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Contents

MOLECULES OF INTEREST

Plant cysteine proteinases: Evaluation of the pharmacological activity pp 2263–2269

Carlos E. Salas*, Marco T.R. Gomes, Martha Hernandez, Miriam T.P. Lopes

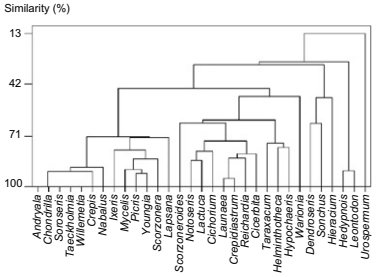
Plant cysteine proteinases have been shown to modulate a variety of physiologic and pathologic conditions in plants and mammals. Some of these biological and pharmacological properties are discussed in the present work.

REVIEW

Sesquiterpene lactones and their precursors as chemosystematic markers in the tribe Cichorieae of the Asteraceae pp 2270–2296

Christian Zidorn*

This review summarizes all reports on sesquiterpene lactones and their immediate precursors from the Cichorieae (Lactuceae) tribe of the Asteraceae. A total of 360 compounds have been reported from this tribe. These substances belong to three classes of sesquiterpenoids: guaianolides (243 compounds), eudesmanolides (73 compounds), and germacranolides (44 compounds). Sources of these compounds encompass 139 taxa from 31 different genera. The distribution of these lactones within the tribe Cichorieae is discussed in a chemosystematic context. Moreover, some general ideas about the interpretation of chemosystematic data are discussed.

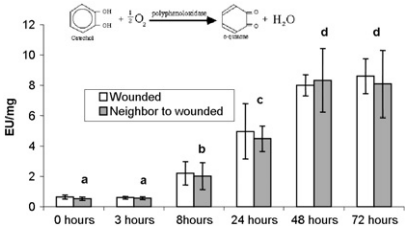


PROTEIN BIOCHEMISTRY AND PROTEOMICS

A wounding-induced PPO from cowpea (*Vigna unguiculata*) seedlings pp 2297–2302

Márcio S.T. Pinto, Fabrício P. Siqueira, Antônia E.A. Oliveira, Kátia V.S. Fernandes*

Polyphenol oxidases (Mrs 58, 73 and ≅220 kDa) are induced locally and systemically by wounding in unifoliates of cowpea plants. Purified PPO shows an improved affinity towards small *o*-diphenols, an optimum pH 6.0 and a high thermal stability. SDS acts as an efficient activator, whereas tropolone serves as an efficient inhibitor for this soluble wounding-induced cowpea PPO.

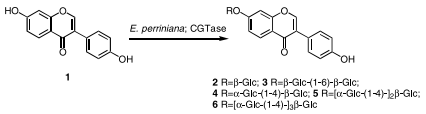


METABOLISM

Glycosylation of daidzein by the *Eucalyptus* cell cultures pp 2303–2306

Kei Shimoda, Noriaki Sato, Tatsunari Kobayashi, Hatsuyuki Hamada, Hiroki Hamada*

Compounds 3, 4 and 6 together with 2 and 5 were produced by the sequential glycosylation of daidzein (1) with cultured suspension cells of *Eucalyptus perriniana* and cyclodextrin glucanotransferase.

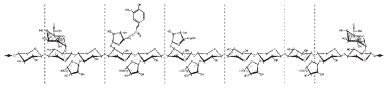


ECOLOGICAL BIOCHEMISTRY

Glucuronoarabinoxylan structure in the walls of *Aechmea* leaf chlorenchyma cells is related to wall strength pp 2307–2311

Johan Ceusters*, Elsje Londers, Kristof Brijs, Jan A. Delcour, Maurice P. De Proft

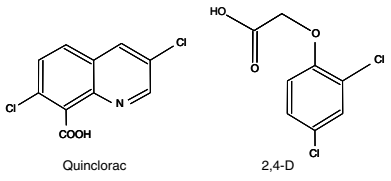
The degree of substitution of arabinose on the xylose backbone is strongly related to chlorenchyma cell wall strength in *Aechmea*. Lower degree of substitution means stronger cell walls and the possibility of withstanding higher internal turgor pressures without cell bursting.



Quinclorac-induced cell death is accompanied by generation of reactive oxygen species in maize root tissue pp 2312–2319

Yukari Sunohara*, Hiroshi Matsumoto

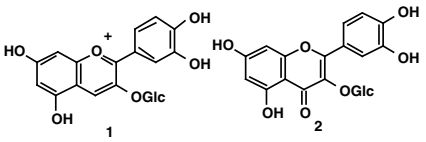
Quinclorac, an auxinic herbicide, has a mode of action thought to be similar to other auxins such as 2,4-D. It exhibits high selectivity among grass species and the primary mechanism of its specific action has been considered to be the selective induction of ethylene biosynthesis, which ultimately leads to cyanide accumulation in susceptible grasses. Here, we report results suggesting that quinclorac may have a different action from 2,4-D; quinclorac-induced cell death in maize roots may be caused by ROS, but not by ethylene as well as its biosynthetic pathway-related substances including cyanide.



Light filtering by epidermal flavonoids during the resistant response of cotton to *Xanthomonas* protects leaf tissue from light-dependent phytoalexin toxicity pp 2320–2328

W. Ray Edwards, Judy A. Hall, Alan R. Rowlan, Tama Schneider-Barfield, Tzeli Julia Sun, Mohini A. Patil, Margaret L. Pierce, R. Gary Fulcher, Alois A. Bell, Margaret Essenberg*

Ultraviolet-absorbing pigments accumulate in red epidermal cells surrounding and sometimes over infection sites. The two principal ones have been identified as cyanidin-3-*O*-β-glucoside (**1**) and quercetin-3-*O*-β-glucoside (**2**).

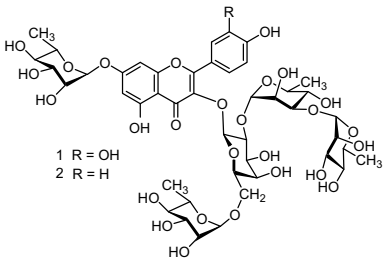


CHEMOTAXONOMY

Flavonol pentaglycosides of *Cordyla* (Leguminosae: Papilionoideae: Swartzieae): Distribution and taxonomic implications **pp 2329–2335**

Nigel C. Veitch*, Geoffrey C. Kite, Gwilym P. Lewis

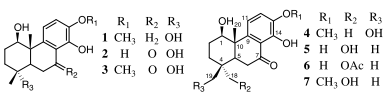
Two flavonol pentaglycosides (**1**, **2**) that accumulate in leaflets of three species of *Cordyla* s.l. were identified as the 3-*O*-α-L-rhamnopyranosyl(1→3)-α-L-rhamnopyranosyl(1→2)[α-L-rhamnopyranosyl(1→6)]-β-D-galactopyranoside-7-*O*-α-L-rhamnopyranosides of quercetin and kaempferol. Their distribution does not support the recent transfer of two species of *Cordyla* s.l. to the genus *Dupuya*. Flavonoid glycoside profiles are also used to reassess the generic relationship between *Cordyla* s.l. and *Mildbraediodendron*.



18-*nor*-Podocarpanes and podocarpanes from the Bark of *Taiwania cryptomerioides* **pp 2336–2340**

Shih-Chang Chien, Cheng-Chi Chen, Hsi-Lin Chiu, Chi-I Chang, Mei-Hwei Tseng, Yueh-Hsiung Kuo*

Seven nor- and podocarpane-type diterpenes were isolated from the bark of *Taiwania cryptomerioides*. Podocarpane-type diterpenes do not occur extensively, and the 18-*nor* podocarpane skeleton has not been reported in nature. All compounds were spectroscopically identified using 1D and 2D NMR techniques.

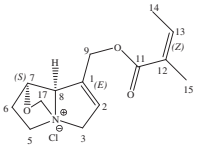


BIOACTIVE PRODUCTS

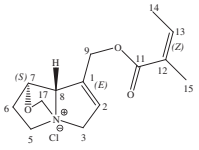
Pyrrolizidine alkaloids from *Echium glomeratum* (Boraginaceae) **pp 2341–2346**

Feras Q. Alali*, Yahya R. Tahboub, Eyad S. Ibrahim, Amjad M. Qandil, Khaled Tawaha, Jason P. Burgess, Arlene Sy, Yuka Nakanishi, David J. Kroll, Nicholas H. Oberlies

Five pyrrolizidine alkaloids were isolated from *Echium glomeratum* Poir. (Boraginaceae). Three of these were (7*S*, 8*R*)-petranine (**1**), (7*S*, 8*S*)-petranine (**2**), and (7*R*, 8*R*)-petranine (**3a**) or (7*R*, 8S)-petranine (**3b**), and two were known but to the species: 7-angeloylretronecine (**4**) and 9-angeloylretronecine (**5**).



(7*S*, 8*R*)-petranine (**1**)

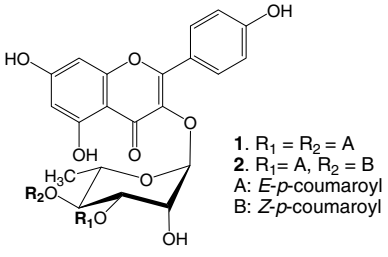


(7*S*, 8*S*)-petranine (**2**)

Acylated flavonol monorhamnosides, α-glucosidase inhibitors, from *Machilus philippinensis* **pp 2347–2353**

Shoei-Sheng Lee*, Hsiao-Ching Lin, Chien-Kuang Chen

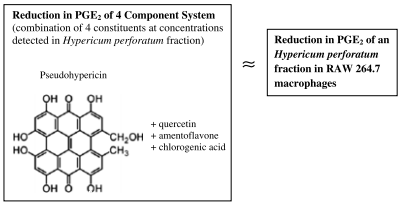
Guided by a bioassay against α-glucosidase, two active kaempferol-3-*O*-α-L-rhamnopyranoside coumaroic acid esters (**1** and **2**) with IC_{50} values of 6.1 and 1.0 μM, respectively, were isolated from the leaf extract of *Machilus philippinense*. Additional seven isomers, of which three were hitherto unknown, were identified by application of an HPLC–SPE–NMR technique.



Pseudohypericin is necessary for the light-activated inhibition of prostaglandin E2 pathways by a 4 component system mimicking an *Hypericum perforatum* fraction **pp 2354–2362**

Kimberly D.P. Hammer, Matthew L. Hillwig, Jeffrey D. Neighbors, Young-Je Sim, Marian L. Kohut, David F. Wiemer, Eve S. Wurtele, Diane F. Birt*

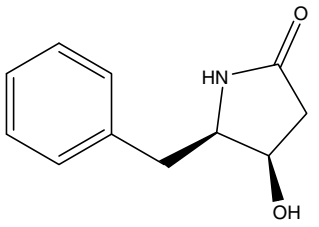
An anti-inflammatory guided fractionation of Hypericum perforatum (Hp) was used because most Hp research has traditionally focused on its anti-depressant and cytotoxic properties. The combination of 4 constituents (chlorogenic acid, amentoflavone, quercetin, pseudohypericin) explained the activity of a subfraction in light-activated but not dark conditions, and pseudohypericin was necessary but not sufficient for the anti-inflammatory activity.



Streptopyrrolidine, an angiogenesis inhibitor from a marine-derived *Streptomyces* sp. KORDI-3973 **pp 2363–2366**

Hee Jae Shin*, Tae Sik Kim, Hyi-Seung Lee, Jung Youl Park, In-Kwon Choi, Ho Jeong Kwon

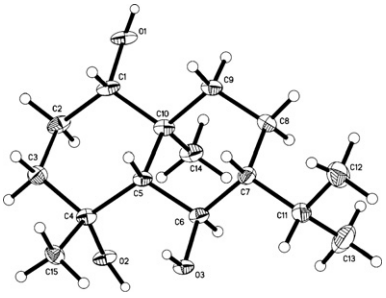
Streptopyrrolidine, a benzyl pyrrolidine derivative, was isolated as an angiogenesis inhibitor from the fermentation broth of a marine *Streptomyces* sp. isolated from the deep sea sediment. Its structure was elucidated by extensive 2D NMR and mass spectroscopic analyses.



Sesquiterpenoids from *Homalomena occulta* affect osteoblast proliferation, differentiation and mineralization *in vitro* **pp 2367–2373**

Yong-Mei Hu, Chuan Liu, Ka-Wing Cheng, Herman H.-Y. Sung, Lan D. Williams, Zhong-Lin Yang*, Wen-Cai Ye

Two sesquiterpenoids and a daucane ester together with five known sesquiterpenoids were identified from *Homalomena occulta*. The $CHCl_3$ extract and compounds **1**–**7** were tested *in vitro* for their activities in stimulating osteoblast (OB) proliferation, differentiation and mineralization *in vitro*.

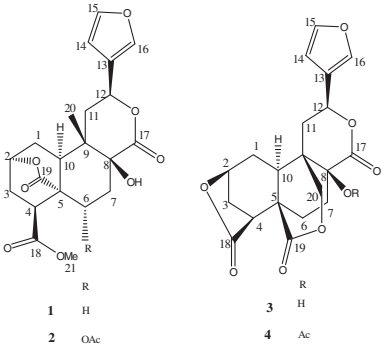


CHEMISTRY

Bafoudiosbulbins F and G, further clerodane diterpenoids from *Dioscorea bulbifera* L. var *sativa* and revised structure of Bafoudiosbulbin B **pp 2374–2379**

Rémy Bertrand Teponno, Azefack Léon Tapondjou*, Eliane Abou-Mansour, H. Stoeckli-Evans, Pierre Tane, Luciano Barboni

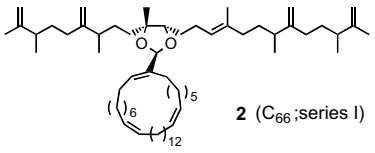
From the bulbils of *Dioscorea bulbifera* L. var *sativa*, two clerodane diterpenoids, Bafoudiosbulbins F (**1**) and G (**2**), together with five known compounds: Bafoudiosbulbins A–C, 3,5,4′-trihydroxy-3′-methoxybibenzyl, and kaempferol were isolated. Their structures were established by spectroscopic techniques, including ^1H, ^{13}C NMR, NOESY, ROESY, COSY, TOCSY, HSQC, and HMBC. The relative stereochemistry of compounds **1** and **2** was assigned on the basis of X-ray crystallographic diffraction analysis. Furthermore, the structure of Bafoudiosbulbin B was revised using extensive 2D NMR techniques as well as chemical transformation.



Braunicetals: Acetals from condensation of macrocyclic aldehydes and terpene diols in *Botryococcus braunii* **pp 2380–2386**

Pierre Metzger*, Marie-Noëlle Rager, Céline Fosse

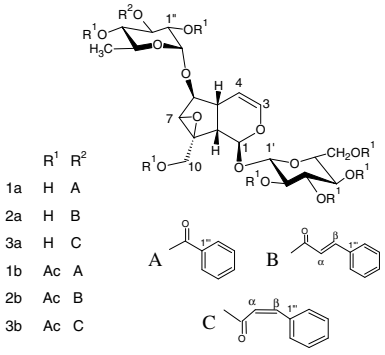
Two series of braunicetals were isolated from the green microalga *Botryococcus braunii*. Based on spectroscopic data and chemical evidence, their structures were determined to be acetals formed by the condensation of C_{32} and C_{34} aldehydes with C_{33} and C_{34} methylated squalene diols (series I), or a C_{40} lycopaene diol (series II).



Iridoid glycosides from *Gmelina arborea* **pp 2387–2390**

Neerja Tiwari, Akhilesh K. Yadav, Pooja Srivastava, Karuna Shanker, Ram K. Verma, Madan M. Gupta*

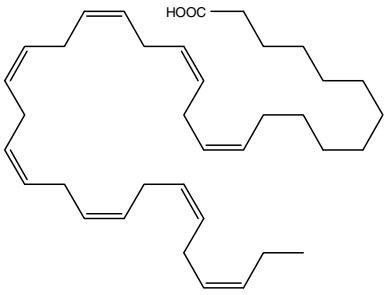
Three iridoid glycosides 6-*O*-(3″-*O*-benzoyl)-α-L-rhamnopyranosyl catalpol (**1a**), 6-*O*-(3″-*O*-*trans*-cinnamoyl)-α-L-rhamnopyranosylcatalpol (**2a**) and 6-*O*-(3″-*O*-*cis*-cinnamoyl)-α-L-rhamnopyranosylcatalpol (**3a**) were isolated from aerial parts of *Gmelina arborea*.



Identification of very-long-chain polyunsaturated fatty acids from *Amphidinium carterae* by atmospheric pressure chemical ionization liquid chromatography–mass spectroscopy **pp 2391–2399**

Tomáš Řezanka*, Linda Nedbalová, Karel Sigler

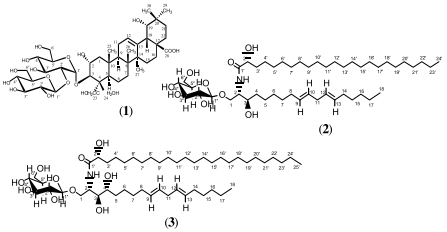
A method is described for the enrichment of very-long-chain polyunsaturated fatty acids from total fatty acids of *Amphidinium carterae* and their identification as picolinyl esters by means of microbore liquid chromatography–mass spectrometry with atmospheric pressure chemical ionization (LC–MS/APCI). The combination of Ag^+–TLC and LC–MS/APCI was used to identify unusual polyunsaturated VLCFAs up to hexatriacontaoctaenoic acid. Two acids, 36:7n-6 and 36:8n-3, were also synthesized to unambiguously confirm their structure. The possibilities of polyunsaturated VLCFAs biosynthesis are proposed.



A triterpenoidal saponin and sphingolipids from *Pteleopsis hylodendron* **pp 2400–2405**

Atta-ur-Rahman, Seema Zareen*, M. Iqbal Choudhary, M. Nadeem Akhtar, F.N. Ngounou

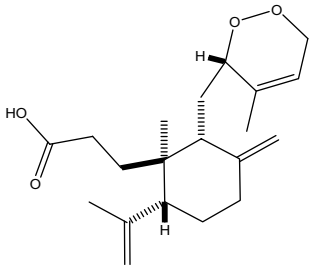
A triterpenoidal saponin bellericagenin {B 3-*O*-[β-D-glucopyranosyl-(1 → 2)-α-D-glucopyranoside] (**1**) (Pteleopsoside)}, and two sphingolipids, hylodendroside-I (**2**), and hylodendroside-II (**3**) were isolated from the stem bark of *Pteleopsis hylodendron*, along with a synthetically known compound, {2α, 3β, 23-triacetoxy-19α-hydroxyolean-12-en-28-oic acid (**4**)}.



***Ent*-3,4-*seco*-labdane and *ent*-labdane diterpenoids from *Croton stipuliformis* (Euphorbiaceae)** **pp 2406–2410**

Freddy Ramos*, Yoshihisa Takaishi, Yoshiki Kashiwada, Coralia Osorio, Carmenza Duque, Ricardo Acuña, Yoshinori Fujimoto

Three *ent*-3,4-*seco*-labdanes (**1**–**3**) and one *ent*-labdane (**4**) were isolated and identified from the leaves of *Croton stipuliformis*. The absolute stereochemistry for compound **4** was assigned by Mosher's method in the NMR tube.



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OTHER CONTENTS

Errata **pp 2411, 2412**

Announcement: Phytochemical Society of North America **p I**

* Corresponding author

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