

BRIEF COMMUNICATIONS

CARBOHYDRATES FROM *Lepidium sativum*

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Lepidium sativum L. (Brassicaceae), garden cress or pepper grass, is a valuable food and medicinal plant that is widely cultivated in many countries. Its seeds contain carbohydrates (29%), polysaccharides (17.06%), triterpenoids, steroids, and fatty oil (from 14 to 25.5%) [1]. Seeds of *L. sativum* cultivated by us were used to investigate the carbohydrates.

Ground air-dried raw material (50 g, seeds) was extracted in a Soxhlet apparatus by CHCl_3 (250 mL) for 14 h to remove lipophilic substances. The remaining raw material was extracted twice with boiling (82°C) ethanol to isolate sugars soluble in alcohol (SSA). The extracts were combined, evaporated, and chromatographed on Filtrak FN 7,12 paper to afford SSA (8.78%), among which were three fructooligosaccharides (one of which was saccharose) and traces of glucose.

The remaining raw material was extracted successively with water at room temperature with constant stirring; on a water bath at 80°C, with aqueous oxalic acid and ammonium oxalate solution (0.5%), and base solution (10%). Polysaccharides were precipitated from the extracts by alcohol to afford water-soluble polysaccharides (WSPS-X, 5.44%; WSPS-G, 1.78%), pectinic substances (PS, 2.74%), and hemicellulose (HC, 4.58%). WSPS-X and WSPS-G were hydrolyzed by H_2SO_4 (1 N) for 10 h; PS and HC, by H_2SO_4 (2 N) for 24 h in ampuls on a boiling-water bath. The hydrolysates were neutralized by BaCO_3 , deionized by cation-exchanger KU-2 (H^+), evaporated to 1 mL, and studied by PC using *n*-BuOH: $\text{C}_5\text{H}_5\text{N}$: H_2O (6:4:3) with development by anilinium biphthalate (for hexoses) and alcoholic urea (5%, for kestoses).

Acid hydrolysis of seed polysaccharides produced monosaccharides, the composition of which was studied by PC and GC [2] (Table 1).

The quantitative composition of the polysaccharides was studied by GC as the aldonitriles [3]. Chromatograms were recorded on a Chrom-5 chromatograph with a flame-ionization detector, glass column (150 × 0.3 cm), 5% silicone XE-60 on Chromaton NAW (0.200-0.250 mesh), thermostat 210°C, detector 280°C, and N_2 carrier gas flowing at 60 mL/min.

WSPS-X, cream-colored powder, soluble in water to give a cloudy solution of relative viscosity 3.18 (*c* 1%, water), dominated by rhamnose, galactose, and arabinose.

WSPS-G, light-brown powder, relative viscosity of aqueous solution 3.3 (1%). Dominated by rhamnose and arabinose. PC identified uronic acids in these carbohydrates, from which it follows that WSPS-X and WSPS-G consist of neutral and acidic sugars.

PS, white powder, insoluble in water. Monosaccharides of pectinic fraction dominated by arabinose. Titration [4] established the content of Af (free acids, 14.4%), Ae (esterified acids, 4.5%), λ (23.9%). Therefore, PS were a low-esterified pectin.

HC, brown powder, insoluble in water, fully soluble in base.

Based on the results, the carbohydrate components of the WSPS and HC fractions of *L. sativum* were considered the most promising for pharmacological investigation.

TABLE 1. Monosaccharide Composition of Polysaccharides from *Lepidium sativum* L. Seeds

Polysaccharide	PS yield, %	Ratio of monosaccharide units						
		Rham	Xyl	Ara	Man	Glc	Gal	UAc
SSA	8.78	-	-	-	-	Tr.	-	-
WSPS-X	5.44	8.1	3.2	5.2	1.0	Tr.	6.1	+
WSPS-G	1.78	8.0	2.9	4.7	1.0	Tr.	3.3	+
PS	2.74	1.22	1.36	9.32	1.0	Tr.	1.9	+
HC	4.58	1.0	1.0	1.28	-	-	4.81	+

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