Chemistry of Natural Compounds, Vol. 34, No. 6, 1998

BRIEF COMMUNICATIONS

CARBOHYDRATES OF THE FRUIT OF *Rosa canina*

M. A. Khodzhaeva, B. T. Sagdullaev, M. T. Turakhozhaev, and Kh. N. Aripov*

UDC 547.917

It is known that rose fruit contains biologically active compounds (vitamins B_2, C, K, and P, carotene, organic acids, flavonoids, and tannin substances), which are responsible for healing properties [1—6], but there is no information on their carbohydrate content.

We have investigated the carbohydrate composition of the fruit of *Rosa canina*. A comparative study was made of the carbohydrate compositions of the fruit (FR), of an aqueous extract (AER), and of the pulp remaining after the production of the preparation Kholasas (PR). As a result we found the compositions of the alcohol-soluble fraction (ASF), of the water-soluble polysaccharides (WSPSs), and of the pectin substances (PSs) (Table 1).

The comminuted air-dry raw material (FR and PR) was treated with 82% alcohol (1:2) twice for 1 h each time at the boil, and the combined extracts were concentrated, giving the total ASF (Table 1). By paper chromatography of the ASF of the FR (system 1, butan-1-ol—pyridine—water (6:4:3), Filtrak FN-11 paper) we detected glucose and sucrose. The WSPSs were extracted with water at 20°C twice for 2 h each.

The extracts were evaporated under vacuum and were precipitated with isopropyl alcohol (1:2) (see Table 1). The precipitate of WSPSs formed a light cream-colored water-soluble powder giving a negative reaction for starch with iodine.

The aqueous extract from the rose was precipitated with alcohol. The supernatant liquid was evaporated, the yield of ASF was determined (9.1%), and this was separated preparatively by PC for the quantitative determination of glucose (63.1%) and fructose (35.2%).

The precipitate obtained was treated with water at 20°C for 2 h, giving the WSPSs (1.69% on the raw material). The insoluble part consisted of the pectin substances (0.47% on the raw material).

In the products of complete acid hydrolysis (1 N H_2SO_4, 36 h) of the FR and AER we detected (PC, system 1) glucose and fructose in amounts of 2.1, 97.8 and 3.7, 96.2%, respectively.

TABLE 1

Rose sample	ASF	WSPSs	PSs	
	yield, %		yield, %	mol. mass
FR	13.20	6.40	2.10	14900
AER	9.1	2.07	0.47	9800
PR	1.49	3.34	1.55	15000

*Deceased.

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, fax (371) 120 64 75. Translated from Khimiya Prirodnykh Soedinenii, No. 6, pp. 826—828, November-December, 1998. Original article submitted May 4, 1998.

 0009-3130/98/3406-0736$20.00

The pectin substances of the FR and the PR were obtained by two successive extractions with 0.5% oxalic acid at 70°C for 2 h. After dialysis and concentration, the extract was precipitated in isopropyl alcohol. The precipitates of PSs (see Table 1) consisted of cream-colored powders and formed colloidal solutions.

In the products of the complete acid hydrolysis of all the samples of PSs (2 N H_2SO_4, 66 h) we detected glucose, xylose, arabinose, galactose, and galacturonic acid by PC in system 1. The molecular masses of all the PS samples were determined by the viscosimetric method [7] (Table 1).

Since the PSs were obtained from a single raw material, their IR spectra were identical. We therefore give the characteristic absorption bands for all the samples. The IR spectra of the pectins [8] were characterized by absorption bands at 840 cm^{-1} (α-configuration) and in the region of 1750 cm^{-1} — bands of the stretching vibrations of carboxylic methyl ester groups; bands at 1250, 1050, and 1080 cm^{-1} related to the vibrations of a pyranose ring, and a band at 890 cm^{-1} belonged to a 1→4-glycosidic bond.

Titrimetric analysis [9] of the pectins showed that they were PSs with a low degree of esterification:

PSs	Degree of esterification	Free COOH groups, %	Methoxylated COOH groups, %	Gal A, %
FR	31.9	2.88	1.35	19.7
AER	28.5	3.46	1.38	20.8
PR	32.7	2.75	1.34	18.9

HMCs-A and HMCs-B were extracted from the PR with 5 and 10% solutions of caustic soda. After dialysis against distilled water, the extracts were precipitated with alcohol. The yields of dry deposits were: HMCs-A — 3.7%, HMCs-B — 5.2% of the raw material. Glucose, galactose, xylose, and arabinose were detected by PC in hydrolysates of HMCs-A and HMCs-B (2 N H_2SO_4, 66 h).

Thus, the fruit of the rose *Rosa canina* is rich in free sugars and contains WSPSs, PSs, and HMCs A and B.

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