PHENOLIC COMPOUNDS OF VISCUM ALBUM

O. I. Popova

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According to the literature [1-3], European mistletoe (Viscum album. L.), family Loranthaceae, contains nitrogenous bases, pectins, tanning substances, polysaccharides, and vitamins. Continuing a study of the chemical composition of leafy shoots in dependence on the host tree, we have investigated for the presence of phenolic compounds raw material gathered in regions of the Karachai-Cherkess AO, Stavropol' territory, from five tree species (wild pear, apple, willow, poplar, birch) at the end of March, 1988.

Four substances of phenolic nature were detected in an alcoholic extract by two-dimensional paper chromatography in the solvent systems: 1) butan-1-ol–acetic acid–water (4:1:5) and 2) 15% acetic acid.

The substances were isolated by extracting the raw material with ethanol, followed by separation into individual compounds on a column of silica gel 100/250 μm. The column was eluted successively with water and with increasing concentrations of ethanol. Substances (I-III) were isolated.

Substance (I) – $C_{16}H_{18}O_9$, mp 203-205°, R_f 0.54 (system 2), 0.74 (system 1). $\lambda_{max}^{C_2H_5OH}$ 240, 298, 325 nm. It was identified as chlorogenic acid by comparison with an authentic specimen.

Substance (II) – $C_{10}H_{10}O_4$, mp 167-169°, R_f 0.83 (system 1), 0.53 (system 2). $\lambda_{max}^{C_2H_5OH}$ 234, 240, 317 nm. A mizture of substance (II) with an authentic sample of ferulic acid gave no depression of the melting point.

Substance (III) – $C_9H_8O_4$, mp 196-197°, R_f 0.21 (system 1), 0.39 (system 2), $\lambda_{max}^{C_2H_5OH}$ 325, 300, 240 nm. A mixture with an authentic sample of caffeic acid gave no depression of the melting point.

An individual substance (IV) was isolated by column chromatography in the chloroform–acetone (8:2) system from an ethyl acetate fraction of an alcoholic extract of European mistletoe.

Substance (IV) – $C_7H_6O_5$, M^+ 170, mp 220-222°C (from water), R_f 0.67 (system 1), 0.49 (system 2), 0.20 (sodium formate–formic acid–water (10:7:3), $\lambda_{max}^{C_2H_5OH}$ 208, 274 nm. On the basis of the results of a study of spectral characteristics and the absence of a depression of the melting point with an authentic sample it was identified as gallic acid [4].

The total amounts of phenolic acids in the European mistletoe raw material were: on the pear tree – 1.32-1.36%; on the apple tree – 1.28-1.30%; on the poplar – 1.30-1.38%; on the willow – 1.40-1.50%; and on the birch – 1.28-1.34%. The quantitative determination of the phenolic acids was performed by a known method [5]. It was found that their total amount in the mistletoe did not depend fundamentally on the host tree from which the raw material was gathered.

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