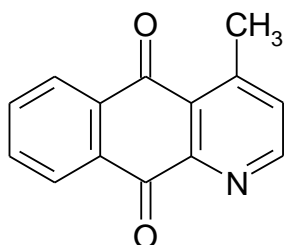


Total syntheses of natural products worked out by the Bracher group

Polycyclic aromatic alkaloids

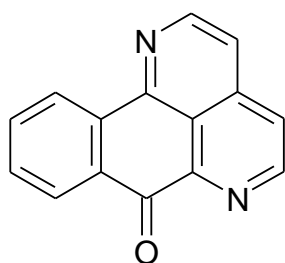


Cleistopholine

Source: *Cleistopholis patens* (Annonaceae)

Synthesis: F. Bracher, Liebigs Ann. Chem. **1989**, 87-88

doi: 10.1002/jlac.198919890117



Sampangine

Source: *Cananga odorata* (Annonaceae)

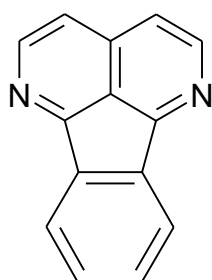
Synthesis:

F. Bracher, Liebigs Ann. Chem. **1989**, 87-88

doi: 10.1002/jlac.198919890117

A. Plodek, M. König, F. Bracher, Eur. J. Chem. **2015**, 1302-1308

doi: 10.1002/ejoc.201403502

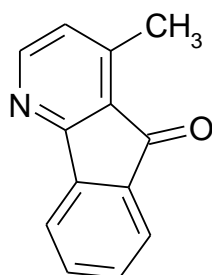


Eupolauridine

Source: *Cleistopholis patens*, *Cananga odorata*, *Eupomatia laurina* (Annonaceae)

Synthesis: F. Bracher, Arch. Pharm. (Weinheim) **1989**, 322, 293-294

doi: 10.1002/ardp.19893220511

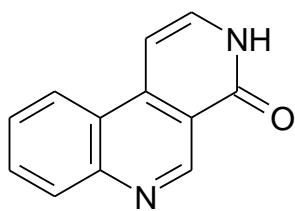


Onychine

Source: *Cleistopholis patens*, *Guatteria dielsiana*, *Onychopetalum amazonicum* (Annonaceae)

Synthesis: F. Bracher, Arch. Pharm. (Weinheim) **1989**, 322, 293-294

doi: 10.1002/ardp.19893220511

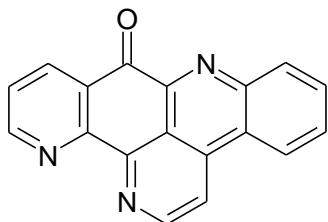


Perlolidine

Source: *Lolium perenne* (Poaceae)

Synthesis: F. Bracher, Arch. Pharm. (Weinheim) **1989**, 322, 511-512

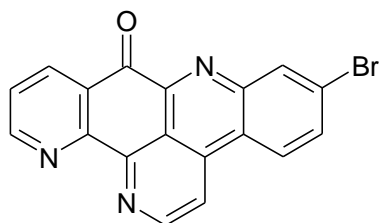
doi: 10.1002/ardp.19893220811



Ascidiemin

Source: *Didemnum* sp. (Didemnidae; ascidian)

Synthesis: F. Bracher, Heterocycles **1989**, 29, 2093-2095

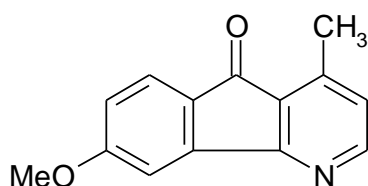


Bromoleptoclinidinone

Source: *Leptoclinides* sp. (ascidian)

Synthesis: F. Bracher, Liebigs Ann. Chem. **1990**, 205-206

doi: 10.1002/jlac.199019900135



6-Methoxyonychine

Source: *Guatteria dielsiana* (Annonaceae)

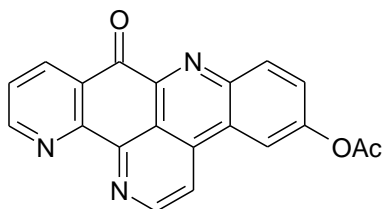
Syntheses:

F. Bracher, Synlett **1991**, 95-96

doi: 10.1055/s-1991-20639

F. Bracher, Arch. Pharm. (Weinheim) **1994**, 371-375

doi: 10.1002/ardp.19943270605

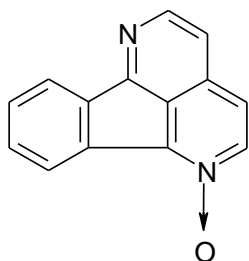


Neocalliactine acetate

Source: *Calliactis parasitica* (sea anemone)

Synthesis: F. Bracher, Liebigs Ann. Chem. **1992**, 1205-1207

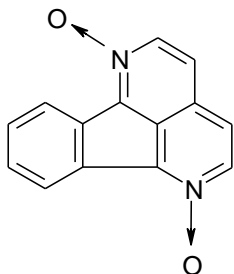
doi: 10.1002/jlac.1992199201199



Eupolauridine-N-oxide

Source: *Cleistopholis patens* (Annonaceae)

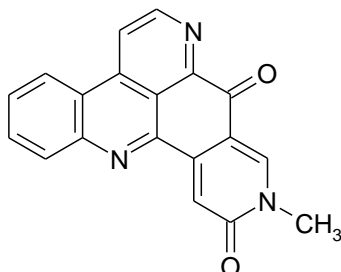
Synthesis: F. Bracher, Pharmazie **1993**, 48, 521-523



Eupolauridine-di-N-oxide

Source: *Cleistopholis patens* (Annonaceae)

Synthesis: F. Bracher, Pharmazie **1993**, 48, 521-523

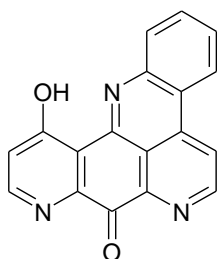


Amphimedine

Source: *Amphimedon sp.* (sponge)

Synthesis: F. Bracher, T. Papke, Liebigs Ann. **1996**, 115-116

doi: 10.1002/jlac.15719960119

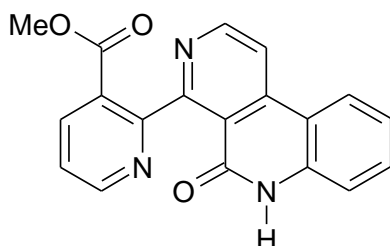


Meridine

Source: *Amphicarpa meridiana* (ascidian)

Synthesis: F. Bracher, N. Bontemps, E. Delfourne, J. Bastide, C. Francisco, Tetrahedron **1997**, 53, 1743-1750

doi: 10.1016/S0040-4020(96)01096-4

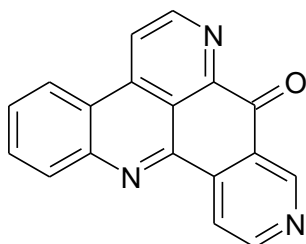


Subarine

Source: unidentified Singaporean ascidian

Synthesis: M. Lotter, F. Bracher, Sci. Pharm. **2009**, 77, 1-7

doi: 10.3797/scipharm.0901-14



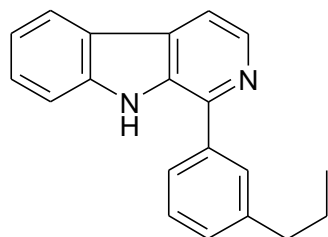
Demethyldeoxyamphimedine

Source: *Cystodytes dellechiajei* (ascidian)

Synthesis: B. Melzer, A. Plodek, F. Bracher, J. Org. Chem. **2014**, 79, 7239-7242

doi: 10.1021/jo501312d

β -Carboline and canthinone alkaloids

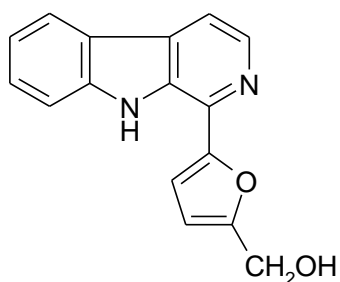


Komaroin

Source: *Nitraria komarovii* (Zygophyllaceae)

Synthesis: F. Bracher, Liebigs Ann. Chem. **1992**, 1315-1319

doi: 10.1002/jlac.1992199201216

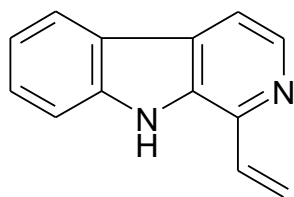


Perlolirine

Source: *Lolium perenne*, *Codonopsis pilosula*,
Codonopsis lanceolata; *Ligusticum chuanxiong*

Synthesis: F. Bracher, Liebigs Ann. Chem. **1992**, 1315-1319

doi: 10.1002/jlac.1992199201216

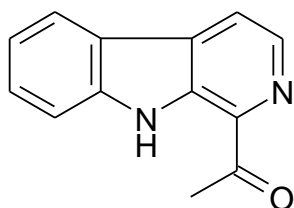


Pavettine

Source: *Pavetta lanceolata*, (Rubiaceae), *Soulamea fraxinifolia*,
(Simaroubaceae), *Costaticella hastata* (Bryozoa)

Synthesis: F. Bracher, Liebigs Ann. Chem. **1992**, 1315-1319

doi: 10.1002/jlac.1992199201216



1-Acetyl- β -carboline

Source: *Ailanthus malabarica* (Simaroubaceae) and others

Syntheses:

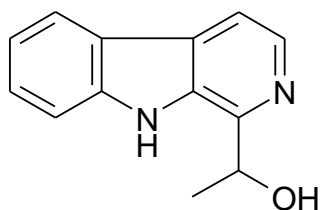
F. Bracher, D. Hildebrand, Liebigs Ann. Chem. **1993**, 837-839

doi: 10.1002/jlac.1993199301132

F. Bracher, J. Daab, Synth. Commun. **1995**, 25, 1557-1562

doi: 10.1080/00397919508011768

1-Hydroxyethyl- β -carboline



Source: *Costaticella hastata* (Bryozoa)

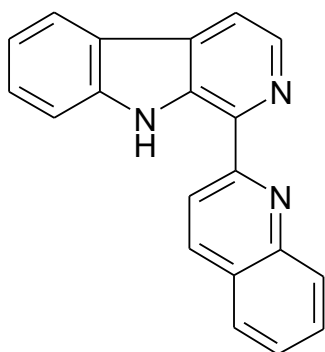
Syntheses:

F. Bracher, D. Hildebrand, Liebigs Ann. Chem. **1993**, 837-839

doi: 10.1002/jlac.1993199301132

F. Bracher, D. Hildebrand, Tetrahedron **1994**, 50, 12329-12336

doi: 10.1016/S0040-4020(01)89542-9



Nitramarine

Source: *Nitraria komarovii* (Zygophyllaceae)

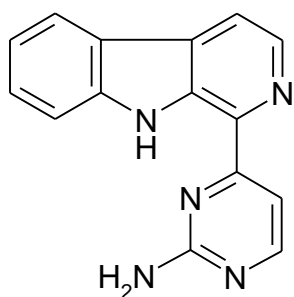
Syntheses:

F. Bracher, D. Hildebrand, Liebigs Ann. Chem. **1993**, 837-839

doi: 10.1002/jlac.1993199301132

F. Bracher, D. Hildebrand, Tetrahedron **1994**, 50, 12329-12336

doi: 10.1016/S0040-4020(01)89542-9



Annomontine

Source: *Annona montana* (Annonaceae)

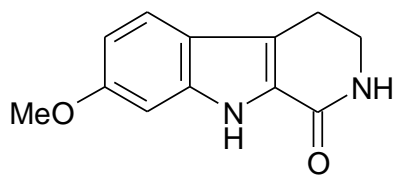
Synthesis:

F. Bracher, D. Hildebrand, Liebigs Ann. Chem. **1993**, 837-839

doi: 10.1002/jlac.1993199301132

A. Puzik, F. Bracher, J. Heterocyclic Chem. **2009**, 46, 770-773

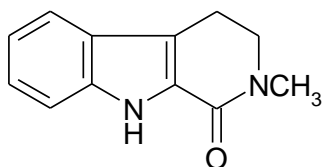
doi: 10.1002/jhet.126



Harmalacidine

Source: *Banisteriopsis caapi* (Malpighiaceae), *Peganum harmala* (Nitrariaceae)

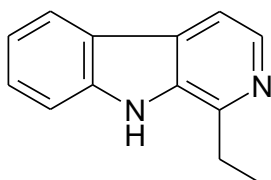
Synthesis: F. Bracher, D. Hildebrand, Pharmazie **1993**, 48, 695



Strychnocarpine

Source: *Strychnos elaeocarpa*, *Strychnos floribunda* (Loganiaceae)

Synthesis: F. Bracher, D. Hildebrand, Pharmazie **1993**, 48, 695

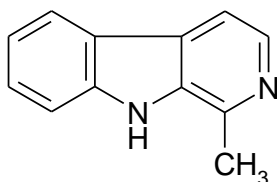


1-Ethyl-β-carboline

Source: *Hannoa klaineana*, *Picrasma javanica* (Simaroubaceae), *Costaticella hastate*, *Cribricellina cribraria* (Bryozoa)

Synthesis: F. Bracher, D. Hildebrand, Liebigs Ann. Chem. **1993**, 1335-1337

doi: 10.1002/jlac.1993199301218



Harmane

Source: *Peganum harmala* (Nitrariaceae) and others

Syntheses:

F. Bracher, D. Hildebrand, Liebigs Ann. Chem. **1993**, 1335-1337

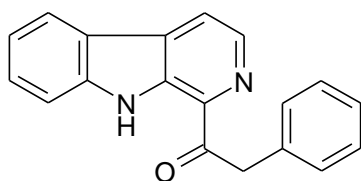
doi: 10.1002/jlac.1993199301218

F. Bracher, A. Puzik, J. Heterocyclic Chem. **2004**, 41, 173-176

doi: 10.1002/jhet.5570410206

A. Kamlah, F. Lirk, F. Bracher, Tetrahedron **2016**, 72, 837-845

doi.org/10.1016/j.tet.2015.12.049

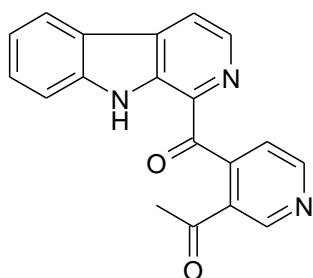


Eudistomin T

Source: *Eudistoma olivaceum* (ascidian)

Synthesis: F. Bracher, D. Hildebrand, L. Ernst, Arch. Pharm. (Weinheim) **1994**, 327, 121-122

doi: 10.1002/ardp.19943270212

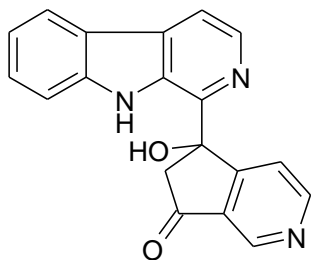


Pauridianthine

Source: *Pauridiantha callicarpoides* (Rubiaceae)

Synthesis: F. Bracher, D. Hildebrand, Tetrahedron **1994**, 50, 12329-12336

doi: 10.1016/S0040-4020(01)89542-9

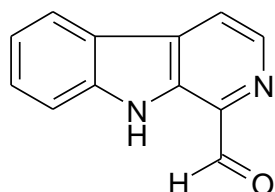


Pauridianthine

Source: *Pauridiantha callicarpoides* (Rubiaceae)

Synthesis: F. Bracher, D. Hildebrand, Tetrahedron **1994**, 50, 12329-12336

doi: 10.1016/S0040-4020(01)89542-9

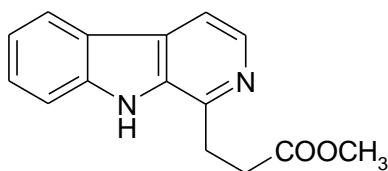


1-Formyl-β-carboline

Source: *Picrasma quassioides* (Simaroubaceae)

Synthesis: F. Bracher, D. Hildebrand, Tetrahedron **1994**, 50, 12329-12336

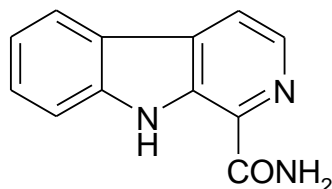
doi: 10.1016/S0040-4020(01)89542-9



Infractine

Source: *Cortinarius infractus* (fungus), *Picrasma quassioides* (Simaroubaceae)

Synthesis: F. Bracher, D. Hildebrand, Pharmazie **1995**, 50, 182-183

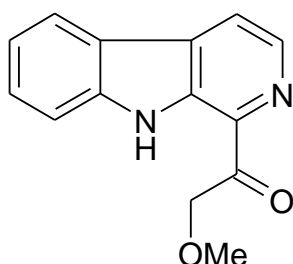


1-Carbamoyl-β-carboline

Source: *Nauclea diderrichii*, *Odyendea gabonensis*, *Neisosperma kilneri*, *Ailanthus altissima*, *Ailanthus malabarica* (plants)

Synthesis: F. Bracher, O. Kast, Synth. Commun. **2003**, 25, 3843-3850

doi: 10.1081/SCC-120026305

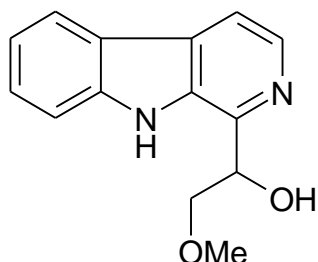


Arenarine A

Source: *Arenaria kansuensis* (Caryophyllaceae)

Synthesis: F. Bracher, A. Puzik, J. Heterocyclic Chem. **2004**, 41, 173-176

doi: 10.1002/jhet.5570410206

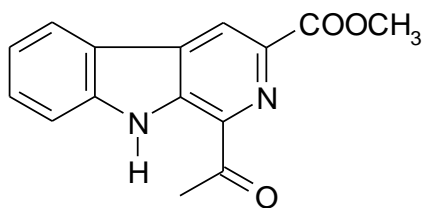


Arenarine B

Source: *Arenaria kansuensis* (Caryophyllaceae)

Synthesis: F. Bracher, A. Puzik, J. Heterocyclic Chem. **2004**, 41, 173-176

doi: 10.1002/jhet.5570410206

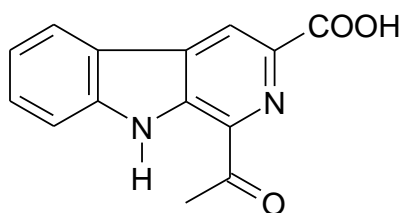


Methyl 1-acetyl- β -carboline-3-carboxylate

Source: *Vestia lycioides* (Solanaceae)

Synthesis: F. Bracher, D. Hildebrand, H. Häberlein, Nat. Prod. Res. **2004**, 18, 391-396

doi: 10.1080/14786410310001630483

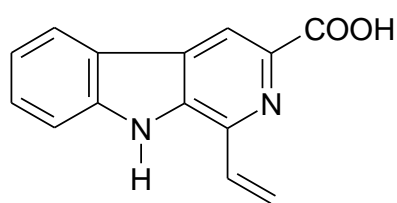


1-Acetyl- β -carboline-3-carboxylic acid

Source: *Vestia lycioides* (Solanaceae)

Synthesis: F. Bracher, D. Hildebrand, H. Häberlein, Nat. Prod. Res. **2004**, 18, 391-396

doi: 10.1080/14786410310001630483

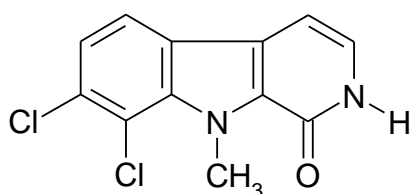


1-Vinyl- β -carboline-3-carboxylic acid

Source: *Nocardioopsis* sp. (bacterium)

Synthesis: F. Bracher, D. Hildebrand, H. Häberlein, Nat. Prod. Res. **2004**, 18, 391-396

doi: 10.1080/14786410310001630483

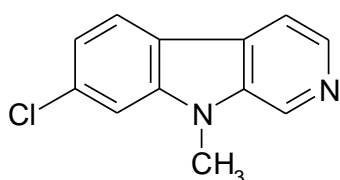


Bauerine C

Source: *Dichothrix baueriana* (blue-green alga)

Synthesis: B. Pohl, T. Luchterhandt, F. Bracher, Synth. Commun. **2007**, 37, 1273-1280

doi: 10.1080/00397910701226228

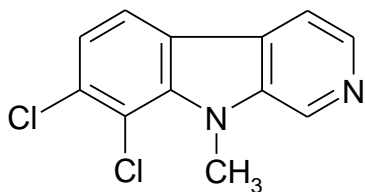


Bauerine A

Source: *Dichothrix baueriana* (blue-green alga)

Synthesis: B. Pohl, T. Luchterhandt, F. Bracher, Synth. Commun. **2007**, 37, 1273-1280

doi: 10.1080/00397910701226228

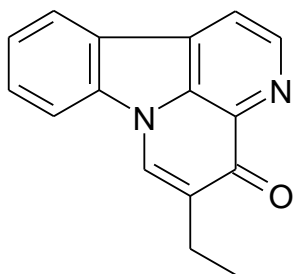


Bauerine B

Source: *Dichothrix baueriana* (blue-green alga)

Synthesis: B. Pohl, T. Luchterhandt, F. Bracher, *Synth. Commun.* **2007**, 37, 1273-1280

doi: 10.1080/00397910701226228

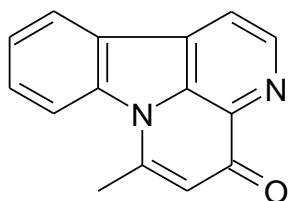


Tuboflavine

Source: *Pleiocarpa mutica*, *Pleiocarpa tubicina* (Apocynaceae)

Synthesis: A. Puzik, F. Bracher, *J. Heterocyclic Chem.* **2009**, 46, 770-773

doi: 10.1002/jhet.126



Norisotuboflavine

Source: *Pleiocarpa mutica* (Apocynaceae)

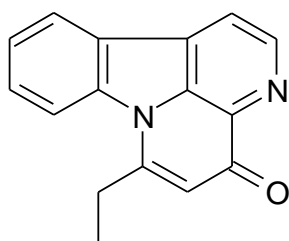
Synthesis:

A. Puzik, F. Bracher, *J. Heterocyclic Chem.* **2009**, 46, 770-773

doi: 10.1002/jhet.126

T. Tremmel, F. Bracher, *Tetrahedron* **2015**, 71, 4640-4646

doi: 10.1016/j.tet.2015.05.002

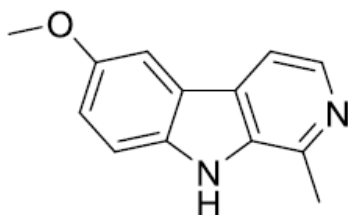


Isotuboflavine

Source: *Pleiocarpa mutica* (Apocynaceae)

Synthesis: T. Tremmel, F. Bracher, *Tetrahedron* **2015**, 71, 4640-4646

doi: 10.1016/j.tet.2015.05.002

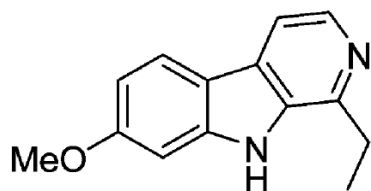


Isoharmine

Source: *Peganum harmala* (Nitrariaceae)

Synthesis: A. Kamlah, F. Lirk, F. Bracher, *Tetrahedron* **2016**, 72, 837-845

doi.org/10.1016/j.tet.2015.12.049



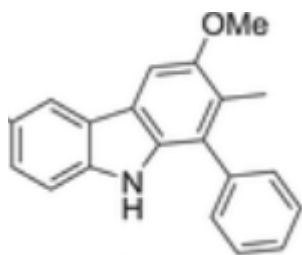
1-Ethyl-7-methoxy-9H-pyrido[3,4-b]indole

Source: *Peganum harmala* (Apocynaceae)

Synthesis: A. Wurzlbauer, K. Rübén, E. Gürdal, A. Chaikuad, S. Knapp, W. Sippl, W. Becker, F. Bracher, *Molecules* **2020**, *25*, 5962

<https://doi.org/10.3390/molecules25245962>

Carbazole alkaloids



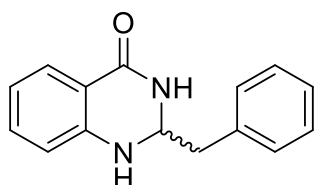
Hyellazole

Source: *Hyella caespitosa* (blue-green alga)

Synthesis: M. Untergehrer, F. Bracher, *Tetrahedron Lett.* **2020**, 61, 151597

doi: 10.1016/j.tetlet.2020.151597

Quinazolin-4-one alkaloids

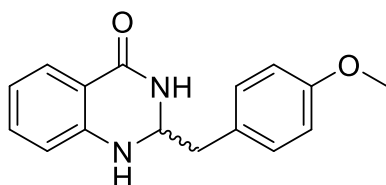


Glycozalone-A

Source: *Glycosmis cochinchinensis* (Rutaceae)

Synthesis: T. Klabmüller, C. Tringali, F. Bracher, *Nat. Prod. Res.* **2022** (epub)

doi: 10.1080/14786419.2022.2110095

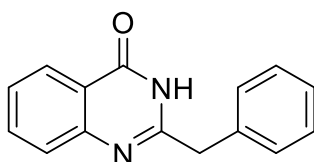


Glycozalone-B

Source: *Glycosmis cochinchinensis* (Rutaceae)

Synthesis: T. Klabmüller, C. Tringali, F. Bracher, *Nat. Prod. Res.* **2022** (epub)

doi: 10.1080/14786419.2022.2110095

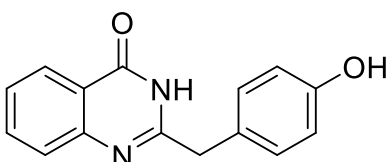


Glycosminine

Source: *Glycosmis pentaphylla* (Rutaceae)

Synthesis: T. Klabmüller, C. Tringali, F. Bracher, *Nat. Prod. Res.* **2022** (epub)

doi: 10.1080/14786419.2022.2110095



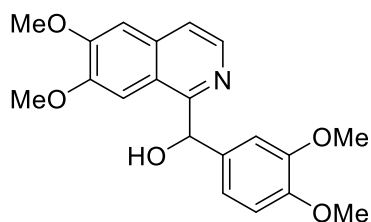
2-(4-Hydroxybenzyl)quinazolin-4(3H)-one

Source: *Isaria farinosa* (fungus)

Synthesis: T. Klabmüller, C. Tringali, F. Bracher, *Nat. Prod. Res.* **2022** (epub)

doi: 10.1080/14786419.2022.2110095

Benzylisoquinoline alkaloids

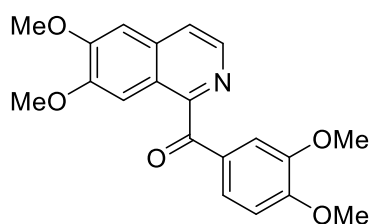


Papaverinol

Source: *Papaver somniferum* (Papaveraceae) and others

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

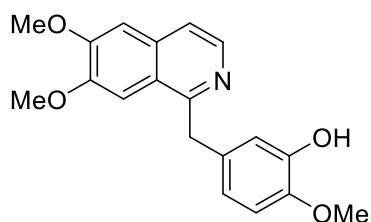


Papaveraldine

Source: *Papaver somniferum* (Papaveraceae) and others

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

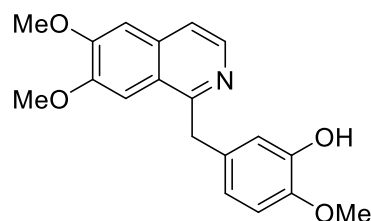


Papaverine

Source: *Papaver somniferum* (Papaveraceae) and others

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

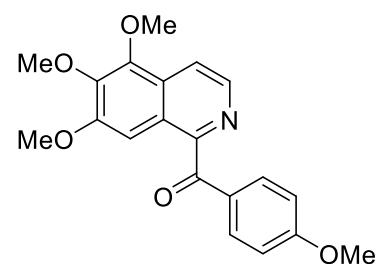


Palaudine

Source: *Papaver somniferum* (Papaveraceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

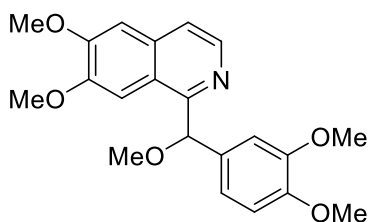


Thalimicrinone

Source: *Thalictrum minus* var. *microphyllum* (Ranunculaceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

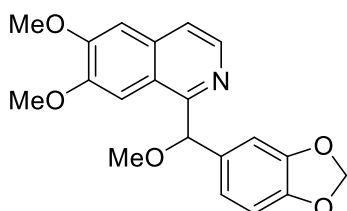


Setigerine

Source: *Papaver setigerum* DC (Papaveraceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

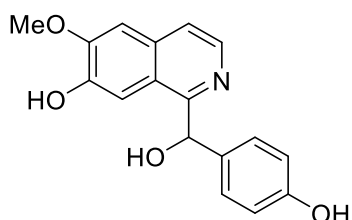


Setigeridine

Source: *Papaver setigerum* DC (Papaveraceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

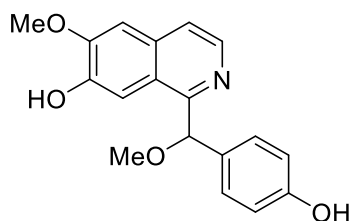


Annocherin A

Source: *Annona cherimola* (Annonaceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

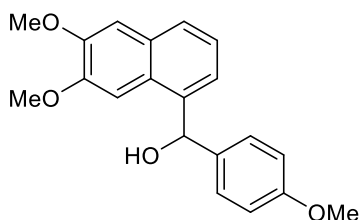


Annocherin B

Source: *Annona cherimola* (Annonaceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

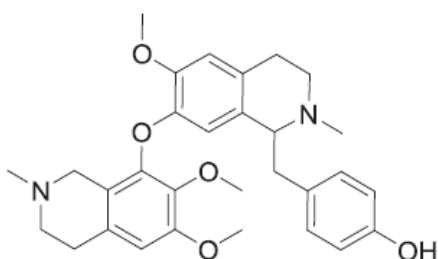


Dimethylannoherin A = Annocherin D

Source: *Nelumbo nucifera* Gaertn. cv. *Rosa-plena* (Nelumbonaceae) and *Beilschmiedia brevipes* (Lauraceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

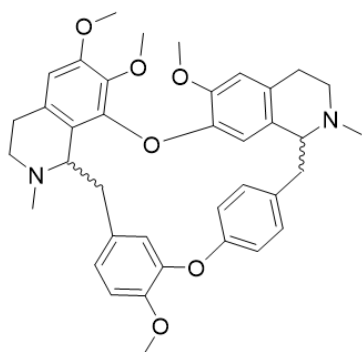


Muraricine (racemic)

Source: *Berberis vulgaris* (Berberidaceae)

Synthesis: R. Schütz, M. Müller, S. Gerndt, K. Bartel, F. Bracher, Arch. Pharm. **2020**, 353, e2000106

doi: 10.1002/ardp.202000106



rac-Tetrandrine (R,R/S,S)

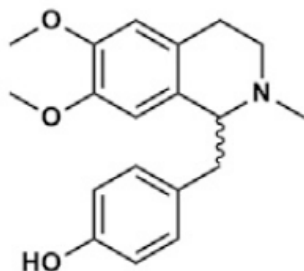
rac-Isotetrandrine (S,R/R,S)

rac-Tetrandrine and *rac*-Isotetrandrine

Source: *Stephania tetrandra* (Menispermaceae)

Synthesis: R. Schütz, M. Meixner, I. Antes, F. Bracher, Org. Biomol. Chem. **2020**, 18, 3047-3068

doi: 10.1039/D0OB00078G

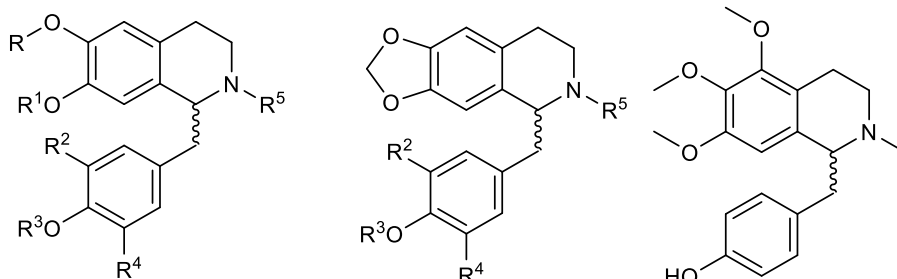


rac-Armepavine

Source: *Nelumbo nucifera* (Nelumbonaceae),
Rhamnus frangula (Rhamnaceae) and others

Synthesis: M. Müller, S. Gerndt, Y.-K. Chao, T. Zisis, O. N. P. Nguyen, A. Gerwien, N. Urban, C. Müller, F. A. Gegenfurtner, F. Geisslinger, C. Ortler, C.-C. Chen, S. Zahler, M. Biel, M. Schaefer, C. Grimm, F. Bracher, A. M. Vollmar, K. Bartel: Gene editing and synthetically accessible inhibitors reveal role for TPC2 in HCC cell proliferation and tumor growth. Cell Chem. Biol. **2021**, 28, 1119-1131.e27

doi: 10.1016/j.chembiol.2021.01.023



rac-armepavine (**2a**)
rac-norarmepavine (**2b**)
rac-laudanine (**2c**)
rac-pseudocodamine (**2d**)
rac-reticuline (**2e**)
rac-orientaline (**2f**)

rac-cinnamolaurine (**3a**)
rac-norcinnamolaurine (**3b**)
rac-*N*-demethylphyllcryptine (**3c**)

rac-thalifendlerine (**4**)

Substitution patterns of the 1-benzyl-1,2,3,4-tetrahydroisoquinoline alkaloids.

Nr.	R	R ¹	R ²	R ³	R ⁴	R ⁵
2a	CH ₃	CH ₃	H	H	H	CH ₃
2b	CH ₃	CH ₃	H	H	H	H
2c	CH ₃	CH ₃	OH	CH ₃	H	CH ₃
2d	CH ₃	CH ₃	H	H	OCH ₃	CH ₃
2e	CH ₃	H	OH	CH ₃	H	CH ₃
2f	CH ₃	H	H	H	OCH ₃	CH ₃
3a	-	-	H	H	H	CH ₃
3b	-	-	H	H	H	H
3c	-	-	OH	CH ₃	H	CH ₃

1-benzyl-1,2,3,4-tetrahydroisoquinoline alkaloids

Source: *rac*-Armepavine: *Nelumbo nucifera* (Nelumbonaceae),
Rhamnus frangula (Rhamnaceae) and others

rac-Norarmepavine: *Nelumbo nucifer*

rac-Laudanine: *Papaver somniferum*, pseudocodamine

rac-Pseudocodamine: metabolite of isoorientaline in *Corydalis platycarpa makino* cell species

rac-Reticuline: *Papaver somniferum*

rac-Orientaline: *Cryptocarya amygdalina*

rac-Cinnamolaurine: *Cinnamomum* sp. T.G.H. 13077

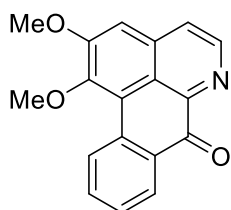
rac-Norcinnamolaurine: *Cinnamomum* sp. T.G.H. 13077

rac-*N*-Demethylphyllcryptine: *Cryptocarya phyllosternon*

rac-Thalifendlerine: *Thalictrum fendleri*

Synthesis: M. Keller, K. Sauvageot-Witzku, F. Geisslinger, N. Urban, M. Schaefer, K. Bartel, F. Bracher: The ethoxycarbonyl group as both activating and protective group in *N*-acyl Pictet-Spengler reactions using methoxystyrenes. A short approach to racemic 1-benzyltetrahydroisoquinoline alkaloids. *Beilst. J. Org. Chem.* **2021**, 17, 2716-2725

Oxoaporphine and oxoisoaporphine alkaloids

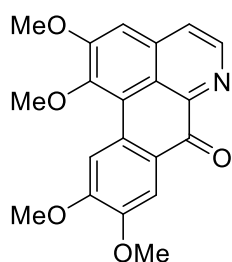


Lysicamine

Source: *Lysichiton camtschatcense* Schott var. *japonicum* Makino (Araceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

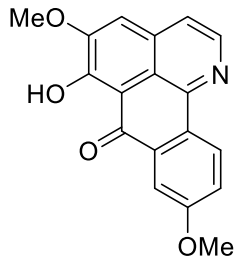


Oxoglaucine

Source: *Liriodendron tulipifera* (Magnoliaceae)

Synthesis: B. Melzer, F. Bracher, Org. Biomol. Chem. **2015**, 13, 7664-7672

doi: 10.1039/C5OB00926J

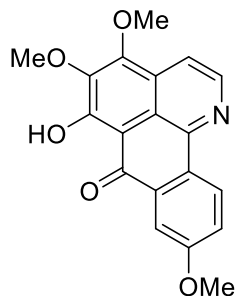


6-O-Demethylmenisporphine

Source: *Menispermium dauricum* DC (Menispermaceae)

Synthesis: B. Melzer, F. Bracher, Beilstein J. Org. Chem. **2017**, 13, 1564-1571

doi: 10.3762/bjoc.13.156

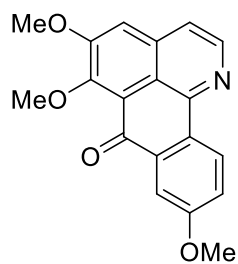


Dauriporphinoline

Source: *Menispermium dauricum* DC (Menispermaceae)

Synthesis: B. Melzer, F. Bracher, Beilstein J. Org. Chem. **2017**, 13, 1564-1571

doi: 10.3762/bjoc.13.156

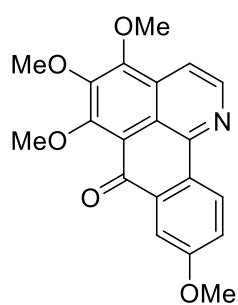


Menisporphine

Source: *Menispermium dauricum* DC (Menispermaceae)

Synthesis: B. Melzer, F. Bracher, Beilstein J. Org. Chem. **2017**, 13, 1564-1571

doi: 10.3762/bjoc.13.156

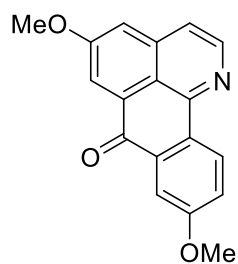


Dauriporphine

Source: *Menispermium dauricum* DC (Menispermaceae)

Synthesis: B. Melzer, F. Bracher, Beilstein J. Org. Chem. **2017**, 13, 1564-1571

doi: 10.3762/bjoc.13.156



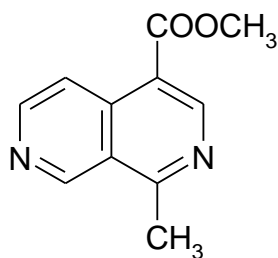
Bianfugecine

Source: *Menispermium dauricum* DC (Menispermaceae)

Synthesis: B. Melzer, F. Bracher, Beilstein J. Org. Chem. **2017**, 13, 1564-1571

doi: 10.3762/bjoc.13.156

Other alkaloids

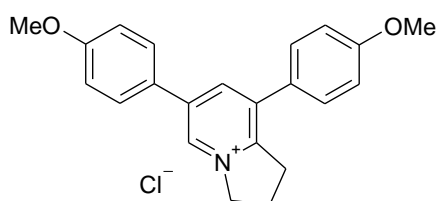


Neozeylanicine

Source: *Neonauclea zeylanica* (Rubiaceae)

Synthesis: F. Bracher, K. Mink, Liebigs Ann. **1995**, 645-647

doi: 10.1002/jlac.199519950490

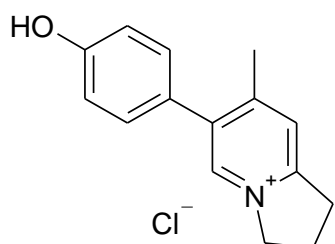


Ficuseptine

Source: *Ficus septica* (Moraceae)

Synthesis: F. Bracher, J. Daab, Eur. J. Org. Chem. **2002**, 2288-2291

doi: 10.1002/1099-0690(200207)2002:14<2288::AID-EJOC2288>3.0.CO;2-G

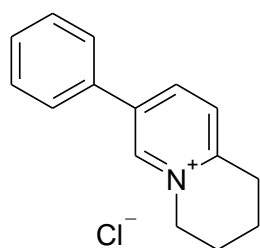


Ipalbidinium

Source: *Ipomoea alba* (Convolvulaceae)

Synthesis: F. Bracher, J. Daab, Monatsh. Chem. **2003**, 134, 573-583

doi: 10.1007/s00706-002-0540-5

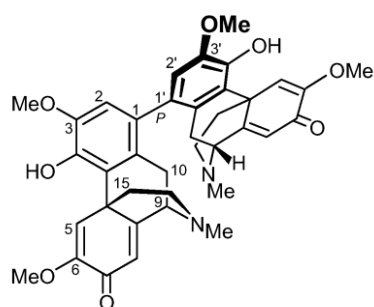


Clathryimine B

Source: *Clathrya basilana* (marine sponge)

Synthesis: F. Bracher, J. Daab, Monatsh. Chem. **2003**, 134, 573-583

doi: 10.1007/s00706-002-0540-5

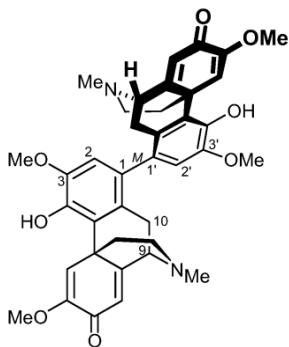


Saludimerine A

Source: *Croton flavens* (Euphorbiaceae)

Synthesis: F. Bracher, W. J. Eisenreich, J. Mühlbacher, M. Dreyer, G. Bringmann, J. Org. Chem. **2004**, 69, 8602-8608

doi: 10.1021/jo048631p

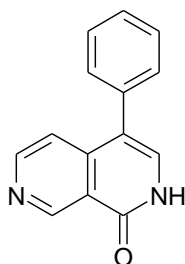


Saludimerine B

Source: *Croton flavens* (Euphorbiaceae)

Synthesis: F. Bracher, W. J. Eisenreich, J. Mühlbacher, M. Dreyer, G. Bringmann, J. Org. Chem. **2004**, 69, 8602-8608

doi: 10.1021/jo048631p

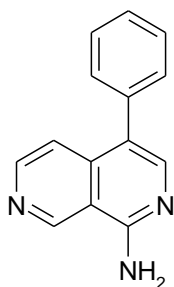


Lophocladine A

Source: *Lophocladia sp.* (red alga)

Synthesis: M. Lotter, J. Schilling, E. Reimann, F. Bracher, Arch. Pharm. Chem. Life Sci. **2006**, 339, 677-679

doi: 10.1002/ardp.200600134

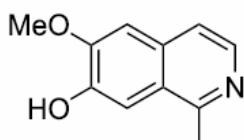


Lophocladine B

Source: *Lophocladia sp.* (red alga)

Synthesis: M. Lotter, J. Schilling, E. Reimann, F. Bracher, Arch. Pharm. Chem. Life Sci. **2006**, 339, 677-679

doi: 10.1002/ardp.200600134

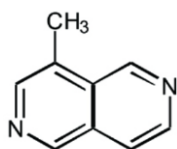


7-Hydroxy-6-methoxy-1-methylisoquinoline

Source: *Hernandia nymphaeifolia* (Hernandiaceae)

Synthesis: B. C. Melzer, J. G. Felber, F. Bracher, Beilst. J. Org. Chem. **2018**, 14, 130-134

doi: 10.3762/bjoc.14.8

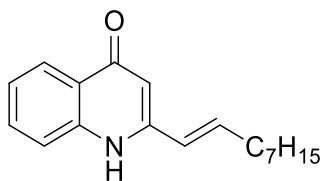


4-Methyl-2,6-naphthyridine

Source: *Antirrhinum majus* (Plantaginaceae)

Synthesis: A. Kamlah, F. Bracher, Lett. Org. Chem. **2019**, 16, 931-934

doi: 10.2174/1570178616666181116110647

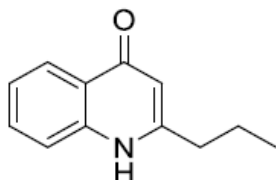


Pyo-III

Source: *Pseudomonas aeruginosa*

Synthesis: B. Lohrer, F. Bracher, *Tetrahedron Lett.* **2018**, 59, 3632-3635

doi: 10.1016/j.tetlet.2018.08.062

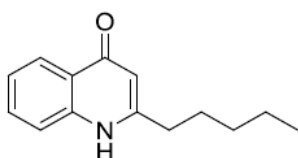


2-Propylquinolin-4-one

Source: *Boronia ternate* (Rutaceae)

Synthesis: B. Lohrer, F. Bracher, *Tetrahedron Lett.* **2019**, 60, 151327

doi: 10.1016/j.tetlet.2019.151327

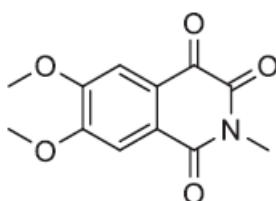


2-Pentylquinolin-4-one

Source: marine Pseudomonad 201-3, *Boronia ternata* (Rutaceae)

Synthesis: B. Lohrer, F. Bracher, *Tetrahedron Lett.* **2019**, 60, 151327

doi: 10.1016/j.tetlet.2019.151327

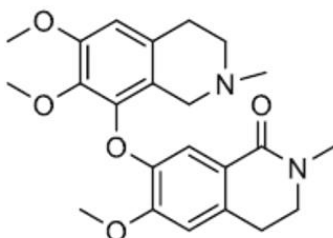


1,3,4-Trioxoisoquinoline

Source: *Menispermum dauricum* (Menispermaceae)

Synthesis: R. Schütz, S. Schmidt, F. Bracher, *Tetrahedron* **2020**, 76, 131150

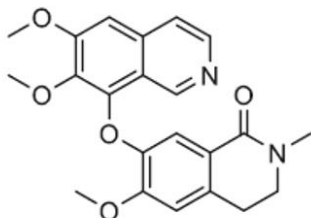
doi: 10.1016/j.tet.2020.131150



Berbidine

Source: *Berberis* sp. (Berberidaceae)

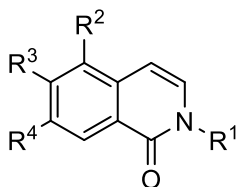
Synthesis: R. Schütz, S. Schmidt, F. Bracher, *Tetrahedron* **2020**, 76, 131150



Berbanine

Source: *Berberis* sp. (Berberidaceae)

Synthesis: R. Schütz, S. Schmidt, F. Bracher, *Tetrahedron* **2020**, 76, 131150



unnamed alkaloid

$R^1 = \text{Me}, R^2 = \text{H}, R^3, R^4 = \text{OMe}$

N-Demethyldoryphornine

$R^1 = \text{H}, R^2 = \text{H}, R^3 = \text{OMe}, R^4 = \text{OH}$

Doryphornine

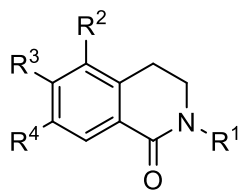
$R^1 = \text{Me}, R^2 = \text{H}, R^3 = \text{OMe}, R^4 = \text{OH}$

Thalactamine

$R^1 = \text{Me}, R^2, R^3, R^4 = \text{OMe}$

unnamed alkaloid

$R^1 = \text{H}, R^2 = \text{H}, R^3-R^4 = \text{OCH}_2\text{O}$



Corydaldine

$R^1 = \text{H}, R^2 = \text{H}, R^3, R^4 = \text{OMe}$

N-Methylcorydaldine

$R^1 = \text{Me}, R^2 = \text{H}, R^3, R^4 = \text{OMe}$

Northalifoline

$R^1 = \text{H}, R^2 = \text{H}, R^3 = \text{OMe}, R^4 = \text{OH}$

Thalifoline

$R^1 = \text{Me}, R^2 = \text{H}, R^3 = \text{OMe}, R^4 = \text{OH}$

N-Methylthalidaldine

$R^1 = \text{Me}, R^2, R^3, R^4 = \text{OMe}$

Noroxyhydrastine

$R^1 = \text{H}, R^2 = \text{H}, R^3-R^4 = \text{OCH}_2\text{O}$

1-Oxoisoquinoline alkaloids

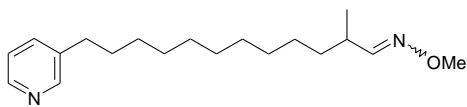
Source: plants from different families (Berberidaceae, Ranunculaceae, Menispermaceae, Papaveraceae)

Menispermum dauricum (Menispermaceae) and others

Synthesis: R. Schütz, S. Schmidt, F. Bracher, *Tetrahedron* **2020**, 76, 131150

doi: 10.1016/j.tet.2020.131150

Alkylpyridine alkaloids

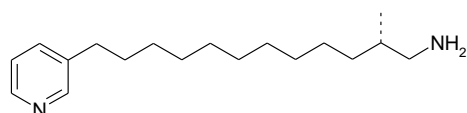


Ikimine A (racemic)

Source: *Eudistoma olivaceum* (ascidian)

Synthesis: F. Bracher, T. Papke, Nat. Prod. Lett. **1994**, 4, 223-226

doi: 10.1080/10575639408043909



Niphatesine C

Source: *Niphates* sp. (marine sponge)

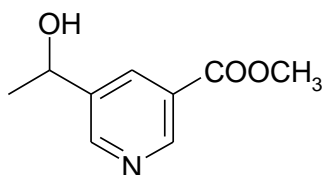
Syntheses:

F. Bracher, T. Papke, J. Chem. Soc. Perkin Trans. 1 **1995**, 2323-2326

doi: 10.1039/P19950002323

F. Bracher, J. Krauss, Arch. Pharm. Pharm. Med. Chem. **2004**, 237, 371-375

doi: 10.1002/ardp.200300861

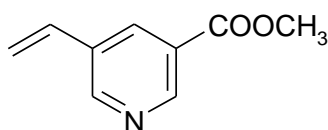


Unnamed Rubiaceae alkaloid

Source: *Nauclea diderrichii* (Rubiaceae), *Isertia haenkeana* (Rubiaceae)

Synthesis: F. Bracher, T. Papke, Monatsh. Chem. **1995**, 126, 805-809

doi: 10.1007/BF00807174

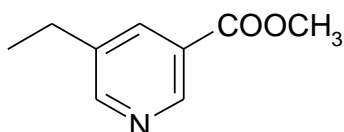


Unnamed Rubiaceae alkaloid

Source: *Nauclea diderrichii* (Rubiaceae)

Synthesis: F. Bracher, T. Papke, Monatsh. Chem. **1995**, 126, 805-809

doi: 10.1007/BF00807174

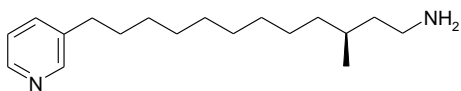


Unnamed alkaloid (artefact?)

Source: *Ligustrum vulgare* (Oleaceae)

Synthesis: F. Bracher, T. Papke, Monatsh. Chem. **1995**, 126, 805-809

doi: 10.1007/BF00807174



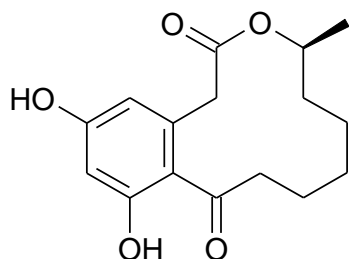
Niphatesine D

Source: *Niphates sp.* (sponge)

Synthesis: F. Bracher, T. Papke, *Monatsh. Chem.* **1996**, 127, 91-95

doi: 10.1007/BF00807413

Polyketides



Curvularin

Source: *Curvularia*, *Penicillium*, *Alternaria*, *Cochliobolus* sp.

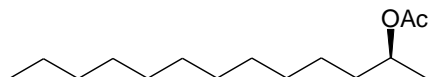
Syntheses:

F. Bracher, B. Schulte, *Nat. Prod. Lett.* **1995**, 7, 65-68

doi: 10.1080/10575639508043189

F. Bracher, B. Schulte, *Liebigs Ann./Recueil* **1997**, 1979-1982

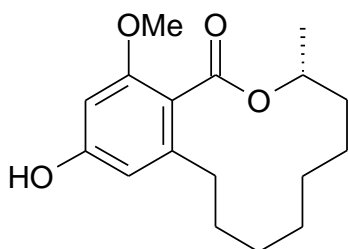
doi: 10.1002/jlac.199719970925



Tridecanol acetate

Source: *Drosophila mulleri* (fruit fly)

Synthesis: F. Bracher, B. Schulte, *Org. Prep. Proc. Int.* **1995**, 27, 682-684

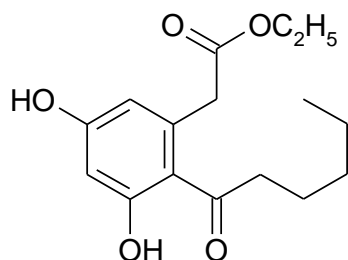


Lasiodiplodin

Source: *Lasiodiplodia theobromae* (fungus),
Euphorbia splendens, *Euphorbia fidjiana* (Euphorbiaceae)

Synthesis: F. Bracher, B. Schulte, *J. Chem. Soc., Perkin Trans. 1* **1996**, 2619-2622

doi: 10.1039/P19960002619

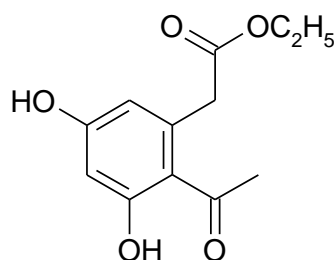


Seccocurvularin

Source: *Spirastrella vagabunda* (sponge)

Synthesis: F. Bracher, J. Krauss, *Nat. Prod. Lett.* **1998**, 12, 31-34

doi: 10.1080/10575639808048867

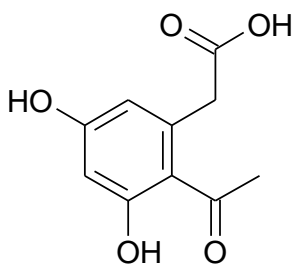


Curvulin

Source: *Curvularia siddiqui* (fungus)

Synthesis: F. Bracher, J. Krauss, *Nat. Prod. Lett.* **1998**, 12, 31-34

doi: 10.1080/10575639808048867

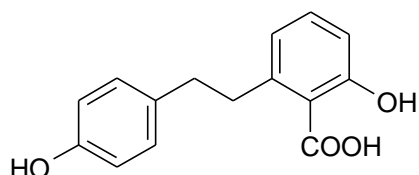


Curvulinic acid

Source: *Curvularia siddiqui* (fungus)

Synthesis: F. Bracher, J. Krauss, Nat. Prod. Lett. **1998**, 12, 31-34

doi: 10.1080/10575639808048867

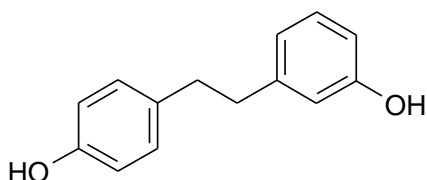


Lunularic acid

Source: *Lunularia cruciata*, *Marchantia polymorpha* (Hepaticaceae)

Synthesis: F. Bracher, J. Krauss, A. Bornatsch, Nat. Prod. Lett. **2000**, 14, 305-310

doi: 10.1080/10575630008041247



Lunularin

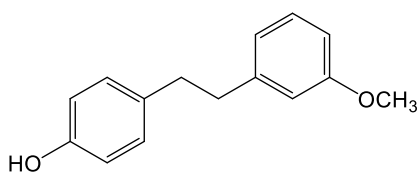
Source: *Marchantia polymorpha* (Hepaticaceae)

Synthesis: F. Bracher, J. Krauß, A. Bornatsch, Nat. Prod. Lett. **2000**, 14, 305-310

doi: 10.1080/10575630008041247

J. Krauß, U. Kopp, F. Bracher, Z. Naturforsch. B **2015**, 70, 637-641

doi: 10.1515/znb-2015-0047

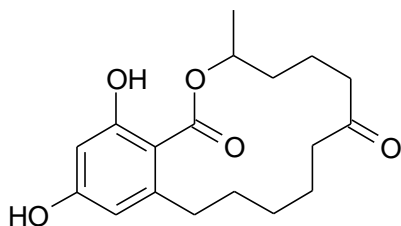


O-Methylunularin

Source: *Marchantia polymorpha* (Hepaticaceae)

Synthesis: J. Krauß, U. Kopp, F. Bracher, Z. Naturforsch. B **2015**, 70, 637-641

doi: 10.1515/znb-2015-0047

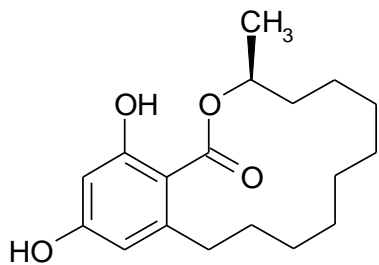


Zearalanone (racemic)

Source: *Fusarium reticulatum* (fungus)

Synthesis: F. Bracher, J. Krauss, Monatsh. Chem. **2001**, 132, 805-811

doi: 10.1007/s007060170067

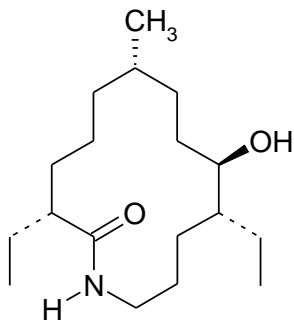


Zearalane

Source: *Gibberella zeae* (fungus)

Synthesis: F. Bracher, J. Krauss, Eur. Org. Chem. **2001**, 4701-4704

doi: 10.1002/1099-0690(200112)2001:24<4701::AID-EJOC4701>3.0.CO;2-6

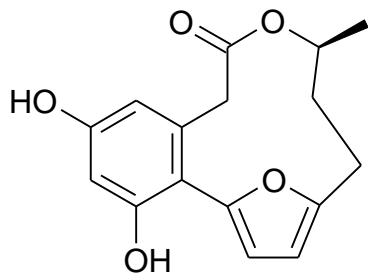


6-Nor-Fluvirucinin B1 (nor-derivative of natural product)

Source: *Actinomadura vulgaris* (actinomycete)

Synthesis: A. Baltrusch, F. Bracher, Synlett **2002**, 1724-1726

doi: 10.1055/s-2002-34214

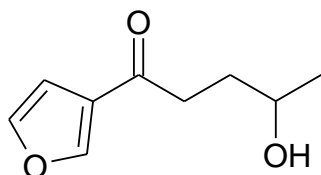


Citreofuran

Source: *Penicillium citreo-viride* (fungus)

Synthesis: F. Bracher, B.Schulte, Nat. Prod. Res. **2003**, 17, 293-299

doi: 10.1080/1478641031000137004

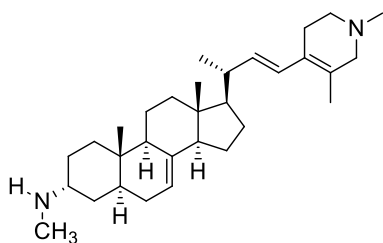


4-Ipomeanol

Source: *Ipomoea batatas* (Convolvulaceae)

Synthesis: J. Krauss, F. Bracher, D. Unterreitmeier, Turk. J. Chem. **2005**, 29, 635-639

Steroids

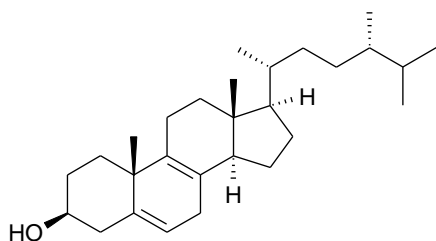


Plakinamine B

Source: *Plakina* sp. (sponge)

Synthesis: M. Gans, F. Bracher, *Tetrahedron* **2014**, 70, 1084-1090

doi: 10.1016/j.tet.2013.11.065

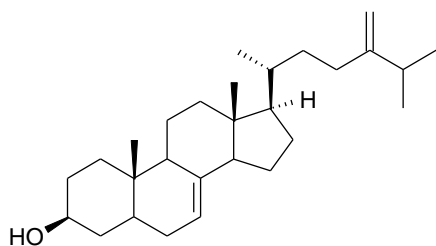


Ergosta-5,8-dien-3β-ol

Source: *Chlorella ellipsoidea* (alga), *Saccharomyces cerevisiae* mutant, *Aspergillus nidulans* (fungi)

Synthesis: M. Giera, F. Bracher, *Sci. Pharm.* **2008**, 76, 599-604

doi: 10.3797/scipharm.0810-22



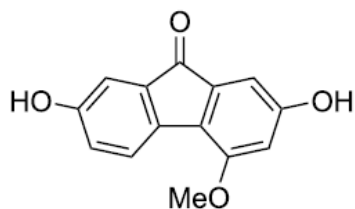
Episterol

Source: *Pisaster ochraceus* (starfish), *Saccharomyces cerevisiae* mutant, *Aspergillus nidulans* (fungi)

Synthesis: S. Dittrich, F. Bracher, *Tetrahedron* **2015**, 71, 2530-2539

<http://dx.doi.org/10.1016/j.tet.2015.03.021>

Fluorenones



Nobilone

Source: *Dendrobium nobile* (Orchidaceae)

Synthesis: I. A. P. Jourjine, L. Zeisel, J. Krauß, F. Bracher, *Beilstein J. Org. Chem.* **2021**, 17, 2668–2679

doi.org/10.3762/bjoc.17.181

Structure revisions by total synthesis

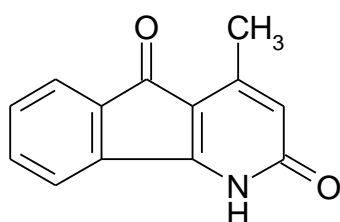
Dielsine

Source: *Guatteria dielsiana* (Annonaceae)

Synthesis: F. Bracher, Arch. Pharm. (Weinheim) **1992**, 325, 645-648

doi: 10.1002/ardp.19923251006

Postulated structure:



Correct structure:

unknown

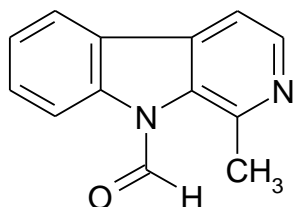
Lycii alkaloid I

Source: *Lycium chinense* (Solanaceae)

Synthesis: F. Bracher, D. Hildebrand, Liebigs Ann. Chem. **1993**, 1335-1337

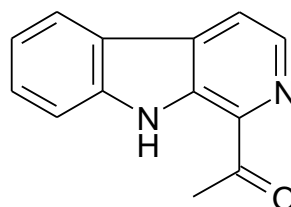
doi: 10.1002/jlac.1993199301218

Postulated structure:



Correct structure:

identical to 1-acetyl- β -carboline

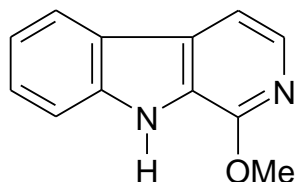


Taraxacine A

Source: *Taraxacum formosanum* (Asteraceae)

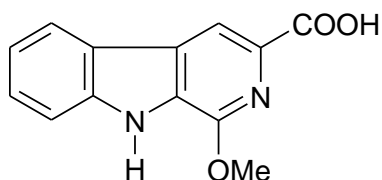
Synthesis: A. Ritter, H. Poschenrieder, F. Bracher, Z. Naturforsch. B, **2009**, 64b, 427-433

Postulated structure:

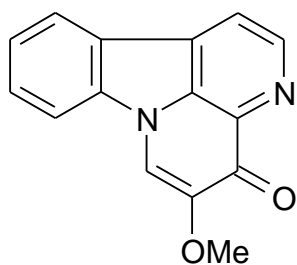


Correct structure:

unknown

Taraxacine B**Source:** *Taraxacum formosanum* (Asteraceae)**Synthesis:** A. Ritter, H. Poschenrieder, F. Bracher, *Z. Naturforsch. B*, **2009**, 64b, 427-433**Postulated structure:****Correct structure:**

unknown

Drymaritine**Source:** *Drymaria diandra* (Caryophyllaceae)**Synthesis:** I. Wetzel, L. Allmendinger, F. Bracher, *J. Nat. Prod.* **2009**, 72, 1908-1910doi: [10.1021/np900515b](https://doi.org/10.1021/np900515b)**Postulated structure:****Correct structure:**

identical to cordatanine

