of carrier gas, nitrogen, 1.3 ml/min. The components were identified from their relative retention times and with the aid of the method of additives. The quantitative compositions of the components were determined by the method of simple normalization (Table 1).

It must be mentioned that the species studied are of practical interest as sources of azulenes but are difficult to distinguish morphologically. The quantitative compositions of the essential oils show their species individuality.

Table 1 gives original results on the compositions of the essential oils of wormwoods of the section investigated. This is the first time that information has been given on the quantitative compositions of the essential oils of *A. absinthium* (Siberian specimen) and *A. samoiedorum*.

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A NEW SESQUITERPENE LACTONE – OPOFERDIN FROM Ferula oopoda

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The resin of the roots of *Ferula oopoda* (Boiss. et Buhse) Boiss. contains, in addition to the main lactones (badkhysin, badkhysinin, oopodin, and dehydroopodin), several minor ones. One of them has been isolated by the repeated rechromatography of fractions 16-25 obtained from the basic column by elution with petroleum–benzene (3:2). This lactone ($C_{20}H_{24}O_5$, mp 126-127°C) is new, and we have called it opoferdin.

The IR spectrum of opoferdin contained the absorption bands of the CO group of a γ-lactone ring (1760 cm^{-1}), of the CO of an α,β-unsaturated ester group (1705 cm^{-1}), and of double bonds (1670, 1640 cm^{-1}).

In the PMR spectrum of the lactone under investigation, the region of CH_3 groups contained the signals of $CH_3-\overset{|}{\underset{|}{C}}-$ (s, 1.25 ppm), $CH_3-\overset{|}{C}=$ (t, 1.82 ppm, J = 1.5 Hz), and $CH_3-CH=$ (d, 1.95 ppm, J = 7 Hz, each component being additionally split by 1.5 Hz).

Doublets at 5.53 ppm (J = 3 Hz, 1H) and 6.30 ppm (J = 3 Hz, 1H) showed the presence of an exomethylene group in the molecule at C-11. A multiplet signal at 6.08 ppm ($-CH=$, 1H), together with the signals of vinylmethyl groups (at 1.82 and 1.95 ppm) characterized the ester group as angeloyl.

A one-proton doublet at 4.90 ppm (J = 6.0 Hz) belonged to a gem-ester proton (H-1). Signals at 5.46 ppm (d, J = 10 Hz, 1H) and 6.14 ppm (q, J_1 = 10; J_2 = 6 Hz, 1H) related to olefinic protons at C-3 and C-2, respectively.

In the opoferdin molecule the lactone ring is located at C(6)–C(7), as was shown by one-proton signals at 4.68 ppm (q, J_1 = 10, J_2 = 7.5 Hz) and 2.22 ppm (d, J = 10 Hz, H-5).

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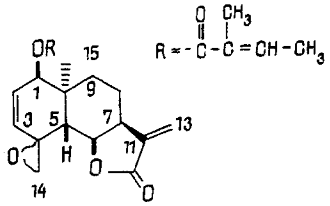
One-proton doublets revealed by the spectrum at 2.65 ppm (J = 4.5 Hz) and 3.51 ppm (J = 4.5 Hz) related to exomethylene protons at C-4 [3-5].

Thus, the features of the NMR spectra given above (multiplicities and SSCCs) together with the results obtained in the investigation of sesquiterpene lactones of Umbelliferae by x-rays [6] have shown that opoferdin is an eudesmanolide with the structure of 1β-angeloyloxy-4,14-epoxy-5βH,6αH,7αH,10αCH_3-eudesma-2(3),11(13)-dien-6,12-olide (I).



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