

## Contents

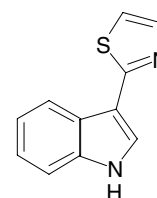
### MOLECULES OF INTEREST

#### Camalexin

pp 401–406

Erich Glawischnig\*

Camalexin is the characteristic phytoalexin of *Arabidopsis thaliana*. This brief survey summarizes the knowledge on function, biosynthesis and regulation of camalexin.



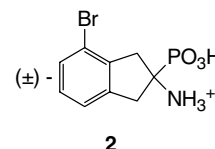
### PROTEIN BIOCHEMISTRY

#### Inhibitors of phenylalanine ammonia-lyase: Substituted derivatives of 2-aminoindane-2-phosphonic acid and 1-aminobenzylphosphonic acid

pp 407–415

Piotr Miziak, Jerzy Zon\*, Nikolaus Amrhein, Roman Gancarz

(±)-2-Amino-4-bromoindane-2-phosphonic acid (**2**) was found as the strongest inhibitor of both phenylalanine ammonia-lyase and anthocyanin biosynthesis from a set of synthesized and evaluated compounds. Therefore, this compound and its derivatives can be valuable tool in the enzyme structure studies in a photolabelling experiments.



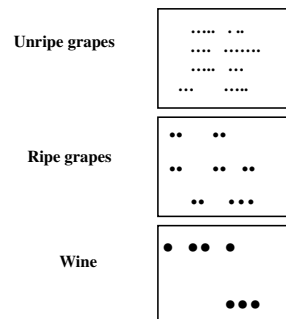
#### The diversity of pathogenesis-related proteins decreases during grape maturation

pp 416–425

Sara Monteiro\*, Maria A. Piçarra-Pereira, Virgílio B. Loureiro, Artur R. Teixeira, Ricardo B. Ferreira

Wines contain a huge diversity of structurally similar PR proteins that are not generated during ripening or winemaking by limited proteolysis and chemical modification of a few common precursors. Rather, grape PR proteins are synthesized as such and their wide diversity, unlike their concentration, decreases during grape maturation.

2-D immunoblots of grapevine PR proteins present in:

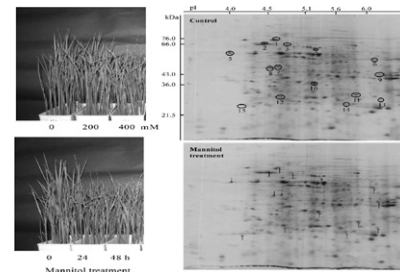


## A proteomics approach for identifying osmotic-stress-related proteins in rice

pp 426–437

Xin Zang, Setsuko Komatsu\*

To investigate the mechanisms of how plants respond to osmotic stress, rice protein profiles from mannitol-treated plants, were monitored using a proteomics approach. specific proteins expressed in the basal part of rice leaf sheaths show a coordinated response to cope with osmotic stress.

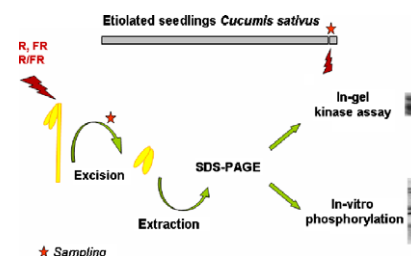


## Protein kinase activity in *Cucumis sativus* cotyledons: Effect of calcium and light

pp 438–445

Dolores Vidal, M. Teresa Gil, Fagua Alvarez-Flórez, Luisa Moysset, Esther Simón\*

The effect of calcium and light on the protein phosphorylation and protein kinase activity of *Cucumis sativus* cotyledons was studied in order to investigate phytochrome-dependence and to understand phytochrome signal transduction better.



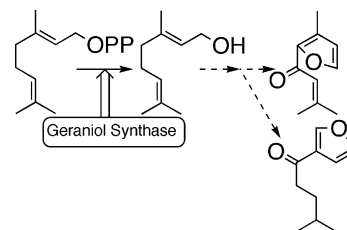
## MOLECULAR GENETICS AND GENOMICS

### Geraniol synthases from perilla and their taxonomical significance

pp 446–453

Michiho Ito\*, Gisho Honda

Geraniol synthases were isolated from citral, elsholtziaketone, perillaketone, and perillene types of *Perilla* spp. The synthases from *Perilla citriodora* and *Perilla frutescens* turned out to be almost identical in sequence, which indicates that *P. frutescens* was formed as an amphidiploid of *P. citriodora* and an unknown wild species.

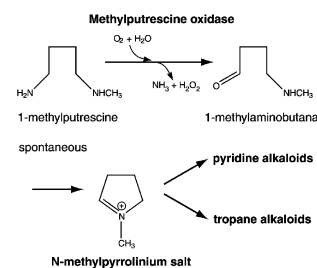


## Cloning and characterization of a *Nicotiana tabacum* methylputrescine oxidase transcript

pp 454–463

William G. Heim, Katie A. Sykes, Sherry B. Hildreth, Jian Sun, Rong-He Lu, John G. Jelesko\*

The oxidative deamination of *N*-methylputrescine is an essential step in both pyridine and tropane alkaloid biosynthesis in a variety of Solanaceous plant species. The oxidative deamination of *N*-methylputrescine gives rise to an unstable intermediate 1-methylaminobutanal that spontaneously cycles into *N*-methylpyrrolinium salt which is common to pyridine and tropane alkaloid biosynthesis.

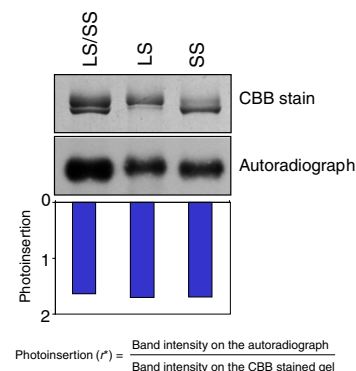


## Catalytic implications of the higher plant ADP-glucose pyrophosphorylase large subunit

pp 464–477

Seon-Kap Hwang, Shigeki Hamada, Thomas W. Okita\*

Our mutagenesis and kinetic analyses of the large subunit of the potato AGPase heterotetramer suggest that the large subunit is essential not only for allosteric regulation but also for catalysis of the enzyme. The catalytic significance of the large subunit is further emphasized by photoaffinity labeling experiment with ATP analog which shows that the large subunit binds ATP as efficiently as the small subunit.

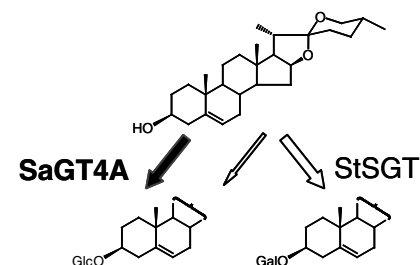


## Characterization and engineering of glycosyltransferases responsible for steroid saponin biosynthesis in Solanaceous plants

pp 478–486

Atsuko Kohara, Chiharu Nakajima, Shigeo Yoshida, Toshiya Muranaka\*

SaGT4A from *Solanum aculeatissimum* glucosylates both steroidal saponogenins and steroidal alkaloids. StSGT from *S. tuberosum* prefers UDP-galactose to UDP-glucose as a sugar donor. *In vitro* mutagenesis and chimeric enzymatic studies were performed for these glycosyltransferases.



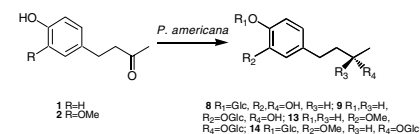
## METABOLISM

### Biotransformation of raspberry ketone and zingerone by cultured cells of *Phytolacca americana*

pp 487–492

Kei Shimoda, Toshio Harada, Hatsuyuki Hamada, Nobuyoshi Nakajima, Hiroki Hamada\*

Four biotransformation products **8**, **9**, **13**, and **14**, together with eight known products, were isolated from the cultured cells of *Phytolacca americana* following administration of raspberry ketone (**1**) and zingerone (**2**).

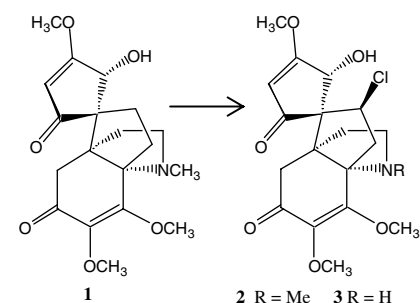


### Conversion of dechlorodauricumine into chlorinated alkaloids in *Menispermum dauricum* root culture

pp 493–498

Yukihiro Sugimoto\*, Miharui Matsui, Hind A.A. Babiker

<sup>15</sup>N-Labeled dechlorodauricumine (**1**) was effectively converted into the chlorinated alkaloids dauricumine (**2**) and dauricumidine (**3**) in *Menispermum dauricum* root culture, suggesting that **1** is the precursor of **2** and **3**.



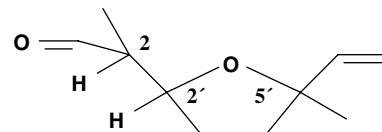
## ECOLOGICAL BIOCHEMISTRY

### Stereoisomeric pattern of lilac aldehyde in *Silene latifolia*, a plant involved in a nursery pollination system

pp 499–504

Stefan Dötterl\*, Dirk Burkhardt, Andreas Jürgens, Armin Mosandl

The stereoisomeric pattern of lilac aldehyde is a more conservative trait in flower scent of *Silene latifolia* compared to the whole scent blend, and may be used by the nursery pollinator *Hadena bicruris* for host-plant detection.

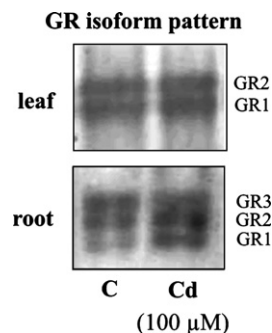


### Glutathione reductase activity and isoforms in leaves and roots of wheat plants subjected to cadmium stress

pp 505–512

Gustavo G. Yannarelli\*, Ana J. Fernández-Alvarez, Diego M. Santa-Cruz, María L. Tomaro

Glutathione reductase up-regulation by the induction of distinctive isoforms occurs as a defensive mechanism against Cd-generated oxidative stress in roots.

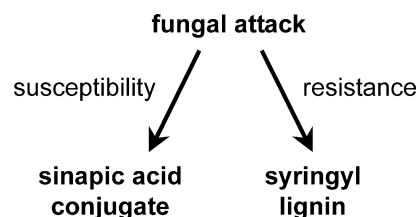


### Wheat cells accumulate a syringyl-rich lignin during the hypersensitive resistance response

pp 513–520

Barbara Menden, Markus Kohlhoff, Bruno M. Moerschbacher\*

Upon penetration by the biotrophic stem rust fungus, resistant wheat cells respond with a hypersensitive reaction which is accompanied by the accumulation of an autofluorescing material. Using biochemical and spectral methods, this material was now identified as a syringyl-rich lignin.

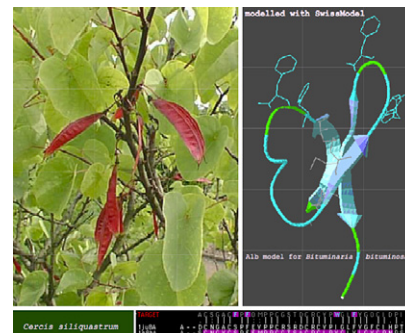


### Broad screening of the legume family for variability in seed insecticidal activities and for the occurrence of the A1b-like knottin peptide entomotoxins

pp 521–535

Sandrine Louis, Bernard Delobel, Frédéric Gressent, Gabrielle Duport, Ousmane Diol, Isabelle Rahioui, Hubert Charles, Yvan Rahbé\*

By using a combination of molecular, biochemical and specific insect (*Sitophilus* weevils) bioassays, we characterised A1b seed entomotoxin genes and proteins from numerous Papilionoideae species, but not from Caesalpinioideae and Mimosoideae species. The origins of this small multigenic family are discussed.



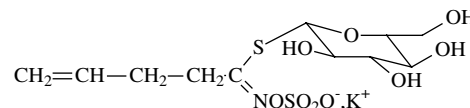
## CHEMOTAXONOMY

Variation of glucosinolates in vegetable crops of *Brassica rapa*

pp 536–545

Guillermo Padilla, María Elena Cartea\*, Pablo Velasco, Antonio de Haro, Amando Ordás

Sixteen glucosinolates were identified from leaves of turnip greens (*Brassica rapa* L.) grown in northwestern Spain. Gluconapin and glucobrassicinapin were the most abundant. Ecological and nutritional effects of glucosinolates are discussed.



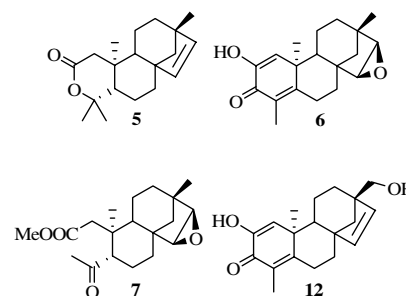
## BIOACTIVE PRODUCTS

*ent*-Beyerane diterpenoids from the heartwood of *Excoecaria parvifolia*

pp 546–553

Mary H. Grace, Juan A. Faraldos, Mary Ann Lila, Robert M. Coates\*

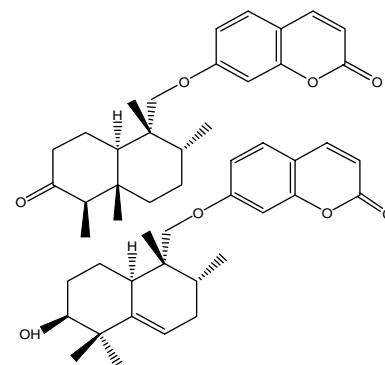
The heartwood of *Excoecaria parvifolia* afforded 12 beyerane diterpenes (1–12), four of which (5–7 and 12) have unusual structures: *ent*-3-oxa-beyer-15-en-2-one, (5); *ent*-15,16-epoxy-2-hydroxy-19-norbeyer-1,4-dien-3-one (6); methyl *ent*-2,4-seco-15,16-epoxy-4-oxo-3,19-dinorbeyer-15-en-2-oate (7); and *ent*-2,17-dihydroxy-19-norbeyer-1,4,15-trien-3-one (12). The isolated diterpenes were tested for their cytotoxic activity against leukemia cells (L1210), but only compounds 2 and 5 exhibited potent activity.

Sesquiterpene coumarins from *Ferula szowitsiana* and *in vitro* antileishmanial activity of 7-prenyloxycoumarins against promastigotes

pp 554–561

Mehrdad Iranshahi\*, Peyman Arfa, Mohammad Ramezani, Mahmoud Reza Jaafari, Hamid Sadeghian, Carla Bassarello, Sonia Piacente, Cosimo Pizza

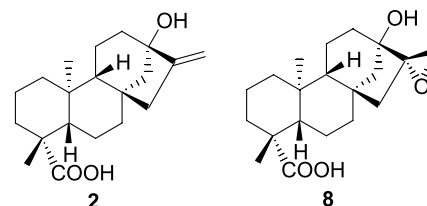
Two sesquiterpene coumarins, named szowitsiacoumarin A (1) and szowitsiacoumarin B were isolated from the roots of *Ferula szowitsiana*. The inhibiting activity of prenylated coumarins, auraptene (4) and umbelliprenin (5), in addition to galbanic acid (6), as major component, and of the acetone extract of *Ferula szowitsiana* (Apiaceae) roots has been evaluated against promastigotes of *Leishmania major*.

Microbial metabolism of steviol and steviol-16 $\alpha$ ,17-epoxide

pp 562–570

Li-Ming Yang, Feng-Lin Hsu, Shwu-Fen Chang, Juei-Tang Cheng, Ju-Yin Hsu, Chung-Yi Hsu, Pan-Chun Liu, Shwu-Juan Lin\*

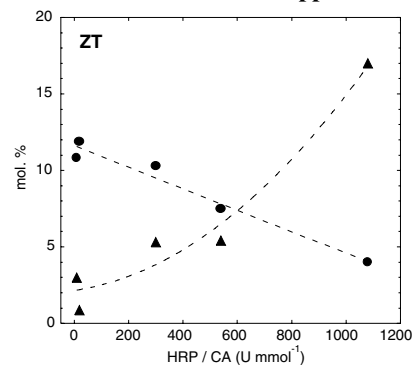
Incubation of steviol (2) with *Bacillus megaterium*, *Mucor recurvatus*, and *Aspergillus niger* afforded compounds 3–7, whereas incubation of steviol-16 $\alpha$ ,17-epoxide (8) with *Mucor recurvatus* afforded 5 and compounds 9–14. The structures of the compounds were fully elucidated using 1D and 2D NMR spectroscopic techniques, and HRFABMS, in addition, to describing the biological activities of the compounds 1–7.



**Chemistry****Peroxidase activity can dictate the *in vitro* lignin dehydrogenative polymer structure****pp 571–579**

Valérie Méchin\*, Stéphanie Baumberger, Brigitte Pollet, Catherine Lapierre

We assessed the influence of the horseradish peroxidase/coniferyl alcohol ratio on the Zutropf and Zulauf DHP synthesis. This parameter governs the polymerization degree, the  $\beta$ -O-4 content and the frequency of coniferyl alcohol end-groups. Lignin biosynthesis and structure could thus be partially controlled by the peroxidase concentration and availability.

**Other Contents****Announcement: Phytochemical Society of North America****p 580**

\* Corresponding author

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