HYDROXYCINNAMIC ACIDS OF *Aster salignus*

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We have studied the leaves of *Aster salignus* (Willd) collected in the northern Caucasus in the watermeadows of the R. Podkumok for their content of phenolic acids. The air-dry raw material was extracted with 80% ethanol. The solvent was distilled off in vacuum until a syrupy residue had been formed, and this was treated with water and then extracted with chloroform. The phenolic acids were extracted with ethyl acetate from the aqueous ethanolic residue. The combined, concentrated, and dried ethyl acetate extract was treated with dried chloroform (fivefold amount). A precipitate deposited which, according to chromatographic analysis and color reactions, consisted mainly of phenolic acids. A two-dimensional chromatogram on paper [solvents: 1) 2% CH_3COOH and 2) BAW 4:1:5] showed the presence of not less than eight phenolic acids in the leaves, two of which were present in insignificant amounts. The results of chromatographic and spectroscopic analyses are given in Table 1.

The acids from the precipitate were isolated preparatively by two-dimensional chromatography (systems 1 and 2). Acid (2 N HCl, 30 min) and alkaline (0.1 N KOH, 30 min in an atmosphere of nitrogen) hydrolyses of substances 1, 2, 3, 5, and 6 gave the same products: caffeic and quinic acids. The caffeic acid was extracted from the hydrolyzate with diethyl ether. The identity of the caffeic acid was determined on the basis of a comparison of it with an authentic sample. The quinic acid in the aqueous residue of the hydrolyzate was detected chromatographically, the spot being revealed with the barbituric acid reagent [1].

The amounts of caffeic acid in the individual compounds were found alkalimetrically after hydrolysis. It was established that its amount in acids 1, 2, and 3 corresponded to a ratio of 2:1, and in acids 5 and 6 to 1:1.

The results of the analysis performed, and also chromatography with authentic samples

TABLE 1

No. of the spot	Rf value		Fluorescence in UV light	Fluorescence in UV light + NH_3 vapor	Diazotized sulfanilic acid	UV spectrum in ethanol, λ_{max}	UV spectrum in ethanol + KOH, λ_{max}	Substance (acid) identified
	in 2% acetic acid	in BAW						
1	0,18	0,75	Blue	Bluish-green	Brown	329,300 +245	370,265	Isochlorogenic (a)
2	0,20	0,78				329,300 +244	370,267	Isochlorogenic (b)
3	0,26	0,76				330,300 +242	370,266	Isochlorogenic (c)
4	0,30	0,82				330,299 +244	380,265	Caffeic
5	0,56	0,64				329,300 +244	370,265	Chlorogenic
6	0,62	0,60				329,300 +245	370,265	Neochlorogenic

Note. +) shoulder.

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of the corresponding acids enabled us to conclude that substances 1, 2, and 3 were isochlorogenic acids a, b, and c (3,5-, 3,4-, and 4,5-dicaffeoylquinic acids), substance 4 did not hydrolyze and was identical with caffeic acid, 5 was chlorogenic (3-caffeoylquinic) acid, and 6 was neochlorogenic (5-caffeoylquinic) acid [2].

The quantitative determination was performed by UV spectroscopy using eluates on the spots of the individual acids on two-dimensional paper chromatography. The total amount of acids in the air-dry raw material, as caffeic acid, was (%) about 1.2, including 0.62 of chlorogenic, 0.3 of isochlorogenic, 0.2 of neochlorogenic, and 0.04 of caffeic acid.

LITERATURE CITED

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