2. T. B. Zinchenko and A. Ya. Kobzar', Farmats. Zh., No. 5, 76 (1979).
3. H. Lichti and A. Wartburg, Helv. Chim. Acta, 49, No. 5, 1522 (1966).

PHYTOCHEMICAL STUDY OF Beonica officinalis.

II. ACIDS FROM THE EPIGEAL PART OF Betonica

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UDC 547.972

The composition of the aromatic acids isolated in the individual state from the herb common betony has been studied. Qualitative chemical reactions, the results of UV spectroscopy (Table 1), and chromatographic analysis characterize these substances as hydroxycinnamic acids [1, 2].

Substance 1, $C_9H_8O_4$, mp 192-295°C, R_f 0.82 (BAW (4:1:2) – system 1); 0.20 (0.1 N HCl on paper previously washed with 2% HCl and dried – system 2). This was obtained by eluting fraction 2 [3] with chloroform. The product of acetylation – $C_{13}H_{12}O_6$; mp 197-198°C – corresponded to the diacetate of caffeic acid. A comparison of substance 1 with an authentic sample of caffeic acid (absence of a depression of the melting point) showed their identity.

Substance 2, $C_{16}H_{19}O_9$, mp 201-204°C, R_f 0.62 (system 1); 0.48 (system 2). This was obtained by eluting fraction 2 with chloroform containing 20% of ethanol followed by the silica-gel TLC chromatography of the eluates obtained (system 2). Fusion with KOH gave protocatechic acid. Alkaline hydrolysis led to the formation of caffeic and D-quinic acids, which were identified by paper chromatography (systems 1 and 2, and 15% CH_3COOH – system 3) in the presence of markers [4]. A mixture with an authentic sample of chlorogenic acid gave no depression of the melting point.

Substance 3, $C_{16}H_{18}O_9$, could not be crystallized, R_f 0.56 (system 1); 0.64 (system 2). The products of fusion and alkaline hydrolysis were identical with those described for substance 2, i.e., substances 2 and 3 were isomers. Paper chromatography (systems 1-3) in the presence of markers characterized substance 3 as neochlorogenic acid.

Substances 4, $C_{16}H_{18}O_9$, could not be crystallized. It was obtained by the TLC method on silica gel (system 2) from the same fractions as substances 2 and 3; R_f 0.86 (system 1), 0.35 (system 2). The products of fusion and alkaline hydrolysis were identical with those described for substances 2 and 3. Two-dimensional paper chromatography (systems 1 and 3; two runs in each system) showed three partially overlapping spots, which is possible when isochlorogenic acid is present. A chromatographic comparison of substance 4 with an authentic sample of isochlorogenic acid (systems 1-3) showed their identity.

TABLE 1. Characteristics of the Hydroxycinnamic Acids from the Herb Common Betony

Acid	mp, °C	Color on the spot on the chromatogram		R_f in		Absorption maxima in the UV region of the spectrum			
		UV	UV +KOH	BAW, 4:1:2	15% acetic acid	solution in methanol	+KOH	+NaOAc	+H_3BO_3
Caffeic	193—196	Deep blue	Deep blue	0,82	0,53	325, 295 (sh.), 245	+22	10	+7
Chlorogenic	201—204	Light blue	Turquoise	0,62	0,62	325, 293 (sh.), 245	+47	+7	+27
Neochlorogenic	—	"	"	0,56	0,66	325, 293 (sh.), 245	+47	+7	+27
Isochlorogenic	—	"	"	0,80—0,86	0,45—0,55	325, 298 (sh.), 245	+47	+7	+27
p-Coumaric	210	—	Deep blue	0,93	0,58	325, 310, 300	+22	0	0

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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

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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

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