OLIGOSACCHARIDES FROM Gypsophila patrinii

V. G. Bukharov, L. N. Surkova, and O. V. Ivanova

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Two triterpene glycosides – philosides A and B – have previously been isolated from a methanolic extract of the roots of Gypsophila patrinii [1]. The results of a further study have shown that the plant contains two oligosaccharides: one of them is a disaccharide and the other a pentasaccharide. A fraction containing them was obtained by the partition chromatography of an extract on silica gel and by gel filtration on Sephadex G-25. The individual oligosaccharides were isolated by chromatography on cellulose. The disaccharide was present in the extract in very small amount, while the pentasaccharide made up 0.05% of the weight of the extract.

The disaccharide, mp 118-123°C, $[\alpha]_D$ +41° (c 1.2; water) mol. wt. ≈ 350 (Rast), did not react with aniline phthalate or Fehling's reagent and is therefore nonreducing. When heated with acids it split into two molecules of D-galactose. On hydrolysis of the permethylate obtained by treating the compound with sodium hydride and methyl iodide in dimethyl sulfoxide only 2,3,4,6-tetra-O-methyl-D-galactose was formed. Thus, the two galactose residues are joined by a 1 – 1 bond, and the disaccharide is α-D-galactosyl-β-D-galactoside, identical with a disaccharide obtained by Sharp [2].

The pentasaccharide, mp 121-126°C, $[\alpha]_D$ +207° (c 1; water), did not react with aniline phthalate and Fehling's reagent. Again, this shows that the pentasaccharide contains a 1 – 1 bond. When the pentasaccharide was heated with mineral acids, D-galactose and D-glucose were isolated in a ratio of 3 : 2. The permethylate obtained in the same way as in the case of the disaccharide was cleaved by acid hydrolysis into 2,3,4-tri-O-methyl-D-galactose and 2,3,4,6-tetra-O-methyl-D-glucose. Consequently, the pentasaccharide has a linear structure, D-galactose residues are present in the middle of the chain, and glucose residues terminate the chain at both ends. The monosaccharide residues are attached to one another by 1 – 6 bonds, as was shown by the results of the periodate oxidation of the pentasaccharide, which led to the decomposition of all the monosaccharides.

On partial hydrolysis of the pentasaccharide on KU-2 cation-exchange resin in aqueous solution with gentle heating, one molecule of D-glucose was first split off, from which it follows that the 1 – 1 bond in the pentasaccharide is located between a terminal D-glucose residue and a D-galactose residue present in the chain.

The configurations of the glycosidic centers of the bonds in the pentasaccharide were calculated by means of Klyne's rule. The α configuration is the most probable for all the bonds.

Thus, the pentasaccharide is α-D-glucosyl-(1→6)-α-D-galactosyl-(1→6)-α-D-galactosyl-(1→6)-α-D-galactosyl-(1→1)-α-D-glucoside.

LITERATURE CITED

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