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FLAVONOIDS OF *Astragalus lagurus*

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The epigeal part of *Astragalus lagurus* collected in the Krasnosel'sk region of the Armenian SSR on the shores of Lake Sevan was exhaustively extracted with 70% ethanol. The ethanolic extract was concentrated in vacuum to an aqueous residue, and this was treated with chloroform to eliminate ballast substances. The combined flavonoids were extracted from the purified aqueous residue with ethyl acetate and were precipitated with chloroform. To isolate individual phenolic compounds, the total flavonoids were deposited on a column containing polyamide sorbent and were eluted successively with water and ethanol in various concentrations, and the individual fractions were obtained by preparative paper chromatography. Seven flavonoid compounds were obtained in the individual state.

Substance (1) — $C_{21}H_{20}O_{11}$, mp 178-180°C, $[\alpha]_D^{20}$ −69° (c 0.5; ethanol), λ_{max} 350, 267 nm. Acid hydrolysis (5% H_2SO_4) gave an aglycone $C_{15}H_{10}O_6$ with mp 273-275°C, λ_{max} 265, 270 nm. The results of a spectral and physicochemical investigation enabled the aglycone to be identified as kaempferol. D-Glucose was detected in the hydrolysate by paper chromatography. This substance was kaempferol 3-glucoside (astragalin) [1].

Substance (2) — $C_{21}H_{20}O_{12}$, mp 237-238°C (from ethanol), $[\alpha]_D^{20}$ −60° (c 0.15; methanol), λ_{max} 259, 365 nm. As the result of acid hydrolysis, an aglycone with mp 307-309°C, identical with quercetin, and D-galactose were found. When this substance was mixed with an authentic sample of crystalline hyperoside no depression of the melting point was observed. Consequently, the substance consisted of quercetin 3-O-β-D-galactopyranoside (hyperoside) [2].

Substance (3) — $C_{21}H_{20}O_{11}$, mp 191-193°C, λ_{max} 359, 255 nm, $[\alpha]_D^{20}$ −45° (c 0.1; methanol). Acid hydrolysis yielded kaempferol. D-Galactose was identified in the hydrolysate by paper chromatography. This substance was kaempferol 3-O-β-D-galactopyranoside (trifolin) [3].

Substance (4) — $C_{21}H_{20}O_{12}\cdot 2H_2O$, mp 236-238°C, $[\alpha]_D^{20}$ −80.9° (c 0.1; methanol). On acid hydrolysis with 2% H_2SO_4, the substance split into quercetin and D-glucose. Spectral investigations in the UV region showed that the glucose was attached to the aglycone in the third position. The results obtained give grounds for considering the substance to be quercetin 3-O-β-D-glucopyranoside (isoquercitrin) [4].

Substance (5) — $C_{21}H_{20}O_{11}$, mp 267-268°C, $[\alpha]^{20}$ −48° (c 0.14; methanol), λ_{max} 365, 265 nm. Kaempferol and D-glucose were detected in the products of acid hydrolysis. The substance gave no depression of the melting point with an authentic sample of populin and it was therefore kaempferol 7-glucoside (populin) [5].

Substance (6) — $C_{21}H_{20}O_{11}$, mp 243-245°C, λ_{max} 369, 259 nm. On acid hydrolysis, quercetin was detected. The carbohydrate moiety consisted of D-glucose. According to its physical properties, hydrolysis products, and UV spectra, the substance was identical with quercimeritrin (3,3',4',5,7-pentahydroxyflavone 7-O-β-D-glucopyranoside) [6].

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Substance (7) — $C_{21}H_{20}O_{11}$, mp 185-187°C, λ_{max} 355, 257 nm, $[\alpha]_D^{20}$ −118.6° (c 0.87; methanol). On hydrolysis with 2% H_2SO_4, quercetin and rhamnose were formed. A mixture of the substance obtained and quercitrin gave no depression of the melting point. The results obtained permit the substance to be identified as quercitrin (quercetin 3-O-α-L-rhamnoside) [7].

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FLAVONOL 3,7-DIGLYCOSIDES OF *Lepidium syvaschicum*

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The flavonol biosides rutin and nicotiflorin have been isolated previously from the epigeal part of *Lepidium syvaschicum* Kleop [1]. We have subsequently investigated the inflorescences of this plant. An ethanolic extract obtained from them was subjected to separation by absorption-partition chromatography on polyamide, and two flavonoid substances (I and II) were isolated in the individual state which fluoresced dark brown on paper chromatograms in UV light before treatment and lettuce-green (substance I) and orange (II) after treatment with a 3% solution of zirconyl chloride and ammonia vapors. Substance (I) had the composition $C_{33}H_{40}O_{19}$, mp 205-207°C; and (II) $C_{33}H_{40}O_{20}$, mp 208-211°C. The results of spectral investigations in the UV region permitted the assumption that the carbohydrate components of both substances were present in positions 3 and 7. Kaempferol (substance (I)) and quercetin (substance II)), D-glucose, and L-rhamnose were detected by paper chromatography in the products of the acid hydrolysis of the glycosides with 5% H_2SO_4 solution. On acid hydrolysis of each of the substances under investigation with 10% CH_3COOH or a 0.04 N solution of HCl, the formation of three intermediate substances provisionally designated (Ia, Ib, and Ic) (substance (I)) and (IIa, IIb, and IIc) (II) was observed. Substances (Ia) and (IIa) on PC, before treatment, fluoresced yellow in UV light, and substances (Ib, IIb, Ic, and IIc) fluoresced dark brown. The results of investigations in the UV regions of the spectrum using ionizing and complex-forming reagents made it possible to establish that the carbohydrate components in the first two of the intermediate substances mentioned above were present in position 7, and in the other four they were in position 3. In the products of acid and enzymatic hydrolyses, PC showed the presence L-rhamnose (substances (Ia and IIa)), D-glucose (IIb and Ib), L-rhamnose and D-glucose (Ic and IIc), and kaempferol and quercetin, respectively. On comparison with substances isolated previously [1-3], the intermediate compounds were identified as the 7-O-α-L-rhamnosides (substance Ia and IIa), 3-O-β-D-glucosides (Ib and IIb), and 3-O-rutinosides (Ic and IIc) of kaempferol and quercetin.

Consequently, substances (I) and (II) were characterized as the 7-O-α-L-rhamnoside 3-O-rutinosides of kaempferol and of quercetin.

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