3. The Determination of Vitamins A and E and of Carotenoids in Feedstuffs, Drugs, and Biological Materials. Methodological Instructions of the USSR Ministry of Agriculture [in Russian], VNIITIP, Zagorsk (1978).
4. A. G. Vereshchagin, Biokhimiya, 23, No. 5, 721 (1958).
5. Kh. N. Pochinok, Methods for the Biochemical Analysis of Plants [in Russian], Kiev (1976), p. 213.

HOMOGENEOUS LECITHIN FROM COMMERCIAL PHOSPHATIDES

Kh. S. Mukhamedova, I. Tolibaev, and A. I. Glushenkova

UDC 547.953:665.37

Phosphatide concentrates (PCs) mainly from soybeans and from sunflowers obtained in the production of vegetable oils, are used as additives in many branches of the food industry [1]. According to the literature, in soybean PCs there are 33.0-36.8% of neutral lipids [2-6], up to 60% of phospholipids [2, 4, 5], 5-7% of carbohydrates [4, 5], and up to 2% of sterols and tocopherols [2]. The main component of commercial PCs is lecithin (phosphatidylcholine) the amount of which in various samples of soybean PCs ranges from 19.0% [6] to 36.7% [2, 5, 7] and in sunflower PCs up to 52% [8, 9] of the weight of the phospholipids of the concentrate.

There is no information in the literature on the fatty acids (FAs) of the homogeneous lecithin of PCs.

We have studied the composition of the PCs and the position distribution of the FA radicals in the lecithin molecules from soybean (Far Eastern varieties of soybean) and sunflower PCs. It was found that in the soybean PCs there were 31% of neutral lipids (NLs), 6.3% of carbohydrates, 58% of total phospholipids, and 4.7% of sterols, pigments, and other impurities; and in sunflower PCs, 30% of NLs, 8% of carbohydrates, 55% of total phospholipids, and 7% of sterols, pigments, and other impurities. The amount of lecithin on the weight of the phospholipids of the soybean PCs was 40% and of the sunflower PCs 38%.

Chromatographically homogeneous lecithin from PCs freed from carbohydrates was obtained by the method of Singleton et al. [10]: a chloroform solution of the PCs was passed through Al_2O_3, neutral, Brockman activity grade II (ratio of PCs to absorbent 1:20) and the column was eluted with acetone (NLs, part of the pigments) and chloroform (NLs and pigments), and then the lecithin was eluted with chloroform–methanol (95:5 and 90:10). In this way, up to 80% of the lecithin was eluted in chromatographically homogeneous form: R_f 0.4 and 0.5 in the chloroform–methanol–25% ammonia (65:25:4) and chloroform–methanol–water (65:35:5) systems, respectively, the remainder being in the form of a mixture with lyso-PCs, which can be separated preparatively in the systems given above. The lecithin formed a slightly yellowish viscous oil readily soluble in the usual organic solvents.

TABLE 1. Composition and Position Distribution of the Fatty Acids of the Lecithin from Commercial Phosphatides

Lecithin	Fatty acid												
	10 : 0	12 : 0	14 : 0	15 : 0	16 : 0	16 : 1	17 : 0	18 : 0	18 : 1	18 : 2	18 : 3	ΣП	ΣН
Soybean													
Total	4,1	6.3	2,5	2,1	14.5	Tr.	1,3	4,5	11,4	48,3	5,0	35,3	64,7
sn-1	5,6	9.2	3,5	Tr.	22,4	Tr.	3.1	6,6	10,9	31 1	4,1	53,9	46,1
sn-2	2.8	3,7	1,8	2,1	4,5	Tr.	—	1.4	9 5	66 9	7,3	16,3	83,7
Sunflower													
Total	3,2	6,5	1,8	—	20.2	1.8	—	7,2	19,2	38 5	1 6	38,9	61,1
sn-1	4,4	8,7	2,0	—	40,0	1,8	—	10.9	15,4	16.8	—	66,0	34,0
sn-2	1.2	1,0	1,5	—	3.6	1,4	—	—	23,8	66,5	1,0	7,3	92,7

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR, Tashkent. Translated from Khimiya Prirodnykh Soedinenii, No. 6, pp. 775-776, November-December, 1986. Original article submitted August 11, 1986.

0009-3130/86/2206-0721$12.50

The fatty acids of the lecithins were split out as described in [11], and the position distribution of the FA radicals in the molecule was determined by enzymatic hydrolysis using kufi venom in 0.1 M Tris buffer, pH 9.4, as the source of phospholipase A_2. The FAs were analyzed by GLC [12] (Table 1).

As can be seen, a more specific distribution of the FAs is observed in the molecule of the sunflower lecithin.

LITERATURE CITED

1. H. Pardun, Seifen-Öle-Fette-Wachse, 111, No. 14, 409 (1985); 111, No. 16, 503 (1985).
2. H. Pardun, Fette-Seifen-Anstr., 64, 536 (1962).
3. Van W. Neiuwenhuyzen, J. Am. Oil Chem. Soc., 53, 425 (1976).
4. R. Brian, J. Am. Oil Chem. Soc., 53, 27 (1976).
5. E. J. Weber, J. Am. Oil Chem. Soc., 53, 425 (1976).
6. C. R. Scholfield, J. Am. Oil Chem. Soc., 53, 425 (1976).
7. É. Ya. Kostetskii and N. I. Gerasiminko, Khim. Prir. Soedin., 35 (1984).
8. G. W. Chapman, Jr., J. Am. Oil Chem. Soc., 58, 902 (1981).
9. W. H. Morrison, J. Am. Oil Chem. Soc., 58, 902 (1981).
10. W. S. Singleton, M. S. Gray, M. L. Brown, and J. L. White, J. Am. Oil Chem. Soc., 42, 53 (1965).
11. E. Stahl, Thin Layer Chromatography, 2nd edn., Allen and Unwin, London (1969).
12. I. Tolibaev, Kh. S. Mukhamedova, and A. I. Glushenkova, Khim. Prir. Soedin., 158 (1986).

COUMARINS OF THE INFLORESCENCES OF *Calendula officinalis* AND *Helichrysum arenarium*

A. I. Derkach, N. F. Komissarenko, and V. T. Chernobai

UDC 577.15/17:582.89

In a study of the inflorescences of *Calendula officinalis* L. (pot marigold calendula) and *Helichrysum arenarium* (L.) Moench, family *Asteraceae*, a number of substances were detected by paper chromatography in the chloroform–formamide system (R_f 0.12, 0.38, 0.66) which fluoresced blue in UV light. To determine their nature, a purified combination of these substances was subjected to degradation as described in [1]. Analysis of the reaction products by paper chromatography in the petroleum ether–formamide system revealed the presence of coumarin (α-benzopyrone). This shows that these substances are coumarin derivatives.

To isolate the substances that had been detected, the comminuted raw material was extracted with 80% ethanol, the extracts so obtained were evaporated in vacuum to an aqueous residue, the precipitate that had deposited was filtered off, and the filtrate was treated with chloroform. The chloroform extract was evaporated and the residue was deposited on a column of silica gel which was washed first with chloroform–benzene (1:1), chloroform, and then with chloroform with the addition of up to 5% of ethanol by volume. This yielded three substances.

Substance (I) (R_f 0.66), $C_{10}H_8O_4$, mp 204-205°C, formed an acetyl derivative with mp 142-143°C. The UV spectrum of the compound isolated had a number of absorption maxima in the 230, 256, 298, and 343 nm regions.

On the basis of the physicochemical properties of the substance under investigation and of its acetyl derivatives, and also of a mixed melting point, the substance isolated was identified as scopoletin [2].

The other two coumarins were isolated in very small amount. From mixed melting points and parallel chromatography with authentic samples they were identified as umbelliferone (R_f 0.38), $C_9H_6O_3$, mp 233-234°C, and esculetin (R_f 0.12), $C_9H_6O_4$, mp 268-271°C.

All-Union Scientific-Research Institute of Drug Chemistry and Technology, Khar'kov.

Translated from Khimiya Prirodnykh Soedinenii, No. 6, p. 777, November-December, 1986. Original article submitted July 8, 1986.

0009-3130/86/2206- 0722$12.60