Melocorin — A New Herbacetin Glucuronide from Melochia corchorifolia

A. G. Ramachandran Nair, P. Ramesh & S. Sankara Subramanian

Department of Chemistry, Jawaharlal Institute Pondicherry 605006

and

B. S. Joshi

Ciba-Geigy Research Centre, Bombay 400063

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A new glycoside, melocorin, has been isolated from the leaves of Melochia corchorifolia along with herbacetin and trifolin. Based on chemical and spectral data, melocorin has been constituted as 3',4',5',7'-tetrahydroxy-8-O-β-D-glucuronosylflavone (herbacetin-8-O-glucuronide).

In continuation of our work on the flavonoids of the Sterculiaceae, we have examined the leaves of Melochia corchorifolia Linn. belonging to the same family. The isolation of three flavonol glycosides — one of them new — is reported here.

The air-dried leaves were exhaustively extracted with hot 90% ethanol and the flavonoids in the aqueous alcoholic concentrate partitioned using ether and ethyl acetate. The flavonol glycoside from the ether layer was identified (m.p., UV) as trifolin (kaempferol-3-O-β-D-glucoside) by comparison with an authentic sample.

The ethyl acetate extract contained two closely related flavonol glycosides. They were separated by preparative paper chromatography (Rf, 0.51 and 0.74, BuOH-27% H2OAc, 1:1). The component with lower Rf was identified as herbacetin (gossypetin-8-O-β-D-glucuronide) by comparison with an authentic sample.

The flavonoid with higher Rf did not melt, but blackened above 280°C. It was light yellow under UV and UV/NH3, and gave a stable yellow colour with alkali; UV: 270, 323 sh, 364 (MeOH); 225 sh, 295, 348 sh, 395 (NaOMe); 278, 310 sh, 370 (NaOAc); 270 sh, 353, 425 (AlCl3) and 273, 350, 425 (AlC13/HCl) and Rf (×100, Whatman No. 1, 28-30') 52 (water), 16 (15%, H2OAc), 32 (30%, H2OAc), 48 (50%, H2OAc), 52 (BAW), 24 (phenol), 57 (Forestal) and 40 (β-BAW). On strong acid hydrolys, it yielded an aglycone and d-glucuronic acid in equal ratio. It also underwent easy hydrolysis with β-glucuronidase at 37°C in 12 hr. The aglycone, m.p. 280-82°C, λmax 275, 327, 378, was purple under UV and UV/NH3 and gave a yellow colour changing to greenish blue colour with alkalis and yielded a pentacetate, m.p. 190-92°C. The MS of the aglycone exhibited the parent ion (m/e ≠ 302) and prominent fragment ions at m/e 168 (typical of trihydroxy A-ring fragment), 154, 138 (168-CO-H), 121 (B-ring with CO), 110 (138-CO), 93 (121-CO) and 81 (110-COOH) indicating it to be a flavonol with a trisubstitution pattern in ring-A and monosubstitution in B-ring. The UV fluorescence, colour with alkali and shift in λmax with standard reagents showed the presence of hydroxyls at 3',4',5,7 and 8 position. Thus, the compound was identified as 3',4',5,7,8-pentahydroxyflavonol (herbacetin). A comparison of the UV fluorescence, alkali colour and λmax of the glycoside with those of its aglycone clearly shows the absence of a free 8-OH in the glycoside. The λmax with shift reagents points to the presence of free OH at C-3, C-4', C-5 and C-7. Hence, the C8-OH is involved in glycosylation and the compound is thus shown to be herbacetin-8-O-glucuronide. The new glycoside is designated melocorin with its structure as 3',4',5,7-tetrahydroxy-8-O-β-D-glucuronosylflavone.

M. corchorifolia containing herbacetin and gossypetin (8-hydroxyflavones) resembles Chiranthodendron pentadactylon and Fremontia californica and differs from Sterculia colorata and S. foetida (containing 6-oxygenated flavones) of the same family. The first flavonol of herbacetin (4'-O-glucuronide) was recently isolated along with its five new glycosides (including three acyl derivatives) from Rhodiola alpina. Melocorin is a notable addition to the 8-O-glycosyflavonoids and can be listed as the tenth glycoside of this comparatively rare flavonoid.

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References