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WATER-SOLUBLE POLYSACCHARIDES FROM THE BULBS OF PLANTS OF THE GENUS Ungernia

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Plants of the genus Ungernia Bunge (family Amaryllidaceae) are represented in Central Asia by seven species [1]. There are reports on the determination of the amounts of mucilages, pentosans [2], and pectin substances [3] in some species of Ungernia. We have investigated the amounts of water-soluble polysaccharides (PSs) in the bulbs of seven species of Ungernia by a method described previously [4]:

Plant	Place and date of collection	Amt. of PSs, % on the weight of the air-dry raw material
U. ferganica Vved.	KirgSSR, Dzhalalabad oblast, gorge of the R. Kugart, May 22, 1974.	10,1
U. oligostroma M. Pop. et Vved.	Chimkent oblast, environs of the village of Abai, May 20, 1970.	11,7
U. sewertzovii (Regel) B. Fedtsch.	Tashkent oblast, gorge of the R. Galvasai, June 20, 1970.	10,9
U. spiralis Praskor.	TurkmenSSR, Karakalinskii region, May 20, 1973.	8,1
U. tadshikorum Vved.	TadzhSSR, gorge of the R. Kafirnigan, village of Chinar, June 20, 1973.	9,0
U. trisphaera Bunge	TurkmenSSR, environs of the village of Baba-Durmez, May 27, 1973.	8,6
U. victoris Vved.	TadzhSSR, gorge of the R. Khanaka, April 15, 1973.	10,8

The samples of PSs consisted of white fibrous powders soluble in water and solutions of alkalis. Hydrolyzates of the samples were found to contain mainly mannose, a small amount of glucose, and traces of galactose. The PSs from the bulbs of U. oligostroma were studied in detail. The IR spectrum of the initial PS showed absorption bands at 1740 and 1260 cm^{-1}, the product obtained by purification via the copper complex did not have these bands. In view of this, the assumption arose of the presence of acetyl groups readily hydrolyzed by alkali in the PSs, and O-Ac groups were identified by the method of Igamberdieva et al. [5] and by GLC.

Gel filtration of the initial polysaccharide on a column of G-100 showed its polydispersity. From an aqueous solution of the PSs by precipitation with ethanol we obtained five fractions, of which three, with a yield of 68.6%, gave a single peak on gel filtration and ultracentrifugation. In the products of acid hydrolysis mannose and traces of glucose were found by the PC method, and their ratio was determined as 550:1 by GLC. D-Mannose was identified in the form of the phenylhydrazone and of methyl α-D-mannopyranoside. This shows that the PS is a homopolysaccharide. We have called it ungeromannan-O.

Ungermannan-O contains 8.2% of O-Ac groups, and on deacetylation it becomes insoluble in water. The weight-average molecular weight calculated from a calibration curve corresponds to 53,000 carbon units. The results of a study of the viscosity of a solution (0.2 g/100 ml) have been expressed in the form of the relative viscosity (η_{rel}=5.81), the specific viscosity (η_{sp}=4.81), and the reduced viscosity (η_{red}=24.05). The high value of η_{red} at a low concentration is evidence in favor of a fibrillar structure [6] of the ungeromannan-O molecule, which differs in its properties from known mannans [7-10]. The results of a study of the PSs of the

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other species of Ungernia showed that they all contain O-Ac groups. Thus, a native acetylated mannan has been obtained from plant material for the first time.

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QUINONES OF Salvia drobovii, S. karabachensis, AND S. trautvetteri

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In a qualitative examination of plants of the family Labiatae of the flora of the USSR, quinones of the type of tanshinone have been detected in 31 species of sage [1-3]. The roots of three species of sage from Central Asia and Transcaucasia have been studied: Drobov's sage (Salvia drobovii Botsch.), Karabagh sage (S. karabachensis Pobed.), and Trautvetter's sage (S. trautvetteri Regel). The quantitative compositions of the quinones of these species were different, but some spots on the thin-layer chromatograms coincided.

To obtain the tanshinones, the ground roots were covered with petroleum ether (1:6), and the mixture was stirred for 15 min and steeped for 12 h. The operation was repeated three times. The combined extracts were evaporated in vacuum, giving a resinous residue. Approximately 10 mg of this residue was dissolved in 0.5 ml of chloroform and deposited on a plate coated with silica gel in the form of a number of spots. After chromatography in column, the corresponding bands were removed, the substances were eluted with chloroform, and after the solvent had been distilled off in vacuum red and orange residues were obtained which were crystallized from chloroform or benzene.

The roots of Drobov's sage yielded four substances, of which the two main ones were identified as miltirhone cryptotanshinone. From Karabagh sage we obtained tanshinone I and cryptotanshinone, and from the roots of Trautvetter's sage cryptotanshinone. The other substances were isolated in very small amounts.

Miltirhone, $C_{19}H_{22}O_2$, red crystals with mp 98-100°C, Rf 0.54 (chloroform, orange spot). IR spectrum (paraffin oil): 1680 (inflection), 1660, 1635 cm^{-1}. UV spectrum (ethanol): 260, 360-362, 436 nm.

Cryptotanshinone, $C_{19}H_{20}O_3$, orange crystals with mp 175-180°C, Rf 0.20 (chloroform, pinkish-orange spot). IR spectrum (paraffin oil): 1680, 1648, 1620 cm^{-1}. UV spectrum (ethanol): 221, 263, 272, 290, 355, 447 nm.

Tanshinone I, $C_{18}H_{12}O_3$, brownish red crystals, mp 231-233°C, Rf 0.50 (chloroform: cinnamon-brown spot). IR spectrum (paraffin oil): 1688 (inflection), 1660, 1593 cm^{-1}. UV spectrum (ethanol): 244, 266 (inflection), 325, 417 nm.

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