A CHEMICAL STUDY OF THE FRUIT OF Athamanta macrophylla

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In a study of the fruit of Athamanta macrophylla (Rgl. et Schmalh) Eug. Kor. growing on the slopes of Mt. Chimgan and in the Pskem Gorge (gathered at the end of September) we found that it contained two substances of flavonoid nature with R_f 0.69 and 0.25 [in the BAW (4 : 1 : 5) system]. Coumarins have been found in the roots of this species, but not previously in the fruit.

To separate the natural components, 1 kg of the comminuted fruit was extracted with ethanol, and the extract was concentrated. This gave a residue which was diluted with water (1 : 2) and extracted with ether. The purified aqueous extract was deposited on a chromatographic column filled with 0.5 kg of Kapron, and the column was washed with water and then with aqueous ethanol (discrete method). Elution with 50% ethanol gave a yellow crystalline substance with mp 198.5-200°C (decomp.), R_f 0.69, M^+ 302. Its acid hydrolysis yielded an aglycone with R_f 0.95. On the basis of the bathochromic shifts in the presence of ionizing and complex-forming reagents, the latter was identified as quercetin [1].

The carbohydrate component of the glycoside proved to be D-galactose, which was identified by paper chromatography and by the gas-liquid chromatography of the trimethylsilyl ether (T. T. Gorovits). The bathochromism results show that the D-galactose residue occupies position 7. The IR spectrum had absorption bands at 1086, 1065, and 1010 cm^{-1}, showing that the latter is present in the pyranose form and is connected with the aglycone by an α-glycosidic bond (838 cm^{-1}).

The peak of the main ion in the mass spectrum of the glycoside corresponded to the aglycone, which is characteristic for flavonoids glycosylated in position 7 and is caused by the splitting off of the sugar component under the influence of electron impact.

We obtained information concerning the number of carbohydrate units by considering the NMR spectrum of the acetate of the substance taken on a JNM-4H-100/100 MHz instrument ($CDCl_3$). In the 1.8-2.4 ppm region there are the signals of the methyls of acetyl groups with an intensity of 24 H, which shows the presence of eight acetyl residues – four in the aglycone and four in the galactose. In addition, the NMR spectrum of the silylated glycoside showed signals at 3.2-3.8 ppm and 5.43 ppm with intensities of 6 H and 1 H, respectively, due to the protons of one galactose unit. It follows from this that the substance has the structure of 7-O-α-D-galactopyranosylquercetin.

In addition to the glycoside, from the same eluate we obtained a considerable amount of D-mannitol, identified by a mixed melting point and by its IR spectrum. A second glycoside could not be isolated because of its small amount.

LITERATURE CITED

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