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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HOMOGENEOUS LECITHIN FROM COMMERCIAL PHOSPHATIDES

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Phosphatide concentrates (PCs) mainly from soybeans and from sunflowers obtained in the production of vegetable oils, are used as additives in many branches of the food industry [1]. According to the literature, in soybean PCs there are 33.0-36.8% of neutral lipids [2-6], up to 60% of phospholipids [2, 4, 5], 5-7% of carbohydrates [4, 5], and up to 2% of sterols and tocopherols [2]. The main component of commercial PCs is lecithin (phosphatidylcholine) the amount of which in various samples of soybean PCs ranges from 19.0% [6] to 36.7% [2, 5, 7] and in sunflower PCs up to 52% [8, 9] of the weight of the phospholipids of the concentrate.

There is no information in the literature on the fatty acids (FAs) of the homogeneous lecithin of PCs.

We have studied the composition of the PCs and the position distribution of the FA radicals in the lecithin molecules from soybean (Far Eastern varieties of soybean) and sunflower PCs. It was found that in the soybean PCs there were 31% of neutral lipids (NLs), 6.3% of carbohydrates, 58% of total phospholipids, and 4.7% of sterols, pigments, and other impurities; and in sunflower PCs, 30% of NLs, 8% of carbohydrates, 55% of total phospholipids, and 7% of sterols, pigments, and other impurities. The amount of lecithin on the weight of the phospholipids of the soybean PCs was 40% and of the sunflower PCs 38%.

Chromatographically homogeneous lecithin from PCs freed from carbohydrates was obtained by the method of Singleton et al. [10]: a chloroform solution of the PCs was passed through Al_2O_3, neutral, Brockman activity grade II (ratio of PCs to absorbent 1:20) and the column was eluted with acetone (NLs, part of the pigments) and chloroform (NLs and pigments), and then the lecithin was eluted with chloroform–methanol (95:5 and 90:10). In this way, up to 80% of the lecithin was eluted in chromatographically homogeneous form: R_f 0.4 and 0.5 in the chloroform–methanol–25% ammonia (65:25:4) and chloroform–methanol–water (65:35:5) systems, respectively, the remainder being in the form of a mixture with lyso-PCs, which can be separated preparatively in the systems given above. The lecithin formed a slightly yellowish viscous oil readily soluble in the usual organic solvents.

TABLE 1. Composition and Position Distribution of the Fatty Acids of the Lecithin from Commercial Phosphatides

Lecithin	Fatty acid												
	10 : 0	12 : 0	14 : 0	15 : 0	16 : 0	16 : 1	17 : 0	18 : 0	18 : 1	18 : 2	18 : 3	ΣП	ΣН
Soybean													
Total	4,1	6.3	2,5	2,1	14.5	Tr.	1,3	4,5	11,4	48,3	5,0	35,3	64,7
sn-1	5,6	9.2	3,5	Tr.	22,4	Tr.	3.1	6,6	10,9	31 1	4,1	53,9	46,1
sn-2	2.8	3,7	1,8	2,1	4,5	Tr.	—	1.4	9 5	66 9	7,3	16,3	83,7
Sunflower													
Total	3,2	6,5	1,8	—	20.2	1.8	—	7,2	19,2	38 5	1 6	38,9	61,1
sn-1	4,4	8,7	2,0	—	40,0	1,8	—	10.9	15,4	16.8	—	66,0	34,0
sn-2	1.2	1,0	1,5	—	3.6	1,4	—	—	23,8	66,5	1,0	7,3	92,7

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