

SESQUITERPENE LACTONES OF *Ferula koso-poljanskyi*

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Continuing an investigation of terpene derivatives of plants of the genus *Ferula L.*, fam. Apiaceae, we have studied the component composition of the roots of *F. koso-poljanskyi* Korov. gathered in the Pamir (Peter I range).

In the systematics of the *Ferula* genus, *Ferula koso-polyanskyi* belongs to the subgenus *Euferula* (Section *Antriches*) the representatives of which are extremely inhomogeneous and contain all the groups of natural compounds characteristic for this genus: sesquiterpene lactones, esters of terpenoid alcohols with aromatic and aliphatic acids, terpenoid coumarins, and furocoumarins [1].

The ground roots of the plant (1.4 kg) were extracted four times with ethanol. The concentrated alcoholic extract was diluted with water in a ratio of 1:2, and the substances were extracted with ethyl acetate. After elimination of the solvent, 54 g (3.7% on the raw material) of total extractive substances was obtained, and this was deposited on a column (3 × 100cm) of KSK silica gel and was eluted with hexane-ethyl acetate mixtures containing gradually increasing concentrations of the latter.

Two substances of lactone nature were isolated. Substance (1) had the composition $C_{15}H_{20}O_2$, mp 78-80°C, $[\alpha]_D -120^\circ$ (c 1.0; chloroform). The IR spectrum of (1) contained absorption bands at 1650, 1770, and 2860-2980 cm^{-1} . Its mass spectrum was characteristic for sesquiterpene lactones and showed the peaks of ions with m/z 232 ($M^+ - 24$), 217 (10), 204 (100), 159 (80), 158 (100), 120 (39), 105 (75), 91 (60), 79 (41), 55 (22).

The signals of the following protons appeared in the PMR spectrum of (1): 1.10 (d, 7 Hz, 3H, $C_{11}-CH_3$), 1.78 (d, 2 Hz, 3H, C_4-CH_3), 4.35 (q, 10 Hz, 6 Hz, 1H, C_6-H), 4.78 (d, 2 Hz, 2H, $C_{10}-CH_2$) and 5.42 ppm. (br.s, 1H, C_3-H).

Substance (2), composition $C_{15}H_{18}O_2$, mp 116-117°C, $[\alpha]_D -15.8^\circ$ (c 1.0; chloroform). In the IR spectrum of (2) bands were observed at 1650, 1670, 1765, and 2860-2920 cm^{-1} . The mass spectrum of (2) had the peaks of ions with m/z 230 ($M^+ - 230$), 215 (30), 185 (24), 151 (25), 120 (95), 105 (82), 91 (55), 79 (42), and 53 (21), which are characteristic for sesquiterpene lactones. Its PMR spectrum showed the following signals: 1.77 (br. s, 3H, $C_{11}-CH_3$), 1.84 (br.s, 3H, C_4-CH_3), 4.62 (br.d, 10 Hz, C_6-H), 4.88 and 4.96 (br.s, each 1H, $C_{10}=CH_2$), 5.58 ppm (br.s, 1H, C_3-H).

A comparison of the physicochemical constants and spectral characteristics of (1) and (2) showed that substance (1) was identical with grilactone [2], and (2) with dehydrogrilactone [3], isolated previously from *F. grigorewii* and *F. arrigonii*, respectively.

REFERENCES

1. E. P. Korobin, Illustrated Monograph of the Genus *Ferula* [Tourn] Z [in Russian], Tashkent (1947).
2. N. P. Kir'yalov, T. V. Bukreeva, and V. A. Gindin, *Khim. Prirod. Soedin.*, 446 (1972).
3. C. G. Gasinovi, Z. Tomassinin, and M. Nicoletti, *Gazz. Chim. Ital.*, 119, No. 11, 563 (1989).

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