PHYTOCHEMICAL STUDY OF *Kalidium caspicum*

Zh. Zh. Karzhaubekova and G. Sh. Burasheva UDC 547.972

We investigated the aerial part of *Kalidium caspicum* (Caspian thistle, Chenopodiacea, goosefoot) collected during flowering in the Chiliisk Region of Almaty District. Two-dimensional paper chromatography has shown that the aqueous-acetone extract contains more than ten phenolic compounds representing flavonoids, phenolic acids, and terpenoids and alkaloids.

The quantity of extracted compounds at 3.87% moisture is 38.23%. This includes amino acids (1.21%), carbohydrates (4.2%), and flavonoids (1.81%). The mineral content is 18%; vitamin C, 0.025%; vitamin E, 0.021%. The fatty-acid composition was studied by GLC. Twelve fatty acids were determined quantitatively. Linoleic, oleic, and palmitinic acids predominate. The aerial mass contains nine phenolic acids, of which three were identified as ferulic, *p*-hydroxybenzoic, and coumarinic acids [1].

The dried raw material was exhaustively extracted with aqueous acetone. The extract was evaporated in vacunm. The aqueous solution was successively treated with $CHCl_3$ and ethylacetate. Column chromatography of the ethylacetate extract over polyamide sorbent isolated two flavone aglycones [2, 3] and a phenolic acid [4].

A triterpene glycoside was isolated by extraction of the raw material with ethanol (80%), purification by hexane with subsequent extraction with ethylacetate and *n*-butanol, column chromatography over polyamide, and purification of the butanol extract over Sephadex [5].

The structures of the pure compounds were proved using chemical and physicochemical (UV, IR, PMR, FAB/MS) analytical methods.

Compound 1, $C_{17}H_{14}O_5$, mp 168-170°C, UV (λ_{max}, MeOH, nm): 270, 310 sh, 348. Characterized as apigenin 7,4′-dimethylether [1].

Compoud 2, $C_{18}H_{16}O_5$, mp 160-162°C, M^+ 312 (100), UV (λ_{max}, MeOH, nm): 252, 272 sh, 346; NaOAc: 252, 272, 346, 402; $AlCl_3$: 263, 279, 371; $AlCl_3$/HCl: 258, 281, 365, 402. Mass spectrum, *m/z*: 312 $[M]^+$, 181 $[A]^+$, 121 $[B]^+$. ^{1}H PMR (CD_3OD, 500 MHz, δ, ppm): 6.20 (1H, s, H-C6), 7.27 (2H, d, C-2, C-6′), 7.94 (2H, d, C-3′, C-5′), 3.68 (3H, s, C-7-OMe), 3.67 (3H, C-4′ OMe), 1.88 (3H, s, C-8, Me). The aglycone was characterized as 5-hydroxy-7,4′-dimethoxy-8-methylflavone [3].

Compound 3, $C_{10}H_{12}O_5$, mp 196-198°C. Mass spectrum, *m/z*: 212. PMR ($CDCl_3$, 300 MHz, δ, ppm): 3.90, 3.91 (9H, C_3, C_4, C_5-OCH_3), 7.24 (1H, C-6), 7.38 (1H, C-2). Identified as 3,4,5-trimethoxygallic acid [3, 4].

Compound 4, $C_{35}H_{57}O_7$, FAB/MS, *m/z*: 609 (*m/z* of the aglycone). IR spectrum (KBr, ν, cm^{-1}): 840, 1043, 1076, 1380, 1634, 1700, 3430. ^{1}H PMR (CD_3OD, 500 MHz, δ, ppm): 0.79 (1H, m, H-5), 0.96 (3H, H-24), 1.04 (3H, H-29), 0.89 (3H, s, H-26), 0.97 (3H, s, H-25), 0.99 (3H, s, H-30), 1.07 (3H, s, H-23), 1.14 (3H, s, H-27), 2.88 (3H, H-18), 3.17 (1H, H-3), 5.25 (1H, H-12), 5.36 (1H, J = 2 Hz, H-1′), 1.32-1.33 (2H, H-6), 1.32-1.44 (2H, H-7), 1.90 (2H, H-1), 2.04 (2H, H-15,16), 1.36-2.85 (H, H-19), 1.26-1.28 (2H, H-21,22), 1.69 (1H, H-9), 3.58 (1H, H-19), 0.89 (2H, H-1), 1.81 (2H, H-2). Characterized as oleanic acid 3-O-α-L-xylopyranoside [5, 6].

Thus, these compounds are isolated from thistle for the first time.

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Al′-Farabi Kazakh National University, 480012, Almaty, ul. Karasai Batyra, 95a, e-mail: Gauhar.B@kazsu.kz. Translated from Khimiya Prirodnykh Soedinenii, No. 1, p. 81, January-February, 2002. Original article submitted December 25, 2001.

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