IR spectrum (cm^{-1}): 2900, 3550 (OH groups), 1657 (=CO group); 790, 815, 844 (presence of substitution in the lateral phenyl radical). There are absorption bands due to the deformation vibrations of the OH groups of a sugar residue in the 1000-1100 cm^{-1} region [1].

This substance was also difficult to hydrolyze. On acid hydrolysis in a mixture of conc. HCl + CH_3COOH + H_2O (10 + 3.5 + 5.5), after 4 h luteolin, D-glucose, and a very small amount of arabinose were formed.

On the basis of the results obtained, substance (II) was identified as orientin.

In the combined flavonoids, saponaretin (isovitexin) was detected by paper chromatography.

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INVESTIGATION OF THE FLAVONOIDS OF Scutellaria polyodon. II

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UDC 547.972

We have previously reported that the flowers of Scutellaria polyodon Juz., contain scutellarein and its 7-β-glucuronide [1].

Continuing to study the flavonoid composition, we subjected the comminuted freshly-gathered flowers to acetone extraction. After the raw material had been steeped for a day at room temperature, the acetone extract was evaporated to 1/3 of its initial volume and benzene was added until phase separation took place. When the system was left in the refrigerator, a bright yellow precipitate formed at the boundary of the two phases, and this was separated off and washed with ice water. In addition to this, we treated the raw material with liquid carbon dioxide at 20-22°C and a pressure of 5.8-6.18 MPa for 80 min, after which the flavonoids were extracted with methanol. In this case it was possible to increase the yield of flavonoid compounds from 2% by the procedure described previously [1] to 7%.

To isolate the individual compounds we used column chromatography on silica gel and on polyamide, and also gel filtration through Sephadex G-25.

Chromatography on silica followed by rechromatography on a polyamide sorbent yielded substances (IV-VI).

Substance (IV) consisted of pale yellow needles with mp 261-262°C (ethanol), $[\alpha]_D^0$ – 92° (c 0.1; dimethylformamide). According to UV spectroscopy in the presence of ionizing and complex-forming additives, the compound belonged to the flavone group and had no free hydroxy group at C-7. The PMR spectrum of the acetyl derivative in $CDCl_3$ contained the signals of the protons H-6, H-3, H-8, H-3', H-5' (2 H, d, 8 Hz), H-2', and H-6' (2 H, d, 8 Hz) and of the protons of acetyl groups, of a carbohydrate component, and of a CH_3 group in the 0.85 ppm region (d, 3 Hz).

D-Glucose, L-rhamnose, and apigenin were found in the products of acid hydrolysis (10% H_2SO_4).

To prove the structure of the carbohydrate component we performed the independent synthesis of various biosides of apigenin containing glucose and rhamnose from the corresponding naringenin glycosides. In its R_f values and the melting point of acetate, substance (IV) corresponded to synthetic apigenin 7-rutinoside, which was obtained from narirutin octaacetate by the method of Rösler et al [2].

Thus, the substance (IV) can be characterized as apigenin 7-O-[O-α-L-rhamnopyranosyl-(1→6)-β-D-glucopyranoside (isorhoifolin).

Substance (V) consisted of light-colored crystals with mp 260°C. UV spectrum, λ_{max}

Pyatigorsk Pharmaceutical Institute. Translated from Khimiya Prirodnykh Soedinenii, No. 4, pp. 563-564, July-August, 1985. Original article submitted January 8, 1985.

0009-3130/85/2104-0529$09.50

C_2H_5OH: 268, 326 nm. Acid hydrolysis (3% HCl, 6 h) led to the formation of acacetin and D-glucose; $[\alpha]_D^{20}$ − 64.5°. According to PMR spectroscopy, the substance was a monoside. We have characterized it as acacetin 7-O-β-D-glucopyranoside (tilianin).

Substance (VI) consisted of light yellow crystals with mp 265°C. UV spectrum, λ_{max} CH_3OH: 270, 330 nm. Acid hydrolysis gave acacetin, D-glucose, and L-rhamnose. From its R_f value and melting point it corresponded to acacetin 7-rutinoside (linarin) which has been isolated from Cirsium oleraceum.

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FLAVONOIDS OF SOME SPECIES OF SAINFOIN FROM THE CENTRAL ASIAN FLORA

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UDC 547.814.5:582.739

The results of a preliminary chromatographic study of the epigeal part of seven species of the genus Onobrychis (sainfoin) family Fabaceae (Leguminosae), which is widespread in the territory of Central Asia, has shown that they are rich in flavonoid compounds and, in particular, quercetin, kaempferol, and isorhamnetin derivatives (+, appreciable amount of the substance; ++, considerable amount; ±, small amount; − absence of the given substance):

Glycosides	O. cornuta	O. echidna	O. ferganica	O. grandis	O. arenosa	O. chorassanica	O. seravschanica
Quercetin:							
3-rhamnopyranoside	+	−	±	+	±	−	−
3-glucopyranoside	±	+	−	+	−	+	+
3-galactopyranoside	+	+	−	−	−	+	+
3-rutinoside	+	−	−	+	−	+	+
7-glucopyranoside	±	−	−	−	−	−	±
Kaempferol:							
3-glucopyranoside	+	+	−	−	+	+	−
3-rutinoside	±	±	−	±	−	−	−
Isorhamnetin:							
3-galactofuranoside	−	±	−	±	−	±	±

Paper chromatography was performed in the presence of authentic samples of the corresponding substances in the 15% acetic acid and n-butanol–acetic acid–water (4:1:5) solvent systems.

The species Onobrychis grandis Lipsky was subjected to a more profound chemical study for flavonoids. The isolation and purification of the total flavonoids was carried out by a known method [1].

With the aid of column chromatography on polyamide with elution by ethanol–water in various ratios six individual substances (I-VI) were isolated from O. grandis and were identified.

Substance (I) – mp 184-186°C, $[\alpha]_D^{20}$ −28.0° (c 0.11; ethanol); UV spectrum $\lambda_{max}^{C_2H_5OH}$ 355, 257 nm.

Substance (II) – mp 231-233°C, $[\alpha]_D^{20}$ −36.4°(c 1.08; dimethylformamide); UV spectrum, $\lambda_{max}^{C_2H_5OH}$: 361, 257 nm.

Substance (III) – mp 189-190°C, $[\alpha]_D^{20}$ −31.5° (c 0.32; dimethylformamide); UV spectrum, $\lambda_{max}^{C_2H_5OH}$: 354, 256 nm.

Substance (IV) – mp 177-179°C, $[\alpha]_D^{20}$ −6.5° (c 0.50; ethanol); UV spectrum, $\lambda_{max}^{C_2H_5OH}$: 355, 268 nm.

Pyatigorsk Pharmaceutical Institute. Translated from Khimiya Prirodnykh Soedinenii, No. 4, pp. 564-565, July-August, 1985. Original article submitted January 22, 1985.

0009-3130/85/2104-0530$09.50