A STUDY OF THE POLYSACCHARIDES OF *Eremurus robustus*

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A water-soluble polysaccharide (PS) has been isolated previously from the tuberous roots of Eremurus robustus Regel. [1]. Continuing an investigation of the polysaccharides of this raw material, we have isolated a glucofructan (GF) (8.9% of the weight of the raw material) from an aqueous extract.

The comminuted air-dry raw material (26.6 g), previously treated with ethanol, was extracted with water (2×530 ml) at room temperature with steeping for 3 h in each case. The extracts obtained were concentrated and poured into four volumes of ethanol, and the resulting precipitate of PS was separated by centrifuging. The supernatant liquid was treated with a solution of neutral lead acetate, the excess of which was eliminated by the addition of a saturated solution of Na_2SO_4. After concentration of the liquid to the state of a syrup, the GF was precipitated in a large volume of ethanol.

The polysaccharide consisted of a cream-colored amorphous powder soluble in water, $[\alpha]_D^{22}$ + 140° (c 0.5; H_2O) and giving no coloration with iodine. The PS was chromatographed on DEAE-cellulose. It consisted of neutral (7.5%) and acid (78%) fractions, which were subjected to hydrolysis with 2 N H_2SO_4 for 10 and 24 h, respectively. The hydrolyzate of the neutral fraction was found by paper chromatography to contain galactose, glucose, and traces of arabinose and xylose, and the hydrolyzate of the acid fraction contained galacturonic acid, galactose, arabinose, rhamnose, and traces of glucose and xylose.

The glucofructan was purified by reprecipitation with ethanol from aqueous solutions (eight precipitations). The product consisted of a snow-white hygroscopic powder readily soluble in water, $[\alpha]_D^{20}$ −34° (c 1.0; H_2O). The action of acetic anhydride in pyridine yielded an acetate, $[\alpha]_D^{20}$ −20° (c 1.0; $CHCl_3$). The IR spectrum of the GF had absorption bands at 830, 890, 935, 1650, and 3200-3600 cm^{-1}, which are close to the absorption bands of inulin.

The homogeneity of the PS was checked by paper electrophoresis in borate buffer and by gel chromatography on Sephadex G-50. A hydrolyzate of the glucofructan was shown by paper chromatography to contain fructofuranose and glucopyranose, their ratio as determined by GLC in the form of the trimethylsilyl derivative being 4 : 1. The fructose was identified in the form of the 2,3 : 4,5-di-O-isopropylidene derivative with mp 91-93°C $[\alpha]_D^{20}$ −25° (c 1.0; H_2O) [2].

The GF was subjected to periodate oxidation [3]. The consumption of periodate and the amount of formic acid liberated per mole of hexose unit amounted to 0.93 and 0.079 mole, respectively. A hydrolyzate of the oxidation products was shown by paper chromatography to contain glycerol, which was identified by the GLC method in the form of the polyol acetate. The ease of acid hydrolysis and the results of periodate oxidation permit the assumption of the presence of the furanose configuration of the fructose units connected with one another by a 1 → 2 or a 2 → 6 bond.

LITERATURE CITED

1. D. A. Rakhimov, M. I. Igamberdieva, Kh. A. Arifkhodzhaev, and Z. F. Ismailov, Khim. Prirodn. Soedin., 511 (1974).
2. M. N. Zaprometov, Biochemical Methods of Plant Analysis [in Russian], Moscow (1960), p. 107.
3. M. Tomoda and N. Saton, Chem. Pharm. Bull (Tokyo), 22, 2306 (1974).

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