HYDROXYCOUMARIN GLUCOSIDES FROM Astragalus falcatus

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In a study of the qualitative composition of an extract of the epigeal part of Astragalus falcatus Lam., we have detected substances giving the reactions for coumarins. To obtain them, an ethanolic-aqueous extract of the raw material was concentrated, freed from resinous substances, and extracted with ethyl acetate. The yellow amorphous powder containing flavonoids and coumarins obtained after the ethyl acetate had been distilled off was chromatographed on a polyamide column. Water eluted fractions containing coumarins which, after acid hydrolysis, appeared on paper chromatograms in the form of two spots at the levels of scopoletin and umbelliferone. Two individual substances were isolated by the partition chromatography of the total coumarin glucosides.

Substance I formed white acicular crystals with mp 215-219°C, soluble in water, methanol, and ethanol. In UV light they fluoresced bright blue, and the fluorescence was intensified after treatment with alkali. UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 250, 315 nm. On acid hydrolysis the substance formed 50% of an aglycone with mp 230-231°C having on paper chromatography the same mobility as an authentic sample of umbelliferone. It is readily soluble in ethanol, acetone, and ethyl ether, and insoluble in water. UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 255, 324 nm. The IR spectrum of the aglycone was completely identical with that of umbelliferone [1]. Glucose was detected in the carbohydrate fraction of the acid hydrolysate by paper chromatography.

Substance II, isolated from dilute methanol, formed small white prisms with mp 214-216°C, soluble in water, methanol, and ethanol. In UV light it fluoresced bright blue. UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 285, 310 nm. After acid hydrolysis, 50% of an aglycone was isolated in the form of white acicular crystals. On a paper chromatogram the aglycone appeared at the level of authentic scopoletin; mp 196-198°C, giving no depression of the melting point with scopoletin. UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 300, 345 nm. The IR spectrum contained the absorption bands characteristic for scopoletin [1, 2]. Glucose was found in the sugar fraction of the hydrolysate.

By comparing the results that we obtained with those given in the literature [1-6], we come to the conclusion that substance I is the 7β-glucoside of umbelliferone, or skimmin, and substance II is the 7β-glucoside of scopoletin, or scopolin.

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