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CHEMICAL INVESTIGATION OF *Cirsium setosum*

A. I. Syrchina, A. A. Semenov, and S. V. Zinchenko

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The genus *Cirsium* (thistle) numbers 250-300 species. Plants of this genus are widely used in folk medicine. *Cirsium setosum* (Willd.) Bieb. is the most widespread and troublesome weed of all the inhabited regions of the steppe and forest-steppe areas of Siberia. The flavonoid linarin has been detected in this plant previously [1].

We have investigated the epigeal part of *C. setosum* gathered at the end of July, 1995, in the environs of Irkutsk. The dried and comminuted raw material was exhaustively extracted, first with methanol and then with a 1:1 mixture of water and methanol. The methanolic and aqueous methanolic extracts were concentrated in vacuum. The methanolic extract was diluted with water and was reextracted successively with chloroform and *n*-butyl alcohol.

By repeated chromatography on silica gel in chloroform–methanol, benzene–acetone, and hexane–benzene gradient systems, the chloroform-soluble fraction yielded substance (**1**). The fractions of the extract that were soluble in *n*-butyl alcohol and water were chromatographed on polyamide and silica gel in the chloroform–methanol, methanol–water (for polyamide), and chloroform–methanol–water (63:23:3) systems. As a result, substances (**2-4**) were isolated.

Substance (**1**), composition $C_{30}H_{50}O$, M^+ 426, mp 216-218°C, was identified from its ^1H and ^{13}C NMR spectra [2] as taraxasterol.

Substance (**2**), composition $C_{15}H_{10}O_5$, M^+ 270, mp 340-342°C, λ_{max}^{MeOH} 270, 335 nm, was identified on the basis of its UV and NMR [3] and mass spectra and by comparison with a specimen isolated previously [4] as apigenin.

Substance (**3**), composition $C_{21}H_{22}O_{11}$, mp 178-180°C, λ_{max}^{MeOH} 267, 354 nm, was identified on the basis of its physicochemical constants, UV and NMR spectra, and comparison with a specimen isolated previously [5] as kaempferol 3-β-*D*-glucopyranoside (astragalin).

Substance (**4**), composition $C_{17}H_{24}O_9$, mp 188-190°C, λ_{max}^{MeOH} 266 nm, was identified by comparison with an authentic sample as syringin (eleutheroside B) [6].

Taraxasterol has been found previously in *C. canum* and *C. arvense*, and apigenin in *C. arvense*. The presence of astragalin and syringin in plants of the *Cirsium* genus has not been reported previously [1].

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