

HYDROLYZABLE TANNIDES OF *Potentilla*. I.

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Continuing an investigation of the hydrolyzable tannins of plants of the flora of Kazakhstan, we have begun a study of *Potentilla chrysantha* Trev. (primrose cinquefoil) [1]. The results of chromatography on paper of a methanolic extract of the epigeal part of the primrose cinquefoil have shown that it contains six hydrolyzable tanning substances colored blue by a 1% solution of iron ammonium alum and giving no reaction with vanillin and concentrated HCl. To isolate the tannides, a methanolic extract was concentrated under reduced pressure in a current of nitrogen with the addition of water at the end of evaporation. The resulting aqueous solution was extracted with ether and then with ethyl acetate. Separation in the ethyl acetate-water system gave the total tanning substances of the epigeal part of the plant concerned.

To determine the structure of the products of the cleavage of the tanning complex, it was subjected to acid hydrolysis with 5% sulfuric acid in the boiling water for 24 h. The carbohydrate component was identified as glucose on the basis of the results of comparative paper chromatography with markers in the following solvents: BAW (4:1:5) and ethyl acetate-pyridine-water (2:1:2). By comparative paper chromatography, the hydrolyzate was found to contain three acids: gallic, dehydrogallic, and ellagic. The ellagic acid had decomp. pt. $\sim 350^{\circ}\text{C}$, R_f 0.43, 0.05 [solvent 1 - BAW (40:12.5:29); solvent 2 - 15% acetic acid; ascending chromatography, Filtrak F No. 1 paper]; it was identified on the basis of its R_f values and qualitative reactions [2] in comparison with a marker. Extraction of the hydrolyzate with ether yielded gallic acid (mp $240-242^{\circ}\text{C}$, R_f 0.70-0.52, a mixture with an authentic sample gave no depression of the melting point) and dehydrogallic acid with R_f 0.56-0.60, decomp. pt. $\sim 230^{\circ}\text{C}$. For the dehydrogallic acid, C 49.48; 49.23, H 3.32; 3.43; $\text{C}_{14}\text{H}_{10}\text{O}_{10}$. Calculated %: C 49.71; H 2.98.

Its IR spectra showed the absorption bands of an ether bond (1040 cm^{-1}), of tetra- and penta-substituted benzene rings (870 and 820 cm^{-1}), and of acid and alcoholic hydroxyls (3120 cm^{-1} and $3320-3380\text{ cm}^{-1}$). When this substance was heated with concentrated sulfuric acid for 5 min, anthrone was formed. The methylation of the dehydrogallic acid led to a derivative, the melting point and the results of distillation of which corresponded to literature information for the pentamethyl ether [3].

Dehydrogallic acid was not found in the plant in the free form. From an ethereal extract of the total substances of a methanolic extract of primrose cinquefoil by chromatography on Kapron with water, gallic acid and methyl gallate with decomp. pt. 192°C , R_f 0.77-0.71 were isolated. The latter substance was hydrolyzed with 5% sulfuric acid at the boil to give gallic acid. With an ethanolic solution of ferric chloride, it gave the green coloration characteristic for methyl gallate [4]. The IR spectrum contained the absorption band of a tetrasubstituted benzene ring (860 cm^{-1}), an ester bond (1700 cm^{-1}), alcoholic hydroxyls ($3320-3380\text{ cm}^{-1}$), and a methoxy group (2952 cm^{-1}).

LITERATURE CITED

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