



## Phytochemistry Vol. 69, No. 11, 2008

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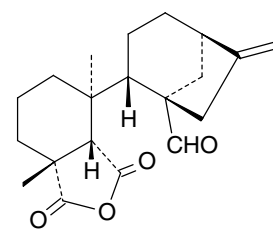
## MOLECULES OF INTEREST

## Fujenal, a diterpenoid saga of neighbouring group participation

pp 2104–2109

James R. Hanson, Braulio M. Fraga\*

The chemistry, the biosynthesis and the biotransformations related to fujenal and its analogues have been reviewed. Despite the opportunity for free rotation about the C-9:C-10 bond, the chemistry of the ring B of this diterpenoid is dominated by neighbouring group participation between C-6, C-7 and C-19.



Fujenal

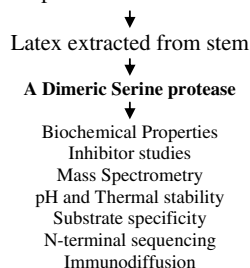
## PROTEIN BIOCHEMISTRY AND PROTEOMICS

Indicain, a dimeric serine protease from *Morus indica* cv. K2

pp 2110–2119

Vijay Kumar Singh, Ashok Kumar Patel, A.J. Moir, Medicherla V. Jagannadham\*

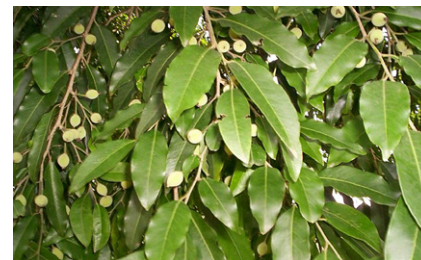
*Morus indica* plant with medicinal implications

Purification and characterization of a trypsin inhibitor from *Putranjiva roxburghii* seeds

pp 2120–2126

Navneet S. Chaudhary, Chandan Shee, Asimul Islam, Faizan Ahmad, Dinesh Yernool, Pravindra Kumar, Ashwani K. Sharma\*

*Putranjiva roxburghii* is an ornamental tree of tropical India known as child life tree that belongs to the *Euphorbiaceae* family. A highly stable and potent trypsin inhibitor (PRTI) of approximately 34 kDa was purified and characterized from its seeds.



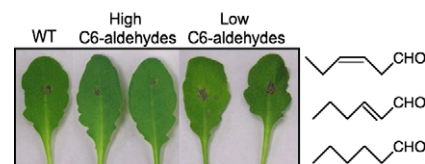
## MOLECULAR GENETICS AND GENOMICS

**Direct fungicidal activities of C6-aldehydes are important constituents for defense responses in *Arabidopsis* against *Botrytis cinerea***

pp 2127–2132

Kyutaro Kishimoto, Kenji Matsui\*, Rika Ozawa, Junji Takabayashi

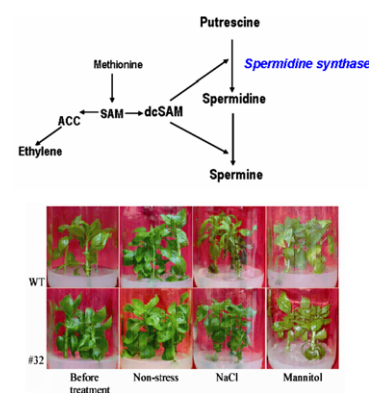
Fungicidal activities of C6-aldehydes, such as (*Z*)-3-hexenal, (*E*)-2-hexenal, and *n*-hexanal, formed by hydroperoxide lyase are found to be one of most important components for the defense against necrotrophic fungal pathogen, *Botrytis cinerea*, in *Arabidopsis*.

**Enhancement of spermidine content and antioxidant capacity in transgenic pear shoots overexpressing apple *spermidine synthase* in response to salinity and hyperosmosis**

pp 2133–2141

Lixiong He, Yusuke Ban, Hiromichi Inoue, Narumi Matsuda, Jihong Liu, Takaya Moriguchi\*

Overexpression of apple *spermidine synthase* gene (*MdSPDS1*), one of the polyamine biosynthetic genes, conferred tolerance to NaCl and mannitol stress in European pear (*Pyrus communis* L.) *in vitro* shoots through enhancing enzymatic and non-enzymatic antioxidant capacity (photo, 15 days after stress treatment; #32, transgenic pear; WT, wild type).



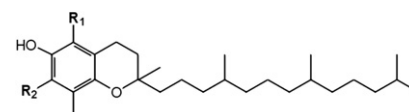
## METABOLISM

 **$\gamma$ -Tocopherol dominates in young leaves of runner bean (*Phaseolus coccineus*) under a variety of growing conditions: The possible functions of  $\gamma$ -tocopherol**

pp 2142–2148

Renata Szymańska, Jerzy Kruk\*

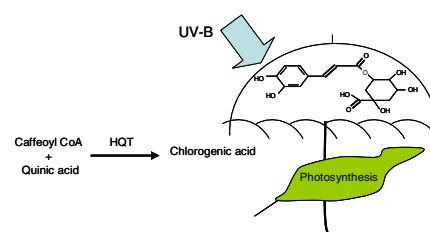
It has been shown that young leaves of runner bean plants grown under natural conditions showed an unusually high content of  $\gamma$ -tocopherol, accounting for up to 90% of all tocopherol isomers. The level of  $\gamma$ -tocopherol gradually decreased during the first two weeks of leaves development. During simultaneous drought and light stress,  $\gamma$ -tocopherolquinone, an oxidation product of  $\gamma$ -tocopherol, was preferentially accumulated. This indicates specific function of  $\gamma$ -tocopherol in the protection against drought stress in young leaves.

**Modulation of chlorogenic acid biosynthesis in *Solanum lycopersicum*; consequences for phenolic accumulation and UV-tolerance**

pp 2149–2156

Carla Clé, Lionel M. Hill, Ricarda Niggeweg, Cathie R. Martin, Yves Guisez, Els Prinsen, Marcel A.K. Jansen\*

Hydroxycinnamoyl CoA quinate transferase (HQT) mediates chlorogenic acid biosynthesis in tomato (*Solanum lycopersicum*). Our study revealed that increased chlorogenic acid accumulation was associated with UV-protection in transgenics with altered HQT activity. However, manipulation of HQT activity also resulted in more complex alterations in the profiles of phenolics. Our data suggests the existence of regulatory mechanisms that direct the flow of phenolic precursors in response to both metabolic parameters and environmental conditions.



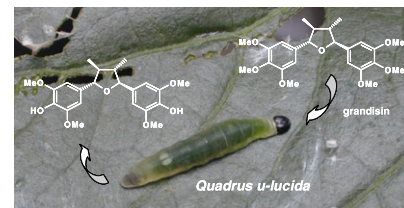
## ECOLOGICAL BIOCHEMISTRY

### Metabolism of (–)-grandisin from *Piper solmsianum* in Coleoptera and Lepidoptera species

pp 2157–2161

Clécio S. Ramos, Sérgio A. Vanin, Massuo J. Kato\*

The major tetrahydrofuran lignan grandisin from leaves of *Piper solmsianum* was mono- and di-*O*-demethylated during the digestive process of the beetle *Naupactus bipes* as well as in the caterpillars *Heraclides hectorides* and *Quadrus u-lucida*. Additionally, 3-hydroxy-4,5-dimethoxycinnamyl and 3,4,5-trimethoxycinnamyl alcohols were identified in the fecal extracts of *N. bipes*.



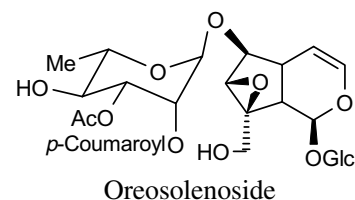
## CHEMOTAXONOMY

### Phytochemistry and molecular systematics of *Triaenophora rupestris* and *Oreosolen wattii* (Scrophulariaceae)

pp 2162–2166

Søren Rosendal Jensen\*, Hong-Qing Li, Dirk C. Albach, Charlotte H. Gotfredsen

The relationships between the genera *Triaenophora*, *Oreosolen* and *Rehmannia* have been investigated. The content of iridoid glucosides in *Triaenophora* and *Rehmannia* were almost identical while *Oreosolen wattii* was different. These results are consistent with a phylogenetic tree based on DNA sequencing.

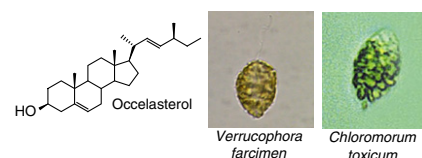


### Sterols and fatty acids of three harmful algae previously assigned as *Chattonella*

pp 2167–2171

José-Luis Giner\*, Hui Zhao, Carmelo Tomas

The sterol and fatty acids were investigated of three harmful marine algae previously regarded as *Chattonella* species. The lipids of *Chloromorom toxicum* are consistent with its inclusion in the Raphidophyceae. Both species of the new genus *Verrucophora* (Dictyochophyceae) contained the rare 27-norsterol ocellasterol.



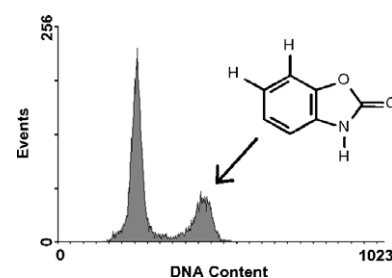
## BIOACTIVE PRODUCTS

### The natural compound benzoxazolin-2(3*H*)-one selectively retards cell cycle in lettuce root meristems

pp 2172–2179

Adela M. Sánchez-Moreiras\*, Teodoro Coba de la Peña, Manuel J. Reigosa

Previous experiments showed an effect on germination and radicle growth of 2-benzoxazolinone (BOA), a compound released mainly by grasses to the environment. Our group investigated this mode of action in the cell cycle progression related with seedling growth inhibition in lettuce seedlings.

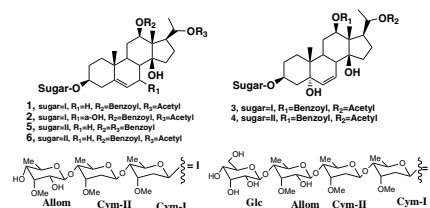


**Acylated pregnane glycosides from *Caralluma tuberculata* and their antiparasitic activity**

pp 2180–2186

Essam Abdel-Sattar\*, Fathalla M. Harraz, Soliman Mohammed Abdullah Al-ansari, Sahar El-Mekkawy, Chikara Ichino, Hiroaki Kiyohara, Aki Ishiyama, Kazuhiko Otaguro, Satoshi Omura, Haruki Yamada

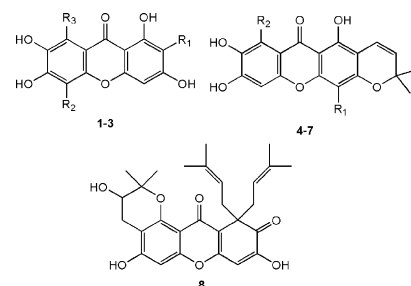
Five pregnane glycosides were isolated from *Caralluma tuberculata* (1–5), in addition to a known one (russelloside E, 6). The structures of the isolated compounds were elucidated by the analysis of NMR data and FAB–MS experiments. All the isolated compounds were tested for their antimalarial and antitrypanosomal activities as well as their cytotoxicity against human diploid embryonic cell line (MRC-5).

**Xanthenes with growth inhibition against HeLa cells from *Garcinia xipshuanbannaensis***

pp 2187–2192

Quan-Bin Han, Nian-Yun Yang, Hong-Lei Tian, Chun-Feng Qiao, Jing-Zheng Song, Donald C. Chang, Shi-Lin Chen, Kathy Q. Luo\*, Hong-Xi Xu\*

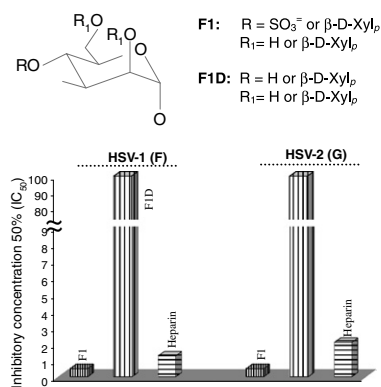
Polyprenylated xanthenes, bannaxanthenes A–H (1–8), together with seven known compounds, were isolated from the acetone extract of the twigs of *Garcinia xipshuanbannaensis*. Their structures were elucidated by spectroscopic data interpretation. Some of these compounds showed growth inhibition effects against HeLa cells.

**Anti-herpetic activity of a sulfated xylomannan from *Scinaia hatei***

pp 2193–2199

Pinaki Mandal, Carlos A. Pujol, María J. Carlucci, Kausik Chattopadhyay, Elsa B. Damonte, Bimalendu Ray\*

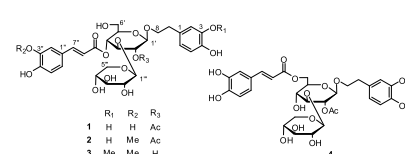
The sulfated xylomannan (F1) of *Scinaia hatei* is selective inhibitors of herpes simplex virus types 1 and 2, whereas its desulfated derivative (F1D) shows little activity. The anti-herpetic activity of this polymer is higher than heparin.

**Chemical constituents of *Aeschynanthus bracteatus* and their weak anti-inflammatory activities**

pp 2200–2204

Su-Mei Li, Xian-Wen Yang, Yun-Heng Shen, Lin Feng, Yue-Hu Wang, Hua-Wu Zeng, Xiao-Hua Liu, Jun-Mian Tian, Ya-Na Shi, Chun-Lin Long\*, Wei-Dong Zhang\*

Phenylethanol glycosides, aeschynanthosides A–D (1–4), and 55 known constituents were isolated from the aerial parts of *Aeschynanthus bracteatus*. Aeschynanthoside D (4) and naringenin (41) showed weak inhibitory activities against LPS-induced NO production in RAW 264.7 macrophages within the concentration range tested (50–100 µg/mL).

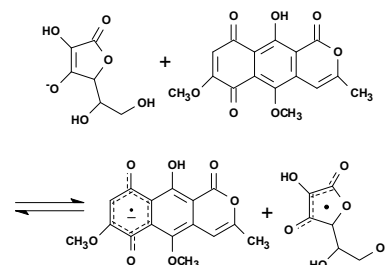


**Ascorbic acid potentiates the cytotoxicity of the naphthoquinone 5-methoxy-3,4-dehydroxanthomegnin**

pp 2205–2208

Rodrigo R. Kitagawa, Luiz M. da Fonseca, Valdecir F. Ximenes, Najeh M. Khalil, Wagner Vilegas, Maria Stella G. Raddi\*

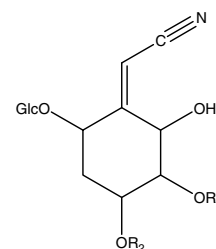
The synergic cytotoxic effect of adding ascorbic acid on 5-methoxy-3,4-dehydroxanthomegnin, was investigated. Results indicated that ascorbic acid reduced 5-methoxy-3,4-dehydroxanthomegnin via a semiquinone free radical intermediate, which generate reactive oxygen species. This association resulted in the cytotoxic index being 7 times lower than when 5-methoxy-3,4-dehydroxanthomegnin was added alone to McCoy cell line.

**Nitrile glucosides and serotobenine from *Campylospermum glaucum* and *Ouratea turnarea***

pp 2209–2213

Auguste Abouem à Zintchem, Dominique Ngoni Bikobo, Alex de Théodore Atchadé, Joséphine Ngo Mbing, Joseph Gangoue-Pieboji, Raphael Ghogomu Tih, Alain Blond, Dieudonné Emmanuel Pegnyemb\*, Bernard Bodo

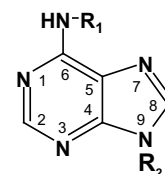
Two nitrile glucosides, campyloside A (**1**) and campyloside B (**2**) were isolated from the stem roots of *Campylospermum glaucum*, whereas serotobenine was isolated from *Ouratea turnarea*. The structure elucidations were based on spectroscopic evidence. The biological assays of compounds and crude extract of plant species showed good antimicrobial activity of crude extracts against Gram-positive cocci.

1-  $R_1 = \text{Bz}$ ,  $R_2 = \text{H}$ 2-  $R_1 = \text{indol-3-yl-CO-}$ ,  $R_2 = \text{Bz}$ **CHEMISTRY****Cytokinin profiling in plant tissues using ultra-performance liquid chromatography–electrospray tandem mass spectrometry**

pp 2214–2224

Ondřej Novák, Eva Hauserová, Petra Amakorová, Karel Doležal, Miroslav Strnad\*

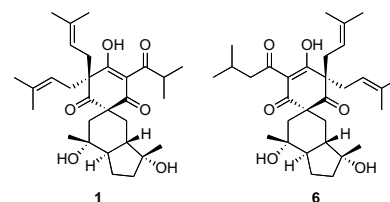
A simple, high-throughput batch immunoextraction (IAE) micropurification procedure for extracting a wide range of naturally occurring cytokinins (bases, ribosides, O- and N-glucosides, and nucleotides) from plant tissues in solutions that are compatible with ultra-performance liquid chromatography (UPLC), thereby facilitating sensitive subsequent analysis was developed.

**Tomoeones A–H, cytotoxic phloroglucinol derivatives from *Hypericum ascyron***

pp 2225–2230

Waka Hashida, Naonobu Tanaka, Yoshiki Kashiwada, Michiko Sekiya, Yasumasa Ikeshiro, Yoshihisa Takaishi\*

Eight phloroglucinols, tomoeones A–H were isolated from the leaves of *Hypericum ascyron*. Their structures were established based on spectroscopic analyses. Cytotoxicities of tomoeones (A–H) against human tumor cell lines were evaluated. Tomoeone F (**6**) demonstrated significant cytotoxicity against KB cells with an  $\text{IC}_{50}$  value of 6.2  $\mu\text{g/mL}$ .

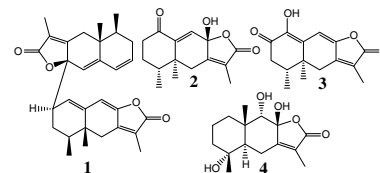


### Cytotoxic sesquiterpenes from *Ligularia platyglossa*

pp 2231–2236

Jian-Qun Liu, Mian Zhang, Chao-Feng Zhang, Huan-Yang Qi, Alan Bashall, S.W. Annie Bligh, Zheng-Tao Wang\*

Four sesquiterpenes (**1–4**) along with two known ones were isolated from *Ligularia platyglossa*. A dimer of eremophilanolides (**1**) linked at C-2  $\beta$ /C-8' $\alpha$  was obtained for the first time. Compound **3** showed cytotoxic activities against HL-60, B16, BEL7402 and Hela cancer cells.

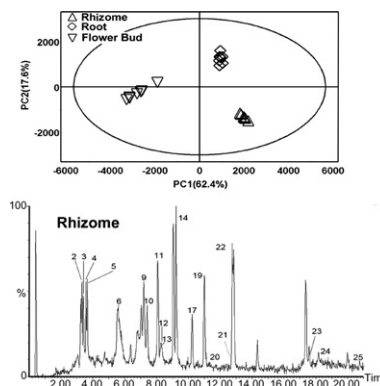


### Metabolite profiling of *Panax notoginseng* using UPLC–ESI-MS

pp 2237–2244

Mo Dan, Mingming Su, Xianfu Gao, Tie Zhao, Aihua Zhao, Guoxiang Xie, Yunping Qiu, Mingmei Zhou, Zhong Liu, Wei Jia\*

UPLC–ESI-MS/MS coupled with multivariate statistical analysis was used for metabolic profiling and identification of multiple saponins in *Panax notoginseng* revealing saponin differences and critical markers among different parts of *P. notoginseng*.

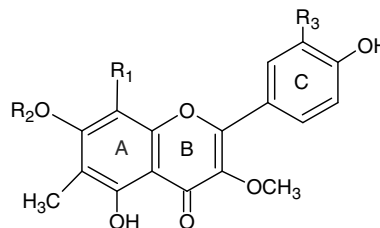


### Flavonols and an oxychromonol from *Piliostigma reticulatum*

pp 2245–2250

Olalekan J. Babajide, Omotola O. Babajide, Abimbola O. Daramola, Wilfred T. Mabusela\*

Chemical investigation of *Piliostigma reticulatum* leaves lead to the isolation of a chromone, three new and three known flavonoids, namely, **1**, C-methyl-*p*-phenoxychromonol (Piliostigmol), **2**, 6,8-di-C-methylquercetin-3,3',7'-trimethyl ether, **3**, 6,8-di-C-methylquercetin-3,3'-dimethyl ether, **4**, 3',6,8-tri-C-methylquercetin-3,7-dimethyl ether, **5**, 6-C-methylquercetin-3-methyl ether, **6**, 6,8-di-C-methylkaempferol-3-methyl ether and **7**, 6-C-methylquercetin-3,3',7'-trimethyl ether, respectively. The compounds showed variable cytotoxic and antimicrobial activities.

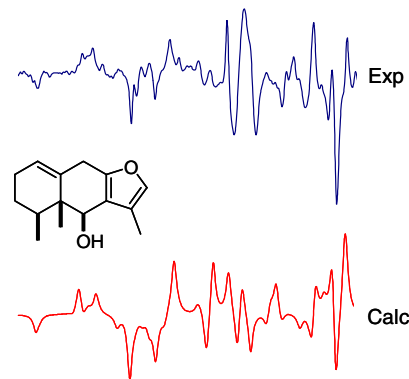


### Absolute configuration of eremophilanoids by vibrational circular dichroism

pp 2251–2256

Eleuterio Burgueño-Tapia, Pedro Joseph-Nathan\*

The absolute configurations of natural occurring 6-hydroxyeremopsin (**1**), of its acetyl derivative **2**, and of eremophilanolide **8** were confirmed by comparison of the experimental vibrational circular dichroism spectra with their respective theoretical curves generated from density functional theory calculations.



**OTHER CONTENTS****Announcement: The Phytochemical Society of Europe****pp I–II**

\* Corresponding author

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