

BRIEF COMMUNICATIONS

GALACTOMANNANS FROM *Gleditsia aquatica*

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We reported previously on the isolation and study of polysaccharides from seeds of eight *Gleditsia* species [1]. In the present article we report results from a study of the properties and structure of galactomannans from seeds of *G. aquatica* Desf introduced into the Republic of Uzbekistan. Aqueous extracts of ground air-dried seeds were precipitated with alcohol to produce water-soluble polysaccharide (WSPS) in 21% yield [1]. The isolated starting WSPS was inhomogeneous. A homogeneous fraction was prepared by treating an aqueous solution of WSPS (300 mL, 0.3%) dropwise with constant stirring with alcohol (150 mL). The resulting solid was separated by centrifugation, washed with alcohol, dehydrated with acetone, and dried over P₂O₅. The yield of fraction I was 18%. The supernatant solution was treated with another portion (150 mL) of alcohol. The resulting solid was separated as above. The yield of fraction II was 72%. Adding dropwise another portion of alcohol (150 mL) produced fraction III in 0.18% yield. Paper chromatography (PC) of the hydrolysates of all fractions (*n*-butanol:pyridine:water, 6:4:3, anilinium acid phthalate developer) detected galactose and mannose. The ratios of the sugars were determined by GC as the acetates of the aldononitriles [1] and were 1:3.4, 1:4.9, and 1:2.2, respectively. Therefore, all fractions were galactomannans.

Fraction II, designated by us GMA, was investigated in more detail.

GMA was a white powder with a cream tint. It dissolved well in water to form a thick solution with relative viscosity 20.8 (*c* 0.25%, H₂O). The molecular weight (MW) was determined by ultracentrifugation in a MOM-3170 instrument (50,000 rpm, 20°C) for 30 min. We studied an aqueous solution (1%) of GMA. The MW of GMA was 58,000 ± 10%. GMA was methylated by the literature method [2] to produce the permethylate with 40.8% O-CH₃ content. The completeness of the methylation was monitored by TLC [CHCl₃:(CH₃)₂CO, 9:1; conc. H₂SO₄ developer] and IR spectroscopy (lack of OH groups). Mainly 2,3,6-tri-O-Me-D-mannose and 2,3,4,6-tetra-O-Me-D-mannose in addition to 2,3,4,6-tetra-O-Me-D-galactose and 2,3-di-O-Me-mannose were identified in the hydrolysate of the permethylate by TLC (benzene:acetone, 2:1; anilinium acid phthalate developer). The last two derivatives were found in smaller quantities.

GMA was separated into fragments using partial acid hydrolysis (H₂SO₄, 0.5 N, 90 min, 100°C). PC of the products of partial hydrolysis and authentic specimens identified galactose and mannose and oligosaccharides with *R*_{gal} values of 0.85 (mannobiose), 0.74 (mannotriose), 0.2 (mannotetraose), and 0.09 (mannopentaose).

Thus, a galactomannan consisting of galactose and mannose in a 1:4.9 ratio with MW 58,000 was isolated from seeds of *G. aquatica*. The macromolecule contains a main β-1-4-mannopyranoside chain in which the mannose units are substituted at C-6 (branching point) by single units of D-galactopyranose. GMA of *G. aquatica* differs from galactomannans of previously studied *Gleditsia* species in MW, ratio of monosaccharide units, and degree of polymerization and is the more common type of galactomannans of the families Caesalpiniceae and Fabaceae [3-6].

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