28	28.1				
14	49.1	29	16.7				
15	45.3	30	71.5				

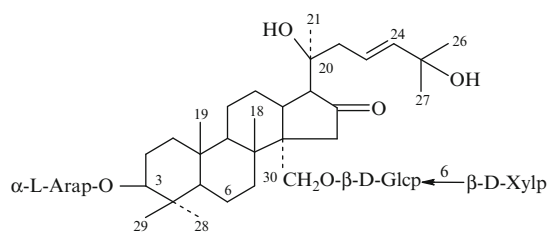
Pharm./Biol.: Completely suppressed the sensation of sweetness induced by 0.2 M sucrose [1]

References

1. K. Yoshikawa, Y. Nagai, M. Yoshida, S. Arihara, Chem. Pharm. Bull. **41**(10), 1722 (1993)

Hoduloside VIII

CAS Registry Number: 154971-12-7

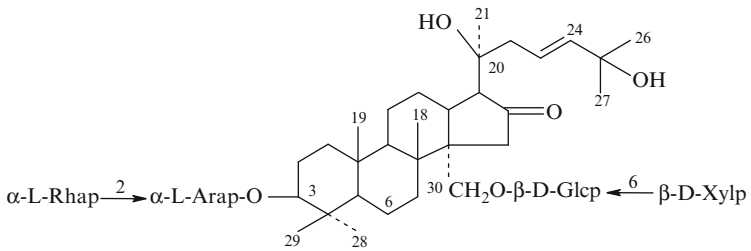


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 16-Oxo-dammar-23-en-3β,20(S),25,30-tetraol
Biological source: *Hovenia dulcis* [1]
$C_{46}H_{76}O_{18}$: 916.503
$[\alpha]_D$−34.4° (c 4.6, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1730 [1]
FAB-MS *m/z*: 915 $[M-H]^-$, 783 $[M-H-Xyl]^-$ [1]
^{1}H NMR (200 MHz, J/Hz, C_5D_5N): 0.80, 0.93, 1.06, 1.25, 1.52, 1.52, 1.54 (s, CH_3 × 7), 2.43 (d, J = 16.3, H-15), ca 2.80 (H-15), ca 2.83 (H-22), 3.06 (d, J = 11.4, H-17), 3.26 (m, H-3), 4.76 (d, J = 10.5, H_2-30), 6.00 (d, J = 15.6, H-24), 6.31 (ddd, J = 15.6, 7.8, 7.8, H-23)
α-L-Arap: 4.86 (d, J = 7.7, H-1)
β-D-Glcp: 4.89 (d, J = 7.3, H-1)
β-D-Xylp: 4.83 (d, J = 7.8, H-1) [1]
^{13}C NMR (50 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	220.8	Ara-1	107.3	Xyl-1	105.8
2	26.9	17	58.2	2	73.1	2	74.9
3	88.6	18	17.2	3	74.7	3	78.1
4	39.9	19	16.8	4	69.6	4	71.2
5	56.1	20	75.1	5	66.7	5	67.0
6	18.7	21	26.9	Glc-1	105.2		
7	36.5	22	44.0	2	75.1		
8	40.9	23	123.2	3	78.7		
9	51.8	24	142.8	4	71.2		
10	37.5	25	70.3	5	77.1		
11	21.9	26	30.7	6	69.9		
12	27.4	27	30.7				
13	41.9	28	28.3				
14	49.4	29	16.9				
15	45.2	30	71.5				

Pharm./Biol.: Completely suppressed the sensation of sweetness induced by 0.2 M sucrose [1]



Hoduloside IX

References

1. K. Yoshikawa, Y. Nagai, M. Yoshida, S. Arihara, Chem. Pharm. Bull. **41**(10), 1722 (1993)

Hoduloside IX

CAS Registry Number: 154971-13-8
See Figure Hoduloside IX
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 16-Oxo-dammar-23-en-3β,20(S),25,30-tetraol
Biological source: *Hovenia dulcis* [1]
$C_{52}H_{86}O_{22}$: 1062.561
$[\alpha]_D$−37.6° (c 1.8, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1730 [1]
FAB-MS *m/z*: 1061 $[M-H]^-$, 929 $[M-H-Xyl]^-$, 915 $[M-H-Rha]^-$ [1]
^{1}H NMR (200 MHz, J/Hz, C_5D_5N): 0.79, 1.04, 1.05, 1.17, 1.51, 1.51, 1.53 (s, CH_3 × 7), 2.43, 2.78 (d, J = 15.9, H_2-15), 2.95 (dd, J = 13.5, 7.8, H-22), 3.11 (d, J = 11.2, H-17), ca 3.26 (m, H-3), 4.81 (d, J = 10.5, CH_2-30), 6.01 (d, J = 15.6, H-24), 6.33 (ddd, J = 15.6, 7.8, 7.8, H-23)
α-L-Arap: 4.98 (d, J = 5.4, H-1)
α-L-Rhap: 6.15 (s, H-1)
β-D-Glcp: 4.93 (d, J = 7.3, H-1)
β-D-Xyl: 4.85 (d, J = 7.8, H-1) [1]
^{13}C NMR (50 MHz, C_5D_5N): [1]

Table 1

C-1	38.9	C-16	220.6	Ara-1	104.8	Glc-1	105.2
2	26.8	17	58.0	2	76.0	2	75.0
3	88.4	18	17.0	3	73.9	3	78.7

(*continued*)

Table 1 (continued)

4	39.7	19	16.7	4	68.8	4	71.5
5	56.1	20	75.0	5	64.8	5	77.1
6	18.6	21	26.8	Rha-1	101.7	6	69.9
7	36.3	22	44.0	2	72.4	Xyl-1	105.8
8	40.7	23	123.2	3	72.6	2	74.7
9	51.6	24	142.7	4	74.1	3	78.0
10	37.4	25	70.1	5	69.9	4	71.3
11	21.8	26	30.8	6	18.6	5	67.0
12	27.3	27	30.8				
13	41.8	28	28.0				
14	49.2	29	16.9				
15	45.4	30	71.4				

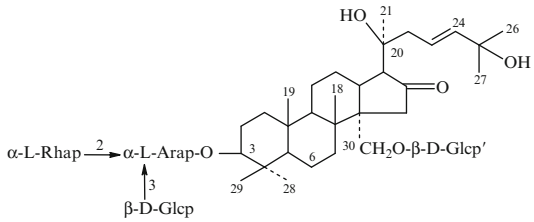
Pharm./Biol.: Completely suppressed the sensation of sweetness induced by 0.2 M sucrose [1]

References

1. K. Yoshikawa, Y. Nagai, M. Yoshida, S. Arihara, Chem. Pharm. Bull. **41**(10), 1722 (1993)

Hoduloside X

CAS Registry Number: 154971-14-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 16-Oxo-dammar-23-en-3β,20(S),25,30-tetraol

Biological source: *Hovenia dulcis* [1]

$C_{53}H_{88}O_{23}$: 1092.571

$[\alpha]_D$ −35° (c 1.8, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730 [1]

FAB-MS *m/z*: 1091 $[M-H]^-$, 945 $[M-H-Rha]^-$, 929 $[M-H-Glc]^-$ [1]

^{1}H NMR (200 MHz, J/Hz, C_5D_5N): 0.76, 1.01, 1.09, 1.10, 1.51, 1.51, 1.52 (s, CH_3 × 7), 2.42, 2.68 (d, J = 15.9, H_2-15), 2.96 (dd, J = 13.5, 7.8, H-22), ca 2.78 (H-22), ca 3.18 (m, H-3), 3.27 (dd, J = 11.5, H-17), 4.71 (d, J = 10.3, H_2-30), 6.00 (d, J = 15.6, H-24), 6.39 (ddd, J = 15.6, 7.8, 7.8, H-23)

α-L-Arap: 4.84 (d, J = 5.7, H-1)

α-L-Rhap: 6.22 (s, H-1), 1.64 (d, J = 5.5, CH_3-6)

β-D-Glcp: 5.14 (d, J = 7.5, H-1)

β-D-Glcp′: 4.98 (d, J = 7.5, H-1) [1]

^{13}C NMR (50 MHz, C_5D_5N): [1]

Table 1

C-1	38.8	C-16	220.3	Ara-1	104.8	Glc-1	104.8
2	26.8	17	57.8	2	74.6	2	75.0
3	87.7	18	17.0	3	82.4	3	78.2
4	39.7	19	16.6	4	68.4	4	71.4
5	56.1	20	74.9	5	65.0	5	78.6
6	18.5	21	26.7	Rha-1	102.0	6	62.5
7	36.1	22	44.1	2	72.5	Glc′-1	105.2
8	40.6	23	123.2	3	72.5	2	75.0
9	51.5	24	142.6	4	73.9	3	78.9
10	37.3	25	69.9	5	70.0	4	71.4
11	21.7	26	30.6	6	18.6	5	78.6
12	27.2	27	30.6			6	62.7
13	41.7	28	27.8				
14	49.0	29	16.8				
15	45.2	30	71.4				

References

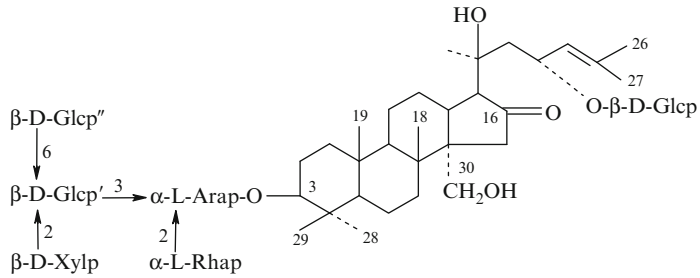
1. K. Yoshikawa, Y. Nagai, M. Yoshida, S. Arihara, Chem. Pharm. Bull. **41**(10), 1722 (1993)

Protojujuboside A

CAS Registry Number: 259196-70-8

See Figure Protojujuboside A

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 16-Oxo-dammar-24-en-3β,20S,23S,30-tetraol



Protojujuboside A

Biological source: *Zizyphus jujuba* [1]
$C_{64}H_{106}O_{32}$: 1386.666
Mp: 200–202°C [1]
$[\alpha]_D^{29}$ −37.6° (c 0.25, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3419, 1719, 1638, 1075 [1]
FAB-MS *m/z*: 1409 $[M + Na]^+$, 1385 $[M-H]^-$ [1]
^{1}H NMR (500 MHz, C_5D_5N): 3.12 (dd-like, H-3), 2.71 (m, H-13), 2.46, 2.77 (ABq, J = 14.9, H_2-15), 2.95 (m, H-17), 1.13 (s, CH_3-18), 0.80 (s, CH_3-19), 1.75 (s, CH_3-21), 5.30 (m, H-23), 5.62 (d, J = 6.9, H-24), 1.63 (s, CH_3-26), 1.77 (s, CH_3-27), 1.12 (s, CH_3-28), 1.12 (s, CH_3-29)
α-L-Arap: 4.92 (d-like, H-1)
α-L-Rhap: 5.95 (H-1), 1.67 (CH_3-6)
β-D-Glcp: 4.98 (d, J = 7.4, H-1)
β-D-Xylp: 5.38 (d, J = 7.8, H-1)
β-D-Glcp′: 4.90 (d, J = 6.7, H-1)
β-D-Glcp″: 5.03 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	219.3	Ara-1	104.0	Glc-1	104.0	Glc′-1	105.2
2	26.6	17	59.8	2	75.1	2	83.1	2	75.4
3	88.4	18	16.9	3	82.8	3	78.0	3	78.2
4	39.7	19	16.7	4	67.9	4	71.4	4	71.4
5	56.4	20	74.5	5	63.4	5	76.6	5	78.4
6	18.6	21	27.3	Rha-1	101.6	6	70.3	6	62.5
7	36.4	22	45.2	2	72.4	Xyl-1	106.4	Glc″-1	104.6
8	40.7	23	76.6	3	72.5	2	76.3	2	75.5
9	51.8	24	128.8	4	73.9	3	78.0	3	78.9
10	37.3	25	132.6	5	70.1	4	70.8	4	71.6
11	21.9	26	25.8	6	18.6	5	67.9	5	78.4
12	27.6	27	18.3					6	62.5
13	41.8	28	28.0						
14	49.4	29	17.1						
15	45.2	30	62.7						

Pharm./Biol.: Immunological adjuvant activity [1]

References

1. H. Matsuda, T. Murakami, A. Ikebata, J. Yamahara, M. Yoshikawa, Chem. Pharm. Bull. **47**(12), 1744 (1999)

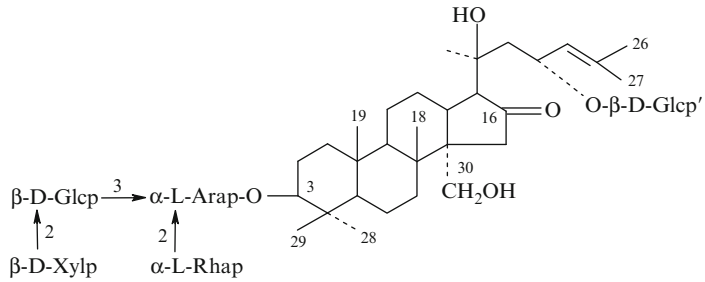
Protojujuboside B

CAS Registry Number: 259196-91-3
See Figure Protojujuboside B
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 16-Oxo-dammar-24-en-3β,20S,23S,30-tetraol
Biological source: *Zizyphus jujuba* [1]
$C_{58}H_{96}O_{27}$: 1224.613
Mp: 200–204°C [1]
$[\alpha]_D^{29}$ −25.8° (c 0.25, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3419, 1719, 1638, 1075 [1]
FAB-MS *m/z*: 1247 $[M + Na]^+$, 1223 $[M-H]^-$ [1]
^{1}H NMR (500 MHz, C_5D_5N): 3.17 (dd-like, H-3), 2.85 (m, H-13), 2.75 (ABq, J = 14.6, H-15), 2.95 (m, H-17), 1.12 (s, CH_3-18), 0.82 (s, CH_3-19), 1.72 (s, CH_3-21), 5.28 (m, H-23), 5.65 (d, J = 9.2, H-24), 1.63 (s, CH_3-26), 1.77 (s, CH_3-27), 1.12 (s, CH_3-28), 1.10 (s, CH_3-29)
α-L-Arap: 4.92 (d-like, H-1)
α-L-Rhap: 5.95 (brs, H-1), 1.65 (d-like, CH_3-6)
β-D-Glcp: 5.11 (d, J = 7.5, H-1)
β-D-Xylp: 5.35 (d, J = 7.5, H-1)
β-D-Glcp′: 4.99 (d, J = 8.0, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	219.4	Ara-1	104.1	Glc-1	103.7	Glc′-1	104.5
2	26.6	17	59.8	2	74.9	2	83.4	2	75.5

(*continued*)



Protojujuboside B

Table 1 (continued)

3	88.4	18	16.9	3	81.9	3	78.2	3	78.9
4	39.7	19	16.7	4	67.8	4	71.2	4	71.7
5	56.4	20	74.5	5	63.6	5	78.5	5	78.3
6	18.6	21	27.3	Rha-1	101.6	6	62.5	6	62.4
7	36.4	22	45.4	2	72.3	Xyl-1	106.3		
8	40.7	23	76.5	3	72.5	2	76.1		
9	51.8	24	128.8	4	74.0	3	78.1		
10	37.4	25	132.6	5	70.1	4	70.8		
11	21.9	26	25.8	6	18.5	5	67.8		
12	27.6	27	18.3						
13	41.9	28	28.1						
14	49.4	29	17.1						
15	45.2	30	62.8						

Pharm./Biol.: Immunological adjuvant activity [1]

References

1. H. Matsuda, T. Murakami, A. Ikebata, J. Yamahara, M. Yoshikawa, Chem. Pharm. Bull. **47**(12), 1744 (1999)

Protojujuboside B_1

CAS Registry Number: 259196-94-6

See Figure Protojujuboside B_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 16-Oxo-dammar-24-en-3β,20S,23S,30-tetraol

Biological source: *Zizyphus jujuba* [1]

$C_{58}H_{96}O_{27}$: 1224.613

Mp: 201–203°C [1]

$[\alpha]_D^{29}$ −24.4° (c 0.25, MeOH) [1]

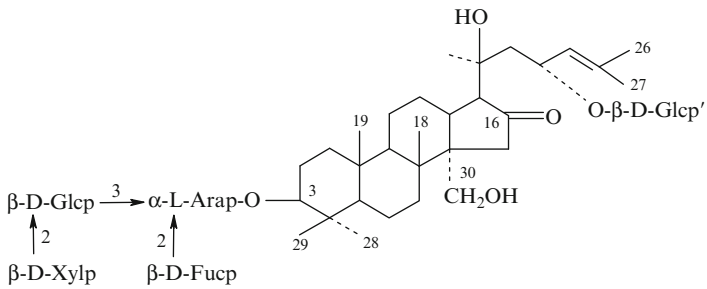
IR (KBr) ν_{max} cm^{-1}: 3418, 1719, 1638, 1075 [1]

FAB-MS *m/z*: 1247 $[M + Na]^+$, 1223 $[M-H]^-$ [1]

^{1}H NMR (500 MHz, C_5D_5N): 3.25 (dd-like, H-3), 2.85 (m, H-13), 2.76 (ABq, J = 15.4, H-15), 2.94 (m, H-17), 1.13 (s, CH_3-18), 0.82 (s, CH_3-19), 1.74 (s, CH_3-21), 5.27 (m, H-23), 5.62 (d-like, H-24), 1.63 (s, CH_3-26), 1.77 (s, CH_3-27), 1.11 (s, CH_3-28), 0.98 (s, CH_3-29)

α-L-Arap: 4.80 (d-like, H-1)

α-L-Fucp: 6.15 (brs, H-1), 1.56 (d, J = 6.0, CH_3-6)



Protojujuboside B_1

β-D-Glcp: 5.14 (d, J = 6.6, H-1)
β-D-Xylp: 5.14 (d, J = 7.3, H-1)
β-D-Glcp′: 5.01 (d, J = 7.3, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	219.3	Ara-1	104.6	Glc-1	103.4	Glc′-1	104.6
2	26.7	17	59.7	2	74.5	2	82.5	2	75.5
3	88.0	18	17.1	3	82.6	3	78.5	3	78.9
4	39.6	19	16.7	4	67.8	4	71.6	4	71.2
5	56.4	20	74.5	5	64.7	5	78.4	5	78.5
6	18.6	21	27.3	Fuc-1	101.8	6	62.4	6	62.5
7	36.4	22	45.3	2	67.8	Xyl-1	105.9		
8	40.7	23	76.5	3	72.1	2	75.8		
9	51.8	24	128.8	4	74.2	3	78.1		
10	37.3	25	132.6	5	67.0	4	70.8		
11	21.9	26	25.8	6	17.3	5	67.7		
12	27.6	27	18.3						
13	41.9	28	28.0						
14	49.4	29	16.7						
15	45.2	30	62.8						

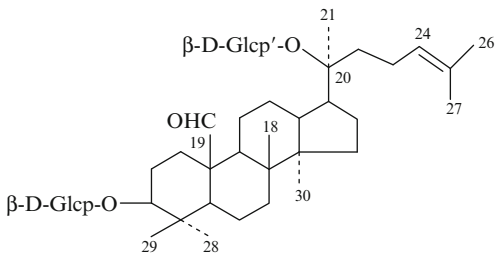
Pharm./Biol.: Immunological adjuvant activity [1]

References

1. H. Matsuda, T. Murakami, A. Ikebata, J. Yamahara, M. Yoshikawa, Chem. Pharm. Bull. **47**(12), 1744 (1999)

Gymnemaside I

CAS Registry Number: 141358-44-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 19-Oxo-dammar-24-en-3β,20(S)-diol

Biological source: *Gymnema sylvestre* [1]
$C_{42}H_{70}O_{13}$: 782.481
Mp: 159–161°C [1]
$[\alpha]_D$ + 23.7° (c 3.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1} : 3400, 1700, 1635 [1]
FAB-MS *m/z*: 805 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.91, 0.97, 1.02, 1.37, 1.48, 1.69, 1.69 (s, CH_3 × 7), 3.46 (dd, J = 11.5, 4.0, H-3), 5.30 (m, H-24), 10.31 (s, OHC-19), 4.95 (d, J = 7.5, H-1 of Glc), 5.06 (d, J = 7.5, H-1 of Glc′) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

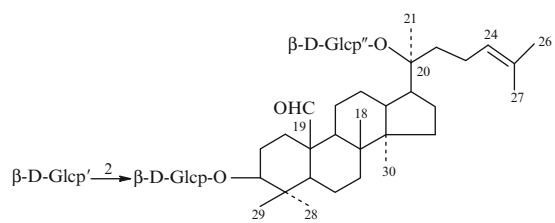
C-1	33.5	C-11	22.5	C-21	21.7	Glc-1	106.9	Glc′-1	98.6
2	27.7	12	25.5	22	40.3	2	75.7	2	75.6
3	87.7	13	42.4	23	23.3	3	78.7	3	79.1
4	40.1	14	50.5	24	126.1	4	72.0	4	71.9
5	54.7	15	31.9	25	130.8	5	78.4	5	77.9
6	17.7	16	27.9	26	25.9	6	63.0	6	63.2
7	34.7	17	48.4	27	17.9				
8	40.5	18	16.0	28	26.7				
9	52.9	19	205.9	29	16.8				
10	52.8	20	82.2	30	17.3				

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, T. Miyase, Phytochemistry **31**(1), 237 (1992)

Gymnemaside II

CAS Registry Number: 141358-45-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 19-Oxo-dammar-24-en-3β,20(S)-diol

Biological source: *Gymnema sylvestre* [1]

$C_{48}H_{80}O_{18}$: 944.534
Mp: 212–214°C [1]
$[\alpha]_D$ + 10.5° (c 3.2, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1700, 1635 [1]
FAB-MS *m/z*: 967 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.91, 0.99, 1.03, 1.32, 1.48, 1.68, 1.68 (s, CH_3 × 7), 3.37 (dd, J = 11.5, 4.0, H-3), 5.30 (m, H-24), 10.30 (s,CHO-19), 4.91 (d, J = 6.0, H-1 of Glc), 5.05 (d, J = 7.5, H-1 of Glc′), 5.17 (d, J = 8.0, H-1 of Glc″)
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

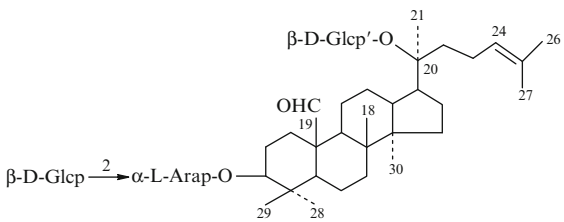
C-1	33.5	C-11	22.5	C-21	21.7	Glc-1	104.9	Clc′-1	98.6
2	27.6	12	25.5	22	40.1	2	83.6	2	75.6
3	87.6	13	42.3	23	23.3	3	78.2	3	79.1
4	40.1	14	50.5	24	126.1	4	72.0	4	71.7
5	54.9	15	31.9	25	130.8	5	78.3	5	77.8
6	17.7	16	27.9	26	25.8	6	62.8	6	63.2
7	34.7	17	48.4	27	17.9	Glc′-1	106.2		
8	40.4	18	15.9	28	26.7	2	77.1		
9	52.8	19	205.7	29	16.7	3	78.2		
10	52.8	20	82.1	30	17.2	4	71.5		
						5	78.2		
						6	62.7		

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, T. Miyase, Phytochemistry **31**(1), 237 (1992)

Gymnemaside III

CAS Registry Number: 141358-46-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 19-Oxo-dammar-24-en-3β,20(S)-diol
Biological source: *Gymnema sylvestre*
$C_{47}H_{78}O_{17}$: 914.523
Mp: 182–184°C [1]
$[\alpha]_D$ + 8.2° (c 6.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1} : 3400, 1700, 1630 [1]
FAB-MS *m/z*: 937 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.91, 0.98, 1.03, 1.29, 1.48, 1.68, 1.69 (s, CH_3 × 7), 3.37 (dd, J = 11.5, 4.0, H-3), 5.30 (m, H-24), 10.31 (s, CHO-19), 4.95 (d, J = 6.0, H-1 of Ara), 5.05 (d, J = 7.5, H-1 of Glc′), 5.17 (d, J = 8.0, H-1 of Glc′) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

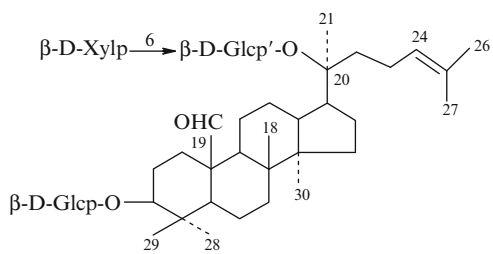
C-1	33.5	C-11	22.5	C-21	21.7	Ara-1	104.8	Glc′-1	98.6
2	27.6	12	25.5	22	40.1	2	81.3	2	75.6
3	87.6	13	42.3	23	23.3	3	73.5	3′	79.1
4	40.1	14	50.5	24	126.1	4	68.4	4	72.0
5	54.9	15	31.9	25	130.8	5	65.2	5	77.8
6	17.7	16	27.9	26	25.8	Glc-1	106.1	6	63.2
7	34.7	17	48.4	27	17.9	2	76.5		
8	40.4	18	15.9	28	26.7	3	78.2		
9	52.8	19	205.7	29	16.7	4	71.6		
10	52.8	20	82.1	30	17.2	5	78.1		
						6	62.6		

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, T. Miyase, Phytochemistry **31**(1), 237 (1992)

Gymnemaside IV

CAS Registry Number: 141358-47-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 19-Oxo-dammar-24-en-3β,20(S)-diol
Biological source: *Gymnema sylvestre* [1]
$C_{47}H_{78}O_{17}$: 914.523

Mp: 256–257°C [1]
$[\alpha]_D$ −14.5° (c 1.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1} : 3400, 1700, 1635 [1]
FAB-MS *m/z*: 937 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.91, 0.97, 1.02, 1.38, 1.48, 1.70, 1.72 (s, CH_3 × 7), 3.46 (dd, J = 11.5, 4.0, H-3), 5.36 (m, H-24), 10.32 (s, CHO-19), 4.96 (d, J = 8.0, H-1 of Glc), 4.96 (d, J = 8.0, H-1 of Xyl), 5.02 (d, J = 8.0, H-1 of Glc′) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

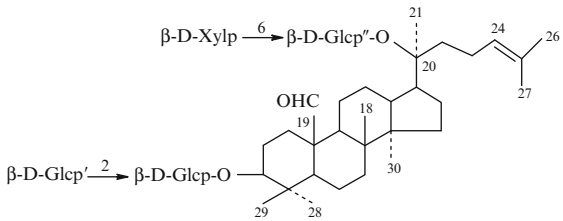
C-1	33.5	C-11	22.5	C-21	21.3	Glc-1	106.9	Xyl-1	105.9
2	27.7	12	25.6	22	40.3	2	75.5	2	74.8
3	87.6	13	42.4	23	23.2	3	78.7	3	77.9
4	40.0	14	50.5	24	126.2	4	71.8	4	71.1
5	54.6	15	32.0	25	130.7	5	78.4	5	66.9
6	17.7	16	27.9	26	25.9	6	63.0		
7	34.7	17	48.4	27	18.0	Glc′-1	98.7		
8	40.4	18	16.0	28	26.7	2	75.5		
9	52.8	19	205.9	29	16.8	3	79.1		
10	52.0	20	82.3	30	17.2	4	71.7		
						5	76.6		
						6	70.5		

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, T. Miyase, Phytochemistry **31**(1), 237 (1992)

Gymnemaside V

CAS Registry Number: 141358-48-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 19-Oxo-dammar-24-en-3β,20(S)-diol
Biological source: *Gymnema sylvestre*
$C_{53}H_{88}O_{22}$: 1076.576

Mp: 187–189°C [1]
$[\alpha]_D$ + 5.9° (c 5.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1} : 3400, 1700, 1630 [1]
FAB-MS *m/z*: 1099 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.90, 0.99, 1.04, 1.31, 1.48, 1.70, 1.72 (s, CH_3 × 7), 3.34 (dd, J = 11.5, 4.0, H-3), 5.36 (s, H-24), 10.30 (s, CHO-19), 4.89 (d, J = 7.5, H-1 of Glc), 4.91 (d, J = 7.5, H-1 of Glc″), 4.98 (d, J = 7.5, H-1 of Xyl), 5.31 (d, J = 8.0, H-1 of Glc′)
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

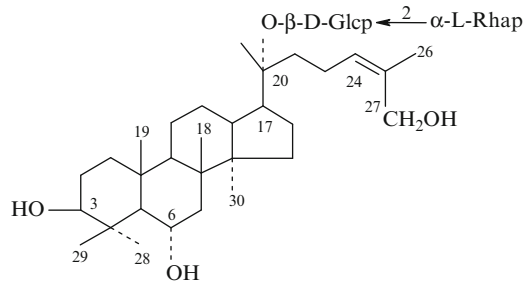
C-1	33.5	16	28.0	Glc-1	105.0	Glc″-1	98.7
2	27.7	17	48.5	2	83.6	2	75.5
3	87.8	18	15.9	3	78.2	3	79.1
4	40.1	19	205.9	4	71.8	4	71.7
5	54.7	20	82.3	5	78.3	5	76.6
6	17.8	21	21.4	6	62.8	6	70.5
7	34.8	22	40.1	Glc′-1	106.1	Xyl-1	105.9
8	40.5	23	23.3	2	77.1	2	74.8
9	52.8	24	126.2	3	78.2	3	77.9
10	52.8	25	130.8	4	71.6	4	71.1
11	22.6	26	25.9	5	78.1	5	66.9
12	25.7	27	18.1	6	62.8		
13	42.5	28	26.7				
14	50.6	29	16.9				
15	32.1	30	17.3				

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, T. Miyase, Phytochemistry **31**(1), 237 (1992)

Actinostemmoside D

CAS Registry Number: 108906-61-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(R)-Dammar-24-en-3β,6α,7β,20,27-tetraol
Biological source: *Actinostemma lobatum* [1]
$C_{42}H_{72}O_{13}$: 784.497
Mp: 168–171°C (EtOH) [1]
$[\alpha]_D^{17}$ −2.2° (c 1.0, MeOH) [1]
FAB-MS *m/z*: 807 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz, $C_5D_5N + D_2O$): 3.50 (dd, J = 7, 10, H-3), 1.17 (d, J = 11, H-5), 4.35 (ddd, J = 11, 11, 3, H-6), 2.22 (ddd, J = 11, 11, 6, H-17), 0.85 (s, CH_3-18), 1.08 (s, CH_3-19), 1.49 (s, CH_3-21), 2.45, 2.70 (m, H_2-23), 5.50 (t, J = 7, H-24), 2.00 (s, CH_3-26), 4.54, 4.64 (d, J = 12, H_2-27), 1.92 (s, CH_3-28), 1.42 (s, CH_3-29), 1.03 (s, CH_3-30)
β-D-Glcp: 4.98(d, J = 8, H-1), 4.13 (dd, J = 8, 10, H-2), 4.25 (t, J = 10, H-3), 3.99 (t, J = 10, H-4), 3.87 (ddd, J = 10, 7, 2, H-5), 4.18 (dd, J = 7, 12, H-6), 4.45 (dd, J = 12, 2, H-6)
α-L-Rhap: 6.40 (s-like, H-1), 4.77 (t, J = 3, H-2), 4.57 (dd, J = 3, 9, H-3), 4.28 (t, J = 9, H-4), 4.65 (dd, J = 9, 6, H-5), 1.76 (d, J = 6, CH_3-6) [1]
^{13}C NMR ($C_5D_5N + D_2O$): [1]

Table 1

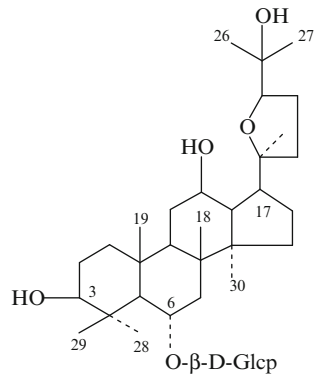
C-1	39.5	C-16	28.2	Glc-1	97.4
2	27.5	17	48.1	2	77.9
3	78.5	18	17.6	3	80.2
4	40.4	19	17.3	4	72.7
5	61.8	20	82.6	5	77.3
6	67.8	21	22.7	6	63.2
7	48.1	22	38.9	Rha-1	101.5
8	41.9	23	22.2	2	72.3
9	50.9	24	127.8	3	72.4
10	39.5	25	136.1	4	74.2
11	21.8	26	21.9	5	69.6
12	25.3	27	61.1	6	19.4
13	42.4	28	32.0		
14	50.2	29	16.5		
15	31.2	30	16.9		

References

1. M. Iwamoto, T. Fujioka, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **35**(2), 553 (1987)

Pseudoginsenoside RT_5

CAS Registry Number: 98474-78-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(R),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol
Biological source: *Panax pseudoginseng* subsp. *himalaicus* [1]
$C_{36}H_{62}O_{10}$: 654.434
Mp: 211–213°C [1]
$[\alpha]_D^{25}$ + 24.2° (c 1.05, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

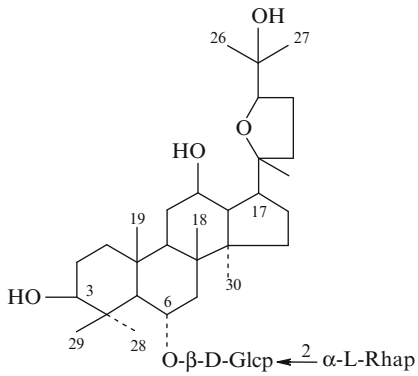
Table 1

C-1	39.5	C-16	25.4	Glc-1	106.0
2	27.9	17	49.5	2	75.5
3	78.2	18	17.9	3	80.1
4	40.4	19	17.1	4	71.9
5	61.5	20	86.7	5	79.7
6	78.6	21	26.9	6	63.2
7	45.1	22	32.7		
8	41.0	23	28.8		
9	50.6	24	85.6		
10	39.6	25	70.3		
11	32.4	26	27.1		
12	71.2	27	27.7		
13	48.4	28	31.7		
14	52.2	29	16.3		
15	31.7	30	18.0		

References

1. O. Tanaka, T. Morita, R. Kasai, J. Kinouchi, S. Sanada, Y. Ida, J. Shoji, Chem. Pharm. Bull. **33**(6), 2323 (1985)

24(R)-Pseudoginsenoside F_{11}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol

Biological source: *Panax pseudoginseng*, subsp. *himalaicus* [1, 2], *P. quinquefolium* [3]

$C_{42}H_{72}O_{14}$: 800.492

$[\alpha]_D^{24}$ −12.0° (c 0.043, MeOH) [1]

^{13}C NMR (64.80 MHz, C_5D_5N): [2]

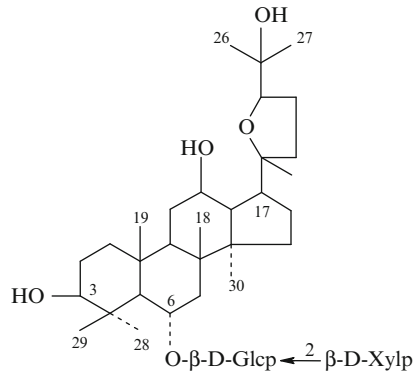
Table 1

C-1	39.5	C-16	25.7	Glc-1	101.8
2	27.6	17	49.3	2	79.2
3	78.3	18	17.8	3	78.3
4	39.9	19	17.5	4	72.2
5	60.8	20	87.0	5	78.3
6	74.0	21	26.9	6	63.0
7	45.9	22	32.5	Rha-1	101.8
8	41.0	23	28.6	2	72.2
9	49.9	24	88.3	3	72.5
10	39.5	25	70.0	4	74.3
11	32.0	26	26.5	5	69.3
12	70.8	27	28.9	6	18.6
13	49.0	28	32.0		
14	52.1	29	16.9		
15	32.0	30	17.8		

References

1. O. Tanaka, S. Yahara, Phytochemistry **17**, 1353 (1978)
2. T. Namba, K. Matsushige, T. Morita, O. Tanaka, Chem. Pharm. Bull. **34**(2), 730 (1986)
3. S.E. Chen, E.J. Staba, S. Taniyasu, R. Kasai, O. Tanaka, Planta Medica **42**(8), 406 (1981)

24(R)-Pseudoginsenoside RT_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol

Biological source: *Panax pseudoginseng* var. *elegantior, P. japonicus* [1], *P. pseudoginseng* subsp. *himalaicus* [2]

$C_{41}H_{70}O_{14}$: 786.476

$[\alpha]_D^{15}$ + 9.4° (c 0.62, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [2]

Table 1

C-1	39.6	C-16	25.4	Glc-1	103.5
2	27.8	17	49.5	2	79.9
3	78.8	18	17.8	3	78.8
4	40.2	19	17.0	4	71.3
5	61.5	20	86.7	5	80.4
6	79.4	21	26.9	6	63.0
7	44.9	22	32.7	Xyl-1	104.9
8	41.0	23	28.8	2	75.9
9	50.5	24	85.6	3	78.1
10	39.6	25	70.3	4	71.8
11	32.4	26	27.1	5	67.3
12	71.2	27	27.7		

(*continued*)

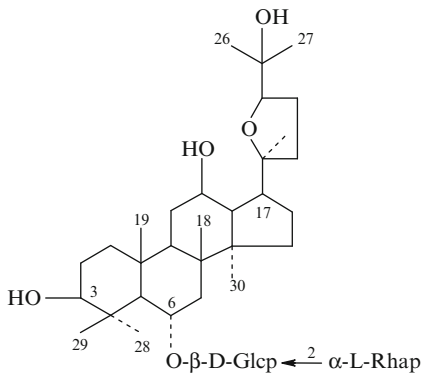
Table 1 (continued)

13	48.4	28	31.7
14	52.2	29	16.6
15	31.7	30	18.1

References

1. T. Morita, Y.-C. Kong, P.-H. Paul, P.-P. But, K.-H. Ng, T.-T. Yip, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **34**(10), 4368 (1986)
2. O. Tanaka, T. Morita, R. Kasai, J. Kinouchi, S. Sanada, Y. Ida, J. Shoji, Chem. Pharm. Bull. **33**(6), 2323 (1985)

24(S)-Pseudoginsenoside F_{11}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol

Biological source: *Panax vietnamensis* [1], *P. quinquefolium* [2], *P.* sp. var. *pseudoginseng* [3]

$C_{42}H_{72}O_{14}$: 800.492

$[\alpha]_D^{18}$ −22.9° (c 1.53, MeOH) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.3	C-16	25.6	Glc-1	101.7
2	27.6	17	49.2	2	79.2
3	78.4	18	17.7	3	78.2
4	39.8	19	17.4	4	72.2
5	60.8	20	86.9	5	78.2
6	74.0	21	26.8	6	62.9
7	45.8	22	32.4	Rha-1	101.6
8	40.9	23	28.5	2	72.1

(*continued*)

Table 1 (continued)

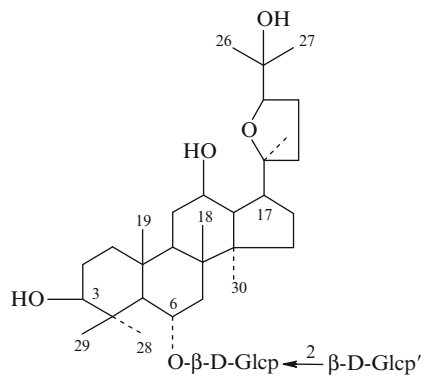
9	49.7	24	88.2	3	72.4
10	39.4	25	69.9	4	74.2
11	32.0	26	26.4	5	69.3
12	70.7	27	28.8	6	18.6
13	48.9	28	31.9		
14	52.1	29	16.8		
15	32.4	30	17.8		

References

1. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)
2. H. Besso, R. Kasai, I. Wei, I.-F. Wang, Y. Saruwatari, T. Fuwa, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4534 (1982)
3. T. Namba, K. Matsushige, T. Morita, O. Tanaka, Chem. Pharm. Bull. **34**, 730 (1986)

Majonoside R1

CAS Registry Number: 81534-62-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol

Biological source: *Panax vietnamensis* [1], *P. japonicus* [2], *P.* sp. var. *pseudoginseng* [3]

$C_{42}H_{72}O_{15}$: 816.487

$[\alpha]_D^{15}$ + 1.0° (c 1.13, MeOH) [2]

^{13}C NMR (25 MHz, C_5D_5N): [2]

Table 1

C-1	39.7	C-16	25.8	Glc-1	103.6
2	27.8	17	49.5	2	79.9
3	78.0	18	17.9	3	78.6

(*continued*)

Table 1 (continued)

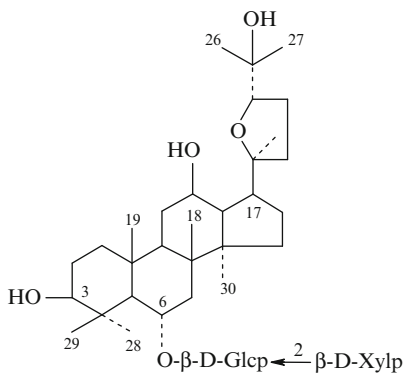
4	40.3	19	17.3	4	71.7
5	61.5	20	87.1	5	79.9
6	79.9	21	27.1	6	63.0
7	45.0	22	32.4	Glc′-1	103.9
8	41.2	23	29.0	2	76.0
9	50.4	24	88.4	3	78.6
10	39.7	25	70.1	4	72.4
11	32.4	26	26.7	5	79.9
12	71.0	27	29.0	6	63.5
13	49.2	28	32.4		
14	52.3	29	16.8		
15	32.4	30	17.9		

References

1. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)
2. T. Morita, R. Kasai, O. Tanaka, J. Zhou, T.-R. Yang, S. Shoji, Chem. Pharm. Bull. **30**, 4341 (1982)
3. T. Namba, K. Matsushige, T. Morita, O. Tanaka, Chem. Pharm. Bull. **34**, 730 (1986)

Majonoside R2

CAS Registry Number: 81534-63-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol

Biological source: *Panax vietnamensis* [1], *P. japonicus* [2], *P.* sp. var. *pseudoginseng* [3]

$C_{41}H_{70}O_{14}$: 786.476

$[\alpha]_D^{18}$ −3.8° (c 1.05, MeOH) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

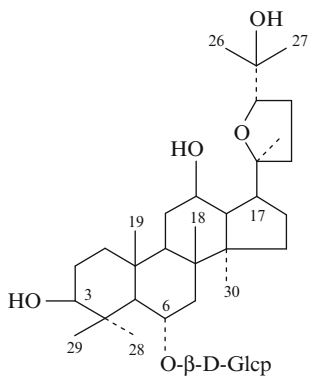
C-1	39.5	C-16	25.8	Glc-1	103.4
2	27.7	17	49.4	2	79.8
3	78.0	18	17.7	3	78.7
4	40.1	19	17.1	4	71.2
5	61.4	20	87.0	5	80.2
6	79.4	21	26.9	6	62.8
7	44.8	22	32.5	Xyl-1	104.8
8	41.0	23	28.6	2	75.7
9	50.2	24	88.3	3	78.6
10	39.5	25	70.0	4	71.6
11	32.2	26	26.5	5	67.1
12	70.8	27	28.9		
13	49.0	28	31.6		
14	52.2	29	16.6		
15	32.4	30	17.8		

References

1. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)
2. T. Morita, R. Kasai, O. Tanaka, J. Zhou, T.-R. Yang, J. Shoji, Chem. Pharm. Bull. **30**, 4341 (1982)
3. T. Namba, K. Matsushige, T. Morita, O. Tanaka, Chem. Pharm. Bull. **34**, 730 (1986)

Pseudoginsenoside RT_4

CAS Registry Number: 98474-77-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol

Biological source: *Panax vietnamensis* [1], *P. pseudoginseng* subsp. *himalaicus* [2]
$C_{36}H_{62}O_{10}$: 654.434
Mp: 247–249°C (MeOH-H_2O) [2]
$[\alpha]_D^{25}$ + 14.4° (c 1.00, MeOH) [2]
^{13}C NMR (25 MHz, C_5D_5N): [2]

Table 1

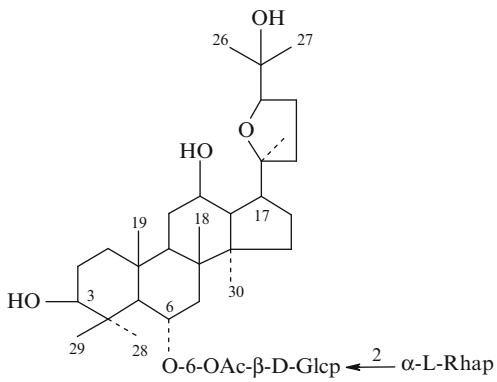
C-1	39.6	C-16	25.8	Glc-1	106.0
2	28.0	17	49.6	2	75.5
3	78.2	18	17.8	3	80.2
4	40.4	19	17.2	4	71.9
5	61.6	20	87.1	5	79.7
6	78.6	21	27.0	6	63.2
7	45.2	22	32.7		
8	41.1	23	28.7		
9	50.4	24	88.4		
10	39.7	25	70.0		
11	32.5	26	26.6		
12	70.9	27	29.0		
13	49.2	28	31.7		
14	52.2	29	16.3		
15	32.3	30	17.9		

References

1. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)
2. O. Tanaka, T. Morita, R. Kasai, J. Kinouchi, S. Sanada, Y. Ida, J. Shoji, Chem. Pharm. Bull. **33**(6), 2323 (1985)

Vina-Ginsenoside-R1

CAS Registry Number: 156980-41-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol
Biological source: *Panax vietnamensis* [1]
$C_{44}H_{74}O_{15}$: 842.502
$[\alpha]_D^{25}$ −23.1° (c 1.08, MeOH) [1]
FAB-MS *m/z*: 841 $[M-H]^-$, 695 $[M-H-Rha]^-$, 491 $[M-H-(Rha-Ac-Glc)]^-$ [1]
EI-MS (TMSi deriv) *m/z*: 711 [(Glc-Rha)AcTMSi_5], 621 (711-TMSiOH), 363 [(terminalRha)TMSi_3], 273 (363-TMSiOH) [1]
^{1}H NMR (J/Hz, C_5D_5N): 1.01, 1.09, 1.31, 1.32, 1.34, 1.34 (overlapped), 1.46, 2.10 (s, CH_3 × 8), 2.11 (s, CH_3CO)
β-D-Glcp: 5.26 (d, J = 6.7, H-1)
α-L-Rhap: 6.49 (brs, H-1); 1.80 (d, J = 6.2, CH_3-6) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

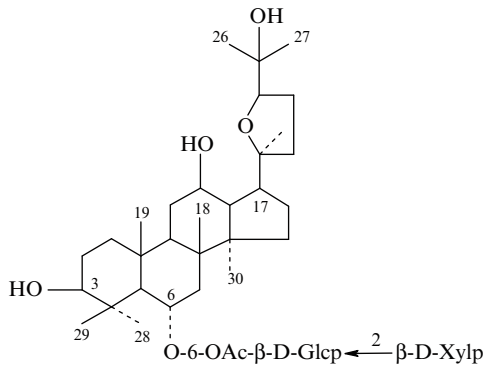
C-1	39.5	C-16	25.7	Glc-1	102.0
2	27.7	17	49.4	2	79.0
3	78.2	18	17.7	3	78.3
4	39.8	19	17.5	4	72.2
5	60.7	20	87.0	5	75.4
6	73.4	21	26.9	6	64.9
7	46.0	22	32.5	Ac	170.7
8	41.1	23	28.6		20.9
9	49.8	24	88.3	Rha-1	101.2
10	36.9	25	70.0	2	72.2
11	32.1	26	26.4	3	72.3
12	70.8	27	28.9	4	74.0
13	49.1	28	31.9	5	69.3
14	52.2	29	16.8	6	18.6
15	32.1	30	17.9		

References

1. M.D. Nguyen, T.N. Nguyen, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)

Vina-Ginsenoside-R2

CAS Registry Number: 156980-42-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,6α,12β,25-tetraol

Biological source: *Panax vietnamensis* [1]

$C_{43}H_{72}O_{15}$: 828.487

Mp: 186–189°C (MeOH-H_2O) [1]

$[\alpha]_D^{25}$ −17.4° (c 0.69, MeOH) [1]

FAB-MS *m/z*: 827 $[M-H]^-$, 695 $[M-H-Xyl]^-$, 491 $[M-H-(Xyl-Ac-Glc)]^-$ [1]

EI-MS (TMSi deriv) *m/z*: 627 [(Glc-Xyl)AcTMSi$_5$], 607 (697-TMSiOH), 349 [(terminalXyl)TMSi$_3$], 259 (349-TMSiOH) [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.89, 1.05, 1.28, 1.32, 1.33, 1.42, 1.47, 2.06 (s, CH_3 × 8), 2.10 (s, CH_3CO)

β-D-Glcp: 5.75 (d, J = 6.4, H-1)

α-L-Xylp: 5.00 (H-1) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

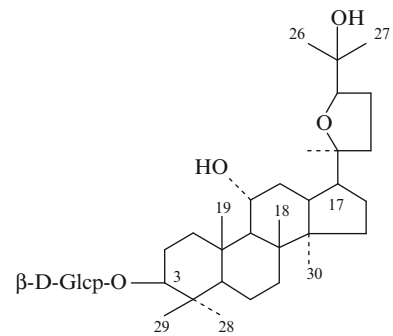
C-1	39.5	C-16	25.8	Glc-1	103.5
2	27.8	17	49.5	2	80.2
3	78.7	18	17.9	3	78.7
4	40.1	19	17.0	4	71.2
5	61.3	20	87.0	5	75.0
6	79.3	21	27.0	6	65.0
7	45.3	22	32.6	Ac	170.8
8	41.1	23	28.6		21.0
9	50.2	24	88.4	Xyl-1	105.0
10	39.6	25	70.0	2	75.7
11	32.2	26	26.6	3	78.7
12	70.8	27	28.9	4	71.2
13	49.2	28	31.7	5	67.3
14	52.3	29	16.9		
15	32.6	30	17.9		

(*continued*)

References

1. M.D. Nguyen, T.N. Nguyen, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)

Compound 2 From *Betula ermanii*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,11α,25-triol

Biological source: *Betula ermanii* [1]

$C_{36}H_{62}O_9$: 638.439

$[\alpha]_D$ + 14° (c 0.5, MeOH) [1]

HR-FAB-MS *m/z*: 637.433 $[M-H]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.00, 1.03, 1.10, 1.19, 1.20, 1.37, 1.39, 1.41 (s, CH_3 × 8), 3.98 (t, J = 8.2), 4.97 (d, J = 7.6) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	41.6	C-16	26.0	Glc-1	106.0
2	27.2	17	50.1	2	75.8
3	88.8	18	17.0	3	78.8

(*continued*)

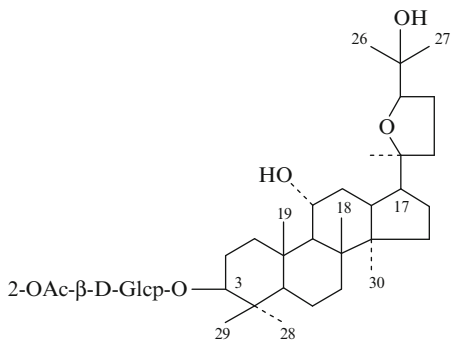
Table 1 (continued)

4	40.3	19	17.0	4	71.8
5	56.9	20	86.0	5	78.2
6	18.4	21	23.0	6	62.9
7	36.5	22	36.5		
8	40.9	23	26.8		
9	56.0	24	84.2		
10	39.3	25	71.1		
11	70.3	26	26.1		
12	40.0	27	27.0		
13	41.8	28	28.4		
14	50.2	29	16.9		
15	31.4	30	16.5		

References

1. H. Fuchino, T. Satoh, N. Tanaka, Chem. Pharm. Bull. **43**(11), 1937 (1995)

Compound 3 from *Betula ermanii*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,11α,25-triol

Biological source: *Betula ermanii* [1]

$C_{38}H_{64}O_{10}$: 680.449

$[\alpha]_D$ + 21° (c 1.0, MeOH) [1]

HR-FAB-MS *m/z*: 679.441 $[M-H]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.00, 1.00, 1.02, 1.13, 1.15, 1.20, 1.38, 1.40, (s, CH_3 × 8), 2.15 (s, Ac), 3.33 (dd, J = 12.5, 3.8), 4.92 (d, J = 8.2) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

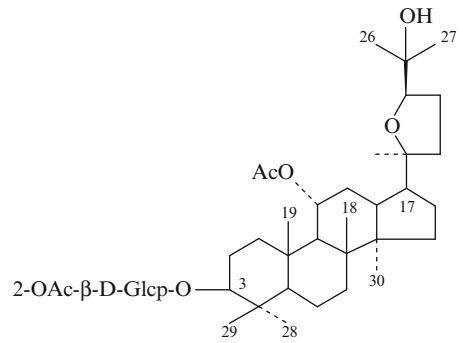
Table 1

C-1	41.4	C-16	26.1	Glc-1	103.9
2	26.9	17	50.1	2	76.2
3	89.0	18	16.9	3	75.8
4	40.0	19	16.9	4	71.8
5	56.8	20	86.0	5	78.4
6	18.4	21	23.0	6	62.6
7	36.5	22	36.5	Ac-1	170.0
8	40.9	23	26.8	2	21.3
9	56.0	24	84.2		
10	38.2	25	71.1		
11	70.3	26	26.1		
12	40.0	27	27.0		
13	41.8	28	28.1		
14	50.2	29	16.8		
15	31.4	30	16.5		

References

1. H. Fuchino, T. Satoh, N. Tanaka, Chem. Pharm. Bull. **43**(11), 1937 (1995)

Compound 4 from *Betula ermanii*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,11α,25-triol
Biological source: *Betula ermanii* [1]
$C_{40}H_{66}O_{11}$: 722.460
$[\alpha]_D$ + 25° (c 1.0, MeOH) [1]
FAB-MS *m/z*: 721.452 $[M-H]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.94, 0.94, 0.95, 0.96, 1.15, 1.17, 1.40, 1.44, (s, CH_3 × 8), 1.92 (Ac), 2.16 (s, Ac), 3.32 (dd, J = 11.9, 4.6), 3.96 (t, J = 7.0), 5.00 (d, J = 7.9) [1]
^{13}C NMR (500 MHz, C_5D_5N): [1]

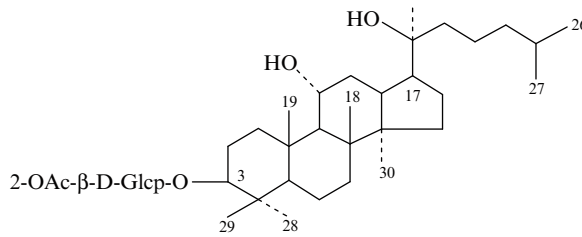
Table 1

C-1	40.5	C-16	26.6	Glc-1	103.9
2	26.8	17	49.8	2	76.2
3	88.6	18	16.8	3	75.8
4	39.9	19	17.0	4	71.8
5	56.1	20	85.9	5	78.5
6	18.3	21	23.5	6	62.6
7	36.1	22	36.1	Ac	170.0
8	41.3	23	26.8		169.9
9	53.1	24	84.2		21.9
10	38.8	25	71.2		21.2
11	73.0	26	26.1		
12	35.7	27	27.1		
13	40.9	28	28.1		
14	50.0	29	16.6		
15	31.4	30	16.3		

References

1. H. Fuchino, T. Satoh, N. Tanaka, Chem. Pharm. Bull. **43**(11), 1937 (1995)

Compound 6 from *Betula ermanii*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3β,11α,25-triol
Biological source: *Betula ermanii* [1]
$C_{38}H_{64}O_9$: 664.455
$[\alpha]_D$ + 20° (c 1.0, MeOH) [1]
HR-FAB-MS *m/z*: 663.448 $[M-H]^-$ [1]
^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.01, 1.02, 1.10, 1.13, 1.15, 1.43, 1.63, 1.68 (s, CH_3 × 8), 2.16 (s, OAc), 5.29 (t, J = 7.0) [1]
^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

C-1	41.4	C-16	25.5	Glc-1	103.9
2	26.9	17	50.3	2	76.2
3	89.0	18	17.0	3	75.8
4	40.0	19	16.9	4	71.8
5	56.8	20	73.9	5	78.4
6	18.4	21	25.8	6	62.6
7	36.6	22	41.8	Ac	169.9
8	41.0	23	23.3		21.3

(*continued*)

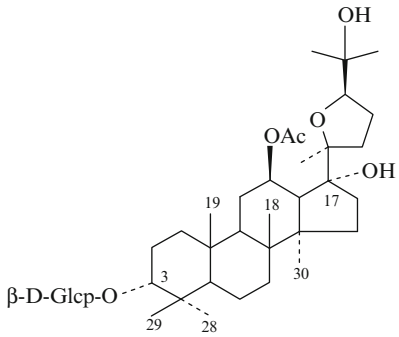
Table 1 (continued)

9	56.0	24	126.0
10	39.2	25	130.7
11	70.4	26	26.1
12	40.7	27	17.7
13	41.1	28	28.2
14	50.6	29	16.7
15	31.3	30	16.8

References

1. H. Fuchino, T. Satoh, N. Tanaka, Chem. Pharm. Bull. **43**(11), 1937 (1995)

Betulamaximoside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3α,12β,17α,25-tetraol

Biological source: *Betula maximowicziana* [1]

$C_{38}H_{64}O_{11}$: 696.444

$[\alpha]_D - 19°$ (c 1.0, MeOH) [1]

FAB-MS (negative ion mode) *m/z*: 695.438 $(M-H)^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.86, 0.87, 1.01, 1.03, 1.24, 1.29, 1.39, 1.50 (s, $CH_3 \times 8$), 2.04 (s, OAc), 3.63 (brs), 3.93 (dd, J = 8.1, 5.8)

β-D-Glcp: 4.82 (d, J = 7.6, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

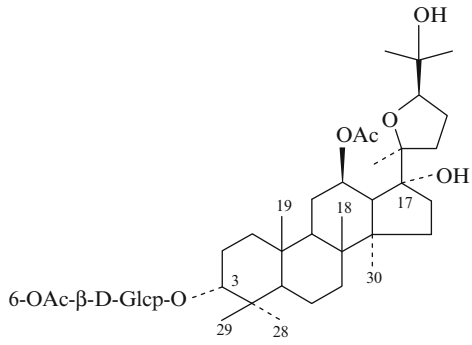
Table 1

C-1	34.1	C-17	84.7	Glc-1	102.8
2	21.9	18	15.8	2	75.0
3	82.6	19	16.4	3	78.9
4	37.5	20	91.1	4	71.7
5	50.7	21	23.8	5	78.2
6	18.4	22	33.9	6	63.2
7	34.2	23	27.4		
8	40.4	24	84.2		
9	50.0	25	72.1		
10	37.4	26	27.8		
11	29.0	27	26.8		
12	72.1	28	29.5		
13	49.0	29	22.6		
14	52.2	30	18.3		
15	33.4	Ac-1	170.2		
16	39.5	2	21.8		

References

1. H. Fuchino, T. Satoh, N. Tanaka, Chem. Pharm. Bull. **44**(9), 1748 (1996)

Betulamaximoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S),24(R)-Epoxy-dammar-3α,12β,17α,25-tetraol

Biological source: *Betula maximowicziana* [1]

$C_{40}H_{66}O_{12}$: 738.455

$[\alpha]_D - 22°$ (c 1.0, MeOH) [1]

FAB-MS (negative ion mode) *m/z*: 737.448 $(M\text{-}H)^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.88, 0.92, 1.01, 1.03, 1.27, 1.29, 1.39, 1.50 (s, $CH_3 \times 8$), 2.02, 2.04 (s, AcO × 2), 3.58 (brs), 3.93 (dd, J = 8.1, 5.8), 4.04 (d, J = 8.9), 4.19 (t, J = 8.9), 4.75 (d, J = 7.6), 4.81 (dd, J = 11.6, 6.1), 4.95 (dd, J = 11.6, 1.8), 5.42 (td, J = 11.0, 5.2) [1]

^{13}C NMR (C_5D_5N): [1]

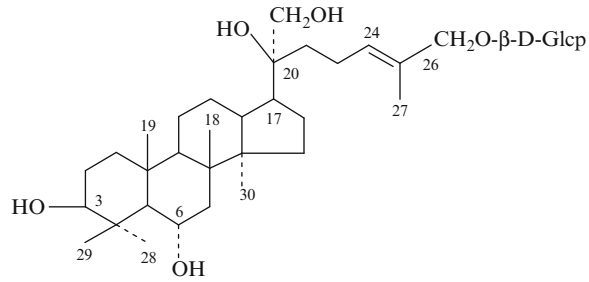
Table 1

C-1	34.1	C-17	84.7	Glc-1	103.1
2	22.3	18	15.8	2	74.8
3	83.2	19	16.4	3	78.6
4	37.5	20	91.1	4	71.6
5	50.8	21	23.8	5	75.0
6	18.4	22	33.9	6	64.7
7	34.2	23	27.4	Ac-1	170.8
8	40.4	24	84.3	2	20.8
9	50.0	25	72.1		
10	37.4	26	27.8		
11	29.0	27	26.8		
12	72.1	28	29.4		
13	49.0	29	22.7		
14	52.2	30	18.3		
15	33.4	Ac-1	170.2		
16	39.5	2	21.8		

References

1. H. Fuchino, T. Satoh, N. Tanaka, Chem. Pharm. Bull. **44**(9), 1748 (1996)

Kizuta-Saponin K_{7b}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,6α,20,21,26-pentaol

Biological source: *Hedera rhombea* [1]

$C_{36}H_{62}O_{10}$: 654.434

Mp: 131–134°C (dil. MeOH) [1]

$[\alpha]_D^{23} + 23.0°$ (c 0.66, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1100–1000 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 3.55 (t-like, H-3), 0.98 (s, CH_3-18), 1.01 (s, CH_3-19), 4.03 (s, H_2-20), 5.77 (H-24), 1.82 (s, CH_3-27), 1.11 (s, CH_3-28), 2.00 (s, CH_3-29), 1.46 (s, CH_3-30)

β-D-Glcp: 4.9 (d, J = 7.3, H-1) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.5	C-16	28.2	Glc-1	103.6
2	28.1	17	46.3	2	75.2
3	78.6	18	17.6	3	78.6
4	40.4	19	17.4	4	71.8
5	61.9	20	76.6	5	78.4
6	67.8	21	66.8	6	62.9
7	48.1	22	36.2		
8	41.9	23	22.9		
9	50.9	24	129.5		

(*continued*)

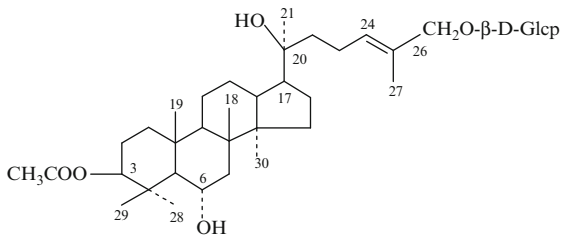
Table 1 (continued)

10	39.5	25	132.2
11	21.9	26	75.2
12	24.8	27	14.3
13	41.5	28	32.0
14	50.6	29	16.5
15	31.8	30	16.8

References

1. H. Kizu, M. Koshijima, T. Tomimori, Chem. Pharm. Bull. **33**(8), 3176 (1985)

Kizuta-Saponin K_4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,6α,20,26-tetraol

Biological source: *Hedera rhombea* [1]

$C_{38}H_{64}O_{10}$: 680.449

Mp: 116–120°C (Et_2O-$CHCl_3$) [1]

$[\alpha]_D^{20}$ + 25.1° (c 1.50, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1710, 1250, 1100–1000 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.93 (s, CH_3-18), 0.99 (s, CH_3-19), 1.40 (s, CH_3-20), 1.06 (s, CH_3-29), 1.32 (s, CH_3-30), 1.65 (s, CH_3-28), 1.82 (s, CH_3-27), 2.10 (s, Ac), 4.76 (t-like, H-3), 5.73 (t-like, H-24)

β-D-Glcp: 4.91 (d, J = 7.3, H-1) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

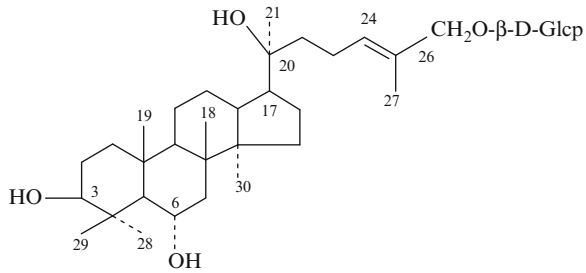
Table 1

C-1	38.8	C-16	28.0	Glc-1	103.5
2	23.9	17	50.4	2	75.2
3	81.3	18	17.5	3	78.6
4	38.9	19	17.3	4	71.8
5	61.5	20	74.1	5	78.4
6	67.4	21	26.1	6	62.9
7	47.9	22	41.5		
8	41.7	23	22.9		
9	50.6	24	129.4		
10	39.2	25	132.2		
11	21.9	26	75.2		
12	25.3	27	14.3		
13	42.1	28	31.3		
14	50.7	29	17.0		
15	31.6	30	16.8		
		Ac	170.9		
			21.2		

References

1. H. Kizu, M. Koshijima, M. Hayashi, T. Tomimori, Chem. Pharm. Bull. **33**(4), 1400 (1985)

Kizuta-Saponin K_7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,6α,20,26-tetraol

Biological source: *Hedera rhombea* [1]

$C_{36}H_{62}O_9$: 638.439

Mp: 128–132°C (dil. MeOH) [1]

$[\alpha]_D^{20}$ + 22.3° (c 0.97, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1100–1000 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.99 (s, CH_3-18), 0.99 (s, CH_3-19), 1.09 (s, CH_3-30), 1.40 (s, CH_3-21), 1.46 (s, CH_3-29), 1.82 (s, CH_3-27), 1.99 (s, CH_3-28), 3.56 (t-like, H-3), 5.75 (t-like, H-24)
β-D-Glcp: 4.91 (d, J = 7.1, H-1) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

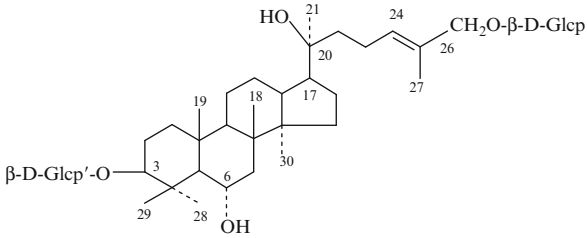
Table 1

C-1	39.5	C-16	28.1	Glc-1	103.5
2	28.1	17	50.4	2	75.2
3	78.6	18	17.6	3	78.6
4	40.4	19	17.3	4	71.8
5	61.9	20	74.1	5	78.4
6	67.8	21	26.0	6	62.9
7	48.1	22	41.5		
8	41.8	23	22.9		
9	50.7	24	129.4		
10	39.5	25	132.2		
11	21.9	26	75.2		
12	25.4	27	14.2		
13	42.2	28	32.0		
14	50.7	29	16.5		
15	31.6	30	16.8		

References

1. H. Kizu, M. Koshijima, M. Hayashi, T. Tomimori, Chem. Pharm. Bull. **33**(4), 1400 (1985)

Kizuta-Saponin K_9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,6α,20,26-tetraol

Biological source: *Hedera rhombea* [1]
$C_{42}H_{72}O_{14}$: 800.492
Mp: 144–147°C (MeOH–AcOEt) [1]
$[\alpha]_D^{20}$ + 10.8° (c 1.05, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1100–1000 [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 3.45 (m, H-3), 0.90 (s, CH_3-18), 1.01 (s, CH_3-19), 1.40 (s, CH_3-21), 5.73 (H-24), 1.81 (CH_3-27), 1.04 (CH_3-28), 2.05 (CH_3-29), 1.38 (CH_3-30)
β-D-Glcp: 4.98 (d, J = 7.1, H-1)
β-D-Glcp′: 4.87 (d, J = 7.3, H-1) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	28.1	Glc-1	107.3
2	26.7	17	50.4	2	75.9
3	89.6	18	17.5	3	78.8
4	39.0	19	17.3	4	71.9
5	61.9	20	74.1	5	78.3
6	67.6	21	26.0	6	63.1
7	48.0	22	41.5	Glc′-1	103.5
8	41.7	23	22.9	2	75.2
9	50.7	24	129.4	3	78.6
10	40.6	25	132.2	4	71.7
11	21.9	26	75.2	5	78.4
12	25.3	27	14.2	6	62.8
13	42.1	28	31.4		
14	50.7	29	17.0		
15	31.6	30	16.8		

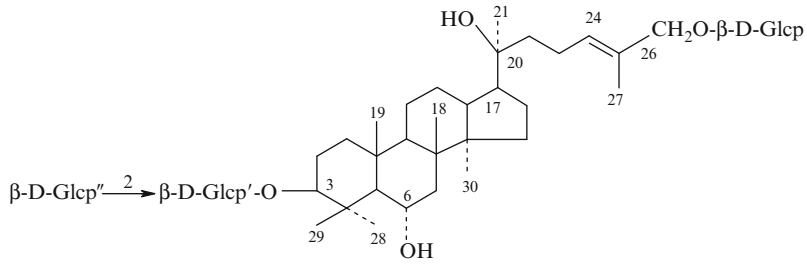
References

1. H. Kizu, M. Koshijima, T. Tomimori, Chem. Pharm. Bull. **33**(8), 3176 (1985)

Kizuta-Saponin K_{13}

See Figure Kizuta-Saponin K_{13}

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,6α,20,26-tetraol



Kizuta-Saponin K_{13}

Biological source: *Hedera rhombea* [1]
$C_{48}H_{82}O_{19}$: 962.545
Mp: 175–179°C (MeOH–AcOEt) [1]
$[\alpha]_D^{20}$ + 3.0° (c 0.76, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1100-1000 [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 3.36 (m, H-3), 0.90 (s, CH_3-18), 1.02 (s, CH_3-19), 1.40 (s, H-21), 5.73 (brs, H-24), 1.83 (s, CH_3-27), 1.06 (s, CH_3-28), 2.02 (s, CH_3-29), 1.53 (s, CH_3-30)
β-D-Glcp: 4.92 (d, J = 7.1, H-1)
β-D-Glcp′: 5.43 (d, J = 6.8, H-1)
β-D-Glcp″: 4.92 (d, J = 7.1, H-1) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

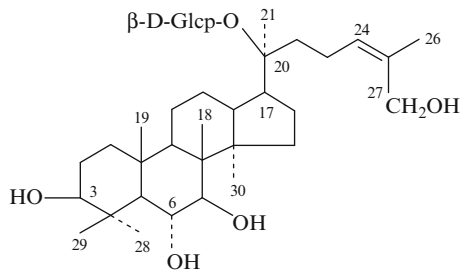
Table 1

C-1	39.3	C-16	28.1	Glc-1	105.5	Glc″-1	103.6
2	26.8	17	50.4	2	83.5	2	75.2
3	89.6	18	17.5	3	78.1	3	78.7
4	39.0	19	17.3	4	71.9	4	71.9
5	62.0	20	74.1	5	78.5	5	78.5
6	67.6	21	26.0	6	62.9	6	62.9
7	48.1	22	41.6	Glc′-1	106.1		
8	41.8	23	22.9	2	77.1		
9	50.7	24	129.4	3	78.1		
10	40.7	25	132.3	4	71.9		
11	21.9	26	75.2	5	78.1		
12	25.4	27	14.2	6	62.9		
13	42.2	28	31.4				
14	50.7	29	16.8				
15	31.6	30	16.8				

References

1. H. Kizu, M. Koshijima, T. Tomimori, Chem. Pharm. Bull. **33**(8), 3176 (1985)

Actinostemmoside G



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,6α,7β,20,27-pentaol
Biological source: *Actinostemma lobatum* [1]
$C_{36}H_{62}O_{10}$: 654.434
FAB-MS *m/z*: 677.424 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.97, 1.62 (H-1), 3.52 (dd, J = 7, 10, H-3), 1.28 (d, J = 11, H-5), 4.18 (dd, J = 9, 11, H-6), 3.88 (d, J = 9, H-7), 1.45 (s, H-9), 2.15 (ddd, J = 4, 10, 10, H-17), 1.28 (s, CH_3-18), 0.99 (s, CH_3-19), 1.49 (s, CH_3-21), 2.50, 2.58 (m, H_2-23), 5.48 (t, J = 7, H-24), 2.01 (s, CH_3-26), 4.49, 4.56 (d, J = 12, H_2-27), 1.90 (s, CH_3-28), 1.39 (s, CH_3-29), 1.08 (s, CH_3-30)
β-D-Glcp: 5.05 (d, J = 8, H-1), 3.97 (dd, J = 8, 9, H-2), 4.23 (t, J = 9, H-3), 4.16 (t, J = 9, H-4), 3.88 (ddd, J = 9, 5, 3, H-5), 4.28 (dd, J = 5, 11), 4.45 (dd, J = 11, 3, H_2-6) [1]
^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

Table 1

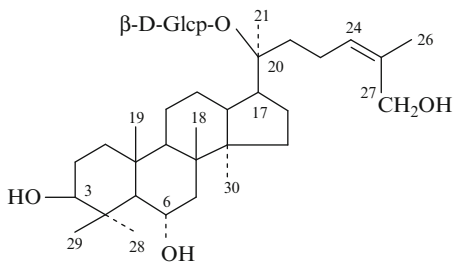
C-1	39.4	C-16	28.1	Glc-1	98.6
2	27.9	17	47.6	2	75.6
3	78.3	18	12.1	3	79.0
4	40.3	19	17.8	4	71.9
5	58.3	20	82.3	5	77.9
6	71.8	21	21.4	6	63.0
7	80.3	22	40.5		
8	46.4	23	22.7		
9	50.3	24	127.7		
10	39.3	25	135.9		
11	21.9	26	21.7		
12	25.9	27	61.0		
13	43.0	28	31.6		
14	50.5	29	16.6		
15	35.0	30	16.6		

References

1. T. Fujioka, Y. Iwase, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **35**(9), 3870 (1987)

Actinostemmoside A

CAS Registry Number: 108906-64-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,6α,20,27-tetraol

Biological source: *Actinostemma lobatum* [1]

$C_{36}H_{62}O_9$: 638.439

Mp: 125–130°C (EtOH) [1]

$[\alpha]_D^{16}$ + 32.3° (c 0.3, MeOH) [1]

FAB-MS *m/z*: 661 $[M + Na]^+$ [1]

^{1}H NMR (MHz, J/Hz, C_5D_5N-D_2O): 3.53 (dd, J = 6, 11, H-3), 1.21 (d, J = 11, H-5), 4.38 (ddd, J = 11, 11, 4, H-6), 2.15 (ddd, J = 11, 11, 6, H-17), 0.96 (s, CH_3-18), 1.10 (s, CH_3-19), 1.47 (s, CH_3-21), 2.47, 2.53 (m, H_2-23), 5.50 (t, J = 7, H-24), 2.02 (s, CH_3-26), 4.49, 4.57 (d, J = 12, H_2-27), 1.97 (s, CH_3-28), 1.44 (s, CH_3-29), 0.94 (s, CH_3-30)

β-D-Glcp: 5.03 (d, J = 8, H-1), 3.97 (dd, J = 8, 9, H-2), 4.26 (t, J = 9, H-3), 4.17 (t, J = 9, H-4), 3.88 (ddd, J = 9, 5, 3, H-5), 4.29 (dd, J = 5, 12, H-6), 4.46 (dd, J = 12, 3, H-6) [1]

^{13}C NMR (C_5D_5N-D_2O): [1]

Table 1

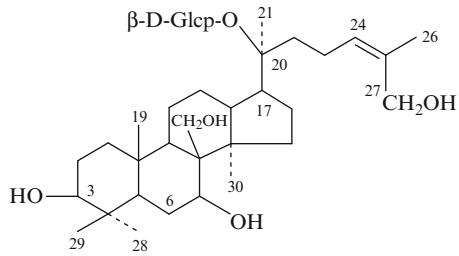
C-1	39.6	C-16	28.2	Glc-1	98.6
2	27.9	17	48.4	2	75.6
3	78.5	18	17.7	3	79.0
4	40.4	19	17.4	4	71.9
5	61.9	20	82.2	5	77.9
6	67.7	21	21.4	6	63.0
7	48.1	22	40.7		
8	41.8	23	22.7		
9	50.8	24	127.7		
10	39.5	25	136.0		
11	22.0	26	21.8		
12	25.5	27	61.0		
13	42.2	28	32.0		
14	50.7	29	16.5		
15	31.5	30	16.8		

References

1. M. Iwamoto, T. Fujioka, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **35**(2), 553 (1987)

Actinostemmoside C

CAS Registry Number: 108906-62-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,7β,18,20,27-pentaol

Biological source: *Actinostemma lobatum* [1]

$C_{36}H_{62}O_{10}$: 654.434

Mp: 194–197°C (MeOH) [1]

$[\alpha]_D^{17}$ + 3.3° (c 1.0, MeOH) [1]

FAB-MS *m/z*: 661 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N-D_2O): 3.45 (t, J = 8, H-3), 4.11 (dd, J = 11, 3, H-7), 2.33 (ddd, J = 11, 11, 2, H-13), 4.49, 4.68 (d, J = 12, H_2-18), 1.05 (s, CH_3-19), 1.52 (s, CH_3-21), 5.45 (t, J = 7, H-24), 1.99 (s, CH_3-26), 4.47, 4.52 (d, J = 12, H_2-27), 1.20 (s, CH_3-28), 1.02 (s, CH_3-29), 1.16 (s, CH_3-30)

β-D-Glcp: 5.02 (d, J = 8, H-1), 3.92 (dd, J = 8, 9, H-2), 4.20 (t, J = 9, H-3), 4.11 (t, J = 9, H-4), 3.84 (ddd, J = 9, 5, 3, H-5), 4.25 (dd, J = 5, 12, H-6), 4.41 (dd, J = 12, 2, H-6) [1]

^{13}C NMR (C_5D_5N-D_2O): [1]

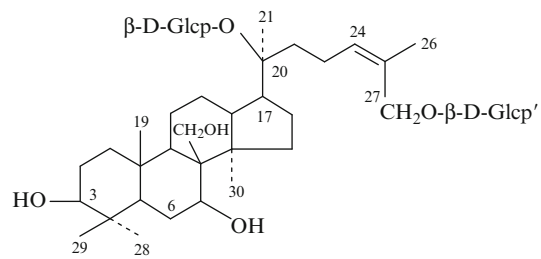
Table 1

C-1	39.8	C-16	28.2	Glc-1	98.7
2	28.5	17	47.4	2	75.6
3	78.0	18	62.0	3	78.9
4	39.5	19	16.9	4	71.9
5	54.6	20	82.4	5	77.9
6	30.3	21	21.9	6	62.9
7	77.8	22	40.9		
8	49.2	23	22.9		
9	52.2	24	127.8		
10	37.8	25	136.0		
11	22.9	26	21.8		
12	25.8	27	61.0		
13	44.4	28	28.7		
14	50.4	29	16.6		
15	36.5	30	17.1		

References

1. M. Iwamoto, T. Fujioka, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **35**(2), 553 (1987)

Actinostemmoside H



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,7β,18,20,27-pentaol

Biological source: *Actinostemma lobatum* [1]

$C_{42}H_{72}O_{15}$: 816.487

Mp: 135–140°C (aq. MeOH) [1]

$[\alpha]_D^{24}$ + 1.6° (c 0.54, MeOH) [1]

FAB-MS *m/z*: 839 $[M + Na]^+$, 815 $[M-H]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.92, 1.65 (H-1), 3.47 (dd, J = 6, 10, H-3), 0.97 (dd, J = 3, 10, H-5), 4.12 (dd, J = 1, 10, H-7), 1.26 (s, H-9), 2.30 (ddd, J = 2, 11, 11, H-13), 4.52, 4.70 (d, J = 12, H_2-18), 1.02 (s, CH_3-19), 1.57 (s, CH_3-21), 2.50 (m, H-23), 5.53 (t, J = 7, H-24), 1.94 (s, CH_3-26), 4.62, 4.68 (d, J = 12, H_2-27), 1.20 (s, CH_3-28), 1.20 (s, CH_3-29), 1.04 (s, CH_3-30)

β-D-Glcp: 5.06 (d, J = 8, H-1), 3.98 (dd, J = 8, 9, H-2), 4.24 (t, J = 9, H-3), 4.15 (t, J = 9, H-4), 3.90 (ddd, J = 9, 6, 3, H-5), 4.28 (dd, J = 6, 12), 4.45 (dd, J = 12, 3, H_2-6)

β-D-Glcp′: 4.87 (d, J = 8, H-1), 4.02 (dd, J = 8, 9, H-2), 4.25 (t, J = 9, H-3), 4.17 (t, J = 9, H-4), 3.95 (ddd, J = 9, 6, 3, H-5), 4.32 (dd, J = 6, 12), 4.53 (dd, J = 12, 3, H_2-6) [1]

^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

Table 1

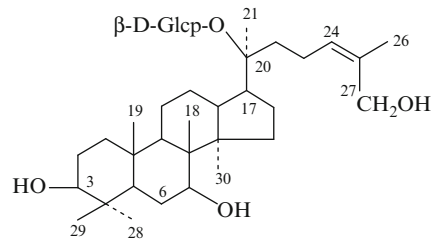
C-1	39.8	C-16	28.2	Glc-1	98.6
2	28.5	17	47.6	2	75.6
3	78.0	18	62.1	3	78.8
4	39.5	19	16.6	4	71.8
5	54.6	20	82.4	5	77.8
6	30.3	21	22.1	6	62.9
7	77.7	22	40.8	Glc′-1	103.3
8	49.2	23	23.1	2	75.1
9	52.2	24	130.9	3	78.5
10	37.7	25	131.9	4	71.7
11	22.9	26	21.9	5	78.4
12	25.8	27	67.7	6	62.8
13	44.3	28	28.7		
14	50.4	29	16.8		
15	36.5	30	17.1		

References

1. T. Fujioka, Y. Iwase, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **35**(9), 3870 (1987)

Actinostemmoside B

CAS Registry Number: 108906-63-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,7β,20,27-tetraol

Biological source: *Actinostemma lobatum* [1]

$C_{36}H_{62}O_9$: 638.439

Mp: 142–145°C (EtOH) [1]

$[\alpha]_D^{19}$ + 15.4° (c 0.5, MeOH) [1]

FAB-MS *m/z*: 661 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N + D_2O): 3.46 (t, J = 8, H-3), 4.05 (dd, J = 11, 4, H-7), 2.17 (m, H-17), 1.26 (s, H-18), 0.88 (s, CH_3-19), 1.50 (s, CH_3-21), 2.52, 2.62 (m, H_2-23), 5.50 (t, J = 7, H-24), 2.02 (s, CH_3-26), 4.50, 4.57 (d, J = 12, H_2-27), 1.20 (s, CH_3-28), 1.05 (s, CH_3-29), 1.13 (s, CH_3-30)

β-D-Glcp: 5.03 (d, J = 8, H-1), 3.97 (dd, J = 8, 9, H-2), 4.26 (t, J = 9, H-3), 4.17 (t, J = 9, H-4), 3.88 (ddd, J = 9, 5, 3, H-5), 4.29 (dd, J = 5, 12, H-6), 4.46 (dd, J = 12, 3, H-6) [1]

^{13}C NMR (C_5D_5N-D_2O): [1]

Table 1

C-1	39.6	C-16	28.1	Glc-1	98.6
2	28.4	17	47.6	2	75.6
3	78.1	18	10.5	3	79.0
4	39.4	19	16.7	4	71.9

(*continued*)

Table 1 (continued)

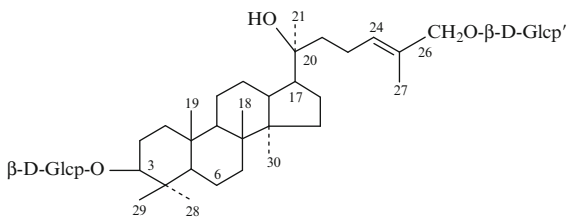
5	54.1	20	82.5	5	77.9
6	29.4	21	21.8	6	63.0
7	74.8	22	40.5		
8	46.6	23	22.7		
9	51.0	24	127.9		
10	37.0	25	135.9		
11	22.2	26	21.4		
12	26.1	27	61.1		
13	43.7	28	28.7		
14	50.4	29	16.5		
15	35.4	30	16.8		

Pharm./Biol.: Herb used as a diuretic, for the treatment of nephrotic edema, as an antidote for poisonous snake bite [2]

References

1. M. Iwamoto, T. Fujioka, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **35**(2), 553 (1987)
2. Chiang Su new Medical College, *Dictionary of Chinese Crude Drugs* (Shanghai Scientific Technologic Publisher, Shanghai, 1977), p. 936

Kizuta-Saponin K_{7c}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Dammar-24-en-3β,20,26-triol

Biological source: *Hedera rhombea* [1]

$C_{42}H_{72}O_{13}$: 784.497

Mp: 217–220°C (MeOH) [1]

$[\alpha]_D^{20}$ + 2.8° (c 1.00, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1100–1000 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 3.39 (m, H-3), 0.79 (s, CH_3-18), 0.95 (s, CH_3-19), 1.39 (s, CH_3-21), 5.73 (t-like, H-24), 1.81 (s, CH_3-27), 1.00 (s, CH_3-28), 1.31 (s, CH_3-30)

β-D-Glcp: 4.94 (d, J = 7.1, H-1)

β-D-Glcp′: 4.87 (d, J = 7.3, H-1) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

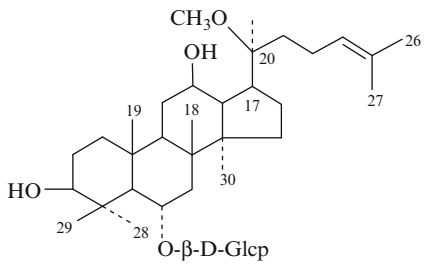
C-1	39.4	C-16	28.2	Glc-1	103.6
2	26.8	17	50.4	2	75.2
3	89.0	18	16.5	3	78.7
4	39.7	19	15.7	4	71.8
5	56.5	20	74.1	5	78.5
6	18.5	21	26.0	6	62.9
7	35.7	22	41.6	Glc′-1	107.0
8	40.7	23	22.9	2	75.8
9	51.1	24	129.4	3	78.8
10	37.1	25	132.2	4	71.9
11	21.9	26	75.2	5	78.3
12	25.3	27	14.3	6	63.1
13	42.6	28	28.2		
14	50.7	29	16.8		
15	31.7	30	16.8		

References

1. H. Kizu, M. Koshijima, M. Hayashi, T. Tomimori, Chem. Pharm. Bull. **33**(4), 1400 (1985)

Ginsenoside Rh_5

CAS Registry Number: 340270-88-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Methoxy-protopanaxatriol

Biological source: *Panax vietnamensis* [1]

$C_{37}H_{64}O_9$: 652.455

$[\alpha]_D^{25}$ + 32.4° (c 2.39, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1650 [1]

FAB-MS *m/z*: 651.4471 [1]

^{1}H NMR (J/Hz, C_5D_5N): 1.73, 1.01 (m, H_2-1), 1.97, 1.84 (m, H_2-2), 3.49 (dd, J = 11.3, 4.7, H-3), 1.41 (d, J = 10.8, H-5), 4.38 (td, J = 10.8, 3.0, H-6), 2.45 (dd, J = 12.7, 3.0, H-7), 1.92 (m, H-7), 1.50 (m, H-9), 1.41, 2.07 (m, H_2-11), 3.68 (td, J = 10.0, 5.4, H-12), 1.8 (dd, J = 11.2, 5.4, H-13), 1.56, 1.04 (m, H_2-15), 1.61, 1.18 (m, H_2-16), 2.30 (m, H-17), 1.02 (s, CH_3-18), 1.12 (s, CH_3-19), 1.13 (s, CH_3-21), 1.92, 1.18 (m, H_2-22), 2.25, 2.06 (m, H_2-23), 5.23 (t, J = 6.9, H-24), 1.66 (s, CH_3-26), 1.62 (s, CH_3-27), 2.01 (s, CH_3-28), 1.56 (s, CH_3-29), 0.79 (s, CH_3-30)

β-D-Glcp: 4.96 (d, J = 7.8, H-1), 4.02 (t, J = 7.8, H-2), 4.17 (m, H-3), 4.14 (m, H-4), 3.88 (m, H-5), 4.46 (dd, J = 11.4, 2.4, H-6), 4.29 (dd, J = 11.4, 5.4, H-6), 3.22 (s, CH_3O) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

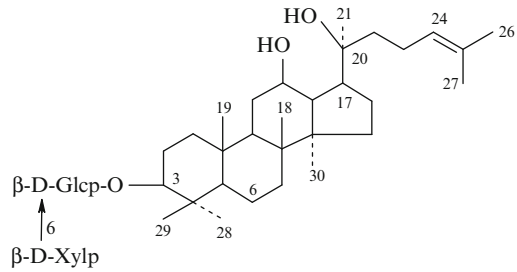
C-1	39.5	C-16	26.2	Glc-1	105.9
2	27.8	17	46.9	2	75.3
3	78.6	18	17.5	3	79.5
4	40.3	19	17.4	4	71.8
5	61.4	20	79.8	5	78.0
6	80.0	21	21.1	6	63.1
7	45.1	22	35.1	CH_3O	48.8
8	41.0	23	22.7		
9	49.8	24	125.5		
10	39.7	25	130.2		
11	31.0	26	25.8		
12	70.3	27	17.7		
13	48.6	28	31.6		
14	51.3	29	16.3		
15	30.7	30	16.8		

Pharm./Biol.: Ginsenoside Rh_5 showed hepatocyto-protective activity against D-GalN/TNF-a-induced cell death in primary cultured mouse hepatocytes, with cell survival rates of 91.8 (3.6%, 59.7 (6.9%, and 51.1 (7.8%, respectively, at a concentration of 200 μg/mL, compared to that of vehicle control (56.2 (8.2%) [1]

References

1. Q. Tran, I.K. Adnyana, Y. Tezuka, T. Nagaoka, Q.K. Tran, Sh. Kadota, J. Nat. Prod. **64**(4), 456 (2001)

Chikusetsusaponin Ia



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax japonicus* [1]

$C_{41}H_{70}O_{12}$: 754.486

Mp: 194°C [1]

$[\alpha]_D^{16}$ − 3.51° (c 1.42, MeOH) [1]

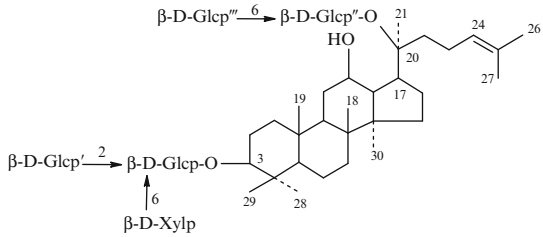
IR (KBr) ν_{max} cm^{-1}: 3400, 1630 [1]

References

1. T.D. Lin, N. Kondo, J. Shoji, Chem. Pharm. Bull. **24**, 253 (1976)

Chikusetsusaponin VI

CAS Registry Number: 137348-15-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax pseudoginseng* [1]

$C_{59}H_{100}O_{27}$: 1240.645

$[\alpha]_D - 10.3°$ (c 1.07, C_5H_5N) [1]

FAB-MS *m/z*: 1239 $[M-H]^-$, 1107 $[M-H-Xyl]^-$, 1077 $[M-H-Glc]^-$, 915 $[M-H-2Glc]^-$, 783 $[M-H-2Glc-Xyl]^-$ [1]

^{1}H NMR (400 MHz, JHz, C_5D_5N): 5.50 (brs, H-24), 4.84 (d, J = 7.7, anomeric H), 4.91 (d, J = 7.3, anomeric H), 5.07 (d, J = 7.7), 5.11 (d, J = 7.9), 5.30 (d, J = 7.5) all anomeric H [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.4	C-16	26.7	Glc-1	105.0	Xyl-4	71.7
2	26.7	17	51.7	2	83.1	5	67.0
3	89.1	18	16.2	3	78.1	Glc′-1	98.1
4	39.7	19	16.2	4	71.3	2	75.2
5	56.5	20	83.5	5	76.4	3	79.1
6	18.4	21	22.3	6	70.2	4	71.5
7	35.1	22	36.2	Glc′-1	105.9	5	77.0
8	40.1	23	23.1	2	77.0	6	70.0
9	50.2	24	125.9	3	78.2	Glc″-1	105.2
10	37.0	25	130.9	4	71.1	2	74.7
11	30.8	26	25.7	5	77.9	3	78.2
12	70.2	27	17.9	6	62.8	4	71.7
13	49.5	28	28.1	Xyl-1	105.9	5	77.9
14	51.5	29	16.5	2	74.9	6	62.8
15	30.8	30	17.5	3	78.1		

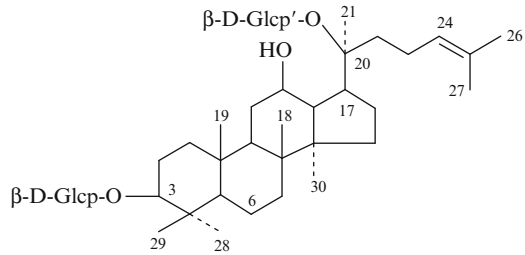
(*continued*)

References

1. H. Kohda, S. Tanaka, Y. Yamaoka, H. Izumi, M. Nuno, S. Isoda, K. Gotoh, T. Watanabe, S. Katsuki, M. Satake, Chem. Pharm. Bull. **39**(6), 1588 (1991)

Ginsenoside F_2

CAS Registry Number: 62025-49-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1], *P. notoginseng* [2], *P. quinquefolium* [3], *P. pseudoginseng subsp. himalaicus*[4]

$C_{42}H_{72}O_{13}$: 784.497

$[\alpha]_D^{25}$ + 21.1° (c 1.14, MeOH) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	26.6	Glc-1	106.9
2	26.6	17	51.5	2	75.7
3	88.7	18	16.2	3	79.2
4	39.6	19	16.9	4	71.6
5	56.3	20	83.3	5	78.2
6	18.4	21	22.3	6	63.1
7	35.1	22	36.1	Glc′-1	98.2
8	40.0	23	23.1	2	75.1

(*continued*)

Table 1 (continued)

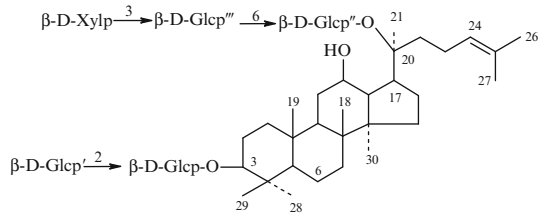
9	50.1	24	125.8	3	78.7
10	36.9	25	130.8	4	71.8
11	30.6	26	25.7	5	78.2
12	70.1	27	17.8	6	62.8
13	40.4	28	28.0		
14	51.3	29	16.7		
15	30.6	30	17.5		

References

1. S. Yahara, O. Tanaka, T. Komori, Chem. Pharm. Bull. **24**(9), 2204 (1976)
2. S. Taniyasu, O. Tanaka, T.-R. Yang, J. Zhou, Planta Med. **44**(2), 124 (1982)
3. H. Besso, R. Kasai, J. Wei, J.-F. Wang, Y.-I. Saruwatari, T. Fuwa, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4534 (1982)
4. O. Tanaka, T. Morita, R. Kasai, J. Kinouchi, S. Sanada, Y. Ida, J. Shoji, Chem. Pharm. Bull. **33**(6), 2323 (1985)

Ginsenoside-Ra$_3$

CAS Registry Number: 90985-77-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1]

$C_{59}H_{100}O_{27}$: 1240.645

$[\alpha]_D^{17}$ + 9.8° (c 0.43, MeOH) [1]

EI-MS *m/z*: 1043 (1), 1042 (2), 619 (1), 547 (1), 331 (24), 259 (20), 169 (100) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	26.6	Glc-1	104.9	4	71.7
2	26.6	17	51.6	2	83.5	5	77.0

(*continued*)

Table 1 (continued)

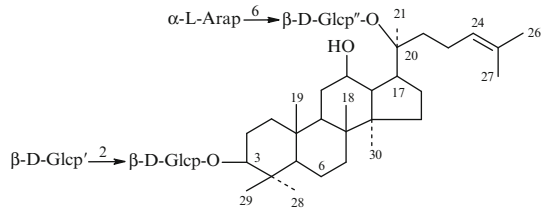
3	89.0	18	16.2	3	78.0	6	69.6
4	39.7	19	16.0	4	71.7	Glc‴-1	104.9
5	56.5	20	83.5	5	78.0	2	74.1
6	18.3	21	22.8	6	62.7	3	87.5
7	35.1	22	36.1	Glc′-1	105.9	4	71.3
8	40.0	23	23.2	2	77.0	5	78.0
9	50.2	24	126.0	3	79.2	6	62.4
10	36.9	25	130.9	4	71.7	Xyl-1	106.3
11	30.8	26	25.8	5	78.0	2	75.3
12	70.1	27	17.9	6	62.7	3	77.0
13	49.5	28	28.0	Glc″-1	98.0	4	70.8
14	51.4	29	16.5	2	74.8	5	67.3
15	30.8	30	17.4	3	78.0		

References

1. H. Matsuura, R. Kasai, O. Tanaka, Y. Saruwatari, K. Kunihiro, T. Fuwa, Chem. Pharm. Bull. **32**(3), 1188 (1984)

Ginsenoside-Rb$_2$

CAS Registry Number: 11021-13-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1, 2], *P. notoginseng* [3], *P. quinquefolium* [4, 5], *P. vietnamensis* [6]

$C_{53}H_{90}O_{22}$: 1078.592

Mp: 200–203°C [2]

$[\alpha]_D^{20}$ + 16° (MeOH) [1], $[\alpha]_D^{22}$ + 16.1° (c 0.92, MeOH) [5]

IR (KBr) ν_{max} cm^{-1}: 3420, 1620 [2]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.4	C-16	26.4	Glc-1	105.0	Glc″-1	97.9
2	26.6	17	51.6	2	83.0	2	74.8
3	89.1	18	16.2	3	78.1	3	78.7
4	39.6	19	15.9	4	71.5	4	71.5
5	56.4	20	83.5	5	78.1	5	76.6
6	18.3	21	22.2	6	62.7	6	69.0
7	35.1	22	36.3	Glc′-1	105.7	Ara-1	104.5
8	39.9	23	23.1	2	76.9	2	72.0
9	50.1	24	125.8	3	79.0	3	73.9
10	36.8	25	131.0	4	71.5	4	68.5
11	30.7	26	25.8	5	78.7	5	65.5
12	70.1	27	17.9	6	62.7		
13	49.4	28	28.0				
14	51.3	29	16.5				
15	30.7	30	17.3				

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1], *P. notoginseng* [2], *P. pseudoginseng* [3], *P. trifolius* [4]

$C_{53}H_{90}O_{22}$: 1078.592

Mp: 193–195°C (i–PrOH) [1]

$[\alpha]_D^{28}$ + 19.4° (c 0.98, MeOH) [1], $[\alpha]_D^{15}$ + 6.0° (c 1.00, MeOH) [2], $[\alpha]_D^{24}$ + 8.5° (c 0.53, MeOH) [3]

IR (KBr) ν_{max} cm^{-1}: 3420, 1620 [1]

^{1}H NMR (90 MHz, J/Hz, $CDCl_3$) (for permethylate): 0.84, 0.88, 0.92, 1.02, 1.32, 1.62, 1.70 (s, $CH_3 \times 7$), 3.33-3.60 (s, CH_3O), anomeric H: 4.25 (d, J = 7.0), 4.29 (d, J = 7.0), 4.45 (d, J = 7.0), 4.66 (d, J = 7.0) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [3]

References

1. R. Kasai, H. Besso, O. Tanaka, Y. Saruwatari, T. Fuwa, Chem. Pharm. Bull. **31**(6), 2120 (1983)
2. S. Sanada, N. Kondo, J. Shoji, O. Tanaka, S. Shibata, Chem. Pharm. Bull. **22**, 421 (1974)
3. S. Taniyasu, O. Tanaka, T.-R. Yang, J. Zhou, Planta Med. **44**(2), 124 (1982)
4. H. Besso, R. Kasai, I. Wei, I.-F. Wang, Y. Saruwatari, T. Fuwa, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4534 (1982)
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6. S.E. Chen, E.J. Staba, S. Taniyasu, R. Kasai, O. Tanaka, Planta Med. **42**(8), 406 (1981)

Ginsenoside-Rb$_3$

CAS Registry Number: 68406-26-8

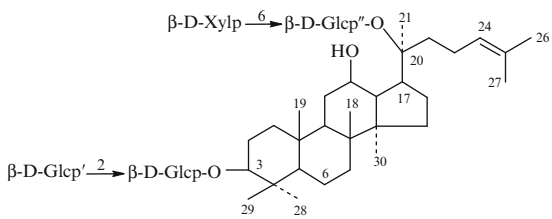


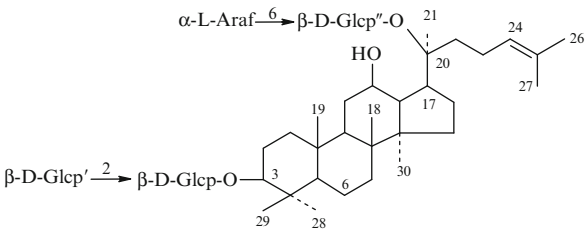
Table 1

C-1	39.4	C-16	26.7	Glc-1	104.8	Glc″-1	97.9
2	26.7	17	51.7	2	83.4	2	74.8
3	89.1	18	16.2	3	77.7	3	78.1
4	39.7	19	16.2	4	71.7	4	71.7
5	56.5	20	83.5	5	78.8	5	76.6
6	18.4	21	22.3	6	62.8	6	69.8
7	35.1	22	36.2	Glc′-1	105.6	Xyl-1	105.2
8	40.1	23	23.1	2	76.7	2	74.2
9	50.2	24	125.9	3	78.1	3	77.3
10	37.0	25	130.9	4	71.7	4	70.8
11	30.8	26	25.7	5	78.1	5	66.4
12	70.2	27	17.9	6	62.8		
13	49.5	28	28.1				
14	51.5	29	16.5				
15	30.8	30	17.5				

References

1. S. Sanada, J. Shoji, Chem. Pharm. Bull. **26**(6), 1694 (1978)
2. T.R. Yang, R. Kasai, J. Zhou, O. Tanaka, Phytochemistry **22**, 1473 (1983)
3. O. Tanaka, S. Yahara, Phytochemistry **17**(8), 1353 (1978)
4. T.M. Lee, A.H. Marderosian, Phytoter. Res. **2**, 165 (1988) [Chem. Abstr. **110**: 209296k (1989)]

Ginsenoside-Rc



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1, 2], *P. notoginseng* [3], *P. quinquefolium* [4], *P. japonicus* [5], *P. trifolius* [6]

$C_{53}H_{90}O_{22}$: 1078.592

Mp: 199–201°C [2]

$[\alpha]_D^{20}$ + 1.93° (c 1.03, MeOH) [6]

IR (KBr) ν_{max} cm^{-1}: 3400, 1620 [2]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	26.6	Glc-1	104.9	Glc″-1	97.9
2	26.6	17	51.6	2	83.1	2	74.9
3	89.0	18	16.2	3	77.8	3	78.0
4	39.6	19	15.9	4	71.5	4	71.5
5	56.3	20	83.1	5	77.8	5	76.3
6	18.3	21	22.2	6	62.6	6	68.3
7	35.1	22	36.0	Glc′-1	105.6	Ara-1	109.9
8	39.9	23	23.1	2	76.8	2	83.3
9	50.1	24	125.9	3	78.7	3	78.9
10	36.8	25	130.9	4	71.5	4	85.8
11	30.7	26	25.7	5	78.0	5	62.6
12	70.2	27	17.8	6	62.6		
13	49.5	28	28.0				
14	51.4	29	16.5				
15	30.8	30	17.3				

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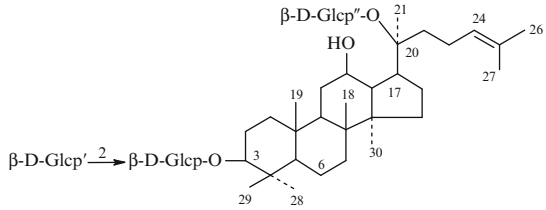
1. R. Kasai, H. Besso, O. Tanaka, Y.-I. Saruwatari, T. Fuwa, Chem. Pharm. Bull. **31**(6), 2120 (1983)
2. S. Sanada, N. Kondo, J. Shoji, O. Tanaka, S. Shibata, Chem. Pharm. Bull. **22**(2), 421 (1974)
3. S. Taniyasu, O. Tanaka, T.-R. Yang, J. Zhou, Planta Medica **44**(2), 124 (1982)
4. H. Besso, R. Kasai, I. Wei, I.-F. Wang, Y. Saruwatari, T. Fuwa, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4534 (1982)
5. T. Morita, O. Tanaka, H. Kohda, Chem. Pharm. Bull. **33**(9), 3852 (1985)
6. T.M. Lee, A.H. Marderosian, Phytoter. Res. **2**, 165 (1988) [Chem. Abstr. **110**: 209296k (1989)]

Ginsenoside-Rd

CAS Registry Number: 52705-93-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1], *P. quinquefolium* [2], *P. notoginseng* [3, 4], *P. pseudoginseng* [5]

$C_{48}H_{82}O_{18}$: 946.550

Mp: 206–209°C [3]

$[\alpha]_D$ + 18.8° (MeOH) [3]

^{13}C NMR (25.15 MHz, C_5D_5N): [4]

Table 1

C-1	39.1	C-16	26.7	Glc-1	105.0	Glc″-1	98.2
2	26.7	17	51.7	2	83.3	2	75.0
3	88.9	18	15.9	3	78.1	3	78.1
4	39.6	19	16.3	4	71.6	4	71.6
5	56.4	20	83.3	5	78.1	5	78.1
6	18.5	21	22.4	6	62.7	6	62.7
7	35.2	22	36.0	Glc′-1	105.9		
8	40.0	23	23.2	2	77.0		
9	50.2	24	125.9	3	79.1		
10	36.9	25	130.9	4	71.6		
11	30.8	26	25.8	5	78.1		
12	70.2	27	16.6	6	62.7		
13	49.4	28	28.0				
14	51.4	29	17.3				
15	30.8	30	17.8				

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3. S. Taniyasu, O. Tanaka, T.-R. Yang, J. Zhou, Planta Med. **44**(2), 124 (1982)
4. T.-R. Yang, R. Kasai, J. Zhou, O. Tanaka, Phytochemistry **22**(6), 1473 (1983)
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Ginsenoside RS_1

CAS Registry Number: 87733-67-3

See Figure Ginsenoside RS_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1]

$C_{55}H_{92}O_{23}$: 1120.602

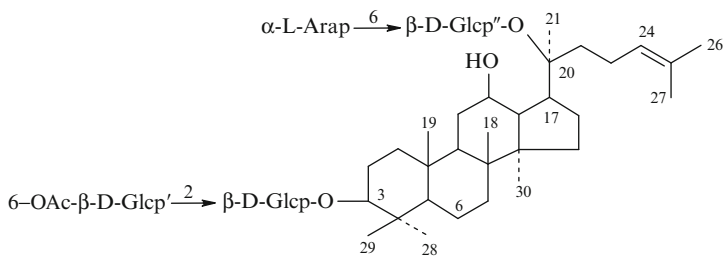
$[\alpha]_D^{16}$ + 19° (c 1.0, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	26.6	Glc-1	104.8	Glc″-1	97.9
2	26.6	17	51.6	2	84.1	2	74.8
3	89.2	18	16.2	3	77.9	3	78.4
4	39.6	19	15.9	4	71.6	4	71.3
5	56.4	20	83.4	5	77.9	5	76.6
6	18.4	21	22.2	6	62.7	6	69.1
7	35.1	22	36.0	Glc′-1	106.1	Ara-1	104.5
8	39.9	23	23.1	2	76.6	2	72.0
9	50.2	24	125.8	3	79.0	3	73.9
10	36.8	25	131.0	4	70.9	4	68.4
11	30.6	26	25.7	5	75.2	5	65.4
12	70.1	27	17.8	6	64.7	Ac	170.8
13	49.36	28	27.9				20.8
14	51.3	29	16.2				
15	30.6	30	17.3				

(*continued*)



Ginsenoside RS_1

References

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Ginsenoside RS_2

CAS Registry Number: 87733-66-2

See Figure Ginsenoside RS_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1]

$C_{55}H_{92}O_{23}$: 1120.602

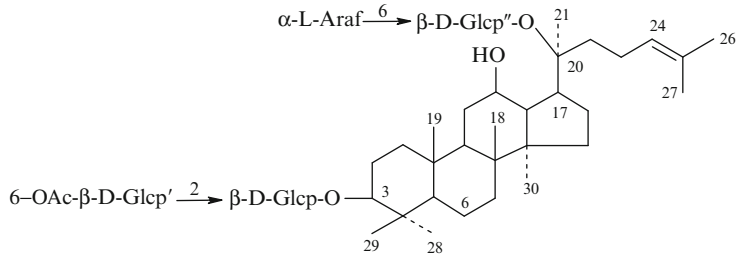
$[\alpha]_D^{16}$ + 2.5° (c 1.0, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	26.6	Glc-1	104.8	Glc″-1	98.0
2	26.6	17	51.6	2	84.0	2	74.9
3	89.2	18	16.3	3	77.8	3	78.3
4	39.6	19	15.9	4	71.8	4	71.2
5	56.3	20	83.3	5	77.8	5	76.5
6	18.4	21	22.2	6	62.5	6	68.3
7	35.1	22	36.0	Glc′-1	105.9	Ara-1	109.9
8	39.9	23	23.1	2	76.5	2	83.3

(*continued*)



Ginsenoside RS$_2$

Table 1 (continued)

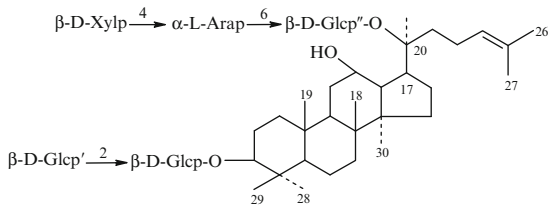
9	50.1	24	125.8	3	78.7	3	79.0
10	36.8	25	130.9	4	70.8	4	85.8
11	30.7	26	25.7	5	75.2	5	62.5
12	70.2	27	17.8	6	64.5		
13	49.3	28	27.9	Ac	170.8		
14	51.3	29	16.3		20.8		
15	30.7	30	17.2				

References

1. R. Kasai, H. Besso, O. Tanaka, Y. Saruwatari, T. Fuwa, Chem. Pharm. Bull. **31**(6), 2120 (1983)

Ginsenoside-Ra$_1$

CAS Registry Number: 83459-41-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1]

$C_{58}H_{98}O_{26}$: 1210.634

$[\alpha]_D^{25}$ + 12.8° (c 1.0, MeOH) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

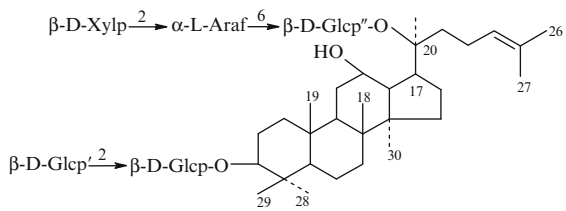
C-1	39.1	C-16	26.7	Glc-1	104.9	Glc″-4	71.5
2	26.7	17	51.3	2	83.0	5	76.8
3	89.1	18	16.2	3	78.0	6	69.7
4	39.6	19	16.0	4	71.5	Ara-1	104.9
5	56.5	20	83.5	5	78.0	2	72.6
6	18.5	21	22.2	6	62.7	3	73.7
7	35.2	22	36.1	Glc′-1	105.6	4	78.0
8	40.0	23	23.1	2	76.8	5	65.5
9	50.2	24	125.8	3	79.1	Xyl-1	106.6
10	36.8	25	131.0	4	71.5	2	75.2
11	30.6	26	25.7	5	78.0	3	78.0
12	70.1	27	17.9	6	62.7	4	70.8
13	49.4	28	28.0	Glc″-1	97.9	5	67.0
14	51.3	29	16.5	2	74.7		
15	30.6	30	17.4	3	79.1		

References

1. H. Besso, R. Kasai, Y. Saruwatari, T. Fuwa, O. Tanaka, Chem. Pharm. Bull. **30**(7), 2380 (1982)

Ginsenoside-Ra$_2$

CAS Registry Number: 83459-42-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1]

$C_{58}H_{98}O_{26}$: 1210.634

$[\alpha]_D^{25}$ −2.4° (c 1.0, MeOH) [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

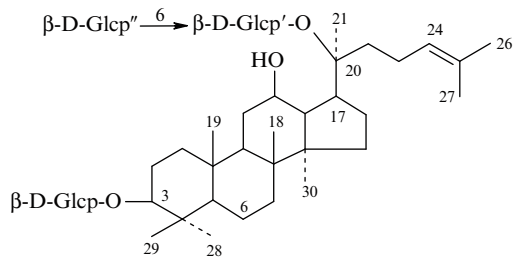
Table 1

C-1	39.1	C-16	26.6	Glc-1	105.0	Glc″-4	71.6
2	26.6	17	51.3	2	83.1	5	76.9
3	89.0	18	16.2	3	77.3	6	68.2
4	39.6	19	16.0	4	71.6	Ara-1	108.0
5	56.4	20	83.4	5	78.0	2	90.6
6	18.4	21	22.3	6	62.7	3	79.1
7	35.1	22	36.0	Glc′-1	105.7	4	85.3
8	39.9	23	23.0	2	76.9	5	62.7
9	50.2	24	126.0	3	79.1	Xyl-1	104.3
10	36.8	25	131.0	4	71.6	2	74.8
11	30.7	26	25.7	5	78.0	3	78.0
12	70.3	27	17.9	6	62.7	4	70.9
13	49.2	28	28.0	Glc″-1	98.0	5	67.2
14	51.3	29	16.5	2	74.8		
15	30.7	30	17.3	3	78.0		

References

1. H. Besso, R. Kasai, Y. Saruwatari, T. Fuwa, O. Tanaka, Chem. Pharm. Bull. **30**(7), 2380 (1982)

Gypenoside XVII



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax japonicus* [1], *P. pseudoginseng* [2], *P. quinquefolium* [3], *Gynostemma pentaphyllum* [4], *P. pseudoginseng* subsp. *himalaicus* [5]

$C_{48}H_{82}O_{18}$: 946.550

$[\alpha]_D^{13}$ + 17.3° (c 1.00, MeOH) [3]

^{13}C NMR (25.15 MHz, C_5D_5N): [3]

Table 1

C-1	39.2	C-16	26.6	Glc-1	106.7
2	26.6	17	51.5	2	75.6
3	88.7	18	16.2	3	79.0
4	39.6	19	16.0	4	71.6
5	56.3	20	83.3	5	78.6
6	18.4	21	22.3	6	62.9
7	35.1	22	36.1	Glc′-1	97.9
8	40.0	23	23.1	2	75.1
9	50.1	24	125.8	3	78.1
10	36.9	25	130.8	4	71.6
11	30.6	26	25.7	5	76.8
12	70.1	27	17.8	6	71.6
13	49.1	28	28.0	Glc″-1	105.1
14	51.3	29	16.7	2	74.6
15	30.6	30	17.5	3	78.1
				4	71.6
				5	78.1
				6	62.7

References

1. T. Morita, O. Tanaka, H. Kohda, Chem. Pharm. Bull. **33**(9), 3852 (1985)
2. T. Morita, Y.-C. Kong, P.P.-H. But, K.-H. Ng, T.-T. Yip, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **34**(10), 4368 (1986)
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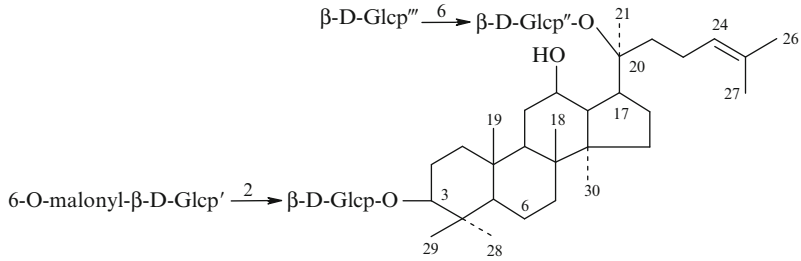
Malonyl-Ginsenoside Rb_1

See Figure Malonyl-Ginsenoside Rb_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol



Malonyl-Ginsenoside Rb_1

Biological source: *Panax ginseng* [1], *Gynostemma pentaphyllum* [2], *P. pseudoginseng* [3]

$C_{57}H_{94}O_{26}$: 1194.603

Mp: 150–152°C (aq. EtOH) [1]

$[\alpha]_D^{20}$ + 10.2° (c 1.0, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3489, 2925, 1730, 1628, 1380, 1071 [1]

SiMS-MS *m/z*: 1217 $(M + Na)^+$, 1131, 1083, 1055, 1037, 969, 893, 807, 501 [1]

^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-3	89.3	Glc-1	105.3		
12	70.2	2	84.2	Glc″-1	98.1
20	83.5	3	77.9	2	74.9
		4	71.7	3	78.3
		5	78.3	4	71.7
		6	62.8	5	76.6
		Glc′-1	106.1	6	71.6
		2	77.0	Glc‴-1	104.9
		3	79.1	2	74.9
		4	71.0	3	78.3
		5	75.2	4	71.7
		6	65.6	5	78.3
		Malonyl-1	167.1	6	62.8
					41.6
					167.1
				OMe	52.2

(*continued*)

References

1. I. Kitagawa, T. Taniyama, M. Yoshikawa, Y. Ikenishi, Y. Nakagawa, Chem. Pharm. Bull. **37**(11), 2961 (1989)
2. M. Kuwahara, F. Kawanishi, T. Komiya, H. Oshio, Chem. Pharm. Bull. **37**(1), 135 (1989)
3. T. Namba, K. Matsushige, T. Morita, O. Tanaka, Chem. Pharm. Bull. **34**(2), 730 (1986)

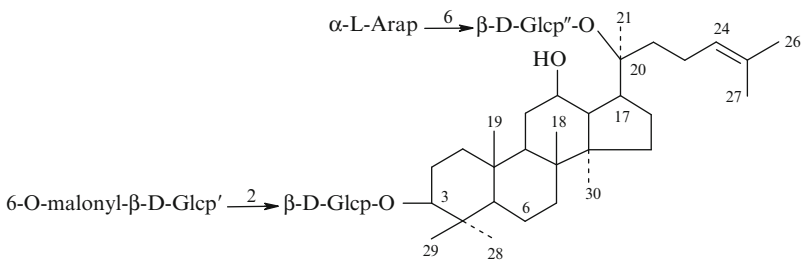
Malonyl-Ginsenoside Rb_2

See Figure Malonyl-Ginsenoside Rb_2

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1]

$C_{56}H_{92}O_{25}$: 1164.592



Malonyl-Ginsenoside Rb_2

Mp: 148–150°C (aq. EtOH) [1]
$[\alpha]_D^{20}$ + 11.5° (c 0.9, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3381, 2928, 1730, 1628, 1380, 1067 [1]
SiMS-MS *m/z*: 1187 $(M + Na)^+$, 1083, 967, 893, 875, 835, 807, 759, 679, 627, 585, 511, 407 [1]
^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-3	89.3	Glc-1	104.9	Glc″-1	98.1
12	70.2	2	84.2	2	74.7
20	83.5	3	78.0	3	78.0
		4	72.1	4	71.5
		5	78.6	5	76.6
		6	62.9	6	69.2
		Glc′-1	106.1	Ara-1	104.5
		2	76.6	2	71.8
		3	79.1	3	73.8
		4	71.0	4	68.4
		5	75.2	5	65.4
		6	65.5		
		Malonyl-1	167.2		
		2	41.6		
		3	167.2		
		OMe	52.2		

References

1. I. Kitagawa, T. Taniyama, M. Yoshikawa, Y. Ikenishi, Y. Nakagawa, Chem. Pharm. Bull. **37**(11), 2961 (1989)

Malonyl-Ginsenoside Rc

See Figure Malonyl-Ginsenoside Rc

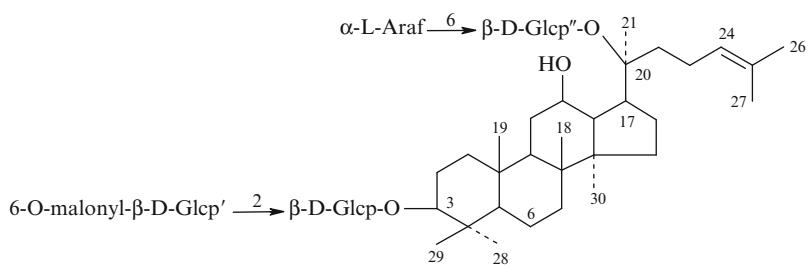
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol
Biological source: *Panax ginseng* [1]
$C_{56}H_{92}O_{25}$: 1164.592
Mp: 150–152°C (aq. EtOH) [1]
$[\alpha]_D^{20}$ + 1.7° (c 1.0, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3381, 2934, 1733, 1630, 1381, 1071 [1]
SiMS-MS *m/z*: 1187 $(M + Na)^+$, 1083, 967, 875, 835, 807, 777, 759, 713, 627, 569, 537, 451, 407 [1]
^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-3	89.3	Glc-1	104.8	Glc″-1	98.1
12	70.3	2	84.1	2	75.0
20	83.4	3	77.9	3	78.4
		4	72.1	4	71.4
		5	77.9	5	76.4
		6	62.6	6	68.4
		Glc′-1	106.0	Ara-1	110.0
		2	76.6	2	83.1
		3	78.8	3	79.0
		4	70.9	4	86.0
		5	75.1	5	62.6
		6	65.4		
		Malonyl-1	167.2		
		2	41.6		
		3	167.2		
		OMe	52.2		

References

1. I. Kitagawa, T. Taniyama, M. Yoshikawa, Y. Ikenishi, Y. Nakagawa, Chem. Pharm. Bull. **37**(11), 2961 (1989)



Malonyl-Ginsenoside Rc

Malonyl-Ginsenoside Rd

See Figure Malonyl-Ginsenoside Rd

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax ginseng* [1], *Gynostemma pentaphyllum* [2]

$C_{52}H_{84}O_{21}$: 1044.550

Mp: 158–161°C (aq. EtOH) [1]

$[\alpha]_D^{20}$ + 16.4° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3383, 2937, 1738, 1632, 1383, 1074 [1]

SiMS-MS *m/z*: 1055 $(M + Na)^+$, 969, 907, 893, 875, 835, 807, 783, 621, 569, 511, 425, 407 [1]

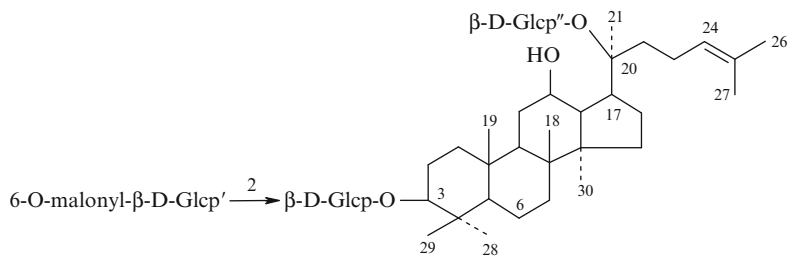
^{13}C NMR (22.5 MHz, C_5D_5N) (Me ester): [1]

Table 1

C-3	89.3	Glc-1	104.8	Malonyl-1	167.2
12	70.2	2	84.1	2	41.6
20	83.3	3	78.4	3	167.2
		4	71.6	OMe	52.2
		5	79.0	Glc″-1	98.2
		6	62.8	2	75.1
		Glc′-1	106.0	3	78.1
		2	76.6	4	71.6
		3	79.6	5	77.9
		4	70.9	6	62.8
		5	75.1		
		6	65.5		

References

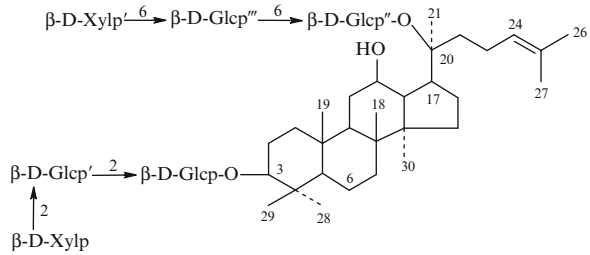
1. I. Kitagawa, T. Taniyama, M. Yoshikawa, Y. Ikenishi, Y. Nakagawa, Chem. Pharm. Bull. **37**(11), 2961 (1989)
2. M. Kuwahara, F. Kawanishi, T. Komiya, H. Oshio, Chem. Pharm. Bull. **37**(1), 135 (1989)



Malonyl-Ginsenoside Rd

Notoginsenoside D

CAS Registry Number: 193895-50-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax notoginseng* [1]

$C_{64}H_{108}O_{31}$: 1372.687

Mp: 207–210°C (aq. MeOH) [1]

$[\alpha]_D^{22}$ + 6.5° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1638, 1085 [1]

FAB-MS (negative ion mode) *m/z*: 1371 $(M-H)^-$, 1239 $[M-C_5H_9O4]-$, 1106 $[M-C_{10}H_{18}O_8]$ [1]

FAB-MS (positive ion mode) *m/z*: 1395.6772 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.80, 0.95, 0.98, 1.11, 1.28, 1.62 (s, CH_3-19, 18, 30, 29, 28, 26), 1.66 (s, CH_3-21, 27), 3.29 (dd, J = 3.3, 10.4, H-3), 4.08 (m, H-12), 5.31 (d-like, H-24),4.92 (d, J = 7.9, H-1 of Glc′), 4.94 (d, J = 8.5, H-1 of Xyl′), 5.02 (d, J = 7.6, H-1 of Glc‴), 5.12 (d, J = 7.6, H-1 of Glc″), 5.38 (d, J = 7.0, H-1 of Xyl), 5.52 (d, J = 7.9, H-1 of Glc) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-18	16.0	Glc-1	105.2	Glc″-1	98.5
2	26.7	19	16.3	2	83.1	2	75.3
3	89.0	20	83.5	3	78.7	3	78.3
4	39.8	21	22.4	4	71.6	4	72.0
5	56.5	22	36.3	5	78.7	5	77.4
6	18.5	23	23.2	6	63.3	6	70.8
7	35.2	24	126.0	Glc′-1	103.5	Glc‴-1	105.8
8	40.1	25	131.0	2	85.0	2	75.5
9	50.3	26	25.8	3	78.1	3	78.7
10	36.9	27	18.0	4	72.3	4	71.6
11	30.8	28	28.1	5	78.3	5	77.4
12	70.2	29	16.7	6	63.3	6	70.3
13	49.5	30	17.5	Xyl-1	106.8	Xyl′-1	106.3
14	51.4			2	76.3	2	75.3
15	30.8			3	79.6	3	79.1
16	26.7			4	72.0	4	71.2
17	51.6			5	67.8	5	67.5

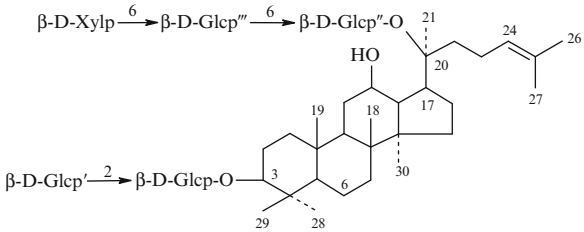
Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, K. Yashiro, N. Hirokawa, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45**(6), 1039 (1997)

Notoginsenoside-R4

CAS Registry Number: 87741-77-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax notoginseng* [1]

$C_{59}H_{100}O_{27}$: 1240.645

$[\alpha]_D^{16}$ + 8.9° (c 1.0, MeOH) [1]

FD-MS *m/z*: 1279 $(M + K)^+$, 1263 $(M + Na)^+$, 1131 $(M + Na\text{-}Xyl)^+$, 1101 $(M + Na\text{-}Glc)^+$, 939 $(M + Na\text{-}Glc\text{-}Glc)^+$, 807 $(M + Na\text{-}Glc\text{-}Glc\text{-}Xyl)^+$ [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	26.6	Glc-1	105.0	Glc″-4	71.4
2	26.6	17	51.3	2	82.6	5	76.5
3	89.2	18	16.1	3	77.7	6	71.2
4	39.5	19	15.9	4	71.4	Glc‴-1	105.0
5	56.3	20	83.5	5	77.7	2	74.7
6	18.4	21	22.3	6	62.6	3	77.7
7	35.1	22	36.1	Glc′-1	105.2	4	71.4
8	39.9	23	22.8	2	76.5	5	76.5
9	50.0	24	125.7	3	78.6	6	69.6
10	36.7	25	130.9	4	71.4	Xyl-1	105.2
11	30.6	26	25.7	5	77.7	2	74.7
12	70.0	27	17.8	6	62.6	3	77.7
13	49.2	28	27.9	Glc″-1	97.8	4	71.0
14	51.3	29	16.5	2	74.7	5	66.7
15	30.6	30	17.3	3	77.7		

References

1. H. Matsuura, R. Kasai, O. Tanaka, Y. Saruwatari, T. Fuwa, J. Zhou, Chem. Pharm. Bull. **31**(7), 2281 (1983)

Pseudoginsenoside RC_1

See Figure Pseudoginsenoside RC_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax pseudoginseng* [1]

$C_{50}H_{82}O_{19}$: 986.545

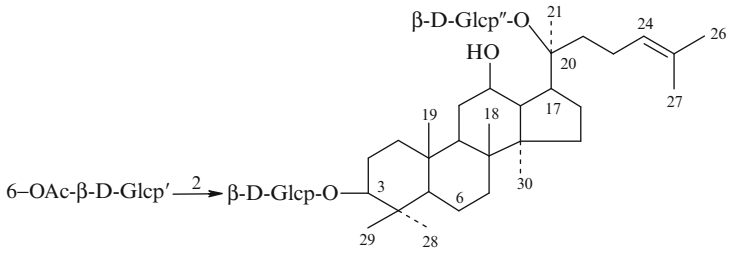
$[\alpha]_D^{17}$ + 20.8° (c 0.63, MeOH) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	26.6	Glc-1	104.8	Glc″-1	98.2
2	26.6	17	51.7	2	84.2	2	75.0
3	89.2	18	16.2	3	77.9	3	78.1
4	39.7	19	15.9	4	71.4	4	71.4
5	56.4	20	83.2	5	77.8	5	78.4

(*continued*)



Pseudoginsenoside RC$_1$

Table 1 (continued)

6	18.4	21	22.4	6	62.7	6	62.7
7	35.1	22	36.0	Glc′-1	106.1	Ac	170.9
8	40.0	23	23.2	2	76.6		20.9
9	50.2	24	125.9	3	79.1		
10	36.8	25	130.8	4	70.9		
11	30.8	26	25.7	5	75.3		
12	70.2	27	17.7	6	64.6		
13	49.3	28	27.9				
14	51.4	29	16.4				
15	30.8	30	17.3				

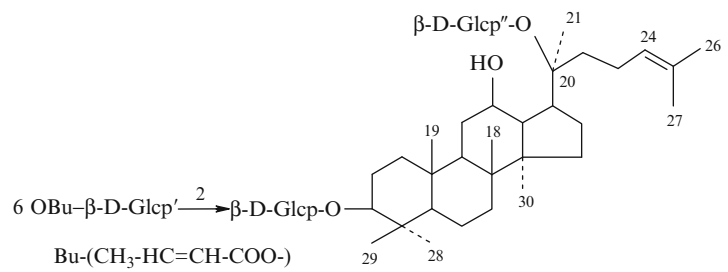
References

1. T. Namba, K. Matsushige, T. Morita, O. Tanaka, Chem. Pharm. Bull. **34**(2), 730 (1986)

Quinquenoside I

See Figure Quinquenoside I

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol



Quinquenoside I

Biological source: *Panax quinquefolium* [1]

$C_{52}H_{86}O_{19}$: 1014.576

Mp: 172–174°C [1]

$[\alpha]_D^{28}$ + 34.6° (c 0.25, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1716, 1655, 1076 [1]

UV λ_{max} nm (log ε): 211 (4.3) [1]

FAB-MS (negative ion mode) *m/z*: 1013 $(M\text{-}H)^-$, 945 $(M\text{-}C_4H_5O)^-$ [1]

HR-FAB-MS (positive ion mode) *m/z*: 1037.5661 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.84, 0.96, 0.97, 1.11, 1.31 (s, CH_3-19, 30, 18, 29, 28), 1.61 (s, CH_3-21, 26, 27), 1.67 (dd, J = 1.6, 7.0, CH_3-4 of Bu), 1.98 (t-like, H-13), 3.27 (dd, J = 1.8, 11.0, H-3), 4.10 (m, H-12), 5.25 (t-like, H-24), 5.98 (brd, H-2 of Bu), 7.05 (dq, J = 7.0, 15.6, H-3 of Bu)

β-D-Glcp: 4.87 (d, J = 7.6, H-1), 4.89 (dd-like), 4.97 (dd, J = 1.5, 11.4, H-6)

β-D-Glcp′: 5.29 (d, J = 7.6, H-1)

β-D-Glcp″: 5.16 (d, J = 7.7, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-16	26.7	Glc-1	104.9	Glc″-1	98.3
2	26.8	17	51.8	2	84.3	2	75.2
3	89.3	18	16.0	3	78.5	3	79.2
4	39.8	19	16.3	4	71.6	4	71.7

(*continued*)

Table 1 (continued)

5	56.5	20	83.4	5	78.0	5	78.2
6	18.7	21	22.5	6	62.9	6	62.9
7	35.3	22	36.2	Glc′-1	106.2	Bu-1	166.6
8	40.1	23	23.3	2	76.8	2	123.8
9	50.3	24	126.0	3	78.0	3	144.6
10	37.0	25	130.9	4	71.1	4	17.7
11	30.8	26	25.7	5	75.6		
12	70.3	27	17.8	6	64.4		
13	49.5	28	28.1				
14	51.5	29	16.5				
15	31.0	30	17.4				

Pharm./Biol.: The methanolic extract and 1-butanol-soluble fraction of American ginseng, the roots of *Panax quinquefolium*, were found to exhibit a protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, K. Yashiro, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **46**(4), 647 (1998)

Quinquenoside II

See Figure Quinquenoside II

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax quinquefolium* [1]

$C_{62}H_{104}O_{24}$: 1232.691

Mp: 168–170°C [1]

$[\alpha]_D^{28}$ + 22.5° (c 0.25, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1717, 1655, 1078 [1]

UV λ_{max} nm (log ε): 205 (4.5) [1]

FAB-MS (negative ion mode): *m/z* 1231 $(M\text{-}H)^-$, 1107 $(M\text{-}C_8H_{13}O)^-$ [1]

HR-FAB-MS (positive ion mode): *m/z* 1255 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.84 (t, J = 7.4, CH_3-8 of Oc), 0.86, 0.98, 1.00, 1.12, 1.33, 1.62, 1.64, 1.67 (s, CH_3-19, 30, 18, 29, 28, 26, 21, 27), 1.98 (t-like, H-13), 3.27 (dd, 4.3, 11.9, H-3), 4.11 (m, H-12), 5.32 (t-like, H-24), 6.02 (d, J = 15.5, H-2 of Oc), 7.15 (dt, J = 8.2, 15.5, H-3 of Oc)

β-D-Glcp: 4.87 (d, J = 6.6, H-1)

β-D-Glcp′: 5.09 (d, J = 7.2, H-1), 4.86, 4.90 (dd-like, H_2-6)

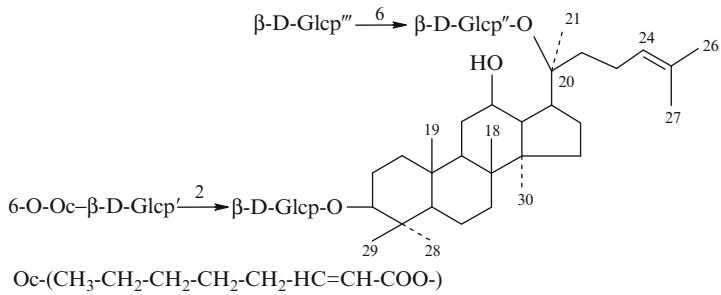
β-D-Glcp″: 5.04 (d, J = 8.0, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-18	16.0	Glc-1	105.0	Glc″-5	77.0
2	26.8	19	16.3	2	84.4	6	70.2
3	89.3	20	83.4	3	78.5	Glc‴-1	105.4
4	39.8	21	22.4	4	71.4	2	75.2
5	56.4	22	36.1	5	78.1	3	78.4
6	18.5	23	23.2	6	62.8	4	71.7
7	35.1	24	125.9	Glc′-1	106.3	5	78.3
8	40.0	25	131.0	2	76.8	6	62.8
9	50.2	26	25.8	3	77.9	Oc-1	166.9
10	36.9	27	17.9	4	70.9	2	121.7
11	30.8	28	28.0	5	75.5	3	149.5
12	70.1	29	16.5	6	64.4	4	32.2
13	49.5	30	17.4	Glc″-1	98.1	5	27.8
14	51.4			2	74.8	6	31.5
15	30.7			3	79.2	7	22.6

(*continued*)



Quinquenoside II

Table 1 (continued)

16	26.6	4	71.5	8	14.1
17	51.6				

Pharm./Biol.: The methanolic extract and 1-butanol-soluble fraction of American ginseng, the roots of *Panax quinquefolium*, were found to exhibit a protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, K. Yashiro, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **46**(4), 647 (1998)

Quinquenoside III

See Figure Quinquenoside III

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax quinquefolium* [1]

$C_{50}H_{84}O_{19}$: 988.560

Mp: 167–169°C [1]

$[\alpha]_D^{28}$ + 24.3° (c 0.25, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 1736, 1655, 1078 [1]

FAB-MS (negative ion mode) *m/z*: 987 $(M\text{-}H)^-$, 945 $(M\text{-}C_2H_3O)^-$ [1]

HR-FAB-MS (positive ion mode) *m/z*: 1011 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.86, 0.96, 0.97, 1.10, 1.29, 2.02 (s, CH_3-19, 30, 18, 29, 28), 1.61 (s, CH_3-21, 26, 27), 1.98 (t-like, H-13), 3.26 (dd, J = 4.8, 11.0, H-3), 4.10 (m, H-12), 5.25 (t-like, H-24)
β-D-Glcp: 4.84 (d, J = 7.3, H-1), 4.91 (brd, H_2-6)
β-D-Glcp′: 5.34 (d, J = 7.6, H-1)
β-D-Glcp″: 5.16 (d, J = 7.7, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

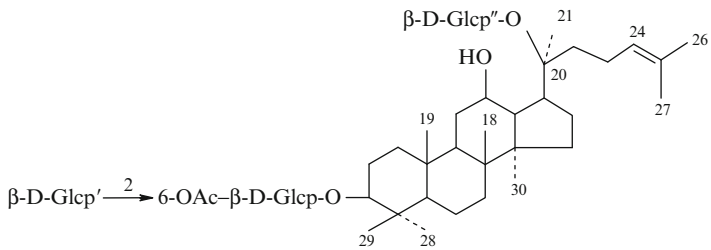
Table 1

C-1	39.3	C-16	26.7	Glc-1	105.3	Glc″-1	98.3
2	26.8	17	51.8	2	83.3	2	75.2
3	89.5	18	16.1	3	78.0	3	79.3
4	39.7	19	16.3	4	71.5	4	71.8
5	56.5	20	83.4	5	74.7	5	78.2
6	18.5	21	22.4	6	64.4	6	62.9
7	35.2	22	36.2	Glc′-1	106.0	Ac-1	170.7
8	40.1	23	23.3	2	77.0	2	20.8
9	50.3	24	126.0	3	78.1		
10	37.1	25	130.9	4	71.9		
11	30.8	26	25.7	5	78.2		
12	70.2	27	17.8	6	63.0		
13	49.6	28	28.2				
14	51.5	29	16.6				
15	31.0	30	17.4				

Pharm./Biol.: The methanolic extract and 1-butanol-soluble fraction of American ginseng, the roots of *Panax quinquefolium*, were found to exhibit a protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

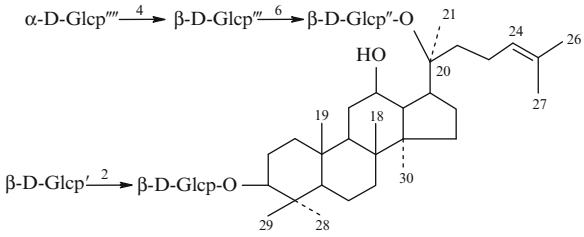
References

1. M. Yoshikawa, T. Murakami, K. Yashiro, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **46**(4), 647 (1998)



Quinquenoside III

Quinquenoside V



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax quinquefolium* [1]

$C_{60}H_{102}O_{28}$: 1270.655

Mp: 192–194°C [1]

$[\alpha]_D^{28}$ + 24.4° (c 0.25, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3399, 1655, 1075 [1]

FAB-MS (negative ion mode) *m/z*: 1269 $(M\text{-}H)^-$, 1107 $(M\text{-}C_6H_{11}O_5)^-$ [1]

HR-FAB-MS (positive ion mode) *m/z*: 1293 $(M + Na)^+$, 1315 $(M + 2Na\text{-}H)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.83, 0.96, 0.97, 1.09, 1.27, 1.68 (s, CH_3-19, 30, 18, 29, 28, 27), 1.64 (s, CH_3-21, 26), 1.98 (t-like, H-13), 3.26 (dd, J = 4.2, 11.2, H-3), 4.14 (m, H-12), 5.31 (t-like, H-24) β-D-Glcp: 4.88 (d, J = 7.6, H-1); β-D-Glcp′: 5.32 (d, J = 7.9, H-1); β-D-Glcp″: 5.08 (d, J = 7.6, H-1); β-D-Glcp‴: 5.00 (d, J = 7.9, H-1); α-D-Glcp: 5.82 (d, J = 4.0, H-1) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.3	C-18	16.1	Glc-1	105.0	Glc‴-1	105.0
2	26.8	19	16.3	2	83.6	2	74.8
3	89.1	20	83.5	3	78.3	3	77.6
4	39.7	21	22.3	4	71.7	4	81.4
5	56.5	22	36.2	5	78.1	5	76.8
6	18.5	23	23.2	6	62.9	6	61.9
7	35.1	24	125.9	Glc′-1	106.0	Glc⁗-1	103.1
8	40.0	25	131.2	2	77.0	2	74.4
9	50.2	26	25.8	3	78.0	3	75.4
10	37.0	27	18.0	4	71.8	4	71.9
11	30.8	28	28.1	5	78.0	5	75.1
12	70.2	29	16.6	6	62.8	6	62.8
13	49.5	30	17.5	Glc″-1	98.1		
14	51.4			2	74.9		
15	30.9			3	79.1		
16	26.7			4	71.6		
17	51.6			5	77.0		
				6	70.2		

Pharm./Biol.: The methanolic extract and 1-butanol-soluble fraction of American ginseng, the roots of *Panax quinquefolium*, were found to exhibit a protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, K. Yashiro, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **46**(4), 647 (1998)

Quinquenoside R_1

CAS Registry Number: 85013-02-1

See Figure Quinquenoside R

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxadiol

Biological source: *Panax quinquefolium* [1]

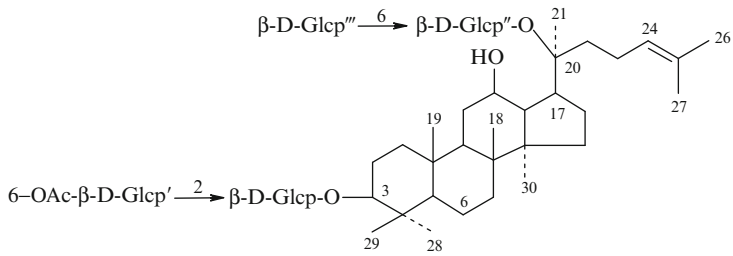
$C_{56}H_{94}O_{24}$: 1150.613

$[\alpha]_D^{16}$ + 12.0° (c 1.0, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	26.6	Glc-1	104.9	Glc″-1	98.0
2	26.6	17	51.6	2	84.3	2	74.9
3	89.2	18	16.4	3	77.0	3	78.2
4	39.7	19	16.0	4	71.5	4	71.5
5	56.4	20	83.4	5	78.2	5	76.6
6	18.4	21	22.4	6	62.7	6	71.5



Quinquenoside R

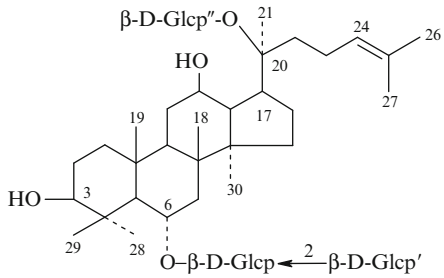
Table 1 (continued)

7	35.2	22	36.2	Glc′-1	106.1	Glc‴-1	105.2
8	40.0	23	23.2	2	76.6	2	74.9
9	50.2	24	125.9	3	79.1	3	78.2
10	36.9	25	131.0	4	71.5	4	71.5
11	30.8	26	25.8	5	75.2	5	78.2
12	70.1	27	17.9	6	64.7	6	62.7
13	49.5	28	28.0			Ac	170.8
14	51.3	29	16.4				20.9
15	30.8	30	17.4				

References

1. H. Besso, R. Kasai, J. We, J-F. Wang, Y-I. Saruwatari, T. Fuwa, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4534 (1982)

20-Glucoginsenoside-Rf



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax ginseng* [1]

$C_{48}H_{82}O_{19}$: 962.545

Mp: 182–184°C (i-PrOH) [1]

$[\alpha]_D^{28}$ + 21° (c 0.1, MeOH) [1]

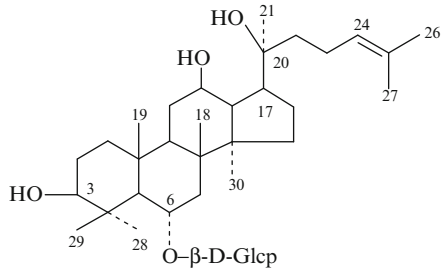
IR (KBr) ν_{max} cm^{-1}: 3420, 1620 [1]

^{1}H NMR (90 MHz, J/Hz, $CDCl_3$) (for permethylate): 0.88, 0.92, 0.95, 1.01, 1.26, 1.33, 1.59, 1.67 (s, CH_3 × 8), 3.33-3.63 (s, OCH_3), 4.34 (d, J = 7.0, H-1 of Glc), 4.48 (d, J = 7.0, H-1 of Glc′), 4.65 (d, J = 7.0, H-1 of Glc″) [1]

References

1. S. Sanada, J. Shoji, Chem. Pharm. Bull. **26**(6), 1694 (1978)

20(R)-Ginsenoside Rh_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax notoginseng* [1], *P. vietnamensis* [2]

$C_{36}H_{62}O_9$: 638.439

$[\alpha]_D^{22}$ + 20.0° [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	39.4	C-16	27.2	Glc-1	105.9
2	27.9	17	54.7	2	75.4
3	78.0	18	17.4	3	80.0

(*continued*)

Table 1 (continued)

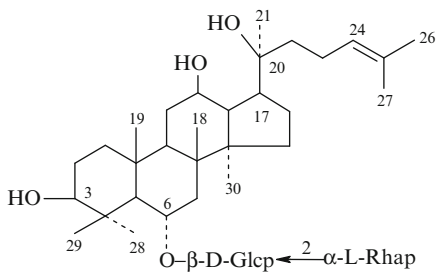
4	40.3	19	17.6	4	71.8
5	61.4	20	73.0	5	79.5
6	78.6	21	26.8	6	63.1
7	45.2	22	35.8		
8	41.1	23	23.0		
9	50.2	24	126.3		
10	39.6	25	130.6		
11	32.0	26	25.8		
12	71.0	27	17.6		
13	48.2	28	31.7		
14	51.6	29	16.4		
15	31.1	30	16.8		

References

1. J. Zhou, M.-Z. Wu, S. Taniyasu, H. Besso, O. Tanaka, Y. Saruwatari, T. Fuwa, Chem. Pharm. Bull. **29**(10), 2844 (1981)
2. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)

Chikusetsusaponin I (Ginsenoside Rg_2)

CAS Registry Number: 52286-74-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax japonicus* [1], *P. ginseng* [2], *P. notoginseng* [3]

$C_{42}H_{72}O_{13}$: 784.497

Mp: 189–191°C (EtOH) [1]

$[\alpha]_D^{30}$ + 4.96° (c 1.01, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1630 [1]

^{1}H NMR (J/Hz, $CDCl_3$) (for permethylate): 0.88-1.65 (CH_3 × 9), 3.33-3.63 (CH_3O × 8), 5.15 (H-24), 4.60 (d, J = 7.0, H-1 of Glc), 5.35 (brs, H-1 of Rha) [1]

^{13}C NMR (C_5D_5N) (for aglycone moiety): [4]

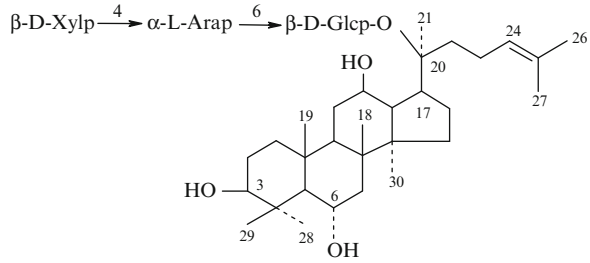
Table 1

C-1	39.7	C-11	32.2	C-21	27.0
2	27.8	12	71.1	22	35.9
3	78.4	13	48.3	23	23.1
4	40.1	14	51.7	24	126.4
5	60.9	15	31.4	25	130.7
6	74.3	16	27.1	26	26.0
7	46.2	17	54.8	27	17.7
8	41.2	18	17.2	28	32.2
9	49.9	19	17.7	29	17.0
10	39.7	20	73.0	30	17.0

References

1. T.D. Lin, N. Kondo, J. Shoji, Chem. Pharm. Bull. **24**, 253 (1976)
2. S. Sanada, N. Kondo, J. Shoji, O. Tanaka, S. Shibata, Chem. Pharm. Bull. **22**(10), 2407 (1974)
3. J. Zhou, M.-Z. Wu, S. Taniyasu, H. Besso, O. Tanaka, Y. Saruwatari, T. Fuwa, Chem. Pharm. Bull. **29**(10), 2844 (1981)
4. R. Kasai, H. Besso, O. Tanaka, Y. Saruwatari, T. Fuwa, Chem. Pharm. Bull. **31**, 2120 (1983)

Chikusetsusaponin L_5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax japonicus* [1]

$C_{46}H_{78}O_{17}$: 902.523

Mp: 193–195°C [1]
$[\alpha]_D^{20}$ + 23° (c 0.35, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

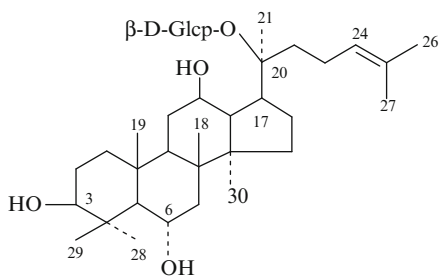
C-1	39.3	C-16	26.6	Glc-1	97.9
2	28.0	17	51.3	2	74.6
3	78.4	18	17.4	3	79.1
4	40.2	19	17.4	4	71.7
5	61.7	20	83.4	5	76.6
6	67.7	21	22.2	6	69.7
7	47.4	22	36.1	Ara-1	104.8
8	41.2	23	23.1	2	72.7
9	49.9	24	125.8	3	73.7
10	39.3	25	131.0	4	78.4
11	30.8	26	25.8	5	65.5
12	70.1	27	17.9	Xyl-1	106.7
13	49.1	28	31.9	2	75.2
14	51.3	29	16.5	3	78.4
15	30.8	30	17.4	4	70.8
				5	67.2

References

1. S. Yahara, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **25**(8), 2041 (1977)

Ginsenoside F_1 (Chikusetsusaponin L_{10})

CAS Registry Number: 53963-43-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol
Biological source: *Panax japonicus* [1], *P. ginseng* [2]
$C_{36}H_{62}O_9$: 638.439
$[\alpha]_D^{25}$ + 36.6° (c 0.15, MeOH) [2]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

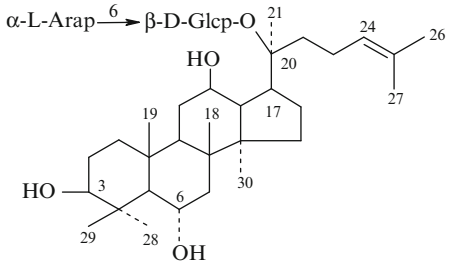
C-1	39.2	C-16	26.6	Glc-1	98.0
2	27.9	17	51.6	2	74.9
3	78.4	18	17.3	3	78.9
4	40.1	19	17.3	4	71.4
5	61.6	20	83.2	5	78.0
6	67.6	21	22.3	6	62.9
7	47.3	22	35.9		
8	41.1	23	23.1		
9	49.8	24	125.8		
10	39.2	25	130.8		
11	30.8	26	25.7		
12	70.2	27	17.7		
13	48.9	28	31.8		
14	51.3	29	16.4		
15	30.5	30	17.3		

References

1. S. Yahara, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **25**(8), 2041 (1977)
2. S. Yahara, O. Tanaka, T. Komori, Chem. Pharm. Bull. **24**(9), 2204 (1976)

Ginsenoside F_3

CAS Registry Number: 62025-50-7

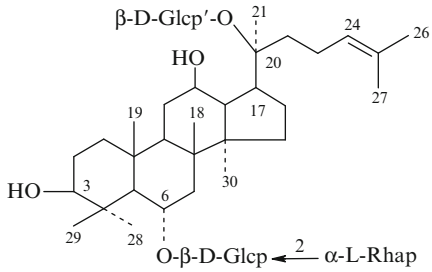


Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol
Biological source: *Panax ginseng* [1]
$C_{41}H_{70}O_{13}$: 770.481
$[\alpha]_D^{25}$ + 26.5° (c 0.98, MeOH) [1]

References

1. S. Yahara, O. Tanaka, T. Komori, Chem. Pharm. Bull. **24**(9), 2204 (1976)

Ginsenoside-Re



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax ginseng* [1, 2], *P. pseudoginseng* subsp. *himalaicus* [3], *P. quinquefolium* [4, 5], *Panax pseudoginseng* var. *elegantior* [6], *P. vietnamensis* [7]

$C_{48}H_{82}O_{18}$: 946.550

Mp: 203–205°C [1]

$[\alpha]_D^{15}$ −4.5° (c 1.28, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 1620 [1]

^{1}H NMR (J/Hz, C_5D_5N): anomeric protons- 4.40 (d, J = 7.0), 4.60 (d, J = 7.0), 5.31 (brs) [1]

^{13}C NMR (25 MHz, C_5D_5N): [6]

Table 1

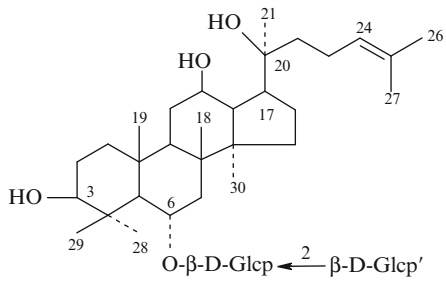
C-1	39.6	C-16	26.6	Glc-1	101.8	Glc′-1	98.2
2	27.6	17	51.6	2	79.1	2	75.0
3	78.1	18	17.5	3	78.1	3	79.1
4	39.9	19	17.5	4	72.5	4	71.5
5	60.8	20	83.2	5	78.1	5	78.1
6	74.5	21	22.3	6	63.0	6	62.8
7	45.9	22	36.0	Rha-1	101.8		
8	41.1	23	23.2	2	72.3		
9	49.5	24	125.9	3	72.3		
10	39.6	25	130.8	4	74.0		
11	30.7	26	25.7	5	69.4		
12	70.1	27	17.7	6	18.7		
13	49.0	28	32.1				
14	51.4	29	17.2				
15	30.7	30	17.2				

References

1. S. Sanada, N. Kondo, J. Shoji, O. Tanaka, S. Shibata, Chem. Pharm. Bull. **22**(10), 2407 (1974)
2. S. Yahara. O. Tanaka, T. Komori, Chem. Pharm. Bull. **24**(9), 2204 (1976)
3. O. Tanaka, S. Yahara, Phytochemistry **17**(8), 1353 (1978)
4. S.E. Chen, E.J. Staba, S. Taniyasu, R. Kasai, O. Tanaka, Planta Med. **42**(8), 406 (1981)
5. H. Besso, R. Kasai, J. Wei, J.-F. Wang, Y.-I. Saruwatari, T. Fuwa, O. Tanaka, Chem. Pharm. Bull. **30**(12), 4534 (1982)
6. T. Morita, Y.-C. Kong, P.P.-H. But, K.-H. Ng, T.-T. Yip, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **34**(10), 4368 (1986)
7. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)

Ginsenoside-Rf

CAS Registry Number: 52286-58-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax ginseng* [1], *P. trifolius* [2]

$C_{42}H_{72}O_{14}$: 800.492

Mp: 197–198°C ($(CH_3)_2CO$) [1]

$[\alpha]_D^{30}$ + 6.99° (c 1.0, MeOH) [1]

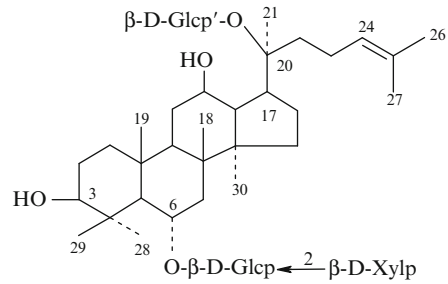
IR (KBr) ν_{max} cm^{-1}: 3380, 1620 [1]

References

1. S. Sanada, N. Kondo, J. Shoji, O. Tanaka, S. Shibata, Chem. Pharm. Bull. **22**, 2407 (1974)
2. O. Tanaka, R. Kasai, Progr. Chem. Org. Nat. Prod. **46**, 1 (1984)

Notoginsenoside-R1

CAS Registry Number: 80418-24-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax notoginseng* [1], *P. vietnamensis* [2], *P. pseudoginseng* var. *elegantior*, *P. japonicus* [3]

$C_{47}H_{80}O_{18}$: 932.534

Mp: 215–217°C (H_2O) [1]

$[\alpha]_D^{25}$ + 15.0° (c 1.0 MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 5.07 (d, J = 8), 5.05 (d, J = 8), 4.85 (d, J = 6) all anomeric protons [1]

^{13}C NMR (25.15 MHz, C_5D_5N): [1]

Table 1

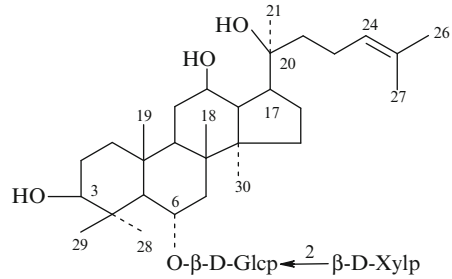
C-1	39.5	C-16	26.6	Glc-1	103.4	Glc′-1	98.1
2	27.6	17	51.7	2	79.4	2	75.0
3	78.0	18	17.7	3	78.9	3	78.5
4	40.1	19	17.0	4	71.4	4	71.1
5	61.2	20	83.3	5	79.9	5	79.9
6	79.4	21	22.4	6	62.6	6	62.6
7	44.8	22	35.9	Xyl-1	104.5		
8	41.0	23	23.2	2	75.6		
9	49.9	24	125.8	3	78.9		
10	39.5	25	130.9	4	71.4		
11	30.7	26	25.7	5	67.0		
12	70.3	27	17.4				
13	48.9	28	31.5				
14	51.3	29	17.4				
15	30.7	30	16.6				

References

1. J. Zhou, M.-Z. Wu, S. Taniyasu, H. Besso, O. Tanaka, Y. Saruwatari, T. Fuwa, Chem. Pharm. Bull. **29**(10), 2844 (1981)
2. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)
3. T. Morita, Y.-C. Kong, P.P.-H. But, K.-H. Ng, T.-T. Yip, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **34**(10), 4368 (1986)

Notoginsenoside-R2

CAS Registry Number: 80418-25-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax pseudoginseng* [1], *P. japonicus* [2], *P. notoginseng* [3]

$C_{41}H_{70}O_{13}$: 770.481

Mp: 185–187°C [1]

$[\alpha]_D^{13}$ + 10.3° (c 1.34, MeOH) [3]

^{13}C NMR (25 MHz, C_5D_5N): [3]

Table 1

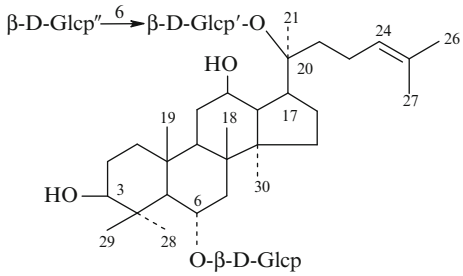
C-1	39.6	C-16	26.6	Glc-1	103.3
2	27.6	17	54.6	2	79.6
3	77.8	18	17.5	3	78.6
4	40.1	19	17.3	4	71.6
5	61.2	20	72.9	5	79.9
6	79.4	21	27.0	6	62.7
7	44.9	22	35.7	Xyl-1	104.6
8	41.0	23	22.9	2	75.6
9	50.1	24	126.2	3	78.6
10	39.6	25	130.9	4	71.6
11	31.6	26	25.8	5	67.1
12	71.1	27	17.5		
13	48.1	28	32.0		
14	51.6	29	17.9		
15	31.6	30	16.6		

References

1. T. Morita, Y.-C. Kong, P.P.-H. But, K.-H. Ng, T.-T. Yip, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **34**(10), 4368 (1986)
2. T. Morita, R. Kasai, O. Tanaka, J. Zhou, T.-R. Yang, J. Shoji, Chem. Pharm. Bull. **30**(12), 4341 (1982)
3. J. Zhou, M.-Z. Wu, S. Taniyasu, H. Besso, O. Tanaka, Y. Saruwatari, T. Fuwa, Chem. Pharm. Bull. **29**(10), 2844 (1981)

Notoginsenoside-R3

CAS Registry Number: 87741-76-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax notoginseng* [1]

$C_{48}H_{82}O_{19}$: 962.545

$[\alpha]_D^{16}$ + 23.7° (c 0.97, MeOH) [1]

FD-MS *m/z*: 985 $(M + Na)^+$, 823 $(M + Na\text{-}Glc)^+$ [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.5	C-16	26.5	Glc-1	105.7	Glc″-1	105.0
2	27.7	17	51.1	2	75.1	2	74.6
3	78.0	18	17.6	3	79.7	3	78.0
4	40.1	19	17.6	4	71.5	4	71.5
5	61.2	20	83.2	5	79.3	5	78.0
6	78.9	21	22.2	6	62.6	6	62.6
7	44.9	22	35.9	Glc′-1	97.9		
8	40.9	23	23.0	2	74.6		
9	49.7	24	125.7	3	78.0		
10	39.5	25	130.7	4	71.5		
11	30.5	26	25.7	5	76.7		
12	70.0	27	17.6	6	71.5		
13	48.9	28	31.5				
14	51.1	29	16.1				
15	30.9	30	17.4				

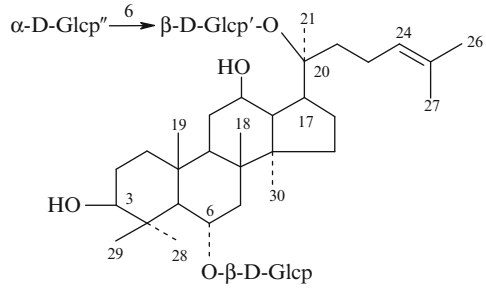
(*continued*)

References

1. H. Matsuura, R. Kasai, O. Tanaka, Y. Saruwatari, T. Fuwa, J. Zhou, Chem. Pharm. Bull. **31**(7), 2281 (1983)

Notoginsenoside-R6

CAS Registry Number: 87741-78-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax notoginseng* [1]

$C_{48}H_{82}O_{19}$: 962.545

$[\alpha]_D^{17}$ + 44.3° (c 0.5, MeOH) [1]

FD-MS *m/z*: 985 $(M + Na)^+$, 823 $(M + Na\text{-}Glc)^+$ [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.6	C-16	26.6	Glc-1	105.8	Glc″-1	100.3
2	27.7	17	51.3	2	75.4	2	73.9
3	78.0	18	17.5	3	79.9	3	75.2
4	40.3	19	17.5	4	71.8	4	71.8
5	61.4	20	83.4	5	79.1	5	73.9
6	79.4	21	22.5	6	62.7	6	62.7
7	45.1	22	36.0	Glc′-1	97.9		
8	41.1	23	23.2	2	75.2		
9	49.9	24	126.0	3	78.7		
10	39.6	25	130.9	4	71.8		
11	30.7	26	25.7	5	76.1		
12	70.4	27	17.9	6	68.0		
13	48.9	28	31.7				

(*continued*)

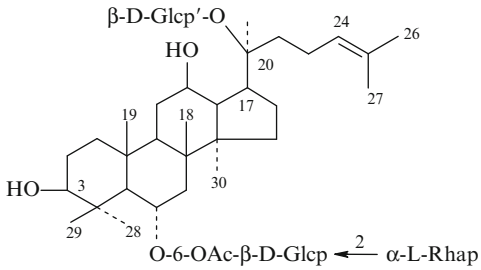
Table 1 (continued)

14	51.3	29	16.3
15	30.7	30	17.2

References

1. H. Matsuura, R. Kasai, O. Tanaka, Y. Saruwatari, T. Fuwa, J. Zhou, Chem. Pharm. Bull. **31**(7), 2281 (1983)

Pseudoginsenoside RS_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax vietnamensis* [1], *P. pseudoginseng* [2]

$C_{50}H_{84}O_{19}$: 988.560

$[\alpha]_D^{15}$ + 1.6° (c 0.93, MeOH) [2]

^{13}C NMR (25 MHz, C_5D_5N): [2]

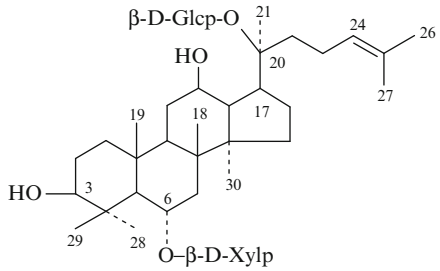
Table 1

C-1	39.7	C-16	26.6	Glc-1	101.3	Glc′-1	98.2
2	27.7	17	51.6	2	79.0	2	75.0
3	78.3	18	17.3	3	78.3	3	79.0
4	39.8	19	17.6	4	72.2	4	71.5
5	60.6	20	83.2	5	75.4	5	78.3
6	73.5	21	22.2	6	64.9	6	62.8
7	46.1	22	36.0	Ac	170.6		
8	41.2	23	23.2		20.8		
9	49.5	24	125.9	Rha-1	101.9		
10	39.7	25	130.8	2	72.2		
11	30.8	26	25.7	3	72.2		
12	70.1	27	17.7	4	74.0		
13	49.1	28	32.0	5	69.3		
14	51.4	29	17.3	6	18.6		
15	30.8	30	17.3				

References

1. N.M. Duc, N.T. Nham, R. Kasai, A. Ito, K. Yamasaki, O. Tanaka, Chem. Pharm. Bull. **41**(11), 2010 (1993)
2. T. Morita, Y.-C. Kong, P.P.-H. But, K.-H. Ng, T.-T. Yip, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **34**(10), 4368 (1986)

Pseudoginsenoside RT_3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 20(S)-Protopanaxatriol

Biological source: *Panax pseudoginseng* subsp. *himalaicus* [1]

$C_{41}H_{70}O_{13}$: 770.481

$[\alpha]_D^{14}$ + 30.9° (c 1.15, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

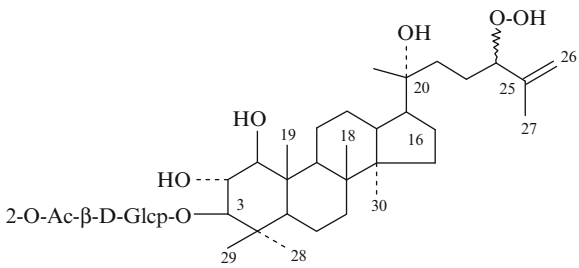
C-1	39.5	C-16	26.6	Xyl-1	106.6
2	27.9	17	51.6	2	75.2
3	78.7	18	17.5	3	79.1
4	40.3	19	17.6	4	71.1
5	61.4	20	83.3	5	67.0
6	78.2	21	22.4	Glc-1	98.3
7	45.4	22	36.1	2	75.1
8	41.2	23	23.2	3	79.6
9	50.0	24	126.0	4	71.7
10	39.7	25	130.9	5	79.3
11	31.0	26	25.8	6	62.9
12	70.2	27	17.8		
13	49.2	28	31.6		
14	51.4	29	16.5		
15	30.8	30	17.3		

References

1. O. Tanaka, T. Morita, R. Kasai, J. Kinouchi, S. Sanada, Y. Ida, J. Shoji, Chem. Pharm. Bull. **33**(6), 2323 (1985)

Chilianoside B

CAS Registry Number: 222541-48-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 24-Hydroperoxy-dammar-25-en-1β,2α,3β,20(R)-tetraol

Biological source: *Rhoiptelea chiliantha* [1]

$C_{38}H_{64}O_{12}$: 712.439

$[\alpha]_D^{20}$ + 29.4° (c 0.3, MeOH) [1]

FAB-MS *m/z*: 735 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, CD_3OD): 0.76 (s, CH_3-29), 0.81 (m, H-5), 0.90 (s, CH_3-30), 0.96 (s, CH_3-19), 0.98 (s, CH_3-28), 0.99 (s, CH_3-18), 1.07 (s, CH_3-21), 1.47, 1.03 (m, H_2-15), 1.36 (m, Hb-11), 1.50, 1.36 (m, H_2-22), 1.54 (m, H-9), 1.58, 1.26 (m, H_2-7), 1.60, 1.26 (m, H_2-6), 1.63, 1.50 (m, H_2-23), 1.66, 1.35 (m, H_2-16), 1.67 (m, H-17), 1.70 (m, H-13), 1.71 (s, CH_3-27), 1.90, 1.28 (m, H_2-12), 2.09 (s, Ac), 2.48 (dd, J = 13.0, 13.0, Ha-11), 3.04 (d, J = 9.0, H-3), 3.13 (d, J = 9.0, H-1), 3.46 (t, J = 9.0, H-2), 4.16 (t, J = 6.0, H-24), 4.91 (s, Ha-26), 4.92 (dd, J = 2.0, 3.0, Hb-26)

β-D-Glcp: 4.53 (d, J = 8.0, H-1), 4.80 (d, J = 8.9, H-2), 3.52 (t, J = 9.0, H-3), 3.40 (t, J = 9.0, H-4), 3.36 (m, H-5), 3.89 (dd, J = 2.0, 12.0, Ha-6), 3.68 (dd, J = 6.0, 12.0, Hb-6) [1]

^{13}C NMR (125 MHz, CD_3OD): [1]

Table 1

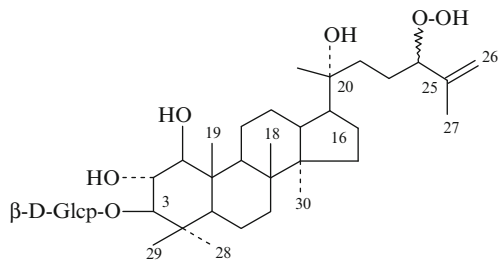
C-1	84.5	C-16	26.1	Glc-1	103.7
2	73.0	17	50.96, 50.99	2	75.5
3	92.5	18	16.3	3	76.1
4	40.8	19	14.5	4	71.3
5	54.3	20	75.95, 75.91	5	78.2
6	18.8	21	23.7	6	62.2
7	36.2	22	38.9		
8	42.2	23	26.0	Ac-1	171.6
9	53.2	24	91.03, 91.00	2	21.3
10	44.2	25	145.9		
11	25.2	26	114.1		
12	28.7	27	17.12, 17.09		
13	42.9	28	28.5		
14	51.2	29	17.5		
15	32.2	30	16.9		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside C

CAS Registry Number: 222541-50-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 24-Hydroperoxy-dammar-25-en-1β,2α,3β,20(R)-tetraol

Biological source: *Rhoiptelea chiliantha* [1]

$C_{36}H_{62}O_{11}$: 670.429

$[\alpha]_D^{15}$ + 13.7° (c 0.2, MeOH) [1]

FAB-MS *m/z*: 669 $(M-H)^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.89, 0.90, 0.98, 0.99, 1.08, 1.08, 1.71 (s, CH_3-30, 29, 28, 21, 18, 19, 27), 3.05 (d, J = 9.0, H-3), 3.16 (d, J = 9.0, H-1), 3.50 (t, J = 9.0, H-2), 4.16 (t, J = 6.0, H-24), 5.00, 4.79 (s, CH_2-26)

β-D-Glcp: 4.34 (d, J = 8.0, H-1), 3.88 (d, J = 12.0, Ha-6), 3.68 (dd, J = 5.0, 12.0, Hb-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

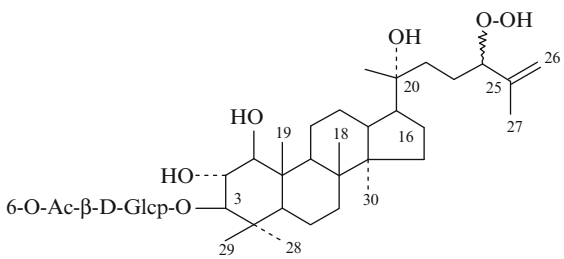
C-1	84.7	C-16	26.0	Glc-1	106.2
2	73.2	17	51.0	2	75.4
3	92.5	18	16.3	3	78.1
4	41.1	19	14.6	4	71.4
5	54.5	20	76.0	5	78.1
6	18.8	21	23.7	6	62.4
7	36.2	22	38.9		
8	42.3	23	26.0		
9	53.3	24	91.06, 91.03		
10	44.2	25	145.9		
11	25.2	26	114.08,113.99		
12	28.7	27	17.1		
13	42.9	28	28.6		
14	51.2	29	17.6		
15	32.2	30	16.9		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside D

CAS Registry Number: 222541-52-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 24-Hydroperoxy-dammar-25-en-1β,2α,3β,20(R)-tetraol

Biological source: *Rhoiptelea chiliantha* [1]

$C_{38}H_{64}O_{12}$: 712.439

$[\alpha]_D^{15}$ + 15.5° (c 0.2, MeOH) [1]

FAB-MS *m/z*: 711 $(M-H)^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.89, 0.90, 0.98, 0.99, 1.08, 1.08, 1.71 (s, CH_3-30, 29, 28, 19, 18, 27), 2.09 (s, Ac), 3.05 (d, J = 9.0, H-3), 3.16 (d, J = 9.0, H-1), 3.50 (t, J = 9.0, H-2), 4.16 (t, J = 6.0, H-24), 4.91, 4.78 (s, CH_2-26)

β-D-Glcp: 4.34 (d, J = 8.0, H-1), 4.44 (d, J = 12.0, Ha-6), 4.17 (dd, J = 5.0, 12.0, Hb-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

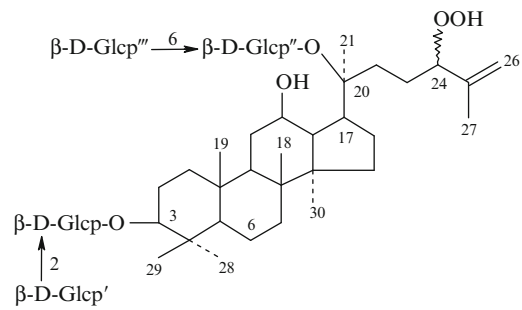
C-1	84.9	C-16	26.0	Glc-1	106.3
2	73.0	17	51.03,50.78	2	75.2
3	93.2	18	16.3	3	77.9
4	41.1	19	14.6	4	71.6
5	54.5	20	75.97,75.93	5	75.3
6	18.8	21	23.7	6	64.6
7	36.2	22	49.0	Ac-1	172.8
8	42.3	23	26.0	2	20.8
9	53.2	24	91.0		
10	44.2	25	145.9		
11	25.2	26	114.05,113.97		
12	28.7	27	17.1		
13	42.9	28	28.5		
14	51.2	29	17.6		
15	32.2	30	16.9		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Notoginsenoside C

CAS Registry Number: 193895-49-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 24-Hydroperoxy-dammar-25-en-3β,12β,20(S)-triol
Biological source: *Panax notoginseng* [1]
$C_{54}H_{92}O_{25}$: 1140.592
Mp: 199–202°C (aq. MeOH) [1]
$[\alpha]_D^{22}$ + 14.4° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 1655, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 1139 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1163.5826 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.83, 0.94, 0.99, 1.10, 1.28, 1.63, 1.96 (s, CH_3-19, 30, 18, 29, 28, 21, 27), 1.97 (m), 2.55 (m, H_2-22), 3.27 (dd, J = 2.9, 11.0, H-3), 4.14 (m, H-12), 4.79 (dd-like, H-24), 5.10, 5.30 (m, CH_2-26), 4.91 (d, J = 7.3, H-1 of Glc), 5.09 (d-like, H-1 of Glc″), 5.10 (d-like, H-1 of Glc‴), 5.36 (d, J = 7.6, H-1 of Glc′) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	26.7	Glc-1	105.1	Glc″-1	98.1
2	26.8	17	51.7	2	83.3	2	74.8
3	89.0	18	16.0	3	78.3	3	79.1
4	39.7	19	16.3	4	71.6	4	71.5
5	56.4	20	83.4	5	78.2	5	77.0
6	18.5	21	22.6	6	62.8	6	70.0
7	35.1	22	32.6	Glc′-1	106.0	Glc‴-1	105.2
8	40.0	23	26.3	2	77.1	2	75.2
9	50.2	24	90.0	3	78.1	3	78.4
10	36.9	25	146.0	4	71.7	4	71.8
11	30.9	26	113.5	5	78.3	5	78.3
12	70.2	27	17.6	6	62.7	6	62.9
13	49.4	28	28.1				
14	51.4	29	16.6				
15	30.8	30	17.4				

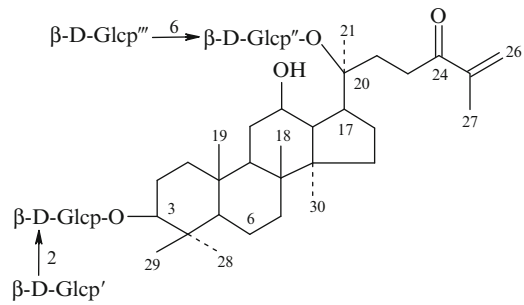
Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, K. Yashiro, N. Hirokawa, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45**(6), 1039 (1997)

Notoginsenoside B

CAS Registry Number: 193895-26-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 24-Oxo-dammar-25-en-3β,12β,20(S),25-triol
Biological source: *Panax notoginseng* [1]
$C_{54}H_{90}O_{24}$: 1122.582
Mp: 201–204°C (aq. MeOH) [1]
$[\alpha]_D^{23}$ + 17.8° (c 0.1, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 216 (3.5) [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 1655, 1638, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 1121 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1145.5720 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.82, 0.92, 0.97, 1.11, 1.28, 1.59, 1.83 (s, CH_3-19, 18, 30, 29, 28, 21, 27), 3.26 (dd-like, H-3), 4.18 (m, H-12), 5.77, 6.37 (s, CH_2-26), 4.93 (d, J = 7.6, H-1 of Glc), 5.03 (d, J = 7.2, H-1 of Glc‴), 5.11 (d, J = 7.3, H-1 of Glc″), 5.38 (d, J = 7.6, H-1 of Glc′) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	26.7	Glc-1	105.6	Glc″-1	98.0
2	26.8	17	52.1	2	83.5	2	74.8
3	89.0	18	16.0	3	78.4	3	79.4
4	39.7	19	16.3	4	71.7	4	71.3
5	56.4	20	83.2	5	78.1	5	76.7
6	18.4	21	21.9	6	62.8	6	70.3
7	35.1	22	32.8	Glc′-1	106.0	Glc‴-1	105.1

(*continued*)

Table 1 (continued)

8	40.0	23	29.8	2	77.1	2	75.2
9	50.2	24	202.2	3	78.0	3	78.5
10	36.9	25	144.4	4	71.7	4	71.8
11	30.8	26	125.6	5	78.3	5	78.3
12	70.2	27	17.8	6	62.7	6	62.9
13	49.5	28	28.1				
14	51.5	29	16.6				
15	30.7	30	17.4				

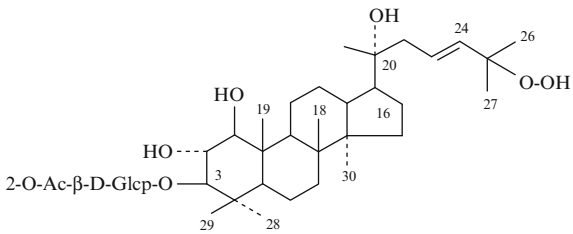
Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, K. Yashiro, N. Hirokawa, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45**(6), 1039 (1997)

Chilianoside E

CAS Registry Number: 222541-54-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 25-Hydroperoxy-dammar-23-en-1β,2α,3β,20(R)-tetraol

Biological source: *Rhoiptelea chiliantha* [1]

$C_{38}H_{64}O_{12}$: 712.439

$[\alpha]_D^{20}$ + 44.0° (c 0.2, MeOH) [1]

FAB-MS *m/z*: 735 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, CD_3OD): 0.76 (s, CH_3-29), 0.81 (m, H-5), 0.89 (s, CH_3-30), 0.97 (s, CH_3-19), 0.98 (s, CH_3-28), 1.00 (s, CH_3-18), 1.08 (s, CH_3-21), 1.26 (m, Hb-12), 1.30 (s, CH_3-26, 27), 1.36 (m, Hb-11), 1.49, 1.05 (m, CH_2-15), 1.56 (m, H-9), 1.58, 1.25 (m, H_2-7), 1.59, 1.27 (m, H_2-6), 1.68, 1.36 (m, H_2-16), 1.69 (m, H-17), 1.72 (m, H-13), 1.91 (d, J = 13.0, Ha-12), 2.09 (s, Ac), 2.18 (m, H_2-22), 2.48 (dd, J = 13.0, 13.0, Ha-11), 3.04 (d, J = 9.0, H-3), 3.14 (d, J = 9.0, H-1), 3.46 (t, J = 9.0, H-2), 5.59 (d, J = 16.0, H-24), 5.75 (dt, J = 16.0, 7.0, H-23)

β-D-Glcp: 4.53 (d, J = 8.0, H-1), 4.80 (d, J = 8.9, H-2), 3.52 (t, J = 9.0, H-3), 3.40 (t, J = 9.0, H-4), 3.35 (m, H-5), 3.89 (dd, J = 2.0, 12.0, Ha-6), 3.68 (dd, J = 6.0, 12.0, Hb-6) [1]

^{13}C NMR (125 MHz, CD_3OD): [1]

Table 1

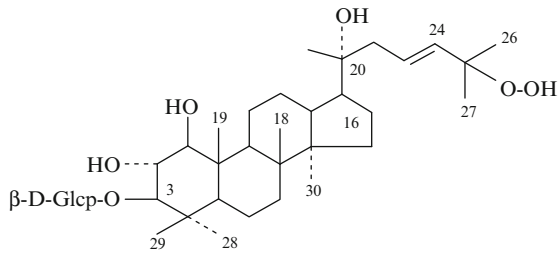
C-1	84.5	C-16	26.0	Glc-1	103.7
2	73.0	17	51.0	2	75.5
3	92.6	18	16.3	3	76.5
4	41.0	19	14.5	4	71.3
5	54.3	20	76.1	5	78.2
6	18.8	21	23.7	6	62.3
7	36.2	22	46.2	Ac-1	171.8
8	42.3	23	127.5	2	21.3
9	53.3	24	138.3		
10	44.2	25	82.6		
11	25.2	26	24.9		
12	28.8	27	25.0		
13	43.1	28	28.5		
14	51.2	29	17.5		
15	32.2	30	16.8		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside F

CAS Registry Number: 222541-56-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 25-Hydroperoxy-dammar-23-en-1β,2α,3β,20(R)-tetraol

Biological source: *Rhoiptelea chiliantha* [1]

$C_{36}H_{62}O_{11}$: 670.429

$[\alpha]_D^{15}$ + 11.1° (c 0.2, MeOH) [1]

FAB-MS *m/z*: 669 $(M\text{-}H)^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.89, 0.89, 0.98, 1.00, 1.08, 1.08, 1.29, 1.29 (s, CH_3-30, 29, 28, 21, 19, 18, 26, 27), 3.05 (d, J = 9.0, H-3), 3.16 (d, J = 9.0, H-1), 3.50 (t, J = 9.0, H-2), 5.59 (d, J = 16.0, H-24), 5.76 (dt, J = 16.0, 7.0, H-23)

β-D-Glcp: 4.33 (d, J = 8.0, H-1), 3.88 (dd, J = 2.0, 12.0, Ha-6), 3.66 (dd, J = 5.0, 12.0, Hb-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

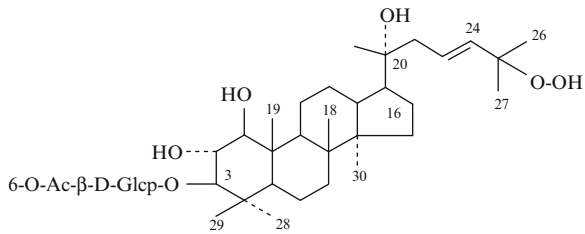
C-1	84.7	C-16	25.9	Glc-1	106.2
2	73.2	17	51.0	2	75.5
3	92.6	18	16.4	3	78.1
4	41.1	19	14.5	4	71.4
5	54.5	20	76.5	5	78.2
6	18.1	21	23.7	6	62.5
7	36.2	22	46.2		
8	42.3	23	127.5		
9	53.3	24	138.3		
10	44.3	25	82.5		
11	25.2	26	25.0		
12	28.8	27	25.0		
13	43.1	28	28.6		
14	51.2	29	17.6		
15	32.2	30	16.8		

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Chilianoside G

CAS Registry Number: 222541-58-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 25-Hydroperoxy-dammar-23-en-1β,2α,3β,20(R)-tetraol

Biological source: *Rhoiptelea chiliantha* [1]

$C_{38}H_{64}O_{12}$: 712.439

$[\alpha]_D^{15}$ + 13.6° (c 0.2, MeOH) [1]

FAB-MS *m/z*: 711 $(M\text{-}H)^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 0.89, 0.89, 1.00, 1.08, 1.08, 1.29, 1.29 (s, CH_3-30, 29, 28, 21, 19, 18, 26, 27), 2.09 (s, Ac), 3.02 (d, J = 9.0, H-3), 3.15 (d, J = 9.0, H-1), 3.48 (t, J = 9.0, H-2), 5.59 (d, J = 16.0, H-24), 5.76 (dt, J = 16.0, 7.0, H-23)

β-D-Glcp: 4.34 (d, J = 8.0, H-1), 4.43 (dd, J = 2.0, 12.0, Ha-6), 4.17 (dd, J = 6.0, 12.0, Hb-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

C-1	85.0	C-16	26.0	Glc-1	106.3
2	73.0	17	51.0	2	75.3
3	93.2	18	16.4	3	77.9
4	41.1	19	14.6	4	71.6
5	54.5	20	76.5	5	75.3
6	18.8	21	23.7	6	64.6
7	36.3	22	46.0	Ac-1	172.8
8	42.3	23	127.5	2	20.8

(*continued*)

Table 1 (continued)

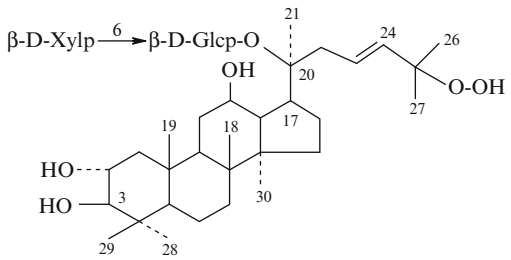
9	53.3	24	138.4
10	44.2	25	82.6
11	25.2	26	24.9
12	28.8	27	25.0
13	43.1	28	28.5
14	51.2	29	17.6
15	32.2	30	16.8

References

1. Z.-H. Jiang, R. Fukuoka, F. Aoki, T. Tanaka, I. Kouno, Chem. Pharm. Bull. **47**, 257 (1999)

Gymnemaside VII

CAS Registry Number: 141380-42-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 25-Hydroperoxy-dammar-23-en-2α,3β,12β,20(S)-tetraol

Biological source: *Gymnema sylvestre* [1]

$C_{41}H_{70}O_{15}$: 802.471

Mp: 185–187°C [1]

$[\alpha]_D$ −7.7° (C 1.4, MeOH) [1]

FAB-MS *m/z*: 826 $[M + Na + H]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.87, 0.99, 1.04, 1.09, 1.26, 1.61, 1.67, 1.62, (s, CH_3 × 7), 3.40 (dd, J = 11.5, 4.0, H-3), 6.13 (d, J = 15.5, H-24), 6.20 (ddd, J = 15.5, 8.0, 4.5, H-23), 4.96 (d, J = 7.5, H-1 of Xyl), 5.16 (d, J = 8.0, H-1 of Glc) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

C-1	48.4	C-11	30.6	C-21	23.1	Glc-1	98.2	Xyl-1	105.6
2	68.8	12	70.3	22	38.0	2	75.0	2	74.8

(*continued*)

Table 1 (continued)

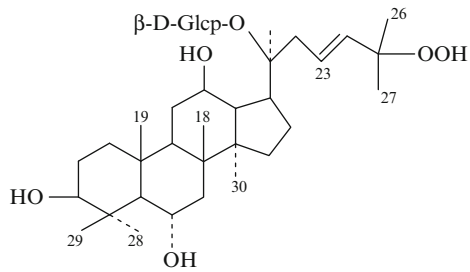
3	83.7	13	49.7	23	126.8	3	79.0	3	78.0
4	40.0	14	51.5	24	140.1	4	71.6	4	71.1
5	56.5	15	31.1	25	81.4	5	76.8	5	67.0
6	18.8	16	26.4	26	25.1	6	70.0		
7	35.1	17	51.8	27	25.4				
8	40.2	18	16.1	28	29.2				
9	50.3	19	17.3	29	17.6				
10	38.6	20	83.2	30	17.5				

References

1. K. Yoshikawa, S. Arihara, K. Matsuura, T. Miyase, Phytochemistry **31**(1), 237 (1992)

Ginsenoside-Rh$_6$

CAS Registry Number: 343780-67-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 25-Hydroperoxy-dammar-23-en-3β,6α,12β,20(S)-tetraol

Biological source: *Panax ginseng* [1]

$C_{36}H_{62}O_{11}$: 670.429

$[\alpha]_D^{21}$ + 21.8° (c 0.1, MeOH) [1]

HR-FAB-MS *m/z*: 693.4190 $[M + Na]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.91, 1.06, 1.15, 1.47, 1.59, 1.62, 1.88, 2.01 (s, CH_3-30, 19, 18, 29, 21, 27, 28), 1.30 (d, J = 10.0, H-5), 2.74, 3.06 (dd, J = 6.0, 14.0, H_2-22), 3.52 (dd, J = 4.0, 11.5, H-3), 4.02 (m, H-12), 4.42 (dt, J = 3.5, 10.0, H-6), 6.06 (d, J = 16.0, H-24), 6.19 (m, H-23)

β-D-Glcp: 5.22 (d, J = 7.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

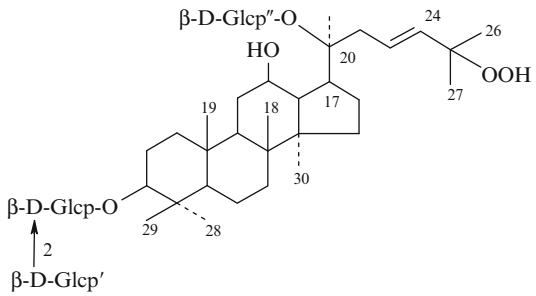
Table 1

C-1	39.4	C-16	26.4	Glc-1	98.3
2	28.2	17	52.2	2	75.3
3	78.5	18	17.6	3	78.9
4	40.4	19	17.5	4	71.6
5	61.8	20	83.1	5	78.3
6	67.7	21	23.3	6	63.0
7	47.4	22	39.7		
8	41.2	23	126.5		
9	49.8	24	138.1		
10	39.4	25	81.3		
11	31.0	26	25.2		
12	70.5	27	25.4		
13	49.2	28	32.0		
14	51.5	29	16.5		
15	30.7	30	17.2		

References

1. D.-Q. Dou, Y.-J. Chen, L.-H. Liang, F.-G. Pang, N. Shimizu, T. Takeda, Chem. Pharm. Bull. **49**(4), 442 (2001)

Notoginsenoside E



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – 25-Hydroperoxy-dammar-23-en-3β,12β,20(S)-triol
Biological source: *Panax notoginseng* [1]

$C_{48}H_{82}O_{20}$: 978.539
Mp: 202–204°C (aq. MeOH) [1]
$[\alpha]_D^{24}$ + 19.2° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1638, 1078 [1]
FAB-MS (negative ion mode) *m/z*: 977 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1001.5297 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.83, 0.89, 1.00, 1.12, 1.30, 1.58, 1.59, 1.61 (s, CH_3-19, 30, 18, 29, 28, 26, 27, 21), 3.26 (dd-like, H-3), 4.01 (m, H-12), 6.07 (d, J = 15.0, H-24), 6.16 (m, H-23)
β-D-Glcp: 4.95 (d, J = 7.0, H-1); β-D-Glcp′: 5.39 (d, J = 6.7, H-1); β-D-Glcp″: 5.22 (d, J = 7.6, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-18	15.8	Glc-1	105.0	Glc″-1	98.2
2	26.5	19	16.1	2	83.0	2	75.2
3	88.9	20	83.3	3	78.1	3	78.6
4	39.6	21	23.2	4	71.5	4	71.4
5	56.3	22	39.5	5	78.1	5	78.0
6	18.3	23	126.3	6	62.8	6	62.8
7	35.0	24	138.0	Glc′-1	105.8		
8	39.9	25	81.2	2	77.0		
9	50.0	26	25.0	3	77.8		
10	36.8	27	25.3	4	71.6		
11	30.8	28	28.0	5	78.2		
12	70.4	29	16.4	6	62.6		
13	49.3	30	17.0				
14	51.4						
15	30.5						
16	26.3						
17	52.2						

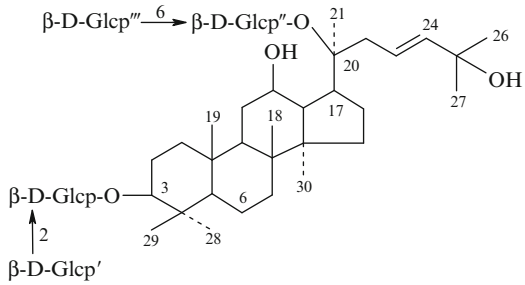
Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, N. Hirokawa, K. Yashiro, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45** (6), 1056 (1997)

Notoginsenoside A

CAS Registry Number: 193895-21-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – Dammar-23-en-3β,12β,20(S),25-tetraol

Biological source: *Panax notoginseng* [1]

$C_{54}H_{92}O_{24}$: 1124.597

Mp: 197–200°C [1]

$[\alpha]_D^{24}$ + 18.9° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1632, 1072 [1]

FAB-MS (negative ion mode) *m/z*: 1123 $(M-H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1147.5876 $(M + Na)^+$, 1169 $(M + 2Na-H)^+$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.85, 0.89, 1.03, 1.11, 1.29, 1.61 (s, CH_3-19, 30, 18, 29, 28, 21), 1.55 (s, CH_3-26, 27), 3.28 (dd, J = 3.4, 11.2, H-3), 4.34 (m, H-12), 6.08 (d, J = 15.6, H-24), 6.19 (ddd-like, H-23), 4.92 (d, J = 7.6, H-1 of Glc), 5.10 (d, J = 7.6, H-1 of Glc‴), 5.18 (d, J = 7.6, H-1 of Glc″), 5.37 (d, J = 7.3, H-1 of Glc′) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.2	C-16	26.4	Glc-1	105.1	Glc″-1	98.1
2	26.8	17	52.1	2	83.3	2	75.1
3	89.1	18	16.0	3	78.3	3	78.7
4	39.7	19	16.3	4	71.7	4	71.6
5	56.4	20	83.4	5	78.1	5	77.1
6	18.5	21	23.3	6	62.8	6	70.5
7	35.1	22	39.7	Glc′-1	106.0	Glc‴-1	104.8
8	40.1	23	122.7	2	77.1	2	75.2
9	50.1	24	142.3	3	77.9	3	78.3
10	36.9	25	70.0	4	71.8	4	71.6
11	30.8	26	30.6	5	78.2	5	78.3
12	70.0	27	30.7	6	62.7	6	62.9
13	49.5	28	28.1				
14	51.5	29	16.6				
15	30.6	30	17.2				

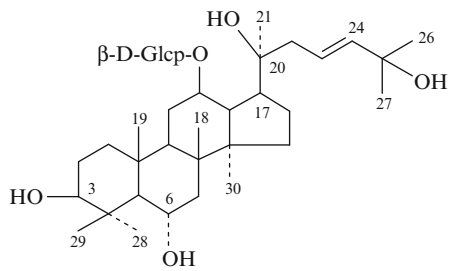
(*continued*)

Pharm./Biol.: Glycosidic fraction obtained from the dried roots of *Panax notoginseng* showed remarkable protective effect on liver injury induced by D-galactosamine and lipopolysaccharide [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueno, K. Yashiro, N. Hirokawa, N. Murakami, J. Yamahara, H. Matsuda, R. Saijoh, O. Tanaka, Chem. Pharm. Bull. **45**(6), 1039 (1997)

Chikusetsusaponin L_{9A}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – Dammar-23-en-3β,6α,12β,20(S),25-pentaol

Biological source: *Panax japonicus* [1]

$C_{36}H_{62}O_{10}$: 654.434

$[\alpha]_D^{23}$ + 14.0° (c 0.51, MeOH) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	26.9	Glc-1	100.2
2	28.0	17	53.4	2	75.1
3	78.3	18	17.5	3	78.3
4	40.3	19	17.5	4	71.1
5	61.7	20	73.3	5	77.4
6	67.6	21	27.6	6	62.4
7	47.2	22	40.8		

(*continued*)

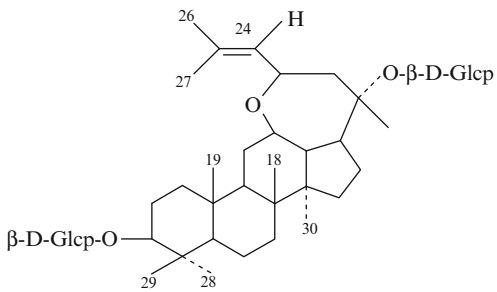
Table 1 (continued)

8	41.1	23	123.5
9	49.8	24	141.4
10	39.4	25	69.8
11	28.0	26	31.2
12	78.3	27	31.2
13	46.7	28	31.8
14	52.1	29	16.4
15	31.2	30	17.2

References

1. S. Yahara, R. Kasai, O. Tanaka, Chem. Pharm. Bull. **25**(8), 2041 (1977)

Ginsenoside La



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Dammarane Type – Protopanaxadiol-12,23-oxid

Biological source: *Panax ginseng* [1]

$C_{42}H_{68}O_{13}$: 780.465

Mp: 179–180°C (MeOH) [1]

$[\alpha]_D$ − 18.4° (C_5N_5N) [1]

FAB-MS *m/z*: 781 $[M\text{-}H]^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3500 [1]

^{1}H NMR (J/Hz): 3.64 (d, J = 8, H-12), 0.95 (s, CH_3-18), 0.83 (s, CH_3-19), 1.50 (s, CH_3-21), 4.81 (t, J = 9, H-23), 5.51 (brd, J = 9, H-24), 1.66 (s, CH_3-26), 1.80 (s, CH_3-27), 1.30 (s, CH_3-28), 1.00 (s, CH_3-29), 1.06 (s, CH_3-30)

β-D-Glcp: 4.94 (d, J = 8, H-1), 4.04 (t, J = 8, H-2), 4.26 (m, H-3), 4.22 (m, H-4), 4.02 (m, H-5), 4.40 (dd, J = 11, 5, H-6), 4.60 (dd, J = 11, 2, H-6)

β-D-Glcp′: 5.13 (d, J = 8, H-1), 3.97 (t, J = 8, H-2), 4.26 (m, H-3), 4.23 (m, H-4), 3.98 (m, H-5), 4.36 (dd, J = 11, 2, H-6), 4.54 (dd, J = 11, 5, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.4	C-12	79.8	Glc-1	106.9
3	88.7	13	49.7	2	75.8
4	39.7	14	51.2	3	78.8
5	56.4	15	32.5	4	71.89
7	35.2	17	46.9	5	78.3
8	39.8	20	81.8	6	63.1
9	50.6	22	51.8	Glc′-1	99.3
10	37.6	23	72.4	2	75.3
		24	129.2	3	78.9
		25	131.4	4	71.93
		26	18.8	5	78.2
		27	25.7	6	63.1

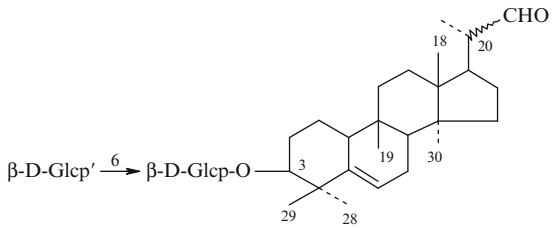
References

1. S. Zhang, X. Yao, Y. Chen, C. Cui, Y. Tezuka, T. Kikuchi, Chem. Pharm. Bull. **37**(7), 1966 (1989)

Glycosides of Aglycones of Cucurbitane Type

Momordicoside E

CAS Registry Number: 78887-74-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 3β-Hydroxy-23,24,25,26,27-pentanor-(20ξ)cucurbita-5-ene-22-al

Biological source: *Momordica charantia* [1]

$C_{37}H_{60}O_{12}$: 696.408

$[\alpha]_D^{20}$ + 1.82° (c 1.10, MeOH) [1]

Mixture (20R) and (20S) of isomers

FD-MS *m/z*: 719 $(M + Na)^+$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 9.66 (d, J = 2.5, CHO), 9.67 (d, J = 4.0, CHO) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

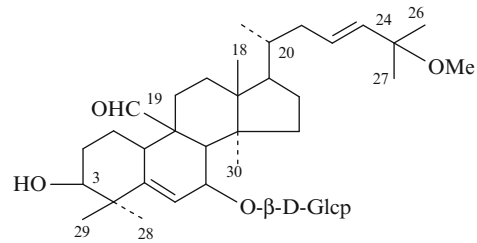
C-3	87.4	Glc-1	105.3	Glc′-1	107.0
4	49.0	2	77.4	2	77.4
5	143.3	3	78.5	3	78.5
6	118.5	4	71.7	4	71.7
9	47.0	5	75.2	5	75.4
13	41.7	6	70.2	6	62.8
14	34.8				
CHO	205.7				
CHO	204.9				

References

1. Y. Miyahara, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **29**, 1561 (1981)

Momordicoside K

CAS Registry Number: 81348-84-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 3β,7β-Dihydroxy-25-methoxy-cucurbita-5,23-diene-19-al

Biological source: *Momordica charantia* [1]

$C_{37}H_{60}O_9$: 648.423

Mp: 236–237°C [1]

$[\alpha]_D^{20}$ + 63.3° (c 1.00, $CHCl_3$-MeOH (1:1)) [1]

CD $[\theta]_{208}^{11}$: +58500° (c, 2.05×10^{-4} g/ml, MeOH) [1]

^{1}H NMR (J/Hz): 3.79 (brs, H-3), 6.17 (brd, J = 6.0, H-6), 5.57 (brs, H-23), 5.57 (H-24), 0.78, 0.87, 0.95, 1.12, 1.31, 1.31, 1.42 (s, CH_3 × 7), 3.21 (OCH_3), 10.43 (CHO) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	71.5	Glc-1	106.8
4	41.8	2	75.4
5	121.9	3	78.5
6	147.1	4	71.7
7	74.7	5	78.3
13	45.6	6	62.7
14	47.9		
19	207.0		
OCH_3	50.0		
23	128.0		
24	137.3		
25	74.7		

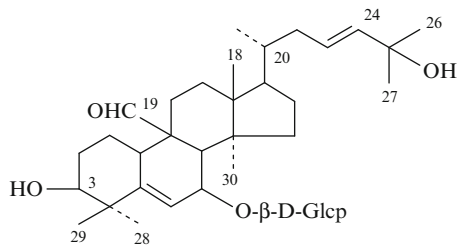
Pharm./Biol.: Bitter tast [2]

References

1. H. Okabe, Y. Miyahara, T. Yamauchi, Chem. Pharm. Bull. **30**, 4334 (1982)
2. H. Okabe, Y. Miyahara, T. Yamauchi, Tetrahedron Lett. **23**, 77 (1982)

Momordicoside L

CAS Registry Number: 81348-83-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 3β,7β,25-Trihydroxy-cucurbita-5,23-diene-19-al
Biological source: *Momordica charantia* [1, 2]
$C_{36}H_{58}O_9$: 634.408
Mp: 227–232°C [1]
$[\alpha]_D^{20}$ + 57.3° (c 1.00, $CHCl_3$-MeOH (1:1)) [1]
CD $[\theta]_{210}^{11}$: +42900° (c, 1.92×10^{-4} g/ml, MeOH) [1]
^{1}H NMR (J/Hz): 0.77, 0.88, 1.15, 1.45, 1.53, 1.53 (s, CH_3 × 6), 3.81 (brs, H-3), 5.92 (brs, H-23), 5.92 (H-24), 10.42 (s, CHO)
β-D-Glcp: 4.99 (d, J = 7.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	71.5	Glc-1	101.4
4	41.8	2	75.4
5	122.0	3	78.5
6	147.2	4	71.5
7	74.7	5	78.5
13	45.5	6	62.8
14	47.9		
19	206.9		
23	123.8		
24	141.3		
25	69.6		

(*continued*)

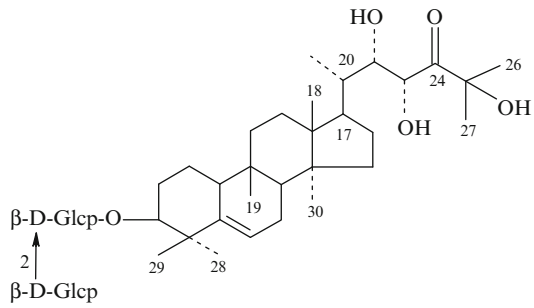
Pharm./Biol.: Bitter tast [1]

References

1. H. Okabe, Y. Miyahara, T. Yamauchi, Chem. Pharm. Bull. **30**, 4334 (1982)
2. H. Okabe, Y. Miyahara, T. Yamauchi, Tetrahedron Lett. **23**, 77 (1982)

Goyaglycoside-h

CAS Registry Number: 333333-19-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 3β,22(S),23(R),25-Tetrahydroxy-cucurbita-5-en-24-one
Biological source: *Momordica charantia* [1]
$C_{42}H_{70}O_{15}$: 814.471
$[\alpha]_D^{24}$ + 0.7° (c 0.5, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3432, 1717, 1076, 1038 [1]
FAB-MS *m/z*: 813 $[M-H]^-$, 491 $[M-C_{12}H_{21}O_{10}]^-$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 3.73 (brs, H-3), 5.45 (dd-like, H-6), 1.65 (brs, H-8), 1.06 (s, CH_3-18), 0.88 (CH_3-19), 1.50 (d, J = 6.3, CH_3-21), 4.81 (dd-like, H-22), 5.53 (d-like, H-23), 1.72 (s, CH_3-26), 1.63 (s, CH_3-27), 0.91 (s, CH_3-28), 1.48 (s, CH_3-29), 0.80 (s, CH_3-30)

β-D-Glcp: 4.80 (d, J = 7.6, H-1)
β-D-Glcp′: 5.17 (d, J = 7.6, H-1) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

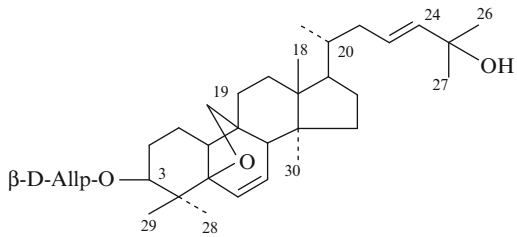
C-1	22.7	C-16	25.3	Glc-1	106.9
2	29.6	17	48.2	2	75.4
3	87.3	18	15.4	3	78.5
4	41.8	19	28.1	4	71.9
5	143.4	20	43.7	5	77.4
6	118.7	21	15.3	6	70.3
7	24.7	22	72.8	Glc′-1	105.3
8	43.9	23	75.2	2	75.3
9	34.8	24	217.6	3	78.5
10	38.6	25	77.3	4	71.9
11	32.6	26	28.1	5	78.6
12	30.9	27	28.9	6	62.9
13	47.1	28	25.9		
14	49.2	29	28.5		
15	35.4	30	18.2		

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Momordicoside F_2

CAS Registry Number: 81348-82-5



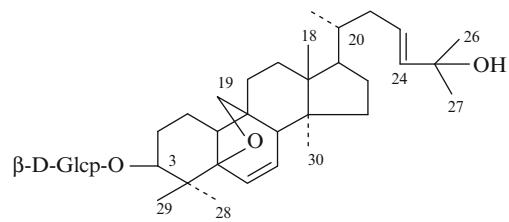
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 5,19-Epoxy-5β-cucurbita-6,23-diene-3β,25-diol
Biological source: *Momordica charantia* [1]
$C_{36}H_{58}O_8$: 618.413
Mp: 155–158°C [1]
$[\alpha]_D$ − 96.5° (c 0.87, $CHCl_3$-MeOH) [1]
^{1}H NMR (J/Hz): 3.66 (brs, H-3), 6.19 (brd, J = 10.0, H-6), 5.57 (dd, J = 4.0, 10.0, H-7), 3.61 (d, J = 8.0, Hα -19), 3.79 (d, J = 8.0, Hβ-19), 5.94 (brs, H-23), 5.94 (H-24), 0.77, 0.86, 0.90, 1.47, 1.54, 1.54 (s, CH_3 × 6)
β-D-Allp: 5.39 (d, J = 8.0, H-1), 3.93 (d, J = 8.0,H-2), 4.69 (t, J = 3.0, H-3) [1]
^{13}C NMR (C_5D_5N): Aglycone: 39.0, 45.2, 45.4, 48.8, 69.7, 80.1, 85.1, 85.9, 124.1, 129.9, 134.1, 141.7; Sugar: 63.3, 69.2, 72.4, 73.0, 76.1, 103.8 [1]

References

1. H. Okabe, Y. Miyahara, T. Yamauchi, Chem. Pharm. Bull. **30**, 3977 (1982)

Momordicoside I

CAS Registry Number: 81371-55-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 5,19-Epoxy-5β-cucurbita-6,23-diene-3β,25-diol
Biological source: *Momordica charantia* [1]
$C_{36}H_{58}O_8$: 618.413
Mp: 210–216°C [1]
$[\alpha]_D^{26}$ − 110.2° (c 1.00, MeOH) [1]
CD $[\theta]_{201}^{16}$: −120200° (c, 0.54 × 10^{-4} g/ml, MeOH) [1]
^{1}H NMR (J/Hz): 3.69 (brs, H-3), 6.19 (brd, J = 10.0, H-6), 5.54 (dd, J = 10.4), 3.58 (d, J = 8.0, Hα-19), 3.74 (d, J = 8.0, Hβ-19), 5.92 (brs, H-23), 5.92 (H-24), 0.76, 0.84, 0.92, 1.51, 1.53, 1.53 (s, CH_3 × 6)
β-D-Glcp: 4.89 (d, J = 8.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

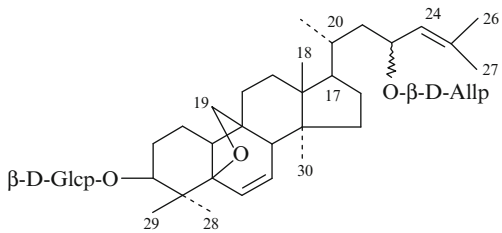
C-3	69.7	Glc-1	106.8
4	39.0	2	75.7
5	80.0	3	78.3
6	124.1	4	71.8
7	134.1	5	78.3
9	45.2	6	63.0
13	45.3		
14	48.8		
23	129.9		
24	141.6		

References

1. H. Okabe, Y. Miyahara, T. Yamauchi, Chem. Pharm. Bull. **30**, 3977 (1982)

Goyaglycoside-f

CAS Registry Number: 333333-13-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 5,19-Epoxy-5β-cucurbita-6,24-diene-3β,23-diol

Biological source: *Momordica charantia* [1]

$C_{42}H_{68}O_{13}$: 780.465

$[\alpha]_D^{27}$ −51.9° (c 0.5, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1082, 1032 [1]

FAB-MS *m/z*: 779 $[M\text{-}H]^-$, 617 $[M\text{-}C_6H_{11}O_5]^-$; 781 $[M + H]^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 3.69 (brs, H-3), 6.19 (d, J = 9.2, H-6), 5.61 (dd-like, H-7), 2.31 (brs, H-8), 0.79 (s, CH_3-18), 3.67, 3.61 (q, J = 8.2, H_2-19), 1.12 (d, J = 6.3, H-21), 5.56 (d-like, H-24), 1.68 (s, CH_3-26), 1.71 (s, CH_3-27), 1.49 (s, CH_3-28), 0.92 (s, CH_3-29), 0.89 (s, CH_3-30)

β-D-Glcp: 4.87 (d, J = 7.6, H-1)

β-D-Allp: 5.43 (d, J = 7.9, H-1) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

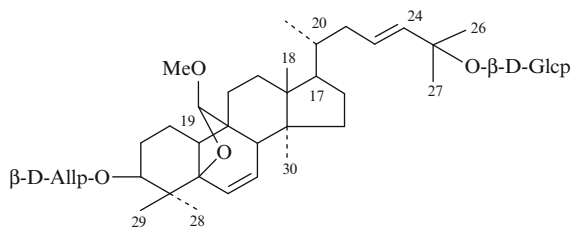
C-1	18.9	C-16	28.3	All-1	101.5
2	27.6	17	51.3	2	72.7
3	85.3	18	15.0	3	73.2
4	39.1	19	80.2	4	69.4
5	85.9	20	32.7	5	75.7
6	134.1	21	19.4	6	63.3
7	130.0	22	43.7	Glc-1	106.6
8	52.3	23	75.2	2	75.8
9	45.3	24	129.3	3	78.3
10	40.2	25	132.0	4	72.0
11	23.9	26	25.8	5	78.3
12	31.2	27	18.2	6	63.1
13	45.6	28	21.1		
14	48.9	29	25.6		
15	33.5	30	20.3		

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Goyaglycoside-g

CAS Registry Number: 333333-14-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 5,19-Epoxy-5β-cucurbita-6,24-diene-3β,23-diol

Biological source: *Momordica charantia* [1]

$C_{43}H_{70}O_{14}$: 810.476

$[\alpha]_D^{27}$ −79.2° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3434, 1655, 1080, 1034 [1]

FAB-MS *m/z*: 809 $[M\text{-}H]^-$, 647 $[M\text{-}C_6H_{11}O_5]^-$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 3.69 (brs, H-3), 6.15 (dd, J = 2.3, 9.9, H-6), 5.61 (dd, J = 3.3, 9.9, H-7), 3.12 (dd-like, H-8), 0.91 (s, CH_3-18), 4.89 (s, CH_3-19), 1.00 (d, J = 5.3, CH_3-21), 5.79 (ddd, H-23), 6.01 (d, J = 15.8, H-24), 1.54 (CH_3-26), 1.60 (CH_3-27), 1.44 (CH_3-28), 0.83 (CH_3-29), 0.92 (CH_3-30), 3.50 (CH_3O-19)
β-D-Allp: 5.43 (d, J = 7.6, H-1)
β-D-Glcp: 4.99 (d, J = 7.9, H-1) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

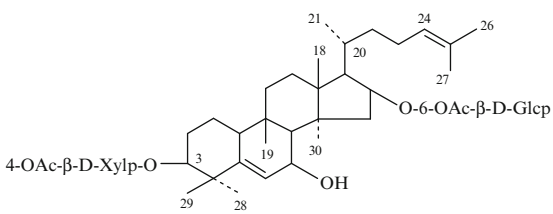
C-1	18.7	C-16	28.2	All-1	102.5
2	27.4	17	50.6	2	73.7
3	83.7	18	14.9	3	71.8
4	39.1	19	112.5	4	69.3
5	85.6	20	36.5	5	76.4
6	133.2	21	19.1	6	63.3
7	131.6	22	39.9	Glc-1	99.8
8	42.3	23	128.4	2	75.3
9	48.2	24	138.5	3	78.8
10	41.7	25	77.6	4	71.9
11	23.3	26	28.7	5	78.0
12	31.0	27	27.7	6	63.0
13	45.4	28	21.2		
14	48.4	29	24.9		
15	33.9	30	20.0		
		OCH_3-19	57.7		

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Hebevinoside II

CAS Registry Number: 89456-98-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin
Biological source: *Hebeloma vinosophyllum* [1]
$C_{45}H_{72}O_{14}$: 836.492
$[\alpha]_D^{20}$ + 30.0° (c 0.20, acetone) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1735, 1640, 1075, 1035 [1]
^{1}H NMR (J/Hz, C_5D_5N): 6.12 (d, J = 5.1, H-6), 4.42 (brd, J = 5.1, H-7), 0.88, 1.12, 1.17, 1.38, 1.61 (s, CH_3 × 5), 1.04 (d, J = 6.8, CH_3-21), 1.70 (s, CH_3-26), 1.73 (s, CH_3-27), 5.53 (brt, J = 7.7, H-24)
β-D-Xylp: 4.82 (d, J = 7.7, H-1), 2.04 (s, OAc)
β-D-Glcp: 4.67 (d, J = 7.7, H-1), 1.96 (s, OAc) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

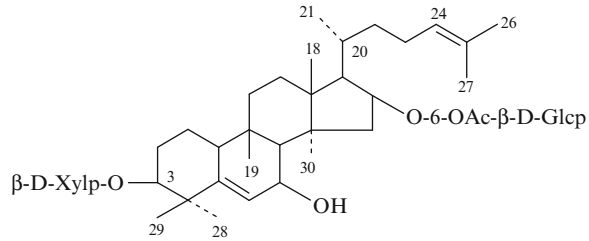
C-3	87.4	Xyl-1	107.3	Glc-1	106.5
5	146.2	2	74.9	2	75.2
6	122.5	3	74.9	3	78.3
7	67.5	4	73.1	4	71.7
16	82.2	5	63.1	5	75.4
24	126.8	Ac-1	170.5	6	64.7
25	130.0	2	20.8	Ac-1	170.7
				2	20.8

References

1. H. Fujimoto, K. Suzuki, H. Hagiwara, M. Yamazaki, Chem. Pharm. Bull. **34**, 88 (1986)

Hebevinoside III

CAS Registry Number: 89203-39-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin

Biological source: *Hebeloma vinosophyllum* [1]
$C_{43}H_{70}O_{13}$: 794.481
$[\alpha]_D^{20}$ + 89.0° (c 0.058, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1735, 1640, 1080, 1040 [1]
^{1}H NMR (J/Hz, C_5D_5N): 6.12 (d, J = 5.6, H-6), 4.41 (brd, J = 5.6, H-7), 1.04 (d, J = 6.0, H-21), 5.52 (brt, J = 6.1, H-24), 1.69 (s, H-26), 1.72 (s, H-27), 0.88, 1.12, 1.18, 1.36, 1.61 (s, CH_3 × 5)
β-D-Xylp: 4.81 (d, J = 7.7, H-1)
β-D-Glcp: 4.67 (d, J = 7.7, H-1), 2.05 (s, OAc) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

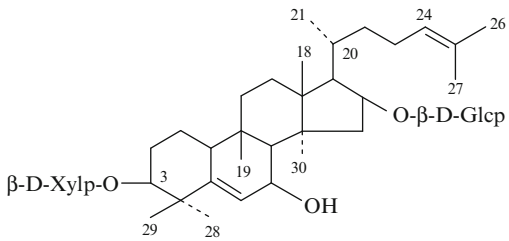
C-3	87.4	Xyl-1	107.7	Glc-1	106.6
5	146.3	2	75.1	2	75.0
6	122.4	3	78.4	3	78.6
7	67.5	4	71.1	4	71.9
16	82.2	5	66.8	5	75.6
24	126.8			6	64.8
25	129.9			Ac-1	170.8
				2	20.8

References

1. H. Fujimoto, K. Suzuhi, H. Hagiwara, M. Yamazaki, Chem. Pharm. Bull. **34**, 88 (1986)

Hebevinoside VI

CAS Registry Number: 101365-08-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin
Biological source: *Hebeloma vinosophyllum* [1]
$C_{41}H_{68}O_{12}$: 752.471
$[\alpha]_D^{23}$ + 56.0° (c 0.054, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3380, 1635, 1075, 1035 [1]
^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

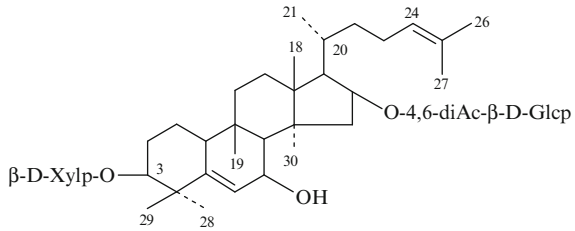
C-3	87.4	Xyl-1	107.6	Glc-1	106.6
5	146.2	2	75.0	2	75.7
6	122.6	3	78.5	3	78.6
7	67.3	4	71.1	4	72.1
16	81.9	5	67.1	5	78.1
24	126.8			6	63.2
25	130.0				

References

1. H. Fujimoto, H. Hagiwara, K. Suzuki, M. Yamazaki, Chem. Pharm. Bull. **35**(6), 2254 (1987)

Hebevinoside VII

CAS Registry Number: 101770-14-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin
Biological source: *Hebeloma vinosophyllum* [1]
$C_{45}H_{72}O_{14}$: 836.492
$[\alpha]_D^{20}$ + 82.0° (c 0.22, acetone) [1]
IR (KBr) ν_{max} cm^{-1}: 3450, 1735, 1630, 1070, 1035 [1]
EI-MS *m/z*: 818 (9.0, M-H_2O), 686 (18.5, M-Xyl), 668 (10.2, M-H_2O-Xyl), 653 (21.3, M-H_2O-$C_5H_{10}O_5$-CH_3) [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 6.12 (d, J = 4.9, H-6), 4.43 (H-7), 1.03 (d, J = 6.0, CH_3-21), 5.51 (t, J = 9.8, H-24), 1.71 (s, CH_3-26), 1.75 (s, CH_3-27), 0.86, 1.08, 1.19, 1.38, 1.63 (s, CH_3 × 5)
β-D-Xylp: 4.82 (d, J = 7.7, H-1)
β-D-Glcp: 4.66 (d, J = 7.7, H-1), 2.03 (s, OAc), 2.09 (s, OAc′) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

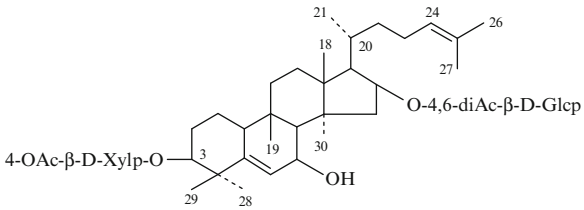
C-3	87.4	Xyl-1	107.6	Glc-1	106.5
5	146.4	2	75.1	2	75.6
6	122.5	3	78.5	3	75.5
7	67.4	4	71.1	4	72.4
16	82.5	5	67.1	5	72.4
24	126.9			6	63.6
25	130.1			Ac-1	170.5
				2	20.8
				Ac′-1	170.7
				2	20.9

References

1. H. Fujimoto, H. Hagiwara, K. Suzuki, M. Yamazaki, Chem. Pharm. Bull. **35**(6), 2254 (1987)

Hebevinoside VIII

CAS Registry Number: 101365-10-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin

Biological source: *Hebeloma vinosophyllum* [1]

$C_{47}H_{74}O_{15}$: 878.502

$[\alpha]_D^{20}$ + 36.5° (c 0.52, $CHCl_3$) [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 1740, 1640, 1075, 1025 [1]

EI-MS *m/z*: 860 (47.1, M-H_2O), 686 (27.4, M-Ac-Xyl), 668 (83.9, M-H_2O-Ac-Xyl), 653 (36.5, M-H_2O-Ac-Xyl-CH_3) [1]

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 5.74 (d, J = 5.5, H-6), 3.93 (d, J = 5.5, H-7), 0.95 (d, J = 6.6, H-21), 5.14 (t, J = 6.8, H-24), 1.61 (s, CH_3-26), 1.68 (s, CH_3-27), 0.66, 1.00, 1.08, 1.22, 1.26 (s, CH_3 × 5)

β-D-Xylp: 4.40 (d, J = 5.9, H-1), 3.70 (t, J = 8.1, H-3), 4.81 (dt, J = 8.1, 5.1, H-4), 3.29 (dd, J = 11.7, 8.1, Ha-5), 3.95 (Hb-5), 2.12 (s, OAc)

β-D-Glcp: 4.22 (d, J = 5.6, H-1), 3.62 (t, J = 9.5, H-3), 4.91 (t, J = 9.5, H-4), 3.55 (m, H-5), 4.07 (dd, J = 12.1, 4.8, Ha-6), 4.16 (dd, Hb-6), 2.10 (s, OAc), 2.12 (s, OAc′) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

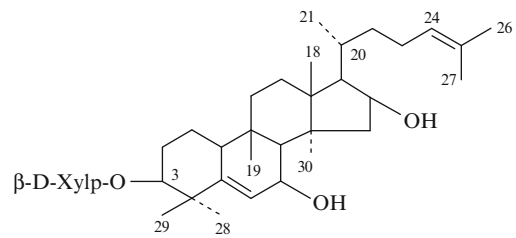
C-3	87.4	Xyl-1	107.4	Glc-1	106.5
5	146.3	2	75.2	2	75.6
6	122.6	3	74.9	3	75.5
7	67.5	4	73.2	4	72.4
16	82.5	5	63.2	5	72.4
24	126.9	Ac-1	170.6	6	63.6
25	130.1	2	20.9	Ac-1	170.5
				2	20.8
				Ac′-1	170.7
				2	20.9

References

1. H. Fujimoto, H. Hagiwara, K. Suzuki, M. Yamazaki, Chem. Pharm. Bull. **35**(6), 2254 (1987)

Hebevinoside IX

CAS Registry Number: 101365-11-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin

Biological source: *Hebeloma vinosophyllum* [1]

$C_{35}H_{58}O_7$: 590.418

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 5.68 (d, J = 4.9, H-6), 3.89 (d, J = 4.9, H-7), 0.90 (d, J = 6.2, CH_3-21), 5.10 (t, J = 6.2, H-24), 1.54 (s, CH_3-26), 1.62 (s, CH_3-27), 0.61, 0.93, 0.97, 1.02, 1.15 (s, CH_3 × 5)

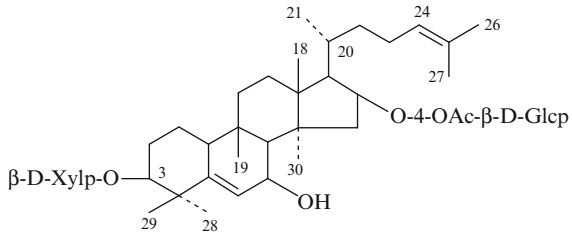
β-D-Xylp: 4.33 (d, J = 5.9, H-1) [1]

References

1. H. Fujimoto, H. Hagiwara, K. Suzuki, M. Yamazaki, Chem. Pharm. Bull. **35**(6), 2254 (1987)

Hebevinoside XII

CAS Registry Number: 138995-51-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin

Biological source: *Hebeloma vinosophyllum* [1]

$C_{43}H_{70}O_{13}$: 794.481

$[\alpha]_D^{22}$ + 60.0° (c 0.36, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730, 1640, 1075, 1035 [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 6.04 (d, J = 4.9, H-6), 4.36 (d, J = 4.9, H-7), 0.78 (CH_3-18), 1.11 (CH_3-19), 1.05 (d, J = 6.4, CH_3-21), 5.56 (t, J = 7.7, H-24), 1.73 (s, CH_3-26), 1.77 (s, CH_3-27), 1.20 (CH_3-28), 1.38 (CH_3-29), 1.67 (CH_3-30)

β-D-Xylp: 4.84 (d, J = 7.6, H-1)

β-D-Glcp: 4.75 (d, J = 7.6, H-1), 5.65 (t, J = 9.6, H-4), 2.06 (OAc) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-3	87.5	Xyl-1	107.7
5	146.2	2	75.0
6	122.6	3	78.5
7	67.3	4	71.1
16	82.1	5	67.1
24	126.9	Glc-1	106.5
25	130.0	2	75.8
		3	75.9
		4	73.1
		5	75.9
		6	62.5
		Ac-1	170.6
		2	21.1

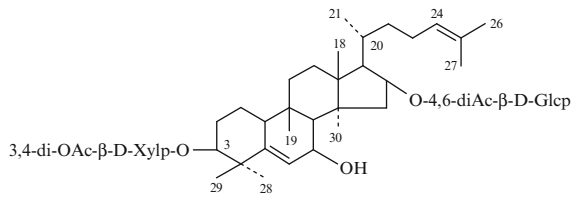
(*continued*)

References

1. H. Fujimoto, K. Maeda, M. Yamazaki, Chem. Pharm. Bull. **39**(8), 1958 (1991)

Hebevinoside XIII

CAS Registry Number: 138995-52-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin

Biological source: *Hebeloma vinosophyllum* [1]

$C_{49}H_{76}O_{16}$: 920.513

$[\alpha]_D^{21}$ + 35.0° (c 0.42, $CHCl_3$) [1]

IR (KBr) ν_{max} cm^{-1}: 3430, 1750, 1645, 1070, 1040 [1]

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 5.61 (d, J = 5.2, H-6), 4.06 (d, J = 5.2, H-7), 0.66, 1.00 (CH_3-18, 19), 0.95 (d, J = 6.6, H-21), 5.13 (t, J = 8.5, H-24), 1.61 (s, CH_3-26), 1.68 (s, CH_3-27), 1.05, 1.08, 1.21 (CH_3-28, 29, 30)

β-D-Xylp: 4.51 (d, J = 6.7, H-1), 5.08 (t, J = 9.3, H-3), 5.00 (brt, J = 8.7, H-4), 3.31 (dd, J = 11.6, 8.7, Hα-5), 2.11, 2.12 (s, OAc)

β-D-Glcp: 4.45 (d, J = 7.6, H-1), 3.67 (t-like, H-3), 4.90 (t, J = 7.8, H-4), 3.64 (m, H-5), 4.08 (dd, J = 11.8, 5, Hα-6), 4.22 (dd, Hβ-6), 2.02, 2.08 (s, OAc) [1]

^{13}C NMR: [1]

Table 1

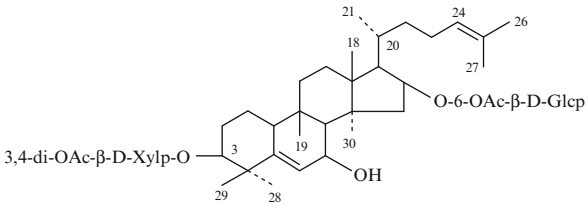
C-3	87.6	Xyl-1	106.9	Glc-1	106.5
5	146.1	2	72.1	2	75.6
6	122.7	3	75.4	3	75.4
7	67.4	4	70.6	4	72.4
16	82.5	5	62.8	5	72.4
24	126.9	OAc	20.6	6	63.5
25	130.0		20.8	OAc	20.9
			170.4		20.9
			170.4		170.2
					170.6

References

1. H. Fujimoto, K. Maeda, M. Yamazaki, Chem. Pharm. Bull. **39**(8), 1958 (1991)

Hebevinoside XIV

CAS Registry Number: 138995-53-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Hydroxy-hebevinogenin

Biological source: *Hebeloma vinosophyllum* [1]

$C_{47}H_{74}O_{15}$: 878.502

$[\alpha]_D^{24}$ + 15.0° (c 0.40, $CHCl_3$) [1]

IR (KBr) ν_{max} cm^{-1}: 3450, 1740, 1635, 1065, 1030 [1]

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 5.71 (d, J = 4.8, H-6), 3.94 (d, J = 4.8, H-7), 0.66, 1.00 (CH_3-18), 1.04, 1.07 (CH_3-19), 0.94 (d, J = 6.4, CH_3-21), 5.13 (t, J = 7.3, H-24), 1.61 (s, CH_3-26), 1.68 (s, CH_3-27), 1.21 (CH_3-28)

β-D-Xylp: 4.35 (d, J = 7.3, H-1), 5.09 (t, J = 9, H-3), 4.89 (dt, J = 9, 5.2, H-4), 3.31 (dd, J = 12, 2.9, Hα-5), 2.03, 2.09 (OAc)

β-D-Glcp: 4.18 (d, J = 7.6, H-1), 3.52 (m, H-5), 4.03 (dd, J = 11.6, 5.2, Hα-6), 4.16 (dd, Hβ-6), 2.13 (s, OAc) [1]

^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

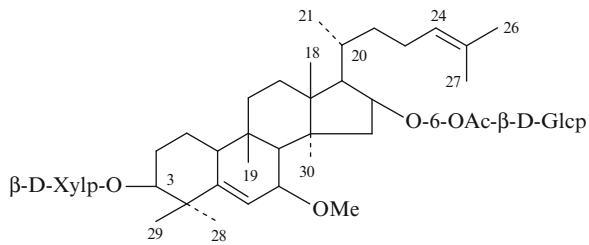
C-3	87.5	Xyl-1	106.8	Glc-1	106.5
5	146.1	2	72.2	2	74.9
6	122.7	3	75.5	3	78.3
7	67.5	4	70.6	4	71.8
16	82.2	5	62.7	5	75.5
24	126.8	Ac-1	170.8	6	64.7
25	130.0	2	20.8	Ac-1	170.4
				2	20.9
		Ac-1	170.2		
		2	20.6		

References

1. H. Fujimoto, K. Maeda, M. Yamazaki, Chem. Pharm. Bull. **39**(8), 1958 (1991)

Hebevinoside I

CAS Registry Number: 87396-30-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Metoxy-hebevinogenin

Biological source: *Hebeloma vinosophyllum* [1]

$C_{44}H_{72}O_{13}$: 808.497

IR (KBr) ν_{max} cm^{-1}: 3400, 1735, 1635, 1075, 1040 [1]

^{1}H NMR (J/Hz, C_5D_5N): 5.99 (brd, J = 5.4, H-6), 3.61 (H-7), 0.83, 1.14, 1.17, 1.24, 1.63 (s, CH_3 × 5),

1.06 (d, J = 6.6, CH_3-21), 1.70 (brs, CH_3-26), 1.74 (brs, CH_3-27), 5.55 (brt, J = 8.1, H-24), 3.41 (s, OMe)
β-D-Xylp: 4.69 (d, J = 8.1, H-1)
β-D-Glcp: 4.76 (d, J = 8.1, H-1), 2.05 (s, OAc) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

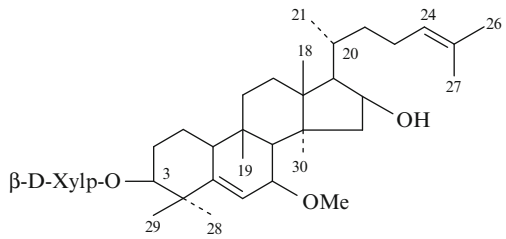
C-3	87.3	Xyl-1	107.3	Glc-1	106.6
5	148.0	2	74.8	2	75.1
6	119.7	3	78.5	3	78.0
7	77.9	4	71.1	4	71.7
16	82.3	5	66.8	5	75.5
24	126.9			6	64.7
25	130.1			Ac-1	170.6
OMe	56.3			2	20.8

References

1. H. Fujimoto, K. Suzuki, H. Hagiwara, M. Yamazaki, Chem. Pharm. Bull. **34**, 88 (1986)

Hebevinoside IV

CAS Registry Number: 101365-06-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Metoxy-hebevinogenin
Biological source: *Hebeloma vinosophyllum* [1]
$C_{36}H_{60}O_7$: 604.433
Mp: 172–173°C [1]
IR (KBr) ν_{max} cm^{-1}: 3410, 1638, 1075, 1038 [1]
^{1}H NMR (J/Hz, $CDCl_3$): 3.98 (dd, J = 11.8, 4.5, H-3), 5.74 (brd, J = 5.6, H-6), 3.42 (brd, J = 5.6, H-7), 0.69, 0.97, 1.00, 1.12, 1.22 (s, CH_3x5), 4.44 (dd, J = 7.3, 13.7, H-16), 0.99 (d, J = 8.1, CH_3-21), 1.62 (s, CH_3-26), 1.70 (s, CH_3-27), 5.19 (brt, J = 7.7, H-24), 3.34 (s, OMe)
β-D-Xylp: 4.36 (d, J = 6.0, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

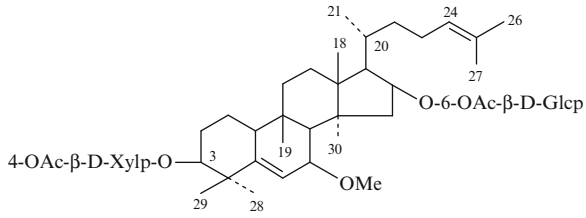
C-3	87.3	Xyl-1	107.8
5	147.9	2	74.9
6	119.3	3	78.5
7	77.8	4	71.2
16	71.1	5	67.1
24	126.2		
25	130.5		
OMe	56.2		

References

1. H. Fujimoto, K. Suzuki, H. Hagiwara, M. Yamazaki, Chem. Pharm. Bull. **34**, 88 (1986)

Hebevinoside V

CAS Registry Number: 101365-07-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Metoxy-hebevinogenin
Biological source: *Hebeloma vinosophyllum* [1]
$C_{46}H_{74}O_{14}$: 850.507
Mp: 165–166°C [1]
$[\alpha]_D^{20}$ + 83.0° (c 0.053, $CHCl_3$) [1]
IR (KBr) ν_{max} cm^{-1}: 3420, 1743, 1725, 1640, 1087, 1032 [1]
^{1}H NMR (J/Hz, C_5D_5N): 5.75 (d, J = 6.2, H-6), 3.42 (brd, J = 6.2, H-7), 0.68, 0.97, 1.01, 1.12, 1.22 (s, CH_3 × 5), 0.96 (d, J = 5.6, CH_3-21), 1.62 (s, CH_3-26), 1.69 (s, CH_3-27), 5.14 (brt, J = 6.9, H-24), 3.34 (s, OMe)

β-D-Xylp: 4.42 (d, J = 6.4, H-1), 4.81 (dt, J = 7.7, 5.0, H-4), 2.10 (s, OAc)
β-D-Glcp: 4.42 (d, J = 6.4, H-1), 4.07, 4.13 (dd, J = 12.0, 4.3, H_2-6), 2.10 (s, OAc) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

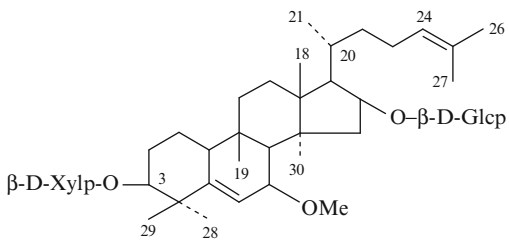
C-3	87.4	Xyl-1	107.5	Glc-1	106.8
5	147.8	2	75.0	2	75.0
6	119.5	3	74.8	3	78.3
7	77.8	4	73.1	4	71.7
16	82.2	5	63.2	5	75.4
24	126.9	Ac-1	170.5	6	64.5
25	130.0	2	20.9	Ac-1	170.5
OMe	56.3			2	20.9

References

1. H. Fujimoto, K. Suzuhi, H. Hagiwara, M. Yamazaki, Chem. Pharm. Bull. **34**, 88 (1986)

Hebevinoside X

CAS Registry Number: 101365-12-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Metoxy-hebevinogenin
Biological source: *Hebeloma vinosophyllum* [1]
$C_{42}H_{70}O_{12}$: 766.486
$[\alpha]_D^{20}$ + 63.0° (c 0.49, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1640, 1075, 1035 [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 5.88 (brd, J = 5.3, H-6), 3.40 (d, J = 5.3, H-7), 0.74, 1.10, 1.16, 1.24, 1.63 (s, CH_3x5), 1.08 (d, J = 7.3, CH_3-21), 1.69 (s, CH_3-26), 1.73 (s, CH_3-27), 5.55 (t, J = 6.8, H-24), 3.21 (s, OMe)
β-D-Xylp: 4.79 (d, J = 7.6, H-1)
β-D-Glcp: 4.79 (d, J = 7.6, H-1) [1]
^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

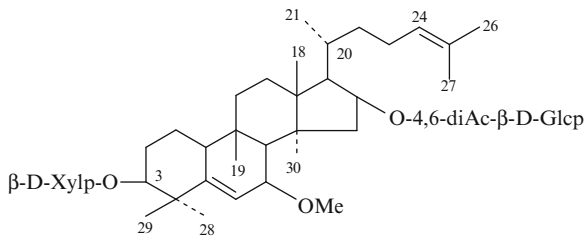
C-3	87.4	Xyl-1	107.7	Glc-1	106.8
5	147.7	2	74.9	2	75.6
6	119.4	3	78.5	3	78.7
7	77.6	4	71.1	4	72.0
16	82.1	5	67.0	5	78.2
24	126.8			6	63.2
25	130.0				
OMe	56.2				

References

1. H. Fujimoto, H. Hagiwara, K. Suzuki, M. Yamazaki, Chem. Pharm. Bull. **35**(6), 2254 (1987)

Hebevinoside XI

CAS Registry Number: 101365-13-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 7β-Metoxy-hebevinogenin
Biological source: *Hebeloma vinosophyllum* [1]
$C_{46}H_{74}O_{14}$: 850.507
$[\alpha]_D^{20}$ + 65.0° (c 0.17, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3450, 1747, 1645, 1085, 1040 [1]
^{13}C NMR (67.8 MHz, C_5D_5N): [1]

Table 1

C-3	87.5	Xyl-1	107.8	Glc-1	106.7
5	148.0	2	74.9	2	75.5
6	119.4	3	78.5	3	75.5

(*continued*)

Table 1 (continued)

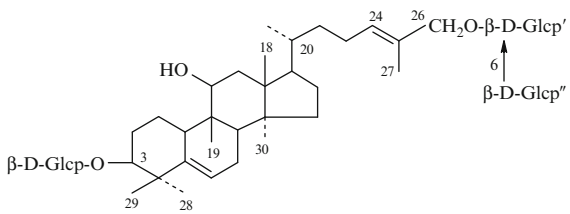
7	77.8	4	71.1	4	72.3
16	82.5	5	67.1	5	72.4
24	126.9			6	63.5
25	130.1			Ac-1	170.3
OMe	56.3			2	20.8
				Ac′-1	170.5
				2	20.9

References

1. H. Fujimoto, H. Hagiwara, K. Suzuki, M. Yamazaki, Chem. Pharm. Bull. **35**(6), 2254 (1987)

Scandenoside R_7

CAS Registry Number: 109985-97-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 11-Epi-carnosiflogenin C

Biological source: *Hemsleya panacis-scandens* [1]

$C_{48}H_{80}O_{18}$: 944.534

$[\alpha]_D^{22}$ + 15.9° (c 0.76, MeOH) [1]

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 3.48 (t-like, J = 6, H-3), 5.62 (brd, J = 4.8, H-6), 3.89 (brs, J = 5, H-11), 0.95 (d, J = 5.8, CH_3-21), 5.39 (t, J = 7, H-24), 3.99 (s, H_2-26), 1.66 (s, CH_3-27), 0.81 (s, CH_3-18), 1.01 (s, CH_3-19), 1.03 (s, CH_3-28), 1.03 (s, CH_3-29), 1.14 (s, CH_3-30) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	23.9	C-16	28.2	Glc-1	107.3	Glc″-1	105.4
2	29.3	17	51.2	2	75.0	2	75.0
3	87.5	18	18.0	3	78.4	3	78.4
4	41.8	19	22.9	4	71.6	4	71.6

(*continued*)

Table 1 (continued)

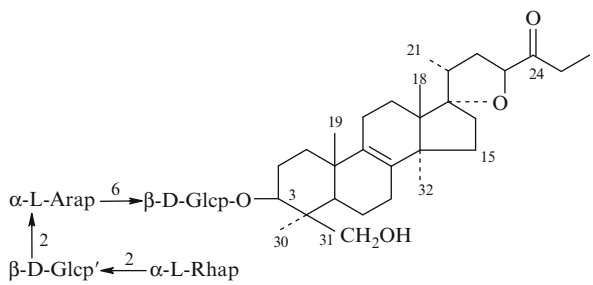
5	142.9	20	36.3	5	78.1	5	78.4
6	119.3	21	18.8	6	63.1	6	62.7
7	25.0	22	36.3	Glc′-1	103.4		
8	41.9	23	24.7	2	75.4		
9	40.7	24	129.1	3	78.4		
10	40.0	25	132.1	4	71.6		
11	72.1	26	75.4	5	77.2		
12	39.3	27	14.2	6	70.0		
13	45.7	28	18.0				
14	49.9	29	28.2				
15	35.2	30	25.9				

References

1. R. Kasai, K. Matsumoto, R.-L. Nie, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **36**(1), 234 (1988)

Scillascilloside D-1

CAS Registry Number: 97400-11-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 15-Deoxoeucosterol

Biological source: *Scilla scilloides* [1]

$C_{52}H_{84}O_{22}$: 1060.545

Mp: 204–205°C (n-BuOH-MeOH-H_2O) [1]

$[\alpha]_D$ − 62.5° (c 1.3, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3350, 1728 [1]

MS *m/z*: 1083 $[M + Na]^+$, 937 $[M\text{-}Rha]^+$, 775$[M\text{-}Rha\text{-}Glc]^+$ [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N) (anomeric protons): 4.93 (d, J = 7.0), 5.12 (d, J = 7.0), 5.32 (brs, H-1 of Rha), 6.32 (brs) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

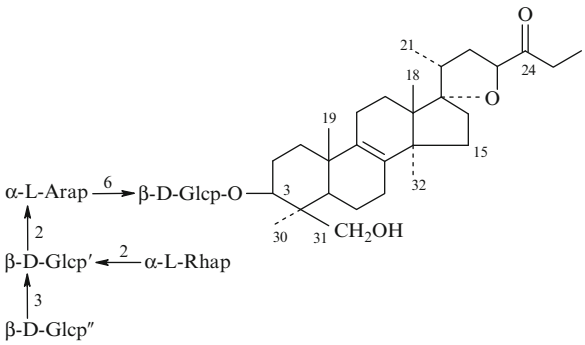
C-1	35.7	C-16	39.7	Glc-1	106.0
2	27.4	17	97.1	Ara-1	100.9
3	88.9	18	19.4	Glc′-1	103.0
4	44.4	19	19.6	Rha-1	101.9
5	51.8	20	43.8		
6	18.7	21	17.3		
7	26.9	22	36.8		
8	135.3	23	81.6		
9	135.9	24	212.5		
10	36.8	25	32.4		
11	21.2	26	7.8		
12	25.4	30	23.2		
13	48.9	31	63.2		
14	50.8	32	26.4		
15	32.3				

References

1. M. Sholichin, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **33**(4), 1756 (1985)

Scillascilloside E-1

CAS Registry Number: 97400-12-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 15-Deoxoeucosterol

Biological source: *Scilla scilloides* [1]

$C_{58}H_{94}O_{27}$: 1222.598

Mp: 221–223°C (aq. MeOH) [1]

$[\alpha]_D^{20}$ − 62.3° (c 1.3, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3350, 1720 [1]

MS *m/z*: 1245 $[M + Na]^+$, 1099, 1083 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N) (anomeric protons): 6.32 (brs, H-1 of Ara), 5.30 (brs, H-1 of Rha), 5.16, 4.99, 4.93 (d, H-1 of 3 × Glc) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

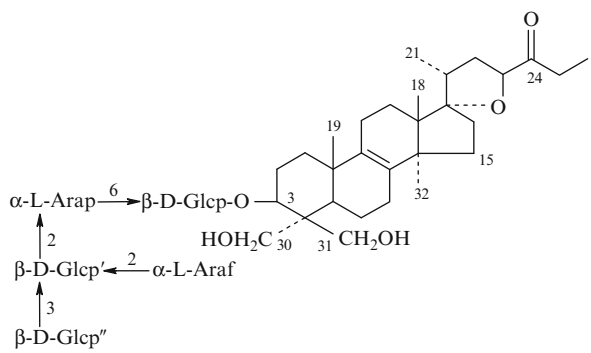
C-1	35.7	C-16	39.7	Glc-1	106.0
2	27.4	17	97.1	Ara-1	101.1
3	89.0	18	19.3	Glc′-1	102.4
4	44.4	19	19.5	Rha-1	102.0
5	51.8	20	43.7	Glc″-1	104.3
6	19.7	21	17.3		
7	26.9	22	36.8		
8	135.3	23	81.6		
9	135.9	24	212.6		
10	36.8	25	32.4		
11	21.1	26	7.7		
12	25.4	30	23.2		
13	48.8	31	63.2		
14	50.8	32	26.4		
15	32.4				

References

1. M. Sholichin, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **33**(4), 1756 (1985)

Scillascilloside E-2

CAS Registry Number: 97400-13-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 15-Deoxoeucosterol

Biological source: *Scilla scilloides* [1]

$C_{57}H_{92}O_{28}$: 1224.577

Mp: 210–216°C (n-BuOH-MeOH-H_2O) [1]

$[\alpha]_D$ − 38.1° (c 1.3, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3350, 1720 [1]
MS *m/z*: 1247 $[M + Na]^+$ [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

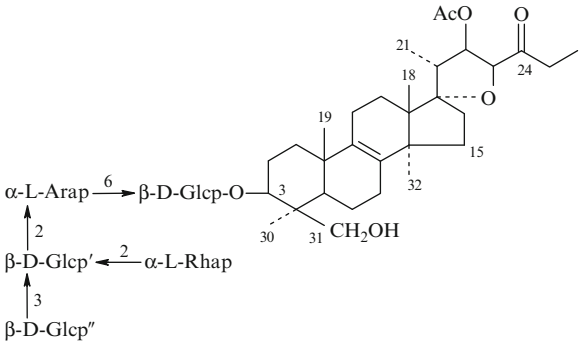
C-1	35.7	C-16	39.7	Glc-1	105.5
2	27.3	17	97.1	Ara-1	101.7
3	82.3	18	19.4	Glc′-1	103.5
4	48.1	19	19.7	Araf-1	111.2
5	43.7	20	43.6	Glc″-1	104.5
6	18.8	21	17.3		
7	26.8	22	36.9		
8	135.4	23	81.6		
9	136.0	24	212.5		
10	36.7	25	32.		
11	21.2	26	7.7		
12	25.4	30	62.6		
13	48.9	31	64.2		
14	50.9	32	26.3		
15	32.3				

References

1. M. Sholichin, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **33**(4), 1756 (1985)

Scillascilloside E-3

CAS Registry Number: 97400-14-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 15-Deoxoeucosterol
Biological source: *Scilla scilloides* [1]
$C_{60}H_{96}O_{29}$: 1280.603
Mp: 218–221°C (n-BuOH-MeOH-H_2O) [1]

$[\alpha]_D$ − 51.9° (c 1.3, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1735 [1]
MS *m/z*: 1304 $[M + Na + H]^+$, 1244 [1304-60 (AcOH) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 2.00 (OAc), 5.41 (d, J = 5.0, H_2-22) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

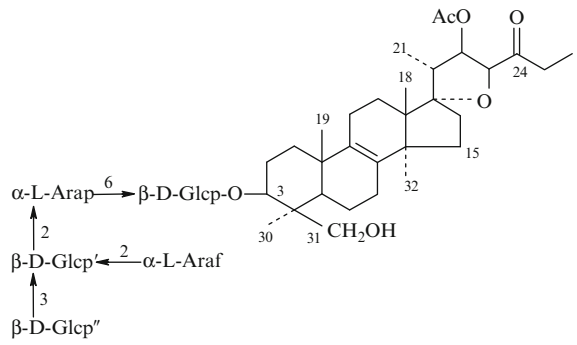
C-1	35.7	C-16	40.1	Glc-1	106.0
2	27.4	17	97.4	Ara-1	101.1
3	88.9	18	19.3	Glc′-1	102.5
4	44.3	19	19.5	Rha-1	102.0
5	51.8	20	49.5	Glc″-1	104.3
6	18.7	21	15.4		
7	27.0	22	82.0		
8	135.0	23	85.0		
9	135.9	24	208.8		
10	36.7	25	33.3		
11	21.1	26	7.6		
12	25.2	30	23.1		
13	49.8	31	63.1		
14	50.4	32	26.4		
15	32.5	Ac-1	169.8		
		2	20.8		

References

1. M. Sholichin, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **33**(4), 1756 (1985)

Scillascilloside E-4

CAS Registry Number: 97400-15-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 15-Deoxoeucosterol
Biological source: *Scilla scilloides* [1]

$C_{59}H_{94}O_{29}$: 1266.588
Mp: 208–213°C (n-BuOH-MeOH-H_2O) [1]
$[\alpha]_D$ − 41.6°(c 1.3, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1735 [1]
MS *m/z*: 1289 $[M + Na]^+$, 1289 $[M + Na\text{-}60]^+$ [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

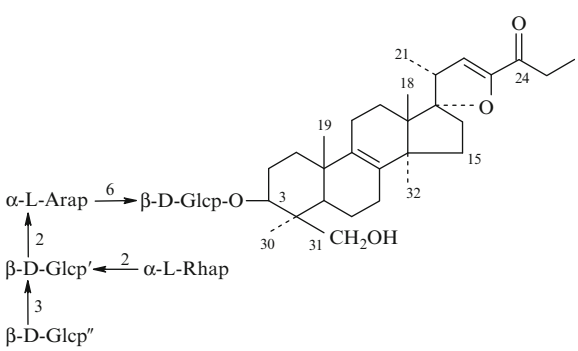
C-1	35.8	C-16	40.1	Glc-1	106.1
2	27.6	17	97.5	Ara-1	101.8
3	89.2	18	19.4	Glc′-1	103.5
4	44.4	19	19.7	Araf-1	111.2
5	51.8	20	49.5	Glc″-1	104.4
6	18.8	21	15.4		
7	26.9	22	82.1		
8	135.1	23	85.0		
9	135.9	24	208.9		
10	36.9	25	33.3		
11	21.2	26	7.6		
12	25.3	30	23.2		
13	49.9	31	63.2		
14	50.4	32	26.5		
15	32.6	Ac-1	169.9		
		2	20.9		

References

1. M. Sholichin, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **33**(4), 1756 (1985)

Scillascilloside E-5

CAS Registry Number: 97411-48-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 15-Deoxoeucosterol

Biological source: *Scilla scilloides* [1]
$C_{58}H_{92}O_{27}$: 1220.582
Mp: 211–215°C (n-BuOH-MeOH-H_2O) [1]
$[\alpha]_D$ − 60.7° (c 1.3, C_5H_5N) [1]
MS *m/z*: 1244 $[M + Na + H]^+$ [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

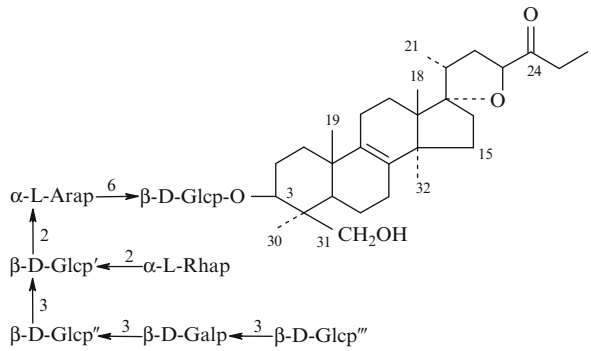
C-1	35.7	C-16	41.1	Glc-1	106.1
2	27.5	17	100.6	Ara-1	101.1
3	88.9	18	19.5	Glc′-1	102.5
4	44.4	19	19.5	Rha-1	102.0
5	51.7	20	47.4	Glc″-1	104.3
6	18.7	21	17.3		
7	26.9	22	117.9		
8	135.3	23	153.0		
9	135.8	24	194.3		
10	36.9	25	31.5		
11	21.0	26	8.0		
12	25.5	30	23.1		
13	48.8	31	63.2		
14	51.2	32	26.3		
15	32.4				

References

1. M. Sholichin, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **33**(4), 1756 (1985)

Scillascilloside G-1

CAS Registry Number: 97400-16-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 15-Deoxoeucosterol

Biological source: *Scilla scilloides* [1]
$C_{70}H_{114}O_{37}$: 1546.703
Mp: 240–243°C (n-BuOH-MeOH-H_2O) [1]
$[\alpha]_D$ − 46.8° (c 1.3, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3350, 1725 [1]
MS *m/z*: 1569 $[M + Na]^+$, 441 $[Aglc\text{-}17]^+$ [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

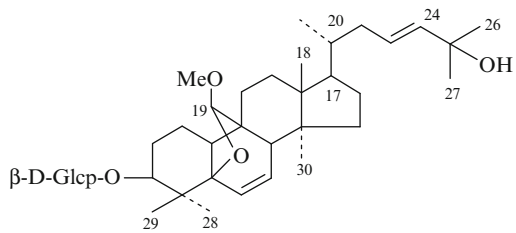
C-1	35.7	C-16	39.7	Glc-1	106.1
2	27.4	17	97.0	Ara-1	101.0
3	88.9	18	19.3	Glc′-1	102.4
4	44.3	19	19.5	Rha-1	102.0
5	51.8	20	43.7	Glc″-1	103.7
6	18.7	21	17.3	Gal-1	106.1
7	26.9	22	36.7	Glc‴-1	105.3
8	135.2	23	81.6		
9	135.9	24	212.5		
10	36.7	25	32.3		
11	21.1	26	7.7		
12	25.4	30	23.1		
13	48.9	31	63.1		
14	50.8	32	26.4		
15	32.3				

References

1. M. Sholichin, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **33**(4), 1756 (1985)

Goyaglycoside-a

CAS Registry Number: 333332-41-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 19(R)-Methoxy-5β,19-epoxy-cucurbita-6,23-diene-3β,25-diol
Biological source: *Momordica charantia* [1]
$C_{37}H_{60}O_9$: 648.423
$[\alpha]_D^{26}$ −101.4° (c 0.5, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3423, 1080 [1]
FAB-MS *m/z*: 649 $[M + H]^+$ [1]
FAB-MS *m/z*: 647 $[M\text{-}H]^-$, 617 $[M\text{-}CH_3O]^-$, 455 $[M\text{-}CH_3O\text{-}C_6H_{10}O_5]^-$ [1]
^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.86 (CH_3-29), 0.89 (CH_3-30), 0.90 (s, CH_3-18), 0.97 (d, J = 5.3, CH_3-21), 1.47 (CH_3-28), 1.54 (CH_3-26), 1.54 (CH_3-27), 3.12 (dd-like, H-8), 3.44 (OCH_3-19), 3.73 (brs, H-3), 4.84 (s, H-19), 5.62 (dd, J = 3.6, 9.6, H-7), 5.92 (m, H-23), 5.92 (m, H-24), 6.16 (dd, J = 2.0, 9.6, H-6)
β-D-Glcp: 4.95 (d, J = 7.6, H-1) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

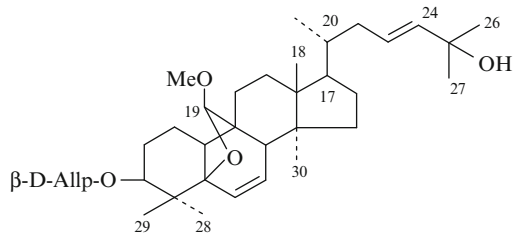
C-1	18.7	C-16	28.2	Glc-1	105.3
2	27.4	17	50.4	2	76.2
3	83.8	18	14.9	3	78.6
4	39.2	19	112.4	4	72.1
5	85.5	20	36.6	5	78.0
6	133.2	21	18.9	6	63.1
7	131.6	22	39.6		
8	42.3	23	124.4		
9	48.2	24	141.7		
10	41.7	25	69.7		
11	23.3	26	30.9		
12	30.9	27	30.9		
13	45.3	28	21.2		
14	48.4	29	24.9		
15	33.9	30	20.0		
		OCH_3-19	57.6		

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Goyaglycoside-b

CAS Registry Number: 333332-48-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 19(R)-Methoxy-5β,19-epoxy-cucurbita-6,23-diene-3β,25-diol

Biological source: *Momordica charantia* [1]

$C_{37}H_{60}O_9$: 648.423

$[\alpha]_D^{23}$ −110.7° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3428, 1086, 1032 [1]

FAB-MS *m/z*: 647 $[M\text{-}H]^-$, 455 $[M\text{-}CH_3O\text{-}C_6H_{11}O_5]^-$; 649 $[M + H]^+$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.83 (CH_3-29), 0.89 (CH_3-30), 0.90 (s, CH_3-18), 0.98 (d, J = 5.3, CH_3-21), 1.44 (CH_3-28), 1.54 (CH_3-26), 1.54 (CH_3-27), 3.13 (dd-like, H-8), 3.50 (CH_3O-19), 3.70 (brs, H-3), 4.88 (s, H-19), 5.61 (dd, J = 3.3, 9.6, H-7), 5.92 (m, H-23), 5.92 (m, H-24), 6.15 (dd, J = 2.0, 9.6, H-6)

β-D-Allp: 5.44 (d, J = 7.6, H-1) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	18.7	C-16	28.2	All-1	102.5
2	27.4	17	50.4	2	73.7
3	83.6	18	14.9	3	71.8
4	39.1	19	112.5	4	69.3
5	85.6	20	36.6	5	76.4
6	133.2	21	18.9	6	63.3
7	131.6	22	39.6		
8	42.3	23	124.4		
9	48.3	24	141.7		
10	41.7	25	69.7		
11	23.4	26	30.8		
12	30.9	27	30.8		
13	45.3	28	21.2		
14	48.4	29	24.9		
15	33.9	30	20.0		
		OCH_3-19	57.7		

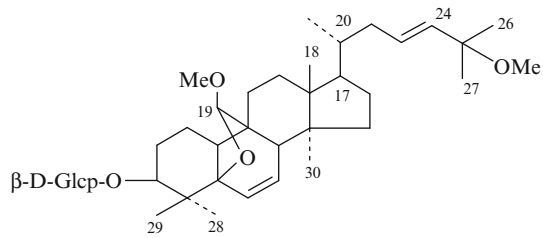
(*continued*)

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Goyaglycoside-c

CAS Registry Number: 333332-49-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 19(R)-Methoxy-5β,19-epoxy-cucurbita-6,23-diene-3β,25-diol

Biological source: *Momordica charantia* [1]

$C_{38}H_{62}O_9$: 662.439

$[\alpha]_D^{26}$-110.8° (c 0.5, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1078 [1]

FAB-MS *m/z*: 661 $[M\text{-}H]^-$, 647 $[M\text{-}CH_3]^-$, 499 $[M\text{-}C_6H_{11}O_5]^-$, 685 $[M + Na]^+$ [1]

^{1}H NMR (270 MHz, J/Hz C_5D_5N): 0.86 (CH_3-29), 0.92 (s, CH_3-18), 0.92 (CH_3-30), 1.33 (CH_3-26), 1.33 (CH_3-27), 1.48 (CH_3-28), 3.22 (H-25), 3.3 (dd-like, H-8), 3.44 (CH_3O-19), 3.73 (brs, H-3), 4.85 (s, H-19), 5.55 (d, J = 15.8, H-24), 5.65 (m, H-7), 5.65 (m, H-23), 6.17 (dd, J = 1.7, 9.6, H-6)

β-D-Glcp: 4.95 (d, J = 7.6, H-1) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

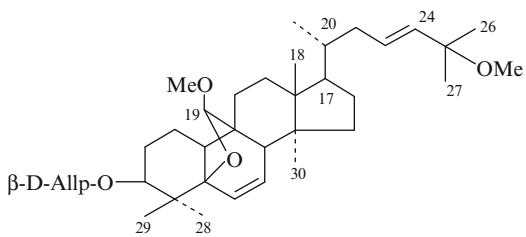
C-1	18.6	C-16	28.1	Glc-1	105.2
2	27.3	17	50.3	2	76.1
3	83.6	18	14.8	3	77.8
4	39.1	19	112.3	4	72.0
5	85.4	20	36.3	5	78.5
6	133.1	21	18.8	6	63.0
7	131.5	22	39.6		
8	42.2	23	128.3		
9	48.1	24	137.6		
10	41.6	25	74.7		
11	23.2	26	26.0		
12	30.9	27	26.4		
13	45.3	28	21.1		
14	48.2	29	24.8		
15	33.8	30	19.9		
		OCH_3-19	57.5		
		OCH_3-25	50.0		

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Goyaglycoside-d

CAS Registry Number: 333332-50-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 19(R)-Methoxy-5β,19-epoxy-cucurbita-6,23-diene-3β,25-diol

Biological source: *Momordica charantia* [1]

$C_{38}H_{62}O_9$: 662.439

$[\alpha]_D^{26}$ −141.1° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3434, 1082, 1034 [1]

FAB-MS *m/z*: 661 $[M-H]^-$, 499 $[M-C_6H_{11}O_5]^-$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.83 (s, CH_3-29), 0.93 (s, CH_3-18), 0.93 (s, CH_3-30), 0.99 (d, J = 5.4, CH_3-21), 1.33 (s, CH_3-26), 1.33 (s, CH_3-27), 1.44 (s, CH_3-28), 3.14 (dd-like, H-8), 3.22 (H-25), 3.50 (CH_3O-19), 3.69 (brs, H-3), 4.89 (s, H-19), 5.55 (d, J = 15.8, H-24), 5.62 (dd, J = 3.7, 9.7, H-7), 5.66 (ddd, J = 5.6, 8.6, 5.8, H-23), 6.15 (dd, J = 1.8, 9.8, H-6)

β-D-Allp: 5.43 (d, J = 7.7, H-1) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

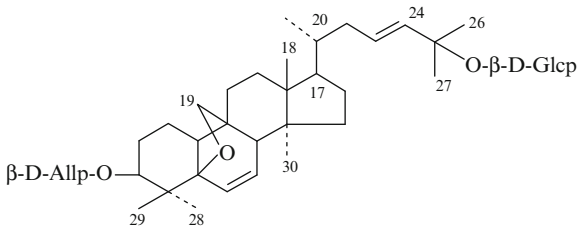
C-1	18.7	C-16	28.1	All-1	102.3
2	27.3	17	50.4	2	73.6
3	83.4	18	14.9	3	71.6
4	39.0	19	112.2	4	69.2
5	85.4	20	36.3	5	76.3
6	132.9	21	18.9	6	63.2
7	131.3	22	39.6		
8	42.2	23	128.2		
9	48.1	24	137.4		
10	41.6	25	74.7		
11	23.3	26	26.1		
12	30.9	27	26.5		
13	45.3	28	21.2		
14	48.3	29	24.9		
15	33.9	30	20.0		
		OCH_3-19	57.6		
		OCH_3-25	50.0		

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Goyaglycoside-e

CAS Registry Number: 333333-12-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 19(R)-Methoxy-5β,19-epoxy-cucurbita-6,23-diene-3β,25-diol

Biological source: *Momordica charantia* [1]

$C_{42}H_{68}O_{13}$: 780.465

$[\alpha]_D^{28}$ −75.6° (c 0.7, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3410, 1082, 1032 [1]

FAB-MS *m/z*: 779 $[M-H]^-$, 617 $[M-C_6H_{11}O_5]^-$ [1]

^{1}H NMR (270 MHz, J/Hz, C_5D_5N): 0.77 (s, CH_3-18), 0.89 (CH_3-30), 0.90 (CH_3-29), 0.98 (d, J = 5.6, CH_3-21), 1.45 (CH_3-28), 1.54 (CH_3-26), 1.60 (CH_3-27), 2.31 (brs, H-8), 3.65, 3.71 (q, J = 7.9, H_2-19), 3.64 (brs, H-3), 5.56 (dd, J = 3.3, 9.9, H-7), 5.79 (ddd-like, H-23), 6.01 (d, J = 15.8, H-24), 6.18 (d, J = 9.9, H-6)
β-D-Allp: 5.35 (d, J = 8.5, H-1)
β-D-Glcp: 4.98 (d, J = 7.6, H-1) [1]

^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

C-1	18.9	C-16	28.2	All-1	103.8
2	27.6	17	50.5	2	73.1
3	85.1	18	15.1	3	72.4
4	39.0	19	80.2	4	69.3
5	86.0	20	36.5	5	76.1
6	134.1	21	19.1	6	63.4
7	130.0	22	39.8	Glc-1	99.8
8	52.3	23	128.4	2	75.3
9	45.3	24	138.5	3	78.8
10	40.2	25	77.6	4	71.9
11	23.8	26	28.7	5	78.0
12	31.1	27	27.7	6	63.0
13	45.5	28	21.1		
14	48.9	29	25.6		
15	33.5	30	20.3		

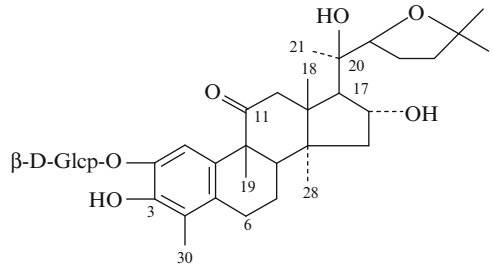
(*continued*)

References

1. T. Murakami, A. Emoto, H. Matsuda, M. Yoshikawa, Chem. Pharm. Bull. **49**(1), 54 (2001)

Cayaponoside A4

CAS Registry Number: 162857-57-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 20(R),29-Nor-1,2,3,4,5,10-hexadehydro-22,25-epoxy-cucurbitacin

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{52}O_{11}$: 648.350

Mp: 155–160°C [1]

$[\alpha]_D^{26}$ + 17.7° (c 0.97, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.49), 220 (shoulder, 4.16), 282 (3.41) [1]

FAB-MS *m/z*: 647 $[M-H]^-$, 485 $[M-H-162]^-$, 385 [1]

HR-FAB-MS *m/z*: 671.3410 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.66 (s, H-1), ca 2.65, 2.80 (m, H_2-6), ca 1.95, 2.25 (m, H_2-7), 2.15 (d, J = 7, H-8), 2.62, 2.78 (d, J = 14, H_2-12), 1.60 (d, J = 13), 2.05 (brdd,

J = 9, 13, H_2-15), 4.57 (brt, J = 7, H-16), 2.31 (d, J = 7, H-17), 0.96 (s, CH_3-18), 1.30 (s, CH_3-19), 1.21 (s, CH_3-21), 4.05 (t, J = 7, H-22), 1.90 (s, H_2-23), 1.70 (m, H_2-24), 1.23 (m, CH_3-26), 1.23 (s, CH_3-27), 2.09 (s, CH_3-28), 1.01 (s, CH_3-30)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

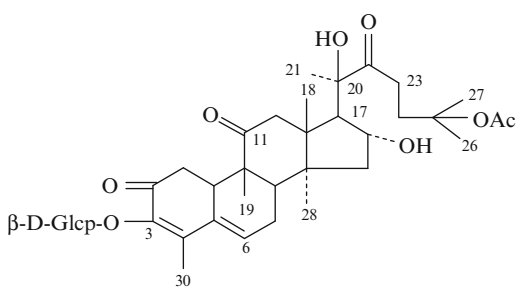
C-1	114.4	C-16	73.8	Glc-1	106.1
2	145.5	17	60.3	2	75.6
3	145.8	18	21.2	3	78.6
4	125.7	19	30.0	4	71.8
5	132.3	20	77.3	5	79.0
6	25.7	21	22.2	6	63.0
7	21.1	22	85.9		
8	44.9	23	27.9		
9	52.8	24	40.0		
10	130.8	25	83.5		
11	218.1	26	28.5		
12	52.1	27	29.6		
13	51.7	28	12.3		
14	50.8	29			
15	46.2	30	20.8		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside A_1

CAS Registry Number: 151466-41-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 20(R),29-Nor-isocucurbitacin R-3-ene

Biological source: *Cayaponia tayuya* [1]

$C_{37}H_{54}O_{13}$: 706.356

Mp: 148–155°C [1]

$[\alpha]_D^{26}$ + 19.5° (c 1.19, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.35), 300 (4.12) [1]

FAB-MS *m/z*: 705 $[M-H]^-$, 543 $[M-H-162]^-$, 483 $[M-H-162-AcOH]^-$, 385 [1]

HR-FAB-MS *m/z*: 729.3466 $[M + Na]^+$, 669.325 $[M + Na-AcOH]^+$ [1]

^{1}H NMR (400 MHz, J/Hz): 2.22 (dd, J = 4, 15), 2.38 (dd, J = 14, 15, H_2-1), 6.48 (m, H-6), 2.28 (ddd, J = 2, 6, 20), ca 2.6 (H_2-7), 2.10 (d, J = 8, H-8), 3.02 (brd, J = 14, H-10), 2.57, 3.27 (d, J = 15, H_2-12), ca 1.43, 1.87 (dd, J = 9, 13, H_2-15), 4.44 (dd, J = 7, 9, H-16), 2.53 (d, J = 7, H-17), 0.92 (s, CH_3-18), 1.11 (s, CH_3-19), 1.37 (s, CH_3-21), 2.69, 2.84 (ddd, J = 6, 10, 18, H_2-23), ca 2.0 (m, H_2-24), 1.44 (s, CH_3-26), 1.44 (s, CH_3-27), 2.14 (s, CH_3-28), 1.30 (s, CH_3-30), 1.94 (s, Ac)

β-D-Glcp: 4.72 (d, J = 7, H-1), 3.31–3.38 (H-2, 3, 4), 3.19 (m, H-5), 3.64 (dd, J = 16, 12, Ha-6), 3.81 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	40.7	C-16	72.1	Ac-1	173.2
2	197.1	17	60.4	2	23.1
3	147.1	18	21.4	Glc-1	104.8
4	134.3	19	20.6	2	76.5
5	145.8	20	81.6	3	79.0
6	132.6	21	26.4	4	72.1
7	26.7	22	217.3	5	79.1
8	44.5	23	33.6	6	63.5
9	50.8	24	36.6		
10	37.8	25	83.9		
11	215.8	26	27.0		
12	50.6	27	27.1		
13	52.4	28	14.4		
14	50.3	29			
15	47.6	30	19.6		

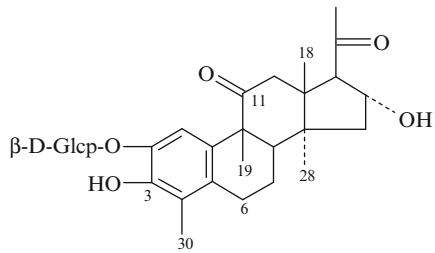
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus (EBV) activation induced by the tumor promoter 12-O-tetra-decanoylphorbol 13-acetate (TPA) [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2301 (1994)

Cayaponoside C_2

CAS Registry Number: 151703-10-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22,23,24,25,26,27,29-Heptanor-1,2,3,4,5,10-hexadehydro-cucurbitacin

Biological source: *Cayaponia tayuya* [1]

$C_{29}H_{40}O_{10}$: 548.262

Mp: 164–170°C [1]

$[\alpha]_D^{24}$ + 47.5° (c 1.33, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.30), 220 (shoulder, 3.91), 280 (3.16) [1]

FAB-MS *m/z*: 547 $[M-H]^-$, 385$[M-H-162]^-$ [1]

HR-FAB-MS *m/z*: 571.2519 $[M + Na]^+$, 386.2087 $[M-C_6H_{10}O_5]^+$ [1]

^{1}H NMR (J/Hz): 6.66 (s, H-1), 2.66 (ddd, J = 1, 10, 18), 2.85 (dd, J = 10, 18, H_2-6), ca 1.96, 2.28 (m, H_2-7), 2.13 (brd, J = 7, H-8), 2.48, 2.98 (d, J = 14, H_2-12), 1.59 (dd, J = 1, 13, H-15), 1.99 (dd, J = 8, 13, H-15), 4.83 (ddd, J = 1, 7, 9, H-16), 3.14 (d, J = 7, H-17), 0.69 (s, CH_3-18), 1.31 (s, CH_3-19), 2.14 (s, CH_3-21), 2.09 (s, CH_3-28), 1.02 (s, CH_3-30)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45-3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

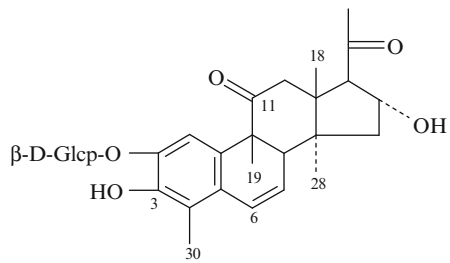
C-1	114.4	C-16	73.2	Glc-1	106.1
2	145.5	17	69.0	2	75.6
3	145.9	18	20.9	3	78.6
4	125.8	19	29.9	4	71.8
5	132.1	20	211.6	5	79.0
6	25.5	21	32.5	6	63.0
7	21.0	22			
8	45.1	23			
9	53.3	24			
10	130.6	25			
11	216.1	26			
12	51.0	27			
13	51.8	28	12.3		
14	51.2	29			
15	46.7	30	20.8		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside C_4

CAS Registry Number: 159650-33-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22,23,24,25,26,27,29-Heptanor-1,2,3,4,5,10-hexadehydro-cucurbit-6-ene

Biological source: *Cayaponia tayuya* [1]

$C_{29}H_{38}O_{10}$: 546.246

Mp: 170–173°C [1]

$[\alpha]_D$ − 39° (c 1.20, MeOH) [1]

UV λ_{max} nm (log ε): 204 (4.08), 233 (4.45), 274 (3.98), 283 (3.92), 303 (3.55), 314 (3.44) [1]

FAB-MS *m/z*: 545 $[M-H]^-$, 383 $[M-H-162]^-$ [1]

HR-FAB-MS *m/z*: 669 $[M + Na]^+$, 384 $[M-C_6H_{10}O_5]^+$ [1]

^{1}H NMR (J/Hz): 6.56 (s, H-1), 6.89 (d, J = 10, H-6), 5.82 (dd, J = 6, 10, H-7), 2.56 (d, J = 6, H-8), 2.55, 3.07 (dd, J = 15, H_2-12), 1.45 (dd, J = 2, 14), 2.14 (dd, J =

10, 14, H_2-15), 4.84 (ddd, J = 2, 7, 10, H-16), 3.10 (d, J = 7, H-17), 0.74 (s, CH_3-18), 1.23 (s, CH_3-19), 2.16 (s, CH_3-21), 2.23 (s, CH_3-28), 0.96 (s, CH_3-30)

β-D-Glcp: 4.61 (d, J = 7, H-1), 3.40–3.55 (H-2, 3, 4), 3.31 (m, H-5), 3.83 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

C-1	113.6	C-16	73.7	Glc-1	105.8
2	146.2	17	69.0	2	75.6
3	146.6	18	20.7	3	78.5
4	124.3	19	27.3	4	71.8
5	130.4	20	211.4	5	79.0
6	127.0	21	32.6	6	63.0
7	127.7	22			
8	49.1	23			
9	53.2	24			
10	129.1	25			
11	215.2	26			
12	51.0	27			
13	51.0	28	12.1		
14	51.0	29			
15	45.2	30	18.9		

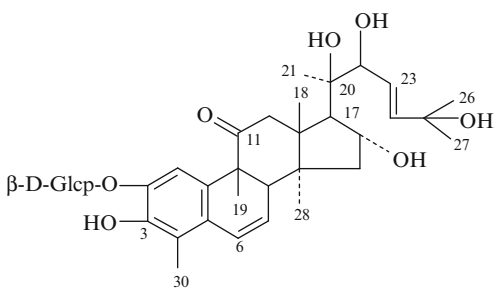
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus activation [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2370 (1994)

Cayaponoside D_2

CAS Registry Number: 159653-47-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22,25-Dihydroxy-6-en-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{50}O_{12}$: 662.330

Mp: 172–175°C [1]

$[\alpha]_D^{26}$ − 106.9° (c 1.38, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.11), 233 (4.36), 274 (3.85), 284 (3.82), 303 (3.47), 315 (3.37) [1]

FAB-MS *m/z*: 661 $[M-H]^-$, 499 $[M-H-162]^-$, 383 [1]

HR-FAB-MS *m/z*: 685.3198 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.53 (s, H-1), 6.88 (d, J = 10, H-6), 5.82 (dd, J = 6, 10, H-7), 2.57 (d, J = 6, H-8), 2.67, 2.88 (dd, J = 15, H_2-12), 1.47 (d, J = 14), 2.08 (dd, J = 9, 14, H_2-15), 4.64 (dd, J = 7, 9, H-16), 2.29 (d, J = 7, H-17), 0.92 (s, CH_3-18), 1.22 (s, CH_3-19), 1.21 (s, CH_3-21), 3.96 (dd, J = 1, 6, H-22), 5.75 (dd, J = 6, 15, H-23), 5.83 (dd, J = 1, 15, H-24), 1.25 (s, CH_3-26), 1.25 (s, CH_3-27), 2.23 (s, CH_3-28), 1.05 (s, CH_3-30)

β-D-Glcp: 4.61 (d, J = 7, H-1), 3.40-3.55 (H-2, 3, 4), 3.31 (m, H-5), 3.83 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

C-1	113.5	C-16	73.3	Glc-1	105.8
2	146.1	17	57.8	2	75.6
3	146.4	18	20.9	3	78.5
4	124.1	19	27.4	4	71.8
5	130.6	20	77.8	5	79.0
6	126.9	21	24.8	6	63.0
7	130.6	22	82.5		
8	48.9	23	128.1		
9	52.5	24	142.4		
10	129.1	25	72.0		
11	217.2	26	30.7		
12	53.1	27	30.8		
13	52.0	28	12.0		
14	50.4	29			
15	44.6	30	18.7		

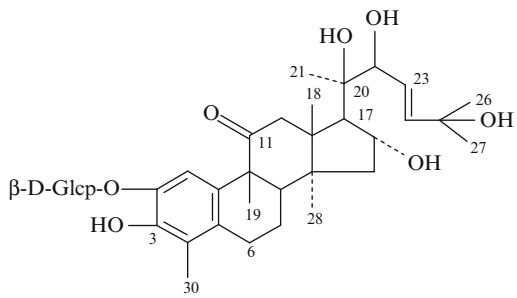
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus activation [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2370 (1994)

Cayaponoside D

CAS Registry Number: 147764-94-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22,25-Dihydroxy-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{52}O_{12}$: 664.345

Mp: 170–173°C [1]

$[\alpha]_D^{26}$ − 7.6° (c 2.23, MeOH) [1]

UV λ_{max}^{MeOH} nm (logε): 207 (4.43), 220 (4.06), 282 (3.31) [1]

FAB-MS *m/z*: 663 $[M-H]^-$, 501$[M-H-162]^-$, 385 [1]

HR-FAB-MS *m/z*: 687.3374 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.63 (s, H-1), ca 2.65, 2.85 (m, H_2-6), ca 1.96, 2.27 (m, H_2-7), 2.15 (brd, J = 7, H-8), 2.59, 2.78 (d, J = 14, H_2-12), 1.59 (d, J = 14), 1.99 (dd, J = 10, 14, H_2-15), 4.62 (t-like, J = 7, H-16), 2.34 (d, J = 7, H-17), 1.00 (s, CH_3-18), 1.30 (s, CH_3-19), 1.21 (s, CH_3-21), 3.95 (brd, J = 5, H-22), 5.74 (dd, J = 5, 16, H-23), 5.83 (dd, J = 1, 16, H-24), 1.25 (s, CH_3-26), 1.25 (s, CH_3-27), 2.09 (s, CH_3-28), 0.98 (s, CH_3-30)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

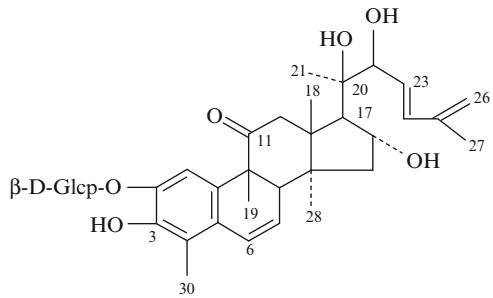
C-1	114.3	C-16	73.0	Glc-1	106.1
2	145.4	17	57.4	2	75.6
3	145.7	18	21.0	3	78.6
4	125.7	19	29.9	4	71.8
5	132.2	20	77.9	5	79.0
6	25.6	21	24.8	6	63.0
7	21.0	22	82.6		
8	44.8	23	127.0		
9	52.8	24	142.3		
10	130.8	25	72.0		
11	218.2	26	30.8		
12	52.9	27	30.9		
13	52.8	28	12.3		
14	50.6	29			
15	46.2	30	20.7		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside B_5

CAS Registry Number: 163047-18-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22-Hydroxy-6,25-dien-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{48}O_{11}$: 644.319

Mp: 168–175°C [1]

$[\alpha]_D^{26}$ − 90.7° (c 0.98, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.11), 233 (4.36), 274 (3.85), 284 (3.82), 303 (3.47), 315 (3.37) [1]

FAB-MS *m/z*: 643 $[M-H]^-$, 481 $[M-H-162]^-$, 383 [1]
HR-FAB-MS *m/z*: 667 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz): 6.53 (s, H-1), 6.88 (d, J = 10, H-6), 5.82 (dd, J = 6, 10, H-7), 2.57 (d, J = 6, H-8), 2.67, 2.87 (dd, J = 15, H_2-12), 1.48 (d, J = 14), 2.08 (dd, J = 8, 14, H_2-15), 4.65 (dd, J = 6, 8, H-16), 2.36 (d, J = 6, H-17), 1.05 (s, CH_3-18), 1.21 (s, CH_3-19), 1.21 (s, CH_3-21), 4.08 (dd, J = 1, 6, H-22), 5.80 (dd, J = 6, 10, H-23), 6.36 (dd, J = 1, 6, H-24), 4.95 (s, H_2-26), 1.82 (s, CH_3-27), 2.23 (s, CH_3-28), 0.92 (s, CH_3-30)
β-D-Glcp: 4.61 (d, J = 7, H-1), 3.40–3.55 (H-2, 3, 4), 3.31 (m, H-5), 3.83 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]
^{13}C NMR: [1]

Table 1

C-1	113.5	C-16	73.3	Glc-1	105.8
2	146.1	17	58.2	2	75.6
3	146.5	18	21.0	3	78.5
4	124.1	19	27.4	4	71.8
5	130.6	20	77.9	5	79.0
6	126.9	21	24.4	6	63.0
7	130.4	22	82.2		
8	48.9	23	128.1		
9	52.6	24	136.6		
10	129.1	25	143.8		
11	217.1	26	117.5		
12	53.2	27	19.6		
13	51.9	28	12.0		
14	50.6	29			
15	44.8	30	18.7		

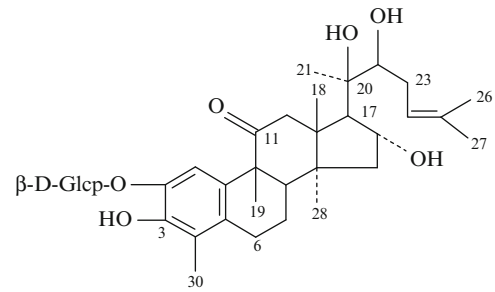
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus activation [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2370 (1994)

Cayaponoside B_3

CAS Registry Number: 162857-60-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22-Hydroxy-23-hydro-24-en-fevicordin A
Biological source: *Cayaponia tayuya* [1]
$C_{35}H_{52}O_{11}$: 648.350
Mp: 158–163°C [1]
$[\alpha]_D^{26}$ − 3.6° (c 1.04, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 207 (4.44), 220 (shoulder, 4.11), 281 (3.40) [1]
FAB-MS *m/z*: 647 $[M-H]^-$, 485 $[M-H-162]^-$, 385 [1]
HR-FAB-MS *m/z*: 671.3412 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz): 6.65 (s, H-1), ca 2.65, 2.86 (m, H_2-6), ca 1.95, 2.25 (m, H_2-7), 2.15 (d, J = 8, H-8), 2.62, 2.81 (d, J = 14, H_2-12), 1.60 (d, J = 14), 1.98 (m, H_2-15), 4.58 (t, J = 8, H-16), 2.36 (d, J = 7, H-17), 1.00 (s, CH_3-18), 1.31 (s, CH_3-19), 1.21 (s, CH_3-21), 3.38 (dd, J = 2, 10, H-22), ca 2.08, 2.25 (m, H_2-23), 6.36 (brt, J = 7, H-24), 1.60 (s, CH_3-26), 1.68 (s, CH_3-27), 2.09 (s, CH_3-28), 1.00 (s, CH_3-30)
β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]
^{13}C NMR: [1]

Table 1

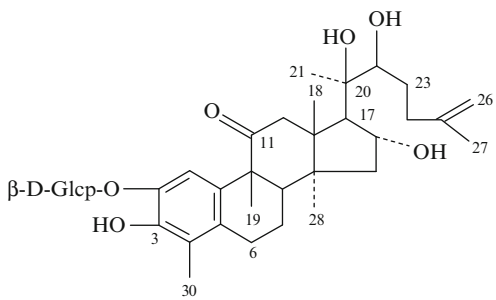
C-1	114.4	C-16	72.9	Glc-1	106.1
2	145.5	17	57.4	2	75.6
3	145.8	18	20.8	3	78.6
4	125.7	19	30.0	4	71.8
5	132.2	20	77.8	5	79.0
6	25.6	21	21.0	6	63.0
7	21.1	22	82.6		
8	44.8	23	31.9		
9	52.7	24	124.3		
10	130.8	25	134.3		
11	218.2	26	26.8		
12	53.1	27	18.9		
13	52.8	28	12.3		
14	50.6	29			
15	46.4	30	18.9		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside B_2

CAS Registry Number: 162857-59-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22-Hydroxy-23,24-dihydro-25-en-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{52}O_{11}$: 648.350

Mp: 175–178°C [1]

$[\alpha]_D^{26}$ + 1.0° (c 1.00, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.48), 220 (shoulder, 4.12), 283 (3.33) [1]

FAB-MS *m/z*: 647 $[M-H]^-$, 485$[M-H-162]^-$, 385 [1]

HR-FAB-MS *m/z*: 671.3416 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.65 (s, H-1), ca 2.65, 2.85 (m, H_2-6), ca 1.95, 2.25 (m, H_2-7), 2.15 (d, J = 7, H-8), 2.21, 2.62 (d, J = 14, H_2-12), 1.59 (d, J = 14), 1.98 (m, H_2-15), 4.57 (t, J = 8, H-16), 2.34 (d, J = 7, H-17), 1.00 (s, CH_3-18), 1.30 (s, CH_3-19), 1.19 (s, CH_3-21), ca 3.32 (H-22), ca 2.05, 2.25 (m, H_2-23), ca 1.48, 1.70 (H_2-24), 4.69 (brs, H_2-26), 1.71 (CH_3-27), 2.09 (CH_3-28), 0.99 (CH_3-30)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

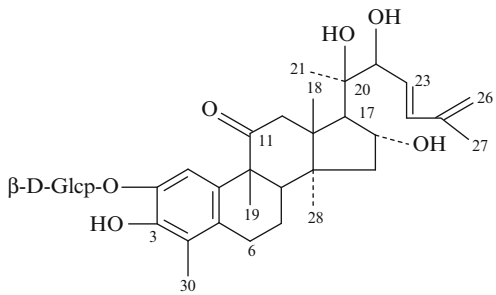
C-1	114.3	C-16	72.9	Glc-1	106.1
2	145.5	17	57.3	2	75.6
3	145.8	18	21.0	3	78.6
4	125.7	19	30.0	4	71.8
5	132.2	20	77.8	5	79.0
6	25.6	21	23.8	6	63.0
7	21.1	22	81.5		
8	44.8	23	37.1		
9	52.8	24	31.1		
10	130.8	25	147.8		
11	218.2	26	111.4		
12	53.2	27	23.4		
13	52.6	28	12.3		
14	50.7	29			
15	46.5	30	20.7		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside B

CAS Registry Number: 147742-05-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22-Hydroxy-25-en-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{50}O_{11}$: 646.335

Mp: 172–174°C [1]

$[\alpha]_D^{26}$ − 8.3° (c 1.16, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.46), 220 (4.13), 282 (3.37) [1]

FAB-MS *m/z*: 645 $[M-H]^-$, 483 $[M-H-162]^-$, 385 [1]

HR-FAB-MS *m/z*: 669.3257 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.64 (s, H-1), ca 2.66, 2.86 (m, H_2-6), ca 1.95, 2.25 (m, H_2-7), 2.15 (brd, J = 7, H-8), 2.60, 2.76 (d, J = 14, H_2-12), 1.60 (d, J = 14), 1.95 (m, H_2-15), 4.63 (t-like, J = 8, H-16), 2.38 (d, J = 6, H-17), 1.00 (s, CH_3-18), 1.30 (s, CH_3-19), 1.19 (s, CH_3-21), 4.08 (dd, J = 1, 6, H-22), 5.79 (dd, J = 6, 16, H-23), 6.36 (dd, J = 1, 16, H-24), 4.94 (s, H_2-26), 1.82 (s, CH_3-27), 2.09 (s, CH_3-28), 0.98 (s, CH_3-30)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

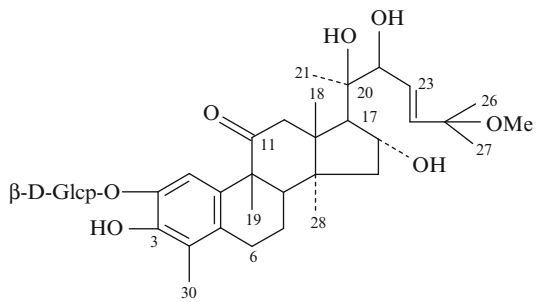
C-1	114.3	C-16	73.0	Glc-1	106.1
2	145.5	17	57.8	2	75.6
3	145.8	18	21.1	3	78.6
4	125.7	19	29.9	4	71.8
5	132.2	20	78.0	5	79.0
6	25.6	21	24.3	6	63.0
7	21.1	22	82.2		
8	44.8	23	130.4		
9	52.8	24	136.5		
10	130.8	25	143.8		
11	218.1	26	117.5		
12	53.0	27	19.6		
13	52.7	28	12.3		
14	50.6	29			
15	46.4	30	20.7		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside B_4

CAS Registry Number: 151703-09-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22-Hydroxy-25-methoxy-fevicordin A
Biological source: *Cayaponia tayuya* [1]
$C_{36}H_{54}O_{12}$: 678.361
Mp: 160–164°C [1]
$[\alpha]_D^{26}$ − 2.6° (c 1.00, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 207 (4.42), 220 (shoulder, 4.11), 282 (3.37) [1]
FAB-MS *m/z*: 677 $[M-H]^-$, 515$[M-H-162]^-$, 385 [1]
HR-FAB-MS *m/z*: 701.3530 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz): 6.63 (s, H-1), ca 2.65, 2.85 (m, H_2-6), ca 1.98, 2.25 (m, H_2-7), 2.15 (brd, J = 7, H-8), 2.60, 2.75 (d, J = 14, H_2-12), 1.60 (d, J = 13), 1.99 (dd, J = 8, 13, H_2-15), 4.63 (t-like, J = 8, H-16), 2.33 (d, J = 7, H-17), 1.00 (s, CH_3-18), 1.30 (s, CH_3-19), 1.22 (s, CH_3-21), 4.01 (d, J = 5, H-22), 5.76 (dd, J = 5, 16, H-23), 5.68 (d, J = 16, H-24), 1.24 (s, CH_3-26), 1.24 (s, CH_3-27), 2.09 (s, CH_3-28), 0.96 (s, CH_3-30), 3.13 (s, OMe)
β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45-3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]
^{13}C NMR: [1]

Table 1

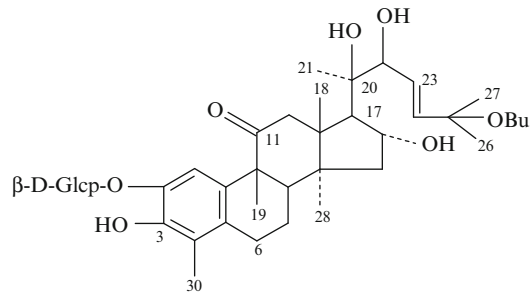
C-1	114.3	C-16	73.1	Glc-1	106.1
2	145.5	17	57.6	2	75.6
3	145.8	18	21.0	3	78.6
4	125.7	19	29.9	4	71.8
5	132.2	20	77.8	5	79.0
6	23.6	21	24.6	6	63.0
7	21.0	22	82.1		
8	44.8	23	130.8		
9	52.8	24	139.0		
10	130.8	25	77.2		
11	218.0	26	27.3		
12	52.9	27	26.9		
13	52.8	28	12.3		
14	50.6	29			
15	46.3	30	20.7		
		OMe	51.6		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside A_3

CAS Registry Number: 162857-56-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 22-Hydroxy-25-O-Bu-fevicordin A
Biological source: *Cayaponia tayuya* [1]
$C_{39}H_{60}O_{12}$: 720.408
Mp: 138–140°C [1]
$[\alpha]_D^{26}$ − 8.9° (c 0.74, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 205 (4.54), 220 (shoulder, 4.14), 281 (3.34) [1]
FAB-MS *m/z*: 719 $[M-H]^-$, 557$[M-H-162]^-$, 385 [1]
^{1}H NMR (J/Hz): 6.66 (s, H-1), ca 2.65, 2.80 (m, H_2-6), ca 1.95, 2.25 (m, H_2-7), 2.15 (brd, J = 7, H-8), 2.62, 2.78 (d, J = 14, H_2-12), 1.60 (d, J = 13, H-15), 1.95 (m, H-15), 4.57 (t-like, J = 7, H-16), 2.31 (d, J = 7, H-17), 0.96 (s, CH_3-18), 1.30 (s, CH_3-19), 1.21 (s, CH_3-21), 4.05 (t, J = 7, H-22), 1.90 (m, H_2-23), ca 1.70 (m, H_2-24), 1.23 (s, CH_3-26), 1.23 (s, CH_3-27), 2.09 (s, CH_3-28), 1.01 (s, CH_3-30), 0.84 (t, J = 7), ca 1.4 (m, 2H), ca 3.28 (m, OBu)
β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, H-6), 3.95 (dd, J = 2, 12, H-6) [1]
^{13}C NMR: [1]

Table 1

C-1	114.2	C-16	73.0	OBu	15.1
2	145.5	17	57.6		34.6
3	145.8	18	20.9		34.6
4	125.7	19	29.9		64.4

(*continued*)

Table 1 (continued)

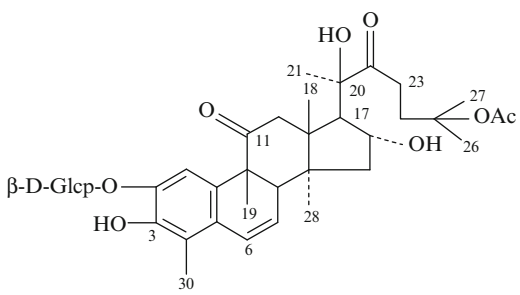
5	132.2	20	77.8	Glc-1	106.1
6	25.6	21	24.9	2	75.6
7	21.0	22	82.5	3	78.6
8	44.8	23	130.1	4	71.8
9	52.8	24	139.9	5	79.0
10	130.7	25	76.7	6	63.0
11	218.0	26	28.0		
12	52.9	27	27.4		
13	52.8	28	12.3		
14	50.6	29			
15	46.2	30	20.8		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside A_5

CAS Registry Number: 149777-93-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-6-en-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{37}H_{52}O_{13}$: 704.340

Mp: 149–151°C [1]

$[\alpha]_D^{26}$ − 135.5° (c 0.96, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 205 (4.20), 232 (4.39), 274 (3.87), 283 (shoulder, 3.84) [1]

FAB-MS *m/z*: 703 $[M-H]^-$, 541 $[M-H-162]^-$, 481 $[M-H-162-AcOH]^-$, 383 [1]

HR-FAB-MS *m/z*: 727.3318 $[M + Na]^+$, 667.3089 $[M + Na-AcOH]^+$ [1]

^{1}H NMR (J/Hz): 6.56 (s, H-1), 6.87 (d, J = 10, H-6), 5.79 (dd, J = 6, 10, H-7), 2.55 (d, J = 6, H-8), 2.70, 3.01 (d, J = 14, H_2-12), ca 1.35, 2.00 (H_2-15), 4.44 (brt, J = 8, H-16), 2.45 (d, J = 8, H-17), 0.94 (s, CH_3-18), 1.22 (s, CH_3-19), 1.39 (s, CH_3-21), 2.7-2.8 (H_2-23), ca 2.0 (H_2-24), 1.42 (s, CH_3-26), 1.43 (s, CH_3-27), 2.22 (s, CH_3-28), 1.00 (s, CH_3-30), 1.92 (s, Ac)

β-D-Glcp: 4.61 (d, J = 7, H-1), 3.40–3.55 (H-2, 3, 4), 3.31 (m, H-5), 3.83 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

C-1	113.6	C-16	72.7	Ac-1	173.2
2	146.1	17	60.7	2	23.3
3	146.5	18	21.1	Glc-1	105.8
4	124.1	19	27.4	2	75.6
5	130.6	20	81.6	3	78.5
6	126.9	21	26.3	4	71.8
7	128.1	22	217.4	5	79.0
8	49.0	23	33.6	6	63.0
9	52.8	24	36.6		
10	129.1	25	83.9		
11	216.9	26	27.0		
12	52.9	27	27.1		
13	51.3	28	12.0		
14	50.4	29	–		
15	45.6	30	18.9		

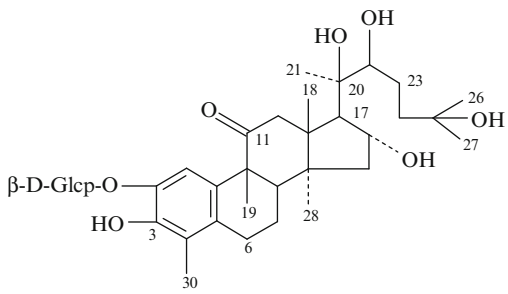
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus (EBV) activation induced by the tumor promoter 12-O-tetra-decanoylphorbol 13-acetate (TPA) [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2370 (1994)

Cayaponoside D_1

CAS Registry Number: 162857-61-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-22,25-dihydroxy-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{54}O_{12}$: 666.361

Mp: 169–173°C [1]

$[\alpha]_D^{27}$ − 2.7° (c 1.21, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.43), 220 (shoulder, 3.99), 280 (3.20) [1]

FAB-MS *m/z*: 665 $[M-H]^-$, 503$[M-H-162]^-$, 385 [1]

HR-FAB-MS *m/z*: 689.3516 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.65 (s, H-1), 2.65 (ddd, J = 1, 9, 18), 2.85 (dd, J = 9, 18, H_2-6), ca 1.98, 2.26 (m, H_2-7), 2.16 (brd, J = 7, H-8), 2.62, 2.82 (d, J = 14, H_2-12), 1.59 (d, J = 13), 1.97 (m, H_2-15), 4.57 (brt, J = 7, H-16), 2.36 (d, J = 7, H-17), 1.00 (s, CH_3-18), 1.30 (s, CH_3-19), 1.21 (s, CH_3-21), ca 3.30 (H-22), ca 1.40, 1.60 (m, H_2-23), ca 1.40, 1.80 (H_2-24), 1.17 (s, CH_3-26), 1.18 (s, CH_3-27), 2.09 (s, CH_3-28), 1.00 (s, CH_3-30)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

C-1	114.3	C-16	72.9	Glc-1	106.1
2	145.5	17	57.5	2	75.6
3	145.8	18	21.0	3	78.6
4	125.7	19	30.0	4	71.8
5	132.2	20	78.0	5	79.0
6	25.6	21	23.8	6	63.0
7	21.1	22	82.7		
8	44.8	23	27.7		
9	52.8	24	43.3		
10	130.8	25	72.2		
11	218.2	26	30.2		
12	53.2	27	29.9		
13	52.6	28	12.3		
14	50.7	29			
15	46.4	30	20.7		

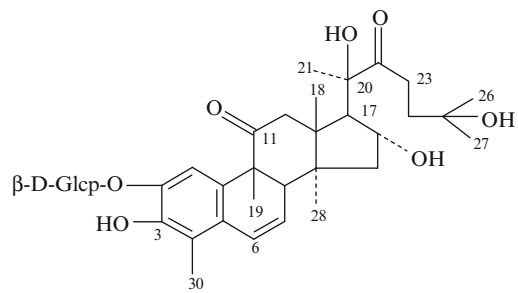
(*continued*)

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside C_{5b}

CAS Registry Number: 133882-82-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-25-hydroxy-6-en-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{50}O_{12}$: 662.330
Mp: 168–170°C [1]
$[\alpha]_D^{26}$ − 138.2° (c 1.16, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 205 (4.03), 233 (4.36), 274 (3.83), 284 (3.81), 303 (3.45), 315 (3.35) [1]
FAB-MS *m/z*: 661 $[M-H]^-$, 499 $[M-H-162]^-$, 383 [1]
HR-FAB-MS *m/z*: 685.3195 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz): 6.57 (s, H-1), 6.87 (d, J = 10, H-6), 5.80 (dd, J = 6, 10, H-7), 2.56 (d, J = 6, H-8), 2.72, 3.02 (dd, 15, H_2-12), 1.32 (d, 14), 2.03 (dd, 9, 14, H_2-15), 4.43 (t-like, 7, H-16), 2.47 (d, J = 7, H-17), 0.94 (s, CH_3-18), 1.22 (s, CH_3-19), 1.38 (s, CH_3-21), 2.7-2.8 (m, H_2-23), ca 1.7 (m, H_2-24), 1.17 (s, CH_3-26), 1.17 (s, CH_3-27), 2.22 (s, CH_3-28), 1.01 (s, CH_3-30)
β-D-Glcp: 4.61 (d, J = 7, H-1), 3.40–3.55 (H-2, 3, 4), 3.31 (m, H-5), 3.83 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]
^{13}C NMR: [1]

Table 1

C-1	113.6	C-16	72.6	Glc-1	105.8
2	146.1	17	60.5	2	75.6
3	146.5	18	21.1	3	78.5
4	124.1	19	27.4	4	71.8
5	130.6	20	81.6	5	79.0
6	126.9	21	26.2	6	63.0
7	128.0	22	218.0		
8	49.0	23	33.9		
9	52.9	24	38.9		
10	129.1	25	71.6		
11	216.8	26	30.2		
12	52.7	27	29.9		
13	51.3	28	12.0		
14	50.4	29			
15	45.6	30	18.9		

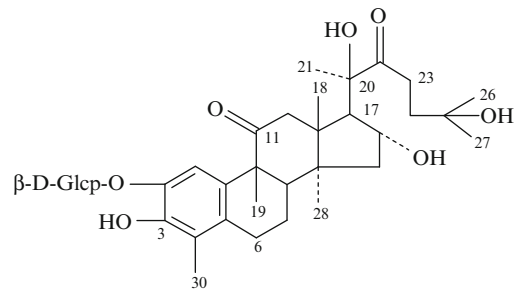
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus (EBV) activation induced by the tumor promoter 12-O-tetra-decanoylphorbol 13-acetate (TPA) [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2370 (1994)

Cayaponoside C

CAS Registry Number: 147742-06-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-25-hydroxy-fevicordin A
Biological source: *Cayaponia tayuya* [1]
$C_{35}H_{52}O_{12}$: 664.345
Mp: 160–165°C [1]
$[\alpha]_D^{24}$ − 28.1° (c 1.40, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 208 (4.41), 220 (4.00), 283 (3.31) [1]
FAB-MS *m/z*: 663 $[M-H]^-$, 501 $[M-H-162]^-$ [1]
HR-FAB-MS *m/z*: 687.3374 $[M + Na]^+$ [1]
^{1}H NMR (J/Hz): 6.67 (s, H-1), ca 2.68, 2.85 (m, H_2-6), ca 1.94, 2.25 (m, H_2-7), 2.13 (brd, J = 7, H-8), 2.65, 2.96 (d, J = 14, H_2-12), 1.48 (d, J = 14), 1.94 (dd, J = 9, 14, H_2-15), 4.42 (t-like, J = 7, H-16), 2.51 (d, J = 7, H-17), 0.96 (s, CH_3-18), 1.31 (s, CH_3-19), 1.36 (s, CH_3-21), ca 2.70, 2.80 (m, H_2-23), 1.70 (m, 2H, H-24), 1.17 (s, CH_3-26), 1.17 (s, CH_3-27), 2.08 (s, CH_3-28), 1.00 (s, CH_3-30)
β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]
^{13}C NMR: [1]

Table 1

C-1	114.4	C-16	72.3	Glc-1	106.1
2	145.4	17	60.3	2	75.6
3	145.8	18	21.2	3	78.6
4	125.7	19	30.0	4	71.8
5	132.2	20	81.7	5	79.0
6	25.6	21	26.2	6	63.0

(*continued*)

Table 1 (continued)

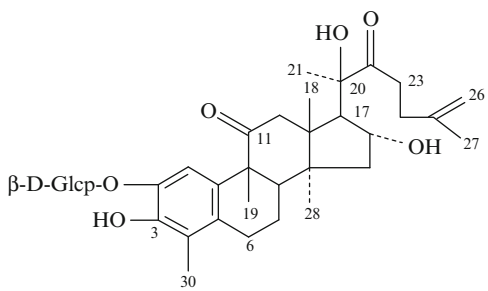
7	21.1	22	217.8
8	44.9	23	33.9
9	53.0	24	38.9
10	130.8	25	71.6
11	218.1	26	30.2
12	52.8	27	30.0
13	52.1	28	12.3
14	50.6	29	
15	47.2	30	20.9

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside A_6

CAS Registry Number: 162857-58-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-25-en-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{50}O_{11}$: 646.335

Mp: 150–154°C [1]

$[\alpha]_D^{26}$ − 27.2° (c 0.95, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.48), 220 (4.12), 281 (3.36) [1]

FAB-MS *m/z*: 645 $[M-H]^-$, 483$[M-H-162]^-$, 385 [1]

HR-FAB-MS *m/z*: 669.3248 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.67 (s, H-1), ca 2.65, 2.83 (m, H_2-6), ca 1.95, 2.75 (m, H_2-7), 2.13 (brd, J = 7, H-8), 2.64, 2.91 (d, J = 14, H_2-12), 1.48 (d, J = 13), 1.94 (dd, J = 9, 13, H_2-15), 4.42 (t-like, J = 7, H-16), 2.50 (d, J = 7, H-17), 0.96 (s, CH_3-18), 1.31 (s, CH_3-19), 1.35 (s, CH_3-21), ca 2.75, 2.85 (m, H_2-23), ca 2.22 (m, H_2-24), 4.68 (brd, J = 5, H_2-26), 1.27 (s, CH_3-27), 2.09 (s, CH_3-28), 0.99 (s, CH_3-30)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

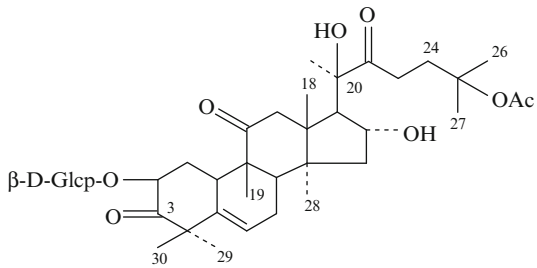
C-1	114.4	C-16	72.3	Glc-1	106.1
2	145.5	17	60.1	2	75.6
3	145.8	18	21.2	3	78.6
4	125.7	19	30.0	4	71.8
5	132.2	20	81.6	5	79.0
6	25.6	21	26.2	6	63.0
7	21.1	22	217.9		
8	44.9	23	37.3		
9	53.0	24	33.4		
10	130.8	25	147.0		
11	217.3	26	111.3		
12	52.8	27	23.5		
13	52.1	28	12.3		
14	50.6	29			
15	47.3	30	20.9		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Arvenin II

CAS Registry Number: 65247-28-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-cucurbitacin B
Biological source: *Anagallis arvensis* [1]
$C_{38}H_{58}O_{13}$: 722.387
Mp: 140–143°C [1]
$[\alpha]_D^{20}$ + 31.7° (c 1.2, EtOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1715, 1690 [1]
^{1}H NMR (100 MHz, J/Hz, $CDCl_3$): 5.75 (m, H-6), 0.97 (s, CH_3-18), 1.08 (s, CH_3-19), 1.30 (s, CH_3-21, 27), 1.48 (s, CH_3-26, 28, 29, 30), 1.99 (s, CH_3COO) [1]
^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	35.4	C-16	70.4	Glc-1	103.9
2	78.1	17	58.9	2	75.5
3	211.1	18	21.7	3	78.1
4	48.6	19	20.1	4	71.4
5	140.7	20	80.0	5	78.1
6	120.4	21	19.9	6	62.6
7	24.2	22	214.7		
8	42.8	23	32.1		
9	48.9	24	35.4		
10	34.3	25	81.7		
11	212.6	26	26.0		
12	49.1	27	26.0		
13	50.8	28	25.5		
14	51.5	29	28.7		
15	46.0	30	18.8		
		$OCOCH_3$	170.0		
			22.2		

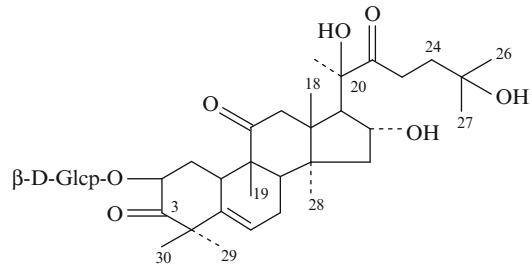
Pharm./Biol.: Show remarkable bitterness [1]

References

1. Y. Yamada, K. Hagiwara, K. Iguchi, S. Suzuki, H.-Y. Hsu, Chem. Pharm. Bull. **26**(10), 3107 (1978)

Arvenin IV

CAS Registry Number: 69312-48-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-cucurbitacin D
Biological source: *Anagallis arvensis* [1]
$C_{36}H_{56}O_{12}$: 680.377
Mp: 160–161°C [1]
$[\alpha]_D^{20}$ + 37.5° (c 0.7, EtOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1715, 1690 [1]
^{1}H NMR (100 MHz, J/Hz, CD_3OD): 5.81 (1H, m, H-6), 0.93 (s, CH_3-18), 1.05 (s, CH_3-19), 1.19 (s, CH_3-21), 1.28 (s, CH_3-26), 1.33 (s, CH_3-27), 1.39 (s, CH_3-28) [1]
^{13}C NMR (15 MHz, C_5D_5N): [1]

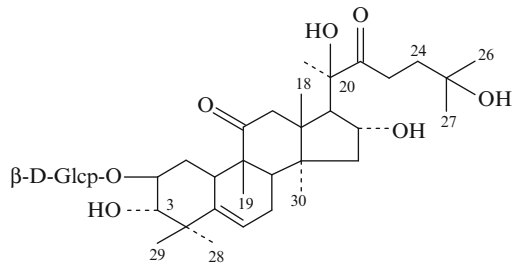
Table 1

C-1	35.0	C-16	70.5	Glc-1	104.1
2	78.1	17	58.7	2	75.7
3	211.5	18	21.8	3	78.1
4	48.7	19	20.2	4	71.5
5	140.9	20	80.1	5	78.1
6	120.5	21	19.8	6	62.7
7	24.1	22	215.9		
8	42.9	23	32.5		
9	48.9	24	38.3		
10	34.4	25	69.2		
11	212.8	26	29.8		
12	49.1	27	29.8		
13	51.0	28	25.4		
14	51.6	29	28.9		
15	46.2	30	18.9		

References

1. Y. Yamada, K. Hagiwara, K. Iguchi, S. Suzuki, H.-Y. Hsu, Chem. Pharm. Bull. **26**(10), 3107 (1978)

Glycoside from *Hemsleya panacis-scandens*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-cucurbitacin F

Biological source: *Hemsleya panacis-scandens* [1]

$C_{36}H_{58}O_{12}$: 682.392

$[\alpha]_D^{22}$ + 41.2° (c 0.57, MeOH) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 5.30 (d, J = 7, H-1 of Glc) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

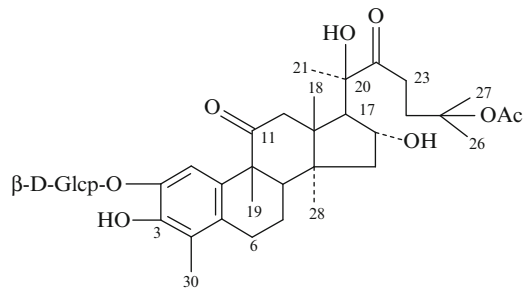
C-1	33.2	C-16	70.3	Glc-1	106.4
2	83.2	17	58.6	2	75.8
3	80.6	18	20.2	3	78.5
4	42.5	19	19.0	4	71.3
5	141,6	20	80.0	5	78.5
6	118.9	21	25.3	6	62.5
7	24.1	22	215.9		
8	34.2	23	32.6		
9	48.8	24	38.4		
10	43.0	25	71.3		
11	213.0	26	29.9		
12	49.1	27	30.1		
13	48.6	28	22.2		
14	51.0	29	22.3		
15	46.3	30	25.3		

References

1. R. Kasai, K. Matsumoto, R.-L. Nie, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **36**(1), 234 (1988)

Cayaponoside A

CAS Registry Number: 147742-04-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 23,24-Dihydro-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{37}H_{54}O_{13}$: 706.356

Mp: 142–146°C [1]

$[\alpha]_D^{26}$ − 26° (c 1.30, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 205 (4.40), 220 (3.91), 284 (3.28) [1]

FAB-MS *m/z*: 705 $[M-H]^-$, 543 $[M-H-162]^-$, 483 $[M-H-162-AcOH]^-$, 385 [1]

HR-FAB-MS *m/z*: 729.3466 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.67 (s, H-1), ca 2.65, 2.85 (H_2-6), ca 1.95, 2.25 (m, H_2-7), 2.13 (brd, J = 7, H-8), 2.63, 2.91 (d, J = 14, H_2-12), 1.50 (d, J = 13), ca 1.97 (m, H_2-15), 4.43 (brdd, J = 7, 9, H-16), 2.48 (d, 7, H-17), 0.95 (s, CH_3-18), 1.31 (s, CH_3-19), 1.35 (s, CH_3-21), ca 2.70, 2.80 (m, H_2-23), ca 1.95 (m, H_2-24), 1.42 (s, CH_3-26), 1.42 (s, CH_3-27), 2.09 (s, CH_3-28), 0.99 (s, CH_3-30), 1.92 (Ac)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

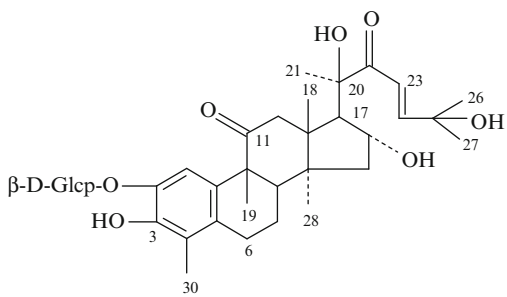
Table 1

C-1	114.3	C-16	72.3	Glc-1	106.1
2	145.5	17	60.6	2	75.6
3	145.8	18	21.2	3	78.6
4	125.7	19	30.0	4	71.8
5	132.2	20	81.7	5	79.0
6	25.6	21	26.3	6	63.0
7	21.1	22	217.5		
8	44.9	23	33.6		
9	53.0	24	36.6		
10	130.8	25	83.9		
11	217.9	26	27.0		
12	52.8	27	27.1		
13	52.1	28	12.3		
14	50.6	29	-		
15	47.2	30	20.9		
		Ac	23.1		
			173.2		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Cayaponoside C_{5a}



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 25-Hydroxy-fevicordin A

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{50}O_{12}$: 662.330

Mp: 173–175°C [1]

$[\alpha]_D^{26}$ − 40.4° (c 1.08, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 206 (4.46), 223 (4.26), 280 (3.41) [1]

FAB-MS *m/z*: 661 $[M-H]^-$, 499 $[M-H-162]^-$, 385 [1]

HR-FAB-MS *m/z*: 685.3209 $[M + Na]^+$ [1]

^{1}H NMR (J/Hz): 6.67 (s, H-1), ca 2.66, 2.85 (m, H_2-6), ca 1.95, 2.25 (m, H_2-7), 2.13 (brd, J = 7, H-8), 2.65, 2.90 (d, J = 14, H_2-12), 1.49 (brd, J = 13), 1.95 (m, H_2-15), 4.46 (t, J = 8, H-16), 2.54 (d, J = 7, H-17), 0.95 (s, CH_3-18), 1.31 (s, CH_3-19), 1.37 (s, CH_3-21), 6.79 (d, J = 16, H-23), 6.46 (d, 16, H-24), 1.30 (s, CH_3-26), 1.30 (s, CH_3-27), 2.09 (s, CH_3-28), 1.01 (s, CH_3-30)

β-D-Glcp: 4.57 (d, J = 7, H-1), 3.45–3.49 (H-2, 3, 4), 3.31 (m, H-5), 3.84 (dd, J = 4, 12, Ha-6), 3.95 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR: [1]

Table 1

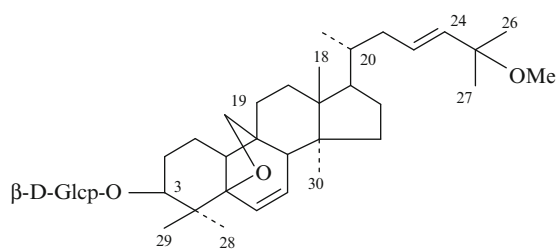
C-1	114.3	C-16	72.6	Glc-1	106.1
2	145.5	17	60.6	2	75.6
3	145.8	18	21.4	3	78.6
4	125.7	19	30.0	4	71.8
5	132.2	20	80.8	5	79.0
6	25.6	21	26.1	6	63.0
7	21.1	22	205.9		
8	44.9	23	122.1		
9	53.0	24	156.2		
10	130.8	25	72.3		
11	217.9	26	30.0		
12	52.7	27	30.0		
13	52.2	28	12.3		
14	50.6	29			
15	47.2	30	20.9		

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2295 (1994)

Momordicoside F_1

CAS Registry Number: 81348-81-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 25-Methoxy-5,19-epoxy-5β-cucurbita-6,23-diene-3β-ol

Biological source: *Momordica charantia* [1]

$C_{37}H_{60}O_8$: 632.428

Mp: 198–203°C (MeOH-H_2O 1:1) [1]

$[\alpha]_D^{28}$ − 111° (c 1.10, MeOH) [1]

CD $[\theta]_{201}^{16}$:−82800° (c, 0.58 × 10^{-4} g/ml, MeOH) [1]

^{1}H NMR (J/Hz): 6.20 (brd, H-6), 3.58 (d, J = 9.0, Hα-19), 3.74 (d, J = 9.0, Hβ-19), 5.59 (brs, H-23), 5.59 (H-24), 0.78, 0.88, 0.92, 1.32, 1.32, 1.50 (s, CH_3 × 6), 3.22 (s, OCH_3)

β-D-Glcp: 4.87 (d, J = 7.0, H-1) [1]

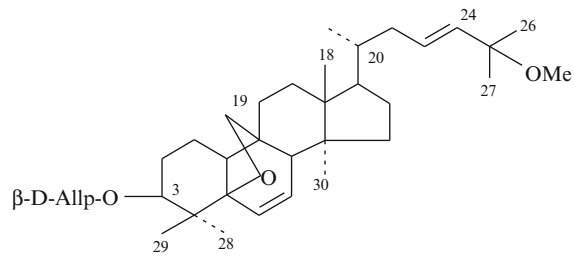
^{13}C NMR (C_5D_5N): Aglycone: 39.0, 45.2, 45.4, 48.8, 52.2, 74.8, 80.0, 85.4, 85.8, 128.3, 129.9, 134.1, 137.6; Sugar: 63.0, 71.7, 75.4, 78.3, 106.8 [1]

References

1. H. Okabe, Y. Miyahara, T. Yamauchi, Chem. Pharm. Bull. **30**, 3977 (1982)

Momordicoside G

CAS Registry Number: 81371-54-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 25-Methoxy-5,19-epoxy-5β-cucurbita-6,23-diene-3β-ol

Biological source: *Momordica charantia* [1]

$C_{37}H_{60}O_8$: 632.428

Mp: 183–187°C [1]

$[\alpha]_D$ − 107.3° (c 1.00, MeOH) [1]

CD $[\theta]_{202}^{16}$: −93200° (c, 0.61 × 10^{-4} g/ml, MeOH) [1]

^{1}H NMR (J/Hz): 3.64 (brs, H-3), 6.20 (dd, J = 10.0, 2.0, H-6), 3.60 (d, J = 8.0, Hα-19), 3.79 (d, J = 8.0, Hβ-19), 5.60 (brs, H-23), 5.60 (H-24), 0.80, 0.90, 1.33, 1.33, 1.47 (s, CH_3 × 5), 3.22 (OCH_3)

β-D-Allp: 5.38 (d, J = 8.0, H-1), 3.93 (dd, J = 8.0, 3.0, H-2), 4.69 (t, J = 3.0, H-3) [1]

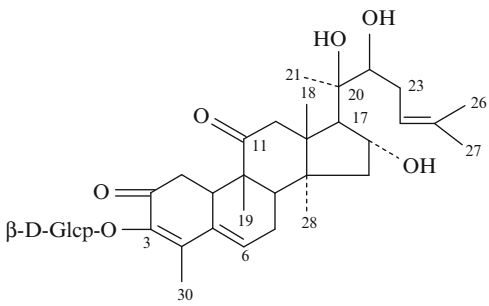
^{13}C NMR (C_5D_5N): Aglycone: 38.9, 45.1, 45.3, 48.7, 52.1, 74.7, 79.9, 84.9, 85.7, 128.0, 129.6, 133.8, 137.3; Sugar: 63.1, 69.0, 72.3, 72.8, 75.8, 103.8 [1]

References

1. H. Okabe, Y. Miyahara, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **30**, 3977 (1982)

Cayaponoside B_{6a}

CAS Registry Number: 151466-42-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 29-Nor-22-hyrdoxy-isocucurbitacin R-3,24-diene

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{52}O_{11}$: 648.350

Mp: 167–172°C [1]

$[\alpha]_D^{26}$ + 43.9° (c 1.01, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 204 (4.16), 300 (4.09) [1]

FAB-MS *m/z*: 648 $[M]^-$, 485 $[M\text{-}H\text{-}162]^-$ [1]

HR-FAB-MS *m/z*: 649.3594 $[M + H]^+$, 487.3060 $[M + H\text{-}162]^+$ [1]

^{1}H NMR (400 MHz, J/Hz): 2.21 (dd, J = 5, 14), 2.38 (t, J = 14, H_2-1), 6.49 (m, H-6), 2.30, 2.60 (m, H_2-7), 2.12 (d, J = 8, H-8), 3.02 (brd, J = 14, H-10), 2.56, 3.18 (d, J = 14, H_2-12), 1.55 (d, J = 13), 1.93 (dd, J = 9, 13, H_2-15), 4.60 (dd, J = 7, 9, H-16), 2.38 (d, J = 7, H-17), 0.97 (s, CH_3-18), 1.11 (s, CH_3-19), 1.23 (s, CH_3-21), ca 3.36 (H-22), 2.13, 2.28 (m, H_2-23), 5.25 (t, J = 7, H-24), 1.70 (s, CH_3-26), 1.62 (s, CH_3-27), 2.15 (s, CH_3-28), 1.31 (s, CH_3-30)

β-D-Glcp: 4.72 (d, J = 7, H-1), 3.31–3.38 (H-2, 3, 4), 3.19 (m, H-5), 3.64 (dd, J = 16, 12, Hα-6), 3.81 (dd, J = 2, 12, Hβ-6) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	40.7	C-16	72.9	Glc-1	104.8
2	197.1	17	57.4	2	76.5
3	147.1	18	21.2	3	79.0
4	134.4	19	20.6	4	72.1
5	145.8	20	77.7	5	79.1
6	132.7	21	24.5	6	63.5
7	26.8	22	82.9		
8	44.5	23	32.0		
9	50.4	24	124.2		
10	37.8	25	134.3		
11	216.2	26	26.8		
12	51.2	27	18.9		
13	53.0	28	14.4		
14	50.4	29			
15	46.7	30	19.5		

(*continued*)

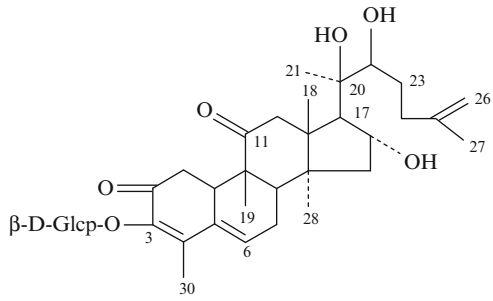
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus (EBV) activation induced by the tumor promoter 12-O-tetra-decanoylphorbol 13-acetate (TPA) [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2301 (1994)

Cayaponoside B_{6b}

CAS Registry Number: 151466-43-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 29-Nor-22-hyrdoxy-isocucurbitacin R-3,25-diene

Biological source: *Cayaponia tayuya* [1]
$C_{35}H_{52}O_{11}$: 648.350
Mp: 165–170°C [1]
$[\alpha]_D^{26}$ + 50.3° (c 1.16, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 204 (4.07), 300 (4.12) [1]
FAB-MS *m/z*: 648 $[M]^-$, 485 $[M\text{-}H\text{-}162]^-$, 385 [1]
HR-FAB-MS *m/z*: 671.3400 $[M + Na]^+$, 649.3587 $[M + H]^+$, 487.3048 $[M + H\text{-}C_6H_{10}O_5]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, CD_3OD): 2.20 (dd, J = 5, 14), 2.37 (t, J = 14, H_2-1), 6.48 (m, H-6), 2.27, 2.60 (m, H_2-7), 2.12 (d, J = 8, H-8), 3.02 (brd, J = 14, H-10), 2.56, 3.19 (d, J = 14, H_2-12), 1.54 (d, J = 13), 1.92 (dd, J = 9, 13, H_2-15), 4.60 (dd, J = 7, 9, H-16), 2.36 (d, J = 7, H-17), 0.97 (s, CH_3-18), 1.11 (s, CH_3-19), 1.21 (s, CH_3-21), ca 3.38 (H-22), ca 1.5, 1.75 (m, H_2-23), 2.05, ca 2.77 (m, H_2-24), 4.70 (brs, H_2-26), 1.72 (s, CH_3-27), 2.15 (s, CH_3-28), 1.30 (s, CH_3-30)
β-D-Glcp: 4.72 (d, J = 7, H-1), 3.31–3.38 (H-2, 3, 4), 3.19 (m, H-5), 3.64 (dd, J = 16, 12, Hα-6), 3.81 (dd, J = 2, 12, Hβ-6) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

C-1	40.6	C-13	53.0	C-25	147.1	Glc-1	104.8
2	197.1	14	50.4	26	111.4	2	76.5
3	147.1	15	46.8	27	23.4	3	79.0
4	134.3	16	72.8	28	14.4	4	72.1
5	145.9	17	57.5	29		5	79.1
6	132.6	18	21.2	30	19.5	6	63.5
7	26.8	19	20.6				
8	44.5	20	77.7				
9	50.4	21	24.3				
10	37.7	22	81.8				
11	216.2	23	31.3				
12	51.2	24	37.1				

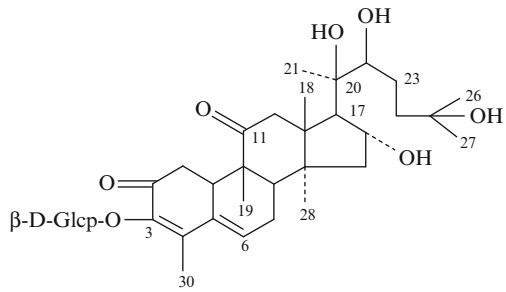
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus (EBV) activation induced by the tumor promoter 12-O-tetra-decanoylphorbol 13-acetate (TPA) [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2301 (1994)

Cayaponoside D_{3b}

CAS Registry Number: 151466-46-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 29-Nor-22,25-hydroxy-isocucurbitacin R-3-ene
Biological source: *Cayaponia tayuya* [1]
$C_{35}H_{54}O_{12}$: 666.361
Mp: 171–175°C [1]
$[\alpha]_D^{26}$ + 36.9° (c 1.53, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 205 (3.88), 300 (4.07) [1]
FAB-MS *m/z*: 666 $[M]^-$, 503 $[M\text{-}H\text{-}162]^-$, 385 [1]
HR-FAB-MS *m/z*: 689.3529 $[M + Na]^+$, 667.3691 $[M + H]^+$ [1]
^{1}H NMR (400 MHz, J/Hz): 2.21 (dd, J = 5, 15), 2.38 (t, J = 15, H_2-1), 6.49 (m, H-6), 2.31 (brdd, J = 5, 21), 2.62 (m, H_2-7), 2.12 (d, J = 9, H-8), 3.10 (brd, J = 14, H-10), 2.56, 3.19 (dd, J = 14, H_2-12), 1.54 (d, J = 13), 1.92 (dd, J = 9, 13, H_2-15), 4.60 (dd, J = 7, 9, H-16), 2.39 (d, J = 7, H-17), 0.97 (s, CH_3-18), 1.11 (s, CH_3-19), 1.22 (s, CH_3-21), 3.30 (H-22), 1.45 (m, H_2-23), 1.45, 1.80 (m, H_2-24), 1.18 (s, CH_3-26), 1.19 (s, CH_3-27), 2.15 (s, CH_3-28), 1.31 (s, CH_3-30)
β-D-Glcp: 4.72 (d, J = 7, H-1), 3.31–3.38 (H-2, 3, 4), 3.19 (m, H-5), 3.64 (dd, J = 16, 12, Ha-6), 3.81 (dd, J = 2, 12, Hb-6) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

C-1	40.6	C-16	72.9	Glc-1	104.8
2	197.1	17	57.5	2	76.5
3	147.1	18	21.3	3	79.0
4	134.3	19	20.6	4	72.1

(*continued*)

Table 1 (continued)

5	145.8	20	77.9	5	79.1
6	132.6	21	24.3	6	63.5
7	26.8	22	82.9		
8	44.5	23	27.8		
9	50.4	24	43.3		
10	37.8	25	72.1		
11	216.2	26	30.0		
12	51.2	27	30.3		
13	53.0	28	14.4		
14	49.9	29			
15	46.7	30	19.5		

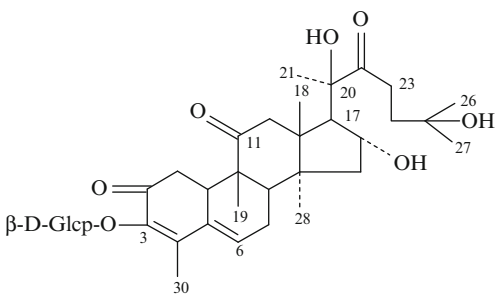
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus (EBV) activation induced by the tumor promoter 12-O-tetra-decanoylphorbol 13-acetate (TPA) [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2301 (1994)

Cayaponoside C_3

CAS Registry Number: 151466-44-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 29-Nor-25-hydroxy-isocucurbitacin R-3-ene

Biological source: *Cayaponia tayuya* [1]

$C_{35}H_{52}O_{12}$: 664.345

Mp: 163–168°C [1]

$[\alpha]_D^{25}$ + 26.5° (c 1.35, MeOH) [1]

UV λ_{max}^{MeOH} nm (log ε): 204 (3.97), 300 (4.06) [1]

FAB-MS *m/z*: 663 $[M-H]^-$, 501 $[M-H-162]^-$, 385 [1]

HR-FAB-MS *m/z*: 687.3352 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz): 2.23 (dd, J = 5, 14), 2.38 (t, J = 14, H_2-1), 6.48 (m, H-6), 2.29 (brdd, J = 8, 22), 2.60 (m, H_2-7), 2.10 (d, J = 8, H-8), 3.02 (brd, J = 14, H-10), 2.58, 3.27 (d, J = 15, H_2-12), 1.43 (d, J = 13), 1.88 (dd, J = 9, 13, H_2-15), 4.44 (dd, J = 7, 9, H-16), 2.55 (d, J = 7, H-17), 0.93 (s, CH_3-18), 1.11 (s, CH_3-19), 1.37 (s, CH_3-21), 2.72, 2.85 (ddd, J = 6, 10, 18, H_2-23), 1.72 (m, H_2-24), 1.18 (s, CH_3-26), 1.18 (s, CH_3-27), 2.15 (s, CH_3-28), 1.30 (s, CH_3-30)

β-D-Glcp: 4.72 (d, J = 7, H-1), 3.31–3.38 (H-2, 3, 4), 3.19 (m, H-5), 3.64 (dd, J = 16, 12, Ha-6), 3.81 (dd, J = 2, 12, Hb-6) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	40.7	C-16	72.2	Glc-1	104.8
2	197.1	17	60.2	2	76.5
3	147.1	18	21.4	3	79.0
4	134.3	19	20.7	4	72.1
5	145.8	20	81.6	5	79.1
6	132.6	21	26.4	6	63.5
7	26.7	22	218.0		
8	44.6	23	33.9		
9	50.6	24	39.0		
10	37.8	25	71.6		
11	215.8	26	30.2		
12	50.8	27	30.0		
13	52.4	28	14.4		
14	50.4	29			
15	47.7	30	19.7		

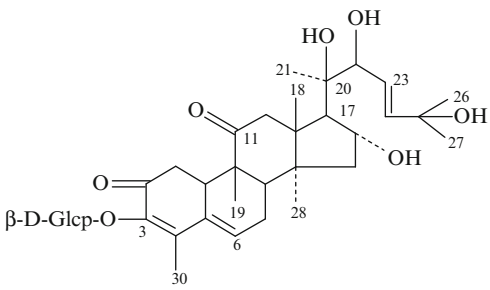
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus (EBV) activation induced by the tumor promoter 12-O-tetra-decanoylphorbol 13-acetate (TPA) [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2301 (1994)

Cayaponoside D_{3a}

CAS Registry Number: 151466-45-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – 29-Nor-25-hydroxy-isocucurbitacin R-3,23-diene
Biological source: *Cayaponia tayuya* [1]
$C_{35}H_{52}O_{12}$: 664.345
Mp: 170–173°C [1]
$[\alpha]_D^{26}$ + 30.3° (c 1.25, MeOH) [1]
UV λ_{max}^{MeOH} nm (log ε): 203 (3.93), 300 (4.04) [1]
FAB-MS *m/z*: 664 $[M]^-$, 501 $[M\text{-}H\text{-}162]^-$, 385 [1]
HR-FAB-MS *m/z*: 687.3357 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, CD_3OD): 2.19 (dd, J = 5, 14), 2.38 (t, J = 14, H_2-1), 6.48 (m, H-6), 2.31 (brdd, J = 6, 20), 2.61 (m, H_2-7), 2.11 (d, J = 8, H-8), 3.00 (brd, J = 14, H-10), 2.53, 3.15 (dd, J = 14, H_2-12), 1.54 (d, J = 14), 1.93 (dd, J = 10, 14, H_2-15), 4.64 (dd, J = 7, 10, H-16), 2.37 (d, J = 7, H-17), 0.96 (s, CH_3-18), 1.11 (s, CH_3-19), 1.22 (s, CH_3-21), 3.96 (d, J = 6, H-22), 5.77 (dd, J = 6, 16, H-23), 5.85 (d, J = 16, H-24), 1.27 (s, CH_3-26), 1.27 (s, CH_3-27), 2.14 (s, CH_3-28), 1.28 (s, CH_3-30)
β-D-Glcp: 4.72 (d, J = 7, H-1), 3.31–3.38 (H-2, 3, 4), 3.19 (m, H-5), 3.64 (dd, J = 16, 12, Ha-6), 3.81 (dd, J = 2, 12, Hb-6) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

C-1	40.6	C-16	73.0	Glc-1	104.8
2	197.1	17	57.4	2	76.5
3	147.1	18	21.1	3	79.0
4	134.3	19	20.5	4	72.1
5	145.8	20	77.9	5	79.1
6	132.7	21	25.1	6	63.5
7	26.8	22	82.7		
8	44.5	23	127.0		
9	50.4	24	142.4		
10	37.8	25	72.0		
11	216.3	26	30.9		
12	51.0	27	30.7		
13	53.1	28	14.4		
14	50.1	29			
15	46.6	30	19.5		

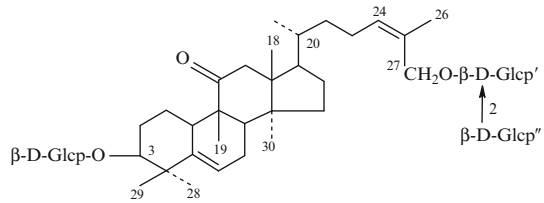
Pharm./Biol.: Inhibitory effect on Epstein-Barr Virus (EBV) activation induced by the tumor promoter 12-O-tetra-decanoylphorbol 13-acetate (TPA) [1]

References

1. E. Himeno, T. Nagao, J. Honda, H. Okabe, N. Irino, T. Nakasumi, Chem. Pharm. Bull. **42**(11), 2301 (1994)

Scandenoside R_5

CAS Registry Number: 114637-78-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Carnosiflogenin B
Biological source: *Hemsleya panacis-scandens* [1]
$C_{48}H_{78}O_{18}$: 942.518
$[\alpha]_D^{23}$ + 59.7° (c 0.39, MeOH) [1]
IR (nujol) ν_{max} cm^{-1}: 3400, 1680 (C = 0) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.90 (d, J = 7, H-1 of Glc), 4.82 (d, J = 7, H-1 of Glc′), 5.28 (d, J = 8, H-1 of Glc″) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	21.8	C-16	28.0	Glc-1	107.2	Glc″-1	106.2
2	28.3	17	49.6	2	75.4	2	76.7
3	87.1	18	16.9	3	78.4	3	78.1
4	41.9	19	20.2	4	71.5	4	71.5
5	141.2	20	35.9	5	78.1	5	78.1
6	118.4	21	18.1	6	62.7	6	62.7
7	24.0	22	36.7	Glc′-1	101.3		
8	43.9	23	24.8	2	83.7		
9	49.0	24	130.0	3	78.4		
10	35.9	25	132.2	4	71.3		
11	213.7	26	21.8	5	78.1		
12	48.8	27	67.2	6	62.7		
13	49.0	28	18.4				
14	49.6	29	28.3				
15	34.5	30	25.8				

References

1. R. Kasai, K. Matsumoto, R.-L. Nie, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **36**(1), 234 (1988)

Momordicoside A

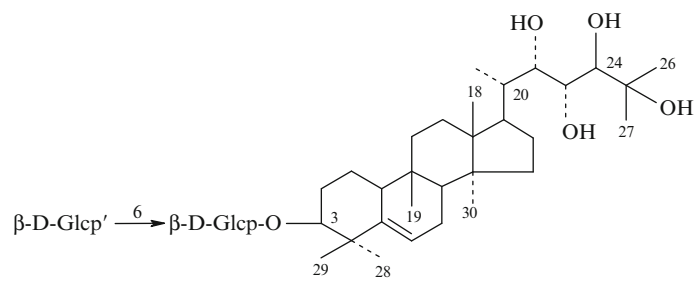
CAS Registry Number: 75801-95-5
See Figure Momordicoside A
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Cucurbita-5-ene-3β,22(S),23(R),24(R),25-pentaol
Biological source: *Momordica charantia* [1]
$C_{42}H_{72}O_{15}$: 816.487
Mp: 181–187°C (MeOH) [1]
$[\alpha]_D^{20}$ + 1.05° (c 0.96, $CHCl_3$-MeOH (2:1)) [1]
FAB-MS *m/z*: 839 $(M + Na)^+$, 855 $(M + K)^+$ [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-3	87.27	Glc-1	105.16	Glc′-1	106.91
4	49.12	2	75.24	2	75.14
5	143.27	3	78.41	3	78.41
6	118.66	4	71.63	4	71.19
9	46.78	5	77.33	5	78.47
13	41.66	6	70.12	6	62.72
14	34.7				
24	72.41				
25	74.41				

References

1. H. Okabe, Y. Miyahara, T. Yamauchi, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **28**, 2753 (1980)



Momordicoside A

Momordicoside B

CAS Registry Number: 75799-04-1

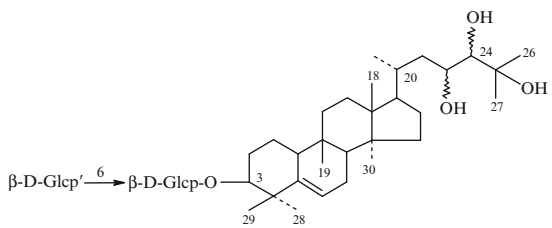
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Cucurbita-5-ene-3β,22(S),23(R),24(R),25-pentaol
Biological source: *Momordica charantia* [1]
$C_{47}H_{80}O_{19}$: 948.529
Mp: 238–242°C [1]
$[\alpha]_D^{20}$ + 6.15° (c 0.98, $CHCl_3$-MeOH (2:1)) [1]
FD-MS *m/z*: 971 $(M + Na)^+$ [1]
^{13}C NMR (C_5D_5N): olefinic carbons: 142.85(s), 118.48 (d); oxygen-bearning carbons: 106.58 (d), 104.82 (d), 87.19 (d), 79.98 (d), 79.51, 78.10 (d), 76.11, 74.94 (s), 74.71, 72.25, 71.48, 71.07, 70.66, 68.38, 67.38, 62.64 (t); quaternary carbons: 49.04, 46.70, 41.60, 34.63 [1]

References

1. H. Okabe, Y. Miyahara, T. Yamauchi, K. Miyahara, T. Kawasaki, Chem. Pharm. Bull. **28**, 2753 (1980)

Momordicoside C

CAS Registry Number: 78887-72-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Cucurbita-5-ene-3β,23,24,25-tetraol
Biological source: *Momordica charantia* [1]
$C_{42}H_{72}O_{14}$: 800.492
Mp: 224–227°C (MeOH-H_2O) [1]
$[\alpha]_D^{20}$ + 13.9° (c 1.15, MeOH) [1]
FD-MS *m/z*: 823 $(M + Na)^+$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.80, 0.86, 0.86, 1.05, 1.48, 1.69, 1.73 (s, CH_3 × 7) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

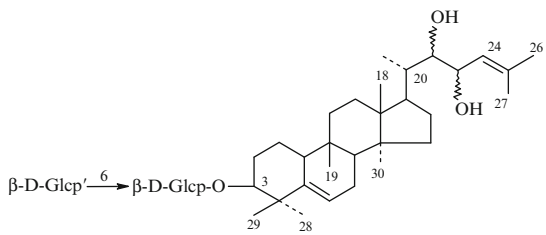
C-3	87.4	Glc-1	105.3	Glc′-1	107.0
4	49.5	2	77.4	2	77.4
5	143.3	3	78.6	3	78.6
6	118.7	4	71.7	4	71.7
9	46.6	5	75.2	5	75.2
13	41.8	6	70.3	6	62.81
14	34.7				
23	71.01				
24	79.8				
25	74.5				

References

1. Y. Miyahara, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **29**, 1561 (1981)

Momordicoside D

CAS Registry Number: 78887-73-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Cucurbita-5,24-diene-3β,22,23-triol
Biological source: *Momordica charantia* [1]
$C_{42}H_{70}O_{13}$: 782.481
Mp: 199–203°C (CH_3CN-H_2O) [1]
$[\alpha]_D^{20}$ − 1.26° (c 1.59, MeOH-$CHCl_3$ (2:1)) [1]
FD-MS *m/z*: 805 $(M + Na)^+$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.85, 0.85, 0.90, 1.05, 1.51, 1.73, 1.76 (s, CH_3 × 7), 1.28 (CH_3-21) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

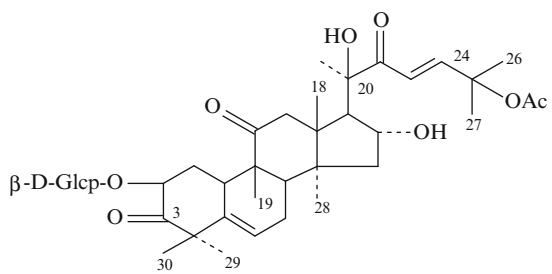
C-3	87.4	Glc-1	105.3	Glc′-1	107.0
4	49.1	2	77.3	2	77.3
5	143.2	3	78.5	3	78.5
6	118.7	4	71.6	4	71.6
9	46.7	5	75.2	5	75.2
13	41.7	6	70.2	6	62.7
14	34.7				
22	76.3				
23	68.0				
24	128.1				
25	133.0				

References

1. Y. Miyahara, H. Okabe, T. Yamauchi, Chem. Pharm. Bull. **29**, 1561 (1981)

Arvenin I

CAS Registry Number: 65247-27-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Cucurbitacin B

Biological source: *Anagallis arvensis* [1]

$C_{38}H_{56}O_{13}$: 720.372

Mp: 141–146°C [1]

$[\alpha]_D^{20}$ + 40.6° (c 1.6, EtOH) [1]

UV λ_{max}^{EtOH} nm (ε): 228 (10900) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1720, 1690, 1630 [1]

^{1}H NMR (100 MHz, J/Hz, $CDCl_3$): 5.75 (m, H-6), 0.96 (CH_3-18), 1.07 (CH_3-19), 1.27 (CH_3-26, 27), 6.52 (d, J = 16, H-23), 7.02 (d, J = 16, H-24), 1.35 (CH_3-28), 1.56 (CH_3-21), 1.44 (CH_3-29), 1.54 (CH_3-30), 2.02 (CH_3COO) [1]

^{13}C NMR (15 MHz, C_5D_5N): [1]

Table 1

C-1	35.0	C-16	70.8	Glc-1	104.0
2	78.2	17	59.6	2	75.6
3	211.3	18	21.8	3	78.2
4	48.5	19	20.4	4	71.4
5	140.8	20	79.8	5	78.2
6	120.4	21	19.9	6	62.6
7	24.2	22	204.0		
8	42.9	23	122.5		
9	48.9	24	150.0		
10	34.4	25	79.8		
11	212.7	26	26.3		
12	49.1	27	26.6		
13	51.0	28	25.3		
14	51.5	29	28.7		
15	46.1	30	18.9		
		$OCOCH_3$	169.7		
			21.8		

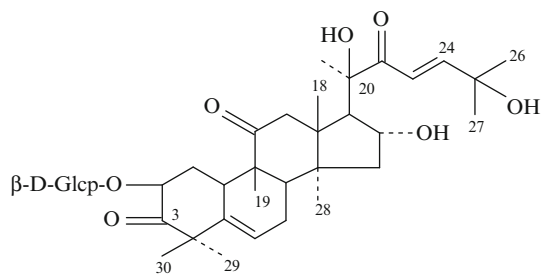
Pharm./Biol.: Show remarkable bitterness [1]

References

1. Y. Yamada, K. Hagiwara, K. Iguchi, S. Suzuki, H.-Y. Hsu, Chem. Pharm. Bull. **26**(10), 3107 (1978)

Arvenin III

CAS Registry Number: 65597-45-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Cucurbitacin D

Biological source: *Anagallis arvensis* [1]
$C_{36}H_{54}O_{12}$: 678.361
Mp: 169–170°C [1]
$[\alpha]_D$ + 16.7° (c 0.6, EtOH) [1]
UV λ_{max}^{EtOH} nm (ε): 228 (8700) [1]
IR (KBr) ν_{max} cm^{-1}: 3370, 1720, 1690, 1630 [1]
^{1}H NMR (100 MHz, J/Hz, CD_3OD): 0.98 (s, CH_3-18), 1.10 (s, CH_3-19), 1.34 (CH_3-21), 1.38 (s, CH_3-26, 28, 29), 1.46 (s, CH_3-27, 30), 5.85 (1H, m, H-6), 6.82 (d, J = 15, H-23), 6.97 (d, J = 15, H-24) [1]
^{13}C NMR (15 MHz, C_5D_5N): [1]

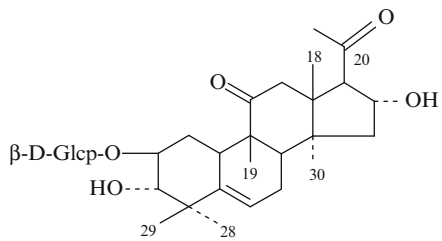
Table 1

C-1	35.0	C-16	70.5	Glc-1	104.1
2	78.0	17	59.0	2	75.6
3	211.3	18	21.8	3	78.3
4	48.7	19	20.3	4	71.5
5	140.9	20	79.1	5	78.3
6	120.5	21	19.9	6	62.7
7	24.2	22	204.0		
8	42.8	23	120.8		
9	48.9	24	155.5		
10	34.4	25	70.3		
11	212.6	26	29.7		
12	49.2	27	29.7		
13	51.1	28	25.4		
14	51.5	29	28.9		
15	46.7	30	18.9		

References

1. Y. Yamada, K. Hagiwara, K. Iguchi, S. Suzuki, H.-Y. Hsu, Chem. Pharm. Bull. **26**(10), 3107 (1978)

Perseapicroside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Hexa-nor-cucurbitacin F
Biological source: *Persea mexicana* [1]
$C_{30}H_{46}O_{10}$: 566.309
Mp: 204–206°C [1]
$[\alpha]_D$ + 100° (c 0.1, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1680 [1]
UV λ_{max} nm (log ε): 208.5 (4.59) [1]
FAB-MS *m/z*: 567 $[M + H]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 2.36, 1.46 (ddd, J = 13.0, 4.4, H_2-1), 4.25 (ddd, J = 13.0, 10.4, H-2), 3.40 (d, J = 10.0, H-3), 5.72 (brd, J = 6.0, H-6), 2.38 (ddd, J = 20.0, 9.0, 6.0, H-7), 1.96 (dd, J = 20.0, 6.0, H-7), 1.88 (d, J = 9.0, H-8), 2.70 (brd, J = 14.0, H-10), 3.34, 2.58 (each d, J = 14.0, H_2-12), 1.81, 1.90 (d, J = 14.0, H_2-15), 5.32 (ddd, J = 8.0, 8.0, 2.0, H-16), 3.48 (d, J = 6.0, H-17), 0.79, 1.22, 2.17, 1.54, 1.21, 1.46 (s, CH_3-18, 19, 21, 28, 29, 30)
β-D-Glcp: 5.18 (d, J = 8.0, H-1), 4.12 (dd, J = 10.0, 8.0, H-2), 4.22 (dd, J = 10.0, 8.0, H-3), 4.27 (dd, J = 8.0, 8.0, H-4), 3.94 (ddd, J = 8.0, 6.0, 2.0, H-5), 4.42, 4.54 (dd, J = 12.2, 12.6, H_2-6) [1]
^{13}C NMR (75.5 MHz, CD_3OD): [1]

Table 1

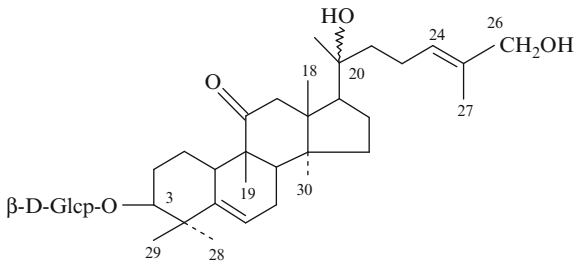
C-1	33.8	C-16	71.61	Glc-1	107.14
2	78.68	17	67.88	2	76.23
3	93.76	18	19.87	3	78.68
4	42.50	19	20.30	4	71.37
5	141.86	20	208.55	5	78.50
6	119.18	21	31.64	6	62.80
7	24.22	28	25.26		
8	43.34	29	23.32		
9	50.39	30	19.16		
10	34.02				
11	211.86				
12	47.39				
13	48.99				
14	49.15				
15	46.00				

References

1. A. Ohsaki, T. Kubota, Y. Asaka, Phytochemistry **29**, 1330 (1990)

Scandenoside R_1

CAS Registry Number: 114637-76-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Scandenogenin A

Biological source: *Hemsleya panacis-scandens* [1]

$C_{36}H_{58}O_9$: 634.408

$[\alpha]_D^{24}$ + 83.8° (c 0.68, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3350, 1680 (C = 0) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.76 (d, J = 7.0, H-1 of Glc) [1]

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 3.47 (t-like, J = 6.0, H-3), 5.67 (brd, J = 6.0, H-6), 2.54, 2.96 (d, J = 14.3, H_2-12), 0.93 (s, CH_3-18), 1.03 (s, CH_3-19), 1.29 (s, CH_3-21), 5.39 (t, J = 7.0, H-24), 3.99 (s, CH_3-26), 1.67 (s, CH_3-27), 1.05 (s, CH_3-28), 1.12 (s, CH_3-29), 1.17 (s, CH_3-30) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

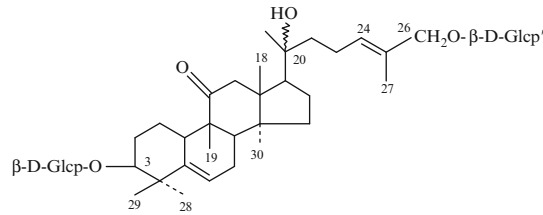
C-1	21.9	C-11	214.1	C-21	25.8	Glc-1	106.9
2	28.3	12	49.1	22	45.0	2	75.2
3	87.3	13	50.1	23	23.1	3	78.2
4	41.8	14	49.1	24	125.0	4	71.4
5	141.1	15	34.5	25	135.8	5	77.8
6	118.5	16	21.9	26	67.9	6	62.5
7	24.2	17	51.0	27	13.8		
8	43.2	18	19.0	28	18.3		
9	48.9	19	20.2	29	28.3		
10	36.0	20	73.8	30	26.3		

References

1. R. Kasai, K. Matsumoto, R.-L. Nie, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **36**(1), 234 (1988)

Scandenoside R_3

CAS Registry Number: 114637-77-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Scandenogenin A

Biological source: *Hemsleya panacis-scandens* [1]

$C_{42}H_{68}O_{14}$: 796.460

$[\alpha]_D^{24}$ + 48.0° (c 0.97, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3350, 1680 (C = 0) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): anomeric: 4.79 (d, J = 8.0, H-1 of Glc), 4.82 (d, J = 7.0, H-1 of Glc′) [1]

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 3.47 (t, like, J = 6.0, H-3), 5.67 (brd, J = 6.7, H-6), 2.54, 2.96 (d, J = 14.0, H_2-12), 0.93 (s, CH_3-18), 1.03 (s, CH_3-19), 1.29 (d, J = 6.5, H-21), 5.39 (t, J = 6.5, H-24), 3.99 (s, CH_3-26), 1.67 (s, CH_3-27), 1.05 (s, CH_3-28), 1.12 (s, CH_3-29), 1.17 (s, CH_3-30) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

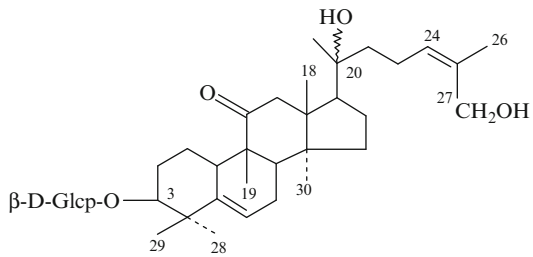
C-1	22.1	C-16	22.1	Glc-1	107.2
2	28.3	17	51.4	2	75.1
3	87.3	18	19.0	3	78.5
4	41.9	19	20.2	4	71.7
5	141.2	20	73.8	5	78.1
6	118.5	21	25.9	6	62.8
7	24.0	22	44.6	Glc′-1	103.4
8	43.3	23	23.1	2	75.1
9	48.8	24	128.6	3	78.5
10	35.9	25	132.2	4	71.7
11	214.0	26	75.4	5	78.3
12	49.0	27	14.2	6	62.8
13	50.2	28	18.3		
14	49.3	29	28.3		
15	34.4	30	26.3		

References

1. R. Kasai, K. Matsumoto, R.-L. Nie, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **36**(1), 234 (1988)

Scandenoside R_2

CAS Registry Number: 114715-44-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Scandenogenin B

Biological source: *Hemsleya panacis-scandens* [1]

$C_{36}H_{58}O_9$: 634.408

$[\alpha]_D^{24}$ + 86.0° (c 0.8, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3400, 1680 (C = 0) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.68 (d, J = 7.0, H-1 of Glc) [1]

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 3.47 (t, like, J = 6.0, H-3), 5.67 (brd, J = 6.0, H-6), 2.52, 2.96 (d, J = 14.0, H_2-12), 1.27 (s, CH_3-21), 5.28 (t, J = 7.0, H-24), 1.78 (s, CH_3-26), 4.08, 4.16 (d, J = 12.0, H_2-27), 0.9 (s, CH_3-18), 1.02 (s, CH_3-19), 1.04 (s, CH_3-28), 1.11 (s, CH_3-29), 1.16 (s, CH_3-30) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	22.0	C-16	22.0	Glc-1	107.1
2	28.3	17	51.9	2	75.3
3	87.1	18	19.1	3	78.5
4	41.9	19	20.2	4	71.5
5	141.1	20	73.8	5	78.0
6	118.5	21	25.8	6	62.8
7	24.0	22	45.3		
8	43.2	23	23.1		
9	49.8	24	127.2		
10	35.9	25	136.1		
11	214.0	26	20.2		
12	49.2	27	60.7		
13	50.1	28	18.4		
14	49.2	29	28.3		
15	34.2	30	26.3		

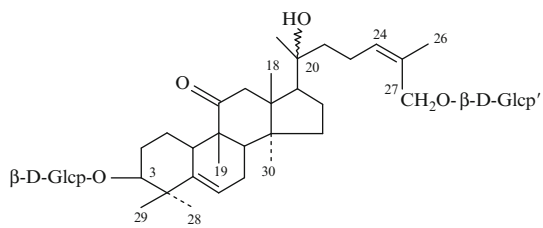
(*continued*)

References

1. R. Kasai, K. Matsumoto, R.-L. Nie, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **36**(1), 234 (1988)

Scandenoside R_4

CAS Registry Number: 114715-45-6



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Scandenogenin B

Biological source: *Hemsleya panacis-scandens* [1]

$C_{42}H_{68}O_{14}$: 796.460

$[\alpha]_D^{24}$ + 69.7° (c 0.75, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3350, 1680 (C = 0) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.72 (d, J = 8.0, H-1 of Glc), 4.52 (d, J = 8.0, H-1 of Glc′)

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 3.47 (t, like, J = 6.0, H-3), 5.67 (brd, J = 6.0, H-6), 2.52, 2.96 (d, J = 14.0, H_2-12), 1.27 (s, CH_3-21), 5.28 (t, J = 7.0, H-24), 1.78 (s, CH_3-26), 4.08, 4.16 (d, J = 12.0, H_2-27), 0.90 (s, CH_3-18), 1.02 (s, CH_3-19), 1.04 (s, CH_3-28), 1.11 (s, CH_3-29), 1.16 (s, CH_3-30) [1]

^{13}C NMR (C_5D_5N):

Table 1

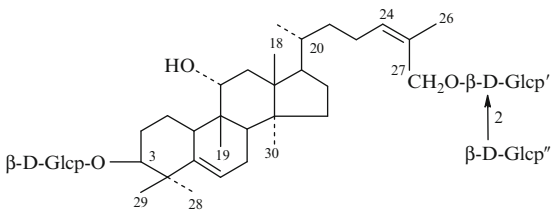
C-1	21.9	C-16	21.9	Glc-1	107.1
2	28.3	17	51.5	2	75.2
3	87.1	18	19.1	3	78.4
4	41.9	19	20.2	4	71.7
5	141.1	20	73.8	5	78.1
6	118.5	21	25.8	6	62.8
7	23.7	22	45.3	Glc′-1	102.4
8	43.2	23	23.0	2	74.9
9	48.7	24	130.9	3	78.4
10	35.9	25	131.8	4	71.7
11	214.0	26	20.2	5	78.1
12	49.1	27	66.8	6	62.8
13	50.1	28	18.3		
14	49.1	29	28.3		
15	34.4	30	26.1		

References

1. R. Kasai, K. Matsumoto, R.-L. Nie, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **36**(1), 234 (1988)

Scandenoside R_6

CAS Registry Number: 114637-79-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Scandenogenin C

Biological source: *Hemsleya panacis-scandens* [1]

$C_{48}H_{80}O_{18}$: 944.534

$[\alpha]_D^{22}$ + 15.9° (c 0.76, MeOH) [1]

IR (nujol) ν_{max} cm^{-1}: 3400, 1640, 1165 (C = C) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 4.84 (d, J = 8.0, H-1 of Glc), 5.22 (d, J = 8.0, H-1 of Glc′), 4.77 (d, = J = 8, H-1 of Glc″) [1]

^{1}H NMR (270 MHz, J/Hz, $CDCl_3$): 3.46 (t-like, J = 6.0, H-3), 5.56 (brd, J = 6.0, H-6), 3.93 (dd, J = 7.7, H-11), 0.93 (d, J = 6.0, CH_3-21), 5.28 (d, J = 7.0, H-24), 1.79 (brs, CH_3-26), 4.13 (brs, H_2-27), 0.82 (s, CH_3-18), 0.87 (s, CH_3-19), 1.06 (s, CH_3-28), 1.12 (s, CH_3-29), 1.15 (s, CH_3-30) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

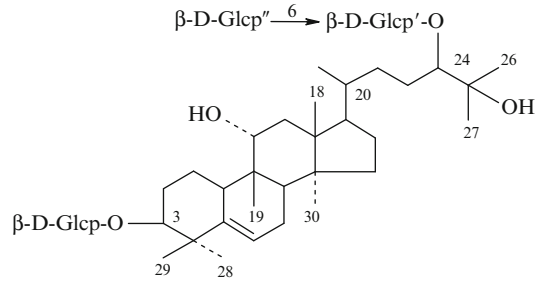
C-1	26.2	C-16	28.3	Glc-1	107.1	Glc″-1	106.0
2	28.3	17	50.7	2	75.4	2	76.6
3	87.8	18	16.9	3	78.4	3	78.4
4	42.3	19	26.7	4	71.4	4	71.2
5	144.2	20	36.1	5	78.0	5	78.0
6	118.4	21	18.7	6	62.9	6	62.4
7	25.0	22	36.9	Glc′-1	101.2		
8	43.5	23	25.0	2	83.4		
9	40.0	24	130.2	3	78.4		
10	36.7	25	132.0	4	71.7		
11	77.9	26	21.9	5	78.0		
12	41.0	27	67.3	6	62.6		
13	47.3	28	19.3				
14	49.7	29	27.6				
15	34.5	30	26.2				

References

1. R. Kasai, K. Matsumoto, R.-L. Nie, J. Zhou, O. Tanaka, Chem. Pharm. Bull. **36**(1), 234 (1988)

Mogroside III

CAS Registry Number: 130567-83-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Mogrol

Biological source: *Siraitia grosvenorii* [1]
$C_{48}H_{82}O_{19}$: 962.545
$[\alpha]_D^{20}$ + 2.5° (c 0.36, MeOH) [1]
IR (Nujol) ν_{max} cm^{-1}: 3400, 1640, 890 [1]
FAB-MS *m/z*: 985.5344 $[M + Na]^+$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 4.84 (d, J = 7.7, H-1) [1]
β-D-Glcp′: 4.86 (d, J = 7.9, H-1); β-D-Glcp″: 4.80 (d, J = 7.5, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

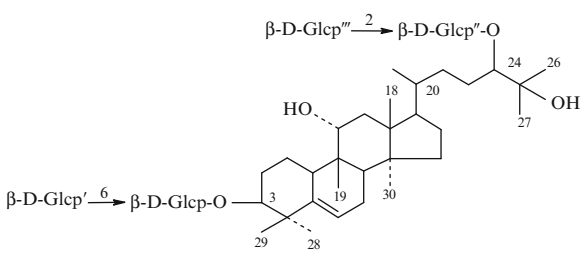
Table 1

C-1	26.2	C-16	28.2	Glc-1	107.4	Glc″-1	106.3
2	29.5	17	51.1	2	75.5	2	75.5
3	87.9	18	17.1	3	78.5	3	78.7
4	42.4	19	26.7	4	71.5	4	71.8
5	144.2	20	36.2	5	78.1	5	78.6
6	118.5	21	18.8	6	63.1	6	62.5
7	24.6	22	33.1	Glc′-1	104.8		
8	43.5	23	27.5	2	75.1		
9	40.1	24	92.8	3	78.1		
10	36.9	25	72.7	4	72.1		
11	77.8	26	24.2	5	76.4		
12	41.1	27	26.3	6	70.4		
13	47.4	28	19.3				
14	49.7	29	27.7				
15	34.6	30	26.3				

References

1. K. Matsumoto, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **38**(7), 2030 (1990)

Mogroside IV



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Mogrol
Biological source: *Siraitia grosvenorii* [1]
$C_{54}H_{92}O_{24}$: 1124.597
$[\alpha]_D^{22}$ −5.8° (c 1.04, MeOH) [1]
IR (Nujol) ν_{max} cm^{-1}: 3400, 1640, 890 [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): β-D-Glcp: 5.34 (d, J = 7.7, H-1) [1]
β-D-Glcp′: 5.17 (d, J = 7.9, H-1); β-D-Glcp″: 5.09 (d, J = 7.7, H-1); β-D-Glcp‴: 4.82 (d, J = 7.9, H-1) [1]
^{13}C NMR (400 MHz, C_5D_5N): [1]

Table 1

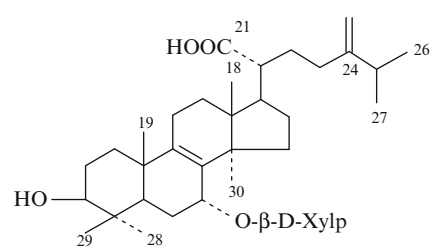
C-1	26.2	C-16	28.2	Glc-1	107.0
2	29.5	17	51.1	Glc′-1	106.4
3	87.9	18	17.1	Glc″-1	105.5
4	42.4	19	26.7	Glc‴-1	101.8
5	144.2	20	36.2		
6	118.5	21	18.8		
7	24.6	22	33.1		
8	43.5	23	27.5		
9	40.1	24	92.8		
10	36.9	25	72.7		
11	77.8	26	24.2		
12	41.1	27	26.3		
13	47.4	28	19.3		
14	49.7	29	27.7		
15	34.6	30	26.3		

References

1. K. Matsumoto, R. Kasai, K. Ohtani, O. Tanaka, Chem. Pharm. Bull. **38**(7), 2030 (1990)

Laetiposide E

CAS Registry Number: 309751-39-1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Mogrol
Biological source: *Laetiporus versisporus* [1]
$C_{36}H_{58}O_8$: 618.413
Mp: 218–220°C [1]
$[\alpha]_D^{25}$ + 9.1° (c 0.3, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1700, 1060 [1]
FAB-MS *m/z*: 617 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.13 (dd, J = 11.0, 4.4, H-3), 4.62 (brs, H-7), 0.99 (s, CH_3-18), 0.99 (s, CH_3-19), 1.00 (d, J = 6.2, CH_3-26), 1.00 (d, J = 6.2, CH_3-27), 1.48 (s, CH_3-28), 1.10 (s, CH_3-29), 1.45 (s, CH_3-30), 4.80, 4.86 (brs, H_2-31)
β-D-Xylp: 4.88 (d, J = 7.7, H-1), 3.95 (dd, J = 8.4, 7.7, H-2), 4.19 (dd, J = 8.4, 8.4, H-3), 4.23 (m, H-4), 3.79 (dd, J = 10.5, 10.5, H-5), 4.40 (dd, J = 10.5, 4.8, H-5) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

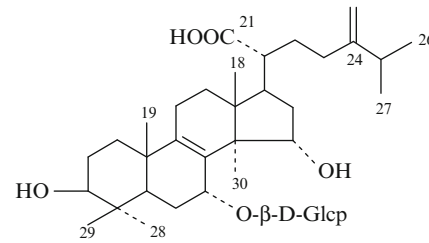
C-1	35.6	C-17	48.1	Xyl-1	102.0
2	28.8	18	17.0	2	75.3
3	78.0	19	18.3	3	78.8
4	39.6	20	49.7	4	72.4
5	44.5	21	178.8	5	67.8
6	23.9	22	32.1		
7	71.5	23	33.1		
8	134.4	24	155.8		
9	142.3	25	34.5		
10	38.9	26	22.2		
11	21.9	27	22.3		
12	30.2	28	28.9		
13	45.9	29	17.3		
14	50.6	30	25.9		
15	29.7	31	107.2		
16	28.0				

References

1. K. Yoshikawa, K. Matsumoto, C. Mine, S. Bando, S. Arihara, Chem. Pharm. Bull. **48**(10), 1418 (2000)

Laetiposide F

CAS Registry Number: 309751-41-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Mogrol
Biological source: *Laetiporus versisporus* [1]
$C_{37}H_{60}O_{10}$: 664.418
Mp: 220–222°C [1]
$[\alpha]_D^{25}$ + 16.7° (c 0.4, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1700, 1060 [1]
FAB-MS *m/z*: 663 $[M-H]^-$ [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 3.14 (t, J = 7.5, H-3), 4.87 (brs, H-7), 4.74 (dd, J = 9.5, 5.5, H-15), 1.05 (s, CH_3-18), 0.97 (s, CH_3-19), 1.00 (d, J = 6.8, CH_3-26), 1.00 (d, J = 6.8, CH_3-27), 1.50 (s, CH_3-28), 1.09 (s, CH_3-29), 1.49 (s, CH_3-30), 4.91, 4.86 (brs, H_2-31)
β-D-Glcp: 5.13 (d, J = 7.4, H-1), 3.97 (dd, J = 8.8, 7.4, H-2), 4.27 (dd, J = 9.0, 8.8, H-3), 4.11 (dd, J = 9.0, 8.8, H-4), 4.15 (m, H-5), 4.41 (dd, J = 11.7, 5.6, H-6), 4.88 (dd, J = 11.7, 2.2, H-6) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	35.0	C-17	47.3	Glc-1	99.8
2	28.4	18	17.0	2	74.9
3	77.7	19	19.5	3	77.9
4	39.1	20	49.3	4	71.5
5	43.7	21	178.5	5	78.8
6	23.0	22	31.7	6	62.9
7	71.5	23	32.7		
8	133.5	24	155.8		
9	143.9	25	34.1		
10	39.1	26	21.9		
11	21.5	27	22.0		
12	29.9	28	28.6		
13	46.4	29	17.0		

(*continued*)

Table 1 (continued)

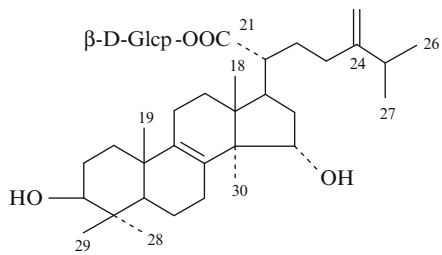
14	53.5	30	17.8
15	72.2	31	107.1
16	38.6		

References

1. K. Yoshikawa, K. Matsumoto, C. Mine, S. Bando, S. Arihara, Chem. Pharm. Bull. **48**(10), 1418 (2000)

Laetiposide G

CAS Registry Number: 309751-43-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Glycosides of Aglycones of Cucurbitane Type – Mogrol

Biological source: *Laetiporus versisporus* [1]

$C_{37}H_{60}O_9$: 648.423

Mp: 238–240°C [1]

$[\alpha]_D^{25}$ + 28.8° (c 0.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1730, 1060 [1]

FAB-MS *m/z*: 647 $[M\text{-}H]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 3.44 (t, J = 8.1, H-3), 4.62 (dd, J = 9.5, 6.0, H-15), 1.21 (s, CH_3-18), 1.01 (s, CH_3-19), 1.00 (d, J = 6.8, CH_3-26), 1.00 (d, J = 6.8, CH_3-27), 1.23 (s, CH_3-28), 1.06 (s, CH_3-29), 1.36 (s, CH_3-30), 4.81, 4.87 (brs, H_2-31)

β-D-Glcp: 6.44 (d, J = 8.1, H-1), 4.23 (dd, J = 9.1, 8.1, H-2), 4.29 (dd, J = 9.4, 9.1, H-3), 4.35 (dd, J = 9.4, 8.8, H-4), 4.05 (m, H-5), 4.26 (dd, J = 11.3, 4.4, H-6), 4.46 (dd, J = 11.3, 2.3, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N): [1]

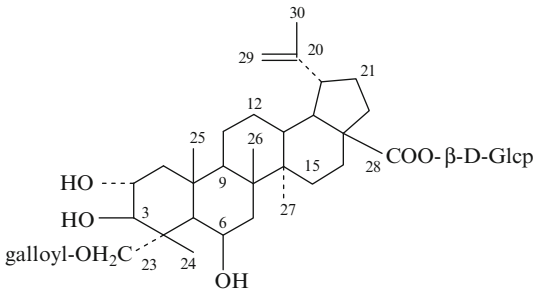
Table 1

C-1	36.4	C-17	46.8	Glc-1	95.9
2	29.0	18	16.7	2	74.2
3	78.2	19	19.7	3	79.2
4	39.8	20	48.6	4	71.5
5	51.0	21	175.9	5	79.4
6	18.5	22	32.4	6	62.7
7	28.0	23	32.4		
8	134.8	24	155.7		
9	135.0	25	34.4		
10	37.8	26	21.6		
11	21.6	27	22.2		
12	30.1	28	29.0		
13	45.8	29	16.7		
14	52.3	30	18.5		
15	72.6	31	107.1		
16	39.4				

References

1. K. Yoshikawa, K. Matsumoto, C. Mine, S. Bando, S. Arihara, Chem. Pharm. Bull. **48**(10), 1418 (2000)

Quadranoside XI



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 2α,23-Dihydroxy-betulinic Acid

Biological source: *Combretum quadrangulare* [1]

$C_{43}H_{62}O_{15}$: 818.408

$[\alpha]_D^{25}$ + 7.9° (c 0.045, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1710, 1640 [1]

HR-FAB-MS *m/z*: 841.3972 $[M + Na]^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 1.18 (m, H-1), 2.31 (dd, J = 12.4, 4.4, H-1), 4.35 (m, H-2), 3.98 (d, J = 9.3, H-3), 1.79 (m, H-5), 4.77 (brs, H-6), 1.77 (m, H-7), 1.49 (m, H-9), 1.40, 1.52 (m, H_2-11), 1.18, 1.88 (m, H_2-12), 2.74 (ddd, J = 11.8, 2.7, H-13), 1.12, 2.02 (m, H_2-15), 1.38 (m, H-16), 2.57 (brd, J = 12.4, H-16), 1.67 (m, H-18), 3.37 (td, J = 4.9, 10.7, H-19), 1.39, 2.02 (m, H_2-21-H), 1.41, 2.15 (m, H_2-22), 4.72 (d, J = 11.2, H-23), 4.89 (d, J = 11.2, H-23), 1.66 (s, CH_3-24), 1.55 (s, CH_3-25), 1.68 (s, CH_3-26), 0.85 (s, CH_3-27), 4.74 (brs, H-29), 4.85 (brs, H-29), 1.74 (s, CH_3-30)

β-D-Glcp: 6.28 (d, J = 8.3, H-1), 4.07 (dd, J = 8.5, 8.3, H-2), 4.25 (dd, J = 9.0, 8.5, H-3), 4.32 (dd, J = 9.3, 9.0H-4), 3.95 (m, H-5), 4.33 (m, H-6), 4.40 (m, H- 6)

Galloyl: 7.22 (s, H-2), 7.22 (s, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

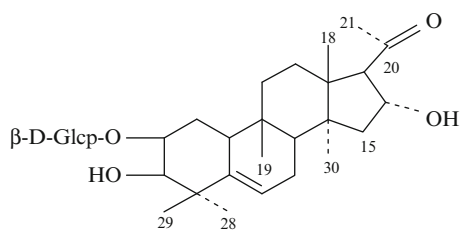
C-1	50.1	C-16	32.1	Glc-1	95.3
2	69.0	17	56.9	2	74.1
3	78.0	18	50.0	3	78.7
4	43.7	19	47.3	4	71.1
5	49.9	20	150.9	5	79.2
6	67.8	21	30.8	6	82.1
7	42.3	22	36.9	Galloyl-1	121.4
8	42.8	23	67.0	2	109.9
9	52.0	24	15.3	3	147.5
10	38.3	25	19.6	4	140.0
11	21.3	26	17.0	5	147.5
12	26.1	27	15.0	6	109.9
13	37.4	28	174.9	7	167.2
14	40.6	29	109.9		
15	29.9	30	19.6		

Pharm./Biol.: The seeds, leaves and stem bark of the plant have been used in Vietnamese folk medicine as an anthelmintic, antipyretic, antidysenteric and antihepatitis agent [1]

References

1. I.K. Adnyana, Y. Tezuka, S. Awale, A.H. Banskota, K.Q. Tran, Sh Kadota, Chem. Pharm. Bull. **48**, 1114 (2000)

Compound 6 from *Picrorhiza kurrooa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 2β,3β,16α-Trihydroxy-4,4,9,14-tetramethyl-19-norpregn-5-en-20-one
Biological source: *Picrorhiza kurrooa* [1]
$C_{30}H_{48}O_9$: 552.329
Mp: 168–169°C [1]
UV λ_{max} nm: 200 [1]
FAB-MS *m/z*: 659 $[M + Li]^+$ [1]
^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.75, 2.59 (ddd, J = 11.9, H_2-1), 4.29 (ddd, J = 11.9, H-2), 3.66 (d, H-3), 5.68 (brd, H-6), 1.92 (ddd, Ha-7), 2.53 (brdd, Hb-7), 1.86 (brd, H-8), 2.58 (H-10), 1.42 (d, Ha-15), 1.89 (dd, Hb-15), 4.93 (brt, H-16), 3.09 (d, H-17), 0.88 (CH_3-18), 1.04 (s, CH_3-19), 2.2 (d, CH_3-21), 1.13 (s, CH_3-28), 1.28 (s, CH_3-29), 1.22 (s, CH_3-30)
β-D-Glcp: 4.52 (d, H-1), 3.99, 3.76 (dd, H_2-6) [1]
^{13}C NMR (75.5 MHz, CD_3OD): [1]

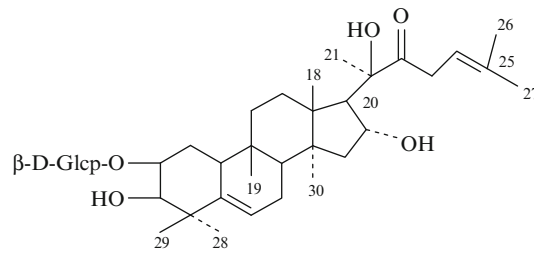
Table 1

C-1	28.34	C-16	72.75	Glc-1	102.06
2	77.57	17	69.64	2	75.23
3	77.13	18	19.24	3	78.12
4	42.27	19	29.0	4	71.79
5	141.73	20	211.83	5	77.92
6	121.33	21	31.86	6	62.89
7	25.35	28	27.41		
8	44.60	29	26.19		
9	35.75	30	18.65		
10	38.04				
11	32.81				
12	30.58				
13	49.85				
14	49.56				
15	46.60				

References

1. H. Stuppner, E.P. Muller, H. Wagner, Phytochemistry **30**, 305 (1991)

Compound 5 from *Picrorhiza kurrooa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 2β,3β,16α,20-Tetrahydroxy-9-methyl-19-norlanosta-5,24-dien-22-one
Biological source: *Picrorhiza kurrooa* [1]
$C_{36}H_{56}O_{10}$: 648.387
Mp: 149–152°C [1]
UV λ_{max} nm: 200, 230 [1]
FAB-MS *m/z*: 657 $[M + Li]^+$, 653 $[M + H]^+$, 635 $[M + H\text{-}H_2O]^+$ [1]
^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.74, 2.52 (ddd, H_2-1), 4.28 (ddd, H-2), 3.69 (d, H-3), 5.66 (brd, H-6), 1.86 (ddd, Ha-7), 2.47 (brdd, Hb-7), 1.87 (brd, H-8), 2.52 (H-10), 1.32 (d, H-15), 4.50 (brt, H-16), 2.44 (d, H-17), 5.36 (brt, H-24), 1.14 (H-18), 1.03 (s, CH_3-19), 1.45 (d, CH_3-21), 1.80 (s, CH_3-26), 1.70 (s, CH_3-27), 1.12 (s, CH_3-28), 1.27 (s, CH_3-29), 1.20 (s, CH_3-30)
β-D-Glcp: 4.52 (d, H-1), 3.98, 3.76 (dd, H_2-6) [1]
^{13}C NMR (75.5 MHz, CD_3OD): [1]

Table 1

C-1	28.96	C-16	72.09	Glc-1	102.03
2	77.61	17	60.18	2	75.23
3	77.13	18	19.24	3	78.12
4	42.25	19	28.41	4	71.78

(*continued*)

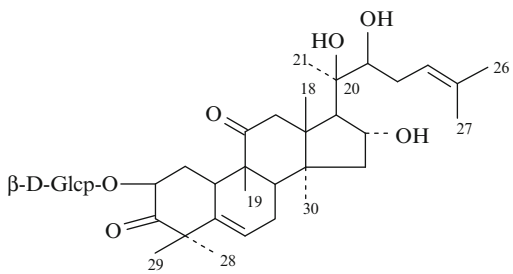
Table 1 (continued)

5	141.73	20	81.32	5	77.92
6	121.55	21	25.5	6	62.86
7	25.26	22	216.17		
8	44.10	23	37.05		
9	35.45	24	118.16		
10	38.15	25	135.57		
11	32.78	26	18.17		
12	31.72	27	25.83		
13	–	28	27.45		
14	–	29	26.18		
15	47.10	30	18.49		

References

1. H. Stuppner, E.P. Muller, H. Wagner, Phytochemistry **30**, 305 (1991)

Compound 2 from *Picrorhiza kurrooa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 2β,16α,20,22-Tetrathydroxy-9-methyl-19-norlanosta-5,24-diene-3,11-dione

Biological source: *Picrorhiza kurrooa* [1]

$C_{36}H_{56}O_{11}$: 664.382

Mp: 153–154°C [1]

UV λ_{max} nm: 200, 230 [1]

FAB-MS *m/z*: 671 $[M + Li]^+$, 663 $[M\text{-}H]^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 2.28 (ddd, J = 12.8, 3.3, 5.6, Ha-1), 1.43 (ddd, J = 12.8, Hb-1), 4.98 (dd, J = 12.8, 5.6, 2.0, H-2), 5.91 (brd, J = 5.6, H-6), 2.54 (ddd, Ha-7), 2.13 (brdd, J = 20.5, 6.0, Hb-7), 2.08 (d, J = 7.8, H-8), 3.12 (brd, J = 12.8, H-10), 3.43 (d, H-12), 2.67 (d, J = 14.7, H-12), 1.98 (dd, J = 13.4, 8.9, H-15), 1.60 (d, J = 13.4, H-15), 4.68 (brt, J = 8.9, 6.9, H-16), 2.52 (d, J = 6.9, H-17), 3.48 (d, J = 10.0, 3.3, H-22), 2.35 (brdd, J = 14.5, 6.7, H-23), 2.26 (dd, H-23), 5.35 (brd, J = 7.1, H-24), 1.78 (s, CH_3-26), 1.71 (s, CH_3-27), 1.48, 1.40, 1.36, 1.33, 1.12, 1.05 (s, CH_3 × 6); β-D-Glcp: 4.41 (d, J = 7.8, H-1), 3.97 (dd, J = 1.7, 12.3, H-6), 3.73 (dd, J = 5.6, 12.3, H-6) [1]

^{13}C NMR (75.5 MHz, CD_3OD): [1]

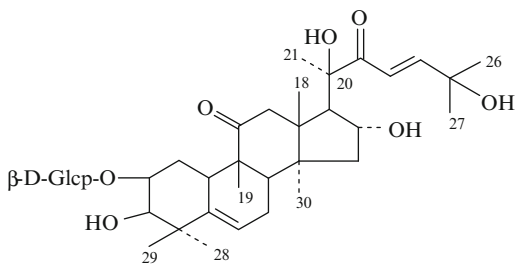
Table 1

C-1	25.9	C-16	72.12	Glc-1	104.36
2	79.69	17	56.60	2	75.47
3	213.37	18	19.29	3	78.25
4	49.18	19	20.37	4	71.56
5	141.76	20	79.97	5	77.98
6	121.44	21	23.62	6	62.96
7	24.89	22	82.02		
8	44.02	23	31.20		
9	49.78	24	123.46		
10	35.03	25	133.60		
11	216.09	26	25.97		
12	50.38	27	18.05		
13	52.44	28	20.37		
14	51.42	29	29.46		
15	45.74	30	20.04		

References

1. H. Stuppner, H. Kählig, O. Seligmann, H. Wagner, Phytochemistry **29**, 1633 (1990)

Compound 3 from *Picrorhiza kurrooa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 2β,3β,16α,20,25-Pentahydroxy-9-methyl-19-norlanosta-5,23-diene-11,22-dione

Biological source: *Picrorhiza kurrooa* [1]

$C_{36}H_{56}O_{12}$: 680.377

Mp: 166–168°C [1]

UV λ_{max} nm: 200, 230 [1]

FAB-MS *m/z*: 687 $[M + Li]^+$, 679 $[M\text{-}H]^-$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.73 (ddd, J = 12.1, H-1), 4.20 (ddd, J = 12.1, 4.6, 2.0, H-2), 3.67 (d, J = 2.0, H-3), 5.75 (brd, J = 5.4, H-6), 2.5 (m, H-7), 2.05 (dd, J = 20.0, 6.0, H-7), 2.02 (d, J = 7.6, H-8), 3.40 (d, H-12), 2.63 (d, J = 14.5, H-12), 1.91 (dd, J = 12.1, 8.3, H-15), 1.48 (d, J = 12.1, H-15), 4.55 (brt, J = 7.4, H-16), 2.67 (d, J = 7.4, H-17), 7.05 (d, J = 15.6, H-23), 6.90 (d, J = 15.6, H-24), 1.47 (s, CH_3-26), 1.40 (s, CH_3-27), 1.40, 1.39, 1.30, 1.19, 1.13, 0.98 (s, CH_3 × 6); β-D-Glcp: 4.47 (d, J = 7.6, H-1), 3.96 (dd, J = 1.8, 11.4, H-6), 3.74 (dd, J = 5.6, 11.4, H-6) [1]

^{13}C NMR (75.5 MHz, CD_3OD): [1]

Table 1

C-1	28.3	C-16	71.73	Glc-1	101.99
2	76.88	17	59.48	2	75.17
3	76.76	18	19.54	3	78.13
4	42.37	19	20.24	4	71.80
5	139.78	20	79.78	5	77.90
6	121.13	21	25.40	6	62.90
7	24.86	22	205.05		
8	44.58	23	121.32		

(*continued*)

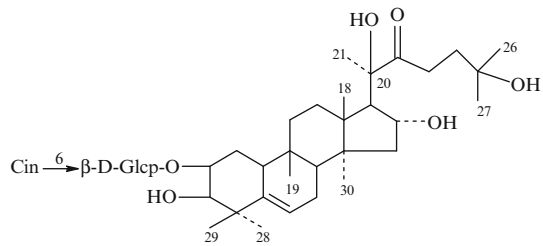
Table 1 (continued)

9	49.19	24	155.35
10	34.98	25	71.49
11	216.32	26	29.23
12	49.57	27	29.23
13	50.19	28	26.13
14	51.96	29	27.40
15	46.72	30	20.60

References

1. H. Stuppner, H. Kählig, O. Seligmann, H. Wagner, Phytochemistry **29**, 1633 (1990)

Compound 8 from *Picrorhiza kurrooa*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 2β,3β,16α,20,25-Pentahydroxy-9-methyl-19-norlanosta-5-en-22-one

Biological source: *Picrorhiza kurrooa* [1]

$C_{45}H_{66}O_{12}$: 798.455

Mp: 102–104°C [1]

UV λ_{max} nm: 200, 300 [1]

FAB-MS *m/z*: 837 $[M + K]^+$, 821 $[M + Na]^+$, 805 $[M + Li]^+$, 131 [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD-$CDCl_3$): 1.75 (ddd, Ha-1), 2.5, 4.17 (ddd, H_2-2), 3.66 (d, H-3), 5.65 (brd, H-6), 1.84 (ddd, Ha-7), 2.46 (brdd, Hb-7), 1.83 (brd, H-8), 2.43 (H-10), 1.29 (d, Ha-15), 1.75 (dd, Hb-15), 4.36 (brt, H-16), 2.39 (d, H-17), 2.68 (ddd, Ha-23), 2.90 (ddd, Hb-23), 1.06 (H-18),

0.99 (s, CH_3-19), 1.39 (d, CH_3-21), 1.25 (s, CH_3-26), 1.25 (s, CH_3-27), 1.07 (s, CH_3-28), 1.25 (CH_3-29), 1.11 (s, CH_3-30)
β-D-Glcp: 4.54 (d, H-1), 4.64, 4.49 (dd, H_2-6)
Cinnamoyl: 7.79 (d, H-1′), 6.58 (d, H-2′), 7.47 (d, H-2″, 6″), 7.62 (dd, 3″, 5″), 7.47 (dd, H-4″) [1]
^{13}C NMR (75.5 MHz, CD_3OD-$CDCl_3$): [1]

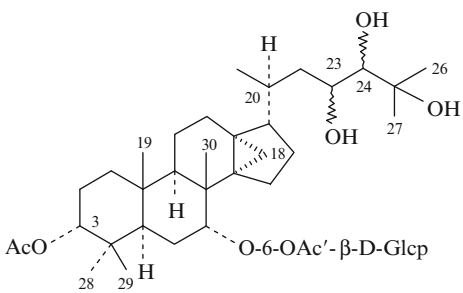
Table 1

C-1	28.69	C-16	71.58	Glc-1	101.76
2	77.76	17	59.38	2	74.56
3	76.68	18	18.98	3	77.20
4	41.84	19	29.27	4	71.11
5	140.75	20	80.84	5	75.04
6	121.39	21	24.84	6	64.62
7	25.08	22	216.86	Cin-1″	135.06
8	43.44	23	32.46	2″-6″	129.71
9	34.97	24	37.71	3″-5″	128.79
10	37.72	25	70.42	4″	131.31
11	32.23	26	29.12	1′	146.25
12	31.34	27	28.32	2′	118.28
13	–	28	27.27	COO	168.14
14	–	29	25.92		
15	46.55	30	18.20		

References

1. H. Stuppner, E.P. Muller, H. Wagner, Phytochemistry **30**, 305 (1991)

Cumingianoside K



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,23,24,25-Pentahydroxy-14,18-cycloapotirucallan
Biological source: *Dysoxylum cumingianum* [1]
$C_{40}H_{66}O_{12}$: 738.455
$[\alpha]_D^{25}$ −33.3° (c 0.58, $CHCl_3$) [1]
FAB-MS (positive ion mode) *m/z*: 739.4452 $(M + H)^+$ [1]
FAB-MS *m/z*: 737 $(M-H)^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N + D_2O): 4.92 (brs, H-3), 2.38 (d, J = 12.0, H-5), 4.01 (brs, H-7), 0.58, 0.70 (d, J = 6.0, 6.0, H_2-18), 0.89 (s, CH_3-19), 1.25 (d, J = 7.0, s, CH_3-21), 4.36 (ddd, J = 3.0, 8.0, 8.0, H-23), 3.76 (d, J = 8.0, H-24), 1.69 (s, CH_3-26), 1.71 (s, CH_3-27), 1.11 (s, CH_3-28), 0.89 (s, CH_3-29), 1.06 (s, CH_3-30)
β-D-Glcp: 4.73 (d, J = 8.0, H-1), 3.87 (dd, J = 8.0, 9.0, H-2), 4.16 (t, J = 9.0, H-3), 3.96 (t, J = 9.0, H-4), 3.95 (ddd, J = 1.5, 5.0, 9.0, H-5), 4.67 (dd, J = 5.0, 12.0, H-6), 4.91 (dd, J = 1.5, 12.0, H-6); Acetyl: 1.94 (s), Acetyl′: 2.04 (s) [1]
^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

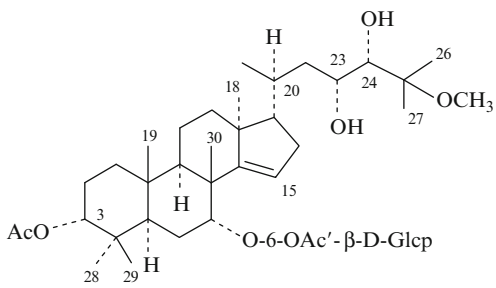
Table 1

C-1	34.5	C-16	26.5	Glc-1	100.3
2	23.4	17	52.8	2	75.0
3	78.2	18	17.3	3	78.3
4	37.0	19	16.2	4	71.6
5	41.5	20	34.3	5	74.6
6	20.7	21	20.7	6	64.7
7	78.2	22	41.4	Ac-1	171.0
8	35.5	23	73.9	2	20.9
9	45.3	24	80.0	Ac′-1	170.9
10	37.7	25	74.5	2	21.2
11	17.5	26	24.6		
12	28.3	27	29.0		
13	27.4	28	27.8		
14	39.5	29	22.3		
15	26.1	30	20.3		

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Cumingianoside P



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,23(R),24(S),25-Pentahydroxy-apotirucallan

Biological source: *Dysoxylum cumingianum* [1]

$C_{41}H_{68}O_{12}$: 752.471

$[\alpha]_D^{25}$ −82.8° (c 0.50, $CHCl_3$) [1]

FAB-MS (positive ion mode) *m/z*: 775 $(M + Na)^+$ [1]

FAB-MS *m/z*: 751 $(M-H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N + D_2O): 4.93 (brs, H-3), 2.45 (brd, J = 13.0, H-5), 4.45 (brs, H-7), 5.60 (brd, J = 2.0, H-15), 0.98 (s, CH_3-18), 0.93 (s, CH_3-19), 1.14 (d, J = 6.5, CH_3-21), 4.37 (brt, J = 7.0, H-23), 3.56 (brs, H-24), 1.38 (s, CH_3-26), 1.40 (s, CH_3-27), 1.11 (s, CH_3-28), 0.91 (s, CH_3-29), 1.18 (s, CH_3-30)

β-D-Glcp: 4.73 (d, J = 8.0, H-1), 3.77 (dd, J = 8.0, 9.0, H-2), 4.13 (t, J = 9.0, H-3), 3.93 (t, J = 9.0, H-4), 3.88 (ddd, J = 2.0, 5.0, 9.0, H-5), 4.62 (dd, J = 5.0, 11.5, H-6), 4.92 (dd, J = 2.0, 11.5, H-6); Acetyl: 1.85 (s), Acetyl′: 2.07 (s), OCH_3: 3.22 (s) [1]

^{13}C NMR (100 MHz, C_5D_5N + D_2O): [1]

Table 1

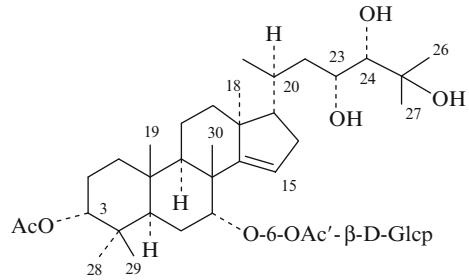
C-1	34.1	C-16	36.1	Ac-1	171.0
2	23.4	17	62.1	2	20.9
3	78.2	18	19.4	OMe-1	49.3
4	36.9	19	16.1	Glc-1	100.3
5	42.0	20	32.3	2	74.7
6	21.1	21	20.2	3	78.4
7	77.6	22	42.6	4	71.3
8	43.3	23	68.3	5	74.6
9	43.5	24	76.8	6	64.5
10	37.8	25	78.7	Ac′-1	170.8
11	17.5	26	22.6	2	21.1
12	36.3	27	20.9		
13	46.9	28	27.7		
14	158.7	29	22.2		
15	120.4	30	28.5		

Pharm./Biol.: This glycoside exhibited significant (EC_{50} < 4 μM) cytotoxicity activity against 37 human cancer cell lines. Among them, the UO-31 (renal cancer) cell line was the most sensitive to this compound (EC_{50} 0.267 μM) [1]

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**, 202 (1997)

Cumingianoside Q



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,23(R),24(S),25-Pentahydroxy-apotirucallan

Biological source: *Dysoxylum cumingianum* [1]

$C_{40}H_{66}O_{12}$: 738.455

$[\alpha]_D^{25}$ −77.5° (c 0.52, $CHCl_3$) [1]

FAB-MS (positive ion mode) *m/z*: 761.4452 $(M + Na)^+$ [1]

FAB-MS *m/z*: 737 $(M-H)^+$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 4.93 (brs, H-3), 2.45 (brd, J = 13.0, H-5), 4.21 (brs, H-7), 5.60 (brd, J = 2.0, H-15), 0.99 (s, CH_3-18), 0.93 (s, CH_3-19), 1.13 (d, 6.5, CH_3-21), 4.52 (brt, 7.0, H-23), 3.57 (brs, H-24), 1.59 (s, CH_3-26), 1.62 (s, CH_3-27), 1.11 (s, CH_3-28), 0.91 (s, CH_3-29), 1.18 (s, CH_3-30)

β-D-Glcp: 4.73 (d, J = 7.5, H-1), 3.78 (dd, J = 7.5, 9.0, H-2), 4.13 (t, J = 9.0, H-3), 3.94 (t, J = 9.0, H-4), 3.88 (ddd, J = 2.0, 5.0, 9.0, H-5), 4.62 (dd, J = 5.0, 11.5, H-6), 4.92 (dd, J = 2.0, 11.5, H-6); Acetyl: 1.85 (s), Acetyl′: 2.07 (s) [1]

^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

Table 1

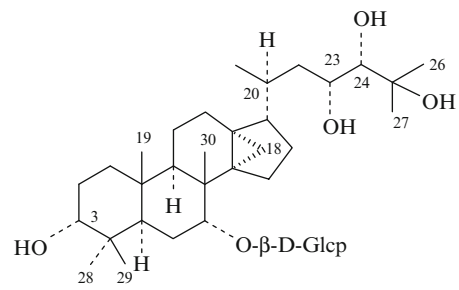
C-1	34.2	C-16	36.1	Glc-1	100.3
2	23.4	17	62.1	2	74.7
3	78.2	18	19.4	3	78.5
4	37.0	19	16.1	4	71.3
5	42.1	20	32.2	5	74.6
6	21.1	21	20.1	6	64.5
7	77.6	22	42.0	Ac′-1	170.9
8	43.3	23	69.4	2	21.1
9	43.5	24	76.9		
10	37.8	25	73.8		
11	17.5	26	27.7		
12	36.4	27	27.1		
13	46.9	28	27.7		
14	158.7	29	22.3		
15	120.4	30	28.5		
		Ac-1	171.1		
		2	21.0		

Pharm./Biol.: Cumingianoside Q showed selective cytotoxicity activity against NCI-H522 (non-small cell lung cancer) cells with an EC_{50} value of 1.67 μM, and exhibited no cytotoxicity (EC_{50} > 10 μM) against most of the remaining cancer cell lines [1]

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I-S. Chen, K-H. Lee. Chem. Pharm. Bull. **45**, 202 (1997)

Cumingianoside G



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,23(R),24(S)-Pentahydroxy-14,18-cycloapotirucallan

Biological source: *Dysoxylum cumingianum* [1]

$C_{36}H_{62}O_{10}$: 654.434

^{1}H NMR (400 MHz, J/Hz, C_5D_5N + D_2O): 3.63 (brs, H-3), 2.50 (d, J = 12.0, H-5), 4.13 (brs, H-7), 0.59, 0.89 (both d, J = 5.5, 5.5, H_2-18), 0.93 (s, CH_3-19), 1.10 (d, J = 6.0, CH_3-21), 4.50 (brt, J = 6.0, H-23), 3.59 (brs, H-24), 1.60 (s, CH_3-26), 1.64 (s, CH_3-27), 1.30 (s, CH_3-28), 0.90 (s, CH_3-29), 1.07 (s, CH_3-30)

β-D-Glcp: 4.82 (d, J = 8.0, H-1), 3.96 (dd, J = 8.0, 9.5, H-2), 4.22 (t, J = 9.5, H-3), 4.08 (t, J = 9.5, H-4), 3.94 (ddd, J = 3.0, 6.0, 9.5, H-5), 4.27 (dd, J = 6.0, 11.5, H-6), 4.52 (dd, J = 3.0, 11.5, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

Table 1

C-1	34.0	C-16	26.4	Glc-1	100.5
2	26.6	17	53.7	2	75.5
3	75.9	18	17.6	3	78.4
4	38.0	19	16.6	4	72.5
5	40.4	20	33.3	5	78.0
6	21.1	21	19.8	6	63.5
7	78.3	22	39.8		
8	35.7	23	69.7		
9	45.2	24	77.2		
10	37.9	25	73.9		
11	17.5	26	27.8		

(*continued*)

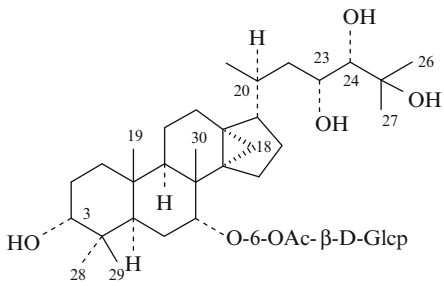
Table 1 (continued)

12	28.3	27	27.1
13	27.4	28	29.1
14	39.6	29	23.0
15	25.8	30	20.5

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Cumingianoside H



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,23(R),24(S)-Pentahydroxy-14,18-cycloapotirucallan

Biological source: *Dysoxylum cumingianum* [1]

$C_{38}H_{64}O_{11}$: 696.444

$[\alpha]_D^{25}$ −31.9° (c 0.52, $CHCl_3$) [1]

FAB-MS (positive ion mode) *m/z*: 719.4346 $(M + Na)^+$ [1]

FAB-MS *m/z*: 695 $[M-H]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 3.62 (brs, H-3), 2.52 (d, J = 12.0, H-5), 4.01 (brs, H-7), 0.60, 0.83 (d, J = 5.5, 5.5, H_2-18), 0.95 (s, CH_3-19), 1.11 (d, J = 6.0, CH_3-21), 4.50 (brt, J = 7.0, H-23), 3.58 (brs, H-24), 1.59 (s, CH_3-26), 1.62 (s, CH_3-27), 1.31 (s, CH_3-28), 0.91 (s, CH_3-29), 0.11 (s, CH_3-30)

β-D-Glcp: 4.73 (d, J = 7.0, H-1), 3.91 (dd, J = 7.0, 9.0, H-2), 4.16 (t, J = 9.0, H-3), 4.01 (t, J = 9.0, H-4), 3.93 (m, H-5), 4.67 (dd, J = 6.0, 12.0, H-6), 4.89 (dd, J = 2.0, 12.0, H-6) Acetyl: 2.06 (s) [1]

^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

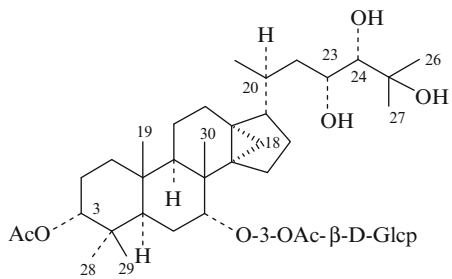
Table 1

C-1	34.0	C-16	26.1	Glc-1	101.1
2	26.4	17	53.6	2	75.1
3	75.6	18	17.6	3	78.2
4	37.7	19	16.6	4	71.5
5	40.3	20	33.1	5	74.5
6	21.5	21	19.7	6	64.8
7	79.1	22	39.6	Ac-1	171.4
8	35.5	23	69.6	2	20.9
9	45.2	24	77.0		
10	37.8	25	73.7		
11	17.4	26	27.7		
12	28.3	27	27.1		
13	27.2	28	29.0		
14	39.4	29	22.9		
15	25.5	30	20.4		

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Cumingianoside I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,23(R),24(S)-Pentahydroxy-14,18-cycloapotirucallan
Biological source: *Dysoxylum cumingianum* [1]
$C_{40}H_{66}O_{12}$: 738.455
$[\alpha]_D^{25}$ −33.5° (c 0.20, $CHCl_3$) [1]
FAB-MS (positive ion mode) *m/z*: 761 $(M + Na)^+$ [1]
FAB-MS *m/z*: 737 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 4.88 (brs, H-3), 2.32 (brd, J = 12.0, H-5), 4.10 (brs, H-7), 0.56, 0.70 (d, J = 6.0, 6.0, H_2-18), 0.88 (s, CH_3-19), 1.10 (d, J = 6.0, CH_3-21), 4.52 (brt, J = 6.5, H-23), 3.58 (brs, H-24), 1.59 (s, CH_3-26), 1.63 (s, CH_3-27), 1.04 (s, CH_3-28), 0.85 (s, CH_3-29), 1.04 (s, CH_3-30)
β-D-Glcp: 4.82 (d, J = 8.0, H-1), 3.93 (dd, 8.0, J = 9.0, H-2), 5.76 (t, J = 9.0, H-3), 4.14 (t, J = 9.0, H-4), 3.98 (m, H-5), 4.30 (dd, J = 5.5, 11.5, H-6), 4.49 (dd, J = 2.5, 11.5, H-6) Acetyl: 1.89 (s), Acetyl′: 2.08 (s) [1]
^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

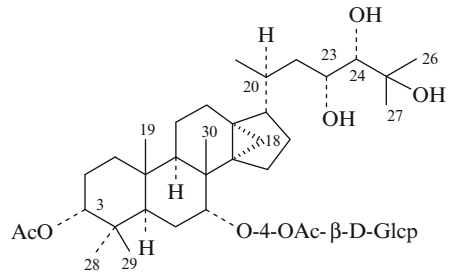
Table 1

C-1	34.4	C-16	26.4	Glc-1	99.9
2	23.4	17	53.4	2	73.1
3	78.1	18	17.3	3	79.9
4	36.9	19	16.2	4	70.3
5	41.4	20	33.1	5	77.8
6	20.5	21	19.7	6	62.8
7	77.9	22	39.7	Ac′-1	170.9
8	35.5	23	69.6	2	21.3
9	45.4	24	77.2		
10	37.7	25	73.8		
11	17.4	26	27.7		
12	28.1	27	27.1		
13	27.4	28	27.8		
14	39.5	29	22.2		
15	25.6	30	20.3		
		Ac-1	171.1		
		2	21.1		

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Cumingianoside J



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,23(R),24(S)-Pentahydroxy-14,18-cycloapotirucallan
Biological source: *Dysoxylum cumingianum* [1]
$C_{40}H_{66}O_{12}$: 738.455
$[\alpha]_D^{25}$ −38.8° (c 0.52, $CHCl_3$) [1]
FAB-MS (positive ion mode) *m/z*: 761 $(M + Na)^+$ [1]
FAB-MS *m/z*: 737 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 4.94 (brs, H-3), 2.39 (brd, J = 12.0, H-5), 4.10 (brs, H-7), 0.45, 0.59 (d, J = 6.0, 6.0, H_2-18), 0.89 (s, CH_3-19), 1.10 (d, J = 6.0, CH_3-21), 4.51 (brt, J = 7.0, H-23), 3.60 (brs, H-24), 1.59 (s, CH_3-26), 1.62 (s, CH_3-27), 1.13 (s, CH_3-28), 0.89 (s, CH_3-29), 1.02 (s, CH_3-30)
β-D-Glcp: 4.81 (d, J = 7.5, H-1), 3.93 (dd, J = 7.5, 9.0, H-2), 5.76 (t, J = 9.0, H-3), 5.50 (t, J = 9.0, H-4), 3.97 (ddd, J = 3, 6, 9, H-5), 4.08 (dd, J = 6.0, 12.0, H-6), 4.16 (dd, J = 3.0, 12.0, H-6); Acetyl: 1.89 (s), Acetyl′: 2.08 (s) [1]
^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

Table 1

C-1	34.4	C-16	26.3	Glc-1	99.6
2	23.4	17	53.5	2	75.3
3	78.2	18	17.4	3	75.7
4	37.0	19	16.2	4	73.5
5	41.2	20	33.2	5	75.8
6	20.2	21	19.7	6	62.8
7	77.4	22	39.7	Ac′-1	170.9
8	35.5	23	69.6	2	21.2
9	45.2	24	77.2		

(*continued*)

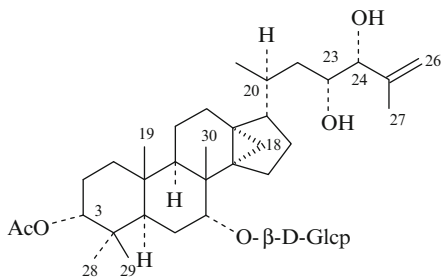
Table 1 (continued)

10	37.7	25	73.7
11	17.2	26	27.7
12	28.0	27	27.1
13	27.3	28	27.7
14	39.4	29	22.2
15	25.6	30	20.2
		Ac-1	170.9
		2	21.1

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Cumingianoside N



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,23(R),24(S)-Tetrahydroxy-14,18-cycloapotirucall-25-ene

Biological source: *Dysoxylum cumingianum* [1]

$C_{38}H_{62}O_{10}$: 678.434

$[\alpha]_D^{25}$ −40.3° (c 0.59, $CHCl_3$) [1]

FAB-MS (positive ion mode) *m/z*: 701.2440 $(M + Na)^+$ [1]

FAB-MS *m/z*: 677 $(M-H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 4.92 (brs, H-3), 2.38 (brd, J = 12.0, H-5), 4.12 (brs, H-7), 0.52, 0.70 (d, J = 6.0, 6.0, H_2-18), 0.90 (s, CH_3-19), 1.15 (d, J = 6.5, CH_3-21), 4.07 (m, H-23), 4.23 (d, J = 5.5, H-24), 5.00, 5.25 (brs, H_2-26), 1.94 (s, CH_3-27), 1.11 (s, CH_3-28), 0.89 (s, CH_3-29), 1.05 (s, CH_3-30)

β-D-Glcp: 4.80 (d, J = 8.0, H-1), 3.94 (dd, J = 8.0, 9.0, H-2), 4.19 (t, J = 9.0, H-3), 4.07 (t, J = 9.0, H-4), 3.94 (m, H-5), 4.28 (dd, J = 5.5, 11.5, H-6), 4.52 (dd, J = 2.5, 11.0, H-6); Acetyl: 1.97 (s) [1]

^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

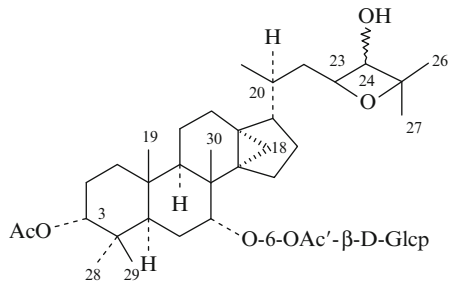
Table 1

C-1	34.5	C-16	26.4	Glc-1	99.8
2	23.4	17	53.0	2	75.3
3	78.2	18	17.1	3	78.5
4	37.8	19	16.2	4	72.4
5	41.3	20	34.1	5	78.0
6	20.3	21	20.4	6	63.4
7	77.4	22	38.4		
8	35.6	23	72.4		
9	45.3	24	79.2		
10	37.1	25	147.5		
11	17.5	26	112.5		
12	28.1	27	19.0		
13	27.3	28	27.7		
14	39.6	29	22.2		
15	25.8	30	20.3		
		Ac-1	171.0		
		2	21.2		

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Cumingianoside O



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,7α,24-Trihydroxy-23,25-epoxy-14,18-cycloapotirucallan

Biological source: *Dysoxylum cumingianum* [1]

$C_{40}H_{64}O_{11}$: 720.444

$[\alpha]_D^{25}$ −20.5° (c 0.1, $CHCl_3$) [1]

FAB-MS (positive ion mode) *m/z*: 743.4346 $(M + Na)^+$ [1]

FAB-MS *m/z*: 719 $(M-H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 4.93 (brs, H-3), 2.40 (brd, J = 13.0, H-5), 4.00 (brs, H-7), 0.50, 0.62 (d, J = 6.0, 6.0, H_2-18), 0.90 (s, CH_3-19), 1.09 (d, J = 6.5, CH_3-21), 4.98 (brt, J = 6.5, H-23), 4.68 (d, J = 6.5, H-24), 1.51 (s, CH_3-26), 1.61 (s, CH_3-27), 1.12 (s, CH_3-28), 0.89 (s, CH_3-29), 1.07 (s, CH_3-30)

β-D-Glcp: 4.73 (d, J = 8.0, H-1), 3.87 (dd, J = 8.0, 9.0, H-2), 4.16 (t, J = 9.0, H-3), 4.00 (t, J = 9.0, H-4), 3.95 (ddd, J = 2.0, 6.0, 9.0, H-5), 4.69 (dd, J = 6.0, 11.0, H-6), 4.92 (dd, J = 2.0, 11.0, H-6); Acetyl: 1.96 (s), Acetyl′: 2.05 (s) [1]

^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

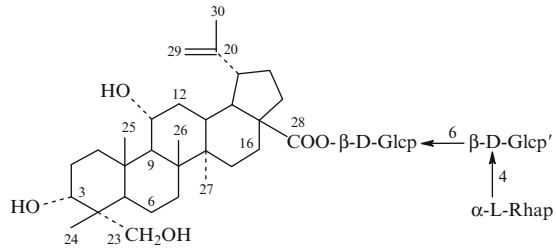
Table 1

C-1	34.5	C-16	26.1	Glc-1	100.2
2	23.4	17	53.4	2	75.0
3	78.0	18	17.2	3	78.2
4	37.0	19	16.2	4	71.6
5	41.4	20	33.7	5	74.6
6	20.7	21	19.9	6	64.7
7	78.3	22	35.6	Ac-1	171.0
8	35.6	23	81.0	2	20.9
9	45.3	24	73.3	Ac′-1	170.8
10	37.7	25	86.6	2	21.1
11	17.4	26	24.1		
12	28.1	27	28.6		
13	27.3	28	27.7		
14	39.4	29	22.2		
15	25.6	30	20.3		

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Acankoreanoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,11α,23-Trihydroxy-lup-20(29)-en-28-oic Acid

Biological source: *Acanthopanax koreanum* [1]

$C_{48}H_{78}O_{19}$: 958.513

Mp: 220–223°C [1]

$[\alpha]_D^{27}$ −37.5° (c 0.37, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3403, 2939, 1727, 1641 [1]

FAB-MS *m/z*: 957 $[M-H]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.83, 1.00, 1.25, 1.29, 1.64 (s, CH_3-24, 27, 26, 25, 30), 1.92 (d, J = 11.0, H-9), 2.98 (m, H-13), 3.38 (m, H-19), 3.67 (d, J = 11.0, H-23), 3.88 (d, J = 11.0, H-23), 3.92 (brs, H-3), 4.33 (H-11), 4.61, 4.80 (brs, H_2-29)

β-D-Glcp: 6.32 (d, J = 7.9, H-1), 4.08 (t, J = 9.2, H-2), 4.21 (t, J = 9.2, H-3), 4.30 (H-4), 4.11 (H-5), 4.28 (H-6), 4.67 (d, J = 11.0, H-6)

β-D-Glcp′: 4.94 (d, J = 7.9, H-1), 3.94 (H-2), 4.15 (H-3), 4.39 (t, J = 9.5, H-4), 3.67 (d, J = 11.0, H-5), 4.11 (H-6), 4.19 (H-6)

α-L-Rhap: 5.83 (brs, H-1), 4.66 (brs, H-2), 4.53 (dd, J = 9.2, 3.1, H-3), 4.32 (H-4), 4.93 (H-5), 1.70 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

C-1	35.9	C-16	32.2	Glc-1	95.3	Rha-1	102.7
2	27.1	17	56.9	2	74.0	2	72.5
3	75.7	18	49.4	3	78.6	3	72.7
4	41.1	19	47.1	4	70.8	4	73.9
5	43.8	20	150.4	5	78.0	5	70.3
6	18.3	21	30.9	6	69.4	6	18.5
7	35.4	22	36.7	Glc′-1	105.0		
8	42.7	23	71.9	2	75.2		

(*continued*)

Table 1 (continued)

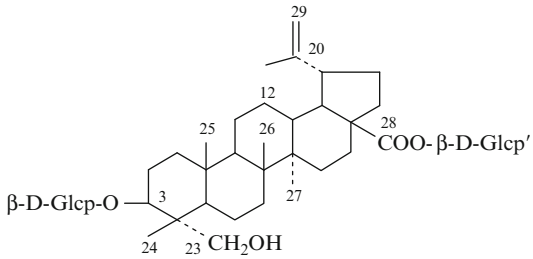
9	55.6	24	18.3	3	76.4
10	39.6	25	17.1	4	78.2
11	69.8	26	17.7	5	77.1
12	38.3	27	14.8	6	61.3
13	37.4	28	175.0		
14	42.9	29	110.0		
15	30.0	30	19.5		

Pharm./Biol.: Used as a tonic and sedative as well as a drug with ginseng-like activity [1]

References

1. S.-Y. Chang, Ch-S Yook, T. Nohara, Chem. Pharm. Bull. **46**, 163 (1998)

Bourneioside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,23-Dihydroxy-lup-20(29)-en-28-oic Acid

Biological source: *Lonicera bournei* [1]

$C_{42}H_{68}O_{14}$: 796.460

Mp: 205–207°C [1]

$[\alpha]_D^{21}$ + 55.0° (c 0.10, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2871, 1741, 1639, 1458, 1377, 1076, 890 [1]

FAB-MS *m/z*: 819 $[M + Na]^+$, 635 $[M + H\text{-}C_6H_{10}O_5]^+$, 616 $[M\text{-}\ C_6H_{12}O_6]^+$, 518, 500 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.91, 1.58 (H_2-1), 1.92, 2.29 (H_2-2), 4.28 (H-3), 1.57 (m, H-5), 1.35, 1.67 (H_2-6), 1.29, 1.51 (H_2-7), 1.41 (H-9), 1.17, 1.38 (H_2-11), 1.19, 1.89 (H_2-12), 2.67 (m, H-13), 1.18, 2.02 (m, H_2-15), 1.46, 2.63 (H_2-16), 1.73 (m, H-18), 3.40 (dt, 10.7, 4.4, H-19), 1.38, 2.09 (H_2-21), 1.50, 2.17 (H_2-22), 3.69, 4.33 (m, H_2-23), 0.95 (s, CH_3-24), 0.84 (s, CH_3-25), 1.14 (s, CH_3-26), 0.99 (s, CH_3-27), 4.71, 4.86 (s, CH_2-29), 1.73 (s, CH_3-30)

β-D-Glcp: 5.12 (d, J = 7.8, H-1), 4.02 (m, H-2), 4.14 (H-3), 4.22 (H-4), 3.87 (m, H-5), 4.35, 4.50 (H-6)

β-D-Glcp′: 6.42 (d, J = 8.0, H-1), 4.17 (m, H-2), 4.28 (H-3), 4.35 (m, H-4), 4.03 (m, H-5), 4.39 (H-6), 4.45 (dd, J = 12.4, 2.4, H-6) [1]

^{13}C NMR: [1]

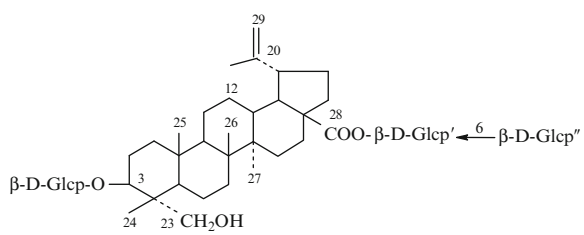
Table 1

C-1	39.0	C-16	32.2	Glc-1	105.8
2	26.0	17	57.0	2	75.9
3	82.0	18	49.8	3	78.7
4	43.5	19	47.5	4	71.6
5	47.7	20	150.8	5	78.3
6	18.1	21	30.9	6	62.8
7	34.3	22	37.0	Glc′-1	95.4
8	42.8	23	64.6	2	74.3
9	50.9	24	13 .5	3	78.9
10	36.9	25	16.9	4	71.0
11	21.1	26	16.4	5	79.4
12	26.0	27	14.9	6	62.1
13	38.3	28	174.9		
14	41.2	29	110.1		
15	30.1	30	19.4		

References

1. S.M. Abdel-Khalik, T. Miyase, H.A. El-Ashaal, F.R. Melek, Phytochemistry **54**, 795 (2000)

Bourneioside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α,23-Dihydroxy-lup-20(29)-en-28-oic Acid

Biological source: *Lonicera bournei* [1]

$C_{48}H_{76}O_{19}$: 956.498

Mp: 214–216°C [1]

$[\alpha]_D^{21}$ + 40.0° (c 0.10, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2870, 1736, 1640, 1450, 1377, 1078, 890 [1]

FAB-MS *m/z*: 981 $[M + Na]^+$, 766 $[M\text{-}C_6H_{10}O_5\text{-}CH_2O]^+$, 695 $[M + H\text{-}2C_6H_{10}O_5]^+$, 613, 517, 501 [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N): 0.93, 1.57 (H_2-1), 1.92, 2.27 (H_2-2), 4.25 (H-3), 1.57 (m, H-5), 1.38, 1.65 (H_2-6), 1.28, 1.50 (H_2-7), 1.40 (H-9), 1.22, 1.38 (H_2-11), 1.20 (m, H-12), 2.63 (H-13), 1.16, 1.98 (m, H_2-15), 1.46, 2.61 (H_2-16), 1.70 (H-18), 3.38 (dt, J = 10.9, 4.8, H-19), 1.38, 2.20 (H_2-21), 1.45, 2.20 (H_2-22), 3.68, 4.31 (H_2-23), 0.94 (s, CH_3-24), 0.85 (s, CH_3-25), 1.13 (s, CH_3-26), 0.97 (s, CH_3-27), 4.68, 4.84 (brs, H_2-29), 1.69 (s, CH_3-30)

β-D-Glcp: 5.10 (d, J = 8.0, H-1), 4.01 (m, H-2), 4.12 (H-3), 4.18 (H-4), 3.86 (m, H-5), 4.36, 4.48 (H-6)

β-D-Glcp′: 6.33 (d, J = 8.0, H-1), 4.07 (m, H-2), 4.16 (H-3), 4.28 (m, H-4), 4.10 (m, H-5), 4.32 (H-6), 4.69 (m, H-6)

β-D-Glcp″: 4.99 (d, J = 7.6, H-1), 3.97 (m, H-2), 4.16 (m, H-3), 4.20 (m, H-4), 3.86 (m, H-5), 4.34 (H-6), 4.46 (m, H-6) [1]

^{13}C NMR: [1]

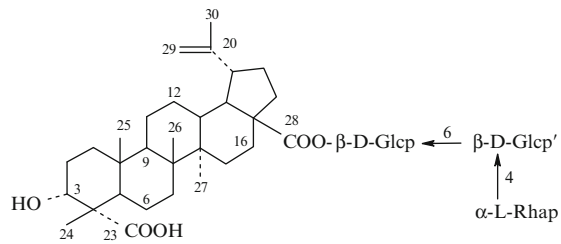
Table 1

C-1	39.0	C-16	32.3	Glc-1	105.7	Glc″-1	105.4
2	26.0	17	57.0	2	75.9	2	75.1
3	82.0	18	49.8	3	78.4	3	78.7
4	43.5	19	47.4	4	71.6	4	70.9
5	47.8	20	150.8	5	78.5	5	78.3
6	18.2	21	30.8	6	62.8	6	62.6
7	34.3	22	37.1	Glc′-1	95.2		
8	42.8	23	64.6	2	74.0		
9	50.9	24	13.5	3	78.7		
10	36.9	25	17.0	4	70.9		
11	21.1	26	16.4	5	78.0		
12	26.0	27	14.9	6	69.5		
13	38.3	28	174.9				
14	41.2	29	110.0				
15	30.2	30	19.4				

References

1. S.M. Abdel-Khalik, T. Miyase, H.A. El-Ashaal, F.R. Melek, Phytochemistry **54**, 795 (2000)

Acankoreanoside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3α-Hydroxy-lup-20(29)-en-23,28-dioic Acid

Biological source: *Acanthopanax koreanum* [1]

$C_{48}H_{76}O_{19}$: 956.498

Mp: 225–228°C [1]

$[\alpha]_D^{27}$ −41.2° (c 0.39, EtOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3417, 2942, 1724, 1641, 1066 [1]

HR-FAB-MS *m/z*: 979.4872 $[M + Na]^+$ [1]

FAB-MS *m/z*: 980 $[M + Na + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.87, 0.95, 1.20, 1.46, 1.70 (s, CH_3-27, 25, 26, 27, 30), 1.23, 1.47 (H_2-11), 1.66 (d, J = 11.6, H-9), 2.67 (m, H-13), 3.38 (m, H-19), 4.28 (brs, H-3), 4.72, 4.85 (brs, H_2-29)

β-D-Glcp: 6.34 (d, J = 7.9, H-1), 4.08 (H-2), 4.21 (t, J = 11.0, H-3), 4.30 (H-4), 4.09 (H-5), 4.28 (H-6), 4.67 (d, J = 9.8, H-6)

β-D-Glcp′: 4.95 (d, J = 7.9, H-1), 3.93 (t, J = 9.2, H-2), 4.13 (H-3), 4.39 (t, J = 9.5, H-4), 3.65 (d, J = 9.2, H-5), 4.07 (d, J = 10.4, H-6), 4.19 (H-6)

α-L-Rhap: 5.84 (brs, H-1), 4.66 (brs, H-2), 4.54 (d, J = 9.2, H-3), 4.34 (H-4), 4.96 (H-5), 1.69 (d, J = 6.1, CH_3-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

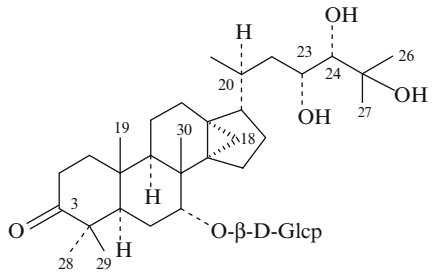
C-1	32.9	C-16	31.9	Glc-1	95.2	Rha-1	102.7
2	26.2	17	57.0	2	74.0	2	72.5
3	73.0	18	49.7	3	78.7	3	72.7
4	52.0	19	47.4	4	70.8	4	73.9
5	44.9	20	150.8	5	77.9	5	70.3
6	21.8	21	30.8	6	69.4	6	18.5
7	34.5	22	36.9	Glc′-1	105.1		
8	41.8	23	179.0	2	75.3		
9	51.0	24	18.0	3	76.4		
10	37.4	25	16.8	4	78.2		
11	20.9	26	16.7	5	77.1		
12	26.0	27	14.8	6	61.3		
13	38.3	28	174.9				
14	42.9	29	110.0				
15	30.1	30	19.4				

Pharm./Biol.: Used as a tonic and sedative as well as a drug with ginseng-like activity [1]

References

1. S.-Y. Chang, Ch.S. Yook, T. Nohara, Chem. Pharm. Bull. **46**, 163 (1998)

Cumingianoside L



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3-Oxo-7α,23(R),24(S),25-tetraoxy-14,18-cycloapotirucallan

Biological source: *Dysoxylum cumingianum* [1]

$C_{36}H_{60}O_{10}$: 652.418

Mp: 145–148°C (dil. MeOH) [1]

$[\alpha]_D^{25}$ −14.1° (c 0.52, $CHCl_3$) [1]

FAB-MS (positive ion mode) *m/z*: 675.4084 $(M + Na)^+$ [1]

FAB-MS *m/z*: 651 $(M-H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 2.44 (brd, J = 10.0, H-5), 4.07 (brs, H-7), 0.75, 0.95 (d, J = 6.0, 6.0, H_2-18), 0.90 (s, CH_3-19), 1.12 (d, J = 6.0, CH_3-21), 4.53 (brt, J = 6.0, H-23), 3.60 (s, H-24), 1.61 (s, CH_3-26), 1.64 (s, CH_3-27), 1.38 (s, CH_3-28), 1.10 (s, CH_3-29), 1.04 (s, CH_3-30)

β-D-Glcp: 4.79 (d, J = 7.0, H-1), 3.98 (dd, J = 7.0, 9.0, H-2), 4.21 (t, J = 9.0, H-3), 4.12 (t, J = 9.0, H-4), 3.96 (m, H-5), 4.30 (dd, J = 6.0, 11.0, H-6), 4.53 (dd, J = 3.0, 11.0, H-6) [1]

^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

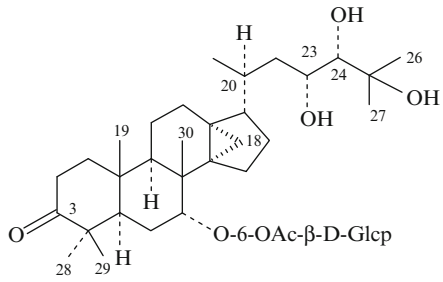
Table 1

C-1	34.3	C-16	26.4	Glc-1	101.3
2	39.7	17	53.5	2	75.3
3	217.3	18	17.9	3	78.6
4	47.3	19	16.2	4	72.4
5	45.6	20	33.1	5	78.0
6	22.5	21	19.9	6	63.4
7	78.6	22	39.5		
8	35.7	23	69.6		
9	44.4	24	77.2		
10	36.9	25	73.8		
11	17.8	26	27.8		
12	28.2	27	27.1		
13	27.4	28	26.9		
14	39.0	29	21.4		
15	25.6	30	20.3		

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Cumingianoside M



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 3-Oxo-7α,23(R),24(S),25-tetraoxy-14,18-cycloapotirucallan

Biological source: *Dysoxylum cumingianum* [1]

$C_{38}H_{62}O_{11}$: 694.429

$[\alpha]_D^{25}$ −10.5° (c 0.7, $CHCl_3$) [1]

FAB-MS (positive ion mode) *m/z*: 717.4190 $(M + Na)^+$ [1]

FAB-MS *m/z*: 693 $(M-H)^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N-D_2O): 2.43 (m, H-5), 3.92 (brt, H-7), 0.75, 0.93 (d, J = 5.5, 5.5, H_2-18), 0.90 (s, CH_3-19), 1.14 (d, J = 6.5, CH_3-21), 4.53 (brt, J = 7.0, H-23), 3.60 (s, H-24), 1.61 (s, CH_3-26), 1.64 (s, CH_3-27), 1.37 (s, CH_3-28), 1.11 (s, CH_3-29), 1.08 (s, CH_3-30)

β-D-Glcp: 4.69 (d, J = 8.0, H-1), 3.92 (t, J = 8.0, H-2), 4.19 (m, H-3), 3.98 (m, H-4), 3.98 (m, H-5), 4.66 (dd, J = 5.0, 11.0, H-6), 4.88 (dd, J = 3.0, 11.0, H-6); Acetyl: 2.11 (s) [1]

^{13}C NMR (100 MHz, C_5D_5N-D_2O): [1]

Table 1

C-1	34.4	C-16	26.3	Glc-1	102.2
2	39.7	17	53.7	2	75.1
3	218.3	18	18.2	3	78.3
4	47.4	19	16.6	4	71.8
5	45.7	20	33.2	5	74.7
6	23.3	21	20.1	6	65.1
7	80.0	22	39.8		
8	35.7	23	69.8	Ac-1	171.5
9	44.6	24	77.4	2	21.2
10	37.0	25	74.1		
11	18.2	26	27.9		
12	28.5	27	27.2		
13	27.4	28	27.2		
14	39.0	29	21.6		
15	25.6	30	20.6		

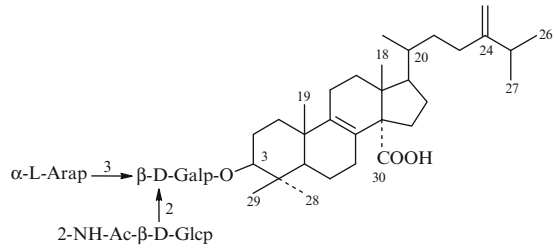
(*continued*)

References

1. T. Fujioka, A. Sakurai, K. Mihashi, Y. Kashiwada, I.-S. Chen, K.-H. Lee, Chem. Pharm. Bull. **45**(1), 68 (1997)

Eryloside G

CAS Registry Number: 350678-22-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 14-Carboxy-24-methyllanosta-8(9),24(31)-diene

Biological source: *Erylus nobilis* [1]

$C_{50}H_{81}NO_{17}$: 967.550

Mp: 187–191°C [1]

$[\alpha]_D^{25}$ −18.8° (c 0.09, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 990.5401 $[M + Na]^+$ [1]

IR (KBr) $\nu_{max}cm^{-1}$: 3350, 2945, 1645, 1565, 1455, 1375, 1075 [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 1.76, 1.29 (m, H_2-1), 2.0, 1.74 (m, H_2-2), 3.18 (dd, J = 11.7, 4.4, H-3), 1.10 (dd, J = 12.7, 2.3, H-5), 1.70, 1.53 (m, H-6), 2.11, 1.98 (m, H_2-7), 2.14, 2.11 (m, H_2-11), 2.25, 1.70 (m, H_2-12), 2.06, 1.40

(m, H_2-15), 2.06, 1.58 (m, H_2-16), 1.55 (m, H-17), 0.80 (s, CH_3-18), 1.05 (s, CH_3-19), 1.48 (m, H-20), 0.94 (d, J = 6.3, H-21), 1.55, 1.12 (m, H_2-22), 2.08 (m, H-23), 1.90 (ddd, J = 14.2, 10.7, 5.9, H-23), 2.20 (m, CH_3-25), 1.02 (d, J = 6.8, CH_3-26), 1.01 (d, J = 6.8, CH_3-27), 1.08 (s, CH_3-28), 0.90 (s, CH_3-29), 4.71 (brs, H-31), 4.64 (d, J = 1.0, H-31); β-D-Galp: 4.37 (d, J = 8.3, H-1), 3.95 (dd, J = 9.8, 8.3, H-2), 3.65 (dd, J = 9.8, 3.4, H-3), 4.12 (m, H-4), 3.51 (m, H-5), 3.70 (d, J = 5.9, H-6);

2-NH-Ac-β-D-Glcp: 4.91 (d, J = 8.3, H-1), 3.73 (dd, J = 10.3, 8.3, H-2), 3.24 (dd, J = 10.3, 9.3, H-3), 3.10 (dd, J = 9.3, 9.3, H-4), 3.27 (ddd, J = 9.3, 7.7, 1.5, H-5), 3.83 (dd, J = 12.1, 1.5, H-6), 3.55 (dd, J = 12.1, 7.7, H-6), 2.02 (s, Ac); α-L-Arap: 4.38 (d, J = 7.8, H-1), 3.68 (dd, J = 9.8, 7.8, H-2), 3.50 (dd, J = 9.8, 3.4, H-3), 3.82 (m, H-4), 3.86 (dd, J = 11.7, 2.4, H-5), 3.57 (brd, J = 11.7, H-5) [1]

^{13}C NMR (600 MHz, CD_3OD): [1]

Table 1

C-1	36.5	C-16	28.9	Gal-1	105.7	Ara-1	107.0
2	27.7	17	52.0	2	75.7	2	73.0
3	92.0	18	18.2	3	86.3	3	74.9
4	40.6	19	20.0	4	70.5	4	70.2
5	51.7	20	37.1	5	75.9	5	67.7
6	19.3	21	19.1	6	62.4		
7	28.8	22	36.0	2-NH-Ac-Glc-1	101.7		
8	128.9	23	32.0	2	57.4		
9	141.2	24	157.7	3	77.6		
10	38.4	25	34.9	4	72.9		
11	23.3	26	22.3	5	78.4		
12	32.8	27	22.5	6	63.9		
13	48.0	28	28.2	Ac-1	23.4		
14	63.9	29	16.7	2	173.4		
15	30.3	30	180.0				

References

1. J. Shin, H.-S. Lee, L. Woo, J.-R. Rho, Y. Seo, Ki W. Cho, Ch.J. Sim, J. Nat. Prod. **64**(6), 767 (2001)

Eryloside H

CAS Registry Number: 350678-23-8

See Figure Eryloside H

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 14-Carboxy-24-methyllanosta-8(9),24(31)-diene

Biological source: *Erylus nobilis* [1]

$C_{49}H_{79}NO_{16}$: 937.539

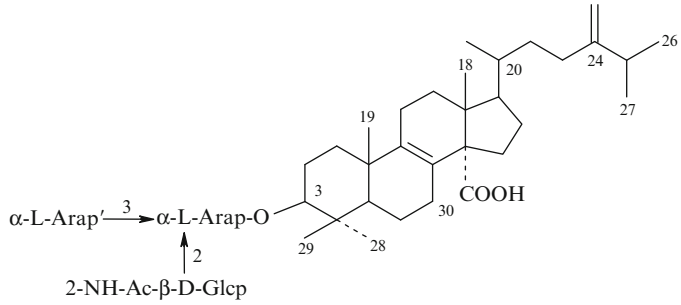
Mp: 208–210°C [1]

$[\alpha]_D^{25}$ −12.4° (c 0.07, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 960.5320 $[M + Na]^+$ [1]

IR (KBr) ν_{max} cm^{-1}: 3350, 2940, 1645, 1565, 1455, 1375, 1080 [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 4.71 (brs, H-31), 4.64 (brs, H-31), 3.15 (dd, J = 11.7, 4.4, H-3), 2.24 (m, H-12), 2.20 (m, H-25), 2.15 (m, H-11), 2.12 (m, H-11), 2.10 (m, H-7, 23), 2.07 (m, H-15, 16), 2.00 (m, H-7), 1.90 (m, H-2, H-23), 1.78 (m, H-2), 1.75 (m, H-1), 1.70 (m, H-6, 12), 1.58 (m, H-16), 1.55 (m, H-17, 22), 1.53 (m, H-6), 1.47 (m, H-20), 1.39 (m, H-15), 1.30 (m, H-1), 1.13 (m, H-22), 1.10 (dd, J = 12.8, 2.3, H-5), 1.07 (s, CH_3-28), 1.04 (s, CH_3-19), 1.02 (d, J = 6.8, CH_3-26), 1.01 (d, J = 6.8, CH_3-27), 0.94 (d, J = 6.4, CH_3-21), 0.90 (s, CH_3-29), 0.79 (s, CH_3-18); α-L-Arap: 4.35



Eryloside H

(d, J = 7.8, H-1), 3.93 (dd, J = 9.3, 7.8, H-2), 3.67 (dd, J = 9.3, 3.4, H-3), 4.05 (m, H-4), 3.83 (dd, J = 12.7, 2.0, H-5), 3.53 (brd, J = 12.7, H-5); 2-NH-Ac-β-D-Glcp: 4.91 (d, J = 8.3, H-1), 3.73 (dd, J = 10.3, 8.3, H-2), 3.24 (dd, J = 10.3, 9.3, H-3), 3.10 (dd, J = 9.3, 9.3, H-4), 3.27 (ddd, J = 9.3, 7.7, 1.5, H-5), 3.83 (dd, J = 12.1, 1.5, H-6), 3.55 (dd, J = 12.1, 7.7, H-6), 2.02 (s, Ac); α-L-Arap′: 4.38 (d, J = 7.8, H-1), 3.68 (dd, J = 9.8, 7.8, H-2), 3.50 (dd, J = 9.8, 3.4, H-3), 3.82 (m, H-4), 3.86 (dd, J = 11.7, 2.4, H-5), 3.57 (brd, J = 11.7, H-5) [1]

^{13}C NMR (600 MHz, CD_3OD): [1]

Table 1

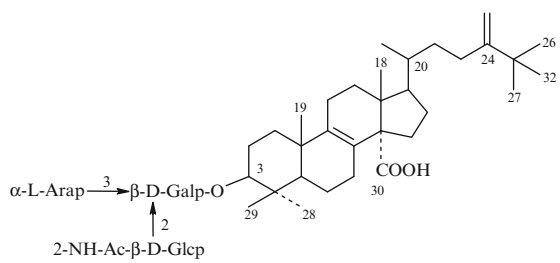
C-1	36.5	C-16	28.9	Ara-1	106.1	Ara′-1	107.0
2	27.7	17	52.0	2	75.9	2	73.0
3	92.0	18	18.2	3	85.4	3	74.9
4	40.6	19	20.0	4	70.4	4	70.2
5	51.7	20	37.1	5	66.6	5	67.7
6	19.3	21	19.1	2-NH-Ac-Glc-1	101.7		
7	28.8	22	36.0	2	57.4		
8	128.9	23	32.0	3	77.6		
9	141.2	24	157.7	4	72.9		
10	38.4	25	34.9	5	78.4		
11	23.3	26	22.3	6	63.9		
12	32.8	27	22.5	Ac-1	23.4		
13	48.0	28	28.2	2	173.4		
14	63.9	29	16.7				
15	30.3	30	180.0				

References

1. J. Shin, H.-S. Lee, L. Woo, J.-R. Rho, Y. Seo, Ki.W. Cho, Ch.J. Sim, J. Nat. Prod. **64**(6), 767 (2001)

Eryloside I

CAS Registry Number: 350678-24-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 14-Carboxy-24-methyllanosta-8(9),24(31)-diene

Biological source: *Erylus nobilis* [1]

$C_{51}H_{83}NO_{17}$: 981.566

Mp: 203–206°C [1]

$[\alpha]_D^{25}$ −18.0° (c 0.06, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 1004.5545 $[M + Na]^+$ [1]

IR (KBr) ν_{max} cm^{-1}: 3350, 2940, 1645, 1555, 1455, 1375, 1070 [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 4.84 (brs, H-31), 4.65 (d, J = 1.0, H-31), 3.18 (dd, J = 11.7, 4.4, H-3), 2.25 (m, H-12), 2.15 (m, H-11), 2.12 (m, H-23), 2.10 (m, H_2-7, 11), 2.07 (m, H_2-15, 16), 2.01 (m, H-7), 1.99 (m, H-2), 1.89 (ddd, J = 15.1, 11.2, 4.9, H-23), 1.76 (m, H-1), 1.74 (m, H-2), 1.70 (m, H-6, H-12), 1.60 (m, H-17), 1.58 (m, H-16, H-22), 1.54 (m, H-6), 1.49 (m, H-20), 1.40 (m, H-15), 1.30 (m, H-1), 1.17 (m, H-22), 1.12 (dd, J = 12.7, 2.0, H-5), 1.07 (s, CH_3-28), 1.05 (s, CH_3-19, 26, 27, 32), 0.96 (d, J = 6.4, CH_3-21), 0.90 (s, CH_3-29), 0.80 (s, CH_3-18)

β-D-Galp: 4.40 (d, J = 8.3, H-1), 3.96 (dd, J = 9.8, 8.3, H-2), 3.65 (dd, J = 9.8, 3.4, H-3), 4.12 (brd, J = 3.4, H-4), 3.50 (m, H-5), 3.70 (d, J = 5.9, H_2-6)

2-NH-Ac-β-D-Glcp: 4.91 (d, J = 8.8, H-1), 3.73 (dd, J = 10.3, 8.8, H-2), 3.24 (dd, J = 10.3, 8.8, H-3), 3.10 (dd, J = 9.8, 8.8, H-4), 3.27 (ddd, J = 9.8, 7.8, 2.4, H-5), 3.55 (dd, J = 12.2, 7.8, H-6), 3.84 (dd, J = 12.2, 2.4, H-6), 2.02 (s, NHAc)

α-L-Arap: 4.41 (d, J = 7.8, H-1), 3.68 (dd, J = 9.8, 7.8, H-2), 3.50 (dd, J = 9.8, 3.4, H-3), 3.83 (m, H-4), 3.57 (brd, J = 12.8, H-5), 3.85 (dd, J = 12.8, 2.0, H-5) [1]

^{13}C NMR (600 MHz, CD_3OD): [1]

Table 1

C-1	36.5	C-17	52.0	Gal-1	105.7	Ara-1	107.0
2	27.7	18	18.3	2	75.8	2	73.0
3	92.1	19	20.0	3	86.3	3	74.9
4	40.6	20	37.5	4	70.5	4	70.2
5	51.7	21	19.2	5	75.9	5	67.7
6	19.3	22	37.6	6	62.4		
7	28.8	23	29.0	2-NH-Ac-Glc-1	101.7		
8	129.2	24	159.8	2	57.4		

(*continued*)

Table 1 (continued)

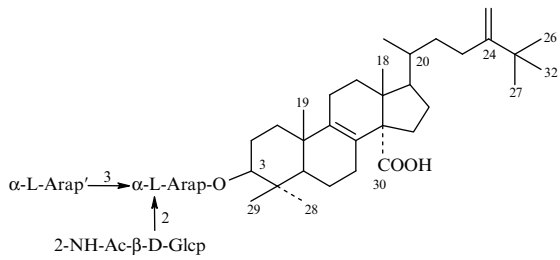
9	140.8	25	37.2	3	77.6
10	38.4	26	29.8	4	72.9
11	23.4	27	29.8	5	78.4
12	32.8	28	28.2	6	63.8
13	48.0	29	16.7	Ac-1	23.4
14	64.0	30	180.7	2	173.4
15	30.4	31	106.7		
16	29.0	32	29.8		

References

1. J. Shin, H.-S. Lee, L. Woo, J.-R. Rho, Y. Seo, Ki W. Cho, Ch.J. Sim, J. Nat. Prod. **64**(6), 767 (2001)

Eryloside J

CAS Registry Number: 350678-25-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 14-Carboxy-24-methyllanosta-8(9),24(31)-diene

Biological source: *Erylus nobilis* [1]

$C_{50}H_{81}NO_{16}$: 951.555

Mp: 193–196°C [1]

$[\alpha]_D^{25}$ −16.9° (c 0.06, MeOH) [1]

FAB-MS (positive ion mode) *m/z*: 974.5436 $[M + Na]^+$ [1]

IR (KBr) ν_{max} cm^{-1}: 3350, 2940, 1645, 1555, 1455, 1375, 1070 [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 4.84 (brs, H-31), 4.65 (d, J = 1.0, H-31), 3.15 (dd, J = 11.7, 4.4, H-3), 2.24 (m, H-12), 2.15 (m, H-11), 2.12 (m, H-23), 2.10 (m, H-7, 11), 2.07 (m, H-15, 16), 2.00 (m, H-7), 1.90 (m, H-2, 23), 1.76 (m, H-1), 1.74 (m, H-2), 1.69 (m, H-6, 12), 1.60 (m, H-17), 1.58 (m, H-22), 1.56 (m, H-16), 1.54 (m, H-6), 1.49 (m, H-20), 1.39 (m, H-15), 1.30 (m, H-1), 1.17 (m, H-22), 1.12 (dd, J = 12.7, 2.0, H-5), 1.07 (s, CH_3-28), 1.05 (s, CH_3-19, 26, 27, 32), 0.96 (d, J = 6.4, s, CH_3-21), 0.90 (s, CH_3-29), 0.80 (s, CH_3-18)

α-L-Arap: 4.35 (d, J = 7.8, H-1), 3.93 (dd, J = 9.3, 7.8, H-2), 3.66 (dd, J = 9.3, 3.4, H-3), 4.05 (m, H-4), 3.53 (brd, J = 12.7, H-5), 3.83 (dd, J = 12.7, 2.0, H-5)

2-NH-Ac-β-D-Glcp: 4.89 (d, J = 8.3, H-1), 3.73 (dd, J = 10.3, 8.3, H-2), 3.25 (dd, J = 10.3, 8.8, H-3), 3.11 (dd, J = 9.8, 8.8, H-4), 3.30 (ddd, J = 9.8, 8.3, 2.0, H-5), 3.55 (dd, J = 12.2, 8.3, H-6), 3.83 (dd, J = 12.2, 2.0, H-6), 2.01 (s, NHAc)

α-L-Arap′: 4.40 (d, J = 7.3, H-1), 3.69 (dd, J = 9.8, 7.3, H-2), 3.50 (dd, J = 9.8, 3.4, H-3), 3.81 (m, H-4), 3.56 (brd, J = 12.2, H-5), 3.85 (dd, J = 12.2, 2.4, H-5) [1]

^{13}C NMR (600 MHz, CD_3OD): [1]

Table 1

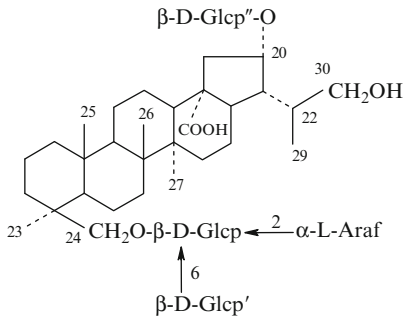
C-1	36.5	C-17	52.0	Ara-1	106.1	Ara′-1	106.9
2	27.7	18	18.2	2	75.9	2	72.9
3	91.9	19	20.0	3	85.5	3	74.8
4	40.7	20	37.5	4	70.4	4	70.1
5	51.7	21	19.2	5	66.6	5	67.6
6	19.3	22	37.6	2-NH-Ac-Glc-1	101.9		
7	28.8	23	28.9	2	57.4		
8	129.0	24	159.8	3	77.5		
9	141.1	25	37.2	4	72.8		
10	38.5	26	29.8	5	78.4		
11	23.3	27	29.8	6	63.8		
12	32.7	28	28.2	Ac-1	23.3		
13	48.0	29	16.7	2	173.4		
14	63.9	30	180.1				
15	30.3	31	106.7				
16	28.9	32	29.8				

References

1. J. Shin, H.-S. Lee, L. Woo, J.-R. Rho, Y. Seo, Ki.W. Cho, Ch.J. Sim, J. Nat. Prod. **64**(6), 767 (2001)

Diplazioside III

CAS Registry Number: 187142-69-4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 20α,24,30-Trihydroxy-22(S)-hopan-28-oic Acid

Biological source: *Diplazium subsinuatum* [1]

$C_{53}H_{88}O_{24}$: 1108.566

Mp: 203–205°C [1]

$[\alpha]_D$ −12.7° (c 1.0, C_5H_5N) [1]

FAB-MS *m/z*: 1107.5588 $[M-H]^-$, 975 $[M-H-Ara]^-$, 945 $[M-H-Glc]^-$, 813 $[975-Glc]^-$, 651 [813-Glc] [1]

EI-MS *m/z*: 472 (9, agl-$H_2O)^+$, 441 (31), 427 (25), 426 (54), 369 (13), 207 (100), 189 (38) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 2920, 1690, 1080, 1040 [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.72 (ddd, J = 13.2, 13.2, 3.5, Hα-1), 1.59 (Hβ-1), 1.40 (Hα-2), 1.77 (Hβ-2), 1.00 (ddd, J = 13.2, 13.2, 3.5, Hα-3), 2.25 (brd, J = 13.2, Hβ-3), 0.86 (brd, J = 12.6, Hα-5), 1.71 (brd, J = 13.2, Hα-6), 1.51 (Hβ-6), 1.33 (H_2-7), 1.30 (brd, J = 12.0, Hα-9), 1.44 (brd, J = 13.2, Hα-11), 1.16 (ddd, J = 13.2, 13.2, 3.5, Hβ-11), 2.16 (dddd, J = 13.2, 13.2, 13.2, 4.0, H-12), 1.88 (H-12), 1.56 (Hβ-13), 1.36 (H_2-15), 2.93 (ddd, J = 13.2, 13.2, 4.0, Hα-16), 1.86 (Hβ-16), 1.53 (H-17), 3.43 (d, J = 12.6, Hα-19), 1.57 (Hβ-19), 4.58 (dd, J = 7.2, 7.2, Hβ-20), 2.36 (ddd, J = 10.8, 10.8, 7.2, Hβ-21), 3.05 (m, H-22), 1.23 (s, CH_3-23), 4.18 (d, J = 9.6, H-24), 3.85 (d, J = 9.6, H-24), 0.91 (s, CH_3-25), 0.98 (s, CH_3-26), 1.20 (s, CH_3-27), 1.53 (d, J = 6.0, CH_3-29), 3.98 (dd, J = 10.5, 6.6, H-30), 3.67 (dd, J = 10.5, 2.5, H-30); β-D-Glcp: 4.84 (d, J = 7.8, H-1), 4.03 (dd, J = 9.0, 7.8, H-2), 4.20 (dd, J = 9.0, 9.0, H-3), 4.04 (dd, J = 9.0, 9.0, H-4), 4.03 (H-5), 4.78 (d, J = 10.8, H-6), 4.32 (dd, J = 10.8, 5.4, H-6); α-L-Araf: 6.34 (s, H-1), 4.99 (d, J = 1.8, H-2), 4.85 (dd, J = 4.1, 1.8, H-3), 4.96 (ddd, J = 4.1, 4.1, 4.1, H-4), 4.32 (dd, J = 11.5, 4.1, H-5), 4.24 (dd, J = 11.5, 4.1, H-5); β-D-Glcp′: 5.09 (d, J = 7.8, H-1), 4.03 (dd, J = 9.0, 7.8, H-2), 4.21 (dd, J = 9.0, 9.0, H-3), 4.20 (dd, J = 9.0, 9.0, H-4), 3.93 (ddd, J = 9.0, 5.4, 2.4, H-5), 4.51 (dd, J = 12.0, 2.4, H-6), 4.35 (dd, J = 12.0, 5.4, H-6);β-D-Glcp″: 4.81 (d, J = 7.8, H-1), 3.83 (dd, J = 9.0, 7.8, H-2), 4.12 (dd, J = 9.0, 9.0, H-3), 3.98 (dd, J = 9.0, 9.0, H-4), 3.89 (ddd, J = 9.0, 5.3, 2.4, H-5), 4.47 (dd, J = 12.0, 2.4, H-6), 4.22 (H-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	40.7	C-11	21.9	C-21	48.3
2	18.8	12	26.8	22	36.9
3	36.7	13	51.3	23	28.3
4	38.2	14	42.5	24	73.0
5	57.4	15	34.2	25	17.0
6	19.3	16	23.8	26	16.5
7	34.6	17	54.3	27	14.5
8	41.9	18	53.3	28	179.4
9	51.2	19	49.8	29	18.7
10	37.5	20	83.8	30	70.3

^{13}C NMR (150 MHz, C_5D_5N) (sugar part): [1]

Table 2

Glc-1	103.9	Glc′-1	105.2
2	77.7	2	75.2
3	78.0	3	78.3
4	71.5	4	71.7
5	77.1	5	78.3
6	69.7	6	62.7
Ara-1	109.4	Glc″-1	106.3
2	81.0	2	75.4
3	78.9	3	78.5
4	88.2	4	71.9
5	62.7	5	77.4
		6	63.1

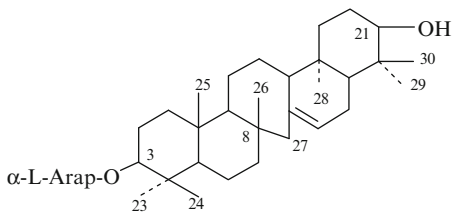
Pharm./Biol.: This plant has been used as a folk medicine (diuretic, hydragogue, etc.) in China [1]

References

1. T. Nakanishi, Y. Inatomi, M. Nishi, H. Murata, A. Inada, Chem. Pharm. Bull. **45**(1), 8 (1997)

Inundoside E

CAS Registry Number: 80244-83-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 21-Epi-serratenediol

Biological source: *Lycopodium inundatum* [1]

$C_{35}H_{58}O_6$: 574.423

Mp: >300°C ($CHCl_3$-MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400 [1]

FD-MS *m/z*: 597 $[M + Na]^+$, 574 $[M]^+$, 442 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.82 (3), 0.96, 0.99, 1.17, 1.29, (s, $CH_3 \times 7$), 4.78 (d, J = 6.4, H-1 of Ara) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-2	26.9	Ara-1	107.3
3	88.7	2	72.9
4	39.0	3	74.6
14	139.0	4	69.4
15	122.8	5	66.6
21	75.3		

(*continued*)

References

1. Y. Tsuda, M. Kaneda, N. Yasufuku, Y. Shimizu, Chem. Pharm. Bull. **29**(8), 2123 (1981)

Inundoside F

CAS Registry Number: 80235-52-5

See Figure Inundoside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 21-Epi-serratenediol

Biological source: *Lycopodium inundatum* [1]

$C_{44}H_{64}O_8$: 720.460

Mp: >300°C ($CHCl_3$-MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3300, 1678, 1629, 1603, 1585, 1512, 1255 [1]

FD-MS *m/z*: 743 $[M + Na]^+$, 720 $[M]^+$ [1]

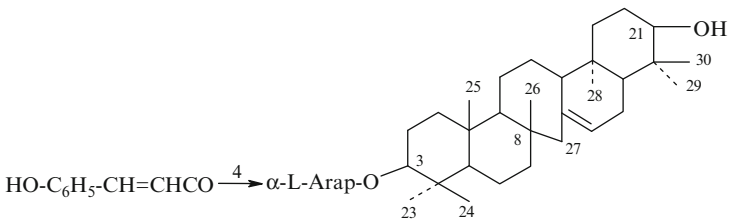
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.79, 0.83 (2), 0.96, 1.04, 1.17, 1.35, (s, $CH_3 \times 7$), 4.83 (d, J = 7.0, H-1 of Ara), ArCH = CHCOO: 6.54, 7.93 (d, J = 16), Ar-H: 7.16, 7.44 (d, J = 8.5) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-2	27.1	Ara-1	107.6
3	89.1	2	72.8
4	39.0	3	73.3
14	139.0	4	72.3
15	122.8	5	66.6
21	75.3		

(*continued*)



Inundoside F

Table 1 (continued)

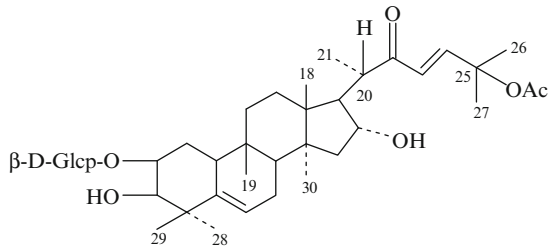
15	122.7	5	64.4
21	75.3	p-Cumaroyl-1″	167.4
		2″	115.5
		3″	145.2
		1‴	126.0
		2‴	130.6
		3‴	116.7
		4‴	161.3

References

1. Y. Tsuda, M. Kaneda, N. Yasufuku, Y. Shimizu, Chem. Pharm. Bull. **29**(8), 2123 (1981)

Compound 2

CAS Registry Number: 132741-61-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 25-Acetoxy-2β,3β,16α-trihydroxy-9-methyl-19-norlanosta-5,23-dien-22-one

Biological source: *Picrorhiza kurrooa* [1]

$C_{38}H_{60}O_{11}$: 692.413

Mp: 132–135°C [1]

UV λ_{max} nm: 200, 230 [1]

FAB-MS *m*/*z*: 699 $[M + Li]^+$, 639 $[M + Li\text{-}HOAc]^+$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.75, 2.51 (H_2-1), 4.28 (ddd, H-2), 3.68 (d, H-3), 5.67 (brd, H-6), 1.89 (brdd, Ha-7), 2.48 (brdd, Hb-7), 1.86 (brd, H-8), 2.52 (H-10), 1.38 (d, Ha-15), 1.79 (dd, Hb-15), 4.11 (brt, H-16), 2.17 (dd, H-17), 3.13 (dd, H-20), 6.39 (d, Ha-23), 7.07 (d, Ha-24), 1.22 (s, CH_3-18), 1.04 (s, CH_3-19), 1.05 (d, CH_3-21), 1.64 (s, CH_3-26), 1.63 (s, CH_3-27), 1.11 (s, CH_3-28), 1.27 (s, CH_3-29), 1.18 (s, CH_3-30), 2.09 (OAc)
β-D-Glcp: 4.52 (d, H-1), 3.99, 3.76 (dd, H_2-6) [1]

^{13}C NMR (75.5 MHz, CD_3OD): [1]

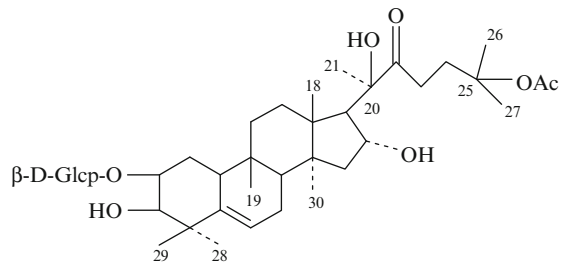
Table 1

C-1	28.97	C-16	77.40	Glc-1	102.03
2	77.58	17	58.48	2	75.23
3	77.13	18	17.37	3	78.12
4	42.25	19	28.43	4	71.78
5	141.68	20	47.05	5	77.92
6	121.52	21	17.80	6	62.85
7	25.38	22	207.46	Ac-1	172.00
8	44.93	23	127.58	2	21.84
9	35.59	24	151.07		
10	38.03	25	80.92		
11	32.84	26	26.72		
12	31.44	27	26.60		
13	–	28	27.44		
14	–	29	26.19		
15	47.05	30	18.87		

References

1. H. Stuppner, E.P. Muller, H. Wagner, Phytochemistry **30**, 305 (1991)

Compound 4



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous

Glycosides – 25-Acetoxy-2β,3β,16α,20-tetrahydroxy-9-methyl-19-norlanosta-5-en-22-one

Biological source: *Picrorhiza kurrooa* [1]

$C_{38}H_{62}O_{12}$: 710.424

Mp: 151–153°C [1]

UV λ_{max} nm: 200, 230 [1]

FAB-MS *m/z*: 717 $[M + Li]^+$, 657 $[M + Li\text{-}HOAc]^+$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.75, 2.53 (ddd, H_2-1), 4.29 (ddd, H-2), 3.69 (d, H-3), 5.67 (brd, H-6), 1.85 (ddd, Ha-7), 2.46 (brdd, Hb-7), 1.87 (brd, H-8), 1.31 (d, Ha-15), 1.78 (dd, Hb-15), 4.48 (brt, H-16), 2.42 (d, H-17), 2.75 (ddd, Ha-23), 2.92 (ddd, Hb-23), 1.14 (CH_3-18), 1.03 (s, CH_3-19), 1.46 (d, CH_3-21), 1.52 (s, CH_3-26), 1.52 (s, CH_3-27), 1.12 (s, CH_3-28), 1.27 (s, CH_3-29), 1.20 (s, CH_3-30), 2.03 (OAc)

β-D-Glcp: 4.53 (d, H-1), 3.99, 3.77 (dd, H_2-6) [1]

^{13}C NMR (75.5 MHz, CD_3OD): [1]

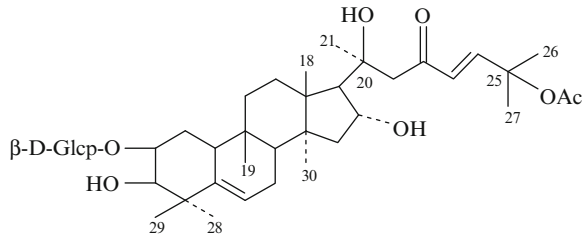
Table 1

C-1	28.95	C-16	72.04	Glc-1	102.02
2	77.60	17	60.31	2	75.22
3	77.12	18	19.21	3	78.11
4	42.25	19	28.41	4	71.77
5	141.73	20	81.44	5	77.92
6	121.55	21	25.48	6	62.86
7	25.26	22	216.84	Ac-1	172.41
8	44.09	23	32.70	2	22.31
9	35.45	24	35.89		
10	38.13	25	83.13		
11	32.77	26	26.33		
12	31.73	27	26.19		
13	49.78	28	27.45		
14	–	29	26.19		
15	47.10	30	18.48		

References

1. H. Stuppner, E.P. Muller, H. Wagner, Phytochemistry **30**, 305 (1991)

Compound 1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 25-Acetoxy-2β,3β,16α,20-tetrahydroxy-9-methyl-19-norlanosta-5,23-dien-22-one

Biological source: *Picrorhiza kurrooa* [1, 2]

$C_{38}H_{60}O_{12}$: 708.408

Mp: 127–137°C [2]

IR (nujol) ν_{max} cm^{-1}: 3380, 1720, 1690, 1265 [2]

^{1}H NMR (220 MHz, J/Hz, CD_3OD): 1.02, 1.11, 1.11, 1.19, 1.27, 1.48, 1.62, 1.64 (s, $CH_3 \times 8$), 1.85 (cm), 2.09 (OAc), 2.5 (cm, 3 H), 3.3–5.2 (cm), 5.7 (brs, H-6), 6.79 (d, J = 17.5, H-23), 7.08 (d, H-24)

β-D-Glcp: 4.52 (d, H-1), 3.99, 3.76 (dd, H-6) [1]

^{13}C NMR (75 MHz, CD_3OD): [1]

Table 1

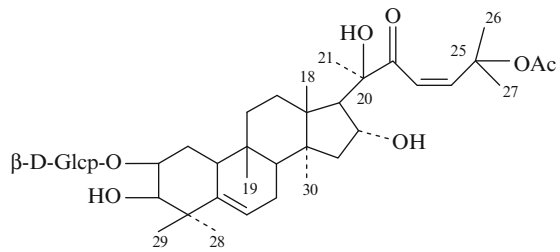
C-1	28.94	C-16	72.56	Glc-1	102.02
2	77.62	17	60.62	2	75.22
3	77.11	18	19.21	3	78.10
4	42.24	19	28.40	4	71.75
5	141.73	20	81.07	5	77.92
6	121.53	21	25.11	6	62.90
7	25.27	22	205.43	Ac-1	172.11
8	44.12	23	122.92	2	21.84
9	35.46	24	151.12		
10	38.10	25	80.83		
11	32.73	26	26.52		
12	31.41	27	26.84		
13	49.51	28	27.44		
14	49.75	29	26.18		
15	46.94	30	18.72		

References

1. H. Stuppner, E.P. Muller, H. Wagner, Phytochemistry **30**, 305 (1991)
2. W.A. Laurie, D. McHale, I.B. Sheridan, Phytochemistry **24**, 2659 (1985)

Compound 3

CAS Registry Number: 132741-62-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – 25-Acetoxy-2β,3β,16α,20-tetrahydroxy-9-methyl-19-norlanosta-5,23(Z)-dien-22-one

Biological source: *Picrorhiza kurrooa* [1]

$C_{38}H_{60}O_{12}$: 708.408

Mp: 126–130°C [1]

UV λ_{max} nm: 200, 230 [1]

FAB-MS *m/z*: 715 $[M + Li]^+$, 655 $[M + Li\text{-}HOAc]^+$ [1]

^{1}H NMR (300 MHz, J/Hz, CD_3OD): 1.54, 2.52 (ddd, H_2-1), 4.29 (ddd, H-2), 3.68 (d, H-3), 5.67 (brd, H-6), 1.86 (ddd, Ha-7), 2.46 (brdd, Hb-7), 1.87 (brd, H-8), 2.52 (H-10), 1.27 (d, H-15), 1.77 (dd, H-15), 4.47 (brt, H-16), 2.44 (d, H-17), 6.32 (d, H-23), 6.53 (d, H-24), 1.15 (CH_3-18), 1.03 (s, CH_3-19), 1.46 (d, CH_3-21), 1.72 (s, CH_3-26), 1.71 (s, CH_3-27), 1.12 (s, CH_3-28), 1.27 (s, CH_3-29), 1.20 (s, CH_3-30), 2.05 (OAc)

β-D-Glcp: 4.52 (d, H-1), 3.99, 3.77 (dd, H-6) [1]

^{13}C NMR (75.5 MHz, CD_3OD): [1]

Table 1

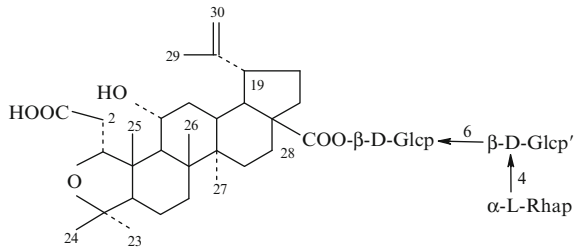
C-1	28.96	C-16	72.18	Glc-1	102.03
2	77.6	17	60.39	2	75.23
3	77.13	18	19.26	3	78.12
4	42.25	19	28.41	4	71.77
5	141.73	20	81.0	5	77.92
6	121.55	21	25.04	6	62.85
7	25.26	22	206.16	Ac-1	172.13
8	44.1	23	122.66	2	21.91
9	35.4	24	151.0		
10	38.16	25	82.74		
11	32.77	26	26.52		
12	31.7	27	26.23		
13	–	28	27.43		
14	–	29	25.8		
15	47.05	30	18.59		

References

1. H. Stuppner, E.P. Muller, H. Wagner, Phytochemistry **30**, 305 (1991)

Isochiisanoside

CAS Registry Number: 105591-35-3



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Anhydro-chiisanogenic Acid

Biological source: *Acanthopanax chiisanensis* [1], *A. divaricatus* [2]

$C_{48}H_{76}O_{20}$: 972.492

$[\alpha]_D^{17}$ −12.9° (c 1.01, MeOH) [1]

IR ν_{max} (Nujol) cm^{-1}: 3300, 1740, 1700 (COOR), 1640, 890 (C = CH_2) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.28 (d, J = 7, H-1)
β-D-Glcp′: 4.93 (d, J = 6.5, H-1)
α-L-Rhap: 5.78 (s, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

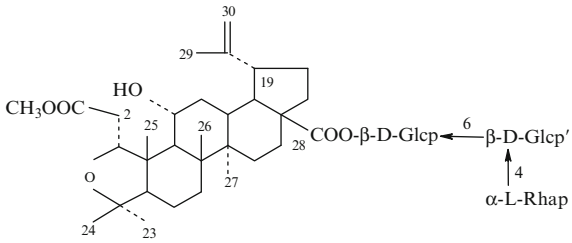
Table 1

C-1	87.4	C-16	32.2	Glc-1	95.2	Rha-1	102.5
2	36.8	17	56.1	2	73.9	2	72.5
3	175.5	18	47.2	3	78.5	3	72.4
4	79.1	19	49.8	4	70.6	4	73.9
5	48.8	20	150.6	5	76.3	5	70.2
6	18.7	21	30.3	6	69.3	6	18.4
7	35.5	22	36.8	Glc′-1	104.8		
8	42.7	23	24.9	2	75.2		
9	56.9	24	32.8	3	76.9		
10	46.8	25	19.2	4	78.2		
11	67.6	26	17.8	5	77.9		
12	38.9	27	15.1	6	61.3		
13	37.5	28	174.8				
14	42.7	29	19.4				
15	30.5	30	110.2				

References

1. R. Kasai, K. Matsumoto, S. Taniyasu, O. Tanaka, J.-H. Kim, D.-R. Hahn, Chem. Pharm. Bull. **34**(8), 3284 (1986)
2. K. Matsumoto, R. Kasai, F. Kanamaru, H. Kohda, O. Tanaka, Chem. Pharm. Bull. **35**(1), 413 (1987)

Methyl-ester Isochiisanoside



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Anhydro-chiisanogenic Acid
Biological source: *Acanthopanax chiisanensis* [1], *A. divaricatus* [2]

$C_{49}H_{78}O_{20}$: 986.508
$[\alpha]_D^{17}$ −10.5° (c 0.95, MeOH) [1]
IR ν_{max} (nujol) cm^{-1}: 3300, 1740, 1720 (COOR), 1640, 880 (C = CH_2) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.26 (d, J = 7, H-1)
β-D-Glcp′: 4.83 (d, J = 6.5, H-1)
α-L-Rhap: 5.77 (s, H-1) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

Table 1

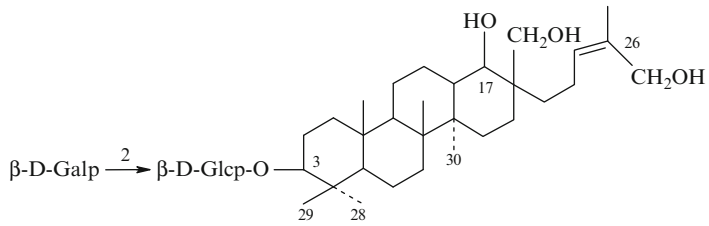
C-1	87.1	C-16	32.3	Glc-1	95.2
2	36.7	17	56.0	2	73.8
3	173.4	18	47.2	3	78.5
4	79.3	19	49.4	4	70.7
5	48.8	20	150.7	5	76.3
6	18.7	21	30.8	6	69.3
7	35.4	22	36.9	Glc′-1	104.9
8	42.7	23	24.9	2	75.2
9	56.9	24	32.6	3	77.0
10	46.8	25	19.1	4	78.2
11	67.5	26	17.8	5	77.9
12	38.5	27	15.1	6	61.2
13	37.4	28	174.8	Rha-1	102.5
14	42.7	29	19.5	2	72.6
15	30.3	30	110.2	3	72.4
		CH_3O	51.2	4	73.8
				5	70.2
				6	18.4

References

1. R. Kasai, K. Matsumoto, S. Taniyasu, O. Tanaka, J.-H. Kim, D.-R. Hahn, Chem. Pharm. Bull. **34**(8), 3284 (1986)
2. K. Matsumoto, R. Kasai, F. Kanamura, H. Kohda, O. Tanaka, Chem. Pharm. Bull. **35**(1), 413 (1987)

Actinostemmoside E

CAS Registry Number: 108910-59-4
See Figure Actinostemmoside E



Actinostemmoside E

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Bacchar-24-ene-3β,17β,21,26-tetraol

Biological source: *Actinostemma lobatum* [1]

$C_{42}H_{72}O_{14}$: 800.492

Mp: 244–247°C (aq. MeOH) [1]

$[\alpha]_D^{19}$ + 6.1° (c 0.45, MeOH) [1]

FAB-MS *m/z*: 823 $[M + Na]^+$, 799 $[M-H]^-$ [1]

^{1}H NMR (400 MHz, J/Hz, C_5D_5N + D_2O): ca 0.78, 1.48 (H_2-1), ca 1.85, 2.25 (H_2-2), 3.31 (dd, J = 5.0, 12.0, H-3), 0.67 (brd, J = 11.0, H_2-5), ca 1.30, 1.48 (H_2-6), ca 1.30 (H_2-7), ca 1.30 (H-9), ca 1.15, 1.48 (H_2-11), ca 1.25, 2.40 (H_2-12), 2.05 (dt, J = 2.0, 12.0, H-13), ca 0.95, 1.55 (H_2-15), ca 1.30, 1.55 (H_2-16), 3.68 (d, J = 12.0, H_2-17), 0.94 (s, CH_3-18), 0.77 (s, CH_3-19), 3.87 (d, J = 11.0, H-21), 4.49 (d, J = 11.0, H-21), ca 1.85, 2.25 (H_2-22), 2.44 (m, H_2-23), 5.48 (t, J = 7.0, H-24), 4.53 (s-like, H_2-26), 2.02 (s, CH_3-27), 1.29 (s, CH_3-28), 1.11 (s, CH_3-29), 0.98 (s, CH_3-30)

β-D-Glcp: 4.92(d, J = 8, H-1), 4.20 (dd, J = 8.0, 9.0, H-2), 4.31 (t, J = 9.0, H-3), 4.13 (t, J = 9.0, H-4), 3.93 (ddd, J = 2.0, 6.0, 9.0, H-5), 4.32 (dd, J = 6.0, 12.0, H-6), 4.52 (dd, J = 2.0, 12.0, H-6)

β-D-Galp: 5.20 (d, J = 8.0, H-1), 4.55 (dd, J = 8.0, 9.0, H-2), 4.15 (dd, J = 3.0, 9.0, H-3), 4.65 (dd, J = 1.0, 3.0, H-4), 4.03 (ddd, J = 1.0, 5.0, 7.0, H-5), 4.40 (dd, J = 5.0, 11.0, H-6), 4.52 (dd, J = 7.0, 11.0, H-6) [1]

^{13}C NMR (C_5D_5N): [1]

Table 1

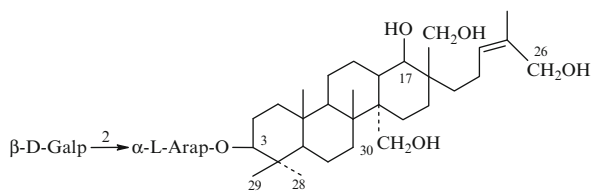
C-1	39.2	C-16	28.3	Glc-1	105.1
2	26.8	17	77.3	2	84.4
3	89.0	18	15.9	3	78.3
4	39.7	19	16.6	4	71.7
5	56.1	20	41.6	5	78.0
6	18.4	21	65.2	6	62.9
7	33.9	22	38.0	Gal-1	107.1
8	41.0	23	22.0	2	74.7
9	51.1	24	127.9	3	75.0
10	37.1	25	136.1	4	69.5
11	21.2	26	60.9	5	76.9
12	25.3	27	21.9	6	61.3
13	40.6	28	28.1		
14	42.6	29	16.6		
15	26.8	30	15.0		

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **36**(8), 2772 (1988)

Actinostemmoside F

CAS Registry Number: 108910-60-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Bacchar-24-ene-3β,17β,21,26,30-pentaol

Biological source: *Actinostemma lobatum* [1]

$C_{41}H_{70}O_{14}$: 786.476
Mp: 193–196°C (aq. MeOH) [1]
$[\alpha]_D^{19}$ + 3.6° (c 0.5, MeOH) [1]
FAB-MS *m/z*: 809 $[M + Na]^+$, 785 $[M-H]^-$ [1]
^{1}H NMR (400 MHz, J/Hz, C_5D_5N + D_2O): ca 0.80, 1.55 (H_2-1), ca 1.85, 2.05 (H_2-2), 3.19 (dd, J = 5.0, 12.0, H-3), 0.80 (H-5), ca 1.28, 1.48 (H_2-6), ca 1.55, 2.15 (H_2-7), ca 1.55 (H-9), ca 1.18, 1.55 (H_2-11), ca 1.18, 2.40 (H_2-12), 2.15 (H-13), ca 1.55, 2.05 (H_2-15), ca 1.78, 1.95 (H_2-16), 3.97 (d, J = 12.0, H-17), 1.01 (s, CH_3-18), 0.82 (s, CH_3-19), 3.98 (d, J = 12.0, H-21), 4.55 (d, J = 12.0, H-21), ca 1.9, 2.23 (H_2-22), 2.45 (H_2-23), 5.41 (t, J = 7.0, H-24), 4.45 (s-like, H_2-26), 1.97 (s, CH_3-27), 1.12 (s, CH_3-28), 1.01 (s, CH_3-29), 4.05, 4.47 (d, J = 12.0, H_2-30)
α-L-Arap: 4.96 (d, J = 5.5, H-1), 4.53 (dd, J = 5.5, 8.0, H-2), 4.38 (dd, J = 3.0, 8.0, H-3), 4.42 (ddd, J = 2.0, 3.0, 5.0, H-4), 3.85 (dd, J = 2.0, 12.0, H-5), 4.32 (dd, J = 5.0, 12.0, H-5);
β-D-Galp: 5.02 (d, J = 8.0, H-1), 4.44 (dd, J = 8.0, 9.0, H-2), 4.08 (dd, J = 3.0, 9.0, H-3), 4.58 (dd, J = 3.0, 1.0, H-4), 3.94 (ddd, J = 6.0, 8.0, 1.0, H-5), 4.30 (dd, J = 6.0, 12.0, H-6), 4.42 (dd, J = 8.0, 12.0, H-6) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

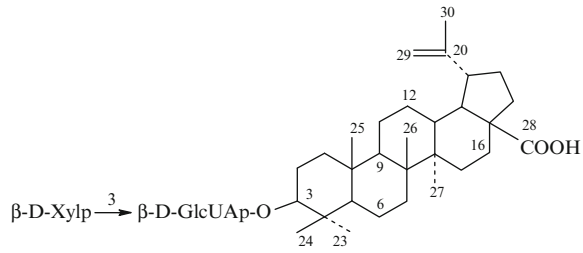
C-1	39.3	C-16	29.0	Ara-1	104.6
2	26.7	17	77.2	2	81.3
3	88.8	18	16.4	3	73.1
4	39.7	19	17.0	4	68.0
5	56.2	20	41.4	5	64.5
6	18.6	21	65.5	Gal-1	106.8
7	35.7	22	38.1	2	73.8
8	41.9	23	22.1	3	75.2
9	52.4	24	128.1	4	69.6
10	37.4	25	135.8	5	76.8
11	21.6	26	60.9	6	61.5
12	24.8	27	21.8		
13	41.6	28	28.1		
14	47.0	29	16.6		
15	20.7	30	59.4		

References

1. T. Fujioka, M. Iwamoto, Y. Iwase, H. Okabe, K. Mihashi, T. Yamauchi, Chem. Pharm. Bull. **36**(8), 2772 (1988)

Kochianoside IV

CAS Registry Number: 193894-16-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Betulinic Acid
Biological source: *Kochia scoparia* [1]
$C_{41}H_{64}O_{13}$: 764.434
Mp: 212–214°C ($CHCl_3$-MeOH) [1]
$[\alpha]_D^{21}$ + 15.5° (c 0.8, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 2962, 2898, 1736, 1719, 1655, 1040 [1]
FAB-MS (negative ion mode) *m/z*: 763 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 787.4245 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.74, 0.96, 1.02, 1.12, 1.28, 1.78 (s, CH_3-25, 24, 26, 27, 23, 30), 1.78 (m, H-18), 2.72 (dt-like, H-13), 3.39 (dd, J = 4.9, 11.6, H-3), 3.50 (m, H-19), 4.74, 4.92 (brs, CH_2-29)
β-D-GlcUAp:5.00 (d, J = 7.3, H-1)
β-D-Xylp:5.30 (d, J = 7.3, H-1) [1]
^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-18	49.9	GlcUA-1	106.8
2	26.8	19	47.8	2	74.6
3	89.4	20	151.3	3	86.6
4	39.7	21	31.3	4	71.4
5	55.9	22	37.6	5	77.5
6	18.5	23	28.0	6	172.0
7	34.9	24	16.8	Xyl-1	106.2
8	41.2	25	16.3	2	75.3
9	50.9	26	16.4	3	78.1
10	37.2	27	14.9	4	71.0
11	21.2	28	178.8	5	67.4
12	26.1	29	109.9		
13	38.7	30	19.5		

(*continued*)

Table 1 (continued)

14	42.9
15	30.3
16	32.9
17	56.7

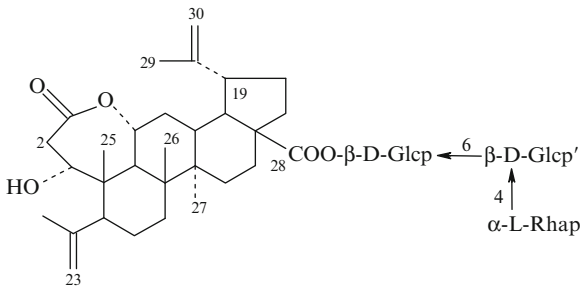
Pharm./Biol.: A Chinese natural medicine, *Kochiae Fructus*, prepared from the fruit of *Kochia scoparia* Schrad. (*Chenopodiaceae*), has been used for the treatment of pain micturition, rubella, eczema, and cutaneous pruritus in traditional Chinese preparations. The methanol extract and glycosidic fraction of *Kochiae Fructus* have inhibitory effects on the cutaneous pruritus induced by Compound 48/80 or serotonin in mice [1]

References

1. M. Yoshikawa, Y. Dai, H. Shimada, T. Morikawa, N. Matsumura, S. Yoshizumi, H. Matsuda, Matsuda Hideaki, M. Kubo, Chem. Pharm. Bull. **45**(6), 1052 (1997)

Chiisanoside

CAS Registry Number: 89354-01-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Chiisanogenin

Biological source: *Acanthopanax chiisanensis* [1], *A. divaricatus* [2]

$C_{48}H_{74}O_{19}$: 954.482

Mp: 228°C (n-BuOH) [1]

$[\alpha]_D^{14}$ + 7.7° (c 1.69, MeOH) [1]

IR ν_{max} (nujol) cm^{-1}: 3450, 1750, 1710 (COOR), 1640, 890 (C = CH_2) [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): β-D-Glcp: 6.40 (d, J = 8, H-1)

β-D-Glcp′: 5.21 (d, J = 8, H-1)

α-L-Rhap: 5.82 (s, H-1) [1]

^{13}C NMR (100 MHz, C_5D_5N): [2]

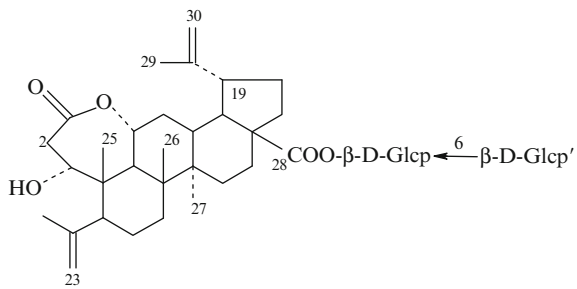
Table 1

C-1	75.0	C-16	32.5	Glc-1	95.2	Rha-1	102.5
2	38.6	17	56.7	2	73.8	2	72.5
3	173.1	18	47.5	3	78.4	3	72.3
4	147.6	19	49.5	4	70.5	4	73.8
5	49.5	20	150.7	5	76.3	5	70.2
6	25.1	21	29.5	6	69.2	6	18.3
7	33.4	22	36.8	Glc′-1	104.7		
8	41.6	23	113.9	2	75.2		
9	44.0	24	23.5	3	76.9		
10	44.0	25	18.9	4	78.4		
11	70.2	26	17.9	5	77.8		
12	32.2	27	13.8	6	61.3		
13	35.2	28	175.0				
14	42.1	29	18.9				
15	30.7	30	110.6				

References

1. R. Kasai, K. Matsumoto, S. Taniyasu, O. Tanaka, J.-H. Kim, D.-R. Hahn, Chem. Pharm. Bull. **34**(8), 3284 (1986)
2. K. Matsumoto, R. Kasai, F. Kanamaru, H. Kohda, O. Tanaka, Chem. Pharm. Bull. **35**(1), 413 (1987)

Divaroside



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Chiisanogenin

Biological source: *Acanthopanax divaricatus* [1]
$C_{42}H_{64}O_{15}$: 808.424
$[\alpha]_D^{19}$ + 30.0° (c 0.59, MeOH) [1]
IR ν_{max} (nujol) cm^{-1}: 3450, 1750, 1710 (COOR), 1640, 890 (C = CH_2) [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 6.22 (d, J = 8.0, H-1 of Glc), 5.01 (d, J = 8.0, H-1 of Glc′) [1]
^{13}C NMR (100 MHz, C_5D_5N): [1]

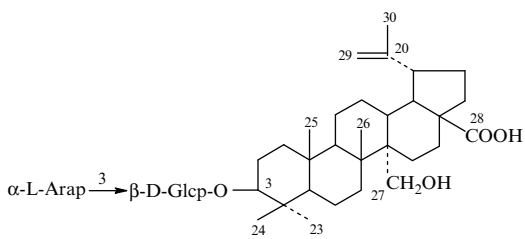
Table 1

C-1	75.1	C-16	32.2	Glc-1	95.4
2	38.8	17	56,8	2	74.1
3	173.0	18	47.6	3	78.1
4	147.7	19	49.6	4	70.9
5	49.6	20	150.1	5	78.4
6	25.1	21	29.5	6	69.5
7	33.5	22	36.8	Glc′-1	105.3
8	41.7	23	113.9	2	75.2
9	44.1	24	23.5	3	78.4
10	44.1	25	18.9	4	71.5
11	70.5	26	18.0	5	78.7
12	32.2	27	13.0	6	62.6
13	35.2	28	175.1		
14	42.2	29	19.1		
15	30.8	30	110.7		

References

1. K. Matsumoto, R. Kasai, F. Kanamaru, H. Kohda, O. Tanaka, Chem. Pharm. Bull. **35**(1), 413 (1987)

Non-name



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Cylicodiscis Acid
Biological source: *Cylicodiscus gabunensis* [1]
$C_{41}H_{66}O_{13}$: 766.450
$[\alpha]_D^{20}$ + 17° (c 1.2, EtOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3783-3100, 3070, 2944, 2890, 1701, 1643, 1458, 1384, 1160, 1080, 885, 781, 638 [1]
FAB-MS *m/z*: 765 $[M-H]^-$ (19), 633 $[765-132]^-$ (8), 615 $[633-18]^-$ (7), 471 $[633-162]^-$ (11), 291 (4), 275 (18), 219 (4), 183 $[Glc-H]^-$ (100) [1]
^{1}H NMR (250 MHz, J/Hz, C_5D_5N): 0.86, 0.94, 0.98, 1.10, 1.18, 1.75 (s, CH_3 × 6), 2.45 (dd, H-2), 2.8 (dd, H-16), 2.95 (m, H-13 or H-1) 3.30 (dd, H-3), 3.60 (m, H-19), 4.50 (d, J = 9.0, H_2-27), 4.73 (s, H-29), 4.92 (s, H-29)
α-L-Arap: 5.21 (d, J = 7.2, H-1), 3.75 (d, J = 10.0, H-5), 3.9-4.3 (H-2, 3, 4, 5)
β-D-Glcp: 4.82 (d, J = 7.8, H-1), 3.9–4.3 (H-2, 3, 4, 6), 4.45 (m, H-5, 6) [1]
^{13}C NMR (C_5D_5N): [1]

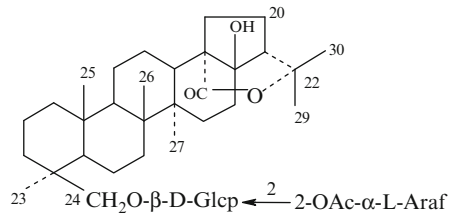
Table 1

C-1	39.71	C-16	34.10	Glc-1	106.16
2	24.27	17	56.70	2	74.49
3	87.36	18	50.23	3	89.10
4	39.39	19	47.90	4	69.42
5	56.13	20	151.05	5	78.07
6	18.62	21	31.29	6	62.56
7	36.09	22	27.90	Ara-1	106.43
8	42.10	23	27.98	2	72.82
9	52.20	24	16.86	3	74.76
10	37.44	25	17.08	4	69.72
11	21.59	26	16.86	5	67.43
12	26.20	27	60.06		
13	39.38	28	180.00		
14	46.92	29	110.40		
15	26.80	30	19.60		

References

1. H.P. Tchivounda, B. Koudogbo, Y. Besace, E. Casadevall, Phytochemistry **30**, 2711 (1991)

2″-O-Acetyl Glycoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-lactone-17β,24-diol
Biological source: *Diplazium subsinuatum* [1]
$C_{43}H_{68}O_{14}$: 808.460
Mp: 274–276°C (MeOH) [1]
$[\alpha]_D$ −2.1° (c 1.0, C_5H_5N) [1]
IR (KBr) ν_{max} cm^{-1}: 3380, 2910, 1720, 1070, 1040 [1]
FAB-MS *m/z*: 807.4532 $(M-H)^-$, 633 $[M-H-CH_2CO-Ara]^-$ [1]
EI-MS *m/z*: 472 (27, Agl)$^+$, 454 (30), 441 (37), 410 (24), 385 (17), 207 (100), 189 (98), 109 (78) [1]
^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.79 (s, CH_3-25), 1.12 (s, CH_3-26), 1.17 (s, CH_3-27), 1.23 (s, CH_3-23), 1.26 (s, CH_3-30), 1.50 (s, CH_3-29), 3.87 (d, J = 9.5), 4.06 (d, J = 9.5, H_2-24)
β-D-Glcp: 4.92 (d, J = 7.8, H-1), 4.23 (dd, J = 9.0, 7.8, H-2), 4.30 (dd, J = 9.0, 9.0, H-3), 4.18 (dd, J = 9.0, 9.0, H-4), 3.91 (ddd, J = 9.0, 4.8, 2.4, H-5), 4.53 (dd, J = 12.0, 2.4, H-6), 4.36 (dd, J = 12.0, 4.8, H-6)
α-L-Araf: 6.32 (s, H-1), 5.92 (d, J = 1.8, H-2), 4.91 (H-3), 5.03 (ddd, J = 4.2, 4.2, 4.2, H-4), 4.34 (dd, J = 11.5, 4.2, H-5), 4.32 (dd, J = 11.5, 4.2, H-5), 1.88 (s, Ac- at C-2) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

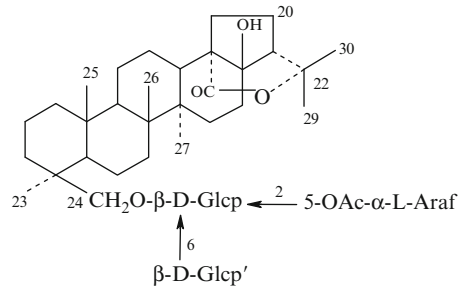
C-1	40.6	C-16	31.5	Glc-1	104.0
2	18.8	17	77.9	2	77.9
3	36.6	18	55.7	3	78.3
4	38.3	19	33.8	4	71.6
5	57.4	20	23.5	5	78.3
6	19.2	21	53.3	6	62.7
7	34.6	22	80.1	Ara-1	106.6
8	42.3	23	28.3	2	84.6
9	51.4	24	72.9	3	76.4
10	37.7	25	16.8	4	87.4
11	22.4	26	16.8	5	62.2
12	25.4	27	15.9	Ac-1	170.3
13	41.1	28	176.6	2	20.7
14	42.2	29	30.5		
15	27.6	30	29.3		

Pharm./Biol.: This plant has been used as a folk medicine (diuretic, hydragogue, etc.) in China [1]

References

1. T. Nakanishi, Y. Inatomi, M. Nishi, H. Murata, A. Inada, Chem. Pharm. Bull. **45**(1), 8 (1997)

5″-O-Acetyl Glycoside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-lactone-17β,24-diol
Biological source: *Diplazium subsinuatum* [1]
$C_{49}H_{78}O_{19}$: 970.513
Mp: 271–273°C (MeOH) [1]
$[\alpha]_D$ + 14.1° (c 1.0, C_5H_5N) [1]

FAB-MS *m/z*: 969.5085 $(M\text{-}H)^-$, 927 $[M\text{-}H\text{-}CH_2\text{-}CO]^-$, 807 $[M\text{-}H\text{-}Glc]^-$, 795 [927-Ara]$^-$, 765 [927-Glc], 633 [795-Glc]$^-$ [1]

EI-MS *m/z*: 472 (9, Agl)$^+$, 454 (15), 441 (18), 410 (16), 358 (10), 207 (100), 189 (63), 109 (48) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 2910, 1720, 1070, 1040 [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.86 (s, CH_3-25), 1.15 (s, CH_3-26), 1.17 (s, CH_3-27), 1.24 (s, CH_3-23), 1.26 (s, CH_3-30), 1.49 (s, CH_3-29), 3.86 (d, J = 9.5), 4.12 (d, J = 9.5, H_2-24)

β-D-Glcp: 4.83 (d, J = 7.8, H-1), 4.09 (dd, J = 9.0, 7.8, H-2), 4.20 (H-3), 4.02 (H-4), 4.02 (H-5), 4.77 (d, J = 10.8, H-6), 4.29 (dd, J = 10.8, 5.4, H-6)

α-L-Araf: 6.38 (s, H-1), 5.01 (d, J = 3.0, H-2), 4.62 (dd, J = 5.4, 3.0, H-3), 4.97 (ddd, J = 6.0, 5.4, 3.6, H-4), 4.80 (dd, J = 11.4, 3.6, H-5), 4.65 (dd, J = 11.4, 6.0, H-5), 1.98 (s, Ac- at C-5)

β-D-Glcp′: 5.05 (d, J = 7.8, H-1), 4.02 (H-2), 4.20 (H-3), 4.20 (H-4), 3.91 (ddd, J = 9.0, 5.4, 2.4, H-5), 4.49 (dd, J = 12.0, 2.4, H-6), 4.34 (dd, J = 12.0, 5.4, H-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

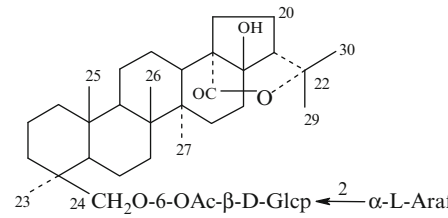
C-1	40.7	C-16	31.5	Glc-1	103.8	Glc′-1	105.3
2	18.9	17	77.9	2	77.9	2	75.2
3	36.6	18	55.8	3	78.4	3	78.4
4	38.3	19	33.8	4	71.7	4	71.7
5	57.5	20	23.5	5	77.0	5	78.4
6	19.3	21	53.3	6	69.9	6	62.8
7	34.7	22	80.1	Ara-1	109.5		
8	42.3	23	28.3	2	82.4		
9	51.4	24	73.0	3	79.5		
10	37.7	25	16.9	4	83.4		
11	22.4	26	16.8	5	65.3		
12	25.4	27	15.9	Ac-1	170.7		
13	41.1	28	176.7	2	20.7		
14	42.2	29	30.5				
15	27.6	30	29.3				

Pharm./Biol.: This plant has been used as a folk medicine (diuretic, hydragogue, etc.) in China [1]

References

1. T. Nakanishi, Y. Inatomi, M. Nishi, H. Murata, A. Inada, Chem. Pharm. Bull. **45**(1), 8 (1997)

6′-O-Acetyl Glycoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-lactone-17β,24-diol

Biological source: *Diplazium subsinuatum* [1]

$C_{43}H_{68}O_{14}$: 808.460

Mp: 278–280°C (MeOH) [1]

$[\alpha]_D$ −4.8° (c 1.0, C_5H_5N) [1]

FAB-MS *m/z*: 807.4573 $(M\text{-}H)^-$, 675 [M-H-Ara]$^-$ [1]

EI-MS *m/z*: 472 (10, Agl)$^+$, 454 (19), 441 (21), 410 (16), 385 (10), 207 (100), 189 (77), 109 (64) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 2910, 1720, 1070, 1040 [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.88 (s, CH_3-25), 1.17 (s, CH_3-26), 1.18 (s, CH_3-27), 1.21 (s, CH_3-23), 1.26 (s, CH_3-30), 1.50 (s, CH_3-29), 3.88 (d, J = 9.5), 4.07 (d, J = 9.5, H_2-24)

β-D-Glcp: 4.88 (d, J = 7.8, H-1), 4.15 (dd, J = 9.0, 7.8, H-2), 4.25 (dd, J = 9.0, 9.0, H-3), 4.00 (dd, J = 9.0, 9.0, H-4), 3.96 (ddd, J = 9.0, 5.5, 2.5, H-5), 4.89 (dd, J = 12.0, 5.5, H-6), 4.77 (dd, J = 12.0, 5.5, H-6), 2.00 (s, Ac- at C-6)

α-L-Araf: 6.41 (s, H-1), 5.06 (brs, H-2), 4.90 (H-3), 5.00 (ddd, J = 4.2, 4.2, 4.2, H-4), 4.36 (dd, J = 11.5, 4.2, H-5), 4.28 (dd, J = 11.5, 4.2, H-5) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	40.7	C-16	31.5	Glc-1	103.8
2	18.8	17	77.9	2	77.3
3	36.8	18	55.8	3	78.1
4	38.2	19	33.8	4	71.4
5	57.4	20	23.5	5	75.0
6	19.3	21	53.4	6	64.4
7	34.7	22	80.1	Ac-1	170.7
8	42.3	23	28.2	2	20.8

(*continued*)

Table 1 (continued)

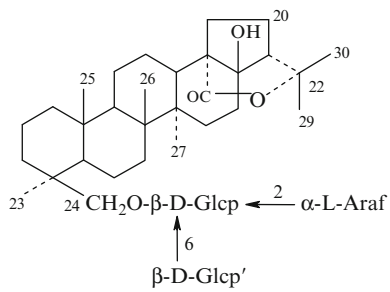
9	51.4	24	72.7	Ara-1	109.6
10	37.7	25	16.8	2	81.3
11	22.5	26	16.8	3	79.0
12	25.4	27	15.9	4	88.2
13	41.1	28	176.6	5	62.7
14	42.3	29	30.5		
15	27.6	30	29.3		

Pharm./Biol.: This plant has been used as a folk medicine (diuretic, hydragogue, etc.) in China [1]

References

1. T. Nakanishi, Y. Inatomi, M. Nishi, H. Murata, A. Inada, Chem. Pharm. Bull. **45**(1), 8 (1997)

Diplazioside I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-lactone-17β,24-diol

Biological source: *Diplazium subsinuatum* [1]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 290–291°C (MeOH) [1]

$[\alpha]_D$ −17.8° (c 1.00, C_5H_5N) [1]

HR-FAB-MS *m/z*: 911.5016 $[M-H]^-$, 779 [M-H-Ara]$^-$, 749 [M-H-Glc]$^-$, 617 [M-H-Ara-Glc]$^-$ [1]

EI-MS *m/z*: 456 (17), 438 (24), 425 (37), 207 (100), 189 (44), 176 (37), 147 (58), 109 (48) [1]

IR (KBr) ν_{max} cm^{-1}: 3370, 2930, 1720 (δ-lactone), 1060, 1040 [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.75 (ddd, J = 13.2, 13.2, 3.6, Hα-1), 1.60 (brd, J = 13.2, Hβ-1), 1.68 (Hα-2), 1.74 (Hβ-2), 1.00 (ddd, J = 13.2, 13.2, 3.6, Hα-3), 2.22 (brd, J = 13.2, Hβ-3), 0.86 (brd, J = 11.0, Hα-5), 1.72 (m, Hα-6), 1.47 (ddd, J = 13.2, 11.0, 3.6, Hβ-6), 1.26 (Hα-7), 1.36 (m, Hβ-7), 1.38 (Hα-9), 1.50 (m, Hα-11), 1.15 (m, Hβ-11), 2.76 (dddd, J = 3 × 13.2, 4.8, Hα-12), 1.72 (Hβ-12), 1.54 (Hβ-13), 1.26 (Hα-15), 1.26 (Hβ-15), 1.68 (m, Hα-16), 1.68 (m, Hβ-16), 1.26 (Hβ-17), 1.54, 1.81 (H_2-19), 1.54, 184 (m, H_2-20), 1.96 (brdd, J = 2 × 4.2, Hβ-21), 1.21 (s, CH_3-23), 4.24, 3.81 (dd, J = 9.6, H_2-24), 0.89 (s, CH_3-25), 0.94 (s, CH_3-26), 1.05 (s, CH_3-27), 1.39 (s, CH_3-29), 1.20 (s, CH_3-30); β-D-Glcp: 4.79 (d, J = 7.8, H-1), 3.99 (dd, J = 9.0, 7.8, H-2), 4.15 (dd, J = 9.0, H-3), 4.00 (dd, J = 9.0, H-4), 3.99 (H-5), 4.73 (d, J = 10.8, H-6), 4.28 (dd, J = 10.8, 5.4, H-6); α-L-Araf: 6.28 (s, H-1), 4.93 (d, J = 1.8, H-2), 4.80 (H-3), 4.91 (ddd, J = 3 × 4.2, H-4), 4.28, 4.20 (dd, J = 11.5, 4.2, H_2-5); β-D-Glcp′: 5.04 (d, J = 7.8, H-1), 3.98 (dd, J = 9.0, 7.8, H-2), 4.17 (dd, J = 9.0, H-3), 4.13 (dd, J = 9.0, H-4), 3.88 (ddd, J = 9.0, 5.4, 2.4, H-5), 4.46 (dd, J = 12.0, 2.4, H-6), 4.29 (dd, J = 12.0, 5.4, H-6) [1]

^{13}C NMR (150.0 MHz, C_5D_5N): [1]

Table 1

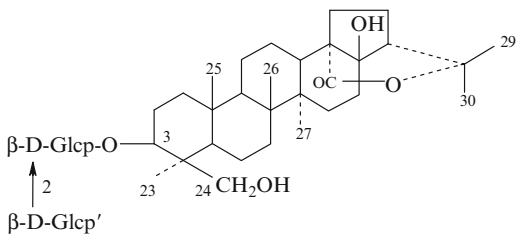
C-1	40.7	C-13	49.8	C-25	17.0	Glc-1	103.9	Glc′-1	105.1
2	18.8	14	41.7	26	16.4	2	77.4	2	75.1
3	36.7	15	32.7	27	16.1	3	77.9	3	78.2
4	38.2	16	24.9	28	175.8	4	71.4	4	71.6
5	57.4	17	50.1	29	29.4	5	77.0	5	78.2
6	19.3	18	50.6	30	29.8	6	69.7	6	62.7
7	34.5	19	35.5			Araf-1	109.4		
8	42.8	20	25.1			2	81.0		
9	51.4	21	45.7			3	78.8		
10	37.6	22	81.7			4	88.1		
11	22.1	23	28.3			5	62.6		
12	25.9	24	73.1						

References

1. T. Nakanishi, Y. Inatomi, M. Nishi, H. Murata, A. Inada, S. Aibara, Chem. Pharm. Bull. **43**(12), 2256 (1995)

Diplazioside VI

CAS Registry Number: 324529-39-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-lactone-17β,24-diol

Biological source: *Diplazium subsinuatum* [1]

$C_{42}H_{68}O_{15}$: 812.455

Mp: 293–295°C [1]

$[\alpha]_D$ + 2.9°(c 1.0, C_5H_5N) [1]

FAB-MS *m/z*: 811.4469 $[M-H]^-$, 649 $[M-H-Glc]^-$, 487 $[M-H-2Glc]^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3420, 1732, 1078, 1040 [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.74 (ddd, J = 13.2, 13.2, 3.6, Hα-1), 1.46 (Hβ-1), 2.32 (Hα-2), 1.89 (Hβ-2), 3.45 (dd, J = 11.7, 4.2, H-3), 0.79 (d, J = 12.0, H-5), 1.51 (Hα-6), 1.25 (Hβ-6), 1.25 (Hα-7), 1.44 (Hβ-7), 1.30 (H-9), 1.51 (Hα-11), 1.25 (Hβ-11), 2.84 (dddd, J = 13.2, 13.2, 13.2, 4.2, H-12), 1.77 (brd, J = 13.2, H-12), 2.64 (dd, J = 13.2, 3.2, Hβ-13), 1.11 (Hα-15), 2.42 (ddd, J = 13.2, 13.2, 4.2, Hβ-15), 2.27 (ddd, J = 13.2, 13.2, 4.2, Hα-16), 2.04 (brd, J = 13.2, Hβ-16), 5.89 (s, HO-17), 1.92 (H-19), 2.11 (ddd, J = 12.8, 12.8, 3.6, H-19), 1.91 (H-20), 2.39 (H-20), 2.23 (d, J = 6.6, Hβ-21), 1.36 (s, CH_3-23), 4.31 (d, J = 10.8, H-24), 3.36 (dd, J = 10.8, 11.4, H-24), 4.34 (d, J = 11.4, HO-24), 0.65 (s, CH_3-25), 1.12 (s, CH_3-26), 1.18 (s, CH_3-27), 1.51 (s, CH_3-29), 1.27 (s, CH_3-30); β-D-Glcp: 4.88 (d, J = 7.8, H-1), 4.08 (dd, J = 7.8, 9.0, H-2), 4.28 (dd, J = 9.0, 9.0, H-3), 4.17 (dd, J = 9.0, 9.0, H-4), 3.94 (ddd, J = 9.0, 5.4, 2.4, H-5), 4.36 (H-6), 4.58 (dd, J = 11.7, 2.4, H-6); β-D-Glcp′: 5.53 (d, J = 7.8, H-1), 4.09 (dd, J = 7.8, 9.0, H-2), 4.19 (dd, J = 9.0, 9.0, H-3), 4.38 (dd, J = 9.0, 9.0, H-4), 3.73 (ddd, J = 9.0, 2.4, 2.4, H-5), 4.34 (H-6), 4.38 (H-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

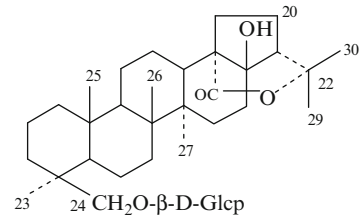
C-1	38.8	C-16	31.5	Glc-1	104.5
2	26.8	17	77.9	2	82.6
3	90.6	18	55.7	3	78.9
4	43.8	19	33.8	4	71.2
5	56.2	20	23.5	5	78.5
6	18.6	21	53.3	6	62.8
7	34.4	22	80.2	Glc′-1	105.2
8	42.0	23	22.6	2	75.8
9	50.9	24	63.4	3	78.3
10	36.7	25	16.3	4	69.9
11	22.6	26	16.6	5	78.4
12	25.3	27	15.9	6	61.6
13	41.1	28	176.7		
14	42.3	29	29.3		
15	27.6	30	30.5		

Pharm./Biol.: Used as a folk medicine (diuretic, hydragogue, etc.) in China [1]

References

1. Y. Inatomi, A. Inada, H. Murata, M. Nishi, T. Nakanishi, Chem. Pharm. Bull. **48**, 1930 (2000)

Glycoside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-lactone-17β,24-diol

Biological source: *Diplazium subsinuatum* [1]

$C_{36}H_{58}O_9$: 634.408

Mp: 305–310°C (MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 2925, 1720, 1080, 1020 [1]

MS *m/z*: 634 (M^+), 472, 454, 410, 207, 189, 109 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.89, 1.11, 1.17, 1.17, 1.26, 1.49 (s, CH_3 × 6), 4.86 (d, J = 8, H-1 of Glc) [1]

^{13}C NMR (C_5D_5N): [1]

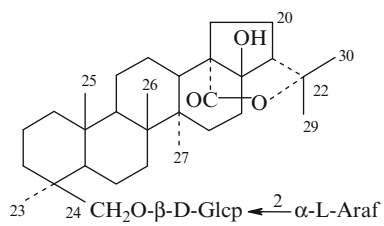
Table 1

C-1	40.6	C-16	31.5	Glc-1	104.0
2	18.8	17	77.9	2	75.4
3	37.7	18	55.8	3	78.2
4	38.5	19	33.8	4	71.6
5	57.4	20	23.5	5	78.4
6	19.1	21	53.3	6	62.9
7	34.6	22	80.1		
8	42.2	23	28.1		
9	51.4	24	73.0		
10	37.7	25	16.8		
11	22.4	26	16.8		
12	25.4	27	15.9		
13	41.0	28	176.6		
14	42.2	29	30.5		
15	27.5	30	29.3		

References

1. N. Tanaka, K. Yamauchi, T. Murakami, Y. Saiki, C.-M. Chen, Chem. Pharm. Bull. **30**(10), 3632 (1982)

Glycoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-lactone-17β,24-diol

Biological source: *Diplazium subsinuatum* [1]

$C_{41}H_{66}O_{13}$: 766.450

Mp: 295–301°C (MeOH) [1]

$[\alpha]_D^{20}$ −1.6° (c 0.60, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 2920, 1710, 1070, 1020 [1]

MS *m/z*: 634, 472 (Aglycon), 454, 410, 369, 207, 109 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.77 (3H, s), 1.09 (3H, s), 1.14 (3H, s), 1.19 (3H, s), 1.25 (3H, s), 1.49 (3H, s) [1]

^{13}C NMR (C_5D_5N): [1]

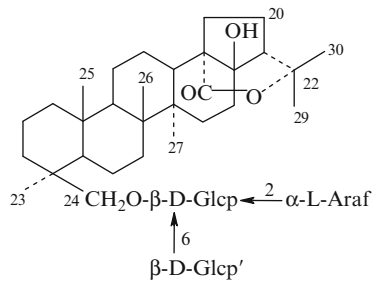
Table 1

C-1	40.7	C-16	31.4	Glc-1	104.2
2	18.8	17	77.8	2	78.7
3	36.3	18	55.7	3	77.7
4	38.2	19	33.7	4	71.5
5	57.4	20	23.4	5	78.1
6	19.0	21	53.2	6	62.6
7	34.5	22	80.0	Ara-1	109.4
8	42.2	23	28.1	2	80.8
9	51.3	24	72.7	3	78.1
10	37.6	25	16.8	4	88.2
11	22.4	26	16.8	5	62.6
12	25.3	27	15.8		
13	40.9	28	176.5		
14	42.2	29	30.4		
15	27.5	30	29.2		

References

1. N. Tanaka, K. Yamauchi, T. Murakami, Y. Saiki, C.-M. Chen, Chem. Pharm. Bull. **30**(10), 3632 (1982)

Glycoside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-lactone-17β,24-diol

Biological source: *Diplazium subsinuatum* [1,2]

$C_{47}H_{76}O_{18}$: 928.503

Mp: 278–280°C [1]

$[\alpha]_D$ −14.9° (c 1.00, C_5H_5N) [1]

IR (KBr) ν_{max} cm^{-1}: 3370, 2930, 1700, 1040, 1020 [1]

FAB-MS *m/z*: 927 $[M\text{-}H]^-$, 795 $[M\text{-}H\text{-}Ara]^-$, 765 $[M\text{-}H\text{-}Glc]^-$, 633 $[M\text{-}H\text{-}Ara\text{-}Glc]^-$ [2]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.76 (ddd, J = 13.0, 13.0, 3.5, Hα-1), 1.61 (brd, J = 13.0, Hβ-1),

1.40 (m, Hα-2), 1.76 Hβ-2), 1.01 (ddd, J = 13.0, 13.0, 3.5, Hα-3), 2.28 (brd, J = 13.0, Hβ-3), 0.89 (brd, J = 10.5, Hα-5), 1.70 (m, Hα-6), 1.46 (m, Hβ-6), 1.30 (m, Hα-7), 1.31 (m, Hβ-7), 1.42 (brd, J = 9.0, Hα-9), 1.58 (brd, J = 13.0, Hα-11), 1.24 (m, Hβ-11), 2.83 (dddd, J = 3 × 13.0, 4.5, Hα-12), 1.76 (Hβ-12), 2.62 (dd, J = 13.0, 3.5, Hβ-13), 1.05 (brd, J = 13.0, Hα-15), 2.38 (ddd, J = 13.0, 13.0, 4.5, Hβ-15), 2.24 (ddd, J = 13.0, 13.0, 4.5, Hα-16), 2.01 (brd, J = 13.0, Hβ-16), 5.78 (brs, HO-17), 2.10 (ddd, J = 13.0, 13.0, 3.5, H-19), 1.90 (m, H-19), 2.40, 1.89 (m, H_2-20), 2.24 (d, J = 6.5, Hβ-21), 1.23 (s, CH_3-23), 4.12, 3.85 (dd, J = 9.5, H_2-24), 0.86 (s, CH_3-25), 1.13 (s, CH_3-26), 1.14 (s, CH_3-27), 1.49 (s, CH_3-29H), 1.26 (s, CH_3-30); β-D-Glcp: 4.82 (d, J = 7.8, H-1), 4.01 (dd, J = 9.0, 7.8, H-2), 4.18 (dd, J = 9.0, 9.0, H-3), 4.05 (dd, J = 9.0, 9.0, H-4), 4.00 (H-5), 4.76 (dd, J = 10.8, 1.5, H-6), 4.29 (dd, J = 10.8, 5.3, H-6); α-L-Araf: 6.31 (s, H-1), 4.97 (d, J = 1.5, H-2), 4.83 (H-3), 4.94 (ddd, J = 3 × 4.2, H-4), 4.30, 4.23 (dd, J = 11.5, 4.2, H_2-5); β-D-Glcp′: 5.04 (d, J = 7.8, H-1), 4.00 (dd, J = 9.0, 7.8, H-2), 4.19 (dd, J = 9.0, 9.0, H-3), 4.16 (dd, J = 9.0, 9.0, H-4), 3.90 (ddd, J = 9.0, 5.4, 2.4, H-5), 4.48 (dd, J = 12.0, 2.4, H-6), 4.31 (dd, J = 12.0, 5.4, H-6) [2]

^{13}C NMR (150.0 MHz, C_5D_5N): [2]

Table 1

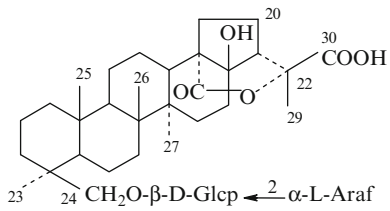
C-1	40.7	C-12	25.4	C-23	28.4	Glc-1	104.0	Glc′-1	105.3
2	18.9	13	41.0	24	73.1	2	77.4	2	75.2
3	36.7	14	42.2	25	16.9	3	78.0	3	78.4
4	38.3	15	27.6	26	16.8	4	71.5	4	71.7
5	57.5	16	31.4	27	15.8	5	77.0	5	78.3
6	19.3	17	77.9	28	176.7	6	69.8	6	62.8
7	34.7	18	55.7	29	29.3	Ara-1	109.5		
8	42.3	19	33.8	30	30.5	2	81.0		
9	51.4	20	23.5			3	78.9		
10	37.7	21	53.3			4	88.3		
11	22.4	22	80.1			5	62.7		

References

1. N. Tanaka, K. Yamauchi, T. Murakami, Y. Saiki, C-M. Chen. Chem. Pharm. Bull. **30**, 3632 (1982)
2. T. Nakanishi, Y. Inatomi, M. Nishi, H. Murata, A. Inada, S. Aibara, Chem. Pharm. Bull. **43**(12), 2256 (1995)

Diplazioside II

CAS Registry Number: 172617-77-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-olide-17β,24-dihydroxy-30-oic Acid

Biological source: *Diplazium subsinuatum* [1]

$C_{41}H_{64}O_{15}$: 796.424

Mp: >300°C (MeOH) [1]

$[\alpha]_D$ + 16.5° (c 1.00, C_5H_5N) [1]

HR-FAB-MS *m/z*: 795.4156 $[M-H]^-$, 663 [M-H-Ara]$^-$, 501 [M-H-Ara-Glc]$^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3380 (OH), 2910, 1720 (δ-lactone), 1700 (COOH), 1080, 1030 [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.81 (m, Hα-1), 1.63 (brd, J = 13.2, Hβ-1), 1.44 (m, Hα-2), 1.74 (m, Hβ-2), 1.05 (ddd, J = 13.2, 13.2, 3.5, Hα-3), 2.38 (brd, J = 13.2, Hβ-3), 0.91 (brs, J = 12.0, Hα-5), 1.58 (m, Hα-6), 1.29 (m, Hβ-6), 1.31 (m, Hα-7), 1.46 (Hβ-7), 1.46 (Hα-9), 1.59 (m, Hα-11), 1.27 (m, Hβ-11), 2.87 (m, Hα-12), 1.79 (brd, J = 13.2, Hβ-12), 2.70 (dd, J = 13.2, 3.5, Hβ-13), 1.14 (brd, J = 13.2, Hα-15), 2.46 (ddd, J = 13.2, 13.2, 4.0, Hβ-15), 2.35 (ddd, J = 13.2, 13.2, 4.0, Hα-16), 2.12 (m, Hβ-16), 2.14 (m, H-19), 2.00, 2.67 (m, H_2-20), 2.89 (d, J = 7.0, Hβ-21), 1.22 (s, CH_3-23), 4.05, 3.92 (dd, J = 9.5, H_2-24), 0.80 (s, CH_3-25), 1.12 (s, CH_3-26), 1.21 (s, CH_3-27), 1.99 (s, CH_3-29)

β-D-Glcp: 4.93 (d, J = 7.8, H-1), 4.12 (dd, J = 9.1, 7.8, H-2), 4.29 (dd, J = 9.1, 9.1, H-3), 4.18 (dd, J = 9.1, 9.1, H-4), 3.91 (ddd, J = 9.1, 5.2, 2.5, H-5), 4.53 (dd, J = 11.8, 2.5, H-6), 4.37 (dd, J = 11.8, 5.2, H-6)

α-L-Araf: 6.39 (s, H-1), 5.05 (d, J = 2.2, H-2), 4.88 (dd, J = 4.1, 2.2, H-3), 4.97 (ddd, J = 3 × 4.1, H-4), 4.33, 4.25 (dd, J = 11.3, 4.1, H_2-5) [1]

^{13}C NMR (150.0 MHz, C_5D_5N): [1]

Table 1

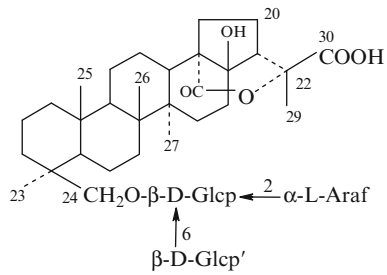
C-1	40.7	C-16	31.1	Glc-1	104.4
2	18.9	17	77.5	2	77.8
3	36.5	18	56.7	3	78.3
4	38.4	19	34.3	4	71.7
5	57.5	20	27.1	5	78.4
6	19.1	21	51.2	6	62.7
7	34.7	22	84.3	Ara-1	109.6
8	42.3	23	28.3	2	81.1
9	51.4	24	72.9	3	79.0
10	37.7	25	16.9	4	88.4
11	22.4	26	16.8	5	62.8
12	25.3	27	15.9		
13	41.1	28	175.9		
14	42.3	29	25.5		
15	27.4	30	175.6		

References

1. T. Nakanishi, Y. Inatomi, M. Nishi, H. Murata, A. Inada, S. Aibara, Chem. Pharm. Bull. **43**(12), 2256 (1995)

Diplazioside IV

CAS Registry Number: 187142-70-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-olide-17β,24-dihydroxy-30-oic Acid

Biological source: *Diplazium subsinuatum* [1]

$C_{47}H_{74}O_{20}$: 958.477

Mp: >300°C [1]

$[\alpha]_D$ −20.1° (c 1.0, C_5H_5N) [1]

FAB-MS *m/z*: 957.4686 $[M-H]^-$, 825 $[M-H-Ara]^-$, 795 $[957-Glc]^-$, 663 [825-Glc] [1]

EI-MS *m/z*: 502 (9, agl)$^+$, 484 (29), 472 (57), 471 (48), 410 (16), 396 (78), 207 (100) [1]

IR (KBr) ν_{max} cm^{-1}: 3380, 2910, 1720, 1700, 1080, 1030 [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.88 (s, CH_3-25), 1.16 (s, CH_3-26), 1.21 (s, CH_3-27), 1.25 (s, CH_3-23), 1.98 (s, CH_3-29), 3.86 (d, J = 9.6), 4.15 (d, J = 9.6, H_2-24)

β-D-Glcp: 4.84 (d, J = 7.8, H-1), 4.03 (dd, J = 9.0, 7.8, H-2), 4.19 (dd, J = 9.0, 9.0, H-3), 4.05 (dd, J = 9.0, 9.0, H-4), 4.02 (H-5), 4.77 (d, J = 10.8, H-6), 4.31 (dd, J = 10.8, 5.4, H-6)

α-L-Araf: 6.33 (s, H-1), 4.98 (d, J = 1.8, H-2), 4.84 (H-3), 4.96 (ddd, J = 4.2, 4.2, 4.2, H-4), 4.32 (dd, J = 11.5, 4.2, H-5), 4.24 (dd, J = 11.5, 4.2, H-5)

β-D-Glcp′: 5.07 (d, J = 7.8, H-1), 4.01 (dd, J = 9.0, 7.8, H-2), 4.20 (dd, J = 9.0, 9.0, H-3), 4.18 (dd, J = 9.0, 9.0, H-4), 3.91 (ddd, J = 9.0, 5.4, 2.4, H-5), 4.49 (dd, J = 12.0, 2.4, H-6), 4.33 (dd, J = 12.0, 5.4, H-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	40.7	C-16	31.0	Glc-1	104.0	Glc′-1	105.3
2	18.9	17	77.4	2	77.5	2	75.2
3	36.7	18	56.7	3	78.0	3	78.4
4	38.3	19	34.2	4	71.6	4	71.7
5	57.5	20	27.1	5	77.1	5	78.4
6	19.3	21	51.1	6	69.8	6	62.8
7	34.7	22	84.2	Ara-1	109.5		
8	42.3	23	28.4	2	81.0		
9	51.4	24	73.1	3	78.9		
10	37.7	25	16.9	4	88.3		
11	22.4	26	16.8	5	62.7		
12	25.3	27	15.9				
13	41.0	28	175.8				
14	42.3	29	25.5				
15	27.4	30	175.5				

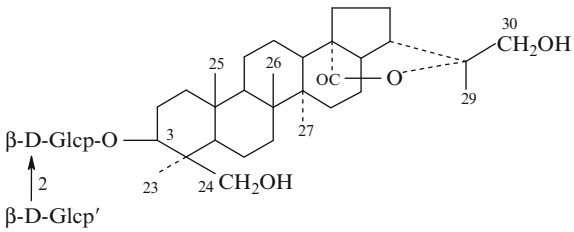
Pharm./Biol.: This plant has been used as a folk medicine (diuretic, hydragogue, etc.) in China [1]

References

1. T. Nakanishi, Y. Inatomi, M. Nishi, H. Murata, A. Inada, Chem. Pharm. Bull. **45**(1), 8 (1997)

Diplazioside VII

CAS Registry Number: 324529-40-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hopan-28,22-olide-24,30-diol

Biological source: *Diplazium subsinuatum* [1]

$C_{42}H_{68}O_{15}$: 812.455

Mp: 286–288°C [1]

$[\alpha]_D$ −8.0° (c 0.5, C_5H_5N) [1]

FAB-MS *m/z*: 811.4487 $[M-H]^-$, 649 $[M-H-Glc]^-$ [1]

IR (KBr) ν_{max} cm^{-1}: 3396, 1734, 1078, 1040 [1]

^{1}H NMR (600 MHz, J/Hz, C_5D_5N): 0.74 (ddd, J = 13.2, 13.2, 3.6, Hα-1), 1.46 (Hβ-1), 2.33 (m, Hα-2), 1.90 (Hβ-2), 3.45 (dd, J = 11.7, 4.2, H-3), 0.78 (brd, J = 12.0, H-5), 1.53 (brd, J = 13.2, Hα-6), 1.24 (Hβ-6), 1.24 (Hα-7), 1.37 (Hβ-7), 1.30 (H-9), 1.46 (Hα-11), 1.15 (Hβ-11), 2.77 (dddd, J = 13.2, 13.2, 13.2, 4.2, H-12), 1.77 (brd, J = 13.2, H-12), 1.61 (Hβ-13), 1.28 (Hα-15), 1.37 (Hβ-15), 1.83 (dddd, J = 13.2, 13.2, 13.2, 3.6, Hα-16), 1.74 (brd, J = 13.2, Hβ-16), 1.36 (H-17), 1.63 (H-19), 2.00 (m, H-19), 1.63 (H-20), 2.24 (H-20), 2.30 (brdd, J = 4.8, 4.8, Hβ-21), 1.36 (s, CH_3-23), 4.32 (d, J = 10.8, H-24), 3.38 (dd, J = 10.8, 11.4, H-24), 4.35 (d, J = 11.4, HO-24), 0.67 (s, CH_3-25), 0.94 (s, CH_3-26), 1.13 (s, CH_3-27), 1.62 (s, CH_3-29), 3.76 (s, H_2-30); β-D-Glcp: 4.88 (d, J = 7.8, H-1), 4.08 (dd, J = 7.8, 9.0, H-2), 4.28 (dd, J = 9.0, 9.0, H-3), 4.16 (dd, J = 9.0, 9.0, H-4), 3.94 (ddd, J = 9.0, 5.4, 2.4, H-5), 4.36 (H-6), 4.59 (dd, J = 11.7, 2.4, H-6); β-D-Glcp′: 5.53 (d, J = 7.8, H-1), 4.10 (dd, J = 7.8, 9.0, H-2), 4.19 (dd, J = 9.0, 9.0, H-3), 4.38 (dd, J = 9.0, 9.0, H-4), 3.73 (ddd, J = 9.0, 2.4, 2.4, H-5), 4.34 (H-6), 4.38 (H-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

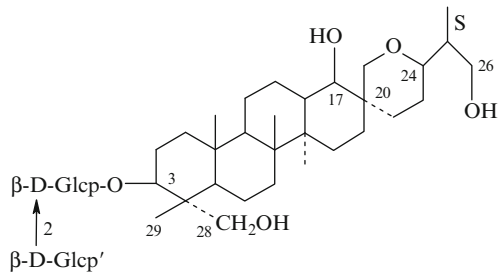
C-1	38.8	C-13	50.1	C-25	16.4	Glc-1	104.5
2	26.8	14	41.6	26	16.3	2	82.6
3	90.6	15	32.8	27	16.1	3	78.9
4	43.8	16	24.9	28	176.3	4	71.2
5	56.1	17	50.1	29	25.0	5	78.6
6	18.6	18	51.5	30	69.0	6	62.8
7	34.3	19	36.2			Glc′-1	105.2
8	43.0	20	25.1			2	75.8
9	51.0	21	43.8			3	78.3
10	36.7	22	83.4			4	70.0
11	22.4	23	22.6			5	78.5
12	26.0	24	63.4			6	61.6

Pharm./Biol.: Used as a folk medicine (diuretic, hydragogue, etc.) in China [1]

References

1. Y. Inatomi, A. Inada, H. Murata, M. Nishi, T. Nakanishi, Chem. Pharm. Bull. **48**, 1930 (2000)

Hosenkoside J



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hosenkol A

Biological source: *Impatiens balsamina* [1]

$C_{42}H_{72}O_{15}$: 816.487

Mp: 241–243 °C (MeOH) [1]

$[\alpha]_D^{20}$ + 23.2° (c 5.3, MeOH) [1]

FAB-MS *m/z*: 815 $[M-H]^-$, 653 $[M-C_6H_{10}0_5-H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.84, 0.87, 0.91, 1.08 (s, CH_3 × 4), 1.10 (d, J = 6.6, CH_3-27), 2.13 (m, H-25), 3.28, 4.57 (d, J = 11.7, H_2-21), 3.42 (d, J = 10.2, H-17), ca 4.40 (m, H-3)
β-D-Glcp: 5.10 (d, J = 7.3, H-1); β-D-Glcp′: 5.37 (d, J = 7.3, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

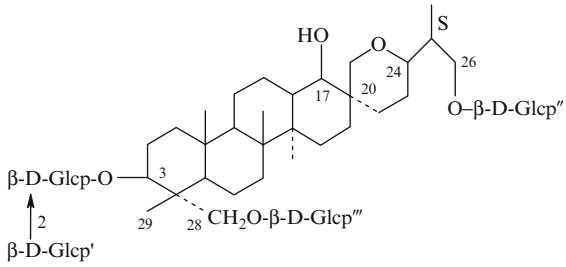
Table 1

C-1	39.0	C-16	32.9	Glc-1	103.9
2	25.9	17	79.8	2	83.9
3	82.5	18	15.7	3	78.0
4	43.5	19	17.1	4	71.2
5	48.3	20	36.0	5	78.3
6	18.1	21	72.3	6	62.6
7	33.5	22	37.4	Glc′-1	105.9
8	40.8	23	26.1	2	76.8
9	51.2	24	79.5	3	78.3
10	36.9	25	40.4	4	71.3
11	21.2	26	64.3	5	78.0
12	24.8	27	13.5	6	62.5
13	41.7	28	64.8		
14	42.2	29	13.2		
15	26.7	30	14.9		

References

1. N. Shoji, A. Umeyama, N. Saitou, K. Yoshikawa, M. Nagai, S. Arihara, Chem. Pharm. Bull. **42**(7), 1422 (1994)

Hosenkoside K



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hosenkol A

Biological source: *Impatiens balsamina* [1]
$C_{54}H_{92}O_{25}$: 1140.592
Mp: 160–162°C (MeOH) [1]
$[\alpha]_D^{20}$ + 16.3° (c 7.0, MeOH) [1]
FAB-MS *m/z*: 1139 $[M-H]^-$, 977 $[M-C_6H_{10}0_5-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.75, 0.80, 0.85, 1.03 (s, CH_3 × 4), 1.02 (d, J = 6.6, CH_3-27), 2.17 (m, H-25), 3.39 (d, J = 10.7, H-17), 3.25, 4.54 (d, J = 11.9, H_2-21), 4.23, 4.54 (d, J = 10.5, H_2-28), ca 4.44 (m, H-3)
β-D-Glcp: 5.69 (d, J = 7.3, H-1); β-D-Glcp′: 5.33 (d, J = 7.3, H-1); β-D-Glcp″: 4.84 (d, J = 7.5, H-1); β-D-Glcp‴: 5.28 (d, J = 7.5, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	38.8	C-16	32.7	Glc-1	104.6	Glc″-1	105.3
2	26.6	17	79.9	2	83.9	2	75.4
3	81.8	18	15.7	3	78.1	3	78.6
4	43.3	19	17.4	4	71.9	4	71.6
5	47.8	20	36.0	5	78.0	5	78.5
6	17.9	21	72.2	6	63.0	6	62.8
7	33.7	22	37.3	Glc′-1	106.2	Glc‴-1	105.4
8	40.8	23	25.7	2	77.3	2	75.5
9	51.0	24	78.9	3	78.5	3	78.5
10	36.9	25	38.1	4	71.7	4	72.0
11	21.2	26	72.1	5	77.7	5	78.0
12	24.9	27	13.9	6	62.8	6	63.1
13	41.7	28	72.1				
14	42.2	29	13.3				
15	26.7	30	15.1				

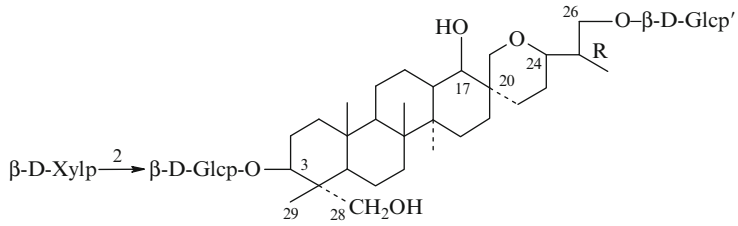
References

1. N. Shoji, A. Umeyama, N. Saitou, K. Yoshikawa, M. Nagai, S. Arihara, Chem. Pharm. Bull. **42**(7), 1422 (1994)

Hosenkoside F

See Figure Hosenkoside F

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hosenkol B



Hosenkoside F

Biological source: *Impatiens balsamina* [1]
$C_{47}H_{80}O_{19}$: 948.529
Mp: 230–232°C (MeOH) [1]
$[\alpha]_D^{20}$ + 7.2°(c 0.94, C_5H_5N) [1]
FAB-MS *m/z*: 947 $[M-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.87, 0.92, 0.98, 1.06 (s, CH_3 × 4), 1.10 (d, J = 6.8, CH_3-27), 2.18 (m, H-25), 3.33 (d, J = 10.3, H-17), 4.00, 4.30 (d, J = 10.5, H_2-21), 4.40 (m, H-3)
β-D-Glcp: 5.15 (d, J = 6.8, H-1); β-D-Glcp′: 4.87 (d, J = 7.8, H-1)
β-D-Xylp: 5.24 (d, J = 6.4, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

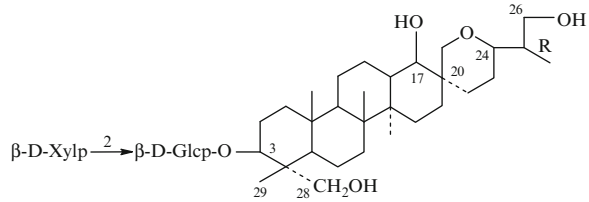
Table 1

C-1	39.2	C-16	26.5	Glc-1	104.2	Glc′-1	105.0
2	26.6	17	76.1	2	84.5	2	75.2
3	81.7	18	15.9	3	78.3	3	78.6
4	43.7	19	17.1	4	71.5	4	71.7
5	47.6	20	38.3	5	77.9	5	78.4
6	18.1	21	67.8	6	62.8	6	62.8
7	33.7	22	34.4	Xyl-1	107.1		
8	41.0	23	24.5	2	76.5		
9	51.3	24	79.7	3	78.2		
10	36.9	25	39.5	4	71.0		
11	21.2	26	72.5	5	67.6		
12	25.7	27	13.7				
13	39.9	28	63.5				
14	42.2	29	13.0				
15	26.5	30	15.3				

References

1. N. Shoji, A. Umeyama, N. Saitou, K. Yoshikawa, M. Nagai, S. Arihara, Chem. Pharm. Bull. **42**(7), 1422 (1994)

Hosenkoside H



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hosenkol B
Biological source: *Impatiens balsamina* [1]
$C_{41}H_{70}O_{14}$: 786.476
$[\alpha]_D^{20}$ + 15.1° (c 1.2, MeOH) [1]
FAB-MS *m/z*: 785 $[M-H]^-$, 653 $[M-C_5H_80_4-H]^-$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.88, 0.92, 0.98, 1.06 (s, CH_3 × 4), 1.15 (d, J = 6.8, CH_3-27), 2.10 (m, H-25), 3.72, 4.20 (d, J = 11.0, H_2-28), 3.33 (d, J = 10.3, H-17), 4.10, 4.30 (d, J = 11.0, H_2-21), ca 4.40 (m, H-3)
β-D-Glcp: 5.15 (d, J = 7.8, H-1)
β-D-Xylp: 5.24 (d, J = 6.8, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

Table 1

C-1	39.2	C-16	26.6	Glc-1	104.2
2	26.4	17	76.1	2	84.5
3	81.7	18	15.9	3	78.3
4	43.7	19	17.1	4	71.5
5	47.6	20	38.4	5	77.9
6	18.1	21	67.8	6	62.8
7	33.7	22	34.5	Xyl-1	107.1
8	41.0	23	24.9	2	76.5

(*continued*)

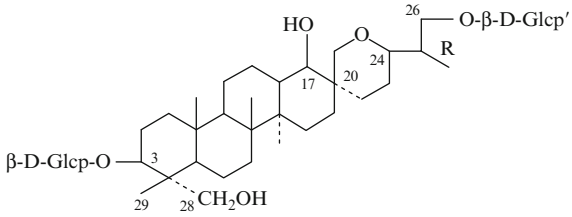
Table 1 (continued)

9	51.3	24	80.7	3	78.2
10	36.9	25	41.9	4	71.0
11	21.2	26	65.0	5	67.5
12	25.6	27	13.6		
13	39.9	28	63.5		
14	42.2	29	13.0		
15	26.4	30	15.2		

References

1. N. Shoji, A. Umeyama, N. Saitou, K. Yoshikawa, M. Nagai, S. Arihara, Chem. Pharm. Bull. **42**(7), 1422 (1994)

Hosenkoside I



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hosenkol B

Biological source: *Impatiens balsamina* [1]

$C_{42}H_{72}O_{15}$: 816.487

Mp: 278–280°C (MeOH) [1]

$[\alpha]_D^{20}$ + 12.0° (c 1.7, MeOH) [1]

FAB-MS *m/z*: 815 $[M\text{-}H]^-$, 653 $[M\text{-}C_6H_{10}0_5\text{-}H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.86, 0.93, 0.98, 0.98 (s, CH_3 × 4), 1.10 (d, J = 6.8, CH_3-27), 2.20 (m, H-25), 3.33 (d, J = 10.3, H-17), 3.73, 4.20 (d, J = 11.0, H_2-28), 4.01, 4.30 (d, J = 10.5, H_2-21), ca 4.40 (m, H-3) β-D-Glcp: 5.15 (d, J = 7.8, H-1); β-D-Glcp′: 4.89 (d, J = 7.8, H-1) [1]

^{13}C NMR (C_5D_5N): [1]

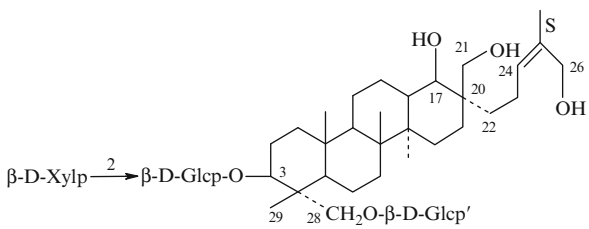
Table 1

C-1	39.1	C-16	26.5	Glc-1	105.8
2	26.1	17	76.1	2	75.8
3	82.0	18	15.9	3	78.6
4	43.5	19	17.1	4	71.7
5	47.8	20	38.3	5	78.3
6	18.1	21	67.7	6	62.9
7	33.6	22	34.4	Glc′-1	105.0
8	41.0	23	24.5	2	75.2
9	51.2	24	79.7	3	78.6
10	37.0	25	39.5	4	71.7
11	21.2	26	72.5	5	78.4
12	25.6	27	13.7	6	62.8
13	39.9	28	64.5		
14	42.2	29	13.4		
15	26.4	30	15.2		

References

1. N. Shoji, A. Umeyama, N. Saitou, K. Yoshikawa, M. Nagai, S. Arihara, Chem. Pharm. Bull. **42**(7), 1422 (1994)

Hosenkoside G



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hosenkol C

Biological source: *Impatiens balsamina* [1]

$C_{47}H_{80}O_{19}$: 948.529

Mp: 223–225°C (MeOH) [1]

$[\alpha]_D^{20}$ + 4.0° (c 1.3, C_5H_5N) [1]

FAB-MS *m/z*: 947 $[M\text{-}H]^-$ [1]

^{1}H NMR (J/Hz, C_5D_5N): 0.82, 0.85, 0.91, 1.04, 2.03 (s, CH_3 × 5), 3.64 (d, J = 10.5, H-17), 3.80, 4.50 (d, J = 11.0, H_2-21), 4.45 (m, H-3), 4.51, 4.53 (d, J = 11.0, H_2-26), 5.49 (t, J = 7.0, H-24)

β-D-Glcp: 5.69 (d, J = 7.8, H-1); β-D-Glcp′: 5.22 (d, J = 7.3, H-1)
β-D-Xylp: 5.25 (d, J = 6.8, H-1) [1]
^{13}C NMR (C_5D_5N): [1]

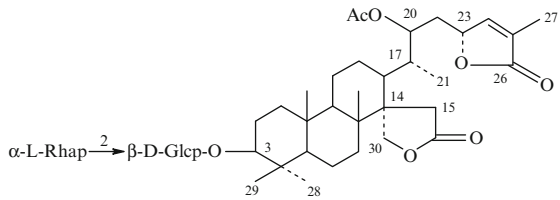
Table 1

C-1	38.8	C-16	28.2	Glc-1	104.2	Glc′-1	105.3
2	26.6	17	77.4	2	84.6	2	75.5
3	81.6	18	15.7	3	78.3	3	78.5
4	43.3	19	17.3	4	71.9	4	71.9
5	47.8	20	41.5	5	78.0	5	77.6
6	17.9	21	65.0	6	63.0	6	63.0
7	33.7	22	38.0	Xyl-1	107.2		
8	40.9	23	22.0	2	76.5		
9	51.0	24	127.9	3	78.2		
10	36.9	25	136.0	4	71.0		
11	21.2	26	60.9	5	67.5		
12	25.3	27	21.9				
13	40.6	28	71.5				
14	42.5	29	12.8				
15	26.7	30	15.2				

References

1. N. Shoji, A. Umeyama, N. Saitou, K. Yoshikawa, M. Nagai, S. Arihara, Chem. Pharm. Bull. **42**(7), 1422 (1994)

Hovenidulcioside A_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hovenidulcigenin A
Biological source: *Hovenia dulcis* [1]

$C_{44}H_{68}O_{16}$: 852.450
Mp: 183–186°C (aq. MeOH) [1]
$[\alpha]_D^{26}$ −48.5° (c 0.5, MeOH) [1]
UV λ_{max} nm (log ε): 224 (3.8) [1]
IR (KBr) ν_{max} cm^{-1}: 3453, 2944, 1765, 1751, 1602, 1046 [1]
HR-FAB-MS *m/z*: 851.4429 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 875 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, CD_3OD): 0.92, 0.93, 1.06, 1.12 (s, CH_3-29, 19, 18, 28), 0.97 (d, J = 9, 21-CH_3), 1.91 (dd, J = 1.6, 1.7, CH_3-27), 2.12 (s, Ac), 2.49, 2.71 (ABq, J = 19.0, CH_2-15), 3.21 (m, H-3), 4.34, 4.53 (ABq, J = 10.7, CH_2-30), 4.46 (d, J = 7.3, H-1 of Glc), 4.75 (t-like, H-20), 5.13 (brs, H-23), 7.34 (brs, H-24), 5.43 (brs, H-1 of Rha), 1.27 (d, J = 5.9, CH_3-6 of Rha) [1]
^{13}C NMR (CD_3OD): [1]

Table 1

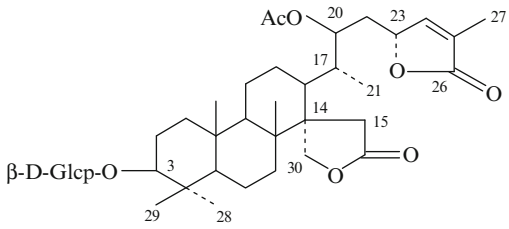
C-1	39.7	C-16	179.9	Glc-1	105.6
2	27.3	17	37.0	2	78.9
3	89.9	18	18.6	3	79.4
4	40.3	19	16.7	4	72.0
5	56.6	20	74.8	5	77.6
6	18.9	21	11.9	6	62.8
7	35.4	22	35.0	Rha-1	101.8
8	42.3	23	80.6	2	72.0
9	54.0	24	151.0	3	72.1
10	37.9	25	130.4	4	73.9
11	21.6	26	176.2	5	69.9
12	25.8	27	10.6	6	18.0
13	39.0	28	28.3		
14	53.6	29	17.0		
15	34.8	30	71.8		
		OAc-1	172.4		
		2	21.2		

Pharm./Biol.: Hovenidulcioside A_1 were found to inhibit the histamine release from rat peritoneal exudates cells induced by compound 48/80 and calcium ionophore A-23187 [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueda, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(9), 1736 (1996)

Hovenidulcioside A_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hovenidulcigenin A

Biological source: *Hovenia dulcis* [1]

$C_{38}H_{58}O_{12}$: 706.392

Mp: 157–160°C (aq. MeOH) [1]

$[\alpha]_D^{27}$ −14.0° (c 0.1, MeOH) [1]

UV λ_{max} nm (log ε): 234 (3.8) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1768, 1750, 1734, 1600, 1034 [1]

FAB-MS (positive ion mode) *m/z*: 729.3826 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, CD_3OD): 0.84, 0.87, 0.99, 1.06 (s, CH_3-29, 19, 18, 28), 0.92 (d, J = 7.2, CH_3-21), 1.84 (dd-like, CH_3-27), 2.05 (s, Ac), 2.43, 2.64 (ABq, J = 19.0, H_2-15), 3.18 (m, H-3), 4.26, 4.47 (ABq, J = 10.5, CH_2-30), 4.68 (m, H-20), 5.06 (brs, H-23), 7.27 (brs, H-24), 4.31 (d, J = 7.6, H-1 of Glc) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	39.5	C-16	180.1	Glc-1	106.7
2	26.7	17	37.1	2	75.7
3	90.5	18	18.6	3	78.3
4	40.3	19	16.6	4	71.7
5	56.4	20	74.8	5	77.7
6	19.0	21	11.9	6	62.8
7	35.4	22	35.0		
8	42.3	23	80.6		
9	54.0	24	151.0		
10	37.9	25	130.5		
11	21.6	26	176.2		
12	25.9	27	10.6		
13	39.1	28	28.4		
14	53.1	29	16.8		
15	34.8	30	71.9		
		OAc-1	172.5		
		2	21.2		

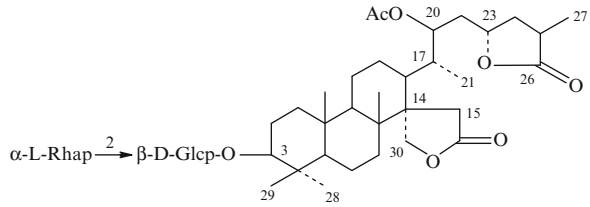
(*continued*)

Pharm./Biol.: Hovenidulcioside A_2 were found to inhibit the histamine release from rat peritoneal exudates cells induced by compound 48/80 and calcium ionophore A-23187 [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueda, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(9), 1736 (1996)

Hovenidulcioside B_1



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hovenidulcigenin B

Biological source: *Hovenia dulcis* [1]

$C_{44}H_{70}O_{16}$: 854.466

Mp: 177–180°C (aq. MeOH) [1]

$[\alpha]_D^{27}$ −21.5° (c 0.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 2944, 1773, 1736, 1048 [1]

FAB-MS (positive ion mode) *m/z*: 877 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, CD_3OD): 0.92, 0.93, 1.06, 1.12 (s, CH_3-29, 19, 18, 28), 0.98 (d, J = 6.9, CH_3-21), 1.29 (d, J = 7.3, CH_3-27), 2.08, 2.27 (m, H_2-24), 2.15 (s, Ac), 2.45, 2.75 (ABq, J = 18.8, H_2-15), 2.72 (m, H-25), 3.23 (m, H-3), 4.38, 4.54 (ABq, J = 10.9, H_2-30), 4.66 (m, H-23), 4.88 (m, H-20), 4.47 (d, J = 7.2, H-1 of Glc), 5.43 (brs, H-1 of Rha), 1.27 (d, J = 5.6, CH_3-6 of Rha) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

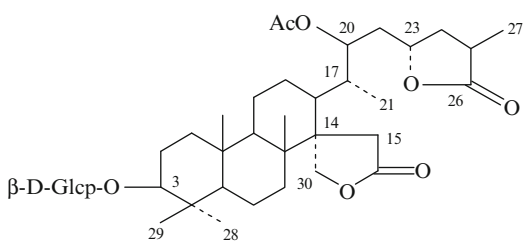
C-1	39.8	C-16	180.0	Glc-1	105.6
2	27.4	17	37.1	2	78.9
3	89.9	18	18.7	3	79.5
4	40.3	19	16.7	4	72.1
5	56.7	20	76.5	5	77.6
6	19.0	21	12.3	6	62.8
7	35.5	22	37.5	Rha-1	101.9
8	42.3	23	78.3	2	72.1
9	54.1	24	36.5	3	72.2
10	37.9	25	35.1	4	74.0
11	21.6	26	182.3	5	70.0
12	25.7	27	16.0	6	18.1
13	39.1	28	28.4		
14	53.5	29	17.0	OAc-1	172.8
15	35.0	30	71.8	2	21.2

Pharm./Biol.: Hovenidulcioside B_1 were found to inhibit the histamine release from rat peritoneal exudates cells induced by compound 48/80 and calcium ionophore A-23187 [1]

References

1. M. Yoshikawa, T. Murakami, T. Ueda, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(9), 1736 (1996)

Hovenidulcioside B_2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Hovenidulcigenin B

Biological source: *Hovenia dulcis* [1]

$C_{38}H_{60}O_{12}$: 708.408

Mp: 133–136°C (aq. MeOH) [1]

$[\alpha]_D^{25}$ −6.0° (c 0.1, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1773, 1734, 1043 [1]

HR-FAB-MS *m/z*: 731.3983 $(M + Na)^+$ [1]

FAB-MS (positive ion mode) *m/z*: 731 $(M + Na)^+$ [1]

^{1}H NMR (J/Hz, CD_3OD): 0.84, 0.86, 0.98, 1.06 (s, CH_3-29, 19, 18, 28), 0.91 (d, J = 5.9, CH_3-21), 1.22 (d, J = 7.2, CH_3-27), 2.03, 2.19 (m, H_2-24), 2.08 (s, Ac), 2.41, 2.66 (ABq, J = 10.5, H_2-15), 2.73 (m, H-25), 3.19 (m, H-3), 4.30, 4.46 (ABq, J = 10.5, H_2-30), 4.38 (m, H-23), 4.86 (m, H-20), 4.31 (d, J = 7.2, H-1 of Glc) [1]

^{13}C NMR (CD_3OD): [1]

Table 1

C-1	39.4	C-16	179.9	Glc-1	106.6
2	27.0	17	37.0	2	75.6
3	90.3	18	18.6	3	78.2
4	40.2	19	16.6	4	71.6
5	56.3	20	76.4	5	77.6
6	19.0	21	12.3	6	62.8
7	35.4	22	37.4		
8	42.2	23	78.2	OAc-1	172.4
9	54.0	24	36.4	2	21.2
10	37.9	25	35.0		
11	21.6	26	182.2		
12	25.6	27	16.0		
13	39.0	28	28.3		
14	53.4	29	16.8		
15	34.9	30	71.7		

Pharm./Biol.: Hovenidulcioside B_2 were found to inhibit the histamine release from rat peritoneal exudates cells induced by compound 48/80 and calcium ionophore A-23187 [1]

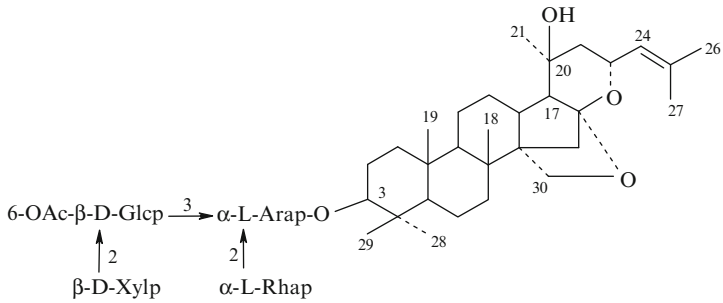
References

1. M. Yoshikawa, T. Murakami, T. Ueda, H. Matsuda, J. Yamahara, N. Murakami, Chem. Pharm. Bull. **44**(9), 1736 (1996)

Acetyljujuboside B

CAS Registry Number: 194737-13-8

See Figure Acetyljujuboside B



Acetyljujuboside B

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Jujubogenin
Biological source: *Zizyphus jujuba* [1]
$C_{54}H_{86}O_{22}$: 1086.561
Mp: 207–210°C (aq. MeOH) [1]
$[\alpha]_D^{28}$ −42.8° (c 0.3, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3424, 1736, 1638, 1047 [1]
FAB-MS (negative ion mode) *m/z*: 1085 $(M-H)^-$ [1]
FAB-MS (positive ion mode) *m/z*: 1109 $(M + Na)^+$ [1]
^{1}H NMR (J/Hz, C_5D_5N): 0.71, 1.08, 1.11, 1.16, 1.39, 1.70 (s, CH_3-19, 18, 29, 28, 21, 26), 2.10 (s, OAc), 2.81 (m, H-13), 3.18 (dd-like, H-3), 5.20 (m, H-23), 5.53 (d, J = 8.2, H-24), 4.24, 4.48 (m, H_2-6 of Glcp), 4.90 (d-like, H-1 of Arap), 5.12 (d, J = 7.6, H-1 of Glcp), 5.37 (d, J = 7.3, H-1 of Xylp), 5.95 (brs, H-1 of Rhap), 1.67 (brs, CH_3-27, CH_3-6 of Rhap) [1]
^{13}C NMR (68 MHz, C_5D_5N): [1]

Table 1

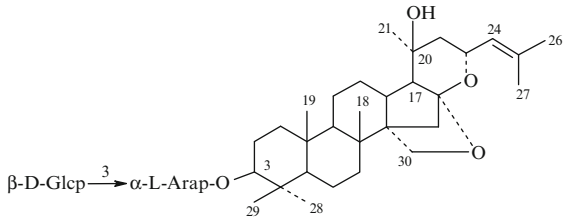
C-1	38.9	C-16	110.6	Ara-1	103.7	Glc-1	104.2
2	26.6	17	54.0	2	75.1	2	82.5
3	88.4	18	18.9	3	83.3	3	78.1
4	39.7	19	16.4	4	67.9	4	71.2
5	56.2	20	68.6	5	63.7	5	74.8
6	18.3	21	30.1	Rha-1	101.7	6	64.5
7	36.0	22	45.5	2	72.4	Ac-1	170.9
8	37.5	23	68.5	3	72.6	2	20.8
9	53.0	24	127.1	4	74.0	Xyl-1	106.5
10	37.3	25	134.2	5	70.1	2	76.2
11	21.8	26	25.6	6	18.6	3	78.1
12	28.5	27	18.3			4	70.8
13	37.1	28	28.1			5	67.9
14	53.8	29	17.0				
15	36.9	30	65.8				

Pharm./Biol.: Acetyljujuboside B was found to inhibit the histamine release from rat peritoneal exudates cells induced by antigen-antibody reaction [1]

References

1. M. Yoshikawa, T. Murakami, A. Ikebata, Sh Wakao, N. Murakami, H. Matsuda, J. Yamahara, Chem. Pharm. Bull. **45**(7), 1186 (1997)

Compound II from *Zizyphus jujuba*



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Jujubogenin
Biological source: *Zizyphus jujuba* [1]
$C_{41}H_{66}O_{13}$: 766.450
Mp: 292–294°C (MeOH) [1]
$[\alpha]_D^{15}$ −16.9° (c 0.86, MeOH) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-1	88.2	Ara-1	106.9
20	68.3	2	71.6

(*continued*)

Table 1 (continued)

21	29.9	3	83.8
22	45.3	4	68.9
		5	66.6
		Glc-1	105.9
		2	75.3
		3	78.0
		4	71.2
		5	78.2
		6	62.4

References

1. N. Okamura, T. Nohara, A. Yagi, I. Nishioka, Chem. Pharm. Bull. **29**(3), 676 (1981)

Jujuboside A_1

CAS Registry Number: 194851-84-8

See Figure Jujuboside A_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Jujubogenin

Biological source: *Zizyphus jujuba* [1]

$C_{58}H_{94}O_{26}$: 1206.603

Mp: 223–225°C (aq. MeOH) [1]

$[\alpha]_D^{29}$ −47.6° (c 0.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3432, 1637, 1047 [1]

FAB-MS (negative ion mode) *m/z*: 1205 $(M\text{-}H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1229.5940 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.71, 0.96, 1.39, 1.67, 1.70 (s, CH_3-19, 29, 21, 27, 26), 1.09 (s, CH_3-18, 28), 2.82 (m, H-13), 3.18 (dd-like, H-3), 5.19 (m, H-23), 5.51 (d, J = 7.9, H-24), 4.86 (d-like, H-1 of Arap), 4.93 (d, J = 7.6, H-1 of Glcp′), 5.01 (d, J = 7.6, H-1 of Glcp), 5.44 (d, J = 7.0, H-1 of Xylp), 6.12 (brs, H-1 of Fucp), 1.55 (d, J = 5.6, CH_3-6 of Fucp) [1]

^{13}C NMR (125 MHz, C_5D_5N): [1]

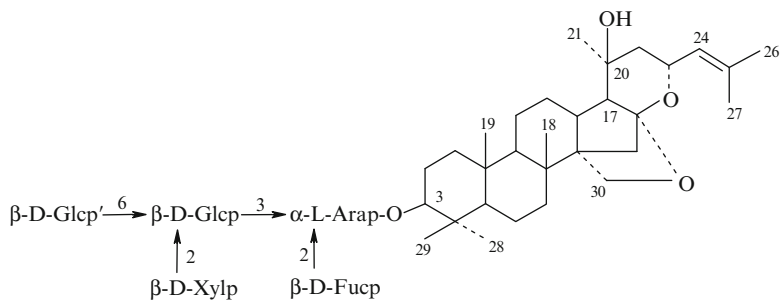
Table 1

C-1	38.8	C-16	110.6	Ara-1	104.5	Xyl-1	105.9
2	26.6	17	54.0	2	74.6	2	75.9
3	88.1	18	18.9	3	83.1	3	78.1
4	39.5	19	16.3	4	68.5	4	70.8
5	56.2	20	68.5	5	64.5	5	67.7
6	18.3	21	30.0	Fuc-1	101.7	Glc′-1	105.2
7	36.0	22	45.4	2	67.7	2	75.3
8	37.5	23	68.6	3	72.1	3	78.4
9	53.0	24	127.1	4	74.2	4	71.4
10	37.2	25	134.2	5	67.0	5	78.4
11	21.7	26	25.6	6	17.3	6	62.5
12	28.5	27	18.3	Glc-1	103.6		
13	37.1	28	28.0	2	82.1		
14	53.7	29	16.7	3	78.1		
15	36.9	30	65.8	4	71.4		
				5	76.7		
				6	70.3		

Pharm./Biol.: Jujuboside A_1 was found to inhibit the histamine release from rat peritoneal exudates cells induced by antigen-antibody reaction [1]

References

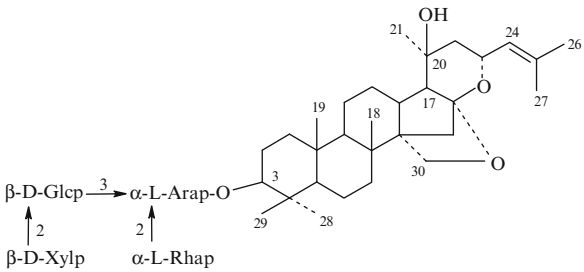
1. M. Yoshikawa, T. Murakami, A. Ikebata, Sh Wakao, N. Murakami, H. Matsuda, J. Yamahara, Chem. Pharm. Bull. **45**(7), 1186 (1997)



Jujuboside A_1

Jujuboside B

CAS Registry Number: 55466-05-2



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Jujubogenin

Biological source: *Zizyphus jujuba* [1], *Zizyphus jujuba* var. spinosa [2]

$C_{52}H_{84}O_{21}$: 1044.550

Mp: 256–259°C (MeOH) [1], 222–225°C (MeOH) [2]

$[\alpha]_D^{21}$ −45.2° (c 1.00, MeOH) [1], $[\alpha]_D^{24}$ −42.0° (c 0.5, MeOH) [2]

IR (KBr) ν_{max} cm^{-1}: 3400 [1]

FD-MS *m/z*: 1067 $[M + Na]^+$, 1049 $[M\text{-}H_2O\text{-}Na]^+$ [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-3	88.0	Ara-1	103.8	Xyl-1	106.0
20	68.3	2	74.6	2	75.9
21	30.0	3	83.2	3	78.0
22	45.3	4	67.5	4	70.6
		5	63.1	5	67.5
		Glc-1	103.4	Rha-1	101.2
		2	81.9	2	72.1
		3	77.8	3	72.1
		4	71.0	4	73.6
		5	78.2	5	69.7
		6	61.5	6	18.4

(*continued*)

References

1. N. Okamura, T. Nohara, A. Yagi, I. Nishioka, Chem. Pharm. Bull. **29**(3), 676 (1981)
2. H. Otsuka, T. Akiyama, K. Kawai, S. Shibata, O. Inone, Y. Ogihara, Phytochemistry **17**, 1349 (1978)

Jujuboside C

See Figure Jujuboside C

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Jujubogenin

Biological source: *Zizyphus jujuba* [1]

$C_{59}H_{96}O_{27}$: 1236.613

Mp: 229–231°C (aq. MeOH) [1]

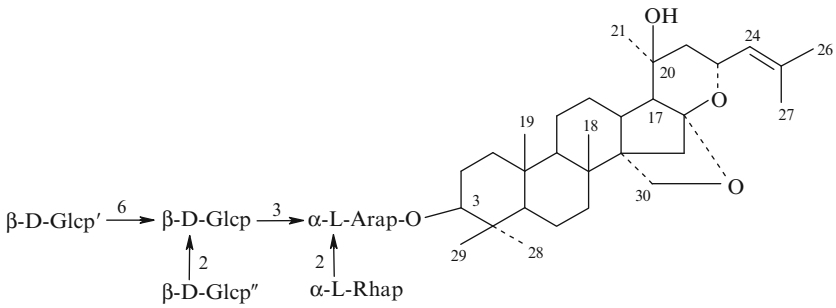
$[\alpha]_D^{29}$ −32.8° (c 0.3, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3418, 1639, 1075 [1]

FAB-MS (negative ion mode) *m/z*: 1235 $(M\text{-}H)^-$ [1]

FAB-MS (positive ion mode) *m/z*: 1259.6034 $(M + Na)^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 0.72, 1.08, 1.14, 1.17, 1.39, 1.68 (s, CH_3-19, 18, 29, 28, 21, 27), 2.82 (m, H-13), 3.18 (dd-like, H-3), 5.19 (m, H-23), 5.56 (d, J = 8.6, H-24), 4.75 (d-like, H-1 of Arap), 4.93 (d, J = 7.6, H-1 of Glcp″), 5.02 (d, J = 7.6, H-1 of Glcp), 5.29 (d, J = 7.6, H-1 of Glcp′), 6.36 (brs, H-1 of Rhap), 1.70 (brs, CH_3-26, CH_3-6 of Rha) [1]



Jujuboside C

^{13}C NMR (125 MHz, C_5D_5N): [1]

Table 1

C-1	39.0	C-16	110.6	Ara-1	105.1	Glc′-1	106.3
2	26.8	17	54.0	2	74.8	2	76.2
3	88.2	18	18.9	3	83.6	3	78.1
4	39.7	19	16.5	4	69.7	4	70.4
5	56.4	20	68.5	5	66.1	5	78.8
6	18.3	21	30.0	Rha-1	101.0	6	61.8
7	36.1	22	45.4	2	72.4	Glc″-1	105.5
8	37.6	23	68.6	3	72.4	2	75.3
9	53.1	24	127.1	4	73.9	3	78.4
10	37.3	25	134.2	5	69.8	4	71.6
11	21.8	26	25.6	6	18.3	5	78.4
12	28.5	27	18.4	Glc-1	103.2	6	62.6
13	37.1	28	28.0	2	84.4		
14	53.8	29	17.0	3	78.3		
15	36.9	30	65.8	4	71.3		
				5	76.8		
				6	70.6		

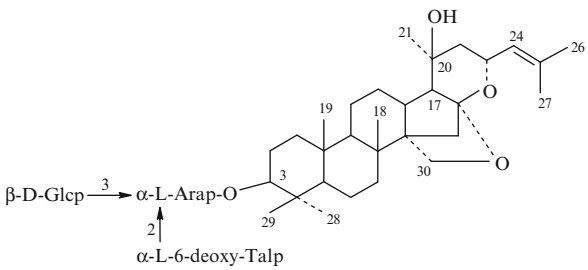
Pharm./Biol.: Jujuboside C was found to inhibit the histamine release from rat peritoneal exudates cells induced by antigen-antibody reaction [1]

References

1. M. Yoshikawa, T. Murakami, A. Ikebata, Sh Wakao, N. Murakami, H. Matsuda, J. Yamahara, Chem. Pharm. Bull. **45**(7), 1186 (1997)

Zizyphus-Saponin I

CAS Registry Number: 77943-56-7



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Jujubogenin

Biological source: *Zizyphus jujuba* [1]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 269–272°C (MeOH) [1]

$[\alpha]_D^{18}$ −48.5° (c 1.0, MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400 [1]

FD-MS *m/z*: 935 $[M + Na]^+$ [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

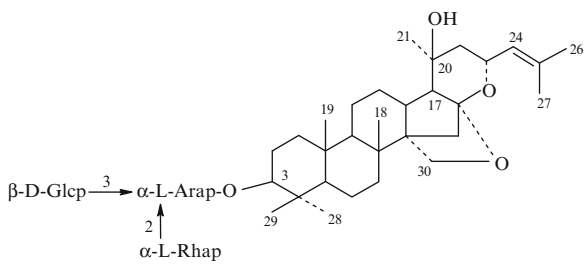
C-3	87.7	Ara-1	105.0	6-deoxy-Tal-1	101.6
20	68.3	2	74.5	2	71.7
21	29.9	3	83.6	3	67.5
22	45.5	4	68.3	4	73.6
		5	65.7	5	67.0
		Glc-1	105.0	6	17.2
		2	74.5		
		3	78.2		
		4	71.1		
		5	78.2		
		6	62.4		

References

1. N. Okamura, T. Nohara, A. Yagi, J. Nishioka, Chem. Pharm. Bull. **29**(3), 676 (1981)

Zizyphus-Saponin II (Saponin C_2)

CAS Registry Number: 77943-83-0



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Jujubogenin

Biological source: *Hovenia dulcis* [1], *Zizyphus jujuba* [2]

$C_{47}H_{76}O_{17}$: 912.508

Mp: 268–269°C (MeOH) [2]
$[\alpha]_D^{14}$ −43.3° (c 0.67, MeOH) [2]
IR (KBr) ν_{max} cm^{-1}: 3400 [2]
FD-MS *m/z*: 935 $[M + Na]^+$ [2]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

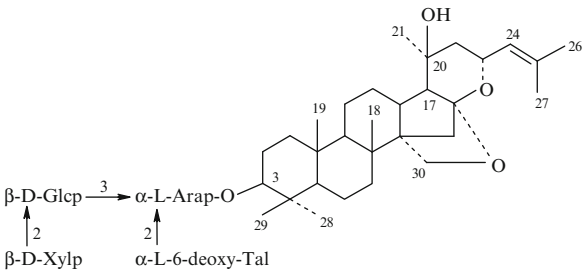
C-1	39.0	C-16	110.6	Ara-1	104.7	Rha-1	101.9
2	26.7	17	53.9	2	74.9	2	72.4
3	88.1	18	18.3	3	82.2	3	72.4
4	39.7	19	16.4	4	68.1	4	73.9
5	56.3	20	68.5	5	64.9	5	70.0
6	18.3	21	30.0	Glc-1	104.7	6	18.6
7	36.0	22	45.5	2	74.9		
8	37.3	23	68.5	3	78.2		
9	53.0	24	127.0	4	71.5		
10	37.3	25	134.2	5	78.5		
11	21.8	26	25.5	6	62.6		
12	28.6	27	18.9				
13	37.5	28	28.0				
14	53.7	29	16.8				
15	37.1	30	65.8				

References

1. Y. Kimura, Y. Kobayashi, T. Takeda, Y. Ogihara, J. Chem. Soc., Perkin Trans. **I**, 1923 (1981)
2. N. Okamura, T. Nohara, A. Yagi, I. Nishioka, Chem. Pharm. Bull. **29**(3), 676 (1981)

Zizyphus-Saponin III

CAS Registry Number: 77943-54-5



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Jujubogenin
Biological source: *Zizyphus jujuba* [1]
$C_{52}H_{84}O_{21}$: 1044.550
Mp: 229–233°C (C_5H_5N-H_2O) [1]
$[\alpha]_D^{28}$ −46.5° (c 0.98, MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400 [1]
FD-MS *m/z*: 1083 [M + K], 1067 $[M + Na]^+$ [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

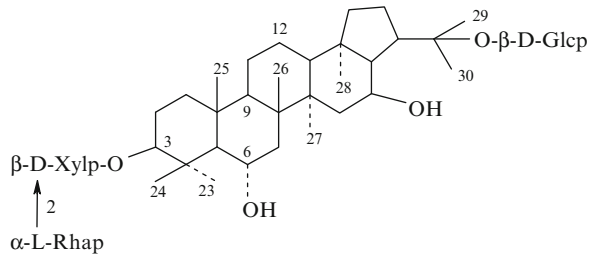
Table 1

C-3	87.8	Ara-1	104.3	6-deoxy-Tal-1	101.5
20	68.3	2	74.2	2	71.7
21	29.9	3	82.1	3	67.4
22	45.2	4	67.4	4	74.0
		5	64.5	5	66.8
		Glc-1	103.1	6	17.2
		2	82.1	Xyl-1	105.5
		3	77.9	2	75.6
		4	71.0	3	78.2
		5	78.2	4	70.6
		6	62.2	5	67.4

References

1. N. Okamura, T. Nohara, A. Yagi, J. Nishioka, Chem. Pharm. Bull. **29**(3), 676 (1981)

Lotoidoside A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Mollugogenol A
Biological source: *Clinus lotoides* [1]
$C_{47}H_{80}O_{17}$: 916.539
$[\alpha]_D^{22}$ −12.2° (c 0.5, MeOH) [1]

ESI-MS *m/z*: 917 $[M + H]^+$, 771 $[(M + H)\text{-}146]^+$, 639 $[(M + H)\text{-}146\text{-}132]^+$, 477 $[(M + H)\text{-}146\text{-}132\text{-}162]^+$ [1]
HR-ESI-MS *m/z*: $[M + H]^+$ [1]
^{1}H NMR (600 MHz, J/Hz, CD_3OD): 4.19 (dt, J = 4.0, 10.5, Hα-16), 4.00 (ddd, J = 10.0, 10.0, 4.5, Hβ-6), 3.09 (dd, J = 11.0, 4.5, H-3), 2.72 (ddd, J = 9.5, 9.5, 9.5, Hα-21), 1.40 (s, CH_3-29), 1.37 (s, CH_3-23), 1.25 (s, CH_3-30), 1.13 (s, CH_3-26), 1.11 (s, CH_3-27), 1.06 (s, CH_3-24), 0.94 (s, CH_3-25), 0.84 (s, CH_3-28); β-D-Xylp: 4.41 (d, J = 7.5, H-1), 3.46 (dd, J = 7.5, 9.0, H-2), 3.41 (dd, J = 9.0, 9.0, H-3), 3.50 (m, H-4), 3.21 (t, J = 11.0, H-5), 3.91 (dd, J = 4.5, 11.0, H-5); α-L-Rhap: 5.36 (d, J = 1.5, H-1), 3.98 (dd, J = 1.5, 2.5, H-2), 3.76 (dd, J = 2.5, 9.0, H-3), 3.42 (dd, J = 9.0, 9.0, H-4), 3.97 (m, H-5), 1.26 (d, J = 6.5, CH_3-6); β-D-Glcp: 4.63 (d, J = 7.5, H-1), 3.11 (dd, J = 7.5, 9.0, H-2), 3.41 (dd, J = 9.0, 9.0, H-3), 3.36 (dd, J = 9.0, 9.0, H-4), 3.29 (m, H-5), 3.70 (dd, J = 4.5, 12.0, H-6), 3.86 (dd, J = 2.5, 12.0, H-6) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

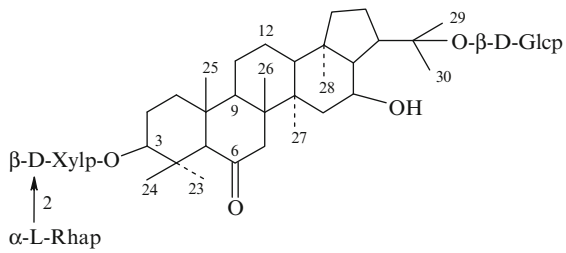
C-1	39.5	C-16	67.4	Xyl-1	106.5	Glc-1	98.0
2	26.5	17	62.5	2	78.6	2	75.1
3	90.1	18	46.4	3	78.0	3	78.0
4	40.7	19	42.4	4	71.4	4	71.0
5	61.7	20	28.1	5	66.2	5	78.0
6	68.8	21	51.1	Rha-1	102.9	6	62.6
7	46.0	22	84.8	2	71.9		
8	43.5	23	30.8	3	71.9		
9	50.6	24	16.8	4	73.9		
10	39.7	25	17.4	5	69.9		
11	21.8	26	18.6	6	18.0		
12	24.6	27	18.6				
13	49.6	28	17.6				
14	44.5	29	23.9				
15	43.9	30	26.6				

Pharm./Biol.: Showed significant cytotoxicity against the three cancer cell lines with IC_{50} values ranging from 0.018 to 0.62 дМ [1]

References

1. A.I. Hamed, S. Piacente, C. Autore, S. Marzocco, C. Pizza, W. Oleszek, Planta Medica **71**, 554 (2005)

Lotoidoside B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Mollugogenol E
Biological source: *Clinus lotoides* [1]
$C_{47}H_{78}O_{17}$: 914.523
$[\alpha]_D^{22}$ −22.6° (c 0.5, MeOH) [1]
ESI-MS *m/z*: 915 $[M + H]^+$, 769 $[(M + H)\text{-}146]^+$, 637 $[(M + H)\text{-}146\text{-}132]^+$, 475 $[(M + H)\text{-}146\text{-}132\text{-}162]^+$ [1]
HR-ESI-MS *m/z*: 915.5317 $[M + H]^+$ [1]
^{1}H NMR (600 MHz, J/Hz, CD_3OD): 4.19 (dt, J = 4.0, 10.5, Hα-16), 3.14 (dd, J = 11.0, 4.5, H-3), 2.72 (2H, m, Ha-16, Hα-21), 2.32 (s, H-5), 1.40 (s, CH_3-29), 1.27 (s, CH_3-24), 1.25 (s, CH_3-30), 1.22 (s, CH_3-27), 1.11 (s, CH_3-23), 1.04 (s, CH_3-26), 0.89 (s, CH_3-28);
β-D-Xylp: 4.41 (d, J = 7.5, H-1), 3.46 (dd, J = 7.5, 9.0, H-2), 3.41 (dd, J = 9.0, 9.0, H-3), 3.50 (m, H-4), 3.21 (t, J = 11.0, H-5), 3.91 (dd, J = 4.5, 11.0, H-5); α-L-Rhap: 5.36 (d, J = 1.5, H-1), 3.98 (dd, J = 1.5, 2.5, H-2), 3.76 (dd, J = 2.5, 9.0, H-3), 3.42 (dd, J = 9.0, 9.0, H-4), 3.97 (m, H-5), 1.26 (d, J = 6.5, CH_3-6); β-D-Glcp: 4.63 (d, J = 7.5, H-1), 3.11 (dd, J = 7.5, 9.0, H-2), 3.41 (dd, J = 9.0, 9.0, H-3), 3.36 (dd, J = 9.0, 9.0, H-4), 3.29 (m, H-5), 3.70 (dd, J = 4.5, 12.0, H-6), 3.86 (dd, J = 2.5, 12.0, H-6) [1]
^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	40.3	C-16	67.4	Xyl-1	106.5
2	26.8	17	62.0	2	78.6
3	88.4	18	46.0	3	78.0

(*continued*)

Table 1 (continued)

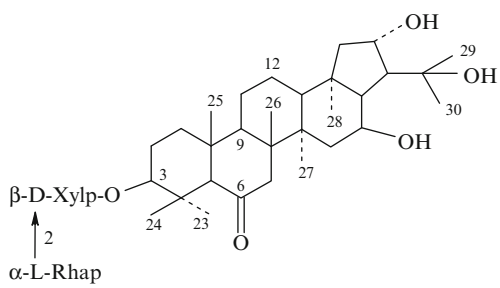
4	38.6	19	42.4	4	71.4
5	66.1	20	27.8	5	66.2
6	214.7	21	51.0	Rha-1	102.9
7	52.5	22	84.4	2	71.9
8	49.4	23	27.4	3	71.9
9	50.8	24	16.6	4	73.9
10	44.1	25	17.4	5	69.9
11	22.2	26	16.8	6	18.0
12	24.0	27	18.6	Glc-1	98.0
13	50.0	28	17.4	2	75.1
14	44.6	29	23.9	3	78.0
15	43.6	30	26.4	4	71.0
				5	78.0
				6	62.6

Pharm./Biol.: Showed weak activity against the cell line HEK-293 with IC_{50} values ranging from 0.018 to 0.62 дМ [1]

References

1. A.I. Hamed, S. Piacente, C. Autore, S. Marzocco, C. Pizza, W. Oleszek, Planta Medica **71**, 554 (2005)

Lotoidoside C



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Mollugogenol H

Biological source: *Clinus lotoides* [1]

$C_{41}H_{68}O_{13}$: 768.465

$[\alpha]_D^{22}$ −16.8° (c 0.5, MeOH) [1]

ESI-MS *m/z*: 769 $[M + H]^+$, 623 $[(M + H-146]^+$, 491 $[(M + H-132]^+$ [1]

HR-ESI-MS *m/z*: 769.4738 $[M + H]^+$ [1]

^{1}H NMR (600 MHz, J/Hz, CD_3OD): 3.90 (m, Hβ-20), 3.83 (dt, J = 4.0, 10.5, Hα-16), 3.15 (dd, J = 11.0, 4.5, H-3), 2.71 (d, J = 11.4, Ha-7), 2.32 (s, H-5), 2.09 (dd, J = 5.7, 12.0, Hα-21), 1.37 (s, CH_3-29), 1.27 (s, CH_3-24), 1.23 (s, CH_3-27), 1.18 (s, CH_3-30), 1.11 (s, CH_3-23), 1.05 (s, CH_3-28), 1.04 (s, CH_3-26)

β-D-Xylp: 4.41 (d, J = 7.5, H-1), 3.46 (dd, J = 7.5, 9.0, H-2), 3.41 (t, J = 9.0, H-3), 3.50 (m, H-4), 3.21 (t, J = 11.0, H-5), 3.91 (dd, J = 4.5, 11.0, H-5)

α-L-Rhap: 5.36 (d, J = 1.5, H-1), 3.98 (dd, J = 1.5, 2.5, H-2), 3.76 (dd, J = 2.5, 9.0, H-3), 3.42 (dd, J = 9.0, 9.0, H-4), 3.97 (m, H-5), 1.26 (d, J = 6.5, CH_3-6) [1]

^{13}C NMR (150 MHz, C_5D_5N): [1]

Table 1

C-1	40.8	C-16	68.4	Xyl-1	106.5
2	26.8	17	58.3	2	78.6
3	88.6	18	46.7	3	78.0
4	38.9	19	52.5	4	71.4
5	66.4	20	75.6	5	66.2
6	214.7	21	62.3	Rha-1	102.9
7	52.0	22	72.3	2	71.9
8	49.6	23	27.5	3	71.9
9	51.0	24	16.8	4	73.9
10	44.6	25	17.4	5	69.9
11	22.2	26	17.0	6	18.2
12	24.0	27	18.2		
13	49.5	28	17.3		
14	44.6	29	30.0		
15	43.1	30	24.0		

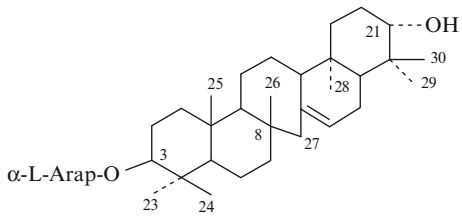
Pharm./Biol.: Showed significant cytotoxicity against the three cancer cell lines with IC_{50} values ranging from 0.018 to 0.62 дМ [1]

References

1. A.I. Hamed, S. Piacente, C. Autore, S. Marzocco, C. Pizza, W. Oleszek, Planta Medica **71**, 554 (2005)

Inundoside A

CAS Registry Number: 80235-56-9



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Serratenediol

Biological source: *Lycopodium inundatum* [1]

$C_{35}H_{58}O_6$: 574.423

Mp: >300°C ($CHCl_3$-MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400 [1]

FD-MS *m/z*: 597 $[M + Na]^+$, 574 $[M]^+$ [1]

^{1}H NMR (60 MHz, J/Hz, C_5D_5N): 0.78, 0.83, 0.92, 0.97, 1.08, 1.17, 1.23, (s, $CH_3 \times 7$), 4.71 (d, J = 6.0, H-1 of Ara) [1]

^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

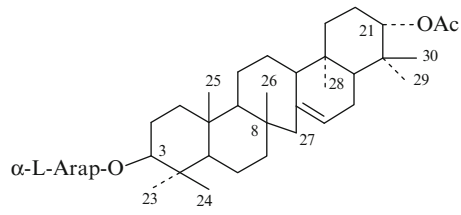
C-2	26.8	Ara-1	106.8
3	88.8	2	72.8
4	39.5	3	74.4
14	138.7	4	69.0
15	122.8	5	66.1
21	78.4		

References

1. Y. Tsuda, M. Kaneda, N. Yasufuku, Y. Shimizu, Chem. Pharm. Bull. **29**(8), 2123 (1981)

Inundoside B

CAS Registry Number: 80235-55-8



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Serratenediol

Biological source: *Lycopodium inundatum* [1]

$C_{37}H_{60}O_7$: 616.433

Mp: 300°C (MeOH) [1]

IR (KBr) ν_{max} cm^{-1}: 3400, 1725, 1250 [1]

FD-MS *m/z*: 655 $(M + K)^+$, 639 $(M + Na)^+$, 616 (M^+), 484 [1]

^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.72, 0.86, 0.86, 0.92, 0.95, 0.99, 1.28 (s, $CH_3 \times 7$), 2.07 (OAc)

α-L-Arap: 4.80 (d, J = 7.0, H-1) [1]

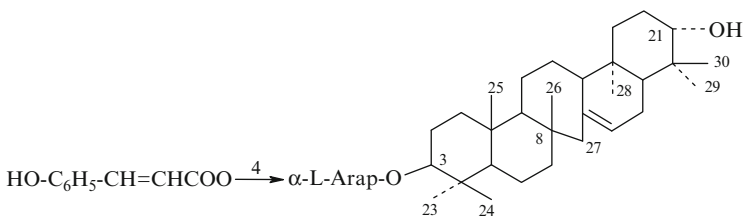
References

1. Y. Tsuda, M. Kaneda, N. Yasufuku, Y. Shimizu, Chem. Pharm. Bull. **29**(8), 2123 (1981)

Inundoside D_1

CAS Registry Number: 80242-62-2

See Figure Inundoside D_1



Inundoside D_1

Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Serratenediol
Biological source: *Lycopodium inundatum* [1]
$C_{44}H_{64}O_8$: 720.460
Mp: 286–290°C ($CHCl_3$-MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1684, 1630, 1605, 1584, 1514, 1200 [1]
FD-MS *m/z*: 743 $[M + Na]^+$, 720 $[M]^+$ [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.75, 0.80, 0.88, 0.98, 1.05, 1.13, 1.30 (s, CH_3 × 7), ArCH = CHCOO: 6.40, 7.75 (d, J = 16), Ar-H: 7.01, 7.32 (d, J = 8.5)
α-L-Arap: 4.75 (d, J = 6.5, H-1) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-2	27.0	Ara-1	107.3
3	89.1	2	72.7
4	39.5	3	73.2
14	138.6	4	72.1
15	122.8	5	64.2
21	78.3	p-Cumaroyl-1″	167.3
		2″	115.5
		3″	145.2
		1‴	126.1
		2‴	130.5
		3‴	116.7
		4‴	161.3

References

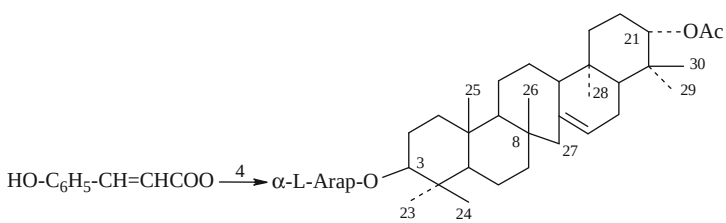
1. Y. Tsuda, M. Kaneda, N. Yasufuku, Y. Shimizu, Chem. Pharm. Bull. **29**(8), 2123 (1981)

Inundoside D_2

CAS Registry Number: 80235-53-6
See Figure Inundoside D_2
Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Serratenediol
Biological source: *Lycopodium inundatum* [1]
$C_{46}H_{66}O_9$: 762.470
Mp: >300°C ($CHCl_3$-MeOH) [1]
IR (KBr) ν_{max} cm^{-1}: 3400, 1728, 1703, 1629, 1603, 1585, 1512, 1250 [1]
FD-MS *m/z*: 785 $[M + Na]^+$, 762 $[M]^+$, 639, 598, 484 [1]
^{1}H NMR (100 MHz, J/Hz, C_5D_5N): 0.73, 0.87(2), 0.94, 0.96, 1.04, 1.35, (s, CH_3 × 7), 2.08 (OAc), 4.86 (d, J = 7.0, H-1 of Ara), ArCH = CHCOO: 6.52, 7.91 (d, J = 16), Ar-H: 7.15, 7.43 (d, J = 8.5) [1]
^{13}C NMR (25 MHz, C_5D_5N): [1]

Table 1

C-2	26.9	Ara-1	107.4
3	89.0	2	72.7
4	39.7	3	73.2
14	138.6	4	72.2
15	122.4	5	64.4
21	80.8	p-Cumaroyl-1″	167.4
		2″	115.4
		3″	145.3
		1‴	125.9
		2‴	130.6
		3‴	116.6
		4‴	161.3

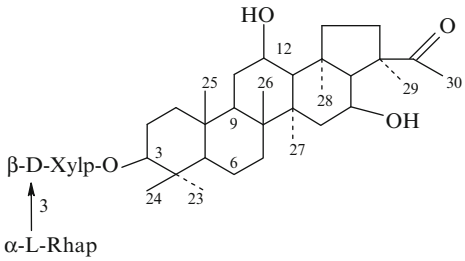


Inundoside D_2

References

1. Y. Tsuda, M. Kaneda, N. Yasufuku, Y. Shimizu, Chem. Pharm. Bull. **29**(8), 2123 (1981)

Spergulacin



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Spergulagenin A

Biological source: *Mollugo spergula* [1]

$C_{41}H_{68}O_{12}$: 752.471

Mp: 280–282°C [1]

$[\alpha]_D^{20}$ −13.7° (c 0.76, C_5H_5N) [1]

HR-FAB-MS *m/z*: 751.46564 $[M\text{-}H]^-$ [1]

LR-FAB-MS *m/z*: 753.4 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, DMSO-d_6): 3.02 (dd, J = 4.5, 11.5, Hα-3), 0.67 (d, J = 1.08, H-5), 3.67 (m, H-12), 1.30 (d, J = 10.8, H-13), 3.60 (m, Hα-16), 1.62 (d, J = 11.5, H-17), 2.01 (dd, J = 7.3, 12.4, Hβ-19), 1.76 (dd, J = 9.0, 13.8, Hβ-20), 0.95 (s, CH_3-23), 0.75 (s, CH_3-24), 0.80 (s, CH_3-25), 0.91 (s, CH_3-27), 0.92 (s, CH_3-28), 0.96 (s, CH_3-26), 1.26 (s, CH_3-29), 2.10 (s, CH_3-30)

β-D-Xylp: 4.17 (d, J = 7.5, H-1), 3.10 (m, H-2), 3.30 (m, H-3), 3.31 (m, H-4), 3.10, 3.70 (H_2-5)

α-L-Rhap: 5.0 (H-1), 3.71 (H-2), 3.48 (H-3), 3.19 (m, H-4), 3.86 (m, H-5), 1.10 (d, J = 6.2, CH_3-6) [1]

^{13}C NMR(500 MHz, DMSO-d_6): [1]

Table 1

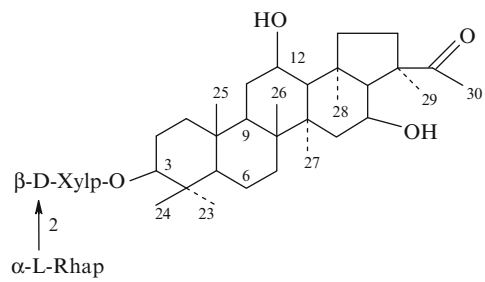
C-1	38.2	C-16	64.0	Xyl-1	105.6
2	25.8	17	62.8	2	73.8
3	87.8	18	45.9	3	81.0
4	38.8	19	44.6	4	68.2
5	54.8	20	36.7	5	65.3
6	17.8	21	52.2	Rha-1	100.5
7	32.8	22	213.6	2	70.5
8	44.7	23	27.4	3	70.6
9	48.1	24	16.0	4	72.1
10	36.1	25	15.5	5	68.0
11	31.8	26	16.5	6	17.8
12	67.3	27	18.4		
13	54.5	28	17.1		
14	40.9	29	20.1		
15	44.3	30	25.7		

(*continued*)

References

1. N.P. Sahu, K. Koike, S. Banerjee, B. Achari, T. Nikaido, Phytochemistry **58**, 1177 (2001)

Spergulacin A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Spergulagenin A

Biological source: *Mollugo spergula* [1]

$C_{41}H_{68}O_{12}$: 752.471

Mp: 260–262°C (MeOH) [1]

$[\alpha]_D^{20}$ −16.1° (c 0.77, C_5H_5N) [1]

HR-FAB-MS (negative) *m/z*: 751.46515 $[M\text{-}H]^-$ [1]

LR-FAB-MS (positive) *m/z*: 753.50 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, DMSO-d_6): 3.02 (dd, J = 4.5, 11.5, Hα-3), 0.67 (d, J = 1.08, H-5), 3.71 (m, H-12), 1.30 (d, J = 10.8, H-13), 3.59 (m, Hα-16),

1.61 (d, J = 11.5, H-17), 2.01 (dd, J = 7.3, 12.4, Hβ-19), 1.73 (dd, J = 7.3, 12.4, Hβ-20), 0.94 (s, CH_3-23), 0.74 (s, CH_3-24), 0.79 (s, CH_3-25), 0.90 (s, CH_3-27), 0.91 (s, CH_3-28), 0.95 (s, CH_3-26), 1.25 (s, CH_3-29), 2.10 (s, CH_3-30)

β-D-Xylp: 4.23 (d, J = 7.5, H-1), 3.23 (m, H-2), 3.19 (m, H-3), 3.27 (m, H-4), 3.02, 3.68 (H_2-5)

α-L-Rhap: 5.22 (H-1), 3.71 (H-2), 3.48 (H-3), 3.14 (m, H-4), 3.78 (dd, J = 6.2, 9.5, H-5), 1.06 (d, J = 6.2, CH_3-6) [1]

^{13}C NMR (125 MHz, DMSO-d_6): [1]

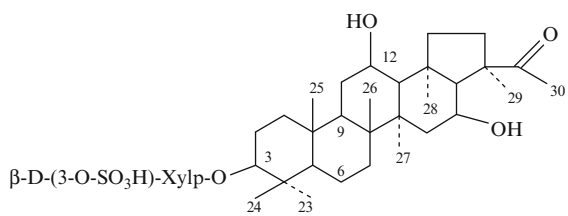
Table 1

C-1	38.5	C-16	64.1	Xyl-1	104.6
2	26.0	17	62.9	2	77.8
3	87.5	18	46.0	3	76.6
4	38.7	19	44.7	4	70.0
5	55.1	20	36.8	5	65.5
6	17.9	21	52.2	Rha-1	100.1
7	32.9	22	213.6	2	70.3
8	44.8	23	27.3	3	70.4
9	48.1	24	16.0	4	72.1
10	36.2	25	15.8	5	68.0
11	31.8	26	16.6	6	17.9
12	67.3	27	18.5		
13	54.5	28	17.2		
14	41.0	29	20.1		
15	44.3	30	25.8		

References

1. N.P. Sahu, K. Koike, S. Banerjee, B. Achari, T. Nikaido, Phytochemistry **58**, 1177 (2001)

Spergulin A



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Spergulagenin A

Biological source: *Mollugo spergula* [1]

$C_{35}H_{58}O_{11}S$: 686.369

Mp: 220–221°C [1]

$[\alpha]_D^{20}$ + 19.1° (c 0.92, DMSO) [1]

IR (KBr)ν_{max} cm^{-1}: 3550, 3468, 1698, 1637, 1460, 1383, 1062, 1021, 972, 824 [1]

HR-FAB-MS *m/z*: 685.36164 $[M-H]^-$ [1]

LR-FAB-MS *m/z*: 685.4 $[M-H]^-$, 641.3, 459.1, 352.1, 227.0, 199.0, 97.0 $[SO_4H]^-$ and 80.0 $[SO_3]^-$ [1]

^{1}H NMR (500 MHz, J/Hz, DMSO-d_6): 1.58, 0.91 (Hα, Hβ-1), 1.68, 1.56 (m, Hα, Hβ-2), 3.04 (dd-like, Hα-3), 0.68 (d, J = 11.5, H-5), 1.48, 1.37 (Hα, Hβ-6), 1.17, 1.41 (Hα, Hβ-7), 1.17 (m, Hα-9), 1.67, 1.22 (m, Hα, Hβ-11), 3.67 (m, H-12), 1.31 (d, J = 10.6, H-13), 1.17, 1.41 (m, Hα, Hβ-15), 3.59 (m, Hα-16), 1.63 (d, J = 11.4, H-17), 1.33 (m, Hα-19), 2.01 (dd, J = 7.4, 12.4, Hβ-19), 1.49, 1.76 (m, Hα, dd, J = 7.0, 14.3, Hβ-20), 0.98 (s, CH_3-23), 0.73 (s, CH_3-24), 0.80 (s, CH_3-25), 0.96 (s, CH_3-26), 0.92 (s, CH_3-27), 0.92 (s, CH_3-28), 1.26 (s, CH_3-29), 2.10 (s, CH_3-30)

β-D-Xylp: 4.23 (d, J = 7.4, H-1), 3.13 (m, H-2), 3.91 (t, J = 9.0, H-3), 3.43 (m, H-4), 3.09 (m, H-5), 3.71 (dd, J = 5.5, 11.4, H-5) [1]

^{13}C NMR: [1]

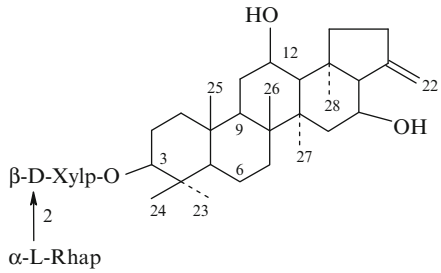
Table 1

C-1	38.2	C-16	64.1	Xyl-1	105.7
2	25.7	17	62.7	2	72.3
3	87.8	18	46.0	3	82.6
4	38.8	19	44.6	4	68.4
5	54.8	20	36.7	5	65.0
6	17.9	21	52.2		
7	32.8	22	213.6		
8	44.7	23	27.3		
9	48.1	24	16.1		
10	36.2	25	15.5		
11	31.8	26	16.5		
12	67.3	27	18.5		
13	54.5	28	17.1		
14	40.9	29	20.1		
15	44.4	30	25.7		

References

1. N.P. Sahu, K. Koike, S. Banerjee, B. Achari, T. Nikaido, Phytochemistry **58**, 1177 (2001)

Spergulin B



Taxonomy: Physicochemical and Pharmacological Properties of Triterpene Glycosides – Miscellaneous Glycosides – Spergulatriol

Biological source: *Mollugo spergula* [1]

$C_{39}H_{64}O_{11}$: 708.444

Mp: 271–273°C [1]

$[\alpha]_D^{20}$ −20.0° (c 0.85, C_5H_5N) [1]

IR (KBr)ν_{max} cm^{-1}: 3414, 1654, 1454, 1040, 985, 839 [1]

HR-FAB-MS *m/z*: 707.43757 $[M-H]^-$ [1]

LR-FAB-MS *m/z*: 709.4 $[M + H]^+$ [1]

^{1}H NMR (500 MHz, J/Hz, C_5D_5N): 1.00, 1.70 (Hα,β-1), 1.84 (m, Hα, Hβ-2), 3.45 (m, Hα-3), 0.82 (dd, J = 2.3, 12.1, H-5), 1.42, 1.57 (m, Hα, Hβ-6), 1.31, 1.5 (m, Hα, Hβ-7), 1.42 (m, Hα-9), 1.66, 2.13 (m, Hα, Hβ-11), 4.22 (m, H-12), 1.80 (d, J = 10.8, H-13), 1.76, 1.9 (m, Hβ-15, dd, J = 4.4, 12.4, Hα-15), 4.32 (dt, J = 4.4, 10.1, Hα-16), 2.15 (H-17), 1.80, 2.54 (Hβ-19, ddd, J = 1.7, 8.6, 12.5, Hα-19), 2.43, 2.47 (m, Hα, Hβ-20), 5.15, 6.07 (t, J = 2.1, H-22), 1.24 (s, CH_3-23), 1.04 (s, CH_3-24), 0.89 (s, CH_3-25), 1.07 (s, CH_3-26), 1.16 (s, CH_3-27), 1.09 (s, CH_3-28)

β-D-Xylp: 4.84 (d, J = 6.2, H-1), 4.23 (m, H-2), 4.16 (m, H-3), 4.14 (m, H-4), 4.33 (m, H-5), 3.71 (dd, J = 9.6, 11.0, H-5)

α-L-Rhap: 6.52 (H-1), 4.86 (dd, J = 1.4, 3.2, H-2), 4.67 (dd, J = 3.4, 9.4, H-3), 4.33 (m, H-4), 4.76 (m, H-5), 1.71 (d, J = 6.2, CH_3-6) [1]

^{13}C NMR (500 MHz, C_5D_5N): [1]

Table 1

C-1	39.1	C-16	67.2	Xyl-1	106.1
2	27.0	17	62.2	2	78.0
3	88.5	18	45.4	3	79.6
4	39.6	19	43.2	4	71.5
5	56.0	20	29.9	5	66.9
6	18.6	21	152.0	Rha-1	101.9
7	33.6	22	106.0	2	72.4
8	45.4	23	28.0	3	72.6
9	49.2	24	16.9	4	74.1
10	37.0	25	16.2	5	69.7
11	33.1	26	17.0	6	18.7
12	69.3	27	19.1		
13	53.9	28	16.0		
14	41.8				
15	45.1				

References

1. N.P. Sahu, K. Koike, S. Banerjee, B. Achari, T. Nikaido, Phytochemistry **58**, 1177 (2001)

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