AN INVESTIGATION OF THE PECTINS FROM THE LEAVES OF Ungernia tadshicorum

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UDC 547.941

It is known that plants of the genus Ungernia (family Amaryllidaceae) are sources of a number of valuable drugs [1]. Other biologically active substances, including carbohydrates, have not been subjected to adequate chemical investigation. We have studied the qualitative and quantitative compositions of the pectin obtained from the leaves, bulbs, and roots of U. tadshicorum collected in June, 1973, in the gorge of the R. Kofernigan, TadzhSSR.

The comminuted raw material (20.0 g), after being boiled with ethanol and treated with water (to eliminate the water-soluble polysaccharides) was extracted with a mixture of 0.5% solutions of oxalic acid and ammonium oxalate (1 : 1) at 70° C. The extracts were filtered and dialyzed against distilled water, and the pectin was precipitated with acetone (three volumes), reprecipitated with ethanol, freed from protein impurities, and dehydrated. The yields of pectins from the leaves, bulbs, and roots were 11.10, 2.43, and 6.07%, respectively. To determine the qualitative carbohydrate composition the samples of pectins were hydrolyzed with 1 N H_2SO_4 for 48 h, followed by neutralization with barium carbonate. The solutions were concentrated in vacuum at 40-45° C. For PC we used FN-11,14 paper in the butan-1-ol–pyridine–water (6 : 4 : 3) system with a running time of 24 h. For TLC wa used KSK silica gel impregnated with sodium dihydrogen phosphate. In the pectin isolated from the leaves and roots we found galacturonic acid, galactose, arabinose, xylose, and rhamnose. In the pectin of the bulbs we found galacturonic acid, galactose, glucose, and mannose.

The pectin isolated from the leaves formed a cream-colored powder in which the amount of uronic anhydride determined by a published method [2] amounted to 55.61%, OCH_3 groups 2.45%, ash 0.87%, moisture 3.4%. Its IR spectrum: 3200-3600, 1630, 1020 cm^{-1}; $[\alpha]_D^{22}$ + 142° (c 0.5; 0.1 N NaOH). Analysis for homogeneity was performed on an MOM-3170 ultracentrifuge, which gave a single peak ($S = 4.2 \cdot 10^{-3}$ sec, 50,000 rpm, 20° C, c = 10 mg/ml in water).

Fractionating of the pectin with Cetavlon gave two fractions: an acid fraction precipitated by Cetavlon and a neutral fraction which remained in solution under these conditions. However, the qualitative carbohydrate compositions of the fractions obtained and of the initial polysaccharides were identical. In a hydrolyzate of the latter we found galacturonic acid, galactose, xylose, arabinose, and rhamnose. D-Galacturonic acid was isolated through its barium salt and was identified from its IR spectrum.

Saponification of the pectin with alkali and precipitation with ethanol [3] gave two fractions: A and B (4.6 : 1). The main component of fraction A was uronic anhydride. IR spectrum: 3100-3600, 1750 cm^{-1}. Among the neutral monosaccharides we found the same sugars as in the initial polysaccharide.

Thus, the results of a chemical investigation of the pectin of the leaves has shown that it contains five monosaccharides, the main component being D-galacturonic acid.

LITERATURE CITED

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Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR. Translated from Khimiya Prirodnykh Soedinenii, No. 3, pp. 417-418, May-June, 1975. Original article submitted December 31, 1974.