GLUCOMANNAN OF THE TUBEROUS ROOTS OF *Eremurus cristatus*

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We have previously reported a preliminary study of the polysaccharides of *Eremurus cristatus* Vved. [~ crested desert candle] [1]. Below we give information obtained from a study of the structure of the glucomannan.

Fresh tuberous roots collected close to the twon of Frunze (Stel'nikov sovkhoz [collective farm]) at the beginning of fruit bearing were treated with boiling ethanol (1:5). Then they were dried, and the polysaccharides were extracted with water at room temperature and were freed from protein impurities by Sevag's method [2], followed by reprecipitation from aqueous solution with ethanol. Yield 13.5 g.

The polysaccharide consisted of a white nitrogen-free water-soluble pulverulent substance and did not give a color reaction with iodine. On hydrolysis it formed mainly glucose and mannose with a very small amount of galactose, arabinose, and a uronic acid.

The polysaccharide was subjected to fractionation with Fehling's solution. In this way we obtained a polysaccharide purified via the copper complex which gave on hydrolysis only glucose and mannose, in a ratio of 1:2.9. The mother solution contained 5% of an accompanying polysaccharide consisting of arabinose, galactose, glucose, and mannose residues in a ratio of 1:2.2:3.4:7.1. The purified polysaccharide has lost its solubility in water but remained soluble in HaOH and HCOOH.

To obtain a water-soluble glucomannan we used the method of precipiting the polysaccharide from aqueous solutions (500 ml of 0.5% solution) with ethanol in various volumes (0.75, 1, 1.5, and 4 volumes). The yields of the fractions were (%): I, 70.1; II, 10.8; III, 2; and IV, 6.4 (corresponding to the successive volumes of ethanol).

The purified polysaccharide and fractions I and II had the same monosaccharide composition: D-mannose and D-glucose (2.9:1). Consequently, they were glucomannans.

The presence in the IR spectra of fractions I and II of absorption in the 1735 and 1250 cm^{-1} regions which were absent from the purified polysaccharide is explained by the presence of O-acetyl groups in them, as has been described for *Eremurus* glucomannans [3]. The glucomannan of fraction I formed quantitatively the main part of the polysaccharide, and therefore this fraction was subjected to chemical study. The glucomannan formed a white powder with $[\alpha]_D^{20}$ −36° (c 1.0, water) which, when chromatographed on DEAE-cellulose, was eluted by water as a single peak. Ultracentrifugation showed a single peak with mol. wt. 69,000. The results of a study of the viscosity of the solution (0.2 g/100 ml) were expressed in the form of the relative (η_{rel} = 2.4), specific (η_{sp} = 1.5), and reduced (η_{red} = 7.5) viscosities. The high value of η_{red} at a low concentration of the glucomannan shows a fibrillar structure of the glucomannan molecule [4].

To ascetain the types of bonds between the monosaccharides the acetylated glucomannan was methylated by Haworth's method [5], and methylation was brought to completion by Purdie's method [6]. The product contained 44.06% of OCH_3 groups and had $[\alpha]_D^{20}$ −19.1° (c 0.5; tetrahydrofuran. The methylated glucomannan was subjected to formolysis and hydrolysis. The hydrolysis products were studied by TLC [7] and GLC (in the form of polyol acetates [8]. 2,3,6-Tri-O-methylglucopyranose and 2,3,6-tri-O-methylmannopyranose in a ratio of 1:2.9, together with traces of 2,3,4,6-tetra-O-methylmannopyranose, were detected.

When the peracetate of the glucomannan was oxidized with chromium trioxide in glacial CH_3COOH [9], only trace amounts of glucose and mannose were found in the reaction products, which indicates a predominance of β-glycosidic bonds.

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The presence of the methylated sugars mentioned and the absence of di- and monomethyl derivatives, together with the negative specific rotation of the polysaccharide and the results of oxidation with chromium trioxide, indicate that the glucomannan of *E. cristatus* is formed by a linear unbranched chain with β-(1→4)-glycosidic bonds.

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A STUDY OF THE FATTY-ACID COMPOSITION OF THE TRIACYLGLYCERIDES OF THE POLLEN (POLLEN PELLETS) OF SOME HONEY-BEARING PLANTS. II. FATTY-ACID COMPOSITION OF THE TRIACYLGLYCERIDES OF THE POLLEN (POLLEN PELLETS) OF SOME PLANTS OF THE FAMILY *Rosaceae*

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We have investigated the fatty acid composition of triacylglycerides of the pollen (pollen pellets) collected by honeybees in 1980 from apple (*Malus domestica* Borkh.), fig (*Pyrus domestica* Medic.), cherry (*Cerasus vulgaris* Mill.), and raspberry (*Rubus idaeus* L.). We have described the methods of isolating and identifying the acids previously [1]. Table 1 gives

TABLE 1. Fatty-Acid Compositions of the Triglycerides of the Pollens (pollen pellets) of a Number of Plants of the Family *Rosaceae*

Fatty acid	Amounts of the fatty acid, wt.%, on the total amount of acids in the pollen			
	apple	fig	cherry	raspberry
10:0	Tr.	0,15	Tr.	Tr.
12:0	1,14	0,84	1,72	2,22
14:0	0,85	2,07	0,74	0,30
14:1	Tr.	0,76	1,09	Tr.
15:0	0,20	0,13	Tr.	0,14
iso-16:0	Tr.	1,39	0,47	0,59
16:0	33,83	25 05	11,66	2,51
16:1	0,33	0 25	0,16	0,31
16:2	Tr.	0,27	0,11	0,14
17:0	0,21	0,59	0,12	0,15
17:1	0,18	0,27	0,22	Tr.
17:2	Tr.	0,45	0 46	Tr.
18:0	3,67	4,14	3,03	5,12
18:1	13,39	14,32	10,19	3,16
18:2	10,59	32,85	30,02	6,31
18:3	32,38	11,96	37,91	52,19
*	0,21	1 56	0,45	26,19
19:0	0,47	0,50	0,56	Tr.
20:0	0,63	0,94	0,52	0,17
21:0	1,91	1,50	0,40	0,28

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