

We have investigated the ripe fruit of *Hippophae rhamnoides* L. (common sea buckthorn) of Altai origin growing wild in the environs of the village of Kamenka, Spasskoe region, and named varieties of common sea buckthorn (Novost' Altaya, Dar Katuni, Zolotoi Pochatok, Maslichnaya, Vitaminnaya) from the plantation of the Ryzanskii sovkhov, Ryzan region, Ryzan province, of the 1982 harvest.

The fruit of the common sea buckthorn contains a number of biologically active substances, and the sea buckthorn oil obtained from them possesses a broad pharmacological action spectrum [3].

The water-soluble polysaccharides (WSPSs) of the fruit of the wild and cultivated common sea buckthorn of the Altaya population have not been considered previously.

The comminuted air-dry raw material (moisture content 8.0-10.0%) previously treated with ethanol (1:10) for 2 h (twice) was extracted with hot water at 90-95°C (1:20) for 1.5 h. The extract was filtered, evaporated, and treated with 96% ethanol (1.5 volumes). The precipitate of WSPSs was separated off and was washed with ethanol and with acetone. The ash content was determined by the combustion of samples of the polysaccharide in a muffle furnace at 600°C, and the amount of uronic anhydride by the method of Karakeeva et al. [4]. Below we give the results of a study of the accumulation of WSPSs in the fruit of the common sea buckthorn:

Fruit	Yield of WSPSs, %	Amount of uronic anhydride, %	Ash content, %
Wild form	2,5	83,2	5,5
Novost' Altaya	2,4	88,5	5,5
Dar Katuni	2,6	82,1	6,3
Zolotoi Pochatok	2,2	86,8	5,2
Maslichnaya	3,0	82,5	6,4
Vitaminnaya	3,0	84,5	5,7

As we see, no appreciable difference were found in the accumulation of polysaccharides in the fruit of either the wild or the cultivated sea buckthorn. A somewhat larger amount of them accumulated in the fruit of the Maslichnaya and Vitaminnaya varieties. A higher amount of uronic acid was found in the WSPSs of the fruit of the Novost' Altaya variety and the wild form. The polysaccharides had practically identical ash contents.

The polysaccharides were demineralized by the reprecipitation of aqueous solutions with acidified ethanol, dialysis through a semipermeable membrane, and treatment with KU-2 cation-exchange resin (H<sup>+</sup> form). The demineralized WSPSs consisted of light beige powders with a creamy tinge. They were all distinguished by a high uronic anhydride content (84.5-88.5%). Their ash content amounted to 0.5-0.6%.

Hydrolysis of the WSPSs, neutralization of the hydrolysates obtained, and the subsequent operations with them were carried out as described previously [5]. The hydrolysates of the polysaccharides were investigated by the PC method in the butan-o-ol-pyridine-water (6:4:3) system. The sugars were revealed with aniline phthalate. It was established that the polysaccharides of the wild and cultivated sea buckthorns consisted of seven monosaccharide components: D-galacturonic acid, D-galactose, D-glucose, L-arabinose, D-xylose, and L-rhamnose, and one unidentified monosaccharide present in trace amounts that was chromatographically more mobile than L-rhamnose. The amounts of galactose, glucose, arabinose, xylose, and rhamnose residues were determined by the method of Zaitseva and Afanas'eva [6], and in the WSPSs of the fruit of the wild form they were present in a ratio of 2.5:2.2:4.9:traces:1.0; in Novost' Altaya, 2.1:2.5:4.1:traces:1.0; in Dar Katuni, 3.0:3.9:5.2:2.3:1.0; in Zolotoi pochatok, 3.4:4.8:5.4:1.6:1.0; in Maslichnaya, 3.0:5.3:6.1:traces:1.0; and in Vitaminnaya, 3.4:4.3:5.8:1.0:1.0. The results obtained permit the polysaccharides of the fruit of the common sea buckthorn of the Altaya population to be assigned to the class of pectin substances.

I. P. Pavlov Ryazan' Medical Institute. Translated from Khimiya Prirodnykh Soedinenii, No. 2, p. 243, March-April, 1984. Original article submitted September 27, 1983.

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OIL AND CARBOHYDRATES OF THE FRUIT OF *Bunium persicum*

D. A. Rakhimov, G. A. Stepanenko,  
Kh. Ubaev, A. I. Glushenkova,  
and E. S. Kondratenko

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Continuing an investigation of plants of the family Umbelliferae we have studied the oil and carbohydrates of the seeds of *Bunium persicum* (Boiss.) K.-Pol. (local name, zira) collected in the village of Dugaba, Dzhizak province. In the literature, only the fatty acid composition of the oils is given for the seeds of the species of the genus *Bunium* studied and there is no information on their carbohydrate composition.

The seeds were ground and the oil was extracted by steeping in hexane at room temperature. The oil content of the seeds was 4.6%. The extracted meal was dried and used for the subsequent extraction of various groups of carbohydrates: mono- and oligosaccharides, water-soluble polysaccharides (WSPSs), pectin substances (PcSs), and hemicelluloses (HCs) by the method of Arifkhodzhaev et al. [3]. The polysaccharides were hydrolyzed with 2 N H<sub>2</sub>SO<sub>4</sub> at 100°C for 10–24 h and the sugars of the hydrolysate were investigated by PC and GLC [4].

The sum of the lipids was separated according to polarity by column chromatography on silica gel: triacylglycerols (TAGs), 96%; components of the essential oil, 2%; free fatty acids (FFAs), 0.3%; sterols, chlorophyll, and an unidentified component, 1.7% (as percentages of the mass of the extract).

The fatty acid composition of the TAGs and the FFAs determined by the GLC method were as follows:

	Acid							
	12:0	14:0	15:0	16:0	18:0	18:1Δ6	18:1Δ9	18:2
TAGs	0.7	3.4	—	6.3	3.4	46.2	12.4	27.6
FFAs	—	2.1	1.1	14.5	7.5	45.8	18.8	10.2

In the oil of the seeds of *B. persicum*, as in the majority of plants of this family, petroselinic acid forms the bulk of the monounsaturated acids both in the TAGs and in FFAs.

The mono- and oligosaccharides (yield of an ethanolic extract 3.7% on the air-dry seeds) contained glucose, fructose, mannitol, sucrose, and raffinose.

The total WSPSs were obtained with a yield of 0.7%. They consisted of an amorphous powder giving a negative starch reaction with iodine and possessing no reducing capacity. In the products of its hydrolysis we detected rhamnose (Rha), arabinose (Ara), xylose (Xyl), mannose (Man), glucose (Glc), and galactose (Gal) in a ratio of 3.2:7.7:1:17.1:18.1:16, together with a very small amount of galacturonic acid. As the sugars in the WSPSs, hexoses were quantitatively predominant.

The pectin substances (yield 4.2%) had the form of a white amorphous powder. In the products of acid hydrolysis we detected mainly galacturonic acid and the neutral sugars Rha, Ara, Xyl, Man, Glc, and Gal in a ratio of 8.5:14.4:1:18.4:8.0:17.1.

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