

LIPIDS AND LIPOPHILIC CONSTITUENTS OF THE AERIAL PART OF *Lipskya insignis*

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Lipskya insignis Nevski (Apiaceae) is an herbaceous perennial plant that flowers only once, produces seeds, and then dies. It is widely distributed in Uzbekistan [1].

It was found earlier that seed lipids of certain plants of this family contain petroselinic acid 18:1(6), which is characteristic of reserve lipids [2, 3].

We studied for the first time lipids from the aerial part of *L. insignis* collected in Kashkadar'ya Oblast in May 2009.

Total lipids (TL) were isolated from air-dried ground raw material by CHCl_3 :MeOH (2:1, v/v). The extract was purified of non-lipid components by washing with aqueous CaCl_2 solution (0.05%). The yield of TL was 4.63%. TL were hydrolyzed. Unsaponified substances (US) were isolated in 31.0% yield [4]. The US contained hydrocarbons such as carotinoids and tocopherols and aliphatic and cyclic alcohols according to analytical TLC on silica gel using hexane:Et₂O (9:1, 4:1, and 1:1) and heptane:benzene (9:1), model compounds, and qualitative reactions.

The content of carotinoids in the US was established by spectrophotometry and was 661.8 mg%; tocopherols, 240 mg% [5]. Calculated for TL content, carotinoids were 205.1 mg%; tocopherols, 74.4 mg%. The content of chlorophyll pigments in the TL was 444.5 mg%. This was also determined by spectrophotometry.

TL were separated by column chromatography over silica gel into neutral (NL), glyco- (GL), and phospholipids (PL) by elution with CHCl_3 , acetone, and MeOH. Their yields were 23.6, 58.7, and 17.7%, respectively, of their total mass. The GL fraction contained a significant amount of pigments, from which they could not be separated. Each lipid group was hydrolyzed by KOH solution (10%) in MeOH with refluxing on a water bath for 1 h. The resulting soaps were decomposed by aqueous H_2SO_4 (10%). The released fatty acids were extracted by Et₂O. The solution of fatty acids was rinsed of traces of acid by distilled water and dried using anhydrous Na_2SO_4 . Then, methyl esters of fatty acids were prepared using diazomethane and were identified by GC in a Chrom-5 instrument with a flame-ionization detector using a steel column (2.5 m) packed with Chromaton N-AW with 15% Reoplex 400 at column temperature 192°C.

Table 1 presents the analytical results.

Table 1 shows that lipids from the aerial part of *L. insignis* were characterized by a broad set of 16 fatty acids. The principal acids of NL and PL were 16:0, 18:1, and 18:2. The GL were dominated by 16:0, 18:0, 18:2, and 18:3. Furthermore, from 2.2 to 6.9% of high-molecular-weight fatty acids were detected in the lipids. These were not observed in seed lipids of plants in this family [2, 3].

The content of saturated fatty acids in GL was 1.9 times greater than that of unsaturated acids; in NL and PL, 2.7 times greater.

The total essential fatty acids in NL and PL were 40.6 and 39.9%; in GL, only 24.0%.

Petroselinic acid, which is characteristic of seeds of Apiaceae plants, could not be detected under the employed GC conditions.

TABLE 1. Fatty-Acid Composition of Neutral (NL), Glyco- (GL), and Phospholipids (PL), GC, mass%

Acid	NL	GL	PL	Acid	NL	GL	PL
10:0	0.1	0.1	0.3	18:3	6.8	11.6	4.1
12:0	0.9	4.2	0.9	20:0	0.7	0.7	0.6
14:0	1.7	4.3	1.2	20:1	Tr.	0.3	3.0
16:0	18.5	38.5	14.7	22:0	0.8	0.6	0.6
16:1	0.4	0.1	0.2	22:1	1.1	0.2	1.8
17:0	0.2	1.1	0.2	24:0	0.2	0.4	0.5
18:0	3.8	15.8	2.7	24:1	0.4	—	0.5
18:1	30.6	9.7	38.9	Σ_{sat}	26.9	65.7	21.7
18:2	33.8	12.4	29.8	Σ_{unsat}	73.1	34.3	78.3

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