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PROTEIN BIOCHEMISTRY

Trypsin inhibitors from the garden four o'clock (*Mirabilis jalapa*) and spinach (*Spinacia oleracea*) seeds: Isolation, characterization and chemical synthesis

pp 1487–1496

Jolanta Kowalska, Katarzyna Pszczoła, Anna Wilimowska-Pelc, Irena Lorenc-Kubis, Ewa Zuziak, Mateusz Ługowski, Anna Łęgowska, Anna Kwiatkowska, Małgorzata Śleszyńska, Adam Lesner, Aleksandra Walewska, Ewa Zabłotna, Krzysztof Rolka, Tadeusz Wilusz*

Mirabilis jalapa trypsin inhibitor I (MJTI I)
EDEEC⁺AKTDQICPPAPNYCCSGSCVPHPLRIFVCA

Five trypsin inhibitors from the ripe seeds of the garden four-o'clock and spinach were isolated. The primary structures and disulfide bridge pattern were established for natural and chemical synthesized inhibitors. There are probably representatives of a family of serine proteinase inhibitors.

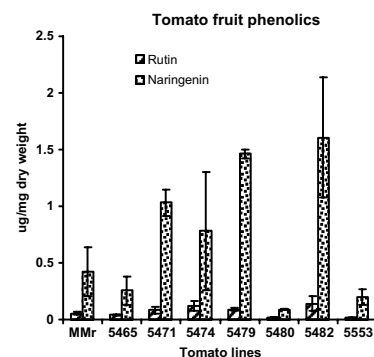
MOLECULAR GENETICS AND GENOMICS

Introduction of sense constructs of cinnamate 4-hydroxylase (CYP73A24) in transgenic tomato plants shows opposite effects on flux into stem lignin and fruit flavonoids

pp 1497–1509

David J. Millar, Marianne Long, Georgina Donovan, Paul D. Fraser, Alain-Michel Boudet, Saida Danoun, Peter M. Bramley, G. Paul Bolwell*

Overexpression of CYP73A24 led to desirable increases in antioxidant flavonoids in fruit without alteration of the carotenoid background. However many lines showed reduced lignin in stems indicating a complex developmental role for cinnamate 4-hydroxylase.

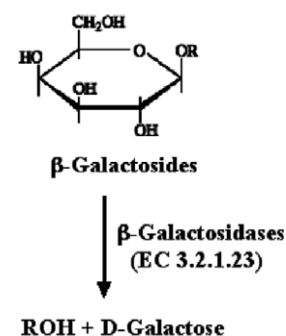


Functional genomic analysis of *Arabidopsis thaliana* glycoside hydrolase family 35

pp 1510–1520

Young Ock Ahn, Meiyong Zheng, David R. Bevan, Asim Esen, Shin-Han Shiu, Jonas Benson, Hsiao-Ping Peng, Joseph T. Miller, Chi-Lien Cheng, Jonathan E. Poulton, Ming-Che Shih*

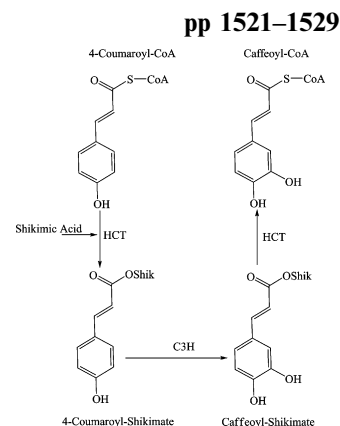
The gene structure, evolutionary patterns, and organ-level expression of the 17 members of *Arabidopsis thaliana* glycoside hydrolase family 35 (β-galactosidases) are described. Evolutionary relationships between these and β-galactosidase genes from 22 other eukaryotes are determined. After overexpression in *Escherichia coli*, homogeneous *Arabidopsis* BGAL4 hydrolyses chromogenic β-D-galactosides and various β-linked galactobiosides and galactotriosides.



Down-regulation of hydroxycinnamoyl CoA: Shikimate hydroxycinnamoyl transferase in transgenic alfalfa affects lignification, development and forage quality

Gail Shadle, Fang Chen, M.S. Srinivasa Reddy, Lisa Jackson, Jin Nakashima, Richard A. Dixon*

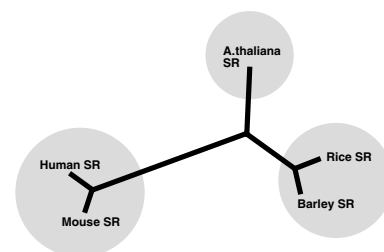
Transgenic alfalfa (*Medicago sativa* L.) plants were generated in which the levels of the enzyme hydroxycinnamoyl CoA: shikimate hydroxycinnamoyl transferase (HCT) were reduced through antisense HCT expression. These plants had strongly reduced lignin content and striking changes in lignin monomer composition. Analysis of forage quality parameter showed strong reductions of neutral- and acid-detergent fiber in the down-regulated lines, in parallel with large increases (up to 20%) in dry matter forage digestibility.



Serine racemases from barley, *Hordeum vulgare* L., and other plant species represent a distinct eukaryotic group: Gene cloning and recombinant protein characterization

Yoshiyuki Fujitani, Terumi Horiuchi, Kazutoshi Ito, Manabu Sugimoto*

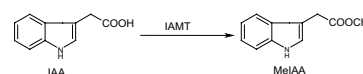
A serine racemase gene was cloned from barley and the corresponding recombinant protein was characterized. The enzymatic and immunological properties suggest that it, as well as rice and *Arabidopsis* serine racemases, represents a distinct group in the eukaryotic serine racemase family.



Molecular cloning and biochemical characterization of indole-3-acetic acid methyltransferase from poplar

Nan Zhao, Ju Guan, Hong Lin, Feng Chen*

The gene *PtIAMT1* was cloned from poplar and found to encode indole-3-acetic acid methyltransferase (IAMT). The latter catalyzes formation of methyl indole-3-acetate (MeIAA) using indole-3-acetic acid (IAA) as substrate. Gene expression analysis suggests that *PtIAMT1* is involved in development of multiple organs in poplar.



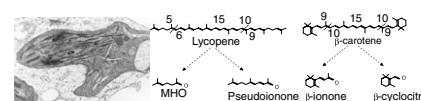
METABOLISM

Fibrillin influence on plastid ultrastructure and pigment content in tomato fruit

pp 1545–1556

Andrew J. Simkin, Joël Gaffé, Jean-Pierre Alcaraz, Jean-Pierre Carde, Peter M. Bramley, Paul D. Fraser, Marcel Kuntz*

Over-expression of fibrillin, a protein implicated in carotenoid storage within fibrillar lipoprotein structures in pepper chromoplasts, induces an increase in carotenoids and their derived volatiles in tomato fruit chromoplasts. However, no chromoplast fibrils, as potential deposition structures, were observed. The most striking ultrastructural changes were plastoglobule clustering and transient formation of plastids with distinct chloroplast and chromoplast zones.

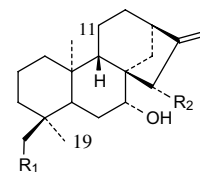


The microbiological transformation of 7 α -hydroxy-*ent*-kaur-16-ene derivatives by *Gibberella fujikuroi*

pp 1557–1563

Braulio M. Fraga*, Carlo Bressa, Pedro González, Ricardo Guillermo, Melchor G. Hernández, Sergio Suárez

Biotransformation of the diterpene *epi*-candol A (**1**) by the fungus *Gibberella fujikuroi* gave fujenoic acid, whilst the incubation of candicandiol (**5**) and canditriol (**9**) afforded oxidated compounds at the 19 and 11 β positions, respectively.



1 R₁ = R₂ = H

5 R₁ = OH R₂ = H

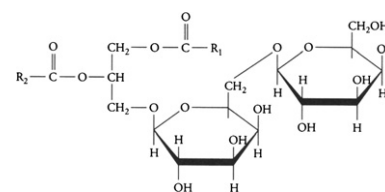
9 R₁ = R₂ = OH

Long- and short-term phosphate deprivation in bean roots: Plasma membrane lipid alterations and transient stimulation of phospholipases

pp 1564–1571

Marco Antonio Russo, Mike F. Quartacci, Riccardo Izzo, Adalgisa Belligno, Flavia Navari-Izzo*

In bean roots subjected to phosphate deprivation the decrease in plasma membrane phospholipids is compensated for by an increase in the non-phosphorous digalactosyldiacylglycerol. Phosphate starvation also induces an activation of the phospholipid-hydrolysing phospholipases C and D.



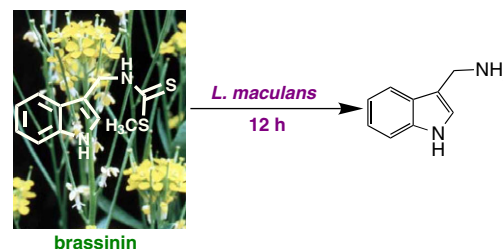
ECOLOGICAL BIOCHEMISTRY

Detoxification of the phytoalexin brassinin by isolates of *Leptosphaeria maculans* pathogenic on brown mustard involves an inducible hydrolase

pp 1572–1578

M. Soledade C. Pedras*, Ravi S. Gadagi, Mukund Jha, Vijay K. Sarma-Mamillapalle

The pathway for detoxification of brassinin, the substrate specificity of the putative detoxifying hydrolase, as well as the antifungal activity of metabolites and analogs of brassinin are reported.



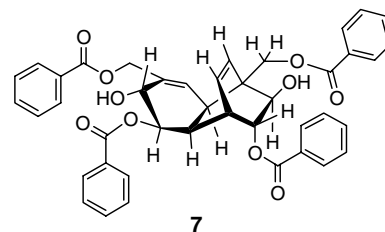
BIOACTIVE PRODUCTS

Polyoxygenated cyclohexane derivatives and other constituents from *Kaempferia rotunda* L.

pp 1579–1586

Philip C. Stevenson*, Nigel C. Veitch, Monique S.J. Simmonds

Extracts of *Kaempferia rotunda* rhizomes yielded seven compounds; (–)-6-acetylzeylenol (**1**), four acylated derivatives of 1-benzoyloxymethyl-1,6-epoxycyclohexan-2,3,4,5-tetrol (**3–6**), a Diels–Alder adduct of 3-benzoyl-1-benzoyloxymethylcyclohexa-4,6-dien-2,3-diol (**7**) and a triacylated derivative of salicin (**9**). Compound **6** and (–)-zeylenol (**2**) showed antifeedant activity against *Spodoptera littoralis*.

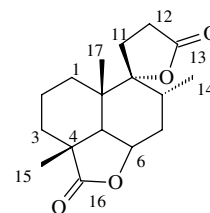


Cytotoxicity and immunomodulating characteristics of labdane diterpenes from *Marrubium cylleneum* and *Marrubium velutinum*

pp 1587–1594

Anastasia Karioti*, Margarita Skopeliti, Ourania Tsitsilonis, Jörg Heilmann, Helen Skaltsa*

From the aerial parts of *Marrubium cylleneum*, one labdane *nor*-diterpene has been isolated together with two labdane diterpenes, hitherto not known as natural products. Several diterpenoids from both plants were tested for their cytotoxic effect against various cancer cell lines and their immunomodulating potential in human peripheral blood mononuclear cells. Our results show a differential cytotoxicity of some compounds, as well as their ability to improve selected lymphocyte functions.

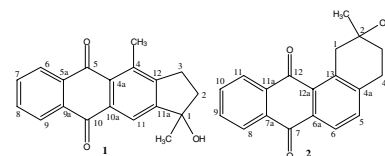


Anthraquinones from the stem bark of *Stereospermum zenkeri* with antimicrobial activity

pp 1595–1599

Bruno N. Lenta*, Bernard Weniger, Cyril Antheaume, Diderot T. Nougoué, Silvére Ngouela, Jules C.N. Assob, Catherine Vonthron-Sénécheau, Patrice A. Fokou, Krishna P. Devkota, Etienne Tsamo, Norbert Sewald

Two anthraquinones **1** and **2** were isolated from *Stereospermum zenkeri* and compound **2** showed the best antimicrobial activity (MIC 9.50 µg/ml) against gram-negative *Pseudomonas aeruginosa*.



OTHER CONTENTS

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