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LIPIDS OF ROSE FRUITS

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The neutral and polar lipids of rose fruit and wastes have been investigated. With respect to its main indices and carotenoid content (333.6 mg%) the oil from rose wastes satisfies the demands of the Pharmacopeia specification.

Every year forestry enterprises gather an enormous amount of rose fruit, the sorting of which gives rise to wastes (crushed and unripe fruit) containing a valuable medicinal oil. We have made a comparative investigation of the lipids of rose fruit and wastes gathered on Uzbekistan territory.

The oil was extracted from the air-dry comminuted fruit with hexane, and the polar lipids (PLs) with a 7:3 mixture of chloroform and methanol, followed by the elimination of nonlipid components [1].

The main indices are given in Table 1. The yields of lipids and the amounts of carotenoids in them were higher for the fruit than for the rose wastes; nevertheless, in its main indices the oil from the wastes satisfied the demands of the Pharmacopeia standard [2].

The PLs were separated by CC on silica gel [1] into individual components (% by weight):

Rose	Neutral lipids (NLs)	Glycolipids (GLs)	Phospholipids (PLs)
Fruit	7.3	83.6	9.1
Wastes	7.6	90.4	2.0

The amounts of NLs, GLs, and PLs as percentages of the total weight of the lipids were, respectively: 4.8, 1.8, and 0.2 for the fruit, and 3.2, 1.8, and 0.1 for the wastes.

When the GLs were analyzed on silica gel in system 1 and the spots were revealed with α-naphthol and perchloric acid, identical sets of components were revealed: sterol glycoside esters (R_f 0.90), monogalactosyldiglycerides (R_f 0.85), sterol glycosides (R_f 0.61), and digalactosyldiglycerides (R_f 0.26).

The PLs were identified by two-dimensional TLC in solvent system 2 by the Dragendorff and Vas'kovskii reagents and ninhydrin. The following classes were revealed: phosphatidylethanolamine (PE), N-acylphosphatidylethanolamine (N-acyl-PE), N-acyl-lyso-phosphatidylethanolamine (N-acyl-lyso-PE), phosphatidylinositol (PI), phosphatidylcholine (PC), lyso-phosphatidylcholine (lyso-PC), and phosphatidic acid (PA). Quantitatively, these components could be arranged in the following order: fruit — PI > PE > PC > PA > N-acyl-lyso-PE > lyso-PC; wastes — PI > PE > PA > PC > N-acyl-lyso-PE > lyso-PC.

The fatty acid compositions of the NLs, GLs, and PLs were established by GLC after the hydrolysis of the corresponding classes of lipids (Table 2).

The NLs and PLs were enriched with unsaturated fatty acids, while the PLs contained a considerably smaller amount of these acids, and in the PLs of the wastes the amount of unsaturated components was 20% lower than in the PLs of the fruit. The proportion of the 18:2 acid was lower in the PLs of the wastes than in the NLs by almost 35%, and the 18:3 acid by 20%. In all the classes of lipids, both of the fruit and of the wastes, the amount of the 16:0 acid remained at the same level.

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TABLE 1. Characteristics of the Lipids of Rose Fruit and Wastes

Rose	Oil content of the fruit, % on a.d.m.	Moisture content of the fruit, % by weight	Yield of PLs, % by weight	Refractive index, n_D	Acid No., mg KOH	Carotenoid content, mg%
Fruit	4.6	11.3	2.2	1.481	4.8	362.5
Wastes	3.4	9.0	2.0	1.479	5.5	333.6

TABLE 2. Compositions of the Fatty Acids of Rose Fruit (I) and Wastes (II), GLC % by Weight

Acid	NLs		GLs		PLs	
	I	II	I	II	I	II
10:0	0.3	0.4	–	–	–	–
12:0	0.2	0.4	0.7	0.5	1.0	1.7
14:0	0.2	0.1	0.6	0.1	0.7	2.2
16:0	4.4	4.1	11.8	7.7	31.5	44.5
16:1	0.5	0.3	0.8	0.3	1.7	5.3
18:0	2.8	3.0	4.1	1.9	8.5	14.2
18:1	22.6	24.8	19.2	19.9	24.2	19.4
18:2	48.9	45.0	31.9	45.2	24.9	10.5
18:3	18.8	21.3	30.9	24.4	7.5	2.2
20:0	1.3	0.6	–	–	–	–
Σ_{sat}	9.2	8.6	17.2	10.2	41.7	62.6
Σ_{unsat}	90.8	91.4	82.8	89.8	58.3	37.4

EXPERIMENTAL

For general observations, see [1].

Solvent systems: 1) $CHCl_3$:CH_3COCH_3:MeOH:CH_3COOH:H_2O (65:20:10:10:3); 2) $CHCl_3$:MeOH:NH_4OH (65:35:5); and 3) $CHCl_3$:MeOH:CH_3COOH:CH_3COCH_3:H_2O (20:10:4:8:2).

Oil and moisture contents were determined as described in [3], acid Nos. in accordance with the handbook [4], and carotenoid contents by the method of [5].

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