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Biochemical Systematics and Ecology

Volume 9, Issue 1, 17 August 1981, Pages 69-78

Plant

Fructose oligosaccharides: Possible markers of phylogenetic relationships among dicotyledonous plant families

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[https://doi.org/10.1016/0305-1978\(81\)90062-4](https://doi.org/10.1016/0305-1978(81)90062-4)

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Abstract

Stems from more than 555 species representing 440 genera of approximately 210 dicotyledonous families were surveyed for the presence of fructose oligosaccharides. The tissues from 372 species representing 312 genera and 187 families did not contain such oligosaccharides. The sugars occurred sporadically or in small amounts in members of the following families: Crossosomataceae, Lauraceae, Malpighiaceae, Cornaceae, Myrsinaceae, Melianthaceae, Greyiaceae, and Simaroubaceae. The fructosyl sucrose trisaccharide, isokestose, as well as its fructose tetrasaccharide homolog (but not higher inulin oligosaccharides) were present in members of the families Hippocastanaceae and Limnathaceae. Stems from members of the families Clethraceae and Monotropaceae, and some members of the Polemoniaceae, contained two series of fructose

oligosaccharides: one based on isokestose (the inulin series) and the other one based on kestose (the levan series). The inulin or isokestose-based series of fructose oligosaccharides, alone, was present in members of the following families: Menyanthaceae, Boraginaceae, Campanulaceae, Goodeniaceae, Stylidiaceae, Brunoniaceae, Calyceraceae and Compositae. The primary metabolites occur ubiquitously and consistently in tissues of plants of these families. We hypothesize that this conservative character represents several phylogenetic alliances among them.



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Keywords

Campanulales; Polemoniales; Compositae; Asteraceae; inulin; levan; fructose oligosaccharides; chemotaxonomy

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