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A STUDY OF THE CHEMICAL COMPOSITION OF A WORMWOOD INFUSION

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UDC 547.582

Artemesia absinthium L. (common wormwood) has long been used in medical practice. The chemical composition of this plant has been studied comparatively well [1-7] but information on the chemical composition of an infusion [8] is inadequate.

We have studied the chemical composition of an infusion obtained from the epigeal part of wormwood. Paper chromatography in various systems revealed coumarins, hydroxycinnamic acids, amino acids, and a small amount of flavonoids.

The wormwood infusion (5 liters) was evaporated in vacuum to give 700 ml of aqueous residue, which was then extracted with four 300-ml portions of ethyl acetate. The aqueous residue and the ethyl acetate extracts, concentrated to 150 ml served as the material for the isolation and identification of the compounds detected.

By column chromatography on silica gel (1:50) with chloroform as eluent, the ethyl acetate extracts yielded 0.035 g (from aqueous ethanol) of a substance with the composition $C_{10}H_8O_4$, mp 201-202°C. Its IR spectrum had absorption bands at (cm^{-1}) 1611, 1415, 1515 (C=C of a benzene ring), 1720 (C=C of a α-pyrone), and 3350 (OH group). The identity of this compound as scopoletin (7-hydroxy-6-methoxycoumarin) was confirmed by spectral results and by the absence of a depression of the melting point of a mixture.

Further elution of the column with chloroform–ethyl acetate (1:1) and then with pure ethyl acetate gave 0.03 g (from aqueous ethanol) of a substance with the composition $C_9H_6O_3$, mp 230-231°C. From its characteristic physicochemical properties (fluorescence, IR spectrum, chromatographic behavior), the substance was identified as umbelliferone (7-hydroxycoumarin).

In addition to the coumarins isolated, 2-, 3-, and 4-caffeoylquinic and chlorogenic acids were detected in the ethyl acetate extract by paper chromatography with hydroxycinnamic acid markers in the 5% acetic acid system. In the aqueous phase by paper chromatography in the butanol–acetic acid–water (7:1:2), the presence of 14 free amino acids was found, of which substances with R_f 0.14, 0.21, 0.28, 0.37, 0.41, 0.56, 0.61, and 0.70 were identified as asparagine, aspartic acid, glutamic acid, alanine, proline, tryptophan, valine and leucine, respectively. The presence of a very small amount of flavonoids of the flavone and flavonol groups was confirmed by the cyanidin reaction.

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COUMARINS OF *Seseli cuneifolium*

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UDC 633.82/88

Continuing the chemical study of representatives of the genus *Sesili*, family Apiaceae, we have investigated the roots and epigeal, part of *Sesili cuneifolium* collected in the following period on August 10, 1984 in the Yasamal'skaya valley near Baku.

The air-dry comminuted roots (0.5 kg) were extracted three times with acetone, and the extract was evaporated. The combined extractive substances were treated successively with ether, chloroform, and ethyl acetate. The chloroform-soluble fraction was transferred to a column of neutral alumina and was eluted with hexane, hexane–chloroform in ratios of 9:9, 8:1, etc., with gradually increasing concentrations of the chloroform, pure chloroform, mixtures of chloroform and ethanol in ratios of 49:1, 19:1, 9:1, and 4:1, and with ethanol.

As the result of chromatography, three substances (I-III) were isolated.

Compound (I) – $C_{24}H_{26}O_7$, mp 173°C; the IR spectrum contained absorption bands of the carbonyl of a γ-lactone present in conjugation with an aromatic nucleus (1735 cm^{-1}) and of an aromatic nucleus (1610, 1580, 1470 cm^{-1}).

Compound (II) – $C_{21}H_{20}O_7$, mp 82°C; its IR spectrum showed absorption bands at (cm^{-1}) 1730 (CO group of a γ-lactone) and 1600 and 1510 (double bonds of an aromatic ring).

Compound (III) – $C_{29}H_{50}O$, mp 136-137°C; its IR spectrum contained absorption bands in the regions of (cm^{-1}) 3300-3430 (hydroxy groups), 1380 (methyl radical) and 1070, 1060, 980, 968, and 810. The substance gave a precipitate with digitonin and also took part in the Liebermann-Burchard and Zal'kovskii reactions, showing that it belonged to the class of steroids. By a comparison of elementary compositions, physicochemical constants, and NMR and IR spectra, and also by the absence of a depression of the melting point in mixtures with authentic samples, substance (I) was identified as anomalin, (II) as pteryxin, and (III) as β-sitosterol [1-3].

Anomalin, pteryxin, and β-sitosterol were also isolated from an acetone extract of the epigeal part of *Sesili cuneifolium* by chromatographic separation on a column.

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Translated from Khimiya Prirodnykh Soedinenii, No. 3, p. 448, May-June, 1987. Original article submitted December 17, 1986.

 0009-3130/87/2303-0372$12.50