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BRIEF COMMUNICATIONS

POLYSACCHARIDES OF *Eremurus*. XXVIII. STUDY OF THE STRUCTURE OF A GALACTURONAN FROM *E. lactiflorus*

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We have established previously [1] that the predominating polysaccharides in the leaves of *E. lactiflorus* are pectin substances, and in the subsequent fractionation of these we obtained the homogeneous fractions D, E, and F [2]. The structure of pectin F, the yield of which amounted to 50%, has now been studied in more detail. Pectin F is a cream-colored powder readily soluble in water, $[\alpha]_D$ +184° (*c* 0.25, water). Its molecular mass, determined viscometrically [3], is 61,000 c.u. Its galacturonic anhydride content, determined by the method of [4], is 67.5%. The percentages of neutral monosaccharides are as follows: rhamnose, 14.5; arabinose, 8.6; xylose, 34.1; galactose, 42.7.

Partial hydrolysis of the pectin gave a 60% yield of a polysaccharide (a galacturonan) composed exclusively of galacturonic acid. The determination of the structure of the galacturonan has been described in [4]. The molecular mass of the galacturonan was 34,500 c.u., and its specific rotation +200° (*c* 0.5, NaOH).

The high positive specific rotation confirmed that in the galacturonan there are glycosidic bonds in the α- configuration between *D*-galacturonic acid residues in the pyranose form. To determine the arrangement of the bonds, the galacturonan was oxidized with periodic and nitric acids. Oxalic and tartaric acids were detected by PC in the oxidation products of the galacturonan. Their formation is possible only in the case of 1→4 bonds between the *D*-galacturonic acid residues.

As is known, the methylation of a galacturonan is difficult, and, therefore, it was first reduced to a galactan, and this was subjected to Hakomori methylation and LiH_4 reduction. The fully methylated galactan obtained, with $[\alpha]_D$ +20°(*c* 1.5, chloroform), was subjected to formolysis and hydrolysis, and in the products TLC showed the presence of 2,3,4,6-tetra-O-methyl-*D*-galactose and 2,3,6-tri-O-methyl-*D*-galactose. The formation of the latter as the main product showed the presence of 1→4 bonds in the galactan and, consequently, in the galacturonan as well.

The galacturonan was studied with the aid of ^{13}C NMR spectroscopy. Signals with the following chemical shifts were detected: C-1 (100.15 ppm), C-2 (69.7 ppm), C-3 (70.4 ppm), C-4 (79.2 ppm), C-5 (72.7 ppm), and C-6 (176 ppm), which also show the presence of α-1→4 glycosidic bonds.

Thus, the galacturonan is a linear α-1→4-bound polymer homolog:

$$\text{GalUA-}\alpha\text{-1-[4-GalUA-}\alpha\text{-1-4-GalUA-}\alpha\text{-1]}_{107}\text{-4-GalUA.}$$

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