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INVESTIGATION OF THE CARBOHYDRATES OF SOME PLANT SPECIES OF CENTRAL ASIA

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The flora of central Asia is rich in medicinal plants and they have long been used in folk medicine and also for food and technical purposes.

We have studied the carbohydrates of various plant organs (Table 1).

The air-dry comminuted raw material (each sample separately) was first extracted three times with chloroform and three times with alcohol to eliminate low-molecular-mass substances and pigments. Then it was extracted with water (1:6) at room temperature three times for 2 h each, and the extracts were evaporated in vacuum, separated from proteins, and precipitated with alcohol (1:5). This gave the water-soluble polysaccharides (WSPSs). All the polysaccharides were hydrolyzed with 1 N sulfuric acid at 100°C (8 h), and the monosaccharides in the hydrolysate were determined by PC in the butan-1-ol—pyridine—water (6:4:3) system and by GLC in the form of aldononitrile acetates and polyol acetate on a Chrom-5 instrument.

The analytical results (see Table 1) showed that the WSPSs of the two *Crambe* species were close in relation to their amounts and their monosaccharide compositions, the predominating sugars being galactose, glucose, arabinose, and rhamnose. Of the four *Ferula* species, the largest amount of polysaccharides was present in *F. jaeshkeana* – 6.0% – while the others contained 4.3-5.0%. Galactose, glucose, arabinose, and rhamnose predominated in the WSPSs of *F. pollida, F. karatavica,* and *F. jaeshkeana*, while galactose, glucose, mannose, and arabinose did so in the WSPSs of *F. xeromorfa*.

TABLE 1. Amounts of Water-Soluble Carbohydrates from Some Plant Species and Their Monosaccharide Compositions

Plant species, organ (family)	Yield, %	Monosaccharide composition					
		Gal	Glc	Man	Xyl	Ara	Rha
Crambe amabelus, roots (fam. Cruciferae)	5.2	5.6	2.6	1.0	—	5.8	2.5
C. kotschyana, roots	4.5	7.1	9.5	1.0	—	4.0	3.0
Ferula pollida, roots (fam. Apiaceae)	4.3	14,5	9.4	1.0	—	12.8	2.2
F. karatavica, roots	4.6	15.8	2.6	1.0	—	8.2	2.6
F. xeromorfa, roots	5.0	12.8	3.1	1.8	—	10.0	1.0
F. jaeshkeana, roots	6.0	62.0	38.3	3.3	1.0	24.5	13.7
Morus rubra, leaves (fam. Moraceae)	4.2	1.0	29.4	—	—	7.2	3.5
Tithymalus turkestanicus, roots (fam. Euphorbiaceae)	9.1	3.6	23.0	1.0	—	2.2	1.2

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In the WSPSs of *Morus rubra* the main monosaccharides were glucose, arabinose, and rhamnose. There is information in the literature on an investigation of some *Morus* polysaccharides, but this is the first time that the other polysaccharides of this plant have been studied.

The roots of *Tithymalus turkestanicus* contained a greater amount of WSPSs (9.1%) than the other plants studied, and this was a reason for their more detailed study. The predominating monosaccharides were galactose, glucose, and arabinose. The WSPSs were separated on DEAE-cellulose into neutral and acidic polysaccharides. The neutral polysacharides were the main ones quantitatively and consisted of galactose, glucose, mannose, and arabinose residues in a ratio of 2.4:20.6:1.0:5.0, respectively.

Thus, we have determined the amounts and monosaccharide compositions of the water-soluble polysaccharides of eight species of Central Asian plants. The roots of *Tithymalus turkestanicus* contain more WSPSs than the other plants and their neutral polysacharide is of the galactoarabinoglucan type.