BRIEF COMMUNICATIONS

QUEBRACHITOL FROM THE LEAVES OF Hippophae rhamnoides

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Continuing investigations of the chemical structure of the leaves of Hippophae rhamnoides (common sea buckthorn), we have detected and isolated quebrachitol – the monomethyl ester of inositol – by the following scheme The air-dry comminuted leaves were extracted with 96% ethanol. The concentrated extract deposited crystals, which were purified on a column of alumina (activity grade III).

From an ethanolic eluate we isolated a substance with mp 192-193°C, $[\alpha]_D^{20}$ −75° (c 1; H_2O) [1]. The IR spectra showed a characteristic band at 2830-2815 cm^{-1}. The number of free hydroxy groups was determined by a titrometric method with potassium periodate. Five hydroxy groups were found. An acetyl derivative was obtained with mp 96-97°C, $[\alpha]_D^{20}$ +25.5° (c 4; chloroform) [2].

Demethylation was carried out in a mixture of liquid phenol, hydriodic acid, and acetic anhydride. The excess of acids was neutralized with AV-17 anion-exchange resin. The product obtained, after recrystallization from ethanol, corresponded to L-inositol with mp 235°C, $[\alpha]_D^{20}$ −65° (c 1; H_2O) [3].

Thus, in its physicochemical properties, IR spectrum, and transformation products the substance isolated was identical with quebrachitol. We are the first to have found quebrachitol in sea buckthorn leaves.

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THE STRUCTURE OF THE GLUCAN OF Arum korolkovii

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The mixture of polysaccharides isolated from the tubers of Arum korolkovii Regel. [1] was fractionated via the copper complex. After the separation of the glucomannan, the mother alkaline solution was dialyzed against distilled water, two volumes of ethanol were added, and the precipitate was filtered off, washed with ethanol and with acetone, and dried. The yield of polysaccharide (PS) was 0.17% of the weight of the raw material, and it gave a red coloration with iodine.

The homogeneity of the substance was checked by gel chromatography on Sephadex G-50 (Fig. 1) in a 66 × 2 cm column. Fractions with a volume of 3 ml each were collected and analyzed by the phenol/sulfuric

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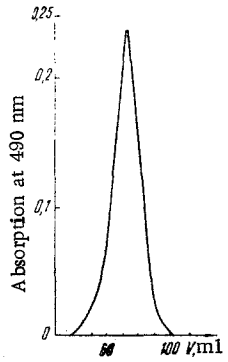

Fig. 1. Gel chromatography curve of the glucan on Sephadex G-50.

acid method [2]. The ultracentrifugation of a 0.5% solution of the PS in 15% NaOH solution (MOM-3170 instrument, 50,000 rpm, 1.5 h) also showed the homogeneity of the PS. The molecular weight calculated from the rate of sedimentation was 7000.

Acid hydrolysis of the PS (2 N H_2SO_4, 100°C, 16 h) and paper chromatography of the hydrolyzate [FN-17, butan-1-ol–pyridine–water (6 : 4 : 3), descending method] gave a single spot corresponding to glucose. Consequently, the PS is a homopolysaccharide – a glucan. The presence in the IR spectrum of the glucan of an absorption band at 925 cm^{-1} shows the pyranose form of the glucose residue [3]. The glucan is not hydrolyzed by α-amylase and, consequently, the glucose residues in it are connected by β bonds.

The glucan was oxidized with a 0.025 M solution of sodium periodate at room temperature in the dark for 24 h. The consumption of sodium periodate was 1.12 mole per mole of anhydrohexose residue. The polyaldehyde formed on oxidation was reduced with sodium tetrahydroborate, and the polyalcohol was hydrolyzed with 2 N H_2SO_4 at 100°C for 8 h, giving a hydrolyzate which, on paper chromatography [ascending method, FN-14, ethyl acetate–propanol–water (1 : 7 : 2)] showed intense spots of glycerol (R_f 0.6) and erythritol (R_f 0.51).

The glycerol and erythritol were also identified by GLC in the form of their acetates on a column (0.3 × 200 cm) containing Chromaton N-AW (0.200-0.250 mm) impregnated with 5% of silicone XE-60 with an evaporator temperature of 190-220°C and helium as the carrier gas at a rate of 50 ml/min.

The formation of erythritol shows the presence of 1 → 4-β bonds and the considerable amount of glycerol shows the presence of 1 → 6-β bonds between the glucose residues.

Thus it has been shown that the glucan from the tubers of A. korolkovii is a polymer consisting of D-glucopyranose residues connected with one another by 1 → 4-β and 1 → 6-β bonds.

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