BRIEF COMMUNICATIONS

COMPOSITION OF THE FATTY ACIDS OF THE PHOSPHOLIPIDS OF THE COTTON PLANT

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The medium-fiber variety of the cotton plant, S-4727, that we are studying is sown in the northern and foothill regions of Uzbekistan on soils weakly infected with wilt. The variety is early-ripening and high-yielding and is one of the ancestors in the breeding of the "Tashkent" wilt-resistant varieties [1].

We have reported the isolation and the qualitative and quantitative composition of the phospholipid complex of the kernels previously [2]. The combined phospholipids (PLs) isolated were additionally freed from carbohydrates on Molselekt G-25. Their yield was 1.15% on the weight of the kernels, and their phosphorus content was 3.51%. Homogeneous fractions of phosphatidylcholine (PC), phosphatidylethanolamine (PE), and phosphatidylinositol (PI) were obtained by the successive fractionation of the combined PLs with ethanol and column chromatography on silica gel [3]. The PE and PI fractions were additionally separated by TLC on silica gel in the $CHCl_3-CH_3OH-NH_4OH$ (14 : 6 : 1) solvent system.

The structures of the PC, PE, and PI, confirmed by physical and chemical methods, corresponded to those of known compounds. We determined the fatty-acid compositions of the intact PLs and the position distribution of the fatty-acid radicals in their molecules by using enzymatic hydrolysis with phospholipase A_2 under conditions described previously [4], but for the application of this reaction to the PI the amount of enzyme was doubled. The time of complete enzymatic hydrolysis at room temperature, 23°C, was 0.5 h for the PC, 16 h for the PE, and 120 h for the PI. It follows from the fatty-acid analysis (Table 1) that the cells of the plant tissue of the seed kernels of the variety of cotton plant investigated synthesize molecules of PC in which unsaturated acids predominate in both positions of the glyceride moiety. For PE and, especially PI, this synthesis takes place more selectively, since saturated (S) acids are localized mainly in position 1 and unsaturated (U) acids in position 2. The main groups of PLs have the sequence of increasing saturation PC → PE → PI.

In the initial combined PLs obtained under mild conditions [2], we found natural lyso-PC (1.7%), isolated it preparatively, and determined its fatty-acid composition (%): 10:0–07; 12:0–1.5; 14:0–0.5; 16:0–26.8; 16:1–1.2; 18:0–4.0; 18:1–27.1; 18:2–38.2, the sum of the saturated fatty acids being 33.5% and of the unsaturated 66.5%. The fatty-acid composition shows that the natural lyso-PCs are present in 1- and 2-acyl form. A similar situation has been described for the lyso-PCs of wheat [5].

TABLE 1. Fatty-Acid Composition of the Phospholipids, %

Fatty acid	Phosphatidylcholine			Phosphatidylethanolamine			Phosphatidylinositol		
	initial	position		initial	position		initial	position	
		1	2		1	2		1	2
12:0	0	0	0	2,0	2,6	0,9	2,0	2,0	2,7
14:0	0,7	1,0	0,6	1,6	2,0	0,8	2,0	2,0	2,6
16:0	18,6	35,4	2,2	30,0	55,7	3,3	36,7	63,9	3,8
16:1	0,9	0,9	0,6	2,1	3,9	0,5	1,9	8,5	2,0
18:0	1,8	4,6	0	2,9	5,3	0,6	5,5	9,4	0
18:1	28,0	23,8	32,8	13,8	6,5	20,0	8,9	7,5	12,3
18:2	50,0	34,3	63,8	47,6	24,0	73,9	41,4	4,8	74,6
18:3	0	0	0	0	0	0	1,6	1,9	2,0
ΣS	21,1	41,0	2,8	36,5	65,6	5,6	46,2	77,4	9,1
ΣU	78,9	59,0	97,2	63,5	34,4	94,4	53,8	22,6	90,9

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COUMARINS OF Angelica sachalinensis

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The new coumarin sachalinin has previously been isolated from the roots of Angelica sachalinensis Maxim, family Umbelliferae; it is an optical isomer of the known discophoridin [2]. The high content of coumarins in the roots and fruit of the plant investigated induced us to study it further.

By chromatography on a column of silica gel we isolated another two coumarins from the roots of this plant.

The first coumarin (I) with the composition $C_{21}H_{20}O_7$, mp 131-132°C, $[\alpha]_D^{20} - 41°$ (in chloroform) proved to be a diester of khellactone, and on the basis of its physicochemical constants and IR and NMR spectra it was identified as isopteryxin.

The second coumarin (II), $C_{14}H_{12}O_3$, mp 104°C, is soluble in organic solvents. It gives the characteristic reactions for coumarins (lactone test, diazo reaction). Its UV spectrum has a maximum at 328 nm (log ε 4.11), which is characteristic for the chromophore of 7-hydroxycoumarin. The presence of small maxima at 250 and 262 nm (log ε 3.50 and 4.0, respectively) enabled us to assign it to the dihydrofuro- and dihydropyrano coumarins. The IR spectrum contained maxima at (cm^{-1}) 1740 (carbonyl), 1620, and 1585 (aromatic nucleus). The NMR spectrum contained a quadruplet at 7.54 and 6.10 ppm, J = 9.5 Hz (H-4, H-3), and doublets at 7.21 and 6.65 ppm, J = 8.5 Hz (H-6, H-5).

These facts show that substance (II) is a 7,8-disubstituted coumarin. A two-proton sextet with its center at 3.22 ppm is due to the methylene protons at an unsubstituted carbon atom of a dihydrofuran ring and a triplet at 5.25 ppm, J = 9 Hz, to a methine proton of the same ring.

The substituent in the furan ring is an isopropylene group, which appears in the form of a three-proton singlet at 1.7 ppm (methyl on a double bond) and one-proton doublets at 5.0 and 4.86 ppm, J = 2.5 Hz—vinyl protons.

On the basis of the facts presented, it may be concluded that (II) has the structure of 2'-isopropenyl-2', 3'-dihydrofuro-4',5':8,7-coumarin—angenomalin.

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