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PHOSPHOLIPIDS OF THE SEEDS OF *Fumaria vaillantii*

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The qualitative and quantitative compositions of the phospholipids from the seeds of Fumaria vaillantii *L. have been determined. The total fatty acid compositions of all the classes of phospholipids and the position-distributions of the phosphatidylcholines, phosphatidylinositols, and phosphatidylethanolamines have been investigated.*

The plant *Fumaria vaillantii* L., fam. Papaveraceae, is widely distributed in Uzbekistan [1]. The closely related plant *Fumaria officinalis* L. (drug fumitory) is used in folk medicine [2]. According to the literature [3], *F. vaillanti* contains alkaloids, vitamins, tanning substances, and lipids. The seed oil of this plant has been studied [4], but not the seed phospholipids.

F. vaillantii seeds were gathered in Tashkent oblast. The oil from one seed weighed about 2 mg, with a moisture content of 5.6%; the total yield of phospholipids (PhLs) was 0.25% of the air-dry seeds. Six classes of PhLs were detected in the seeds (Table 1), the main ones being phosphatidylcholines (PhCs) (64.1%) and phosphatidylinositols (PhIs) (27.5%)

All the classes of PhLs were isolated from the total PhLs by column and thin-layer chromatographies. The compositions of their total fatty acids (FAs) were determined (Table 2). The FAs in the PLs were represented mainly by palmitic, oleic, and linolenic acids. With respect to the level of unsaturated fatty acids, the highest place was occupied by the PhCs — 66.1%, the second by the phosphatidylethanolamines — 60%, and the third by the PhIs — 53.9%; then followed the lyso-PhCs — 46.8%, an unidentified PhL — 41.2% and, finally, phosphatidic acid — 38%.

The position distribution of the FAs in the PhCs, PhEs, and PhIs was established by enzymatic hydrolysis with phospholipase A_2 (Table 2). It was traditional: in the main, the sn-2 position was occupied by unsaturated acids. With respect to the degree of unsaturation of the sn-2 position, the PhCs were in first place, with 94.2%; the PhIs in second place, with 85.4%; and the PhEs in third place, with 83.9%. With respect to the content of saturated FAs in the sn-1 position, the PhIs occupied first place with 77.6%; then came the PhCs, with 64%; and the PhEs, with 63.9%. The greatest degree of symmetry of the attachment of saturated and unsaturated FAs in the PhL molecules was possessed by the PhIs.

EXPERIMENTAL

The phospholipids were isolated and analyzed as described in [5]. The quantitative determination of the composition of the PhLs was carried out after two-dimensional TLC on silica gel by the method of [6] in the following systems: first direc-

TABLE 1. Qualitative and Quantitative Compositions of the Phospholipids of *Fumaria vaillantii* L. Seeds and Their Chromatographic Mobilities

Phospholipids	R_f in system		Amount, % of the total phospholipids
	1	2	
Phosphatidylcholine	0.50	0.55	64.1
Phosphatidylinositol	0.30	0.50	27.5
Phosphatidylethanolamine	0.57	0.68	4.6
Phosphatidic acid	0.25	0.80	3.3
Lysophosphatidylcholine	0.25	0.35	0.1
Unidentified PL	0.25	0	0.4

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TABLE 2. Composition and Position Distribution of the Fatty Acids in the Phospholipids of the Seeds of *Fumaria vaillantii* L. (%, GLC)

Fatty acid	Phosphatidylcholines			Phosphatidylethanolamines			Phosphatidylinositols			Phosphatidic acids	Lysophosphatidylcholines	Unidentified phospholipid
	total	position		total	position		total	position				
		sn-1	sn-2		sn-1	sn-2		sn-1	sn-2			
7:0	–	–	–	–	–	–	0.2	0.2	0.2	–	–	–
9:0	–	–	–	–	–	–	0.3	0.1	0.5	–	–	–
14:0	0.9	1.5	0.3	0.5	0.9	0.1	0.7	0.9	0.5	0.4	0.1	2.2
16:0	28.3	52.6	4.0	33.1	52.1	14.1	41.8	71.3	12.3	48.8	39.0	56.4
16:1	0.9	1.2	0.6	0.9	0.2	1.6	0.3	0.1	0.5	1.3	1.4	1.7
17:0	–	–	–	0.6	1.1	0.1	–	–	–	–	1.8	0.2
18:0	4.7	7.9	1.5	5.8	9.8	1.8	3.1	5.1	1.1	12.8	12.3	–
18:1	31.9	22.8	41.0	17.7	14.6	20.8	13.3	3.4	23.2	11.4	25.8	–
18:2	33.3	14.2	52.6	41.4	21.3	61.5	40.3	18.9	61.7	25.3	19.6	39.5
ΣS	33.9	64.0	5.8	40.0	63.9	16.1	46.1	77.6	14.6	62.0	53.2	58.8
ΣU	66.1	36.0	94.2	60.0	36.1	83.9	53.9	22.4	65.4	38.0	46.8	41.2

tion — system 1) $CHCl_3-CH_3OH-NH_4OH$ (25%) (10:4:1); second direction — system 2) $CHCl_3-CH_3OH-CH_3COOH-H_2O$ (10:4:1:1). FA methyl esters were analyzed on a Chrom-4 chromatograph with a flame-ionization detector, steel column (4 mm × 2.5 m), stationary phase polyethyleneglycol succinate (17%) on Celite-545 (80-100 mesh), carrier gas nitrogen, temperature of the evaporator 250°C and of the thermostat 198°C.

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