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LIPIDS FROM *Sterculia platanifolia* AND *Hamamelis virginiana* SEEDS

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The plants *Sterculia platanifolia* L. f. (Chinese parasol tree) (Sterculiaceae) and *Hamamelis virginiana* L. (American witchhazel) (Hamamelidaceae) have been used since antiquity in traditional medicine. Tincture of *S. platanifolia* is an official medicinal preparation used as a stimulant and tonic for asthenia, exhaustion, and reduction of muscle tone [1]. Leaves of *H. virginiana* are an ingredient of homeopathic preparations. The tincture and cream of extracts of this plant are used for vascular diseases [2-4].

Biological aspects of the growth and development of *S. platanifolia* and *H. virginiana* in the humid subtropics of Georgia have been studied. Recommendations for cultivation have been written. The plants have been cultivated at Kobulet Experimental Station for Medicinal Plants of the Institute of Pharmaceutical Chemistry. Both these species produce a large number of seeds, which prompted our interest in the study of their lipid composition.

Air-dried ground seeds were extracted exhaustively with *n*-hexane at room temperature. Solvent was distilled off to afford neutral lipids (NL) as a yellow oily liquid for *S. platanifolia* (SP) (17.0%) and *H. virginiana* (HV) (12.0%).

The physical chemical properties of the NL from SP and HV, respectively, were as follows: acid number (mg KOH), 12.0 and 4.5; d_4^{20} -0.916 and 0.913; n_D^{20} -1.472 and 1.476; saponification number (mg KOH), 184.5 and 148.9; iodine number (% I_2), 76.6 and 171.3.

TLC of NL from SP and HV on Silufol and silica gel plates (with 10% $CaSO_4$) in various solvent systems detected zones corresponding to hydrocarbons (HC), triacylglycerides (TAG), free fatty acids (FFA), free sterols (FS), 1,3-diacylglycerides (DAG), and phospholipids (PL). Column chromatography of NL with subsequent preparative TLC (PTLC) isolated from mixed fractions all basic NL classes [5, 6]. The ratios of individual classes were typical for lipids of higher plants.

Total lipids and acyl-containing acids in them were hydrolyzed by KOH. Fatty acids (FA) were methylated by diazomethane [7] and analyzed by GC as the methyl esters [8] (Table 1).

It has been found that NL from both plants have a simple fatty-acid composition and contain only 3-4 components, among which linoleic acid dominated.

Phospholipids (PL) from defattted seeds of SP and HV were extracted and purified as before [5, 9]. The yields of total phospholipids from SP and HV seeds were 0.21 and 0.14%, respectively.

Total PL were analyzed and separated by two-dimensional PTLC on silica gel. Quantitative analysis of pure PL was performed by spectrophotometric methods [10].

Table 2 shows that the main component of PL from SP is phosphatidylcholine (PC). The regular distribution PC > phosphatidylinosite (PI) > phosphatidylethanolamine (PE) was observed. The PL from HV had a high content of PI, which was unusual for plant lipids. The presence in both plants of *N*-acylated derivatives of PE and lyso-phosphatidylethanolamine (lPE) was noteworthy.

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TABLE 1. Fatty-Acid Composition of Lipids from *Sterculia platanifolia* (SP) and *Hamamelis virginiana* (HV) Seeds, %, GC

Fatty acid	Total FA		TAG		FFA		DAG	
	SP	HV	SP	HV	SP	HV	SP	HV
16:0	28.7	5.3	41.8	11.7	58.5	23.1	50.2	37.9
18:1	16.8	13.4	16.3	24.5	18.0	27.4	14.9	45.3
18:2	54.5	68.2	41.9	58.2	23.5	49.5	34.9	16.8
18:3	-	13.1	-	5.6	-	-	-	-

TABLE 2. Phospholipid Composition in Purified Total PL (%) from *S. platanfiolia* and *Hamamelis virginiana* Seeds

Plant	PC	PI	PE	l-PC	*N*-ac. PE	*N*-ac. l-PE
Sterculia platanifolia	61.3	12.6	3.7	11	7.3	4.1
Hamamelis virginiana	37.2	28.7	9.8	3.7	13.3	7.3

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PC, phosphatidylcholine; PI, phosphatidylinosite; PE, phosphatidylethanolamine; l-PC, lyso-phosphatidylcholine; *N*-ac. PE, *N*-acylphosphatidylethanolamine; *N*-ac. l-PE, *N*-acyl-lyso-phosphatidylethanolamine.

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