ENZYMATIC-CHEMICAL ISOLATION OF LIPIDS, PROTEINS, AND SOME PHENOLS FROM SUNFLOWER SEEDS AND PEANUTS. II

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Continuing investigations on the extraction of a complex of substances from oil seeds, we have tested the application of the enzymatic-chemical method to the seeds and oil cake of the sunflower and the peanut. The sunflower seeds and oil cake were obtained from the Krasnodar oils and fats combine, and the peanuts from the commercial network.

As in the case of cotton seeds [1], the seeds and nuts were freed from the seed coat and the kernels were subjected to preliminary drying. In contrast to cottonseed meal, which was subjected to enzymatic hydrolysis without drying, the sunflower seed oil cake was also dried. The neutral lipids were extracted from dried and ground samples, and their yields are given in Table 1. Drying increased the yields of neutral lipids, particularly from the oil cake.

The main phenolic substances of sunflower seeds include free and bound forms of caffeic and chlorogenic acids [2, 3], and those of peanuts include sinapic and p-hydroxybenzoic acids [4]. The phenolic compounds were analyzed on Silufol plates in the butanol–acetic acid–water (40:7:32) system [3]. The TLC of the lipids has been described in [1]. Qualitative reactions were performed according to [5]. A low level of free fatty acids was detected in the neutral lipids, but no phenolic compounds and polar lipids (PLs).

The defatted samples were hydrolyzed with protosubtilin G10X under the optimum conditions [1], and the results on the yield of PLs were compared with those obtained by the chemical method (see Table 1). In comparison with the control experiments, under the action

TABLE 1. Yields of Neutral Lipids and Proteolysis Products from Sunflower Seed and Peanut Raw Material and Substrates

Sample	Neutral lipids, % by weight		Lipid content, % by weight*		Yield of lipids from the proteolysis products, % on the weight of the sample			Total yield of lipids, % on the wt. of the sample	Yield of protein hydrolysate, % on the weight, % of protein
	initial	dried	bound	strongly bound	liquid phase	solid phase: ether	solid phase: acetone		
Sunflower seed kernels	51,3	52,0	12,2	5,1	3,6 (20,9)†	5,6 (32,6)	8,0 (46,5)	17,2 (100)	29,86
			17,3						
Control					1,5 (13,4)	4,0 (35,7)	5,7 (50,9)	11,2 (100)	25,54
Sunflower seed oil cake	18,7	21,6	6,6	3,9	0,2 (1,9)	2,5 (23,6)	7,9 (74,5)	10,6 (100)	26,83
			10,5						
Control					0,2 (2,8)	2,4 (33,3)	4,7 (65,3)	(100)	20,60
Peanuts	49,3	50,2	10,0	4,4	0,1 (0,7)	6,0 (42,0)	8,2 (57,3)	14,3 (100)	25,82
			14,4						
Control					0,1 (1,0)	4,1 (41,9)	5,6 (57,1)	9,8 (100)	21,50

*Determined by a chemical method.
†Of the total yields of lipids.

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of the enzyme the yields of PLs and proteins from each substrate increased on an average by a factor of 1.2-1.5, and in the case of the lipids they reached the level determined by the chemical method.

The nature of the substrate appreciably affected the degree of interphase distribution of the lipid and protein products of hydrolysis. On the enzymatic hydrolysis of sunflower-seed kernels 79% of the weight of the LPs was weakly sorbed on the solid phase, while in the case of the peanuts practically their whole amount was sorbed.

According to TLC, the polar lipids of the three samples, like the analogous lipids of cottonseed kernels [1], consisted of components of the phospho- and glycolipids that are common for the seeds of higher plants. No quantitative evaluation of the compositions of the PLs was made.

Analysis of the PLs obtained by the proteolysis of the sunflower seed kernels of the presence of phenols by the TLC method and qualitative reactions showed that there were no phenols in the ethereal extracts of the two phases, but phenols (caffeic acid) were detected in an acetone extract from the solid phase.

Thus, the enzymatic-chemical method is suitable for the initial partially processed seeds (oil cakes) and meals not only of cotton seeds but also of other oil and pulse crops and enables the yields of lipids and water-soluble proteins to be increased.

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FATTY ACID COMPOSITIONS OF THE NEUTRAL LIPIDS OF THE SEEDS OF DIFFERENT VARIETIES OF Olea europaea

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The olive, Olea europaea L., is a valuable oil crop more than 80 varieties of which are grown on the Apsheron peninsula (Azerbaidzhan SSR). We have previously investigated the fatty acids (FAs), neutral lipids (NLs), flesh with skin, seeds, and leaves of a number of varieties of Olea europaea L. growing in the Azerbaidzhan SSR, and also of industrial wastes from this crop [1-3]. There is only extremely limited information in the literature on the FA composition of the NLs of olive seeds [4, 5] but, so far as concerns the varieties grown on the Apsheron peninsula, the FA compositions of the NLs of some of them have been given in [1].

Continuing these investigations, we have studied the FA compositions of the NLs of the seeds of four varieties of Olea europaea not studied previously: Della Madonna, Tossiiskaya, Shirin-zeitun, and Kara-zeitun.

The neutral lipids were isolated by extracting the ground seeds with petroleum ether (40-60°C) in a Soxhlet apparatus [6]. The yields of NLs from the individual varieties were, respectively, 12.6, 13.8, 13.1, and 14.2% of the weight of the raw material. The total FAs

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