

PHOSPHOLIPIDS OF THE PERICARP OF *Crataegus turkestanica*

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UDC 547.958:665.37

Phospholipids of the pericarp of Crataegus turkestanica have been studied and 12 classes of phospholipids have been detected, the main ones being phosphatidylcholine, phosphatidylethanolamine, and phosphatidylinositol. The composition and position distribution of the fatty acids of the main phospholipids have been studied.

Hawthorn (*Crataegus*, fam. Rosaceae) is a widely distributed plant: 22 species grow in Central Asia, and, of them, ten in Uzbekistan [1]. Hawthorn extracts are used for the treatment of nervous and cardiovascular diseases [2]. There are reports in the literature on the chemical composition of the vegetative and generative organs of hawthorn [3] but there is practically no information on their lipid composition.

We have studied the phospholipids (PLs) of the pericarp of *Crataegus turkestanica*. The total yield of PLs was 0.21% on the dry weight of the pericarp. Table 1 gives the chromatographic mobilities and qualitative and quantitative compositions of the PLs of the pericarp. In the total PLs we detected 12 classes, of which five were identified as PI, PC, PG, PA, and PE. The total amount of the main PLs — PC, PE, and PI — was 94.2%.

We determined the fatty acid (FA) composition of the total lipids and of the PC, PE, and PI (Table 2). Of the 16 fatty acids detected, the main ones were palmitic and linoleic. In all the samples their sum exceeded 70%. The lowest level of palmitic acid was observed in the total lipids and in the PLs it increased from the PC to the PE and its highest amount was found in the PI. The total amount of unsaturated FAs changed in the opposite sequence.

The position distribution of the FAs in the PC, PE, and PI was established by enzymatic hydrolysis (Table 2). An asymmetry of the position distribution of the saturated and unsaturated FAs in the nucleus was shown for the PC: 87.1% of the saturated acids were present in the sn-1 position and 95.1% of the unsaturated FAs in the sn-2 position. In the PE, this phenomenon appeared more feebly: 78.5% of the saturated FAs were localized in the sn-1 position and 67.3% of the unsaturated acids in the sn-2 position. In the PI, the sn-1 position was practically 100% esterified with palmitic acid, and the sn-2 position 64.2% with unsaturated FAs.

TABLE 1. Chromatographic Mobilities and Compositions of the Phospholipids of *C. turkestanica* Pericarp

Phospholipids	R_f		Amount, % of phosphorus
	syst. 1	syst. 2	
1. PL 1	0.03	0.03	0.6
2. PL 2	0.28	0.00	0.2
3. PL 3	0.22	0.18	Tr.
4. Phosphatidylinositol (PI)	0.25	0.22	10.3
5. Phosphatidylcholine (PC)	0.41	0.27	60.1
6. PL 4	0.27	0.29	Tr.
7. Phosphatidylglycerol	0.50	0.44	Tr.
8. Phosphatidic acid	0.22	0.45	1.7
9. Phosphatidylethanolamine (PE)	0.53	0.53	23.8
10. PL 5	0.56	0.51	1.3
11. PL 6	0.83	0.71	0.8
12. PL 7	0.91	0.62	1.2

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TABLE 2. Composition of the FAs of the Total Lipids and Position Distribution of the FAs in the Phospholipids of *C. turkestanica* Pericarp, %

FA	Total lipids	Phosphatidylcholine			Phosphatidylethanolamine			Phosphatidylinositol		
		total	position		total	position		total	position	
			sn-1	sn-2		sn-1	s-2		sn-1	sn-2
Unid.	—	—	—	—	—	—	1.0	—	2.0	
12:0	—	—	—	—	0.1	—	0.2	0.3	0.6	
Unid.	—	0.1	—	0.2	—	—	—	—	—	
14:0	0.2	0.4	0.4	0.4	0.1	—	0.2	0.5	1.0	
Unid.	0.5	0.3	—	0.6	0.2	—	0.4	0.9	1.8	
16:0	40.7	45.6	86.7	4.5	53.8	75.9	31.7	61.7	100.0	
16:1	1.4	0.3	—	0.6	—	—	—	1.4	Tr.	
Unid.	1.0	1.0	1.7	0.3	2.1	1.0	3.2	1.7	—	
16:2	—	—	—	—	—	—	—	1.1	—	
18:0	2.0	—	—	—	1.6	2.6	0.6	Tr.	Tr.	
18:1	4.8	4.9	7.5	2.3	1.9	2.9	0.9	2.1	—	
18:2	36.3	40.5	3.7	77.3	34.5	14.9	54.1	14.9	—	
18:3	6.3	6.9	—	13.8	3.3	—	6.6	7.4	—	
Unid.	—	—	—	—	1.8	2.7	0.9	—	—	
Unid.	1.5	—	—	—	0.6	—	1.2	1.0	—	
Unid.	5.3	—	—	—	—	—	—	0.6	—	
Σ_s	42.9	46.0	87.1	4.9	55.6	78.5	32.7	67.9	100.0	
Σ_u	57.1	54.0	12.9	95.1	44.4	21.5	67.3	32.1	—	

Thus, of the 12 classes of PLs detected in the pericarp of *C. turkestanica*, the main ones were PC, PE, and PI. In the main PLs of the pericarp, as in the majority of organisms [4], the traditional position distribution of the FAs was observed, saturated FAs predominating in the sn-1 position and unsaturated ones in the sn-2 position.

EXPERIMENTAL

Crataegus turkestanica was gathered in the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan by A. S. Pozhidaev in December after frost. The PLs were isolated and analyzed as described in the literature [5]. The quantitative composition of the PLs was determined after two-dimensional TLC [6]. Systems for TLC: 1) $\text{CH}_3\text{Cl}-\text{MeOH}-\text{NH}_4\text{OH}$ (25%) (10:5:2); 2) $\text{CH}_3\text{Cl}-\text{MeOH}-\text{CH}_3\text{COOH}-\text{H}_2\text{O}$ (14:5:1:1).

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