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Special issue

Highlights in the Evolution of Phytochemistry: 50 Years of the Phytochemical Society of Europe

Editors: Richard J. Robins, Simon Gibbons and Andrew Marston

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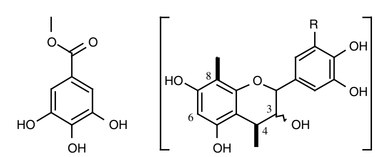
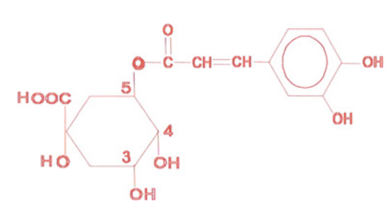
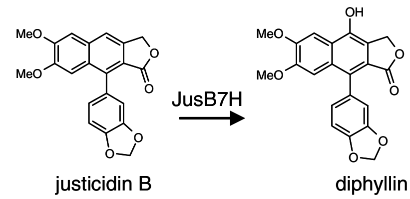


galloyl ester; gallotannins, ellagitannins

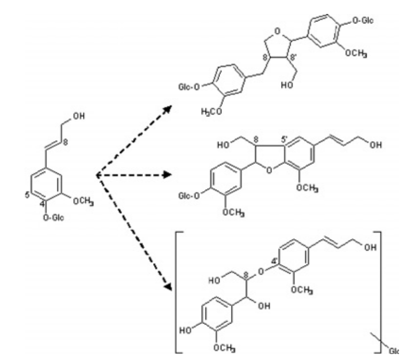
proanthocyanidins



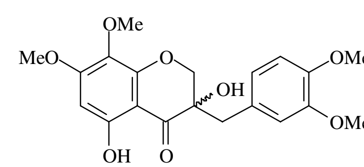
A biosynthetic pathway for the formation of arylnaphthalene lignans like diphyllin is suggested. Justicidin B 7-hydroxylase (JusB7H) which catalyzes the last step in the biosynthesis of diphyllin was characterized as a cytochrome P450 monooxygenase from suspension cultures of *Linum perenne* Himmelszelt.



The use of [8,9-$^{13}C_2$]-coniferin coupled with mass spectrometry and nuclear magnetic resonance showed the ability of a flax cell suspension to biosynthesise differently linked (neo)lignans: 8–8′, 8–5′ and 8-*O*-4′. The continuous synthesis and subsequent metabolisation of these coniferin-derived dimers were established all over the culture period.

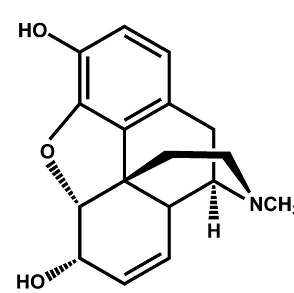


Five homoisoflavanones: 3,5-dihydroxy-7,8-dimethoxy-3-(3′,4′-dimethoxybenzyl)-4-chromanone, 3,5-dihydroxy-7-methoxy-3-(3′,4′-dimethoxybenzyl)-4-chromanone, 3,5-dihydroxy-7,8-dimethoxy-3-(3′-hydroxy-4′-methoxybenzyl)-4-chromanone, 3,5,6-trihydroxy-7-methoxy-3-(3′-hydroxy-4′-methoxybenzyl)-4-chromanone and 3,5,7-trihydroxy-3-(3′-hydroxy-4′methoxybenzyl)-4-chromanone and the nortriterpenoid, 15-deoxoeucosterol, have been isolated from the bulbs of *Pseudoprospero firmifolium*, the sole representative of the tribe Pseudoprospereae (Hyacinthaceae: Hyacinthoideae).



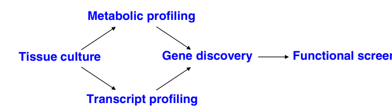
PHYTOCHEMISTRY OF NITROGENOUS COMPOUNDS

With the discovery of nitrogen-containing plant products, 200 years ago, a success story began. Strongly bioactive pure chemicals from plants were isolated and used in medicine and, in parallel, organic and pharmaceutical chemistry developed. This success story continues today and multidisciplinary "phytochemistry" surely has a bright future.



Morphine

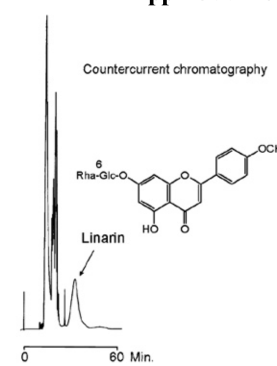
Suvi T. Häkkinen, Sofie Tilleman, Agnieszka Świątek, Valerie De Sutter, Heiko Rischer, Isabelle Vanhoutte, Harry Van Onckelen, Pierre Hilson, Dirk Inzé, Kirsi-Marja Oksman-Caldentey*, Alain Goossens



Potential catalysers of tobacco pyridine metabolism can be discovered by functional genomics-based analysis of a *Nicotiana tabacum* gene platform, established previously by means of integrated transcript and metabolite profiling.

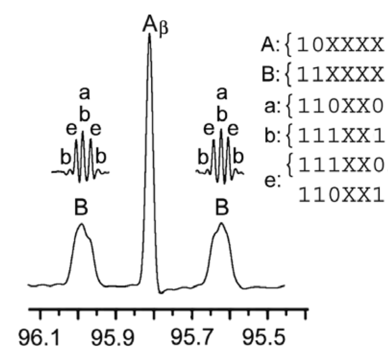
ROLE OF METHODOLOGY IN ADVANCING PHYTOCHEMICAL RESEARCH

Andrew Marston



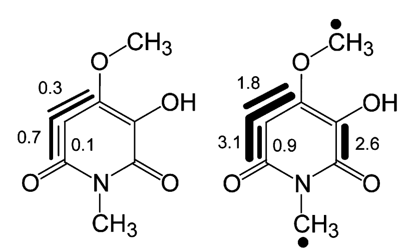
Chromatography is essential to phytochemistry and is the key to obtaining pure compounds for structure elucidation (by countercurrent chromatography, for example), for pharmacological testing or for development into therapeuticals. It also plays a fundamental role as an analytical technique for quality control and standardisation of phytotherapeuticals.

Wolfgang Eisenreich*, Adelbert Bacher



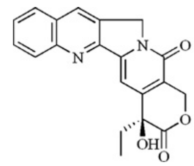
Recent advances in instrumentation have led to a remarkable set of techniques and applications of NMR spectroscopy. This review describes the role of high-resolution NMR spectroscopy in the structural analysis of plant constituents (e.g. proteins and small metabolites) and in the analysis of biosynthetic pathways and metabolite flux.

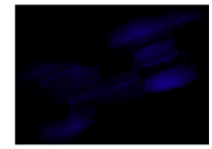
Elena Ostrozhenkova, Eva Eylert, Nicholas Schramek, Avi Golan-Goldhirsh, Adelbert Bacher, Wolfgang Eisenreich*



The isotopologue patterns in hermidin labelled with [U-$^{13}C_6$]glucose or $^{13}CO_2$ indicate that the alkaloid is derived from the nicotinic acid pathway.

Supaart Sirikantaramas, Hiroshi Sudo, Takashi Asano, Mami Yamazaki, Kazuki Saito*

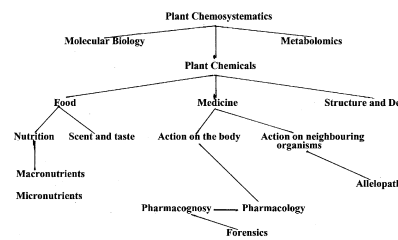




Autofluorescence emitted from camptothecin, an anticancer monoterpene indole alkaloid, in the hairy root of *Ophiorrhiza pumila* suggests its localization in the vacuole. In this paper, we employed a pharmacological approach to elucidate camptothecin transport in the hairy root.

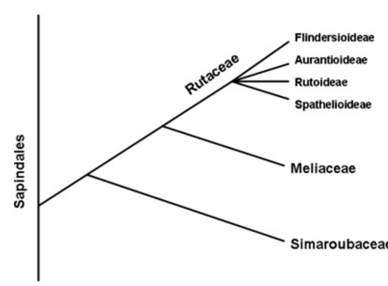
PHYTOCHEMISTRY AND CHEMOSYSTEMATICS

Tom Reynolds



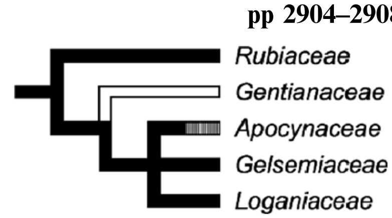
Chemosystematics has been used by animals, including man, to distinguish plants and other beings useful for food and those best avoided. Originally unwritten, this knowledge has been formalized down the ages, until in modern times useful and harmful chemical constituents from relevant taxa have been identified and recorded. In return this knowledge has now been used to aid taxonomic distinctions of these plants, animals and micro-organisms. Advances in analytical instrumentation, in particular chromatography in all its forms, followed by electronic detection methods, has speeded these studies.

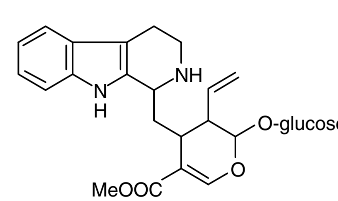
Peter G. Waterman



Chemical systematics sets out to interpret the phylogenetic implications of the occurrence and distribution of secondary metabolites. In this review, a number of the major contributions from the 1960's and 1970's are identified and re-assessed in the light of recent evidence gained from DNA studies. It is shown that for the most part conclusions drawn on the basis of secondary metabolite distribution have been confirmed by the new techniques and it is concluded that chemical systematics can continue to provide useful insights into plant phylogeny.

Sonny Larsson





Recircumscription of plant systematics must be taken into account when drawing chemosystematic conclusions. They are highly dependent on up-to-date botanical classification.

PHYTOCHEMICALS AND HUMAN HEALTH

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* Corresponding author

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