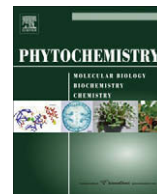




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## Phytochemistry Vol. 70, No. 4, 2009

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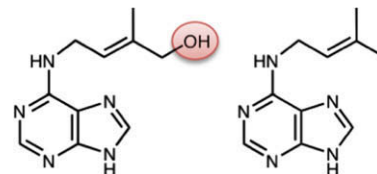
## MOLECULES OF INTEREST

## Molecular basis for cytokinin biosynthesis

pp 444–449

Tomoe Kamada-Nobusada, Hitoshi Sakakibara\*

Identification of the enzymes and the corresponding genes that are involved in cytokinin metabolism allowed us to understand how plants synthesize cytokinins and adjust their activity to optimal levels. These advances also have revealed the complexity of the entire metabolic scheme for CK biosynthesis.



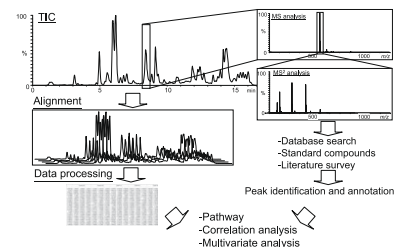
## UPDATE IN BIOINFORMATICS

## Web-based resources for mass-spectrometry-based metabolomics: A user's guide

pp 450–456

Takayuki Tohge, Alisdair R. Fernie\*

The standard procedure for untargeted metabolomics demonstrating metabolite identification strategies and alignment approaches to ensure correct comparison of multiple samples. These processes and subsequent data analysis are currently supported by a wide range of computational resources.



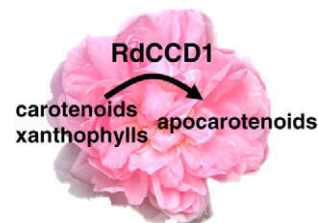
## PROTEIN BIOCHEMISTRY AND PROTEOMICS

Substrate promiscuity of RdCCD1, a carotenoid cleavage oxygenase from *Rosa damascena*

pp 457–464

Fong-Chin Huang, Györgyi Horváth, Péter Molnár, Erika Turcsi, József Deli, Jens Schrader, Gerhard Sandmann, Holger Schmidt, Wilfried Schwab\*

Apocarotenoids are key flavor compounds in rose essential oil and are derived from carotenoid and xanthophyll degradation. The *Rosa damascena* carotenoid cleavage (di-)oxygenase 1 (RdCCD1) protein is able to cleave a variety of carotenoids and xanthophylls at the 9-10 and 9'-10' positions and contributes to the formation of constituents of the rose aroma.

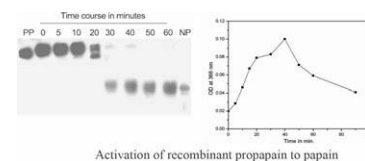


## Production and recovery of recombinant propapain with high yield

pp 465–472

Debi Choudhury, Sumana Roy, Chandana Chakrabarti, Sampa Biswas, J.K. Dattagupta\*

A high yield heterologous expression and refolding protocol for recombinant propapain from *Escherichia coli* inclusion bodies is reported. This recombinant propapain can be activated to mature papain at low pH and its specific activity has been compared with commercially available papain isolated from natural source.

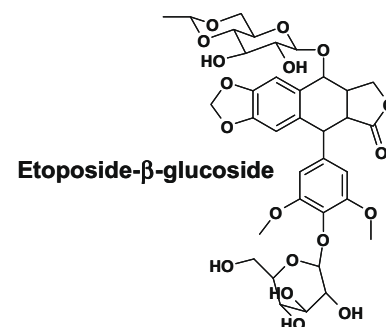


## Substrate specificities of family 1 UGTs gained by domain swapping

pp 473–482

Esben Halkjær Hansen\*, Sarah A. Osmani, Charlotte Kristensen, Birger Lindberg Møller, Jørgen Hansen

Chimeric family 1 UDP-glucose glycosyltransferases (UGTs) with substrates specificities were constructed. Twelve active chimeras were obtained, using domains of the UGTs 71C1, 71C2, 71E1 and 85C1, of two different plant species. Among activities observed were regio-specific glycosylation of resveratrol and increased efficiency of etoposide glycosylation.

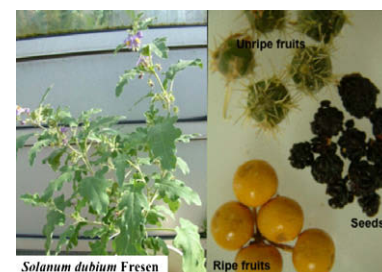


## Dubiumin, a chymotrypsin-like serine protease from the seeds of *Solanum dubium* Fresen

pp 483–491

Isam A. Mohamed Ahmed, Isao Morishima, Elfadil E. Babiker, Nobuhiro Mori\*

*Solanum dubium* Fresen, a weed plant in the family Solanaceae, is locally known in Sudan as Gubbien because of its milk-clotting ability. A highly stable serine protease from the seeds of this plant was purified and characterized. Its enzymatic characteristics suggest possible application of the enzyme in food and biotechnological industries.

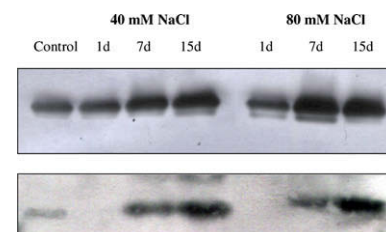


## Changes in plasma membrane lipids, aquaporins and proton pump of broccoli roots, as an adaptation mechanism to salinity

pp 492–500

Luis López-Pérez, María del Carmen Martínez-Ballesta, Christophe Maurel, Micaela Carvajal\*

The lipid composition and PIP1 and PIP2 aquaporin expression of plasma membrane vesicles of broccoli roots were evaluated for different levels of NaCl. Long time salt exposition caused an increase in the abundance of two PIPs isoforms and modified membrane lipid composition. These changes could affect the membrane stability and control the water permeability, as a mechanism of acclimation to salinity.



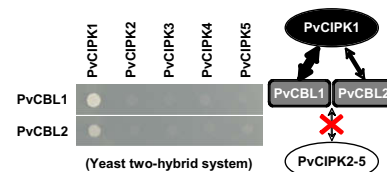
## MOLECULAR GENETICS AND GENOMICS

**Expression and interaction of the CBLs and CIPKs from immature seeds of kidney bean (*Phaseolus vulgaris* L.)**

pp 501–507

Shigeki Hamada, Yoshiko Seiki, Kazuhiro Watanabe, Takashi Ozeki, Hirokazu Matsui, Hiroyuki Ito\*

Using the yeast two-hybrid system, the interaction between CBLs and CIPKs isolated from kidney bean seeds was investigated. The present data indicates that calcium-dependent protein phosphorylation-signaling via CBLs–CIPKs occurs during plant seed development.



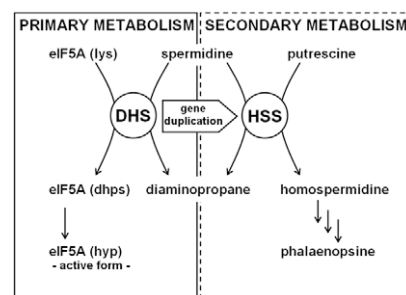
## METABOLISM

**Evolution of pyrrolizidine alkaloids in *Phalaenopsis* orchids and other monocotyledons: Identification of deoxyhypusine synthase, homospermidine synthase and related pseudogenes**

pp 508–516

Niknik Nurhayati, Daniela Gondé, Dietrich Ober\*

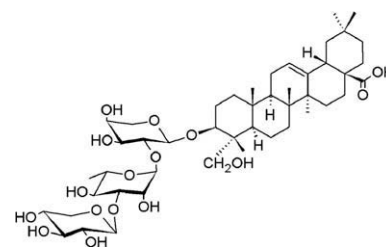
*Phalaenopsis* orchids produce pyrrolizidine alkaloids of the phalaenopsine type. Homospermidine synthase, the first specific enzyme of pyrrolizidine alkaloid biosynthesis, and the related deoxyhypusine synthase were identified together with several pseudogenes as remnants of ongoing gene duplication events in orchids.

**Methyl jasmonate induced accumulation of kalopanaxsaponin I in *Nigella sativa***

pp 517–522

Martin Scholz, Marta Lipinski, Marco Leupold, Heinrich Luftmann, Lena Harig, Rivka Ofir, Rainer Fischer, Dirk Prüfer\*, Kai J. Müller

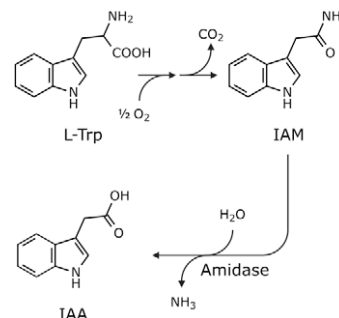
*Nigella sativa* plants growing in hydroponic systems produce increased amounts of kalopanaxsaponin I upon treatment with methyl jasmonate. To further address this observation on molecular level we cloned and functionally characterized the  $\beta$ -amyrin synthase gene (*Ns* $\beta$ AS1), which encodes one of the key enzymes of triterpene saponin biosynthesis.

**Tryptophan-dependent indole-3-acetic acid biosynthesis by 'IAA-synthase' proceeds via indole-3-acetamide**

pp 523–531

Stephan Pollmann\*, Petra Dückting, Elmar W. Weiler

To analyze the conversion of L-tryptophan (L-trp) to indole-3-acetic acid (IAA) *in vitro*, isotope labeling and GC–MS/MS techniques were used. Cell free protein extracts convert L-trp to IAA via the intermediate indole-3-acetamide, which has earlier been shown to be endogenous to *Arabidopsis thaliana*.

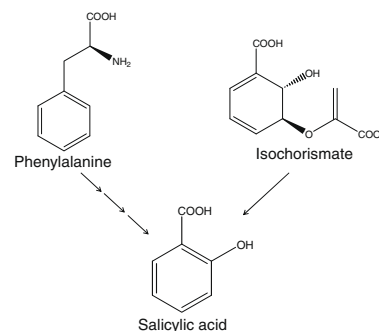


### Biosynthesis of salicylic acid in fungus elicited *Catharanthus roseus* cells

pp 532–539

Natali R. Mustafa, Hye Kyong Kim, Young Hae Choi, Cornelis Erkelens, Alfons W.M. Lefeber, Gerwin Spijksma, Robert van der Heijden, Robert Verpoorte\*

Feeding experiments using [1-<sup>13</sup>C]-D-glucose to *Catharanthus roseus* (L.) G. Don cell suspension cultures were performed in order to study the salicylic acid (SA) biosynthetic pathway and that of 2,3-dihydroxybenzoic acid (2,3-DHBA) as a comparison. Relatively high- and non-symmetrical enrichment ratios at C-2 and C-6, and a lower enrichment ratio at C-7 were observed in both SA and 2,3-DHBA detected by <sup>13</sup>C NMR inverse gated spectrometry leading to the conclusion that the isochorismate pathway is responsible for the biosynthesis of both compounds rather than the phenylpropanoid pathway.



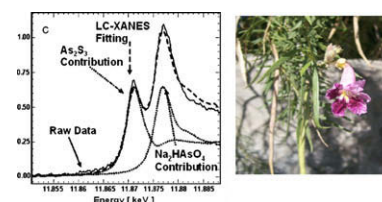
### ECOLOGICAL BIOCHEMISTRY

#### Accumulation, speciation, and coordination of arsenic in an inbred line and a wild type cultivar of the desert plant species *Chilopsis linearis* (Desert willow)

pp 540–545

Hiram A. Castillo-Michel, Nubia Zuverza-Mena, Jason G. Parsons, Kenneth M. Dokken, Maria Duarte-Gardea, Jose R. Peralta-Videa, Jorge L. Gardea-Torresdey\*

X-ray absorption spectroscopic analyses established partial reduction of arsenate to arsenite in roots and stems of the inbred line "Louis Hamilton" of *Chilopsis linearis*. The reduced fraction was found as an As-(SX)<sub>3</sub> species, as confirmed by the As<sub>2</sub>S<sub>3</sub> model compound contribution in the X-ray absorption near edge structure (XANES) spectra.



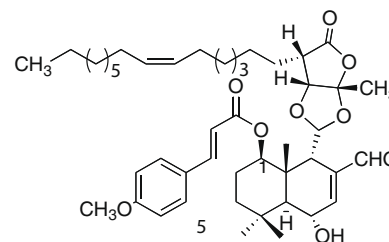
### CHEMISTRY

#### Cytotoxic sesquiterpenoids from Winteraceae of Caledonian rainforest

pp 546–553

Noureddine Allouche, Cécile Apel, Marie-Thérèse Martin, Vincent Dumontet, Françoise Guéritte, Marc Litaudon\*

One secobutanolide, 2 butanolides and 6 drimane sesquiterpenoids, along with 6 known drimanes were isolated from *Zygogynum* spp. (Winteraceae). Their structures were elucidated through analysis of spectroscopic data. Compounds with a dialdehyde function exhibited significant inhibitory activities in the *in vitro* cytotoxic assays against KB, HL60 and HCT116 cancer cell lines.

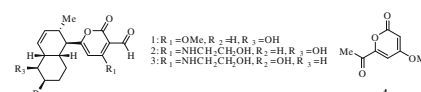


#### Pyrone derivatives from the marine-derived fungus *Nigrospora* sp. PSU-F18

pp 554–557

Kongkiat Trisuwan, Vatcharin Rukachaisirikul\*, Yaowapa Sukpondma, Sita Preedanon, Souwalak Phongpaichit, Jariya Sakayaroj

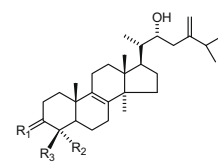
Pyrones, named nigrosporapyrones A–D (1–4), and five known compounds were isolated from the marine-derived fungus *Nigrospora* PSU-F18. Their structures were elucidated on the basis of spectroscopic evidence. The antibacterial activity against the standard *Staphylococcus aureus* ATCC 25923 and methicillin-resistant *S. aureus* was evaluated.



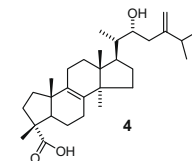
**Lanostane-triterpenoids from the fungus *Phellinus gilvus*****pp 558–563**

Hui-Kang Liu, Tung-Hu Tsai, Tun-Tschu Chang, Cheng-Jen Chou, Lie-Chwen Lin\*

Triterpenoids gilvsins A–D (**1–4**) were isolated from the fruiting body of *Phellinus gilvus*, together with two known compounds. The structures of **1–4** were deduced from spectroscopic evidence. The absolute configuration at C-22 of **1** was determined by the modified Mosher's method and the structure of **1** was confirmed by X-ray analysis.



- 1  $R_1 = O$   $R_2 = R_3 = CH_3$   
 2  $R_1 = \alpha-H$   $\beta-OH$   $R_2 = COOH$   $R_3 = CH_3$   
 3  $R_1 = O$   $R_2 = CH_3$   $R_3 = H$

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

\* Corresponding author

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