The 75% Isopropanol-Soluble Polysaccharides from the Endosperm of the Legume Seed of *Gleditsia Triacanthos*

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Abstract: The 75% isopropanol-soluble material from the endosperm of the legume-seed of *Gleditsia triacanthos* was isolated. The material extracted with boiling water was fractionated by ion-exchange chromatography and characterized. Besides minor amounts of galactomannans, major proportions of arabinans and/or arabinogalactans appear.

Introduction

The galactomannans from the endosperm of the seed of the legume *Gleditsia triacanthos* have been widely studied in our lab [1]. The system of carbohydrates of this seed also comprise low-molecular weight galactomannans, soluble in 85% ethanol, extractable at room temperature [2]. Herein is reported the extraction, purification and characterization of an arabinose-rich product extracted with boiling water, and soluble at high alcohol concentrations.

Experimental

The endosperm of seeds of *Gleditsia triacanthos* was milled and extracted exhaustively with water at room temperature, then at 50° and then at 95°. Extractions were aided with mechanical stirring. The residues were centrifuged off, and the extracts precipitated with 3 vol. of isopropanol. The supernatants were concentrated, and the final material was obtained by freeze-drying.

Analyses (total carbohydrates, proteins, etc.) were carried out following reported procedures [1,2]. The constituting monosaccharides were quantitated after hydrolysis with 2M TFA (90 min, 120°C) by HPLC-AEC. Anion-exchange chromatography was performed on DEAE Sephadex A-50. Exhaustive methylation was carried out with the technique of Ciucanu and Kerek [3]; the permethylated product was hydrolyzed and analyzed by GC of the alditol acetates.

Results and Discussion

The 75% isopropanol-soluble material (**S**) of the extract (95°C) from the endosperm from *Gleditsia triacanthos* was obtained with a yield of 2.3% (endosperm dry weight basis). Its analysis indicated the presence of carbohydrates (70%) and proteins (26%). The main constituent sugars were galactose, mannose and arabinose. Fractionation of **S** by anion-exchange chromatography resulted in two fractions: one eluted with water (**N**, 23% yield), and another eluted with 0.2M ammonium carbonate (**C**, 50% yield). Both reveal similar analyses: 80-85% carbohydrates, with arabinose as their major moosaccharide (63% in **C**, 45% in **N**); although **C** is richer in protein content.

The ^{13}C-NMR spectra of both fractions are similar: three anomeric signals corresponding to furanose sugars appear at 110.2, 109.9 and 109.1 ppm. However, in the hexopyranose anomeric region, while **C** shows a major signal at 105.8 ppm, possibly originated in a β-galactose moiety, **N** shows two signals, at 102.7 and 101.4 ppm, characteristic of the Gal/Man moieties of a galactomannan. Analysis of permethylated **C** and **N** indicate the presence of galactomannans (2,3,4,6-tetra-*O*-methylGal, 2,3-di-*O*-mehyl and 2,3,6-tri-*O*-methylMan), concurrently with arabinans or arabinogalactans, as, besides the above mentioned products, derivatives of arabinose methylated at 2,3,5-, 2,3- and 3- appear as major components, together with minor amounts of other derivatives of this sugar.

References and Notes

1. Manzi, A.E.; Mazzini, M.N.; Cerezo, A.S. *Carbohydr.Res.* **1984**, *125*, 127.
2. Manzi, A.E.; Cerezo, A.S.*Carbohydr.Res.* **1984**, *134*, 115.
3. Ciucanu, I.; Kerek, F. *Carbohydr.Res.* **1984**, *131*, 209.