FLAVONOIDS OF *Alhagi persarum*

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In continuation of examination of plants of the *Alhagi* genus, we investigated the aerial part of Persian camel's thorn (*A. persarum*) collected during flowering in western Kazakhstan District [1-3]. Two-dimensional paper chromatography of the aqueous acetone (1:1) extract with elution by butan-1-ol—acetic acid—water (40:12.5:29) and 15% acetic acid detected in the aerial part 12 flavonoids, 7 of which were isolated pure.

Finely ground air-dried raw material was exhaustively extracted with aqueous acetone (1:1). The extract was concentrated, distilled, and purified of lipophilic substances. The total flavonoids were extracted with ethylacetate and separated over a polyamide column. The following flavonoids were isolated pure:

Compound 1, $C_{15}H_{10}O_7$, mp 306-308°C, UV (λ_{max}, C_2H_5OH, nm): 375, 265. Characterized as quercetin.

Compound 2, $C_{16}H_{12}O_7$, mp 303-307°C, UV (λ_{max}, C_2H_5OH, nm): 370, 268 (sh), 255. Identical to isorhamnetin [4].

Compound 3, $C_{21}H_{20}O_{11}$, mp 182-184°C, $[\alpha]_D^{20}$ -175° (ethanol), UV (λ_{max}, C_2H_5OH, nm): 350, 256. Identified as quercetin 3-O-α-L-rhamnopyranoside.

Compound 4, $C_{20}H_{20}O_{12}$, mp 238-240°C, $[\alpha]_D^{20}$ -52° (ethanol), UV (λ_{max}, C_2H_5OH, nm): 360, 258. Hydrolysis produced quercetin and arabinose. The constants of **4** correspond with those of quercetin-3-O-α-L-arabofuranoside.

Compound 5, $C_{22}H_{22}O_{12}$, mp 220-222°C, $[\alpha]_D^{20}$ -56° (ethanol), UV (λ_{max}, C_2H_5OH, nm): 368, 270 (sh), 254. Characterized as isorhamnetin 3-O-β-D-glucopyranoside [1, 4].

Compound 6, $C_{21}H_{20}O_{20}$, mp 257-259°C, $[\alpha]_D^{20}$ -87° (ethanol), UV (λ_{max}, C_2H_5OH, nm): 364, 272 (sh), 258. Identified as isorhamnetin 3-O-α-L-arabopyranoside.

Compound 7, $C_{36}H_{46}O_{20}$, mp 165-167°C, $[\alpha]_D^{20}$ -64.5° (ethanol), UV (λ_{max}, C_2H_5OH, nm): 362, 278 (sh), 256, IR spectrum (KBr, ν, cm^{-1}): 3300, 3400, 2945, 1665, 1070, 1060, 1055, 1004, 890, 835, 866. FAB/MS, *m*/*z* 798, *m*/*z* of the aglycone 344. PMR (CD_3OD, 300 MHz, δ, ppm): 6.20 (s, C_6-H), 6.40 (s, C_8-H), 7.90 (d, C_2-H), 7.55 (d, C_6-H), 6.90 (d, C_5-H), 3.96, 3.91, 3.87 (9H, -OCH_3-5,3′,4′), 5.22 (1H, J = 6 Hz, H-1″), 5.12 (1H, J = 2 Hz, H-1‴), 4.53 (1H, J = 2 Hz, H-1⁗). The methyl doublet at 1.1-1.2 ppm (6H, J = 6 Hz) belongs to two methyls of the L-rhamnose [4-6].

Stepwise acid, enzymatic, and basic hydrolysis and UV and IR spectroscopic data indicate that the sugar units are rhamnose and galactose (2:1) with a (1→2) bond between them. The sugars are bonded at the C-7 and C-3 positions and have the pyranose form. Alkaline fusion and UV spectra of the glycoside and aglycone and PMR spectra and the mass spectrum of the glycoside characterize it as 5,3′,4′-trimethoxyflavone 3-O-β-D-galactopyranosido-(2→1)-α-L-rhamnopyraosido-7-O-α-L-rhamnopyranoside [7].

Thus, quercetin 3-O-α-L-rhamnopyranoside, quercetin 3-O-α-L-arabofuranoside, isorhamnetin 3-O-α-L-arabopyranoside, and 5,3′,4′-trimethoxyflavone 3-O-β-D-galactopyranosido-(2→1)-α-L-rhamnopyranosido-7-O-α-L-rhamnopyranoside are isolated for the first time from Persion camels' thorn.

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