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FLAVONOIDS OF *Scutellaria baicalensis* AND *S. glabrata*

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Many plant species of the genus *Scutellaria* (fam. Lamiaceae) are used in folk medicine [1], and one species, *S. baicalensis* Georgi, in scientific medicine [1, 2]. Extracts from the roots and leaves of *S. baicalensis* possess antitumoral and antimetastatic activity that is superior to that of known medicinal preparations.

In order to study the influence of the soil and climatic conditions on the composition of the flavonoids, we have investigated the flavonoids of the roots of *S. baicalensis* growing on the territory of Mongolia (the raw material was provided by S. Narantyaa of the Institute of Chemistry, Mongolian People's Republic). By sixfold extraction with ethanol at room temperature, 120 g of comminuted roots yielded 8.0 g of extract. The latter was chromatographed on a column of KSK silica gel in the chloroform—hexane (8:2) system, which led to the isolation of flavonoids (**1**) and (**2**). The column was washed with chloroform and with the mixed solvent chloroform—methanol (97:3). Individual eluates yielded flavonoids (**3-6**) and also a substance of glycosidic nature, (**7**). For the identification of the substances isolated we used UV, PMR, and mass spectra and also the results of chemical transformations and direct comparison with authentic specimens of some of the substances.

Oroxylin A (1), $C_{16}H_{12}O_5$, mp 218-219°C (benzene—hexane), λ_{max}, nm (ethanol) 249, 272, 321 [1, 2].

Wogonin (2), $C_{16}H_{12}O_6$, mp 201-202°C, λ_{max}, nm (ethanol) 247, 277, 320 [1, 2].

Viscidulin III (3). $C_{17}H_{14}O_8$, mp 255-256°C, λ_{max}, nm (ethanol) 264, 338 nm. The mass spectrum of this compound contained peaks of ions with *m/z* 346 (M^+, 67%), 331 ($M - CH_3$) (100%), 316, 303, 299, 167, and 139. The PMR spectrum contained the signals of protons at 3.75 (s, $-OCH_3$), 3.97 (s, $-OCH_3$), 6.66 (s, H-3), 6.76 (s, H-6), 6.84 (d, 7.5 Hz, H-5'), 7.19 (d, 7.5 Hz, H-4') and 13.20 ppm (br.s. 5-OH). In its spectral and physicochemical properties the flavonoid under consideration corresponded to 3',5,6',7-tetrahydroxy-2'8-dimethoxyflavone [2, 4].

2',5,6',7-Tetrahydroxyflavone (4), $C_{15}H_{10}O_6$ (M^+ 286) mp >300°C, λ_{max}, nm (ethanol) 261, 313 [1, 2, 5].

2',5,6',7-Tetrahydroxyflavanone (5). $C_{15}H_{12}O_6$ (M^+ 288), mp 237-238°C (decomp.), λ_{max}, nm (ethanol) 290 [1, 2, 6].

2',3,5,6',7-Pentahydroxyflavone (6), $C_{15}H_{12}O_7$, mp 222-224°C (decomp.), λ_{max}, nm (ethanol) 291, 323*. The mass spectrum showed the peaks of ions with *m/z* 304 (M^+), 286 ($M - H_2O$), 178, 153, 126, 123, 122, 110,and others [1, 2, 6].

Daucosterol (7), $C_{35}H_{60}O_6$, mp 314-317°C. Acid hydrolysis gave β-sitosterol and *D*-glucose.

This is the first time that flavonoids (**1-6**) have been isolated from the plant growing on Mongolian territory.

We have previous isolated five flavonoids from the epigeal part of *S. glabrata* Vved. Continuing the separation of the mixture of flavonoids from this plant, flavonoid (**8**) has been isolated from the chloroform fraction of the alcoholic extract, and flavonoid (**9**) from the ethyl acetate fraction.

2',5,6-Trihydroxy-7,8-dimethoxyflavone (8), $C_{17}H_{14}O_7$, mp 248-249°C, λ_{max}, nm (ethanol) 283, 338. The mass spectrum contained peaks of ions with *m/z* 330 (M^+ 63%), 315 ($M - CH_3$) (100%), and others. The PMR spectrum (in Py-d_5) contained signals of the protons of two $-OCH_3$ groups (3.85 and 3.92 ppm, each s). H-3 (7.02 ppm, s). H-3', 5' (6.97 ppm, m), H-4' (7.38 ppm, dt, 2.0 and 8.0 Hz), H-6' (7.81 ppm, dd, 2-0 and 8.0 Hz) [8].

Baicalein 7-O-β-*D*-glucoside (9), $C_{21}H_{20}O_{10}$, mp 206-207°C (decomp.), λ_{max}, nm (ethanol) 279, 314. Acid hydrolysis of glycoside (**9**) formed baicalein (5,6,7-trihydroxyflavone) and *D*-glucose [1, 9].

This is the first time that flavonoids (**8**) and (**9**) have been isolated from *S. glabrata*.

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