The method can be used in biochemical and medical laboratories of any class occupied with the investigation of bioglycans of different natures.

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POLYSACCHARIDES OF SAPONIN-BEARING PLANTS.

III. POLYSACCHARIDES OF THE EPIGEAL ORGANS OF *Biebersteinia multifida*

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We have reported previously on an investigation of the polysaccharides of the tuberous roots of *Biebersteinia multifida* DC [1]. We now give the results of an investigation of the polysaccharides (PSs) of the epigeal organs (stems, leaves, flowers) of this plant collected in the flowering phase.

The water-soluble polysaccharides (WSPSs) the pectin substances (PCs) and the hemicelluloses (HCs) were isolated and purified as described in [2]. The complete hydrolysis of the polysaccharides and the identification of the monosaccharides by GLC were carried out as in [3]:

Type of PS	Yield of PSs, % on the abs. dry weight	*Gal*	*Glc*	*Man*	*Xyl*	*Ara*	*Rha*	*GalUA*
WSPSs	7.2	15,0	22,5	16,9	1,0	11,7	2,6	Tr.
PCs	10,4	3,4	1,5	6,7	1,0	18,8	3,5	++
HCs	20,8	5,0	4,2	1.3	50,3	2,6	1,0	+

The results of the analysis show that PCs and HCs predominate in the epigeal organs of the plant, in contrast to the tuberous roots [1].

The polysaccharides gave a negative reaction with iodine for the presence of starch. Among the neutral sugars from the PCs arabinose predominated, and among those from the HCs xylose. This makes it possible to assign the HCs to polysaccharides of the xylan type.

The WSPSs were separated on DEAE-cellulose ($-CO_3^{-2}$) into neutral and acidic fractions. Elution with water gave 32% of a neutral polysaccharide (NPS), and elution with 1 M $(NH_4)_2CO_3$ gave 65% of an acidic polysaccharide (APS) consisting of GalUA, Gal, Glc, Man, Xyl, Ara, and Rha. In the NPS, Gal, Glc, Man, Xyl, and Ara were detected in a ratio of 1.2:19.0:4.0:1.0:6.3, respectively.

Thus, water-soluble polysaccharides, pectin substances, and hemicellulose have been isolated from the epigeal organs of *Biebersteinia multifida* and characterized. Pectin substances and hemicellulose predominate in the epigeal organs of the plant, while polysaccharides

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of the glucan type, the presence of which is characteristic for the tuberous roots of the plant, are absent.

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A STUDY OF THE FATTY ACID COMPOSITION OF THE NEUTRAL LIPIDS OF THE LEAVES OF *Ligularia macrophylla*

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Plants of the genus *Ligularia* are widely distributed in Kazakhstan and Central Asia. It is known that their roots contain sesquiterpene lactones [1], but their epigeal parts have not been studied.

We have investigated various organs of *Ligularia macrophylla* DC, growing in the region of Lake Issyk, Alma-Ata Province.

In the present communication we give the results of the determination of the physicochemical constants and fatty acid composition of the neutral lipids from the leaves of *Ligularia macrophylla* DC.

The lipids were extracted from the air-dry communuted leaves with petroleum ether (40-70°C) in a Soxhlet apparatus for 9-10 h [2]. The lipids were obtained in the form of a yellow-green waxy mass with a yield of 3.6%; iodine No. 0.16 mg KOH/g; saponification No. 196.0 mg KOH/g; iodine No. 122.2% I_2; the mean molecular weight of the fatty acids was 270.2 and the amount of unsaponifiable substances 1.8% (on the initial weight of the leaves).

In the unsaponifiable fraction we determined the amounts of carotenoids (57.6 mg/kg) and of β-carotene (1.34 mg/kg) and tocopherols (83.75 mg/kg) [3]. The fatty acids of the saponifiable fraction were studied in the form of their methyl esters [4].

The methyl esters were analyzed by GLC on a Chrom-5 instrument with a flame-ionization detector using a 0.3 × 250 cm glass column filled with polyethyleneglycol succinate (10%) on silanized Chromaton N-AW (0.20-0.25 mm). The temperature of the column was 185°C and that of the evaporator 200°C, and the rate of flow of the carrier gas, argon, was 35 ml/min.

The composition of the fatty acids, (%): $C_{13:0}$ — 1.3, $C_{14:0}$ — 1.4, $C_{15:0}$ — 7.5, $C_{16:0}$ — 20.5, $C_{16:1}$ — 1.6, $C_{18:0}$ — 1.0, $C_{18:1}$ — 6.9, $C_{18:2}$ — 50.2, $C_{18:3}$ — 8.6, $C_{20:0}$ — 0.7.

The amounts of chlorophylls in the leaves of *L. macrophylla* were determined (mg/kg): a — 287, and b — 113.3 [5].

Thus, it has been shown that the main fatty acids in the neutral lipids of the leaves are palmitic, oleic, and linoleic. A considerable amount of acids with odd numbers of carbon atoms (tridecanoic and pentadecanoic) has been detected. The amount of vitamins in the leaves is low.

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