PHENOLIC COMPOUNDS OF *Sedum populifolium*

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Some Siberian species of *Sedum* have been studied previously [1-4].

In an investigation of the epigeal part of *Sedum populifolium* L. (poplar sedum), family Crassulaceae, we detected the presence of, besides alkaloids and tanning substances of the pyrocatechin group, a complex of phenolic compounds consisting of flavonoids, coumarins, phenolic carboxylic acids, and anthroquinones. We have studied the phenolic substances of the plant collected at the end of flowering at the end of July, 1975, in the Western Sayans.

The phenolic components were isolated by the following scheme. The comminuted raw material (1.5 kg) was extracted with boiling ethanol, and the dry extract was dissolved in water and fractionated by means of a series of solvents (chloroform, ether, ethyl acetate). The compositions of the phenolic compounds in the ethyl acetate and ether extracts proved to be similar, and they were combined. After concentration, the residue was separated on a column of polyamide in a gradient chloroform–ethanol system and in 50% ethanol, and also by preparative paper chromatography in 15% acetic acid. In this way, four substances were isolated.

Substance (I): $C_9H_6O_3$, mp 232-233°C (from water), R_f 0.65 (60% AcOH), λ_{max} 253, 324 nm.

Substance (II): $C_9H_6O_4$, mp 270-272°C (from dil. ethanol), R_f 0.46, λ_{max} 262, 302, 355 nm. The UV spectrum with MeONa showed a strong bathochromic shift ($\Delta\lambda$ = 55 nm) due to the presence of an o-dihydroxy grouping, which is extremely sensitive to alkaline agents. On the basis of physicochemical properties and spectral characteristics with diagnostic reagents [5], substances (I) and (II) were identified as umbelliferone and esculetin, respectively.

Substance (III): $C_9H_8O_4$, mp 196-197°C (from 50% ethanol), R_f 0.38 (15% AcOH), λ_{max} 238, 300, 326 nm. By a direct comparison and a mixed melting point with an authentic sample, the compound was identified as caffeic acid [6].

Substance (IV): $C_{20}H_{18}O_{10}$, mp 216-218°C (from dil. ethanol), R_f 0.80 (15% AcOH), λ_{max} 272, 362 nm. The UV spectrum was characteristic for flavonol glycosides. On hydrolytic cleavage with 5% H_2SO_4 (2 h, 90-95%) kaempferol and L-arabinose were formed. The yellow coloration of (IV) on paper chromatograms in UV light shows the presence of a free hydroxy group at C_3. When the glucoside was incubated with emulsin the substance underwent no change. On the basis of the UV spectra with ionizing and complex-forming additives [7], substance (IV) was characterized as kaempferol 7-O-λ-L-arabinoside.

LITERATURE CITED

1. E. A. Krasnov and L. V. Petrova, Khim. Prirodn. Soedin., 476 (1970).
2. E. A. Krasnov, L. V. Petrova, and V. V. Mel'nichenko, Modern Problems of Pharmaceutical Science and Practice [in Russian], Part 2, Kiev (1972), p. 755.
3. G. P. Shnyakina and E. A. Krasnov, Rast. Res., 10, No. 1, 130 (1974).
4. E. A. Krasnov and T. V. Kondareva, Khim. Prirodn. Soedin., 389 (1976).
5. J. Mendez and M. I. Lojo, Microchem. J., 14, No. 4, 567 (1969).
6. A. G. Nikolaeva, P. E. Krivenchuk, and A. P. Prokopenko, Khim. Prirodn. Soedin., 765 (1970).
7. J. Mabry, K. R. Markham, and M. B. Thomas, The Systematic Identification of Flavonoids, Springer Verlag, New York (1970).

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