A polysaccharide isolated from the epigeal parts of *Polygonum aviculare* has been fractionated. It has been shown that the initial polysaccharide consists of at least four fractions differing in their monosaccharide compositions and physico-mechanical properties.

Carbohydrates of plants of the *Polygonaceae* family have been considered in [1-3]. The water-soluble polysaccharides have been studied inadequately. Continuing our investigation [4, 5], we have fractionated polysaccharides isolated from the epigeal parts of *Polygonum aviculare* collected in the environs of Ryazan' in the period of the maximum accumulation [5].

The air-dry raw material was boiled in ether to eliminate pigments and low-molecular-weight impurities. The plant residue after ethereal extraction was dried and was heated with water, and the water-soluble polysaccharides were precipitated with ethanol. The polysaccharides were freed from accompanying protein by Sevag's method [6] and were demineralized with the aid of the ion-exchange resins KU-2 (H+) and AV-17 (OH-). Alkaline saponification was performed [7] and polysaccharides (I) and (II) were obtained in a weight of 3:2 (preparatively). We achieved a similar separation by treating the initial polysaccharide by Fehling's method. The polysaccharides (I) and (II) isolated by this method differed insignificantly from those obtained by alkaline saponification.

When polysaccharide (I) was treated with sodium acetate [8], polysaccharide A was obtained which, according to PC and GLC, consisted of galacturonic acid and rhamnose residues. Its homogeneity was confirmed by chromatography on DEAE-cellulose. From the mother liquor, two volumes of ethanol precipitated polysaccharide B, consisting of galacturonic acid, galactose, and rhamnose residues.

For a strict identification of the uronic acid in the polysaccharide fraction (I), its solution was converted into the methyl ester by treatment with diazomethane and this was reduced with sodium tetrahydroborate [9], giving an almost neutral glycan from the hydrolysis products of which galactose and uronic and aldobiuronic acids were isolated. The galactose was separated by electrophoresis and was identified by oxidation with nitric acid to mucic acid with mp 212-214°C.

When polysaccharide (I) was subjected to enzymatic hydrolysis [10], rhamnose, arabinose, glucose, and galactose were detected by PC and GLC in a quantitative ratio of 1:2:6:37, respectively, and galacturonic acid was isolated in the crystalline state with mp 155-156°C.

On acid hydrolysis and subsequent separation by paper electrophoresis, three zones were obtained which, according to PC results, corresponded to neutral monosaccharides, aldobiuronic acids, and polysaccharides. The zone corresponding to the aldobiuronic acids was isolated, treated with diazomethane, and reduced with sodium tetrahydroborate, giving dulcitol and sorbitol, in a ratio of 7:1 according to GLC.

With the aid of Cetavlon [11], fraction (II) yielded two polysaccharides, C and D, differing in their monosaccharide compositions and physicochemical properties.

The characteristics of the fractions and the quantitative ratios of the monosaccharides in them (moles) are given below:
The samples of polysaccharides were hydrolyzed with 2 N sulfuric acid solution in sealed tubes at 100°C for 8-h, followed by neutralization with barium carbonate and treatment with KU-2 cation-exchange resin (H⁺). Solutions were evaporated in a rotary evaporator at 35-40°C. Optical activities were determined on a EPN-AI instrument, and uronic acids as described in a handbook [12]. FN-7 and FN-11 papers were used for descending chromatography in the following solvent system (by volume): 1) butanol-pyridine-water (6:4:3); 2) ethyl acetate-formic acid-water-acetic acid (18:1:4:3); 3) ethyl acetate-pyridine-water-acetic acid (5:5:3:1). For detecting reducing monosaccharides, the chromatograms were treated with Bonner's aniline phthalate reagent [13], and for polyols with a solution of potassium permanganate-sodium periodate [14]. The GLC of the samples was performed on a Tsver-4-67 instrument with a flame-ionization detector and a glass column (150 × 0.3 cm). Conditions: A) 5% of XE-60 on Chromaton N-AW-DMCS 0.16-0.2 mm, 210°C, air, 300 ml/min, hydrogen and helium 60 ml/min each for the aldonitrile acetates [15]; B) 3% of poly(neopentyl glycol adipate) under the same conditions for the polyol acetates [16]. Electrophoresis was performed in phosphate buffer with pH 8.7 at a current strength of 40 mA and a voltage of 200-400 V for 0.5-2 h.

The isolation and purification of the polysaccharides obtained from the epigeal parts was carried out as described previously [5].

Alkaline Saponification. A solution of 20 g of the initial demineralized polysaccharide in 770 ml of water was treated with 30 ml of a 1 N solution of sodium hydroxide. The resulting mixture was kept at room temperature for 2 h with continuous stirring. Then the alkali was neutralized with an equivalent amount of a 1% solution of hydrochloric acid. The precipitate that then deposited (fraction I) was washed with dilute hydrochloric acid, with ethanol, and with acetone, and was dried in vacuum. The supernatant liquid was evaporated in a rotary evaporator and was precipitated with a double volume of ethanol (fraction II).

Methylation. The polysaccharide (1) (2 g) was triturated in a 1:2 mixture of methanol and water, and then 100 ml of an ethereal solution of diazomethane was added and the mixture was kept at +5°C for 8 h. The product was filtered off, washed with ether, and dried. Yield 1.6 g.

Reduction. A solution of 0.25 g of sodium tetrahydroborate in 20 ml of water with the addition of glycerol was poured into 50 ml of water containing 1.6 g of esterified acid, and the mixture was placed in the refrigerator for 12 h. Then it was neutralized with acetic acid, dialyzed, treated with cation-exchange resin, and evaporated three times with methanol. Methylation and reduction were repeated five times. The yield of glycanc was 1 g.

Isolation of D-Galactose. The glycan (1 g) was hydrolyzed with a 1 N solution of sulfuric acid for 5 h. The hydrolysate was neutralized with barium carbonate and was evaporated to small volume, after which the barium salts of the acidic sugars were precipitated with ethanol. The precipitate was separated off by centrifugation. The filtrate was evaporated and the residue was crystallized from ethanol. D-Galactose was isolated with [α]D + 83° (c 0.1; water); mp 163-164°C.

Fractionation with Sodium Acetate. A homogeneous solution of 8 g of fraction (I) in 600 ml of water containing 12 ml of caustic soda was stirred while 170 ml of 2 N sodium acetate was added. The resulting precipitate was separated off by centrifugation and was dried by means of a change of solvents. Yield 3.1 g (polysaccharide A). The solution was dialyzed for three days, concentrated, and poured into six volumes of ethanol, and the precipitate was separated off. Yield 2.6 g (polysaccharide B).

Chromatography on DEAE-Cellulose. DEAE-cellulose (40 g) was treated three times with 0.5 N hydrochloric acid solution and three times with 0.1 N sodium hydroxide solution and was then placed in a 40 × 4-cm chromatographic column and was washed with 2 liters of phosphate buffer.