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Constituents of the Seed of *Malva verticillata*. II. Characterization of Two Novel Neutral Polysaccharides*

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Two novel minor polysaccharides, designated as MVS-IIA and MVS-IIG, were isolated from the seeds of *Malva verticillata*. L. by affinity chromatography with Con A-Sepharose. Each polysaccharide was homogeneous on gel chromatography and glass-fiber paper electrophoresis. Gel chromatography gave values of 57000 and 10400 for the molecular weights of MVS-IIA and MVS-IIG, respectively.

MVS-IIA is composed of L-arabinose : D-galactos : D-mannose in the molar ratio of 14 : 28 : 1, and MVS-IIG is composed of D-glucose : D-galactose : D-mannose in the molar ratio of 10 : 1 : 1.

The results of methylation analysis and ^{13}C -NMR spectra of the polysaccharides suggested that the minimal repeating unit of MVS-IIA is composed of six terminal α -L-arabinofuranose, eight 1,5-linked α -L-arabinofuranose, three terminal β -D-galactopyranose, fifteen 1,3-linked β -D-galactopyranose, ten 3,6-branched β -D-galactopyranose, and one terminal α -D-mannopyranose. The results also suggested that the repeating unit of MVS-IIG is composed of one terminal α -D-glucopyranose, seven 1,4-linked α -D-glucopyranose, two 4,6-branched α -D-glucopyranose, one 1,3-linked α -D-galactopyranose, and one terminal α -D-mannopyranose.

The controlled Smith degradation of MVS-IIA resulted in complete elimination of the sugar residues located at side chains in the molecule. It may be concluded that MVS-IIA contains the unit shown in Chart 1. The presence of α -D-mannopyranosyl terminal residues is especially unique.

MVS-IIG is apparently an amylopectin-type glucan. However, the average length of unit chains in it is very short. The presence of terminal α -D-mannopyranose units and 1,3-linked α -D-galactopyranosyl residues is an additional unique feature of MVS-IIG as a glucan of this type.

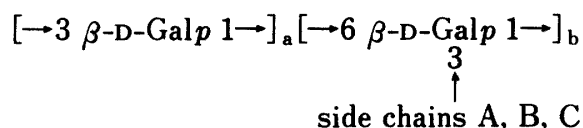


Chart 1. Structural Unit of MVS-IIA

Side chain A, α -L-Araf $1\rightarrow [5 \alpha\text{-L-Araf } 1\rightarrow]_c$; side chain B, $\beta\text{-D-Galp } 1\rightarrow [5 \alpha\text{-L-Araf } 1\rightarrow]_d$; side chain C, $\alpha\text{-D-Manp } 1\rightarrow [5 \alpha\text{-L-Araf } 1\rightarrow]_e$.

$a : b = 3 : 2$, $a + b = 25$, $6c + 3d + e = 8$. side chain A : side chain B : side chain C = 6 : 3 : 1.

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