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We have isolated three terpenoid coumarins from a methanolic extract of the roots of *Ferula diversivittata* Rgl. et Schmalh., collected in the environs of the village of Shovgazsai (Tashkent oblast) by chromatography on a column of silica gel.

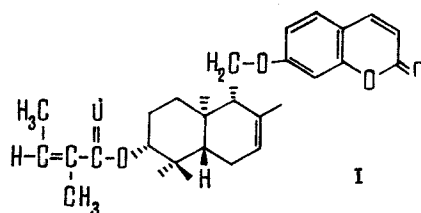
Substance (I) had the composition  $C_{29}H_{36}O_5$ ,  $M^+$  464, mp 66–68°C,  $[\alpha]_D^{22} -35.8^\circ$  (c 0.57;  $CHCl_3$ ).

UV spectrum of (I) [ $\lambda_{max}$  217, 254, 324 nm (log  $\epsilon$  4.35, 3.33, 4.15, respectively)] is characteristic for the 7-hydroxycoumarin chromophore. The IR spectrum showed absorption bands at  $1730\text{ cm}^{-1}$  (C=O of an  $\alpha$ -pyrone),  $1715\text{ cm}^{-1}$  (C=O of an ester grouping), and 1617, 1560, and  $1515\text{ cm}^{-1}$  (aromatic nucleus).

These facts show that the substance is a 7-hydroxycoumarin derivative.

The PMR spectrum of the coumarin was extremely similar to that of feselol [1], differing only by the fact that it had signals at 1.83 (s, 3 H), 1.92 (d, 3 H,  $J = 7\text{ Hz}$ ) and 5.99 ppm (m, 1 H).

What has been said above permits the assumption that compound (I) consists of feselol acylated with angelic acid. In actual fact, when the substance was saponified with caustic alkali an acid with mp 43–45°C, which was identified as angelic acid, and a coumarin,  $C_{24}H_{30}O_4$ , mp 116–117°C, giving no depression of the melting point in admixture with feselol, were attained. Thus, the substance under investigation is an ester of feselol with angelic acid and has the structure (I).



Substance (II) with the composition  $C_{24}H_{30}O_4$ ,  $M^+$  382, mp 116–117°C,  $[\alpha]_D^{22} -98.5^\circ$  (c 0.22; ethanol), was identified by a mixed-melting point and a comparison of IR and PMR spectra as feselol.

Substance (III),  $C_{29}H_{38}O_6$ ,  $M^+$  482, mp 175–177°C,  $[\alpha]_D^{22} -15^\circ$  (c 1.0; ethanol); its IR and PMR spectra were identical with those of isosamarcandin angelate.

It must be mentioned that the coumarins diversin [3] and diversinin [4], the terpenoid moiety of which has the form of an aliphatic monoterpene, have been isolated previously from the roots of *Ferula diversivittata* growing in the Turkmen and Kazakh SSRs.

The terpenoid coumarins of the iresane series that we have isolated show that a given species of *Ferula* may differ considerably in its qualitative and quantitative composition according to its growth site.

## LITERATURE CITED

1. N. P. Kir'yalov and T. V. Bukreeva, *Khim. Prirodn. Soedin.*, 425 (1973).
2. N. P. Kir'yalov and T. V. Bukreeva, *Khim. Prirodn. Soedin.*, 643 (1972).
3. N. P. Kir'yalov, *Khim. Prirodn. Soedin.*, 51 (1969).
4. V. Kiseleva, G. K. Nikonov, and M. O. Karryev, *Khim. Prirodn. Soedin.*, 344 (1975).

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