LITERATURE CITED

1. V. I. Litvinenko and N. P. Maksyutina, Khim. Prirodn. Soedin., 420 (1965).
2. E. E. Bryant, J. Am. Pharm. Assoc. Sci., 39, 480 (1950).
3. I. P. Kovalev and V. I. Litvinenko, Khim. Prirodn. Soedin., 233 (1965).
4. T. K. Chumbalov, G. M. Nurgalieva, and R. A. Abdykalykova, Khim. Prirodn. Soedin., 243 (1972).
5. R. Paris and P. Belaveuer, Compt. Rend., No. 10, 1510 (1961).
6. I. M. Mukhamed'yarova, Khim. Prirodn. Soedin., 131 (1968).
7. Z. P. Pakudina and Ya. S. Sadykov, Khim. Prirodn. Soedin., 98 (1967).
8. T. A. Geissman, J. Org. Chem., 22, 946 (1957).
9. T. S. Zurabishvili, Khim. Prirodn. Soedin., 253 (1974).
10. T. A. Geissman, The Chemistry of Flavonoid Compounds, Pergamon Press, New York (1962), p. 338.

FLAVONOIDS OF *Genista transcaucasica*

S. A. Alieva

UDC 547.972

Genista transcaucasica Schischk, family Leguminosae, was collected in the Lachin region of the Azerbaidzhan SSSR in May-June in the flowering period and in August in the fruit-bearing period. In the chemical respect, this species has acarcely been studied. We have investigated the flavonoids of the epigeal part, the flowering apical part of the plant, and the roots separately.

The total amount of flavonoids in the flowering apical part of the plant was the highest, amounting to 2.7%.

The combined flavonoids were obtained by extraction of the raw material with 70% alcohol. The extract was evaporated in vacuum to an aqueous residue, which was purified with petroleum ether and was then reextracted with ethyl acetate—n-propanol (4:1) until the reaction for flavonoids was negative. The combined extracts were evaporated in vacuum, and the residue was diluted with a small amount of water. This material was separated by adsorption column chromatography on a polyamide sorbent and by preparative chromatography.

For a preliminary investigation of the qualitative composition of the aglycones of the flavonoid compounds, the raw material investigated, an extract from it, and also the combined flavonoids were subjected to acid hydrolysis. It was found that the aglycones of the flavonoids were luteolin and apigenin.

From the combined flavonoids we obtained five individual compounds, one of which consisted of an aglycone while four were of glycosidic nature (Bryant's test). Color reactions, the colors of the spots on chromatograms in visible and UV light, comparison with "markers," and spectroscopic investigations with the aid of ionizing and complex-forming additives [1], and also acid hydrolysis followed by identification of the aglycones and carbohydrate substituents, determinations of melting points and of mixed melting points with presumed authentic samples showed that individual compounds had been obtained. The configurations of the glycosidic bonds were determined by enzymatic hydrolysis and by polarimetric analysis [2-4].

On the basis of the investigations performed, of the five substances isolated one was identified as the aglycone luteolin and the others as glycosides of luteolin and of apigenin — cynaroside, apigenin 7-O-β-D-glucopyranoside, and scolimoside, while the fifth substance has provisionally been identified as isorhoifolin.

N. Narimanov Azerbaidzhan State Medical Institute, Baku. Translated from Khimiya Prirodnykh Soedinenii, No. 1, pp. 113-114, January-February, 1977. Original article submitted September 21, 1976.

LITERATURE CITED

1. N. P. Maksyutina and V. I. Litvinenko, in: Phenolic Compounds and Their Biological Functions [in Russian] (1968), pp. 7-24.
2. P. I. Gvozdyak and V. I. Litvinenko, Med. Prom. SSSR, No. 5, 16 (1964).
3. A. K. Bagrii, V. B. Kurmaz, and V. I. Litvinenko, Khim. Prirodn. Soedin., 85 (1966).
4. I. P. Kovalev and V. I. Litvinenko, Khim. Prirodn. Soedin., 233 (1965).

FLAVONOIDS OF PLANTS OF THE GENERA *Silene* AND *Otites* ADANS, FAMILY CARYOPHYLLACEAE

V. N. Darmograi

UDC 615.32

We have studied the flavonoids of the epigeal parts of plants of the genera *Silene* L. and *Otites* collected in the flowering period. The flavonoid compounds were extracted from the plant material by 50% ethanol with heating on the water bath. The extracts were chromatographed on paper in various solvent systems [15% acetic acid; butan-1-ol—acetic acid—water (4:1:2); 0.1 N hydrochloric acid] before hydrolysis, after hydrolysis with 10% hydrochloric acid for 4 h, and after complete acid cleavage by Kiliani's method [1]. The chromatograms were examined in UV light before and after treatment with a solution of zirconyl nitrate, and also after treatment of the zirconyl complexes with ammonia vapor, which permitted a further differentiation of the colors obtained.

The individual compounds were isolated by chromatography on polyamide sorbent and "hydrocellulose," and also by preparative chromatography on "Filtrak" No. 3 paper. The flavonoid compounds were studied chemically and physically and by chromatographic methods. Interpretation of the UV spectra of the compounds permitted isomeric 6- and 8-C-monoglycosides of apigenin and luteolin to be distinguished on the basis the nature of the absorption of the zirconyl complexes. The following flavonoid compounds were identified: apigenin, luteolin, orientin, isoorientin, vitexin, saponaretin, isosaponarin, adonivernitol, homoadonivernitol, vicinen and its rotational isomers, isoneovitexin, neovitexin, avroside, isoavroside, neoavroside, and isoneoavroside. A chemotaxonomic study of a number of species of the genera *Silene* and *Otites* has been performed. As "markers" we used compounds obtained previously from representatives of the family Caryophyllaceae [2]. It was established that each of the plants contained several flavonoids belonging to the flavone group and having apigenin and luteolin as aglycones. The presence of vicinen and its rotational isomers [3], and also their mono-O- and di-O-glycosides, is characteristic for a number of plants. These compounds were found in the following species: *Silene commutata, S. macrostyla, S. foliosa, S. graminifolia, S. jenisseenis, S. nutans, S. italica, S. wolgensis, S. cyri, S. boissieri, S. chlorantha, Otites dolichocarpa, O. artemisetorium, O. chersonensis, O. borysthenica.* In addition, the same plants contained vitexin, isovitexin, orientin and homoorientin, and also their 8-α, 6-α, and 6-β isomers.

A second group consisted of species in which no vicenin was detected, although the other compounds mentioned above were present. Characteristic for these is the presence of isosaponarin, adonivernitol, and homoadonivernitol. This group includes *S. compacta, S. armeria, S. bupleuroides, S. polaris, S. chlorifolia, S. cubanensis, S. cretacea.* Some plants *(S. multijida, S. brahuica, S. repens, S. supina, S. turgida)* contained only apigenin derivatives — saponaretin, and vitexin and their isomers, and also their mono-O- and di-O-glycoside. The flavonoid composition is characteristic for each plant and can serve as a species characteristic.

Academician I. P. Pavlov Ryazan' Medical Institute. Translated from Khimiya Priodnykh Soedinenii, No. 1, pp. 114-115, January-February, 1977. Original article submitted November 2, 1976.