PHENOLIC COMPOUNDS FROM FRUIT OF Elaeagnus angustifolia

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According to the literature [1-6], the fruit of Elaeagnus angustifolia L. (Russian olive), family Elaeagnaceae, contains tanning substances, polysaccharides, catechins, ascorbic acid, fatty oil, potassium salts, and phosphorus. Continuing a study of the chemical composition of the fruit of the Russian olive, we have investigated fruit gathered in the Dagestan ASSR for the presence of phenolic compounds .

An ethanolic extract was found by two-dimensional paper chromatography in the butan-1-ol-acid—water (4:1) and 15% acetic acid systems to contain three substances of pheno- phenolic nature. It was established with the aid of qualitative reactions on paper that two of them were flavonoids and one a phenolcarboxylic acid.

The combined substances (I), (II), and (III) were isolated by chromatography on polyamide sorbent. They were then separated into individual compounds on a column of silica gel 100/250 μm. The column was eluted successively with water and ethanol of different concentrations.

Substance (I) — $C_{16}H_{12}O_7$, mp 304—307°C, λ_{max} 375, 254 nm, on alkaline hydrolysis split into phloroglucinol and vanillic acid. Spectral investigations in the UV region with additives revealed free hydroxyls at C_3, C_5, C_7, and C_4'. Its dealkylation with HI [7] yielded quercetin. These facts enabled compound (I) to be identified as isorhamnetin [8].

Substance (II) — $C_{22}H_{22}O_{12}$, mp 200-203°C, λ_{max} 365, 255 nm $[\alpha]_D^{20}$ – 80° (c 0.5 methanol) was a glycoside. The acid hydrolysis of (II) gave isorhamnetin and galactose. The yield of aglycon was 67%, which showed the monoglycosidic nature of the compound. The absence of a bathochromic shift of band I of the glycoside on the addition of zirconyl chloride and citric acid showed that the hydroxy group at C_3 was glycosylated. The glycoside underwent enzymatic hydrolysis by a preparation from Aspergillus oryzae.

The presence in the IR region of a band at 890 cm^{-1} demonstrated the β-configuration of the glycosidic bond, while bands at 1050, 1074, and 1098 cm^{-1} showed that the sugar had the pyranose form.

The facts presented permit the statement that the glycoside was isorhamnetin 3-O-β-D-galactopyranosid [8].

Substance (III) — $C_9H_8O_4$, mp 196-198°C, λ_{max} 325, 300, 240 nm, was identified as caffeic acid [9].

The structures of all the substances isolated were confirmed by elementary analysis, UV and IR spectroscopy, and the results of a study of the products of acid, alkaline, and enzymatic hydrolyses, and also those of a comparison with authentic samples.

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PHENOLIC COMPOUNDS OF Phaseolus aureus

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Continuing a study of plants of the genus Phaseolus D., family Fabaceae (Leguminosae) [2-4], we have investigated the chemical composition of the epigeal part of Phaseolus aureus Piper. (mung bean) collected in the fruit-bearing period.

By paper chromatography, no less than 38 substances of phenolic nature were detected in the herbage studied. Chloroform, ethyl acetate, and butanol fractions were obtained by a procedure described previously. In the present communication we give the results of an investigation of the chloroform and ethyl acetate fractions.

In the chloroform fraction no less than nine substances of coumarin nature were detected, and in the ethyl acetate fraction 26 phenolic compounds.

By column chromatography on polyamide sorbent using eluting mixtures of chloroform and ethanol with increasing concentrations of the latter, substances (I)-(III) were isolated from the chloroform fraction, and (IV)-(VIII) from the ethyl acetate fraction.

Substance (I) — $C_{10}H_8O_4$, mp 202-204°C, λ_{max} 230, 256, 298, 343 nm: 7-hydroxy-6-methoxycoumarin (scopoletin) [6].

Substance (II) — $C_{10}H_8O_4$, mp 185-187°C, λ_{max} 230, 255, 295, 345 nm: 6-hydroxy-7-methoxycoumarin (isoscopoletin) [6].

Substance (III) — $C_9H_6O_3$, mp 228-230°C, λ_{max} 250, 328 nm: 7-hydroxycoumarin (umbelliferone) [6].

Substance (IV) — $C_{16}H_{10}O_7$, mp 310-312°C, λ_{max} 375, 256, 268 nm quercetin [5].

Substance (V) — $C_{15}H_{10}O_6$, mp 274-276°C, λ_{max} 369, 265 nm: kaempferol [5].

Substance (VI) — $C_{27}H_{30}O_{16}$, mp 189-192°C, λ_{max} 362, 258 sh., 264 nm: quercetin 3-rutionoside (rutin) [5].

Substance (VII) — $C_{16}H_{18}O_9$, mp 200-203°C, λ_{max} 325, 298, 240 nm, and substance (VIII), with the composition $C_{16}H_{18}O_9$, amorphous, λ_{max} 327, 298, 245 nm, were chlorogenic and neochlorogenic acids [1], respectively.

The structures of the compounds isolated were confirmed by UV and IR spectroscopy with ionizing and complex-forming additives, by the results of acid and enzymatic hydrolyses, and by comparison with authentic samples.

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