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[Lab. of Pharmacognosy]

Phylogenetic Relationship of Six *Glycyrrhiza* Species Based on rbcL Sequences and Chemical Constituents.

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The nucleotide sequences of ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit gene (rbcL.) of Glycyrrhiza glabra, G. uralensis, G. echinata, G. macedonica and G. pallidiflora have been determined to construct their phylogenetic tree. Based on these sequences, the six Glycyrrhiza species were divided into two groups: three, G. glabra, G. uralensis, and G. inflata, which produce glycyrrhizin as a major saponin, and the others, G. echinata, G. macedonica and G. pallidoflora, which produce macedonoside C as a major saponin. Among the three glycyrrhizin-producing species, only two nucleotide substitutions were observed between the rbcL. Sequences of G. glabra and G. uralensis, and the sequence of G. uralensis was identical to that of G. inflata, indicating that G. uralensis and G. inflata were closely related. Among the three macedonoside C-producing species, only one nucleotide substitution was observed between those of G. echinata and G. macedonica, indicating that these two species are also closely related.

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[Lab. of Pharmacognosy]

Caffeic Acid Oligomers in Lithospermum erythrorhizon Cell Suspension Cultures.

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Lithospermum erythrorhizon cells cultured in pigment production (M-9) medium produced lithosperumic acid B, a dimerized caffeic acid ester derivative, in quantities similar to the production of shikonin. The cell also produced a related dimer, (+)-rabdosiin. In Linsmaier-Skoog liquid medium, which suppresses shikonin production, both lithospermic acid B and (+)-rabdosiin were still formed. Lithospermic acid, a caffeic-rosmaric acid conjugate, was isolated as a main constituent in Lithospermum hairy root cultures. In the aerial parts of L. erythrorhizon, the content of these phenylpropanoid oligomers was relatively low compaired to that rosmarinic acid.

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Flavanone 8-Dimethylallyltransferase in Sophora flavescens Cell Suspension Cultures.

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Dimethylallyl diphosphate: naringenin 8-dimethylallyltransferase (EC 2.5.1) was characterized. The enzyme was enantiospecific for (-)-(2S)-naringenin and utilized 3,3-dimethylallyl diphosphate as sole prenyl donor. It required Mg^{2+} (optimum concentration, 10 mM), and has an optimum pH of 9-10. The apparent Km values for 3,3-dimethylallyl diphosphate and naringenin were 120 and μ M, respectively. The microsomal fraction prenylated several other flavanones at the c-8 position less effectively as compared with naringenin. Interestingly, when 2'-hydroxynaringenin was used as a prenyl acceptor, the 8-lavandulyl (sophoraflavanone G) and the 6-dimethylallyl derivatives were formed, together with the 8-dimethylallyl derivative, leachianone G. These results suggest that the 2'-hydroxy group of naringenin plays an important role for the formation of a lavandulyl group.

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[Lab. of Pharmacognosy]

Stilbene Oligomers in Roots of Sophora davidii.

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Three stilbene oligomers, davidiols A-C were isolated from the roots of *Sophora davidii* in addition to the seven known phenols, leachianone A, sophoraflavanones G, H and I, miyabenol C, α -viniferine and ϵ -viniferin. Their structures and relative configurations were established by means of 2D-NMR spectroscopy including COLOC and PSNOESY.