

PLANT POLYSACCHARIDES.

V. CARBOHYDRATES OF *Narcissus poeticus*

D. A. Rakhimov and K. S. Zhaunbaeva

UDC 547.917

Continuing a chemical study of plants of the Amaryllidaceae family [1, 2], we have investigated the carbohydrates of the bulbs of *Narcissus poeticus*. The air-dry comminuted raw material was treated successively with chloroform and methanol to eliminate low-molecular-mass substances and pigments. The carbohydrates were isolated by a known procedure [3] involving fractional extraction successively with cold and hot water, oxalic acid, and alkali. The polysaccharides were hydrolyzed with 2 N H₂SO₄ at 100°C for 10-24 h, and the monosaccharides in the hydrolysates were identified by PC and GLC [4].

Water-soluble polysaccharides were obtained from the bulbs with a yield of 1.9%. They consisted of a white amorphous powder soluble in water with the formation of a viscous solution having η_{rel} 8.0 (*c* 0.5; H₂O), and gave a negative reaction with iodine for starch. On hydrolysis, the main products were glucose and mannose, with insignificant amounts of galactose, arabinose, and a uronic acid.

The polysaccharides were subjected to fractionation with Fehling's solution. A purified polysaccharide (PPS) was obtained through the copper complex. On hydrolysis it gave only glucose and mannose in a ratio of 1:19 and was, therefore, a glucomannan (GM). The mother solution after dialysis and precipitation with alcohol contained 10% of an accompanying polysaccharide consisting of galactose and arabinose residues. The PPS had lost its water-solubility but remained soluble in NaOH and HCOOH. Absorption bands at 1735 and 1250 cm⁻¹ in the IR spectrum of the water-soluble polysaccharide that were not shown by the PPS are explained by the presence of O-acetyl groups. A comparison of the results obtained with the literature [5] showed that the glucomannan isolated differed from those previously known by its high mannose content.

The polysaccharide fractions isolated by hot water, oxalic acid, and alkali gave colorations with iodine, and the action on them of a solution of iodine in potassium iodide led to the precipitation of an iodine-glucan complex, showing that the polysaccharides of the bulbs included starch.

The starch isolated by hot water, $[\alpha]_D +180^\circ$ (0.1 N NaOH) readily underwent amylolysis with the formation of glucose and maltose, detected chromatographically. Its capacity for forming a complex with iodine showed the amylopectin type of structure. No glucose was detected in a hydrolysate of the periodate-oxidized polysaccharide, which showed the absence of α -1 \rightarrow 3-bonds from it.

Thus, the carbohydrate complex of *N. poeticus* includes a water-soluble polysaccharide, a natively acetylated glucomannan, and an α -glucan of the amylopectin type.

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Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, fax (3712) 40 64 75. Translated from *Khimiya Prirodnykh Soedinenii*, No. 2, pp. 277-278, March-April, 1997. Original article submitted September 30, 1996.