Substance 5, $C_9H_8O_3$, mp 208-210°C, R_f 0.93 (system 1). This was obtained by extracting the raw material with 5% sodium carbonate solution followed by separation of the combined purified acids by TLC on silica gel (system 1). Fusion with KOH led to the formation of p-hydroxybenzoic acid. A mixture with an authentic sample of p-coumaric acid gave no depression of the melting point. This substance was obtained from the plant by the use of alkaline solvents, i.e., it could be an artifact. For a check, a comparative chromatographic investigation was made of p-coumaric acid which confirmed the presence of this compound in the raw material.

The qualitative composition of the amino acids and their amounts in the herb betony was studied by Katsukova's procedure [5]. Alanine, arginine, aspartic acid, valine, glycine, histidine, glutamic acid, leucine, and isoleucine, lysine, methionine, tyrosine, threonine, phenylalanine, and traces of cysteine – a total of 15 amino acids – were detected, the total amount calculated in the dry raw material being 0.42%.

LITERATURE CITED

1. V. A. Bandyukova. Khim. Prir. Soedin., No. 2, 263 (1983).
2. L. I. Dranik, in: Phenolic Compounds and Their Biological Functions [in Russian], Moscow (1968), p. 53.
3. A. Ya. Kobzar', Khim. Prir. Soedin., No. 2, 239 (1986).
4. M. J. Michaud, Bull. Soc. Pharm. Bordeaux, 104, 233 (1965).
5. A. A. Katsukova, Naychnotekhn. Byull., No. 22, VASKhNIL., [Lenin Academy of Agricultural Sciences], Khar'kov (1978).

PIGMENTS OF Olea europea

V. N. Golubev, Z. D. Gusar, and É. Sh. Mamedov

UDC 577.115.3:577.161

A component part of the lipid complex of the olive is formed by fat-soluble pigments – carotenoids, chlorophylls, and pheophytins – which largely determine the organic indices of olive oil.

TABLE 1. Relative Amounts (% on the total weight) of Carotenoids and Chlorophylls in the Products of the Olive

Pigment	Olive oil		Olive press-cake
	edible	technical	
Carotenoids			
phytoene	0,31	0,14	1,02
phytofluene	0,12	0,07	1,32
α-carotene	0,18	0,25	0,51
β-carotene	0,27	0,52	0,72
γ-carotene	0,15	0,25	1,02
hydroxy-α-carotene	—	0,14	0,07
cryptoxanthene	—	0,17	0,21
lutein	0,31	0,34	2,3
lutein 5,6-epoxide	—	0,09	0,08
lutein 5,8-epoxide	—	0,04	0,09
neoxanthene	0,03	0,08	0,12
Chlorophylls			
chlorophyll b	—	2,00	4,70
chlorophyll a	2,56	1,04	5,20
pheophytin b	2,28	0,40	3,12
pheophytin a	5,37	8,60	5,19
pheophorbide b	0,4	0,04	0,01
pheophorbide a	0,7	0,90	1,12

Lomonosov Technological Institute of the Food Industry, Odessa. Translated from Khimiya Prirodnykh Soedinenii, No. 2, pp. 241-242, March-April, 1986. Original article submitted July 24, 1985.

Edible and technical olive oils and also the oil cake after the processing of the olive Olea europea L. growing in the Azerbaidzhan SSR have been investigated.

The lipids and chlorophylls were isolated by a modified Bligh-Dyer method [1]. The total green pigments were precipitated with petroleum ether and were separated from the accompanying carotenoids and lipids by column chromatography [2]. Separation into individual forms was carried out by thin-layer chromatography on silica gel in the heptane–methyl ethyl ketone (5:3) system. The identification and quantitative determination of the chlorophylls was performed on the basis of spectrophotometric and chromatographic results [2, 3].

The yellow pigments were freed from accompanying chlorophylls and lipids by saponification with the subsequent elimination of sterols [4]. The purified extract of carotenoids was then separated with the aid of column and thin-layer chromatography [5]. To stabilize the carotenoids in relation of oxidation, ethoxyquin was added (500 mg/100 ml) during chromatography, and the pigments were detected visually from their coloration or, in the case of colorless fractions by staining with iodine vapor [4]. The carotenoids were identified on the basis of the characteristic absorption maxima of their absorption curves in the 200-700 nm region. Quantitative determination was performed spectrophotometrically using known specific extinction coefficients [2, 5]. The results obtained are given in Table 1.

Thus, the carotenoid complex of the olive includes 11 individual pigments, and these are present in the largest amount in technical olive oil and press-cake. Edible olive oil is characterized by the smallest set of carotenoids, but it contains a large amount of colorless carotenoids (phytoene, phytofluene), which are precursors in the biosynthesis of carotenes. It must be mentioned that, of the carotenoids identified, α-, β-, and γ-carotenes, cryptoxanthene, and hydroxy-α-carotene possess vitamin activity.

The study of the distribution of the chlorophylls and pheophytins has shown that the a-forms predominate over the b-forms; this is obviously connected both with the activity of the chlorophyllase that is widely distributed in plant tissues and also with the presence of natural antioxidants (tocopherols), which are capable of inhibiting the oxidative transformation of the a-form of chlorophylls into the b-forms.

LITERATURE CITED

1. A. V. Bogatskii, Yu. L. Zherebin, and A. A. Kolesnik, Vinogradarstvo i Vinodelie SSSR, 8, 26 (1979).
2. Pigments of the Plastids of Green Plants and Procedure for Their Investigation [in Russian], Moscow–Leningrad (1964), p. 121.
3. N. N. Strain and J. Sherma, J. Chromatogr., 73, 371 (1972).
4. V. N. Karnaukhov, The Functions of Carotenoids in Animal Cells [in Russian], Moscow (1973), p. 104.
5. K. A. Buckle and F. H. Rahman, J. Chromatogr., 171, 385 (1979).
6. F. L. Kalinin, V. P. Lobov, and V. I. Zhidkov, Handbook of Biochemistry [in Russian], Kiev (1971), p. 1014.

FLAVONOIDS OF Salvia pratensis

S. A. Prokonenko and I. V. Chushenko

UDC 547.972

Flavonoids of the genus Salvia have been widely studied [1-4], but no detailed investigation has been made of the phenolic groups of meadow sage S. pratensis.

We have isolated and investigated the flavonoids of the epigeal part of meadow sage, which is widely distributed on the territory of the European part of the USSR.

Individual groups of phenolic compounds were obtained from the evaporated aqueous ethanolic extract of the raw material by shaking it out successively with ethyl acetate

Khar'kov Pharmaceutical Institute. Translated from Khimiya Prirodnykh Soedinenii, No. 2, p. 242, March-April, 1986. Original article submitted July 3, 1985.

 0009-3130/86/2202-0226 $12.50