

POLYSACCHARIDES OF THE FRUIT OF *Crataegus orientalis*

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We have investigated the fruit of *Crataegus orientalis* growing in the Nakhichevan ASSR, collected during the ripening period in the Shakhbuzskii region.

Plants of the genus *Crataegus* L. from the family *Rosaceae* contain a series of biologically active substances [1-4].

The water-soluble polysaccharides (WSPSs) and pectin substances (PSs) of *Crataegus orientalis* have not previously been considered.

By exhaustive extraction of the air-dry raw material (45 g) with ethanol, part of the pigments, the soluble sugars, and the amino acids were first eliminated. The residue was then treated with 80% ethanol to free it from polyphenolic compounds and glycosides.

The polysaccharides were extracted from the fruit and were purified by methods described previously [5, 6]. The yield of WSPSs was 13.00% and of PSs 21.95%, these containing 8.40 and 12.00% of ash, respectively.

The polysaccharides were demineralized by the reprecipitation of aqueous solutions with acidified ethanol, by dialysis through a semipermeable membrane, and by treatment with KU-2 cation-exchange resin (H^+ form). The ash content of the demineralized WSPSs was 0.5% and of the PSs 0.8%.

Samples of the polysaccharides were hydrolyzed with 2 N H_2SO_4 at 100°C for 8 h. The resulting hydrolysate was neutralized with $BaCO_3$, filtered, and evaporated, and the residue was investigated by descending paper chromatography in the butan-1-ol-pyridine-water (6:4:3) system at 22-24°C for 40-42 h. The zones of the polysaccharides were revealed with aniline phthalate.

The amounts of the sugar residues were determined by the method of Zaitseva and Afanas'eva [7].

It was shown that the hydrolysate of the WSPSs contained arabinose and galactose in a ratio of 1.5:1.0 as the main components, and also rhamnose and galacturonic acid. In hydrolysates of the PSs, galacturonic acid, galactose, and arabinose in a ratio of 1.22:1.0* were identified by the PC method.

The quantitative and qualitative characteristics of the PSs were determined by the titrimetric method [5]. The following results were obtained (%): free carboxy groups, K_C — 13.51; esterified groups, K_E — 6.96 (degree of esterification 34.00%); methoxy groups — 4.79. The galacturonic acid content was 43.08% [6].

The weight-average molecular weight M_w of the PSs was calculated from the relation

$$KM^2 = (\eta) = 1.1 \cdot 10^{-5} M \cdot 1.22,$$

where (η) is the reduced viscosity, and amounted to 65,000 [5].

The investigation of the polysaccharides of the silver hawthorn (*C. orientalis*) is continuing.

LITERATURE CITED

1. I. A. Gubanov, I. L. Krylova, and V. L. Tikhonova, Wild Field Plants of the USSR [in Russian], Moscow (1976), p. 213.
2. V. S. Batyuk, N. V. Chernobrovaya, and A. P. Prokopenko, Khim. Prir. Soedin., 90 (1966).

*As in Russian original — Publisher.

Nakhichevan Scientific Center, Academy of Sciences of the Azerbaidzhan SSR. Translated from Khimiya Prirodnikh Soedinenii, No. 5, p. 647, September-October, 1982. Original article submitted May 18, 1982.

3. V. I. Bykov, V. I. Glyzin, Khim. Prir. Soedin., 672 (1972).
4. G. B. Iskanderov and M. I. Isaev, Khim. Prir. Soedin., 103 (1974).
5. V. V. Arasimovich, S. V. Baltaga, and N. P. Ponomareva, Methods of Analyzing Pectin Substances, Hemicelluloses, and Pectinolytic Enzymes in Kishinev Fruit [in Russian] (1970).
6. V. I. Sharkov, N. I. Kuibina, and Yu. L. Solov'eva, The Quantitative Chemical Analysis of Plant Raw Material [in Russian], Moscow (1968), p. 59.
7. G. N. Zaitseva and T. I. Afanas'eva, Biokhimiya, 22, No. 6, 1035 (1957).
8. M. Kh. Malikova, G. M. Matulshaikhov, D. A. Rakhimov, Z. F. Ismailov, and S. A. Khamid-khodzhaev, Khim. Prir. Soedin., 533 (1976).