

Hydrogenation of the double bond of the furan ring markedly changes the nature of the spectrum. In compounds IV and V signals of the protons of the methyl group of C₄ and of the benzene ring undergo a considerable diamagnetic shift ($\Delta\delta_5 = -0.66$ ppm; $\Delta\delta_8 = -1.07$ ppm). A one-proton multiplet of the C₅ methine group appears at 4.86 ppm. The protons of the C₄ methylene group, being nonequivalent, form with the C₅ methine proton a system of the AKX type with two well-separated quartets (in the AK part). A signal in the stronger field (2.75 ppm, $J_{AK} = 15$ Hz) must be ascribed to a proton present in the cis position relative to the methyl group at C₅.

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HYPERIN FROM SORBUS TIANSHANICA

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Sorbus tianschanica Rupr. (Tien-Shan mountain ash) is a small tree or shrub of the family Rosaceae which is distributed in the mountain regions of Central Asia and western China.

Branches freed from leaves (2.5 kg) collected in the fruit-bearing phase in the Irdyk gorge, Issyk-Kul'skaya basin were extracted with methanol. The residue after the methanol had been driven off was treated with 0.5 l of water and the filtrate was then extracted with benzene, ether, ethyl acetate, and butan-1-ol.

The total material from the ethyl acetate extract was dissolved in 10% ethanol and transferred to a column of polyamide. The column was washed with water, and then methanol-water (1:1) eluted 12 g (0.48% of the air-dry material) of a crystalline substance with mp 223–224° C. On the basis of qualitative reactions, the substance isolated is a flavonol glycoside. Its acid hydrolysis gave equimolar amounts of quercetin (mp 315–317° C; pentaacetate, mp 195–197° C) and galactose (thin-layer and paper chromatography in the presence of reference samples. The position of the sugar was determined by the exhaustive methylation of the glycoside by means of dimethyl sulfate, followed by acid hydrolysis. This gave 3-hydroxy-3',4',5,7-tetramethoxyflavone with mp 194–194.8° C, which shows that the galactose is attached to the 3-hydroxy group of the quercetin. Thus, the substance isolated is hyperin, as was also confirmed by the results of a direct comparison with an authentic sample [1].

REFERENCE

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FLAVONOLS OF SOLIDAGO CANADENSIS

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Five substances of a flavonoid nature (table) have been isolated by chromatography on polyamide from the epigeal part of Solidago canadensis L., family Compositae (Canada goldenrod) collected in the flowering period.

By their qualitative reactions, physicochemical properties, UV spectra with complex-forming and ionizing additives, and their conversion products, substances I, II, and III have been identified as 3,5,7,3',4'-pentahydroxyflavone (quercetin), 3,5,7,4'-tetrahydroxyflavone (kaempferol), and 5,7,3',4'-tetrahydroxyflavone-3-rutinoside (rutin).