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Natural Compounds

Alkaloids

Plant Sources, Structure and Properties

With 1410 Figures and 362 Tables

Springer

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ISBN 978-1-4614-0559-7 ISBN 978-1-4614-0560-3 (eBook)
DOI 10.1007/978-1-4614-0560-3

This title is part of a set with
Set ISBN 978-0-387-49139-4
Set ISBN 978-0-387-30748-0 (eBook)
Set ISBN 978-0-387-49140-0 (print and electronic bundle)

Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2012943244

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Dedicated to the memory of academician S. Yu. Yunusov

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Alkaloids

S.S. Azimova, M.S. Yunusov (eds.), *Natural Compounds – Alkaloids*,
DOI 10.1007/978-1-4614-0560-3,

The chemistry of alkaloids is one of the most interesting and important topics of bioorganic chemistry.

The term "alkaloid" was initially applied to N-containing compounds of plant origin that had a distinctly basic nature. Now this term is used much more broadly.

Alkaloids form an expansive group of natural N-containing organic compounds produced by plants, micro- and marine organisms, and fungi.

In contrast with other classes of natural compounds, alkaloids have practically unlimited structural frameworks and contain an N atom in their molecules. For this reason, the alkaloids are highly variable.

The functions of alkaloids in natural organisms are not fully understood. They can act as low-molecular-weight bioregulators to catalyze unique biochemical processes. They can play the role of protective and signaling substances in plants.

The first alkaloid was discovered over 200 years ago (morphine, 1806). However, the attention of researchers for this class of natural compounds has not waned even now.

The interest in studying alkaloids and is due primarily to the fact that many of them are very valuable medicinal preparations (vincristine, vinblastine, colchicine, colchamine, strychnine, platyphylline, galanthamine, atropine, cytisine, lappaconitine, theobromine, papaverine, scopolamine, berberine, ergometrine, ephedrine, caffeine, etc.).

Alkaloids localize mainly in leaves, seeds, or roots of plants. The alkaloid content varies widely depending on the species and its organ, the vegetation period of plants, and the environmental conditions such as climate, soil, humidity, etc.

A natural organism contains a single alkaloid only in very rare instances. In most cases a mixture of alkaloids is present, the number of components of which varies widely. Alkaloids in plants are usually found as salts of various organic and mineral acids.

Alkaloids are classified using various signatures such as natural sources or chemical nature. The most correct and common classification of alkaloids is their distribution according to principal structure, i.e., the principal C-N skeleton.

According to the last signature, alkaloids are divided into the following large groups: pyrrolidine, pyridine, quinoline, isoquinoline, indole, quinazoline, steroidal, diterpenoid, and other alkaloids. Each of these groups is subdivided into several subgroups depending on the structural features of its representatives.

The world has now accumulated many experimental results on alkaloids, a significant part of which issued from the CIS countries by followers of Academician A. P. Orekhov. Since the 1950s, of the last century the Institute of the Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan became the center of investigation on alkaloids in USSR and then CIS countries. It was organized by Acad. S.Yu. Yunusov, an outstanding scientist in the field of natural compounds.

The chemistry of about 700 plant species from 50 families has been studied in detail. More than 1,500 alkaloids have been isolated. Structures of more than 700 new alkaloids belonging to the quinoline, isoquinoline, indole, quinazoline, S-containing, pyrrolizidine, diterpenoid, steroidal, and other groups have been established. Structure–activity relationships properties of these compounds have been studied in collaboration with pharmacologists. This led to valuable medicinal preparations.

The pharmaceutical industry produces at present the medicinal preparations, e.g., lycorine, deoxypeganine, galanthamine, cytisine, and allapinine. More than 60 bioreagents have been proposed for medicinal and biological research.

The unwavering interest in the chemistry of alkaloids and the voluminous literature that requires serious thought in order to systematize it, formulate hypotheses and theories, and develop further promising research directions have prompted staff members of the Laboratory of Alkaloid Chemistry of the S. Yu. Yunusov Institute of the Chemistry of Plant Substances of AS RUz to compile this handbook, which is based on the literature of alkaloids from plants, microorganisms, and a few callus tissues that was

published in journals of the Soviet Union and then CIS countries up to 2008 inclusive.

This book consists of two chapter. The first chapter gives information on plant species combined on families and contained alkaloids of established structure. References to the literature are given at the end of each family. The names of the taxons given in the original papers have been retained. The authors of such taxons and names in parentheses are given according to S. K. Cherepanov {*Vascular Plants of the USSR* [in Russian], Nauka, Leningrad (1981)}.

In the second chapter, alkaloids are described according to their groups with details of their producing plants and of the structure composition (structural and empirical formulae), and melting points of the alkaloids and their derivatives, specific rotation, solubilities, spectral characteristics (UV, IR, ^{1}H and ^{13}C NMR, etc.), information on pharmacology and biology, and references to original papers. The groups and alkaloids in them are given in English alphabetical order. UV spectra were taken in ethanol (λmax, nm, log ε); IR spectra, as a rule, for KBr disks (cm^{-1}); and ^{1}H and ^{13}C NMR spectra, in $CDCl_3$ (δ scale, ppm, J/Hz), except where otherwise noted.

In the majority of cases, generally accepted abbreviations have been used.

Conventional symbols and abbreviations used in the book:

abs. conf. – absolute configuration; anhyd. – anhydrous; br s – broadened singlet; dec. – decomposes; deriv. – derivative; dil. – dilute; insol. – insoluble; i/p – intraperitoneal(ly); i/v – intravenous(ly); pet. ether – petroleum ether; org. solv. – organic solvents; pharm./biol. – pharmacological and biological properties; s/c – subcutaneous(ly); sh – shoulder, inflection; sol. – soluble; spar. sol. – sparingly soluble; very sol. – very soluble.

* – these signals may be interchangeable.

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

Family Amaranthaceae

***Aerva lanata* Tuss.**
Canthin-6-one [1]
β-Carboline-1-propionic acid [1]
Ervine (10-hydroxycanthin-6-one) [1]
Ervolanine [1]
Ervozide [1]
Feruloylhomovanillylamine [2]
Feruloyltyramine [2]
Methylervine (10-methoxycanthin-6-one) [1]

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Family Amaryllidaceae

***Amaryllis hybrida* Hort.**
Galanthamine [1]

***Clivia miniata* Regel**
Caranine [2]
Hippeastrine [2]
Lycorine [2]

***Crinum amabile* Donn.**
Crinine [3]
Galanthamine [3]
Galanthine [3]
Hippeastrine [3]
Lycorine [3]
(±)-Narwedine [3]
Tazettine [3]

***Crinum giganteum* L.**
Crinine [4]
Galanthamine [4]
Hippeastrine [4]
Lycorine [4]
Tazettine [4]

***Eucharis subedentata* Benth.**
Galanthamine [5]

***Galanthus caucasicus* (Baker) Grossh.**
Demethylhomolycorine [6]
Galanthamine [6]
Galanthine [6]
Galanthusine [7]
Lycorine [6]
Tazettine [6]

***Galanthus nivalis* L.**
Galanthamine [8]
Hippeastrine [8]
Lycorine [8]
(±)-Narwedine [8]
Tazettine [8]

***Galanthus plicatus* M.B.Bieb.**
Trispheridine [9]

***Galanthus woronowii* Losinsk.**
Galanthamine [10]
Galanthine [11]
Lycorine [12]
Tazettine [12]

***Hippeastrum equestre* Herb.**
Galanthamine [13]
Galanthine [13]
Haemanthamine [13]
Hippeastrine [13]
Lycorine [13]
Tazettine [13]

***Hymenocallis littoralis* Salisb.**
Galanthamine [14]
Hippeastrine [14]
Lycorine [14]
Pancratine [14]
Tazettine [14]
Trispheridine [14]

***Leucojum aestivum* L.**
Galanthamine [15]
Lycorine [15]
Tazettine [15]
Ungerine [16]

***Leucojum vernum* L.**
Galanthamine [17]
Lycorine [17]
Tazettine [17]

Narcissus folli
Lycorine [18]
Tazettine [18]

***Narcissus hybridus* Hort. (copz. Fortune)**
Forthucine [17]
Galanthamine [17]
Haemanthamine [17]

Narcissus kristalli
Galanthamine [18]
Lycorine [18]
(−)-Narwedine [18]
(±)-Narwedine [18]
Tazettine [18]

***Narcissus poeticus* L.**
Lycorine [19]
Tazettine [19]

***Narcissus tazetta* L.**
Lycorine [18]
Pancratine [18]
Tazettine [18, 20]

***Paneratium maritimum* L.**
Lycorine [21]
Pancratine [21]
Tazettine [21]

***Pancratium trianthum* Herb.**
Galanthamine [22]
Hippeastrine [22]
Hordenine [22]
Lycorine [22]
Pancratine [22]
Tazettine [22]
Trianthine [22]
Trispheridine [22]

***Sternbergia fischerana* (Herb.) M.Roem.**
Lycorine [23]

***Sternbergia lutea* (L.) Spreng.**
Hemanthamine [24]
Lycorine [24]
Pancratine [24]
Tazettine [24]

***Ungernia ferganica* Vved. ex Artjushenko**
Galanthamine [25]
Hippeastrine [25]
Hordenine [25]
Lycorine [25]
Pancratine [25]
Tazettine [25]
(−)-Ungiminorine [25]

***Ungernia minor* Vved.**
Lycorine [26]
Tazettine [26]
Ungeremine [27]
Ungiminoridine [27]
(−)-Ungiminorine [27]

***Ungernia sewertzowii* (Regel) B.Fedtsch.**
Galanthamine [28]
Hippeastrine [28]
Lycorine [28]
(+)-Narwedine [28]
(±)-Narwedine [28]
(−)-Narwedine [28]
Pancratine [28]
Tazettine [29]
Ungerine [29]
(−)-Ungiminorine [28]
Unsevine [28]

***Ungernia spiralis* Proskorjakov**
Dihydroepimacronine [30]
Epimacronine [31]
Galanthamine [32]
Hippeastrine [32]
Lycorine [32]
Tazettine [32]
Trispheridine [9]
Ungeremine [32]
Ungspirolidine [33]
Ungspiroline [33]

***Ungernia tadshicorum* Vved. ex Artjushenko**
Galanthamine [34]

Hippeastrine [35]
Hordenine [36]
Lycorine [37]
Pancratine [34]
Tazettine [34]
Ungerine [36]

***Ungernia tamaricum* S.Khamid**
Galanthamine [38]
Hordenine [38]
Lycorine [38]

***Ungernia trisphaera* Bunge**
Galanthamine [39]
Hippeastrine [39]
Hordenine [18]
Lycorine [39]
Pancratine [18]
Tazettine [39]
Trispheridine [40]
Ungerine [39]

***Ungernia victoris* Vved. ex Artjushenko**
Galanthamine [41]
Hippeastrine [19]
Hordenine [41]
Lycorine [41]
(±)-Narwedine [35]
Pancratine [41]
Tazettine [41]

***Ungernia vvedenskyi* S.Khamid**
Galanthamine [42]
Hippeastrine [42]
Hordenine [42]
Lycorine [42]
(±)-Narwedine [42]
Pancratine [42]
Tazettine [42]
Ungiminoridine [42]
(−)-Ungiminorine [42]
(±)-Ungiminorine [42]
Ungvedine[43]

***Vallota speciosa* Durand et Schinz.**
Galanthamine [5]

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Family Apocynaceae

***Amsonia angustifolia* Michx.**
(+)-Eburnamenine [1]
(−)-Eburnamine [1]
(+)-Eburnamonine [1]
(+)-Isoeburnamine [1]
(−)-Tabersonine [1]

***Amsonia illustris* R.E. Woodson**
(+)-Eburnamenine [1]
(−)-Eburnamine [1]
(+)-Eburnamonine [1]
(+)-Isoeburnamine [1]
(−)-Tabersonine [1]

***Amsonia tabernaemontana* Walt. (*A. salicifolia* Pichon)**
(+)-Eburnamenine [1]
(−)-Eburnamine [1, 2]
(+)-Eburnamonine [1, 2]
(+)-Isoeburnamine [1, 2]
(−)-Tabersonine [1]

***Rauwolfia cambodiana* Pierre ex Pitard**
Ajmaline [3]
Isoreserpiline [3]
Reserpine [3]

***Rauwolfia canescens* L.**
Ajmalicine [4]
Ajmaline [4]
Aricine [4]
Raucanine [5]
Reserpiline [4]
Reserpine [4]
Sarpagine [4]
α-Yohimbine [4]

***Rauwolfia littoralis* Pierre ex Pitard (*R. indochinensis* M.Pichon *R. macrocapra* Standl.)**
Alstonine [6]
Reserpine [6]
Serpentine [6]
Serpentinine [6]

***Rauwolfia serpentina* Benth**
Ajmaline [3, 7]
Reserpine [3]
Serpentine [3]
Vomilenine [7, 8]

***Rauwolfia verticillata* Baill**
Ajmalicine [3]
Ajmaline [3]
Reserpine [3]
Serpentine [3]

***Rauwolfia vomitoria* Afz.**
Ajmalicine [3]
Ajmaline [3]
Akuammine [3]
Deserpidine [3]
Isorauhimbine (3-epi-a-yohimbine) [3]
Isoreserpine [3]
Methylreserpat [3]
Reserpine [3]

***Vinca erecta* Regel et Schmalh.**
N-Acetylvinerine [9]
Akuammicine [10, 11]

Akuammidine [12]
Akuammine [10, 13]
(+)-Apovincamine [14]
O-Benzoyltombosine [15]
(−)-1,2-Dehydroaspidospermidine [14]
14,15-Dehydro-3-oxokopsinine [16]
14,15-Dehydro-3-oxokopsinine N-oxide [17]
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(±)-Eburnamine [14]
(−)-Eburnamonine [14]
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Ercinaminine [20]
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Ervincinine [14]
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11-Hydroxystrictamine [20]
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Majdine [28]
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Vincamajine [64]
Vincamine [65]
(−)-Vincanine (norfluorocurarine) [53, 66]

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Akuammine [68]
Akuammine N-oxide [69]
Ervine [67]
Isomajdine [70]

Lanceomigine [69]
Majdine [68]
Majoridine (majdinine) [71]
Majorinine [67]
Quebrachidine (vincarine) [72]
Reserpinine [68]
Vincamajine [67]
Vincamajinine [73]
Vincamajoreine [67, 74]
Vincamine [72]

***Vinca minor* L.**
Akuammicine [75]
Apovincamine [76]
Ervine [77]
Isomajdine [75]
Majdine [77]
11-Methoxyvincadifformine [76]
Reserpine [30]
Reserpinine [77]
Tombozine [77]
(±)-Vincadifformine [76]
Vincamajine [77]
Vincamine (minorine) [78, 79]
Vincanidine [77]
(−)-Vincanine [77]
Vincine [76]
Vineridine [77]
Vinerine [77]

***Vinca pubescens* D'Urv.**
Carapanaubine (vinine) [80, 81]
Isomajdine [82]
Majdine [82]
Majoridine (majdinine) [83]
Reserpinine (pubescine) [80, 81, 83]

***Vinca rosea* I**
Ajmalicine [81]

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Family Asclepiadaceae

***Antitoxicum funebre* (Boiss. et Kotschy) Pobed. (*Vincetoxicum funebre*)**

Antofine [1]

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Family Berberidaceae

***Berberis amurensis* Rupr.**
Amurenine [1, 3]
Berbamine [2]
Berbamunine [3]
Berberine [4]
Berberrubine [3]
Columbamine [5]
N-Dimethylheliamine [2]
Isotetrandrine [5]
Jatrorrhizine [4]
Obaberine [4]
Oxyacanthine [3]
Palmatine [4]
Pseudopalmatine [3]
(+)-Tetrahydropalmatine [3]

Berberis crataegina
Aromoline [6]
Berbamine [6]
Berberine [6]
Columbamine [6]
Isotetrandrine [6]
Jatrorrhizine [6]
Magnoflorine [6]
Oxyacantine [6]
Palmatine [6]

***Berberis densiflora* Boiss. et Buhse**
β-Allocryptopine [7]
Berberine [7, 8]
Glaucine [7]
Densiberine [7]
Densinine [7]
Isocoridine [7]
O-Methylcorypalline [7]
Oxyacanthine [7]
Thalicmidine [7]

***Berberis heterobotrys* E. Wolf**
Berbamine [9]
Berberal [9]
Berberine [4, 9, 10]
Isocorydine [9]
Jatrorrhizine [9]
Obaberine [9]
Oxyacantine [9]
Palmatine [4, 9]
Reticuline [9]
Thalicmidine [9]

***Berberis heteropoda* Schrenk (*B. sphaerocarpa*)**
Aromoline [11]
Berbamine [12, 13]
Berbamunine [11–13]
Berberine [11, 13]
Berpodine [14]
Columbamine [11–13]
Glaucine [13]
8-Hydroxydihydropalmatine [15]
Isoboldine [15]
Isocorydine [11]
Isotetrandrine [15]
Jatrorrhizine [11–13]
Laudanidine [15]
Laudanosine [11]
Magnoflorine [11–13]
N-Methylcoclaurine [15]
N-Methyldihydroberberine [11]
Noroxohydrastinine [15]
Oblongine [13]
8-Oxoberberrubine [11]
Oxyacanthine [11–13]
Palmatine [12, 13]
Pseudopalmatine [11]
Reticuline [13]
(−)-Tetrahydroberberine [11–13]
Thalicmidine [13]

***Berberis iberica* Stev. et Fisch. ex DC.**
Berberine [8, 10]

***Berberis iliensis* M.Pop.**
Berbamine [16]
Berbamunine [16]
Berberine [10, 16, 17]
Berberrubine [16]
Columbamine [16]
Jatrorrhizine [16, 17]
Magnoflorine [16]
N-Methylcoclaurine [16]
(+)-β-N-Methylcorypalmine [16]
Obaberine [16]
Oxyacanthine [16, 17]
Palmatine [16]

***Berberis integerrima* Bunge**
Armepavine [18]
Berbamine [8, 19]
Berbamunine [20]
Berberine [8, 10]
Columbamine [19, 20]
Glaucine [18]
Heliamine [18]
Intebrimine [18]
Intebrine [21]
Intebrinine [18]
Isoboldine [18, 22]
Isocorydine [18]
Isocorydine N-oxide [22]
Isotetrandrine [23]
Jatrorrhizine [19]
Magnoflorine [23]
Oxyacanthine [6, 17, 18]
Palmatine [19]
Reticuline [18, 22]
Thalicmidine [18]
Thalicmidine N-oxide [22]

***Berberis kaschgarica* Rupr.**
Berberine [10]

***Berberis nummularia* Bunge**
Aromoline [24]
Berbamine [8]
Berbamunine [24]
Berberine [8]
Bernumicine [25]
Bernumidine [25]
Bernumine [26]
Columbamine [21]
Corypalline [24]
Glaucine [26]
Isoboldine [24]
Isocorydine [24]
Isotetrandrine [8]
Jatrorrhizine [8, 27]
Laudanosine [26]
Magnoflorine [27]
N-Methylcoclaurine [25]
Noroxohydrastinine [24]
Numularine [24]
Obaberine [24]
Oxyacanthine [24]
Palmatine [8]
Reticuline [27]
(−)-Tetrahydroberberrubine [27]
Thalicmidine [28]
(+)-Thalictricavine [27]

***Berberis oblonga* (Bunge) Schneid.**
Berbamine [29]
Berbamunine [30]
Berberine [29]
Columbamine [29]
Corypallinium or 3,4-dihydrocorypallinium [31]
Glaucine [32]
Isocorydine [20]
Jatrorrhizine [29]
Magnoflorine [29]
2-N-Methylberbamine [33]
2'-N-Methylisotetrandrine [34]
Oblongamine [30]
Oblongine [35]
Oxyacanthine [29]
Palmatine [29]
Thalicmidine [20]

***Berberis orientalis* Schneid**
Berberine [10]

Berberis ottawensis
Berberine [4]
8-Oxoberberine [4]
Palmatine [4]

Berberis regeliana
Berberine [4]

***Berberis sibirica* Pall.**
N-Acetylhomoveratrilamine [36]
Berbamine [36]
Berberine [10, 36]
Berberrubine [36]
Columbamine [36]
Noroxohydrastinine [36]
8-Oxoberberine [36]
8-Oxoberberrubine [36]
Oxyacanthine [36]
Pakistanine [36]
Palmatine [36]
Pronuciferine [36]

***Berberis thunbergii* DC.**
Berbamine [37]
Berberine [37]
Geliamine [37]
Glaucine [37]
Isocorydine [37]
Isotetrandine [37]
Oxyacanthine [37]
Palmatine [37]
Thalicmidine [37]

***Berberis turcomanica* Kar.**
Armepavine [38]
Aromoline [39]
Berbamine [38]
Berberine [10, 38]
Columbamine [38]
Corydine [38]
Corypalline [38]
Epiberberine [38]
Glaucine [38]
Isoboldine [40]
Isocorydine [39]
Jatrorrhizine [38]
Magnoflorine [38]
O-Methylisothalicberine [38]
N-Methylcorydaldine [41]
Oxyacanthine [39]
Palmatine [38]
Papaverine [40]
Thalicmidine [39]
Turcamine [42]
Turcberine [38]
Turcomanine [39]
Turcomanidine [41]
Turconidine [38]

***Berberis vulgaris* L.**
Bargustanine[43]
Berbamine [8, 44]
Berbamunine [44]
Berberine [8, 44, 45]
Berberrubine [23]
Berlambin [44]
Columbamine [44]
Dihydroberberine (Lambertin) [20, 44]
Isocorydine [20]
Isotetrandrine [23]
Jatrorrhizine [20]
Magnoflorine [23]
8-Oxoberberine [23]
Oxyacanthine [8, 44]
Palmatine [44]
Yuzifine [44]

***Leontice alberti* Regel (*Gymnospermium alberti*)**
Albertamine [46]
Albertidine [47]
Albertine [48]
Anabasine [47]
Darvasamine [49]
Darvasine [49]
Leontalbamine [50]
Leontalbine [51]
Leontalbinine [48]
Leontidine [52]
Leontine [47]
Matrine [50]
N-Methylcytisine [48, 53]
(+)-Sophoridine [54]
Taspine [48]

***Leontice darwasica* Regel (*Gymnospermium darwasicum*)**
Anabasine [50]
Darvasamine [55]
Darvasine [56]
Darvasoline [57]
Leontalbinine [50]
Leontidine [50]
Leontine [55]
(−)-Lupanine [55]
N-Methylcytisine [56]
(+)-Sophoridine [50]
Taspine [50, 55]

***Leontice ewersmannii* Bunge**
Leontidine [53]
Leontine [58]
(+)-Lupanine [53]
Pachycarpine [53]
Taspine [59]

***Leontice smirnowii* Trautv. (*Gymnospermium smirnowii*)**
(+)-Argemonine [60]
Isoleontalbine [61]
Leontidine [62]
Leontismidine [61]

Leontismine [50]
(−)-Lupanine [60]
N-Methylcytisine [62]
Sophocarpine [63]
Taspine [60]

***Mahonia aquifolia* Nutt.**
Berbamine [45]
Berberine [45]
Isotetrandrine [8]
Jatrorrhizine [8]
Oxyacanthine [8]
Palmatine [8]

***Nandina domestica* Thunb.**
Berberine [8]

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Family Bignoniaceae

***Catalpa speciosa* (Wander ex Barney) Wanderex Engelm**
Pedicularine [1]
Plantagonine [1]

***Incarvillea olgae* Regel**
Indicaine [2]
(−)-Plantagonine [2]

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Family Boraginaceae

***Cynoglossum amabile* Stapf. et Drummond**
Amabiline [1]
Echinatine [1]

***Cynoglossum officinale* L.**
Heliosupine [2]

***Cynoglossum pictum* Soland (*Cynoglossum creticum*)**
Echinatine [3]
Echinatine N-oxide [3]
Heliosupine [3, 4]
Heliosupine N-oxide [3]

***Cynoglossum viridiflorum* Pall. ex Lehm.**
Heliosupine [1]
Heliosupine N-oxide [1]
Viridiflorine [1]
Viridiflorine N-oxide [5]

***Echium vu1gare* L.**
Asperumine [6]
Asperumine N-oxide [6]
Heliosupine [7]

***Heliotropium acutiflorum* Kar. et Kir.**
Heliotrine [8]
Heliotrine N-oxide [8]

Heliotropium anhusioides
Trichodesmine [9]

***Heliotropium argusioides* Kar. et Kir**
Heliotrine [10]
Trichodesmine [11]
Trichodesmine N-oxide [11]

***Heliotropium dasycarpum* Ledeb.**
Heliotrine [11]
Heliotrine N-oxide [11]

***Heliotropium eichwaldi* Stend.**
Heliotrine [12]
Heliotrine N-oxide [12]

Lasiocarpine [12]
Lasiocarpine N-oxide [12]

Heliotropium europaeum
Heliotrine [13]
Lasiocarpine [13]

***Heliotropium lasiocarpum* Fisch. et Mey.**
Heliotrine [14]
Heliotrine N-oxide [14]
Lasiocarpine [14]
Lasiocarpine N-oxide [14]

***Heliotropium olgae* Bunge**
Heliotrine [15]
Heliotrine N-oxide [15]
Incanine [15]
Incanine N-oxide [15]
Lasiocarpine [15]
Lasiocarpine N-oxide [15]

***Heliotropium supinum* L.**
Heliosupine [16]
Supinine [17]

***Heliotropium transoxanum* Bunge**
Heliotrine [8]
Heliotrine N-oxide [8]

***Lappula intermedia* (Ledeb.) M.Pop. (*Lappula redowskii*)**
Lasiocarpine [18]

***Lindelofia anchusoides auct.* (*Lappula macrostyla* (Bunge) M.Pop.)**
Alkaloid № 1 [19]
Echinatine [20]
Lindelofamine [21]
Lindelofine [20]
Lindelofine N-oxide [19]
Viridiflorine [20]

***Lindelofia olgae* (Regel et Strim.) Brand**
Viridiflorine [22]
Viridiflorine N-oxide [22]

***Lindelofia pterocarpa* (Rupr.) M. Pop.**
Viridiflorine [23]
Viridiflorine N-oxide [23]

***Lindelofia stylosa* (Kar. et.Kir.) Brand**
Echinatine [24]
Echinatine N-oxide [24]
Lindelofine [25]
Lindelofine N-oxide [25]
Viridiflorine [25]
Viridiflorine N-oxide [25]

***Lindelofia tschimganica* (Lipsky) M.Pop. ex Pazij**
Echinatine [26]
Viridiflorine [26]

***Macrotomia echioides* (L.) Boiss (*Arnebia pulchra* (Roem. Et Schult.) J. R. Edmondson)**
Macrotomine [27]

***Paracaryum himalayense* (Klotzsch) Clarke (*Mattiastrum himalayense* (Klotzsch) Brand)**
Viridiflorine [23]
Viridiflorine N-oxide [23]

***Paracynoglossum imeretinum* (Kusn.) M.Pop. (*Cynoglossum imeretinum*)**
Echinatine [28]
Echinatine N-oxide [28]
Heliosupine [28]
Heliosupine N-oxide [28]

***Rindera austroechinata* M.Pop.**
7-Angelylheliotridine [5]
Echinatine [26]
Echinatine N-oxide [26]

***Rindera baldshuanica* Kusn. (*Rindera tetraspis*)**
Echinatine [26]
Rinderine [26]
Trachelanthamine [26]

***Rindera cyclodonta* Bunge (*Rindera tetraspis*)**
Echinatine [29]
Lindelofine [29]
Lindelofine N-oxide [29]

***Rindera echinata* Regel**
Echinatine [23]
Trachelanthamine [30]
Trachelanthamine N-oxide [30]

***Rindera oblongifolia* M.Pop.**
Echinatine [30]

***Solenanthus circinnatus* Ledeb.**
Echinatine [23]

***Solenanthus coronatus* Regel**
Echinatine [24]

***Solenanthus hirsutus* Regel**
Echinatine [23]

***Solenanthus karateginus* Lipsky**
Echinatine [23]

***Solenanthus turkestanicus* (Regel et Smirn.) Kusn.**
Rinderine [22]

***Suchtelenia calycina* (C.A.Mey.) A.DC.**
Echinatine [5]

***Symphytum asperum* Lepech.**
Asperumine [31]
Echinatine [31]
Heliosupine N-oxide [31]

***Symphytum caucasicum* Bieb.**
Asperumine [32]
Echimidine N-oxide [32]
Echinatine [32]
Lasiocarpine [33]

***Symphytum officinale* L.**
Echinatine [34]
Heliosupine N-oxide [34]
Lasiocarpine [34]
Viridiflorine [34]

***Tournefortia sibirica* L. (*Argusia sibirica*)**
Turneforcine [35]

***Tournefortia sogdiana* (Bunge) M.Pop. (*Argusia sogdiana*)**
Supinine [5]

***Trachelanthus hissaricus* Lipsky**
Trachelanthamine [36]
Trachelanthamine N-oxide [36]
Viridiflorine [36]
Viridiflorine N-oxide [36]

***Trachelanthus korolkowii* Lipsky**
Trachelanthamidine [5]
Trachelanthamine [36]
Trachelanthamine N-oxide [36]

***Trichodesma incanum* (Bunge) A.D.C.**
Incanine [37]
Incanine N-oxide [38]
Trichodesmine [37]
Trichodesmine N-oxide [38]

***Ulugbekia tschimganica* (B.Fedtsch.) Zak.**
Uluganine [39]

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Family Buxaceae

***Buxus balearica* L.**
Buxamideine K [1, 2]
Buxidine F [1, 3]
Cyclomicrophylline B [1, 2]
N-3-Isobutyrylcyclobuxidine F [1, 3]
Pseudobaleabuxine F [1, 2]

Buxus colchica
Cyclobuxine D [4]
(−)-Cycloprotobuxine C [4]
Pseudocyclobuxine D [4]

***Buxus hyrcana* Pojark.**
N-3-Benzoylcyclobuxidine F [5]
Buxidine F [5]
Buxpiine [6]
Buxtauine [7]
Cyclobuxine D [5]
Cyclomicrobuxine [5]
Cycloprotobuxine C [5, 8]

***Buxus sempervirens* L.**
N-Benzoylcycloprotobuxine C [9]
Buxaline C [10]
Buxamine E [11]
Cyclobuxine B [12]
Cyclobuxine D [12, 13]
Cycloprotobuxine A [14–16]
(−)-Cycloprotobuxine C [17]
Cycloprotobuxine D [12, 14]
Cyclovirobuxine D [12–14]
Cyclovirobuxine F [18]
Isodihydrocyclomicrofilline-A [19]
O-Methylcyclovirobuxine D [20]
Pseudocyclobuxine D [21]

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Family Campanulaceae (Lobeliaceae)

***Codonopsis clematidea* (Schrenk) Clarke.**
Codonopsine [1]
Codonopsinine [2]

Lobelia cardinalis
Lobelanine [3]
(−)-Lobeline [3]

Lobelia fulgens
Lobelanine [3]
(−)-Lobeline [3]

Lobelia inflata
Lobelanine [3]
(−)-Lobeline [3]

Lobelia laxylora
Lobelanine [3]
(−)-Lobeline [3]

***Lobelia sessilifolia* Lamb.**
Lobelanine [3]
(−)-Lobeline [3]
(+)-Lobeline [4]

Lobelia syphilitica
Lobelanine [3]
(−)-Lobeline [3]

Lobelia urens
Lobelanine [3]
(−)-Lobeline [3]

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Family Capparidaceae (Capparaceae)

***Capparis spinosa* auct. (*C. herbacea*)**
(+)-Stachydrine [1–3]

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Family Caricaceae

***Carica papaya* L.**
Carpaine [1, 2]
Pseudocarpaine [2, 3]

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Family Chenopodiaceae

***Anabasis aphylla* L.**
Anabasamine [1]
Anabasine [2]
Aphyllidine [3]
Aphylline [3]
Hydroxyaphylline [4]
Lupinine [2]
Methyl ester of aphyllinic acid [5]
Oxoaphyllidine [4]

***Anabasis jaxartica* (Bunge) Benth. ex Volkens.**
N-Methyl-4-hydroxy-β-phenethylamine [6]

***Anabasis salsa* (C.A.Mey.) Benth. ex Volkens**
(−)-2,6-Dimethylpiperidine [7]

***Girgensohnia diptera* Bunge**
Dipterine (N-Methyltryptamine) [8]
N-Methylpiperidine [9]

***Girgensohnia oppositiflora* (Pall.) Fenzl**
Girgensonine [10]
N-Methylpiperidine [10]

***Halostachys caspica* (Bieb.) C.A.Mey.**
Halostachine [11, 12]

***Hammada Iljin* (*Arthrophytum wakhanicum* Pauls.), (*Hammada wakhanica* (Pauls.) Iljin)**
Leptocladine [13]
N-Methyl-β-phenethylamine [14]

***Hammada leptoclada* (M. Pop. ex Iljin) Iljin**
Dipterine [15]
Eleagnine [16, 17]
Leptocladine (N-methyltetrahydroharman) [16]
N-Methyl-b-phenethylamine [18]
N-Methyltetrahydro-b-carboline [6]

***Kalidium gracile* Fenzl**
Kalidine [19]

***Nanophyton erinaceum* (Pall.) Bunge**
(−)-2,6-Dimethylpiperidine [20]
(−)-1,2,6-Trimethylpiperidine [20]

***Petrosimonia monandra* (Pall.) Bunge**
Piperidine [21]

***Salsola pestifer* Nels. (*S. australis* R.Br.)**
(−)-Salsolidine [22]
(+)-Salsoline [22]

***Salsola richteri* (Moq.) Kar. ex Litv.**
(−)-Salsolidine [23]
(+)-Salsolidine [24]
(+)-Salsoline [23]
(+)-Salsoline [25]

***Salsola subaphylla* C.A.Mey.(*Aellenia subaphylla* (C.A.Mey.) Aell.)**
Subaphylline [26]

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Family Clavicipidaceae

Claviceps purpurea* Tul. *Ergocryptine stamm
Ergocryptine [1]
Ergometrine [1]

Claviceps purpurea* Tul. *Ergometrine stamm
Ergometrine [2]
Ergometrinine [2]
Ergovalide [3]

Claviceps purpurea* Tul. *Ergotamine stamm
Chanoclavine [4]
Ergocryptine [5]
Ergometrine [5]
Ergotamine [5]
Ergotaminine [5]

Claviceps purpurea* Tul. *Ergotoxyne stamm
Ergovalide [3]

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Family Compositae (Asteraceae)

***Adenostyles alliariae* (Gouan) A. Kerner**
Platyphylline [1]
Seneciphylline [1]

***Achillea millefolium* L.**
Betonicine [2]

***Cacalia hastata* L.**
Hastacine [3]

***Cacalia robusta* Tolm.**
Hastacine [4]

***Centaurea salonitana* Vis.**
Phenyl-β-naphthylamine [5]

***Doronicum macrophyllum* Fisch. ex Hornem.**
Doronine [6]
Floridanine [6]
(+)-Othosenine [6]

***Echinops albicaulis* Kar. et Kir.**
N-Methyl-4-aminoquinolinium [7]

***Echinops chantavicus* Trautv.**
N-Methyl-4-aminoquinolinium [8]

***Echinops karatavicus* Regel et Schmalh.**
N-Methyl-4-aminoquinolinium [8]

***Echinops maracandicus* Bunge**
N-Methyl-4-aminoquinolinium [8]

***Echinops ritro* L.**
N-Methyl-4-aminoquinolinium [9]

***Echinops sphaerocephalus* L.**
N-Methyl-4-aminoquinolinium [9]

***Leucanthemum vulgare* Lam.**
Platyphylline [10]
Senecionine [10]
Choline [10]

***Nardosmia laevigata* (Willd.) DC. (*Petasites radiatus* (J.F.Gmel.) Toman)**
Platyphylline [11]
Renardine [11]

***Saussurea elegans* Ledeb.**
Elegantine [12]

***Senecio amphibolius* C. Koch.**
Macrophylline [13]

***Senecio borysthenicus* (DC.) Andrz.**
Seneciphylline [14]

***Senecio cannabifolius* Less.**
Seneciphylline [14]

***Senecio cineraria* uct. (*S. bicolor*)**
Seneciphylline [15]

***Senecio erraticus* Bertol.**
Floridanine [16]
(+)-Othosenine [16]
Senecionine [16]

***Senecio franchetii* C. Winkl.**
Sarracine N-oxide [17]

***Senecio jacobaea* L.**
Jacobine [18]
(−)-Othosenine [18]
Renardine [18]

***Senecio krylowii* Turcz.**
Seneciphylline [19]

***Senecio lapsanoides* DC.**
Seneciphylline [20]

***Senecio macrophyllus* Bieb.**
Macrophylline [21]

***Senecio othonnae* Bieb.**
Doronine [22]
Floridanine [23]
Onetine [24]
(+)-Othosenine [25]
Seneciphylline [24]

***Senecio palmatus* Pall.**
Seneciphylline [26]

***Senecio paludosus* L.**
Seneciphylline [14]

***Senecio platyphylloides* Somm. et Levier (*Adenostyles platyphylloides*)**
Neoplatyphylline [27, 28]
Platyphylline [29]
Platyphylline N-oxide [30]
Sarracine [31]
Seneciphylline [29]
Seneciphylline N-oxide [30]

***Senecio propinquus* Schischk.**
Seneciphylline [32]

***Senecio renardii* C. Winkl.**
(+)-Othosenine [33]
Renardine [33]
Seneciphylline [33]

***Senecio rhombifolius* (Adam) Sch. Bip. (*Adenostyles rhombifolia*)**
Platyphylline [34]
Sarracine [34]
Sarracine N-oxide [35]
Seneciphylline [34]

***Senecio sarracenicus* L. (*S. fluviatilis*)**
Sarracine [36]
Sarracine N-oxide [36]

***Senecio stenocephalus* Maxim.**
Seneciphylline [37]

***Senecio subdentatus* Ledeb.**
Renardine [38]
Seneciphylline [38]

***Senecio taraxacifolius* (Bieb.) DC.**
Seneciphylline [27, 39]

***Senecio vernalis* Waldst. et Kit.**
Platyphylline [40]
Seneciphylline [40]

***Senecio vulgaris* L.**
Senecionine [41]

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Family Convolvulaceae

***Convolvulus erinaceus* Ledeb.**
Cuscohygrine [1]

***Convolvulus hamadae* (Vved.) V. Petrov**
Cuscohygrine [2]
Hygrine [2]

***Convolvulus Krauseanus* Regel et Schmalh.**
Convolamine [3, 4]
Convolamine N-oxide [5]
Convolicine [3, 4]
Convolidine [3, 4]
Convoline [6]
Convolvidine [7]
Convolvine [3, 4]
Phyllalbine [4]

***Convolvulus lineatus* L.**
Cuscohygrine [8]

***Convolvulus Olgae* Rgl. et Schmalh.**
Cuscohygrine [8]

***Convolvulus pseudocantabrica* Schrenk**
Convolamine [9, 10]
Convolicine [12]

Convolidine [12]
Convoline [12]
Convolvidine [12]
Convolvine [9, 11]
Phyllalbine [12]

***Convolvulus subhirsutus* Regel et Schmalh.**
Confolidine [13]
Confoline [14]
Conpropine [15]
Convolacine [16]
Convolamine [14, 17, 18]
Convolicine [18]
Convolidine [3, 18]
Convoline [18]
Convolvidine [7, 10]
Convolvine [14, 17, 18]
Convosine [19]
Nortropine [20]
Phyllalbine [18]
Phyllalbine N-oxide [20]
Subhirsine [21]

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Family Crassulaceae

***Sedum acre* L.**
(−)-Sedamine [1]

***Sedum aizoon* L.**
(±)-Methylisopelletierine [2]
(±)-Sedamine [2]
(−)-Sedinine [2]

***Sedum ewersii* Ledeb.**
(±)-Sedamine [2]

***Sedum hybridum* L.**
(±)-Methylisopelletierine [2]
(±)-Sedamine [2]
(−)-Sedinine [2]

***Sedum purpureum* (L.) Schult (*S. telephium*).**
(±)-Methylisopelletierine [2]
(±)-Sedamine [2]
(−)-Sedinine [2]

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Family Cruciferae (Brassicaceae)

***Cochlearia arctica* Schlecht. ex DC.**
Cochlearine [1]
Hygrine [1]
Hygroline [1]

***Dipthychocarpus strictus* (Fisch. ex Bieb.) Trautv.**
Deoxydipthocarpaine [2]
Deoxydipthocarpamine [3]
Deoxydipthocarpidine [4]
N,N'-Diisopropylurea [5]
Dipthaline [6]
Dipthamine [7]
Dipthocarpaine [8]
Dipthocarpamine [9]
Dipthocarpidine [10]
Dipthocarpilidine [11]
Dipthocarpiline [10]
Diptocarpinine [12]
N-Isopropylurea [2]

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Family Cyperaceae

***Carex brevicollis* DC.**
Brevicarine [1]
Brevicolline [2]
Dehydrobrevicolline [3]
Harman [1]
Harmine [3]
Harmol [3]
Homobrevicolline [4]

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Family Dipsacaceae

***Cephalaria gigantea* (Ledeb.) Bobr.**
Gentianadine [1]
Gentianaine [1]
Gentianine [1]

***Cephalaria kotschyi* Boiss. et Hohen.**
Gentianadine [1]
Gentianaine [1]
Gentianine [1]

***Cephalaria nachiczevanica* Bobr.**
Gentianadine [1]
Gentianaine [1]
Gentianine [1]

***Dipsacus azureus* Schrenk (*D. dipsacoides* (Kar. et Kir.) Botsch.)**
Cantleyine [2]
Gentianine [3–5]

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Family Elaeagnaceae

***Elaeagnus angustifolia* L.**
Dihydroharman [1]
Eleagnine (tetrahydroharman) [2, 3]
Harman [4]
N-Methyltetrahydro-β-carboline [1]
N-Methyltetrahydroharmol [5]
Tetrahydroharmol [5]

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Family Ephedraceae

***Ephedra ciliata auct.* (*E. kokanica*)**
(−)-Ephedrine [1]
(+)-Pseudoephedrine [1]

***Ephedra distachya* L.**
(−)-Ephedrine [1, 2]
(+)-Pseudoephedrine [1, 2]

***Ephedra equisetina* Bunge**
(−)-Ephedrine [1, 3]
(+)-Pseudoephedrine [1, 3]

***Ephedra fedtschenkoae* Pauls.**
(−)-Ephedrine [1]
(+)-Pseudoephedrine [1]

***Ephedra intermedia* Schrenk et C.A.Mey.**
(−)-Ephedrine [1, 2]
(+)-Pseudoephedrine [1, 2]

***Ephedra lomatolepis* Schrenk**
(−)-Ephedrine [1]
(+)-Pseudoephedrine [1]

***Ephedra monosperma* C.A.Mey.**
(−)-Ephedrine [1]
(+)-Pseudoephedrine [1]

***Ephedra procera* Fisch. et C.A.Mey.**
(−)-Ephedrine [1, 2, 4]
(+)-Pseudoephedrine [1, 2, 4]

***Ephedra strobilacea* Bunge**
(−)-Ephedrine [1]
(+)-Pseudoephedrine [1]

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Family Euphorbiaceae

***Ricinus communis* L.**
Ricinine [1]

***Securinega suffruticosa* (Pall.) Rehd.**
Securinine [2]

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Family Fumariaceae

***Corydalis alpestris* C.A.Mey.**
Adlumidine [1]
(–)-Adlumine [1]
(+)-Bicuculline [1]
Bulbocapnine [1]
Isoboldine [1]
Scoulerine [2]

***Corydalis bracteata* (Steph.) Pers.**
Isoboldine [2]
Isocorypalmine [2]
Protopine [2]
Reticuline [2]
Scoulerine [2]
(+)-Stylopine [2]

***Corydalis caucasica* DC.**
Adlumidine [3]
(–)-Adlumine [2]
α-Allocryptopine [3, 4]
(+)-Bicuculline [3]
Bulbocapnine [3, 4]
Cheilantifoline [3]
Chelerythrine [3, 4]
(+)-β-Hydrastine [3]
Isoboldine [3]
N-Methyllaurotetanine [3]
Norisocoridine [3]
Protopine [3, 4]
Sanguinarine [3, 4]
Scoulerine [3]
Stylopine [3]

***Corydalis emanuelii* C.A.Mey.**
Adlumidine [2]
(+)-Bicuculline [2]
Bulbocapnine [2]
Isoboldine [2]
N-Methyllaurotetanine [2]
Predicentrine [2]
Protopine [2]
Scoulerine [2]
Stylopine [2]

***Corydalis fedtschenkoana* Regel (*Cystocorydalis fedtschenkoana*)**
Bulbocapnine [5]
Protopine [5]
Sanguinarine [5]

***Corydalis fimbrillifera* Korsh.**
Protopine [6]

***Corydalis gigantea* Trautv. et Mey.**
(–)-Adlumidine [7]
(–)-Adlumine [7]
(+)-Bicuculline [7]
(–)-Cheilantifoline [7]
Dihydrosanguinarine [7]
Ophiocarpine [8]
Protopine [7, 9]
Sanguinarine [7]
(–)-Scoulerine [7]

***Corydalis glaucescens* Regel**
Bulbocapnine [10]
Corydaline [10]
Protopine [10]

***Corydalis gortschakovii* Schrenk.**
(–)-Adlumidine [11, 12]
(–)-Adlumine [12–14]
(+)-Bicuculline [11–13]
Bracteoline [11, 14]
Cheilantifoline [11]
Corgoine [13]
Corunnine [11]
Corydine [11, 12, 14]
Corytuberine [12]
Cryptopine [2]
Domesticine [11, 12, 14]
Gortschakoine [12]

Isoboldine [11, 12, 14]
Isocorydine [11–14]
N-Methylcoclaurine [11]
Protopine [11–14]
Reticuline [11]
Scoulerine [11]
Sendaverine [12–14]
Sendaverine N-oxide [12]
(+)-Stylopine [11, 12]
Thalicmidine [11]
Yuzifine [12]
Yuzifine N-oxide [12]

***Corydalis intermedia* (L.) Merat**
α-Allocryptopine [14]
Isoboldine [14]
Protopine [14]

***Corydalis ledebouriana* Kar. et Kir.**
(–)-Adlumidine [2]
(–)-Adlumine [2]
α-Allocryptopine [9, 15]
Berberine [15]
(–)-Bicuculline [2]
Bulbocapnine [15]
(–)-Cavidine [16]
Chelerythrine [15]
Corledine [17]
Corydaline [15]
Corypalline [2]
Cryptopine [15]
Dihydrochelerythrine [15]
Dihydrosanguinarine [15]
Hunnemanine [2]
Isocorydine [15]
Ledeboridine [18]
Ledeborine [19]
Ledecorine [20]
Lederine [21]
N-Methylcoclaurine [2]
Oxosanguinarine [15]
Palmatine [15]
Protopine [15]
(±)-Raddeanine [18]
Raddeanone [2]
Sanguinarine [9, 15]
Scoulerine [2]
Severtzine [2, 22]
Sibiricine [2, 23]
(+)-Tetrahydrocorysamine [16]
Tetrahydropalmatine [15]

***CorydaIis marschalliana* Pers.**
(–)-Adlumidine [24]
α-Allocryptopine [3]
(+)-Bicuculline [24]
(+)-Bulbocapnine [4, 8, 24]
Cheilantifoline [2]
Corycavine [8]
Corydaline [4, 8]
(+)-Corydine [24]
(–)-Domesticine [24]
(+)-Isoboldine [24]
Isocorybulbine [8]
Isocorypalmine [2]
Marshaline [25]
N-Methyllaurotetanine [2]
Nantenine [2]
Protopine [4, 8, 24]
Reticuline [2]
Sanguinarine [8]
(–)-Scoulerine [8]
(+)-Stylopine [2]
Tetrahydropalmatine [8]

***Corydalis paczoskii* N. Busch**
Bulbocapnine [26]
Corydaine [26–28]
Corpaine [26–28]
Protopine [26]

***Corydalis paniculigera* Regel et Schmalh**
(–)-Adlumidine [29]
(–)-Adlumine [29]
(+)-Bicuculline [29]
Coclaurine [29]
Corunnine [29]
Dihydrosanguinarine [29]
Oxosanguinarine [29]
Pancoridine [29]
Pancorine [29, 30]
Pancorinine [29]
Protopine [29]
Sanguinarine [29]
Sibiricine [29]
(+)-Stylopine [29]
Thalicmidine [29]
Wilsonirine [29]

***Corydalis persica* Cham. et Schlecht.**
Chelerythrine [31]
Protopine [31]
Sanguinarine [31]

***Corydalis popovii* Newski ex M. Pop.**
Bulbocapnine [32]
Corydaline [32]

***Corydalis pseudoadunca* M. Pop.**
(–)-Adlumidine [33, 34]
(+)-Bicuculline [33, 34]
(+)-Bicuculline [33]
Coclaurine [34]
Coreximine [33, 34]
Corftaline [34, 35]
(+)-p-Hydrastine [33, 34]
Protopine [33, 34]
Reticuline [34]
Reticuline N-oxide [34]
Sanguinarine [34]
(–)-Scoulerine [33, 34]
Sibiricine [34]
(+)-Stylopine [34]
Wilsonirine [33, 34]
Yuzifine [34]

***Corydalis remota* Fisch. ex Maxim.**
(–)-Adlumidine [8]
α-Allocryptopine [8]
(+)-Bicuculline [8]
Dihydrosanguinarine [8]
Protopine [8]
Sanguinarine [8]

***Corydalis rosea* Leych**
(–)-Adlumidine [8]
(+)-Adlumidine [8]
(–)-Adlumine [8]
(+)-Adlumine [8]
Protopine [8]

***Corydalis rosea-purpurea* (Rupr.) Galushko**
(–)-Adlumine [36]
Bulbocapnine [36]
Cheilantifoline [36]
Corydine [36]
Corypalmine [36]
Glaucine [36]
Isoboldine [36]
Isocorydine [36]
Norcorydine [36]
Protopine [36]
(+)-Stylopine [36]

***Corydalis sewertzowii* Regel**
Adlumidiceine [37]
α-Allocryptopine [14, 22, 37]
(–)-Bicuculline [37]
Chelerythrine [14]
Coclaurine [22, 37]
Coreximine [22, 37]
Corlumine [14, 22, 37]
Cryptopine [22, 37]
Dihydrosanguinarine [14, 37]
Isoboldine [22, 37]
Protopine [14, 22, 37]
Sanguinarine [14]
Scoulerine [22, 37]
Severtzine [22, 37]
Severtzinine [38]
Sibiricine [37]

***Corydalis stricta* Steph. ex Fisch.**
(–)-Adlumidine [39]
(–)-Adlumine [39]
(+)-Bicuculline [39]
Cheilantifoline [39]
Coreximine [39]
Corypalline [39]
Dihydrosanguinarine [39]
(+)-d-β-Hydrastine [6, 39]
Isoboldine [39]
Isocorypalmine [39]
N-Methylcoclaurine [39]
N-Methylcorypalline [39]
N-Methylstylopine [39]
Pancoridine [39]
Pancorinine [39]
Picnorrine [39]
Protopine [6, 39]
Reticuline [39]
Sanguinarine [6, 39]
(–)-Scoulerine [39]
(+)-Stylopine [39]
Wilsonirine [39]
Yuzifine [39]

***Corydalis vaginans* Royle**
(–)-Adlumidine [8]
(–)-Adlumine [8]
(+)-Bicuculline [8]
Bulbocapnine [8]
(–)-Cheilantifoline [8]
(+)-Corydaine [8]
Dihydrosanguinarine [8]
Isocorypalmine [8]
(–)-O-Methylcorpaine [8]
Ochotensine [8]
(+)-Ochrobirine [8]
Protopine [8]
Sanguinarine [8]
(–)-Scoulerine [8]

***Dicentra peregrina* (J.Rudolph) Makino**
α-Allocryptopine [40]
(+)-Bicuculline [40]
Chelerythrine [40]
Corydine [40]
Dicentrine [40]
Dihydrosanguinarine [40]
Isoboldine [40]
Isocorydine [40]
Lederine [40]
Predicentrine [40]
Protopine [40]
Reticuline [40]
Sanguinarine [40]
(–)-Scoulerine [40]

***Dicentra spectabilis* L.**
(–)-Cheilantifoline [40]
Corydine [40]
Dihydrosanguinarine [40]
Protopine [40]
Sanguinarine [40]
(–)-Scoulerine [40]

***Fumaria capreolata* L.**
Adlumidine [41]
Adlumine [41]
(+)-Bicuculline [41]
Capreoline [41]
(+)-α-Hydrastine [41]
Oxosanguinarine [41]
Protopine [41]
Stylopine [41]

***Fumaria micrantha* Lag.**
Protopine [42]

***Fumaria officinalis* L.**
Adlumidine [2, 43]
Adlumine [2, 43]
Cryptopine [2]
Fumaritine [2]
Protopine [2]
Sanguinarine [2]
(–)-Sinactine [2]
Stylopine [2]

***Fumaria parviflora* Lam.**
Adlumidiceine [44]
(–)-Adlumidine [44]
(–)-Adlumine [44]
(+)-Bicuculline [44]
Cheilantifoline [44]
Coclaurine [44]
Cryptopine [44]
Dihydrosanguinarine [44]
(+)-Fumaricine [44]
(+)-α-Hydrastine [44]
Isoboldine [44]
N-Methyladlumine [44]
Noryuzifine [44]
Oxosanguinarine [44]
Parfumidine [45]
Parfumine [44]
Protopine [44]
Sanguinarine [44]
Scoulerine [44]
Stylopine [44]

***Fumaria schleicheri* Soy. – Will.**
Adlumidiceine [46]
Adlumidine [46]
(–)-Bicuculline [46]
(±)-Bicuculline [47]
Fumaritine [46, 47]
(+)-α-Hydrastine [46, 47]
Isoboldine [46]
Oxohydrastinine [47]
Protopine [46, 47]

(+)-Stylopine [46]
(±)-Stylopine [47]

***Fumaria vaillantii* Loisel.**
Adlumidiceine [48]
(–)-Adlumidine [48, 49]
(–)-Adlumine [48, 49]
(+)-Bicuculline [48, 49]
Cheilantifoline [48]
Coclaurine [48]
Fumariline [48]
(+)-α-Hydrastine [48, 49]
Isoboldine [48]
Ledecorine [48]
N-Methyladlumine [50]
N-Methylstylopine [51]
Noryuzifine [48, 52]
Parfumine [48, 52]
Protopine [48, 49]
Reticuline [48]
Scoulerine [48]
(+)-Stylopine [48, 52]
Vaillantine [49]

***Hypecoum erectum* L.**
α-Allocryptopine [53]
Coptisine [53]
Corydamine [53]
Hypecorine [54]
Hypecorinine [54]
Hyperectine [55]
Isohyperectine [56]
(–)-β-N-Methylcanadine [53]
Protopine [54]

***Hypecoum lactiflorum* Kar. et Kir.**
α-Allocryptopine [53]
Hypecorine [53]
Hypecorinine [53]
Protopine [53]

***Hypecoum pendulum* L.**
Protopine [42]

***Hypecoum trilobum* Trautv.**
Chelerythrine [57]
Protopine [57]
Sanguinarine [57]

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Family Gentianaceae

***Erythraea centaurium* (L.) Pers.**
Gentianine [1]

***Gentiana barbata* (Froel.)**
Gentianine [2]

***Gentiana caucasica* Bieb. (*Gentianella caucasica*)**
Gentianaine [3]
Gentiananine [3, 4]
Gentianine [3, 4]

***Gentiana cruciata* L.**
Gentianine [5]

***Gentiana decumbens* L. fil.**
Gentianine [2]

Gentiana kaufmanniana
Regel et Schmalh.
Gentianaine [3]
Gentiananine [3]
Gentianine [3]

***Gentiana kirilowii* Turcz.**
Gentianine [6–8]

***Gentiana macrophylla* Pall.**
Gentianine [2]

***Gentiana olgae* Regel et Schmalh.**
Gentianadine [3]
Gentianaine [3, 9]
Gentiananine [3]
Gentioflavine [10]

***Gentiana olivieri* Griseb.**
Gentianadine [11]
Gentianaine [3, 11]
Gentiananine [12–14]
Gentianine [12, 13]
Gentioflavine [11, 14]
Gentiotibetine [11, 13]
Oliveramine [14]
Oliveridine [11]

***Gentiana pneumonanthe* L.**
Gentianine [2, 15]

***Gentiana tianschanica* Rupr.**
Gentiananine [10]
Gentianine [10, 16]
Gentioflavine [10]

***Gentiana turkestanorum* Gand. (*Gentianella turkestanorum*)**
Gentianadine [9, 12, 17]
Gentianaine [3]
Gentianamine [9, 12]
Gentiananine [12]
Gentianine [12, 18]

***Gentiana vvedenskyi* Grossh. (*Gentianopsis stricta*)**
Gentiananine [10]
Gentianine [10]

***Lomatogonium rotatum* (L.) Fries ex Fern.**
Gentianine [2]

***Ophelia diluta* (Turcz.) Ledeb.**
Gentianine [2]

***Swertia connata* Schrenk**
Gentiananine [10]
Gentianine [10]
Gentioflavine [10]

***Swertia graciliflora* Gontsch.**
Gentiananine [19]
Gentianine [19]
Gentioflavine [19]

***Swertia marginata* Schrenk**
Gentiananine [19]
Gentianine [19]
Gentioflavine [19]

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Family Geraniaceae (Biebersteiniaceae)

***Biebersteinia multifida* DC.**
(−)-Vasicinone [1]

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Family Gramineae (Poaceae)

***Arundo donax* L.**
Ardine [1]
Arundacine [2]
Arundafine [3]
Arundamine [4]
Arundanine [5]
Arundarine [6]
Arundavine [7]
Arundine [8]
Arundinine [9]
Bufotenine [10]
Desoxyvasicinone [11]
Donaxamine [10]
Donaxanine [11, 12]
Donaxaridine [13, 14]
Donaxarine [13, 14]
Donaxine [14, 15]
Donaxine N-oxide [16]
Donine [17]
Phenyl-β-naphthylamine [11]
***Lolium cuneatum* Nevski**
N-Acetylnorloline [18]
N-Formylloline [18]
N-Formylnorloline [19]
Lolidine [20]
Loline [21]
Lolinine [21]
Lolinine N-oxide [19]
N-Methylloline [18]
N-Methyl-N-formylloline [18]
Norloline [22]

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Family Labiatae (Lamiaceae)

***Betonica officinalis* Herd.**
Betonicine [1, 2]

***Eremostachys speciosa* Rupr.**
(+)-Stachydrine [3]

***Lagochilus hirtus* Fish. et Mey.**
(+)-Stachydrine [4]

***Lagochilus inebrians* Bunge**
(+)-Stachydrine [3, 5]

***Lagochilus platycalyx* Schrenk ex Fisch. et Mey.**
(+)-Stachydrine [3, 5]

***Lagochilus pubescens* Vved.**
(+)-Stachydrine [3]

***Lamium album* L.**
(+)-Stachydrine [3]

***Leonurus quinquelobatus* Gilib.**
Choline [6]
(+)-Stachydrine [6, 7]

***Leonurus turkestanicus* V.Krecz. et Kuprian.**
(+)-Stachydrine [3]

***Marrubium alternidens* Rech, fil.**
(+)-Stachydrine [3]

***Panzeria 1anata* (L.) Bunge**
(+)-Stachydrine [8]

***Phlomis Regelii* M.Pop.**
Betonicine [1, 2]

***Phlomis tuberosa* L.**
(+)-Stachydrine [8]

***Sideritis montana* L.**
(+)-Stachydrine [9]

Stachys balansae
(+)-Stachydrine [9]

***Stachys betonicaeflora* Rupr.**
(+)-Stachydrine [3]

***Stachys hissarica* Regel**
(+)-Stachydrine [3]

***Stachys lanata* Jacq. (*Stachys byzantina* C.Koch)**
(+)-Stachydrine [9]

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Family Leguminosae (Fabaceae)

***Ammodendron argenteum* (Pall.) O.Kuntze (*A. bifolium* (Pall.) Yakovl.)**
Ammodendrine [1]
Argentamine [1]
Argentine [1]
Cytisine [1]
(–)-Lupanine [1]
N-Methylcytisine [1]
Pachycarpine [1]

***Ammodendron conollyi* Bunge**
Ammodendrine [2]
Anagyrine [3]
Cytisine [4]
Isoammodendrine [3]
Pachycarpine [2]

***Ammodendron eichwaldii* Ledeb.**
Ammodendrine [5]
Anagyrine [5]
Cytisine [5]
(−)-Lupanine [5]
N-Methylcytisine [5]
Pachycarpine [5]

***Ammodendron karelinii* Firsch. et Mey.**
Ammodendrine [6]
Anagyrine [6]
Cytisine [6]
(–)-Lupanine [6]

N-Methylcytisine [6]
Pachycarpine [6]
Pachycarpine N-oxide [6]

***Ammodendron longiracemosum* Raik.**
Ammodendrine [7]
Anagyrine [7]
Argentamine [7]
Argentine [7]
Cytisine [7]
(–)-Lupanine [7]
N-Methylcytisine [7]
Pachycarpine [7]
Rhombifoline [7]

***Ammopiptanthus mongolicus* (Maxim. ex Kom.) Cheng fill. (*Piptanthus mongolicus*)**
Isoammodendrine [8]
α-Isosparteine [9]
(+)-Lupanine [9]
Piptamine [9]
Piptanthine [9]
Sparteine [9]

***Ammothamnus lehmannii* Bunge**
Cytisine [10]
Lemanine [10]
Lemanine N-oxide [11]
Matrine [10]
Matrine N-oxide [12]
Pachycarpine [13]
Sophocarpine [12]
Sophocarpine N-oxide [10]

***Ammothamnus songoricus* (Schrenk) Lipsky et Vassilcz. (Pavl.)**
Matrine N-oxide [14]
Sophocarpine [14]

***Astragalus tibetanus* Benth. ex Bunge**
Smirnovine [15]

***Cladrastis amurensis* Benth.**
Cytisine [16]

***Cytisus caucasicus* Grossh. (*Chamaecytisus caucasicus*)**
(+)-Lupanine [17]
Pachycarpine [17]

***Cytisus laburnum* L.**
Cytisine [18]
Pachycarpine [18]
Thermopsine [18]

***Cytisus ratisbonensis* Schaeff. (*Chamaecytisus ratisbonensis*)**
(+)-Lupanine [19]
Sparteine [19]

***Cytisus ruthenicus* Fisch. ex Woloszcz. (*Chamaecytisus ruthenicus*)**
Sparteine [20]

***Eremosparton aphyllum* (PaII.) Fisch. et Mey.**
Smirnovine [21]
Smirnovinine [21]

***Eremosparton flaccidum* Litv.**
Smirnovine [21]
Sphaerophysine [22]

***Galega officinalis* L.**
(±)-Peganine [23]
Vasicinone [23]

***Genista abchasica* Sachok.**
Cytisine [24]
Pachycarpine [24]

***Genista aethnensis* DC.**
Cytisine [25]
Retamine [25]

Genista ispanica
Cytisine [26]

***Genista tinctoria* L.**
Anagyrine [27]
Cytisine [27]
N-Methylcytisine [27]

***Genista transcaucasica* Schischk.**
Anagyrine [24]
Lupinine [24]
N-Methylcytisine [24]

***Gleditschia triacanthos* L.**
Triacanthine [28]

***Laburnum anagyroides* Medik.**
Cytisine [29]

***Maackia amurensis* Rupr. et Maxim.**
Cytisine [30]
(–)-Lupanine [30]

***Oxytropis muricata* (Pall.) DC.**
(±)-N-Benzoyl-2-phenyl-2-hydroxyethylamine [31]
(+)-N-Benzoyl-2-phenyl-2-hydroxyethylamine [32]
Muricatide [33]
Muricatisine [34]
(–)-N-Nicotinoyl-2-phenyl-2-hydroxyethylamine [35]

***Oxytropis puberula* Boriss.**
Harmine [35]
Muricatisine [34]
(–)-N-Nicotinoyl-2-phenyl-2-hydroxyethylamine [35]

***Oxytropis trichophysa* Bunge**
N-Benzoyl-2-phenylethylamine [32]
(+)-N-Benzoyl-2-phenyl-2-hydroxyethylamine [32]
Oxitriphine [36]
Trichophidine [37]
Trichophysine [38]

***Piptanthus nanus* M.Pop. (*Ammopiptanthus nanus* (M.Pop.) Cheng fil.)**
(+)-Lupanine [39]
Piptamine [40]
Piptanthine [40]
Sparteine [40]

***Smirnowia turkestana* Bunge**
Smirnovine [41]
Smirnovinine [42]
Sphaerophysine [41]

***Sophora alopecuroides* L. (*Vexibia alopecuroides* (L.))**
Allylaloperine [43]
Aloperine [44]
Baptifoline [45]
Cytisine [46]
13,14-Dehydrosophoridine [47]
13,14-Dehydrosophoridine N-oxide [48]
3-α-Hydroxysophoridine [49]
Isosophoridine [50]
Matrine [51]
Matrine N-oxide [46]
N-Methylaloperine [52]
Neosophoramine [53]
5,6,11,12,13,14,15,16-Octadehydroaloperane [45]
Sophocarpine [55]
Sophocarpine N-oxide [56]
Sophoramine [54]
(–)-Sophoridine [54]
Sophoridine N-oxide [46]
Sophorine (base 8) [57]
Tricrotonyltetramine [58]

***Sophora flavescens* Soland.**
Anagyrine [59]
Baptifoline [59]
Matrine [60]
Matrine N-oxide [59]
N-Methylcytisine [59]
Sophocarpine [60]
Sophoranol [59]

***Sophora griffithii* Stocks (*Keyserlingia griffithii* (Stocks))**
Argentine [61]
Cytisine [62]
Matrine [63]
N-Methylcytisine [64]
Pachycarpine [62]
Sophocarpine [65]
Sophoramine [62]

***Sophora japonica* L.**
Cytisine [66]
Matrine [66]
N-Methylcytisine [66]
Sophocarpine [66]

***Sophora pachycapra* C.A.Mey. (*Vexibia pachycapra* (C.A. Mey.) Yakovl.)**
Cytisine [67]
Goebeline [68]
Isosophoramine [69]
Matrine [70]
Matrine N-oxide [71]
N-Methylcytisine [72]
Pachycarpine [73]
Pachycarpine N-oxide [72]
Sophocarpine [70]

Sophocarpine N-oxide [75]
Sophoramine [55]
Sophorbenzamine [74]

***Spartium junceum* L.**
Anagyrine [76]
Cytisine [76]
N-Methylcytisine [76]

***Sphaerophysa salsula* (PaIl.) DC.**
Sphaerophysine [77]

***Thermopsis alpina* (Pall.) Ledeb.**
Alpine [77]
Argentine [77]
Cytisine [78]
N-Methylcytisine [77]
Pachycarpine [78]
Thermopsine [78]

***Thermopsis alterniflora* Regel et Schma1h.**
Alteramine [79]
Anagyrine [80]
Argentamine [81]
Argentine [81]
Cytisine [82]
Dimethamine [81]
N-Methylcytisine [80]
Pachycarpine [82]
Thermopsine [80]

***Thermopsis dolichocapra* V. Nikit.**
Cytisine [77]
Pachycarpine [77]
Thermopsine [77]

***Thermopsis fabacea* (Pall.) (*Thermopsis lupinoides* (L.) Link)**
Cytisine [83]
N-Methylcytisine [83]
Pachycarpine [84]
Thermopsine [84]

***Thermopsis lanceolata* R.Br.**
Anagyrine [85]
Argentine [86]
Cytisine [87]
Dithermamine [88]
N-Methylcytisine [85]
Pachycarpine [89]
Rhombifoline [90]
Thermopsamine [90]
Thermopsine [89]

***Thermopsis turkestanica* Gand.**
Cytisine [91]
Thermopsine [91]

***Vexibia pachycarpa* (Schrenk ex C.A. Mey.) Yakovl.**
Cytisine [92]
Matrine [92]
Pachycarpine [92]
Sophocarpine [92]

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Family Liliaceae

***Allium altaicum* Pall. (*Alliaceae*)**
Alline [1]

***Allium anisopodium* Ledeb.**
Alline [2]

***Allium odorum* L. (*A. ramosum*)**
Alline [3]

***Allium senescens* L.**
Alline [2]

***Allium splendens* Willd. ex Schult et Schult Fil.**
Alline [1]

***Allium stelleranum* Willd.**
Alline [1]

***Allium victorialis* L.**
Alline [1]

***Colchicum kesselringii* Regel**
Allocolchicine [4]
Colchamine (demecolcine) [5]
Colchiceine [4]
Colchicine [6]
3-Demethylallocolchicine [4]
2-Demethylcolchicine [7]
3-Demethylcolchicine [4, 7]
2-Demethyl-β-lumicolchicine [7]
2-Demethyl-γ-lumicolchicine [7]
3-Demethyl-β-lumicolchicine [7]
3-Demethyl-γ-lumicolchicine [7, 8]
3,10-Didemethylcolchicine (3-demethylcolchiceine) [7, 9]
N-Formyldeacetylcolchicine [5]
Isoregecoline [10]
Isoregelinone [11]
Kesselridine [4]
Kesselringine [7]
Krokiflorinine [4]
Krokiflorinine N-oxide (krokiflorine) [9]
Krokiflorinone [12]
β-Lumicolchicine [4]
γ-Lumicolchicine [4]
Luteine [11]
Regecoline [13]
Regelamine [4]
Regeline [7]
Regelinine [4]
Regelinone [13, 14]
Yolantamine [4]
Yolantimine [15]

***Colchicum laetum* Stev.**
Colchamine [16]
Colchicine [16]
Cornigerine [16]
2-Demethylcolchicine [16]
β-Lumicolchicine [16]

***Colchicum luteum* Baker**
Colchameine (demecolceine) [17]
Colchamine (demecolcine) [17]
Colchiceine [17, 18]
Colchicine [17, 18]
Colchilutine [9]
Collutine [19]
Collutine N-oxide [20]
2-Demethylcolchamine (2-demethyldemecolcine) [17]
2-Demethylcolchicine [17, 18]
3-Demethylcolchicine [17, 18]
2-Demethyl-β-lumicolchicine [17]
2-Demethyl-γ-lumicolchicine [9]

3-Demethyl-β-lumicolchicine [7]
2,10-Didemethylcolchicine [9]
3,10-Didemethylcolchicine (3-demethylcolchiceine) [17]
N-Formyldeacetylcolchicine [17, 18]
Kesselringine [18]
β-Lumicolchicine [17, 18]
Luteicine [7]
Luteidine [18, 20]
Luteidine cis-N-oxide [9]
Luteidine trans-N-oxide [9]
Luteine [18]
Luteinine [7]
Luteinone [9]

***Colchicum speciosum* Stev.**
N-Acetyl-β-lumicolchamine [21]
Colchameine (demecolceine) [9]
Colchamine (demecolcine) [22]
Colchiceine [9]
Colchicine [22–24]
2-Demethylcolchamine (2-demethyldemecolcine) [9]
2-Demethylcolchicine [9]
2-Demethyl-β-lumicolchicine [9]
N-Formyldeacetylcolchicine [9]
γ-Lumicolchicine [9]
β-Lumispeciosine [9]
N-Methyl-β-lumicolchamine [9]
Speciosamine [25]
Specioseine [9]
Speciosine [26]

***Colchicum szovitsii* Fisch. et Mey.**
Colchiceine [27]
Colchicine [27]
3-Demethylcolchicine [27]
2-Demethyl-β-lumicolchicine [27]
3,10-Didemethylcolchicine (3-demethylcolchiceine) [27]
O-Methylandrocymbine [28]
O-Methylkreizigine [27]
Szovitsamine [27]
Szovitsidine [28]
Szovitsinine [29]

***Eremurus fuscus* (O.Fedtsch.) Vved.**
Hordenine [30]
O-Methylhordenine [30]

Eremurus hilariae M.Pop. et Vved.
Hordenine [31]

***Eremurus luteus* Baker**
Hordenine [30]
O-Methylhordenine [30]

***Eremurus olgae* Regel**
Hordenine (eremursine) [31]

***Eremurus regelii* Vved.**
Hordenine [31, 32]

***Eremurus sogdianus* (Regel) Franch.**
Hordenine [31]

***Eremurus tianschanicus* Pazij et Vved. ex Golosk.**
Hordenine [30, 31]
O-Methylhordenine [30]

***Fritillaria walujewii* Regel**
Rinolidine [33]
Rinoline [33]
Rinolinine [33]
Solanidine [33, 36]
Valivine [34]

***Korolkowia sewertzowii* Regel (*Fritillaria sewertzowii* Regel)**
Acetylsevedine [35]
Diacetylsevedine [36]
Kordiline [37]
Korselidine [38]
Korselimine [39]
Korsemine [40]
Korseveramine [41, 42]
Korseveridine [41, 43]
Korseveridinine [44]
Korseveriline [45]
Korseverilinone [46]
Korseverine [41]
Korseverinine [41, 47]
Korsevine [48]
Korsevinine [49]
Korsidine [50]
Korsiline [51]
Korsinamine [52]
Korsine [53]
Korsine N-oxide [54]
Korsinine [55]
Petisidine [56]
Sevcoridinine [57, 58]

Sevcorine [57, 59]
Sevedamine [60, 61]
Sevedine [60, 62]
Sevedinine [60]
Sevedine N-oxide [60, 63]
Seveline [64]
Severidine [64, 65]
Severidinine [60, 66]
Severine [60, 67]
Severine N-oxide [40, 60]
Severzine [68]
Severtcidine [69]
Solanidine [33, 36]

***Lilium martagon* L.**
Lilidine [70]

***Merendera jolantae* Czerniak.**
Colchameine (demecolceine) [71, 72]
Colchamine (demecolcine) [71, 72]
Colchiceine [71, 72]
Colchicine [72, 73]
2-Demethylcolchamine (2-demethyldemecolcine) [71, 72]
3-Demethyl-γ-lumicolchicine [9]
3,10-Didemethylcolchicine (3-demethylcolchiceine) [71, 72]
β-Lumicolchicine [73]
Luteidine [9]
Trigamine N-oxide [74]
Yolantamine [75]
Yolantidine [76]
Yolantimine [73]
Yolantine [77]
Yolantinine [78]

***Merendera raddeana* Regel**
Bechuanine (merenderine, S-floramultine) [79]
Colchamine (demecolcine) [80]
Colchiceine [79]
Colchicine [81]
Cornigerine [82]
3-Demethylcolchiceine [79]
2-Demethylcolchicine [9]
3-Demethylcolchicine [9]
2-Demethyl-β-lumicolchicine [80]
2-Demethyl-γ-lumicolchicine [80]
3-Demethyl-β-lumicolchicine [80]
2,10-Didemethylcolchicine [9]
3,10-Didemethylcolchicine (3-demethylcolchiceine) [79]
N-Formyldeacetylcolchicine [80]
Kreizigine [9]
Kreizigine N-oxide [82, 83]
β-Lumicolchicine [80]
γ-Lumicolchicine [84]
Merenderine N-oxide [82, 83]
O-Methylkreizigine [9]
O-Methylkreizigine N-oxide [82, 83]

***Merendera robusta* Bunge**
Bechuanine (merenderine, S-floramultine) [9]
Colchameine [85, 86]
Colchamine (demecolcine) [86, 88]
Colchiceine [85]
Colchicine [6]
Deacetylcolchiceine [87]
Deacetylcolchicine [87]
3-Demethylcolchamine (2-demethyldemecolcine) [85]
2-Demethylcolchicine [85]
3-Demethylcolchicine [85]
2-Demethyl-β-lumicolchicine [9]
2-Demethyl-γ-lumicolchicine [85]
3-Demethyl-β-lumicolchicine [9]
2,10-Didemethylcolchicine [88]
3,10-Didemethylcolchicine (3-demethylcolchiceine) [9]
N-Formyldeacetylcolchicine [85]
β-Lumicolchicine [85]
γ-Lumicolchicine [85]
Merobustine [88]
Merobustinine [88]
N-Methylcolchamine (N-methyldemecolcine) [87]
Robustamine [89]
Robustamine cis-N-oxide [90]

***Merendera sobolifera* Fisch. et Mey.**
Colchameine [9]
Colchamine [9]
Colchicine [9]
2-Demethylcolchamine (2-demethyldemecolcine) [9]
2-Demethylcolchicine [9]
2-Demethyl-β-lumicolchicine [9]
β-Lumicolchicine [9]

***Merendera trigyna* (Adam) Woronow**
Bechuanine (merenderine, S-floramultine) [91]

Colchiceine [91]
Colchicine [92]
3-Demethylcolchicine [91]
3,10-Didemethylcolchicine (3-demethylcolchiceine) [91]
β-Lumicolchicine [91]
Trigamine [91]

O*rnithogalum montanum*(*O. platyphyllum* Boiss.)
Ornithogalline [9]

***Petilium eduardii* (Regel) Vved. (*Fritillaria eduardii*)**
Edpetilidine [93, 94]
Edpetilidinine [57, 93]
Edpetiline [95]
Edpetilinine [57, 96]
Edpetine [97]
Edpetinosine [98]
Edpetisidine [99, 100]
Edpetisidinine [99, 101]
Edpetisine [102]
Edpetisinine [99, 103]
Eduardine [93, 104]
Eduardinine [94]
Imperialine (sipaimaine, raddeanine) [95, 105]
Imperialine N-oxide [99]
Imperialone [93]
Imperiasine [106]
Peimisine [93]
Petine [107]
Petine N-oxide [107]

***Petilium raddeanum* (Regel) Vved. ex Pazij (*Fritillaria raddeana*)**
Edpetiline [95, 108]
Edpetine [97, 109]
Imperialine [93, 95, 110, 111]
Imperialine N-oxide [99, 112]
Imperialone [93, 111]
Isodihydroimperialine [113]
Peimisine [93, 111]
Petilidine [114]
Petiline [108, 115]
Petilinine [116]
Petisidine [112, 113]
Petisidinine [117]
Petisidinone [109]
Petisine [111, 112]
Petisinine [111]
Radpetine [118]

***Rhinopetalum bucharicum* (Regel) Losinsk.**
Imperialine [95, 105, 119]
Rinoline [120]
Rinolinine [119, 120]
Solanidine [120, 121]

***Rhinopetalum karelinii* Fisch. ex Alexand.**
Rinoline [120, 122]
Rinolinine [119, 120, 122]
Solanidine [120–122]

***Rhinopetalum stenantherum* Regel**
β-Chaconine [123]
Solanidine [121]
Stenantidine [123]
Stenantine [123]
Stenanzamine [124–126]
Stenanzidine [124, 125]
Stenanzidinine [120, 124, 127]
Stenanzine [124]

***Veratrum dahuricum* (Turcz.) Loes. fil.**
Isorubijervine [128]
Jervine [129]
Pseudojervine [129]
Rubijervine [128]
Veramarine [128]
Veramine [128]
Veratramine [129]
Veratrosine [129]
Veratroylzygadenine [128]
Verazine [128]
Verdine [129]

***Veratrum lobelianum* Bernh.**
Deacetylprotoveratrine A [130]
Deacetylveralosine [131]
Dideacetylprotoberatrine A [132]
Germbudine [134]
Germerine [133, 135]
Germidine [136, 137]
Germinaline [138–140]
Germinalinine [134]
Germine [131]
Germinine [141]
Germitetrine [132, 139]
Isorubijervine [128, 130, 142, 143]
Isorubijervosine [142]
Jervine [129, 133, 136, 144–146]

15-(–)-2-Methylbutyrylgermine [147]
3,15-(2'-Methylbuturyl) germine [148]
Neogermitrine [149]
Protoveratrine A [143, 150]
Pseudojervine [129, 133, 134, 151]
Rubijervine [128, 144, 152, 153]
Solanidine [149]
γ-Solanine [149]
Veralcamine [154]
Veralinine [154]
Veralodine [155]
Veralodinine [156]
Veralodisine [157]
Veralomine [133, 158]
Veralosidine [159, 160]
Veralosidinine [133, 161]
Veralosine [142, 159, 160, 162]
Veralosinine [138, 159, 160]
Veramarine [128, 154]
Veramine [128, 154]
Veratroylzygadenine [128, 133, 142]
Verazine [128, 144, 152–154]
Verdine [129, 163]
Verdinine [148]

***Veratrum nigrum* L.**
Deacetylprotoveratrine A [130, 164]
Dideacetylprotoveratrine A [132, 164]
Germerine [121, 164]
Germidine [133, 134, 164]
Isorubijervine [128, 165]
Jervine [129, 133, 136, 144–146, 165]
Protoveratrine A [143, 150, 166]
Rubijervine [128, 144, 152, 153, 165]
Veramarine [128, 154, 166]
Veramine [128, 154, 165]
Veratroylzygadenine [128, 133, 142, 165, 167]
Verazine [128, 144, 152–154, 166]

***Veratrum oxysepalum* Turcz.**
Deacetylprotoveratrine A [130, 167]
Dideacetylprotoveratrine A [132, 167]
Germerine [133, 135, 168]
Protoveratrine A [143, 150, 167]
Rubijervine [128, 168]
Veramarine [128, 154, 166, 169]
Veramine [128, 154, 165, 169]
Veratroylzygadenine [128, 133, 142, 165, 166, 168]
Verazine [129, 144, 152–154, 166, 169]

***Zigadenus elegans* Pursh.**
Zygadenine [170]

***Zigadenus sibiricus* (L.) A.Gray.**
Veratroylzygadenine [128, 133, 142, 165, 166, 168, 171]
Verazine [171]
Verazinine [171]

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Family Magnoliaceae

***Liriodendron tulipiferum* L.**
Anonaine [1]
Apoglaziovine [2]
Asimilobine [3]
(+)-Caaverine [4]
Dehydroisolaureline [3]
Dehydroroemerine [3]
Glaucine [3]
Isocorypalmine [5]
(+)-Isolaureline [6]
Lanuginosine [7]
Liridinine [7]
Lirinidine [6]
Lirinine [8]
Lirinine N-oxide [9]
Liriodenine [10]
Lysicamine [10]
N-Methylcrotsparine [10]
N-Methyllaurotetanine [5]
N-Methyllirinine [9]
O-Methylmoschatoline (liridine) [11]
(+)-Nornuciferine [11]
7-Oxoglaucine (O-methylateroline) [10]
Predicentrine [3]
(+)-Roemerine [1]
Roemerine N-oxide [1]
Stepholidine [2]

***Magnolia fuscata* Andr.**
Magnolamine [12]
Magnoline [12]
Magnolia grandiflora L.
Anonaine [3]
Dehydroroemerine [3]
Ziriodenine [3]
(+)-Roemerine [3]
Roemerine N-oxide [3]

***Magnolia kobus* (DC.)**
Anonain [14]
Asimilobine [13, 14]
Lanuginosine [14]
Liriodenine [13, 14]
Oxolaurenine [14]
Roemerine [14]

***Magnolia soulangeana* Hort.**
Anonaine [14]
Liriodenine [15]
7-Oxolaureline [15]
Roemerine [14]

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Family Menispermaceae

***Cocculus laurifolius* DC.**
Cocculidine [1]
Cocculine [1]
Coclafine [2]
Isoboldine [2]
Norisoboldine [2]

***Menispermum dauricum* L.**
Acutumine [3]
Dauricine [4]
Sinomenine [4]
Stephania delavayi Diels.
Cycleanine [5]
Delavayine [6]
Isostepholidine [7]
16-Oxodelavayine [8]
Stephodeline [5]

***Stephania glabra* Miers (*S. rotunda* Lour.)**
Cycleanine [9]
Sinoacutine [9]
Stepharine (stefaglabrine) [10]
(−)-Tetrahydropalmatine (hindarine, rotundine) [9, 11]

***Stephania hernandifolia* Walp. (*S. discolor* Spreng.)**
3-0-Demethylhernandifoline [12]
Hernandifoline [13]
Hernandine [14]
Hernandoline [15]
Hernandolinol [16]
Methylhernandine [17]

***Stephania tetranda* S.Moore**
Tetrandrine [18]

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Family Moniliaceae

***Penicillium aurantio* virens**
Aurantioclavine [1]

***Penicillium piscarium* Westling**
Rugulosuvine A [2]
Rugulosuvine B [2]

***Penicillium rugulosum* Thom**
Rugulosuvine A [2]
Rugulosuvine B [2]

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Family Nymphaeaceae

***Nuphar lutea* (L.) Smith**
Neothiobinupharidine [1, 2]
Nuphleine [1–3]
Thiobinupharidine [1, 2]

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Family Papaveraceae

***Argemone alba* L.**
Berberine [1]
Chelerythrine [1]
Protopine [1]
Reticuline [1]
Sanguinarine [1]
Scoulerine [1]

***Argemone albiflora* Horner**
α-Allocryptopine [2]
Berberine [2]
Protopine [2]
Reticuline [2]
Scoulerine [2]

Argemone hybrida
α-Allocryptopine [1]
Berberine [1]
Cheilantifoline [1]
Corydine [1]
Munitagine [1]
Platycerine [1]
Protopine [1]
Reticuline [1]
Sanguinarine [1]
Scoulerine [1]

***Argemone mexicana* L.**
α-Allocryptopine [1]
Berberine [1]
Cheilantifoline [1]
Chelerythrine [1]
Isocorydine [1]
Protopine [1]
Reticuline [1]
Sanguinarine [1]
Scoulerine [1]

***Argemone ochroleuca* Sweet**
α-Allocryptopine [2]
Berberine [2]
Cheilantifoline [2]
Chelerythrine [2]
Protopine [2]
Reticuline [2]
Sanguinarine [2]
Scoulerine [2]

***Argemone platyceras* Link et Otto**
α-Allocryptopine [1]
Argemonine [1]
Berberine [1]
Magnoflorine [1]
O-Methylplatycerine [1]
N-Methylstylopine [1]

Munitagine [1]
Platycerine [1]
Protopine [1]
Reticuline [1]
Sanguinarine [1]

***Bocconia cordata* Willd**
Chelerytrine [3]
Sanguinarine [3]

***Bocconia frutescens* L.**
α-Allocryptopine [4]
Berberine [4]
Chelerytrine [4)
Isocorypalmine [4]
Oxosanguinarine [4]
Protopine [4]
Sanguinarine [4]
Scoulerine [4]

***Chelidonium majus* L.**
Chelerythrine [5]
Chelidonine [5]
Protopine [5]
Sanguinarine [5]
(–)-Stylopine (chelidamine) [5]

***Dicranostigma franschetianum* (Prain) Fedde.**
α-Allocryptopine [4, 6]
Berberine [4, 6]
Chelerythrine [4, 6]
Chelirubine [4, 6]
Coptisine [4, 6]
Corydine [4, 6]
Corytuberine [4, 6]
Isocorydine [4, 6]
Magnoflorine [4, 6]
Menisperine [4, 6]
Protopine [4, 6]
Sanguinarine [4, 6]

***Dicranostigma lactucoides* Hook ef Thoms.**
α-Allocryptopine [4]
Berberine [4]
Chelerythrine [4]
Coptisine [4]
Isocorydine [4]
Magnoflorine [4]
Protopine [4]
Sanguinarine [4]

***Dicranostigma leptopodum* (Maxim) Fedde.**
α-Allocryptopine [4]
Berberine [4]
Chelerythrine [4]
Chelirubine [4]
Isocorydine [4]
Isocorypalmine [4]
Magnoflorine [4]
Protopine [4]
Sanguinarine [4]

***Eschscholtzia californica* Cham.**
α-Allocryptopine [7]
Berberine [7]
Californidine [7]
Chelilutine [7]
Chelerythrine [7]
Corunine (glauvine) [7]
Eschscholtzine [7]
Glaucine [7]
Isocorydine [7]
Magnoflorine [7]
O-Methylateroline [7]
N-Methyllaurotetanine [7]
Protopine [7]
Sanguinarine [7]

***Glaucium corniculatum* (L.) J.Rudolph**
α-Allocryptopine [5, 8–10]
Corydine [5, 8–10]
Dehydrocorydine [9]
Glaucine [10]
Glaufidine [9]
Isocorydine [9, 10]
N-Methylstylopine [9]
Norbracteoline [9]
Predicentrine [9]
Protopine [5, 8, 10]
Reticuline [9]
Sanguinarine[9]
Thalicmidine [9, 10]

***Glaucium elegans* Fisch. et Mey.**
α-Allocryptopine [11]
Chelerythrine [11]
Chelidonine [11]
Chelirubine [11]
Corydine [11]
Corunine (glauvine) [11]

Dihydrochelerythrine [11]
Glaucine [11]
Isoboldine [11]
Isocorydine [11]
7-Oxoglaucine (O-methylateroline) [11]
Protopine [11]
Sanguinarine [11]
Thalicmidine [12]

***Glaucium fimbrilligerum* (Trautv.) Boiss.**
α-Allocryptopine [13]
Chelerythrine [14, 15]
(±)-Chelidonine [14]
Columbamine [15]
Corydine [13–15]
Corydine N-oxide [15]
Corytuberine [13, 15]
Dehydrocorydine [14]
Dihydrosanguinarine [14, 15]
Epiglaufidine [15]
Glaufidine [14, 15]
Glaufine [14]
Glaufinine [16]
Glaunidine [17]
Glaunine [17]
Isoboldine [13–15]
Isocorydine [13, 14]
Isocorypalmine [14]
Isocorytuberine [14, 15]
Magnoflorine [15]
N-Methylcoclaurine [14]
N-Methyllindcarpine [15]
α-N-Methylstylopine [15]
Norcorydine [15]
Norisocoridine [15]
Protopine [15]
Reticuline [15]
Sanguinarine [13–15]
Scoulerine [14, 15]

***Glaucium flavum* Crantz**
α-Allocryptopine [10, 18]
Chelerytrine [10]
Corydine [10]
Corunine (glauvine) [10, 19]
Glaucine [10, 20]
Isoboldine [10, 20]
Isocorydine [10, 20]
7-Oxoglaucine (O-methylateroline) [19]
Protopine [10, 20]
Sanguinarine [10]
Sinoacutine [19]

Glaucium flavum* Grantz. *var. rubrum
(–)-Adlumidine [21]
Glaucine [21]
Isoboldine [21]
Isocoridine [21]
N-Methyllaurotetanine [21]
Protopine [21]
Reticuline [21]
Thalicmidine [21]

***Glaucium grandiflorum* Boiss. et Huet**
Corunine (glauvine) [22]
Glaucine [22]
Isoboldine [22]
Isocorypalmine [12]
7-Oxoglaucine (O-methylateroline) [22]
Protopine [22]
Sanguinarine [22]
Thalicmidine [22]

***Glaucium oxylobum* Boiss. et Buhse**
α-Allocryptopine [23]
Corydine [23]
Dehydrocorydine [23]
Domesticine [23]
Glaufidine [23]
Isoboldine [23]
Isocoridine [23]
Isocorytuberine [23]
N-Methylcoclaurine [23]
Norisocorydine [23]
Protopine [23]

***Glaucium serpieri* Heldr.**
Corunine (glauvine) [22]
Glaucine [22]
7-Oxoglaucine (O-methylateroline) [22]

***Glaucium sguamigerum* Kar. et Kir.**
α-Allocryptopine [5, 24]
Chelerythrine [24]
Chelidonine [24]
Corydine [5, 24]
Cryptopine [24]
Glaufine [24]

Isoboldine [24]
Isocorytuberine [24]
Magnoflorine [24]
(–)-β-N-Methylcanadine [24]
Protopine [5, 24]
Reticuline [5, 24]
Sanguinarine [24]
Scoulerine [24]

***Hylomecon vernalis* Maxim.**
α-Allocryptopine [25]
Cheilantifoline [25]
Isoboldine [25]
Oxosanguinarine [25]
Protopine [25]
Reticuline [25]
Scoulerine [25]

***Macleaya cordata* (Willd.) R.Br.**
α-Allocryptopine [4]
Berberine [4]
Chelerythrine [4]
Coptisine [4]
Cryptopine [4]
Oxosanguinarine [4]
Protopine [4]
Sanguinarine [4]

***Macleaya microcarpa* (Maxim.) Fedde**
α-Allocryptopine [26]
Berberine [26]
Chelerythrine [26]
Cryptopine [26]
Oxosanguinarine [26]
Protopine [26]
Sanguinarine [26]

***Papaver alberti* A. D.Mikheev**
Berberine [4]
Chelerythrine [4]
Reticuline [4]
Scoulerine [4]

***Papaver angrenicum* Pazij.**
Pangrenine [27]

***Papaver arenarium* Bieb.**
Arenine [4, 28]
Berberine [4]
Cheilantifoline [4, 28]
Glicomarine [4, 28]
Macrostomine [4, 28]
Macrostomine cis-N-oxide [4, 28]
Macrostomine trans-N-oxide [28]
Scoulerine [4]
Sevanine [4, 28]

***Papaver armeniacum* N.Busch. (*Papaver armeniacum* (L.) DC.)**
Armepavine [29]

***Papaver bipinnatum* C.A.Mey.**
Chelerythrine [4]
Sanguinarine [4]

***Papaver bracteatum* Lindl.**
Alpinigenine [30]
Alpinine [30]
Bracteoline [30]
Floripavidine [30]
Isoboldine [4]
Isothebaine [30]
Mecambridine [30]
Orientalidine [30]
Orientalinone (bracteine) [30]
Oripavine [30]
Salutaridine (floripavine) [30]
Sanguinarine [31]
Scoulerine [4]
Thebaine [30]

***Papaver commutatum* Fisch. et Mey.**
Cheilantifoline [4]
Isocorydine [4]
Papaverine [32]
Roemerine [4]
Scoulerine [4]

***Papaver croceum* Ledeb.**
Amurine [4, 33]
Corydine [33]
Nudaurine [33]
Oxosanguinarine [4, 33]
Protopine [33]

***Papaver floribundum* Desf.**
Armepavine [34]
Floripavidine [34]

N-Methylasimilobine (floribundine) [34]
Salutaridine (floripavine) [34]

***Papaver fugax* Poir.**
Armepavine [35, 36]
Cheilantifoline [36]
Fugapavine (mecambrine) [35, 36]
Roemerine [35, 36]
Roemeroline [36]
(–)-Roemrefidine [35]
(+)-Roemrefidine [37]
Salutaridine (floripavine) [35]
Scoulerine [36]

***Papaver hybridum* L.**
Protopine [4]
Reticuline [4]
Scoulerine [4]

***Papaver lisae* N.Busch.**
Isocoridine [38, 39]
Macrantaline [39]
Mecambridine [38, 39]
N-Methyloridine [38]
Oridine (oreoline) [38, 39]
Protopine [38, 39]

***Papaver macrostomum* Boiss. et Huet.**
Dehydronormacrostomine [40]
Macrostomine [40]
Sevanine [40]

***Papaver maeoticum* Klok.**
Magnoflorine [4]
Mecambrine [4]
Roemerine [4]

***Papaver ocellatum* Woronow**
Cheilantifoline [4]
Isocorydine [4]
Roemerine [4]
Sanguinarine [4]
Scoulerine [4]

***Papaver oreophilum* Rupr.**
α-Allocryptopine [41]
(–)-Armepavine [42]
(–)-Fugapavine [42]
Mecambridine [41]
(–)-Narcotine [41]
(–)-Oridine [42]
Protopine [41]

***Papaver orientale* L.**
Alpinigenine [4, 43]
Bracteoline [42, 44]
Cheilantifoline [4]
Dehydroisothebaine [44]
Isothebaidine [43]
Isothebaine [43, 44]
Mecambridine [43, 44]
O-Methylisothebaine [44]
Nuciferine [45]
Orientalidine [43, 44]
Orientidine [44]
Orientine [44]
Orientinine [44]
Oripavidine [43]
Oripavine [4, 43]
Protopine [43]
Scoulerine [4]
Thebaine [4, 43]

***Papaver paczoskii* A. D.Mikheev**
Berberine [4]
Chelerythrine [4]
Reticuline [4]
Sanguinarine [4]
Scoulerine [4]

***Papaver pavoninum* Schrenk.**
α-Allocryptopine [4]
Cheilantifoline [4]
Protopine [4]
Scoulerine [4]

***Papaver persicum* M. (Lindl.)**
Armepavine [46]
Fugapavine [46]
Protopine [46]
Roemerine [46]

***Papaver pseudo-orientale* (Fedde.) Medw.**
Alkaloid PO-3 (7-oxoisothebaine) [4]
Bracteoline [4]
Dehydroisothebaine [4]
Isocorytuberine [4]
Isothebaine [4]

Isothebaine N-oxide [4]
Mecambridine [4]
Orientalidine [4]
Orientalinone [4]
Salutaridine (floripavine) [4]

***Papaver rhoeas* L.**
Berberine [4]
Oxosanguinarine [4]
Rhoeadine [4]
Stylopine [4]

***Papaver somniferum* L.**
(–)-Canadine [47]
Codamine [48]
Codeine [47–49]
Cotarnoline [48]
Cryptopine [47]
Csanthaline [47]
(+)-Laudanidine [48]
Morfine [47–49]
Narceine [49]
(–)-Narcotine [47–49]
Narcotoline [48]
Papaverine [47–49]
Porfirocsine [47]
Protopine [47]
Reticuline [48]
Thebaine [47–49]

***Papaver stevenianum* A. D.Mikheev**
Berberine [4]

***Papaver urbanianum* L. (DC.) Fedde. (*Papaver urbanianum* auct. = *Papaver armeniacum*)**
Floripavidine [50]
N-Methylasimilobine [50]
O-Methylsalutaridine [50]
Salutaridine (floripavine) [50]

***Papaver zangezuricum* A. D.Mikheev**
α-Allocryptopine [4]
Armepavine [4]
Cheilantifoline [4]
Glaucamine [4]
Isorhoeagenine [4]
Narcotine [4]
Rhoeagenine [4]
Scoulerine [4]
Zangezurine [4, 51]

***Roemeria hybrida* (L.) DC.**
Protopine [5]
Roemeridine [5]

***Roemeria refracta* DC.**
Anonaine [52]
(–)-Ephedrine [53]
Liriodenine [52]
(–)-Mecambroline [54]
(+)-Pseudoephedrine [53]
Reframine [12]
Roemerine [53]
Roemrefidine [55]
Roemrefine [52]

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Family Plantaginaceae

***Plantago indica* L. (*Plantago scarba*)**
Indicaine [1, 2]
Plantagonine [1, 2]

***Plantago ramosa* Aschers.**
Indicaine [2]

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Family Polygonaceae

***Calligonum alatum* Litv. (*Calligonum aphyllum*)**
Harman N-oxide [1]

***Calligonum caput-medusae* Schrenk**
Eleagnine [1]
Eleagnine N-oxide [1]
Harman [1]

***Calligonum eriopodum* Bunge**
Eleagnine [1]
Harman [1]

***Calligonum microcarpum* Borszcz.**
Eleagnine [1]
Eleagnine N-oxide [1]

***Calligonum minimum* Lipsky (*Calligonum microcarpum*)**
Eleagnine (calligonine) [2]
Eleagnine N-oxide [3]
Harman [3]
Harman N-oxide [3]

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Family Pseudomonaceae

Pseudomonas aeruginosa (strain 590)
Aerugine [1]

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Family Ranunculaceae

***Aconitum altaicum* Steinb.**
Aconitine [1]
Altaconitine [1]
Mesaconitine [1]
Napelline [2]

***Aconitum anthoroideum* DC.**
Condelphine [3]
Tadzhaconine [4]

***Aconitum arcuatum* Maxim.**
Aconosine [5]
Arcutine [6]
Arcutinine [6]
Talatizamine [5]

***Aconitum baicalense* Turcz. ex Steinb. (*Aconitum turczaninowii*)**
Aconitine [1]
12-Epinapelline [7]
12-Epinapelline N-oxide [7]
Napelline [1]
Songorine [1]

***Aconitum barbatum* Pers.**
Delcosine [8]
Delsoline [9]
Lepenine [8]
Lepetine [8]
Lycoctonine [9]
Senbusine A [9]
Songorine [9]
Turkosine [8]

***Aconitum chasmanthum* Stapf.**
Aconitine [10]
Isotalatizidine [10]

***Aconitum coreanum* (Levl.) Rapaics**
Acoridine [11]
Acorine [12]
Atisine chloride [13]
Coryphidine [14]
Coryphine [15]
Guan-fu-base F (2-isobutyryl-13-acetyl-14-hydroxyhetisine) [16]
Guan-fu-base F N-oxide (2-isobutyryl-13-acetyl-14-hydroxyhetisine N-oxide) [17]
Guan-fu-base G [18]
Guan-fu-base Z [12]
Guan-fu-base Z N-oxide (2-isobutyryl-14-hydroxyhetisine N-oxide) [19]

Isoatisine [13]
Tangutisine [18]

***Aconitum czekanovskyi* Steinb. (*Aconitum baicalense*)**
Hypaconitine [20]
Mesaconitine [20]
Napelline [20]
Songorine [20]

***Aconitum ferox* Wall.**
Aconitine [21]
Songorine [21]
Virescenine [21]

***Aconitum firmum* Reichenb.**
15-Acetylsongorine [4]
3-Deoxyaconitine [4]
Hypaconitine [4]
Mesaconitine [4]
Neoline [4]
Senbusine A [4]
Songorine [4]
Tadzhaconine [4]
Taurenine [4]

***Aconitum fischeri* Reichenb.**
Aconosine [5]
Talatizamine [5]

***Aconitum karakolicum* Rapaics (*Aconitum soongaricum*)**
12-Acetylnapelline [22]
12-Acetylnapelline N-oxide [23]
Acofine [24]
Aconifine [25]
Aconitine [26]
1-Benzoylkarasamine [22]
Delsoline [22]
Dihydrosongorine [27]
12-Epinapelline [28]
Isoboldine [21]
Karakolidine [29]
Karakoline [21]
Karakanine [30]
Karasamine [21]
Monticamine [21]
Napelline [21]
Napelline N-oxide [31]
Neoline [21]
Phenyl-β-naphtylamine [32]
Secokaraconitine [33, 34]
Songorine [21]

***Aconitum kirinense* Nakai**
8-Acetylexcelsine [35]
Akiradine [36]
Akiramidine [37]
Akiramine [38]
Akirane [39]
Akiranine [40]
Excelsine [40]
Akirine [41]
Lepenine [41]
Lepenine N-oxide [35]
Tugiaconitine [38]

***Aconitum leucostomum* Worosch.**
N-Acetylsepaconitine [42]
Acsinatine [43]
Corydine [44]
N-Deacetyllappaconitine [45]
N-Demethylcolletine [44]
Excelsine [46]
Glaunidine [44]
Lappaconidine [47]
Lappaconitine [47]
Leuconine [48]
O-Methylarmepavine [44]
Sepaconitine [45]

***Aconitum monticola* Steinb. (*Aconitum apetalum*)**
Delsoline [49]
Deoxydelsoline [49]
Dihydromonticamine [49]
Monticamine [50]
Monticoline [50]
Norsongorine [51]
Songoramine [51]
Songorine [51]
Songorine N-oxide [52]

***Aconitum nasutum* Fisch. ex Reichenb.**
14-Acetylaconosine (dolaconine) [53]
Aconitine [53]
Aconosine [54, 55]
Cammaconine [55]
Columbianine [55]
Isotalatizidine [55]

Karakoline [55]
Talatizamine [55]

***Aconitum nemorum* M.Pop.**
14-Acetyltalatizamine [56]
14-Benzoyltalatizamine [56]
Talatizamine [56]

***Aconitum orientale* Mill.**
Aconorine [23]
Cammaconine [57]
Corydine [58]
N-Deacetyllappaconitine [57]
Delcosine [57]
Gigactonine [57]
Kobusine [59]
Lappaconine [58]
Lappaconitine [57]
Lycoctonine [57]
Orgetine [59]
Ranaconitine [57]

***Aconitum paniculatum* Lam.**
Lappaconitine [21]
Panicudine [60]
Paniculadine [21]
Paniculamine [61]

***Aconitum rotundifolium* Kar. et Kir.**
Atisine chloride [13]
Isoatisine [13]

***Aconitum rubicundum* Fisch.**
Ajacine [62]
9-Deoxylappaconitine [62]
Isolappaconitine [62]
Lycaconitine [62]
Lycoctonine [62]
Puberaconitine [62]
Ranaconitine [62]
Septentriodine [62]

***Aconitum sajanense* Kumin.**
Acosanine [63]
Dehydroacosanine [64]

***Aconitum saposhnikovii* B.Fedtsch. (*Aconitum nemorum*)**
14-Acetyltalatizamine [65]
14-Dehydrotalatizamine [65]
Isoboldine [65]
Talatizamine [65]

***Aconitum sczukinii* Turcz.**
Mesaconitine [5]
Neoline [5]

***Aconitum septentrionale* Koelle**
N-Acetylsepaconitine [66]
Acoseptine [67]
Antranilic acid sukcinimid dielhyl ether [68]
Anthranoyllycoctonine [43]
Atisine [69]
N-Deacetyllappaconitine [66]
N-Deacetylranaconitine [43]
Delrestidine [68]
Lappaconitine [66]
Leuconine [48]
Leucostine [69]
Lycoctonine [43]
Ranaconitine [66]
Sepaconitine [45]
Septefine [70]
Septerine [70]
Septenine [43]
Septentriosine [66]
Songorine [66]

***Aconitum soongaricum* Stapf**
12-Acetyl-12-epinapelline [71]
15-Acetylsongoramine [72]
15-Acetylsongorine [73]
Aconifine [25]
Aconine [74]
Aconitine [26]
Isoboldine [25]
Napelline [25]
Napelline N-oxide [31]
Neoline [75]
Norsongorine [75]
Phenyl-β-naphthylamine [32]
Songoramine [76]
Songorine [26]

***Aconitum talassicum* M.Pop.**
14-Acetyltalatizamine [77]
Actaline [77]

Condelphine [78]
11-Dehydrokobusine [79]
Isotalatizidine [77]
Kobusine [79]
Lappaconitine [80]
Pseudokobusine [79]
Talasamine [80]
Talasimidine [80]
Talasimine [80]
Talatizamine [77]
Talatizidine [77]
Talatizine [77]

***Aconitum tauricum* Wulf.**
Aconitine [81, 82]
3-Deoxyaconitine [81, 82]
Hypaconitine [81, 82]
Mesaconitine [81, 82]
Neoline [81, 82]
Senbusine-A [81, 82]
Talatizamine [81, 82]
Taurenine [32, 77]

***Aconitum tokii* Nakai**
Glaucine [4]
Isoboldine [4]
Mesaconitine [4]
N-Methyllaurotetanine [4]

***Aconitum tranzschelii* Steinb. (*Aconitum nemorum*)**
Isotalatizidine [3]
Talatizamine [3]

***Aconitum tuberosum* Host.**
Aconitine [83]
Flaconitine [83]
Mesaconitine [83]
Neoline [84]
Tuberaconitine [84]
Tuberanine [83]
Tubermesaconitine [84]

***Aconitum turczaninowii* Worosch.**
Aconitine [85]
Beiwutine [86]
Delcaroline [86]
Delcosine [85]
Delsoline [85]
Lepenine [85]
Turkosine [86]
Turpelline [87]
Tursoline [85]

***Aconitum umbrosum* (Korsh.) Kom.**
6-Acetylumbrofine [88]
Anthranoyllycoctonine [89]
Lycaconitine [89]
Umbrofine [88]
Umbrosine [89]

***Aconitum volubile* Pall. ex Koelle**
Aconitine [2, 90]
Altaconitine [90, 91]
12-Epinapelline [90]
12-Epidehydronapelline [90]
Lepenine [91]
Napelline [2]
Neoline [90]
Senbusine A [90]
Songorine [2]

***Aconitum zeravschanicum* Steinb.**
Atidine [92]
Atisine-azomethine [92]
Atisine chloride [93]
Heteratisine [94]
Hetisine [95]
Hetisine [95]
Isoatisine [93]
Nominine [93]
Reticuline [93]
Tadzhaconine [96]
Zeraconine [93, 97]
Zeraconine N-oxide [97]
Zeravschanizine [98]

***Aquilegia karelinii* (Baker) O. et B.Fedtsch.**
Magnoflorine [99]

***Aquilegia olympica* Boiss.**
Berberine [100]
Magnoflorine [100]

***Atragene sibirica* L.**
Aconitine [101]
Delphinine [101]

***Consolida divaricata* (Ledeb.) Schroding.**
Delcosine [102]
Delsoline [102]

***Consolida orientalis* (J.Gay) Schroding.**
Delcosine [102]
Delsoline [102]
Lycoctonine [102]

***Delphinium ajacis* L. (*Consolida ajacis*)**
Delcosine [103]

***Delphinium biternatum* Huth**
Anthranoyllycoctonine [104]
14-Benzoylbrowniine [104]
14-Benzoyldelcosine [104]
Browniine [102]
14-Dehydrobrowniine [104]
14-Dehydrodelcosine [104]
Delbiterine [104]
Delcosine [104]
Delphatine [104]
Delsoline [104]
Methyllycaconitine [105]

***Delphinium cheilanthum* Fisch.**
Delcosine [90]
Delsoline [90]
Deltaline [90]
Mesaconitine [90]
Methyllycaconitine [90]

***Delphinium confusum* M.Pop.**
14-Acetylbrowniine [106]
14-Acetylkarakoline [107]
14-Acetylnudicaulidine [106]
14-Acetylviriescenine [107]
Anthranoyllycoctonine [108]
Condelphine [107]
Delcosine [107]
Delsoline [107]
18-Deoxylycoctonine [106]
Isoboldine [107]
Isotalatizidine [107]
14-Methylisotalatizidine [107]
Methyllycaconitine [108]
Nevadenzine [107]
Virescenine [107]

***Delphinium corymbosum* auct. (*Delphinium turkestanicum*)**
Browniine [109]
Cordizine [110]
Corumdephine [109]
Corumdizine [110]
Corumdizinine [110]
Dehydrodelcorine [106]
Delcoridine [109]
Delcorine [109]
Delcorinine [110]
Delphatine [109]
Delpheline [105]
Demethylenedelpheline [111]
Deoxydelcorine [109]
Dictysine [109]
N-Ethyl-des-N-methyldictizine [110]
Lycoctonine [109]
Methyllycaconitine [112]

***Delphinium dictyocarpum* DC.**
14-Acetyldelectine [113]
N-Acetyldelectine [113]
Anthranoylylcoctonine [103]
14-Benzoyldictyocarpine [114]
Dehydrodictysine [115]
Delectine [115]
Delectinine [115]
Delporphine [115]
Demethyleneeldelidine [115]
Dictyocarpine [115]
Dictysine [113]
Eldelidine [116]
Eldeline [116]
Isoboldine [115]
Lycoctonine [116]
N-Methyllaurotetanine [115]
Methyllycaconitine [103]

***Delphinium elatum* L.**
14-Deacetylnudicauline [82]
Delectinine [82]
Elatine [103]
Eldeline [103]
Nudicauline [9]

***Delphinium elisabethae* N.Busch**
Alkaloid B [117]
Anthranoyllycoctonine [118]

Karakoline [117]
Lycoctonine [118]
Methyllycaconitine [118]

***Delphinium flexuosum* Bieb.**
Anthranoyllycoctonine [103]
Methyllycaconitine [103]

***Delphinium freynii* Conrath**
Anthranoyllycoctonine [103]
Methyllycaconitine [103]

***Delphinium grandiflorum* L.**
Methyllycaconitine [119]

***Delphinium iliense* Huth**
Browniine [120]
6-Dehydrodelcorine [121]
Delcoridine [120]
Delcorine [121]
Dictyocarpinine [120]
Eldeline [121]
Ilidine [121]
Lycoctonine [121]

***Delphinium oreophilum* Huth**
14-Acetylbrowniine [122]
Anthranoyllycoctonine [103]
Lycoctonine [123]
Methyllycaconitine [103]

***Delphinium orientale* J.Gay (*Consolida orientalis*)**
Ajacine [124]
Delsoline [124]

***Delphinium poltoratskii* Rupr.**
Ajacine [125]
Antranoyllycoctonine [125]
Delpoline [125]
Karakoline [125]
Lycoctonine [125]
Methyllycaconitine [125]

***Delphinium puniceum* Pall.**
Anthranoyllycoctonine [103]
Methyllycaconitine [103]

***Delphinium pyramidatum* Albov**
Anthranoyllycoctonine [103]

***Delphinium retropilosum* Sambuk**
14-Deacetylnudicauline [126]
Delretine [126, 127]
Elasine [126, 127]
Lycoctonine [126, 127]
Methyllycaconitine [126, 127]
Nudicauline [126]

***Delphinium rotundifolium* Afan.**
Browniine [104]
Methyllycaconitine [128]

***Delphinium semibarbatum* Bien. ex Boiss.**
Anthranoyllycoctonine [103]
Lycoctonine [129]
Methyllycaconitine [128]

***Delphinium speciosum* Bieb.**
Alkaloid B [130]
Anthranoyllycoctonine [130]
Gigactonine [130]
Lycoctonine [130]
Methyllycaconitine [130]

***Delphinium ternatum* Huth**
6-Dehydroeldelidine [131]
Delcorine [132]
Delpheline [132]
Delterine [133]
Dictyocarpine [131]
Glaucine [131]
Lycoctonine [132]
Methyllycaconitine [105]
Terdeline [134]
Ternatine [135]

***Delphinium thamarae* Kem.-Nath**
Anthranoyllycoctonine [136]
Lycoctonine [136]
Methyllycaconitine [136]
Norsongoramine [136]

***Thalictrum alpinum* L.**
Hernandezine (thalicsimine) [137]

***Thalictrum amurense* Maxim.**
β-Allocryptopine [138]
Protopine [138]
Thalictrisine [138]

***Thalictrum baikalense* Turcz. ex Ledeb.**
Baicalidine [139]
Baicaline [139]
Berberine [140]
Glaucine [139]
Magnoflorine [140]
7-Oxobaicaline [141]
Thalbaicalidine [142]
Thalbaicaline [142]

***Thalictrum collinum* Wallr.**
Berberine [143]
Glaucine [143]
Isoboldine [143]
Magnoflorine [143]
O-Methylthalicberine [143]
Thalmine [143]

***Thalictrum contortum* L.**
β-Allocryptopine [138]

***Thalictrum filamentosum* Maxim.**
Glaucine [138]
Thalicsimidine [138]

***Thalictrum flavum* L.**
Berberine [144]
Cryptopine [145]
Magnoflorine [145]
Thalflavidine [146]
Thalflavine [147]
Thalicarpine [147]
Thalicminine [148]
Thaliglucinone (thalicsine) [144]

***Thalictrum foetidum* L.**
Berberine [149]
Corunnine [149]
Fetidine [150]
Glaucine [149]
Harmine [151]
Isoboldine [149]
Magnoflorine [152]
7-Oxoglaucine (O-methylateroline) [151]
Thalfine [151]
Thalfinine [151]
Thalflavine [153]
Thalicmidine [152]

***Thalictrum isopyroides* C.A.Mey.**
Cabudine [154]
Cryptopine (thalisopirine) [155]
Dehydrothalicmine [156]
Isoboldine [157]
Magnoflorine [152]
1-Oxo-6,7-dimethoxy-2-methy1-1,2-dihydroisoquinoline [158]
Thalicmine [159]
Thalicminine [159]
Thalisopidine [159]
Thalisopyne [160]
Thalisopynine [161]

***Thalictrum longipedunculatum* E.Nikit.**
Berberine [152]
Columbamine [162]
Glaucine [162]
Magnoflorine [152]
O-Methylthalicberine [162]
Thalicberine [162]
Thalicminine [162]
Thalicsimidine [162]
Thalidasine [163]
Thaliglucinone (thalicsine) [162]
Thalphetidine (thalictrinine) [152]

***Thalictrum minus* L.**
α-Allocryptopine [153]
β-Allocryptopine (thalictrimine) [164]
Argemonine [158]
Aromoline [158]
Berberine [152, 165]
Corunnine [158]
Dehydrothalicmine [166]
Glaucine [167]
Jatrorrhizine [153]
Magnoflorine [152]
N-Methylargemonine [158]
β-N-Methylcanadine [168]
N-Methyltetrahydropseudoberberine [153]
O-Methylthalicberine (thalmidine) [169]
Palmatine [153]
Preocoteine N-oxide [170]
Thalbadensine [158]
Thalicberine [153]
Thalicmidine [168]
Thalicmidine N-oxide [170]
Thalicmine [168]

Thalicminine [171]
Thalicsimidine [158]
Thalmethine [158]
Thalmine [168]
Thalphenine [172]

***Thalictrum orientale* Baiss**
Fangchinoline [173]
Fuziline [173]

***Thalictrum sachalinense* Lecoy.**
Berberine [174]
Glaucine [174]
Magnoflorine [174]
N-Methylnantenine [174]
Thalrugosine [174]

***Thalictrum simplex* L.**
β-Allocryptopine [175]
Berberine (thalsine) [176]
Hernandesine (thalicsimine) [176]
Magnoflorine [175]
Thalicmine [177]
Thalicminine [178]
Thalicsimidine [175]
Thalictrisine [178]
Thaliclucinone (thalicsine) [176]
Thalphetidine (thalictrinine) [179]
Thalsimidine [180]
Thalsimine [181]

***Thalictrum strictum* Ledeb.**
Argemonine [182]
Berberine [183]
Magnoflorine [183]
O-Methylcassyfiline [182]
Preocoteine [183]
Thalicmine [182]
Thalicminine [182]
Thalicsimidine [183]
Thalictuberine [183]
2,3,7-Trimethoxy-8,9-methylendioxy-N-methylpavinane [183]

***ThaIictrum sultanabadense* Stapf**
Hernandezine [184]
Hernandezine 2'-N-oxide [185]
O-Methylthalmine [186]
Thalbadensine [184]
Thalictine [186]
Thalidezine [185]

Thalictrum triternatum
α-Allocryptopine [187]
Berberine [187]
Glaucine [187]
Magnotlorine [187]
Protopine [187]
Thalmine [187]
Thalphine [187]

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Family Resedaceae

***Reseda lutea* L.**
Luteanine [1]
Phenyl-β-naphthylamine [1]

***Reseda luteola* L.**
Lutine [2]
Lutinine [2]
β-Hydroxyphenylethylamine [3]
Phenyl-β-naphthylamine [3, 4]
Resedine [5]
Resedinine (barbarine) [6]

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Family Rhamnaceae

***Zizyphus jujuba* Mill.**
Asimilobine [1]
Coclaurine [1]
Isoboldine [1]
Norisoboldine [1]
Yuzifine [1]
Yuzirine [1]

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Family Rosaceae

Spiraea japonica
Spiradine A [1]
Spiredine [1]
Spireine [2]

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Family Rutaceae

***Boenninghausenia albiflora* Reichenb. (callosal tissue)**
Gravacridondiol glycoside [1]
1-Hydroxy-3-methoxy-N-methylacridone [1]
Isogravacridonechlorine [1]
Rutacridone [1]

***Choisya ternata* H.B. et K.**
Choisyine [2]
Evoxine [2]
Skimmianine [2]

***Dictamnus angustifolius* G.Don. fil. ex Sweet**
Dictamnine [3, 4]
Dubamine [3]
Dubinidine [3]
Evoxine [3]
γ-Fagarine [4]
Isodictamnine [4]
Isopteleine [4]
Preskimmianine [4]
Skimmianine [3, 4]

***Dictamnus caucasicus* (Fisch. et Mey.) Grossh.**
Dictamnine [5]
γ-Fagarine [5]
Isodictamnine [5]
Isomaculosidine [5]
Isopteleine [5]
Robustine [5]
Skimmianine [5]

***Haplophyllum acutifolium* (DC.) G.Don fil.**
Acetamide [6]
Acutine [7]

Evoxine [8]
Haplamine [8]
Perfamine [8]
Skimmianine [6]

***Haplophyllum alberti-regelii* Korov.**
Acetamide [9]
Evoxine [9]
Skimmianine [9]

***Haplophyllum bucharicum* Litv.**
Benzamide [10]
Buchapine [11]
Bucharaine [12]
Bucharamine [10]
Bucharaminole [13]
Bucharidine [14]
Dictamnine [10]
3-Dimethylallyl-4-dimethylallyloxyquinolin-2-one [15]
γ-Fagarine [10]
Flindersine [16]
Folifine [17]
Haplobucharine [16]
Haplopine [12]
4-Hydroxyquinolin-2-one [18]
4-Methoxyquinolin-2-one [18]
Robustine [10]
Skimmianine [19]

***Haplophyllum bungei* Trautv.**
Dictamnine [20]
Folimine [21]
Haplobungine [21]
4-Methoxyquinolin-2-one [21]
Robustinine [20]
Skimmianine [20]

***Haplohyllum dauricum* (L.) G.Don.**
Daurine [22]
Dictamnine [22]
γ-Fagarine [22]
Folimine [22]
Haplopine [22]
4-Methoxy-N-methylquinolin-2-one [22]
Robustine [22]
Robustinine [22]
Skimmianine [22]

***Haplophyllum dubium* Korov.**
Dubamine [23]
Dubinidine [23]
Dubinine [23]
Evoxine [24]
γ-Fagarine [25]
Folifidine [26]
Foliosidine [26]
Graveoline [24]
Haplopine [26]
Norgraveolline [25]
Robustine [26]
Skimmianine [24]

***Haplophyllum ferganicum* Vved.**
Acetylevoxine [27]
Anhydroevoxine [27]
Evodine [27]
Evoxine [27]
Glycoperine [27]
Haplopine [27]
7-Isopentenyloxy-γ-fagarine [27]

***Haplophyllum foliosum* Vved.**
Dubinidine [28]
Edulinine [29]
Folidine [30]
Folifidine [17]
Folifine [17]
Folifinine [31]
Foliforine [32]
Folimidine [33]
Folimine [34]
Foliminine [35]
Foliosidine [28]
Folisine [36]
Graveoline [28]
Haplodimerine [37]
Haplofoline [38]
Haplopine [17]
N-Methyl-2-phenylquinolin-4-one [39]
Myrtopsine [40]
Norgraveoline [40]
Robustinine [17]
Skimmianine [28]

***Haplophyllum kowalenskyi* Stschegl.**
γ-Fagarine [41]
Skimmianine [41]

***Haplophyllum latifolium* Kar. et Kir.**
Dubamine [42]
Evoxine [43]
Glycoperine [43]
Haplamide [43]
Haplamidine [43]
Haplatine [43]
Haplopine [43]
7-Isopentenyloxy-γ-fagarine [43]
Skimmianine [43]

***HaplophyllIum leptomerum* Licz. et Vved.**
γ-Fagarine [44]
Leptomerine [44]
N-Methyl-2-phenylquinolin-4-one [44]
Skimmianine [44]

***Haplophyllum obtusifolium* Ledeb.**
Acetylhaplatine [45]
Benzamide [46]
Dictamnine [47]
Evodine [45]
Evoxine [10]
γ-Fagarine [47]
Folimine [46]
Haplobine [47]
Haplopine [45]
Haplotusine [46]
Methylevoxine [45]
Robustine [47]
Skimmianine [10]

***Haplophyllum pedicellatum* Bunge**
γ-Fagarine [23]
Haplopine [10]
Robustine [10]
Skimmianine [19]

***Haplophyllum perforatum* Kar. et Kir.**
Acetylhaplophyllidine [48]
Anhydroevoxine [49]
Anhydroperforine [50]
Dictamnine [51]
Dihydrohaplamine [48]
Dubinidine [51]
Evodine [52]
Evoxine [19]
Evoxoidine [52]
Flindersine [53]
Folimine [51]
Foliosidine [51]
Glucohaplopine [54]
Glycoperine [55]
Graveoline [51]
Haplafine [56]
Haplamine [57]
Haplophidine [58]
Haplophyllidine [59]
Haplopine [60]
Haplosamine [61]
Haplosidine [62]
Haplosine [63]
Haplosinine [64]
7-Isopentenyloxy-γ-fagarine [65]
Methylevoxine [66]
N-Methyl-2-phenylquinolin-4-one [51]
Monoacetylglycoperine [58]
Perfamine [67]
Perforine [68]
Platydesmine [51]
Robustine [63]
Skimmianine [19]
Triacetylglycoperine [58]

***HaplophyllIum popovii* Korov.**
Evoxine [69]
Hapovine [70]
Skimmianine [69]

***HaplophyllIum ramosissimum* (Pauls.) Vved.**
Acetylevoxine [71]
Cinnamamide [71]
Dictamnine [72]
Evodine [73]
Evoxine [72]
Haplopine [73]
Methylevoxine [73]
Robustine [73]
Skimmianine [72]

***Haplophyllum robustum* Bunge**
Dictamnine [13]
γ-Fagarine [74]
Haplopine [74]
Robustine [74]
Robustinine [75]
Skimmianine [74]

***Haplophyllum schelkovnikovii* Grossh.**
γ-Fagarine [41]
Skimmianine [41]

***Haplophyllum tenue* Boiss.**
γ-Fagarine [41]
Skimmianine [41]

***Haplophyllum villosum* (Bieb.) G.Don fil.**
γ-Fagarine [41]

***Phellodendron amurense* Rupr.**
Berberine [76]

***Phellodendron lavallei* Dode**
Berberine [76]

***Phellodendron sachalinense* (Fr. Schmidt) Sarg.**
Berberine [76]

***Ptelea trifoliata* L.**
Kokusaginine [77]
Maculosidine [77]
Pteleine [77]
Skimmianine [77]

***Ruta graveolens* L. (callosal tissue)**
Arborinine [78]
Dictamnine [78]
γ-Fagarine [78]
Gravacridonechlorine [78]
Gravacridonediol [78]
Gravacridonediol glycoside [78]
Gravacridonolchlorine [78]
Graveoline [78]
Graveolinine [78]
1-Hydroxy-3-methoxy-N-methylacridone [78]
1-Hydroxy-N-methylacridone [78]
Kokusaginine [78]
Methyl ester of gravacridonediol [78]
Ribalinidine [78]
Ribalinium [78]
Rutacridone [78]
Rutalinidine [78]
Rutalinium [78]
Skimmianine [78]

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Family Santalaceae

***Thesium minkwitzianum* B.Fedtsch.**
(+)-Isoretronecanol [1]
Thesine [1]
Thesinine [1]

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Family Saxifragaceae

***Dichroa febrifuga* Lour.**
Febrifugine [1]
Isofebrifugine [1]

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Family Scrophulariaceae

***Leptorhabdos parviflora* (Benth.) Benth.**
Aloperine [1]
Leptorhabine [2]
(+)-Leptorhabine [3]
Pachycarpine [1]
Sophoramine [1]
Sophorcarpine [1]
(–)-Sophoridine [1, 4]

***Linaria popovii* Kuprian.**
(±)-Peganine [5, 6]

***Linaria transiliensis* Kuprian.**
Deoxyvasicinone [7]
(±)-Peganine [7]
(–)-Vasicinone [7]

***Linaria vulgariformis* E.Nikit.**
(±)-Peganine [7]

***Linaria vulgaris* Mill.**
(±)-Peganine [6]

***Pedicularis dolichorhiza* Schrenk**
N-Methylcytisine [8]
Plantagonine [8]

***Pedicularis ludwigii* Regel**
Indicaine [9]
Platagonine [9]

***Pedicularis macrochila* Vved.**
Gentiananine [10, 11]
Noractinidine [10, 11]
Plantagonine [10, 11]

***Pedicularis olgae* Regel**
Indicaine [12, 13]
Indicainine [12, 13]
N-Methylcytisine [12]
Pedicularidine [14]
Pedicularine [12, 15]
Pediculidine [16]
Pediculine [17]
Pediculinine [18]
Plantagonine [12, 13]

***Pedicularis rhinanthoides* Schrenk**
Plantagonine [15]
Tecostidine [15]

***Pedicularis violascens* Schrenk**
Indicaine [19]
Plantagonine [19]

***Verbascum nobile* Velen.**
Pediculinine [20]

***Verbascum songaricum* Schrenk**
Anabasine [21]
Plantagonine [21]

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Family Solanaceae

***Anisodus luridus* Link. et Otto**
Cuscohygrine [1]
Hyoscyamine [1]

***Atropa belladonna* L.**
Apoatropine [2]
Atropine [2]

***Capsicum annuum* L.**
Capsaitsine [3]
Solanidine [4]
Solanine [4]

***Datura innoxia* Mill.**
Apoatropine [5]
Apohyoscine [5]
(−)-3α,6β-Dihydroxytropane [5]
(−)-3α,6β-Ditygloyloxytropane [5]
Hyoscine {(−)-scopolamine)} [5]
Hyoscyamine [5]
Oscine [5]
Pseudotropine [5]
α-Scopodonnine [6]
β-Scopodonnine [6]
(−)-3α,6β-Tropandiole [5]
Tropine [5]
(±)-6β-Tygloyloxytropan-3α,7β-diole [6]

***Datura metel* L.**
(−)-Scopolamine (hyoscine) [7]

***Datura stramonium* L.**
Apoatropine [8]
Apohyoscine [8]
α-Belladonnine [8]
β-Belladonnine [8]
(−)-3α,6β-Dihydroxytropane {(−)-3α,6β-tropandiole} [8]
Hyoscine {(−)-scopolamine} [8–10]
Hyoscyamine [8–10]
Tropine [8]

***Hyoscyamus albus* L.**
Hyoscyamine [11]

***Hyoscyamus niger* L.**
Apoatropine [8]
Apohyoscine [8]
α-Belladonnine [8]
β-Belladonnine [8]
Hyoscine [8]
Hyoscyamine [8, 12, 13]
Tropine [8]

***Hyoscyamus pusillus* L.**
Apoatropine [14]
Apohyoscine [14]
Hyoscine {(−)-scopolamine} [14]
Hyoscyamine [14]
Tropine [14, 15]

Nicotiana acuminata
Nicotine [15]

Nicotiana alata
Nicotine [15]

Nicotiana angustifolia
Nicotine [15]

Nicotiana benthamiana
Nornicotine [15]

Nicotiana bigelovi
Nicotine [15]

Nicotiana bonariensis
Nicotine [15]

Nicotiana calyzina
Nicotine [15]

Nicotiana caudigera
Nornicotine [15]

Nicotiana chinensis
Nicotine [15]

Nicotiana clevelandi
Nicotine [15]

Nicotiana debneyi
Anabasine [15]
Nicotine [15]
Nornicotine [15]

Nicotiana eastii
Nornicotine [15]

Nicotiana glauca
Anabasine [15]

Nicotiana glutinosa
Nicotine [15]
Nornicotine [15]

Nicotiana inglubra
Nicotine [15]
Nornicotine [15]

Nicotiana langsdorfii
Nicotine [15]

Nicotiana longiflora
Nornicotine [15]

Nicotiana macrophylla
Nicotine [15]

Nicotiana maritima
Nornicotine [15]

Nicotiana megalosiphon
Nornicotine [15]

Nicotiana palmeri
Nornicotine [15]

Nicotiana paniculata
Nicotine [15]

Nicotiana petiolaris
Nicotine [15]

Nicotiana plumbaginifolia
Nornicotine [15]

Nicotiana quadrivalvis
Nicotine [15]

Nicotiana raimondii
Nicotine [15]

Nicotiana repanda
Nornicotine [15]

Nicotiana rosulata
Nicotine [15]
Nornicotine [15]

Nicotiana rotundifolia
Anabasine [15]
Nicotine [15]
Nornicotine [15]

Nicotiana rusbyi
Nornicotine [15]

Nicotiana rustica
Nicotine [15]

Nicotiana sanderae
Nornicotine [15]

Nicotiana sanguinea
Nicotine [15]
Nornicotine [15]

Nicotiana solanifolia
Nicotine [15]
Nornicotine [15]

Nicotiana suaveolens
Nornicotine [15]

Nicotiana sylvestris
Nicotine [15]
Nornicotine [15]

Nicotiana tabacum
Nicotine [15]

Nicotiana tomentosa
Nicotine [15]
Nornicotine [15]

Nicotiana trigonophylla
Nornicotine [15]

Nicotiana undulata
Nicotine [15]

Nieotiana velutina
Nornicotine [15]

Nicotiana wiganditoides
Nicotine [15]

***Physochlaina alaica* Korotk. (*Ph. dubia* Pasch.)**
Apoatropine [16]
Apohyoscine [16]
Atropine [17]
α-Belladonnine [18]
β-Belladonnine [18]
(−)-3α,6β-Dihydroxytropane {(−)-3α,6β-tropandiole} [19]
6-Hydroxyatropine {(±)-6-hydroxyhyoscyamine } [20]
6-Hydroxyhyoscyamine [21]
6-Hydroxyhyoscyamine N-oxide [19]
Hyoscine {(−)-scopolamine} [18]
Hyoscyamine [13, 19]
Physochlaine [16]
Tropine [16]

***Physochlaina orientalis* (Bieb.) G.Don fil.**
Apoatropine [22]
Hyoscine {(−)-scopolamine} [22, 23]
Hyoscyamine [22, 23]
Tropine [22]

***Scopolia carniolica* Jacq.**
Hyoscine {(−)-scopolamine} [24–29]
Hyoscyamine [24–29]
Tropine [26]

***Scopolia stramonifolia* (Wall.) Semenova**
Cuscohygrine [24]
Hyoscine {(−)-scopolamine} [24]
Hyoscyamine [24]

***Scopolia tangutica* Maxim.**
Anisodine [30]
Atropine [31]
Cuscohygrine [32]
6-Hydroxyhyoscyamine [33]
Hyoscine [30–36]
Hyoscyamine [30–36]

Solanum aviculare* var. *brisbanense
Solasodine [37]

***Solanum dulcamara* L.**
α-Soladulcine [38]
β-Soladulcine [38]

Solanum khasianum
Solasodine [39]

***Solanum kieseritzkii* C.A.Mey.**
Solamargine [40]
Solasonine [40]
Tomatine [40]

***Solanum laciniatum* Ait.**
Solasodine [41–43]

***Solanum megacarpum* Eoidz.**
Megacarpidine (dihydrosolasodine) [44]
Megacarpine [44]

***Solanum nigrum* L.**
Solamargine [45]
β-Solamargine [45]
Solasonine [45]

***Solanum persicum* Willd. ex Roem. et Schult.**
Solamargine [46]
Solasodine [46]
Solasonine [46]

***Solanum pseudopersicum* Pojark.**
α-Soladulcine [47]
Solamargine [47]
β-Solamargine [47]
Solasonine [47]

***Solanum rostratum* Dun. (*S. cornutum* Lat.)**
Solamargine [48]
Solasonine [48]

***Solanum transcaucasicum* Pojark.**
Solamargine [49]
β-Solamargine [49]
Solasonine [49]

***Solanum tuberosum* L.**
Allosolanidanol-3α [50]
Solanidine [50, 51]
α-Chaconine [50, 52, 53]
β-Chaconine [53]
Solanidanol-3α [50]
α-Solanine [50, 52, 53]

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Family Taxaceae

***Taxus baccata* L.**
Taxol [1]

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Family Theaceae

***Thea sinensis* L.**
Caffeine [1]
Theophylline [2]

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Family Umbelliferae (Apiaceae)

***Bupleurum aureum* Fisch.**
N-Phenyl-2-naphthylamine [1]
Prangos pabularia Lindl.
Prangosine [2]

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Family Zygophyllaceae (Nitrariaceae, Peganaceae)

***Malacocarpus crithmifolius* (Retz.) C.A. Mey.**
(+)-Anabasine [1]
Nitraria komarovii Iljin et Lava
Acetylkomavine [2]
N-allylnitrarine [3]
N-Allylschoberidine [4]
Dehydroisokomarovine [5]
Dehydronitramidine [4]
Dehydroschoberine [6]
Deoxypeganine [6]
Deoxypeganine N-oxide [7]
Deoxyvasicinone [6]
Deoxyvasicinone N-oxide [8]
Dihydronitraraine [6]
Dihydronitraridine [9]
Isokomarovine [10]
Isonitrarine [11]
Isoschoberidine [6]
Komarine [12]
Komaroine [13]
Komarovicine [14]
Komarovidine [15]
Komarovidinine [10]
Komarovidinine N-oxide [3]
Komarovine [17]
Komarovinine [18]
Komavicine [19]
Komavine [2]
Nitramarine [20]
Nitramidine [11]
Nitraraine [5]

Nitraramine [6]
Nitraramine N-oxide [6]
Nitraricine [16]
Nitraridine [9]
Nitrarine [11]
Nitrarizine [16]
Nitraroxine [6]
(–)-Peganine [6]
Peganine N-oxide [4]
Peganole N-oxide [12]
Schoberidine [11]
Schoberine [6]
Tetrahydroisokomarovine [5]
Tetrahydrokomarovinine [5]
Tetrahydronitramarine [5]
Tetrahydronitraridine [9]
Tetramethylenetetrahydro-β-carboline [11]
Tetramethylenetetrahydro- β -carboline N-oxide [21]
Tryptamine [6]
(±)-Vasicinone [6]
Vasicinone N-oxide [8]

***Nitraria schoberi* L.**
Acetylkomavine [2]
N-allylisonitrarine [22]
Dehydroschoberine [23]
Deoxypeganine [23]
Deoxyvasicinone [23]
Dihydronitraraine [24]
Evoxine [25]
Isonitrarine [26]
Isoschoberidine [27]
Komavine [2]
N-Methylnitrarine [23]
Nitramidine [27]
Nitramine [28]
Nitraraine [29]
Nitraramine [30]
Nitraramine N-oxide [23]
Nitrarine [31]
Nitraroxine [32]
Schoberidine [33]
Schoberine [25]
Sibiridine [34]
Tetramethylenedihydro-β-carboline [25]
Tetramethylenetetrahydro-β-carboline [35]
Tetramethylentetrahydro-β-carboline N-oxide [23]
Tryptamine [23]
(±)-Vasicinone [23]

***Nitraria sibirica* Pall.**
Dehydroschoberine [36]
Deoxyvasicinone [37]
Dihydroschoberine [36]
Isonitramine [38]
Nitrabirine [39]
Nitrabirine N-oxide [36]
Nitramine [38]
(+)-Nitramine [40]
Nitraraidine [41]
Nitraramidine [41]
Nitraramine [40]
Nitraramine N-oxide [36]
Nitraroxine [42]
Phenylnitrabirine [37]
Schoberine [42]
Sibiridine [34]
Sibirine [43]
Sibirinine [44]
(–)-Vasicinone [40]

***Peganum harmala* L.**
Deoxypeganidine [45]
Deoxypeganine [46]
Deoxyvasicinone [46]
Dipegine [47]
Dipeginole [48]
Harmaline [49]
Harmine [46]
Isopeganidine [47]
Pegamine [50]
Peganidine [51]
(–)-Peganine [46]
(±)-Peganine [46]
Peganol [52]
Quinaldine [47]
Quinoline [47]
(–)-Vasicinone [46]
(±)-Vasicinone [49]
Vasicol [53]

***Peganum nigellastrum* Bunge**
Deoxypeganine [54]
Deoxyvasicinone [55]
Harmaline [54]
Harmine [54]
(±)-Peganine [55]
(–)-Vasicinone [55]

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Physicochemical and Pharmacological Properties of Alkaloids

S.S. Azimova, M.S. Yunusov (eds.), *Natural Compounds – Alkaloids*,
DOI 10.1007/978-1-4614-0560-3,

Amaryllidaceae Alkaloids

Plants of the Amaryllidaceae family are widely distributed around the world. Investigations of alkaloids of the Amaryllidaceae family began in earnest after galanthamine was found to have valuable pharmacological properties.

More than 30 alkaloids have been isolated from 32 plant species belonging to 13 genera. Various plant organs have been studied depending on the habitat and vegetation period.

Amaryllidaceae alkaloids are divided into several groups according to the structure of the main heterocyclic skeleton: lycorine (indophenanthridine), crinine, lycorenine, galanthamine, and tazettine.

Lycorine, crinine, and related alkaloids are methylene and methyl derivatives of tri-, tetra-, or pentahydroxyphenanthridine.

Lycorine alkaloids have substituents in aromatic ring A at the 8-, 9-, and 10-positions.

Crinine (ethanophenanthridine) alkaloids usually have a methylenedioxy group in the aromatic part of the molecule and methoxyls that can be located in both the aromatic parts and hydrogenated rings B, C, and D.

Lycorenine alkaloids are divided into two subgroups, those with a hemiacetal and with a δ-lactone ring. Alkaloids of this group contain an *N*-methyl in a five-membered ring, a methylenedioxy in the benzene ring, and a double bond. Certain alkaloids of this group have three substituents in the benzene ring in the 9-, 10-, and 11- or 8-, 9-, and 10-positions.

The stereochemistry of lycorenine alkaloids has been studied using NMR spectra and conversion to lycorine alkaloids of known configuration.

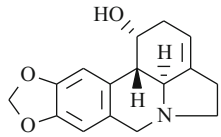
Galanthamine alkaloids contain an oxygen bridge and an *N*-methyl in a seven-membered ring (galanthamine, *dl*-narvedine, *l*-narvedine, *d*-narvedine) in addition to the aforementioned substituents. Mineral acids cleaved the oxygen bridge and saponificated the methoxyl. This reaction also cleaves the hydroxyl located in the partially hydrogenated ring. This is aromatisized this ring. The oxygen bridge is not cleaved and the methoxyl is not saponified if ring B contains a double bond.

Tazettine alkaloids contain a hemiacetal. Only the double bond is reduced upon catalytic hydrogenation. The hemiacetal remains untouched in contrast with the lycorenine group.

The preparation galanthamine has been used successfully during recovery from acute poliomelitis. The slightly toxic preparation methylapogalanthamine is used for hypotension. The preparation lycorine are used to treat bronchial asthma.

Caranine

CAS Registry Number: 477-12-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Clivia miniata*
$C_{16}H_{17}NO_3$: 271.1208
Mp: 175–177°C (Me_2CO) [1]; 318°C (methiodide), 270°C (dec., perchlorate), 163°C (dihydro), 185°C (Ac) [1, 2]
$[\alpha]_D$ −191° ($CHCl_3$) [1]
UV: 235, 294(3.47, 3.68) [2]
IR(perchlorate Ac): 3436, 1733, 1029, 992 [3]
MS *m/z*: 271(M^+, 73), 270(43), 253(18), 252(70), 250(13), 227(62), 226(100) [4]

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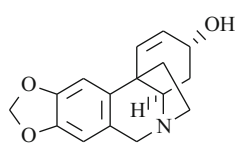
Crinine (Crinidine)

CAS Registry Number: 510-67-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Crinum amabile, C. giganteum*
$C_{16}H_{17}NO_3$: 271.1208
Mp: 206–207°C [1]; 239°C (picrate), 221°C (dihydro) [2]
$[\alpha]_D$ −38° ($CHCl_3$) [1]
UV: 237, 294 [1, 2]
IR: 3610, 3010, 2955, 2930, 2890, 1622, 1509, 1488, 1442, 1405, 1369, 1335, 1043, 1005, 997, 976, 940, 903, 879, 854, 848, 831 [3]
MS *m/z*: 271(M^+), 254, 199, 187 [1]
HPLC: [4]

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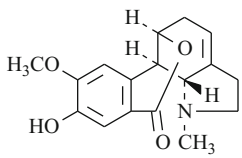
4. S. Ghosal, K. Dutta, S.H. Singh, Y. Kumar, Indian J. Chem. **30**, 260 (1991)

Demethylhomolycorine (9-Demethylhomolycorine)

CAS Registry Number: 6879-81-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Galanthus caucasicus*
$C_{17}H_{19}NO_4$: 301.1314
Mp: 214°C (H_2O) [1]
$[\alpha]_D$ +94° (MeOH) [1]

UV: 228, 269, 310 (4.32, 3.91, 3.73) [1]
IR: 3400–3200, 1700 [1]
MS *m/z*: 301(M^+), 109(100), 108, 96, 94, 82 [1]
^{1}H NMR: 1.92(3H, s, NCH_3), 3.84(3H, s, OCH_3), 5.46(1H), 7.01, 7.46(each 1H) [1]

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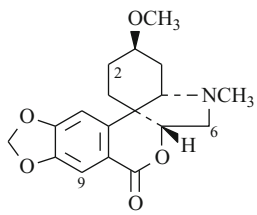
Dihydroepimacronine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Ungernia spiralis*
$C_{18}H_{21}NO_5$: 331.1420
Mp: 98–99°C [1]
$[\alpha]_D$ +11° ($CHCl_3$) [1]
UV: 227, 272, 314(4.36, 3.85, 3.73) [1]
IR: 1710, 1620, 1510, 1480 [1]
MS *m/z*: 331(M^+), 317, 316, 301, 300, 287, 272, 259, 247, 245, 229, 201, 175, 141, 70(100), 57, 56, 53 [1, 2]
^{1}H NMR: 1.81(6H, m), 2.26(3H, s, NCH_3), 2.79, 2.92(each 1H, d, H-6), 3.32(3H, s, OCH_3), 3.70(1H, m, H-3), 4.84(1H, m, H-6a), 5.98(2H, s, OCH_2O), 7.00(1H, s, H-12), 7.48(1H, s, H-9) [1, 2]

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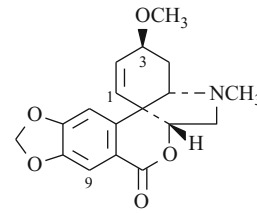
Epimacronine

CAS Registry Number: 17322-73-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Ungernia spiralis*
$C_{18}H_{19}NO_5$: 329.1263
Mp: 104–105°C ($CHCl_3$) [1]
$[\alpha]_D$ +109° ($CHCl_3$) [1]
UV: 232, 272, 312(4.67, 3.99, 3.94) [1]
IR: 1620, 1500, 1480, 1440 [1]
MS *m/z*: 329(M^+), 314, 298, 284, 272, 259, 247, 245, 203, 201, 141, 71, 70 [1, 2]
^{1}H NMR: 2.47(3H, s, NCH_3), 3.40(3H, s, OCH_3), 4.10(1H, m, H-3), 5.33(1H, q, J = 10.5; 2.5, H-2), 5.98(2H, s, OCH_2O), 6.20(1H, d, J = 10.5, H-1), 6.83(1H, s, H-12), 7.51(1H, s, H-9) [1, 2]

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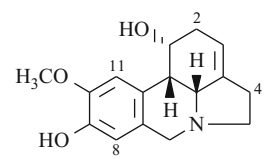
Forthucine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Narcissus hybridus*
$C_{16}H_{19}NO_3$: 273.1365
Mp: 160–162°C (MeOH), 257°C (methiodide), 209°C (hydrochloride), 212°C (picrate), 201°C (O–Acetyl), 113°C (O–Methyl) [1]
$[\alpha]_D$ +67° (EtOH) [1]
UV: 226 sh, 285(3.79, 3.53) [1]
IR: 3180, 1615, 1590, 1460 [1]
MS *m/z*: 273(M^+, 99), 272(100), 229(17), 228(23), 256(12), 254(5), 252(22), 244(22), 242(8) [1]
^{1}H NMR: 2.30–2.60(6H, H-2, H-4, H-5), 2.68(1H, J = 6, H-6a), 2.95(1H, J = 6, H-6), 3.27, 3.87(each 1H, J = 14, H-7), 3.83(3H, s, OCH_3), 4.25(1H, d, J = 2.5, H-1), 5.52(1H, J = 7, H-3), 6.53(1H,H-8), 6.79(1H, H-11) [1]
CD: [1]

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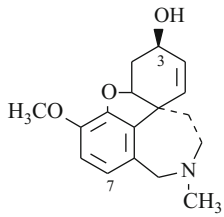
Galanthamine (Lycorimine)

CAS Registry Number: 357-70-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Amaryllis hybrida, Crinum amabile, C. giganteum, Eucharis subedentata, Galanthus caucasicus, G. nivalis, G. woronowii, Hippeastrum equestre, Hymenocallis littoralis, Leucojum aestivum, L. vernum, Narcissus hybridus, Pancratium trianthum, Ungernia ferganica, U. sewertzowii, U. spiralis, U. tadshicorum, U. tamaricum, U. trisphaera, U. victoris, U. vvedenskyi, Vallota speciosa*
$C_{17}H_{21}NO_3$: 287.1521
Mp: 127–128°C (C_6H_6)[1], 257°C (hydrochloride)[1], 247°C (hydrobromide) [1], 224°C (perchlorate) [1], 279°C (methiodide) [1], 217°C (chloroplatinate) [1]
$[\alpha]_D$ −119° [1]
Solubility: very sol. EtOH, MeOH, Me_2CO, $CHCl_3$; sol.C_6H_6, H_2O; spar. sol. Et_2O, petr. ether [1]
UV: 285 [2]
IR: 3580, 3020, 2935, 2845, 2810, 1629, 1596, 1514, 1465, 1441, 1410, 1390, 1376, 1365, 1333, 1318, 1284, 1269, 1170, 1153, 1112, 1093, 1070, 1049, 1028, 992, 979, 963, 952, 942, 923, 898, 872, 840, 836 [2]
MS *m/z*: 287(M^+), 272, 258, 244, 230, 226, 216, 174 [3]
^{1}H NMR: 2.30(3H, s, NCH_3), 3.76(3H, s, 9-OCH_3), 4.00(1H, m, H-3), 4.59(1H, t, J = 8, H-1), 6.51(1H, d, J = 8.5, H-7), 6.56(1H, d, J = 8.5, H-8) [4]
HPLC: [5]
Pharm./Biol.: LD_{50} 8.7 mg/kg (mice). Strong cholinestease inhibitor increased sensitivity of the organism to acetylcholine. Galanthamine hydrobromide is used in the treatment of myasthenia, progressive muscular dystrophy, motor and sensory disturbances connected with neuritises, polyneuritises, radiculitises, and other phenomena after a disturbance of the cerebral blood circulation, and in the treatment of polyomyelitis and infantile cerebral paralyses. It supplied in ampuls with 1 ml of 0.1% and 1% solns [6]. Antiarrhythmic activity [7]. Hydrochloride of the monomethyl ether of apogalanthamine: LD_{50} 58.5, 131.2, 200 mg/kg (i/v, i/p, s/c) [8].

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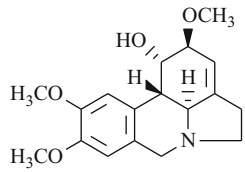
Galanthine

CAS Registry Number: 517-78-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Crinum amabile, Galanthus caucasicus, G. woronowii, Hyppeastrum equestre*

$C_{16}H_{23}NO_4$: 293.1627

Mp: 132–134°C (EtOH), 199°C (hydrochloride), 203°C (hydrobromide), 201°C (perchlorate) [1, 2]

$[\alpha]_D$ −87° [1, 2]

UV: 230, 284 [3]

IR: 3600, 3010, 2965, 2935, 2825, 2800, 2760, 1618, 1590, 1521, 1510, 1470, 1457, 1420, 1390, 1360, 1342, 1319, 1271, 1250, 1170, 1152, 1138, 1118, 1092, 1078, 1060, 1041, 998, 955, 915, 872, 854 [3]

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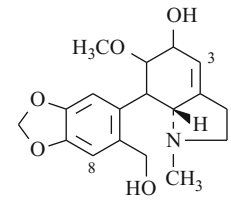
Galanthusine

CAS Registry Number: 31278-95-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Galanthus caucasicus*

$C_{18}H_{23}NO_5$: 333.1576

Mp: 118–119°C (Me_2CO) [1], 200°C (dec., hydrobromide) [1]

$[\alpha]_D$ −66° (EtOH) [1]

UV: 242, 292(3.87, 3.77) [1]

IR: 3400–3200, 940 [1, 2]

MS *m/z*: 333(M^+), 315, 301, 283, 125(100), 96 [1, 2]

^{1}H NMR: 1.58(3H, s, NCH_3), 3.56(3H, s, OCH_3), 5.60(1H, H-3), 5.78(2H, s, CH_2O_2), 6.52(1H, s, H-11), 7.37(1H, s, H-8) [1, 2]

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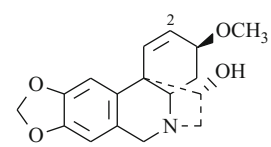
2. S.Yu. Yunusov, T.N. Kiparenko, R. Razakov, A. Abdusamatov, D.M. Tsakadze, Soobshch. AN GSSR **65**(2), 333 (1972)

Haemanthamine (Natalensine, 3-Epicrinamine)

CAS Registry Number: 466-75-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Hippeastrum equestre, Narcissus hybridus, Sternbergia lutea*

$C_{17}H_{19}NO_4$: 301.1314

Mp: 200–201°C (Me_2CO) [1], 190°C (methiodide), 220°C (picrate) [1], 192°C (hydrobromide) [2]

$[\alpha]_D$ +33° ($CHCl_3$) [1]

UV: 239, 296 [3]

IR: 3600, 3010, 2930, 2900, 2825, 2770, 1626, 1509, 1490, 1468, 1447, 1409, 1387, 1375, 1325, 1304, 1243, 1191, 1160, 1123, 1098, 1084, 1064, 1040, 981, 940, 906, 887, 872, 855, 825 [3]

MS *m/z*: 301(M^+), 286, 272, 270, 269, 257, 240, 227, 225, 211, 181, 153, 152 [4]

^{1}H NMR: 1.97–2.17(2H, m, H-4), 3.32(3H, s, 3-OCH_3), 3.80(1H, H-3), 3.95(1H, dt, H-11), 4.35(1H, d, J = 16), 5.82(2H, s, CH_2O_2), 6.23(1H, dd, J = 5), 6.40(1H, dd, J = 10, H-1), 6.40(1H, s, H-7), 6.75(1H, s, H-10) [2]

Pharm./Biol.: LD_{50} 318 mg/kg (s/c, mice). Inhibits the activity of cholinesterase [5]. Hypotensive action. In high doses suppression [6]

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4. A.M. Duffield, R.T. Aplin, H. Budzikiewicz, K. Djerassi, C.F. Murphy, W.C. Wildman, J. Amer. Chem. Soc. **87**, 4902 (1965)
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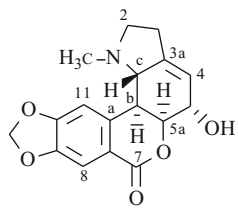
Hippeastrine (Trispherine)

CAS Registry Number: 477-17-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Clivia miniata, Crinum amabile, C. giganteum, Galanthus nivalis, Hippeastrum equestre, Hymenocallis littoralis, Pancratium trianthum, Ungernia ferganica, U. sewertzowii, U.spiralis, U. tadshicorum, U. trisphaera, U. victoris, U. vvedenskyi*

$C_{17}H_{17}NO_5$: 315.1107

Mp: 209–210°C (MeOH) [1]

$[\alpha]_D$ +122° (EtOH) [1], 267° (hydrobromide) [1], 218° (methiodide) [1], 258° (perchlorate) [1], 271° (nitrate) [1], 281° (hydrochloride) [1], 243° (picrate) [1]

Solubility: sol.MeOH, EtOH, $CHCl_3$; spar. sol. Me_2CO, Et_2O; insol. H_2O [1]

UV: 227, 267, 308 [2]

IR: 3600, 3015, 2960, 2920, 2860, 2790, 1715, 1618, 1508, 1484, 1453, 1400, 1387, 1354, 1338, 1318, 1293, 1252, 1190, 1152, 1121, 1058, 1041, 998, 983, 955, 943, 905, 888, 864, 841, 824 [2]

MS *m/z*: 315(M^+, 0.7), 298(1), 297(2.3), 125(100), 124(13), 96(19) [3]

^{1}H NMR: 5.65 (H-4), 4.58 (H-5a), 4.38 (H-5), 7.43 (H-8), 6.94 (H-11), 2.94 (H-11b), 2.50 (H-11c), 2.04 (3H, s, N–CH_3), 6.06 (OCH_2O) [4]

Pharm./Biol.: LD_{50} 800, 670, 195 mg/kg (s/c., i/p., i/v., mice). Suppressed muscular motor activity, exerts an inhibiting influence on the higher nervous activity of rats, prolonged the action of hypnotics [5, 6]. Alkaloid exhibits a hypotensive effect [7].

References

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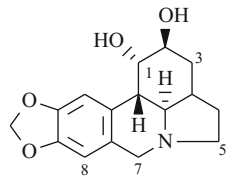
5. U.B. Zakirov, Kh.A. Abduazimov, F.C. Sadritdinov, I.K. Kamilov, *The Pharmacology and Pharmacotherapy of Alkaloids and Glycosides* [in Russian] (Nauka, Tashkent, 1965), p. 243
6. U.B. Zakirov, N.V. Abdumalikova, I.K. Kamilov, *The Pharmacology and Pharmacotherapy of Alkaloids and Glycosides* [in Russian] (Fan, Tashkent, 1966), p. 40
7. U.B. Zakirov, Kh.U. Aliev, N.V. Abdumalikova, I.K. Kamilov, *The Pharmacology and Pharmacotherapy of Alkaloids and Glycosides [in Tashkent]* (Fan, Tashkent, 1967), p. 120

Lycorine (Narcissine, Galanthidine)

CAS Registry Number: 476-28-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Clivia miniata, Crinum amabile, C. giganteum, Galanthus caucasicus, G. nivalis, G. woronowii, Hippeastrum equestre, Hymenocallis littoralis, Leucojum aestivum, L. vernum, Narcissus poeticus, N. tazetta, Pancratium maritimum, P. trianthum, Sternbergia fischeriana, S. lutea, Ungernia ferganica, U. minor, U. sewertzowii, U. spiralis, U. tadshicorum, U. tamaricum, U. trisphaera, U. victoris, U. vvedenskyi*

$C_{16}H_{17}NO_4$: 287.1158

Mp: 265–266°C (MeOH), 211°C (hydrochloride), 211°C (hydrobromide) [1, 2]

$[\alpha]_D$ −120° (Py) [2]

Solubility: spar. sol.EtOH, $CHCl_3$; insol.Me_2CO, Et_2O, H_2O [1]

UV: 233, 293 [3]

IR: 3330, 1507, 1489, 1340, 1314, 1293, 1263, 1243, 1220, 1185, 1158, 1134, 1120, 1104, 1091, 1068, 1054, 1038, 1018, 1003, 988, 940, 910, 893, 881, 863, 843, 828, 795, 762, 749 [3]

^{1}H NMR: 2.88(2H, m, H-4), 2.99(1H, dd, J = 11.8, 2.2, H-11b), 3.49(1, m, H-5), 3.75(1H, m, H-5), 3.95(1H, d, J = 11.8, H-11c), 4.19(1H, d, J = 14, H-7), 4.26(1H, m, J = 1.1, H-2), 4.48(1H, d, J = 14, H-7), 4.58(1H, s, H-8), 6.98(1H, s, H-11) [4]

^{13}C NMR: [4]

Table 1

C-1	70.1	C-5	55.1	C-10	148.1
2	71.9	7	54.2	11	106.4
3	122.9	7a	130.6	11a	125.7
3a	137.9	8	108.8	11b	38.2
4	30.3	9	149.7	11c	61.8
				12	102.8

HPLC: [4]

Pharm./Biol.: LD_{50} 106 mg/kg (s/c) [5]. Lycorine hydrochloride is used as an expectorant in chronic and acute inflammatory processes in lungs and bronchi, in bronchoectatic diseases, and bronchial asthma. Supplied in 0.0002-g tablets [6]. Pronounced hypotensive and sedative properties. Exhibits a pronounced influence on conditional reflex activity [7]. Anticancerogenic activity [8]. (Dihydro): LD_{50} 170 mg/kg (i/v, mice). Antiarrhythmic action [9]

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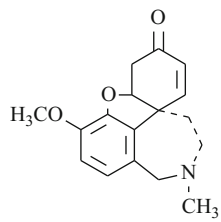
8. A. Brossi (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 25 (Academic Press, New York, 1985), p. 207
9. Kh.U. Aliev, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (Tashkent, Fan, 1972), p. 84

(+)-Narwedine (Galanthaminone)

CAS Registry Number: 510-77-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Ungernia sewertzowii*
$C_{17}H_{19}NO_3$: 285.1365
Mp: 185–186°C (Me_2CO)[1]
$[\alpha]_D$ +310° ($CHCl_3$) [1]; +100° ($CHCl_3$) [2, 3]
UV: 262 [2]
IR: 3020, 2940, 2850, 2810, 1692, 1631, 1598, 1516, 1466, 1443, 1392, 1377, 1367, 1340, 1320, 1288, 1268, 1260, 1171, 1150, 1132, 1128, 1111, 1070, 1053, 1038, 1011, 990, 978, 961, 928, 895, 870, 838, 829 [2]

References

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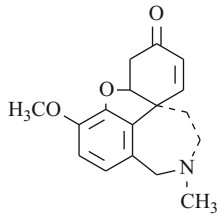
(-)-Narwedine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Ungernia sewertzowii*
$C_{17}H_{19}NO_3$: 285.1365
Mp: 184–185°C (C_6H_6), 201°C (methiodide), 188°C (picrate) [1]
$[\alpha]_D$ −35° ($CHCl_3$) [1]

References

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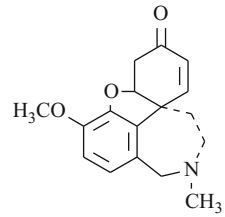
(±)-Narwedine

CAS Registry Number: 1668-86-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological source: *Crinum amabile, Galanthus nivalis, Ungernia sewertzowii, U. victoris, U. vvedenskyi*
$C_{17}H_{19}NO_3$: 285.1365
Mp: 186-187°C (MeOH), 256°C (hydrobromide), 266°C (methiodide), 245°C (nitrate), 193°C (picrate) [1]
$[\alpha]_D$ 0° ($CHCl_3$) [1]
UV: 250, 262(3.66, 3.82) [1]
IR: 1685, 1595, 1510, 1445, 1270, 1055, 935 [2]
MS *m/z*: 285(M^+), 270, 257, 256, 242, 228, 216, 214, 199, 174 [2]
Pharm./Biol.: LD_{50} 36.77 mg/kg (i/v, s/c, mice). Pronounced antinarcotic action. Facilitates the transmission of nervous excitation in n- and m-cholinergic synapses [3]. Stimulates respiration and possessed a brief hypotensive effect. Has no negative influence on the heart [4]

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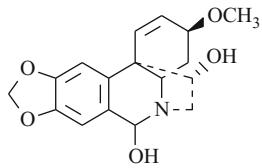
4. E.D. Bazhenova, Kh.U. Aliev, U.B. Zakirov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (Fan, Tashkent, 1972), p. 74

Pancratine (Hemantidine, Lyuteine)

CAS Registry Number: 466-73-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Hymenocallis littoralis, Narcissus tazetta, Pancratium maritimum, P. trianthum, Sternbergia lutea, Ungernia ferganica, U. sewertzowii, U. tadshicorum, U. trisphaera, U. victoris, U. vvedenskyi*

$C_{17}H_{19}NO_5$: 317.1263

Mp: 190–191°C, 206°C (hydrochloride) [1], 119°C (perchlorate), 205°C (picrate) [2], 214°C (dec., methiodide), 203°C (dihydro) [3]

$[\alpha]_D$ −34° ($CHCl_3$) [1]

UV: 242, 293 [4]

IR: 3390, 1509, 1489, 1304, 1248, 1195, 1168, 1127, 1110, 1063, 1038, 983, 942, 936, 910, 870, 858, 817, 773, 740, 708 [4]

Pharm./Biol.: LD_{50} 280 mg/kg (i/v, mice) [5]. Suppressed conditioned reflex activity; prolongs the action of narcotics and hypnotics [6]. Pronounced and prolonged hypotensive action [5]

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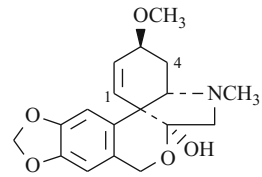
Tazettine (Ungernine, Sakisonine)

CAS Registry Number: 507-79-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Crinum amabile, C. giganteum, Galanthus caucasicus, G. nivalis, G. woronowii, Hippeastrum equestre, Hymenocallis littoralis, Leucojum aestivum, L. vernum, Narcissus poeticus, N. tazetta, Pancratium maritimum, P. trianthum, Sternbergia lutea, Ungernia ferganica, U. minor, U. sewertzowii, U. spiralis, U. tadshicorum, U. trisphaera, U. victoris, U. Vvedenskyi*

$C_{18}H_{21}NO_5$: 331.1420

Mp: 212–213°C (Me_2CO) [1], 208°C (picrate) [1], 108°C (perchlorate) [1], 223°C (methiodide) [1], 183°C (dihydro) [1]

$[\alpha]_D$ +150° ($CHCl_3$) [1]

Solubility: sol. Et_2O, $CHCl_3$; spar. sol. Me_2CO, EtOH, C_6H_6; insol. H_2O [1]

UV: 240, 291 [2]

IR: 1665, 1507, 1493, 1330, 1313, 1257, 1237, 1194, 1173, 1131, 1108, 1085, 1070, 1061, 1040, 1019, 1007, 990, 974, 953, 939, 921, 910, 873, 866, 857, 826, 811, 783, 776, 737, 728 [2]

MS *m/z*: 331(M^+), 316, 298, 260, 247, 229, 201, 71, 70 [3]

^{1}H NMR: 2.37(3H, s, NCH_3), 2.68, 3.29(each 1, d, J = 10, H-6), 3.41(3H, s, OCH_3), 3.87–4.26(1H, m, H-3), 4.62, 4.94(each 1H, d, J = 15, H-8), 5.59(1H, br d, J = 10, H-1), 5.84(2H, s, CH_2O_2), 6.10(1H, br d, J = 10, H-2), 6.44(1H, s, H-9), 6.81(1H, s, H-12) [4]

^{13}C NMR: [5]

Table 1

C-1	130.6	C-6a	101.8	C-12	109.2
2	128.5	8	65.1	12a	125.5
3	72.5	8a	127.9	12b	50.2
4	26.7	9	103.8	CH_2O_2	100.7
4a	70.0	10	146.4	OCH_3	55.7
6	61.8	11	146.4	NCH_3	42.0

Pharm./Biol.: LD_{50} 48.2 mg/kg (i/v, mice). It exerts an expressed and prolonged hypotensive action [6]. It has antiarrythmic activity. It blocks nerve conduction in ganglia of vegetative nervouse system and considerably decreased arterial pressure [7]: (methiodide): LD_{50} 14.0 mg/kg. It blocks nerve conduction in ganglia of vegetative nervouse system and considerably decreased arterial pressure [7]

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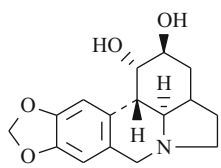
Trianthine ((+)-Ungminoridine, (+)-Zefirantine)

CAS Registry Number: 84236-20-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Pancratium trianthum*

$C_{16}H_{19}NO_4$: 289.1314

Mp: 205–206C (MeOH) [1]

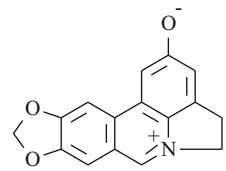
$[\alpha]_D$ +51° [1]

References

1. M.F. Dabire, D.A. Murav'eva, Chem. Nat. Comp. **18**, 510 (1982)

Ungeremine (Licobetaine)

CAS Registry Number: 2121-12-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Ungernia minor, U. spiralis*

$C_{16}H_{11}NO_3$: 265.0739

Mp: 270–272°C, 329°C (dec., hydrobromide), 315°C (dec., hydrochloride), 281°C (dec., nitrate), 282°C (dec., picrate), 295°C (methiodide) [1]

UV: 262, 280–284, 366 [1]

IR: 1610, 1310, 1030, 930 [1]

Pharm./Biol.: LD_{50} 196, 36.4 mg/kg (i/p, i/v, mice). At the small doses – stimulates – and at the large doses – inhibits conditioned reflex [2] It prolongs the soporific action of barbiturates, reinforced the analgetic effect of morphine and promedol [3]. Anticancerous activity [4]

References

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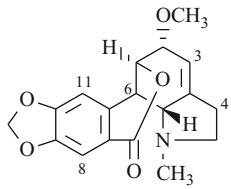
Ungerine

CAS Registry Number: 477-13-4

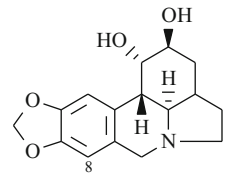


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Leucojum aestivum, Ungernia sewertzowii, U. tadshicorum, U. trisphaera*
$C_{18}H_{19}NO_5$: 329.1263
Mp: 135–136°C (EtOH), 288° (dec., hydrobromide), 271° (hydrochloride), 260° (dec., nitrate), 266° (methiodide), 139° (dihydro) [1]
$[\alpha]_D$ +117° [1]
Solubility: very sol. Me_2CO, EtOH, $CHCl_3$, Et_2O; spar. sol. pet. ether., C_6H_6
UV: 227, 228. 306 [2]
IR: 1725 [2]
MS *m/z*: 329(M^+, 2), 298(6), 297(3), 139(100), 124(38), 96(6) [2]
^{1}H NMR: 1.96(3H, s, NCH_3), 2.50(J = 10, H-6a), 3.20(J = 10, H-6), 3.38(3H, s, OCH_3), 3.86(H-2), 4.58(H-1), 5.60(H-4), 6.02(2H, CH_2O_2), 6.91, 7.48(each 1H, s, H-11, H-8) [3]
Pharm./Biol.: LD_{50} 180 mg/kg (s/c, mice). It substantially prolongs the soporific and analgetic action [4] and inhibits the higher nervous activity [5, 6]. Iodine alkylates have hypotensive action [7]

References

1. S.Yu. Yunusov, Kh.A. Abduazimov, Zh. Obshch. Khim. **27**, 3357 (1957)
2. R. Razzakov, Kh.A. Abduazimov, N.S. Vul'fson, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 18 (1967)
3. M.R. Yagudaev, Kh.A. Abduazimov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 88 (1970)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 15
5. U.B. Zakirov, Kh.U. Aliev, N.V. Abdumalikova, I.K. Kamilov, *The Pharmacology of Alkaloids and Glycosides* [in Russian] (Fan, Tashkent, 1967), p. 120
6. U.B. Zakirov, I.K. Kamilov, *The Pharmacology of Alkaloids* (Fan, Tashkent, 1965), p. 253
7. U.B. Zakirov, I.K. Kamilov, Kh.U. Aliev, *The Pharmacology and Pharmacotherapy of Alkaloids and Glycosides* [in Russian] (Fan, Tashkent, 1966), p. 44

Ungminoridine [(±)-Zefirantine]

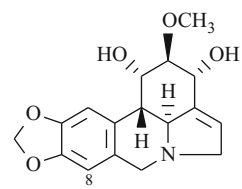


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Ungernia minor, U.vvedenskyi*
$C_{16}H_{19}NO_4$: 289.1314
Mp: 193–194°C (MeOH) [1]
$[\alpha]_D$ 0° [1]
UV: 240, 290(3.50, 3.54) [1]
IR: 3400, 1040, 931[1]
MS *m/z*: 289(M^+), 288, 271, 254, 252, 250[1]
^{1}H NMR: 3.84(2H, 2 × OH), 5.87(2H, CH_2O_2), 6.60, 6.92(each 1H, s, H-11, H-8) [1]

References

1. Kh.A. Abduazimov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 227 (1968)

(–)-Ungminorine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

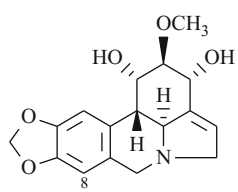
Biological sources: *Ungernia ferganica, U. minor, U. sewertzowii, U. vvedenskyi*
$C_{17}H_{19}NO_5$: 317.1263
Mp: 206–208°C (Me_2CO) [1], 248°C (dec., methiodide) [1], 174°C (diacetate) [1], 175°C (picrate) [1], 171°C (dihydro) [1]
$[\alpha]_D$ −29° ($CHCl_3$) [2], −49° (EtOH) [1]
Solubility: very sol. MeOH, $CHCl_3$; spar. sol. Me_2CO, EtOH, Et_2O, H_2O [2]
UV: 290 [1]
IR: 3612, 3544–3200, 2840, 1610, 1265 [2, 3]
MS *m/z*: 317(M^+, 24), 316(22), 299(53), 268(100), 250(30), 243(13), 242(40) [3]
^{1}H NMR: 3.35(3H, s, OCH_3), 4.51(2H, m), 5.55(1H), 5.80(2H, CH_2O_2), 6.57, 6.80(each 1H, s, H-11, H-8) [4]
Pharm./Biol.: LD_{50} 189 mg/kg (i/v, mice). It inhibits orientation reaction and prolongs the soporific action [5]. At the small doses reinforced at the large doses – inhibits the conditioned reflexes [6]

References

1. M.N. Normatov, Kh.A. Abduazimov, S.Yu. Yunusov, Uzb. Khim. Zh. (2), 25 (1965)
2. M.N. Normatov, Kh.A. Abduazimov, S.Yu. Yunusov, DAN UzSSR (9), 23 (1961)
3. R. Razakov, V.N. Bochkarev, N.S. Vul'fson, Kh.A. Abduazimov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 15 (1968)
4. M.R. Yagudaev, Kh.A. Abduazimov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 85 (1969)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 16
6. U.B. Zakirov, I.K. Kamilov, *The Pharmacology of Alkaloids and Glycosides* [in Russian] (Fan, Tashkent, 1967), p. 111

(±)-Ungminorine

CAS Registry Number: 27857-09-6



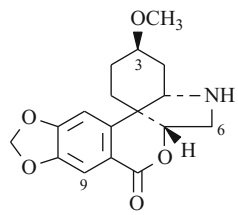
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Ungernia vvedenskyi*
$C_{17}H_{19}NO_5$: 317.1263
Mp: 210–212°C [1]
$[\alpha]_D$ 0° [1]
UV: 290(3.40) [1]
IR: 3400–3200, 2840, 1610, 1265[1]
MS *m/z*: 317(M^+) [1]
^{1}H NMR: 4.65(2H, 2 × OH), 5.49(2H, s, H-1, H-3), 5.82(2H, s, CH_2O_2), 6.38, 6.82(each 1H, s, H-8, H-11) [1]

References

1. Kh.A. Kadyrov, S.A. Khamidkhodzhaev, Chem. Nat. Comp. **15**, 370 (1979)

Ungspirolidine

CAS Registry Number: 66408-49-9



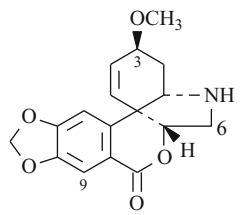
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Ungernia spiralis*
$C_{17}H_{19}NO_5$: 317.1263
Mp: 142–143°C [1]
$[\alpha]_D$ +11° ($CHCl_3$) [1]
UV: 230, 270, 309(4.30, 3.70, 3.63) [2]
IR: 3360, 2940, 2890, 2832, 1715, 1622, 1510, 1440 [2, 3]
MS *m/z*: 317(M^+), 303, 302, 288, 286, 273, 272, 261, 259, 247, 245, 231, 203, 171, 141, 71, 70, 57, 56(100), 55 [1, 3]
^{1}H NMR: 1.84(6H, m) 2.84, 2.97(each 1H, d, H-6), 3.32(3H, s, OCH_3), 3.62(1H, m, H-3), 5.06(1H, m, H-6a), 5.98(2H, s, CH_2O_2), 6.93, 7.47(each 1H, s, H-12, H-9) [2, 3]

References

1. Kh.A. Kadyrov, A. Abdusamatov, Chem. Nat. Comp. **13**, 364 (1977)
2. Kh.A. Kadyrov, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 606 (1977)
3. Kh.A. Kadyrov, Author's Abstract of Candidate's Dissertation, Tashkent, 1982

Ungspiroline

CAS Registry Number: 17245-18-0



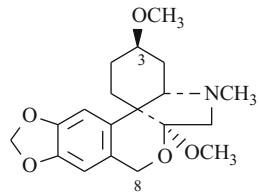
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Ungernia spiralis*
$C_{17}H_{17}NO_5$: 315.1107
Mp: 148–149°C [1]
$[\alpha]_D$ +105° ($CHCl_3$) [1]
UV: 229, 270, 310(4.44, 3.82, 3.78) [2]
IR: 3400–3300, 1715, 1615, 1510, 1485 [2, 3]
MS *m/z*: 315(M^+), 301, 300, 286, 284, 272, 271, 261, 259, 245, 243, 231, 201, 171, 141, 71, 70, 57, 56(100), 55 [2, 3]
^{1}H NMR: 3.48(3H, s, OCH_3), 5.43(1H, d, J = 11; 2.5, H-2), 6.05(2H, s, CH_2O_2), 6.45(1H, d, J = 11, H-1), 6.90, 7.60(each 1H, s, H-12, H-9) [2]

References

1. Kh.A. Kadyrov, A. Abdusamatov, Chem. Nat. Comp. **13**, 364 (1977)
2. Kh.A. Kadyrov, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 606 (1977)
3. Kh.A. Kadyrov, Author's Abstract of Candidate's Dissertation, Tashkent, 1982

Ungvedine

CAS Registry Number: 73276-40-1



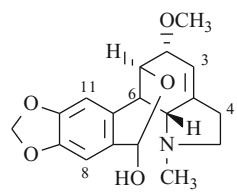
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids
Biological sources: *Ungernia vvedenskyi*
$C_{19}H_{25}NO_5$: 347.1733
Mp: 148–150°C (Me_2CO) [1, 2]
$[\alpha]_D$ +12° ($CHCl_3$) [1]
UV: 206, 235 sh, 295(4.50, 3.66, 3.62) [1]
IR: 1620, 1500, 1255, 1035, 935 [1, 2]
MS *m/z*: 347(M^+), 332, 316, 300, 298, 261(100), 260, 247, 231, 230, 229, 201, 181, 159, 141, 115, 104, 71(35), 70(30) [1, 2]
^{1}H NMR: 2.29(3H, s, NCH_3), 2.35–2.80(m), 3.27, 3.33(each 3H, s, 2 × OCH_3), 4.46(m, H-3, H-8), 5.83(2H, CH_2O_2), 6.37(1H, s), 7.22(1H, s) [1, 2]

References

1. Kh.A. Kadyrov, Kh.A. Abduazimov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 513 (1979)
2. Kh.A. Kadyrov, Author's Abstract of Candidate's Dissertation, Tashkent, 1982

Unsevine

CAS Registry Number: 4838-99-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amaryllidaceae Alkaloids

Biological sources: *Ungernia sewertzowii*

$C_{18}H_{21}NO_5$: 331.1420

Mp: 173–174°C (Me_2CO), 183°C (hydrobromide), 196°C (oxalate), 250°C (methiodide), 187°C (tetrahydro), 155°C (dihydro) [1]

$[\alpha]_D$ +170° ($CHCl_3$) [1]

Solubility: very sol. $CHCl_3$; spar. sol. Me_2CO, EtOH, C_6H_6, Et_2O, pet. ether.; insol. H_2O [1]

UV: 238, 288(3.64. 3.76) [1]

IR: 3690, 2832, 1620, 1440, 1365, 1250, 1040, 935 [1]

MS *m/z*: 331(M^+, 2), 300(1), 299(2), 139(100), 124(35), 96(3) [2]

^{1}H NMR: 2.04(3H, s, NCH_3), 3.35(3H, s, OCH_3), 3.68(H-2), 4.24(H-1), 5.54(H-4), 6.00(2H, s, CH_2O_2), 6.80, 6.92(each 1H, s, H-11, H-8) [3].

Pharm./Biol.: LD_{50} 605, 171.5 mg/kg (i/p, i/v, mice). It inhibits locomotory activity, prolongs the soporific action, and reinforced the analgetic efficiency [4]. Sedative and hypotensive properties [5]

References

1. L.S. Smirnova, Kh.A. Abduazimov, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 252 (1965)
2. R. Razzakov, Kh.A. Abduazimov, N.S. Vul'fson, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 18 (1967)
3. M.R. Yagudaev, Kh.A. Abduazimov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 88 (1970)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 16
5. U.B. Zakirov, I.K. Kamilov, *The Pharmacology of Alkaloids and Glycosides* [in Russian] (Fan, Tashkent, 1967), p. 107

The amines presented in this section were combined because they contain a primary, secondary, or tertiary amine in their molecules. They do not belong to a single class of organic compounds and have different C skeletons. They are most frequently encountered in nature as derivatives of β-phenylethylamine (hordenine et al.) and less frequently as amines with phenanthrene (thalictuberine), furocoumarin (prangosine), and dimeric (donine) skeletons.

Amines have been found in plants of 22 genera in 11 families: *Ephedra* (Ephedraceae), *Berberis* and *Leontice* (Berberidaceae), *Corydalis* and *Fumaria* (Fumariaceae), *Halostachys* and *Anabasis* (Chenopodiaceae), *Eremurus* (Liliaceae), *Pancratium* and *Ungernia* (Amaryllidaceae), *Reseda* (Resedaceae), *Aconitum* and *Thalictrum* (Ranunculaceae), *Bupleurum* and *Prangos* (Umbelliferae), *Centaurea* (Compositae), *Eremosparton*, *Sphaerophysa*, *Smirnowia*, and *Oxytropis* (Leguminosae).

Phenyl-β-naphthylamine, which was isolated from plants of five families, and ephedrine, pseudoephedrine, and hordenine, which were observed in representative of two families, are the most widely distributed.

Ephedrine has found use in medicine for bronchial asthma, allergic illnesses, trauma, hypotension, narcotic intoxication, and enuresis.

Amides have been isolated from plants of 12 genera from eight families: *Oxytropis*, *Astragalus*, *Eremosparton*, *Smirnowia* (Leguminosae), *Kalidium* and *Salsola* (Chenopodiaceae), *Aerva* (Amaranthaceae), *Dipthychocarpus* (Cruciferae), *Berberis* (Berberidaceae), *Capsicum* (Solanaceae), *Aconitum* (Ranunculaceae), and *Haplophyllum* (Rutaceae).

Most discovered amides are acylated derivatives of β-phenylethylamine, putrescine, and urea.

Amide alkaloids belonging to the β-phenylethylamine group are most widely distributed in plants of the genus *Oxytropis*. A common property is the ability to be hydrolyzed to form an amine and an acid. Like typical amides, they are not basic and do not give a reaction with Dragendorff's solution with the exception of (−)-*N*-nicotinoyl-2-hydroxy-2-phenylethylamine. This is due to the presence in it of a pyridine ring. They give a positive reaction with silicotungstic acid only if the preliminary treatment uses concentrated (∼60%) solutions of mineral acids and not the usual dilute solutions.

S-containing alkaloids have been observed in plants of two genera belonging to two families, *Dipthychocarpus* (Cruciferae) and *Nuphar* (Nymphaeaceae), and in *Pseudomonas aeruginosa* microorganisms.

The chemistry of S-containing alkaloids from plants of the genus *Dipthychocarpus* have been studied in detail.

Alkaloids isolated from *D. strictus* represent a new class of S-containing alkaloids and include the structural types *N*-alkylurea in various combinations with methylsulfoxide, sulfide, nitrile, and imine groups.

Sulfur in the alkaloids is present as sulfide or sulfoxide groups.

All new S-containing alkaloids have been separated into four subgroups: dipthocarpaine, dipthocarpamine, dipthocarpidine, and dipthocarpilidine.

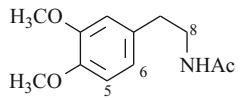
The dipthocarpamine subgroup comprises alkaloids that are derivatives of *N*,*N*′-dialkylurea: dipthocarpamine, deoxydipthocarpamine, and dipthamine. Their distinguishing feature is that the substitution of an isopropyl group at one of the N atoms is identical for all three compounds. The dipthocarpaine subgroup includes alkaloids that are derivatives of monoalkylurea: dipthocarpaine, deoxydipthocarpaine, and dipthaline. Derivatives of *N*,*N*′-dialkylurea are combined into the dipthocarpidine subgroup: dipthocarpidine, deoxydipthocarpidine, and dipthocarpiline. The fourth subgroup includes dipthocarpilidine and dipthocarpinine. Their distinguishing feature is that they are not urea derivatives.

The alkaloid aerugine, a thiazoline derivative, has been isolated from the culture liquid of *P. aeruginosa*.

S-containing alkaloids of *D. strictus* possess antihypoxic activity that increases with an increase in the number of sulfoxides and the molecular symmetry.

N-Acetylhomoveratrylamine

CAS Registry Number: 6275-29-2



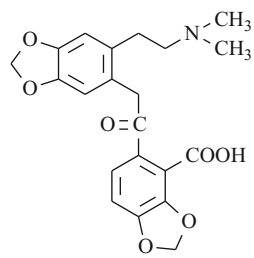
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Berberis sibirica*
$C_{12}H_{17}NO_3$: 223.1208
Mp: 104–105°C [1]
IR: 3200, 3080, 3000, 2950, 1650, 1580, 1270, 1240 [1]
MS *m/z*: 223(M^+), 164(100), 151, 149, 121, 107 [1]
^{1}H NMR: 1.86(3H, s, N-Ac), 2.68(2H, t, J = 6.5, 2H-7), 3.37, 3.44(each 1H, t, J = 6.5, 2H-8), 3.77(6H, s, 2 × OCH_3), 5.40(1H, br s, NH), 6.64(1H, d, J = 2, H-2), 6.66(1H, dd, J = 8.8, J = 2, H-6), 6.72(1H, d, J = 8.8, H-5) [1]

References

1. A.T. Karimov, M.G. Levkovich, N.D. Abdullaev, R. Shakirov, Chem. Nat. Comp. **29**, 361 (1993)

Adlumidiceine

CAS Registry Number: 51059-65-5



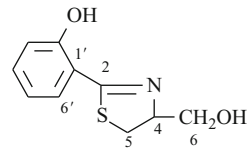
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Corydalis sewerzowii, Fumaria parviflora, F. schleicheri, F. vaillantii*
$C_{21}H_{21}NO_7$: 399.1318
Mp: 209–210°C (MeOH) [1]
IR: 1700, 1610, 1505, 1050, 920 [1]
MS *m/z*: 399, 381, 336, 58(100) [1]
^{1}H NMR: 2.67 (6H, s, $N(CH_3)_2$), 2.90–3.64 (6H, m), 5.47, 5.70 (each 2H, s, 2 × CH_2O_2), 6.15, 6.30 (each 1H, s, *p*-H-Ar), 6.66, 6.92 (each 1H, d, J = 8, *o*-H-Ar) [1]
HPLC: [2]

References

1. M. Alimova, I.A. Israilov, Chem. Nat. Comp. **17**, 437 (1981)
2. I. Valka, V. Simanek, J. Chromatogr. **445**, 258 (1988)

Aerugine

CAS Registry Number: 112515-23-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Pseudomonas aeruginosa*
$C_{10}H_{11}NO_2S$: 209.0511
Mp: 85–88°C (C_6H_{14}), 60°C (O-Ac) [1]
$[\alpha]_D$ + 28° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, Me_2CO, EtOH, MeOH, Et_2O; sol. C_6H_{14} [1]
UV: 213, 251, 256 sh, 317(4.09, 3.74, 3.72, 3.32) [1]
IR: 3300, 1620, 1600, 1580, 750 [1]
MS *m/z*: 209(M^+, 61), 178(100), 146(9), 120(12), 119(8), 73(8), 59(27), 57(10) [1]
^{1}H NMR: 3.19, 3.32(each 1H, dd, ^{3}J = 8.8; 8.5; ^{2}J = 10.9, 2H-5), 3.69, 3.87(each 1H, dd, ^{3}J = 5.1; 4.9; ^{2}J = 11.4, 2H-6), 4.73(1H, m, H-4), 6.84, 7.20, 6.72, 7.25(each 1H, 4H-Ar) [1]

^{13}C NMR: [1]

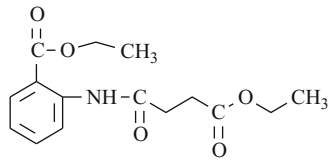
Table 1

C–1′	116.2	C–2	173.2
2′	158.9	4	77.8
3′	119.0	5	32.7
4′	133.0	6	64.0
5′	117.0		
6′	130.5		

References

1. A. Zunnundzhanov, I.A. Bessonova, N.D. Abdullaev, D.K. Ogai, Chem. Nat. Comp. **23**, 461 (1987)

Anthranilic Acid Succinimid Diethyl Ester



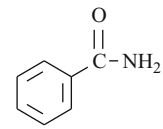
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Aconitum septentrionale*
$C_{15}H_{19}NO_5$: 293.1255
Mp: 57–58°C (Me_2CO) [1]
IR: 3265, 2988, 1730, 1702, 1685, 1602, 1590, 1535, 1475, 1450, 1440, 1370, 1318, 1257, 1202, 1170, 1160, 1150, 1095, 1085, 1025, 765 [1]
MS *m/z*: 293 (M^+), 248, 202, 165 (100) [1]
^{1}H NMR: 1.02, 1.36 (each 3H, t, J = 7.5, 2 × $OCH_2\underline{CH_3}$), 4.1, 4.31 (each 2H, q, J = 7.5, 2 × O–$\underline{CH_2}$–CH_3) [1]

References

1. S.K. Usmanova, I.A. Bessonova, Chem. Nat. Comp. **32**, 62 (1996)

Benzamide

CAS Registry Number: 55-21-0

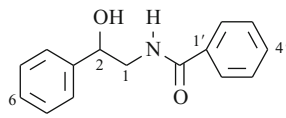


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Haplophyllum bucharicum, H. obtusifolium*
C_7H_7NO: 121.0528
Mp: 120–121°C [1]
UV: 227(4.22) [1]
IR: 3375, 3185, 1660, 1630, 1580 [1]
MS *m/z*: 121 (M^+, 86), 105(100), 77(100) [1]

References

1. D.M Razakova, I.A. Bessonova, S.Yu Yunusov, Chem. Nat. Comp. **20**, 599 (1984)

(+)-N-Benzoyl-2-phenyl-2-hydroxyethylamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Oxytropis muricata, O. trichophysa*
$C_{15}H_{15}NO_2$: 241.1103
Mp: 154–155°C (Me_2CO) [1]
$[\alpha]_D$ +35° (CH_3OH) [1]
UV: 204 sh, 207 [1]
IR: 3350, 1650 [1]

MS *m/z*: 242((M + H)$^+$, 0.3), 241(M$^+$, 0.4), 223(2), 135(100), 134(84), 122(14), 117(11), 107(6), 105(95), 91(4), 79(11), 77(39) [1]
^{1}H NMR: 3.32(1H, br s, OH), 3.51(1H, ddd, J = 5, 8, 14, H-1), 3.91(1H, ddd, J = 3.5, 7, 14, H-1), 4.95(1H, dd, J = 3.5, 8, H-2), 6.59(1H, br s, NH), 7.38(8H, m, H-Ar), 7.74(2H, dd, J = 8, 2, H-2′, H-6′) [1]
^{13}C NMR (DMSO-d_6): [1]

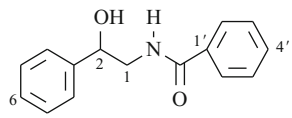
Table 1

C–1	47.8	C = O	166.6	Ar-C	126.1
2	71.3	1′	144.0		127.4
3	134.7	4′	131.2		128.2
6	127.2				128.4

References

1. D. Batsuren, S. Tsetsegmaa, N. Batbayar, D. Dungerdorzh, V.I. Akhmedzhanova, Yu.M. Mil'grom, Ya.V. Rashkes, A. A. Ibragimov, Chem. Nat. Comp. **28**, 340 (1992)

(±)-N-Benzoyl-2-phenyl-2-hydroxyethylamine



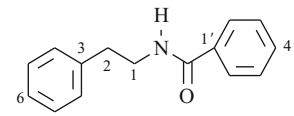
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Oxytropis muricata*
$C_{15}H_{15}NO_2$: 241.1103
Mp: 147–149°C ($CHCl_3$) [1]
$[\alpha]_D$ 0° [1]
Mp: 197°C(hydrochloride) [1]
Solubility: very sol. EtOH, $CHCl_3$; spar. sol. Me_2CO, Et_2O, H_2O [1]
IR: 3290, 1645 [1]

References

1. Z.N. Duboshina, N.F. Proskurnina, Zh. Obshch. Khim. **33**, 2071 (1963)

N-Benzoyl-2-phenylethylamine

CAS Registry Number: 3278-14-6



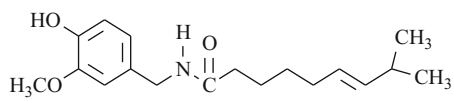
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Oxytropis trichophysa*
$C_{15}H_{15}NO$: 225.1154
Mp: 117–118°C (Me_2CO) [1]
UV: 208, 226 sh [1]
IR: 3390, 1650 [1]
MS *m/z*: 225(M$^+$, 39), 207(3), 134(18), 105(100), 104(44), 91(9), 84(11), 77(29) [1]
^{1}H NMR: 2.84(2H, t, J = 6.5, 2H-2), 3.48(2H, m, 2H-1), 7.12(1H, t, J = 7.5, H-6), 7.24(2H, d, J = 7.5, H-4, H-8), 7.29(2H, t, J = 7.5, H-5, H-7), 7.44(2H, t, J = 7.5, H-3′, H-5′), 7.51(1H, t, J = 7.5, H-4′), 7.81(2H, d, J = 7.5, H-2′, H-6′), 8.55(1H, br s, NH) [1]

References

1. D. Batsuren, S. Tsetsegmaa, N. Batbayar, D. Dungerdorzh, V.I. Akhmedzhanova, Yu.M. Mil'grom, Ya.V. Rashkes, A. A. Ibragimov, Chem. Nat. Comp. **28**, 340 (1992)

Capsaitsine (Capsaicine) (8-Methyl-N-vanillyl-6-nonenamide)

CAS Registry Number:



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

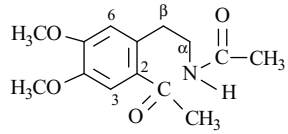
Biological sources: *Capsicum annuum L.*
$C_{18}H_{27}NO_3$: 305.4150
Mp: 62–63°C [1]
IR: 3316, 1652, 1601-1558, 973 [1]
MS *m/z*: 305 (M^+, 8.3), 167 (21), 150 (58), 137 (94), 112 (48), 68 (100) [1]
^{1}H NMR: 0.84 [6H, d, $CH(CH_3)_2$], 1.1–2.24 (8H,m), 3.78 (3H, s, OCH_3), 4.24 (2H, d), 5.32-5.18 (2H, t, –CH = CH–), 5.85-5.55 (2H, NH,OH), 6.84-6.60 (3H, H-Ar) [1]

References

1. B.T. Sagdullaev, S.F. Aripova, Chem. Nat. Comp. **36**, 227 (2000)

Densinine

CAS Registry Number: 57621-03-1



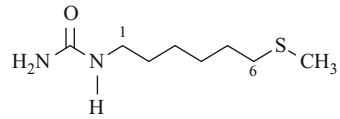
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Berberis densiflora* Boiss et Buhse
$C_{14}H_{19}NO_4$: 265.1314
Mp: 128–129°C (EtOH) [1]
UV: 231, 274, 310 [1]
IR: 3319, 1673, 1635, 1451, 1300 [1]
MS *m/z*: 265 (M^+, 40), 206 (100), 194 (90), 192 (70), 179 (90), 164 (50), 151 (40), 149 (40) [1]
^{1}H NMR: 1.86 (3H, s, $NCOCH_3$), 2.56 (3H, s, CH_3–CO–Ar), 2,94 (2H, t, ^3J = 6, Hβ), 3.49 (2H, 2, ^3J = 6, Hα), 3.88 (6H, s, $2OCH_3$), 6.73, 7.14 (each 1H, s, H-6, H-3), 6.66 (1, br s, NH) [1]

References

1. I.I. Khamidov, S.F. Aripova, M.V. Telejenetskaya, A. Karimov, I. Djepberov, Chem. Nat. Comp. **33**, 323 (1997)

Deoxydipthocarpaine

CAS Registry Number: 62580-21-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_8H_{18}N_2OS$: 190.1660
Mp: 118–119°C (Me_2CO–MeOH) [1]
IR: 3390, 3220, 1660 [1]
MS *m/z*: 190(M^+), 175, 143, 129, 73, 61, 44 [1]
^{1}H NMR: 2.06(3H, s, SCH_3), 1.10–1.62(8H, m, 4 × CH_2), 2.44(2H, t, SCH_2), 3.08(2H, m, NCH_2) [1]
^{13}C NMR: [2]

Table 1

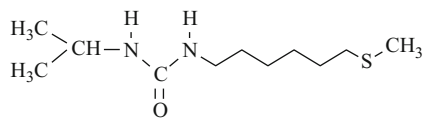
C–1	40.6	SCH_3	15.3
2	30.7	NHCO	165.6
3	26.7		
4	28.6		
5	29.2		
6	34.0		

References

1. O. Abdilalimov, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 463 (1978)
2. S.F. Aripova, Author's Abstract of Doctoral Dissertation, Tashkent, 1991

Deoxydipthocarpamine

CAS Registry Number: 62784-29-6

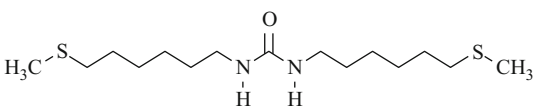


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_{11}H_{24}N_2OS$: 232.1610
Mp: 108–109°C [1]
Solubility: sol. Me_2CO, $CHCl_3$, MeOH, EtOH [1]
IR: 3350, 3330, 1630 [1]
MS *m/z*: 232(M^+), 217, 185(100), 171, 157, 143, 129, 115, 101, 58, 44 [1]
^{1}H NMR: 1.08(6H, d, J = 6, $CH(CH_3)_2$), 1.10–1.75(8H, m, 4 × CH_2), 2.06(3H, s, CH_3S), 2.42(2H, t, CH_2S), 3.06(2H, t, CH_2N), 3.77(1H, m, CHN), 5.44(1H, d, J = 8, NHCH), 5.63(2H, m, NHCO) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 926 (1996)

Deoxydipthocarpidine



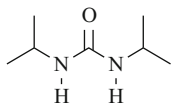
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_{15}H_{32}N_2OS_2$: 320.1956
Mp: 57–59°C [1]
$[\alpha]_D$ ±0°
IR: 3335, 1630 [1]
MS *m/z*: 320(M^+), 305, 273(100), 227, 199, 157, 118, 75, 61 [1]
^{1}H NMR: 1.10–1.90(16H, m, 8 × CH_2), 2.04(6H, s, 2 × SCH_3), 2.40(2H, t, 2 × SCH_2), 3.09(2H, t, 2 × NCH_2), 5.03(2H, m, 2 × NH) [1]

References

1. O. Abdilalimov, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 271 (1980)

N,N′-Diisopropylurea

CAS Registry Number: 4128-37-4



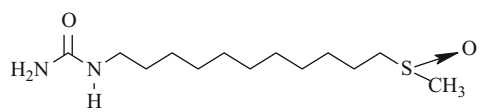
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_7H_{16}N_2O$: 144.1263
Mp: 190–192°C [1]
IR: 3350, 1630, 1580 [1]
MS *m/z*: 144(M^+), 129, 58, 44(100) [1]
^{1}H NMR: 1.10(12H, d, J = 6, 4 × CH_3), 3.64(4H, m, CH, NH) [1]

References

1. S.F. Aripova, S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 784 (1975)

Dipthaline

CAS Registry Number: 94898-72-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_{13}H_{28}N_2O_2S$: 276.1872
Mp: oil [1]
$[\alpha]_D$ −10° (MeOH) [1]
Solubility: sol. $CHCl_3$, MeOH, H_2O; spar. sol. Et_2O, C_6H_6, Me_2CO [1]
IR: 3380, 3220, 1660, 1030 [2]

MS *m/z*: 276(M^+, 5), 261(13), 259(5), 213(24), 188(46), 142(100), 126(33), 114(86), 83(88), 71(33), 64(54) [2]

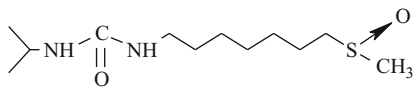
^{1}H NMR: 1.10–2.10(18H, m, 9 × CH_2), 2.52(3H, s, SCH_3), 2.70(2H, t, J = 6, CH_2S), 3.03(2H, t, J = 6, CH_2N), 5.49, 6.87(3H, m, NH_2, NH) [2]

References

1. O. Abdilalimov, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 271 (1980)
2. S.F. Aripova, O. Abdilalimov, Chem. Nat. Comp. **20**, 380 (1984)

Dipthamine

CAS Registry Number: 75069-56-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Dipthychocarpus strictus*

$C_{12}H_{26}N_2O_2S$: 262.1715

Mp: 87–89°C [1]

$[\alpha]_D$ −42° (MeOH) [1]

Solubility: sol. $CHCl_3$, EtOH, MeOH, H_2O; spar. sol. Et_2O, C_6H_6, Me_2CO

IR: 3350, 1630, 1035 [1]

MS *m/z*: 262(M^+, 5), 247(11), 204(30), 199(25), 161(10), 132(28), 114(16), 101(7), 84(27), 71(60), 69(52), 58(100) [1]

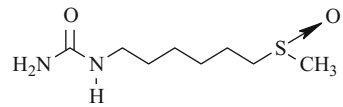
^{1}H NMR: 1.13(6H, d, J = 8, $(CH_3)_2CH$), 1.25–1.75(10H, m, CH_2), 2.52(3H, s, CH_3SO), 2.65(2H, t, J = 8, CH_2S), 3.07(2H, t, J = 7.5, CH_2N), 3.79(1H, m, CHN), 5.07(1H, d, J = 8, NH), 5.26(1H, t, NH) [1]

References

1. S.F. Aripova, O. Abdilalimov, Chem. Nat. Comp. **19**, 631 (1983)

Dipthocarpaine

CAS Registry Number: 58985-19-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Dipthychocarpus strictus*

$C_8H_{18}N_2O_2S$: 206.1089

Mp: 124–125°C (Me_2CO-MeOH) [1]

$[\alpha]_D$ −80° (EtOH) [1]

IR: 3380, 3220, 1660, 1035 [1]

MS *m/z*: 206(M^+), 162, 143, 129, 119, 100, 73, 61, 44 [1]

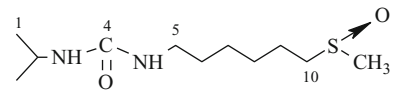
^{1}H NMR: 1.10–1.80(8H, m, 4 × CH_2), 2.52(3H, s, CH_3SO), 2.73(2H, t, J = 6, CH_2S), 3.03(2H, t, J = 6, CH_2N), 4.30(2H, m, NH_2), 5.38(1H, m, NH) [1]

References

1. S.F. Aripova, O. Abdilalimov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 502 (1976)

Dipthocarpamine

CAS Registry Number: 58985-20-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Dipthychocarpus strictus*

$C_{11}H_{24}N_2O_2S$: 248.1559

Mp: 100–101°C [1]

$[\alpha]_D$ −58° (MeOH)

IR: 3360, 3330, 1630, 1045 [1]

MS *m/z*: 248(M^+), 233, 218, 190, 185, 171, 162, 61, 58, 44 [1]
^{1}H NMR: 1.10(6H, d, J = 7, $HC(CH_3)_2$), 1.25–2.00(8H, m, CH_2), 2.54(3H, s, CH_3–S → O), 2.65(2H, t, J = 8, CH_2–S), 3.04(2H, t, J = 7.5, CH_2–N), 3.78(1H, m, CH–N), 5.45(1H, d, J = 8, CH–N), 5.64(1H, t, NH–C) [1]
^{13}C NMR: [2]

Table 1

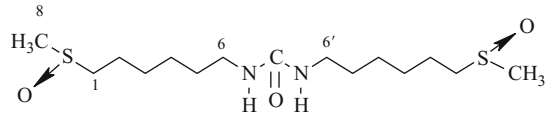
C–1	23.5	C–7	26.4*
2	23.5	8	28.4*
3	41.8	9	30.0*
4	158.8	10	54.5
5	39.9	11	38.6
6	22.5*		

References

1. S.F. Aripova, O. Abdilalimov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 609 (1976)
2. O.V. Tolstikova, A.G. Tolstikov, V.S. Shmakov, E.G. Galkin, E.M. Vyrypaev, S.F. Aripova, I.V. Abdrakhmanov, Chem. Nat. Comp. **25**, 199 (1989)

Dipthocarpidine

CAS Registry Number: 58985-21-0



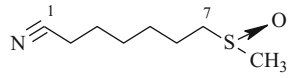
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_{15}H_{32}N_2O_3S_2$: 352.1855
Mp: 135–136°C [1]
$[\alpha]_D$ −70° (MeOH) [1]
IR: 3300, 1640, 1040 [1]
MS *m/z*: 352(M^+), 336, 289, 273, 190, 173, 147, 61
^{1}H NMR: 1.10–1.90(16H, m, 8 × CH_2), 2.52(6H, s, 2 × CH_3SO), 2.63(4H, t, J = 6, 2 × CH_2SO), 3.09(4H, t, J = 6, 2 × CH_2N), 4.89(2H, m, NHCO) [1, 2]
Pharm./Biol.: Antihypoxic action [3]

References

1. O. Abdilalimov, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 183 (1978)
2. O.V. Tolstikova, A.G. Tolstikov, V.S. Shmakov, Chem. Nat. Comp. **24**, 66 (1988)
3. A.G. Kurmukov, M.I. Aizikov, S.S. Nazrullaev, S.F. Aripova, O.V. Tolstikova, O. Abdilalimov, Khim. Farm. Zh. **7**, 29 (1991)

Dipthocarpilidine

CAS Registry Number: 75272-86-5, Extra CAS Registry Numbers(s): 139450-85-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_8H_{15}NOS$: 173.0875
Mp: 193–195°C (4mmHg) [1]
$[\alpha]_D$ −49° ($CHCl_3$) [1]
UV: 206(3.15)
IR: 2255, 1030 [1]
MS *m/z*: 174($(M + 1)^+$, 6), 158(77), 156(36), 110(98), 93(40), 81(52), 69(100), 55(64), 41(94) [1]
^{1}H NMR: 1.20–1.85(8H, m, 4 × CH_2), 2.28(2H, t, J = 6, N ≡ C–CH_2), 2.51(3H, s, CH_3SO), 2.65(2H, t, J = 6, CH_2S)
^{13}C NMR: [2]

Table 1

C–1	119.6	C–7	54.3
2	17.0	8	38.6
3	22.3		
4	25.0		
5	28.1		
6	28.1		

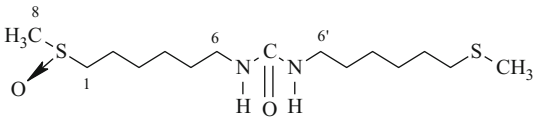
Pharm./Biol.: Pronounced antihypoxic activity [3]

References

1. S.F. Aripova, O. Abdilalimov, E.S. Bagdasarova, M.I. Aizikov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 79 (1984)

2. A.G. Tolstikov, L.A. Biktemirova, O.V. Tolstikova, V.S. Shmakov, S.F. Aripova, V.N. Odinokov, G.A. Tolstikov, Chem. Nat. Comp. **27**, 225 (1991)
3. S.F. Aripova, O. Abdilalimov, E.S. Bagdasarova, M.I. Aizikov, A.G. Kurmukov, DAN UzSSR **6**, 34 (1983)

Dipthocarpiline



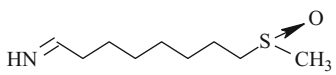
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_{15}H_{32}N_2O_2S_2$: 336.1906
Mp: 95–97°C [1]
$[\alpha]_D$ −53° (MeOH) [1]
IR: 3340, 1620, 1590, 1030 [1]
MS *m/z*: 336(M^+), 320, 289, 273, 190, 173(100), 147, 61 [1]
^{1}H NMR: 1.10–1.70(16H, m, 8 × CH_2), 2.00(3H, s, CH_3S), 2.40(2H, t, J = 6, CH_2S), 2.52(3H, s, CH_3SO), 2.63(2H, t, J = 6, CH_2SO), 3.04 (4H, t, J = 6, 2 × CH_2N), 5.27(2H, m, 2 × NH) [1]

References

1. O. Abdilalimov, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 183 (1978)

Dipthocarpinine

CAS Registry Number: 58916-87-3



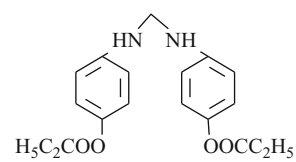
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Dipthychocarpus strictus*
$C_9H_{19}NOS$: 189.1188
Mp: 91–92°C ($CHCl_3$) [1]
$[\alpha]_D$ −47° (MeOH) [1]
IR: 3400, 1680, 1030 [1]
MS *m/z*: 189(M^+, 16), 174(5), 172(22), 126(61), 112(14), 106(52), 84(19), 70(12), 59(92), 43(100) [1]
^{1}H NMR: 1.15–2.00(10H, m, 5 × CH_2), 2.16(2H, CH_2), 2.53(3H, s, CH_3SO), 2.65(2H, t, J = 6, CH_2SO), 6.25(1H, m, N = CH), 6.51(1H, m, NH) [2]

References

1. S.F. Aripova, O. Abdilalimov, Chem. Nat. Comp. **20**, 241 (1984)
2. S.F. Aripova, O. Abdilalimov, Chem. Nat. Comp. **23**, 390 (1987)

Donine

CAS Registry Number: 74763-68-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Arundo donax*
$C_{19}H_{22}N_2O_4$: 342.3922
Mp: 126–128°C [1]
UV: 201, 246 (4.76, 4.62) [1]
IR: 3321, 3045–2908, 1703, 1600, 860, 838, 770 [1]
MS *m/z*: 342 (M^+), 313 (M-29)$^+$, 296 (M-46)$^+$, 267 (M-75)$^+$, 250 (M-92)$^+$, 237, 223, 221, 208, 132, 83, 43 (100) [1]
^{1}H NMR (Py-d_5): 1.13 (3H, t, CH_2–CH_3), 3.89 (2H, s, N–CH_2), 4.17–4.22 (4H, q, –CH_2–), 7.00–7.22 (4H, d, J = 8, H-Ar) [1]

^{13}C NMR (Py-d_5): [1]

Table 1

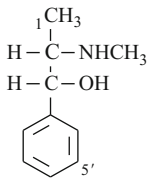
C–1	135.5	C–7	154.7
2	119.8	8	60.6
3	129.7	9	14.7
4	138.5	10	40.8
5	129.7		
6	119.8		

References

1. V.U. Khujaev, S.F. Aripova, U.A. Abdullaev, Chem. Nat. Comp. **32**, 194 (1996)

(−)-Ephedrine

CAS Registry Number: 299-42-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Ephedra ciliata, E. equisetina, E. distachya, E. fedtschenkoae, E. intermedia, E. lomatolepis, E. monosperma, E. procera, E. strobilacea, Roemeria refracta*

$C_{10}H_{15}NO$: 165.1154

Mp: 38–39°C, 217°C (hydrochloride), 240°C (oxalate) [1]

$[\alpha]_D$ −34° (H_2O) [1]

UV: 252, 257, 263(2.13, 2.25, 2.13) [2]

IR: 1590, 1490, 1331, 1321, 1241, 1208, 1175, 1158, 1120, 1110, 1072, 1050, 1026, 1012, 993, 916, 895, 835, 820, 753, 702 [2]

IR(LiF): 3320 [2]

MS *m/z*: 165(M^+, 0.1), 107(1), 58(100) [3]

^{13}C NMR (hydrochloride, D_2O): [4]

Table 1

C–1	10.6	C–1′	139.4
2	60.8	2′, 6′	126.9
3	72.1	3′, 5′	129.6
		4′	129.2
		NCH_3	31.7

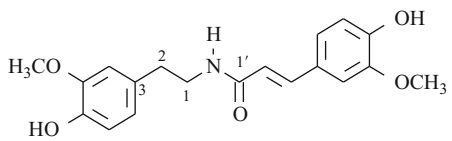
HPLC: [5]

Pharm./Biol.: LD_{50} 300–320 mg/kg (i/v, rats); 300–450 mg/kg (i/v, rabbits); 100 mg/kg (i/v, mice) [6]. It causes stenosis of vessels, increase of arterial pressure, dilatation of bronchi and mydriasis, inhibition of intestinal peristalsis. It is used in bronchial asthma, hay fever, allergic diseases, traumas, hypotension, poisoning with narcotics and enuresis. It is manufactured in the form of powder, tablets, ampules containing 1 ml of 5% solution, and vials containing 2, 3% solution. It is the part of "Theoephedrine," "Ephatin," and "Solutan" [7]

References

1. R.A. Konovalova, S.Yu. Yunusov, A.P. Orekhov, Zh. Obshch. Khim. **9**, 1359 (1939)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1968), **1**, No. 434
3. M. Hesse, *Alkaloide (Progress in Mass Spectrometry)*, vol. 3 (Verlag Chemie, Weinheim, 1975), p. 300
4. T.A. Broadbent, E.G. Paul, Heterocycles **20**, 863 (1983)
5. J. Zhang, Z. Tian, Zhi-cen Lou, Planta Med. **54**, 69 (1988)
6. F.S Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 127
7. M.D. Mashkovskii, *Drugs* [in Russian], vol. 1 (Meditsina, Moscow, 1984), p. 277

Feruloylgomovanilylamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

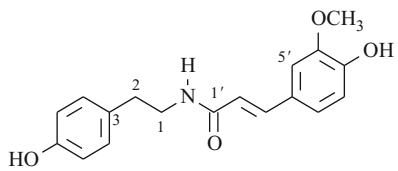
Biological sources: *Aerva lanata*
$C_{19}H_{21}NO_5$: 343.1420
Mp: 158–160°C, 133°C (di O–Ac) [1]
UV: 218, 232, 290, 318 [1]
IR: 1660 [1]
MS *m/z*: 343(M^+), 194, 193, 192, 177, 150, 149, 137 [1]
^{1}H NMR: 3.90(OCH_3), 6.60–7.00(6H, H–Ar) [1]

References

1. G.G. Zapesochnaya, V.A. Kurkin, L.N. Pervykh, Chem. Nat. Comp. **26**, 590 (1990)

Feruloyltyramine

CAS Registry Numbers: 65646-26-6, 66648-43-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Aerva lanata*
$C_{18}H_{19}NO_4$: 313.1314
Mp: 146–148°C [1], 92–93°C ($CHCl_3$) [2]
UV: 221, 290, 317 [1]; 220, 293, 319(4.39, 4.16, 4.26) [2]
UV(EtOH + OH^-): 210, 242, 306, 362(4.80, 4.29, 3.88, 4.38) [2]
IR: 1660 [1]
MS *m/z*: 313(M^+), 194, 193, 192, 177, 149, 120, 107 [1, 2]
^{1}H NMR: 2.81(2H, t, J = 7, 2H-2), 3.61(2H, q, J = 6.5, 2H-1), 3.92(OCH_3), 6.81(dd, J = 8.2, H-5, H-7), 6.90(d, J = 8.2, H-8′), 6.98(d, J = 1.8, H-5′), 7.04(dd, J = 8.2; 1.8, H-9′), 7.09(dd, J = 8.5, H-4, H-8), 7.17(d, J = 15.5, H-3′), 7.54(d, J = 15.5, H-2′) [1, 2]
^{13}C NMR (CD_3OD): [2]

Table 1

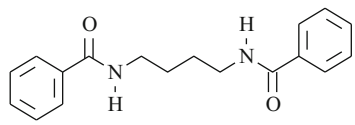
C-1	42.5	C–7	116.3	C–5′	111.5*
2	35.8	8	130.7	6′	149.2
3	131.3	1′	169.0	7′	149.8*
4	130.7	2′	118.7	8′	116.3
5	116.3	3′	142.0	9′	123.2
6	156.9	4′	128.3	OCH_3	56.4

References

1. G.G. Zapesochnaya, V.A. Kurkin, Chem. Nat. Comp. **26**, 590 (1990)
2. E.K. Nemethy, M. Calvin, Phytochemistry **21**, 2981 (1982)

Haplamide

CAS Registry Number: 31991-78-3



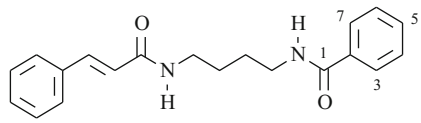
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Haplophyllum latifolium*
$C_{18}H_{20}N_2O_2$: 296.1525
Mp: 172–173°C (EtOH) [1]
$[\alpha]_D$ 0° (Py) [1]
Solubility: spar. sol. EtOH, MeOH, $CHCl_3$, Me_2CO [1]
UV: 224(4.00) [1]
IR: 3430, 1640, 1587, 1550, 1480, 1305, 775, 730 [1]
MS *m/z*: 296(M^+, 3), 191(6), 175(11), 174(16), 162(9), 149(4), 148(6), 135(5), 134(11), 105(100), 77(43), 70(5) [1]
^{1}H NMR (CF_3COOH): 1.57, 3.48(each 4H, br s, 2 × CH_2–CH_2N), 7.05–7.50(10H, m, H-Ar), 8.25(2H, br s, NH) [1]

References

1. E.F. Nesmelova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 253 (1977)

Haplamidine (Piramidatine)

CAS Registry Number: 64223-54-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Haplophyllum latifolium*

$C_{20}H_{22}N_2O_2$: 322.1681

Mp: 172–173°C (EtOH) [1]

$[\alpha]_D$ 0° (Py) [1]

Solubility: spar. sol. EtOH, MeOH, $CHCl_3$, Me_2CO [1]

UV: 218, 224, 274, 300 sh (4.36, 4.37, 4.19, 3.70) [1, 2]

IR: 3320, 1630, 1581, 1542, 1480, 1308, 771, 725 [1, 2]

MS *m/z*: 322(M^+, 33), 217(8), 201(80), 200(14), 191(17), 188(3), 175(69), 174(80), 162(17), 160(11), 148(20), 146(11), 134(11), 131(100), 105(57), 103(26), 77(9) [1, 2]

^{1}H NMR (CF_3COOH): 1.56, 3.39(each 4H, br s, 2 × CH_2–CH_2N), 7.10–7.33(10H, m, H-Ar), 6.42, 7.55(each 1H, d, J = 16, CH = CH), 8.35(2H, br s, NH) [1]

^{13}C NMR: [3]

Table 1

C–1	166.2	C–1′	164.9
3, 7	127.5	4′	134.9
5	131.0		

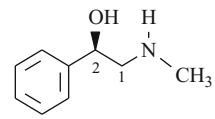
Pharm./Biol.: Antitumoral activity [3]

References

1. E.F. Nesmelova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 365 (1977)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)
3. G.A. Cordell, A.D. Kinghorn, Tetrahedron **47**, 3521 (1991)

Halostachine

CAS Registry Number: 495-42-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Halostachys caspica*

$C_9H_{13}NO$: 151.0997

Mp: 43–45°C [1]; 114°C (hydrochloride), 231°C (N-Me methiodide) [1, 2]

$[\alpha]_D$ −47° [1]

^{1}H NMR: 2.18(3H, NCH_3), 2.40(2H, 2H-1), 4.37(1H, NH), 4.60(1H, H-2), 7.13(5H, H–Ar) [3]

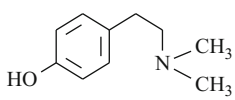
Pharm./Biol.: Pressor action. In animals it sharply constricts the vessels of the kidneys and sharply dilates the vessels of the spleen. A strong antagonist of papaverine in its action on the peripheral vessels. In its vasoconstricting action it is similar to ephedrine. Possesses a mydriatic action [4]

References

1. G.P. Men'shikov, M.M. Rubinshtein, Zh. Obshch. Khim. **13**, 801 (1943)
2. G.P. Men'shikov, G.M. Borodina, Zh. Obshch. Khim. **17**, 1569 (1947)
3. V.A. Coptyug, M.I. Podgornyi (eds), *Guide to Literature Results on ^{1}H NMR Spectroscopy* [in Russian], (Novosibirsk, 1978), No. 3, p. 149
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 101

Hordenine (Eremursine)

CAS Registry Number: 539-15-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Eremurus fuscus, E. hilariae, E. luteus, E. olgae, E. regelii, E. sogdianus, E. tianschanicus, Pancratium trianthum, Ungernia ferganica, U. tadshicorum, U. tamaricum, U. trisphaera, U. victoris, U. vvedenskyi*

$C_{10}H_{15}NO$: 165.1154

Mp: 117–118°C (Me_2CO), 179°C (hydrochloride), 175°C (hydrobromide), 152°C (hydroiodide), 230°C (methiodide), 140°C (picrate) [1]

UV: 278 [2]

IR: 3590, 3010, 2940, 2860, 2820, 2780, 2680, 1611, 1582, 1513, 1469, 1375, 1331, 1255, 1172, 1143, 1100, 1053, 1039, 1005, 930, 913, 868, 842, 826 [2]

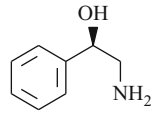
MS *m/z*: 165(0.7), 107(2.7), 58(100) [3]

Pharm./Biol.: LD_{50} 131 mg/kg (i/v., mice) [4]. Broncholytic action [5]. Used for inhibiting intestinal peristalsis [6]

References

1. S. Wilkinson, J. Chem. Soc. 2079 (1958)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1970), **5**, No. 638
3. M. Hesse, H.O. Bernhard, *Alkaloide*, vol. 3 (Verlag Chemie, Wiencheim, 1975), p. 300
4. Kh.U. Aliev, U.B. Zakirov, I.K. Kamilov, *The Pharmacology of Alkaloids and Glycosides* [in Russian] (FAN, Tashkent, 1967), p. 114
5. Z.S. Akbarov, A. Nabiev, *The Pharmacology of Plant Substances* [in Russian] (FAN, Tashkent, 1976), p. 71
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 10

β-Hydroxyphenylethylamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Reseda luteola*

$C_8H_{11}NO$: 137.0841

Mp: 112–114°C ($CHCl_3$) [1]

$[\alpha]_D$ 0° [1]

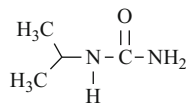
IR: 3390, 760, 710 [1]

MS *m/z*: 137(M^+), 107(70), 79(90), 77(97), 30(100) [1]

References

1. K.L. Lutfullin, M.M. Tadzhibaev, V.M. Malikov, U.A. Abdullaev, U. Rakhmankulov, Chem. Nat. Comp. **13**, 696 (1977)

N-Isopropylurea



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Dipthychocarpus strictus*

$C_4H_{10}N_2O$: 102.0089

Mp: 157–158°C [1]

IR: 3360, 3230, 1660, 1605, 1600, 1555 [1]

MS *m/z*: 102(M^+), 87, 58, 44(100) [1]

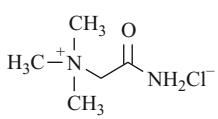
^{1}H NMR: 1.08(6H, d, J = 6, $CH(CH_3)_2$), 3.32(1H, m, CH), 4.41(3H, m, NH, NH_2) [1]

References

1. O. Abdilalimov, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 463 (1978)

Kalidine

CAS Registry Number: 16676-65-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Kalidium gracile*
$C_5H_{13}N_2OCl$: 152.0716/154.0687
Mp: 238–239°C (Me_2CO–H_2O) [1]
IR: 1730 [1]
^{1}H NMR: 3.68(3H, br s, NCH_3), 4.57(2H, br s, N–CH_2–C = O) [1]
^{13}C NMR: [1]

Table 1

$N(CH_3)_3$	54.0	NCH_2	63.8	C = O	166.8

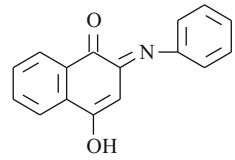
X-ray: [1]

References

1. N. Batbayar, D. Batsuren, B. Tashkhodzhaev, V.I. Akhmedzhanova, I.A. Bessonova, M.R. Yagudaev, Chem. Nat. Comp. **23**, 466 (1987)

Lutine

CAS Registry Number: 66855-47-8



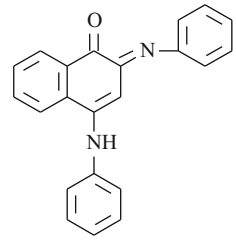
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Reseda luteola*
$C_{16}H_{11}NO_2$: 249.079
Mp: 185–186°C ($CHCl_3$) [1]
UV: 216, 222, 274 (4.45, 4.37, 4.50) [1]
IR: 3320, 1670, 770, 750, 710 [1]
MS *m/z*: 249(M^+, 100), 232(10), 231(24), 220(50), 172(8), 104(30), 77(76) [1]
^{1}H NMR: 6.35(1H, s, CH = C), 7.25–8.05(9H, m, H-Ar) [1]

References

1. K.L. Lutfullin, M.M. Tadzhibaev, V.M. Malikov, U.A. Abdullaev, U. Rakhmankulov, Chem. Nat. Comp. **13**, 696 (1977)

Lutinine

CAS Registry Number: 66855-48-9



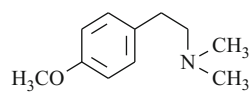
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Reseda luteola*
$C_{22}H_{16}N_2O$: 324.1263
Mp: 177–179°C ($CHCl_3$) [1]
UV: 253, 283, 470(4.35, 4.39, 3.80) [1]
IR: 3300, 1660, 775, 760, 710 [1]
MS *m/z*: 324(M^+, 100), 307(2), 295(8), 247(20), 232(12), 104(2), 93(4), 77(30) [1]

References

1. K.L. Lutfullin, M.M. Tadzhibaev, V.M. Malikov, U.A. Abdullaev, U. Rakhmankulov, Chem. Nat. Comp. **13**, 696 (1977)

O-Methylhordenine

CAS Registry Number: 775-33-7

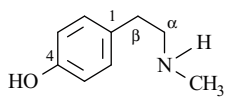


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Eremurus fuscus, E. luteus, E. tianschanicus*
$C_{11}H_{17}NO$: 179.1310
Mp: 196–198°C [1]

References

1. G.P. Sheveleva, N.V. Plekhanova, D.S. Sargazakov, in *Proceedings of a Scientific Conference Devoted to the Centenary of D.I. Mendeleev's Periodic Law* [in Russian], Frunze, 1970, p. 107

N-Methyl-4-hydroxy-β-phenethylamine

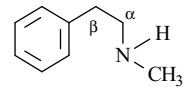


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Anabasis jaxartica*
$C_9H_{13}NO$: 151.0997
Mp: 133–134.5°C (Me_2CO), 150°C (hydrochloride), 148°C (picrate), 238°C (dec., picrolonate) [1]
UV: 205, 227, 277 [2]
IR: 3378, 2900, 1625 [2]
MS *m*/*z*: 151(M^+), 135, 121, 107, 91, 77 [2]

References

1. T.F. Platonova, A.D. Kuzovkov, P.S. Massagetov, Zh. Obshch. Khim. **28**, 3128 (1958)
2. K.L. Stuart, D.Y. Byfield, Phytochemistry **10**, 460 (1971)

N-Methyl-β-phenylethylamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Arthrophytum leptocladum, A. wakhanicum*
$C_9H_{13}N$: 135.1048
Bp: 73–75°C (4 mmHg), 162°C (hydrochloride), 143°C (picrate), 228°C (methiodide) [1]
$[\alpha]_D$ 0° [1]
MS *m*/*z*: 135(M^+) [2]

References

1. N.K. Yurashevskii, Zh. Obshch. Khim. **11**, 207 (1941)
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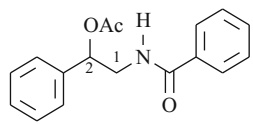
Muricatide

CAS Registry Number: 111025-01-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Oxytropis muricata*
$C_{17}H_{17}NO_3$: 283.1208
Mp: 114–115°C (C_6H_{14}– Et_2O) [1]
UV: 208, 226 [1]
IR: 3065, 2982, 1732, 1642, 1579, 1533, 1488, 1453, 1421, 1367, 1313, 1245, 1050, 949, 905, 857, 723, 695 [1]

MS *m/z*: 283 (M^+, 9), 240 (8), 177 (17), 164 (13), 135 (50), 134 (30), 117 (25), 105 (100), 77 (25) [1]
^{1}H NMR: 2.02 (3H, s, Ac), 3.78 (2H, t, J = 6.5, 2H-1), 5.92 (1H, t, J = 6.5, H-2), 6.42 (1H, br s, NH), 7.10–7.50 (8H, m, H-Ar), 7.65 (2H, dd, J = 7.0, 3.0, H-Ar) [1]

References

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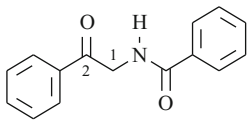
Muricatisine



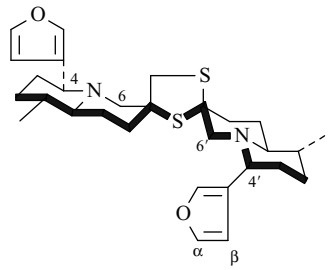
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Oxytropis muricata, O. puberula*
$C_{15}H_{13}NO_2$: 239.2764
Mp: 124–125°C (Me_2CO) [1]
UV: 202, 242 [1]
IR: 3359, 1694, 1635, 1579, 1523, 1485, 1450, 1443, 1240, 1224, 980, 926, 800, 779, 756, 714 [1]
MS *m/z*: 239 (M^+, 46), 211 (45), 135 (50), 134 (58), 105 (100), 77 (40) [1]
^{1}H NMR: 4.97 (2H, d, J = 4.2, 2H-1), 7.35 (1H, br s, NH), 7.50 (5H, m, 5 × H-Ar), 7.65 (1H, tt, J = 7.4, 1.9, 1.3, H-Ar), 7.89 (2H, m, 2 × H-Ar), 8.03 (2H, m, 2 × H-Ar) [1]

References

1. N.B. Demeuov, V.I. Akhmedzhanova, M.A. Moldagulov, R.Sh. Shakirov, Chem. Nat. Comp. **34**, 484 (1998)

Neothiobinupharidine

CAS Registry Number: 4850-09-3



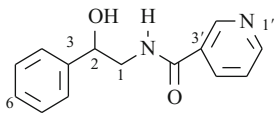
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Nuphar lutea*
$C_{30}H_{42}N_2O_2S$: 494.3906
Mp: 158–159°C (abs. EtOH), 320°C (dec., perchlorate) [1]
$[\alpha]_D$ ±0°
UV: 210 [1]
UV(H+): 284
IR: 2780, 2735, 2580, 1595, 1502, 1265, 1137, 1062, 990, 870, 788, 705-685
MS *m/z*: 494(M^+), 479, 465, 461, 451, 447, 427, 359, 264, 247, 231, 230, 178(100), 136, 107, 94 [1]
^{1}H NMR: 0.91(6H, d, J = 5, 2 × CH_3), 2.60–3.00(4H, m, H-4, H-4′, H-6, H-6′), 2.67(2H, s, $w_{1/2}$ = 3, CH_2S), 6.34, 6.52(each 1H, br s, $w_{1/2}$ = 3, 2 × H-β), 7.23, 7.32(1H, br s, $w_{1/2}$ = 3; 3H, m, 4 × H-α) [2, 3]

References

1. O. Achmatowicz, H. Baczek, Tetrahedron Lett. **5**, 927 (1964)
2. J.T. Wrobel, B. Bobeszko, Can. J. Chem. **51**, 2810 (1973)
3. T.N. Il'inskaya, A.D. Kuzovkov, T.G. Monakhova, Chem. Nat. Comp. **3**, 147 (1967)

(−)-Nicotinoyl-2-phenyl-2-hydroxyethylamine

CAS Registry Number: 168780-03-8



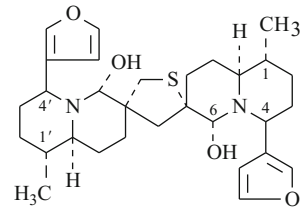
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Oxytropis muricata, O. puberula*
$C_{14}H_{14}N_2O_2$: 242.1055
Mp: 157–158°C (Me_2CO) [1]
$[\alpha]_D$ −25° (MeOH) [1]
UV: 210, 256 sh [1]
IR: 3330, 1650 [1]
MS *m/z*: 242(M^+, 0.5), 224(2), 136(100), 135(70), 123(16), 118(9), 107(28), 106(52), 105(11), 79(35), 78(30), 77(22) [1]
^{1}H NMR (DMSO-d_6): 3.30, 3.48(each 1H, m, 2H-1), 4.77(1H, m, H-2), 5.49(1H, d, J = 2.5, OH), 7.22(1H, t, J = 7, H-6), 7.31(2H, t, J = 7, H-5, H-7), 7.35(2H, d, J = 7, H-4, H-8), 7.45(1H, dd, J = 5, 8, H-5′), 8.13(1H, dt, J = 8, 1.3, H-4′), 8.65(1H, dd, J = 5, 1.3, H-6′), 8.67(1H, t, J = 5, NH), 8.95(1H, d, J = 1.3, H-2′) [1]

References

1. D. Batsuren, S. Tsetsegmaa, N. Batbayar, D. Dungerdorzh, V.I. Akhmedzhanova, Yu.M. Mil'grom, Ya.V. Rashkes, A.A. Ibragimov, Chem. Nat. Comp. **28**, 340 (1992)

Nuphleine

CAS Registry Number: 30343-70-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Nuphar lutea*
$C_{30}H_{42}N_2O_4S$: 526.2866
Mp: amorph., 226°C (MeOH, perchlorate) [1]
$[\alpha]_D$ +104° (EtOH) [1]
IR: 3628, 3535, 3165, 2128, 1600, 1579, 1508, 1379, 1240, 1025, 873, 852, 755 [1]
^{1}H NMR: 0.89(6H, d, J = 5, 2 × CH_3), 2.18, 2.71(each 1H, d, J = 13), 3.58, 3.70(each 1H, q, J = 6; 6.5; 8; 8.5, H-4, H-4′), 3.98(1H, s, H-6′), 4.24(1H, s, $w_{1/2}$ = 5, H-6), 6.36(2H, br s, H-β-furan), 7.33(4H, br s, H-α-furan) [1]
Pharm./Biol.: LD_{50} 7.6, 150 mg/kg (i/p, s/c, mice) [2, 3]. A mixture (hydrochloride) of nuphleine and thiobinupharidine – lyutenurin is used as an antimicrobial preparation [3]

References

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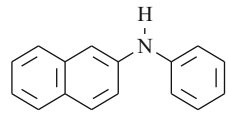
Phenyl-β-naphthylamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Aconitum karacolicum, Arundo donax, Bupleurum aureum, Centaurea salonitana, Reseda lutea, R. luteola*

$C_{16}H_{13}N$: 219.1048

Mp: 109–110°C (pet. ether-Me_2CO) [1–4]

UV: 220, 273, 312, 350(4.53, 4.16, 4.20, 3.40) [3]

IR: 3400, 1600, 1510, 1310 [2]

MS *m/z*: 219(M^+), 217, 191, 127, 115, 107, 77 [2]

^{1}H NMR: 5.68(1H, br s, NH), 6.70–7.75(12H, m, H-Ar) [2]

References

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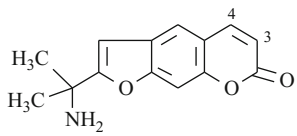
4. V.U. Khujaev, Author's Abstract of Candidate's Dissertation, Tashkent, 1996

Prangosine

CAS Registry Number: 15399-67-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Prangos pabularia*

$C_{14}H_{13}NO_3$: 243.0895

Mp: 131–132°C (Me_2CO), 280°C (hydrochloride), 272°C (hydrobromide), 208°C (hydroiodide), 235°C (sulfate), 224°C (nitrate), 229°C (picrate), 194°C (methiodide) [1]

Solubility: sol. Me_2CO, MeOH, $CHCl_3$, CCl_4 [1]

UV: 250, 292, 332(4.46, 4.02, 3.84) [2]

IR: 3350, 3290, 1715, 1600, 1382, 1365 [2]

MS *m/z*: 243(M^+), 228, 226, 198, 183, 155, 127 [3]

^{1}H NMR: 1.50(6H, s, C–CH_3), 1.86(2H, s, NH_2), 6.22, 7.45(each 1H, d, J = 10; 7.25, H-3, H-4), 6.44(1H, s, H-furan), 7.25, 7.45(each 1H, s, H-Ar) [4]

References

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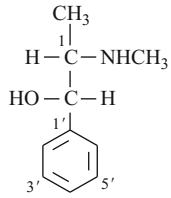
(+)-Pseudoephedrine

CAS Registry Number: 90-84-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Ephedra ciliata, E. distachya, E. equisetina, E. fedtschenkoae, E. intermedia, E. lomatolepis, E. monosperma, E. procera, E. strobilacea, Roemeria refracta*

$C_{10}H_{15}NO$: 165.1154

Mp: 118–119°C (pet. ether), 183°C (hydrochloride) [1]

$[\alpha]_D$ +55° (EtOH) [1]

UV: 252, 257, 264(2.19, 2.27, 2.14) [2]
IR: 1600, 1340, 1322, 1306, 1288, 1240, 1203, 1164, 1136, 1093, 1070, 1060, 1028, 980, 924, 911, 858, 829, 815, 760, 704 [2]
^{13}C NMR (hydrochloride, D_2O): [3]

Table 1

C–1	12.8	C–1′	140.5	C–4′	129.8
2	60.5	2′, 6′	127.8	NCH_3	30.9
3	75.5	3′, 5′	129.8		

HPLC: [4]
Pharm./Biol.: LD_{50} 100 mg/kg (i/v, mice). Sympathomimetic of indirect action [5]. Used in large doses as a broncholytic agent [6]

References

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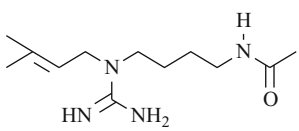
Smirnovine

CAS Registry Number: 2758-69-2



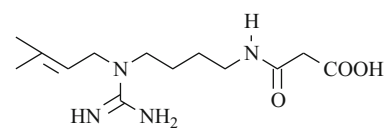
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Astragalus tibetanus, Eremosparton aphyllum, E. flaccidum, Smirnowia turkestana*
$C_{12}H_{24}N_4O$: 240.1950
Mp: 154°C (picrate), 163°C (hydrochloride) [1]
Pharm./Biol.: Briefly lowers arterial pressure, stimulates respiration, exhibits a ganglioblocking action [2]

References

1. A.A. Ryabinin, DAN SSSR **61**, 317 (1948); A. Heesing, R. Eckard, Chem. Ber. **103**, 534 (1970)
2. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 144

Smirnovinine

CAS Registry Number: 27586-70-5



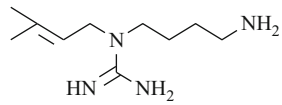
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids
Biological sources: *Eremosparton aphyllum, Smirnowia turkestana*
$C_{13}H_{24}N_4O_3$: 284.1848
Mp: 145°C (picrate) [1, 2]

References

1. A.A. Ryabinin, E.M. Il'ina, DAN SSSR **76**, 851 (1951)
2. A. Heesing, R. Eckard, Chem. Ber. **103**, 534 (1970)

Sphaerophysine

CAS Registry Number: 25978-54-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Eremosparton flaccidum, Sphaerophysa salsula, Smirnowia turkestana*

$C_{10}H_{22}N_4$: 198.1844

Mp: 193°C (carbonate), 155°C (dipicrate) [1]

MS *m/z*: 198(M^+, 35), 126(54), 84(100) [2]

^{1}H NMR: 1.64(3H, s), 1.70(3H, s), 5.18(1H, t, J = 7) [2]

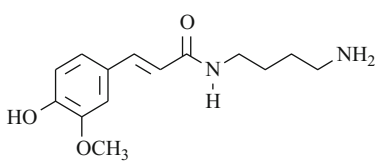
Pharm./Biol.: Used as hypotensive and obstetric agent. Supplied in the form of a powder [3]

References

1. M.M. Rubinshtein, G.P. Men'shikov, Zh. Obshch. Khim. **14**, 161 (1944)
2. A. Heesing, R. Eckard, Chem. Ber. **103**, 534 (1970)
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 147. M.D. Mashkovskii, *Drugs* [in Russian] (Meditsina, Moscow, 1984), **1** p. 528

Subaphylline

CAS Registry Number: 501-13-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Salsola subaphylla*

$C_{14}H_{20}N_2O_3$: 264.1474

Mp: 218°C (dec., picrate), 198°C (O,N-dibenzoyl), 151°C (hydrochloride) [1–3]

UV: 230, 292, 314 [4]

IR: [4]

MS *m/z*: 264(M^+), 192, 177, 124, 109, 59, 30 [4]

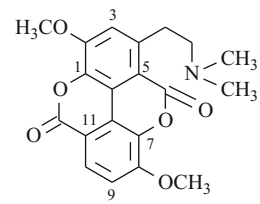
Pharm./Biol.: LD_{50} 225 mg/kg. Lowers arterial pressure [5]

References

1. A.A. Ryabinin, E.M. Il'ina, DAN SSSR **67**, 513 (1949)
2. A.A. Ryabinin, E.M. Il'ina, DAN SSSR **76**, 689 (1951)
3. S. Mizusaki, Y. Tanabe, M. Noguchi, E. Tamaki, Phytochemistry **10**, 1347 (1971)
4. T.A. Wheaton, J. Stewart, Nature **206**, 620 (1965)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 225

Taspine

CAS Registry Number: 602-07-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Leontice alberti, L. darwasica, L. ewersmannii, L. smirnowii*

$C_{20}H_{19}NO_6$: 369.1212

Mp: 370°C (toluene), 360°C (dec., sulfate) [1]

$[\alpha]_D$ 0° [1]

UV: 246, 285, 330, 345(4.83, 4.01, 3.89, 3.97) [2]

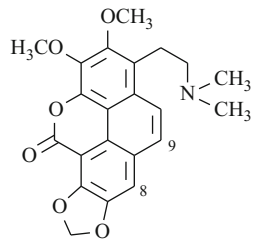
IR: 1740, 1720, 1600, 1333, 1322, 1292, 1244, 1218, 1200, 1170, 1138, 1092, 1050, 1037, 1023, 994, 980, 938, 902, 888, 878, 860, 842, 833, 822, 800, 773, 757, 738, 715 [2]; 1728, 1596, 1285, 1140, 1085 [3]

^{1}H NMR: 2.40(6H, s, $N(CH_3)_2$), 2.70–3.48(4H, m, CH_2–CH_2), 4.10(6H, s, 2 × OCH_3), 7.19(1H, s, H-3), 7.29(1H, d, J = 9, H-9), 8.14(1H, d, J = 9, H-10) [4]

References

1. T.F. Platonova, A.D. Kuzovkov, P.S. Massagetov, Zh. Obshch. Khim. **23**, 880 (1953)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1966), **2**, No. 393
3. T.F. Platonova, A.D. Kuzovkov, Yu.N. Sheinker, Zh. Obshch. Khim. **26**, 2651 (1956)
4. M. Shamma, *The Isoquinoline Alkaloids*, vol. 1 (Academic Press, New York, 1972), p. 265

Thalflavidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Thalictrum flavum*

$C_{22}H_{21}NO_6$: 395.1369

Mp: 219–220°C (MeOH) [1]

UV: 254, 263, 296, 400(4.38, 4.49, 3.94, 3.60) [1]

IR: 1730, 1060, 950 [1]

MS *m/z*: 395(M^+), 337, 322, 279, 58(100) [1]

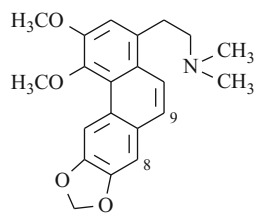
^{1}H NMR: 2.30(6H, s, $N(CH_3)_2$), 2.50, 3.26(4H, m, CH_2–CH_2), 3.82, 4.04(each 3H, s, 2 × OCH_3), 6.29(2H, s, CH_2O_2), 7.44(1H, s, H-8), 7.56, 7.81(each 1H, d, H-9, H-10) [1]

References

1. Kh.S. Umarov, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 660 (1973)

Thalicthuberine

CAS Registry Number: 477-35-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Thalictrum strictum*

$C_{21}H_{23}NO_4$: 353.1627

Mp: 117–118°C (MeOH) [1], 126–127°C [2]; 203°C (hydrochloride) [1]

UV: 264, 285, 313, 327, 348, 366 [1]; 261, 285, 310, 345(4.84, 4.50, 4.32, 3.50) [2]

IR: 1045, 953, 930 [2]

MS *m/z*: 353(M^+), 295, 251, 209, 58(100) [1]

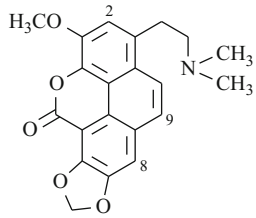
^{1}H NMR: 2.34(6H, s, $N(CH_3)_2$), 2.35–3.35(4H, m, CH_2–CH_2), 3.85, 4.02(each 3H, s, 2 × OCH_3), 6.04(2H, s, CH_2O_2), 7.12(2H, s, H-Ar), 7.47, 7.75(each 1H, d, J = 10, H-9, H-10) [1]

References

1. S.Kh. Maekh, P.G. Gorovoi, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 507 (1976)
2. H. Guinaudeau, M. Leboeuf, A. Cave, Lloydia **38**, 275 (1975)

Thaliglucinone (Thalicsine)

CAS Registry Number: 35988-96-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Thalictrum flavum, Th. longipedunculatum, Th. simplex*

$C_{21}H_{19}NO_5$: 365.1263

Mp: 194–195°C [1], 126–128°C [2], 133–135°C [3]; 267°C (hydrochloride), 278°C (dec., hydroiodide), 219°C (dec., tartrate), 250°C (picrate), 306°C (dec., methiodide) [1]

Solubility: very sol. $CHCl_3$; spar. sol. Me_2CO, EtOH, MeOH, C_6H_6, Et_2O, EtOAc [1]

UV: 237, 265, 313, 390(4.22, 4.48. 3.96, 3.60) [4]; 238, 256, 264, 287, 312, 390(4.46, 4.56, 4.70, 3.67, 4.16, 3.80) [5]

IR: 3400, 1722, 1277, 1230, 1040 [3]; 1740, 930 [4]; 1735 [5]

MS *m/z*: 365(M^+, 44), 320(33), 307(27), 305(13), 277(10), 58(100) [4]

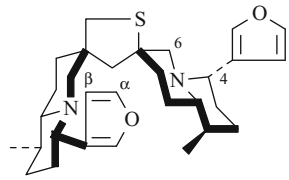
^{1}H NMR: 2.40(6H, s, $N(CH_3)_2$), 4.08(3H, s, OCH_3), 6.32(2H, s, CH_2O_2), 7.27, 7.43(each 1H, s, H-2, H-8), 7.47, 7.81(each 1H, d, J = 9) [5]; 2.31(6H, s, $N(CH_3)_2$), 2.40–3.30(4H, m), 3.97(3H, s, OCH_3), 6.22(2H, s, CH_2O_2), 7.11, 7.25(each 1H, s, H-2, H-8), 7.13, 7.48(each 1H, d, J = 9) [4]

References

1. Z.F. Ismailov, S.Kh. Maekh, S.Yu. Yunusov, DAN UzSSR **7**, 32 (1959)
2. N.M. Mollov, L.N. Thuan, P.P. Panov, Dokl. Bolg. Akad. Nauk **24**, 1047 (1971)
3. Z.F. Ismailov, K.L. Lutfullin, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 173 (1968)
4. V.G. Khodzhaev, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 421 (1973)
5. W-W. Wu, J.L. Beal, G.W. Clark, L.A. Mitscher, Lloydia **39**, 65 (1976)

Thiobinupharidine

CAS Registry Number: 30343-72-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Nuphar luteum*

$C_{30}H_{42}N_2O_2S$: 494.2967

Mp: 129–130°C (MeOH), 283°C (perchlorate) [1]

$[\alpha]_D$ +49° (EtOH) [1]

UV: 198 [1]

UV(H+): 287 [1]

IR: 2920, 2850, 2780, 2739, 1595, 1500, 1375, 1268, 1135, 1065, 987, 870, 782, 760, 717 [1]

MS *m/z*: 494(M^+), 479, 465, 461, 451, 447, 427, 359, 264, 247, 231, 230, 178(100), 136, 107, 94 [2]

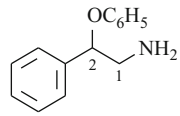
^{1}H NMR: 0.85(6H, d, J = 5.5, 2 × CH_3), 2.32(2H, q, J = 11.5, CH_2S), 2.77–2.98(4H, m, H-4, H-4′, H-6, H-6′), 6.39(2H, br s, $W_{1/2}$ = 7.2, H-β), 7.25(2H, q, $W_{1/2}$ = 4, H-α), 7.32(2H, s, $W_{1/2}$ = 5, H-α) [3, 4]

References

1. O. Achmatowicz, J.T. Wrobel, Tetrahedron Lett. **3**, 122 (1962)
2. O. Achmatowicz, H. Baczek, Tetrahedron Lett. **5**, 927 (1964)
3. J.T. Wrobel, B. Bobeszko, Can. J. Chem. **51**, 2810 (1973)
4. T.N. Il'inskaya, A.D. Kuzovkov, T.C. Monakhova, Chem. Nat. Comp. **3**, 147 (1967)

Trichophydine

CAS Registry Number: 67031-54-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Oxytropis trichophysa*

$C_{15}H_{15}NO_2$: 241.1103

Mp: 200–203°C (hydrochloride) [1]

UV (hydrochloride): 233, 284(sh) [1]

IR (hydrochloride): 3100-2800, 1730, 1600, 1275, 1105, 980, 770, 710 [1]

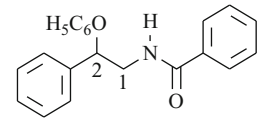
MS (hydrochloride) *m/z*: 120(5), 119(33), 117(37), 105(100), 91(13), 51(34); LSIMS(+): 242[(M-HCl) + H]$^+$ [1]

^{1}H NMR (hydrochloride) (D_2O): 3.68(2H, m, 2H-1), 6.28(1H, dd, J = 4.5, 6, H-2), 7.62, 8.18(8H, 2H, m, H-Ar); (C_5D_5N): 3.78(2H, m, 2H-1), 6.75(1H, dd, J = 5, 6, H-2), 7.38(m, H-Ar), 8.12(2H, m, H-Ar) [1]

References

1. V.I. Akhmedzhanova, Chem. Nat. Comp. **30**, 379 (1994)

Trichophysine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Amine, Amide, and Sulfur Containing Alkaloids

Biological sources: *Oxytropis trichophysa*

$C_{22}H_{19}NO_3$: 345.1365

Mp: 100–103°C (C_6H_{14}– Et_2O) [1]

UV: 201, 229 [1]

IR: 3346, 1714, 1641 [1]

MS *m/z*: 240 (M-C_6H_5CO, 3), 223 (M-C_6H_5COOH, 2), 135 (93), 134 (90), 105 (100), 77 (89) [1]

^{1}H NMR: 3.94 (2H, t, J = 6.5, 2H-1), 6.20 (1H, t, J = 6.5, H-2), 6.69 (br s, NH), 7.38 (11H, m, H-Ar), 8.05 (4H, m, H-Ar) [1]

References

1. V.I. Akhmedzhanova, Chem. Nat. Comp. **32**, 187 (1996)

Colchicine-containing plant species of the lily family (Liliaceae) are widely distributed throughout the world. The family numbers about 3,000 species, primarily herbaceous plants, both annual and perennial. The majority of them are cultivated for their economic value as medicinals, decoratives, food, feed, and insecticides.

Many representatives of the Liliaceae family are highly toxic and have caused animal poisoning. However, several of them, or compounds in them, have been used in conventional and folk medicine.

The presence of tropolone alkaloids in plants of the subfamily Wurmbaeoideae is considered a chemotaxonomic signature of these plant species. The first and most studied genus is *Colchicum*. The presence of colchicine alkaloids has been established reliably only in three genera of those growing in Central Asia: *Colchicum* L., *Merendera* Ramond, and *Bulbocodium* L. The first genus has 13 species; the second, 8; the third only 1. The structure of colchicine alkaloids is based on the tropolone core, cyclohepta-3,5,7-trien-1-ol-2-one.

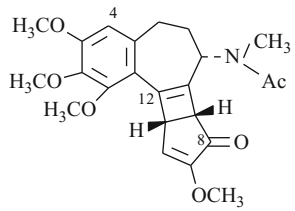
Tropolone and its derivatives were synthesized in the period 1948–1951. A total of 17 alkaloids that include the tropolone core were isolated from various lily species. The structures were established for all alkaloids. The most common and principal ones are colchicine and colchamine. The main alkaloid in *C. corniger* is cornigerine, an exception, whereas colchicine is absent. Other tropolone alkaloids are found in plants in small quantities.

The structures of colchicine and its natural analogs are based on a condensed tricyclic system consisting of aromatic, aminated cycloheptadiene, and tropolone rings. Colchicine is the most available and studied alkaloid.

The absolute configuration of colchicine was established by Corrodi and Hardegger and occurs in all tropolone alkaloids.

Colchicine and its analogs are mitotic poisons. They are antimitotic agents that decrease the rate of cell division, i.e., they possess cytostatic activity. Therefore, colchicine and some of its derivatives are used as effective cytostatics for chemotherapy of cancerous tumors (cancer, sarcoma, etc.) and blood diseases (leukemia). However, the high toxicity of these compounds presents a hurdle to their effective use in medicine. Colchamine is less toxic and has been incorporated into medical practice.

N-Acetyl-β-lumicolchamine



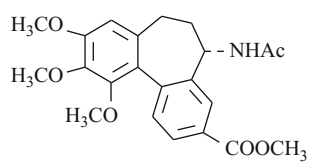
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum speciosum*
$C_{23}H_{27}NO_6$: 413.1838
Mp: 132–133°C [1]
$[\alpha]_D$ + 410° ($CHCl_3$) [1]
UV: 226–230, 264–266, 342 [2]
IR: 1720, 1640 [2]
MS *m/z*: 342 [2]
^{1}H NMR: 2.14 (3H, s, NAc), 3.26 (3H, s, NCH_3), 3.52 (1H, dd, H-8), 3.60, 3.84, 3.86, 3.94 (each 3H, s, 4 × OCH_3), 4.12 (1H, dd, H-12), 6.46 (1H, s, H-4), 6.67 (1H, d, H-11) [2]

References

1. B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **26**, 113 (1990)
2. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Allocolchicine

CAS Registry Number: 641-28-1



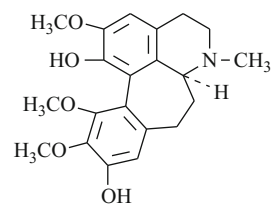
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{22}H_{25}NO_6$: 399.1682
Mp: 255–257°C (Et_2O–$CHCl_3$), 262°C (colchicinic acid) [1]
Solubility: sol. MeOH, $CHCl_3$, Me_2CO; spar. sol. H_2O, Et_2O, petr. ether [1]
UV: 226, 290 [2]
IR: 3300, 1735, 1660, 1610 [2]
MS *m/z*: 340 [2]
^{1}H NMR: 2.00, 3.57, 3.71, 3.83 (NAc, 4 × OCH_3) [2]

References

1. M.K. Yusupov, A.S. Sadykov, Zh. Obshch. Khim. **34**, 1672, 1677 (1964)
2. M.K. Yusupov, *The Chemistry of Plant Substances* [in Russian] (Fan, Tashkent, 1972), p. 19

Bechuanine (Merenderine)

CAS Registry Number: 1354-66-1



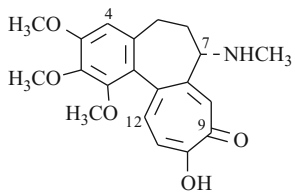
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera raddeana, M. robusta, M. trigyna*
$C_{21}H_{25}NO_5$: 371.1733
Mp: 229–230°C (Me_2CO), 220°C (hydrochloride), 150°C (dec., methiodide) [1]
$[\alpha]_D$ + 105° ($CHCl_3$) [1]
UV: 258, 296(4.11, 3.89) [1]
IR: 3560, 3470, 1600, 1577, 1455 [1]
MS *m/z*: 371(M^+, 55), 370(21), 356(35), 354(100), 352(4), 342(17), 340(25), 338(15), 328(5), 326(4), 324(10), 204(12) [2]

^{1}H NMR: 2.20 (3H, s, NCH_3), 3.67, 3.80 (3H, 6H, s, 3 × OCH_3), 6.60, 6.69 (each 1H, s, H-1, H-7) [1]
Pharm./Biol.: Reversible cholinesterase inhibitor [3]

References

1. M.K. Yusupov, A.A. Trozyan, Kh.A. Aslanov, A.S. Sadykov, Chem. Nat. Comp. **8**, 757 (1972); A.A. Trozyan, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **11**, 557 (1975)
2. A.K. Kasymov, E.Kh. Timbekov, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **13**, 197 (1977)
3. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, A.A. Abduvakhabov, Yu.R. Khakimov, B. Chommadov, D.I. Israilov, Uzb. Khim. Zh. (2), 33 (1991)

Colchameine (Demecolceine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum, C. speciosum, Merendera jolantae, M. robusta, M. sobolifera*
$C_{20}H_{23}NO_5$: 357.1576
Mp: 132–134°C (Me_2CO–MeOH), 245°C (dec., hydroiodide), 134°C (N–Me.) [1, 2]
$[\alpha]_D$ −206° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$; sol. Me_2CO, EtOAc; spar. sol. Et_2O, MeOH, EtOH; insol. H_2O [2]
UV: 244, 350 [3]
IR: 3645, 3480, 1617, 1601, 1545, 1488, 1475, 1453, 1407, 1348, 1323, 1309, 1277, 1141, 1123, 1094, 1064, 1039, 1016, 979, 945, 922, 861, 844 [3]
MS *m/z*: 357(M^+, 39), 342(21), 326(20), 207(100) [3]
^{1}H NMR: 1.82(1H) and 2.0–2.6 (3H) (2m, 2H–C(5) and 2H–C(6)), 2.25 (NCH_3), 3.32(1H, m, H-7), 3.61, 3.92 (each 3H, 6H, s, 3 × OCH_3), 4.10–4.80 (NH, OH), 6.54 (1H, s, H-4), 7.28, 7.54 (each 1H, d, J = 11, H-11, H-12), 8.03 (1H, s, H-8) [3]
^{13}C NMR: [4]

Table 1

C–1	150.6	C–7	59.8	C–12a	136.5
2	141.6	7a	151.3	1a	126.3
3	153.7	8	118.3	1-OCH_3	61.0
4	107.7	9	173.0	2-OCH_3	61.2
4a	135.5	10	168.2	3-OCH_3	56.2
5	30.3	11	124.5	NCH_3	35.0
6	39.8	12	141.8		

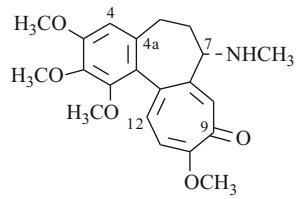
Pharm./Biol.: LD_{100} > 100 mg/kg [5]

References

1. K.M. Zuparova, B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 481 (1972)
2. V.V. Kiselev, G.P. Men'shikov, DAN SSSR **88**, 825 (1953)
3. H.-G. Capraro, A. Brossi, Helv. Chim. Acta **62**, 965 (1979)
4. C.D. Hufford, H.-G. Capraro, A. Brossi, Helv. Chim. Acta **63**, 50 (1980)
5. V.V. Kiselev, Chem. Nat. Comp. **13**, 1 (1977)

Colchamine (Demecolcine)

CAS Registry Number: 477-30-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, C. laetum, C. luteum, C. speciosum, Merendera jolantae, M. raddeana, M. robusta, M. sobolifera*
$C_{21}H_{25}NO_5$: 371.1733 [1, 2]
Mp: 185–186°C (EtOAc), 217°C (hydrochloride), 197°C (hydroiodide), 264°C (perchlorate), 228°C (N–Ac.), 202°C (N–Me), 210°C (N–benzoyl) [2]
$[\alpha]_D$ −127° ($CHCl_3$) [2]

Solubility: very sol. $CHCl_3$, EtOH, MeOH; sol. Me_2CO; spar. sol. EtOAc; insol. Et_2O [1, 2]
UV: 243, 350 [3]
IR: 3690, 3450, 1619, 1595, 1565, 1489, 1467, 1451, 1435, 1400, 1351, 1324, 1288, 1143, 1099, 1045, 1024, 1010, 925, 911, 844 [3]
MS *m/z*: 371(M^+, 89), 356(20), 342(38), 340(30), 328(27), 314(28), 312(62), 299(22), 297(25), 282(21), 207(100) [3]
^{1}H NMR: 1.38 (NH), 1.60 (1H) and 1.90–2.70 (3H) (2m, 2H–C(5) and 2H–C(6)), 2.24 (3H, s, NCH_3), 3.26 (1H, m, H-7), 3.62, 3.90, 3.92, 4.00 (each 3H, s, 4 × OCH_3), 6.52 (1H, s, H-4), 6.77, 7.22 (each 1H, d, H-11, H-12), 7.68 (1H, s, H-8) [3]
^{13}C NMR: [4]

Table 1

C–1	150.6	C–7	62.8	C–12a	137.2
2	141.6	7a	150.9	1a	126.0
3	153.5	8	132.3	1-OCH_3	60.8
4	107.5	9	179.8	2-OCH_3	61.2
4a	135.3	10	164.1	3-OCH_3	56.2
5	30.4	11	111.9	10-OCH_3	56.2
6	38.7	12	134.6	NCH_3	34.5

HPLC: [5]
GLC: [6]
Pharm./Biol.: LD_{100} 35 mg/kg. Used in the chemotherapy of malignant tumors [7] – in particular, cancer of the esophagus and the skin. Supplied in the form of tablets and salve [8]

References

1. V.V. Kiselev, T.P. Men'shikov, A.A. Beer, DAN SSSR **87**, 277 (1952)
2. K.M. Zuparova, B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 481 (1972)
3. H.-G. Capraro, A. Brossi, Helv. Chim. Acta **62**, 965 (1979)
4. C.D. Hufford, H.-G. Capraro, A. Brossi, Helv. Chim. Acta **63**, 50 (1980)
5. R.J. Ko, W.Y. Li, R.T. Koda, J. Chromatogr. **525**, 411 (1990)
6. O.I. Popova, S.A. Kudrin, Khim. Pharm. Zh. (3), 59 (1991)
7. V.V. Kiselev, Chem. Nat. Comp. **13**, 1 (1977)
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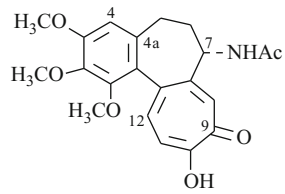
Colchiceine

CAS Registry Number: 477-27-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, C. luteum, C. speciosum, C. szovitsii, Merendera jolantae, M. raddeana, M.robusta, M. trigyna*
$C_{21}H_{23}NO_6$: 385.1525
Mp: 175–177°C (EtOAc) [1]
$[\alpha]_D$ −256° [1]
UV: 243, 348(4.49, 4.29) [2]
IR: 3445, 3300, 3015, 2940, 2870, 1688, 1615, 1573, 1559, 1493, 1471, 1460, 1411, 1371, 1357, 1328, 1281, 1245, 1144, 1098, 1048, 1009 [2]
^{1}H NMR: 2.00 (NAc), 3.65, 3.92, 3.93 (each 3H, s, 3 × OCH_3), 6.59 (H-4), 7.65 (H-8) [3]
^{13}C NMR: [4]

Table 1

C–1	150.3	C–7	51.7	C–12a	134.4
2	140.9	7a	150.1	1a	125.8
3	153.2	8	118.3	1-OCH_3	60.8
4	108.0	9	168.7	2-OCH_3	60.8
4a	134.8	10	171.9	3-OCH_3	56.0
5	29.3	11	124.3	N–CO	168.9
6	36.9	12	140.3	CH_3	22.5

HPLC: [5]
Pharm./Biol.: LD_{50} > 100 mg/kg. Antitumoral activity [6]

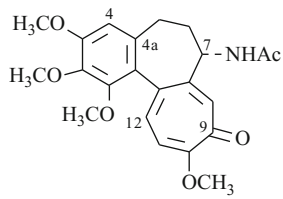
References

1. M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **14**, 1 (1978)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd, London, 1965), **1**, No. 61B

3. A.D. Cross, A. El-Hamidi, L. Pijewska, F. Santavy, Collect. **31**, 374 (1966)
4. J. Elguero, R.N. Muller, A. Blade-Font, R. Faure, E.J. Vincent, Bull. Soc. Chim. Belg. **89**, 193 (1980)
5. A.E. Klein, P.J. Davis, J. Chromatogr. **207**, 247 (1981)
6. V.V. Kiselev, Chem. Nat. Comp. **13**, 1 (1977)

Colchicine

CAS Registry Number: 64-86-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids

Biological sources: *Colchicum kesselringii, C. laetum, C. luteum, C. speciosum, C. szovitsii, Merendera jolantae, M. raddeana, M. robusta, M. sobolifera, M. trigyna*

$C_{22}H_{25}NO_6$: 399.1682

Mp: 155–157°C (EtOAc), 209°C (hydrochloride) [1]

$[\alpha]_D$ −121° ($CHCl_3$); −219° (MeOH) [1]

Solubility: sol. H_2O, EtOH, $CHCl_3$; spar. sol. C_6H_6 [1]

UV: 245, 350 (4.48, 4.22) [2]

IR: 3320, 3240, 1686, 1648, 1620, 1597, 1570, 1558, 1491, 1326, 1254, 1176, 1141, 1097 [2]

MS *m/z*: 399(M^+), 371, 356, 340, 328, 312, 297, 281 [3]

^{1}H NMR: 1.95 (NAc), 3.65, 3.93, 4.00 (each 3H, 6H, 3H, s, 4 × OCH_3), 6.54 (H-4), 6.90, 7.36 (each 1H, d, J = 11, H-11, H-12), 7.65 (H-8) [4]

^{13}C NMR: [5]

Table 1

C–1	150.7	C–7a	151.2	C–1a	125.7
2	141.1	8	130.7	1-OCH_3	60.9
3	153.2	9	178.4	2-OCH_3	60.7
4	108.0	10	163.8	3-OCH_3	55.9
4a	134.3	11	112.3	10-OCH_3	56.0
5	29.4	12	134.7	C = O	168.9
6	36.0	12a	135.6	CH_3	22.4
7	51.7				

HPLC: [6]

GLC: [7]

Pharm./Biol.: LD_{100} 5 mg/kg, LD_{50} 2 mg/kg. Antitumoral activity [8]

References

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3. J.M. Wilson, M. Ohashi, H. Budzikiewicz, F. Santavy, C. Djerassi, Tetrahedron **19**, 2225 (1963)
4. A.D. Cross, A. El-Hamidi, L. Pijewska, F. Santavy, Collect. **31**, 374 (1966)
5. J. Elguero, R.N. Muller, A. Blade-Font, R. Faure, E.J. Vincent, Bull. Soc.Chim. Belg. **89**, 193 (1980)
6. M. Lhermitte, J.L. Bernier, D. Mathieu, M. Mathieu-Nolf, F. Erb, P. Roussel, J. Chromatogr. **342**, 416 (1985)
7. O.I. Popova, S.A. Kudrin, Khim. Pharm. Zh. (3), 59 (1991)
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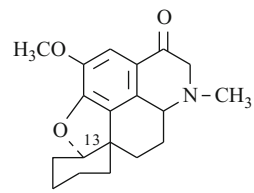
Colchilutine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids

Biological sources: *Colchicum luteum*

$C_{19}H_{23}NO_3$: 313.1678

Mp: 190–191°C [1]

$[\alpha]_D$ −83° ($CHCl_3$) [1]

Solubility: very sol. MeOH, $CHCl_3$; spar. sol. H_2O, Me_2CO; insol. Et_2O, C_6H_{14} [1]

UV: 230 sh, 286 [1]

IR: 2930, 1660, 1470, 1370 [1]

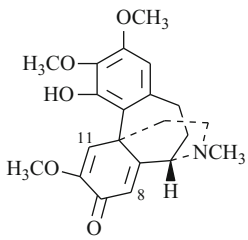
MS *m/z*: 313(M^+, 46), 312(93), 286, 285(100), 284, 270, 257(16), 256(14), 244(10), 242(46), 230, 229(28), 214 [1]

^{1}H NMR: 2.35 (3H, s, NCH_3), 3.73 (3H, s, OCH_3), 4.76 (1H, t, H-13), 6.46 (1H, s, H–Ar) [1]

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Collutine



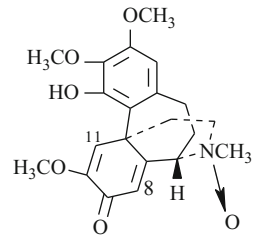
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum*
$C_{21}H_{25}NO_5$: 371.1733
Mp: 192–194°C, 234°C (methiodide), 214°C (methiodide O–Me) [1]
$[\alpha]_D$ −182° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, MeOH; sol. Me_2CO, Et_2O; spar. sol. alc [1]
UV: 238, 275 sh (4.30, 3.81) [1]
IR: 3450, 1660, 1630, 1600, 1560, 1455 [1]
MS *m/z*: 371(M^+, 100), 356(16), 340(10), 328(10), 210(22) [1]
^{1}H NMR: 2.35 (3H, s, NCH_3), 3.59, 3.80, 3.98 (each 3H, s, 3 × OCH_3), 6.22 (2H, s, H-4, H-8), 6.77 (1H, s, H-11) [1]

References

1. N.L. Mukhamed'yarova, M.K. Yusupov, Kh.A. Aslanov, A.S. Sadykov, Chem. Nat. Comp. **11**, 781 (1975)

Collutine N-Oxide

CAS Registry Number: 102719-92-6

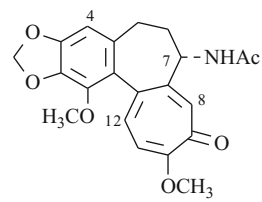


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum*
$C_{21}H_{25}NO_6$: 387.1682
Mp: 217–219°C (dec.) [1]
$[\alpha]_D$ −204° [1]
UV: 240, 277 [1]
IR: 3300, 1680, 1656, 1618, 1600 [1]
^{1}H NMR: 3.24 (3H, s, NCH_3), 3.57, 3.71, 4.00 (each 3H, s, 3 × OCH_3), 6.26, 6.32, 6.72 (each 1H, s, H-4, H-8, H-11) [1]

References

1. B. Chommadov, M.K. Yusupov, Chem. Nat. Comp. **21**, 770 (1985)

Cornigerine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids

Biological sources: *Colchicum laetum, Merendera raddeana*
$C_{21}H_{21}NO_6$: 383.1369
Mp: 268–270°C (EtOAc–Et_2O) [1]
$[\alpha]_D$ −150° ($CHCl_3$) [1]
UV: 243, 350(4.50, 4.20) [1]
IR: 3240, 2870, 1665, 1612, 1590, 1480, 1450, 1440, 1400, 1360, 1275, 1250, 1170, 1140, 1075, 1048 [2]
MS *m/z*: 383(M^+, 41), 355(15), 340(12), 296(100) [2]
^{1}H NMR: 1.96 (3H, s, NAc), 1.80–2.80 (4H, m, H-5, H-6), 3.77, 3.97 (each 3H, s, 2 × OCH_3), 4.60 (1H, m, H-7), 5.96 (2H, s, CH_2O_2), 6.41 (1H, s, H-4), 6.80, 7.20 (each 1H, d, J = 11, H-11, H-12), 7.48 (1H, s, H-8), 7.58 (1H, d, J = 6, NH) [2]
HPLC: [3]

References

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2. M. Rosner, F.-L. Hsu, A. Brossi, J. Org. Chem. **46**, 3686 (1981)
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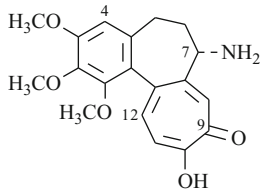
Deacetylcolchiceine

CAS Registry Number: 3476-50-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera robusta*
$C_{19}H_{21}NO_5$: 343.1420
Mp: 151–153°C [1]
$[\alpha]_D$ −180° [2]; −152° [1]
UV: 244, 350 [2]
MS *m/z*: 312, 207 [1]
^{1}H NMR: 3.66, 3.92, 3.94 (each 3H, s, 3 × OCH_3) [2]
^{13}C NMR: [3]

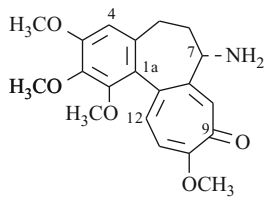
Table 1

C–1	149.9	C–7	53.2	C–12	139.9
2	140.5	7a	153.0	12a	133.8
3	153.0	8	119.5	1a	127.5
4	107.5	9	169.1	1-OCH_3	60.5
4a	135.3	10	172.2	2-OCH_3	60.5
5	29.8	11	123.6	3-OCH_3	55.9
6	36.3				

References

1. Kh. Turdikulov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 247 (1972)
2. M.K. Yusupov, *The Chemistry of Plant Substances* [in Russian] (Fan, Tashkent, 1972), p. 99
3. J. Elguero, R.N. Muller, A. Blade-Font, R. Faure, E.J. Vincent, Bull. Soc. Chim. Belg. **89**, 193 (1980)

Deacetylcolchicine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera robusta*
$C_{20}H_{23}NO_5$: 357.1576
Mp: amorph.
$[\alpha]_D$ −146°
UV: 246, 350 [1]
IR: 3400, 1616, 1590, 1561, 1486, 1443, 1430, 1398, 1374, 1348, 1320, 1282, 1154, 1137, 1113, 1092, 1049, 1012, 996, 985, 915, 898, 862, 839 [2]
MS *m/z*: 357(M^+, 100), 329(21), 328(22), 312(71), 298(77) [2]
^{1}H NMR: 1.00–1.90, 1.90–2.60 (7H, m, H-5, H-6, H-7, NH2), 3.64, 3.88, 3.98 (each 3H, 6H, 3H, s,

4 × OCH_3), 6.52 (1H, s, H-4), 6.77, 7.17 (1H, d, J = 11, H-11, H-12), 7.72 (1H, s, H-8) [2]
^{13}C NMR: [3]

Table 1

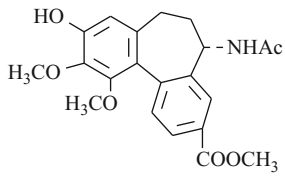
C–1	150.9	C–7	53.8	C–12a	136.5
2	141.6	7a	154.5	1a	125.9
3	153.6	8	132.0	1-OCH_3	61.0
4	107.4	9	179.8	2-OCH_3	61.1
4a	134.5	10	164.0	3-OCH_3	56.3
5	30.7	11	111.9	10-OCH_3	56.3
6	40.6	12	135.3		

HPLC: [4]
Pharm./Biol.: LD_{50} 20 mg/kg. LD_{100} 30 mg/kg. Antitumoral activity [5]

References

1. Kh. Turdikulov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 247 (1972)
2. H.-G. Capraro, A. Brossi, Helv. Chim. Acta **62**, 965 (1979)
3. C.D. Hufford, H.-G. Capraro, A. Brossi, Helv. Chim. Acta **63**, 50 (1980)
4. R.J. Ko, W.Y. Li, R.T. Koda, J. Chromatogr. **525**, 411 (1990)
5. V.V. Kiselev, Chem. Nat. Comp. **13**, 3 (1977)

3-Demethylallocolchicine

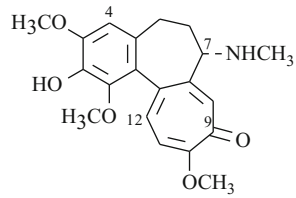


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{21}H_{23}NO_6$: 385.1525
Mp: 238–240°C, 261°C (3-demethylcolchicinic acid) [1]
Solubility: sol. MeOH, $CHCl_3$, Me_2CO; spar. sol. H_2O, Et_2O, pet. ether [1]
UV: 228, 296 [2]
IR: 3350, 1720, 1650 [2]
MS *m/z*: 326 [2]
^{1}H NMR: 2.00, 3.53, 3.70, 3.80 (each 3H, NAc, 3 × OCH_3) [2]

References

1. M.K. Yusupov, A.S. Sadykov, Zh. Obshch. Khim. **34**, 1672, 1677 (1964)
2. M.K. Yusupov, *The Chemistry of Plant Substances* [in Russian] (Fan, Tashkent, 1972), p. 19

2-Demethylcolchamine (2-Demethyldemecolcine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum, C. speciosum, Merendera jolantae, M. robusta, M. sobolifera*
$C_{20}H_{23}NO_5$: 357.1576
Mp: 136–138°C
$[\alpha]_D$ −120° [1, 2]
UV: 241, 355(4.49, 4.19) [2]
IR: 3260, 1616, 1591, 1568, 1557, 1498, 1315, 1248, 1143, 1080, 1036, 981, 918 [3]
HPLC: [4]

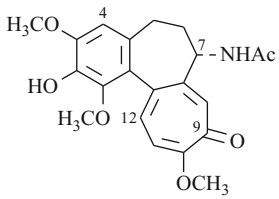
References

1. M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. (3), (1978)
2. H. Potesilova, L. Hruban, F. Santavy, Collect. **41** (10), 3141 (1976)
3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak

Academy of Sciences, Heyden & Son Ltd, London, 1965), **1**, No. 94 A
4. A. Husek, N. Sutlupinar, P. Sedmera, F. Voegelein, I. Valka, V. Simanek, Phytochemistry **29**, 3058 (1990)

2-Demethylcolchicine

CAS Registry Number: 7336-36-9



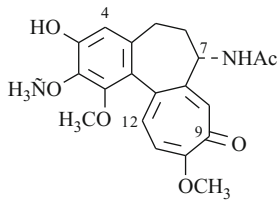
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, C. laetum, C. luteum, C. speciosum, Merendera raddeana, M. robusta, M. sobolifera*
$C_{21}H_{23}NO_6$: 385.1525
Mp: 178–180°C ($CHCl_3$)
$[\alpha]_D$ −133° ($CHCl_3$) [1, 2]
UV: 243, 253(4.43, 4.17) [3]
IR: 3260, 1683, 1668, 1615, 1589, 1552, 1535, 1498, 1318, 1258, 1178, 1146, 1084 [3]
MS m/z: 385(M^+) [2]
^{1}H NMR: 1.99 (NAc), 3.66, 3.90, 4.10 (each 3H, s, 3 × OCH_3), 6.52 (1H, s, H-4), 7.61 (1H, s, H-8), 6.77, 7.38 (each 1H, d, J = 10, H-11, H-12) [2]
HPLC: [4]
Pharm./Biol.: LD_{100} 70 mg/kg [5]

References

1. M.K. Yusupov, A.S. Sadykov, DAN UzSSR (3), 25 (1967)
2. O.I. Popova, D.A. Murav'eva, O.N. Tolkachev, Chem. Nat. Comp. **27**, 647 (1991)
3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd, London, 1965). **1**, No. 92A
4. A.E. Klein, P.J. Davis, J. Chromatogr. **207**, 247 (1981)
5. V.V. Kiselev, Chem. Nat. Comp. **13**, 1 (1977)

3-Demethylcolchicine

CAS Registry Number: 7336-33-6

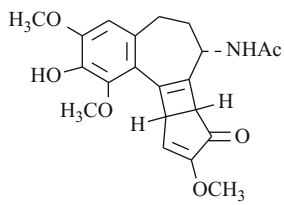


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, C. luteum, C. szovitsii, Merendera raddeana, M. robusta, M. trigyna*
$C_{21}H_{23}NO_6$: 385.1525
Mp: 276–278°C (EtOAc–Me_2CO) [1]; 176–182°C [2]
$[\alpha]_D$ −263° (MeOH) [1]; −130° ($CHCl_3$) [2]; 225° (Ac), 228° (O–Ac) [1, 2]
UV: 243, 355(4.46, 4.19) [3]
MS *m/z*: 385(M^+), 357, 342, 326 [2]
^{1}H NMR: 2.00 (3H, s, NAc), 3.65 (s, OCH_3), 4.00 (3H, s, OCH_3), 6.55 (1H, s, H-4), 6.88 (1H, d, J = 12, H-11), 7.34 (1H, d, J = 12, H-12), 7.58 (1H, s, H-8), 8.02 (1H, m, NH) [2]
HPLC: [4]
Pharm./Biol.: LD_{100}-25 mg/kg, LD_{50}-16 mg/kg. [5]

References

1. B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **6**, 77 (1970)
2. S.M. Kupchan, R.W. Britton, C.K. Chiang, N.N. Alpan, M.F. Ziegler, J. Natur. Prod. **36**, 338 (1973)
3. H. Potesilova, L. Hruban, F. Santavy, Collect. **41**, 3146 (1976)
4. A.E. Klein, P.J. Davis, J. Chromatogr. **207**, 247 (1981)
5. V.V. Kiselev, Chem. Nat. Comp. **13**, 1 (1977)

2-Demethyl-β-Lumicolchicine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids

Biological sources: *Colchicum kesselringii, C. luteum, C. speciosum, C. szovitsii, Merendera raddeana, M. robusta, M. sobolifera*

$C_{21}H_{23}NO_6$: 385.1525

Mp: 234–236°C (Me_2CO) [1]

$[\alpha]_D$ +288° (MeOH) [1]

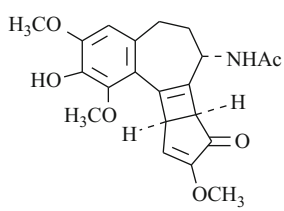
IR: 1710, 1640 [2]

Pharm./Biol.: Anticholinesterase activity [3]

References

1. B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **26**, 113 (1990)
2. H. Potesilova, J. Wiedermannova, F. Santavy, Collect. **34**, 3642 (1969)
3. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, B. Chommadov, Yu.R. Khakimov, A.A. Abduvakhabov, D.I. Israilov, DAN UzSSR (4), 33 (1991)

2-Demethyl-γ-Lumicolchicine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids

Biological sources: *Colchicum kesselringii, C. luteum, Merendera raddeana, M. robusta*

$C_{21}H_{23}NO_6$: 385.1525

Mp: 291–293°C (Me_2CO), 276°C (O–Me.), 268°C (O–Ac.) [1]

$[\alpha]_D$ −410° (MeOH) [1]

Solubility: very sol. MeOH; sol. $CHCl_3$; spar. sol. Me_2CO, H_2O; insol. Et_2O, pet. ether [2]

UV: 228, 264, 282, 342 [1]

IR: 3543, 1720, 1645, 1613 [3]

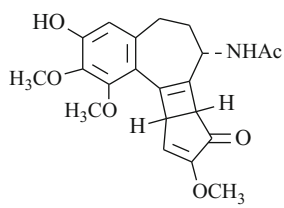
MS *m/z*: 385(M^+), 342 [2]

^{1}H NMR: 1.98, 2.65 (4H, H-6, H-5), 1.98 (3H, s, NAc), 3.50 (1H, NH), 3.60 (H-8), 3.62, 3.85, 3.93 (each 3H, s, 3 × OCH_3), 4.10 (H-12), 6.42 (H-4), 6.58 (H-11) [2, 3]

References

1. B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **6**, 77, 274 (1970)
2. B. Chommadov, M.K. Yusupov, F.G. Kamaev, A.S. Sadykov, Izv. AN Turk. SSR, Ser. Fiz-Tekhn., Khim. Geol. Nauk (5), 111 (1970)
3. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

3-Demethyl-β-Lumicolchicine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids

Biological sources: *Colchicum kesselringii, C. luteum, Merendera raddeana, M. robusta*

$C_{21}H_{23}NO_6$: 385.1525

Mp: 198–200°C (EtOAc), 224°C (O–Ac.) [1]

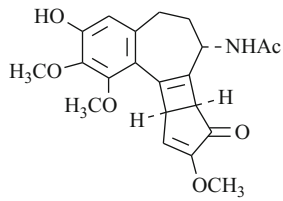
$[\alpha]_D$ + 337° ($CHCl_3$) [1]

UV: 226, 264, 344 [1]; 276(4.30) [2]
IR: 3600, 3370, 3290, 1702, 1629, 1605, 1572, 1543, 1534, 1335, 1283, 1255, 1231, 1173, 1140, 1120, 1079 [2]
MS *m/z*: 385(M^+) [1]
^{1}H NMR: 2.05, 2.65 (each 2H, m, H-5, H-6), 2.07 (NAc), 3.63 (H-8), 3.68, 3.91, 3.94 (each 3H, s, 3 × OCH_3), 4.10 (H-12), 4.80 (H-7), 6.03 (NH), 6.52 (1H, s, H-4), 6.62 (H-11) [3]

References

1. Kh. Turdikulov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **7**, 528 (1971)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd, London, 1972), **7**, No. 818A
3. R.G. Severini, B. Danieli, Gazz. Chim. Ital. **99**, 133 (1969)

3-Demethyl-γ-Lumicolchicine

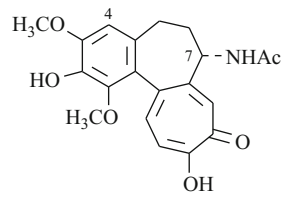


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, Merendera jolantae*
$C_{21}H_{23}NO_6$: 385.1525
Mp: 287–288°C, 276°C (O–Ac.) [1]
$[\alpha]_D$ −420° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$; spar. sol. MeOH, Me_2CO; insol. Et_2O, pet. ether [1]
UV: 226, 266, 340 [1]
IR: 3310, 1710, 1635 [1]
MS *m/z*: 385(M^+), 342 [1]
^{1}H NMR: 2.04 (3H, s, NAc), 3.72, 3.92, 3.94 (each 3H, s, 3 × OCH_3) [1]

References

1. Kh. Turdikulov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 494 (1972)

2,10-Didemethylcolchicine

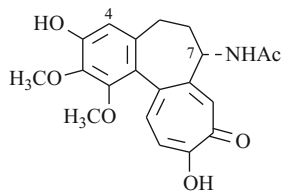


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum, Merendera raddeana, M. robusta*
$C_{20}H_{21}NO_6$: 371.1369
Mp: 259–261°C (EtOAc), 221°C (di–Ac) [1]
$[\alpha]_D$ −230° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, MeOH, Me_2CO; spar. sol. Et_2O, H_2O [1]
UV: 246, 348 [1]
IR: 3275, 1675, 1605, 1600 [1]
MS *m/z*: 371(M^+), 343, 328, 312, 300, 284, 269 [1]
^{1}H NMR: 1.96 (3H, s, NAc), 2.26 (4H, m, H-5, H-6), 3.65, 3.91 (each 3H, s, 2 × OCH_3), 4.60 (1H, H-7), 5.86 (2H, 2 × OH), 6.51 (1H, s, H-4), 7.20 (1H, NH), 7.26, 7.52 (each 1H, d, J = 11, H-11, H-12), 7.55 (1H, s, H-8) [1]

References

1. B. Chommadov, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **27**, 58 (1991)

3,10-Didemethylcolchicine (3-Demethylcolchiceine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids

Biological sources: *Colchicum kesselringii, C. luteum, C. szovitsii, Merendera jolantae, M. raddeana, M. robusta, M. trigyna*

$C_{20}H_{21}NO_6$: 371.1369

Mp: 179–183°C (amorph.), 122°C (di–Ac) [1]

$[\alpha]_D$ −170° ($CHCl_3$) [1, 2]

Solubility: sol. MeOH, $CHCl_3$, Me_2CO; spar. sol. H_2O, Et_2O, pet. ether [1]

UV: 244, 350(4.30, 4.00) [1]

IR: 3275, 1675, 1615, 1354, 1280 [1]

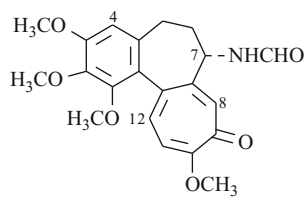
^{1}H NMR: 1.98, 2.30 (each 2H, m, H-5, H-6), 2.13 (3H, s, NAc), 3.57, 3.96 (each 3H, s, 2 × OCH_3), 3.83 (OH-10), 4.45–4.85 (1H, br s, H-7), 6.58 (1H, s, H-4) [1]

References

1. B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **6**, 77 (1970)
2. K.M. Zuparova, B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 481 (1972)

N-Formyldeacetylcolchicine

CAS Registry Number: 36069-06-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids

Biological sources: *Colchicum kesselringii, C. luteum, C. speciosum, Merendera raddeana, M. robusta*

$C_{21}H_{23}NO_6$: 385.1525

Mp: 265–267°C [1]

$[\alpha]_D$ −167° [1]

UV: 241, 350(4.44, 4.18) [2]

IR: 3240, 1746, 1686, 1616, 1594, 1556, 1538, 1492, 1325, 1258, 1196, 1141, 1095, 1018 [2]

MS *m/z*: 385(M^+), 357, 342, 312(100), 297, 281 [3]

^{1}H NMR: 1.90–2.60 (4H, H-5, H-6), 3.65, 3.90, 3.93, 4.00 (each 3H, s, 4 × OCH_3), 4.70 (1H, m, H-7), 6.55 (1H, s, H-4), 6.89, 7.35 (each 1H, d, J = 11, H-11, H-12), 7.60 (1H, s, H-8), 8.19 (CHO), 8.31 (NH) [4]

HPLC: [5]

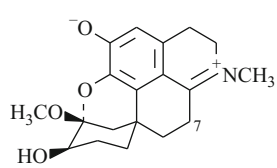
Pharm./Biol.: LD_{50} 100 mg/kg. Antitumoral activity [6]

References

1. M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **14**, 1 (1978); *DAN UzSSR*, No. 3, 25 (1967)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd, London, 1965), **1**, No. 120
3. J.M. Wilson, M. Ohashi, H. Budzikiewicz, F. Santavy, C. Djerassi, Tetrahedron **19**, 2225 (1963)
4. R.G. Severini, B. Danieli, Gazz. Chim. Ital. **99**, 133 (1969)
5. A. Husek, N. Sutlupinar, P. Sedmera, F. Voegelein, I. Valka, V. Simanek, Phytochemistry **29**, 3058 (1990)
6. V.V. Kiselev, Chem. Nat. Comp. **13**, 1 (1977)

Isoregecoline

CAS Registry Number: 104972-88-5



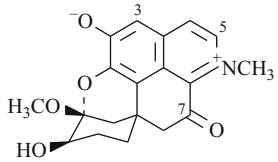
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{19}H_{23}NO_4$: 329.1627
Mp: 284–286°C, 228°C (dihydro) [1]
IR: 3380, 3250, 2930, 1630, 1595, 1450, 1440 [1]
MS *m/z*: 329(M^+, 100), 327, 314(100), 310, 298, 296, 270, 228 [1]
^{1}H NMR: (CD_3OD): 3.34, 3.50(each 3H, s, NCH_3, OCH_3), 3.78–4.23(3H, m, CH_2, CH), 6.65(1H, s, H-3) [1]

References

1. B. Chommadov, A.M. Usmanov, M.K. Yusupov, Chem. Nat. Comp. **21**, 767 (1985)

Isoregelinone

CAS Registry Number: 79027-71-7



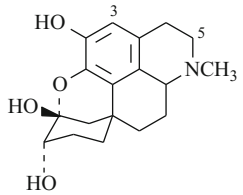
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{19}H_{19}NO_5$: 341.1263
Mp: 321–323°C (Me_2CO–MeOH) [1]; 226°C (octahydro) [2]
Solubility: very sol. MeOH, H_2O; spar. sol. $CHCl_3$, Me_2CO; insol. Et_2O, pet. ether [1]
UV: 250, 300, 393 [3]
IR: 3250, 1690
MS *m/z*: 341(M^+, 100), 326, 323, 313, 309, 298, 294, 282, 256, 244, 242, 241, 240, 232, 230, 228, 226, 213, 212 [1]
^{1}H NMR ($CF_3COOH + D_2O$): 0.90–1.80(4H, m, H-9, H-10), 1.91(1H, d, J = 13.5, H-13a), 2.41(1H, dd, J = 13.5; 2, H-13e), 2.93, 3.21(each 1H, d, J = 13.5, H-8), 3.34(3H, s, OCH_3), 3.82(1H, dd, J = 11.5; 5.0, H-11a), 4.36(3H, s, NCH_3), 7.38(1H, s, H-3), 8.05, 8.19(each 1H, d, J = 7, H-4, H-5) [1]

References

1. A.M. Usmanov, M.K. Yusupov, Chem. Nat. Comp. **17**, 152 (1981)
2. A.M. Usmanov, B. Chommadov, M.K. Yusupov, Chem. Nat. Comp. **21**, 76 (1985)
3. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Kesselridine

CAS Registry Number: 56775-79-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{18}H_{23}NO_4$: 317.1627
Mp: 232–234°C, 263°C (hydrochloride), 250°C (methiodide) [1]
$[\alpha]_D$ −50° (Py)
UV: 219, 290 [2]
IR: 3590, 3420–3230, 1595 [2]
MS *m/z*: 317(M^+), 316(100), 298, 274, 270, 258, 256, 242, 230, 228 [2]
^{1}H NMR (D_2O): 3.10(3H, s, NCH_3), 6.68(1H, s, H-3) [2]
Pharm./Biol.: Reversible cholinesterase inhibitor [3]

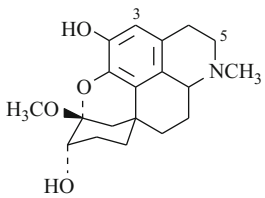
References

1. M.K. Yusupov, A.S. Sadykov, Zh. Obshch. Khim. **34**, 1672 (1964)

2. A.K. Kasymov, M.K. Yusupov, E.Kh. Timbekov, Kh.A. Aslanov, Chem. Nat. Comp. **11**, 205 (1975)
3. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, A.A. Abduvakhabov, Yu.R. Khakimov, B. Chommadov, D.I. Israilov, Uzb. Khim. Zh. (2), 33 (1991)

Kesselringine

CAS Registry Number: 54692-48-7



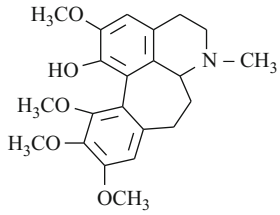
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, C. luteum*
$C_{19}H_{25}NO_4$: 331.1783
Mp: 194–196°C (EtOH), 253°C (hydrochloride), 175°C (perchlorate), 237°C (methiodide), 200°C (O–Me), 142°C (O,O′–di–Ac) [1, 2]; 198°C (O–Me) [3]
$[\alpha]_D$ + 53° (MeOH)
UV: 218, 290(4.13, 3.48) [4]
IR: 3530, 1600, 1460, 900–800 [2]
MS *m/z*: 331(M^+, 42), 330(100), 316, 288, 256, 244, 242, 238, 230, 228, 165 [2]
^{1}H NMR: 2.32 (NCH_3), 3.32 (OCH_3), 3.72 (H-11), 6.42 (H-3) [2]
X-ray: (2-methyl-12-demethylkesselringine methosulfate) [5]
Pharm./Biol.: Reversible cholinesterase inhibitor [6]. Sedative and hypnotic action [7]. Lowers arterial pressure and causes retardation of the rhythm of cardiac activity and stimulation of respiration [8]

References

1. M.K. Yusupov, A.S. Sadykov, Uzb. Khim. Zh (5), 49 (1961)
2. M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **12**, 305 (1976)
3. D.A. Abdullaeva, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **12**, 702 (1976)
4. M.K. Yusupov, *The Chemistry of Plant Substances* [in Russian] (Tashkent, Fan, 1972), p. 19
5. G.B. Nazarov, B.T. Ibragimov, S.A. Talipov, B. Chommadov, M.K. Yusupov, T.F. Aripov, Chem. Nat. Comp. (22), 82 (1986)
6. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, A.A. Abduvakhabov, Yu.R. Khakimov, B. Chommadov, D.I. Israilov, Uzb. Khim. Zh. (2), 33 (1991)
7. S. Kh. Nasyrov, L. S. Emel'yanova, *Modern Problems of Pharmacology*. Proceedings of the IIIrd Congress of Pharmacologists of the USSR [in Russian], (Kiev, 1971), p. 195
8. L.S. Emel'yanova, *The Pharmacology of Plant Substances*, Scientific Proceedings of Tashkent State University, No. 457, Fan, (Tashkent, 1973), p. 69

Kreizigine (Kreisigine)

CAS Registry Number: 19741-86-7

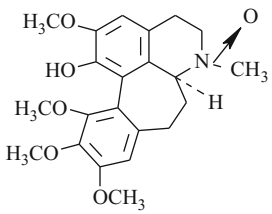


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera raddeana*
$C_{22}H_{27}NO_5$: 385.1889
Mp: 188°C (EtOH), 266°C (methiodide) [1]
$[\alpha]_D$ 0°
UV: 221, 260, 293 [1]
IR: 1608, 1577 [1]
MS *m/z*: 385(M^+), 368(100) [2]
^{1}H NMR: 1.90–3.50 (9H), 3.59, 3.83, 3.86 (3H, 3H, 6H, s, 4 × OCH_3), 6.54, 6.59 (each 1H, s, H–Ar) [2]

References

1. G.M. Badger, R.B. Bradbery, J. Chem. Soc. **85**, 445 (1960)
2. A.R. Battersby, R.B. Bradbery, R.B. Herbert, M.N. Munro, R.Ramage, Chem. Commun. 450 (1967)

Kreizigine N-Oxide (Kreisigine N-Oxide)

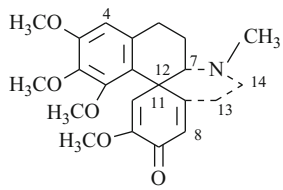


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera raddeana*
$C_{22}H_{27}NO_6$: 401.1838
Mp: 143–145°C [1, 2]

References

1. M.K. Yusupov, B. Chommadov, Kh.A. Aslanov, Chem. Nat. Comp. **27**, 75 (1991)
2. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Krokiflorinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{22}H_{27}NO_5$: 385.1889
Mp: 209–210°C, 230°C (methiodide) [1]
$[\alpha]_D$ −205° [1]
UV: 212, 235, 270 sh, 282 [1]
IR: 1685, 1655, 1625, 1605 [1]
MS *m/z*: 385(M^+, 100), 384, 370, 357, 356, 354, 342, 224 [1]
^{1}H NMR: 2.87 (3H, s, NCH_3), 3.58, 3.86, 4.00 (3H, 6H, 3H, s, 4 × OCH_3), 4.60 (H-7), 6.32, 6.57, 6.74 (each 1H, s, H-4, H-8, H-11) [1]
^{13}C NMR: [1]

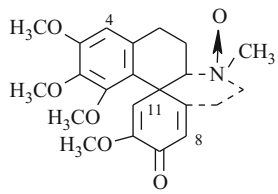
Table 1

C–1	153.4	C–8	131.6	C–1a	141.2
2	152.4	9	179.4	4a	136.5
3	152.4	10	150.1	8a	119.8
4	109.8	11	120.9	NCH_3	39.2
5	33.0	12	47.5	OCH_3	60.6
6	31.7	13	25.8		60.1
7	64.9	14	45.4		55.4
					54.4

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Krokiflorinine N-Oxide (Krokiflorine, Crociflorinine N-Oxide, Crociflorine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{22}H_{27}NO_6$: 401.1838
Mp: 229–230°C [1]
$[\alpha]_D$ −255° ($CHCl_3$) [1]
Solubility: very sol. H_2O, MeOH; spar. sol. $CHCl_3$, Me_2CO [1]

IR: 1680, 1655, 1630, 1610, 1470 [1]
MS *m/z*: (M^+, 3), 385(100), 384, 370, 356, 342, 224 [1]
^{1}H NMR: 3.52 (3H, s, NCH_3), 3.56, 3.75, 3.98 (3H, 6H, 3H, s, 4 × OCH_3), 6.27, 6.68, 6.70 (each 1H, s, H-4, H-8, H-11) [1]
^{13}C NMR: [1]

Table 1

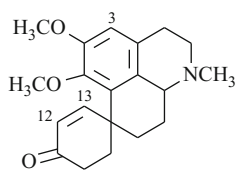
C=	154.0, 152.8, 151.6, 150.4, 141.4, 136.7, 119.8
=CH	134.0, 120.9, 109.9
CH_2	30.3, 32.1, 26.8
CH–N	73.1
CH_2–N	54.3
CH_3–N	50.5
>C<	47.1
OCH_3	61.0, 60.3, 55.7, 54.7
C = O	179.2

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992; Unpub.

Krokiflorinone (Crociflorinone)

CAS Registry Number: 55437-98-4

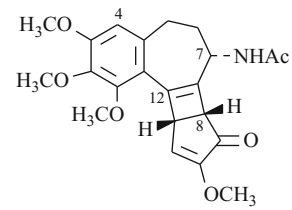


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{20}H_{25}NO_3$: 327.1834
Mp: 246–248°C (Me_2CO-Et_2O), 272°C (methiodide) [1]
UV: 227 sh, 276 sh, 288 sh [1]
IR: 2940, 1695, 1600, 1470, 900–800 [1]
MS *m/z*: 327(M^+), 326, 284 [1]
^{1}H NMR: (methiodide, CF_3COOH): 2.65, 3.02(each 3H, s, $N(CH_3)_2$), 3.52(6H, s, 2 × OCH_3), 5.89, 6.89(each 1H, d, H-12, H-13), 6.48(s, H-3) [1]

References

1. Kh. Turdikulov, M.K. Yusupov, Kh.A. Aslanov, A.S. Sadykov, Chem. Nat. Comp. **10**, 844 (1974)

β-Lumicolchicine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, C. laetum, C. luteum, Merendera jolantae, M. raddeana, M. robusta, M. sobolifera, M. trigyna*
$C_{22}H_{25}NO_6$: 399.1682
Mp: 184–186°C (EtOAc)
$[\alpha]_D$ + 309° ($CHCl_3$) [1, 2]
UV: 226, 264, 342 [1]
IR: 3280, 1733, 1648, 1619, 1600, 1570, 1537, 1498, 1336, 1295, 1254, 1135, 1125, 1110, 1033 [2]
MS *m/z*: 399(M^+), 356, 340 [3]
^{1}H NMR: 2.05 (2H, H-6), 2.06(3H, s, NAc), 2.70 (2H, H-5), 3.64 (H-8), 3.67, 3.87, 3.97 (3H, 6H, 3H, s, 4 × OCH_3), 4.12 (H-12), 4.86 (H-7), 6.08 (NH), 6.48 (H-4), 6.65 (H-11) [4]
HPLC: [5]
Pharm./Biol.: Anticholinesterase activity [6]

References

1. K.M. Zuparova, B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 481 (1972)
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Academy of Sciences, Heyden & Son Ltd, London, 1965), **1**, No. 160A
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4. G. Severini Ricco, B. Danieli, Gazz. Chim. Ital. **99**, 133 (1969)
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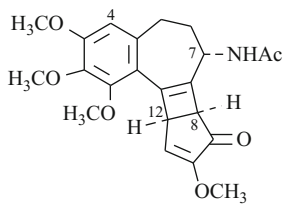
γ-Lumicolchicine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, C. speciosum, Merendera raddeana, M. robusta*
$C_{22}H_{25}NO_6$: 399.1682
Mp: 276–278°C (Et_2O–$CHCl_3$)
$[\alpha]_D$ −304° ($CHCl_3$) [1, 2]
UV: 223, 266, 335(4.41, 4.42, 3.38) [2]
IR: 3320, 1714, 1647, 1613, 1601, 1537, 1500, 1330, 1251, 1238, 1198, 1138, 1131, 1112, 1098, 1039 [2]
^{1}H NMR: 2.00 (NAc), 2.05, 2.70 (each 2H, H-6, H-5), 3.68 (H-8), 3.68, 3.88, 3.94 (each 3H, 6H, 3H, s, 4 × OCH_3), 4.04 (H-12), 4.65 (H-7), 5.92 (NH), 6.47 (H-4), 6.61 (H-11) [3]
HPLC: [4]

References

1. M.K. Yusupov, A.S. Sadykov, Zh. Obshch. Khim. **34**, 1672 (1964)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd, London, 1965), **1**, No. 161A
3. R.G. Severini, B. Danieli, Gazz. Chim. Ital. **99**, 133 (1969)
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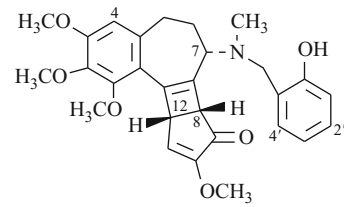
β-Lumispeciosine



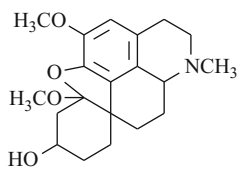
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum speciosum*
$C_{28}H_{31}NO_6$: 477.2151
Mp: 157–158°C (Me_2CO) [1]
$[\alpha]_D$ +132° ($CHCl_3$) [1]
UV: 226 sh, 265, 340 [1]
IR: 2960, 2880, 1720, 1460 [1]
MS *m/z*: 477(M^+), 462, 447, 446, 434, 371, 370, 356, 340, 328, 282, 107, 106 [1]
^{1}H NMR: 2.06 (NCH_3), 3.58 (1H, dd, J = 2.6, 1.8, H-8), 3.68, 3.82, 3.84, 3.90 (each 3H, c, 4 × OCH_3), 3.90 (1H, dd, J = 3.0, 2.6, H-12), 6.38 (1H, s, H-4), 6.68 (1H, d, J = 3, H-11), 6.70, 6.90 (1H, 2H, m, H-3′, H-4′, H-5′), 7.14 (1H, q, J = 7.15, H-2′) [1]

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Luteicine

CAS Registry Number: 1359-25-7



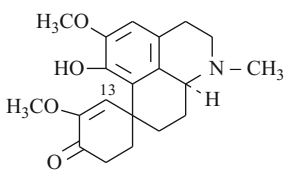
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum*
$C_{20}H_{27}NO_4$: 345.1940
Mp: 211°C (Ac) [1]; 250°C (methiodide) [2]; 230°C (methiodide Ac) [1]; 267°C (luteicinone) [1]
$[\alpha]_D$ + 112° ($CHCl_3$) [1]
UV: 215, 237 sh, 287(4.70, 4.10, 3.50) [1]
IR: 3370, 1600, 1470 [1]
MS *m/z*: 345(M^+, 50), 344(100), 330, 328, 314, 302, 284 [1]
^{1}H NMR: 2.73(3H, s, NCH_3), 3.28, 3.73(each 3H, s, 2 × OCH_3), 6.43(1H, s, H–Ar) [2]

References

1. M.K. Yusupov, N.L. Mukhamed'yarova, Kh.A. Aslanov, Chem. Nat. Comp. **12**, 313 (1976)
2. M.K. Yusupov, *The Chemistry of Plant Substances* [in Russian] (Fan, Tashkent, 1972), p. 19

Luteidine

CAS Registry Number: 55790-08-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum, Merendera jolantae*
$C_{20}H_{25}NO_4$: 343.1783
Mp: 231–232°C (Me_2CO) [1], 258°C (hydrochloride), 265°C (methiodide), 181°C (picrate) [2]; 171°C (oxime) [3]; 235°C (luteinone), 200°C (O, N–di–Ac), 265°C (methiodide O–Me) [1]
$[\alpha]_D$ −96° (MeOH) [1]
UV: 228, 272(3.89, 4.05) [1]
IR: 3535, 1677, 1667, 1617, 1600 [1]
MS *m/z*: 343(M^+, 38), 342(22), 244(100) [1]
^{1}H NMR: 2.37 (3H, s, NCH_3), 3.51, 3.78 (each 3H, s, 2 × OCH_3), 5.79 (1H, s, H-13), 6.46 (1H, s, H-3) [1]
^{13}C NMR: [1]
X-ray: [4]
Pharm./Biol.: Reversible cholinesterase inhibitor [5]. Only slightly toxic. Lowers arterial pressure with brief stimulation of respiration [6]

References

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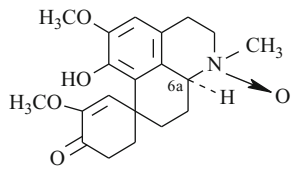
5. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, A.A. Abduvakhabov, Yu.R. Khakimov, B. Chommadov, D.I. Israilov, Uzb. Khim. Zh. (2), 33 (1991)
6. L.S. Emel'yanova, *The Pharmacology of Plant Substances, Nauchn. Trudy TashGU [Scientific Papers of Tashkent State University]*, 457 (Fan, Tashkent, 1973), p. 69

Luteidine *cis*-N-Oxide

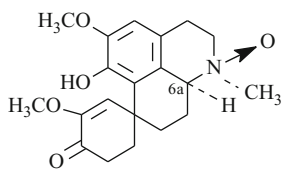


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum*
$C_{20}H_{25}NO_5$: 359.1732
Solubility: very sol. H_2O [1]
UV: 226–228 sh, 268–270 [1]
IR: 3400, 1685–1680 [1]
MS *m/z*: 359(M^+), 343, 342, 341, 328, 326, 300 [1]
^{1}H NMR: 3.52 (3H, s, NCH_3), 4.38–4.66 (1H, m, H-6a) [1]

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Luteidine *trans*-N-Oxide



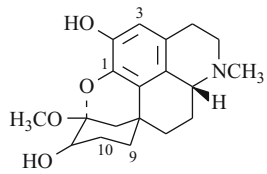
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum*
$C_{20}H_{25}NO_5$: 359.1732
Mp: 179–180°C [1]
Solubility: very sol. H_2O [1]
UV: 226–228 sh, 268–270 [1]
IR: 3400, 1685–1680 [1]
MS *m/z*: 359(M^+), 343, 342, 341, 328, 326, 300 [1]
^{1}H NMR: 3.14 (3H, s, NCH_3), 4.38–4.66 (1H, m, Ha-6) [1]

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Luteine

CAS Registry Number: 62624-08-2



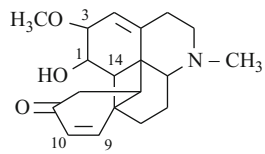
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, C. luteum*
$C_{19}H_{25}NO_4$: 331.1783
Mp: 228–230°C (Me_2CO), (O,O′,N–tri Ac amorph.) [1]; 262°C (hydrochloride), 251°C (methiodide), 165°C (perchlorate), 172°C (picrate) [2]
$[\alpha]_D$ +93° (MeOH) [1]
Solubility: very sol. MeOH, $CHCl_3$; spar. sol. Me_2CO; insol. H_2O [2]
UV: 210, 285(4.70, 3.70) [1]
IR: 3470, 1590, 1470 [1]
MS *m/z*: 331(M^+, 43), 330(100), 316, 300, 288, 284, 270, 230, 228, 215, 201 [1]
^{1}H NMR: 1.25 (H-10a), 1.40 (H-13a), 1.75 (H-10e), 1.97 (H-9a), 2.03 (H-13e), 2.35 (3H, s, NCH_3), 3.25 (3H, s, OCH_3), 3.64 (1H, dd, J = 10, 5.5, H-11a), 4.70 (1H, br s, OH), 6.47 (1H, s, H-3) [1]

References

1. N.L. Mukhamed'yarova, M.K. Yusupov, M.G. Levkovich, Chem. Nat. Comp. **12**, 718 (1976)
2. M.K. Yusupov, A.S. Sadykov, Nauch. Trudy TashGU (203), 3 (1962)

Luteinine

CAS Registry Number: 1359-27-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum*
$C_{19}H_{25}NO_3$: 315.1834
UV: 220, 246 sh, 278 sh (4.12, 4.04, 3.20) [1]
IR: 3350, 1680 [1]
MS *m/z*: 315(M^+), 300, 289, 282, 272 [1]
^{1}H NMR: 2.04 (1H, d, J = 6, 14-H), 2.46 (3H, s, NCH_3), 3.34 (3H, s, OCH_3), 3.46 (1H, dd, J = 6,

4, H-1), 4.32 (1H, dd, J = 6.2, 4, H-2), 5.82 (1H, d, J = 6.2, H-3), 5.86 (1H, dd, J = 9.5, 1.8, H-9), 6.77 (1H, dd, J = 9.5, 2, H-10) [1]
^{13}C NMR: [1]

Table 1

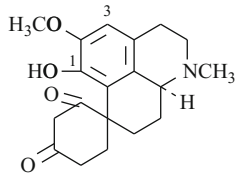
>C = O	192.6	–O–CH<	76.3; 64.4
>C=	144.0	N–CH<	62.1
>C<	52.0; 48.3	N–CH_2	50.2
–CH=	158.8; 128.2; 119.8	O–CH_3	56.2
–CH	48.0; 45.2	N–CH_3	41.2
>CH_2	42.8; 33.8; 30.9; 24.4		

References

1. N.L. Mukhamed'yarova, M.G. Levkovich, M.K. Yusupov, Nauch. Trudy TashGU, Tashkent (513), 111 (1976)

Luteinone

CAS Registry Number: 61929-88-0



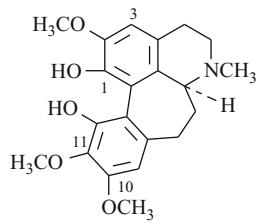
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum luteum*
$C_{19}H_{23}NO_4$: 329.1627
Mp: 237–238°C (Me_2CO), 213°C (dioxime) [1]
$[\alpha]_D$ + 325° ($CHCl_3$) [1, 2]
IR: 3220, 1735 [1, 2]
MS *m/z*: 329(M^+, 50), 328(100), 287, 257, 244, 242 [1, 2]
^{1}H NMR: 2.35 (3H, s, NCH_3), 3.70 (3H, s, OCH_3), 6.44 (1H, s, H-3) [1, 2]
Pharm./Biol.: Reversible cholinesterase inhibitor [3]

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992
2. N.L. Mukhamed'yarova, M.K. Yusupov, M.G. Levkovich, Kh.A. Aslanov, A.S. Sadykov, Chem. Nat. Comp. **12**, 308 (1976)
3. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, A.A. Abduvakhabov, Yu.R. Khakimov, B. Chommadov, D.I. Israilov, Uzb. Khim. Zh. (2), 33 (1991)

Merobustine

CAS Registry Number: 170554-73-1

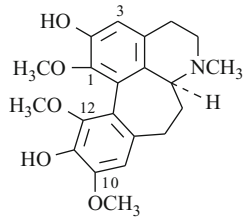


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera robusta*
$C_{21}H_{25}NO_5$: 371.1733
Mp: 241–242°C (Me_2CO) [1]
$[\alpha]_D$ + 76° ($CHCl_3$) [1]
UV: 260, 290 [1]
IR: 3470–3420 [1]
MS *m/z*: 371(M^+), 356, 354(100), 340 [1]
^{1}H NMR: 2.40 (3H, s, NCH_3), 3.83–3.85 (9H, 3 × OCH_3), 6.43, 6.67 (each 1H, s, H-9, H-3) [1]

References

1. R.V. Alikulov, M.K. Yusupov, Chem. Nat. Comp. **29**, 767 (1993)

Merobustinine

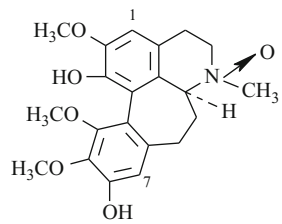


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera robusta*
$C_{21}H_{25}NO_5$: 371.1733
Mp: 216–218°C (Me_2CO) [1]
$[\alpha]_D$ + 42° ($CHCl_3$) [1]
UV: 258, 292 [1]
MS *m/z*: 371(M^+), 356, 354, 340(100) [1]
^{1}H NMR: 2.38 (3H, s, NCH_3), 3.52, 3.60, 3.85 (each 3H, s, 12-OCH_3, 1-OCH_3, 10-OCH_3), 6.55, 6.68 (each 1H, s, H-9, H-3) [1]

References

1. R.V. Alikulov, M.K. Yusupov, Chem. Nat. Comp. **29**, 767 (1993)

Merenderine N-Oxide



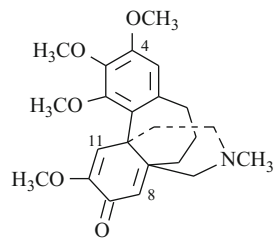
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera raddeana*
$C_{21}H_{25}NO_6$: 387.1682
Mp: 251–252°C (Me_2CO) [1]
$[\alpha]_D$ + 125° (MeOH) [1]
Solubility: very sol. H_2O; spar. sol. nonpolar solvent [1]
UV: 260, 290(4.16, 3.77) [1]
IR: 1600, 1465, 900–800 [1]
MS *m/z*: 387(M^+, 11), 371(53), 370(17), 369(11), 354(89), 340(42), 328(100) [1]
^{1}H NMR: (CF_3COOH): 3.18(3H, s, NCH_3), 3.46, 3.59, 3.65(each 3H, s, 3 × OCH_3), 6.47, 6.52(each 1H, s, H-1, H-7) [1]

References

1. M.K. Yusupov, B. Chommadov, Kh.A. Aslanov, Chem. Nat. Comp. **27**, 75 (1991)

O-Methylandrocymbine

CAS Registry Number: 6890-90-0

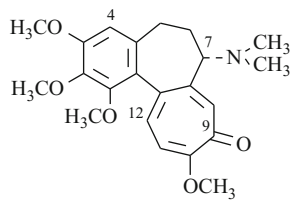


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum szovitsii*
$C_{22}H_{27}NO_5$: 285.1889
Mp: 176–178°C (Et_2O–C_6H_{14}) [1]
$[\alpha]_D$ −140° ($CHCl_3$) [1]
UV: 238, 280(4.28, 3.69) [1, 2]
IR: 1670, 1642, 1610, 1600 [1]
MS *m/z*: 385(M^+, 100), 370, 356, 354, 342 [1]
^{1}H NMR: 2.32 (3H, s, NCH_3), 3.56, 3.76, 3.94 (3H, 6H, 3H, s, 4 × OCH_3), 6.22, 6.27, 6.74 (each 1H, s, H-4, H-8, H-11) [1]

References

1. M.K. Yusupov, Kh.A. Aslanov, Bik Ngo Din Tkhi. Chem. Nat. Comp. **11**, 289 (1975)
2. T. Kametani, M. Koizumi, K. Fukumoto, J. Chem. Soc. B. 1792 (1971)

N-Methylcolchamine (N-Methyldemecolcine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera robusta*
$C_{22}H_{27}NO_5$: 385.1889
Mp: 206–208°C (EtOAc–Et_2O) [1]
$[\alpha]_D$ −109° ($CHCl_3$) [1]
UV: 244, 255(4.54, 4.25) [2]
IR: 1615, 1590, 1560, 1487, 1464, 1398, 1359, 1345, 1326, 1313, 1281, 1138, 1093, 1011, 999, 986, 898 [3]
MS *m/z*: 385(M^+, 100), 370(27), 357(36), 356(50), 354(27), 342(73), 326(73), 314(45), 313(50), 312(73) [3]
^{1}H NMR: 1.74, 1.90–2.60(4H)(2m, 2H–C(5) and 2H–C(6)), 2.12(6H, s, $N(CH_3)_2$), 2.68(m, H-7), 3.60, 3.90, 3.93, 3.98(3H, s, 4 × OCH_3), 6.51(1H, s, H-4), 6.76, 7.21(each 1H, d, J = 11, H-11, H-12), 8.09(1H, s, H-8) [3]
^{13}C NMR: [4]

Table 1

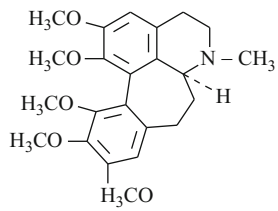
C–1	150.6	C–7	68.5	C–12a	137.5
2	141.6	7a	152.0	1a	125.9
3	153.6	8	134.2	1-OCH_3	60.6
4	107.5	9	180.1	2-OCH_3	61.2
4a	134.8	10	164.1	3-OCH_3	56.1
5	30.6	11	111.7	10-OCH_3	56.1
6	36.3	12	133.8	NCH_3	43.7

Pharm./Biol.: LD_{100} 20 mg/kg. Antitumoral activity [5]

References

1. Kh. Turdikulov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 247 (1972)
2. A. Uffer, O. Schindler, F. Santavy, T. Reichstein, Helv. Chim. Acta **37**, 18 (1954)
3. H.-G. Capraro, A. Brossi, Helv. Chim. Acta **62**, 965 (1979)
4. C.D. Huffort, H.-G. Capraro, A. Brossi, Helv. Chim. Acta **63**, 50 (1980)
5. V.V. Kiselev, Chem. Nat. Comp. **13**, 1 (1977)

O-Methylkreizigine (O-Methylkreisigine)

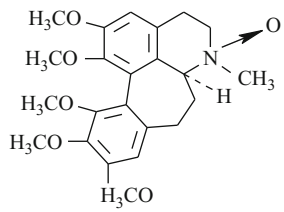


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum szovitsii, Merendera raddeana*
$C_{23}H_{29}NO_5$: 399.2046
Mp: oil, 153°C (methiodide) [1]
$[\alpha]_D$ +81° ($CHCl_3$) [1]
UV: 258, 290(4.00, 3.78) [1]
MS *m/z*: 399(M^+, 23), 398(4), 384(17), 370(10), 368(100), 356(2), 354(4), 352(4), 204(6) [2]
^{1}H NMR: 2.35 (3H, s, NCH_3), 3.48, 3.56, 3.81 (each 3H, s, 3 × OCH_3), 3.83 (6H, s, 2 × OCH_3) [1]

References

1. M.K. Yusupov, B.N. Din Tkhi, Kh.A. Aslanov, Chem. Nat. Comp. **11**, 555 (1975)
2. A.K. Kasymov, E.Kh. Timbekov, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **13**, 197 (1977)

O-Methylkreizigine N-Oxide (O-Methylkreisigine N-Oxide)

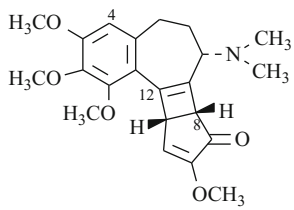


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera raddeana*
$C_{23}H_{29}NO_6$: 415.1995
Mp: 161–163°C [1]

References

1. M.K. Yusupov, B. Chommadov, Kh.A. Aslanov, Chem. Nat. Comp. **27**, 75 (1991)

N-Methyl-β-Lumicolchamine



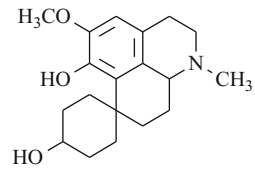
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum speciosum*
$C_{22}H_{27}NO_5$: 385.1889
Mp: 158–160°C [1]; amorph. [2]
$[\alpha]_D$ + 321° [1]
UV: 226–230, 264–266, 342 [1]
IR: 1720 [1]
^{1}H NMR: 2.15 (6H, s, $N(CH_3)_2$), 3.60 (1H, dd, H-8), 3.72, 3.92, 3.94, 3.96 (each 3H, s, 4 × OCH_3), 4.60 (1H, dd, H-12), 6.43 (1H, s, H-4), 6.65 (1H, d, H-11) [1]

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992
2. B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **26**, 113 (1990)

Ornithogalline

CAS Registry Number: 59272-74-1



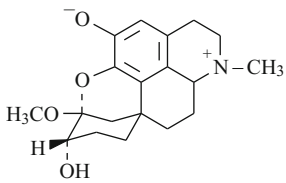
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Ornithogalum platyphyllum*
$C_{19}H_{27}NO_3$: 317.1991
Mp: 169–170°C [1]
IR: 3400–3200, 1600, 1480 [1]
MS *m/z*: 317(M^+) [1]
^{1}H NMR: 2.38 (3H, s, NCH_3), 3.77 (3H, s, OCH_3), 6.40 (1H, s, H-3) [1]

References

1. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Regecoline

CAS Registry Number: 97682-67-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{19}H_{23}NO_4$: 329.1627
Mp: 312–314°C (dec.), 196°C (dihydro) [1]
Solubility: very sol. H_2O; sol. MeOH; spar. sol. $CHCl_3$, Me_2CO; insol. Et_2O [1]
UV: 253, 312, 355 [1]
IR: 3500, 2890, 1638, 1600, 1470, 1450 [1]
MS *m/z*: 329(M^+), 328, 314(100), 310, 298, 296, 270, 228 [1]
^{1}H NMR (CF_3COOH): 1.80–3.40(CH_2–), 3.43(3H, s, OCH_3), 3.59(3H, s, NCH_3), 3.78–4.29(3H, m, CH_2, CH), 6.84(1H, s, H-3) [1]
^{13}C NMR (D_2O): [1]

Table 1

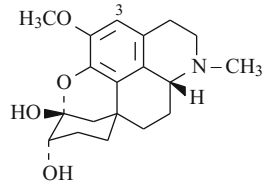
=C–O	172.0; 151.6	–CH_2–N	51.9
=C–	140.7; 132.1; 131.3	–OCH_3	49.3
=CH–	114.0	>NCH_3	42.1
–C = N–	113.2	>C<	34.2
>CO_2	103.3	>CH_2	32.8; 31.8; 28.7;
>CH(OH)	69.4		26.2; 24.7; 24.8

References

1. A.M. Usmanov, B. Chommadov, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **21**, 233 (1985)

Regelamine

CAS Registry Number: 58111-42-5



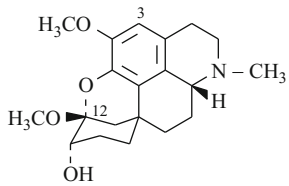
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{19}H_{25}NO_4$: 331.1783
Mp: 225–226°C (Me_2CO), 200°C (O–Me), 250°C (methiodide O–Me), 169°C (O,O–di–Ac), 142°C (O,O, N–tri Ac) [1]; 187°C (dihydro) [2]; 177°C (1,12-desoxa-12-desoxy-1-oxy) [2]
$[\alpha]_D$ +33° (MeOH) [1]
Solubility: sol. MeOH, $CHCl_3$; spar. sol. Me_2CO, H_2O; insol. Et_2O, pet. ether [1]
UV: 218, 290(4.34, 3.59) [1]
IR: 3560, 1600, 1480 [1]
MS *m/z*: 331(M^+, 43), 330(100), 312, 284, 272, 270, 256, 244, 242, 228, 205 [1, 2]
^{1}H NMR: 2.32 (3H, s, NCH_3), 3.73 (3H, s, OCH_3), 6.40 (1H, s, H-3) [1]
Pharm./Biol.: Reversible cholinesterase inhibitor [3]

References

1. M.K. Yusupov, D.A. Abdullaeva, Kh.A. Aslanov, A.S. Sadykov, Chem. Nat. Comp. **11**, 395 (1975)
2. E.Kh. Timbekov, A.K. Kasymov, D.A. Abdullaeva, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **12**, 289 (1976)
3. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, A.A. Abduvakhabov, Yu.R. Khakimov, B. Chommadov, D.N. Israilov, Uzb. Khim. Zh. (2), 33 (1991)

Regeline

CAS Registry Number: 62653-08-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources:*Colchicum kesselringii*
$C_{20}H_{27}NO_4$: 345.1940
Mp: 198–200°C (Me_2CO), 238°C (hydrochloride), 250°C (methiodide), 234°C (norregeline) [1]
$[\alpha]_D$ + 93° (MeOH) [1]
Solubility: very sol. $CHCl_3$, MeOH; sol. Me_2CO, H_2O; insol. Et_2O [1]
UV: 216, 225, 290(4.04, 3.96, 3.37) [1]
IR: 3200, 1600, 1460 [1]
MS *m/z*: 345(M^+, 65), 344(100), 330, 326, 302, 286, 258, 244, 242, 205, 202 [1]
^{1}H NMR: 2.36 (3H, s, NCH_3), 3.34, 3.74 (each 3H, s, 2 × OCH_3), 6.42 (1H, s, H-3) [1]
^{13}C NMR: [1]

Table 1

C–1	142.1	C–6a	60.0	NCH_3	48.9
2	145.0	11	70.5	2-OCH_3	48.9
3	110.2	12	101.9	12-OCH_3	56.0
3a	124.6	14	34.6		
CH_2	34.2, 34.2,	1a	124.4		
	33.0, 28.8,	3b	123.8		
	27.0, 26.4	NCH_2	53.6		

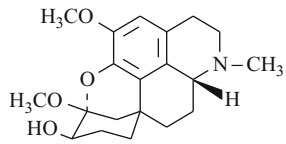
Pharm./Biol.: Highly specific butyrylcholinesterase inhibitor [2]

References

1. D.A. Abdullaeva, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **12**, 702 (1976)
2. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, A.A. Abduvakhabov, Yu.R. Khakimov, B. Chommadov, D.I. Israilov, Uzb. Khim. Zh. (2), 33 (1991)

Regelinine

CAS Registry Number: 97806-68-3



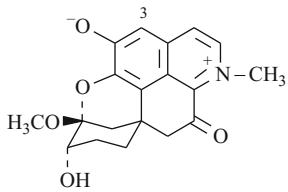
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{20}H_{27}NO_4$: 345.1940
Mp: 253–254°C [1]
$[\alpha]_D$ + 46° [2]
UV: 243, 293 [1]
IR: 3370, 1600, 1470 [1]
MS *m/z*: 345(M^+), 344(100), 302, 298, 284, 244, 242, 229 [1]
^{1}H NMR: 2.36 (3H, s, NCH_3), 3.32, 3.74 (each 3H, s, 2 × OCH_3), 6.44 (H-3) [1]

References

1. M.K. Yusupov, B. Chommadov, Kh.A. Aslanov, Chem. Nat. Comp. **21**, 396 (1985)

Regelinone

CAS Registry Number: 66855-44-5



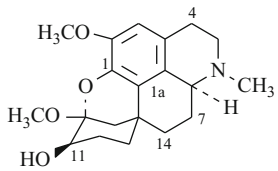
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii*
$C_{19}H_{19}NO_5$: 341.1263
Mp: 316–317°C [1]; 248°C (oxime) [2]; 134°C (hexahydro), 198°C (octahydro) [2]
UV: 248, 300, 395 [1]
IR: 3240, 1690, 1620, 1585 [1, 3]
MS *m/z*: 341(M^+, 100), 326, 298, 242, 241, 240, 228, 227, 213, 212 [1]
^{1}H NMR: (D_2O): 3.58, 4.27(each 3H, s, OCH_3, NCH_3), 6.74(1H, s, H-3), 7.53, 7.82(each 1H, d, H-4, H-5) [3]

References

1. M.K. Yusupov, A.M. Usmanov, A.K. Kasymov, Kh. Turdikulov, Chem. Nat. Comp. **13**, 736 (1977)
2. A.M. Usmanov, B. Chommadov, M.K. Yusupov, Chem. Nat. Comp. **21**, 76 (1985)
3. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Robustamine

CAS Registry Number: 174847-42-8



Biological sources: *Merendera robusta*
$C_{20}H_{27}NO_4$: 345.1940
Mp: 251–252°C (Me_2CO), 207°C (O–Ac) [1]
$[\alpha]_D$ −40° [1]
Solubility: very sol. MeOH + $CHCl_3$, sol. MeOH, $CHCl_3$, spar. sol. H_2O, Me_2CO, insol. Et_2O, C_6H_{14} [1]
UV: 216, 296 [1]
IR: 3500–3300, 2955, 2858, 2800, 1608, 1495, 1470, 1456, 1380, 1273, 1250, 1144, 1100, 1004, 982, 945, 895, 858, 760 [1]
MS *m/z*: 345(M^+, 50), 344(100), 323, 317, 312, 302, 244, 242 [1]
^{1}H NMR: 2.36 (3H, s, NCH_3), 3.32, 3.75 (each 3H, s, 2 × OCH_3), 4.97 (1H, m, H-11), 6.40 (1H, s, H-3) [1]
^{13}C NMR: [2]

Table 1

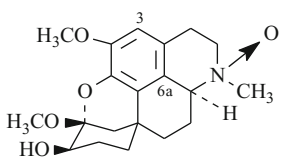
C–1	142.3	C-12	100.6	2-OCH_3	55.7
2	145.1	14	34.7	12-OCH_3	49.0
3	110.2	1a	125.9	CH_2	37.4, 37.2,
3a	124.3	3b	123.4		33.7, 28.5,
6a	59.9	NCH_3	43.3		28.1, 26.8
11	75.1	NCH_2	53.8		

References

1. M.H. Yusupov, B. Chommadov, Chem. Nat. Comp. **31**, 87 (1995)
2. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Robustamine *cis*-N-Oxide

CAS Registry Number: 191356-25-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera robusta*
$C_{20}H_{27}NO_5$: 361.1889
Mp: 140–142°C (Me_2O) [1]
$[\alpha]_D$ −24° [1]
UV: 216, 295 [1]
IR: 3450, 2930, 2855, 1605, 1490, 1467,1377, 1330, 1273, 1255, 1230, 1200, 1179, 1116, 1107, 1080, 1036, 990, 975, 960, 926, 895, 867 [1]

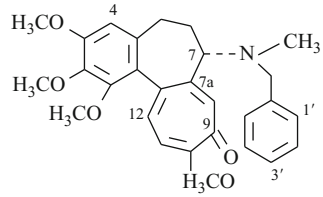
MS *m/z*: 361(M^+, 21), 345(3), 344(10), 343(19), 342(19), 326(13), 302(100), 284(29), 283(19), 270(26), 269(25), 243(32), 237(35) [1]
^{1}H NMR: 3.20 (3H, s, NCH_3), 3.26, 3.72 (each 3H, s, 2 × OCH_3), 4.09 (1H, t, J = 8, H-6a), 6.48 (1H, s, H-3) [1]

References

1. M.K. Yusupov, Chem. Nat. Comp. **32**, 716 (1996)

Speciosamine

CAS Registry Number: 97763-01-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum speciosum*
$C_{28}H_{31}NO_5$: 461.2202
Mp: 192–194°C (Me_2CO–EtOAc)
$[\alpha]_D$ −42° ($CHCl_3$) [1]
Solubility: very sol. MeOH, $CHCl_3$; sol. EtOAc, Me_2CO; spar. sol. H_2O, Et_2O [2]
UV: 248, 350 [1]
IR: 1616, 1588 [1]
MS *m/z*: 461(M^+) [1]
^{1}H NMR: 2.00 (3H, s, NCH_3), 3.54, 3.76, 3.80, 3.83 (each 3H, s, 4 × OCH_3), 6.37 (1H, s, H-4), 6.52, 6.95 (each 1H, d, J = 11, H-11, H-12), 7.14 (5H, s, H-Ar), 7.90 (1H, s, H-8) [1, 3]
^{13}C NMR: [1, 2]

Table 1

C–1	149.0	C–9	178.2	NCH_3	38.4
2	140.0	10	162.5	NCH_2	59.4
3	151.9	11	110.8	C–1′	127.6
4	106.3	12	132.8	2′	127.0
4a	136.1	12a	137.6	3′	125.7
5	30.0	1a	124.3	4′	127.0
6	35.5	1-OCH_3	60.9	5′	127.6
7	66.3	2-OCH_3	60.2	6′	133.4
7a	151.3	3-OCH_3	55.5		
8a	132.4	10-OCH_3	55.3		

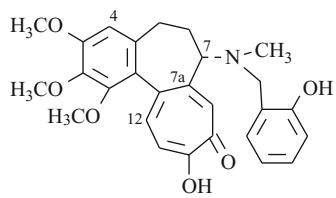
(*continued*)

References

1. B. Chommadov, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **21**, 394 (1985)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 855 (1996)
3. B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Specioseine

CAS Registry Number: 142735-47-5



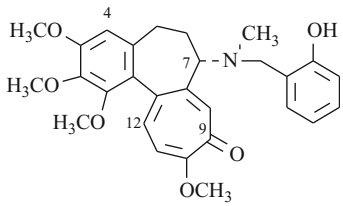
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum speciosum*
$C_{27}H_{29}NO_6$: 463.1995
Mp: 169–171°C [1]
$[\alpha]_D$ −78° ($CHCl_3$) [1]
UV: 247, 348(4.51, 4.39) [1]
IR: 3530–3380, 3000, 2950, 2840, 1612, 1590, 1495, 1450 [1]
MS *m/z*: 463(M^+), 448, 357, 342, 207, 107, 106 [1]
^{1}H NMR: 2.15 (3H, s, NCH_3), 3.08 (1H, m, H-7), 3.57, 3.87 (3H, 6H, s, 3 × OCH_3), 6.50 (1H, s, H-4), 6.65–7.30 (4H, H–Ar), 6.70, 7.50 (each 1H, d, J = 12, H-11, H-12), 7.70 (1H, s, H-8) [1]

References

1. B. Chommadov, Chem. Nat. Comp. **27**, 218 (1991)

Speciosine

CAS Registry Number: 16892-03-8



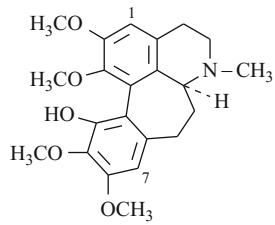
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum speciosum*
$C_{28}H_{31}NO_6$: 477.2151
Mp: 209–211°C (C_6H_6–Me_2CO) [1]
$[\alpha]_D$ −21° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$; sol. EtOH, Me_2CO; spar. sol. Et_2O, C_6H_6; insol. H_2O [1]
UV: 245, 352(4.50, 4.23) [2]
IR: 3200, 1606, 1589, 1537, 1488, 1347, 1258, 1098, 1047, 1023 [2]
MS *m/z*: 477(M^+), 462, 371, 356, 342, 312, 208, 207, 107, 106 [3, 4]
^{1}H NMR: 2.16 (3H, s, NCH_3), 3.08 (1H, m, H-7), 3.50, 3.87, 3.91 (each 3H, 6H, 3H, s, 4 × OCH_3), 6.46 (1H, s, H-4), 6.63–7.00 (4H, H–Ar), 6.68, 7.18 (each 1H, d, J = 10, H-11, H-12), 7.53 (1H, s, H-8) [5]
X-ray: [6]
Pharm./Biol.: Highly specific butyrylcholinesterase inhibitor [7]

References

1. V.V. Kiselev, Zh. Obshch. Khim. **26**, 3218 (1956)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd, London, 1966), **2**, No. 258
3. J.M. Wilson, M. Ohashi, H. Budzikiewicz, F. Santavy, C. Djerassi, Tetrahedron **19**, 2225 (1963)
4. V.V. Kiselev, Ya.V. Rashkes, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 553 (1974)
5. B. Chommadov, Chem. Nat. Comp. **27**, 218 (1991)
6. L.Yu. Izotova, K.M. Beketov, P.M. Yusupov, M.K. Yusupov, B.T. Ibragimov, Chem. Nat. Comp. **33**, 469 (1997)
7. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, B. Chommadov, Yu.R. Khakimov, A.A. Abduvakhabov, D.I. Israilov, DAN UzSSR (4), 33 (1991)

Szovitsamine

CAS Registry Number: 56596-02-2



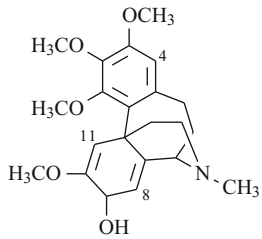
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum szovitsii*
$C_{22}H_{27}NO_5$: 385.1889
Mp: 188–190°C (Et_2O) [1]
$[\alpha]_D$ + 86° ($CHCl_3$) [1]
UV: 258, 287(4.33, 4.07) [1]
MS *m/z*: 385(M^+, 33), 384(5), 370(15), 368(6), 356(7), 354(100), 342 [1]
^{1}H NMR: 2.33 (3H, s, NCH_3), 3.50, 3.82 (each 3H, 9H, s, 4 × OCH_3), 6.37, 6.64 (each 1H, s, H-1, H-7) [1]

References

1. M.K. Yusupov, N. Din Tkhi, Kh.A. Aslanov, A.S. Sadykov, Chem. Nat. Comp. **11**, 127 (1975)

Szovitsidine

CAS Registry Number: 57912-36-4



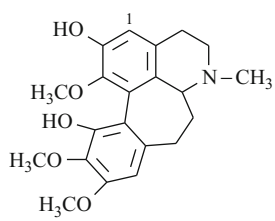
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum szovitsii*
$C_{22}H_{29}NO_5$: 387.2046
UV: 280 [1]
MS *m/z*: 387(M^+, 100), 372, 356, 344, 316, 149 [1]
^{1}H NMR: 2.32 (3H, s, NCH_3), 3.52, 3.74, 3.83, 3.86 (each 3H, s, 4 × OCH_3), 6.26, 6.40, 6.50 (each 1H, s, H-4, H-8, H-11) [1]

References

1. M.K. Yusupov, Kh.A. Aslanov, Din Bik Ngo. Chem. Nat. Comp. **11**, 289 (1975)

Szovitsinine

CAS Registry Number: 65022-65-3



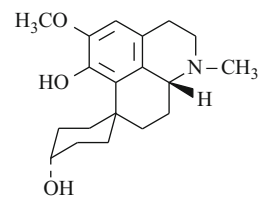
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum szovitsii*
$C_{21}H_{25}NO_5$: 371.1733
MS *m/z*: 371(M^+), 370, 356, 354, 340(100), 328, 204 [1]
^{1}H NMR: 2.38 (3H, s, NCH_3), 3.50, 3.80, 3.82 (each 3H, s, 3 × OCH_3) [1]

References

1. A.K. Kasymov, E.Kh. Timbekov, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **13**, 197 (1977)

Trigamine

CAS Registry Number: 59272-74-1



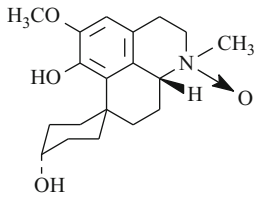
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera trigyna*
$C_{19}H_{27}NO_3$: 317.1991
Mp: 169–170°C [1]
$[\alpha]_D$ −7° ($CHCl_3$) [1]
UV: 216, 287 [1]
IR: 3400–3200, 1600, 1480 [1]
MS *m/z*: 317(M^+, 49), 316(100), 300, 274, 256, 244, 228, 205, 202 [1]
^{1}H NMR: 2.34 (3H, s, NCH_3), 3.75 (3H, s, OCH_3), 6.48 (1H, s, H-3) [1]

References

1. M.K. Yusupov, A.A. Trozyan, Kh.A. Aslanov, Chem. Nat. Comp. **13**, 824 (1975); B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Trigamine N-Oxide

CAS Registry Number: 97763-03-6



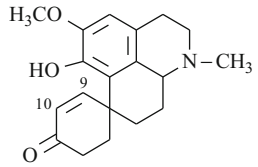
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera jolantae*
$C_{19}H_{27}NO_4$: 333.1940
Mp: 201–202°C (Me_2CO–MeOH) [1]
$[\alpha]_D$ + 10° (MeOH) [1]
UV: 216, 290 [2]
IR: 3390–3210, 1600, 1475 [2]
MS *m/z*: 333(M^+), 317, 316(100), 315, 300, 289, 275, 259, 248, 246(100), 218, 217 [2]
^{1}H NMR: 3.40 (3H, s, NCH_3), 3.80 (3H, s, OCH_3), 6.50 (1H, s, H-3) [2]

References

1. B. Chommadov, A.M. Usmanov, M.K. Yusupov, Chem. Nat. Comp. **19**, 755 (1983)
2. B. Chommadov, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **21**, 395 (1985)

Yolantamine (Jolantamine)

CAS Registry Number: 37376-03-7



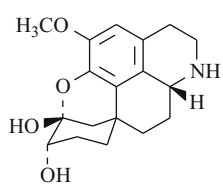
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, Merendera jolantae*
$C_{19}H_{23}NO_3$: 313.1678
Mp: 215–216°C (Et_2O–Me_2CO), 275°C (hydrochloride), 258°C (methiodide) [1]; 175°C (tetrahydro) [2]
$[\alpha]_D$ + 112° ($CHCl_3$) [1]
UV: 225 sh, 275 sh, 288 sh [1]
IR: 3350, 1650, 1630, 1600 [3]
MS *m/z*: 313(M^+, 65), 312(100), 285, 270, 244, 242, 229, 165 [3]
^{1}H NMR: 2.38 (3H, s, NCH_3), 3.78 (3H, s, OCH_3), 5.85 (H-9), 6.45 (H-3), 6.82 (H-10) [4]
Pharm./Biol.: Reversible cholinesterase inhibitor [5]

References

1. K.M. Zuparova, B. Chommadov, M.K. Yusupov, A.S. Sadykov, Chem. Nat. Comp. **8**, 481 (1972)
2. E.Kh. Timbekov, A.K. Kasymov, D.A. Abdullaeva, M.K. Yusupov, Kh.A. Aslanov, Chem. Nat. Comp. **12**, 289 (1976)
3. M.K. Yusupov, *The Chemistry of Plant Substances* [in Russian] (Fan, Tashkent, 1972), p. 19
4. M.K. Yusupov, D.A. Abdullaeva, Kh.A. Aslanov, A.S. Sadykov, DAN SSSR **208**, 1123 (1973)
5. K.M. Zuparova, E.V. Rozengart, M.K. Yusupov, A.A. Abduvakhabov, Yu.R. Khakimov, B. Chommadov, D.I. Israilov, Uzb. Khim. Zh. (2), 33 (1991)

Yolantidine (Jolantidine)

CAS Registry Number: 89759-22-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera jolantae*
$C_{18}H_{23}NO_4$: 317.1627

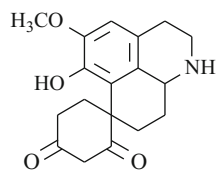
Mp: 275–277°C (Me_2CO) [1]
$[\alpha]_D$ + 102° (MeOH) [1]
UV: 216, 290 [1]
IR: 3580, 3360, 1600, 1470–1440 [1]
MS *m/z*: 317(M^+) [1]
^{1}H NMR: 3.86 (3H, s, OCH_3), 6.50 (1H, s, H-3) [1]

References

1. B. Chommadov, A.M. Usmanov, M.K. Yusupov, Chem. Nat. Comp. **19**, 755 (1983); B. Chommadov, Author's Abstract of Doctoral Dissertation, Tashkent, 1992

Yolantimine (Jolantimine)

CAS Registry Number: 60142-20-3



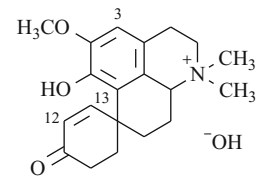
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Colchicum kesselringii, Merendera jolantae*
$C_{18}H_{21}NO_4$: 315.1471
Mp: 272–273°C (Me_2CO–MeOH) [1]
$[\alpha]_D$ + 98° (MeOH) [1]
UV: 215, 287 [1]
IR: 3380, 1640, 1600, 1460 [1]
MS *m/z*: 315(M^+, 20), 314(15), 287(100), 286(36), 245(10), 244(28), 242(42), 230(13) [1]
^{1}H NMR: 3.88 (3H, s, OCH_3), 6.52 (1H, s, H-3) [1]

References

1. D.A. Abdullaeva, M.K. Yusupov, A.K. Kasymov, Dau Nguen Van, Kh.A. Aslanov, Chem. Nat. Comp. **12**, 115 (1976)

Yolantine (Jolantine)

CAS Registry Number: 62249-76-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Colchicine Alkaloids
Biological sources: *Merendera jolantae*
$C_{20}H_{26}NO_3$: 328.1913
Mp: 269–270°C (Me_2CO–MeOH), 271°C (methiodide O–Me) [1]
UV: 210, 285 [1]
IR: 3400, 1650, 1630, 1600, 1460 [1]
MS *m/z*: 313, 312, 298, 285, 270, 244, 214, 205 [1]
^{1}H NMR: 2.56, 2.90 (each 3H, s, $N(CH_3)_2$), 3.47 (3H, s, OCH_3), 5.81, 6.82 (each 1H, d, H-12, H-13), 6.31 (1H, s, H-3) [1]

References

1. Kh. Turdikulov, Dau Nguen Van, M.K. Yusupov, Chem. Nat. Comp. **12**, 501 (1976)

The richest sources of diterpenoid alkaloids are plants of the genera *Aconitum* and *Delphinium*. Alkaloids were observed in Aconitum plants in 1820. Diterpenoid alkaloids have also been found in plants of the genera *Consolida*, *Thalictrum*, *Atragene* (Ranunculaceae), *Garrya* (Garryaceae), *Spiraea* (Rosaceae), *Inula*, *Artemisia* (Compositae), *Anopterus* (Escolloniaceae), *Lavandula* (Labiatae), and *Rumex* (Polygonaceae).

The chemical structures of the first representatives were determined only in the 1950s because of the complex structure and difficulties to isolate chemically pure compounds. It has been shown that the alkaloids have the new diterpenoid carbon skeletons. Elucidation of the structures provided a strong impetus to perform successful phytochemical and pharmacological investigations.

This section includes information on the alkaloids composition of 35 species of the genus *Aconitum*; 23, *Delphinium*; 2, *Consolida*; and 1, *Atragene*. These plants are indigenous to Kirgyzstan, Uzbekistan, Kazakhstan, Russia, Georgia, Tadzhikistan, and Mongolia.

The investigations resulted in the isolation of 196 alkaloids belonging to various structural types. Diterpenoid alkaloids are divided into four main groups according to the structure of the carbon skeleton. The first includes alkaloids with an aconane (lycoctonine) skeleton. Most representatives of this group have skeletons with 19 carbon atoms and are called norditerpenoid alkaloids (aconitine, lycoctonine, karakoline, et al.). In present time a number of aconane alkaloids which are formed by biochemical removal of the C-18 atom and have skeleton with 18 carbon atoms have been isolated (Bisnorditerpenoid alkaloids: lappaconine, aconosine, akirane, et al.). Recently the aconane alkaloids with skeleton containing 20 carbon atoms have been isolated (C-20-aconane alkaloids: actaline, et al.). The terminal methylene group of the biogenetic precursor is retained in these compounds.

Due to the structural features and characteristic chemical properties, the aconane alkaloids can be divided into several structural types. Aconitine type have an oxygene function at C-8 and lack oxygen substituents on C-7 and C-9. The C-6 substituent (most often methoxyl) usually has the α-orientation. If the C-8 acetates of these alkaloids are heated in vacuo, acetic acid is eliminated and formed characteristic pyrolysis products.

The second structural type comprises lycoctonine and its analogs with oxygen substituents at C-7 and C-8 and a C-6 substituent with the β-orientation. Oxidation with periodic acid forms seco-products that contain a carbonyl in five- and six-membered rings.

Alkaloids of the heteratisine type contains a lactone function at C-14.

Chemical transformations and modern one and two dimensional NMR-methods, different kind of mass-spectrometry and X-ray analysis are commonly used in structural investigations of aconane alkaloids.

The second group of diterpenoid alkaloids consists of atisanes. Atisane diterpenoid can be the biogenetic precursors of these alkaloids. Atisane alkaloids are highly variable and include many structural types (atisine, isoatisine, denudatine, hetisine, zeraconine, coryphine, talasamine et al.). The carbon skeleton of most compounds consists of 20 atoms. As a rule, it contains an 18-methyl and 17-terminal methylene group. The exceptions are zeraconine, coryphine, and their analogs, which contain additional carbon fragments at C-17.

The nature and number of functional groups can be determined by chemical methods (hydrogenation, oxidation, reduction, hydrolysis), whereas the location and stereochemistry of the substituents are determined using NMR spectroscopy and X-ray analysis.

The third group combines kaurane diterpenoid alkaloids. The nomenclature originates from a biogenetic link to kaurane diterpenoid. Kaurane alkaloids include several structural types. However, only napelline-type alkaloids (napelline, songorine, turpelline, et al.) are included in this section.

The carbon skeleton of all known kaurane alkaloids consists of 20 atoms. A C-18 methyl and C-17 exomethylene are also characteristic of them. Most representatives of the kaurane alkaloids contain three, less often four, fire, or six oxygen functions. The oxygen substituents can be hydroxyls, methoxyls, carbonyls, or ester mojity. In several instances, the

oxygen function is found as a 1,19-internal ester of a α-carbinolamine.

Structures of the alkaloids are typically established by combining chemical transformations (oxidation, hydrogenation, acylation) with modern spectral methods.

The fourth group includes bisditerpenoid alkaloids consisting of two diterpenoid fragments.

Plants of the genera *Aconitum* and *Delphinium* were used from the ancient times by various peoples as poisons and medicinal preparations.

Diterpenoid alkaloids have a broad spectrum of biological activities. For example, the poisonous properties of plants of the genus *Aconitum* are due to the presence of the neurotoxin aconitine and its analogs. Aconitine in small doses causes steady cardiac arriythmia and is used to induce experimental model arrythmia.

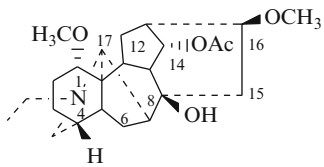
Distinct kurare-like properties were observed for the alkaloids methyllycaconitine, condelphine, and elatine. Methyllycaconitine and condelphine were used in medical practice.

Derivatives of aconitine and mesaconitine possess analgesic and anti-inflammatory properties and were patented by Japanese researchers.

An important achievement was the observation of the antiarrhythmic properties of diterpenoid alkaloids. Lappaconitine hydrobromide was introduced in medical practice and has been used successfully for many years.

Furthermore, compounds with distinct local anaesthetic, psychotropic, spasmolytic, anticonvulsant, anticancer, and antitoxic (against acontine) properties have been founded among them.

14-Acetylaconosine (Dolaconine)



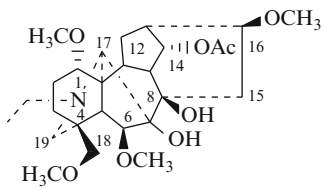
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum nasutum*
$C_{24}H_{37}NO_5$: 419.5384
Mp: amorph. [1]
IR: 3580, 3570–3200, 1740, 1650, 1470, 1460, 1444, 1370, 1250, 1238, 1095 [1]
MS *m/z*: 419(M^+, 4), 404(3), 401(2), 389(25), 388(100), 372(8) [1]
^{1}H NMR: 1.00(3H, t, J = 7.5, NCH_2CH_3), 1.97(3H, s, OAc), 3.14, 3.20(each 3H, s, 2×OCH_3), 4.73(1H, t, J = 4.5, H-14β) [1]

References

1. A.N. Manukov, I.A. Bessonova, Z.M. Vaisov, V.A. Chelombit´ko, Chem. Nat. Comp. **29**, 693 (1993)

14-Acetylbrowniine

CAS Registry Number: 65601-04-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium confusum, D. oreophyllum*
$C_{27}H_{43}NO_8$: 509.2989
Mp: 115–117°C (C_6H_{12}–Et_2O) [1]
IR: 3600–3400, 1750, 1100 [1]
MS *m/z*: 509(M^+), 478(100) [1]
^{1}H NMR: 0.95(3H, t, J = 7, NCH_2CH_3), 2.00(3H, s, Ac), 3.17, 3.21, 3.24, 3.30(each 3H, s, 4×OCH_3), 4.66(1H, t, J = 5, H-14β) [1]
^{13}C NMR: [2]

Table 1

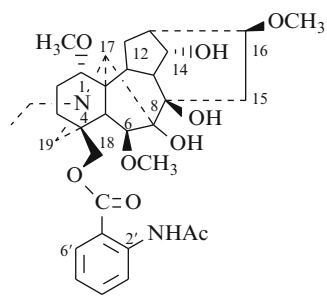
C-1	84.2	C-10	38.1	C-19	52.7
2	26.2	11	49.5	N-CH_2	48.8
3	32.4	12	28.2	CH_3	14.2
4	38.1	13	45.7	1-OCH_3	55.8
5	42.5	14	76.0	6-OCH_3	57.3
6	90.3	15	33.7	16-OCH_3	56.2
7	88.3	16	82.4	18-OCH_3	59.0
8	77.1	17	64.8	C = O	171.9
9	51.2	18	78.0	CH_3	21.5

References

1. V.G. Kozlikhin, V.A. Tel'nov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 737 (1977)
2. S.W. Pelletier, N.V. Mody, R.S. Sawhney, J. Bhattacharyya, Heterocycles **7**, 327 (1977)

N-Acetyldelectine (14-Deacetylajadine)

CAS Registry Number: 63596-61-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium dictyocarpum*

$C_{33}H_{46}N_2O_9$: 614.3203
Mp: 116–118°C (Me_2CO) [1]
$[\alpha]_D$ +30° ($CHCl_3$) [1]
IR: 3460, 1595, 1705, 1690, 1090 [1]
MS *m/z*: 614(M^+), 599, 597, 596, 583(100) [1]
^{1}H NMR: 1.03(3H, t, J = 7, NCH_2CH_3), 2.20(3H, s, Ac), 3.21, 3.31, 3.33(each 3H, s, 3×OCH_3), 7.07–8.66(H–Ar), 10.93(1H, br s, NHAc) [1]
^{13}C NMR: [2]

Table 1

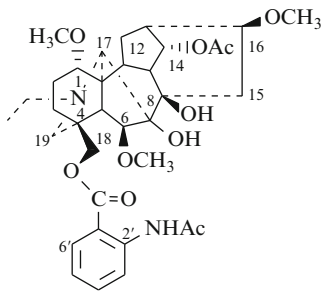
C-1	84.7	C-12	27.4	6-OCH_3	58.3
2	25.2	13	36.3	16-OCH_3	56.5
3	32.2	14	75.2	ArCO	168.0
4	37.8	15	33.1	Ar-C-1′	114.4
5	50.4	16	81.6	2′	141.8
6	90.4	17	65.0	3′	120.5
7	89.2	18	69.7	4′	135.0
8	76.2	19	52.4	5′	122.5
9	45.1	N-CH_2	51.1	6′	130.3
10	46.0	CH_3	14.2	NHCO	169.0
11	48.3	1-OCH_3	56.0	CH_3	25.5

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 120 (1977)
2. P. Kulanthaivel, H.K. Desai, S.W. Pelletier, J. Natur. Prod. **52**, 143 (1989)

O-Acetyldelectine (Andersonidine)

CAS Registry Number: 66408-08-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium dictyocarpum*
$C_{33}H_{46}N_2O_9$: 614.3203
Mp: 118–120°C (MeOH) [1], 127–129°C [2]
$[\alpha]_D$ +42° ($CHCl_3$) [3]
IR: 3460, 1740, 1690, 1593, 1090 [1]
MS *m/z*: 614(M^+), 599, 596, 583(100), 581, 120 [1, 3]
^{1}H NMR: 1.04(3H, t, J = 7, NCH_2CH_3), 2.02(3H, s, OAc), 3.18, 3.26, 3.29(each 3H, s, 3×OCH_3), 5.70(2H, br s, NH2), 6.61–7.76(4H, m, H–Ar) [1]
^{13}C NMR: [2]

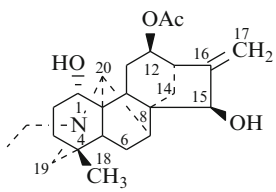
Table 1

C-1	83.9	C-12	28.2	6-OCH_3	58.0
2	26.1	13	38.2	16-OCH_3	56.2
3	32.2	14	75.9	CO	171.8
4	37.6	15	33.7	CH_3	21.8
5	42.6	16	82.3	Ar-CO	167.7
6	90.7	17	64.5	Ar-C-1′	110.3
7	88.3	18	68.5	2′	150.7
8	77.4	19	52.4	3′	116.8
9	50.1	N-CH_2	51.0	4′	134.3
10	45.7	CH_3	14.0	5′	116.4
11	49.0	1-OCH_3	55.7	6′	130.7

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 603 (1977)
2. S.W. Pelletier, P. Kulanthaivel, J.D. Olsen, Heterocycles **28**, 107 (1989)
3. B.T. Salimov, Author's Abstract of Candidate's Dissertation, Tashkent. 1979

12-Acetyl-12-Epinapelline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

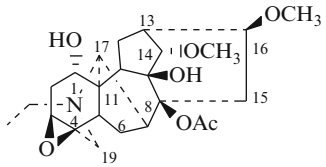
Biological sources: *Aconitum soongaricum*
$C_{24}H_{35}NO_4$: 401.2567
Mp: 198.5–200.5°C (Me_2CO) [1]
IR: 3430, 3069, 1729, 1656, 1233, 1031, 878 [1]
MS *m/z*: 401(M^+) [1]
^{1}H NMR: 0.71(3H, s, 3H-18), 0.98(3H, t, J = 7.0, N-CH_2-CH_3), 1.90(3H, s, $OCOCH_3$), 2.94(1H, dd, J_1 = 9.0, J_2 = 4.0, H-13), 3.23(1H, br s, H-20), 3.83(1H, br t, J = 7.0, H-1β), 4.14(br d, J = 9.0, H-15α), 4.88, 5.12(each 1H, br d, J = 2.0, 2H-17) [1]
X-ray: [1]
Pharm./Biol.: LD_{50} 40.5 (i/v, mice), moderate antiarrhythmic action [1]

References

1. B.T. Salimov, K.K. Turgunov, B. Tashkhodjaev, F.N. Dzhakhangirov, Chem. Nat. Comp. **40**, 151 (2004)

8-Acetylexcelsine

CAS Registry Number: 142735-46-4

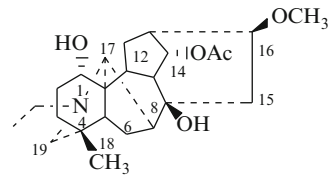


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum kirinense*
$C_{24}H_{35}NO_7$: 449.2414
Mp: amorph. [1]
IR: 3500, 3270, 1740 [1]
MS *m/z*: 449(M^+, 83), 434(42), 418(5), 406(7), 405(6), 390(100), 389(29), 374(14), 372(58), 358(17) [1]
^{1}H NMR: 1.05(3H, t, NCH_2CH_3), 2.00(3H, s, OAc), 3.25, 3.32(each 3H, s, 2×OCH_3), 3.88(1H, br s) [1]

References

1. A.A. Nishanov, M.N. Sultankhodzhaev, M.S. Yunusov, V.G. Kondrat'ev, Chem. Nat. Comp. **27**, 222 (1991)

14-Acetylkarakoline (14-Acetylkaracoline)



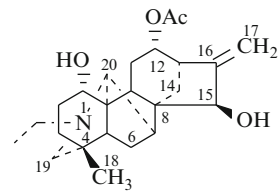
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium confusum*
$C_{24}H_{37}NO_5$: 419.2672
Mp: 99–100°C (Me_2CO) [1]
IR: 3620, 3460, 1743, 1100 [1]
MS *m/z*: 419(M^+), 404, 402(100), 363 [1]
^{1}H NMR: 0.83(3H, s, 3H-18), 1.06(3H, t, J = 7, NCH_2CH_3), 2.00(3H, s, Ac), 3.22(3H, s, OCH_3) [1]

References

1. Z.M. Vaisov, M.S. Yunusov, Chem. Nat. Comp. **23**, 725 (1987)

12-Acetylnapelline

CAS Registry Number: 62511-84-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum, A. soongaricum*
$C_{24}H_{35}NO_4$: 401.2566

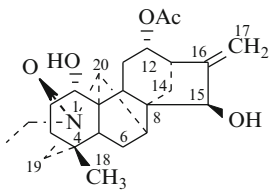
Mp: 205–206°C (Me_2CO) [1]
IR: 3440, 3070, 2990, 2975, 2950, 2930, 2910, 2880, 2850, 1735, 1660, 1500, 1480, 1460, 1410, 1380, 1360, 1330, 1285, 1260, 1250, 1235, 1190, 1175, 1155, 1130, 1100, 1090, 1070, 1050, 1030, 1015, 980, 920, 910, 880, 810, 780, 740, 725 [1]
MS *m/z*: 401(M^+, 100), 386(8), 384(9), 358(5), 357(3), 356(3), 342(39), 324(5), 314(3), 312(4), 298(2), 284(4), 282(4), 242(15), 224(2), 218(2), 212(3), 58(6), 44(5) [1]
^{1}H NMR: 0.70(3H, s, 3H-18), 1.05(3H, t, J = 7, NCH_2CH_3), 1.91(3H, s, OAc), 4.93, 5.10(each 1H, d, J = 1.5, 2H-17) [1]

References

1. M.N. Sultankhodzhaev, L.V. Beshitaishvili, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 407 (1978)

12-Acetylnapelline N-Oxide

CAS Registry Number: 83019-08-3

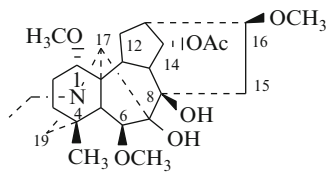


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum soongaricum*
$C_{24}H_{35}NO_5$: 417.2515
Mp: 235°C (Me_2CO) [1]
Solubility: very sol. H_2O, MeOH; sol. $CHCl_3$ [1]
IR: 3440, 3150, 3060, 3000, 2960, 2930, 2900, 2860, 2810, 1730, 1660, 1470, 1450, 1380, 1315, 1265, 1240, 1200, 1170, 1135, 1115, 1075, 1050, 1040, 1020, 970, 930, 920, 905, 885, 860, 820, 800, 775, 730 [1]
MS *m/z*: 417(M^+), 411, 410, 409 [1]
^{1}H NMR: 0.80(3H, s, 3H-18), 1.37(3H, t, J = 7, NCH_2CH_3), 1.91(3H, s, OAc), 4.86, 5.11(each 1H, br s, 2H-17) [1]
Pharm./Biol.: Weak antiarrhythmic and N-cholinolytic action [2]

References

1. M.N. Sultankhodzhaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 249 (1982)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(2), 216 (1996)

14-Acetylnudicaulidine



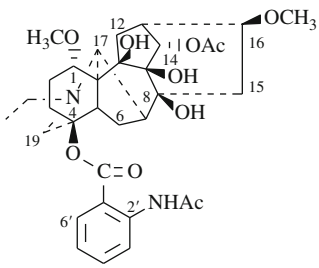
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium confusum*
$C_{26}H_{41}NO_7$: 479.2883
Mp: 206–208°C (C_6H_{12}–Et_2O) [1]
IR: 3550–3400, 1740, 1100 [1]
MS *m/z*: 479(M^+, 1), 464(30), 448(100) [1]
^{1}H NMR: 0.85(3H, s, 3H-18), 1.00(3H, t, J = 7, NCH_2CH_3), 2.10(3H, s, OAc), 3.18, 3.26, 3.36(each 3H, s, 3×OCH_3), 3.81, 3.87(each 1H, br s), 4.70(1H, t, J = 4.5, H-14β) [1]

References

1. A.S. Narzullaev, S.Yu. Yunusov, V.M. Matveev, S.S. Sabirov, Chem. Nat. Comp. **25**, 41 (1989)

N-Acetylsepaconitine

CAS Registry Number: 118201-55-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum leucostomum*
$C_{32}H_{44}N_2O_9$: 600.3047
Mp: amorph. [1]
IR: 1700, 1600, 1280, 1250, 750 [1]
MS *m/z*: 600(M^+), 569, 421(100) [1]
^{1}H NMR: 1.11(3H, t, J = 7, NCH_2CH_3), 3.25, 3.35(6H, 3H, s, 3×OCH_3), 6.92–8.52(H–Ar), 10.77(1H, s, NHAc) [1]
^{13}C NMR: [1]

Table 1

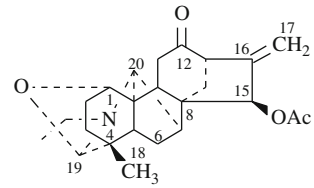
C-1	77.8	C-12	37.5	14-OCH_3	58.0
2	26.5	13	34.7	16-OCH_3	56.2
3	31.6	14	87.9	NHCO	169.0
4	84.7	15	44.8	CH_3	25.5
5	44.3	16	82.8	Ar-CO	167.5
6	24.5	17	61.5	1′	115.8
7	46.9	18	–	2′	141.7
8	74.6	19	55.6	3′	120.3
9	78.9	N-CH_2	48.5	4′	134.4
10	79.6	CH_3	13.4	5′	122.8
11	56.4	1-OCH_3	56.3	6′	131.0

References

1. V.A. Tel'nov, M.S. Yunusov, N.D. Abdullaev, M.G. Zhamierashvili, Chem. Nat. Comp. **24**, 472 (1988)

15-Acetylsongoramine

CAS Registry Number: 76971-23-8

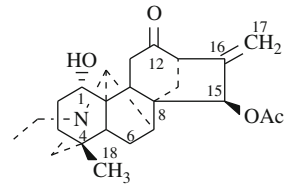


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum soongaricum*
$C_{24}H_{31}NO_4$: 397.2253
Mp: amorph. [1]
IR: 1740, 1720 [1]
MS *m/z*: 397(M^+, 100), 382(5), 369(15), 354(36), 341(68) [1]
^{1}H NMR: 0.78(3H, s, 3H-18), 0.97(3H, t, J = 7, NCH_2CH_3), 2.10(3H, s, Ac), 5.16, 5.22(each 1H, br s, 2H-17) [1]

References

1. M.G. Zhamierashvili, V.A. Tel'nov, M.S. Yunusov, S.Yu. Yunusov, Khim. Prirod. Soedin. 733 (1980)

15-Acetylsongorine



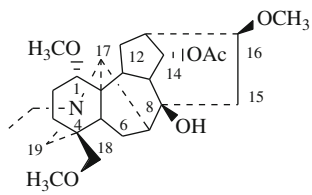
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum firmum, A. soongaricum*
$C_{24}H_{33}NO_4$: 399.2410

Mp: 176–178°C (EtOH), 273°C (perchlorate), 286°C (hydrochloride) [1]
$[\alpha]_D$ −172° (H_2O) [1]
IR: 3480, 1730, 1710, 1660, 1455, 1380, 1250, 1170, 1125, 1100, 1080, 1030, 910 [1]
MS *m/z*: 399(M^+, 72), 384(14), 382(14), 371(12), 370(18), 356(100), 340(84), 312(20) [1]
^{1}H NMR: 0.74(3H, s, 3H-18), 1.03(3H, t, J = 7, NCH_2CH_3), 2.03(3H, s, Ac), 4.85, 5.18(each 1H, br s, 2H-17), 5.55(1H, br s, H-15) [1]

References

1. Z.M. Vaisov, I.A. Bessonova, V.A. Tel'nov, Chem. Nat. Comp. **29**, 71 (1993)

14-Acetyltalatisamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum nemorum, A. saposhnikovii, A. talassicum*
$C_{26}H_{41}NO_6$: 463.2934
Mp: 95–97°C [1]
$[\alpha]_D$ +19° ($CHCl_3$) [1]
MS: 463(M^+, 45), 448(30), 432(100) [1]
^{1}H NMR: 1.01(3H, t, J = 7, NCH_2CH_3), 1.98(3H, s, Ac), 3.14, 3.18, 3.21(each 3H, s, 3×OCH_3), 4.72(1H, t, J = 4.5, H-14β) [1]
^{13}C NMR: [2]

Table 1

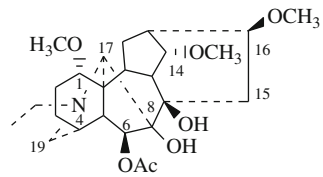
C-1	85.8	C-10	45.0	C-19	53.1
2	26.2	11	48.8	N-CH_2	49.4
3	32.7	12	28.5	CH_3	13.6
4	38.6	13	45.0	1-OCH_3	56.1
5	35.4	14	77.0	16-OCH_3	56.1
6	25.0	15	41.0	18-OCH_3	59.5
7	45.4	16	81.7	CO	170.7
8	73.7	17	62.2	CH_3	21.4
9	46.3	18	79.7		

(*continued*)

References

1. M.S. Yunusov, Author's Abstract of Doctoral Dissertation, Tashkent, 1973
2. S. Sakai, H. Takayama, T. Okamoto, J. Pharm Soc. Japan **99**, 647 (1979)

6-Acetylumbrofine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum umbrosum*
$C_{25}H_{39}NO7$: 465.2783
Mp: 174–175°C (EtOH) [1]
IR: 3554, 3460, 1730, 1475, 1455, 1370, 1345, 1330, 1270, 1232, 1214, 1170, 1122, 1110, 1093, 1080, 1045, 1030, 1010, 994, 934, 920, 887, 860, 830, 814, 798, 764 [1]
MS *m/z*: 465(M^+), 450, 434(100), 432, 422, 406, 405, 390, 374, 362 [1]
^{1}H NMR: 0.99(3H, t, J = 7.5, NCH_2CH_3), 1.99(3H, s, Ac), 3.22, 3.30, 3.38(each 3H, s, 3×OCH_3), 3.68(1H, t, J = 4.5, H-14β), 5.13(1H, br s, H-6α) [1]
^{13}C NMR: [1]

Table 1

C-1	86.0	C-10	38.0	C-19	50.4
2	26.1	11	48.2	N-CH_2	49.9
3	30.7	12	30.1	CH_3	13.9
4	35.9	13	46.2	CO	169.5

(*continued*)

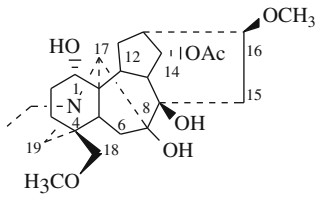
Table 1 (continued)

5	45.8	14	84.2	CH_3	21.6
6	79.4	15	35.1	1-OCH_3	56.2
7	88.5	16	81.9	14-OCH_3	57.8
8	76.1	17	63.6	16-OCH_3	56.5
9	47.1	18	–		

References

1. V.A. Tel'nov, Chem. Nat. Comp. **29**, 60 (1993)

14-Acetylviriscinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium confusum*
$C_{25}H_{39}NO_7$: 465.2726
Mp: 157–159°C [1]
$[\alpha]_D$ +32° ($CHCl_3$) [1]
IR: 3550, 3365, 1740, 1497, 1470, 1452, 1405, 1390, 1377, 1350, 1332, 1303, 1286, 1250, 1215, 1162, 1130, 1105, 1036, 998, 985, 970, 950, 920, 908, 892, 877, 865, 850, 814, 760 [1]
MS *m/z*: 465(M^+, 21.4), 450(61.9), 448(100), 432(14), 422(16.6), 409(3.5), 378(14) [1]
^{1}H NMR: 1.10(3H, t, NCH_2CH_3), 2.07(3H, s, Ac), 3.29, 3.33(each 3H, s, 2×OCH_3), 4.88(1H, dd, H-14β) [2]
^{13}C NMR: [2]

Table 1

C-1	72.4	C-10	37.7	C-18	78.8
2	29.0	11	50.0	19	56.1
3	29.4	12	26.8	N-CH_2	50.6
4	37.7	13	42.9	CH_3	13.9
5	41.7	14	77.1	16-OCH_3	56.3

(*continued*)

Table 1 (continued)

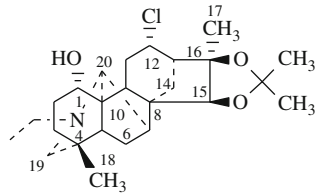
6	33.7	15	35.9	18-OCH_3	59.4
7	85.9	16	82.1	CO	170.9
8	76.9	17	64.9	CH_3	21.3
9	45.9				

References

1. Z.M. Vaisov, M.S. Yunusov, Chem. Nat. Comp. **22**, 744 (1986), Chem. Nat. Comp. **23**, 725 (1987)
2. S.W. Pelletier, N.V. Mody, A.P. Venkov, S.B. Jones, Heterocycles **12**, 779 (1979)

Acofine

CAS Registry Number: 169626-13-5



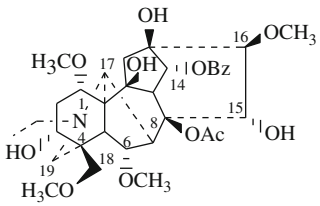
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum*
$C_{25}H_{38}NO_3Cl$: 436.0858
Mp: 159–160°C ($(Me)_2CO$), 274–286°C (dec., hydrochloride) [1]
IR: 3250 [1]
MS *m/z*: 435(M^+, 100), 420(63), 418(12), 400(63), 376(31), 377(33), 362(10), 342(94), 320(31), 318(15), 300(31), 286(47), 284(42), 242(42), 185(63) [1]
^{1}H NMR: 0.66(3H, s, 3H-18), 0.99(3H, t, J = 7, NCH_2CH_3), 1.35, 1.39, 1.44(each 3H, s, 3×CH_3), 3.23(1H, br s), 4.17(1H, q, J = 10, 7, H-1β) [1]
X-ray: [1]

References

1. B. Tashkhodzhaev, M.N. Sultankhodzhaev, I.M. Yusupova, Chem. Nat. Comp. **29**, 222 (1993)

Aconifine

CAS Registry Number: 41849-35-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum*
$C_{34}H_{47}NO_{12}$: 661.3098
Mp: 195–197°C (Me_2CO), 184°C (hydrochloride) [1]
$[\alpha]_D$ +15° (MeOH) [1]
IR: 3590, 3520, 1740, 1720, 1600, 1500, 1100 [1]
^{1}H NMR: 0.96(3H, t, J = 6, NCH_2CH_3), 1.26(3H, s, Ac), 3.00, 3.14, 3.61(3H, 6H, 3H, s, 4×OCH_3), 5.24(1H, d, J = 5, H-14β), 7.39–7.87(H–Ar)
^{13}C NMR: [1]

Table 1

C-1	79.8	C-12	48.9	6-CH_3	58.2
2	33.5	13	77.0	16-OCH_3	61.2
3	71.6	14	77.3	18-OCH_3	59.1
4	43.1	15	78.7	CO	172.1
5	42.8	16	90.1	CH_3	21.5
6	83.6	17	61.2	Ar-CO	166.1
7	44.7	18	74.9	Ar-C	130.2
8	89.7	19	47.7	Ar-C	129.7
9	54.0	N-CH_2	47.2	Ar-C	128.6
10	78.6	CH_3	13.3	Ar-C	133.2
11	55.9	1-OCH_3	55.4		

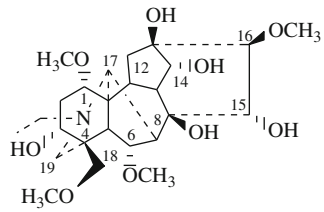
Pharm./Biol.: LD_{50} 0.22, 1.15 mg/kg (i/v, s/c, mice). Causes a disturbance in the rhythm of cardiac contractions. Can be used for creating a model of cardiac pathology with a disturbance of the rhythm [2]

References

1. M.N. Sultankhodzhaev, L.V. Beshitaishvili, M.S. Yunusov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 481 (1980)
2. N.T. Tulyaganov, F.N. Dzhakhangirov, F.S. Sadritdinov, I. Khamdamov, *The Pharmacology of Plant Substances* [in Russian] (Fan, Tashkent, 1976), p. 76

Aconine

CAS Registry Number: 509-20-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum soongoricum*
$C_{25}H_{41}NO_9$: 499.2781
Mp: 132°C [1]
$[\alpha]_D$ +23° [1]
IR: 3440, 1100 [2]
MS *m/z*: 499(M^+, 5), 484(7), 482(4), 468(100), 454(11), 452(8), 450(17) [2]
^{1}H NMR: 1.02(3H, t, NCH_2CH_3), 3.14, 3.20, 3.23, 3.57(each 3H, s, 4×OCH_3) [2]
^{13}C NMR: [1]

Table 1

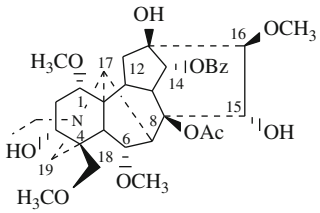
C-1	84.1	C-10	42.4	C-19	48.3
2	35.5	11	50.5	N-CH_2	46.2
3	71.9	12	37.4	CH_3	13.4
4	43.2	13	78.8	1-OCH_3	55.7
5	49.0	14	80.6	6-OCH_3	58.0
6	83.0	15	78.5	16-OCH_3	61.9
7	51.3	16	91.8	18-OCH_3	59.1
8	76.4	17	60.8		
9	50.1	18	77.4		

References

1. S.W. Pelletier, N.V. Mody, R.S. Sawhney, Canad. J. Chem. **57**, 1652 (1979)
2. M.G. Zhamierashvili, Author's Abstract of Candidate's Dissertation, Tashkent, 1982

Aconitine

CAS Registry Number: 302-27-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum altaicum, A. baicalense, A. chasmanthum, A. ferox, A. nasutum, A. soongaricum, A. tauricum, A. tuberosum, A. turczaninowii, A. volubile, Atragene sibirica*

$C_{34}H_{47}NO_{11}$: 645.3149

Mp: 202–203°C, 159°C (hydrochloride), 210°C (hydrobromide), 204°C (hydroiodide), 224°C (perchlorate) [1–3]

$[\alpha]_D$ +19°($CHCl_3$) [1–3]

IR: 3580–3490, 1730, 1720, 1610, 1500, 1460, 1405, 1383, 1325, 1285, 1244, 1204, 1186, 1115, 1025, 987, 960, 925, 900, 842, 770, 730, 720 [2, 3]

MS *m/z*: 585(6), 570(5.5), 554(100), 536(9) [2, 3]

^{1}H NMR: 1.15(3H, t, J = 7, NCH_2CH_3), 1.44(3H, s, Ac), 3.29, 3.38, 3.42, 3.88 (each 3H, s, 4×OCH_3), 5.04(1H, d, J = 5, H-14b), 7.67–8.25(H–Ar) [2, 3]

^{13}C NMR: [4]

Table 1

C-1	83.4	C-10	40.8	C-19	48.8	Ar-C = O	165.9
2	36.0	11	49.8	N-CH_2	46.9	Ar-C-1	129.6
3	70.4	12	34.0	CH_3	13.3	2	128.6
4	43.2	13	74.0	1-OCH_3	55.7	3	129.9
5	46.6	14	78.9	6-OCH_3	57.9	4	133.2
6	82.3	15	78.9	16-OCH_3	60.7	5	129.8
7	44.8	16	90.1	18-OCH_3	58.9	6	128.6
8	92.0	17	61.0	CO	172.2		
9	44.2	18	75.6	CH_3	21.3		

X-ray: [5]

HPLC: [6]

Pharm./Biol.: LD_{50} 0.12 (i/v, mice). Causes changes in the CNS and cardiovascular and respiratory systems, and produces cardiac arrhythmia. Used in experimental medicine for creating a model of arrhythmia [7]. Suppressed epileptiform activity [8]

References

1. S.Yu. Yunusov, Zh. Obshch. Khim. **18**, 575 (1948)
2. M.N. Sultankhodzhaev, L.V. Beshitaishvili, M.S. Yunusov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 481 (1980)
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5. M. Przybylska, L. Marion, Canad. J. Chem. **37**, 1843 (1959)
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7. N. Tulyaganov, F.N. Dzhakhangirov, F. Sadritdinov, L. Khamdamov, *The Pharmacology of Plant Substances* [in Russiun] (Fan, Tashkent, 1976), p. 76
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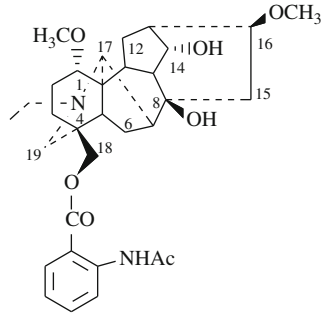
Aconorine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum orientale*

$C_{32}H_{44}N_2O_7$: 568.3149

Mp: amorph., 237°C (boil., perchlorate) [1]

IR: 3560, 3455, 1695, 1595 [1]

MS *m/z*: 568(M^+), 553, 551, 550, 537(100) [1]

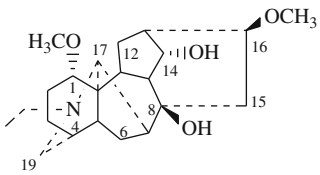
^{1}H NMR: 1.03(3H, t, J = 7.5, NCH_2CH_3), 2.19(3H, s, Ac), 3.24, 3.31(each 3H, s, 2×OCH_3), 3.96(2H, br s, H-18), 4.11(1H, t, J = 4.5, H-14b), 6.90–8.70 (H–Ar) [1]

References

1. V.A. Tel'nov, M.S. Yunusov, S.Yu. Yunusov, B.T. Ibragimov, Chem. Nat. Comp. **11**, 830 (1975)

Aconosine

CAS Registry Number: 38839-95-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum arcuatum, A. fischeri, A. nasutum*
$C_{22}H_{35}NO4$: 377.2566
Mp: 148°C (C_6H_{14}) [1]
$[\alpha]_D$ −21° (MeOH) [1]
Solubility: sol. $CHCl_3$, MeOH, Me_2CO [1]
IR: 3630, 3460, 1100 [1]
MS *m/z*: 377(M^+), 362, 360, 346(100)[1]
^{1}H NMR: 1.03(3H, t, J = 7.5, NCH_2CH_3), 3.20, 3.28 (3H, s, 2×OCH_3), 4.09(1H, t, J = 4.5, H-14β) [1]
^{13}C NMR [2]

Table 1

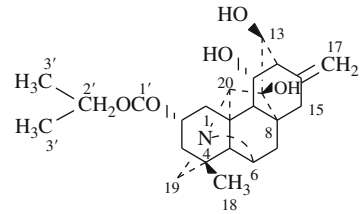
C-1	86.3	C-9	47.8	C-17	63.0
2	26.6	10	39.1	18	–
3	30.3	11	49.0	19	50.8
4	46.5	12	28.2	N-CH_2	49.8
5	37.0	13	45.7	CH_3	13.8
6	29.8	14	76.0	1-OCH_3	55.8
7	46.2	15	40.0	16-OCH_3	56.0
8	73.2	16	82.7		

References

1. D.A. Murav'eva, T.I. Plekhanova, M.S. Yunusov, Chem. Nat. Comp. **8**, 132 (1972)
2. O.E. Edwards, R.J. Kolt, K.K. Purushothaman, Canad. J. Chem. **61**, 1194 (1983)

Acoridine

CAS Registry Number: 144425-27-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{23}H_{31}NO_5$: 401.2202
Mp: 204–206°C [1]
$[\alpha]_D$ +16° (MeOH) [1]
Solubility: sol. $CHCl_3$, MeOH, EtOH [1]
IR: 3370, 1730 [1]
MS *m/z*: 401(M^+, 100), 384(72), 373(72), 356(86), 345(54), 328(75), 312(43), 310(18), 300(18), 272(14), 146(21), 105(21), 94(14), 91(20), 79(12) [1]
^{1}H NMR: 0.86(3H, s, 3H-18), 1.07(3H, t, J = 7.5, NCH_2CH_3), 1.33(1H, dd, J = 14; 3, H-7), 1.48(1H, s, H-5), 1.64(1H, dd, J = 15.5; 4, H-3β), 1.70–1.90(3H, m, H-1β, H-3α, H-7), 1.90–2.00(3H, H-9, H-15α, H-15β), 2.28(2H, q, J = 7.5, NCH_2CH_3), 2.42(1H, br s, H-12), 2.84(1H, d, J = 16, H-1α), 2.48, 2.91(each 1H, d, J = 12, H-19α, H-19β), 3.05(1H, br s, H-6), 3.46(1H, s, H-20), 3.98(1H, br s, H-13α), 4.15(1H, d, J = 9, H-11), 4.60, 4.99(each 1H, s, 2H-17), 5.08(1H, br s, H-2β) [1]
^{13}C NMR: [1]

Table 1

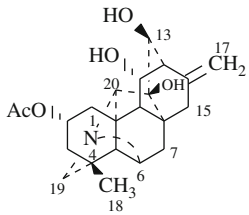
C-1	31.2	C-9	53.6	C-17	108.2
2	69.9	10	46.5	18	29.7
3	36.8	11	76.0	19	63.1
4	37.7	12	52.7	20	69.2
5	60.1	13	79.9	1′	174.0
6	63.1	14	80.4	2′	28.3
7	32.1	15	31.2	3′	9.2
8	44.4	16	144.9		

References

1. I.A. Bessonova, L.N. Samusenko, M.S. Yunusov, M.R. Yagudaev, V.G. Kondrat'ev, Chem. Nat. Comp. **27**, 79 (1991)

Acorine (Guan-Fu Base Y)

CAS Registry Number: 110225-59-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{22}H_{29}NO_5$: 387.2046
Mp: 214–215°C (Me_2CO) [1, 2]
$[\alpha]_D$ +9° (MeOH) [1, 2]
Solubility: sol. MeOH, $CHCl_3$ [1]
IR: 3400, 1745 [1, 2]
MS *m/z*: 387(M^+, 95), 370(100), 359(87), 342(97), 328(64) [1, 2]
^{1}H NMR: 0.96(3H, s, 3H-18), 1.32(1H, dd, J = 13.9; 2.4, H-7), 1.48(1H, s, H-5), 1.53(1H, dd, J = 15.5; 4.5, H-3b), 1.99(3H, s, Ac), 1.64–2.60(6H, m, H-15a, H-15b, H-1b, H-7, H-3a, H-9), 2.40–2.60(1H, m, H-12), 2.86(1H, d, J = 16, H-1a), 2.48, 2.92(each 1H, d, J = 12, H-19β, H-19α), 3.06(1H, br s, H-6), 3.48(1H, s, H-20), 4.00(1H, br s, H-13), 4.18(1H, d, J = 9, H-11), 4.64, 4.83(each 1H, br s, 2H-17), 5.09(1H, m, H-2) [1, 2]
^{13}C NMR [1, 2]

Table 1

C-1	31.2	C-9	53.6	C-17	108.2
2	71.1	10	46.4	18	29.7
3	36.6	11	76.2	19	63.1
4	37.5	12	52.7	20	69.2
5	60.1	13	80.0	CO	174.2
6	63.1	14	80.3	CH_3	21.6
7	32.0	15	31.2		
8	44.2	16	144.9		

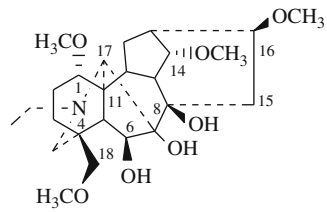
(*continued*)

References

1. I.A. Bessonova, M.S. Yunusov, V.G. Kondrat'ev, Chem. Nat. Comp. **23**, 573 (1987)
2. M.G. Reinecke, D.E. Minter, D.C. Chen, W.M. Yan, Tetrahedron **42**, 6621 (1986)

Acosanine

CAS Registry Number: 52358-56-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum sajanense*
$C_{25}H_{41}NO_7$: 467.2883
Mp: 78–80°C (petr. Et_2O) [1]
Solubility: sol. $CHCl_3$, Me_2CO, EtOH; spar. sol. Et_2O [1]
IR: 3600–3300, 1100 [1]
MS *m/z*: 467(M^+, 4.6), 452(4), 450(2), 449(2), 337(30), 436(100), 420(6), 418(4.5), 71(1.5), 58(2) [1]
^{1}H NMR: 1.00(3H, t, J = 7, NCH_2CH_3), 3.15, 3.24, 3.31(3H, 6H, 3H, s, 4×OCH_3), 3.62(1H, t, J = 5, H-14b), 4.22(1H, s, H-6a) [1]
^{13}C NMR: [1]

Table 1

C-1	84.3	C-9	54.4	C-17	65.8
2	25.7	10	37.3	18	79.2
3	32.0	11	48.3	19	53.6
4	38.5	12	29.0	1-OCH_3	55.7

(*continued*)

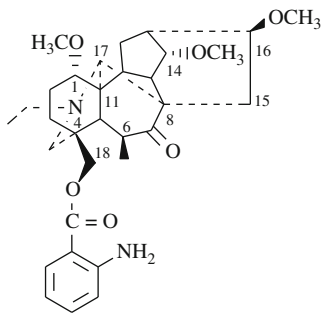
Table 1 (continued)

5	44.1	13	45.7	14-OCH_3	57.8
6	80.7	14	84.3	16-OCH_3	56.2
7	87.5	15	36.3	18-OCH_3	59.5
8	78.7	16	82.4		

References

1. Z.M. Vaisov, I.A. Bessonova, M.S. Yunusov, A.I. Shreter, Chem. Nat. Comp. **28**, 212 (1992)

Acoseptine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum septentrionale*
$C_{32}H_{44}N_2O_7$: 568.3136
Mp: 127–128°C (Me_2CO) [1]
Solubility: sol. $CHCl_3$, MeOH [1]
IR: 3461, 3354, 2972, 2942, 2887, 2818, 2361, 2342, 1718, 1693, 1618, 1591, 1561, 1489, 1457, 1388, 1371, 1341, 1297, 1246, 1209, 1190, 1163, 1120, 1098, 1079, 995, 979, 760 [1]
MS *m/z*: 568(M^+, 100), 553(15), 537(32), 509(9), 507 (10), 448(1.5), 419(4), 405(6), 375(8), 374(27), 346 (7), 281(3), 256(4), 219(3), 218(9), 187(6), 185(30), 150(6), 149(35), 121(16), 120(64), 92(22), 91(30), 83(34), 71(58) [1]
^{1}H NMR: 1.00(3H, t, J = 7.2), 3.36, 3.37, 3.48, 3.49 (each 3H, s, 4×OCH_3), 4.15, 4.37(each 1H, d, J = 11.6, 2H-19), 5.84(2H, br s, NH_2), 6.75(2H, m, Ar-H3 and 5), 7.35(1H, ddd, J = 8.4, 1.6, Ar-H4), 8.01(1H, dd, J = 8.4, 1.6, Ar-H6) [1]
^{13}C NMR: [1]

Table 1

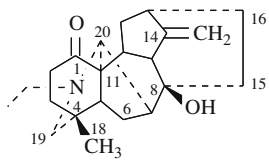
C-1	84.0	C-11	51.4	1-OCH_3	110.5
2	26.0	12	29.6	6-OCH_3	59.7
3	31.5	13	46.6	14-OCH_3	57.0
4	39.2	14	83.4	16-OCH_3	56.7
5	42.4	15	10.3	Ar-C = O	168.1
6	79.4	16	83.0	Ar-C	110.5
7	201.6	17	66.0	Ar-C	150.6
8	59.1	18	69.8	Ar-C	116.6
9	49.1	19	55.8	Ar-C	134.2
10	39.7	N-CH_2	42.4	Ar-C	116.3
		CH_3	9.9	Ar-C	131.2

References

1. S.K. Usmanova, I.A. Bessonova, N.D. Abdullaev, M.G. Levkovich, Chem. Nat. Comp. **35**, 91 (1999)

Actaline

CAS Registry Number: 122279-81-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum talassicum*
$C_{22}H_{31}NO_2$: 341.2355
Mp: 125–127°C (C_6H_{14}) [1]
IR: 3475, 1680 [1]
MS *m/z*: 341(M^+, 45), 326(100), 324(4), 323(4), 322(3), 258(3), 284(3.5), 267(26), 266(2), 149(4.5) [1]

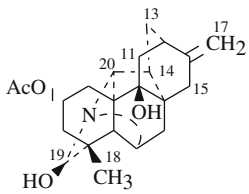
^{1}H NMR: 0.80(3H, s, 3H-18), 1.03(3H, t, J = 7, NCH_2CH_3), 3.20(1H, s), 4.51, 4.53(each 1H, br s, 2H-17) [1]
X-ray: [1]

References

1. A.A. Nishanov, B. Tashkhodzhaev, M.N. Sultankhodzhaev, B.T. Ibragimov, M.S. Yunusov, Chem. Nat. Comp. **25**, 32 (1989)

Acsinatine

CAS Registry Number: 1353-76-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum leucostomum*
$C_{22}H_{29}NO_4$: 371.2097
Mp: 251–253°C (Et_2O–MeOH) [1]
Solubility: sol. $CHCl_3$, MeOH [1]
IR: 3540, 3455, 1735, 1380, 1260, 1160, 1076, 978, 935, 880 [1]
MS *m/z*: 371(M^+), 354, 327, 311(100) [1]
^{1}H NMR: 1.01(3H, s, 3H-18), 1.98(3H, s, Ac), 2.72(1H, br s), 3.45(1H, br s), 4.51(2H, br s), 4.61(1H, br s), 5.17(1H, br s, H-2β) [1]
^{13}C NMR: [1]

Table 1

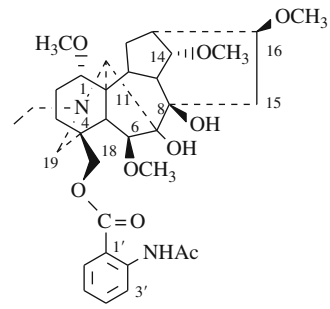
C-1	31.8	C-9	78.8	C-16	152.1
2	70.7	10	50.4	17	104.3
3	37.8	11	39.0	18	23.0
4	42.2	12	36.9	19	92.0
5	55.1	13	34.3	20	70.1
6	60.8	14	43.9	CO	169.6
7	29.6	15	31.7	CH_3	21.7
8	42.1				

References

1. V.A. Tel'nov, S.K. Usmanova, N.D. Abdullaev, Chem. Nat. Comp. **29**, 346 (1993)

Ajacine

CAS Registry Number: 509-17-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum rubicundum, Delphinium orientale*
$C_{34}H_{48}N_2O_9$: 628.3360
Mp: 152–154°C (water EtOH) [1]
$[\alpha]_D$ +50° (EtOH) [1, 2]
Solubility: sol.$CHCl_3$ [1]
IR: 3450, 3310, 3280, 1700–1680, 1610–1593 [1, 2]
MS *m/z*: 628(M^+), 613, 611, 610, 598, 597(100), 595, 450, 436 [1]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 2.24(3H, s, Ac), 3.27, 3.35, 3.38, 3.42(each 3H, s, OCH_3) [2]
^{13}C NMR: [3]

Table 1

C-1	83.9	C-12	28.6	6-OCH_3	57.8
2	26.1	13	46.1	14-OCH_3	58.1
3	32.2	14	83.9	16-OCH_3	56.3
4	38.2	15	33.8	Ar-C = O	168.1
5	43.3	16	82.6	Ar-C-1′	114.5
6	91.0	17	64.5	2′	141.9
7	88.6	18	69.8	3′	120.6
8	77.5	19	52.5	4′	135.0
9	50.5	NCH_2	51.0	5′	122.5

(*continued*)

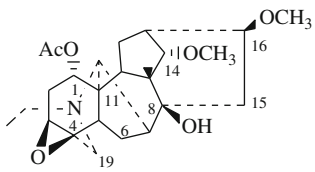
Table 1 (continued)

10	37.6	CH_3	14.0	6′	130.3
11	49.1	1-OCH_3	55.8	NHCO	169.0
				CH_3	25.5

References

1. A.A. Nishanov, M.N. Sultankhodzhaev, M.S. Yunusov, V. G. Kondrat'ev, Chem. Nat. Comp. **27**, 349 (1991)
2. S.W. Pelletier, R.S. Sawhney, H.K. Desai, N.V. Mody, J. Natur. Prod. **43**, 395 (1980)
3. S.W. Pelletier, N.V. Mody, R.S. Sawhney, J. Bhattacharyya, Heterocycles **7**, 327 (1977)

Akiradine

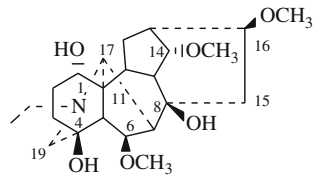


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum kirinense*
$C_{24}H_{35}NO_7$: 449.5483
Mp: 108–110°C (Et_2O) [1]
IR: 3648, 3628, 3481, 2966, 2818, 1732, 1652, 1456, 1375, 1246, 1222, 1185, 1126, 1080, 1023, 977, 957, 936, 902, 868, 802, 754, 709, 608, 504 [1]
MS *m/z*: 449(M^+, 16), 434(12), 432(8), 418(8), 406(5), 390(100), 374(5), 372(4), 358(5) [1]
^{1}H NMR: 1.01(3H, t, J = 7, NCH_2CH_3), 2.00(3H, s, $OCOCH_3$), 3.24, 3.33(each 3H, s, 2×OCH_3), 3.54 (1H, br s), 5.07(1H, dd, J = 6, 0, 3.5, H-1b) [1]

References

1. U.T. Teshebaeva, M.N. Sultankhodzhaev, A.A. Nishanov, Chem. Nat. Comp. **35**, 692 (1999)

Akiramidine

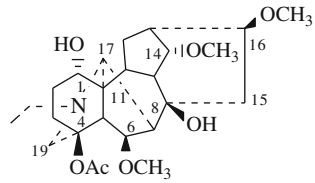


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum kirinense*
$C_{23}H_{37}NO_6$: 423.5536
Mp: amorph. [1]
IR: 3423, 2932, 2364, 2458, 1398, 1303, 1226, 1089, 1004, 977, 880, 592 [1]
MS *m/z*: 423(M^+, 9), 408(22), 406(100), 390(9), 388 (5) [1]
^{1}H NMR: 1.07(3H, s, J = 7, NCH_2CH_3), 3.26, 3.30, 3.36(each 3H, s, 3×OCH_3), 3.56(1H, t, J = 5, H-14b), 3.71(1H, t, J = 2.5, H-1b), 4.06(1H, d, J = 7, H-6a) [1]

References

1. U.T. Teshebaeva, M.N. Sultankhodzhaev, A.A. Nishanov, Chem. Nat. Comp. **35**, 659 (1999)

Akiramine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum kirinense*
$C_{25}H_{39}NO_7$: 465.5913
Mp: 162–164°C (Me_2CO) [1]

IR: 3586, 3480, 2936, 2351, 1730, 1683, 1652, 1634, 1558, 1539, 1471, 1456, 1409, 1245, 1230, 1145, 1100, 1082, 1020, 982, 856, 697, 583, 498 [1]
MS *m/z*: 465(M^+, 6), 450(18), 448(21), 405(100), 390 (11), 388(19) [1]
^{1}H NMR: 1.06(3H, t, J = 7, NCH_2CH_3), 1.97(3H, s, $OCOCH_3$), 3.28, 3.29, 3.35(each 3H, s, 3×OCH_3), 3.55(1H, t, J = 5, H-14b), 3.66(1H, t, J = 2.5), 3.72 (1H, t, J = 2.5, H-1b), 4.02(1H, d, J = 7, H-6a), 4.29 (1H,s) [1]
^{13}C NMR: [1]

Table 1

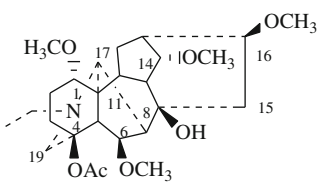
C-1	71.9	C-10	44.0	C-19	59.1
2	29.5	11	49.6	N-CH_2	48.0
3	30.4	12	30.5	CH_3	12.7
4	79.0	13	37.6	6-OCH_3	57.6
5	49.0	14	81.8	14-OCH_3	57.7
6	84.5	15	39.9	16-OCH_3	56.2
7	51.4	16	83.0	C = O	169.6
8	75.0	17	64.0	CH_3	21.9
9	44.1				

References

1. U.T. Teshebaeva, M.N. Sultankhodzhaev, A.A. Nishanov, Chem. Nat. Comp. **35**, 445 (1999)

Akirane

CAS Registry Number: 171119-09-8



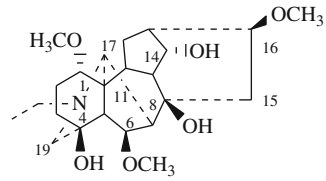
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum kirinense*
$C_{26}H_{43}NO_7$: 479.2883
Mp: 214–217°C (Me_2CO) [1]
IR: 3540, 2950, 2830, 1745, 1475, 1410, 1375, 1275, 1240, 1140, 1100, 1050, 990, 960, 870 [1]
MS *m/z*: 479(M^+, 6), 464(13), 448(28), 446(5), 430(3), 419(100), 404(33), 388(66), 364(4), 362(4), 360(3), 358(4), 356(5), 346(15), 330(5), 288(6) [1]
^{1}H NMR: 1.00(3H, t, J = 7, NCH_2CH_3), 1.93(3H, s, $OCOCH_3$), 3.18, 3.25, 3.33, 3.33(each 3H, s, 4×OCH_3), 3.49(1H, t, J = 5, H-14β), 3.93(1H, m, J = 7, H-6α), 4.33(1H, br s) [1]
X-ray: [1]

References

1. M.N. Sultankhodzhaev, I.M. Yusupova, B. Tashkhodzhaev, A.A. Nishanov, Chem. Nat. Comp. **30**, 603 (1994)

Akiranine

CAS Registry Number: 213478-70-7

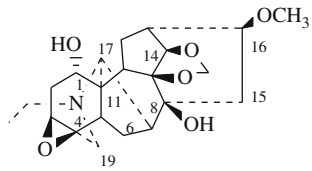


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum kirinense*
$C_{24}H_{39}NO_6$: 437.5808
Mp: amorph. [1]
IR: 3500–3530, 1110 [1]
MS *m/z*: 437(M^+, 7), 422(30), 406(100) [1]
^{1}H NMR: 1.00(3H, t, J = 7.5, NCH_2CH_3), 3.16, 3.25, 3.34(each 3H, s, 3×OCH_3), 3.92(1H, d, J = 7.5, H-6a), 3.49(3H, t, J = 5, H-14β) [1]

References

1. M.N. Sultankhodzhaev, Z.S. Boronova, A.A. Nishanov, Khim. Prirod. Soedin. 889 (1997)

Akirine



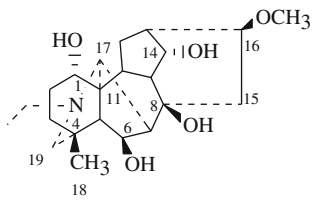
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum kirinense*
$C_{22}H_{31}NO_6$: 405.2151
Mp: 214–217°C (Me_2CO) [1]
IR: 3515, 3200, 1100 [1]
MS *m/z*: 405(M^+, 100), 390(60), 388(43), 377(11), 375(15), 374(60), 362(15), 360(7), 358(6), 356(4), 350(9), 346(6), 344(5), 334(9), 332(6), 330(5), 328(5), 319(11), 316(5), 303(14), 235(27), 218(8), 208(8), 207(7), 206(8), 190(6) [1]
^{1}H NMR: 1.02(3H, t, NCH_2CH_3), 3.24(3H, s, OCH_3), 3.46(1H, s), 3.94(1H, s), 5.03, 5.24 (each 1H, s, CH_2O_2) [1]
X-ray: [1]

References

1. A.A. Nishanov, B. Tashkhodzhaev, I.M. Yusupova, M.N. Sultankhodzhaev, Chem. Nat. Comp. **28**, 466 (1992)

Alkaloid B

CAS Registry Number: 133086-81-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium elisabetae, D. speciosum*
$C_{22}H_{35}NO_5$: 393.2515
Mp: 190–192°C (Me_2CO), 164°C (tri Ac.) [1]
$[\alpha]_D$ +16° ($CHCl_3$) [1, 2]
IR: 3450–3300, 1460, 1450, 1410, 1378, 1305, 1243, 1230, 1190, 1157, 1136, 1092, 1083, 1055, 1043, 1020, 1000, 983, 945, 920, 893, 880, 867, 820, 810, 723 [1, 2]
MS *m/z*: 393(M^+), 378, 376, 360, 337 [1]
^{1}H NMR: 0.97(3H, s, 3H-18), 1.04(3H, t, J = 7, NCH_2CH_3), 3.28(3H, s, OCH_3), 4.12(1H, t, J = 5, H-14β), 4.36(1H, d, J = 7) [1]
^{13}C NMR: [2]

Table 1

C-1	72.9	C-9	50.2	C-17	64.9
2	29.7	10	40.0	18	27.4
3	32.2	11	48.4	19	61.8
4	32.8	12	29.7	16-OCH_3	56.3
5	46.1	13	44.4	NCH_2	48.4
6	72.0	14	76.0	CH_3	13.0
7	54.8	15	42.4		
8	76.0	16	82.4		

References

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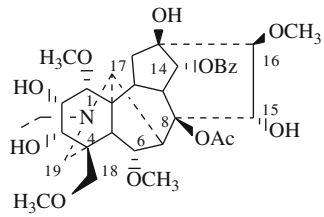
2. P.W. Codding, K.A. Kerr, M.N. Benn, A.J. Jones, S.W. Pelletier, N.V. Mody, Tetrahedron Lett. **21**, 127 (1980)

Altaconitine

CAS Registry Number: 171090-87-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum altaicum, A. volubile*
$C_{34}H_{47}NO_{12}$: 661.3098

Mp: 235–237°C (dec.) [1]
IR: 3520, 3500, 1730, 1710, 1120 [1]
MS *m/z*: 661(M^+, 33), 646(44), 630(55), 616(22), 614(24), 602(100), 570(33), 554(77), 386(66) [1]
^{1}H NMR: 1.34(3H, t, J = 7, NCH_2CH_3), 1.41(3H, s, Ac), 3.24, 3.31, 3.33, 3.72(each 3H, s, 4×OCH_3), 4.11(1H, d, J = 5, H-6β), 4.35(1H, d, J = 3, H-15β), 4.47(1H, dd, J = 6,3), 4.88(1H, d, J = 5, H-14β), 7.47–8.06(H-Ar) [1]
^{13}C NMR: [1]

Table 1

C-1	83.6	C-12	38.1	6-OCH_3	58.4
2	65.2	13	73.8	16-OCH_3	60.9
3	67.7	14	78.6	18-OCH_3	58.7
4	43.8	15	78.6	CO	172.2
5	45.6	16	90.1	CH_3	21.2
6	82.4	17	59.3	Ar-CO	166.0
7	44.9	18	71.6	Ar-C	129.7
8	91.5	19	48.6	Ar-C	129.5
9	45.3	NCH_2	43.8	Ar-C	128.5
10	40.5	CH_3	12.0	Ar-C	133.2
11	52.4	1-OCH_3	56.0		

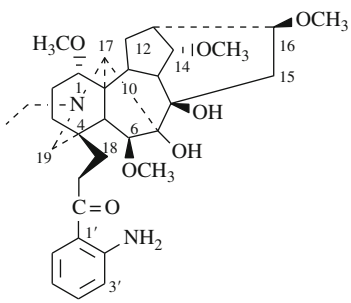
X-ray: [1]

References

1. N. Batbayar, D. Batsuren, B. Tashkhodzhaev, M.N. Yusupova, M.N. Sultankhodzhaev, Chem. Nat. Comp. **29**, 38 (1993)

Anthranoyllycoctonine (Inuline)

CAS Registry Number: 22413-78-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum septentrionale, A. umbrosum, Delphinium biternatum, D. confusum, D. dictyocarpum, D. elisabethae, D. flexuosum, D. freynii, D. oreophilum, D. poltoratskii, D. puniceum, D. semibarbatum, D. speciosum, D. thamarae*
$C_{32}H_{46}N_2O_8$: 586.3254
Mp: 153–155°C (Me_2CO) [1, 2]
$[\alpha]_D$ +50° ($CHCl_3$) [1, 2]
Solubility: sol. $CHCl_3$, MeOH
IR: 3580, 3525, 3450, 3240, 1695, 1630, 1595, 1490, 1465, 1395, 1306, 1255, 1243, 1166, 1115, 1090, 1030, 985, 970, 863, 810, 760, 712 [1]
MS *m/z*: 586(M^+, 8), 571(21), 569(3), 568(3.2), 555(100), 538(4.1), 523(3) [1]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 3.24, 3.31, 3.36, 3.40(each 3H, s, 4×OCH_3), 6.70–7.68(H–Ar) [1]
^{13}C NMR: [2]

Table 1

C-1	84.0	C-12	28.8	6-OCH_3	57.9
2	26.2	13	46.2	14-OCH_3	58.0
3	32.3	14	84.0	16-OCH_3	56.3
4	37.6	15	33.7	Ar-C = O	167.9
5	43.3	16	82.6	Ar-C-1′	110.4
6	91.0	17	64.6	2′	150.9
7	88.6	18	68.7	3′	116.9*
8	77.6	19	52.6	4′	134.4**
9	50.4	NCH_2	51.0	5′	116.4*
10	38.3	CH_3	14.1	6′	130.8**
11	49.1	1-OCH_3	55.8		

HPLC: [3]
Pharm./Biol.: LD_{50} 20.1, 95.0 mg/kg (i/v, i/p, mice). Lowers arterial pressure, exhibits a ganglioblocking and curaremimetic action. In vitro in a concentration of 2×10^{-6}, M blocks by 50% the amplitude of miniature end-plate potentials [4]

References

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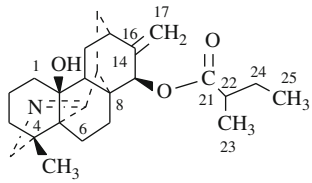
2. S.W. Pelletier, N.V. Mody, R.S. Sawhuey, J. Bhattacharyya, Heterocycles **7**, 327 (1977)

3. G.D. Manners, K.E. Panter, M.H. Ralphs, J.A. Pfister, J.D. Olsen, I.F. James, J. Agric. Food Chem. **41**, 96 (1993)
4. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(2), 216 (1996)

Arcutine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum arcuatum*

$C_{25}H_{35}NO_3$: 397.2642

Mp: 225–226°C (C_6H_{14})

IR: 3289, 1729, 1645 (mixture of arcutine and arcutinine, 2:1) [1]

MS *m/z*: 397(M^+, 12), 314(24), 313(100), 312(6), 297(10), 296(50), 295(86), 294(17), 280(13), 267(20), 224(30), 223(17), 199(20), 198(63), 197(13), 196(17), 105(33), 91(27), 85(22), 71(20) [2]

^{1}H NMR: 0.88(3H, t, J = 7, $CH_2\underline{CH_3}$), 0.94(3H, s, 3H-18), 1.13(3H, d, J = 7, $CHCH_3$), 3.69, 3.33(each 1H, dd, J = 14.0, 1.4), 4.85, 4.94(each 1H, dd, J = 1.2, 2H-17), 5.36(1H, t, J = 1.2, H-15α) (mixture of arcutine and arcutinine, 2:1) [1]

^{13}C NMR: (mixture of arcutine and arcutinine, 2:1) [1]

Table 1

C-1	33.34, 33.52	C-10	75.33	C-18	23.50, 23.63
2	20.56, 20.60	11	26.27	19	73.83
3	31.24	12	35.83	20	185.63
4	39.63	13	32.55, 32.70	21	175.80
5	58.90	14	37.47	22	41.83, 34.77
6	17.05	15	74.08	23	27.26, 19.51
7	28.89, 28.99	16	150.8	24	12.10, 19.58
8	41.34	17	110.38, 110.57	25	17.22
9	43.97				

X-ray: [2]

References

1. Sh.A. Saidkhodzhaeva, I.A. Bessonova, N.D. Abdullaev, Chem. Nat. Comp. **37**, 466 (2001)
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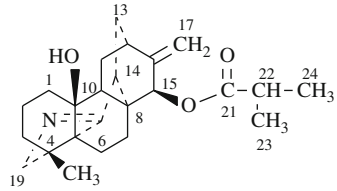
Arcutinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum arcuatum*

$C_{24}H_{33}NO_3$: 383.2452

IR: 3289, 1729, 1645 (mixture of arcutine and arcutinine, 2:1) [1]

MS *m/z*: 383(M^+), 313, 295 [1]

^{1}H NMR: 0.88(3H, t, J = 7, $CH_2\underline{CH_3}$), 0.94(3H, s, 3H-18), 1.13(3H, d, J = 7, $CHCH_3$), 3.69, 3.33(each 1H, dd, J = 14.0, 1.4), 4.85, 4.94(each 1H, dd, J = 1.2, 2H-17), 5.36(1H, t, J = 1.2, H-15α) (mixture of arcutine and arcutinine, 2:1) [1]

^{13}C NMR: (mixture of arcutine and arcutinine, 2:1) [1]

Table 1

C-1	33.34, 33.52	C-9	43.97	C-17	110.38, 110.57
2	20.56, 20.60	10	75.33	18	23.50, 23.63
3	31.24	11	26.27	19	73.83
4	39.63	12	35.83	20	185.63
5	58.90	13	32.55, 32.70	21	175.80
6	17.05	14	37.47	22	41.83, 34.77
7	28.89, 28.99	15	74.08	23	27.26, 19.51
8	41.34	16	150.8	24	12.10, 19.58

References

1. Sh.A. Saidkhodzhaeva, I.A. Bessonova, N.D. Abdullaev, Chem. Nat. Comp. **37**, 466 (2001)
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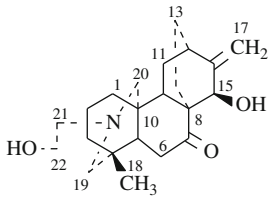
3. S.W. Pelletier, J. Am. Chem. Soc. **87**, 799 (1965)
4. N.V. Mody, S.W. Pelletier, Tetrahedron **34**, 2421 (1978)
5. B.T. Salimov, Zh.Kh. Kuzibaeva, F.N. Dzhakhangirov, Chem. Nat. Comp. **32**, 366 (1996)

Atidine

CAS Registry Number: 467-91-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum zeravschanicum*
$C_{22}H_{33}NO_3$: 359.2452
Mp: 179–180°C (MeOH) [1], 182.5–183.5°C (C_6H_6) [2, 3], 204–205°C (hydrochloride), 182–190°C (diacetate hydrochloride) [2]
$[\alpha]_D$ −47° [2]
IR: 3544, 3454, 3086, 1695, 1658, 1376, 900 [2, 3]
^{1}H NMR: 0.77(3H, s, 3H-18), 3.58, 3.68, 3.78(2H, t, J = 6.0, NCH_2CH_2OH), 5.07, 5.20(each 1H, dt, J = 2, 2H-17) [3]
^{13}C NMR [4]:

Table 1

C-1	40.7	C-9	41.6	C-16	151.5
2	22.6	10	37.2	17	109.5
3	39.1	11	28.0	18	25.8
4	33.5	12	36.0	19	58.9
5	47.9	13	26.0	20	53.5
6	36.2	14	25.3	21	58.0
7	215.8	15	72.8	22	60.5
8	53.0				

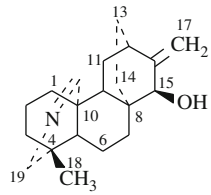
Pharm./Biol.: LD_{50} 58.0 mg/kg (i/v, mice). High anti-arrhythmic action [5]

References

1. B.T. Salimov, Chem. Nat. Comp. **29**, 70 (1993)

Atisine Azomethine

CAS Registry Number: 18041-82-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum zeravschanicum*
$C_{20}H_{29}NO$: 299.2242
Mp: 180–182°C (C_6H_{14}–Me_2CO) [1]
Solubility: sol. $CHCl_3$, MeOH, EtOH; Spar. Sol. Me_2CO, C_6H_{14}
IR: 3340, 3080, 1650, 900 [1]
MS *m/z*: 299(M^+, 100), 284, 256 [1]
^{1}H NMR: 0.77(3H, s, 3H-18), 3.35(2H, d, J = 3.0, 19-CH_2), 3.61(1H, br s, H-15α), 4.98, 5.03(1H, d, J = 2.0, 1H, s, 2H-17), 7.83(1H, br s, H-20) [1]
^{13}C NMR [2]:

Table 1

C-1	42.4	C-8	37.4	C-15	75.2
2	20.0	9	38.1	16	156.2
3	34.1	10	42.5	17	108.9
4	32.8	11	28.1	18	25.8
5	46.9	12	36.0	19	60.2
6	19.6	13	26.1	20	166.4
7	31.0	14	25.5		

References

1. B.T. Salimov, Chem. Nat. Comp. **29**, 70 (1993)
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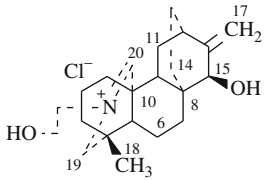
Atisine Chloride



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum, A. rotundifolium, A. zeravschanicum*
$C_{22}H_{34}NO_2Cl$: 379.2277/381.2248
Mp: 297°C (dec., EtOH) [1, 2]
Solubility: sol. MeOH, water
IR: 3390, 3320, 3270, 2935, 2870, 1685, 1665, 1455, 1371, 1225, 1075, 1005, 900 [1, 2]
^{1}H NMR: 1.03(3H, s, 3H-18), 3.56–3.75(3H, m, H-19, H-15), 3.90, 4.14(each 2H, m, H-21, H-22), 5.00(2H, s, 2H-17), 8.65(1H, br s, H-20) [1, 2]

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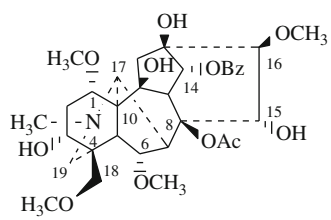
Beiwutine

CAS Registry Number: 76918-93-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum turchaninovii*
$C_{33}H_{45}NO_{12}$: 647.2942
Mp: 196–198°C [1]
IR: 3510, 1715, 1610, 1500, 1450, 1410, 1380, 1340, 1285, 1190, 1120, 1100, 1060, 995, 950, 890, 855, 810, 780, 760, 730 [1]
MS *m/z*: 587(M^+ –60), 572, 570, 550, 538 [1]
^{1}H NMR: 1.34(3H, s, Ac), 2.38(3H, s, NCH_3), 3.06, 3.24, 3.34, 3.64(each 3H, s, 4×OCH_3), 5.28(1H, dd, J = 4.5, H-14β), 7.22–8.00 (H–Ar) [1]
^{13}C NMR: [1]

Table 1

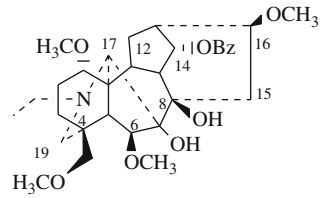
C-1	83.3	C-11	56.0	1-OCH_3	55.8
2	33.7	12	42.6	6-OCH_3	58.2
3	71.3	13	76.5	16-OCH_3	61.2
4	43.2	14	78.4	18-OCH_3	59.1
5	46.8	15	77.1	C = O	172.4
6	79.8	16	89.6	CH_3	21.4
7	43.4	17	62.8	ArCO	166.3
8	89.8	18	75.7	Ar-C	128.8
9	53.9	19	49.7	Ar-C	129.7
10	74.8	N-CH_3	42.5	Ar-C	129.9

References

1. Y.-G. Wang, Y.-L. Zhu, R.-H. Zhu, Heterocycles **17**, 607 (1982)

14-Benzoylbrowniine

CAS Registry Number: 66891-15-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium biternatum*
$C_{32}H_{45}NO_8$: 571.3145
Mp: 114–116°C (MeOH) [1]
$[\alpha]_D$ +53° ($CHCl_3$) [1]
IR: 3460, 1715, 1610, 1585, 1100 [1]
MS *m/z*: 571(M^+), 556, 554, 553, 540(100), 105 [1]
^{1}H NMR: 1.01(3H, t, J = 7, NCH_2CH_3), 3.22, 3.32(9H, 3H, c, 4×OCH_3), 5.00(1H, t, J = 5, H-14β), 7.42-8.10(H–Ar) [1]
^{13}C NMR [2]:

Table 1

C-1	84.2	C-11	49.2	CH_3	14.0
2	25.9	12	28.3	1-OCH_3	55.9
3	32.0	13	45.5	6-OCH_3	57.4
4	38.1	14	76.0	16-OCH_3	56.1
5	43.1	15	34.0	18-OCH_3	59.1
6	90.2	16	82.2	C = O	167.0
7	88.3	17	64.8	Ar-C	132.5
8	77.5	18	77.9	Ar-C	129.9
9	51.3	19	52.9	Ar-C	128.3
10	37.6	N-CH_2	51.3		

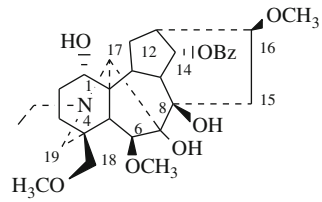
Pharm./Biol.: LD_{50} 17.5; 125.0 mg/kg (i/v, i/p, mice). Aconitine antagonist. Possess a pronounced antiarrhythmic and a weak hypotensive action. Exhibits N-cholinoblocking, myotropic, spasmolytic, local anesthetic, analgesic, and antiinflammatory effects [3]

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 84 (1978)
2. S.W. Pelletier, R.S. Sawhney, Heterocycles **9**, 463 (1978)
3. F.N. Dzhakhangirov, DAN UzSSR (9), 36 (1982)

14-Benzoyldelcosine

CAS Registry Number: 66891-16-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium biternatum*
$C_{31}H_{43}NO_8$: 557.2989
Mp: 147–149°C (Et_2O) [1]
$[\alpha]_D$ +50° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$, Me_2CO, MeOH
IR: 3460, 1715, 1602, 1585, 1100 [1]
MS *m/z*: 557(M^+), 542(100), 105 [1]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 3.27(9H, s, 3×OCH_3), 5.01(1H, t, J = 5, H-14β), 7.43–8.06 (H–Ar) [1, 2]
^{13}C NMR [3]:

Table 1

C-1	72.6	C-12	29.4	6-OCH_3	57.2
2	27.3	13	43.1	16-OCH_3	56.1
3	29.8	14	76.5	18-OCH_3	59.0
4	37.4	15	34.2	C = O	166.5
5	43.6	16	82.6	Ar-C-1	130.7
6	90.1	17	66.2	2	129.8
7	87.7	18	77.1	3	128.3
8	78.4	19	57.2	4	132.6
9	44.9	NCH_2	50.3	5	128.3
10	37.9	CH_3	13.6	6	129.8
11	49.2				

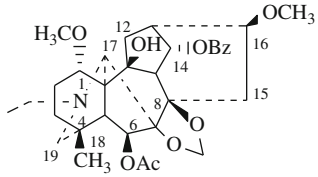
Pharm./Biol.: LD_{50} 35.1 mg/kg (i/v, mice). Hypotensive. N-cholinoblocking, quinidine-like, antiarrhythmic action [4]

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 84 (1978)
2. S.Yu. Yunusov, *Alkaloids, Supplement 1* [in Russian] (Fan, Tashkent, 1984), p. 28
3. S.W. Pelletier, N.V. Mody, B.S. Joshi, L.C. Schramm, in *Alkaloids: Chemical and Biological Perspectives*, ed. by S.W. Pelletier, vol. 2 (Wiley, New York, 1984), p. 284. Ch. 5
4. F.N. Dzhakhangirov, DAN UzSSR (9), 36 (1982)

14-Benzoyldictyocarpine (Glaucephine)

CAS Registry Number: 78018-30-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium dictyocarpum*
$C_{33}H_{43}NO_9$: 597.2938
Mp: 143–145°C (Me_2CO) [1]
IR: 3510, 1745, 1725, 1605, 1585, 1285, 1255, 1090 [1]
MS *m/z*: 597(M^+), 582, 566(100), 538, 105 [1]
^{1}H NMR: 0.84(3H, s, 3H-18), 1.01(3H, t, J = 7, NCH_2CH_3), 1.94(3H, s, Ac), 3.18, 3.20(each 3H, s, 2×OCH_3), 4.78, 4.83(each 1H, s, CH_2O_2), 5.43(1H, t, J = 5, H-14β), 5.35(1H, s, H-6α), 7.32–8.01(H–Ar) [1]
^{13}C NMR [2]:

Table 1

C-1	79.0	C-12	36.6	1-OCH_3	55.5
2	26.9	13	38.7	16-OCH_3	55.9
3	36.9	14	74.3	OC = O	170.2
4	33.8	15	35.1	CH_3	21.6
5	50.2	16	81.2	Ar-C = O	166.9
6	77.4	17	64.1	Ar-C-1	130.7
7	91.7	18	25.6	2	129.9
8	83.2	19	56.9	3	128.3
9	50.1	NCH_2	50.4	4	132.7
10	81.2	CH_3	13.9	5	128.3
11	55.7	OCH_2O	93.9	6	129.9

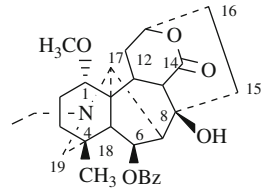
Pharm./Biol.: LD_{50} 22.1 mg/kg (i/v, mice). Powerful antiarrhythmic action and antitoxic properties in relation to aconitine. Weak hypotensive, N-cholinoblocking, cardiodepressive, and antiinflammatory effects [3]

References

1. B.T. Salimov, M.S. Yunusov, Khim. Prirod. Soedin. 530 (1981)
2. S.W. Pelletier, O.D. Dailey, N.V. Mody, J.D. Olsen, J. Org. Chem. **46**, 3284 (1981)
3. F.N. Dzhakhangirov, *DAN UzSSR* (9), 36 (1982)

6-Benzoylheteratisine

CAS Registry Number: 99759-48-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum zeravschanicum*
$C_{29}H_{37}NO_7$: 495.2621 [1]
Mp: 209–211°C (Me_2CO) [1, 2], 212–214°C (C_6H_6) [2]
$[\alpha]_D$ +74° ($CHCl_3$) [1, 2]
IR: 3480, 1750, 1710, 1115 [1, 2]
MS *m/z*: 495(M^+), 480, 464(100), 390, 374, 358, 342, 102 [1, 2]
^{1}H NMR: 0.87(3H, s, 3H-18), 1.02(3H, t, J = 7.5, NCH_2CH_3), 3.22(3H, s, OCH_3), 3.59(1H, d, J = 2.5, H-17), 3.95(1H, d, J = 7.0, H-9), 4.67(1H, m,

H-13), 5.65(1H, d, J = 7.0, H-6), 7.47–8.00(5H, m, H–Ar) [1, 2]

^{13}C NMR: [3]

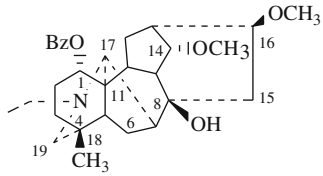
Table 1

C-1	82.3	C-11	49.9	N-CH_2	48.9
2	26.7	12	35.3	CH_3	13.4
3	36.4	13	75.8	1-OCH_3	55.8
4	34.9	14	173.5	OC = O	166.6
5	49.9	15	28.8	Ar-C-1	130.2
6	74.5	16	29.4	2	129.6
7	48.9	17	62.6	3	128.5
8	75.2	18	26.0	4	132.8
9	57.5	19	54.9	5	128.5
10	42.8			6	129.6

References

1. A.M. Nigmatullaev, B.T. Salimov, Rast. Resursi (Russian) **36**(4), 118 (2000)
2. R. Aneja, D.M. Locke, S.W. Pelletier, Tetrahedron **29**, 3297 (1973)
3. S.W. Pelletier, N.V. Mody, B.S. Joshi, L.C. Schramm, *Alkaloids Chemical and Biological Perspectives*, vol. 2 (Wiley, New York, 1984), p. 285. Ch.V

1-Benzoylkarasamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum karakolicum*

$C_{30}H_{41}NO_5$: 495.2985

Mp: 206–208°C (Me_2CO)

IR: 3400, 1710, 1100 [1]

MS *m/z*: 495(M^+), 374(100) [1]

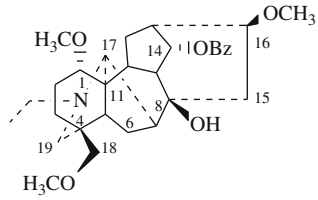
^{1}H NMR: 0.74(3H, s, 3H-18), 1.19(3H, t, J = 7, NCH_2CH_3), 3.21, 3.34(each 3H, s, 2×OCH_3), 5.18(1H, q, J = 10; 7, H-1β), 7.38–7.95(H–Ar) [1]

Pharm./Biol.: LD_{50} 20.3 mg/kg (i/v, mice). Pronounced myotropic and spasmolytic activity. Superior to papaverine and No-Spa. Cardiodepressive, antiarrhythmic, and N-cholinoblocking actions. Suppressed of the CNS [2]

References

1. M.N. Sultankhodzhaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 192 (1986)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(2), 216 (1996)

14-Benzoyltalatisamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum nemorum*

$C_{31}H_{43}NO_6$: 525.3090

Mp: amorph., 221°C (EtOH, perchlorate) [1, 2]

IR: 1720, 1590, 1100 [1, 2]

MS *m/z*: 525(M^+), 494(100), 146, 105 [1, 2]

^{1}H NMR: 1.03(3H, t, NCH_2CH_3), 3.09, 3.21, 3.21(each 3H, s, 3×OCH_3), 5.03(1H, t, H-14β), 7.56, 7.88(5H, m, H–Ar) [1, 2]

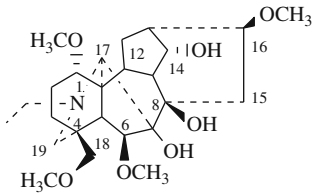
Pharm./Biol.: LD_{50} 25.0 and 122.5 mg/kg (i/v, rats and i/p, mice). Powerful antiarrhythmic and antifibrillatory action and antitoxic properties in relation to aconitine. Its activity exceeds that of quinidine, ajmaline, etc. Anti-inflammatory and spasmolytic, and weak local anaesthetic and N-cholinoblocking effects [3]

References

1. M.N. Sultankhodzhaev, *Results of an Investigation of Alkaloid-bearing Plants* [in Russian] (Fan, Tashkent, 1993), p. 37
2. M.N. Sultankhodzhaev, Chem. Nat. Comp. **31**, 233 (1995)
3. F.N. Dzhakhangirov, *DAN UzSSR* (9), 36 (1982)

Browniine

CAS Registry Number: 5140-42-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium biternatum, D. corymbosum, D. iliense, D. rotundifolium*

$C_{25}H_{41}NO_7$: 467.2883

Mp: 110–112°C (Et_2O), 212°C (perchlorate), 196°C (hydroiodide), 130°C (14-Ac) [1]

$[\alpha]_D$ +39° (EtOH) [1]

IR: 3530, 3475, 1464, 1410, 1387, 1365, 1345, 1315, 1295, 1220, 1193, 1170, 1120, 1090, 990, 945, 875, 855, 747, 733 [1]

MS *m/z*: 467(M^+, 7), 452(28), 436(100) [1]

^{1}H NMR: 1.05(3H, t, J = 7, NCH_2CH_3), 3.27, 3.32, 3.38, 3.44(each 3H, s, 4×OCH_3), 3.90(1H, d, J = 1, H-6α), 4.05(1H, dd, J = 7, 4, H-14β) [2]

^{13}C NMR: [3]

Table 1

C-1	85.2	C-9	49.6	C-17	65.4
2	25.5	10	36.4	18	78.0
3	32.5	11	48.2	19	52.7
4	38.4	12	27.5	NCH_2	51.3
5	45.1	13	46.1	CH_3	14.3
6	90.1	14	75.3	1-OCH_3	56.0
7	89.1	15	33.1	6-OCH_3	57.5
8	76.3	16	81.7	16-OCH_3	56.5
				18-OCH_3	59.1

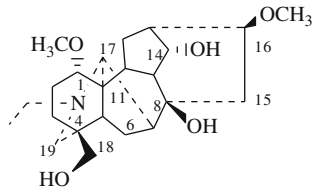
Pharm./Biol.: LD_{50} 70 mg/kg (i/v, mice). Hypotensive, N-cholinoblocking, and weak spasmolytic effects [4]

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 84 (1978)
2. S.W. Pelletier Jr., O.D. Daily, N.V. Mody, J.D. Olsen, J. Org. Chem. **46**, 3284 (1981)
3. S.W. Pelletier, N.V. Mody, R.S. Sawhney, J. Bhattacharyya, Heterocycles **7**, 327 (1977)
4. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp **32**(2), 216 (1996)

Cammaconine

CAS Registry Number: 32152-70-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum nasutum, A. orientale*

$C_{23}H_{37}NO_5$: 407.2672

Mp: 135–137°C [1, 2]

$[\alpha]_D$ −4.48° (MeOH) [1, 2]

IR: 3380, 1085 [1]

MS *m/z*: 407(43), 392(1.6), 376(100) [1]

^{1}H NMR: 1.06(3H, t, J = 7, NCH_2CH_3), 3.21, 3.39 (each 3H, s, 2×OCH_3), 4.08(1H, t, J = 4.5, H-14β) [1, 2]

^{13}C NMR: [3]

Table 1

C-1	86.3	C-9	47.0	C-17	63.0
2	25.8	10	37.6	18	68.8
3	33.2	11	48.8	19	53.1
4	39.1	12	27.7	NCH_2	49.5

(*continued*)

Table 1 (continued)

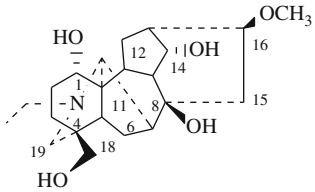
5	46.0	13	45.6	CH_3	13.7
6	24.6	14	75.6	1-OCH_3	56.5
7	45.9	15	38.3	16-OCH_3	56.3
8	73.7	16	82.3		

References

1. C.H. Wang, D.H. Wang, W.L. Sung, Chinese Traditional and Herbal Drugs **14**, 5 (1983)
2. L.V. Beshitaishvili, M.N. Sultankhodzhaev, *Izv. Akad. Nauk GSSR, Khim Ser., A Collection of Papers* [in Russian] (Metsniereba, Tbilisi, 1988), p. 301
3. N.V. Mody, S.W. Pelletier, N.M. Mollow, Heterocycles **14**, 1751 (1980)

Columbianine

CAS Registry Number: 90579-23-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum nasutum*

$C_{22}H_{35}NO_5$: 393.2515

Mp: 202–205°C [1, 2]

$[\alpha]_D$ −6° (EtOH) [1]

MS *m/z*: 393(M^+), 376(100) [2]

^{1}H NMR: 1.12(3H, t, J = 7, NCH_2CH_3), 2.81(1H, s), 3.34(3H, s, OCH_3), 3.73(1H, br s), 4.22(1H, t, J = 4.5, H-14β) [2]

^{13}C NMR: [2]

Table 1

C-1	72.4	C-9	46.8	C-17	64.1
2	26.5	10	44.2	18	68.3
3	29.9	11	48.8	19	56.4
4	38.1	12	28.5	NCH_2	48.6
5	41.4	13	40.3	CH_3	13.1
6	24.8	14	75.9	16-OCH_3	56.5
7	45.3	15	42.3		
8	74.2	16	82.0		

Pharm./Biol.: Toxicity low, lowers arterial pressure, exerts peripheral N-cholinolytic action [3]

References

1. L.V. Beshitaishvili, M.N. Sultankhodzhaev, *Izv. Akad. Nauk GSSR, Khim. Ser., A Collection of Papers* [in Russian] (Metsniereba, Tbilisi, 1988), p. 301
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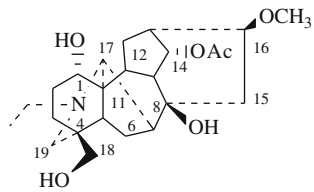
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(3), 386 (1996)

Condelphine

CAS Registry Number: 7633-69-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum anthoroideum, A. talassicum, Delphinium confusum*

$C25H_{39}NO_6$: 449.2777

Mp: 156–158°C (Et_2O–EtOH), 210°C (dec., perchlorate), 162°C (dec., oxalate) [1, 2]

$[\alpha]_D$ +27° ($CHCl_3$) [1, 2]

Solubility: sol. $CHCl_3$, MeOH

IR: 3485, 3165, 1745, 1515, 1495, 1470, 1380, 1360, 1318, 1305, 1287, 1245, 1220, 1190, 1172, 1155, 1120, 1105, 1080, 1050, 984, 963, 927, 900, 883, 867, 828, 805, 775, 750 [2]

MS *m/z*: 449(M^+, 29), 434(28.5), 432(100), 431(25), 418(4), 416(24) [2]

^{1}H NMR: 1.09(3H, t, J = 7, NCH_2CH_3), 2.00(3H, s, Ac), 3.19, 3.26(each 3H, s, 2×OCH_3), 4.78(1H, t, J = 4.5, H-14β) [1, 2]
^{13}C NMR: [3]

Table 1

C-1	72.1	C-9	44.6	C-17	63.5
2	29.1	10	37.0	18	79.0
3	29.7	11	49.0	19	56.6
4	37.3	12	26.7	NCH_2	48.4
5	41.4	13	43.5	CH_3	13.0
6	25.1	14	76.9	16-OCH_3	55.9
7	45.8	15	42.4	18-OCH_3	59.3
8	74.5	16	82.2	CO	170.3
				CH_3	21.2

Pharm./Biol.: LD_{50} 18.5mg/kg (i/v, mice). Hypotensive, ganglioblocking, curaremimetic effect [4, 5]

References

1. S.W. Pelletier, L.H. Keith, P.C. Parthasarathy, J. Amer. Chem. Soc. **89**, 4146 (1967)
2. V.A. Tel'nov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 366 (1971)
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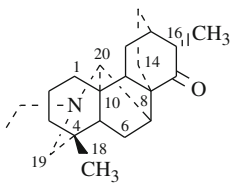
4. K.M. Kovalenkov, Author's Abstract of Doctoral Dissertation (Medical Sciences), 1958
5. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(N3), 386 (1996)

Cordizine

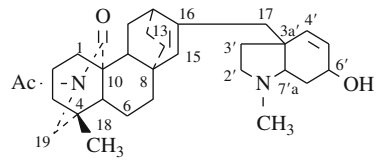


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum*
$C_{22}H_{33}NO$: 327.2554
Mp: 122–124°C (MeOH) [1]
IR: 1719 [1]
MS *m/z*: 327(M^+), 299(100%), 284, 270, 256, 186 [1]
^{1}H NMR: 0.64(3H, s, 3H-18), 0.97(3H, t, J = 7.0, NCH_2CH_3), 1.16(3H, d, J = 8.0, 3H-17), 3.21(1H, br s, H-20) [1]

References

1. B.T. Salimov, F.N. Dzhakhangirov, M.S. Yunusov, in *Nitrogen-Containing heterocycles and alkaloids*, ed. by V.G. Kartsev, G.A. Tolstikov, vol. 1 (Iridium Press, Moskow, 2001), p. 480

Coriphidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{31}H_{44}N_2O_3$: 492.3352
Mp: 247–249°C (MeOH) [1]
UV: 205(3.95) [1]
IR: 3300, 1710, 1650, 1568 [1]
MS *m/z*: 492(M^+, 10), 475(12), 464(5), 449(4), 422(18), 341(5), 152(47), 151(100), 150(22), 134(24), 121(19), 70(12), 44(10) [1]
^{1}H NMR: 0.87(3H, s, 3H-18), 1.92(3H, s, NAc), 2.31(3H, s, NCH_3), 2.95(1H, ddd, J = 9.2; 7.0; 1, H-7′a), 3.14, 3.45(each 1H, d, J = 13.2, H-19β, H-19α), 4.17(1H, tdd, J = 10.8; 5.5; 1.8, H-6′), 5.53–5.60(3H, m, H-4′, H-5′, H-15) [1]
^{13}C NMR (Py-d_5): [1]

Table 1

C-1	46.3	C-12	36.6	C-2′	54.8
2	22.4	13	32.9	3′	38.0
3	40.5	14	31.5	3′a	43.1

(*continued*)

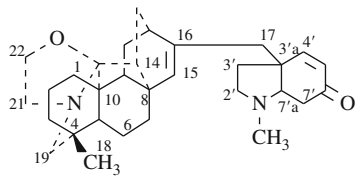
Table 1 (continued)

4	38.9	15	135.7	4′	131.2
5	55.3	16	147.8	5′	130.7
6	20.2	17	36.5	6′	63.9
7	37.4	18	27.6	7′	35.1
8	40.6	19	55.4	7′a	70.5
9	52.8	20	171.4	NCH_3	40.8
10	55.3	N-C = O	171.5		
11	28.7	CH_3	23.2		

References

1. I.A. Bessonova, M.R. Yagudaev, M.S. Yunusov, Chem. Nat. Comp. **28**, 209 (1992)

Coriphine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{31}H_{42}N_2O_2$: 474.3246
Mp: 200°C, 226°C (perchlorate) [1]
$[\alpha]_D$ +150° (MeOH) [1]
Solubility: sol. $CHCl_3$
UV: 212(4.04) [1]
IR: 1690, 1460, 1250, 1215, 1127, 1080, 1040, 1013, 889, 878, 780 [1]
MS *m/z*: 474(M^+, 3.4), 459(1.1), 446(1.6), 445(1.0), 431(1.3), 324(100), 150(3.4), 149(6.9), 148(3.1) [1]
^{1}H NMR: 1.00(3H, s, 3H-18), 2.26(3H, s, NCH_3), 2.42, 2.61(each 1H, d, J = 11, H-19β, H-19α), 2.60(2H, m), 2.84(1H, ddd, J = 12.3; 7.0; 2.0, H-7a), 3.02, 3.10(each 1H, dt, J = 9.0; 3.0, 2H-21), 3.55, 3.78(each 1H, m, 2H-11), 5.38(1H, s, H-15), 5.87(1H, d, J = 10, H-5′), 6.60(1H, dd, J = 10; 1.8, H-4′) [1]
^{13}C NMR: [1]

Table 1

C-1	44.4	C-12	35.6	C-2′	54.6
2	23.1	13	31.4	3′	36.0
3	41.5	14	54.4	3′a	47.4
4	35.0	15	136.3	4′	156.1
5	53.3	16	146.5	5′	125.9
6	19.9	17	34.7	6′	197.6
7	34.4	18	28.5	7′	37.3
8	43.8	19	57.8	7′a	70.1
9	48.3	20	105.7	NCH_3	40.0
10	47.1	21	51.7		
11	27.9	22	61.4		

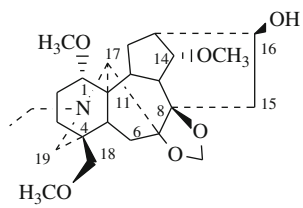
X-ray: [1]
Pharm. /Biol.: Curare-like and local anaesthetic action [2]

References

1. I.M. Yusupova, I.A. Bessonova, B. Tashkhodzhaev, M.S. Yunusov, M.R. Yagudaev, Z.M. Vaisov, Chem. Nat. Comp. **27**, 343 (1991)
2. Sh.A. Saidkhodzhaeva, S.K. Usmanova, I.A. Bessonova, F. N. Dzhakhangirov, in *Nitrogen containing heterocycles and alkaloids*, ed. by V.G. Kartsev, G.A. Tolstikov, vol. 1 (Iridium Press, Moscow, 2001), p. 475

Corumdephine (Corumdepine)

CAS Registry Number: 98752-03-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum*
$C_{25}H_{39}NO_6$: 449.2777
Mp: amorph.
IR: 3500, 1100 [1]
MS *m/z*: 449(M^+), 434, 419, 418(100) [1]

^{1}H NMR: 1.00(3H, t, J = 7, NCH_2CH_3), 3.14, 3.18, 3.39(each 3H, s, 3×OCH_3), 4.80, 4.90(each 1H, s, CH_2O_2) [1]
^{13}C NMR: [1]

Table 1

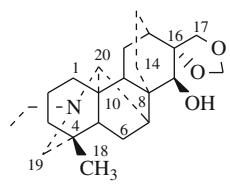
C-1	83.8	C-9	47.8	C-17	62.3
2	26.2	10	42.3	18	78.9
3	31.9	11	50.3	19	52.6
4	38.4	12	26.9	NCH_2	50.7
5	44.0	13	39.9	CH_3	14.0
6	32.5	14	84.7	CH_2O_2	93.4
7	92.1	15	36.2	1-OCH_3	55.9
8	79.7	16	72.0	14-OCH_3	58.1
				18-OCH_3	59.4

Pharm./Biol.: Toxicity low. Possesses brief hypotensive action that is connected with a peripheral N-cholinoblocking effect [2]

References

1. B.T. Salimov, M.S. Yunusov, N.D. Abdullaev, Z.M. Vaisov, Chem. Nat. Comp. **21**, 99 (1985)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(N3), 386 (1996)

Corumdizine

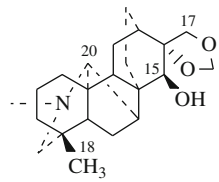


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum*
$C_{23}H_{35}NO_3$: 373.2608
Mp: amorph. [1]
IR: 3450, 1091 [1]
MS *m/z*: 373(M^+), 372, 358, 343, 330, 326(100%), 314, 270, 186 [1]
^{1}H NMR: 0.64(3H, s, 3H-18), 0.96(3H, t, J = 7.0, NCH_2CH_3), 3.26(1H, br s, H-20), 3.40, 4.35(each 1H, d, J = 8.0, 2H-17), 3.92(1H, s, H-15α), 4.51; 4.93(each 1H, s, CH_2O_2) [1]

References

1. B.T. Salimov, F.N. Dzhakhangirov, M.S. Yunusov, in *Nitrogen-Containing heterocycles and alkaloids*, ed. by V.G. Kartsev, G.A. Tolstikov, vol. 1 (Iridium Press, Moskow, 2001), p. 480

Corumdizinine



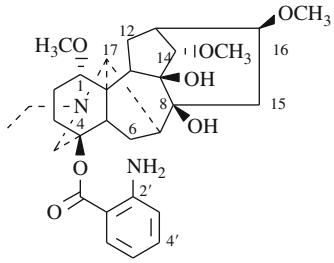
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum*
$C_{22}H_{33}NO_3$: 359.2552
Mp: 104–105°C (C_6H_{14}) [1]
IR: 3445, 1095 [1]
MS *m/z*: 359(M^+), 358, 316, 312(100%), 300, 256, 172 [1]
^{1}H NMR: 0.61(3H, s, 3H-18), 2.13(3H, s, NCH_3), 3.17(1H, br s, H-20), 3.37; 4.32(each 1H, d, J = 8.0, 2H-17), 3.91(1H, s, H-15α), 4.49; 4.88(each 1H, s, CH_2O_2) [1]

References

1. B.T. Salimov, F.N. Dzhakhangirov, M.S. Yunusov, in *Nitrogen-containing heterocycles and alkaloids*, ed. by V.G. Kartsev, G.A. Tolstikov, vol. 1 (Iridium Press, Moskow, 2001), p. 480

N-Deacetyllappaconitine (Puberanidine)

CAS Registry Number: 11033-64-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum leucostomum, A. orientale, A. septentrionale*

$C_{30}H_{42}N_2O_7$: 542.2992

Mp: 209–214°C [1]

$[\alpha]_D$ +42° (EtOH) [1]

Solubility: sol. $CHCl_3$, MeOH, Me_2CO [1]

IR: 3500, 3380, 1680, 1608, 1580, 1240 [1]

MS *m/z*: 542(M^+), 527, 525, 511, 405(100) [1]

^{1}H NMR: 1.10(3H, t, J = 7), 3.26, 3.28, 3.40(each 3H, s, 3×OCH_3), 6.56–7.75(H–Ar) [2]

^{13}C NMR: [3]

Table 1

C-1	83.1	C-12	24.2	1-OCH_3	56.5
2	26.4	13	49.0	14-OCH_3	57.9
3	32.1	14	90.3	16-OCH_3	56.1
4	84.6	15	44.9	Ar-C = O	167.7
5	48.8	16	83.0	Ar-C-1′	112.2
6	26.9	17	61.6	2′	150.6
7	47.7	18	–	3′	116.8
8	75.7	19	55.7	4′	134.1
9	78.6	NCH_2	50.1	5′	116.4
10	36.5	CH_3	13.8	6′	131.7
11	51.0				

HPLC: [4]

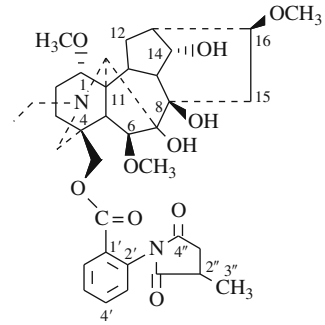
Pharm./Biol.: Pronounced antiarrhythmic, local anesthetic, analgesic, and antiinflammatory action. Main metabolite of lappaconitine. Blocks fast sodium channels of excitable terminals [5, 6]

References

1. S.K. Usmanova, V.A. Tel'nov, N.D. Abdullaev, Chem. Nat. Comp. **29**, 346 (1993)
2. L. Marion, L. Fonzes, C.K. Wilkins, J.R. Boca, F. Sandberg, R. Thorsen, E. Linden, Canad. J. Chem. **45**, 969 (1967)
3. D. Yu, B.C. Das, Planta Med. **49**, 85 (1983)
4. F. Xie, H. Wang, H. Shu, J. Li, J. Jiang, J. Chang, Y. Hsieh, J. Chromatogr. **526**, 109 (1990)
5. F.N. Dzhakhangirov, E.G. Sirotenko, Ya.V. Rashkes, DAN UzSSR (8), 44 (1990)
6. F.N. Dzhakhangirov, B.T. Salimov, I.A. Bessonova, M.N. Sultankhodzaev, Chem. Nat. Comp. **31**, 708 (1995)

14-Deacetylnudicauline

CAS Registry Number: 119347-24-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium elatum, D. retropilosum*

$C_{36}H_{48}N_2O_{10}$: 668.7274

Mp: amorph.

$[\alpha]_D$ +27° (MeOH) [1]

MS *m/z*: 668(M^+, 4), 653(15), 651(9), 640(14), 638(40), 637(100), 216(35) [1]

^{1}H NMR: 1.06(3H, t, J = 7.2, NCH_2CH_3), 3.25, 3.36(3H, 6H, s, 3×OCH_3), 7.30(1H, dd, J = 7.5, 2,0), 7.57(1H, dt, J = 7.5, 2,0), 7.72(1H, dt, J = 7.5, 2,0), 8.06(1H, dd, J = 7.5, 2,0) [2]

^{13}C NMR: [2]

Table 1

C-1	84.9	C-13	46.0	Ar-C = O	164.2
2	25.3	14	75.2	Ar-C-1′	127.0
3	32.1	15	33.1	2′	133.1

(*continued*)

Table 1 (continued)

4	37.8	16	81.7	3′	129.4
5	45.1	17	65.0	4′	133.7
6	90.3	18	69.4	5′	131.0
7	89.2	19	52.3	6′	130.0
8	76.3	NCH_2	51.2	1″	179.9
9	50.1	CH_3	14.2	2″	37.0
10	36.3	1-OCH_3	56.1	3″	16.3
11	48.3	6-OCH_3	58.3	4″	35.2
12	27.4	16-OCH_3	56.5	5″	175.9

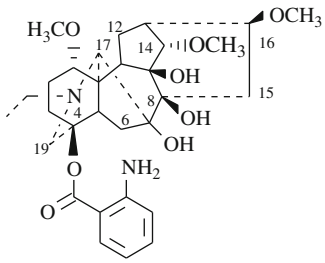
Pharm. /Biol.: LD_{50} 4.2 mg/kg (i/v, mice). Possess a pronounced curaremimetic action [3]

References

1. Z.M. Vaisov, V.A. Tel'nov, I.A. Bessonova, Chem. Nat. Comp. **29**, 68 (1993)
2. M.H. Benn, F.I. Okanga, R.M. Manavu, Phytochemistry **28**, 919 (1989)
3. F.N. Dzhakhangirov, B.T. Salimov, I.A. Bessonova, M.N. Sultankhodzhaev, Chem. Nat. Comp. **31**, 708 (1995)

N-Deacetylranaconitine

CAS Registry Number: 82872-80-8

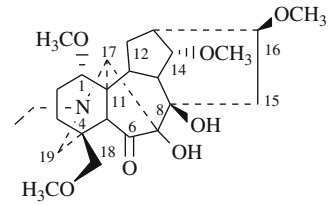


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum septentrionale*
$C_{30}H_{42}N_2O_8$: 558.2941
Mp: 125–127°C [1]
$[\alpha]_D$ +44° [1]
Solubility: sol. $CHCl_3$, MeOH, Me_2CO [1]
IR: 3600–3370, 1695, 1625, 1597, 1572, 1496, 1465, 1303, 1255, 1163, 1100, 1040, 950, 755 [1]
MS *m/z*: 558, 527, 434, 421(100), 406, 392, 390, 376, 361, 137 [1]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 3.22, 3.26, 3.36(each 3H, s, 3×OCH_3), 6.50–7.66(H–Ar) [2]

References

1. S.K. Usmanova, V.A. Tel'nov, N.D. Abdullaev, Chem. Nat. Comp. **29**, 349 (1993)
2. S.-N. Jiang, Y.-L. Zhu, Z.-Y. Zhao, R.-H. Zhu, Acta Pharmaceutica Sinica **18**, 440 (1983)

6-Dehydroacosanine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum sajanense*
$C_{25}H_{39}NO_7$: 465.2726
Mp: 140–141°C (MeOH-C_6H_{14}) [1]
Solubility: sol. $CHCl_3$, Me_2CO, MeOH [1]
IR: 3548, 3480, 1743 [1]
MS *m/z*: 465(M^+, 7.4), 450(3), 448(1), 447(1), 435(29), 434(100), 422(2), 416(22), 407(3), 406(8.5) [1]
^{1}H NMR: 1.00(3H, t, J = 7.5, NCH_2CH_3), 3.23, 3.27, 3.27, 3.27(each 3H, s, 4×OCH_3), 3.57(1H, t, J = 4.5, H-14β) [1]
^{13}C NMR: [1]

Table 1

C-1	83.4	C-10	37.7	C-19	52.7
2	26.2	11	43.5	NCH_3	50.7
3	32.6	12	28.3	CH_3	15.3
4	39.0	13	45.8	1-OCH_3	56.3
5	56.1	14	84.0	14-OCH_3	57.7
6	219.6	15	34.3	16-OCH_3	57.6

(*continued*)

Table 1 (continued)

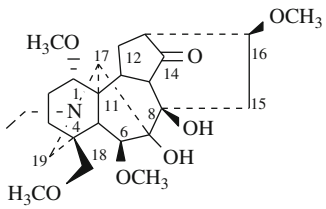
7	84.8	16	81.9	18-OCH_3	59.2
8	75.5	17	63.0		
9	45.8	18	76.8		

References

1. Z.M. Vaisov, I.A. Bessonova, Chem. Nat. Comp. **28**, 463 (1992)

14-Dehydrobrowniine

CAS Registry Number: 4829-56-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium biternatum*
$C_{25}H_{39}NO_7$: 465.2726
Mp: 176–178°C (MeOH) [1]
$[\alpha]_D$ +32° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$
IR: 3513, 3455, 1755, 1100 [1]
^{1}H NMR: 1.00(3H, t, J = 7, NCH_2CH_3), 3.23, 3.26, 3.32(6H, 3H, 3H, s, 4×OCH_3) [1]
^{13}C NMR: [2]

Table 1

C-1	85.5	C-10	43.9	C-19	52.7
2	25.5	11	49.0	NCH_2	51.4
3	32.5	12	25.3	CH_3	14.3
4	38.5	13	49.5	1-OCH_3	56.1
5	46.1	14	216.3	6-OCH_3	57.6
6	89.8	15	33.1	16-OCH_3	56.3
7	88.9	16	85.5	18-OCH_3	59.2
8	85.5	17	65.9		
9	53.8	18	77.9		

Pharm./Biol.: LD_{50} 68 mg/kg (i/v, mice). Possess spasmolytic and weak antiarrhythmic action [3]

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 106 (1978)
2. S.W. Pelletier, N.V. Mody, R.S. Sawhney, Can. J. Chem. **57**, 1652 (1979)
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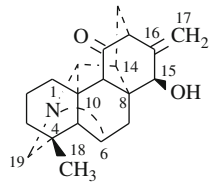
11-Dehydrokobusine

CAS Registry Number: 85352-58-5



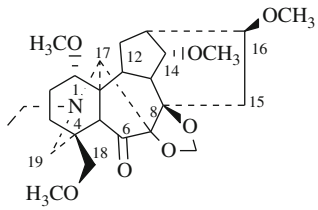
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum talassicum*
$C_{20}H_{25}NO_2$: 311.1885
Mp: 239–241°C (Me_2CO) [1, 2]
Solubility: sol. $CHCl_3$, MeOH
UV: 304(2.27) [1]
IR: 3080, 1725 [1, 2]
MS *m/z*: 311(M^+, 87), 283(100), 266(38) [1, 2]
^{1}H NMR: 0.93(3H, s, 3H-18), 4.07(1H, br s, H-15β), 5.07, 5.15(each 1H, br s, 2H-17) [2]
CD: 0(262), 3.33(305), 2.64(313), 0(335) [1]

References

1. S.-I. Sakai, I. Yamamoto, K. Yamaguchi, H. Takayama, M. Ito, T. Okamoto, Chem. Pharm. Bull. **30**, 4579 (1982)
2. A.A. Nishanov, M.N. Sultankhodzhaev, M.S. Yunusov, Chem. Nat. Comp. **25**, 728 (1989)

6-Dehydrodelcorine

CAS Registry Number: 51856-90-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium corymbosum, D. iliense*

$C_{26}H_{39}NO_7$: 477.2726

Mp: 142–144°C (EtOH) [1]

$[\alpha]_D$ −64° (MeOH) [1]

IR: 1740, 1100 [1]

MS *m/z*: 477(M^+, 6), 462(4), 446(100), 432(6), 416(12.5) [1]

^{1}H NMR: 1.00(3H, t, J = 7, NCH_2CH_3), 3.22, 3.25, 3.28, 3.32(each 3H, s, 4×OCH_3), 3.60(1H, t, J = 5, H-14β), 5.00, 5.43(each 1H, d, J = 2, CH_2O_2) [1]

^{13}C NMR: [2]

Table 1

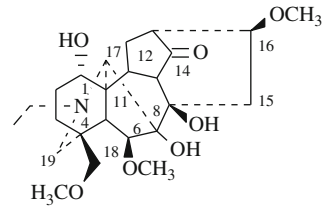
C-1	82.7	C-10	38.6	C-19	53.4
2	26.5	11	46.1	NCH_2	50.2
3	32.2	12	27.7	CH_3	13.7
4	41.8	13	38.7	CH_2O_2	95.3
5	56.5	14	82.4	1-OCH_3	55.9
6	216.7	15	32.9	14-OCH_3	58.1
7	90.4	16	82.3	16-OCH_3	56.5
8	81.5	17	63.0	18-OCH_3	59.2
9	47.8	18	76.8		

References

1. M.G. Zhamierashvili, V.A. Tel'nov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 704 (1977)
2. S.W. Pelletier, N.V. Mody Jr., O.D. Dailey, Can. J. Chem. **58**, 1875 (1980)

14-Dehydrodelcosine (Shimoburo Base II, 14-Dehydroiliensine)

CAS Registry Number: 1361-18-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium biternatum*

$C_{24}H_{37}NO_7$: 451.257

Mp: 208–210°C (MeOH) [1]

$[\alpha]_D$ +26° ($CHCl_3$) [1]

Solubility: sol. $CHCl_3$, Me_2CO [1]

IR: 3455, 3275, 1750, 1460, 1440, 1400, 1390, 1340, 1300, 1290, 1245, 1217, 1174, 1130, 1100, 1080, 1054, 1025, 990, 975, 960, 947, 887, 874, 818, 790, 770, 750, 713 [1]

MS *m/z*: 451(M^+, 9), 436(100), 434(29), 420(84), 418(29), 395(4), 364(3) [1]

^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 3.28(9H, s, 3×OCH_3) [1]

^{13}C NMR: [2]

Table 1

C-1	72.1	C-9	53.1	C-17	66.4
2	27.3	10	40.9	18	77.0
3	29.6	11	49.7	19	57.3
4	37.5	12	27.5	NCH_2	50.5
5	45.3	13	46.8	CH_3	13.6
6	89.7	14	214.8	6-OCH_3	56.6
7	87.3	15	34.8	16-OCH_3	56.0
8	82.9	16	86.3	18-OCH_3	59.0

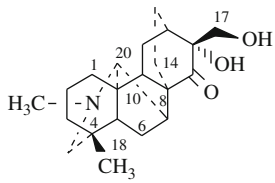
Pharm./Biol.: LD_{50} 94.2 mg/kg (i/v, mice). In high doses, exhibits a curaremimetic action [3]

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 84 (1978)
2. S. Sakai, H. Takayama, T. Okamoto, J. Pharm. Soc. Jap. **99**, 647 (1979)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(3), 386 (1996)

Dehydrodictysine

CAS Registry Number: 74119-95-2



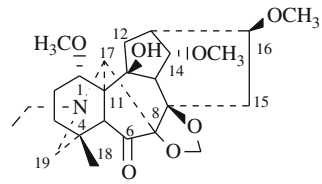
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium dictyocarpum*
$C_{21}H_{31}NO_3$: 345.2304
Mp(acetonide): 145°C (Me_2CO) [1]
$[\alpha]_D$ (acetonide): −58° ($CHCl_3$) [1]
IR(acetonide): 1735, 1090 [1]
MS *m/z*: 345(M^+), 328, 317, 316, 314, 300(100), 286, 274, 258, 256, 172 [1]
^{1}H NMR(acetonide): 0.64(3H, s, 3H-18), 1.40, 1.48(each3H, s, 3×CH_3), 2.18(3H, s, NCH_3), 3.14(1H, s, H-20), 3.75, 3.91(each 1H, d, J = 10, 2H-17) [1]

References

1. B.T. Salimov, B. Tashkhodjaev, M.S. Yunusov, Chem. Nat. Comp. **18**, 81 (1982)

Dehydroeldelidine

CAS Registry Number: 51856-91-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium ternatum*
$C_{25}H_{37}NO_7$: 463.2570
Mp: 121–122°C (C_6H_{14}) [1]
IR: 3600–3400, 1745, 1100 [1]
MS *m/z*: 463(M^+), 448, 446, 432(100), 418, 400, 390, 382, 372, 368 [1]
^{1}H NMR: 0.88(3H, s, 3H-18), 1.02(3H, t, J = 7, NCH_2CH_3), 3.26, 3.29, 3.34(each 3H, s, 3×OCH_3), 4.09(1H, t, J = 5, H-14β), 5.00, 5.44(each 1H, s, CH_2O_2) [1]
^{13}C NMR: [2]

Table 1

C-1	77.0	C-10	80.3	C-19	56.5
2	27.0	11	51.7	NCH_2	50.0
3	39.2	12	37.7	CH_3	13.7
4	35.2	13	38.3	O-CH_2O	95.5
5	57.2	14	81.3	1-OCH_3	55.7
6	216.7	15	34.0	14-OCH_3	58.1
7	90.2	16	81.0	16-OCH_3	56.5
8	82.8	17	62.6		
9	51.2	18	25.0		

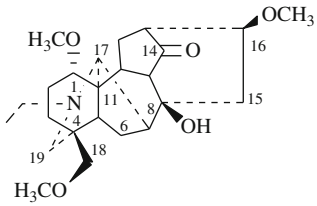
Pharm./Biol.: LD_{50} 198 mg/kg (i/v, mice). Toxicity low. Possess a brief hypotensive and gangioblocking action. Exhibits an antiarrhythmic action on models of arrhythmia in rats evoked by aconitine and calcium chloride [3]

References

1. V.M. Matveev, A.S. Narzullaev, S.S. Sabirov, M.S. Yunusov, Chem. Nat. Comp. **21**, 133 (1985)

2. S.W. Pelletier, N.V. Mody Jr., O.D. Dailey, Can. J. Chem. **58**, 1875 (1980)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(3), 386 (1996)

14-Dehydrotalatisamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum saposhnikovii*
$C_{24}H_{37}NO_5$: 419.2672
Mp: 128–130°C (Et_2O) [1, 2]
IR: 3300, 1750 [1, 2]
MS *m/z*: 419(M^+, 23), 404(18), 388(100), 374(15), 372(17) [1]
^{1}H NMR: 1.03(3H, t, J = 7, NCH_2CH_3), 3.19, 3.21, 3.21(3H, 6H, s, 3×OCH_3) [1]
^{13}C NMR: [3]

Table 1

C-1	85.5	C-9	55.3	C-17	63.8
2	25.7	10	46.2*	18	79.3
3	32.6	11	48.9	19	53.1
4	38.8	12	24.6	NCH_2	49.4
5	45.8*	13	43.9	CH_3	13.7
6	25.2	14	216.2	1-OCH_3	56.1
7	45.8*	15	36.8	18-OCH_3	59.5
8	82.8	16	86.2	16-OCH_3	56.3

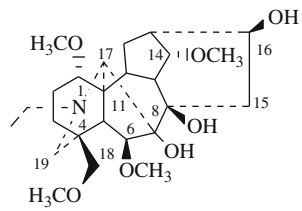
*The assignments may be interchanged

References

1. M.N. Sultankhodzaev, M.S. Yunusov, Chem. Nat. Comp. **18**, 249 (1982)
2. V. Boido, O.E. Edwards, K.L. Handa, R.J. Kolt, K.K. Purushothaman, Can. J. Chem. **62**, 778 (1984)
3. S.W. Pelletier, S.K. Srivastava, B.C. Joshi, J.D. Olsen, Heterocycles **23**, 331 (1985)

Delbiterine

CAS Registry Number: 66891-14-3



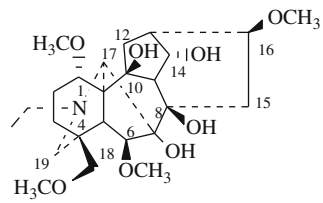
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium biternatum*
$C_{25}H_{41}NO_7$: 467.2883
Mp: 137–138°C (Me_2CO) [1]
IR: 3495, 1100 [1]
MS *m/z*: 467(M^+), 452, 436(100), 434 [1]
^{1}H NMR: 1.02(3H, t, J = 7, NCH2CH3), 3.17, 3.25, 3.38(3H, 3H, 6H, s, 4×OCH3) [1]

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 84 (1978)

Delcaroline

CAS Registry Number: 77996-00-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum turczaninowii*
$C_{25}H_{41}NO_8$: 483.2832
Mp: amorph., 162°C (perchlorate) [1, 2]
$[\alpha]_D$ +50° (MeOH) [1, 2]
IR: 3442, 1083 [1]
^{1}H NMR: 1.05(3H, t, NCH_2CH_3), 3.25, 3.30, 3.35, 3.42(each 3H, s, 4×OCH_3), 4.06(1H, m, H-14β) [1, 2]
^{13}C NMR: [2]

Table 1

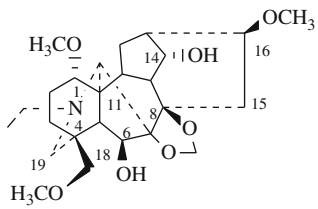
C-1	85.1	C-9	49.5	C-17	65.4
2	25.3	10	36.5	18	67.6
3	31.6	11	48.2	19	52.8
4	38.8	12	27.5	NCH_2	51.3
5	45.1	13	46.1	CH_3	14.2
6	90.1	14	75.3	1-OCH_3	56.0
7	89.0	15	33.1	6-OCH_3	58.1
8	76.3	16	81.8	16-OCH_3	56.5

References

1. N. Batbayar, D. Batsuren, M.N. Sultankhodzhaev, Chem. Nat. Comp. **29**, 48 (1993)
2. S.W. Pelletier, N.V. Mody, H.K. Desai, Heterocycles **16**, 747 (1981)

Delcoridine

CAS Registry Number: 76971-29-4



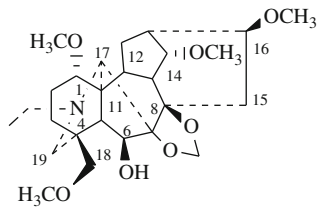
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum, D. iliense*
$C_{25}H_{39}NO_7$: 465.2726
Mp: amorph. [1], 222–223°C (perchlorate) [2]
IR: 3400, 1100 [1]
MS *m/z*: 465(M^+), 450, 434(100) [1, 2]
^{1}H NMR: 1.00(3H, t, J = 7, NCH_2CH_3), 3.15, 3.20, 3.25(each 3H, s, 3×OCH_3), 5.00, 5.10(each 1H, s, CH_2O_2) [1]

References

1. M.G. Zhamierashvili, V.A. Tel'nov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 479 (1980)
2. B.T. Salimov, M.S. Yunusov, N.D. Abdullaev, Z.M. Vaisov, Chem. Nat. Comp. **21**, 91 (1985)

Delcorine

CAS Registry Number: 52358-55-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum, D. iliense, D. ternatum*
$C_{26}H_{41}NO_7$: 479.2883
Mp: 200–202°C (MeOH), 118°C (hydrochloride) [1]
$[\alpha]_D$ −18° ($CHCl_3$) [1]
IR: 3520, 1100 [1]
MS *m/z*: 479(M^+), 462, 448(100) [1]
^{1}H NMR: 1.00(3H, t, J = 7, NCH_2CH_3), 3.22, 3.28, 3.30, 3.40(each 3H, s, 4×OCH_3), 3.69(1H, t, J = 5, H-14β), 4.22(1H, s, H-6α), 5.01, 5.07(each 1H, s, CH_2O_2) [1]
^{13}C NMR: [2]

Table 1

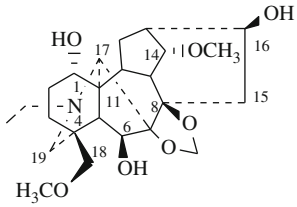
C-1	72.7	C-9	45.3	C-17	66.3
2	27.5	10	39.4	18	77.4
3	29.4	11	48.9	19	57.1
4	37.6	12	29.4	NCH_2	50.4
5	44.0	13	45.3	CH_3	13.7
6	90.1	14	75.8	6-OCH_3	57.4
7	87.9	15	34.5	16-OCH_3	56.4
8	78.1	16	82.0	18-OCH_3	59.1

Pharm./Biol.: Ganglioblocking and curaremimetic [3]. Antiarrhythmic action. More active than procainamide [procainamide hydrochloride] and quinidine [4]

References

1. A.S. Narzullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 468 (1973)
2. S.W. Pelletier, N.V. Mody Jr., O.D. Dailey, Can. J. Chem. **58**, 1875 (1980)
3. N. Tulyaganov, F.N. Dzhakhangirov, F.S. Sadritdinov, I. Khamdamov, *The Pharmacology of Plant Substances* [in Russian] (Fan, Tashkent, 1976), p. 76
4. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(3), 386 (1996)

Delcorinine



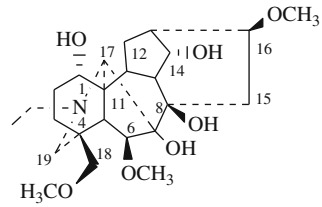
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum*
$C_{24}H_{37}NO_7$: 451.2560
Mp: 226–228°C (Me_2CO) [1]
IR: 3470, 3330, 1090 [1]
MS *m/z*: 451(M^+), 436, 434(100%), 421, 406, 404, 392, 390, 378, 376, 149 [1]
^{1}H NMR: 1.07(3H, t, J = 7.0, NCH_2CH_3), 3.31, 3.33(each 3H, s, 2×OCH_3), 4.32(1H, br s, H-6α), 5.07, 5.12(each 1H, s, CH_2O_2) [1]

References

1. B.T. Salimov, Chem. Nat. Comp. **37**, 272 (2001)

Delcosine (Delphamine, Lucaconine, Takaobase 1)

CAS Registry Number: 545-56-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum barbatum, A. orientale, A. turczaninowii, Consolida divaricata, C. orientalis, Delphinium ajacis, D. biternatum, D. confusum*
$C_{24}H_{39}NO_7$: 453.2726
Mp: 203–204°C (EtOH) [1]
$[\alpha]_D$ +54° (abs. EtOH) [1]
Solubility: sol. $CHCl_3$
IR: 3530, 3475, 3370, 1480, 1410, 1362, 1305, 1230, 1170, 1100, 940, 885, 870, 810, 770, 753, 718 [1]
MS *m/z*: 453(M^+, 12), 438(100), 436(33), 422(60), 420(6) [1]
^{1}H NMR: 1.01(3H, t, J = 7, NCH_2CH_3), 3.34, 3.36, 3.39(each 3H, s, 3×OCH_3), 4.02(1H, s, H-6β), 4.10(1H, dd, J = 4.5, H-14β) [2]
^{13}C NMR: [3]

Table 1

C-1	79.4	C-10	79.9	C-18	77.2
2	25.5	11	53.8	19	52.5
3	32.2	12	37.6	NCH_2	51.3
4	38.1	13	37.0	CH_3	14.3
5	45.1	14	73.6	1-OCH_3	55.5
6	90.8	15	33.9	6-OCH_3	57.7
7	88.0	16	81.3	16-OCH_3	56.3
8	75.1	17	66.1	18-OCH_3	59.1
9	54.0				

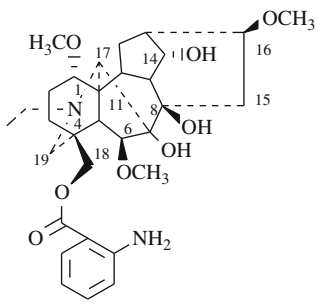
Pharm./Biol.: LD_{50} 107 mg/kg (i/v, mice). Curaremimetic action [4]

References

1. M.S. Yunusov, V.E. Nezhevenko, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 791 (1975)
2. S. Sakai, H. Takayama, T. Okamoto, Zasshi Yakugaku **99**, 647 (1979)
3. S.W. Pelletier, N.V. Mody, R.S. Sawhney, J. Bhattacharyya, Heterocycles **7**, 327 (1977)
4. F.N. Dzhakhangirov, F.S. Sadritdinov, DAN UzSSR (1), 33 (1977)

Delectine

CAS Registry Number: 58485-71-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium dictyocarpum*

$C_{31}H_{44}N_2O_8$: 572.3098

Mp: 107–109°C (C_6H_{14}–Me_2CO) [1, 2]

$[\alpha]_D$ +49° ($CHCl_3$) [1, 2]

IR: 3475, 1695, 1595, 1100 [1]

MS *m/z*: 572(M^+), 557, 555, 541(100), 539, 120 [1, 3]

^{1}H NMR: 1.02(3H, t, J = 7, NCH_2CH_3), 3.20, 3.32, 3.34(each 3H, s, 3×OCH_3), 5.71(2H, br s, NH_2), 6.65–7.80(H–Ar) [1]

Pharm./Biol.: LD_{50} 35.8 mg/kg (i/v, mice). In acute experiments on cats causes lowering of the arterial pressure and depression of the conduction of nervous impulses in sympathic ganglia; in high doses (10–15 mg/kg) blocks the transmission of impulses from nerve to muscle [4]

References

1. B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, A.S. Narzullaev, Chem. Nat. Comp. **11**, 704 (1975)
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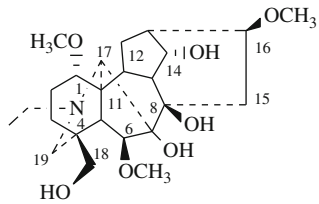
Delectinine

CAS Registry Number: 58480-82-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium dictyocarpum, D. elatum*

$C_{24}H_{39}NO_7$: 453.2726

Mp: 167–169°C (C_6H_{14}–Me_2CO) [1,2]

$[\alpha]_D$ +42° ($CHCl_3$) [1]

Solubility: sol. $CHCl_3$, Me_2CO, MeOH [1]

IR: 3445, 1110 [1]

MS *m/z*: 453(M^+), 438, 422(100), 420 [1]
^{1}H NMR: 0.99(3H, t, J = 7, NCH_2CH_3), 3.20, 3.29, 3.37(each 3H, s, 3×OCH_3) [1]
^{13}C NMR [2]:

Table 1

C-1	85.1	C-9	49.5	C-17	65.4
2	25.3	10	36.5	18	67.6
3	31.6	11	48.2	19	52.8
4	38.8	12	27.5	NCH_2	51.3
5	45.1	13	46.1	CH_3	14.2
6	90.1	14	75.3	1-OCH_3	56.0
7	89.0	15	33.1	6-OCH_3	58.1
8	76.3	16	81.8	16-OCH_3	56.5

Pharm./Biol.: LD_{50} 130 mg/kg (i/v, mice). Weak hypotensive and ganglioblocking action [3]

References

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2. S.W. Pelletier, R.S. Sawhney, Heterocycles **9**, 463 (1978)
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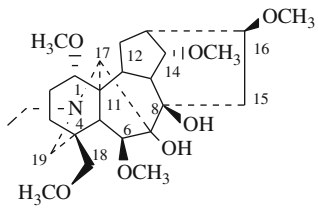
Delphatine

CAS Registry Number: 25488-62-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium biternatum, D. corymbosum*
$C_{26}H_{43}NO_7$: 481.3040
Mp: 101–106°C (petr. Et_2O–Et_2O), 221°C (perchlorate (dec.)), 199°C (hydroiodide) [1]
$[\alpha]_D$ +38° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$, C_6H_6, Me_2CO
IR: 3580, 3475, 1120 [2]
MS *m/z*: 481(M^+), 466, 464, 463, 450(100) [2]
^{1}H NMR: 0.96(3H, t, J = 7, NCH_2CH_3), 3.26, 3.29, 3.33, 3.37(3H, 3H, 3H, 6H, s, 5×OCH_3), 3.57(1H, t, J = 5, H-14β) [2]
^{13}C NMR: [3]

Table 1

C-1	72.6	C-9	44.9	C-17	66.0
2	27.2	10	37.7	18	77.3
3	29.3	11	49.3	19	57.2
4	37.4	12	30.5	NCH_2	50.3
5	43.9	13	43.3	CH_3	13.5
6	90.4	14	84.5	6-OCH_3	57.2
7	87.8	15	33.5	14-OCH_3	57.9
8	78.5	16	82.9	16-OCH_3	56.3
				18-OCH_3	59.1

References

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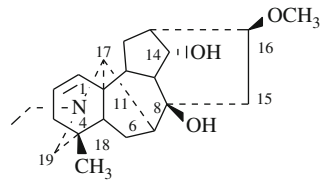
Delpoline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium poltoratskii*
$C_{22}H_{33}NO_3$: 359.5125
Mp: 192–194°C (Me_2CO) [1]
IR: 3444, 3330, 3032, 2973, 2941, 2883, 2823, 2359, 1669, 1456, 1383, 1350, 1294, 1269, 1241, 1221,

1115, 1090, 1042, 1026, 969, 948, 895, 806, 780, 751, 715, 692, 614, 573, 524, 497 [1]

Ms *m/z*: 359(M^+, 87), 344(100), 339(14), 278(8), 244(5), 216(6), 190(3), 188(10), 146(7), 122(9), 88(7) [1]

^{1}H NMR: 0.82(3H, s, 3H-18), 1.02(3H, t, NCH_2CH_3), 3.31(3H, s, OCH_3), 4.21(1H, t, J = 5, H-14β), 5.35(1H, d, J = 9, H-1), 5.86(1H, dt, J = 9, 3, H-2) [1]

^{13}C NMR: [1]

Table 1

C-1	127.1	C-9	46.4	C-16	82.2
2	128.8	10	39.9	17	61.5
3	40.7	11	47.9	18	26.6
4	33.8	12	28.8	19	60.2
5	47.8	13	44.4	N-CH_2	48.9
6	24.4	14	75.9	CH_3	13.1
7	42.2	15	41.8	16-OCH_3	56.4
8	74.5				

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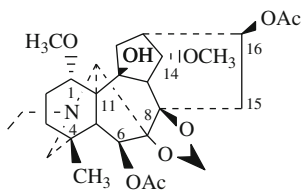
1. Z.S. Boronova, M.N. Sultankhodzhaev, Chem. Nat. Comp. **36**, 390 (2000)

Delretine

CAS Registry Number: 123064-66-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium retropilosum*

$C_{28}H_{41}NO_9$: 535.2770

Mp: 218–219°C (C_6H_{14}), 219.5–221.5°C (Et_2O–C_6H_6) [1,2]

Solubility: sol. $CHCl_3$, $M_{e2}CO$, MeOH

IR: 3448, 2962, 2938, 2872, 1745, 1458, 1368, 1295 [1]

MS *m/z*: 535(M^+, 4), 520(3), 504(100), 476(12) [1]

^{1}H NMR: 0.80(3H, s, 3H-18), 0.99(3H, t, J = 7.5, NCH_2CH_3), 1.96, 2.00(each 3H, s, 2×$OCOCH_3$), 3.40, 3.18(each 3H, s, 2×OCH_3), 4.80, 4.88(each 1H, s, CH_2O_2) [1, 2]

^{13}C NMR [2]:

Table 1

C-1	79.1	C-11	55.9	N-CH_2	50.2
2	26.9	12	36.5	CH_3	13.8
3	38.5	13	38.5	1-OCH_3	55.2
4	33.5	14	81.1	14-OCH_3	57.8
5	50.5	15	34.0	OCH_2O	94.0
6	77.1	16	73.7	6-OCO	169.8
7	91.9	17	63.6	6-OCO-CH_3	21.4
8	83.4	18	25.6	16-OCO	170.6
9	50.5	19	56.9	16-OCO-CH_3	21.7
10	81.1				

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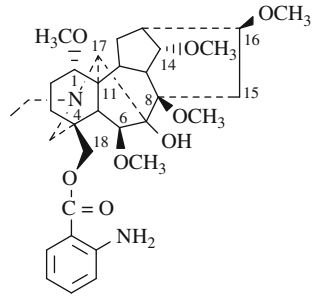
Delvestidine

CAS Registry Number: 99815-78-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum septentrionale*
$C_{33}H_{48}N_2O_8$: 600.3398
Mp: amorph. [1, 2]
$[\alpha]_D^{26}$ + 22 (CHCl3) [2]
IR: 3480, 3365, 1692, 1615, 1590 [1]
MS *m/z*: 600(9.5), 585(1.0), 569(100), 553(38), 537(17), 523(5), 507(10), 137(5), 120(5) [1]
^{1}H NMR: 2.4, 3.18, 3.3(6H, 3H, 6H, s, 5×OCH_3), 5.63(2H, br s, NH_2), 6.43, 7.17, 7.73(2H, 1H, 1H, Ar-H) [1, 2]
^{13}C NMR: [2]

Table 1

C-1	83.4	C-12	27.9	6-OCH_3	59.8
2	25.6	13	37.9	8-OCH_3	54.3
3	31.9	14	83.0	14-OCH_3	57.6
4	37.7	15	28.0	16-OCH_3	56.4
5	40.5	16	82.8	ArCO	167.9
6	91.3	17	66.2	Ar-C	110.4
7	90.1	18	69.5	Ar-C	150.6
8	80.7	19	53.3	Ar-C	116.7
9	51.9	N-CH_2	51.8	Ar-C	134.1
10	46.6	CH_3	14.8	Ar-C	116.3
11	47.5	1-OCH_3	55.6	Ar-C	131.0

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1. S.K. Usmanova, I.A. Bessonova, Chem. Nat. Comp. **32**, 62 (1996)
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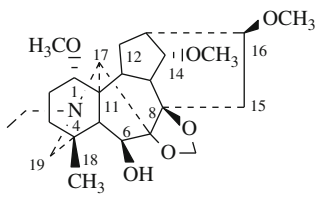
Delpheline

CAS Registry Number: 509-28-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium ternatum*
$C_{25}H_{39}NO_6$: 449.2777
Mp: 223–225°C (Me_2CO) 215–217°C [1, 2]
$[\alpha]_D$ −24° ($CHCl_3$) [1, 2]
IR: 3475, 1100 [1, 2]
MS *m/z*: 449(M^+), 434, 418(100) [1, 2]
^{1}H NMR: 0.86(3H, s, 3H-18), 0.98(3H, t, J = 7, NCH_2CH_3), 3.16, 3.25, 3.33(each 3H, s, 3×OCH_3), 3.59(1H, t, J = 5, H-14β), 4.11(1H, s, H-6α), 4.92, 5.02(each 1H, s, CH_2O_2) [1, 2]
^{13}C NMR: [3]

Table 1

C-1	83.9	C-10	38.1	C-19	52.8
2	26.2	11	48.9	NCH_2	51.1
3	32.4	12	28.7	CH_3	14.2
4	38.1	13	46.1	1-OCH_3	55.7
5	43.3	14	84.3	6-OCH_3	57.3
6	90.6	15	33.5	14-OCH_3	57.8
7	88.4	16	82.6	16-OCH_3	56.3
8	77.5	17	64.8	18-OCH_3	59.0
9	49.8	18	78.1		

References

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2. V.M. Matveev, A.S. Narzullaev, S.S. Sabirov, Chem. Nat. Comp. **19**, 627 (1983)
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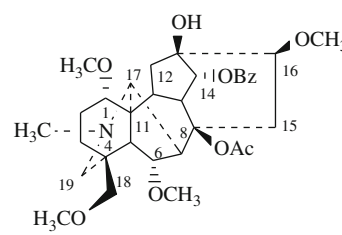
Delphinine

CAS Registry Number: 561-07-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Atragene sibirica*
$C_{33}H_{45}NO_9$: 599.3094
Mp: 191–192°C [1]
$[\alpha]_D$ +25° (EtOH) [1]
UV: 262 [1]
IR: 3520, 2980, 2935, 2890, 2820, 2770, 1726, 1605, 1586, 1455, 1393, 1372, 1338, 1318, 1285, 1258, 1179, 1168, 1117, 1095, 1028, 1017, 988, 948, 894, 876, 858 [2]
^{1}H NMR: 1.31(3H, s, OAc), 2.39(3H, s, NCH_3), 3.26, 3.65(each 3H, s, 2×OCH_3), 3.40(6H, s, 2×OCH_3), 5.08(1H, d, H-14β), 7.66–8.42(5H, m, H–Ar) [3]
^{13}C NMR: [4]

Table 1

C-1	84.9	C-12	35.7	16-OCH_3	58.6
2	26.3	13	74.8	18-OCH_3	58.9
3	34.7	14	78.9	CO	169.4
4	39.3	15	39.3	CH_3	21.4
5	48.8	16	83.7	Ar-C = O	166.0
6	83.0	17	63.3	Ar-C-1	129.6
7	48.2	18	80.2	2	128.4
8	85.4	19	56.1	3	130.4
9	45.1	NCH_3	42.3	4	132.8
10	41.0	1-OCH_3	56.1	5	130.4
11	50.2	6-OCH_3	57.6	6	128.4

Pharm. /Biol.: Neurocardiotoxic. Similar in the nature of its action to aconitine, but inferior to it in toxicity and arrhythmogenic effect [5, 6]

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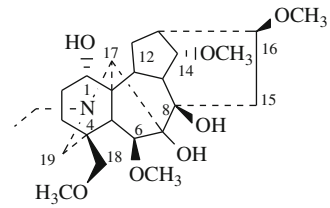
Delsoline

CAS Registry Number: 509-18-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum barbatum, A. karakolicum, A. monticola, A. turczaninowii, Consolida divarilata, C. orientalis, Delphinium biternatum, D. confusum*
$C_{25}H_{41}NO_7$: 467.2883
Mp: 215–218°C (MeOH), 191°C (perchlorate), 83°C (hydrobromide), 207°C (hydrochloride) [1, 2]
$[\alpha]_D$ +48° ($CHCl_3$) [1, 2]
IR: 3460, 3410–3260, 1455, 1408, 1390, 1338, 1325, 1300, 1270, 1218, 1175, 1130, 1105, 1080, 1040, 1027, 1010, 990, 960, 860, 810, 795, 760, 745, 714 [1, 2]
MS *m/z*: 467(M^+, 22), 452(100), 450(44), 449(5), 436(61), 434(53), 424(13), 422(15), 406(10), 396(5), 380(5) [1, 2]
^{1}H NMR: 1.13(3H, t, J = 7, NCH_2CH_3), 3.27, 3.29, 3.35(3H, 3H, 6H, s, 4×OCH_3) [1, 2]
^{13}C NMR: [2]

Table 1

C-1	83.1	C-10	40.3	C-19	53.7
2	26.4	11	50.2	NCH_2	50.7
3	31.8	12	28.1	CH_3	14.0
4	38.1	13	37.9	CH_2O_2	92.9
5	52.6	14	82.5	6-OCH_3	55.5
6	78.9	15	33.3	14-OCH_3	57.8
7	92.7	16	81.8	16-OCH_3	56.3
8	83.9	17	63.9	18-OCH_3	59.6
9	48.1	18	78.9		

Pharm. /Biol.: LD_{50} 175, 550 mg/kg (i/v, i/p, mice). Lowers arterial pressure, blocks ganglionic N-cholinoreceptors. Muscle relaxant activity [3]

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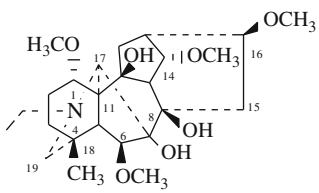
Delterine

CAS Registry Number: 107814-38-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium ternatum*
$C_{25}H_{41}NO_7$: 467.2883
Mp: 73–75°C (Et_2O–C_6H_{14}) [1]
IR: 3400, 1100 [1]
MS *m/z*: 467(M^+), 452, 450, 436(100) [1]
^{1}H NMR: 0.94(3H, s, 3H-18), 0.99(3H, t, J = 7, NCH_2CH_3), 3.18, 3.24, 3.36, 3.38(each 3H, s, 4×OCH_3) [1]

References

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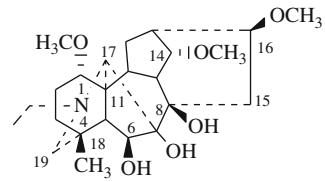
Demethylenedelpheline

CAS Registry Number: 122279-79-2



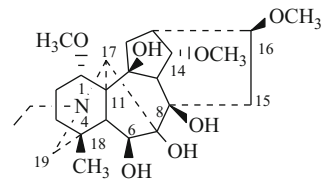
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum*
$C_{24}H_{39}NO_6$: 437.2777
Mp: 78–80°C (Et_2O) [1]
IR: 3600–3400, 1100 [1]
MS *m/z*: 437(M^+), 406(100) [1]
^{1}H NMR: 0.85(3H, s, 3H-18), 0.96(3H, t, J = 7, NCH_2CH_3), 3.18, 3.30, 3.39 (each 3H, s, 3×OCH_3), 4.24(1H, br s, H-6α) [1]

References

1. A.S. Narzullaev, M.S. Yunusov, V.M. Matveev, S.S. Sabirov, Chem. Nat. Comp. **25**, 43 (1989)

Demethyleneldelidine

CAS Registry Number: 63596-60-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium dictyocarpum*
$C_{24}H_{39}NO_7$: 453.2726
Mp: 98–100°C (C_6H_{14}–Me_2CO) [1]

$[\alpha]_D$ +30° ($CHCl_3$) [1]
IR: 3455, 1104 [1]
MS *m/z*: 453(M^+), 438, 336, 335, 422(100) [1]
^{1}H NMR: 0.91(3H, s, 3H-18), 0.98(3H, t, J = 7, NCH_2CH_3), 3.17, 3.25, 3.35(each 3H, s, 3×OCH_3) [1]
Pharm./Biol.: LD_{50} 230 mg/kg (i/v, mice). Weakly hypotensive and N-cholinoblocking and pronounced antiarrhythmic action. In antiarrhythmic activity superior to procainamide [procaineamide hydrochloride] [2]

References

1. B.T. Salimov, N.D. Abdullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 194 (1978). B.T. Salimov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 120 (1977)
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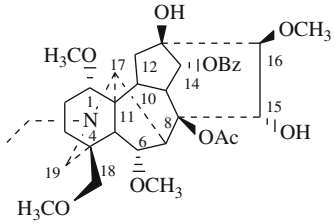
3-Deoxyaconitine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum firmum, A. tauricum*
$C_{34}H_{47}NO_{10}$: 629.3200
Mp: 174–176°C [1]
$[\alpha]_D$ +16° (EtOH) [1]
Solubility: sol. $CHCl_3$, MeOH
UV: 231 [1]
IR: 3495, 1725, 1715, 1280, 1120, 1095, 725, 715 [1]
MS *m/z*: 629(M^+, 1.3), 614(1.4), 598(75.3), 569(6.9), 554(14), 538(100), 525(18), 523(16.9), 510(18.1), 508(30), 494(7.1), 492(6.8) [2]
^{1}H NMR: 1.02(3H, t, J = 7, NCH_2CH_3), 1.34(3H, s, Ac), 3.07, 3.18, 3.65(3H, 6H, 3H, s, 4 × OCH_3), 4.78(1H, d, J = 5, H-14β), 7.40–8.00(H–Ar) [1, 2]
^{13}C NMR: Signals given relative to the chemical shift of CS2 (192.8 ppm) [3]

Table 1

C-1	85.2	C-13	74.0	18-OCH_3	59.0
2	26.3	14	78.8	C = O	172.2
3	35.2	15	79.0	CH_3	21.3
4	39.0	16	90.2	Ar-C = O	165.9
5	49.1	17	61.2	Ar-C-1	129.9
6	83.3	18	80.2	2	129.5
7	45.1	19	53.3	3	128.5
8	92.0	NCH_2	49.1	4	133.1
9	44.6	CH_3	13.4	5	128.5
10	41.0	1-OCH_3	56.0	6	129.5
11	49.9	6-OCH_3	57.9		
12	36.7	16-OCH_3	60.9		

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1. Y.-G. Wang, Y.-L. Zhu, R.-H. Zhu, Acta Pharmaceutica Sinica **15**, 526 (1980)
2. Z.M. Vaisov, V.A. Tel'nov, I.A. Bessonova, Chem. Nat. Comp. **29**, 71 (1993)
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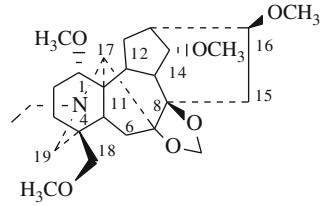
6-Deoxydelcorine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum*
$C_{26}H_{41}NO_6$: 463.2934
Mp: 93–95°C (C_6H_{14}) [1]

$[\alpha]_D$ −14° (MeOH) [1]
IR: 1100 [1]
MS *m/z*: 463(M^+), 448, 432(100) [1]
^{1}H NMR: 1.01(3H, t, J = 7, NCH_2CH_3), 3.22, 3.25, 3.30, 3.36(each 3H, s, 4×OCH_3), 3.6(1H, t, J = 5, H-14β), 4.86, 4.96 (each 1H, s, CH_2O_2) [1, 2]
^{13}C NMR: [3]

Table 1

C-1	83.1	C-10	43.6	C-19	52.6
2	26.6	11	50.8	NCH_2	50.4
3	32.2	12	28.0	CH_3	13.8
4	38.1	13	38.3	CH_2O_2	93.3
5	44.5	14	83.5	1-OCH_3	55.4
6	32.2	15	33.1	14-OCH_3	57.6
7	90.5	16	81.9	16-OCH_3	56.1
8	81.7	17	61.8	18-OCH_3	59.3
9	47.8	18	79.0		

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2. S.W. Pelletier, N.V. Mody, K.I. Varughese, J.A. Maddry, H.K. Desai, J. Amer. Chem. Soc. **103**, 6536 (1981)
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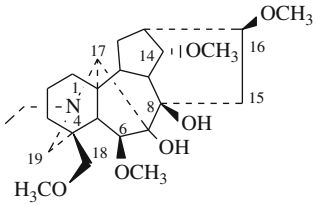
Deoxydelsoline

CAS Registry Number: 58111-35-6

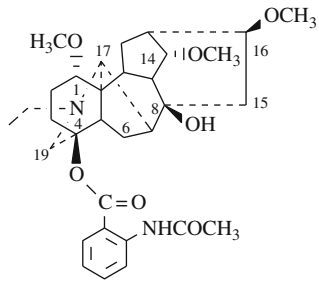


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum monticola*
$C_{25}H_{41}NO_6$: 451.2934
Mp: 134–135°C (Me_2CO) [1]
IR: 3550, 3400 [1]
MS *m/z*: 451(M^+, 45), 436(100), 420(97), 418(93) [1]
^{1}H NMR: 1.41(3H, t, J = 7, NCH_2CH_3), 3.10, 3.12, 3.16, 3.30(each 3H, s, 4×OCH_3), 3.48(1H, t, J = 5, H-14β) [1]
Pharm./Biol.: LD_{50} 101 mg/kg (i/v, mice). Weak ganglioblocking and curaremimetic action [2]

References

1. E.F. Ametova, M.S. Yunusov, V.A. Tel'nov, Chem. Nat. Comp. **18**, 472 (1982)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(3), 386 (1996)

9-Deoxylappaconitine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum rubicundum*
$C_{32}H_{44}N_2O_7$: 568.3149
Mp: 195–198°C (Et_2O) [1, 2]
Solubility: sol. $CHCl_3$, MeOH, Me_2CO
MS *m/z*: 568(M^+, 2), 553(2), 537(15), 535(2), 389(100), 376(30), 374(26), 360(9), 359(15), 358(18) [1]
^{1}H NMR: 1.06(3H, t, J = 7, NCH_2CH_3), 2.16(3H, s, Ac), 3.23, 3.26, 3.35(each 3H, s, 3×OCH_3), 3.62(1H, t, J = 5, H-14β), 6.94, 7.40(each 1H, t, J = 7, H–Ar), 7.80, 8.58(each 1H, d, J = 7, H–Ar) [1, 2]

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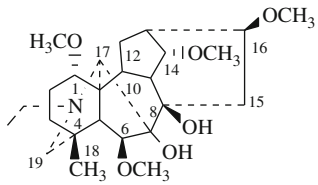
18-Deoxylycoctonine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium confusum*

$C_{25}H_{41}NO_6$: 451.2934

Mp: 73–75°C (C_6H_{14}–Et_2O) [1]

IR: 3600–3400, 1100 [1]

MS *m/z*: 451(M^+), 436, 434, 433, 420(100) [1]

^{1}H NMR: 0.94(3H, s, 3H-18), 1.00(3H, t, J = 7, NCH_2CH_3), 3.34, 3.36, 3.45(3H, 3H, 6H, s, 4×OCH_3), 3.57(1H, t, J = 5, H-14β), 4.06(1H, br s, H-6α) [1]

^{13}C NMR [2]:

Table 1

C-1	82.8	C-10	46.2	C-19	56.8
2	33.8	11	49.3	NCH_2	50.9
3	37.3	12	28.9	CH_3	14.0
4	34.1	13	38.2	1-OCH_3	57.7
5	43.4	14	84.5	6-OCH_3	55.6
6	91.5	15	26.8	14-OCH_3	58.2
7	88.6	16	84.1	16-OCH_3	56.2
8	77.6	17	64.3		
9	55.2	18	26.8		

Pharm./Biol.: LD_{50} 124 mg/kg (i/v., mice). In doses of 5–10 mg/kg lowers arterial pressure and exhibits N-cholinoblocking action. Possesses weak antiarrhythmic activity [3]

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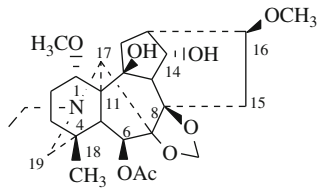
Dictyocarpine

CAS Registry Number: 59989-92-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium dictyocarpum, D. ternatum*

$C_{26}H_{39}NO_8$: 493.2676

Mp: 210–212°C (Me_2CO–C_6H_{14}) [1]

$[\alpha]_D$ −14° ($CHCl_3$) [1]

IR: 3490, 1710, 1140 [1]

MS *m/z*: 493(M^+), 478, 462(100), 434 [1]

^{1}H NMR: 0.91(3H, s, 3H-18), 1.03(3H, t, J = 7, NCH_2CH_3), 2.04(3H, s, Ac), 3.20, 3.32(each 3H, s, 2×OCH_3), 4.55(1H, t, J = 5, H-14β), 5.08, 5.14(each 1H, s, CH_2O_2), 5.42(1H, s, H-6α) [1]

^{13}C NMR [2]:

Table 1

C-1	78.7	C-10	79.9	C-19	56.9
2	26.4	11	55.1	NCH_2	50.4
3	37.6	12	36.5	CH_3	14.0
4	34.0	13	36.6	OCH_2O	94.0
5	51.8	14	72.8	1-OCH_3	55.6
6	77.2	15	32.9	16-OCH_3	56.3
7	93.0	16	81.2	OC = O	170.2
8	82.9	17	64.4	CH_3	21.8
9	50.4	18	25.5		

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1. A.S. Narzullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 491 (1972)
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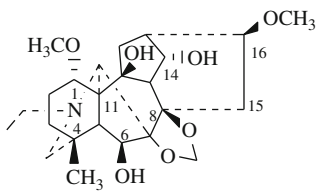
Dictyocarpinine

CAS Registry Number: 50657-27-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium iliense*
$C_{24}H_{37}NO_7$: 451.2570
Mp: 204–205°C [1]
$[\alpha]_D$ −5.0° (MeOH) [1, 2]
IR: 3420, 1100 [1]
MS *m/z*: 451(M^+), 436, 420(100) [1]
^{1}H NMR: 0.93(3H, s, 3H-18), 1.06(3H, t, J = 7.5, NCH_2CH_3),.26, 3.38(each 3H, s, 2×OCH_3), 4.28(1H, d, J = 1, H-6α), 4.72(1H, dd, J = 6.5, H-14β), 5.00, 5.12(each 1H, s, CH_2O_2) [1, 2]
^{13}C NMR: [3]

Table 1

C-1	79.9	C-9	51.6	C-17	64.0
2	26.4	10	80.5	18	25.4
3	36.9	11	55.4	19	57.2
4	33.9	12	36.7	NCH_2	50.5
5	51.9	13	36.5	CH_3	14.0
6	77.3	14	72.6	1-OCH_3	55.6
7	93.4	15	33.2	16-OCH_3	56.3
8	82.8	16	81.2	CH_2O_2	93.4

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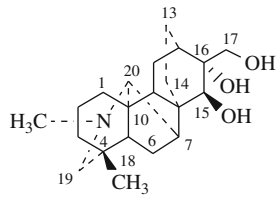
Dictysine

CAS Registry Number: 67256-05-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum, D. dictyocarpum*
$C_{21}H_{33}NO_3$: 347.2460
Mp: 184–186°C (MeOH) [1]
$[\alpha]_D$ −120° ($CHCl_3$) [1]
Solubility: sol. Me_2CO, MeOH
IR: 3440 [1]
MS *m/z*: 347(M^+, 100), 330(31), 316(20), 312(8), 304(21), 256(8), 172(27) [1]
^{1}H NMR: 0.62(3H, s, 3H-18), 2.23(3H, s, NCH_3), 3.46, 4.18(each 1H, d, J = 12), 3.96(1H, s, H-15α) [1, 2]
^{13}C NMR: [3]

Table 1

C-1	27.6	C-8	43.0	C-15	87.1
2	21.8	9	42.5	16	81.1
3	41.2	10	46.9	17	67.9
4	35.2	11	24.7	18	27.0
5	54.0	12	36.5	19	60.8
6	24.0	13	23.0	20	74.7
7	44.0	14	29.0	NCH_3	44.5

X-ray: [2]
Pharm./Biol.: LD_{50} 165 mg/kg (i/v., mice). Brief hypotensive action due to a peripheral gangliolytic and spasmolytic effect [4]

References

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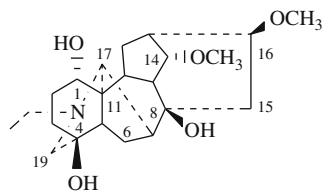
Dihydromonticamine

CAS Registry Number: 81037-23-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum monticola*

$C_{22}H_{35}NO_5$: 393.2515

Mp: 156–157°C (Et_2O–Me_2CO), 202°C (hydrochloride) [1]

IR: 3550–3335 [1]

MS *m/z*: 393(M^+, 13), 378(28), 376(100), 360(20), 337(10) [1]

^{1}H NMR: 0.92(3H, t, J = 7, NCH_2CH_3), 3.14, 3.28(each 3H, s, 2×OCH_3), 3.75(1H, t, J = 5, H-14β) [1]

^{13}C NMR: [1]

Table 1

C-1	72.0	C-9	45.7	C-17	62.7
2	29.9	10	37.1	18	–
3	33.4	11	50.0	19	60.2
4	70.3	12	30.3	NCH_2	48.0
5	48.0	13	43.4	CH_3	13.0
6	24.6	14	84.8	14-OCH_3	57.6
7	45.3	15	42.9	16-OCH_3	56.1
8	75.0	16	82.8		

Pharm./Biol.: LD_{50} 220 mg/kg (i/v, mice). Weak and brief hypotensive and N-cholinoblocking action [2]

References

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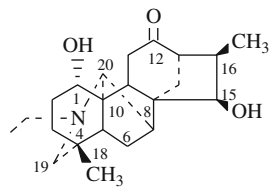
Dihydrosongorine

CAS Registry Number: 29603-32-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum karakolicum*

$C_{22}H_{33}NO_3$: 359.2460

Mp: 202–204°C (Me_2CO) [1]

IR: 3500–3400, 1700 [1]

MS *m/z*: 359(26), 342(5), 301(100), 284(6), 259(7), 242(5) [2]

^{1}H NMR: 0.68(3H, s, 3H-18), 0.74(3H, d, J = 7, 16-CH_3), 1.00(3H, t, J = 7, NCH_2CH_3) [1]

Pharm./Biol.: LD_{50} 120 mg/kg, 450 mg/kg (i/v, i/p, mice). Its antiarrhythmic action superior to quinidine and procainamide [procaineamide hydrochloride]. Psychostimulating and anti-inflammatory action [3]

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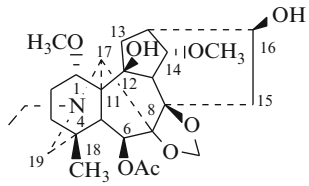
Elasine

CAS Registry Number: 123064-65-3



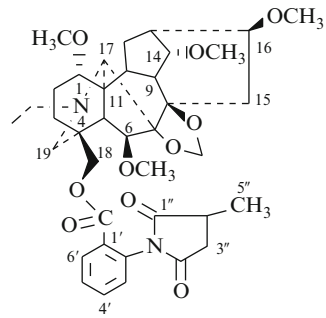
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium retropilosum*
$C_{26}H_{39}NO_8$: 493.2675
Mp: 116–118°C (C_6H_{14}) [1], amorph. [2], 213–215°C (perchlorate, EtOH) [1], 219.5–221.5°C (monoacetate, Et_2O–C_6H_{14}) [2]
IR: 3448, 2962, 2938, 2872, 1745, 1458, 1368, 1295, 1246, 1217, 1197, 1160, 1129, 1100, 1084, 1049, 985, 964 [1]
MS *m/z*: 493(M^+, 4), 478(3), 462(100), 434(20) [1]
^{1}H NMR: 0.82(3H, s, 3H-18), 1.00(3H, t, J = 7.0, NCH_2CH_3), 2.00(3H, s, $OCOCH_3$), 3.19, 3.43(each 3H, 2×OCH_3), 4.22(1H, t, J = 5.0, H-14β), 4.87, 4.92(each 1H, s, CH_2O_2), 5.42(1H, br s, H-6α) [1]
^{13}C NMR [2]:

Table 1

C-1	78.9	C-11	55.0	N-CH_2	50.2
2	26.2	12	36.4	CH_3	13.8
3	37.9	13	40.0	1-OCH_3	55.4
4	33.9	14	82.5	14-OCH_3	57.9
5	50.2	15	37.1	OCH_2O	93.6
6	77.1	16	71.7	CO	169.7
7	92.7	17	64.0	CH_3	21.4
8	83.0	18	25.4		
9	47.6	19	56.8		
10	80.1				

Elatine

CAS Registry Number: 26000-16-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium elatum*
$C_{38}H_{50}N_2O_{10}$: 694.3466
Mp: 222–225°C [1]
$[\alpha]_D$ −3° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$, MeOH
IR: 1718, 1605, 1585, 1497, 1460, 1395, 1296, 1260, 1190, 1140, 1090, 1020, 965, 860, 800, 770, 753, 718 [1]
^{1}H NMR: 1.06(3H, t, J = 7, NCH_2CH_3), 1.50(3H, d, J = 6,0, 5″-CH_3), 3.25, 3.33, 3.34, 3.42(each 3H, s, 4 × OCH_3), 3.65(1H, t, J = 4.5, H-14β), 5.06(2H, s, CH_2O_2), 7.25(1H, dd, J = 8.0, J = 2.0, H-3′), 7.52–7.68(2H, m, H-4′, H-5′), 8.08(1H, dd, J = 8.0, J = 2.0, H-6′) [2]
^{13}C NMR [2]:

Table 1

C-1	83.4	C-14	81.3	CO	164.0
2	28.4	15	34.9	Ar–C-1′	127.3
3	31.8	16	81.7	2′	133.1
4	37.2	17	64.1	3′	129.4
5	53.0	18	69.8	4′	133.5
6	89.4	19	52.6	5′	131.2

(*continued*)

Table 1 (continued)

7	92.1	NCH_2CH_3	50.4	6′	131.0
8	83.4	NCH_2CH_3	13.8	C-1″	179.8
9	48.5	1-OCH_3	55.2	2″	37.0
10	40.0	6-OCH_3	57.8	3″	35.3
11	50.1	7,8-CH_2O_2	93.6	4″	75.8
12	27.9	14-OCH_3	58.9	5″	16.4
13	38.7	16-OCH_3	56.1		

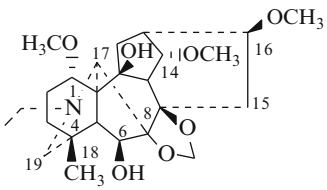
Pharm./Biol.: The preparation has expressed curare-like action. It is effective in administration per os. It was used in medicine as the drug [3]

References

1. K. Vizner, S.D. Kusovkov, T.F. Platonova, Zh. Obshch. Khim. **34**, 1666 (1964)
2. S.W. Pelletier, H.K. Desai, P. Kulanthaivel, B.S. Joshi, Heterocycles **26**, 2835 (1987)
3. D.N. Kharkevich, *Pharmacologiya curarepodobnyh sredstv* (Meditcina, Moskow, 1969), p. 190

Eldelidine (Deltamine)

CAS Registry Number: 6836-10-8



Biological sources: *Delphinium dictyocarpum*

$C_{25}H_{39}NO_7$: 465.2726

Mp: 226–228°C, 217°C (hydrochloride), 219°C (hydroiodide) [1]

$[\alpha]_D$ −17° (MeOH) [1]

IR: 3520–3450, 1100 [1]

MS *m/z*: 465(M^+), 450, 434(100) [1]

^{1}H NMR: 0.90(3H, s, 3H-18), 1.05(3H, t, J = 7, NCH_2CH_3), 4.1(1H, t, J = 5, H-14β), 4.22(1H, s, H-6α), 4.99, 5.06(each 1H, s, CH_2O_2) [1]

^{13}C NMR: [2]

Table 1

C-1	80.2	C-10	82.4	C-19	57.3
2	27.0	11	56.2	1-OCH_3	55.5
3	38.7	12	36.8	14-OCH_3	57.9
4	33.6	13	37.6	16-OCH_3	56.2
5	51.0	14	81.6	NCH_2	50.4
6	77.4	15	34.3	CH_3	13.9
7	92.4	16	81.6	CH_2O_2	93.3
8	83.5	17	63.2		
9	51.5	18	25.6		

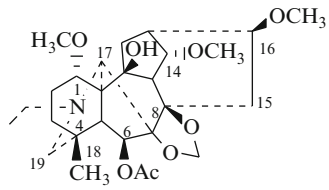
Pharm./Biol.: LD_{50} 235 mg/kg (i/v, mice). It exerts antiarrhythmic, a weak hypotensive and N-cholinoblocking action [3]

References

1. A.S. Narzullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 491 (1972). **9**, 424 (1973)
2. S.W. Pelletier, N.V. Mody Jr., O.D. Dailey, Canad. J. Chem. **58**, 1875 (1980)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(6), 932 (1996)

Eldeline (Deltaline)

CAS Registry Number: 6836-11-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium dictyocarpum, D. elatum, D. iliense*

$C_{27}H_{41}NO_8$: 507.2832

Mp: 182–184°C, 216° C (hydrochloride), 217°C (perchlorate) [1, 2]

$[\alpha]_D$ −30° (MeOH) [1, 2]

IR: 3490, 1720, 1472, 1387, 1283, 1265, 1185, 1112, 1100, 1027, 973, 865, 805, 764, 746 [2]

MS *m/z*: 507(M^+), 492, 476(100), 448(20) [2]
^{1}H NMR: 0.83(3H, s, 3H-18), 1.01(3H, t, J = 7, NCH_2CH_3), 2.05(3H, s, Ac), 3.22, 3.27, 3.40(each 3H, s, 3×OCH_3), 4.08(1H, t, J = 5, H-14β), 4.86, 4.97(each 1H, br s, CH_2O_2), 5.41(1H, br s, H-6α) [2]
^{13}C NMR: [3]

Table 1

C-1	79.2	C-10	81.6	C-19	56.9
2	27.1	11	56.0	1-OCH_3	55.3
3	39.4	12	36.5	14-OCH_3	57.7
4	33.7	13	38.5	16-OCH_3	56.2
5	50.4	14	81.7	NCH_2	50.2
6	77.3	15	34.8	CH_3	13.8
7	91.6	16	81.5	CH_2O_2	93.9
8	83.8	17	63.5	CO	169.9
9	50.4	18	25.7	CH_3	21.8

Pharm./Biol.: Curarelike and ganglioblocking action [4]. It exceeds quinidine and procainamid [5]

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4. N. Tulyaganov, F.N. Dzhakhangirov, F. Sadritdinov, I. Khamdamov, *The Pharmacology of Plant Substances* [in Russian] (Fan, Tashkent, 1976), p. 76
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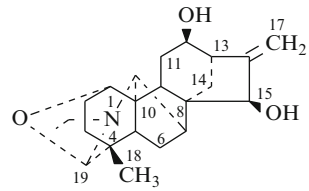
12-Epidehydronapelline

CAS Registry Number: 116197-11-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum volubile*
$C_{22}H_{31}NO_3$: 357.2314
Mp: amorph.
$[\alpha]_D$ +56.8 [1]
MS *m/z*: 357(M^+), 301(M^+ -C_3H_4O, 100) [1, 2]
^{1}H NMR: 0.82(3H, s, 3H-18), 1.01(3H, t, J = 7.3, NCH_2CH_3), 2.82(1H, dd, J_1 = 4.6, J_2 = 8.8, H-13), 4.16(1H, dd, J_1 = 8.8, J_2 = 6.1, H-12α), 4.28(1H, t, J = 2.2, H-15α), 5.21, 5.40(each 1H, d, J = 2.0, 2H-17) [1, 2]

References

1. H. Takayama, F.E. Wu, H. Eda, K. Oda, N. Aimi, S. Sakai, Chem. Pharm. Bull. **39**, 1644 (1991)
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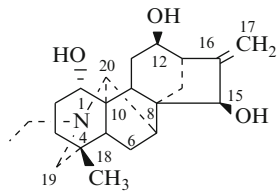
12-Epinapelline

CAS Registry Number: 110064-71-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum*
$C_{22}H_{33}NO_3$: 359.2460
Mp: 118–121°C ($CHCl_3$), 170°C (tri Ac) [1], 72–73.5°C [2]
IR: 3500–3200 [1]
MS *m/z*: 359(M^+, 100), 344(6), 342(16), 300(21) [1]
^{1}H NMR: 0.79(3H, s, 3H-18), 1.18(3H, t, J = 7, NCH_2CH_3), 1.09(1H, dd, J = 12.1, 4.0, H-14α), 1.76(1H, d, J = 12.2, H-14β), 2.30, 2.71(each 1H, q, J = 11.8, H-19), 2.80(1H, dd, J = 8.8, 3.7, H-13), 3.52(1H, br s, H-20), 3.87(1H, dd, J = 8.6, 6.7, H-1b), 4.18(1H, dd, J = 8.8, 4.8, H-12), 4.21(1H, br s, H-15), 5.12, 5.32(each 1H, br s, 2H-17) [1,2]

^{13}C NMR: [2]

Table 1

C-1	69.5	C-8	51.6	C-15	78.1
2	31.5	9	39.6	16	154.8
3	32.4	10	53.8	17	112.2
4	35.2	11	33.6	18	26.7
5	51.6	12	71.8	19	58.9
6	24.3	13	45.7	20	67.3
7	45.1	14	38.8	NCH_2	52.1
				CH_3	13.7

Pharm./Biol.: It exerts hypotensive, N-cholinoblocking, antiinflammatory and antiarrhythmic action [3]

References

1. M.N. Sultankhodzhaev, M.S. Yunusov, Chem. Nat. Comp. **23**, 319 (1987)
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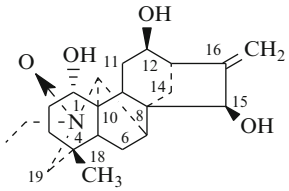
12-Epinapelline N-Oxide

CAS Registry Number: 169336-56-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum baicalense (A. Czekanovshyi)*

$C_{22}H_{33}NO_4$: 375.2410

Mp: amorph., 225°C (perchlorate) [1]

Solubility: sol. H_2O, MeOH, EtOH, $CHCl_3$ [1]

IR: 3500–3350, 3000–2800, 1650, 1070, 1040, 905–920 [1]

MS *m/z*: 375(M^+) [1]

^{1}H NMR: 0.82(3H, s, 3H-18), 1.13(1H, dd, J = 12.0, 4.1, H-14α), 1.30(2H, m, H-3α, H-6α), 1.39(3H, t, J = 7.1, NCH_2CH_3), 1.50(1H, br d, J = 7.9, H-5), 1.70(1H, dd, J = 15.0, 6.5, H-11_a), 1.72(1H, d, J = 12.0, H-14_e), 1.95(2H, m, H-2_a i H-3_e), 2.02(1H, d, J = 5.3, H-7), 2.08(1H, dd, J = 6.5, 13.0, H-9), 2.25(1H, ddd, J = 15.0, 12.9, 6.0, H-11_e), 2.45(1H, m, H-2_e), 2.71(1H, dd, J = 7.9, 14.0, H-6_e), 2.80(1H, dd, J = 8.7, 4.1, H-13), 3.10(2H, d, J = 13.8, H-19β, m, NCH_2CH_3), 3.24(1H, m, NCH_2CH_3), 3.28(1H, d, J = 13.8, H-19α), 3.75(1H, br s, H-20), 3.86(1H, t, J = 7.1, H-1), 4.18(1H, dd, J = 8.7, 6.0, H-12α) [1]

^{13}C NMR: [1]

Table 1

C-1	67.2	C-9	39.0	C-17	112.7
2	30.5	10	54.2	18	26.5
3	32.6	11	28.9	19	74.8
4	35.2	12	66.6	20	80.3
5	46.6	13	43.8	NCH_2	67.2
6	22.8	14	34.9	CH_3	7.8
7	46.3	15	76.4		
8	49.8	16	153.6		

References

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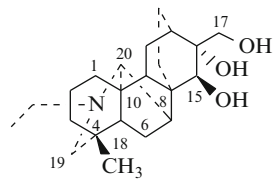
N-Ethyl-des-N-methyldictyzine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium corymbosum*
$C_{22}H_{35}NO_3$: 361.2618
Mp(acetonide): 87–89°C (Me_2CO) [1]
IR(acetonide): 3495, 1090 [1]
MS *m/z* (acetonide): 401(M^+, 100), 386, 372, 358, 326, 314, 270, 186 [1]
^{1}H NMR(acetonide): 0.64(3H, s, 3H-18), 0.95(3H, t, J = 7.0, NCH_2CH_3), 1.25; 1.35(each 3H, s, 2×CH_3), 3.25(1H, br s, H-20), 3.63; 4.34(each 1H, d, J = 8.0, 2H-17), 3.88(1H, d, J = 2.0, H-15α) [1]

References

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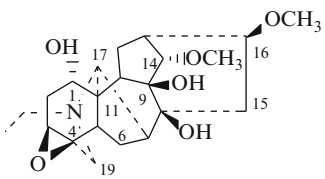
Excelsine

CAS Registry Number: 136051-70-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum leucostomum*
$C_{22}H_{33}NO_6$: 407.2308
Mp: 103–105°C (Et_2O–MeOH), 186°C (hydroiodide), 218°C (Cl-tetra Ac) [1]
Solubility: sol. $CHCl_3$, Me_2CO, MeOH [1]
IR: 3510, 3415, 3280, 1640, 1470, 1395, 1300, 1295, 1260, 1228, 1190, 1135, 1113, 1080, 1037, 994, 947, 915, 880, 810, 768 [1]
MS *m/z*: 407(M^+, 75), 392(53), 376(100), 364(14.5), 358(8.8), 348(8.7), 321(14.5), 288(7.5) [1]
^{1}H NMR: 1.01(3H, t, J = 7, NCH_2CH_3), 3.13, 3.18(each 3H, s, 2 × OCH_3) [1]
X-ray: [2, 3]
Pharm./Biol.: LD_{50} 130 mg/kg (i/v, mice). It exerts transitory hypotensive and quinidine-like antiarrhythmic effect [4]

References

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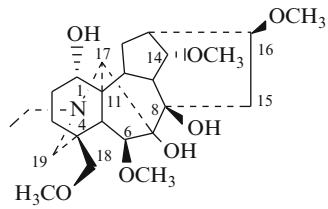
Gigactonine

CAS Registry Number: 65967-20-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum orientale, Delphinium speciosum*
$C_{24}H_{39}NO_7$: 453.2726
Mp: 168–169°C [1, 2]
$[\alpha]_D$ +49° (EtOH) [1, 2]
IR: 3490–3370, 1470, 1460, 1400, 1380, 1302, 1230, 1193, 1182, 1160, 1120, 1100, 1090, 1075, 1024, 1005, 980, 950, 930, 900, 880, 865, 800, 760, 746 [1, 2]
MS *m/z*: 453(M^+), 438(100), 436, 422, 420, 397 [1, 2]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 2.92(2H, q, J = 7, NCH_2CH_3), 3.33, 3.40(3H, 6H, s, 3×OCH_3), 3.98(1H, s, H-6α) [2, 3]
^{13}C NMR: [2]

Table 1

C-1	72.7	C-9	43.4	C-17	66.1
2	29.4	10	44.0	18	66.8
3	30.5	11	49.4	19	57.3
4	38.2	12	26.7	6-OCH_3	57.7
5	44.7	13	37.8	14-OCH_3	57.7
6	90.6	14	84.6	16-OCH_3	56.4
7	87.8	15	33.5	NCH_2	50.4
8	78.5	16	83.0	CH_3	13.6

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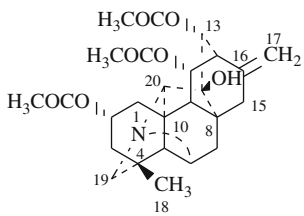
Guan-Fu-Base C

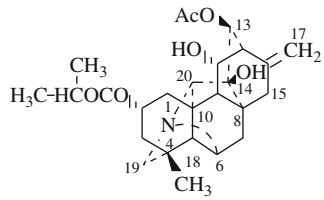


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{26}H_{33}NO_7$: 471.5560
Mp: 176°C (C_6H_{14}–Me_2CO) [1]
MS *m/z*: 471(M^+, 21), 454(7), 429(20), 428(22), 412(23), 385(10), 370(23), 369(100), 352(9), 342(40), 43(24) [1]
^{1}H NMR: 1.87, 1.90, 1.93(each 3H, s, 3×OAc), 5.00–5.60(5H, m) [1]

References

1. I.A. Bessonova, Chem. Nat. Comp. **35**, 103 (1999)

Guan-Fu-Base F



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{26}H_{35}NO_6$: 457.2464
Mp: 181–182°C [1]
$[\alpha]_D$ +58° [1]
IR: 3555–3430, 1745, 1735, 1680 [1]
MS *m/z*: 457(M^+), 415, 414(100), 398, 370 [1]
^{1}H NMR: 0.96(3H, s, 3H-18), 1.09, 1.13(each 3H, d, J = 6.5, -$C(CH_3)_2$), 1.33(1H, dd, J = 14; 2, H-7β), 1.49(1H, s, H-5), 1.56(1H, dd, J = 15.5; 4, H-3β), 1.97(3H, s, Ac), 1.64–2.06(m, H_2-15, H-9, H-1β, H-7α, H-3α), 2.40(m, H-2′), 2.55(1H, d, J = 4, H-12), 2.47, 2.83(each 1H, d, J = 12, H-19β, H-19α), 2.88(1H, d, J = 16, H-1α), 3.07(1H, br s, H-6), 3.32(1H, s, H-20), 4.19(1H, d, J = 9, H-11), 4.68, 4.89(each 1H, br s, 2H-17), 4.99(1H, br s, H-13), 5.12(1H, br s, H-2β) [1]

References

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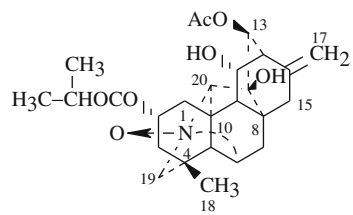
Guan-Fu-Base F N-Oxide

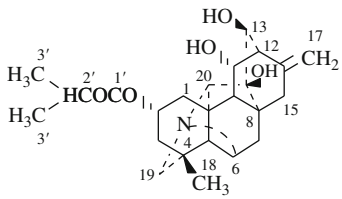


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{26}H_{35}NO_7$: 473.2414
Mp: 240–242°C, 286°C (perchlorate) [1]
IR(perchlorate): 3500, 3400, 1740, 1720, 1660, 890 [1]
MS *m/z*: 473(M^+), 457(28), 456(14), 455(15), 430(91), 414(100), 398(41), 384(18), 326(20) [1]
^{1}H NMR: 1.20(3H, s, 3H-18), 1.15, 1.24(each 3H, d, J = 4, $HC(CH_3)_2$), 2.04(3H, s, OAc), 4.90, 4.99(each 1H, br s, 2H-17) [1]
X-ray(perchlorate): [1]

References

1. I.M. Yusupova, B. Tashkhodzhaev, I.A. Bessonova, M.S. Yunusov, M.R. Yagudaev, V.G. Kondrat'ev, A.I. Shreter, Chem. Nat. Comp. **26**, 314 (1990)

Guan-Fu-Base Z (2-Isobutyryl-14-hydroxyhetisine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{24}H_{33}NO_5$: 415.2359
Mp: 229–230°C (C_6H_{14}–Et_2O) [1]
Solubility: sol. $CHCl_3$
IR: 3400, 1745, 1658 [1]
MS *m/z*: 415(M^+, 82), 398(88), 387(89), 370(100), 328(70) [1]
^{1}H NMR: 1.01(3H, s, 3H-18), 1.16(6H, d, J = 6.8, 2 × CH_3), 1.37(1H, dd, J = 13.9; 2.2, H-7β), 1.52(1H, s, H-5), 1.59(1H, dd, J = 15.4; 4.1, H-3β), 1.77–2.00(6H, br m, H-1β, H-3α, H-7α, H-9, H-15), 2.47–2.52(3H, br m, H-2′, H-12, H-19β), 2.85(1H, d, J = 15.7, H-1α), 2.95(1H, d, J = 12.2, H-19α), 3.11(1H, br s, H-6), 3.53(1H, s, H-20), 4.04(1H, br s, H-13), 4.22(1H, d, J = 8.7, H-11), 4.68, 4.86(each 1H, br s, 2H-17), 5.13(1H, m, H-2) [2]
^{13}C NMR: [1, 2]

Table 1

C-1	31.4	C-9	53.5	C-17	108.2
2	69.6	10	46.3	18	29.7
3	36.7	11	76.0	19	63.0
4	37.6	12	52.7	20	69.1
5	59.9	13	80.0	1′	176.5
6	63.0	14	80.2	2′	34.4
7	32.0	15	31.1	3′	19.1
8	44.3	16	144.7		

References

1. I.A. Bessonova, M.S. Yunusov, V.G. Kondrat'ev, Chem. Nat. Comp. **23**, 573 (1987)
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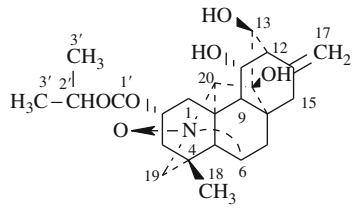
Guan-Fu-Base Z N-Oxide



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{24}H_{33}NO_6$: 431.2308
Mp: 317–319 °C [1]
$[\alpha]_D$ +25° (EtOH) [1]
IR: 3600–3200, 1730, 1680 [1]
MS *m/z*: 431(M^+, 64), 415(50), 414(100), 413(10), 403(36), 398(23), 387(25), 386(43), 375(10), 370(19), 359(14), 358(16), 344(44), 328(20), 326(54) [1]

^{1}H NMR: 1.15(3 H, s, 3 H-18), 1.16(6 H, d, J = 6, HC$(CH_3)_2$), 2.91(1 H, d, J = 12, H-19b), 3.73(2 H, m, H-6, H-13), 3.93(1 H, br s, H-20), 4.02(1 H, d, J = 12, H-19α), 4.14(1 H, br d, J = 9, H-11), 4.65, 4.75(each 1 H, br s, 2 H-17), 5.10(1 H, m, H-2) [1]
^{13}C NMR: [1]

Table 1

C-1	30.2	C-9	52.9	C-17	108.9
2	68.2	10	–	18	29.5
3	36.6	11	71.4	19	76.2
4	–	12	51.5	20	82.2
5	55.0	13	73.4	C-1′	179.6
6	75.2	14	85.5	2′	34.2
7	28.5	15	31.8	3′	19.1
8	44.5	16	143.6		

Pharm./Biol.: LD_{50} 230 mg/kg (i/v, rats). Weak hypotensive and N-cholinoblocking effect [2]

References

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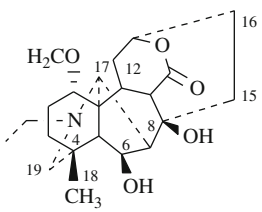
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32** (N2), 216 (1996)

Heteratisine (Zeravschanine)

CAS Registry Number: 3328-84-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum zeravschanicum*
$C_{22}H_{33}NO_5$: 391.2359
Mp: 258°C (dec.) [1, 2]
$[\alpha]_D$ +26° ($CHCl_3$) [1, 2]
Solibility: sol. $CHCl_3$, MeOH, Et_2O [1, 2]
IR: 3460, 3401, 1738 [1]
MS *m/z*: 391(M^+, 6), 376(9), 373(9), 374(10), 360(100), 344(10), 342(22) [2]
^{1}H NMR: 0.97(3H, s, 3H-18), 1.02(3H, t, J = 7.5, NCH_2CH_3), 3.25(3H, s, OCH_3), 3.49(1H, d, J = 2, H-17), 4.03(1H, H-9), 4.50(1H, m, H-6α), 4.74(1H, m, H-13) [1]
^{13}C NMR: [3, 4]

Table 1

C-1	83.5	C-8	75.4	C-15	29.1
2	26.9	9	57.8	16	29.2
3	36.8	10	42.8	17	62.2
4	34.7	11	49.3	18	26.2
5	50.9	12	33.1	19	58.3
6	72.9	13	75.8	NCH_2	49.0
7	49.3	14	176.0	CH_3	13.5
				1-OCH_3	55.2

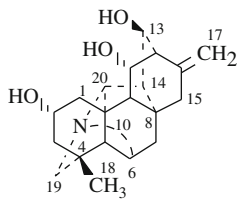
Pharm./Biol.: LD_{50} 192.5 mg/kg (i/v, mice). Brief hypotensive and ganglioblocking action, antiarrhythmic effect [5]

References

1. R. Aneja, D.M. Locke, S.W. Pelletier, Tetrahedron **29**, 3297 (1973)
2. S.W. Pelletier, R. Aneja, Tetrahedron Lett. **8**, 557 (1967)
3. S.W. Pelletier, N.V. Mody, A.J. Jones, M.H. Benn, Tetrahedron Lett. **17**, 3025 (1976)
4. H.K. Desai, S.W. Pelletier, J. Nat. Prod. **56**, 2193 (1993)
5. F.N. Dzhakhangirov, F. Sadritdinov, DAN UzSSR. (3), 50 (1977)

Hetisine

CAS Registry Number: 10089-23-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum zeravschanicum*
$C_{20}H_{27}NO_3$: 329.1984
Mp: 256.5–259°C (MeOH–Me_2CO) [1], Hydrobromide [2], perchlorate [3], hydrochloride [4]
$[\alpha]_D$ +10.9° [1]
IR: 3390, 3030, 1653, 1379, 900 [1]
MS *m/z*: 329(M^+, 100), 312(50), 300(10), 283(20) [1]
^{1}H NMR: 0.99(3H, s, 3H-18), 3.80(1H, br s, H-20), 4.00–4.15(3H, m, H-2β, H-11β, H-13α), 4.65, 4.90(each 1H, br s, 2H-17) [5]
^{13}C NMR [6]:

Table 1

C-1	34.5	C-8	43.6	C-15	34.5
2	67.0	9	55.8	16	146.4
3	39.4	10	51.2	17	107.7
4	36.7	11	76.7	18	30.3
5	61.7	12	50.8	19	63.7
6	64.5	13	72.4	20	68.4
7	36.6	14	52.9		

X-ray: [2–4]
Pharm./Biol.: LD_{50} 26.2 mg/kg (i/v, mice). High antiarrhythmic action [7]. Ca^{+2} ion's antagonist [8]

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3. K.Z. Varughese, S.W. Pelletier, J. Nat. Prod. **47**, 470 (1984)
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6. A.G. Gonzales, G. de la Fuente, M. Reina, R. Diaz, I. Timon, Phytochemistry **25**, 1971 (1986)
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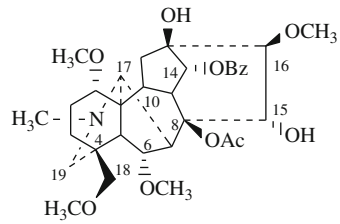
Hypaconitine

CAS Registry Number: 6900-87-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum firmum, A. tauricum*
$C_{33}H_{45}NO_{10}$: 615.3043
Mp: 189–190°C (MeOH–$CHCl_3$), 178°C (hydrobromide) [1]
$[\alpha]_D$ +21° ($CHCl_3$) [1]
Solibility: sol. $CHCl_3$
UV: 231(4.18) [1]
IR: 3512, 3405, 1730, 1608, 1590, 1455, 1387, 1323, 1285, 1205, 1120, 1100, 1067, 1035, 994, 960, 900, 855, 843, 720 [2]
MS *m/z*: 615(M^+, 0.82), 584(17.5), 555(5), 540(12.5), 524(100), 508(2.5) [2]
^{1}H NMR: 1.30(3H, s, Ac), 2.26(3H, s, NCH_3), 3.07, 3.20, 3.65(3H, 6H, 3H, s, 4×OCH_3), 4.79(1H, d, J = 5, H-14β), 7.29–7.90(H–Ar) [2, 3]
^{13}C NMR: [4]

Table 1

C-1	85.0	C-12	36.3	18-OCH_3	59.0
2	26.4	13	74.1	NCH_3	42.6
3	34.9	14	78.8	C = O	172.3
4	39.3	15	78.8	CH_3	21.4
5	48.2	16	90.1	Ar-C = O	166.1
6	83.1	17	62.1	Ar-C-1	129.9
7	44.5	18	80.1	2	129.6
8	91.9	19	56.0	3	128.6
9	43.8	16-OCH_3	60.9	4	133.2
10	41.1	1-OCH_3	56.5	5	128.6
11	49.9	6-OCH_3	57.9	6	129.6

HPLC: [5]

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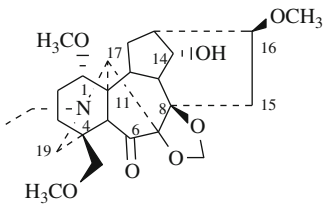
Ilidine

CAS Registry Number: 66921-48-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium iliense*
$C_{25}H_{37}NO_7$: 463.2570
Mp: 141–143°C [1]
IR: 3445, 1745 [1]
MS *m/z*: 4 63(M^+), 448, 432(100) [1]
^{1}H NMR: 1.02(3H, t, J = 7, NCH_2CH_3), 3.25, 3.27, 3.31(each 3H, s, 3×OCH_3), 5.07, 5.53(each 1H, d, J = 1.5, CH_2O_2) [1]
Pharm./Biol.: Toxicity and activity low. In doses of 10–20 mg/kg (i/v, cats), possesses a brief hypotensive and peripheral ganglioblocking action [2]

References

1. M.G. Zhamierashvili, V.A. Tel'nov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 704 (1977)
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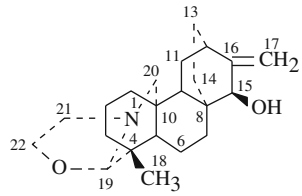
Isoatisine

CAS Registry Number: 510-38-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum, A. rotundifolium, A. zeravschanicum*
$C_{22}H_{33}NO_2$: 343.2511
Mp: 152–153°C (C_6H_{14}–Me_2CO) [1, 2]
$[\alpha]_D$ −22° (EtOH) [1, 2]
IR: 3455, 3090, 2950, 2875, 1657, 1490, 1470, 1460, 1390, 1350, 1316, 1293, 1252, 1238, 1176, 1114, 1090, 1074, 1055, 1020, 988, 977, 950, 900, 870, 855, 827, 818 [1, 2]
^{1}H NMR: 1.00, 1.19(3H, s, 3H-18), 2.71(2H, br s, 2H-20), 3.47(3H, m), 3.86(1H, br s), 4.87, 4.98(each 1H, br s, 2H-17) [1, 2]
^{13}C NMR: [3]

Table 1

C-1	40.6	C-9	39.6	C-17	109.6
2	22.1	10	35.9	18	24.3
3	40.0	11	28.1	19	98.4
4	38.1	12	36.4	20	49.8
5	48.6	13	27.6	21	54.9
6	19.2	14	26.4	22	58.6
7	31.9	15	76.8		
8	37.5	16	156.2		

Pharm./Biol.: LD_{50} 8 mg/kg (i/v, mice). Possesses a brief curaremimetic action. Blocks the transmission of a nervous impulse from the sciatic nerve to the gastrocnemius muscle of the antidepolarizing [4]

References

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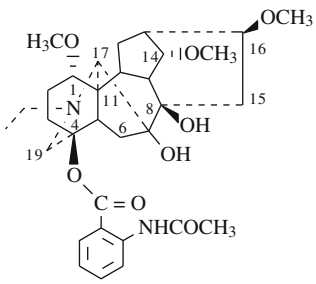
Isolappaconitine

CAS Registry Number: 114216-94-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum rubicundum*

$C_{32}H_{44}N_2O_8$: 584.3098

Mp: 186–188°C (Et_2O) [1]

Solubility: sol. $CHCl_3$, MeOH

IR: 3570, 3535, 3270, 1700, 1693, 1610, 1593 [1]

MS *m/z*: 584(M^+, 5), 569(2), 566(3), 554(4), 553(20), 537(2), 535(2), 523(1), 509(1.3), 405(100), 392(25), 390(13), 376(9), 374(8) [1]

^{1}H NMR: 1.05(3H, t, J = 7, NCH_2CH_3), 2.15(3H, s, Ac), 3.19, 3.26, 3.33(each 3H, s, 3×OCH_3), 6.90, 7.40(each 1H, t, J = 7), 7.81, 8.56(each 1H, d, J = 7) [1, 2]

Pharm./Biol.: LD >10 mg/kg (i/v, mice). Antiarrhythmic and local anaesthetic action [3]

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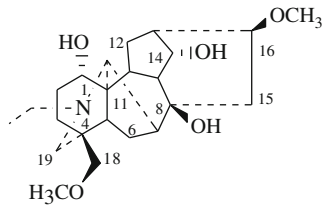
Isotalatisidine

CAS Registry Number: 7633-68-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum chasmanthum, A. nasutum, A. talassicum, A. tranzschelii, Delthinium confusum*

$C_{23}H_{37}NO_5$: 407.2672

Mp: 140–142°C (pet. ether), 117°C (hydrate), 198°C (dec., oxalate), 200°C (methyl′iodide), 134°C (tri Ac.) [1]

$[\alpha]_D$ 0° (MeOH) [1]

UV: 206.5(2.99) [2]

IR: 3565, 3515, 3420, 1460, 1410, 1395, 1380, 1365, 1295, 1280, 1257, 1228, 1205, 1197, 1175, 1163, 1130, 1115, 1090, 1025, 992, 970, 943, 932, 910, 873, 855, 798, 780, 708 [3]

MS *m/z*: 407(M^+, 34), 492(30), 490(100), 489(10), 376(5), 374(16) [3]

^{1}H NMR: 1.10(3H, t, J = 7, NCH_2CH_3), 2.96, 3.16(each 1H, d, J = 9, H-19), 3.30, 3.32(each 3H, s, 2×OCH_3), 4.18(1H, t, J = 4.5, H-14β) [3, 4]

^{13}C NMR: [5]

Table 1

C-1	72.3	C-9	46.7	C-17	63.7
2	29.2	10	40.4	18	79.0
3	29.7	11	48.7	19	56.6
4	37.3	12	26.8	NCH_2	48.4
5	41.7	13	44.1	CH_3	13.0
6	25.0	14	75.6	16-OCH_3	56.2
7	45.3	15	42.3	18-OCH_3	59.3
8	74.3	16	82.4		

Pharm./Biol.: LD_{50} 40.1, 170.0 mg/kg (i/v, i/p, mice). Possesses hypotensive, ganglioblocking, and curaremimetic action. Action on smooth musculature, EcG, and CNS not pronounced [3]

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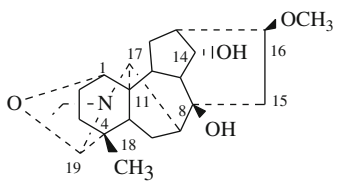
Karakanine

CAS Registry Number: 50656-90-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum*
$C_{22}H_{33}NO_4$: 375.2410
Mp: 193–195°C (Me2CO) [1]
IR: 3530, 3450, 1090 [1]
MS: 375(M^+, 6), 360(4), 346(1), 344(1), 319(100), 304(8), 122(8) [1]
^{1}H NMR: 0.80(3H, s, 3H-18), 1.20(3H, t, NCH_2CH_3), 3.29(3H, s, OCH_3) [1]
^{13}C NMR: [1]

Table 1

C-1	72.6	C-8	74.5	C-15	42.5
2	29.1	9	47.0	16	82.5
3	31.5	10	40.5	17	63.5
4	33.1	11	49.1	18	27.8
5	47.0	12	29.9	19	60.5
6	25.4	13	44.3	NCH_2	48.6
7	45.4	14	75.9	CH_3	13.3
				16-OCH_3	56.6

Pharm./Biol.: Lowers systemic arterial pressure. Possesses a ganglioblocking action. In high doses, prevents aconitine arrhythmia [2]

References

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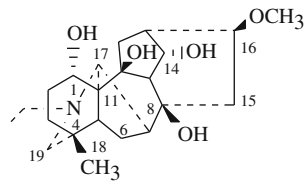
Karakolidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum*
$C_{22}H_{35}NO_5$: 393.2515
Mp: 222–224°C (MeOH), 181°C (dehydro), 186°C (pyr.) [1, 2]

IR: 3540, 3480, 3335, 1480, 1460, 1390, 1360, 1300, 1250, 1230, 1110, 1055, 993, 964, 945, 885, 770 [1–3]

MS *m/z*: 393(M^+), 376(100), 360, 337. 322 [1–3]

^{1}H NMR: 0.87(3H, s, 3H-18), 1.07(3H, t, J = 7, NCH_2CH_3), 3.28(3H, s, OCH_3), 4.60(1H, t, J = 5, H-14β) [1, 2]

Pharm./Biol.: LD_{50} 60 mg/kg (i/v., mice). Exhibits a brief hypotensive and gangioblocking and a weak antiarrhythmic action [3]

References

1. M.N. Sultankhodzhaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 129 (1973)
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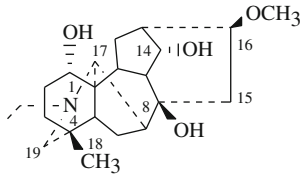
Karakoline (Vilmorrianine B)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum karakolicum, A. nasutum, Delphinium elisabethae, D. poltoratskii*

$C_{22}H_{35}NO_4$: 377.2566

Mp: 183–184°C (Me_2CO), 216°C (hydrobromide (EtOH–Et_2O)), 122°C (di Ac), 169°C (tri Ac), 181°C (didehydro) [1, 2]

$[\alpha]_D$ −10° (MeOH) [2]

IR: 3550, 3400–3000, 1100 [1, 2]

MS *m/z*: 377(M^+), 360(100), 344, 321, 306 [1, 2]

^{1}H NMR: 0.84(3H, s, 3H-18), 1.07(3H, t, J = 7, NCH_2CH_3), 3.29(3H, s, OCH_3), 4.16(1H, t, J = 4.5, H-14β) [1, 2]

^{13}C NMR: [3]

Table 1

C-1	72.6	C-9	47.0	C-17	63.5
2	29.1	10	40.5	18	27.8
3	31.5	11	49.1	19	60.5
4	33.1	12	29.9	N-CH_2	48.6
5	47.0	13	44.3	CH_3	13.3
6	25.4	14	75.9	16-OCH_3	56.6
7	45.4	15	42.5		
8	74.6	16	82.5		

Pharm./Biol.: LD_{50} 51.5 mg/kg (i/v, mice). Curaremimetic effect. Stimulates the smooth musculature of the horn of the uterus. Lowers arterial pressure, slows heart rate, depresses conduction, exhibits antiarrhythmic effect [4, 5]

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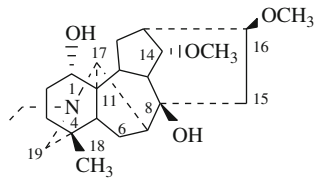
Karasamine

CAS Registry Number: 84714-33-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum karakolicum*
$C_{23}H_{37}NO_4$: 391.2722
Mp: 112°C (Me_2CO) [1, 2]
IR: 3590, 3180, 1100 [1, 2]
MS: 391(M^+), 374(100), 358(38) [1, 2]
^{1}H NMR: 0.86(3H, s, 3H-18), 1.03(3H, t, J = 7, NCH_2CH_3), 3.22, 3.30(each 3H, s, 2×OCH_3) [1, 2]
Pharm./Biol.: Peripheral, brief hypotensive, and ganglioblocking action [3]

References

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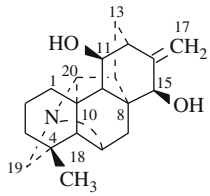
Kobusine

CAS Registry Number: 27530-78-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum talassicum*
$C_{20}H_{27}NO_2$: 313.2042
Mp: 272–274°C (Me_2CO) [1]
$[\alpha]_D$ +80° (MeOH) [1]
IR: 3470, 3090, 1660, 1475, 1456, 1445, 1415, 1385, 1350, 1317, 1290, 1280, 1230, 1210, 1167, 1140, 1120, 1090, 1055, 1035, 1010, 990, 965, 930, 900, 890, 867, 860, 836, 800, 745 [1]
MS *m/z*: 313(M^+, 100), 296(18), 285(11), 202(14), 149(11), 146(13) [1]
^{1}H NMR: 0.90(3H, s, 3H-18), 3.77(1H, br s, H-15α), 3.91(1H, d, J = 5, H-11α), 4.97, 5.07(each 1H, br s, 2H-17) [1, 2]

References

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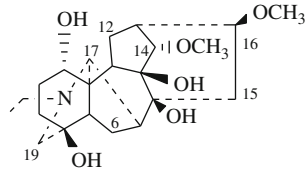
Lappaconidine

CAS Registry Number: 31000-13-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum leucostomum*
$C_{22}H_{35}NO_6$: 409.2464
Mp: 206–207°C (C_6H_6–MeOH), 197°C (tetra Ac.) [1, 2]
$[\alpha]_D$ +120° ($CHCl_3$) [1, 2]
Solubility: sol.$CHCl_3$, Me_2CO, MeOH
IR: 3540, 3430, 3390, 1460, 1380, 1130, 1080, 980, 917, 890, 690 [1–3]
MS *m/z*: 409(M^+, 5.3), 394(4.7), 392(100), 353(2.8) [1–3]
^{1}H NMR: 1.07(3H, t, J = 7, NCH_2CH_3), 3.26, 3.33(each 3H, s, 2×OCH_3) [1, 2]
^{13}C NMR: [4]

Table 1

C-1	72.5	C-9	77.6	C-17	63.1
2	28.9	10	36.3	18	–
3	33.5	11	50.4	19	60.4
4	70.7	12	23.1	NCH_2	46.5
5	48.2	13	48.4	CH_3	13.1
6	27.4	14	90.4	14-OCH_3	58.1
7	47.0	15	45.1	16-OCH_3	56.3
8	76.3	16	83.0		

Pharm./Biol.: LD_{50} 195 mg/kg (i/v, mice). Brief weak hypotensive, ganglioblocking, anti-inflammatory, and antiarrhythmic action [3]

References

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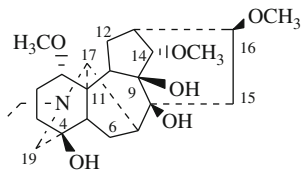
Lappaconine

CAS Registry Number: 23943-93-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum orientale*
$C_{23}H_{37}NO_6$: 423.2621
Mp: 96°C [1]
$[\alpha]_D$ +27° ($CHCl_3$) [1]
IR: 3550, 1610 [2]
MS *m/z*: 423(100), 408(8) [3]
^{1}H NMR: 1.07(3H, t, J = 7, NCH_2CH_3), 3.26, 3.28, 3.38(each 3H, s, 3×OCH_3) [4]
^{13}C NMR: [5]

Table 1

C-1	85.2	C-9	78.8	C-17	61.7
2	26.6	10	37.4	18	–
3	36.3	11	51.0	19	58.0
4	71.1	12	23.7	NCH_2	49.9
5	50.8	13	49.0	CH_3	13.5
6	26.9	14	90.3	1-OCH_3	56.5
7	47.8	15	44.7	14-OCH_3	58.0
8	75.7	16	83.1	16-OCH_3	56.1

X-ray: [6]

Pharm./Biol.: LD_{50} 142–195 mg/kg (i/v, mice). Weak hypotensive, ganglioblocking, and antiarrhythmic action [7, 8]

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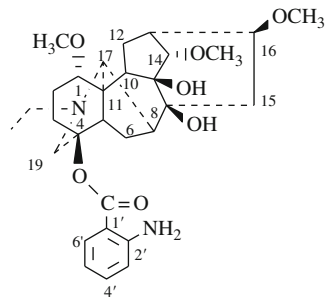
Lappaconitine

CAS Registry Number: 32854-75-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum leucostomum, A. orientale, A. paniculatum, A. septentrionale, A. talassicum*
$C_{32}H_{44}N_2O_8$: 584.3098

Mp: 217–218°C [1], 208°C (hydrochloride), 225°C (dec., hydrobromide), 253°C (perchlorate), 96°C (lappaconine) [1]

$[\alpha]_D$ +27° (EtOH) [1]

Solubility: sol.$CHCl_3$, MeOH

IR: 3560, 3540, 3295, 3265, 1700, 1686, 1588, 1527, 1518, 1445, 1380, 1320, 1290, 1270, 1235, 1140, 1130, 1090, 950, 897, 880, 770 [1]

MS *m/z*: 584(M^+, 3), 553(18), 523(5), 405(100), 390(86), 374(36), 360(21), 345(43), 178(29), 160(20) [1]

^{1}H NMR: 1.10(3H, t, J = 7, NCH_2CH_3), 2.12(3H, s, NAc), 3.19, 3.29(6H, 3H, s, 3×OCH_3), 6.83–7.60(H–Ar), 10.85(1H, br s, NHAc) [1]

^{13}C NMR: [2]

Table 1

C-1	84.2	C-12	24.2	14-OCH_3	57.9
2	26.2	13	49.0	16-OCH_3	56.1
3	31.9	14	90.2	Ar-C = O	167.7
4	84.7	15	44.9	Ar C-1′	115.9
5	48.6	16	82.9	2′	141.8
6	26.8	17	61.5	3′	120.4
7	47.6	18	–	4′	134.6
8	75.6	19	55.5	5′	122.6
9	78.6	NCH_2	49.9	6′	131.3
10	36.4	CH_3	13.5	HNCO	169.5
11	51.0	1-OCH_3	56.5	CH_3	25.6

X-ray: [3]

HPLC: [4]

Pharm./Biol.: Pronounced prolonged antiarrhythmic, local anaesthetic, analgesic, anti-inflammatory, and sedative action. Blocks the sodium ion current entering the cell. Belongs to the 1"D" group of antiarrhythmic drugs. The medicinal preparation Allapinine, patented in the USA, France, and Switzerland, has been created on the basis of lappaconitine [5, 6]. Diminished epileptiform activity [7].

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6. F.N. Dzhakhangirov, S.F. Sokolov, A.N. Verkhratskii, *Allapinine – A New Antiarrhythmic Drug of Plant Origin* [in Russian] (Fan, Tashkent, 1993)
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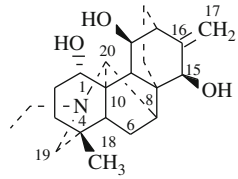
Lepenine

CAS Registry Number: 111524-32-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum barbatum, A. kirinense, A. turczaninowii, A. volubile*

$C_{22}H_{33}NO_3$: 359.246

Mp: 191–193°C [1, 2]

IR: 3500–3300 [1, 2]

MS *m/z*: 359(M^+, 66), 341(100), 330(27.5), 314(22), 313(25), 312(27.5), 300(39) [1, 2]

^{1}H NMR: 0.64(3H, s, 3H-18), 0.98(3H, t, J = 7, NCH_2CH_3), 3.69(1H, br s, H-20), 4.15(1H, br s, H-15a), 4.33(1H, d, J = 8, H-11a), 4.93, 5.40(each 1H, br s, 2H-17) [1, 2]

^{13}C NMR: [1]

Table 1

C-1	70.1	C-9	54.3	C-17	108.7
2	31.7	10	51.6	18	26.3
3	39.3	11	73.2	19	51.1
4	33.8	12	42.4	20	68.3
5	52.8	13	23.8	NCH_2	57.3
6	28.2	14	25.1	CH_3	13.8
7	47.9	15	77.9		
8	44.3	16	155.5		

Pharm./Biol.: LD_{50} 132.5 mg/kg (i/v, mice). Weak N-cholinolytic, membrane stabilizing, and antiarrhythmic action [3]

References

1. N. Batbayar, D. Batsuren, M.N. Sultankhodzhaev, Chem. Nat. Comp. **28**, 388 (1992)
2. W. Song, H. Li, D. Chen, Proc.CAMS and PUMC **2**, 48 (1987)
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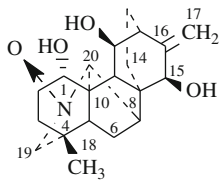
Lepenine N-Oxide

CAS Registry Number: 169134-44-5



Biological sources: *Aconitum kirinense*
$C_{22}H_{33}NO_4$: 375.2410
Mp: amorph. [1]
Solubility: very sol. H_2O, MeOH, EtOH, spar. sol., $CHCl_3$ [1]
IR: 3390–3340, 3080, 1695, 1650, 1597, 1280, 900 [1]
MS *m/z*: 375(M^+, 17), 359(50), 358(50), 357(33), 342(25), 341(67), 340(17), 331(33), 330(25), 329(42), 313(67), 312(100), 311(33), 300(30), 294(33), 284(33), 256(33) [1]
^{1}H NMR: 0.77(3 H, s, 3 H-18), 1.32(3 H, t, J = 7, NCH_2CH_3), 3.95(1 H, s, H-20), 4.14(1 H, s, H-15), 5.15, 4.91(each 1 H, br s) [1]
^{13}C NMR(CD_3OD): [1]

Table 1

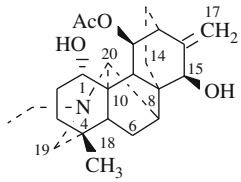
C-1	67.4	C-9	55.3	C-17	110.7
2	30.6	10	53.6	18	26.4
3	36.5	11	73.1	19	67.8
4	35.4	12	45.6	20	83.9
5	50.7	13	23.0	NCH_2	74.6
6	28.7	14	25.2	CH_3	8.0
7	48.0	15	77.8		
8	44.1	16	153.6		

References

1. A.A. Nishanov, M.N. Sultankhodzhaev, V.G. Kondrat'ev, Chem. Nat. Comp. **29**, 651 (1993)

Lepetine

CAS Registry Number: 111509-08-1



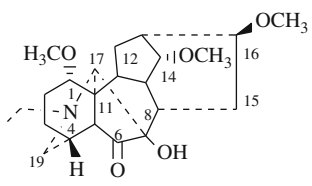
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum barbatum*
$C_{24}H_{35}NO_4$: 401.2566
Mp: 137–139°C [1, 2]
^{1}H NMR: 0.92(3H, s, 3H-18), 1.01(3H, t, J = 7, NCH_2CH_3), 2.03(3H, s, Ac), 3.68(1H, br s), 4.23(1H, m), 4.92, 5.17(each 1H, br s, 2H-17) [1, 2]

References

1. N. Batbayar, D. Batsuren, M.N. Sultankhodzhaev, Chem. Nat. Comp. **28**, 388 (1992)
2. W. Song, H. Li, D. Chen, Proc. CAMS and PUMC **2**, 48 (1987)

Leuconine

CAS Registry Number: 192386-06-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum leucostomum, A. septentrionale*
$C_{23}H_{35}NO_5$: 405.2506
Mp: 195–197°C [1]
Solubility: sol. $CHCl_3$, MeOH
IR: 3460, 1740 [1]
MS *m/z*: 405(M^+, 22), 390(5.6), 374(100), 362(26.8), 346(32) [1]
^{1}H NMR: 1.01(3H, t, J = 7.5, NCH_2CH_3), 3.25, 3.32(6H, 3H, s, 3×OCH_3), 3.65(1H, t, J = 4.5, H-14β) [1]
^{13}C NMR: [1]

Table 1

C-1	84.9	C-9	40.2	C-17	62.4
2	26.3	10	46.0	18	–
3	30.0	11	44.8	19	51.1
4	35.0	12	29.0	NCH_2	49.5
5	56.8	13	35.8	CH_3	14.1
6	222.6	14	84.9	1-OCH_3	56.2
7	85.0	15	23.0	14-OCH_3	57.2
8	39.1	16	83.2	16-OCH_3	56.3

Pharm./Biol.: Only slightly toxic. In anesthetized cats, in doses of 15–20 mg/kg, it briefly lowers the arterial pressure, blocks the conduction of impulses in vegetative ganglia, lowers the frequency of cardiac contractions, and depressed conductivity [2]

References

1. V.A. Tel'nov, S.K. Usmanova, Chem. Nat. Comp. **28**, 470 (1992)
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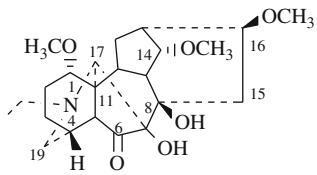
Leucostine

CAS Registry Number: 192386-08-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum septentrionale*
$C_{23}H_{35}NO_6$: 390.2284
Mp: amorph. [1]
IR: 3488, 2928, 1744, 1448, 1376, 1096, 880 [1]
MS *m/z*: 421(M^+, 13), 406(12), 403(28), 391(32), 390(100), 376(14), 362(33) [1]
^{1}H NMR: 1.03(3H, t, J = 7.1, N-CH_2-CH_3), 1.53(1H, m, H-3a), 1.67(1H, dd, J = 14.3, 5.4, H-15β), 1.8–2.05(3H, m, H-3β, H-9, H-10), 2.07–2.28(5H, m, H-12, H-5, H-4, H-2β), 2.30–2.50(3H, m, H-2a, 2H-13), 2.55–2.90(5H, m, 2H-19, N-CH_2CH_3, H-15a), 2.85(2H, br s, OH-7, OH-8), 3.14(1H, dd, H-1, J = 9.2, 6.2), 3.20–3.48(2H, m, H-16, H-17), 3.27, 3.32, 3.37(each 3H, s, 3×OCH_3), 3.68(1H, t, H-14, J = 4.7, 4.7) [1]
^{13}C NMR: [1]

Table 1

C-1	84.2	C-9	45.6	C-17	63.2
2	26.0	10	45.9	19	50.8
3	29.4	11	43.8	N-CH_2	49.2
4	35.4	12	28.4	CH_3	14.1
5	57.3	13	37.5	1-OCH_3	56.1
6	220.0	14	83.3	14-OCH_3	57.8
7	85.7	15	34.8	16-OCH_3	56.4
8	75.3	16	81.8		

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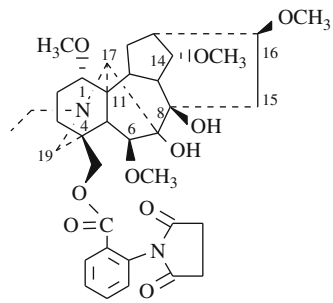
1. E.C. Zinurova, T.V. Khakimova, L.V. Spirihin, M.S. Yunusov, Chem. Nat. Comp. **36**, 387 (2000)

Lycaconitine

CAS Registry Number: 25867-19-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum rubicundum, A. umbrosum*

$C_{36}H_{48}N_2O_{10}$: 668.3309

Mp: amorph., 201°C (dec., hydroiodide) [1, 2]

$[\alpha]_D$ +42° [1, 2]

Solubility: sol. $CHCl_3$, MeOH, Me_2CO, EtOH

IR: 3480, 1720 [1, 2]

MS *m/z*: 668(M^+, 6), 653(10), 650(5), 637(100), 635(20), 621(3), 434(2), 406(2), 390(2), 256(2), 248(5), 239(2), 219(2), 202(2), 174(4), 149(4) [1]

^{1}H NMR: 1.03(3H, t, J = 7, NCH_2CH_3), 2.84(4H, s, -CH_2CH_2-), 3.19, 3.26, 3.34(3H, 3H, 6H, s, 4×OCH_3), 3.52(1H, t, J = 4.5, H-14β), 3.79(1H, s), 3.91(1H, s), 4.10(1H, br s), 7.15, 7.95(each 1H, d, J = 7, H–Ar), 7.52(2H, t, J = 7.5, H–Ar) [1, 2]

Pharm./Biol.: LD_{50} 2.6, 31.0 mg/kg (i/v, oral, mice). Pronounced curaremimetic action, hypotensive effect [3]

References

1. A.A. Nishanov, M.N. Sultankhodzhaev, M.S. Yunusov, V. G. Kondrat'ev, Chem. Nat. Comp. **27**, 349 (1991)
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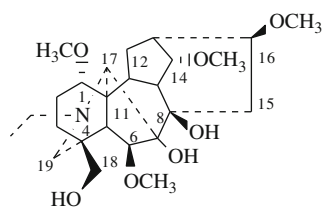
Lycoctonine (Delsine, Royaline)

CAS Registry Number: 26000-17-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum barbatum, A. orientale, A. rubicundum, A. septentrionale, Consolida orientalis, Delphinium corymbosum, D. dictyocarpum, D. elisabethae, D. iliense, D. oreophilum, D. poltoratskii, D. retropilosum, D. semibarbatum, D. speciosum, D. thamarae, D. ternatum*

$C_{25}H_{41}NO_7$: 467.2883

Mp: 136–140°C (EtOH) [1], 185°C (hydrobromide), 165°C (hydrochloride), 189°C (hydroiodide) [1, 2]

$[\alpha]_D$ +52° (abs. EtOH) [1, 2]

Solubility: sol. $CHCl_3$, MeOH

IR: 3520, 3440, 3350, 1470, 1405, 1390, 1336, 1304, 1265, 1223, 1197, 1167, 1100, 1015, 995, 965, 865, 820, 763, 720 [1]

MS *m/z*: 467(M^+, 4.5), 452(26), 450(3), 449(5), 436(100), 434(1.5), 418(6) [1, 2]

^{1}H NMR: 1.02(3H, t, J = 7, NCH_2CH_3), 3.19, 3.27, 3.33, 3.40(each 3H, s, 4×OCH_3) [1, 2]

^{13}C NMR: [3, 4]

Table 1

C-1	84.2	C-10	38.0	C-19	52.9
2	26.1	11	48.9	NCH_2	51.1
3	31.6	12	28.8	CH_3	14.1
4	38.6	13	46.1	1-OCH_3	55.7
5	43.3	14	84.0	6-OCH_3	57.7
6	90.6	15	33.7	14-OCH_3	58.0
7	88.3	16	82.7	16-OCH_3	56.2
8	77.5	17	64.8		
9	49.7	18	67.6		

Pharm./Biol.: Hypotensive and ganglioblocking action [5]

References

1. V.A. Tel'nov, S.K. Usmanova, N.D. Abdullaev, Chem. Nat. Comp. **29**, 346 (1993)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(4), 596 (1996)
3. S.W. Pelletier, R.S. Sawhney, H.K. Desai, N.V. Mody, J. Nat. Prod. **43**, 395 (1980)
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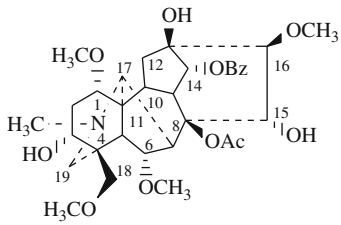
Mesaconitine

CAS Registry Number: 2752-64-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum altaicum, A. firmum, A. sczukinii, A. tauricum, A. tokii, A. tuberosum*

$C_{33}H_{45}NO_{11}$: 631.2993

Mp: 208–209°C (MeOH) [1, 2]

$[\alpha]_D$ +30° ($CHCl_3$) [1, 2]

Solubility: sol. $CHCl_3$

UV: 232(4.25) [1]

IR: 3515, 3412, 1713, 1604, 1587, 1495, 1464, 1453, 1400, 1380, 1328, 1280, 1260, 1245, 1220, 1210, 1192, 1156, 1123, 1100, 1033, 990, 960, 944, 925, 900, 880, 855, 840, 800, 773, 718 [2, 3]

MS *m/z*: 631(M^+, 0.47), 613(0.56), 600(3.4), 571(15.4), 556(13), 554(13), 540(100), 524(34), 522(8.4) [2, 3]

^{1}H NMR: 1.36(3H, s, OAc), 2.33(3H, s, NCH_3), 2.87(1H, br s, H-17), 3.15, 3.27, 3.29, 3.73(each 3H, s, 4×OCH_3), 3.32(1H, d, J = 5.3, H-16α), 3.59(2H, dd, J = 9, H-18), 3.72(1H, dd, J = 10.5, H-3), 3.94(1H, s, OH-13), 4.03(1H, d, J = 6.5, H-6β), 4.35(1H, d, J = 25, OH-15), 4.45(1H, dd, J = 5.5; 2.5, H-15β), 4.86(1H, d, J = 5.0, H-14β) [4]

^{13}C NMR: [5]

Table 1

C-1	83.2	C-11	50.0	1-OCH_3	56.2
2	35.9	12	34.2	6-OCH_3	57.9
3	70.8	13	74.1	16-OCH_3	61.0
4	43.5	14	78.9	18-OCH_3	59.0
5	46.5	15	78.9	CO	172.3
6	82.4	16	90.1	CH_3	21.4
7	44.3	17	62.2	Ar-C = O	166.0
8	91.8	18	75.8	Ar C-1	129.9
9	43.8	19	49.4	2,6	129.6
10	40.9	NCH_3	42.4	3,5	128.6
				4	133.2

HPLC: [6]

Pharm./Biol.: LD_{50} 0.085, 0.024, 0.019, 0.018 (i/v, mice, rats, rabbits, dogs). Neurocardiotoxin. Superior to aconitine in toxicity and arrhythmogenic action but inferior in the duration of the effect. Interacts selectively with the sodium channels of electrostimulable formations, changing their basic characteristics – selectivity, activation, inactivation [3, 7]

References

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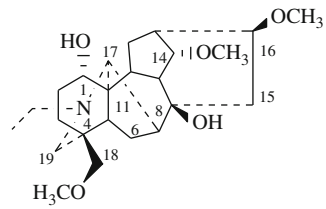
14-Methylisotalatizidine



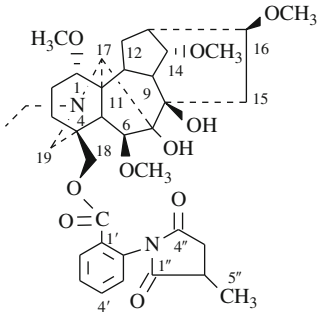
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium confusum*
$C_{24}H_{39}NO_5$: 421.2828
Mp: 136–137°C (Me_2CO) [1]
IR: 3560, 3210, 1120 [1]
MS *m/z*: 421(M^+, 6.3), 406(30), 404(100), 365(2.5), 334(15) [1]
^{1}H NMR: 1.06(3H, t, J = 7, NCH_2CH_3), 3.28, 3.30, 3.36(each 3H, s, 3×OCH_3) [1]
Pharm./Biol.: Only slightly toxic. Hypotensive and ganglioblocking action [2]

References

1. Z.M. Vaisov, M.S. Yunusov, Chem. Nat. Comp. **23**, 725 (1987)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(4), 596 (1996)

Methyllycaconitine

CAS Registry Number: 21019-30-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium biternatum, D. confusum, D. corymbosum, D. dictyocarpum, D. elisabethae, D. flexuosum, D. freynii, D. grandiflorum, D. oreophilum, D. poltoratskii, D. pyramidatum, D. puniceum, D. retropilosum, D. rotundifolium, D. semibarbatum, D. speciosum, D. ternatum, D. thamarae*
$C_{37}H_{50}N_2O_{10}$: 682.3466
Mp: amorph., 201°C (hydroiodide) [1–3]
$[\alpha]_D$ +49° (EtOH) [1–3]
Solubility: sol. $CHCl_3$, MeOH, Me_2CO [1]
IR: 3540–3450, 1730–1715, 1612, 1500, 1460, 1395, 1300, 1270, 1200, 1140, 1100 [2, 3]
MS *m/z*: 682(M^+), 667, 651(100), 649 [2, 3]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 1.47(3H, d, J = 6, CH-CH_3), 3.28, 3.38, 3.42, 3.45(each 3H, s, 4×OCH_3), 3.98(1H, dd, J = 4.1, H-14β), 4.15(1H, d, J = 1, H-6α), 7.54–8.01(H–Ar) [2, 3]
^{13}C NMR: [3]

Table 1

C-1	83.8	C-13	46.2	Ar-C = O	164.1
2	26.0	14	83.9	Ar-C-1′	127.4
3	34.0	15	35.3	2′	133.3
4	37.6	16	82.7	3′	129.0
5	43.5	17	64.3	4′	133.3
6	90.9	18	69.6	5′	130.8
7	88.4	19	52.7	6′	130.0
8	77.5	N-CH_2	50.9	1″	179.1
9	50.9	CH_3	13.8	2″	37.0
10	38.3	1-OCH_3	55.5	3″	35.3
11	49.1	6-OCH_3	57.7	4″	175.0
12	28.9	14-OCH_3	58.3	5″	16.4
		16-OCH_3	56.1		

HPLC: [4]
Pharm./Biol.: Active curaremimetic agent. Exerts its effect on intravenous and intraventricular introduction [5, 6]. Inhibitor of the nicotinic acetylcholinic receptors (nAChRs) [7]

References

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2. L.V. Beshitaishvili, M.N. Sultankhodzhaev, M.S. Yunusov, K.S. Mudzhiri, Soobshch. AN GSSR **79**, 617 (1975)
3. S.W. Pelletier, O.D. Dailey, N.V. Mody, J.D. Olsen, J. Org. Chem. **46**, 3284 (1981)
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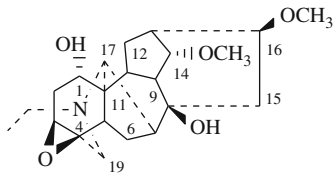
7. J.M. Jacuno, J.S. Harwood, N.-H. Lin, J.E. Campbell, J.P. Sullivan, M.W. Holladay, J. Nat. Prod. **59**, 707 (1996)

Monticamine

CAS Registry Number: 81047-05-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum, A. monticola*
$C_{22}H_{33}NO_5$: 391.2359
Mp: 163–164°C (Et_2O–Me_2CO), 198°C (Ac), 205°C (hydrochloride dihydro) [1]
$[\alpha]_D$ +4° [1]
Solubility: sol. $CHCl_3$, MeOH
IR: 3560, 3350–3120, 1105 [1]
MS *m/z*: 391(M^+, 90), 376(72), 374(20), 360(100) [1]
^{1}H NMR: 0.84(3H, t, J = 7, NCH_2CH_3), 3.14, 3.26(each 3H, s, 2×OCH_3), 3.54(1H, t, J = 5, H-14β) [1]
^{13}C NMR: [1]

Table 1

C-1	77.0	C-9	45.3	C-17	64.5
2	32.3	10	37.2	18	–
3	57.7	11	53.6	19	57.7
4	58.7	12	30.6	NCH_2	47.6
5	46.3	13	42.3	CH_3	13.3
6	25.9	14	84.6	14-OCH_3	57.6
7	45.5	15	42.8	16-OCH_3	56.1
8	74.4	16	82.6		

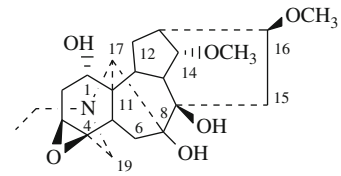
Pharm./Biol.: LD_{50} 250 mg/kg, 735 mg/kg (i/v, i/p, mice). Weak hypotensive, N-cholinoblocking, and antiarrhythmic effect [2]

References

1. E.F. Ametova, M.S. Yunusov, V.E. Bannikova, N.D. Abdullaev, V.A. Tel'nov, Chem. Nat. Comp. **17**, 345 (1981)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(4), 596 (1996)

Monticoline

CAS Registry Number: 81037-22-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum monticola*
$C_{22}H_{33}NO_6$: 407.2308
Mp: 166–167°C (Me_2CO) [1]
$[\alpha]_D$ +15° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$, MeOH
IR: 3500, 3430, 3180, 1100 [1]
MS *m/z*: 407(M^+, 62), 392(100), 376(11), 374(3), 360(15) [1]
^{1}H NMR: 0.92(3H, t, J = 7, NCH_2CH_3), 3.13, 3.26(each 3H, s, 2×OCH_3), 3.56(1H, t, J = 5, H-14β) [1]
^{13}C NMR: [1]

Table 1

C-1	77.3	C-9	46.6	C-17	65.7
2	31.8	10	37.1	18	–
3	58.0	11	54.4	19	53.2
4	59.5	12	30.5	NCH_2	50.0
5	45.7	13	42.0	CH_3	14.1
6	34.2	14	84.6	14-OCH_3	57.6
7	86.6	15	36.0	16-OCH_3	56.2
8	76.9	16	82.5		

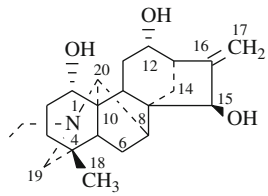
Pharm./Biol.: LD_{50} 495 mg/kg (i/v, mice). Weak hypotensive and ganglioblocking and pronounced antiarrhythmic action [2]

References

1. E.F. Ametova, M.S. Yunusov, V.E. Bannikova, N.D. Abdullaev, V.A. Tel'nov, Chem. Nat. Comp. **17**, 345 (1981)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(4), 596 (1996)

Napelline (Luciculine)

CAS Registry Number: 5008-52-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum altaicum, A. baicalense, A. czekanovskyi, A. karakolicum, A. soongoricum, A. volubile*

$C_{22}H_{33}NO_3$: 359.246

Mp: 166°C, 229°C (hydrobromide), 238°C (perchlorate) [1–3]

IR: 3500–3380, 1660, 1460, 1448, 1397, 1280, 1230, 1175, 1130, 1105, 1070, 1045, 1024, 915 [1, 2]

MS *m/z*: 359(M^+, 100), 344(6), 342(11), 341(10), 330(4), 300(7) [1, 2]

^{1}H NMR: 0.72(3H, s, 3H-18), 1.01(3H, t, J = 7, NCH_2CH_3), 5.05, 5.28(each 1H, br s, 2H-17) [1–4]

^{13}C NMR: [5]

Table 1

C-1	70.5	C-9	38.2	C-17	107.4
2	31.9	10	53.5	18	26.4
3	32.4	11	29.4	19	57.7
4	34.7	12	76.2	20	66.2
5	49.4	13	49.9	NCH_2	51.6
6	23.6	14	38.4	CH_3	13.3
7	45.0	15	77.8		
8	50.3	16	160.8		

Pharm./Biol.: LD_{50} 87.5 mg/kg (i/v, mice). Hypotensive, N-cholinolytic, anti-inflammatory, and pronounced antiarrhythmic action [6]

References

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2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(4), 596 (1996)
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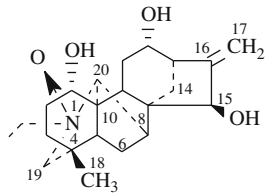
5. Z. Chen, A. Lao, H. Wang, S. Hong, Heterocycles **26**, 1455 (1987)
6. F.N. Dzhakhangirov, F.S. Sadritdinov, DAN UzSSR (3), 50 (1977)

Napelline N-Oxide (Flavamine)

CAS Registry Number: 74047-88-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum soongoricum*

$C_{22}H_{33}NO_4$: 375.2410

Mp: 197–199°C

IR: 3500–3400 [1]

MS *m/z*: 375(M^+), 359, 358, 357 [1]

^{1}H NMR: 0.80(3H, s, 3H-18), 1.32(3H, t, J = 7, NCH_2CH_3), 5.09, 5.25(each 1H, d, J = 1.5, 2H-17) [1]

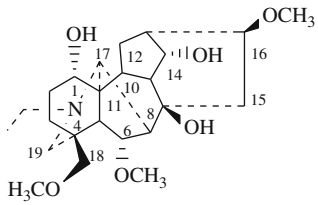
Pharm./Biol.: LD_{50} 725 mg/kg (i/v., mice). Feebly toxic, feebly active. Weak antiarrhythmic and N-cholinoblocking action [2]

References

1. M.N. Sultankhodzhaev, L.V. Beshitaishvili, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 731 (1979)
2. F.N. Dzhakhangirov, M.N. Sultankhodzhaev, B. Tashkhodzhaev, B.T. Salimov, Chem. Nat. Comp. **33**(N2), 190 (1997)

Neoline (Bullatine B)

CAS Registry Number: 466-26-2



Biological sources: *Aconitum karakolicum, A. firmum, A. sczukinii, A. soongoricum, A. tauricum, A. tuberosum*

$C_{24}H_{39}NO_6$: 437.2777

Mp: 162 °C, 180 °C (hydrochloride), 215 °C (hydrobromide) [1]

$[\alpha]_D$ +10° (Me_2CO) [1]

Solubility: $CHCl_3$, MeOH

IR: 3575, 3535, 3300, 1492, 1455, 1404, 1363, 1315, 1296, 1275, 1250, 1233, 1218, 1210, 1185, 1165, 1115, 1105, 1085, 1045, 990, 957, 934, 921, 900, 880, 865 [1, 2]

MS *m/z*: 437(M^+, 19), 422(26), 420(100), 404(15), 381(7), 350(11) [1, 2]

^{1} H NMR: 1.03(3 H, t, J = 7, NCH_2CH_3), 3.25(9 H, s, 3×OCH_3) [1, 3]

^{1} H NMR: [3, 4]

Table 1

C-1	72.1	C-9	48.3	C-17	63.3
2	29.5	10	44.9	18	80.3
3	29.9	11	49.6	19	57.2
4	38.2	12	29.8	NCH_2	48.2
5	44.3	13	40.7	CH_3	13.0
6	83.3	14	75.9	6-OCH_3	57.8
7	52.3	15	42.7	16-OCH_3	56.3
8	73.4	16	82.3	18-OCH_3	59.1

Pharm./Biol.: LD_{50} 69 mg/kg (i/v, mice). Hypotensive, ganglioblocking, curaremimetic action [2]

References

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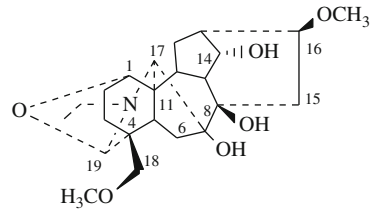
Nevadensine

CAS Registry Number: 100447-59-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium confusum*

$C_{23}H_{35}NO_6$: 421.2464

Mp: amorph.

IR: 3520–3380, 1465, 1378, 1365, 1305, 1230, 1200, 1180, 1130, 1100, 1070, 1055, 1045, 997, 950, 935, 898, 870, 830, 815, 785, 770, 755 [1, 2]

MS *m/z*: 421(M^+), 406, 403, 390, 388, 365, 334 [1, 2]

^{1}H NMR: 1.04(3H, t, J = 7, NCH_2CH_3), 3.27, 3.31(each 3H, s, 2×OCH_3) [1, 2]

^{13}C NMR: [3]

Table 1

C-1	85.3	C-9	46.7	C-17	64.4
2	25.9	10	43.9	18	73.9
3	22.3	11	47.9	19	69.0
4	42.7	12	27.3	NCH_2	47.9
5	36.7	13	38.9	CH_3	14.1
6	32.5	14	75.5	16-OCH_3	56.6
7	86.7	15	35.3	18-OCH_3	59.5
8	74.1	16	81.9		

References

1. Z.M. Vaisov, M.S. Yunusov, Chem. Nat. Comp. **23**, 725 (1987)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(4), 596 (1996)
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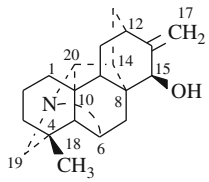
Nominine (Nomibase I, 11-Deoxykobusine)

CAS Registry Number: 120991-21-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: Aconitum zeravschanicum

$C_{20}H_{27}NO$: 297.2093

Mp: 258–259°C (EtOH) [1–3]

$[\alpha]_D$ +53° [1, 2]

IR: 3150, 1655, 1467, 1440, 1380, 1340, 1315, 1297, 1277, 1252, 1238, 1227, 1205, 1165, 1154, 1134, 1117, 1085, 1048, 1037, 1015, 985, 945, 937, 884, 855, 827, 795, 744 [1, 2]

MS *m/z*: 297(M^+, 100), 282(6.9), 280(5.5), 269(8.3), 160(12.5), 146(34.7), 105(15), 91(25) [1, 2]

^{1}H NMR: 0.89(3H, s, 3H-18), 2.28(1H, d, J = 12, H-19α), 2.42(1H, s, H-20), 2.45(1H, d, J = 12, H-19β), 3.15(1H, br s, H-6), 3.90(1H, s, H-15α), 4.88(2H, br s, 2H-17) [1–4]

^{13}C NMR: [5]

Table 1

C-1	33.3	C-8	45.7	C-15	74.9
2	19.8	9	43.8	16	156.8
3	34.2	10	49.7	17	108.3
4	38.0	11	27.1	18	28.9
5	61.2	12	34.0	19	62.8
6	65.4	13	32.9	20	71.8
7	27.0	14	44.0		

Pharm./Biol.: LD_{50} 68 mg/kg (i/v, mice). Membrane stabilizing, local anaesthetic, anti-inflammatory, and antiarrhythmic action [2]

References

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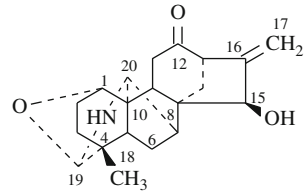
Norsongoramine

CAS Registry Number: 78982-16-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium thamarae*

$C_{20}H_{25}NO_3$: 327.1834

Mp: 286–288°C (Me_2CO) [1]

IR: 3530, 3450, 1710 [1]

MS *m/z*: 327(M^+, 28), 310(23), 299(7), 281(100) [1]

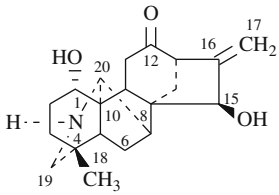
^{1}H NMR: 1.12(3H, s, 3H-18), 4.63, 4.85(each 1H, br s, 2H-17) [1]

References

1. L.V. Beshitaishvili, M.N. Sultankhodzhaev, K.S. Mudzhiri, M.S. Yunusov, Chem. Nat. Comp. **17**, 156 (1981)

Norsongorine

CAS Registry Number: 29722-71-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum monticola, A. soongoricum*

$C_{20}H_{27}NO_3$: 329.1991

Mp: 284–286°C (dec., MeOH) [1]

$[\alpha]_D$ −86° (MeOH) [1]

IR: 3530, 3450, 1710 [1, 2]

MS *m/z*: 329(M^+, 28), 310(23), 299(7), 281(100), 271(29) [1, 2]

^{1}H NMR: 1.12(3H, s, 3H-18), 4.63, 4.85(each 1H, br s, 2H-17) [1, 2]

Pharm./Biol.: LD_{50} 150 mg/kg (i/v, mice). Hypotensive, weak ganglioblocking, and pronounced antiarrhythmic action [2]

References

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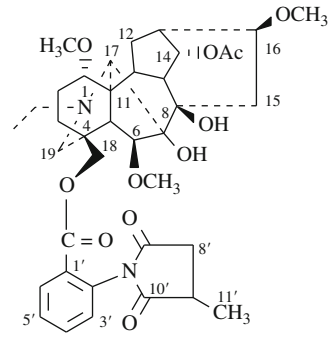
Nudicauline

CAS Registry Number: 119347-24-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium elatum, D. retroptlosum*

$C_{38}H_{50}N_2O_{11}$: 710.3415

Mp: amorph., 219°C (perchlorate) [1]

IR: 3470, 2940, 1730, 1600, 1500, 1460, 1398, 1279, 1260, 1198, 1145, 1100 [1]

MS *m/z*: 710(M^+, 4), 695(11), 692(18), 680(42), 679(100), 677(27), 661(77), 633(13.5), 631(9.6), 386(4), 216(35), 188(11.5), 146(7.7), 71(5.8) [1]

^{1}H NMR: 1.00(3H, t, J = 7, NCH_2CH_3), 1.39(3H, d, J = 7, CH-CH_3), 2.00(3H, s, Ac), 3.17, 3.25, 3.28(each 3H, s, 3×OCH_3), 4.01(2H, s, 2H-18), 4.65(1H, t, J = 5, H-14β) [1]

^{13}C NMR: [2]

Table 1

C-1	83.8	C-14	75.9	OCO	164.0
2	26.0	15	33.7	1′	126.9
3	32.0	16	82.3	2′	133.0
4	37.5	17	64.5	3′	130.0
5	42.5	18	69.3	4′	131.0
6	90.5	19	52.2	5′	133.7
7	88.2	NCH_2	51.0	6′	129.4
8	77.4	CH_3	14.1	7′	175.8
9	49.9	1-OCH_3	55.8	8′	35.2
10	38.1	6-OCH_3	58.1	9′	37.0
11	48.9	16-OCH_3	56.2	10′	179.8
12	28.1	CO	171.9	11′	16.4
13	45.7	CH_3	21.5		

HPLC: [3]

Pharm./Biol.: LD_{50} 1.75 mg/kg, 38 mg/kg (i/v, oral, mice). Pronounced curaremimetic action. More active than lycaconitine and methyllycaconitine [4]

References

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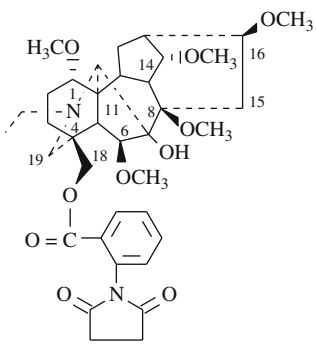
Oreaconine

CAS Registry Number: 144049-69-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum orientale*

$C_{37}H_{50}N_2O_{10}$: 682.3452

Mp: amorph. [1]

IR: 3501, 1720, 1605, 1585, 1260, 1100, 770 [1]

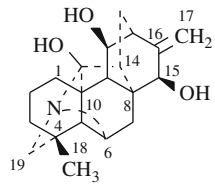
MS *m/z*: 682(M^+, 2), 681(1), 667(3.9), 651(100), 650(47), 635(31), 619(20), 589(13), 202(50), 174(17), 146(24) [1]

^{1}H NMR: 0.98(3H, t, J = 7.5, N–CH_2–CH_3), 3.20, 3.28, 3.38(3H, 6H, 6H, s, 5×OCH_3), 3.45(1H, dd, J = 4.5, 1.0, H-14β), 3.62(1H, br s, H-6α), 7.25–8.09(4H, m, Ar–H) [1]

References

1. B.T. Salimov, Y.G. Mil'grom, N. Kirimer, U.A. Abdullaev, K.H.C. Baser, Chem. Nat. Comp. **30**, 776 (1994)

Orgetine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum orientale*

$C_{20}H_{27}NO_3$: 329.1991

Mp: 280–282°C [1]

$[\alpha]_D$ +40° (EtOH) [1]

IR: 3500–3300 [1]

MS *m/z*: 329(M^+, 100) [1]

^{1}H NMR: 1.28(3H, s, 3H-18), 3.00(1H, d, J = 12), 3.82(1H, s, H-15), 3.97(1H, d, J = 5, H-11α), 5.02, 5.05(each 1H, br s, H-17b, H-17a) [1]

^{13}C NMR: [1]

Table 1

C-1	30.6	C-8	47.2	C-15	73.2
2	19.6	9	54.5	16	149.8
3	35.9	10	50.2	17	114.8
4	37.9	11	70.6	18	27.7
5	61.9	12	41.2	19	60.5
6	67.8	13	41.4	20	97.4
7	29.5	14	40.7		

References

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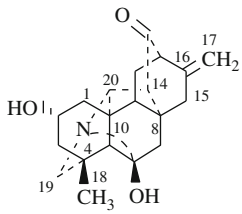
Panicudine

CAS Registry Number: 178451-93-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum paniculatum*
$C_{20}H_{25}NO_3$: 327, 18133
Mp: 249–250°C (EtOH–$CDCl_3$–C_6H_{12}) [1]
UV: 300, 205 [1]
IR: 3405, 2931, 1718, 1650, 1423, 1342, 1278, 1219, 1171, 1143, 1066, 1037, 1015, 965, 947, 902, 867, 822 [1]
MS *m/z*: 327(M^+, 100), 310(32), 299(14), 292(6), 254(12), 240(7), 224(7), 191(15), 190(13), 175(15), 176(16), 160(60), 148(10), 128(12), 118(32), 105(18), 91(30), 84(11), 77(18), 55(18) [1]
^{1}H NMR: 1.29(3H, s, 3H-18), 2.20(1H, s, J = 5, H-14), 2.22, 2.52(each 1H, dt, J = 18, 1.5, 2H-15), 2.74(1H, br d, J = 4, H-12), 2.95, 3.12(each 1H, d, J = 11.5, 2, 2H-19), 3.49(1H, s, H-20), 4.02(1H, m, J = 10, H-2β), 4.76, 4.87(each 1H, $W_{1/2}$ = 4.2, 2H-17) [1]
^{13}C NMR: [1]

Table 1

C-1	34.9	C-8	44.2	C-15	34.0
2	66.1	9	49.7	16	144.9
3	43.3	10	49.7	17	110.3
4	37.7	11	23.4	18	32.0
5	62.5	12	54.0	19	61.9
6	99.7	13	210.8	20	70.2
7	44.4	14	61.9		

References

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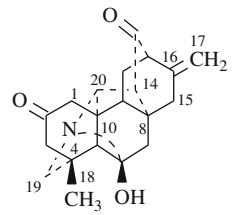
Paniculadine

CAS Registry Number: 188904-81-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum paniculatum*
$C_{20}H_{23}NO_3$: 325.1672
Mp: 276–278°C (Me_2CO) [1]
UV: 301 (5.11) [1]
IR: 3194, 2952, 2941, 2923, 2907, 2877, 1717, 1708, 1651, 1458, 1421, 1352, 1339, 1293, 1268, 1218, 1164, 1032, 1010, 915, 862 [1]
MS *m/z*: 325(M^+, 100), 310(5), 308(4), 297(26), 282(5), 270(13), 269(28), 254(10), 242(14), 240(11), 224(25), 192(10), 191(17), 190(10), 176(25), 175(10) [1]
^{1}H NMR: 1.50(3H, s, 3H-18), 1.59(2H, m), 1.88(2H, s), 1.97(1H,s), 2.00(2H,s), 2.05(1H, s), 2.17(2H, s), 2.20(3H, s), 2.05(1H, s), 2.17(2H, s), 2.20(3H, s), 2.25–2.45(3H, m), 2.63(1H, s), 2.85(1H, t, J = 7, H-12), 3.32(1H, d, J = 12, H-19a), 4.62, 4.79(each 1H, s, 2H-17) [1]
^{13}C NMR: [1]

Table 1

C-1	43.7	C-8	44.7	C-15	32.2
2	210.1	9	48.6	16	143.7
3	52.4	10	54.8	17	110.6
4	43.9	11	23.2	18	30.4
5	61.0	12	53.2	19	63.2
6	99.0	13	210.0	20	71.8
7	44.1	14	61.1		

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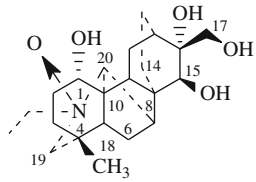
1. I.A. Bessonova, Sh.A. Saidkhodjaeva, Chem. Nat. Comp. **32**, 561 (1996)

Paniculamine

CAS Registry Number: 174545-79-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum paniculatum*
$C_{22}H_{36}NO_5$: 393.2584
Mp: 222–224°C (C_5H_5N) [1]
IR: 3600–3025, 1460, 1338, 1255, 1190, 1150, 1106, 1060, 1020, 950, 920 [1]
MS *m/z*: 393(M^+, 7), 377(84), 376(36), 375(27), 360(37), 349(20), 348(33), 347(34), 346(44), 330(29), 319(31), 318(73), 302(12), 286(44), 258(16), 242(15), 186(100), 158(25), 143(21), 131(23), 122(62), 117(30), 105(35), 91(65), 79(41), 67(33), 58(13), 55(62), (M^+-16) 377.25524 [1]
^{1}H NMR: 0.82(3H, s, 3H-18), 1.33(3H, t, J = 7.5, N–CH_2–CH_3), 2.78(1H, q, J = 7.5, H-21), 3.00–3.40(1H, m, H-21), 3.11, 3.36(each 1H, d, J = 13, 2H-19), 3.67, 3.90(each 1H, d, J = 12, 2H-17), 3.97–4.10(3H, H-1, H-15, H-20) [1]
X-ray: [1]

References

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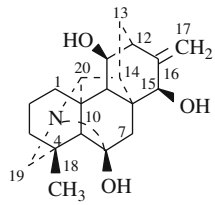
Pseudokobusine

CAS Registry Number: 174545-79-0 27901-01-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum talassicum*
$C_{20}H_{27}NO_3$: 329.1991
Mp: 268–270°C (Me_2CO), 307°C (hydrochloride), 146°C (di Ac) [1, 2]
IR: 3400–3300, 1390, 1170, 1135, 1100, 1033, 1006, 975, 960, 920, 864, 840 [1]
MS *m/z*: 329(M^+, 100), 314(15), 313(12), 312(32), 311(18), 301(42) [1, 3]
^{1}H NMR: 1.34(3H, s, 3H-18), 3.87(1H, s, H-15α), 4.01(1H, d, J = 5, H-11α), 5.07, 5.17(each 1H, br s, 2H-17) [1–3]

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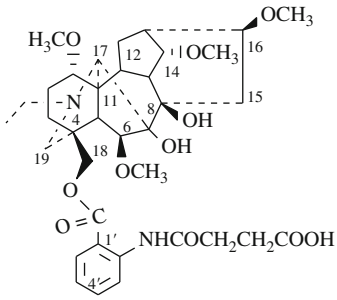
Puberaconitine

CAS Registry Number: 69787-06-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum rubicundum*
$C_{36}H_{50}N_2O_{11}$: 686.3415
Mp: amorph. [1]
$[\alpha]_D$ +34° ($CHCl_3$) [2]
Solubility: sol. $CHCl_3$, MeOH, Me_2CO
UV: 310, 253 [1]
IR: 3450, 3300, 1680, 1080 [1]
MS *m/z*: 668, 653(4), 650(6), 637(30), 619(2), 555(6), 467(8), 452(36), 436(100), 418(6), 404(5), 202(5), 174(4), 146(2) [1, 2]
^{1}H NMR: 1.10(3H, t, J = 7, NCH_2CH_3), 2.80(4H, s, $-CH_2CH_2-$), 3.00(1H, m, H-17), 3.30, 3.38, 3.40, 3.42(each 3H, s, 4×OCH_3), 3.20(1H, m, H-16α), 3.65(1H, d, H-14β), 3.95(1H, s, H-6α), 4.20, 4.22(each 1H, d, J = 11), 7.30(1H, t, J = 7, H–Ar), 7.58(1H, t, J = 7, H-4-Ar), 8.00(1H, d, J = 7, H-3-Ar), 8.72(1H, t, J = 7, H-6-Ar) [1]
^{13}C NMR: [1, 3]

Table 1

C-1	83.8	C-13	45.9	16-OCH_3	56.1
2	25.7	14	83.8	Ar-CO	168.0
3	31.7	15	33.6	Ar C-1	114.7
4	37.5	16	82.5	2	141.6
5	43.2	17	64.5	3	120.7
6	90.9	18	69.2	4	134.8
7	88.3	19	52.5	5	122.5
8	77.7	NCH_2	50.9	6	130.3
9	50.3	CH_3	13.7	NHCO	170.7
10	37.9	1-OCH_3	55.7	CH_2	29.5
11	49.0	6-OCH_3	57.6	CH_2	29.8
12	28.7	14-OCH_3	58.0	COOH	170.7

Pharm./Biol.: LD_{50} 22.5 mg/kg (i/v, mice). Hypotensive, N-cholinoblocker, curarelike action [4]

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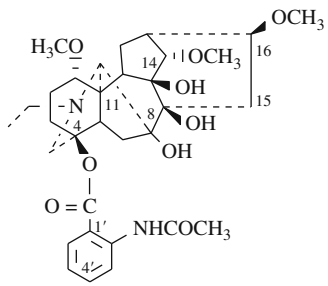
Ranaconitine

CAS Registry Number: 69787-06-0 1360-76-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum orientale, A. rubicundum, A. septentrionale*
$C_{32}H_{44}N_2O_9$: 600.3047
Mp: 132–134°C (Me_2CO)
$[\alpha]_D$ +33° ($CHCl_3$)
Solubility: sol. $CHCl_3$, MeOH
UV: 308, 253 [1]
IR: 3500, 3150, 1685, 1600, 1585, 1087 [1]
MS *m/z*: 600(MM^+, 4), 585(5), 582(4), 569(20), 557(5), 438, 421(100), 406(80), 392(37), 390(29), 361, 292, 287, 162, 120 [1, 2]
^{1}H NMR: 1.13(3H, t, J = 7, NCH_2CH_3), 2.24(3H, s, Ac), 3.28, 3.33, 3.43(each 3H, s, 3×OCH_3), 7.13–8.68(H–Ar), 11.07(1H, br s, NHAc) [3]
^{13}C NMR: [3]

Table 1

C-1	83.5	C-12	25.9	14-OCH_3	58.0
2	26.5	13	49.8	16-OCH_3	56.3
3	31.6	14	90.0	Ar-C = O	167.7
4	84.4	15	37.8	Ar C-1′	115.9
5	51.1	16	82.9	2′	141.8
6	32.5	17	63.1	3′	120.4
7	85.7	18	–	4′	134.6
8	77.9	19	55.2	5′	122.6
9	78.4	NCH_2	48.7	6′	131.3
10	36.6	CH_3	14.4	NHCO	169.5
11	51.4	1-OCH_3	56.3	CH_3	25.6

HPLC: [4]
Pharm./Biol.: LD_{50} 6.2 mg/kg (i/v, mice). Powerful antiarrhythmic, local anaesthetic, analgesic, and anti-inflammatory action [5]. Metabolite of lappaconitine [6]

References

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5. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(5), 737 (1996)
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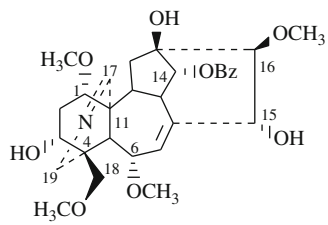
Secokaraconitine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum*
$C_{30}H_{39}NO_9$: 557.27503
Mp: 230–232°C (Me_2CO) [1]
IR: 3375, 2930, 2885, 2830, 1727, 1639, 1600, 1491, 1464, 1451, 1414, 1378, 1352, 1319, 1284, 1263, 1223, 1198, 1182, 1106, 1075, 1046, 1080, 986, 962, 933, 915, 873, 717, 668, 640, 612, 594 [1]
MS *m/z*: 557(M^+, 1.6), 542(2.6), 526(22.5), 104(100), 59(5.4) [1]
^{1}H NMR: 3.20, 3.22, 3.31, 3.7(each 3H, s, 4×OCH_3), 4.48(1H, dtd, J = 2.2, 2.3, 2.2, H-6β), 4.82(1H, dd, J = 2.6, 2.7, H-15β), 5.09(1H, d, J = 4.2, H-14β),

5.62(1H, br.dd, J = 2.7, 3.9, H-7), 7.83(1H, br d, J = 1.7, H-17), 7.43(2H, t, J = 7.7, Ar–H), 7.56(1H, t, J = 7.4, Ar–H), 8.0(2H, d, J = 8.1, Ar–H) [1]

^{13}C NMR: [1]

Table 1

C-1	79.5	C-11	51.5	1-OCH_3	56.8
2	33.0	12	38.6	6-OCH_3	59.0
3	71.0	13	73.9	16-OCH_3	61.6
4	47.9	14	79.5	18-OCH_3	57.9
5	43.6	15	79.2	Ar-C = O	166.3
6	87.0	16	92.1	Ar-C	133.2
7	137.0	17	165.1		131.0
9	42.7	18	76.5		131.0
10	41.5	19	51.5		129.9
					129.9
					128.5

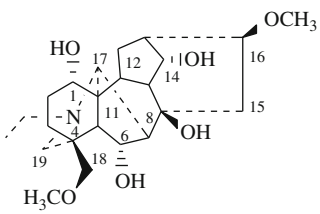
X-ray: [2]

References

1. M.N. Sultankhodzhaev, Atia-tul-Wahab, M.I. Choudhary, Atta-ur-Rahman, Chem. Nat. Comp. **39**, 512 (2003)
2. M.N. Sultankhodzhaev, B. Tashkhodjaev, B.B. Averkiev, M.Yu. Antipin, Chem. Nat. Comp. **38**, 78 (2002)

Senbusine A (Bataconine)

CAS Registry Number: 82202-95-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum barbatum, A. firmum, A. tauricum*

$C_{23}H_{37}NO_6$: 423.2621

Mp: 96–99°C (Me_2CO) [1]

Solubility: sol. $CHCl_3$, MeOH

IR: 3525, 3480, 3365, 1120, 1090 [1]

MS *m/z*: 423(M^+, 6.7), 408(26), 406(100), 367(4.5), 336(7) [1]

^{1}H NMR: 1.06(3H, t, J = 7, NCH_2CH_3), 3.25(6H, s, OCH_3), 4.10(1H, t, J = 5, H-14β), 4.66(1H, d, J = 7, H-6β) [1, 2]

^{13}C NMR: [2]

Table 1

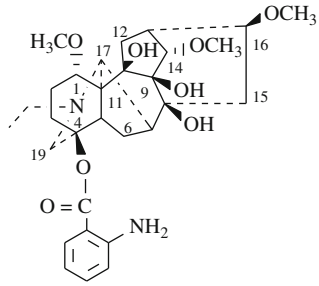
C-1	72.1	C-9	45.6	C-17	63.5
2	29.2	10	40.6	18	80.3
3	29.8	11	48.2	19	57.1
4	37.9	12	29.9	16-OCH_3	56.3
5	48.2	13	44.2	18-OCH_3	59.2
6	72.6	14	75.8	NCH_2	49.7
7	55.4	15	42.2	CH_3	12.9
8	75.4	16	82.0		

References

1. N. Batbayar, D. Batsuren, M.N. Sultankhodzhaev, Chem. Nat. Comp. **24**, 200 (1988)
2. C. Konno, M. Shirasaka, H. Hikino, J. Nat. Prod. **45**, 128 (1982)

Sepaconitine

CAS Registry Number: 114622-05-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum leucostomum, A. septentrionale*

$C_{30}H_{42}N_2O_8$: 558.2941

Mp: 250–253°C (MeOH–$CHCl_3$) [1]

$[\alpha]_D$ +25° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$, Py
IR: 3547, 3468, 3360, 1690, 1596, 1260, 1247, 1170, 760 [1]
MS *m/z*: 558(M^+), 509, 497, 489, 421(100), 406, 390 [1]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 3.27, 3.28, 3.38(each 3H, s, 3×OCH_3), 3.73(1H, d, J = 5, H-14β), 6.55–7.68 (H–Ar) [1]
^{13}C NMR: [1]

Table 1

C-1	78.1	C-12	37.6	NCH_2	48.9
2	26.7	13	34.8	CH_3	13.5
3	31.9	14	88.0	Ar-C = O	167.4
4	83.1	15	44.9	ArC-1	112.1
5	44.7	16	83.0	2	150.6
6	24.5	17	61.6	3	116.3
7	47.1	18	–	4	133.9
8	74.8	19	55.9	5	116.9
9	79.8	1-OCH_3	56.2	6	131.9
10	79.1	14-OCH_3	58.1		
11	56.4	16-OCH_3	56.2		

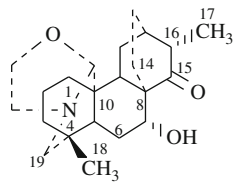
Pharm./Biol.: LD_{50} 16.5 mg/kg (i/v, mice). Powerful antiarrhythmic, local anaesthetic, and anti-inflammatory action. Superior in activity to quinidine and ajmaline [2]

References

1. S.K. Usmanova, V.A. Tel'nov, S.Yu. Yunusov, N.D. Abdullaev, A.I. Shreter, G.B. Filippova, Chem. Nat. Comp. **23**, 734 (1987)
2. F.N. Dzhakhangirov, G.D. Kalinov, DAN UzSSR (5), 49 (1989)

Septedine

CAS Registry Number: 176181-91-2



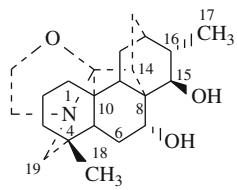
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum septentrionale*
$C_{22}H_{31}NO_3$: 357.23038
Mp: 160–161°C (Me_2CO) [1]
IR: 3175, 2960, 2925, 2892, 1710, 1460, 1370, 1340, 1315, 1290, 1280, 1260, 1230 [1]
MS *m/z*: 357(M^+, 3.1), 356(2.8), 340(3.6), 329(40), 328(33), 314(6.9), 312(10.8), 300(42), 286(40), 274(10.9) [1]
^{1}H NMR: 0.97(3H, s, 3H-18), 1.04(3H, s, 17-CH_3), 2.32, 2.60(each 1H, d, J = 12, 2, H-19), 2.87, 3.65(each 2H, m, O–CH_2–CH_2–N), 4.07(1H, t, J = 9, CH–O), 4.26(1H, s, OH) [1]
X-ray: [1]
Pharm./Biol.: Curare-like and local anaesthetic action [2]

References

1. S.K. Usmanova, I.M. Yusupova, B. Tashkhodjaev, I.A. Bessonova, Chem. Nat. Comp. **31**, 83 (1995)
2. Sh.A. Saidkhodzhaeva, S.K. Usmanova, I.A. Bessonova, F. N. Dzhakhangirov, in *Nitrogen Containing Heterocycles and Alkaloids*, ed. by V.G. Kartsev, G.A. Tolstikov (Iridium Press, Moscow, 2001), p. 475

Septedinine

CAS Registry Number: 156400-93-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum septentrionale*
$C_{22}H_{31}NO_3$: 357.23038
Mp: 124–126°C (C_6H_{14}–Me_2CO) [1]

IR: 3600–3200, 2970, 2935, 2875, 1662, 1455, 1415, 1285, 1245, 1220, 1205, 1160, 1120, 1095, 1052, 1028, 1000, 925, 920, 885, 865 [1]

MS *m/z*: 357(M^+, 86), 340(100), 329(34), 314(32), 312(12), 300(8), 286(20), 274(58), 256(10), 202(6), 192(6), 149(26), 129(10), 101(16) [1]

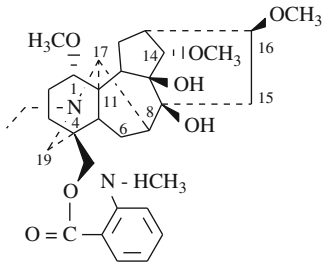
^{1}H NMR: 0.95(3H, s, 3H-18), 2.30, 2.56(each 1H, d, J = 12, 2H-19), 2.88(2H, m, 2H-21), 3.64(2H, m, 2H-22), 4.18(1H, t, J = 9, H-7), 4.46(1H, t, J = 2, H-15), 4.80, 4.97(each 1H, dd, J = 2, 1, 2H-17) [1]

Pharm./Biol.: Curare-like and local anaesthetic action [2]

References

1. S.K. Usmanova, I.A. Bessonova, Chem. Nat. Comp. **32**, 62 (1996)
2. Sh.A. Saidkhodzhaeva, S.K. Usmanova, I.A. Bessonova, F. N. Dzhakhangirov, *Nitrogen-Containing Heterocycles and Alkaloids* (Iridium Press, Moscow, 2001), p. 475

Septefine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum septentrionale*

$C_{31}H_{44}N_2O_7$: 525, 29495

Mp: 194–195°C (MeOH) [1]

IR: 3525–3460, 3388, 2970, 2923, 2830, 1690, 1613, 1589, 1530, 1460, 1440, 1390, 1370, 1340, 1268, 1240, 1180, 1140, 1120, 1092, 1040, 1025, 1000, 970, 950, 905, 880, 850, 799, 755 [1]

MS *m/z*: 556(M^+, 2.7), 525(5.0), 495(2.2), 422(2.2), 406(30), 405(100), 390(56), 374(27), 360(13), 345(30), 262.5(8.0), 151(4.0), 134(20) [1]

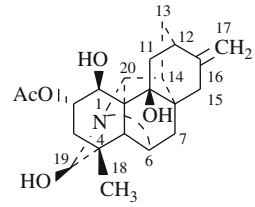
^{1}H NMR: 1.02(3H, t, J = 7.5, N–CH_2–CH_3), 2.80(3H, d, J = 5, N–CH_3), 2.90(1H, s, H-17), 3.19, 3.20, 3.31(each 3H, s, 3×OCH_3), 3.45(1H, s, H-14β), 3.53(1H, d, J = 11, H-19a), 6.49(1H, d, J = 7, H–Ar), 6.42(1H, t, J = 7, H–Ar), 7.22(1H, t, J = 7, H–Ar), 7.67(1H, d, J = 7, H–Ar) [1]

References

1. S.K. Usmanova, I.A. Bessonova, Y.G. Mil'grom, Chem. Nat. Comp. **32**, 198 (1996)

Septenine

CAS Registry Number: 147677-10-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum septentrionale*

$C_{22}H_{29}NO_5$: 387.2046

Mp: 190–192°C (Me_2CO–C_6H_{14}) [1]

Solubility: sol. Py, $CHCl_3$ [1]

IR: 3570, 3450, 3345–3080, 1740, 1660, 1445, 1375, 1340, 1287, 1250, 1195, 1170, 1150, 1120, 1080, 1060, 1030, 985, 970, 925, 910, 885, 845, 810 [1]

MS *m/z*: 387(M^+), 370, 327(100), 310, 309 [1]

^{1}H NMR: 1.00(3H, s, 3H-18), 1.99(3H, s, Ac), 3.55(1H, br s), 4.47(1H, s, H-19α), 4.54, 4.68(each 1H, br s, 2H-17), 4.95(1H, br s, H-2β) [1]

^{13}C NMR: [1]

Table 1

C-1	67.9	C-9	79.6	C-17	104.7
2	73.1	10	53.7	18	22.2
3	33.0	11	39.2	19	91.2
4	42.2	12	36.2	20	67.9

(*continued*)

Table 1 (continued)

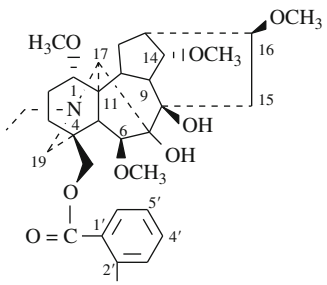
5	50.8	13	33.9	CO	170.2
6	60.7	14	43.9	CH_3	21.6
7	30.8	15	31.1		
8	41.7	16	150.6		

References

1. S.K. Usmanova, V.A. Tel'nov, N.D. Abdullaev, Chem. Nat. Comp. **29**, 349 (1993)

Septentriodine (Cashmiradelphine)

CAS Registry Number: 69787-05-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum rubicundum*
$C_{37}H_{52}N_2O_{11}$: 700.3571
Mp: 130–135°C [1, 2]
$[\alpha]_D$ +56° (EtOH) [1, 2]
IR: 3500–3225, 1710, 1595 [1, 2]
MS *m/z*: 700(M^+), 669(100), 251, 233, 202, 174, 146 [1, 2]
^{1}H NMR: 1.06(3H, t, J = 7, NCH_2CH_3), 2.72(4H, s, $-CH_2CH_2-$), 3.20, 3.28, 3.35(3H, 3H, 6H, s, 4×OCH_3), 3.82(3H, s, OCH_3), 6.80–8.46(H–Ar), 10.75(1H, br s, NHCO) [1, 2]
^{13}C NMR: [3]

Table 1

C-1	84.0	C-13	46.1	16-OCH_3	56.4
2	26.1	14	84.0	Ar–CO	168.3

(*continued*)

Table 1 (continued)

3	31.6	15	33.7	Ar–C-1′	114.7
4	37.6	16	82.7	2′	141.9
5	43.3	17	64.6	3′	120.8
6	91.1	18	69.9	4′	135.2
7	88.7	19	52.4	5′	122.8
8	77.6	NCH_2	51.0	6′	130.5
9	50.4	CH_3	14.1	NHCO	170.6
10	38.1	1-OCH_3	55.9	CH_2	28.9
11	49.1	6-OCH_3	57.9	CH_2	32.7
12	28.7	14-OCH_3	58.1	CO	173.3
				OCH_3	51.9

Pharm./Biol.: Hypotensive, N-cholinoblocking, curaremimetic action. Less active than lycaconitine [4]

References

1. A.A. Nishanov, M.N. Sultankhodzhaev, M.S. Yunusov, V. G. Kondrat'ev, Chem. Nat. Comp. **27**, 349 (1991)
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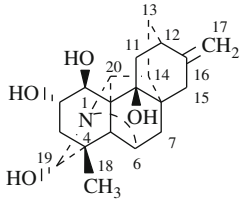
3. S.W. Pelletier, R.S. Sawhney, A.J. Aasen, Heterocycles **12**, 377 (1979)
4. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(5), 737 (1996)

Septentriosine

CAS Registry Number: 115569-73-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum septentrionale*
$C_{20}H_{27}NO_4$: 345.1940

Mp: 260–262°C [1]
$[\alpha]_D$ +21° (MeOH) [1]
IR: 3540, 3460, 3360, 3280, 1660, 1450, 1430, 1415, 1370, 1345, 1320, 1300, 1275, 1240, 1210, 1200, 1170, 1155, 1140, 1120, 1100, 1070, 1030, 980, 925, 905, 890, 870 [1]
MS *m/z*: 345(M^+, 45), 328(100). 310(18), 299(12), 280(15), 264(18), 218(50) [1]
^{1}H NMR: 1.02(3H, s, 3H-18), 3.30(1H, br s, H-6), 3.60(1H, br s, H-20). 4.08(1H, s, H-19), 4.48, 4.65(each 1H, s, 2H-17) [1]
^{13}C NMR: [1]

Table 1

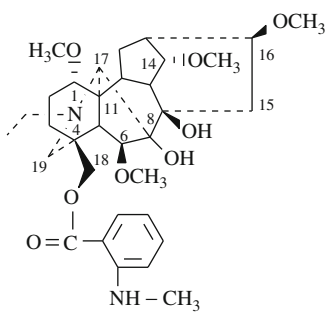
C-1	69.0	C-8	42.1	C-15	30.7
2	70.4	9	79.8	16	150.3
3	39.1	10	53.0	17	104.8
4	39.7	11	33.5	18	28.4
5	58.8	12	36.2	19	95.2
6	60.5	13	33.1	20	60.5
7	31.1	14	43.3		

X-ray: [1]

References

1. B.S. Joshi, H.K. Desai, S.W. Pelletier, E.M. Holt, A.J. Aasen, J. Nat. Prod. **51**, 265 (1988)

Septerine



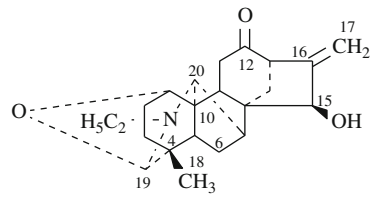
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum septentrionale*
$C_{33}H_{48}N_2O_8$: 600.3410
Mp: amorph. [1]
IR: 3530–3460, 3383, 2970, 2860, 2820, 1685, 1610, 1582, 1523, 1467, 1452, 1430, 1385, 1325, 1298, 1260, 1240, 1195, 1175, 1162, 1129, 1090, 1010, 990, 959, 860, 752 [1]
MS *m/z*: 600(M^+, 6.6), 585(17), 582(3.3), 570(40), 569(100), 567(40), 551(17), 537(5.0), 521(13), 434(20), 151(8.3), 134(50) [1]
^{1}H NMR: 1.01(3H, t, J = 7.5, N–CH_2–CH_3), 2.85(3H, d, J = 5, NH–CH_3), 2.88(1H, s, H-17), 3.19, 3.27, 3.35(3H, 6H, 3Hs, 4×OCH_3), 3.55(1H, t, J = 5, H-14β), 3.88, 3.99(each 1H, d, J = 11, 2H-18), 4.05(1H, s, H-6α), 6.56(1H, t, J = 7, H–Ar), 6.60(1H, d, J = 7, H–Ar), 7.35(1H, t, J = 7, H–Ar), 7.57(1H, q, J = 5, N–H), 7.81(1H, d, J = 7, H–Ar) [1]

References

1. S.K. Usmanova, I.A. Bessonova, Y.G. Mil'grom, Chem. Nat. Comp. **32**, 198 (1996)

Songoramine

CAS Registry Number: 23179-78-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum karakolicum, A. monticola, A. soongoricum*
$C_{22}H_{29}NO_3$: 355.2148
Mp: 211–212°C (Me_2CO), 290°C (hydrochloride (dec., Et_2O–MeOH)), 115°C (Ac.) [1]
UV: 295(2.60) [1]
IR: 3400, 1722, 1660, 1100, 1050, 960 [1]

MS *m/z*: 355(M^+, 100), 327(10), 299(46), 122(29) [1]
^{1}H NMR: 0.79(3H, s, 3H-18), 0.97(3H, t, J = 7, NCH_2CH_3), 5.15, 5.23(each 1H, s, 2H-17) [1]
^{13}C NMR: [2]

Table 1

C-1	67.9	C-9	31.6	C-17	111.9
2	29.9	10	51.9	18	19.0
3	24.4	11	31.4	19	93.1
4	37.9	12	209.0	20	66.4
5	48.7	13	37.5	NCH_2	48.5
6	24.1	15	77.1	CH_3	48.5
7	46.1	16	149.9		
8	50.4				

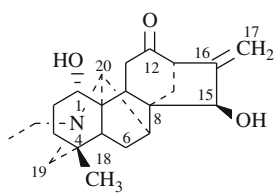
Pharm./Biol.: $LD5_0$ 120 mg/kg (i/v, mice). Weak peripheral N-cholinoblocking effect. Increases reflex excitability, exhibits an antiarrhythmic action [3]

References

1. M.S. Yunusov, Ya.V. Rashkes, S.Yu. Yunusov, A.S. Samatov, Chem. Nat. Comp. **6**, 95 (1970)
2. C. De la Fuente, M. Reina, E. Valencia, A. Rodriguez-ojeda, Heterocycles **27**, 1109 (1988)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(3), 386 (1996)

Songorine (Shimoburo Base I, Bullatine G, Napellonine)

CAS Registry Number: 23179-78-4 509-24-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum baicalense, A. barbatum, A. czekanovskyi, A. ferox, A. firmum, A. karakolicum, A. monticola, A. septentrionale, A. soongoricum, A. volubile*
$C_{22}H_{31}NO_3$: 357.2304
Mp: 201–203°C (MeOH), 257°C (hydrochloride), 260°C (hydrobromide), 236°C (perchlorate) [1, 2]
[α]D −140° (abs. EtOH) [1]
IR: 3545–3430, 1710, 1660, 1465, 1425, 1395, 1380, 1362, 1325, 1290, 1270, 1250, 1190, 1120, 1057, 1035, 1018, 960, 910, 885 [3]
MS *m/z*: 357(M^+, 100), 340(17), 328(16), 315(5), 314(10), 298(16), 246(13), 180(6) [2]
^{1}H NMR: 0.71(3H, s, 3H-18), 1.02(3H, t, J = 7, NCH_2CH_3), 5.13, 5.20(each 1H, br s, 2H-17) [3, 4]
^{13}C NMR: [4]

Table 1

C-1	70.1	C-9	35.1	C-17	111.1
2	31.5	10	52.1	18	26.0
3	31.9	11	37.3	19	57.2
4	34.0	12	209.6	20	65.8
5	49.0	13	53.6	NCH_2	50.8
6	23.0	14	38.0	CH_3	13.8
7	43.4	15	76.9		
8	49.7	16	150.3		

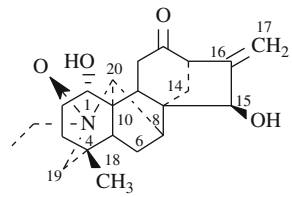
Pharm./Biol.: LD_{50} 142.5 mg/kg (i/v, mice). Pronounced psychotropic activity. High antiarrhythmic activity [5, 6]

References

1. S.Yu. Yunusov, Zh. Obshch. Khim. **18**, 515 (1948)
2. M.S. Yunusov, Ya.V. Rashkes, S.Yu. Yunusov, A.S. Samatov, Chem. Nat. Comp. **6**, 95 (1970)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(3), 386 (1996)
4. G. De la Fuente, M. Reina, E. Valencia, A. Rodriguez-Ojeda, Heterocycles **27**, 1109 (1988)
5. F.N. Dzhakhangirov, F. Sadritdinov, DAN UzSSR (3), 39 (1973)
6. N. Tulyaganov, F.N. Dzhakhangirov, F.S. Sadritdinov, V. Khamdamov, *The Pharmacology of Plant Substances* [in Russian] (Fan, Tashkent, 1976), p. 76

Songorine N-Oxide

CAS Registry Number: 66921-56-0



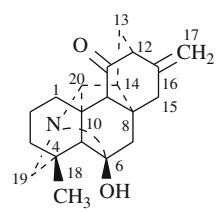
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum monticola*
$C_{22}H_{31}NO_4$: 373.2253
Mp: 253–255°C (MeOH) [1]
Solubility: sol. H_2O
UV: 292(2.44) [1]
IR: 1710, 1658 [1]
MS *m/z*: 373(M^+), 357, 356, 355 [1]
^{1}H NMR: 0.84(3H, s, 3H-18), 1.36(3H, t, J = 7, NCH_2CH_3) [1]
Pharm./Biol.: LD_{50} 550 mg/kg (i/v, mice). Feebly active. Weak antiarrhythmic and N-cholinoblocking action [2]

References

1. E.F. Ametova, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 735 (1977)
2. F.N. Dzhakhangirov, M.N. Sultankhodzhaev, B. Tashkhodzhaev, B.T. Salimov, Chem. Nat. Comp. **33**(2), 190 (1997)

Spiradine A

CAS Registry Number: 19741-46-9



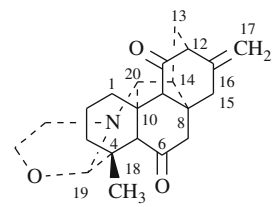
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Spiraea japonica*
$C_{20}H_{25}NO_2$: 311.1885
Mp: 281–282°C [1, 2]
IR: 3100, 1710, 1655 [1, 2]
MS: 311(M^+) [1, 2]
^{1}H NMR: 1.33(3H, s, 3H-18), 4.73, 4.87(each 1H, s, 2H-17) [1, 2]

References

1. V.D. Gorbunov, V.I. Sheichenko, A.I. Ban'kovskii, Chem. Nat. Comp. **12**, 119 (1976)
2. G. Goto, K. Sasaki, N. Sakabe, Y. Hirata, Tetrahedron Lett. **9**, 1369 (1968)

Spiredine

CAS Registry Number: 60062-45-5

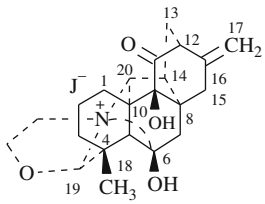


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Spiraea japonica*
$C_{22}H_{27}NO_3$: 353.1991
Mp: 163°C [1]
IR: 1720, 1690 [1]
MS *m/z*: 353(M^+) [1]
^{1}H NMR: 1.43, 1.47(3H, s, 3H-18), 4.12(1H, s, H-19), 3.00–3.50(2H, m, NCH_2), 3.50–4.00(2H, m, OCH_2), 4.73, 4.91(each 1H, s, 2H-17) [1]

References

1. V.D. Gorbunov, V.I. Sheichenko, A.I. Ban'kovskii, Chem. Nat. Comp. **12**, 119 (1976)

Spireine*

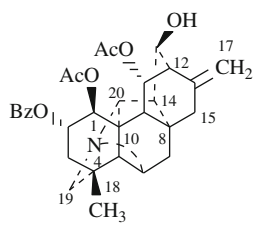


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Spiraea japonica*
$C_{22}H_{27}NO_4$: 369.1940
Mp: 230°C (EtOH) [1]
IR: 3425, 1727, 1683 [1]
MS *m/z*: 369(M^+) [1]
^{1}H NMR: 1.44, 1.47(each 3H, s, 2×CH_3), 2.05, 2.47(each 1H, d, J = 9), 4.81, 4.97(each 1H, s, 2H-17) [1]
X-ray: (benzene solvate of spireine hydroiodide) [2]*
*Structure given for the hydroiodide [2]

References

1. V.D. Gorbunov, A.I. Ban'kovskii, M.E. Perel'son, O.S. Chizhov, Chem. Nat. Comp. **5**, 379 (1969)
2. L.D. Shadyro, V.D. Gorbunov, *III rd All-Union Conference on Organic Crystal Chemistry. Abstracts* [in Russian] Gorkii, 1981, p. 139

Tadzhaconine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological source: *Aconitum zeravschanicum, A. firmum, A. anthoroideum*
$C_{31}H_{35}NO_7$: 533.2413
Mp: 236–237°C (dec., EtOH)[1]
IR: 3490, 3070, 1660, 1600, 1585, 860, 720 [1]
MS *m/z*: 533(M^+), 490, 474, 430, 414, 368, 352, 310, 292, 282, 264, 207, 122, 105(100) [1]
^{1}H NMR: 0.94(3H, s, 3H-18), 1.93, 1.94(each 3H, s, 2×Ac), 2.39(1H, d, J = 12, H-19α), 2.79(1H, d, J = 12, H-19β), 3.18(1H, br s, H-6), 4.08(1H, br d, J = 9, H-13α), 4.21(1H, s, H-20), 4.67, 4.78(each 1H, s, 2H-17), 5.26(1H, d, J = 9, H-11β), 5.46(1H, m, H-2β), 5.77(1H, d, J = 3, H-1α), 7.28–8.12(H–Ar) [1]
^{13}C NMR: [1]

Table 1

C-1	71.6	C- 11	76.1	C-2-OC = O-	165.9
2	68.9	12	49.4	Ar C	130.3
3	36.7	13	70.4		129.9
4	36.2	14	51.5		128.7
5	58.0	15	33.2		133.3
6	64.3	16	144.6	C-1-OC = O	172.0
7	34.0	17	108.9	CH_3	21.6
8	44.0	18	29.4	C-11-OC = O	170.5
9	51.9	19	63.6	CH_3	21.4
10	54.7	20	65.7		

X-ray: [1]
Pharm./Biol.: LD_{50} 12.8 mg/kg (i/v, mice). The preparation has an expressed antiarrhythmic action. Its activity exceeds quinidine [2]. It expressed local anaesthetic action exceeds cocain and dicain [3]

References

1. I.M. Yusupova, B.T. Salimov, B. Tashkodzhaev, Chem. Nat. Comp. **28**, 335 (1992)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(5), 737 (1996)
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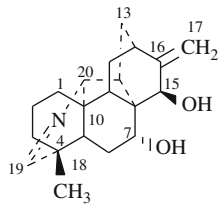
Talasamine

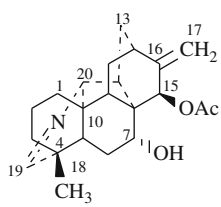


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum talassicum*
$C_{20}H_{27}NO_2$: 313.2042
Mp: 208–210°C (Me_2CO) [1]
IR: 3510, 1645 [1]
MS *m/z*: 313(M^+, 100), 298(18), 295(29), 285(21), 281(18), 280(6), 272(7), 268(8), 267(10), 265(8), 256(8), 252(9) [1]
^{1}H NMR: 1.00(3H, s, 3H-18), 3.22(1H, br s, H-20), 3.94(1H, q, J = 10, 7; H-7), 4.53(1H, t, J = 1.5, H-15), 4.81, 4.92(each 1H, s, 2H-17), 7.31(1H, br s, H-19) [1]

References

1. A.A. Nishanov, M.N. Sultankhodzhaev, M.S. Yunusov, I.M. Yusupova, B. Tashkhodzhaev, Chem. Nat. Comp. **27**, 82 (1991)

Talasimidine

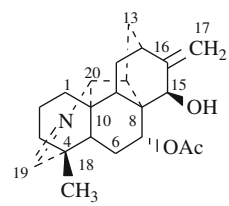


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum talassicum*
$C_{22}H_{29}NO_3$: 355.2148
Mp: 263–265°C (Me_2CO) [1]
IR: 3225, 1740, 1662, 1642 [1]
MS *m/z*: 355(M^+, 72), 340(8), 338(11), 326(9), 312(100), 296(67), 267(10), 252(8), 176(7), 90(9), 53(11) [1]
^{1}H NMR: 1.00(3H, s, 3H-18), 2.12(3H, s, Ac), 3.25(1H, br s, H-20), 3.47(1H, q, J = 10, 7; H-7), 4.61, 4.86(each 1H, d, J = 2, 2H-17), 5.84(1H, J = 1.5, H-15), 7.33(1H, br s, H-19) [1]

References

1. A.A. Nishanov, M.N. Sultankhodzhaev, M.S. Yunusov, I.M. Yusupova, B. Tashkhodzhaev, Chem. Nat. Comp. **27**, 82 (1991)

Talasimine

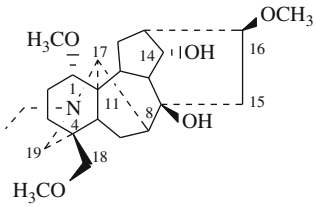


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum talassicum*
$C_{22}H_{29}NO_3$: 355.2148
Mp: 242–245°C (Et_2O) [1]
IR: 3180, 1750, 1655 [1]
MS *m/z*: 355(M^+, 50), 340(7), 326(8), 312(21), 246(90), 295(100), 280(15), 267(44), 266(16), 149(18) [1]
^{1}H NMR: 0.98(3H, s, 3H-18), 1.99(3H, s, Ac), 3.24(1H, br s, H-20), 4.20(1H, J = 1.5, H-15), 4.83, 4.92(each 1H, s, 2H-17), 5.18(1H, q, J = 10, 7; H-7b), 7.32(1H, br s, H-19) [1]
X-ray: [1]

References

1. A.A. Nishanov, M.N. Sultankhodzhaev, M.S. Yunusov, I.M. Yusupova, B. Tashkhodzhaev, Chem. Nat. Comp. **27**, 82 (1991)

Talatisamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum arcuatum, A. fischeri, A. nasutum, A. nemorum, saposhnikovii, A. talassicum, A. tauricum, A. tranzschelii*

$C_{24}H_{39}NO_5$: 421.2828

Mp: 145–146°C, 123°C (di Ac) [1]

$[\alpha]_D$ 0° [1]

IR: 3525, 3425, 2980, 2920, 2887, 1120, 1090 [2]

^{1}H NMR: 1.08(3H, t, NCH_2CH_3), 3.00, 3.12(each 1H, d, H-18), 3.28, 3.30, 3.36(each 3H, s, 3×OCH_3), 4.13(1H, t, H-14β) [3]

^{13}C NMR: [3]

Table 1

C-1	86.1	C-9	46.9	C-17	62.8
2	25.7	10	45.7	18	79.4
3	32.6	11	48.6	19	53.1
4	38.6	12	28.6	1-OCH_3	56.1
5	37.7	13	45.7	16-OCH_3	56.3
6	24.8	14	75.7	18-OCH_3	59.3
7	45.7	15	39.2	NCH_2	49.4
8	72.7	16	82.2	CH_3	13.6

X-ray: [4]

HPLC: [5]

Pharm./Biol.: LD_{50} 110 mg/kg (i/v, mice). It exerts hypotensive, N-cholinoblocking, curare-like [6] and antiarrhythmic effect [2]

References

1. M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 85 (1970)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(3), 386 (1996)
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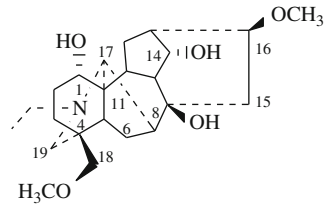
5. Y. Tong, Yaowu Fenxi Zazhi **10**, 279 (1990)
6. N.T. Tulyaganov, F.N. Dzhakhangirov, F.S. Sadritdinov, I. Khamdamov, *The Pharmacology of Plant Substances* [in Russian] (Fan, Tashkent, 1976), p. 76

Talatisidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum talassicum*

$C_{23}H_{37}NO_5$: 407.2672

Mp: 220–221°C (Me_2CO), 189°C (hydrochloride), 220°C (perchlorate) [1]

$[\alpha]_D$ −20° (MeOH) [1]

Solubility: sol. $CHCl_3$, MeOH

IR: 3560–3380, 1100 [1, 2]

MS *m/z*: 407(M^+, 100), 392(93), 390(57) [1, 2]

^{1}H NMR: 1.02(3H, t, J = 7, NCH_2CH_3), 3.29(6H, s, 2×OCH_3), 4.07(1H, t, J = 5, H-14β) [2]

Pharm./Biol.: It has hypotensive, N-cholinoblocking, and curare-like action. It exceeds talatisamine [3]

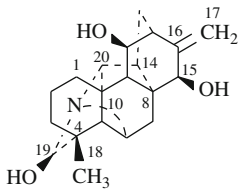
References

1. A.D. Kusovkov, T.F. Platonova, Zh. Obshch. Khim. **31**, 1389 (1961)

2. S.W. Pelletier, L.H. Keith, P.C. Parthasarathy, J. Amer. Chem. Soc. **89**, 4146 (1967)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(6), 932 (1996)

Talatisine

CAS Registry Number: 80248-73-3



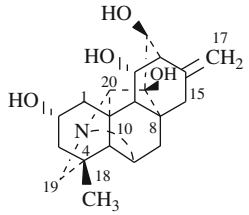
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum talassicum*
$C_{20}H_{27}NO_3$: 329.1991
Mp: 246–246.5°C (EtOH), 257°C (hydrochloride), 222°C (perchlorate), 265°C (hydroiodide), 250°C (picrate) [1]
$[\alpha]_D$ +38° (EtOH) [1]
X-ray [2]
Pharm./Biol.: LD_{50}110.8, 300 mg/kg (i/v, i/p, mice). Antiarrhythmic, local anaesthetic activity, exceeds quinidine, procainamid. It exerts N-depolarizing action on vegetative ganglions and has anti-inflammatory action [3]

References

1. S.Yu. Yunusov, E.V. Sichkova, G.F. Potemkin, DAN UzSSR (2), 21 (1954)
2. Z. Karimov, M.G. Zhamierashvili, Chem. Nat. Comp. **17**, 259 (1981)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(6), 932 (1996)

Tangutisine

CAS Registry Number: 139219-95-7



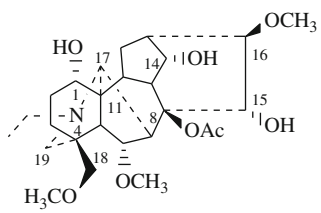
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum coreanum*
$C_{20}H_{22}NO_4$: 345, 1932
Mp: 320–321°C (MeOH, EtOH, decomp.) [1]
IR: 3200–3600, 1650 [1]
MS *m/z*: 345(M^+, 87), 330(70), 328(100), 317(49), 316(40) [1]
^{1}H NMR: 1.10(3H, s, 3H-18), 2.44(1H, d, J = 3.5, H-12), 2.86, 3.83(each 1H, d, J = 11.5, H-19β, H-19a), 3.95(2H, br s, H-6, H-13β), 4.08(1H, br s, H-2β), 4.21(1H, d, J = 8.5, H-11β), 4.55(1H, s, H-20), 4.82, 4.87(each 1H, br s, 2H-17) [1]

References

1. I.A. Bessonova, Chem. Nat. Comp. **35**, 103 (1999)

Taurenine

CAS Registry Number: 172616-86-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Aconitum tauricum, A. firmum*
$C_{26}H_{41}NO_8$: 495.2832
Mp: 100–102°C (pet. ether. $CHCl_3$) [1]
Solubility: sol. $CHCl_3$, MeOH, Me_2CO, EtOH
IR: 3490, 3400, 3325, 1720 [1]
MS *m/z*: 495(M^+, 0.9), 480(1.6), 478(4.6), 435(43), 420(100), 418(21.4), 404(18), 390(53.5), 60(8.0) [1]
^{1}H NMR: 1.08(3H, t, J = 7.5, NCH_2CH_3), 2.00(3H, s, Ac), 3.21, 3.26, 3.41(each 3H, s, 3×OCH_3), 4.01(2H, m), 4.32(1H, dd, J = 6, 3, H-6β), 4.47(1H, d, J = 3.0, H-15β) [1]
^{13}C NMR: [1]

Table 1

C-1	72.3	C-10	41.5	C-19	56.5
2	29.7	11	49.4	6-OCH_3	58.3
3	29.7	12	29.7	16-OCH_3	58.3
4	38.2	13	43.6	18-OCH_3	59.2
5	43.8	14	75.1	NCH_2	48.7
6	84.7	15	76.0	CH_3	13.2
7	47.0	16	89.0	CO	172.8
8	92.2	17	62.5	CH_3	22.6
9	43.6	18	80.0		

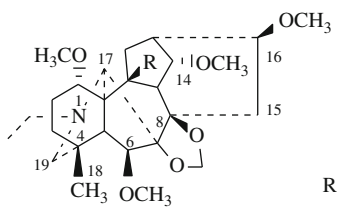
Pharm./Biol.: It lowers arterial pressure, blocks up the conduction of nervous impulses in the vegetative ganglions. It is low toxic [2]

References

1. V.A. Tel'nov, Z.M. Vaisov, M.S. Yunusov, A.P. Gorelova, Chem. Nat. Comp. **28**, 91 (1992)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(6), 932 (1996)

Terdeline

CAS Registry Number: 119152-46-4



R = OCH_3

Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Delphinium ternatum*
$C_{27}H_{43}NO_7$: 493.3040
Mp: 116–118°C (Et_2O–C_6H_{14}) [1]
IR: 1100 [1]
MS *m/z*: 493(M^+, 2), 478(6), 464(8), 463(32), 462(100), 448(10), 446(9) [1]
^{1}H NMR: 0.90(3H, s, 3H-18), 1.07(3H, t, J = 7, NCH_2CH_3), 3.18, 3.20, 3.29, 3.31, 3.41(each 3H, s, 5×OCH_3), 5.07(2H, s, CH_2O_2) [1]
^{13}C NMR: [1]

Table 1

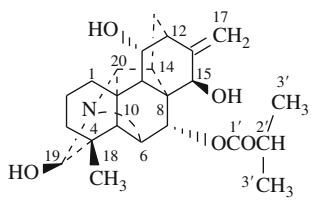
C-1	77.7	C-10	88.5	C-19	57.1
2	27.2	11	57.6	1-OCH_3	54.9
3	36.8	12	36.6	6-OCH_3	58.5
4	33.0	13	38.1	10-OCH_3	52.0
5	44.3	14	81.7	14-OCH_3	57.8
6	90.3	15	35.3	16-OCH_3	56.0
7	91.9	16	82.7	NCH_2	50.3
8	82.8	17	63.1	CH_3	13.8
9	50.3	18	26.3	CH_2O_2	94.0

References

1. A.S. Narzullaev, V.M. Matveev, N.D. Abdullaev, S.S. Sabirov, M.S. Yunusov, Chem. Nat. Comp. **24**, 335 (1988)

Ternatine

CAS Registry Number: 193901-34-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids

Biological sources: *Delphinium ternatum*
$C_{24}H_{33}NO_5$: 415.2359
Mp: 236–238°C (Me_2CO) [1]
^{1}H NMR: 0.99(3H, s, 3H-18), 1.21, 1.23(each 3H, d, J = 7, $HC(CH_3)_2$), 2.12(1H, d, J = 8.8, H-9), 2.20(1H, br t, $W_{1/2}$ = 6, H-12), 2.69(1H, m, $HC(CH_3)_2$), 2.77(1H, br s, H-20), 3.52(1H, m, H-6), 3.86(1H, s), 4.21(1H, s, H-15), 4.46(1H, dd, J = 8.4, H-11b), 5.05(2H, s, 2H-17), 5.16(1H, d, J = 2.9, H-7) [1]
^{13}C NMR: [1]

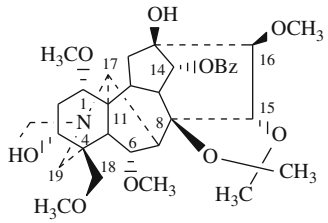
Table 1

C-1	30.1	C-9	50.0	C-17	100.2
2	29.1	10	52.0	18	23.5
3	20.6	11	74.0	19	91.9
4	53.2	12	40.2	20	70.1
5	61.5	13	34.5	1′	177.2
6	66.6	14	44.4	2′	35.2
7	65.2	15	70.2	3′	19.8
8	43.8	16	153.6		19.2

References

1. V.M. Matveev, Author's Abstract of Candidate's Dissertation, Dushanbe, 1988

Tuberaconitine

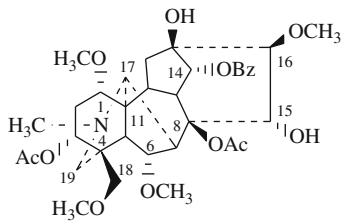


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum tuberosum*
$C_{35}H_{49}NO_{10}$: 643.3343
Mp: amorph. [1]
IR: 3530, 2980, 2830, 1720, 1615, 1380, 1245, 1200, 1140, 1100, 1035, 980, 845 [1]
MS *m/z*: 643(M^+, 7), 594(9), 585(100), 568(53), 554(38), 537(20) [1]
^{1}H NMR: 1.05(3H, t, J = 6, N–CH_2–CH_3), 1.20(3H, s, C–CH_3), 1.36(3H, s, C–CH_3), 3.12, 3.23, 3.25, 3.70(each 3H, s, 4×OCH_3), 3.37(1H, d, J = 5, H-16a), 3.51(2H, d, J = 9, 2H-18), 3.68(1H, dd, J = 10, 7, H-3β), 3.75(1H, br s, OH-13), 3.99(1H, d, J = 6.5, H-6β), 4.40(1H, dd, J = 5.5, 2.5, H-15β), 4.82(1H, d, J = 5, H-14β), 7.50, 7.97(5H, m, Ar–H) [1]

References

1. Z.S. Boronova, M.N. Sultankhodzhaev, Chem. Nat. Comp. **37**, 269 (2001)

Tuberanine



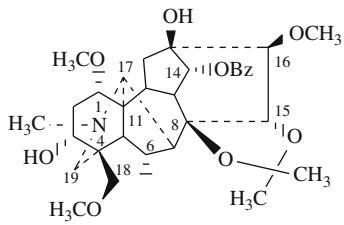
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum tuberosum*
$C_{35}H_{47}NO_{12}$: 673, 3085
Mp: 253–255°C (Me_2CO) [1]
IR: 3520, 2975, 2931, 2878, 2825, 1734, 1710, 1602, 1493, 1451, 1382, 1318, 1281, 1244, 1200, 1153, 1097, 1049, 1027, 986, 959, 895, 840, 770, 728, 717, 653, 615, 570, 528 [1]
MS *m/z*: 673(M^+, 2), 658(2), 642(29), 613(20), 600(18), 582(100), 555(54), 522(77), 508(8), 494(14), 492(12), 490(7), 105(53) [1]
^{1}H NMR: 1.32(3H, s, 8-$OCOCH_3$), 1.99(3H, s, 3-$OCOCH_3$), 3.12, 3.12, 3.20, 3.67(each 3H, s, 4×OCH_3), 3.86(1H, s, 13-OH), 4.02(3H, d, J = 7,

H-6β), 4.26(1H, d, J = 2.5, 15-OH), 4.37(1H, dd, J = 5, 2.5, H-15β), 4.80(1H, d, J = 5, H-14β), 4.83(1H, dd, J = 10, 5, H-3β), 7.44, 7.95(5H, m, ArH) [1]

References

1. M.N. Sultankhodzhaev, Z.S. Boronova, Chem. Nat. Comp. **35**, 201 (1999)

Tubermesaconitine

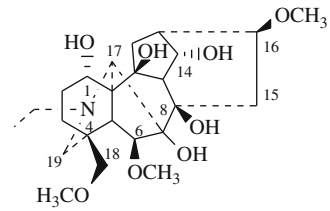


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum tuberosum*
$C_{34}H_{47}NO_{10}$: 629.3187
Mp: amorph. [1]
IR: 3490, 2930, 2855, 1710, 1590, 1430, 1385, 1310, 1255, 1245, 1130, 1110, 1055, 975, 955, 830 [1]
MS *m/z*: 629(M^+, 9), 599(15), 588(7), 571(100), 554(68), 540(43), 523(28) [1]
^{1}H NMR: 1.20, 1.36(each 3H, s, 2-C–CH_3), 2.30(3H, s, N–CH_3), 3.11, 3.24, 3.25, 3.67(each 3H, s, 4×OCH_3), 3.55(2H, d, J = 7.2, 2H-18), 4.00(1H, d, J = 6.5, H-6β), 4.45(1H, dd, J = 5.5, 2.5, H-15β), 4.83(1H, d, J = 5, H-14β), 7.50, 8.00(5H, m, Ar–H) [1]

References

1. Z.C. Boronova, M.N. Sultankhodzhaev, Chem. Nat. Comp. **37**, 269 (2001)

Turkosine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum barbatum, A. turczaninowii*
$C_{24}H_{39}NO_8$: 469.2676
Mp: 206–208°C [1]
IR: 3530–3300, 1100, 1090 [1]
MS *m/z*: 469(M^+, 14), 454(100), 452(41), 438(12), 436(38) [1]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 3.32, 3.33. 3.35(each 3H, s, 3×OCH_3), 3.99(1H, d, J = 2, H-6α), 4.62(1H, dd, J = 5, H-14β) [1]
^{13}C NMR: [1]

Table 1

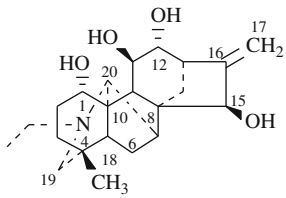
C-1	69.7	C-9	54.8	C-17	66.9
2	27.3	10	81.8	18	77.3
3	30.5	11	53.6	19	57.1
4	37.3	12	39.9	6-OCH_3	57.6
5	41.2	13	39.9	16-OCH_3	56.3
6	90.5	14	74.2	18-OCH_3	59.1
7	87.1	15	35.3	NCH_2	50.4
8	76.4	16	81.2	CH_3	13.3

References

1. N. Batbayar, D. Batsuren, M.N. Sultankhodzhaev, Chem. Nat. Comp. **29**, 48 (1993)

Turpelline

CAS Registry Number: 169626-33-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum turczaninowii*
$C_{22}H_{33}NO_4$: 375.240
Mp: 268–271°C (Me_2CO) [1]
IR: 3440, 3300, 1080, 1040 [1]
MS *m/z*: 375(M^+, 100), 360(20), 358(40), 357(21), 340(13), 316(26), 246(13), 228(10), 200(20) [1]
^{1}H NMR: 0.62(3H, s, 3H-18), 1.05(1H, dd, J = 12.1, 4.4, H-14a), 1.16(1H, m, H-3α), 1.34(1H, dd, J = 4.5, 13.5, H-6α), 1.36(1H, m, H-3β), 1.37(3H, t, J = 7.4, NCH_2CH_3), 1.56(1H, dd, J = 7.9, H-5), 2.01(1H, m, H-2α), 2.09(1H, d, J = 12.1, H-14β), 2.23(1H, d, J = 5, H-10), 2.31(1H, d, J = 10.3, H-9), 2.45(1H, br d, J = 13.5, H-19a), 2.81(1H, br d, J = 4.4, H-13), 2.86(2H, m, NCH_2CH_3), 2.9(1H, m, H-19β), 3.23(1H, dd, J = 8.3, 13.5, H-6β), 3.90(1H, br d, J = 7.5, H-12), 3.98(1H, br s, H-20), 4.45(1H, t, J = 2.4, H-15), 4.58(1H, dd, J = 7.1, 12.2, H-1β), 4.82(1H, dd, J = 7.8; 10.3, H-11), 5.16(1H, d, J = 2.0, H-17α), 5.32(1H, br s, 2H-17β) [1]
^{13}C NMR: [1]

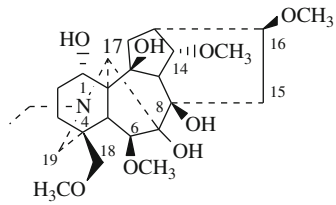
Table 1

C-1	68.9	C-9	46.8	C-17	109.8
2	30.2	10	55.5	18	25.6
3	31.2	11	73.5	19	59.2
4	36.8	12	82.7	20	66.8
5	48.4	13	46.8	NCH_2	51.5
6	23.6	14	37.2	CH_3	10.7
7	45.8	15	77.4		
8	55.2	16	158.6		

References

1. N. Batbayar, D. Batsuren, A.A. Semenov, M.N. Sultankhodzhaev, Chem. Nat. Comp. **29**, 658 (1993)

Tursoline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum turczaninowii*
$C_{25}H_{41}NO_8$: 483.2832
Mp: 249–251°C (Me_2CO), (1-O-Ac amorph.)
IR: 3460, 1100 [1]
MS *m/z*: 483(M^+, 16), 468(100), 466(58), 452(7), 450(41), 434(6), 432(10), 427(2), 412(6), 396(5), 336(4), 332(16) [1]
^{1}H NMR: 1.08(3H, t, J = 7, NCH_2CH_3), 3.32, 3.33, 3.37. 3.43(each 3H, s, 4×OCH_3), 4.08(1H, m, J = 5, H-14β) [1, 2]
^{13}C NMR(1-Ac tursoline): [1, 2]

Table 1

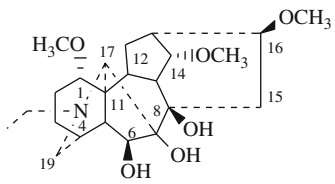
C-1	79.4	C-10	79.9	6-OCH_3	57.7
2	25.5	11	53.8	14-OCH_3	57.5
3	32.2	12	37.6	16-OCH_3	56.3
4	38.1	14	73.6	18-OCH_3	59.1
5	45.1	15	33.9	NCH_2	51.3
6	90.8	16	81.3	CH_3	14.3
7	88.0	17	66.1	CO	170.5
8	75.6	18	77.2	CH_3	22.0
9	54.0	19	52.5		

References

1. N. Batbayar, D. Batsuren, M.N. Sultankhodzhaev, Chem. Nat. Comp. **28**, 521 (1992)
2. C. de la Fuente, L. Ruir Mesia, Phytochemistry **37**(1), 285 (1994)

Umbrophine

CAS Registry Number: 144049-71-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum umbrosum*
$C_{23}H_{37}NO_6$: 423.2621
Mp: 110–112°C (Me_2CO–C_6H_{14}) [1]
Solubility: sol. $CHCl_3$, MeOH, Me_2CO
IR: 3600, 3400–3200, 1470, 1390, 1368, 1328, 1302, 1250, 1206, 1172, 1118, 1102, 1070, 1028, 998, 994, 968, 887, 753 [1]
MS *m/z*: 423(M^+, 11.3), 408(9.6), 406(9.4), 405(6), 392(100), 376(11.2), 374(5) [1]
^{1}H NMR: 1.08(3H, t, J = 7.5, NCH_2CH_3), 3.27, 3.37, 3.44(each 3H, s, 3×OCH_3), 3.64(1H, t, J = 4.5, H-14β), 4.24(1H, br s, H-6α) [1]
^{13}C NMR: [1]

Table 1

C-1	86.1	C-9	47.5	C-17	63.2
2	26.3	10	37.8	18	–
3	30.8	11	48.7	19	50.3
4	36.4	12	29.3	1-OCH_3	56.1
5	46.2	13	45.9	14-OCH_3	57.9
6	80.3	14	84.8	16-OCH_3	56.3
7	89.7	15	35.2	NCH_2	49.7
8	76.4	16	82.5	CH_3	13.6

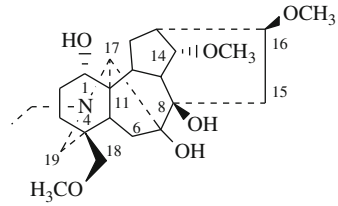
Pharm./Biol.: It has low toxicity. It exerts a weak hypotensive and ganglioblocking action [2]

References

1. V.A. Tel'nov, Chem. Nat. Comp. **29**, 60 (1993)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(6), 932 (1996)

Umbrosine

CAS Registry Number: 63201-50-3



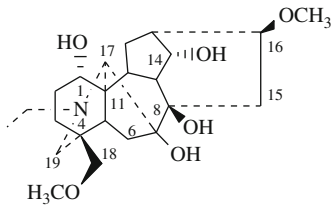
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum umbrosum*
$C_{24}H_{39}NO_6$: 437.2777
Mp: 150–151°C (C_6H_{14}) [1]
Solubility: sol. $CHCl_3$, MeOH, Me_2CO
IR: 3550, 3500–3360, 1500, 1460, 1395, 1340, 1300, 1205, 1130. 1095, 980, 940, 885, 820, 770 [1]
MS *m/z*: 437(M^+, 35), 422(54), 420(100), 404(16), 394(8), 388(5.4), 381(2.7), 350(10.7) [1]
^{1}H NMR: 1.05(3H, t, J = 7, NCH_2CH_3), 3.26, 3.28, 3.33(each 3H, s, 3×OCH_3) [1]
Pharm./Biol.: LD_{50} 130 mg/kg (i/v, mice). At large doses, it has hypotensive, ganglioblocking, and curare-like effect [2]

References

1. V.A. Tel'nov, N.M. Golubev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 610 (1976)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**(6), 932 (1996)

Virescenine

CAS Registry Number: 71609-78-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *A. ferox, Delphinium confusum*
$C_{23}H_{37}NO_6$: 423.2621
Mp: 68–70°C [1, 2]
$[\alpha]_D$ +17° ($CHCl_3$) [1, 2]
IR: 3500–3390, 1496, 1455, 1363, 1324, 1295, 1198, 1172, 1105, 1050, 1020, 990, 984, 955, 935, 870, 850, 752 [1]
MS *m/z*: 423(M^+, 23.7), 408(52.6), 406(100), 390(16), 367(5.2), 336(12) [1]
^{1}H NMR: 1.10(3H, t, NCH_2CH_3), 3.33, 3.35(each 3H, s, 2×OCH_3), 4.23(1H, dd, H-14β) [2, 3]
^{13}C NMR: [2, 3]

Table 1

C-1	72.4	C-9	48.0	C-17	64.9
2	28.8	10	39.9	18	78.7
3	29.3	11	49.5	19	55.9
4	37.7	12	26.9	NCH_2	50.5
5	41.9	13	43.6	CH_3	13.9
6	33.6	14	75.5	16-OCH_3	56.4
7	86.1	15	36.0	18-OCH_3	59.4
8	76.3	16	82.2		

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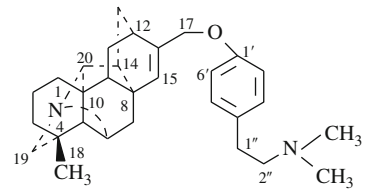
Zeraconine

CAS Registry Number: 111313-35-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum zeravschanicum*
$C_{30}H_{40}N_2O$: 444.3141
Mp: 130–131°C (Me_2CO) [1]
IR: 1615, 1585, 1515, 830, 810 [2]
MS *m/z*: 444(M^+, 15), 429(0.4), 401(0.4), 398(0.2), 338(0.5), 280(16), 64(0.4), 252(0.3), 251(0.3), 250(0.2), 238(0.3), 237(0.2), 236(0.3), 224(0.4), 210(0.5), 174(1.4), 160(1.0), 146(1.1), 58(100), [2]
^{1}H NMR: 0.90(3H, s, 3H-18), 2.19(6H, s, $N(CH_3)_2$), 3.10(1H, br s), 4.38(2H, br s), 5.69(1H, br s), 6.68, 6.95(each 2H, d, J = 8.5, Ar–H) [1]
^{13}C NMR: [1]

Table 1

C-1	27.7	C-12	61.9	C-1′	157.4
2	29.8	13	33.5	2′	129.4
3	33.2	14	50.1	3′	128.7
4	37.4	15	114.8	4′	144.2
5	48.6	16	132.5	5′	128.7
6	65.5	17	69.0	6′	129.4
8	50.0	18	28.9	1″	19.6
9	31.2	19	63.1	2″	61.8
10	44.9	20	74.2	$N(CH_3)_2$	45.5

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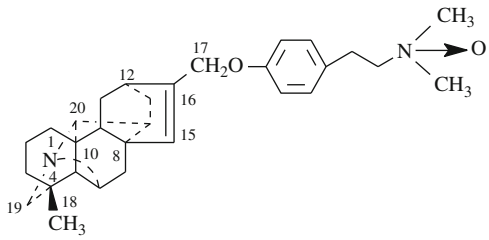
Zeraconine N-Oxide

CAS Registry Number: 111261-81-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum zeravchanicum*
$C_{30}H_{40}N_2O_2$: 460.3090
Mp: 94–95°C [1]
MS *m/z*: 460(M^+, 0.01), 459(0.02), 458(0.04), 457(0.02), 444(1.8), 429(0.1), 402(0.7), 399(11), 387(0.1), 339(0.1), 338(0.1), 296(0.1), 280(100), 264(0.4), 252(0.3), 251(0.3), 250(0.2), 239(0.3), 238(0.3), 237(0.2), 236(0.3), 224(0.3), 210(0.4), 174(0.6), 160(0.6), 146(0.9), 61(75), 60(57), 58(1), 42(50) [2]
^{1}H NMR: 0.93(3H, s, 3H-18), 3.14(6H, s, $N(CH_3)_2$), 3.44(2H, br s), 4.42(2H, br s), 5.72(1H, br s), 6.73, 7.03(each 2H, d, J = 8.5, *o*-Ar-H) [1]

References

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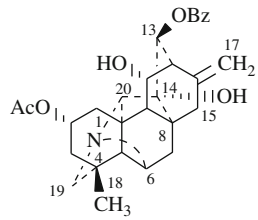
2. Ya.V. Rashkes, M.S. Yunusov, E.G. Sirotenko, Z.M. Vaisov, Chem. Nat. Comp. **23**, 452 (1987)

Zeravschanizine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diterpenoid Alkaloids
Biological sources: *Aconitum zeravschanicum*
$C_{29}H_{33}NO_6$: 491.2308
Mp: amorph., 289°C (dec., perchlorate) [1]
IR: 3620–3400, 3080, 1730, 1660, 1605, 1590, 1280, 890 [1]
MS *m/z*: 491(M^+), 476, 474, 448, 432, 386(100), 370, 105 [1]
^{1}H NMR: 0.90(3H, s, 3H-18), 2.13(3H, s, OCOCH3), 2.40(1H, d, J = 12, H-19-Hb), 2.67(1H, d, J = 12, H-19a), 3.23(1H, s, H-20), 4.34(1H, d, J = 9, H-11β), 4.70, 4.88(each 1H, br s, 2H-17), 5.15(1H, m, H-2β), 5.46(1H, br s, H-13α), 7.35–8.10(H–Ar) [1]
X-ray: [1]
Pharm./Biol.: LD_{50} 34.1 mg/kg (i/v, mice). Pronounced antiarrhythmic and local anaesthetic activity [2]

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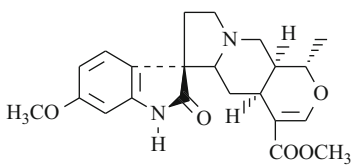
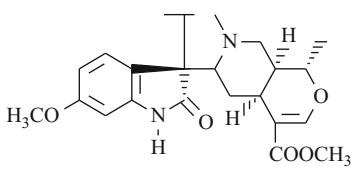
Indole alkaloids have been isolated from plants of 40 families. The richest sources are plants of the dogbane (Apocynaceae), madder (Rubiaceae), and loganica (Loganiaceae) families.

In plants growing in the CIS countries, they have been observed in representatives of the Amaranthaceae, Apocynaceae, Chenopodiaceae, Cyperaceae, Gramineae (Poaceae), Elaeagnaceae, Leguminosae, Polygonaceae, Ranunculaceae, and Zygophyllaceae families and certain strains of microorganisms. The richest sources were plants of the genus *Vinca*, especially *Vinca erecta* (Apocynaceae), which is endemic to Central Asia, from which more than 70 alkaloids were isolated (S. Yu. Yunusov, P. Kh. Yuldashev, V. M. Malikov, Kh. N. Aripov, et al.). These were derivatives of indoline, indole, oxindole, and indolenine.

The indoline skeleton is found in structural analogs of kopsinine, pseudokopsinine, kopsanone, picrinine, akuammine, akuammicine, quebrachidine, and vincadifformine. The indole group of the alkaloids varies widely in structure. It includes derivatives of quebrachamine, tombozine, and vincamine. All oxindole alkaloids are derivatives of carapanaubine and occur as pairs of stereoisomers, for example, vinerine and vineridine.



Vinerine



Vineridine

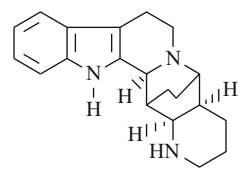
Each of these alkaloid groups has its own characteristic reactions and spectral properties. Distinguishing features of the PMR spectra of oxindole bases of the allo and epiallo series have been found. The sign of the specific rotation in oxindole alkaloids with *cis*-fused rings *D*/*E* was observed to depend on the spatial orientation of the C-3 proton. For the α-orientation, the oxindole alkaloids rotate the plane of polarization to the left; the β-orientation, to the right.

There is a definite relationship among compounds from this plant in spite of the large structural differences. This is supported by the isolation of the corresponding intermediates.

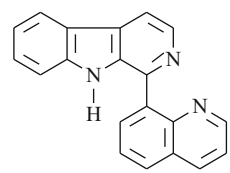
Alkaloids of *V. erecta* have pharmacological properties of practical value.

The methyl chloride of vincanine turned out to be very active as a short-duration ganglioblocker. Vinsumine (total alkaloids from the aerial part of *V. erecta*) exhibits relatively stable and distinct hypotensive action. Vincanine is a central nervous system analeptic with activity that is highly similar to strychnine. Vincanidine, similar to apomorphine, exhibits a distinct central emetic effect.

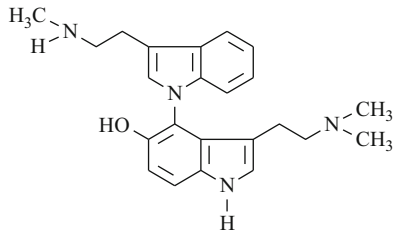
The most interesting indole alkaloids have been found in plants of the genus *Nitraria* (Zygophyllaceae). These alkaloids are based on the new heterocyclic systems 14,21-ethano-16-azoyohimbane (nitrarine) and indolo[3,2,1-*ij*]quinolino-[4,5-*bc*]-1,5-naphthyridine (komarovidinine). Alkaloids with the new structural type 1-quinolinyl-β-carboline (komarovine) have also been found.



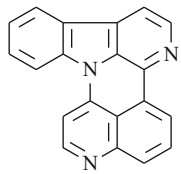
Nitrarine



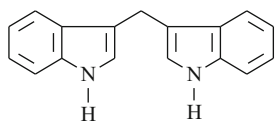
Komarovine



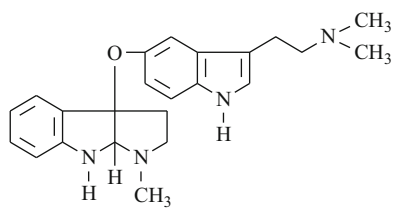
Arundamine



Komarovidinine



Arundine



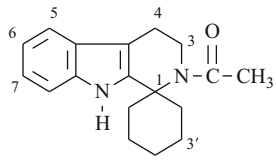
Arundinine

The chemistry of the alkaloids has been studied and their absolute configurations and preferred conformations have been established. Dehydrogenation reactions of nitrarine in the presence of selenium and sulfur and over palladium and mercury acetate and other conversions providing a methodological basis for proving the structures of alkaloids from this subgroup have been studied in detail.

Compounds with distinct spasmolytic, hypotensive, antimicrobial, antiarrhythmic, and anti-inflammatory activities have been found among the isolated alkaloids and their synthetic analogs.

Wild and cultivated *Arundo donax* has afforded monomeric indole alkaloids and dimeric ones with C–C (arundine), C–N (arundamine), and C–O (arundinine) bonds between the monomeric fragments.

Acetylkomavine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{18}H_{22}N_2O$: 282.3873
Mp: 162–163°C (iso-PrOH) [1]
UV: 225, 282, 291 sh (4.62, 4.03, 396) [1]
IR: 3287 (N–H), 3057 (Ar–H), 2927, 2853 ($-CH_2$, $-CH_3$), 1640 (N–CO), 1620, 1465, 1452, 1400, 1297, 1209, 1154, 1037, 1010, 742 [1]
MS *m/z*: 282 (M^+, 94), 267 (41), 240 (19), 239 (81), 225 (66), 223 (53), 211 (40), 210 (63), 197 (100), 184 (27), 183 (36), 168 (39), 167 (37), 155 (35), 154 (38), 144 (32), 130 (32), 129 (33), 95 (30), 93 (27), 91 (27), 81 (41) [1]
^{1}H NMR: 1.30–1.80 (8H, m), 2.21 (3H, s, $-CH_3$), 2.77 (2H, t, J = 6.0), 2.85 – 3.12 (2H, m), 3.72 (2H, t, J = 6.0), 7.08 (2H, m), 7.23 (1H, m), 7.42 (1H, m), 8.26 (1H, br s, N–H) [1]
^{13}C NMR: [1]

Table 1

C-1	60.7	C-6	117.9	C-3′	23.6
3	43.7	7	119.6	4′	24.5
4	22.2	8	121.7	5′	23.6
4a	107.2	8a	141.0	6′	34.6
4b	135.4	9a	126.5	CH_3	26.1
5	111.1	2′	34.6	C = O	171.9

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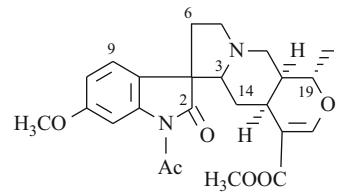
N-Acetylvinerine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{24}H_{28}N_2O_6$: 440.1947
Mp: 152–153°C [1]
IR: 1765, 1700, 1638 [1]
MS *m/z*: 440(M^+, 100), 223(40), 208(9), 189(7), 180(7), 69(11) [1]
^{1}H NMR: 1.41(d, CH_3-19), 2.66(s, NAc), 3.60(s, $COOCH_3$), 3.82(s, OCH_3), 4.36(s, H-19), 7.20 (s, H-9), 7.40(s, H-17), 7.87(d, H-12) [2]
^{13}C NMR: [3]

Table 1

C-2	180.7	C-11	159.6	C-20	37.8
3	72.3	12	102.7	21	54.0*
5	53.5*	13	140.2	22	167.3
6	36.6	14	30.1	CH_3-19	18.5
7	56.6	15	30.4	OCH_3	50.8
8	123.9	16	109.6	NCO	170.7
9	124.3	17	154.9	CH_3	26.6
10	111.1	19	72.0	Ar–OCH_3	55.5

Abs. conf.: 3S, 4R, 7S, 15S, 19S, 20S [2]

References

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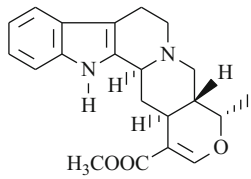
Ajmalicine

CAS Registry Number: 483-04-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia canescens, R. verticillata, R. vomitoria, Vinca rosea*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: 256–257°C, 283°C (hydrochloride) [1]
$[\alpha]_D$ −49° (MeOH) [1]
UV: 227, 282, 290(4.67, 3.92, 3.85) [2, 3]
IR: [2]
MS *m/z*: 352(M^+, 100), 351(61), 337(5), 321(5), 225(8), 223(3), 208(4), 170(10), 169(16), 156(63) [4]
^{1}H NMR: [2]
ORD: [3]
Stereochemistry: [3, 5, 6]
HPLC: [7]
Pharm./Biol.: Hypotensive, cardiotonic, adreno-, and sympatholytic action [8].

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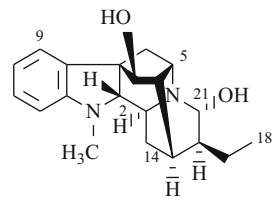
Ajmaline

CAS Registry Number: 4360-12-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia cambodiana, R. canescens, R. serpentina, R. verticillata, R. vomitoria*
$C_{20}H_{26}N_2O_2$: 326.1994
Mp: 205°C (MeOH) [1], 200–202°C [2]
$[\alpha]_D$ +130° ($CHCl_3$) [3]
UV: 248, 291 (3.96, 3.50) [3]
IR($CHCl_3$): 3620, 2960, 1612, 1468, 1358, 1068, 985 [4]
MS *m/z*: 326(M^+, 42), 311(11), 308(9), 298(4), 297(7), 237(4), 200(18), 183(49), 182(60), 168(33), 160(16), 158(35), 144(100), 131(35) [5]
^{13}C NMR (DMSO-d_6): [6]

Table 1

C-2	79.4	C-10	118.5	C-17	76.3
3	44.6*	11	126.7	18	12.3
5	52.5*	12	109.1	19	25.5
6	35.3	13	154.0	20	42.2
7	55.5	14	31.6	21	87.6
8	134.5	15	28.4	NCH_3	34.3
9	123.1	16	48.7*		

HPLC: [7]
Pharm./Biol.: LD_{50} 130, 206 mg/kg (i/p, mice, s/c, rats). Pronounced antiarrhythmic and hypotensive action. Used in medicine as an antiarrhythmic agent [8]

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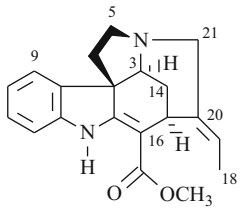
Akuammicine

CAS Registry Number: 639-43-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. herbacea, V. major, V. minor*
$C_{20}H_{22}N_2O_2$: 322.1681
Mp: 186°C [1]
$[\alpha]_D$ −735° (EtOH) [1], −580° ($CHCl_3$) [2]
UV: 227, 300, 330 (4.09, 4.07, 4.24) [1]
IR: 3382, 1667, 1603 [1]
MS *m/z*: 322(M^+), 307(10), 263(20), 121(100) [3]
^{13}C NMR: [4]

Table 1

C-2	167.5*	C-10	120.3	CO	167.7*
3	61.7	11	127.4	CH_3-18	13.1
5	56.1	12	109.1	19	120.0
6	46.1	13	136.8	20	139.2
7	57.4	14	30.8	21	56.8
8	136.8	15	29.6	$COOCH_3$	50.6
9	120.4	16	101.1		

Pharm./Biol.: In animals under narcosis intensifies cardiac contractions, lowers arterial pressure, and stimulates respiration. In high doses causes strychnine-like convulsions [5]

References

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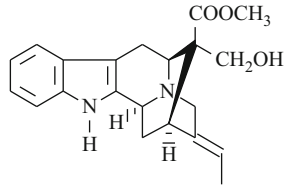
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 26

Akuammidine

CAS Registry Number: 639-36-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: 242–243°C (MeOH), 254°C (dec., O-Ac) [1]
$[\alpha]_D$ +27° (MeOH) [1]
UV: 227, 281(4.54, 3.93) [1]
IR: 1720, 1640 [1]
MS *m/z*: 352(M^+, 100), 351(73), 335(11), 334(6), 321(45), 293(19), 249(65), 183(11), 169(59), 168(42) [2, 3]
Pharm./Biol.: LD_{50} 391, 550 mg/kg (i/v, s/c, mice) [4]. Hypotensive and sedative action [4, 5]

References

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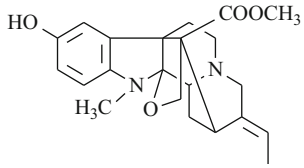
5. Kh Akhmedkhodzhaeva, A.G. Kurmukov, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (FAN, Tashkent, 1971), p. 30

Akuammine

CAS Registry Number: 3512-87-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia vomitoria, Vinca erecta, V. herbacea, V. major*
$C_{22}H_{26}N_2O_4$: 382.1893
Mp: 250–252°C (Me_2CO) [1]
$[\alpha]_D$ −103° [1], −140° [2]
UV: 244, 312(3.87, 3.60) [1]
IR: 3280, 1255, 780, 760, 750, 720 [2]
MS *m/z*: 382(M^+, 100), 255(37), 254(32.6), 196(20), 178(6), 174(28), 166(13), 161(15) [2]
Pharm./Biol.: Hypotensive and ganglioblocking action [3].

References

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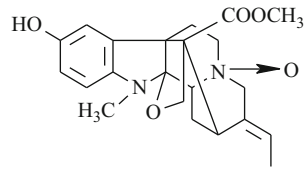
Akuammine N-Oxide



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca major*
$C_{22}H_{26}N_2O_5$: 398.1842
Mp: 178–180°C (EtOH) [1]
UV: 243, 312(2.91, 3.21) [1]
IR(vaseline oil): 3400–3200, 1735, 820, 750, 725 [1]
MS *m/z*: 398(M^+, 30), 383(32), 382(100), 381(45), 352(50), 337(30), 174(60), 121(70) [1]

References

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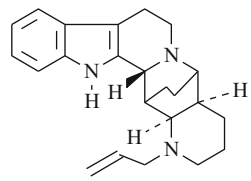
N-Allyl Isonitrarine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria schoberi*
$C_{23}H_{29}N_3$: 347.5056
Mp: 257–258°C (EtOH) [1]
$[\alpha]_D$ 0° (EtOH) [1]

UV: 223, 266–271, 280 (sh), 389 (4.74, 3.83, 3.80, 3.48) [1]
IR: 3046, 2937, 2863, 2814, 2744, 1640, 1468, 1445, 1334, 1232, 1143, 1122, 1009, 951, 937, 924, 892, 852, 773, 743[1]
MS *m/z*: 347 (M^+, 45), 320 (10), 319 (11), 318 (12), 306 (59), 289 (10), 277 (12), 263 (28), 243 (38), 237 (43), 225 (98), 224 (100), 222 (83), 221 (94), 169 (54), 168 (62), 144 (72) [1]
^{1}H NMR ($CD_3OD + CDCl_3$): 1.62 (m), 2.08 (m), 2.75 (m), 3.12 (m), 3.31 (2H, d, J = 9.5), 4.38 (m), 4.68 (1H, br s), 5.24 (2H, m), 5.86 (2H, m), 7.11 (2H, m), 7.42 (2H, m) [1]

References

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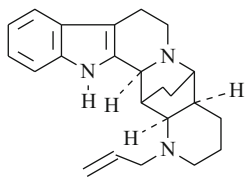
N-Allylnitrarine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{23}H_{29}N_3$: 347.5056
Mp: 269–271°C (EtOH) [1]
$[\alpha]_D$ 0°
UV: 222, 265–272, 280 (sh), 388 (4.72, 3.85, 3.84, 3.52) [1]
IR: 3382, 3120, 3046, 2932, 2862, 2815, 1641, 1622, 1495, 1468, 1423, 1385, 1334, 1277, 1261, 1232, 1195, 1164, 1155, 1143, 1122, 1081, 1050, 1008, 995, 970, 951, 937, 925, 891, 880, 852, 773 [1]
MS *m/z*: 347 (M^+, 52), 324 (10), 306 (23), 289 (10), 264 (24), 263 (21), 225 (76), 224 (100), 223 (81), 169 (47), 168 (44), 144 (36), 123 (85), 98 (62) [1]
^{1}H NMR: 1.21 (m), 1.70 (m), 2.20 (m), 2.90 (m), 3.30 (2H, d, J = 10), 3.75 (m), 4.21 (m), 4.62 (1H, br s), 5.25 (2H, m), 5.87 (1H, m), 7.13 (2H, m), 7.46 (2H, m) [1]

References

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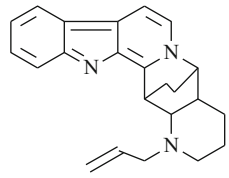
N-Allylschoberidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{23}H_{25}N_3$: 343.4740
Mp: 242–243°C [1]
$[\alpha]_D$ 0° [1]
UV: 254, 307, 367 (4.12, 4.01, 3.32) [1]
UV: EtOH + OH^-: 282, 333, 420 [1]
IR: 3400, 3070, 2960, 2860, 2820, 1645, 1630, 1590, 1465, 1345, 1265, 1120, 1100, 1005, 925, 840, 750 [1]
MS *m/z*: 343 (M^+, 20), 317 (67), 303 (48), 302 (37), 276 (24), 260 (26), 220 (68), 219 (100), 182 (57), 162 (51) [1]
^{1}H NMR: 1.20, 1.43, 2.00, 2.49, 3.06, 3.13, 3.24, 3.48, 4.51 (2H, m, H-3′), 4.92 (2H, m, H-1′), 5.42 (1H, m, H-2′), 7.16-8.52 [1]

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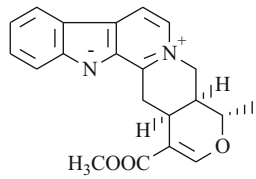
Alstonine

CAS Registry Number: 47485-83-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia littoralis*
$C_{21}H_{20}N_2O_3$: 348.1474
Mp: 203–205°C [1], 207°C (dec., sulphate) [2]
UV: 252, 307, 370 [1]; 251, 308, 368(4.53, 4.35, 3.65) [2]
IR: 1690, 1634, 1576, 1530, 1505, 1331, 1315, 1293, 1251, 1225, 1211, 1195, 1178, 1127, 1090, 1040, 1010, 985, 970, 945, 920, 849, 831, 798, 780, 766, 745, 720 [2]
IR(LiF): 3560, 3350 [2]
Pharm./Biol.: LD_{50} 8.8 mg/kg (i/v., mice); 14.4 mg/kg (i/v, rats). Hypotensive and antiparasitic action [3]

References

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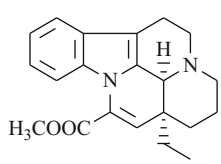
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 26

(+)-Apovincamine

CAS Registry Number: 4880-92-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. minor*
$C_{21}H_{24}N_2O_2$: 336.1838
Mp: 160–162°C (MeOH) [1]
$[\alpha]_D$ +202° (Py) [2], +121° ($CHCl_3$) [3]
UV: 230, 275, 315(4.40, 4.00, 3.80) [2]
IR: 1725, 1630, 1610, 750 [1]; 1750, 1255, 745 [2]
MS *m/z*: 336(M^+, 100), 307(83), 266(75), 251(10) [1]; 336(M^+, 33), 307(100), 266(92) [4]
HPLC: [5]

References

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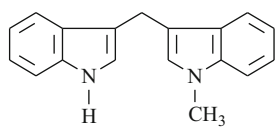
Ardine

CAS Registry Number: 174545-80-3



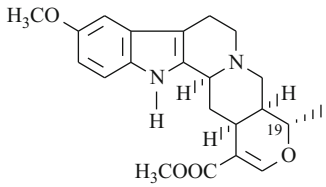
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Arundo donax*
$C_{18}H_{16}N_2$: 260, 1310
Mp: amorph. [1]
UV: 215, 278, 289 (4.66, 3.94, 3.89) [1]
IR: 3173, 2919–2855, 1617, 820, 747 [1]
MS *m/z*: 260 (M^+), 259, 144, 130 [1]
^{1}H NMR (CD_3OD): 2.90 (3H, s, NCH_3), 4.75 (2H, br s, CH_2–Ar), 6.80–7.75 (10H, H–Ar) [1]

References

1. V.U. Khujaev, S.F. Aripova, Chem. Nat. Comp. **31**, 277 (1995)

Aricine

CAS Registry Number: 482-91-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia canescens*
$C_{22}H_{26}N_2O_4$: 382.1893
Mp: 189–190°C (EtOH) [1, 2]; 255°C (hydrochloride), 264°C (hydrobromide), 223°C (picrate), 245°C (oxalate) [3]
$[\alpha]_D$ −79° (Py) [2], −59° (EtOH) [3]
UV: 227, 250, 279, 298 sh (4.54, 4.05, 3.98, 3.88) [4]; 229, 281 [2]
IR: [2]
MS *m/z*: [4]
^{1}H NMR: 1.37(J = 6.3, CH_3-19) [5]
ORD: [4]
Stereochemistry: [4–7]

References

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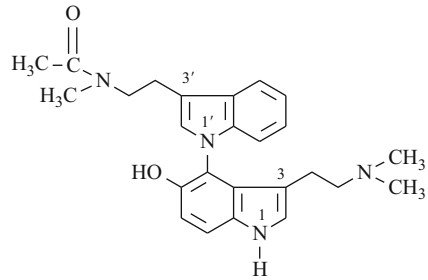
Arundacine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Arundo donax L.*
$C_{25}H_{30}N_4O_2$: 418.5368
Mp: 192–193°C [1]
IR: 3400–3175, 1630, 1600, 1509 [1]
MS *m/z*: 418 (M^+, 417 (M-1, 100), 332, 204, 130 [1]
^{1}H NMR (for two conformers of arundacine in Py-d_5) (c-conformer): 1.902 (H-10), 2.043 (Ac), 2.15 and 2.28 (H-9), 2.26 and 2.38 (H-8), 2.845 (H-10′), 3.09 and 3.15 (H-8′), 3.81 and 3.85 (H-9′), 7.20 (H-5′), 7.32 (H-6′), 7.36 (H-2), 7.37 (H-7′), 7.37 (H-6), 7.40 (H-2′), 7.645 (d, J = 7.9, H-7), 7.91 (d, J = 8.6, H-4′), 9.77 (OH), 11.928 (H-1) [1]
(t-conformer): 1.890 (H-10), 2.131 (Ac), 2.15 and 2.28 (H-9), 2.26 and 2.38 (H-8), 3.060 (H-10′), 3.01 and 3.04 (H-8′), 3.56 and 3.59 (H-9′), 7.21 (H-6′), 7.25 (H-5′), 7.35 (H-2′), 7.36 (H-2), 7.37 (H-6), 7.37 (H-7′), 7.629 (d, J = 7.7, H-7), 7.759 (d, J = 7.0, H-4′), 9.77 (OH), 11.901 (H-1) [1]
^{13}C NMR (for two conformers of arundacine in Py-d_5): [1]

c-conformer:

Table 1

C-1	125.41	C-8	23.79	C-6′	122.28
2	112.28	9	61.22	7′	119.61
3	117.08	10	45.07	7′a	139.64
4	128.79	2′	129.19	8′	23.84
5	149.05	3′	113.26	9′	48.80
6	113.11	3′a	133.16	10′	36.35
7	113.11	4′	111.87	Ac	21.94
7a	126.81	5′	119.39	C = O	169.93

t-conformer:

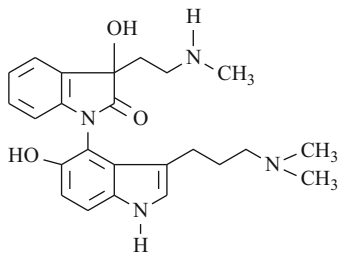
Table 2

C-1	125.30	C-8	23.68	C-6′	122.13
2	112.28	9	61.22	7′	119.44
3	116.98	10	45.05	7′a	139.64
4	128.40	2′	129.00	8′	24.72
5	149.05	3′	113.26	9′	51.57
6	113.11	3′a	133.16	10′	33.13
7	113.00	4′	111.67	Ac	21.40
7a	126.81	5′	118.94	C = O	169.93

References

1. V.U. Khuzaev, I.Zh. Zhalolov, M.G. Levkovich, S.F. Aripova, A.S. Shashkov, Chem. Nat. Comp. **38**, 280 (2002)

Arundafine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Arundo donax L.*

$C_{23}H_{28}N_4O_3$: 408.4980

Mp: 205–207°C [1]

IR: 3320–3200, 1630, 1610, 1520 [1]

MS *m/z*: 409 (M + 1, 100), 391 (7), 390 (17), 372 (7), 332 (6), 296, 295, 272, 249, 248, 237, 204, 188, 171, 170, 146, 145, 130, 115, 113, 112, 103, 97, 95, 92, 81 [1]

^{1}H NMR ($CD_3OD + CDCl_3$): 1.88 (s, H-10′), 2.13 (dt, J = 11.4 and 5.5) and 2.19 (td, J = 11.4 and 4.4, H-9′), 2.29 (s, H-10), 2.30 (dt, J = 12.2 and 8.3) and 2.46 (m, H-9), 2.52 (m) and 2.61 (m, H-8′), 2.54 (m) and 2.70 (dt, J = 12.2 and 8.3, H-8), 6.44 (d, J = 7.5, H-7), 6.89 (d, J = 8.7, H-6′), 6.95 (s, H-2′), 7.15 (t, J = 7.5, H-5), 7.21 (t, J = 7.5, H-6), 7.45 (d, J = 7.5, H-4) [1]

^{13}C NMR ($CD_3OD + CDCl_3$): [1]

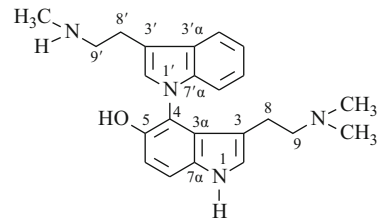
Table 1

C-2	180.38	C-8	35.93	C-5′	148.07
3	75.20	9	47.77	6′	112.70
3a	130.88	10	36.25	7′	113.98
4	124.24	2′	124.00	8′	25.14
5	124.94	3′	111.47	9′	60.61
6	130.17	3′a	124.55	10′	44.37
7	110.74	4′	109.94		

References

1. V.U. Khuzaev, I. Zhalolov, K.K. Turgunov, B. Tashkhodjaev, M.G. Levkovich, S.F. Aripova, A.S. Shashkov, Chem. Nat. Comp. **40**, 269 (2004)

Arundamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Arundo donax*

$C_{23}H_{28}N_4O$: 376.5000

Mp: 104–105°C [1]

UV: 222, 285 (4.36, 3.74) [1]

IR: 3334–3049, 2935–2799, 1612–1505, 1459–1390, 764–744 [1]

MS *m/z*: 376 (M^+), 332, 318, 302, 273, 259, 204, 173, 159, 146, 130, 115, 89 [1]

^{1}H NMR: 1.86 [6H, s, $N(CH_3)_2$], 2.09, 2.20 (each 1H, dt, J = 11.2, 11.2, 5.4; J_2 = 10.8, 10.8, 5.2, H-9),

2.29, 2.42 (each 1H, dt, J_1 = 10.1, 14.3, 5.4, J_2 = 10.6, 10.6, 5.4, H-8), 2.44 (3H, s, NCH_3), 3.02 (2H, m, H-9′), 7.21 (2H, m, H-5′, 6′), 7.33 (1H, m, H-4′), 7.35 (1H, s, H-2), 7.38 (1H, d, J = 8.6), 7.38 (1H, s, H-2′), 7.64 (1H, d, J = 8.6, H-7), 7.76 (1H, d, J = 7.9, H-7′)[1]

^{13}C NMR: [1]

Table 1

C-2	125.29	C-8	24.10	C-6′	122.01
3	113.28	9	61.35	7′	119.41
3α	133.13	10	45.12	7′ α	139.58
4	128.84	2′	129.03	8′	26.19
5	149.04	3′	114.15	9′	52.90
6	113.09	3′ α	117.10	11′	36.45
7	113.14	4′	111.66		
7 α	126.81	5′	119.25		

X-Ray: [2]

References

1. I.Zh. Zhalolov, V.U. Khujaev, M.G. Levkovich, S.F. Aripova, A.S. Shashkov, Chem. Nat. Comp. **38**, 276 (2002)
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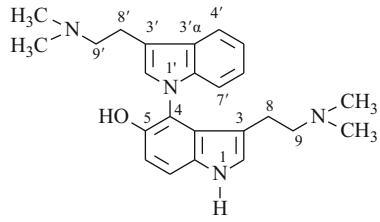
Arundanine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Arundo donax*

$C_{24}H_{30}N_4O$: 390.5268

Mp: 198–199°C [1]

UV: 208, 223, 284 (4.59, 4.66, 4.07) [1]

IR: 3350–3050, 2943–2830, 1579–1467, 795–747 [1]

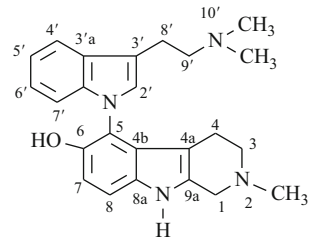
MS *m/z*: 390 (M^+), 346, 332, 302, 273, 259, 243, 230, 204, 187, 146, 130, 115, 89 [1]

^{1}H NMR: 1.72 [6H, s, $N(CH_3)_2$], 1.85 (2H, m, H-8′), 2.0 (2H, m, H-8), 2.24 [6H, s, $N(CH_3)_2$], 2.64 (2H, m, H-9′), 2.94 (2H, m, H-9), 6.84 (1H, s, H-2), 6.88 (1H, d, J = 8.7), 6.90–7.15 (2H, m, H-5′, 6′), 6.98 (1H, s, H-2′), 8.57 (NH) [1]

References

1. V.U. Khuzhaev, I.Zh. Zhalolov, M.G. Levkovich, S.F. Aripova, Russ. Chem. Bull. **52**(3), 16 (2003)

Arundarine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Arundo donax L.*

$C_{24}H_{28}N_4O$: 388.5110

Mp: 250–252° [1]

IR: 3251, 3050, 2949, 2760, 1597, 1459, 1445, 1388, 1351, 1243, 1153, 1133, 1053, 969, 739 [1]

MS *m/z*: 388 [M^+] (14), 373 [M-15]$^+$ (30), 374 (11), 330 [M-58]$^+$ (12), 273 (5), 202 (3), 188 (3), 130 (8), 115 (5), 77 (8), 58 (12), 57 (100) [1]

^{1}H NMR (DMSO-d_6): 1.84 and 1.355 (both dt, J = 15.8 and J = 5.5, H-4), 2.23 and 2.30 (both m, H-3), 2.24 (s, NMe), 2.30 (s, $N(10')Me_2$), 2.66 (t, J = 7.8, H-9), 2.93 (brs, H-8′), 3.42 (s, H-1), 6.76 (d, J = 8.7, H-4′), 6.78 (d, J = 8.6, H-7′), 7.005 (m, H-6′), 7.015 (m, H-5′), 7.12 (s, H-2), 7.20 (d, J = 8.6, H-8), 7.59 (d, J = 8.7, H-7′), 8.73 (brs, OH), 10.66 (s, NH) [1]

^{13}C NMR (DMSO-d_6): [1]

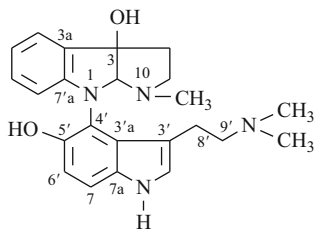
Table 1

C-1	52.1	C-6	146.4	C-5′	118.3
9a	134.15	7	110.6	6′	118.25
2	45.3	8	111.3	7′	120.9
3	52.4	8a	130.75	7′a	138.1
4	20.95	2′	128.35	8′	22.7
4a	104.5	3′	112.4	9′	59.7
4b	125.5	3′a	127.2	10′	44.9
5	114.9	4′	110.65		

References

1. V.U. Khuzhaev, I.Zh. Zhalolov, M.G. Levkovich, S.F. Aripova, A.S. Shashkov, Russ. Chem. Bull. Int. Ed. **53**, 1765 (2004)

Arundavine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Arundo donax L.*
$C_{23}H_{28}N_4O_2$: 392.4990
Mp: 250–252°C [1]
IR: 3343, 3247, 1606, 1540, 1481, 1463, 1385, 1289, 1241, 1142, 1101, 1054, 1001, 950, 827, 755 [1]
MS *m/z*: 392 (M^+), 393 $(M + 1)^+$, 375, 374 (98), 347, 334, 331, 292, 288, 273, 247, 173, 171, 145, 130, 115, 97, 95, 92, 58, 57 (100) [1]
^{1}H NMR (DMSO-d_6): 2.250 (bs, H-10′), 2.463 (s, H-10), 2.525 (m, H-8), 2.625 (m) and 2.779 (m, H-9′), 2.653 (m, H-8′), 2.863 and 2.95 (m, H-9), 4.558 (s, H-2), 5.712 (d, J = 7.8, H-7), 6.662 (t, J = 7.3, H-5), 6.776 (J = 8.6, H-7′), 6.959 (t, J = 7.6, H-6), 7.06 (J = 2.0, H-2′), 7.235 (J = 8.6, H-6′), 7.316 (d, J = 7.3, H-4) [1]
^{13}C NMR (DMSO-d_6): [1]

Table 1

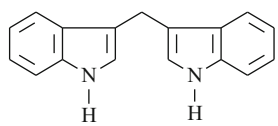
C-1	97.37	C-8	38.19	C-5′	149.35
2	88.13	9	53.36	6′	112.85
3	131.05	10	42.46	7′	111.96
4	123.71	2′	124.24	7′a	132.02
5	117.05	3′	108.93	8′	22.05
6	129.16	3′a	124.48	9′	58.17
7	106.11	4′	116.35	10′	42.46
7a	149.70				

References

1. V.U. Khuzaev, I. Zhalolov, K.K. Turgunov, B. Tashkhodjaev, M.G. Levkovich, S.F. Aripova, A.S. Shashkov, Chem. Nat. Comp. **40**, 261 (2004)

Arundine

CAS Registry Number: 1968-05-4



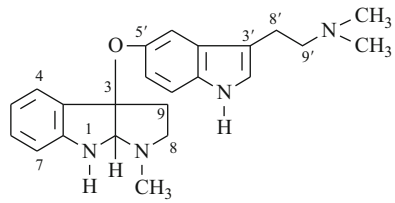
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Arundo donax*
$C_{17}H_{14}N_2$: 246.1157
Mp: 166–168°C (MeOH) [1]
Solubility: sol. MeOH, EtOH [1]
IR: 3400, 1620, 1600, 1470, 860, 800. [1]
MS m/z: 246(M^+), 130, 96, 75, 51 [1]
^{1}H NMR: 3.85(2H, br s, CH_2), 6.85–7.65(10H, H–Ar) [1]

References

1. V.U. Khuzhaev, S.F. Aripova, R. Shakirov, Chem. Nat. Comp. **30**, 635 (1994)

Arundinine

CAS Registry Number: 246856-96-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Arundo donax*
$C_{23}H_{28}N_4O$: 376.5000
Mp: 148–150°C [1]
UV: 204, 226, 288 (4.49, 4.02, 3.48) [1]
IR: 3397, 3040–2826, 1260, 1609, 820, 748 [1]
MS *m/z*: 376 (M^+), 204, 190, 173 (100), 130 [1]
^{1}H NMR: 2.30 [6H, s, $N(CH_3)_2$], 2.33 (1H, J = 12.5, 5.42, 5.10, Ha-9), 2.44 (2H, J = 16.57, H-9′), 2.47 (3H, s, NCH_3), 2.69 (1H, J = 8.4, 8.0, 5.4, Ha-8), 2.73 (2H, J = 16.09, H-8′), 2.77 (1H, J = 12.1, 8.0, 6.5, He-9), 2.9 (1H, J = 8.4, 6.5, 5.1, H-8e), 4.24 (1H, NH), 4.93 (1H, s, H-2), 6.62 (1H, J = 7.8, 1.0, 0.5, H-7), 6.70 (1H, J = 8.7, 2.3, H-6′), 6.77 (1H, J = 7.4, 7.5, 1.0, H-5), 6.83 (1H, J = 2.3, H-4′), 6.90 (1H, J = 2.3, H-2), 7.08 (1H, J = 8.7, H-7′α), 7.11 (1H, J = 7.8, 7.5, 1.3, H-6), 7.94 (1H, NH) [1]
^{13}C NMR: [1]

Table 1

C-2	84.59	C-8e	51.87	C-6′	116.78
3	96.69	9e	40.87	7′	132.29
3α	130.41	2′	122.20	7′ α	109.03
4	124.89	3′	114.16	8′	60.00
5	119.28	3′ α	127.52	9′	23.52
6	129.63	4′	111.1	NCH_3	37.47
7	110.30	5′	149.55	$N(CH_3)_2$	45.34
7 α	151.01				

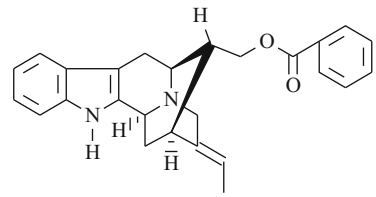
X-Ray: [1]

References

1. I.Zh. Zhalolov, V.U. Khujaev, B. Tashkhodjaev, M.G. Levkovich, S.F. Aripova, N.D. Abdullaev, Chem. Nat. Comp. **34**, 706 (1998)

O-Benzoyltombosine

CAS Registry Number: 54357-60-7



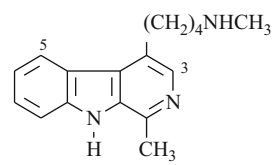
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{26}H_{26}N_2O_2$: 398.1994
Mp: 255–256°C (Et_2O) [1]
$[\alpha]_D$ +9° ($CHCl_3$) [1]
UV: 227, 281, 291(4.48, 3.95, 3.62) [1]
IR: 3170, 1720 [1]
MS *m/z*: 398(M^+), 397, 293, 277, 276, 275, 263, 169, 168, 105 [1]
^{1}H NMR: 1.51(d, CH_3), 5.40(q, =CH), 7.01-8.02(9H, H–Ar), 8.39(s, NH) [1]

References

1. M.R. Sharipov, M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 422 (1974)

Brevicarine

CAS Registry Number: 25978-39-6



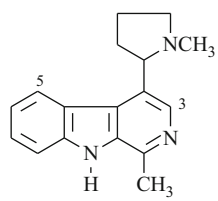
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Carex brevicollis*
$C_{17}H_{21}N_3$: 267.1736

Mp: 61°C (crystal hydrate), 112°C (anhyd.), 196°C (dihydrochloride, EtOH), 202°C (dec., dinitrate, EtOH), 212°C (dec., dipicrate) [1]
$[\alpha]_D$ +30° (MeOH) [2]
Solubility: very sol. alc., Py; sol.C_6H_6, $CHCl_3$; spar. sol. petether, Et_2O; in sol.H_2O [2]
UV: 236, 244, 288, 338, 350(2.53, 4.51, 4.12, 3.79, 3.83) [2]
UV(H^+): 250, 302, 365(4.55, 4.24, 3.92) [2]
IR: 3125, 1639, 1563, 1504, 1481, 746, 719 [2]
MS *m/z*: 267(M^+, 5), 252, 237, 223, 209, 195, 44(100) [1]
^{1}H NMR: 1.67, 2.05(each 2H, m), 2.35(3H, s, NCH_3), 2.55(2H, m), 2.70(3H, s, C-CH_3), 3.10(2H, m), 7.40(3H, m, H–Ar), 8.05(1H, m, H-5), 8.08(1H, m, H-3), 10.10(1H, br s, NH) [3]
Pharm./Biol.: LD_{50} 375 mg/kg (s/c, mice). Antiarrhythmic activity [3, 4]

References

1. I.V. Terent'eva, T.I. Shirshova, A.F. Sholl', V.I. Kovalenko, *Brevicolline – An Alkaloid of the Sedge Carex brevicollis* [in Russian] (AN MSSR, Kishinev, 1969), p. 36
2. I.V. Terent'eva, A.V. Borovkov, *Alkaloid-Beariing Plants of Moldavia* [in Russian] (Shtiintsa, Kishinev, 1960), p. 41
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 123
4. P.P. Denisenko, T.V. Vinogradova, A.A. Semenov, *Farmakol Toksicol.* **LI**(2), 50 (1988); CA, **108**, 161209p (1988)

Brevicolline



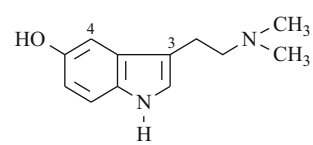
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Carex brevicollis*
$C_{17}H_{19}N_3$: 265.1579
Mp: 224–225°C (MeOH), 242°C (hydrochloride (H_2O)), 273°C (dihydrochloride (EtOH)), 253°C (dihydroiodide (EtOH)), 212°C (methiodide), 264°C (dimethiodide), 214°C (sulphate), 253°C (disulphate), 246°C (diperchlorate (EtOH)), 189°C (dinitrate (EtOH)), 231°C (dipicrate (EtOH)) [1]
$[\alpha]_D$ −146° (EtOH) [1]
UV: 245, 288, 338, 352(4.42, 3.98, 3.64, 3.69) [1]
UV(H^+): 262, 306, 372 [1]
IR: 3440, 1625, 1575, 1460, 1160, 1060, 910, 670 [1]
MS *m/z*: 265(M^+, 10), 236(38), 222(18), 84(100), 42(54) [1]
^{1}H NMR: 1.90(2H, m), 2.20(2, m), 2.25, 2.80(each 3, s, NCH_3, CH_3), 3.25(2, m), 4.00(1, t), 7.50(3H, m, H–Ar), 8.45(1H, d, H-5), 8.50(1H, H-3), 10.70(1H, br s, NH) [1]
Pharm./Biol.: LD_{50} 146 mg/kg (s/c, mice) [2]. LD_{100} 50–80 mg/kg (s/c, rats). (Dihydrochloride) stimulates respiration, intensifies contraction of the muscles of the intestine and the uterus, and exhibits vasodilator and antispasmodic effects [3]. Used in gynecological practice [1, 4, 5]

References

1. I.V. Terent'eva, G.V. Lazur'evskii, Vember P.A., *Brevicolline – An Alkaloid of the Sedge Carex brevicollis* [in Russian] (AN MSSR, Kishinev, 1969), p. 5
2. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 124
3. V.M. Chernov, *Alkaloid-Bearing Plants of Moldavia* [in Russian] (Shtiintsa, Kishinev, 1960), p. 49
4. A.D. Turova A.I. Leskov, A.I. MitroFANov, P.I. Sizov, *Brevicolline – An Alkaloid of the Sedge Carex brevicollis* [in Russian] (AN MSSR, Kishinev, 1969), p. 69
5. M.N. Konovalova, N.A. Chernovskaya, G.P. Men'shikov, O.N. Shirokinskaya, *Brevicolline – An Alkaloid of the Sedge Carex brevicollis* [in Russian] (AN MSSR, Kishinev, 1969), p. 81

Bufotenine

CAS Registry Number: 487-93-4



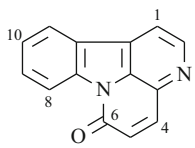
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Arundo donax*
$C_{12}H_{16}N_2O$: 204.2730
Mp: 146–147°C [1]
IR: 3407, 3310,1625, 1582 [1]
MS *m/z*: 204 (M^+), 187, 160, 146, 131, 117, 91, 77, 58, 57 [1–3]
^{1}H NMR ($CDCl_3$ + CD_3OD): 2.34 (6H, s, NMe_2), 2.82 (2H, m), 2.72 (2H, m), 6.93 (1H, s, H-2), 6.78 (dd, J = 2.3, 8.5, H-6), 7.00 (1H, d, J = 2.3, H-4), 7.19 (1H, d, J = 8.5, H-7), 8.59 (1H, bs, NH) [1]

References

1. I. Zhalolov, V.U. Khuzaev, M.G. Levkovich, S.F. Aripova, Chem. Nat. Comp. **36**, 528 (2000)
2. S. Ghosal, R.K. Chaudhuri, S.K. Dutta, Phytochemistry **10**, 2852 (1971)
3. I.J. Pachzer, D.E. Zachrias, O. Ribeiro, J. Org. Chem. **24**, 1285 (1959)

Canthin-6-One

CAS Registry Number: 479-43-6



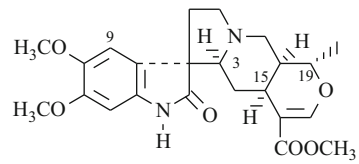
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aerva lanata*
$C_{14}H_8N_2O$: 220.0637
Mp: 155–156°C (EtOH) [1]
UV: 251, 259, 268, 300, 347, 362, 380(4.10, 4.12, 4.07, 3.92, 3.94, 4.15, 4.13) [1]
IR: 1670, 1630, 1600 [1]
MS *m/z*: 220(M^+, 100), 192(87), 165(37), 164(43), 139(37), 110(22) [1]
^{1}H NMR: 6.95(d, J = 10, H-5), 7.48(t, J = 8.5, H-10), 7.66(t, J = 8.5, H-9), 7.88(d, J = 5, H-1), 7.96(d, J = 10, H-4), 8.06(d, J = 8.5, H-11), 8.62(d, J = 8.5, H-8), 8.78(d, J = 5, H-2) [1]

References

1. G.G. Zapesochnaya, L.N. Pervykh, V.A. Kurkin, Chem. Nat. Comp. **27**, 336 (1991)

Carapanaubine (Vinine)

CAS Registry Number: 1255-02-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea, V. pubescens*
$C_{23}H_{28}N_4O_6$: 428.1947
Mp: 216–217°C (Me_2CO) [1], 221–223°C (EtOH) [2], 212–214°C (MeOH) [3]
$[\alpha]_D$ −110° ($CHCl_3$) [3], −115° (Py) [4]
UV: 215, 244(4.57, 4.23) [2]
UV(H^+): 222, 278(4.56, 3.79) [2]
IR: 3236, 1695, 1669, 1626 [2]
MS *m/z*: 428(M^+), 413, 411, 397, 223(100), 219, 208, 206, 204, 190, 69(100) [2, 3]
^{1}H NMR: 1.40(3H, d, J = 6, CH_3-19), 3.61(3H, s, $COOCH_3$), 3.90(3H, s, OCH_3), 3.92(3H, s, OCH_3), 4.20–4.70(1H, q, H-15), 4.56(1H, m, J = 6, H-19), 6.55(1H, s, H-Ar), 6.74(1H, s, H-Ar), 7.44(1H, s, H-17), 8.73(1H, s, NH) [2–4]
Stereochemistry: [5]
Pharm./Biol.: Pronounced hypotensive action [6]

References

1. N. Abdurakhimova, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 172 (1965)

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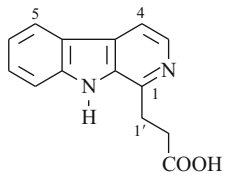
3. G.V. Chkhikvadze, V.Yu. Vachnadze, K.S. Mudzhiri, Soobshch. AN GSSR **69**, 369 (1973)
4. I. Ognyanov, B. Pyuskylev, I. Kompis, T. Sticzag, G. Spiteller, M. Shamma, K.J. Shine, Tetrahedron **24**, 4641 (1968)
5. N. Finch, C.W. Gemenden, I.H.-C. Hsu, W.I. Taylor, J. Amer. Chem. Soc. **85**, 1520 (1963)
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 29

β-Carboline −1-propionic Acid

CAS Registry Number: 89915-39-9



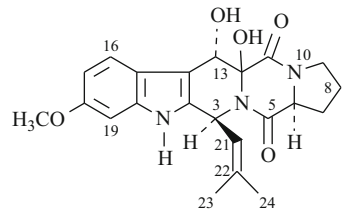
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aerva lanata*
$C_{14}H_{12}N_2O_2$: 240.0899
Mp: 214–215°C (Me_2CO–H_2O) [1]
UV: 236, 280 sh, 290, 300 main peak, 336, 350(4.92, 4.45, 4.50, 4.40, 4.36, 4.36) [1]
UV(EtOH + HCl): 251, 303, 370(4.97, 4.80, 4.45) [1]
MS *m/z*: 240(M^+, 80), 222(100), 195(45), 194(60), 193(50), 181(30), 168(47), 167(35), 140(49) [1]
^{1}H NMR(Py-d_5): 3.34(t, J = 7.5, 2H-2′), 3.80(t, J = 7.5, 2 H-1′), 7.20–7.60(m, H-6, H-7, H-8), 7.92(d, J = 5, H-4), 8.20(d, J = 9, H-5), 8.52(d, J = 5, H-3) [1]

References

1. G.G. Zapesochnaya, L.N. Pervykh, V.A. Kurkin, Chem. Nat. Comp. **27**, 336 (1991)

Cyclotryprostatin A

CAS Registry Number: 111468-06-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aspergillus fumigatus* KMM 4631
$C_{22}H_{25}N_3O_5$: 411.1794
Mp: 178–182°C ($CHCl_3$) [1]
$[\alpha]_D^{26}$ +83.0° (*c* 0.4, $CHCl_3$) [1]
MS *m/z*: 411 (M^+, 72), 243 (66), 200 (100) [1]
^{1}H NMR: 7.82 (1H, brs, NH), 6.65 (1, d, J = 9.7, H-3), 4.42 (1H, dd, J = 6.0, 10.5, H-6), 1.99, 2.49 (2H, m, 2H-7), 1.99, 2.08 (2H, m, 2H-8), 3.64–3.80 (2H, m, 2H-9), 5.10 (1H, s, H-13), 7.45 (1H, d, J = 8.5, H-16), 6.81 (1H, dd, J = 2.2, 8.5, H-17), 6.86 (1H, d, J = 2.2, H-19), 5.60 (1H, dm, J = 9.6, H-21), 1.79 (3H, s, CH_3-23), 2.04 (3H, s, CH_3-24), 4.43 (1H, brs, OH-12), 2.20 (1H, brs, OH-13), 3.82 (3, s, OCH_3) [1]
^{13}C NMR: [1]

Table 1

C-2	133.4	C-12	85.6	C-19	95.4
3	48.9	13	68.9	20	136.8
5	165.6	14	107.5	21	123.5
6	60.5	15	120.7	22	138.0
7	29.9	16	118.4	23	26.0
8	22.1	17	110.0	24	18.3
9	45.9	18	156.8	CH_3O-18	55.8
11	166.9				

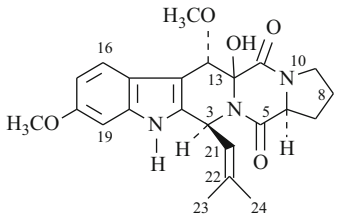
Pharm./Biol.: Cytotoxic action

References

1. Sh.Sh. Afiyatulov, A.I. Kalinovskii, M.V. Pivkin, P.S. Dmitrenok, T.A. Kuznetsova, Chem. Nat. Comp. **40**, 615 (2004)

Cyclotryprostatin B

CAS Registry Number: 184305-67-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aspergillus fumigatus* KMM 4631
$C_{23}H_{27}N_3O_5$: 425.1951
Mp: 155–160°C ($CHCl_3$) [1]
$[\alpha]_D^{26}$ +108° (*c* 0.2, $CHCl_3$) [1]
MS *m/z*: 425 (M^+, 59), 257 (100), 226 (56) [1]
^{1}H NMR: 7.90 (1H, brs, NH), 6.65 (1H, d, J = 9.8, H-3), 4.42 (1H, dd, J = 6.2, 10.8, H-6), 2.00, 2.49 (2H, m, 2H-7), 2.00, 2.10 (2H, m, 2H-8), 3.70, 3.75 (2H, m, 2H-9), 4.73 (1H, s, H-13), 7.44 (1H, d, J = 8.5, H-16), 6.82 (1H, dd, J = 2.2, 8.5, H-17), 6.88 (1H, d, J = 2.2, H-19), 5.55 (1H, dm, J = 9.7, H-21), 1.79 (3H, d, J = 0.9, CH_3-23), 2.04 (3H, d, J = 1.3, CH_3-24), 4.40 (1H, brs, OH-12), 3.36 (3H, s, CH_3O-13), 3.82 (3H, s, CH_3O-18) [1]
^{13}C NMR: [1]

Table 1

C-2	133.8	C-12	84.8	C-20	136.7
3	49.2	13	76.6	21	123.7
5	167.1	14	105.4	22	137.9
6	60.0	15	122.7	23	26.1
7	29.8	16	118.7	24	18.3
8	22.2	17	110.1	CH_3O-13	56.7
9	45.9	18	156.5	CH_3O-18	55.8
11	166.0	19	95.3		

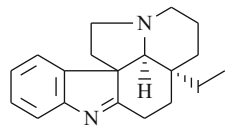
Pharm./Biol.: Cytotoxic action

References

1. Sh.Sh. Afiyatulov, A.I. Kalinovskii, M.V. Pivkin, P.S. Dmitrenok, T.A. Kuznetsova, Chem. Nat. Comp. **40**, 615 (2004)

(−)-Dehydroaspidospermidine

CAS Registry Number: 19751-76-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{19}H_{24}N_2$: 280.1939
Mp: amorph. [1, 2]
$[\alpha]_D$ −236° (MeOH) [1], −212° (EtOH) [2]
UV: 216, 223, 267(4.21, 4.23, 3.70) [1]; 222, 228, 253(4.39, 4.26, 3.78) [3]
MS *m/z*: 280(M^+), 251, 210 [1, 4]
^{1}H NMR: 0.45(3H, m, CH_3), 7.15–7.65(H–Ar) [1]

References

1. D.A. Rakhimov, M.R. Sharipov, Kh.N. Aripov, V.M. Malikov, T.T. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 724 (1970)
2. B.W. Bycroft, D. Schumann, M.B. Patel, H. Schmid, Helv. Chim. Acta **47**, 1147 (1964)
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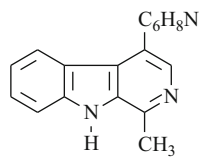
Dehydrobrevicolline

CAS Registry Number: 31049-73-7



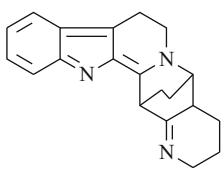
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Carex brevicollis*
$C_{17}H_{17}N_3$: 263.1422
Mp: 237–238°C (MeOH), 280°C (di hydrochloride (H_2O–EtOH)), 252°C (methiodide (H_2O–EtOH)) [1]
Solubility: spar. sol. EtOH, Me_2CO, C_6H_6 [1]
UV: 245, 288, 305, 338, 352 [1]
IR: 810 [1]
MS *m/z*: 263(M^+), 82(100) [1]

References

1. I.V. Terent'eva, T.I. Shirshova, A.F. Sholl', V.I. Kovalenko, *Brevicolline – An Alkaloid of the Sedge Carex brevicollis*, [in Russian] (AN MSSR, Kishinev, 1969), p. 36; 88

Dehydronitramidine



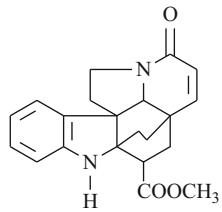
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{21}N_3$: 303.4090
Mp: 268–269°C (Me_2CO) [1]
$[\alpha]_D$ 0° (EtOH) [1]
UV: 210, 250, 365 (3.26, 3.81, 4.16) [1]
UV: EtOH + OH^-: 212, 257, 388 [1]
IR: 3400, 3070, 2940, 2860, 1650, 1630, 1585, 1530, 1460, 1335, 1110, 770 [1]
MS *m/z*: 303 (M^+, 57), 302 (27), 301 (25), 276 (17), 274 (10), 260 (21), 258 (8), 247 (7), 220 (68), 219 (100), 206 (26), 195 (20), 193 (16), 182 (55), 169 (27), 133 (21), 122 (29)
^{1}H NMR: 1.98, 2.25, 2.63, 3.22, 3.48, 4.27, 5.0, 7.28 (1H, m), 7.51 (2H, m), 7.76 (1H,d) [1]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **30**, 727 (1994)

14,15–Dehydro–3–oxokopsinine (6,7-Dehydro-8-oxokopsinine)

CAS Registry Number: 4880-84-6

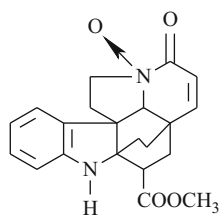


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{22}N_2O_3$: 350.1631
Mp: 231–232°C (MeOH) [1], 227–231°C [2]
$[\alpha]_D$ −93° ($CHCl_3$) [1], −99° [2]
UV: 244, 292(3.93, 3.42) [1, 2]
IR: 3365, 1720, 1660, 1600, 815, 760 [1, 2]
MS *m/z*: 350(M^+), 227, 215, 214, 195, 168, 154 [1, 2]
^{1}H NMR: 3.69(3H, s, $COOCH_3$), 5.20-6.10(2H, J = 10, CH = CH), 6.55–7.20(4H, H–Ar) [1, 2]

References

1. M. Sharipov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 281 (1974)
2. H.H.A. Linde, Helv. Chim. Acta **48**, 1822 (1965)

14,15–Dehydro–3–oxokopsinine N-Oxide (6,7-Dehydro-8-oxokopsinine N-Oxide)



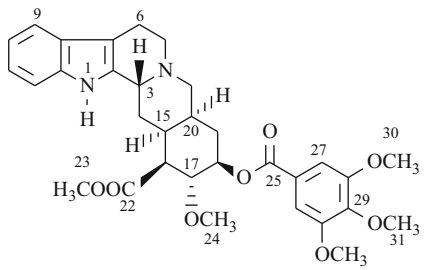
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{22}N_2O_4$: 366.1580
Mp: 245–248°C [1, 2]
$[\alpha]_D$ −48° [1], −55° [2]
UV: 244, 292 [2]
IR: 3600, 3400, 1728, 1665, 1600 [2]
MS *m/z*: 366(M^+), 350, 335, 307 [2]
^{1}H NMR: [2]

References

1. M.R. Sharipov, M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 355 (1976)
2. H.H.A. Linde, Helv. Chim. Acta **48**, 1822 (1965)

Deserpidine

CAS Registry Number: 131-01-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia vomitoria*
$C_{32}H_{38}N_2O_8$: 578.2628
Mp: 229–231°C [1]
$[\alpha]_D$ −137° ($CHCl_3$) [1]
UV: 217, 271(4.81, 4.30) [1]
IR: 3000, 1720, 1470, 1420, 1340, 1230, 1130 [1,2]
MS *m/z*: 578(M^+, 95), 577(56), 370(53), 369(38), 368(47), 354(49), 195(100), 184(38) [2]; 578(M^+, 31), 577(38), 383(8), 367(26), 366(16), 365(24), 221(46), 212(16), 195(100), 184(26), 170(32), 156(38) [3]
^{13}C NMR: Signals given relative to the chemical shift of CS_2 (192.8 ppm) [4]

Table 1

C-2	61.8	C-13	57.2	C-23	141.6
3	133.0	14	159.4*	24	141.6
5	140.1	15	161.0***	25	27.3
6	176.8*	16	141.4	26	67.8
7	85.5	17	115.5	27	86.2
8	65.3	18	115.5	28	39.8
9	74.0**	19	169.4*	29	50.7
10	72.1	20	163.8***	30	137.4
11	75.4**	21	144.0	31	133.1
12	82.3	22	20.3		

References

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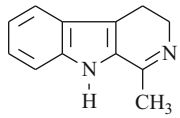
2. M.S. Habib, W.E. Court, Planta Med. **25**, 331 (1974)
3. M. Hesse, *Indolalkaloide (Progress in Mass Spectrometry)* (Verlag Chemie, Weinheim, 1974), 1, Teil. 1, p. 203
4. R.H. Levin, J.-L. Lallemand, J.D. Roberts, J. Org. Chem. **38**, 1983 (1973)

Dihydrogarmane



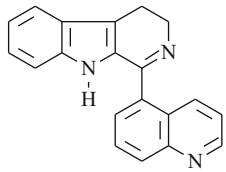
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Elaeagnus angustifolia*
$C_{12}H_{12}N_2$: 184.1001
Mp: (234°C picrate) [1]
UV: 233, 315(4.19, 4.18) [1]
UV(H^+): 246, 350(4.02, 4.35) [1]

References

1. A.G. Nikolaeva, Chem. Nat. Comp. **6**, 659 (1970)

Dihydroisokomarovine

CAS Registry Number: 85403-69-6



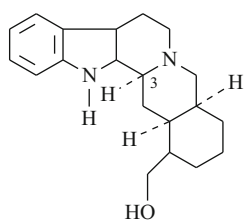
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{15}N_3$: 297.1266
Mp: 252–253°C ($CHCl_3$-MeOH) [1]
Solubility: spar. sol. org. solvs. [1]
UV: 220, 246 sh, 293, 320, (4.60, 4.66, 4.10, 3.87) [1]
UV: (H^+): 216, 252, 305, 321. [1]
IR: 3170–3110, 3060, 2960, 2840, 1625, 1575, 1510, 1460, 1285, 1245, 1145, 815, 770 [1]
MS *m/z*: 297(M^+) [1]
^{1}H NMR: 3.20, 4.70(each 2H, m), 7.00–9.27(11H, m, H–Ar, NH) [1]

References

1. T.S. Tulyaganov, S.Yu. Yunusov, Chem. Nat. Comp. **26**, 49 (1990)

Dihydronitraraine

CAS Registry Number: 101144-41-6

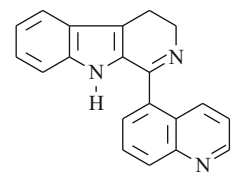


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{20}H_{26}N_2O$: 310.2045
Mp: 286–287°C, 95°C (O–Ac.) [1]
$[\alpha]_D$ 0° (Py) [1]
MS *m/z*: 310(M^+), 309, 293, 292, 279, 197, 184, 170, 169, 156, 144 [1]
^{1}H NMR(CF_3COOH): 0.99–2.70(14H, m, 7 × CH_2), 3.86(3H, m, CH_2OH, H-3), 6.93, (4H, m, H–Ar) [1]

References

1. A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **21**, 510 (1985)

Dihydronitraridine



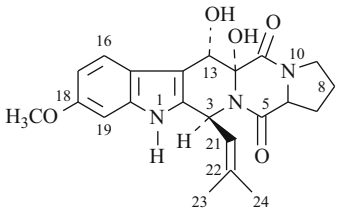
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{15}N_3$: 297.1266
Mp: 262–263° [1]
Solubility: sp. sol. MeOH, EtOH, $CHCl_3$ [1]
UV: 218, 244 sh, 307, 312 (4.51, 4.07, 3.93, 3.98) [1]
IR: 3140, 3070, 2950, 2840, 1620, 1600, 1560, 1510, 1465, 1450, 1370, 1325, 1280, 1185, 910, 850 [1]
MS *m/z*: 297 (M^+, 100), 296, 269, 148.5 (M^{++}) [1]
^{1}H NMR: 3.04 (t, J = 8, 2H-4), 4.07 (t, J = 8, 2H-3), 7.05 (m, H-6′), 7.15 (m, H-6, H-7), 7.38 (d, J = 5.5, H-3′), 7.40 (m, H-7′), 7.53 (m, H-8, H-5′), 7.70 (dd, J = 8, 2, H-5), 7.94 (d, J = 9, H-8′), 8.68 (d, J = 6, H-2′) [1]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **42**, 459 (2006)

12,13-Dihydroxy-fumitremorgin C

CAS Registry Number: 111427-99-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aspergillus fumigatus* KMM 4631
$C_{22}H_{25}N_3O_5$: 411.1794
Mp: 196–199°C (MeOH) [1], 197–198°C [2]
$[\alpha]_D^{26}$ +9.0° (*c* 0.4, $CHCl_3$) [1]
IR: 1685, 1645 [2]
MS *m/z*: 411 (M^+, 56), 394 (13), 371 (4), 330 (4), 315 (8), 257 (44), 243 (100), 226 (36), 214 (30), 200 (86), 187 (42), 159 (16) [1]
^{1}H NMR: 7.67 (1H, brs, NH), 5.87 (1H, dd, J = 1.2, 9.5, H-3), 4.42 (1H, dd, J = 6.6, 9.1, H-6), 1.99, 2.49 (2H, m, 2H-7), 1.99, 2.08 (2H, m, 2–8), 3.65 (2, m, 2–9), 5.75 (1H, dd, J = 1.3, 2.8, H-13), 7.80 (1H, d, J = 8.5, H-16), 6.81 (1H, dd, J = 2.2, 8.5, H-17), 6.84 (1H, d, J = 2.2, H-19), 4.79 (1H, dm, J = 9.5, H-21), 1.66 (3H, s, CH_3-23), 2.01 (3H, s, CH_3-24), 4.10 (1H, s, OH-12), 4.67 (1H, d, J = 2.8, OH-13), 3.82 (3H, s, CH_3O-18) [1]
^{13}C NMR: [1]

Table 1

C-2	130.2	C-12	83.0	C-20	137.6
3	50.2	13	68.7	21	124.0
5	166.2	14	105.5	22	134.6
6	58.7	15	120.8	23	25.7
7	29.2	16	121.3	24	18.3
8	22.6	17	109.9	CH_3O-18	55.8
9	45.3	18	156.8		
11	171.0	19	95.1		

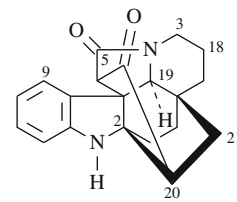
Pharm./Biol.: Cytotoxic action [1]

References

1. Sh.Sh. Afiyatulov, A.I. Kalinovskii, M.V. Pivkin, P.S. Dmitrenok, T.A. Kuznetsova, Chem. Nat. Comp. **40**, 615 (2004)
2. W.-R. Abraham, H.-A. Aifmann, Phytochemistry **29**(3), 1025 (1990)

5,22-Dioxokopsane

CAS Registry Number: 3703-90-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{20}H_{20}N_2O_2$: 320.1525
Mp: 284–285°C [1], 309–310°C [2], 307–308C [3]
$[\alpha]_D$ +99° ($CHCl_3$) [1], +156° [4]
UV: 243, 298(3.94, 3.61) [1, 2, 4]; 207, 243, 295–297(3.38, 2.89, 2.54) [3]
IR: 3300, 1740, 1670, 1607, 1280, 1233, 1197, 1082, 906, 754 [1, 2]; 3310, 1735, 1655, 1600, 1440 [3]; 3380, 2950, 1760, 1690, 1605 [4]
MS *m/z*: 321(80), 320(M^+, 100), 292(4), 291(1), 265(12), 264(11), 263(13), 251(10), 223(13), 198(24), 180(28), 170(48), 169(83), 154(21) [2]
^{1}H NMR: 2.88(1H, m, H-3), 3.68(NH), 3.71(1H, s, H-19), 4.25(1, d, J = 13; 4.5, H-3α), 6.70, 6.80, 7.10, 7.16(4H, H–Ar) [2, 3]
^{13}C NMR: [5]

Table 1

C-2	69.1	C-10	138.5	C-17	19.5
3	40.5	11	122.2	18	33.2
5	165.6	12	111.3	19	65.8
6	62.7	13	150.7	20	52.3
7	55.9	14	33.2	21	28.9

(*continued*)

Table 1 (continued)

8	130.7	15	23.2	22	205.0
9	119.7	16	32.7		

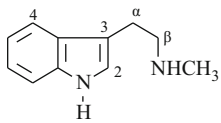
ORD: [2]

References

1. D.A. Rakhimov, M.R. Sharipov, Kh.N. Aripov, V.M. Malikov, T.T. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 724 (1970)
2. J.M.F. Filho, B. Gilbert, M. Kitagawa, L.A.P. Leme, L.J. Durham, J. Chem. Soc. **1260** (1966)
3. A. Chatterjee, D.J. Ray, R.S. Mukhopadhyay, Indian J. Chem. **17B**, 651 (1979)
4. H. Achenbach, K. Biemann, J. Amer. Chem. Soc. **87**, 4944 (1965)
5. M.R. Yagudaev, Chem. Nat. Comp. **20**, 344 (1984)

Dipterine (N-Methyltryptamine)

CAS Registry Number: 61-49-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Girgensohnia diptera, Hammada leptoclada*

$C_{11}H_{14}N_2$: 174. 1157

Mp: 87–88°C, 178°C (hydrochloride), 191°C (picrate), 243°C (picrolonate) [1]

$[\alpha]_D$ 0° [1]

Solubility: very sol. EtOH, Et_2O, $CHCl_3$; sol. C_6H_6; spar. sol. pet. ether., H_2O [1]

^{13}C NMR: [2]

Table 1

C-2	122.2	C-6	121.7	C-α	25.4
3	113.3	7	111.2	β	51.8
4	118.7	3a	127.3	NCH_3	36.1
5	119.0	6a	136.5		

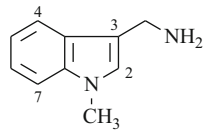
Pharm./Biol.: LD 550 mg/kg (s/c, mice). Spasmolytic action. Lowers the arterial pressure in cats and retards the pulse [3]

References

1. N. Yurashevskii, S. Stepanov, Zh. Obshch. Khim. **9**, 2203 (1939)
2. C. Poupat, A. Ahoud, T. Sevenet, Phytochemistry **15**, 2019 (1976)
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 102

Donaxamine

CAS Registry Number: 19293-60-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Arundo donax*

$C_{10}H_{12}N_2$: 160.2182

Mp: 178–179°C [1]

IR: 3160, 3116, 1618, 1578 [1]

MS *m/z*: 160 (M^+), 144, 13 (100), 117, 103, 89, 77, 63, 30 1]

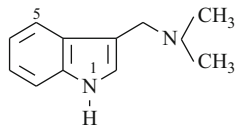
^{1}H NMR (CD_3OD): 2.94 (s, NMe), 4.83 (H-8), 7.18 (t, J = 1.1, 7.0 and 7.2), 7.23 (t, J = 7.5, 7.0, 0.8, H-5), 7.49 (dd, J = 7.5, 1.1, 0.9, H-4), 7.64 (s, H-2), 7.74 (dt, J = 0.9, 0.8, 7.2, H-7) [1]

References

1. I.Zh. Zhalolov, V.U. Khuzaev, S.F. Aripova, M.G. Levkovich, Chem. Nat. Comp. **36**, 528 (2000)

Donaxine (Gramine)

CAS Registry Number: 87-52-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Arundo donax*
$C_{11}H_{14}N_2$: 174.1157
Mp: 138–139°C (Me_2CO), 145°C (picrate), 181C (perchlorate), 177°C (methiodide) [1]
MS *m/z*: 174(M^+, 33), 130(100) [2]
^{13}C NMR: [3]

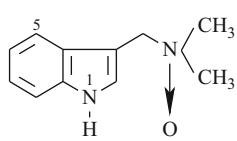
Table 1

C-2	123.9	C-5	119.0	C-8	111.1
3	112.2	6	121.6	NCH_2	54.3
4	127.8	7	119.2	$N(CH_3)_2$	45.1

References

1. A.P. Orekhov, S.S. Norkina, Zh. Obshch. Khim. **7**, 673 (1937)
2. M. Hesse, *Indolalkaloide (Progress in Mass Spectrometry)* (Verlag Chemie, Weinheim, 1974), 1, Teil 2, Abb.1
3. M. Shamma, D.M. Hindenlang, Carbon-13 NMR Shift Assignments of Amines and Alkaloids (Plenum Press, New York-London, 1979), No. 499

Donaxine N-Oxide (Gramine N-Oxide)



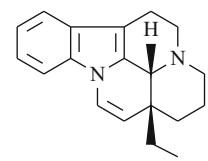
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Arundo donax*
$C_{11}H_{14}N_2O$: 190.2440
Mp: 135–136°C (121–122°C) [1]
UV: 272, 280, 288 [1]
IR: 2188, 1698, 1619 [1]
MS *m/z*: 173, 130, 129 [1–3]
^{1}H NMR ($CDCl_3$): 3.00 (6H, s, N(Me)2, 4.55 (2H, s, CH_2), 5.08–4.85 (bs, NH), 7.70–7.06 (5H, Ar) [4]

References

1. V.U. Khuzaev, Chem. Nat. Comp. **40**, 160 (2004)
2. D.W. Henry, E. Lette, J. Amer. Chem. Soc. **79**, 5254 (1957)
3. S.K. Dutta, S. Ghosal, Chem. Ind. **2**, 2046 (1967)
4. V.U. Khuzaev, Doctoral Dissertation, Tashkent, 2005

(+)-Eburnamenine

CAS Registry Number: 517-30-6



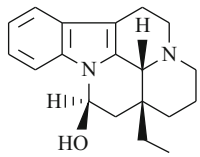
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Amsonia angustifolia, A. illustris, A. tabernaemontana*
$C_{19}H_{22}N_2$: 278.1783
MS *m/z*: 278(M^+, 30), 249(97), 208(100), 193(25) [1]
Abs. conf.: [2]

References

1. M. Hesse, *Indolalkaloide (Progress in Mass Spectrometry)* (Verlag Chemie, Weinheim, 1974), 1, Teil. 2, Abb. 76
2. J. Trojanek, Z. Koblicova, K. Blaha, Chem. Ind. 1261 (1965)

(−)-Eburnamine

CAS Registry Number: 473-99-4

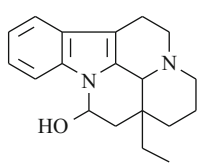


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Amsonia angustifolia, A. illustris, A. tabernaemontana*
$C_{19}H_{24}N_2O$: 296.1889
Mp: 105–107°C, 178°C [1]
$[\alpha]_D$ −94° ($CHCl_3$) [1]
UV: 229, 282(4.52, 3.93) [1]
IR: 1319, 1297, 1285, 1271, 1262, 1240, 1211, 1170, 1152, 1139, 1112, 1099, 1070, 1055, 1035, 1028, 1013, 995, 980, 973, 940, 930, 926, 910, 895, 881, 800, 767, 748, 740 [2]
MS *m/z*: 296(M^+, 100), 278, 267, 249, 226, 208, 193 [3]
Abs. conf.: [4]

References

1. E.S. Zabolotnaya, A.S. Belikov, S.P. Ivashchenko, M.M. Molodozhnikov, Med. Prom. SSSR (5), 28 (1964)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1968), **3**, No. 432
3. M. Hesse, *Indolalkaloide (Progress in Mass Spectrometry)* (Verlag Chemie, Weinheim, 1974)
4. J. Trojanek, Z. Koblicova, K. Blaha, Chem. Ind., 1261 (1965)

(±)-Eburnamine



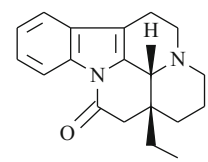
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{19}H_{24}N_2O$: 296.1889
Mp: 213–214°C (Me_2CO) [1]
$[\alpha]_D$ 0° (MeOH) [1]
UV: 230, 285, 292(4.89, 3.87, 3.79) [1]
IR: 330–3000, 740 [1]
MS *m/z*: 296(M^+), 278, 267, 249, 208, 206, 193 [1]
^{1}H NMR: 0.87, 5.39, 7.05–7.61 [1]

References

1. D.A. Rakhimov, M.R. Sharipov, Kh.N. Aripov, V.M. Malikov, T.T. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 724 (1970)

(+)-Eburnamonine

CAS Registry Number: 474-00-0



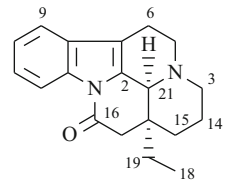
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Amsonia angustifolia, A. illustris, A. tabernaemontana*
$C_{19}H_{22}N_2O$: 294.1732
Mp: 174–175°C (EtOH, MeOH) [1]
$[\alpha]_D$ +105° ($CHCl_3$) [1]
UV: 242, 268, 296, 302(4.28, 3.99, 3.69, 3.69) [1]
MS *m/z*: 294(M^+, 100), 293, 265, 237, 224, 180, 147 [2]
Abs. conf.: [3]

References

1. E.S. Zabolotnaya, A.S. Belikov, S.P. Ivashchenko, M.M. Molodozhnikov, Med. Prom. SSSR, (5), 28 (1964)
2. M. Hesse, *Indolalkaloide (Progress in Mass Spectrometry)* (Verlag Chemie, Weinheim, 1974), **1**, Teil. 2, Abb. 77
3. J. Trojanek, Z. Koblicova, K. Blaha, Chem. Ind. 1263 (1965)

(−)-Eburnamonine

CAS Registry Number: 4880-88-0



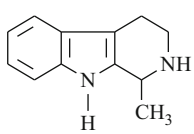
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{19}H_{22}N_2O$: 294.1732
Mp: 167–168°C (Me_2CO) [1], 174–176°C [2]
$[\alpha]_D$ −90° ($CHCl_3$) [2]
UV: 243, 268, 297–305(4.55, 4.16, 3.36) [1]
IR: 1700, 760 [1]
MS *m/z*: 294(M^+), 265, 237, 224 [1]
^{1}H NMR: 0.94(t, CH_3-18), 0.98(ddd, H-15), 1.38(d, H-14), 1.47(d, H-15), 1.62(dq, H-19), 1.72(ddd, H-14), 2.02(dq, H-19'), 2.35(d, H-17), 2.86(m, H-6), 3.16(ddd, H-5), 3.28(dd, H-5), 3.85(s, H-21), 7.24(t, H-10), 7.28(t, H-11), 7.40(d, H-9), 8.35(d, H-12) [3]

References

1. D.A. Rakhimov, V.M. Malikov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 221 (1970)
2. J. Mokry, I. Kompis, P. Sefcovic, S. Bauer, Collect. **28**, 1309 (1963)
3. X.Z. Feng, C. Kan, H.-P. Husson, P. Potier, S.-K. Kan, M.J. Lounasmaa, J. Nat. Prod. **47**, 117 (1984)

Eleagnine (Calligonine, Tetrahydroharman)

CAS Registry Number: 2506-10-7

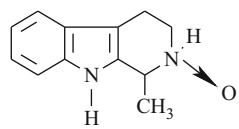


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Calligonum caput-medusae, C. eriopodum, C. microcarpum, C. minimum, Elaeagnus angustifolia, Hammada leptoclada*
$C_{12}H_{14}N_2$: 186.1157
Mp: 177–178°C, 267°C (hydrochloride), 223°C (hydroiodide), 190°C (perchlorate), 222°C (di picrate) [1]
$[\alpha]_D$ 0° [1]
Solubility: sol. Et_2O, $CHCl_3$, EtOH, Me_2CO
UV: 224, 280(4.50, 3.90) [2]
IR: 3290, 1628, 1578, 1512, 1348, 1317, 1302, 1250, 1221, 1200, 1161, 1147, 1121, 1112, 1071, 1050, 1024, 1008, 952, 937, 915, 888, 852, 838, 808, 742 [2]

References

1. P.S. Massagetov, Zh. Obshch. Khim. **16**, 139 (1946); A.S. Sadykov, B. Abdusalamov, Uzb. Khim. Zh. (6), 47 (1961)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1965), **1**, No. 101

Eleagnine N-Oxide (Calligonidine)



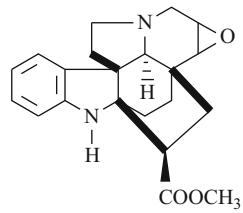
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Calligonum caput-medusae, C. microcarpum, C. minimum*
$C_{12}H_{14}N_2O$: 202.1106
Mp: 132–133°C (Me_2CO), 215°C (hydrochloride), 121°C (picrate) [1]

References

1. B. Abdusalamov, A.S. Sadykov, Uzb. Khim. Zh. (4), 79 (1962)

Epoxykopsinine

CAS Registry Number: 26619-93-2



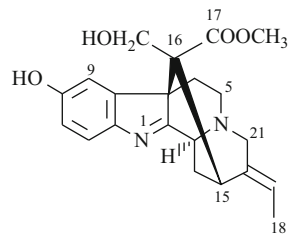
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: 123–124°C (MeOH) [1], 223–225°C [2], 230–236°C [3]
$[\alpha]_D$ −95° [3]
UV: 248, 292(3.83, 3.39) [1–3]
IR: 3385, 1720, 760 [1, 3]
MS *m/z*: 352(M^+), 138, 123 [1, 2]
^{1}H NMR: 3.68(3H, s, $COOCH_3$), 6.56–6.87(4H, H–Ar) [1, 3]

References

1. D.A. Rakhimov, M.R. Sharipov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 663 (1971)
2. B. Das, K. Biemann, A. Chatterjee, A.B. Ray, P.L. Majumber, Tetrahedron Lett. **6**, 2239 (1965)
3. H.H.A. Linde, Helv. Chim. Acta **48**, 1822 (1965)

Ercinamine

CAS Registry Number: 85783-98-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_4$: 368.1736
Mp: 238–240°C [1]
$[\alpha]_D$ +53° (MeOH) [1]
Solubility: very sol. EtOH, MeOH; insol. $CHCl_3$ [1]
UV: 226, 283(3.95, 3.66) [1]
IR: 3400, 1732, 1630, 1590, 1500, 825, 795, 760 [1]
MS *m/z*: 368(M^+, 100), 338(26), 337(59), 309(12), 149(8), 97(18), 85(19) [1]
^{1}H NMR: 1.55(3H, d, J = 7, CH_3-18), 3.60(2H, br s, OCH_2), 3.68(3H, s, $COOCH_3$), 5.40(1H, q, J = 7, H-19), 6.66(1H, q, J = 8; 2, H-11), 6.98(1H, d, J = 2, H-9), 7.35(1H, d, J = 8, H-12) [1]
^{13}C NMR (Py–d_5): [1]

Table 1

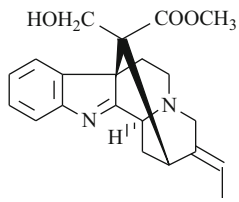
C-2	187.7	C-10	157.4	C-19	118.8
3	55.2	11	115.3	20	141.5
5	52.4	12	121.7	21	54.4
6	39.3	13	149.2	17-C = O	174.0
7	59.4	14	31.2	CH_3-18	13.2
8	147.6	15	35.1	CH_2-OH	64.0
9	114.1	16	61.1	OCH_3	51.4

References

1. M.R. Yagudaev, M.M. Khalmirzaev, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 454 (1983)

Ercinaminine

CAS Registry Number: 1897-30-9



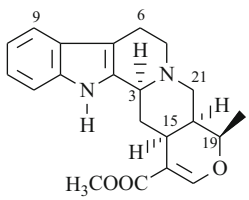
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: amorph. [1]
Solubility: very sol. MeOH, $CHCl_3$, Me_2CO; insol. Et_2O[1]
UV: 222, 279(3.91, 3.64) [1]
IR: 3400, 1730, 1630, 1600, 1580, 760[1]
MS *m/z*: 352(M^+, 100), 322(21), 321(33), 293(15), 149(9), 97(30), 85(27), 83(37) [1]
^{1}H NMR: 1.58(3H, d, J = 7, CH_3), 3.62(2H, br s, OCH_2), 3.75(3H, s, $COOCH_3$), 5.40(1H, q, =CH), 6.65–7.56(4H, m, H–Ar) [1]

References

1. M.R. Yagudaev, M.M. Khalmirzaev, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 454 (1983)

Ervine

CAS Registry Number: 5299-09-2



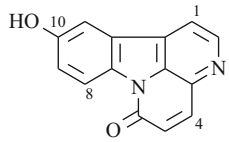
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. herbacea, V. major*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: 222–223°C (MeOH) [1, 2]; 268°C (dec., hydrochloride), 286°C (dec., hydrobromide), 258°C (dec., hydroiodide), 260°C (dec., methiodide) [1]
$[\alpha]_D$ −57° (MeOH) [1, 2], −84° (Py) [1]
UV: 227, 282, 291(3.52, 3.77, 3.70) [1]
IR: 3390, 2750, 1710, 1630 [1]
MS *m/z*: 352(M^+, 100), 351(65), 337(20), 321(4), 225(2), 223(8), 208(2), 170(4), 169(6), 156(13) [3]
^{1}H NMR: 1.33(3H, d, J = 7, CH_3-19), 3.68(3H, s, $COOCH_3$), 4.41(1H, m, J = 11, H-19), 7.50(1H, s, H-17), 7.92(1H, s, NH) [3]
Pharm./Biol.: LD_{50} 175 mg/kg (i/v, mice). Hypotensive, antiarrhythmic, and sedative action [4]

References

1. V.M. Malikov, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **2**, 276 (1966)
2. G.V. Chkhikvadze, V.Yu. Vachnadze, Chem. Nat. Comp. **22**, 363 (1986)
3. V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 345 (1970)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 63

Ervine (10-Hydroxycanthin-6-one)

CAS Registry Number: 86293-41-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aerva lanata*
$C_{14}H_8N_2O_2$: 236.0686
Mp: 310–313°C (dec., MeOH, $CHCl_3$–EtOH), 195°C (O–Me), 188°C (O–Ac) [1]
UV: 271 sh, 279 sh, 308 sh, 358 sh, 375(4.22, 4.30, 3.87, 3.82, 3.96, 3.97) [1, 2]
UV(EtOH + $NaOCH_3$): 299, 358, 376, 460(4.31, 3.96, 3.85, 3.51) [1, 2]
UV(EtOH + HCl): 280, 310 sh, 323, 361, 377(4.24, 3.93, 3.89, 3.98, 3.95) [1, 2]
IR: 1670 [1]
MS *m/z*: 236(M^+, 100), 208(66), 179(20), 153(7), 124(4), 118(12) [1]

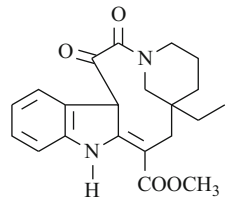
^{1}H NMR(Py–d_5): 6.98(d, J = 10, H-5), 7.48(dd, J = 8.5, 2, H-9), 7.88(d, J = 2, H-11), 7.93(d, J = 5, H-1), 8.02(d, J = 10, H-4), 8.72(d, J = 8.5, H-8), 8.82(d, J = 5, H-2) [1]

References

1. G.G. Zapesochnaya, L.N. Pervykh, V.A. Kurkin, Chem. Nat. Comp. **27**, 336 (1991)
2. G.G. Zapesochnaya, V.A. Kurkin, V.V. Okhanov, L.N. Pervykh, A.I. Miroshnikov, Chem. Nat. Comp. **27**, 725 (1991)

Ervinidine

CAS Registry Number: 35989-12-9



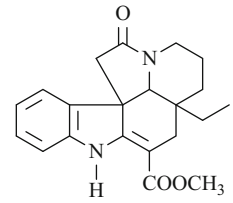
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_4$: 368.1736
Mp: 283–284°C (dec., MeOH) [1]
$[\alpha]_D$ +17° ($CHCl_3$) [1, 2]
UV: 232, 302, 340(4.10, 4.08, 4.30) [1]; 232, 305, 342(3.92, 3.93, 4.10) [2]
IR: 3310, 1720, 1690, 1660, 1230 [1, 2]
MS *m/z*: 368(M^+), 340, 228, 214, 168, 154 [2]
^{1}H NMR(CF_3COOH): 1.13(CH_3), 3.85($COOCH_3$), 7.61(4H, m, H–Ar), 9.21(1H, s, NH) [2]

References

1. V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 119 (1967)
2. V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 619 (1971)

Ervinidinine

CAS Registry Number: 23107-01-9

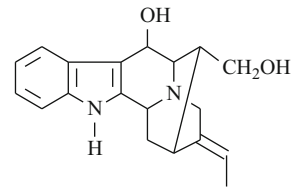


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: 265–266°C (dec., Me_2CO, MeOH) [1, 2]
$[\alpha]_D$ −160° (MeOH) [1, 2]
UV: 228, 298, 332(3.86, 3.84, 3.98) [1, 2]
IR: 3250, 1680, 1632, 1600, 760 [2]
IR($CHCl_3$): 3400, 1680, 1610 [1]
MS *m/z*: 352(M^+, 58), 320(7), 214(100), 182(8), 154(9) [1, 2]
^{1}H NMR: 0.62(3H, s, CH_3), 3.69(3H, s, $COOCH_3$), 6.90(4H, m, H–Ar), 8.91(1H, s, NH) [1, 2]

References

1. V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 58 (1969)
2. V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 619 (1971)

Ervincidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

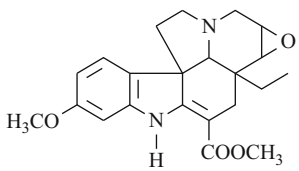
Biological source: *Vinca erecta*
$C_{19}H_{22}N_2O_2$: 310.1681
Mp: 279–280°C (dec., MeOH) [1, 2]
$[\alpha]_D$ +29° (MeOH) [1, 2]
UV: 227, 282, 292(4.80, 4.11, 4.00) [1. 2]
IR: 3330–3000, 760 [2]
MS *m/z*: 310(M^+, 80), 309(75), 292(32), 279(12), 249(12), 182(62), 169(100), 168(75) [2]

References

1. D.A. Rakhimov, M.R. Sharipov, Kh.N. Aripov, V.M. Malikov, T.T. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 713 (1970)
2. V.M. Malikov, M.R. Sharipov, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 741 (1972)

Ervincinine

CAS Registry Number: 22223-16-1



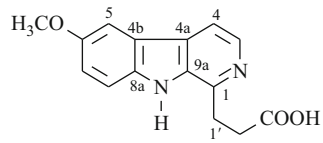
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{22}H_{26}N_2O_4$: 382.1893
Mp: 247–248°C (dec., MeOH), 208°C (dihydro) [1]
$[\alpha]_D$ −80° ($CHCl_3$) [1]
UV: 250, 330(4.08, 4.18) [1, 2]
IR: 3265, 1685–1615, 840, 800 [1, 2]
MS *m/z*: 382(M^+, 100), 351(10), 244(78), 138(9), 108(6) [2]
^{1}H NMR: 0.61(3H, t, CH_3), 3.71(6, s, 2 × OCH_3), 6.34–7.01(3H, H–Ar), 8.89(1H, s, NH) [1, 2]

References

1. D.A. Rakhimov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 281 (1968)
2. D.A. Rakhimov, V.M. Malikov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 221 (1970)

Ervolanine

CAS Registry Number: 139742-35-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aerva lanata*
$C_{15}H_{14}N_2O_3$: 270.1004
Mp: 194–196°C (EtOH) [1]
UV: 234, 250 sh, 292 sh, 299, 310 sh, 358, 375 sh (4.71, 4.57, 4.32, 4.47, 4.11, 3.63, 3.62) [1]
UV(EtOH + $NaOCH_3$): 295, 301, 357(4.41, 4.56, 4.06, 4.06) [1]
UV(EtOH + HCl): 238, 267, 314, 410(4.59, 4.57, 4.53, 3.89) [1]
IR: 1660, 1640, 1620 [1]
MS *m/z*: 270(M^+, 58), 252(100), 240(24), 237(26), 225(71), 224(78), 209(100), 195(82), 181(38), 168(22), 153(13), 140(31), 127(15), 126(18) [1]
^{1}H NMR(DMSO–d_6): 2.90(m, J = 7.5, 2H-2′), 3.37(m, J = 7.5, 2H-1′), 3.92(s, OCH_3), 7.23(dd, J = 9, 2H-7), 7.55(d, J = 9, H-8), 7.78(d, J = 2, H-5), 7.95(d, J = 5, H-4), 8.25(d, J = 5, H-3), 11.15(s, NH) [1]
^{1}H NMR(Py–d_5): 3.33(2H-2′), 3.75(2H-1′), 3.85(OCH_3), 7.28(H-7), 7.55(H-8), 7.83(H-5), 7.93 (H-4), 8.50(H-3) [1]
^{13}C NMR (DMSO–d_6): [2]

Table 1

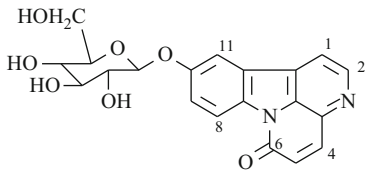
C-1	148.3	C-5	107.5	C-9a	138.7
3	140.8	6	157.5	1′	32.0
4	116.9	7	122.0	2′	35.4
4a	131.1	8	116.9	3′	178.3
4b	125.4	8a	139.3	OCH_3	59.6

References

1. G.G. Zapesochnaya, L.N. Pervykh, V.A. Kurkin, Chem. Nat. Comp. **27**, 336 (1991)
2. G.G. Zapesochnaya, V.A. Kurkin, V.V. Okhanov, L.N. Pervykh, A.I. Miroshnikov, Chem. Nat. Comp. **27**, 725 (1991)

Ervoside (10-β-D-Glucopyranosyloxycanthin-6-one)

CAS Registry Number: 139767-01-4



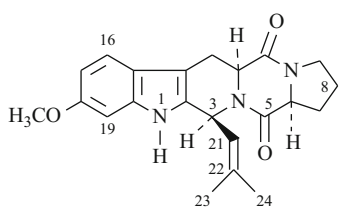
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aerva lanata*
$C_{20}H_{18}N_2O_7$: 398.1114
Mp: 215–218°C (MeOH, EtOH) [1]
UV: 265, 273, 360, 377(4.08, 4.15, 3.86, 3.82) [1]
IR: 3350, 1670, 1660, 1640, 1610, 1575 [1]
^{1}H NMR(Py–d_5): 4.25(m, J = 12, H-6′), 4.37(m, H-5′), 4.45(m, H-2′, H-3′, H-4′), 4.66(dd, J = 12, 2, H-6′), 5.79(d, J = 7.3, H-1′), 7.00(d, J = 10, H-5), 7.69(dd, J = 8.5; 2, H-9), 7.92(d, J = 5, H-1), 8.04(d, J = 10, H-4), 8.25(d, J = 2, H-11), 8.71(d, J = 8.5, H-8), 8.83(d, J = 5, H-2) [1]

References

1. G.G. Zapesochnaya, Chem. Nat. Comp. **27**, 336 (1991)

Fumitremorgin C

CAS Registry Number: 118974-02-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aspergillus fumigatus* KMM 4631
$C_{22}H_{25}N_3O_3$: 379.1896
Mp: 128–132°C (MeOH) [1]
$[\alpha]_D^{26}$ −27.0° (*c* 0.2, $CHCl_3$) [1]
MS *m/z*: 379 (M^+, 97), 364 (20), 324 (30), 315 (25), 281 (100), 212 (40) [1]
^{13}C NMR: [1]

Table 1

C-2	132.2	C-12	51.1	C-20	137.1
3	56.9	13	45.5	21	124.3
5	165.8	14	106.5	22	134.1
6	59.3	15	120.9	23	18.2
7	28.7	16	119.0	24	25.7
8	23.1	17	109.7	CH_3O-18	55.9
9	45.5	18	156.7		
11	169.6	19	95.4		

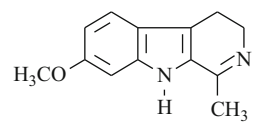
Pharm./Biol.: Cytotoxic action

References

1. Sh.Sh. Afiyatulov, A.I. Kalinovskii, M.V. Pivkin, P.S. Dmitrenok, T.A. Kuznetsova, Chem. Nat. Comp. **40**, 615 (2004)

Harmaline

CAS Registry Number: 304-21-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Peganum harmala, P. nigellastrum*
$C_{13}H_{14}N_2O$: 214.1106
Mp: 250–252°C, 235°C (hydroiodide), 229°C (picrate) [1]
UV: 231, 259, 333 [2]
^{1}H NMR(Py–d_5): 2.40(3H, t, J = 1.5, CH_3), 2.80(2H, t, J = 8.5, H-4), 3.69(3H, s, OCH_3), 3.95(2H, br t, J = 8.5, H-3) [3]
HPLC: [4]

References

1. Kh.N. Khashimov, Author's Abstract of Candidate's Dissertation, Tashkent, 1978
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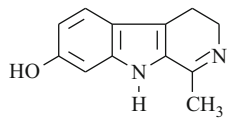
3. B. Robinson, Chem. Ind. 605 (1965)
4. M.T. Ayoub, L.J. Rashan, Phytochemistry **30**, 1046 (1991)

Harmalol

CAS Registry Number: 525-57-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Peganum harmala*
$C_{12}H_{12}NO$: 186.0919
Mp: 212°C [1]
HPLC: [2]

References

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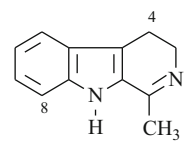
2. F. Sasse, J. Hammer, J. Berling, J. Chromatogr. **194**, 234 (1980)

Harman

CAS Registry Number: 486-84-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Calligonum caput-medusae, C. eriopodum, C. minimum, Carex brevicollis, Elaeagnus angustifolia*
$C_{12}H_{10}N_2$: 182.0842
Mp: 236–237°C (C_6H_6), 275°C (dec., hydrochloride), 255°C (dec., picrate) [1]
Solubility: very sol. Et_2O, Me_2CO, EtOac, $CHCl_3$; spar. sol. C_6H_6 [2]
UV: 235, 249, 288, 336, 348 [3]
IR: 1630, 1570, 1510, 1450, 760 [4]
MS *m/z*: 182(M^+, 100), 181(25), 154(17), 140(5), 127(7), 91(M^{++}, 8), 76(5) [2]
^{1}H NMR($CDCl_3$ + CD_3OD): 2.70(3H, s, CH_3), 7.18(1H, td, J = 9.0, 4.0, H-6), 7.44(2H, m, H-7, H-8), 7.69(1H, d, J = 7, H-4), 8.00(1H, dd, J = 9.0, 1.5, H-5), 8.14(1H, d, J = 7, H-3) [5]
^{13}C NMR: [6]

Table 1

C-1	141.8	C-4b	128.2	C-8	111.5
3	138.8	5	141.8	8a	140.1
4	112.9	6	120.2	9a	134.6
4a	128.3	7	128.2	1′	20.3

HPLC: [7]

References

1. I.V. Terent'eva, A.V. Borovkov, *Alkaloid-Bearing Plants of Moldavia* [in Russian] (Shtiintsa, Kishinev, 1960), p. 41
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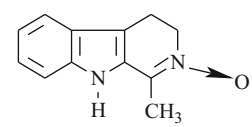
3. A.G. Nikolaeva, A.T. Prokopenko, P.E. Krivenchuk, Chem. Nat. Comp. **6**, 718 (1970)
4. A.G. Nikolaeva, I.V. Terent'eva, P.E. Krivenchuk, Chem. Nat. Comp. **6**, 517 (1970)
5. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
6. H. Seki, A. Hashimoto, T. Hino, Chem. Pharm. Bull. **41**, 1169 (1993)
7. J. Adachi, Y. Mizoi, T. Naito, K. Yamamoto, S. Fujiwara, I. Ninomiya, J. Chromatogr. **538**, 331 (1991)

Harman N-Oxide (Harmanine)



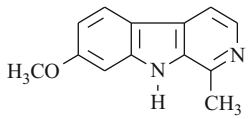
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Calligonum alatum, C. minimum*
$C_{12}H_{10}N_2O$: 198.0793
Mp: oil, 240°C (picrate) [1]
Solubility: very sol. EtOH, H_2O; insol. Et_2O [1]
UV: 255, 315 [2]

References

1. B. Abdusalamov, A.S. Sadykov, Kh.A. Aslanov, Nauch. Trudy TashGU (263), 3 (1964)
2. L.A. Mudzhiri, Author's Abstract of Candidate's Dissertation, Tbilisi, 1975

Harmine

CAS Registry Number: 442-51-3



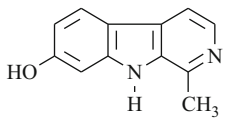
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Carex brevicollis, Oxytropis puberula, Peganum harmala, P. nigellastrum, Thalictrum foetidum*
$C_{13}H_{12}N_2O$: 212.0950
Mp: 252°C, 270°C (hydrochloride), 231°C (nitrate), 306°C (dec., methiodide) [1]
UV: 243, 303, 327, 339(4.71, 4.33, 3.79, 3.74) [1]
MS *m/z*: 212(M^+, 100), 197, 169 [1]
IR (hydrochloride): 3500, 3435, 1632, 1548, 1331, 1282, 1263, 1233, 1201, 1164, 1137, 1110, 1075, 1022, 877, 822, 802, 771, 740 [2]
^{1}H NMR(CF_3COOH): 3.61(3H, s, OCH_3), 3.64(3H, s, CH_3), 6.76(2H, m), 7.70(3H, m) [1]
HPLC: [3]
Pharm./Biol.: LD_{50} −75,124 mg/kg (i/v, i/p, mice). Psychotomimetic action [4]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 376 (1983)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1965), **1**, No. 133
3. J. Moncrieff, J. Chromatogr. **496**, 269 (1989)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 301

Harmol

CAS Registry Number: 487-03-6



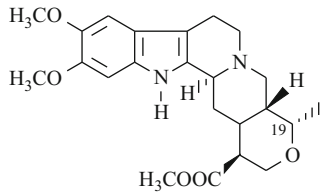
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Carex brevicollis*
$C_{12}H_{10}N_2O$: 198.0793
Mp: 319–321°C (Et_2O) [1]; 193°C (Et ether (EtOH))
UV: 240, 302, 323, 338(4.68, 4.26, 3.96, 3.87) [2]
IR: 3270, 1630, 1568, 1324, 1292, 1232, 1172, 1139, 1112, 1071, 990, 962, 942, 898, 885, 850, 839, 823, 802 [2]
HPLC: [3]

References

1. I.V. Terent'eva, A.F. Sholl', T.I. Shirshova, V.I. Kovalenko, *Brevicolline – An Alkaloid of the Sedge Carex brevicolllis* [in Russian] (AN MSSR, Kishinev, 1969), p. 36, 92
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1972), **7**, No. 840
3. F. Sasse, J. Hammer, J. Berlin, J. Chromatogr. **194**, 234 (1980)

Herbaceine (Vincaherbinine)

CAS Registry Number: 5308-79-2



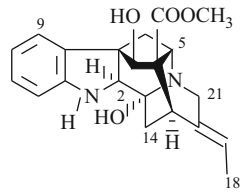
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea*
$C_{23}H_{30}N_2O_5$: 414.2155
Mp: 139–140°C (dec., MeOH) [1], 144°C (dec.) [2], 142–144°C [3], 207°C (perchlorate) [1]
$[\alpha]_D$ −238° (Py) [1], −219° [2]
UV: 226, 300(4.53, 4.04) [1, 2]; 226, 280, 300(4.46, 3.83, 4.04) [3]
IR: 3384, 3254, 1741, 1634, 1604, 1573 [1]; 3365, 1715, 1225, 835 [2, 3]
MS *m/z*: 414(M^+,100), 413, 399, 384, 383, 355, 295, 283, 281, 254, 244, 236, 230, 229, 216, 149 [2, 4]
^{1}H NMR: 1.22(3H, d, J = 7, CH_3-19), 3.70(3H, s, $COOCH_3$), 3.88(3H, s, Ar–OCH_3), 3.97(5H, m, Ar–OCH_3, CH_2-17), 6.87(1H, s, H–Ar), 6.98(1H, s, H–Ar), 8.03(1H, br s, NH) [2]
Stereochemistry: [5]

References

1. E.S. Zabolotnaya, E.V. Bukreeva, Zh. Obshch. Khim. **33**, 3780 (1963)
2. I. Ognyanov, B. Pyuskyulev, Chem. Ber. **99**, 1008 (1966)
3. G.V. Chkhikvadze, V.Yu. Vachnadze, K.S. Mudzhiri, Khim. Prirod. Soedin. **850** (1980)
4. I. Ognyanov, B. Pyuskyulev, G. Spiteller, Monatsh. Chem. **97**, 857 (1966)
5. I. Ognyanov, B. Pyuskyulev, Chem. Comm. (12), 579 (1967)

Herbadine

CAS Registry Number: 38485-12-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea*
$C_{21}H_{24}N_2O_4$: 368.1736
Mp: 206–208°C (dec., Me_2CO) [1], 202–205°C (dec.) [2], 240°C (dihydro) [1]
UV: 238, 292(3.84, 3.55) [1]
UV(MeOH): 212, 242, 292(4.57, 3.98, 3.48) [2]
IR: 3450, 2950, 2875, 2400, 1240, 1200, 1140, 1100, 1060, 1040, 980, 950, 900, 860, 810, 780, 760, 735 [2]
MS *m/z*: 368(M^+, 32), 337(2), 252(2), 251(2), 178(3), 168(1), 167(1), 166(1), 158(1), 157(1), 150(3), 147(3), 144(5), 143(20), 135(5), 130(10), 121(2), 117(100) [2]
^{1}H NMR($Py–d_5$): 1.71(3H, d, J = 6, CH_3-18), 1.84(1H, d, J = 15, H-14), 2.12(1H, d, J = 12, H-6), 3.23(1H, dd, J = 12, H-6), 3.40(1H, dd, J = 4, H-14β), 3.42(1H, d, J = 17, H-21), 3.86(1H, d, J = 4, H-15), 3.90(3H, s, $COOCH_3$), 4.16(1H, d, J = 4.5, H-5), 4.24(1H, d, J = 3, H-2), 4.50(1H, d, J = 17, H-21β), 4.85(1H, d, J = 5, H-17), 5.32(1H, q, J = 6, H-19), 6.65(1H, d, J = 3, NH), 7.00(1H, m, J = 6.5, H-10), 7.17(1H, d, J = 6.5, H-12), 7.30–7.75(4H, m, H-9, H-11, 2 × OH) [2]
^{13}C NMR ($Py–d_5$): [3]

Table 1

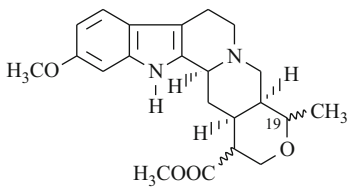
C-2	76.3	C-10	118.3	C-17	73.6
3	85.4	11	127.5	19	114.0
5	64.0	12	110.2	21	40.1
6	36.6	14	30.1	OCH_3	50.7
7	61.2	15	33.3	CH_3-18	12.5
9	125.9	16	58.6		

References

1. V.Yu. Vachnadze, V.M. Malikov, K.S. Mudzhiri, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 334 (1972)
2. G.H. Aynilian, C.L. Bell, N.R. Farnsworth, J. Pharm. Sci. **64**, 341 (1975)
3. M.R. Yagudaev, Chem. Nat. Comp. **18**, 693 (1982)

Herbaine (Vincaherbine)

CAS Registry Number: 5308-82-7



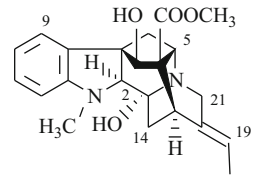
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea*
$C_{22}H_{28}N_2O_4$: 384.2049
Mp: 129–130°C (dec., MeOH) [1], 126–128°C [2, 3], 128–129°C [4], 203°C (perchlorate) [1]
$[\alpha]_D$ −253° (Py) [1], −217° [2, 3]
UV: 228, 274, 297(4.63, 3.85, 3.87) [1–4]
IR: 3465, 1720, 1250, 1225, 860 [1, 4]
MS *m/z*: 384(M^+, 100), 369, 353, 325, 253, 214, 200, 199, 186, 174 [2]
^{1}H NMR: 1.19(3H, d, J = 7, CH_3-19), 3.65(3H, s, $COOCH_3$), 3.83(3H, s, Ar–OCH_3), 6.70(3H, m, H–Ar), 8.17(1H, s, NH) [2]

References

1. E.S. Zabolotnaya, E.V. Bukreeva, Zh. Obshch. Khim. **33**, 3780 (1963)
2. I. Ognyanov, B. Pyuskyulev, G. Spiteller, Monatsh. Chem. **97**, 857 (1966)
3. I. Ognyanov, B. Pyuskyulev, Chem. Ber. **99**, 1008 (1966)
4. G.V. Chkhikvadze, V.Yu. Vachnadze, K.S. Mudzhiri, Khim. Prirod. Soedin. **850** (1980)

Herbamine

CAS Registry Number: 38485-13-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea*
$C_{22}H_{26}N_2O_4$: 382.1893
Mp: 176–179°C (dec.) [1]
$[\alpha]_D$ 0 ± 5° ($CHCl_3$) [1]
UV: 250, 295(3.82, 3.38) [1]
IR: 3400, 1740, 745 [1]
MS *m/z*: 382(M^+, 50), 168(1), 167(3), 158(5), 157(25), 144(25), 131(100) [1]
^{1}H NMR: 1.50(3H, d, CH_3-18), 2.72(3H, s, NCH_3), 5.07(1H, q, H-19), 6.12–7.00(4H, m, H–Ar) [1–3]
^{13}C NMR: [4]

Table 1

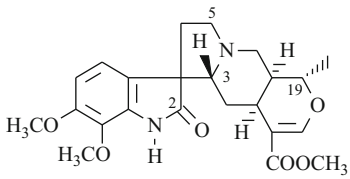
C-2	80.8	C-10	118.9	C-17	74.1
3	86.0	11	128.4	19	115.7
5	62.9	12	108.9	20	136.5
6	34.6	13	154.1	21	48.4
7	57.6	14	29.5	CH_3-18	12.7
8	129.4	15	32.4	NCH_3	35.8
9	124.1	16	59.0	OCH_3	51.4
				C = O	172.6

References

1. V.Yu. Vachnadze, V.M. Malikov, K.S. Mudzhiri, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 334 (1972)
2. M.R. Yagudaev, Chem. Nat. Comp. **17**, 442 (1981)
3. G.H. Aynilian, C.L. Bell, N.R. Farnsworth, Lloydia **37**, 589 (1974)
4. M.R. Yagudaev, Chem. Nat. Comp. **18**, 693 (1982)

Herboksine

CAS Registry Number: 57495-67-7

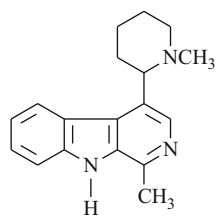


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea*
$C_{23}H_{28}N_4O_6$: 428.1947
Mp: 179–181°C [1]
$[\alpha]_D$ +40° (MeOH) [1]
UV: 224, 250 sh (4.39) [1]
IR: 1710, 1635, 800, 775 [1]
MS *m/z*: 428(M^+, 100), 413, 411, 397, 223, 222, 219, 208, 206, 204, 180, 69 [1]
^{1}H NMR: 1.18(3H, d, J = 6, CH_3-19), 3.37(3H, s, $COOCH_3$), 3.71(3H, s, Ar–OCH_3), 3.78(3H, s, Ar–OCH_3), 4.12(1H, q, J = 10, H-19), 6.40(1H, d, J = 8, H-10), 6.70(1H, d, J = 8, H-9), 7.32(1H, s, H-17), 8.20(1H, br s, NH) [1]

References

1. G.V. Chkhikvadze, M.M. Khalmirzaev, V.Yu. Vachnadze, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 201 (1976)

Homobrevicolline



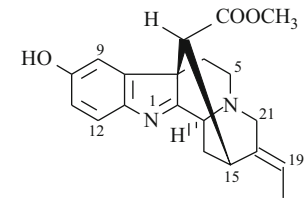
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Carex brevicollis*
$C_{18}H_{21}N_3$: 279.1736
Mp: 262°C [1]
UV: 212, 225 sh, 262, 310, 375 [1]
UV(H^+): 220, 245, 285, 350 [1]
MS *m/z*: 279(M^+), 278, 264, 250, 236, 222, 209, 98(100) [1]

References

1. I.N. Sharipov, I.V. Terent'eva, G.V. Lazur'evskii, Izv. AN MSSR (1), 86 (1979)

10-Hydroxystrictamine

CAS Registry Number: 88754-97-6



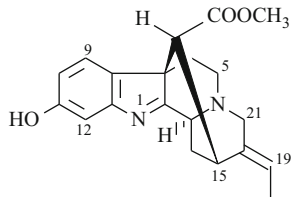
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{20}H_{22}N_2O_3$: 338.1631
Mp: amorph. [1, 2]
UV: 226, 280(4.11, 3.65) [1]
IR: 3300–3100, 1730, 840, 790, 760 [1]
MS *m/z*: 338(M^+), 337, 323, 307, 279, 196 [1]
^{1}H NMR: 1.50(d, J = 7, CH_3-18), 3.55(s, $COOCH_3$), 5.50(q, J = 7, H-19), 6.75(q, J = 8, 2, H-11), 6.96(d, J = 2, H-9), 7.41(d, J = 8, H-12) [1]

References

1. M.M. Khalmirzaev, M.R. Yagudaev, S.Yu. Yunusov, Khim. Prirod. Soedin. 426 (1980)
2. M.R. Yagudaev, M.M. Khalmirzaev, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 454 (1983)

11-Hydroxystrictamine

CAS Registry Number: 88754-98-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{20}H_{22}N_2O_3$: 338.1631
Mp: 228–229°C (Me_2CO) [1]
$[\alpha]_D$ +71° (MeOH) [1]
Solubility: very sol. EtOH, $CHCl_3$, MeOH, Me_2CO, alk.; insol. Et_2O, C_6H_6 [1]
UV: 233, 285(4.25, 3.64) [1]
IR: 3465, 1742, 860, 840, 790 [1]
MS *m/z*: 338(M^+, 100), 337(6), 323(3), 307(9), 279(40), 196(12) [1]
^{1}H NMR: 1.47(d, J = 6, CH_3-18), 3.63($COOH_3$), 5.45(q, J = 7, H-19), 6.49-7.15(3H, H-Ar) [1]
^{13}C NMR: [2]

Table 1

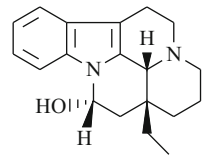
C-2	191.7	C-10	113.0	C-19	120.2
3	55.6	11	157.5	20	137.1
5	51.5	12	168.4	21	53.5
6	35.8	13	156.0	CH_3-18	12.8
7	55.3	14	33.3	OCH_3	51.5
8	137.1	15	32.2	O = C-17	171.5
9	123.8	16	54.6		

References

1. Kh.T. Il'yasova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 728 (1970)
2. M.R. Yagudaev, M.M. Khalmirzaev, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 454 (1983)

(+)-Isoeburnamine

CAS Registry Number: 4201-84-7



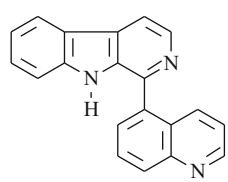
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Amsonia angustifolia, A. illustris, A. tabernaemontana*
$C_{19}H_{24}N_2O$: 296.1889
Mp: 217–220°C [1]
$[\alpha]_D$ +111° ($CHCl_3$) [1]
UV: 228, 282(4.49, 3.89) [1]; 229, 282(4.55. 3.95) [2]
IR: 1339, 1326, 1317, 1302, 1285, 1260, 1240, 1206, 1190, 1158, 1140, 1123, 1110, 1090, 1079, 1059, 1045, 1031, 1006, 975, 955, 940, 919, 910, 896, 848, 831, 793, 770, 760, 740 [1]
Abs. conf.: [3]

References

1. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1971), **6**, No. 743
2. E.S. Zabolotnaya, A.S. Belikov, S.P. Ivashchenko, M.M. Molodozhnikov, Med. Prom. SSSR (5), 28 (1964)
3. J. Trojanek, Z. Koblicova, K. Blaha, Chem. Ind. 1261 (1965)

Isokomarovine

CAS Registry Number: 85403-68-5



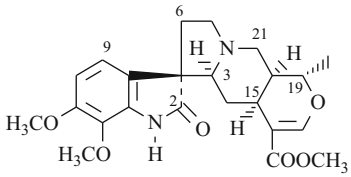
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{13}N_3$: 295.1110
Mp: 321–322°C ($CHCl_3$–MeOH) [1]
UV: 220, 292, 358(4.65, 4.18, 3.69) [1]
UV(H^+): 215, 253, 312, 385 [1]
MS *m/z*: 295(M^+), 147.5(M^{++}) [1]

References

1. T.S. Tulyaganov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 601 (1982)

Isomajdine

CAS Registry Number: 20497-41-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea, V. major, V. minor, V. pubescens*
$C_{23}H_{28}N_4O_6$: 428.1947
Mp: 208–210°C [1], 206–207°C (MeOH) [2–5], 201–202°C (MeOH) [6]
$[\alpha]_D$ −111° (Py) [1], −95° ($CHCl_3$) [2], −69° ($CHCl_3$) [3], −102° ($CHCl_3$) [4–6]
UV: 225, 248 sh, 285 sh (4.53, 4.16, 3.04) [1, 3, 4]
IR: 3330, 1730, 1710, 885, 875, 830 [2]; 3305, 1725, 1640, 775, 735 [3–6]
MS *m/z*: 428(M^+) [1, 3, 4, 6]
^{1}H NMR: 1.37(CH_3-19), 3.58($COOCH_3$), 3.80(OCH_3), 3.83(OCH_3), 4.30(H-19), 6.50(H–Ar), 6.84 (H–Ar), 7.40(H-17) [1]
^{13}C NMR: [7]

Table 1

C-2	<180.8	C-10	106.6	C-17	154.8
3	72.1	11	152.1	19	71.1
5	53.4*	12	132.9	20	38.0
6	35.1	13	133.7	21	53.9*
7	57.1	14	30.2	22	167.4
8	126.9	15	30.4	CH_3-19	18.4
9	119.4	16	109.8	Ar–OCH_3	55.9
					60.7
				OCH_3	50.8

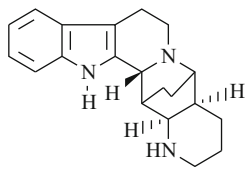
Abs. conf.: 3S, 4R, 7S [7]
Pharm./Biol.: LD_{50} 327 mg/kg (i/v, mice). Pronounced but brief hypotensive action [8].

References

1. I. Ognyanov, B. Pyuskyulev, I. Kompis, T. Sticzay, G. Spiteller, M. Shamma, R.Y. Shine, Tetrahedron **24**, 4641 (1968)
2. E.Z. Dzhakeli, V.Yu. Vachnadze, M.M. Mudzhiri, K.S. Mudzhiri, Soobshch. AN GSSR **50**, 397 (1968)
3. E.Z. Dzhakeli, K.S. Mudzhiri, Soobshch. AN GSSR **57**, 353 (1970)
4. Z.V. Robakidze, V.Yu. Vachnadze, K.S. Mudzhiri, Soobshch. AN GSSR **89**, 117 (1978)
5. V.Yu. Vachnadze, E.N. Zhukovich, K.S. Mudzhiri, Soobshch. AN GSSR **83**, 593 (1976)
6. G.V. Chkhikvadze, V.Yu. Vachnadze, K.S. Mudzhiri, Soobshch. AN GSSR **69**, 369 (1973)
7. M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 170 (1980)
8. A.G. Kurmukov, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (FAN, Tashkent, 1971), p. 43

Isonitrarine

CAS Registry Number: 57969-03-6



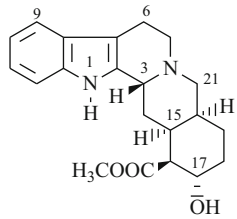
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{20}H_{25}N_3$: 307.2048
Mp: 208–209°C ($CHCl_3$), 239°C (di hydrochloride), 236°C (dec., perchlorate) [1]
$[\alpha]_D$ 0° [1]
UV: 226, 286(4.46, 3.84) [1]
IR: 3400, 3200, 2950, 2910, 755 [1]
MS *m/z*: 307(M^+, 100), 306, 279, 278, 224(85), 223, 197, 196, 195, 184, 183, 182, 171, 170, 169, 156, 144, 83. [1]
^{1}H NMR(CF_3COOH): 1.45, 1.95, 3.20(m, CH_2), 5.00(1H, H-3), 6.96(4H, m, H–Ar), 7.35, 8.26(each 1H, 2 × NH) [1]

References

1. A.A. Ibragimov, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 298 (1975)

Isorayhimbine (3-Epi-α-Yohimbine)

CAS Registry Number: 483-09-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia vomitoria*
$C_{21}H_{26}N_2O_3$: 354.1943
Mp: 125–128°C, 181–183°C, 222–223°C [1]; 240°C (hydrochloride) [2]
$[\alpha]_D$ −93° [1], −100° (Py) [2]
UV: 225, 279(4.49, 3.89) [2]
IR: 1720, 1338, 1322, 1313, 1293, 1280, 1260, 1223, 1196, 1188, 1170, 1160, 1140, 1130, 1098, 1064, 1058, 1035, 1024, 1018, 1008, 982, 968, 941, 914, 897, 856, 838, 806, 763, 758, 750, 715 [2]
IR(LIF): 3460, 3290 [2]
^{13}C NMR: [3]

Table 1

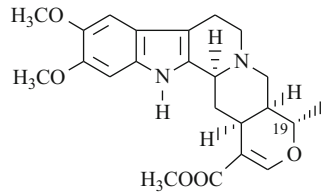
C-2	131.7	C-10	118.9	C-17	65.7
3	53.7	11	121.0	18	33.5
5	50.8	12	110.8	19	23.9
6	16.5	13	135.6	20	35.6
7	107.3	14	23.6	21	49.4
8	127.2	15	32.5	C = O	174.7
9	117.6	16	54.1	OCH_3	51.7

References

1. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 8 (Academic Press, New York, 1965), p. 292
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1966), 2, No. 331
3. E. Wenkert, C.-J. Chang, H.P.S. Chawla, W. Cochran, E.W. Hagaman, J.C. King, K. Orito, J. Amer. Chem. Soc. **98**, 3645 (1976)

Isoreserpiline

CAS Registry Number: 572-67-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia cambodiana, Vinca erecta*
$C_{23}H_{28}N_4O_5$: 412.1998
Mp: 211–212°C [1], 212–213°C [2], 254°C (dec., hydrochloride), 272°C (dec., hydrobromide), 246°C (oxalate) [1]

$[\alpha]_D$ −88° (EtOH), −82° (Py) [1]; −102° ($CHCl_3$) [2]
UV: 228, 303(4.55, 4.01) [2]; 228, 250, 300, 304, 311 sh (4.58, 4.16, 4.01, 4.02, 3.98) [3]
IR: 3413, 1698, 1629 [2, 4]
^{1}H NMR: 1.37(3H, d, J = 6, CH_3-19), 3.72(3H, s, $COOCH_3$), 3.83(3H, s, OCH_3), 3.87(3H, s, OCH_3), 4.44(1H, m, H-19), 4.20–4.70(1H, q, H-15), 6.77(1H, s, H–Ar), 6.90(1H, s, H–Ar), 7.57(1H, s, H-17), 7.95(1H, s, NH) [5]
ORD: [3]
Stereochemistry: [3, 6]
Pharm./Biol.: LD_{50} 430 mg/kg (i/p., mice). Sedative action [7]

References

1. A. Stoll, A. Hofmann, R. Brunner, Helv. Chim. Acta **38**, 270 (1955)
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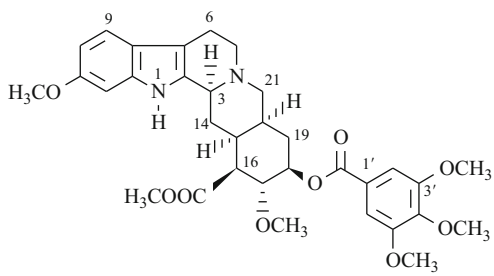
6. M. Shamma, J.M. Richey, J. Amer. Chem. Soc. **85**, 2507 (1963)
7. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 43

Isoreserpine

CAS Registry Number: 482-85-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia vomitoria*
$C_{33}H_{40}N_2O_9$: 608.2734
Mp: 152–156°C [1]
$[\alpha]_D$ −164° [1]
^{13}C NMR: [2]

Table 1

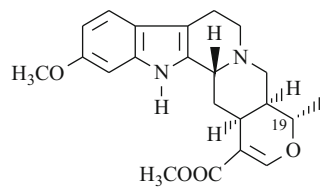
C-2	132.9	C-13	136.5	$COOCH_3$	51.7
3	59.6	14	27.6	11-OCH_3	55.6
5	52.8	15	37.0	17-OCH_3	60.5
6	21.6	16	51.7	C-1′	124.9
7	107.6	17	77.5	2′	106.7
8	121.4	18	77.8	3′	152.5
9	118.2	19	30.3	4′	141.9
10	108.4	20	34.6	3′-OCH_3	56.0
11	155.6	21	59.6	4′-OCH_3	60.6
12	94.8	16-C = O	172.2	1′-C = O	165.0

References

1. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 8 (Academic Press, New York, 1965), p. 291
2. E. Wenkert, C.-J. Chang, H.P.S. Chawla, W. Cochran, E.W. Hagaman, J.C. King, K. Orito, J. Amer. Chem. Soc. **98**, 3645 (1976)

Isoreserpinine

CAS Registry Number: 482-95-1



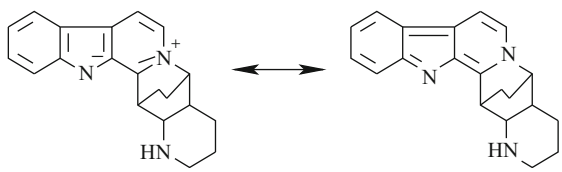
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea*
$C_{22}H_{26}N_2O_4$: 382.1893

Mp: 224–226°C (dec.) [1, 2]; 270°C (nitrate), 216°C (tartrate) [2]
$[\alpha]_D$ −18° (Py) [1], −5° (Py) [2]
UV: 229, 299(4.69, 3.83) [2]
IR: 1211, 1202, 1123, 1081, [3]
MS *m/z*: 382(M^+), 367, 351, 323, 297, 295, 281, 253, 214, 200, 199, 186 [1]
^{1}H NMR(Me_2CO-d_6): 1.33(3H, d, CH_3-19), 3.63(3H, s, $COOCH_3$), 3.71(3H, s, OCH_3) [1]
Stereochemistry: [4]

References

1. E.Z. Dzhakeli, Chem. Nat. Comp. **14**, 362 (1978)
2. A. Stoll, A. Hofmann, R. Brunner, Helv. Chim. Acta **38**, 270 (1955)
3. N. Neuss, H.E. Boaz, J. Org. Chem. **22**, 1001 (1957)
4. M. Shamma, J.M. Richey, J. Amer. Chem. Soc. **85**, 2507 (1963)

Isoschoberidine

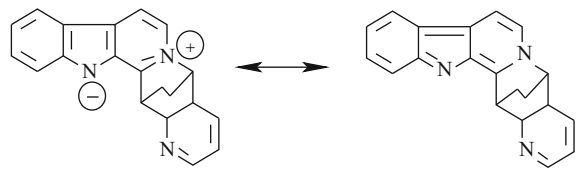


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{20}H_{21}N_3$: 303.1736
Mp: 244–245°C (EtOH) [1]
$[\alpha]_D$ 0° [1]
Solubility: spar. sol. org. solvs. [1]
UV: 254, 308, 372(4.21, 4.07, 3.34) [1]
UV(OH^-): 284, 330, 415 [1]
MS *m/z*: 303(M^+) [1]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **29**, 26 (1993). Unpub

Komarine



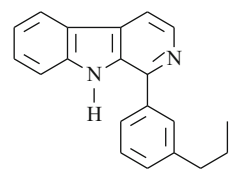
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{17}N_3$: 299.1422
Mp: 224–225°C (EtOH) [1]
$[\alpha]_D$ 0° (EtOH) [1]
UV: 210, 252, 306, 370 (4.41, 4.16, 4.08, 3.80) [1]
UV: (OH^-) 214, 292, 320, 425 [1]
IR: 3065, 2940, 2860, 1650, 1630, 1580, 1490, 1460, 1340, 1170, 755 [1]
MS *m/z*: 299M^+ [1]
^{1}H NMR: 1.62 (m, 4H), 3.34 (m, 2H), 4.29 (m, 2H), 7.00–8.20 (m, 9Ar–H), 9.32 (1H, br s) [1]

References

1. T.S. Tulyaganov, O.E. Makhmudov, Chem. Nat. Comp. **36**, 76 (2000)

Komaroine

CAS Registry Number: 94898-73-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{18}N_2$: 286.1470

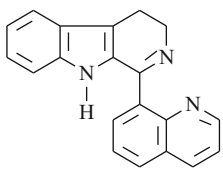
Mp: 144–145°C ($CHCl_3$–MeOH) [1]
UV: 215, 235, 280, 290, 350, (4.44, 4.42, 4.12, 4.12, 3.81) [1]
UV(H^+): 216, 255, 265, 310–318, 382 [1]
IR: 2965, 2930, 2870, 2860, 1630, 1570, 1505, 1460, 750 [1]
MS *m/z*: 286(M^+), 271, 257, 243 [1]
^{1}H NMR: 0.85(3H, t, CH_2CH_3), 2.58(2H, t, Ar–CH_2), 1.58(2H, m, CH_2CH_3) [1]

References

1. T.S. Tulyaganov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 378 (1984)

Komarovidine

CAS Registry Number: 76971-22-7



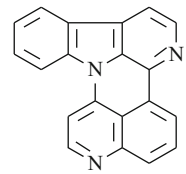
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{15}N_3$: 297.1266
Mp: 219–220°C ($CHCl_3$–MeOH) [1]
UV: 218, 242 sh, 317(4.58, 4.25, 4.18) [1]
UV(H^+): 212, 240 sh, 362 [1]
IR: 2940, 2830, 1630, 1560, 1505, 1450, 760 [1]
MS *m/z*: 297(M^+), 296(100), 282, 269, 151, 148.5(M^{++}, 5) [1]
^{1}H NMR: 3.01, 4.04(each 2H, t) [1]

References

1. T. S. Tulyaganov, A. A. Ibragimov, S. Yu. Yunusov, Khim. Prirod. Soedin. 732 (1980)

Komarovidinine

CAS Registry Number: 85412-78-8

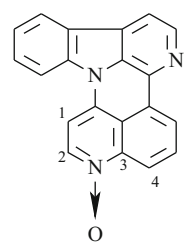


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{11}N_3$: 293.0953
Mp: 254–255°C ($CHCl_3$–MeOH) [1]
UV: 242, 267, 295–308, 390, 406, 480(4.70, 4.36, 4.02, 3.04, 3.30, 3.56) [1]
UV(H^+): 246 sh, 267, 396 sh, 417, 440 [1]
MS *m/z*: 293(M^+), 146(M^{++}) [1]

References

1. T.S. Tulyaganov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 601 (1982)

Komarovidinine N-Oxide



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{11}N_3O$: 309.3294
Mp: 263–264°C (EtOH) [1]
Solubility: insol. org. solvs. [1]

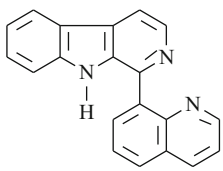
UV: 210, 229, 266, 295–306, 387, 406, 432 (4.68, 4.67, 4.38, 4.04, 4.10, 4.40, 4.57) [1]
UV: (H^+) 208, 266, 310, 291, 414, 445 [1]
IR: 3062, 1615, 1602, 1510, 1485, 1453, 1431, 1384, 1333, 1284, 1261, 1241, 1120, 966, 823, 771, 739 [1]
MS *m/z*: 309 (8), 293 (100), 292 (29), 291 (22), 146.5 $(M\text{-}16)^{++}$(5) [1]
^{1}H NMR: 7.39 (d, H-1, J = 6), 7.44 (m, H-11), 7.54 (m, H-5), 7.65 (3H, m, H-6, H-12, H-13), 7.80 (d, H-9, J = 7), 8.05 (m, H-4), 8.09 (m, H-10), 8.25 (d, H-8, J = 5.5), 8.60 (d, H-2, J = 7) [1]

References

1. T.S. Tulyaganov, O.E. Makhmudov, Chem. Nat. Comp. **36**, 396 (2000)

Komarovine

CAS Registry Number: 62209-25-0



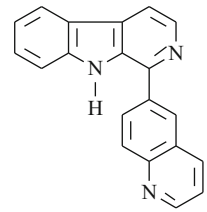
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{13}N_3$: 295.1110
Mp: 229–230°C ($CHCl_3$–MeOH) [1]
UV: 220, 292, 358(4.65, 4.18, 3.69) [1]
UV(H^+): 215, 253, 312, 385 [1]
IR: 1630, 1570, 1505, 1460, 740 [1]
MS *m/z*: 295(M^+), 147.5(M^{++}) [1]
Pharm./Biol.: LD_{50}−171 mg/kg (i/v, mice). Hypotensive action [2]

References

1. T. S. Tulyaganov, A. A. Ibragimov, S. Yu. Yunusov, Khim. Prirod. Soedin. 732 (1980)
2. A.G. Kurmukov, U.B. Zakirov, *Alkaloids and Preparations of Medicinal Herbs for the Treatment of Hypertensive States* [in Russian] (Ibn Sina, Tashkent, 1992), p. 106

Komarovinine

CAS Registry Number: 85412-79-9



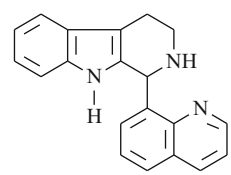
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{13}N_3$: 295.1110
Mp: 239–240°C ($CHCl_3$–MeOH) [1]
UV: 225, 272, 296, 370(4.60, 4.31, 4.19, 4.00) [1]
UV: (H^+): 225, 254, 284, 316, 400 [1]
IR: 3210, 3150, 1630, 1575, 1505, 1460, 750 [2]
^{1}H NMR: 7.43–8.75(H–Ar) [2]
Pharm./Biol.: LD_{50} 146.5 mg/kg (i/v, rats). Hypertensive action [2]

References

1. T.S. Tulyaganov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 604 (1982)
2. T. S. Tulyaganov, A. A. Ibragimov, S. Yu. Yunusov, A. A. Vakhabov, S. D. Aminov, Khim. Pharm. Zh. **XXI**, 295 (1987)

Komarovicine

CAS Registry Number: 85403-71-0



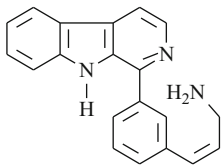
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{17}N_3$: 299.1422
Mp: 209–210°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D$ 0° [1]
Solubility: spar. sol. org. solvs [1]
UV: 220, 275–286, 294, 318(4.75, 4.14, 4.13, 3.68) [1]
UV(H^+): 225, 272, 283, 316 [1]
IR: 2940, 2860, 1620, 1580, 1505, 1460 [1]
MS *m/z*: 299(M^+, 100), 283(20), 282(52), 281(44), 271(30), 270(28), 269(54), 149.5(M^{++}) [1]
^{1}H NMR($CDCl_3$–CD_3OD): 2.81, 2.99(each 2H, m, H-3, H-4), 3.21(1H, 2-NH), 6.28(1H, H-1) [1]
Pharm./Biol.: LD_{50} 33.7 mg/kg (i/v, mice). Hypotensive action [2]

References

1. T.S. Tulyaganov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **24**, 598 (1982)
2. A.G. Kurmukov, U.B. Zakirov, *Alkaloids and Preparations of Medicinal Herbs for the Treatment of Hypertensive States* [in Russian] (Ibn Sina, Tashkent, 1992), p. 106

Komavicine

CAS Registry Number: 169626-15-7

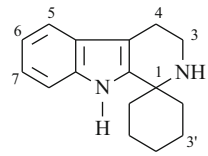


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{17}N_3$: 299.1422
Mp: amorph., 205°C (N–Ac) [1]
UV: 215, 233, 272, 290, 355(4.47, 4.45, 4.15, 4.18, 3.83) [1]
UV(H^+): 254, 307, 375 [1]
IR: 3410, 3060, 2940, 2860, 1620, 1570, 760 [1]
MS *m/z*: 299(M^+), 271, 270, 196, 195 [1]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **29**, 26 (1993)

Komavine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{16}H_{20}N_2$: 240.3303
Mp: 131–132°C (C_6H_{14}) [1]
UV: 225, 282, 291 (sh) (4.69, 4.14, 4.03) [1]
IR: 3296 (N–H), 3050 (Ar–H), 2921, 2841 ($-CH_2-$), 1617, 1580, 1464, 1441, 1368, 1345, 1295, 1234, 1157, 1026, 835, 747 [1]
MS *m/z*: 240 (M^+, 43), 212 (10), 211 (17), 198 (22), 197 (100), 184 (19), 168 (13), 167 (14), 155 (16), 154 (15), 98 (13), 85 (9), 81 (8), 78 (9) [1]
^{1}H NMR: 1.30–1.80 (10H, m), 2.62 (2H, t, J = 6.0), 3.06 (2H, t, J = 6.0), 7.08 (2H, m), 7.18 (1H, m), 7.42 (1H, m), 7.68 (1H, br s, N–H) [1]
^{13}C NMR: [1]

Table 1

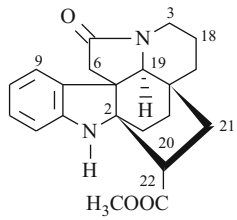
C-1	52.3	C-6	118.2*	C-2′	36.7
3	39.2	7	119.4*	3′	21.4
4	23.1	8	121.5*	4′	25.8
4a	108.1	8a	141.2	5′	21.4
4b	135.4**	9a	127.6**	6′	36.7
5	110.7*				

References

1. T.S. Tulyaganov, O.M. Nazarov, M.G. Levkovich, N.D. Abdullaev, Chem. Nat. Comp. **37**, 61 (2001)

Kopsinilam

CAS Registry Number: 464-68-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: 248–249°C [1], 254–254.5°C [2]
$[\alpha]_D$ −13° ($CHCl_3$) [1, 2]
UV: 246, 295(3.59, 3.50) [1, 2]
IR: 3260, 1742, 1690, 1612 [1, 2]
^{13}C NMR(Py-d_5): [3]

Table 1

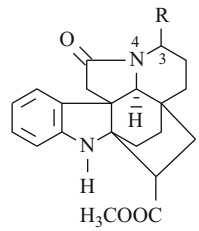
C-2	66.5	C-10	127.9	C-17	21.0
3	41.9	11	121.1	18	35.4
5	172.3	12	111.0	19	65.7
6	40.1	13	150.7	20	44.4
7	50.0	14	31.6	21	31.8
8	138.6	15	28.5	22	174.2
9	119.5	16	33.3	OCH_3	51.8

References

1. D.A. Rakhimov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 300 (1967)
2. C. Kump, H. Schmid, Helv. Chim. Acta **45**, 1090 (1962)
3. M.R. Yagudaev, Chem. Nat. Comp. **20**, 320 (1984)

Kopsinilamine

CAS Registry Number: 36101-53-8



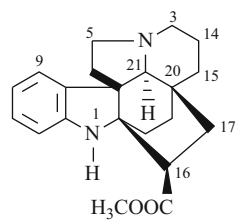
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_4$: 368.1736
Mp: 243–244°C (Me_2CO) [1]
$[\alpha]_D$ −65° (Me_2CO) [1]
UV: 246, 296(3.75, 3.34) [1]
IR: 3420–3400, 3220, 1720, 1680, 1220, 760 [1]
MS *m/z*: 351(28), 350(100), 214(55) [1]
^{1}H NMR: 3.69(3H, s, $COOCH_3$), 6.50–7.00(4H, H–Ar) [1]

References

1. V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 765 (1971)

Kopsinine (Erectine)

CAS Registry Number: 559-51-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Vinca erecta*
$C_{21}H_{26}N_2O_2$: 338.1994
Mp: 105°C [1, 2]; 215°C (picrate), 265°C (methiodide) [1]
$[\alpha]_D$ −69° [1]
UV: 205, 246, 295(4.43, 3.83, 3.45) [1]
IR: 3333, 1730 [1]
MS *m/z*: 338(M^+), 310, 124, 109 [3]
^{1}H NMR: [4]
^{13}C NMR: [5]

Table 1

C-2	66.7	C-10	119.7	C-17	31.8
3	47.6	11	126.6	18	33.9
5	50.7	12	110.8	19	33.9
6	36.5	13	149.0	20	31.2
7	57.9	14	17.1	21	68.4
8	140.6	15	34.8	C = O	174.3
9	121.6	16	43.8	OCH_3	51.9

Pharm./Biol.: CNS analeptic [6].

References

1. H.G. Kump, H. Schmid, Helv. Chim. Acta **44**, 1503 (1961)
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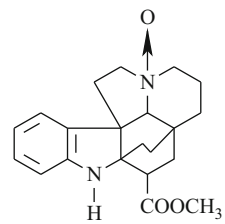
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 47

Kopsinine N-Oxide

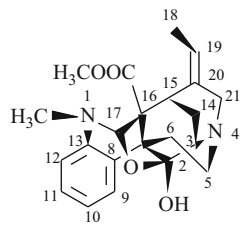


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{26}N_2O_3$: 354.1943
Mp: 159–161°C (EtOAc) [1]
UV: 245, 297(3.87, 3.47) [1]
IR: 3370, 1730, 755 [1]
MS *m/z*: 354(M^+), 338, 337, 336, 124, 109 [1]
^{1}H NMR: 3.72(s, $COOCH_3$), 6.50–7.05(4H, H–Ar), 8.11(d) [1]

References

1. M.R. Sharipov, M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 422 (1974)

Langeomigine (Lanceomigine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca major*
$C_{22}H_{26}N_2O_4$: 382.1893
Mp: amorph. [1, 2]
$[\alpha]_D$ +32° [2]
UV: 225, 257, 295 [2]
UV (EtOH + $HClO_4$): 235, 290 [2]
IR($CHCl_3$): 3640, 3400, 1750, 1740, 1600, 1500 [2]
MS *m/z*: 382(M^+), 367, 354, 338, 337, 323, 295, 278, 264, 216, 194, 181, 170, 167, 157 [1]
^{1}H NMR: 1.50(3H, br d, J = 7), 2.95(3H, s), 3.55(3H, s), 4.80(1H, s), 5.45(1H, m) [2]
^{13}C NMR: [2]

Table 1

C-2	110.9	C-7	50.1	C-11	127.3*
3	57.7	8	126.4	12	112.3

(*continued*)

Table 1 (continued)

5	48.3	9	128.7*	13	144.7
6	27.4	10	118.2		

References

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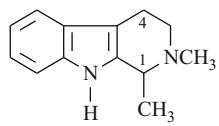
2. J. Vercauteren, G. Massiot, T. Sevenet, B. Richard, V. Lobjois, L. Men-Oliver, J. Levy, Phytochemistry **20**, 1411 (1981)

Leptocladine (N-Methyltetrahydroharman)

CAS Registry Number: 27297-47-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Hammada leptoclada*

$C_{13}H_{16}N_2$: 200.1313

Mp: 109–110°C (xylene), 235°C (hydrochloride), 184°C (picrate) [1]

$[\alpha]_D$ 0° [1]

Solubility: very sol.org. solvs.; spar. sol.H_2O [1]

UV: 224, 280(4.50, 3.80) [2]

IR: 3465, 3410, 3055, 3010, 2930, 2835, 2790, 1460, 1370, 1320, 1309, 1271, 1188, 1169, 1160, 1150, 1130, 1105, 1080, 1070, 1050, 1028, 1011, 968, 929, 912, 878, 850 [2]

^{1}H NMR: 1.30(3H, d, 1-CH_3), 2.42(3H, s, NCH_3), 2.60–3.15(4H, m, H-3, H-4), 3.40(2H, q, H-1), 6.85–7.55(5H, m, H–Ar), 7.88(NH) [3]

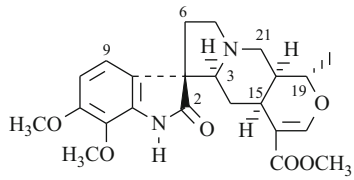
Pharm./Biol.: LD_{50} 75 mg/kg (s/c, mice). Causes an increase in reflex excitability and clonic convulsions passing into the tetanic type. In experiments on urethanized cats, it exhibits a ganglioblocking action. Affects respiration, which is connected with vasodepressor reflexes [4]

References

1. N. K. Yurashevskii, Zh. Obshch. Khim. **9**, 595 (1939); **11**, 157 (1941)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1968), 3, No. 446
3. S.R. Johns, J.A. Lamberton, A.A. Sioumis, Austral. J. Chem. **19**, 1539 (1966)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 103

Majdine

CAS Registry Number: 20497-42-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Vinca erecta, V. herbacea, V. major, V. minor, V. pubescens*

$C_{23}H_{28}N_4O_6$: 428.1947

Mp: 190–192°C (MeOH) [1, 2]

$[\alpha]_D$ −108° (Py), −145° ($CHCl_3$) [2]

UV: 225, 248 sh, 285 sh (4.57, 4.23, 3.16) [1]; 227, 270–290 sh [3]

IR: 3330, 1730, 1710, 1635, 790, 775 [4]

MS *m/z*: 428(M^+, 100), 413(2), 411(3), 397(3), 223(46), 208(13), 206(4), 205(5), 204(6), 180(9), 59(35) [1, 2, 4]

^{1}H NMR: 1.35(3H, d, J = 6.6, CH_3-19), 3.54(3H, s, $COOCH_3$), 3.79(6H, 2 × OCH_3), 4.41(1H, m, H-19), 6.50(1H, d, J = 8, H–Ar), 6.73(1H, d, J = 8, H–Ar), 7.40(1H, s, H-17), 8.18(1H, NH) [1, 2, 4, 5]

^{13}C NMR: [6]

Table 1

C-2	180.8	C-10	106.1	C-17	154.9
3	74.0	11	152.2	19	72.0
5	53.3*	12	133.9	20	38.1
6	33.7	13	132.5	21	54.6*
7	55.9	14	29.3	22	167.4
8	126.5	15	30.8	CH_3-19	18.4
9	117.8	16	109.1	Ar–OCH_3	56.2
					60.5
				OCH_3	50.6

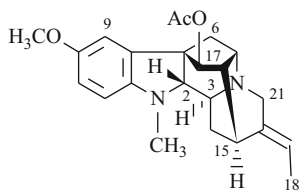
Abs. conf.: 3S, 4R, 7R [6]
Pharm./Biol.: LD_{50} 240 mg/kg (i/v, mice). Hypotensive action [7]

References

1. M. Shamma, R.I. Shine, Tetrahedron **24**, 4641 (1968)
2. G.V. Chkhikvadze, V.Yu. Vachnadze, K.S. Mudzhiri, Soobshch. AN GSSR **69**, 369 (1973)
3. N. Abdurakhimova, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 263 (1967)
4. V.Yu. Vachnadze, V.M. Malikov, K.S. Mudzhiri, S.Yu. Yunusov, Soobshch. AN GSSR **66**, 333 (1972)
5. M.R. Yagudaev, N. Abdurakhimova, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 170 (1968)
6. M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 170 (1980)
7. A.G. Kurmukov, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (FAN, Tashkent, 1971), p. 43

Majoridine (Majdinine)

CAS Registry Number: 6519-30-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. major, V. pubescens*

$C_{23}H_{28}N_2O_3$: 380.2100
Mp: 222–223°C [1, 2], 195°C (dihydro) [2]
$[\alpha]_D$ −27° ($CHCl_3$) [1], −19° ($CHCl_3$) [3]
UV: 248, 307(4.00, 3.58) [3]
IR: 1728, 1255, 760, 749, 742 [3]
IR($CHCl_3$): 1728, 1593, 1255, 1038, 815, 805 [2]
MS *m/z*(dihydro): 382(M^+, 12), 381(100), 352(1.5), 190(14), 188(6), 174(18) [2, 3]
^{1}H NMR: [2]
^{13}C NMR: [4]

Table 1

C-2	79.6	C-11	111.1	C-19	114.3
3	49.3*	12	109.6	20	139.3
5	55.9*	13	147.8	21	55.2
6	36.1	14	29.4	NCH_3	35.1
7	53.6	15	27.8	Ar-OCH_3	55.5
8	113.3	16	50.1	C = O	169.9
9	110.0	17	79.1	OCH_3	21.1
10	153.0	18	12.8		

ORD: [2]

References

1. P.Kh. Yuldashev, D.L. Kaul, Z. Kablitsova, Ya Troyanek, S. Yu. Yunusov, Chem. Nat. Comp. **2**, 154 (1966)
2. J. L. Kaul, J. Trojanek, Chem. Ind. 853 (1966); Lloydia **29**, 26 (1966)
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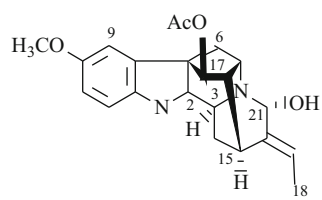
Majorinine

CAS Registry Number: 64986-27-2



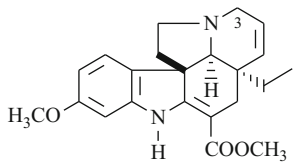
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca major*
$C_{22}H_{24}N_2O_4$: 380.1736
Mp: 195–196°C (Me_2CO) [1]
UV: 213, 222, 280(4.31, 4.32, 3.92) [1]
IR: 3200, 1748, 1635, 880, 830 [1]
MS *m/z*: 380(M^+), 362, 352, 351, 350, 337, 321, 213, 199 [1]
^{1}H NMR: 1.67(q, Ha-6, CH_3-18), 1.95(m, H-14α, H-14β), 2.19(s, OAc), 2.37(t, J = 6, 0.5), 2.71(q, J = 12, 5, He-6), 3.28(m, J = 6, 0.5, H-15α), 3.82(s, 10-OCH_3), 3.85(m, J = 5, 0.5, 6, H-5α), 4.30(q, J = 7, 3, He-3), 4.98(m, H-17α, H-21α), 5.70(o, J = 6.5, 2, H-19), 6.90(q, J = 8.5, 2.3, H-11), 7.02(d, J = 2.3, H-9), 7.53(d, J = 2.3, H-12) [1]

References

1. L.I. Il'yashenko, V.M. Malikov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 324 (1977)

11-Methoxytabersonine (Ervamicine)

CAS Registry Number: 27773-39-3



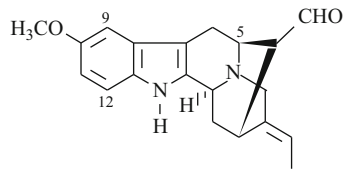
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{22}H_{26}N_2O_3$: 366.1943
Mp: amorph. [1, 2], 186°C (dec., hydrochloride) [2], 208°C (dec., hydroiodide) [1]
$[\alpha]_D$ −310° ($CHCl_3$) [2]
IR: 3375, 1685, 824, 900–700 [1, 2]
MS *m/z*: 366(M^+), 259, 135(100), 121, 107 [1, 2]
^{1}H NMR(CCl_4): 0.58(3H, t, CH_3), 3.30(2H, q, 2H-3), 3.63(3H, s, $COOCH_3$), 3.66(3H, s, OCH_3), 6.19, 6.29, 6.94(each 1H, H–Ar), 8.95(NH) [1, 2]

References

1. D.A. Rakhimov, V.M. Malikov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 221 (1970)
2. B. Pyuskyulev, I. Kompis, I. Ognyanov, G. Spiteller, Collect. **32**, 1289 (1967)

10-Methoxyvellosimine

CAS Registry Number: 2149-40-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{20}H_{22}N_2O_2$: 322.1681
Mp: 224–226°C (MeOH) [1, 2]; 217–220°C (dec.) [3]
UV: 228, 274, 293(4.32, 3.94, 3.78) [2]
IR: 1715, 1600, 1220, 880, 805 [2]
MS *m/z*: 322(M^+), 293, 279, 212, 199, 198 [2]
^{1}H NMR: 1.50(3H, d, J = 7, CH_3), 3.58(3H, s, OCH_3), 5.00(1H, q, J = 7, =CH-), 9.00(1H, s, CHO) [2]; (DMSO–d_6) 1.56(3H, d, J = 6.5, CH_3), 3.76(3H, s, OCH_3), 5.28(1H, q, J = 6.5, =CH), 6.68(1H, dd, J = 8.5, 2.5, H-11), 6.86(1H, d, J = 2.5, H-9), 7.22(1H, d, J =8.5, H-12), 8.09(1H, s, NH), 9.57(1H, s, CHO) [3]

References

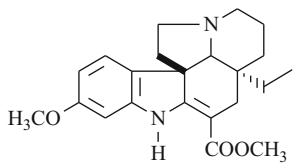
1. V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 497 (1977)

2. M. M. Plat, R. Lemay, J. Le Men, M.-M. Janot, C. Djerassi, H. Budszikiewicz, Bull. Soc. Chim. France 2497 (1965)

3. A. Banerji, M. Chakrabarty, Phytochemistry **13**, 2309 (1974)

11-Methoxyvincadifformine (Ervinceine)

CAS Registry Number: 25858-80-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. herbacea, V. minor*
$C_{22}H_{28}N_2O_3$: 368.2100
Mp: 99–100°C (MeOH) [1]; amorph. [2, 3]; 215°C (hydroiodide), 119°C (dihydro) [1]
$[\alpha]_D$ −448° ($CHCl_3$) [1, 3], −368° ($CHCl_3$) [2]
UV: 248, 328(4.12, 4.26) [1, 4]
IR: 3335, 1682, 868, 805 [1, 2]
MS *m/z*: 368(M^+, 48), 125(16), 124(100) [1–3, 5]
^{1}H NMR: 0.53(3H, CH_3), 3.63(s, $COOCH_3$), 3.66(s, OCH_3), 6.15, 6.28, 6.88(each 1H, H–Ar), 8.88(s, NH) [5]

References

1. D.A. Rakhimov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 280 (1969)
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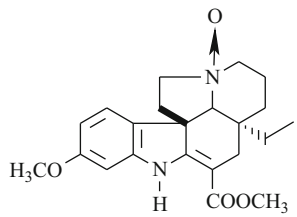
3. G.V. Chkhikvadze, V.Yu. Vachnadze, Chem. Nat. Comp. **22**, 363 (1986)
4. B. Pyuskyulev, I. Kompis, I. Ognyanov, G. Spiteller, Collect. **32**, 1289 (1967)
5. D.A. Rakhimov, V.M. Malikov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 221 (1970)

11-Methoxyvincadifformine N-Oxide

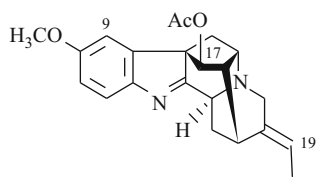


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{22}H_{28}N_2O_4$: 384.2049
Mp: 150–152°C (Me_2CO) [1]
Solubility: very sol. H_2O, MeOH [1]
IR: 1680, 1650 [1]
MS *m/z*: 384(M^+, 4), 368(26), 366(15), 338(12), 125(13), 124(100), 69(8) [1]
^{1}H NMR: 0.62(3H, t, CH_3), 3.72(6H, s, $COOCH_3$, Ar–OCH_3) [1]

References

1. M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 776 (1973)

10-Methoxyvinorine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*

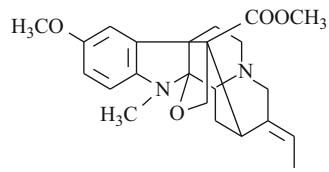
$C_{22}H_{24}N_2O_3$: 364.1787
Mp: amorph., 200°C (dihydro) [1]
UV: 223, 280(4.07, 3.66) [1]
IR: 1745, 860, 825, 780 [1]
MS *m/z*: 364(M^+, 100), 321(63), 305(42), 212(10), 199(21), 198(38) [1]
^{1}H NMR: 1.60(d, CH_3), 2.10(s, OAc), 3.75(s, OCH_3), 5.00(s, H-17), 5.25(q, J = 6, H-19), 6.86 (H-11), 6.97(H-9), 7.45(H-12) [1]

References

1. M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 657 (1973)

O-Methylakuammine

CAS Registry Number: 36101-52-7

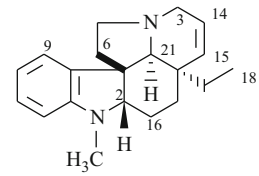


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{23}H_{28}N_2O_4$: 396.2049
Mp: 241–242°C (MeOH) [1]
UV: 245, 310(3.76, 3.18) [1]
IR: 1730, 820, 725 [1]
MS *m/z*: 396(M^+) [1]
^{1}H NMR: 1.45(d, CH_3), 2.70(s, NCH_3), 3.68(s, $COOCH_3$), 3.73(s, Ar–OCH_3), 6.40-6.67(H–Ar) [1]

References

1. D.A. Rakhimov, M.R. Sharipov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 663 (1971)

N(α)-Methyl-14,15-dehydroaspidospermidine

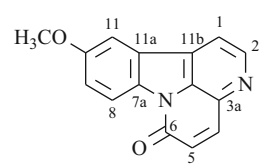


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea*
$C_{20}H_{26}N_2$: 294.2096
Mp: 110–112°C (EtOH) [1], 118–120°C [2]
$[\alpha]_D$ −40° ($CHCl_3$) [1]
UV: 258, 308(3.91, 3.45) [1, 2]
IR: 1605, 730 [1]; 1607 [2]
MS *m/z*: 294(M^+), 265, 182, 170, 158(100), 135, 122, 121, 107 [1]; 294(M^+, 30), 266(4), 265(100), 158(58), 144(31), 135(100), 122(39), 121(46), 107(44) [2]
^{1}H NMR: 0.73(3H, t, J = 7, CH_3-18), 1.20(2H, q, J = 7, H-19), 2.76(3H, s, Na–CH_3), 3.10–3.60(3H, m), 5.50(1H, q, J = 10, 2, H-15), 5.70(1H, m, J = 10, 4.5, 1, H-14), 6.39(1H, d, J = 8, H-12), 6.65 (1H, t, J = 8, H-10), 7.05(1H, d, J = 8, H-9), 7.12(1H, t, J = 8, H-11) [2]

References

1. N.A. Babaev, A.M. Aliev, V.M. Malikov, Chem. Nat. Comp. **11**, 283 (1975)
2. A.A. Gorman, H. Schmid, Mh. Chem. **98**, 1554 (1967)

Methylervine (10-Methoxycanthin-6-one)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aerva lanata*
$C_{15}H_{10}N_2O_2$: 250.0742
Mp: 194–196°C (MeOH, $CHCl_3$–EtOH) [1]
UV: 269 sh, 277, 297 sh, 308 sh, 355 sh, 376(4.31, 4.41, 3.93, 3.90, 4.01, 4.09) [1]
UV(EtOH + HCl): 269 sh, 278, 310 sh, 323 sh, 361, 380(−, 4.30, 3.92, 3.83, 4.08, 4.08) [1]
IR: 1670, 1635, 1610, 1575 [1]
MS *m/z*: 250(M^+, 100), 235(88), 207(21), 179(15), 153(8), 125(9) [1]
^{1}H NMR: 3.98(s, OCH_3), 6.97(d, J = 10, H-5), 7.22(dd, J = 8.5, 2, H-9), 7.52(d, J = 2, H-11), 7.90(d, J = 5, H-1), 8.00(d, J = 10, H-4), 8.50(d, J = 8.5, H-8), 8.80(d, J = 5, H-2) [1]
^{13}C NMR: [2]

Table 1

C-1	117.9	C-6	159.1	C-11	106.4
2	145.5	7a	133.7	11a	125.5
3a	136.3	8	116.2	11b	130.1
4	139.1	9	117.8	11c	132.3
5	128.9	10	157.8	OCH_3	55.8

References

1. G.G. Zapesochnaya, L.N. Pervykh, V.A. Kurkin, Chem. Nat. Comp. **27**, 336 (1991)
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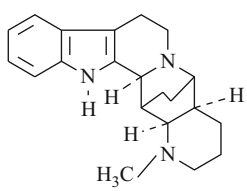
N-Methylnitrarine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria schoberi*
$C_{21}H_{27}N_3$: 321.4675
Mp: 263–264°C (EtOH) [1]
$[\alpha]_D$ 0° [1]
UV: 220, 266–272, 280 (sh), 288 (4.68, 3.88, 3.85, 3.52) [1]
IR: 3441, 3179, 3028, 2949, 2855, 2776, 1623, 1572, 1473, 1451, 1427, 1374, 1332, 1299, 1240, 1212, 1151, 1141, 1097, 1006, 983, 900, 845, 766, 746 [1]
MS *m/z*: 321 (M^+, 50), 306 (2), 293 (11), 292 (27), 239 (4), 238 (2), 224 (20), 223 (24), 197 (10), 196 (10), 195 (11), 184 (7), 182 (7), 171 (15), 170 (16), 169 (20), 156 (15), 144 (100), 98 (60) [1]
^{1}H NMR: 1.21 (m), 1.76 (m), 2.25 (m), 2.32 (3H, s, N–CH_3), 2.86 (m), 3.45 (m), 3.71 (m), 3.96 (m), 4.48 (m), 4.76 (m), 7.13 (2H, m), 7.45 (2H, m) [1]

References

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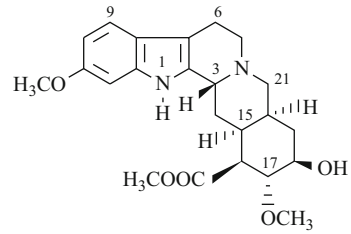
Methylreserpat



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia vomitoria*
$C_{23}H_{30}N_2O_5$: 414.2155
Mp: 231–239°C, 235–240°C [1]
$[\alpha]_D$ −106° [1]
MS *m/z*: 414(86), 413(100), 383(16), 382(23), 381(27), 251(16), 214(20), 200(42), 186(29) [2]
^{13}C NMR: [3]

Table 1

C-2	131.1	C-10	109.0	C-18	75.2
3	53.8	11	156.2	19	32.7

(*continued*)

Table 1 (continued)

5	51.3	12	95.5	20	34.7
6	16.8	13	136.6	21	49.5
7	108.0	14	24.3	C = O	173.5
8	122.4	15	32.7	$COOCH_3$	51.5
9	118.5	16	51.5	CH_3O-11	55.6
		17	81.6	CH_3O-17	60.5

Pharm./Biol.: Hypotensive and sedative action [4]

References

1. L. Dorfman, A. Furlenmeier, C.F. Huebner, R. Lucas, H.B. McPhillaney, J.M. Mueller, E. Schlitter, R. Schwyzer, A.F. Andre, Helv. Chim. Acta **37**, 59 (1954)
2. M. Hesse, *Indolalkaloide (Progress in Mass Spectrometry)* (Verlag Chemie, Weinheim 1974), **1**, Part 1, 203
3. E. Wenkert, C.-J. Chang, H.P.S. Chawla, W. Cochran, E.W. Hagaman, J.C. King, K. Orito, J. Amer. Chem. Soc. **98**, 3645 (1976)
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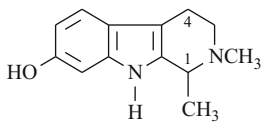
N-Methyltetrahydroharmol



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Elaeagnus angustifolia*

$C_{13}H_{16}N_2O$: 216.1263

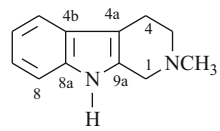
Mp: 268–270°C (EtOH), 275°C (H_2O, hydrochloride) [1]

$[\alpha]_D$ 0° [1]

References

1. T.F. Platonova, A.D. Kuzovkov, P.S. Massagetov, Zh. Obshch. Khim. **26**, 3220 (1956)

N-Methyltetrahydro-β-carboline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Arthophytum leptocladum, Elaeagnus angustifolia*

$C_{12}H_{14}N_2$: 186.1157

Mp: 216–218°C (C_6H_6), 197°C (picrate), 247°C (hydrochloride), 266°C (methiodide) [1]

$[\alpha]_D$ 0° [1]

Solubility: very sol. $CHCl_3$; sol. Me_2CO, EtOH, Et_2O [1]

UV: 224, 280(3.50, 3.90) [2]

IR: 3130, 1622, 1500, 1336, 1310, 1280, 1250, 1234, 1199, 1180, 1170, 1148, 1132, 1115, 1092, 1059, 1042, 1009, 998, 960, 922, 908, 870, 860, 798, 780, 753, 746, 735, 710 [2]; 3570 [3]

MS *m/z*: 186(M^+, 22), 143(100), 116 [3]; 186, 143(100), 115, 102, 78 [4]

^{1}H NMR: 2.37(NCH_3), 2.78(4H, H-3, H-4), 3.33(2H, H-1), 6.92–7.58(4H, H–Ar), 8.45(NH) [3]

^{13}C NMR: [5]

Table 1

C-1	52.5	C-4a	106.0	C-7	120.1
NCH_3	45.3	4b	126.6	8	110.8
3	52.0	5	117.2	8a	135.8
4	21.2	6	118.1	9a	132.7

X – ray: [6]

References

1. T.F. Platonova, A.D. Kuzovkov, P.S. Massagetov, Zh. Obshch. Khim. **28**, 3128 (1958)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1972), 7, No. 869
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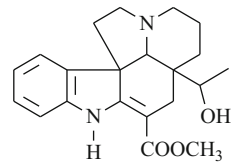
5. C. Poupat, A. Ahond, T. Sevenet, Phytochemistry **15**, 2019 (1976)
6. Zh.Zh. Jalolov, V.U. Khujaev, K.K. Turgunov, B. Tashkhodzaev, S.F. Aripova, Chem. Nat. Prod. **39**, 289 (2003)

Minovincinine



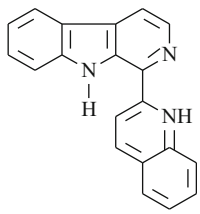
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{26}N_2O_3$: 354.1943
Mp: amorph. [1, 2]
$[\alpha]_D$ −418° (EtOH) [2]
UV: 225, 297, 328(4.02, 4.00, 4.09) [2]
IR: 3480, 1662, 1600 [2]
MS *m/z*: 354(M^+), 336, 140, 122 [2]
^{1}H NMR: 0.90(3H, d, J = 7, CH_3) [2]

References

1. M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 277 (1975)
2. M. Plat, J. Le Men, M.-M. Janot, H. Budzikiewicz, J.M. Wilson, L.J. Durham, C. Djerassi, Bull. Soc. Chim. France 2237 (1962)

Nitramarine

CAS Registry Number: 95360-17-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{13}N_3$: 295.1110
Mp: 172–173°C ($CHCl_3$–MeOH) [1]
UV: 213, 230, 246, 275, 310 sh, 388(4.62, 4.54, 4.40, 4.24, 3.92, 4.12) [1]
UV(H^+): 233, 262, 282, 330–340, 410 [1]
IR: 3380, 3060, 3035, 1630, 1600, 1580, 1510, 1500, 1450, 835, 755 [1]
^{1}H NMR: 6.94, 7.44, 7.77, 7.87, 7.92, 8.07, 8.32 [1]
Pharm./Biol.: LD_{50} 232 mg/kg (i/v., mice). Tranquilizing properties [1]

References

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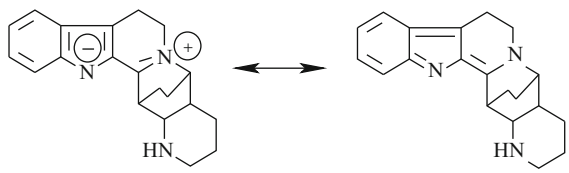
Nitramidine

CAS Registry Number: 56775-82-7



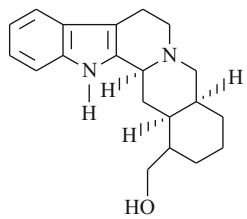
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{20}H_{23}N_3$: 305.1892
Mp: amorph., 253°C (di hydrochloride) [1]
UV(di hydrochloride): 250, 263(3.95, 4.27) [2]
UV(OH^-): 257, 388 [2]
MS *m/z*: 305(M^+, 100), 304, 277, 276, 262, 261, 249, 247, 222, 221, 219, 197, 184, 171, 83 [1]

References

1. A.A. Ibragimov, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 295 (1975)
2. A.A. Ibragimov, Author's Abstract of Candidate;s Dissertation, Tashkent, 1975

Nitraraine

CAS Registry Number: 101222-61-1



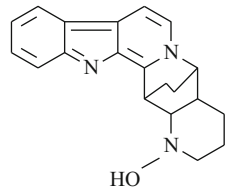
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{20}H_{24}N_2O$: 308.1889
Mp: 280–281°C (EtOH) [1]; 91°C (O–Ac), 287°C (dihydro) [1]
$[\alpha]_D$ 0° [1]
Solubility: spar. sol. org. solvs [1]
UV: 222, 284, 292(4.56, 3.87, 3.79) [1]
IR: 3260, 2920, 1630, 1570, 1470, 1450, 1020, 740 [1]
MS *m/z*: 308(M^+, 80), 307(50), 291(6), 277(3), 223(6), 197(12), 184(9), 171(27), 170(100), 169(42), 156(10), 144(10) [2]
^{1}H NMR: 3.09(1H, d, J = 11.6), 4.05(1H, d, J = 12.5), 7.29(1H, d, J = 12.5), 7.44(1H, d, J = 7.3), 8.00(1H, br s) [2]
^{13}C NMR: triplets: 23.4, 25.8, 32.3, 53.6, 61.5, 65.9, 81.7; doublets: 34.5, 35.7, 60.3, 110.9, 118.0, 119.2, 121.1, 125.0; singlets: 108.0, 127.4, 135.5; 136.1, 140.5 [2]

References

1. A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **21**, 502 (1985)
2. R. Yamaguchi, T. Hamasaku, T. Sasaku, T. Ohta, K. Utimoto, S. Kozima, H. Takaya, J. Org. Chem. **58**, 1136 (1993)

Nitraricine

CAS Registry Number: 176181-92-3

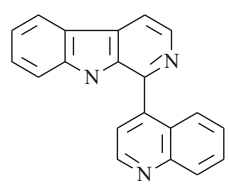


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{21}N_3O$: 319.4084
Mp: 214–215°C (EtOH–Me_2CO) [1]
$[\alpha]_D$ 0° (EtOH) [1]
Solubility: very sol. EtOH, MeOH, H_2O [1]
UV: 208, 253, 310, 365 (4.16, 4.13, 4.02, 3.41) [1]
UV: EtOH + OH^-: 216, 283, 330, 380 [1]
IR: 3400, 2940, 2860, 1650, 1590, 1530, 1460, 1335, 1160, 1110, 1070, 960 (N → 0), 840 [1]
MS *m/z*: 319 (3), 318 (11), 303 (60), 302 (31), 301 (23), 276 (19), 260 (23), 258 (7), 221 (41), 220 (69), 219 (100), 206 (27), 195 (19), 193 (15), 182 (57), 169 (31), 122 (80) [1]
^{1}H NMR (CD_3OD): 0.66 (1H, m), 1.50 (3H, t), 1.84 (2H, m), 2.24 (2H, m), 2.64 (2H, dd), 3.54 (1H, dd, J = 9.2, 2.5), 4.05 (1H, br s), 4.90 (1H, br s), 7.40 (1H, m), 7.69 (1H, m), 7.74 (1H, m), 8.34 (1H, m), 8.45 (2H, s) [1]

References

1. T.S. Tulyaganov, N.D. Abdullaev, Chem. Nat. Comp. **31**, 76 (1995)

Nitraridine



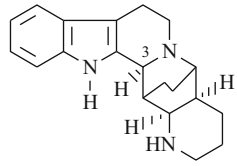
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{13}N_3$: 295.1110
Mp: 273–274°C (CH_2Cl_2) [1]
Solubility: insol. org. solv. [1]
UV: 211, 233, 252 sh, 294, 317 sh, 360 (4.65, 4.65, 4.32, 4.18, 3.93, 3.77) [1]
UV (H^+): 227, 242sh, 313, 385 [1]
IR: 3130, 3070, 1630, 1590, 1570, 1510, 1460, 1430, 840, 770, 745 [1]
MS *m/z*: 295 (100), 142.5 (7) [1]
^{1}H NMR: 8.67 (d, J = 5, H-2′), 8.51 (d, J = 7, H-3), 8.19 (dd, J = 9 and 2, H-5), 8.10 (d, J = 6, H-4), 7.94 (dd, J = 8 and 2, H-8′), 7.62 (m, H-5′), 7.52 (m, H-7′), 7.48 (3H, m, H-7, H-8, H-6′), 7.30 (2H, m, H-6, H-3′) [1]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **42**, 459 (2006)

Nitrarine

CAS Registry Number: 20069-03-8



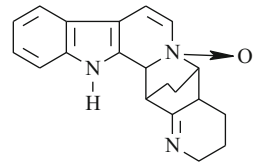
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{20}H_{25}N_3$: 307.2048
Mp: 256–257°C (EtOH–$CHCl_3$), 267°C (di hydrochloride), 208°C (di picrate), 270°C (methiodide) [1]
UV: 226, 286(4.52, 4.04) [1]
IR: 3150, 2960, 2920, 755 [2]
MS *m/z*: 307(M^+, 100), 306, 279, 278, 224(85), 223(85), 197, 196, 195, 184, 183, 182, 171, 170, 169, 156, 144, 83 [1]
^{1}H NMR: 1.57, 2.74, 3.45, 3.80, 4.80, 6.80, 7.80(1H, NH), 8.20(1H, NH) [1]
X-ray: [2, 3]
Pharm./Biol.: LD_{50} 117, 340, 524 mg/rg (i/v, i/p, s/c, mice). Hypotensive, tranquilizing, and spasmolytic action. Prolongs the action of hypnotics [3]

References

1. A.A. Ibragimov, S.M. Nasirov, V.T. Andrianov, S.Kh. Maekh, Yu.T. Struchkov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 293 (1975)
2. S.M. Nasirov, A.A. Ibragimov, V.T. Andrianov, S.Kh. Maekh, Yu.T. Struchkov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 294 (1976)
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 303

Nitrarizine

CAS Registry Number: 176181-93-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{21}N_3O$: 319.4084
Mp: 265–267°C (EtOH–Me_2CO) [1]
$[\alpha]_D$ 0° (EtOH) [1]
Solubility: very sol. EtOH, MeOH, H_2O [1]
UV: 208, 248, 356 (3.21, 3.69, 4.06) [1]
IR: 3400, 3030, 2960, 2840, 1620, 1600, 1580, 1510, 1450, 1410, 1380, 1340, 1280, 1230, 1160, 1140, 1110, 1050, 1010, 965 (N→0), 770 [1]
MS *m/z*: 319 (M^+, 2), 318 (7), 303 (56), 302 (28), 301 (25), 276 (16), 274 (11), 220 (70), 219 (100), 206 (25), 193 (15), 182 (53), 169 (28), 133 (22), 122 (30) [1]

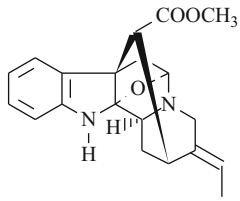
^{1}H NMR (CD_3OD): 0.64 (1H, m), 1.61 (3H, m), 1.86 (2H, m), 2.26 (2H, m), 2.84 (2H, dd), 3.85 (1H, br d, J = 8.8), 4.26 (1H, br s), 5.01 (1H, br s), 7.39 (1H, m), 7.68, 7.71 (each 1H, br s), 8.33 (1H, br d, J = 8.0), 8.50 (2H, br s) [1]

References

1. T.S. Tulyaganov, N.D. Abdullaev, Chem. Nat. Comp. **31**, 76 (1995)

Picrinine (Vincaridine)

CAS Registry Number: 4684-32-6



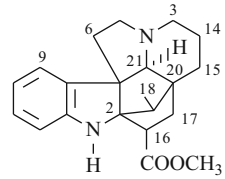
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{20}H_{22}N_2O_3$: 338.1631
Mp: 217–218°C (MeOH) [1, 2]; 187°C (hydrochloride), 209°C (N–Me) [2]
$[\alpha]_D$ −58° ($CHCl_3$) [1, 2]
UV: 238, 289(3.87. 3.52) [2]
UV(EtOH + $HClO_4$): 240, 244, 300(3.77, 3.75, 3.79) [2]
IR: 3390, 1730, 760 [1, 3]
MS *m/z*: 338(M^+), 320, 307, 279, 261, 239, 182, 168 [2]
^{1}H NMR: 1.46(d, CH_3), 3.62(s, $COOCH_3$), 4.79(H–C–O), 6.60–6.80(H–Ar) [2]

References

1. M.A. Kuchenkova, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 55 (1967)
2. D.A. Rakhimov, Kh.T. Il'yasova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 440 (1969)
3. A. Chatterjee, B. Mukerjee, A. Ray, Tetrahedron Lett. **6**, 3633 (1965)

Pseudokopsinine

CAS Registry Number: 17172-16-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{26}N_2O_2$: 338.1994
Mp: 136–138°C (C_6H_6), 268°C (dec., dihydrochloride), 262°C (dec., dihydrobromide), 207°C (dec., dinitrate), 277°C (dec., methiodide), 142°C (N–Ac) [1]
$[\alpha]_D$ −30.4° (*c* 1.51, MeOH) [1]
UV: 248, 298(3.89, 3.47) [1]
IR: 3350, 1735, 755 [1]
MS *m/z*: 338(M^+), 279, 251, 229, 170, 135, 124, 123, 122, 109 [2]
^{1}H NMR: 0.82(3H, d, CH_3), 3.64(3H, s, $COOCH_3$), 6.60–7.30(4H, H–Ar) [1]
^{13}C NMR: [3]

Table 1

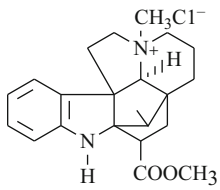
C-2	79.9	C-10	121.8	C-17	24.8
3	55.5	11	128.1	19	51.6
5	47.3	12	112.0	20	42.6
6	34.6	13	148.3	21	72.0
7	60.0	14	19.1	CH_3-18	6.8
8	135.0	15	33.2	C = O	173.4
9	125.3	16	40.0	OCH_3	52.1

X-ray: [4]
Abs. conf.: 2R, N4(S),7S, 16R, 19R, 20S, 21S [4]
Pharm./Biol.: LD_{50} 125.76 mg/kg (s/c, i/p, mice). Spasmodic analeptic [5]

References

1. N. Abdurakhimova, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 263 (1967)
2. N. Abdurakhimova, P.Kh. Yuldashev, S.Yu. Yunusov, DAN SSSR **173**, 87 (1967)
3. M.R. Yagudaev, Chem. Nat. Comp. **20**, 311 (1984)
4. S.M. Nasirov, V.G. Andrianov, Yu.T. Struchkov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 176 (1976)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 52

Pseudokopsinine Chloromethylate



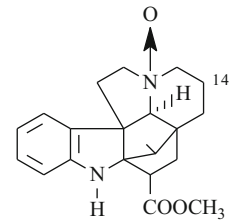
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{22}H_{29}N_2O_2Cl$: 388.1917/390.1888
Mp: 285–287°C (dec., MeOH) [1]
Solubility: very sol. H_2O [1]
IR: 3410, 1720, 1610, 770 [1]
MS *m/z*: 352, 338(100), 279, 251, 229, 170, 135, 124, 123, 122, 109 [1, 2]
^{1}H NMR: 3.57(3H, NCH_3) [1]

References

1. M.M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 277 (1975)
2. N. Abdurakhimova, P.Kh. Yuldashev, S.Yu. Yunusov, DAN SSSR **173**, 87 (1967)

Pseudokopsinine N-oxide

CAS Registry Number: 54387-75-6



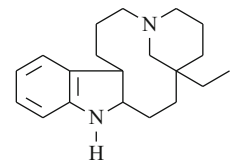
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{26}N_2O_3$: 354.1943
Mp: 186–188°C (Et_2O) [1]
UV: 247, 301(3.77, 3.43) [1]
IR: 1730, 760 [1]
MS *m/z*: 338, 324, 279, 229, 170, 135 [1]
^{1}H NMR: 0.86(d, J = 8, CH_3), 3.61(s, $COOCH_3$), 6.55–7.00(4H, H–Ar), 7.67(d, J = 8, H-14) [1]

References

1. M.R. Sharipov, M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 422 (1974)

(+)-Quebrachamine

CAS Registry Number: 14430-17-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{19}H_{26}N_2$: 282.2096
Mp: 143–144°C [1], 147–149°C [2, 3]

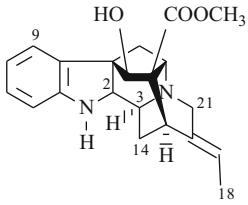
$[\alpha]_D$ +142° (MeOH) [1], +154° (EtOH) [2], +111° [3]
UV: 230, 287, 294(4.68, 3.92, 3.90) [1, 3]
IR: 3400 [1]
MS *m/z*: 282(M^+), 267, 253, 210, 199, 157, 143, 138, 125, 124, 115, 110, 96 [1, 4]

References

1. D.A. Rakhimov, M.R. Sharipov, Kh.N. Aripov, V.M. Malikov, T.T. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 724 (1970)
2. B.W. Bycroft, D. Schumann, M.B. Patel, H. Schmid, Helv. Chim. Acta **47**, 1147 (1964)
3. F. Walls, O. Colter, A. Sandoval, Tetrahedron **2**, 173 (1958)
4. K. Biemann, G. Spiteller, J. Amer. Chem. Soc. **84**, 4578 (1962)

Quebrachidine (Vincarine)

CAS Registry Number: 4835-69-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. herbacea, V. major*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: 263–264°C (MeOH) [1–4], 276–278°C [5]
$[\alpha]_D$ +14° (MeOH) [1–4], +54° ($CHCl_3$) [5]
UV: 242, 292(3.84, 3.50) [1, 2]; 243, 294(3.69, 3.25) [3, 4]
IR: 1733, 1250, 770 [1, 2]; 3350, 3060, 1720, 1245, 750 [3, 4]; 3590, 3370, 1722, 1235 [5]
MS *m/z*: 352(M^+), 222, 190, 143, 130 [2, 4, 6]
^{1}H NMR(Py–d_5): 1.50(1H, dd, J = 10; 14, H-14α), 1.72(3H, dt, J = 7; 2, CH_3-18), 2.02(1H, d, J = 12, H-6α), 2.91(1H, dd, J = 5, H-14β), 3.62(2H, m, 21-CH_2), 3.80(1H, d, J = 5, H-15), 3.88(3H, s, $COOCH_3$), 3.99(1H, d, J = 6, H-5), 4.17(1H, dd, J = 3.5, 4, H-2), 4.84(1H, d, J = 6, H-17), 5.32(1H, q, J = 7, H-19), 6.10(1H, d, J = 4, NH), 6.95–7.55(5H, m, H-9, H-10, H-11, H-12, OH) [4, 7]
^{13}C NMR: [8]

Table 1

C-2	68.3	C-10	119.3	C-17	74.0
3	54.4	11	128.0	19	115.9
5	61.4	12	110.7	20	137.0
6	35.5	13	151.6	21	55.2
7	57.6	14	22.3	CH_3-18	12.6
8	129.8	15	30.2	CO	173.0
9	124.9	16	59.6	OCH_3	51.3

Pharm./Biol.: LD_{50} 520, 330, 179 mg/kg (s/c, i/p, i/v, mice). Hypotensive and sedative action [9]

References

1. P.Kh. Yuldashev, S.Yu. Yunusov, DAN SSSR **154**, 1412 (1964)
2. P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 85 (1965)
3. E.N. Zhukovich, V.Yu. Vachnadze, Chem. Nat. Comp. **20**, 509 (1984)
4. V.Yu. Vachnadze, V.M. Malikov, K.S. Mudzhiri, S.Yu. Yunusov, Soobshch. AN GSSR **66**, 97 (1972)
5. M. Gorman, A.L. Burlingame, K. Biemann, Tetrahedron Lett. **4**, 39 (1963)
6. P.Kh. Yuldashev, S.Yu. Yunusov, DAN SSSR **163**, 123 (1965)
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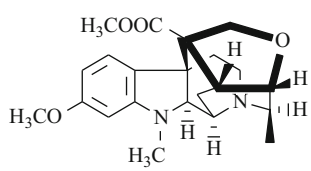
8. M.R. Yagudaev, Chem. Nat. Comp. **18**, 693 (1982)
9. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 37

Raucanine



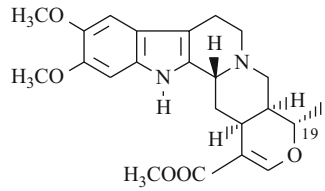
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia canescens*
$C_{22}H_{28}N_2O_4$: 384.2049
Mp: 183–185°C [1, 2]
$[\alpha]_D$ −27° ($CHCl_3$) [1, 2]
UV: 251, 295 [1]
IR($CHCl_3$): 1740, 1595 [1]
MS *m/z*: 384(M^+) [1]
^{1}H NMR: 2.71(NCH_3), 3.76(3H, s, OCH_3), 3.80(3H, s, $COOCH_3$), 6.21–7.01(H–Ar) [1]

References

1. A.S. Belikov, T.G. Monakhova, *The Chemistry and Pharmacology of Indole Compounds, Abstracts of Lectures at the IIIrd All-Union Colloquium* [in Russian] (Shtiintsa, Kishinev, 1971), p. 10
2. A. S. Belikov, M. E. Perel'son, *IIIrd Soviet-Indian Symposium on the Chemistry of Natural Compounds, Abstracts of Lectures* [in Russian] (Fan, Tashkent, 1973), p. 35

Reserpiline

CAS Registry Number: 131-02-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia canescens*
$C_{23}H_{28}N_2O_5$: 412.1998
Mp: amorph. [1, 2], 245°C (oxalate) [2], 240°C (dec., oxalate) [3], 192°C (dec., tartrate) [2]
$[\alpha]_D$ −69° (MeOH) [1]; −19° (Py), −12° ($CHCl_3$) [2]
UV: 229, 300(4.57, 4.03) [2]; 229, 250, 300, 304, 307 sh (4.57, 4.07, 4.03, 4.03, 4.00) [4]
IR: [5]
^{1}H NMR: 1.32(J = 6.3, CH_3-19) [6]
Pharm./Biol.: LD_{50} 68.3 mg/kg (mice). Negative inotropic action [7]

References

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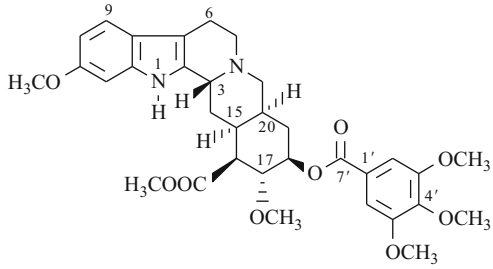
3. A.S. Belikov, Chem. Nat. Comp. **5**, 57 (1969)
4. N. Finch, W.I. Taylor, T.R. Emerson, W. Klyne, R.J. Swan, Tetrahedron **22**, 1327 (1966)
5. N. Neuss, H.E. Boaz, J. Org. Chem. **22**, 1001 (1957)
6. M. Shamma, J.M. Richey, J. Amer. Chem. Soc. **85**, 2507 (1963)
7. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 53

Reserpine

CAS Registry Number: 50-55-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia cambodiana, R. canescens, R. littoralis, R. serpentina, R. verticillata, R. vomitoria, Vinca minor*
$C_{33}H_{40}N_2O_9$: 608.2734
Mp: 256–257°C (dec., EtOH) [1], 264–265°C [2]
$[\alpha]_D$ −115° ($CHCl_3$) [2]
UV: 217, 267(4.75, 4.23) [2]
IR($CHCl_3$): 3475, 2900, 1729, 1594, 1507, 1466, 1333, 1131, 881, 820 [2]
MS *m/z*: 608(M^+, 100), 607, 593, 577, 413, 397, 395, 381, 365 [3]
^{1}H NMR: [4]
^{13}C NMR: [5]

Table 1

C-2	130.2	C-13	136.1	C = O-22	172.5
3	53.6	14	24.1	CH_3O-11	51.6
5	51.1	15	32.2	C-1′	124.9

(*continued*)

Table 1 (continued)

6	16.7	16	51.6	2′	106.7
7	107.7	17	77.8*	3′	152.5
8	121.9	18	77.7*	4′	141.9
9	119.2	19	29.6	CH_3O-3′	56.0
10	108.7	20	33.8	CH_3O-4′	60.6
11	155.8	21	48.8	C = O-7′	165.0
12	95.0				

HPLC: [6]
Stereochemistry: [7, 8]
Pharm./Biol.: LD_{50} 28 mg/kg (i/v, rats). Hypotensive action. Used in the treatment of hypertonic disease and sympathomimetic hypertension [9]

References

1. A.S. Belikov, Chem. Nat. Comp. **5**, 57 (1969)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1966), 2, No. 227
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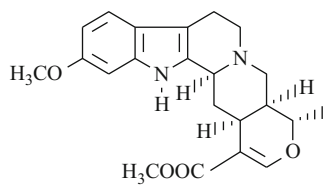
6. E. Dargel, J.B. Mielck, J. Liq. Chromatogr. **13**, 3973 (1990)
7. P.E. Aldrich, P.A. Diassi, D.F. Dickel, C.M. Dylion, P.D. Hance, C.F. Huebner, B. Korzun, M.E. Kuehne, L.H. Liu, H. B. McPhillamy, E.W. Rolb, D.K. Rouchaudhuri, E. Schlitter, A.F.S. Andre, E.E. Tamelen, F.L. Weisenborn, E. Wenkert, O. Wintersteiner, J. Amer. Chem. Soc. **81**, 2481 (1959)
8. Y. Ban, O. Yonemitsu, Chem. Ind. 948 (1961)
9. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 53

Reserpinine (Pubescine)

CAS Registry Number: 482-96-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Vinca erecta, V. herbacea, V. major, V. minor, V. pubescens*
$C_{22}H_{26}N_2O_4$: 382.1893
Mp: 236–237°C [1, 2], 270°C (nitrate) [1]
$[\alpha]_D$ −134° (Me_2CO) [1], −160° ($CHCl_3$) [3, 4]
UV: 228, 250 sh, 296(4.65, 4.12, 3.81) [4, 5]
IR: 3390, 1710, 1620, 1280, 1215, 790, 780, 760, 710 [4, 6]
MS *m/z*: 382(M^+, 100), 381(50), 367(11), 351(3), 255(4), 223(1), 200(10), 199(11), 186(20) [7]
^{1}H NMR: 1.38(J = 6.1, CH_3) [8]
ORD: [5]
Stereochemistry: [5, 8]
Pharm./Biol.: LD_{50} 148 mg/kg (i/v, mice). Hypotensive action [9]

References

1. S.Yu. Yunusov, P.Kh. Yuldashev, DAN UzSSR (9), 23 (1956)
2. N. Abdurakhimova, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 172 (1965)
3. G.V. Chkhikvadze, V.S. Asatiani, V.Yu. Vachnadze, K.S. Mudzhiri, Soobshch. AN GSSR **64**, 345 (1971)
4. V.Yu. Vachnadze, E.N. Zhukovich, K.S. Mudzhiri, Soobshch. AN GSSR **83**, 393 (1976)
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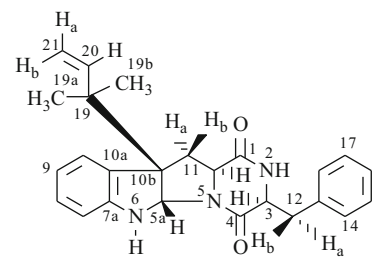
9. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 58

Rugulosuvine A



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Penicillium piscarium* BKM F-325, *P. rugulosum* BKM F-352
$C_{25}H_{27}N_3O_3$: 401.2128
Mp: 220–222°C (EtOAc) [1]
$[\alpha]_D$ −308° (*c* 0.3, MeOH) [1]
UV: 245, 302 (3.77, 3.37) [1]
MS *m/z*: 401 (M^+), 332, 241, 185, 157, 130[1]
^{1}H NMR (DMSO–d_6): 0.8 (3H, s, CH_3-19b), 0.95 (3H, s, CH_3-19a), 1.85 (1H, dd, J = 9.0, 18.0, Ha-12), 1.95 (1H, dd, J = 4.0, 18.0, Hb-12), 1.99 (1H, dd, J = 4.0, 9.0, H-3), 2.79 (1H, dd, J = 5.0, 13.0, H-11), 3.05 (1H, dd, J = 3.0, 13.0, Ha-11), 4.03 (1H, br dd, H-11a), 5.03 (1H, dd, J = 10.0, 1.0, Ha-21), 5.03 (1H, dd, J = 17.0, 1.0, Hb-21), 5.4 (1H, s, H-5a), 5.9 (1H, dd, J = 10.0, 17.0, H-20), 6.45 (1H, s, NH), 6.55 (1H, t, J = 7.0, H-9), 6.65 (1H, d, J = 7.0, H-10), 6.8 (1H, t, J = 7.0, H-16), 6.85 (J = 6, 7.0, H-15), 6.85 (J = 6, 7.0, H-17), 6.95 (1H, d, J = 7.0, H-7), 6.95 (1H, br s, NH), 7.05 (1H, t, J = 7.0, H-8), 7.05 (1H, d, J = 7.0, H-14), 7.05 (1H, d, J = 7.0, H-18) [1]
^{13}C NMR (DMSO–d_6): [1]

Table 1

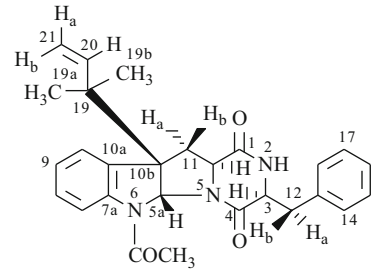
C-1	164.6	C-10a	134.7	C-17	127.93
3	56.62	10b	60.05	18	130.07
4	167.97	11	39.59	19	40.3
5a	76.37	11a	56.91	19a	22.17
7	124.90	12	36.56	19b	22.5
7a	150.2	13	134.7	20	144.09
8	128.15	14	130.07	21	113.7
9	116.99	15	127.93		
10	108.4	16	126.23		

Pharm./Biol.: LD_{50} 40–50 mg/ml. Middle cytotoxic action against the cells L-929, K 562, and Hela [1]

References

1. A.G. Kozlovskii, V.M. Adanin, Kh.M. Daze, U. Grefe, Prikl. Biokhim. Mikrobiol. **37**(3), 292 (2001)

Rugulosuvine B



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Penicillium piscarium* BKM F-325, *P. rugulosum* BKM F-352
$C_{27}H_{29}N_3O_3$: 443.2228
Mp: 100–105°C (MeOH) [1]
$[\alpha]_D$ −138° (*c* 0.3, MeOH) [1]
UV: 246, 276, 284 (3.97, 3.19. 3.11) [1]
MS *m/z*: 443 (M^+), 401, 332, 241, 185, 157, 130, 43 [1]
^{1}H NMR (DMSO–d_6): 0.78 (3H, s, CH_3-19b), 0.93 (3H, s, CH_3-19a), 1.60 (1H, dd, J = 12.0, 12.0, Ha-11), 2.05 (3H, s, CH_3-23), 2.35 (1H, dd, J = 4.0, 12.0, Hb-11), 3.0 (1H, dd, J = 5.0, 14.0, Ha-12), 3.12 (1H, dd, J = 5.0, 14.0, Hb-12), 3.50 (1H, dd, J = 4.0, 12.0, H-11a), 4.42 (1H, br, H-3), 5.02 (1H, d, J = 17.0, Ha-21), 5.05 (1H, d, J = 10.0, Hb-21), 5.63 (1H, dd, J = 17.0, 10.0, H-20), 5.95 (1H, d, J = 10.0, Hb-21), 5.95 (1H, s, H-5a), 7.15 (1H, dd, J = 7.0, 7.0, H-8), 7.23 (1H, ddd, J = 7.7, 1.0, H-15), 7.23 (1H, ddd, J = 7.7, 1.0, H-17), 7.25 (1H, dd, J = 7.0, 7.0, H-9), 7.25 (1H, dd, J = 7.0, 1.0, H-14), 7.25 (1H, ddd, J = 7.7, 1.0, H-16), 7.25 (1H, dd, J = 7.0, 1.0, H-18), 7.38 (1H, d, J = 7.0, H-7), 7.82 (1H, d, J = 7.0, H-10), 8.2 (2H, s, 2NH) [1]
^{13}C NMR (DMSO–d_6): [1]

Table 1

C-1	165.17	C-10a	132.43	C-17	126.46
3	55.48	10b	60.49	18	129.5
4	166.53	11	35.84	19	40.3
5a	78.55	11a	58.48	19a	22.05

(*continued*)

Table 1 (continued)

7	124.86	12	35.94	19b	22.85
7a	143.15	13	136.6	20	143.35
8	124.06	14	129.9	21	114.0
9	129.9	15	126.46	22	169.44
10	117.65	16	128.0	23	23.61

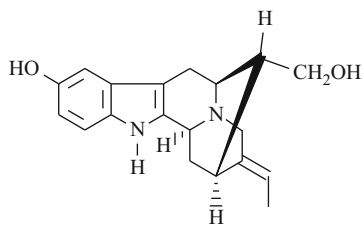
Pharm./Biol.: LD_{50} 40–50 mg/ml. Middle cytotoxic action against the cells L-929, K 562, and Hela [1]

References

1. A.G. Kozlovskii, V.M. Adanin, Kh.M. Daze, U. Grefe, Prikl. Biokhim. Mikrobiol. **37**(3), 292 (2001)

Sarpagine

CAS Registry Number: 482-68-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia canescens*
$C_{19}H_{22}N_2O_2$: 310.1681
Mp: 304–306°C (dec., MeOH) [1]
$[\alpha]_D$ +55° (Py) [2]
UV: 230, 278(4.30, 3.92) [2]
UV(OH^-): 276, 322(3.88, 3.59) [2]
IR: 3401, 1621, 1595 [2]
MS *m/z*: 310(M^+, 100), 295, 293, 279, 265, 185, 172 [3]
Abs. conf.: [4]
Pharm./Biol.: Hypotensive action [5]

References

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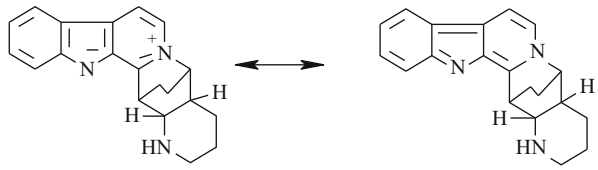
Schoberidine

CAS Registry Number: 56775-83-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{20}H_{21}N_3$: 303.1736
Mp: 204–205°C, 267°C (di hydrochloride) [1]
Solubility: spar.sol. org. solvs
UV: 254, 308, 372(4.24, 4.09, 3.38) [1, 2]
UV(OH^-): 284, 330, 415(4.37, 3.80, 3.32) [1, 2]
MS *m/z*: 303(M^+), 275, 274, 260, 259, 220, 219(100), 195, 182, 169, 168, 83 [1]
Pharm./Biol.: LD_{50} 11.9 mg/kg (i/v, mice). Hypotensive action [3]

References

1. A.A. Ibragimov, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 297 (1975)
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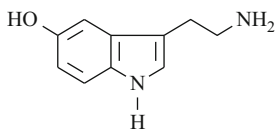
Serotonine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Hippophae rhamnoides*
$C_{10}H_{12}N_2O$: 176.0950
Mp: 165°C (hydrochloride), 223°C (picrolonate), 197°C (picrate), 216°C (creatinine-sulphate) [1]
Pharm./Biol.: In the CNS plays the role of mediator, contracts smooth musculature, constricts blood vessels, increases the aggregation of thrombocytes. Used (serotonine adipate) for treating a hemotthagic syndrome in various pathological states. Supplied in the form of a powder and 1-ml ampuls of a 1% soln [2]

References

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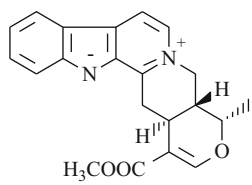
Serpentine

CAS Registry Number: 18786-24-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia littoralis, R. serpentina, R. verticillata*
$C_{21}H_{20}N_2O_3$: 348.1474
Mp: 170–175°C [1], 158–159°C [2]
$[\alpha]_D$ +292° (MeOH), +267° (EtOH) [3]
UV: 253, 307, 368 [1]; 251, 309, 370 [2]; 251, 307, 361 [3–5]
IR: 1710, 1690, 1625, 1580, 1305, 1250, 1205, 1120, 1090, 780 [2]; 2950, 1710, 1625, 1301, 1220, 1120, 1095, 775 [4]
MS *m/z*: 351(23), 350(100), 349(17), 262(16), 222(20), 208(35), 207(26), 206(26) [4]

References

1. K.K. Nguen, Chem. Nat. Comp. **26**, 233 (1990)
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3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1966), 2, No. 249
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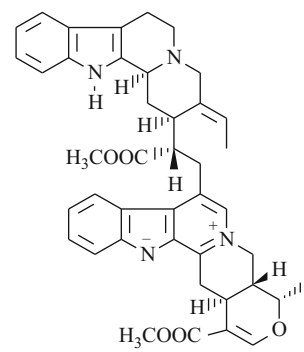
Serpentinine

CAS Registry Number: 36519-42-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia littoralis*

$C_{42}H_{44}N_4O_5$: 684.3312
Mp: 260–265°C [1], 265–266°C [2], 270°C [3], 250°C (hydrochloride), 226°C (nitrate), 259°C (perchlorate), 273°C (picrate), 234°C (methiodide) [4]
$[\alpha]_D$ +117° [2]; +52° (MeOH), +72° (EtOH) [4]
UV: 225, 258, 292, 307, 370 [1]; 225, 258, 292–295 [4]
IR: [4]
X-ray: [5]

References

1. Kim Kan Nguen, Chem. Nat. Comp. **26**, 233 (1990)
2. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 8 (Academic Press, New York, 1965), p. 292. 714
3. C. Djerassi, J. Fishman, Chem. Ind. 627 (1955)
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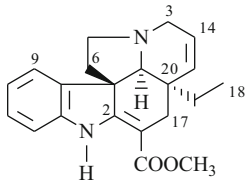
(–)-Tabersonine

CAS Registry Number: 4429-63-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Amsonia angustifolia, A. illustris, A. tabenaemontana, Vinca herbacea*
$C_{21}H_{24}N_2O_2$: 336.1838
Mp: amorph. [1, 2], 215°C (perchlorate) [1], 192°C (dec., hydrochloride) [2]
$[\alpha]_D$ −204° (EtOH) [1], −366° (EtOH) [2]
UV: 224, 300, 333(3.84, 3.74, 3.89) [1, 2]
IR: 3365, 1680, 750 [1]
MS *m/z*: 336(M^+, 80), 214(9), 195(5.7), 135(100), 122(40), 107(40) [1]; 336(M^+, 56), 214(17), 195(23), 158(29), 149(52), 122(33), 107(49), 18(20) [2]
^{1}H NMR: 0.62(3H, t, CH_3), 3.69(3H, s, $COOCH_3$), 5.67(2H, q, J = 10, CH = CH), 6.77–7.26(4H, m, H–Ar), 8.96(1H, s, NH) [1]
^{13}C NMR: [3]

Table 1

C-2	166.7	C-10	120.5	C-17	26.7
3	50.3	11	127.6	18	7.3
5	50.8	12	109.2	19	28.4
6	44.3	13	143.1	20	41.2
7	55.0	14	124.5	21	69.9
8	137.8	15	132.9	22	168.8
9	121.4	16	92.2	23	50.8

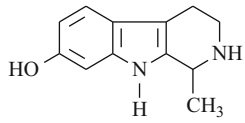
HPLC: [4]

References

1. V.Yu. Vachnadze, V.M. Malikov, K.S. Mudzhiri, S.Yu. Yunusov, Soobshch. AN GSSR **66**, 97 (1972)
2. B. Pyuskyulev, I. Kompis, I. Ognyanov, G. Spiteller, Collect. **32**, 1289 (1967)
3. M. Shamma, D. M. Hindenlang, *Carbon-13 NMR Shift Assignments of Amines and Alkaloids* (Plenum Press, New York-London, 1979), No. 226
4. G. Stoev, D. Uzunov, B. Pyuskyulev, J. Liq. Chromatogr. **14**, 3397 (1991)

Tetrahydroharmol

CAS Registry Number: 17952-75-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Elaeagnus angustifolia*
$C_{12}H_{14}N_2O$: 202.1106
Mp: 256°C [1]; 235°C (hydrochloride) [1]
$[\alpha]_D$ 0° [1]

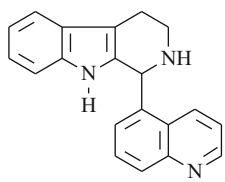
Solubility: insol. Me_2CO, Et_2O, H_2O [1]
UV: 235, 270, 293(4.25, 3.70, 3.70) [1]
IR: 3448, 3333, 2632 [1]; 3380, 3265, 3245, 1620, 1560 [2]
MS *m/z*: 202(M^+), 187(100), 172, 159 [2]

References

1. T.F. Platonova, A.D. Kuzovkov, P.S. Massagetov, Zh. Obshch. Khim. **26**, 3220 (1956)
2. W.A. Ayer, L.M. Browne, Canad. J. Chem. **48**, 1980 (1970)

Tetrahydroisokomarovine

CAS Registry Number: 127498-35-5



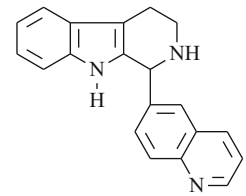
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{17}N_3$: 299.1422
Mp: 274–275°C ($CHCl_3$–MeOH) [1]
UV: 232, 284–288, 295, 316(4.65, 4.08, 4.04, 3.57) [1]
UV(H^+): 222, 275–280, 285, 291, 316 [1]
IR: 3310, 3190, 3070, 2930, 2860, 1620, 1600, 1510, 1470, 1145, 810, 760 [1]
MS *m/z*: 299(M^+) [1]
^{1}H NMR: 2.10, 2.95(each 2H, m, H-3, H-4), 3.19(1H, NH), 5.70(1H, H-1), 7.10–8.70(H–Ar) [1]

References

1. T.S. Tulyaganov, S.Yu. Yunusov, Chem. Nat. Comp. **26**, 49 (1990)

Tetrahydrokomarovinine

CAS Registry Number: 85403-70-9

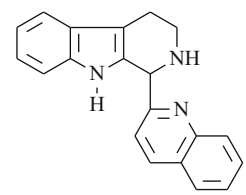


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{17}N_3$: 299.1422
Mp: 252–253°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D$ 0° [1]
UV: 226, 232 sh, 275–283, 292, 318(4.85, 4.80, 4.23, 4.17, 3.92) [1]
IR: 3320, 3290, 2970, 2850, 1625, 1580, 1505, 1455, 750 [1]
MS *m/z*: 299(M^+) [1]
^{1}H NMR: 2.83, 2.93, 3.25, 4.52, 5.22, 6.96–8.60 [1]
Pharm./Biol.: LD_{50} 67 mg/kg (i/v, mice). Hypertensive action [2]

References

1. T.S. Tulyaganov, S.Yu. Yunusov, Chem. Nat. Comp. **26**, 49 (1990)
2. T.S. Tulyaganov, A.A. Ibragimov, S.Yu. Yunusov, A.A. Vakhabov, S.D. Aminov, Khim. Farm. Zh. **XXI**, 295 (1987)

Tetrahydronitramarine

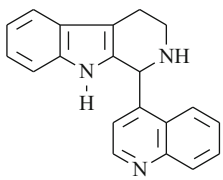


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{17}N_3$: 299.1422
Mp: 193–194°C [1]
$[\alpha]_D$ 0° [1]
UV: 236, 269, 305, 309, 316(4.95, 4.08, 3.95, 3.84, 4.04) [1]
IR: 3350–3250, 2960, 2930, 2860, 1620, 1600, 1570, 1505, 1430 [1]
MS *m/z*: 299(M^+) [1]
^{1}H NMR: 3.23, 3.38, 3.69, 5.33. 7.23–8.16 [1]
Pharm./Biol.: LD_{50} 126 mg/kg (i/v, mice). Hypertensive action [2]

References

1. T.S. Tulyaganov, S.Yu. Yunusov, Chem. Nat. Comp. **26**, 49 (1990)
2. T.S. Tulyaganov, A.A. Ibragimov, S.Yu. Yunusov, A.A. Vakhabov, S.D. Aminov, M.B. Sultanov, Khim. Farm. Zh. **XVIII**, 1474 (1984)

Tetrahydronitraridine

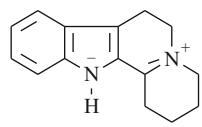


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii*
$C_{20}H_{17}N_3$: 299.1422
Mp: 176–177°C [1]
$[\alpha]_D$ 0° [1]
Solubility: sp. sol. MeOH, EtOH, $CHCl_3$ [1]
UV: 227, 275, 286, 304, 316 (4.52, 4.01, 3.84, 3.72) [1]
IR: 3240, 2960, 2930, 2870, 1620, 1580, 1515, 1470, 765 [1]
MS *m/z*: 299 (M^+), 284, 283, 282, 271, 270, 269, 149.5 (M^{++}) [1]
^{1}H NMR: 3.15 (t, J = 7 and 2, H–4), 3.53 (t, J = 8 and 2, H-3), 5.77 (br.s, H-1), 7.15 (d, J = 6, H-3′), 7.25 (m, H-6, H-6′), 7.46 (m, H-7, H-8, H-7′), 7.53 (m, H-5), 7.83 (m, H-5′), 8.44 (d, J = 7, H-8′), 8.62 (d, J = 6, H-2′) [1]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **42**, 459 (2006)

Tetramethylenedihydro-β-carboline

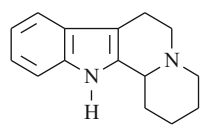


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria schoberi*
$C_{15}H_{16}N_2$: 224.1313
Mp: 81–83°C, 252°C (hydrochloride) [1]

References

1. A.A. Ibragimov, *Itogi Issledovaniya alkaloidonosnykh rastenii* (FAN, Tashkent, 1993), p. 105

Tetramethylenetetrahydro-β-carboline

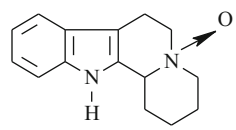


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N.schoberi*
$C_{15}H_{18}N_2$: 226.1470
Mp: 149–150°C (pet. ether) [1]
$[\alpha]_D$ −83° (EtOH) [1]
UV: 228, 284, 292(4.43, 3.50, 3.43) [1]
IR: 3280, 750 [1]
MS *m/z*: 226(85), 225(100), 197(24), 184(8), 170(24), 169(30), 156(10) [1]
^{1}H NMR: 1.66, 2.93(13H, m), 7.06(4H, m, H–Ar), 7.76(1H, s, NH) [1]

References

1. B.M. Pakhritdinov, N.Yu. Novgorodova, M. Normatov, S. Yu. Yunusov, Chem. Nat. Comp. **6**, 663 (1970)

Tetramethylenetetrahydro-β-carboline N-oxide



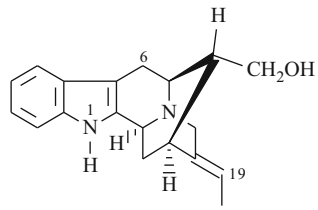
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{15}H_{18}N_2O$: 242.1419
Mp: 214°C [1]
$[\alpha]_D$ 0° [1]
Solubility: very sol. EtOH, MeOH, H_2O [1]
UV: 223, 270–276, 290(4.86, 3.87, 3.57) [1]
UV: (OH^-): 228, 270–275, 292 [1]
IR: 3150, 2940, 2860, 2760–2400, 1680, 1630, 1455, 1325, 745 [1]
MS *m/z*: 242(M^+, 2), 226(80), 225(100), 224(5), 197(22), 185(15), 184(10), 174(16), 170(13), 169(17), 156(9) [1]
^{1}H NMR: 1.75–2.12, 2.12–2.75, 3.00–3.60, 4.00, 5.00(1H, t). 7.00, 7.25–7.50, 7.62, 8.12 [1]

References

1. T.S. Tulyaganov, N.N. Shorakhimov, Chem. Nat. Comp. **26**, 478 (1990)

Tombozine (Tombosine, Normacusine B)

CAS Registry Number: 604-99-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. minor*
$C_{19}H_{22}N_2O$: 294.1732
Mp: 270–272°C, 242–243°C [1]; 212°C (O–Ac) [2]
$[\alpha]_D$ + 37°C (MeOH) [1]
UV: 233, 281, 290(4.50, 3.83. 3.75) [2]
IR: 3390, 3300, 1630, 1600 [2]
MS *m/z*: 294(100), 293(84), 279(11), 277(14), 263(40), 249(12), 182(15), 169(100), 168(78), 156(14), 154(10), 143(11), 130(10), 115(14) [2, 3]
^{1}H NMR(DMSO–d_6): 1.60(3H, t, J = 7), 4.07(2H, m), 5.20(1H, q, J = 7), 6.80–7.50(4H, m), 10.70(1H, s) [2]
Pharm./Biol.: LD_{50} 65–70, 325 mg/kg (i/m, s/c, mice). Sedative and hypotensive action [4]

References

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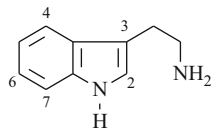
2. M.B. Patel, L. Thompson, C. Miet, J. Poisson, Phytochemistry **12**, 451 (1973)
3. L.D. Antonaccio, N.A. Pereira, B. Gilbert, H. Vorbrueggon, H. Budzikiewicz, J.M. Wilson, L.T. Durham, C. Djerassi, J. Amer. Chem. Soc. **84**, 2162 (1962)

4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 60

Tryptamine

CAS Registry Number: 61-54-1



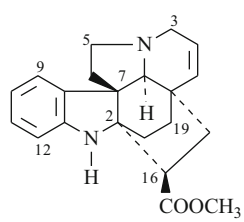
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Nitraria komarovii, N. schoberi*
$C_{10}H_{12}N_2$: 160.1193
Mp: 116–117°C, 247–248°C (hydrochloride) [1]
UV: 224, 281, 292 (sh) (4.68, 4.07, 3.99) [1]
MS *m/z*: 160 (M^+) [1]
^{1}H NMR: 1.95 (2H, s, $–NH_2$), 3.01 (2H, t, $–CH_2$), 3.51 (2H, t, $–CH_2$), 6.91 (1H, s, H-2), 7.09 (2H, m, H-5, H-6), 7.24 (1H, dd, H-7), 7.58 (1H, dd, H-4), 8.50 (1H, br s, NH) [1]

References

1. T. S. Tulyaganov, Unpub

Venalstonine

CAS Registry Number: 5001-20-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. herbacea*
$C_{21}H_{24}N_2O_2$: 336.1838
Mp: 139–140°C (MeOH) [1]
$[\alpha]_D$ −85° ($CHCl_3$) [1]
UV: 243, 293(3.82, 3.27) [1, 2]
IR: 3370, 1720, 760 [1, 2]
MS *m/z*: 336(M^+), 216, 156, 149, 135, 107 [1]
^{1}H NMR: 3.67(s, $COOCH_3$), 5.30–5.70(CH = CH), 6.50–7.10(4H, H–Ar) [1]
^{13}C NMR: [3]

Table 1

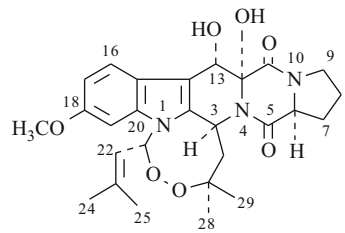
C-2	66.5	C-10	119.0	C-17	29.6
3	49.0	11	126.8	18	31.6
5	50.0	12	110.9	19	34.0
6	36.4	13	149.0	20	35.0
7	56.1	14	126.5	21	66.8
8	139.5	15	132.5	C = O	173.7
9	121.1	16	43.4	OCH_3	51.6

References

1. M. Sharipov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 281 (1974)
2. B. Das, K. Biemann, A. Chatterjee, A. B. Ray, P. L. Majumder, Tetrahedron Lett. **6**, 2239 (1965)
3. A. Ahond, M.M. Janot, N. Langlois, G. Lukacs, P. Potier, Ph Rasoanaivo, M. Sangare, N. Neuss, M. Plat, J.Le. Men, E.W. Hagaman, E. Wenkert, J. Amer. Chem. Soc. **96**(2), 633 (1974)

Verruculogen

CAS Registry Number: 12771-72-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Aspergillus fumigatus* KMM 4631
$C_{27}H_{33}N_3O_7$: 511.2319
Mp: 232–234°C (MeOH) [1], 233–235°C (dec.) [2]
$[\alpha]_D^{26}$ −22.2° (*c* 1.0, $CHCl_3$) [1]
UV: 226 (47500), 277 (11000), 295 (9750) [2]
MS *m/z*: 511 (M^+, 12), 479 (4), 386 (6), 371 (8), 346 (10), 330 (8), 315 (14), 300 (14), 285 (24), 239 (28), 199 (16), 149 (36), 84 (100) [1]
^{1}H NMR: 1.01 (3H, s, CH_3-28), 1.72 (3H, s, CH_3-29), 1.74 (3H, d, J = 1.2, CH_3-24), 2.00 (3H, d, J = 1.2, CH_3-25), 1.65–2.55 (6H, m, 2H-7, 2H-8, 2H-26), 3.63 (2H, t, 2H-9), 3.82 (3H, s, OCH_3), 4.10 (1H, brs, OH-12), 4.48 (1H, m, H-6), 4.78 (1H, brs, OH-13), 5.05 (1H, dm, J = 8.0, H-22), 5.65 (1H, brs, H-13), 6.05 (1H, d, J = 10.0, H-3), 6.59 (1H, d, J = 2.2, H-19), 6.64 (1H, d, J = 8.0, H-21), 6.83 (1H, dd, J = 2.2, 8.7, H-17), 7.90 (1H, d, J = 8.7, H-16) [1]
^{13}C NMR [1]:

Table 1

C-2	131.7	C-13	68.7	C-22	118.6
3	49.0	14	105.6	23	143.2
5	166.3	15	121.1	24	18.8
6	58.8	16	121.7	25	24.3
7	29.1	17	109.4	26	45.4
8	22.7	18	156.5	27	82.2
9	51.3	19	94.0	28	27.2
11	170.8	20	136.3	29	25.7
12	82.6	21	85.9	CH_3O-18	55.8

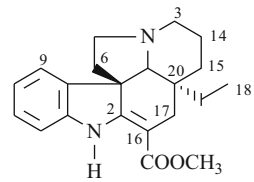
X-ray: [2]
Pharm./Biol.: A cytotoxic [1] and tremor producing agent [2]

References

1. Sh.Sh. Afiyatulov, A.I. Kalinovskii, M.V. Pivkin, P.S. Dmitrenok, T.A. Kuznetsova, Chem. Nat. Comp. **40**, 615 (2004)
2. J. Fayes, D. Lokengard, J. Clardy, R.J. Cole, J.W. Kirksey, J. Am. Chem. Soc. **96**(21), 6785 (1974)

(−)-Vincadifformine (Ervamine)

CAS Registry Number: 3247-10-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{26}N_2O_2$: 338.1994
Mp: amorph. [1]; 200°C (hydroiodide), 258°C (nitrate), 129°C (tartrate) [1]
$[\alpha]_D$ −502° (MeOH) [1]
UV: 226, 302, 328(4.11, 4.10, 4.24) [1]
IR: 3370, 1690 [1]; 3580, 1660, 1610 [2]
MS *m/z*: 338(M^+), 214, 124(100) [3]
^{13}C NMR: [4]

Table 1

C-2	167.8	C-10	120.5	C-17	25.6
3	51.7	11	127.4	18	7.3
5	50.7	12	109.3	19	29.3
6	45.3	13	143.4	20	38.2
7	55.5	14	22.2	21	72.7
8	138.0	15	32.9	22	169.2
9	121.0	16	92.8	23	50.9

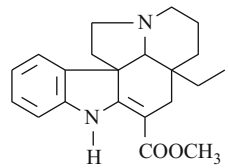
Pharm./Biol.: LD_{50} 225.90 mg/kg (i/p, i/v, mice) [5]. Myometrium stimulator [6]

References

1. V.M. Malikov, P.Kh. Yuldashev, S.Yu. Yunusov, DAN UzSSR (4), 21 (1963)
2. M. Plat, J. Le Men, M.-M. Janot, H. Budzikiewicz, J.M. Wilson, L.T. Durham, C. Djerassi, Bull. Soc. Chim. France 2237 (1962)
3. M. Hesse, *Indolalkaloide (Progress in Mass Spectrometry)*, (Verlag Chemie, Weinheim, 1974), **1**, Teil. 2, Abb. 19

4. M. Shamma, D. M. Hindenlang, *Carbon-13 NMR Shift Assignments of Amines and Alkaloids* (Plenum Press, New York/London, 1979), No. 226
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 62
6. M.B. Sultanov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (FAN, Tashkent, 1972), p. 11

(±)-Vincadifformine

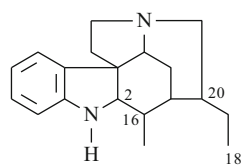


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca herbacea, V. minor*
$C_{21}H_{26}N_2O_2$: 338.1994
Mp: 123–125°C (MeOH) [1]
$[\alpha]_D$ 0° ($CHCl_3$) [1]
UV: 225, 298, 325(4.03, 4.05, 4.15) [1]
IR: 3385, 1680, 1610, 750 [1]
MS *m/z*: 338(M^+) [1]

References

1. Z.V. Robakidze, M.M. Mudzhiri, V.Yu. Vachnadze, K.S. Mudzhiri, Khim. Prirod. Soedin. 735 (1980)

Vincaerectine



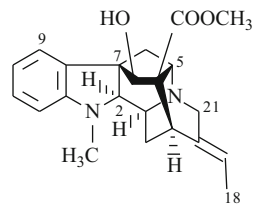
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{19}H_{26}N_2$: 282.4391
Mp: 179–180°C (Me_2CO) [1]
$[\alpha]_D$ +70.50° (*c* 1.32, MeOH) [1]
UV: 242, 302 [1]
IR: 3350, 1607, 1596, 1488, 1472, 1313, 1242, 1065, 1018, 756 [1]
MS *m/z*: 282 (M^+), 199, 144, 130, 69 [1]
^{1}H NMR: 0.87 (3H, t, CH_3-18), 1.07 (3H, d, CH_3-16), 6.50 (1H, m, H–Ar), 6.73 (1H, m, H–Ar), 6.95 (2H, m, H–Ar) [1]

References

1. V.I. Akhmedzhanova, *Nitrogen-Containing Heterocycles and Alkaloids* [in Russian] (Iridium-Press, Moscow, 2001), p. 24

Vincamajine

CAS Registry Number: 2506-26-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. herbacea, V. major, V. minor*
$C_{22}H_{26}N_2O_3$: 366.1943
Mp: 226–227°C (MeOH) [1]
$[\alpha]_D$ −55° (EtOH) [1], −22° ($CHCl_3$) [2]
UV: 249, 292(3.95, 3.49) [1, 2]
IR: 1740, 775 [1]
MS *m/z*: 366(M^+) [2]
^{1}H NMR: 1.58(3H, d, J = 6.5, CH_3-19), 2.60(3H, s, NCH_3), 3.64(3H, s, $COOCH_3$), 4.17(1H, s, H-17), 5.20(q, J = 6.5, H-19), 6.50–7.20(4H, m, H–Ar) [3–5]

^{13}C NMR: [6]

Table 1

C-2	74.4	C-11	127.6	C-19	116.1
3	52.7	12	108.4	20	135.6
6	35.0	13	153.8	21	54.7
7	56.5	14	21.4	CH_3-18	12.3
8	129.7	15	29.6	NCH_3	33.8
9	124.2	16	59.6	CO	172.8
10	118.2	17	73.9	OCH_3	51.1

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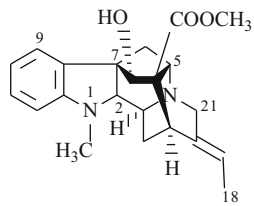
Vincamajinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca major*
$C_{22}H_{26}N_2O_3$: 366.1943
Mp: 274–275°C (MeOH) [1]
UV: 242, 290(4.48, 4.14) [1]
IR: 3200–3050, 1745, 1250, 770 [1]
MS *m/z*: 366(M^+, 83), 222(44), 190(68), 158(29), 157(100), 144(73), 131(42) [1]
^{1}H NMR: 1.62(d, CH_3-18), 2.64(s, NCH_3), 3.69(s, $COOCH_3$), 5.31(q, H-19) [1]

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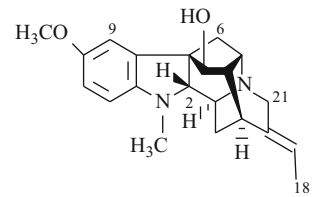
Vincamajoreine

CAS Registry Number: 3382-93-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca major*
$C_{21}H_{26}N_2O_2$: 338.1994
Mp: 227–229°C (MeOH) [1, 2], 246–247°C (MeOH) [3]
UV: 246, 310(4.13, 3.66) [3]
IR: 3340, 1620, 815 [1]; 1215, 807 [3]
MS *m/z*: 338(M^+), 213, 212, 187, 174 [3]
^{1}H NMR: 1.65(3H, d, J = 7, CH_3-18), 2.75(3H, s, NCH_3), 3.78(3H, s, OCH_3), 4.47(1H, s, OH), 5.25(1H, q, J = 7, H-19), 7.00(3H, m, H–Ar) [3]
^{13}C NMR: [4]

Table 1

C-2	79.6	C-10	153.0	C-17	76.0
3	49.0	11	111.4	18	12.5
5	55.8	12	109.2	19	114.2
6	34.9	13	147.7	20	138.6
7	54.9	14	29.2	21	54.6
8	134.4	15	27.9	NCH_3	34.8
9	110.2	16	51.9	Ar–OCH_3	55.6

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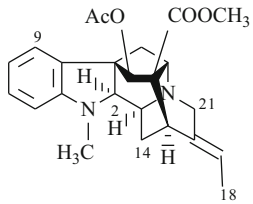
Vincamedine

CAS Registry Number: 912-27-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{24}H_{28}N_2O_4$: 408.2049
Mp: 185–187°C [1]
$[\alpha]_D$ −75° ($CHCl_3$) [1]
UV: 248, 292(3.94, 3.48) [1]
IR($CHCl_3$): 2950, 2910, 1616, 1484, 1376, 1250, 831 [2]
MS *m/z*: 408(M^+, 100), 349, 264, 222, 190, 157, 144 [3]
^{13}C NMR: [4]

Table 1

C-2	74.7	C-11	128.2	18-CH_3	12.6
3	53.1	12	109.1	C-20	136.6
5	61.4	13	154.1	21	55.4
6	36.3	14	21.5	NCH_3	33.9
7	56.0	15	30.2	CO	172.1
8	128.6	16	58.8	OCH_3	51.4
9	123.1	17	75.2	CO	168.2
10	118.7	19	116.5	CH_3	20.5

References

1. J.L. Kaul, J. Trojanek, Lloydia **29**, 26 (1966)
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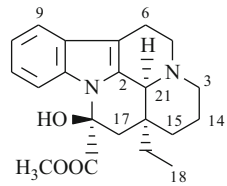
(+)-Vincamine (Minorine)

CAS Registry Number: 1617-90-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. herbacea, V. major, V. minor*
$C_{21}H_{26}N_2O_3$: 354.1943
Mp: 232–233°C (MeOH) [1, 2]; 227°C (hydrochloride), 215°C (nitrate), 203°C (picrate) [3]
$[\alpha]_D$ −5° ($CHCl_3$) [2, 4], +41° (Py) [1, 5]
Solubility: very sol. $CHCl_3$; insol. EtOH, Me_2CO, Et_2O, C_6H_6, H_2O [6]
UV: 225, 275(4.50, 3.95) [1, 4, 5]
IR: 3590, 1745, 1255, 1210, 742 [1, 2, 4]
MS *m/z*: 354(M^+, 100), 339(11), 336(8), 325(10), 307(30), 295(51), 294(36), 284(21), 267(63), 252(72) [7]
^{1}H NMR: 0.66(3H, t, CH_3), 3.62(3H, s, $COOCH_3$), 3.78(1H, s, OH), 4.77, 7.55(m, H–Ar) [4]
^{13}C NMR: [8]

Table 1

C-2	131.4	C-10	121.5	C-17	44.5
3	44.5	11	120.1	18	7.6
5	50.9	12	110.2	19	28.8
6	16.9	13	134.1	20	35.1
7	105.9	14	20.8	21	59.1
8	128.9	15	25.2	C = O	174.3
9	118.4	16	81.9	OCH_3	54.1

HPLC: [9]

Pharm./Biol.: LD_{50} 411.57 mg/kg (i/p, i/v, mice). Approved for use as stimulant in weak labor activity. Used in Hungary as a hypotensive agent [10]

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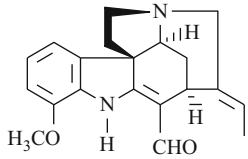
Vincanicine

CAS Registry Number: 32258-16-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{20}H_{22}N_2O_2$: 322.1681
Mp: amorph [1]
$[\alpha]_D$ −438° ($CHCl_3$) [1]
UV: 248, 293, 376(3.90, 3.29, 4.04) [1]
IR: 3400, 1650, 1560, 860–830 [1]
MS *m/z*: 322(M^+, 60), 307(7), 293(15), 121(100) [1]
^{1}H NMR: 3.80(3H, s, OCH_3) [1]; 6.50–6.80(3H, m, H–Ar) [2]

References

1. D.A. Rakhimov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 386 (1969)
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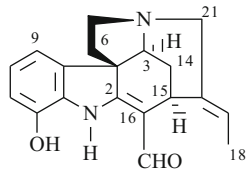
Vincanidine

CAS Registry Number: 1630-41-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. minor*
$C_{19}H_{20}N_2O_2$: 308.1525
Mp: 250–280°C (dec.) [1, 2]; 175°C (hydrochloride), 170°C (hydrobromide), 142.5°C (nitrate), 315°C (methiodide) [1, 2]; 221°C (picrate) [2]
$[\alpha]_D$ −849° (MeOH) [3]
Solubility: very sol. Py, alk.; insol. EtOH, $CHCl_3$, C_6H_6, Me_2CO [2]
UV: 242, 291, 375(3.95, 3.26, 4.14) [3]
IR: 1660, 1580 [3]; 860, 815 [4]
^{1}H NMR: 6.50–6.80(3H, m, H–Ar) [5]
^{13}C NMR (Py–d_5): [6]

Table 1

C-2	169.4	C-9	115.9	C-15	31.4
3	62.5	10	123.5	16	112.2
5	56.9	11	112.7	17	187.9
6	47.2	12	143.7	19	120.0
7	59.8	13	131.8	20	139.4
8	141.0	14	31.2	21	57.1
				CH_3-18	13.0

Pharm./Biol.: LD_{50} 85 mg/kg (s/c, i/p, mice). Emetic effect. Quaternary alkyl derivatives possess hypotensive, ganglioblocking, and curaremimetic actions [7]

References

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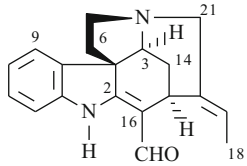
(−)-Vincanine (Norfluorocurarine)

CAS Registry Number: 6880-54-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids

Biological source: *Vinca erecta, V. herbacea, V. minor*

$C_{19}H_{20}N_2O$: 292.1576

Mp: 187.5–188°C (MeOH) [1, 2]; 212°C (hydrochloride) [2]; 194°C (nitrate), 227°C (hydrobromide), 282°C (methiodide) [1, 2]

$[\alpha]_D$ −992° (MeOH) [1, 2], −1243° ($CHCl_3$) [3]

UV: 245, 302, 365.5(4.01, 3.61, 4.26) [3, 4]

IR: 3300, 1645, 1610, 1575 [3–5]

MS *m/z*: 292(M^+), 249(17), 180(16), 167(20), 121(100), 57(26) [3]; 292(M^+, 83), 277(9), 263(20), 121(100) [6]

^{13}C NMR: [7]

Table 1

C-2	168.7	C-9	121.7	C-15	31.2
3	62.7	10	120.7	16	111.1
5	56.4	11	127.6	CO-17	188.2
6	46.2	12	110.2	CH_3-18	12.7
7	58.3	13	142.9	C-19	120.2
8	136.9	14	30.8	20	139.6
				21	56.6

Pharm./Biol.: LD_{50} 14, 13.6, 5.6 mg/kg (s/c, i/p, i/v, mice). Analeptic for treating a number of diseases of the CNS and neuritises of the acoustic nerve; methochloride is used as a brief-action ganglioblocker [8]

References

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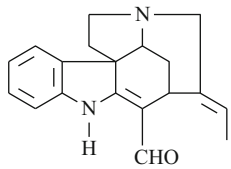
7. M.R. Yagudaev, Chem. Nat. Comp. **19**, 199 (1983)
8. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), pp. 34–36

(±)-Vincanine (Vinervidine)

CAS Registry Number: 27565-46-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{19}H_{20}N_2O$: 292.1576
Mp: 190–191°C (Me_2CO) [1]
$[\alpha]_D$ 0° (MeOH) [1]
UV: 244, 300, 362(4.08, 3.67, 4.33) [1]
IR: 3220, 1665, 1575, 743 [1]
MS *m/z*: 292(M^+, 62), 277(9), 263(17), 121(100) [1]

References

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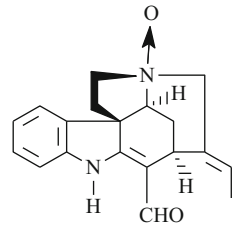
Vincanine N-oxide

CAS Registry Number: 52845-16-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{19}H_{20}N_2O_2$: 308.1525
Mp: amorph., 205°C (hydrobromide) [1]
UV: 244, 300, 365(3.50, 3.84, 4.25) [1]
IR: 3340, 1652, 1560, 770 [1]
MS *m/z*: 308(M^+, 6), 292(12), 290(4), 121(13), 107(71), 92(100) [1]

References

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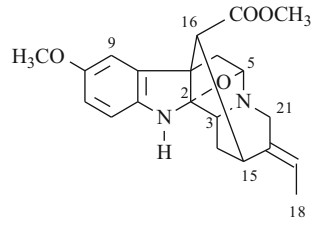
Vincaricine

CAS Registry Number: 22223-13-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_4$: 368.1736
Mp: 187–189°C (MeOH, Me_2CO) [1]
$[\alpha]_D$ ±5° ($CHCl_3$) [1]
UV: 236, 308(3.85, 3.48) [1, 2]
UV(EtOH + H^+): 255, 343(3.97, 4.02) [1, 2]
IR: 3180, 1750, 770 [1, 2]
MS *m/z*: 368(M^+, 70), 350(100), 337(18), 309(20), 291(24), 269(90) [1, 2]
^{1}H NMR: 1.45(CH_3-18), 3.62(3H, s, OCH_3), 3.67(3H, s, $COOCH_3$), 5.36(H-19), 6.53–6.69(H–Ar) [1–3]
^{13}C NMR: [3]

Table 1

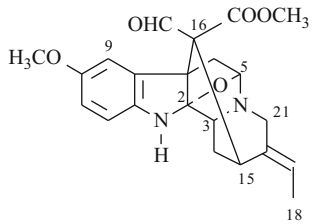
C-2	107.0	C-10	154.4	C-18	12.6
3	51.4	11	112.8*	19	120.2
5	87.2	12	110.8	20	136.4
6	40.5	13	141.2	21	46.3
7	52.0	14	25.9	Ar–OCH_3	55.9
8	136.2	15	31.0	CO	172.3
9	111.2*	16	51.6	OCH_3	51.4

References

1. D.A. Rakhimov, Kh.T. Il'yasova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 440 (1969)
2. Kh.T. Il'yasova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 278 (1968)
3. M.R. Yagudaev, Chem. Nat. Comp. **21**, 131 (1985)

Vincarinine

CAS Registry Number: 33023-09-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{22}H_{24}N_2O_5$: 396.1685
Mp: 178–179°C (C_6H_6) [1]
UV: 238, 312(3.89, 3.53) [1]
UV(EtOH + $HClO_4$): 260, 356(3.40, 3.38) [1]
IR: 3310, 1750, 1720 [1]
MS *m/z*: 396(M^+, 95), 367(100), 337(23), 309(25), 269(71), 212(8) [1]
^{1}H NMR: 1.43(3H, d, J = 6, CH_3-18), 3.60-3.65(6H, s, 2 × OCH_3), 5.06(1H, s, NH), 5.32(1H, q, J = 6, H-19), 6.52–6.70(3H, H–Ar), 8.51(1H, s, CHO) [1]
^{13}C NMR: [2]

Table 1

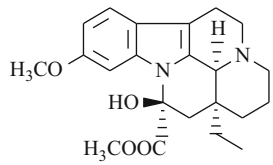
C-2	106.7	C-10	155.0	C-17	197.0
3	52.9	11	113.3*	18	12.8
5	87.4	12	111.0	19	120.7
6	43.4	13	141.5	20	136.2
7	53.8	14	20.5	21	46.5
8	133.3	15	31.6	Ar–OCH_3	55.8
9	113.2*	16	55.9	CO	168.0
				OCH_3	51.8

References

1. Kh.T. Il'yasova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 155 (1971)
2. M.R. Yagudaev, Chem. Nat. Comp. **21**, 131 (1985)

Vincine

CAS Registry Number: 4752-37-8



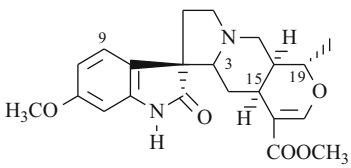
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. minor*
$C_{22}H_{28}N_2O_4$: 384.2049
Mp: 205–206°C (Me_2CO) [1], 212–214°C (MeOH) [2], 217°C (methiodide) [3]
$[\alpha]_D$ +38° (Py) [2]
UV: 232, 275, 300(4.45, 3.78, 3.70) [1, 2]
IR: 1750, 762, 746 [1]; 3540, 1745, 1260, 1210, 830, 760, 720 [2]
MS *m/z*: 384(100), 369(6), 354(7), 324(12), 297(16), 282(31), 267(13), 254(16), 234(13), 227(20), 200(15), 189(15) [1]
^{1}H NMR: 0.90(t, J = 7), 3.82, 3.84, 6.60–6.90 [4]
HPLC: [5]

References

1. V.M. Malikov, Sh.Z. Kasymov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 662 (1970)
2. Z.V. Robakidze, M.M. Mudzhiri, V.Yu. Vachnadze, K.S. Mudzhiri, Khim. Prirod. Soedin. 640 (1980)
3. O. Strouf, J. Trojanek, Chem. Ind. 2037 (1962)
4. M. Plat, R. Lemay, J. Le Men, M.-M. Janot, K. Djerassi, H. Budzikiewicz, Bull. Soc. Chim. France 2497 (1965)
5. M. Gazdag, G. Szepesi, K. Csomor, J. Chromatogr. **243**, 315 (1982)

Vineridine

CAS Registry Number: 3489-06-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. minor*
$C_{22}H_{26}N_2O_5$: 398.1842
Mp: 179–180°C (Me_2CO) [1]
$[\alpha]_D$ +23° (Py), +42° (MeOH), +40° ($CHCl_3$) [1]; 211° (methiodide), 178° (nitrate) [1]
UV: 220(4.54) [1]
IR: 3240, 1720, 1630 [1]
IR($CHCl_3$): 3440, 3200, 1720, 1630 [1]
^{1}H NMR: 1.24(d, CH_3-19), 3.40(s, $COOCH_3$), 3.77(s, Ar–OCH_3), 4.22(o, H-19), 6.51(q, H-10), 6.55(s, H-17), 6.99(d, H-9), 7.37(d, H-12), 9.60(br s, NH) [2]
^{13}C NMR: [3]

Table 1

C-2	182.5	C-10	107.6	C-17	153.5
3	70.1	11	159.8	19	74.6
5	53.2*	12	96.7	20	36.5
6	34.2	13	142.2	21	54.6*
7	55.3	14	26.2	22	167.3
8	125.0	15	25.1	CH_3-19	18.5
9	123.0	16	105.1	Ar–OCH_3	55.3
				OCH_3	50.3

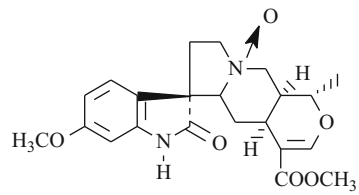
CD: [2]
Abs. conf.: 3R, 4S, 7S, 15S, 19S, 20S [2, 3]
Pharm./Biol.: LD_{50} 125.485 mg/kg (i/v, i/p, mice) [4]. Sedative action [5]

References

1. Sh.Z. Kasymov, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **2**, 210 (1966)
2. M.R. Yagudaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 496 (1974)
3. M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 170 (1980)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 28
5. M.B. Sultanov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (FAN, Tashkent, 1972), p. 10

Vineridine N-oxide

CAS Registry Number: 53643-15-5



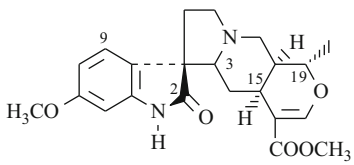
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{22}H_{26}N_2O_6$: 414.1791
Mp: 193–195°C ($CHCl_3$) [1]
$[\alpha]_D$ +20° (MeOH) [1]
Solubility: very sol. H_2O, MeOH; sol. $CHCl_3$, Me_2CO [1]
IR: 1720 [1]
MS *m/z*: 414(M^+, 7), 398(100), 243(9), 223(40), 208(9), 189(12), 69(26) [1]
^{1}H NMR(CD_3OD): 1.25(d, CH_3-19), 3.30(s, $COOCH_3$), 3.75(s, OCH_3), 4.20(q, H-19), 6.50–7.15(3H, H–Ar) [1]

References

1. M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 776 (1973)

Vinerine

CAS Registry Number: 3382-38-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta, V. minor*
$C_{22}H_{26}N_2O_5$: 398.1842
Mp: 202–203°C (MeOH) [1], 195°C (methiodide), 170°C (nitrate) [1]
$[\alpha]_D$ +20° (Py), +54° (Me_2CO), +36° ($CHCl_3$) [1]
UV: 220(4.54) [1]
IR: 3295, 1730, 1665, 1605, 830, 800 [1]
MS *m/z*: 398(M^+), 223, 208, 189, 176, 174, 160, 69 [1]
^{1}H NMR: 1.20(d, CH_3-19), 3.59(s, $COOCH_3$), 3.77(s, Ar–OCH_3), 4.16(o, H-19), 6.47(s, H-17), 6.51(q, H-10), 7.24(d, H-9), 7.40(d, H-12), 8.90(br s, NH) [2]
^{13}C NMR: [3]

Table 1

C-2	182.0	C-10	106.8	C-17	153.5
3	67.2	11	159.6	19	74.5
5	53.2*	12	96.6	20	36.8
6	34.8	13	141.5	21	53.7*
7	56.0	14	27.0	22	167.3
8	125.4	15	24.8	CH_3-19	18.4
9	125.3	16	104.9	Ar–OCH_3	55.3
				OCH_3	50.7

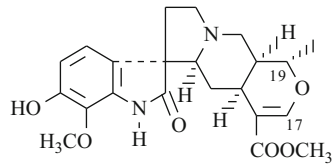
CD: [2]
Abs. conf.: 3R, 4S, 7R, 15S, 19S, 20S [2, 3]
Pharm./Biol.: LD_{50} 91 mg/kg [4]. Sedative and hypotensive action [5]

References

1. Sh.Z. Kasymov, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **2**, 210 (1966)
2. M.R. Yagudaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 496 (1974)
3. M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 170 (1980)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 28
5. M.B. Sultanov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (FAN, Tashkent, 1972), p. 10

Vinerinine

CAS Registry Number: 54347-88-5



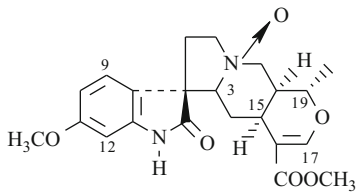
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{22}H_{26}N_2O_6$: 414.1791
Mp: amorph. [1]
$[\alpha]_D$ −74° (MeOH) [1]
Solubility: very sol. alk., $CHCl_3$, MeOH; sol. Et_2O [1]
UV: 224(4.44) [1]
IR: 3500–3100, 1720, 1635, 810, 780 [1]
MS *m/z*: 414(M^+, 100), 224(22), 223(50), 222(11), 208(21), 205(11), 180(14), 69(46) [1]
^{1}H NMR: 1.34(d, J = 6, CH_3-19), 3.56 (s, OCH_3), 3.77(s, $COOCH_3$), 4.50(J = 10, H-19), 6.50, 6.70(each 1H, J = 8, H-Ar), 7.47 (1H, s, H-17) [1, 2]

References

1. M.M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 419 (1974)
2. M.M. Khalmirzaev, V.M. Malikov, K.L. Seitanidi, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 605 (1977)

Vinerine N-oxide

CAS Registry Number: 61687-65-8



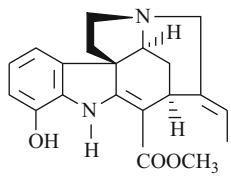
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{22}H_{26}N_2O_6$: 414.1791
Mp: 246–247°C (MeOH) [1]
UV: 218(4.59) [1]
IR: 3600–3300, 1705, 1630, 830, 810 [1]
^{1}H NMR: 1.24(3H, d, CH_3), 3.53(3H, s, $COOCH_3$), 3.74(3H, s, OCH_3), 4.15(1H, q, H-19), 6.43–6.55(2H, H-10, H-12), 7.53(1H, s, H-17), 7.66(1H, d, H-9) [1]

References

1. M.R. Sharipov, M. Khalmirzaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 355 (1976)

Vinervine

CAS Registry Number: 1963-86-6



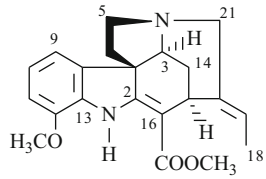
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{20}H_{22}N_2O_3$: 338.1631
Mp: 154–155°C (dec., Et_2O), 200°C (hydrochloride), 183°C (sulphate) [1]
$[\alpha]_D$ −505° (MeOH) [1]
UV: 234, 290, 336(4.22, 3.86, 4.22) [1]
IR: 3440, 1690 [1]
^{1}H NMR: [2]
Pharm./Biol.: LD_{50} 24.5, 100, 102, 167 mg/kg (i/v, i/p, s/c, oral, mice) [3]. Sedative and hypotensive action [4]

References

1. P.Kh. Yuldashev, Kh Ubaev, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 25 (1965)
2. M.R. Yagudaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 276 (1974)
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 40
4. A.G. Kurmukov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (FAN, Tashkent, 1972), p. 13

Vinervinine

CAS Registry Number: 17366-53-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Vinca erecta*
$C_{21}H_{24}N_2O_3$: 352.1787
Mp: 190–191°C (MeOH), 144°C (dihydro) [1]
$[\alpha]_D$ −564° ($CHCl_3$) [1]
UV: 237, 292, 334(4.12, 3.82, 4.26) [1]
IR: 3380, 1690 [1]
^{1}H NMR: 6.50–6.80(3H, H–Ar) [2]

^{13}C NMR: [3]

Table 1

C-2	167.7*	C-10	121.5	C-19	120.3
3	62.0	11	110.3	20	139.3
5	56.2	12	144.3	21	57.0
6	46.2	13	132.5	CO	167.8*
7	58.5	14	31.0	CH_3-18	12.7
8	138.0	15	30.0	$COOCH_3$	50.8
9	113.2	16	101.6	Ar–OCH_3	55.5

Pharm./Biol.: LD_{50} 115 mg/kg (i/p, mice). Sedative and hypotensive action [4]

References

1. N. Abdurakhimova, P.Kh. Yuldashev, S.Yu. Yunusov, DAN SSSR **173**, 87 (1967)
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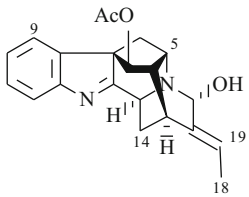
Vomilenine

CAS Registry Number: 6880-50-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia serpentina*
$C_{21}H_{22}N_2O_3$: 350.1631
Mp: 207°C [1, 2]
$[\alpha]_D$ −76° (Py) [1], −72° (Py) [2]
UV: 219, 259(4.37, 3.74) [1, 2]
IR: 3600, 1740 [1, 2]
MS *m/z*: 350(M^+) [1]

^{1}H NMR: 1.68(3H, d, J = 6, =C-CH_3), 2.15(3H, s, Ac), 7.12-7.65(4H, m, H–Ar) [1, 2]
^{13}C NMR: [3]

Table 1

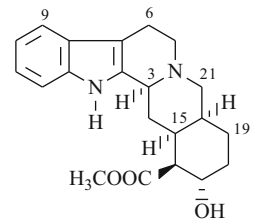
C-2	183.6	C-10	125.8	C-17	77.5
3	54.3*	11	128.9	18	13.0
5	50.9	12	121.1	19	119.4
6	36.4	13	156.3	20	131.0
7	65.1	14	26.3	21	82.5
8	136.1	15	28.2	Ac	169.7
9	123.9	16	49.0*		21.1

References

1. L.L. Shimolina, S.A. Minina, Chem. Nat. Comp. **17**, 599 (1981)
2. W.I. Taylor, A.J. Frey, A. Hofman, Helv. Chim. Acta **45**, 611 (1962)
3. F. Libot, N. Kunesch, J. Poisson, Phytochemistry **19**, 989 (1980)

α-Yohimbine

CAS Registry Number: 131-03-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Indole Alkaloids
Biological source: *Rauwolfia canescens*
$C_{21}H_{26}N_2O_3$: 354.1943
Mp: 230°C (EtOH) [1], 239–241°C (dec.) [2], 235–236°C [3]
$[\alpha]_D$ −26° (EtOH), −15° (Py) [2]; −18° (Py) [3]
UV: 227, 281(4.50, 3.93) [4]
IR($CHCl_3$): 3570, 3480, 2805, 2765, 1730, 1055 [4, 5]

MS *m/z*: 354(M^+, 100), 353(88), 339(5), 337(2), 335(2), 323(5), 321(3), 320(2), 295(5), 293(3), 226(8), 224(3), 223(6), 221(6), 184(10), 170(11), 169(12), 156(8) [5]

^{1}H NMR: 3.15(1H, m, H-3), 3.84(3H, s, $COOCH_3$), 3.99(1H, dt, J = 26, H-17), 7.02–7.15(2H, m, H-10, H-11), 7.28(1H, d, H-12), 7.44(1H, d, H-9), 7.75(1H, s, NH) [5]

^{13}C NMR: [6]

Table 1

C-2	134.3	C-10	119.1	C-17	66.0
3	60.1	11	121.1	18	33.2
5	53.2	12	110.6	19	24.5
6	21.7	13	135.7	20	36.4
7	108.1	14	27.6	21	60.4
8	127.1	15	37.9	OCH_3	51.8
9	117.9	16	54.6	C = O	174.4

X-ray: [7]

HPLC: [8]

Abs. conf.: 3αH, 15αH, 16β$COOCH_3$, 17αOH, 20αH [9]

Pharm./Biol.: LD_{50} 36.5 mg/kg (oral, mice). Hydrochloride is used as a hypotensive and anesthetic agent [10]

References

1. A.S. Belikov, Chem. Nat. Comp. **5**, 57 (1969)
2. A. Stoll, A. Hofmann, R. Brunner, Helv. Chim. Acta **38**, 270 (1955)
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4. A.L. Hir, M.-M. Janot, R. Goutarel, Bull. Chim. France 1027 (1953)
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Isoquinoline Alkaloids

S.S. Azimova, M.S. Yunusov (eds.), *Natural Compounds – Alkaloids*,
DOI 10.1007/978-1-4614-0560-3,

Aporphine alkaloids form a large group of isoquinoline alkaloids that number more than 700 compounds. This section includes data on 90 aporphine alkaloids isolated from plants growing in the CIS. Plants of the families Berberidaceae, Fumariaceae, Magnoliaceae, Papaveraceae, Ranunculaceae, and others are rich in these alkaloids.

Aporphine alkaloids have a biphenyl system and can be di-, tri-, tetra-, penta-, and hexa-substituted derivatives where the substituents are hydroxyl, methoxyl, and methylenedioxy that can be situated over all four rings. The most widely distributed in nature are 1,2,9,10- and 1,2,10,11-tetrasubstituted bases and 1,2,3,9,10-pentasubstituted ones. The disubstituted aporphines have substituents in the 1- and 2-positions. *N*-oxides of aporphine alkaloids have also been isolated. The N atom in aporphines can be secondary, tertiary, and quaternary.

Oxoaporphine alkaloids with a completely dehydrogenated system and a C-7 ketone are widely distributed. These optically inactive colored bases are poorly soluble in organic solvents. Nonphenolic oxoaporphines are yellow and red; phenolic ones (with a C-1 or C-11 hydroxyl), green.

UV-, mass-, and NMR-spectra provide good information about the mutual positioning of the substituents in aporphines.

Unsubstituted or monosubstituted (ring D) compounds have UV absorption maxima at 270–280 nm and a shoulder at 310–320; 1,2,9,10-substituted, at 280 and 305–310 nm; 1,2,10,11-substituted, at 270 and 305–310 nm.

Hydroxyls in ring A are weaker phenolic bases than those in ring D.

Aporphine alkaloids have a twisted biphenyl system and an asymmetric H atom on C-6a. It has been demonstrated that the absolute configuration of the asymmetric center is *S* in dextro-rotating alkaloids with the A configuration; for levo-rotating, *R* (B configuration). Shamma found that aporphine alkaloids cannot have diastereoisomers.

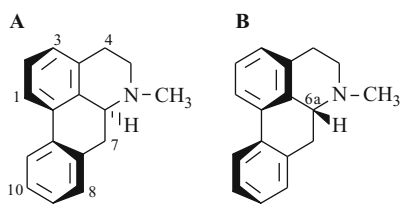
Alkaloids with 1,2,9- and 1,2,9,10-substituents have specific rotations of 40–100E, whereas those with 1,2,11- and 1,2,10,11-substituents have 200–300E rotations [1].

Oxidation of optically inactive des-bases with HNO_3 produced mellophanic (benzene-1,2,3,4-tetracarboxylic) acid.

Oxidation of phenolic alkaloids begins with the core containing the hydroxyl.

The methylenedioxy in aporphine alkaloids is most often located in the 1,2-position.

Pharmacological investigations showed that aporphine alkaloids are slightly toxic compounds. Many of them possess hypotensive and spasmolytic activity. Glaucine is used in medicine as an antitussive preparation.



References

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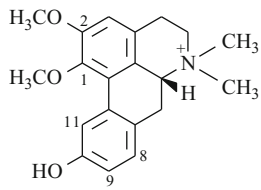
Amurenine

CAS Registry Number: 169626-39-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Berberis amurensis*

$C_{20}H_{24}NO_3^+$: 326.1750

Mp: 194–195°C (chloride), 187°C (O-Ac) [1]

$[\alpha]_D$ (chloride) −164° (*c* 0.03, MeOH) [1]

UV: 265, 275, 305(4.23, 4.25, 4.16) [1]

IR: 3200, 1610, 1580, 1470 [1]

MS *m/z*: 326, 325, 309, 296, 268, 58(100) [1]

^{1}H NMR(CD_3OD): 3.00, 3.36(each 3H, s, $N[CH_3]_2$), 3.60(3H, s, 1-OCH_3), 3.82(3H, s, 2-OCH_3), 6.65(1H, dd, J = 8.5, J = 1.5, H-9), 6.82(1H, s, H-3), 7.11(1H, dd, J = 8.5, J = 1, H-8), 7.72(1H, d, J = 1.5, H-11) [1]

^{1}H NMR(O-Ac) [1]

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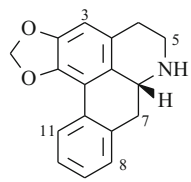
Anonaine

CAS Registry Number: 1862-41-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Liriodendron tulipiferum, Magnolia grandiflora, M. kobus, M. soulangeana, Roemeria refracta*

$C_{17}H_{15}NO_2$: 265.1103

Mp: 122–123°C (Et_2O), 277°C (dec., hydrochloride) [1]; 270°C (dec., hydrochloride, H_2O) [2], 231–233°C (N-Ac) [3]

$[\alpha]_D$ −52° ($CHCl_3$) [1], −56° (*c* 0.15, $CHCl_3$) [2]

UV: 234, 272, 315 (4.12, 4.20, 3.53) [2]

IR: 1040, 945 [2]

MS *m/z*: 265(M^+), 264, 250, 236, 235, 132.5 ($^{++}$) [2]

^{1}H NMR: 1.84(NH), 5.82, 5.96(each 1H, d, J = 1.5, CH_2O_2), 6.54(1H, s, H-3), 7.05–8.00(3H, m), 8.00(1H, m, H-11) [2]

^{13}C NMR: [4]

Table 1

C-1	142.5	C-7	37.4
1a	116.3	7a	135.4
2	146.8	8	127.0*
3	108.0	9	127.1*
4	29.6	10	127.5*
4a	128.7	11	128.1*
5	43.6	11a	131.4
6a	53.6	OCH_2O	100.6

Pharm./Biol.: LD_{50} 109 mg/kg (s/c, mice). In white mice and rabbits, causes convulsions and also a brief lowering of the arterial pressure and the suppression of respiration [5]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
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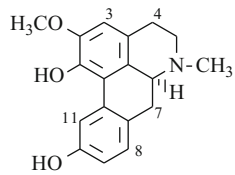
4. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **42**, 325 (1979)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 200

Apoglaziovine (1,10-Dihydroxy-2-methoxyaporphine)

CAS Registry Number: 18058-59-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Liriodendron tulipiferum*

$C_{18}H_{19}NO_3$: 297.1365

Mp: 249°C (dec.) [2], 256°C (hydrochloride, Me_2CO–EtOH) [1]

$[\alpha]_D$ (hydrochloride) +165° ($CHCl_3$) [2]

UV: 218, 266, 275, 307 [3]

IR: 3460, 3300, 1600, 1302, 1136 [3]

^{1}H NMR: 2.57(3H, s, NCH_3), 3.92(3H, s, OCH_3), 6.62(1H, q, J = 7.8, 2.5), 6.77(1H, s), 7.18(1H, d, J = 7.8), 8.08(1H, d, J = 2.5) [3]

^{13}C NMR(25,2MHz, DMSO-d_6): [4]

Table 1

C-1	141.6	C-4	28.4	C-9	113.2*
2	146.5	5	52.8	10	155.3
3	110.2	6a	62.5	11	115.4*
3a	122.9	7	33.6	11a	133.0
1a	119.4	7a	126.0	N-CH_3	43.5
1b	127.5	8	127.9	2-OCH_3	55.7

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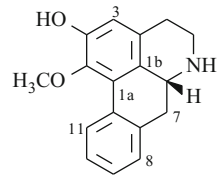
Asimilobine

CAS Registry Number: 6871-21-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Liriodendron tulipiferum, Magnolia kobus, Zizyphus jujuba*

$C_{17}H_{17}NO_2$: 267.1259

Mp: 175–177°C (Me_2CO), 244°C (dec., hydrochloride) [1]

$[\alpha]_D$ −210° ($CHCl_3$) [1]

UV: 274, 308(4.21, 3.51) [2]

^{1}H NMR: 3.58(3H, s, OCH_3), 6.64(1H, s, H-3), 7.17–7.30(3H, m, H-8, H-9, H-10), 8.13(1H, m, H-11) [3]

^{13}C NMR(DMSO-d_6): [3]

Table 1

C-1	143.2	C-4	28.5	C-9	127.5*
1a	125.1	5	42.6	10	127.2*
1b	129.3	6a	53.2	11	126.5*
2	148.9	7	36.9	11a	132.1
3	115.7	7a	136.3	1-OCH_3	59.3
3a	126.8	8	127.7*		

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1. R. Ziyaev, T. Irgashev, I.A. Israilov, N.D. Abdullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 204 (1977)
2. H. Guinaudeau, M. Leboeuf, A. Cave, Lloydia **38**, 276 (1975)
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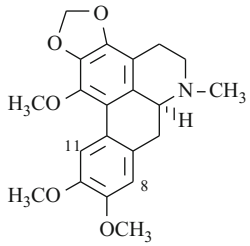
Baicalidine

CAS Registry Number: 83008-39-3



(S)-form

Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum baikalense*
$C_{21}H_{23}NO_5$: 369.1576
Mp: 146–147°C (Me_2CO) [1]
$[\alpha]_D$ +55° (MeOH) [1]
UV: 217, 242, 291, 306, 318, 295 [1]
MS *m/z*: 369(M^+), 368, 354, 338, 326, 311 [1]
^{1}H NMR: 2.44(3H, s, NCH_3), 3.76, 3.81(9H, s, OCH_3), 5.84, 5.89(CH_2O_2), 6.64, 7.71(each 1H, s, H-8, H-11) [1]
Synthesis: [2]

References

1. S.Kh. Maekh, S.Yu. Yunusov, E.V. Boiko, V.M. Starchenko, Chem. Nat. Comp. **18**, 761 (1982)
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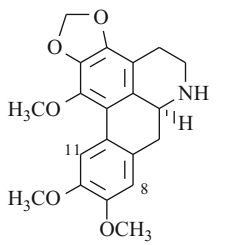
Baicaline

CAS Registry Number: 83008-38-2



(S)-form

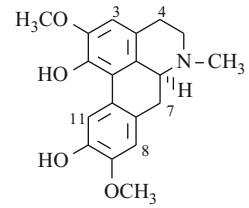
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum baikalense*
$C_{20}H_{21}NO_5$: 355.1420
Mp: 169–172°C (Et_2O) [1]
$[\alpha]_D$ +48° (MeOH) [1], (N-Ac. oil, $[\alpha]_D$ +262° [c 1.3, EtOH]) [1]
UV: 220, 246, 287, 303, 315 [1]
UV(N-Ac): 218, 243, 290, 307, 317(4.56, 4.30, 4.10, 4.15, 4.15) [1]
IR(N-Ac): 1650 [1]
MS *m/z*: 355(M^+), 354, 340, 326 [1]
MS(N-Ac): 397(M^+) [1]
^{1}H NMR: 3.91(9H, s, OCH_3), 6.03(2H, br s, CH_2O_2), 6.82(1H, s, H-8), 7.94(1H, s, H-11) [1]

References

1. S.Kh. Maekh, S.Yu. Yunusov, E.V. Boiko, V.M. Starchenko, Chem. Nat. Comp. **18**, 208 (1982)

Bracteoline

CAS Registry Number: 25651-04-1



(S)-form

Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Corydalis gortschakovii, Papaver bracteatum, P. orientale, P. pseudo-orientale*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 218–221°C (EtOH) [1]
$[\alpha]_D$ +36° ($CHCl_3$) [1]
UV: 223, 282, 310 [1]
MS *m/z*: 327(M^+), 326, 312, 284 [1]
^{1}H NMR: 2.50(3H, s, NCH_3), 3.70(6H, s, 2×OCH_3), 6.40, 6.65, 7.90(each 1H, s, H–Ar) [1]
^{13}C NMR(DMSO-d_6): [2]

Table 1

C-1	140.8	C-5	52.8	C-10	143.8
1a	119.4	6a	62.4	11	111.3
1b	122.7	7	33.9	11a	124.7
2	146.2	7a	126.9	NCH_3	43.6
3	109.2	8	116.0	2-OCH_3	55.6
3a	126.9	9	145.7	9-OCH_3	55.3
4	28.4				

Synthesis: (±) [3]

References

1. I.A. Israilov, M.U. Ibragimova, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 642 (1975)
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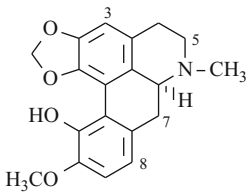
Bulbocapnine

CAS Registry Number: 298-45-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Corydalis alpestris, C. caucasica, C. emanuelii, C. fedtschenkoana, C. glaucescens, C. ledebouriana, C. marschalliana, C. paczoskii, C. popovii, C. rosea-purpurea, C. vaginans*

$C_{19}H_{19}NO_4$: 325.1314

Mp: 199–200°C (EtOH) [1]

Solubility: sol. MeOH, $CHCl_3$; poorly sol. H_2O [1]

$[\alpha]_D$ +237° ($CHCl_3$) [1]

UV: 223, 235 sh, 269, 282 sh, 306(4.48, 4.33, 4.16, 4.12, 3.81) [1]

MS *m/z*: 325(M^+), 324, 310(100), 282, 165, 152 [1]

CD: +8.5(322), −4.4(295), −11.7(272), +77.4(235), −14.5(216) [2]

^{1}H NMR: 2.57(3H, s, NCH_3), 3.92(3H, s, OCH_3), 5.95, 6.10(each 1H, d, J = 1, CH_2O_2), 6.64(1H, s, H-3), 6.83(2H, s, H–Ar) [1]

Pharm./Biol.: LD_{50} 220 mg/kg (s/c, mice). Suppresses respiratory activity and lowers arterial pressure. Causes catalepsy. Is a blocker of dopamine receptors [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
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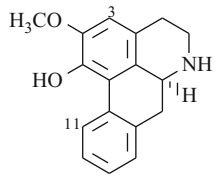
(+)-Caaverine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Liriodendron tulipiferum*

$C_{17}H_{17}NO_2$: 267.1259

Mp:> 207–209°C (dec.), 238°C (O,N-di Ac, Me_2CO) [1]

$[\alpha]_D$ +95° (MeOH) [1]

UV: 273, 313(4.19, 3.70) [1]

IR: 3310, 2845, 1610, 1505, 1385, 1250, 1130 [1]

MS *m/z*: 267(M^+), 266(100), 252, 250, 238, 236, 223 [1]

^{1}H NMR: 3.83(3H, s, OCH_3), 6.52(1H, s, H-3), 7.05–7.30(3H, m, H-8, H-9, H-10), 8.30(1H, m, H-11) [1]

^{13}C NMR(DMSO-d_6): [2]

Table 1

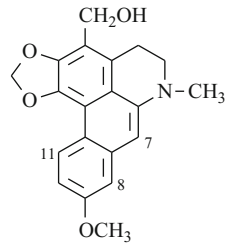
C-1	141.6	C-4	28.4	C-9	128.1*
1a	119.7	5	42.7	10	126.2*
1b	123.5	6a	53.2	11	125.9*
2	146.5	7	36.8	11a	132.4
3	110.9	7a	135.7	2-OCH_3	55.8
3a	127.3	8	128.1*		

References

1. R. Ziyaev, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 727 (1973)
2. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **42**, 325 (1979)

Cabudine[1]

[1]CAS Registry Number: 59272-70-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Thalictrum isopyroides*

$C_{20}H_{19}NO_4$: 337.1314

Mp: 184–185°C (EtOH), 255°C (dec., hydrochloride), 196°C (methiodide) [1]

Solubility: very sol. org. solvs. [1]

UV: 220, 280, 291, 320 [1]

IR: 3450, 2885, 2780, 1060, 931 [1]

MS *m/z*: 337(M^+, 75), 336(100), 335(22), 294(49) [1]

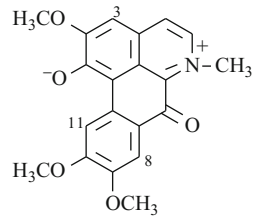
^{1}H NMR: 2.53(3H, s, NCH_3), 2.62–3.22(7H, m), 3.85(3H, s, OCH_3), 4.65–4.88(1H, d, J = 8), 5.20–5.42(1H, d, J = 8), 5.78–5.84(2H, q, CH_2O_2), 6.42, 6.52(each 1H, s) [1]

References

1. M. Kurbanov, Kh.Sh. Khusainova, M. Khodzhimatov, A.E. Vezen, K.Kh. Khaidarov, V.K. Burichenko, DAN Tadzh. SSR **18**(11), 120 (1975)
2. J. Wu, J.L. Beal, W.N. Wu, R.W. Doskotch, Lloydia **40**, 294 (1977)

Corunnine (Glauvine)

CAS Registry Number: 34421-18-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Corydalis gortschakovii, C. paniculigera, Eschscholtzia californica, Glaucium elegans, G. flavum, G. grandiflorum, G. serpieri, Thalictrum foetidum, T. minus*

$C_{20}H_{17}NO_5$: 351.1107

Mp: 235–240°C [1], 255–257°C [2], 210–212°C (MeOH) [3]

UV: 260, 326, 396, 440 sh, 614(4.25, 4.41, 3.79, 3.69, 3.70) [1]

UV(H^+): 257, 295, 384, 550(4.33, 4.85. 3.93, 3.43) [1]

IR: 1620, 1567 [2]

MS *m/z*: 351(M^+, 100), 337, 320, 306, 292, 278, 264 [4]

[1] ^{1}H NMR spectral data does not confirm the structure of cabudine as it was described in [1] but the data correspond to the structure of N-demethylthalphenine as reported in [2].

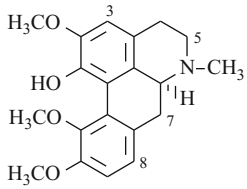
^{1}H NMR(CF_3COOH): 3.62, 3.75, 3.97(each 3H, s, 3×OCH_3), 4.55(3H, s, NCH_3), 7.21, 7.59, 8.59(each 1H, s, H-3, H-8, H-11), 8.05, 8.18(each 1H, d, J = 6.5, H-4, H-5) [2]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Khim. Prirod. Soedin. 251 (1981)
2. I. Ribas, J. Sueiras, L. Castedo, Tetrahedron Lett. **12**, 3093 (1971)
3. L.D. Yakhontova, V.I. Sheichenko, O.N. Tolkachev, Chem. Nat. Comp. **8**, 212 (1972)
4. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)

Corydine (Glaucentrine)

CAS Registry Number: 476-69-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Aconitum leucostomum, A. orientale, Argemone hybrida, Corydalis gortschakovii, C. marschalliana, C. rosea-purpurea, Dicentra spectabilis, Dicranostigma franschetianum, Glaucium corniculatum, G. elegans, G. flavum, G. fimbrilligerum, G. oxylobum, G. squamigerum, Papaver croceum*

$C_{20}H_{23}NO_4$: 341.1627

Mp: 149–150°C [1]

$[\alpha]_D$ + 204° (EtOH) [1]

UV: 218, 262, 270, 302 (4.19, 3.72, 3.70, 3.40) [1, 2]

IR(nujol): 3200, 1605, 1580, 1500, 1460, 1390, 1350, 1338, 1314, 1295, 1264, 1245, 1228, 1186, 1177, 1166, 1145, 1108, 1088, 1070, 1051, 1025, 995, 975, 961, 935, 900, 872, 855, 828, 820, 790, 770, 760, 730 [3]

MS *m/z*: 341(M^+), 340, 326, 324, 310, 298, 283, 267, 170.5($^{++}$) [1]; 341(M^+, 100), 326(60), 310(88), 298(14), 283(8) [2]

^{1}H NMR: 2.54(3H, s, NCH_3), 3.73(3H, s, OCH_3), 3.85(6H, s, 2×OCH_3), 6.70(1H, s, H-3), 6.83, 7.07(each 1H, d, J = 8, *o*–H–Ar) [1, 2]

^{1}H NMR: 2.59(N–CH_3), 3.76(3H, s, CH_3O-11), 3.95(6H, s, CH_3O-10, CH_3O-2), 6.81(1H, s, H-3), 6.95(2H, s, H-8, H-9), 3.95(OH) [4]

^{13}C NMR: [5]

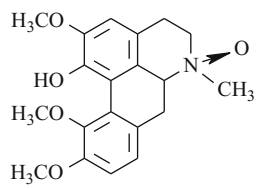
Pharm./Biol.: LD_{50} 80–115 mg/kg (mice). Causes catalepsy [6]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
2. M. Shamma, S.S. Salgar, Phytochemistry **12**, 1505 (1973)
3. K.P. Tiwari, M. Masood, Phytochemistry **17**, 1068 (1978)
4. D.S. Bhakuni, S. Tewari, M.M. Dhar, Phytochemistry **11**, 1819 (1972)
5. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **57**, 1033 (1994)
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 212

Corydine N-Oxide

CAS Registry Number: 74804-29-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

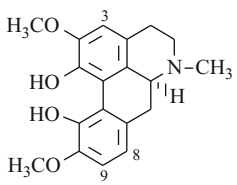
Biological sources: *Glaucium fimbrilligerum*
$C_{20}H_{23}NO_5$: 357.1576
Mp: amorph. [1]
$[\alpha]_D$ +154° (MeOH) [1]
UV: 225, 270, 313(4.43, 3.89, 3.70) [1]
MS *m/z*: 357(M^+), 341, 340, 339, 326, 324, 298, 283, 267 [1]
^{1}H NMR: 2.00–4.00(m), 3.43(3H, s, NCH_3), 3.67(3H, s, OCH_3), 3.85(6H, s, 2×OCH_3), 6.67(1H, s, H–Ar), 6.84, 7.10(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. S.U. Karimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 177 (1980)

Corytuberine

CAS Registry Number: 517-56-6



(S)-form

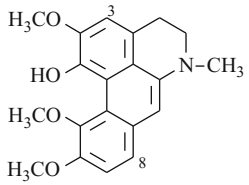
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Corydalis gortschakovii, Dicranostigma franschetianum, Glaucium fimbrilligerum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 232–234°C [3], 239–242°C [2]
$[\alpha]_D$ +276° ($CHCl_3$) [1], $[\alpha]_D^{20}$ +288 (*c* 0.026, EtOH) [3]
UV: 225, 272, 311 [1]
UV (EtOH + KOH): 208(4.5), 226(4.4), 276(3.7), 318(3.7) [2]
UV (EtOH): 222(4.4), 268(4.0), 306(3.5) [2]
IR: 3400 (OH) [2]
MS *m/z*: 327(M^+), 312, 310, 296, 284, 269, 253 [1]
^{1}H NMR(CF_3COOH): 3.40(3H, d, J = 6, NCH_3), 4.07(6H, s, 2×OCH_3), 6.96(1H, s), 7.11(2H, s) [1, 3]
^{1}H NMR(DMSO-d_6, 100 MHz): 2.55(3H, s, NCH_3), 3.75(6H, s, 2OCH_3), 4.50(2H, br s, 2OH), 6.53(1H, s, H-3), 6.58(1H, s, J = 8, H-9), 6.80(1H, d, J = 8, H-8) [2]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
2. S.T. Lu, I.L. Tsai, S.P. Leou, Phytochemistry **28**, 615 (1989)
3. T. Kametani, M. Takemura, M. Ihara, Phytochemistry **15**, 2017 (1976)

Dehydrocorydine

CAS Registry Number: 74799-12-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Glaucium corniculatum, G. fimbrilligerum, G. oxylobum*
$C_{20}H_{21}NO_4$: 339.1471
Mp: amorph. [1]

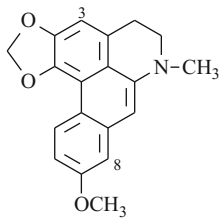
UV: 220, 310, 340(4.33, 4.27, 4.10) [1]
^{1}H NMR: 2.96(3H, s, NCH_3), 3.65, 3.89, 3.93(each 3H, s, 3×OCH_3), 6.32, 6.97(each 1H, s, H–Ar), 7.10, 7.34(each 1H, d, J = 8, *o*–H–Ar) [1]
Synthesis: [2]

References

1. S.U. Karimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 177 (1980)
2. L. Castedo, A. Rodriguez de Lera, J.M. Saa, R. Suau, C. Villaverde, Heterocycles **14**, 1135 (1980)

Dehydroisolaureline

CAS Registry Number: 65967-04-6



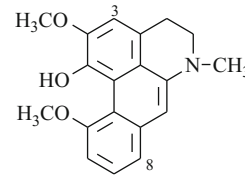
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{19}H_{17}NO_3$: 307.1208
Mp: 143–145°C (C_6H_6) [1]
Solubility: very sol. org. solvs. [1]
UV: 264, 334(4.75, 4.08) [1]
^{1}H NMR(CCl_4): 2.96(3H, s, NCH_3), 3.81(3H, s, OCH_3), 6.08(2H, s, CH_2O_2), 6.29, 6.70(each 1H, H-7, H-3), 6.77, 8.59(each 1H, d, J = 8, H-10, H-11), 6.83(1H, s, H-8) [1]

References

1. R. Ziyaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 602 (1977)

Dehydroisothebaine

CAS Registry Number: 25984-81-0



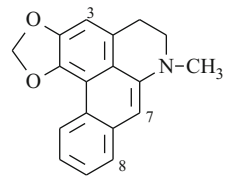
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver orientale, P. pseudo-orientale*
$C_{19}H_{19}NO_3$: 309.1365
Mp: amorph.
UV: 267, 340, 391, 438 [1]
MS *m/z*: 309(M^+, 100), 294, 292, 154.5($^{++}$) [2]
^{1}H NMR: 3.00(3H, s, NCH_3), 3.22(4H, br s, 2×CH_2), 3.92(6H, s, 2×OCH_3), 6.40, 6.97(each 1H, s, H–Ar), 6.75–7.25(3H, m, H–Ar) [1]

References

1. I.A. Israilov, M.A. Manushakyan, V.A. Mnatsakanyan, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 243 (1984)
2. M.A. Manushakyan, Author's Abstract of Candidate's Dissertation, Tashkent, 1987

Dehydroroemerine

CAS Registry Number: 36285-03-7

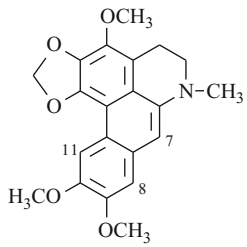


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum, Magnolia grandiflora*
$C_{18}H_{15}NO_2$: 277.1103
Mp: 88–90°C (C_6H_6) [1]
UV: 254, 262, 332(4.61, 4.76, 4.12) [1]
MS *m/z*: 277(M^+, 100), 262, 246, 232, 218, 138.5($^{++}$) [1]
^{1}H NMR(CCl_4): 2.95(3H, s, NCH_3), 6.07(2H, s, CH_2O_2), 6.34, 6.71(each 1H, s, H-7, H-3), 7.02–7.40(3H, m, 3H–Ar), 8.68(1H, H-11) [1]
HPLC: [2]

References

1. R. Ziyaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 602 (1977)
2. M. Hutin, A. Oztekin, A. Cave, J.P. Foucher, J. Chromatogr. **265**, 139 (1983)

Dehydrothalicmine (Dehydroocoteine)

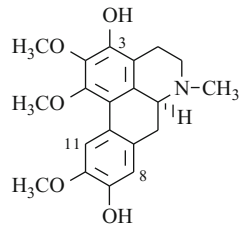


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum isopyroides, T. minus*
$C_{21}H_{21}NO_5$: 367.1420
Mp: 190–191°C ($CHCl_3$–EtOH) [1]
UV: 267, 337(4.60, 3.93) [1]
IR: 2845, 1640–1590, 960 [1]
MS *m/z*: 367(M^+, 100), 352 [1]
^{1}H NMR: 2.94(3H, s, NCH_3), 3.07–3.32(4H, m), 3.95, 4.05(6H, 3H, s, 3×OCH_3), 6.10(2H, s, CH_2O_2), 6.52(1H, s, H-8), 6.98(1H, s, H-7), 8.28(1H, s, H-11) [1]

References

1. S.Kh. Maekh, V.G. Khodzhaev, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 363 (1971)

Delporphine



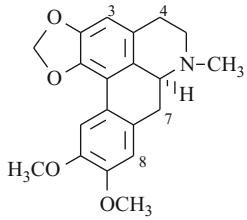
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Delphinium dictyocarpum*
$C_{20}H_{23}NO_5$: 357.1576
Mp: 116–117°C (EtOH) [1]
$[\alpha]_D$ +68° (EtOH) [1]
UV: 217, 283, 304, 315(4.54, 4.13, 4.08, 4.01) [1]
IR: 3420, 1595, 1520 [1]
MS *m/z*: 357(M^+, 100), 356, 342, 340, 326, 314, 283, 178.5($^{++}$) [1]
^{1}H NMR: 2.43(3H, s, NCH_3), 3.62(3H, s, 1-OCH_3), 3.79(3H, s, 10-OCH_3), 3.86(3H, s, 2-OCH_3), 6.66(1H, s, H-8), 7.79(1H, s, H-11) [1]

References

1. B.T. Salimov, N.D. Abdullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 194 (1978)

Dicentrine (Eximine)

CAS Registry Number: 517-66-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Dicentra peregrina*
$C_{20}H_{21}NO_4$: 339.1471
Mp: 158–159°C (MeOH) [1]
$[\alpha]_D$ +57° ($CHCl_3$) [1]
UV: 220, 282, 303 [1]
MS *m/z*: 339(M^+), 338(100), 324, 307, 296, 281, 265 [1]
^{1}H NMR: 2.25–3.25(7H, m), 2.45(3H, s, NCH_3), 3.79(6H, s, 2×OCH_3), 5.82, 5.96(each 1H, d, J = 2, CH_2O_2), 6.42, 6.70, 7.59(each 1H, s, 3×H–Ar) [1]
^{13}C NMR: [2]

Table 1

C-1	141.7	C-5	53.6	C-10	147.6
1a	116.6	6a	62.4	11	111.2
1b	126.4	7	34.3	11a	123.4
2	146.6	7a	128.3	NCH_3	44.0
3	106.1	8	110.5	9-OCH_3	55.9
3a	126.6	9	148.2	10-OCH_3	56.1
4	29.2				

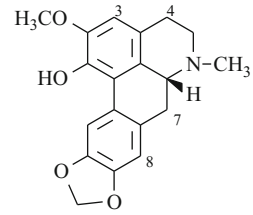
Synthesis: [3]

References

1. I.A. Israilov, F.M. Melikov, D.A. Murav'eva, Chem. Nat. Comp. **20**, 74 (1984)
2. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **42**, 325 (1979)
3. H. Hara, F. Hashimoto, O. Hoshino, B. Umezawa, Chem. Pharm. Bull. **34**, 1946 (1986)

Domesticine

CAS Registry Number: 2565-01-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Corydalis gortschakovii, C. marschalliana, Glaucium oxylobum*
$C_{19}H_{19}NO_4$: 325.1314
Mp: 155–156°C (Et_2O) [1]
$[\alpha]_D$ −56° ($CHCl_3$) [1]
UV: 219, 283, 313 [1]
MS *m/z*: 325(M^+), 324, 310, 282
^{1}H NMR: 2.43(3H, s, NCH_3), 3.80(3H, s, OCH_3), 5.86(2H, s, CH_2O_2), 6.45, 6.68, 7.86(each 1H, s, 3×H–Ar) [1]
^{13}C NMR: [2]

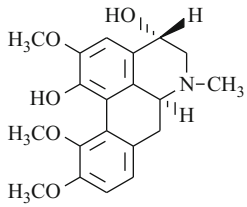
Table 1

C-1	140.7	C-4	28.8	C-9	145.8
1a	119.5	5	53.3	10	145.8
1b	127.5	6a	62.5	11	108.7
2	145.8	7	34.9	11a	125.8
3	109.7	7a	130.2	NCH_3	43.9
3a	123.6	8	108.2	2-OCH_3	56.0

References

1. I.A. Israilov, M.U. Ibragimova, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 642 (1975)
2. S. Kano, Y. Takahagi, E. Komiyama, T. Yokomatsu, S. Shibuya, Heterocycles **4**, 1013 (1976)

Epiglaufidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Glaucium fimbrilligerum*
$C_{20}H_{23}NO_5$: 357.1576
Mp: amorph. [1]
$[\alpha]_D$ +198° (MeOH) [1]
UV: 224, 270, 305(4.23, 3.72, 3.37) [1]
MS *m/z*: 357(M^+, 100), 356, 342, 340, 326, 314, 285, 178.5($^{++}$) [1]
^{1}H NMR: 2.50(3H, s, NCH_3), 3.00–4.00(5H, m). 3.63(3H, s, OCH_3), 3.82(6H, s, 2×OCH_3), 4.93(1H, m, $W_{1/2}$ = 15), 6.75, 6.92(each 1H, d, J = 8, *o*–H–Ar), 7.04(1H, s, H–Ar) [1]

References

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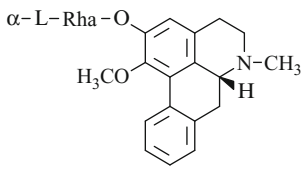
Floripavidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver bracteatum, P. floribundum, P. urbanianum*
$C_{24}H_{29}NO_6$: 427.1995
Mp: 241–242°C [1]
$[\alpha]_D$ −156° (MeOH) [1]
UV: 229 sh, 273, 310(4.37, 4.25, 3.45) [1]
IR: 3575, 3430, 1595, 1500, 1200–1000 [1]
MS *m/z*: 427(M^+), 281, 280, 266, 250, 238 [1]
^{1}H NMR(Py-d_5): 1.51(3H, d, J = 5, CH–CH_3), 2.27(3H, s, NCH_3), 3.54(3H, s, OCH_3), 4.33, 4.63(each 2H, m), 5.95(1H, s), 6.70–7.25(4H, m, H–Ar), 8.45(1H, br d) [1]

References

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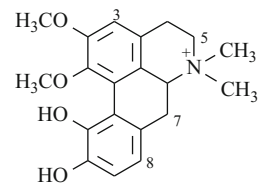
Fuzitine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum orientale*
$C_{20}H_{24}NO_4^+$: 342.1704
Mp: 209–211°C (dec.) [1]
$[\alpha]_D$ + 258° [1], + 275° (MeOH) [2]
UV: 324, 280, 272, 230 [1]; 324 sh, 320 sh, 278 sh [2]
IR: 3440, 2840, 1640, 1530, 1450, 1380, 1250, 1235, 1218, 1070, 1050 [1]
MS *m/z*: 342(M^+,6), 341(23), 327(3), 312(1), 284(3), 268(4), 206(3), 165(3), 152(3), 58(100) [2]
^{1}H NMR (90 MHz, D_2O): 2.54(3H, s, N–Me), 3.28(s, N–Me), 3.66(3H, s, OMe), 6.35(1H, d, J = 8, H-8), 6.44(1H, s, H-3), 6.64(1H, d, J = 8, H-9) [2]

References

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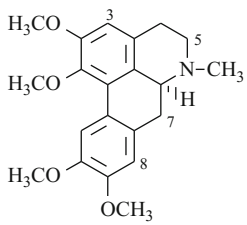
2. F.Z. Erdemgil, M.V. Telezhenetskaya, K.H.C. Baser, N. Kirimer, Chem. Nat. Comp. **36**, 223 (2000)

Table 1

C-1	143.9	C-5	53.1	C-11	111.4
1a	126.5	6a	62.3	11a	124.2
1b	128.6	7	34.4	NCH_3	43.4
2	151.5	7a	129.1	1-OCH_3	59.8
3	110.1	8	110.6	OCH_3	55.5
3a	127.0	9	147.7	OCH_3	55.5
4	29.1	10	147.1	OCH_3	55.7

Glaucine

CAS Registry Number: 66396-10-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Aconitum tokii, Corydalis roseapurpurea, Berberis densiflora, B. heteropoda, B. integerrima, B. thunbergii, Delphinium ternatum, Eschscholtzia californica, Glaucium corniculatum, G. elegans, G. flavum, G. grandiflorum, G. serpieri, Liriodendron tulipiferum, Thalictrum baikalense, T. collinum, T. filamentosum, T. foetidum, T. longipedunculatum, T. minus, T. sachalinense*

$C_{21}H_{25}NO_4$: 355.1783

Mp: 104–109°C (Et_2O) [1], 116–117°C [2], oil [3]; 219°C (methiodide), 237°C (hydrobromide) [1]

$[\alpha]_D$ +84° (MeOH) [1]; +113° (EtOH) [2]

UV: 282, 304(4.34, 4.24) [3]

IR: 2800, 1600, 1583, 1440, 1318, 1105, 975, 950 [4]

MS *m/z*: 355(M^+), 354, 340, 324, 312, 297, 281 [3]

^{1}H NMR: 2.49(3H, s, NCH_3), 3.59(3H, s, 1-OCH_3), 3.84(9H, s, 3×OCH_3), 6.54, 6.74, 8.03(each 1H, s, H-3, H-8, H-11) [3]

^{13}C NMR: [5]

HPLC: [6]

GLC: [7]

Pharm./Biol.: LD_{50} 430, 420, 33 mg/kg (oral, s/c, i/v, mice) [8]; (methiodide): LD_{50} 59, 4.8 mg/kg (s/c, i/v, mice).; (ethiodide): LD_{50} 400, 10.3 mg/kg (s/c, i/v, mice) [9]. Glaucine and its (methiodide) possess a hypotensive action. Glaucine prolongs the action of hypnotics [10] and possesses antitussive activity [11]. The (hydrochloride) is used as an antitussive agent. Supplied in 0.05 g coated tablets [12]

References

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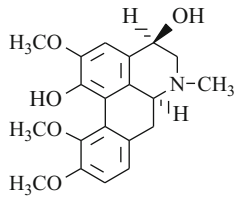
Glaufidine

CAS Registry Number: 71609-80-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Glaucium corniculatum, G. fimbrilligerum*
$C_{20}H_{23}NO_5$: 357.1576
Mp: amorph. [1]
$[\alpha]_D$ +182° (MeOH) [1]
UV: 223, 269, 305(4.51, 4.03, 3.69) [1]
IR: 3500-3200, 1610, 1580 [1]
MS *m/z*: 357(M^+), 356, 342, 340, 339, 326, 314, 178.5($^{++}$) [1]
^{1}H NMR: 2.20–3.50(m, CH_2), 2.48(3H, s, NCH_3), 3.66(3H, s, OCH_3), 3.85(3H, s, OCH_3), 3.88(3H, s, OCH_3), 4.46(1H, t, $W_{1/2} = 5$), 6.79, 6.99(each 1H, d, J = 8, *o*–H–Ar), 6.92(1H, s, H–Ar) [1]
Revised structure: [2]

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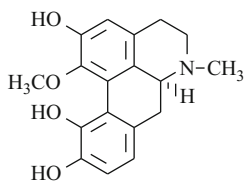
Glaufine

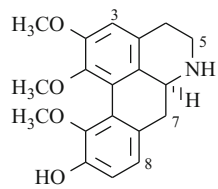


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Glaucium fimbrilligerum, G. squamigerum*
$C_{18}H_{19}NO_4$: 313.1314
Mp: amorph. [1]
$[\alpha]_D$ +183° (MeOH) [1]
UV: 217, 274, 308(4.60, 4.21, 3.84) [1]
^{1}H NMR($CDCl_3$ + CD_3OD): 2.49(3H, s, NCH_3), 3.63(3H, s, OCH_3), 6.70–7.20(3H, m, H–Ar) [1]

References

1. S.U. Karimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 699 (1978)

Glaufinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Glaucium fimbrilligerum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: amorph. [1]
$[\alpha]_D$ +165° (MeOH) [1]
UV: 222, 270, 309(4.35, 3.82, 3.43) [1]
MS *m/z*: 327(M^+), 326, 312, 310, 298, 296, 163.5($^{++}$) [1]
^{1}H NMR: 2.30–3.70(m, CH_2), 3.62(3H, s, OCH_3), 3.80(6H, s, 2×OCH_3), 6.63(1H, s, H–Ar), 6.75(2H, s, H–Ar) [1]
^{1}H NMR($CDCl_3$) O,N-diAc: 2.10, 2.17(each 3H, s, 2×$COCH_3$), 2.00–3.70(CH_2, CH), 3.34, 3.76, 3.78(each 3H, s, 3×OCH_3), 6.61(1H, s, H-3), 6.80 and 7.06(each 1H, d, J = 8, H-8, H-9), [1]

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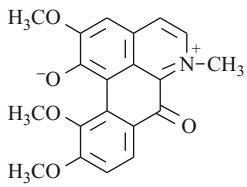
Glaunidine

CAS Registry Number: 72032-70-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Aconitum leucostomum, Glaucium fimbrilligerum*
$C_{20}H_{17}NO_5$: 351, 1105
Mp: 230–232°C (dec., $CHCl_3$) [1]
UV: 235, 315, 410, 620(4.53, 4.46, 3.72, 3.59) [1]
UV(H^+): 250, 290 sh, 380, 450(4.54, 4.36, 3.87, 3.55) [1]
IR: 3500, 1625, 1585 [1]
^{1}H NMR: 3.65, 3.94, 4.03(each 3H, s, 3×OCH_3), 4.49(3H, s, NCH_3), 6.52(1H, s, H–Ar), 7.02, 8.09(each 1H, d, J = 9, *o*–H–Ar), 7.12, 7.45(each 1H, d, J = 6, *o*–H–Ar) [1]

References

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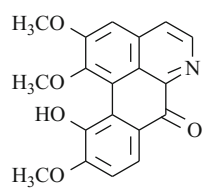
Glaunine

CAS Registry Number: 57986-73-9



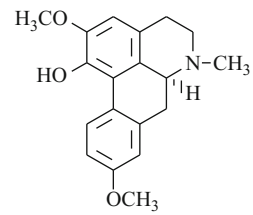
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Glaucium fimbrilligerum*
$C_{19}H_{15}NO_5$: 337.0950
Mp: 292–294°C (dec.) [1]
UV: 250, 272, 310 sh, 348, 406, 600(4.40, 4.22, 3.97, 3.87, 2.75, 2.68) [1]
UV(H^+): 248, 263 sh, 285, 320 sh, 375, 470 sh (4.46, 4.41, 4.32, 3.88, 2.94, 2.60) [1]
IR: 3410, 1660, 1590 [1]
^{1}H NMR: 3.78, 4.03, 4.04(each 3H, s, 3 × OCH_3), 7.17(1H, s, H–Ar), 7.18, 8.50(each 1H, d, J = 8, *o*–H–Ar), 7.72, 8.77(each 1H, d, J = 5, *o*–H–Ar) [1]

References

1. I.A. Israilov, S.U. Karimova, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 367 (1979)

1-Hydroxy-2,9,-dimethoxyaporphine (Orientinine)

CAS Registry Number: 174293-69-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver orientale*
$C_{19}H_{21}NO_3$: 311.1521
Mp: amorph.
$[\alpha]_D$ +62° (MeOH)
UV: 277, 315 sh [1]
IR: 3450-3150, 1600, 1500, 1470 [2]
MS *m/z*: 311(M^+), 310(100), 296, 294, 281, 280, 268, 155.5($^{++}$) [2]
^{1}H NMR: 2.50(3H, s, NCH_3), 2.60–3.70(7H, m), 3.76, 3.82(each 3H, 2 × OCH_3), 6.53(1H, s, H–Ar), 6.70–6.95(2H, m, H–Ar), 8.36(1H, d, J = 10, *o*–H–Ar) [2]

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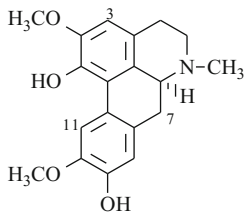
Isoboldine

CAS Registry Number: 3019-51-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Aconitum karakolicum, A. saposhnikovii, A. soongaricum, A. tokii, Berberis heteropoda, B. integerrima, B. nummularia, B. turcomanica, Cocculus laurifolius, Corydalis alpestris, C. bracteata, C. caucasica, C. emanuelii, C. gortschakovii, C. intermedia, C. marschalliana, C. rosea-purpurea, C. sewerzowii, C. stricta, Dicentra peregrina, Delphinium confusum, D. dictyocarpum, Fumaria parviflora, F. schleicheri, F. vaillantii, Glaucium corniculatum, G. elegans, G. fimbrilligerum, G. flavum, G. grandiflorum, G. oxylobum, G. squamigerum, Hylomecon vernalis, Papaver bracteatum, Thalictrum collinum, T. foetidum, T. isopyroides, Zizyphus jujuba*

$C_{19}H_{21}NO_4$: 327.1471

Mp: 125–126°C (C_6H_6), 262°C (dec., hydrochloride), 196°C (dec., picrate), 167°C (di Ac) [1]

$[\alpha]_D$ +60° (EtOH)

UV: 219, 268 sh, 280, 304, 313 (4.58, 4.08, 4.16, 4.21, 4.18) [2]

IR: 3500–3300, 1608, 1585, 1515, 1415, 1335, 1315, 1280, 1250, 1110, 1080 [3]

MS *m/z*: 327(M^+), 326(100), 312, 296, 284, 269, 253, 163.5($^{++}$) [4]

^{1}H NMR: 2.52(3H, s, NCH_3), 3.86(6H, s, 2×OCH_3), 6.46(1H, s, H-3), 6.72(1H, s, H-8), 7.95(1H, s, H-11) [5]

^{13}C NMR(DMSO-d_6): [6]

Table 1

C-1	140.6	C-4	28.4	C-10	145.3
1a	119.7	5	52.9	11	113.6
1b	123.5	6a	62.4	11a	123.0
2	146.5	7	33.7	NCH_3	43.6
3	109.2	7a	129.1	2-OCH_3	55.8
3a	126.7	8	114.9	10-OCH_3	55.8
		9	145.4		

HPLC: [7]

Synthesis: (±) [8]

Pharm./Biol.: Antitussive action [9]

References

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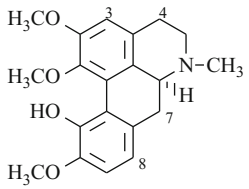
Isocorydine

CAS Registry Number: 475-67-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Argemone mexicana, Berberis densiflora, B. heteropoda, B. integerrima, B. nummularia, B. oblonga, B. thunbergii, B. turcomanica, B. vulgaris, Corydalis gortschakovii, C. ledebouriana, C. rosea-purpurea, Dicentra peregrina, Dicranostigma franschetianum, D. lactucoides, D. leptopodum, Eschscholtzia californica, Glaucium corniculatum, G. elegans, G. fimbrilligerum, G. flavum, G. oxylobum, Papaver commutatum, P. lisae, P. ocellatum*

$C_{20}H_{23}NO_4$: 341.1627

Mp: 183–184°C (EtOH) [1]

$[\alpha]_D$ +181° ($CHCl_3$) [1]

UV: 220, 267, 304 [1]

IR: 3400 [1]

MS *m/z*: 341(M^+), 340, 326, 324, 310, 298, 283, 267, 170.5($^{++}$) [1]

^{1}H NMR: 2.50(3H, s, NCH_3), 3.68(3H, s, OCH_3), 3.85(6H, s, 2×OCH_3), 6.67(1H, s), 6.81(2H, s) [1]

^{13}C NMR: [2]

Table 1

C-1	141.7	C-4	29.1	C-10	149.0
1a	125.4	5	52.4	11	143.6
1b	129.8	6a	62.6	11a	119.8
2	150.8	7	35.6	NCH_3	43.6
3	110.8	7a	129.6	1-OCH_3	61.7
3a	128.8	8	118.6	2-OCH_3	55.5
		9	110.7	10-OCH_3	55.8

HPLC: [3]

Pharm./Biol.: LD_{50} 52 mg/kg (s/c, mice). In toxic doses, causes convulsions. Possesses an adrenolytic action [4]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
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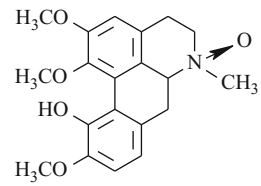
3. T.J. Betts, J. Chromatogr. **511**, 373 (1990)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 209

Isocorydine N-Oxide

CAS Registry Number: 25405-80-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Berberis integerrima*

$C_{20}H_{23}NO_5$: 357.1576

Mp: amorph., 229°C (hydrochloride) [1]

UV: 223, 271, 306(4.39, 3.95, 3.96) [1]

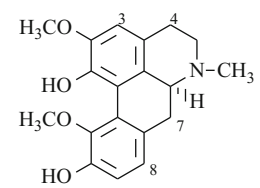
MS *m/z*: 341, 340, 326, 298, 267 [1]

^{1}H NMR: 3.41(3H, s, NCH_3), 3.65(3H, s, OCH_3), 3.84(6H, s, 2×OCH_3), 6.75(1H), 6.77(1H), 6.80(1H) [1]

References

1. A. Karimov, M.V. Telezhenetskaya, K.L. Lutfullin, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 360 (1978)

Isocorytuberine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

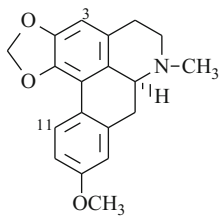
Biological sources: *Glaucium fimbrilligerum, G. oxylobum, G. squamigerum, Papaver pseudo-orientale*

$C_{19}H_{21}NO_4$: 327.1471
Mp: amorph., 221°C (hydrochloride, EtOH) [1]
$[\alpha]_D$ + 181° (MeOH) [1]
UV: 225, 275, 313(44.39, 3.87, 3.67) [1]
MS *m/z*: 327(M^+), 312, 310, 296, 284, 270, 269, 163.5($^{++}$)[1]
^{1}H NMR: 2.10–3.70(m, 7H), 2.51(3H, s, NCH_3), 3.62(3H, s, OCH_3), 3.84(3H, s, OCH_3), 6.61(1H, s, H–Ar), 6.75, 6.93(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. S.U. Karimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 177 (1980)

(+)-Isolaureline



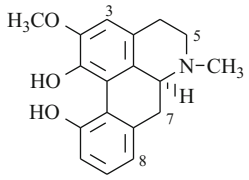
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{19}H_{19}NO_3$: 309.1365
Mp: 245°C (dec., hydrochloride) [1]
$[\alpha]_D$ +35° (H_2O) [1]
UV: 218, 283(4.46, 4.26) [1]
IR: 2850, 1605, 1255, 1060, 940 [1]
^{1}H NMR: 2.46(3H, s, NCH_3), 3.76(3H, s, OCH_3), 5.81, 5.95(2H, d, J = 1.5, CH_2O_2), 6.42, 6.72(each 1H, s, H-3, H-8), 6.80, 7.91(each 1H, d, J = 7.5, H-10, H-11) [1]

References

1. R. Ziyaev, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 714 (1974)

Isothebaidine

CAS Registry Number: 68156-56-9



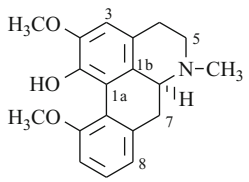
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver orientale*
$C_{18}H_{19}NO_3$: 297.1365
Mp: 236–237°C (dec.) [1]
$[\alpha]_D$ +321° (MeOH) [1]
UV: 217, 262 sh, 271, 302 [2]
MS *m/z*: 297(M^+), 296, 282, 280, 266, 254, 236 [1]
^{1}H NMR: 2.63(3H, s, N–CH_3), 3.93(3H, s, 2-OCH_3), 6.61(1H, s, H-3), 6.85(1H, d, J = 8.0, H-10), 6.99(1H, d, J = 8.0, H-8), 7.17(1H, t, H-9) [2]

References

1. I.A. Israilov, O.N. Denisenko, M.S. Yunusov, D.A. Murav'eva, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 402 (1978)
2. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **51**, 389 (1988)

Isothebaine

CAS Registry Number: 568-21-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Papaver bracteatum, P. orientale, P. pseudo-orientale*
$C_{19}H_{21}NO_3$: 311.1521
Mp: 203–204°C (EtOH) [1], 214°C (hydrochloride) [1]
$[\alpha]_D$ +276° (abs. EtOH) [1]
UV: 207, 273, 287 [1]
MS *m/z*: 311(M^+), 310, 296, 294, 280, 268, 155.5($^{++}$) [1]
^{1}H NMR: 2.46(3H, s, NCH_3), 3.83, 3.89(each 3H, s, 2×OCH_3), 6.61(1H, s), 6.70–7.30(3H, m) [1]
^{13}C NMR: [2]

Table 1

C-1	141.4	C-4	28.4	C-9	127.8
1a	119.1	5	52.4	10	111.2
1b	127.6	6a	62.0	11	153.3
2	148.4	7	35.6	11a	121.5
3	110.5	7a	139.2	NCH_3	43.4
3a	123.6	8	121.8	2-OCH_3	55.5
				11-OCH_3	56.4

HPLC: [3]
Pharm./Biol.: LD_{50} 30 mg/kg (s/c, mice). On the administration of 10 mg/kg to mice and rabbits, an acceleration of respiration and pronounced total depression are observed. In experiments on dogs, it causes motor excitation, copious salivation, and defecation. On i/v administration to dogs, cats, and rabbits, it causes a lowering of the arterial pressure with a change in the frequency and amplitude of cardiac contractions [4]

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1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
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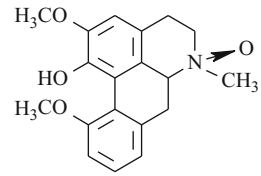
3. J. Milo, A. Levy, D. Palevitch, G. Ladizinsky, J. Chromatogr. **452**, 563 (1988)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 210

Isothebaine N-Oxide



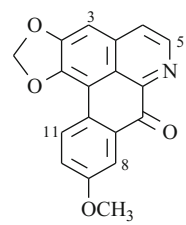
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver pseudo-orientale*
$C_{19}H_{21}NO_4$: 327.1471
Mp: amorph. [1]
$[\alpha]_D$ +260° ($CHCl_3$) [1]
UV: 226, 271, 305 [1]
MS *m/z*: 327(M^+), 311, 310, 309, 296, 294, 268 [1]
^{1}H NMR: 3.40(3H, s, NCH_3), 3.78, 3.86(each 3H, s, 2×OCH_3), 6.61–7.10(4H, m, H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)

Lanuginosine

CAS Registry Number: 23740-25-2



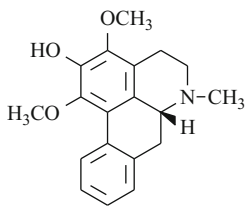
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Liriodendron tulipiferum, Magnolia kobus*
$C_{18}H_{11}NO_4$: 305.0688
Mp: 319–321°C ($CHCl_3$) [1]
UV: 246, 271, 315(4.54, 4.44, 3.83) [1]
IR: 1655, 1490, 1405, 1360, 1254, 1125, 1040, 960, 940 [1]
MS *m/z*: 305(M^+, 100), 275 [1]
^{1}H NMR(CF_3COOH): 4.12(3H, s, OCH_3), 6.65(2H, s, CH_2O_2), 7.53(1H, s, H-3), 7.67(1H, dd, J = 9; 3, H-10), 8.07(1H, d, J = 3, H-8), 8.45, 8.78(each 1H, d, J = 6, H-4, H-5), 8.78(1H, d, J = 9, H-11) [1]
^{1}H NMR(400 MHz): 4.00(3H, s, 9-OCH_3), 6.36(2H, s, CH_2O_2), 7.04(1H, s, H-8), 7.17(1H, br s, H-3), 7.33(1H, dd, J = 8, 2.5, H-10), 7.79(1H, d, J = 5, H-4), 8.60(1H, d, J = 8, H-11), 8.90(1H, d, J = 5, H-5) [2]
Pharm./Biol.: Shows antimicrobial activity [3]

References

1. S.M. Kupchan, M.I. Suffness, E.M. Gordon, J. Org. Chem. **35**, 1682 (1970)
2. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **57**, 1033 (1994)
3. A. Villar, J.L. Rios, M.C. Recio, D. Cortes, A. Cave, Planta Med. **52**, 556 (1986)

Liridinine



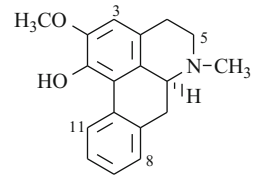
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{19}H_{21}NO_3$: 311.1521
Mp: 142–144°C (Me_2CO) [1]
$[\alpha]_D$ −38° ($CHCl_3$) [1]
UV: 221, 281(4.41, 4.16) [1]
IR: 3400, 3200, 2830, 1595, 1290, 760 [1]
^{1}H NMR: 2.50(3H, s, NCH_3), 3.65, 3.94(each 3H, s, 2×OCH_3), 7.16(3H, m, H–Ar), 8.10(1H, m, H–Ar) [1]

References

1. A. Abdusamatov, R. Ziyaev, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 829 (1975)

Lirinidine

CAS Registry Number: 54383-28-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{18}H_{19}NO_2$: 281.1416
Mp: oil [1], 214–215°C [2], 239°C (dec., hydrochloride) [1]
$[\alpha]_D$ +78° ($CHCl_3$) [1]
UV: 230 sh, 271, 312(4.22, 4.12, 3.67) [1]
IR: 3400–3200, 2850, 1610, 1260, 781, 752 [1]
MS *m/z*: 281(M^+), 280(100), 266, 264, 250, 238 [1]
^{1}H NMR: 2.47(3H, s, NCH_3), 3.81(3H, s, OCH_3), 6.50(1H, s, H-3), 7.05-7.35(3H, m, H-8, H-9, H-10), 8.27(1H, m, H-11) [1]
^{13}C NMR($DMSO-d_6$): [3]

Table 1

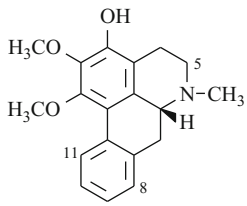
C-1	141.6	C-4	28.4	C-9	127.5*
1a	119.2	5	52.9	10	126.2*
1b	123.5	6a	62.1	11	126.0*
2	146.5	7	34.4	11a	132.4
3	110.3	7a	135.7	NCH_3	43.6
3a	127.4	8	128.1*	OCH_3	55.8

Pharm./Biol.: LD_{50} 9.8, 21.3 mg/kg (i/v, s/c, mice). Relaxes the smooth musculature, possesses a hypotensive and spasmolytic action [4]

References

1. R. Ziyaev, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 727 (1973)
2. H. Guinaudeau, M. Leboeuf, A. Cave, Lloydia **38**, 275 (1975)
3. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **42**, 325 (1979)
4. Kh.U. Aliev, *The Pharmacology of Plant Substances* [in Russian] (Fan, Tashkent, 1976), p. 111

Lirinine (3-Hydroxynuciferine)

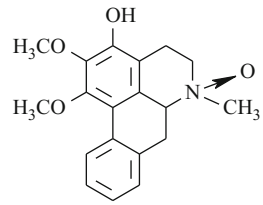


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{19}H_{21}NO_3$: 311.1521
Mp: 152–154°C (EtOH), 255°C (dec., hydrochloride) [1]
$[\alpha]_D$ −55° ($CHCl_3$) [1]
Solubility: spar. sol. C_6H_6, EtOH, Me_2CO; very sol. $CHCl_3$, MeOH [1]
UV: 223, 284(4.42, 4.17) [1]
IR: 3400–3100, 2850, 1590, 1290 [1]
MS *m/z*: 311(M^+, 100), 310, 296, 294, 280, 253, 237, 155.5($^{++}$) [1]
^{1}H NMR: 2.45(3H, s, NCH_3), 3.63, 3.81(each 3H, s, 2×OCH_3), 7.22–7.28(3H, m, H-8, H-9, H-10), 8.15(1H, dd, J = 7.5; 0.8, H-11) [1]
Pharm./Biol.: LD_{50} 28.105 mg/kg (i/v, s/c). Relaxes the smooth musculature. Exerts a hypotensive and spasmolytic action. Enhances the action of caffeine and arecoline on combined use [2]

References

1. R. Ziyaev, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 59 (1973)
2. Kh.U. Aliev, *The Pharmacology of Plant Substances* [in Russian] (Fan, Tashkent, 1976), p. 111

Lirinine N-Oxide



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{19}H_{21}NO_4$: 327.1470
Mp: 162–164°C (dec.) [1]
$[\alpha]_D$ −49.9° (*c* 0.15, MeOH) [1]
Solubility: spar. sol. org. solvs.; very sol. H_2O [1]
UV: 218, 284(4.40, 4.03) [1]
IR: 3500–3200, 2855, 1590, 1245 [1]
MS *m/z*: 327(M^+), 311, 310, 309, 296, 294, 280, 268(100), 253 [1]

References

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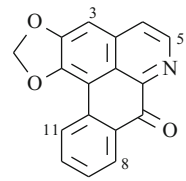
Liriodenine

CAS Registry Number: 475-75-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum, Magnolia soulangeana, M. grandiflora, M. kobus, Roemeria refracta*

$C_{17}H_9NO_3$: 275.0582
Mp: 271–273°C ($CHCl_3$) [1], 280–282°C (yellowish-green needles) [2]
UV: 247, 269, 302(4.23, 4.16, 3.70) [1]
UV(cyclohexane): 244(4.57), 259(4.50), 261(4.48), 268(4.13), 278(3.60), 335(4.10), 377(4.10), 398(4.16), 475(2.90) [2]
UV(conc. H_2SO_4): 243(4.49), 249(4.48), 275(4.35), 290(4.28), 412(4.28), 503(4.27), 568(3.72), 608(sh) (3.65) [2]
UV(H^+): 256, 280, 334(4.33, 4.25, 3.70) [3]
IR: 1650, 1042, 953, 613 [4]
MS *m/z*: 275(M^+, 100), 247, 246, 219, 217, 189, 188, 162 [5]
MS: 276(24), 275(M^+, 100), 248(5), 247(18), 246(10), 222(m*) [2]
^{1}H NMR(CF_3COOH): 6.22(2H, s, CH_2O_2), 7.11(1H, s, H-3), 7.35–8.78(6H, m, H–Ar) [1]
^{1}H NMR($CDCl_3$): 8.94(H-5), 8.63(H-11), 8.63(H-8), 7.77(H-4), 7.64(H-10), 7.64(H-9), 7.17(H-3), 6.34(OCH_2O) [2]
^{1}H NMR(400 MHz): 6.38(2H, s, OCH_2O), 7.22(1H, br s, H-3), 7.59(1H, dt, H-9), 7.78(1H, dt, J = 8, 2, H-10), 7.80(1H, d, J = 5, H-4), 8.60(1H, dd, J = 8, 2, H-8), 8.68(1H, d, J = 8, H-11), 8.90(1H. d, J = 5, H-5) [6]
Pharm./Biol.: Does not modify arterial pressure [7]. Antimicrobial action [8]. Shows some cytotoxicity against human nasopharyngeal carcinoma cells [9]. Antibacterial and antifungal activity [10]

References

1. A. Abdusamatov, R. Ziyaev, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 126 (1974)
2. C.L. Chen, H.M. Chang, E.B. Cowling, Phytochemistry **15**, 547 (1976)
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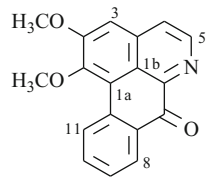
10. C.D. Hufford, A.S. Sharma, B.O. Oguntimein, J. Pharm. Sci. **69**, 1180 (1980)

Lysicamine

CAS Registry Number: 15444-20-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{18}H_{13}NO_3$: 291.0895
Mp: 208–210°C (EtOH) [1]
UV: 235, 270, 307, 400(4.47, 4.41, 3.76, 3.94)
UV(H^+): 249, 276, 306, 453(4.33, 4.44, 3.82, 5.55) [2]
IR: 1675 [2]
^{1}H NMR: 3.95, 4.01(each 3H, s, 2×OCH_3), 7.07(1H, s, H-3), 7.50(1H, dd, J = 7.5, 2.0, H-10), 7.70(1H, dd, J = 7.5, 2.0, H-9), 8.50(1H, dd, J = 7.5, 2.0, H-8), 9.05(1H, dd, J = 7.5, 2.0, H-11), 7.65, 8.77(each 1H, d, J = 5.5, H-4, H-5) [3,4]
^{13}C NMR: [4]

Table 1

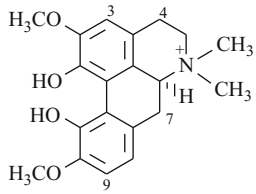
C-1	145.3	C-4	123.4	C-9	128.7
1a	119.6	5	145.0	10	134.2
1b	122.0	6	156.7	11	128.3
2	152.0	7	182.5	11a	134.7
3	106.4	7a	132.0	1-OCH_3	60.5
3a	135.3	8	128.7	2-OCH_3	55.0

References

1. R. Ziyaev, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 495 (1975)
2. N. Katsui, K. Sato, S. Tobinaga, N. Takenchi, Tetrahedron Lett. **7**, 6257 (1966)
3. H. Guinaudeau, M. Leboeuf, A. Cave, Lloydia **38**, 275 (1975)
4. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **46**, 761 (1983)

Magnoflorine

CAS Registry Number: 2141-09-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Aquilegia karelinii, A. olympica, Argemone platyceras, Berberis crataegina, B. heteropoda, B. iliensis, B. integerrima, B. nummularia, B. oblonga, B. vulgaris, Dicranostigma franschetianum, D. lactucoides, D. leptopodum, Eschscholtzia californica, Glaucium fimbrilligerum, G. squamigerum, Papaver maeoticum, Thalictrum baikalense, T. collinum, T. flavum, T. foetidum, T. isopyroides, T. longipedunculatum, T. minus, T. sachalinense, T. simplex, T. strictum*

$C_{20}H_{24}NO_4^+$: 342.1705

Mp: 249–251°C (dec., iodide) [1], 235°C (dec., O,O-di Ac iodide), 262°C (perchlorate) [2]

$[\alpha]_D$(iodide) +193° (MeOH) [3], +100° (H_2O) [1]

UV(iodide): 227, 271, 310(4.65, 3.93, 3.80) [2]

IR(iodide): 3400–3100 [1]

MS(iodide) *m/z*: 342, 341, 327, 58(100) [2,3]

^{1}H NMR(iodide, DMSO-d_6): 2.98, 3.41(each 3H, s, N[CH_3]$_2$), 3.88(3H, s, 10-OCH_3), 3.93(3H, s, 2-OCH_3), 6.90(1H, s, H-3), 6.95(2H, s, H-8, H-9) [3]

^{13}C NMR(iodide, $CDCl_3$ + CF_3COOH): [4]

Table 1

C-1	140.2	C-4	23.4	C-10	147.6
1a	118.9	5	61.5	11	140.2
1b	117.7	6a	69.7	11a	119.2*
2	148.2	7	30.3	NCH_3	43.4
3	109.6	7a	123.8	NCH_3	54.2
3a	120.3*	8	120.8	2-OCH_3	55.8
		9	110.9	10-OCH_3	55.8

HPLC: [5]

Pharm./Biol.: LD_{50} 138 mg/kg (s/c, mice). Hypotensive action [6]

References

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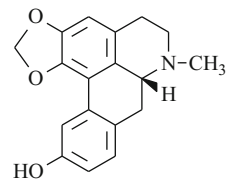
2. X.A. Dominguez, L. Benavides, D. Butruille, Phytochemistry **13**, 680 (1974)
3. J. Slavik, L. Dolejs, Collect. Czech. Chem. Commun. **38**, 3514 (1973)
4. A.J. Marsaioli, F.A.M. Reis, A.F. Magalhaes, E.A. Ruveda, A.M. Kuck, Phytochemistry **18**, 165 (1979)
5. A. Bonora, B. Tosi, G. Dall'Olio, A. Bruni, Phytochemistry **29**, 2389 (1990)
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 187

Mecambroline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Roemeria refracta*

$C_{18}H_{17}NO_3$: 295.1208

Mp: 232–233°C [1], 252°C [2]

$[\alpha]_D$ −76° ($CHCl_3$) [1]

UV: 230, 263, 273, 308(4.42, 4.09, 4.12, 3.90) [3]

MS *m/z*: 295(M^+), 280, 278

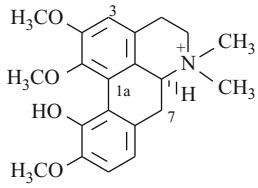
^{1}H NMR: 2.55(3H, s, NCH_3), 5.65, 5.72(each 1H, d, J = 1.5, CH_2O_2), 6.42(1H, s), 6.60(1H, q, J = 2.5, 7.5), 7.00(1H, d, J = 7.5), 7.47(1H, d, J = 2.5) [1]

References

1. S.R. Johns, J.A. Lamberton, Aust. J. Chem. **20**, 1277 (1967)
2. J. Slavik, Collect. Czech. Chem. Commun. **30**, 914 (1965)
3. K. Bernhauer, Helv. Chim. Acta **50**, 1583 (1967)

Menisperine

CAS Registry Number: 25342-82-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Dicranostigma franschetianum*
$C_{21}H_{26}NO_4^+$: 356.1862
Mp: 219°C (dec., chloride)
$[\alpha]_D$ +168° (chloride, H_2O)
UV: 223, 270, 303 [1]
IR: 3180 [1]
MS *m/z*: 356(M^+), 355, 341, 328, 310, 298, 58(100) [1]
^{1}H NMR(CD_3OD): 3.05, 3.65(each 3H, s, $N[CH_3]_2$), 3.75, 3.92, 3.95(each 3H, s, 3 × OCH_3), 4.35(1H, q, J = 3.5, 14), 6.96(2H, s), 7.02(1H, s) [1]
^{13}C NMR($CDCl_3$ + CD_3OD): [2]

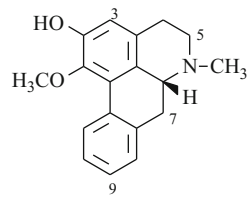
Table 1

C-1	143.0	C-5	60.3	C-11	143.5
1a	126.0	6a	69.1	11a	120.2
1b	118.3	7	30.6	NCH_3	42.9
2	152.9	7a	124.3	CH_3	53.5
3	110.6	8	119.6	1-OCH_3	62.1
3a	125.2	9	111.5	2-OCH_3	55.8
4	23.8	10	149.7	10-OCH_3	55.8

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 596 (1996)
2. A.J. Marsaioli, F.A.M. Reis, A.F. Magalhaes, E.A. Ruveda, A.M. Kuck, Phytochemistry **18**, 165 (1979)

N-Methylasimilobine (Floribundine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver floribundum, P. urbanianum*
$C_{18}H_{19}NO_2$: 281.1416
Mp: 194–195°C
$[\alpha]_D$ −221° ($CHCl_3$) [1]
UV: 231, 272, 314 [2]
IR($CHCl_3$): 3500 [2]
MS *m/z*: 281(M^+), 280, 266, 265, 250, 238 [1]
^{1}H NMR: 2.48(3H, s, NCH_3), 2.50–3.10(7H, m), 3.50(3H, s, OCH_3), 6.60(1H, s), 7.21(3H, m, 3×H–Ar), 8.20(1H, br d, J = 8)
^{13}C NMR ($CDCl_3$): [3]

Table 1

C-1	143.0	C-4	28.6	C-9	127.2*
1a	125.6	5	53.2	10	127.2*
1b	126.9	6a	62.2	11	127.2*
2	148.1	7	34.7	11a	131.7
3	114.2	7a	136.0	NCH_3	43.7
3a	129.6	8	127.8*		

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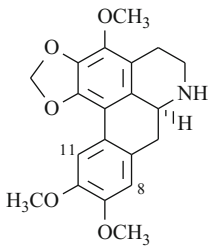
1. I.A. Israilov, O.N. Denisenko, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 716 (1976)
2. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **38**, 275 (1975)
3. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **42**, 325 (1979)

O-Methylcassyfiline (Nortalicmine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum strictum*
$C_{20}H_{21}NO_5$: 355.1420
Mp: 150–152°C [1], 168°C (N–Ac) [2]
$[\alpha]_D$ +16° ($CHCl_3$) [3], $[\alpha]_D$ +233° (N–Ac, $CHCl_3$) [2]
UV: 236, 283, 302, 312(4.43, 4.31. 4.30, 4.27) [1]
UV(N-Ac): 222, 240 sh, 287, 305, 317(4.51, 4.38, 4.18, 4.20, 4.19) [2]
IR(N-Ac): 1650–1638 [2]
MS(N-Ac) *m/z*: 397(M^+) [2]
^{1}H NMR: 3.87, 3.97(6H, 3H, s, 3 × OCH_3), 5.87, 6.02(each 1H, d, J = 1.5, CH_2O_2), 6.71(1H, s, H-8), 7.61(1H, s, H-11) [4]
^{1}H NMR (N–Ac): 2.11(3H, s, NAc), 3.80, 3.82, 3.89(each 3H, s, 3 × OCH_3), 5.81, 5.96(each 1H, br s, CH_2O_2), 6.63(1H, s, H-8), 7.52(1H, s, H-11) [2]

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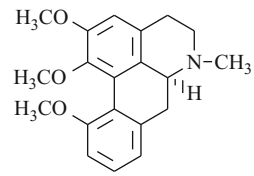
O-Methylisothebaine

CAS Registry Number: 90275-86-8



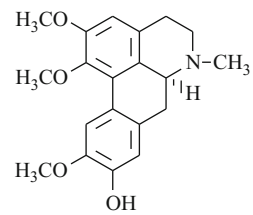
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver orientale*
$C_{20}H_{23}NO_3$: 325.1678
Mp: amorph.
$[\alpha]_D$ +26° ($CHCl_3$) [1]
UV: 273, 302(4.26, 3.31) [1]
MS *m/z*: 325(M^+, 100), 324, 310, 294, 282, 162.5($^{++}$) [1]
^{1}H NMR: 2.35–3.15(m, CH_2), 2.46(3H, s, NCH_3), 3.53(3H, s, OCH_3), 3.78(6H, s, 2×OCH_3), 6.57(1H, s, H–Ar), 6.68–7.23(3H, m, H–Ar) [1]

References

1. I.A. Israilov, M.A. Manushakyan, V.A. Mnatsakanyan, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 76 (1984)

N-Methyllaurotetanine (Lauroscholtzine)

CAS Registry Number: 2169-44-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Aconitum tokii, Corydalis emanuelii, C. marschalliana, Delphinium dictyocarpum, Eschscholtzia californica, Glaucium corniculatum, Liriodendron tulipiferum*
$C_{20}H_{23}NO_4$: 341.1627
Mp: amorph., 211°C (dec., hydrobromide, abs. EtOH)
$[\alpha]_D$ +80° ($CHCl_3$) [1]
UV: 221, 281, 310 [2]
MS *m/z*: 341(M^+), 340, 326, 311, 310, 298 [2]
^{1}H NMR: 2.10–3.10(7H, m), 2.45(3H, s, NCH_3), 3.57, 3.77, 3.79(each 3H, s, 3 × OCH_3), 5.32(1H, br s, OH), 6.50, 6.70, 7.97(each 1H, s, H–Ar) [1]
HPLC: [3]
Synthesis: (±) [4]

References

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2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 596 (1996)
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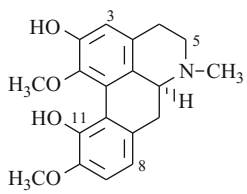
N-Methyllindcarpine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Glaucium fimbrilligerum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 197–198°C [1]
$[\alpha]_D$ +340° (MeOH) [1], +160° ($CHCl_3$) [2]
UV: 219, 272, 307(4.62, 4.20, 3.81) [1]
MS *m/z*: 327(M^+), 312, 310, 296, 284 [1]
MS *m/z*: 327(84), 312(100), 296(60), 281(21), 164(32), 149(49) [3]
^{1}H NMR: 2.48(3H, s, NCH_3), 2.60–3.00(7H, m), 3.58(3H, s, OCH_3), 3.85(3H, s, OCH_3), 6.55(1H, s), 6.78(2H, s, 2 × H–Ar) [1]
^{1}H NMR($CDCl_3$): 2.58(3H, s, NCH_3), 3.70(3H, s, OCH_3), 3.97(3H, s, OCH_3), 5.73(2H, s, 2OH exchanged by D_2O), 6.77(1H, s, H-3), 6.92(2H, s, ArH) [3]

References

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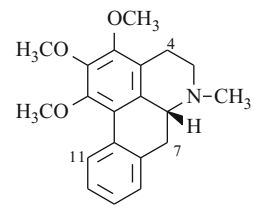
2. S.R. Johns, J.A. Lamberton, Aust. J. Chem. **20**, 1277 (1967)
3. A. Shafiee, I. Lalezari, O. Rahimi, Lloydia **40**, 352 (1977)

O-Methyllirinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{20}H_{23}NO_3$: 325.1678
Mp: amorph. [1]
$[\alpha]_D$ −53° ($CHCl_3$) [1]
UV: 222, 283(4.46, 4.22) [1]
IR: 2855, 1590, 1270 [1]
MS *m/z*: 325(M^+, 100), 324, 310, 294, 282, 267, 251 [1]
^{13}C NMR: [2]

Table 1

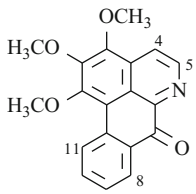
C-1	150.2	C-5	53.0	C-11	126.9
1a	122.6	6a	62.6	11a	131.5
1b	132.0	7	34.8	NCH_3	44.0
2	145.2	7a	135.9	OCH_3	60.4
3	150.1	8	127.8*	OCH_3	60.6
3a	122.9	9	127.7*	OCH_3	60.9
4	23.8	10	127.0		

References

1. R. Ziyaev, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 475 (1973). C.L. Chen, H.M. Chang, Phytochemistry **17**, 779 (1978)
2. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **46**, 761 (1983)

O-Methylmoschatoline (Liridine)

CAS Registry Number: 5140-38-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Liriodendron tulipiferum*

$C_{19}H_{15}NO_4$: 321.1001

Mp: 162–164°C ($CHCl_3$) [1], 177°C (Et_2O, dark red needles) [2]

UV: 238, 276, 440(4.32, 4.36, 3.80) [1]

UV(EtOH): 221(4.46), 235(4.46), 2.75(4.56), 311 sh (3.90), 365 sh (3.42), 440(3.22) [2]

UV(H^+): 243, 282, 450 [1]

IR: 1655, 760 [1]

IR: 1660, 1580, 1480, 1467, 1391, 1312, 1205, 1094, 1004, 972, 937, 757 [2]

MS*m/z*: 321(M^+, 100), 306(38), 291(6), 278(8), 263(9), 248(5) [2]

MS *m/z*: 321(M^+, 100), 306, 291, 278, 263, 235, 220, 207, 192, 164 [3]

^{1}H NMR(CF_3COOH): 4.37(9H, s, 3 × OCH_3), 7.58(1H, H-10), 8.03(1H, H-9), 8.81(1H, H-4), 8.98(1H, H-5), 9.18(1H, H-11) [4]

^{1}H NMR: 4.07(1-OCH_3), 4.10(3-OCH_3), 4.19(2-OCH_3), 7.44(H-10), 7.69(H-9), 8.13(H-4), 8.48 (H-8), 8.88(H-5), 9.00(H-11) [3]

^{13}C NMR: [5]

Table 1

C-1	148.2	C-4	118.9	C-9	128.7
1a	115.4	5	144.3	10	134.1
1b	122.5	6a	145.0	11	127.4
2	147.0	7	182.3	11a	134.3
3	156.2	7a	131.4	OCH_3	61.7
3a	130.8	8	127.9	OCH_3	61.3
				OCH_3	60.9

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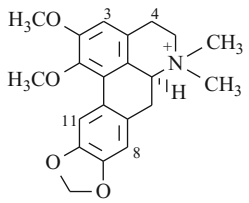
4. M. Leboeuf, D. Cortes, R. Hocquemiller, A. Cave, Planta Med. **48**, 234 (1983)
5. A.J. Marsaioli, A.F. Magalhaes, E.A. Ruveda, A.M. Reis, Phytochemistry **19**, 995 (1980)

N-Methylnantenine

CAS Registry Number: 56799-50-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Thalictrum sachalinence*

$C_{21}H_{24}NO_4^+$: 354.1705
Mp: 213–214°C [1]
$[\alpha]_D$ +39° (EtOH) [1]
UV: 285, 313 [2]
MS *m/z*: 353, 295, 251, 209, 58(100) [2]
^{1}H NMR: 3.02, 3.50(each 3H, s, $N[CH_3]_2$), 3.60(3H, s, 1-OCH_3), 3.82(3H, s, 2-OCH_3), 5.84(2H, br s, CH_2O_2), 6.64, 6.79, 7.70(each1H, s, H-3, H-8, H-11) [2]
^{13}C NMR: [3]

References

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2. D. Umarova, S.Kh. Maekh, S.Yu. Yunusov, N.M. Zaitseva, S.A. Volkova, P.G. Gorovoi, Chem. Nat. Comp. **14**, 511 (1978)
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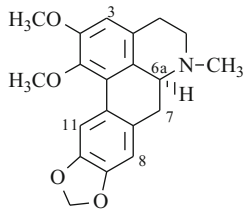
Nantenine

CAS Registry Number: 2565-01-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Corydalis marschalliana*
$C_{20}H_{21}NO_4$: 339.1471
Mp: 138–139°C [1]
$[\alpha]_D$ +90° ($CHCl_3$) [1]
UV: 220, 281, 310 [1]
UV(MeOH): 223(4.56), 272 sh (3.9), 282(4.0), 308(4.1), 318 sh (4.0) [2]
MS *m/z*: 339(M^+), 338, 324, 308, 296, 281, 169.5($^{++}$) [1]
^{1}H NMR: 2.53(3H, s, NCH_3), 3.65, 3.89(each 3H, s, 2 × OCH_3), 6.01(2H, s, CH_2O_2), 6.54, 6.85, 7.96(each 1H, H–Ar) [1]
^{13}C NMR: [3]

Table 1

C-1	144.0	C-5	52.9	C-11	108.4
1a	126.4	6	62.1	11a	125.1
1b	128.2	7	34.9	NCH_3	43.6
2	151.4	7a	130.4	1-OCH_3	59.8
3	110.3	8	107.8	2-OCH_3	55.4
3a	127.0	9	146.0	9,10-CH_2O_2	100.4
4	29.0	10	145.9		

Synthesis: (chiral) [4]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 596 (1996)
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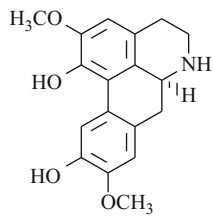
Norbracteoline

CAS Registry Number: 89825-97-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

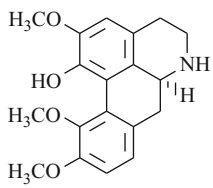
Biological sources: *Glaucium corniculatum*
$C_{18}H_{19}NO_4$: 313.1314
Mp: amorph.
$[\alpha]_D$ +41° (MeOH) [1]
UV: 220, 280, 310 [1]
IR: 3400, 3285, 1520 [1]
MS *m/z*: 313(M^+), 312, 298, 296, 284, 282, 156.5($^{++}$) [1]
^{1}H NMR: 2.50–4.00(7H, m), 3.83(6H, s, 2 × OCH_3), 6.43, 6.66, 7.97(each 1H, s, H–Ar) [1]

References

1. I.A. Israilov, S.U. Karimova, O.N. Denisenko, M.S. Yunusov, D.A. Murav'eva, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 714 (1983)

Norcorydine

CAS Registry Number: 26931-78-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Corydalis rosea-purpurea, Glaucium fimbrilligerum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: amorph.
$[\alpha]_D$ +156° (MeOH) [1]
UV: 223, 270, 310 [1]
MS *m/z*: 327(M^+), 326, 312, 310, 298, 296, 253, 163.5($^{++}$) [1]
^{1}H NMR: 3.67(3H, s, OCH_3), 3.88(6H, s, 2 × OCH_3), 6.64(1H, s, H-3), 6.87, 7.16(each 1H, d, J = 8, H–Ar) [1]

References

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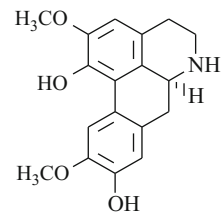
Norisoboldine (Laurelliptine)

CAS Registry Number: 23599-69-1



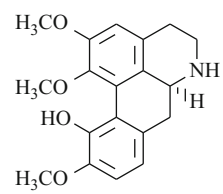
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Cocculus laurifolius, Zizyphus jujuba*
$C_{18}H_{19}NO_4$: 313.1314
Mp: 192–194°C (Me_2CO) [1]
$[\alpha]_D$ +42° (EtOH) [1]
UV: 280, 305 [1]
MS *m/z*: 313(M^+), 312, 298, 296, 284 [1]
^{1}H NMR: 3.85, 3.88(each 3H, s, 2 × OCH_3), 6.52, 6.74, 8.03(each 1H, s, 3 × H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 596 (1996)

Norisocorydine

CAS Registry Number: 475-70-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Corydalis caucasica, Glaucium fimbrilligerum, G. oxylobum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: amorph.
$[\alpha]_D$ +168° (MeOH) [1]
UV: 220, 270, 308 [1]
MS *m/z*: 327(M^+), 326, 312, 310, 298, 296, 253, 163.5($^{++}$) [2]
^{1}H NMR: 3.67(3H, s, OCH_3), 3.85(6H, s, 2 × OCH_3), 6.64(1H, s, H-3), 6.81, 7.03(each 1H, d, J = 8, H–Ar) [1]
HPLC: [3]

References

1. S.U. Karimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 177 (1980)
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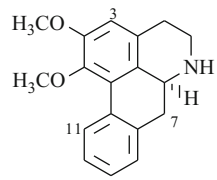
(+)-Nornuciferine

CAS Registry Number: 20454-22-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{18}H_{19}NO_2$: 281.1415
Mp: 128–129°C, 232°C (NAc) [1]
$[\alpha]_D$ +140° (EtOH) [1]
UV: 232, 272, 311(4.29, 4.12, 3.62) [1]
MS *m/z*: 281(M^+), 280(100), 266, 252, 250, 221, 165, 152 [1]
^{1}H NMR: 3.64, 3.83(each 3H, s, 2 × OCH_3), 6.59(1H, s), 7.10–7.33(3H, m), 8.29(1H, m) [1]
^{13}C NMR: [2]

Table 1

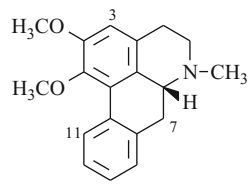
C-1	145.2	C-4	29.2	C-9	127.4*
1a	126.6	5	43.2	10	127.8*
1b	129.1	6a	53.5	11	127.0*
2	152.2	7	37.5	11a	132.3
3	111.8	7a	136.3	1-OCH_3	60.2
3a	129.0	8	128.4*	2-OCH_3	55.6

References

1. R. Ziyaev, A.A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 119 (1974)
2. H. Achenbach, C. Renner, I. Addae-Mensah, Liebigs Ann. Chem. **1982**, 1623 (1982)

Nuciferine (1,2-Dihydroxyaporphine)

CAS Registry Number: 475-83-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver orientale*
$C_{19}H_{21}NO_2$: 295.1572
Mp: 164–165°C (EtOH)
$[\alpha]_D$ −164° (MeOH) [1]
UV: 230, 274, 312 [1]
IR: 1600, 1500, 1425, 1375, 1250 [1]
MS *m/z*: 295(M^+, 100), 294, 280, 252, 237, 221 [1]
^{1}H NMR: 2.54(3H, s, NCH_3), 3.66, 3.88(each 3H, s, 2 × OCH_3), 6.66(1H, s), 7.15–7.35(3H, m), 8.33(1H, m) [1]
^{13}H NMR(DMSO-d_6): [2]

Table 1

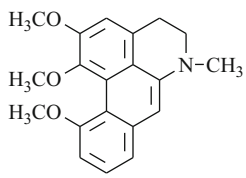
C-1	144.3	C-5	52.3	C-10	127.1
1a	125.7	6a	61.9	11	126.6
1b	128.6	7	34.3	11a	131.5
2	151.4	7a	136.2	NCH_3	43.6
3	111.8	8	127.9	1-OCH_3	59.6
3a	127.5	9	127.5	2-OCH_3	55.6
4	28.6				

References

1. H. Guinaudeau, A. Cave, R.R. Paris, Phytochemistry **10**, 1963 (1971)
2. E. Wenkert, B.L. Buckwalter, I.R. Burfitt, M.J. Gasic, H.E. Gottlieb, E.W. Hagaman, F.M. Schell, P.M. Wovkulich, in *Topics in ^{13}C NMR Spectroscopy*, ed. by G.C. Levy, 2nd edn. (Wiley, New-York, 1976), p. 81

Orientidine

CAS Registry Number: 90275-84-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Papaver orientale*

$C_{20}H_{21}NO_3$: 323.1521

Mp: amorph.

UV: 215, 271, 340(4.45, 4.39, 3.98) [1]

IR: 1640, 1595, 1570, 1535 [1]

MS *m/z*: 323(M^+, 100), 308 [1]

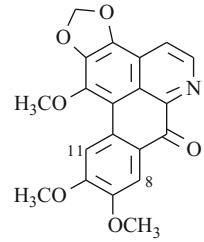
^{1}H NMR: 2.94(3H, s, NCH_3), 3.05–3.25(4H, m), 3.44(3H, s, OCH_3), 3.85(6H, s, 2 × OCH_3), 6.35(1H, s, H–Ar), 6.60–7.29(4H, m, H–Ar) [1]

References

1. I.A. Israilov, M.A. Manushakyan, V.A. Mnatsakanyan, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 76 (1984)

7-Oxobaicaline

CAS Registry Number: 105418-66-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Thalictrum baikalense*

$C_{20}H_{15}NO_6$: 365.0899

Mp: 240°C (dec., MeOH) [1]

UV: 250, 289, 380, 500 [1]

IR: 1650 [1]

MS *m/z*: 365(M^+, 100), 350, 349, 336, 320, 307, 279, 223, 185.5($^{++}$) [1]

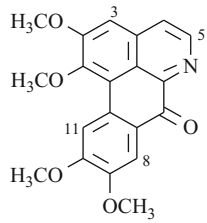
^{1}H NMR(CF_3COOH): 3.73, 3.80(6H, 3H, s, 3 × OCH_3), 6.18(2H, s, CH_2O_2), 7.60(1H, s, H-8), 8.20–8.40(2H, m, H-4, H-5), 8.45(1H, s, H-11) [1]

References

1. S.Kh. Maekh, E.V. Boiko, V.M. Starchenko, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 238 (1986)

7-Oxoglaucine (O-Methylateroline)

CAS Registry Number: 5574-24-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Glaucium elegans, G. flavum, G. grandiflorum, G. serpieri, Liriodendron tulipiferum, Thalictrum foetidum*

$C_{20}H_{17}NO_5$: 351.1107

Mp: 219–221°C (dec.) [1]

UV: 243, 272, 290 sh, 355, 433 [1]

UV(H^+): 254, 285, 383, 495 [1]

IR: 1655 [2]

MS *m/z*: 351(M^+, 100), 353, 352, 350, 336, 321, 320, 308, 306, 293, 292, 175.5($^{++}$) [3]

^{1}H NMR: 3.89, 3.97(3H, 9H, s, 4 × OCH_3), 6.96, 7.82, 8.54(each 1H, s, H-3, H-8, H-11), 7.57, 8.67(each 1H, d, J = 5.5, H-4, H-5) [1]

^{13}C NMR: [4]

Table 1

C-1	155.9	C-5	133.1	C-11	111.3
1a	120.1	6a	141.7	11a	130.4
1b	123.4	7	174.8	1-OCH_3	61.6
2	162.9	7a	133.1	OCH_3	57.3
3	106.5	8	110.1	OCH_3	56.3
3a	135.3	9	150.2	OCH_3	56.3
4	126.2	10	156.7		

Pharm./Biol.: Antifungal and antibacterial activity [5]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 376 (1983)
2. K.G. Kiryakov, P. Panov, Dokl. Bolg. Akad. Nauk **22**, 1019 (1970)
3. I.R.C. Bick, J.H. Bowie, G.K. Douglas, Aust. J. Chem. **20**, 1403 (1967)
4. A.J. Marsaioli, A.F. Magalhaes, E.A. Ruveda, F.A.M. Ries, Phytochemistry **19**, 995 (1980)
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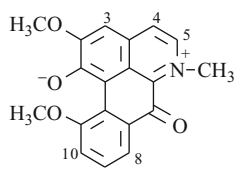
7-Oxoisothebaine (Alkaloid PO-3)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Papaver pseudo-orientale*

$C_{19}H_{15}NO_4$: 321.1001

Mp: amorph.

UV: 293, 297, 505 [1]

IR: 1620, 1580 [1]

MS *m/z*: 321(M^+) [1]

^{1}H NMR(DMSO-d_6): 3.85, 3.95(each 3H, s, 2 × OCH_3), 4.65(3H, s, NCH_3), 7.15(1H, s), 7.20–7.90 (4H, m), 8.40(1H, d, J = 5)

^{1}H NMR($CDCl_3$/TFA, 250 MHz): 4.17, 4.22(each 3H, s, 2 × OCH_3), 4.71(3H, s, NCH_3), 7.50(1H, s, H-3), 7.57(1H, d, J = 7.9, H-10), 7.72(1H, m, H-9), 8.13(1H,d, J = 7.9, H-8), 8.41(1H, d, J = 6.1, H-4), 8.61(1H, d, J = 6.1, H-5) [2]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
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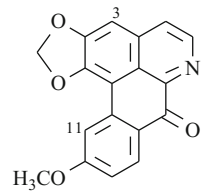
Oxolaureline (Lauterine)

CAS Registry Number: 28200-65-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Magnolia kobus, M. soulangeana*

$C_{18}H_{11}NO_4$: 305.0688

Mp: 265–267°C (MeOH), 301–303°C (dec., $CHCl_3$) [2]

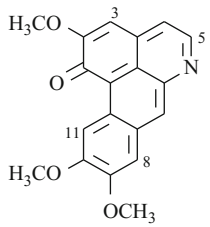
Solubility: sol. acids; spar. sol. $CHCl_3$, EtOH, MeOH; insol. alk.
UV: 249, 270, 309, 349(4.21, 4.08, 3.72, 3.84) [1]
UV(MeOH): 247(4.26), 267(4.19), 309(3.78), 349(3.81), 400(3.81) [2]
UV(H^+): 259, 280, 379(4.07, 3.99, 3.73) [1]
IR: 2850, 1650, 1605, 1265, 1060, 970 [1]
IR: 1650(C = O), 1600, 1580, 1500, 1490, 1450, 1420, 1360, 1310, 1280, 1260, 1050, 1020 [2]
MS *m/z*: 305(M^+, 100), 290, 275, 262, 234, 206, 204, 176, 175, 152.5($^{++}$), 149 [1]
MS *m/z*: 305(100), 277(6.9), 262(89), 234(9.5), 206(3.2), 204(5.8), 176(8.9) [2]
^{1}H NMR(CF_3COOH): 3.68(3H, s, OCH_3), 6.22(2H, s, CH_2O_2), 7.02(1H, dd, J = 8.5, 2.5, H-9), 7.16(1H, s, H-3), 8.05(1H, d, J = 8.5, H-8), 8.17, 8.35 (each 1H, d, J = 7, H-4, H-5), 8.45(1H, H-11) [1, 2]

References

1. R. Ziyaev, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 560 (1975)
2. C.C. Hsu, R.H. Dobberstein, G.A. Cordell, N.R. Farnsworth, J. Nat. Prod. **40**, 152 (1977)

Pancoridine

CAS Registry Number: 39945-37-4



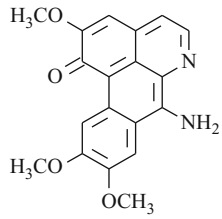
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Corydalis paniculigera, C. stricta*
$C_{19}H_{15}NO_4$: 321.1001
Mp: 218–219°C ($CHCl_3$–MeOH) [1]
UV: 218, 236, 259, 277, 298, 312, 340, 402, 466 [1]
IR: 1635, 1580, 1505 [1]
MS *m/z*: 321(M^+), 306, 290(100), 160.5($^{++}$) [1]
^{1}H NMR(CF_3COOH): 3.75(6H, s, 2 × OCH_3), 3.82(3H, s, OCH_3), 6.77, 7.08, 8.51, 9.07(each 1H, s, H–Ar), 7.68, 8.53(each 1H, d, J = 5.5, *o*–H–Ar) [1]
^{1}H NMR($CDCl_3$-CD_3OD, 10%, 90 MHz): 4.05(3H, s, OCH_3-9), 4.15(3H, s, OCH_3-10), 4.09(3H, s, OCH_3-2), 6.88(1H, s, H-3), 7.32(1H, s, H-8), 7.61(1H, d, J = 4.8, H-4), 8.91(1H, d, J = 4.6, H-5), 8.82(1H, s, H-7), 9.52(1H, s, H-11) [2]

References

1. M. Alimova, I.A. Israilov, M.S. Yunusov, N.D. Abdullaev, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 689 (1982)
2. A. Jossang, M. Leboeuf, A. Cave, T. Sevenet, J. Nat. Prod. **49**, 1028 (1986)

Pancorinine

CAS Registry Number: 85011-55-8



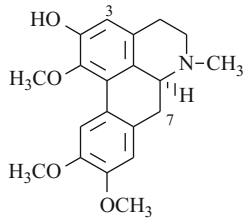
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Corydalis paniculigera, C. stricta*
$C_{19}H_{16}N_2O_4$: 336.1108
Mp: 289–290°C ($CHCl_3$MeOH) [1]
UV: 232, 247, 265, 276, 287, 296, 376, 412, 440, 526, 566 [1]
IR: 1650, 1545, 1510, 1250 [1]
MS *m/z*: 336(M^+), 305(100), 292 [1]
^{1}H NMR: 3.74, 3.83, 3.95(each 3H, s, 3 × OCH_3), 7.24, 7.45, 8.63(each 1H, s, H–Ar), 8.20, 8.54(each 1H, d, J = 5.5, *o*–H–Ar) [1]

References

1. M. Alimova, I.A. Israilov, M.S. Yunusov, N.D. Abdullaev, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 689 (1982)

Predicentrine

CAS Registry Number: 517-65-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Corydalis emanuelii, Dicentra peregrina, Glaucium corniculatum, Liriodendron tulipiferum*

$C_{20}H_{23}NO_4$: 341.1627

Mp: oil, 214°C (dec., hydrochloride) [1], 205°C (dec., hydrobromide) [2]

$[\alpha]_D$ +97° (EtOH) [3]

UV: 282, 303(4.19, 4.20) [3]

MS *m/z*: 341(M^+), 340(100), 326, 325, 310, 283, 266, 170.5($^{++}$) [3]

^{1}H NMR: 2.49(3H, s, NCH_3), 2.50–3.30(7H, m), 3.48(3H, s, 1-OCH_3), 3.79, 3.82(each 3H, s, 2 × OCH_3), 6.52(1H, s, H-3), 6.72(1H, s, H-8), 7.86(1H, s, H-11) [3]

^{13}C NMR: [4]

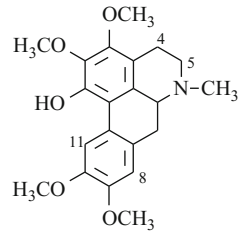
Table 1

C-1	142.3	C-5	53.3	C-11	110.0
1a	126.3	6a	62.5	11a	124.1
1b	125.9	7	34.2	NCH_3	43.8
2	148.2	7a	129.2	1-OCH_3	60.3
3	113.5	8	110.7	9-OCH_3	55.8
3a	129.6	9	148.1	10-OCH_3	56.0
4	28.7	10	147.6		

References

1. C.L. Chen, H.M. Chang, E.B. Cowling, C.H. Hsu, R.P. Gates, Phytochemistry **15**, 1161 (1976)
2. S.R. Johns, J.A. Lamberton, A.A. Sioumis, H.J. Tweeddale, Aust. J. Chem. **22**, 1277 (1969)
3. I.A. Israilov, F.M. Melikov, D.A. Murav'eva, Chem. Nat. Comp. **20**, 74 (1984)
4. M. Shamma, J.L. Moniot, *Isoquinoline Alkaloids Research* (Plenum Press, New York/London, 1978)

Preocoteine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Thalictrum strictum*

$C_{21}H_{25}NO_5$: 371.1733

Mp: oil [1]

$[\alpha]_D$ +26° (EtOH) [2]

UV: 280, 305, 315 [1]

MS *m/z*: 371(M^+), 370, 356, 340, 328 [1]

MS *m/z*: 371(100), 370(73), 356(52), 354(23), 340(26), 328(25), 313(13), 311(5), 297(21), 178(5) [2]

^{1}H NMR: 2.49(3H, s, NCH_3), 3.80, 3.85, 3.89(12H, s, 4 × OCH_3), 6.76(1H, s, H-8), 7.91(1H, s, H-11) [1]

^{13}C NMR: [2]

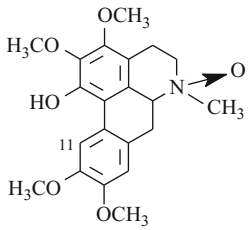
Table 1

C-1	138.3	C-5	53.2	C-11	110.9
1a	148.5	6a	62.8	11a	124.6
1b	125.2	7	34.3	NCH_3	44.0
2	144.3	7a	130.5	2-OCH_3	60.0
3	147.3	8	111.6	3-OCH_3	60.8
3a	115.7	9	147.1	9-OCH_3	56.0
4	23.4	10	147.1	10-OCH_3	56.0

References

1. S.Kh. Maekh, P.G. Gorovoi, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 507 (1976)
2. F.R. Stermitz, O. Castro, J. Nat. Prod. **46**, 913 (1983)

Preocoteine N-Oxide



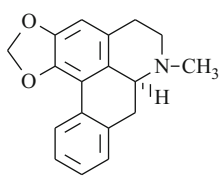
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum minus*
$C_{21}H_{25}NO_6$: 387.1682
Mp: 199–200°C (dec.) [1]
UV: 226, 282, 306(4.52, 4.01, 4.11) [1]
IR: 3400, 2855 [1]
MS *m/z*: 387(M^+, 4), 371(100), 370(59), 356(17), 328(43) [1]
^{1}H NMR(CF_3COOH): 3.10(3H, s, NCH_3), 3.55, 3.63(3H, 9H, s, 4 × OCH_3), 6.56(1H, s, H-8), 7.74(1H, s, H-11) [1]

References

1. V.G. Khodzhaev, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 599 (1972)

(+)-Roemerine (Aporheine)

CAS Registry Number: 2030-53-7



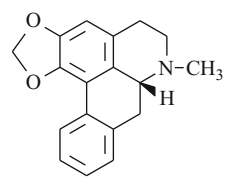
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Liriodendron tulipiferum, Magnolia grandiflora, M. kobus, M. soulangeana, Papaver commutatum, P. fugax, P. maeoticum, P. ocellatum, P. persicum*
$C_{18}H_{17}NO_2$: 279.1259
Mp: 87–88°C (pet. ether) [1], 102–103°C [2, 3], 247–248°C (hydrochloride, H_2O) [3]
$[\alpha]_D$ +69° (EtOH) [1], +80° (*c* 0.50, MeOH) [3]
UV: λ_{max} 210(4.56), 234(4.29), 272(4.35), 317(3.65), λ_{min} 229(4.29), 254(4.10), 303(3.58) [3]

References

1. S.Yu. Yunusov, V.A. Mnatsakanyan, S.T. Akramov, DAN UzSSR (8), 43 (1961)
2. V.A. Chelombit'ko, I.A. Israilov, Chem. Nat. Comp. **24**, 475 (1988)
3. J. Slavik, L. Slavikova, Collect. Czech. Chem. Commun. **46**, 1534 (1981)

(−)-Roemerine

CAS Registry Number: 548-08-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Roemeria refracta*
$C_{18}H_{17}NO_2$: 279.1259
Mp: 102–103°C (Et_2O) [1]; 87–88°C (Et_2O) [2]; 95–97°C, 247–252°C (hydrochloride, H_2O) [3]; 240°C (hydrochloride) [4]
$[\alpha]_D$ −77° (EtOH) [1], −71° (EtOH) [2]
UV: 234, 264 sh, 273, 285 sh, 293 sh, 318 [3]; 234, 272, 312(4.17, 4.21, 3.52) [4]
IR: 1400, 1360, 1053, 940 [3]
MS *m/z*: 279(M^+), 278, 264, 249, 139.5($^{++}$) [3, 4]
^{1}H NMR: 2.46(3H, s, NCH_3), 5.80, 5.95(each 1H, d, J = 1.5, CH_2O_2), 6.45(1H, s), 7.08–7.66(3H, m), 8.00(1H, m, H-11) [3]; 2.7(3H, s, N–CH_3), 6.0,

6.04(each 1H, d, CH_2O_2), 6.68 (1H, H-3), 7.36(3H, m, H-8, H-9, H-10), 7.82(1H, m, H-11) [4]

Synthesis: from anonaine [4]

HPLC: [5]

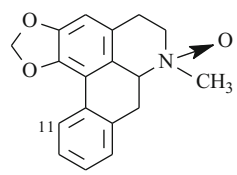
Pharm./Biol.: $LD50_{50}$ 79.5, 38.8 mg/kg (s/c, i/v, mice); 26.4 mg/kg (i/v, rabbits); 114 mg/kg (s/c, frogs). Causes an increase in excitability, convulsions, vomiting. In dogs, in a dose of 20 mg/kg, causes a cessation of respiration and of the heart. Accelerates the motor-defense reflex in rats. Potentiates the soporific action of hexenal and the action of the analeptics caffeine and strychnine [6]

References

1. R.A. Konovalova, S.Yu. Yunusov, A.P. Orekhov, Zh. Obshch. Khim. **9**(1356), 1507 (1939)
2. S.Yu. Yunusov, V.A. Mnatsakanyan, S.T. Akramov, DAN UzSSR (8), 43 (1961)
3. H. Guinaudeau, M. Leboeuf, A. Cave, Lloydia **38**, 275 (1975)
4. D.S. Bhakuni, S. Tewari, M.M. Dhar, Phytochemistry **11**, 1819 (1972)
5. M. Hutin, A. Oztekin, A. Cave, J.P. Foucher, J. Chromatogr. **265**, 139 (1983)
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 223

Roemerine N-Oxide

CAS Registry Number: 75088-35-6 [(R)-form]



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Liriodendron tulipiferum, Magnolia grandiflora*

$C_{18}H_{17}NO_3$: 295.1208

Mp: 168–170°C (MeOH) [1]

Solubility: very sol. H_2O, $CHCl_3$; spar. sol. EtOH, Et_2O, Me_2CO, C_6H_6 [1]

UV: 235, 272, 316(4.19, 4.21, 3.62) [1]

MS *m/z*: 295(M^+), 279, 278, 277, 236(100), 176, 151 [1]

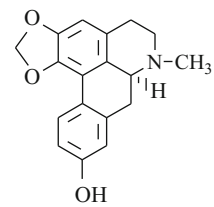
MS *m/z*: 295(M^+, 7), 279(M^+-16, 56), 278(100), 264(32), 236(85) [2]

^{1}H NMR: 3.03(3H, s, NCH_3), 5.89, 6.09(each 1H, d, J = 1.5, CH_2O_2), 6.48(1H, s, H-3), 7.05–7.35(each 3H, m, 3 × H–Ar), 8.00(1H, m, H-11)

References

1. R. Ziyaev, O.N. Arslanova, A. Abdusamatov, S.Yu. Yunusov, Khim. Prirod. Soedin. 428 (1980)
2. J.D. Philipson, A.I. Gray, A.A.R. Askari, A.A. Khalil, J. Nat. Prod. **44**, 296 (1981)

Roemeroline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Papaver fugax*

$C_{18}H_{17}NO_3$: 295.1208

Mp: 226–227°C [1]

$[\alpha]_D$ +48° (EtOH) [1]

UV: 222, 280, 315(4.25, 4.01, 3.85) [1]

MS *m/z*: 295(M^+). 280, 278, 252 [1]

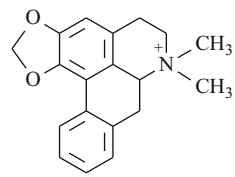
^{1}H NMR: 2.45(3H, s, NCH_3), 6.02, 6.06(each 1H, d, J = 1.5, CH_2O_2), 6.61(1H, s, H–Ar), 6.75–6.88(2H, m), 7.98(1H, d, J = 9) [1]

References

1. V.A. Chelombit'ko, I.A. Israilov, Chem. Nat. Comp. **24**, 475 (1988)

Roemrefidine (Remrefidine)

CAS Registry Number: 21153-67-3

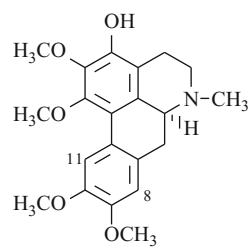


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Roemeria refracta, Papaver fugax*
$C_{19}H_{20}NO_2^+$: 294.1494
Mp: 224°C (iodide, aq. MeOH) [1]
$[\alpha]_D$ +79° (MeOH) [1]
UV: 270, 315(4.26, 3.73) [1]
MS *m/z*: 293, 287, 277, 235, 205, 178, 176, 151, 142, 128, 127, 58 [2]

References

1. S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 173 (1968)
2. M.A. Manushakyan, V.A. Mnatsakanyan, Chem. Nat. Comp. **599** (1977)

Thalbaicalidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum baikalense*
$C_{21}H_{25}NO_5$: 371.1733
Mp: 191–193°C (EtOAc) [1]
$[\alpha]_D$ +73° (MeOH) [1]
UV: 282, 303, 315 [1]
UV(OH^-): 326 [1]
UV: 222(4.53), 284(4.19), 297(4.15), 301(4.15), 314(4.07) [2]
IR($CHCl_3$): 3530 [2]
MS *m/z*: 371(M^+), 370, 356, 341, 328
MS *m/z*: 371(M^+, 100), 370(75), 356(65), 354(33), 340(45), 328(52), 313(25), 297(53) [2]
^{1}H NMR: 2.46(3H, s, NCH_3), 3.62(3H, s, 1-OCH_3), 3.83, 3.88(6H, 3H, s, 3 × OCH_3), 6.65(1H, s, H-8), 7.77(1H, s, H-11) [1]
^{13}C NMR(DMSO-d_6): [2]

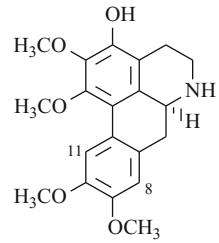
Table 1

C-1	148.0	C-5	52.9	C-11	111.1**
1a	118.8	6a	62.8	11a	124.7
1b	131.1	7	34.3	NCH_3	44.0
2	138.5	7a	128.4	1-OCH_3	60.1
3	145.5	8	111.0**	2-OCH_3	60.1
3a	116.3	9	147.4	9-OCH_3	55.8*
4	23.3	10	147.5	10-OCH_3	56.1*

References

1. S.Kh. Maekh, S.Yu. Yunusov, E.V. Boiko, V.M. Starchenko, Chem. Nat. Comp. **19**, 511 (1983)
2. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **51**, 389 (1988)

Thalbaicaline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

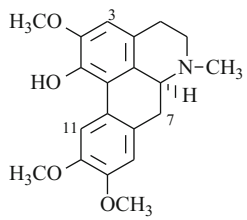
Biological sources: *Thalictrum baikalense*
$C_{20}H_{23}NO_5$: 357.1576
$[\alpha]_D$ +61° (MeOH) [1]
UV: 220, 285, 303, 313 [1]
UV(OH^-): 325 [1]
IR(O,N-di Ac): 1760, 1650 [1]
MS *m/z*: 357(M^+), 356, 342, 340, 328, 327, 297 [1]
MS(O,N-di Ac) *m/z*: 441(M^+), 382, 381, 340, 339, 327. 310, 293 [1]
^{1}H NMR: 3.63(3H, s, 1-OCH_3), 3.81, 3.83, 3.88(each 3H, s, 3 × OCH_3), 6.36(1H, s, H-8), 7.81(1H, s, H-11) [1]
^{1}H NMR(O,N-di Ac): 2.09, 2.13(each 3H, s, NAc), 2.30(3H, s, OAc), 3.64(3H, s, 1-OCH_3), 3.84(9H, s, 3 × OCH_3), 6.67(1H, s, H-8), 7.93(1H, s, H-11) [1]

References

1. S.Kh. Maekh, S.Yu. Yunusov, E.V. Boiko, V.M. Starchenko, Chem. Nat. Comp. **19**, 511 (1983)

Thalicmidine (Thaliporphine)

CAS Registry Number: 5083-88-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Berberis densiflora, B. heteropoda, B. integerrima, B. nummularia, B. oblonga, B. thunbergii, B. turcomanica, Corydalis gortschakovii, C. paniculigera, Glaucium corniculatum, G. grandiflorum, Thalictrum foetidum, T. minus*
$C_{20}H_{23}NO_4$: 341.1627
Mp: 192–193°C (MeOH), 217°C (dec., hydroiodide), 217°C (methiodide), 222°C (methiodide O-Me) [1]
$[\alpha]_D$ +44° (EtOH) [2]
UV: 220, 280, 305(4.58, 4.14, 4.18) [3]
IR: 3350–3250 [3]
MS *m/z*: 341(M^+, 100), 340(92), 326(36), 310(28), 298(50), 283(11), 267(57), 236(21) [4]
^{1}H NMR: 2.50(3H, s, NCH_3), 3.73, 3.82, 3.84(each 3H, s, 3 × OCH_3), 6.44(1H, s, H-3), 6.70(1H, s, H-8), 8.02(1H, s, H-11) [2]
^{13}C NMR: [5]

Table 1

C-1	140.7	C-5	53.5	C-10	147.1
1a	119.5	6a	62.7	11	112.0
1b	127.2	7	34.5	11a	124.8
2	145.8	7a	128.9	NCH_3	44.0
3	108.7	8	110.9	OCH_3	55.9
3a	123.9	9	147.6	OCH_3	56.0
4	29.0				

ORD: [6]
Pharm./Biol.: LD_{50} 242 mg/kg (s/c, mice) [7]. Hypotensive, anti-inflammatory action [8]. Methiodide – hypotensive action [9]

References

1. S.Yu. Yunusov, N.N. Progressov, Zh. Obshch. Khim. **20**, 1151 (1950)
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3. L.D. Yakhontova, O.N. Tolkachev, D.A. Pakaln, Chem. Nat. Comp. **9**, 661 (1973)
4. Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 169 (1968)
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7. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 250
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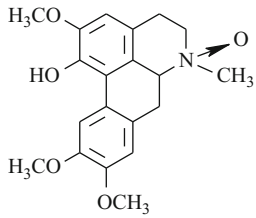
9. Kh.S. Shamirzaeva, S.F. Fakhrutdinov, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (Fan, Tashkent, 1971), p. 141

Thalicmidine N-Oxide

CAS Registry Number: 41607-13-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Berberis integerrima, Thalictrum minus*

$C_{20}H_{23}NO_5$: 357.1576

Mp: 192–193°C (dec.), 220°C (hydrochloride), 205°C (hydrobromide) [1]

$[\alpha]_D$ +90° ($CHCl_3$) [1]

Solubility: very sol. MeOH, EtOH; sol. Me_2CO, $CHCl_3$ [1]

UV: 227, 282, 308(4.42, 4.10, 4.07) [1]

IR: 3400, 2855 [1]

MS *m/z*: 357(M^+, 6), 341(100), 340(97), 326(11), 298(69) [1]

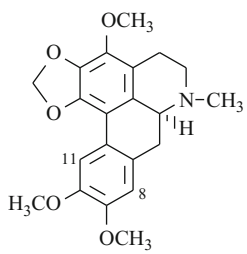
^{1}H NMR(CF_3COOH): 3.08(3H, s, NCH_3), 3.55(9H, s, 3 × OCH_3), 6.42, 6.54, 7.77(each 1H, s, H–Ar) [1]

References

1. V.G. Khodzhaev, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 599 (1972)

Thalicmine (Ocoteine)

CAS Registry Number: 3246-21-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Thalictrum isopyroides, T. minus, T.simplex, T. strictum*

$C_{21}H_{23}NO_5$: 369.1576

Mp: 137–138°C (MeOH) [1], 270°C (hydrochloride), 224°C (dec., hydroiodide), 260°C (hydrobromide), 237°C (methiodide)

$[\alpha]_D$ +60° ($CHCl_3$) [2]

UV: 220, 282, 304, 315(4.46, 4.22, 4.22, 4.18) [3]

IR: 1627, 1608, 1510, 935 [4]

MS *m/z*: 369(M^+, 100), 368(94), 354(22), 338(21), 326(15), 311(16), 295(21) [5]

^{1}H NMR: 2.42(3H, s, NCH_3), 3.79, 3.82(each 3H, s, 10-OCH_3, 9-OCH_3), 3.90(3H, s, 3-OCH_3), 5.90(2H, d, J = 2, CH_2O_2), 6.70(1H, s, H-8), 7.53(1H, s, H-11) [6]

^{13}C NMR: [7]

Table 1

C-1	143.2	C-4	23.6	C-10	147.5
1a	110.4	5	53.2	11	110.0
1b	127.4	6a	62.3	11a	123.5
2	134.8	7	34.1	CH_2O_2	100.4
3	139.1	7a	127.4	3-OCH_3	59.3
3a	119.1	8	111.1	9-OCH_3	56.0
		9	147.5	10-OCH_3	55.8

Pharm./Biol.: LD_{50} 147, 145 mg/kg (s/c, i/p, mice). It decreases locomotory activity, prolongs the soporifics action, and inhibits cough reflex [8]

References

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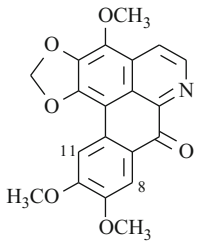
8. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 250

Thalicminine

CAS Registry Number: 16408-77-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Thalictrum flavum, T. isopyrodes, T. longipedunculatum, T. minus, T. simplex, T. strictum*

$C_{20}H_{15}NO_6$: 365.0899

Mp: 263–265°C ($CHCl_3$) [1], 275–277°C [2]

UV: 252, 282, 364, 456(4.29, 4.43, 3.91, 3.72) [1]

IR: 2850, 1650, 1280, 1150 [1]

MS *m/z*: 365, 350, 335, 322, 320, 307, 292, 290, 223, 219, 210, 205, 182.5($^{++}$) [2]

^{1}H NMR(CF_3COOH): 4.20, 4.25, 4.55(each 3H, s, 3 × OCH_3), 6.65(2H, s, CH_2O_2), 8.10, 8.35, 8.88, 8.94(each 1H, H–Ar) [2]

Pharm./Biol.: It has low toxicity. It prolongs the soporific action of chloral hydrate and hexobarbitalum [3]

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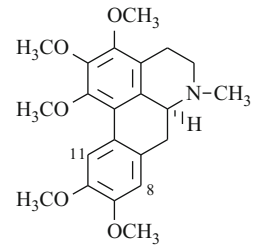
Thalicsimidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids

Biological sources: *Thalictrum filamentosum, T. longipedunculatum, T. minus, T. simplex, T. strictum*

$C_{22}H_{27}NO_5$: 385.1889

Mp: 131–132°C (EtOH), 252°C (dec., hydrobromide), 202°C (dec., sulfate), 150°C (picrate), 225°C (methiodide) [1]

$[\alpha]_D$ +20° ($CHCl_3$) [1], +57° (EtOH) [1]

UV: 220, 280, 300 [1]; 273, 282, 303, 312(4.26, 4.36, 4.33, 4.29) [2]

MS *m/z*: 385(M^+, 100), 384(74), 370(50), 354(21), 342(33), 327(17), 311(33), 280(26), 57, 56, 55, 43 [3, 4]

^{1}H NMR: 2.47(3H, s, NCH_3), 3.64(3H, s, 1-OCH_3), 3.82(3H, s, 2-OCH_3), 3.85(6H, s, 9-OCH_3, 10-OCH_3), 3.88(3H, s, 3-OCH_3), 6.70(1H, s, H-8), 7.89(1H, s, H-11) [3]

References

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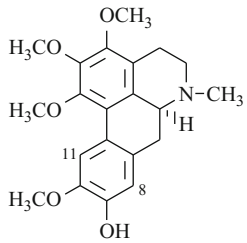
Thalisopynine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum isopyroides*
$C_{21}H_{25}NO_5$: 371.1731
Mp: oil
$[\alpha]_D$ +45° (MeOH) [1]
UV: 282, 305. 316 sh. [1]
MS *m/z*: 371(M^+), 370, 356, 340, 328 [1]
^{1}H NMR: 2.49(3H, s, NCH_3), 3.65(3H, s, 1-OCH_3), 3.82(3H, s, 10-OCH_3), 3.85, 3.90(each 3H, s, 2-OCH_3, 3-OCH_3), 6.73(1H, s, H-8), 7.85(1H, s, H-11) [1]

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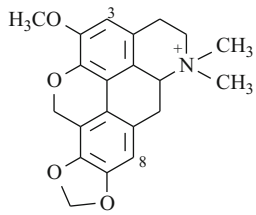
1. S. Abdizhabbarova, S.Kh. Maekh, S.Yu. Yunusov, M.R. Yagudaev, D. Kurbanov, Chem. Nat. Comp. **14**, 400 (1978)

Thalphenine

CAS Registry Number (chloride): 39027-97-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Thalictrum minus*
$C_{21}H_{22}NO_4^+$: 352.1549
Mp: 186°C (chloride) [1, 2]
$[\alpha]_D$ +69° (chloride, EtOH)
UV: 221, 230 sh, 280 sh, 288, 317, 328 sh(4.32, 4.21, 3.69, 3.83, 3.97, 3.87) [2]
MS *m/z*: 351, 293, 250 [2]
^{1}H NMR(DMSO-d_6): 3.05, 3.45(each 3H, s, N[CH_3]$_2$), 3.76(3H, s, OCH_3), 5.00(2H, m), 6.02(2H, d, J = 2.5, CH_2O_2), 6.79(1H, s, H-8), 6.82(1H, s, H-3) [2]

References

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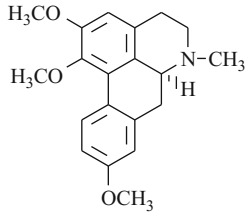
1,2,9-Trimethoxyaporphine (Orientine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver orientale*
$C_{20}H_{23}NO_3$: 325.1678
Mp: amorph.

$[\alpha]_D$ +70° (*c* 0.16, MeOH) [1]
UV: 278, 310 sh(4.25, 3.21) [1]
MS *m/z*: 325(M^+), 324(100), 310, 294, 282, 162.5($^{++}$) [1]
^{1}H NMR: 2.46(3H, s, NCH_3), 2.50–3.70(m, CH_2), 3.55, 3.74, 3.77(each 3H, s, 3 × OCH_3), 6.45, 6.65(each 1H, s, H–Ar), 6.70(1H, m, H–Ar), 8.17(1H, d, J = 9.5, H–Ar) [1]

References

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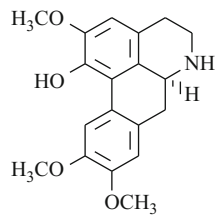
Wilsonirine (Aducaine)

CAS Registry Number: 17807-64-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Corydalis pseudoadunca, C. paniculigera, C. stricta*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 211–213°C (dec., Me_2CO) [1], 247°C (dec., hydrobromide), 200°C (picrate) [2]
$[\alpha]_D$ +55° ($CHCl_3$) [1]
UV: 220, 280, 303(4.50, 4.12, 4.13) [2]
IR: 3400 [2]
^{1}H NMR: 3.73, 3.80, 3.80(each 3H, s, 3 × OCH_3), 6.60, 6.83, 8. 05(each 1H, s, H–Ar [1]

References

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The majority of benzylisoquinoline alkaloids isolated from plants of the CIS flora have oxygen substituents in the 6- and 7-positions. This is characteristic of a large group of isoquinolines that arise biogenetically from benzylisoquinoline precursors.

Benzylisoquinoline alkaloids have been observed in 43 species of ten genera of plants from the families Berberidaceae, Fumariaceae, Papaveraceae, Ranunculaceae, and Rhamnaceae. A total of 37 benzylisoquinolines typical of 1-benzyltetrahydroisoquinoline, 1-methyl-*N*-benzyltetrahydroisoquinoline, *N*-benzyltetrahydroisoquinoline, and 1-beyzylisoquinoline alkaloids has been isolated.

Hofmann degradation of benzyltetrahydroisoquinoline derivatives proceeds smoothly and forms the N-free compound.

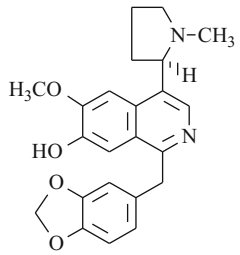
Distinguishing features observed in the UV, mass, and ^{1}H NMR spectra of benzylisoquinoline alkaloids are mainly due to the structural type or the location of the oxygen substitutents and can be used to establish the structure of a new representative of one type or another.

It has been found that armepavine stimulates isolated uterine-horn muscle. It decreases arterial pressure in acute experiments on cats.

Papaverine acts as a vasoconstrictor and spasmolytic. It is used for spasms of smooth muscle, peripheral vasculature, and brain vessels.

Arenine

CAS Registry Number: 68676-55-1



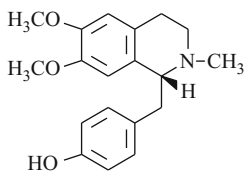
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Papaver arenarium*
$C_{23}H_{24}N_2O_4$: 392.1736
Mp: amorph. [1]
$[\alpha]_D$ −31° (MeOH) [1]
UV: 244, 291, 319, 333(4.49, 3.78, 3.57, 3.57) [1]
IR: 3300, 1510, 1495, 1040, 930 [1]
MS *m/z*: 392(M^+), 377, 363, 349, 135, 84(100) [1]
^{1}H NMR: 1.90–3.50(m), 2.19(3H, s, NCH_3), 3.94(3H, s, OCH_3), 4.32(2H, s, CH_2), 5.74(2H, s, CH_2O_2), 6.53–6.60(3H, m, 3 × H–Ar), 7.47, 7.74, 8.30(each 1H, s, 2 × H–Ar) [1]

References

1. I.A. Israilov, M.A. Manushakyan, M.S. Yunusov, V.A. Mnatsakanyan, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 358 (1978)

Armepavine

CAS Registry Number: 3423-14-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Papaver armeniacum, P. floribundum, P. fugax, P. persicum, P. zangezuricum*
$C_{19}H_{23}NO_3$: 313.1678
Mp: 148–149°C (Me_2CO–Et_2O) [1], 152°C (hydrochloride), 212°C (oxalate), 200°C (methiodide), 64°C (O-Me) [2]
$[\alpha]_D$ −118° ($CHCl_3$) [1]
UV: 228, 282 [2]
IR: 3500 [3]
MS *m/z*: 206, 191, 176 [3]
^{1}H NMR: 2.50(3H, s, NCH_3), 3.40, 3.72(each 3H, s, 2 × OCH_3), 5.87, 6.48(each 1H, s, *p*–H–Ar), 6.56, 6.85(each 2H, d, J = 8, *o*–H–Ar) [3]
Pharm./Biol.: LD_{50} 22.2 mg/kg (i/v, mice). In acute experiments on cats, lowers arterial pressure on i/v administration. Stimulates the muscles of isolated animal uteri [4]

References

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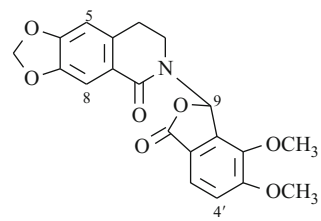
Berberal

CAS Registry Number: 66408-44-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis heterobotrys*
$C_{20}H_{17}NO_7$: 383.1005
Mp: 151–153°C (Et_2O) [1]
UV: 226, 255, 305(4.92, 4.60, 4.41) [1]
IR: 2970, 2840, 1770, 1660, 1500, 1350, 1270, 1100, 850 [1]
MS *m/z*: 383(M^+, 100), 365(7), 354(5), 352(12), 338(31), 324(31), 220(28), 208(5), 193(45), 190(58), 176(75), 165(72), 148(43) [1]
^{1}H NMR: 2.81(2H, t, J = 7.4, H-4), 2.99, 3.20(each 1H, dt, J = 14.7, 7.4, H-3), 3.87(3H, s, 6′-OCH_3), 3.97(3H, s, 5′-OCH_3), 6.01(2H, s, CH_2O_2), 6.60(1H, s, H-5), 7.14(1H, d, J = 8.0, H-4′), 7.59(1H, s, H-8), 7.65(1H, d, J = 8.0, H-3′), 7.97(1H, s, H-9) [1]
^{13}C NMR: [1]

Table 1

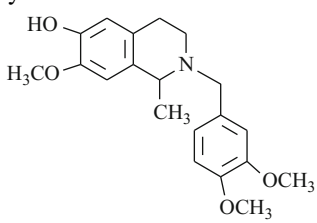
C-1	164.5	C-8	107.0	C-4′	115.0
3	40.0	8a	122.4	5′	157.3
4	27.9	9	81.8	6′	144.0
4a	134.5	10	168.4	CH_2O_2	101.7
5	108.6	C-1′	135.8	5′-OCH_3	60.8
6	151.3	2′	120.7	6′-OCH_3	56.5
7	147.1	3′	121.8		

References

1. A. Karimov, M.F. Faskhutdinov, N.D. Abdullaev, M.G. Levkovich, E.G. Mil'grom, Ya.V. Rashkes, R. Shakirov, Chem. Nat. Comp. **29**, 774 (1993)

Bernumicine

CAS Registry Number: 169626-38-4



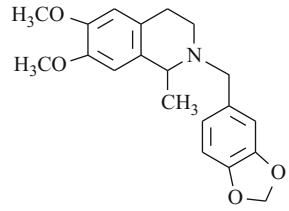
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis nummularia*
$C_{20}H_{25}NO_4$: 343.1777
Mp: oil, 212°C (hydrochloride) [1]
$[\alpha]_D$ +14° ($CHCl_3$) [1]
UV: 286(3.84) [1]
IR: 3400 [1]
MS *m/z*: 343(M^+, 4), 328(56), 192(3), 178(9), 151(100) [1]
^{1}H NMR(hydrochloride) ($CDCl_3$ + Py-d_5): 1.61(3H, d, J = 6.6, CH_3), 2.97(2H, m), 3.40(2H, m), 3.77, 3.80(3H, 6H, s, 3 × OCH_3), 4.26(2H, s), 4.44(1H, q), 6.65, 6.72(each 1H, s, H–Ar), 7.01, 7.12(2H, br s, 1H, br s, H–Ar) [1]

References

1. A. Karimov, R. Shakirov, Chem. Nat. Comp. **29**, 335 (1993)

Bernumidine

CAS Registry Number: 169626-37-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis nummularia*
$C_{20}H_{23}NO_4$: 341.1627 [1]
Mp: oil, 181°C (hydrochloride) [1]
$[\alpha]_D$ +21° ($CHCl_3$) [1]
UV: 286(3.78) [1]
IR: 2920, 2439, 1610, 1540, 1450, 1270, 1110, 1030, 810, 780 [1]
MS *m/z*: 341(M^+, 3), 326(52), 207(11), 206(8), 192(14), 135(100) [1]
^{1}H NMR(hydrochloride) ($CDCl_3$ + CD_3OD): 1.71(3H, d, J = 7, CH_3), 3.00(2H, m), 3.32(2H, m), 3.76, 3.78(each 3H, s, 2 × OCH_3), 4.06(2H,

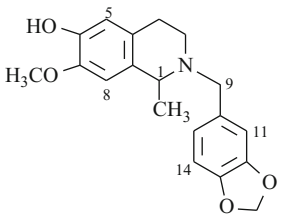
br s, CH_2O_2), 4.15(1H, m), 5.91(2H, s), 6.35, 6.56(each 1H, s, H–Ar), 6.70, 6.96, 7.20(each 1H, d, J = 8.5, dd, J = 8.5, 1.8, d, J = 1.8, H–Ar) [1]

References

1. A. Karimov, R. Shakirov, Chem. Nat. Comp. **29**, 335 (1993)

Bernumine

CAS Registry Number: 169134-46-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Berberis nummularia*

$C_{19}H_{21}NO_4$: 327.1465 [1]

Mp: oil [1]

$[\alpha]_D$ +33°C ($CHCl_3$) [1]

UV: 285(3.84) [1]

IR: 3450 [1]

MS *m/z*: 327(M^+, 2), 312(55), 192(2, 5), 190(2), 178(5, 5), 135(100) [1]

^{1}H NMR: 1.30(3H, d, J = 6.6, CH_3), 2.30–3.20(4H, m), 3.58, 3.64(each 1H, d, J = 13.5, H-9), 3.74(1H, q, J = 6.6, H-1), 3.75(3H, s, OCH_3), 5.92(2H, s, CH_2O_2), 6.42(1H, s, H-8), 6.56(1H, s, H-5), 6.65(1H, d, J = 8, H-14), 6.74(1H, d, J = 8, H-15), 6.87(1H, d, J = 1.5, H-11) [1]

^{13}C NMR: [1]

Table 1

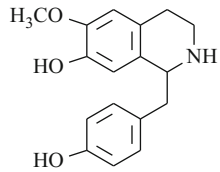
C-1	55.5	C-8	109.4	C-13	146.5
3	43.2	8a	132.2	14	109.3
4	25.7	9	57.3	15	121.9
4a	126.1	10	130.5	CH_3	20.0
5	114.3	11	107.8	OCH_3	55.8
6	143.9	12	147.5	CH_2O_2	100.8
7	145.0				

References

1. A. Karimov, M.G. Levkovich, N.D. Abdullaev, R. Shakirov, Chem. Nat. Comp. **29**, 335 (1993)

Coclaurine

CAS Registry Number: 486-39-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Corydalis paniculigera, C. pseudoadunca, C. sewerzowii, Fumaria parviflora, F. vaillantii, Zizyphys jujuba*

$C_{17}H_{19}NO_3$: 285.1365

Mp: 218–220°C (MeOH), 263°C (dec., hydrochloride) [1]

UV: 230, 285(3.91, 4.08) [2]

IR: 3380, 1590 [2]

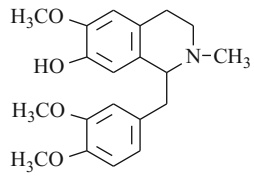
MS *m/z*: 178(100), 163, 107 [2]

^{1}H NMR: 2.50–3.50(6H), 3.76(3H, s, OCH_3), 3.94(1H, q, J = 2; 7.5), 6.57, 6.62(each 1H, s, *p*–H–Ar), 6.68, 7.02(each 2H, d, J = 8, *o*–H–Ar) [2]

References

1. R. Ziyaev, T. Irgashev, I.A. Israilov, N.D. Abdullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 204 (1977)
2. T. Irgashev, Author's Abstract of Candidate's Dissertation, Tashkent, 1983

Codamine



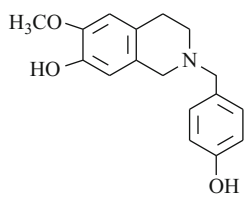
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Papaver somniferum*
$C_{20}H_{25}NO_4$: 343.1783
Mp: 126–127°C [1], 217°C (methiodide) [1]
$[\alpha]_D$ +75° (EtOH) [1, 2]
UV: 284 [1]
MS *m/z*: 343, 192(100), 190, 177, 175 [2]
^{1}H NMR: 2.40(3H, s, NCH_3), 3.76(3H, s, OCH_3), 3.82(6H, s, 2 × OCH_3), 6.32, 6.46(each 1H, s), 6.49–6.72(3H, m) [2]

References

1. L. Kuhn, S. Pfeifer, Pharmazie **18**, 819 (1963)
2. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 10 (Academic, New York, 1968), p. 401

Corgoine

CAS Registry Number: 15778-86-6



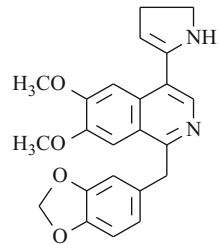
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Corydalis gortschakovii*
$C_{17}H_{19}NO_3$: 285.1365
Mp: 190–191°C (MeOH), 269°C (dec., hydrochloride) [1, 2]
Solubility: spar. sol. org. solvs [1, 2]
UV: 226, 284(4.36, 3.91) [1, 2]
IR: 3500, 3400, 1610, 1520 [1, 2]
MS *m/z*: 285(M^+), 178, 163, 150, 107 [1, 2]
^{1}H NMR(CF_3COOH): 3.48(3H, s, OCH_3), 6.28, 6.38(each 1H, s, *p*–H–Ar), 6.65, 6.98(each 2H, d, J = 8, *o*–H–Ar) [1, 2]

References

1. M.U. Ibragimova, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 660 (1970). **7**, 209 (1971)
2. M.U. Ibragimova, Author's Abstract of Candidate's Dissertation, Tashkent, 1974

Dehydronormacrostomine

CAS Registry Number: 115107-84-1



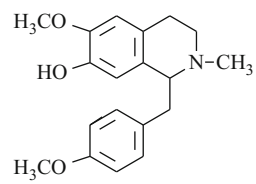
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Papaver macrostomum*
$C_{23}H_{22}N_2O_4$: 390.1580
Mp: 193–195°C (Me_2CO) [1]
UV: 249, 295, 317, 333 sh(4.24, 3.51, 3.46, 3.43) [1]
MS *m/z*: 390(M^+), 389(100), 376, 375, 373, 361, 359, 347, 345, 344, 343, 331, 317, 316, 315, 180, 135, 77 [1]

References

1. V.A. Mnatsakanyan, V. Preininger, V. Simanek, J. Jurina, A. Klasek, L. Dolejs, F. Santavy, Collect. Czech. Chem. Commun. **42**, 1421 (1977)

N-Demethylcolletine

CAS Registry Number: 19879-50-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Aconitum leucostomum*
$C_{19}H_{23}NO_3$: 313.1678

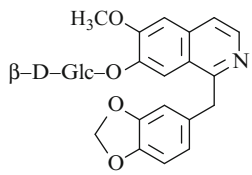
$[\alpha]_D$ −80° (MeOH) [1]
UV: 223, 284(4.20, 3.69) [2]
MS *m/z*: 192(100), 121(25) [2]
^{1}H NMR: 2.38(3H, s, NCH_3), 3.63, 3.78(each 3H, s, 2 × OCH_3), 6.25, 6.40(each 1H, s, H-8, H-5), 6.37, 6.91(each 2H, d, J = 8, 4 × H–Ar) [2]

References

1. M. Nieto, T. Sevenet, M. Leboeuf, A. Cave, Planta Med. **30**, 48 (1976)
2. M.G. Zhamierashvili, V.A. Tel'nov, M.S. Yunusov, S.Yu. Yunusov, A. Nigmatullaev, K. Taizhanov, Chem. Nat. Comp. **16**, 576 (1980)

Glicomarine

CAS Registry Number: 77396-64-6



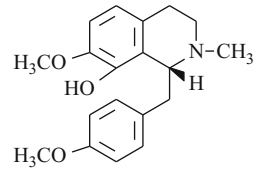
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Papaver arenarium*
$C_{24}H_{25}NO_9$: 471.1529
Mp: 205–206°C (MeOH) [1]
$[\alpha]_D$ −51° ($CHCl_3$–MeOH) [1]
UV: 239, 290, 313, 327(4.78, 4.01, 3.81, 3.85) [1]
IR: 3515, 3450, 1630, 1605, 1580, 1520, 1100–1000, 940, 925 [1]
MS *m/z*: 471(M^+), 309, 308 [1]
^{1}H NMR(Py-d_5): 3.64(3H, s, OCH_3), 4.22(2H, s, Ar-CH_2-Ar), 4.25–5.65(11H, m), 5.69(2H, s, CH_2O_2), 6.67(1H, d, J = 8, *o*–H–Ar), 7.03–7.28(3H, m, H–Ar), 7.44, 8.56(each 1H, d, J = 4.5, *o*–H–Ar), 8.21(1H, s, H–Ar) [1]

References

1. I.A. Israilov, M.A. Manushakyan, V.A. Mnatsakanyan, M.S. Yunusov, S.Yu. Yunusov, Khim. Prirod. Soedin. 852 (1980)

Gortschakoine

CAS Registry Number: 16336-17-7

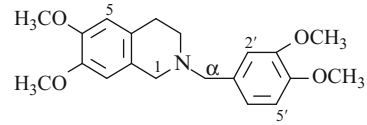


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Corydalis gortschakovii*
$C_{19}H_{23}NO_3$: 313.1678
Mp: amorph. [1]
$[\alpha]_D$ −40° (MeOH) [1]
UV: 226, 282(4.31, 3.68) [1]
IR: 3510, 1610 [1]
MS *m/z*: 313(M^+), 192(100), 177, 148, 121 [1]
^{1}H NMR(CCl_4): 2.20–3.30(6H, m, 3 × CH_2), 2.23(3H, s, NCH_2), 3.63(3H, s, OCH_3), 3.73(3H, s, OCH_3), 3.88(1H, q, H-1), 5.94(1H, br s, OH), 6.34, 6.50(each 1H, d, J = 7.9, o–H–Ar), 6.56, 7.00(each 2H, d, J = 8.1, o–H–Ar) [1]

References

1. T. Irgashev, I.A. Israilov, N.D. Abdullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 118 (1977)

Intebrimine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis integerrima*
$C_{20}H_{25}NO_4$: 343.1783
Mp: oil, 171–172°C (hydrochloride) [1]
Solubility: very sol. org. solvs [1]
UV: 208, 230 sh, 285(4.31, 3.84, 3.69) [1]

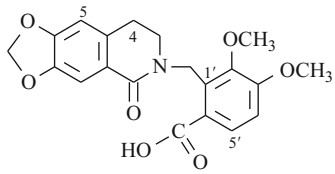
IR: 2900, 2540, 1600, 1480, 1440, 1110 [1]
MS *m/z*: 343(M^+, 25), 342(23), 328(2), 206(3), 192(100), 176(6), 164(63), 151(82) [1]
^{1}H NMR: 2.82(4H, m, H-3, H-4), 3.56(2H, s, H-α), 3.62(2H, s, H-1), 3.81(6H, s, 2 × OCH_3), 3.84(6H, s, 2 × OCH_3), 6.49(1H, s, H-5), 6.60(1H, s, H-8), 6.78(1H, d, J = 8.5, H-5′), 6.90(1H, dd, J = 8.5; 1.8, H-6′), 6.98(1H, d, J = 1.8, H-2′) [1]

References

1. A. Karimov, V.I. Vinogradova, R. Shakirov, Chem. Nat. Comp. **29**, 57 (1993)

Intebrine

CAS Registry Number: 169238-47-5



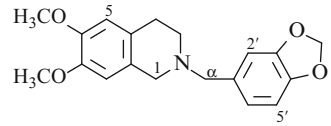
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis integerrima*
$C_{20}H_{19}NO_7$: 385.1161
Mp: 193–194°C (MeOH) [1]
Solubility: spar. sol. org. solvs [1]
UV: 223, 250, 304(4.98, 4.62, 4.45) [1]
IR: 3440, 2430, 1715, 1580, 1490, 1400, 1280 [1]
MS *m/z*: 385(M^+, 81), 367(20), 356(30), 354(100), 340(22), 338(19), 310(50), 222(5), 206(10), 204(19), 193(67), 192(50), 190(72), 176(64) [1]
^{1}H NMR(DMSO-d_6): 2.70(2H, t, H-3), 3.24(2H, t, H-4), 3.68(3H, s, OCH_3), 3.85(3H, s, OCH_3), 4.97(2H, s, H-α), 6.00(2H, s, CH_2O_2), 6.72(1H, s, H-5), 7.05(1H, d, J = 8.5, H-4′), 7.27(1H, s, H-8), 7.65(1H, d, J = 8.5, H-5′) [1]
X-ray: [1]

References

1. A. Karimov, B. Tashkhodzhaev, Ya.V. Rashkes, M.K. Makhmudov, E.G. Mil'grom, Chem. Nat. Comp. **29**, 53 (1993)

Intebrinine

CAS Registry Number: 169238-46-4



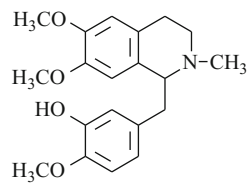
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis integerrima*
$C_{19}H_{21}NO_4$: 327.1471
Mp: oil, 224°C (hydrochloride) [1]
UV: 206, 230 sh, 287(4.21, 3.87, 3.72) [1]
IR: 2920, 2530, 1610, 1500, 1450, 1260, 1120, 1040, 940, 820 [1]
MS *m/z*: 327(M^+, 26), 326(23), 312(2), 206(3.5), 192(100), 176(5), 164(65), 135(82), 121(10.5) [1]
^{1}H NMR: 2.80(4H, m, H-3, H-4), 3.51(2H, s, H-α), 3.60(2H, s, H-1), 3.80(3H, s, OCH_3), 3.84(3H, s, OCH_3), 5.96(2H, s, CH_2O_2), 6.45(1H, s, H-5), 6.58(1H, s, H-8), 6.76(1H, d, J = 8.5, H-5′), 6.87(1H, dd, J = 8.5; 1.8, H-6′), 6.94(1H, d, J = 1.8. H-2′) [1]

References

1. A. Karimov, V.I. Vinogradova, R. Shakirov, Chem. Nat. Comp. **29**, 57 (1993)

Laudanidine

CAS Registry Number: 3122-95-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

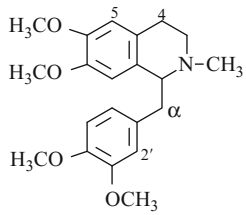
Biological sources: *Berberis heteropoda*
$C_{20}H_{25}NO_4$: 343.1783
Mp: 178–179°C [1, 2]
$[\alpha]_D$ +75° ($CHCl_3$) [1, 2]
UV: 285(3.82) [1, 2]

References

1. Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **2**, 35 (1966)
2. M.M. Yusupov, A. Karimov, I.A. Israilov, R. Shakirov, Dep. VINITI No. 640–V92; Ref. Zh. Khim. 17E 113 (1992)

Laudanosine

CAS Registry Number: 2688-77-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis heteropoda*
$C_{21}H_{27}NO_4$: 357.1940
Mp: 86–87°C (Me_2CO), 220°C (methiodide) [1]
$[\alpha]_D$ +48° ($CHCl_3$) [1]
UV: 282(3.82) [1]
IR: 2830, 2780, 1610, 1580, 1520, 1270, 1240 [1]
^{13}C NMR: [2]

Table 1

C-1	65.5	C-8	110.7	C-5′	110.7
3	46.8	8a	132.2	6′	121.5
4	25.3	α	40.4	6-OCH_3	55.5
4a	125.8	1′	129.0	7-OCH_3	55.5
5	112.8	2′	110.7	3′-OCH_3	55.3
6	146.9	3′	148.3	4′-OCH_3	55.3
7	146.9	4′	146.0	NCH_3	42.4

HPLC: [3]
Pharm./Biol.: Convulsive agent acting on the extrapyramidal system and mesencephalon [4]

References

1. Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **2**, 35 (1966)
2. M. Shamma, D.M. Hindenlang, *Carbon^{-13} NMR Shift Assignment of Amines and Alkaloids* (Plenum Press, New York/London, 1979). No. 320
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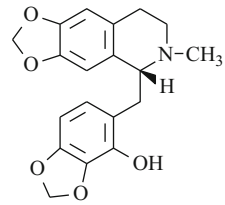
Ledecorine

CAS Registry Number: 68676-56-2



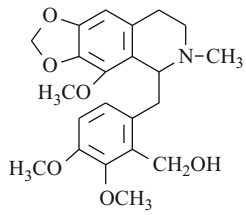
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana, Fumaria vaillantii*
$C_{19}H_{19}NO_5$: 341.1263
Mp: 199–200°C (MeOH) [1]
$[\alpha]_D$ −112° (MeOH) [1]
UV: 240 sh, 295(3.88, 3.74) [1]
IR: 3430, 1620, 1590, 1040, 935 [1]
MS *m/z*: 190(100), 175, 160, 149 [1]
^{1}H NMR: 2.55(3H, s, NCH_3), 2.60–3.20(m), 4.20(1H, t, J = 6), 5.86, 5.88(each 1H, s, CH_2O_2), 6.01(2H, s, CH_2O_2), 6.23, 6.54(each 1H, s, *p*–H–Ar), 6.27, 6.58(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 465 (1978)

Macrantaline

CAS Registry Number: 62818-76-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Papaver lisae*

$C_{22}H_{27}NO_6$: 401.1838

Mp: 140–141°C (Me_2CO-Et_2O-pet. ether) [1]

$[\alpha]_D$ +30° ($CHCl_3$) [1]

UV: 238, 285 [1]

IR: 3150 [1]

MS *m/z*: 401(M^+), 220(100), 205, 181 [1]

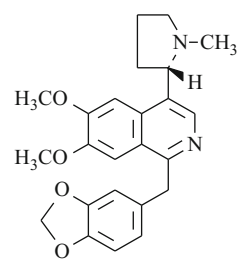
^{1}H NMR: 2.19(3H, s, NCH_3), 2.40–3.40(6H, m), 3.67(1H, q), 3.82, 3.86, 4.16(each 3H, s, 3 × OCH_3), 4.39, 4.82(each 1H, d, J = 10), 5.84(2H, s, CH_2O_2), 6.29(1H, s, H–Ar), 6.81, 7.04 (each 1H, d, J = 7, *o*–H–Ar) [1]

References

1. V.V. Melik-Guseinov, D.A. Murav'eva, V.A. Mnatsakanyan, Chem. Nat. Comp. **15**, 209 (1979)

Macrostomine

CAS Registry Number: 53912-94-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Papaver arenarium, P. macrostomum*

$C_{24}H_{26}N_2O_4$: 406.1893

Mp: 107–110°C (C_6H_6) [1]

$[\alpha]_D$ −51° ($CHCl_3$) [1]

UV: 241, 246 sh, 276 sh, 288, 292 sh, 317, 332(4.87, 4.62, 3.87, 3.97, 3.80, 3.74, 3.77) [1]

IR: 2792, 1645 [1]

MS *m/z*: 406(M^+), 405, 391, 377, 375, 364, 363, 350, 349, 322, 271, 243, 160, 135, 84(100) [1]

^{1}H NMR(C_6D_6): 1.50–2.20(4H, m), 2.13(3H, s, NCH_3), 3.00–3.60(3H, m), 3.47, 3.55(each 3H, s, 2 × OCH_3), 4.55(2H, s, Ar–CH_2–Ar), 5.30(2H, s, CH_2O_2), 6.55(1H, d, J = 8), 6.80(1H, dd, J = 8; 1), 6.97(1H, d, J = 1), 7.35, 7.87, 8.72(each 1H, s, 3 × H–Ar) [1]

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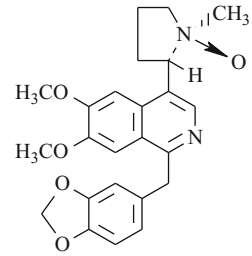
Macrostomine *cis*-N-Oxide



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Papaver arenarium*

$C_{24}H_{26}N_2O_5$: 422.1842

Mp: amorph. [1, 2]

$[\alpha]_D$ +35° (MeOH) [1, 2]

UV: 248, 292, 320, 335(4.49, 3.78, 3.57, 3.57) [1, 2]

IR: 1620, 1570, 1520, 1040, 930 [1, 2]

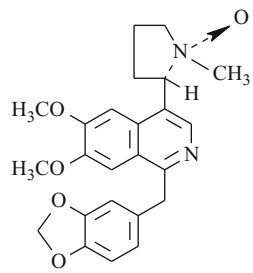
MS *m/z*: 422(M^+), 406, 405, 404, 363(100), 348, 84, 60, 43 [1, 2]

^{1}H NMR: 2.25–3.70(6H, m), 2.79(3H, s, NCH_3), 3.86, 4.06(each 3H, s, 2 × OCH_3), 4.45(2H, s, CH_2), 5.54(1H, t, J = 7), 5.82(2H, s, CH_2O_2), 6.65(1H, H–Ar), 6.70(2H, H–Ar), 7.33, 8.00, 8.33(each 1H, s, H–Ar) [1, 2]

References

1. I.A. Israilov, M.A. Manushakyan, V.A. Mnatsakanyan, M.S. Yunusov, Chem. Nat. Comp. **20**, 71 (1984)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. comp. **32**, 596 (1996)

Macrostomine *trans*-N-Oxide



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Papaver arenarium*

$C_{24}H_{26}N_2O_5$: 422.1842

Mp: 141–142°C (Me_2CO) [1]

$[\alpha]_D$ +68° (MeOH) [1]

UV: 243, 290, 320, 333(4.52, 3.43, 3.69, 3.48) [1]

IR: 1620, 1570, 1525, 1045, 930 [1]

MS *m/z*: 422(M^+), 406, 405, 404, 363(100), 348, 84, 60, 43 [1]

^{1}H NMR: 2.10–3.90(m, 6), 3.02(3H, s, NCH_3), 3.85, 3.97(each 3H, s, 2 × OCH_3), 4.37(2H, s, CH_2), 4.76(1H, m), 5.81(2H, s, CH_2O_2), 6.66–7.22(5H, m, H–Ar), 8.63(1H, br s, H–Ar) [1]

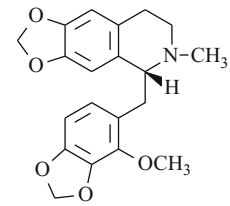
^{1}H NMR(CD_3OD): 6.61(3H, m, H–Ar), 7.37, 7.47, 8.65(each 1H, s, H–Ar) [1]

References

1. I.A. Israilov, M.A. Manushakyan, V.A. Mnatsakanyan, M.S. Yunusov, Chem. Nat. Comp. **20**, 71 (1984)

Marshaline

CAS Registry Number: 68676-57-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Corydalis marschalliana*

$C_{20}H_{21}NO_5$: 355.1420

Mp: 134–135°C [1]

$[\alpha]_D$ −105° ($CHCl_3$) [1]

UV: 290(3.75) [1]

MS *m/z*: 190(100) [1]

^{1}H NMR: 2.29(3H, s, NCH_3), 2.30–3.70(m, 7H), 3.77(3H, s, OCH_3), 5.77, 5.92(each 2H, s, 2 × CH_2O_2), 6.22, 6.42(each 1H, s, *p*–H–Ar), 6.40, 6.67(each 1H, d, J = 8, *o*–H–Ar) [1]

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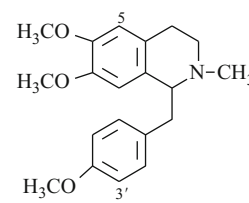
O-Methylarmepavine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Aconitum leucostomum*
$C_{20}H_{25}NO_3$: 327.1834
Mp: 63–64°C (pet. ether) [1], oil [2], 136°C (methiodide) [1]
$[\alpha]_D$ −84° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, Et_2O, EtOH; spar. sol. pet. ether [1]
UV(methiodide): 284(3.66) [3]
IR: 2910, 2820, 1610, 1515, 1460, 1450, 1380, 1300, 1250, 1190, 1170, 1120, 1030, 870, 800 [4]
MS *m/z*: 327(M^+), 206(100), 192, 121 [4]
^{1}H NMR: 2.55(3H, s, NCH_3), 3.60(3H, s, 7-OCH_3), 3.80(3H, s, 4′-OCH_3), 3.87(3H, s, 6-OCH_3), 6.10(1H, s, H-8), 6.60(1H, s, H-5), 6.83, 7.07(each 2H, d, J = 7.5, H-2′, H-3′, H-5′, H-6′) [5]

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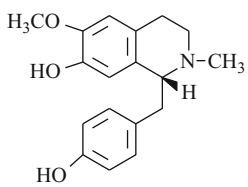
N-Methylcoclaurine

CAS Registry Number: 5096-70-8



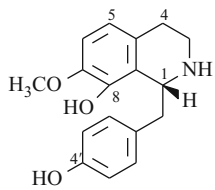
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis heteropoda, B. iliensis, Corydalis gortschakovii, C. ledebouriana, C. stricta, Glauciun fimbrilligerum, G. oxylobum*
$C_{18}H_{21}NO_3$: 299.1521
Mp: 132–133°C (MeOH) [1]
$[\alpha]_D$ −62° ($CHCl_3$) [1]
UV: 228, 288 [1]
IR: 3600–3200, 1600, 1510 [1]
MS *m/z*: 299(M^+), 192, 177 [1]
^{1}H NMR: 2.39(3H, s, NCH_3), 2.40–3.70(7H, m), 3.75(3H, s, OCH_3), 5.70(2H, br s), 6.31, 6.46(each 1H, s, *p*–H–Ar), 6.44, 6.85(each 2H, d, J = 8, *o*–H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. comp. **32**, 596 (1996)

Noryuzifine

CAS Registry Number: 74119-87-2



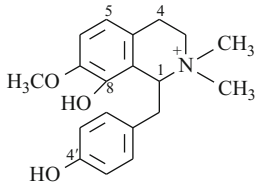
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Fumaria parviflora, F. vaillantii*
$C_{17}H_{19}NO_3$: 285.1365
Mp: 198–199°C [1]
$[\alpha]_D$ −18° (MeOH) [1]
UV: 228, 285(4.20, 3.56) [1]
IR: 3370, 1610, 1590 [1]
MS *m/z*: 285(M^+), 178(100), 163, 107 [1]
^{1}H NMR(CD_3OD): 2.50–2.90(m), 3.79(3H, s, OCH_3), 4.19(1H, q, H-1), 6.50, 7.05(each 2H, d, J = 8), 6.69, 6.72(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. M. Alimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 783 (1979)

Oblongine

CAS Registry Number: 60008-01-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis oblonga*
$C_{19}H_{24}N^{+}O_3$: 314.1756
Mp: 160°C (iodide) [1]
$[\alpha]_D$(iodide): +9° (MeOH) [1]
UV(iodide): 224 sh, 284(4.47, 3.78) [1]
IR(iodide): 3260, 810, 765 [1]
MS *m/z* (iodide): 313(M-HI), 206, 192(100), 142, 127, 107, 58 [1]
^{1}H NMR(iodide, Py-d_5): 2.92(2H, m, H-4), 3.31(3H, s, NCH_3), 3.46(3H, s, NCH_3), 3.64(3H, s, OCH_3), 4.09(2H, m, H-3), 5.38(1H, dd, H-1), 6.55(1H, d, J = 8.4, H-5), 6.85(1H, d, J = 8.4, H-6), 6.98(2H, d, J = 8.5), 7.35(2H, d, J = 8.5) [1]

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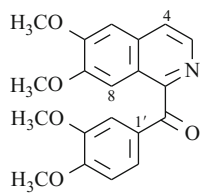
Papaveraldine (Csantaline)

CAS Registry Number: 522-57-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Papaver somniferum*
$C_{20}H_{19}NO_5$: 353.1263
Mp: 210°C, 135°C (methiodide) [1]
^{13}C NMR: [2]

Table 1

C-1	153.5	C-8	103.8	C-6′	126.6
3	139.7	8a	122.5	OCH_3	55.9
4	120.9	1′	129.6	OCH_3	55.9
4a	133.6	2′	111.7	OCH_3	55.9
5	104.6	3′	148.7	OCH_3	55.9
6	152.9	4′	153.5	C = O	186.4
7	150.7	5′	109.7		

HPLC: [3]

References

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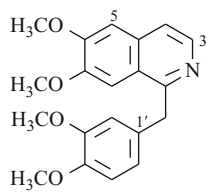
Papaverine

CAS Registry Number: 58-74-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Berberis turcomanica, Papaver commutatum, P. somniferum*
$C_{20}H_{21}NO_4$: 339.1471
Mp: 145–147°C, 196°C (dec., oxalate), 186°C (dec., picrate), 226°C (hydrochloride) [1]
UV: 239, 280 [2]
IR: 1649, 1600, 1534, 1485, 1317, 1288, 1259, 1203, 1188, 1168, 1142, 1128, 1102, 1039, 1013, 978, 938, 925, 890, 869, 862, 853 [3]
MS *m/z*: 339(M^+), 338, 324(100), 308 [4]
^{13}C NMR: [5]

Table 1

C-1	157.4	C-7	149.7	C-4′	147.0
3	140.6	8	103.8	5′	110.5
4	118.3	8a	122.5	6′	120.1
4a	133.0	9	42.0	OCH_3	55.5
5	104.9	1′	131.9	OCH_3	55.5
6	152.0	2′	111.5	OCH_3	55.5
		3′	148.6	OCH_3	55.5

X-ray: [6]
HPLC: [7]
Pharm./Biol.: Vasodilating and spasmolytic action. Used in spasms of the smooth musculature, the peripheral vessels, and the vessels of the brain [8]. Supplied in the form of tablets, ampules, suppositories, and combined tablets: "Mopaverin," "Pafillin," "Kellatrin," "Kelliverin," and "Nikoverin."

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5. A.J. Marsaioli, E.A. Ruveda, F.A.M. Reis, Phytochemistry **17**, 1655 (1978)
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7. N.R. Ayyangar, S.R. Bhide, J. Chromatogr. **366**, 435 (1986)
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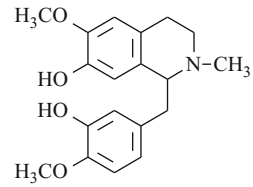
Reticuline

CAS Registry Number: 485-19-8



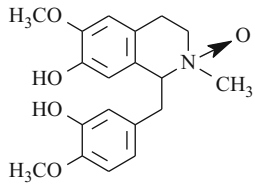
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Aconitum zeravschanicum, Argemone alba, A. albiflora, A. hybrida, A. mexicana, A. ochroleuca, A. platyceras, Berberis heteropoda, B. integerrima, B. nummularia, Corydalis gortschakovii, C. marschalliana, C. pseudoadunca, C. stricta, Dicentra peregrina, Fumaria vaillantii, Glaucium corniculatum, G. fimbrilligerum, G. squamigerum, Hylomecon vernalis, Papaver alberti, P. hybridum, P. paczoskii, P.* somniferum
$C_{19}H_{23}NO_4$: 329.1627
$[\alpha]_D$ +47° (MeOH) [1]
UV: 286(4.10) [2]
MS *m/z*: 329(M^+), 192(100), 178, 137 [2]
^{1}H NMR: 2.43(3H, s, NCH_3), 2.45–3.90(7H, m), 3.78(6H, s, 2 × OCH_3), 5.35(2H, 2 × OH), 6.23, 6.47(each 1H, s), 6.48–6.77(3H, m) [2]

References

1. S.U. Karimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 177 (1980)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. comp. **32**, 737 (1996)

Reticuline N-Oxide

CAS Registry Number: 71657-63-1



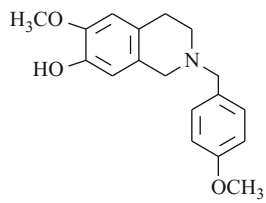
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Corydalis pseudoadunca*
$C_{19}H_{23}NO_5$: 345.1576
Mp: amorph. [1]
$[\alpha]_D$ +27° (MeOH) [1]
MS *m/z*: 345(M^+), 329, 328, 327, 192(100), 137 [1]
^{1}H NMR(Py-d_5): 2.59–4.90(7H, m), 3.03(3H, s, NCH_3), 3.59, 3.64(each 3H, s, 2 × OCH_3), 6.50–7.70(5H, m, H–Ar) [1]

References

1. I.A. Israilov, T. Irgashev, M.S. Yunusov, Chem. Nat. Comp. **21**, 807 (1985)

Sendaverine

CAS Registry Number: 5056-80-4



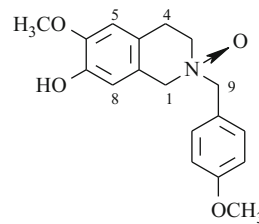
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Corydalis gortschakovii*
$C_{18}H_{21}NO_3$: 299.1521
Mp: 136–138°C (MeOH) [1]
UV: 226, 285(3.59, 4.15) [2]
IR: 3546, 2849, 2799 [2]
MS *m/z*: 299(M^+), 192, 178, 163, 150, 135, 121(100), 107 [2]
^{1}H NMR: 3.72(6H, s, 2 × OCH_3), 6.39, 6.46, 6.78, 7.20(6 × H–Ar) [2]
^{1}H NMR(CF_3COOH): 3.52, 3.57(each 3H, s, 2 × OCH_3), 6.29, 6.38(each 1H, s, *p*–H–Ar), 6.70, 7.04(each 2H, d, J = 8, *o*–H–Ar) [2]

References

1. M.U. Ibragimova, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 447 (1970)
2. M.U. Ibragimova, Author's Abstract of Candidate's Dissertation, Tashkent, 1974

Sendaverine N-Oxide

CAS Registry Number: 65907-09-7



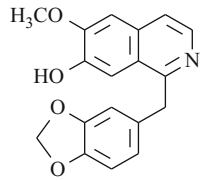
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Corydalis gortschakovii*
$C_{18}H_{21}NO_4$: 315.1471
Mp: 215–216°C [1]
Solubility: spar. sol. org. solvs [1]
UV: 232, 284(4.28, 4.04) [1]
MS *m/z*: 315(M^+), 299, 298, 297, 178, 150, 135, 121(100), 107 [1]
^{1}H NMR: 3.50, 3.55(each 3H, s, 2 × OCH_3), 3.61, 2.93(each 2H, m), 4.15, 4.35(each 1H, d, J = 14), 4.41(2H, s, 2H-9), 6.29, 6.43(each 1H, s, H–Ar), 6.70, 7.09(each 2H, d, J = 8, *o*–H–Ar) [1]

References

1. I.A. Israilov, T. Irgashev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 702 (1977)

Sevanine

CAS Registry Number: 54293-58-2



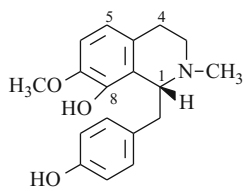
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Papaver arenarium, P. macrostomum*
$C_{18}H_{15}NO_4$: 309.1001
Mp: 213–215°C (MeOH) [1]
UV: 241, 277 sh, 285, 291 sh, 321, 332 [1]
MS *m/z*: 309(M^+), 308(100), 307, 293, 292, 280, 278, 265, 264, 250, 248, 236, 235, 220, 208, 207, 191, 178, 167, 151, 150, 135, 123, 121 [1]
^{1}H NMR($CDCl_3$–CD_3OD): 4.03(3H, s, OCH_3), 4.45(2H, s, Ar–CH_2–Ar), 5.87(2H, s, CH_2O_2), 6.72(3H, s), 7.10, 7.48(each 1H, s), 7.45, 8.23(each 1H, d, J = 6) [1]

References

1. V.A. Mnatsakanyan, V. Preininger, V. Simanek, J. Jurina, A. Klasek, L. Dolejs, F. Santavy, Collect. Czech. Chem. Commun. **42**, 1421 (1977)

Yuzifine

CAS Registry Number: 64091-05-0



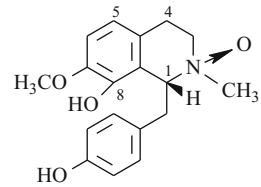
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Berberis vulgaris, Corydalis gortschakovii, C. pseudoadunca, C. stricta, Zizyphus jujuba*
$C_{18}H_{21}NO_3$: 299.1521
Mp: 158–159°C (MeOH), 231°C (Me_2CO, hydrochloride) [1]
$[\alpha]_D$ +18° ($CHCl_3$) [1]
UV: 227, 286(4.33, 3.92) [1]
IR: 3210–3030, 2845, 1610, 1590, 1245 [1]
MS *m/z*: 192(100), 177, 148, 107 [1]
^{1}H NMR: 2.30–3.45(6H, m, 3 × CH_2), 2.36(3H, s, NCH_3), 3.82(3H, s, OCH_3), 4.19(1H, q, H-1), 5.96(2H, br s, 2 × OH), 6.35, 6.99(each 2H, d, J = 8, *o*–H–Ar), 6.56, 6.70(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. R. Ziyaev, T. Irgashev, I.A. Israilov, N.D. Abdullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 204 (1977)

Yuzifine N-Oxide

CAS Registry Number: 65954-43-0

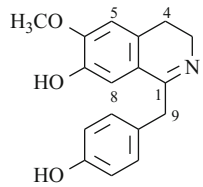


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids
Biological sources: *Corydalis gortschakovii*
$C_{18}H_{21}NO_4$: 315.1471
Mp: 197–198°C (MeOH) [1]
$[\alpha]_D$ −29° (MeOH) [1]
UV: 228, 281(4.36, 3.73)
MS *m/z*: 315(M^+), 299, 298, 297, 192(100), 178, 150, 135, 121, 107 [2]
^{1}H NMR(CF_3COOH): 2.35–3.75(6H, m), 3.15(3H, d, NCH_3), 3.53(3H, s, OCH_3), 5.04(1H, m, H-1), 6.30–6.80(6H, m, H–Ar) [1, 2]

References

1. T. Irgashev, Author's Abstract of Candidate's Dissertation, Tashkent, 1983
2. I.A. Israilov, T. Irgashev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 702 (1977)

Yuzirine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Benzylisoquinoline Alkaloids

Biological sources: *Zizyphus jujuba*

$C_{17}H_{15}NO_3$: 281.1052

Mp: 203–205°C (Me_2CO), 239°C (dec., hydrochloride) [1]

Solubility: spar. sol. org. solvs [1]

UV: 239, 273, 280, 319, 331(4.48, 3.63, 3.63, 3.31, 3.32) [1]

IR: 3380–3200 [1]

MS *m*/*z*: 281(M^+), 280(100), 265, 264, 249, 236, 220, 140.5 ($^{++}$) [1]

^{1}H NMR(CF_3COOH): 3.82(3H, s, OCH_3), 4.37(2H, s, 2H-9), 6.64–7.60(8H, H–Ar) [1]

References

1. R. Ziyaev, T. Irgashev, I.A. Israilov, N.D. Abdullaev, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 204 (1977)

Bisbenzylisoquinoline (BBIQ) alkaloids occupy a special place among isoquinoline dimers with an ether bridge that have been isolated from plants.

BBIQ alkaloids have been observed in 27 species of plants from six genera of the families Berberidaceae, Magnoliaceae, Menispermaceae, and Ranunculaceae. The majority of 34 BBIQ found in the studied plants have been isolated from representatives of the genus *Thalictrum*. They all are dimers with two ether bridges. They include alkaloids with a fully aromatized isoquinoline moiety and partially hydrogenated ones. Quaternary BBIQ and *N*-oxides have also been observed.

Berbamunine, dauricine, magnoline, and magnolamine, being ditertiary bisbenzyltetrahydroisoquinolines with one ether bridge, have been observed in plants of the genera *Berberis*, *Menispermum*, and *Magnolia*, respectively.

Dimers with two ether bridges belong to the berbamine, thalicberine, hydroxyacanthine, thalmine, thalidasine, talphinine, or talphine types. The berbamine group comprises mainly dimers with two ether bridges. Of these, hernandezine, thalsimine, thalsimidine, and hernandezine *N*-oxide are primary BBIQ with C-5 substituents. Thalsimine differs by the presence of an imine.

Among hydroxyacanthine dimers, thalisopine has a C-5′ substituent.

The thalmine group includes BBIQ with a 21-membered dioxide ring.

Thalphine contains a fully aromatized isoquinoline moiety.

Characteristic features of the spectral and chemical properties are observed for each subgroup. BBIQ with an 18- or 19-membered dioxide ring and without an OH ortho to the ether bridge are cleaved by Na/NH_3 to form benzylisoquinolines (BIQ). Thalmine, being a BBIQ with a 21-membered dioxide ring, is cleaved into two (+)BIQ despite the presence of a hydroxyl ortho to the ether bridge.

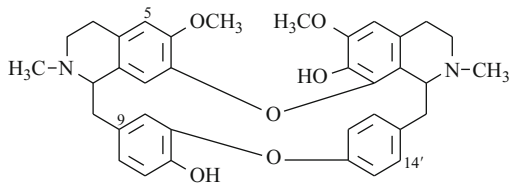
A study of the Na/NH_3 cleavage reactions of hernandezine, thalsimidine, and thalsimine showed that hydrolysis and hydrogenolysis of the OH and OCH_3 groups are possible. Therefore, mistakes are probable if the structures of BBIQ are determined only from the cleavage products.

Mass and PMR spectra provide much information about BBIQ structures. The position of the OCH_3 and $N–CH_3$ signals and the BBIQ structure were found to be related.

Berbamunine, obaberine, isotetrandrine, hydroxyacanthine, and berbamine possess hypotensive properties. Hernandezine, thalisopine, thalicarpine, thalsimine, thalmine, and thalfetidine exhibit analgesic, anti-inflammatory, and hypotensive activities. *O*-Methylthalicberine dimethyliodide exhibits curare-like activity; thalmine, antitumor activity. Cycleanine possesses anti-inflammatory, analgesic, and antipyretic activities. Thalisopine passed successfully clinical tests as an anticonvulsive agent; thalsimine, an anti-inflammatory agent.

Aromoline

CAS Registry Number: 519-53-9



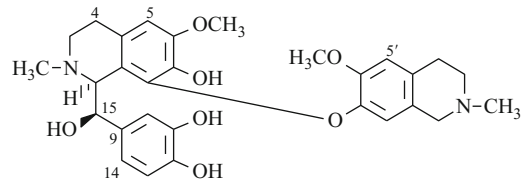
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis crataegina, B. heteropoda, B. turcomanica, Thalictrum minus*
$C_{36}H_{38}N_2O_6$: 594.2730
Mp: 189–190°C ($CHCl_3$) [1]
UV: 287 [1]
UV(OH^-): 295 [1]
MS *m/z*: 594(M^+), 593, 487, 403, 381, 192, 191, 190, 174, 168 [1]
^{1}H NMR($CDCl_3$ + CD_3OD): 2.46(6H, s, 2 × NCH_3), 3.48, 3.72(each 3H, s, 2 × OCH_3), 6.23–7.27(10H, m, H–Ar) [1]
^{1}H NMR: 2.55(2-NCH_3), 2.61(2′-NCH_3), 3.60(6-OCH_3), 3.61(H-1), 3.81(6′-OCH_3), 4.22(H-1′), 5.63(H-10), 6.36(H-5′), 6.37(H-5), 6.41(H-11′), 6.68(H-8), 6.78(H-14), 6.82(H-13), 6.89(H-10′), 6.91(H-13′), 7.45(H-14′) [2]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 375 (1983)
2. H. Guinaudeau, A.J. Freyer, M. Shamma, Nat. Prod. Rep. **5**, 477 (1986)

Bargustanine

CAS Registry Number: 169626-12-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis vulgaris*
$C_{29}H_{34}N_2O_7$: 522.2366
Mp: 193–194°C (MeOH) [1]
$[\alpha]_D$ +114 (MeOH) [1]
UV: 218 sh, 286(4.85, 3.98) [1]
IR: 3540, 1273, 840, 810, 750, 710 [1]
MS *m/z*: 522(M^+, 0.3), 381(100), 367(44), 192(16), 191.5(11), 191(44) [1]
^{1}H NMR(Py-d_5): 2.46(3H, s, 2′-NCH_3), 2.51(3H, s, 2-NCH_3), 2.74–2.92(4H, m, H-4, H-4′), 3.14–3.42(4H, m, H-3, H-3′), 3.54(2H, s, H-1′), 3.79(6H, 2 × OCH_3), 4.51(1H, d, J = 5, H-15), 6.39(1H, d, J = 5, 15-OH), 6.45(1H, s, H-5′), 6.46(1H, s, H-5), 6.67(1H, s, H-8′), 6.74(1H, d, J = 1.5, H-10), 6.85(1H, dd, J = 8.5; 1.5, H-14), 7.65(1H, d, J = 8.5, H-13) [1]
^{13}C NMR: [1]

Table 1

C-1	60.5	C-10	117.9	C-4′	24.6
3	45.4	11	145.5	4a′	130.1
4	28.5	12	146.6	5′	112.1
4a	126.2	13	124.8	6′	148.1
5	106.3	14	132.0	7′	147.6

(*continued*)

Table 1 (continued)

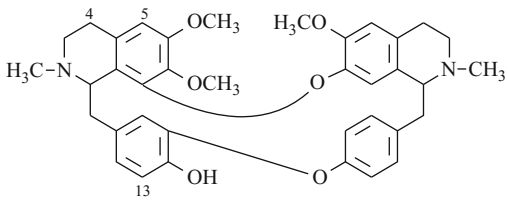
6	149.2	15	67.1	8′	116.0
7	146.9	2-NCH_3	43.5	8a′	129.1
8	142.5	6-OCH_3	56.5	2′-NCH_3	42.0
8a	128.0	1′	51.3	6′-OCH_3	55.6
9	136.4	3′	40.4		

References

1. A. Karimov, M.M. Yusupov, R. Shakirov, Chem. Nat. Comp. **29**, 35 (1993)

Berbamine

CAS Registry Number: 478-61-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids

Biological sources: *Berberis crataegina, B. heteropoda, B. iliensis, B. integerrima, B. nummularia, B. oblonga, B. thunbergii, B. vulgaris, Mahonia aquifolia*

$C_{37}H_{40}N_2O_6$: 608.2886

Mp: 156–157°C [1]

$[\alpha]_D$ +107° ($CHCl_3$) [1]

Mp: 255° (di hydrochloride) [1]

UV: 284(3.79) [2]

MS *m/z*: 608(M^+, 79), 607(50), 485(2), 417(7), 395(68), 381(34), 198($^{++}$, 100) [2]

^{1}H NMR: 2.25(2-NCH_3), 2.57(2′-NCH_3), 3.11(7-OCH_3), 3.58(6′-OCH_3), 3.75(6-OCH_3), 3.82(H-1), 3.85(H-1′), 5.98(H-8′), 6.26(H-5), 6.42(H-10), 6.51(H-5′), 6.62(H-11′), 6.73(H-14), 6.83(H-13), 7.10(H-13′), 7.30(H-14′) [3]

^{13}C NMR: [4]

Table 1

C-1	62.0	C-13	147.3	C-9′	38.2
3	44.7	14	114.6	10′	134.6
4	29.3	15	123.5	11′	130.0
4a	129.0	1′	63.4	12′	121.2
5	105.4	3′	45.2	13′	153.9
6	151.7	4′	24.8	14′	121.4
7	136.8	4′a	127.9	15′	132.0
8	147.7	5′	111.1	6-OCH_3	55.7
8a	120.1	6′	149.9	7-OCH_3	60.3
9	37.5	7′	143.4	6′-OCH_3	55.7
10	134.0	8′	119.7	2-NCH_3	42.6
11	115.3	8′a	126.3	2′-NCH_3	42.0
12	143.8				

Pharm./Biol.: Hypotensive effect [5], (dimethiodide)-curaremimetic action [6]

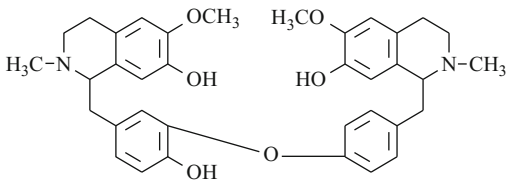
References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
2. M. Akasu, H. Itokawa, M. Fujita, Phytochemistry **15**, 471 (1976)
3. H. Guinaudeau, A.J. Freyer, M. Shamma, Nat. Prod. Rep. **5**, 477 (1986)

4. T.A. Broadbent, E.G. Paul, Heterocycles **20**, 863 (1983)
5. L.P. Naidovich, E.A. Trutneva, O.N. Tolkachev, V.D. Vasil'eva, Farmatsiya **25**(4), 33 (1976)
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 78

Berbamunine

CAS Registry Number: 485-18-7



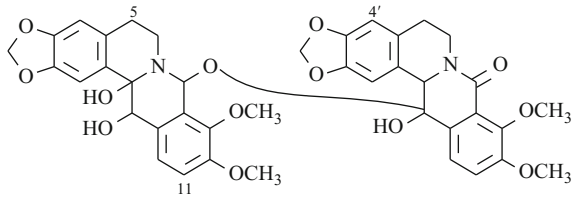
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis heteropoda, B. iliensis, B. integerrima, B. nummularia, B. oblonga*
$C_{36}H_{40}N_2O_6$: 596.2886
Mp: 190–191°C (Me_2CO) [1]
$[\alpha]_D$ +55° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, MeOH, EtOH; spar. sol. C_6H_{14}, C_6H_6 [1]
UV: 283(4.02) [1]
IR: 3350 [1]
MS *m/z*: 192(100), 178 [1]
^{1}H NMR: 2.35(3H, s, NCH_3), 2.40(3H, s, NCH_3), 3.74(6H, s, 2 × OCH_3), 6.05–7.00(11H, m, H–Ar) [1]
Pharm./Biol.: Spasmolytic action on the smooth musculature of the intestine [2]

References

1. A. Karimov, Author's Abstract of Candidate's Dissertation, Tashkent, 1978
2. F.S. Sadritdinov, Med. Zh. Uzb. **2**, 54 (1980)

Berpodine

CAS Registry Number: 169238-48-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis heteropoda*
$C_{40}H_{38}N_2O_{13}$: 754.2363
Mp: 197–198°C [1]
UV: 235 sh, 295(4.34, 4.18) [1]
IR: 3300, 1680, 1510, 1490 [1]
^{1}H NMR(Py-d_5): 1.85, 2.39, 2.43, 2.55, 2.96, 3.07, 3.28, 3.82(each 1H, m, 4 × CH_2), 3.44, 3.49, 3.98, 4.01(each 3H, s, 4 × OCH_3), 5.32, 6.11(each 1H, s, H-14′, H-8), 5.75, 5.80, 5.84, 5.91(each 1H, br s, 2 × CH_2O_2), 5.91(1H, s, H-13), 6.44, 6.56, 6.81, 7.74(each 1H, s, H–Ar), 6.50, 7.07(each1H, d, J = 8.1, *o*–H–Ar), 6.60, 7.32(each 1H, d, J = 8.8, *o*–H–Ar) [1]
^{13}C NMR: [1]

Table 1

C-1	109.0	C-13	67.0	C-8′	172.6
2	143.5	14	85.1	8′a	129.1
3	147.3	14a	133.6	9′	151.8
4	107.8	CH_2O_2	101.4	10′	145.7
4a	131.3	9-OCH_3	61.7	11′	112.0
5	29.7	10-OCH_3	55.3	12′	124.0
6	42.5	C-1′	107.7	12′a	132.9
8	78.2	2′	146.1	13′	83.2
8a	125.2	3′	147.1	14′	56.2
9	152.0	4′	107.8	14′a	130.8
10	146.0	4′a	129.3	CH_2O_2	101.8

(*continued*)

Table 1 (continued)

11	111.5	5′	28.9	9′-OCH_3	61.6
12	125.4	6′	45.4	10′-OCH_3	55.5
12a	132.6				

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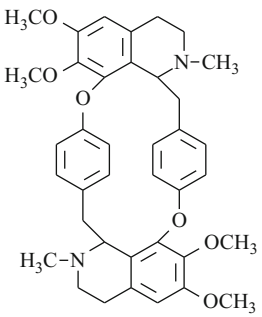
Cycleanine

CAS Registry Number: 518-94-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania delavayi, S.glabra*
$C_{38}H_{42}N_2O_6$: 622.3043
Mp: 272–273°C (EtOH), 311°C (methiodide), 193°C (picrate) [1]
$[\alpha]_D$ −12° ($CHCl_3$) [1]
UV: 232 sh, 276, 285 sh(4.87, 3.89, 3.83) [2]
IR: 1608, 1505, 1490, 1452, 1415, 1375, 1340, 1293, 1220, 1170, 1145, 1115, 1068, 1017, 843, 805 [2]
MS *m/z*: 622(M^+, 29), 621(8), 313(26), 312(100), 311(28), 204(21), 190(17), 174(17), 159(14), 146(7), 145(8) [2]
^{1}H NMR: 2.53(6H, s, 2 × NCH_3), 3.38(6H, s, 2 × OCH_3), 3.78(6H, s, 2 × OCH_3), 6.13–7.05(10H, m, H–Ar) [2]
Pharm./Biol.: Anti-inflammatory, analgetic, antipyretic action [3]

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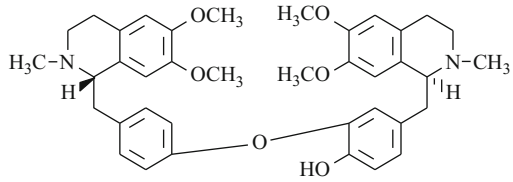
Dauricine

CAS Registry Number: 524-17-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Menispermum dauricum*
$C_{38}H_{44}N_2O_6$: 624.3199
Mp: 115°C [1]
$[\alpha]_D$ −139° (EtOH) [1]
UV: 283(4.00) [2]
MS *m/z*: 624(M^+), 329, 314, 297, 206(100), 203, 192, 190 [3]
^{1}H NMR: 2.44, 2.48(2 × NCH_3), 3.78, 3.80, 3.82(4 × OCH_3) [2]
Abs. conf.: 1R, 1′R [2]
Pharm./Biol.: Hypotensive [4], anti-inflammatory, and anesthetic action [5]

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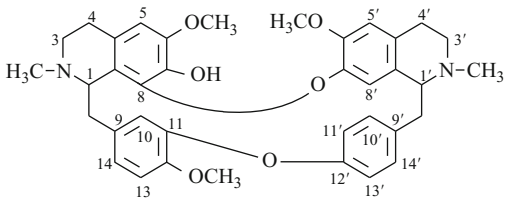
Fangchinoline

CAS Registry Number: 33889-68-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum orientale*
$C_{37}H_{40}N_2O_6$: 608.2776
Mp: 153–156°C (MeOH) [1]
$[\alpha]_D$ +126° (MeOH) [1]
UV: 282 sh, 209 sh [1]
IR: 3534, 2933, 1585–1445, 1232, 1060 [1]
MS *m/z*: 608(M^+), 417, 381, 380, 367, 283, 191(100) [1]
^{1}H NMR: 2.32(3H, s, N-Me), 2.62(3H, s, N-Me), 3.34(3H, s, 6′-OMe), 3.76(3H, s, 6-OMe), 3.92(3H, s, 12-OMe), 6.06(1H, s, H-8′), 6.29(1H, s, H-5), 6.52(1H, s, H-5′), 6.57(1H, d, H-10), 6.86(2H, dd, H-13, H-14), 6.91(1H, dd, H-13′), 7.13(1H, dd, H-11′), 7.34(1H, dd, H-10′) [1]

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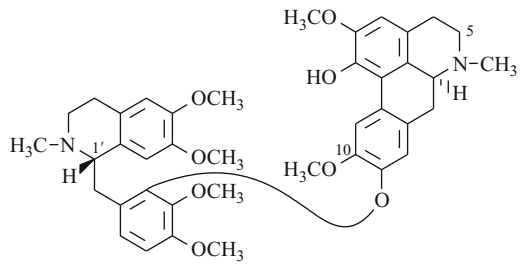
Fetidine

CAS Registry Number: 7072-86-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum foetidum*
$C_{40}H_{46}N_2O_8$: 682.3254
Mp: 132–135°C (EtOAc) [1], 200°C (dec., nitrate), 230°C (dec., hydrochloride), 230°C (hydrobromide), 218°C (dec., sulfate), 210°C (methiodide)
$[\alpha]_D$ +121° (MeOH) [1]
UV: 220, 280, 305(4.80, 4.36, 4.24) [2]
IR: 3400, 2830, 2800, 1605, 1580, 1515 [2]
MS *m/z*: 476(1.5), 341($^{++}$, 3), 327(5), 284(3), 206(100), 191(10) [3]
^{1}H NMR: 2.30, 2.37(each 3H, s, 2 × NCH_3), 3.50(3H, s, 7′-OCH_3), 3.71, 3.78, 3.81(6H, 3H, 3H, s, 4 × OCH_3), 3.90(3H, s, 10-OCH_3), 6.14(1H, s), 6.42(1H, s), 6.52(2H, s), 6.75, 6.81(each 1H, d, J = 8.5), 8.12(1H, s, H-11) [4]
Abs. conf.: 1′R, 6a S [5]
CD: [5]
Pharm./Biol.: Anti-inflammatory, hypotensive activity [6]. Inhibitory influence on the higher nervous activity [7]

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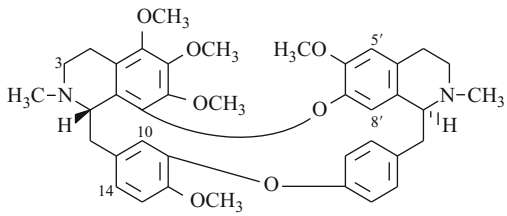
Hernandezine (Thalicsimine)

CAS Registry Number: 6681-13-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids

Biological sources: *Thalictrum alpinum, T. simplex, T. sultanabadense*

$C_{39}H_{44}N_2O_7$: 652.3148

Mp: 153–154°C (EtOH) [1], 122–123°C (Me_2CO) [2], 190–193°C [3], 211°C (dec., nitrate), 253°C (hydrobromide), 242°C (hydroiodide), 236°C ([dec.] methiodide) [1], 192°C (α-des. $[\alpha]_D$ 0°) [4], 230° (dec., hydrochloride) [5], 204° (dec., picrate), 152° (β-des. $[\alpha]_D$ +422° [$CHCl_3$]) [5]

$[\alpha]_D$ +221° ($CHCl_3$) [1], +250° ($CHCl_3$) [3]

Solibility: very sol. Me_2CO, MeOH, EtOH, Et_2O, C_6H_6, $CHCl_3$; spar. sol. pet. ether; insol. H_2O, alk. [1]

UV: 286(3.76) [2]

IR: [3]

MS *m/z*: 652(M^+, 62), 651(31), 637(12), 461(16), 426(17), 425, 411, 394, 379, 365, 213($^{++}$, 100), 192, 190($^{++}$, 13), 174(27) [6–8]

^{1}H NMR: 2.24(3H, s, 2-NCH_3), 2.55(3H, s, 2′-NCH_3), 3.18(3H, s, 7-OCH_3), 3.27(3H, s, 6′-OCH_3), 3.73(3H, s, 6-OCH_3), 3.75(3H, s, 5-OCH_3), 3.85(3H, s, 12-OCH_3), 5.92(1H, s, H-8′) [5]; 6.02(1H, s, H-8′) [7]

^{13}C NMR: [9]

Table 1

C-1	61.3	C-11	143.5	C-8′	120.0
3	43.5	12	146.8	8à′	128.3
4	16.4	13	111.4	α′	41.7
4a	121.6	14	122.6	9′	134.9
5	145.3	1′	63.7	10′	129.9
6	142.2	3′	45.2	11′	121.7
7	149.1	4′	25.4	12′	153.5
8	144.2	4′a	127.9	13′	121.7
8a	125.5	5′	112.5	14′	132.4
α	37.8	6′	148.1	2-NCH_3	42.3
9	134.7	7′	149.1	2′-NCH_3	42.6
10	116.0				

Abs. conf.: 1S, 1′S

CD: [10]

Pharm./Biol.: LD_{50} 282 mg/kg (s/c, mice), 175 mg/kg (s/c, rats). Anti-inflammatory, antipyretic, and analgesic action [11]

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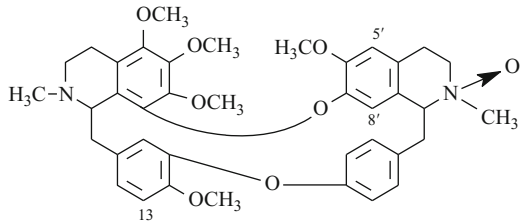
Hernandezine N-Oxide

CAS Registry Number: 78414-48-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum sultanabadense*
$C_{39}H_{44}N_2O_8$: 668.3098
Mp: 179–180°C ($CHCl_3$) [1]
UV: 285 [1]
MS *m/z*: 668(M^+, 15), 652(100), 461(25), 460(21), 425(34), 424(31), 411(62) [1]
^{1}H NMR: 2.31(3H, s, 2-NCH_3), 3.15(3H, s, 7-OCH_3), 3.27(3H, s, 6′-OCH_3), 3.65(3H, s, 2′-NCH_3), 3.71(6H, s, 5-OCH_3, 6-OCH_3), 3.81(3H, s, 12-OCH_3), 5.97–7.15(9H, m, H–Ar) [1]

References

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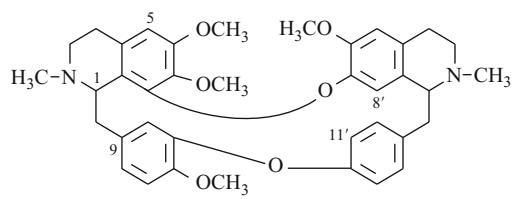
Isotetrandrine

CAS Registry Number: 518-34-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis crataegina, B. integerrima, B. nummularia, B. thunbergii, B. vulgaris, Mahonia aquifolia*
$C_{38}H_{42}N_2O_6$: 622.3043
Mp: 181–182°C (Me_2CO), 242°C (di methiodide)
$[\alpha]_D$ +142° ($CHCl_3$) [1]
UV: 206, 238 sh, 282(4.97, 4.38, 3.85) [2]
MS *m/z*: 622(M^+), 621, 485, 431, 430, 396, 395, 381, 364, 349, 198($^{++}$), 190, 175($^{++}$), 174 [3]
^{1}H NMR: 2.26(3H, s, 2-NCH_3), 2.57(3H, s, 2′-NCH_3), 3.13(3H, s, 7-OCH_3), 3.62(3H, s, 6′-OCH_3), 3.76(3H, s, 6-OCH_3), 3.82(H-1), 3.84(H-1′), 3.92(3H, s, 12-OCH_3), 5.99(H-8′), 6.28(H-5), 6.42(H-10, H-10′), 6.54(H-5′), 6.65(H-11′), 6.78(H-14), 6.80(H-13), 7.10(H-13′), 7.27(H-14′) [4]
Pharm./Biol.: Antituberculous activity [5]

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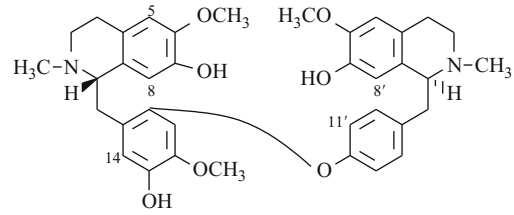
Magnolamine

CAS Registry Number: 573-73-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Magnolia fuscata*
$C_{37}H_{42}N_2O_7$: 626.299
Mp: 117–118°C (C_6H_6) [1], 145°C (dec., picrate) [1], 152°C (O,O,O-tri Me) [2]; 103°C (O,O,O- tri Et) [2]

$[\alpha]_D$ +183° [2]
Solubility: very sol. EtOH, $CHCl_3$; spar. sol. C_6H_6
UV: 284(4.11) [3]
IR: 3545, 1650, 1610, 1268, 1220, 1170 [3, 4]
MS *m/z*: 192(100) [5]
^{1}H NMR: 2.34, 2.43(each 3H, s, 2 × NCH_3), 3.74, 3.76, 3.78(each 3H, s, 3 × OCH_3), 6.02, 6.21(each 1H, s, H-8, H-8′), 6.73, 6.98(each 2H, d, J = 8, H-10′, H-11′, H-13′, H-14′), 6.46, 6.49(each 1H, s, H-5, H-5′), 6.53, 6.64(each 1H, s, H-11, H-14) [4]
Abs. conf.: 1S, 1′S
Pharm./Biol.: Hypotensive [6] and depressive [7] action

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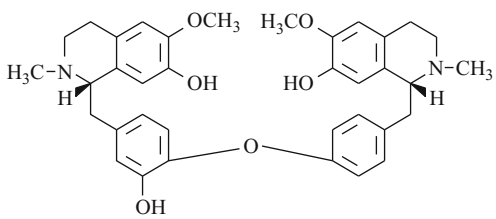
Magnoline (Grisabutine)

CAS Registry Number: 6859-66-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Magnolia fuscata*
$C_{36}H_{40}N_2O_6$: 596.2886
Mp: 178–179°C (EtOH) [1], 192–193°C [2], 162°C (dec., picrate), 190°C (dec., picrolonate); 110°C (O,O,O-tri Me)
$[\alpha]_D$ −10° (Py) [1], $[\alpha]_D$ −50° ($CHCl_3$) [2], $[\alpha]_D$ (O,O, O-tri Me) +92° ($CHCl_3$) [3]
Solubility: spar. sol. EtOH, Me_2CO, $CHCl_3$; insol. C_6H_6, Et_2O, pet. ether, H_2O[1]
IR: 3400 [2]
MS *m/z*: 596(M^+, 15), 404(13), 192(100), 175(6) [2]
^{1}H NMR(DMSO-d_6): 2.32(6H, s, 2 × NCH_3), 3.71(6H, s, 2 × OCH_3) [2]
Abs. conf.: 1S, 1′R [2]
Pharm./Biol.: Anticholinesterase [4] and depressive [5] action

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1. A.P. Orekhov, N.F. Proskurnina, Zh. Obshch. Khim. **9**, 127 (1939)
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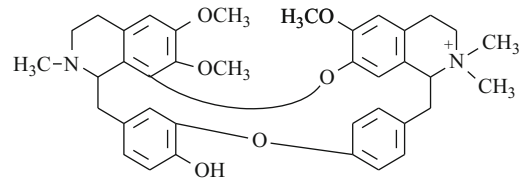
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 186. M.D. Mashkovskii, in: *Main Directions of the Work of VNIKhFI [Sergei Ordzhonikidze All-Union Scientific-Research of Pharmaceutical Chemistry*], Moscow, 1959, p. 393
5. O.N. Tolkachev, E.P. Nakova, R.P. Evstigneeva, Chem. Nat. Comp. **13**, 382 (1977)

2′-N-Methylberbamine

CAS Registry Number: 68231-29-8



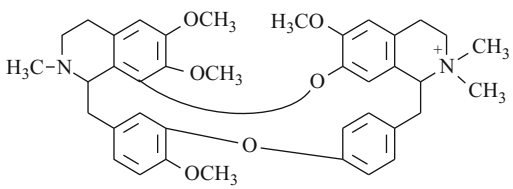
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis oblonga*
$C_{38}H_{43}NN^{+}O_6$: 623.3121
Mp: amorph (iodide), 222°C (iodide O-methyl) [1]
UV(iodide): 282(3.87) [1]
MS *m/z* (iodide): 622, 608, 417, 396, 395, 361, 198, 175, 174, 142, 127, 58(100) [1]
^{1}H NMR(iodide, Py-d_5): 2.14(3H, s, 2-NCH_3), 3.20 (6H, s), 3.35(6H, s), 3.57(3H, s), 6.35–7.10(10H, m, H–Ar) [1]

References

1. A. Karimov, M.V. Telezhenetskaya, K.L. Lutfullin, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 186 (1978)

2′-N-Methylisotetrandrine

CAS Registry Number: 68331-87-3



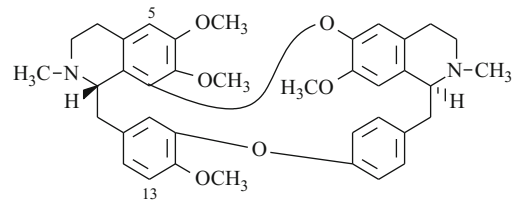
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis oblonga*
$C_{39}H_{45}NN^{+}O_6$: 637.3278
Mp: 222°C (iodide) [1]
$[\alpha]_D$(iodide): +29.5° ($CHCl_3$)) [1]
UV(iodide): 284(3.91) [1]
MS *m/z* (iodide): 636, 622, 607, 431, 395, 381, 198, 175, 142, 127, 58(100) [1]
^{1}H NMR(iodide): 2.15(3H, s, NCH_3), 3.06, 3.55(each 3H, s, $N[CH_3]_2$), 3.31(3H, s, OCH_3), 3.72(6H, s, 2 × OCH_3), 3.82(3H, s, OCH_3), 6.20–6.90(10H, m, H–Ar) [1]

References

1. A. Karimov, K.L. Lutfullin, Chem. Nat. Comp. **22**, 235 (1986)

O-Methylthalicberine (Thalmidine)

CAS Registry Number: 5096-71-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum collinum, T. longipedunculatum, T. minus*
$C_{38}H_{42}N_2O_6$: 622.3043
Mp: 192–193°C (EtOH) [1], 255°C (dec., methiodide) [1]
$[\alpha]_D$ +252° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, EtOH, MeOH, Me_2CO; spar. sol. Et_2O; insol. H_2O, EtOH [1]
UV: 282(4.00) [2]
IR: 2820, 1610, 1590, 1520, 1450, 1270, 1220, 1130, 1020, 880, 850 [2]
MS *m/z*: 622(M^+, 52), 621(26), 607(6), 591(2), 396(100), 381(18), 198(24), 175(5), 174(10), 90(2), 89(2) [3]
^{1}H NMR: 2.01(3H, s, 2-NCH_3), 2.48(3H, s, 2′-NCH_3), 3.56(3H, s, 7-OCH_3), 3.69(3H, s, 7′-OCH_3), 3.77(3H, s, 6-OCH_3), 3.80(3H, s, 12-OCH_3) [4]
CD: [5]
Abs. conf.: 1S, 1′S
Pharm./Biol.: LD_{50} 310, 175 mg/kg (i/p, mice, rats). Anti-inflammatory, analgesic [6], and hypotensive action. (Di m-i.) – curaremimetic action [7]

References

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2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. comp. **32**, 596 (1996)
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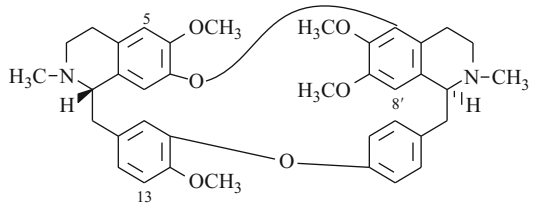
5. G.P. Moiseeva, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 723 (1979)
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 247
7. S.A. Tursunova, Kh.I. Tashbaev, M.B. Sultanov, in: *The Pharmacology of Alkaloids and Glycosides* [in Russian] (Fan, Tashkent, 1967), p. 156; 160

O-Methylthalmine

CAS Registry Number: 7682-67-9



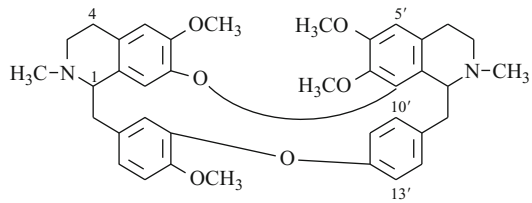
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum sultanabadense*
$C_{38}H_{42}N_2O_6$: 622.3043
Mp: amorph. [1]
$[\alpha]_D$ −43° (MeOH) [1]
UV: 285 [1]
MS *m/z*: 622(M^+), 621, 396, 395, 198, 190, 175, 174 [1]
^{1}H NMR: 2.10(3H, s, 2′-NCH_3), 2.58(3H, s, 2-NCH_3), 3.60(3H, s, 6′-OCH_3), 3.78(3H, s, 7′-OCH_3), 3.81(6H, s, 6-OCH_3, 12-OCH_3), 5.76, 5.98(each 1H, s, H-8′, H-8), 6.49–6.85(8H, m, H–Ar) [1]
Abs. conf.: 1S, 1′S [1]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 377 (1984)

Obaberine

CAS Registry Number: 1263-80-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis iliensis, B. nummularia*
$C_{38}H_{42}N_2O_6$: 622.3043
Mp: 139–140°C, 180°C (picrate) [1]
$[\alpha]_D$ +144° (EtOH) [1]
MS *m/z*: 622(M^+), 621, 515, 431, 430, 396, 395, 381, 361, 349, 335, 311($^{++}$), 198($^{++}$), 175($^{++}$), 174 [2]
^{1}H NMR: 2.58(3H, s, 2-NCH_3), 2.67(3H, s, 2′-NCH_3), 3.19(3H, s, 7′-OCH_3), 3.63(3H, s, 6-OCH_3), 3.64(H-1), 3.78(3H, s, 6′-OCH_3), 3.89(3H, s, 12-OCH_3),4.21(H-1′), 5.45(H-10), 6.32(H-5′), 6.36(H-5), 6.37(H-11′), 6.64(H-8), 6.76(H-13), 6.79(H-14), 6.94(H-10′, H-13′) [3]
Pharm./Biol.: Anti-inflammatory action [4]

References

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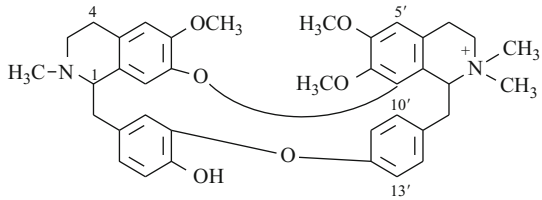
Oblongamine

CAS Registry Number: 63511-70-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis oblonga*
$C_{38}H_{43}NN^{+}O_6$: 623.3121
Mp: 200°C (iodide) [1]
$[\alpha]_D$ +54° (MeOH) [1]
UV(iodide): 284(3.97) [1]
MS *m/z* (iodide): 622, 607, 577, 564, 550, 501, 411, 396, 395, 381, 220, 206, 198, 175, 174, 58(100) [1]
^{1}H NMR(iodide, Py-d_5): 3.10, 3.15, 3.31, 3.61(NCH_3, $N^{+}(CH_3)_2$, 3 × OCH_3), 6.39–7.00(10H, H–Ar) [1]

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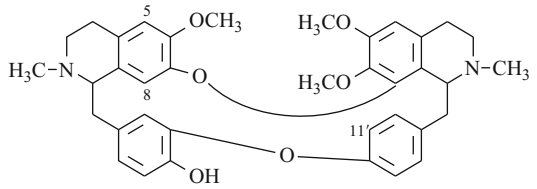
1. A. Karimov, M.V. Telezhenetskaya, K.L. Lutfullin, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 68 (1977)

Oxyacanthine

CAS Registry Number: 548-40-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis amurensis, B. crataegina, B. densiflora, B. heteropoda, B. iliensis, B. integerrima, B. nummularia, B. oblonga, B. thunbergii, B. turcomanica, B. vulgaris, Mahonia aquifolia*
$C_{37}H_{40}N_2O_6$: 608.2886
Mp: 206–208°C (EtOH) [1], 216–217°C (Et_2O) [1]
$[\alpha]_D$ +279° ($CHCl_3$) [1]
UV: 206, 238 sh, 282(4.94, 5.45, 3.92) [2]
MS *m/z*: 608(M^+), 607, 501, 417, 416, 396, 395, 381, 364, 349, 335, 304($^{++}$), 198($^{++}$, 100), 192, 175($^{++}$), 174 [3]
^{1}H NMR: 2.56(2-NCH_3), 2.66(2′-NCH_3), 3.18(7′-OCH_3), 3.63(H-1, 6-OCH_3), 3.79(6′-OCH_3), 4.19(H-1′), 5.43(H-10), 6.31(H-5′), 6.34(H-11′), 6.35(H-5), 6.63(H-8), 6.76(H-14), 6.78(H-13), 6.94(H-13′), 6.98(H-10′) [4]
Pharm./Biol.: LD_{50} 43.5 mg/kg (i/v, mice). Hypotensive [6], antimycotic [5], depressive [7] action

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
2. A.R. Battersby, I.R.C. Bick, W. Klyne, J.P. Jennings, P.M. Scopes, M.J. Vernengo, J. Chem. Soc. 2239 (1965)
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4. H. Guinaudeau, A.J. Freyer, M. Shamma, Nat. Prod. Rep. **3**, 477 (1986)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 82
6. L.P. Naidovich, E.A. Trutneva, O.N. Tolkachev, V.D. Vasil'eva, Farmatsiya **25**(4), 33 (1976)
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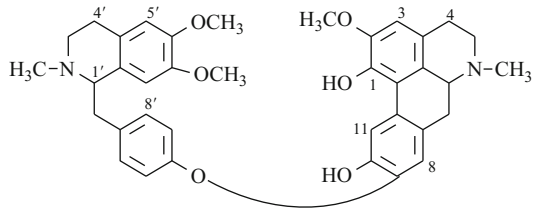
Pakistanine

CAS Registry Number: 36506-69-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis sibirica*
$C_{37}H_{40}N_2O_6$: 608.2876

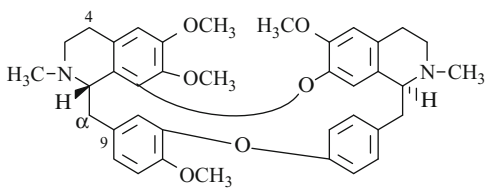
Mp: 155–156°C (EtOH) [1]
$[\alpha]_D$ +102° (MeOH) [1]
UV: 275, 305 (4.12, 2.02) [1]
IR: 3400 [1]
MS *m/z*: 608(M^+), 402, 401, 206(100), 107 [1]
^{1}H NMR($CDCl_3$ + CD_3OD): 2.1–3.5(7H, m), 2.47, 2.50(each 3H, s, 2 × NCH_3), 3.44, 3.71, 3.85(each 3H, s, 3 × OCH_3), 5.85(1H, s, H-8′), 6.62(2H, s, H-3, H-5′), 6.74(1H, s, H-8), 6.83, 6.96(each 2H, d, J = 8.5, *o*–H–Ar), 8.08(1H, s, H-11) [1]

References

1. A. Karimov, M.G. Levkovich, N.D. Abdullaev, R. Shakirov, Chem. Nat. Comp. **29**, 361 (1993)

Tetrandrine

CAS Registry Number: 518-34-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Stephania tetrandra*
$C_{38}H_{42}N_2O_6$: 622.3043
Mp: 218°C
$[\alpha]_D$ +241° ($CHCl_3$) [1]
UV: 214, 283(4.78, 3.91) [1]
IR: 1608, 1585, 1505, 1273, 1235, 1213, 1135, 1128, 1113, 1070, 1028, 845 [1]
MS *m/z*: 622(33), 621(19), 607(6), 396(12), 395(42), 349(7), 335(5), 198.5(23), 198(100), 192(10), 190(7), 176(8), 175.5(9), 175(39), 174(31) [1]
^{1}H NMR: 2.30(3H, s, 2-NCH_3), 2.59(3H, s, 2′-NCH_3), 3.18(3H, s, 7-OCH_3), 3.35(3H, s, 6′-OCH_3), 3.73(3H, s, 6-OCH_3), 3.90(3H, s, 12-OCH_3) [2]
^{13}C NMR: [3]

Table 1

C-1	61.2	C-10	116.0	C-7′	149.1
3	44.0	11	143.5	8′	119.1
4	21.9	12	146.7	8′a	127.9
4a	127.7	13	111.3	α′	41.8
5	105.5	14	122.4	9′	134.7
6	151.1	1′	63.8	10′	129.8
7	137.6	3′	45.2	11′	121.6
8	148.1	4′	25.2	12′	153.4
8a	127.7	4′a	127.9	13′	121.6
α	38.2	5′	112.5	14′	132.4
9	134.9	6′	148.2	2-NCH_3	42.1
				2′-NCH_3	42.5

CD: [4]
Abs. conf.: 1S, 1′S
Pharm./Biol.: LD_{50} 950 mg/kg (s/c, mice). Tuberculostatic, anticancerogenic [5], antipyretic [6], hypotensive [7] action [6]. It is permitted by Ministry of Public Health of the former USSR for the treatment of radiculitis, ischialgia, neuralgia as an anti-inflammatory and analgetic agent [6]

References

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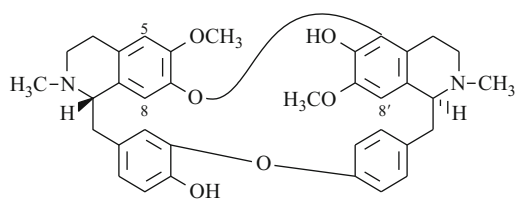
Thalbadensine

CAS Registry Number: 66834-86-4



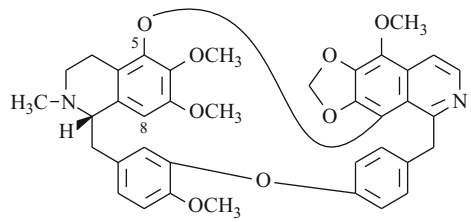
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum minus, T. sultanabadense*
$C_{36}H_{38}N_2O_6$: 594.2730
Mp: amorph. [1]
UV: 286 [1]
MS *m/z*: 594(M^+), 395, 381 [1]
^{1}H NMR: 2.17(3H, s, 2-NCH_3), 2.56(3H, s, 2′-NCH_3), 3.81(3H, s, 7′-OCH_3), 3.87(3H, s, 6-OCH_3), 4.63(2H, br s, 2 × OH), 5.95(2H, s, H-8, H-8′), 5.95–6.76(10H, H–Ar), [1]
Abs. conf.: 1S, 1′S [1]

References

1. S. Abdizhabbarova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 114 (1978)

Thalfine

CAS Registry Number: 27764-05-2



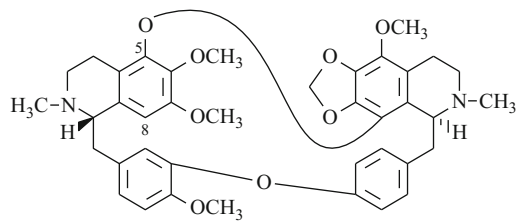
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum foetidum*
$C_{38}H_{36}N_2O_8$: 648.2472
Mp: 141–142°C (dec.) [1]
$[\alpha]_D$ +69° (EtOH) [1]
UV: 260, 348(4.58, 3.86) [2]
IR: 1562, 1050, 1030, 920 [1, 2]
MS *m/z*: 648(M^+, 100), 647(31), 633(83), 617(21), 442(7), 421(7), 324(49), 220(12), 204(21) [3]
^{1}H NMR: 2.20(3H, s, 2-NCH_3), 3.40(3H, s, 7-OCH_3), 3.50(3H, s, 6-OCH_3), 3.61(3H, s, 5′-OCH_3), 3.76(3H, s, 12-OCH_3), 5.93(1H, s, H-8), 6.04(2H, s, CH_2O_2) [2]
Abs. conf.: 1S [4]
Pharm./Biol.: LD_{50} 1,000 mg/kg (i/p, mice). Weak anti-inflammatory and hypothermal action [5]

References

1. S. Abdizhabbarova, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 281 (1968)
2. S. Abdizhabbarova, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 281 (1970)
3. W.-T. Liao, J.L. Beal, W.-N. Wu, R.W. Doskotch, Lloydia **41**, 257 (1978)
4. G.P. Moiseeva, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 723 (1979)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 255

Thalfinine

CAS Registry Number: 27764-06-3



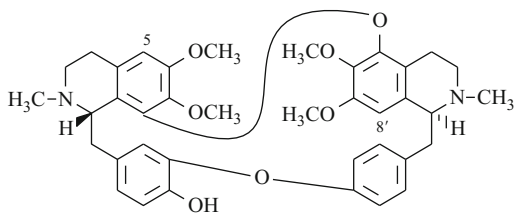
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum foetidum*
$C_{39}H_{42}N_2O_8$: 666.2941
Mp: 117–118°C [1], 235°C (dec., diperchlorate), 225°C (dec., dihydrochloride) [1], 234–136°C (dec., dihydroiodide) [2]
$[\alpha]_D$ +115° (EtOH) [1]
UV: 282(3.76) [1]
IR: 3600–3300, 1030, 920 [1]
MS *m/z*: 666(M^+, 95), 440(14), 220(100), 204(16) [2]
^{1}H NMR: 2.30(3H, s, 2-NCH_3), 2.54(3H, s, 2′-NCH_3), 3.34(3H, s, 7-OCH_3), 3.43(3H, s, 6-OCH_3), 3.66(3H, s, 5′-OCH_3), 3.80(3H, s, 12-OCH_3), 5.80(2H, s, CH_2O_2) [1]
Abs. conf.: 1S, 1′S [2]

References

1. S. Abduzhabbarova, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 281 (1968)
2. W.-T. Liao, L. Beal, W.-N. Wu, R.W. Doskotch, Lloydia **41**, 257 (1978)

Thalfoetidine (Thalictrinine)

CAS Registry Number: 16687-93-7



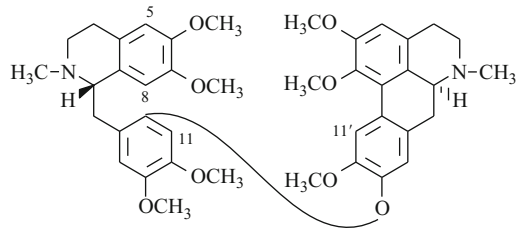
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum longipedunculatum, T. simplex*
$C_{38}H_{42}N_2O_7$: 638.2992
Mp: 169–170°C (dec.) [1]
$[\alpha]_D$ −81° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$; spar. sol. Et_2O, EtOH, Me_2CO [1]
MS *m/z*: 638(M^+, 100), 637(46), 623(9), 607(6), 515(2), 417(63), 402(57), 213(67), 206(18), 190(65), 175(7), 174(5) [2]
^{1}H NMR: 2.32(3H, s, 2-NCH_3), 2.72(3H, s, 2′-NCH_3), 3.32(3H, s, 7-OCH_3), 3.51(3H, s, 7′-OCH_3), 3.77(3H, s, 6-OCH_3), 3.89(3H, s, 6′-OCH_3) [3]
Abs. conf.: 1S, 1′S
Pharm./Biol.: LD_{50} 345 mg/kg (i/p, mice). Antipyretic action [4]

References

1. S.S. Norkina, N.A. Pakhareva, Zh. Obshch. Khim. **20**, 1720 (1950)
2. Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 220 (1968)
3. N.M. Mollov, W. Georgiev, Chem. Ind. **27**, 1178 (1966)
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 254

Thalicarpine

CAS Registry Number: 5373-42-2



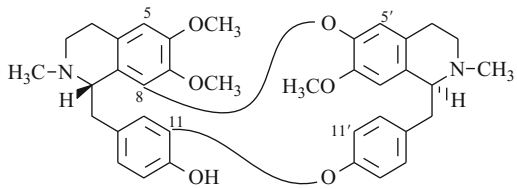
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum flavum*
$C_{41}H_{48}N_2O_8$: 696.3411
Mp: 105–106°C (amorph.) [1]; 153–155°C [2]
$[\alpha]_D$ +89° ($CHCl_3$) [1]
UV: 282, 303, 316(4.52, 4.38, 4.30) [1]
IR: 2935, 1600, 1505, 1460, 1060, 950 [1]
MS *m/z*: 696(M^+), 490, 324, 293, 206(100), 204 [2]
^{1}H NMR: 2.45, 2.48(each 3H, s, 2 × NCH_3), 3.58(3H, s, 7-OCH_3), 3.71(3H, s, 1′-OCH_3), 3.80, 3.83, 3.91(6H, s, 2 × OCH_3, each 3H, s, 2 × OCH_3), 3.95(3H, s, 10′-OCH_3), 6.21(1H, s, H-8), 6.53, 6.56, 6.60, 6.62(4H, H–Ar), 6.67(1H, H-11) [2]
Abs. conf.: 1R, 6a′S [2]
Pharm./Biol.: LD_{50} 345 mg/kg (i/p, mice). Hypotensive, spasmolytic, anticough action. It inhibits the growth of malignant tumors [3]

References

1. Kh.S. Umarov, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 452 (1970)
2. H. Guinaudeau, M. Leboeuf, A. Cave, J. Nat. Prod. **42**, 133 (1979)
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 250

Thalicberine (7-O-Demethylisothalicberine)

CAS Registry Number: 73711-14-5



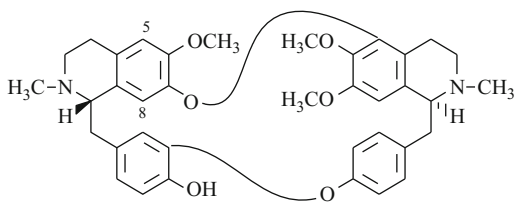
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloidss
Biological sources: *Thalictrum longipedunculatum*
$C_{37}H_{40}N_2O_6$: 608.2886
Mp: 159°C (Et_2O) [1]
$[\alpha]_D$ +230° ($CHCl_3$) [1]
UV: 280 [1]
UV(OH^-): 285, 310 [1]
MS *m/z*: 608(M^+), 607, 485, 417, 416, 396, 395, 381, 198, 175, 174 [1]
^{1}H NMR: 2.02(3H, s, 2-NCH_3), 2.47(3H, s, 2′-NCH_3), 3.52(3H, s, 7-OCH_3), 3.67(3H, s, 7′-OCH_3), 3.77(3H, s, 6-OCH_3), 5.90–7.05(10H, H–Ar) [1]
Abs. conf.: 1S, 1′S [2]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 246 (1984)
2. K.P. Guha, B. Mukherjee, R. Mukherjee, J. Nat. Prod. **42**, 1 (1979)

Thalictine

CAS Registry Number: 58092-24-3



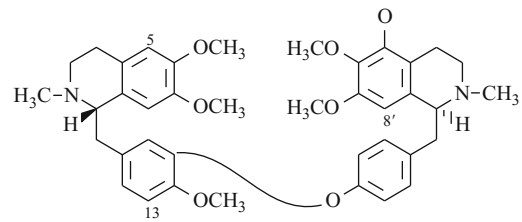
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum sultanabadense*
$C_{37}H_{40}N_2O_6$: 608.2886
Mp: amorph., 223°C (nitrate) [1]
$[\alpha]_D$ −33° (MeOH) [1]
UV: 284 [2]
MS *m/z*: 608(M^+), 396, 395, 381, 380, 205, 198(100), 190, 175 [2]
^{1}H NMR: 2.19(3H, s, 2′-NCH_3), 2.62(3H, s, 2-NCH_3), 3.62(3H, s, 6′-OCH_3), 3.82(3H, s, 7′-OCH_3), 3.86(3H, s, 6-OCH_3) [2]
CD: [1]
Abs. conf.: 1S, 1′S [1]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 377 (1984)
2. T. Tomimatsu, M. Sasakawa, Chem. Pharm. Bull. **23**, 2279 (1975)

Thalidasine

CAS Registry Number: 16623-56-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum longipedunculatum*
$C_{39}H_{44}N_2O_7$: 652.3149
Mp: 105–107°C [1], 177°C (picrate) [1]
$[\alpha]_D$ −70° (MeOH) [1]
UV: 275, 282(3.66, 3.63) [1]
MS *m/z*: 652(M^+), 637, 621, 425, 411, 394, 213(100), 204, 190 [1]
^{1}H NMR: 2.25(3H, s, 2-NCH_3), 2.62(3H, s, 2′-NCH_3), 3.27(3H, s, 7-OCH_3), 3.50(3H, s, 7′-OCH_3), 3.75(3H, s, 6-OCH_3), 3.87(3H, s, 6′-OCH_3), 3.91(3H, s, 12-OCH_3) [1]

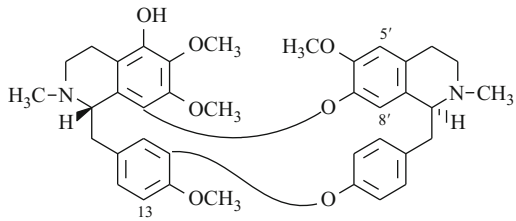
Abs. conf.: 1S, 1′S [4]
Pharm./Biol.: Antimicrobial activity [2]. Hypotensive [3], antitumoral [5] action

References

1. S.M. Kupchan, T.H. Yang, G.S. Vasilikiotis, M.H. Barnes, M.L. King, J. Org. Chem. **34**, 3884 (1969)
2. L.A. Mitscher, W.-N. Wu, R.W. Doscotch, J.L. Beal, Chem. Commun. 589 (1971)
3. W.-N. Wu, J.L. Beal, R.W. Doscotch, Lloydia **40**, 508 (1977)
4. K.P. Guha, B. Mukherjee, R. Mukherjee, J. Nat. Prod. **42**, 1 (1979)
5. O.N. Tolkachev, E.P. Nakova, R.P. Evstigneeva, Chem. Nat. Comp. **13**, 382 (1977)

Thalidezine

CAS Registry Number: 18251-36-0



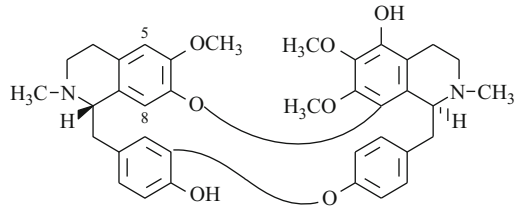
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum sultanabadense*
$C_{38}H_{42}N_2O_7$: 638.2992
Mp: amorph. [1], 158–159°C [2]
$[\alpha]_D$ +200° (MeOH) [1], +235° ($CHCl_3$) [2]
UV: 286(4.02) [1, 2]
MS *m/z*: 638(M^+), 623, 607, 411 [1]
^{1}H NMR: 2.26(3H, s, 2-NCH_3), 2.58(3H, s, 2′-NCH_3), 3.22(3H, s, 7-OCH_3), 3.27(3H, s, 6′-OCH_3), 3.78(3H, s, 6-OCH_3), 3.86(3H, s, 12-OCH_3), 6.02(1H, s, H-8′) [1, 2]
Abs. conf.: 1S, 1′S [3]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Khim. Prirod. Soedin. 250 (1981)
2. R. Shamma, R.J. Shine, B.S. Dudock, Tetrahedron **23**, 2887 (1967)
3. K.P. Guha, B. Mukherjee, R. Mukherjee, J. Nat. Prod. **42**, 1 (1979)

Thalisopidine

CAS Registry Number: 26989-49-1



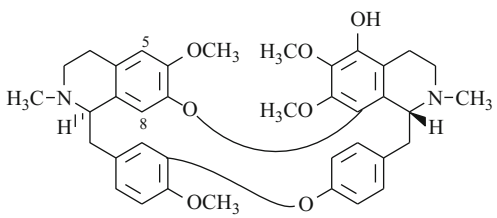
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum isopyroides*
$C_{37}H_{40}N_2O_7$: 624.2836
Mp: 215–216°C (Me_2CO), 239°C (O,O-di Me)
$[\alpha]_D$ −9° (EtOH)
UV: 285(4.04) [1]
IR: 3540–3300 [1]
^{1}H NMR: 2.44(3H, s, 2-NCH_3), 2.49(3H, s, 2′-NCH_3), 2.96(3H, s, 7′-OCH_3), 3.30(3H, s, 6-OCH_3), 3.70(3H, s, 6′-OCH_3), 6.30(1H, s, H-8), 6.40–7.20(8H, m, H–Ar) [2]
CD: [3]
Abs. conf.: 1S, 1′S [3]

References

1. Kh.G. Pulatova, S.Kh. Maekh, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 336 (1968)
2. Kh.G. Pulatova, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 533 (1969)
3. G.P. Moiseeva, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 723 (1979)

Thalisopine

CAS Registry Number: 22226-72-8



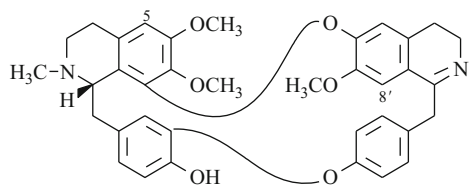
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum isopyroides*
$C_{38}H_{42}N_2O_7$: 638.2992
Mp: 151–153°C (H_2O–MeOH), 166°C (O–Me), 234°C (hydroiodide), 166°C (des-base)
$[\alpha]_D$ −105° (Me_2CO) [1], −71° ($CHCl_3$) [1]
Solubility: very sol. MeOH, EtOH, Me_2CO, $CHCl_3$; spar. sol. C_6H_6, Et_2O, pet. ether, insol. H_2O, alk. [1]
UV: 284(3.65) [2]
IR: 3500–3400 [3]
MS *m/z*: 638(M^+, 11), 412(89), 397(38), 221(18), 206($^{++}$, 100), 183(17), 174(18), 173(29), 172(89), 90(9), 89(20) [3]
^{1}H NMR: 2.43(3H, s, 2-NCH_3), 2.48(3H, s, 2′-NCH_3), 3.00(3H, s, 7′-OCH_3), 3.29(3H, s, 6-OCH_3), 3.70(3H, s, 6′-OCH_3), 3.86(3H, s, 12-OCH_3), 6.31(1H, s, H-8), 6.38–7.06(8H, H–Ar) [3]
CD: [4]
Abs. conf.: 1S, 1′S [3]
Pharm./Biol.: LD_{50} 900, 397, 75 mg/kg (per os, s/c, i/v, mice). Expressed antispastic, antiarrhythmic, sedative, anti-inflammatory, antipyretic, analgetic action [5]

References

1. Z.F. Ismailov, A.U. Rakhmatkariev, S.Yu. Yunusov, Uzb. Khim. Zh. (6), 56 (1961)
2. Z.F. Ismailov, A.U. Rakhmatkariev, S.Yu. Yunusov, DAN UzSSR (11), 21 (1963)
3. Kh.G. Pulatova, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 336 (1968)
4. G.P. Moiseeva, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 723 (1979)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 249

Thalmethine

CAS Registry Number: 3729-83-7



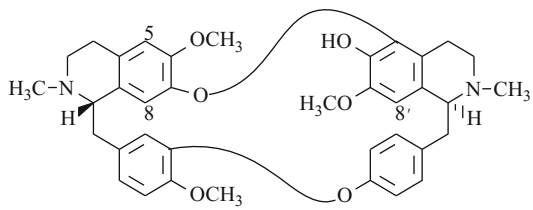
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum minus*
$C_{36}H_{36}N_2O_6$: 592.2573
Mp: 265–268°C (MeOH) [1]
$[\alpha]_D$ +200° ($CHCl_3$) [1]
UV: 283, 315(3.73, 3.41) [1]
IR: 3500–3350, 1630, 1605 [1]
MS *m/z*: 592(M^+, 100), 591, 578, 560, 546, 205, 190, 174 [1, 2]
^{1}H NMR: 1.87(3H, s, 2-NCH_3), 3.60(3H, s, 7-OCH_3), 3.77(3H, s, 7′-OCH_3), 3.87(3H, s, 6-OCH_3) [2]
Abs. conf.: 1S [3]

References

1. V.G. Khodzhaev, H. Allayarov, Chem. Nat. Comp. (6), 522 (1970)
2. H. Allayarov, V.G. Khodzhaev, Z.F. Ismailov, Izv. AN TSSR (6), 121 (1971)
3. K.P. Guha, B. Mukherjee, R. Mukherjee, J. Nat. Prod. **42**, 1 (1979)

Thalmine

CAS Registry Number: 7682-65-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum collinum, T. minus*
$C_{37}H_{40}N_2O_6$: 608.2886
Mp: 252–253°C (dec.), 157°C (dec., hydrochloride), 241°C (dec., perchlorate), 250°C (dec., methiodide) [1]
$[\alpha]_D$ −64° ($CHCl_3$)
Solubility: very sol. $CHCl_3$; spar. sol. EtOH, MeOH, Me_2CO, C_6H_6 [1]
UV: 280(3.60) [2]

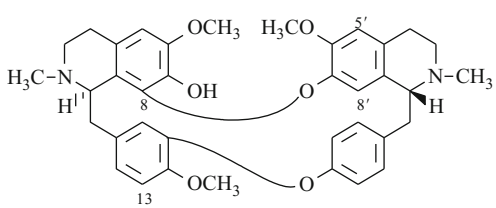
IR: 3400 [3]
IR(Ac): 1770, 1195 [3]
MS *m/z*: 608(M^+, 40), 607(23), 593(5), 577(5), 382(70), 191(100), 183(10), 175(15), 174(40), 168(30), 90(10), 89(5) [4]
^{1}H NMR: 2.10(3H, s, 2-NCH_3), 2.55(3H, s, 2′-NCH_3), 3.77(3H, s, 6-OCH_3), 3.83(6H, s, 2 × OCH_3), 5.00(1H, OH), 5.85–6.90(10H, m, H–Ar) [5]
Abs. conf.: 1S, 1′S
Pharm./Biol.: LD_{50} 217.5 mg/kg (i/v, mice); 3250, 372 mg/kg (per os, i/p, rats). Hypotensive, antipyretic, analgetic, anti-inflammatory [6], antitumoral [7] action

References

1. S.Yu. Yunusov, N.N. Progressov, Zh. Obshch. Khim. **20**, 1151 (1950)
2. S.Yu. Yunusov, M.V. Telezhenetskaya, DAN UzSSR (5), 22 (1963)
3. M.V. Telezhenetskaya, S.Yu. Yunusov, DAN SSSR **162**, 354 (1965)
4. Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 220 (1968)
5. Z.F. Ismailov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 226 (1968)
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 252
7. O.N. Tolkachev, Chem. Nat. Comp. **17**, 195 (1981)

Thalrugosine (Isofangchinoline)

CAS Registry Number: 33889-68-8



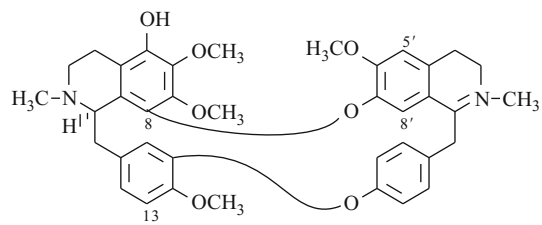
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum sachalinense*
$C_{37}H_{40}N_2O_6$: 608.2886
Mp: amorph. [1]; 153°C [2]; 211–212°C (Me_2CO) [3]
$[\alpha]_D$ +146° (MeOH) [1]; +87° (MeOH) [2]; +177° (MeOH) [3]
UV: 285 [1]
IR($CHCl_3$): 3330 [3]
MS *m/z*: 608(M^+), 593, 577, 471, 417, 382, 381(100), 367, 192 [1]
^{1}H NMR: 2.26(3H, s, 2-NCH_3), 2.43(3H, s, 2′-NCH_3), 3.72(3H, s, 6′-OCH_3), 3.87(6H, s, 6-OCH_3, 12-OCH_3), 6.24–7.05(10H, m, H–Ar) [1]; 6.10(1H, s, H-8′) [2]
Abs. conf.: 1R, 1′S [1]
Pharm./Biol.: Antimicrobial [4], hypotensive [5] action

References

1. D. Umarova, S.Kh. Maekh, S.Yu. Yunusov, N.M. Zaitseva, S.A. Volkova, P.G. Gorovoi, Chem. Nat. Comp. **14**, 511 (1978)
2. M. Shamma, S.Y. Yao, Experientia **29**, 517 (1973)
3. J. Kunitomo, Y. Murakami, M. Oshikata, M. Akasu, K. Kodama, N. Takeda, K. Harada, M. Suzuki, A. Tatematsu, E. Kawanabe, H. Ishii, Chem. Pharm. Bull. **33**, 135 (1985)
4. L.A. Mitscher, W.-N. Wu, R.W. Doskotch, J.L. Beal, J Chem. Soc. Chem. Commun. 589 (1971)
5. A.G. Kurmukov, U.B. Zakirov, *Alkaloidy i preparaty tselebnykh trav dlya lechenya gipertenzivnykh sostoyanii* (Ibn Sina, Tashkent, 1992)

Thalsimidine

CAS Registry Number: 22223-14-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum simplex*

$C_{37}H_{38}N_2O_7$: 622.2679
Mp: 195°C (EtOH)
$[\alpha]_D$ +48° ($CHCl_3$) [1]
Solubility: insol. alk. [1]
UV: 280, 312(4.12, 3.76) [1]
IR: 3490, 1630 [1]
MS *m/z*: 622(M^+, 100), 621(60), 607(56), 591(20), 485(10), 311($^{++}$, 28), 221(8), 190(10), 175(6) [2]
^{1}H NMR(Py-d_5): 2.20(3H, d, J = 11.5, NCH_3), 3.33(3H, s, 7-OCH_3), 3.44(3H, s, 6′-OCH_3), 3.77(3H, s, 6-OCH_3), 3.82(3H, s, 12-OCH_3), 6.51, 6.74(each 1H, s, H-8′, H-5′) [3]
Abs. conf.: 1S [2]

References

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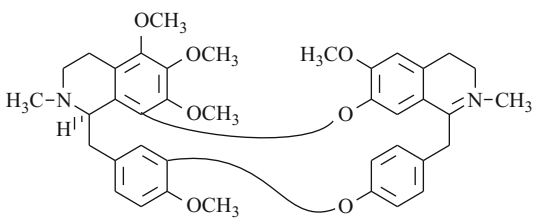
2. S.Kh. Maekh, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 335 (1968)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)

Thalsimine

CAS Registry Number: 5525-36-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Thalictrum simplex*
$C_{38}H_{40}N_2O_7$: 636.2836
Mp: 140–142°C (Me_2CO) [1], 235°C (dec., hydrochloride), 218°C (dec., nitrate), 171°C (dec., tartrate), 211°C (dec., picrate)
$[\alpha]_D$ +27° ($CHCl_3$) [1]
Solubility: very sol. EtOH, C_6H_6, EtOAc, $CHCl_3$; spar. sol. pet. ether; insol. H_2O, alk. [1]
UV: 278, 310(4.02, 3.76) [2]
IR: 1630-1550 [2]
MS *m/z*: 636(M^+, 100), 635(64), 621(51), 605(17), 499(11), 235, 205(13), 190, 175(5), 174(7), 90(15) [3]
^{1}H NMR: 3.74–3.84(5 × OCH3) [4]
Abs. conf.: 1S [5]
Pharm./Biol.: LD50 1263, 505, 69 mg/kg (s/c, i/p, i/v, mice); 358 mg/kg (i/p, rats). Hypotensive, anti-inflammatory, sedative, antispastic action [6]

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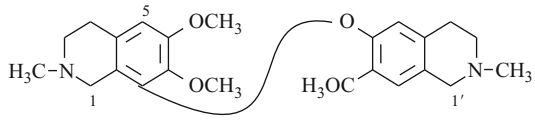
Turcberine

CAS Registry Number: 169626-34-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis turcomanica*
$C_{23}H_{30}N_2O_4$: 398.2206
Mp: oil [1]
Solubility: very sol. org. solvs. [1]

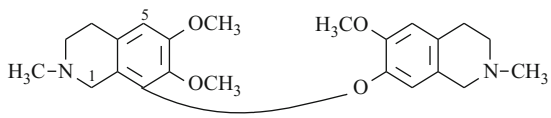
UV: 283(3.83) [1]
IR: 2850, 1610, 1140, 810, 800 [1]
MS *m/z*: 398(M^+, 23), 397(57), 383(6), 368(29), 222(44.5), 221(100), 220(13.5), 206(96.7), 198(13), 192(13), 190(19), 176(28), 175(15), 174(13) [1]
^{1}H NMR: 2.32(3H, s, 2-NCH_3), 2.36(3H, s, 2′-NCH_3), 2.57(2H, t, J = 5.5, 3-H_2), 2.57(4H, s, 3′-H_2, 4′-H_2), 2.83(2H, t, J = 5.5, 4-H_2), 3.36(2H, s, 1-H_2), 3.44(2H, s, 1′-H_2), 3.61(3H, s, 7-OCH_3), 3.78(3H, s, 6-OCH_3), 3.85(3H, s, 7′-OCH_3), 6.20(1H, s, H-5′), 6.50(1H, s, H-5), 6.54(1H, s, H-8′) [1]

References

1. A. Karimov, M.G. Levkovich, N.D. Abdullaev, R.Sh. Shakirov, Chem. Nat. Comp. **29**, 63 (1993)

Turconidine

CAS Registry Number: 66113-64-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Berberis turcomanica*
$C_{23}H_{30}N_2O_4$: 398.2206
Mp: amorph. [1]
UV: 225 sh, 284(3.87, 3.44) [1]
IR: 2940, 2840, 2780, 1610, 1580, 1520, 1450, 1380, 1320, 1260, 1130, 870, 760 [1]
MS *m/z*: 398(M^+, 68), 397(62), 367(42), 221(70), 220(31), 206(100), 198.5^{++}(9), 198^{++}(21), 192(14), 190(25), 175(35) [1]
^{1}H NMR: 2.31(3H, s, 2′-NCH_3), 2.32(3H, s, 2-NCH_3), 2.56(2H, t, J = 5.9, 3′-H_2), 2.57(2H, t, J = 5.9, 3-H_2), 2.79(2H, t, J = 5.9, 4′-H_2), 2.83(2H, t, J = 5.9, 4-H_2), 3.27(2H, s, 1′-H_2), 3.36(2H, s, 1-H_2), 3.62(3H, s, 7-OCH_3), 3.79(3H, s, 6-OCH_3), 3.86(3H, s, 6′-OCH_3), 6.12(1H, s, H-8′), 6.50(1H, s, H-5), 6.63(1H, s, H-5′) [1] [1]
^{13}C NMR: [1]

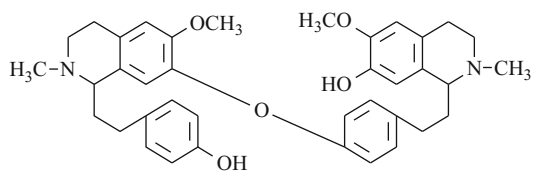
Table 1

=C<	=CH–	N–CH_2	N–CH_3	OCH_3	–CH_2–
151.7	112.3	57.1	45.7	60.7	29.1
147.0	111.8	52.6	45.7	56.1	28.6
145.5	108.7	52.3		55.8	
144.7		52.2			
139.7					
129.5					
126.9					
126.7					
121.5					

References

1. A. Karimov, M.G. Levkovich, N.D. Abdullaev, R. Shakirov, Chem. Nat. Comp. **29**, 771 (1993)

Yolantinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Bisisoquinoline Alkaloids
Biological sources: *Merendera jolantae*
$C_{38}H_{44}N_2O_5$: 608.3250
IR: 3450, 1620, 1460, 890 [1]
MS *m/z*: 608(M^+), 296, 192, 121 [1]
^{1}H NMR: 1.00–4.00(18H, 8 × CH_2, 2 × CH), 2.22, 2.33(each 3H, s, 2 × NCH_3), 3.72, 3.74(each 3H, s, 2 × OCH_3), 6.38–6.75(12H, H–Ar) [1]
^{13}C NMR: [1]

Table 1

=C	=CH–	N–CH–	N–CH_2–	N–CH_3	OCH_3	–CH_2–
155.1	129.3	62.7	47.8	42.1	56.1	36.4
149.2	129.3	62.0	47.4	41.7	55.9	36.4
146.0	124.4					31.3
146.0	119.3					31.0
144.6	118.3					25.4
144.4	116.6					24.5
134.1	115.7					
132.8	115.7					
130.0	115.7					
129.7	113.6					
128.7	112.6					
124.4	111.2					

(*continued*)

References

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Diisoquinoline alkaloids have been found in 94 studied species of plants from 21 genera of the families Berberidaceae, Fumaraceae, Magnoliaceae, Menispermaceae, Ranunculaceae, Rutaceae, and Papaveraceae. They include salts of protoberberines, dihydroprotoberberines, or tetrahydroprotoberberines. The studied plants have afforded seven protoberberine salts; five dihydroprotoberberines, and 25 alkaloids as tetrahydroprotoberberines. Of the diisoquinolines, 32 of 37 contain oxygen substituents in the 2-, 3-, 9-, and 10-positions. The other five diisoquinolines, in which the oxygens occupy the 2-, 3-, 10-, and 11-positions, include mecambridine (oreophylline) and orientalidine, which contain additional substituents on C-1 and C-12.

Several diisoquinoline tetrahydroprotoberberines that were observed in plants of the genera *Corydalis* or *Berberis* contain an α- or β-oriented methyl [(−)-cavidine, corydaline, isocorybulbine, (±)-thalictricavine, tetrahydrocorysamine] in addition to oxygens in the 2-, 3-, 9-, and 10-positions. Ophiocarpine, a diisoquinoline with an oxygen on C-13, has been observed in *Corydalis gigantea*.

8-Hydroxydihydropalmatine has been found in *Berberis heteropoda*. This provides evidence that protoberberine alkaloids can exist as pseudobases in plants.

Protoberberines are the main alkaloids in plants of the genus *Berberis*. The oxygen substituents in protoberberines isolated from studied plants of the genus *Berberis* are located in the 2-, 3-, 9-, and 10-positions whereas the methyl always occupies the 13-position. The position of the substituents in protoberberines was established by converting them to tetrahydroprotoberberines and then oxidizing them as the bases themselves and the Hofmann-degradation products. For new *Berberis* alkaloids [*N*-methyltetrahydroberberine, (+)-β-*N*-methylcorypalmine, 8-hydroxy-dihydropalmatine], the positions were found using UV, NMR, and mass spectroscopies.

An example of this is *N*-methyldihydroberberine, the structure of which was established by converting it to (±)-canadine and by studying the mass and PMR spectra. The mass spectrum of this alkaloid lacks peaks for ions formed by loss of dibenzyl. This is consistent with a double bond between C(13) and C (14).

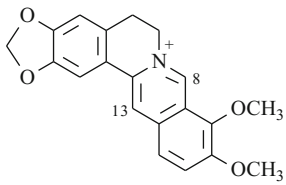
Berberine, being the main alkaloid in plants of the genus *Berberis*, has been used as the bisulfate in medicine as a cholegogic agent. It possesses antimicrobial and antitumor activities. Tetrahydroberberine, which is prepared from berberine, exhibits distinct sedative-tranquilizing action.

Palmatine acts as a stimulant for peripheral cholinoreactive systems. It increases the sensitivity of frog rectal tissue to acetylcholine and has a tonic effect on smooth intestinal muscle.

(−)-Tetrahydropalmatine (hindarine) possesses sedative, hypotensive, and antimalarial activities. It is approved for medical use as a sedative.

Berberine

CAS Registry Number: 2086-83-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids

Biological sources: *Aquilegia olympica, Argemone alba, A. albiflora, A. hybrida, A. mexicana, A. platyceras, A. ochroleuca, Berberis amurensis, B. crataegina, B. ensiflora, B. heterobotrys, B. heteropoda, B. iberica, B. iliensis, B. integerrima, B. kaschgarica, B. nummularia, B. oblonga, B. orientalis, B. ottawensis, B. regeliana, B. sibirica, B. thunbergii, B. turcomanica, B. vulgaris, Bocconia frutescens, Corydalis ledebouriana, Dicranostigma franschetianum, D. lactucoides, D. leptopodum, Eschscholtzia californica, Mahonia aquifolia, Macleaya cordata, M. microcarpa, Nandina domestica, Phellodendron amurense, P. lavallei, P. sachalinense, Thalictrum baikalense, T. collinum, T. flavum, T. foetidum, T. longipedunculatum, T. minus, T. sachalinense, T. simplex, T. strictum, Papaver alberti, P. arenarium, P. paczoskii, P. rhoeas, P. stevenianum*

$C_{20}H_{18}N^+O_4$: 336.1236

Mp: 197°C (chloride) [1], 263°C (iodide) [2]

Solubility(chloride): sol. MeOH, EtOH, H_2O, spar.; sol. Me_2CO [2]

UV: 267, 347, 426(4.45, 4.42, 3.75) [1]

IR: 3400, 1630, 1590, 1540, 1500 [1]

^{1}H NMR(CD_3OD): 4.12(3H, s, 10-OCH_3), 4.23(3H, s, 9-OCH_3), 6.12(2H, s, CH_2O_2), 6.91(1H, s, H-4), 7.64(1H, s, H-1), 7.99, 8.11(each 1H, d, J = 8.9, H-11, H-12), 8.68(1H, s, H-13) [3]

^{13}C NMR: [4]

Table 1

C-1	105.4	C-6	55.2	C-12a	132.9
2	147.6	8	145.4	13	120.2
3	149.8	8a	121.4	13a	137.4
4	108.4	9	143.6	13b	120.4
4a	130.6	10	150.4	2,3-CH_2O_2	102.1
5	26.3	11	126.7	OCH_3	57.1
		12	123.5	OCH_3	61.9

HPLC: [5]

Pharm./Biol.: LD_{50} 13.3, 9.5 mg/kg (s/c, i/v, mice). Active cholagogic and hypotensive agent. The bisulfate is used in the treatment of chronic cystitises. Supplied in 0.005 g tablets [6, 7]

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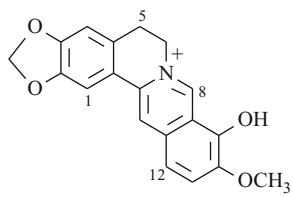
Berberrubine

CAS Registry Number: 15401-69-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids

Biological sources: *Berberis amurensis, B. iliensis, B. vulgaris*

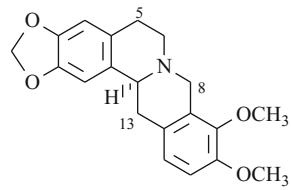
$C_{19}H_{16}N^+O_4$: 322.1079
Mp: 285–286°C (iodide), 180°C (tetrahydro) [1]
Solubility: very sol. $CHCl_3$, MeOH; spar. sol. C_6H_6, Et_2O [1]
UV: 235, 276, 354, 350(4.30, 4.10, 3.91, 3.78) [1]
IR: 3350 [1]
^{1}H NMR: 3.00(2H, t, J = 7, H-5), 3.75(3H, s, OCH_3), 4.30(2H, t, J = 7, H-6), 5.98(2H, s, CH_2O_2), 6.12(1H, d, J = 8.5), 6.77(1H, s), 7.12(1H, s), 7.13(1H, d, J = 8.5), 7.47(1H, s), 9.11(1H, s) [1]

References

1. A. Karimov, R. Shakirov, Chem. Nat. Comp. **29**, 69 (1993)

(–)-Canadine [(–)-Tetrahydroberberine]

CAS Registry Number: 2086-96-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis heteropoda, Papaver somniferum*
$C_{20}H_{21}NO_4$: 339.1471
Mp: 134–135°C
$[\alpha]_D$ −298° ($CHCl_3$) [1, 2]
UV: 230, 284 [3]
IR: 2800-2700, 940 [3]
MS *m/z*: 339(M^+, 66), 176(5), 174(26), 164(100), 149(72) [2]
^{1}H NMR: 2.60(1H, m, H-5e), 2.64(1H, m, H-6a), 2.81(1H, dd, J = 15.7; 7.12, H-13a), 3.15(1H, m, H-5a), 3.20(1H, m, H-6e), 3.23(1H, dd, J = 15; 7.4, H-13e), 3.40(1H, dd, J = 12; 4, H-14), 3.49(1H, d, J = 15.5, H-8a), 4.22(1H, d, J = 15.5, H-8e), 5.88(2H, s, CH_2O_2), 6.59(1H, s, H-4), 6.73(1H, s, H-1), 6.83(1H, d, J = 8.2, H-11), 6.87(1H, d, J = 8.2, H-12) [4]
^{13}C NMR: [4]

Table 1

C-1	105.5	C-8	53.9	C-13	36.0
2	146.4	8a	127.4	14	59.8
3	146.3	9	150.4	14a	130.4
4	108.5	10	145.0	CH_2O_2	101.0
4a	127.5	11	111.3	9-OCH_3	60.2
5	29.1	12	124.2	10-OCH_3	55.9
6	51.5	12a	128.0		

Abs. conf.: [5]

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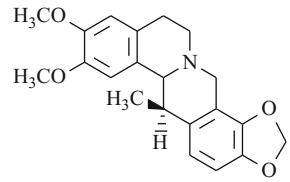
(–) – Cavidine

CAS Registry Number: 32728-75-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana*
$C_{21}H_{23}NO_4$: 353.1627
Mp: 139–140°C [1]
$[\alpha]_D$ −105° (MeOH) [1]
UV: 288(3.85) [1]
IR: 2760, 1605, 1515, 1050, 935 [1]

MS *m/z*: 353(M^+), 338, 192, 190, 176.5($^{++}$), 162(100) [1]
^{1}H NMR: 0.88(3H, d, J = 7, CH_3), 2.50–3.50(m, CH_2), 3.42, 4.01(each 1H, d, J = 15), 3.82(6H, s, 2 × OCH_3), 5.87(2H, q, CH_2O_2), 6.54(1H, s, H–Ar), 6.62(3H, s, H–Ar) [1]

References

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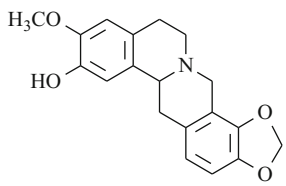
Cheilantifoline



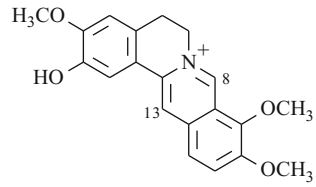
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Argemone hybrida, A. mexicana, A. ochroleuca, Corydalis caucasica, C. gigantea, C. gortschakovii, C. marschalliana, C. rosea-purpurea, C. stricta, C. vaginans, Dicentra spectabilis, Fumaria parviflora, F. vaillantii, Hylomecon vernalis, Papaver arenarium, P. commutatum, P. fugax, P. ocellatum, P. orientale, P. zangezuricum*
$C_{19}H_{19}NO_4$: 325.1314
Mp: 185–186°C (MeOH) [1]
$[\alpha]_D$ −318° ($CHCl_3$) [1]
UV: 240, 280 [1]
IR: 3420, 1600, 1510 [1]
MS *m/z*: 325(M^+), 324, 178, 176, 149, 148(100) [1]
^{1}H NMR: 1.60–3.60(7H, m), 3.75(3H, s, OCH_3), 3.45, 4.05(each 1H, d, J = 16), 5.87(2H, s, CH_2O_2), 6.53, 6.85(each 1H, s, *p*–H–Ar), 6.58(2H, s, *o*–H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)

Columbamine

CAS Registry Number: 3621-36-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis crataegina, B. heteropoda, B. integerrima, B. nummularia, B. oblonga, B. vulgaris, Glaucium fimbrilligerum, Thalictrum longipedunculatum*
$C_{20}H_{20}N^+O_4$: 338.1392
Mp: 227°C (iodide) [1]
^{1}H NMR(CF_3COOH): 4.07(3H, s, OCH_3), 4.18(3H, s, OCH_3), 4.30(3H, s, OCH_3), 7.03(1H), 7.06(1H), 7.70(1H), 8.07(1H), 8.47(1H), 9.56(1H) [2]
HPLC: [3]

References

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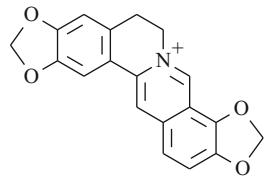
2. K. Jewers, A.H. Manchanda, P.N. Jenkins, J. Chem. Soc. Perkin Trans. II 1393 (1972)
3. A. Bonora, B. Tosi, G. Dall'Olio, A. Bruni, Phytochemistry **29**, 2389 (1990)

Coptisine

CAS Registry Number: 3486-66-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids

Biological sources: *Dicranostigma lactucoides, D. franschetianum, Hypecoum erectum, Macleaya cordata*
$C_{19}H_{14}N^+O_4$: 320.0923
Mp: 280°C (iodide), 219°C (EtOH, tetrahydro) [1]
UV(chloride): 229, 241, 268, 354, 363, 467 [2]
IR(chloride): 3630, 3450, 3010, 2940, 2880, 2860, 2750, 1469, 1460, 1450, 1358, 1317, 1268, 1161, 1138, 1116, 1094, 1003, 968, 920, 894, 854 [3]
^{1}H NMR(CF_3COOH): 6.10, 6.44(each 2H, s, 2 × CH_2O_2), 6.91, 7.46, 8.44, 9.41(each 1H, s, 4 × H–Ar), 7.81(2H, s, 2 × H–Ar) [4]
HPLC: [5]

References

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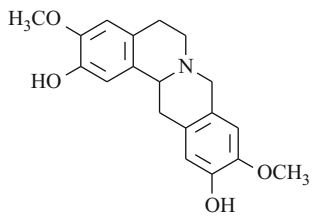
2. S. Pavelka, E. Smekal, Collect. Czech. Chem. Commun. **41**, 3157 (1976)
3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids*, vol. 1 (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1965), No. 66
4. K. Jewers, A.H. Manchanda, P.N. Jenkins, J. Chem. Soc. Perkin Trans. II 1393 (1972)
5. N. Chang-Qun, L.-Y. He, J. Chromatogr. **542**, 193 (1991)

Coreximine (Coramine)

CAS Registry Number: 483-45-4



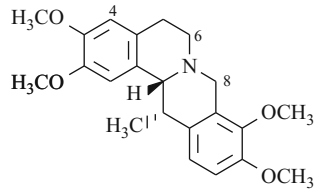
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis pseudoadunca, C. sewerzowii, C. stricta*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 247–252°C (EtOH) [1]
$[\alpha]_D$ −391° (MeOH) [1]
UV: 288 [1]
IR: 3470, 2800, 2750 [2]
MS *m/z*: 327(M^+), 178(100), 176, 150, 135 [2]
^{1}H NMR: 3.85(3H, s, OCH_3), 3.87(3H, s, OCH_3), 6.54, 6.58, 6.69, 6.81(each 1H, 4 × H–Ar) [3]

References

1. M.S. Yunusov, S.T. Akramov, S.Yu. Yunusov, DAN SSSR **162**, 607 (1965)
2. M.S. Yunusov, S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **2**, 279 (1966)
3. E. Brochmann-Hanssen, H.-C. Chiang, J. Org. Chem. **42**, 3588 (1977)

Corydaline

CAS Registry Number: 518-69-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis glaucescens, C. ledebouriana, C. marschalliana, C. popovii*
$C_{22}H_{27}NO_4$: 369.1940
Mp: 134–135°C (MeOH) [1]
$[\alpha]_D$ +300° ($CHCl_3$) [1]
UV: 227, 282 [2]
IR: 3010, 2980, 2950, 2900, 2850, 2800, 1665, 1648, 1623, 1509, 1488, 1468, 1421, 1398, 1368, 1337, 1319, 1295, 1281, 1258, 1241, 1159, 1130, 1086, 1078, 1047, 1016, 973, 962, 942, 921, 873, 858, 838, 825, 814 [3]
MS *m/z*: 369(M^+), 192, 190, 178(100) [4]
^{1}H NMR: 0.98(3H, d, J = 7), 3.83(3H, s, OCH_3), 3.89(9H, s, 3 × OCH_3), 6.61, 6.84(each 1H, s, 2 × H–Ar), 6.72(2H, s, H–Ar) [4, 5]
^{13}C NMR: [5]

Table 1

C-1	109.0	C-8	54.5	C-13	38.4
2	147.3	8a	128.6	14	63.1
3	147.8	9	150.2	14a	128.6
4	111.3	10	145.1	15	18.4
4a	128.5	11	111.7	2-OCH_3	55.8
5	29.4	12	124.1	3-OCH_3	55.9
6	51.5	12a	135.1	9-OCH_3	60.1
				10-OCH_3	56.2

Abs. conf.: [6]
HPLC: [7]

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2. S. Pavelka, E. Smekal, Collect. Czech. Chem. Commun. **41**, 3157 (1976)
3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids*, vol. 1 (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1965), No. 73
4. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
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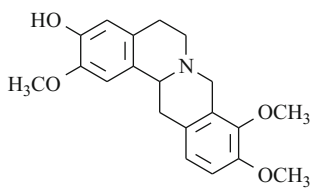
Corypalmine (Discretinine)

CAS Registry Number: 13063-54-2



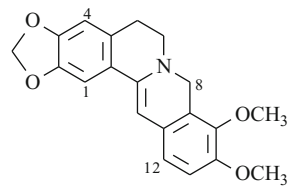
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis rosea-purpurea*
$C_{20}H_{23}NO_4$: 341.1627
Mp: 185–186°C (EtOH) [1]
$[\alpha]_D$ −260° ($CHCl_3$) [1]
UV: 230, 287 [1]
IR: 3500, 1605 [1]
MS *m/z*: 341(M^+), 326, 310, 178, 164(100), 149, 134, 104 [1]
^{1}H NMR: 3.85(6H, s, 2 × OCH_3), 3.89(3H, s, OCH_3), 6.68, 6.70(each 1H, s, *p*–H–Ar), 6.81(2H, s, *o*–H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)

Dihydroberberine (Lambertine)

CAS Registry Number: 483-15-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis vulgaris*
$C_{20}H_{19}NO_4$: 337.1314
Mp: 163–164°C [1]
Solubility: very sol. $CHCl_3$; spar. sol. Et_2O, C_6H_6 [1]
UV: 280, 368(4.21; 4.30) [1]
IR: 3250-3150, 1600, 1570, 1230, 1065, 1040 [2]
^{1}H NMR(DMSO-d_6): 3.05–3.60(6H, m, 3 × CH_2), 4.1, 4.2(each 3H, s, 2 × OCH_3), 6.15(2H, CH_2O_2), 7.05–9.20(H–Ar), 9.50(1H) [2]
^{13}C NMR(DMSO-d_6): [2]

Table 1

C-1	108.3	C-5	37.0	C-11	121.2
2	143.5	6	57.7	12	120.3
3	145.3	8	57.1	12a	137.3

(*continued*)

Table 1 (continued)

4	105.3	8a	132.9	9-OCH_3	56.2
4a	126.6	9	149.6	10-OCH_3	61.9
4b	123.4	10	147.5	CH_2O_2	101.5

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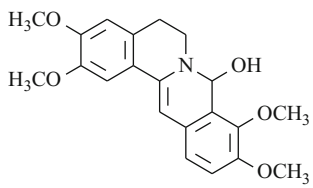
8-Hydroxydihydropalmatine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis heteropoda*
$C_{21}H_{23}NO_5$: 369.1576
Mp: 129–130°C [1]
Solubility: very sol. MeOH; spar. sol $CHCl_3$, C_6H_6, Et_2O [1]
UV: 358, 434 (3.97, 4.17) [1]
IR: 3350 [1]
MS *m/z*: 369(M^+), 352, 351, 336, 322 [1]
^{1}H NMR: 2.75(2H, m), 3.35(2H, m), 3.76(6H, s, 2 × OCH_3), 3.85(3H, s, OCH_3), 3.87(3H, s, OCH_3), 5.61(1H, s), 6.05, 6.60(each 1H, s), 6.75(1H, d, J = 8.5), 6.88(1H, d, J = 8.5), 7.11(1H, s) [1]

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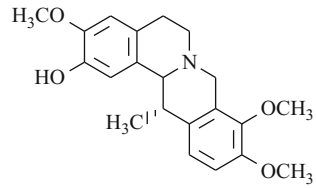
Isocorybulbine

CAS Registry Number: 22672-74-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis marschalliana*
$C_{21}H_{25}NO_4$: 355.1783
Mp: 179–180°C (EtOH) [1]
$[\alpha]_D$ +300° ($CHCl_3$) [1]
UV: 225, 283 [2, 3]
IR: 3560, 1665, 1615, 1585, 1508, 1300, 1288, 1220, 1185, 1173, 1117, 1068, 1046, 1018, 975, 945, 928, 857, 837, 818, 809, 782, 762 [3]
MS *m/z*: 355(M^+), 192, 190, 178(100) [2]
^{1}H NMR: 1.18(3H), 3.81(3H, s, OCH_3), 3.85(6H, s, 2 × OCH_3), 6.56, 6.71(each 1H, s, 2 × H–Ar), 6.65(2H, s, 2 × H–Ar) [2]

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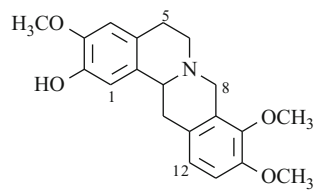
Isocorypalmine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Bocconia frutescens, Corydalis marschalliana, C. stricta, C. vaginans, Dicranostigma leptopodum, Glaucium fimbrilligerum, Liriodendron tulipiferum*
$C_{20}H_{23}NO_4$: 341.1627
Mp: 231–232°C [1]
$[\alpha]_D$ −82° (MeOH) [1]
UV: 285 [1]
MS *m/z*: 341(M^+), 326, 324, 310, 178, 176, 164(100), 149 [1]
^{1}H NMR(CF_3COOH): 3.53(6H, s, 2 × OCH_3), 3.60(3H, s, OCH_3), 6.42, 6.61(each 1H, s, *p*–H–Ar), 6.72(2H, s, H-11, H-12) [1]

References

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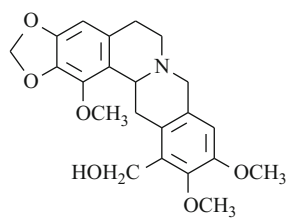
Mecambridine (Oreofilline)

CAS Registry Number: 31098-60-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Papaver bracteatum, P. lisae, P. oreophilum, P. orientale, P. pseudoorientale*
$C_{22}H_{25}NO_6$: 399.1682
Mp: 176–177°C (EtOH) [1]
$[\alpha]_D$ −260° ($CHCl_3$) [1]
UV: 229, 288 [2]
IR: 3605 [3]
MS *m/z*: 399(M^+), 368, 206, 204, 195, 194, 179 [3]
^{1}H NMR: 2.10–3.80(10H, m), 3.84(6H, s, 2 × OCH_3), 3.98(3H, s, OCH_3), 4.65(2H, s, Ar–CH_2OH), 5.85(2H, s, CH_2O_2), 6.33, 6.58(each 1H, s, 2 × H–Ar) [3]

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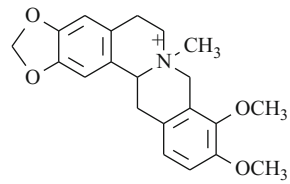
(−) -β -N-Methylcanadine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Glaucium squamigerum, Hypecoum erectum, Thalictrum minus*
$C_{21}H_{24}N^+O_4$: 354.1705
Mp: 192°C (hydroxide), 193°C (dec., chloride), 265°C (iodide), 111°C (anhydrobase) [2]
$[\alpha]_D$ −28° (EtOH) [1]; $[\alpha]_D$ −58° [2]; $[\alpha]_D$ −30° (MeOH) [3]
UV: 231 sh, 286(3.99, 3.69) [2]

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1. H. Dutschwska, B. Dimov, N. Mollov, L. Evstatieva, Planta Med. **39**, 77 (1980)
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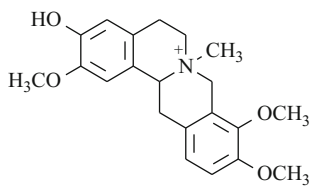
(+) -β -N-Methylcorypalmine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis iliensis*
$C_{21}H_{26}NO_4$: 356.1862
Mp: 231°C (iodide) [1]
$[\alpha]_D$ (iodide): +127° (EtOH) [1]
Solubility(iodide): sol. MeOH; spar. sol. $CHCl_3$, C_6H_6, Et_2O [1]
UV: 224, 285(4.17, 3.94) [1]
IR: 3400, 2840 [1]
MS *m/z* (iodide): 355, 341, 178, 164, 149, 142, 127 [1]
^{1}H NMR(DMSO-d_6): 2.75(2H, m), 3.08(1H, d, J = 15), 3.35(3H, s, NCH_3), 3.75(9H, br s, 3 × OCH_3), 4.01(1H, d, J = 15), 4.76(2H, m), 6.75(1H, s), 6.87(1H, s), 7.05(2H, s) [1]

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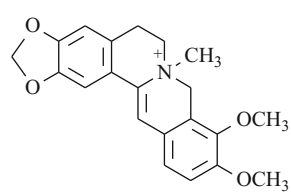
N-Methyldihydroberberine

CAS Registry Number: 47474-50-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis heteropoda*
$C_{21}H_{22}N^+O_4$: 352.1549
Mp: 212°C (chloride) [1]
Solubility: very sol. MeOH; spar. sol. $CHCl_3$ [1]
UV(chloride): 241, 350(4.37, 3.92) [1]
MS *m/z* (chloride): 351, 337, 336, 321, 320, 308, 307, 292, 278 [1]
^{1}H NMR(chloride, DMSO-d_6): 3.22–4.98(6H, m), 3.45(3H, br s, N^+CH_3), 4.05(3H, s, OCH_3), 4.17 (3H, s, OCH_3), 6.05(2H, s, CH_2O_2), 6.49(1H, s), 6.78(1H, s), 7.44(2H, s), 7.85(1H, s) [1]

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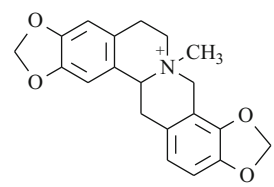
1. M.M. Yusupov, A. Karimov, M.G. Levkovich, N.D. Abdullaev, R.Sh. Shakirov, Chem. Nat. Comp. **29**, 43 (1993)

N-Methylstylopine

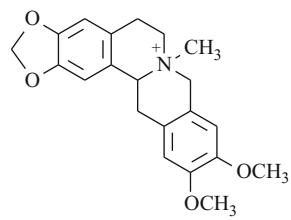


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Argemone platyceras, Corydalis stricta, Fumaria vaillantii, Glaucium corniculatum, G. fimbrilligerum*
$C_{20}H_{20}N^+O_4$: 338.1392
Mp: 266°C (MeOH–$CHCl_3$; hydroxymethylate) [1]
$[\alpha]_D$ −121° (MeOH) [1]
UV(hydroxymethylate): 244, 294 [1]
IR(hydroxymethylate): 3650-3150, 1510, 1045, 940, 920 [1]
MS *m/z* (hydroxymethylate): 323, 174, 148(100) [1]
^{1}H NMR(hydroxymethylate, CF_3COOH): 2.63(3H, s, N^+CH_3), 2.65–4.70(9H, m), 5.58(4H, s, 2 × CH_2O_2), 6.34(1H, s, H–Ar), 6.49(3H, s, 3 × H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 596 (1996)

N-Methyltetrahydro-pseudoberberine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Thalictrum minus*
$C_{21}H_{24}N^+O_4$: 354.1705
Mp: 128°C (iodide) [1]
UV: 287 [1]
MS *m/z*: 354(M^+), 353, 339, 174, 164, 149, 142, 127 [1]
^{1}H NMR(CF_3COOH): 3.43(3H, s, N^+CH_3), 3.98(3H, s, OCH_3), 4.05(3H, s, OCH_3), 4.98(2H, s), 6.01(2H, s, CH_2O_2), 6.80(2H, s), 7.15(2H, s) [1]

References

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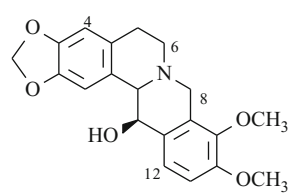
Ophiocarpine

CAS Registry Number: 478-13-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis gigantea*
$C_{20}H_{21}NO_5$: 355.1420
Mp: 188–189°C [1], 248–252°C [2]
$[\alpha]_D$ −285° ($CHCl_3$) [1]
UV: 230, 290 [1]
IR: 2850-2750 [3]
MS *m/z*: 355(M^+), 176, 174 [1]
^{1}H NMR: 3.52(1H, d, J = 16), 3.85(6H, s, 2 × OCH_3), 4.23(1H, d, J = 16), 4.67(1H, d, J = 1.5), 5.80(2H, s, CH_2O_2), 6.55, 6.77(each 1H, s, *p*–H–Ar), 6.83, 7.18(each 1H, d, J = 8, *o*–H–Ar) [3]
^{13}C NMR: [2]

Table 1

C-1	105.7	C-8	53.9	C-13	70.1
2	146.3	8a	128.7	14	64.8
3	146.6	9	151.8	14a	129.5
4	108.5	10	144.9	9-OCH_3	55.8
4a	127.4	11	111.4	10-OCH_3	60.1
5	29.5	12	125.5	2,3-OCH_2O	100.9
6	60.0	12a	131.9		

References

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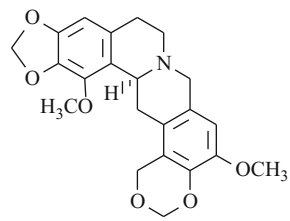
3. T. Kametani, H. Matsumoto, Y. Satoh, H. Nemoto, K. Fukumoto, J. Chem. Soc. Perkin Trans. I 376 (1977)

Orientalidine

CAS Registry Number: 23943-90-0



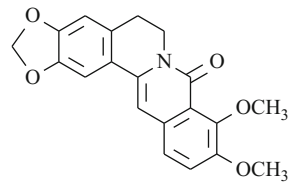
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Papaver bracteatum, P. orientale, P. pseudo-orientale*

$C_{22}H_{23}NO_6$: 397.1525
Mp: 193–194°C (EtOH) [1]
$[\alpha]_D$ −236° ($CHCl_3$) [1]
UV: 231 sh, 286 [2]
MS *m/z*: 397(M^+), 367, 366, 198.5($^{++}$), 192, 162(100) [1, 2]
^{1}H NMR: 3.80, 4.13(each 1H, d, J = 16), 3.83, 3.95(each 3H, s, 2 × OCH_3), 4.61, 4.86(each 1H, d, J = 15), 5.22(2H, s), 5.86(2H, s, CH_2O_2), 6.32, 6.49(each 1H, s, 2 × H–Ar) [2]
ORD: [2]
HPLC: [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
2. V. Preininger, A.D. Cross, J.W. Murphy, F. Santavy, T. Toube, Collect. Czech. Chem. Commun. **34**, 875 (1969)
3. J. Milo, A. Levy, D. Palevitch, G. Ladizinsky, J. Chromatogr. **452**, 563 (1988)

8-Oxoberberine



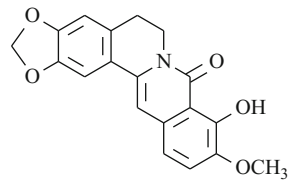
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis ottawensis, B. vulgaris*
$C_{20}H_{17}NO_5$: 351.1107
Mp: 200–201°C [1]
Solubility: very sol. $CHCl_3$; spar. sol. MeOH [2]
UV: 279, 362(3.87, 3.81) [2]
IR: 2980, 2940, 2910, 2840, 1650, 1620, 1600, 1500, 1380, 1270, 1220 [1, 2]
MS *m/z*: 351(M^+), 337, 336, 322, 308, 306, 292 [2]
^{1}H NMR: 2.80(2H, t), 3.85(3H, s), 3.92(3H, s), 4.18(2H, t), 5.88(2H, s), 6.58(2H, s), 7.08 (1H, s), 7.17(2H, s) [2]

References

1. M.M. Yusupov, A. Karimov, K.L. Lutfulline, Chem. Nat. Comp. **26**, 105 (1990)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)

8-Oxoberberrubine

CAS Registry Number: 139220-06-7



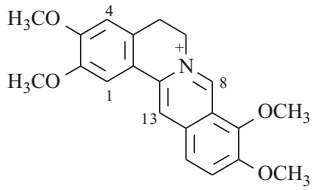
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis heteropoda*
$C_{19}H_{15}NO_5$: 337.0950
Mp: 251–252°C [1]
Solubility: very sol. $CHCl_3$; spar. sol. EtOH, MeOH, C_6H_6 [1]
UV: 280, 364(3.97, 3.94) [1]
IR: 3450, 1650, 1490 [1]
MS *m/z*: 337(M^+, 100), 323(22), 322(50), 308(13), 294(63), 279(27) [1]
^{1}H NMR: 2.83(2H, t), 3.88(3H, s, OCH_3), 4.17(2H, t), 5.92(2H, s, CH_2O_2), 6.60(1H, s), 6.71(1H, s), 6.86(1H, d, J = 8.5), 7.08(1H, s), 7.19(1H, d, J = 8.5), 12.75(1H, s, OH) [1]

References

1. M.M. Yusupov, A. Karimov, M.G. Levkovich, N.D. Abdullaev, R. Shakirov, Chem. Nat. Comp. **29**, 43 (1993)

Palmatine

CAS Registry Number: 3486-67-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids

Biological sources: *Berberis amurensis, B. crataegina, B. heterobotrys, B. heteropoda, B. integerrima, B. nummularia, B. oblonga, B. ottawensis, B. thunbergii, B. turcomanica, B. vulgaris, Corydalis ledebouriana, Mahonia aquifolia, Thalictrum minus*

$C_{21}H_{22}NO_4$: 352.1549

Mp: 241°C (iodide), 205°C (chloride), 262°C (perchlorate) [1]

Solubility: very sol. MeOH, EtOH; spar. sol. $CHCl_3$ [2]

UV: 226, 265(4.35, 4.37) [3]

IR: 3392, 1638, 1605 [3]

^{1}H NMR(D_2O): 3.06(4H, br s, H-5, H-6), 3.74(3H, s, 2-OCH_3), 3.79(3H, s, 3-OCH_3), 3.91(3H, s, 10-OCH_3), 4.00(3H, s, 9-OCH_3), 6.76(1H, s, H-4), 7.04(1H, s, H-1), 7.56(1H, d, J = 9.1, H-12), 7.80(1H, d, J = 9.1, H-11), 8.04(1H, s, H-13), 9.39(1H, s, H-8) [4]

^{13}C NMR: [5]

Table 1

C-1	108.7	C-8	145.0	C-13	120.5
2	149.6	8a	119.0	13a	138.3
3	150.6	9	152.4	13b	122.1
4	111.1	10	144.5	2-OCH_3	57.2
4a	134.0	11	123.6	3-OCH_3	57.2
5	27.2	12	126.8	9-OCH_3	62.5
6	56.8	12a	128.3	10-OCH_3	56.4

HPLC: [6]

Pharm./Biol.: Depressive influence on cholinesterase [7]. Antimalarial activity [5]

References

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2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
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4. A. Patra, A. Ghosh, A.K. Mitra, Planta Med. **40**, 333 (1980)
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6. A. Bonora, B. Tosi, G. Dall'Olio, A. Bruni, Phytochemistry **29**, 2389 (1990)
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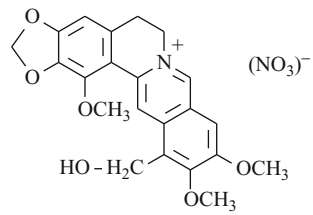
Pangrenine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids

Biological sources: *Papaver angrenicum*

$C_{22}H_{22}N^+O_6 \cdot NO_3$: 458.4211

Mp: 281–283°C [1]

$[\alpha]_D$ ±0° [1]

Solubility: MeOH, EtOH

^{1}H NMR: 1.8–2.8(m, CH_2), 4.02, 4.06 and 4.14(each 3H, 3Ar–OCH_3), 5.07(1H, s, Ar–H), 6.06(2H, s, Ar–H), 6.67(1H, s, Ar–H), 4.80(2H, s, O–CH_2–O) [1]

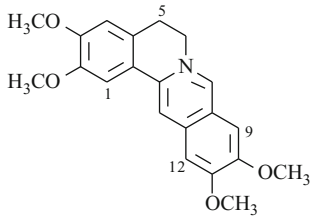
X – ray: [1]

References

1. D. Siddikov, I.Zh. Zhalolov, B. Tashkhodzaev, K.K. Turgunov, S.F. Aripova, V.U. Khujaev, Chem. Nat. Comp. **41**, 442 (2005)

Pseudopalmatine

CAS Registry Number: 19716-66-6



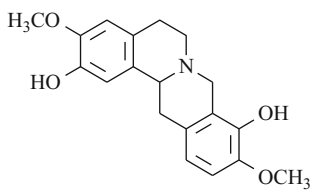
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis heteropoda*
$C_{21}H_{22}N^+O_4$: 352.1549
Mp: 213°C (chloride) [1]
Solubility: very sol. $CHCl_3$, MeOH; insol. C_6H_6, Et_2O [1]
UV: 263, 288, 307 sh, 330, 379(4.14, 4.45, 4.32, 4.10. 3.66) [1]
^{1}H NMR: 3.25(2H, t, 5-H_2), 3.97(3H, s, OCH_3), 3.99(3H, s, OCH_3), 4.03(3H, s, OCH_3), 4.14(3H, s, OCH_3), 4.97(2H, t, 6-H_2), 6.85(1H, s), 7.48(1H, s), 7.90(2H, s), 8.65(1H, s), 9.75(1H, s) [1]

References

1. M.M. Yusupov, A. Karimov, M.G. Levkovich, N.D. Abdullaev, R. Shakirov, Chem. Nat. Comp. **29**, 43 (1993)

Scoulerine (Discretamine)

CAS Registry Number: 605-34-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Argemone alba, A. albiflora, A. hybrida, A. mexicana, A. ochroleuca, Bocconia frutescens, Corydalis alpestris, C. bracteata, C. caucasica, C. emanuelii, C. gigantea, C. gortschakovii, C. ledebouriana, C. marschalliana, C. pseudoadunca, C. sewerzowii, C. stricta, C. vaginans, Dicentra peregrina, D. spectabilis, Fumaria parviflora, F. vaillantii, Glaucium fimbrilligerum,G. squamigerum, Hylomecon vernalis, Papaver alberti, P. arenarium, P. bracteatum, P. commutatum, P. fugax, P. hybridum, P. ocellatum, P. orientale, P. paczoskii, P. zangezuricum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 192–193°C (EtOH) [1]
$[\alpha]_D$ −260° ($CHCl_3$) [1]
UV: 287 [1]
IR: 3455, 1590, 1500 [1]
MS *m/z*: 327(M^+), 326, 178(100), 176, 150, 135 [1,2]
^{1}H NMR: 3.68(6H, s, 2 × OCH_3), 3.97, 4.23(each 1H, d, J = 16), 6.43, 6.65(each 1H, s, H–Ar), 6.53(2H, s) [1]
Pharm./Biol.: Pronounced sedative-tranquilizing action [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
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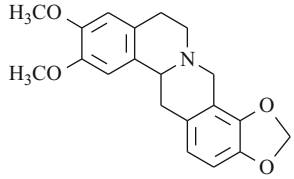
Sinactine

CAS Registry Number: 522-96-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Fumaria officinalis*
$C_{20}H_{21}NO_4$: 339.1471
Mp: 170–171°C [1]
$[\alpha]_D$ −310° ($CHCl_3$) [1]
UV: 232, 287 [2]
MS *m/z*: 339(M^+), 176, 174, 148(100) [1]
^{1}H NMR: 3.78, 3.86(each 3H, s, 2 × OCH_3), 5.90(2H, s, CH_2O_2), 6.55, 6.75(each 1H, s, 2 × H–Ar), 6.65(2H, s) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
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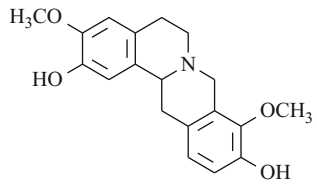
Stepholidine

CAS Registry Number: 16562-13-3



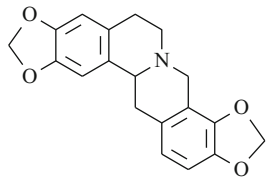
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 156–158°C (Me_2CO) [1]
UV: 286(3.70) [1]
MS *m/z*: 327(M^+), 326, 296, 178(100), 176, 150, 135 [1]
^{1}H NMR(CF_3COOH): 3.52, 3.55(each 3H, s, 2 × OCH_3), 6.50(1H, s), 6.56(1H, s), 6.66(2H, s) [1]

References

1. R. Ziyaev, K. Ikramov, Kh.A. Kadyrov, A. Abdusamatov, Chem. Nat. Comp. **27**, 516 (1991)

(+)-Stylopine

CAS Registry Number: 7461-02-1 (stylopine)



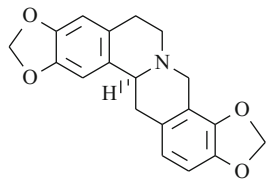
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis bractea, C. caucasica, C. emanuelii, C. gortschakovii, C. marschalliana, C. paniculigera, C. pseudoadunca, C. rosea-purpurea, C. stricta, Fumaria capreolata, F. officinalis, F. parviflora, F. schleicheri, F. vaillantii, Papaver rhoeas*
$C_{19}H_{17}NO_4$: 323.1158
Mp: 202–203°C (EtOH) [1]
$[\alpha]_D$ +308° ($CHCl_3$) [1]
UV: 230, 285 [1]
IR: 1500, 1050, 920 [1]
MS *m/z*: 323(M^+), 322, 174, 148(100) [1]
^{1}H NMR: 3.42, 4.02(each 1H, d, J = 16), 5.81(4H, s, 2 × CH_2O_2), 6.49, 6.62(each 1H, s, H–Ar), 6.55(2H, s, H–Ar) [1]
HPLC: [2]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
2. H. Liang-Feng, W. Nowicky, V. Gutmann, J. Chromatogr. **543**, 123 (1991)

(−)-Stylopine (Chelidamine)

CAS Registry Number: 84-39-9



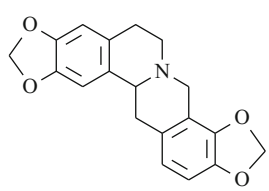
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Chelidonium majus*
$C_{19}H_{17}NO_4$: 323.1158
Mp: 204–205°C, 256°C (hydrochloride), 275°C (methiodide) [1]
$[\alpha]_D$ −317° ($CHCl_3$) [1]
Abs. conf.: [2]

References

1. T.F. Platonova, P.S. Massagetov, A.D. Kuzovkov, L.M. Utkin, Zh. Obshch. Khim. **26**, 173 (1956)
2. G. Snatzke, J. Hrbek, J. Hruban, A. Horeau, F. Santavy, Tetrahedron **26**, 5013 (1970)

(±)-Stylopine

CAS Registry Number: 4312-32-7

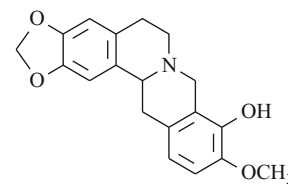


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Fumaria schleicheri*
$C_{19}H_{17}NO_4$: 323.1158
Mp: 205–206°C [1]
$[\alpha]_D$ 0° [1]

References

1. S.S. Markosyan, T.A. Tsulikyan, V.A. Mnatsakanyan, Arm. Khim. Zh. **29**, 1053 (1976)

(−)-Tetrahydroberberrubine



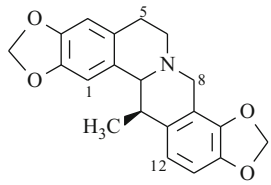
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis heteropoda, B. nummularia*
$C_{19}H_{19}NO_4$: 325.1314
Mp: 188–190°C [1]
$[\alpha]_D$ −287° (EtOH) [1]
Solubility: very sol. $CHCl_3$, MeOH; spar. sol. C_6H_6, Et_2O [1]
MS *m/z*: 325(M^+, 43), 176(100), 174(43), 150(48), 135(27) [1]
^{1}H NMR: 2.70(2H, t), 3.51(2H, t), 3.73(1H, d, J = 15), 3.75(3H, s, OCH_3), 4.12(1H, d, J = 15), 5.81(2H, s), 6.01(1H, s), 6.49(1H, s), 6.68(2H, s) [1]

References

1. A. Karimov, R. Shakirov, Dep. VINITI 1639-B92; RZh. Khim. 1992, 17E114

Tetrahydrocorysamine

Related CAS Registry Numbers(s): 42511-93-3 42511-94-4



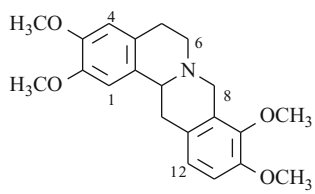
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana*
$C_{20}H_{19}NO_4$: 337.1314
Mp: 199–200°C (MeOH) [1]
$[\alpha]_D$ +300° (MeOH) [1]
UV: 288(3.85) [1]
MS *m/z*: 337(M^+), 322, 176, 174, 168.5($^{++}$), 162(100) [1]
^{1}H NMR: 0.90(3H, d, J = 7, 13-CH_3), 2.50–3.50(6H, m), 3.42, 4.03(each 1H, d, J = 15), 5.86(4H, s, 2 × CH_2O_2), 6.52(1H, s), 6.66(3H, s) [1]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 369 (1979)

(−)-Tetrahydropalmatine (Hindarine)

CAS Registry Number: 10097-84-4 (tetrahydropalmitine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana, C. marschalliana, Stephania glabra*
$C_{21}H_{25}NO_4$: 355.1783
Mp: 141–142°C (EtOH), 257°C (hydrochloride), 257°C (methiodide), 218°C (sulfate) [1]
$[\alpha]_D$ −292° ($CHCl_3$)
UV: 281(3.75) [2]
MS *m/z*: 356(21), 355(M^+, 94), 354(81), 338(27), 192(100), 191(32), 190(32), 164(35), 163(38) [2]
^{1}H NMR: 2.65(1H, m, H-5e), 2.68(1H, m, H-6a), 2.91(1H, dd, J = 15.8; 12.2, H-13a), 3.10(1H, m, H-5a), 3.23(1H, m, H-6e), 3.27(1H, dd, J = 15; 8.4, H-13e), 3.49(1H, dd, J = 12; 2.4, H-13a), 3.54(1H, d, J = 15.7, H-8a), 3.85, 3.86(each 3H, s, 2-OCH_3, 3-OCH_3), 3.88(3H, s, 9-OCH_3), 3.90(3H, s, 10-OCH_3), 4.31(1H, d, J = 15.7, H-8e), 6.66(1H, s, H-4), 6.73(1H, s, H-1), 6.77(1H, d, J = 8, H-11), 6.92(1H, d, J = 8, H-12) [3]
^{13}C NMR: [3]

Table 1

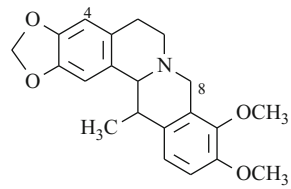
C-1	108.5	C-8	54.0	C-13	36.3
2	147.5	8a	127.7	14	59.3
3	147.3	9	150.2	14a	129.6
4	111.2	10	145.0	2-OCH_3	55.8
4a	126.7	11	110.8	3-OCH_3	55.8
5	29.1	12	123.8	9-OCH_3	60.1
6	51.5	12a	128.6	10-OCH_3	56.0

HPLC: [4]
Pharm./Biol.: Sedative, soporific, hypotensive action [5] Antimalarial action [3]. It is permitted by Pharmacological Committee of Ministry of Public Health of the former USSR as a sedative agent [6]

References

1. I.I. Shchelchkova, T.N. Il'inskaya, A.D. Kuzovkov, Chem. Nat. Comp. **1**, 210 (1965)
2. J. Siwon, R. Verpoorte, G.F.A. van Essen, A. Baerheim-Swendsen, Planta Med. **38**, 24 (1980)
3. R.A. Hussain, J. Kim, C.W.W. Beecher, A.D. Kinghorn, Heterocycles **29**, 2257 (1989)
4. K. Sagara, Y. Ito, M. Ojima, T. Oshima, K. Suto, T. Misaki, H. Itokawa, Chem. Pharm. Bull. **33**, 5369 (1985)
5. E.A. Trutneva, Farmakologiya i toksikologiya **24**(3), 279 (1961)
6. I.M. Rabinovich, P.N. Kibal'chich, I.I. Fadeeva, T.N. Il'inskaya, A.D. Kuzovkov, V.V. Berezhinskaya, E.A. Trutneva, S.S. Nikitina, Aptechn. Delo **14**(6), 19 (1965)

(±)-Thalictricavine

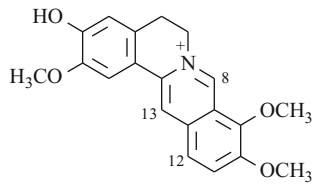


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis nummularia*
$C_{21}H_{23}NO_4$: 353.1627
Mp: 211–212°C [1]
Solubility: very sol. $CHCl_3$; spar. sol. C_6H_6, Et_2O [1]
UV: 234 sh, 285(4.10, 3.70) [1]
IR: 2750 [1]
MS *m/z*: 353(M^+), 338, 322, 307, 178, 176, 163 [1]
^{1}H NMR: 0.88(3H, d, CH_3), 3.73, 4.09(each 1H, d, J = 15, 8-H_2), 3.75(6H, s, 2 × OCH_3), 5.85(2H, s, CH_2O_2), 6.21, 6.32(each 1H, s, H-1, H-4), 6.62, 6.72(each 1H, d, J = 8.5, H-11, H-12) [1]

References

1. A. Karimov, R. Shakirov, Dep. VINITI. 1639-B92; RZh Khim. 17E 114 (1992)

Yatrorhizine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Diisoquinoline Alkaloids
Biological sources: *Berberis amurensis, B. crataegina, B. heteropoda, B. iliensis, B. integerrima, B. nummularia, B. oblonga, B. vulgaris, Mahonia aquifolia, Thalictrum minus*
$C_{20}H_{20}N^+O_4$: 338.1392
Mp: 206°C (chloride), 210°C (iodide), 210°C (picrate), 225°C (nitrate) [1]
UV: 266, 347, 440(4.4, 4.4, 3.7) [2]
UV(OH^-): 245, 385 [3]
^{1}H NMR(CD_3OD): 3.94(3H, s, 2-OCH_3), 4.07(3H, s, 10-OCH_3), 4.17(3H, s, 9-OCH_3), 6.65(1H, s, H-4), 7.45(1H, s, H-1), 7.88(1H, d, H-12), 8.02(1H, d, H-11), 8.56(1H, s, H-13), 9.58(1H, s, H-8) [3]
^{13}C NMR: [4]

Table 1

C-1	110.9	C-6	57.6	C-12a	128.2
2	149.4	8	145.2	13	119.3
3	146.5	8a	119.2	13a	134.9
4	116.3	9	151.5	13b	120.9
4a	130.2	10	145.2	2-OCH_3	58.3
5	29.1	11	122.9	9-OCH_3	63.0
		12	125.7	10-OCH_3	57.0

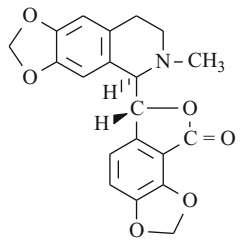
HPLC: [5]
Pharm./Biol.: LD_{50} 150 mg/kg. Tonic influence on smooth musculature of intestine [6]. Antimalarial activity [4]

References

1. S.Yu. Yunusov, *Alkaloidy* (Fan, Tashkent, 1981), p. 135
2. M. Shamma, J.C.D. Hillman, Chem. Rev. **779** (1969)
3. J. Siwan, R. Verpoorte, G.F.A. van Essen, A. Baerheim Svendsen, Planta Med. **38**, 24 (1980)
4. R.A. Hussain, J. Kim, C.W.W. Beecher, A.D. Kinghorn, Heterocycles **29**, 2257 (1989)
5. S. Tosa, S. Ishihara, Y. Nose, T. Usikawa, S. Yoshida, H. Makazawa, T. Tomimatsu, Zasshi Shoyakugaku **43**, 28 (1989). *C. A.*, **111**, 160355 (1989)
6. Z.P. Naidovich, E.A. Trutneva, O.N. Tolkachev, V.D. Vasil'eva, Farmatsiya **25**(4), 33 (1976)

Miscellaneous Isoquinoline Alkaloids

(–) – Adlumidine

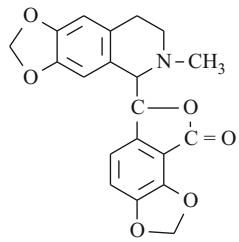


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis alpestris, C. caucasica, C. emanuelii, C. gigantea, C. gortschakovii, C. ledebouriana, C. marschalliana, C. paniculigera, C. pseudoadunca, C. remota, C. rosea, C. stricta, C. vaginans, Fumaria capreolata, F. officinalis, F. parviflora, F. schleicheri, F. vaillantii, Glaucium corniculatum*
$C_{20}H_{17}NO_6$: 367.1056
Mp: 220–221°C (MeOH–$CHCl_3$) [1]
$[\alpha]_D$ −100° ($CHCl_3$) [1]
UV: 225, 295, 325 [1]
IR: 1750, 1615, 1505, 1040, 1030, 935 [1]
MS *m/z*: 190 [1]
^{1}H NMR: 2.45(3H, s, NCH_3), 5.76, 6.00 (each 2H, s, 2 × CH_2O_2), 6.31, 6.58 (1H, s, *p*–H–Ar), 6.84, 7.06 (1H, d, J = 8, *o*–H–Ar) [1]
Abs. conf.: 1R, 9R [2]

References

1. M.U. Ibragimova, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 447 (1970)
2. G.P. Moiseeva, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 82 (1978)

(±) –Adlumidine

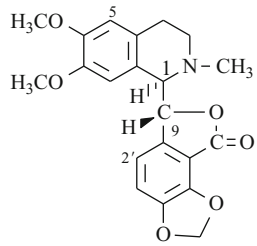


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis rosea*
$C_{20}H_{17}NO_6$: 367.1056
Mp: 184–185°C [1]
$[\alpha]_D$ 0° [1]

References

1. N.N. Margvelashvili, Author's Abstract of Candidate's Dissertation, Moscow, 1979

(–) –Adlumine



Biological sources: *Corydalis alpestris, C. caucasica, C. gigantea, C. gortschakovii, C. ledebouriana, C. paniculigera, C. rosea, C. rosea-purpurea, C. stricta, C. vaginans, Fumaria capreolata, F. officinalis, F. parviflora, F. vaillantii*

$C_{21}H_{21}NO_6$: 383.1369
Mp: 179–180°C (MeOH–$CHCl_3$) [1]
$[\alpha]_D$ −51° ($CHCl_3$) [1]
UV: 224, 286, 324 [2]
IR: 1775, 1620, 1500, 1040, 940 [2]
MS *m/z*: 206 [2]
^{1}H NMR: 2.67(3H, s, NCH_3), 3.77, 3.83(each 3H, s, 2 × OCH_3), 4.08, 5.68(1H, d, J = 4), 6.07(2H, s, CH_2O_2), 6.38, 6.70(1H, s, *p*–H–Ar), 6.87, 7.17(1H, d, J = 8, *o*–H–Ar) [3]
^{13}C NMR: [4]

Table 1

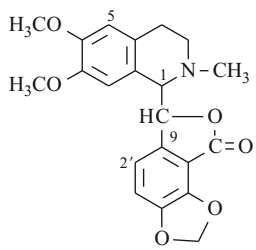
C-1	65.7	C−8	110.0	C−4′	148.8
3	51.7	8a	128.4	5′	144.1
4	29.1	9	82.1	6′	109.7
4a	123.9	10	167.7	NCH_3	44.9
5	111.0	1′	140.9	6−OCH_3	55.6
6	147.4	2′	116.1	7−OCH_3	55.9
7	146.9	3′	112.8	4′,5′−OCH_2O	103.1

Abs. conf.: 1R, 9R [5]

References

1. M.U. Ibragimova, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 447 (1970)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
3. K.L. Seitanidi, M.R. Yagudaev, I.A. Israilov, M.S. Yunusov, Chem. Nat. Comp. **14**, 395 (1978)
4. D.W. Hughes, H.L. Holland, D.B. McLean, Can. J. Chem. **54**, 2252 (1976)
5. G.P. Moiseeva, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 82 (1978)

(±) –Adlumine

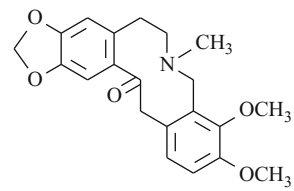


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis rosea*
$C_{21}H_{21}NO_6$: 383.1369
Mp: 175°C [1]
$[\alpha]_D$ 0° [1]

References

1. N.N. Margvelashvili, A.T. Kir'yanova, O.N. Tolkachev, Chem. Nat. Comp. **8**, 131 (1972)

α-Allocryptopine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Argemone albiflora, A. hybrida, A. mexicana, A. ochroleuca, A. platyceras, Bocconia frutescens, Corydalis caucasica, C. intermedia, C. ledebouriana, C. marschalliana, C. remota, C. sewerzowii, Dicentra peregrina, Dicranostigma franschetianum, D. lactucoides, D. leptopodum, Eschscholtzia californica, Glaucium corniculatum, G. elegans, G. fimbrilligerum, G. flavum, G. oxylobum, G. squamigerum, Hylomecon vernalis, Hypecoum erectum, H. lactiflorum, Macleaya cordata, M. microcarpa, Papaver oreophilum, P. pavoninum, P. zangezuricum, Thalictrum minus*
$C_{21}H_{23}NO_5$: 369.1576
Mp: 159–160°C ($CHCl_3$–EtOH)
UV: 232, 285 [1]
IR: 1665 [1]
MS *m/z*: 369(M^+), 206, 164(100), 149 [1]
^{1}H NMR: 1.85(3H, s, NCH_3), 2.60, 2.86(2H, m), 3.50–4.00(4H, m), 3.79, 3.84(3H, s, 2 × OCH_3), 5.92(2H, s, CH_2O_2), 6.64, 6.95(1H, s, *p*–H–Ar), 6.87(2H, q, *o*–H–Ar) [2]
HPLC: [3]

Pharm./Biol.: Pronounced local anesthetic and antiarrhythmic action. Superior to quinidine and novocainamid (procaine amide hydrochloride) [4]

References

1. F. Veznik, I.A. Israilov, E. Taborska, J. Slavik, Collect. Czech. Chem. Commun. **50**, 1745 (1985)
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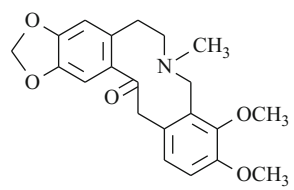
3. H. Liang-Feng, W. Nowicky, V. Gutmann, J. Chromatogr. **543**, 123 (1991)
4. Kh.U. Aliev, I.K. Kamilov, *The Pharmacology of Alkaloids and Glycosides* [in Russian] (Fan, Tashkent, 1967). 176

β-Allocryptopine (Thalictrimine)

CAS Registry Number: 16687-93-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Berberis densiflora, Thalictrum amurense, T. contortum, T. minus, T. simplex*

$C_{21}H_{23}NO_5$: 369.1576

Mp: 169–170°C (Me_2CO), 179°C (dec., hydrobromide), 219°C (sulfate), 179°C (dec., nitrate) [1]

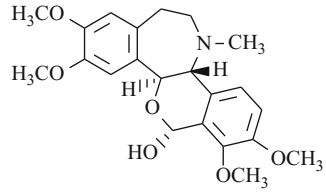
Pharm./Biol.: LD_{50} 220 mg/kg (s/c, mice). Pronounced stimulating action on the musculature of the uterus [2]

References

1. S.Yu. Yunusov, *Alkaloids* [in Russian] (Fan, Tashkent, 1981). 126
2. V.I. Popova, A.I. Leskov, Trudy VILR (Proceedings of the All-Union Scientific Research Institute of Drugs), Drugs [in Russian], **14**, 266 (1971), **14**, 91 (1971)

Alpinigenine

CAS Registry Number: 14028-91-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Papaver bracteatum, P. orientale*

$C_{22}H_{27}NO_6$: 401.1838

Mp: 192–193°C (EtOH) [1], 186.5–187°C [2]

$[\alpha]_D$ +290° ($CHCl_3$) [1]; +306° (MeOH) [2]

UV: 230, 284 [2]

IR(CCl_4): 3610, 3484 [2]

MS *m/z*: 401(M^+), 222, 208, 206, 179, 164

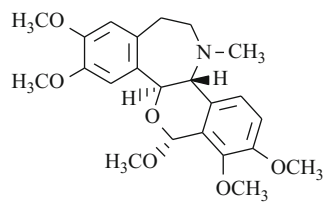
^{1}H NMR: 2.28(3H, s, NCH_3), 2.00–2.40(4H, m), 3.79, 3.87(each 6H, s, 4 × OCH_3), 3.95, 5.69(each 1H, d, J = 9), 6.28, 6.55, 7.11(each 1H, s), 6.78, 7.13(each 1H, d, J = 8.5) [2]

HPLC: [3]

References

1. O.N. Denisenko, I.A. Israilov, D.A. Murav'eva, M.S. Yunusov, Chem. Nat. Comp. **13**, 456 (1977)
2. A. Guggisberg, M. Hesse, H. Shmid, H. Bohm, H. Ronsch, K. Mothes, Helv. Chim. Acta **50**, 621 (1967)
3. J. Milo, A. Levy, D. Palevitch, J. Ladizinsky, J. Chromatogr. **452**, 563 (1988)

Alpinine

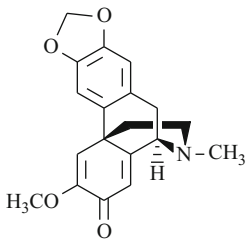


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver bracteatum*
$C_{23}H_{29}NO_6$: 415.1995
Mp: 119–120°C (MeOH) [1]
$[\alpha]_D$ +280° ($CHCl_3$) [1]
UV: 233, 286 [1]
MS *m/z*: 415(M^+), 400, 384, 222, 208, 206, 193 [1]
^{1}H NMR: 2.26(3H, s, NCH_3), 3.10–3.90(4H, m), 3.50(3H, s, OCH_3), 3.85(12H, s, 4 × OCH_3), 3.96, 5.51(each 1H, d, J = 9), 5.78(1H, s), 6.62, 7.29(each 1H, s, *p*–H–Ar), 6.86, 7.19(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. O.N. Denisenko, I.A. Israilov, D.A. Murav'eva, M.S. Yunusov, Chem. Nat. Comp. **13**, 456 (1977)

Amurine

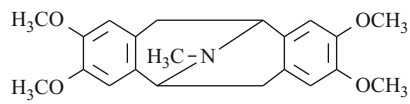


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids – Aporphine Alkaloids
Biological sources: *Papaver croceum*
$C_{19}H_{19}NO_4$: 325.1314
Mp: 212–213°C (Me_2CO) [1]
$[\alpha]_D$ +9° (MeOH) [1]
UV: 238, 290 [1]
IR: 1680, 1660, 1623, 1570, 1490, 1040, 935 [1]
MS *m/z*: 325(M^+), 324, 310, 297, 282, 162.5($^{++}$) [1]
^{1}H NMR: 1.65–3.65(7H, m), 2.25(3H, s, NCH_3), 3.60(3H, s, OCH_3), 5.80(2H, s, CH_2O_2), 6.27(2H, s), 6.57, 6.79(each 1H, s) [1]
HPLC: [2]
ORD: [3]

References

1. F. Veznik, I.A. Israilov, E. Taborska, J. Slavik, Collect. Czech. Chem. Commun. **50**, 1745 (1985)
2. M. Hutin, A. Oztekin, A. Cave, J.P. Foucher, J. Chromatogr. **265**, 139 (1983)
3. W. Dopke, H. Flentje, P.W. Jeffs, Tetrahedron **24**, 4459 (1968)

(+) –Argemonine

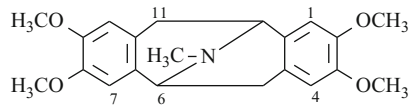


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Leontice smirnowii*
$C_{21}H_{25}NO_4$: 355.1783
Mp: 152–153°C [1], 165°C (perchlorate), 270°C (methiodide) [2]
$[\alpha]_D$ +218° (EtOH) [1]
IR: 3005, 2840, 1610, 1520, 1450 [2]
MS *m/z*: 355(M^+, 30), 204(100) [2]
^{1}H NMR: 2.44(3H, s, NCH_3), 3.68, 3.77(each 6H, s, 4 × OCH_3), 6.38, 6.51(each 2H, s, *p*–H–Ar) [2]

References

1. E.G. Tkeshelashvili, K.S. Mudzhiri, Chem. Nat. Comp. **11**, 823 (1975)
2. E.G. Tkeshelashvili, S. Iskandarov, K.S. Mudzhiri, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 525 (1971)

(–) –Argemonine



Taxonomy:Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Argemone platyceras, Thalictrum minus, T. strictum*
$C_{21}H_{25}NO_4$: 355.1783
Mp: 147–148°C [1], 154–155°C [2]
$[\alpha]_D$ −208° ($CHCl_3$) [2]
UV: 223, 287(4.20, 4.00) [2]
MS *m/z*: 355(M^+, 30), 354, 204(100) [3]
^{1}H NMR: 2.57(3H, s, NCH_3), 2.62(2H, d, J = 17, H-5, H-11), 3.42, 3.53(2H, dd, J = 6; 17, H-5, H-11), 3.84, 3.92(each 6H, s, 4 × OCH_3), 4.08(2H, d, J = 6, H-6, H-12), 6.59, 6.76(each 2H, s, *p*–H–Ar) [3]
^{13}C NMR: [4]

Table 1

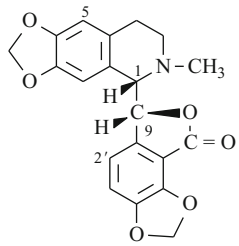
C-1	C-10	109.9	C-4	C-7	111.4	C-6	C-12	66.2
2	9	147.3	4a	10a	123.7	6a	12a	129.7
3	8	147.7	5	11	33.3		NCH_3	40.6

References

1. P.G. Gorovoi, A.A. Ibragimov, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 568 (1975)
2. V.A. Chelombitrko, L.E. Nazarova, Khim. Farm. Zh. 580 (1988)
3. R.H.F. Manske, K.H. Shin, A.R. Battersby, D.E. Shaw, Can. J. Chem. **43**, 2183 (1965)
4. R. Shamma, J.L. Moniot, *Isoquinoline Alkaloids Research* (Plenum Press, New York/London, 1978), p. 69

(+) – Bicuculline

CAS Registry Number: 485-49-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Corydalis alpestris, C. caucasica, C. emanuelii, C. gigantea, C. gortschakovii, C. marschalliana, C. paniculigera, C. pseudoadunca, C. remota, C. stricta, C. vaginans, Dicentra peregrina, Fumaria capreolata, F. parviflora, F. vaillantii*
$C_{20}H_{17}NO_6$: 367.1056
Mp: 194–195°C (MeOH–$CHCl_3$) [1]
$[\alpha]_D$ +112° ($CHCl_3$) [1]
UV: 222, 298, 324 [1]
IR: 1750 [1]
MS *m/z*: 190 [2]
^{1}H NMR: 2.50(3H, s, NCH_3), 3.97, 5.62(each 1H, d, J = 4), 5.83, 6.08(each 2H, s, 2 × CH_2O_2), 6.32, 6.49(each 1H, s, *p*–H–Ar), 6.21, 6.85(each 1H, d, J = 8, *o*–H–Ar) [2]
^{13}C NMR: [3]

Table 1

C-1	66.0	C-8	107.8	C-4′	149.1
3	49.5	8a	130.7	5′	144.5
4	27.0	9	85.0	6′	110.3
4a	124.8	10	167.2	6,7-OCH_2O	101.0
5	108.5	1′	140.5	4′,5′-OCH_2O	103.3
6	146.8	2′	115.6	NCH_3	45.3
7	146.0	3′	113.1		

Abs. conf.: 1S, 9R [4]
Pharm./Biol.: LD_{50} 1.48, 0.3 mg/kg (s/c, i/v, mice). Exhibits an antinarcotic action in relation to trunk narcotics [5, 6]. Is a specific antagonist of GABA and is widely used in experimental studies [7]

References

1. M.S. Yunusov, S.T. Akramov, S.Yu. Yunusov, DAN SSSR [in Russian] **162**, 607 (1965)
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4. J. Blasko, S.F. Hussain, M. Shamma, J. Nat. Prod. **44**, 475 (1981)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 204
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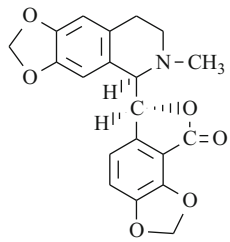
7. A.E. Valeev, N.I. Chernyavskaya, F.N. Dzhkhangirov, M.S. Yunusov, I.A. Israilov, Neirofiziologiya (6), 820 (1988)

(−) –Bicuculline

CAS Registry Number: 19730-80-4



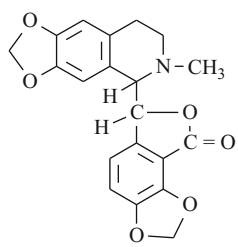
Biological sources: *Corydalis ledebouriana, C. sewerzowii, Fumaria schleicheri*
$C_{20}H_{17}NO_6$: 367.1056
Mp: 193–195°C (MeOH–Me_2CO) [1]
$[\alpha]_D$ −110° ($CHCl_3$) [1]
Abs. conf.: 1R, 9S [2]
Pharm./Biol.: Has low activity. In contrast to (+)-bicuculline, is not a blocker of GABA receptors [3]

References

1. M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 54 (1968)
2. G.P. Moiseeva, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 82 (1978)
3. A.E. Valeev, N.I. Chernyavskhaya, F.N. Dzhakhangirov, M. S. Yunusov, I.A. Israilov, Neirofiziologiya (6), 820 (1988)

(±) – Bicuculline

CAS Registry Number: 56083-00-2



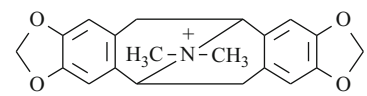
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis pseudoadunca, Fumaria schleicheri*
$C_{20}H_{17}NO_6$: 367.1056
Mp: 197–203°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D$ 0° [1]

References

1. M.S. Yunusov, S.T. Akramov, S.Yu. Yunusov, DAN SSSR **162**, 607 (1965). S.S. Markosyan, T.A. Tsulikyan, V.A. Mnatsakanyan, Arm. Khim. Zh. (29), 1053 (1976)

Californidine

CAS Registry Number: 18830-99-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Eschscholtzia californica*
$C_{20}H_{20}NO_4$: 338.1392
Mp: 286°C (iodide, MeOH) [1]
$[\alpha]_D$ −214° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, C_6H_6; spar. sol. MeOH, EtOH [1]
UV: 292 [1]
^{1}H NMR(CF_3COOH): 2.92(6H, s, $N[CH_3]_2$), 2.40–3.70(4H, m), 4.32(2H, d, J = 6), 5.41(4H, s, 2 × CH_2O_2), 6.06, 6.31(each 2H, s) [1]

References

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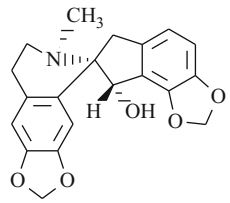
Capreoline



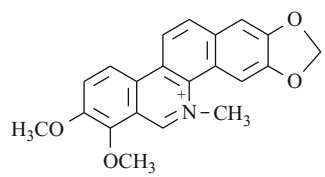
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria capreolata*
$C_{20}H_{19}NO_5$: 353.1263
Mp: amorph. [1]
$[\alpha]_D$ +106° ($CHCl_3$) [1]
UV: 290 [1]
IR: 3600–3450, 1605, 1040, 935 [1]
MS *m/z*: 353(M^+), 338, 322, 190, 188, 176.5($^{++}$)[1]
^{1}H NMR: 2.45(3H, s, NCH_3), 2.60–3.40(6H, m), 4.88(1H, s), 5.85(2H, s, CH_2O_2), 5.95, 6.00(each 1H, d, J = 2, CH_2O_2), 6.30, 6.60(each 1H, s, *p*–H–Ar), 6.80(2H, s, *o*–H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)

Chelerythrine

CAS Registry Number: 34316-15-9



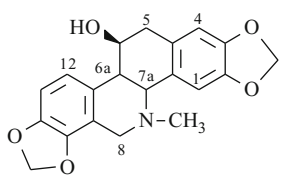
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Argemone alba, A. mexicana, A. ochroleuca, Bocconia cordata, B. frutescens, Chelidonium majus, Corydalis caucasica, C. ledebouriana, C. persica, C. sewerzowii, Dicentra peregrina, Dicranostigma franschetianum, D. lactucoides, D. leptopodum, Eschscholtzia californica, Glaucium elegans, G. flavum, G. squamigerum, Hypecoum trilobum, Macleaya cordata, M. microcarpa, Papaver alberti, P. bipinnatum, P. paczoskii*
$C_{21}H_{18}NO_4$: 348.1236
Mp: 207°C (chloride, $CHCl_3$–MeOH) [1]
UV(chloride): 228, 272, 283 sh, 302 sh, 343 [1]
IR(chloride, nujol): 1605, 1425, 1278, 1175, 946, 863 [1]
^{1}H NMR(CF_3COOH): 4.26, 4.44(each 3H, s, 2 × OCH_3), 5.12(3H, s, NCH_3), 6.31(2H, s, CH_2O_2), 7.57, 8.15(each 1H, s, *p*–H–Ar), 8.22, 8.27, 8.67, 8.72(each 1H, d, J = 9.6, 4 × *o*–H–Ar), 9.89(1H, s) [1]
HPLC: [2]

References

1. B.D. Krane, M.O. Fagbule, M. Shamma, B. Cozler, J. Nat. Prod. **47**, 1 (1984)
2. H. Jiang-Feng, W. Nowicky, V. Gutman, J. Chromatogr. **543**, 123 (1991)

Chelidonine

CAS Registry Number: 476-32-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Chelidonium majus, Glaucium elegans, G. squamigerum*
$C_{20}H_{19}NO_5$: 353.1263
Mp: 135–136°C (EtOH) [1]
$[\alpha]_D$ +115° (EtOH) [1]
UV: 206, 238, 289 [1]
IR($CHCl_3$): 3210, 3206 [1]
MS *m/z*: 353(M^+), 352, 336, 335(100) [1]
^{1}H NMR: 2.27(3H, s, NCH_3), 2.98(1H, m), 3.08, 3.20(each 1H, d, J = 17.5), 3.43, 4.08(each 1H, d, J = 15.5), 3.57(1H, br s), 4.23(1H, br s, $W_{1/2}$ = 7.9), 5.93, 5.94(each 1H, d, J = 1.5, CH_2O_2), 5.95, 5.99(each 1H, d, J = 1.5, CH_2O_2), 6.64, 6.66(each 1H, s, H-1, H-4), 6.73, 6.76(each 1H, d, J = 7.9, H-11, H-12) [2]
^{13}C NMR: [3]

Table 1

C-1	111.9	C-6	72.4	C-11	109.6
1a	128.9	6a	42.1	12	120.4
2	145.6	7a	62.9	12a	131.4
3	145.3	8	53.9	NCH_3	42.4
4	107.4	9	143.1	2,3-CH_2O_2	101.1
4a	125.8	10	148.2	7,8-CH_2O_2	101.4
5	39.7				

Abs. conf.: [4]
X-ray: [4]
HPLC: [5]
Pharm./Biol.: LD_{50} 125(i/p, mice), 160 mg/kg (i/p, frogs), 140 mg/kg (i/p, cats). It increases arterial pressure, reinforces tonus and intestinal peristalsis at large doses (10–20 mg/kg). It has local anaesthetic action [6]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)
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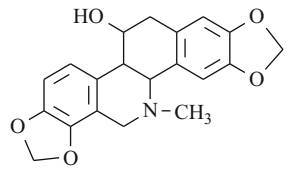
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 228

(±) – Chelidonine

CAS Registry Number: 20267-87-2



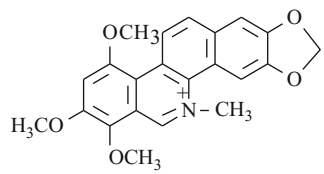
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Glaucium fimbrilligerum*
$C_{20}H_{19}NO_5$: 353.1263 [1]
Mp: 213–214°C ($CHCl_3$–MeOH) [1]
$[\alpha]_D$ 0° [1]

References

1. A.Kh. Yunusov, I.A. Israilov, Chem. Nat. Comp. **10**, 555 (1974)

Chelilutine

CAS Registry Number: 55950-32-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Eschscholtzia californica*
$C_{22}H_{20}N^+O_5$: 378.1342

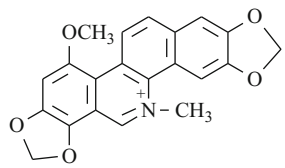
Mp: 186°C (chloride)
UV(chloride): 230, 241 sh, 280, 340, 420 sh, 470 [1]
IR(chloride): 3640, 3580, 3370, 3260, 1660, 1567, 1549, 1508, 1493, 1330, 1302, 1268, 1237, 1218, 1210, 1143, 1133, 1095, 1078, 1044, 1032, 1018, 990, 954, 941, 918, 888, 872, 864, 846, 818, 784, 755, 745, 733, 722, 709 [1]
^{1}H NMR(DMSO, γ-CN): 2.56(3H, s, NCH_3), 3.85(6H, s, 2 × OCH_3), 3.98(3H, s, OCH_3), 5.88(1H, s), 6.18(2H, s, CH_2O_2), 6.96, 7.35, 7.57(each 1H, s, 3 × H–Ar), 7.63, 8.33(each 1H, d, J = 8, *o*-H–Ar) [1]
HPLC: [2]

References

1. B.D. Krane, M.O. Fagbule, M. Shamma, B. Gozler, J. Nat. Prod. **47**, 1 (1984)
2. N. Chauret, D. Rho, J. Archambault, J. Chromatogr. **519**, 99 (1990)

Chelirubine

CAS Registry Number: 18203-11-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Dicranostigma franschetianum, D. leptopodum, Glaucium elegans*
$C_{21}H_{16}N^+O_5$: 362.1028 [1]
Mp: 302°C (dec., chloride) [2]
UV(chloride): 231, 281, 305 sh, 341, 353, 413, 508 [1]
IR(chloride): 3350, 1648, 1605, 1555, 1520, 1511, 1486, 1328, 1305, 1285, 1260, 1224, 1209, 1192, 1128, 1038, 1018, 980, 964, 937, 908, 875, 828, 790 [1]
^{1}H NMR(chloride, CF_3COOH): 4.27(3H, s, OCH_3), 4.96(3H, s, NCH_3), 6.24, 6.44(each 2H, s, 2 × CH_2O_2), 7.48, 7.61, 7.87(each 1H, s, 3 × H–Ar), 8.13, 9.53(each 1H, d, J = 8.5, *o*–H–Ar), 9.49(1H, s) [2]
HPLC: [3]

References

1. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids*, vol. 1 (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1965), No. 54
2. H. Ishii, E. Ueda, K. Nakajima, T. Ishida, T. Ishikawa, K.-I. Harada, I. Ninomiya, T. Naito, T. Kiguchi, Chem. Pharm. Bull. **26**, 864 (1978)
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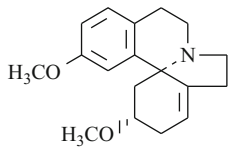
Cocculidine

CAS Registry Number: 27675-40-7



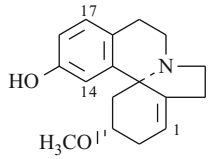
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Cocculus laurifolius*
$C_{18}H_{23}NO_2$: 285.1729
Mp: 86–87°C (pet. ether), 175°C (hydroiodide), 138°C (nitrate), 239°C (methiodide) [1]
$[\alpha]_D$ +251° ($CHCl_3$)
MS *m/z*: 285(M^+), 270, 254, 227(100), 220, 196 [2]
Pharm./Biol.: LD_{50} 93, 7.3 mg/kg (s/c, i/v, mice). Pronounced influence on conditioned reflex activity [3]

References

1. S.Yu. Yunusov, Zh. Obshch. Khim. **20**, 368 (1950)
2. S.Yu. Yunusov, R. Razzakov, Chem. Nat. Comp. **6**, 69 (1970)
3. U.B. Zakirov, I.K. Kamilov, *The Pharmacology of Alkaloids and Glycosides* [in Russian] (Fan, Tashkent, 1967), p. 190

Cocculine

CAS Registry Number: 115-53-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Cocculus laurifolius*
$C_{17}H_{21}NO_2$: 271.1572
Mp: 217–218°C (Me_2CO), 197°C (nitrate) [1], 122°C (O,N-di Ac) [3]
$[\alpha]_D$ +271° (MeOH) [1]
Solubility: very sol. EtOH, Me_2CO, Et_2O [1]
IR(O, N-di Ac): 1755, 1635 [2]
MS *m/z*: 271(M^+), 256, 240, 213(100), 212, 198 [2]
^{1}H NMR: 1.40–3.80(12H, m, 6 × CH_2), 3.20(3H, s, 3-OCH_3), 5.55(1H, m, H-1), 6.53(1H, s, H-14), 6.65(1H, q, J = 8; 3, H-16), 6.92(1H, d, J = 8, H-17), 8.50(1H, m, OH) [3]
X-ray: [3, 4]
Abs. conf.: 3R, 5S [3]
Pharm./Biol.: LD_{50} 10.2, 1.33 mg/kg (s/c, i/v, mice). Pronounced influence on conditioned reflex activity. Hypotensive and spasmolytic action [5]

References

1. S.Yu. Yunusov, Zh. Obshch. Khim. **20**, 368 (1950)
2. S.Yu. Yunusov, R. Razzakov, Chem. Nat. Comp. **6**, 69 (1970)
3. R. Razzakov, S.Yu. Yunusov, S.M. Nasyrov, V.G. Andrianov, Yu.T. Struchkov, Izv. AN SSSR, Ser. Khim. (1), 218 (1974)
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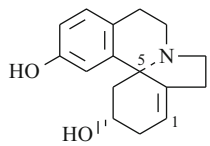
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 190

Coclafine



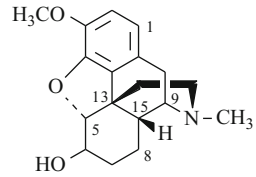
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological source: *Cocculus laurifolius*
$C_{16}H_{19}NO_2$: 257.1416
Mp: 264–266°C (Me_2CO) [1]
$[\alpha]_D$ +255° (MeOH) [1]
Solubility: spar. sol. Et_2O, C_6H_6; very sol. EtOH [1]
UV: 208, 230, 285(4.30, 3.71, 3.41) [1]
IR: 3455, 1585, 1510 [1]
MS *m/z*: 257(M^+), 240, 213, 212, 196, 150 [1]
^{1}H NMR(CD_3OD): 5.58(1H, br s, $W_{1/2}$ = 7), 6.54(1H, br s), 6.58(1H, dd, J = 8; 3), 6.92(1H, d, J = 8) [1]
Abs. conf.: 3S, 5R [1]

References

1. R. Ziyaev, A. Abdusamatov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **27**, 73 (1991)

Codeine

CAS Registry Number: 76-57-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Papaver somniferum*
$C_{18}H_{21}NO_3$: 299.1521
Mp: 155–156°C (C_6H_6)
$[\alpha]_D$ −134° (MeOH)
UV: 211, 239 sh, 286 [1]
IR: 3400, 1698, 1641, 1618, 1593, 1496, 1323, 1283, 1247, 1238, 1206, 1173, 1151, 1132, 1114, 1095, 1076, 1028, 1000, 968, 950, 914, 894, 882, 861, 834, 807, 793, 776, 745, 730, 705 [2]
MS *m/z*: 299(M^+), 282, 229, 214, 188, 162 [3]
^{1}H NMR: 2.41(3H, s, NCH_3), 2.48(1H, d, J = 6, H-10α), 2.63(1H, dd, J = 3; 3.5, H-14), 3.06(1H, d, J = 1, H-10β), 3.34(1H, dd, J = 6; 1, H-9), 3.82(3H, s, OCH_3), 4.16(1H, dd, J = 6.4; 2.9, H-6), 4.91(1H, dd, J = 6.4; 1.3, H-5), 5.32(1H, dd, J = 10; 2.9, H-8), 5.72(1H, dd, J = 10; 3, H-7), 6.68(2H, s) [4]
^{13}C NMR: [5]

Table 1

C-1	119.4	C-7	133.4	C-13	42.9
2	112.8	8	127.8	14	40.3
3	142.1	9	58.8	15	35.4
4	146.9	10	20.4	16	46.3
5	91.1	11	126.7	NCH_3	42.8
6	66.9	12	131.1	3-OCH_3	56.2

Abs. conf.: [6]
X-ray: [7]
HPLC: [8]
Pharm./Biol.: Used as an antitussive. Used in combination with nonnarcotic analgesics for headaches and neuralgias. Supplied in the form g of a powder and of 0.015 tablets. A component of Uspokaivayushchaya mikstura Bekhtereva ("Bekhterev's soothing mixture"),, Tabletki ot kashla ("cough tablets"), and Kodterpin [9]

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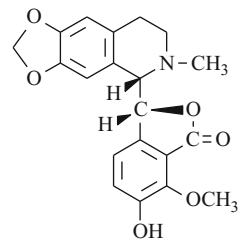
7. J.M. Lindsey, W.H. Barnes, Acta Cryst. **8**, 227 (1955)
8. G. Chari, A. Gulati, R. Bhat, I.R. Tebbett, J. Chromatogr. **571**, 263 (1991)
9. M.D. Mashkovskii, *Drugs* [in Russian], vol. 1 (Meditsina, Moscow, 1984), p. 171

Corftaline

CAS Registry Number: 77492-95-6

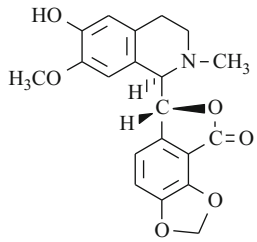


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis pseudoadunca*
$C_{20}H_{19}NO_6$: 369.1212
Mp: 173–174°C (MeOH) [1]
$[\alpha]_D$ +33° (MeOH) [1]
UV: 298 [1]
IR: 3400, 1775, 1510, 1490, 1035, 935 [1]
MS *m/z*: 190(100) [1]
^{1}H NMR: 2.10–2.90(4H, m), 2.49(3H, s, NCH_3), 4.10(3H, s, OCH_3), 3.92, 5.42(each 1H, d, J = 4), 5.82(2H, s, CH_2O_2), 6.23, 6.47(each 1H, s, *p*–H–Ar), 6.38, 7.04(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. I.A. Israilov, T. Irgashev, M.S. Yunusov, S.Yu. Yunusov, Khim. Prirod. Soedin. 851 (1980)

Corledine



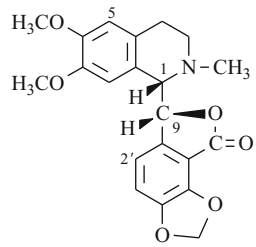
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana*
$C_{20}H_{19}NO_6$: 369.1212
Mp: 210–212°C (MeOH) [1]
$[\alpha]_D$ −100° (MeOH) [1]
Solubility: spar. sol. Me_2CO, C_6H_6, Et_2O, $CHCl_3$; very sol. alk. [1]
UV: 221, 290, 326 [1]
IR: 3350, 1750, 1610, 1040, 920 [1]
MS *m/z*: 192(100), 177, 149, 135 [1]
^{1}H NMR: 2.22–3.04(4H, m), 2.60(3H, s, NCH_3), 3.74(3H, s, OCH_3), 4.02, 5.61(each 1H, d, J = 3.8), 4.90(1H, OH), 5.98(2H, s, CH_2O_2), 6.35, 6.63(each 1H, s, *p*–H–Ar), 6.80, 7.14(each 1H, d, J = 8, *o*–H–Ar) [1]
Abs. conf.: 1R, 9R [2]

References

1. I.A. Israilov, M.S. Yunusov, N.D. Abdullaev, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 572 (1975)
2. G.P. Moiseeva, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 82 (1978)

Corlumine

CAS Registry Number: 130480-92-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis sewerzowii*
$C_{21}H_{21}NO_6$: 383.1369
Mp: 158–159°C (MeOH) [1]
$[\alpha]_D$ +77° ($CHCl_3$) [1]
UV: 290 [1]
IR: 1760 [1]
MS *m/z*: 206 [1]
^{1}H NMR: 2.60(3H, s, NCH_3), 3.74, 3.89(each 3H, s, 2 × OCH_3), 4.09, 5.66(each 1H, d, J = 4), 6.15(2H, s, CH_2O_2), 6.22, 6.93(each 1H, d, J = 8, *o*–H–Ar), 6.40, 6.61(each 1H, s, *p*–H–Ar) [2]
^{13}C NMR: [3]

Table 1

C-1	65.7	C-8	110.7	C-4′	149.1
3	49.5	8a	129.5	5′	144.5
4	26.5	9	84.9	6′	110.3
4a	123.4	10	167.2	NCH_3	45.1
5	111.3	1′	140.8	6-OCH_3	55.9
6	148.2	2′	115.5	7-OCH_3	55.9
7	147.2	3′	113.1	4′,5′-OCH_2O	103.3

Abs. conf.: 1S, 9R [4]
Pharm./Biol.: Is a specific antagonist of GABA receptors [5]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
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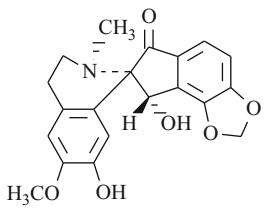
Corpaine

CAS Registry Number: 31002-20-7

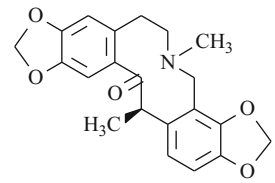


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis paczoskii*
$C_{20}H_{19}NO_6$: 369.1212
Mp: 204°C (abs. EtOH) [1]
IR: 3260, 1707, 1633, 1601, 1516 [1]
MS *m/z*: 369(M^+) [1]
^{1}H NMR: 2.35(3H, s, NCH_3), 3.87(3H, s, OCH_3), 5.09(1H, s), 6.16, 6.20(each 1H, q, J = 1.2, CH_2O_2), 6.19, 6.58(each 1H, s, *p*–H–Ar), 6.98, 7.45(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. Kh.Sh. Baisheva, D.A. Fesenko, M.E. Perel'son, B.K. Rostotskii, Chem. Nat. Comp. **6**, 590 (1970). D.A. Fesenko, M.E. Perel'son, Chem. Nat. Comp. **7**, 157 (1971)

Corycavine

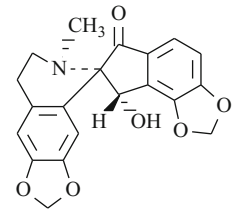


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis marschalliana*
$C_{21}H_{21}NO_5$: 367.1420
Mp: 218–219°C (EtOH) [1]
UV: 240 sh, 288 [1]
IR: 1660, 1030, 940 [1]
MS *m/z*: 367(M+), 352, 204, 163, 162, 148 [1]
^{1}H NMR: 2.04(3H, s, NCH_3), 2.50–2.95(4H, m), 3.45(2H, m), 5.90, 6.05(each 2H, s, 2 × CH_2O_2), 6.50, 6.95(each 1H, s, *p*–H–Ar), 6.65(2H, s) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)

Corydaine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Corydalis paczoskii, C. vaginans*
$C_{20}H_{17}NO_6$: 367.1056
Mp: 184°C (abs. EtOH) [1]; 189–189.5°C (Et_2O) [2]
$[\alpha]_D$ +145° ($CHCl_3$) [2]
UV: 236, 290, 314 [1]
IR: 3200, 3050, 1710, 1638, 1610 [1]
MS *m/z*: 367(M^+), 352, 338, 336, 322, 190 [1]
^{1}H NMR: 2.28(3H, s, NCH_3), 5.02(1H, s), 5.82(2, s, CH_2O_2), 6.16, 6.19(each 1H, d, J = 1.2, CH_2O_2), 6.06, 6.55(each 1H, s, *p*–H–Ar), 6.99, 7.45(each 1H, d, J = 8, *o*–H–Ar) [1]
^{13}C NMR: [3]

Table 1

C-1	105.8	C-8	75.0	C-13	202.2
2	146.9	8a	134.3	14	72.0
3	146.9	9	144.4	14a	129.8
4	108.2	10	154.5	NCH_3	41.7
4a	129.3	11	110.6	2,3-OCH_2O	101.1
5	29.5	12	119.6	9,10-OCH_2O	103.1
6	50.2	12a	131.2		

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1. Kh.Sh. Baisheva, D.A. Fesenko, B.K. Rostotskii, M.E. Perel'son, Chem. Nat. Comp. **6**, 465 (1970). D.A. Fesenko, M.E. Perel'son, Chem. Nat. Comp. **7**, 157 (1971)
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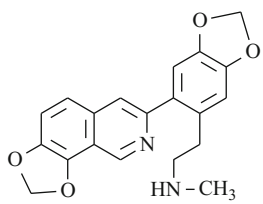
Corydamine

CAS Registry Number: 49870-84-0



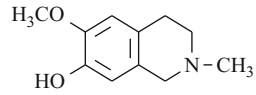
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Hypecoum erectum*
$C_{20}H_{18}N_2O_4$: 350.1266
Mp: 235–239°C (dec., hydrochloride, MeOH) [1]
UV(hydrochloride): 245, 312, 380
IR(hydrochloride): 3420, 2440, 1580, 1570 [1]
MS *m/z* (hydrochloride): 350(H–HCl), 306(100) [1]
^{1}H NMR(hydrochloride, CF_3COOH): 2.88(3H, m, J = 6), 2.70–3.80(4H, m), 6.10, 6.48(each 2H, s, 2 × CH_2O_2), 6.95, 6.97(each 1H, s, *p*–H–Ar), 7.78, 7.95(each 1H, d, J = 9, *o*–H–Ar), 8.18(1H, br s), 9.51(1H) [1]
Pharm./Biol.: Antimicrobial activity [2]

References

1. G. Nonaka, I. Nishioka, Chem. Pharm. Bull. **21**, 1410 (1973)
2. O.N. Tolkachev, L.D. Yakhontova, S.A. Vichkanova, T.V. Fateeva, in: *Abstracts of Lectures at an All-Union Conference on the Results and Prospects of Scientific Investigations in the Field of Creating Drugs from Plant Raw Material* [in Russian], Moscow, 1985, p. 56

Corypalline

CAS Registry Number: 450-14-6

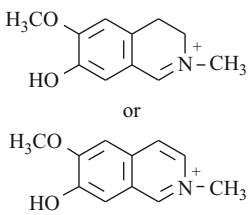


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis nummularia, B. oblonga, B. turcomanica, Corydalis ledebouriana, C. stricta*
$C_{11}H_{15}NO_2$: 193.1103
Mp: 167–168°C (MeOH) [1]
UV: 202, 225, 285 [1]
MS *m/z*: 193(M^+), 192, 176, 151, 150, 148, 135, 107 [1]
^{1}H NMR: 2.29(3H, s, NCH_3), 2.60(4H, m), 3.31(2H, s), 3.73(3H, s, OCH_3), 6.44, 6.73(each 1, s, 2 × H–Ar), 8.65(1H, br s) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)

Corypallinium or 3,4-Dehydrocorypallinium



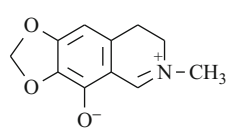
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis oblonga*
$C_{11}H_{14}N^+O_2$: 192.1024 or $C_{11}H_{12}N^+O_2$: 190.0868 (reduced product – corypalline) [1]

References

1. A. Karimov, M.V. Telezhenetskaya, K.M. Lutfullin, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 563 (1975). **16**, 68 (1977)

Cotarnoline

CAS Registry Number: 525-13-3



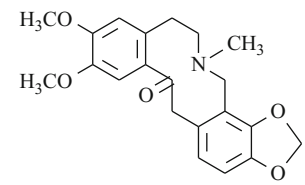
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver somniferum*
$C_{11}H_{11}N^+O_3$: 205.0739 [1]

References

1. S.Yu. Yunusov, *The Alkaloids* [in Russian] (Fan, Tashkent, 1981), p. 207

Cryptopine

CAS Registry Number: 482-74-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis gortschakovii, C. ledebouriana, C. sewerzowii, Fumaria officinalis, F. parviflora, Glaucium squamigerum, Macleaya cordata, M. microcarpa, Papaver somniferum, Thalictrum flavum, T. isopyroides*
$C_{21}H_{23}NO_5$: 369.1576
Mp: 216–217°C
MS *m/z*: 369(M^+), 354, 338, 148(100) [1]
^{1}H NMR: 1.85(3H, s, NCH_3), 2.30–3.10(4H, m), 3.53, 3.68(each 2H, s, 2 × CH_2), 3.81(6H, s, 2 × OCH_3), 5.89(2H, s, CH_2O_2), 6.64, 6.97(each 1H, s, *p*–H–Ar), 6.66(2H, s, *o*–H–Ar) [1]
^{13}C NMR: [2]

Table 1

C-1	111.8	C-8	49.9	C-13	45.7
2	146.7	8a	117.1	14	194.7
3	149.0	9	145.9	14a	130.8
4	112.2	10	145.6	9,10-OCH_2O	100.3
4a	134.3	11	106.2	2-OCH_3	55.4
5	31.8	12	124.5	3-OCH_3	55.4
6	57.2	12a	128.9	NCH_3	40.8

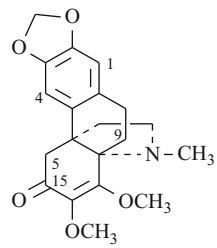
X-ray: [3]
HPLC: [4]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
2. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology* (Academic, New York, 1981). **18**, 217
3. S.R. Hall, F.R. Ahmed, Acta Cryst. **24B**, 337 (1968)
4. I. Valka, V. Simanek, J. Chromatogr. **445**, 258 (1988)

Delavayine

CAS Registry Number: 27989-72-6

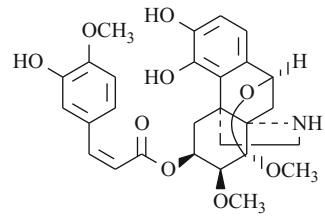


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania delavayi*
$C_{20}H_{23}NO_5$: 357.1576
Mp: 149–150°C (EtOH), 204°C (hydrochloride), 192°C (methiodide), 120°C (des-base) [1]
$[\alpha]_D$ −240° ($CHCl_3$) [1]
UV: 238, 268(3.59, 3.97) [1]
IR: 1670, 1608 [1]
^{1}H NMR: 1.90–2.20(4H, m, H-9, H-15), 2.46, 3.00(each 1H, J = 16, H-5), 2.49(3H, s, NCH_3), 3.40, 4.06(each 3H, s, 2 × OCH_3), 5.84(2H, s, CH_2O_2), 6.41, 6.64(each 1H, s, H-1, H-4) [2]

References

1. I.I. Fadeeva, T.N. Il'inskaya, M.E. Perel'son, A.D. Kuzovkov, Chem. Nat. Comp **6**, 139 (1970)
2. I.I. Fadeeva, T.N. Il'inskaya, M.E. Perel'son, A.D. Kuzovkov, Chem. Nat. Comp **7**, 756 (1971)

3-O-Demethylhernandifoline



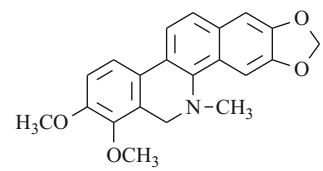
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania gernandifolia*
$C_{28}H_{31}NO_9$: 525.1999
Mp: 148–149°C (MeOH–Et_2O) [1]
IR: 3560, 3440, 3200–2700, 1695, 1640, 1612, 1588, 1512, 1489 [1]
^{1}H NMR: 1.85(1H, d, J = 10.5, H-9), 2.02(1H, q, J = 15; 2.3, H-5a), 2.62(1H, q, J = 10.5; 5.8, H-9), 3.17(1H, q, J = 15; 4.1, H-5e), 3.40, 3.41, 3.89(each 3H, s, 3 × OCH_3), 3.74(1H, d, J = 4, H-7), 4.88(1H, d, J = 5.8, H-10), 5.35, 7.00(each 1H, d, J = 15.6, Ar-CH = CH-C = O), 5.40(1H, m, H-6), 6.50, 6.60(each 1H, d, J = 8, H-1, H-2), 6.89(3H, m, H–Ar) [1]

References

1. I.I. Fadeeva, M.E. Perel'son, O.N. Tolkachev, T.N. Il'inskaya, D.A. Fesenko, Chem. Nat. Comp **8**, 136 (1972)

Dihydrochelerythrine

CAS Registry Number: 6880-91-7



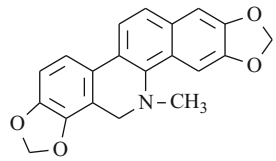
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana, Glaucium elegans*
$C_{21}H_{19}NO_4$: 349.1314
Mp: 161–162°C ($CHCl_3$–MeOH)
UV: 226, 282, 318, 350 sh [1]
IR($CHCl_3$): 2780, 1270, 1243 [1]
MS *m/z*: 349(M^+), 348, 347, 333, 332, 318, 305, 304, 290 [1]
^{1}H NMR: 2.56(3H, s, NCH_3), 3.84, 3.88(each 3H, s, 2 × OCH_3), 4.28(2H, s), 6.01(2H, s, CH_2O_2), 6.92, 7.50(each 1H, d, J = 8, *o*–H–Ar), 7.10, 7.71(each 1H, s, *p*–H–Ar), 7.47, 7.69(each 1H, d, J = 8, *o*–H–Ar) [1]
HPLC: [2]

References

1. B.D. Krane, M.O. Fagbule, M. Shamma, B. Cozler, J. Nat. Prod. **47**, 1 (1984)
2. T. Tanahashi, M.H. Zenk, J. Nat. Prod. **53**, 579 (1990)

Dihydrosanguinarine

CAS Registry Number: 3606-45-9

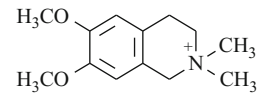


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis gigantea, C. ledebouriana, C. paniculigera, C. remota, C. sewerzowii, C. stricta, C. vaginans, Dicentra peregrina, D. spectabilis, Fumaria parviflora, Glaucium fimbrilligerum*
$C_{20}H_{15}NO_4$: 333.1001
Mp: 187–188°C (MeOH) [1]
UV: 240, 288, 330 [1]
MS *m/z*: 333(M^+), 332(100), 318 [1]
^{1}H NMR: 2.55(3H, s, NCH_3), 4.13(2H, s), 5.95(4H, s, 2 × CH_2O_2), 6.79, 7.23, 7.42, 7.63(each 1H, d, J = 8, 4Ч*o*–H–Ar), 7.03, 7.62(each 1H, s, *p*–H–Ar) [1]
HPLC: [2]

References

1. S.U. Karimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp **16**, 177 (1980)
2. N. Chang-Qun, H. Li-Yi, J. Chromatogr. **542**, 193 (1991)

N-Dimethylheliamine

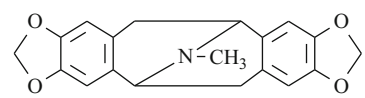


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis amurensis*
$C_{13}H_{20}N^+O_2$: 172.0187
Mp: 242–243°C (iodide) [1]
UV(iodide): 284(3.78) [1]
MS *m/z* (iodide): 207(43), 206(64), 164(100), 149(14), 58(14) [1]
^{1}H NMR(iodide, CD_3OD): 3.19, 3.72(each 2H, m, H-4, H-3), 3.24, 3.26(each 3H, s, 2 × CH_3), 3.82(6H, s, 2 × OCH_3), 4.52(2H, s, H-1), 6.71, 6.79(each 1H, s, *p*–H–Ar) [1]

References

1. M.M. Yusupov, A. Karimov, R. Shakirov, P.G. Gorovoi, Dep. VINITI, (2917) (1992)

Eschscholtzine



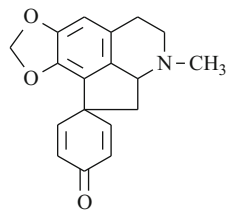
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Eschscholtzia californica*
$C_{19}H_{17}NO_4$: 323.1158
Mp: 127–128°C (Et_2O)
$[\alpha]_D$−239° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, MeOH; spar. sol. Et_2O
UV: 295 [1]
IR: 1775, 1645, 901 [1]
MS *m/z*: 323(M^+), 322, 308, 204, 190, 188(100), 161.5($^{++}$) [1]
^{1}H NMR: 2.42(3H, s, NCH_3), 2.44(1H, d, J = 16), 3.19, 3.35(each 1H, d, J = 6), 3.86(1H, d, J = 6), 5.68, 5.71(each 2H, s, 2 × CH_2O_2), 6.27, 6.44(each 2H, s, *p*–H–Ar)
HPLC: [2]

References

1. S.A. Parfeinikov, Author's Abstract of Candidate's Dissertation, Moskva, 1984
2. J.-P. Rey, J. Levesque, J.-L. Pousset, F. Roblot, J. Chromatogr. **587**, 314 (1991)

Fugapavine (Mecambrine)

CAS Registry Number: 1093-07-8

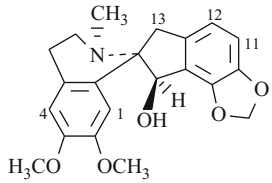


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver fugax, P. maeoticum, P. persicum*
$C_{18}H_{17}NO_3$: 295.1208
Mp: 178–179°C [1]
$[\alpha]_D$−116° ($CHCl_3$) [1]
UV: 231, 294 [1]
IR: 2735, 1667, 1607, 1592, 1490, 1462, 1365 [1]
MS *m/z*: 295(M^+), 294, 266(100), 252, 237 [1]
^{1}H NMR: 2.36(3H, s, NCH_3), 5.76, 5.82(each 1H, d, J = 1.5, CH_2O_2), 6.51(1H, s), 6.15–7.10(4H, m) [1]
HPLC: [2]
Pharm./Biol.: LD_{50} 7.015 mg/kg (s/c, mice). Analeptic of CNS [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp **32**, 932 (1996)
2. M. Hutin, A. Oztekin, A. Cave, J.P. Foucher, J. Chromatogr. **265**, 139 (1983)
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 227

d-Fumaricine



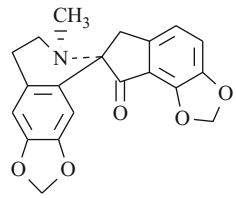
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria parviflora*
$C_{21}H_{23}NO_5$: 369.1576
Mp: 175–176°C (MeOH) [1]
$[\alpha]_D$+38° ($CHCl_3$) [1]
UV: 237, 288(3.95, 3.74) [1]
IR: 3200–3100, 1615, 1525, 1500, 1035, 930 [1]
MS *m/z*: 369(M^+), 354(100), 338, 206, 184.5($^{++}$) [1]
^{1}H NMR: 2.34(3H, s, NCH_3), 2.35–3.70(6H, m), 3.45, 3.78(each 3H, s, 2 × OCH_3), 5.48(1H, s), 5.89, 5.91(each 1H, d, J = 2, CH_2O_2), 6.37, 6.57(each 1H, s, *p*–H–Ar), 6.70(2H, s, *o*–H–Ar) [1]

References

1. M. Alimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 608 (1982)

Fumariline

CAS Registry Number: 20411-03-4

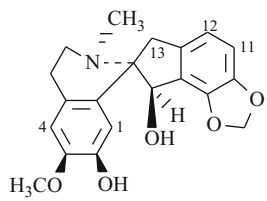


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria officinalis, F. vaillantii*
$C_{20}H_{17}NO_5$: 351.1107
Mp: 137–138°C [1]
$[\alpha]_D$+66° (EtOH) [1]
UV: 203, 237, 263, 294, 355(4.60, 4.31, 4.05, 3.66, 3.51) [2]
IR: 1709, 1040, 940 [2]
MS *m/z*: 351(M^+), 336, 322(100), 308, 293, 264, 175, 135 [2]
^{1}H NMR: 2.36(3H, s, NCH_3), 2.60–3.60(6H, m), 5.80, 6.12(each 2H, s, 2 × CH_2O_2), 6.16, 6.54(each 1H, s, *p*–H–Ar), 6.86, 7.07(each 1H, d, J = 8, *o*–H–Ar) [2]
Abs. conf.: [3]

References

1. M. Alimova, I.A. Israilov, Chem. Nat. Comp. **17**, 437 (1981)
2. J.K. Saunders, R.A. Bell, C.Y. Chen, D.B. McLean, R.H.F. Manske, Can. J. Chem. **46**, 2873 (1968)
3. M. Shamma, J.L. Moniot, R.H.F. Manske, W.K. Chan, K. Nakanishi, J. Chem. Soc. Chem. Commun. 310 (1972)

Fumaritine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria officinalis, F. schleicheri*
$C_{20}H_{21}NO_5$: 355.1420
Mp: 157–159°C (EtOH) [1]
UV: 287 [1]
IR: 3550, 2880, 1590, 1275, 1100 [1]
MS *m/z*: 355(M^+), 340, 324, 192(100) [2]
^{1}H NMR: 2.41(3H, s, NCH_3), 3.29(2H, s), 3.85(3H, s, OCH_3), 5.47(1H, s), 5.95(2H, s, CH_2O_2), 6.47, 6.59(each 1H, s, *p*–H–Ar), 6.68, 6.74(each 1H, d, J = 8, *o*–H–Ar) [2]
^{13}C NMR: [2]

Table 1

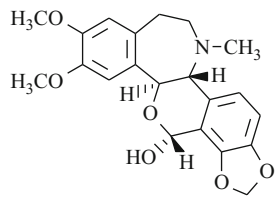
C-1	111.2	C-8	82.3	C-13	44.0
2	144.2	8a	125.5	14	74.5
3	146.4	9	144.2	14a	127.9
4	112.9	10	147.5	NCH_3	38.1
4a	127.4	11	108.9	3-OCH_3	56.0
5	23.3	12	113.3	9,10-CH_2O_2	101.6
6	47.6	12a	135.0		

References

1. D.B. McLean, R.A. Bell, J.K. Saunders, C.Y. Chen, R.H.F. Manske, Canad. J. Chem. **47**, 3593 (1969)
2. H.G. Kiryakov, D.W. Hughes, B.C. Nalliah, D.B. MacLean, Can. J. Chem. **57**, 53 (1979)

Glaucamine

CAS Registry Number: 2255-44-9



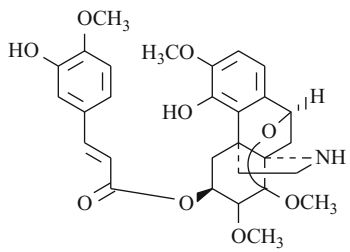
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Papaver zangezuricum*
$C_{21}H_{23}NO_6$: 385.1525
Mp: 218–219°C (MeOH) [1]
$[\alpha]_D$+287° ($CHCl_3$) [1]
UV: 232, 279 [1]
MS *m/z*: 385(M^+), 206(100), 192, 190, 163 [2]
^{1}H NMR: 2.25(3H, s, NCH_3), 3.75(6H, s, 2 × OCH_3), 3.91, 5.69(each 1H, d, J = 9), 5.88, 5.95(each 1H, d, J = 1, CH_2O_2), 5.90(1H, s), 6.20, 6.55(each 1H, s, *p*–H–Ar), 6.85(2H, s, *o*–H–Ar) [3]
ORD: [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp **32**, 216 (1996)
2. L. Dolejs, V. Hanus, Collect. Czech. Chem. Commun. **23**, 2997 (1967)
3. F. Santavy, J. Hrubek, K. Blaha, Collect. Czech. Chem. Commun. **23**, 4452 (1967)

Hernandifoline

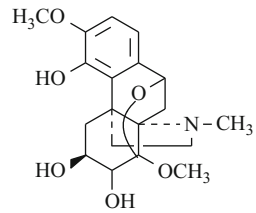


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania hernandifolia*
$C_{29}H_{33}NO_9$: 539.2155
Mp: 128–129°C, 171°C (di Ac) [1]
$[\alpha]_D$−25° (EtOH) [1]
IR: 1700 [1]
MS *m/z*: 363, 218, 217(100), 216, 215, 202, 186 [1]
^{1}H NMR: 1.85(1H, d, J = 10.5, H-9), 1.98(1H, q, J = 15; 2.2, H-5a), 2.23(1H, q, J = 10.5; 5.8, H-9), 3.08(1H, H-5e), 3.31, 3.32, 3.51(each 3H, s, 3-OCH_3, 7-OCH_3, 8-OCH_3), 3.74(1H, d, J = 4.4, H-7), 4.85(1H, d, J = 5.8, H-10), 5.32(1H, m, H-6), 6.39, 6.64(each 1H, d, J = 8, H-2, H-1) [1]

References

1. D.A. Fesenko, I.I. Fadeeva, T.N. Il'inskaya, M.E. Perel'son, O.N. Tolkachev, Chem. Nat. Comp **7**, 150 (1971)

Hernandine

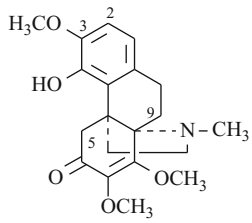


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania hernandifolia*
$C_{19}H_{25}NO_6$: 363.1682
Mp: 197–199°C (EtOH) [1]
$[\alpha]_D$−33° (EtOH) [1]
IR: 3530, 3260 [1]
MS *m/z*: 363(M^+), 348, 231(100), 230, 216, 199 [1]
^{1}H NMR: 1.51(1H, d, J = 10.8, H-9), 1.95(1H, q, J = 2.4; 14.6, H-5), 2.52(3H, s, NCH_3), 2.68(1H, d, J = 11, OH), 2.85(1H, q, J = 6.2; 10.8, H-9), 3.09(1H, q, J = 3.5; 14.6, H-5), 3.42, 3.65(each 3H, s, 8-OCH_3, 3-OCH_3), 3.58(1H, d, J = 3.8), 4.15(2H, m, H-6, H-7), 4.01(1H, s, OH), 4.82(1H, d, J = 10.8, H-10), 6.45(2H, s, H-1, H-2), 6.53(1H, s, OH) [1]

References

1. T.N. Il'inskaya, D.A. Fesenko, I.I. Fadeeva, M.E. Perel'son, O.N. Tolkachev, Chem. Nat. Comp **7**, 171 (1971)

Hernandoline

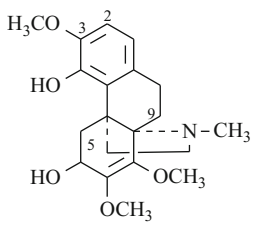


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania hernandifolia*
$C_{20}H_{25}NO_5$: 359.1733
Mp: amorph., 226°C (perchlorate), 188°C (methiodide), 114°C (O–Ac) [1]
UV: 267, 288(4.07, 3.78) [1]
IR: 2870, 1670, 1600, 1460 [1]
^{1}H NMR: 2.50(3H, s, NCH_3), 2.60, 3.47(each 1H, d, J = 16), 3.62, 3.80(each 3H, s, 2 × OCH_3), 4.04(3H, s, 3-OCH_3), 6.50, 6.67(each 1H, d, J = 8, H-1, H-2) [1]

References

1. I.I. Fadeeva, M.E. Perel'son, T.N. Il'inskaya, A.D. Kuzovkov, Farmatsiya **19**(2), 28 (1970)

Hernandolinole

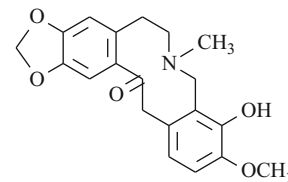


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania hernandifolia*
$C_{20}H_{27}NO_5$: 361.1889
Mp: 114–115°C (Et_2O); 144.5°C (MeOH), 201°C (hydrochloride, EtOH), 180°C (methiodide), 115°C (des-base) [1]
$[\alpha]_D$ −98° (EtOH) [1]
UV: 216, 285(3.94, 3.48) [1]
IR: 3520, 3300, 1630, 1590 [1]
^{1}H NMR: 2.46(3H, s, NCH_3), 3.38, 3.47, 3.65(each 3H, s, 3 × OCH_3) [1]

References

1. I.I. Fadeeva, T.N. Il'inskaya, M.E. Perel'son, A.D. Kuzovkov, Chem. Nat. Comp **6**, 516 (1970)

Hunnemanine

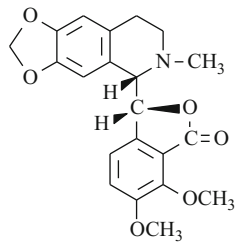


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana*
$C_{20}H_{21}NO_5$: 355.1420
Mp: 208–209°C (EtOH) [1]
UV: 288 [1]
IR: 3500, 1660, 1505, 1035, 940 [1]
MS *m/z*: 355(M^+), 340, 338, 192, 163, 150 [1]
^{1}H NMR: 1.82(3H, s, NCH_3), 2.48, 2.84(each 2H, m), 3.64(4H, br s), 3.80(3H, s, OCH_3), 5.87(2H, s, CH_2O_2), 6.56, 6.88(each 1H, s, *p*–H–Ar), 6.65(2H, s, *o*–H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp **32**, 216 (1996)

(+) - α-Hydrastine

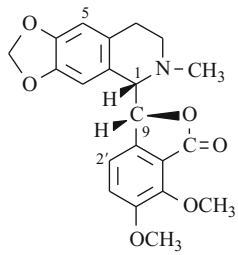


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria capreolata, F. parviflora, F. schleicheri, F. vaillantii*
$C_{21}H_{21}NO_6$: 383.1369
Mp: 158–159°C (MeOH) [1]
$[\alpha]_D$+128° ($CHCl_3$) [1]
UV: 296 [1]
IR: 1760, 1610, 1505, 1035, 940 [1]
^{1}H NMR: 2.56(3H, s, NCH_3), 3.86, 3.99(each 3H, s, 2 × OCH_3), 3.99, 5.54(each 1H, d, J = 3.5), 5.81(2H, q), 6.38, 6.66(each 1H, s, *p*–H–Ar), 7.04, 7.30(each 1H, d, J = 8, *p*–H–Ar) [2]
Abs. conf.: 1S, 9S [3]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 167 (1968)
2. K.L. Seitanidi, M.R. Yagudaev, I.A. Israilov, M.S. Yunusov, Chem. Nat. Comp. **14**, 395 (1978)
3. G.P. Moiseeva, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 82 (1978)

(+) - β - Hydrastine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis caucasica, C. pseudoadunca, C. stricta*
$C_{21}H_{21}NO_6$: 383.1369
Mp: 131–132°C (MeOH) [1], 206°C (methiodide [MeOH])
$[\alpha]_D$+63° [1]
UV: 298 [2]
IR: 1760 [2]
MS *m/z*: 190 [2]
^{1}H NMR: 2.57(3H, s, NCH_3), 3.92, 4.08(each 3H, s, 2 × OCH_3), 3.99, 5.49(each 1H, d, J = 4), 5.92(2H, s, CH_2O_2), 6.39, 6.58(each 1H, s, *p*–H–Ar), 6.52, 7.08(each 1H, d, J = 8, *o*–H–Ar) [3]
^{13}C NMR: [4]

Table 1

C-1	66.0	C-8	107.3	C-5′	147.5
3	49.0	8a	130.0	6′	119.4
4	26.7	9	82.7	10	167.0
4a	124.5	1′	140.4	NCH_3	44.7
5	108.1	2′	117.3	6,7-OCH_2O	100.5
6	146.3	3′	118.5	4′-OCH_3	56.7
7	145.4	4′	152.6	5′-OCH_3	62.0

Abs. conf.: 1S, 9R [5]
Pharm./Biol.: LD_{50} 0.97, 0.102 mg/kg (s/c, i/v, mice); 1.45(s/c, rats). Active antinarcotic agent. Its activity far exceed those of the known drugs Bemetrid, Korozal, Ervinin, and d-Bicuculline. The (hydrochloride), under the name Izokorin, is recommended for clinical trials as an antinarcotic agent in cases of poisoning by narcotics and hypnotics [6]. Is an antagonist of GABA receptors and can be used as an analyzer in experimental biological investigations. Its pharmacological activity is 5–10 times greater than that of the currently used drug d-bicuculline [7]

References

1. M.S. Yunusov, S.T. Akramov, S.Yu. Yunusov, DAN SSSR **162**, 607 (1965)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I.

Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp **32**, 216 (1996)
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4. D.W. Hughes, H.L. Holland, D.B. McLean, Can. J. Chem. **54**, 2252 (1976)
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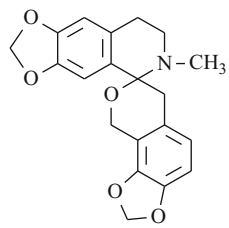
6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 207
7. A.E. Valeev, N.I. Chernavskaya, F.N. Dzhakhangirov, I.A. Israilov, M.S. Yunusov, *Neirofiziologiya*, 820 (1988)

Hypecorine

CAS Registry Number: 41787-56-8



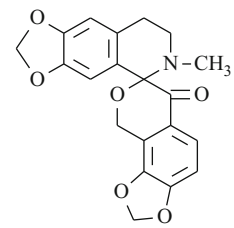
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Hypecoum erectum, H. lactiflorum*
$C_{20}H_{19}NO_5$: 353.1263
Mp: 154–156°C (EtOH) [1]
$[\alpha]_D \pm 0°$ [1]
UV: 236, 290 [1]
^{1}H NMR(CCl_4): 2.19(3H, s, NCH_3), 2.35–3.35(6H, m), 4.61, 4.65(each 1H, d, J = 15), 5.79, 5.86(each 2H, s, 2 × CH_2O_2), 6.38, 6.52(each 1H, d, J = 8, *o*–H–Ar), 6.40, 6.74(each 1H, s, *p*–H–Ar) [1]

References

1. L.D. Yakhontova, M.N. Komarova, M.E. Perel'son, K.F. Blinova, O.N. Tolkachev, Chem. Nat. Comp. **8**, 592 (1972)

Hypecorinine

CAS Registry Number: 41787-57-9



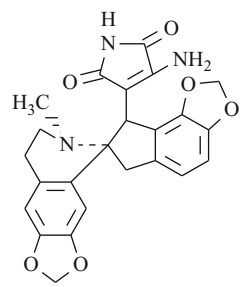
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Hypecoum erectum, H. lactiflorum*
$C_{20}H_{17}NO_6$: 367.1056
Mp: 197–198°C (EtOH) [1]
$[\alpha]_D \pm 0°$ [1]
UV: 240, 292, 322 [1]
IR: 1690 [1]
MS *m/z*: 367(M^+), 190, 177 [1]
^{1}H NMR(CCl_4): 2.21(3H, s, NCH_3), 2.30–3.40(4H, m), 4.63, 5.04(each 1H, d, J = 15.5), 5.81, 6.01(each 2H, s, 2 × CH_0O_2), 6.41, 6.45(each 1H, s, *p*–H–Ar), 6.76, 7.61(each 1H, d, J = 8.2, *o*–H–Ar) [1]

References

1. L.D. Yakhontova, M.N. Komarova, M.E. Perel'son, K.F. Blinova, O.N. Tolkachev, Chem. Nat. Comp. **8**, 592 (1972)

Hyperectine

CAS Registry Number: 94656-46-9



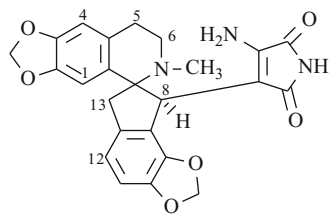
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Hypecoum erectum*
$C_{24}H_{21}N_3O_6$: 447.1430
Mp: 237–238°C (dec., MeOH-$CHCl_3$), 259°C (dec., N–Me) [1]
UV: 230 sh, 292, 363(4.29, 3.81, 3.35) [1]
IR($CHCl_3$): 3500, 3450, 3395, 1775, 1730, 1675 [1]
MS *m/z*: 447(M^+), 322, 190 [1]
^{1}H NMR: 2.18(3H, s, NCH_3), 3.45(2H, s), 3.45(1H, br s), 3.96(2H, br s), 4.64(1H, s), 5.76–5.89(4H, m, 2 × CH_2O_2), 6.45, 6.77(each 2H, s, 4 × H–Ar) [1]
X-ray: [1]

References

1. M.E. Perel'son, G.G. Aleksandrov, L.D. Yakhontova, O.N. Tolkachev, D.A. Fesenko, M.N. Komarova, S.E. Esipov, Chem. Nat. Comp. **20**, 592 (1984)

Isohyperectine

CAS Registry Number: 170384-75-5



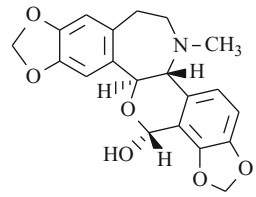
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Hypecoum erectum*
$C_{24}H_{21}N_3O_6$: 447.1430
Mp: 239–240°C (dec.) [1]
MS *m/z*: 447(M^+), 355, 322, 243, 228, 204, 190, 188 [1]
^{1}H NMR($CDCl_3$-CF_3COOH): 2.97(3H, d, NCH_3), 3.15(2H, m, H-6), 3.40, 3.98(each 1H, d, J = 16, H-13); 4.12, 3.50(2H, m, H-5), 4.55(1H, s, H-8), 5.94, (4H, m, 2 × CH_2O_2), 6.28, 6.66(each 1H, s, *p*–H–Ar), 6.90(2H, s, *o*–H–Ar) 8.34, 9.09(3H, NH, NH_2) [1]

References

1. L.D. Yakhontova, I.V. Yartseva, N.A. Klyuev, O.N. Tolkachev, Chem. Nat. Comp. **29**, 744 (1993)

Isorhoeagenine

CAS Registry Number: 17948-35-5



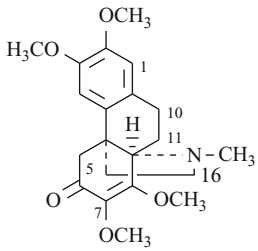
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver zangezuricum*
$C_{20}H_{19}NO_6$: 369.1212
Mp: 159–160°C (MeOH) [1]
$[\alpha]_D$+307° ($CHCl_3$) [1]
UV: 241, 290 [1]
MS *m/z*: 369(M^+), 206, 192, 163 [2]
ORD: [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
2. L. Dolejs, V. Hanus, Collect. Czech. Chem. Commun. **32**, 2997 (1967)
3. F. Santavy, J. Hrbek, K. Blaha, Collect. Czech. Chem. Commun. **32**, 4452 (1967)

Isostephodeline

CAS Registry Number: 56648-85-2



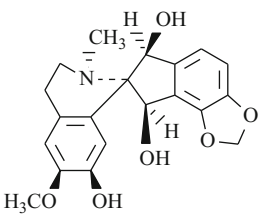
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania delovayi*
$C_{21}H_{27}NO_5$: 373.1889
Mp: 184–185°C (C_6H_6, Et_2O) [1]
$[\alpha]_D$+160° (EtOH) [1]
UV: 226, 275(3.78, 3.79) [1]
IR: 1661, 1615, 1522 [1]
^{1}H NMR: 1.40–2.50(4H, m, H-15, H-16), 2.36(3H, s, NCH_3), 2.56(1H, d, J = 3.1, H-11), 2.62, 3.05(each 1H, d, J = 17, H-5a, H-5e), 2.78(2H, m, H-10), 3.26(3H, s, 7-OCH_3), 3.58(1H, d, J = 3.1), 3.72, 3.74(each 3H, s, 2-OCH_3, 3-OCH_3), 3.88(3H, s, 8-OCH_3), 6.45(1H, s, H-1), 6.56(1H, s, H-4) [1]

References

1. M.E. Perel'son, I.I. Fadeeva, T.N. Il'inskaya, Chem. Nat. Comp. **11**, 197 (1975)

Ledeboridine

CAS Registry Number: 64191-01-1



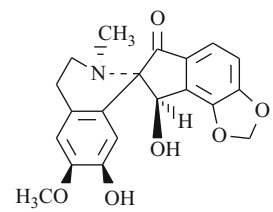
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana*
$C_{20}H_{21}NO_6$: 371.1369
Mp: 140–141°C [1]
$[\alpha]_D$+114° (MeOH) [1]
IR: 3540, 3430, 1600, 1500, 1030, 920 [1]
MS *m/z*: 371(M^+), 356, 353, 338, 324, 308, 294, 192, 190, 177 [1]
^{1}H NMR: 2.50(3H, s, NCH_3), 3.75(3H, s, OCH_3), 5.11, 5.33(each 1H, s), 5.91(2H, s, CH_2O_2), 6.19, 6.59(each 1H, s, *p*–H–Ar), 6.77(2H, s, *o*–H–Ar) [1]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 366 (1977)

Ledeborine

CAS Registry Number: 56816-35-4



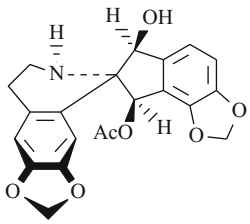
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana*
$C_{20}H_{19}NO_6$: 369.1212
Mp: 184–185°C ($CHCl_3$–MeOH) [1]
UV: 238, 293, 316(4.38, 3.98, 3.90) [1]
IR: 3450, 1705, 1600, 1040, 920 [1]
MS *m/z*: 369(M^+), 354, 338, 206, 192, 177 [1]
^{1}H NMR(CF_3COOH): 2.67(3H, d, J = 5, NCH_3), 2.70–3.50(4H, m), 3.40(3H, s, OCH_3), 5.62(1H, s), 5.70(3H, br s), 6.31(1H, s, *p*–H–Ar), 6.70, 7.25(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 284 (1975)

Lederine

CAS Registry Number: 76193-61-8



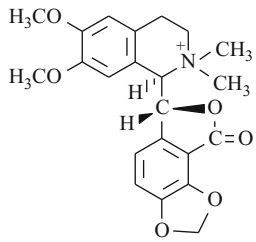
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana, Dicentra peregrina*
$C_{21}H_{19}NO_7$: 397.1161
Mp: 208–209°C (MeOH) [1]
$[\alpha]_D$+13° ($CHCl_3$) [1]
IR: 3600–3150, 1760, 1605, 1500, 1050, 940 [1]
^{1}H NMR: 1.90(3H, s, Ac), 2.40–3.65(4H, m), 5.23(1H, s), 5.86, 5.89, 6.00, 6.03(each 1H, d, J = 2, 2 × CH_2O_2), 6.18, 6.51, 6.66(each 1H, s), 6.78(2H, s, *o*–H–Ar) [1]

References

1. I.A. Israilov, F.M. Melikov, M.S. Yunusov, D.A. Murav'eva, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 392 (1980)

N – Methyladlumine

CAS Registry Number: 80550-26-1

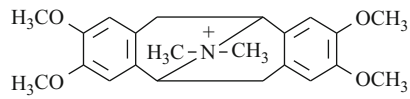


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria vaillantii*
$C_{22}H_{24}N^+O_6$: 398.1604
Mp: 199°C (iodide, MeOH) [1]
$[\alpha]_D$−45° (MeOH) [1]
Solubility: spar. sol. $CHCl_3$, Me_2CO, EtOH, C_6H_6, Et_2O [2]
UV: 240, 292, 330(4.46, 4.04, 3.14) [1]
IR: 1775, 1510, 1490, 1035, 915 [1]
^{1}H NMR(CF_3COOH): 2.85, 3.11(each 3H, s, N$(CH_3)_2$), 3.21, 3.50(each 3H, s, 2 × OCH_3), 4.41, 5.09(each 1H, d, J = 8), 5.69(4H, br s), 6.44(1H, d, J = 8, *o*–H–Ar), 6.48(1H, s, *p*–H–Ar) [1]

References

1. M. Alimova, I.A. Israilov, Chem. Nat. Comp. **17**, 437 (1981)
2. M. Alimova, Author's Abstract of Candidate's Dissertation, Tashkent, 1983

N – Methylargemonine



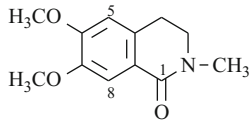
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Thalictrum minus*
$C_{22}H_{28}N^+O_4$: 370.2018
Mp: 203–205°C [1]
$[\alpha]_D$−185° (MeOH) [1]
UV: 288 [1]
MS *m/z*: 355, 354. 340, 324, 205, 204(100) [1]
^{1}H NMR(Py-d_5): 3.49(12H, s, N$(CH_3)_2$, 2 × OCH_3), 3.59(6H, s, 2 × OCH_3), 5.33(2H, br d), 6.45, 6.94(each 2H, s, H–Ar) [1]

References

1. S. Mukhamedova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 375 (1983)

N-Methylcorydaldine

CAS Registry Number: 6514-05-2



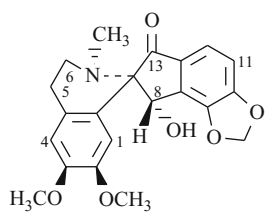
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis turcomanica*
$C_{12}H_{15}NO_3$: 221, 1048
Mp: 125–126°C [1]
UV: 223, 261, 297 [1]
IR: 1639 [1]
MS *m/z*: 221 (M^+), 178, 150, 135, 107 [1, 2]
^{1}H NMR: 2.89, 3.50 (each 2H, t, J = 7, 2 × CH_2), 3.10 (3H, s, NCH_3), 3.50 (2H, t, J = 7, CH_2), 3.85, 3.90 (each 3H, s, 2 × OCH_3), 6.58 (1H, s, H-5), 7.58 (1H, s, H-8) [2]

References

1. I.I. Khamidov, S.F. Aripova, M.V. Telezhenetskaya, M.F. Faskhutdinov, A.K. Karimov, I. Dzhepberov, Chem. Nat. Comp. **32**, 873 (1996)
2. M. Shamma Sr., M.A. Podczasy, Tetrahedron **27**, 727 (1971)

O – Methylcorpaine

CAS Registry Number: 56435-44-0
Related CAS Registry Numbers(s): 64397-11-1 64439-44-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis vaginans*
$C_{21}H_{21}NO_6$: 383.1369
Mp: 220–221°C
$[\alpha]_D$ −37° ($CHCl_3$) [1]
UV: 204, 240, 291, 313 [1]
IR: 3260, 1710 [1]
MS *m/z*: 383(M^+, 100), 368, 338, 206, 191.5($^{++}$), 190, 177 [1]
^{1}H NMR: 2.25(3H, s, NCH_3), 3.72, 3.82(each 3H, s, 2 × OCH_3), 5.08(1H, s), 6.20(2H, s, CH_2O_2). 6.06, 6.58(each 1H, s, *p*–H–Ar), 6.93, 7.32(each 1H, d, J = 8, *o*–H–Ar) [1]
^{13}C NMR: [2]

Table 1

C-1	110.7	C-8	75.1	C-13	202.7
2	148.5	8a	134.6	14	72.0
3	148.6	9	144.4	14a	128.7
4	111.4	10	154.6	NCH_3	41.9
4a	128.7	11	109.5	9,10-CH_2O_2	103.2
5	29.3	12	119.6	2-OCH_3	56.1
6	50.3	12a	131.3	3-OCH_3	56.5

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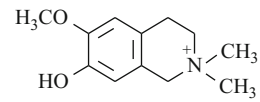
1. N.N. Margvelashvili, O.E. Lasskaya, A.T. Kir'yanova, O.N. Tolkachev, Chem. Nat. Comp **12**, 118 (1976)
2. D.W. Hughes, B.C. Nalliah, H.L. Holland, D.B. McLean, Can. J. Chem. **55**, 3304 (1977)

N – Methylcorypalline

CAS Registry Number: 23594-91-4



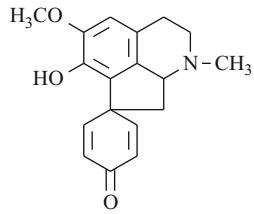
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis olensiflora, Corydalis stricta*

$C_{12}H_{18}N^+O_2$: 208.1338
Mp: 239°C (iodide) [1]
UV: 287(4.14) [1]
IR: 3370, 1620, 1610, 1530 [1]
MS *m/z*: 207, 206, 177, 164, 150, 142, 127 [1]
^{1}H NMR(CF_3COOH): 2.85(6H, s, $N(CH_3)_2$), 2.70–3.45(4H, m), 3.50(3H, s, OCH_3), 4.06(2H, s, CH_2), 6.34, 6.40(each 1H, s, H-5, H-8) [1]

References

1. T. Irgashev, I.A. Israilov, D. Batsuren, M.S. Yunusov, Chem. Nat. Comp. **19**, 461 (1983)

N-Methylcrotsparine

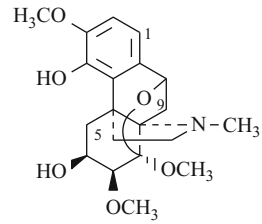


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Liriodendron tulipiferum*
$C_{18}H_{19}NO_3$: 297.1365
Mp: 222–224°C (dec., Me_2CO) [1]
$[\alpha]_D$−39° ($CHCl_3$) [1]
UV: 235, 284–292(4.38, 3.18) [1]
IR: 2860, 1660, 1615, 1490, 1375, 1270, 1185, 1135, 1075, 1020, 865 [1]
MS *m/z*: 297(M^+, 100), 296, 282, 280, 268, 254, 226, 174, 148.5($^{++}$) [1]
^{1}H NMR: 2.34(3H, s, NCH_3), 3.76(3H, s, OCH_3), 6.10–6.35, 6.65–7.05(4H, H-8, H-9, H-10, H-11) [1]

References

1. R. Ziyaev, Author's Abstract of Candidate's Dissertation, Tashkent, 1974

Methylhernandine

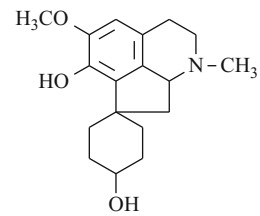


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania hernandifolia*
$C_{20}H_{27}NO_6$: 377.1838
Mp: 152–153°C (MeOH), 201°C (hydrochloride) [1]
$[\alpha]_D$+125° (EtOH) [1]
IR: 3525, 3250 [1]
^{1}H NMR: 1.45(1H, d, J = 10.8, H-9), 1.93(1H, q, J = 14.8; 2.9, H-5a), 2.24(1H, d, J = 9.8, 6-OH), 2.48(3H, s, NCH_3), 2.63(1H, q, J = 10.8; 6.2, H-9), 3.00(1H, q, J = 14.8; 3.4, H-5e), 3.38, 3.48, 3.72(each 3H, s, 3 × OCH_3), 3.62(1H, d, J = 4.1, H-7), 4.05(1H, m, H-6), 4.81(1H, d, J = 6.2, H-10), 6.50(2H, s, H-1, H-2) [1]

References

1. I.I. Fadeeva, D.A. Fesenko, T.N. Il'inskaya, M.E. Perel'son, O.N. Tolkachev, Chem. Nat. Comp. **7**, 432 (1971)

N-Methyloridine



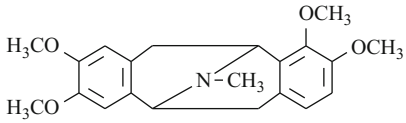
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver lisae*
$C_{18}H_{25}NO_3$: 303.1834
Mp: 190–192°C (Me_2CO) [1]
$[\alpha]_D$ −61° ($CHCl_3$) [1]
UV: 285 [1]
MS *m/z*: 303(M^+), 302(100), 260 [1]

References

1. V.A. Chelombit'ko, V.A. Mnatsakanyan, L.V. Sal'nikova, Chem. Nat. Comp. **14**, 228 (1978)

O – Methylplatycerine

CAS Registry Number: 7688-85-9

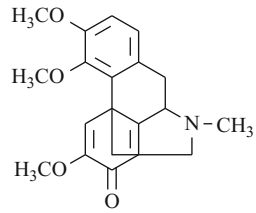


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Argemone platyceras*
$C_{21}H_{25}NO_4$: 355.1783
Mp: amorph. [1]
$[\alpha]_D$ −285° [1]
UV: 282 [1]
MS *m/z*: 355(M^+), 204(100) [1]
^{1}H NMR: 2.48(3H, s, NCH_3), 2.60–3.60(4H, m), 3.66, 3.70, 3.74, 3.83(each 3H, s, 4 × OCH_3), 3.89, 4.24(each1H, d, J = 5), 6.30, 6.46(each1H, s, *p*–H–Ar), 6.57(2H, s, *o*–H–Ar) [1]

References

1. I.A. Israilov, M.S. Yunusov, Chem. Nat. Comp. **22**, 189 (1986)

O – Methylsalutaridine



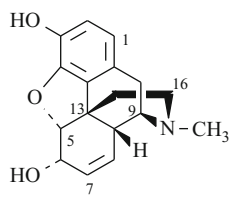
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver urbanianum*
$C_{20}H_{23}NO_4$: 341.1624
Mp: 147–148°C [1]
$[\alpha]_D$+74° ($CHCl_3$) [1]
UV: 240, 283 [1]
IR: 1675, 1650, 1625, 1490, 1285, 1210 [1]
MS *m/z*: 341(M^+), 326, 313, 298, 282, 170.5($^{++}$) [1]
^{1}H NMR: 1.90–3.50(7H, m), 2.39(3H, s, NCH_3), 3.75, 3.82, 3.88(each 3H, s, 3 × OCH_3), 6.24, 7.21(each 1H, s), 6.77(2H, s) [1]

References

1. M.A. Manushakyan, I.A. Israilov, V.A. Mnatsakanyan, M.S. Yunusov, S.Yu. Yunusov, Khim. Prirod. Soedin. 849 (1980)

Morphine

CAS Registry Number: 57-27-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver somniferum*

$C_{17}H_{19}NO_3$: 285.1365
Mp: 253–254°C (EtOH)
$[\alpha]_D$ −140° (MeOH) [1]
UV: 233 sh, 285 [1]
IR: 3610, 3010, 2930, 2905, 2825, 2770, 1609, 1511, 1490, 1452, 1375, 1336, 1294, 1280, 1191, 1173, 1138, 1083, 1043, 1028, 1003, 978, 942, 887, 876, 862, 828 [2]
MS *m/z*: 285(M^+), 268, 215, 200, 171, 162 [3]
^{13}C NMR: [4]

Table 1

C-1	118.6	C-7	133.4	C-13	43.0
2	116.4	8	128.5	14	40.6
3	138.4	9	58.0	15	35.6
4	146.3	10	20.2	16	46.0
5	91.5	11	125.5	NCH_3	42.8
6	66.4	12	131.0		

ORD: [5]
Abs. conf.: [6]
X-ray: [7]
HPLC: [8]
Pharm./Biol.: Analgesic, antishock, hypnotic action. Enhances the action of hypnotic, narcotic, and local anesthetic agents, raises the tone of smooth musculature of internal organs, and depresses respiration. Used as an anslgesic in traumas and diseases with severe painful sensations. Supplied in the form of 0.01 g tablets and ampules with 1 ml of 1% soln. [9]

References

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2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids*, vol. 1 (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1965), No. 184
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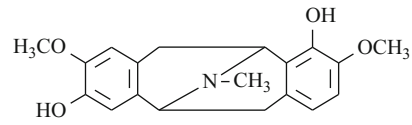
4. F.I. Carroll, C.G. Moreland, G.A. Brine, J.A. Kepler, J. Org. Chem. **41**, 996 (1976)
5. J.M. Bobbit, U. Weiss, D. Hanessian, J. Org. Chem. **24**, 1582 (1959)
6. K.W. Bentley, H.M.E. Cardwell, J. Chem. Soc. 3252 (1955)
7. M. McKay, D.C. Hodgkin, J. Chem. Soc. 3261 (1955); J. Fridrichsons, M. McKay, A.M. Mathieson, Tetrahedron Lett. 2887 (1968); Tetrahedron **26**, 1969 (1970)
8. J.L. Mason, S.P. Ashmore, A.R. Aitkenhead, J. Chromatogr. **570**, 191 (1991)
9. M.D. Mashkovskii, *Drugs* [in Russian], vol. 1 (Meditsina, Moscow, 1984), p. 146

Munitagine

CAS Registry Number: 7691-07-8



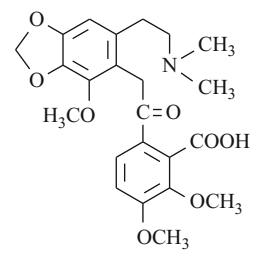
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Argemone hybrida, A. platyceras*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 167–168°C (EtOH) [1]
$[\alpha]_D$ −230° ($CHCl_3$) [1]
UV: 284 [1]
MS *m/z*: 327(M^+), 326, 190(100), 175 [1]
^{1}H NMR: 2.53(3H, s, NCH_3), 3.72, 3.76(each 3H, s, 2 × OCH_3), 3.92, 4.38(each 1H, d, J = 6), 6.41, 6.60(each 1H, s, *p*–H–Ar), 6.48, 6.62(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 596 (1996)

Narceine

CAS Registry Number: 131-28-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

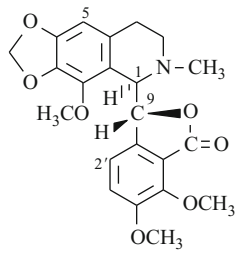
Biological sources: *Papaver somniferum*
$C_{21}H_{21}NO_7$: 399.1318
Mp: 198–200°C (MeOH) [1]
$[\alpha]_D$ −189° ($CHCl_3$) [2]
UV: 291, 309 [1]
IR(nujol): 1770, 1537, 1505, 1488, 1278, 1041, 1030, 1010 [3]
MS *m/z*: 206, 194, 178, 176, 165 [1]
Abs. conf.: 1R, 9S [3]
HPLC: [4]

References

1. L. Kuhn, S. Pfeifer, Pharmazie **18**, 819 (1963)
2. G. Blasko, V. Elango, B. Sener, A.J. Freyer, M. Shamma, J. Org. Chem. **47**, 880 (1982)
3. G. Blasko, D.J. Gula, M. Shamma, J. Nat. Prod. **45**, 105 (1982)
4. R. Verpoorte, J.M. Verzijl, A. Baerheim-Svendsen, J. Chromatogr. **283**, 401 (1984)

Narcotine

CAS Registry Number: 128-62-1 (Noscapine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver oreophilum, P. somniferum, P. zangezuricum*
$C_{22}H_{23}NO_7$: 413.1475
Mp: 175–176°C (EtOH) [1]
$[\alpha]_D$ −207° ($CHCl_3$) [1]
UV: 209, 291, 309 [1]
IR: 1765, 1600, 1505, 1485, 1040, 940 [1]
MS *m/z*: 220(100), 205, 190 [1]
^{1}H NMR: 2.45(3H, s, NCH_3), 3.77, 3.93, 3.97(each 3H, s, 3 × OCH_3), 4.29, 5.47(each 1H, d, J = 4), 5.87(2H, s, CH_2O_2), 6.00, 6.93(each 1H, d, J = 8, *o*–H–Ar), 6.23(1H, s) [1]
^{13}C NMR: [2]

Table 1

C-1	60.9	C-8a	117.2	C-5′	147.8
3	50.1	9	81.9	6′	120.3
4	28.1	10	168.2	NCH_3	46.3
4a	132.2	1′	140.6	6,7-CH_2O_2	100.8
5	102.4	2′	117.8	4′-OCH_3	55.9
6	148.5	3′	118.4	5′-OCH_3	62.2
7	134.1	4′	152.3	8-OCH_3	59.4
8	141.3				

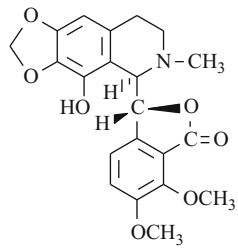
HPLC: [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 596 (1996)
2. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 18 (Academic, New York, 1981), p. 217
3. V.K. Srivastava, M.L. Maheshwari, J. Assoc. Off. Anal. Chem. **68**, 801 (1985)

Narcotoline

CAS Registry Number: 521-40-4



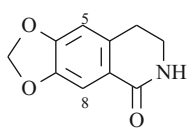
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver somniferum*
$C_{23}H_{27}NO_8$: 445.1737

Mp: 145–146°C [1]
UV: 220, 271, 288 sh [2]
IR($CHCl_3$): 3340, 1683, 1583, 1253, 1089, 1059, 995 [3]
^{1}H NMR: 2.25(6H, s, $N(CH_3)_2$), 3.86, 3.89, 3.97(each 3H, s, 3 × OCH_3), 4.22(2H, s), 5.90(2H, s, CH_2O_2), 6.46(1H, s), 6.99, 7.84(each 1H, d, J = 8.5) [2]
HPLC: [4]

References

1. B. Proksa, J. Cerny, J. Putek, Pharmazie **34**, 194 (1979)
2. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 24 (Academic, New York, 1985), p. 253
3. G. Blasko, D.J. Gula, M. Shamma, J. Nat. Prod. **45**, 105 (1982)
4. M. Johansson, D. Westerlund, J. Chromatogr. **452**, 241 (1988)

Noroxohydrastinine



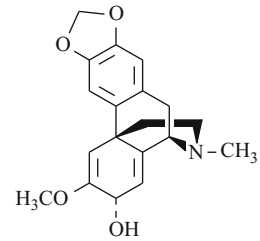
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis heteropoda, B. nummularia*
$C_{10}H_9NO_3$: 191.0582
Mp: 184–185°C (MeOH) [1]
Solubility: very sol. $CHCl_3$; spar. sol. EtOH, MeOH [1]
UV: 226, 265, 308(4.17, 3.92, 4.04) [1]
IR: 3180, 1670 [1]
MS *m/z*: 191(M^+), 162, 134, 104 [1]
^{1}H NMR: 2.85(2H, t, J = 7), 3.52(2H, t, J = 7), 5.96(2H, s, CH_2O_2), 6.61(1H, s, H-5), 7.51(1H, s, H-8) [1]

References

1. M.M. Yusupov, A. Karimov, I.A. Israilov, R. Shakirov, Dep. VINITI, 1640-B92; RZh. Khim. 1992, 17E113

Nudaurine

CAS Registry Number: 4850-04-8



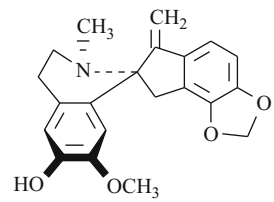
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver croceum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 199–200°C (Me_2CO) [1]
$[\alpha]_D$ −41° (MeOH) [1]
UV: 244, 292 [1]
IR: 3500–3100, 1665, 1630, 1515, 1495, 1030, 935 [1]
MS *m/z*: 327(M^+, 100), 326, 312, 310, 309, 294 [1]
^{1}H NMR: 1.30-3.45(7H, m), 2.25(3H, s, NCH_3), 3.60(3H, s, OCH_3), 4.53, 5.62(each 1H), 5.13(1H, s), 5.80(2H, s, CH_2O_2), 6.46, 6.71(each 1H, s, *p*–H–Ar) [1]

References

1. F. Veznik, I.A. Israilov, E. Taborska, J. Slavik, Collect. Czech. Chem. Commun. **50**, 1745 (1985)

Ochotensine

CAS Registry Number: 4959-88-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

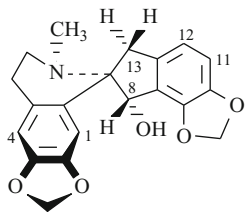
Biological sources: *Corydalis vaginans*
$C_{21}H_{21}NO_4$: 351.1471
Mp: 241–242°C [1]
$[\alpha]_D$+51°
UV: 284 [2]
IR: 1650, 1600 [3]
MS *m/z*: 351(M^+), 350, 349, 348, 336, 334, 323, 322, 321, 320, 308, 306, 305, 191, 190, 189, 176, 148, 103, 102, 99, 94, 83, 78, 77, 76, 65, 63 [3]
X-ray: [4]
Abs. conf.: [2]

References

1. N.N. Margvelashvili, Author's Abstract of Candidate's Dissertation, Moscow, 1979
2. M. Shamma, J.L. Moniot, R.H.F. Manske, W.K. Chan, K. Nakanishi, J. Chem. Soc. Chem. Commun. 310 (1972)
3. S. McLean, M.-S. Lin, R.H.F. Manske, Can. J. Chem. **44**, 2449 (1966)
4. S. McLean, M.-S. Lin, A.C. McDonald, J. Trotter, Tetrahedron Lett **2**, 185 (1966)

Ochrobirine

CAS Registry Number: 24181-64-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis vaginans*
$C_{20}H_{19}NO_6$: 369.1212
Mp: 204°C [1]
$[\alpha]_D$+36° ($CHCl_3$) [1]
UV: 205, 240, 291 [2]
IR: 3585, 3300 [2]
MS *m/z*: 369(M^+), 351, 322, 190 [2]
^{1}H NMR: 2.67(3H, s, NCH_3), 2.50–3.50(4H, m), 4.88, 5.42(each1H, s), 5.81, 6.00(each 2H, s, 2 × CH_2O_2), 6.04, 6.62(each1H, s, *p*–H–Ar), 6.85(2H, s, *o*–H–Ar) [2]
^{13}C NMR: [3]

Table 1

C-1	109.7	C-8	73.4	C-13	79.5
2	146.2	8a	121.5	14	75.2
3	146.8	9	144.7	14a	129.5
4	110.0	10	148.6	NCH_3	37.7
4a	126.0	11	107.1	2,3-OCH_2O	101.0
5	22.8	12	116.1	9,10-OCH_2O	101.9
6	47.6	12a	140.0		

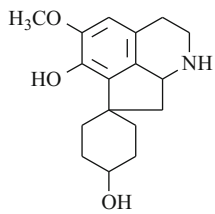
X-ray: [4]
Abs. conf.: [5]

References

1. N.N. Margvelashvili, Author's Abstract of Candidate's Dissertation, Moscow, 1979
2. R.H.F. Manske, R.G.A. Rodrigo, D.B. McLean, D.E.F. Gracey, J.K. Saunders, Can. J. Chem. **47**, 3589 (1969)
3. D.W. Hughes, B.C. Nalliah, H.L. Holland, D.B. McLean, Can. J. Chem. **55**, 3304 (1977)
4. M. Mathew, G. Palenik, Acta Cryst. **31**, 2899 (1975)
5. M. Shamma, J.L. Moniot, R.H.F. Manske, W.K. Chan, K. Nakanishi, J. Chem. Soc. Chem. Commun. 310 (1972)

Oridine (Oreoline)

CAS Registry Number: 17366-36-8



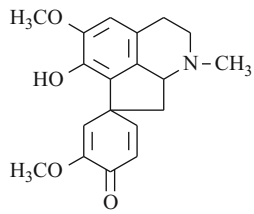
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver lisae*
$C_{17}H_{23}NO_3$: 289.1678
Mp: 234–235°C (Me_2CO) [1]
$[\alpha]_D$−83° (EtOH) [1]
UV: 205, 231, 286 [1]

IR: 3380, 3200 [1]
MS *m/z*: 289(M^+), 288(100), 260, 242, 191 [1]
^{1}H NMR: 2.60–3.84(14H, m), 3.75(3H, s, OCH_3), 4.05(1H, m), 6.48(1H, s) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)

Orientalinone (Bracteine)



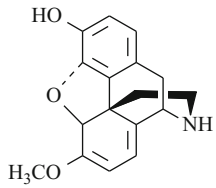
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver bracteatum, P. pseudo-orientale*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 227–229°C [1]
$[\alpha]_D$ +120° ($CHCl_3$) [1]
UV: 230, 242, 284 [1]
MS *m/z*: 327(M^+), 326, 298, 284 [1]
^{1}H NMR: 2.38(3H, s, NCH_3), 3.70, 3.77(each 3H, s, 2 × OCH_3), 5.92(1H, d, J = 2.5), 6.33(1H, d, J = 9), 6.54(1H, s), 6.54(1H, q) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)

Oripavidine

CAS Registry Number: 7168-66-3



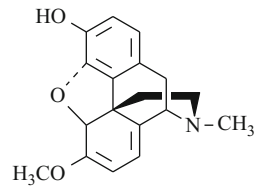
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver orientale*
$C_{17}H_{17}NO_3$: 283.1208
Mp: 215°C (dec.) [1]
$[\alpha]_D$ −90° (MeOH) [1]
Solubility: very sol. MeOH, EtOH, alk.; spar. sol. Et_2O, C_6H_6, $CHCl_3$, Py, C_6H_{14} [1]
UV: 207, 228, 286 [1]
IR: 3430, 1605 [1]
^{1}H NMR(CD_3OD): 1.50–3.50(7H, m), 3.53(3H, s, OCH_3), 5.10, 5.68(each 1H, d, J = 8), 5.29(1H, s), 6.45, 6.56(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. I.A. Israilov, O.N. Denisenko, M.S. Yunusov, S.Yu. Yunusov, D.A. Murav'eva, Chem. Nat. Comp. **13**, 600 (1977)

Oripavine

CAS Registry Number: 467-04-9



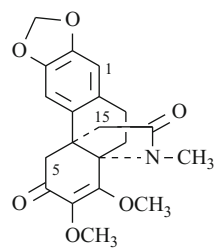
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Papaver bracteatum, P. orientale*
$C_{18}H_{19}NO_3$: 297.1365
Mp: 201–202°C (EtOH), 208°C (methiodide., MeOH) [1]
$[\alpha]_D$ −232° ($CHCl_3$) [1]
UV: 285 [2]
MS *m/z*: 297(M^+), 296, 282, 266, 254, 241 [2]
^{1}H NMR: 2.38(3H, s, NCH_3), 3.52(3H, s, OCH_3), 4.98, 5.52(each 1H, d, J = 8), 5.20(1H, s), 6.45, 6.60(each 1H, d, J = 9, *o*–H–Ar) [2]
HPLC: [3]

References

1. V.V. Kiselev, R.A. Konovalova, Zh. Obshch. Khim. **18**, 855 (1948)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
3. J. Milo, A. Levy, D. Palevitch, G. Ladizinsky, J. Chromatogr. **452**, 563 (1988)

16-Oxodelavayine

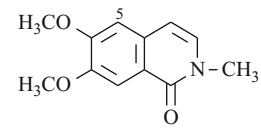


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania delavayi*
$C_{20}H_{21}NO_6$: 371.1369
Mp: 221–222°C (MeOH) [1]
$[\alpha]_D$ −180° ($CHCl_3$) [1]
UV: 242, 268(3.79, 4.05) [1]
IR: 1686, 1670, 1605, 1510, 1490 [1]
^{1}H NMR: 2.10–2.35(2H, m, H-9), 2.50–2.80(4H, m, H-10, H-15), 2.66, 2.90(each 1H, d, J = 16, H-5), 2.96(3H, s, NCH_3), 3.66(3H, s, 7-OCH_3), 4.10(3H, s, 8-OCH_3), 5.88(2H, s, CH_2O_2), 6.46, 6.64(each 1H, s, H-1, H-4) [1]

References

1. T.N. Il'inskaya, M.E. Perel'son, I.I. Fadeeva, D.A. Fesenko, O.N. Tolkachev, Chem. Nat. Comp. **8**, 134 (1972)

1-Oxo-6,7-dimethoxy-2-methyl-1,2-dihydroisoquinoline

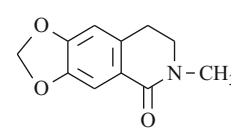


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Thalictrum isopyroides*
$C_{12}H_{13}NO_3$: 219.0895
Mp: 104–105°C (Et_2O) [1]
UV: 249, 268 sh, 271, 283, 294, 324, 330 sh [1]
IR: 1658 [1]
MS *m/z*: 219(M^+), 204, 190, 176, 109.5($^{++}$) [1]
^{1}H NMR: 3.67(3H, s, NCH_3), 3.93(6H, s, 2 × OCH_3), 6.68, 7.06(each 1H, d, J = 7, H-4, H-3), 6.88(1H, s, H-5), 7.65(1H, s, H-8) [1]

References

1. S. Abdizhabbarova, S.Kh. Maekh, S.Yu. Yunusov, M.R. Yagudaev, D. Kurbanov, Chem. Nat. Comp. **14**, 400 (1978)

Oxohydrastinine



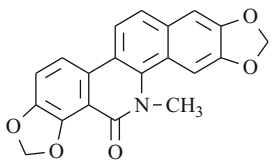
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria schleicheri*
$C_{11}H_{11}NO_3$: 205.0739
Mp: 96–97°C (pet. ether) [1]
IR: 1645, 1600, 1510 [1]
MS *m/z*: 205(M^+, 100), 162, 134, 104, 76 [1]
^{1}H NMR: 2.80, 3.50(each 2H, m), 3.05(3H, s, NCH_3), 5.96(2H, s, CH_2O_2), 6.51, 7.40(each 1H, s, *p*–H–Ar) [1]

References

1. S.S. Markosyan, T.A. Tsulikyan, V.A. Mnatsakanyan, Arm. Khim. Zh. **29**, 1053 (1976)

Oxosanguinarine

CAS Registry Number: 548-30-1



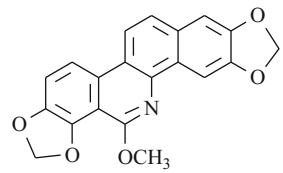
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Bocconia frutescens, Corydalis ledebouriana, C. paniculigera, Fumaria capreolata, F. parviflora, Hylomecon vernalis, Macleaya cordata, M. microcarpa, Papaver croceum, P. rhoeas*
$C_{20}H_{13}NO_5$: 347.0794
Mp: 365–366°C ($CHCl_3$–MeOH) [1]
UV: 248, 280 sh, 289, 331, 348, 370, 382 [1]
IR: 1655 [1]
MS *m/z*: 347(M^+, 100), 346, 318, 289, 203, 159, 69, 44 [1]
^{1}H NMR: 3.90(3H, s, NCH_3), 6.11, 6.28(each 2H, s, 2 × CH_2O_2), 7.17–8.15(6H, m) [1]

References

1. B.D. Krane, M.O. Fagbule, M. Shamma, B. Gozler, J. Nat. Prod. **47**, 1 (1984)

Pancorine

CAS Registry Number: 80559-46-2



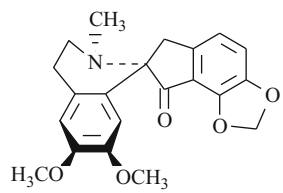
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis paniculigera*
$C_{20}H_{13}NO_5$: 347.0794
Mp: 254–256°C (dec.) [1]
UV: 245, 270, 288, 297 (inflection), 325 [1]
IR: 1640, 1610, 1580, 1505, 1045, 940 [1]
MS *m/z*: 347(M^+) [1]
^{1}H NMR(CF_3COOH): 3.78(3H, s, OCH_3), 5.74, 6.02(each 2H, s, 2 × CH_2O_2), 6.82–7.76(6H, m, H–Ar) [1]

References

1. M. Alimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Khim. Prirod. Soedin. 671 (1981)

Parfumidine

CAS Registry Number: 31225-67-9



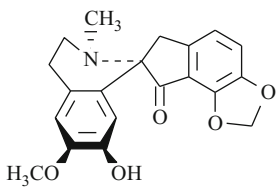
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria parviflora*
$C_{21}H_{21}NO_5$: 367.1420
Mp: 170–171°C [1]
$[\alpha]_D$ +33° ($CHCl_3$) [1]
UV: 235, 263, 290, 360 [1]
IR: 1720, 1620, 1520, 1020, 915 [1]
MS *m/z*: 367(M^+), 352, 338, 324, 308, 183.5($^{++}$) [1]
^{1}H NMR: 2.28(3H, s, NCH_3), 2.60–3.60(6H, m), 3.52, 3.77(each 3H, s, 2 × OCH_3), 6.07(2H, s, CH_2O_2), 6.13, 6.52(each 1H, s, *p*–H–Ar), 6.83, 7.03(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 518 (1970)

Parfumine

CAS Registry Number: 28230-70-8

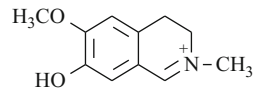


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria parviflora, F. vaillantii*
$C_{20}H_{19}NO_5$: 353.1263
Mp: 111–112°C (dec.)
$[\alpha]_D$ +18° ($CHCl_3$) [1]
Solubility: spar. sol. Me_2CO, Et_2O; very sol. EtOH, $CHCl_3$ [1]
UV: 235, 260, 290, 358 [1]
IR: 3420, 3100, 1710, 1610, 1505, 1030, 920 [1]
MS *m/z*: 353(M^+), 338, 324, 308 [1]
^{1}H NMR: 2.27(3H, s, NCH_3), 2.60–3.60(6H, m), 3.71(3H, s, OCH_3), 6.03(2H, s, CH_2O_2), 6.18, 6.48(each 1H, s, *p*–H–Ar), 6.77, 6.99(each 1H, d, J = 8, *o*–H–Ar) [1]
X-ray: [2]
HPLC: [3]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, DAN SSSR **189**, 1262 (1969)
2. S.M. Nasirov, L.G. Kuz'mina, Yu.T. Struchkov, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 55 (1980)
3. I. Valka, V. Simanek, J. Chromatogr. **445**, 258 (1988)

Picnarrine



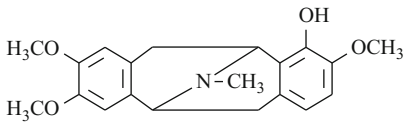
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis stricta*
$C_{11}H_{14}N^+O_2$: 192.1024
Mp: 206°C (iodide, MeOH–$CHCl_3$) [1]
Solubility: spar. sol. $CHCl_3$, MeOH, EtOH [1]
UV: 217, 252, 313, 370 [1]
IR: 3320, 3225, 1675, 1610, 1580 [1]
MS *m/z*: 192, 178, 175, 160, 142, 127 [1]
^{1}H NMR(CF_3COOH): 3.31(3H, s, NCH_3), 3.40–4.00(4H, m), 3.62(3H, s, OCH_3), 6.50, 6.86, 8.04(each 1H, s, 3 × H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)

Platycerine

CAS Registry Number: 18826-68-1

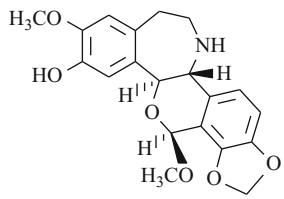


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Argemone hybrida, A. platyceras*
$C_{20}H_{23}NO_4$: 341.1627
Mp: amorph. [1]
$[\alpha]_D$ −260° ($CHCl_3$) [1]
UV: 283 [1]
MS *m/z*: 341(M^+), 340, 204(100), 190 [1]
^{1}H NMR: 2.51(3H, s, NCH_3), 3.71(3H, s, OCH_3), 3.78(6H, s, 2 × OCH_3), 3.91, 4.39(each 1H, d, J = 6), 6.40, 6.63(each 1H, s, *p*–H–Ar), 6.51, 6.61(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)

Porfirocsine



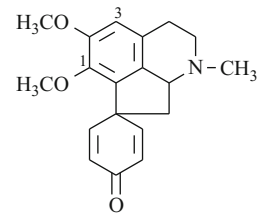
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver somniferum*
$C_{19}H_{25}NO_6$: 363.1682
Mp: 187–190°C [1]
$[\alpha]_D$ −140° ($CHCl_3$) [1]
IR: 3460, 2925, 2835, 1600, 1518, 1468, 1375, 1330, 1290, 1255, 1220, 1200 [1]
MS *m/z*: 363(M^+), 348(100), 179 [1]

References

1. I.A. Bessonova, Z.Sh. Faizutdinova, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 721 (1970)

Pronuciferine

Related CAS Registry Numbers(s): 32410-24-5



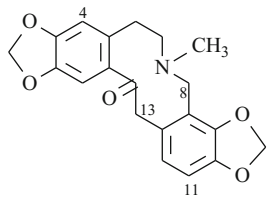
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis sibirica*
$C_{19}H_{21}NO_3$: 311.1521
Mp: 162–163°C, 223°C (hydrochloride) [1]
UV: 236 sh, 287(4.87, 4.30) [1]
MS *m/z*: 311(M^+, 100), 310, 282(5), 268(50), 253, 237, 225 [1]
^{1}H NMR: 2.32(3H, s, NCH_3), 3.52(3H, s, 1-OCH_3), 3.72(3H, s, 2-OCH_3), 6.22(1H, dd, J = 10.2, 2), 6.37(1H, dd, J = 10.2, 2), 6.55(1H, H-3), 6.74(1H, dd, J = 9.5, 3), 6.87(1H, dd, J = 9.5, 3) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)

Protopine

CAS Registry Number: 130-86-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Argemone alba, A. albiflora, A. hybrida, A. mexicana, A. ochroleuca, A. platyceras, Bocconia frutescens, Chelidonium majus, Corydalis caucasica, C. emanuelii, C. fedtschenkoana, C. fimbrillifera, C. gigantea, C. glaucescens, C. gortschakovii, C. intermedia, C. ledebouriana, C. marschalliana, C. paczoskii, C. paniculigera, C. persica, C. pseudoadunca, C. remota, C. rosea, C. rosea-purpurea, C. sewerzowii, C. stricta, C. vaginans, Dicentra peregrina, D. spectabilis, Dicranostigma franschetianum, D. lactucoides, D. leptopodum, Eschscholtzia californica, Fumaria capreolata, F. micrantha, F. officinalis, F. parviflora, F. schleicheri, F. vaillantii, Glaucium corniculatum, G. elegans, G. fimbrilligerum, G. flavum, G. grandiflorum, G. oxylobum, G. squamigerum, Hylomecon vernalis, Hypecoum erectum, H. lactiflorum, H. pendulum, H. trilobum, Macleaya cordata, M. microcarpa, Papaver croceum, P. hydridum, P. lisae, P. oreophilum, P. orientale, P. pavoninum, P. persicum, P. somniferum, Roemeria hybrida, Thalictrum amurense*

$C_{20}H_{19}NO_5$: 353.1263

Mp: 205–206°C ($CHCl_3$–EtOH)

UV: 239, 291 [1]

IR: 1660 [1]

MS *m/z*: 353(M^+), 206, 148(100) [1]

^{1}H NMR: 1.97(3H, s, NCH_3), 2.80–3.80(8H, m), 5.92, 5.98(each 2H, s, 2 × CH_2O_2), 6.63, 6.95(each 1H, s, H-1, H-4), 6.69(2H, s, H-11, H-12) [1]

^{13}C NMR: [2]

Table 1

C-1	107.5	C-6	57.4	C-12a	128.5
2	145.9	8	50.4	13	46.0
3	147.5	8a	117.5	14	194.1
4	109.9	9	145.5	14a	132.2
4a	135.8	10	145.5	NCH_3	40.9
5	31.2	11	106.1	2,3-CH_2O_2	100.6
		12	124.6	9,10-CH_2O_2	100.3

X-ray: [3]

HPLC: [4]

Pharm./Biol.: Hypotensive [5], bile-stimulating [6], spasmolytic [7], and pronounced antiarrhythmic action [5]. Superior to novocainamid and quinidine

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
2. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 18 (Academic, New York, 1981), p. 217
3. S.R. Hall, F.R. Ahmed, Acta Cryst. **24B**, 337 (1968)
4. H. Liang-Feng, W. Nowicky, V. Gutmann, J. Chromatogr. **543**, 123 (1991)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 221
6. A. Nabiev, K.L. Badalyan, B.N. Sirov, Chemistry and Farmacy [in Russian] **3**, 40 (1999)
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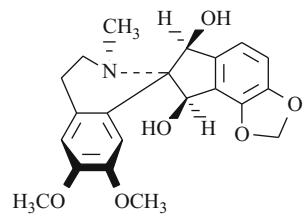
(±) – Raddeanine

CAS Registry Number: 64234-40-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

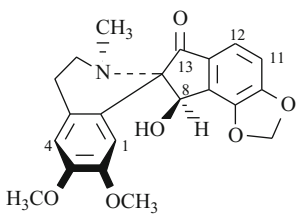
Biological sources: *Corydalis ledebouriana*
$C_{21}H_{23}NO_6$: 385.1525
Mp: 219–220°C (MeOH–$CHCl_3$) [1]
$[\alpha]_D$ ±0° [1]
IR: 3540, 3520, 1515, 1040, 930, 920 [1]
MS *m/z*: 385(M^+), 370, 367, 352, 338, 324, 308, 206 [1]
^{1}H NMR: 2.56(3H, s, NCH_3), 3.35, 3.78(each 3H, s, 2 × OCH_3), 5.19, 5.39(each 1H, s), 5.94(2H, s, CH_2O_2), 6.11, 6.61(each 1H, s, *p*–H–Ar), 6.76, 6.88(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 366 (1977)

Raddeanone

CAS Registry Number: 59654-08-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana*
$C_{21}H_{21}NO_6$: 383.1369
Mp: 168–170°C
UV: 238, 289, 313 [2]
IR: 3570, 1720 [2]
MS *m/z*: 383(M^+), 368, 338, 220, 206, 191.5($^{++}$)
^{1}H NMR: 2.31(3H, s, NCH_3), 3.45, 3.77(each 3H, s, 2 × OCH_3), 5.55(1H, s), 6.18(2H, s, CH_2O_2), 6.03, 6.66(each 1H, s, *p*–H–Ar), 7.01, 7.53(each 1H, d, J = 8, *o*–H–Ar) [1, 2]
^{13}C NMR: [3]

Table 1

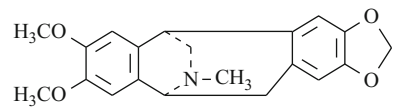
C-1	110.7	C-8	70.1	C-13	201.7
2	147.2	8a	132.9	14	76.9
3	148.9	9	145.0	14a	129.7
4	112.5	10	154.5	NCH_3	39.6
4a	124.0	11	110.4	9,10-OCH_2O	103.1
5	28.5	12	119.5	2-OCH_3	56.1
6	48.9	12a	132.5	3-OCH_3	56.0

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp **11**, 284 (1975). **13**, 366 (1977)
2. T. Kametani, M. Takemura, M. Ihara, K. Fukumoto, J. Chem. Soc. Perkin. Trans. I 390 (1977)
3. D.W. Hughes, B.C. Nalliah, H.L. Holland, D.B. McLean, Can. J. Chem. **55**, 3304 (1977)

Reframine

CAS Registry Number: 21305-35-1



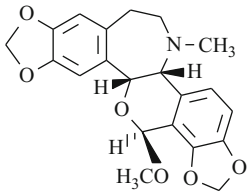
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Roemeria refracta*
$C_{20}H_{21}NO_4$: 339.1471
Mp: oil [1]
$[\alpha]_D$ −162°C ($CHCl_3$) [1]
UV: 228, 290 [1]
MS *m/z*: 339(M^+), 338, 324, 308, 296, 253, 204, 188 [1]
^{1}H NMR: 2.45(3H, s, NCH_3), 3.76(6H, s, 2 × OCH_3), 5.78(2H, s, CH_2O_2), 6.45, 6.65, 6.75, 6.80(each 1H, s, 4 × H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)

Rhoeadine

CAS Registry Number: 2718-25-4



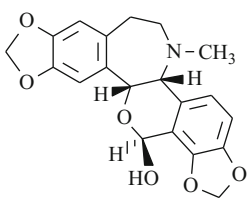
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver rhoeas*
$C_{21}H_{21}NO_6$: 383.1369
Mp: 252–254°C (MeOH) [1]
$[\alpha]_D$ +306° ($CHCl_3$) [1]
UV: 204, 236, 286
MS *m/z*: 383, 368, 353, 220, 177(100) [2]
Abs. conf.: [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
2. L. Dolejs, V. Hanus, Collect. Czech. Chem. Commun. **32**, 2997 (1967)
3. F. Santavy, J. Hrbek, K. Blaha, Collect. Czech. Chem. Commun. **32**, 4452 (1967)

Rhoeagenine

CAS Registry Number: 5574-77-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver zangezuricum*
$C_{20}H_{19}NO_6$: 369.1212
Mp: 231–232°C (EtOH) [1]
$[\alpha]_D$ +130° ($CHCl_3$) [1]
UV: 243, 290
MS *m/z*: 369(M^+), 206, 192, 163 [2]
^{1}H NMR: 2.25(3H, s, NCH_3), 3.54, 5.00(each 1H, d, J = 2), 5.80(1H, s), 5.88, 6.01(each 2H, s, 2 × CH_2O_2), 6.05, 6.58(each 1H, s, *p*–H–Ar), 6.73(2H, s, *o*–H–Ar) [1]
Abs. conf.: [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
2. L. Dolejs, V. Hanus, Collect. Czech. Chem. Commun. **32**, 2997 (1967)
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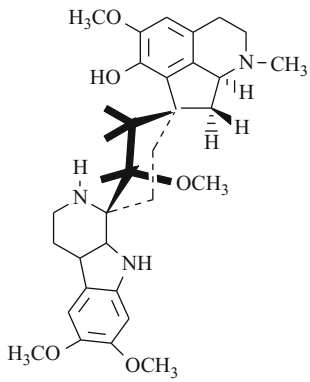
Roemeridine

CAS Registry Number: 122890-33-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Roemeria hybrida*
$C_{31}H_{39}N_3O_5$: 533.2890
Mp: 228–230°C (Me_2CO) [1], 241–243°C (dec., MeOH–Me_2CO) [2, 3]
$[\alpha]_D$ −37° (MeOH) [2]; −21° (MeOH) [3]
UV: 220, 273, 291 [2]
IR: 3350, 3290, 1608–1565 [2]
MS *m/z*: 533(M^+), 518, 257, 244(100), 230, 229, 216, 215 [2]
^{1}H NMR: 1.65(1H, m, J = 11.2), 1.92(2H), 1.93(2H), 2.09(1H, dd, J = 14, 3.7), 2.20(1H, dd, J = 14, 7.4), 2.38(3H, s, NCH_3), 2.45(1H, ddd, J = 11.7, 11.6; 5.2), 3.46(3H, s, OCH_3), 3.76(1H, dd, J = 7.4, 3.7), 3.92(3H, s, OCH_3), 3.93(6H, s, 2 × OCH_3), 6.56(1H, s), 6.91(1H, s), 6.95(1H, s) [2]
^{13}C NMR: quartet: 43.5(NCH_3), 56.5(3 × OCH_3), 57.3(OCH_3); triplet: 23.0, 27.4, 31.5, 32.2, 34.0, 39.0, 55.9; doublet: 65.3, 80.3, 95.1, 100.5; singlet: 47.0, 55.9, 109.7, 120.0, 123.0, 129.6, 132.3, 134.8, 136.8, 139.4, 144.8, 146.5, 146.9 [2]
X-ray: [2]

References

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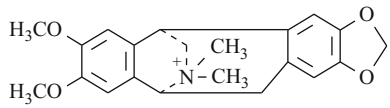
Roemrefine

CAS Registry Number: 26012-99-7



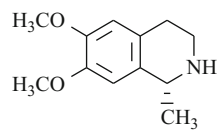
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Roemeria refracta*
$C_{21}H_{24}N^+O_4$: 354.1705
Mp: 242°C (chloride, Me_2CO–EtOH), 245°C (iodide, water-MeOH) [1]
$[\alpha]_D$ −147° (H_2O) [1]
UV: 294 [1]
^{1}H NMR: 2.90, 3.38(each 3H, s, $N(CH_3)_2$), 3.83, 3.88(each 3H, s, 2 × OCH_3), 5.72, 5.84(each 1H, s, CH_2O_2), 6.28, 6.67, 7.05, 7.17(each 1H, s, 4 × H–Ar) [1]

References

1. M.S. Yunusov, S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 193 (1968)

(−) – Salsolidine (O-Methylsalsoline, N-Norcarnegine)

CAS Registry Number: 493-48-1



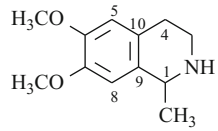
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Salsola pestifer, S. richteri*
$C_{12}H_{17}NO_2$: 207.1255
Mp: 71–72°C (Et_2O), 60–61°C (H_2O), 231°C (hydrochloride), 195°C (picrate), 221°C (picrolonate) [1]
$[\alpha]_D$ −53° (EtOH)
Solubility: very sol. EtOH, Me_2CO, $CHCl_3$; sol. Et_2O, H_2O [1]
X-ray(hydrochloride $2H_2O$): [2]

References

1. A.P. Orekhov, N.F. Proskurnina, Zh. Obshch. Khim. **9**, 415 (1939)
2. H.L. Ammon, S.M. Prasad, D.M. Barnhart, V.K. Syal, K. El-Sayed, G.M. Wassel, Acta Cryst. Sect. C. Cryst. Struct. Commun. **43**, 567 (1987). C. A., **108**, 94819 (1988)

(±) – Salsolidine

CAS Registry Number: 38520-68-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Salsola richteri*
$C_{12}H_{17}NO_2$: 207.1259
Mp: 52–53°C [1], 195°C (hydrochloride)
UV: 212, 232, 285(4.08, 3.99, 3.84) [2]
IR: 3540, 3320, 1625, 1535, 1040 [3]
MS *m/z*: 207(M^+, 2), 206(14), 192(100), 163(7), 162(3), 154(6), 153(17), 151(5), 149(8), 133(4), 43(21) [2]
^{1}H NMR: 1.35(1-CH_3), 3.92(6H, 2 × OCH_3), 6.30(2H, H-5, H-8) [2]
^{13}C NMR: [4]

Table 1

C-1	51.2	C-6	147.4	C-10	127.1
3	41.9	7	147.5	CH_3	22.8
4	29.6	8	109.6	OCH_3	55.8
5	112.2	9	132.8	OCH_3	56.0

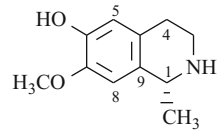
Pharm./Biol.: LD_{50} 170 mg/kg (i/v, mice). In a dose of 1 mg/kg, raises arterial pressure, and in a dose of 10–30 mg/kg, lowers it. Spasmolytic action. Polymeric derivatives possess the same properties [5]

References

1. A.P. Orekhov, N.F. Proskurnina, Zh. Obshch. Khim. **9**, 415 (1939)
2. S. Ghosal, R.S. Srivastava, Phytochemistry **12**, 193 (1973)
3. M.D. Menachery, G.L. Lavamer, M.L. Wetherly, H. Guinaudeau, M. Shamma, J. Nat. Prod. **49**, 745 (1986)
4. C. Verchere, D. Rousselle, C. Viel, Org. Magn. Reson. **11**, 395 (1978)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 107

(+) – Salsoline

CAS Registry Number: 89-31-6

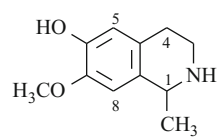


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Salsola pestifer, S. richteri*
$C_{11}H_{15}NO_2$: 193.1103
Mp: 215–216°C, 172°C (hydrochloride), 196°C (tartrate) [1]
$[\alpha]_D$ +40° (H_2O)
UV(HCl, i-PrOH): 204, 227, 284, 286(4.60, 3.77, 3.55, 3.55) [2]
^{1}H NMR: 1.59(3H, d, J = 7, 1-CH_3), 2.88(2H, m, H-4), 3.28(2H, s, H-3), 3.77(3H, s, OCH_3), 6.61, 6.78(each 1H, s, H-5, H-8) [2]
X-ray(hydrochloride H_2O) [3]

References

1. N. Proskurnina, A. Orekhov, Bull. Soc. Chim. France **4**, 1265 (1937)
2. M.D. Menachery, G.L. Lavanier, M.L. Wetherly, H. Guinaudeau, M. Shamma, J. Nat. Prod. **49**, 745 (1986)
3. H.L. Ammon, S.M. Prasad, D.M. Barnhart, V.K. Syal, K. El-Sayed, G.M. Wassel, Acta Cryst. Sect. C: Cryst. Struct. Commun **43**, 567 ((1987). *C.A.*, **108**, 94819 (1988)

(±) – Salsoline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Salsola richteri*
$C_{11}H_{15}NO_2$: 193.1099
Mp: 217–219°C, 203°C (hydrochloride), 195°C (picrate), 233°C (picrolonate) [1]
$[\alpha]_D$ 0°
UV: 226, 285(3.79, 3.55) [2]
IR: 3280, 1608, 1535, 1323, 1302, 1263, 1254, 1220, 1181, 1137, 1118, 1099, 1067, 1042, 1030, 1012, 923, 867, 841, 811, 798, 743, 732, 720 [2]
MS *m/z*: 193(M^+, 3), 192(12), 178(100), 164(5), 163(17), 149(11), 134(7), 122(6), 43(25) [3]
^{1}H NMR: 1.38(3H, d, 1-CH_3), 3.88(3H, s, OCH_3), 4.16(1H, d, H-1), 6.22(2H, s, H-5, H-8)
Pharm./Biol.: LD_{50}(hydrochloride) 370 mg/kg. Small doses cause transitory hypertension. High doses lower pressure, stimulate respiration, and reduce diuresis with retention of chlorides. (The hydrochloride) is used in the treatment of hypertonic disease and spasms of the vessels of the brain [4]

References

1. A. Orechoff, E. Spath, F. Kuffner, Chem. Ber. **67**, 1214 (1934)
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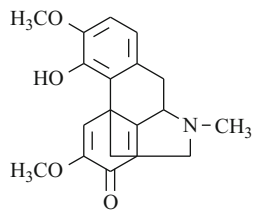
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 105

Salutaridine (Floripavine)

CAS Registry Number: 1936-18-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver bracteatum, P. floribundum, P. fugax, P. pseudo-orientale, P. urbanianum*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 200–201°C (EtOH) [1]
$[\alpha]_D$ +90° ($CHCl_3$) [1]
UV: 241, 276 [1]
IR: 3550, 1675, 1647, 1618 [1]
MS *m/z*: 327(M^+, 100), 326, 312, 299, 283 [1]
^{1}H NMR: 1.90–3.50(7H, m), 2.37(3H, s, NCH_3), 3.74, 3.83(each 3H, s, 2 × OCH_3), 6.22, 7.45(each 1H, s), 6.77(2H, s) [1]
ORD: [2]
CD: [2]
HPLC: [3]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
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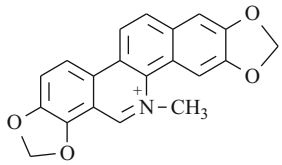
Sanguinarine

CAS Registry Number: 2447-54-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Argemone alba, A. hybrida, A. mexicana, A. ochroleuca, A. platyceras, Bocconia cordata, B. frutescens, Chelidonium majus, Corydalis caucasica, C. fedtschenkoana, C. gigantea, C. ledebouriana, C. marschalliana, C. paniculigera, C. persica, C. pseudoadunca,*

C. remota, C. sewerzowii, C. stricta, C. vaginans, Dicentra peregrina, D. spectabilis, Dicranostigma franschetianum, D. lactucoides, D. leptopodum, Eschscholtzia californica, Fumaria officinalis, F. parviflora, Glaucium corniculatum, G. elegans, G. fimbrilligerum, G. flavum, G. grandiflorum, G. squamigerum, Hypecoum trilobum, Macleaya cordata, M. microcarpa, Papaver bipinnatum, P. bracteatum, P. ocellatum, P. paczoskii

$C_{20}H_{14}NO_4$: 332.0923

Mp: 242–243°C (MeOH)

UV: 240, 285, 330 [1]

UV(chloride): 236, 285, 328, 352 sh, 400, 476 [2]

IR(chloride): 3560, 3360, 1662, 1647, 1617, 1595, 1537, 1524, 1499, 1331, 1307, 1278, 1251, 1234, 1220, 1205, 1176, 1160, 1126, 1105, 1030, 1008, 978, 965, 915, 868, 843, 834, 804, 789 [2]

MS *m/z*: 332(M^+), 317(100) [1]

^{1}H NMR(CF_3COOH): 4.55(3H, s, NCH_3), 5.78, 6.04(each 2H, s, 2 × CH_2O_2), 7.00, 7.53(each 1H, s, *p*–H–Ar), 7.41, 7.68, 7.94, 8.05(each 1H, d, J = 9, 4 × *o*–H–Ar) [1]

HPLC: [3]

Pharm./Biol.: Is an effective agent in the treatment of inflammatory diseases of the external and middle ear [4], the mucous lining of the oral cavity [5], and infected wounds and ulcers [6]. As an anticholinesterase drug, is desirably used in infantile neurological practice in the treatment of patients with infantile cerebral paralyses in combination with various amino acids [7]. The drug Sanguiritrinum – a mixture of (the bisulfates) of sanguinarine and chelerythrine – possess antimicrobial and anticholinesterae activity. Is used in the treatment of lesions of the skin and mucous membranes and in myopathies. Supplied in the form of a 1% liniment, 1% aqueous and 0.2% alcoholic solns., and 0.005 g tablets [8]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Akhmedzhanova, V.I. Vinogradova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
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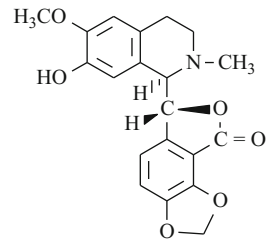
Severtzine

CAS Registry Number: 59272-73-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids

Biological sources: *Corydalis ledebouriana, C. sewerzowii*

$C_{20}H_{19}NO_6$: 369.1212

Mp: 94–95°C (dec., MeOH)

$[\alpha]_D$ −52° ($CHCl_3$)

UV: 221, 291, 326(4.45, 3.64, 3.76) [1]

IR: 3500, 1760, 1600, 1050, 920 [1]

MS *m/z*: 369(M^+), 192(100), 177, 149 [1]

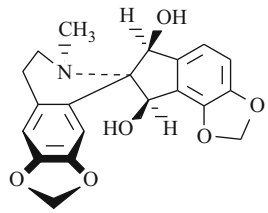
^{1}H NMR: 2.38(3H, s, NCH_3), 3.72(3H, s, OCH_3), 3.92, 5.54(each 1H, d, J = 3.8), 6.00(2H, s, CH_2O_2), 6.37, 6.67(each 1H, s, *p*–H–Ar), 6.86, 7.02(each 1H, d, J = 8, *o*–H–Ar) [1]

Abs. conf.: 1R, 9R [2]

References

1. I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 826 (1975)
2. G.P. Moiseeva, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 82 (1978)

Severtzinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis sewerzowii*
$C_{20}H_{19}NO_6$: 369.1212
Mp: 90–91°C (dec., EtOH) [1]
$[\alpha]_D$ +109° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, Me_2CO, C_6H_6; spar. sol. MeOH [1]
UV: 290 [1]
IR: 3400, 1510, 1490, 1050, 930 [1]
MS *m/z*: 369(M^+), 336, 322(100), 292, 190 [1]
^{1}H NMR: 2.47(3H, s, NCH_3), 2.50–3.50(4H, m), 5.10, 5.33(each 1H, s), 5.76(2H, s, CH_2O_2), 5.92(2H, q, CH_2O_2), 6.14, 6.56(each 1H, s, *p*–H–Ar), 6.76(2H, s, *o*–H–Ar) [1]

References

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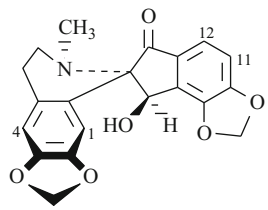
Sibiricine

CAS Registry Number: 24181-66-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Corydalis ledebouriana, C. paniculigera, C. pseudoadunca, C. sewerzowii*
$C_{20}H_{17}NO_6$: 367.1056
Mp: 224–225°C (EtOH)
UV: 205, 240, 291, 313 [1]
IR: 3560, 1710 [1]
MS *m/z*: 367(M^+), 352, 338, 322, 190, 183.5($^{++}$) [1]
^{1}H NMR: 2.43(3H, s, NCH_3), 2.50–4.00(4H, m), 5.57(1H, s), 5.84, 6.18(each 2H, s, 2 × CH_2O_2), 6.04, 6.54(each 1H, s, *p*–H–Ar), 7.01, 7.51(each 1H, d, J = 8, *o*–H–Ar) [1]
^{13}C NMR: [2]

Table 1

C-1	106.9	C-8	70.3	C-13	201.5
2	147.4	8a	132.7	14	77.2
3	147.4	9	146.1	14a	130.6
4	109.6	10	154.8	NCH_3	39.7
4a	125.0	11	110.9	2,3-OCH_2O	101.3
5	29.2	12	119.9	9,10-OCH_2O	103.2
6	48.9	12a	132.5		

X-ray: [3]

References

1. R.H.F. Manske, R. Rodrigo, D.B. McLean, D.E.F. Gracey, J. K. Saunders, Can. J. Chem. **47**, 3585 (1969)
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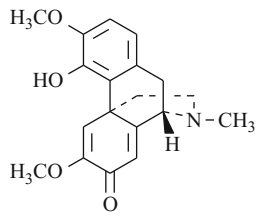
Sinoacutine

CAS Registry Number: 4090-18-0 (salutaridine)



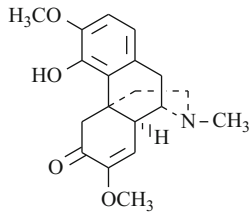
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania glabra, S. rotunda*
$C_{19}H_{21}NO_4$: 327.1471
Mp: 205–206°C [1], 180°C (hydrochloride), 226°C (picrate), 175°C (Ac)
$[\alpha]_D$ −70° ($CHCl_3$), $[\alpha]_D$ −116° (EtOH) [2], $[\alpha]_D$ −125° (EtOH)
UV: 242, 282(4.18, 3.60) [1]
IR: 3300, 1670 [1]
Pharm./Biol.: LD_{50} 115 mg/kg (i/p, mice). Possesses weak ganglioblocking properties [3]

References

1. I.I. Shchelchkova, T.N. Il'inskaya, A.D. Kuzovkov, Chem. Nat. Comp. **1**, 210 (1965)
2. J.C. Hsu, S.Y. Lo, J.H. Chu, Sci. Sinia **13**, 2016 (1964). *C. A.*, **62**, 9183 (1965)
3. V.V. Berezhinskaya, S.S. Nikitina, S.A. Trutneva, Trudy VILR [Proceedings of the All-Union Scientific Research Institute of Drugs], Drugs [in Russian], **14**, 58 (1971)

Sinomenine

CAS Registry Number: 115-53-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Menispermum dayricum*
$C_{19}H_{23}NO_4$: 329.1627
Mp: 161–162°C (Et_2O), 180–181°C (EtOH) [1], 231°C (hydrochloride), 231°C (hydrobromide), 218°C (nitrate), 233°C (hydroiodide), 217°C (perchlorate), 162°C (picrate) [1]
$[\alpha]_D$ −79° (EtOH)
Solubility: very sol. $CHCl_3$, MeOH; spar. sol. H_2O, pet. ether [1]
UV(hydrochloride): 262(3.69) [2]
IR(hydrochloride): 3370, 1700, 1642, 1496, 1283, 1205, 1150, 1056, 1000, 893, 792 [2]
^{13}C NMR: [3]

Table 1

C-1	117.9	C-7	152.3	C-13	40.5
2	109.1	8	115.3	14	45.7
3	145.2	9	56.6	15	35.8
4	144.8	10	24.4	16	47.1
5	49.1	11	130.3	NCH_3	42.5
6	193.4	12	122.7	3-OCH_3	55.8
				7-OCH_3	54.6

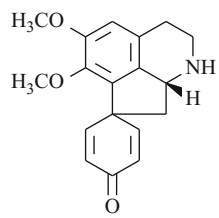
Pharm./Biol.: Hypotensive and weak ganglioblocking action [1]

References

1. T.N. Il'inskaya, Trudy VILAR [Proceedings of the All-Union Scientific Research Institute of Drugs], Drugs [in Russian], **11**, 51 (1959)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids*, vol. 2 (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1966), No. 251
3. V. Terui, K. Tori, S. Maeda, K. Sawa, Tetrahedron Lett. **16**, 2853 (1975)

Stepharine (Stefaglabrine)

CAS Registry Number: 2810-21-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania glabra*
$C_{18}H_{19}NO_3$: 297.1365

Mp: 179–180°C, 235°C (N–Ac) [1]
$[\alpha]_D$ +143° ($CHCl_3$) [1], $[\alpha]_D$ –80° ($CHCl_3$) [1]
UV: 209, 232, 284(4.53, 4.35, 3.35) [2]
IR: 3250, 1660, 1620 [2]
MS *m/z*: 297(M^+, 100), 296(43), 282(4), 268(63), 266(5) [3]; 297(M^+, 100), 296(43), 268(65), 253(15), 237(15), 225(13) [3]
Pharm./Biol.: LD_{50} 245 mg/kg (i/v, mice). Hypotensive action, anticholinesterase activity [4]. (Sulfate) is used in diseases of the peripheral nervous system. Supplied in 1 ml ampules of 0.25% soln. [5]

References

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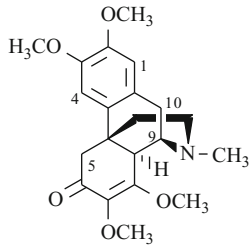
2. A.N. Tackie, D. Dwuma-Badu, P.A. Lartey, P.L. Schiff, J.E. Knapp, D.J. Slatkin, J. Nat. Prod. **37**, 6 (1974)
3. S.C. Flor, N.J. Doorenbos, G.H. Svoboda, J.E. Knapp, P.L. Schiff, J. Pharm. Sci. **63**, 618 (1974)
4. V.V. Berezhinskaya, E.A. Trutneva, Trudy VILR **14**, 66 (1971)
5. M.D. Mashkovskii, *Drugs* [in Russian], vol. 1 (Meditsina, Moscow, 1984), p. 229

Stephodeline

CAS Registry Number: 56596-12-4



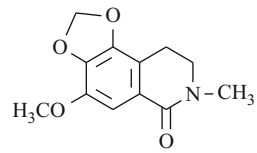
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Stephania delavayi*
$C_{21}H_{27}NO_5$: 373.1889
Mp: amorph., 200°C (hydrochloride) [1]
UV: 230, 275(3.90, 4.06) [1]
IR: 3040, 1665, 1610, 1516 [1]
^{1}H NMR: 2.38(3H, s, NCH_3), 2.55, 2.96(each 1H, d, J = 16, H-5α, H-5β), 2.66, 2.87(each 1H, d, J = 18, H-10α, H-10β), 3.64(3H, s, 7-OCH_3), 3.66(1H, d, H-9), 3.75, 3.77(each 3H, s, 2 × Ar–OCH_3), 4.09(3H, s, 8-OCH_3), 6.53, 6.55(each 1H, s, H-1, H-4) [1]

References

1. T.N. Il'inskaya, M.E. Perel'son, I.I. Fadeeva, O.N. Tolkachev, Chem. Nat. Comp. **9**, 613 (1973)

Thalflavine

CAS Registry Number: 125617-79-0



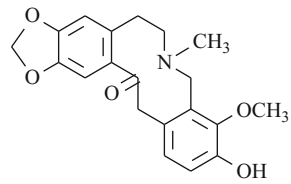
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Thalictrum flavum, T. foetidum*
$C_{12}H_{13}NO_4$: 235.0845
Mp: 132–133°C [1], 141–142°C (pet. ether) [2]
UV: 216, 264, 278(4.59, 3.90, 3.96) [2]
IR: 1625 [1]
MS *m/z*: 235(M^+, 100), 192(95), 164(88), 150(17), 117.5($^{++}$, 5) [1], 235(M^+, 90), 192(100), 164(97), 163(2), 147(3), 134(3) [2]
^{1}H NMR: 2.77, 3.95(each 2H, t, J = 7, H-3, H-4), 3.05(3H, s, NCH_3), 3.84(3H, s, OCH_3), 5.95(2H, s, CH_2O_2), 7.32(1H, s, H-8) [1]

References

1. Kh.S. Umarov, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 452 (1970)
2. Y. Aly, A. Galal, L.K. Wong, E.W. Fu, F.-T. Lin, F.K. Duah, P.L. Schiff, Phytochemistry **28**, 1967 (1989)

Thalictrisine

CAS Registry Number: 22047-92-3



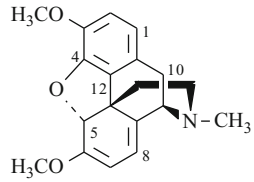
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Thalictrum amurense, T. simplex*
$C_{20}H_{21}NO_5$: 355.1420
Mp: 261–263°C (MeOH) [1]
Solubility: spar. sol. org. solvs.; sol. alk. [1]
UV: 288(3.95) [1]
IR: 3640, 2900, 2860, 1640, 1615, 1580, 1505, 1240, 1130, 1040, 930 [1]
MS *m/z*: 355(M^+), 269, 207, 206(100), 192, 150 [1]

References

1. Kh.S. Umarov, Z.F. Ismailov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 280 (1968)

Thebaine

CAS Registry Number: 115-37-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver bracteatum, P. orientale, P. somniferum*
$C_{19}H_{21}NO_3$: 311.1521
Mp: 192–193°C (EtOH) [1]
$[\alpha]_D$ −217° ($CHCl_3$) [1]
UV: 285 [2]
MS *m/z*: 311(M^+, 100), 310, 296, 280, 268, 255, 155.5 ($^{++}$) [2]
^{1}H NMR: 2.39(3H, s, NCH_3), 3.52, 3.76(each 3H, s, 2 × OCH_3), 4.96, 5.48(each 1H, d, J = 8), 5.20(1H, s), 6.48, 6.60(each 1H, d, J = 9, *o*–H–Ar) [2]
^{13}C NMR: [2, 3]

Table 1

C-1	119.1	C-8	111.3	C-14	132.3
2	112.9	9	60.7	15	37.0
3	142.7	10	29.5	16	46.0
4	144.6	11	127.6	NCH_3	42.3
5	89.0	12	133.1	3-OCH_3	56.2
6	152.3	13	46.0	OCH_3	54.7
7	95.8				

HPLC: [4]
ORD: [5]
CD: [5]

References

1. R.A. Konovalova, S.Yu. Yunusov, A.P. Orekhov, Zh. Obshch. Khim. **7**, 1791 (1937)
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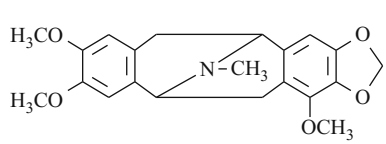
3. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 18 (Academic, New York, 1981), p. 217
4. J. Milo, A. Levy, D. Palevitch, G. Ladizinsky, J. Chromatogr. **452**, 563 (1988)
5. T. Kametani, M. Ihara, K. Fukumoto, H. Yagi, J. Chem. Soc. 2030 (1969)

2,3,7-Trimethoxy-8,9-methylendioxy-N-methylpavinane



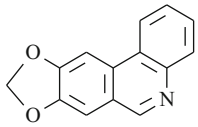
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Thalictrum strictum*
$C_{21}H_{23}NO_5$: 369.1576
Mp: 144–145°C (Et_2O) [1]
$[\alpha]_D$ −174° (MeOH) [1]
Solybility: very sol. MeOH, EtOH, Me_2CO [1]
UV: 287(3.84) [1]
MS *m/z*: 369(M^+), 368, 354, 218(70), 204(100) [1]
^{1}H NMR: 2.40–4.05(6H, m), 2.46(3H, s, NCH_3), 3.72(3H, s, OCH_3), 3.80(6H, s, 2 × OCH_3), 5.75, 5.80(each 1H, d, J = 1.5, CH_2O_2), 6.23, 6.36, 6.54(each 1H, s, H–Ar) [1]

References

1. S.Kh. Maekh, S.Yu. Yunusov, P.G. Gorovoi, Chem. Nat. Comp. **12**, 110 (1976)

Trispheridine

CAS Registry Number: 224-11-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Galanthus plicatus, Hymenocallis littoralis, Pancratium trianthum, Ungernia spiralis, U. trisphaera*
$C_{14}H_9NO_2$: 223.0633
Mp: 140–141°C (Me_2CO), 274°C (dec., hydrobromide), 285°C (dec., hydrochloride), 198°C (dec., nitrate) [1]
UV: 205, 253, 288, 309, 335, 351(4.56, 4.72, 4.30, 3.96, 3.54, 3.46) [2, 3]
IR: 1620–1500, 860–765 [2]
MS *m/z*: 223(M^+)
^{1}H NMR: 5.98(2H, s, CH_2O_2), 7.13(1H, s), 7.53(2H, m), 7.66(1H, s), 8.10(2H, m), 8.92(1H, br s) [2]

References

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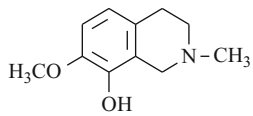
Turcamine

CAS Registry Number: 28026-17-7



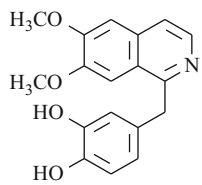
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis turcomanika*
$C_{11}H_{15}NO_2$: 193.1102
Mp: 100–102°C (Me_2CO) [1]
MS *m/z*: 193(M^+, 15), 192[(M-1)$^+$, 100], 178[(M-15)$^+$, 40], 177, 150(50), 149 [1]
^{1}H NMR: 2.38(3H, s, NCH_3), 3.76(3H, s, OCH_3), 2.60–3.10(4H, m, H-3, H-4), 3.34(2H, s, H-1), 6.65, 6.86(each 1H, d, J = 8.5, H-5, H-6) [1]

References

1. I.I. Khamidov, S.F. Aripova, M.V. Telezhenetskaya, A. Karimov, Chem. Nat. Comp. **32**, 880 (1996)

Turcomanidine

CAS Registry Number: 16637-56-2



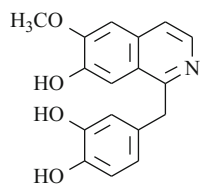
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis turcomanica*
$C_{18}H_{17}NO_4$: 311.1157
Mp: 200–202°C (hydrobromide) [1]
UV: 238, 280, 310 [1]
IR: 3500–3200, 2941, 1238, 858, 838 [1]
MS *m/z*: 311(M^+, 70), 310[(M-1)$^+$, 100], 296[(M-15)$^+$, 50], 280, 265, 252, 236 [1]
^{1}H NMR($CDCl_3$): 3.87, 3.95(each 3H, s, 2 × OCH_3), 4.35(2H, s, CH_2), 6.65(3H, br s, H-2′, H-5′, H-6′), 7.01, 7.37(each 1H, s, H-5, H-8), 7.43, 8.18(each 1H, d, J = 6.0, H-4, H-3)
^{1}H NMR(Py–d_5): 3.65, 3.69(each 1H, s, 2 × OCH_3), 4.62(2H, s, CH_2), 6.93(1H, dd, J = 8.0, 2.5, H-6′), 7.28(1H, d, J = 2.5, H-2′), 7.07, 7.55(each1H, s, H-5, H-8), 7.12(1H, d, J = 8.0, H-5′), 7.42, 8.45 (each 1H, d, J = 6.0, H-4, H-3) [1]

References

1. I.I. Khamidov, S.F. Aripova, M.V. Telezhenetskaya, M. Faskhutdinov, A. Karimov, I. Djepberov, Chem. Nat. Comp. **32**, 893 (1996)

Turcomanine

CAS Registry Number: 60372-11-4



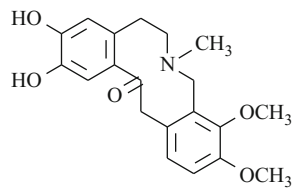
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Berberis turkomanica*
$C_{17}H_{15}NO_4$: 297.1001
Mp: 247–248°C (hydrobromide) [1]
UV: 236, 282, 312 [1]
IR: 3380–2750, 1451, 1300 [1]
MS *m/z*: 297(M^+, 45), 296[(M-1)$^+$, 100], 280, 264, 252, 236, 159, 125(55) [1]
^{1}H NMR: 3.92(3H, s, OCH_3), 4.95(2H, s, CH_2), 7.04(1H, dd, J = 8.4, 1.9, H-6′), 7.14(1H, d, J = 8.4, H-5′), 7.40, 8.14(each 1H, s, H-5,H-8), 7.54(1H, d, J = 1.9, H-2′), 7.78, 8.45(each 1H, d, J = 6.1, H-4, H-3) [1]

References

1. I.I. Khamidov, M. Faskhutdinov, M.V. Telezhenetskaya, A. Karimov, M.G. Levkovich, N.D. Abdullaev, R. Shakirov, Chem. Nat. Comp. **32**, 59 (1996)

Vaillantine

CAS Registry Number: 53964-96-8



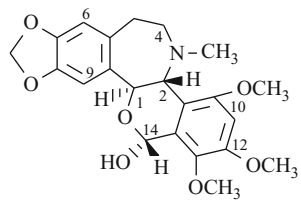
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Fumaria vaillantii*
$C_{20}H_{23}NO_5$: 357.1576
Mp: 165–167°C (dec., Me_2CO–MeOH), 175°C (0,0′-di Me (muramine)) [1]
Solubility: spar. sol. Et_2O, C_6H_6, $CHCl_3$, Me_2CO, EtOH [1]
UV: 292(3.92) [1]
IR: 1650, 1600 [1]
MS *m/z*: 357(M^+), 164(100) [1]
MS *m/z* (0,0′- di Me): 385(M^+), 206, 179, 164(100), 149, 121 [1]
^{1}H NMR(0,0′- di Me): 1.80(3H, s, NCH_3), 3.80(3H, s, OCH_3), 3.84(9H, s, 3 × OCH_3), 6.60, 6.97(each 1H, s, *p*–H–Ar), 6.74, 6.88(each 1H, d, J = 8, *o*–H–Ar) [1]

References

1. M.U. Ibragimova, I.A. Israilov, M.S. Yunusov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 481 (1974)

Zangezurine

CAS Registry Number: 114216-91-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Isoquinoline Alkaloids
Biological sources: *Papaver zangezuricum*
$C_{22}H_{25}NO_7$: 415.1631
Mp: amorph. [1]
$[\alpha]_D$ +208°C (MeOH) [1]
UV: 234, 293 [1]
IR: 3400, 1610, 1050, 950 [1]
MS *m/z*: 415(M^+), 252, 238, 209 [1]
^{1}H NMR: 2.43(3H, s, NCH_3), 3.76(3H, s, OCH_3), 3.88(6H, s, 2 × OCH_3), 4.19, 5.88(each 1H, d, J = 8.5), 5.90(2H, s, CH_2O_2), 6.34, 6.50, 6.55, 7.03(each 1H, s, 4 × H) [1]
^{13}C NMR: [1]

Table 1

C-1	63.1	C-8	145.6	C-13	150.0
2	61.2	9	104.6	14	88.2
4	55.7	9a	131.9	CH_2O_2	100.8
5	31.7	10	155.5	NCH_3	34.6
5a	132.2	10a	132.2	OCH_3	59.2
6	109.9	11	98.8	OCH_3	57.1
7	146.0	12	152.0	OCH_3	56.1

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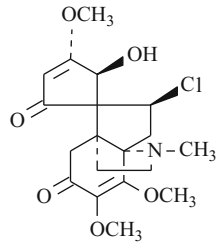
Acutumine

CAS Registry Number: 17088-50-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Menispermum dauricum*
$C_{19}H_{24}NO_6Cl$: 397.1292/399.1263
Mp: 241°C (dec., EtOH–EtOAc) [1]
$[\alpha]_D$ −120° (Py) [1]
Solubility: sol. $CHCl_3$, Py; sp. sol. Et_2O, EtOH [1]
IR: 1690, 1670, 1625, 1605 [2]
MS *m/z*: 397(M^+), 362, 209(100), 194, 181, 166, 150 [2]
^{1}H NMR(Py-d_5): 2.27(3H, s, NCH_3), 3.72, 3.79, 4.04(each 3H, s, 3 × OCH_3), 5.01, 5.59(each 1H, d, J = 0.8, C<u>H</u> = C–C<u>H</u>–OH), 5.18(1H, q, J = 7.5, CH_2–C<u>H</u>Cl) [2]

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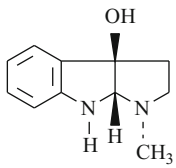
Alline

CAS Registry Number: 101053-34-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Allium altaicum, A. anisopodium, A. odorum, A. senescens, A. splendens, A. stelleranum, A. victorialis*
$C_{11}H_{14}N_2O$: 190.1106
Mp: 91–92°C (Me_2CO) [1], 197°C (hydrochloride) [2]
$[\alpha]_D$ +136° ($CHCl_3$) [2]
UV: 245, 303(3.68, 3.14) [2]
IR: 3350, 1615, 1495, 760, 710 [2]
MS *m/z*: 190(M^+, 100), 189(11), 173(42), 172(27), 171(14), 162(32), 161(23), 148(19), 147(98), 146(100), 134(20), 133(55), 132(55), 131(88), 130(77), 128(19), 120(32), 119(32), 118(48), 117(28), 106(19), 105(16), 104(34), 103(14), 93(55), 92(28), 91(33), 78(12), 77(46) [2]
^{1}H NMR: 2.00, 2.70(each 2H, m, NCH_2CH_2), 2.21(3H, s, NCH_3), 4.03, 4.18(2H, s, 1H, s, OH, NH, CH), 6.45–7.12(4H, m, H–Ar) [2]
X-ray: [2]

References

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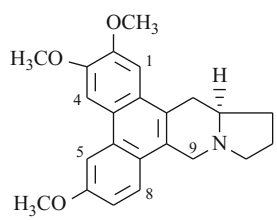
Antofine

CAS Registry Number: 32671-82-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Antitoxicum funebre*

$C_{23}H_{25}NO_3$: 363.1834
Mp: 213–215°C (Me_2CO) [1]
$[\alpha]_D$ −165° ($CHCl_3$) [1]
UV: 259, 286, 342, 360(4.71, 4.46, 2.99, 2.61) [2]
IR: 845, 810, 775 [2]
MS *m/z*: 363(M^+), 294(100), 279, 251, 181.5$^{(++)}$ [2]
^{1}H NMR: 3.90, 3.93, 3.98(each 3H, s, 3 × OCH_3), 7.24(1H, dd, J = 9, 2.4, H-7), 7.36(1H, s, H-1), 7.82(1H, d, J = 9, H-8), 8.09(2H, s, H-4, H-5) [3]

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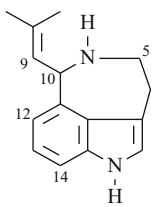
Aurantioclavine

CAS Registry Number: 80152-02-9



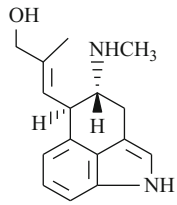
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Penicillium aurantio-virens*
$C_{15}H_{18}N_2$: 226.1469
Mp: 188–189°C (MeOH) [1]
$[\alpha]_D$ −28° (Py), −34° ($CHCl_3$) [1]
Solubility: sol. EtOH, $CHCl_3$, acids; sp. sol. petr. ether, C_6H_{14} [1]
UV: 227, 287(4.43, 3.81) [1]
MS *m/z*: 226(M^+, 100), 225, 197, 196, 182, 169, 167, 154 [1]
^{1}H NMR: 1.7(6H, s, 2 × CH_3), 2.50(1H, s, NH), 2.80–3.70(4H, m, 2H-4, 2H-5), 4.90(H-10), 5.50(H-9), 6.70–7.20(H–Ar), 8.25(NH) [1]

References

1. A.G. Kozlovskii, T.F. Solov'eva, V.G. Sakharovskii, V.M. Adanin, DAN SSSR **260**, 230 (1981)

Chanoclavine-I

CAS Registry Number: 2390-99-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Claviceps purpurea*
$C_{16}H_{20}N_2O$: 256.1576
Mp: 208–210°C (dec.) [1], 214–216°C [2], 220–222°C [3]; 186°C (dec., oxalate), 224°C (dec., mono Ac), 170°C (dec., di Ac) [1]
$[\alpha]_D$ −197° (EtOH) [1], −214° (Py) [2], −240° (Py) [3]
Solubility: very sol. MeOH; insol. Me_2CO, H_2O [1]
UV: 224, 273 sh, 283, 292(4.51, 3.82, 3.84, 3.78) [2, 3]
IR: 3310, 3260, 3130, 1615, 1598 [1, 3]
MS *m/z*: 256(M^+, 100), 238, 237, 183, 168, 155, 108 [2]
^{1}H NMR: [2]
Stereochemistry: [4]

References

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2. A.G. Kozlovskii, M.U. Arinbasarov, T.F. Solov'eva, V.M. Adanin, I. Grigorov, T.I. Angelov, L.S. Slokoska, M.B. Angelova, Prikl. Biokhim. Mikrobiol. **16**, 569 (1980)
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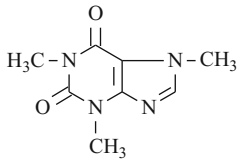
Coffeine (Caffeine)

CAS Registry Number: 58-08-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Thea sinensis*
$C_8H_{10}N_4O_2$: 194.0804
Mp: 232–235°C (Me_2CO) [1]
UV: 273(3.99) [1]
IR: 3130–3120, 1715, 1700, 1668, 1560, 1487, 980, 761, 750 [1–3]
MS *m/z*: 194, 165, 137, 109, 82, 67, 55 [4, 5]
^{1}H NMR: 3.44, 3.50, 3.92(each 3H, s, 3 × NCH_3), 7.44(1H, s) [1]
GLC: [2]
HPLC: [6]
Pharm./Biol.: Causes a permanent increase in mental activity and total working capacity [7]. Weakens the action of hypnotics and narcotics, stimulates respiration, and lowers thrombocyte aggregation. Used in infectious and other diseases accompanied by depression of the CNS and the cardiovascular system, spasms of the vessels of the brain, etc. Supplied in the form of a powder. In combination with analgesics, it is a component of the tablets Askofen, Tsitramone, Coffetamine, etc. [8]

References

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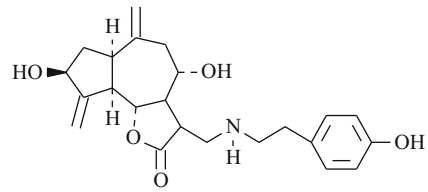
Elegantine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Saussurea elegans*
$C_{23}H_{29}NO_5$: 399.2046
Mp: 190–192°C (MeOH), 210°C (dec., hydrobromide) [1]; 162°C (product of saponification) [1, 2]
$[\alpha]_D$ +75° (DMFA) [1]
Solubility: spar. sol. org. solvs. [1]
UV: 224, 276(3.24, 2.56) [1]
IR: 3250, 1765, 1640, 1595, 1520, 910 [1]
^{1}H NMR (Py-d_5, product of saponification): 3.89(1H, m), 4.12(1H, t, J = 8.5), 4.61(1H, t, J = 7; 2; 1.9), 4.91, 5.01(each 1H, d, J = 2), 5.47(4H, br s), 6.21, 6.30(each 1H, d) [3]
Pharm./Biol.: Hypertensive effect [4]

References

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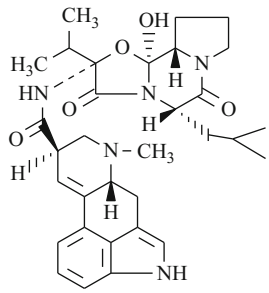
Ergocryptine

CAS Registry Number: 511-09-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Claviceps purpurea*
$C_{32}H_{41}N_5O_5$: 575.3108
Mp: 202–203°C (dec.) [1], 217–218°C (dec.) [2], 200°C (tartrate) [1], 190°C (o-phosphate) [3]
$[\alpha]_D$ −182° ($CHCl_3$) [1], −110° (Py) [2]
Solubility: very sol. $CHCl_3$, C_6H_6, MeOH, EtOH; insol. Et_2O, H_2O [1]
UV: 240, 312(4.31, 3.97) [2]
IR: 1741, 1673, 1647, 1639, 1611, 1555, 1540, 1316, 1293, 1266, 1238, 1210, 1164, 1149, 1133, 1108, 1083, 1072, 1043, 1033, 1013, 1005, 990, 973, 935, 918, 897, 878, 868, 854, 836, 817, 785, 763, 706 [1, 2]
HPLC: [4]

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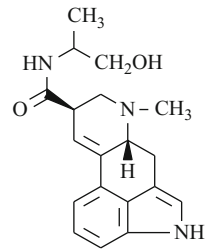
Ergometrine

CAS Registry Number: 60-79-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Claviceps purpurea*
$C_{19}H_{23}N_3O_2$: 325.1790
Mp: 157–158°C (dec., C_6H_6) [1], 246°C (hydrochloride), 239°C (dec., hydrobromide), 190°C (dec., oxalate) [1]
$[\alpha]_D$ +40° (EtOH) [1]
Solubility: very sol. MeOH, EtOH, Me_2CO; insol. H_2O, C_6H_6, $CHCl_3$ [1]
IR: [1]
MS *m/z*: 325(M^+), 223, 221, 207, 196, 192, 167, 154, 111 [2]
HPLC: [3]
Pharm./Biol.: LD_{50} 0.15 mg/kg (i/v, mice), 6 mg/kg (i/v, rabbits). Uterine action. It is used with the aim of reduction of the duration of the third period of labor [4]

References

1. A.N. Ban'kovskaya, A.I. Ban'kovskii, Trudy VILAR, Lekarstvennye rasteniya **15**, 368 (1969)
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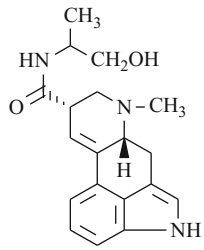
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 109

Ergometrinine

CAS Registry Number: 479-00-5



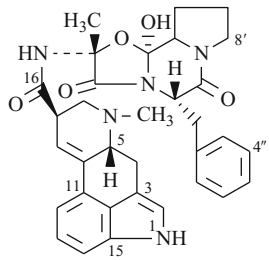
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Claviceps purpurea*
$C_{19}H_{23}N_3O_2$: 325.1790
Mp: 193–194°C (dec.) [1]
$[\alpha]_D$ +412° ($CHCl_3$) [1]
Solubility: very sol. MeOH, EtOH, Me_2CO; insol. $CHCl_3$, H_2O [1]

References

1. A.N. Ban'kovskaya, L.D. Vechkanova, A.I. Ban'kovskii, Chem. Nat. Comp. **6**, 392 (1970)

Ergotamine

CAS Registry Number: 113-15-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Claviceps purpurea*
$C_{33}H_{35}N_5O_5$: 581.2638
Mp: 184°C (dec., Me_2CO) [1], 212–214°C [2]; 184°C (dec., sulfate), 203°C (dec., hydrochloride), 204°C (dec., hydrobromide), 193°C (dec., tartrate) [1]; 194.5°C (dec., sulfate) [3]
$[\alpha]_D$ −160° ($CHCl_3$) [2]
Solubility: very sol. $CHCl_3$, EtOH, MeOH, Me_2CO; insol. H_2O [1]
UV: 240, 312(4.33, 3.99) [2]
IR: 1732, 1647, 1609, 1570, 1558, 1538, 1518, 1485, 1316, 1306, 1294, 1283, 1266, 1250, 1228, 1197, 1181, 1160, 1141, 1123, 1100, 1082, 1068, 1048, 1030, 996, 979, 954, 922, 915, 890, 877, 867, 850, 818, 807, 794, 762, 752, 745 [2]
IR(LiF): 3520, 3375, 3230 [2]
^{13}C NMR (DMSO-d_6): [4]

Table 1

C-2	119.4	C-13	122.2	C-10′	25.9
3	108.8	14	110.2	11′	63.9
4	26.6	15	133.8	12′	102.8
5	62.4	16	174.3	13′	23.8
7	55.1	2′	85.9	1″	38.7
8	42.5	3′	165.8	2″	138.7
9	118.3	5′	56.1	3″, 7″	129.9
10	136.0	6′	164.2	4″, 6″	127.7
11	127.1	8′	45.8	5″	127.4
12	111.0	9′	21.7	NCH_3	43.4

HPLC: [5]
Pharm./Biol.: LD_{50} 60 mg/kg (i/v, mice); 3.5 (i/v, rabbits); 80–100 (i/v, rats). Haemostatic action. It is used in uterine bleeding and hemorrhages [6]

References

1. A.N. Ban'kovskaya, A.I. Ban'kovskii, Trudy VILAR, Lekarstvennye rasteniya **15**, 368 (1969)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids*, (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1965), **1**, No. 111
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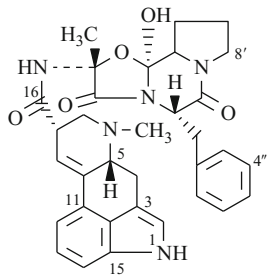
Ergotaminine

CAS Registry Number: 639-81-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Claviceps purpurea*
$C_{33}H_{35}N_5O_5$: 581.2638
Mp: 231–233°C (dec., MeOH) [1], 243°C (dec.) [2]
$[\alpha]_D$ +364° ($CHCl_3$) [1]
Solubility: very sol. Py, AcOH; insol. Et_2O, EtOH, C_6H_6 [1]
UV: 241, 309(4.28, 3.93) [2]
IR: 1734, 1685, 1640, 1611, 1540, 1346, 1324, 1292, 1273, 1260, 1249, 1210, 1184, 1169, 1156, 1140, 1083, 1072, 1053, 1034, 1013, 942, 918, 908, 878, 870, 842, 820, 811, 778, 755, 705 [1, 2]
IR(LiF): 3290 [1, 2]
^{13}C NMR: [3]

Table 1

C-2	119.7	C-13	122.4	C-10′	25.9
3	109.0	14	110.3	11′	63.9
4	26.9	15	133.8	12′	102.9
5	61.7	16	175.3	13′	23.8
7	53.0	2′	85.7	1″	38.7
8	41.8	3′	165.9	2″	138.9
9	118.1	5′	56.1	3″, 7″	129.9
10	137.1	6′	164.5	4″, 6″	127.9
11	127.9	8′	45.7	5″	126.1
12	111.4	9′	21.8	NCH_3	42.5

(*continued*)

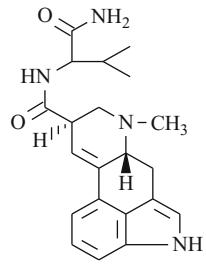
HPLC: [4]

References

1. A.N. Ban'kovskaya, A.I. Ban'kovskii, Trudy VILAR, Lekarstvennye rasteniya **15**, 368 (1969)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1965), **1**, No. 112
3. M. Shamma, D.M. Hindenlang, *Carbon-13 NMR Shift Assignments of Amines and Alkaloids* (Plenum Press, New York/London, 1979). No. 246
4. M. Puttemans, R.J. De Cock, G. Hoogewijs, L. Dryon, D.L. Massart, J. Pharm. Belg. **40**, 387 (1985)

Ergovalide

CAS Registry Number: 41645-63-0



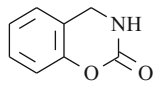
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Claviceps purpurea*
$C_{21}H_{26}N_4O_2$: 366.2056
Mp: 152–154°C (MeOH), 275°C (dec., hydrochloride) [1]
$[\alpha]_D$ −81° ($CHCl_3$) [1]
UV: 270, 315(3.30. 4.02) [1]
IR: 3430, 3330, 3230, 1670, 1550, 1475 [1]
MS *m*/*z*: 366(M^+), 223, 221, 207, 196, 192, 167, 154, 111 [1]
^{1}H NMR: 0.80(CH_3), 0.90(CH_3), 2.25, 4.43, 7.70(NH) [1]

References

1. A.N. Ban'kovskaya, V.I. Sheichenko, A.I. Ban'kovskii, L.D. Vechkanova, V.S. Kabanov, Chem. Nat. Comp. **9**, 139 (1973)

Luteanine

CAS Registry Number: 1125-85-5



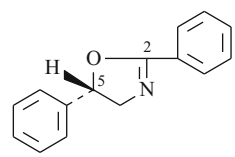
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Reseda lutea*
$C_8H_7NO_2$: 149.0477
Mp: 185–187°C (C_6H_6) [1]
IR: 3280–3240, 1720–1710, 750 [1]
MS *m/z*: 149(M^+), 106, 78 [1]
^{1}H NMR: 4.26(2H, s, CH_2), 6.78(4H, m, H–Ar) [1]

References

1. I.K. Nakhatov, M.M. Tadzhibaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 362 (1977)

Oxytriphine

CAS Registry Number: 87443-39-8



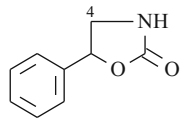
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Oxytropis trichophysa*
$C_{15}H_{13}NO$: 223.0996
Mp: 38–40°C [1]
$[\alpha]_D$ +162° ($CHCl_3$) [1], +116° ($CHCl_3$) [2]
IR(film): 1655, 1500, 1455, 1340, 1260, 700 [1–3]
MS *m/z*: 223(M^+, 2.4), 118(12), 117(100), 105(16), 97(7), 90(4), 89(4), 78(3), 77(27) [2, 3]
^{1}H NMR: 3.91(1H, dd, J = 8, 13, H-4), 4.40(1H, dd, J = 10, 13, H-4), 5.60(1H, dd, J = 8, 10, H-5), 7.32, 7.98(8H, 2H, m, H–Ar) [1–3].
^{13}C NMR: 63.06(t, C-4), 80.84(d, C-5), 125.58, 128.16, 128.28, 128.63, 129.10(each d), 131.28(s), 163.08(s, C-2) [1, 3]
Abs. conf.: 5S [1]

References

1. A.I. Meyers, M.A. Hanagan, L.M. Trefonas, R.J. Baker, Tetrahedron **39**, 1991 (1983)
2. V.I. Akhmedzhanova, D. Batsuren, R.Sh. Shakirov, Chem. Nat. Comp. **29**, 778 (1993)
3. O. Tsuge, S. Kanemasa, K. Matsuda, J. Org. Chem. **51**, 1997 (1986)

Resedine

CAS Registry Number: 60426-44-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Reseda luteola*
$C_9H_9NO_2$: 163.0633
Mp: 88–89°C (C_6H_6) [1]
$[\alpha]_D$ 0° [1]
UV: 253, 258(2.23, 2.33) [1]
IR: 3400–3200, 1720, 760, 710 [1]
MS *m/z*: 163(M^+), 119, 118, 107(100), 106, 91, 79, 77 [1]

^{1}H NMR: 3.40, 3.90, 5.52(each 1H, t, 2H-4, H-5), 6.85(1H, br s, NH), 7.70(5H, s, H–Ar) [1]

Pharm./Biol.: Growth-stimulating, fungicidal, and tranquilizing action. Enhances the action of soporifics [2]

References

1. K.L. Lutfullin, M.M. Tadzhibaev, U.A. Abdullaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 559 (1976)
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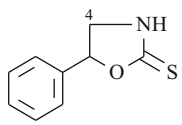
Resedinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids

Biological sources: *Reseda luteola*

C_9H_9NOS: 179.0405

Mp: 119–121°C (C_6H_6) [1]

$[\alpha]_D$ +70° (MeOH) [1]

Solubility: sol. $CHCl_3$, EtOH [1]

UV: 246(4.29) [1]

IR: 3260–3170, 1535, 1480, 773, 710 [1]

MS *m/z*: 179(M^+), 136, 123, 119, 107, 104, 91, 77, 51 [1]

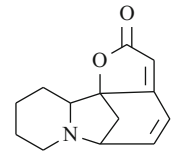
^{1}H NMR: 3.65, 4.10, 5.80(each 1H, t, 2H-4, H-5), 7.34(5H, m, H–Ar), 8.52(1H, br s, NH) [1]

References

1. M.M. Tadzhibaev, K.L. Lutfullin, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 247 (1976)

Securinine

CAS Registry Number: 6704-68-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids

Biological sources: *Securinega suffruticosa*

$C_{13}H_{15}NO_2$: 217.1103

Mp: 142–143°C [1, 2]; 230°C (hydrochloride), 205°C (nitrate), 218°C (picrate), 208°C (perchlorate), 194°C (picrolonate), 128°C (sulfate), 168°C (chloroaurate), 210°C (chloroplatinate) [1, 2]

$[\alpha]_D$ +1042° (EtOH), +1106° ($CHCl_3$) [1]

Solubility: very sol. EtOH, $CHCl_3$, dichloroetane; sol. Et_2O, pet. ether, Me_2CO; spar. sol. H_2O [1]

UV: 256(4.26) [2]

IR: 1840, 1760 [2]

MS *m/z*: 217(M^+), 134, 106, 84, 78, 56 [2]

^{1}H NMR: 1.00–1.80(6H, m), 1.77(1H, d), 2.05(1H, q), 2.40(1H, q), 2.50(1H, q), 2.99(1H, br t), 3.84(1H, br t), 5.54(1H, s), 6.30–6.75(2H, octet) [2]

Pharm./Biol.: Its action is close to that of strychnine, but it is 8–10 times less toxic. Used in asthenic states, pareses, and paralyses. Supplied in the form of 0.002-g tablets, 4% soln. in bottles, and 0.2% soln. in 1-ml ampule [3]

References

1. V.I. Murav'eva, A.I. Ban'kovskii, DAN SSSR **110**, 998 (1956)
2. R.H.F. Manske (ed.), *The Alkaloids, Chemistry and Physiology*, vol. 14 (Academic Press, New York, 1973), p. 425
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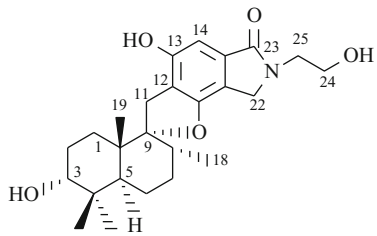
Stachybotryne



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Stachybotrys alternans*
$C_{25}H_{35}NO_5$: 429.2483
Mp: 202°C (MeOH) [1]
IR: 3350–3140; 1675; 1650; 1630; 1475; 1360 [1]
MS *m/z*: M^+ 429 (95), 411 (17.5), 398 (100), 396 (11.3), 386 (16.3), 380 (10), 368 (2.8), 354 (2), 342 (1.9), 339 (1.8), 312 (1.9), 300 (3), 287 (3.3), 274 (10), 260 (10), 256 (7.5), 242 (10), 234 (12.5), 223 (30), 221 (20), 207 (12.5), 189 (15), 149 (12.5), 135 (12.5), 129 (12.5), 109 (12.5) [1]
^{1}H NMR: 0.80 (3H, J = 5.8, CH_3-18), 0.88 (3H, c, CH_3-21), 0.97 (3H, c, CH_3-19), 1.13 (1H, dt, J = 13, 3, H-1в), 1.19 (3H, s, CH_3-20), 1.42 (1H, qd, J = 13, 3.5, H-6в), 1.55 (1H, H-7в), 1.70 (1H, H-7α), 1.70 (1H, H-2α), 1.75 (1H, H-8), 11.95 (1H, tt, J = 13, 3, H-2в), 2.35 (1H, td, J = 13, 3, H-1α), 2.56 (1H, dd, J = 13, 2.4, H-5), 3.09 (1H, d, J = 16.7, H-11в), 3.50 (1H, d, J = 16.7, H-11α), 3.65, 3.90 (each 1H, m, 2H-25), 3.90 (2H, m, H-24), 4.90, 4.35 (each 1H, d, J = 16.7, 2H-22) [1]
^{13}C NMR: [1, 2]

Table 1

C-1	24.72	10	42.00	C-18	15.91
2	26.05	11	32.86	19	16.21
3	74.83	12	117.60	20	29.11
4	38.21	13	155.39	21	22.72
5	40.85	14	101.80	22	48.54
6	21.33	15	135.66	23	169.09
7	31.60	16	113.22	24	60.50
8	37.34	17	156.88	25	45.95
9	98.72				

References

1. L.S. Kamalov, S.F. Aripova, B. Tashkhodjaev, M.I. Isaev, Chem. Nat. Comp. **34**, 605 (1998)
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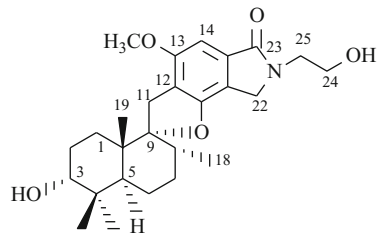
Stachybotryne A



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Stachybotrys alternans*
$C_{26}H_{37}NO_5$: 443.5885
^{1}H NMR: 0.78 (3H, d, J = 6, CH_3-18), 0.91 (3H, s, CH_3-21), 0.99 (3H, s, CH_3-19), 1.10 (1H, dt, J = 13, 3.4, H-1β), 1.22 (3H, s, CH_3-20), 1.43 (1H, qd, J = 13, 3.5, H-6β), 1.98 (1H, tt, J = 13, 3.4, H-2β), 2.27 (1H, td, J = 13, 3.5, H-1α), 2.57 (1H, dd, J = 13, 2.5, H-5), 2.94 (1H, d, J = 17, H-11β), 3.36 (1H, d, J = 17, H-11α), 3.60 (1H, m, H-3), 3.68, 3.98 (each 1H, m, 2H-25), 3.79 (3H, s, OCH_3), 3.98 (2H, m, H-24), 4.11, 4.37 (each 1H, d, J = 17, 2H-22), 7.16 (1H, s, H-14) [1]
^{13}C NMR: [1]

Table 1

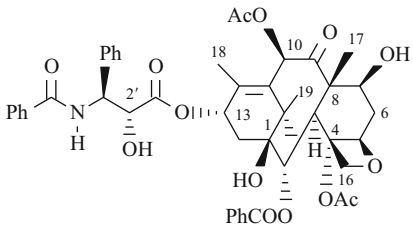
C-1	24.71	10	42.75	C-18	15.87
2	26.07	11	32.59	19	16.19
3	74.82	12	118.12	20	29.15
4	38.25	13	150.24	21	22.74
5	40.39	14	97.34	22	48.48
6	21.32	15	135.75	23	168.85
7	31.60	16	115.32	24	60.54
8	37.32	17	156.72	25	46.02
9	99.19			CH_3O	55.56

References

1. L.S. Kamalov, S.F. Aripova, M.I. Isaev, Chem. Nat. Comp. **35**, 82 (1999)

Taxol

CAS Registry Number: 33069-62-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Taxus baccata*
$C_{47}H_{51}NO_{14}$: 853.3309
Mp: 205–208°C (H_2O–EtOH) [1], 213–216°C (dec.) [2]
$[\alpha]_D$ −54° (MeOH), −21° (Py) [1]
UV: 230, 274, 282(4.46, 3.22, 3.07) [1]
IR: 3500–3300, 1730, 1710, 1650 [2]
MS *m/z*: 853(M^+) [2]
MS(SIMS) *m/z*: 854(MH^+), 836, 714, 447, 286, 268, 123 [1]
^{1}H NMR: 1.14(3H, s, CH_3-17), 1.22(3H, s, CH_3-19), 1.67(3H, s, CH_3-20), 1.80(3H, s, OAc-4), 2.20(3H, s, CH_3-18), 2.36(3H, s, OAc-10), 3.80(1H, d, J = 6, H-3), 4.24(2H, s, 2H-16), 4.92(1H, d, J = 10, H-5), 5.68(1H, d, J = 6, H-2), 6.20(1H, br t, J = 8, H-13), 6.28(1H, s, H-10) [2]; 1.82, 2.50(each 1H, m, 2H-6), 2.25(2H, m, 2H-14), 4.38(1H, m, H-7), 4.76(1H, d, J = 3, H-2′), 5.76(1H, dd, J = 3, 9, H-3′), 6.97(1H, d, J = 9, NH), 7.36(5H, m, Ph-3′) [1]
HPLC: [3]
Pharm./Biol.: Antitumoral action [2, 4]

References

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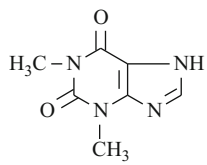
Theophylline

CAS Registry Number: 58-55-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Thea sinensis*
$C_7H_8N_4O_2$: 180.0647
Mp: 268–270°C (H_2O) [1]
UV: 272(4.02) [2]
IR: [3]
MS *m/z*: 180, 123, 95 [4, 5]
HPLC: [6]
Pharm./Biol.: Sodium-salicylate (diuritium) is indicated in the treatment of hypertension [7]. It dilates bronchial musculature, stimulates central nervous system, and decreases aggregation of thrombocytes. It is used as broncholytic and diuretic agent. It is manufactured in the form of powder and suppositoria. It is a part of combined tablets "Euphyllinum," "Theophedrinum," "Antasman" [8]

References

1. N.R. Skhiladze, V.Yu. Vachnadze, Chem. Nat. Comp. **20**, 641 (1984)
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4. B. Gober, R. Kraft, Pharmazie **33**, 717 (1978)
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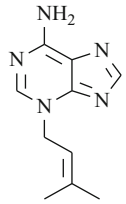
Triacanthine

CAS Registry Number: 10091-84-6

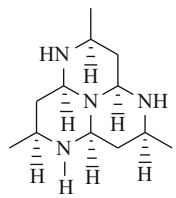


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Gleditschia triacanthos*
$C_{10}H_{13}N_5$: 203.1171
Mp: 227–228°C, 241°C (picrate), 219°C (hydrochloride), 216°C (hydrobromide), 203°C (methiodide) [1]; 228–229°C [2]
UV: 272(4.10) [1], 273 [2]
IR: 3370, 3250, 1684, 1630, 1556, 1517, 1341, 1289, 1279, 1235, 1225, 1210, 1176, 1118, 1087, 1058, 1041, 1018, 957, 943, 922, 873, 847, 806, 779 [3]
Pharm./Biol.: LD_{50} 259, 147, 500 mg/kg (i/p, i/v, per os, mice). Papaverin-like adrenolytic action. It dilates vessels, decreases tonus and contractile activity of uterus, and exerts the favorable effect in ulcerous disease, spastic colitis, bronchial asthma, hypertension [4]

References

1. A.S. Belikov, E.S. Zheleznova, Trudy VILAR **11**, 22 (1959)
2. N.J. Leonard, J.A. Deyrup, J. Am. Chem. Soc. **84**(11), 2148 (1962)
3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1966), **2**, No. 273
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 149

Tricrotonyltetramine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Miscellaneous Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{12}H_{24}N_4$: 244.2001
Mp: 101–103°C (Me_2CO), 224°C (dipicrate), 289°C (dec., dihydrochloride) [1]
IR: 3250, 3270, 2820–2740 [1]
MS *m/z*: 224(M^+, 44), 223(50), 207(12), 181(63), 165(11), 155(20), 153(22), 139(57), 112(90), 111(100), 97(70), 96(72), 70(80) [1]
^{1}H NMR: 1.03, 1.04(CH_3), 1.86, 2.81, 3.01 [1]

References

1. T.E. Monakhova, O.N. Tolkachev, M.E. Perel'son, V.C. Kabanov, N.F. Proskurnina, Chem. Nat. Comp. **10**, 771 (1974)

The genus *Nitraria* (Zygophyllaceae Dum.) was first described by Dr. Shober in 1735 in the lower Volga.

Linneus in 1759 used the binary name *Nitraria shoberi* for this plant. Another four species grow in the former Soviet Union: *N. sibirica* Pall., *N. komarovii* Iljin et Lava, *N. roborowskii* Kom., *and N. pamirica* Vassil. The two last species have limited distributions.

Nitraria alkaloids are subdivided into two main groups: spiropiperidine and indole. A third group includes bases of various structures that do not fit in the first two.

Structures of spiropiperidine *Nitraria* alkaloids are based on the new system 2-azaspiro[5.5]undecan-7-ol, γ-aminoalcohol, and its variations. The simplest alkaloids of this subgroup, nitramine and isonitramine, are diastereomers at the C-6 spiro atom.

The structures and stereochemistries of nitramine and isonitramine were determined by chemical and spectral methods and confirmed by *X*-ray structure analyses of their crystalline salts. The experimental results revealed an interesting fact. Salts of nitramine and isonitramine occur in conformations without intramolecular H-bonds, whereas the starting bases in $CHCl_3$ solution have conformations with a strong intramolecular H-bond.

The tricyclic alkaloid sibirinine is very soluble in $CHCl_3$. However, its mass spectrum is typical of *N*-oxides. The strength of the peak for the molecular ion is relatively weak. There is a strong peak for the $[M\text{-}16]^+$ ion formed by loss of O.

Sibirinine undergoes the Polonovskii transformation with acetic anhydride to give *N,O*-diacetylisonitramine.

The structure of nitraramine was proved by an *X*-ray structure analysis.

Nitraroxine is the hydroxylamine of nitramine.

^{13}C NMR spectra of five spiropiperidine *Nitraria* alkaloids have been published. Their resonances have been assigned.

PMR Spectra

A comparison of the parameters for nitramine and isonitramine indicates that only the chemical shifts for the equatorial protons H-1 (Δδ 0.46 ppm) and H-5 are substantially different. This is a consequence of steric compression caused by γ-gauche coupling of one of these protons with axial protons H-8 and H-10. In sibirine, sibirinine, and nitrabirine, H-7 is axial; in nitraramine and nitraroxine, equatorial. Spectra of nitrabirine and nitraramine exhibit unusually large chemical shifts for H-7 (Δδ ∼ 0.80 ppm). In nitrabirine, the effect is due to total deshielding by the heteroaromatic ring and Nδ of Hax-7. The C-1–N-2 and C-7–H bonds in nitraramine are synclinal. The decrease in chemical shifts of H-7 in the order nitraramine → nitraroxine → *N*-acetylnitraramine indicates that the deshielding effect depends on the electron density on the N atom.

Mass Spectra

The fragmentation of nitramine alkaloids has much in common with that of decahydroquinoline and quinolizidine derivatives because the principal decomposition pathway of these systems involves formation of fragments containing piperidine. In addition, there are also distinctive features in mass spectra of spiropiperidine alkaloids that are not discussed in this review.

Pharmacology

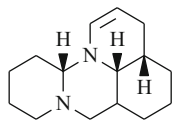
Nitramine exhibits hypotensive activity. Its mechanism of action is H-cholinolytic. It blocks transfer of pulses through the upper cervical ganglia and cardiac ganglia of the vagus [1].

References

Sh.R. Aliev, A.A. Vakhabov, M.B. Sultanov, Dokl. Akad. Nauk Uzb. SSR **4**, 48 (1975)

Dehydroschoberine

CAS Registry Number: 169564-18-5

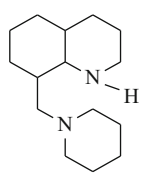


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria komarovii, N. sibirica, N. schoberi*
$C_{15}H_{24}N_2$: 232.1836
Mp: oil [1]
$[\alpha]_D$ 0° [1]
IR: 2940, 2860, 2810, 2750, 1680–1630, 1450, 1375, 1365, 1310, 1290, 1275, 1245, 1185, 1135, 1125, 1105, 1090, 1055, 1035, 1020, 980, 970, 950, 930, 895, 855, 815, 785 [1]
MS *m/z*: 232(M^+), 231, 205, 203, 192, 190, 178, 176, 175, 148, 96, 61 [1]
^{1}H NMR: (CD_3OD): 1.50, 2.65(m;), 3.18(1H, m), 4.61(1H, br s), 5.40(1H, br s) [1]
^{1}H NMR: (CD_3OD + CF_3COOH): 1.75–2.95, 3.48; 3.82, 4.72(1H, m), 5.88(1H, br s), 8.72(1H, br s) [1]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **29**, 31 (1993)

Dihydroschoberine



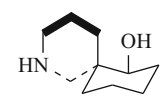
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{15}H_{28}N_2$: 236.2254
Mp: oil, 251–252°C (hydrochloride) [1]
$[\alpha]_D$ 0° (EtOH) [1]
IR: 3363, 3297, 2934, 2865, 2813, 2698, 2634, 2578, 2553, 1479, 1456, 1314, 1284, 1202, 1175, 1142, 1089, 1065, 1048, 1018, 995, 945, 910, 883 [1]
MS *m/z*: 236 (M^+, 29), 219 (1), 206 (1.5), 194 (4), 192 (5), 179 (3), 178 (9), 149 (13), 148 (100), 138 (36), 137 (39), 136 (51), 124 (21), 123 (69), 122 (55), 112 (47), 99 (52), 98 (99), 97 (99), 89 (25), 88 (62), 70 (36), 69 (40) [1]
^{1}H NMR: 1.55 (m), 2.78 (m), 3.50 (m) [1]

References

1. T.S. Tulyaganov, F.Kh. Allaberdiev, Chem. Nat. Comp. **37**, 556 (2001)

Isonitramine

CAS Registry Number: 65620-67-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{10}H_{19}NO$: 169.1467
Mp: 101–103°C, 198°C (hydrochloride), 189°C (methoiodide) [1]
$[\alpha]_D$ −30° ($CHCl_3$) [2]
Solubility: very sol. $CHCl_3$, EtOH, MeOH, Me_2CO; sol. pet. ether [2]
IR: 3305, 3288 [1]
MS *m/z*: 169(M^+, 100), 168, 151, 150, 136, 123, 122, 110, 109, 108, 96, 84 [2]
^{1}H NMR: 2.14(1H, m, He-5), 2.44(1H, Ha-1), 2.54(1H, td, Ha-3), 2.88(1H, d, He-1), 2.92(1H, m, He-3), 3.57(1H, dd, H-7), 3.87(2H, br s, NH, OH) [3]
^{13}C NMR: [3]

Table 1

C-1	60.3	C-6	36.2	C-9	24.3
3	47.3	7	79.8	10	20.4
4	23.1	8	29.8	11	36.3
5	28.7				

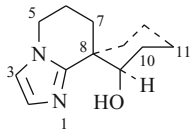
X-ray: [4]
Abs. conf.: 6S, 7eS [5]
Pharm./Biol.: Hypotensive action [2]

References

1. Z. Osmanov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 607 (1977)
2. Z. Osmanov, Author's Abstract of Candidate's Dissertation, Tashkent, 1985
3. A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **24**, 71 (1988)
4. B. Tashkhodzhaev, Chem. Nat. Comp. **18**, 70 (1982)
5. A.A. Ibragimov, G.P. Moiseeva, Z. Osmanov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 676 (1986)

Nitrabirine

CAS Registry Number: 86629-99-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{12}H_{18}N_2O$: 206.1419
Mp: 184–185°C (MeOH), 225°C (hydrochloride) [1]
$[\alpha]_D$ 0° [1]
UV: 212(3.84) [1]
IR: 3350–3180, 2945–2875, 1670, 1595, 1530, 1490, 1250, 1090, 935 [1]
MS *m*/*z*: 206(M^+, 70), 189(15), 188(9), 135(100) [1]
^{1}H NMR: 1.47, 1.77, 2.00(each 4H, m, 6 × CH_2), 3.91(2H, m, H-5), 4.37(1H, dd, H-9), 6.73(1H, d, H-3), 6.94(1H, d, H-2) [1, 2]
^{13}C NMR: [2]

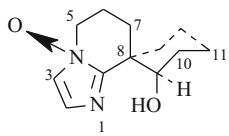
Table 1

C-1	150.9	C-6	42.7	C-10	20.8
3	44.7	7	74.7	11	35.4
4	19.7	8	29.1	12	127.7
5	21.6	9	24.6	13	117.9

References

1. A.A. Ibragimov, Z. Osmanov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 202 (1983)
2. A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **24**, 71 (1988)

Nitrabirine N-Oxide



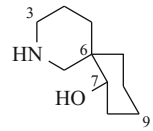
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{12}H_{18}N_2O_2$: 222.1413
Mp: 235–236°C (EtOH) [1]
$[\alpha]_D$ 0° (MeOH) [1]
UV: 213 (3.81) [1]
IR: 3382, 3327, 2972, 2941, 2865, 1611, 1521, 1455, 1418, 1323, 1201, 1087, 1071, 863, 854, 795 [1]
MS *m*/*z*: 222 (M^+, 2), 206 (40), 189 (10), 178 (11), 161 (5), 160 (15), 148 (13), 136 (30), 135 (100), 123 (3), 121 (18), 95 (4), 90 (4), 89 (32), 88 (53), 57 (6) [1]
^{1}H NMR (CD_3OD): 1.50 (m), 1.75 (m), 2.05 (m), 4.02 (3H, m), 7.39 (1H, d, J = 2.5), 7.47 (1H, d, J = 2.5) [1]

References

1. T.S. Tulyaganov, F.Kh. Allaberdiev, Chem. Nat. Comp. **37**, 556 (2001)

Nitramine

CAS Registry Number: 49620-06-06



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria schoberi, N. sibirica*
$C_{10}H_{19}NO$: 169.1467
Mp: oil, 206°C (nitrate), 201°C (hydrochloride) [1]
$[\alpha]_D$ +17° ($CHCl_3$) [1]; −8° (MeOH) [2]
IR ($CHCl_3$): 3365, 3320 [1]
MS *m/z*: 169(M^+, 100), 151(82), 150(34), 123, 122(41), 96(27), 84(71), 57(47) [1]
^{1}H NMR: 0.90–2.10(1H, He-5), 2.37, 3.34(each 1H, d, J = 11.9, Ha-1, He-1), 2.58(1H, td, J = 11.4, 11.4, 3.3, Ha-3), 2.95(1H, He-3), 3.48(1H, dd, J = 9.1, 4.2, H-7), 3.98(2H, br s, NH, OH) [3]
^{13}C NMR: [3]

Table 1

C-1	52.0	C-6	36.1	C-9	23.9
3	46.7	7	77.0	10	21.1
4	23.2	8	32.0	11	36.3
5	37.4				

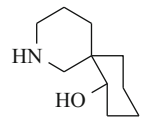
X-ray: [4]
CD: [2]
Abs. conf.: 6R, 7eS [2]
Pharm./Biol.: LD50 229 mg/kg (i/v, mice). Hypotensive action [5]

References

1. N.Yu. Novgorodova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 196 (1973)
2. A.A. Ibragimov, G.P. Moiseeva, Z. Osmanov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 676 (1986)
3. A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **24**, 82 (1988)
4. B. Tashkhodzhaev, Chem. Nat. Comp. **18**, 75 (1982)
5. Sh.R. Aliev, A.A. Vakhabov, M.B. Sultanov, DAN UzSSR (4), 43 (1975)

(±)-Nitramine

CAS Registry Number: 82227-98-3

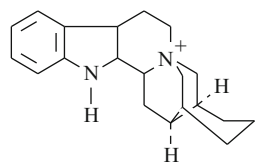


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{10}H_{19}NO$: 169.1467
Mp: 75–76°C [1]
IR: 3320 [1]
MS *m/z*: 169(M^+, 100), 151, 150, 136, 123, 122, 110, 96 [1]

References

1. Z. Osmanov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 121 (1982)

Nitraraidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{20}H_{25}N_2^+$: 293.4339
Mp: 308–310°C (EtOH–$CHCl_3$) [1]
$[\alpha]_D$ 0° [1]
Solubility: insol. org. solvs. [1]
UV: 224, 275, 288 sh (4.05, 3.59, 3.47) [1]
IR: 3435, 3273, 3054, 2965, 2919, 2865, 2745, 2635, 1599, 1571, 1435, 1456, 1379, 1329, 1288, 1178, 1124, 1108, 1082, 1036, 1010, 974, 948, 912, 860, 840, 817, 761, 744 [1]

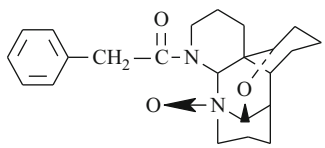
MS *m/z*: 293 (M^+, 3), 292 (5), 279 (45), 223 (9), 197 (13), 184 (16), 170 (38), 169 (49), 156 (14), 144 (13), 137 (100), 130, 125, 98, 97 [1]

^{1}H NMR (DMSO-d_6 + TFA): 1.75 (m), 2.25 (br.s), 2.58 (m), 3.05 (m), 3.32 (m), 4.11 (m), 4.51 (m), 7.13 (m, 2H), 7.42 (m, 1H), 7.62 (m, 1H) [1]

References

1. T.S. Tulyaganov, F.Kh. Allaberdiev, Chem. Nat. Comp. **38**, 602 (2002)

Nitraramidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids

Biological sources: *Nitraria sibirica*

$C_{23}H_{30}N_2O_3$: 382.5050

Mp: 225–226°C (EtOH–Me_2CO) [1]

$[\alpha]_D$ 0° [1]

Solubility: very sol. H_2O, Py, DMSO, sp. sol. MeOH, EtOH [1]

UV: 209, 245–253(4.02, 2.05) [1]

IR: 3334, 2947, 2843, 2767, 1642, 1453, 1372, 1339, 1291, 1257, 1226, 1146, 1093, 1009, 902, 754, 702 [1]

MS *m/z*: 382 (11) $(M + 1)^+$, 382 (M^+, 20), 292 (100), 275 (20), 264 (13), 263 (21), 248 (9), 245 (33), 218 (11), 205 (17), 186 (13), 164 (10), 158 (18), 136 (16), 119 (17), 115 (28), 112 (42), 99 (16), 98 (21), 95 (28), 92 (52), 80 (70), 69 (68) [1]

^{1}H NMR (CD_3OD): 1.75 (m), 2.57 (m), 3.09 (m), 3.48 (m), 4.09 (br.s, 1H), 4.31 (br.s), 4.44 (br.s), 4.81 (m), 7.31 (br.s, 5H) [1]

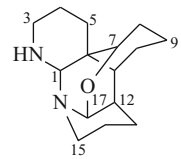
^{1}H NMR (dPy): 1.10 (m), 1.56 (m), 2.45 (m), 2.95 (m), 3.28 (m), 4.68 (m), 5.35 (br.s), 7.10 (m, 5H) [1]

References

1. T.S. Tulyaganov, F.Kh. Allaberdiev, Chem. Nat. Comp. **38**, 602 (2002)

Nitraramine

CAS Registry Number: 57912-25-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids

Biological sources: *Nitraria komarovii, N. schoberi, N. sibirica*

$C_{15}H_{24}N_2O$: 248.1889

Mp: 85–86°C (pet. ether) [1]; 220°C (hydrochloride), 197°C (dec., hydrobromide), 201°C (nitrate) [2]

$[\alpha]_D$ 0°

IR: 3280 [1]

MS *m/z*: 248(M^+, 100), 231, 219, 205, 204, 191, 190, 177, 176, 163, 150 [3]

^{1}H NMR: 2.13(1H, m, He-5), 2.64(2H, m, Ha-3, Ha-15), 3.03(1H, m, He-3, He-15), 3.28(1H, s, Ha-1), 4.04(1H, d, He-17), 4.38(1H, br s, H-7) [4]

^{13}C NMR: [4]

Table 1

C-1	66.4	C-8	30.5	C-13	28.4
3	45.3	9	14.5	14	15.3*
4	24.0	10	25.1	15	50.4
5	21.9	11	37.9**	17	82.2
6	32.3	12	38.8**		
7	75.9				

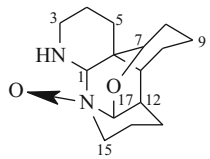
X-ray: [2]

References

1. N.Yu. Novgorodova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 455 (1975)
2. B. Tashkhodzhaev, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **21**, 649 (1985)
3. Z. Osmanov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 121 (1982)
4. A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **24**, 71 (1988)
5. Z. Osmanov, Authors Abstract of Candidate's Dissertation, S.Yu. Yunusov Institute of the Chemistry of Plant Substances, Tashkent, 1985

Nitraramine N-Oxide

CAS Registry Number: 57912-26-2



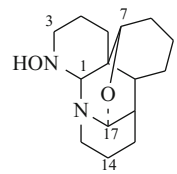
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria komarovii, N. schoberi, N. sibirica*
$C_{15}H_{24}N_2O_2$: 264.1883
Mp: 251–252°C [1]
$[\alpha]_D$ 0° [1]
IR: 3550–3350, 2940, 1460, 1420, 1305, 1155, 1110, 1085, 1075, 965, 955, 935, 910, 875 [1]
MS *m/z*: 264(M^+), 248, 247, 231, 219, 204, 190, 176, 162, 150, 136, 122, 109, 98, 96, 83, 70, 55 [1]
^{1}H NMR: 0.90–2.25(17H, m), 2.75(2H, m, Ha-3, Ha-15), 3.57(2H, m, He-3, He-15), 3.77(1H, s, H-1), 4.01(1H, br s, H-7), 4.58(1H, br s, H-17) [1]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **29**, 31 (1993)

Nitraroxine

CAS Registry Number: 57912-26-2

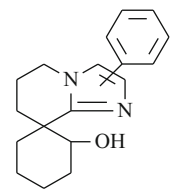


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria komarovii, N. schoberi, N. sibirica*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 220–221°C (EtOH), 143°C (O-Ac) [1]
$[\alpha]_D$ 0° [1]
Solubility: very sol. H_2O; spar. sol. org. solvs. [1]
IR: 3400–3030, 965, 945, 925 [1]
MS *m/z*: 264(M^+, 100), 248(18), 247(41), 219, 204, 190, 176, 162, 150, 138, 125, 106, 98, 96, 83 [1]
^{1}H NMR(CF_3COOH): 1.00–2.00(m, CH_2), 2.55(2H, m, Ha-3, Ha-15), 2.87(1H, s, Ha-1), 3.20(2H, d, He-3, He-15), 3.77(1H, s, He-1), 4.00(1H, d, J = 2.5, H-17), 4.17(1H, br s, H-7), 4.19(1H, m, He-7), 4.64(1H, H-17) [2]

References

1. N.Yu. Novgorodova, S.Kh. Maekh, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 562 (1975)
2. A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 620 (1986)

Phenylnitrabirine



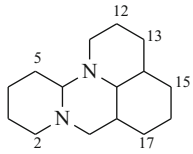
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{18}H_{22}N_2O$: 282.1732
Mp: 219–221°C [1]
$[\alpha]_D$ 0° [2]
UV: 204, 266 [2]

References

1. S.Yu. Yunusov, *Alkaloids, Appendix II* (Fan, Tashkent, 1989), p. 48
2. A.A. Ibragimov, Author's Abstract of Doctoral Dissertation, Moscow, 1989

Schoberine

CAS Registry Number: 63653-27-0

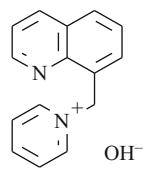


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria komarovii, N. sibirica, N. schoberi*
$C_{15}H_{26}N_2$: 234.2096
Mp: 62–63°C [1], 184°C (picrate) [2]
$[\alpha]_D$ 0° [1]
MS *m/z*: 234(M^+, 67), 233(36), 206(22), 205(48), 192(100), 178(33), 177(17), 150(11), 138(3), 137(4), 136(7), 124(7), 123(4), 122(4), 110(7), 98(8), 97(10), 96(20), 84(7), 83(8), 67(6), 56(4), 55(8) [1]
^{1}H NMR: (CF_3COOH) 1.49(14H, m), 2.35(1H, m), 2.70(3H, m), 3.20(3H, m), 3.46(2H, m), 3.75(2H, m), 8.29(1H, m) [1]
X-ray: [1]
Pharm./Biol.: Hypotensive action [3]

References

1. B. Tashkodzhaev, A.A. Ibragimov, B.T. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **25**, 24 (1989)
2. A.A. Ibragimov, N.Yu. Novgorodova, Kh.N. Aripov, Chem. Nat. Comp. **13**, 71 (1977)
3. Z. Osmanov, Authors Abstract of Candidate's Dissertation, Tashkent, 1985

Sibiridine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria schoberi, N. sibirica*
$C_{15}H_{13}N_2^+OH$: 221.2776
Mp: 192–193°C (EtOH) [1]
UV: 220, 280–295, 307, 320 (4.1, 3.51, 3.46, 3.54) [1]
IR: 3128, 3068, 2225, 1708, 1665, 1631, 1585, 1538, 1500, 1475, 1453, 1385, 1321, 1265, 1247, 1216, 1192, 1171, 1142, 1131, 1069, 1040, 1000, 978, 957, 913, 865, 843, 807, 776, 767, 742, 641 [1]
MS *m/z*: 222, 221 (M^+, 0.5), 220 (0.5), 130 (28), 129 (100), 128 (36), 103 (22), 102 (69), 91 (11), 78 (18), 77, 76, 75 [1]
^{1}H NMR: 7.85–9.20, 4.8 br s [1]

References

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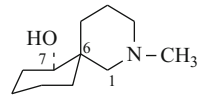
Sibirine

CAS Registry Number: 83023-77-2



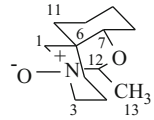
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{11}H_{21}NO$: 183.1623
Mp: oil, 210°C (methiodide) [1]
$[\alpha]_D$ −22° ($CHCl_3$) [2]
Solubility: very sol. $CHCl_3$, MeOH, EtOH; sol. pet. ether, C_6H_{14} [2]
IR: 3320, 2935, 2865, 1110, 1082 [2]
MS *m/z*: 183(M^+, 100), 182, 169, 168, 166, 155, 140, 122, 112, 110, 98, 96, 84, 57 [1]
^{1}H NMR: 2.19(3H, s, NCH_3), 2.52(1H, He-1), 2.73(1H, He-3), 3.54(1H, m, Ha-7), 4.94(OH) [1]

References

1. Z. Osmanov, A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 206 (1982)
2. Z. Osmanov, Author's Abstract of Candidate's Dissertation, Tashkent, 1985

Sibirinine

CAS Registry Number: 113866-79-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – *Nitraria* Alkaloids
Biological sources: *Nitraria sibirica*
$C_{12}H_{21}NO_2$: 211.1572
Mp: 40°C [1]
$[\alpha]_D$ −9° ($CHCl_3$) [1]

MS *m/z*: 211(M^+, 24), 195(67), 180(81), 167(57), 166(27), 152(46), 150(80), 138(29), 124(98), 122(32), 111(43), 110(100), 99(62) [1]
^{1}H NMR: 1.65(3H, d, CH_3), 3.17(1H, dt, He-1), 3.31(1H, d, Ha-1), 3.58(1H, dd, H-7), 3.70(2H, m, Ha-3, He-3), 4.58(1H, q, H-12) [2]
^{13}C NMR: [2]

Table 1

C-1	77.1	C-6	38.1	C-10	21.0
3	62.0	7	84.3	11	34.5
4	19.0	8	26.8	12	101.9
5	26.1	9	24.6	13	14.4

Abs. conf.: 6S, 7S, 2S, 12R [1]

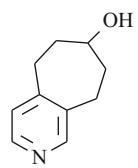
References

1. A.A. Ibragimov, N.D. Abdullaev, Z. Osmanov, S.Yu. Yunusov, Chem. Nat. Comp. **28**, 569 (1987)
2. A.A. Ibragimov, S.Yu. Yunusov, Chem. Nat. Comp. **24**, 71 (1988)

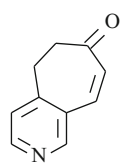
Pyridine and piperidine alkaloids are widely distributed in nature and have been found in plants of 27 families. These compounds are subdivided into simple derivatives of pyridine (e.g., 3-methoxypyridine) and piperidine (e.g., coniine) and bi- and tricyclic uncondensed derivatives of pyridine (anabasine et al.) and piperidine (lobeline et al.).

Pyridine and piperidine alkaloids have been observed in CIS countries in plants of 26 genera belonging to 14 families. The chemistry of plants of eight genera have been studied in most detail: *Dipsacus* (Dipsacaceae), *Catalpa* and *Incarvillea* (Bignoniaceae), *Gentiana* and *Swertia* (Gentianaceae), *Leptorhabdos*, *Pedicularis*, and *Verbascum* (Scrophulariaceae), which produce mainly pyridine bases. The alkaloid content in them depends on the vegetation period and habitat.

A total of 27 alkaloids has been isolated from 22 species these genera (S. Yu. Yunusov, A. Abdusamatov, et al.), 17 of which were new. Among the studied species, *Pedicularis olgae*, *Gentiana kaufmanniana*, and *Verbascum nobile* were the plants richest in alkaloids. In addition to known types of pyridine alkaloids, representatives of a new type were observed. These were derivatives of cycloheptapyridine with a condensed seven-membered ring, pediculinine, and pediculidine.



Pediculinine

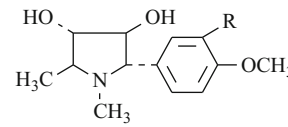


Pediculidine

Piperidine alkaloids, including piperidine itself, have been found in plants of the genera *Ammodendron* and *Ammopiptanthus* (Leguminosae), *Carica* (Caricaceae), *Anabasis*, *Nanophyton*, *Girgensohnia*, *Petrosimonia* (Chenopodiaceae), *Sedum* (Crassulaceae), *Cephalaria* (Dipsacaceae), *Gentiana* (Gentianaceae), and *Lobelia* (Lobeliaceae).

A few pyrrolidine alkaloids have been isolated from plants of 17 genera belonging to eight families: Campanulaceae, Capparidaceae, Convolvulaceae, Cruciferae, Gramineae, Lamiaceae, Liliaceae, and Solanaceae. These compounds were most widely distributed in plants of the family Lamiaceae, where they were found in representatives of nine genera: *Eremostachys*, *Lagochilus*, *Lamium*, *Leonurus*, *Marrubium*, *Panzeria*, *Phlomis*, *Sideritis*, and *Stachys*.

Codonopsine and codonopsinine were isolated from *Codonopsis clematidea* (Campanulaceae) and represent a new type of pyrrolidine bases (S. F. Aripova).



Codonopsine (R=OCH3)
Codonopsinine (R=H)

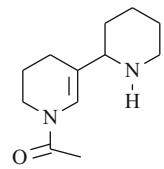
Pyridine, piperidine, and pyrrolidine alkaloids include compounds with physiological activity. Pyridine bases plantagonine and indicaine at doses of 3–10 mg/kg decrease briefly arterial pressure. Indicaine at higher concentrations (1:1000) possesses spasmolytic and antihistamine activity. At doses of 10–25 mg/kg, it facilitates quicker healing of experimental stomach ulcers in white mice. Gentianine possesses distinct tranquilizing and anti-inflammatory properties.

Pyrrolidine alkaloids codonopsine and codonopsinine are cholegogic agents.

Certain representatives of these groups of alkaloids have been used in medicine and other areas, for example, lobeline as a breathing stimulant; anabasine hydrochloride, an antismoking aide; and anabasine sulfate, an agricultural insecticide.

Ammodendrine

CAS Registry Number: 20824-32-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Ammodendron argenteum, A. conollyi, A. eichwaldii, A. karelinii, A. longiracemosum*

$C_{12}H_{20}N_2O$: 208.1575

Mp: 73–74°C (petr. ether), 200°C (perchlorate), 220°C (hydroiodide) [1]

$[\alpha]_D$ 0° [1]

Solubility: very sol. EtOH, Me_2CO, $CHCl_3$; sol. water, Et_2O; spar. sol. petr. ether [1]

UV: 243 [2]

IR: 1622, 1578, 1325, 1300, 1270, 1255, 1199, 1189, 1127, 1075, 1041, 1020, 1003, 983, 969, 941, 919, 905, 886, 870, 861, 811, 782, 763 [2]

MS *m/z*: 208(M^+, 48), 179(43), 165(80), 137(42), 136(55), 123(65), 110(79), 109(68), 94(40), 43(100) [3]

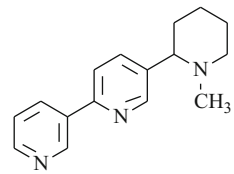
Pharm./Biol.: LD_{50} 385 mg/kg (s/c, mice). Exhibits a permanent pressor action on narcotized animals [4]

References

1. A.P. Orekhov, N.F. Proskurnina, Zh. Obshch. Khim. **8**, 308 (1938)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1972). **7**, No. 803
3. S.W. Pelletier (ed.), *Alkaloids, Chemical and Biological Perspectives*, vol. 2 (Wiley, New York, 1984), p. 105
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 138

Anabasamine

CAS Registry Number: 20410-87-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Anabasis aphylla*

$C_{16}H_{19}N_3$: 253.1579

Mp: 65–66°C(petr. ether), 265°C (hydrochloride), 293°C (hydrobromide), 90°C (picrate) [1]

$[\alpha]_D$ +107°(EtOH) [1]

UV: 246, 278(4.10, 4.00) [1]

IR: 3090-3030, 2950-2800, 2780-2500, 1593-1560, 1470, 1330, 825-815, 810, 805 [1]

MS *m/z*: 253(M^+), 252, 224, 210, 98(100) [1]

^{1}H NMR: 1.20–1.60(6H, m, 3 × CH_2), 1.85(3H, s, NCH_3), 1.90–2.00(1H), 2.80(2H, CH_2), 7.20(2H, d), 7.60(2H, d), 8.20(1H, d), 8.50(2H, t), 9.10(1H, d) [1]

Pharm./Biol.: LD_{50} 159 mg/kg (i/p, mice). Hypothermal action. Enhances the effect of aminazine [chloropromazine] and hypnotics, possesses a central myorelaxant effect and pronounced analgesic activity, and enhances the similar property of morphine 2- to 12-fold [2]. Sedative, hypotensive, and ganglioblocking actions. Lowers the tonus of the smooth musculature and retards the cardiac rhythm [3]

References

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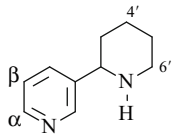
2. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 96
3. I.S. Khazbievich, *The Pharmacological Properties of Natural Substances* [in Russian] (FAN, Tashkent, 1973), p. 37

(+)-Anabasine

CAS Registry Number: 34366-21-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Malacocarpus crithmifolius*

$C_{10}H_{14}N_2$: 162.1157

Bp: 145–150°C (25 mmHg) [1]

Mp: 153°C (perchlorate), 80°C (nitrate), 68°C (oxalate), 186°C (picrate) [1]

$[\alpha]_D$ +7° (Me_2CO), +10° (no solvent) [1]

UV: 255 sh, 260, 264 sh (3.14, 3.18, 3.04) [1, 2]

UV(H+): 260 [1]

IR: 3670, 3330, 3120, 2950, 2870, 2830, 2740, 2710, 2500, 1600, 1590, 1460, 1380, 1330, 1160, 1120, 1060, 1040 [2]

MS *m/z*: 162(M^+, 65), 84(100) [3]

^{1}H NMR: 1.50(6H, br s, 3 × CH_2), 2.60(1H, s, NH), 2.90(2H, m, CH_2), 3.47(1H, m), 7.15(1H, m, H-β), 7.64(1H, m, H-γ), 8.20–8.42(2H, m, 2H-α) [3]

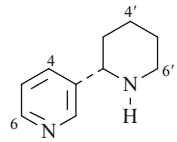
HPLC: [4]

References

1. B.Kh. Zharekeev, M.V. Telezhenetskaya, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 524 (1971)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
3. B.Kh. Zharekeev, Author's Abstract of Candidate's Dissertation, Tashkent, 1974
4. J.A. Saunders, D.E. Blume, J. Chromatogr. **205**, 147 (1981)

(−)-Anabasine

CAS Registry Number: 494-52-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Anabasis aphylla, Leontice alberti, L. darwasica, Nicotiana debney, N. glauca, N. rotundifolia, Verbascum songoricum*

$C_{10}H_{14}N_2$: 162.1157

Bp: 104–105°C (2 mmHg), 276°C (760 mmHg) [1]

Mp: 237°C (perchlorate), 203°C (picrate) [1]

$[\alpha]_D$ −52° (EtOH) [1]

UV: 262(3.20) [2, 3]

IR: 3270, 3075, 3045, 3020, 2980, 2925, 2850, 2785, 2720, 2690, 1589, 1574, 1478, 1461, 1440, 1423, 1370, 1351, 1318, 1300, 1265, 1208, 1183, 1150, 1110, 1064, 1052, 1027, 1020, 998, 945, 935, 918, 889, 850, 806, 795, 770, 716 [2, 3]

MS *m/z*: 162(M^+), 161, 133, 119, 105, 84(100), 56, 42 [3]

^{13}C NMR: [4]

Table 1

C-2	148.9	C-5	123.6	C-3′	34.9
3	140.9	6	148.8	4′	24.3
4	134.3	2′	59.9	5′	25.7
				6′	47.7

HPLC: [5]

Pharm./Biol.: LD_{50} 13.7, 10.2, 240 mg/kg (s/c, i/p, oral, mice). Stimulates respiration, raises arterial pressure accompanied by a retardation of the rhythm of cardiac contractions and an increase in the amplitude of pulse waves. Potentiates the action of acetylcholine and barium chloride on the intectine. In low doses (0.25–0.5 mg/kg), intensifies

the spontaneous motor activity of muscles and, in higher doses (1.50–3.00 mg/kg), suppresses them. Insecticide [6]. Shortens the time of action of hypnotics. Protonated forms of anabasine possess a neuroleptic action [7]

References

1. A.P. Orekhov, G.P. Men'shikov, Byull. NIKhFI (1), 1 (1931)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1968), **3**, No. 404
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6. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 97
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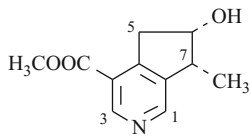
Cantleyine

CAS Registry Number: 30333-81-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Dipsacus azureus*
$C_{11}H_{13}NO_3$: 207.0895
Mp: 130–131°C (Et_2O) [1]
UV: 273(3.25) [1]
IR: 3255, 1735, 1595 [1]
MS *m/z*: 207, 179, 175, 160, 147, 118, 91, 77, 65 [1]
^{1}H NMR: 1.31(3H, d, J = 6.8, CH_3), 3.05(1H, m, H-7β), 3.16(1H, m, H-5), 3.37(1H, m, H-5), 3.78(3H, s, $COOCH_3$), 4.42(1H, m, H-6β), 8.29(1H, s, H-1), 8.77(1H, s, H-3) [2, 3]

References

1. T.U. Rakhmatullaev, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 401 (1972)
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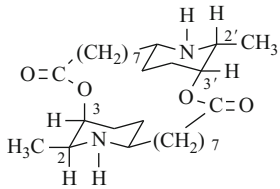
Carpaine

CAS Registry Number: 3463-92-1



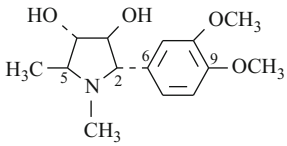
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Carica papaya*
$C_{28}H_{50}N_2O_4$: 478.377
Mp: 120–121°C, 225°C (hydrochloride), 205°C (chloroaurate) [1]
$[\alpha]_D$ +22° (EtOH) [1]
IR: 3320, 1718, 1236 [1]
MS *m/z*: 478(M^+), 463, 436, 407, 384, 335, 300, 240, 222, 195, 180, 110, 94, 80, 69, 55, 44 [2]
^{1}H NMR: 1.02(6H, d, J = 7, CH_3), 2.83(2H, br q, J = 7, H-2, H-2′), 4.75(2H, br s, H-3, H-3′) [2]

References

1. L.I. Topuriya, V.I. Rossinskii, G.S. Erkomaishvili, Chem. Nat. Comp. **14**, 354 (1978)
2. T.R. Govindachari, K. Nagarajan, N. Viswanathan, Tetrahedron Lett. **24**, 1907 (1965)

Codonopsine

CAS Registry Number: 26989-20-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Codonopsis clematidea*
$C_{14}H_{21}NO_4$: 267.1471
Mp: 150–151°C (Me_2CO-MeOH), 208°C (methiodide) [1]
$[\alpha]_D$ −16° (MeOH) [1]
Solubility: sol. Me_2CO, $CHCl_3$, EtOH, Py, H_2O [1]
UV: 226, 278(4.10, 3.26) [1]
IR: 3380, 870, 810 [1]
MS *m/z*: 267(M^+, 50), 207(92), 206(100), 192(60), 177(20) [1, 2]
^{1}H NMR: 1.16(3H, d, J = 8, CH_3), 2.06(3H, s, NCH_3), 3.26(2H, br s, 2 × OH), 3.52, 3.62(each 3H, s, 2 × OCH_3), 6.82(3H, m, H-Ar) [1, 2]
^{13}C NMR: [3]

Table 1

C-2	74.5	C-6	135.5	C-10	149.0
3	86.9	7	121.1	11	112.1
4	84.8	8	112.1	C-CH_3	13.7
5	64.9	9	150.1	NCH_3	34.6
				OCH_3	55.6

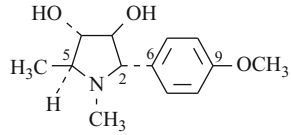
Pharm./Biol.: LD_{50} 720 mg/kg (i/p). Bile-stimulating action [4, 5]
X – ray: [6]

References

1. S.F. Matkhalikova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 24 (1969)
2. S.F. Matkhalikova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 528 (1969)
3. M.R. Yagudaev, S.F. Aripova, Chem. Nat. Comp. **25**, 459 (1989)
4. M.T. Khanov, M.B. Sultanov, T.A. Egorova, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (FAN, Tashkent, 1971), p. 210
5. A.N. Nabiev, V.N. Syrov, S.F. Aripova, DAN UzSSR **12**, 34 (1980)
6. B. Tashkhodzhaev, S.F. Aripova, K.K. Turgunov, O. Abdilalimov, Chem. Nat. Prod. **40**, 508 (2004)

Codonopsinine

CAS Registry Number: 32490-07-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Codonopsis clematidea*
$C_{13}H_{19}NO_3$: 237.1365
Mp: 169–170°C (MeOH) [1]
$[\alpha]_D$ −9° (MeOH) [1]
Solubility: very sol. EtOH, MeOH, Py; sol. H_2O [1]
UV: 228, 277, 284 (sh) (4.14, 3.22, 3.14) [1]
IR: 3375, 812, 705 [1]
MS *m/z*: 237(M^+, 29), 177(81), 176(100), 162(43) [1]
^{1}H NMR: 1.15(3H, d, J = 8.5, CH_3), 2.08(3H, s, NCH_3), 3.54(3H, s, Ar-OCH_3), 3.40–4.50(4H, m, CH), 6.70–7.50(4H, H-Ar) [1]
^{13}C NMR: [2]

Table 1

C-2	74.1	C-7	129.6	C–CH_3	13.8
3	87.0	8	113.4	NCH_3	34.6
4	84.8	9	159.1	OCH_3	55.0
5	64.9	10	113.9		
6	135.0	11	129.6		

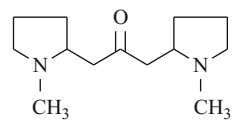
Pharm./Biol.: Bile-stimulating action [3]
X – ray: [4]

References

1. S.F. Matkhalikova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 207 (1971)
2. M.R. Yagudaev, S.F. Aripova, Chem. Nat. Comp. **25**, 459 (1989)
3. A.N. Nabiev, V.N. Syrov, S.F. Aripova, DAN UzSSR (12), 34 (1990)
4. B. Tashhodjaev, S.F. Aripova, K.K. Turgunov, O. Abdilalimov, Chem. Nat. Prod. **40**, 508 (2004)

Cuscohygrine

CAS Registry Number: 454-14-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Anisodus luridus, Convolvulus erinaceus, C. hamadae, Scopolia stramonifolia, S. tangutica*

$C_{13}H_{24}N_2O$: 224.1889

Bp: 118–121°C (2 mmHg), 209°C (nitrate), 215°C (picrate), 244°C (methiodide), 228°C (hydrochloride), 234°C (hydrobromide) [1]

$[\alpha]_D$ 0°; D_n^{17}: 0.9782; n_D: 1.4845 [2]

UV: 307(2.36) [2]

IR: 3000-2800, 2680, 1707 [2]

MS *m/z*: 224(M^+), 140, 126, 98, 84 [2]

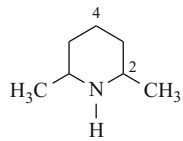
^{1}H NMR: 1.20–1.80(8H, m, CH_2), 1.80–2.70(8H, m, CH_2CO, CH_2N), 2.87(2H, m, CHN) [2]

References

1. G.V. Lazur'evskii, Trudy UzGU **15**, 43 (1939)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)

(−)-2,6-Dimethylpiperidine

CAS Registry Number: 504-03-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Anabasis salsa, Nanophyton erinaceum*

$C_7H_{15}N$: 113.1204

Bp: 133–135°C [1]

Mp: 280°C (hydrochloride), 276°C (hydrobromide), 173°C (oxalate), 163°C (picrate), 109°C (N-Bz) [1]

$[\alpha]_D$ −14° (MeOH) [1]

^{13}C NMR: [2]

Table 1

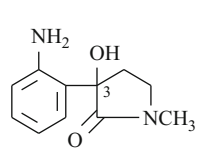
C-α	53.7	C-β	35.5	C-γ	26.3
				CH_3	23.5

References

1. A.D. Kuzovkov, G.P. Men'shikov, Zh. Obshch. Khim. **20**, 1524 (1950)
2. M. Shamma, D.M. Hindenlang, *Carbon-^{13} NMR Shift Assignments of Amines and Alkaloids* (Plenum Press, New York/London, 1979), No. 73

Donaxaridine

CAS Registry Number: 62209-18-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Arundo donax*
$C_{11}H_{14}N_2O_2$: 206.1055
Mp: 175–176°C, (N-Ac 186°, O, N-di Ac amorph.) [1]
$[\alpha]_D$ 0° [1]
UV: 204, 241, 290(3.32, 3.67, 4.28) [1]
IR: 3452(OH), 3362, 2995-2919, 1674, 1496, 1452, 1307-1270, 956, 860, 753 [1]
MS *m/z*: 206(M^+, 80), 188, 146, 135, 132, 120, 100, 92, 77, 58, 44 [1]
^{1}H NMR: 2.47(2H, m, CH_2), 2.87(3H, s, NCH_3), 3.17(2H, m, CH_2), 6.52–7.16(4H, m, H-Ar) [1]
^{13}C NMR: [2]

Table 1

C-2	175.5	C-1′	125.1	C–5′	117.7*
3	79.5	2	145.8	6′	125.7*
4	32.9	3′	117.9*	NCH_3	29.87
5	45.6	4′	128.9*		

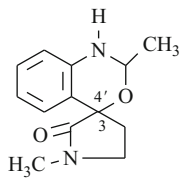
X-ray: [2]

References

1. K.A. Ubaidullaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 499 (1976)
2. V.U. Khuzhaev, B. Tashkhodzhaev, S.F. Aripova, Chem. Nat. Comp. **31**, 604 (1995)

Donaxarine

CAS Registry Number: 62209-19-2



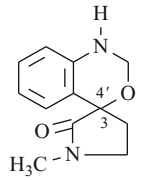
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Arundo donax L.*
$C_{13}H_{16}N_2O_2$: 232.1212
Mp: 218–220°C [1]
$[\alpha]_D$ 0° [1]
UV: 206, 250, 292(3.19, 3.43, 4.04) [2]
IR: 3266, 2881, 1497-1458, 1697, 1307, 981, 746, 664 [2]
MS *m/z*: 232(M^+, 100), 190, 189, 174, 160, 146, 132, 118, 58, 44 [2]
^{1}H NMR: 1.29(3H, d, J = 6, CH–CH_3), 2.41(2H, t, J = 7, CH_2), 2.90(3H, s, NCH_3), 3.45(2H, m, CH_2), 4.66(1H, m, CH), 6.70–7.16(4H, m, H-Ar), 8.12(1H, br s, NH) [2]

References

1. K.A. Ubaidullaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 499 (1976)
2. V.U. Khuzhaev, B. Tashkhodzhaev, S.F. Aripova, Chem. Nat. Comp. **31**, 604 (1995)

Donaxanine

CAS Registry Number: 178493-90-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Arundo donax*
$C_{12}H_{14}N_2O_2$: 218.1055
Mp: 162–164°C (Me_2CO) [1]
IR: 3305, 2886, 1678, 1610, 1468, 1283, 854, 798 [1]
MS *m/z*: 219(5), 218(35), 203(1), 200(3), 191(11), 190 (100), 189(13), 161(5), 160(30), 159(8), 158(8), 148(5), 147(44), 146(55), 145(5), 144(5), 133(50), 132(33), 130(33), 120(5), 119(16), 118(16), 117 (27), 106(5), 105(22), 104(27), 103(5), 96(5), 78 (16), 77(27) [1]

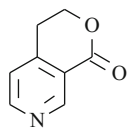
^{1}H NMR (Py-d_5): 2.32 (m, 2H, CH_2), 2.72 (3H, s, NCH_3), 3.20 (2H, m, CH_2), 4.73 (1H, d, J = 7.5, H-2′), 5.51 (1H, d, J = 7.5, H-2′), 4.70 (1H, br s, NH), 6.62–7.20 (4H, m, H-Ar) [1]

References

1. V.U. Khuzhaev, S.F. Aripova, U.A. Abdullaev, Chem. Nat. Comp. **31**, 610 (1995)

Gentianadine

CAS Registry Number: 6790-32-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Cephalaria gigantea, C. kotschyi, C. nachiczevanica, Gentiana olgae, G. olivieri, G. turkestanorum*

$C_8H_7NO_2$: 149.0477

Mp: 77–78°C (abs. Et_2O), 196°C (hydrochloride), 158°C (picrate) [1]

Solubility: sol. MeOH, Me_2CO, $CHCl_3$ [1]

IR: 1730 [1]

MS *m/z*: 149(M^+, 100), 121(10), 120(80), 92(27), 65(13) [1]

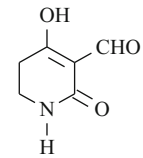
^{1}H NMR: 3.03, 4.52(each 2H, t, J = 6), 7.20, 8.65, 9.12(each 1H, s, d, q, H-Ar) [1]

Pharm./Biol.: LD_{50} 1210 mg/kg (i/p, mice). Sedative and anti-inflammatory action [2]

References

1. A.S. Samatov, S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 150 (1967)
2. F. Sadritdinov, N. Tulyaganov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (FAN, Tashkent, 1972), p. 152

Gentianaine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Cephalaria gigantea, C. kotschyi, C. nachiczevanica, Gentiana kaufmanniana, G. olgae, G. olivieri, G. turkestanorum*

$C_6H_7NO_3$: 141.0426

Mp: 149–150°C (Me_2CO) [1]

Solubility: sol. H_2O, EtOH, MeOH [1]

UV: 231, 283(4.10, 4.16) [1]

IR: 3390, 3260, 1718, 1640 [1]

MS *m/z*: 141(M^+, 85), 114, 113, 112, 98, 69(100) [1]

^{1}H NMR (Py-d_5): 2.01, 5.30(each 2H, t, 2 × CH_2), 4.88(1H, s, OH), 8.25(1H, m, NH), 8.50(1H, s, CHO) [2]

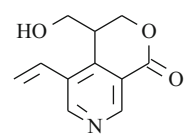
Pharm./Biol.: LD_{50} 1275 mg/kg (i/p, mice). Anti-inflammatory and sedative action [3]

References

1. T.U. Rakhmatullaev, S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 26 (1969)
2. S.T. Akramov, M.R. Yagudaev, T.U. Rakhmatullaev, A. Samatov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 10 (1969)
3. F. Sadritdinov, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (FAN, Tashkent, 1971), p. 146. 151

Gentianamine

CAS Registry Number: 22952-54-1



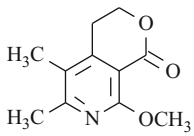
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Gentiana turkestanorum*
$C_{11}H_{11}NO_3$: 205.0739
Mp: 149–150°C (Me_2CO), 159°C (oxalate (EtOH)), 128°C (nitrate), 147°C (picrate), 158°C (methiodide), 97°C (O-Ac), 170°C (dihydro) [1]
Solubility: sol. $CHCl_3$, MeOH, EtOH [1]
UV: 218, 250(3.96, 4.46) [1]
IR: 3200, 1720, 1660, 1585 [1]
MS *m/z*: 205(M^+), 175, 131, 130, 117, 91, 77 [1]
Pharm./Biol.: LD_{50} 770 mg/kg (i/p, mice). Sedative and anti-inflammatory action [2]

References

1. A.S. Samatov, S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 150 (1967)
2. F. Sadritdinov, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (FAN, Tashkent, 1971), p. 151

Gentiananine

CAS Registry Number: 11075-48-2



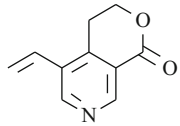
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Gentiana caucasica, G. kaufmanniana, G. olgae, G. olivieri, G. tianschanica, G. turkestanorum, G. vvedenskyi, Pedicularis macrochila, Swertia graciliflora, S. marginata*
$C_{11}H_{13}NO_3$: 207.0895
Mp: 375–380°C (dec.) [1]
UV: 219, 265(3.89, 3.50) [1]
IR: 1735, 1600 [1]
^{1}H NMR: 1.78, 2.27(each 3H, s, 2 × CH_3), 3.38(3H, s, OCH_3) [1]

References

1. A. Abdusamatov, A. Samatov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 116 (1976)

Gentianine

CAS Registry Number: 439-89-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Cephalaria gigantea, C. kotschyi, C. nachiczevanica, Dipsacus azureus, Erythraea centaurium, Gentiana barbata, G. caucasica, G. cruciata, G. decumbens, G. kaufmanniana, G. kirilowii, G. macrophylla, G. olivieri, G. pneumonanthe, G. tianschanica, G. turkestanorum, G. vvedenskyi, Lomatogonium rotatum, Ophelia diluta, Swertia connata, S. graciliflora, S. marginata*
$C_{10}H_9NO_2$: 175.0633
Mp: 81–82°C (EtOH), 172°C (hydrochloride), 178°C (hydrobromide), 153°C (oxalate), 240°C (nitrate), 191°C (methiodide), 122°C (dec., picrate) [1]
UV: 218, 254, 290(4.41, 3.90, 3.10) [2]
IR: 1730, 1632, 1592, 1574, 1475, 1129, 1045 [2]
MS *m/z*: 175(M^+), 117(87), 147, 90 [2]
^{1}H NMR: 3.24, 4.67(each 2H, t, J = 5.9, CH_2–C, CH_2–O), 5.77, 5.95(each 1H, d, J = 10.7, 17.9, =CH_2), 7.08(1H, q, J = 10.7, 17.9, =CH), 9.17(2H, br s, H-Ar) [2]

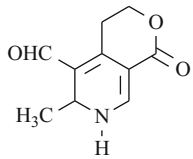
Pharm./Biol.: LD_{50} 504, 460, 618 mg/kg (s/c, i/p, oral, mice). Anti-inflammatory, sedative [3], and antihelminthic [4] actions.

References

1. N.F. Proskurnina, Zh. Obshch. Khim. **14**, 1148 (1944)
2. D. Lavie, R. Taylor-Smith, Chem. Ind. **781** (1963)
3. N. Tulyaganov, V.L. Danilevskii, F. Sadritdinov, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (FAN, Tashkent, 1971), p. 148
4. M.D. Mashkovskii, *The Main Directions of the Work of VNIKhFI* [Sergo Ordzhonikidze All-Union Research Institute of Pharmaceutical Chemistry] [in Russian], (Moscow, 1959), p. 393

Gentioflavine

CAS Registry Number: 18058-50-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Gentiana olgae, G. olivieri, G. tianschanica, Swertia connata, S. graciliflora, S. marginata*

$C_{10}H_{11}NO_3$: 193.0739

Mp: 218–220°C [1]

Solubility: sol. $CHCl_3$, EtOH, H_2O [1]

UV: 235, 298, 410 [1]

IR: 3235, 1700, 1640, 1620 [1]

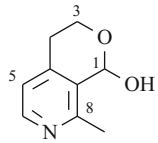
^{1}H NMR: 1.30(3H, d, CH_3), 3.00, 4.35(each 2H, t, 2 × CH_2), 5.20(1H, q, CH–CH_3), 8.45, 8.80, 10.10(each 1H, s, H-Ar, NH, CHO) [1]

References

1. N.L. Marekov, S.S. Popov, Tetrahedron **24**, 1323 (1968)

Gentiotibetine

CAS Registry Number: 26005-36-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Gentiana olivieri*

$C_9H_{11}NO_2$: 165.0790

Mp: 161.5°C [1]

UV: 263, 270 [1]

IR: 3200–2500, 1602, 1575, 1381–1377, 830, 780, 732–728 [1]

MS *m/z*: 165(M^+), 134, 106, 79, 77, 51 [1]

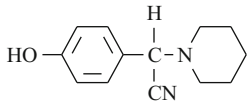
^{1}H NMR: 2.53(3H, s, CH_3), 2.56(1H, dd, J = 17, 3.5, H-4), 2.98(1H, m, J = 17, 12, 6, H-4), 3.88(1H, q, J = 11.5, 6, H-3), 4.29(1H, td, J = 11.5, 12, 3.5, H-3), 4.60–5.20(1H, br s, OH), 5.94(1H, br s, H-1), 6.85(1H, d, J = 5, H-5), 8.21(1H, d, J = 5, H-6) [1]

References

1. F. Rulko, L. Dolejs, A.D. Cross, G.W. Murphy, T.P. Toube, Rocz. Chem. **41**, 567 (1967)

Girgensonine

CAS Registry Number: 486-30-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids

Biological sources: *Girgensohnia oppositiflora*

$C_{13}H_{16}N_2O$: 216.1263

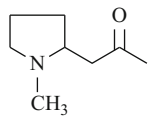
Mp: 147–148°C (MeOH), 148°C (hydrochloride), 194°C (dec., picrolonate) [1]
$[\alpha]_D$ 0° [1]
Solubility: very sol. EtOH, Et_2O, $CHCl_3$; sol. C_6H_6; spar. sol. pet. ether., H_2O [1]

References

1. N.K. Yurashevskii, N.L. Stepanova, Zh. Obshch. Khim. **16**, 141 (1946)

Hygrine

CAS Registry Number: 496-49-1

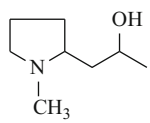


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Cochlearia arctica, Convolvulus hamadae*
$C_8H_{15}NO$: 141.1154
Br: 193–195°C [1]
Mp: 153°C (picrate), 158°C (chloroaurate) [1]
D_0^{17} 0.9392; n_D1.4565 [1]
$[\alpha]_D$ −4° [1]

References

1. G.V. Lazur'evskii, Trudy UzGU **15**, 43 (1939)

Hygroline



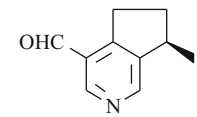
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Cochlearia arctica*
$C_8H_{17}NO$: 143.1310
Mp: 33–34°C [1]
$[\alpha]_D$ −63° (H_2O) [1, 2]

References

1. T.F. Platonova, A.D. Kuzovkov, Med. Prom. SSSR **10**, 19 (1963)
2. E. Spath, F. Kittel, Chem. Ber. **76**, 942 (1943)

Indicaine

CAS Registry Number: 18070-40-1



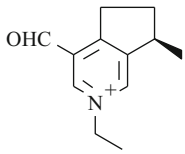
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Incarvillea olgae, Pedicularis ludwigii, P. olgae, P. violascens, Plantago indica, P. ramosa*
$C_{10}H_{11}NO$: 161.0841
Bp: 92–105°C [1]
Mp: 153°C (picrate) [1]
$[\alpha]_D$ +20° ($CHCl_3$), +59° (MeOH) [1]
UV: 268(3.13) [1]
IR: 2970, 2940, 1700, 1600, 1580 [1]
MS *m/z*: 161(M^+), 146, 133, 118, 91, 77 [1]
^{1}H NMR: 1.32(3H, d, J = 7, CH_3), 1.65, 2.35(each 1H, m, CH_2), 3.32(3H, m, CH, CH_2), 8.70, 8.82(each 1H, H-Ar), 10.05(1H, s, CHO) [2]

References

1. A. Abdusamatov, Author's Abstract of Doctoral Dissertation, Tashkent, 1972
2. A. Abdusamatov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 229 (1968)

Indicainine

CAS Registry Number: 32152-74-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Pedicularis olgae*
$C_{12}H_{16}NO$: 190.1228
Mp: oil, 127°C (picrate) [1]
$[\alpha]_D$ +14° ($CHCl_3$) [1]
UV: 261, 268(3.52, 3.48) [1]
IR: 3600-3200, 2980, 2940, 2750, 1700, 1580, 910, 855 [1]
MS *m/z*: 190(M^+), 161, 146, 133, 118, 117, 91, 77 [1]
^{1}H NMR: 1.10, 1.40(each 3H, t, d, 2 × CH_3), 1.70, 2.34(each 1H, m, CH_2), 3.55(2H, q, CH_2N), 8.55, 8.75(each 1H, s, H-Ar), 10.13(1H, s, CHO) [1]

References

1. S. Khakimdzhanov, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 121 (1971)

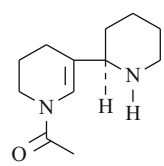
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Ammodendron conollyi, Ammopiptanthus mongolicus*
$C_{12}H_{20}N_2O$: 208.1576
Mp: 43–46°C, 194°C (hydrochloride), 203°C (perchlorate), 219°C (hydroiodide) [1]
$[\alpha]_D$ +15° (EtOH) [1]
UV: 242(4.29) [2, 3]
IR: 3550-3450, 3315, 2935, 2850, 2790, 2719, 1670-1630, 1410, 1265, 1190, 1111, 1070, 1020, 990, 975, 770 [2,3]
^{1}H NMR: 1.20–3.20, 2.10, 7.16, 7.54 [3]
X-ray: [4]
Pharm./Biol.: In a dose of 5–50 mg/kg, lowers the arterial pressure and stimulates the respiration of narcotized animals [5]

References

1. I.F. Proskurnina, V.M. Merlis, Zh. Obshch. Khim. **19**, 1396 (1949)
2. E. Steinegger, K. Wicky, Pharm. Acta Helv. **40**, 610 (1965)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
4. B. Tashkhodzhaev, D. Selenge, Chem. Nat. Comp. **18**, 631 (1982)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 139

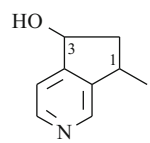
Isoammodendrine

CAS Registry Number: 494-15-5



(+)-Leptorhabine

CAS Registry Number: 55727-36-1

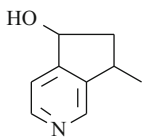


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Leptorhabdos parviflora*
$C_9H_{11}NO$: 149.0841
Mp: oil [1]
$[\alpha]_D$ +110° ($CHCl_3$) [1]
UV: 263, 269(3.36, 3.33) [1]
IR: 3400–3200, 2980–2940, 1605, 1580 [1]
MS *m/z*: 149(M^+), 132, 131, 118, 117, 106, 104, 79, 77, 65, 63 [1]
^{1}H NMR: 1.20(3H, d, J = 7, CH_3), 1.97(2H, m, CH_2), 3.30, 5.06(2H, m, 2 × CH), 6.94(1H, br s, OH), 7.15, 8.07(each 1H, d, J = 5, H-Ar), 8.11(1H, s, H-Ar) [1]

References

1. Kh.A. Kadyrov, V.I. Vinogradova, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 711 (1974)

(±)-Leptorhabine



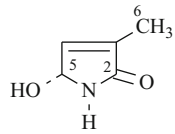
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Leptorhabdos parviflora*
$C_9H_{11}NO$: 149.0841
Mp: oil, 137°C (picrate, H_2O) [1]
UV: 262, 267 [1]
IR: 3400–3200, 1610, 1580 [1]
MS *m/z*: 149(M^+), 132, 131, 118, 106, 104, 79, 77, 65, 63 [1]
^{1}H NMR: 1.04(3H, d, J = 6, CH_3), 1.84(2H, m, CH_2), 3.14, 4.88(each 1H, m, 2 × CH), 6.80, 7.84(each 1H, J = 4, H-Ar), 7.88(1H, s, H-Ar) [1]

References

1. Kh.A. Kadyrov, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 286 (1975)

Lilidine (Jatropham)

CAS Registry Number: 50656-76-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Lilium martagon*
$C_5H_7NO_2$: 113.045
Mp: 118–119°C (Me_2CO) [1], 119–123°C ($CHCl_3$–MeOH) [2]
$[\alpha]_D$ −26° (MeOH) [1], −76.2° (*c*, 1.00, MeOH) [2]
UV: 206, 240 sh(4.30, 3.25) [2]; 235(3.10) [3]
IR: 3300, 1690, 1645 [1]
MS *m/z*: 113(M^+), 98(100), 85, 69, 68 [3]
^{1}H NMR: 1.76(3H, dd, CH_3), 4.78(1H, d, OH), 5.46(1H, dddq, J = 9; 1.3; 1.3, H-5), 6.59(1H, ddq, J = 1.9; 1.2; 1.8, H-4), 7.40(1H, br s, NH) [3]
^{13}C NMR (CD_3OD): [1, 2]

Table 1

C-2	175.2	C-5	79.8
3	136.7	6	10.4
4	142.9		

Pharm./Biol.: Antitumor action [2]

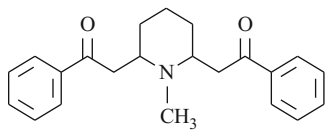
References

1. N.D. Abdullaev, K. Samikov, T.P. Antsupova, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 576 (1987)

2. H. Shimomura, Y. Sashida, Y. Mimaki, Y. Minegishi, Phytochemistry **26**(2), 582 (1987)
3. M. Haladova, A. Buckova, E. Eisenreichova, D. UhrQn, I. Tomko, Chem. Pap. **41**, 835 (1987)

Lobelanine

CAS Registry Number: 579-21-5



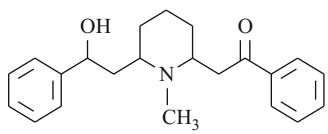
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Lobelia cardinalis, L. fulgens, L. inflata, L. laxylora, L. sessilifolia, L. syphilitica, L. urens*
$C_{22}H_{25}NO_2$: 335.1885
Mp: 99°C, 188°C (dec., hydrochloride), 188°C (hydrobromide), 172°C (hydroiodide), 174°C (perchlorate), 154°C (nitrate) [1]
$[\alpha]_D$ 0° [1]

References

1. H.G. Boit, *Ergebnisse der Alkaloid – Chemie bis 1960* (Akademie-Verlag, Berlin, 1961), p. 136

(−)-Lobeline

CAS Registry Number: 90-69-7



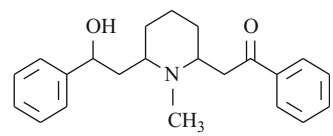
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Lobelia cardinalis, L. fulgens, L. inflata, L. laxylora, L. sessilifolia, L. syphilitica, L. urens*
$C_{22}H_{27}NO_2$: 337.2042
Mp: 130–131°C (EtOH), 132°C (hydrochloride) [1]
$[\alpha]_D$ −35° [1]
Solubility: sol. $CHCl_3$, C_6H_6, EtOH [1]
UV: 280, 345(3.15, 4.12) [1]
IR: 3200, 3090, 3010, 2930, 2900, 1698, 1690, 1607, 1588, 1502, 1477, 1370, 1354, 1300, 1143, 1073, 1048, 986, 930, 892, 870 [1]

References

1. M.V. Tsarev, Trudy VILR **10**, 48 (1950)

(±)-Lobeline

CAS Registry Number: 134-65-6

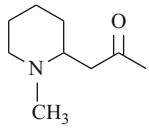


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Lobelia sessilifolia*
$C_{22}H_{27}NO_2$: 337.2042
Mp: 110°C, 170°C (hydrochloride), 160°C (nitrate) [1]
Pharm./Biol.: Respiration stimulator. 1-ml doses of 1% solution used i/v. A component of Lobesil antismoking tablets [2]

References

1. H.G. Boit, *Ergebnisse der Alkaloid – Chemie bis 1960* (Akademie-Verlag, Berlin, 1961), p. 136
2. M.D. Mashkovskii, *Drugs* [in Russian], vol. 1 (Meditsina, Moscow, 1984), p. 133

(±)-Methylisopelletierine



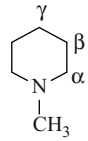
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Sedum aizoon, S. hybridum, S. purpureum*
$C_9H_{17}NO$: 155.1310
Bp: 100°C (15 mmHg) [1]
Mp: 158°C (picrate), 156°C (hydrochloride), 156°C (methiodide) [1]
$[\alpha]_D$ 0° [1, 2]
IR: 2950, 1690 [2]

References

1. H.G. Boit, *Ergebnisse der Alkaloid – Chemie bis 1960* (Akademie-Verlag, Berlin, 1961), p. 132
2. E.A. Krasnov, L.V. Petrova, E.F. Bekker, Chem. Nat. Comp. **13**, 492 (1977)

N-Methylpiperidine

CAS Registry Number: 626-67-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Girgensohnia diptera, G. oppositiflora*
$C_6H_{13}N$: 99.1048
Bp: 107°C [1]
Mp: 152°C (picrate), 226°C (picrolonate) [1]
$[\alpha]_D$ 0° [1]
IR: 2920, 2850, 2830, 2780, 2730, 2700, 2670, 2625, 1469, 1453, 1442, 1378, 1350, 1328, 1295, 1278, 1261, 1163, 1141, 1100, 1086, 1033, 997, 975, 860, 810, 770 [2]
^{13}C NMR: [3]

Table 1

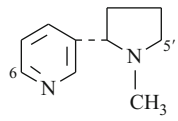
C-α	56.2	C-β	25.9	C-γ	23.9
				NCH_3	46.4

References

1. N.K. Yurashevskii, S.I. Stepanov, Zh. Obshch. Khim. **9**, 2203 (1939)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1973), **8**, No. 966
3. M. Shamma, D.M. Hindenlang, *Carbon-13 NMR Shift Assignments of Amines and Alkaloids* (Plenum Press, New York/London, 1979), No. 6

(−)-Nicotine

CAS Registry Number: 54-11-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Nicotiana acuminata, N. alata, N. angustifolia, N. bigelovi, N. bonariensis, N. calyzina, N. chinensis, N. clevelandii, N. debneyi, N. glufinosa, N. ingulba, N. langsdorfii, N. macrophylla, N. paniculata, N. petiolaris, N. quadriwalvis, N. raimondii, N. rosulata, N. rotundifolia, N. rustica, N. sanquinea, N. solanifolia, N. sylvestris, N. tabacum, N. tomentosa, N. undulata, N. wigandoides*

$C_{10}H_{14}N_2$: 162.1157
Bp: 246°C [1]
Mp: 224°C (dipicrate), 218°C (dipicrolonate), 195°C (dihydroiodide), 280°C (chloroplatinate), 208°C (trinitro-*m*-cresylate) [1]
$[\alpha]_D$ −169° [1]
UV: 262(3.43) [2]
MS *m/z*: 162(M^+), 161, 133, 119, 84 [2]
^{1}H NMR: 2.18(3H, s, NCH_3), 7.30(H-5), 7.75(H-4), 8.55(H-6), 8.60(H-2) [2]
^{13}C NMR: [2]

Table 1

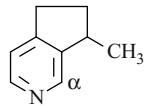
C-2	148.8	C-6	147.8	C-4′	21.7
3	138.3	2′	67.7	5′	55.8
4	134.0	3′	34.4	NCH_3	39.2
5	122.6				

HPLC: [3]
Pharm./Biol.: Selective depressing influence on some branches of the activating system of the reticular formation of the brain stem [4]

References

1. H.G. Boit, *Ergebnisse der Alkaloid – Chemie bis 1960* (Akademie-Verlag, Berlin, 1961), p. 138
2. J.I. Seeman, Heterocycles **22**, 165 (1984)
3. T.A. Perfetti, J.K. Swadesh, J. Chromatogr. **543**, 129 (1991)
4. V.P. Lebedev, Farmakol. Toksikol. **XXIV**(5), 515 (1961)

Noractinidine



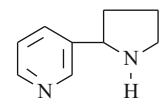
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Pedicularis macrochila*
$C_9H_{11}N$: 133.0891
Mp: oil [1], 137°C (picrate) [2]
$[\alpha]_D$ +22° (EtOH) [1]
UV: 259, 267(3.05, 2.98) [2]
IR: 2930, 1600 [1]
^{1}H NMR: 1.60(3H, d, CH_3), 2.00–2.40(1H), 2.50–3.00(1H), 3.20–3.80(3H, m, CH, CH_2), 8.03, 8.80(each 1H, d, H-Ar), 8.85(1H, s, H-α) [2]

References

1. A. Abdusamatov, Author's Abstract of Doctoral Dissertation, Tashkent, 1972
2. E.M. Dickinson, G. Jones, Tetrahedron **25**, 1523 (1969)

(±)-Nornicotine

CAS Registry Number: 5746-86-1



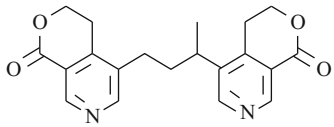
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Nicotiana benthamiana, N. caudigera, N. debneyi, N. eastii, N. glufinosa, N. ingulba, N. longiflora, N. maritima, N. megalosyphon, N. palmeri, N. plumbogenifolia, N. repanda, N. rosulata, N. rotundifolia, N. rusbyi, N. sanderae, N. sanguinea, N. solanifolia, N. suaveolens, N. sylvestris, N. tomentosa, N. trigonophylla, N. velutina*
$C_9H_{12}N_2$: 148.1001
Bp: 267°C [1]
Mp: 194°C (dipicrate), 240°C (dipicrolonate) [1]
$[\alpha]_D$ 0° [1]
HPLC: [2]

References

1. H.G. Boit, *Ergebnisse der Alkaloid – Chemie bis 1960* (Akademie-Verlag, Berlin, 1961), p. 137
2. J.I. Seeman, H.V. Secor, D.W. Armstrong, K.D. Ward, T.J. Ward, J. Chromatogr. **483**, 169 (1989)

Oliveramine

CAS Registry Number: 41645-64-1



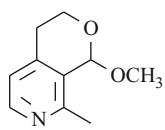
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Gentiana olivieri*
$C_{20}H_{20}N_2O_4$: 352.1423
Mp: 144–145°C [1]
Solubility: sol. $CHCl_3$ [1]
UV: 273(3.48) [1]
IR: 1720, 1585 [1]
MS *m/z*: 352(M^+), 324, 296, 190, 176, 162 [1]
^{1}H NMR: 1.44(3H, d, J = 7, CH_3), 1.98, 2.67(each 2H, m, $–CH_2–CH_2–$), 2.97, 4.46(each 2H, m, $CH_2–CH_2–O$), 8.43, 8.66, 8.94, 9.00(each 1H, s, 4 × H-Ar) [1]

References

1. T.U. Rakhmatullaev, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 56 (1973)

Oliveridine

CAS Registry Number: 29276-66-2



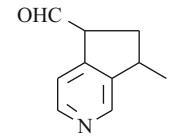
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Gentiana olivieri*
$C_{10}H_{13}NO_2$: 179.0946
Mp: 260°C (dec., Me_2CO) [1]
UV: 261, 268(3.42, 3.41) [1]
IR: 1630, 1480, 1375 [1]
MS *m/z*: 179(M^+), 178, 148(100), 120, 97 [1]

References

1. T.U. Rakhmatullaev, S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 531 (1969)

Pedicularidine

CAS Registry Number: 41645-65-2



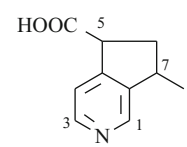
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Pedicularis olgae*
$C_{10}H_{11}NO$: 161.0841
Mp: 211–212°C (EtOH) [1]
$[\alpha]_D$ +68° (MeOH) [1]
UV: 263, 270(3.36, 3.32) [1]
IR: 2960, 1700, 1600 [1]
MS *m/z*: 161(M^+, 100), 160(16), 133(4), 132(15), 118(16), 117(19), 91(10), 77(6) [1]

References

1. S. Khakimdzhanov, A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 137 (1973)

Pedicularine

CAS Registry Number: 28330-57-6



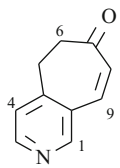
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Catalpa speciosa, Pedicularis olgae*
$C_{10}H_{11}NO_2$: 177.0790
Mp: 208–209°C (dec., MeOH), 184°C (dec., nitrate) [1]
$[\alpha]_D$ −15° (MeOH) [1]
UV: 265, 272(2.87, 2.89) [1]
IR: 2960, 1710, 1600 [1]
MS *m/z*: 177(M^+, 52), 162(100), 133(40), 118(68), 117(52), 91(34), 77(14) [1]
^{1}H NMR: 1.07(3H, d, J = 6, CH_3), 1.66, 2.18(each 1H, m, 2H-6), 3.08(2H, m, H-5, H-7), 8.07, 8.47(each 1H, d, J = 5.5, H-4, H-3), 8.92(1H, s, H-1) [1]

References

1. A. Abdusamatov, S. Khakimdzhanov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 383 (1969)

Pediculidine

CAS Registry Number: 33579-98-5



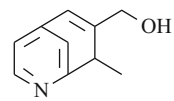
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Pedicularis olgae*
$C_{10}H_9NO$: 159.0684
Mp: 74–75°C, 212°C (picrate) [1]
UV: 268, 273, 293(3.97, 3.96, 3.36) [1]
IR: 1695-1640, 1620, 1595, 1590, 855, 810 [1]
MS *m/z*: 159(M^+, 100), 158, 132, 131, 130, 118, 117, 104, 103, 102, 91, 89, 77 [1]
^{1}H NMR: 2.45–3.15(4H, m, 2H-5, 2H-6), 6.34, 7.12(each 1H, d, J = 12.5, H-9, H-8), 7.15, 8.41(each 1H, d, J = 5.2, H-4, H-3), 8.51(1H, s, H-1) [1]

References

1. A. Abdusamatov, M.U. Rashidov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 292 (1971)

Pediculine

CAS Registry Number: 19772-84-0



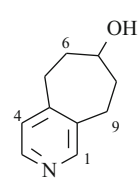
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Pedicularis olgae*
$C_{10}H_{11}NO$: 161.0841
Mp: 188–189°C (EtOH) [1]
$[\alpha]_D$ +61.5° (EtOH) [1]
UV: 265 [1]
IR: 3200, 2960, 1590, 880, 810 [1]
MS *m/z*: 161(100), 146, 117, 91 [1]

References

1. A. Abdusamatov, Kh. Ubaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 117 (1968)

Pediculinine

CAS Registry Number: 33605-28-6



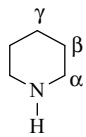
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Pedicularis olgae, Verbascum nobile*
$C_{10}H_{13}NO$: 163.0997
Mp: 133–134°C (Me_2CO), 161°C (picrate) [1]
$[\alpha]_D$ 0° (EtOH) [1]
UV: 262, 269(3.33, 3.23) [1]
IR: 3400-3200, 1595 [1]
MS *m/z*: 163(M^+), 161, 146, 145, 131, 130, 119, 118, 117, 91, 77 [1]
^{1}H NMR: 1.57, 1.98(each 2H, t, 2H-6, 2H-8), 2.40–3.05(4H, m, 2H-5, 2H-9), 4.01(2H, m, H-7, OH), 6.93(1H, d, J = 5, H-4), 8.19(2H, m, H-1, H-3) [1]

References

1. A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 294 (1971)

Piperidine

CAS Registry Number: 110-89-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Petrosimonia monandra*
$C_5H_{11}N$: 85.0892
Bp: 106.5°C [1]
Mp: 246°C (hydrochloride), 152°C (picrate), 201°C (chloroplatinate) [1]
$[\alpha]_D$ 0° [1]
IR: 3270, 3080, 2930, 2845, 2800, 2730, 2670, 2625, 1468, 1442, 1385, 1365, 1345, 1330, 1319, 1286, 1259, 1191, 1168, 1148, 1118, 1051, 1037, 1009, 965, 940, 860, 825, 745 [2]
^{13}C NMR: [3]

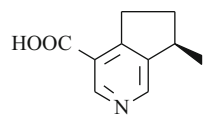
Table 1

C-α	47.3	C-β	27.2	C-γ	25.4

References

1. N.K. Yurashevskii, S.I. Stepanov, Zh. Obshch. Khim. **9**, 1687 (1939)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1972), **7**, No. 879
3. M. Shamma, D.M. Hindenlang, *Carbon-^{13} NMR Shift Assignments of Amines and Alkaloids* (Plenum Press, New York/London, 1979), No. 65

(+)-Plantagonine

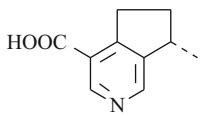


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Catalpa speciosa, Pedicularis dolichorhiza, P. ludwigii, P. macrochilla, P. olgae, P. rhinanthoides, P. violascens, Plantago indica, Verbascum songoricum*
$C_{10}H_{11}NO_2$: 177.0790
Mp: 218–220°C (dec., Me_2CO), 169°C (dec., nitrate) [1]
$[\alpha]_D$ +40° (MeOH) [1]
UV: 270(3.12) [2]
IR: 1715, 1595 [2]
MS *m/z*: 177(M^+), 162, 133, 118, 91, 77 [2]
^{1}H NMR: 1.15(3H, d, CH_3) [2]
^{1}H NMR (O-Me ester): 1.26(3H, d, J = 7, CH_3), 1.57, 2.29(each 1H, m, CH_2), 3.12(3H, m, CH, CH_2), 3.84(3H, s, OCH_3), 8.44, 8.88(each 1H, s, 2 × H-Ar) [3]

References

1. Kh. Ubaev, P.Kh. Yuldashev, S.Yu. Yunusov, Uzb. Khim. J. (3), 33 (1963)
2. K.L. Lutfullin, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 287 (1965)
3. A. Abdusamatov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 229 (1968)

(−)-Plantagonine



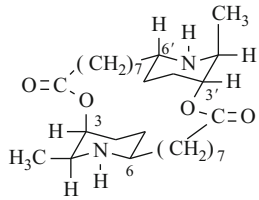
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Incarvillea olgae*
$C_{10}H_{11}NO_2$: 177.0790
Mp: 218–220°C (dec.) [1]
$[\alpha]_D$ −33° (EtOH) [1]
UV: 270(3.12) [2]
IR: 1715 [2]
MS *m/z*: 177(M^+), 162, 133, 118, 91, 77 [2]
^{1}H NMR (O-Me ester): 1.26(3H, d, J = 7, CH_3), 1.57, 2.29(each 1H, m, CH_2), 3.12(3H, m, CH, CH_2), 3.84(3H, s, $COOCH_3$), 8.44, 8.88(each 1H, s, 2 × H-Ar) [3]

References

1. I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **2**, 178 (1966)
2. K.L. Lutfullin, P.Kh. Yuldashev, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 287 (1965)
3. A. Abdusamatov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 229 (1968)

Pseudocarpaine

CAS Registry Number: 3760-91-6

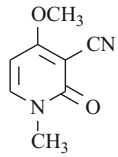


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Carica papaya*
$C_{28}H_{50}N_2O_4$: 478.3770
Mp: 65–68°C [1]
$[\alpha]_D$ +5° (EtOH) [1]
IR: 2990, 1720, 1470, 1380, 1230 [2]
MS *m/z*: 478(M^+), 463, 436, 407, 384, 335, 300, 240, 222, 195, 180, 110, 96, 80, 69, 55, 44 [3]
^{1}H NMR: 1.02, 1.07(each 3H, d, J = 7, CH_3), 2.85, 3.15(each 1H, m, br d, H-2, H-2′), 4.83(each 1H, br s, H-3, H-3′) [3]

References

1. L.I. Topuriya, Chem. Nat. Comp. **19**, 241 (1983)
2. T.R. Govindachari, B.R. Pai, N.S. Narasimhan, J. Chem. Soc. 1847 (1954)
3. T.R. Govindachari, K. Nagarajan, N. Viswanathan, Tetrahedron Lett. **24**, 1907 (1965)

Ricinine

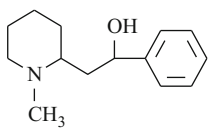


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Ricinus communis*
$C_8H_8N_2O_2$: 164.1652
Mp: 200–201°C (EtOH) [1], 199–201°C [2]
$[\alpha]_D$ 0° [2]
UV: 256 (3.50), 313 (3.89) [3]
IR: 2958, 2854, 2224, 1662 [1]
MS *m/z*: 164 (M^+, 100), 146, 135, 121, 96, 93, 80, 69, 58, 51 [1]

References

1. P.Kh. Yuldashev, Chem. Nat. Comp. **37**, 274 (2001)
2. R.V. Tuson, J. Chem. Soc. **17**, 195 (1864)
3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids*, (Prague Publishing House, Czechoslovak Academy of Sciences/Heyden & Son, London, 1966), **2**, No. 232

(−)-Sedamine

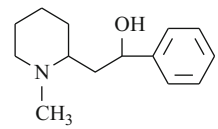


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Sedum acre*
$C_{14}H_{21}NO$: 219.1623
Mp: 86–87°C [1], 207°C (hydrochloride) [2]
$[\alpha]_D$ −75° (MeOH) [2]
Solubility: sol. EtOH, $CHCl_3$, Me_2CO [1]
UV: 213, 252, 258, 264 [2]
IR: 3010, 2890, 1445, 1369, 1335, 1193, 1055, 1015, 909, 868, 695 [2]

References

1. D.G. Kolesnikov, A.G. Shvartsman, Zh. Obshch. Khim. **9**, 2156 (1939)
2. B. Franck, Chem. Ber. **91**, 2803 (1958); **92**, 1001 (1959)

(±)-Sedamine

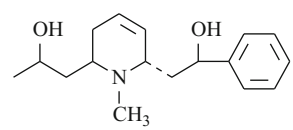


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Sedum aizoon, S. ewersii, S. hybridum, S. purpureum*
$C_{14}H_{21}NO$: 219.1623
Mp: 89–90°C, 188°C (hydrochloride) [1]
UV: 213, 252, 258, 264 [2]
IR: 3280, 2955, 1570, 1485 [1]

References

1. E.A. Krasnov, L.V. Petrova, E.F. Bekker, Chem. Nat. Comp. **13**, 492 (1977)
2. B. Franck, Chem. Ber. **91**, 2803 (1958)

(−)-Sedinine



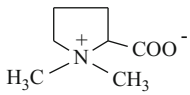
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Sedum aizoon, S. hybridum, S. purpureum*
$C_{17}H_{25}NO_2$: 275.1885
Mp: 119–121°C, 170°C (hydrochloride) [1]
$[\alpha]_D$ −140°C (MeOH) [1]
UV: 212, 252, 258, 264 [2]
IR: 3385, 2935, 1590, 760, 745 [1]

References

1. E.A. Krasnov, L.V. Petrova, E.F. Bekker, Chem. Nat. Comp. **13**, 492 (1977)
2. B. Franck, Chem. Ber. **92**, 1001 (1959); **91**, 2803 (1958)

(±)-Stachydrine

CAS Registry Number: 50298-93-6

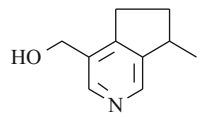


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Capparis spinosa, Eremostachys speciosa, Lagochilus hirtus, L. inebrians, L. platicalyx, L. pubescens, Lamium album, Leonurus quinquelobatus, L. turkestanicus, Marrubium alternidens, Panzeria lanata, Phlomis tuberosa, Sideritis montana, Stachys balansae, S. betonicaeflora, S. hissarica, S. lanata*
$C_7H_{13}NO_2$: 143.0946
Mp: 235–236°C (EtOH), 228°C (hydrochloride), 196°C (EtOH., picrate), 107°C (oxalate) [1, 2]
Solubility: sol. H_2O, EtOH, MeOH [1]
IR: 2940, 2870, 1725, 1680, 1630, 1425 [1]

References

1. L.M. Kozlova, Farmatsiya No. 6, 23 (1967)
2. X.P. Fu, H.A. Aisa, M. Abdurahim, A. Yili, S.F. Aripova, B. Tashkhodzhaev, Chem. Nat. Comp. **43**, 181 (2007)

Tecostidine

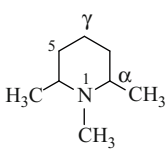


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Pedicularis rhinanthoides*
$C_{10}H_{13}NO$: 163.0997
Mp: oil, 153°C (picrate) [1]
$[\alpha]_D$ +6° (EtOH) [1]
UV: 262, 270(3.27, 3.21) [2]
IR: 3400-3200, 2960, 1595, 850, 815 [1]
^{1}H NMR: 1.27(3H, s, CH_3), 3.25(1H, m, CH), 4.62, 4.65(3H, m, CH_2OH), 8.22, 8.27(each 1H, s, 2 × H-Ar) [2]

References

1. A. Abdusamatov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 285 (1969)
2. J. Hammouda, J. Le Men, Bull. Soc. Chim. Fr. 2901 (1963)

(−)-1, 2, 6-Trimethylpiperidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyridine, Piperidine, and Pyrrolidine Alkaloids
Biological sources: *Nanophyton erinaceum*
$C_8H_{17}N$: 127.1361
Bp: 153–154°C [1]
Mp: 164°C (hydrochloride) [1]

$[\alpha]_D$ −43° [1]
^{13}C NMR: [2]

Table 1

C-α	59.7	C-γ	24.9	$C–CH_3$	21.7
C-β	35.2			$N–CH_3$	38.1

References

1. A.D. Kuzovkov, G.P. Men'shikov, Zh. Obshch. Khim. **20**, 1524 (1950)
2. M. Shamma, D.M. Hindenlang, *Carbon-^{13} NMR Shift Assignments of Amines and Alkaloids* (Plenum Press, New York/London, 1979), No. 78

Pyrrolizidine alkaloids occur most frequently in plants of the families *Boraginaceae, Compositae, Leguminosae, Gramineae*, etc.

Men'shikov and coworkers first demonstrated that this group of alkaloids is based on the heliotridane skeleton.

A total of 50 alkaloids has been isolated from the aforementioned plants. Of these, 17 are new. They can be divided into two groups:

1. Hydroxy derivatives of 1-methylpyrrolizidine and their esters.

2. Derivatives of tetrahydrofuranomorpholino-pyrrolizidine.

The majority of alkaloids belonging to the first group are esters. Their bases are hydroxy derivatives of 1-methylpyrrolizidine and are called necinic alcohols; the esterified acids, one or two monocarboxylic acids or one dicarboxylic acid. These acids usually have a branched carbon chain and are called necinic acids.

Necinic alcohols contain one, two, or even three hydroxyls.

The hydroxyls are usually located in the 7- and 9-positions of the 1-methylpyrrolizidine core. The differences in the aforementioned amino alcohols depend also on the degree of saturation and the stereochemistry of the heterocyclic core. The double bond in the unsaturated amino alcohols is located between C-1 and C-2.

1-Methylpyrrolizidine (heliotridane) contains two asymmetric C atoms (C_1 and C_8). This makes it possible for four optically active isomers to exist. Bases were found among natural pyrrolizidine alkaloids that are derivatives of all four stereoisomers. All four possible isomers of 1-hydroxymethylpyrrolizidine were found in the alkaloids trachelanthamidine, isoretronecanol, lindelofidine, and laburnine.

The double bond is reduced stereospecifically to form mainly the isomer with the b-configuration of the CH_2OH group.

Many pyrrolizidine alkaloids occur in plants as *N*-oxides. Their content in certain instances reaches greater than 90% of the total bases.

Loline alkaloids include 12 bases and are found in plants of the families *Gramineae* and *Leguminosae*.

Instrumental methods such as UV, NMR (^1H and ^{13}C), mass spectrometry, and *X*-ray structure analysis have been used successfully recently to establish structures of pyrrolizidine alkaloids.

The UV spectra of alkaloids containing α, β-unsaturated acids have absorption maxima at 212–219 nm.

The mass spectrometric behavior of pyrrolizidine alkaloids and their transformation products has been studied. Mass spectra of pyrrolizidine alkaloids are analyzed to establish the nature of the amino alcohol in the low-mass range and to determine the structure of the esterified acid using peaks located near the molecular ion. The decomposition of molecular ions of the amino alcohols begins with cleavage of the C_1–C_8 or C_7–C_8 bond. The contribution of one process or another depends on the presence of a hydroxyl on C7 and C9. The spectra of unsaturated amino alcohols displays clearly an alternative loss of hydroxyl from C9 and the C7–C6 chain.

Mass spectra of *N*-oxides of amino alcohols and alkaloids with the heliotridine, platynecine, and retronecine skeletons have been studied.

Fragments observed in spectra of *N*-oxides have been divided into three types: A-ions from the starting bases and B-ions retaining the O atom of the N–O group.

A study of the PMR spectra of loline dihydrochloride found that the observed vicinal coupling constants, with the exception of *J*5/6, have very low values.

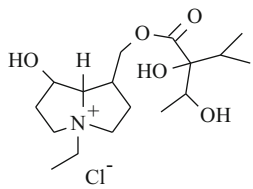
^{13}C NMR spectra of pyrrolizidine alkaloids have been reviewed [1].

Many pyrrolizidine alkaloids possess M-cholinolytic and spasmolytic activities, dilate pupils, and inhibit salivation induced by carbocholine and pilocarpine.

References

E. Roeder, Phytochemistry **29**, 11 (1990)

Alkaloid No. 1



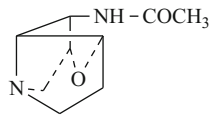
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lindelofia anchusoides*
$C_{17}H_{32}NO_5Cl$: 365.1969/367.1940
Mp: 149–151°C (abs. dioxane-EtOH), 92°C {(trachelanthic acid), 220°C (necine $[\alpha]_D$ +4° (water), +2°C (EtOH)} [1]
$[\alpha]_D$ +20° (anhyd. MeOH) [1]
Solubility: very sol. water, EtOH; spar. sol. org. solvents [1]

References

1. L.T. Tsirul'nikova, A.S. Labenskii, L.M. Utkin, Zh. Obshch. Khim. **32**, 2705 (1962)

N-Acetylnorloline

CAS Registry Number: 38964-35-1



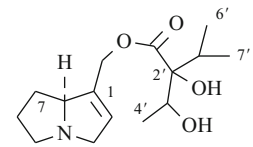
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lolium cuneatum*
$C_9H_{14}N_2O_2$: 182.1055
Mp: oil, 235°C (dec., hydrochloride) [1]
$[\alpha]_D$ +50° ($CHCl_3$) [1]
Solubility: very sol. EtOH, $CHCl_3$ [2]
IR: (hydrochloride): 3250–3200, 1670 [1]
MS *m/z*: 182(M^+), 139, 124, 123, 111, 110, 95, 83, 82(100), 69, 55, 42 [2]
^{1}H NMR: 1.95(3H, s, Ac), 7.04(NH) [1]

References

1. E.Kh. Batirov, S.A. Khamidkhodzhaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Compd. **12**, 50 (1976)
2. E.Kh. Batirov, *Unpub.*

Amabiline

CAS Registry Number: 151204-56-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Cynoglossum amabile*
$C_{15}H_{25}NO_4$: 283.1783
Mp: oil, 113°C (picrate) [1]
$[\alpha]_D$ −7° (EtOH) [1]
IR: 3340, 1720 [2]
MS *m/z*: 283(M^+), 120, 85, 83 [3]
MS(SIMS) *m/z*: 284(M + 1), 238, 220, 140, 124, 122, 120 [3]
^{1}H NMR: 0.89(3H, d, J = 6.8, H-6′), 0.94(3H, d, J = 6.86, H-7′), 1.22(3H, d, J = 6.05, H-4′), 1.55(1H, m, H-7), 1.79(2H, m, H-6), 1.99(1H, m, H-7), 2.17(1H, m, H-5′), 2.50(1H, m, H-5), 3.15(1H, m, H-5), 3.38(1H, dd, H-3), 3.93(1H, dd, H-3), 4.02(1H, q, H-3′), 4.19(1H, br s, H-8), 4.78(2H, m, H-9), 5.70(1H, br s, H-2) [2, 3]
^{13}C NMR: [2]

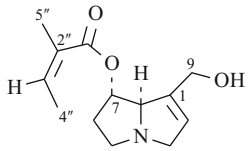
Table 1

C-1	137.5	C-7	30.0	C-3′	70.5
2	125.5	8	71.5	4′	17.2
3	61.8	9	62.3	5′	32.2
5	56.8	1′	174.4	6′	16.1
6	25.9	2′	83.3	7′	17.7

References

1. I.V. Man'ko, Rastit. Res. **8**, 243 (1972)
2. E. Roeder, E. Breitmaier, H. Birecka, M.W. Frohlich, A. Badziez-Crombach, Phytochemistry **30**, 1703 (1991)
3. C.D. Dodson, F.R. Stermitz, J. Natur. Prod. **49**, 727 (1986)

7-Angelylheliotridine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Rindera austroechinata*

$C_{13}H_{19}NO_3$: 237.1365

Mp: 116–117°C, 164°C (picrate) [1]; 141°C (methiodide) [2]; 46°C (angelic acid), 118°C (heliotridine, $[\alpha]_D$ +32° [3])

$[\alpha]_D$ +22°(EtOH), −16° ($CHCl_3$) [1]

UV: 218(4.07) [4]

IR: 3100, 1700, 1640 [5]

MS *m/z*: 237(M^+, 2), 219, 154, 137, 124, 111, 106, 94, 80(100), 55 [5]

^{1}H NMR: 1.85(3H, m, CH_3-5″), 1.90(2H, m, H-6), 1.97(3H, dd, CH_3-4″), 2.90(1H, m, H-5), 3.22(1H, m, H-5), 3.36(1H, d, H-3), 3.99(1H, d, H-3), 4.14(1H, br s, H-8), 4.33(2H, s, H-9), 5.12(1H, br s, H-7), 5.61(1H, s, H-2), 6.12(1H, q, H-3″) [6]

^{13}C NMR: [5]

Table 1

C-1	127.7	C-7	77.7	C-2″	140.8
2	139.0	8	79.3	3″	124.4
3	62.0	9	59.8	4″	15.9
5	53.8	1″	168.7	5″	20.5
6	30.2				

CD: [7]

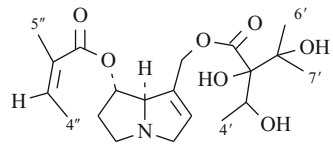
X-ray: [8]

References

1. M.V. Telezhenetskaya, A.D. Matkarimov, S.N. Khadzhibekov, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 389 (1987)
2. F. Santavy, B. Sula, V. Manis, Collect. **27**, 1666 (1962)
3. A. Klasek, P. Vrublovsky, F. Santavy, Collect. **32**, 2512 (1967)
4. V. Simanek, A. Klasek, F. Santavy, Collect. **34**, 1832 (1969)
5. E. Roder, H. Wiedenfeld, P. Stengl, Planta Med. **40**, 182 (1980)
6. C.F. Asibal, J.A. Clinski, L.T. Gelbaum, L.H. Zalkow, J. Natur. Prod. **52**, 109 (1989)
7. J. Hrbek, L. Hruban, A. Klasek, N.K. Kochetkov, A.M. Likhosherstov, F. Santavy, G. Snatzke, Collect. **37**, 3918 (1972)
8. H. Wiedenfeld, E. Roder, Arch. Pharm. **314**, 737 (1981)

Asperumine

CAS Registry Number: 32728-78-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Echium vulgare*, *Symphytum asperum*, *S. caucasicum*

$C_{20}H_{31}NO_7$: 397.2101

Mp: oil, 137°C (picrate), 171°C (picrolonate), 45°C (angelic acid) [1]

$[\alpha]_D$ ±0° (EtOH) [1]

UV: 222(3.90) [2]

IR: 3500–2800, 1730, 1708, 1645 [2]

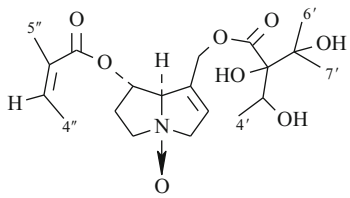
MS *m/z*: 397(M^+), 136, 120, 119, 93, 80 [2]

^{1}H NMR: 1.00–1.15(9H, m, CH_3-4′, CH_3-6′, CH_3-7′), 1.77(3H, s, CH_3-5″), 1.92(3H, d, J = 7, CH_3-4″), 6.02(1H, m) [2]

References

1. I.V. Man'ko, B.K. Kotovskii, Zh. Obshch. Khim. **40**, 2519 (1970)
2. Z.V. Mel'kumova, M.V. Telezhenetskaya, S.Yu. Yunusov, I.V. Man'ko, Chem. Nat. Comp. **10**, 483 (1974)

Asperumine N-Oxide



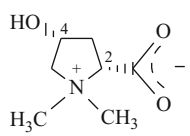
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Echium vulgare*
$C_{20}H_{31}NO_8$: 413.2050
Mp: 151–153°C (dec.), 145°C (H_2O, picrate) [1]
$[\alpha]_D$ ±0° [1]

References

1. A. Karimov, M.V. Telezhenetskaya, K.L. Lutfullin, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 452 (1975)

Befonicine

Trans – N,N-Dimethyl-4-Hydroxy-L-Proline



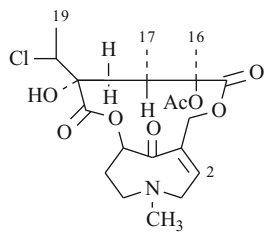
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Achyllea millefolium, Befonica officinalis, Phlomis regelii*
$C_7H_{13}NO_3$: 159.1857
Mp: 235–236°C [1–3]
$[\alpha]_D$ −24° (H_2O) [1]
Solubility: sol. MeOH, EtOH, H_2O [1]
IR: 3400, 1635 [1]
MS *m/z*: 159, 132, 120, 107, 100, 84, 82, 70, 60, 58, 44, 42 [1]
^{1}H NMR: 3.12 and 3.38(3H each, s, N–CH_3), 4.54(1H, m, OH), 2.30–2.65(2H, m, CH_2), 3.88–4.08(2H, k, $J_1 = J_2 = 6$, N–CH_2), 4.16–4.36(2H, k, $J_1 = 8$, $J_2 = 2$, CH-COO), 3.40–3.46(1H, m, CH-O-) [1]
X – ray: [1, 4]

References

1. N.A. Razzakov, B. Tashkhodzaev, S.F. Aripova, A.A. Tojibaev, Chem. Nat. Comp. **41**, 56 (2005)
2. F.M. Miller, L.M. Chow, J. Amer. Chem. Soc. **76**, 1353 (1954)
3. A. Schulze, A. Trier, Helv. Chem. Acta. **76**, 258 (1911)
4. G.P. Jones, B.P. Naidu, L.G. Paleg, E.R.T. Tiekink, Acta. Crystallogr. Sect. C: Cryst. Sfruct. Commum. **44**, 2208 (1988)

Doronine

CAS Registry Number: 60367-00-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Doronicum macrophyllum*, *Senecio othonnae*
$C_{21}H_{30}NO_8Cl$: 459.1659/461.1630
Mp: 113–114°C (dec., C_6H_6-cyclohexane) [1]; 125°C [2]; 235°C (dec., picrate) [1]
$[\alpha]_D$ +45° ($CHCl_3$) [1]
IR: 3500–2800, 1750, 1620 [1]; 3440, 1750, 1735, 1710, 1630 [3]
MS *m/z*: 461/459(M^+, 50), 446/444(10), 427(7), 424(30), 423(5), 396(62), 374/372(100), 352(10),

336(12), 238(32), 168(70), 150(40), 122(35), 110(30) [1, 3]

^{1}H NMR: 1.21(6H, d, J = 5, CH_3-17, CH_3-19), 1.65(3H, s, CH_3-16), 2.03(6H, s, NCH_3, OAc-11), 6.11(1H, m, H-2) [1]

X-ray: [4]

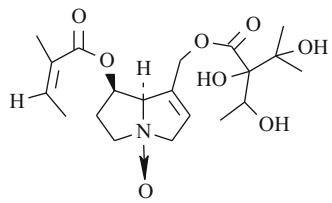
Pharm./Biol.: LD_{50} 703 mg/kg (mice). Hypotensive action [5].

References

1. Sh.A. Alieva, U.A. Abdullaev, M.V. Telezhenetskaya, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 173 (1976)
2. E. Roder, H. Wiedenfeld, P. Knozinger-Fisher, Planta Med. **50**, 203 (1984)
3. D. Cheng, E. Roder, Planta Med. 484 (1986)
4. R.Y. Wong, J.N. Roitman, Acta Cryst. **40C**, 163 (1984)
5. D.Ya. Guseinov, P.A. Yuzbashinskaya, D.S. Khalilov, K.T. Mamedova, Azerb. Med. Zh. (5), 21 (1979)

Echimidine N-Oxide

CAS Registry Number: 41093-89-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Symphytum caucasicum*

$C_{20}H_{31}NO_8$: 413.2050

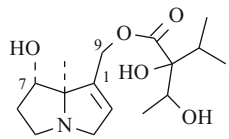
Mp: 165°C [1]

References

1. I.V. Man'ko, Z.V. Mel'kumova, V.F. Malysheva, Rast. Res. **8**, 538 (1972)

Echinatine

CAS Registry Number: 480-82-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Cynoglossum amabile*, *C. pictum*, *Lindelofia macrostyla*, *L. stylosa*, *L. tschmganica*, *Paracynoglossum imeretinum*, *Rindera austroechinata*, *R. baldshuanica*, *R. cyclodonta*, *R. echinata*, *R. oblongifolia*, *Solenanthus circinnatus*, *S. coronatus*, *S. hirsutus*, *S. karateginus*, *Suchtelenia calycina*, *Symphytum asperum*, *S. caucasicum*, *S. officinale*

$C_{15}H_{25}NO_5$: 299.1733

Mp: 111–112°C (Me_2CO) [1]; oil, 97°C (hydrochloride), 140°C (methiodide), 206°C (picrolonate) [2]

$[\alpha]_D$ +12° (MeOH) [1]

UV: 266, 272 [3]*

IR: 3360, 3340, 3230, 3120, 2965, 2745, 2130, 1738, 1650, 1470, 1430, 1420, 1250, 880 [3]

MS *m/z*: 299(M^+, 3), 255(6), 138(100), 93(89) [4]

^{1}H NMR: 0.82, 0.88(each 3H, d, CH_3-7′, CH_3-6′), 1.25(3H, d, CH_3-4′), 1.77, 1.87(2H, m, H-6), 2.13(1H, m, H-5′), 2.55, 3.18(2H, m, H-5), 3.24, 3.89(2H, d, H-3), 3.91(1H, q, H-3′), 3.94(1H, br s, H-8), 4.08(1H, m, H-7), 4.75, 4.97(2H, q, H-9), 5.62(1H, br s, H-2) [5]

^{13}C NMR: [5]

Table 1

C-1	135.9	C-7	74.0	C-3′	74.4
2	125.4	8	79.6	4′	17.4
3	61.9	9	61.6	5′	32.3
5	54.2	1′	173.7	6′	17.9
6	33.6	2′	84.0	7′	15.8

CD: [6]

X-ray: [7]

Pharm./Biol.: LD_{50} 101.2, 350 mg/kg (i/v, i/p, mice and rats). Hepatotoxic and ganglioblocking action [8]

References

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5. C.F. Asibal, J.A. Glinski, L.T. Gelbaum, L.H. Zalkow, J. Natur. Prod. **52**, 109 (1989)
6. J. Hrbek, L. Hruban, A. Klasek, N.K. Kochetkov, A.M. Likhosherstov, F. Santavy, G. Snatzke, Collect. Czech. Chem. Commun **37**, 3918 (1972)
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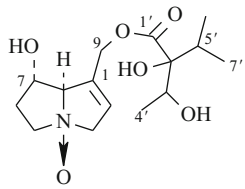
8. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 91

Echinatine N-Oxide

CAS Registry Number: 20267-93-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Cynoglossum pictum*, *Lindelofia stylosa*, *Paracynoglossum imeretinum*, *Rindera austroechinata*

$C_{15}H_{25}NO_6$: 315.1682

Mp: 196–197°C (EtOH) [1]

Solubility: very sol. H_2O, EtOH; spar. sol. $CHCl_3$; insol. Me_2CO, Et_2O [1]

MS *m/z*: 299(0.91), 138(100), 136(32), 118(34), 95(22), 93(60), 80(19) [2]

^{1}H NMR: 0.85, 0.90(each 3H, d, J = 7), 1.27(3H, d, J = 7), 1.94(1H, m), 2.16(1H, m), 2.31(1H, m), 3.63(1H, m), 3.90(1H, q, J = 7), 4.04(1H, m). 4.32(1H, d, J = 16), 4.61(1H, d, J = 16), 4.62, 5.07(each 1H, d, J = 14), 5.19(2H, br s), 5.65(1H, br s) [2]

^{13} C NMR: [2]

Table 1

C-1	133.4	C-7	71.2	C-3′	71.7
2	121.4	8	96.1	4′	16.7
3	77.1	9	60.1	5′	32.0
5	68.0	1′	173.3	6′	17.5
6	32.5	2′	84.0	7′	15.4

References

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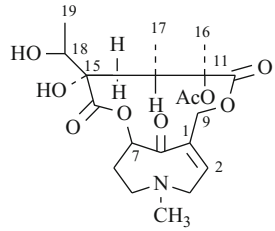
2. C.F. Asibal, J.A. Glinski, L.T. Gelbaum, L.H. Zalkow, J. Natur. Prod. **52**, 109 (1989)

Floridanine

CAS Registry Number: 16958-31-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Doronicum macrophyllum, Senecio erraticus, S. othonnae*

$C_{21}H_{31}NO_9$: 441.1999

Mp: 194–196°C (Me_2CO–$CHCl_3$), 225°C (picrate), 178°C (acetate) [1]

$[\alpha]_D$ +67° ($CHCl_3$) [1]

IR: 3500–3400, 2980, 2960, 1740, 1680–1530, 1450, 1380, 1280, 1240, 1190, 1150, 1110, 1090, 1030, 950, 760 [1, 2]

MS *m/z*: 441(M^+, 44), 397(25), 354(100), 352(22), 338(35), 337(35), 326(5), 310(2), 308(2), 299(4), 282(3), 281(4), 280(2), 269(4), 250(10), 238(30), 168(100), 151(30), 150(30), 149(10), 141(40), 123(25), 122(22), 110, 108, 97, 96, 94 [1, 3, 4]

^{1}H NMR: 1.21(3H, d, J = 7, CH_3-19), 1.22(3H, d, J = 6, CH_3-17), 1.64(3H, s, H-16), 1.89(1H, m, H-12),

2.06(3H, s, H-22), 2.07(3H, s, NCH_3), 2.21, 2.66(each 1H, m, H-6), 2.35(2H, d, J = 3.5, H-13), 2.53, 2.91(each 1H, dd, J = 4, H-5), 3.03(2H, m, 2 × OH), 3.37(2H, m, H-3), 4.43, 5.16(each 1H, dd, J = 11, H-9), 4.98(1H, m, H-7), 6.08(1H, m, H-2) [5]

^{13}C NMR: [5]

Table 1

C-1	133.9	C-9	60.2	C-16	21.6
2	136.7	10	171.4	17	14.6
3	64.0	11	84.0	18	72.8
5	54.3	12	40.9	19	17.2
6	35.9	13	36.1	21	170.0
7	79.1	14	82.0	22	21.4
8	191.1	15	174.7	NCH_3	39.8

Pharm./Biol.: LD_{50} 510 mg/kg (mice) [6]. Hypotensive action. It relaxes the smooth musculature of vascular wall [7]

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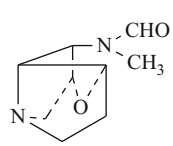
N-Formylloline

CAS Registry Number: 38964-33-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Lolium cuneatum*

$C_9H_{14}N_2O_2$: 182.1055

Mp: 93–94°C [1]

$[\alpha]_D$ +48° ($CHCl_3$) [1]

Solubility: very sol. $CHCl_3$, MeOH [2]

IR: 1670 [1]

MS *m/z*: 182(M^+) [1]; 182(M^+), 154, 153, 124, 123, 111, 110, 95, 83, 82(100), 69, 55 [2]

^{1}H NMR: 2.90, 3.10(s, NCH_3), 8.00, 8.27(CHO) [1]

References

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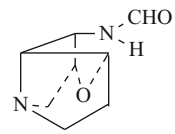
N-Formylnorloline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Lolium cuneatum*

$C_8H_{12}N_2O_2$: 168.0899

Mp: oil, 181°C (hydrochloride) [1]

$[\alpha]_D$ +31° (Me_2CO) [1]

Solubility: very sol. EtOH, $CHCl_3$ [1]

IR: 3600–3300, 1640 [1]

MS *m/z*: 168(M^+), 139, 125 [1]; 168(M^+, 3), 140(25), 139(21), 124(27), 123(34), 111(12), 110(15), 95(21), 83(9), 82(100), 56(4), 55(12), 42(18) [2]

References

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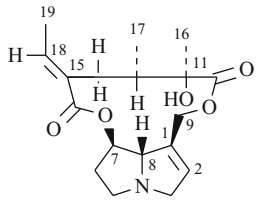
Hastacine

CAS Registry Number: 20361-77-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Cacalia hastata, C. robusta*

$C_{18}H_{27}NO_5$: 337.1889

Mp: 171–172°C (Me_2CO) [1]; 193°C (picrate) [1]; 114°C (hastanecine) $[\alpha]_D$ −9° [1, 2]; 150° (integerrinecic acid) $[\alpha]_D$ +9°(EtOH) [3]

$[\alpha]_D$ −72° ($CHCl_3$) [1]

Solubility: very sol. EtOH, $CHCl_3$, Me_2CO; spar.sol. Et_2O [1]

IR: 1735, 1718, 1653 [2]

MS *m/z*: 337(M^+, 33), 322(2), 320(3), 294(3), 293(11), 266(2), 239(4), 238(7), 226(6), 222(6), 220(2), 212(9), 211(49), 210(4), 180(4), 156(4), 153(7), 149(3), 141(14), 140(100), 139(10), 138(47), 124(13), 123(53), 122(59), 121(14), 120(14), 110(5), 109(8), 108(11), 106(39), 97(4), 96(26), 95(16), 94(6), 93(5), 83(11), 82(90). 81(11), 80(9) [3]

^{1}H NMR: 6.72(1H, H-18) [3]; 3.32(1H, H-8), 3.84, 4.79(each 1H, dd, J = 1.6; 10.8, H-9), 4.46(1H, m, H-7) [4]

Pharm./Biol.: Spasmolytic action [1, 2]

References

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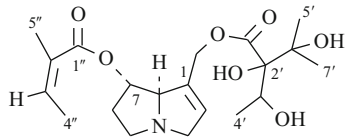
Heliosupine

CAS Registry Number: 32728-78-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Cynoglossum officinale, C. pictum, C. viridiflorum, Echium vulgare, Heliotropium supinum, Paracynoglossum imeretinum*

$C_{20}H_{31}NO_7$: 397.2101

Mp: oil [1], 101°C (picrate), 104°C (picrolonate), 45°C (angelic acid), 118°C (heliotridine) $[\alpha]_D$ +31°) [1]

$[\alpha]_D$ −4° (EtOH), [1]

Solubility: very sol. EtOH, $CHCl_3$, Me_2CO; sol. C_6H_6, Et_2O, pet. ether, H_2O [1]

IR: 3475, 1740, 1710 [2]

MS *m/z*: 397(M^+), 297, 220(70), 136(62), 120(82), 119(100), 100(70), 93(70), 83(62) [2]

^{1}H NMR: 1.20(3H, s, CH_3-6′), 1.22(3H, d, CH_3-4′), 1.25(3H, s, CH_3-7′), 1.82(3H, s, CH_3-5″), 1.87(2H, m, H-6), 1.93(3H, dd, CH_3-4″), 2.81(1H, m, H-5), 3.13(1H, m, H-5), 3.31(1H, m, H-3), 3.91(1H, m, H-3), 4.06(1H, br s, H-8), 4.15(1H, q, H-3′), 4.93(2H, q, H-9), 5.12(1H, m, H-7), 5.84(1H, s, H-2), 6.08(1H, dq, H-3″) [3]

^{13}C NMR: [3]

Table 1

C-1	134.1	C-9	62.5	C-7′	24.8
2	129.6	1′	174.0	1″	168.0
3	62.1	2′	82.8	2″	127.3
5	54.2	3′	69.7	3″	138.9
6	30.2	4′	18.5	4″	16.0
7	76.9	5′	73.8	5″	20.5
8	79.0	6′	26.0		

Pharm./Biol.: LD_{50} 60 mg/kg (i/v, rats). Hypotensive, spasmolytic, and antitumoral action [4]

References

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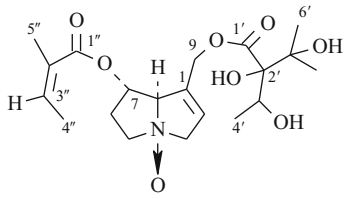
3. C.F. Asibal, J.A. Glinski, L.T. Gelbaum, L.H. Zalkow, J. Natur. Prod. **52**, 109 (1989)
4. F.S. Sadritdinov, *The Pharmacology of Natural Compounds* [in Russian] (FAN, Tashkent, 1979), p. 29

Heliosupine N-Oxide

CAS Registry Number: 31701-88-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Cynoglossum pictum, C. viridiflorum, Paracynoglossum imeretinum, Symphytum asperum, S. officinale*

$C_{20}H_{31}NO_8$: 413.2050

Mp: 152–153°C [1]

MS *m/z*: 220(41), 136(34), 121(30), 120(65), 119(52), 94(33), 93(27), 83(22), 80(38), 70(56), 59(84), 56(37), 55(74); MS chem. ionization: 399(100) [2]

^{1}H NMR: 1.10(3H, s), 1.13(3H, d, J = 7), 1.20(3H, s), 1.81(3H, s), 1.91(3H, dd, J = 7.2), 2.15(1H, m), 2.41(1H, m), 3.71(1H, m), 3.80(1H, m), 4.07(1H, q, J = 7), 4.38(2H, q, J = 16), 4.57(1H, m), 4.71, 5.06(each 1H, d, J = 14), 4.99(1H, m), 5.91(1H, br s), 6.10(1H, dq, J = 7.1) [2]

^{13}C NMR: [2]

Table 1

C-1	132.6	C-9	60.7	C-7′	24.7
2	122.8	1′	174.0	1″	167.1
3	76.8	2′	84.6	2″	126.4
5	67.5	3′	69.5	3″	140.6
6	30.5	4′	18.5	4″	16.0
7	73.1	5′	72.8	5″	20.3
8	94.4	6′	24.4		

References

1. I.V. Man'ko, Rast. Res. **8**, 243 (1972)
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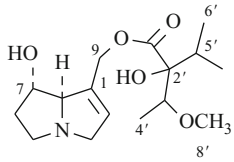
Heliotrine

CAS Registry Number: 303-33-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Heliotropium acutiflorum, H. argusioides, H. dasycarpum, H. eichwaldi, H. europaeum, H. lasiocarpum, H. olgae, H. transoxanum*

$C_{16}H_{27}NO_5$: 313.1889

Mp: 125–126°C (Me_2CO) [1]; 125°C (heliotridine hydrochloride), 90°C (heliotric acid) [2]

$[\alpha]_D$ −75° [1]

UV: 213(3.29) [3]

IR: 3550–3350, 1750 [4]

MS *m/z*: 313(M^+, 0.2), 255(0.9), 197(2.2), 156(11.1), 139(39), 138(93), 136(14), 120(10), 119(20), 95(20), 94(32), 93(100), 80(25) [4]

^{1}H NMR: 0.82, 0.87(each 3H, d, CH_3-7′, CH_3-6′), 1.07(3H, d, CH_3-4′), 1.83, 1.97(2H, m, H-6), 2.07(1H, m, H-5′), 2.52, 3.22(2H, m, H-5), 3.27(3H, s, CH_3-8′), 3.27(1H, m, H-3), 3.54(1H, q, H-3′), 3.80(1H, d, H-3), 3.81(1H, s, H-8), 4.01(1H, m, H-7), 4.61, 4.98(2H, q, H-9), 5.64(1H, s, H-2) [5]

^{13}C NMR: [5]

Table 1

C-1	136.1	C-7	75.3	C-3′	78.5
2	126.9	8	79.9	4′	12.4
3	61.9	9	62.5	5′	31.9
5	54.1	1′	174.6	6′	17.1
6	34.3	2′	82.5	7′	16.6
				8′	57.0

CD: [6]

X-ray: [5, 7]

Pharm./Biol.: 274.4, 254.6 mg/kg (i/v, rats, mice). Hepatotoxic. Inhibits development of experimental tumors [8]

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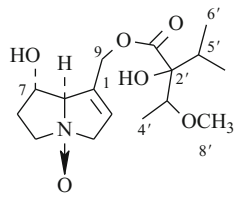
Heliotrine N-Oxide

CAS Registry Number: 6209-65-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Heliotropium acutiflorum, H. dasycarpum, H. eichwaldi, H. lasiocarpum, H. olgae, H. transoxanum*

$C_{16}H_{27}NO_6$: 329.1838

Mp: 160–161°C (C_6H_6) [1]; 170–172°C (EtOH) 174°C (dec.) [2]

Solubility: very sol. H_2O, EtOH, $CHCl_3$, Me_2CO; spar. sol. C_6H_6, pet. ether [1]

IR: 3439, 1730 [2]

MS *m/z*: 313, 295, 270, 254, 214, 197, 136, 120, 119, 93, 80 [2]

^{1}H NMR: 0.80(3H, d, CH_3-7′), 0.83(3H, d, CH_3-6′), 1.03(3H, d, CH_3-4′), 1.85(1H, s, H-5′), 1.96, 2.30(each 1H, m, H-6), 3.17(3H, s, OCH_3), 3.56(1H, m, H-5), 3.59(1H, q, H-3′), 3.96(1H, m, H-5), 4.20(1H, m, H-7), 4.28, 4.42(each 1H, d, H-3), 4.70(1H, s, H-8), 4.68, 4.78(each 1H, d, H-9), 5.61(1H, s, H-2) [3]

^{13}C NMR: [3]

Table 1

C-1	134.1	C-8	96.2	C-4″	11.6
2	120.2	9	60.8	5′	33.0
3	77.3	1′	173.9	6′	17.1
5	68.3	2′	83.1	7′	17.1
6	33.2	3′	78.8	8′	56.6
7	71.8				

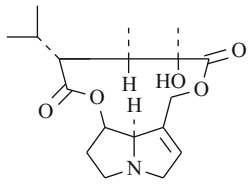
Pharm./Biol.: LD_{50} 5000 mg/kg (i/p, rats) [4].

References

1. S.Yu. Yunusov, G.P. Sidyakin, DAN UzSSR (1), 3 (1950)
2. M.A. Khan, A.S. Khan, Planta Med. **40**, 383 (1980)
3. C.F. Asibal, L.T. Gelbaum, L.H. Zalkow, J. Natur. Prod. **52**, 726 (1989)
4. F.S. Sadritdinov, *The Pharmacology of Natural Compounds* [in Russian] (FAN, Tashkent, 1979), p. 29

Incanine

CAS Registry Number: 480-77-3



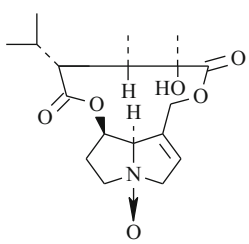
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Heliotropium olgae, Trichodesma incanum*
$C_{18}H_{27}NO_5$: 337.1889
Mp: 96–97°C (Me_2CO), 208°C (hydrobromide), 207°C (hydroiodide), 182°C (nitrate), 246°C (dec., picrate), 199°C (hydrochloride), 228°C (methoiodide), 163°C (incaninic acid), $[\alpha]_D$ +25°; 123° (isoincaninic acid), $[\alpha]_D$ −26°; 120° (retronecine) [1]
$[\alpha]_D$ −39° (EtOH) [1]
Solubility: very sol. Et_2O, Me_2CO, $CHCl_3$, EtOH; spar. sol. H_2O [1]
MS *m/z*: 337(M^+, 89), 293(24), 292(22), 266(5), 264(26), 250(59), 248(16), 225(31), 222(100), 213(15), 206(96), 154(15), 136, 120, 119. 93, 80 [2]
X-ray: [3]
Pharm./Biol.: LD_{50}-300 mg/kg (i/v., mice). Cholinolytic action. Stimulates respiration, briefly lowers blood pressure. Hepatotoxic [4]

References

1. S.Yu. Yunusov, N.V. Plekhanova, Zh. Obshch. Khim. **29**, 677 (1959). Unpub
2. Ya.V. Rashkes, U.A. Abdullaev, S.Yu Yunusov, Chem. Nat. Comp. **10**, 34 (1974)
3. B. Tashkhodzhaev, M.V. Telezhenetskaya, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 315 (1979)
4. M.D. Mashkovskii, A.I. Polezhaeva, A.I. Yakovleva, DAN UzSSR (4), 36 (1953)

Incanine N-Oxide

CAS Registry Number: 55740-49-3



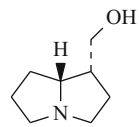
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Heliotropium olgae, Trichodesma incanum*
$C_{18}H_{27}NO_6$: 353.1838
Mp: 168–169°C (dec., EtOH) [1]
Solubility: sol. H_2O, EtOH, C_6H_6, $CHCl_3$; spar. sol. Me_2CO, Py [1]
MS *m/z*: 337(0.7), 336, 335, 292, 250, 222, 204, 155. 135, 119(100), 117 [2]
Pharm./Biol.: LD_{50} 600 mg/kg (i/v, mice). Cholinolytic action. Lowers blood pressure briefly; stimulates respiration [3]

References

1. S.Yu. Yunusov, N.V. Plekhanova, Zh. Obshch. Khim. **29**, 677 (1959)
2. U.A. Abdullaev, V.Ya. Rashkes, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 629 (1974)
3. M.D. Mashkovskii, A.I. Polezhaeva, A.I. Yakovleva, DAN UzSSR (4), 36 (1953)

(+)-Isoretronecanol (Lindelofidine)

CAS Registry Number: 488-06-2



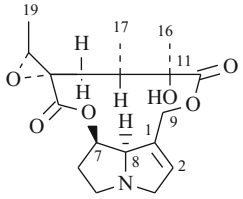
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Thesium minkwitzianum*
$C_8H_{15}NO$: 141.1154
Mp: 39–40°C (pet. ether), 193°C (picrate), 184°C (picrolonate), 286°C (dec., methoiodide) [1]
$[\alpha]_D$ +76° (EtOH) [1]
Solubility: very sol. EtOH, $CHCl_3$, Me_2CO, H_2O; spar. sol. Et_2O, pet. ether [1]

References

1. A.P. Arendaruk, N.F. Proskurnina, R.A. Konovalova, Zh. Obshch. Khim. **30**, 670 (1960)

Jacobine

CAS Registry Number: 6870-67-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Senecio jacobaea*
$C_{18}H_{25}NO_6$: 351.1681
Mp: 222–226 °C (Me_2CO) [1] 212–214 °C (Me_2CO–C_6H_{14}) [2]
$[\alpha]_D$ –28° ($CHCl_3$) [1, 2]
UV: 219(3.34) [3]
IR: 3420, 1740, 1730 [2]; 1258, 907, 838 [4]
^{1}H NMR: 1.15(3 H, d, J = 7), 1.21(3 H, d, J = 6), 1.32(3 H, s), 2.91(1 H, q, J = 6), 4.04(1 H, br d, J = 12), 4.25(1 H, m), 5.11(1 H, br s), 5.56(1 H, d, J = 12), 6.18(1 H, br s) [2, 5]
^{13}C NMR: [2]

Table 1

C-1	131.2	C-8	77.6	C-14	64.1
2	136.4	9	60.5	15	168.6
3	63.1	10	177.9	16	24.3
5	53.0	11	77.0	17	12.8
6	35.0	12	38.1	18	56.0
7	75.9	13	36.0	19	13.6

CD: [6]
X-ray(bromhydrene): [7]
HPLC: [8]
Pharm./Biol.: LD_{50} 77.1 mg/kg (i/v, mice). Hepatotoxic. Cholinolytic action [9]

References

1. S.T. Akramov, Z. Shadmanov, A. Samatov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 221 (1968)
2. Y. Asada, M. Shiraishi, T. Takeuchi, Y. Osawa, T. Furuya, *Planta Med.* 539 (1985)
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5. C.C.J. Culvenor, Austral. J. Chem. **17**, 233 (1964)
6. J. Hrbek, L. Hruban, A. Klasek, N.K. Kochetkov, A.M. Likhosherstov, F. Santavy, G. Snatzke, Collect. **37**, 3918 (1972)
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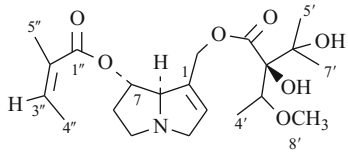
8. H.S. Ramsdell, D.R. Buhler, J. Chromatogr. **210**, 154 (1981)
9. F.S. Sadritdinov, *Farmakologiya prirodnikh soedineniy* (FAN, Tashkent, 1979), p. 29

Lasiocarpine

CAS Registry Number: 303-34-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Heliotropium eichwaldi, H. europaeum, H. lasiocarpum, H. olgae, Lappula intermedia, Symphytum caucasicum, S. officinale*
$C_{21}H_{33}NO_7$: 411.2257
Mp: 94–95°C (pet. ether) [1]
$[\alpha]_D$ −4° [1]
UV: 219(4.07) [2]
IR: 3680, 3600, 3460, 1735, 1710 [3]
MS *m/z*: 411(1), 396(2), 311(4), 279(5), 221(43), 220(100), 219(7), 137(20), 136(49), 124(22), 120(74), 119(42), 106(15), 95(49), 94(23), 93(33), 83(39) [3, 4]
^{1}H NMR: 1.11(3H, c, CH_3-7′), 1.21(3 H, d, CH_3-4′), 1.24(3 H, s, CH_3-6′), 1.81(3 H, s, CH_3-5″), 1.85(2 H, m, H-6), 1.92(3 H, dd, CH_3-4″), 2.78, 3.14(each 1 H, m, H-5), 3.20(3 H, s, OCH_3-8′), 3.31(1 H, m, H-3), 3.75(1 H, q, H-3′), 3.89(1 H, d, H-3), 4.06(1 H, br s, H-8), 4.88(2 H, s, H-9), 5.09(1 H, m, H-7), 5.77(1 H, br s, H-2), 6.03(1 H, q, H-3″) [5]
^{13}C NMR: [5]

Table 1

C-1	134.7	C-9	62.2	C-7′	24.5
2	128.3	1′	173.6	8′	56.4
3	62.2	2′	83.6	1″	167.5
5	54.2	3′	78.7	2″	127.5
6	30.4	4′	13.0	3″	138.3
7	76.7	5′	72.8	4″	15.9
8	78.7	6′	26.5	5″	20.5

CD: [6]

X-ray: [7]

Pharm./Biol.: LD_{50} 88.1, 85.1 mg/kg (i/v, rats, mice). [8] Antimicrobiotic activity [9]

References

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2. V. Simanek, A. Klasek, F. Santavy, Collect. **34**, 1832 (1969)
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4. Ya.V. Rashkes, U.A. Abdullaev, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 121 (1978)
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7. D.G. Hay, M.F. McKay, C.C.J. Culvenor, Acta Cryst. **38B**, 155 (1982)
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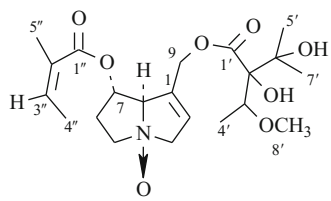
Lasiocarpine N-Oxide

CAS Registry Number: 127-30-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Heliotropium eichwaldi, H. lasiocarpum, H. olgae*

$C_{21}H_{33}NO_8$: 427.2206

Mp: 133°C (dec.) [1]

IR: 3300, 1680, 1180 [1]

^{1}H NMR: 1.18(3H, s, CH_3-7′), 1.22(3H, d, CH_3-4′), 1.25(3H, s, CH_3-6′), 1.88(3H, s, CH_3-5″), 1.99(3H, dd, CH_3-4″), 2.20(1H, m, H-6), 2.52(1H, m, H-6), 3.25(3H, s, OCH_3-8′), 3.79(1H, m, H-5), 3.79(1H, q, H-3′), 3.92(1H, m, H-5), 4.42(1H, d, H-3), 4.58(1H, d, H-3), 4.67(1H, br s, H-8), 4.95(2H, q, H-9), 5.14(1H, m, H-7), 5.91(1H, br s, H-2), 6.17(1, H-3″) [2]

^{13}C NMR: [2]

Table 1

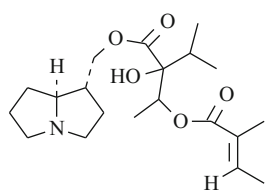
C-1	132.9	C-9	61.2	C-7′	24.8
2	123.1	1′	173.5	8′	56.3
3	77.3	2′	83.9	1″	167.3
5	68.0	3′	78.8	2″	126.5
6	30.7	4′	12.9	3″	140.8
7	73.2	5′	71.0	4″	16.2
8	94.9	6′	26.4	5″	20.5

Pharm./Biol.: LD_{50} 547 mg/kg (i/p, rats) [3]. Antimicrobial action [3]

References

1. S.C. Jain, R. Sharma, Chem. Pharm. Bull. **35**, 3487 (1987)
2. C.F. Asibal, L.T. Gelbaum, L.H. Zalkow, J. Natur. Prod. **52**, 726 (1989)
3. F.S. Sadritdinov, *The Pharmacology of Natural Compounds* [in Russian] (FAN, Tashkent, 1979), p. 29

Lindelofamine



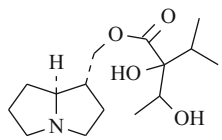
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lindelofia anchusoides*
$C_{20}H_{33}NO_5$: 367.2359
Mp: 88°C (pet. ether), 65°C (tiglic acid) [1]

References

1. A.S. Labenskii, G.P. Men'shikov, Zh. Obshch. Khim. **18**, 1836 (1948)

Lindelofine

CAS Registry Number: 487-99-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lindelofia macrostyla, L. stylosa, Rindera cyclodonta*
$C_{15}H_{27}NO_4$: 285.1940
Mp: 105–106°C [1]; 124°C (picrate), 135°C (picrolonate), 95°C (trachelanthic acid) [2]; 141°C (methiodide), 125°C (hydrobromide), 143°C (hydrochloride), 119°C (nitrate), 122°C (hydroiodide), 133°C (oxalate), 127°C (sulphate) [1]
$[\alpha]_D$ +50° (EtOH) [2], $[\alpha]_D$ +81° (lindelofidine)
Solubility: very sol. H_2O, EtOH, Me_2CO, $CHCl_3$; spar. sol. Et_2O, pet. ether [2]
UV: 257, 260 [1]*
IR: 3360, 3340, 3320, 3120, 2963, 2850, 2745, 2125, 1937, 1738, 1470, 1430, 1420, 1250 [1]
MS *m/z*: 285(M^+), 284, 270, 267, 252, 242, 241, 240, 226, 142, 140, 124(100), 96, 83, 82, 55 [3]
CD: [4]
Pharm./Biol.: LD_{50} 101.5 mg/kg (i/v, mice). [5] Hypotensive and cholinolytic action [6]

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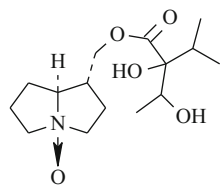
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 88
6. F.S. Sadritdinov, *The Pharmacology of Natural Compounds* [in Russian] (FAN, Tashkent, 1979), p. 29

Lindelofine N-Oxide



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lindelofia anchusoides, L. stylosa, Rindera cyclodonta*
$C_{15}H_{27}NO_5$: 301.1889
Mp: 186.5°C [1]; 196.5°C [2]
$[\alpha]_D$ +21° (MeOH) [2]
Solubility: very sol. EtOH, H_2O, $CHCl_3$; spar. sol. Me_2CO, Et_2O, dioxane, C_6H_6 [1, 2].

References

1. S.Yu. Yunusov, N.V. Plekhanova, DAN UzSSR (12), 27 (1958)
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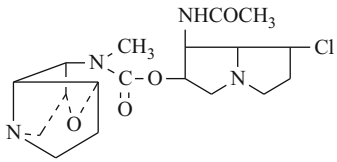
Lolidine

CAS Registry Number: 60092-32-2



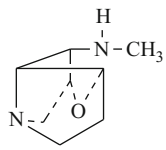
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lolium cuneatum*
$C_{18}H_{27}N_4O_4Cl$: 398.1720/400.1691
Mp: 225–226°C (MeOH) [1]
$[\alpha]_D$ +146° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$, Et_2O [2]
IR: 3180–3170, 1665, 1635 [1]
MS *m/z*: 400(M^+), 398, 363, 362, 245, 217, 181, 153 [1]; 398/400(M^+), 383/385, 355/357, 245/247, 217/219, 153, 124, 123, 111, 110, 95, 83, 82(100), 69, 55 [2]
^{1}H NMR: 1.96(3H, s, NAc), 2.63(3H, s, NCH_3) [1]

References

1. E.Kh. Batirov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 52 (1976)
2. E.Kh. Batirov, Unpub.

Loline

CAS Registry Number: 25161-91-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lolium cuneatum*
$C_8H_{14}N_2O$: 154.1106
Bp: 103°C (5 mm Hg) [1], 257°C (di hydrochloride), 255°C (di hydrobromide), 251°C (sulphate), 282°C (perchlorate) [1]
$[\alpha]_D$ +19° (Me_2CO) [2]
IR: [3]
MS *m/z*: 154(M^+, 18), 124(22), 123(29), 111(41), 110(81), 95(48), 83(45), 82(100), 56(7), 55(19), 42(41) [4]
^{1}H NMR: [3]
Pharm./Biol.: LD_{50} 448 mg/kg (i/p, mice). Hypotensive action [5]

References

1. S.Yu. Yunusov, S.T. Akramov, Zh. Obshch. Khim. **25**, 1813 (1955)
2. S.Yu. Yunusov, S.T. Akramov, DAN UzSSR (3), 27 (1954)
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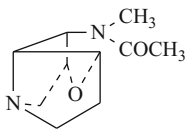
4. S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 252 (1968)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 136

Lolinine

CAS Registry Number: 4914-36-7



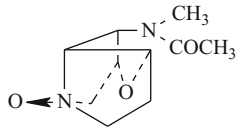
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lolium cuneatum*
$C_{10}H_{16}N_2O_2$: 196.1212
Mp: 76–77°C (anhyd. Et_2O) [1]; 198°C (hydrochloride), 227°C (hydrobromide), 147°C (methiodide), 175°C (perchlorate) [2]
$[\alpha]_D$ +51° (Me_2CO) [1]
MS *m/z*: 196(M^+, 7), 124(13), 123(35), 111(4), 110(4), 95(45), 83(15), 82(100), 56(16), 55(8), 42(20) [3]

References

1. S.Yu. Yunusov, S.T. Akramov, DAN UzSSR **3**, 27 (1954)
2. S.Yu. Yunusov, S.T. Akramov, Zh. Obshch. Khim. **25**, 1813 (1955)
3. S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 252 (1968)

Lolinine N-Oxide

CAS Registry Number: 61391-09-1



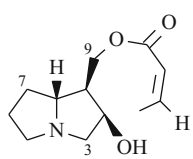
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lolium cuneatum*
$C_{10}H_{16}N_2O_3$: 212.1161
Mp: oil [1]
$[\alpha]_D$ +22° (MeOH) [1]
Solubility: very sol. H_2O, EtOH; insol. Et_2O, $CHCl_3$, Me_2CO [1]
^{1}H NMR (D_2O): 2.45(3H, s, $COCH_3$), 3.43(3H, s, NCH_3) [1]

References

1. E.Kh. Batirov, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 114 (1976)

Macrophylline

CAS Registry Number: 27841-97-0

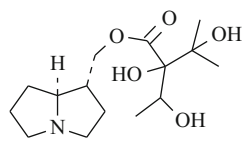


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Senecio amphibolius, S. macrophyllus*
$C_{13}H_{21}NO_3$: 239.1521
Mp: 42–44°C [1]; 50–52°C (pet. ether) [2]; 164°C (bitartrate), 88°C (dihydro), 128°C (macronecine) [1]
$[\alpha]_D$ +34° (EtOH), $[\alpha]_D$ +49°(macronecine) (EtOH) [1]
Solubility: very sol. Me_2CO, EtOH, pet. ether, H_2O; sol. C_6H_6 [1]
MS *m/z*: 239(M^+, 24), 141(13), 140(99), 139(17), 138(8), 122(17), 111(15), 110(9), 108(44), 98(7), 96(6), 84(19), 83(100), 82(12), 81(9), 80(9), 70(20), 55(70) [3]
^{1}H NMR: 3.33(2H, H-3), 3.71, 4.60(each 1H, H-9), 5.21(2H, H-7) [3]

References

1. A.V. Danilova, L.M. Utkin, P.S. Massagetov, Zh. Obshch. Khim. **25**, 831 (1955)
2. A.V. Danilova, L.M. Utkin, Zh. Obshch. Khim. **30**, 345 (1960)
3. A.J. Aasen, C.C.J. Culvenor, L.W. Smith, J. Org. Chem. **34**, 4137 (1969); A.J. Aasen, C.C.J. Culvenor, J. Org. Chem. **34**, 4143 (1969)

Macrotomine

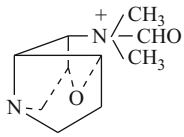


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Macrotomia echioides*
$C_{15}H_{27}NO_5$: 301.1889
Mp: 95–97°C (Me_2CO), 132°C (picrate) [1]
$[\alpha]_D$ −7° (EtOH) [1]
Pharm./Biol.: LD_{50} 148.4 mg/kg (i/v, mice) [2]. Cholinolytic action [3]

References

1. G.P. Men'shikov, M.F. Petrova, Zh. Obshch. Khim. **22**, 1457 (1952)
2. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 88
3. F.S. Sadritdinov, *The Pharmacology of Natural Compounds* [in Russian] (FAN, Tashkent, 1979), p. 29

N-Methyl-N-Formylloline



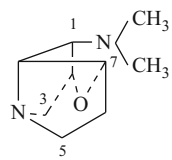
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lolium cuneatum*
$C_{10}H_{17}N_2O_2$: 197.1290
Mp: (iodide): 180°C [1]
IR: 1680 [1]
MS *m/z*: 182, 153, 142 [1]
^{1}H NMR (D_2O): 3.69(3H, s, NCH_3) [1]

References

1. E.Kh. Batirov, S.A. Khamidkhodzhaev, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 50 (1976)

N-Methylloline

CAS Registry Number: 22143-50-6



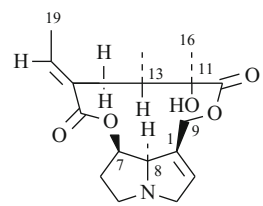
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Lolium cuneatum*
$C_9H_{16}N_2O$: 168.1263
Mp: oil, 247°C (dec., di hydrochloride) [1]
$[\alpha]_D$ +14° (Me_2CO) [1]
Solubility: very sol. Et_2O, EtOH, $CHCl_3$ [2]
MS *m/z*: 168(M^+), 153, 82(100) [1]; 168(M^+, 11), 124(52), 123(93), 111(12), 110(6), 95(96), 83(14), 82(100), 56(9), 55(2), 42(90) [3]
^{1}H NMR (CCl_4): 1.82(m, H-6). 2.16, 3.42(q, H-3), 2.21(6H, s, $N(CH_3)_2$), 2.83(m, H-5), 3.75–3.84(1H, H-2), 4.23(m, H-7) [3]

References

1. E.Kh. Batirov, S.A. Khamidkhodzhaev, V.M. Malikov, S. Yu. Yunusov, Chem. Nat. Comp. **12**, 50 (1976)
2. E.Kh. Batirov, *Unpub.*
3. S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 252 (1968)

Neoplatyphylline

CAS Registry Number: 20361-76-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Senecio platyphylloides, S. rhombifolius*
$C_{18}H_{27}NO_5$: 337.1889
Mp: 131–133°C (MeOH), 140°C (dec., bitartrate), 165°C (picrate), 218°C (dec., perchlorate), 148°C (platynecine), $[\alpha]_D$ −60° ($CHCl_3$), 150°C (integerrinecic acid), $[\alpha]_D$ +10° (EtOH) [1]
$[\alpha]_D$ +2°($CHCl_3$) [1]; −4° (EtOH) [2],
IR: 2940, 1739, 1712, 1650, 1464, 1385, 1291, 1273, 1218, 1195, 1178, 1154, 1117, 1091, 1073, 1030, 986, 974, 949, 931, 897, 881, 841, 804, 758, 738 [1]

MS *m/z*: 337(M^+, 27), 322(3), 320(3), 266(5), 252(2), 239(3), 238(3), 226(8), 222(6), 220(3), 212(8), 211(53), 210(4), 180(12), 156(4), 141(11), 140(96), 139(13), 138(52), 125(12), 124(9), 123(55), 122(65), 121(14), 120(12), 110(5), 109(9), 108(14), 97(4), 96(26), 95(16), 94(5), 83(12), 82(100), 81(11), 80(10) [3]

^{1}H NMR: 6.58(1H, H-18) [3]; 3.44(1H, J = 5.8, H-8), 3.90, 4.45(each 1H, ddd, J = 2.3, 9.7, 11.1, H-9), 5.49(1H, J = 5.8, H-7) [4]

^{13}C NMR: [2]

Table 1

C-1	39.5	C-8	69.0	C-14	131.8
2	30.5	9	65.1	15	167.2
3	51.7	10	178.6	16	26.4
5	53.1	11	76.5	17	13.1
6	35.9	12	36.9	18	138.2
7	73.9	13	39.0	19	14.4

CD: [5]

Pharm./Biol.: Cholinolytic and spasmolytic action [1]

References

1. A.V. Danilova, L.M. Utkin, G.V. Kozyreva, Yu.J. Syrneva, Zh. Obshch. Khim. **29**, 2432 (1959)
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3. C.C.J. Culvenor, N.I. Koretskaya, L.W. Smith, L.M. Utkin, Austral. J. Chem. **21**, 1671 (1968)
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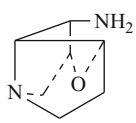
5. J. Hrbek, L. Hruban, A. Klasek, N.K. Kochetkov, A.M. Likhosherstov, F. Santavy, G. Snatzke, Collect. **37**, 3918 (1972)

Norloline

CAS Registry Number: 4839-19-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Lolium cuneatum*

$C_7H_{12}N_2O$: 140.0950

Bp: 94–95°C (5 mm Hg), 141°C (carbonate), 311°C (di hydrochloride), 192°C (di nitrate), 226°C (di picrate) [1]

$[\alpha]_D$ +15° (MeOH) [1]

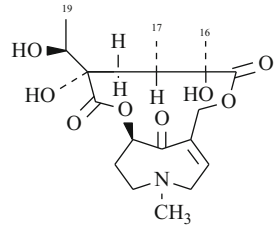
MS *m/z*: 140(M^+, 11), 124(10), 123(31), 111(26), 110(14), 95(17), 83(9), 82(100), 56(8), 55(16), 42(18) [2]

References

1. S.Yu. Yunusov, S.T. Akramov, Zh. Obshch. Khim. **30**, 677 (1960)
2. S.T. Akramov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 252 (1968)

Onetine

CAS Registry Number: 41451-67-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Senecio othonnae*

$C_{19}H_{29}NO_8$: 399.1893

Mp: 192–193°C (Abs. EtOH) [1]; 203–204°C; 112–113°C ($CHCl_3$) [2]; 240°C (flavianate) [1]

$[\alpha]_D$ +73° ($CHCl_3$) [1]; +48° ($CHCl_3$); +52° (Me_2CO) [2]

Solubility: sol. Me_2CO, EtOH, H_2O; spar. sol. $CHCl_3$, Et_2O, C_6H_6 [3]

IR: 3580, 3500, 3340, 3250, 2970, 2930, 1730, 1650, 1460, 1420, 1380, 1300, 1290, 1210, 1200, 1170, 1150, 1110, 1040, 1000, 960, 940, 910, 890, 850, 820, 760 [2, 3]

MS *m/z*: 399(M^+, 20), 384(3), 382, 371(10), 355(30), 354, 338(12), 326(5), 310(7), 294(5), 285(7), 284(8), 283(7), 266(7), 257(10), 254, 238(20), 186(21), 170(21), 168(100), 151(100), 122(28), 110(35), 94(25) [2, 3]

^{1}H NMR (Py-d_5): 1.21(3H, d, J = 4.5, CH_3-17), 1.32(3H, s, CH_3-16), 1.43(3H, d, J = 4, CH_3-19), 1.82(3H, s, NCH_3) [2]

CD: [4]

References

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2. D.S. Khalilov, M.V. Telezhenetskaya, S.Yu. Yunusov, Khim. Prirod. Soedin. 262 (1980)
3. D.S. Khalilov, M.V. Telezhenetskaya, *Unpub.*
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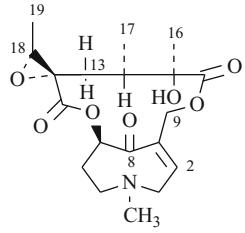
(+)-Othosenine

CAS Registry Number: 16958-29-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Doronicum macrophyllum, Senecio erraticus, S. othonnae, S. renardii*

$C_{19}H_{27}NO_7$: 381.1787

Mp: 221–222°C (EtOH) [1]; 231°C [2]; 232°C (dec., picrate) [1]; 245°C (dec.) [2]; 148°C (hydrochloride otonecine) [1]

$[\alpha]_D$ +21° ($CHCl_3$) [1]

Solubility: very sol. $CHCl_3$, MeOH, H_2O; sol. EtOH, Me_2CO; spar. sol. Et_2O, C_6H_6 [1]

UV: 214 sh (3.46) [2, 3]

IR: 3400, 2980, 2890, 2820, 1750, 1580, 1440, 1390, 1360, 1350, 1270, 1230, 1150, 1080, 1030, 980, 950, 860, 830, 800, 780, 760, 710 [4]

MS *m/z*: 381(M^+, 32), 353(68), 337(42), 310(8), 294(18), 292(18), 282(9), 266(33), 254(3), 250(30), 239(8), 238(8), 168(90), 151(100), 150(30), 123(95), 122(60), 110(80), 94(55) [5]

^{1}H NMR: 1.15(3H, d, J = 6, CH_3-17), 1.21(3H, d, J = 5.5, CH_3-19), 1.31(3H, s, CH_3-16), 1.87(1H, m, H-12), 2.13(3H, s, NCH_3), 2.19, 2.56(each 1H, d, J = 4, H-13), 2.26, 2.81(each 1H, m, H-6), 2.66, 2.90(each 1H, m, H-5), 2.91(1H, m, OH), 2.96(1H, q, J = 5.5, H-18), 3.40(2H, m, H-3), 4.34, 5.48(each 1H, dd, J = 11; 11, H-9), 5.10(1H, m, H-7), 6.14(1H, m, H-2) [6]

CD: [7]

HPLC: [8]

Pharm./Biol.: LD_{50} 630 mg/kg (i/p, mice) [9]. Spasmolytic action on the smooth musculature of the intestine [10]

References

1. E.S. Zhdanovich, G.P. Men'shikov, Zh. Obshch. Khim. **11**, 835 (1941)
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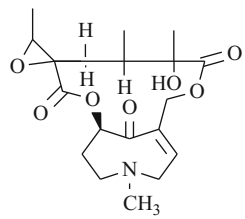
8. H. Niwa, H. Ishiwata, K. Yamada, J. Chromatogr. **257**, 146 (1983)
9. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 114
10. M.D. Litvinchuk, R.I. Gaiduk, V.I. Kit, Farmakol. Toksikol. **42**, 509 (1979)

(–)-Othosenine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Senecio jacobaea*
$C_{19}H_{27}NO_7$: 381.1787
Mp: 232–235°C (MeOH), 235°C (picrate) [1]
$[\alpha]_D$ −14° ($CHCl_3$) [1]
$[\alpha]_D$ −45° ($CHCl_3$) [1], −74° (EtOH) [1, 2]
UV: 217(3.90) [3]
IR: 3600, 3403, 2940, 1746, 1719, 1650, 1464, 1392, 1253, 1220, 1195, 1160, 1123, 1097, 1054, 1036, 1024, 986, 953, 938, 882, 838, 807, 787, 764, 740 [4]
MS *m/z*: 337(27), 322(3), 320(3), 266(5), 252(c3), 239(3), 238(3), 226(12), 222(7), 220(3), 212(10), 211(60), 180(8), 156(5), 141(12), 140(100), 139(15), 138(64), 125(12), 124(10), 123(55), 122(63), 121(10), 120(10), 110(5), 109(9), 108(14), 97(5), 96(29), 95(15), 94(5), 83(12), 82(98), 81(11), 80(10) [5]
^{1}H NMR: 0.98(3H, d), 1.29(3H, s), 1.86(3H, d), 3.40(1H, dd), 3.95(1H, dd), 4.59(1H, dd), 5.37(1H, q), 5.84(1H, q) [6]
^{13}C NMR: [2]

Table 1

C-1	39.6	C-8	69.5	C-14	131.9
2	31.8	9	66.7	15	167.7
3	51.9	10	178.8	16	26.2
5	53.6	11	75.8	17	13.5
6	35.8	12	37.7	18	136.0
7	74.2	13	39.2	19	15.6

CD: [7]
X-ray: [8]
Pharm./Biol.: (Hydrogen tartrate) possesses cholinolytic, tranquilizing, and spasmolytic actions. Is used in spasms of the smooth musculature of the organs of the abdominal cavity, gastric ulcers of the stomach and the duodenum, bronchial asthma, hypertension, stenocardia, spasms of the vessels of the brain, and in ophthalmic practice of dilating the pupil. Supplied in the form of tablets, powders (0.05 g), and ampuls, containing 1 ml of 0.2% soln. [9]

References

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1. R.I. Konovalova, A.P. Orekhov, Zh. Obshch. Khim. **8**, 273 (1938)
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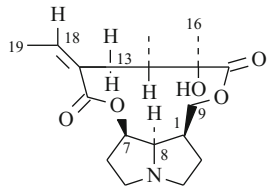
5. C.C.J. Culvenor, N.I. Koretskaya, L.W. Smith, L.M. Utkin, Austral. J. Chem. **21**, 1671 (1968); U.A. Abdullaev, Ya.V. Rashkes, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 556 (1974)

Platyphilline



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Adenostyles alliariae, Leucanthemum vulgare, Nardosmia laevigata, Senecio platyphylloides, S. rhombifolius, S. vernalis*
$C_{18}H_{27}NO_5$: 337.1890
Mp: 124–125°C (Me_2CO), 200°C (picrate), 223°C (dec., perchlorate), 201°C (chloroaurate), 206°C (picrolonate), 217°C (methiodide), 193 C (bitartrate), 148°C (platynecine), $[\alpha]_D$ −57°; 155°C (senecionic acid) $[\alpha]_D$ +38° [1]

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7. J. Hrbek, L. Hruban, A. Klasek, N.K. Kochetkov, A.M. Likhosherstov, F. Santavy, G. Snatzke, Collect. **37**, 3918 (1972)
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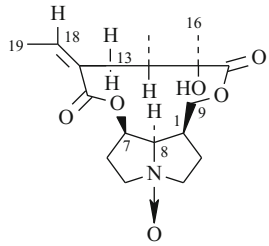
Platyphilline N-Oxide



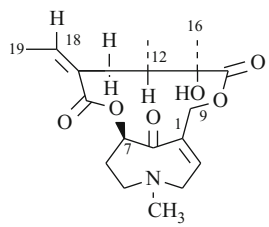
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Senecio platyphylloides*
$C_{18}H_{27}NO_6$: 353.1838
Mp: 180–181°C, 184°C (hydrochloride), 166°C (dec., nitrate), 149°C (platynecine N-oxide) [1]
$[\alpha]_D$ −45° (EtOH) [1]
Solubility: very sol. H_2O; spar. sol. org. solvs [1]

References

1. R.A. Konovalova, DAN SSSR **78**, 905 (1951)

Renardine (Sencircine)

CAS Registry Number: 2318-18-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Nardosmia laevigata, Senecio jacobaea, S. renardii, S. subdentatus*
$C_{19}H_{27}NO_6$: 365.1838
Mp: 192–193°C (Me_2CO), 220°C (picrate), 197°C (bitartrate), 196°C (dec., methiodide), 143°C (hydrochloride otonecine), 149°C (senecionic acid) $[\alpha]_D$ −8° [1]
$[\alpha]_D$ −2° [1]
Solubility: very sol. EtOAc; sol. Me_2CO, Et_2O, H_2O [1]
UV: 227 [2]; 214(3.95) [3]
IR: 3400, 3030, 3000, 2860, 2805, 1708, 1655, 1165, 1145, 1120, 1110 [2]
MS *m/z*: 365(M^+, 8), 337(20), 321(28), 294(38), 278(6), 276(2), 266(47), 254(6), 250(9), 238(9), 168(73), 151(100), 150(23), 123(90), 122(55), 110(93), 94(38) [2, 4]
^{1}H NMR: 0.84(3H, d, J = 6.37, CH_3-17), 1.27(3H, s, CH_3-16), 1.84(dd, J = 1.7; 7.3, CH_3-19), 2.00(1H, m, H-13), 2.02(3H, s, CH_3-4), 2.33(1H, m, H-13), 2.45(2H, m, H-6), 2.68(1H, ddd, J = 3.91; 12.2; 12.2, H-5), 2.81(1H, ddd, J = 2.9; 5.86; 12.2, H-5), 3.17(1H, ddd, J = 18.55; 1.9; 2.9, H-3), 3.39(1H, dd, J = 18.55; 1.9, H-3), 4.28(1H, d, J = 11.2, H-9), 4.91(1H, t, J = 2.3, H-7), 5.35(1H, d, J = 11.2, H-9), 5.79(1H, dq, J = 1.5; 7.3, H-18), 6.07(1H, t, J = 2.4, H-2) [5]
^{13}C NMR: [5]

Table 1

C-1	134.4	C-9	64.4	C-15	166.4
2	137.4	10	178.0	18	137.0
3	58.5	11	77.8	CH_3-4	40.5
5	53.2	12	38.6	CH_3-16	24.6
6	36.3	13	37.7	CH_3-17	10.1
7	78.1	14	131.9	CH_3-19	15.2
8	192.4				

CD: [6]
X-ray: [7]
HPLC: [8]
GLC: [9]

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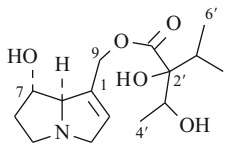
Rinderine

CAS Registry Number: 480-82-0 (indicine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Rindera baldshuanica, Solenanthus turkestanicus*

$C_{15}H_{25}NO_5$: 299.1733

Mp: 100–101°C (Me_2CO), 153°C (hydrochloride), 124°C (hydrobromide), 119°C (hydroiodide) [1]

$[\alpha]_D$ +25° (EtOH) [1]

Solubility: very sol. $CHCl_3$, EtOH, H_2O; sol. Me_2CO; spar. sol. Et_2O [1]

IR: 3525, 3440, 3410, 3250, 3070, 1735, 1340, 1315 [1]

^{1}H NMR: 0.89(3H, d, CH_3-7′), 0.90(3H, d, CH_3-6′), 1.16(3H, d, CH_3-4′), 1.79(1H, m, H-6), 1.91(1H, m, H-6), 1.98(1H, m, H-5′), 2.57(1H, m, H-5), 3.23(1H, m, H-5), 3.29(1H, dd, H-3), 3.86(1H, d, H-3), 3.88(1H, br s, H-8), 4.06(1H, q, H-3′), 4.11(1H, m, H-7), 4.83-4.85(each 1H, q, H-9), 5.66(1H, br s, H-2) [2]

^{13} C NMR: [2]

Table 1

C-1	135.9	C-7	74.7	C-3′	69.4
2	126.9	8	80.0	4′	17.0
3	61.7	9	62.1	5′	33.1
5	54.1	1′	175.1	6′	17.1
6	33.1	2′	83.4	7′	17.0

Pharm./Biol.: LD_{50} 562 mg/kg (i/p, mice). In a dose 100 mg/kg, it causes complete block in nerve–muscle synapses [3]

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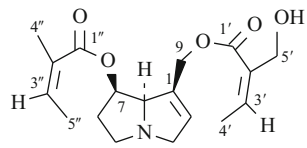
Sarracine

CAS Registry Number: 2492-09-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Senecio platyphylloides, S. rhombifolius, S. sarracenicus*

$C_{18}H_{27}NO_5$: 337.1889

Mp: 151–152°C (H_2O) [1]; 45–46°C [2], 179°C (bitartrate), 171°C (picrate), 152°C (platynecine), $[\alpha]_D$ −57° ($CHCl_3$), 44° (angelic acid), 58° (sarracinic acid) [1]

$[\alpha]_D$ −130° (EtOH) [1]

Solubility: very sol. EtOH, Et_2O, $CHCl_3$; spar. sol. H_2O [1]

MS *m/z*: 337(3), 254(3), 237(40), 222(20), 211(3), 138(97), 122(34), 106(33), 95(47), 82(100) [3]
^{1}H NMR: 1.80–1.98(2H, m, H-2, H-6), 1.91(3H, dq, J = 1.5; 1.4, CH_3-5″), 2.02(3H, dq, J = 7.3; 1.5, CH_3-4″), 2.00–2.14(2H, m, H-2, H-6), 2.05(3H, d, J = 7.3, CH_3-4′), 2.76(1H, m, H-5), 2.80(1H, m, H-3), 2.85(1H, m, H-1), 3.25(1H, m, H-3), 3.40(1H, br t, H-5), 3.69(1H, dd, J = 3.7; 8, H-8), 4.24(2H, s, H-5′), 4.25(1H, dd, J = 7; 11, H-9), 4.43(1H, dd, J = 7.6; 11, H-9), 5.36(1H, br t, H-7), 6.13(1H, dd, J = 7.3; 1.4, H-3″), 6.38(1H, q, J = 7.2, H-3′) [4]
CD: [5]
HPLC: [6]
Pharm./Biol.: LD_{50} 1250 mg/kg (s/c, mice). Pronounced spasmolytic action. (Hydrogen tartrate) used in spasms of the smooth musculature of the abdominal cavity, ulcers, gastritises, cholecystitises, bronchial asthma, migraine. Supplied in 0.01 g tablets [7]

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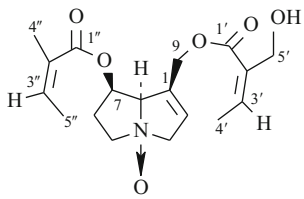
Sarracine N-Oxide

CAS Registry Number: 19038-27-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Senecio francheti, S. rhombifolius, S. sarracenicus*
$C_{18}H_{27}NO_6$: 353.1838
Mp: 123–124°C (Me_2CO) [1]; 140–141°C (anhyd.) [2]; 108°C (picrate), 155°C (chloroaurate) [1]
$[\alpha]_D$ −82° [1]; −94° (EtOH) [2], −73° (H_2O) [2]
MS *m/z*: 337, 336, 335, 253 [3]
^{1}H NMR: 1.93, 2.05(3H, s, 6H, d, 3 × CH_3), 5.63(1H, OH), 6.16(2H) [2]
HPLC: [4]

References

1. A.V. Danilova, A.D. Kuzovkov, DAN SSSR **89**, 865 (1953)
2. C.C.J. Culvenor, T.A. Geissman, J. Org. Chem. **26**, 3045 (1961)
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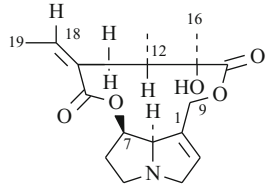
Senecionine

CAS Registry Number: 130-01-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Leucanthemum vulgare, Nardosmia laevigata, Senecio erraticus, S. vulgaris*
$C_{18}H_{25}NO_5$: 335.1733
Mp: 232–233°C (MeOH) [1]; 242°C [2]; 191°C (picrate), 214°C (nitrate), 121°C (retronecine) [1]
$[\alpha]_D$ −57° ($CHCl_3$) [1]; −71° (EtOH) [2]

Solubility: insol. Me_2CO, H_2O [3]
UV: 218(3.86) [3]
IR: 3400, 1740, 1710, 1660 [3, 4]
MS *m/z*: 335(M^+, 6), 291, 248, 220, 139, 138, 137, 136, 121, 120(100), 119, 95, 94, 93, 80 [3, 4]
^{1}H NMR: 0.90(3H, d, J = 6.5, CH_3-17), 1.31(3H, s, CH_3-16), 1.64(1H, m, H-12), 1.75(1H, m, H-13), 1.82(3H, dd, J = 7.2; 1.8, CH_3-19), 2.13(1 H, m, H-6), 2.16(1H, dd, J = 12, H-13), 2.37(1H, dd, J = 14.1; 5.8, H-6), 2.53(1H, m, H-5), 3.25(1H, t, J = 1.9, H-5), 3.38(1H, m, H-3), 3.93(1H, m, H-3), 4.03(1H, d, J = 11.9, H-9), 4.27(1H, m, H-8), 5.00(1H, m, H-7), 5.48(1H, d, J = 11.9, H-9), 5.71(1H, m, H-18), 6.18(1H, d, J = 1.8, H-2) [4–6]
^{13}C NMR: [4, 6]

Table 1

C-1	131.7	C-8	74.7	C-14	133.2
2	135.9	9	62.7	15	167.4
3	59.9	10	177.3	16	24.9
5	52.9	11	76.6	17	10.9
6	34.6	12	37.3	18	133.7
7	77.5	13	38.3	19	14.9

CD: [7]
X-ray: [8]
HPLC: [9]
GLC: [4, 10]
Pharm./Biol.: LD_{50} 64.1 mg/rg (i/v., mice). Hypotensive and spasmolytic action on the smooth musculature of the intestine [11, 12]. 25–50 times less active than platyphylline [13]

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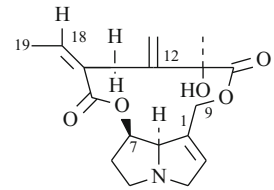
Seneciphylline

CAS Registry Number: 480-81-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Adenostyles alliaria, Senecio borysthenicus, S. cannabifolius, S. cineraria, S. erraticus, S. krylowii, S. lapsanoides, S. othonnae, S. palmatus, S. paludosus, S. platyphylloides, S. propinquus, S. renardii, S. rhombifolius, S. stenocephalus, S. subdentatus, S. taraxacifolius, S. vernalis*
$C_{18}H_{23}NO_5$: 333.1576
Mp: 217–218°C (EtOH) [1]; 183°C (picrate), 163°C (chloroaurate), 245°C (dec., perchlorate), 232°C (dec., methiodide), 120°C (retronecine) [2]
$[\alpha]_D$ −128° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$; spar. sol. Et_2O, pet. ether [1]; C_6H_6, EtOH, Me_2CO [2]
UV: 218(3.90) [3]
IR: 1741, 1718, 1665, 1648, 1245, 1206, 1188, 1155, 1104, 1071, 1033, 963, 944, 902, 823 [4]
MS *m/z*: 333(M^+, 76), 289(73), 288(35), 262(4), 260(6), 246(100), 244(25), 218(42), 209(21) [5]
^{1}H NMR: 1.53(3H, s, CH_3-16), 1.87(3H, dd, J = 6.8; 1.2, CH_3-19), 2.09(1H, m, H-6), 2.34(1H, dd,

J = 13.7; 5.6, H-6), 2.53(1H, m, H-5), 2.74(1H, d, J = 16.9, H-13), 2.94(1H, d, J = 16.9, H-13), 3.26(1H, t, J = 8, H-5), 3.38(1H, d, J = 2, H-3), 3.93(1H, d, J = 15.7, H-3), 4.01(1H, d, J = 11.2, H-9), 4.24(1H, m, H-8), 4.95(1H, t, J = 3, H-7), 5.04(1H, d, J = 2, H-17), 5.23(1H, d, J = 2, H-17), 5.39(1H, d, J = 11.2, H-9), 5.83(1H, q, J = 7.2; 1.0, H-18), 6.18(1H, d, J = 1.5, H-2) [6]

^{13}C NMR: [7]

Table 1

C-1	131.4	C-8	77.7	C-14	131.6
2	136.4	9	61.0	15	167.1
3	62.7	10	176.9	16	24.8
5	53.2	11	76.3	17	114.3
6	37.4	12	146.3	18	136.0
7	74.8	13	34.8	19	15.1

X-ray: [8]

CD: [9]

HPLC: [10]

Pharm./Biol.: Parasympatholytic action. Similar to platyphylline (action on the intestine) but weaker [11]

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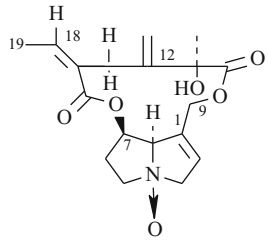
Seneciphylline N-Oxide

CAS Registry Number: 38710-26-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Senecio platyphylloides*

$C_{18}H_{23}NO_6$: 349.1525

Mp: 120°C (Abs. EtOH–Et_2O) [1]

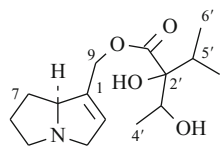
^{1}H NMR: 1.23(3H, s, CH_3-16), 1.89(3H, d, J = 7, CH_3-19), 2.47(1H, m, H-6), 2.72(1H, m, H-13), 2.90(1H, d, J = 16.1, H-13), 2.97(1H, d, J = 17, H-6), 3.63(1H, m, H-5), 3.93(1H, m, H-5), 4.12(1H, m, H-9), 4.55(2H, m, H-3), 4.79(1H, m, H-8), 5.01(1H, d, J = 1.5, H-17), 5.23(1H, d, J = 1.5, H-19), 5.42(1H, mH-9), 5.44(1H, m, H-7), 5.94(1H, d, J = 6.9, H-18), 6.28(1H, m, H-2) [2]

References

1. R.A. Konovalova, DAN SSSR **78**, 905 (1951)
2. H.J. Segall, J.L. Dallas, Phytochemistry **22**, 1271 (1983)

Supinine

CAS Registry Number: 551-58-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Heliotropium supinum, Tournefortia sogdiana*
$C_{15}H_{25}NO_4$: 283.1783
Mp: 145–147°C (Me_2CO) [1]
$[\alpha]_D$ −16° (EtOH) [1]
Solubility: very sol. EtOH; spar. sol. Me_2CO, H_2O [2]
UV: 212(3.27) [3]
IR: 3340, 1750, 1228, 1179, 1140, 1110, 1087, 1022, 978, 900, 832, 799 [4]
MS *m/z*: 283(M^+), 268, 240, 239, 238, 140, 138, 120, 94, 93, 80 [1]
^{1}H NMR: 0.90(3H, d, J = 8), 0.98(3H, d, J = 8), 1.19(3H, d, J = 8) [1]
^{13}C NMR: [5]

Table 1

C-1	137.9	C-7	30.2	C-3′	71.5
2	125.6	8	69.3	4′	17.3*
3	61.9	9	62.4	5′	33.1
5	56.9	1′	175.2	6′	17.1*
6	25.9	2′	83.1	7′	17.0*

CD: [6]
X-ray: [7]
Pharm./Biol.: LD_{50} 222.5 mg/kg (i/v, mice). Antagonist of acetylcholine, carbachol, and eserine (physostigmine) [8]. Hepatotoxic [9]

References

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3. V. Simanek, A. Klasek, F. Santavy, Collect. **34**, 1832 (1969)
4. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (London, Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., 1966), **2**, No. 261A
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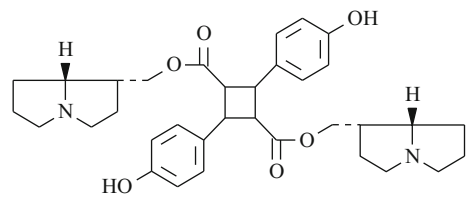
7. M.F. Mackay, P. Mitrprachachon, P.J. Oliver, C.C.J. Culvenor, Acta Cryst. **41C**, 722 (1985)
8. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 89
9. F.S. Sadritdinov, *The Pharmacology of Natural Compounds* [in Russian] (FAN, Tashkent, 1979), p. 29

Thesine

CAS Registry Number: 528-37-0



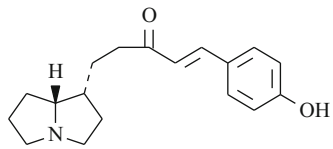
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Thesium minkwitzianum*
$C_{34}H_{42}N_2O_6$: 574.3043
Mp: 254–256°C (EtOH), 246°C (sulphate), 226°C (dec., picrate), 150°C (di methiodide), 40°C ((+)-isoretronecanol) [1]
$[\alpha]_D$ +76° [1]
Solubility: spar. sol. org. solvs.; insol. H_2O [1,2]
Pharm./Biol.: LD_{50} 2.99, 26 mg/kg (i/v, s/c, mice). At the dose 2.5–3 mg/kg, it causes the complete cessation of neuromuscular transmission, inhibition of respiration, hypotensive effect in cats under narcosis [3]. (di methiodide) has an increase of toxicity and curare-like action [4]

References

1. A.P. Arendaruk, N.F. Proskurnina, R.A. Konovalova, Zh. Obshch. Khim. **30**, 670 (1960)
2. A.P. Arendaruk, A.P. Sklodinov, Zh. Obshch. Khim. **30**(484), 489 (1960)
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 279
4. F.S. Sadritdinov, *Farmakologiya prirodnykh soedinenii* (FAN, Tashkent, 1979), p. 29

Thesinine

CAS Registry Number: 488-02-8



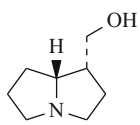
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Thesium minkwitzianum*
$C_{17}H_{21}NO_3$: 287.1521
Mp: 38–40°C, 208°C (n-oksikorichnol acid), 40°C ((+)-izoretronekanol) [1]
Solubility: very sol. EtOH, $CHCl_3$, Me_2CO; spar. sol. Et_2O, H_2O [1]

References

1. A.P. Arendaruk, N.F. Proskurnina, R.A. Konovalova, Zh. Obshch. Khim. **30**, 670 (1960)

Trachelanthamidine

CAS Registry Number: 526-64-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Trachelanthus korolkowii*
$C_8H_{15}NO$: 141.1154
Mp: oil [1]; 179°C (picrate), 115°C (hydrochloride), 183°C (picrolonate) [2]
$[\alpha]_D$ −14° (EtOH) [2]
IR: 3300 [3]
MS *m/z*: 141(M^+, 24), 140(9), 124(15), 110(9), 108, 97, 83(100), 82(37), 70, 55(21), [3, 4]
^{1}H NMR: 1.90(7H, m), 2.63(2H, m), 3.21(3H, m), 3.63(2H, d, J = 6, H-9), 4.60(1H, s, OH) [3]
GLC: [5]

References

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4. U.A. Abdullaev, Ya.V. Rashkes, Kh. Shakhidoyatov, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 602 (1972)
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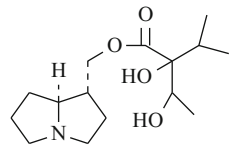
Trachelantamine

CAS Registry Number: 14140-18-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Rindera baldshuanica, R. echinata, Trachelanthus hissaricus, T. korolkowii*
$C_{15}H_{27}NO_4$: 285.194
Mp: 91–92°C (pet. ether.- Me_2CO), 156°C (picrate), 95°C ((+)-trachelanthic acid) [1]
$[\alpha]_D$ −18° (H_2O) [1]
IR: [2]
MS *m/z*: 285(M^+), 284, 270, 267, 252, 242, 241, 240, 142, 124(100), 83, 82, 55 [3]
CD: [4]
Pharm./Biol.: LD_{50} 139.1, 1950 mg/kg (i/v, s/c, mice) [5]. Cholinolytic action [6]

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2. V.N. Kulakov, A.M. Likhosherstov, N.K. Kochetkov, Zh. Obshch. Khim. **37**, 146 (1967)
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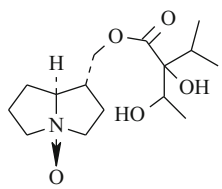
4. J. Hrbek, L. Hruban, A. Klasek, N.K. Kochetkov, A.M. Likhosherstov, F. Santavy, G. Snatzke, Collect. **37**, 3918 (1972)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 90
6. F.S. Sadritdinov, *Farmakologiya prirodnykh soedinenii* (FAN, Tashkent, 1979), p. 29

Trachelanthamine N-Oxide

CAS Registry Number: 510-19-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Rindera echinata, Trachelanthus hissaricus, T. korolkowii*

$C_{15}H_{29}NO_5$: 303.2046

Mp: 166–167°C (Me_2CO) [1]; 125°C [2]; 95°C (trachelanthic acid) [1]

$[\alpha]_D$ −22° (H_2O) [1]

Pharm./Biol.: LD_{50} 3900 mg/kg (i/v., mice) [3]

References

1. G.P. Men'shikov, G.M. Bolodina, Zh. Obshch. Khim. **15**, 225 (1945); **11**, 209 (1941)
2. M.V. Telezhenetskaya, A.D. Matkarimov, S.N. Khodzhibekov, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 389 (1987)
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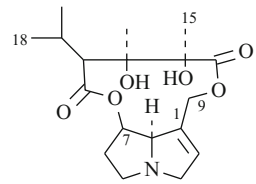
Trichodesmine

CAS Registry Number: 548-90-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Heliotropium argusioides, Trichodesma incanum*

$C_{18}H_{27}NO_6$: 353.18387

Mp: 160–161°C (dec., Me_2CO) [1]; 154–155°C [2]; 228°C (picrate), 205°C (hydrochloride), 200°C (methiodide), 152°C (sulphoether), 209°C (trichodesmic acid), 120°C (retronecine)

$[\alpha]_D$ +38° (H_2O EtOH) [1]

IR($CHCl_3$): 3510, 1730 [3, 4]

MS *m/z*: 353(M^+, 8), 281(8), 264(100), 222(3), 220(6), 209(9), 136, 120, 119, 93, 80 [5]

^{1}H NMR: 0.96, 1.04(each 3H, d, J = 6, CH_3-17, CH_3-18), 1.35, 1.38(each 3H, s, CH_3-15, CH_3-16), 4.47. 5.11(each 1H, H-9), 5.11(1H, J = 11, H-7) [2]

X-ray: [3]

CD: [6]

Pharm./Biol.: LD_{50} 100 mg/kg (s/c, rats). It causes severe organic injuries of internalorgans and CNS [7]

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5. Ya.V. Rashkes, U.A. Abdullaev, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 34 (1974)
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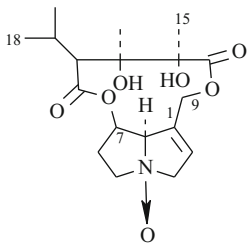
7. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 91

Trichodesmine N-Oxide

CAS Registry Number: 55727-46-3

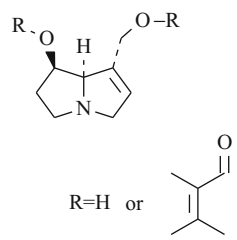


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Heliotropium argusioides, Trichodesma incanum*
$C_{18}H_{27}NO_7$: 369.1787
Mp: 169–170°C (dec., EtOH–Me_2CO) [1]
Solubility: very sol. EtOH, H_2O; insol. Me_2CO, $CHCl_3$ [2]
MS *m/z*: 353(1), 352, 351, 281, 264, 262, 171, 154(57), 139, 136, 135, 126, 119, 117, 111(100) [2]

References

1. S.Yu. Yunusov, N.V. Plekhanova, Zh. Obshch. Khim. **29**, 677 (1959)
2. U.A. Abdulaev, Ya.V. Rashkes, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 629 (1974)

Turneforcine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Tournefortia sibirica*
$C_{13}H_{21}NO_3$: 239.1521
Mp: oil, 155°C (chloroplatinate) [1], 170°C (hydrochloride), 201°C (picrate), 44°C (angelic acid), 120°C (turneforcidine) $[\alpha]_D$ −10C (MeOH), −4° (EtOH) [1, 2]
$[\alpha]_D$ −59° [1]

References

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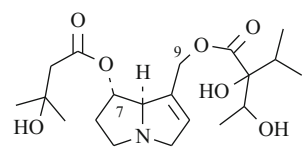
Uluganine

CAS Registry Number: 55437-97-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids
Biological sources: *Ulugbekia tschimganica*
$C_{20}H_{33}NO_7$: 399.2257
Mp: 106–109°C (Me_2CO) [1]; 116°C (heliotridine picrate) [2]
$[\alpha]_D$ −32° (Me_2CO) [1]
Solubility: very sol. EtOH, Me_2CO, $CHCl_3$; insol. Et_2O, pet. ether. [2]
IR: 3525, 3397, 1733, 1682, 1385, 1370, 1250 [1]
MS *m/z*: 399(M^+, 2), 384(8), 356(1), 355(3), 354(2), 341(0.6), 281(3), 256(9), 238(100), 220(10), 138, 136, 120, 119, 94, 93, 80, 59(29) [1, 2]
^{1}H NMR: 0.86, 0.87(each 3H, d, CH_3-6′, CH_3-7′), 1.13(3H, d, CH_3-4′), 1.20(6H, s, CH_3-4″, CH_3-5″),

1.20(2H, s, H-2″), 4.65(2H, m, H-9), 5.25(1H, m, H-7) [1, 2]

References

1. M.A. Khasanova, U.A. Abdullaev, M.V. Telezhenetskaya, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 842 (1974)
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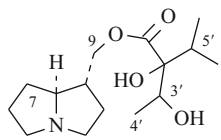
Viridiflorine

CAS Registry Number: 551-57-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Cynoglossum viridiflorum, Lindelofia macrostyla, L. olgae, L. pterocarpa, L. stylosa, L. tschimganica, Paracaryum himalayense, Symphytum officinale, Trachelanthus hissaricus*

$C_{15}H_{27}NO_4$: 285.1940

Mp: 101–102°C (Me_2CO) [1]; 164°C (hydrochloride) [2]; 144°C (methiodide)[3]

$[\alpha]_D$ −12° (EtOH) [2]

Solubility: very sol. EtOH, H_2O; spar. sol. Et_2O, petr. ether [2]

UV: 262, 268 [1]*

IR: 3400, 3360, 3230, 3120, 2965, 2860, 2745, 2130, 1940, 1738, 1470, 1430, 1420, 1250 [1]

MS *m/z*: 285(M^+), 284, 270, 267, 252, 242, 241, 240, 226, 142, 140, 124(100), 96, 83, 82, 55 [4]

^{1}H NMR: 0.90, 0.92(each 3H, d, J = 6, CH_3-5′, CH_3-6′), 1.22(3H, d, J = 6, CH_3-4′), 1.95(1H, m, H-5′), 3.52(1H, br s, OH), 3.99(1H, q, H-3′) [5]

CD: [6]

Pharm./Biol.: Cholinolytic action [7]

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2. A.M. Likhosherstov, V.N. Kulakov, N.K. Kochetkov, Zh. Obshch. Khim. **37**, 1012 (1967)
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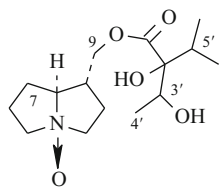
Viridiflorine N-Oxide

CAS Registry Number: 19038-28-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Pyrrolizidine Alkaloids

Biological sources: *Cynoglossum viridiflorum, Lindefolia olgae, L. pterocarpa, L. stylosa, Paracaryum himalayense, Trachelanthus hissaricus*

$C_{15}H_{27}NO_5$: 301.1889

Mp: 197–198°C (EtOH) [1]; 170–173°C [2]

$[\alpha]_D$ −9° (EtOH) [3]

Solubility: very sol. H_2O, EtOH, MeOH; spar. sol. $CHCl_3$; insol. Me_2CO [1]

References

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The principal structural feature of quinazoline alkaloids is the heterocyclic quinazoline skeleton that has not yet been observed in nature and was prepared synthetically in 1895.

Quinazoline and quinazolone alkaloids form a small group of secondary natural compounds.

The chemistry of quinazoline alkaloids began in 1888 when the nature of their first representative, (±)-peganine (vasicine in the foreign literature), was discovered.

Tricyclic quinazoline and quinazolone alkaloids occur mainly only in higher plants. These alkaloids are the most numerous. At present 40 compounds of this type are known worldwide.

The chemistry of this group is exceedingly varied. «Classical» tricyclic quinazoline alkaloids with substituents in the 4- (ketone, hydroxyl, acetone) and 9-positions (hydroxyl) can be found. One example each of broken rings B (vasicol) and C (pegamine) exists.

Dimers (dipegine and dipeginol) have been observed among the compounds of this group.

N-Oxides of tricyclic quinazoline bases have been isolated from *Nitraria komorowii*. This was the first instance of verified observation of compounds with this group among the quinazoline alkaloids.

These bases belong to two types: quinazoline, a representative of which is peganine, and quinazolone, to which vasicinone belongs. Bases of the peganine type (deoxypeganidine, deoxypeganine, isopeganidine, peganidine) have in the UV spectrum two absorption maxima at 222–225 and 295–303 nm. A hypsochromic shift was observed for peganol. Bases of the vasicinone type exhibit five absorption maxima at 220, 267–272, 302–306, 314, and 318 nm.

The conjugated double-bond system in quinazolines and quinazolones gives characteristic absorption maxima in the IR spectra at 1,630–1,585 and 1,505–1,406 cm^{-1}. Furthermore, bases of the vasicinone type have a strong carbonyl band (at 1695 cm^{-1} in pegamine). Deoxypeganidine, isopeganidine, and peganidine have a strong C = O band near 1700–1710 cm^{-1}.

The strength of the molecular ion in mass spectra of the *N*-oxides of these bases is from 3 to 13%.

IR spectra of *N*-oxides of quinazoline and quinazolone alkaloids exhibit characteristic absorption bands near 1630–1585 and 1505–1465 cm^{-1} for the C = C and C = N bonds. *N*-Oxides of the vasicinone group have bands for the C = C and C = N bonds and a strong absorption band at 1685–1690 cm^{-1} and bands near 1270–1290 cm^{-1} that are characteristic of *N*-oxides.

Absorption bands in the IR spectrum that correspond to OH-vibrations appear at lower frequency (in vasicinone *N*-oxides $\nu_{KBr} = 3150$ cm^{-1} and $\nu_{CHCl3} = 3200$; in vasicinone, $\nu_{KBr} = 3400$; in peganine *N*-oxide, $\nu_{KBr} = 3150$; in peganine, $\nu_{KBr} = 3250$ cm^{-1}) due to formation of intramolecular H-bonds in these bases.

Mass and PMR spectra of quinazoline and quinazolone alkaloids differ substantially.

PMR spectra of peganine and deoxypeganine *N*-oxides have signals for aromatic protons that are shifted to weak field by about 0.15–0.20 ppm; alicyclic, 0.20–0.66 ppm.

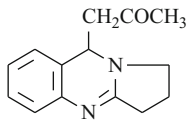
PMR spectra of vasicinone alkaloids have a characteristic H-5 signal that is shifted to weak field by about 0.5 ppm compared with signals of the other aromatic protons due to the anisotropic effect of the carbonyl in the *peri*-position. We observed the same paramagnetic shift for vasicinone and deoxyvasicinone *N*-oxides. In contrast with peganine and deoxypeganine *N*-oxides, the N → O group has practically no noticeable effect on the chemical shifts.

The PMR spectra of peganine and vasicinone contain no signals for OH protons. Spectra of their *N*-oxides exhibit a broad signal from the OH proton at 6.15 and 5.62 ppm, respectively, owing to formation of an intramolecular H-bond.

Pharmacological studies of the properties of quinazoline alkaloids and their synthetic analogs revealed their anticholinesterase, choline-sensitizing, cholinolytic, antiaminooxidase, and soporific activities.

Deoxypeganidine

CAS Registry Number: 42405-57-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Peganum harmala*

$C_{14}H_{16}N_2O$: 228.1263

Mp: 76–78°C [1], 69–70°C, 176°C (picrate), 167°C (perchlorate), 157°C (nitrate), (oxime 179°C) [2]

UV: 218, 224 sh, 292(4.13, 4.09, 3.88) [2]

IR: 1710, 1628, 1593, 1490 [2]

MS *m/z*: 228(M^+., 12), 171(100), 143(3), 116(5), 89(2)

^{1}H NMR: 1.95(3H, s, CH_3), 2.00(2H, m, H-10), 2.20, 3.50(4H, m, H-9, H-11), 2.85(2H, t, H-12), 5.14(1H, t, H-4), 7.05(4H, m, H-Ar) [2]

Pharm./Biol.: LD_{50} 143, 254, 380 mg/kg (i/v, i/p, s/c, mice). Causes salivation, lacrimation, and vomiting [3]

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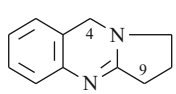
Deoxypeganine

CAS Registry Number: 495-59-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Nitraria komarovii, N. schoberi, Peganum harmala, P. nigellastrum*

$C_{11}H_{12}N_2$: 172.1001

Mp: 86–87°C [1], 250°C (hydrochloride), 138°C (dec., nitrate), 245°C (perchlorate), 204°C (picrate) [1]

Solubility: very sol. org. solvent; insol. H_2O [2]

UV: 225, 303 [2]

IR: 1635, 1600, 1510, 1490 [2]

MS *m/z*: 172(M^+), 171(100) [3]

^{1}H NMR(CF_3COOH): 2.02, 2.75, 3.46(each 2H, m, H-10, H-9, H-11), 4.45(2H, s, H-4), 6.86 (4H, H-Ar)

X-ray($2 \times C_{11}H_{13}N_2^+ \times [ZnCl_4]^{2-}$): [4]

HPLC: [5, 6]

Pharm./Biol.: LD_{50} 54.24 mg/kg (s/c, i/v, mice). High anticholinesterase activity [7]. Nontoxic [8]. Used in medicine for treating damage to the peripheral nervous system [9]

References

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5. A.L. D'yakonov, B.D. Kabulov, Chem. Nat. Comp. **27**, 256 (1991)
6. Kh. R. Nuritdinov, K. D. Sargazakov, L. V.Molchanov, Kh. N. Aripov, in *Proceedings of an All-Union Conference on the Use of Chromatography in the Food, Microbiological, and Medicinal Industries* [in Russian], Gelendzhik, 8–12 October, 1990
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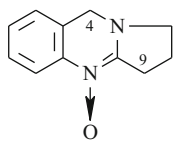
Deoxypeganine N-Oxide

CAS Registry Number: 168780-02-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Nitraria komarovii*

$C_{11}H_{12}N_2O$: 188.0995

Mp: 243–244°C (EtOH–Me_2CO) [1]

Solubility: very sol. EtOH, MeOH, H_2O, $CHCl_3$, spar. sol. Me_2CO, Et_2O, C_6H_6 [1]

UV: 214, 217, 223, 285(4.04; 4.10; 3.98; 3.51) [1]

IR: 3500–3350, 3030, 2840, 2770, 1680, 1630, 1585, 1505, 1465, 1430, 1360, 1315, 1255, 1195, 790 [1]

MS *m/z*: (M^+)188, 187, 172, 171, 155, 144, 143, 131, 129, 116, 104, 102, 89, 85 [1].

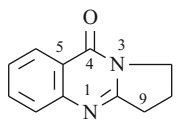
^{1}H NMR: 2.22(2H, m, H-10), 3.17(2H, t, J = 7.5, H-9), 3.66(2H, t, J = 6.5, H-11), 4.71(2H, s, H-4), 6.88–7.28(4H, m, H-Ar) [1, 2]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **29**, 73 (1993)
2. T.S. Tulyaganov, N.M. Kozimova, S.A. Sultanov, Rastit. Res. **1**, 82 (2008)

Deoxyvasicinone

CAS Registry Number: 530-53-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Linaria transiliensis, Nitraria komarovii, N. schoberi, N. sibirica, Peganum harmala, P. nigellastrum*

$C_{11}H_{10}N_2O$: 186.0793

Mp: 110–111°C (Et_2O), 188°C (picrate), 250–251°C (hydrochloride), 293°C (hydrobromide) [1]

Solubility: very sol. C_6H_6, $CHCl_3$, EtOH, Et_2O [1]

UV: 224, 267, 272, 302, 314(4.20, 4.63, 3.59, 3.40, 3.33) [2]

IR: 1675, 1616 [1]; 1681, 1626 [2]

MS *m/z*: 186(M^+, 100), 185(80) [3]

^{1}H NMR: 2.20(2H, m, H-10), 3.10(2, H-9), 4.15(2, m, H-11), 8.20(1, d, H-5) [4]

^{13}NMR: [5]

Table 1

C-2	159.4	C-6	126.7*	C-9	32.4
4	160.6	7	133.9	10	19.4
4a	120.4	8	126.1*	11	46.4
5	125.7	8a	142.4		

HPLC: [6, 7]

X-ray: [8]

Pharm./Biol.: LD_{50} 158, 446 mg/kg (i/v, i/p, mice). Muscle relaxant, hypnotic, sedative action [9]

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8. K.K. Turgunov, B. Tashkhodzhaev, L.V. Molchanov, Kh.N. Aripov, Chem. Nat. Comp. **31**, 714 (1995)
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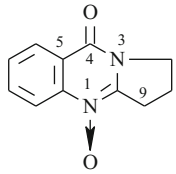
Deoxyvasicinone N-Oxide

CAS Registry Number: 168781-18-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Nitraria komarovii*

$C_{11}H_{10}N_2O_2$: 202.0787

Mp: 152–153°C [1]

Solubility: very sol. H_2O, EtOH MeOH spar. sol. pet. ether [1]

UV: 229, 270, 304, 315(4.42, 4.10, 3.94, 3.88) [1]

IR: 3050, 2965, 2930, 1685, 1630, 1610, 1570, 1470, 1380, 1335, 1285, 1270, 1025, 880, 840, 770 [1]

MS *m/z*: 202(M^+, 13), 186(100), 185(100), 184(17), 169(8), 160(26), 157(25), 130(42), 129(39), 119(19), 116(16), 103(58), 90(23) [1]

^{1}H NMR: 2.22(2H, m, H-10), 3.08(2H, t, J = 8.5, H-9), 4.10(2H, t, J = 8, H-11), 7.32(1H, m, H-6), 7.35(2H, m, H-7, H-8), 8.12(1H, d, J = 8.5, H-5) [1, 2]

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1. T.S. Tulyaganov, R.Sh. Atadzhanov, N.D. Abdullaev, E.L. Kristallovich, Z. Osmanov, Chem. Nat. Comp. **29**, 509 (1993)
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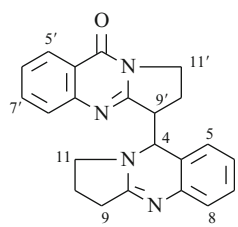
Dipegine

CAS Registry Number: 53416-72-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Peganum harmala*

$C_{22}H_{20}N_4O$: 356.1637

Mp: 221–223°C (Me_2CO) [1]

UV: 226, 277, 305, 317 sh (4.48, 4.14, 4.05, 3.89) [1]

IR: 1660, 1620, 1590 [1]

MS *m/z*: 356(M^+, 0.25), 185(3), 171(100) [1]

^{1}H NMR: 2.17(4H, m, H-10, H-10′), 7.00, 7.50(7H, m, H-Ar), 8.05(1H, d, J = 7, H-5) [1]

^{1}H NMR: 1.82 (2H, m, Ha-10), 2.06 (1H, J = 13.4, 9.0, 8.9, 8.2, H′a -10), 2.12 (1H, J = 13.4, 8.9, 8.2, 4.3, He-10′), 2.56 (1H, J = 16.5, 6.5, 6.5 He-9), 2.64 (1H, J = 16.5, 9.5, 9.5, Ha-9), 2.79 (1H, J = 10.1, 7.8, 7.8 Ha-11), 3.14 (1H, J = 10.1, 5.9, 5.9, He-11), 3.47 (1H, J = 8.9, 8.9, 2.1H-9′), 3.89 (1H, J = 12.4,9.0, 4.3, He-11′), 4.14 (1H, J = 12.4, 8.2, 8.2 Ha-11′), 5.70 (1H, J = 2.1, H-4), 7.02 (1H, J = 8.0, 1.5, H-5), 7.04 (1H, J = 7.9, 6.9, 1.5, H-7), 7.09 (1H, J = 7.9, 1.8, H-8), 7.18 (1H, J = 8.0, 6.9, 1.8, H-6), 7.44 (1H, J = 8.0, 6.7, 1.6, H-6′), 7.67 (1H, J = 8.2, 1.6, 0.6, H-8′), 7.72 (1H, J = 8.2, 6.7, 1.4, H-7′), 8.25 (1H, J = 8.0, 1.4, 0.6, H-5′) [2]

^{13}C NMR: [2]

Table 1

C-2	121.31	C-6	127.76*	C-9	32.05
2′	121.53	6′	127.29*	9′	53.99
4	58.34	7	125.32*	10	20.49
4′	163.28	7′	135.08	10′	20.55
4a	144.03	8	126.34*	11	45.57
4′a	149.69	8′	127.38*	11′	51.92
5	124.82*	8a	159.19		
5′	129.64*	8′a	161.57		

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1. B.Kh. Zharekeev, Kh.N. Khashimov, M.V. Telezhenetskaya, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 282 (1974)
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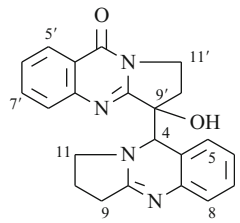
Dipeginole



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Peganum harmala*
$C_{22}H_{20}N_4O_2$: 372
Mp: 243°C (MeOH) [1]
UV: 225, 276, 303, 317 (4.46, 4.11, 4.04, 3.82) [1]
IR: 1680, 1630, 1580 [1]
MS *m/z*: 201, 171 [1]
^{1}H NMR: 2.13 (1H, m, Ha-10), 2.25 (1H, J = 14.0, 9.0, 8.0, Ha-10′), 2.37 (1H, m, He-10), 2.66 (1H, J = 14.0, 7.8, 3.4, He-10′), 2.87 (1H, m, He-9), 2.90 (1H, J = 12.4, 8.6, 8.0, Ha-11), 3.04 (1H, m, Ha-9), 3.78 (1H, J = 10.9, 9.0, 3.4, He-11′), 3.89 (1H, J = 12.4, 9.0, 3.2, He-11), 4.52 (10.9, 8.0, 7.8, Ha-11′), 5.40 (1H, s, H-4), 6.92 (1H, J = 7.5, 1.5, H-5), 7.24 (1H, J = 7.2, 7.2, 1.5, H-7), 7.30 (1H, J = 7.5, 7.2, 1.8, H-6), 7.46 (1H, J = 7.2, 1.8, H-8), 7.50 (1H, J = 8.1, 6.8, 1.5, H-6′), 7.73 (1H, J = 8.2, 1.5, 0.5, H-8′), 7.80 (1H, J = 8.2, 6.8, 1.5, H-7′), 8.20 (1H, J = 8.1, 1.5, 0.5, H-5′) [1]
^{13}C NMR: [1]

Table 1

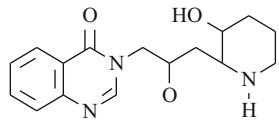
C-2	121.49	C-6	129.35*	C-9	32.41
2′	127.18	6′	127.93*	9′	83.19
4	63.68	7	118.82*	10	20.01
4′	165.45	7′	135.42	10′	30.91
4a	135.42	8	127.18*	11	43.63
4′a	149.19	8′	128.16*	11′	55.78
5	115.39*	8a	158.61		
5′	131.14*	8′a	161.09		

References

1. M.F. Faskhutdinov, M.V. Telezhenetskaya, M.G. Levkovich, N.D. Abdullaev, Chem. Nat. Comp. **36**, 602 (2000)

Febrifugine

CAS Registry Number: 24159-07-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Dichroa febrifuga*
$C_{16}H_{19}N_3O_3$: 301.1426
Mp: 152–154°C ($CHCl_3$), 218°C (dec., di hydrochloride), 230°C (sulphate) [1]
$[\alpha]_D$ +21° (EtOH) [1]
Solubility: sol. EtOH, Me_2CO, $CHCl_3$, H_2O; spar. sol. C_6H_6, Et_2O [1]
UV: 225, 266, 275, 302, 312(4.40, 3.84, 3.82, 3.68, 3.45) [2]
IR: [1]
Pharm./Biol.: LD_{50} 2.7 mg/kg (mice) [3]. Antimalarial and antitumoral activity [1]

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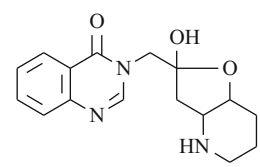
Isofebrifugine

CAS Registry Number: 24159-07-7



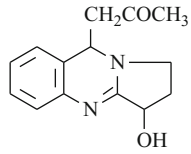
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Dichroa febrifuga*
$C_{16}H_{19}N_3O_3$: 301.1426
Mp: 129–130°C, 209°C (hydrochloride), 218°C (sulphate) [1]
$[\alpha]_D$ +120° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$, MeOH; spar. sol. Me_2CO, H_2O; insol. C_6H_6, Et_2O [1]
UV: 225, 266, 275, 302, 312(4.40, 3.84, 3.82, 3.68, 3.45) [2]
IR: [1]

References

1. E.S. Zabolotnaya, L.N. Safronich, in *Trudy VILR* [Proceedings of the All-Union Scientific Research Institute of Medicinal and Aromatic Plants]. Medicinal Plants [in Russian], **15**, 356 (1969)
2. A.W. Sangster, R.L. Stuart, Chem. Rev. **65**, 69 (1965)

Isopeganidine

CAS Registry Number: 53448-58-1



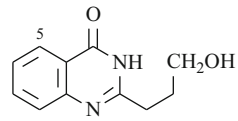
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Peganum harmala*
$C_{14}H_{16}N_2O_2$: 244.1212
Mp: 169–170°C, 178°C (picrate) [1]
$[\alpha]_D$ 0° [1]
UV: 227, 295(3.93, 3.85)
IR: 1710, 1640, 1600, 1580 [1]
MS *m/z*: 244(M^+, 10), 187(100), 169(4), 159(8), 131(7), 57(3), 43(4) [1]
^{1}H NMR(CF_3COOH): 1.82(3H, s), 2.05, 2.45(each 1H, m), 2.95(2H, d), 3.47(2H, m), 5.04(1H, d), 6.86(4H, m) [1]

References

1. B.Kh. Zharekeev, Kh.N. Khashimov, M.V. Telezhenetskaya, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 282 (1974)

Pegamine

CAS Registry Number: 31431-93-3



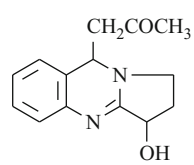
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Peganum harmala*
$C_{11}H_{12}N_2O_2$: 204.0899
Mp: 160–161°C, 193°C (perchlorate), 174°C (Ac) [1]
Solubility: spar. sol. org. solvs [1]
UV: 226, 266, 306, 318 [1]
IR: 3500–2700, 1695, 1618, 1510, 1440 [1]
MS *m/z*: 204(M^+), 187, 186, 185, 174, 173, 160(100), 119, 92, 90, 77, 76 [1]
^{1}H NMR(CF_3COOH): 2.14, 3.00, 4.20(each 2H, m), 7.75(3H, m), 8.15(1H, d, J = 5, H-5) [1]

References

1. Kh.N. Khashimov, M.V. Telezhenetskaya, Ya.V. Rashkes, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 462 (1970)

Peganidine

CAS Registry Number: 28463-17-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Peganum harmala*
$C_{14}H_{16}N_2O_2$: 244.1212
Mp: 189–190°C, 192°C (dec., hydrochloride), 152°C (perchlorate), 183°C (picrate), 86°C (oxime), 206°C (semicarbazone) [1]
$[\alpha]_D$ 0° [1]
Solubility: spar. sol. C_6H_6, Me_2CO, EtOH, $CHCl_3$ [2]
UV: 226, 297(4.04. 3.96) [1]
IR: 2870, 1700, 1350 [1]
MS *m/z*: 244(M^+, 8), 188(6), 187(100), 169(4), 159(8), 131(10), 57(3), 43(4) [1, 2]
^{1}H NMR(CF_3COOH): 1.86(3H, s, CH_3), 2.02, 2.38, 3.35, 3.73(each 1H, m), 3.07(2H, d), 5.02 (1H, t), 6.86(4H, m) [2]
Pharm./Biol.: LD_{50} 143, 254, 380 mg/kg (i/v, i/p, s/c, mice). Causes salivation, vomiting, defecation [3]

References

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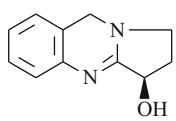
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 303

(–)-Peganine

CAS Registry Number: 50591-64-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Nitraria komarovii, Peganum harmala*
$C_{11}H_{12}N_2O$: 188.0950
Mp: 211–212°C (dec.), 211°C (picrate), 207°C (hydrochloride), 130°C (dec., nitrate) [1]
$[\alpha]_D$ −61° (EtOH); −189° ($CHCl_3$) [1]
X-ray: [2]

References

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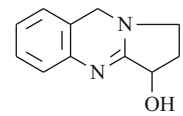
(±)-Peganine

CAS Registry Number:6159-56-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Galega officinalis, Linaria popovii, L. transiliensis, L. vulgariformis, L. vulgaris, Peganum harmala, P. nigellastrum*
$C_{11}H_{12}N_2O$: 188.0950
Mp: 209–210°C (dec., EtOH), 169°C (dec., nitrate), 194°C (picrate), 204°C (hydrochloride), 192°C (hydroiodide), 187°C (methiodide) [1]
Solubility: very sol. $CHCl_3$; sol. EtOH, MeOH [1]
UV: 226, 303(4.10, 3.95) [2]
IR: 3100, 2850, 1640, 1590, 1505, 1485, 1460 [3]
MS *m/z*: 188(M^+), 187(100), 169, 159, 131, 104, 77 [4]
^{1}H NMR: 2.80, 3.50(each 2H, m, H-10, H-11), 4.62(2H, s, H-4), 4.80(1H, t, J = 7, H-9), 7.05(4H, m, H-Ar) [2]
^{13}C NMR: [5]

Table 1

C-2	163.9	C-6	124.0*	C-9	69.9
4	47.1	7	128.3	10	69.9
4a	118.9	8	123.6*	11	48.3
5	125.7	8a	142.4		

HPLC: [6]
X-ray: [7]
Pharm./Biol.: LD_{50} 78.7, 220 mg/kg (i/v., s/c., mice). Anticholinesterase properties [8]

References

1. Kh.N. Khashimov, Author's Abstract of Candidate's Dissertation, Tashkent, 1973
2. R.R. Arndt, S.H. Eggers, A. Jordaan, Tetrahedron **23**, 3521 (1967)
3. Kh.N. Khashimov, Unpub.
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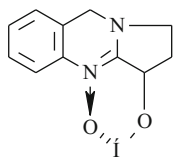
5. S. Johne, B. Jung, D. Groger, J. Pract Chem. **319**, 919 (1977)
6. K.M. Parikh, V.J. Doshi, J.B. Salunkhe, R.P. Kamath, Indian Drugs **27**, 64 (1989)
7. K.K. Turgunov, B. Tashkhodzhaev, L.V. Molchanov, M.K. Makhmudov, Kh.N. Aripov, Chem. Nat. Comp. **31**, 353 (1995)
8. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 304

peganine *N*-Oxide

CAS Registry Number: 170712-17-1



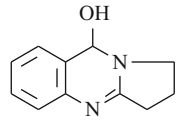
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Nitraria komarovii*
$C_{11}H_{12}N_2O_2$: 204.0944
Mp: 207–208°C (EtOH–Me_2CO) [1]
$[\alpha]_D$ 0° [1]
Solubility: very sol., H_2O, EtOH, MeOH [1]
UV: 207, 220 (sh), 225, 232 (sh), 302 (4.16, 4.21, 4.27, 4.18, 4.06) [1]
UV: (EtOH + H^+): 213, 220, 225 (sh), 282 [1]
IR: 3150 (OH), 2940, 2860, 2840 (-CH_2-), 1630, 1585, 1510, 1465 (C = C, C = N), 1270, 1230 (N → 0), 770 [1]
MS *m/z*: 204 (M^+, 3), 203 (4), 188 (8), 187 (12), 186 (10), 171 (9), 155 (26), 140 (100), 123 (24), 122 (14), 98 (64), 84 (65), 83 (77) [1]
^{1}H NMR: 2.25, 2.66 (2H, m, H-10), 3.68 (2H, m, H-11), 4.75 (2H, s, H-4), 5.38 (1H, t, J = 8.5, H-9), 6.15 (1H, br s, OH), 6.96 (1H, m, H-5), 7.16 (3H, m, H-6, 7, 8) [1, 2]

References

1. T.S. Tulyaganov, Chem. Nat. Comp. **30**, 727 (1994)
2. T.S. Tulyaganov, N.M. Kozimova, S.A. Sultanov, Rastit. Res. **1**, 82 (2008)

Peganol

CAS Registry Number: 36101-54-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Nitraria komarovii, Peganum harmala*
$C_{11}H_{12}N_2O$: 188.0950
Mp: 178–180°C (dec.), 138°C (nitrate) [1]
Solubility: very sol. MeOH, EtOH, $CHCl_3$; spar. sol. C_6H_6, Me_2CO; insol. Et_2O [2]
UV: 275(3.96) [1]
IR: 3200, 2700, 1620, 1568, 1480, 1420 [2]
MS *m/z*: 188(M^+, 9), 187(6), 171(100) [3]
^{1}H NMR: 0.75(1H, m), 1.70(3H, m). 3.25(1H, m), 3.88(1H, m), 5.75(1H, s), 7.00(4H, m) [3]
HPLC: [4]
Pharm./Biol.: LD_{50} 130 mg/kg (i/v, mice) [5]. Causes reversible suppression of cholinesterase activity and gross disturbances of conditioned reflex activity and behavioral reactions [6]

References

1. Kh.N. Khashimov, M.V. Telezhenetskaya, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 835 (1971)

2. Kh.N. Khashimov, Author's Abstract of Candidate's Dissertation, Tashkent, 1978
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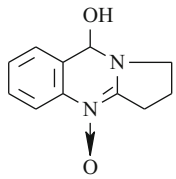
6. N.T. Tulyaganov, *Abstracts of the IVth All-Union Congress of Pharmacologists*, Leningrad, 1976, p. 204

Peganole *N*-Oxide



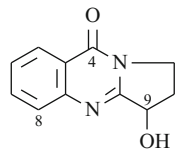
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Nitraria komarovii*
$C_{11}H_{12}N_2O_2$: 204.0944
Mp: 182–183°C (EtOH) [1]
$[\alpha]_D$ 0° (EtOH) [1]
Solubility: very sol. H_2O, EtOH, MeOH [1]
UV: 207, 270 (4.08; 3.62) [1]
IR: 3062, 2977, 2934, 2875, 2826, 2697, 1620, 1599, 1568, 1479, 1455, 1423, 1293, 1190, 1169, 1076, 1006, 881, 781 [1]
MS *m/z*: 204(M^+, 4), 203(3), 188(8), 187(11), 186(7), 172(48), 171(100), 143(9), 129(11), 116(15), 89 (13) [1]
^{1}H NMR: 0.75(m, 1H), 1.16–2.13(m, 3H), 3.30(m, 1H), 3.89(m, 1H), 5.80(s, 1H), 6.95–7.40(m, 4Ar-H), 7.80(br s) [1]

References

1. T.S. Tulyaganov, O.E. Makhmudov, Chem. Nat. Comp. **36**, 76 (2000)

(–)-Vasicinone

CAS Registry Number: 486-64-6 (vasicinone)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids
Biological sources: *Biebersteinia multifida, Galega officinalis, Linaria transiliensis, Nitraria sibirica, Peganum harmala, P. nigellastrum*
$C_{11}H_{10}N_2O_2$: 202.0742
Mp: 203–204°C, 232°C (dec., hydrochloride), 250°C (dec., hydrobromide) [1]
$[\alpha]_D$ −129° ($CHCl_3$) [1]
Solubility: spar. sol. org. solvent, H_2O [2]
UV: 226, 270, 303, 316
IR: 3200, 1700, 1640, 1600, 1475 [2]; 3110, 1668 [1]
MS *m/z*: 202(M^+, 100), 146(85), 119(55) [3]
^{1}H NMR: 2.55(2H, m, H-10), 4.10(2H, m, H-11), 5.10(1H, OH-9), 5.20(1H, t, H-9), 7.55(3H, m, H-6, H-7, H-8), 8.30(1H, d, J = 8, H-5) [4]
^{13}C NMR: [5]

Table 1

C-2	160.3	C-6	126.9*	C-9	72.0
4	160.3	7	134.4	10	29.4
4a	121.0	8	126.7*	11	43.4
5	126.6*	8a	148.7		

HPLC: [6]
Pharm./Biol.: LD_{50} 152.1133 mg/kg (i/v, s/c, mice). Causes muscular relaxation and labored respiration [7]

References

1. N.I. Koretskaya, Zh. Obshch. Khim. **27**, 3361 (1957)
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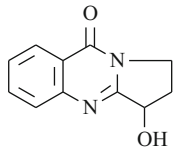
6. K.M. Parikh, V.J. Doshi, J.B. Salunkhe, R.P. Kamath, Indian Drugs **27**, 64 (1989)
7. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 301

(±)-Vasicinone

CAS Registry Number: 35387-16-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Peganum harmala, Nitraria komarovii, N. schoberi*

$C_{11}H_{10}N_2O_2$: 202.0742

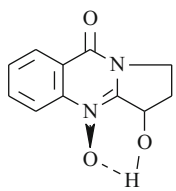
Mp: 211–212°C, 235°C (hydrochloride) [1]

References

1. Kh.N. Khashimov, Author's Abstract of Candidate's Dissertation, Tashkent, 1973

Vasicinone *N*-Oxide

CAS Registry Number: 168781-19-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Nitraria komarovii*

$C_{11}H_{10}N_2O_3$: 218.0736

Mp: 203–204°C [1]

$[\alpha]_D$ 0° [1]

Solubility: very sol. H_2O, MeOH, EtOH, $CHCl_3$, spar. sol. Me_2CO, C_6H_6, Et_2O [1]

UV: 209, 226, 270, 305, 316(4.51, 4.63, 4.06, 3.76, 3.67) [1]

IR: 3160, 2960, 2930, 2860, 1690, 1630, 1610, 1570, 1470, 1330, 1280, 1110, 775. [1]

MS *m/z*: 218(M^+, 4), 202(100), 201(20), 186(18), 185(23), 174(12), 155(6), 146(60), 130(19), 119(35) [1]

^{1}H NMR: 2.25, 2.54(each 1H, m, H-10), 3.98, 4.24(each 1H, m, H-11), 5.17(1H, t, J = 6, H-9), 5.62(1H, br s, OH), 7.38(1H, m, H-6), 7.62(2H, m, H-7, H-8), 8.20(1H, d, J = 8, H-5) [1, 2]

References

1. T.S. Tulyaganov, R.Sh. Ataszhanov, N.D. Abdullaev, E.L. Kristallovich, Z. Osmanov, Chem. Nat. Comp. **29**, 509 (1993)
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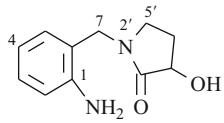
Vasicol

CAS Registry Number: 78720-03-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinazoline and Quinazolone Alkaloids

Biological sources: *Peganum harmala*

$C_{11}H_{14}N_2O_2$: 206.1055

Mp: oil, 130°C (di acetate), 147°C (4-Br.) [1]

UV: 240, 293(3.89, 3.53) [1]

IR: 3450–3240, 1690–1660, 1612 [1]

MS *m*/*z*: 206(M^+, 72), 187(11), 161(28), 147(37), 133(20), 106(100) [2]

^{1}H NMR: 2.02, 3.12(each 2H, m, H-4′, H-5′), 4.22(3H, m, H-7, H-3′), 6.57(4H, m, H-Ar) [1]

13C NMR (di acetate): [1]

Table 1

C-1	137.3	C-6	123.9	C-5′	44.7
2	124.7	7	137.3	OCO	169.5
3	129.5	1′	137.3	CH_3	20.8
4	123.2	2′	171.2	NCO	170.1
5	130.9	3′	71.0	CH_3	24.4
		4′	25.8		

X-ray (4-Br): [1]

References

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2. M.V. Telezhenetskaya, Unpub.

Quinoline alkaloids are found in 13 plant families. Quinoline alkaloids of the family Rutaceae stand out for their distribution and structural variation.

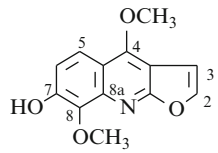
Quinoline alkaloids have been isolated in the CIS countries from plants of the genera *Haplophyllum*, *Dictamnus*, *Ptelea*, and *Choisya* and from callus tissue of *Ruta graveolens*, all from the Rutaceae family. Only a few alkaloids have been observed in single species of other families.

Most quinoline alkaloids have been isolated from plants of the genus *Haplophyllum* from the Central Asian region, where 23 species grow, including 16 species in Uzbekistan, which is the center of variation for species of these plants. More than 70 alkaloids have been obtained from 20 *Haplophyllum* species, among which were 53 new ones (S. Yu. Yunusov, G. P. Sidyakin, I. A. Bessonova, V. I. Akhmedzhanova, et al.).

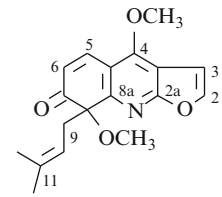
The genus *Haplophyllum* is a unique source of quinoline alkaloids with various structures and pharmacological activities. Representatives of almost all known types of quinolines found in plants of the family Rutaceae have been observed in plants of this genus: 4-hydroxyquinolin-2-one, pyranoquinolin-2-one, dihydropyranoquinolin-4-one, 2-phenylquinoline, 2-phenyl(or alkyl)-quinolin-4-one, furanoquinoline, dihydrofuranoquinoline, and dihydrofuranoquinolin-4-one. In addition, new structural systems have been observed: furanoquinolines with a geminal substituted cyclohexadienone ring (perfamine), 5,6,7,8-tetrahydrofuranoquinolines (haplophyllidine.), geminal substituted hemiterpenoid quinoldiones (buchapine), dimers with a cyclobutane ring (haplodimerine), glycoalkaloids including biosides and acylbiosides (haplosidine), and quinoline alkaloids with a terpenoid substituent (bucharaine.).

The chemistry of alkaloids with new structural systems has been studied and methods for establishing their structures have been developed [1]. Reactions such as an unusual cyclocondensation in the 5,6,7,8-tetrahydroquinoline series (perforine, haplophyllidine) that lead to compounds with an aromatic ring; hydrogenolysis of a dihydrofuran ring that is new for dihydrofuranoquinolines (dubinidine) upon Clemmensen reduction of dubinidinone; and the ability of pyranoquinolin-2-one (haplamine) to react in the lactim form to form *O*-methyl and *O*-acetyl derivatives have also been observed.

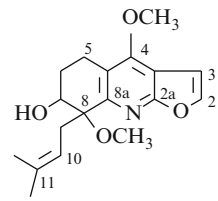
Numerous interconversions of alkaloids have been carried out. It has been hypothesized that 7,8-disubstituted 4-methoxyfuranoquinolines of various structures are linked biogenetically and that they are formed from the common precursor haplopine.



Haplopine



Perfamine



Haplophyllidine

Pharmacological investigations (N. P. Polievtsev, Kh. S. Akhmedkhodzhaeva, F. S. Sadritdinov, A. G. Kurmukov, M. B. Sultanov, et al.) showed that *Haplophyllum* alkaloids are slightly toxic compounds. Most of them act as central nervous system (CNS) depressants and only a few, for example graveoline and dubamine, act as CNS stimulants. Graveoline is more active than such analeptics as cordiamine and caffeine and comparable with corazole.

Foliosidine exhibits antiarrhythmic properties and has a broader spectrum of pharmacological activity and efficacy than quinidine and novocainamide.

Dubinidine, haplophyllidine, perforine, and skimmianine exhibit sedative activity; haplamine and skimmianine, estrogenic and antitumor activities. Buchapine acts as an HIV-1 inhibitor.

Plants of the genus *Dictamnus* contain mainly furanoquinoline, isofuranoquinoline, and 3-alkyl-4-methoxyquinolin-2-one alkaloids. A distinguishing feature of these plants is the presence of isofuranoquinoline alkaloids in them (I. M. Kikvidze), which has not been observed in *Haplophyllum* species.

Because they occur in all investigated species of the genus *Dictamnus*, they can be considered a taxonomic signature of plants from this genus.

Acridone derivatives, which have also been isolated from callus tissue of *Boennighausenia albiflora* (I. N. Kuzovkina), in addition to quinoline compounds, were observed in callus tissue of *Ruta graveolens*. Alkaloids of the acridone group are presented in this section because there are few known representatives and they occur together with quinoline derivatives.

References

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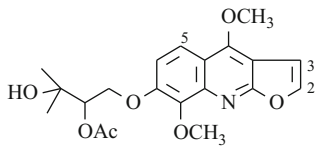
Acetylevoxine

CAS Registry Number: 40817-01-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum ferganicum, H. ramosissimum*
$C_{20}H_{23}NO_7$: 389.1475
Mp: 160–162°C [1]
IR: 3335, 3165, 3150, 1750, 1630, 1590, 1520 [2]
MS *m/z*: 389(M^+, 32), 329(15), 258(20), 245(50), 244(70), 227(100), 202, 199, 145, 127, 85 [1]
^{1}H NMR: 1.26, 1.28(each 3H, s, 2 × CH_3), 2.08(3H, s, OAc), 4.01, 4.35(each 3H, s, 2 × OCH_3), 4.30(2H, m, OCH_2), 5.12(1H, m, CH–OAc), 7.00, 7.55(each 1H, d, J = 3, H-3, H-2), 7.15, 7.85(each 1H, J = 9, H-6, H-5) [1, 2]

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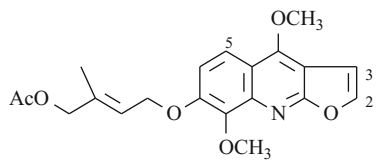
Acetylhaplatine

CAS Registry Number: 58480-58-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum obtusifolium*
$C_{20}H_{21}NO_6$: 371.1369
Mp: 78–80°C [1], 87–88°C [2]
Solubility: sol. $CHCl_3$ [1, 2]
IR: 3165, 3140, 1740, 1628, 1583, 1520, 1498 [1, 2]
MS *m/z*: 371(M^+, 75), 312(15), 245(100), 244(98), 230(70), 227(90), 216(98), 201(61), 127(62) [1, 2]
^{1}H NMR: 1.76(3H, s, CH_3), 1.99(3H, s, OAc), 4.00, 4.26(each 3H, s, 2 × OCH_3), 4.57(2H, s, CH_2–OAc), 4.72(2H, d, J = 6.5, O–CH_2), 5.68(1H, t, J = 6.5, =CH), 6.88, 7.43(each 1H, d, J = 3, H-3, H-2), 7.05, 7.81(each 1H, d, J = 10, H-6, H-5) [1]

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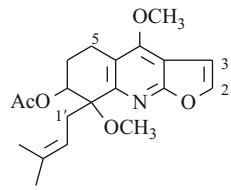
Acetylhaplophyllidine

CAS Registry Number: 23107-57-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{20}H_{25}NO_5$: 359.1733
Mp: 149–150°C (EtOH) [1]
Solubility: sol. $CHCl_3$, C_6H_6, Et_2O, Me_2CO [1]
UV: 219, 259 [1]
IR: 3155, 3132, 1741 [1]

MS *m/z*: 359(M^+, 2), 327(30), 312(92), 290(100), 270 (21), 268(95), 248(98), 233(59), 188(45), 173(12), 69(8) [1]

^{1}H NMR: 1.54, 1.66(each 3H, s, 2 × CH_3), 1.90(3H, s, OAc), 1.97–2.30, 2.42–2.75(each 2H, m, 2H-5, 2H-6), 3.40(2H, dd, J = 18, 5, 2H-1′), 5.13(1H, t, J = 5.0, H-2′), 5.19(1H, dd, J = 2.5, 4.5, H-7), 6.94(1H, d, J = 2.5, H-3), 7.55(1H, d, J = 2.5, H-2) [1]

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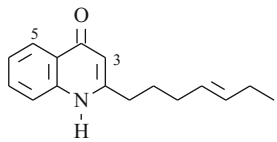
1. I.A. Bessonova, Chem. Nat. Comp. **35**, 589 (1999)

Acutine

CAS Registry Number: 36150-05-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum acutifolium*

$C_{16}H_{19}NO$: 241.1467

Mp: 122–123°C (Me_2CO), 143°C (dihydro) [1]

Solubility: sol. $CHCl_3$, EtOH, MeOH; insol. Et_2O, petr. ether, H_2O [1]

UV: 214, 235, 305 sh, 318, 330 (4.45, 4.61, 3.92, 4.04, 3.97) [1]

IR: 1635, 1597, 1560, 1510 [1]

MS *m/z*: 241(M^+, 16), 226, 212, 199, 186, 173(24), 172(39), 159(100), 130(12) [1]

^{1}H NMR: 0.84(3H, t, J = 7, CH_3), 1.87(6H, m, CH_2), 2.68(2H, t, J = 7, Ar–CH_2), 5.12(2H, m, CH = CH), 6.21(1H, s, H-3), 7.25–7.90(3H, m, H–Ar), 8.24(1H, d, J = 9, H-5) [1]

Pharm./Biol.: Estrogenic action [2]

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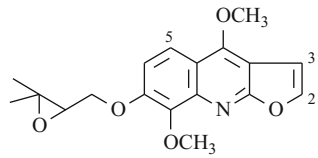
Anhydroevoxine

CAS Registry Number: 24099-25-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum ferganicum, H. perforatum*

$C_{18}H_{19}NO_5$: 329.1263

Mp: 136–138°C (EtOAc–C_6H_{14}) [1]

$[\alpha]_D$ +13° ($CHCl_3$) [2]

Solubility: sol. $CHCl_3$ [1]

UV: 248, 310, 320, 332 [3]

IR: 3170, 3138, 1621, 1585, 1510, 1495, 1370 [3]

MS *m/z*: 329(M^+, 100), 314(33), 300(13), 258(19), 245(90), 227(83) [1]

^{1}H NMR: 1.24, 1.26(each 3H, s, 2 × CH_3), 3.11(1H, t, J = 5, CH–O), 4.20(2H, d, J = 5, CH_2–O), 3.99, 4.28(each 3H, s, 2 × OCH_3), 6.93, 7.47(each 1H, d, J = 3, H-3, H-2), 7.14, 7.87(each 1H, d, J = 9, H-6, H-5) [1]

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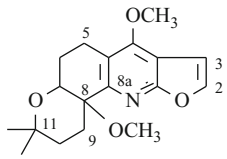
Anhydroperforine

CAS Registry Number: 22952-50-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{18}H_{23}NO_4$: 317.1627
Mp: 143–144°C (EtOH) [1]
$[\alpha]_D$ −35° (MeOH) [1]
Solubility: sol. Et_2O, $CHCl_3$, C_6H_6 [1]
UV: 258(4.08) [2]
IR: 3130, 1610, 1580, 1542, 1470, 1448 [2]
MS *m/z*: 317(M^+, 1), 302(9), 287(100), 272(16), 229(70), 218(26), 216(19), 203(12), 202(27), 188(16), 174(4) [3]
^{1}H NMR (CCl_4): 0.91, 1.20(each 3H, s, 2 × CH_3), 3.08, 4.15(each 3H, 2 × OCH_3), 3.76(1H, q, J = 2.5, 3.5, H-7), 6.76, 7.39(each 1H, H-3, H-2) [3]
^{13}C NMR: [4]

Table 1

C-2	142.6	C-5	18.2	C-10	25.8
2a	161.9	6	22.3	11	71.0
3	104.5	7	70.8	12	30.7
3a	118.0	8	73.0	13	21.8
4	158.3	8a	149.2	4-OCH_3	58.1
4a	104.9	9	34.0	8-OCH_3	50.0

X-ray: [5]

References

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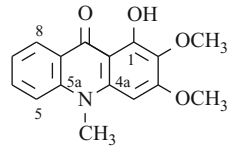
Arborinine

CAS Registry Number: 5489-57-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{16}H_{15}NO_4$: 285.1001
Mp: 175–176°C, 243°C (norarborinine) [1]
UV: 217, 265 sh, 274, 319 sh, 395(4.38, 4.63, 4.71, 3.77, 3.84) [2]
IR: 1637, 1587, 1550, 1493, 1460, 1316, 1282, 1143, 1105, 1053, 990, 855 [2]
MS *m/z*: 285(M^+, 74), 284(23), 271(23), 270(100), 256(14), 243(13), 242(59), 226(7), 212(9), 200(8), 199(39), 184(6), 171(17), 170(18), 143(11), 142(8), 128(8), 115(13), 77(15) [3]
^{1}H NMR: 3.65, 4.07, 4.12(each 3H, s, NCH_3, 2 × OCH_3), 6.07(1H, s, H-4), 6.98–7.80(3H, m, H–Ar), 8.23(1H, d, H-8) [2]
^{13}C NMR: [4]

Table 1

C-1	155.7	C-5	114.5	C-9a	105.3
2	129.9	6	133.7	2-OCH_3	60.6
3	159.1	7	121.2	3-OCH_3	55.8
4	86.7	8	126.0	NCH_3	33.8
4a	140.1	8a	120.3		
5a	141.6	9	180.4		

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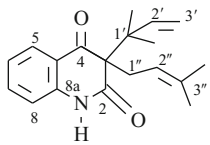
Buchapine

CAS Registry Number: 84017-97-0



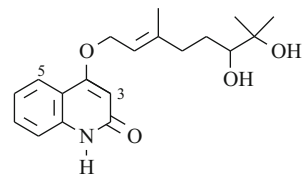
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bucharicum*
$C_{19}H_{23}NO_2$: 297.1729
Mp: 134–135°C (C_6H_{14}) [1]
Solubility: very sol. $CHCl_3$, EtOH, MeOH, Me_2CO, Et_2O [1]
UV: 234, 238 sh, 242 sh, 244 sh, 258 sh, 324, 329 sh, 335 sh (4.44, 4.41, 4.32, 3.72, 3.60, 3.41, 3.50, 3.40) [1]
IR: 1692, 1660 [1]
MS *m/z*: 297(M^+, 10), 229(34), 228(100), 214(20), 212(24), 200(16), 186(38), 174(24), 69(20) [1]
^{1}H NMR: 1.09, 1.40, 1.88(6H, 3H, 3H, each s, 4 × CH_3), 2.77, 4.65(2H, d, 1H, t, J = 7.5, CH_2–CH=), 4.81, 5.76(2H, 1H, CH = CH_2), 6.82–7.50(3H, m, H–Ar), 7.74(1H, d, J = 8.5, H-5) [1]
^{13}C NMR: [2]

Table 1

C-2	173.4	C-8	115.7	C-1″	29.6
3	67.6	8a	140.8	2″	119.4
4	196.1	1′	43.9	3″	135.0
4a	121.7	2′	142.7	3″-CH_3	18.2
5	126.9	3′	113.1	3″-CH_3	25.9
6	123.2	1′-CH_3	23.2		
7	135.5	1′-CH_3	23.4		

Bucharaine

CAS Registry Number: 21059-47-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bucharicum*
$C_{19}H_{25}NO_4$: 331.1783
Mp: 151–152°C (MeOH), 165°C (O–Ac), 143°C (N–Me) [1], 158°C (acetonide) [2]
$[\alpha]_D$ 0° (Py) [1]
Solubility: spar. sol. org. solvents [2]
UV: 227, 267, 278, 316, 328 sh (4.64, 3.80, 3.80, 3.78, 3.64) [1]
IR: 3325, 3070, 1660, 1612, 1510, 1468, 1445, 1412, 1380, 1360, 1340, 1265, 1230, 1152, 1118, 1088, 830, 800 [3]
MS *m/z*: 331(M^+, 4), 316(9), 272(12), 214(12), 189(33), 188(21), 174(11), 162(13), 161(9), 143(100), 125(21), 85(19), 71(33), 59(10) [4]
^{1}H NMR (acetonide): 1.06, 1.21, 1.28, 1.35(each 3H, s, 4 × CH_3), 1.56(2H, m, CH_2), 1.74(3H, s, =C–CH_3), 2.18(2H, t, J = 7.5, =C–CH_2), 3.65(1H, t, J = 6.5, CH–O), 4.68(2H, d, J = 6, O–CH_2), 5.53(1H, t, J = 6, CH), 5.97(1H, s, H-3), 7.00–7.50(3H, m, H–Ar), 7.82(1H, d, J = 9, H-5), 12.72(1H, br s, NH) [2]
Pharm./Biol.: Low toxicity. Sedative action [5]

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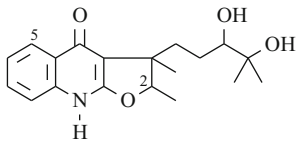
Bucharaminol



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bucharicum*
$C_{19}H_{25}NO_4$: 331.1783 [1]
Mp: 223°C (acetonide) [2]
UV: 216, 232, 250 sh, 297, 307, 317(4.20, 4.22, 3.96, 3.70, 3.79, 3.72) [3]
IR: 3440, 3210, 1620, 1580, 1510, 1475, 1455, 1370, 1340, 1310, 1270, 1240, 1205, 1122, 1060, 1040, 1010 [3]
MS *m/z*: 331(M^+, 6), 316(7), 313(14), 286(9), 272(15), 242(6), 215(50), 214(100), 200(15) [3]
^{1}H NMR (acetonide): 0.80–2.35(22H, m, 6 × CH_3, 2 × CH_2), 3.60(1H, m, CH–O), 4.60(1H, q, J = 7, H-2), 7.20–7.70(3H, m, H–Ar), 8.37(1H, d, J = 8.5, H-5) [2]

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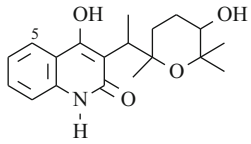
Bucharidine

CAS Registry Number: 25865-94-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bucharicum*
$C_{19}H_{25}NO_4$: 331.1783
Mp: 251–252°C (Me_2CO) [1]
$[\alpha]_D$ 0° (Py) [1]
Solubility: sol. $CHCl_3$ [1]
UV: 214, 228, 265 sh, 274, 282, 306 sh, 314, 328 (4.36, 4.43, 3.54, 3.72, 3.76, 3.43, 3.77, 3.66) [1]
IR: 3470, 1643, 1608, 1500, 1425, 1380, 1335, 1310, 1280, 1190, 1160, 1120, 1060, 1040, 890 [2]
MS *m/z*: 331(M^+, 3), 316(6), 272(18), 214(9), 189(38), 188(25), 174(8), 162(4), 143(100), 125(31), 85(22), 71(39), 59(6) [3]
^{1}H NMR: 1.16(6H, s, 2 × CH_3), 1.23(3H, d, J = 6.5, CH_3), 1.30(3H, s, CH_3), 1.70–2.30(4H, m, CH_2–CH_2), 3.70–4.10(2H, m, Ar–CH, CH–O), 7.22(3H, m, H–Ar), 7.88(1H, d, J = 8.5, H-5) [1]
Pharm./Biol.: Estrogenic action [4]

References

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2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
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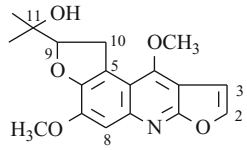
Choisyine

CAS Registry Number: 18556-07-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Choisya ternata*
$C_{18}H_{19}NO_5$: 329.1263
Mp: 188–189°C (EtOH), 145°C (nitrate), 196°C (sulphate), 191°C (perchlorate), 210°C (picrolonate), 177°C (hydrochloride), 252°C (picrate), 232°C (Ac), 259°C (isochoisyine), 256°C (norchoisyine) [1–3]
Solubility: sol. EtOH, $CHCl_3$, C_6H_6 [1–3]
UV: 255, 320, 330, 351 [1]
IR: 3405, 1627 [1]
MS *m/z*: 329(M^+, 79), 311(6), 296(54), 270(100), 256(14), 255(12), 241(10), 240(10), 228(13), 226(26) [3]
^{1}H NMR: 1.29, 1.42(each 3H, s, 2 × CH_3), 3.70, 4.77(2H, 1H, H-10, H-9), 3.91, 4.29(each 3H, s, 2 × OCH_3), 6.95, 7.50(each 1H, d, J = 2, 5, H-3, H-2), 7.13(1H, s, H-8) [3]
^{13}C NMR [4]:

Table 1

C-2	142.6	C-5	–	C-10	33.9
2a	–	6	–	11	72.0
3	104.6	7	–	12	24.4
3a	–	8	106.8	13	26.1
4	–	8a	–	4-OCH_3	58.9
4a	–	9	90.7	7-OCH_3	55.8

Pharm./Biol.: Sympathomimetic properties [5]

References

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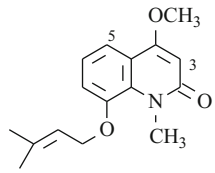
Daurine

CAS Registry Number: 54357-79-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum dauricum*
$C_{16}H_{19}NO_3$: 273.1365
Mp: 117–118°C (C_6H_{14}) [1]
Solubility: sol. EtOH, $CHCl_3$, MeOH [1]
UV: 215, 235, 254, 268 sh, 276 sh, 286 sh, 328 (4.44, 4.40, 3.85, 3.80, 3.68, 3.35) [1]
IR: 1655, 1600, 1580, 1490, 1470, 1395, 1322, 1265, 1240, 1160, 1110, 1080, 1048, 990 [2]
MS *m/z*: 273(M^+, 33), 205(100), 190, 174, 162, 69(18) [1, 2]
^{1}H NMR: 1.73, 1.80(each 3H, s, 2 × CH_3), 3.91, 3.93(each 3H, s, NCH_3, OCH_3), 4.57, 5.52(2H, d, 1H, t, J = 6.8, =CH–CH_2–O), 6.05(1H, s, H-3), 7.09(1H, dd, J = 7.8, 2.4, H-7), 7.13(1H, t, J = 7.8, 7.2, H-6), 7.60(1H, dd, J = 7.2, 2.4, H-5) [1]

References

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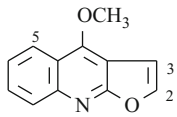
Dictamnine

CAS Registry Number: 484-29-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Dictamnus angustifolius, D. caucasicus, Haplophyllum bucharicum, H. bungei, H. dauricum, H. obtusifolium, H. perforatum, H. ramosissimum, H. robustum, Ruta graveolens*

$C_{12}H_9NO_2$: 199.0633

Mp: 132–133°C (Me_2CO), 170°C (hydrochloride), 163°C (picrate), 188°C (isodictamine) [1]

UV: 212 sh, 233, 242 sh, 299 sh, 307, 334, 358 (4.42, 4.59, 4.50, 3.34, 3.94, 3.59, 3.57) [2]

IR: 3145, 3120, 1623, 1580, 1510, 1470, 1450, 1370, 1266 [2]

MS *m/z*: 199(M^+, 100), 184(70), 156(33), 140(4), 128(26), 101(11), 76(7) [2]

^{1}H NMR: 4.30(3H, s, OCH_3), 6.90, 7.48(each 1H, d, J = 2.5, H-3, H-2), 7.20–8.00(3H, m, H–Ar), 8.10(1H, dd, J = 8.2, 2, H-5) [2]

^{13}C NMR: [3]

Table 1

C-2	143.6	C-4	122.4	C-7	129.6
2a	–	4a	–	8	127.9
3	104.7	5	122.4	8a	–
3a	–	6	123.7	4-OCH_3	59.0

HPLC: [4]

Pharm./Biol.: 0.05–0.055 mg/kg – death of the animal with symptoms of asphyxia; 0.001 mg/ml – raises the tonus of the cardiac musculature [5]

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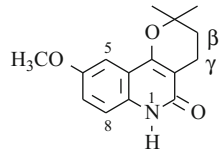
4. H. Kanamori, I. Sakamoto, M. Mizuta, Chem. Pharm. Bull. **34**, 1826 (1986)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 269

Dihydrohaplamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum perforatum*

$C_{15}H_{17}NO_3$: 259.1110

Mp: 231–233°C (dec., Me_2CO) [1, 2]

UV: 216, 232, 278, 287, 334 [2]

IR: 3150, 1650, 1604, 1503, 1480, 1460, 1420, 1370, 1315, 1220, 1170, 1120, 1040, 860, 820, 770, 715 [1]

MS *m/z*: 259(M^+, 100), 216(45), 204(65), 203(71), 188(28), 168(25) [1]

^{1}H NMR: 1.18(6H, s, 2 × CH_3), 1.68(2H, t, J = 6.5, β-CH_2), 2.47(2H, t, J = 6.5, γ-CH_2), 3.60(3H, s, OCH_3), 7.00–7.34(3H, m, H-5, 7, 8) [2]

References

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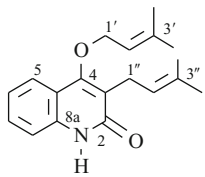
3-Dimethylallyl-4-dimethylallyloxyquinolin-2-one



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bucharicum*
$C_{19}H_{23}NO_2$: 297.1729
Mp: 113–114°C (Me_2CO) [1]
Solubility: very sol. $CHCl_3$ [1]
UV: 227, 272, 282, 313, 324, 338 (4.10, 3.50, 3.41, 3.35, 3.46, 3.35) [1]
IR: 3300, 1650 [1]
MS *m/z*: 297(M^+, 6), 229(25), 228(100), 214(18), 212(27), 200(16), 186(26), 174(24), 69(36) [1]
^{1}H NMR: 1.61, 1.75, 1.82(6H, 3H, 3H, each s, 4 × CH_3), 3.37, 4.44(each 2H, d, J = 7.5, CH_2), 5.25, 5.51(each 1H, t, J = 7.5, =CH), 7.08–7.45(3H, m, H–Ar), 7.65(1H, dd, J = 8.5, 2, H-5) [1]
^{13}C NMR: [2]

Table 1

C-2	161.2	C-8	115.9	C-1″	23.8
3	117.7	8a	139.0	2″	121.7
4	165.8	1′	71.2	3″	132.5
4a	122.8	2′	119.7	3″-CH_3	18.0
5	123.1	3′	137.4	3″-CH_3	25.8
6	122.1	3′-CH_3	18.1		
7	129.8	3′-CH_3	25.9		

References

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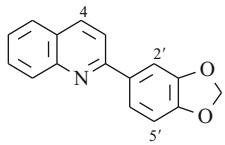
Dubamine

CAS Registry Number: 6808-65-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Dictamnus angustifolius, Haplophyllum dubium, H. latifolium*
$C_{16}H_{11}NO_2$: 249.0790
Mp: 96–97°C (pet. ether.), 202°C (hydrochloride), 158°C (nitrate), 187°C (oxalate) [1]
UV: 222 sh, 237 sh, 336, 374 sh (4.55, 4.36, 4.12, 3.64) [2]
IR: 1610, 1500, 1445, 1400, 1360, 1098, 1050, 935 [2]
MS *m/z*: 249(M^+, 100), 248(62), 220(10), 192(20), 191(43), 164, 163, 128, 101 [3]
^{1}H NMR(CF_3COOH): 5.72(2H, s, OCH_2O), 6.68(1H, d, J = 7.5, H-5′), 7.02(1H, d, J = 1.5, H-2′), 7.20(1H, dd, J = 7.5, 1.5, H-6′), 7.80(5H, m, H–Ar), 8.08(1H, d, J = 8, H-4) [2]
Pharm./Biol.: 2500 mg/kg does not cause the death of mice. 50 mg/kg briefly and slightly lowers the arterial pressure and increases the rate of respiration in narcotized dogs [4]

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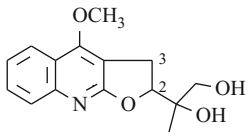
Dubinidine

CAS Registry Number: 22964-77-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Dictamnus angustifolius, Haplophyllum dubium, H. foliosum, H. perforatum*

$C_{15}H_{17}NO_4$: 275.1158

Mp: 132–133°C (Me_2CO), ($[\alpha]_D$ −63° (EtOH)); 196°C (hydrochloride), ($[\alpha]_D$ −54° (MeOH)); 198°C (hydrobromide), 162°C (hydroiodide), ($[\alpha]_D$ −47° (MeOH)); 177°C (nitrate), ($[\alpha]_D$ −52° (MeOH)); 154°C (methiodide), 109°C (di Ac), ($[\alpha]_D$ −48° (EtOH)); 215°C (isodubinidine), 83°C (dubinidinone), ($[\alpha]_D$ +62° ($CHCl_3$)); 186.5°C (Ac), ($[\alpha]_D$ −57° (EtOH)) [1–4]

UV: 230, 274, 284, 308, 320 (5.03, 4.31, 4.23, 4.08, 4.09) [1]

IR: 3400, 1630, 1595, 1540, 1438, 1375, 1180, 1062, 978, 948 [5]

MS *m/z*: 275(M^+, 33), 245(4), 244(21), 226(12), 202(23), 201(55), 200(100), 188(4), 186(12), 185(13), 173(12), 172(12), 170(3), 158(8), 156(4), 143(4), 142(4), 130(4), 115(4), 75(5) [2]

^{1}H NMR (Py-d_5): 1.45(3H, s, CH_3), 3.75, 5.05(2H, 1H, H-3, H-2), 3.95(3H, s, OCH_3), 3.93, 4.20(each 1H, d, J = 11, CH_2–O), 7.00–8.00(4H, m, H-Ar) [6]

Pharm./Biol.: LD_{50} 970, 885 mg/kg (s/c, i/p). Sedative, hypnotic, analgesic, anticonvulsive, estrogenic action [7, 8]

References

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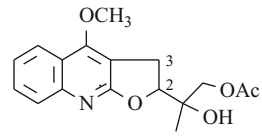
Dubinine

CAS Registry Number: 23092-72-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum dubium*

$C_{17}H_{19}NO_5$: 317.1263

Mp: 185–186°C (EtOH), 171°C (hydrochloride), 150°C (nitrate), 212°C (methiodide), 109°C (Ac) [1]

$[\alpha]_D$ −59° (EtOH) [1]

Solubility: very sol. Me_2CO, Py, MeOH; insol. H_2O, pet. ether. [1]

UV: 225, 234 sh, 274, 283, 306 (5.26, 4.93, 4.32, 4.30, 4.16) [2]

IR: 3270, 1725, 1630, 1600, 1540, 1465, 1400, 1305, 1270, 1160, 1155, 910 [2]

MS *m/z*: 317(M^+, 17), 245(4), 244(21), 226(6), 202(18), 201(35), 200(100), 199(8), 186(8), 185(9), 173(8), 172(7), 158(4), 156(2), 143(3), 142(3), 130(4), 129(3), 117(5), 115(5) [3]

^{1}H NMR: 1.33(3H, s, CH_3), 2.15(3H, s, OAc), 4.16(3H, s, OCH_3), 4.56 (2H, s, CH_2–OCO), 3.51, 3.93, 4.94(each 1H, q, J = 15.5, 9.5, 6.6, CH_2–CH–O), 6.80–7.43(4H, m, H–Ar) [4, 5]

Pharm./Biol.: Weak estrogenic action [6]

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1. S.Yu. Yunusov, G.P. Sidyakin, Zh. Obshch. Khim. **25**, 2009 (1955)
2. I.A. Bessonova, G.P. Sidyakin, S.Yu. Yunusov, Zh. Obshch. Khim. **34**, 347 (1964)
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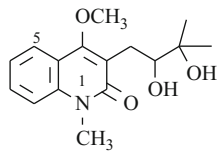
Edulinine

CAS Registry Number: 27495-36-9



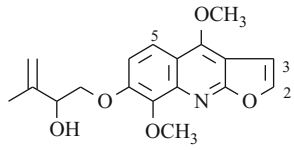
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum foliosum*
$C_{16}H_{21}NO_4$: 291.1471
Mp: 141–142°C (Me_2CO), 92°C (acetonide) [1]
UV: 230, 245 sh, 267 sh, 275, 285, 316 sh, 326, 337 (4.44, 4.02, 3.74, 3.86, 3.82, 3.72, 3.82, 3.69) [1]
IR: 3425, 3215, 1630, 1590, 1470, 1378, 1115, 765 [1, 2]
MS *m/z*: 276(1), 273(3), 258(2), 232(100), 203(58), 188(67), 160(8), 59(19) [1]
MS (acetonide) *m/z*: 331(M^+, 5), 316(100), 274(23), 273(90), 258(16), 256(19), 232(6), 59(32) [1]
^{1}H NMR: 1.26(6H, s, 2 × CH_3), 2.67, 3.07, 3.56(each 1H, q, J = 13, 10, 2, CH_2–CH–O), 3.68, 3.89(each 3H, OCH_3, NCH_3), 7.33(3H, m, H–Ar), 7.75(1H, d, J = 7.6, H-5) [1]

References

1. V.I. Akhmedzhanova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 574 (1980)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)

Evodine

CAS Registry Number: 6989-38-4



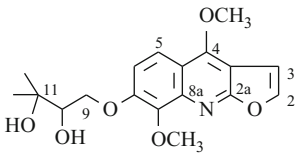
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum ferganicum, H. obtusifolium, H. perforatum, H. ramosissimum*
$C_{18}H_{19}NO_5$: 329.1263
Mp: 152–153°C (Me_2CO), 127°C (Ac) [1]
$[\alpha]_D$ −60° (EtOH) [1]
Solubility: sol. $CHCl_3$; spar. sol. Me_2CO, Et_2O; insol. H_2O [1]
UV: 250, 323, 335 (4.56, 3.82, 3.80) [2]
IR: 3320, 3145, 1630, 1628, 1590, 1520, 1498 [2]
MS *m/z*: 329(M^+, 78), 258(16), 245(50), 244(25), 227(100), 216(25), 71(7) [1]
^{1}H NMR: 1.79(3H, s, CH_3), 3.47(1H, OH), 3.94–4.54(3H, m, CH_2–CH), 4.09, 4.34(each 3H, s, 2 × OCH_3), 4.93, 5.09(each 1H, s, =CH_2), 6.96, 7.52(each 1H, d, J = 3, H-3, H-2), 7.13, 7.90(each 1H, d, J = 9.4, H-6, H-5) [1]

References

1. V.I. Akhmedzhanova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 254 (1977)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)

Evoxine (Haloperine)

CAS Registry Number: 522-11-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Choisya ternata, Dictamnus angustifolius, Haplophyllum acutifolium, H. alberti-regelii, H. dubium, H. ferganicum, H. latifolium, H. obtusifolium, H. perforatum, H. popovii, H. ramosissimum, Nitraria schoberi*

$C_{18}H_{21}NO_6$: 347.1369

Mp: 155–156°C (Me_2CO), 130°C (dec., hydrochloride), 159°C (isoevoxine) [1]

Solubility: sol. $CHCl_3$; spar. sol. C_6H_6, Et_2O, H_2O, pet. ether. [1]

UV: 250, 300 sh, 320, 335 (4.95, 3.64, 3.90, 3.88) [2]

IR: 3340, 3165, 3135, 1620, 1590, 1520, 1498, 1400, 1375, 1290, 1100, 1060, 996, 790, 730 [2]

MS *m/z*: 347(M^+, 69), 288(17), 258(10), 245(36), 244(49), 228(23), 227(100), 216(20), 199(14), 187(6), 59(79) [2, 3]

^{1}H NMR: 1.28, 1.32(each 3H, s, 2 × CH_3), 4.12, 4.40(each 3H, s, 2 × OCH_3), 6.96, 7.55(each 1H, d, J = 2.5, H-3, H-2), 7.15, 7.95(each 1H, d, J = 9, H-6, H-5) [4]

^{13}C NMR(DMSO-d_6): [5]

Table 1

C-2	143.6	C-5	117.6	C-10	76.1
2a	163.8	6	113.9	11	70.9
3	105.3	7	141.7	12	24.3
3a	114.1	8	140.8	13	27.3
4	156.7	8a	151.6	4-OCH_3	59.3
4a	101.7	9	71.6	8-OCH_3	60.8

HPLC: [6]

Pharm./Biol.: LD_{50} 370, 180, 705 mg/kg (i/p, i/v, s/c). Sedative, soporific, analgetic, antispastic, and estrogenic action [7, 8]

References

1. S.Yu. Yunusov, G.P. Sidyakin, Zh. Obshch. Khim. **22**, 1055 (1952)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)
3. V.I. Akhmedzhanova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 291 (1975)
4. A.V. Robertson, Austral. J. Chem. **16**, 451 (1963)
5. N.M.D. Brown, M.F. Grundon, D.M. Harrison, S.A. Surgenor, Tetrahedron **36**, 3579 (1980)
6. M. Montagu, P. Levillain, J.C. Chenieux, M. Rideau, J. Chromatogr. **331**, 437 (1985)
7. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 276
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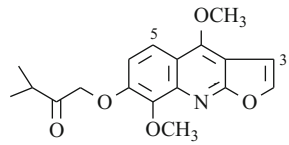
Evoxoidine

CAS Registry Number: 572-24-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum perforatum*

$C_{18}H_{19}NO_5$: 329.1263

Mp: 135–136°C (Me_2CO) [1]

Solubility: very sol. $CHCl_3$; sol. Me_2CO, Et_2O; insol. H_2O [1]

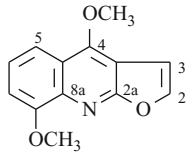
MS *m/z*: 329(M^+, 54), 258(47), 245(17), 244(100) [1]

References

1. V.I. Akhmedzhanova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 254 (1977)

γ -Fagarine (Haplofine)

CAS Registry Number: 524-15-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Dictamnus angustifolius, D. caucasicus, Haplophyllum bucharicum, H. dauricum, H. dubium, H. kowalenskyi, H. leptomerum, H. obtusifolium, H. pedicellatum, H. robustum, H. schelkovnikovii, H. tenue, H. villosum, Ruta graveolens*

$C_{13}H_{11}NO_3$: 229.0739

Mp: 141°C (Me_2CO), 250°C (hydrochloride), 177°C (iso-γ-fagarine) [1]

Solubility: sol. $CHCl_3$, Me_2CO, EtOH, Et_2O; spar. sol. H_2O, pet. ether. [1]

UV: 246, 270 sh, 313, 326, 336 sh (4.88, 3.84, 3.98, 3.98. 3.92) [2]

IR: 3165, 3135, 1622, 1590, 1520, 1475, 1450, 1398, 1370, 1310, 1266, 1090, 980, 865, 818 [3]

MS *m/z*: 229(M^+, 100), 228(76), 214(29), 200(90), 184(50), 156(48), 128(40), 101(19) [3]

^{1}H NMR: 4.05, 4.35(each 3H, s, 2 × OCH_3), 6.97, 7.52(each 1H, d, J = 2.5, H-3, H-2), 7.01, 7.34, 7.80(each 1H, q, J = 9, 2.5, H-7, H-6, H-5) [4]

^{13}C NMR: [5]

Table 1

C-2	143.3	C-4a	103.3	C-8	154.1
2a	162.7	5	107.3	8a	137.1
3	104.1	6	122.9	4-OCH_3	58.5
3a	119.1	7	113.7	8-OCH_3	55.5
4	156.3				

HPLC: [6]

Pharm./Biol.: Pronounced antiarrhythmic and estrogenic action [7, 8]

References

1. S.Yu. Yunusov, G.P. Sidyakin, Zh. Obshch. Khim. **22**, 1055 (1952); **25**, 2009 (1955)
2. I.M. Fakhrutdinova, G.P. Sidyakin, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 83 (1965)
3. Z.Sh. Faizutdinova, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 218 (1967)
4. A.V. Robertson, Austral. J. Chem. **16**, 451 (1963)
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7. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 273
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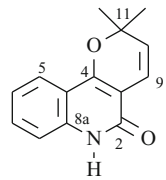
Flindersine

CAS Registry Number: 523-64-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum bucharicum, H. perforatum*

$C_{14}H_{13}NO_2$: 227.0946

Mp: 185–186°C (dec., EtOH), 229°C (dihydro) [1]

Solubility: very sol. $CHCl_3$; spar. sol. EtOH, Me_2CO, Et_2O; insol. H_2O [1]

UV: 220, 328 sh, 334, 347, 364 (4.86, 3.62, 3.74, 3.86, 3.54) [1, 2]

IR: 3165, 1665, 1628, 1598, 1500, 1480, 1410 [1, 2]

MS *m/z*: 227(M^+, 22), 212(100) [1]

^{1}H NMR: 1.52(6H, s, 2 × CH_3), 5.48, 6.75(each 1H, d, J = 10, CH = CH), 7.00–7.45(3H, m, H–Ar), 7.78(1H, d, J = 8, H-5) [1]

^{13}C NMR: [3]

Table 1

C-2	162.9	C-6	122.6	C-10	117.0
3	115.7	7	130.9	11	79.5
4	151.9	8	118.5	12	28.7
4a	106.7	8a	138.3	13	28.7
5	122.0	9	126.8		

References

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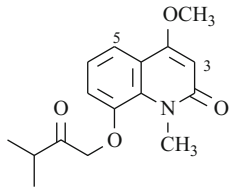
Folidine

CAS Registry Number: 102719-91-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum foliosum*
$C_{16}H_{19}NO_4$: 289.1314
Mp: 148–149°C (Me_2CO-pet. ether.) [1]
Solubility: very sol. Et_2O, $CHCl_3$, Me_2CO, EtOH; insol. H_2O [1]
UV: 233, 249, 273, 286, 325 (3.42, 3.32, 2.89. 2.84, 2.60) [1]
IR: 1730, 1640, 1590, 1580, 1491, 1470, 1390 [1]
MS *m/z*: 289(M^+, 89), 218(62), 205(59), 204(100), 71(26) [1]
^{1}H NMR: 1.14(6H, d, J = 7.5, 2 × CH_3), 2.80(1H, q, J = 7.5, CH), 4.78(2H, s, CH_2O), 3.90, 3.94(each 3H, s, OCH_3, NCH_3), 6.08(1H, s, H-3), 6.85–7.45(2H, m, H-6, H-7), 7.72(1H, dd, J = 7.5, 3, H-5) [1]

References

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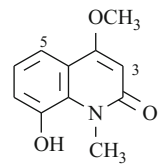
Folifidine

CAS Registry Number: 3148-23-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum dubium, H. foliosum*
$C_{11}H_{11}NO_3$: 205.0739
Mp: 226–227°C (EtOH), 232°C (hydrochloride), 218°C (picrate), 151°C (Ac) [1]
Solubility: sol. alk. [1]
UV: 212, 225, 254, 288 sh, 332 (4.36, 4.38, 4.42, 3.78, 3.34) [2]
IR: 3300–2500, 1635 [2]
MS *m/z*: 205(M^+, 100), 204(9), 190(18), 177(4), 176(9), 175(5), 174(4), 162(10) [3]
^{1}H NMR(CF_3COOH): 3.78, 3.98(each 3H, s, NCH_3, OCH_3), 6.27(1, s, H-3), 7.03(2H, m, H-7, H-6), 7.48(1H, dd, J = 8, 2.5, H-5) [4]
Pharm./Biol.: Estrogenic action [5]

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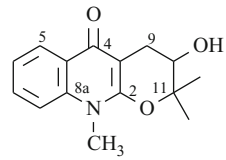
5. S.S. Nazrullaev, I.A. Bessonova, Kh.S. Akhmedkhodjaeva, Chem. Nat. Comp. **37**, 551 (2001)

Folifine (Ribalinine)

CAS Registry Number: 62928-56-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum bucharicum, H. foliosum*

$C_{15}H_{17}NO_3$: 259.1208

Mp: 232–233°C (EtOH) [1, 2]; 231 (hydrochloride), 190°C (picrate), 149°C (nitrate), 155°C (Ac) [1]

$[\alpha]_D$ +14° (MeOH) [1]

Solubility: very sol. MeOH; sol. $CHCl_3$, EtOH [1]

UV: 238, 316, 328 (4.40, 4.00, 3.98) [1]

IR: 3180, 1630, 1605, 1580, 1555, 1510 [2]

MS *m/z*: 259(M^+, 37), 242(4), 230(4), 226(4), 216(4), 200(5), 189(45), 188(100), 135(12), 134(8), 72(12) [2, 3]

^{1}H NMR: 1.23, 1.47(each 3H, 2 × CH_3), 2.88(2H, d, J = 6.5, H-9). 3.36(3H, s, NCH_3), 3.86(1H, t, H-10), 6.95–7.60(3H, m, H–Ar), 8.15(1H, dd, J = 9, 2.5, H-5) [4]

^{13}C NMR: [5]

Table 1

C-2	154.0	C-6	125.2	C-10	67.3
3	96.3	7	131.3	11	82.1
4	175.1	8	115.4	12	20.9
4a	123.2	8a	138.9	13	25.0
5	122.0	9	25.7	NCH_3	30.1

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1. Z.Sh. Faizutdinova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 215 (1967)
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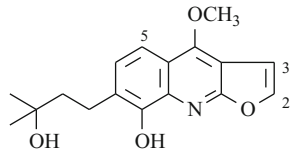
Folifinine

CAS Registry Number: 22329-40-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum foliosum*

$C_{17}H_{19}NO_4$: 301.1314

Mp: 181–182°C (Me_2CO), 123°C (hydrochloride), 163°C (dec., picrate), 140°C (di Ac), 201°C (tetrahydro) [1]

$[\alpha]_D$ 0° (MeOH) [1]

Solubility: spar. sol. MeOH, EtOH, Me_2CO; insol. $CHCl_3$, H_2O [1]

UV: 252, 315, 331 (4.81. 3.95, 3.96) [1]

IR: 3600–3100, 1630, 1600, 1560, 1522, 1460, 1410, 1375, 1350, 1295, 1270, 1140, 1095, 1075, 1050, 982, 902, 820, 808, 720 [2]

MS *m/z*: 301(M^+, 18), 286(9), 283(20), 268(16), 242(25), 240(100), 228(52) [2]

^{1}H NMR(di Ac): 1.52(6H, s, 2 × CH_3), 1.96, 2.34(each 3H, AcO–R, AcO–Ar), 2.00, 3.14(each 2H, m, CH_2–CH_2–Ar), 4.28(3H, s, OCH_3), 6.92, 7.50(each 1H, d, J = 3, H-3, H-2), 7.07, 8.05(each 1H, d, J = 9, H-6, H-5) [1]

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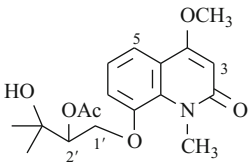
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)

Foliforine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum foliosum*
$C_{18}H_{23}NO_6$: 349.3862
Mp: 83–84°C (C_6H_{14}–Et_2O) [1]
UV: 214, 233, 251, 274 sh [1]
IR: 3300, 1741, 1638, 1576, 1490, 1397, 1241, 1073, 1061, 825, 794, 735 [1]
MS *m/z*: 349(M^+, 43), 334(31), 307(9) [1]
^{1}H NMR: 1.27, 1.31(each 3H, s, 2 × CH_3), 2.11(3H, s, OAc), 3.82(3H, s, NCH_3), 3.90(3H, s, OCH_3), 4.17, 4.35(each 1H, dd, J = 10, 7, H-1′ and J = 10, 3, H-1′), 5.15(1H, s, OH), 5.34(1H, dd, J = 7, 3, H-2′), 6.00(1H, s, H-3), 7.12(2H, m, H-6, H-7), 7.63(1H, m, H-5) [1]

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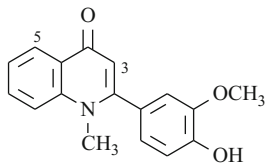
1. V.I. Akhmedzhanova, Chem. Nat. Comp. **35**, 552 (1999)

Folimidine

CAS Registry Number: 40444-99-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum foliosum*
$C_{17}H_{15}NO_3$: 281.1052
Mp: 246–247°C (EtOH), 187°C (O–Me) [1]
Solubility: very sol. alk.; spar. sol. org. solvs. [1]
UV: 214, 246, 276, 326, 338 (4.40, 4.34, 3.83, 4.08, 4.08) [1]
IR: 1624, 1605, 1565, 1545, 1520, 1510, 870, 842, 770 [1]
MS *m/z*: 281(M^+, 100), 280(5), 253(56), 238(18), 210(16) [1]
^{1}H NMR(CF_3COOH): 3.57(3H, s, OCH_3), 3.83(3H, s, NCH_3), 6.60–6.80(3H, m, H–Ar), 6.86(1H, s, H-3), 7.52(1H, m, H-8), 7.76(2H, m, H-7, H-6), 8.25(1H, dd, J = 9, 2, H-5) [1]

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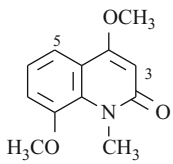
Folimine

CAS Registry Number: 3148-24-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bungei, H. dauricum, H. foliosum, H. obtusifolium, H. perforatum*
$C_{12}H_{13}NO_3$: 219.0895
Mp: 139–140°C (C_6H_6-pet. ether.), 172°C (hydrochloride), 194°C (picrate) [1]
Solubility: sol. $CHCl_3$, MeOH, EtOH [1]
UV: 214, 234, 253, 267 sh, 282 sh, 328 (4.40. 4.49, 4.44, 3.88, 3.80, 3.48) [2, 3]
IR: 1649, 1590, 1580, 1490, 1470, 1398, 1240 [3]
MS *m/z*: 219(M^+, 100), 218(13), 204(93), 189(41), 174(54) [1]
^{1}H NMR: 3.80(9H, s, NCH_3, 2 × OCH_3), 5.94(1H, s, H-3), 6.97(2H, m, H-7, H-6), 7.45(1H, dd, J = 9, 2.5, H-5) [1]

References

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2. V.I. Pastukhova, G.P. Sidyakin, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 20 (1965)
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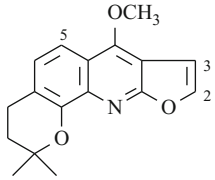
Foliminine

CAS Registry Number: 52617-28-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum foliosum*
$C_{17}H_{17}NO_3$: 283.1203
Mp: 107–108°C (Me_2CO–H_2O), 188°C (hydrochloride), 203°C (isofoliminine), 225°C (tetrahydro) [1]
Solubility: very sol. Me_2CO, $CHCl_3$ [1]
UV: 252, 303 sh, 314, 328, 340(4.55, 3.68, 3.80, 3.79. 3.73) [1]
IR: 3170, 3140, 1630, 1598, 1525, 1450, 1410, 1370, 1360, 1325, 1298, 1250, 1240, 1165, 1130, 1098, 983 [2]
MS *m/z*: 283(M^+, 97), 268(21), 240(100), 228(56) [1]
^{1}H NMR: 1.30(6H, s, 2 × CH_3), 1.83, 3.12(each 2H, t, J = 7, CH_2–CH_2–Ar), 4.12(3H, s, OCH_3), 6.72, 7.36(each 1H, d, J = 3, H-3, H-2), 6.90, 7.85(each 1H, d, J = 9, H-6, H-5) [1]

References

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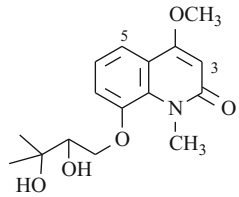
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)

Foliosidine

CAS Registry Number: 2520-38-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum dubium, H. foliosum, H. perforatum*
$C_{16}H_{21}NO_5$: 307.1420
Mp: 141–142°C (Me_2CO), 164°C (hydrochloride), 168°C (hydrobromide), 183°C (picrate) [1, 2]; 120°C (acetonide) [3]
$[\alpha]_D$ +42° (EtOH) [1]
Solubility: sol. MeOH, $CHCl_3$, H_2O [1]
UV: 232, 252, 280 sh, 326, 334 (4.94, 4.92, 4.22, 3.90, 3.84) [1]

IR: 3350, 1645, 1590, 1455, 1390, 1265, 1235, 1150, 1100, 1070, 1050, 985 [4]
MS *m/z*: 307(M^+, 30), 292(5), 248(8), 205(100), 174(9), 162(6), 59(28) [4]
^{1}H NMR: 1.24, 1.32(each 3H, 2 × CH_3), 3.70, 3.85(each 3H, s, NCH_3, OCH_3), 4.10(5H, m, $–CH_2–CH–$, 2 × OH), 5.65(1H, s, H-3), 7.03(2H, m, H-6, H-7), 7.40(1H, dd, H-5) [3, 5]
Pharm./Biol.: LD_{50} 61.1, 1084 mg/kg (i/v, per os, mice). Antispastic, hypothermal, antiarrhythmic, and estrogenic action [6–8]

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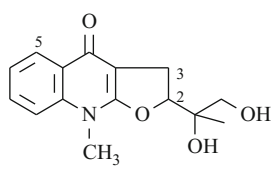
Folisine

CAS Registry Number: 36069-06-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum foliosum*
$C_{15}H_{17}NO_4$: 275.1158
Mp: 236–237°C (MeOH), 144°C (folisinone), 230°C (hydrochloride) [1]
$[\alpha]_D$ −123° (MeOH) [1]
Solubility: spar. sol. Me_2CO, Et_2O, $CHCl_3$ [1]
UV: 215, 237, 251 sh, 299 sh, 310, 321 (4.50, 4.43, 4.24, 4.01, 4.12, 4.07) [1]
IR: 3510, 3415, 3200, 1628, 1590, 1555, 1540, 1520 [1]
MS *m/z*: 275(M^+, 100), 244(29), 226(15), 215(14), 214(38), 202(53), 201(15), 200(68), 189(59), 188(70), 176(38), 175(22), 134(20) [1]
^{1}H NMR(CF_3COOH): 1.13(3H, s, CH_3), 3.40(2H, d, J = 8, H-3), 3.78(3H, s, NCH_3), 3.83(2H, s, $CH_2–O$), 5.25(1H, t, J = 8, H-2), 7.35–7.85(3H, m, H–Ar), 8.20(1H, d, J = 9, H-5) [1]

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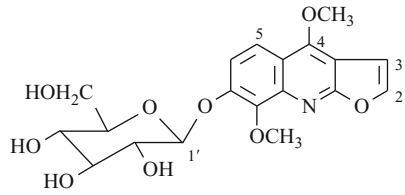
Glucohaplopine

CAS Registry Number: 74201-15-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{19}H_{21}NO_9$: 407.1216
Mp: 217–218°C (EtOH), 137°C (tetra Ac) [1]
$[\alpha]_D$ −41° (Py) [1]
Solubility: spar. sol. MeOH, EtOH, H_2O; insol. $CHCl_3$, C_6H_6, EtOAc, Et_2O [1]
UV: 250, 321, 334, 348 [1]

IR: 3470, 3340, 3220, 3175, 3150, 1630, 1590, 1515, 1495, 1470, 1400, 1375, 1280, 1240, 1098, 1070 [1, 2]

MS (tetra Ac) *m/z*: 575(M^+, 3), 331(38), 271(6), 246(23), 245(100), 230(9), 227(23), 216(9), 169(28), 127(14), 109(16) [1, 2]

^{1}H NMR(CF_3COOH): 3.00–4.00(6H, m), 3.59, 4.26(each 3H, s, 2 × OCH_3), 4.88(1H, d, J = 7, H-1′), 7.07, 7.30(each 1H, d, J = 2.5, H-3, H-2), 7.08, 8.05(each 1H, d, J = 9.5, H-6, H-5) [3]

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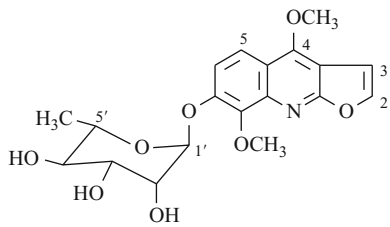
Glycoperine

CAS Registry Number: 55740-45-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum ferganicum, H. latifolium, H. perforatum*

$C_{19}H_{21}NO_8$: 391.1267

Mp: 224–225°C (MeOH), 182°C (tri Ac.), 219°C (tetrahydro) [1]

$[\alpha]_D$ −66° (Py) [1]

Solubility: sol. H_2O; spar. sol. $CHCl_3$, MeOH, EtOH, Me_2CO[1]

UV: 250, 322 (4.85, 3.96) [1]

IR: 3428, 3165, 3145, 1622, 1583, 1512, 1487, 1450 [2]

MS *m/z*: 391(M^+, 3), 245(100), 227(49), 216(10) [1]

^{1}H NMR(CF_3COOH): 1.10(3H, d, J = 4.5, CH_3), 3.80, 4.35(each 3H, s, 2 × OCH_3), 5.64(1H, br s, H-1′), 7.10, 7.41(each 1H, d, J = 3, H-3, H-2), 7.39, 7.89(each 1H, d, J = 10, H-6, H-5) [1]

^{13}C NMR(DMSO-d_6): [3]

Table 1

C-2	144.0	C-6	116.2	C-1′	100.0
2a	163.8	7	143.2	2′	70.5
3	105.3	8	141.0	3′	70.7
3a	115.2	8a	148.7	4′	71.9
4	156.8	4-OCH_3	59.5	5′	70.0
4a	102.3	8-OCH_3	61.1	6′	18.0
5	117.8				

Pharm./Biol.: Estrogenic action [4]

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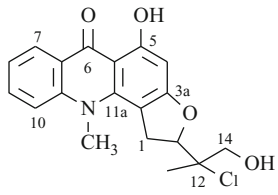
Gravacridonechlorine

CAS Registry Number: 38494-84-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Ruta graveolens*
$C_{19}H_{18}NO_4Cl$: 359.0924/361.0895
Mp: 254–257°C (Me_2CO) [1]
UV: 213, 227, 249, 264 sh, 273, 300, 332, 391(4.36, 4.33, 4.58, 4.63, 4.72, 4.38, 4.04, 3.86) [1]
IR: 3600–3200, 1640, 1600, 1590, 1550, 1510 [1]
MS *m/z*: 359(M^+), 266(100) [1]
^{1}H NMR: 1.15(3H, s, CH_3), 3.50(2H, s, H-14), 3.60(2H, m, H-1), 3.90(3H, s, NCH_3), 4.80(1H, t, H-2), 6.10(1H, s, H-4), 7.00–7.60(3H, m, H–Ar), 8.15(1H, dd, H-7) [1]

References

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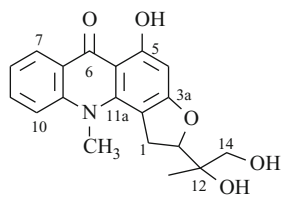
Gravacridonediol

CAS Registry Number: 37551-75-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{19}H_{19}NO_5$: 341.1263
Mp: 224–227°C (dec., Me_2CO), 223°C (Ac, C_6H_6) [1]
UV: 213, 227, 249, 264, 273, 300, 332, 390 (4.16, 4.15, 4.40, 4.46, 4.55, 4.18, 3.86, 3.68) [1]
IR: 3600–3200, 1640, 1600, 1575, 1550, 1500 [1]
MS *m/z*: 341(M^+), 266(100) [1]
^{1}H NMR(DMSO-d_6): 1.00(3H, s, CH_3), 3.50(2H, br s, H-14), 3.60(2H, m, H-1), 3.90(3H, s, NCH_3), 4.70(1H, t, H-2), 6.10(1H, H-4), 7.00–7.60(3H, m, H–Ar), 8.10(1H, dd, H-7) [1]
^{13}C NMR: [2]

Table 1

C-1	37.7	C-6	179.9	C-10a	142.1
2	86.3	6a	120.0	11a	143.1
3a	167.4	7	125.2	11b	101.4
4	91.5	8	121.4	12	72.7
5	164.9	9	134.1	13	20.6
5a	105.0	10	115.7	14	65.9
				NCH_3	31.4

References

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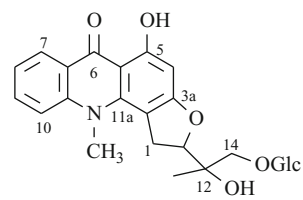
Gravacridonediol Glucoside

CAS Registry Number: 59086-97-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Boenninghausenia albiflora, Ruta graveolens*
$C_{25}H_{29}NO_{10}$: 503.1791
Mp: 185–187°C (Me_2CO-pet. ether) [1]
UV: 227.5, 250, 265 sh, 272.5, 300, 332.5, 400 [2]
^{13}C NMR: [3]

Table 1

C-1	37.9	C-8	121.6	C-14	63.7*
2	86.7	9	134.4	NCH_3	32.1
3a	167.1	10	115.9	1′	97.7
4	91.7	10a	142.3	2′	73.7
5	165.0	11a	143.3	3′	76.8
5a	105.3	11b	101.5	4′	70.3

(*continued*)

Table 1 (continued)

6	180.1	12	80.1	5′	76.8
6a	120.1	13	16.7	6′	61.3*
7	125.4				

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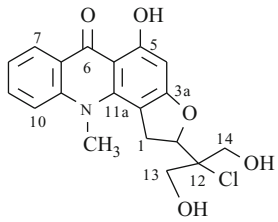
Gravacridonolchlorine

CAS Registry Number: 38494-85-8



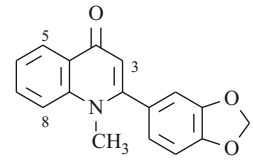
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{19}H_{18}NO_5Cl$: 375.1873/377.1844
Mp: 223–227°C [1]
UV: 213, 227, 249, 264 sh, 272, 300, 331, 291(4.25, 4.22, 4.47, 4.37, 4.63, 4.26, 3.93, 3.77) [1]
IR: 3400, 1620, 1590, 1565, 1535, 1500 [1]
MS *m/z*: 375(M^+), 266(100) [1]
^{1}H NMR: 3.50(4H, br s, H-13, H-14), 3.60(2H, m, H-1), 3.90(3H, s, NCH_3), 4.80(1H, t, H-2), 6.08(1H, s, H-4), 7.00–7.60(3H, m, H–Ar), 8.15(1H, dd, H-7) [1]

References

1. J. Reisch, K. Szendrei, Z. Rozsa, I. Novak, E. Minker, Phytochemistry **11**, 2359 (1972)

Graveoline (Foliosine)

CAS Registry Number: 485-61-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum dubium, H. foliosum, H. perforatum, Ruta graveolens*
$C_{17}H_{13}NO_3$: 279.0895
Mp: 188°C (hydrated form, EtOH–H_2O), 204–205°C (anhydrous form, EtOH), 254°C (hydrochloride), 250°C (hydrobromide), 226°C (hydroiodide), 171°C (nitrate), 211°C (methiodide), 231°C (perchlorate) [1]
Solubility: spar. sol. MeOH, Me_2CO, EtOH; insol. Et_2O, $CHCl_3$ [1]
UV: 214, 244, 275, 294 sh, 326, 338 (4.30, 4.28, 3.77, 3.78, 4.03, 4.04) [2]
IR: 1623, 1602, 1574, 1492, 1250, 927, 885, 841, 819, 730 [3]
MS *m/z*: 279(M^+, 100), 278(8), 251(58), 220, 192, 165 [3]
^{1}H NMR(CF_3COOH): 3.83(3H, s, NCH_3), 5.67(2H, s, CH_2O_2), 6.60–6.63(3H, m, H–Ar), 6.86(1H, s, H-3), 7.52(1H, m, H-8), 7.76(2H, m, H-7, H-6), 8.22(1H, d, J = 9, H-5) [2]
Pharm./Biol.: LD_{50} 363.5, 410 mg/kg (i/p., oral, mice). Respiratory analeptic. Tones the cardiovascular system [4, 5]

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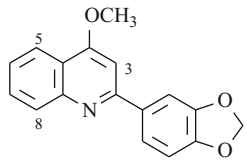
Graveolinine

CAS Registry Number: 4179-37-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{17}H_{13}NO_3$: 279.0895
Mp: 116–117°C (EtOAc) [1, 2]
UV: 224 sh, 234, 274, 311, 323 sh (4.55, 4.61, 4.28, 4.17, 4.11) [2]

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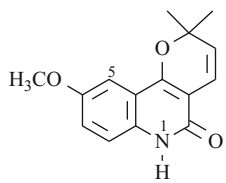
Haplamine

CAS Registry Number: 52617-31-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum acutifolium, H. perforatum*
$C_{15}H_{15}NO_3$: 257.1051
Mp: 201–202°C (dec., EtOH), 232°C (dihydro), 95°C (O–Me) [1]
Solubility: very sol. $CHCl_3$; sol. Et_2O, EtOH; insol. H_2O, acids [1]
UV: 220, 243, 323 sh, 340, 359, 377 (4.45, 4.44, 3.64, 3.70, 4.02, 3.98) [1]
IR: 3155, 1660, 1630, 1600, 1505, 1490, 1470, 1425, 1354, 1330, 1280, 1238, 1220, 1130, 1048, 860, 835 [1]
MS *m/z*: 257(M^+, 47), 242(100) [1]
^{1}H NMR(CCl_4): 1.50(6H, s, 2 × CH_3), 3.80(3H, s, OCH_3), 5.43, 6.72(each 1H, J = 10, CH = CH), 7.01(1H, dd, J = 8.5, 3, H-7), 7.05(1H, br s, H-5), 7.36(1H, d, J = 8.5, H-8) [1]
Pharm./Biol.: LD_{50} 1020 mg/kg (i/p, mice). Sedative and estrogenic action [2, 3]

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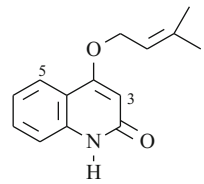
Haplaphine

CAS Registry Number: 54357-78-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*

$C_{14}H_{15}NO_2$: 229.1103
Mp: 159–160°C (Me_2CO) [1]
Solubility: very sol. $CHCl_3$ [1]
UV: 215, 225, 229, 238 sh, 267, 277, 317, 328 [1]
IR: 3170, 1665, 1610, 1510, 1442, 1414, 1380, 1368, 1330, 1265, 1230, 1160, 1110, 1040, 980 [2]
MS *m/z*: 229(M^+, 42), 214(11), 186(10), 162(40), 161(100), 133(20), 132(21), 120(20), 119(35), 69(70) [1,2]
^{1}H NMR: 1.73, 1.79(each 3H, 2 × CH_3), 4.62(2H, d, J = 6.8, CH_2O), 5.50(1H, t, J = 6.8, CH), 5.97(1H, s, H-3), 7.27(3H, m, H–Ar), 7.86(1H, dd, J = 9, 2, H-5), 12.09(1H, br s, NH) [1]

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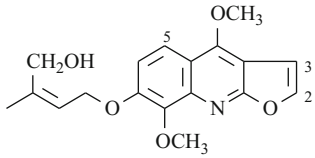
Haplatine

CAS Registry Number: 58480-57-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum latifolium*
$C_{18}H_{19}NO_5$: 329.1263
Mp: 139–140°C (C_6H_6), 88°C (O-Ac) [1]; 166°C (isohaplatine), 120°C (hexahydro) [2]
Solubility: very sol. $CHCl_3$, EtOH, MeOH, Me_2CO; sol. Et_2O; insol. H_2O [1]
UV: 252, 320, 335 (4.87, 3.82, 3.80) [1]
IR: 3340, 3170, 3140, 1625, 1590, 1510, 1500, 1450 [1, 3]
MS *m/z*: 329(M^+, 18), 245(100), 244(52), 230(30), 227(98), 216(35), 202(20), 201(17), 199(20), 187(12), 84(7) [1, 3]
^{1}H NMR: 1.80(3H, s, CH_3), 2.86(1H, br s, OH), 4.19(2H, s, CH_2–OH), 4.05, 4.31(each 3H, s, 2 × OCH_3), 4.75, 5.60(2H, d, 1H, t, J = 6.5, CH–CH_2–O), 6.92, 7.48(each 1H, J = 3, H-3, H-2), 7.11, 7.85(each 1H, J = 10, H-6, H-5) [1]

References

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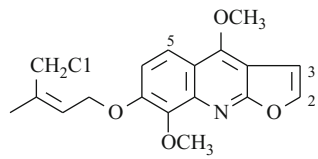
Haplobine

CAS Registry Number: 107783-37-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum obtusifolium*
$C_{18}H_{18}NO_4Cl$: 349.0895/347.0924
Mp: 151–153°C (Me_2CO) [1]
UV: 251, 319, 330 (4.73, 3.60, 3.67) [1]
IR: 3145, 3115, 1628, 1588, 1518, 1495, 1460, 1390, 1370, 1323, 1270, 1235, 1150, 1100, 1089, 1060, 1000, 990 [2]
MS *m/z*: 349(6.2), 347(M^+, 19), 312(4), 245(50), 244(100), 230(10), 227(43), 216(31), 199(9) [1]
^{1}H NMR: 1.87(3H, s, CH_3), 4.05(3H, s, OCH_3), 4.09(2H, s, CH_2Cl), 4.35(3H, s, OCH_3), 4.78, 5.68(2H, d, 1H, t, J = 7, CH–CH_2–O), 6.99, 7.53(each 1H, d, J = 2.8, H-3, H-2), 7.15, 7.93(each 1H, d, J = 9.4, H-6, H-5) [1]

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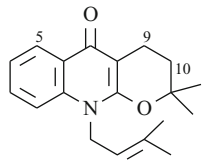
Haplobucharine

CAS Registry Number: 58969-44-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bucharicum*
$C_{19}H_{23}NO_2$: 297.1729
Mp: 126°C (EtOAc) [1]
Solubility: very sol. $CHCl_3$, EtOH, MeOH, Me_2CO [1]
UV: 214, 238, 250 sh, 317, 329 (4.10, 4.12, 3.90, 3.74, 3.73) [1]
IR: 1625, 1610, 1590, 1550, 1540, 1500, 1430, 1398, 1355, 1300, 1250, 1210, 1195, 1110, 850, 768, 710 [1, 2]
MS *m/z*: 297(M^+, 56), 229(40), 228(57), 214(15), 212(47), 200(13), 186(70), 174(100), 69(70) [1, 2]
^{1}H NMR: 1.37(6H, s, 2 × CH_3), 1.69, 1.81(each 3H, s, 2 × CH_3), 1.78, 2.69(each 2H, t, J = 7, H-9, H-10), 4.75, 5.10(2H, d, 1H, t, J = 7.5, CH–CH_2–N), 7.42(3H, m, H–Ar), 8.33(1H, dd, J = 9, 2, H-5) [1]

References

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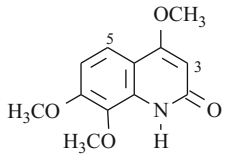
Haplobungine

CAS Registry Number: 121949-99-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bungei*
$C_{12}H_{13}NO_4$: 235.0845
Mp: 174–175°C (EtOAc), 144°C (N–Me) [1]
UV: 219, 231, 251 sh, 288, 313, 323 [1]
IR: 3175, 1660, 1610, 1580, 1460, 1400, 1330, 1290, 1258, 1233, 1110, 1070, 1000, 950 [2]
MS *m/z*: 235(M^+, 100), 234(25), 220(65), 206(22), 192(22) [1]
^{1}H NMR: 3.87, 3.90(6H, 3H, s, 3 × OCH_3), 5.74(1H, s, H-3), 6.78, 7.50(each 1H, J = 9, H-6, H-5), 8.65(1H, br s, NH) [1]

References

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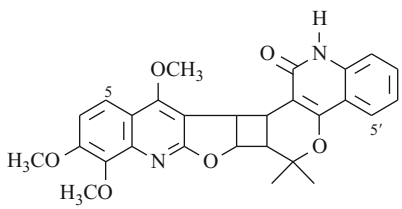
Haplodimerine

CAS Registry Number: 120931-43-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum foliosum*
$C_{28}H_{26}N_2O_6$: 486.1791
Mp: 292–293°C (EtOH) [1]
Solubility: spar. sol. org. solvs., H_2O [1]
UV: 219, 228, 243 sh, 278, 286, 315, 325 (4.68, 4.69, 4.59, 3.94, 3.96, 3.94, 3.93) [1]
IR: 3165, 1645, 1620, 1587, 1520, 1490 [1]
MS *m/z*: 486(M^+, 1.1), 485(1.6), 260(20), 259(100), 258(20), 256(1.6), 245(17), 244(75), 230(40), 229(14), 228(14), 227(15), 216(10), 213(25), 212(50) [1]
^{1}H NMR: 1.03, 1.50(each 3H, s, 2 × CH_3), 3.21, 3.57, 4.20(each 3H, s, 3 × OCH_3), 3.25, 4.00, 4.85, 5.58(each 1H, m, H-cyclobutane), 6.85, 7.53(each 1H, d, J = 9.5, H-6, H-5), 6.87–7.42(3H, m, H–Ar), 7.81(1H, dd, J = 8, 2, H-5′) [1]
X-ray: [1]

References

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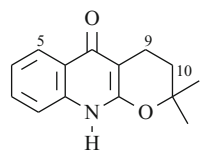
Haplofoline (Haplopholine)

CAS Registry Number: 6431-83-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum foliosum*
$C_{14}H_{15}NO_2$: 229.1103
Mp: 272–274°C (MeOH), 188°C (hydrobromide), 80°C (hydrochloride), 197°C (sulphate), 156°C (O–Ac), 121°C (N-Me) [1]
Solubility: spar. sol. org. solvs.; insol. H_2O [1]
UV: 234, 310, 322 (4.45, 3.92, 3.88) [1]
IR ($CHCl_3$): 3425, 1632 [1]
MS *m/z*: 229(M^+, 70), 214(17), 212(10), 200(10), 186(70), 174(100), 173(15) [2, 3]
^{1}H NMR(CF_3COOH): 1.18(6H, s, 2 × CH_3), 1.74, 2.60(each 2H, t, J = 6.5, H-9, H-10), 7.32(3H, m, H–Ar), 7.82(1H, dd, J = 9, 2, H-5) [2]
Pharm./Biol.(N–Me): LD_{50} 485.77 mg/kg (s/c, i/v, mice). Respiratory analgetic. Depending of dose the action of the preparation continues from 30 to 90 minutes. Small doses (5–10 mg/kg) stimulate the respiration and increase arterial pressure; the large doses stimulate the respiration with the drop in arterial pressure [4, 5]

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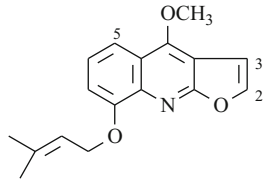
Haplophidine (Haplophydine)

CAS Registry Number: 55727-61-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{17}H_{17}NO_3$: 283.1208
Mp: 111–112°C (Et_2O) [1]
Solubility: very sol. $CHCl_3$, Me_2CO; sol. EtOH, Et_2O; insol. H_2O [1]
UV: 245, 261 sh, 272 sh, 300 sh, 314, 329, 342 (4.82, 3.96, 3.72, 3.75, 3.84, 3.80, 3.75) [1]
IR: 3160, 3140, 1625, 1590, 1525, 1450, 1400, 1370, 1302, 1275, 1193, 1160, 1100, 1070, 990 [1, 2]

MS *m/z*: 283(M^+, 6), 215(100), 200(23), 186(7), 172(7), 156(5), 69(5) [1]

^{1}H NMR: 1.78(6H, s, 2 × CH_3), 4.32(3H, s, OCH_3), 4.75, 5.58(2H, d, 1H, t, J = 6.5, O–CH_2–CH), 6.95, 7.53(each 1H, d, J = 3, H-3, H-2), 6.98, 7.23, 7.72(each 1H, q, t, q, J = 8, 1.5, H-7, H-6, H-5) [1]

References

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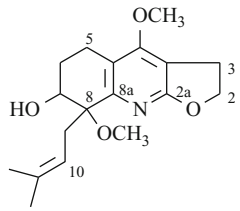
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)

Haplophyllidine

CAS Registry Number: 18063-21-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum perforatum*

$C_{18}H_{23}NO_4$: 317.1627

Mp: 110–111°C (pet. ether), 148°C (O–Ac), 136°C (tetrahydro) [1]

$[\alpha]_D$ −16° (Me_2CO) [1]

Solubility: very sol. MeOH, EtOH, Me_2CO, C_6H_6, $CHCl_3$, EtOAc [1]

UV: 258 (4.18) [2]

IR: 3300, 3142, 3115, 1612, 1252 [1, 2]

MS *m/z*: 317(M^+, 4), 302(2), 287(14), 285(22), 270(72), 248(68), 216(100), 188(94), 173(12), 69(6) [3]

^{1}H NMR(CCl_4): 1.67, 1.73(each 3H, s, 2 × CH_3), 3.05, 4.21(each 3H, s, 2 × OCH_3), 4.00(1H, m, O–CH–), 5.25(1H, t, J = 7, =CH), 6.86, 7.48(each 1H, J = 3, H-3, H-2) [3]

^{13}C NMR: [4]

Table 1

C-2	142.0	C-5	18.4	C-10	119.5
2a	161.5	6	23.9	11	133.2
3	104.3	7	69.4	12	25.8
3a	116.8	8	78.8	13	17.8
4	157.9	8a	150.1	4-OCH_3	58.1
4a	104.7	9	29.7	8-OCH_3	50.3

Pharm./Biol.: LD_{50} 600, 500, 750, 160 mg/kg (per os, s/c, i/p, i/v, mice). Sedative, soporific, analgetic, tranquilizing, and estrogenic action [5, 6]

References

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2. Z.Sh. Faizutdinova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 304 (1968)
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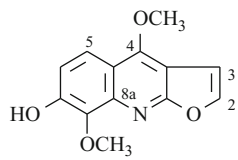
4. M.R. Yagudaev, I.A. Bessonova, Chem. Nat. Comp. **25**, 20 (1989)
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 275
6. S.S. Nazrullaev, I.A. Bessonova, Kh.S. Akhmedkhodjaeva, Chem. Nat. Comp. **37**, 551 (2001)

Haplopine

CAS Registry Number: 5876-17-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum bucharicum, H. dauricum, H. dubium, H. ferganicum, H. foliosum, H. latifolium, H. obtusifolium, H. pedicellatum, H. perforatum, H. ramosissimum, H. robustum*

$C_{13}H_{11}NO_4$: 245.0688

Mp: 203–204°C (MeOH), 169°C (hydrochloride) [1]; 225°C (sulphate) [2]

Solubility: sol. alk; spar. sol. Et_2O, C_6H_6, Me_2CO, $CHCl_3$ [1]
UV: 250, 262 sh, 322 (4.88, 3.68, 3.74) [2]
IR: 3200–2620, 1626, 1590 [3]
MS *m/z*: 245(M^+, 100), 244(22), 230(28), 227(78), 216(14) [2]
^{1}H NMR(CF_3COOH): 3.76, 4.31(each 3H, s, 2 × OCH_3), 7.05, 7.79(each 1H, d, J = 9, H-6, H-5), 7.08, 7.39(each 1H, d, J = 3, H-3, H-2) [2]
^{13}C NMR(DMSO-d_6): [4]

Table 1

C-2	142.1	C-4	156.9	C-7	141.4
2a	163.8	4a	101.2	8	139.3
3	105.4	5	117.9	8a	150.2
3a	113.3	6	116.5	4-OCH_3 59.2	
				8-OCH_3 60.8	

Pharm./Biol.: In administration of the dose 200 mg/kg the preparation inhibits in white mice provoked rage, conditioned reflex of "watchfulness" and "evasion" [5]. Estrogenic action [6]

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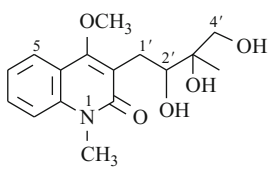
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)
4. Kh.A. Rasulova, I.A. Bessonova, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 731 (1987)
5. N.P. Polievtsev, M.B. Sultanov, *Farmakologiya Alkaloidov i Serdechnykh Glikozidov* (FAN, Tashkent, 1971), p. 178
6. S.S. Nazrullaev, I.A. Bessonova, Kh.S. Akhmedkhodzhaeva, Chem. Nat. Comp. **37**, 551 (2001)

Haplosamine (Haplozamine)

CAS Registry Number: 169306-07-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{16}H_{21}NO_5$: 307.1420
Mp: 132–133°C (Me_2CO) [1]
Solubility: sol. $CHCl_3$, spar. sol. H_2O, MeOH [1]
UV: 229, 244 sh, 265, 274, 284, 312, 326, 340(5.18, 4.72, 4.39, 4.49, 4.40, 4.32, 4.42, 4.29) [1]
IR: 3552, 3430, 3225, 1633, 1595, 1510, 1470, 1420, 1370, 1340, 1230, 1110 [1]
MS *m/z*: 289($M–H_2O^+$, 1.5), 276(4), 271(5), 268(12), 258(10), 240(3), 232(100), 216(15), 203(43), 202 (38), 188(53), 172(20), 160(8), 144(18), 134(13), 122(13), 115(10), 105(10), 91(14), 77(18) [1]
^{1}H NMR: 1.15(3H, s, CH_3), 2.77(1H, dd, J = 8.5, 13.5, H-1′), 3.00(1H, dd, J = 2.5, 13.5, H-1′), 3.12 (1H, s, OH), 3.55(1H, s, OH), 3.68, 3.92(each 3H, s, N–CH_3, OCH_3), 3.90–4.10(3H, m, H-2′, 2H-4′), 5.07(1H, s, OH), 7.37(3H, m, H-6, 7, 8), 7.82(1H, dd, J = 2.5, 8.0, H-5) [1]

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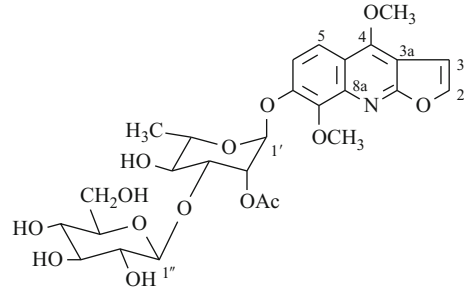
1. Kh.A. Rasulova, I.A. Bessonova, Chem. Nat. Comp. **31**, 487 (1995)

Haplosidine (Haplozidine)

CAS Registry Number: 115345-32-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{27}H_{33}NO_{14}$: 595.1901

Mp: 158–160°C, 105°C (penta Ac) [1]
$[\alpha]_D$: −77° (Py) [1]
Solubility: sol. H_2O, MeOH [1]
UV: 249, 320, 330 [1]
IR: 3650–3100, 1735, 1645, 1550, 1530, 1490, 1245 [1]
^{1}H NMR(Py-d_5): 1.57(3H, d, J = 6, CH_3), 2.04(3H, s, Ac), 5.45(1H, d, J = 7, H-1″), 6.19(2H, H-1′, H-2′), 4.27, 4.30(each 3H, s, 2 × OCH_3), 7.16, 7.82(each 1H, d, J = 3, H-3, H-2), 7.62, 8.08(each 1H, d, J = 8.5, H-6, H-5) [1]
^{13}C NMR(DMCO-d_6): [1]

Table 1

C-2	144.2	C-8	141.0	C-6′	17.8
2a	163.9	8a	148.0	1″	104.9
3	105.5	4-OCH_3	59.6	2″	74.0
3a	115.8	8-OCH_3	61.4	3″	76.4
4	157.0	1′	96.9	4″	70.1
4a	102.6	2′	71.8	5″	76.9
5	117.9	3′	78.3	6″	61.2
6	116.5	4′	71.0	CO	170.5
7	143.8	5′	69.7	$COCH_3$	21.0

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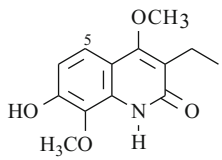
1. Kh.A. Rasulova, I.A. Bessonova, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **24**, 82 (1988)

Haplosine (Haplozine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{13}H_{15}NO_4$: 249.1001
Mp: 155–156°C (C_6H_6) [1]
UV: 217, 252, 322, 344 (4.57, 4.24, 4.24, 4.22) [1]
IR: 3570, 3480, 3100, 1650, 1500, 1450 [1]
MS *m/z*: 249(M^+, 98), 248(14), 235(17), 234(100), 233(10), 221(10), 220(72), 219(58), 218(27), 204(14), 202(14) [1]
^{1}H NMR: 1.15(3H, t, J = 7.5, CH_3), 2.60(2H, q, J = 7.5, CH_2), 3.84(6H, s, 2 × OCH_3), 6.79, 7.31(each 1H, d, J = 8.8, H-6, H-5) [1]

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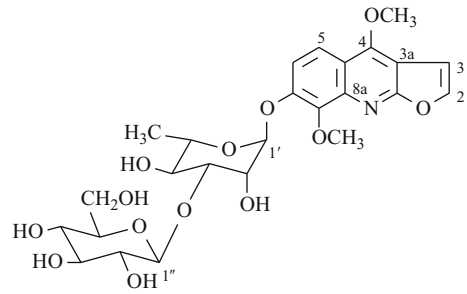
1. Kh.A. Rasulova, I.A. Bessonova, Chem. Nat. Comp. **28**, 214 (1992)

Haplosinine (Haplozinine)

CAS Registry Number: 115345-33-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{25}H_{31}NO_{13}$: 553.1796
Mp: 227–228°C (MeOH), 105°C (hexa Ac) [1]
$[\alpha]_D$: −74° (Py) [1]
Solubility: sol. H_2O, MeOH [1]
IR: 3650–3100, 1630, 1590, 1518, 1495 [1]
^{1}H NMR (Py-d_5): 1.54(3H, d, J = 6, CH_3), 3.90–5.60(m, the protons of carbohydrate part), 4.27(6H, s, 2 × OCH_3), 7.14, 7.82(each 1H, d, J = 3, H-3, H-2), 7.65, 8.08(each 1H, J = 8.5, H-6, H-5) [1]
^{13}C NMR (DMSO-d_6): [1]

Table 1

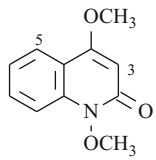
C-2	144.3	C-8	141.2	C-1″	105.0
2a	164.0	8a	148.7	2″	74.3
3	105.7	1′	100.2	3″	76.6
3a	115.6	2′	70.0	4″	70.2
4	157.2	3′	81.3	5″	77.0
4a	102.7	4′	71.0	6″	61.6
5	118.2	5′	70.0	4-OCH_3	59.8
6	116.6	6′	18.2	8-OCH_3	61.3
7	143.7				

References

1. Kh.A. Rasulova, I.A. Bessonova, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 731 (1987)

Haplotusine

CAS Registry Number: 27667-33-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum obtusifolium*
$C_{11}H_{11}NO_3$: 205.0739
Mp: 118–119°C [1]
Solubility: very sol. $CHCl_3$; sol. H_2O [1]
UV: 230, 271, 280, 320 (4.77, 3.90, 3.90, 3.84) [1]
IR: 1670, 1600, 1570, 1500 [1]
MS *m/z*: 205(M^+, 55), 175(100), 160(14), 146(28), 132(35), 117(45) [1]
^{1}H NMR: 3.83, 3.96(each 3H, s, 2 × OCH_3), 5.89(1H, s, H-3), 7.07(1H, m, H-8), 7.41(2H, m, H-6, H-7), 7.75(1H, dd, J = 9, 2.5, H-5) [1]

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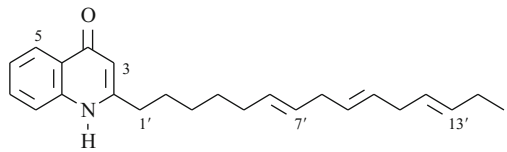
1. D.M. Razakova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 599 (1984)

Hapovine

CAS Registry Number: 80981-97-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum popovii*
$C_{24}H_{31}NO$: 349.2406
UV: 211, 236, 317, 329 (4.38, 4.34, 3.99, 3.98) [1]
IR: 1650, 1600, 1560, 1510 [1]
MS *m/z*: 349(M^+, 22), 334(8), 320(10), 294(16), 280(14), 254(16), 240(10), 214(14), 200(18), 186(20), 173(30), 172(84), 159(100), 130(45) [1]
^{1}H NMR: 0.88(3H, t, CH_3), 1.08–1.47(4H, m, H-3′, H-4′), 1.45–2.15(6H, m, H-2′, H-5′, H-14′), 2.45–2.92(6H, H-1′, H-8′, H-11′), 5.00–5.40(6H, m, CH), 6.15(1H, s, H-3), 7.18, 7.46, 7.74, 8.24(each 1H, br d, J = 8, H-8, H-7, H-6, H-5), 12.67(1H, br s, NH) [1]

References

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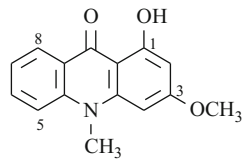
1-Hydroxy-3-methoxy-N-methylacridone



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Boenninghausenia albiflora, Ruta graveolens*

$C_{15}N_{13}NO_3$: 255.0895
Mp: 174–175°C (C_6H_6–EtOAc) [1]
UV: 223, 248, 263, 271, 295, 324, 395 (4.11, 4.40, 4.55, 4.61, 4.00, 3.77, 3.72) [1]
IR: 2650 [1]
MS *m/z*: 255(M^+, 100), 254(20), 227(19), 226(54), 225(30), 212(19), 200(8), 199(11), 184(13), 183(9), 182(12), 169(8), 168(6), 154(9), 140(6), 128(6), 77(11) [2]
^{1}H NMR: 3.60(3H, s, NCH_3), 3.80(3H, s, OCH_3), 6.10(2H, s, H-2, H-4), 7.10–7.80(3H, m, H–Ar), 8.29(1H, d, H-8), 14.60(1H, s, OH) [1]
^{13}C NMR: [3]

Table 1

C-1	164.6	C-5a	141.9	C-8a	119.9
2	93.3	5	115.7	9	179.6
3	165.7	6	134.2	9a	104.3
4	89.7	7	121.7	3-OCH_3	55.5
4a	144.4	8	125.4	NCH_3	34.0

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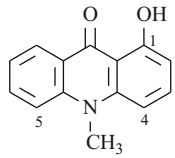
2. J.H. Bowie, R.G. Cooks, R.H. Prager, H.M. Thredgold, Austral. J. Chem. **20**, 1179 (1967)
3. D. Bergenthal, I. Mester, Z. Rozsa, J. Reisch, Phytochemistry **18**, 161 (1979)

1-Hydroxy-N-methylacridone



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{14}H_{11}NO_2$: 225.0790
Mp: 192–194°C (Me_2CO) [1]
MS *m/z*: 225(M^+, 100), 210(3), 197(7.5), 196(7), 182(16), 168(3.5), 167(3), 154(5), 127(4), 112.5(2), 98.5, 77(6) [2]
^{1}H NMR: 3.80(3H, s, NCH_3), 14.50(1H, s, OH) [3]

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2. Z. Rozsa, K. Szendrei, Z. Kovacs, I. Novak, E. Minker, J. Reisch, Phytochemistry **17**, 169 (1978)
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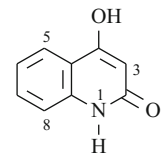
4-Hydroxyquinolin-2-one



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bucharicum*
$C_9H_7NO_2$: 161.1612
Mp: 353–354°C (dec., MeOH) [1]
^{1}H NMR (DMSO-d_6): 5.69 (1H, s, H-3), 7.05, 7.40 (each 1H, t, H-6, 7), 7.21, 7.75 (each 1H, dd, J = 8, 2, H-8, H-5), 11.95 (1H, br s, NH) [1]

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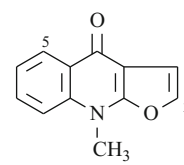
Isodictamnine

CAS Registry Number: 484-74-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

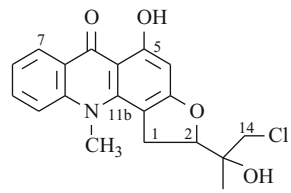
Biological sources: *Dictamnus angustifolius, D. caucasicus*
$C_{12}H_9NO_2$: 199.0633
Mp: 185–186°C (H_2O) [1]
IR: 3135, 3115, 1630, 1597, 1555, 1520 [2]
MS *m/z*: 199(M^+, 100), 184(13), 170(11), 156(17), 143(35), 142(8), 130(6), 128(22), 116(6), 115(22), 104(22), 102(8), 101(17), 99(13), 91(5), 89(4), 85(10), 77(19), 76(16), 75(10), 66(10) [3]
^{1}H NMR: 3.81(3H, s, NCH_3), 7.00, 7.22(each 1H, d, H-3, H-2), 7.20–7.25(3H, m, H–Ar), 8.55(1H, d, H-5) [4]

References

1. V.S. Asatiani, I.M. Kikvidze, I.A. Bessonova, K.S. Mudzhiri, S.Yu. Yunusov, Soobshch. AN GSSR **64**(1), 85 (1971)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
3. F.N. Lahey, I. Lauder, M. McCamisch, Austral. J. Chem. **22**, 431 (1969)
4. J.F. Collins, G.A. Grey, M.F. Grundon, D.M. Harrison, C.G. Spyropoulos, J. Chem. Soc. Perkin I 94 (1973)

Isogravacridonchlorine

CAS Registry Number: 62512-94-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Boenninghausenia albiflora*
$C_{19}H_{18}NO_4Cl$: 359.0924/361.0895
Mp: 224–226°C (dec., Me_2CO) [1]
UV: 225, 247, 275, 298, 322, 400 (4.40, 4.52, 4.81, 4.17, 4.15, 3.80) [1]
MS *m/z*: 359(M^+, 18), 339(100), 324(30), 308(30), 266(18), 169.5(25), 43(68), 36(75), 18(50) [1]
^{13}C NMR: [2]

Table 1

C-1	37.7	C-6a	120.0	C-11a	143.1
2	86.0	7	125.0	11b	101.1
3a	167.0	8	121.4	12	72.3
4	91.6	9	134.2	13	20.9
5	165.0	10	115.8	14	49.9
5a	105.1	10a	142.1	NCH_3	31.5
6	180.0				

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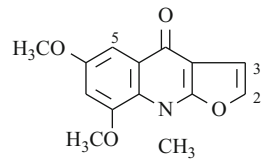
1. J. Reisch, Z. Rosza, K. Szendrei, I. Novak, E. Minker, Phytochemistry **16**, 151 (1977)
2. D. Bergenthal, I. Mester, Z. Rosza, J. Reisch, Phytochemistry **18**, 161 (1979)

Isomaculosidine

CAS Registry Number: 518-96-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Dictamnus caucasicus*
$C_{14}H_{13}NO_4$: 259.0845
Mp: 168–169°C (EtOH–Me_2CO) [1, 2]; 215°C (tetrahydro), 186°C (picrate) [1]
Solubility: sol. $CHCl_3$; insol. H_2O [1, 2]
UV: 214, 250, 261 sh, 292, 302 sh, 347, 364 (4.11, 4.62, 4.28, 3.62, 3.41, 3.97, 4.01) [2]
IR: 3145, 3120, 1636, 1615, 1575, 1525, 1470, 1445, 1430, 1390, 1363, 1295, 1278, 1220, 1188, 1165, 1122, 1100, 988, 950, 840, 785, 760 [3]

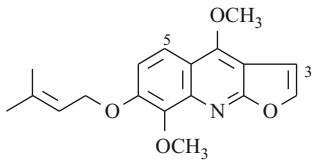
MS *m/z*: 259(M^+, 100), 258(15), 245(36), 229(13), 216(10), 214(6), 201(17), 173(9) [2]
^{1}H NMR: 3.84, 3.88, 4.06(each 3H, s, 2 × OCH_3, NCH_3), 6.69, 7.51(each 1H, d, J = 2.5, H-7, H-5), 6.99, 7.23(each 1H, d, J = 2, H-3, H-2) [3]

References

1. I.M. Kikvidze, I.A. Bessonova, K.S. Mudzhiri, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 659 (1971)
2. V.S. Asatiani, I.M. Kikvidze, I.A. Bessonova, K.S. Mudzhiri, S.Yu. Yunusov, Soobshch. AN GSSR **64**(1), 85 (1971)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)

7-Isopentenyloxy-γ-fagarine

CAS Registry Number: 23417-92-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum ferganicum, H. latifolium, H. perforatum*
$C_{18}H_{19}NO_4$: 313.1314
Mp: 105–106°C (EtOAc), 234°C (hexahydro) [1]
Solubility: very sol. $CHCl_3$, EtOH, MeOH; sol. Me_2CO, Et_2O; insol. H_2O [1]
UV: 251, 322, 335 (4.90, 3.91, 3.89) [1]
IR: 3160, 3120, 1620, 1580, 1510, 1490, 1370, 1265 [1]
MS *m/z*: 313(M^+, 14), 245(100), 244(55), 230(41), 227(98), 216(59), 202(30), 199(38), 187(9), 69(43) [1]
^{1}H NMR: 1.70, 1.74(each 3H, s, 2 × CH_3), 4.01, 4.28(each 3H, s, 2 × OCH_3), 4.62(2H, d, J = 6.5, CH_2), 5.46(1H, t, J = 6.5, CH), 6.81, 7.49(each 1H, d, J = 3, H-3, H-2), 6.96, 7.67(each 1H, d, J = 9, H-6, H-5) [1]

References

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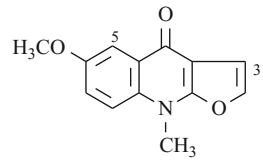
Isopteleine

CAS Registry Number: 2181-84-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Dictamnus angustifolius, D. caucasicus*
$C_{13}H_{11}NO_3$: 229.0739
Mp: 208–209°C (EtOH–Me_2CO) [1, 2]
Solubility: spar. sol. org. solvs.; insol. H_2O [1, 2]
UV: 217, 243, 256, 264, 292, 302, 329, 345, 362 (4.20, 4.47, 4.41, 4.52, 3.23, 3.47, 3.72, 4.03, 4.05) [2]
IR: 3158, 3117, 1642, 1610, 1567, 1525, 1365, 1250, 1155 [3]
MS *m/z*: 229(M^+, 100), 228(42), 227(5), 215(5), 214(38), 200(14), 199(33), 186(10), 158(21), 143(4) [2]
^{1}H NMR: 3.84, 3.90(each 3H, s, OCH_3, NCH_3), 7.00(1H, d, J = 2, H-3), 7.10–7.30(3H, m, H-2, H-7, H-8), 7.86(1H, d, J = 2.5, H-5) [1]

References

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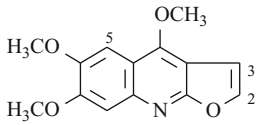
2. V.S. Asatiani, I.M. Kikvidze, I.A. Bessonova, K.S. Mudzhiri, S.Yu. Yunusov, Soobshch. AN GSSR **64**(1), 85 (1971)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)

Kokusaginine

CAS Registry Number: 484-08-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens, Ptelea trifoliata*
$C_{14}H_{13}NO_4$: 259.0845
Mp: 170–171°C, 218°C (picrate), 223°C (dec., hydrochloride), 249°C (isobase (MeOH)) [1]
UV: 243, 273, 307, 317, 333 [2]
IR: 3140, 1624 [2]
MS *m/z*: 259(M^+, 100), 244(50), 216(23), 201, 184, 173, 158 [3]
^{1}H NMR: 4.02, 4.04, 4.46(each 3H, s, 3 × OCH_3), 7.00, 7.55(each 1H, d, J = 2.5, H-3, H-2), 7.33, 7.42(each 1H, s, H-8, H-5) [4]
HPLC: [5]

References

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4. A.V. Robertson, Austral. J. Chem. **16**, 451 (1963)
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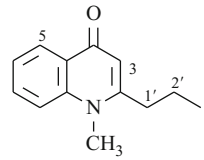
Leptomerine

CAS Registry Number: 22048-97-1



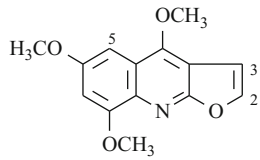
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum leptomerum*
$C_{13}H_{15}NO$: 201.1154
Mp: 147–148°C (Me_2CO) [1]
Solubility: very sol. $CHCl_3$, EtOH; sol. Me_2CO, Et_2O; insol. H_2O [1]
UV: 213, 230, 285, 294 (3.63, 3.61, 3.31, 3.40) [1]
IR: 1635, 1600, 1580, 1500, 1480, 1440, 1425 [1]
MS *m/z*: 201(M^+, 100), 186(38), 173(100), 172(19), 158(28), 145(69), 144(56), 130(59), 77(45) [1]
^{1}H NMR: 0.99(3H, t, J = 7.5, CH_3), 1.63(2H, m, H-2′), 2.59(2H, t, J = 7.5, H-1′), 3.62(3H, s, NCH_3), 6.11(1H, s, H-3), 7.42(3H, m, H–Ar), 8.34(1H, dd, J = 9, 3, H-5) [1]

References

1. V.I. Akhmedzhanova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 78 (1986)

Maculosidine

CAS Registry Number: 522-19-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ptelea trifoliata*
$C_{14}H_{13}NO_4$: 259.0845
Mp: 183–184°C (EtOH) [1]
UV: 211, 246, 284 sh, 294, 306, 338, 351 (4.29, 4.85, 3.72, 3.86, 3.88, 3.76, 3.69) [1, 2]
MS *m/z*: 259(M^+, 100), 244(22), 230(45), 216, 201, 186, 173, 158 [3]
^{1}H NMR: 3.81, 4.01, 4.33(each 3H, s, 3 × OCH_3), 6.68, 6.98(each 1H, d, J = 2.5, H-7, H-5), 6.93, 7.53(each 1H, d, J = 2.5, H-3, H-2) [4]

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1. V.I. Frolova, A.D. Kuzovkov, P.N. Kibal'chich, Zh. Obshch. Khim. **34**, 3499 (1964)
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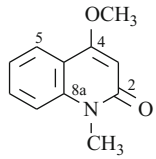
4-Methoxy-N-methylquinolin-2-one



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum dauricum, H. bucharicum*
$C_{11}H_{11}NO_2$: 189.0890
Mp: 100–101°C (C_6H_{14}) [1]
UV: 229, 269, 279, 318, 330 (4.50, 3.64, 3.67, 3.56, 3.46) [1]
IR: 1650, 1592, 1505, 1468, 1395, 1330, 1270, 1243, 1155, 1123, 1080 [2]
MS *m/z*: 189(M^+, 100), 174(43), 146(14), 132(13), 77(10) [1]
^{1}H NMR(CCl_4): 3.47, 3.87(each 3H, NCH_3, OCH_3), 5.79(1H, s, H-3), 7.28(3H, m, H–Ar), 7.82(1H, dd, J = 9, 2.5, H-5) [1]
^{13}C NMR: [3]

Table 1

C-2	163.7	C-4a	116.3	C-7	131.1
3	90.2	5	123.2	8	114.0
4	162.5	6	121.5	8a	139.6

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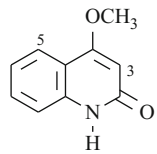
4-Methoxyquinolin-2-one



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bungei, H. bucharicum*
$C_{10}H_9NO_2$: 175.0633
Mp: 254–255°C (EtOH) [1]
UV: 212 sh, 224 sh, 227, 239 sh, 266, 275, 307 sh, 310, 327 [2]
IR: 1670, 1609, 1505, 1450, 1400, 1363, 1240, 1200, 1160, 1120, 1040, 990, 840 [3]
MS *m/z*: 175(M^+, 100), 146(15), 132(29), 117(30) [4]
^{1}H NMR: 3.91(3H, s, OCH_3), 5.95 (1H, s, H-3), 7.00–7.55(3H, m, H–Ar), 7.80(1H, dd, J = 8, 2.5, H-5), 11.95(1H, br s, NH) [5]

References

1. I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **25**, 18 (1989)
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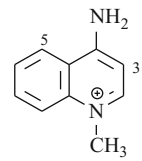
N-Methyl-4-aminoquinolinium



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Echinops albicaulis, E. chantavicus, E. karatavicus, E. ritro, E. maracandicus, E. sphaerocephalus*
$C_{10}H_{11}N_2$: 159.0922
$[\alpha]_D$ + 54° [1]
Mp: 151°C (echinopsine), 314°C (echinopsidine) [1]
UV: 240, 310 (4.00, 3.50) [1]
IR(echinopsine): 1653, 1621, 1565, 1549, 1496 [1]
IR(echinopsidine): 3422, 3357, 3307, 3147, 1674, 1622, 1568, 1549, 1514 [1]
Pharm./Biol.(echinopsine): LD_{50} 490 mg/kg (s/c, mice) [2]
Pharm./Biol.(echinopsidine): LD_{50} 47.5 mg/kg (s/c, mice). Affects the peripheral and central links of the nervous system [2]

References

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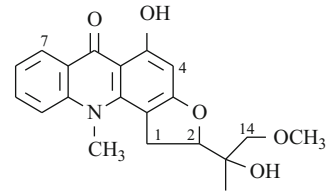
Methyl Ether of Gravacridondiol

CAS Registry Number: 37551-76-1



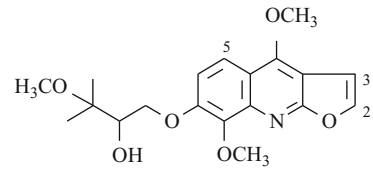
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{20}H_{21}NO_5$: 355.1420
Mp: 219–221°C (EtOAc) [1]
UV: 213, 227, 249, 265, 272, 299, 332, 390(4.23, 4.22, 4.52, 4.59, 4.68, 4.33, 3.96, 3.78) [1]
IR: 3600–3200, 1640, 1600, 1580, 1560, 1510 [1]
MS *m/z*: 355(M^+), 266(100) [1]
^{1}H NMR: 1.18(3H, s, CH_3), 3.40(3H, s, OCH_3), 3.50(2H, s, H-14), 3.60(2H, m, H-1), 3.90(3H, s, NCH_3), 4.80(1H, t, H-2), 6.05(1H, s, H-4), 7.00–7.60(3H, m, H–Ar), 8.20(1H, dd, H-7) [1]

References

1. J. Reish, Z. Rozsa, K. Szendrei, I. Novak, E. Minker, Phytochemistry **11**, 2121 (1972)

Methylevoxine

CAS Registry Number: 56775-80-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum obtusifolium, H. perforatum, H. ramosissimum*

$C_{19}H_{23}NO_6$: 361.1525

Mp: 122–123°C (Et_2O) [1]

$[\alpha]_D$ −15° (EtOH) [2]

Solubility: very sol. $CHCl_3$, MeOH; spar. sol. Et_2O; insol. H_2O [3]

UV: 251, 322, 334 (4.91, 3.78, 3.77) [3]

IR: 3450, 3170, 3140, 1628, 1588, 1510, 1500, 1473, 1460, 1400, 1330, 1280, 1245 [4]

MS *m/z*: 361(M^+, 48), 288(5), 258(8), 245(59), 244(22), 227(100), 216(18), 199(13), 187(6), 73(93) [3]

^{1}H NMR: 1.17(6H, s, 2 × CH_3). 3.11, 3.89, 4.18(each 3H, s, 3 × OCH_3), 3.55–4.17(3H, m, O–CH–CH_2–O), 6.73, 7.25(each 1H, d, J = 3, H-3, H-2), 6.92, 7.63(each 1H, d, J = 9, H-6, H = 5) [3]

References

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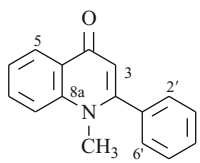
N-Methyl-2-phenylquinolin-4-one



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum foliosum, H. leptomerum, H. perforatum*

$C_{16}H_{13}NO$: 235.0997

Mp: 118–119°C (Me_2CO); 141–142° (anhyd.), 229° (hydrochloride), 176° (picrate) [1]

UV: 251, 325, 337 (4.52, 4.12, 4.18) [2]

IR: 1625 [1]

MS *m/z*: 235(M^+, 100), 234(10), 207(66), 190, 178, 165 [2]

^{1}H NMR: 3.51(3H, s, NCH_3), 6.19(1H, s, H-3), 7.45(8H, m, H–Ar), 8.40(1H, dd, J = 10, 2, H-5) [1]

^{13}C NMR: [3]

Table 1

C-2	154.83	C-7	132.39	C-3′	128.57
3	112.58	8	116.04	4′	129.65
4	177.58	8a	141.94	5′	128.57
4a	126.60	1′	135.86	6′	128.81
5	126.60	2′	128.81	NCH_3	37.26
6	123.68				

Pharm./Biol.: Weak estrogenic action [4]

References

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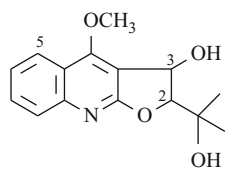
4. S.S. Nazrullaev, I.A. Bessonova, Kh.S. Akhmedkhodjaeva, Chem. Nat. Comp. **37**, 551 (2001)

Myrtopsine

CAS Registry Number: 60623-06-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum foliosum*
$C_{15}H_{17}NO_4$: 275.1158
Mp: 201–202°C ($CHCl_3$), 175°C (3-O-Ac) [1]
$[\alpha]_D$ −5° (MeOH) [1]
Solubility: spar. sol. MeOH, $CHCl_3$ [1]
UV: 230, 237 sh, 265, 272, 283, 313, 326 (4.67, 4.55, 3.83, 3.88, 3.79, 3.62, 3.63) [1]
IR: 3260, 1638, 1592, 1520, 1463, 1428, 1382, 1295, 1210, 1170, 1125, 1070, 1030, 1000, 970 [2]
MS *m/z*: 275(M^+, 100), 260(16), 257(12), 242(39), 226(26), 216(19), 204(23), 202(24), 200(100), 199(28), 187(22), 186(25), 185(28), 173(14), 156(28), 59(53) [1, 2]
^{1}H NMR(CD_3OD): 1.22, 1.30(each 3H, s, 2 × CH_3), 4.31(1H, d, J = 3, H-2), 4.42(3H, s, OCH_3), 5.64(1H, d, J = 3, H-3), 7.05–7.78(3H, m, H–Ar), 8.02(1H, dd, J = 8.5, 1.5, H-5) [1]

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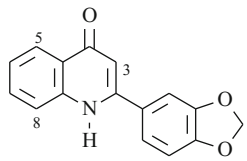
1. V.I. Akhmedzhanova, I.A. Bessonova, Chem. Nat. Comp. **17**, 447 (1981)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 596 (1996)

Norgraveoline

CAS Registry Number: 74054-38-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum dubium, H. foliosum*
$C_{16}H_{11}NO_3$: 265.0739
Mp: 288–290°C (dec., EtOH) [1]
Solubility: insol. $CHCl_3$, Me_2CO, Et_2O, H_2O [1]
UV: 213, 243, 276, 324 (4.46, 4.46. 4.13, 4.30) [1]
IR: 3260–2840, 1635, 1600, 1555, 1505 [1]
MS *m/z*: 265(M^+, 100), 264(13), 237(34), 207(5), 178(20) [1]
^{1}H NMR(CF_3COOH): 5.69(2H, s, CH_2O_2), 6.50–7.05(3H, m, H–Ar), 6.87(1H, s, H-3), 7.36(1H, m, H-8), 7.58(2H, d, H-6, H-7), 8.00(1H, d, J = 9, H-5) [1]

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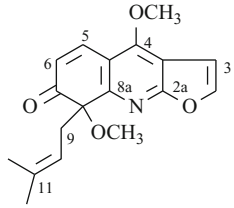
1. D.M. Razakova, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 716 (1979)

Perfamine

CAS Registry Number: 59557-95-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum acutifolium, H. perforatum*
$C_{18}H_{19}NO_4$: 313.1314
Mp: 164–165°C (Et_2O–Me_2CO) [1], 212°C (semicarbazone) [2], 225°C (hydrogenation product) [1, 3]
$[\alpha]_D$ +53° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$; sol. EtOH, MeOH, Me_2CO, Et_2O; insol. H_2O [1]
UV: 215, 264, 272, 345 (4.30, 4.43, 4.43, 3.91) [1]
IR: 3145, 3115, 1670 [1]
MS *m/z*: 313(M^+, 4), 298(2), 283(6), 266(14), 252(8), 245(100), 240(15), 230(18), 228(12), 227(92), 216(24) [1]

^{1}H NMR: 1.28, 1.43(each 3H, s, 2 × CH_3), 2.73, 4.76(2H, d; 1H, t, J = 6.5, H-9, H-10), 3.04, 4.37(each 3H, s, 2 × OCH_3), 6.12, 8.03(each 1H, d, J = 10, H-6, H-5), 7.10, 7.66(each 1H, d, J = 3, H-3, H-2) [1]

^{13}C NMR: [4]

Table 1

C-2	143.5	C-5	137.2	C-10	113.6
2a	162.1	6	124.4	11	136.2
3	105.3	7	201.4	12	17.6
3a	115.5	8	86.3	13	25.7
4	158.0	8a	157.6	4-OCH_3	59.0
4a	105.6	9	42.3	8-OCH_3	53.9

Pharm./Biol.: Estrogenic action [5]

References

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2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
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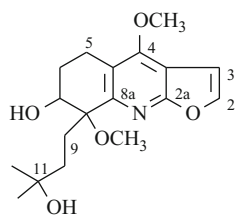
Perforine

CAS Registry Number: 18063-20-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum perforatum*

$C_{18}H_{25}NO_5$: 335.1733

Mp: 182–183°C (MeOH), 158°C (chlor. Ac), 144°C (EtOH., anhydro.), 107°C (tetrahydro), 169°C (dihydro) [1]

$[\alpha]_D$ +15° (MeOH) [1]

Solubility: sol. DMSO.; spar. sol. $CHCl_3$, MeOH, Me_2CO; insol. Et_2O, pet. ether, H_2O [2]

UV: 256 (4.00) [1]

IR: 3420, 3148, 3118, 1605, 1585, 1545, 1475, 1267, 1100 [2]

MS *m/z*: 335(M^+, 62), 302(74), 288(31), 270(10), 248(34), 228(26), 216(100), 202(31), 201(30), 188(87), 173(8) [2]

^{1}H NMR: 1.20, 1.24(each 3H, s, 2 × CH_3), 3.09, 4.19(each 3H, s, 2 × OCH_3), 4.20(1H, m, H-7), 6.87, 7.47(each 1H, J = 3, H-3, H-2) [2]

^{13}C NMR(DMSO-d_6): [3]

Table 1

C-2	142.7	C-5	18.0	C-10	23.2
2a	161.9	6	23.9	11	69.2
3	104.6	7	67.2	12	29.4
3a	116.5	8	78.0	13	29.4
4	157.9	8a	151.2	4-OCH_3	58.6
4a	104.9	9	35.9	8-OCH_3	49.6

Pharm./Biol.: LD_{50} 709 mg/kg (oral, mice). Sedative, anticonvulsive, soporific, analgesic, central muscle-relaxing [4], and estrogenic action [5, 6]

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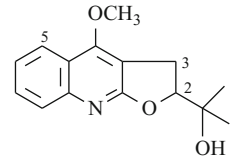
Platydesmine

CAS Registry Number: 2824-86-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum perforatum*
$C_{15}H_{17}NO_3$: 259.1208
Mp: 138–139°C (Et_2O–Me_2CO) [1, 2], 109°C (picrate) [3]
Solubility: very sol. $CHCl_3$, EtOH, MeOH [3]
UV: 229, 238, 253, 262, 272, 283, 294, 307, 320 (4.57, 4.43, 3.50, 3.65, 3.73, 3.65, 3.24, 3.49, 3.55) [3]
IR($CHCl_3$): 3584, 2976, 1637, 1590, 1517, 1471, 1429, 1397, 1368, 1335, 1309, 1295, 1238–1203, 1181, 1166, 1147, 1122, 1101, 1018, 996, 952 [3]
MS *m/z*: 259(M^+, 31), 241(10), 226(15), 200(100), 186(18), 185(20), 173(24), 172(22), 158(23), 156(9) [4]
^{1}H NMR: 1.20, 1.25(each 3H, s, 2 × CH_3), 3.52(2H, d, J = 8, H-3), 4.12(3H, s, OCH_3), 4.50(1H, q, J = 7, 9, H-2), 7.00–7.60(3H, m, H–Ar), 7.88(1H, dd, J = 8.5, 2, H-5) [2]

References

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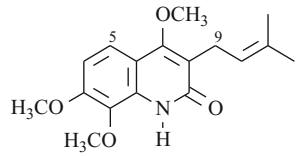
Preskimmianine

CAS Registry Number: 38695-41-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Dictamnus angustifolius*
$C_{17}H_{21}NO_4$: 303.1471
Mp: 154–155°C (Me_2CO), 81°C (N-Me) [1]
UV: 219, 232 sh, 250, 258, 310 sh, 322, 335 (4.53, 4.31. 4.07, 4.08, 3.82, 3.98, 3.83) [1]
IR: 3160–3100, 1635, 1600, 1580, 1515, 1450 [2]
MS *m/z*: 303(M^+, 100), 288(99), 272(20), 260(78), 258(26), 248(52), 234(38) [1]
^{1}H NMR: 1.65, 1.75(each 3H, s, 2 × CH_3), 3.31(2H, d, J = 6.5, H-9), 3.85, 3.88(3H, 6H, 3 × OCH_3), 5.25(1H, t, J = 6.5, H-10), 6.77. 7.40(each 1H, J = 9, H-6, H-5) [1]
^{13}C NMR: [3]

Table 1

C-2	164.4	C-7	–	C-12	18.0
3	120.8	8	–	13	25.7
4	162.0	9	23.5	OCH_3	61.7
4a	112.2	10	121.8		61.0
5	118.5	11	132.3		56.3
6	107.6				

References

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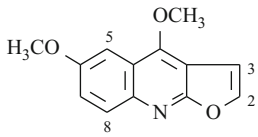
Pteleine

CAS Registry Number: 2221-41-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ptelea trifoliata*
$C_{13}H_{11}NO_3$: 229.0739
Mp: 137–138°C (EtOH) [1]; 141–143°C (C_6H_{14}) [2]; 185°C (dec., hydrochloride), 196°C (picrate), 202°C (dec., picrolonate), 211°C (C_6H_6, isopteleine) [1]
Solubility: sol. MeOH, EtOH, Me_2CO, Et_2O, EtOAc; insol. H_2O [1]
UV: 249, 261, 284 sh, 296, 307, 333, 350 (6.10, 4.91, 4.81, 4.99, 5.04, 4.75, 4.68) [1, 3]
IR: 2941, 1618, 1580, 1541, 1506, 1464, 1414, 1364, 1304, 1264, 1233, 1215, 1153, 1110, 1093, 1033, 980, 848, 829, 699 [3]
^{1}H NMR: 3.90, 4.40(each 3H, s, 2 × OCH_3), 7.10(1H, d, J = 3.5), 7.50(3H, d, J = 3.5), 7.90(1H, d, J = 9.5, H–Ar) [2]

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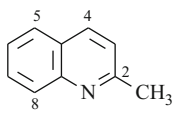
Quinaldine (2-Methylquinoline)

CAS Registry Number: 91-63-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Peganum harmala*
$C_{10}H_9N$: 143.0735
Mp: 187°C (picrate) [1]
^{13}C NMR: [2]

Table 1

C-2	158.2	C-4a	126.4	C-7	129.1
3	121.7	5	127.3	8	128.7
4	135.6	6	125.4	8a	147.9
				CH_3	25.1

References

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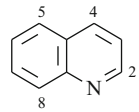
Quinoline

CAS Registry Number: 91-22-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Peganum harmala*
C_9H_7N: 129.0578
Mp: 202°C (picrate) [1]
UV: 227, 278, 301, 314 (4.56, 3.56, 3.43) [2]
MS *m/z*: 129(M^+, 100), 102 [3]
^{1}H NMR: [4]
^{13}C NMR: [5]

Table 1

C-2	150.2	C-4a	128.2	C-7	129.2
3	120.9	5	127.6	8	129.4
4	135.7	6	126.4	8a	148.3

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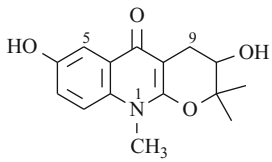
Ribalinidine

CAS Registry Number: 87936-14-9



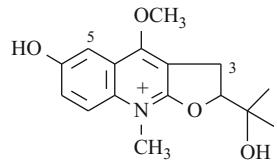
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{15}H_{17}NO_4$: 275.1153
Mp: 257–258°C (dec., abs. EtOH), 233°C (O–Me), 242°C (O–Ac), 204°C (O,O-di Ac) [1]
$[\alpha]_D$ −15° (MeOH) [1]
UV: 220 sh, 235, 245 sh, 301, 331, 346 (4.31, 4.48, 4.43, 3.88, 3.87, 3.81) [1]
IR: 3340, 3200, 1610, 1578, 1558, 1520, 1470 [1, 2]
^{1}H NMR(CF_3COOH): 1.66, 1.83(each 3H, s, 2 × CH_3), 3.38(2H, d, CH_2), 4.18(3H, s, NCH_3), 4.48(1H, t, –CH–O), 7.86–8.06(3H, m, H–Ar) [2]

References

1. R.A. Corral, O.O. Orazi, I.A. Benages, Tetrahedron Lett. **9**, 545 (1968)
2. R.A. Corral, O.O. Orazi, I.A. Benages, Tetrahedron **29**, 205 (1973)

Ribalinium

CAS Registry Number: 6883-22-3



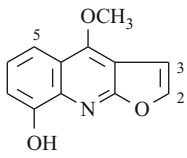
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{16}H_{20}NO_4$: 290.1392
Mp: 190°C (MeOH–EtOAc, chloride), 193°C (picrate), 220°C (perchlorate) [1]
$[\alpha]_D$ + 40° (MeOH) [1]
UV(chloride): 221, 247, 293 sh, 299, 334 (4.42, 4.35, 3.83, 3.88, 3.65) [1]
IR(chloride): 3324, 1636, 1596, 1544, 1232, 976 [1]
MS *m/z*: 289, 275, 258, 246, 230, 218, 204, 188, 174, 160, 148, 120, 59 [2]
^{1}H NMR: [2, 3]
HPLC: [4]

References

1. R.A. Corral, O.O. Orazi, Tetrahedron **21**, 909 (1965)
2. K. Szendrei, J. Reisch, I. Novak, L. Simon, Z. Rozsa, E. Minker, M. Koltai, Herba Hungarica **10**(2–3), 131 (1971)
3. K. Szendrei, E. Minker, M. Koltai, J. Reisch, I. Novak, G. Benezas, Acta Pharmaceutica Hungarica **39**(2), 60 (1969)
4. M. Montagu, P. Levillain, J.C. Chenieux, M. Rideau, J. Chromatogr. **331**, 437 (1985)

Robustine

CAS Registry Number: 2255-50-7



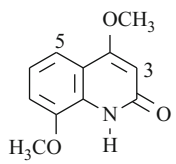
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Dictamnus caucasicus, Haplophyllum bucharicum, H. dauricum, H. dubium, H. obtusifolium, H. pedicellatum, H. perforatum, H. ramosissimum, H. robustum*
$C_{12}H_9NO_3$: 215.0582
Mp: 147–149°C (EtOH), 200°C (hydrochloride), 180°C (picrate), 175°C (Ac), 202°C (tetrahydro), 141°C (O–Me) [1]
Solubility: very sol. Me_2CO, $CHCl_3$; spar. sol. EtOH; insol. H_2O [1]
UV: 246, 314, 330, 342 (4.86, 3.94, 3.94, 3.92) [1]
IR: 3300, 3130, 1622, 1590, 1528, 1368, 1310, 1190, 1108, 1060, 1000 [1, 2]
MS *m/z*: 215(M^+, 100), 200(44), 186(26), 172(26), 144(14), 116(14), 83(12), 63(5) [3]
^{1}H NMR: 4.30(3H, s, OCH_3), 6.91, 7.47(each 1H, d, J = 3, H-3, H-2), 7.10(2H, m, H-6, H-7), 7.59(1H, dd, J = 9, 2.5, H-5) [2]
Pharm./Biol.: LD_{50} 300 mg/kg (oral, mice) [4, 5]

References

1. I.M. Fakhrutdinova, G.P. Sidyakin, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 83 (1965)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
3. Z.Sh. Faizutdinova, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 218 (1967)
4. M.B. Sultanov, *The Pharmacology of Plant Substances* [in Russian] (FAN, Tashkent, 1976), p. 3
5. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 272

Robustinine (Edulitine)

CAS Registry Number: 15272-24-9



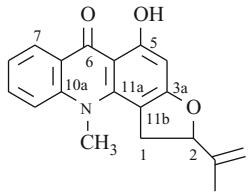
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Haplophyllum bungei, H. dauricum, H. foliosum, H. robustum*
$C_{11}H_{11}NO_3$: 205.0739
Mp: 232–233°C (Me_2CO), 246°C (norrobustinine), 227°C (nitroso derivative of norrobustinine) [1]
Solubility: very sol. EtOH, MeOH, $CHCl_3$ [1]
UV: 225, 270, 282, 320, 332 (4.34, 4.42, 3.85, 3.78, 3.44) [1]
IR: 3165, 1650, 1580, 1488, 1460, 1395, 1270, 1230, 1080, 980 [2]
MS *m/z*: 205(M^+, 100), 204(80), 202(3), 190(19), 176(34), 175(32), 162(13) [2]
^{1}H NMR: 3.93, 3.94(3H, s, 2 × OCH_3), 7.45(1H, H-5) [3]

References

1. I.M. Saitbaeva, G.P. Sidyakin, S.Yu. Yunusov, Chem. Nat. Comp. **2**, 364 (1966)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
3. T.P. Toube, J.W. Murphy, A.D. Cross, Tetrahedron **23**, 2061 (1967)

Rutacridone

CAS Registry Number: 17948-33-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Boenninghausenia albiflora, Ruta graveolens*
$C_{19}H_{17}NO_3$: 307.1208
Mp: 162–164°C (Me_2CO-pet. ether) [1]

$[\alpha]_D$ −43° [1]
UV: 228, 249, 264, 270, 330, 332, 390 [2]
MS *m/z*: 307(M^+, 100), 292(30), 278(29), 264(27), 250(16), 239(16), 236(15), 222(6), 208(12), 183(4), 180(6.5), 167(5), 154(5), 146(2), 140(5), 127(1), 115(1.2), 107(9), 89(3.5), 77(13) [1]
^{13}C NMR: [3]

Table 1

C-1	37.6	C-6	180.0	C-10a	142.2
2	85.8	6a	120.0	11a	143.1
3a	166.8	7	125.3	11b	100.7
4	91.6	8	121.6	12	143.4
5	165.3	9	134.3	13	16.9
5a	105.3	10	115.8	14	112.4
				NCH_3	35.9

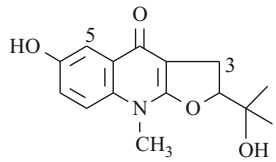
HPLC: [4]

References

1. Z. Rozsa, K. Szendrei, Z. Kovacs, I. Novak, E. Minker, J. Reisch, Phytochemistry **17**, 169 (1978)
2. I.N. Kuzovkina, Zh Rozha, K. Sendrei, A.M. Smirnov, Rast. Res. **19**, 374 (1983)
3. D. Bergenthal, I. Mester, Z. Rozsa, J. Reisch, Phytochemistry **18**, 161 (1979)
4. J. Reisch, W. Probst, D. Groger, Pharmazie **45**, 500 (1990)

Rutalinidine (Ribaline)

CAS Registry Number: 50894-68-3



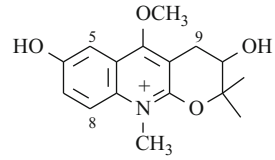
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{15}H_{17}NO_4$: 275.1158
Mp: 259–260°C (MeOH), 224°C (dec., picrate), 227°C (O–Me), 225°C (perchlorate) [1]
Solubility: spar. sol. org. solvs. [1]
UV: 235, 245, 304, 325, 339 (4.37, 4.34, 3.90, 3.80, 3.71) [1]
IR: 1618, 1580, 1558, 1545, 1519, 1470 [1]
MS (O–Me) *m/z*: 289(M^+, 2), 230(44), 218(100), 217(85), 200(32), 71(25) [2]
^{1}H NMR(O–Me): [2]

References

1. R.A. Corral, O.O. Orazi, I.A. Benages, Tetrahedron **29**, 205 (1973)
2. R.A. Corral, O.O. Orazi, Tetrahedron **21**, 909 (1965)

Rutalinium

CAS Registry Number: 27539-40-8



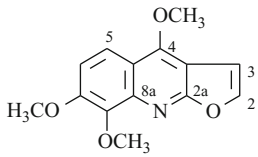
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids
Biological sources: *Ruta graveolens*
$C_{16}H_{20}NO_4$: 290.1392
Mp: 248°C (chloride), 180°C (picrate) [1]
UV (chloride): 248, 294, 304, 346 (4.52, 3.93, 3.99, 3.78) [1]
MS (chloride) *m/z*: 289, 275, 204, 150, 120, 107, 82, 77, 72, 65 [1]
^{1}H NMR(chloride): [1]
HPLC: [2]

References

1. K. Szendrei, J. Reisch, I. Novak, L. Simon, Z. Rozsa, E. Minker, M. Koltai, Herba Hungarica **10**(2–3), 131 (1971)
2. M. Montagu, P. Levillain, J.C. Chenieux, M. Rideau, J. Chromatogr. **331**, 437 (1985)

Skimmianine

CAS Registry Number: 83-95-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Choisya ternata, Dictamnus angustifolius, D. caucasicus, Haplophyllum acutifolium, H. alberti-regelii, H. bucharicum, H. bungei, H. dauricum, H. dubium, H. foliosum, H. kowalenskyi, H. latifolium, H. leptomerum, H. obtusifolium, H. pedicellatum, H. perforatum, H. popovii, H. ramosissimum, H. robustum, H. schelkovnikovii, H. tenue, Ptelea trifoliata, Ruta graveolens, Vinca erecta, V. herbacea*

$C_{14}H_{13}NO_4$: 259.0845

Mp: 176–177°C (Me_2CO), 197°C (dec., picrate), 154°C (hydrochloride) [1]

UV: 250, 300 sh, 320, 338 (4.90, 3.50, 3.86, 3.85) [2]

IR: 3145, 3114, 1624, 1584, 1510, 1450, 1395, 1370, 1270, 1094 [2]

MS *m/z*: 259(M^+, 72), 244(100), 230(60), 216(32), 213(28), 201(32), 184(10), 173(18), 158(10), 130(23) [3]

^{1}H NMR: 4.07, 4.16, 4.46(each 3H, s, 3 × OCH_3), 7.05, 7.58 and 7.23, 8.03(each 1H, d, J = 2.5, H-3, H-2 and J = 9, H-6, H-5) [4]

^{13}C NMR: [5]

Table 1

C-2	142.8	C-4a	101.8	C-8a	152.0
2a	164.3	5	118.1	4-OCH_3	58.8
3	104.6	6	111.8	7-OCH_3	56.7
3a	114.8	7	141.9	8-OCH_3	61.6
4	157.1	8	141.1		

HPLC: [6]

Pharm./Biol.: LD_{50} 160, >100 mg/kg (i/p, oral, mice). Sedative, analgesic, soporific, anticonvulsive, hypothermal, and estrogenic action [7, 8]

References

1. G.P. Sidyakin, S.Yu. Yunusov, Zh. Obshch. Khim. **22**, 1055 (1952)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 737 (1996)
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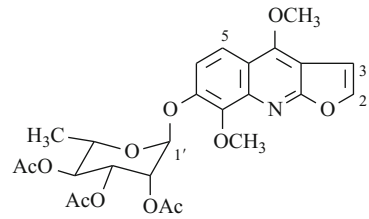
4. A.V. Robertson, Austral. J. Chem. **16**, 451 (1963)
5. A. Ahond, F. Picot, P. Potier, C. Poupat, T. Sevenet, Phytochemistry **17**, 166 (1978)
6. H. Kanamori, I. Sakamoto, M. Mizuta, Chem. Pharm. Bull. **34**, 1826 (1986)
7. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 272; M.B. Sultanov, *The Pharmacology of Plant Substances* [in Russian] (Tashkent, FAN, 1976), p. 3
8. S.S. Nazrullaev, I.A. Bessonova, Kh.S. Akhmedkhodjaeva, Chem. Nat. Comp. **37**, 551 (2001)

Triacetylglycoperine

CAS Registry Number: 55740-46-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinoline Alkaloids

Biological sources: *Haplophyllum perforatum*

$C_{25}H_{27}NO_{11}$: 517.1584

Mp: 181–182°C (C_6H_6-pet. ether.) [1]

$[\alpha]_D$ −91° (EtOH) [1]

Solubility: very sol. $CHCl_3$, Me_2CO; spar. sol. Et_2O, pet. ether.; insol. H_2O [1]

UV: 248, 314, 323, 336 (4.94, 3.91, 3.93, 3.83) [1]

IR: 3155, 3130, 1750, 1622, 1582, 1512, 1490, 1450 [1, 2]

MS *m*/*z*: 517(M^+, 5), 273(41), 245(93), 227(52), 171(30), 153(100), 111(8) [1]

^{1}H NMR: 1.05(3H, d, J = 6.5, CH_3), 1.88, 1.92, 2.05(each 3H, s, 3 × Ac), 3.80–4.40(1H, m, H-5′), 4.00, 4.15(each 3H, 2 × OCH_3), 5.05(1H, t, J = 10, H-4′), 5.49(3H, m, H-1′, H-2′, H-3′), 6.91, 7.46(each 1H, d, J = 3, H-3, H-2), 7.12, 7.86(each 1H, d, J = 9.5, H-6, H-5) [1]

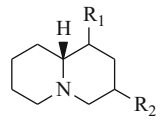
References

1. Kh.A. Abdullaeva, I.A. Bessonova, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 363 (1977)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)

Quinolizidine alkaloids were first isolated from various species of *Lupinus* L. Therefore, they are often called lupine alkaloids.

Quinolizidine alkaloids have been isolated from plants of the genera *Lupinus*, *Cytisus*, *Sophora*, and *Thermopsis* of the family Fabaceae (Leguminosae) and from certain species of the families Berberidaceae, Chenopodiaceae, Papaveraceae, and Nymphaeceae.

At present, more than 200 bi-, tri-, and tetracyclic and dimeric quinolizidine alkaloids are known. These are divided into six groups depending on the structure: lupinine (**1**), cytisine (**2**), sparteine (**3**–**5**), matrine (**6**), C20 alkaloids (*Ormosia*, **7**), and azaphenalenes (**8**).



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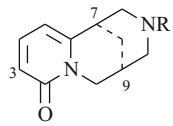

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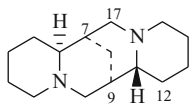

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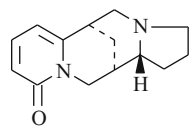

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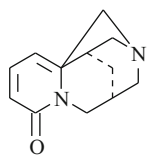

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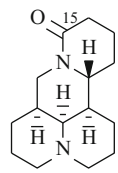

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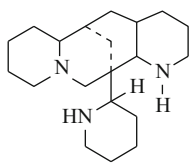

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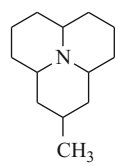


8

About 70 alkaloids have been isolated from the studied species. Of these, 50 were new.

The studied species of *Thermopsis* produce bases of only the cytisine and sparteine groups. They typically have significant amounts of cytisine, *N*-methylcytisine, and thermopsine. Plants of the genera *Ammothamnus* and *Sophora* also contain matrine alkaloids. Alkaloids of the C20 series have been isolated only from *Ammopiptantus*. Plants of the genus *Leontice* turned out to be a unique source of not only quinolizidine alkaloids but also pyridine, diphenyl, pavine, and benzylisoquinoline bases.

Sparteine alkaloids are subdivided into three subgroups depending on the size and fusion site of ring D: sparteine (**3**), leontidine (**4**), and tzukushinamine (**5**). Representatives of the last group have not been observed in the plants discussed in this section.

Sparteines are isomerized catalytically under more forcing conditions (100–130°C) than matrine alkaloids to form α-isosparteine.

The interest in these alkaloids is due to steric features. The structural formula of sparteine shows that it contains four asymmetric C atoms (6, 7, 9, and 11), two of which are tightly bound through a methylene bridge. This is possible only if the H atoms on C-7 and C-9 have the *cis*-orientation.

Matrine bases (**6**) consist of two asymmetrically condensed quinolizidine fragments, in contrast with sparteine. As a result, ring C is bound simultaneously to three rings. This can generate eight racemic pairs that can be subdivided into *trans*- and *cis*-series according to the type of A/B fusion.

Bohlmann demonstrated that *trans*-quinolizidine compounds have a series of three characteristic bands in the IR spectrum at 2680, 2750, and 2780 cm^{-1}. The *trans*-band is absent in the spectra of salts, lactams, *N*-oxides, and *cis*-fused compounds.

All matrine alkaloids isolated from plants have a C-15 lactam and differ in the location of the OH group and double bonds and the type of ring fusion.

The most important method for proving the skeleton of matrine alkaloids is dehydrogenation over Pd, which produces optically inactive 5,7,12,14-octadehydromatrine. A comparison of the rates of dehydrogenation was used to establish the type of fusion and the configuration. *trans*-Quinolizidines are more easily dehydrogenated than the *cis*-isomers. The latter are not dehydrogenated by Hg(II) acetate.

Reduction by $LiAlH_4$ does not change the asymmetric center. Adams hydrogenation in alcoholic

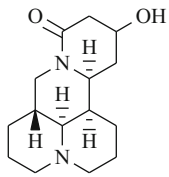
solution isomerized *cis*-bonded rings to *trans*-bonded. Quinolizidine alkaloids include a small group of dimeric bases that are based on two cytisines or thermopsines. The chemistry of the dimeric bases has been studied. A difference in the behavior of the dimers upon vacuum distillation has been observed. Dithermamine and dimethamine decompose into the monomers thermopsine and *N*-methylcytisine in quantitative yield.

Two quinolizidine alkaloids have found applications. Pachycarpine is used as a ganglioblocker; cytisine, as a breathing stimulator.

Certain matrine alkaloids (leontalbine, leontalbinine, albertine) have activities typical of pachycarpine.

Albertamine (13-Hydroxydarvasamine)

CAS Registry Number: 54383-31-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 190–192°C (Me_2CO), 120°C (perchlorate), 250°C (methiodide), 85°C (picrate) [1]
$[\alpha]_D$ +11° (EtOH) [1]
Solubility: very sol. $CHCl_3$, EtOH, Et_2O, C_6H_6, H_2O; spar. sol. Me_2CO [1]
UV: 220 [1]
IR: 3300, 1640 [1]
MS *m/z*: 264(M^+, 87), 263(97), 249(5), 246(38), 235(12), 221(54), 218(55), 205(23), 203(9), 192(30), 190(23), 188(22), 177(39), 162(35), 150(9), 137(64), 122(20), 110(31), 98(22), 96(100) [1]

References

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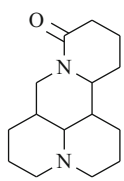
Albertidine

(Stereoisomer of matrine)



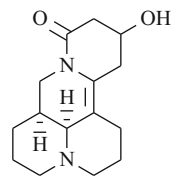
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti*
$C_{15}H_{24}N_2O$: 248.1889
Mp: 70–71°C, 254°C (perchlorate) [1]
$[\alpha]_D$ +34° (*c* 0.52, EtOH) [1]
Solubility: very sol. $CHCl_3$, MeOH, Et_2O, EtOH; spar. sol. petr. Et_2O [2]
IR: 2800–2700, 1640 [1]
MS *m/z*: 248(M^+, 55), 247(48), 219(12), 205(25), 192(15), 177(11), 162(10), 152(14), 151(13), 150(12), 137(25), 98(48), 96(70), 55(100) [2]

References

1. D.D. Kamalitdinov, S. Iskandarov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 340 (1969)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)

Albertine (13-Hydroxy-7, 11-dehydromatrine)

CAS Registry Number: 20078-85-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti*
$C_{15}H_{22}N_2O_2$: 262.1681
Mp: 161°C (Me_2CO), 229°C (perchlorate), 285°C (methiodide) [1]
$[\alpha]_D$ −101° (EtOH)
Solubility: very sol. $CHCl_3$, EtOH; sol. Me_2CO [2]
UV: 244(4.20) [3]
IR: 3300, 2795, 1675, 1655 [3]
MS *m/z*: 262(M^+, 83), 261(100), 247(3), 234(87), 220(30), 206(30), 189(8), 175(3), 160(4), 148(8), 134(8), 120(6), 108(5), 96(4), 95(2), 94(8), 82(2), 55(4) [2]

References

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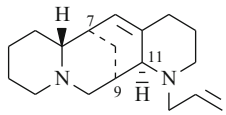
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
3. S. Iskandarov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 118 (1968)

Allylaloperine

CAS Registry Number: 56595-96-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Sophora alopecuroides*

$C_{18}H_{28}N_2$: 272.2253

Mp: oil, 237°C (hydrobromide) [1]

MS *m/z*: 272(M^+), 231, 203, 189, 174, 148, 134, 98, 97, 96, 84, 83 [1]

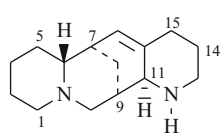
^{1}H NMR: 1.10(q, J = 3.1, 12), 1.76(H-7), 1.95(H-9), 2.45(q, J = 3.4, 12, H-10a), 2.86(q, J = 5.2, 12, H-10e), 3.11(d, J = 6.3, H-11), 4.90–5.20(CH_2), 5.50(d, J = 6.5, H-17), 5.60–5.80(m, CH) [1]

References

1. O.N. Tolkachev, T.E. Monakhova, V.I. Sheichenko, V.S. Kabanov, O.G. Fesenko, N.F. Proskurnina, Chem. Nat. Comp. **11**, 29 (1975)

Aloperine

CAS Registry Number: 56293-29-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Leptorhabdos parviflora, Sophora alopecuroides*

$C_{15}H_{24}N_2$: 232.194

Mp: 72°C (petr. ether), 265°C (dihydrochloride), 208°C (hydrochloride) [1]

$[\alpha]_D$ +82° (*c* 0.854, EtOH)

MS *m/z*: 232(M^+), 203, 189, 174, 148, 134, 98, 97, 96, 84, 83 [1]

^{1}H NMR: 1.79(1H, H-7), 2.26(1H, $^2J_{15}$ = 13.5, $J_{15,13e}$ = 2.2, $J_{15,14e}$ = 2.2, He-15), 2.45(1H, q, J = 3.4, 12, Ha-10), 2.66(1H, $J_{13,14a}$ = 9, $^2J_{13}$ = 12, Ha-13), 2.86(1H, q, J = 5.2, 12, He-10), 3.08(1H, $^2J_{13}$ = 12, He-13), 3.11(1H, d, J = 6.3, H-11), 5.40(1H, d, $J_{7,17}$ = 6.5, H-17) [1]

X-ray: [2]

Abs. Conf.: 6R7R9R11S [2]

HPLC, GC: [3]

Pharm./Biol.: Stimulating action. Raises arterial pressure and stimulates respiration [4]

References

1. O.N. Tolkachev, T.E. Monakhova, V.I. Sheichenko, V.S. Kabanov, O.G. Fesenko, N.F. Proskurnina, Chem. Nat. Comp. **11**, 29 (1975)
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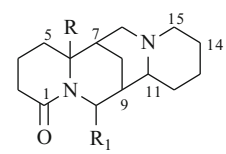
4. T.E. Monakhova, Author's Abstract of Candidate's Dissertation, Moscow, 1975

Alpine



R = H, R_1 = OH
or
R = OH, R_1 = H

Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Thermopsis alpina*

$C_{15}H_{24}N_2O_2$: 264.1838

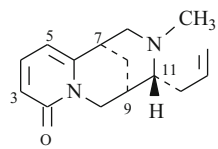
Mp: 135–137°C (petr. ether) [1]
IR: 3300, 2800–2600, 1630, 1470, 1450, 1420 [1]
MS *m/z*: 264(M^+, 5), 246(52), 136, 122, 98(100), 84 [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)

Alteramine (Tinctorine)

CAS Registry Number: 33023-11-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Thermopsis alterniflora*
$C_{15}H_{20}N_2O$: 244.1576
Mp: 112°C (petr. ether), 235°C (perchlorate), 216°C (picrate), 186°C (hydrochloride) [1,2]
$[\alpha]_D$ −43° (EtOH) [1]; −49° (*c* 1.385, EtOH) [2]; −59° (*c* 0.1, EtOH) [3]
Solubility: very sol. $CHCl_3$, EtOH, Me_2CO, H_2O; sol. ether, C_6H_6; spar. sol. petr. ether [1]
UV: 234, 312(3.70, 3.80) [1]
IR: 3070, 2790, 1660, 1645, 1565, 1545, 910 [1]
MS *m/z*: 244(M^+), 203(100), 160, 146, 132, 117, 108, 98, 94, 82, 70, 68, 58, 41 [1]
^{1}H NMR: 2.15(3H, s, NCH_3), 4.91, 5.05, 5.52, 5.72(1H, d, J = 7, H-5), 6.14(1H, dd, J = 9; 2, H-3), 7.10(1H, q, J = 7, 9, H-4) [1]
^{1}H NMR (MeOD, 500 MHz): 7.46(1H, dd, J = 7.0, 8.9, H-4), 6.41(1H, dd, J = 1.3, 8.9, H-3), 6.26(1H, dd, J = 1.1, 7.0, H-5), 5.81(1H, m, H-15), 5.14(1H, m, H-16a), 5.08(1H, td, J = 1.3, 10.1, H-16b), 3.93(2H, m*, Hα-10, Hβ-10), 3.02(1H, bd, J = 2.2, H-7), 2.91(2H, m*, H-11, H-13a), 2.51(1H, m, J = 11.4, H-13b), 2.45(2H, m*, H-9, H-14a), 2.33(1H, m*, H-14b), 2.23(3H, s, N-CH_3), 2.07(1H, td, J = 2.8, 13.4, H-8a), 1.70(1H, br dd, J = 1.3, 13.3, H-8b) [3]
^{13}C NMR (CD_3OD, 75.5 MHz): [3]

Table 1

C-2	165.6	C-7	36.6	C-13	56.2
3	116.5	8	20.1	14	26.8
4	141.3	9	30.4	15	137.6
5	107.6	10	53.0	16	117.3
6	154.2	11	66.9	17	42.8

ORD: [4]
Pharm./Biol.: Stimulates respiration but is inferior to cytisine. Lowers arterial pressure slightly [5]

References

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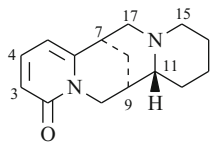
5. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)

Anagyrine

CAS Registry Number: 486-89-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammodendron conollyi, A. eichwaldii, A. karelinii, A. longiracemosum, Genista tinctoria, G. transcaucasica, Sophora flavescens, Spartium junceum, Thermopsis alterniflora, T. lanceolata*

$C_{15}H_{20}N_2O$: 244.1576

Mp: oil, 285°C (hydrochloride), 253°C (picrate), 315°C (perchlorate), 264°C (methiodide) [1]

$[\alpha]_D$ −165°(EtOH)

UV(hydrochloride): 233, 310(3.77, 3.90) [2]

IR(hydrochloride): 3465, 3380, 1663, 1655, 1623, 1589, 1572, 1552, 1301, 1270, 1249, 1218, 1188, 1163, 1134, 1088, 1077, 1058, 1043, 1022, 1010, 993, 975, 946, 910, 878, 860, 852, 832, 808, 800, 792, 776, 732, 723 [2]

MS *m/z*: 244(M+, 22), 243(5), 160(7), 146(13), 136(9), 122(7), 98(100), 97(10), 41(22) [3]

^{13}C NMR: [4]

Table 1

C-2	163.5	C-7	35.6	C-12	25.7
3	116.6	8	22.6	13	19.2
4	138.6	9	32.7	14	20.8
5	104.3	10	51.6	15	53.0
6	151.1	11	63.3	17	54.4

^{13}C NMR (75.5 MHz, CD_3OD): [5]

Table 2

C-2	165.5	C-7	36.8	C-12	23.4
3	116.6	8	21.3	13	26.6
4	141.3	9	33.9	14	19.9
5	107.8	10	53.1	15	55.3
6	154.0	11	64.5	17	53.7

Abs. Conf.: 7R, 9R, 11R [6]

HPLC: [7]

GLC: [8]

References

1. S.Yu. Yunusov, *Alkaloids* [in Russian] (Fan, Tashkent, 1981), p. 219
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd, London, 1965), **1**, No. 20
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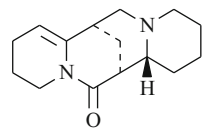
8. A. Ueno, K. Morinaga, S. Fukushima, S. Okuda, Chem. Pharm. Bull. **26**, 1832 (1978)

Aphyllidine

CAS Registry Number: 643-32-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Anabasis aphylla*

$C_{15}H_{22}N_2O$: 246.1732

Mp: 100–103°C (pet. ether), 112–113°C, 211°C (perchlorate), 225°C (methiodide), 236°C (dec., picrolonate), 237°C (hydrochloride) [1]

$[\alpha]_D$ +7° (MeOH) [1]

Solubility: very sol. EtOH, Et_2O; spar. sol. pet. ether [1]

UV: 248(4.10) [2]

MS *m/z*: 246(M^+, 42), 245(19), 137(14), 136(18), 135(15), 134(16), 110(16), 98(100), 97(55), 42(22) [3]

ORD: [4]

References

1. A.P. Orekhov, G.P. Men'shikov, Khim. Farm. Prom. (1), 10 (1932); Chem. Ber. **65**, 234 (1932)
2. A.W. Sangster, K.L. Stuart, Chem. Rev. **65**, 69 (1965)
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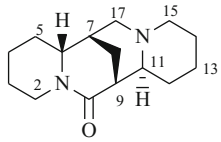
Aphylline

CAS Registry Number: 577-37-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Anabasis aphylla*
$C_{15}H_{24}N_2O$: 248.1889
Mp: 52–53°C (Et_2O), 231°C (dec. picrolonate), 213°C (methiodide) [1]
Solubility: very sol. H_2O, EtOH; spar. sol. Et_2O [1]
$[\alpha]_D$ +10° (MeOH)
IR: 3000–2800, 1660 [2]
MS *m/z*: 248(M^+, 35), 247(33), 220(43), 191(19), 137(46), 136(100), 98(31), 97(40), 96(35), 84(32), 41(47) [3]
^{1}H NMR: 1.49(Ha-8), 1.85(2H, H-7, He-8), 2.04(H-9), 2.17(Ha-2), 2.45(He-17), 2.50 (He-15), 2.80 (Ha-15), 2.82(H-11), 2.99(Ha-17), 3.14(H-6), 4.56(He-2) [4]
^{13}C NMR: [4]

Table 1

C-2	45.0	C-7	33.8	C-12	26.3
3	28.8	8	27.8	13	20.1
4	23.7	9	43.2	14	23.7
5	30.2	10	172.9	15	54.9
6	59.7	11	59.7	17	49.7

^{13}C NMR: [5]

Table 2

C-2	41.1 t	C-7	32.0 d	C-12	22.6 t
3	24.3 t	8	23.3 t	13	24.9 t
4	23.7 t	9	42.8 d	14	19.2 t
5	28.3 t	10	172.2 s	15	54.4 t
6	59.1 d	11	59.3 d	17	53.1 t

ORD: [6]
Pharm./Biol.: Local anesthetic action not inferior to novocaine [procaine hydrochloride] [7]. Infiltration-anesthetic action. Possesses a slight hypotensive effect and stimulates respiration [8]

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1. A.P. Orekhov, G.P. Men'shikov, Khim. Pharm. Prom. (1), 10 (1932); Chem. Ber. **65**, 234 (1932)
2. F. Bohlmann, W. Weise, M. Sander, H. Manke, E. Winterfeldt, Chem. Ber. **90**, 653 (1957)
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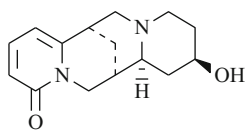
Argentamine (13-Hydroxythermopsine)

CAS Registry Number: 27773-56-4



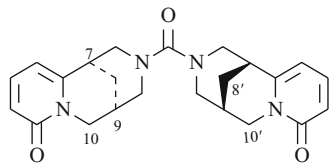
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Ammodendron argenteum, A. longiracemosum, Thermopsis alterniflora*
$C_{15}H_{20}N_2O_2$: 260.1525
Mp: 202°C (C_6H_6), 246°C (perchlorate MeOH), 298°C (hydrochloride, EtOH–Me_2CO), 230°C (picrate) [1,2]
$[\alpha]_D$ −142° (*c* 2.04, EtOH) [1]
UV: 232, 308(4.30, 4.40) [1,2]
IR: 3260, 3040, 2810–2675, 1640, 1545, 800 [1,2]
MS *m/z*: 260(M^+), 243, 215, 160, 152, 146, 114, 100, 96, 83, 70, 55 [2]

References

1. Yu.K. Kushmuradov, N. Fam Khoang, A.S. Sadykov, Kh.A. Aslanov, Nauch. Trudy TashGU **3**(341), 95 (1968)
2. N. Fam Khoang, A.S. Sadykov, Z.S. Ziyavitdinov, V.G. Zaikin, N.S. Vul'fson, Chem. Nat. Comp. **6**, 103 (1970)

Argentine

CAS Registry Number: 37551-61-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammodendron argenteum, A. longiracemosum, Sophora griffithii, Thermopsis alpina, T. alterniflora, T. lanceolata*

$C_{23}H_{26}N_4O_3$: 406.2005

Mp: 258–259°C (EtOH–Me_2CO) [1]

$[\alpha]_D$ −318° (EtOH) [1]

Solubility: very sol. $CHCl_3$, EtOH; sol. C_3H_6, Me_2CO, H_2O; spar. sol. pet. ether, Et_2O [1]

UV: 232, 308(4.19, 4.16) [1]

IR: 1665, 1645, 1565, 1555, 800 [2]

MS *m/z*: 406(M^+), 217, 189, 160, 146 [2]

^{1}H NMR: 1.90(H-8, H-8′), 2.40(H-7, H-7′), 2.70–3.00(10H), 3.10(J = 13, Ha-10′), 4.25(J = 13, He-10′), 6.00, 6.55, 7.35 [3]

References

1. Yu.K. Kushmuradov, N. Fam Khoang, A.S. Sadykov, Kh.A. Aslanov, Nauch. Trudy TashGU **3**(341), 95 (1968)
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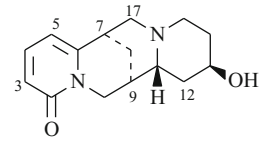
3. A.S. Sadykov, Kh.A. Aslanov, Yu.K. Kushmuradov, *Alkaloids of the Quinolizidine Series* [in Russian] (Nauka, Moscow, 1975), p. 72

Baptifoline (13-Hydroxyanagyrine)

CAS Registry Number: 732-50-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Sophora alopecuroides, S. flavescens*

$C_{15}H_{20}N_2O_2$: 260.1525

Mp: 210°C (Me_2CO), 256°C (hydrochloride), 145°C (picrate) [1]

$[\alpha]_D$ −149° (*c* 0.243, EtOH) [1]

UV: 233, 309(3.84, 3.91) [2]

IR: 3610, 3360, 3010, 2990, 2890, 2810, 1650, 1565, 1550, 1472, 1460, 1442, 1428, 1379, 1358, 1331, 1315, 1288, 1270, 1175, 1160, 1148, 1118, 1103, 1080, 1070, 1040, 1020, 1003, 990, 962, 941, 930, 910, 899, 890, 862, 852, 830 [2]

MS *m/z*: 260(M^+, 27), 241(4), 160(13), 146(27), 145(11), 114(100), 96(31), 70(37), 43(33) [1, 3]

^{1}H NMR($CDCl_3$): 1.25(1H, br d, J = 14, Hβ-12), 1.31(1H, br d, J = 13.5, Hβ-14), 1.67(1H, br d, J = 13, H-8R), 1.85(1H, dt, J = 13.5, 13.5, 2, Hα-14), 1.97(1H, br d, J = 13, H-8S), 2.08(1H, m, H-9), 2.10(1H, br dt, J = 14, 2.5, Hα-12), 2.37(1H, br d, J = 14, Hα-15), 2.45(1H, br d, J = 10.7, Hβ-17), 2.95(1H, m, H-7), 3.19(1H, dt, J = 14, 14, 2.8, Hβ-15), 3.33(1H, br d, J = 10.7, Hα-17), 3.44(1H, br dt, J = 13, 2, 2, H-11), 3.88(1H, dd, J = 15.4, 6.6, Hα-10), 4.06(1H, br d, J = 15.4, Hβ-10), 4.26(1H, m, Hα-13), 5.97(1H, dd, J = 7, 1.3, H-5), 6.40(1H, dd, J = 9.1, H-3), 7.26(1H, dd, J = 9.7, H-4) [4]

^{13}C NMR(400 MHz, $CDCl_3$): [4]

Table 1

C-2	163.6	C-7	35.2	C-12	29.0
3	116.5	8	20.4	13	55.8
4	138.9	9	31.8	14	25.7
5	105.0	10	51.5	15	47.8
6	151.8	11	65.3	17	52.1

^{13}C NMR(75.5 MHz, CD_3OD): [5]

Table 2

C-2	165.7	C-7	36.3	C-12	30.0
3	117.0	8	20.8	13	65.7
4	141.0	9	33.3	14	26.1
5	108.0	10	52.9	15	48.9
6	153.1	11	57.6	17	52.8

GLC: [6]

References

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5. A.L. Sagen, J. Gertsch, R. Becker, J. Heilmann, O. Sticher, Phytochemistry **61**, 975 (2002)
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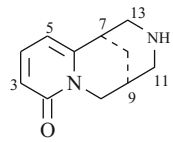
Cytisine

CAS Registry Number: 485-35-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammodendron argenteum, A. conollyi, A. eichwaldii, A. karelinii, A. longiracemosum, Ammothamnus lehmannii, Cladrastis amurensis, Cytisus laburnum, Genista abchasica, G. aethnensis, G. ispanica, G Laburnum anagyroides, Maackia amurensis, Sophora alopecuroides, S. griffithii, S. japonica, S. pachycarpa, Spartium junceum, Thermopsis alpina, T.alterniflora, T. dolichocarpa, T. fabacea, T. lanceolata, T. turkestanica, Vexibia pachycarpa*

$C_{11}H_{14}N_2O$: 190.1106

Mp: 155°C (Me_2CO), 290°C (picrate), 298°C (perchlorate), 187°C (nitrate) [1]

$[\alpha]_D$ −120° (H_2O)

Solubility: very sol. H_2O, EtOH, MeOH, $CHCl_3$; sol. Me_2CO, C_6H_6; spar. sol. pet. ether, Et_2O [1]

UV: 235, 308(3.80, 3.90) [2]

IR: 3320, 3280, 1646, 1567, 1553, 1540, 1483, 1312, 1301, 1266, 1232, 1178, 1158, 1141, 1115, 1104, 1088, 1075, 1058, 1038, 1013, 978, 923, 908, 893, 869, 863, 855, 847, 820, 810, 793, 750, 739, 718 [3]

MS *m/z*: 190(M^+, 57), 160(23), 148(35), 147(82), 146(100), 134(32), 109(22), 83(25), 44(93), 41(57) [4]

^{1}H NMR($CDCl_3$, 400 MHz): 1.58(1H, br s, NH), 1.96(2H, m, H-8), 2.32(1H, m, J = 6.6, 3.3, 3.3, 2.5, 2.5, 1.2, 0.8, H-9), 2.90(1H, m, J = 3.3, 3.3, 2.4, 2.4, 1.2, 0.6, H-7), 2.99(1H, br d, J = 12.6, Hα-11), 2.99(1H, ddd, J = 12.0, 2.4, 1.3, Hβ-13), 3.05 (1H, dd, J = 12.2, 2, Hα-13), 3.09(1H, br d, J = 12.6, Hβ-11), 3.90(1H, ddd, J = 15.6, 6.6, 1.3, Hα-10), 4.12(1H, dt, J = 15.6, 0.8, 0.8, Hβ-10), 6.00(1H, ddd, J = 6.9, 1.5, 0.6, H-5), 6.45(1H, dd, J = 9.0, 1.5, H-3), 7.30 (1H, dd, J = 9.0, 6.9, H-4) [5]

^{13}C NMR: [6]

Table 1

C-2	166.6	C-6	153.4	C-10	51.8
3	117.8	7	36.9	11	53.6
4	142.1	8	27.3	13	54.6
5	108.9	9	29.5		

^{13}C NMR(75.5 MHz, CD_3OD): [7]

Table 2

C-2	165.8	C-6	152.9	C-10	51.1
3	116.9	7	36.3	11	53.0
4	141.3	8	26.9	13	54.0
5	108.2	9	28.8		

X-ray: [8]

Abs. Conf.: 7R, 9S [9]

HPLC: [10]

Pharm./Biol.: LD_{50} 12.5, 8.75, 5.0 mg/kg (s/c, mice, rats, rabbits). The preparation stimulates respiration and increases arterial pressure. It sharply reinforces vomitive actions of apomorphine [11]. It is available in the form of 15% solution (the drug "Cytiton") as analeptic in shock collaptoid state, postnatal asphyxia and, etc. Anti-inflammatory agent. It is manufactured in ampules containing 1 ml. It is part of the tablets "Tabex" for relief to fall out of the habit of smoking [12]

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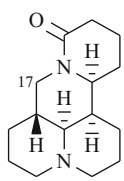
Darvasamine

CAS Registry Number: 36284-98-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Leontice alberti, L. darwasica*

$C_{15}H_{24}N_2O$: 248.1889

Mp: 102°C (Et_2O), 355°C (hydrochloride), 265°C (dec., perchlorate), 305°C (dec., methiodide), 297°C (hydroiodide) [1]

$[\alpha]_D$ +72° (*c* 0.4, EtOH) [1]

Solubility: very sol. $CHCl_3$, EtOH, MeOH, Me_2CO, H_2O; spar. sol. Et_2O, pet. ether [1]

IR: 3000–2800, 1645, 1460, 1420, 1350, 1310 [1]

MS *m/z*: 248(M^+, 58), 247(100), 219, 205, 191, 177, 162, 150, 138, 136, 98, 83, 55 [1]

^{1}H NMR: 4.45(1H, q, J = 13.5, 3, He-17) [1]

Stereochemistry is questionable: [2,3]

ORD: [4]

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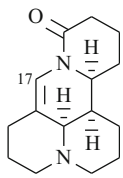
Darvasine

CAS Registry Number: 24533-37-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Leontice alberti, L. darwasica*

$C_{15}H_{22}N_2O$: 246.1732

Mp: 145°C (Et_2O), 250°C (perchlorate), 262°C (methiodide), 231°C (picrate) [1]

$[\alpha]_D$ −183° (*c* 1, EtOH) [1]
Solubility: very sol. Me_2CO, C_6H_6, $CHCl_3$, EtOH, MeOH, pet. ether, H_2O; spar. sol. Et_2O [2]
UV: 244(4.30) [1]
IR: 1670, 1645 [1]
MS *m/z*: 246(M^+, 56), 245(100), 231, 217, 204, 149, 148, 135, 108, 98, 96, 82 [2]
^{1}H NMR: 6.81(1H, s, H-17) [1]
ORD: [3]

References

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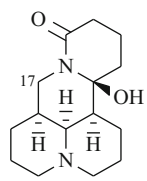
Darvasoline

CAS Registry Number: 52484-77-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice darwasica*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 116°C (Et_2O), 237°C (perchlorate), 249°C (methiodide) [1]
$[\alpha]_D$ +28°
Solubility: very sol. $CHCl_3$, EtOH, MeOH, Me_2CO. H_2O; spar. sol. Et_2O [1]
IR: 3440, 2800–2700, 1640 [1]
MS *m/z*: 264(M^+, 60), 246, 203, 176, 150(70), 136(100), 96, 83 [1]

References

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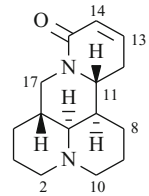
13,14-Dehydrosophoridine

CAS Registry Number: 68398-59-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{15}H_{22}N_2O$: 246.1732
Mp: 84–85°C (pet. ether) [1]
$[\alpha]_D$ +78° (EtOH)
UV: 253(3.00) [2]
IR: 2795, 2750, 2690, 2672, 1650, 1596 [2], 2825, 2765, 1660, 1655, 1597 [3]
MS *m/z*: 246(M^+, 75), 245(100), 231(6), 217(9), 203(5), 188(4), 177(88), 160(10), 150(82), 137(14), 122(23), 96(71) [2]
^{1}H NMR: 3.24(H-11), 3.66(He-17), 5.74(H-13), 6.24(H-14) [2];
^{1}H NMR: 3.03(1H, m, Hβ-11), 3.20(1H, d, J = 13.5, 11, Hα-17), 3.69(1H, dd, J = 13.5, 5, Hβ-17), 5.82(1H, dq, J = 10.5, 3.5, 5, H-13), 6.04(1H, d, J = 10.5, H-14) [3]

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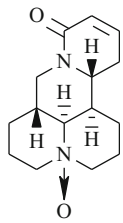
13,14-Dehydrosophoridine N-Oxide

CAS Registry Number: 64838-17-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{15}H_{22}N_2O_2$: 262.1681
Mp: 68–70°C (Et_2O) [1]
$[\alpha]_D$ +27° (H_2O) [1]
UV: 253(3.00) [1]
IR: 1658, 1602, 970, 950, 925 [1]
MS *m/z*: 262(M^+), 246(86), 245(100), 217(8), 203(12), 177(90), 150(72), 138(42), 122(19), 96(68) [1]
^{1}H NMR: 1.30–3.40, 3.60–4.45, 5.88, 6.42 [1]

References

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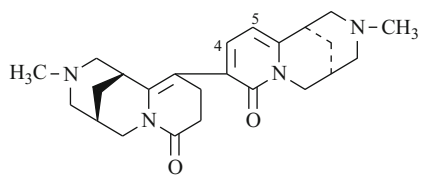
Dimethamine

CAS Registry Number: 37551-60-3



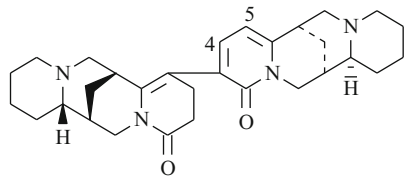
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Termopsis alterniflora*
$C_{24}H_{32}N_4O_2$: 408.2525
Mp: 216–217°C (dec., MeOH–Me_2CO), 212°C (dihydrochloride), 219°C (dec., dipicrate), 254°C (dec., methiodide) [1]
$[\alpha]_D$ +143° (*c* 0.58, EtOH) [1]
Solubility: very sol. H_2O, MeOH, EtOH, $CHCl_3$; sol. Me_2CO; spar. sol. C_6H_6, Et_2O, pet. ether. [1]
UV: 280(3.61) [1]
IR: 2920, 2800–2600, 1670, 1645, 1610 [1]
MS *m/z*: 408(M^+, 10), 204(32), 160(8), 146(12), 58(100) [1]
^{1}H NMR: 1.93(3H, s, NCH_3), 2.12(3H, s, NCH_3), 5.77(d, J = 10, H-4), 6.18(1H, dd, J = 10, 3, H-5) [1]

References

1. S. Iskandarov, V.I. Vinogradova, R.A. Shaimardanov, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 216 (1972)

Dithermamine

CAS Registry Number: 38948-08-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Thermopsis lanceolata*
$C_{30}H_{40}N_4O_2$: 488.3151
Mp: 235°C (dec., EtOH), 204°C (dipicrate), 221°C (dec., diperchlorate) [1]
$[\alpha]_D$ +122° ($CHCl_3$) [1]
Solubility: very sol. $CHCl_3$; sol. MeOH, EtOH; spar. sol. Me_2CO, C_6H_6, Et_2O, H_2O [1]
UV: 280(3.60) [1]

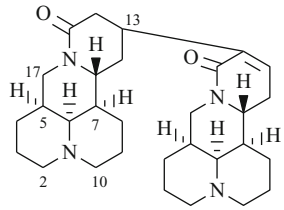
IR: 2940, 2600–2800, 1670, 1645, 1610, 1450, 810 [1]
MS *m/z*: 488(M^+, 2), 244(72), 161(20), 160(20), 146(18), 136(22), 98(100) [1]
^{1}H NMR: 5.75(1H, d, J = 10, H-4), 6.12(1H, dd, J = 10, 3, H-5) [1]

References

1. V.I. Vinogradova, S. Iskandarov, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 82 (1972)

Goebeline (artefact)

CAS Registry Number: 25908-93-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora pachycarpa*
$C_{30}H_{44}N_4O_2$: 492.3464
Mp: 231°C (Et_2O), 310°C (perchlorate), 360°C (hydroiodide), 362°C (hydrobromide), 348°C (dihydrochloride) [1,2]
$[\alpha]_D$ −13° (MeOH) [1]
UV: 262(3.30) [1]
IR: 2941, 2809, 1678, 1658, 1574, 1565, 1374, 1256, 1153, 1120, 1112, 1100 [1]
MS *m/z*: 492(M^+, 100), 449, 246.5($^{++}$), 224.5($^{++}$), 150(63), 137(30) [2]
^{1}H NMR: 6.10(1H, t, J = 5) [3]
^{13}C NMR: [4]

Table 1

C-2	57.6	C-12	31.7	C-7′	41.9
3	20.6	13	18.2	8′	26.0
4	27.1	14	37.5	9′	20.3
5	34.8	15	168.9	10′	57.6
6	63.0	17	40.6	11′	52.7
7	43.8	2′	56.8	12′	27.3
8	26.0	3′	20.3	13′	130.8
9	20.6	4′	27.1	14′	135.6
10	56.8	5′	34.3	15′	165.1
11	50.8	6′	63.4	17′	41.3

Synthesis: [5]

References

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2. S. Iskandarov, B. Sadykov, Ya.V. Rashkes, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 340 (1972)
3. A.S. Sadykov, Kh.A. Aslanov, Yu.K. Kushmuradov, *Alkaloids of the Quinolizidine Series* [in Russian] (Nauka, Moscow, 1975), p. 136
4. A.S. Sadykov, Izv. AN SSSR Ser. Khim. 2432 (1983)
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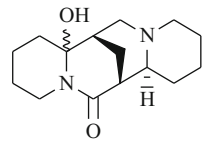
Hydroxyaphylline



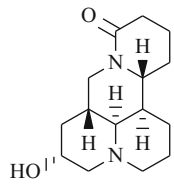
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Anabasis aphylla*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 165–167°C (Me_2CO), 255°C (hydrochloride), 211°C (perchlorate), 255°C (methiodide) [1]
$[\alpha]_D$ +39° (MeOH)
Solubility: very sol. C_6H_6, EtOH, $CHCl_3$; spar. sol. H_2O, Me_2CO, pet. ether [1]
IR: 3390, 1620 [1]

References

1. A.S. Sadykov, R.N. Nuriddinov, Zh. Obshch. Khim. **30**, 1736 (1960)

3-α-Hydroxysophoridine

CAS Registry Number: 41645-69-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 162–164°C (Me_2CO), 147°C (O–Ac) [1]
$[\alpha]_D$ −51° (*c* 0.555, EtOH) [1]
IR: 3620, 2800–2600, 1620 [1]
MS *m/z*: 264(M^+, 78), 263(100), 247(10), 205(31), 193(26), 166(37), 112(26) [1]
MS(O–Ac) *m/z*: 306(M^+, 21), 305(20), 246(100), 231(17), 218(22), 205(6), 190(18), 148(27), 134(22), 96(14), 84(13), 69(13), 55(24)
^{1}H NMR(O–Ac): [1]

References

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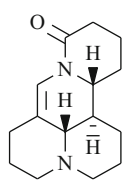
2. B.T. Ibragimov, G.N. Tishchenko, Yu.K. Kushmuradov, S.A. Talipov, T.F. Aripov, Chem. Nat. Comp. **18**, 66 (1982). rev

Isoleontalbine

CAS Registry Number: 40444-77-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice smirnowii*
$C_{15}H_{22}N_2O$: 246.1732
Mp: oil, 207°C (perchlorate) [1]
$[\alpha]_D$ −147° (EtOH) [1]
Solubility: very sol. $CHCl_3$, MeOH, EtOH, Me_2CO [1]
UV: 240(4.20) [1]
IR: 2800–2700, 1670, 1642 [1,2]
MS *m/z*: 246(M^+, 100), 233, 217, 190, 173, 160, 149, 135, 98, 96, 83 [1]

References

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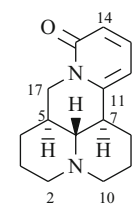
Isosophoramine

CAS Registry Number: 6838-34-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora pachycarpa*
$C_{15}H_{20}N_2O$: 244.1576
Mp: 143–145°C (pet. ether), 336°C (hydrochloride), 187°C (picrate) [1]
$[\alpha]_D$ +53° (EtOH)
UV: 235, 309(3.80, 3.90) [2]
IR: 3145, 2941, 2717, 2427, 1832, 1712, 1623, 1502, 1471, 1435, 1404, 1323, 1242, 1182, 1155, 1147, 1089, 1048, 1006 [2]
MS *m/z*: 244(M^+, 95), 243(100), 215, 150, 149, 136 [3]
^{1}H NMR: 1.79(1H, H-5), 2.04(2H, J = 11, Ha-2, Ha-10), 2.82(2H, J = 11, He-2, He-10), 3.03(1H, J = 15, 11, Ha-17), 4.32(1H, J = 15, 5, He-17) [4]

^{13}C NMR: [4]

Table 1

C-2	55.2	C-6	64.0	C-9	24.0
3	24.5	7	41.3	10	54.8
4	28.7	8	28.4	17	48.7
5	36.2				

References

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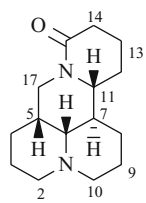
Isosophoridine

CAS Registry Number: 6838-36-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{15}H_{24}N_2O$: 248.1889
Mp: 111–112°C (pet. ether) [1]
$[\alpha]_D$ +101° (EtOH) [1]
IR: 2907, 2860, 1629, 1458, 1444, 1348, 1319, 1294, 1264, 1228, 1180, 1134, 1111, 999, 941, 844 [1]
MS *m/z*: 248(M^+, 66), 247(100), 219(3), 206(3), 205(6), 192(3), 177(11), 162(3), 150(26), 137(5), 136(13) [2]
^{1}H NMR: 1.72(1H, H-5), 2.30(1H, J = 11, 3.5, 3, He-2), 2.41(1H, J = 13.2, 3.5, Ha-17), 2.55(1H, J = 10.6, 4.8, H-6), 2.60(1H, He-10), 2.74(1H, H-11), 2.77(1H, J = 11, 10.8, 4.2, Ha-2), 2.90(1H, Ha-10), 4.48(1H, J = 13.2, 1.8, He-17) [3]
X-ray: [4]
Abs. Conf.: 5S, 6S, 7R, 11S [5]

References

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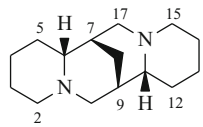
α-Isosparteine

CAS Registry Number: 446-95-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Ammopiptanthus mongolicus*
$C_{15}H_{26}N_2$: 234.2096
Mp: 105–106°C, 219°C (dec., picrate), 258°C (dec., sulphate), 255°C (perchlorate)
$[\alpha]_D$ −67° (MeOH)
IR: 3540, 3420, 3250, 1642, 1328, 1318, 1293, 1273, 1252, 1242, 1186, 1175, 1160, 1138, 1120, 1106, 1074, 1068, 1053, 1032, 1025, 1020, 984, 964, 920, 910, 893, 884, 869, 857, 841, 816, 770, 730 [1]
MS *m/z*: 234(M^+, 20), 193(22), 150(15), 137(57), 110(28), 98(100), 97(33), 84(29), 55(49), 41(68) [2]
^{1}H NMR: 1.53(J = 8, Ha-2, Ha-15), 1.94(J = 11.5, 3.2, Ha-10, Ha-17), 2.56(J = 8, He-2, He-15), 2.77(J = 11.5, He-10, He-17) [3]
^{13}C NMR: [4]

Table 1

C-2	56.0	C-7	34.4	C-12	28.0
3	24.0	8	35.0	13	23.7
4	23.7	9	34.4	14	24.0
5	28.0	10	54.8	15	56.0
6	63.9	11	63.9	17	54.8

Abs. Conf.: [5]

References

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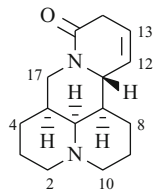
Lehmanine (Lehmannine)

CAS Registry Number: 58480-54-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Ammothamnus lehmannii*
$C_{15}H_{22}N_2O$: 246.1732
Mp: 93–94°C (pet. ether), 145°C (picrate) [1]
$[\alpha]_D$ +37° (c 0.54, EtOH) [1]
UV: 255–260 sh [1]
IR: 2810, 2770, 2750, 2680, 1650 [1]
MS *m/z*: 246(M^+, 100), 245(62), 231(1.5), 217(16), 203(85), 188(9), 177(12), 160(32), 150(89), 137(30), 122(34), 96(98) [2]
EI-MS: 246(M^+, 100), 245(67), 217(10), 203(52), 159(13), 150(28), 136(19), 122(12), 121(19), 96(42) [3]
^{1}H NMR: 1.00–2.10 (m), 2.60–2.85(He-2, He-10), 2.95(1H, t, J = 12, 11, Ha-17), 4.20–4.50(2H, He-17, H-11), 5.60–5.90(H-12, H-13) [1]
^{1}H NMR($CDCl_3$, 400 MHz): 5.85(1H, dm, J = 10.5, H-12), 5.76(1H, dm, J = 10.5, H-13), 4.46–4.56(2H, m, H-11, Hα-17), 3.11(1H, dd, J = 12.1, 12.1, Hβ-17), 2.93(2H, m, Hα-14) [3]
^{13}C NMR($CDCl_3$, 400 MHz): [3]

Table 1

C-2	57.2	C-7	44.4	C-12	122.6
3	21.0	8	26.7	13	123.6
4	27.8	9	21.0	14	29.7
5	35.8	10	57.2	15	160.0
6	64.0	11	54.7	17	41.6

HPLC, GC: [4]

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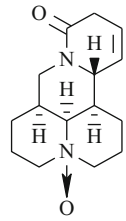
Lehmanine N-Oxide (Lehmannine N-Oxide)

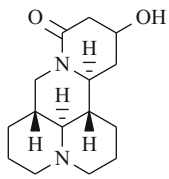


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Ammothamnus lehmannii*
$C_{15}H_{22}N_2O_2$: 262.1681
Mp: 136°C (Me_2CO) [1]
X-ray: [1]

References

1. B.T. Ibragimov, S.A. Talipov, Yu.K. Kushmuradov, T.F. Aripov, S. Kuchkarov, Chem. Nat. Comp. **17**, 552 (1981)

Leontalbamine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 195°C, 287°C (methiodide) [1]
$[\alpha]_D$ −93° [1]
Solubility: very sol. $CHCl_3$, Me_2CO, EtOH, MeOH, Et_2O; spar. sol. pet. ether [1]
UV: 220(3.40) [1]
IR: 3390, 2800–2700, 1640 1440, 1490 [1]
MS *m/z*: 264(M^+, 2), 263(2), 249(2), 246(90), 245(100), 218(47), 204(19), 190(20), 188(17), 177(11), 162(5), 150(5), 136(5), 122(5), 109(3), 98(5), 97(3), 96(6), 83(4), 55(8) [2]
^{1}H NMR: 5.20(OH) [2]

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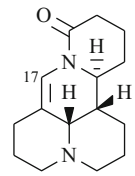
Leontalbine

CAS Registry Number: 6475-07-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti*
$C_{15}H_{22}N_2O$: 246.1732
Bp: 180°C (5 mm Hg), 247°C (perchlorate), 277°C (hydrochloride), 216°C (picrate), 259°C (methiodide) [1]
$[\alpha]_D$ −167° (EtOH) [1]
Solubility: very sol. $CHCl_3$; sol. H_2O, Me_2CO; spar. sol. Et_2O [1]
UV: 242(4.20) [1]
IR: 2800–2700, 1670, 1640, 803 [1]
MS *m/z*: 246(M^+, 52), 245(100), 231(1), 217, 203, 175(5), 161(2), 148(3), 134(2), 108(0.7), 97(0.5), 96(0.4), 95(0.8), 83(79), 55(8) [2]
^{1}H NMR: 6.90(1H, s, H-17) [3]
ORD: [4]
Pharm./Biol.: LD_{50} 142 mg/kg (i/v, mice). Ganglioblocking and uterine action [5]

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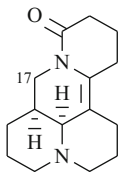
Leontalbinine

CAS Registry Number: 16665-57-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti, L. darwasica*
$C_{15}H_{22}N_2O$: 246.1732
Mp: 108°C (Et_2O), 245°C (perchlorate), 295°C (methiodide) [1]
$[\alpha]_D$ −135° (EtOH) [1]
Solubility: very sol. $CHCl_3$, EtOH, Me_2CO; spar. sol. pet. ether [1]
UV: 242(4.20) [1]
IR: 2800–2700, 1665, 1640 [1]
MS *m/z*: 246(M^+, 11), 244(100), 230(2), 217(46), 203(17), 180(27), 175(12), 160(4), 147(6), 133(5), 121(3), 109(3), 97(2), 96(1), 95(3), 82(3), 55(6) [2]
^{1}H NMR: 4.05(1H, He-17) [2]

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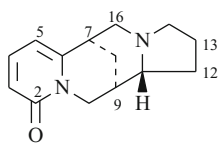
Leontidine

CAS Registry Number: 35721-27-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti, L. darwasica, L. ewersmannii, L. smirnowii*
$C_{14}H_{18}N_2O$: 230.1419
Mp: 119–120°C (pet. ether), 311°C (hydrochloride), 276°C (methiodide) [1]
$[\alpha]_D$ −190° (MeOH) [1]
Solubility: very sol. Et_2O, C_6H_6, EtOH, Me_2CO, H_2O; spar. sol. pet. ether [1,2]
UV: 234, 309(3.70, 3.80) [2]
IR: 2700–2500, 1657, 1552 [1]
IR(hydrochloride): 3410, 3350, 1650, 1571, 1553, 1324, 1314, 1280, 1231, 1200, 1168, 1150, 1119, 1088, 1072, 1059, 1041, 1028, 1020, 994, 970, 950, 935, 914, 905, 894, 868, 856, 806, 745, 735 [3]
MS *m/z*: 230(M^+, 4.8), 160, 146, 96, 84(100) [2]
^{1}H NMR: 4.03(2H, m, H-10), 5.75(1H, d, J = 8, H-5), 6.12(1H, d, J = 10, H-3), 7.04(1H, dd, J = 10, 8, H-4) [2]
ORD: [4]
Synthesis: [2]

References

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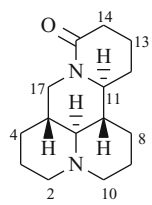
Leontine

CAS Registry Number: 6783-60-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti, L. darwasica, L. ewersmannii*
$C_{15}H_{24}N_2O$: 248.1889
Mp: 107–108°C (Et_2O), 258°C (perchlorate), 292°C (dec., methiodide), 179°C (picrate) [1]
$[\alpha]_D$ −78° (EtOH) [1]
Solubility: very sol. H_2O, $CHCl_3$, EtOH, MeOH, Me_2CO; spar. sol. pet. ether [2]
IR: 3010, 2950, 2860, 2820, 2760, 2680, 1626, 1471, 1452, 1423, 1377, 1358, 1339, 1327, 1301, 1290, 1271, 1260, 1248, 1184, 1168, 1151, 1138, 1118, 1105, 1081, 1067, 1052, 1026, 1000, 970, 942, 932, 914, 898, 880, 862, 850, 838, 814 [3]
MS *m/z*: 248(M^+, 58), 247(100), 219(3), 206(2), 205(4), 192(1), 177(34), 162(4), 150(27), 138(2), 137(4), 136(11) [4]
^{1}H NMR: 2.85(H-5) [5]
^{13}C NMR: [6]

Table 1

C-2	55.9	C-7	46.2	C-12	28.4
3	24.7	8	26.9	13	19.4
4	27.5	9	24.7	14	32.8
5	39.1	10	56.0	17	46.2
6	70.9	11	60.3		

Pharm./Biol.: Slight antitumoral action [7]

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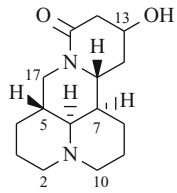
Leontismidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice smirnowii*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 110°C (Et_2O), 235°C (perchlorate) [1]
Solubility: very sol. $CHCl_3$, EtOH, Me_2CO, MeOH; spar. sol. Et_2O, pet. ether [1]
UV: 220 [1]
IR: 3440, 2775–2690, 1620 [1]
MS *m/z*: 264(M^+, 96), 247(65), 246(90), 217(25), 203(20), 176(22), 162(15), 136(100), 96(30) [1]

References

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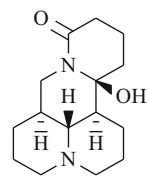
Leontismine

CAS Registry Number: 41787-66-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice smirnowii*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 168–169°C, 209°C (perchlorate, Me_2CO), 182°C (methiodide) [1]

$[\alpha]_D$ +71° (EtOH)

Solubility: very sol. EtOH, MeOH, $CHCl_3$, H_2O; sol. Me_2CO; spar. sol. Et_2O, pet. ether [1]

IR: 3400, 2800–2700, 1625 [1]

MS *m/z*: 264(M^+), 246, 218, 203, 176, 162, 150, 136, 96, 83 [1]

References

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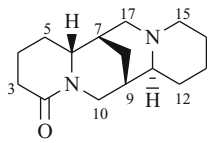
(+)-Lupanine

CAS Registry Number: 550-90-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammopiptanthus mongolicus, Cytisus caucasicus, C. ratisbonensis, Leontice ewersmannii, L. smirnowii, Piptanthus nanus*

$C_{15}H_{24}N_2O$: 248.1889

Mp: 44°C (Et_2O), 213°C (perchlorate), 180°C (picrate), 190°C (hydroiodide), 163°C (hydrochloride), 164°C (hydrobromide), 240°C (methiodide) [1]

$[\alpha]_D$ +85° (EtOH) [1]

UV: 215(3.80) [2]

IR(hydrochloride): 3670, 3410, 3010, 2960, 2870, 1646, 1636, 1464, 1450, 1420, 1363, 1351, 1332, 1312, 1295, 1275, 1244, 1191, 1167, 1148, 1131, 1102, 1081, 1068, 1047, 1018, 1008, 991, 965, 951, 935, 923 [3]

MS *m/z*: 248(M^+, 39), 247(21), 150(37), 149(49), 136(100), 110(24), 98(30), 97(28), 84(19), 41(40) [4]

^{1}H NMR: 1.10(J = 11.5, 2.2, 2.2, Ha-8), 1.45(J = 10, H-9), 1.76(H-7), 1.85(J = 11.8, 3.5, H-17a), 1.87(J = 12, Ha-15), 2.10(J = 11.5, He-8), 2.27(J = 12.9, 2.5, Ha-10), 2.61(J = 12, He-15), 2.65(J = 11.8, 11.2, He-17), 3.14(H-6), 4.32(J = 12, He-10) [5]

^{13}C NMR: [6]

Table 1

C-3	33.0	C-7	34.9	C-12	33.5
4	19.6	8	27.3	13	24.5
5	26.7	9	32.4	14	25.3
6	61.7	10	46.6	15	55.3
		11	63.8	17	52.8

HPLC: [7]

Pharm./Biol.: LD_{50} 550 mg/kg (s/c, mice). In experiments on narcotized animals lowers the arterial pressure and strengthens respiration. Enhances the hypotensive effect of acetylcholine and the hypertensive effect of adrenaline. Decreases the influence of cytisine on pressure and respiration [7,8]

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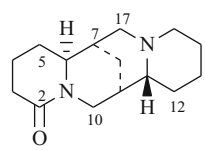
(−)-Lupanine

CAS Registry Number: 486-88-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammodendron argenteum, A. eichwaldii, A. karelinii, A. longiracemosum, Leontice darwasica, L. smirnowii, Maackia amurensis*

$C_{15}H_{24}N_2O$: 248.1889

Mp: 44°C, 163°C (hydrochloride), 211°C (perchlorate), 190°C (hydroiodide), 178°C (picrate) [1]

$[\alpha]_D$ −75° [1]

UV: 215(3.80) [2]

IR: 1635 [2]

MS *m/z*: 248(M^+), 219, 150, 149, 136(100), 110, 98, 97, 84 [2]

^{1}H NMR: 1.45(1H, H-9), 1.75(1H, H-7), 1.85(1H, J = 11.8, 3.5, Ha-17), 1.87(1H, J = 12, Ha-15), 2.10(1H, J = 11.5, He-8), 2.27(1H, J = 12.9, 2.5, Ha-10), 2.61(1H, J = 12, He-15), 2.65(1H, J = 11.8, 11.2, He-17), 3.14(1H, H-6), 4.32(1H, J = 12.9, 2.1, 2.0, He-10) [3]

^{13}C NMR(75.5 MHz, CD_3OD): [4,5]

Table 1

C-2	174.1	C-7	33.3	C-12	34.0
3	33.7	8	27.1	13	25.4
4	20.2	9	36.1	14	25.6
5	28.1	10	47.9	15	56.7
6	62.2	11	65.7	17	53.7

Abs. Conf.: 6S, 7R, 9R, 11R [6]

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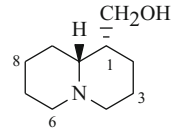
Lupinine

CAS Registry Number: 486-70-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Anabasis aphylla, Genista transcaucasica*

$C_{10}H_{19}NO$: 169.1467

Mp: 68–69°C (pet. ether), 212°C (hydrochloride) [1]

$[\alpha]_D$ −24° (H_2O)

Solubility: very sol. H_2O, EtOH, Et_2O; spar. sol. pet. ether [1]

IR: 3250, 3010, 2945, 2900, 2860, 2815, 2770, 2700, 2680, 1484, 1459, 1407, 1365, 1345, 1303, 1278, 1264, 1193, 1155, 1134, 1118, 1112, 1091, 1070, 1058, 1021, 1013, 940, 891, 878, 870, 857, 823, 815 [2]

MS *m/z*: 169(M^+, 32), 168(28), 152(54), 138(52), 97(66), 96(51), 83(100), 82(43), 55(57), 41(57) [3,4]

^{1}H NMR: 2.82, 3.65(J = 11.6, 3), 4.00(J = 11.6, 6), 4.65(OH) [4]

^{13}C NMR: [5]

Table 1

C-1	38.5	C-6	56.9	C-9	29.5
2	30.8	7	25.5	10	65.0
3	22.7	8	24.6	CH_2OH	65.0
4	56.9				

Pharm./Biol.: LD_{50} 110.15 mg/kg (s/c, i/v, mice). Lowers arterial pressure and depresses respiration (in acute experiments on cats). Stimulates respiration in dogs. The action is connected with a peripheral and central effect. Cumulative property. (Benzoyllupinine) possesses an antithelminthic action [6]. Increases liver regeneration in white rats [7]

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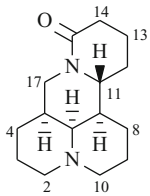
Matrine

CAS Registry Number: 519-02-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammothamnus lehmannii, Leontice alberti, Sophora alopecuroides, S. flavescens, S. griffithii, S. japonica, S. pachycarpa, Vexibia pachycarpa*

$C_{15}H_{24}N_2O$: 248.1889

Mp: 77°C (α-form), 87°C (β-form), oil (γ-form), 84°C (δ-form) [1]; 214°C (perchlorate), 275°C (hydrobromide), 211°C (methiodide) [1, 2]

$[\alpha]_D$ +38° (EtOH) [1]

IR: 2795, 2750, 2700, 2690 [3]

MS *m/z*: 248(M^+, 73), 247(100), 219(8), 205(29), 177(23), 150(63), 136(26), 98(26), 96(67), 41(54) [4]; 248(M^+, 100), 247(98.7), 233(2.6), 219(19), 205(78), 192(20), 177(24), 162(28), 150(61), 137(36), 130(8), 122(22), 110(13), 98(45), 97(11), 96(49), 83(34), 55(34) [5]

^{1}H NMR: 3.00(1H, dd, J = 12.5, 12.5, 4, Ha-17), 3.81(1H, m, H-11), 4.42(1H, dd, J = 12.5, 4, He-17) [6]

^{13}C NMR: [7]

Table 1

C-2	57.2	C-6	63.7	C-11	53.1
3	20.7	7	41.3	12	27.8
4	27.1	8	26.4	13	18.9
5	35.3	9	21.2	14	32.8
		10	57.2	17	43.2

Abs. Conf.: 5S, 6S, 7S, 11R [8, 9]

ORD: [10]

HPLC: [11]

Pharm./Biol.: Acts on the CNS. Initially stimulates, and then causes paralysis [12, 13]. On i/v administration to animals in a dose of 50 mg/kg, general excitation is observed which becomes more pronounced with an increase in the dose. On i/v administration to erethanized cats in a dose of 1 mg/kg, it raises the arterial pressure. In a dose of 10 mg/kg it stimulates respiration. Possesses an anticancerogenic action against sarcoma 180 for mice [14]. Antinociceptive activities [15]

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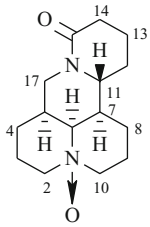
Matrine N-Oxide

CAS Registry Number: 16837-52-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Ammothamnus lehmannii, A. songoricus, Sophora alopecuroides, S. flavescens, S. pachycarpa*
$C_{15}H_{24}N_2O_2$: 264.1836
Mp: 208°C (Me_2CO) 216°C (picrate), 240°C (dec., perchlorate), 285°C (dec., methiodide), 163°C (hydrate) [1]
$[\alpha]_D$ +30° [1]
MS *m/z*: 264(M^+), 248, 247, 245, 231, 218, 205, 190, 176, 162, 150, 148(100), 138, 122, 110, 98, 96, 84, 80, 67, 55 [2]
^{13}C NMR: [3]

Table 1

C-2	68.8	C-7	43.3	C-12	26.8
3	19.4	8	29.2	13	17.9
4	25.3	9	17.9	14	33.7
5	35.2	10	68.4	15	169.5
6	66.3	11	53.8	17	43.5

X-ray: [3]
GLC: [4]
HPLC, GC: [5]

References

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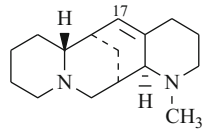
N-Methylaloperine

CAS Registry Number: 63128-33-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{16}H_{26}N_2$: 246.2096
Mp: 92°C (Me_2CO) [1], 94–95°C (Et_2O) [2]
$[\alpha]_D$ +104° (EtOH)
IR: 2800, 1450 [1]; 2800, 1475–1450 [2]
MS *m/z*: 246(M^+), 231, 215, 189, 174, 163, 148, 136, 124, 110, 98(100), 84, 70, 58 [1]
^{1}H NMR(CCl_4): 2.15(NCH_3), 5.42–5.46(1H, d, H-17) [1, 2]

References

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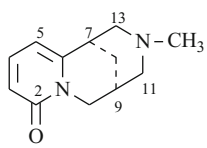
2. O.N. Tolkachev, T.E. Monakhova, V.I. Sheichenko, V.S. Kabanov, O.G. Fesenko, N.F. Proskurnina, Chem. Nat. Comp. **11**, 29 (1975)

N-Methylcytisine

CAS Registry Number: 486-86-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Ammodendron argenteum, A. eichawaldii, A. karelinii, A. longiracemosum, Genista tinctoria, G. transcaucasica, Leontice*

alberti, L. darwasica, L. smirnowii, Pedicularis dolichorhiza, P. olgae, Sophora flavescens, S. griffithii, S. japonica, S. pachycarpa, Spartium junceum, Thermopsis alpina, T. alterniflora, T. fabaceae, T. lanciolata

$C_{12}H_{16}N_2O$: 204.1263

Mp: 138°C [Et_2O], 255°C (hydrochloride), 233°C (picrate), 282°C (perchlorate) [1]

$[\alpha]_D$ −213° (EtOH)

UV: 234, 309(3.80, 3.90) [2]

IR: 1663, 1651, 1576, 1555, 1542, 1337, 1315, 1290, 1273, 1262, 1222, 1183, 1160, 1145, 1105, 1068, 1055, 1023, 993, 917, 907, 886, 873, 827, 811, 745, 726 [3]

MS *m/z*: 204(M^+, 7), 160(2), 146(3), 96(3), 82(3), 59(4), 58(100), 57(3), 42(8), 41(7) [4]

^{1}H NMR: 2.13(3H, s, NCH_3), 2.34(H-7), 3.60–4.40(2H, H-10), 6.05(1H, d, J = 7, H-5), 6.47(1H, dd, J = 9, 2, H-3), 7.33(1H, dd, J = 9, 7, H-4) [5]

^{13}C NMR: [6]

^{13}C NMR(75.5 MHz, CD_3OD): [7]

Table 1

C-2	165.7	C-6	153.5	C-10	51.5
3	116.7	7	36.6	11	63.2
4	141.3	8	25.9	C-13	63.6
5	107.9	9	29.3	N–CH_3	46.5

GLC: [8]

X-ray: [9]

Abs. conf.: 7R, 9S[10]

ORD: [11]

Pharm./Biol.: LD_{50} 32.125 mg/kg (s/c, oral). Paralyzes ganglionic receptors. Emetic action [12]

References

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5. A.S. Sadykov, Kh.A. Aslanov, Yu.K. Kushmuradov, *Alkaloids of the Quinolizidine Series* [in Russian] (Nauka, Moscow, 1975), p. 49
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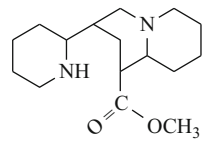
Methyl Ester of Aphyllinic Acid



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Anabasis aphylla*

$C_{16}H_{28}N_2O_2$: 280.2151

Mp: 80–81°C (Me_2CO), 250°C (MeOH, hydrochloride), 258°C (EtOH, hydrobromide), 241°C (EtOH, hydroiodide), 220°C (EtOH, picrate) [1]

$[\alpha]_D$ +20° (EtOH)

IR: 1740 [1]

MS *m/z*: 280(M^+), 208, 149, 136, 124, 123, 122, 110, 98, 97, 84, 83, 69, 68 [2]

Pharm./Biol.: LD_{50} 410 mg/kg (i/p, mice). Depresses the orientation reactions of white mice, prolongs the action of hypnotics, and exhibits a weak analgesic action [3]. Tranquilizing, weak hypotensive, and broncholytic effect [4]

References

1. Kh.A. Aslanov, S.Z. Mukhamedzhanov, A.S. Sadykov, Nauch. Tr. TashGu. (286), 71 (1966)

2. E.Kh. Timbekov, F.Sh. Eshbaev, Kh.A. Aslanov, A.S. Sadykov, A.I. Ishbaev, T.K. Kasymov, Chem. Nat. Comp. **8**, 196 (1972)
3. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian] (UzSSR, Tashkent, 1980), p. 105
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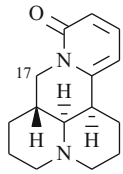
Neosophoramine

CAS Registry Number: 52932-74-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{15}H_{20}N_2O$: 244.1576
Mp: 124–125°C (Et_2O), 285°C (dec., hydrochloride) [1]
$[\alpha]_D$ −30° (EtOH)
IR: 1650 [1]
MS *m/z*: 244(M^+, 90), 243(66), 229, 215, 172, 160, 146, 136(100), 122, 109, 95, 67, 55 [1, 2]
^{1}H NMR(CCl_4): 2.71(q, J = 15.2, 11.5, Ha-17), 4.27(q, J = 15.2, 5.4, He-17), 5.75(q, J = 6.8, 1.8), 6.06(q, J = 9.5, 1.8), 7.03(q, J = 9.5, 6.8) [1]
X-ray(tetrahydro): [3]
Pharm./Biol.: Not very active [4]

References

1. T.E. Monakhova, O.N. Tolkachev, V.S. Kabanov, M.E. Perel'son, N.F. Proskurnina, Chem. Nat. Comp. **10**, 477 (1974)
2. Yu.K. Kushmuradov, F.Sh. Eshbaev, A.K. Kasymov, S. Kuchkarov, Chem. Nat. Comp. **15**, 306 (1979)
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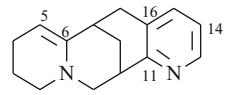
5,6,11,12,13,14,15,16-Octadehydroaloperane

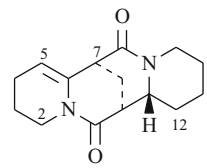


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{15}H_{18}N_2$: 226.147
Mp: oil
MS *m/z*: 226(M^+), 197, 169, 119, 111 [1]

References

1. T.E. Monakhova, Author's Abstract of Candidate's Dissertation, Moscow, 1975

Oxoaphyllidine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Anabasis aphylla*
$C_{15}H_{20}N_2O_2$: 260.1525
Mp: 182–184°C (Et_2O) [1], 188–189°C [2]
$[\alpha]_D$ −22° (MeOH), −29.8° (c 0.56, EtOH)
Solubility: very sol. C_6H_6, $CHCl_3$, EtOH; spar. sol. Et_2O [1]
UV: 244(0.75) [2]
IR: 1645 [2]
MS *m/z*: 260, 231, 203, 150, 149 [2]
^{1}H NMR: 4.92(1H, H-5), 4.62(2H, d, He-2, He-15), 3.86(1H, m, H-11) [2]
Synthesis: [2]

References

1. R.N. Nuriddinov, A.S. Sadykov, Zh. Obshch. Khim. **30**, 1739 (1960)
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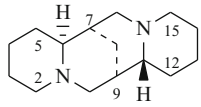
Pachycarpine [(+)-Sparteine]

CAS Registry Number: 492-08-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammodendron argenteum, A. conollyi, A. eichwaldii, A. karelinii, A. longiracemosum, Ammothamnus lehmanii, Cytisus caucasicus, C. laburnum, Genista abchasica, Leontice ewersmannii, Leptorhabdos parviflora, Sophora griffithii, S. pachycarpa, Thermopsis alpina, T. alterniflora, T. dolichocarpa, T. fabacea, T. lanceolata, Vexibia pachycarpa*

$C_{15}H_{26}N_2$: 234.2096

Mp: 235°C (hydroiodide), 258°C (dihydroiodide), 173°C (perchlorate), 240°C (methiodide), 97°C (picrate), 208°C (dipicrate) [1]

$[\alpha]_D$ +17° (EtOH)

IR: 2780, 2730 [2]

MS *m/z*: 234(M^+), 193, 137, 136, 98(100), 97, 84, 55, 41 [3]

^{1}H NMR: 0.90(1H, Ha-8), 1.30(1H, H-9). 1.65(1H, H-7), 1.87(2H, Ha-2, Ha-15), 1.90(1H, J = 10, 2, Ha-10), 2.02(1H, J = 11, He-8), 2.22(1H, J = 10, 2, Ha-17), 2.42(1H, J = 10, 2, He-10), 2.50(1H, J = 10, He-17), 2.56(2H, He-2, He-15) [4]

^{13}C NMR: [5]

Table 1

C-2	55.9	C-7	32.8	C-12	27.3
3	25.2	8	29.1	13	24.4
4	24.5	9	35.7	14	25.5
5	33.8	10	61.5	15	55.0
6	64.0	11	66.1	17	52.9

Abs. Conf.: 6S, 7R, 9R, 11R [6]

Pharm./Biol.: LD_{50} (hydroiodide) 90.26 mg/kg (s/c, i/v) [7]. Blocker of n-choline receptors. Enhances the activity of enzymes. Used for the treatment of obliterating endarteritis, ganglionitis, and myopathy, and as an obstetric agent. Supplied in the form of powder, tablets, and ampuls with 2 ml of a 3% solution [8]

References

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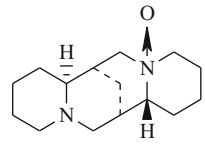
Pachycarpine N-Oxide

CAS Registry Number: 30301-23-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammodendron karelinii*

$C_{15}H_{26}N_2O$: 250.2045

Mp: 140°C (Me_2CO) [1]

IR: 2800–2600, 950 [1, 2]

^{1}H NMR: [3]

X-ray: [4]

References

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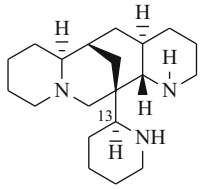
Piptamine (Ormosanine)

CAS Registry Number: 5001-21-8



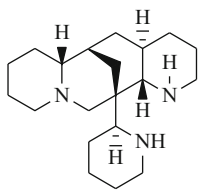
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Piptanthus mongolicus, P. nanus*
$C_{20}H_{35}N_3$: 317.2831
Mp: 173–174°C (Me_2CO), 335°C (dec., hydrochloride), 294°C (dec., hydrobromide), 96°C (dec., N–Ac) [1]
$[\alpha]_D$ +3°
Solubility: very sol. Et_2O, EtOH; sol. Me_2CO; spar. sol. H_2O [1]
UV: 211(2.05) [2]
MS *m/z*: 317(M^+) [2]

References

1. R.A. Konovalova, B.S. Diskina, M.S. Rabinovich, Zh. Obshch. Khim. **21**, 773 (1951)
2. C.H. Hassall, E.M. Wilson, Chem. Ind. (34), 1358 (1961)

Piptanthine

CAS Registry Number: 7344-67-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Piptanthus mongolicus, P. nanus*
$C_{20}H_{35}N_3$: 317.2831
Mp: 144–145°C (Me_2CO) [1], 206°C (nitrate), 256°C (dec., hydrochloride), 286°C (dec., hydrobromide) [1];
$[\alpha]_D$ −24° (EtOH) [1], −19° (*c* 0.1, $CHCl_3$) [2]
IR: 3286 [3]
MS *m/z*: 317 (M^+, 29), 234(52), 233(11), 219(14), 191(10), 151(22), 98(38), 96(13), 84(100), 56(14) [2]
Pharm./Biol.: LD_{50} 173 mg/kg (s/c, mice). Lowers arterial pressure, strengthens respiration. Ganglioblocking action [4]

References

1. R.A. Konovalova, B.S. Diskina, M.S. Rabinovich, Zh. Obshch. Khim. **21**, 773 (1951)
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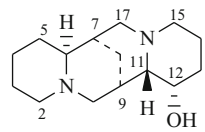
Retamine

CAS Registry Number: 2122-29-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Genista aethnensis*
$C_{15}H_{26}N_2O$: 250.2045
Mp: 167–168°C (EtOH), 278°C (dec., hydrochloride), 217°C (dec., methiodide), 175°C (dipicrate) [1]
$[\alpha]_D$ +45° (EtOH) [1]
Solubility: very sol. EtOH, Et_2O, $CHCl_3$, C_6H_6; spar. sol. H_2O [1]
UV: [1]

IR: 3510, 3010, 2940, 2855, 2810, 2770, 2760, 1473, 1450, 1378, 1360, 1350, 1324, 1304, 1270, 1188, 1155, 1148, 1125, 1115, 1079, 1066, 1034, 1028, 1011, 994, 961, 935, 911, 896, 879, 854, 840, 829, 824 [2]

MS *m/z*: 250(M^+), 232, 207(15), 175(10), 150, 135(18), 134(24), 98(100), 97(28), 96(21), 84(17) [3]

^{13}C NMR: [4]

Table 1

C-2	56.2	C-7	33.0	C-12	70.7
3	25.8	8	28.4	13	31.4
4	24.6	9	32.7	14	19.8
5	29.3	10	62.3	15	55.0
6	66.3	11	67.7	17	52.9

Synthesis: [5]

Pharm./Biol.: LD_{50} 1185 mg/kg (s/c, mice). Diuretic action. Excites adrenoreactive systems, stimulates the contractile activity of the uterus, and raises its tonus [6]

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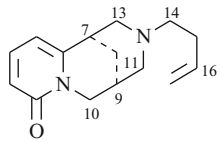
Rhombifoline

CAS Registry Number: 529-78-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammodendron longiracemosum, Thermopsis lanceolata*

$C_{15}H_{20}N_2O$: 244.1576

Mp: oil, 120°C (2 mm Hg) [1], 245°C (perchlorate), 258°C (hydrochloride), 226°C (picrate) [2]

$[\alpha]_D$ −151° ($CHCl_3$) [1]; −232° (EtOH) [2]

IR: 3060, 1651, 1565, 1552, 982, 911 [2]; 1660, 1554, 1468, 978 [1]

MS *m/z*: 244(M^+, 5), 203(100), 160, 146, 98, 58(70) [1]; 204(8), 203, 160(12), 146(14), 136(8), 122(8), 98(15), 58(100), 55(20), 41(34), [3]

^{1}H NMR(C_6D_6, 100 MHz): 1.08(2H, m, 2H-8), 1.5–2.1(7H, m), 2.19(1H, br s, H-7), 2.38(1H, br d, J = 9.5, Heq-13 or 11), 2.48(1H, br d, J = 9.5, Heq-13 or 11), 3.69(1H, dd, J = 15.5, 7.5, Hα-10), 4.05(1H, d, J = 15.5, Hβ-10), 4.82(1H, fine split, d, J = 17, H-17), 4.87(1H, fine split, J = 9.5, H-17), 5.39(1H, dd, J = 6.5, 1.5, H-5), 5.48(1H, m, H-16), 6.53(1H, dd, J = 9.5, 1.5, H-3), 6.81(1H, dd, J = 9.5, 6.5, H-4) [4]

^{13}C NMR(CD_3OD, 75.5 MHz): [4]

Table 1

C-2	165.6	C-7	36.8	C-13	61.5
3	116.4	8	26.6	14	58.1
4	141.2	9	29.5	15	32.2
5	107.8	10	51.7	16	137.6
6	154.0	11	61.0	17	115.7

X-ray: [5]

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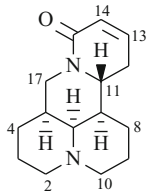
Sophocarpine

CAS Registry Number: 6483-15-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammothamnus lehmannii, A. songoricus, Leontice smirnowii, Leptorhabdos parviflora, Sophora alopecuroides, S. flavescens, S. griffithii, S. japonica, S. pachycarpa, Vexibia pachycarpa*

$C_{15}H_{22}N_2O$: 246.1732

Mp: 53–55°C (Et_2O) [1], 157°C (picrate), 202°C (methiodide), 82°C (hydrate) [2]

$[\alpha]_D$ −29° (EtOH) [1]

UV: 260 [2]

IR: 2800–2700, 1670, 1645 [2]

MS *m/z*: 246(M^+, 73), 245(100), 231(3), 203(20), 192(5), 188(6), 177(14), 160(12), 150(44), 137(23), 122(20), 110(13), 98(28), 97(9), 96(47), 83(28), 55(19) [3, 4]

^{1}H NMR: 1.64(H-5), 1.80(2H, J = 11.2, Ha-2, Ha-10), 2.67(2H, J = 11.2, He-2, He-10), 2.92(1H, J = 12.8, 12.2, Ha-17), 3.85(H-11), 3.90(1H, J = 12.8, 4.7, He-17), 5.70(1H, dd, J = 10, 2, H-14), 6.40(1H, m, J = 10, 3, 3.5, H-13) [5]

^{1}H NMR(300 MHz, $CDCl_3$): 1.68(H-7), 1.79(H-5), 1.94(2H, m, H-2, H-10), 2.09(1H, t, J = 2.4, H-6), 2.19(1H, ddt, J = 18, 9.3, J = 2.7, H-12), 2.60(1H, dt, J = 18, 5.5, H-12), 2.80(2H, m, H-2, H-10), 3.15(1H, t, J = 12.8, Hβ-17), 3.97(1H, td, J = 9.9, 6.8, H-11), 4.12(1H, dd, J = 12.9, 4.7, Hα-17), 5.85(1H, dt, J = 9.8, 2.7, H-14), 6.45(dt, J = 9.2, 4.1, H-13) [4]

2M NMR(COSY, HMQC, HMBC, ROESY): [4]

^{13}C NMR: [4, 5]

Table 1

C-2	56.9	C-7	41.1	C-12	27.6
3	20.7	8	27.7	13	124.0*
4	28.6	9	20.3	14	137.1*
5	34.3	10	56.8	15	167.9
6	63.1	11	51.1	17	41.6

GLC: [6]

HPLC, GC: [7]

Pharm./Biol.: LD_{50} 39.43 mg/kg (i/v, mice). In a dose of 10 mg/kg, tonic contraction of the uterus is observed. In the duration of the uterine action, it is inferior to pachycarpine [8] Stimulating action. Raises arterial pressure in urethanized cats [9]

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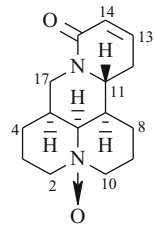
Sophocarpine N-Oxide

CAS Registry Number: 26904-64-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Ammothamnus lehmannii, Sophora alopecuroides, S. pachycarpa*
$C_{15}H_{22}N_2O_2$: 262.1681
Mp: 208–210°C
$[\alpha]_D$ +37° (EtOH) [1]
UV: 260(3.40) [1, 2]
IR: 950 [1]
MS *m/z*: 262(M^+), 244, 245(100), 217, 215, 202, 191, 177, 160, 150, 138, 136, 134, 122, 110, 96, 80, 68, 55 [1, 2]
^{1}H NMR: 2.02(J = 8, 10.8, 3.1, Ha-12), 2.57(J = 18, 6.1, 5.2, He-12). 3.97(J = 12, 5.4, He-17), 4.17 (J = 12, 12, Ha-17), 5.04(J = 10.8, 6.1, 10.8, H-11), 5.83(J = 9.5, 2.4, 1.2, H-14), 6.43(J = 9.5, 5.2, 3.1, H-13) [1]
GLC: [3]
HPLC, GC: [4]
Pharm./Biol.: In large doses possesses a stimulating action [5]

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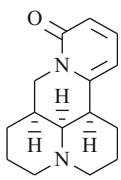
Sophoramine

CAS Registry Number: 6882-66-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leptorhabdos parviflora, Sophora alopecuroides, S. griffithii, S. pachycarpa*
$C_{15}H_{20}N_2O$: 244.1576
Mp: 164–165°C (pet. ether), 231°C (picrate), 248°C (dec., hydrochloride), 175°C (picrolonate), 247°C (chloroplatinate), 296°C (hydroiodide) [1]
$[\alpha]_D$ −91° (EtOH)
Solubility: very sol. EtOH, C_6H_6, $CHCl_3$; sol. Et_2O, pet. ether; spar. sol. H_2O [1]
UV: 234, 310(3.80, 3.90) [2]
IR: 2800–2700, 1645, 1580, 1560 [2]
MS *m/z*: 244(M^+, 94), 243(100), 229(3), 215(14), 201(13), 186(12), 159(8), 149(8), 136(21), 122(5), 110(8), 98(3), 97(4), 96(8), 82(7), 55(11) [3, 4]
HPLC. GC: [5]
Pharm./Biol.: Tranquilizing action. Prolongs sleep induced by hexenal and barbital sodium [6]

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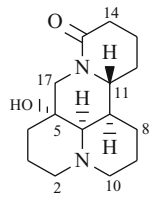
Sophoranol

CAS Registry Number: 3411-37-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora flavescens*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 172°C (Me_2CO) [1], 232°C (hydrochloride) [2]
$[\alpha]_D$ +60° (H_2O) [1]
UV: 220 [3]
IR: 3340, 2800–2700, 1645 [2, 4]
IR(KBr): 3236(OH), 2933, 2857, 2796, 2747(*trans*-quinolizidine), 1629(C = O) [5]
EI-MS: 264.1840(M^+, 87), 263.1761(29), 247.1815($C_{15}H_{23}N_2O$, 100), 246.1728($C_{15}H_{22}N_2O$, 24), 222.1850($C_{14}H_{24}NO$, 6), 221.1289($C_{12}H_{17}N_2O_2$, 26), 208.1569($C_{21}H_{20}N_2O$, 4), 193.1345($C_{11}H_{17}N_2O$, 10), 166.1235($C_{10}H_{16}NO$, 15), 112.1129($C_7H_{14}N$, 3), 120.0768($C_6H_{10}NO$, 35), 98.0962($C_6H_{12}N$, 4), 98.0606(C_5H_8NO, 6), 96.0813($C_6H_{10}N$, 36) [5]
^{1}H NMR(C_5D_5N, 100 MHz): [6]
^{1}H NMR($CDCl_3$, 100 MHz): 4.34(1H, dd, Heq-17), 3.77(1H, m, H-11), 3.21(1H, d, Hax-17), 2.86(1H, bd, Heq-10), 2.75(1H, bd, Heq-2) [6]
^{13}C NMR: [7, 8]

Table 1

C-2	56.8	C-7	37.1	C-12	26.6
3	22.4	8	25.8	13	18.7
4	37.1	9	20.4	14	32.6
5	65.5	10	56.4	15	170.8
6	68.2	11	53.1	17	46.4

GLC: [9]

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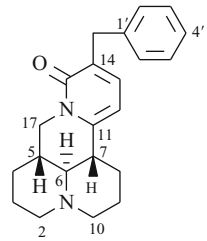
Sophorbenzamine

CAS Registry Number: 60077-56-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora pachycarpa*
$C_{22}H_{26}N_2O$: 334.2045
Mp: 118–119°C (C_6H_{14}), 123°C (picrate) [1]
$[\alpha]_D$ +90° (*c* 0.1, $CHCl_3$)
Solubility: very sol. MeOH, EtOH, $CHCl_3$, Et_2O, sol. C_6H_{14}, C_6H_{12}, spar. sol. H_2O [1]
UV: 238, 310(4.10, 4.16) [1]
IR: 2700, 2630, 2580, 1645, 1600, 1550, 810 [1]
MS *m/z*: 334(M^+), 333, 305, 291, 149, 91 [1]
^{13}C NMR: [1]

Table 1

C-2	54.7	C-7	41.1	C-17	48.7
3	24.6	8	28.3	1′	139.4
4	28.7	9	24.0	2′,6′	128.5
5	36.1	10	54.7	3′,5′	125.5
6	35.5	15	64.0	4′	127.8

References

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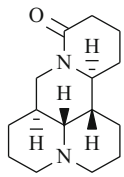
(+)-Sophoridine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leontice alberti, L. darwasica*
$C_{15}H_{24}N_2O$: 248.1889
Mp: 108–109°C (pet. ether), 250°C (methiodide)
$[\alpha]_D$ +59° (H_2O)
Solubility: very sol. $CHCl_3$, Me_2CO, EtOH, MeOH; sol. Et_2O, H_2O; spar. sol. pet. ether [1]
IR: 2800–2700 [1]
MS *m/z*: 248(M^+, 77), 247(100), 219(9), 206(9), 205(23), 192(9), 177(20), 162(9), 150(40), 138(8), 137(11), 136(16), 96(33) [2]
^{1}H NMR: [3]
ORD: [3]
X-ray: [4–6]
HPLC: [7]

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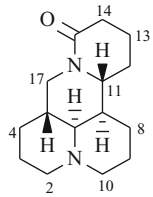
(–)-Sophoridine

CAS Registry Number: 6882-68-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Leptorhabdos parviflora, Sophora alopecuroides*
$C_{15}H_{24}N_2O$: 248.1889
Mp: 109°C (pet. ether) [1], 236°C (methiodide) [2]
$[\alpha]_D$ −64° (H_2O)
Solubility: very sol. org. solvs., H_2O [1, 2]
IR: 2903, 2820, 1658, 1629, 1458, 1444, 1315, 1180, 1124, 1027, 989, 900 [2]
MS *m/z*: 248(M^+, 86), 2479100), 205(25), 177(19), 150(37), 96(37) [3]
^{1}H NMR: 1.89(1H, J = 11.4, 2.7, Ha-2), 1.98(1H, J = 11, 7.4, Ha-10), 2.51(1H, J = 11, 9, 3.8, He-10), 2.61(1H, J = 11.4, He-2), 2.92(1H, H-11), 3.33(1H, J = 13.6, 11.2, Ha-17), 3.37(1H, J = 13.3, 4.9, He-17) [4, 5]
^{13}C NMR: [5]

Table 1

C-2	55.7	C-7	41.2	C-12	21.7
3	28.5	8	23.9	13	19.2
4	32.6	9	22.0	14	30.6
5	30.8	10	50.4	15	171.2
6	63.2	11	56.2	17	47.4

X-ray: [6, 7]
Abs. Conf.: 5S, 6R, 7R, 11S [8]
HPLC, GC: [9]
Pharm./Biol.: Stimulating action. In doses of 5–25 mg/kg, shortens by a factor of 1.5–2 the duration of sleep in mice induced by hexenal or barbital sodium. Stimulates respiration [10]

References

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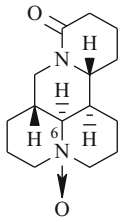
10. M.P. Bichikhanov, B.D.V. Badyaraev, T.E. Monakhova, E.L. Trutneva, O.N. Tolkachev, Rast. Res. **26**, 387 (1990)

Sophoridine N-Oxide

CAS Registry Number: 54809-74-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{15}H_{24}N_2O_2$: 264.1838
Mp: 164–165°C [1]
$[\alpha]_D$ +15° (EtOH) [1]
IR: 1670–1630, 970–950 [1]
MS *m/z*: 264(M^+), 248, 247, 246, 231, 218, 205, 192, 177, 161, 150, 148, 136, 134, 122, 120, 105, 96(100), 80, 68, 55 [2]
^{1}H NMR: 4.15(1H, q, J = 12; 12, H-6) [3]
X-ray: [4]

References

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2. V.G. Zaikin, Z.S. Ziyavidinova, N.S. Vul'fson, Izv. AN SSSR (8), 1734 (1974)
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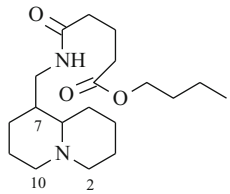
Sophorine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Sophora alopecuroides*
$C_{19}H_{34}N_2O_3$: 338.257
Mp: 59–60°C
$[\alpha]_D$ −19° (EtOH)
IR: 3300, 3080, 2800–2700, 1683, 1605, 1524, 1170, 1150 [1]
MS *m/z*: 338(M^+), 323(4), 296(7), 265(7), 168(21), 167(3), 152(30), 151(40), 150(24), 149(6), 138(100), 136(20), 124(10), 111(38), 110(42), 109(15), 98(19), 84(19), 83(50) [1]
^{1}H NMR: 0.89(3H, t, CH_3), 2.90–3.40(2H, m), 3.62(2H, m, He-2, He-10), 3.95(2H, t, J = 6), 6.08(1H, t) [1]
^{13}C NMR: Only ^{13}C chemical shifts were given in [2]

Table 1

172.7 s	41.0 t	25.2 t
171.8 s	34.9 t	24.6 t
64.9 d	33.0 t	24.1 t
63.7 t	30.2 t	20.6 t
56.4 t	29.4 t	18.7 t
56.1 t	28.8 t	13.2 q
41.4 d		

References

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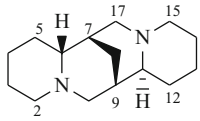
Sparteine

CAS Registry Number: 90-39-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Ammopiptanthus mongolicus, Cytisus ratisbonensis, C. ruthenicus, Piptanthus nanus*

$C_{15}H_{26}N_2$: 234.2096

Mp: 188°C (18 mm Hg) [1], 173°C (perchlorate), 208°C (dipicrate), 235°C (hydroiodide), 258°C (dihydroiodide) [1, 2]

$[\alpha]_D$ −17° (EtOH), −13° (EtOH)

UV: 214(3.70) [3]

IR: 1471, 1449, 1398, 1378, 1355, 1341, 1328, 1307, 1294, 1271, 1258, 1249, 1234, 1196, 1184, 1149, 1129, 1116, 1084, 1076, 1060, 1049, 1039, 1018, 976, 948, 939, 922, 905, 883, 870, 853, 846, 839, 828, 786, 736 [3]

MS *m/z*: 234(M^+, 17), 193(24), 150(12), 137(87), 110(23), 98(100), 97(41), 84(22), 55(23), 41(39), [4]

^{1}H NMR: 0.90(1H, J = 11, 2, 2, Ha-8), 1.30(1H, H-9), 1.65(1H, H-7), 1.87(2H, J = 10, Ha-2, Ha-15), 1.90(1H, J = 10.5, 2.5, Ha-10), 2.02(1H, J = 11, He-8), 2.22(1H, J = 10.6, 2, Ha-17), 2.42(1H, J = 10, He-10), 2.50(1H, J = 10.6, 10, He-17), 2.56(2H, J = 10, He-2, He-15) [2]

^{13}C NMR: [5]

Table 1

C-2	56.2	C-7	36.2	C-12	34.7
3	25.9	8	27.6	13	24.7
4	24.9	9	33.0	14	25.9
5	29.4	10	62.0	15	55.4
6	66.5	11	64.4	17	53.6

Abs. Conf.: [6]

HPLC: [7]

Pharm./Biol.: LD_{50} 30 mg/kg (i/v, rabbits); 120, 100, 375 mg/kg (s/c, guinea pigs, rabbits, frogs). Curaremimetic and central suppressive action. Causes a hypotensive effect in narcotized rabbits. (Sulphate) recommended for use in sinusal tachycardia, ventricular extrasystole, diseases of the gall bladder, weakness of labor activity [8]. Enhances the antiarrhythmic action of ajmaline [9]

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2. A.S. Sadykov, Kh.A. Aslanov, Yu.K. Kushmuradov, *Alkaloids of the Quinolizidine Series* [in Russian] (Nauka, Moscow, 1975), p. 217
3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd, London, 1966), **2**, No. 391
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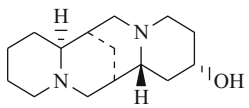
Thermopsamine

CAS Registry Number: 14145-73-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids

Biological sources: *Termopsis lanceolata*

$C_{15}H_{26}N_2O$: 250.2045

Mp: 154–155°C (Me_2CO), 131°C (dipicrate), 246°C (dec., methiodide) [1]

$[\alpha]_D$ +26° (EtOH)
Solubility: very sol. $CHCl_3$, EtOH, MeOH, H_2O; sol. Et_2O, Me_2CO; spar. sol. pet. Ether [1]
IR: 3370, 2800–2600, 1275, 1112, 1080, 1023 [1]
MS *m/z*: 250(M^+, 53), 233(12), 209, 152, 150, 137(100), 113, 98(92), 97, 84(18), 83(30) [1]

References

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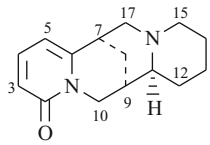
Thermopsine

CAS Registry Number: 486-90-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Quinolizidine Alkaloids
Biological sources: *Cytisus laburnum, Thermopsis alpina, T. alterniflora, T. dolichocarpa, T. fabacea, T. lanceolata, T. turkestanica*
$C_{15}H_{20}N_2O$: 244.1576
Mp: 205–206°C (Me_2CO), 209°C (picrate), 289°C (perchlorate), 242°C (dec., methiodide), 308°C (dec., hydroiodide) [1]
$[\alpha]_D$ −161° (EtOH) [1]
Solubility: very sol. Et_2O, EtOH, $CHCl_3$, H_2O; spar. sol. Me_2CO, pet. ether [1]
UV: 235, 309(3.80, 3.90) [2]
IR: 3000, 2950, 2865, 2800, 2770, 2690, 1660, 1555, 1470, 1450, 1423, 1400, 1380, 1355, 1317, 1304, 1279, 1188, 1152, 1147, 1131, 1113, 1081, 1073, 1060, 1043, 1028, 976, 960, 861, 852, 838, 804 [2]
MS *m/z*: 244(M^+, 26), 243(5), 229(4), 160(8), 146(13), 136(11), 122(10), 98(100), 97(12), 41(19) [3]
^{1}H NMR: 1.70(Ha-15), 1.84(2H, H-8), 2.00(H-9), 2.29(Ha-17), 2.53(He-15), 2.74(He-17), 2.85(H-7), 3.56(Ha-10), 4.20(He-10) [4]
^{13}C NMR: [5]

Table 1

C-2	162.2	C-7	34.2	C-12	28.7
3	103.6	8	26.2	13	23.4
4	137.4	9	31.9	14	24.4
5	111.2	10	43.8	15	62.3
6	152.3	11	64.8	17	55.0

^{13}C NMR: [6]

Table 2

C-2	165.8	C-7	36.5	C-12	31.0
3	116.6	8	28.3	13	25.4
4	141.4	9	34.2	14	26.4
5	107.9	10	46.3	15	57.4
6	153.7	11	67.4	17	64.6

Abs. Conf.: 7R, 9R, 11S [7]
Pharm./Biol.: At the large doses it inhibits the central nervous system. It inhibits the conduction of stimulation in the ganglions of vegetative nervous system similar to pachycarpine but it is less active [8]

References

1. A.P. Orekhov, S.S. Norkina, E.L. Gurevich, Khim. Pharm. Prom. (3), 9 (1934)
2. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1966), **2**, No. 270
3. S.W. Pelletier (ed.), *Alkaloids, Chemical and Biological Perspectives*, vol. 2 (Wiley, New York, 1984), p. 105
4. A.S. Sadykov, Kh.A. Aslanov, Yu.K. Kushmuradov, *Alkaloids of the Quinolizidine Series* [in Russian] (Nauka, Moscow, 1975), p. 217
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Steroidal alkaloids have been isolated from 30 species of plants from the genera *Veratrum*, *Petilium*, *Korolkowia*, *Rhinopetalum*, *Fritillaria*, *Zygadenus* (Liliaceae), *Solanum* (Solanaceae), and *Buxus* (Buxaseae) growing in the CIS countries.

Plants of the genera *Veratrum*, *Petilium*, *Korolkowia*, and *Solanum* have been used in folk medicine as hypotensives, bronchodilators, spasmolytics, and anti-inflammatory agents. Extracts of *Buxus* leaves were used in ancient times as laxative agents, to cure skin and venereal diseases, and as an antimalarial agent. Steroidal alkaloids include compounds with distinct hypotensive, anti-inflammatory, spasmolytic, anaesthetic, hypothermic, and other properties.

Studies of steroidal alkaloids began at the start of the last century. However, the combination of chemical methods and modern physical methods made it possible to solve successfully the structures of the isolated alkaloids.

The research isolated 153 alkaloids of various types.

Steroidal alkaloids are divided into typical ones and *C*-nor, D-homosteroidal alkaloids. *C*-nor, D-homosteroidal alkaloids have been isolated from plants of various Liliaceae species. They are divided into the cevine, jervine, and veratramine groups according to the basic structure of the heterocyclic skeleton.

Alkaloids of the cevine group have been found in plants of the genera *Veratrum*, *Zygadenus*, *Petilium*, *Korolkowia*, *Fritillaria*, etc.; of the jervine and veratramine groups, in various species of the genus *Veratrum* and in *Petilium eduardi*, *Korolkowia severzowii*, and *Rhinopetalum stenantherum*. Alkaloids of these groups occur in nature as the free aminoalcohols and as ethero- or glycoalkaloids that contain the cevanine heterocyclic skeleton and are 1,2-benzofluorene derivatives.

One of the O atoms in most alkaloids of the jervine group forms an ether bridge between C-17 and C-23, which is cleaved by acid to form an iso-compound. This is in contrast with the cevine and veratramine groups.

Alkaloids of the veratramine group have been isolated mainly from various *Veratrum* species. In contrast with alkaloids of the other groups, they contain an aromatic ring.

Typical steroidal alkaloids are subdivided into the solanidine, solasodine, and verazine groups. New steroidal alkaloids of the veralkamine, verattsintine, edpetilidinine, radpetine, and severidine types have also been observed. Alkaloids of these groups also occur in nature as the free base or glycoalkaloids.

Alkaloids of the solanidine group have been found in plants of the genera *Solanum*, *Fritillaria*, *Rhinopetalum*, *Veratrum*, and *Korolkowia*; and of the solasodine group, mainly in plants of the genus *Solanum*. Alkaloids of the solanidine, solasodine, and verazine groups are based on the solanidanine, tomatanine, and 22,26-epiiminocholestane heterocyclic skeletons, respectively.

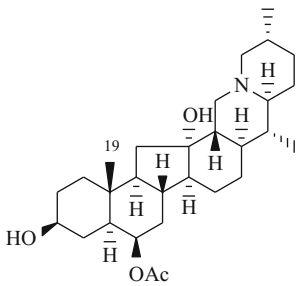
Alkaloids of the veralkamine type have been found in *Veratrum lobelianum* and *V. album* and have the 22,26-epiimino-17β-methyl-18-nor-cholestane skeleton. Alkaloids of the verazine group have been isolated from plants of the genera *Veratrum*, *Petilium*, *Zygadenus*, *Korolkowia*, and *Solanum* and contain an azomethine ring F.

The new steroidal alkaloid types severedine, edpetilidinine, and radpetin have been isolated from *Korolkowia severzowii*, *Petilium eduardi*, and *Petilium raddeanum*, respectively. Severidine has the 11,12-secocevanine heterocyclic skeleton; edpetilidinine, C-20–C-21-ene-pregnane; radpetine, C-20-epoxy-ethylidenocholestane.

Plants of the genus *Buxus* are widely distributed and comprise 60 species. Steroidal alkaloids with the pregnane heterocyclic skeleton with two N atoms on C-3 and C-20 have been isolated from four plant species growing in the CIS.

Acetylsevedine (Acetylcevedine)

CAS Registry Number: 104513-83-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{29}H_{47}NO_4$: 473.3505
Mp: 189°C (Et_2O–Me_2CO)
$[\alpha]_D$ −37° (EtOH)
IR: 3400, 2940–2865, 1735, 1455, 1255, 1030
MS m/z: 473(M^+), 458, 456, 445, 444, 431, 430, 416, 412, 402, 394, 384, 179, 166, 164, 162, 150, 139, 138, 125, 124, 112, 111(100), 98
^{1}H NMR: 0.90(3H, s, CH_3-19), 1.99(3H, s, OAc), 4.94(1H, m, HC–OAc) [1]
X-ray: [2]

References

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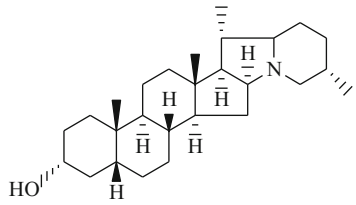
Allosolanidanol-3α (5-Epidemissidine)

CAS Registry Number: 78513-80-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum tuberosum*
$C_{27}H_{45}NO$: 399.3490
Mp: 219–220°C [1, 2]
$[\alpha]_D$ +26° ($CHCl_3$) [1, 2]

References

1. A.P. Orekhov, *The Chemistry of Alkaloids* [in Russian], (Moscow, 1955), p. 703
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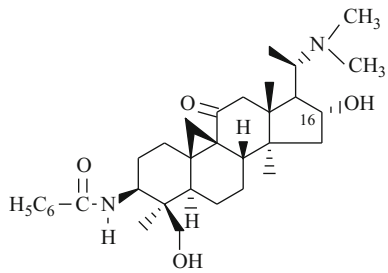
N-3-Benzoylcyclobuxidine F



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus hyrcana*
$C_{33}H_{48}N_2O_4$: 536.3614
Mp: 273–275°C (Me_2CO) [1]
$[\alpha]_D$ +52° ($CHCl_3$) [2]
UV: 225, 230, 245,(4.15, 4.15, 3.84) [1]
IR: 290, 3050, 1670, 1630, 1540, 1460 [1]
MS m/z: 536(M^+), 105(11), 72(41) [2]
^{1}H NMR: 0.58, 0.77, 077(9H, s, CH_3), 0.80(3H, d, J = 7, CH_3), 2.17 (6H, s, $N(CH_3)_2$), 3.07, 3.40 (2H, dd, J = 12.5, CH_2–OH), 4.05(1H, m, H-16), 6.10(1H, d, J = 9, NH), 7.34, 7.80 (5H, m, H–Ar) [1]
CD: [2]

References

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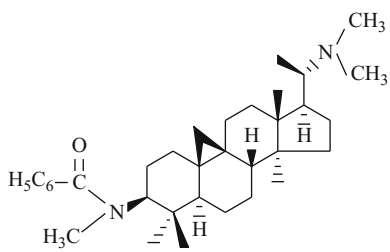
N-Benzoylcycloprotobuxine C

CAS Registry Number: 16974-72-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{34}H_{52}N_2O$: 504, 4067
Mp: 231–233°C (C_6H_6)
IR: 3042, 2960–2830, 1642, 1455
MS m/z: 504 (M^+), 490, 462, 446, 424, 400, 384, 344, 104, 98, 84, 72 (100%), 71, 70, 58, 57, 56, 44
^{1}H NMR: 0.78 (3H, d, J = 7, 5, CH_3), 0.81, 0.88, 0.93, 1.02 (12H, s, CH_3), 2.36(9H, s, $N(CH_3)_2$, NCH_3), 7.36–7.64 (5H, m, H–Ar) [1, 2]

References

1. B.U. Khodzhaev, R. Shakirov, Chem. Nat. Comp. **39**, 52 (2003)
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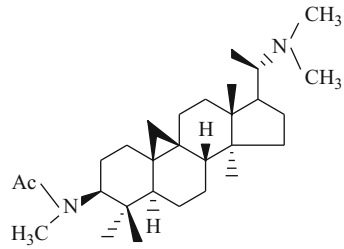
Buxaline C

CAS Registry Number: 16975-11-4



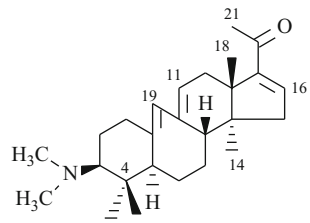
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{29}H_{50}N_2O$: 442.3923
Mp: 230–232°C (EtOH)
$[\alpha]_D$ +29° ($CHCl_3$) [1]
IR: 3050, 1645, 1450 [1]
MS m/z: 442(M^+), 427, 85, 84, 72(100), 71, 70, 58, 44 [1]
^{1}H NMR: 0.78(3H, s, CH_3), 0.84(3H, d, J = 6, CH_3), 0.87(3H, s, CH_3), 1.21(6H, s, 2 × CH_3), 2.07(3H, s, NAc), 2.21(6H, s, $N(CH_3)_2$), 2.85(3H, s, NCH_3) [1]

References

1. B.U. Khodzhaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 795 (1975)

Buxamideine K (Buxpsiine)

CAS Registry Number: 5189-69-5



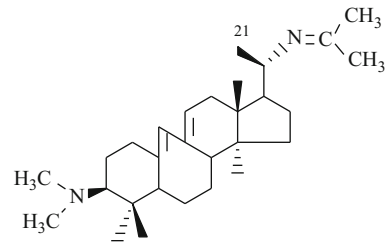
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus balearica*
$C_{26}H_{39}NO$: 381.3032
Mp: 180–183°C (Me_2CO) [1]
$[\alpha]_D$ +118° ($CHCl_3$) [1, 2]
UV: 239, 247(4.52, 4.48) [1]
IR: 3075, 1669, 1596 [2]
MS m/z: 381(M^+), 184, 71, 58, 43 [1]
^{1}H NMR: 0.69(6H, s, $(CH_3)_2$-4), 0.86(3H, s, CH_3-14), 1.08(3H, s, CH_3-18), 2.20(3H, s, CH_3-21), 2.34(6H, s, $N(CH_3)_2$), 5.52(1H, H-11), 5.84(1H, H-19), 6.62(1H, H-16) [1, 3]
ORD: [3]

References

1. I.O. Kurakina, N.F. Proskurnina, A.Ts. Stepanyants, Chem. Nat. Comp. **5**, 337 (1969)
2. I.O. Kurakina, N.F. Proskurnina, P.N. Kibal'chich, Chem. Nat. Comp. **5**, 20 (1969)
3. I. Tomko, O. Bauerova, Z. Voticky, R. Goutarel, P. Longevialle, Tetrahedron Lett. **7**, 915 (1966)

Buxamine E (N-Isopropylidenbuxamine)

CAS Registry Number: 14317-17-0

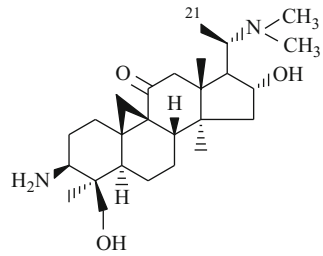


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{29}H_{48}N_2$: 424.7159
Mp: 187–189°C (Me_2CO) [1]
$[\alpha]_D$ +50° ($CHCl_3$) [1]
UV: 240, 249, 257(4.46, 4.49, 4.29) [2]
IR: 1670 [2]
MS m/z: 424(M^+), 382, 381(100), 380, 379, 354, 85, 84, 71, 58, 44 [2]
^{1}H NMR: 0.65(6H, s, CH_3), 0.74(3H, s, CH_3), 0.95(3H, s, CH_3), 0.98(3H, d, CH_3-21), 1.78, 1.91(6H, s, $N(CH_3)_2$), 2.21(6H, s, $N(CH_3)_2$), 5.42, 5.83(2H, m, 2 × C = CH) [2–4]

References

1. B.U. Khodzhaev, I.M. Primukhamedov, A. Dzhabbarov, S. Yu. Yunusov, Chem. Nat. Comp. **23**, 774 (1987)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
3. D. Stauffacher, Helv. Chim. Acta **47**, 968 (1964)
4. F. Khuong-Huu, D. Herlem-Gaulier, Q. Khuong-Huu, E. Stanislas, R. Goutarel, Tetrahedron **22**, 3321 (1966)

Buxidine F



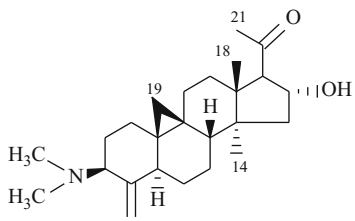
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus balearica, B. hyrcana*
$C_{26}H_{44}N_2O_3$: 432.3352
Mp: 227–230°C (C_6H_6), 228°C (tri Ac), 222°C (N–Me), 237°C (N–di Me) [1]
$[\alpha]_D$ +114° ($CHCl_3$) [1]
UV: 221(3.95) [1]
IR: 3500, 3240, 1670, 1640, 1593 [1]
MS m/z: 432(M^+), 72(100) [1]
^{1}H NMR: 0.77(3H, s, CH_3), 0.80(3H, d, J = 6, CH_3-21), 0.82(3H, s, CH_3), 1.10(3H, s, CH_3), 2.16(6H, N$(CH_3)_2$), 3.37, 3.57(2H, q, J = 12.7, CH_2–OH) [1]

References

1. I.O. Kurakina, N.F. Proskurnina, A.Ts. Stepanyants, D.M. Mondeshka, Chem. Nat. Comp. **6**, 225 (1970)

Buxpiine (Buxpiine K, Cyclomicrobuxine)

CAS Registry Number: 3296-11-5



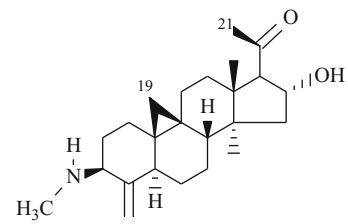
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus hyrcana*
$C_{25}H_{39}NO_2$: 385.2981
Mp: 171–172°C (C_6H_6) [1]
$[\alpha]_D$ +157° ($CHCl_3$) [1]
IR: 3583, 3093, 1709, 1653, 1458, 1037, 903 [2]
MS m/z: 385(M^+), 58, 43 [2]
^{1}H NMR: 0.08, 0.29(2H, H-19), 0.92, 1.15(each 3H, s, CH_3-18, CH_3-14), 2.23(3H, s, CH_3-21), 2.35(6H, N$(CH_3)_2$), 4.66, 4.95(2H, CH_2-4) [2]

References

1. G.M. Orazmuradov, A.M. Aliev, Chem. Nat. Comp. **13**, 489 (1977)
2. Z. Voticky, I. Tomko, Tetrahedron Lett. **6**, 3579 (1965)

Buxtauine (Buxtauine M)

CAS Registry Number: 4236-73-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus hyrcana*
$C_{24}H_{37}NO_2$: 371.2824
Mp: 177–178°C (Me_2CO) [1]; 172°C (dihydro), 190°C (diol) [2]; 197°C (di Ac) [1, 2]
$[\alpha]_D$ +155° (EtOH) [1]
UV: 203(3.69) [2]
IR: 3595, 3290, 3095, 1695, 1630, 1455, 1040, 896 [1]

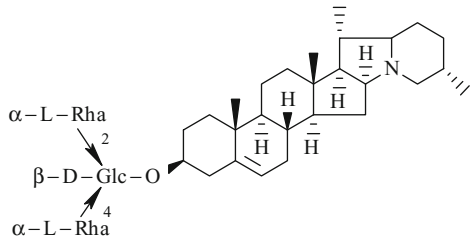
MS m/z: 371(M^+), 356, 353, 44(100), 43 [2]
^{1}H NMR: 0.27(2H, H-19), 0.84(3H, CH_3), 1.15(3H, CH_3), 2.07(3H, CH_3-21), 2.40(3H, s, N–CH_3), 4.53, 4.76(2H, d, CH_2-4) [2]

References

1. A.M. Aliev, G.M. Orazmuradov, Chem. Nat. Comp. **10**, 415 (1974)
2. Z. Voticky, I. Tomko, L. Doleis, V. Hanus, Collect. Czech. Chem. **11**, 3705 (1965)

α-Chaconine

CAS Registry Number: alpha 20562-03-2



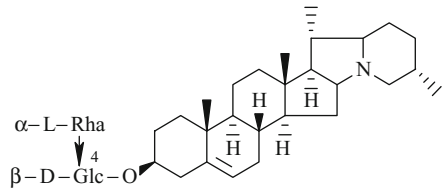
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum tuberosum*
$C_{45}H_{73}NO_{14}$: 851.5031
Mp: 234–238°C (MeOH) [1]
$[\alpha]_D$ −86° (Py) [1, 2]
IR: 3420, 1650, 1150–1000 [1]
MS m/z: 397, 204, 150(100) [1]
HPLC: [3]
Pharm./Biol.: Potent cholinesterase inhibitor [4]

References

1. A. Nabiev, R. Shakirov, Chem. Nat. Comp. **10**, 132 (1974)
2. R. Kuhn, I. Low, H. Trischmann, Chem. Ber. **88**, 1690 (1955)
3. K.-E. Hellenas, A. Nyman, P. Slanina, L. Loof, J. Gabrielsson, J. Chromatogr. **573**, 69 (1992)
4. A.M. Fewel, J.G. Roddick, Phytochemistry **33**, 323 (1993)

β-Chaconine

CAS Registry Number: 472-51-5



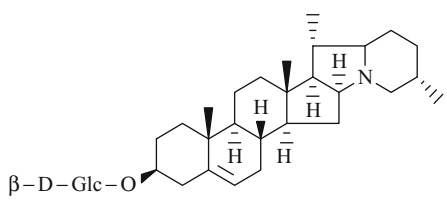
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum stenantherum, Solanum tuberosum*
$C_{39}H_{63}NO_{10}$: 705.4452
Mp: 253–255°C (MeOH) [1]
$[\alpha]_D$ −62° (Py) [1]
Solubility: spar. sol. Me_2CO, EtOH, $CHCl_3$ [1]
IR: 3420, 1640, 1150–1000
MS m/z: 705(M^+, 16), 397(5.3), 396(5.5), 380(23), 204(25), 150(100) [1]
GLC: Glc-Rha (1:1) [1]
HPLC: [2]

References

1. K. Samikov, Ya.V. Rashkes, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **17**, 273 (1981)
2. K.-E. Hellenas, A. Nyman, P. Slanina, L. Loof, J. Gabrielsson, J. Chromatogr. **573**, 69 (1992)

γ-chaconine

CAS Registry Number: gamma 511-36-4



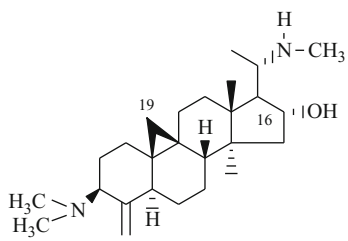
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum tuberosum*
$C_{33}H_{53}NO_6$: 559.3873
Mp: 249–251°C (MeOH) [1, 2]
$[\alpha]_D$ −37° (Py) [1]
IR: 3420, 1650, 1150–1000 [1]
MS m/z: 397, 204, 150(100) [1]
HPLC: [3]

References

1. A. Nabiev, R. Shakirov, Chem. Nat. Comp. **10**, 132 (1974)
2. R. Kunh, I. Low, Angew. Chem. **66**, 639 (1954); W. E. Rosen, D. B. Rosen, Chem. Ind. 1581 (1954)
3. K.-E. Hellenas, A. Nyman, P. Slanina, L. Loox, J. Gabrielsson, J. Chromatogr. **573**, 69 (1992)

Cyclobuxine B

CAS Registry Number: 5232-38-2



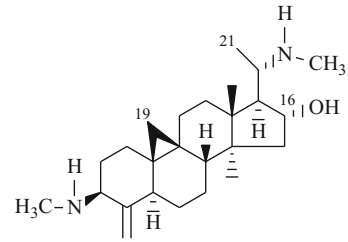
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{26}H_{44}N_2O$: 400.3454
Mp: 236–238°C (EtOH) [1]
$[\alpha]_D$ +117° ($CHCl_3$) [1]
IR: 3580, 3310, 3032, 2777, 1655, 1460, 1280, 1040, 900 [2]
MS m/z: 400(M^+), 385, 370, 342, 84, 71, 58(100) [2]
^{1}H NMR: 0.05, 0.30(2H, dd, J = 4, H-19), 0.91(3H, s, CH_3), 0.96(3H, d, J = 6, CH_3), 1.06(3H, s, CH_3), 2.23(6H, s, $N(CH_3)_2$), 2.37(3H, s, NH–CH_3), 4.09(1H, m, H-16), 4.65, 4.95(2H, CH_2-4) [2]

References

1. B.U. Khodzhaev, R. Shakirov, S. Yu. Yunusov, Khim. Prirod. Soedin. 130 (1980)
2. Z. Voticky, V. Paulik, B. Sedlak, Chem. Zvesti **23**, 702 (1969)

Cyclobuxine D (Cyclobuxine)

CAS Registry Number: 2241-90-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus colhica, B. hyrcana, B. sempervirens*
$C_{25}H_{42}N_2O$: 386.3297
Mp: 235–237°C (EtOH) [1]
$[\alpha]_D$ +96° ($CHCl_3$) [1]
IR: 3310, 3150, 3042, 2930, 1650, 1463, 910 [1]
MS m/z: 386(M^+, 20), 372(31), 356(29), 328(11), 58(100) [1]
^{1}H NMR: 0.91(3H, s, CH_3), 1.02(3H, d, J = 6. CH_3-21),1.06(3H, s, CH_3), 2.38(3H, s, NCH_3), 2.43(3H, s, NCH_3), 4.03(1H, m, H-16), 4.52, 4.75(2H, dd, J < 1, CH_2-4) [1, 2]
Pharm./Biol.: LD_{50} 20, 100, 137 mg/kg (i/v, s/c, per os, mice). Antimicrobial, antifungal activity [3], anti-inflammatory, sedative, hypotensive action. It is of low toxicity [4]

References

1. B.U. Khodzhaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 530 (1971)
2. K.S. Brown, S.M. Kupchan, J. Amer. Chem. Soc. **86**, 4414/4424 (1964)
3. I.M. Isamukhamedov, *Farmakologiya rastitel'nykh veshchestv* (Fan, Tashkent, 1976), p. 146
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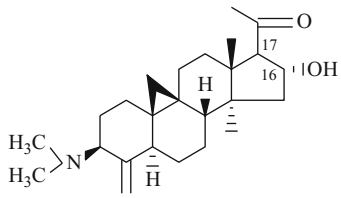
Cyclomicrobuxine (Buxpiine K)

CAS Registry Number: 3296-11-5



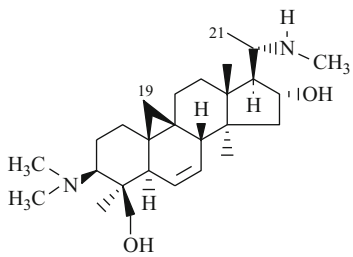
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus hyrcana*
$C_{25}H_{39}NO_2$: 385.2981
Mp: 178–180°C (Me_2CO) [1]
$[\alpha]_D$ +172° [2]
UV: 203(4.88) [1]
IR: 3400, 3040, 1700, 1463 [1]
^{1}H NMR: 2.08(3H, s, CH_3), 2.26(6H, s, $N(CH_3)_2$), 2.97(1H, d, J = 6.5, H-17), 4.58, 4.89(2H, CH_2-4), 4.83(1H, m, H-16) [1]

References

1. I.O. Kurakina, O.N. Tolkachev, D.A. Pakaln, Chem. Nat. Comp. **10**, 849 (1974)
2. T. Nakawa, M. Hasegawa, J. Chem. Soc. 6688 (1965)

Cyclomicrophilline B (Cyclobaleabuxine)

CAS Registry Number: 3556-11-4



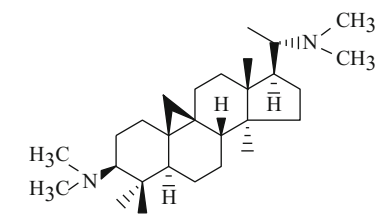
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus balearica*
$C_{27}H_{46}N_2O_2$: 430.3559
Mp: 246–248°C (EtOH) [1]; 195°C (Ac), 230°C (Me)
$[\alpha]_D$ −69° ($CHCl_3$) [1]
UV: 196(4.23) [2]
IR: 3410, 3320 [1]
MS m/z: 430(M^+), 412, 410, 397, 395, 84(7), 71(37), 58(6) [2]
^{1}H NMR: 0.16, 0.78(2H, dd, J = 5, CH_2-19), 1.09(3H, d, CH_3-21), 0.91, 1.11(each 3H, s, 2 × CH_3), 2.31(6H, s, $N(CH_3)_2$), 2.45(3H, s, NH–CH_3), 3.51, 3.85(2H, dd, J = 10, CH_2OH), 4.15(1H, m, HC–OH), 5.46(2H, m, CH = CH) [2]

References

1. I.O. Kurakina, N.F. Proskurnina, A.U. Stepanyants, Chem. Nat. Comp. **5**, 337 (1969)
2. D. Herlem-Gaulier, F. Khuong-Huu-Laine, E. Stanislas, R. Goutarel, Bull. Soc. Chim. France 657 (1965)

Cycloprotobuxine A

CAS Registry Number: 2278-38-8



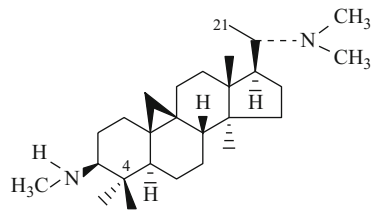
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{28}H_{50}N_2$: 414.3974
Mp: 200–202°C (EtOH) [1]
$[\alpha]_D$ +103° ($CHCl_3$) [1]
IR: 3050, 1460 [2]
MS m/z: 414(M^+), 84, 72(100), 55 [3]
^{1}H NMR: 0.75, 0.88(6H, s, 2 × CH_3), 0.92(6H, s, 2 × CH_3), 0.88(3H, d, CH_3), 2.14(6H, s, $N(CH_3)_2$), 2.26(6H, s, $N(CH_3)_2$) [2, 4]
Pharm./Biol.: Depressing effect [5]

References

1. B.U. Khodzhaev, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 120 (1982)
2. B.U. Khodzhaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 129 (1974)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 386 (1996)
4. D. Herlem-Gaulier, F. Khuong-Huu-Laine, E. Stanislas, R. Goutarel, Bull. Soc. Chim. France 657 (1965)
5. Yong-Xiao Wang, Yue-Hug Tan, Bao-Heng Sheng, Shui-Ying Chen, European Journal of Pharmacology **222**(2–3), 219 (1992)

Cycloprotobuxine C

CAS Registry Number: 1936-70-5



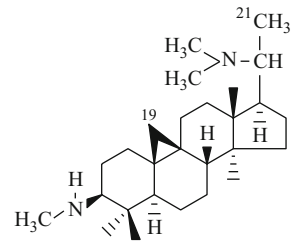
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus hyrcana*
$C_{27}H_{48}N_2$: 400.3817
Mp: 201–202°C (Me_2CO), 225°C (Ac), 205°C (N–Me) [1]
$[\alpha]_D$ +76° ($CHCl_3$) [1]
IR: 3060, 1460 [1]
MS m/z: 400(M^+, 20), 385(12), 356(17), 84(8), 72(100), 70(15), 58(12) [1,2]
^{1}H NMR: 0.76(6H, s, 2 × CH_3), 0.82(3H, d, J = 6, CH_3-21), 0.92(3H, s, CH_3-4), 0.95(3H, s, CH_3-4), 2.17(6H, s, $N(CH_3)_2$), 2.44(3H, d, NH–CH_3) [1]

References

1. A.M. Aliev, G.M. Orasmuradov, Chem. Nat. Comp. **10**, 840 (1974)
2. D. Herlem-Gaulier, Khuong-Huu-Laine, E. Stanislas, R. Goutarel, Bull. Soc. Chim. France 657 (1965)

(−)-Cycloprotobuxine C

CAS Registry Number: 56687-61-7



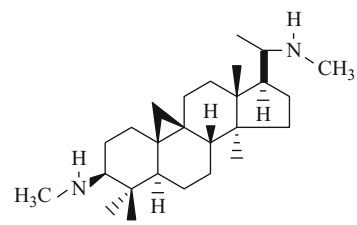
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus colchica, B. sempervirens*
$C_{27}H_{48}N_2$: 400.3817
Mp: 195–197°C, 227°C (Ac), 203°C (Me), 246°C (Bz) [1]
$[\alpha]_D$ −62° ($CHCl_3$) [1]
IR: 3050, 1460 [1]
MS m/z: 400(M^+), 385, 356, 329, 72(100), 71, 70 [1]
^{1}H NMR: 0.72(3H, s, CH_3), 0.78(3H, d, CH_3-21), 0.88(3H, s, CH_3), 0.91(6H, s, 2 × CH_3-4), 2.15(6H, s, $N(CH_3)_2$), 2.39(3H, s, NCH_3) [1–3]

References

1. B.U. Khodzhaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 281 (1975)
2. B.U. Khodzhaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 500 (1976)
3. E.Z. Dzhakeli, E.N. Zhukovich, V.Yu. Vachnadze, Chem. Nat. Comp. **26**, 718 (1990)

Cycloprotobuxine D

CAS Registry Number: 2255-38-1



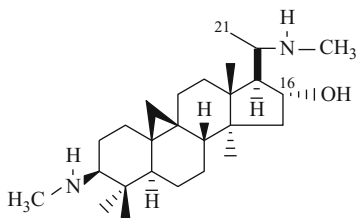
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{26}H_{46}N_2$: 386.3661
Mp: 135–137°C (Me_2CO), 200°C (di Me) [1]
$[\alpha]_D$ +71° ($CHCl_3$) [1]
IR: 3050, 1460 [1]
MS m/z: 386(M^+), 371, 314, 58(100), 57 [2]
^{1}H NMR: 0.69(3H, s, CH_3), 0.85(3H, s, CH_3), 0.88(3H, d, CH_3), 0.91(3H, s, CH_3), 0.94(3H, s, CH_3), 2.38(6H, s, $(NCH_3)_2$) [1, 3]

References

1. B.U. Khodzhaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 129 (1974)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B. T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 932 (1996)
3. S.M. Kupchan, E. Kurosawa, J. Org. Chem. **30**, 2046 (1965)

Cyclovirobuxine D (Bebuxine)

CAS Registry Number: 860-29-7

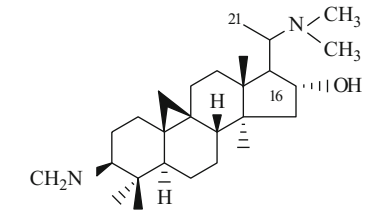


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{26}H_{46}N_2O$: 402.361
Mp: 219–221°C (EtOH) [1]; 238°C (tri Ac), 245°C (di Me) [1]
$[\alpha]_D$ +66° ($CHCl_3$) [1]
IR: 3305, 3150, 3030, 1460 [1]
MS m/z: 402(M^+)
^{1}H NMR: 0.67(3H, s, CH_3), 0.89(6H, s, 2 × CH_3), 1.02(3H, d, CH_3-21), 1.03(3H, s, CH_3), 2.36(6H, s, 2 × NCH_3), 4.04(1H, m, H-16) [1, 2]

References

1. B.U. Khodzhaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 129 (1974)
2. K.S. Brown, S. M. Kupchan, Tetrahedron Lett. **5**, 2895 (1964)

Cyclovirobuxine F



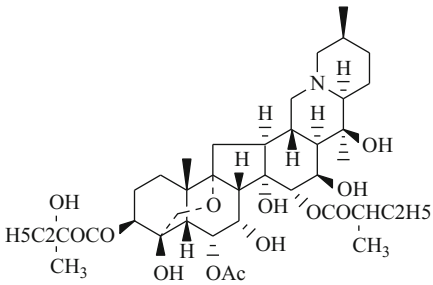
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{26}H_{46}N_2O$: 402.361
Mp: 224–226°C (EtOH), 231°C (di Ac), 246°C (di Me) [1]
$[\alpha]_D$ +53° ($CHCl_3$) [1]
IR: 3310, 3050, 1642, 1592, 1460 [1]
MS m/z: 402(M^+), 386, 371, 84, 72, 71 [1]
^{1}H NMR: 0.71(3H, s, CH_3), 0.76(3H, s, CH_3), 0.88(3H, s, CH_3), 0.89(3H, d, J = 6, CH_3-21), 0.94(3H, s, CH_3), 2.23(6H, s, $N(CH_3)_2$), 4.06(1H, m, H-16) [1]

References

1. B.U. Khodzhaev, I.M. Primukhamedov, S.Yu. Yunusov, Chem. Nat. Comp. **21**, 679 (1985)

Deacetylprotoveratrine A (Desacetylprotoveratrine A)

CAS Registry Number: 67375-42-2



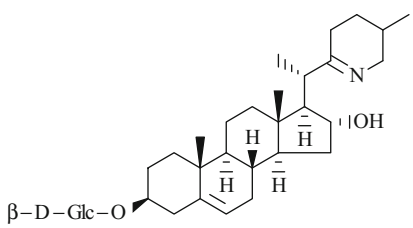
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum, V. nigrum, V. oxysepalum*
$C_{39}H_{61}NO_{13}$: 751.4143
Mp: 191–192 °C (C_6H_6) [1]
$[\alpha]_D$ −15° (Py) [1]
UV (H^+): 259, 290, 370, 540 [1]
IR: 1740, 1250 [1, 2]

References

1. N.V. Bondarenko, Chem. Nat. Comp. **18**, 504 (1982)
2. S.M. Kupchan, C.I. Ayres, R.H. Hensler, J. Amer. Chem. Soc. **82**, 2616 (1960)

Deacetylveralosine (Etioline 3-Glucoside)

CAS Registry Number: 54557-67-4



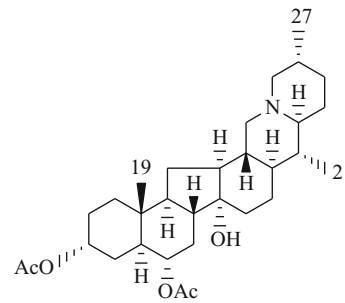
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{33}H_{53}NO_7$: 575.3822
Mp: 238–240°C (MeOH) [1]
$[\alpha]_D$ −30° ($CHCl_3$) [1]
Solubility: spar. sol. MeOH, Me_2CO; sol. $CHCl_3$ [1]
IR: 3400, 2935, 1650, 1450, 1100–1000 [1]

References

1. K.A. Ubaidullaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 703 (1974)

Diacetylsevedine (Diacetylcevedine)

CAS Registry Number: 66512-89-8

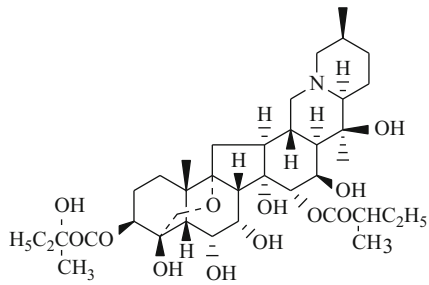


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{31}H_{49}NO_5$: 515.3611
Mp: 202–204°C (Me_2CO –pet. ether.) [1]
Solubility: very sol. $CHCl_3$, EtOH, MeOH [1]
IR: 3500, 2770, 1740, 1240 [1]
MS m/z: 515(M^+, 31), 514(6), 500(13), 498(13), 456(8), 432(21), 431(40), 416(38), 178(15), 166(20), 164(23), 125(9), 112(3), 111(100), 98(17) [1]
^{1}H NMR: 0.81(6H, d, CH_3-21, CH_3-27), 0.94(3H, s, CH_3-19), 1.97(6H, s, OAc), 4.68, 4.95(each 1H, m, HC–OAc) [1, 2]

References

1. V.V. Kul'kova, K. Samikov, R. Shakirov, Chem. Nat. Comp. **27**, 384 (1991)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Dideacetylprotoveratrine A



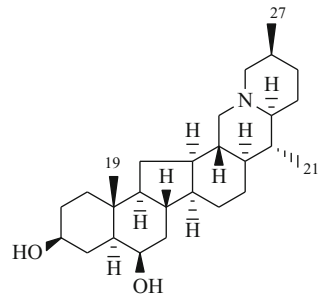
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum, V. nigrum, V. oxysepalum*
$C_{37}H_{59}NO_{12}$: 709.4037
Mp: 202–204°C (C_6H_6)
$[\alpha]_D$ −19° (Py)
UV(H$^+$): 250, 291, 370, 540
IR: 1738, 1248 [1–3]

References

1. N.V. Bondarenko, Chem. Nat. Comp. **18**, 504 (1982)
2. S.M. Kupchan, C.I. Ayres, J. Amer. Chem. Soc. **81**, 1009 (1959)
3. N.V. Bondarenko, Chem. Nat. Comp. **15**, 92 (1979)

Edpetilidine (Ebeidine)

CAS Registry Number: 25650-70-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii*
$C_{27}H_{45}NO_2$: 415.3450
Mp: 227–228°C (MeOH), 285°C (hydrochloride), 272°C (hydrobromide), 263°C (hydroiodide), 225°C (nitrate) [1]; 294°C (methiodide) [2]
$[\alpha]_D$ −48° (Py) [1]
IR: 3425, 2930, 1465 [3]
MS m/z: 415(M^+), 400, 397, 386, 372, 370, 368, 359, 358, 345, 344, 218, 178, 164, 150, 139, 124, 112, 111, 98 [4]
^{1}H NMR (Py–d_5): 0.57(3H, d, CH_3-21), 1.01(3H, d, CH_3-27), 1.25(3H, s, CH_3-19) [5, 6]

References

1. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, DAN UzSSR (9), 23 (1963)
2. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 339 (1965)
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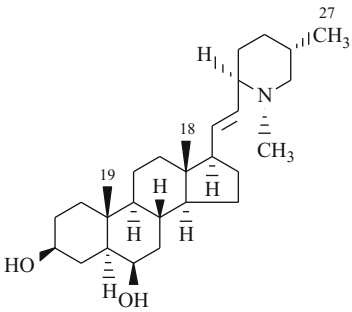
5. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 284 (1969)
6. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 570 (1975)

Edpetilidinine

CAS Registry Number: 27509-73-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Petilium eduardii*

$C_{28}H_{47}NO_2$: 429.3607

Mp: 269–271°C (MeOH), 283°C (dec., hydrochloride), 282°C (hydrobromide) [1]; amorph. (di Ac), 228°C (dione) [2]

$[\alpha]_D$ +42° (EtOH) [2]

IR: 3420, 2930, 2790, 1700–1620, 975 [2]

MS m/z: 429(M^+, 28), 414, 411, 138(29), 125(42), 112(100) [2]

^{1}H NMR (di Ac): 0.55(s, CH_3-18), 0.79(d, CH_3-27), 0.95(s, CH_3-19), 1.93(s, OAc), 1.95(s, OAc), 2.14(s, NCH_3), 4.60(m, HC–OAc), 4.85(m, HC–OAc), 5.30(2H, t, olefin) [2]

^{1}H NMR (dione): 0.55(s, CH_3-18), 0.79(d, CH_3-27), 0.89(s, CH_3-19), 2.13(s, NCH_3), 5.30(2H, t, olefin) [2]

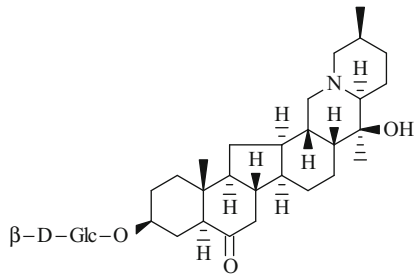
X-ray: [3]

References

1. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 302 (1965)
2. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 521 (1969)
3. S.M. Nasirov, B. Tashkodzhaev, K. Samikov, R. Shakirov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 721 (1987)

Edpetiline

CAS Registry Number: 32685-93-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Petilium eduardii, P. raddeanum*

$C_{33}H_{53}NO_8$: 591.3771

Mp: 272–276°C (EtOH), 220°C (hydrochloride), 226°C (hydrobromide), 228°C (hydroiodide), 262°C (dec., oxime), 226°C (tetra Ac) [1–3]

$[\alpha]_D$ −58° (MeOH) [1]

IR: 3445, 1710, 1140–1000 [4–6]

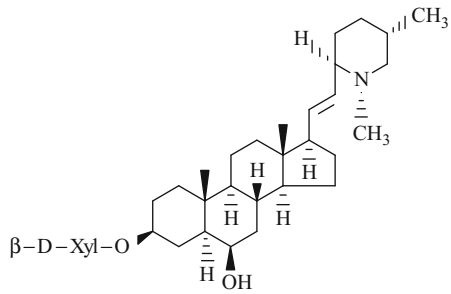
Pharm./Biol.: LD_{50} 193 mg/kg (s/c, mice). Anti-inflammatory, hypothermal, weak hypotensive, antimicrobial, weak spasmolytic action [7–9]

References

1. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, DAN UzSSR (9), 23 (1963)
2. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, Uzb. Khim. Zh. (1), 38 (1965)
3. R.N. Nuriddinov, B. Babaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 145 (1968)
4. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 302 (1965); **3**, 267 (1967)
5. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, DAN UzSSR (161), 620 (1965)
6. S. Ito, Y. Fukasawa, M. Miyashita, Tetrahedron Lett. **36**, 3161 (1976)
7. T. Saidkasymov, M.B. Sultanov, Sh. Umarova, *Farmakologiya alkaloidov i serdechnykh glikozidov* (Fan, Tashkent, 1971), pp. 183, 187
8. I. Isamukhamedov, *Farmakologiya alkaloidov i ikh proizvodnykh* (Fan, Tashkent, 1972), p. 185
9. T. Saidkasymov, *Farmakologiya rastitel'nykh veshchestv* (Fan, Tashkent, 1976), p. 60

Edpetilinine

CAS Registry Number: 28440-32-6



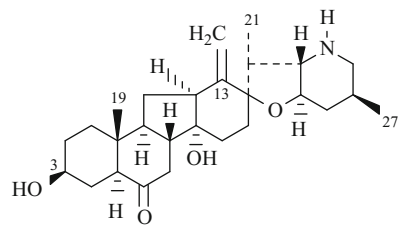
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii*
$C_{33}H_{55}NO_6$: 561.4030
Mp: 262–264°C (MeOH) [1]
$[\alpha]_D$ −11° (Py) [1]
Solubility: sol. Py
IR: 3400, 2930, 2770, 1640, 1470, 1115–1015 [1]
X-ray: [2]

References

1. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 527 (1969)
2. S.M. Nasirov, B. Tashkodzhaev, K. Samikov, R. Shakirov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 721 (1987)

Edpetine

CAS Registry Number: 27317-54-0



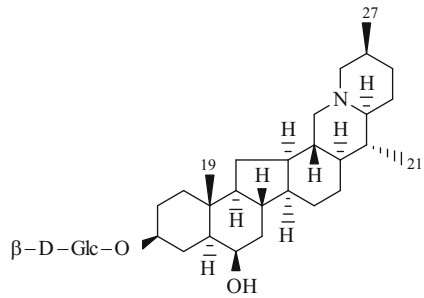
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii, P. raddeanum*
$C_{27}H_{41}NO_4$: 443.3036
Mp: 314–315°C (EtOH), amorph. (O, N–di Ac)
IR: 3460, 3260, 3120, 2980–2950, 1690, 1650–1640, 1470–1430
MS m/z: 443(M^+), 428, 414, 410, 125(24), 124(100), 114(10), 113(14), 110(12), 97(5)
^{1}H NMR (O, N–di Ac): 0.60(3H, s, CH_3-19), 0.81(3H, d, CH_3-21), 0.96(3H, d, CH_3-27), 1.92(3H, s, OAc), 1.97(3H, s, NAc), 4.60(1H, m, H-3). 5.18, 5.33(2H, CH_2-13) [1, 2]

References

1. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 523 (1969)
2. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 583 (1986)

Edpetinosine

CAS Registry Number: 207129-43-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardi*
$C_{33}H_{55}NO_7$: 577.8049
Mp: 174–176°C (Me_2CO–MeOH), 217–220°C (penta Ac) [1]
IR: 3335, 2870–2925, 1024–1160 [1]
MS m/z: 577 (M^+, 84), 562 (20), 559 (8), 548 (14), 521 (12), 415 (18), 398 (46), 386 (6), 380 (10), 358 (4),

328 (6), 272 (4), 179 (4), 164 (10), 162 (2), 150 (4), 149 (4), 139 (8), 138 (6), 125 (6), 124 (8), 112 (76), 111 (100), 98 (30) [1]

^{1}H NMR ($CDCl_3$–CD_3OD): 0.69 (3H, d, CH_3-21), 0.95 (3H, s, CH_3-19), 1.03 (3H, d, CH_3-27), 3.32, 3.74 (4H, m, CH–OH), 4.36 (1H, d, J = 6.7, H-anomeric) [1]

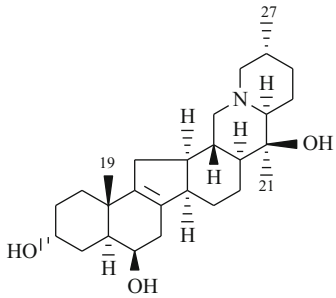
^{1}H NMR (penta Ac): 0.71 (3H, d, J = 6.5, CH_3-21), 0.92 (3H, s, CH_3-19), 1.02 (3H, d, J = 7, CH_3-27), 1.97, 1.99, 2.03 (15H, s, OAc), 4.14 (5H, H–Glc), 4.53 (1H, d, J = 6.5, H-anomeric), 4.95, 5.12 (6H, m, HC–OAc) [1]

References

1. U.T. Shakirova, R. Shakirov, Chem. Nat. Comp. **33**, 476 (1997)

Edpetisidine

CAS Registry Number: 68676-58-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Petilium eduardii*

$C_{27}H_{43}NO_3$: 429.3243

Mp: 257–259°C (Me_2CO), amorph. (dihydro), amorph. (di Ac dihydro)

$[\alpha]_D$ −34° (MeOH) [1]

Solubility: sol. Py, EtOH

IR: 3400, 2760, 1670 [2]

MS m/z: 429(M^+), 414, 411, 388, 386, 374, 368, 358, 156, 155, 154, 149, 125, 124, 112(100), 111, 98 [2]

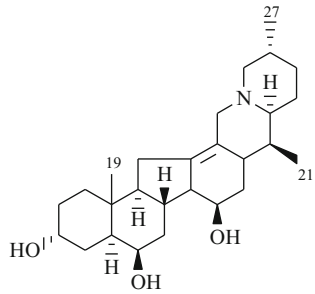
^{1}H NMR: 0.97(s, CH_3-19), 1.03(s, CH_3-21), 0.85(d, CH_3-27) [2]

References

1. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 612 (1976)
2. R. Shakirov, A. Nabiev, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 357 (1978)

Edpetisidinine

CAS Registry Number: 73276-38-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Petilium eduardii*

$C_{27}H_{43}NO_3$: 429.3243

Mp: 263–265°C (MeOH), amorph. (tri Ac), 218°C (dione) [1]

$[\alpha]_D$ −15° ($MeOH$–$CHCl_3$) [1]

Solubility: sol. MeOH, $CHCl_3$

IR: 3300, 2770, 1670 [2]

MS m/z: 429(M^+, 100), 414, 400, 373, 178, 164, 149, 125, 124, 123, 112, 111, 98 [2]

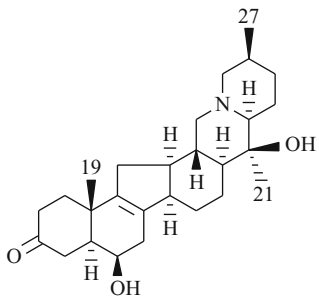
^{1}H NMR: 0.90(s, CH_3-19), 0.87, 0.79(d, CH_3-21, CH_3-27) [2]

References

1. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 612 (1976)
2. R. Shakirov, A. Nabiev, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 512 (1979)

Edpetisine

CAS Registry Number: 61966-02-7



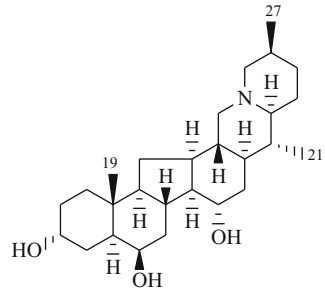
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii*
$C_{27}H_{41}NO_2$: 411.3137
Mp: 169–171°C (Me_2CO), 128°C (deoxodihydro) [1]
$[\alpha]_D$ +5° ($CHCl_3$) [1]
UV: 282(2.16) [1]
IR: 3530, 2790, 1685 [1]
MS m/z: 411(M^+), 396, 393, 378, 368, 366, 355, 354, 164, 156, 155, 154, 140, 125, 124, 125, 124, 112(100), 111, 98 [1]
^{1}H NMR: 0.95(s, CH_3-19), 1.04(s, CH_3-21), 1.07(d, CH_3-27) [1]

References

1. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 357 (1976)

Edpetisinine

CAS Registry Number: 62908-12-7



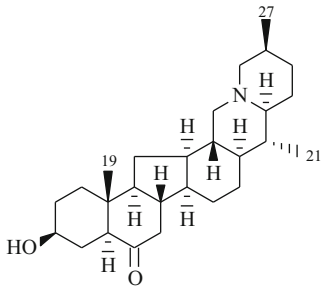
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii*
$C_{27}H_{45}NO_3$: 431.3399
Mp: 247–248°C (MeOH), 201°C (tri Ac), 202°C (dione)
$[\alpha]_D$ −46°(MeOH) [1]
Solubility: sol. MeOH, $CHCl_3$
IR: 3420, 2770 [2]
MS m/z: 431(M^+), 416, 413, 402, 375, 361, 260, 258, 218, 179, 178, 164, 150, 149, 139, 138, 125, 124, 112, 111(100), 98 [2]
^{1}H NMR: 0.92(s, CH_3-19), 0.86(d, CH_3-21), 1.07(d, CH_3-27) [2]

References

1. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 612 (1976)
2. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 615 (1976)

Eduardine (Edwardine)

CAS Registry Number: 25650-68-4



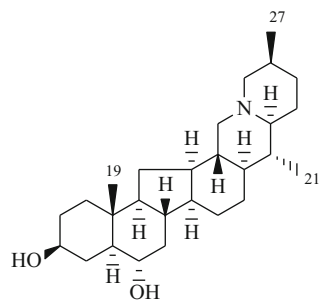
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 247–251°C (EtOH), 147°C (Ac)
$[\alpha]_D$ −53° (MeOH)
IR: 3530, 2930, 1700, 1450 [1, 2]
MS m/z: 413(M^+), 398, 395, 384, 358, 357, 344, 343, 218, 178, 169, 150, 139, 124, 112, 111, 98 [3]
^{1}H NMR: 0.68(3H, d, CH_3-21), 0.70(3H, d, CH_3-19), 0.98(3H, d, CH_3-27) [4, 5]

References

1. R. Shakirov, R.N. Nuriddinov, S. Yu. Yunusov, DAN UzSSR (9), 23 (1965)
2. R. Shakirov, R.N. Nuriddinov, S. Yu. Yunusov, Chem. Nat. Comp. **1**, 302; 339 (1965)
3. R.N. Nuriddinov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 267 (1967)
4. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 284 (1969)
5. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 570 (1975)

Eduardinine (Edwardinine)

CAS Registry Number: 58116-31-7



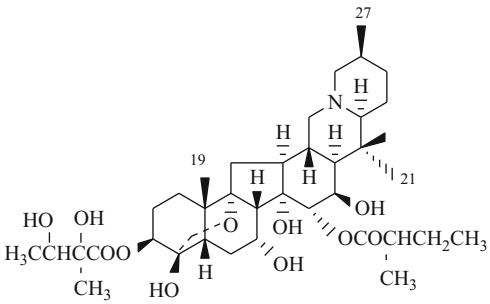
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii*
$C_{27}H_{45}NO_2$: 415.3450
Mp: 255–257°C (Me_2CO), amorph. (di Ac), 240°C (dione) [1]
$[\alpha]_D$ +7° ($CHCl_3$) [1]
Solubility: sol. $CHCl_3$ [1]
IR: 3360, 2930–2860, 2750, 1460 [1]
MS m/z: 415(M^+), 400, 397, 386, 360, 358, 218, 178, 150, 149, 139, 125, 124, 112, 111(100), 98 [1]
^{1}H NMR: 0.67(d, CH_3-21), 0.76(s, CH_3-19), 0.99(d, CH_3-27) [1]

References

1. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 570 (1975)

Germbudine

CAS Registry Number: 426-34-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{37}H_{59}NO_{12}$: 709.4037
Mp: 157–159°C (C_6H_6), 207°C (Ac) [1]
$[\alpha]_D$ +8° ($CHCl_3$) [1]
IR: 3350, 1740, 1245 [1]
MS m/z: 709(M^+), 112(100) [1]
^{1}H NMR: 0.84(3H, t, CH_2–CH_3), 0.92(3H, s, CH_3-19), 1.02(3H, d, CH_3-27), 1.09(3H, d, CH–CH_3), 1.13(3H,s, CH_3-21), 1.16(3H, d, CH(OH)–CH_3), 1.39(3H, s, C(OH)–CH_3), 4.96(1H, m, HC–O–Acyl), 5.26(1H, d, HC–O–Acyl) [1, 2]
Pharm./Biol.: LD_{50} 0.34, 30.0, 41.2 mg/kg (i/v, s/c, oral, mice). Considerable hypotensive activity, weak anesthetic action. In high doses, causes pressor effect. Recommended for experimental purposes and as a test object [3, 4]

References

1. R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 566 (1975); R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov. Chem. Nat. Comp. **32**, 216 (1996)
2. S.M. Kupchan, N. Gruenfeld, J. Amer. Pharm. Ass. Sci. **48**, 737 (1959)
3. Yu. R. Mirzaev, Author's Abstract of Candidate's Dissertation, Tashkent, 1982
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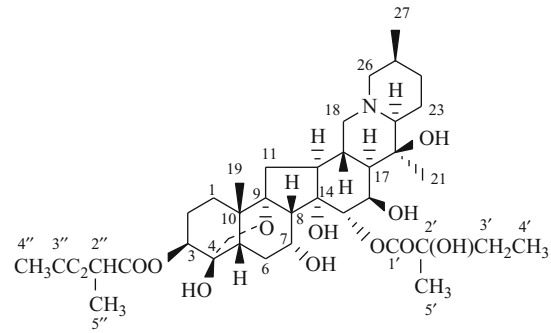
Germerine (Veratensine)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum, V. nigrum, V. oxysepalum*
$C_{37}H_{59}NO_{11}$: 693.4088
Mp: 203–205°C (C_6H_6) [1], 215°C (hydrochloride), 213°C (hydrobromide), 189°C (picrate), 222°C (rhodanide) [1]
$[\alpha]_D$ +10° ($CHCl_3$) [1]
IR: 3360, 2935, 1742, 1465, 1250 [1]
^{1}H NMR: 0.85(3H, t, J = 7, CH_3-4″), 0.94(3H, s, CH_3-19), 1.03(3H, d, J = 7. CH_3-27), 1.07(3H, t, J = 7, CH_3-4′), 1.11(3H, d, J = 7, CH_3-5″), 1.14(3H, s, CH_3-21), 1.35(3H, s, CH_3-5′), 4.22(1H, m, H-7), 4.48(1H, m, H-16), 4.96(1H, m, H-3), 5.29(1H, d, J = 3, H-15, O–Acyl) [2, 3]
^{13}C NMR: [4]

Table 1

C-1	32.4 t	C-10	45.9 s	C-19	19.1 q	C-1′	176.4 s
2	26.5 t	11	33.1 t	20	72.9 s	2′	34.8 s
3	75.5 t	12	47.2 d	21	19.9q	3′	33.2 t
4	105.2 s	13	33.6 d	22	69.6 d	4′	7.7 q
5	46.3 d	14	81.1 s	23	18.3 t	5′	25.6 q
6	28.6 t	15	69.8 d	24	28.9 t	C-1″	175.6 s
7	66.6 d	16	69.3 d	25	27.3 d	2″	41.1 d
8	47.9 d	17	45.4 d	26	61.3 t	3″	26.7 t
9	92.9 s	18	61.4 t	27	17.0 q	4″	11.5 q
						5″	16.8 q

Pharm./Biol.: LD_{50} 0.34, 3.00, 41.2 mg/kg (i/v, s/c, oral, mice). Considerable hypotensive and weak anesthetic action. In high doses, a hypertensive effect [5]

References

1. R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 840 (1971)
2. R. Shakirov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 606 (1972)
3. S.M. Kupchan, J. Amer. Chem. Soc. **81**, 1921 (1959)
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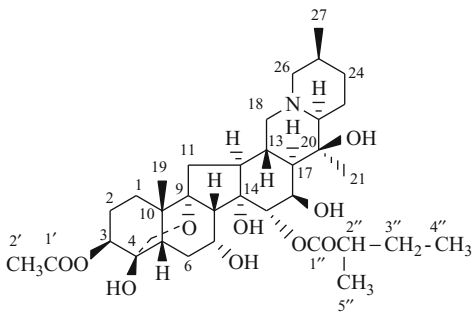
5. Yu. R. Mirzaev, Author's Abstract of Candidate's Dissertation, Tashkent, 1982

Germidine

CAS Registry Number: 465-77-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Veratrum lobelianum, V. nigrum*

$C_{34}H_{53}NO_{10}$: 635.3669

Mp: 200–202°C (Et_2O), 230–231°C, 240°C ($CHCl_3$–Et_2O) [1]

$[\alpha]_D$ –11° [2]

IR: 3600–3160, 3030–2750, 1745, 1245 [1]

^{1}H NMR: 0.91 (3H, t, J = 7, 3H – 4″), 0.97 (3H, s, CH_3-19), 1.08 (3H, d, J = 7, CH_3-27), 1.14 (3H, d, J = 7, CH_3-5″), 1.20 (3H, s, CH_3-21), 1.66 (2H, dqd, J = 14.7, 7, CH_2-3″), 2.08 (3H, s, CH_3-2′), 2.40 (1H, sextet, J = 7, H-2″), 3.36 (1H, brs, OH-20), 4.29 (1H, dd, J = 3·5.2, H-16), 4.31(1H, s, OH-16), 4.53 (1H, s, OH-14), 4.92 (1H, brd, J = 4, H-3), 4.97 (1H, brs, OH-7), 4.59 (1H, brd, J = 5, H-7), 5.34 (1H, d, J = 3.5, H-15), 6.21 (1H, brs, OH-4) [3]

^{13}C NMR: [3]

Table 1

C-1	32.4 t	C-10	45.9 s	C-19	19.1 q	C-1′	170.5 s
2	26.6 t	11	33.1 t	20	73.0 s	2′	21.5 q
3	76.6 d	12	47.3 d	21	19.9 q	C-1″	175.7 s
4	105.4 s	13	33.7 d	22	69.65 d	2″	41.2 d
5	46.0 d	14	81.2 s	23	18.4 t	3″	26.8 t
6	28.6 t	15	69.71 d	24	28.9 t	4″	11.6 q
7	66.7 d	16	69.3 d	25	27.3 d	5″	16.8 q
8	47.9 d	17	45.5 d	26	61.3 t		
9	92.9 s	18	61.4 t	27	17.1 q		

Pharm./Biol.: Possesses hypotensive activity and is a component of preparation lowering blood pressure [1, 4, 5]

References

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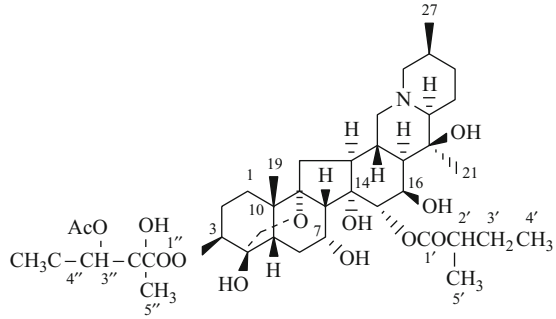
5. M. Cholakova et al., Exp Pathol Parasitol. **8**(2), 16 (2005)

Germinaline

CAS Registry number: 23211-84-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Veratrum lobelianum*

$C_{39}H_{61}NO_{13}$: 751.4143

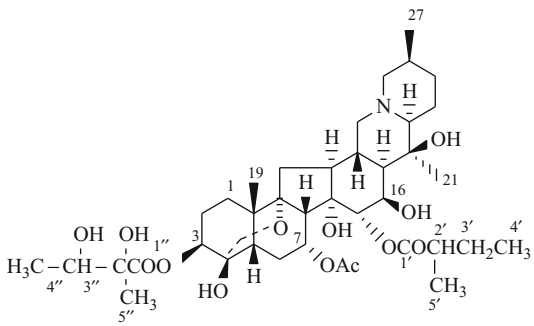
Mp: 138–140°C (C_6H_6), 212°C (di Ac), 202°C (tri Ac) [1]
Solibility: very sol. $CHCl_3$; spar. sol. C_6H_6
IR: 3450, 1745, 1250 [1]
MS m/z: 751(M^+), 112(100) [1]
^{1}H NMR: 0.82(3H, t, CH_3-4′), 0.89(3H, s, CH_3-19), 1.00(3H, d, CH_3-27), 1.08(3H, d, $CH_3$4″), 1.11(3H, s, CH_3-21), 1.21(3H, d, CH_3-5′), 1.26(3H, s, CH_3-5″), 1.89(3H, s, OAc), 4.98(1H, m, H-3), 5.23(1H, m, H-15), 5.91(1H, m, H-3″) [1, 2]

References

1. R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 118 (1983)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)

Germinalinine

CAS Registry Number: 58162-51-9



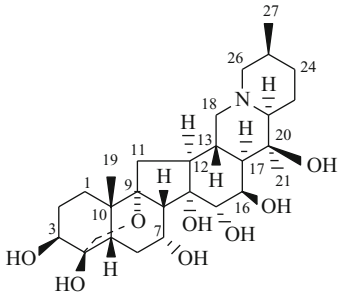
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{39}H_{61}NO_{13}$: 751.4143
Mp: 168–170°C (Et_2O) [1]
$[\alpha]_D$ −52° (Py) [1]
IR: 3490, 1750, 1255 [1]
MS m/z: 751(M^+), 112(100) [1]
1H NMR: 0.81(3H, t, CH_3-4′), 0.93(3H, s, CH_3-19), 1.02(3H, d, CH_3-27), 1.05(3H, d, CH_3-2′), 1.12(3H, d, CH_3-4″), 1.13(3H, s, CH_3-21), 1.38(3H, s, CH_3-5″), 2.03(3H, s, OAc), 4.99(1H, m, H-3), 5.10(1H, d, H-15), 5.72(1H, m, H-7) [2]
Pharm./Biol.: LD_{50} 0.046, 0.56, 15.7 mg/kg (i/v, s/c, oral, mice). Smooth and prolonged hypotensive action [3]

References

1. R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 566 (1975)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
3. Yu.R. Mirzaev, Author's Abstract of Candidate's Dissertation, Tashkent, 1982

Germine

CAS Registry number: 508-65-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum, V. nigrum*
$C_{27}H_{43}NO_8$: 509.2989
Mp: 220–222 °C (MeOH) [1]
$[\alpha]_D$ +19° (10% H_2SO_4) [2]
IR: 3400, 2930, 2770, 1445 [2]
MS m/z: 509(M^+), 494, 493, 491, 482, 474, 466, 451, 330, 320, 149, 137, 125, 112(100), 98, 97 [2, 3]
^{13} C NMR: [4]

Table 1

C-1	32.2	C-10	46.8	C-19	18.7
2	28.6	11	33.2	20	73.4

(*continued*)

Table 1 (continued)

3	72.7	12	45.9	21	20.7
4	106.5	13	33.4	22	70.4
5	44.0	14	82.3	23	19.2
6	29.5	15	69.91	24	29.3
7	67.5	16	70.4	25	27.6
8	48.8	17	47.7	26	61.9
9	93.1	18	61.7	27	17.3

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2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
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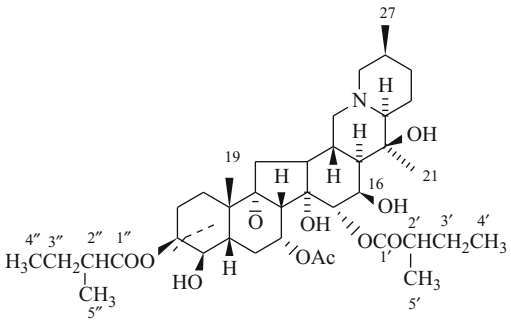
4. T.A. Broadbent, E.G. Paul, Heterocycles **20**, 966 (1983)

Germinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{39}H_{61}NO_{11}$: 719, 4323
Mp: 195–197°C (Me_2CO–C_6H_{14}), 235–237°C (Ac) [1]
IR: 3290–3510, 2860–2995, 2780–2810, 1748, 1250 [1]
MS m/z: 719 (M^+, 4), 718 (1), 704 (0.3), 701 (0.3), 676 (1), 677 (0.5), 659 (1), 658 (0.7), 642 (0.5), 635 (1.6), 618 (1), 617 (1), 616 (1), 600 (2), 598 (0.5), 575 (0.5), 574 (1), 540 (0.5), 515 (0.3), 514 (1), 154 (3), 124 (0.5), 112 (100), 111 (8), 98 (4) [1]
^{1}H NMR ($CDCl_3$): 0.84 (6H, t, J = 7, CH_3-4′, CH_3-4″), 0.91 (3H, s, CH_3-19), 1.13 (3H, s, CH_3-21), 1.01 (3H, d, CH_3-27), 1.08 (6H, d, J = 7, CH_3-5′, CH_3-5″), 2.01 (3H, s, OAc), 3.26–6.14 (H-16, HC–OAcyl) [1]

References

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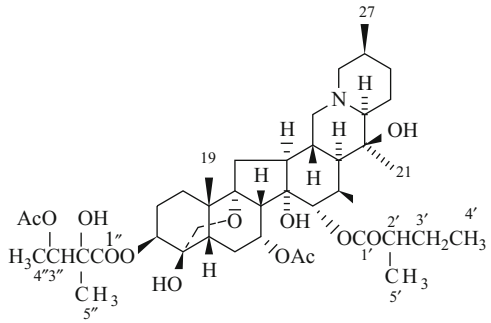
Germitetrine (Germitetrine B)

CAS Registry number: 465-75-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{41}H_{63}NO_{14}$: 793.4249
Mp: 220–221°C (Me_2CO–Et_2O) [1], 246°C (picrate) [1]
$[\alpha]_D$ −65° (Py) [1]
IR: 3540, 1750, 1253 [1]
MS m/z: 793(M^+), 112(100) [1]
^{1}H NMR: 0.82(3H, t, CH_3-4′), 0.94(3H, s, CH_3-19), 1.02(3H, d, CH_3-27), 1.06(3H, d, CH_3-2′), 1.10(3H, s, CH_3-21), 1.22(3H, d, CH_3-4″), 1.28(3H, s, CH_3-2″), 1.88(3H, s, OAc), 2.00(3H, s, OAc), 5.04(3H, m, H-7), 5.71(1H, m, H-3″) [1, 2]
Pharm./Biol.: LD_{50} 0.82 [sic] mg/kg (i/v, mice). Smooth and prolonged hypotensive action. Weak pressor effect [3]

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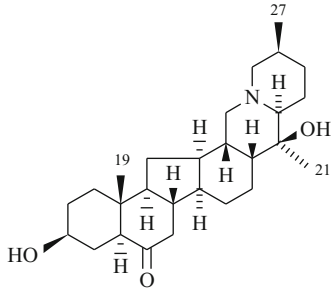
Imperialine (Sipeimine, Kashmirine)

CAS Registry Number: 61825-98-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Petilium eduardii, P.raddeanum, Rhinopetalum buharicum*

$C_{27}H_{43}NO_3$: 429.3243

Mp: 265–267°C (EtOH), 211°C (hydrochloride), 207°C (perchlorate), 184°C (dec., nitrate), 170°C (rhodanide), 255°C (methiodide), 170°C (oxime), 185°C (O–Ac) [1]; 207°C (dihydro), 240°C (isodihydro) [2]

$[\alpha]_D$ −35° ($CHCl_3$) [3]

UV: 290(1.70) [3]

IR: 3430, 2950, 1710, 1460 [3]

MS m/z: 429(M^+), 414, 411, 386, 384, 372, 358, 236, 235, 234, 217, 180, 164, 162, 156, 155, 154, 150, 140, 125, 124, 112, 111, 98 [4]

^{1}H NMR: 0.67(s, CH_3-19), 0.99(s, CH_3-21), 0.99(d, CH_3-27) [5]

X-ray: [6]

Pharm./Biol.: Excites the CNS, causing paralysis in high doses. LD_{50} 155 mg/kg (s/c, mice). Is of interest as an agent for the selective blockade of the M-cholinoreceptors of the heart and other organs. The sensitiration by imperialine of certain subtypes of M-receptors provides the possibility of developing fundamentally new drugs and bioreagents from it [7–9]

References

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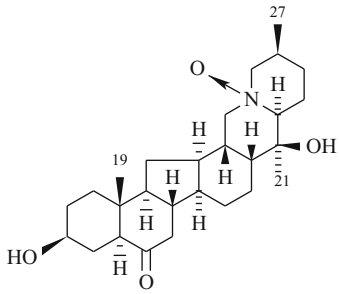
Imperialine N-oxide

CAS Registry number: 62565-72-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Petilium eduardii, P. raddeanum*

$C_{27}H_{43}NO_4$: 445.3192

Mp: 266–268°C (Me_2CO)
$[\alpha]_D$ −48° (MeOH)
IR: 3540–3200, 2937–2878, 1705, 1462, 970, 935, 928
MS m/z: 445(M^+), 429, 413, 411, 410, 386, 384, 372, 230, 164, 162, 156, 155, 154, 150, 140, 138, 125, 114, 112(100), 111, 98
^{1}H NMR: 0.71(s, CH_3-19), 0.88(d, CH_3-27), 1.04(s, CH_2-21) [1, 2]

References

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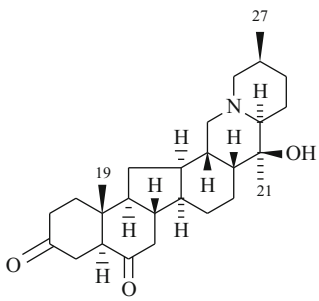
Imperialone

CAS Registry number: 23521-53-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii, P. raddeanum*
$C_{27}H_{41}NO_3$: 427.3087
Mp: 228–231°C (Me_2CO) [1]
MS m/z: 427(M^+), 412, 409, 384, 382, 370, 356, 236, 235, 217, 180, 164, 162, 156, 155, 154, 150, 140, 125, 124, 112, 111, 98 [2]
^{1}H NMR: 0.87(s, CH_3-19), 1.00(s, CH_3-21), 1.01(d, CH_3-27) [3]
X-ray: [4]

References

1. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **1**, 302 (1965)
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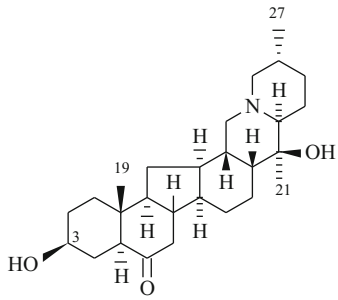
Imperiasine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardi*
$C_{27}H_{43}NO_3$ 429.6456
Mp: 213–216°C [1]
IR: 3502, 2870–2943, 2787, 1703 [1]
MS m/z: 429 (M^+), 412, 386, 384, 372, 358, 316, 289, 260, 236, 204, 180, 164, 162, 156, 155, 152, 150, 140, 125, 124, 112 (100), 111, 98 [1]
^{1}H NMR ($CDCl_3$): 0.68 (3H, s, CH_3-19) (3H, s, CH_3-21), 0.77 (3H, d, J = 7, CH_3-27), 3.51 (1H, m, $W_{1/2}$ = 24, H-3) [1]

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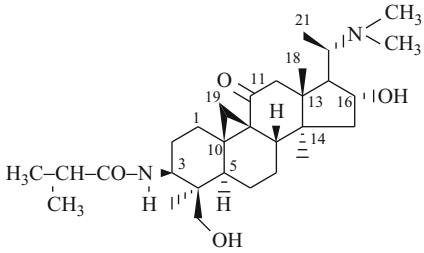
N-3-Isobutyrylcyclobuxidine F (Baleabuxidine)

CAS Registry Number: 4947-53-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus balearica*
$C_{30}H_{50}N_2O_4$: 502.377
Mp: 236–238°C (Me_2CO) [1]
$[\alpha]_D$ +76° ($CHCl_3$) [1]
UV: 219(3.84) [2]
IR: 3250, 1670, 1650, 1540 [3]
MS m/z: 502(M^+), 72 [2, 3]
^{1}H NMR: 0.56(3H, s, CH_3), 0.83(3H, s, CH_3), 0.85(3H, d, J = 6, CH_3-21), 1.16(3H, d, J = 7, CH–CH_3), 1.17(3H, d, J = 7, CH–CH_3), 1.20(3H, s, CH_3), 2.23(6H, s, $N(CH_3)_2$, 2.90, 3.35(2H, dd, J = 12, CH_2OH), 4.00(1H, m, H-16), 5.60(1H, d, J = 8, NH) [1, 2]
CD: [2]

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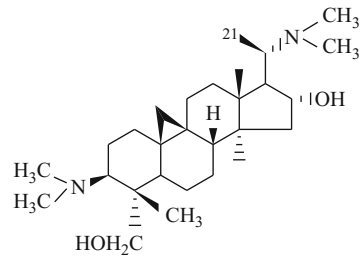
Isodihydrocyclomicrofilline A



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{28}H_{50}N_2O_2$: 446.387228
Mp: 215–217°C (EtOH) [1]
$[\alpha]_D$ −64° ($CHCl_3$) (di Ac 189°C) [1]
Solubility: very sol. $CHCl_3$; spar. sol. EtOH [1]
IR: 3368, 3047, 1452 [1]
MS m/z: 446(M^+), 424, 383, 342, 98, 84, 72(100%), 71, 70, 58, 57 [1]
^{1}H NMR: 0.92(3H, s, CH_3); 0.97(3H, d, J = 7.52, CH_3); 1.06, 1.15(each 3H, s, 2 × CH_3); 2.18, 2.32 [each 6H, s, 2 × $N(CH_3)_2$)], 3.02, 3.25(each 1H, d, CH_2–OH) [1]

References

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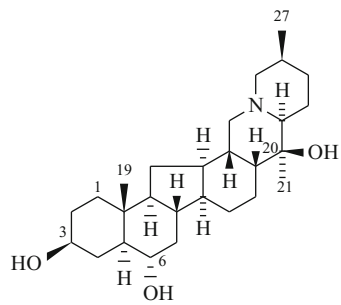
Isodihydroimperialine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{27}H_{45}NO_3$: 431.3399
Mp: 236–239°C (Me_2CO) [1]
$[\alpha]_D$ +17° [1]
IR: 3450, 2950, 2750, 1460 [1]
MS m/z: 431(M^+), 416, 412, 388, 386, 374, 156, 155, 154, 112(100), 111, 98 [2]
^{1}H NMR: 0.72(3H, s, CH_3-19), 0.99(3H, d, CH_3-27), 1.00(3H, s, CH_3-21), 3.43(m, Ha-3, He-6, OH-20) [2]
^{1}H NMR(di Ac isodihydro): 0.79(3H, s, CH_3-19), 0.99(3H, d, CH_3-27), 1.00(3H, s, CH_3-21), 1.95(6H, s, OAc), 3.20(1H, m, OH-20), 4.60(2H, m, HC–OAc) [2]

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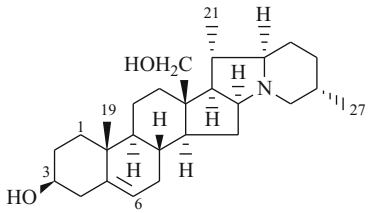
Isorubijervine

CAS Registry Number: 468-45-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum dahuricum, V. lobelianum, V. nigrum*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 237–238°C, 275°C (hydrobromide), 279°C (tosylate), 309.5°C (iodide), 267°C (Ac), 255° (isorubijervone) [1, 2]
$[\alpha]_D$ +7° (EtOH) [3]
IR: 3260, 3040, 2960, 2800 [4]
^{1}H NMR: 0.77, 0.99(6H, d, CH_3-21, CH_3-27), 0.96(3H, s, CH_3-19), 5.29(1H, m, H-6) [4]
HPLC: [5]

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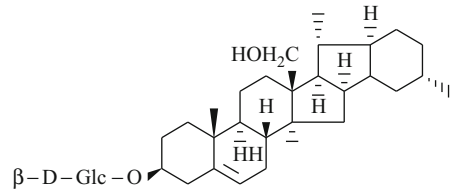
Isorubijervosine

CAS Registry Number: 468-46-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{33}H_{53}NO_7$: 575.3822
Mp: 270–271°C (MeOH) [1]; 203°C (penta Ac) [2]
$[\alpha]_D$ −18° ($CHCl_3$–EtOH) [1]
IR: 3410, 2960–2880, 1110–1100 [1]
MS m/z: 575(M^+), 560, 559, 545, 544, 413, 396, 383, 382, 380, 366, 204, 150(100) [1]

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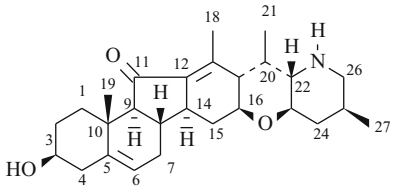
Jervine

CAS Registry Number: 469-59-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum dahuricum, V. lobelianum, V. nigrum*
$C_{27}H_{39}NO_3$: 425.293
Mp: 243–245°C (MeOH) [1], 297.5° (sulphate), 334° (hydrochloride), 247° (nitroso) [2]
$[\alpha]_D$ −151° [1]
UV: 250, 360(3.50, 1.70) [3]
IR: 3430–3100, 2990–2770, 1715, 1632 [3]
MS m/z: 425(M^+), 410, 396, 314, 233, 125, 124, 113, 110(100), 97 [4]
^{1}H NMR: 0.82(6H, d, J = 7, CH_3-21, CH_3-27), 0.95(3H, s, CH_3-19), 2.10(3H, s, CH_3-18), 5.28(1H, m, C = CH) [1, 5]
^{13}C NMR: [6]

Table 1

C-1	38.40	C-10	37.20	C-19	18.30
2	30.80	11	205.40	20	31.80
3	70.90	12	136.20	21	12.10
4	40.70	13	142.30	22	67.10
5	145.50	14	30.60	23	76.60
6	100.20	15	24.50	24	42.30
7	39.20	16	37.20	25	31.40
8	44.60	17	85.10	26	55.00
9	62.50	18	12.80	27	18.30

HPLC: [7]

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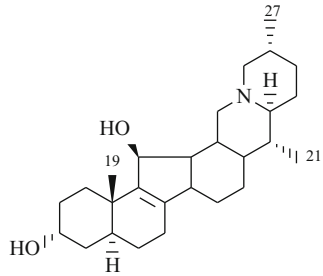
Kordiline (Cordiline)

CAS Registry Number: 97745-01-2



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 286–288°C (Me_2CO), amorph. (di Ac), 226°C (dihydro) [1]
IR: 3400, 2985–2835, 2775, 1470, 1440, 1030 [1]
MS m/z: 413(M^+), 398, 396, 395, 385, 384, 357, 356, 343, 342, 216, 180, 178, 164, 162, 150, 149, 125, 124, 112(100), 111, 98 [1]
^{1}H NMR: 0.78(3H, d, CH_3-21), 0.85(3H, d, CH_3-27), 1.20(3H, s, CH_3-19) [1]
^{1}H NMR(di Ac): 0.78(3H, d, CH_3-21), 0.84(3H, d, CH_3-27), 0.96(3H, s, CH_3-19), 1.97, 1.99(each 3H, s, OAc), 4.86, 5.00(each 1H, m, HC–OAc) [1]
^{1}H NMR(dihydro): 0.78(3H, d, CH_3-21), 0.84(3H, d, CH_3-27), 1.18(3H, s, CH_3-19) [1]

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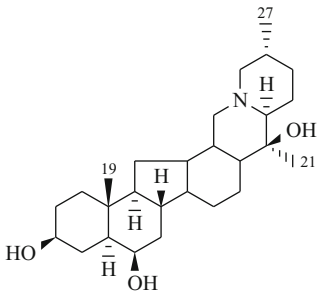
Korselidine

CAS Registry Number: 122405-29-2



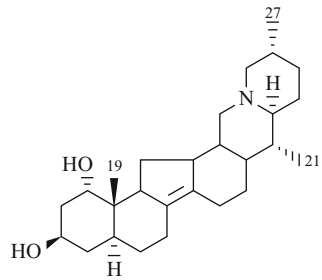
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{45}NO_3$: 431.3399
Mp: 276–278°C (Me_2CO), amorph. (di Ac), amorph. (dione) [1]
$[\alpha]_D$ −53° (EtOH) [1]
IR: 3450, 3000–2810, 2765, 1450 [1]
MS m/z: 431(M^+), 430, 416, 414, 412, 387, 386, 154, 150, 149, 125, 124, 113, 112(100), 111, 98 [1]
^{1}H NMR: 0.80(3H, d, CH_3-27), 0.95(3H, s, CH_3-19), 1.02(3H, s, CH_3-21), 3.41, 3.71(each 1H, m, 2 × HC–OH) [1]
^{1}H NMR (di Ac): 0.78(3H, d, CH_3-27), 0.93(3H, s, CH_3-19), 1.05(3H, s, CH_3-21), 1.95(6H, s, 2 × OAc), 4.68, 4.93(each 1H, 2 × HC–OAc) [1]
^{1}H NMR(dione): 0.79(3H, d, CH_3-27), 0.88(3H, s, CH_3-19), 1.01(3H, s, CH_3-21) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **25**, 28 (1989)

Korselimine

CAS Registry Number: 122279-80-5



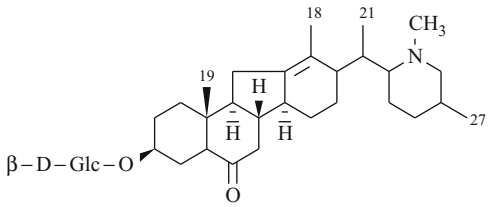
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 272–274°C (MeOH), amorph. (di Ac), amorph. (dione) [1]
$[\alpha]_D$ −75° (EtOH) [1]
IR: 3350, 2960–2830, 2750, 1450 [1]
MS m/z: 413(M^+, 100), 412, 398, 396, 384, 357, 356, 300, 272, 179, 178, 164, 150, 149, 124, 112, 111, 98 [1]
^{1}H NMR: 0.58(3H, s, CH_3-19), 0.80(3H, s, CH_3-21), 0.84 (3H, d, CH_3-27) [1]
^{1}H NMR(di Ac): 0.66(3H, s, CH_3-19), 0.82(3H, d, CH_3-21), 0.86(3H, d, CH_3-27), 1.97, 2.00 (each 3H, s, 2 × OAc), 4.50, 5.02(each 1H, m, HC–OAc) [1]
^{1}H NMR(dione): 0.82(6H, CH_3-21, CH_3-27), 1.19(3H, s, CH_3-19) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **25**, 37 (1989)

Korsemine

CAS Registry Number: 74119-90-7



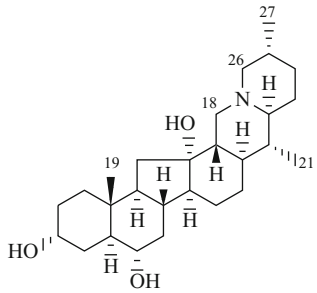
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{34}H_{55}NO_7$: 589.3978
Mp: amorph, (tetra Ac) [1]
$[\alpha]_D$ −47° (MeOH) [1]
IR: 3400, 3057, 1710, 1635, 1100–1000 [1]
^{1}H NMR (tetra Ac): 0.60(3H, s, CH_3-19), 0.70(3H, d, CH_3-21), 0.95(3H, d, CH_3-27), 1.58(3H, s, CH_3-18), 1.95, 1.97(each 3H, s, 2 × OAc), 2.02(6H, s, 2 × OAc), 2.24(3H, s, NCH_3) [1]

References

1. K. Samikov, D.U. Abdullaeva, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 728 (1979)

Korseveramine

CAS Registry Number: 36506-67-9



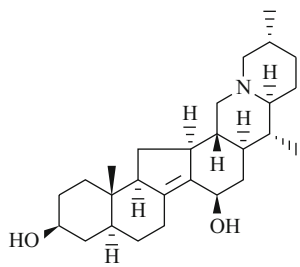
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{45}NO_3$: 431.3399
Mp: 304–305°C (MeOH), 175°C (di Ac), 217°C (korseveramindione) [1]
$[\alpha]_D$ −15° (10% AcOH) [1]
Solubility: spar. sol. pet. ether, Et_2O, C_6H_6, $CHCl_3$, Py
IR: 3610, 3430, 2960–2885, 2780, 1460–1440, 1053, 1000 [1]
MS m/z: 431(M^+) 416, 413, 398, 395, 164, 162, 150, 149, 125, 124, 112, 111, 98 [1]
^{1}H NMR(di Ac): 0.79(9H, s, CH_3-19, CH_3-21, CH_3-27), 1.97(3H, s, OAc), 2.01(3H, s, OAc), 2.77(2H, t, He-18, He-26), 4.57(m, HC–OAc), 5.03(m, HC–OAc) [1]
^{1}H NMR (korseveramindione): 0.80(3H, d, CH_3-21), 0.80(3H, d, CH_3-27), 0.86(3H, s, CH_3-19) [1, 2]

References

1. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 746 (1971)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Korseveridine

CAS Registry Number: 20072-14-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294

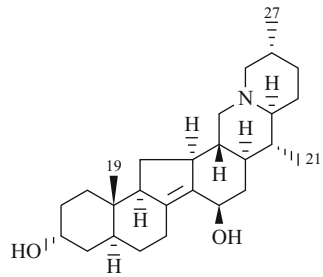
Mp: 290–292°C (MeOH), 326°C (hydrochloride), 315°C (hydrobromide), 306°C (hydroiodide), 312°C (methiodide), 201°C (di Ac), 124°C (korseveridinone) [1, 2]
$[\alpha]_D$ −49° (10% AcOH) [1]
IR: 3370–3310, 2960–2820, 2745, 1470–1430 [1, 3]
MS m/z: 413(M^+), 398, 395, 357, 356, 179, 164, 149, 112, 111, 98 [1, 3]
^{1}H NMR (di Ac.): 0.61(3H, s, CH_3-19), 0.76(3H, d, CH_3-21), 0.81(3H, d, CH_3-27), 1.96(3H, s, OAc), 2.00(3H, d, OAc), 4.50(1H, m, HC–OAc), 5.02(1H, m, HC–OAc) [1, 3]
^{1}H NMR (korseveridinone): 0.76(3H, s, CH_3-19), 0.78(3H, d, CH_3-21), 0.83(3H, d, CH_3-27) [1–3]

References

1. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 86 (1968)
2. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 320 (1976)
3. D.U. Abdullaeva, K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 714 (1976)

Korseveridinine

CAS Registry Number: 62959-88-0



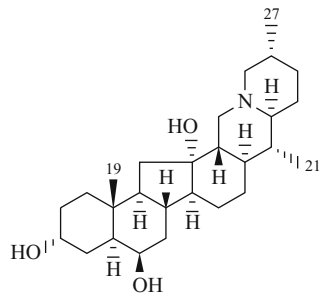
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 282–284°C (MeOH), amorph. (di–Ac), 124°C (ketone) [1]
$[\alpha]_D$ −40° ($CHCl_3$–MeOH) [1]
IR: 3380, 3150, 2990–2820, 2778 [1]
MS m/z: 413(M^+), 398, 395, 384, 357, 356, 203, 195, 179, 178, 164, 162, 150, 149, 124, 112, 111(100) [1]
^{1}H NMR (di Ac): 0.74(3H, s, CH_3-19), 0.79, 0.84(each 3H, d, CH_3-21, CH_3-27), 1.93, 2.01(6H, s, OAc), 4.80, 5.05(each 1H, m, HC–OAc) [1]

References

1. D.U. Abdullaeva, K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 714 (1976)

Korseveriline

CAS Registry Number: 21851-05-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{45}NO_3$: 431.3399
Mp: 240–242°C (MeOH), 301°C (methiodide), 178°C (thiocyanate), 173°C (di Ac), 218°C (dione), 167°C (dideoxotetrahydro dione) [1]
$[\alpha]_D$ −15° (EtOH) [1]
IR: 3375, 2915, 2860, 2773, 1465, 1443, 1130, 1100–990, 1055, 1028 [1]
MS m/z: 431(M^+), 430, 413, 178, 164, 162, 112, 111(100), 98 [1]
^{1}H NMR (di Ac): 0.79(3H, d, CH_3-21), 0.79(3H, d, CH_3-27), 0.89(3H, s, CH_3-19), 1.95(3H, s, OAc), 1.97(3H, s, OAc), 4.86(1H, m, HC–OAc), 5.03(1H, m, HC–OAc) [1]

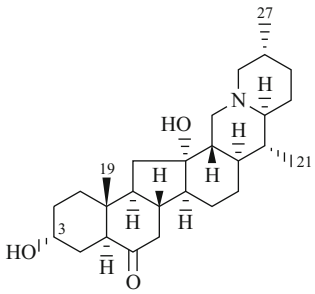
^{1}H NMR (dione): 0.79(3H, d, CH_3-21), 0.79(3H, d, CH_3-27), 0.85(3H, s, CH_3-19) [1]
^{1}H NMR (dideoxotetrahydrodione): 0.66(3H, s, CH_3-19), 0.78(3, d, CH_3-21), 0.81(3H, d, CH_3-27) [1, 2]

References

1. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 222 (1968)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Korseverilinone

CAS Registry Number: 86630-13-9



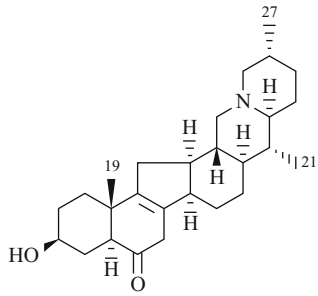
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_3$: 429.3243
Mp: 222–223°C (Me_2CO), amorph. (Ac), 241°C (dihydro) [1]
$[\alpha]_D$ −19° ($CHCl_3$) [1]
IR: 3450, 2955–2860, 2775, 1710, 1465 [1]
MS m/z: 429(M^+), 414, 412, 411, 400, 396, 373, 166, 164, 149, 125, 124, 112, 111(100), 98 [1]
^{1}H NMR: 0.66(3H, s, CH_3-19), 0.83(6H, d, CH_3-21, CH_3-27), 4.08(1H, m, H-3) [1, 2]

References

1. V.V. Kul'kova, K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 68 (1983)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Korseverine

CAS Registry Number: 22223-08-1



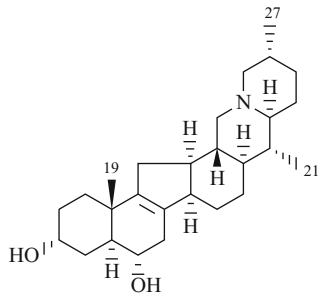
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{41}NO_2$: 411.3027
Mp: 167–168°C (Me_2CO), 292°C (hydrobromide), 295°C (hydroiodide), 270°C (methiodide), 186°C (Ac), 224°C (ketone), 174°C (deoxodihydro), 165°C (dihydro)
$[\alpha]_D$ + 83° (MeOH) [1]
UV: 300(2.07) [2]
IR: 3510, 3390, 2920–2870, 2760, 1703, 1650, 1440, 1060 [2]
MS m/z: 411(M^+), 396, 393, 112, 111, 98 [2]
^{1}H NMR: 0.73(3H, s, CH_3-19), 0.87(3H, d, CH_3-21), 1.04(3H, d, CH_3-27) [2]
^{1}H NMR (Ac): 0.75(3H, s, CH_3-19), 0.87(3H, d, CH_3-21), 1.02(3H, d, CH_3-27), 1.96(3H, s, OAc), 4.62(1H, m, HC–OAc) [2]
^{1}H NMR (ketone): 0.87(3H, d, CH_3-21), 0.92(3H, s, CH_3-19), 1.04(3H, d, CH_3-27) [2, 3]

References

1. R.N. Nuriddinov, S.Yu. Yunusov, DAN UzSSR (5), 47 (1962)
2. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 332 (1968)
3. R.N. Nuriddinov, A.I. Saidkhodzhaev, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 54 (1969)

Korseverinine

CAS Registry Number: 36506-64-6



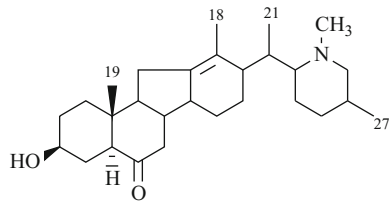
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 320–322°C (Me_2CO), 312°C (hydrochloride), 287°C (hydrobromide), 220°C (hydroiodide), 296°C (methiodide), 140°C (di Ac), 265°C (ketone), 229°C (dione) [1]
$[\alpha]_D$ + 23° (10% AcOH) [1]
Solubility: spar. sol. Et_2O, C_6H_6, $CHCl_3$, Py
IR: 3420, 3180, 2980–2830, 2790, 1620, 1470, 1430, 1085, 1060, 1030, 990 [1]
MS m/z: 413(M^+), 398, 384, 164, 162, 139, 125, 112, 111, 98 [1]
^{1}H NMR (di Ac): 0.80(3H, d, CH_3-27), 0.85(3H, s, CH_3-19), 0.85(3H, d, CH_3-21), 1.98(3H, s, OAc), 2.00(3H, s, OAc), 4.62(1H, m, HC–OAc), 5.04(1H, m, HC–OAc) [1]
^{1}H NMR (ketone): 0.80(3H, d, CH_3-27), 0.85(3H, d, CH_3-21), 0.99(3H, s, CH_3-19), 3.46(1H, m, HC–OH) [1]
^{1} H NMR (dione): 0.80(3 H, d, CH_3-27), 0.85(3 H, d, CH_3-21), 0.93(3 H, s, CH_3-19) [1–3]

References

1. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 740 (1971)
2. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 320 (1976)
3. D.U. Abdullaeva, K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 702 (1978)

Korsevine (Corsevine)

CAS Registry Number: 18209-21-7



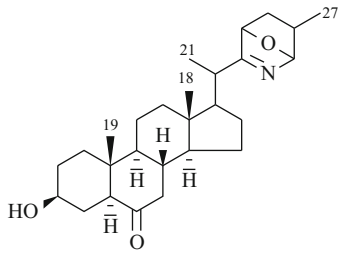
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{28}H_{45}NO_2$: 427.3450
Mp: 170°C (MeOH), 290°C (hydrobromide), 245°C (perchlorate), 265°C (thiocyanate), 245°C (methiodide), 201°C (oxime), 190°C (semicarbazone), 219°C (dihydro), 134°C (di Ac dihydro), amorph. (korsevinine) [1]
$[\alpha]_D$ –84° (MeOH) [1]
UV: 289(1.86) [1]
IR: 3250, 2940–2830, 1715, 1630, 1460, 1080 [1]
MS m/z: 427(M^+), 426, 412, 409, 398. 316, 314, 287, 139, 114, 113, 112, 111, 98, 96 [1]
^{1}H NMR: 0.60(3H, s, CH_3-19), 0.68(3H, d, CH_3-21), 0.93(3H, d, CH_3-27), 1.55(3H, s, CH_3-18), 2.22(3H, s, NCH_3) [1]
^{1}H NMR (di Ac dihydro): 0.68(3H, d, CH_3-21), 0.85(3H, s, CH_3-19), 0.93(3H, d, CH_3-27), 1.55(3H, s, CH_3-18), 1.95(6H, s, 2 × OAc), 2.24(3H, s, NCH_3) [1]
^{1}H NMR (ketone): 0.68(3H, d, CH_3-21), 0.80(3H, s, CH_3-19), 0.93(3H, d, CH_3-27), 1.55(3H, s, CH_3-18), 2.24(3H, s, NCH_3) [1]

References

1. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 333 (1967)

Korsevinine (Corsevinine)

CAS Registry Number: 27336-00-1



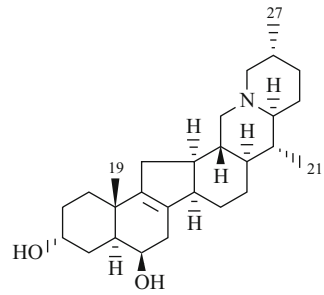
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{41}NO_3$: 427.3087
Mp: 224–225°C (Me_2CO), 155°C (Ac), 221°C (hexahydro), amorph. (tri Ac hexahydro) [1]
$[\alpha]_D$ −16.04° [1]
IR: 3400, 2940, 1700, 1620, 1460–1440, 1070 [1]
MS m/z: 427(M^+), 412, 409, 399, 384, 139(100), 111(81), 110(27) [1]
^{1}H NMR: 0.69(3H, s, CH_3-19), 0.69(3H, s, CH_3-18), 0.98(3H, d, CH_3-21), 1.00(3H, d, CH_3-27) [1]
^{1}H NMR (Ac): 0.69(3H, s, CH_3-18), 0.71(3H, s, CH_3-19), 0.99(3H, d, CH_3-21), 1.00(3H, d, CH_3-27), 1.96(3H, s, OAc), 4.60(1H, m, HC–OAc) [1]
^{1}H NMR (hexahydro): 0.67(3H, s, CH_3-18), 0.79(3H, d, CH_3-21), 0.83(3H, d, CH_3-27), 0.97(3H, s, CH_3-19) [1]
^{1}H NMR (tri Ac hexahydro): 0.68(3H, s, CH_3-18), 0.88(3H, d, CH_3-21), 0.92(3H, d, CH_3-27), 0.96(3H, s, CH_3-19), 1.96(3H, s, OAc), 1.97(3H, s, OAc), 2.07(3H, s, NAc), 4.60(1H, m, HC–OAc), 4.88(1H, m, HC–OAc) [1]

References

1. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 519 (1969)

Korsidine

CAS Registry Number: 61989-84-2



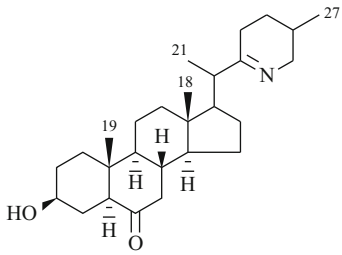
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 316–318°C (MeOH), amorph. (di Ac korsidine), 217°C (korsidindione), 256°C (dihydro) [1]
$[\alpha]_D$ ±0° (10% AcOH) [1]
IR: 3400–3200, 2975–2830, 2776 [1]
MS m/z: 413(H^+, 100), 398, 395, 384, 244, 202, 201, 183, 179, 165, 149, 122, 112, 111, 98, 97 [1]
^{1}H NMR (di Ac): 0.80(6H, d, CH_3-21, CH_3-27), 0.98(3H, s, CH_3-19), 1.99(6H, s, 2 × OAc), 4.90(1H, m, HC–OAc), 5.05(1H, m, HC–OAc) [1]
^{1}H NMR (korsidindione): 0.81(3H, d, CH_3-21), 0.81(3H, d, CH_3-27), 0.95(3H, s, CH_3-19) [1]
^{1}H NMR (dihydro): 0.80(3H, d, CH_3-21), 0.80(3H, d, CH_3-27), 0.93(3H, s, CH_3-19) [1, 2].

References

1. K. Samikov, R. Shakirov, D.N. Safaeva, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 699 (1976)
2. D.U. Abdullaeva, K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 702 (1978)

Korsiline

CAS Registry Number: 62929-45-7



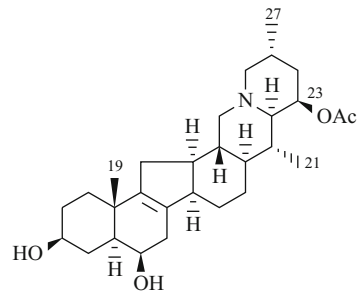
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 194–196°C (Me_2CO), amorph. (O,N–di Ac) [1]
IR: 3350, 2980–2840, 1715, 1663, 1467, 1082 [1]
MS m/z: 413(M^+, 31), 398(24), 166(5), 165(17), 164(19), 152(8), 151(16), 150(21), 139(3), 138(7), 126(14), 125(100), 124(21), 112(8.5), 111(54), 110(8), 97(4), 96(6) [1]
^{1}H NMR: 0.63(3H, s, CH_3-18), 0.68(3H, s, CH_3-19), 0.86(3H, d, CH_3-21), 1.03(3H, d, CH_3-27) [1]
^{1}H NMR (O,N–di Ac): 0.60(3H, s, CH_3-18), 0.70(3H, s, CH_3-19), 0.91(3H, d, CH_3-21), 1.04(3H, d, CH_3-27), 2.00(3H, s, OAc), 2.11(3H, s, NAc), 4.60(1H, m, HC–OAc), 5.12(1H, m, C = CH) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 748 (1976)

Korsinamine

CAS Registry Number: 68231-27-6



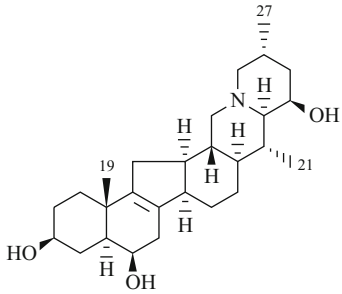
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{29}H_{45}NO_4$: 471.3349
Mp: 155–158°C (Me_2CO–C_6H_{14}), amorph. (di Ac) [1]
$[\alpha]_D$ + 68° ($CHCl_3$) [1]
IR: 3440, 2960–2860, 2790, 1738, 1650, 1470, 1446, 1248 [1]
MS m/z: 471(M^+, 100), 456, 442, 429, 428, 411, 400, 234, 222, 220, 181, 178, 170, 167, 149, 137, 111, 110 [1]
^{1}H NMR: 0.80(6H, d, CH_3-21, CH_3-27), 1.02(3H, s, CH_3-19), 2.01(3H, s, OAc), 4.94(1H, H-23) [1]
^{1}H NMR (di Ac): 0.82(3H, d, CH_3-21), 0.82(3H, d, CH_3-27), 1.02(3H, s, CH_3-19), 1.95(3H, s, OAc), 1.98(3H, s, OAc), 2.01(3H, s, OAc), 4.70(1H, m, HC–OAc), 4.98(2H, m, HC–OAc) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 192 (1978)

Korsine

CAS Registry Number: 20321-59-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Korolkowia sewerzowii*

$C_{27}H_{43}NO_3$: 429.3243

Mp: 236–238°C (MeOH), 257–259°C (EtOH), 303°C (hydrochloride), 326°C (hydrobromide), 294°C (hydroiodide), 275°C (methiodide), amorph. (tri Ac), 276°C (dihydro), 278°C (ketone), 260°C (dione) [1]

$[\alpha]_D$ + 88° (EtOH) [1]

Solubility: sol. EtOH; spar. sol. $CHCl_3$, Py; insol. H2O

IR: 3490, 3420, 2930–2830, 2780, 1670, 1485–1465, 1056, 1010 [1]

MS m/z: 429(M^+, 100), 414, 411, 400, 393, 384, 372, 358, 194, 180, 178, 155, 141, 128, 127, 114 [1]

^{1}H NMR: 0.79(3H, d, CH_3-21), 0.80(3H, d, CH_3-27), 0.96(3H, s, CH_3-19)

^{1}H NMR (tri Ac): 0.81(3H, d, CH_3-21), 0.83(3H, d, CH_3-27), 0.99(3H, s, CH_3-19), 1.94(6H, s, OAc), 1.98(3H, s, OAc), 4.65(1H, m, HC–OAc), 4.94(2H, m, 2 × HC–OAc)

^{1}H NMR (ketone): 0.74(3H, s, CH_3-19), 0.82(3H, d, CH_3-21), 0.85(3H, d, CH_3-27) [1, 2]

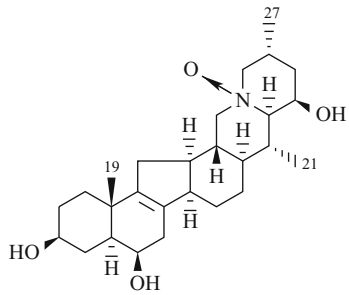
Pharm./Biol.: LD_{50} 100 mg/kg (s/c, mice) [3, 4]. Anti-inflammatory, spasmolytic, hypothermal, and hypotensive properties

References

1. R.N. Nuriddinov, A.I. Saidkhodzhaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 139 (1968)
2. R.N. Nuriddinov Author's Abstract of Doctoral Dissertation, Tashkent, 1970, p. 24
3. M.B. Sultanov, A.G. Kurmukov, A.A. Vakhabov, U.B. Zakirov, Kh. U. Aliev, N.P. Polievtsev, Kh.S. Akhmedkhodzhaeva, S.F. Fakhrutdinov, F.S. Sadritdinov, N.T. Tulyaganov, T.K. Saidkasymov, *Soviet-Indian Symposium on the Chemistry of Natural Compounds*, Abstracts of Lectures [in Russian] (Fan, Tashkent, 1968), p. 66
4. T.K. Saidkasymov, Sh. Umarova, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian], (Fan, Tashkent, 1971), p. 190

Korsine N-oxide

CAS Registry Number: 105256-28-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Korolkowia sewerzowii*

$C_{27}H_{43}NO_4$: 445.3192

Mp: 257–259°C (Me_2CO) [1]

$[\alpha]_D$ −8° (EtOH) [1]

Solubility: sol.H_2O [1]

IR: 3400, 1655 [1]

MS m/z: 445(M^+), 430, 429(100), 428, 426, 425, 414, 412, 410, 400, 358, 288, 286, 256, 180, 178, 149, 141, 129, 128(100), 127, 121, 114, 110 [1]

^{1}H NMR: 0.87(3H, d, CH_3-21), 0.98(3H, s, CH_3-19), 1.04(3H, d, CH_3-27) [1]

^{1}H NMR (dihydro): 0.86(3H, d, CH_3-21), 0.96(3H, s, CH_3-19), 1.03(3H, d, CH_3-27) [1]

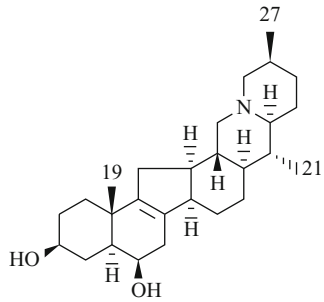
References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 237 (1986)

1. R.N. Nuriddinov, A.I. Saidkhodzhaev, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 54 (1969)

Korsinine

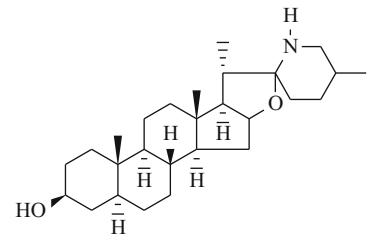
CAS Registry Number: 22958-10-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 164–165°C (Me_2CO), 239°C (hydrochloride), 228°C (di Ac dihydro) [1]
$[\alpha]_D$ +105° (MeOH) [1]
IR: 3410, 2920–2870, 2780, 1650, 1450, 1070–1015 [1]
MS m/z: 413(M^+), 398, 395, 112, 111, 98, 97 [1]
^{1}H NMR: 0.86(3H, d, CH_3-21), 0.99(3H, s, CH_3-19), 1.04(3H, d, CH_3-27) [1]
^{1}H NMR (di Ac): 0.88(3H, d, CH_3-21), 0.99(3H, s, CH_3-19), 1.03(3H, d, CH_3-27), 1.96(6H, s, 2 × OAc), 4.62(1H, m, HC–OAc), 4.95(1H, m, HC–OAc) [1]

Megacarpidine (Soladulcidine)

CAS Registry Number: 511-98-8

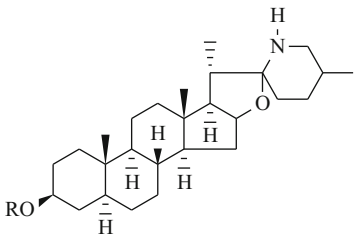


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum megacarpum*
$C_{27}H_{45}NO_2$: 415.345
Mp: 208–209°C [1, 2], 299°C (hydrochloride), 219°C (picrolonate), 152°C (picrate), 232°C (perchlorate), 215.5°C (Ac), 183°C (di Ac) [1]
$[\alpha]_D$ −52° ($CHCl_3$) [2]; −54° (MeOH) [1]

References

1. A.S. Labenskii, I.I. Gerasimenko, L.M. Utkin, Zh. Obshch. Khim. **28**, 3120 (1958)
2. A.S. Labenskii, Zh. Obshch. Khim. **30**, 335 (1960)

Megacarpine



R = Glc + Gal + 2Xyl

Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum megacarpum*
$C_{49}H_{81}NO_{20}$: 1003.535
Mp: 259–260°C (dec., EtOH), 219°C (sulphate)
$[\alpha]_D$ −62° (Py) [1, 2]

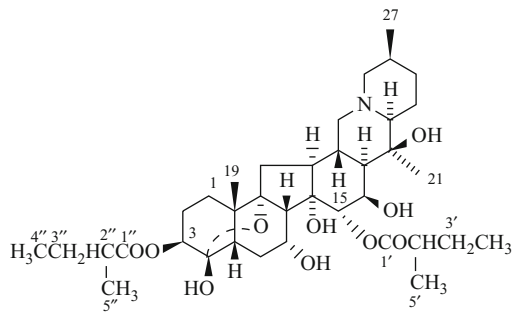
References

1. A.S. Labenskii, I.I. Gerasimenko, L.M. Utkin, Zh. Obshch. Khim. **28**, 3120 (1958)
2. A.S. Labenskii, Zh. Obshch. Khim. **30**, 335 (1960)

3,15-O, O′-(2-Methylbutyroyl) Germine

[3,15–Bis(2-Methylbutyryl) Germine]

CAS Registry Number: 175030-77-0



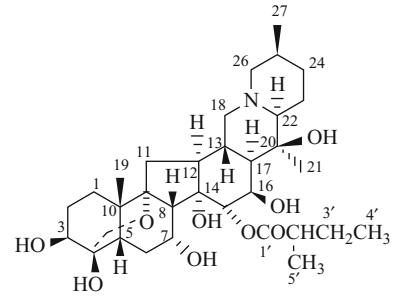
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{37}H_{59}NO_{10}$: 677.4135
Mp: 214–216°C (C_6H_6), 231–233°C (di Ac) [1]
IR: 3290–3490, 2900–2960, 2790–2830, 1735, 1190 [1]
MS m/z: 677 (M^+, 2), 593 (37), 576 (9), 575 (8), 558 (3), 557 (3), 550 (4), 548 (2), 535 (5), 509 (2), 492 (7), 491 (6), 473 (8), 471 (4), 456 (3), 454 (2), 448 (2), 182 (2), 180 (2), 164 (2), 162 (2), 154 (4), 150 (2), 138 (3), 136 (2), 125 (2), 112 (100), 111 (37), 98 (29) [1]
^{1}H NMR ($CDCl_3$): 0.84 (6H, t, J = 7, CH_3-4′, CH_3-4″), 0.88 (3H, s, CH_3-19), 1.13 (3H, s, CH_3-21), 1.01 (3H, d, J = 7, CH_3-27), 1.07 (6H, d, J = 7, CH_3-5′, CH_3-5″), 3.70–4.60 (br s, HC–OH, H–OH), 5.27 (1H, d, J = 3, H-15), 5.03 (1H, m, $W_{1/2}$ = 8, H-3), 6.28 (1H, br s, OH-4) [1]

References

1. R. Shakirov, V.V. Kul'kova, I. Nakhatov, Chem. Nat. Comp. **31**, 79 (1995)

15-(−)-2-Methylbutyrylgermine

CAS Registry Number: 42138-61-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*

$C_{32}H_{51}NO_9$: 539.3564
Mp: 224–226°C (C_6H_6 [1], 252°C (tri Ac) [1]
$[\alpha]_D$ –22° (Py) [1]
IR: 3450, 1735, 1260 [1]
MS m/z: 593(M^+), 576, 558, 535, 491, 474, 472, 456, 112(100) [1]
^{1}H NMR: 0.87(3H, t, CH_3-4′), 0.89(3H, s, CH_3-19), 1.02(3H, d, CH_3-27), 1.09(3H, d, CH_3-5′), 1.13(3H, s, CH_3-21), 5.26(1H, H-15) [1, 2]
^{13}C NMR: [3]

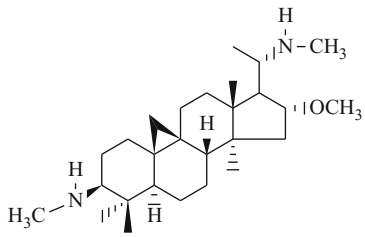
Table 1

C-1	32.1 t	C-10	46.2 s	C-19	19.2 q	C-1′	175.7 s
2	27.0 t	11	33.1 t	20	72.9 s	2′	41.1 d
3	72.7 d	12	47.2 d	21	20.0 q	3′	26.7 t
4	107.0 s	13	33.6 d	22	69.7 d	4′	11.5 q
5	44.5 d	14	81.1 s	23	18.3 t	5′	16.8 q
6	28.6 t	15	69.9 d	24	28.9 t		
7	66.8 d	16	69.3 d	25	27.3 d		
8	47.8 d	17	45.4 d	26	61.2 t		
9	92.6 s	18	61.3 t	27	17.1 q		

References

1. I. Nakhatov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 120 (1983)
2. F.L. Weisenborn, I.W. Bolger, J. Amer. Chem. Soc. **76**, 5543 (1954)
3. W. Zhao, Y. Tezuka, K. Kikuchi, J. Chen, Y. Guo, Chem. Pharm. Bull. **39**, 549 (1991)

O-Methylcyclovirobuxine D



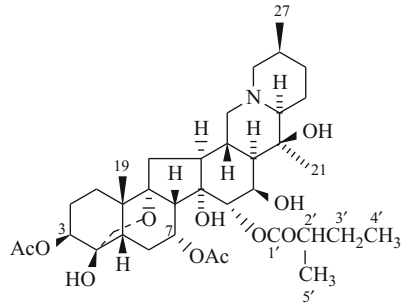
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus sempervirens*
$C_{27}H_{48}N_2O$: 416.3766
Mp: 231–233°C (EtOH), 244°C (di Ac), 255°C (di Me) [1]
$[\alpha]_D$ +84° ($CHCl_3$) [1]
IR: 3045, 2860, 1452, 1275 [1]
MS m/z: 416(M^+), 402, 386, 371, 314, 58(100), 57, 56 [1]
^{1}H NMR: 0.69, 0.90, 1.01(3H, 3H, 6H, s, 4 × CH_3), 1.04(3H, d, J = 6, HC–CH_3), 2.34(6H, s, 2 × HN–CH_3), 3.45(3H, s, OCH_3) [1]

References

1. B.U. Khodzhaev, I.M. Primukhamedov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 743 (1986)

Neogermitrine

CAS Registry Number: 508-66-7



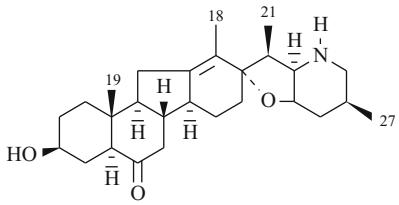
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{36}H_{55}NO_{11}$: 677.3775
Mp: 226–228°C (Me_2CO–Et_2O), 252°C (Ac) [1]
$[\alpha]_D$ −70° (Py) [1]
IR: 3560, 3440, 1740, 1250 [1]
^{1}H NMR: 0.83(3H, t, CH_3-4′), 0.94(3H, s, CH_3-19), 1.01(3H, d, CH_3-27), 1.08(3H, d, CH_3-5′), 1.13(3H, s, CH_3-21), 2.01(3H, s, OAc), 2.03(3H, s, OAc), 4.95(1H, t, H-3), 5.14(1H, d, H-15), 5.74(1H, m, H-7) [1, 2]

References

1. R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 279 (1975)
2. S.M. Kupchan, J. Amer. Chem. Soc. **81**, 1921 (1959)

Peimisine (Ebeiensine)

CAS Registry Number: 19773-24-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardii*, *P. raddeanum*
$C_{27}H_{41}NO_3$: 427.3087
Mp: 267–269°C (MeOH), 252°C (hydrochloride), 259°C (hydrobromide), 256°C (hydroiodide), 232°C (nitrate), 191°C (oxime), 240°C (O.N–di Ac), 240°C (N–Me) [1,2]
$[\alpha]_D$ −45° (EtOH)
IR: 3520, 3260, 2930, 1700, 1665 [3]
MS m/z: 427(M^+), 125(100), 125(100), 124, 111(46) [3]
^{1}H NMR: 0.62(3H, s, CH_3-19), 0.85(3H, d, CH_3-21), 0.90(3H, d, CH_3-27), 1.56(3H, s, CH_3-18) [3]
^{1}H NMR (O.N–di Ac): 0.64(3H, s, CH_3-19), 0.79(3H, d, CH_3-21), 0.97(3H, d, CH_3-27), 1.65(3H, s, CH_3-18), 1.96(3H, s, OAc), 2.04(3H, s, NAc), 4.64(1H, m, HC–OAc) [3]

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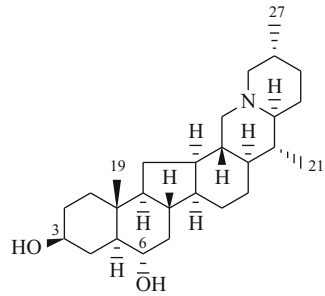
1. R. Shakirov, R.N. Nuriddinov, S.Yu. Yunusov, DAN UzSSR (9), 23 (1963)
2. I. Nakhatov, A. Nabiev, R. Shakirov, Chem. Nat. Comp. **17**, 450 (1981)
3. R.N. Nuriddinov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **3**, 345 (1967)

Petilidine

CAS Registry Number: 22169-21-7



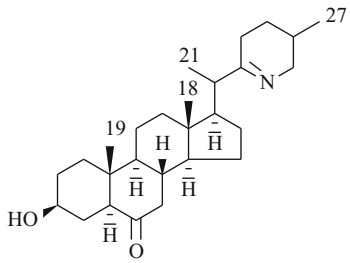
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{27}H_{45}NO_2$: 415.2450
Mp: 265–266°C (Me_2CO–MeOH), 274°C (hydrochloride), 312°C (hydrobromide), 228°C (diketone), amorph. (di Ac) [1]
$[\alpha]_D$ −15.5° (MeOH) [1]
IR: 3300, 2950–2850, 2750, 1450, 1055 [1]
MS m/z: 415(M^+), 400, 397, 112, 111, 98, 97 [1]
^{1}H NMR: 0.71(3H, s, CH_3-19), 0.77(3H, d, CH_3-21), 0.77(3H, d, CH_3-27) [1]
^{1}H NMR (di Ac): 0.79(3H, s, CH_3-19), 0.77(3H, d, CH_3-21), 0.77(3H, d, CH_3-27), 1.96(6H, s, OAc), 4.58(2H, m, H-3, H-6) [1]
^{1}H NMR (diketone): 0.78(3H, d, CH_3-21), 0.78(3H, d, CH_3-27), 0.87(3H, s, CH_3-19) [1]
Pharm./Biol.: Weak antimicrobial activity [2]

References

1. R.N. Nuriddinov, B. Babaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 282 (1968)
2. I. Isamukhamedov, *Pharmacology of Alkaloids and Their Derivaties* [in Russian], (Fan, Tashkent, 1972), p. 185

Petiline

CAS Registry Number: 26989-18-4



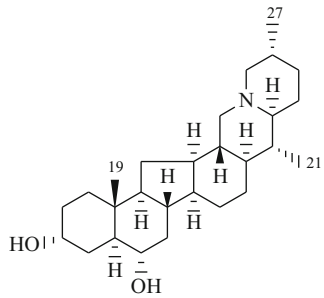
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 206°C (Me_2CO), 289°C (hydrochloride), 316°C (hydrobromide), 220°C (oxime), 189°C (N,O–di Ac), 221°C (N–Me), 210°C (tetrahydro) [1]
$[\alpha]_D$ −51°
Solubility: very sol. MeOH, EtOH, $CHCl_3$; spar. sol. pet. ether
IR: 3400, 3310, 2940–2840, 1718, 1675, 1470
MS m/z: 413(M^+, 54), 398, 395, 165(18), 164(12), 151(16), 150(7), 125(100), 112(17), 111(84), 110(8) [1, 2]
^{1}H NMR: 0.63(3H, s, CH_3-18), 0.68(3H, s, CH_3-19), 0.83(3H, d, CH_3-21), 1.01(3H, d, CH_3-27) [2]
CD: [3]
Pharm./Biol.: Anti-inflammatory, hypotensive [4, 5], and antimicrobial action [6]

References

1. R.N. Nuriddinov, B. Babaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 145 (1968)
2. R.N. Nuriddinov, B. Babaev, S.Yu. Yunusov, Chem. Nat. Comp. **5**, 525 (1969)
3. G.P. Moiseeva, A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 319 (1986)
4. T. Saidkasymov, M. B. Sultanov, Sh. Umarova, *The Pharmacology of Alkaloids and Cardiac Glycosides* [in Russian] (Fan, Tashkent, 1971), p. 187
5. T. Saidkasymov, *The Pharmacology of Plant Substances* [in Russian] (Fan, Tashkent, 1976), p. 60
6. I. Isamukhamedov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (Fan, Tashkent, 1972), p. 185

Petilinine

CAS Registry Number: 21851-16-1



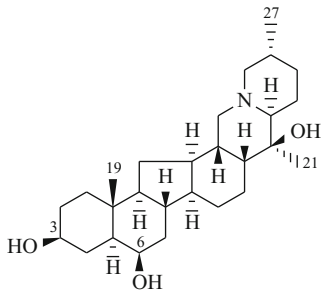
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{27}H_{45}NO_2$: 415.3450
Mp: 277–278°C (MeOH), 297°C (hydrochloride), 283°C (hydrobromide), 194°C (di Ac), 228°C (petilinindione) [1]
$[\alpha]_D$ −10° [1]
Solubility: spar. sol. $CHCl_3$, Me_2CO, MeOH
IR: 3410, 3140, 2980–2860, 2785, 1455, 1435, 1053 [1]
MS m/z: 415(M^+, 32), 112(33), 111(100), 98(10), 97(24) [1]
^{1}H NMR (di Ac): 0.76(3H, s, CH_3-19), 0.77(3H, d, CH_3-21), 0.77(3H, d, CH_3-27), 1.95(3H, s, OAc), 1.98(3H, s, OAc), 4.58(1H, m, HC–OAc), 5.03(1H, m, HC–OAc) [1]
^{1}H NMR (petilinindione): 0.79(3H, d, CH_3-21), 0.79(3H, d, CH_3-27), 0.87(3H, s, CH_3-19) [1]
Pharm./Biol.: Does not exhibit antimicrobial activity [2]

References

1. R.N. Nuriddinov, B. Babaev, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 225 (1968)
2. I. Isamukhamedov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (Fan, Tashkent, 1972), p. 185

Petine

CAS Registry Number: 171236-02-5



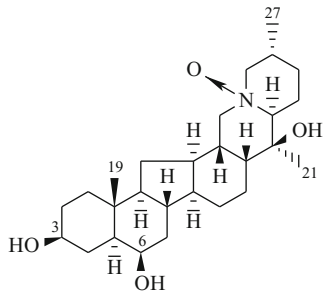
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardi*
$C_{27}H_{45}NO_3$: 431
Mp: 145–147°C (C_6H_{14}–Me_2CO), 210–212°C (petindione) [1]
IR: 3445, 2860–2940, 2780 [1]
MS m/z: 431 (M^+), 416, 413, 388, 380, 364, 358, 236, 180, 164, 162, 156, 155, 154, 150, 140, 125, 124, 113, 112 (100), 98 [1]
MS m/z: **(petindione)**: 427 (M^+), 412, 410, 384, 382, 356, 355, 354, 164, 162, 156, 155, 154, 150, 140, 125, 124, 113, 112 (100), 111, 98 [1]
^{1}H NMR ($CDCl_3$): 0.94(3H, s, CH_3-19), 1.01(3H, s, CH_3-21), 0.77(3H, d, J = 7, CH_3-27), 3.56(1H, m, H-3), 3.76(1H, m, H-6) [1]
^{1}H NMR (petindione): 0.88(3H, s, CH_3-19), 1.02(3H, s, CH_3-21), 0.78(3H, d, J = 7, CH_3-27) [1]

References

1. U.T. Shakirova, R. Shakirov, Chem. Nat. Comp. **30**, 483 (1994)

Petine N-oxide

CAS Registry Number: 170557-06-9



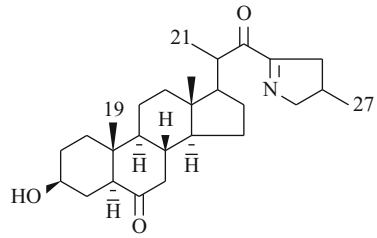
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium eduardi*
$C_{27}H_{45}NO_4$: 447
Mp: 241–243°C (Me_2CO) [1]
IR: 3410, 2885–2950, 1460, 970, 937, 930 [1]
MS m/z: 447 (M^+), 431, 430, 429, 413, 414, 415, 416, 388, 386, 374, 358, 344, 236, 180, 164, 162, 156, 155, 154, 150, 140, 125, 124, 113, 112 (100), 98 [1]
^{1}H NMR ($CDCl_3$): 0.93(3H, s, CH_3-19), 1.01(3H, s, CH_3-21), 0.85(3H, d, J = 7, CH_3-27) [1]

References

1. U.T. Shakirova, R. Shakirov, Chem. Nat. Comp. **30**, 483 (1994)

Petisidine

CAS Registry Number: 79805-74-6



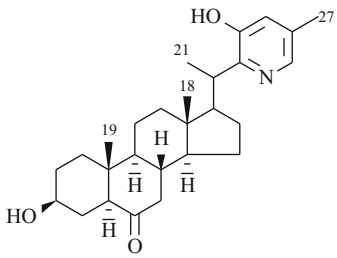
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*, *Korolkowia sewerzowii*
$C_{27}H_{41}NO_3$: 427.3087
Mp: 150–152°C (Me_2CO–C_6H_{14}) [1]
$[\alpha]_D$ −20° (MeOH) [1]
Solubility: very sol. $CHCl_3$ [1–3]
UV: 285(2.65) [2]
IR: 3380, 1691, 1615, 1065 [2]
MS m/z: 427(M^+, 33), 412(7), 256(7), 164(9), 150(9), 149(14), 140(100), 139(33), 129(9), 124(9), 121(7), 111(28), 110(19), 97(28) [2]
^{1}H NMR: 0.57(3H, s, CH_3-19), 0.66(3H, s, CH_3-18), 0.99(3H, d, J = 6, CH_3-21), 1.06(3H, d, J = 7, CH_3-27) [2, 3]

References

1. A. Nabiev, R. Shakirov, Shakirova U.T., Khim. Prirod. Soedin. 405 (1981)
2. A. Nabiev, I. Nakhatov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 502 (1982)
3. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **21**, 130 (1985)

Petisidinine

CAS Registry Number: 89783-63-1



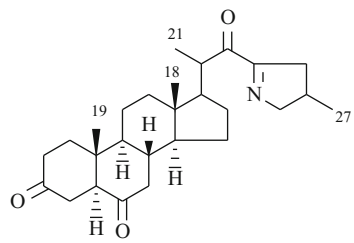
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{27}H_{39}NO_3$: 425.2930
Mp: 290–292°C (MeOH), 330°C (dihydro), 154°C (octahydro) [1]
IR: 3400, 3030, 2950, 2875, 1710, 1610, 1585, 765 [1]
MS m/z: 425(M^+), 410, 408, 394, 356, 285, 177, 176, 162, 150, 149, 137(100), 136, 123, 119, 111, 110, 97 [1]
^{1}H NMR: 0.60(6H, s, CH_3-18, CH_3-19), 1.07(3H, d, CH_3-21), 2.16(CH_3–Ar), 6.81, 7.64(2H, H–Ar) [1]

References

1. I. Nakhatov, A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 710 (1983)

Petisidinone

CAS Registry Number: 107316-97-2



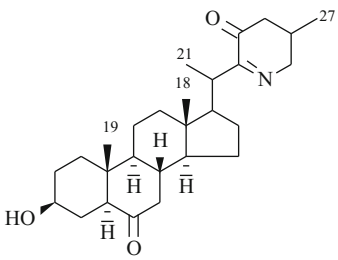
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{27}H_{39}NO_3$: 425.2930
Mp: 217–219°C (C_6H_{14}–Me_2CO) [1]
$[\alpha]_D$ ±0° [1]
Solubility: sol. $CHCl_3$, EtOH, MeOH [1]
IR: 1710, 1690, 1610 [1]
MS m/z: 425(M^+), 410, 397, 149, 140(100), 139, 110, 97 [1]
^{1}H NMR: 0.60(3H, s, CH_3-18), 0.86(3H, s, CH_3-19), 0.99(3H, d, J = 5, CH_3-21), 1.00(3H, d, J = 6, CH_3-27) [1]

References

1. A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 583 (1986)

Petisine (Petizine)

CAS Registry Number: 79805-75-7



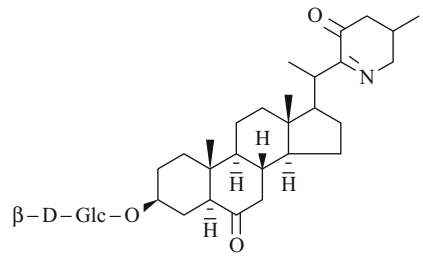
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{27}H_{41}NO_3$: 427.3087
Mp: 221–222°C (MeOH) [1]
$[\alpha]_D$ −34° (MeOH) [1]
UV: 270, 277(2.74, 2.66) [1]
IR: 3400, 1710, 1628 [1]
MS m/z: 427(M^+, 100), 412, 399, 394, 150, 149, 140, 139, 121, 119, 111, 97 [1]
^{1}H NMR: 0.71(3H, s, CH_3-19), 0.71(3H, s, CH_3-18), 1.00(3H, d, CH_3-21), 1.06(3H, d, CH_3-27) [2]
CD: [3]

References

1. A. Nabiev, R. Shakirov, U.T. Shakirova, Chem. Nat. Comp. **17**, 405 (1981)
2. I. Nakhatov, A. Nabiev, R. Shakirov, Chem. Nat. Comp. **17**, 450 (1981)
3. G.P. Moiseeva, A. Nabiev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 319 (1986)

Petisinine (Petizinine)

CAS Registry Number: 80981-47-1



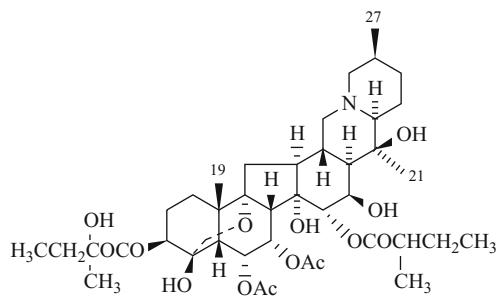
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{33}H_{51}NO_8$: 589.3615
Mp: 232–234°C (MeOH) [1]
$[\alpha]_D$ −35° [1]
Solubility: sol. $CHCl_3$, MeOH [1]
IR: 3430, 1715, 1630, 1100–1000 [1]
MS m/z: 589(M^+) [1]

References

1. I. Nakhatov, A. Nabiev, R. Shakirov, Chem. Nat. Comp. **17**, 450 (1981)

Protoveratrine A (Protoveratrine)

CAS Registry Number: 143-57-7



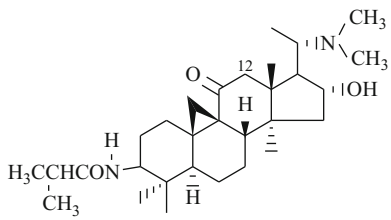
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum, V. nigrum, V. oxysepalum*
$C_{41}H_{63}NO_{14}$: 793.4249
Mp: 260–262°C (EtOH)
$[\alpha]_D$ −44° (Py)
UV(H^+): 250, 330, 370, 530
IR: 1740, 1245 [1, 2]

References

1. N.V. Bondarenko, Chem. Nat. Comp. **18**, 504 (1982)
2. S.M. Kupchan, C.I. Ayres, J. Amer. Chem. Soc. **82**, 2252 (1960)

Pseudobaleabuxine F (Pseudobaleabuxine)

CAS Registry Number: 31768-83-9



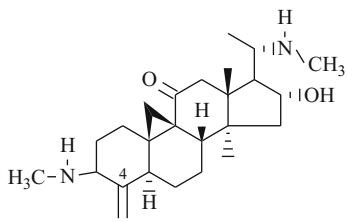
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus balearica*
$C_{30}H_{50}N_2O_2$: 470.3872
Mp: 236–240°C (Me_2CO) [1]
$[\alpha]_D$ +121° ($CHCl_3$) [1]
UV: 219(3.86) [2]
IR: 3600, 3400, 1685, 1660 [1]
MS m/z: 470(M^+), 469, 72(100) [2]
^{1}H NMR: 0.70(3H, s, CH_3), 0.78(3H, s, CH_3), 0.79(3H, d, J = 6, HC–CH_3), 0.83(3H, s, CH_3), 0.96(3H, s, CH_3), 1.08(3H, d, HC–CH_3), 1.10(3H, d, J = 6.8, HC–CH_3), 2.11(6H, s, $N(CH_3)_2$), 2.34(2H, H-12), 5.32(1H, NH) [3]

References

1. I.O. Kurakina, N.F. Proskurina, P.N. Kibal'chik, Chem. Nat. Comp. **5**, 20 (1969)
2. I.O. Kurakina, N.F. Proskurina, A.U. Stepanyants, Chem. Nat. Comp. **5**, 337 (1969)
3. I.O. Kurakina, N.F. Proskurina, A.U. Stepanyants, D.M. Mondeshka, Chem. Nat. Comp. **6**, 225 (1970)

Pseudocyclobuxine D

CAS Registry Number: 54357-48-1



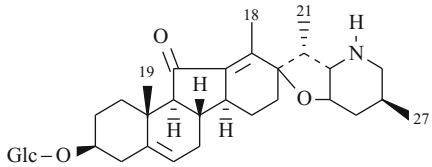
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Buxus colchica, B. sempervirens*
$C_{25}H_{42}N_2O$: 386.3297
Mp: 229–231°C (EtOH), 200°C (di Me), 240°C (tri Ac) [1]
$[\alpha]_D$ +90° ($CHCl_3$) [1]
IR: 3312, 3155, 3048, 2935, 1648, 1452, 910 [1]
MS m/z: 386(M^+, 4), 372(3), 371(11), 370(28), 357(3), 356(10), 355(25), 340(22), 330(5), 328(4), 312(9), 70(2), 58(1), 57(1), 56(5), 55(4), 45(6), 44(100), 43(8), 41(5) [1]
^{1}H NMR: 0.94(3H, s, CH_3), 1.05(3H, d, J = 7, CH_3), 1.09(3H, s, CH_3), 2.38(3H, s, NCH_3), 2.44(3H, s, NCH_3), 3.97(1H, m, HC–OH), 4.54, 4.77(2H, d, J < 1, CH_2-4) [1]

References

1. B.U. Khodzhaev, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 723 (1973)

Pseudojervine

CAS Registry Number: 36069-05-3



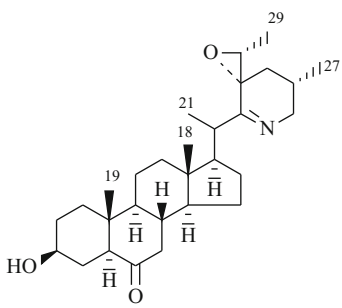
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum dahuricum, V. lobelianum*
$C_{33}H_{49}NO_8$: 587.3458
Mp: 278–280°C (MeOH)
$[\alpha]_D$ −101° (EtOH–$CHCl_3$)
UV: 253, 361
IR: 3535, 3300, 2930, 1700, 1635, 1450, 1145–1000
MS m/z: 587(M^+), 110(100) [1, 2]

References

1. R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 840 (1971)
2. S.M. Kupchan, M.I. Suffness, J. Amer. Chem. Soc. **90**, 2730 (1968)

Radpetine

CAS Registry Number: 139751-06-7



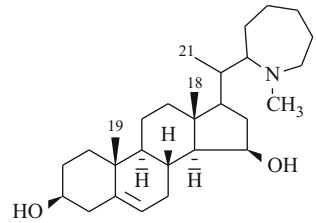
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Petilium raddeanum*
$C_{29}H_{45}NO_3$: 455.3399
Mp: 229–231°C (Me_2CO–pet. ether), 103°C (Ac) [1]
IR: 3380, 1712, 1645 [1]
MS m/z: 455, 440, 437, 424, 412, 398, 384, 206, 192, 178, 167(100), 152, 112 [1]
^{1}H NMR: 0.65(3H, s, CH_3-18), 0.71(3H, s, CH_3-19), 0.95(3H, d, J = 6, CH_3-27), 1.01(3H, d, J = 6, CH_3-21), 1.29(3H, d, J = 6, CH_3-29), 3.52(1H, m, H-3) [1]
X-ray: [1]

References

1. B. Tashkhodzhaev, S. Nasirov, A. Nabiev, R. Shakirov, K. Samikov, M.R. Yagudaev, Chem. Nat. Comp. **27**, 332 (1991)

Rinolidine

CAS Registry Number: 70474-40-7



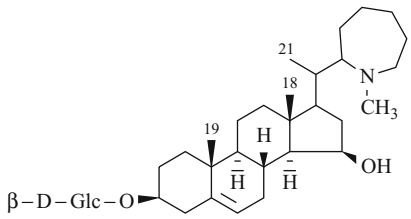
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Fritillaria walujewii*
$C_{28}H_{47}NO_2$: 429.3607
Mp: 199–201°C (Me_2CO)
$[\alpha]_D$ −53° (EtOH) [1, 2]
IR: 3450–3140, 2797, 1050 [1]
MS m/z: 429(M^+), 414, 402, 401, 400, 386, 179, 168, 164, 154, 149, 137, 125, 124, 113, 112(100) [1]
^{1}H NMR: 0.90(3H, s, CH_3-18), 0.97(3H, s, CH_3-19), 1.03(3H, d, CH_3-21), 2.22(3H, s, NCH_3), 4.43(1H, m, CH–OH), 5.30(1H, m, C = CH) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 701 (1978)
2. K. Samikov, R. Shakirov, Khim. Prirod. Soedin. 530 (1981)

Rinoline

CAS Registry Number: 72060-81-2



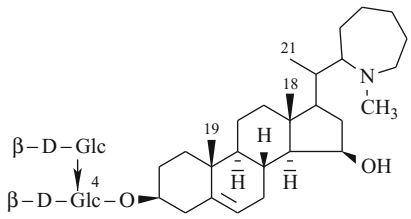
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum bucharicum, Rh. karelinii, Fritillaria walujewii*
$C_{34}H_{57}NO_7$: 591.4135
Mp: 255–257°C (MeOH) [1]
$[\alpha]_D$ −53° (EtOH) [1]
IR: 3500–3120, 2965–2830, 2800, 1650, 1470–1450, 1100–1000 [1]
^{1}H NMR: 0.90(3H, s, CH_3-18), 0.98(3H, s, CH_3-19), 1.02(3H, d, CH_3-21), 2.25(3H, s, NCH_3), 5.32(1H, m, C = CH) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 701 (1978)

Rinolinine

CAS Registry Number: 72060-81-2



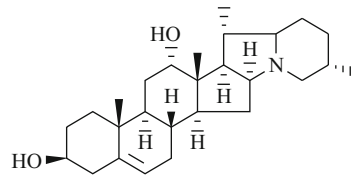
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum bucharicum, Rh. karelinii, Fritillaria walujewii*
$C_{40}H_{67}NO_{12}$: 753.463
Mp: 301–302°C (MeOH) [1]
$[\alpha]_D$ −36.5° (EtOH) [1]
IR: 3400, 2963–2855, 2795, 1460, 1447, 1110–1020 [1]
^{1}H NMR: 0.90(3H, s, CH_3-18), 0.98(3H,0020s, CH_3-19), 1.03(3H, d, CH_3-21), 2.20(3H, s, NCH_3), 5.30(1H, m, C = CH) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 303 (1979)

Rubijervine

CAS Registry Number: 79-58-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum dahuricum, V. lobelianum, V. nigrum, V. oxysepalum*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 239–241°C (EtOH), 269°C (hydrobromide) [1]
$[\alpha]_D$ −18° (EtOH) [1]
UV: 250, 323, 444, 504 [1]
IR: 3500, 3000, 1670, 1420 [2]
HPLC: [3]
Pharm./Biol.: Antimicrobial activity [4]

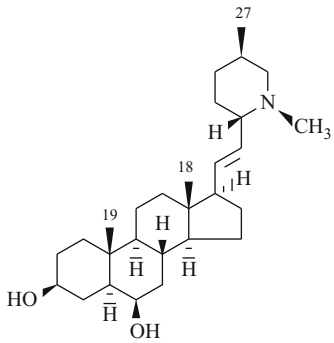
References

1. N.V. Bondarenko, A.L. Shinkarenko, G.I. Gerashchenko, Chem. Nat. Comp. **7**, 843 (1971)
2. S.W. Pelletier, D.M. Locke, J. Amer. Chem. Soc. **79**, 4531 (1957)

3. I.R. Hunter, M.K. Walden, E. Heftmann, J. Chromatogr. **198**, 363 (1980)
4. K.A. Sayed, D.Ch. Dunbar, Chem. Pharm. Bull. **50**(11), 1427 (2002)

Sevcoridinine

CAS Registry Number: 27509-73-5



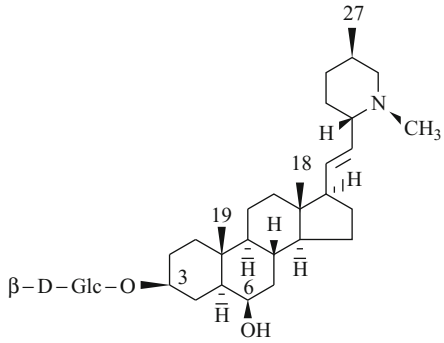
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{28}H_{47}NO_2$: 429.3607
Mp: 241–243°C (Me_2CO) [1]
IR: 3400, 3125, 2795, 1670 [1]
MS m/z: 429(M^+), 414, 411, 400, 358, 178, 164, 150, 138, 125, 112(100) [1]
^{1}H NMR: 0.54(3H, s, CH_3-18), 0.81(3H, d, CH_3-27), 0.98(3H, s, CH_3-19), 2.12(3H, s, NCH_3), 5.35(2H, HC = CH) [2]
X-ray: [3]

References

1. D.U. Abdullaeva, K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **14**, 702 (1978)
2. K. Samikov, R. Shakirov, D.U. Abdullaeva, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 244 (1976)
3. S.M. Nasirov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 721 (1987)

Sevcorine (Sewcorine)

CAS Registry Number: 19625-06-0



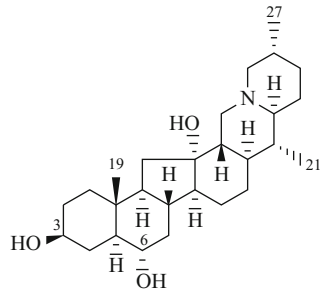
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{34}H_{57}NO_7$: 591.4135
Mp: 236–238°C (MeOH), 223°C (hydrobromide), 216°C (hydrochloride) [2]; 243°C (sevcoridinine), 181°C (O,O'-di Ac sevcoridinine) [1]
$[\alpha]_D$ –41° (MeOH) [1]
IR: 3430–3350, 2860–2840, 2790, 1450, 1100–1030 [2]
MS(sevcoridinine): 429(M^+), 414, 411, 400, 358, 178, 164, 149, 138, 125, 112(100) [3]
^{1}H NMR (sevcoridinine): 0.54(3H, s, CH_3-18), 0.81(3H, d, CH_3-27), 0.98(3H, s, CH_3-19), 2.12(3H, s, NCH_3), 5.35(2H, m, CH = CH) [3]
^{1}H NMR (O,O'-di Ac sevcoridinine): 1.99, 2.01(6H, s, OAc), 4.62, 4.89(2H, m, H-3, H-6) [1]
X-ray: [3]

References

1. K. Samikov, R. Shakirov, D.U. Abdullaeva, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 244 (1976)
2. R.N. Nuriddinov, S.Yu. Yunusov, Chem. Nat. Comp. **4**, 52 (1968)
3. S.M. Nasirov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **23**, 721 (1987)

Sevedamine (Sewedamine)

CAS Registry Number: 107657-48-7



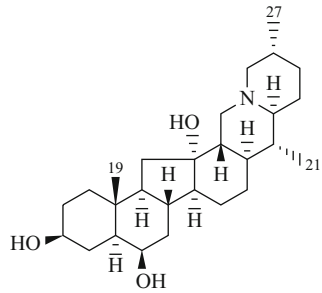
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{45}NO_3$: 431.3399
Mp: 256–258°C (Me_2CO), amorph. (di Ac)
$[\alpha]_D$ +4° (EtOH)
IR: 3390, 2950–2850, 2770, 1460, 1060, 1040
MS m/z: 431(M^+), 416, 414, 413, 402, 400, 373, 232, 218, 179, 178, 164, 162, 149, 138, 125, 124, 112, 111(100), 98
^{1}H NMR: 0.73(3H, s, CH_3-19), 0.84(6H, CH_3-21, CH_3-27)
^{1}H NMR (di Ac): 0.79(3H, s, CH_3-19), 0.84(6H, CH_3-21, CH_3-27), 2.00(6H, s, 2 × OAc), 4.63(2H, m, H-3, H-6) [1, 2]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 585 (1986)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Sevedine (Cevedine)

CAS Registry Number: 66512-88-7



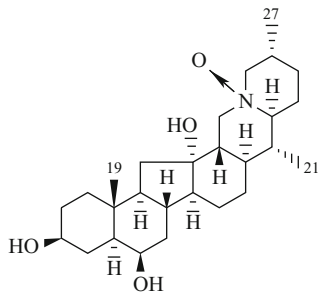
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{45}NO_3$: 431.3399
Mp: 212–214°C (Me_2CO), 204°C (di Ac), 217°C (dione)
$[\alpha]_D$ −17° ($CHCl_3$)
IR: 3375, 2983–2865, 2775, 1470, 1450, 1035
MS m/z: 431(M^+), 416, 413, 402, 398, 375, 360, 179, 178, 166, 164, 162, 150, 139, 138, 125, 124, 112, 111(100), 98
^{1}H NMR (di Ac): 0.81(6H, d, CH_3-21, CH_3-27), 0.94(3H, s, CH_3-19), 2.00(6H, s, 2 × OAc), 4.68(1H, m, HC–OAc), 4.97(1H, HC–OAc)
^{1}H NMR (dione): 0.81(6H, d, CH_3-21, CH_3-27), 0.87(3H, s, CH_3-19) [1, 2]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 559 (1977)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Sevedine N-oxide (Cevedine N-Oxide)

CAS Registry Number: 74119-89-4

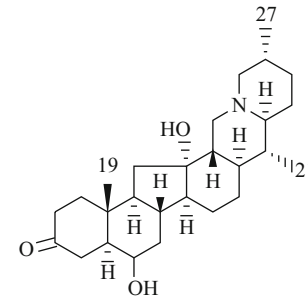


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{45}NO_4$: 447.3349
Mp: 241–243°C (MeOH–Me_2CO)
$[\alpha]_D$ –14° (EtOH)
Solubility: sol. EtOH, MeOH, H_2O
IR: 3440, 2950–2886, 1470, 1050, 960
MS m/z: 447(M^+), 432, 431, 430, 429, 412, 411, 402, 375, 178, 166, 164, 162, 149, 124, 112, 111(100), 98
^{1}H NMR: 0.87(6H, d, J = 7, CH_3-21, CH_3-27), 0.98(3H, s, CH_3-19) [1, 2]

References

1. K. Samikov, V.V. Kul'kova, R. Shakirov, Khim. Prirod. Soedin. 529 (1981)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Sevedinine



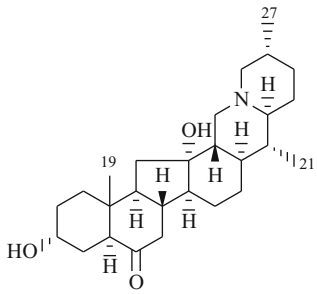
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkovia severzowii*
$C_{27}H_{43}NO_3$: 429.3243
Mp: 233–235°C (Me_2CO), 182–184°C (Ac), 215–217°C (keton), 212–214°C (dihydro) [1]
IR: 3537, 2760, 1710, 1038 [1]
MS m/z: 429 (M^+), 414, 412, 411, 400, 396, 358, 178, 162, 139, 138, 125, 124, 112, 111 (100%), 98 [1]
^{1}H NMR: 0.80 (6H, d, CH_3-21, CH_3-27), 1.11 (3H, s, CH_3-19) [1]
^{1}H NMR (Ac): 0.80 (6H, d, CH_3-21, CH_3-27), 1.09 (3H, s, CH_3-19), 2.01 (3H, s, $OCOCH_3$), 4.91 (H, m, HC–$OCOCH_3$) [1]
X-ray: [1]

References

1. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Seveline (Ceveline)

CAS Registry Number: 73307-46-7



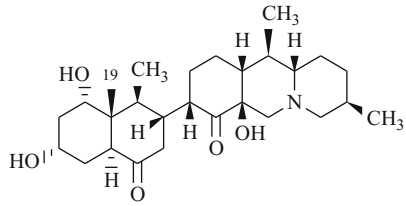
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_3$: 429.3243
Mp: 267–269°C (Me_2CO), amorph. (Ac), 236°C (ketone), 261°C (dihydro), amorph. (di Ac dihydro) [1]
$[\alpha]_D$ +49° (EtOH–$CHCl_3$) [1]
UV: 290(2.31) [1]
IR: 3470–3340, 2970–2860, 2750, 1690 [1]
MS m/z: 429(M^+), 414, 412, 411, 400, 396, 373, 358, 290, 271, 260, 235, 234, 223, 180, 178, 166, 150, 149, 140, 138, 125, 124, 112(100), 111, 98 [1]
^{1}H NMR: 0.71(3H, s, CH_3-19), 0.85(3H, d, CH_3-27),0.88(3H, s, CH_3-21) [1]
^{1}H NMR (Ac): 0.72(3H, s, CH_3-19), 0.84(3H, d, CH_3-27), 0.87(3H, s, CH_3-21), 1.98(3H, s, OAc), 5.09(1H, m, HC–OAc) [1]
^{1}H NMR (ketone): 0.83(3H, d, CH_3-27), 0.86(3H, s, CH_3-21), 0.92(3H, s, CH_3-19) [1]
^{1}H NMR (dihydro): 0.84(3H, d, CH_3-27), 0.87(3H, s, CH_3-21), 0.95(3H, s, CH_3-19) [1]
^{1}H NMR (di Ac dihydro): 0.83(3H, d, CH_3-27), 0.86(3H, s, CH_3-21), 1.00(3H, s, CH_3-19), 1.96, 1.98(each 3H, s, 2 × OAc), 4.89, 5.05(each 1H, 2 × HC–OAc) [1, 2]

References

1. K. Samikov, D.U. Abdullaeva, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 459 (1979)
2. D.U. Abdullaeva, K.K. Turguniv, R. Shakirov, Abstracts *Aktual Problems of the Chemistry of Natural Compounds*, Tashkent, Uzbekistan, 18–19 March, 2009, p. 151

Severidine (Seweridine)

CAS Registry Number: 80248-74-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_5$: 461.3141
Mp: 200–202°C (Me_2CO), 237°C (hydrochloride), amorph. (di Ac), amorph. (tri Ac), 245°C (tetrahydro), amorph. (penta Ac tetrahydro) [1]
$[\alpha]_D$ −98° (EtOH) [1, 2]
IR: 3400, 2990–2817, 2780, 2760, 1710, 1700, 1482–1400 [1]
MS m/z: 461(M^+), 446, 444, 430, 413, 251, 250(100), 234, 233, 196, 180, 178, 164, 162, 139, 125, 124, 112, 111, 98, 97 [1]
^{1}H NMR: 0.59(3H, s, CH_3-19), 0.81(9H, d, 3 × CH–CH_3) [1]
^{1}H NMR (tri Ac): 0.65(3H, d, CH–CH_3), 0.68(3H, s, CH_3-19), 0.75(3H, d, CH–CH_3), 0.81(3H, d, CH–CH_3), 1.96, 2.01, 2.05(each 3H, s, OAc), 4.85, 5.05(2H, m, HC–OAc) [1]

^{1}H NMR (di Ac): 0.67(3H, d, HC–CH_3), 0.70(3H, s, CH_3-19), 0.74(3H, d, HC–CH_3), 0.80(3H, d, HC–CH_3), 1.96, 2.06(6H, s, OAc), 4.83, 5.04(each 1H, HC–OAc) [1]

^{1}H NMR (tetrahydro): 0.82(3H, s, CH_3-19), 0.82(9H, d, 3 × HC–CH_3) [1]

^{1}H NMR (penta Ac tetrahydro): 0.74(3H, d, HC–CH_3), 0.77(3H, s, CH_3-19), 0.86(6H, d, 2 × HC–CH_3), 1.95, 1.97, 2.02(15H, s, 5 x OAc), 4.78, 4.88, 4.99(4H, m, 4 × HC–OAc) [1]

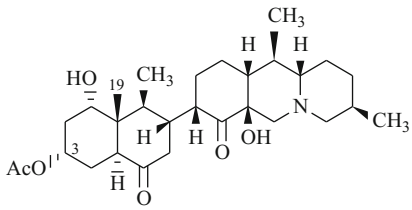
X-ray: [2]

References

1. K. Samikov, D.U. Abdullaeva, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 459 (1979)
2. S.M. Nasirov, L.G. Kuz'mina, K. Samikov, R. Shakirov, D. U. Abdullaeva, Yu.T. Struchkov, S.Yu. Yunusov, Chem. Nat. Comp. **17**, 265 (1981)

Severidinine (Seweridinine)

CAS Registry Number: 88755-00-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Korolkowia sewerzowii*

$C_{29}H_{45}NO_6$: 503.3247

Mp: 145–147°C (Me_2CO–pet. ether), 200°C (hydrochloride), 150°C (ketone), amorph. (Ac ketone) [1]

$[\alpha]_D$ −50° ($CHCl_3$) [1]

IR: 3460, 2960–2815, 2780, 1730, 1710, 1260 [1]

MS m/z: 503(M^+), 486, 470, 460, 444, 442, 420, 411, 400, 276, 251, 250(100), 238, 233, 196, 180, 178, 166, 164, 162, 140, 139, 138, 125, 124, 112, 111, 98 [1]

^{1}H NMR: 0.60(3H, s, CH_3-19), 0.77, 0.80(9H, d, 3 × HC–CH_3), 2.01(3H, s, OAc), 5.18(1H, m, H-3) [1]

^{1}H NMR (ketone): 0.75, 0.80, 0.91(each 3H, d, HC–CH_3), 1.08(3H, s, CH_3-19), 1.97(3H, s, OAc), 5.36(1H, m, H-3) [1]

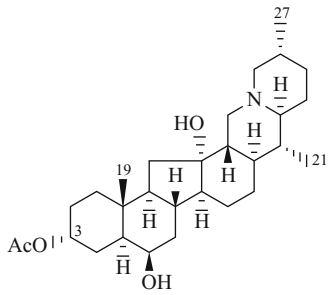
^{1}H NMR (Ac ketone): 0.79, 0.87(9H, d, 3 × HC–CH_3), 1.04(3H, s, CH_3-19), 1.96, 2.01(each 3H, s, OAc), 5.34(1H, m, H-3) [1]

References

1. D.U. Abdullaeva, K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 459 (1983)

Severine

CAS Registry Number: 139165-01-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Korolkowia sewerzowii*

$C_{29}H_{47}NO_4$: 473.3505

Mp: 144–146°C (C_6H_6), amorph. (Ac) [1]

$[\alpha]_D$ –21° ($CHCl_3$) [1]

IR: 3460, 2947–2860, 2770, 1734, 1463, 1440, 1250 [1]

MS m/z: 473(M^+), 458, 455, 444, 431, 430, 418, 417, 412, 179, 178, 166, 165, 164, 150, 149, 138, 125, 124, 112, 111(100), 98 [1]

^{1}H NMR: 0.93(3H, s, CH_3-19), 2.00(3H, OAc), 5.07(1H, H-3) [1]

^{1}H NMR (Ac): 0.80(3H, d, CH_3-21), 0.80(3H, d, CH_3-27), 0.90(3H, s, CH_3-19), 1.97(3H, s, OAc),

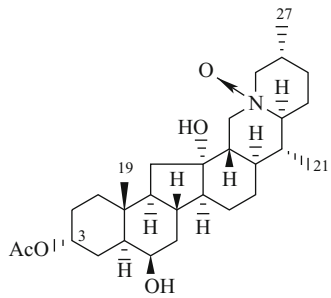
2.00(3H, s, OAc), 4.88(1H, HC–OAc), 5.05(1H, s, HC–OAc) [1, 2]

References

1. D.U. Abdullaeva, K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 557 (1977)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Severine N-oxide (Ceverine N-Oxide)

CAS Registry Number: 74119-88-3



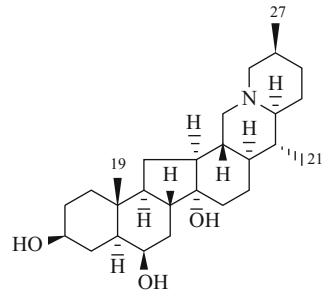
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{29}H_{47}NO_5$: 489.3454
Mp: 255–257°C (MeOH) [1]
$[\alpha]_D$ ±0° [1]
IR: 3380, 2980–2855, 1725, 1455, 1255, 970, 954, 935 [1]
MS m/z: 489(M^+), 473, 472, 471, 458, 454, 453, 444, 440, 430, 417, 412, 178, 166, 162, 149, 124, 112, 111(100), 98 [1]
^{1}H NMR: 0.84(6H, d, CH_3-21, CH_3-27), 0.94(3H, s, CH_3-19), 1.97(3H, s, OAc), 5.07(1H, m, H-3) [1, 2]

References

1. K. Samikov, D.U. Abdullaeva, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 728 (1979)
2. D.U. Abdullaeva, K.K. Turgunov, B. Tashkhodzhaev, K. Samikov, R. Shakirov, Chem. Nat. Comp. **40**, 394 (2004)

Severtcidine (Sewertzidine)

CAS Registry Number: 61950-74-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{45}NO_3$: 431.3399
Mp: 244–245°C (Me_2CO), 226°C (hydrochloride), amorph. (di Ac), 139°C (dione) [1]
$[\alpha]_D$ −46° ($CHCl_3$) [1]
IR: 3450, 2960–2860, 2785 [1]
MS m/z: 431(M^+), 416, 413, 402, 398, 376, 375, 360, 274, 272, 258, 234, 180, 178, 164, 162, 159, 150, 140, 139, 138, 128, 126, 125, 124, 112, 111(100), 98 [1]
^{1}H NMR: 0.76(3H, d, J = 7, CH_3-21), 0.97(3H, s, CH_3-19), 1.05(3H, d, J = 7, CH_3-27) [1]
^{1}H NMR (di Ac): 0.76(3H, d, J = 7, CH_3-21), 0.99(3H, s, CH_3-19), 1.04(3H, d, J = 7, CH_3-27), 1.99(3H, s, OAc), 2.01(3H, s, OAc), 3.77(1H, m, HC–OH), 4.65(1H, m, HC–OAc), 4.98(1H, m, HC–OAc) [1]
^{1}H NMR (dione): 0.78(3H, d, J = 7, CH_3-21), 0.91(3H, s, CH_3-19), 1.04(3H, d, J = 7, CH_3-27) [1]

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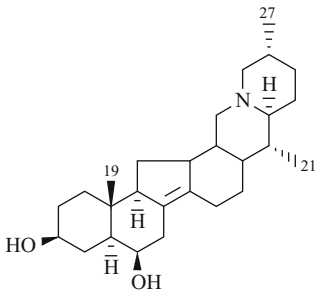
1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 320 (1976)

Severzine

CAS Registry Number: 78982-11-3



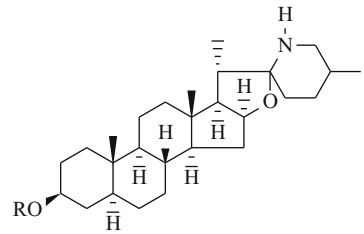
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Korolkowia sewerzowii*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 202–204°C, amorph. (di Ac), amorph. (dione) [1]
$[\alpha]_D$ −45° [1]
IR: 3420, 3100, 3018, 2960–2827, 2778, 1663 [1]
MS m/z: 413(M^+, 398, 396, 384, 357, 356, 300, 282, 190, 178, 164, 162, 150, 124 112, 111(100), 98 [1]
^{1}H NMR: 0.77(3H, s, CH_3-19), 0.80(3H, d, CH_3-21), 0.86(3H, d, CH_3-27) [1]
^{1}H NMR (di Ac): 0.77(3H, s, CH_3-19), 0.80(3H, d, CH_3-21), 0.86(3H, d, CH_3-27), 1.95, 2.00(each 3H, s, OAc), 4.68, 4.88(each 1H, 2 × HC–OAc) [1]
^{1}H NMR (dione): 0.86(9H, CH_3-19, CH_3-21, CH_3-27) [1]

References

1. K. Samikov, R. Shakirov, Khim. Prir. Soedin. 252 (1981)

α-Soladulcine

CAS Registry Number: 37337-73-8



R = D – Glc + D – Gal + L – Rha

Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum dulcamara, S. pseudopersicum*
$C_{50}H_{83}NO_{21}$: 1033.546
Mp: 268–270°C(dec., MeOH) [1–4]
$[\alpha]_D$ −58° (MeOH) [1]
UV(H^+): 255, 318, 400(4.14, 4.58, 3.87) [1]
IR: 3400, 1140, 1050 [1]
Pharm./Biol.: Specifically inhibits the growth of fungal cultures [5]

References

1. E.A. Tukalo, B.T. Ivanchenko, Chem. Nat. Comp. **7**, 203 (1971)
2. K. Schreiber, Planta Med. **6**, 94 (1958)
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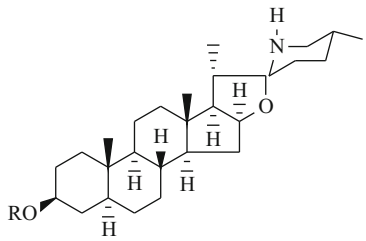
4. S.M. Aslanov, Chem. Nat. Comp. **11**, 278 (1975)
5. E.A. Tukalo, E. S. Leplya, B.T. Ivanchenko, *Nauch. Dokl. Vysshei Shkoly*, Biol. Nauki, No. **12**, 99 (1972)

β-Soladulcine

CAS Registry Number: 11093-43-9



R = D – Glc + D – Gal + L – Rha

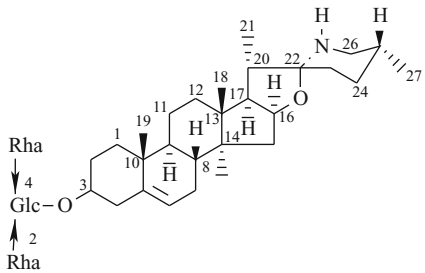
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum dulcamara, S. pseudopersicum*
$C_{45}H_{75}NO_{16}$: 885.5086
Mp: 246–248°C (dec., MeOH) [1, 2]
$[\alpha]_D$ −39° (MeOH) [1]
UV(H⁺): 267, 325, 410(4.01, 4.31, 3.66) [1]
IR: 3400, 1140, 1050 [1]

References

1. E.A. Tukalo, B.T. Ivanchenko, Chem. Nat. Comp. **7**, 203 (1971)
2. K. Schreiber, Planta Med. **6**, 94 (1958)

Solamargine

CAS Registry Number: 20311-51-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum kieseritzkii, S. nigrum, S. persicum, S. pseudopersicum, S. rostratum, S. transcaucasicum*
$C_{45}H_{73}NO_{15}$: 867.498
Mp: 300–304°C (MeOH) [1–3]; 189°C (picrate), 205°C (picrolonate), 120°C (benzoate) [2]
$[\alpha]_D$ −96° (MeOH) [4]
UV(H⁺): 268, 320, 408(4.24, 4.49, 3.94) [5]
IR: 3550–3180, 1640, 1620, 1460, 1380, 1140, 1060, 980 [4]
HPLC: [6]
^{13}C NMR: [7]

Table 1

C-1	37.5	C-10	37.1	C-19	19.3	C-1′	100.2	C-4″	73.7
2	30.1	11	21.1	20	41.6	2′	78.2	5″	70.3
3	78.3	12	40.1	21	15.6	3′	72.5	6″	18.3
4	38.8	13	40.6	22	98.2	4′	77.7	C-1‴	101.8
5	140.8	14	56.7	23	34.6	5′	76.7	2‴	72.5
6	121.7	15	31.5	24	31.0	6′	61.3	3‴	72.5
7	32.4	16	78.7	25	31.7	C-1″	102.7	4‴	73.9
8	32.4	17	63.4	26	48.0	2″	72.5	5‴	69.3
9	50.3	18	16.5	27	19.7	3″	72.5	6‴	18.5

Pharm./Biol.: Hemolytic activity [8]; Anticancer activity [9]

References

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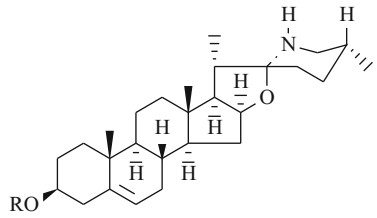
β-Solamargine

CAS Registry Number: 73069-20-2



R = L – Rha + D – Glc

Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum nigrum, S. pseudopersicum, S. transcaucasicum*
$C_{39}H_{63}NO_{11}$: 721.4401
Mp: 240–245°C [1]; 246–249°C [2]
$[\alpha]_D$ −92° (MeOH) [2]; −100° (MeOH) [1].
IR: 3550–3180, 1640, 1610, 1460, 1390, 1140, 1060, 980 [2]
HPLC: [3]

References

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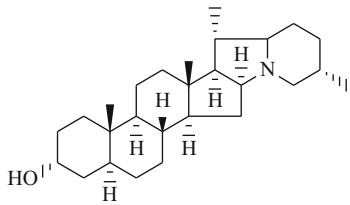
Solanidanol-3α (Demissidine)

CAS Registry Number: 474-08-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum tuberosum*
$C_{27}H_{45}NO$: 399.3390
Mp: 210–211°C [1, 2]; 173°C (Ac) [2]
$[\alpha]_D$ + 31° ($CHCl_3$) [2]

References

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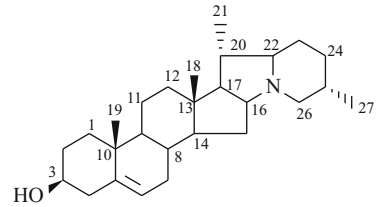
Solanidine (Solatubine)

CAS Registry Number: 80-78-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Capsicum annuum, Fritillaria walujewii, Korolkowia sewerzowii, Rhinopetalum bucharicum, Rh. karelinii, Rh. stenantherum, Solanum tuberosum, Veratrum lobelianum*
$C_{27}H_{43}NO$: 397.3345
Mp: 215–217°C (EtOH), 333°C (hydrochloride) [1]
$[\alpha]_D$ −25° [1]
IR: 3250, 3035, 2960–2830, 1665 [2]
MS m/z: 397(M^+, 57), 396(43), 383(12), 382(37), 341(5), 340(5), 204(83), 178(13), 164(8), 162(7), 151(33), 150(100), 112(10), 111(7), 98(20), 97(10) [1, 3]
^{13}C NMR: [4]

Table 1

C–1	37.9	C–10	36.9	C–19	19.7
2	32.4	11	21.3	20	36.9
3	71.2	12	40.1	21	18.6
4	43.5	13	10.6	22	74.7
5	141.9	14	57.8	23	29.6
6	121.2	15	33.6	24	31.6
7	32.6	16	69.2	25	31.3
8	32.0	17	63.4	26	60.2
9	50.6	18	17.0	27	19.7

HPLC: [5]

References

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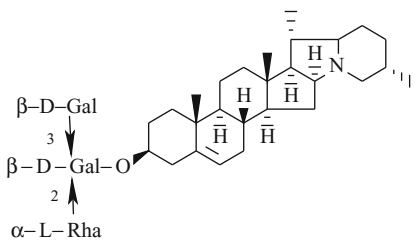
α-Solanine

CAS Registry Number: 20562-02-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum tuberosum*
$C_{45}H_{73}NO_{15}$: 867.498
Mp: 285–286°C (EtOH) [1, 2]
$[\alpha]_D$ −57° (Py) [1]
IR: 3420, 1650, 1150–1000 [3]
MS m/z: 397, 204, 150(100) [3]
HPLC: [4]
Pharm./Biol.: Acetylcholinesterase inhibitor [5, 6]; antifeedant, fungicide, and pesticide activities [7]

References

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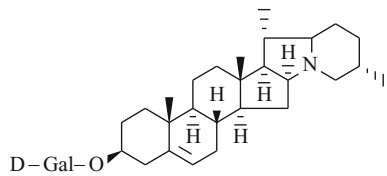
γ-Solanine

CAS Registry Number: 511-37-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{33}H_{53}NO_6$: 559.3873
Mp: 237–239°C ($CHCl_3$)
$[\alpha]_D$ −23°
IR: 3400, 1660, 1110–1010
MS m/z: 559(M^+), 544, 397, 380, 204, 150(100) [1–3]
HPLC: [4]

References

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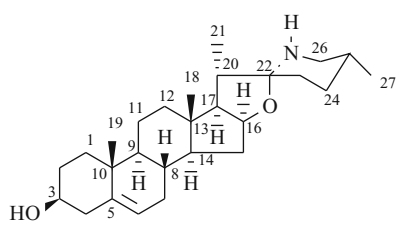
4. K.-E. Hellenas, A. Nyman, P. Slanina, L. Loof, J. Gabrielsson, J. Chromatogr. **573**, 69 (1992)

Solasodine (Solancarpidine)

CAS Registry Number: 126-17-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Solanum aviculare, S. khasianum, S. laciniatum, S. persicum*

$C_{27}H_{43}NO_2$: 413.3294

Mp: 200–202°C (EtOH–H_2O) [1, 2]

$[\alpha]_D$ –97° (MeOH) [1]

IR: 3600, 2940, 2910, 2870, 2860, 1465, 1455, 1438, 1380, 1344, 1305, 1290, 1275, 1138, 1087, 1074, 1048, 1020, 1010, 1000, 975, 962, 912, 896, 879, 838, 810 [3]

MS m/z: 413(M^+), 398, 385, 370, 357, 342, 314, 282, 271, 253, 138, 133, 125, 119, 114(100), 105, 98, 79 [4]

^{1}H NMR: 0.82(3H, s, CH_3-18), 0.85(3H, d, CH_3-27), 0.94(3H, d, CH_3-21), 1.02(3H, s, CH_3-19), 2.62(2H, CH_2-26), 3.50(1H, m, HC–OH), 4.28(1H, CH-16), 5.34(1H, C = CH) [5]

^{13}C NMR: [6]

Table 1

C–1	37.3	C–10	36.7	C–19	19.3
2	31.5	11	20.9	20	41.3
3	71.7	12	40.0	21	15.2
4	42.3	13	40.5	22	98.4
5	140.9	14	56.6	23	34.1
6	121.3	15	32.1	24	30.3
7	32.1	16	79.0	25	31.5
8	31.5	17	62.9	26	47.7
9	50.2	18	16.4	27	19.3

HPLC: [7]

Pharm./Biol.: LD_{50} 27.5 mg/kg (oral, mice). Cardiotonic, anti-inflammatory, and desensitizing antidematous and antishock action. Improves the conditioned reflex activity of animals. Raises the resistance of the organism under extreme stresses. Embryotoxic. Has been used for the treatment of various forms of rheumatism [8, 9]; anticancer [10]; cytocoxic [11–13]

References

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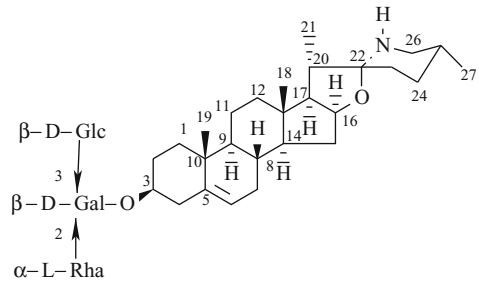
Solasonine (Solasodamine)

CAS Registry Number: 19121-58-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Solanum kieseritzkii, S. nigrum, S. persicum, S. pseudopersicum, S. rostratum, S. transcaucasicum*

$C_{45}H_{73}NO_{16}$: 883.4929 [1, 2]

Mp: 276–279°C [3]

$[\alpha]_D$ –57° (Py) [3]

UV(H^+): 260, 325, 412(4.10, 4.34, 3.86) [4]

IR: 3600–3200, 1640, 1610, 1450, 1410, 1370, 1140, 1050, 980 [3]

HPLC: [5]
^{13}C NMR: [6]

Table 1

C-1	37.4	C-10	37.1	C-19	19.3	C-1′	100.3	C-4″	71.4
2	30.1	11	21.1	20	41.5	2′	76.3	5″	78.3
3	78.3	12	40.1	21	15.6	3′	84.8	6″	61.8
4	38.8	13	40.6	22	98.2	4′	70.2	C-1‴	102.0
5	140.7	14	56.7	23	34.6	5′	74.9	2‴	72.4
6	121.6	15	31.7	24	31.1	6′	62.4	3‴	72.7
7	32.5	16	78.7	25	31.7	C-1″	105.7	4‴	74.0
8	32.5	17	63.5	26	47.9	2″	74.8	5‴	69.3
9	50.2	18	16.5	27	19.7	3″	78.7	6‴	18.5

Pharm./Biol.: Antifungal activity [7]

References

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3. S.M. Aslanov, Chem. Nat. Comp. **8**, 138 (1972)
4. E.N. Novruzov, S.M. Aslanov, N.M. Ismailov, Chem. Nat. Comp. **9**, 659 (1973)
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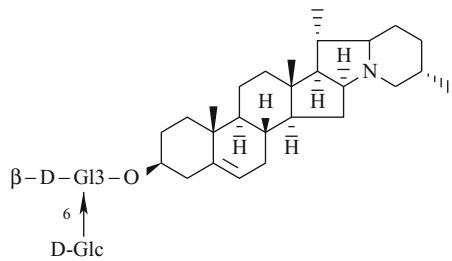
7. L. Martin, Cipollini and Douglas J. Levey, Ecology–Online journals (www.esajournals.org), **78**(3), 799 (1997)

Stenantidine

CAS Registry Number: 80248-81-3



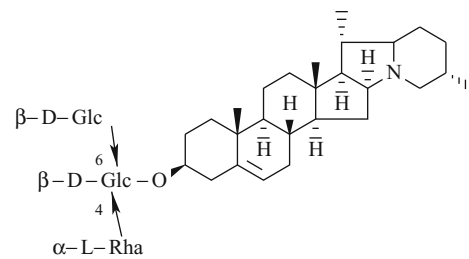
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum stenantherum*
$C_{39}H_{63}NO_{11}$: 721.4401
Mp: 269–271°C (MeOH) [1]
$[\alpha]_D$ −48° (Py) [1]
Solubility: spar. sol.: Me_2CO, EtOH, $CHCl_3$ [1]
IR: 3420, 1640, 1150–1000.[1]
MS m/z: 721(M^+, 4.5), 706(2), 577(68), 544(19), 397(11), 396(11), 380(26), 204(56), 150(100) [1]
GLC: glucose–glucose (1:1) [1]

References

1. K. Samikov, Ya.V. Rashkes, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **17**, 273 (1981)

Stenantine

CAS Registry Number: 80248-79-9



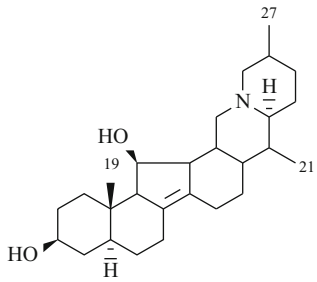
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum stenantherum*
$C_{45}H_{73}NO_{15}$: 867.498
Mp: 262–264°C (MeOH) [1]
$[\alpha]_D$ −47° (Py) [1]
Solubility: spar. sol. Me_2CO, EtOH, $CHCl_3$ [1]
IR: 3420, 1640, 1150–1000 [1]
MS m/z: 867(M^+, 0.1), 721(1.3), 705(15), 690(2.2), 671(5.5), 656(1.8), 559(31), 544(9), 397(11), 396(10), 380(31), 204(16), 150(100) [1]
GLC: glucose–rhamnose (2:1) [1]

References

1. K. Samikov, Ya.V. Rashkes, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **17**, 273 (1981)

Stenanzamine

CAS Registry Number: 94898-74-5



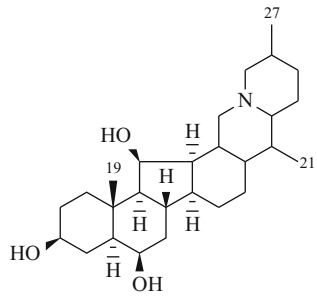
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum stenantherum*
$C_{27}H_{43}NO_2$: 413.3294
Mp: amorph., amorph. (di Ac) [1]
$[\alpha]_D$ −22° ($CHCl_3$) [1]
IR: 3400, 2940–2860, 2775, 1660, 1430, 1070 [1]
MS m/z: 413(M^+, 100), 398, 396, 395, 386, 385, 384, 359, 358, 190, 178, 166, 164, 150, 149, 139, 138, 137, 125, 112, 111, 98 [1]
^{1}H NMR: 0.93(3H, s, CH_3-19), 0.82, 1.00(6H, d, CH_3-27, CH_3-21), 3.58, 3.78(2H, HC–OH) [1]
^{1}H NMR (di Ac): 0.82, 0.93(6H, d, CH_3-21, CH_3-27), 0.88(3H, s, CH_3-19), 1.95(6H, s, 2 × OAc), 4.65, 4.92(2H, m, 2 × HC–OAc) [2]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 318 (1984)
2. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 379 (1984)

Stenanzidine

CAS Registry Number: 94482-44-7

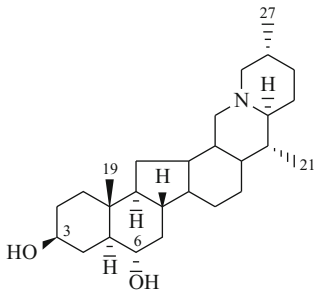


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum stenantherum*
$C_{27}H_{45}NO_2$: 415.3450
Mp: 277°C (MeOH–Me_2CO), amorph. (di Ac), 176°C (dione) [1]
$[\alpha]_D$ −17° (EtOH) [1]
IR: 3410, 2975–2865, 1447, 1075, 1047 [1]
MS m/z: 415(M^+), 400, 398, 397, 388, 386, 372, 360, 358, 344, 179, 178, 166, 164, 150, 149, 140, 139, 138, 125, 124, 112, 111(100), 98 [1]
^{1}H NMR: 1.00(3H, s, CH_3-19), 1.13, 1.19(6H, d, CH_3-21, CH_3-27), 3.30, 3.77(2H, m, HC–OH) [1]
^{1}H NMR (di Ac): 0.94(3H, s, CH_3-19), 1.10, 1.16(6H, d, CH_3-21, CH_3-27), 1.95, 1.96(6H, s, 2 × OAc), 4.65, 4.90(2H, m, 2 × HC–OAc) [1]
^{1}H NMR (dione): 0.90(3H, s, CH_3-19), (6H, d, CH_3-21, CH_3-27) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 318 (1984)

Stenanzidinine



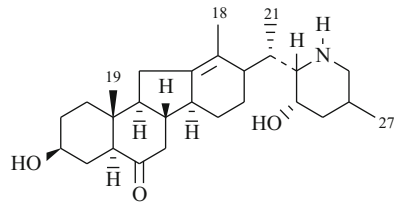
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum stenantherum*
$C_{27}H_{45}NO_2$: 415.3450
Mp: 215–217°C (Me_2CO), amorph. (di Ac), 174°C (dione) [1]
$[\alpha]_D$ + 5° ($CHCl_3$) [1]
IR: 3450, 2980–2818, 1777, 1470, 1454 [2]
MS m/z: 415(M^+), 400, 398, 387, 386, 359, 358, 164, 149, 139, 125, 124, 112, 111, 98 [2]
^{1}H NMR: 0.73(3H, s, CH_3-19), 0.83(3H, d, CH_3-21), 0.83(3H, d, CH_3-27) [2]
^{1}H NMR (di Ac): 0.82(3H, s, CH_3-19), 0.82(3H, d, CH_3-21), 0.82(3H, d, CH_3-27), 1.95(6H, s, 2 × OAc), 4.59(2H, m, H-3, H-6) [2]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 318 (1984)
2. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 470 (1984)

Stenanzine

CAS Registry Number: 83133-08-8



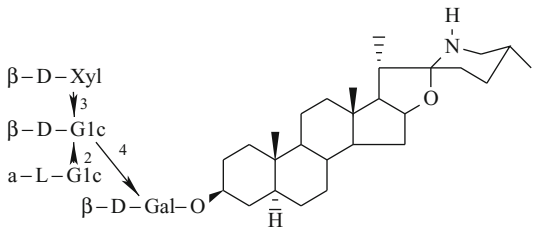
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Rhinopetalum stenantherum*
$C_{27}H_{43}NO_3$: 429.3243
Mp: 203–205°C (Me_2CO), amorph. (O,O', N–Ac), 236°C (N–Ac), 257°C (dihydro) [1]
$[\alpha]_D$ –44° ($CHCl_3$) [1]
IR: 3425–3125, 2930–2830, 1713, 1475, 1455, 1420 [1]
MS m/z: 429(M^+), 428, 315, 256, 141. 115, 114, 96 [1]
^{1}H NMR: 0.63(3H, s, CH_3-19), 0.87(3H, d, J = 7, CH_3-21), 0.93(3H, d, J = 7, CH_3-27), 1.56(3H, s, CH_3-18), 3.65, 3.76(2H, HC–OH) [1]
^{1}H NMR (O,O', N–Ac): 0.66(3H, s, CH_3-19), 0.79(3H, d, J = 7, CH_3-21), 0.95(3H, d, J = 7, CH_3-27), 1.66(3H, s, CH_3-18), 1.96(6H, s, 2 × OAc), 2.04(3H, s, N–Ac), 4.61, 5.04(2H, m, 2 × HC–OAc) [1]
^{1}H NMR (N–Ac): 0.62(3H, s, CH_3-19), 0.85(3H, d, CH_3-21), 0.90(3H, d, CH_3-27), 1.56(3H, s, CH_3-18), 2.04(3H, s, N–Ac) [1]
^{1}H NMR (dihydro): 0.64(3H, s, CH_3-19), 0.79(3H, d, CH_3-21), 0.97(3H, d, CH_3-27), 1.65(3H, s, CH_3-18) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 314 (1982)

Tomatine (α-Tomatine)

CAS Registry Number: 17406-45-0



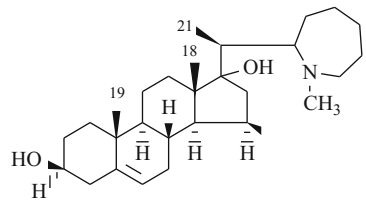
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Solanum* kieseritzkii
$C_{50}H_{83}NO_{21}$: 1033.546
Mp: 269–271°C [1, 2]; 290–295°C [3]
$[\alpha]_D$ −20° (Py) [3]
IR: 3390, 1650, 1483, 1163, 1072, 1038, 1020, 978, 893, 870 [3]
Pharm./Biol.: LD_{50} 18 mg/kg (i/v, mice). Irritative, weak hypotensive action. Specifically inhibits the growth of fungal cultures, inhibits the formation of granular tissue, decreases the permeability of vascular wall [4]. Anticholinestarase activity [5]

References

1. S.M. Aslanov, Chem. Nat. Comp. **6**, 796 (1970)
2. R. Kuhn, I. Low, H. Trischmann, Angew. Chem. **68**, 212 (1956)
3. J. Holubek, O. Strouf, *Spectral Data and Physical Constants of Alkaloids* (Prague Publishing House, Czechoslovak Academy of Sciences, Heyden & Son Ltd., London, 1966), **2**,No. 272
4. F.S. Sadritdinov, A.G. Kurmukov, *The Pharmacology of the Plant Alkaloids and Their Use in Medicine* [in Russian], (UzSSR, Tashkent, 1980), p. 294
5. S.V. Dzyadevych, V.N. Arkhypova, A.P. Soldatkin, A.V. El'skaya, C. Martelet, N. Jafferzie–Renault, Analytical Letters, **37**(8), 1611 (2004)

Valivine

CAS Registry Number: 85403-65-2



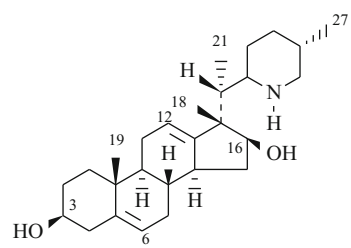
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Fritillaria walujewii*
$C_{28}H_{47}NO_3$: 445.3556
Mp: 256–258°C (MeOH), 212°C (di Ac) [1]
$[\alpha]_D$ –48° ($CHCl_3$–MeOH, 1:1) [1]
IR: 3430, 2975–2835, 2740, 1470, 1455, 1055 [1]
MS m/z: 445(M^+), 430, 428, 410, 401, 400, 212, 199, 171, 170, 149, 141, 140, 113, 112(100) [1]
^{1}H NMR: 0.92(s, CH_3-18), 0.97(CH_3-19), 1.08(3H, d, CH_3-21), 2.34(s, N–CH_3), 3.56, 3.99(2H, m, HC–OH), 5.24(m, C = CH) [1]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 610 (1982)

Veralcamine (Veralkamine)

CAS Registry Number: 17155-31-6



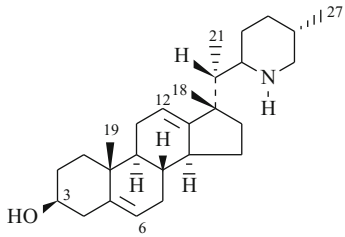
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 168°C (EtOH) [1]; 154°C (0,0′,N–tri Ac), 193°C (N–Ac.), 233°C (dihydro), 221°C (tetrahydro) [2]
UV: 305, 408, 460, 496 [1]
IR: 3635, 3230 [2]
MS m/z: 413(M^+), 315, 98 [2]
^{1}H NMR: 0.81(3H, d, CH_3-21), 0.96(6H, s, CH_3-18, CH_3-19), 0.97(3H, d, CH_3-27), 3.41(1H, m, H-3), 4.00(1H, m, H-16), 5.25(2H, m, H-6, H-12) [2]

References

1. N.V. Bondarenko, Chem. Nat. Comp. **9**, 136 (1973)
2. I. Tomko, A. Vassova, G. Agam, K. Schreiber, E. Hohne, Tetrahedron Lett. **40**, 3907 (1967)

Veralinine

CAS Registry Number: 21233-19-2



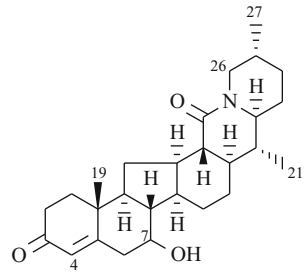
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{27}H_{43}NO$: 397.3345
Mp: 124–126°C (C_6H_{14}), 120°C (N–nitroso), 161°C (N,0–di–Ac), 111°C (tetrahydro) [1]
$[\alpha]_D$ −80° ($CHCl_3$) [1]
IR: 3628, 3360, 3040, 1679 [1]
MS m/z: 397(M^+), 125, 98 [1]
^{1}H NMR: 0.96(6H, s, CH_3-18, CH_3-19), 3.50(1H, m, H-3), 5.30(2H, m, H-6, H-12) [1]

References

1. I. Tomko, A. Vassova, G. Agam, K. Schreiber, Tetrahedron **24**, 6839 (1968)

Veralodine

CAS Registry Number: 41787-59-1



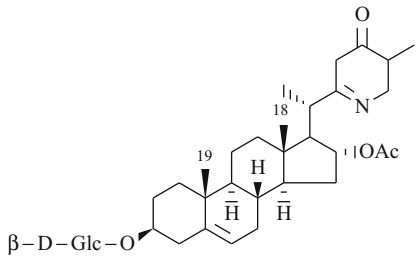
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{27}H_{39}NO_3$: 425.2930
Mp: 254–257°C (Me_2CO) [1], 250°C (Ac.), 236°C (dihydro), 305°C (tetrahydro) [1]
$[\alpha]_D$ + 96° ($CHCl_3$) [1]
UV: 245(4.26) [1]
IR: 3470, 2960–2830, 1690, 1610, 1465, 1445, 1257 [1]
MS m/z: 425(M^+), 424, 410, 407, 392, 302, 285, 249, 220(100), 204, 165, 151, 149, 131, 126, 125, 111, 98 [1]
^{1}H NMR: 0.85(3H, d, J = 6, CH_3-27), 0.93(3H, d, J = 6, CH_3-21), 1.25(3H, s, CH_3-19), 3.50(1H, m, H-7), 4.73(1H, q, J = 12, 2; He-26), 5.63(1H, s, H-4) [1]
CD: [2]

References

1. K. Samikov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 751 (1972)
2. G.P. Moiseeva, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 563 (1976)

Veralodinine

CAS Registry Number: 56598-27-7



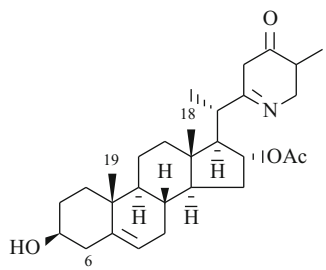
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{35}H_{53}NO_9$: 631.3720
Mp: 226–228°C (MeOH), 229°C (tetrahydro), 239°C (des. Ac) [1]
$[\alpha]_D$ −95° ($CHCl_3$) [1]
UV: 268(2.43) [1]
IR: 3500–3260, 3040, 1728, 1710, 1690, 1630, 1250, 1100–1000 [1]
^{1}H NMR: 0.79(3H, s, CH_3-18), 0.95(3H, s, CH_3-19), 0.99(3H, d, CH_3,), 1.06(3H, d, CH_3), 1.87(3H, s, OAc), 3.12–4.62(signals of the protons of the sugar component), 4.97(1H, m, HC–OAc), 5.28(1H, m, C = CH) [1]

References

1. K. Samikov, R. Shakirov, K.A. Ubaidullaev, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 193 (1975)

Veralodisine

CAS Registry Number: 52617-23-9



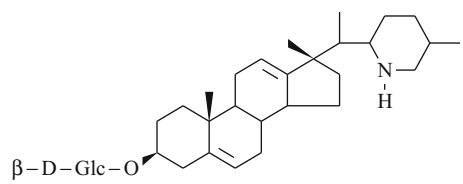
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{29}H_{43}NO_4$: 469.3192
Mp: 172–174°C (C_6H_6), 190°C (veralodisinol) [1]
$[\alpha]_D$ –93° ($CHCl_3$) [1]
UV: 275(3.63) [1]
IR: 3475, 3030, 2940, 1730, 1700, 1680, 1460, 1435, 1270 [1]
MS m/z: 469(M^+), 454, 441, 427, 426, 409(100), 398, 394, 382, 381, 366, 352, 326, 314, 300, 299, 298, 281, 272, 177, 164, 140, 139, 111, 110, 84, 83 [1]
^{1}H NMR: 0.64(3H, s, CH_3-18), 0.92(3H, s, CH_3-19), 0.93, 1.00(6H, d, J = 6, CH_3-21, CH_3-27), 1.99(3H, s, OAc), 3.71(1H, m, H-3), 4.96(1H, m, H-16), 5.26(1H, m, H-6) [1]
^{1}H NMR (veralodisinol): 0.61(3H, s, CH_3-18), 0.91(3H, s, CH_3-19), 0.98(6H, m, CH_3-21, CH_3-27), 3.60, 4.10(2H, m, 2 × HC–OH), 5.23(1H, H-6) [1]

References

1. R. Shakirov, A.M. Khashimov, K. Samikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 38 (1974)

Veralomine

CAS Registry Number: 58078-63-0



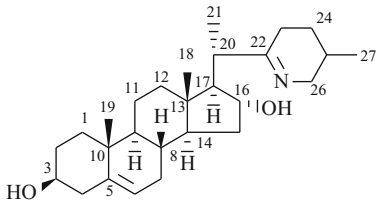
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{33}H_{53}NO_6$: 559.3873
Mp: 275–277°C (MeOH) [1]; 202°C (O,N-penta Ac) [2]
$[\alpha]_D$ −54° (10% AcOH) [1]
IR: 3400, 1040–1000 [2]

References

1. R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 840 (1971)
2. R. Shakirov, K.A. Ubaidullaev, S.Yu. Yunusov, Chem. Nat. Comp. **11**, 558 (1975)

Veralosidine (Etioline)

CAS Registry Number: 29271-49-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{27}H_{43}NO_2$: 413.3294
Mp: 153–155°C (MeOH–Me_2CO), 168°C (di Ac), 195°C (tri Ac), 216°C (dihydro), 196°C (Δ^4–veralosidinone-3) [1, 2]
$[\alpha]_D$ –92° (EtOH) [1]
UV: 242(2.45) [1]
IR: 3330, 3035, 2930, 1650, 1460, 1060 [1]
MS m/z: 413(M^+), 162, 138, 125(100), 111, 98 [1]
^{1}H NMR: 0.68(3H, s, CH_3-18), 0.88(3H, d, CH_3-27), 0.94(3H, s, CH_3-19), 1.06(3H, d, CH_3-21), 5.26(1H, m, H-6) [2]
^{1}H NMR (di Ac): 0.68(3H, s, CH_3-18), 0.78(3H, d, CH_3-27), 0.94(3H, s, CH_3-19), 1.02(3H, d, CH_3-21), 1.87(3H, s, OAc), 1.90(3H, s, OAc), 4.62(1H, m, H-3), 4.96(1H, m, H-16), 5.29(1H, m, H-6) [2, 3]
^{1}H NMR (tri Ac): 0.64(3H, s, CH_3-18), 0.87(3H, d, CH_3-27), 0.95(3H, s, CH_3-19), 1.18(3H, d, CH_3-21), 1.93(3H, s, OAc), 1.98(3H, c, OAc), 2.07(3H, s, NAc), 4.50(1H, m, H-3), 4.72(1H, m, H-16), 5.11(1H, m, H-23), 5.27(1H, m, H-6) [2]
^{1}H NMR (dihydro): 0.64(3H, s, CH_3-18), 0.73(3H, d, CH_3-27), 0.91(3H, s, CH_3-19), 0.95(3H, d, CH_3-21), 3.44(1H, m, H-3), 3.99(1H, m, H-16), 5.27(1H, m, H-6) [2]
^{1}H NMR (Δ^4-veralosidinone-3): 0.68(3H, s, CH_3-18), 0.83(3H, d, CH_3-27), 1.03(3H, d, CH_3-21), 1.12(3H, s, CH_3-19), 4.38(1H, m, H-16), 5.65(1H, m, H-4) [2, 3]
CD: [3]
^{13}C NMR: [4]

Table 1

C–1	37.1	C–10	36.5	C–19	19.4
2	31.3	11	20.8	20	44.4
3	71.4	12	40.0	21	18.9
4	42.2	13	43.9	22	177.1
5	140.3	14	53.4	23	29.7
6	121.3	15	35.1	24	27.9
7	31.7	16	76.5	25	27.3
8	31.6	17	63.4	26	55.7
9	49.9	18	13.8	27	19.1

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1. A.M. Khashimov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 338 (1970)
2. A.M. Khashimov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 751 (1971)
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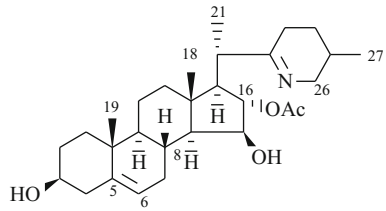
Veralosidinine

CAS Registry Number: 52389-14-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{29}H_{45}NO_4$: 471.3337

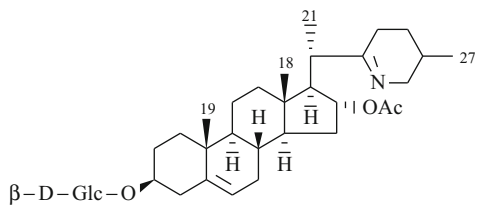
Mp: 220–221°C (Me_2CO)
$[\alpha]_D$ −173° ($CHCl_3$)
UV: 248(2.44)
IR: 3420, 3030, 2930, 1725, 1650, 1445, 1250, 1065
MS m/z: 471(M^+), 456, 429, 413, 412, 411, 163, 162, 148, 138, 126, 125(100), 124, 111, 110, 99, 98
^{1}H NMR: 0.58(3H, s, CH_3-18), 0.86(3H, d, CH_3-21), 0.89(3H, s, CH_3-19), 0.92(3H, d, CH_3-27), 1.95(3H, s, OAc), 4.85(1H, m, H-16), 5.23(1H, m, H-6)

References

1. R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **9**, 472 (1973)

Veralosine (Veralozine)

CAS Registry Number: 30511-97-8



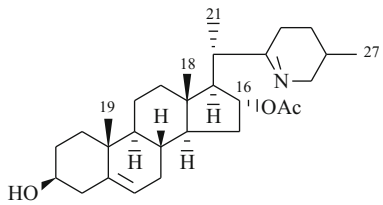
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{35}H_{55}NO_8$: 617.3928
Mp: 213–215°C (MeOH–Me_2CO) [1]; 222°C (hydrochloride), 250°C(Ac) [2]
$[\alpha]_D$ −148° (MeOH) [1]
Solubility: very sol. MeOH, $CHCl_3$
UV: 245(2.20) [2]
IR: 3450, 2900, 1725, 1660, 1460, 1100–1000 [2]
CD: [3]
Pharm./Biol.: LD_{50} 65.30 mg/kg (s/c, i/v, mice). Pronounced anti-inflammatory activity. Stimulating action of the CNS. Possesses a potentiating effect with central analeptics and a moderate antagonism with narcotics [4, 5]

References

1. A.M. Khashimov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 338 (1970)
2. A.M. Khashimov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **6**, 342 (1970)
3. G.P. Moiseeva, R. Shakirov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 557 (1976)
4. T. Saidkasymov, Yu.R. Mirzaev, M.B. Sultanov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (Fan, Tashkent, 1972), p. 100
5. T. Saidkasymov, *The Pharmacology of Natural Substances* [in Russian] (Fan, Tashkent, 1978), p. 71

Veralosinine (Veralozinine)

CAS Registry Number: 36506-65-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum lobelianum*
$C_{29}H_{45}NO_3$: 455.3399
Mp: 161–163°C (Me_2CO) [1]; 195°C (Ac) [2]
$[\alpha]_D$ –186° ($CHCl_3$) [1]
Solubility: very sol. MeOH, $CHCl_3$
UV: 242(2.39) [2]
IR: 3470, 3080, 2940, 1730, 1650, 1460, 1260, 1040 [3]
MS m/z: 455(M^+), 396, 163, 162, 138, 125(100), 111, 98 [3]
^{1}H NMR: 0.71(3H, s, CH_3-18), 0.81(3H, d, CH_3-27), 0.94(3H, s, CH_3-19), 1.03(3H, d, CH_3-21), 1.93(3H, s, OAc), 4.87(1H, m, H-16), 5.27(1H, m, C = CH) [2]
CD: [4]
Pharm./Biol.: Weak anti-inflammatory activity [5]

References

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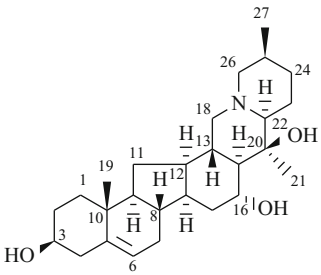
2. A.M. Khashimov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **7**, 751 (1971)

3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 216 (1996)
4. G.P. Moiseeva, R. Shakirov, M.R. Yagudaev, S.Yu. Yunusov, Chem. Nat. Comp. **12**, 557 (1976)
5. T. Saidkasymov, Yu.R. Mirzaev, M.B. Sultanov, *The Pharmacology of Alkaloids and Their Derivatives* [in Russian] (Fan, Tashkent, 1972), p. 100

Veramarine

CAS Registry Number: 4565-85-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum dahuricum, V. lobelianum, V. nigrum, V. oxysepalum*
$C_{27}H_{43}NO_3$: 429.3243
Mp: amorph., 255°C (O–Ac), 211°C (0,0′–di Ac), amorph. (dihydro), amorph. (diketodihydro)
$[\alpha]_D$ –85° ($CHCl_3$) [1, 2]
IR: 3625, 3480, 1052
MS m/z: 429(M^+), 112(100)
^{1}H NMR: 1.04(3H, s, CH_3-19), 1.10(3H, d, J = 7, CH_3-27), 1.19(3H, s, CH_3-21), 3.52(1H, m, Ha-3), 4.36(1H, m, $W_{1/2}$ = 9, Ha-16), 5.38(1H, m, H-6) [3]
^{13}C NMR: [3]

Table 1

C–1	38.2	C–10	37.0	C–19	19.1
2	31.5	11	29.2	20	73.2
3	71.9	12	41.5	21	19.9
4	42.0	13	32.7	22	70.0
5	141.7	14	43.7	23	19.2
6	122.6	15	30.8	24	28.8
7	31.3	16	66.1	25	27.6
8	38.7	17	50.4	26	17.3
9	5.46	18	61.9	27	62.2

X-ray: [4]

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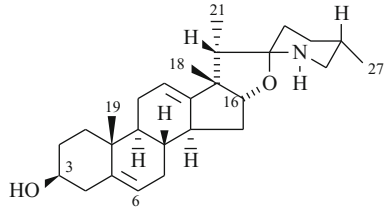
2. I. Tomko, Z. Voticky, H. Budzikiewicz, L.I. Durham, Collect. Czech. Chem. **30**, 3320 (1965)
3. Ko. Kaneko, M. Tanaka, T. Kuribayashi, H. Mitsuhashi, J. Tomko, Collect.Czech. Chem. **48**, 2840 (1983)
4. F. Pavelcik, I. Tomko, Tetrahedron Lett. **20**, 887 (1979)

Veramine

CAS Registry Number: 21059-48-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum dahuricum, V. lobelianum, V. nigrum, V. oxysepalum*
$C_{27}H_{41}NO_2$: 411.3137
Mp: amorph. [1]
$[\alpha]_D$ –94° [1]
UV: 289, 416, 502 [1]
IR: 3420, 3030, 1670, 975, 949, 919, 878 [2]
MS m/z: 411(M^+), 410, 114(100) [2]
^{1}H NMR: 0.84(3H, d, J = 6, CH_3-27), 0.92, 1.09(6H, s, CH_3-19, CH_3-18), 0.97(3H, d, J = 6, CH_3-21), 3.47(1H, m, H-3), 4.00(1H, d, H-16), 5.30(1H, m, H-6) [2]
HPLC: [3]

References

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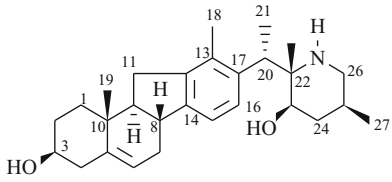
Veratramine

CAS Registry Number: 60-70-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Veratrum dahuricum*

$C_{27}H_{39}NO_2$: 409.2981

Mp: 203–205°C (Me_2CO) [1]; 194°C (digydro) [2, 3]

$[\alpha]_D$ −71° [1]

UV: 268(5.75) [1]

MS m/z: 409(M^+), 394, 391, 376, 295, 114(100) [1]

^{1}H NMR: 0.80(3H, d, J = 6, CH_3-27), 1.14(3H, s, CH_3-19), 1.34(3H, d, J = 7, CH_3-21), 1.55(2H, s, OH, NH), 2.27(3H, s, CH_3-18), 5.41(1H, m, C = CH), 7.01(2H, H–Ar) [1]

^{13}C NMR: [4]

Table 1

C–1	38.0	C–10	36.9	C–19	19.4
2	31.3	11	30.3	20	36.1
3	71.8	12	140.3	21	39.2
4	41.9	13	132.6	22	67.1
5	142.4	14	143.9	23	70.8
6	122.0	15	119.8	24	30.5
7	44.1	16	125.2	25	32.2
8	41.2	17	143.0	26	54.0
9	56.9	18	15.8	27	18.8

HPLC: [5]

References

1. I. Nakhatov, R. Shakirov, E.M. Taskhanova, S.Yu. Yunusov, Khim. Prir. Soedin. 131 (1980)
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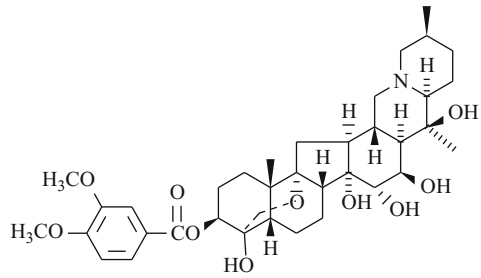
Veratroylzygadenine

CAS Registry Number: 31329-58-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Veratrum dahuricum, V. lobelianum, V. nigrum, V. oxysepalum, Zigadenus sibiricus*

$C_{36}H_{51}NO_{10}$: 657.3513

Mp: 259–261°C (Me_2CO) [1]

$[\alpha]_D$ −39° ($CHCl_3$) [1]

UV: 262, 293(4.13, 3.85)

IR: 3480, 2775, 1715, 1610, 1525, 1260 [2, 3]

MS m/z: 657(M^+), 642, 640, 639, 492, 475, 458, 440, 183, 165, 125, 112(100), 98 [2, 4]

Pharm./Biol.: LD_{50} 0.77 mg/kg (i/v). Exhibits a pronounced anesthetic action [5] and a weak hypotensive effect, sudden and brief [6, 7]

References

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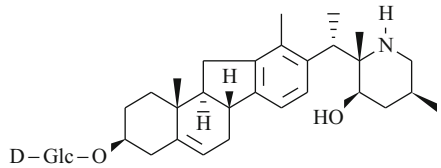
Veratrosine

CAS Registry Number: 475-00-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum dahuricum*
$C_{33}H_{49}NO_7$: 571.3509
Mp: 243–245°C (MeOH) [1]; 206°C (veratramine) [2, 3]
IR: 3400, 1650, 1150, 1000, 820 [1]
MS m/z: 571(M^+), 114(100) [1]

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2. M.W. Klohs, M.D. Draper, F. Keller, W. Malesh, F.I. Petracek, J. Amer. Chem. Soc. **75**, 2133 (1953)
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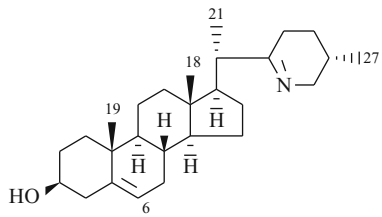
Verazine (Verasine)

CAS Registry Number: 14320-81-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Veratrum dahuricum, V. lobelianum, V. nigrum, V. oxysepalum, Zigadenus sibiricus*
$C_{27}H_{43}NO$: 397.3345
Mp: 173–175°C (Me_2CO) [1]; amorph (di Ac), amorph. (Δ^4-verazin-3-one), amorph. (tetrahydro A), amorph. (tetrahydro B) [2]
$[\alpha]_D$ −99°C
IR: 3390, 3095, 1670
MS m/z: 397(M^+), 382, 368, 354, 327, 259, 164, 150, 149, 125(100), 111, 98
^{1}H NMR: 0.70(3H, s, CH_3-18), 0.88(3H, d, CH_3-21), 0.99(3H, s, CH_3-19), 1.09(3H, d, CH_3-27), 5.32(1H, m, H-6) [1, 2]
Pharm./Biol.: Antifungal activity [3]

References

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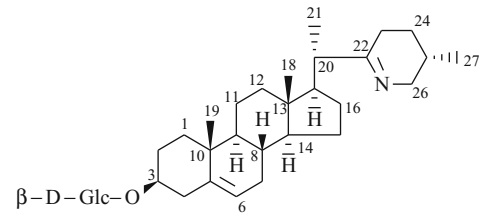
Verazinine

CAS Registry Number: 97763-02-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids
Biological sources: *Zigadenus sibiricus*
$C_{33}H_{53}NO_6$: 559.3873
Mp: 259–261°C (Me_2CO) [1]
$[\alpha]_D$ −112° ($CHCl_3$) [1]
IR: 3430, 1655, 1105–1030 [1]
MS m/z: 559(M^+) [1]
^{1}H NMR: 0.67(3H, s, CH_3-18), 0.85(3H, d, J = 6.5, CH_3-27), 0.93(3H, s, CH_3-19), 1.14(3H, d, J = 7, CH_3-21), 3.96(1H, tt, J = 11, 4·5, H-3), 3.99(1H, ddd, J = 8, 5·5, 2·5, H-5′), 4.06(1H, t, J = 8, H-2′),

4.28(1H, m, H-4′), 4.30(1H, m, H-3′), 4.42(2H, dd, J = 12, 5·5, 2H-6′), 5.06(1H, d, J = 8, H-1′), 5.35(1H, dt, J = 5, 2·5, H-6) [2]

^{13}C NMR: [2]

Table 1

C–1	37.5 t	C–10	36.9 s	C–19	19.4 q	C–1′	102.6 d
2	30.2 t	11	21.3 t	20	46.9 d	2′	75.3 d
3	78.1 d	12	40.0 t	21	18.2 q	3′	78.6 d
4	39.3 t	13	42.4 s	22	173.4 s	4′	71.7 d
5	140.9 s	14	56.7 d	23	27.5 t	5′	78.5 d
6	121.9 d	15	24.6 t	24	28.4 t	6′	62.9 t
7	32.2 t	16	27.7 t	25	28.0 d		
8	32.1 d	17	54.0 d	26	57.1 t		
9	50.4 d	18	12.2 q	27	19.4 q		

References

1. E.M. Taskhanova, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **21**, 343 (1985)
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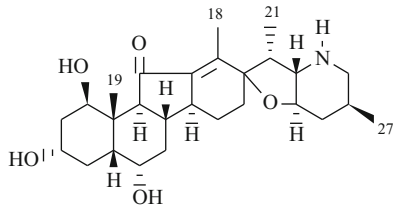
Verdine

CAS Registry Number: 73667-53-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Veratrum dahuricum, V. lobelianum*

$C_{27}H_{41}NO_5$: 459.2985

Mp: 218–220°C ($CHCl_3$) [1]

$[\alpha]_D$ −81° (MeOH) [1]

UV: 252(4.07) [2]

IR: 3400, 1710, 1630 [2]

MS m/z: 459(M^+), 444, 441, 430, 426, 346, 328, 125, 124, 113, 112, 110(100), 97 [2]

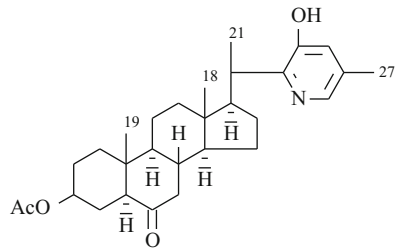
^{1}H NMR: 0.70(3H, d, CH_3-21), 0.93(3H, d, CH_3-27), 1.31(3H, s, CH_3-19), 2.23(3H, s, CH_3-18) [2]

X-ray: [3]

References

1. I. Nakhatov, R. Shakirov, E.M. Taskhanova, S.Yu. Yunusov, Khim. Prir. Soedin. 131 (1980)
2. I. Nakhatov, R. Shakirov, S.Yu. Yunusov, Chem. Nat. Comp. **20**, 375 (1984)
3. B. Tashkhodzhaev, I. Nakhatov, R. Shakirov, M.R. Yagudaev, Chem. Nat. Comp. **20**, 711 (1984)

Verdinine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Veratrum lobelianum*

$C_{29}H_{41}NO_4$: 467.6515

Mp: 265–267°C (Me_2CO) [1]

IR: 3515, 3045, 2970, 2865, 1715–1740, 1610, 1585, 1265, 750 [1]

MS m/z: 467 (M^+, 25), 452 (4), 451 (8), 450 (17), 425 (8), 424 (21), 407 (42), 393 (21), 392 (63), 271 (2), 175 (17), 174 (24), 160 (24), 136 (63), 137 (100), 123 (24), 119 (8), 111 (8), 110 (8), 97 (12) [1]

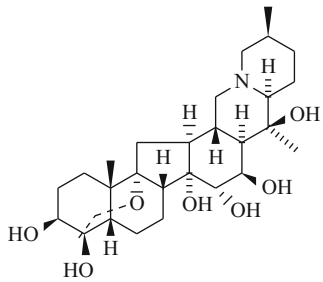
^{1}H NMR ($CDCl_3$-CD_3OD): 0.66 (3H, s, CH_3-18), 0.80 (3H, s, CH_3-19), 1.11 (3H, d, J = 7, CH_3-21), 2.00 (3H, s, OAc), 2.20 (3H, s, CH_3-27), 6.94 (2H, s, 2H–Ar) [1]

References

1. R. Shakirov, V.V. Kul'kova, I. Nakhatov, Chem. Nat. Comp. **31**, 79 (1995)

Zygadenine

CAS Registry Number: 545-45-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Steroidal Alkaloids

Biological sources: *Zigadenus elegans*

$C_{27}H_{43}NO_7$: 493.304

Mp: 198–200°C ($CHCl_3$), 220°C (sulphate), 241°C (hydrochloride), 176°C (chloroaurate) [1]; 272°C (di Ac acetonide), 257°C (di Ac) [2]

$[\alpha]_D$ −37° [1]

References

1. V.V. Feofilaktov, L.D. Alekseeva, Zh. Prikl. Khim. **28**, 989 (1955)
2. S.M. Kupchan, J. Amer. Chem. Soc. **81**, 1925 (1959)

Tropane Alkaloids

Tropane alkaloids occur mainly in plants belonging to 14 species of the family Solanaceae. They are also found in individual species of the families Convolvulaceae, Erytroxylaceae, Euphorbiaceae, Agaricaceae, Proteaceae, and others. Tropane alkaloids include a rather large number of bases of various degrees of complexity. Their structures are based on the heterocyclic nortropane skeleton (8-aza-[3.2.1] bicyclooctane), which has a bicyclic system that includes condensed piperidine and pyrrolidine rings. The principal representatives of tropane alkaloids are esters of amino alcohols that can be esterified by aliphatic and aromatic acids. Tropane alkaloids contain amino alcohols of the following nortropane derivatives: nortropine or tropanol (C3-OH, C8-Me), norecgonine (C3-OH, C2-COOH), dihydroxytropane (C3-OH, C7-OH, C8-Me), and scopine (C3-OH, C6,7-O, C8-Me). The esterifying acids include tropic, atropic, isatropic, acetic, (+)-α-methylbutyric, tiglic, cinnamic, anisic, veratric, benzoic, isovaleric, vanillic, and others. Based on the structure of the amino alcohol part of tropane alkaloids, all presently known alkaloids of this type can arbitrarily be classified in the following groups:

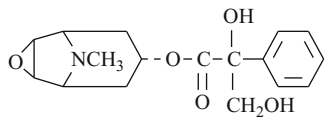
1. Hyoscyamine alkaloids. This group includes nortropane alkaloids with a C-3 substituent, derivatives of tropine, pseudotropine, and nortropine.
2. Hyoscine alkaloids. This group includes bases that are scopine and norscopine derivatives.
3. Valeroidine alkaloids. Tropane alkaloids of this group have substituents in the 2,3- or 3,6-nortropane positions and are derivatives of 2,3-nortropanediol or 3,6-tropanediol.
4. Meteloidine alkaloids. Bases with substituents in the 3,6,7-nortropane positions, teloidine derivatives, are assigned to this group.

Dimeric tropane alkaloids are known in addition to the monomeric ones. Natural compounds of this small group are most frequently dibasic acids, the structures of which consist of two tropane cores and one, two, or three fragments. The bond between monomers in certain dimeric alkaloids involves two N atoms of nortropane and CH_2–CH_2 or C = O bridges.

Certain tropane alkaloids (atropine, scopolamine) possess cholinolytic action and are used in medicine as medicinal preparations.

Anisodine

CAS Registry Number: 52646-92-1



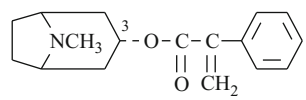
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Scopolia tangutica*
$C_{17}H_{21}NO_5$: 361.1512
Mp: 197–200°C [1]
$[\alpha]_D$ −29° (H_2O), −12° (EtOH) [1]
IR: 3600, 3510, 1740, 860 [1]
^{1}H NMR (CF_3COOH): 4.39, 4.84(1H, d, J = 12, CH_2-O), 7.48(5H, m, H–Ar) [1, 2]
HPLC: [3]

References

1. S.A. Minina, T.V. Astakhova, D.A. Fesenko, Chem. Nat. Comp. **13**, 598 (1977)
2. Hsieh Ching-Hsi, Wang Lin, Liu Yung-Lung, Shang Tian-Ming, Hsieh Feng-Chin, Ke Ta-Lun, K'o Hsueh Tung Pao, **20**(1), 52 (1975): *C. A.* **83**, 93824 (1975)
3. He Li-Ji, Zhang Gua-De, Tong Ju-Ji, K. Sagara, T. Oshima, T. Yoshida, J. Chromatogr. **481**, 428 (1989)

Apoatropine

CAS Registry Number: 500-55-0



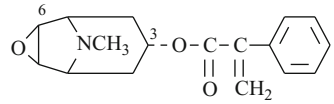
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Atropa belladonna, Datura innoxia, D. stramonium, Hyoscyamus niger, H. pusillus, Physochlaina alaica, Ph. orientalis*
$C_{17}H_{21}NO_2$: 271.1572
Mp: 62°C ($CHCl_3$), 248°C (hydrobromide), 239°C (hydrochloride), 168°C (picrate), 112°C (chloraurate) [1]
$[\alpha]_D$ 0° [2]
UV: 251(3.47) [2]
IR: 1715, 1620, 780, 710 [2]
MS *m/z*: 271(M^+) [2]
^{1}H NMR: 2.20(3H, s, NCH_3), 5.08(1H, t, H-3), 5.79, 6.26(each 1H, d, C = CH_2), 7.25(5H, m, H–Ar) [2]

References

1. H. King, L. Ware, J. Chem. Soc. **63**, 331 (1941)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 266 (1996)

Apohyoscine

CAS Registry Number: 535-26-2



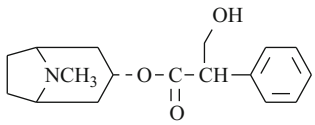
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia, D. meteoides, D. stramonium, Hyoscyamus niger, H. pusillus, Physochlaina alaica*
$C_{17}H_{19}NO_3$: 285.1365
Mp: 80°C (Et_2O), 216°C (dec., picr.), 185°C (chloraurate) [1, 2]
IR: 1700, 1605, 780, 710 [1]
MS *m/z*: 285(M^+) [1]
^{1}H NMR: 2.40(3H, s, NCH_3), 3.17(H-6, H-7), 4.95(1H, t, H-3), 5.65, 6.15(each 1H, d, =CH_2), 7.22(5H, H–Ar) [1]

References

1. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 266 (1996)
2. W. P. Evans, J. G. Woolley, J. Chem. Soc. **9**, 4936 (1965)

Atropine ((±)-Hyosciamine)

CAS Registry Number: 51-55-8



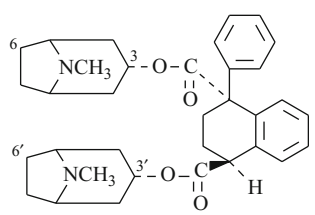
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Atropa belladonna, Physochlaina alaica, Scopolia tangutica*
$C_{17}H_{23}NO_3$: 289.1678
Mp: 115–116°C (EtOH-$CHCl_3$), 165°C (hydrochloride), 164°C (hydrobromide), 198°C (oxalate), 176°C (picrate), 139°C (chloraurate) [1]
$[\alpha]_D$ 0° [1]
IR: 3420, 3380, 1722, 760, 710 [1]
MS *m/z*: 289(M^+), 124, 123, 113, 112, 97, 96, 95, 82 [1]
^{1}H NMR: 2.18(3H, s, NCH_3), 5.00(1H, t, H-3β), 7.22(5H, s, H–Ar) [1]
HPLC: [2]

References

1. R.T. Mirzamatov, K.L. Lutfullin, Chem. Nat. Comp. **21**, 129 (1985)
2. T. Okuda, M. Nishida, I. Sameshima, K. Kyoyama, K. Hiramatsu, Y. Takehara, K. Kohriyama, J. Chromatogr. **567**, 141 (1991)

α-Belladonnine

CAS Registry Number: 5878-33-1



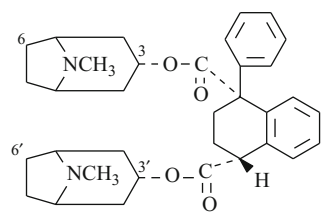
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia, D. stramonium, Physochlaina alaica, Hyoscyamus niger*
$C_{34}H_{42}N_2O_4$: 542.3145
Mp: 128–129°C (EtOAc), 196°C (hydrochloride), 191°C (hydrobromide), 260°C (methiodide), 95°C (methochloride), 231°C (ethiodide), 226°C (ethochloride), 196°C (propyl chloride deriv.), 77°C (chloroplatinate), 201°C (butyl iodide deriv.), 80°C (butyl chloride deriv.) [1, 2]
UV: 255, 259, 2663(2.56, 2.61, 2.60) [1]
IR: 1725, 775, 715 [1]
MS *m/z*: 542(M^+, 70), 461(10), 375(90), 271(15), 124(100), 96(40), 95(30), 94(44), 83(19), 82(18), 81(3) [3]
^{1}H NMR: 1.10–1.99(16H, m, H-2, H-2′, H-4, H-4′, H-6, H-6′, H-7, H-7′), 2.04(3H, s, NCH_3), 2.10(3H, s, NCH_3), 2.81(4H, q, H-1, H-1′, H-5, H-5′), 3.70(1H, t, CH), 4.87(1H, t, H-3), 4.97(1H, t, H-3′), 7.10(9H, m, H–Ar) [1, 3]

References

1. R.T. Mirzamatov, Author's Abstract of Candidate's Dissertation, Tashkent, 1974
2. H.W. Voigtlander, W. Rosenberg, Arch. Pharm. **292**, 632 (1959)
3. S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **27**, 389 (1991)

β-Belladonnine

CAS Registry Number: 6696-63-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia, D. stramonium, Hyoscyamus niger, Physochlaina alaica*
$C_{34}H_{42}N_2O_4$: 542.3145

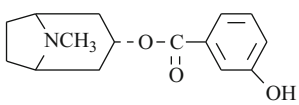
Mp: amorph. [1], 180°C(dec., perchlorate), 150°C (picrate), 88°C (hydrobromide), 231°C (methiodide), 85°C (methochloride), 225°C (ethiodide), 243°C (ethochloride), 186°C (butyl iodide deriv.), 96°C (butyl chloride deriv.) [2]
Solubility: very sol.MeOH, EtOH, $CHCl_3$, Me_2CO [1]
UV: 254, 259, 263(2.63, 2.67, 2.66) [1]
IR: 1725, 770, 710 [1]
MS *m/z*: 542 (M^+), 461(6), 375(44), 271(18), 140(30), 124(100), 96(35), 95(30), 94(40). [1, 3]
^{1}H NMR: 2.06, 2.12 (each 3H, s, 2 × NCH_3), 2.74–2.94 (4H, m, H-1, H-1′, H-5, H-5′), 3.70 (1H, t, CH), 4.97 (2H, m, H-3, H-3′), 6.85, 7.09 (7H, br s, 2H, q, J = 8; 1.5, H–Ar) [3]
Pharm./Biol.: LD_{50} 0.223, 0.394 mg/kg (i/v, s/c, mice). Etbellonii – {the diethochloride of β-belladonnine} – possesses curaremimetic properties [4]

References

1. R.T. Mirzamatov, Author's Abstract of Candidate's Dissertation, Tashkent, 1974
2. H.W. Voigtlander, W. Rosenberg, Arch. Pharm. **292**, 632 (1959)
3. S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **27**, 389 (1991)
4. A.A. Vakhabov, Author's Abstract of Doctoral Dissertation, Moscow, 1982

Cochlearine

CAS Registry Number: 52418-07-2

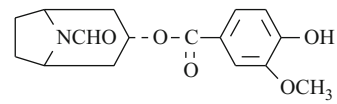


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Cochlearia arctica*
$C_{15}H_{19}NO_3$: 261.1365
Mp: 235–236°C (abs. EtOH), 307°C (dec., hydrochloride), 205°C (dec., perchlorate), 276°C (picrate) [1]
UV: 239, 300 [2]
IR: 1713, 1602, 1572 [2]

References

1. T.F. Platonova, A.D. Kuzovkov, Med. Prom. **10**, 19 (1963)
2. V.I. Murav'eva, A.G. Mamedova, A.I. Ban'kovskii, Zh. Obshch. Khim. **33**, 1690 (1963)

Confolidine



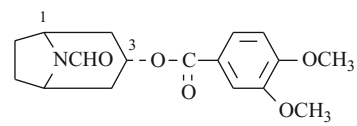
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus subhirsutus*
$C_{16}H_{19}NO_5$: 305
Mp: 178–179°C [1]
IR: 3422, 3000–2880, 1706, 1647, 1591, 1451, 1381, 870, 818 [1]
MS *m/z*: 305 (M^+, 83), 277, 151 (100), 138, 110, 109, 108 [1]
^{1}H NMR ($CDCl_3$): 3.38 (3H, s, OCH_3), 4.08 (1H, m, H-5), 4.60 (1H, m, H-1), 5.30 (1H, t, H-3), 6.85 (1H, d, J = 7), 7.45–7.67 (2H, m), 8.10 (1H, s) [1]

References

1. N.A. Razzakov, S.F. Aripova, Chem. Nat. Comp. **40**, 54 (2004)

Confoline

CAS Registry Number: 76971-33-0



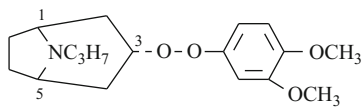
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids

Biological sources: *Convolvulus subhirsutus*
$C_{17}H_{21}NO_5$: 319.1420
Mp: 140–141°C (Me_2CO) [1]
IR: 1710, 1660, 875, 825 [1]
MS *m/z*: 319(M^+), 290, 182, 165, 137 [1]
^{1}H NMR: 3.86(6H, s, 2 × OCH_3), 4.08, 4.58(each 1H, m, H-1, H-5), 5.28(1H, t, H-3β), 6.78, 7.45–7.60(3H, m, H–Ar) [1]

References

1. E.G. Sharova, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 487 (1980)

Conpropine (±)-N-Propyl-3α-veratroylnortropane



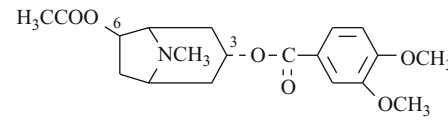
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus subhirsutus*
$C_{19}H_{27}NO_4$: 127.1869
Mp: amorph. [1]
$[\alpha]_D$ ±0° [1]
IR: 2980, 2920, 1708, 1610, 1580, 870, 810 [1]
MS *m/z*: 333(20), 304(25), 182, 168, 165, 148, 124, 111, 97, 96, 95, 77 [1]
1H NMR: 0.90(3H, t, J = 6.8, CH_2-CH_3), 1.35–2.20(10H, m, 5CH_2), 2.20–2.65(2H, m, CH_2-N), 3.25–3.50(2H, m, H-1, H-5), 3.90 and 3.92(each 3H, s, 2ArOCH_3), 5.25(1H, t, 3αH), 7.51(1H, d, J = 2, Hα–Ar), 7.60(1H, dd, J_{meta} = 2, J_{orto} = 8.5, Hα–Ar), 6.86(1H, d, J = 8.5, Hβ–Ar) [1]

References

1. A.M. Gapparov, S.F. Aripova, N.A. Razzakov, V.U. Khujaev, Chem. Nat. Comp. **44**, 743 (2008)

Convolacine

CAS Registry Number: 169626-32-8



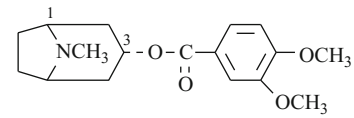
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus subhirsutus*
$C_{19}H_{25}NO_6$: 363.1675
Solubility: sol. Me_2CO, EtOH
IR: 1730, 1700, 885, 820 [1]
MS *m/z*: 363(M^+), 348, 304, 290, 182, 165, 140, 124 [1]
^{1}H NMR: 2.03(3H, s, CH_3), 2.23(3H, s, NCH_3); 3.25(each 1H, H-1, H-5); 3.89(6H, s, 2 × OCH_3), 5.00(1H, m, H-3β); 5.15(1H, m, H-6α), 6.87(1H, d, J = 7, H–Ar), 7.55(1H, d, J = 7; J = 2, H–Ar), 7.67(1H, d, J = 2, H–Ar) [2]

References

1. S. Aripova, O. Abdilalimov, Chem. Nat. Comp. **24**, 74 (1993)
2. S. Aripova, Author's Abstract of Doctoral Dissertation, Tashkent, 1991

Convolamine

CAS Registry Number: 500-56-1



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus Krauseanus, C. pseudocanthabrica, C. subhirsutus*
$C_{17}H_{23}NO_4$: 305.1627
Mp: 114–115°C (pet. ether), 237°C (hydrochloride), 264°C (picrate), 217°C (chloroplatinate), 202°C (chloraurate), 275°C (methiodide) [1]
IR: 1710, 1600, 1520, 885, 815 [2]

MS *m/z*: 305(M^+), 290, 182, 165, 140, 124, 95, 83, 82 [2]
^{1}H NMR: 2.20(3H, s, NCH_3), 3.15(2H, m, H-1, H-5), 3.80(6H, s, 2 × OCH_3), 5.10(1H, t, H-3β), 6.80–7.40(3H, m, H–Ar) [2]
^{13}C NMR: [3]

Table 1

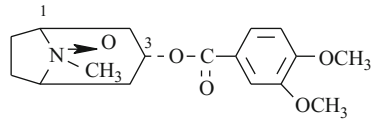
C–1	59.1	C = O	167.3	C–1′	122.8	OCH_3	55.1
2	35.9			2′	122.4	OCH_3	55.1
3	67.0			3′	111.4	NCH_3	39.6
4	35.9			4′	152.3		
5	59.1			5′	148.0		
6	25.1			6′	109.6		
7	25.1						

References

1. A.P. Orekhov, R.A. Konovalova, Chem. Ber. **67**, 1153 (1934)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 492 (1996)
3. M.R. Yagudaev, S.F. Aripova, Chem. Nat. Comp. **22**, 74 (1986)

Convolamine N-Oxide

CAS Registry Number: 97534-16-2



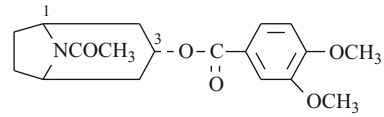
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus Krauseanus, C. subhirsutus*
$C_{17}H_{23}NO_5$: 321.1586
Mp: 118–119°C [1]
Solubility: sol.H_2O, EtOH, MeOH [1]
IR: 1700, 885, 825 [1]
MS *m/z*: 321(M^+), 305, 304, 182, 165, 151, 140, 124, 97, 95, 83, 82, 57 [1]
^{1}H NMR: 3.27(3H, s, NCH_3), 3.84, 3.86(each 3H, s, 2 × OCH_3), 4.27(2H, m, H-1, H-5), 5.18(1H, t, H-3β), 6.82–7.50(3H, m, H–Ar) [1]

References

1. S.F. Aripova, Chem. Nat. Comp. **21**, 261 (1985)

Convolicine

CAS Registry Number: 72994-86-6



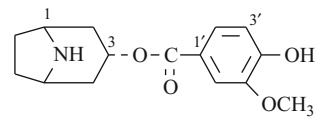
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus Krauseanus, C. subhirsutus, C. pseudocanthabrica*
$C_{18}H_{23}NO_5$: 333.1576
Mp: 144–145°C [1]
Solubility: sol. MeOH, EtOH [1]
IR: 1700, 1640, 880, 810 [1]
MS *m/z*: 333(M^+), 290, 182, 165, 151, 126, 123, 110, 97, 95 [1]
^{1}H NMR: 2.05(3H, s, CH_3CO), 3.88(6H, s, 2 × OCH_3), 5.32(1H, t, H-3β), 6.86, 7.45–7.65(3H, m, H–Ar) [1]

References

1. S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **15**, 457 (1979)

Convolidine

CAS Registry Number: 63911-32-0



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids

Biological sources: *Convolvulus Krauseanus, C. subhirsutus, C. pseudocanthabrica*
$C_{15}H_{19}NO_4$: 277.1314
Mp: 214–215°C (MeOH) [1]
$[\alpha]_D \pm 0°$ [1]
Solubility: sol.$CHCl_3$ [1]
IR: 3600, 3200, 1680, 880, 825, 805 [1]
MS *m/z*: 277(M^+), 167, 154, 151, 126, 123, 110(100), 108, 97 [1]
^{1}H NMR: 3.57(3H, s, OCH_3), 5.08(1H, t, H-3β), 6.65, 7.12–7.35(3H, m, H–Ar) [1]
^{13}C NMR: [2]

Table 1

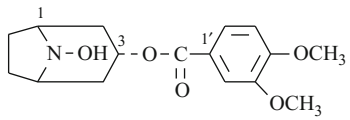
C–1	52.5	C = O	164.8	C–1′	121.0	Ar-OCH_3	55.5
2	36.8			2′	123.1		
3	68.0			3′	115.3		
4	36.8			4′	151.6		
5	52.5			5′	147.4		
6	28.8			6′	112.5		
7	28.9						

References

1. S.F. Aripova, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **13**, 255 (1977)
2. M.R. Yagudaev, S.F. Aripova, Chem. Nat. Comp. **22**, 74 (1986)

Convoline

CAS Registry Number: 89783-61-9



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus Krauseanus, C. subhirsutus, C. pseudocanthabrica*
$C_{16}H_{21}NO_5$: 307.1420
Mp: 184–185°C [1]
$[\alpha]_D \pm 0°$ [1]
IR: 3245, 1705, 1600, 885, 830 [1]
MS *m/z*: 307(M^+), 290, 182, 165, 142, 125 [1]
^{1}H NMR: 3.89(6H, s, 2 × OCH_3), 5.06(1H, t, H-3β), 6.92, 7.50–7.70(3H, m, H–Ar) [1]
^{13}C NMR: [2]

Table 1

C–1	64.3	C = O	164.4	C–1′	123.1	OCH_3	55.9
2	37.4			2′	124.2	OCH_3	55.9
3	66.3			3′	112.0		
4	37.4			4′	153.1		
5	64.3			5′	148.8		
6	25.9			6′	110.5		
7	25.9						

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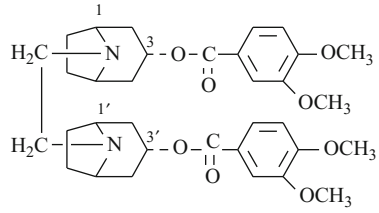
1. S.F. Aripova, E.G. Sharova, U.A. Abdullaev, S.Yu. Yunusov, Chem. Nat. Comp. **19**, 712 (1983)
2. M.R. Yagudaev, S.F. Aripova, Chem. Nat. Comp. **22**, 74 (1986)

Convolvidine

CAS Registry Number: 50656-81-0



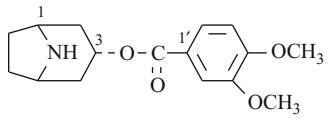
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus Krauseanus, C. subhirsutus, C. pseudocanthabrica*
$C_{34}H_{44}N_2O_8$: 608.3098
Mp: 189–190°C [1]
Solubility: sol. Me_2CO, $CHCl_3$, MeOH, EtOH [1]
IR: 1716, 1605, 880, 830 [1]
MS *m/z*: 608(M^+), 426, 304, 138, 122, 110, 83 [1]
^{1}H NMR: 2.50(4H, s, 2 × CH_2), 3.41(4H, m, H-1, H-1′, H-5, H-5′), 3.82(12H, s, 4 × OCH_3), 5.15(2H, m, H-3β), 6.77–7.42(6H, m, H–Ar) [1]

References

1. S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 622 (1986)

Convolvine

CAS Registry Number: 537-30-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids

Biological sources: *Convolvulus Krauseanus, C. pseudocanthabrica, C. subhirsutus*

$C_{16}H_{21}NO_4$: 291.1471

Mp: 114–115°C (pet. ether), 261°C (dec., hydrochloride), 266°C (dec., oxalate), 263°C (picrate), 241°C (dec., chloroplatinate), 217°C (dec., chloroaurate), 231°C (methiodide) [1]

IR: 3390, 1720, 1600, 1520, 880, 820 [2]

MS *m/z*: 291(M^+), 181, 165, 126, 110 [2]

^{1}H NMR: 1.80–2.35(8H, m, H-2, H-4, H-6, H-7), 3.45–3.65(2H, m, H-1, H-5), 3.90(6H, s, 2 × OCH_3), 5.30(1H, t, H-3β), 6.94–7.45(3H, m, H–Ar) [2]

^{13}C NMR: [3]

Table 1

C–1	52.8	C = O	164.7	C–1′	122.8	OCH_3	55.2
2	36.9			2′	122.5	OCH_3	55.2
3	67.9			3′	111.4		
4	36.9			4′	152.3		
5	52.8			5′	148.1		
6	28.8			6′	109.9		
7	28.8						

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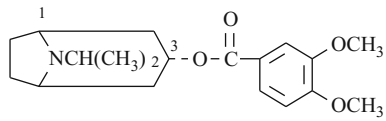
1. A.P. Orekhov, R.A. Konovalova, Zh. Obshch. Khim. **7**, 646 (1937)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 493 (1996)
3. M.R. Yagudaev, S.F. Aripova, Chem. Nat. Comp. **22**, 74 (1986)

Convosine

CAS Registry Number: 107373-72-8



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids

Biological sources: *Convolvulus subhirsutus*

$C_{19}H_{27}NO_4$: 333.1940

Mp: 103–104°C (Me_2CO) [1]

IR: 1710, 1605, 1520, 885, 830 [1]

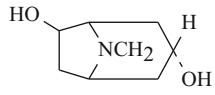
MS *m/z*: 333(M^+), 318, 290, 182, 165, 98, 83 [1]

^{1}H NMR: 1.10(6H, d, J = 7, 2 × CH_3), 3.80(6H, s, 2 × OCH_3), 3.05, 3.47(3H, m, CH), 5.22(1H, t, H-3β), 6.89, 7.50(3H, m, H–Ar) [1]

References

1. S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **22**, 581 (1986)

(–)-3α,6β-Dihydroxytropane



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids

Biological sources: *Datura innoxia, D. stramonium, Physochlaina alaica*
$C_8H_{15}NO_2$: 157.1103
Mp: 212°C (MeOH), 253°C (picrate), 197°C (nitrate), 295°C (hydrochloride), 256°C (hydrobromide) [1]
$[\alpha]_D$ −25° [2]
IR: 3450–3310 [2]
MS *m/z*: 157(M^+, 35), 140(14), 124(12), 113(100), 96(92), 82(36), 81(15) [2]

References

1. G. Fodor, O. Kovges, R. Meszaros, J. Chem. Soc. **8**, 2341 (1953)
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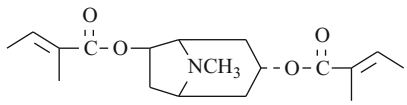
(–)3α,6β-Ditigloyloxytropane

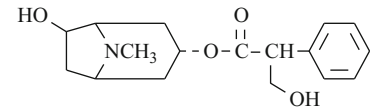


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia*
$C_{18}H_{27}NO_4$: 321.1940
Mp: amorph., 151°C (picrate), 230°C (chloroplatinate) [1]
$[\alpha]_D$−1° (EtOH) [1]
MS *m/z*: 321(M^+), 238, 222, 154, 138, 122, 94, 83 [2]
^{1}H NMR: 1.82(6H, s, 2 × CH_3), 1.74(6H, d, 2 × CH_3), 2.43(3H, s, NCH_3), 3.15(2H, m, H-1, H-5), 5.07(1H, m, H-3β), 5.42(1H, m, H-6α), 6.83(2H, m, 2 × CH = C) [2]

References

1. W.C. Evans, M. Willendorf, J. Chem. Soc. **5**, 1991 (1958)
2. S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **25**, 30 (1989)

6-Hydroxyatropine



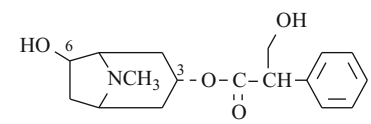
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Physochlaina alaica*
$C_{17}H_{23}NO_4$: 305.1627
Mp: 68–69°C [1]
$[\alpha]_D$ 0° [1]
UV: 240, 262 [1]
IR: 3480–3320, 1730, 745, 710 [1]
^{1}H NMR: 2.73(3H, s, NCH_3), 6.99(5H, m, H–Ar) [1]

References

1. R.T. Mirzamatov, K.L. Lutfullin, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 427 (1974)

6-Hydroxyhyoscyamine

CAS Registry Number: 55869-99-3



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Physochlaina alaica, Scopolia tangutica*
$C_{17}H_{23}NO_4$: 305.1627
Mp: 61–62°C (C_6H_6), 157°C (hydrobromide), 75°C (di Ac)
$[\alpha]_D$ −14° [1]
Solubility: sol. $CHCl_3$, Me_2CO, MeOH, EtOH
UV: 243, 262 [2]
IR: 3380–3420, 1722, 760, 710 [2]
MS *m/z*: 305(M^+), 261, 224, 140, 96, 95, 94 [2]
^{1}H NMR: 2.32(3H, s, NCH_3), 2.88(3H, m, H-1, H-5, OH), 3.78(2H, m, CH_2), 4.37(1H, q, J = 7.5; 2.5, H-6α), 4.93(1H, t, H-3β), 7.25(5H, m, H–Ar) [2]

Pharm./Biol.: Pronounced m-cholinolytic properties. More toxic than atropine; relatively brief action [3]

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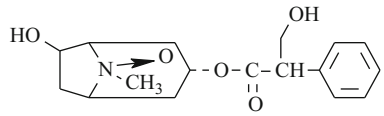
2. R.T. Mirzamatov, V.M. Malikov, K.L. Lutfullin, S.Yu. Yunusov, Chem. Nat. Comp. **8**, 486 (1972)
3. A.A. Vakhabov, R.T. Mirzamatov, M.B. Sultanov, DAN UzSSR (11), 26 (1975)

6-Hydroxyhyoscyamine N-Oxide

CAS Registry Number: 54519-13-0



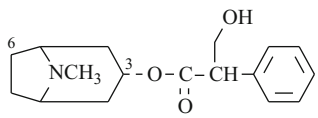
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Physochlaina alaica*
$C_{17}H_{23}NO_5$: 321.1576
Mp: 105–106°C (MeOH) [1]
Solubility: sol. H_2O, MeOH [1]
IR: 3420–3280, 1730, 750, 705 [1]
MS *m/z*: 321(M^+), 305, 304, 261, 156, 138, 96, 95, 94, 82, 81 [1]

References

1. R.T. Mirzamatov, K.L. Lutfullin, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 558 (1974)

Hyoscyamine

CAS Registry Number: 101-31-5



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Anisodus luridus, Datura innoxia, D. stramonium, Hyoscyamus albus, H. niger, H. pusillus, Physochlaina alaica, Ph. orientalis, Scopolia carniolica, S. stramonifolia, S. tangutica*
$C_{17}H_{23}NO_3$: 289.1678
Mp: 109.5°C (EtOH), 165°C (picrate), 151°C (hydrobromide), 176°C (oxalate), 168°C (chloraurate), 206°C (chloroplatinate) [1, 2]
$[\alpha]_D$ −21° (EtOH–H_2O) [2]
UV: 252, 258, 264(2.24, 2.30, 2.20) [2]
IR: 3600, 3020, 2940, 1727, 1717, 1606, 1473, 1116, 1065, 930, 853, 812 [2]
MS *m/z*: 289(M^+, 23), 140(11), 124(100), 96(14), 95(15), 94(24), 83(30), 82(31), 81(7) [2]
^{1}H NMR: 1.18–2.12(8H, m, H-2, H-4, H-6, H-7), 2.20(3H, s, NCH_3), 3.70–3.95(2H, m, CH_2), 4.05–4.40(2H, m, CH, OH), 5.04(1H, m, H-3), 7.28(5H, m, H–Ar) [2]
HPLC: [3]
Pharm./Biol.: m-cholinolytic action [4]

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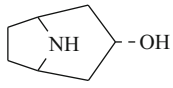
1. R. Willstatter, Chem. Ber. **31**, 1534 (1888)
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 331 (1996)
3. M. Bashir Khan, J.B. Harborne, Phytochemistry **30**, 3559 (1991)
4. V.G. Longo, Pharmacol. Rev. **18**, 965 (1966)

Nortropine



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus subhirsutus*
$C_7H_{13}NO$: 127.1869
Mp: amorph. [1]
$[\alpha]_D$ ±0° [1]
Solubility: MeOH, EtOH, H_2O [1]

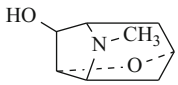
IR: 3358–3350, 2885, 1410, 1028 [1]
^{1}H NMR: 1.0–2.0(8 H, m, $4CH_2$)

References

1. A.M. Gapparov, N.A. Razzakov, S.F. Aripova, Chem. Nat. Comp. **43**, 291 (2007)

Oscine (Scopoline)

CAS Registry Number: 487-27-4



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia*
$C_8H_{13}NO_2$: 155.0946
Mp: 110°C, 282°C (hydrobromide), 238°C (picrate), 257°C (hydrochloride), 57°C (Ac) [1, 2]
$[\alpha]_D \pm 0°$
IR: 3300–3200 [3]
MS *m/z*: 155(M^+), 138, 126, 100, 96(100) [3]

References

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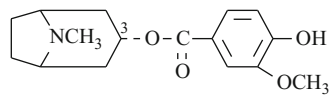
2. K. Hess, O. Wahe, Chem. Ber. **55**, 1979 (1922)
3. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 791 (1996)

Phyllalbine

CAS Registry Number: 4540-25-4

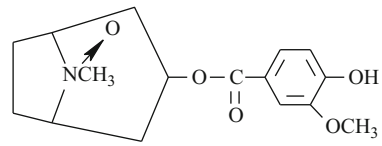


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus Krauseanus, C. pseudocanthabrica, C. subhirsutus, Phyllantus discoides*
$C_{16}H_{21}NO_4$: 291.1471
Mp: 209–210°C ($CHCl_3$-MeOH), 254°C (hydrochloride) [1]
IR: 3400, 1720, 890, 820 [2]
MS *m/z*: 291(M^+), 124(100), 108, 97, 96, 82 [2]
^{1}H NMR: 2.30(3H, s, NCH_3),5.18(1H, t, H-3β), 6.87, 7.40–7.55(3H, m, H–Ar), 8.27(1H, br s, OH) [2]

References

1. J. Parello, P. Longevialle, W. Vetter, G.A. McCloskey, Bull. Soc. Chim. France **12**, 2787 (1963)
2. E.G. Sharova, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **16**, 487 (1980)

Phyllalbine N-Oxide



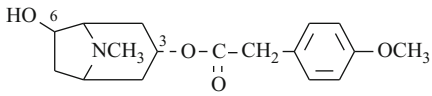
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus subhirsutus*
$C_{16}H_{21}NO_5$: 307.3480
Mp: amorph. [1]
$[\alpha]_D \pm 0°$ [1]
Solubility: MeOH, EtOH, H_2O [1]
IR: 3552–3451, 2962, 2838, 1703, 1640, 1601, 1439, 1323, 874, 759 [1]
^{1}H NMR: 1.75–2.25(8H, m, $4CH_2$), 3.84(3H, s, Ar-OCH_3), 5.14(1H, t, C3αH), 6.75–7.55(3H, m, Ar–H) [1]

References

1. A.M. Gapparov, N.A. Razzakov, S.F. Aripova, Chem. Nat. Prod. **43**, 291 (2007)

Physochlaine

CAS Registry Number: 54357-41-4



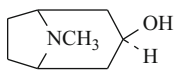
Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Physochlaina alaica*
$C_{17}H_{23}NO_4$: 305.1627
Mp: 75–76°C [1]
$[\alpha]_D \pm 0°$ [1]
UV: 230, 283(3.85, 3.55) [1]
IR: 3420–3260, 1730, 825 [1]
MS *m/z*: 305(M^+), 261, 156, 140, 96, 95, 94, 83, 82, 81 [1]
^{1}H NMR: 2.52(3H, s, NCH_3), 3.50(3H, s, OCH_3), 4.78(1H, t, H-3β), 6.30–6.55(4H, m, H–Ar) [1]

References

1. R.T. Mirzamatov, K.L. Lutfullin, V.M. Malikov, S.Yu. Yunusov, Chem. Nat. Comp. **10**, 426 (1974)

Pseudotropine

CAS Registry Number: 135-97-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia*
$C_8H_{15}NO$: 141.1154
Mp: 108°C, 259°C (picrate), 282°C (hydrochloride) [1]
$[\alpha]_D \pm 0°$
IR: 3330 [2]
MS *m/z*: 141(M^+), 124, 113, 96, 83, 82, 77, 55, 42, 28 [2]
^{1}H NMR: 1.50–2.00(8H, m, CH_2), 2.22(3H, s, NCH_3), 3.07(2H, m, H-1, H-5), 3.51(1H, br s, OH), 3.70(1H, t, H-3) [2, 3]

References

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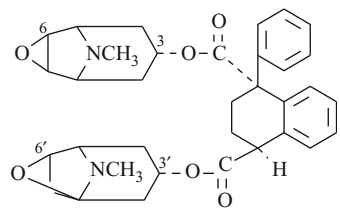
2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 813 (1996)
3. R.J. Bishop, G. Fodor, A.R. Katritzky, F. Soti, L.E. Sutton, F.J. Swinboume, J. Chem. Soc. **C1**, 74 (1966)

α-Scopodonnine

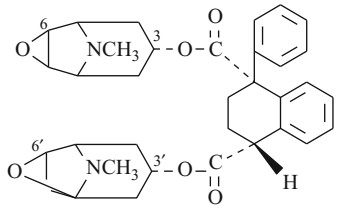


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia*
$C_{34}H_{38}N_2O_6$: 570.2730
Mp: 178–179°C [1]
$[\alpha]_D \pm 0°$ [1]
Solubility: sol. MeOH, EtOH [1]
UV: 254, 259. 263(2.63, 2.67, 2.66) [1]
IR: 1730, 775–770, 760–710 [1]
MS *m/z*: 570(M^+, 33), 389(7), 154(20), 138(100), 108(20), 97(14), 94(40), 81(10), 57(48), 55(36) [1]
^{1}H NMR: 1.20–2.25(8H, m, H-2, H-2′; H-4, H-4′; H-6, H-6′; H-7, H-7′), 2.41, 2.45(each 3H, s, 2 × NCH_3), 3.00(4H, m, H-1, H-1′; H-5, H-5′), 3.76(1H, t, CH), 4.97, 5.09(each 1H, t, H-3β, H-3′β), 7.28(9H, br s, H–Ar) [1]

References

1. S.F. Aripova, B. Tashkhodzhaev, Chem. Nat. Comp. **27**, 464 (1991)

β-Scopodonnine

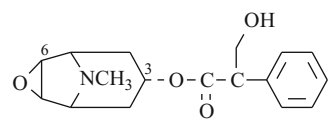


Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia*
$C_{34}H_{38}N_2O_6$: 570.2730
Mp: 190–191°C, 222°C (di methiodide) [1]
$[\alpha]_D \pm 0°$ [1]
UV: 254, 259, 263(2.63, 2.67, 2.66) [1]
IR: 1730, 775–770, 710–700 [1]
MS *m/z*: 570(M^+, 82), 389(27), 154(30), 138(100), 108(79), 97(19), 94(66), 81(12), 57(6), 55(5) [1]
^{1}H NMR: 1.30–1.35(8H, m, H-2, H-2′; H-4, H-4′; H-6, H-6′; H-7, H-7′), 2.44, 2.49(each 3H, s, 2 × NCH_3), 3.08(4H, m, H-1, H-1′; H-5, H-5′), 3.75(1H, t, CH), 5.07, 5.14(each 1H, t, H-3β, H-3′β), 7.26(9H, br s, H–Ar) [1]
X-ray: (di methiodide) [1]

References

1. S.F. Aripova, B. Tashkhodzhaev, Chem. Nat. Comp. **27**, 464 (1991)

(−)-Scopolamine (Hyoscyne)



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia, D. metel, D. stramonium, Hyoscyamus niger, H. pusillus, Physochlaina alaica, Ph. orientalis, Scopolia carniolica, S. stramonifolia, S. tangutica*
$C_{17}H_{21}NO_4$: 303.1471
Mp: 59°C (H_2O) [1], oil [2], 188°C (picrate), 194°C (hydrobromide), 200°C (hydrochloride), 210°C (dec., perchlorate), 209°C (dec., chloroaurate) [1]
$[\alpha]_D$ −18° (EtOH), −28° (H_2O) [1]
Solubility: very sol. EtOH, $CHCl_3$, Et_2O, Me_2CO; spar. sol. C_6H_6, pet. ether [1]
UV: 253, 262, 275 [2]
IR: 3430–3370, 3020–2980, 1727, 755, 695 [2]
MS *m/z*: 303(M^+, 100), 154(62), 138(62), 124(37), 96(25), 95(27), 94(75), 83(27), 82(37), 81(39) [2]
^{1}H NMR: 1.15–2.30(4H, m, H-2, H-4), 2.35(3H, s, NCH_3), 2.74, 3.33(each 1H, d, J = 4, H-6, H-7), 2.85, 3.03(each 1H, m, H-1, H-5), 4.91(1H, t, H-3β), 7.22(5H, m, H–Ar) [2]
HPLC: [3]
Pharm./Biol.: (hydrobromide) causes dilatation of the pupil and an increase in the frequency of cardiac contractions, relaxes the smooth musculature, exhibits a sedative and soporific action. Is used in psychiatry as a tranquilizing agent, in neurological practice for treating parkinsonism, and in surgery together with analgesics. Is a component of Aeron tablets, which are used as antiemetic agents in sea and air sickness. Supplied in the form of powder, 1-ml ampuls of a 0.05% soln., eye drops, and a salve [4]

References

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2. R. Shakirov, M.V. Telezhenetskaya, I.A. Bessonova, S.F. Aripova, I.A. Israilov, M.N. Sultankhodzhaev, V.I. Vinogradova, V.I. Akhmedzhanova, T.S. Tulyaganov, B.T. Salimov, V.A. Tel'nov, Chem. Nat. Comp. **32**, 817 (1996)
3. R. Whelpton, P.R. Hurst, Metodol. Surv. Biochem. Anal. **20**, 279 (1990)
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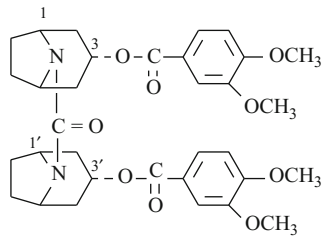
Subhirsine

CAS Registry Number: 85412-77-7



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus subhirsutus*
$C_{33}H_{40}N_2O_9$: 608.2734
Mp: 190–191°C (Me_2CO) [1]
Solubility: sol. $CHCl_3$, MeOH, EtOH [1]
IR: 1710, 1645, 1600, 880, 827 [1]
MS *m/z*: 608(M^+), 443, 426, 320, 304($^{++}$), 290, 261, 182, 165 [1]
^{1}H NMR: 3.84(12H, s, 4 × OCH_3), 4.13(4H, m, H-1, H-1′, H-5, H-5′), 5.25(2H, t, H-3β, 3′β), 6.82, 7.42–7.62(6H, m, H–Ar) [1]
^{13}C NMR: [2]

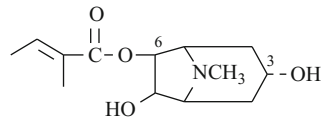
Table 1

C–1, 1′	54.6	NCO	160.8	C–1″	122.9	Ar-OCH_3	55.7
2, 2′	35.8	C = O	165.2	2″	123.0		55.7
3, 3′	68.0			3″	111.8		
4, 4′	35.8			4″	152.9		
5, 5′	54.6			5″	148.5		
6, 6′	27.6			6″	110.3		
7, 7′	27.6						

References

1. E.G. Sharova, S.F. Aripova, S.Yu. Yunusov, Chem. Nat. Comp. **18**, 606 (1982)
2. M.R. Yagudaev, S.F. Aripova, Chem. Nat. Comp. **16**, 74 (1986)

(±)-6β-Tigloyloxytropan-3α,7β-diol



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Datura innoxia*
$C_{13}H_{21}NO_4$: 255.1471
Mp: 157–159°C, 171°C (picrate) [1]
$[\alpha]_D \pm 0°$
MS *m/z*: 255(M^+), 172, 155 [2]
^{1}H NMR: 1.75(3H, s, CH_3), 1.80(3H, d, CH–CH_3), 2.46(3H, s, NCH_3), 3.08(2H, m, H-1, H-5), 4.04(1H, m, H-3β), 4.76(1H, m, H-6α), 5.60(1H, m, H-7α), 6.95(1H, m, CH) [2]

References

1. W.C. Evans, J.F. Lampard, Phytochemistry **11**, 3293 (1972)
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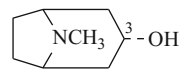
Tropine

CAS Registry Number: 120-29-6



Taxonomy: Physicochemical and Pharmacological Properties of Alkaloids – Tropane Alkaloids
Biological sources: *Convolvulus subhirsutus, Datura innoxia, D. stramonium, Hyoscyamus niger,*

H. pusillus, Physochlaina alaica, Ph. orientalis, Scopolia carniolica

$C_8H_{15}NO$: 141.1154

Mp: 63°C, 188°C (picrate), 193°C (hydrobromide) [1]

IR: 3500–3300

MS *m/z*: 141(M^+), 124, 113, 96, 89, 82(100), 42 [2]

^{1}H NMR: 1.60–1.90(4H, m, H-2, H-2′, H-4. H-4′), 2.05(2H, m, H-6, H-7), 2.16(3H, s, NCH_3), 3.00(2H, m, H-1, H-5), 3.90(1H, t, H-3), 4.30(1H, br s, OH) [3]

HPLC: [4]

References

1. L.C. Keagle, W.H. Hartung, J. Amer. Chem. Soc. **68**, 1608 (1946)
2. E.C. Blossey, H. Budzikiewicz, M. Ohashi, G. Fodor, C. Djerassi, Tetrahedron **20**, 585 (1964)
3. R.J. Bishop, G. Fodor, A.R. Katritzky, F. Soti, L.E. Sutton, F.J. Swinboume, J. Chem. Soc. **C1**, 74 (1966)
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