PHENOLIC COMPOUNDS OF Rhodiola coccinea

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In the course of an investigation of plants of the family Crassulaceae our attention was attracted by Rhodiola coccinea (Royle) growing in central Asia, this being a botanical synonym of the Altai species R. quadrifida, the biologically active compounds of which have been studied previously. By chromatography on paper and in a thin layer of alumina we detected more than five substances of phenolic nature. The best results were obtained by the separation of the combined phenolic compounds on Kapron powder.

The comminuted roots of R. coccinea, after the elimination of the lipophilic substances by successive treatment with petroleum ether, chloroform, and diethyl ether were extracted with 96% ethanol. The ethanolic extract was evaporated, and the residue was separated by chromatography on polyamide sorbent. Elution with water gave crystals of an individual substance in the form of colorless needles with mp 157-158°C (from ethanol), R_f 0.41 in the BEW (5:1:2) system (TLC, Al_2O_3) and 0.43 (PC). IR spectrum, λ_{max}, cm^{-1}: 3345 (OH group), 1530 (benzene nucleus), 1076, 1043, 1024 (pyranose ring of a sugar), 901 (β-glycosidic linkage).

On the basis of the spectral and chromatographic results, the products of acid and enzymatic hydrolysis, and the melting point and a mixed melting point, the phenolic glycoside isolated was identified as arbutin – hydroquinone β-D-glucopyranoside [2].

On further elution of the column with water, hydroquinone passed into the eluate, and aqueous ethanol gave a mixture of substances crystallizing from 96% ethanol consisting of arbutin, an anthocyanin, and two compounds of unknown structure. By a photocolorimetric method [3] based on the color reaction of arbutin with diazotized p-nitroaniline, it was established that the amount of arbutin in the epigeal part of the plant was 1.38%.

From the epigeal part by chromatography on polyamide of a purified ethanolic extract with elution by chloroform–ethanol (9:1), we isolated a flavonoid glycoside with mp 240-242°C (from aqueous ethanol), and the same system in a ratio of 2:8 yielded arbutin.

The acid hydrolysis of the flavonoid with 5% sulfuric acid led to the isolation of the aglycone and a sugar component, which were identified as quercetin and D-glucose. From the products of acid hydrolysis, melting point, chromatographic behavior with the use of chromogenic reagents, and a direct comparison with an authentic sample, the glycoside isolated was characterized as quercetin 3-glucoside, or isoquercitrin [4].

An interesting fact is the absence from R. coccinea of biologically active components – salidroside and p-tyrosol.

LITERATURE CITED

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