URSOLIC ACID FROM LEAFY SHOOTS OF Viscum album

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In an investigation of methanolic extracts of leafy shoots of European mistletoe Viscum album L., family Lorantaceae, gathered from various host trees (wild pear, apple, willow), triterpenoids were detected on Silufol plates with revelation by a solution of antimony trichloride and tungstophosphoric and sulfuric acids.

Information on the accumulation of biologically active substances including ursolic acid in European mistletoe as a function of the host tree is contradictory [1–3]. We have made an attempt to isolate this substance from various samples of raw material gathered in the Zelenchukskaya region of the Karachaevo-Cherkeskaya Autonomous Oblast, Stavopol' territory, in December–February, 1988-1989.

The comminuted air-dry raw material (100.0 g) was loaded into a Soxhlet apparatus and was extracted with petroleum ether for 2 h to eliminated impurities. The cartridge with the plant material was dried in the air and was again charged into the Soxhlet apparatus and was extracted with methanol. The methanolic extract was cooled, whereupon an amorphous greyish-green precipitate deposited, which was separated off by filtration. Then the methanol was distilled off from the filtrate on the water bath and the residue was combined with the residue on the filter. The dried greyish-green amorphous powder gave positive Liebermann-Burchard and Salkowsky reactions and the reaction with chlorosulfonic acid. For purification, the substance was repeatedly treated with ether, and the extract was passed through a column containing 50.0 g of activated carbon. The ether was distilled off on the water bath and the residue was recrystallized from acetone. After further recrystallization, the substance had mp 282–283°C, $[\alpha]_D^{20}$ +63.2° (c 1.0; chloroform).

Its individuality was determined chromatographically: on Silufol UV_{254} plates in the benzene–acetone (8:2) system it had R_f 0.30; on paper (medium) in the benzene–toluene (1:4) system R_f 0.36 and in the BAW (4:1:2) system R_f 0.95. The substance isolated was identified ursolic acid from its IR spectrum and the absence of a depression of the melting point of a mixture with an authentic sample.

The quantitative determination of the ursolic acid was carried out by a spectrophotometric method [4, 5]. The amount of ursolic acid in the mistletoe gathered from wild pear was 0.32%; from apple, 0.35%; and from willow, 0.33%

LITERATURE CITED

1. T. Krzaczek, Investigations of Pharmacological Subspecies of Viscum album L. [in Polish], Ann. Univ. Mariae Curie-Sklodowska, Sect. D, 32, No. 17, 35 (1977).
2. G. Schimert and H. Blomer, Pathol. Pharmacol., 4, 337 (1953).
3. R. Hegnauer, Chemotaxonomie der Pflanzen, Birkauser Verlag, Basel-Stuttgart, Vol. 6 (1973).
4. V. D. Ponomarev, É. T. Oganesyan, and V. F. Semenchenko, Khim. Prir. Soedin., 147 (1971).
5. É. T. Oganesyan, A. L. Shinkarenko, and V. A. Bandyukova, Khim. Prir. Soedin., 212 (1968).

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