BRIEF COMMUNICATIONS

POLYSACCHARIDES OF Eremurus.

XXI. A GALACTURONAN FROM THE PECTIN SUBSTANCES OF THE LEAVES OF Eremurus lactiflorus

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Continuing investigations into the pectin substances (PSs) of plants of the genus Eremurus [1], we have studied the PSs of the leaves of E. lactiflorus O. Fedtsch.

The partial acid hydrolysis of the PSs (2 N H_2SO_4, 98°C, 4 h) gave a polysaccharide (a galacturonan with a yield of 25%), $[\alpha]_D^{20}$+ 240° (c 0.2; 0.1 N. NaOH). D-Galacturonic acid was detected in a hydrolysate of the galacturonan by PC (butan-1-ol–pyridine–water (6:4:3) system with aniline hydrogen phthalate as the chromogenic agent).

To prove the position of the bonds between the galacturonic residues the galacturan was subjected to periodate/nitric acid oxidation [2]. Oxalic and tartaric acids were detected in the products of its oxidation by PC (butan-1-ol–acetic acid–water (4:1:5) system with aniline/glucose as the chromogenic agent). The formation of tartaric acid showed that α-diol groupings had undergone oxidation. This is possible when there is a 1 → 4 bond between galacturonic acid residues.

The methylation of the galacturonan was difficult, and it was therefore esterified with diazomethane [3] and reduced with tetrahydroborate, which gave a galactan in a hydrolysate of which galactose was detected. The galactan was methylated by Hakomori's method [4], and methylation was completed by Purdie's method [6]. A galactan permethylate was obtained with $[\alpha]_D^{20}$ +19° (c 1.5; $CHCl_3$) the IR spectrum of which lacked the absorption band of hydroxy groups.

The products of the complete acid hydrolysis of the permethylate were shown by TLC (benzene–acetone (1:1) system with aniline hydrogen phthalate as chromogenic agent) to contain 2,3,6-tri-O-methyl-D-galactose and 2,3,4,6-tetra-O-methyl-D-galactose by a comparison with markers.

To confirm the results obtained, the galacturonan was investigated by ^{13}C NMR spectroscopy. The ^{13}C NMR spectrum of the galacturonan had the following signals, given with their chemical shifts: 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). These values of the signals correspond to those given in the literature [6] and show that the galacturonan consisted of a chain of α-1 → 4-linked D-galacturonic acid residues.

Thus, the galacturonan is a linear polymer consisting of D-galacturonic acid residues linked with one another by α-1 → 4-glycosidic bonds.

LITERATURE CITED

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