

# FLAVONOIDS OF *PASSIFLORA PAVONIS*

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As part of a broad biochemical investigation of the mostly New World genus *Passiflora* (Passifloraceae), we report here the flavonoid chemistry of *Passiflora pavonis* Mast., a vine which occurs in the mountains of Central Mexico. Although we previously examined a number of other *Passiflora* species for their flavonoids (1, 2), this is our first investigation of a member of the large subgenus *Plectostemma* (ca. 150 species of herbaceous, small-flowered plants). Two other species in this subgenus, *P. bryonioides* HBK and *P. pulchella* HBK, were, however, examined previously for their flavonoids by other workers (3, 4); they each were found to exhibit a flavonoid chemistry similar to that reported here for *P. pavonis*.

The leaves of *P. pavonis* yielded isoorientin 4'- $\beta$ -D-glucoside as the major flavonoid constituent. Two other C-glycosylflavones, isovitexin and isoorientin, as well as luteolin 7- $\beta$ -D-glucoside, were also obtained. Although too few species have been investigated to draw taxonomic conclusions, the genus *Passiflora* is already proving to be a rich source of C-glycosylflavones.

## EXPERIMENTAL

**PLANT MATERIAL.**—Plants and vouchers were collected December 2, 1979, 0.3 miles east of the road to Huetamo and Tzitzio and 1.0 mile west of Las Trojes, Municipio de Charo, Michoacan, Mexico, (voucher specimen) J. MacDougal #544 is deposited in the Duke University Herbarium. A second population (MacDougal #370) collected several miles north of Temascaltepec, Mexico, on Rt. 134, Aug. 24, 1978, was found by paper chromatography to contain the same compounds plus one additional

C-glycosylflavonoid [Rf 0.73, 15% HOAc (glacial acetic acid-water, 15:85); 0.82 TBA (t-butanol-acetic acid-water 3:1:1)]. There was insufficient plant material to isolate this latter compound.

**EXTRACTION AND SEPARATION.**—Air-dried and powdered leaves (167 g) were extracted with 85% aqueous methanol (9 $\times$ 2 liters). The combined extracts were concentrated *in vacuo*. The aqueous concentrate was extracted with hexane, dichloromethane and ethyl acetate, successively; the extracts, including the remaining water layer, afforded 7.1 g, 1.5 g, 2.0 g and 43.0 g of syrup, respectively. Only the syrups from the ethyl acetate and water fractions contained flavonoids. When the ethyl acetate fraction was chromatographed on a microcrystalline cellulose column (17.5 $\times$ 4.5 cm) with 15% acetic acid, isovitexin (5 mg), isoorientin (25 mg) and luteolin 7-glucoside (3 mg) were obtained. When the water fraction was chromatographed on a microcrystalline cellulose column (17.5 $\times$ 4.5 cm) with TBA and with 15% acetic acid, isoorientin 4'- $\beta$ -D-glucoside (250 mg) was obtained along with traces of another as yet unidentified C-glycosylflavonoid (Rf 0.78, 15% acetic acid; 0.59, TBA). Each compound was cleaned over Sephadex LH-20 in 100% methanol prior to spectral analysis.

**IDENTIFICATION OF THE FLAVONOIDS.**—All flavonoids were identified by uv spectral analysis and Rf values on paper. Identification of the products obtained from the hydrolysis of both luteolin 7- $\beta$ -D-glucoside and isoorientin 4'- $\beta$ -D-glucoside with 0.1N trifluoroacetic acid and  $\beta$ -glucosidase established their structures. The <sup>1</sup>H nmr spectrum of the trimethylsilyl ether of the latter C-glycosylflavone as well as the ms of its perdeuteriomethyl ether confirmed its structure assignment (5). Isoorientin 4'-glucoside was previously reported from *Gentiana lutea* (Gentianaceae) (6). The ms of the perdeuteriomethyl ethers of both luteolin 7-glucoside and isoorientin were in accord with the assigned structures (7).

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