The PMR spectrum of the TMS ether of naringenin showed doublets at δ 7.19 ppm (1H) and 6.7 ppm (2H), and the spectrum of the TMS ether of apigenin had doublets at δ 7.83 ppm (2H) and 6.83 ppm (2H) with J = 8 Hz, belonging to the 2.6', and 3',5', protons, respectively.

Protons 6 and 8 of ring B in the spectrum of naringenin are shown by doublets at about δ 5.92 ppm (1H) and 6.14 ppm (1H) with J = 2 Hz, and in the spectrum of apigenin the signals of these protons are observed at δ 6.08 ppm (1H) and 6.48 ppm (1H) with J = 2 Hz. The spectrum of apigenin has the signal of the H-3 proton in the form of a singlet at δ 6.23 ppm. In the spectrum of naringenin, the H-3 protons of the hydrogenated $C_{2-3}$ bond are represented by a multiplet signal at δ 2.7 ppm (2H) in the strong field as typical aliphatic protons; the H-2 protons appear in the form of a doublet of doublets with its center at δ 5.21 ppm (1H), J = 8 Hz and J = 14 Hz, which shows the coupling of the H-2 proton with the H-3 protons in the trans and cis positions with respect to the H-2 proton [2]. The PMR spectra were taken on a Varian 100 instrument with $CCl_4$ as the solvent and HMDS as internal standard, and the chemical shifts are given in the δ scale.

The flavonoid compounds of the needles of the genus Picea have not been studied hitherto. All that was known is the presence of kaempferol in the needles of Picea maximoviczii Regel. [3].

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# FLAVONOIDS OF SOME SPECIES OF Cephalaria


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We have studied the flavonoid composition of the flowers of two species of Cephalaria – Cephalaria kotschyi Boiss. et Hoh. and C. nachiczevanica Bobr. family Dipsacaceae – collected in the environs of Bata-Bat, Nakhichevan ASSR.

The comminuted and previously defatted raw material was extracted with methanol. The combined extracts were evaporated in vacuum. The resulting viscous product was dissolved in water and the solution was filtered. Then it was purified with chloroform, and the polyphenolic compounds were extracted with ethyl acetate. After the elimination of the solvent and drying, residues of 7.2 and 3.6%, respectively (calculated on the air-dry weight of the raw material) were obtained.

Paper chromatography in systems 1) 30% $CH_3COOH$ and 2) butan-1-ol–$CH_3COOH$–water (4 : 1 : 5) followed by inspection in UV light showed that the composition of the two species of Cephalaria were identical, and each included eight substances. On the basis of color reactions on the paper, six of them were assigned to the flavonoids and the others to the phenolic acids [1]. Then the flavonoids of Cephalaria kotschyi were investigated. By column chromatography on polyamide sorbents [2] with elution by chloroform–methanol at increasing concentrations of the latter we obtained three compounds in the individual state. On the basis of qualitative reactions, IR and UV spectra with ionizing and complex-forming reagents [3], physicochemical properties, the results of comparative chromatographic analyses, and mixed melting points with authentic samples, the substances were identified as hyperoside, cynaroside [4], and quercimeritrin, respectively.


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# FLAVONOIDS OF THE EPIGEAL PARTS OF *Scutellaria oreophila*

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The epigeal part of Scutallaria oreophila Grosch., family Labiatae, was collected in the flowering phase (July 24, 1973) on the sloped of the mountains close to the Kedabek region of AzerbSSR.

Paper chromatography (two-dimensional) in the butan-1-ol–acetic acid–water (4 : 1 : 2) and 15% acetic acid systems before and after examination in filtered UV light showed the presence in ethanolic extracts of the epigeal parts of the plants of ten substances of flavonoid nature. A saturated methanolic solution of zirconyl nitrate and ammonia vapors were used as the chromogenic agents.

To isolate the flavonoids, the dried and comminuted material was extracted with 70% ethanol. The ethanolic extracts were concentrated under vacuum to an aqueous residue. The chlorophyll that had deposited was separated off, and the aqueous residue was treated first with chloroform and then, in order to decompose the complex salts of the flavonoids, it was diluted with 30% acetic acid and treated with ethyl acetate.

The fractions obtained were chromatographed from paper in the solvent systems mentioned above. It was found that the chloroform fraction contained three flavonoids of aglycone nature, and the ethyl acetate fraction six different flavonoid compounds. The chloroform fractions were concentrated and were separated on a column of polyamide, chloroform being used for elution. Substances (I) and (II) were isolated.

The ethyl acetate fractions were also evaporated and the resides were treated with small amounts of water and separated on a column of Kapron sorbent. On elution with water and ethanols of different strengths (10, 30, 50, and 70%), three substances (III-V) were isolated.

The substances isolated were investigated, and it was found that substance (I) was baicalein, (II) chrysin, (III) baicalin, (IV) luteolin, and (V) cynaroside.

The flavonoids obtained were identified on the basis of their physicochemical properties, the products of their hydrolysis, IR and UV spectroscopy, and paper chromatography with authentic samples. In addition to the compounds identified, other flavonoids were detected, the study of which is continuing.

The flavonoids of Scutellaria oreophila have not been investigated previously.

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