POLYPHENOLIC COMPOUNDS OF Rhus coriaria

FLAVONOIDS

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Among the plants of the flora of the USSR, Cotinus coggygria Scop. (common smoketree) and Rhus coriaria L. (Sicilian sumac) are the main sources of all materials for the preparation of tannin substances of the gallotannin group [1]. The tannin of these plants is closest in composition to the tannin from Chinese gallnuts [2]. However, in contrast to Chinese gallnuts, the leaves of these plants contain a large amount of accompanying substances resembling tannin substances in a number of properties.

We have studied the polyphenolic substances accompanying the gallotannins of Sicilian sumac.

By two-dimensional paper chromatography, we found in an extract of the leaves, in addition to gallotannin (substance G), another seven substances (A, B, C, D, E, F, and H) of a phenolic nature. Of them, five (C, D, E, F, and H) were shown up in UV light in the form of dark brown spots. By means of quantitative reactions, the substances were shown to be flavonoids, and substances A and B were shown to be derivatives of phenolcarboxylic acids [3].

The flavonoid substances were obtained on a polyamide sorbent. Five substances were isolated giving a positive cyanidin reaction, showing them to be flavonoid in nature.

To determine the structures of these substances, they were hydrolyzed with 1.5% sulfuric acid, and the aglycones that deposited were filtered off and identified.

The acid aqueous filtrates containing the sugars were neutralized with AB-17 ion-exchange resin, the neutral solutions were evaporated to syrupy residues, and the nature of the sugar components was determined. The position of attachment of the sugar residues was established by UV spectroscopy with additions of ionizing and complex-forming reagents [4].

The configurations of the glycosidic bonds were shown by comparing the molecular rotations of the substances under investigation and those of the phenyl glycosides of the corresponding sugars [5]. The structures of the compounds were definitively established on the basis of the physicochemical properties of the initial substances and of their hydrolysis products, by IR and UV spectroscopy, by their R_f values in various systems, and by mixed melting points with authentic samples.

Substance C ($C_{21}H_{20}O_{12}$, mp 184-189°C, $[\alpha]_D^{20}$ −159°) is myricetin 3-O-α-L-rhamnofuranoside; D ($C_{21}H_{20}O_{11}$, mp 174-176°C, $[\alpha]_D^{20}$ −160°) is quercetin 3-O-α-L-rhamnofuranoside; E ($C_{20}H_{18}O_{11}$, mp 209-211°C, $[\alpha]_D^{20}$ −165°) is quercetin 3-O-L-arabinofuranoside (avicularin), F($C_{21}H_{20}O_{10}$, mp 210-230°C, $[\alpha]_D^{20}$ −16°) is kaempferol 3-O-β-D-glucopyranoside (astragalin); and H ($C_{21}H_{20}O_{13}$, mp 252-254°C, $[\alpha]_D^{20}$ −24°) is myricetin 3-O-β-D-glucopyranoside.

LITERATURE CITED

1. N. I. Libizov and S. E. Zemlinskii, Sumac and Smoketree [in Russian], Moscow (1963).
2. N. F. Komissarenko, I. F. Makarevich, and D. G. Kolesnikov, "Polyphenolic compounds of the common smoketree (Cotinus coggygria Scop.)," in: Phenolic Compounds and Their Biological Functions [in Russian], Moscow (1968).
3. M. P. Zaprometov, ed., Biological Methods of Plant Analysis [in Russian], Moscow (1960).

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4. T. A. Geissman, The Chemistry of Flavonoid Compounds, Pergamon Press, New York (1962).
5. I. I. Kovalev and V. I. Litvinenko, KhPS [Chemistry of Natural Compounds], 233 (1965).