FLAVONOIDS OF Cirsium heterophyllum

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By two-dimensional paper chromatography of an extract of Cirsium heterophyllum (L.) Hill., family Compositae, we have found four substances of flavonoid nature. By adsorption chromatography on polyamide, two individual flavone glycosides were isolated from an ethanolic extract of the herb.

Substance I has mp 267-268°C (methanol), R_f 0.11 in system 1 (15% acetic acid), 0.40 in system 2 [butan-1-ol–acetic acid–water (4 : 1 : 5)], and 0.43 in system 3 [ethyl acetate–formic acid–water (10 : 2 : 3)]. Bryant's test showed that it was a glycoside. Color reactions and the colors of the spots on chromatograms in UV light showed the flavone nature of the substance. UV spectrum: λ_{max} 255, 268, 350 nm. On hydrolysis with 10% sulfuric acid and on enzymatic hydrolysis (Aspergillus oryzae) equimolar amounts of aglycone and D-glucose were obtained. The aglycone had R_f 0.04 (system 1), 0.83 (system 2), and 0.94 (system 3), and gave an acetate with mp 218-220°C. UV spectrum of the aglycone: λ_{max} (in methanol) 252, 264, 352 mm with sodium acetate 270, 380 nm. In the products of the alkaline cleavage of the aglycone we found phloroglucinol and protocatechuic acid.

The IR spectrum of the glycoside showed absorption bands at (cm^{-1}) 1660 (C = 0 of a γ-pyrone) [1], 1035, 1057, 1098, and 887 (β-pyranose form of a sugar) [2]. In a chromatographic comparison of substance (I) with an authentic sample of luteolin 7-glucoside no differences were found. Substance I has therefore been identified as luteolin 7-O-β-glocopyranoside.

Substance II forms light-yellow crystals with mp 182-184°C (methanol). Bryant's test showed its glycosidic nature; R_f 0.17 (system 1), 0.58 (system 2). Color reactions and the colors of the spots on chromatograms in UV light showed that it was a flavone. UV spectrum: λ_{max} 250, 268, 335 nm. On acid and enzymatic hydrolyses, as described above, D-glucose and luteolin were obtained. UV spectrum of the aglycone: λ_{max} 257, 268, 352 nm.

The results of acid and enzymatic hydrolysis and of UV spectroscopy with ionizing reagents [3] showed that substance (II) is luteolin 4'-O-β-glucoside.

LITERATURE CITED

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