BRIEF COMMUNICATIONS

PECTIN SUBSTANCES FROM *Eremurus altaicus*

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We have shown previously that the tuberous roots of *Eremurus altaicus* (Pall.) Stev. are rich in polysaccharides [1]. In the present paper we give the results of a study of the pectin substances (PSs) of various organs of the plant.

The amounts of PSs and the carbohydrate composition of the neutral fraction of the pectin (in the form of aldononitrile acetates; GLC; column 0.3 × 200 cm, Chromaton N-AW, 5% of XE-60; temperature 210°C; He, 55 ml/min) are given below:

Plant organ	PSs, %	Ratio of the sugars Gal	Rha	Ara	Xyl
Leaves	10.3	2.8	1.8	1	Tr.
Peduncles	3.8	2.1	1	2	Tr.
Rhizomes	5.7	3.8	1	1	Tr.
Tuberous roots	12.9	11.0	6	3	1

The pectin substances from the tuberous roots isolated after reprecipitation and drying consisted of a cream-colored powder readily soluble in water with the formation of a viscous solution contained traces of nitrogen and 3.01% of OCH_3. The PSs (1 g in 50 ml of H_2O) were fractionated on a column (3.5 × 40 cm) of DEAE-cellulose DE-52 (CO_3^{2-} form), elution being performed with water (1 liter) and 1 M ammonium carbonate solution (2 liters). The eluates were collected in 20-ml portions and were analyzed by the phenol/sulfuric acid method [2].

The aqueous eluate yielded a neutral polysaccharide (0.29 g). Fractionation of the latter with Fehling's solution showed that it consisted of a mixture of a glucomannan (0.2 g) and a polysaccharide containing mannose, galactose, and traces of xylose and glucose.

The alkaline eluates, dialyzed against distilled water, after evaporation, the elimination of water, and drying, gave a homogeneous acidic polysaccharide (AP) (0.45 g) which was insoluble in water and solutions of alkalis and contained no nitrogen. The amount of uronic anhydride determined by a known method [3] was 52.9%. Consequently, the AP is a pectin.

To determine its qualitative composition, the SP (0.15 g) was subjected to hydrolysis (2 N H_2SO_4; 20 h, 100°C). The hydrolyzate was neutralized, deionized with Amberlite IR-120 (H^+), evaporated, and subjected to descending paper chromatography (PC) in the butanol—pyridine—water (6:4:3) system. The hydrolyzate was separated by preparative PC into acid and neutral fractions, and the composition of the latter is given below.

The pectin substances isolated from the other organs of the plant consisted of an acid polysaccharide, the monosaccharide composition of which was identical with that of the AP of the tuberous roots isolated by fractionation on a column of DEAE-cellulose. Investigation by PC and electrophoresis of the acid fraction showed the presence of galacturonic acid: on oxidation with bromine it was converted into mucic acid which was identified by comparison with an authentic sample.

Treatment of the AP with pectinase (37°C, 10 days) led to the formation of galacturonic acid and to a degraded AP containing galactose, rhamnose, arabinose, xylose, and a very small amount of galacturonic acid.

The isolation of galacturonic acid on enzymatic hydrolysis shows the presence of sections of the carbohydrate chain of a galacturonan free from glycosidic bonds with neutral monosaccharides.

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Thus, it has been established that the pectin substances of the tuberous roots contain neutral and acid polysaccharides.

It has been established by acid and enzymatic hydrolyses that the acid polysaccharide is a pectin consisting of residues of galactose, rhamnose, xylose, and arabinose and of galacturonic acid, which forms the main chain.

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LACTONES FROM *Artemisia compacta*

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From the epigeal part of *Artemisia compacta* Fisch., of the subgenus Seriphidium (Bess) Rauy, family Asteraceae collected in the following phase in the environs of the village of Kosh-Agach, Gorno-Altai Autonomous Region, we have isolated the combined lactones (0.4%) by Rybalko's method.

These were chromatographed on Al_2O_3 (activity grade IV), and when the column was eluted with chloroform the first fraction yielded a substance with mp 25°C which was identified by its IR and UV spectra as dihydrocoumarin [2, 3].

On standing, fraction II deposited crystals with mp 215-216°C (from ethanol) which were identified by a comparison of IR spectra and by thin-layer chromatography on a Silufol plate as β-santonin. We did not detect α-santonin [4] in *A. compacta*.

When the column was eluted with ethanol—chloroform (1:3), a mixture of substances was isolated. Chromatography on paper in various systems showed the presence in it of nine substances of coumarin nature, two of which corresponded to scopoletin and to umbelliferone. After preparative isolation, their nature was confirmed by their IR spectra [2, 3].

We have previously investigated several Siberian species of wormwood for their scopoletin content and have found it in represenatatives of the subgenus Artemisia — *A. gmelinii* var. *latiloba*, *A. laciniata*, *A. latifolia* — of the subgenus Seriphidium — *A. mongolorum* and *A. nitrosa* —, and of the subgenus Dracunculus — *A. glauca var. humilis* and *A. bargusinensis*. This confirms once more that scopoletin is characteristic of the genus *Artemisia* [5].

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