

# BRIEF COMMUNICATIONS

## CARBOHYDRATES OF *Malva neglecta*

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The search for plants forming sources of biologically active substances with the aim of obtaining drugs from them remains an urgent task at the present time. In this connection, plants containing mucilaginous polysaccharides appeared of interest and among these may be included the species *Malva neglecta* Iljin, family Malvaceae.

In the present paper, we give the amounts of monosaccharide compositions of the water-soluble polysaccharides (WSPSs), the pectin substances (PSs), and the hemicelluloses (HCs) of the epigeal part of the plant collected in the mountains of the Western Badakhshan in the fruit-bearing period, September, 1987.

The air-dried raw material was first treated with 80% ethanol and chloroform to remove substances of noncarbohydrate nature. From the residual raw material were successively isolated the WSPSs (with water) and the PSs (with a mixture of a 0.5% solution of ammonium oxalate and oxalic acid at 70°C). The polysaccharides were precipitated from the aqueous and acid extracts with 96% ethanol. Extraction with 7% and 15% alkali, followed by neutralization, dialysis, and precipitation with ethanol, gave the hemicelluloses. To determine their monosaccharide compositions, the polysaccharides were hydrolyzed (2 N H<sub>2</sub>SO<sub>4</sub>, 100°C, 48 h). The compositions of the hydrolysates were established with the aid of PC and GLC. The relative amounts of sugars were determined from the areas of peaks on the GL chromatograms of the corresponding aldononitrile acetates [1]. Information on the amounts and compositions of the polysaccharides is given below:

Carbohydrate fraction	Yield, % on the air-dried plant	Ratio of sugars					
		rham- nose	arabi- nose	xyl- ose	mannose	glucose	galactose
WSPS	3.6	14	7	Tr.	3	1	9
PSS	6.5	4	2	—	—	—	1
HC-A	2.2	3.4	2.1	—	—	—	1
(7% NaOH)							
HC-B	3.6	2.7	4.9	Tr.	—	—	1
HC-A	1.4	1.7	1.7	1.4	Tr.	1	2.1
(15% NaOH)							
HC-B	1.2	2.9	2.5	29.1	1	1	2.6

The results obtained show that PSs and WSPSs predominate in the epigeal part of *M. neglecta*.

The water-soluble polysaccharides consisted of a water-soluble light brown fibrous powder containing no nitrogen; 0.3% aqueous solutions had a relative viscosity of 1.84. It did not give the starch reaction with iodine. The IR spectrum of the WSPSs showed absorption bands at 1030, 1270, 1420, 1620, 1720, and 3400-3600 cm<sup>-1</sup>.

Components of the WSPSs were found to be uronic acids and neutral sugars, in which rhamnose predominated.

The isolated PSs consisted of a cream-colored fibrous powder slowly soluble in water,  $[\alpha]_D^{25} +134^\circ$  (c 0.5; water). The aqueous solutions of the PSs were precipitated with a 1% solution of ammonium sulfate with the formation of pectates. The titrimetric method [2] gave the following characteristics of the PSs (%): free carboxy groups ( $K_C - 4.2$ ; degree of esterification,  $\lambda - 57$ ; methoxylated carboxy groups ( $K_E - 5.67$ ). The molecular mass determined viscosimetrically [3] was 35,000 c.u. Galacturonic acid and neutral sugars were detected as components of the PSs. The IR spectra of the pectins were similar to the spectra of the pectin substances of other plants [4].

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The hemicelluloses differed from one another with respect to their amounts in the plant and their monosaccharide content. Xylose predominated in a hydrolysate of HC-B (15% NaOH), which showed the presence of polysaccharides of the xylan type.

As can be seen from the results obtained, the carbohydrate complex of the epigeal part of *M. neglecta* includes a mucilaginous polysaccharide, pectin substances, and hemicelluloses. This is the first time that these polysaccharides have been isolated.

The mucilaginous polysaccharide of *M. neglecta* differs from other representatives of this family, especially from the genus *Alcea* [5], by the presence of considerable amounts of mannose residues in it.

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#### LIPIDS OF PROTOZOA.

##### I. PHOSPHOLIPID COMPOSITION OF *Colpoda* SP.

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In recent years, free-living infusoria have been widely used as model organisms for the study of the functional role of alkylglycerides and phosphonolipids in the structural organization of biomembranes [1-3]. One of the representatives of the infusorium *Colpoda* sp. has been isolated from natural water bodies, and its lipid composition has been investigated:

Classes and Subclasses of Phospholipids	Percentage of the Total Lipid Phosphorus
1-O-Akyl-2-acyl-sn-glycero-phosphatidylethanolamine	59.2
1-O-Alk-1'-enyl-2-acyl-sn-glycero-3-phosphatidyl- ethanolamine	2.4
1,2-Di-O-Alkyl-sn-glycero-3-phosphatidylethanolamine	4.6
1,2-Diacyl-sn-glycero-3-phosphatidylethanolamine	8.9
Lysophosphatidylethanolamine	2.9
Sum of the aminophospholipids	78.0
Ceramide aminoethylphosphonate	3.6
1-O-Alkyl-2-acyl-sn-glycero-3-phosphatidylcholine	7.0
1,2-Diacyl-sn-glycero-3-phosphatidylcholine	4.1
Lysophosphatidylcholine	0.9

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