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PHOSPHOLIPIDS OF THE FRUIT KERNELS OF *Crataegus turkestanica*

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The lipids of the kernels of the fruit of C. turkestanica *contain five classes of phospholipids, the main ones being phosphatidylcholine, phosphatidylinositol, and phosphatidylethanolamine. Their fatty acid compositions and, in the main phospholipids, the position distributions of the acyls have been studied.*

We have previously [1] investigated the pericarp lipids of the hawthorn *Crataegus turkestanica*. In the present paper we give the results of a study of the phospholipids (PLs) of the kernels of the fruit of this plant. The moisture content of the kernels was 6.0%. The total yield of PLs was 0.03% on the air-dry weight of the material, which is 7 times smaller than in the pericarp. The number of classes of PLs in the kernels was also smaller than in the pericarp, with five representatives. The main PLs were phosphatidylcholine (PC) — 61.5% — phosphatidylinositol (PI) — 27.9% — and phosphatidylethanolamine — 8.7% — while the others totalled 1.9% (1.7% of phosphatidic acid and 0.2% of unidentified PLs).

In all the classes of PLs we determined the total fatty acid (FA) composition. In contrast to the PLs of the pericarp, which contained 16 classes of FAs, only 8 FAs were found in the kernels (Table 1). As in the pericarp, the main FAs were linoleic, oleic, and palmitic acids. The PC contained more unsaturated FAs (85%) than the other PLs, while the PI contained least (61.8%).

We determined the position distributions of the FAs in the main PLs — PC, PI, and PE — by enzymatic hydrolysis (see Table 1). We observed in them the traditional distribution of FAs, with unsaturated FAs predominating in the sn-2 position. With respect to the degree of asymmetry of the position distribution of the FAs, first place was occupied by the PI — in the sn-1 position saturated FAs predominated (75.1%), the main one being palmitic acid (67.7%), while in the sn-2 position there was 98.7% of unsaturated FAs — linoleic (51.6%), oleic (34.5%), and linolenic (12.6%). The PE was in the second place, with 53.6% of saturated FAs, mainly palmitic (44.4%), in the sn-1 position, while in the sn-2 position there was 95.8% of unsaturated acids, with a predominance of linoleic (63.1%), its level in the PE in fact being greater than in the other PLs. In the PC, 72.3% of the unsaturated acids was localized in the sn-1 position, and unsaturated FAs also predominated in the sn-2 position, the main ones being linoleic (50.7%) and oleic (37.9%).

It must be mentioned that the main PLs of the kernels contained more unsaturated acids than the PLs of the pericarp. With respect to the asymmetry of the position distribution of the FAs, also, the PLs of the pericarp differed from those of the kernels: in all of them saturated acids predominated in the sn-1 position, while in the sn-2 positions of the PI and PE, although unsaturated FAs predominated, their amounts were smaller than in the kernel PLs.

Thus, of the five classes of PLs detected in the fruit kernels of *Crataegus turkestanica* the main ones were PC, PI, and PE, as in the pericarp. In the main PLs of the kernels, as in the majority of living organisms [2], the traditional position distribution of the FAs is observed, with unsaturated acids predominating in the sn-2 position.

EXPERIMENTAL

The *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 the first autumn frosts [3]. The PLs were determined quantitatively after

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TABLE 1. Compositions and Position Distributions of the Fatty Acids in the Phospholipids of the Fruit Kernels of *Crataegus turkestanica*, %

FA	PC			PI			PE			PA	Unident.
	tot.	sn-1	sn-2	tot.	sn-1	sn-2	tot.	sn-1	sn-2		
14:0	0.2	–	0.4	0.3	0.6	–	1.6	2.2	1.0	1.2	1.4
16:0	13.5	25.1	1.9	34.5	67.7	1.3	23.8	44.4	3.2	31.7	25.0
16:1	0.3	–	0.6	–	–	–	–	–	–	–	–
16:2	–	–	–	0.8	1.6	–	–	–	–	1.3	0.6
18:0	1.3	2.6	–	3.4	6.8	–	3.5	7.0	–	5.0	3.4
18:1	38.2	38.5	37.9	22.7	10.9	34.5	22.6	20.3	24.9	15.6	13.9
18:2	42.2	33.7	50.7	30.2	8.8	51.6	44.6	26.1	63.1	20.3	44.7
18:3	4.3	0.1	8.5	8.1	3.6	12.6	3.9	Tr.	7.8	24.9	11.0
Σ_s	15.0	27.7	2.3	38.2	75.1	1.3	28.9	53.6	4.2	37.9	28.8
Σ_u	85.0	72.3	97.7	61.8	24.9	98.7	71.1	46.4	95.8	62.1	71.2

TLC by the method of Dyatlovitskaya et al. [4]. Methyl esters of the FAs were analyzed by GLC on a Chrom-4 instrument (Czechoslovakia) with a flame-ionization detector, using a steel column (4 mm × 2.5 m) with the stationary phase polyethyleneglycol succinate (17%) on Celite-545 (80-100 mesh) and the carrier gas helium, the temperature of the evaporator being 250°C and that of the thermostat 198°C.

REFERENCES

1. F. Yu. Gazizov and A. I. Glushenkova, Khim. Prir. Soedin., 562 (1995).
2. F. Yu. Gazizov, A. Sh. Isamukhamedov, and A. I. Glushenkova, Khim. Prir. Soedin., 691 (1990).
3. F. Yu. Gazizov, L. A. Shustanova, and S. T. Akramov, Khim. Prir. Soedin., 198 (1977).
4. É. V. Dyatlovitskaya, T. I. Torkhovksaya, and L. D. Bergel'son, Biokhimiya, **34**, No. 1, 77 (1969).