FLAVONOIDS FROM THE LEAVES OF Calligonum leucocladum

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The presence of quercetin derivatives in some species of the genus *Calligonum* (family Polygonaceae) has been reported in the literature previously [1]. By paper chromatography and specific qualitative reactions we have found that the leaves of *C. leucocladum* Schrenk. Bge. contain seven substances of flavonoid nature.

To isolate these compounds a methanolic extract was evaporated under vacuum until the ethanol had been eliminated. The residue was dissolved in a fivefold amount of hot water. The aqueous solution was treated with chloroform and ethyl acetate, evaporated to a viscous residue, and diluted with acetone (1 : 10). The precipitate that deposited was filtered off. The acetone solution was evaporated to a viscous residue and, after dilution with water (1 : 10), chromatographed on a column of polyamide sorbent. The flavonoids were eluted with water heated to various temperatures. The individual fractions of flavonoids from the aqueous eluates, and also the substances of the ethyl acetate fraction, were separated and purified by preparative paper chromatography in systems 1) 15% acetic acid and 2) benzene–ethyl acetate–acetic acid–formamide (50 : 50 : 1 : 1), respectively. Four substances were isolated.

Substance (I) with mp 306-309° C and substance (II) with mp 275-277° C. They were identified by comparison with authentic samples as quercetin and kaempferol, respectively.

Substance (III) – mp 237-241° C, $[\alpha]_D^{20}$ + 45.0°, λ_{max} in methanol 290 and 330 sh, nm, with sodium acetate 330 nm, with zirconyl chloride, 330 nm, with alkali, 330 nm, with zirconyl chloride and citric acid, 320 nm, and with sodium acetate and boric acid 330 nm. The changes in the UV spectra of substance (III) and the others with diagnostic reagents were found by differential spectroscopy [2]. It was observed that in the UV spectra of (III), in addition to bathochromic shifts, there were hyperchromic shifts characterizing individual functional groups. With sodium tetrahydroborate and hydrochloric acid, (III) gave a red coloration [3]. The oxidation of substance (III) with hydrogen perioxide (1-2%) in a 3% solution of hydrochloric acid (1.5 h, 100° C) gave a product identified as kaempferol. Consequently, substance (III) is 3,4',5,6-tetrahydroxyflavanone or aromadendrin [3].

Substance (VI), mp 232-234° C, on hydrolysis with 3% hydrochloric acid for 1.5 h yielded quercetin and D-galactose. The proportion of aglycone in the glycoside was 67-70%.

A study of UV spectra with complex-forming and diagnosing reagents and comparison with an authentic sample showed that substance (IV) was hyperoside.

LITERATURE CITED

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