FLAVONOLS OF Caragana jubata

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We have studied the flavonoid composition of the epigeal part of Caragana jubata (shagspine pea-shrub), as a result of which we have isolated and identified nine individual flavonoids.

To isolate these flavonoids from the alcoholic extract of the epigeal part of C. jubata after appropriate working up, ethereal and ethyl-acetate extracts were obtained. When the ethereal extract was chromatographed on polyamide, elution of the column with a mixture of ethanol and chloroform (1.5 : 8.5) yielded three individual substances (I-III) which were shown to be identical by their physicochemical constants, UV spectra, and chromatographic analysis with authentic samples of 3,3',4',5,5',7-hexahydroxyflavone (myricetin), 3,3',4',5,7-pentahydroxyflavone (quercetin), and 3,4',5,7-tetrahydroxy-3'-methoxyflavone (isorhamnetin) [1].

The chromatographic separation of the ethyl acetate extract under the same conditions gave another six individual flavonoids (IV-IX) which, from their qualitative reactions and the results of a preliminary chemical study, were assigned to the group of flavonol glycosides.

Quercetin and sugar components identified as rhamnose, xylose, and galactose were isolated from the products of the acid hydrolysis with 1% sulfuric acid of substances (IV-VI).

On the basis of UV spectra with complex-forming and ionizing additives it was established that the sugar components in substances (IV-VI) were attached at position 3.

The bathochromic shifts, the hydrolysis products, and the IR spectra and comparisons of the molecular rotations show that the substances isolated were quercetin 3-α-L-rhamnofuranoside $[\alpha]_D^{20} - 187°$; (c 0.1 methanol) [2], quercetin 3-β-D-galactopyranoside $[\alpha]_D^{20} - 10°$ (c 0.1; methanol) [3], and quercetin 3-β-D-xylopyranoside $[\alpha]_D^{20} - 70°$ (c 0.1; methanol) [4].

Substance (VII) has the composition $C_{22}H_{22}O_{11}$, mp 155-158° C, $[\alpha]_D^{20} - 171°$ (c 0.1; methanol), λ_{max} (in methanol) 348, 255 nm, and the aglycone of substance (VII) had the composition $C_{16}H_{12}O_7$, mp 310-313° C, λ_{max} (in methanol), 369, 255 nm.

From its physicochemical properties, UV spectra, and chromatographic behavior, the aglycone of substance (VII) was shown to be identical with an authentic sample of 3,4',5,7-tetrahydroxy-3'-methoxyflavone (isorhamnetin), and the glycoside of substance (VII) was shown to be isorhamnetin 3-α-L-rhamnofuranoside [5].

The composition of substance (VIII) was $C_{21}H_{20}O_{11}$, mp 198-200° C, $[\alpha]_D^{20} - 60°$ (c 0.1; methanol), λ_{max} 356, 255 nm. Isorhamnetin and arabinose were found in the products of the hydrolysis of substance (VIII) with 1% sulfuric acid. It was established by chemical and spectral investigations that substance (VIII) is isorhamnetin 3-α-L-arabofuranoside [6].

The composition of substance (IX) was $C_{22}H_{22}O_{12}$; it melted at 198-200° C, $[\alpha]_D^{20} - 20°$ (c 0.1; methanol), λ_{max} 356, 256 nm. When substance (IX) was hydrolyzed, isorhamnetin and galactose were isolated. Chemical and spectral analysis showed that substance (IX) is isorhamnetin 3-β-D-galactopyranoside [7].

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