ESSENTIAL OILS OF TWO SPECIES OF THE GENUS *Grammosiadium* FROM THE FAMILY UMBELLIFERAE

A. Sh. Shikhev, R. M. Abbasov,
and T. A. Malinovskaya

UDC 547.953

The plant *Grammosiadium platycarpum* (*Caropodium platycarpum*) was collected in Ordubad and Shakhbuz regions of the Nakhichevan ASSR in the stage of ripening of the seeds. The chemical composition of the essential oil of *G. platycarpum* has been investigated previously [1-3]. The presence in it of linalool, linalyl formate, linalyl acetate, and limonene in it was established.

G. daucoides is a perennial plant; thickets of this plant have been found by us in the environs of Lake Bata-bat (Shakhbuz region). The raw material for investigation was collected in the stage of the ripening of the seeds. There is no information in the literature on the essential oil of *G. daucoides*. The collected material (fruit) was dried in the shade and comminuted. The essential oil was obtained from it by steam distillation. Acids and phenols were isolated from it by treatment with 5% sodium carbonate solution and then with 5% caustic soda solution. The neutral fraction of the oil was separated by fractional distillation (5 mm Hg) into fractions. The yields and characteristics of the essential oils are given below:

	G. platycarpum	*G. daucoides*
Yield of essential oils, %	1.85	2,5
D_{20}^{20}	0,8684	0,8273
n_{20}^{D}	1,4670	1,4858
Acid No.	2,1	1,04
Ester No.	34,2	34.5
Ester No. after acetylation	253,45	61.3
Yields of fractions calculated on whole oil, %		
fraction with bp 42-45°C	8,2	70,4
fraction with bp 61-65°C	80,1	—
high-boiling residue	11,7	14,8
phenols	Tr.	13.8

A considerable difference was observed in the oils under investigation after acetylation, which showed the greater amount of alcohols in the oil of *G. platycarpum*. The essential oils differed markedly from one another in their content of phenols. While the oil of *G. platycarpum* contained almost no phenols, the essential oil of *G. daucoides* contained 13.8% of them. The neutral fractions of the essential oils also differed sharply with respect to the classes of chemical compounds. While in the former the fraction with bp 61-65°C predominated, in the latter it was the monoterpene hydrocarbons with bp 42-45°C.

Individual fractions of the essential oils were analyzed on a Pye Unicam gas–liquid chromatograph. We used the following stationary phases for chromatographic separation: poly(ethylene succinate), poly(propylene adipate), polyethyleneglycol-6000, SE-30, and XE-60. A number of components was identified in the composition of the monoterpene fraction by repeated chromatography, comparison with the retention times of known substances, and the addition of these substances to the mixture. The main components in the oils were also isolated preparatively and were identified from their physicochemical properties and by comparison of their IR spectra with those of known substances. The percentages of the monoterpene hydrocarbons identified were as follows:

V. L. Komarov Institute of Botany of the Academy of Sciences of the Azerbaidzhan SSR, Baku. Translated from Khimiya Prirodnykh Soedinenii, No. 3, pp. 410-411, May-June, 1979. Original article submitted February 28, 1979.

 0009-3130/79/1503-0360$07.50

Terpene hydrocarbons	*G. platycarpum*, % calculated on 1st fraction	whole oil	*G. daucoides*, % calculated on 1st fraction	whole oil
α-Pinene	Tr.	Tr.	2 2	1,5
Camphene	Tr.	Tr.	—	—
Myrcene	Tr.	Tr.	Tr.	Tr.
β-Pinene	15,6	1,0	7,2	5,0
Sabinene	—	—	2,8	2,1
Limonene	65,8	5,3	—	—
o-Cymene	5,2	0,3	52,2	32,7
p-Cymene	12,4	1,0	35,6	25,1

In the second fraction (with bp 61-65°C) of the essential oil of *G. platycarpum* linalool (80%) was identified, and in the high-boiling residue nerol, geraniol, linalyl acetate, and linalyl formate. The phenolic fraction of the essential oil of *G. daucoides* consisted mainly of carvacrol.

Thus, it has been established that the essential oil of *G. platycarpum* contains, in addition to substances detected previously, α- and β-pinenes, camphene, myrcene, o- and p-cymenes, nerol, and geraniol. This is the first time that the chemical composition of the essential oil of *G. daucoides* has been studied. It must be mentioned that the oils investigated of the two species of the genus *Grammosiadium* differ markedly in the composition of their chemical compounds, which is not characteristic for species of a single genus.

LITERATURE CITED

1. I. Yu. Galzhiev, Composition of the Essential Oil of *Caropodium platycarpum* [in Russian], Baku, Vol. III (1938).
2. I. Yu. Gadshiev, "Composition of the essential oil in the unripe and ripe fruit of Caropodium," Tr. Inst. Bot. Akad. Nauk AzSSR, 15, 182 (1950).
3. G. V. Pigulevskii and T. P. Razbegaeva, The Study of the Essential Oil of *Caropodium platycarpum* [in Russian], Moscow, No. 8 (1961).

GERMACRANOLIDES OF *Tanacetum pseudoachillea*

A. I. Yunusov and G. P. Sidyakin

UDC 547.314.582.998

By chromatography on silica gel of the nonpolar fraction of an extract of the inflorescences of *Tanacetum pseudoachillea* C. Winkl. [1] with a mixture of hexane and ethyl acetate (9:1) we have isolated a substance with the composition $C_{20}H_{26}O_5$, mp 146-147°C (ethanol); $[\alpha]_D^{22}$ +42° (c 1.2; methanol), whichhas proved to be a new sesquiterpene lactone and has been named tanadin (I).

The IR spectrum of (I) shows absorption bands at (cm^{-1}) 1760 (γ-lactone carbonyl), 1710 and 1235 (α,β-unsaturated ester group), and 1672 and 1652 (double bonds). The mass spectrum has the peaks of ions with m/e: 346 (M^+), 263 $(M-83)^+$, 246 $(M-100)^+$, 231 $(M-100-15)^+$, 218 $(M-100-15-28)^+$, 213 $(M-100-15-28-15)^+$. The ion with m/e 246 is formed by the splitting out of an acyl radical, $C_5H_8O_2$, from the molecular ion. On further fragmentation, the acyl residue loses a CH_3 radical and a CO group. From the products of the alkaline hydrolysis of compound (I) we isolated an identified angelic acid, just as in the hydrolysis of tanacin and tanapsin [1].

The PMR spectrum of (I) (taken on a JNM-4H-100/100 MHz instrument in C_5D_5N, δ scale, ppm, O — HMDS) the following resonance signals were observed: 1.30, s, 3 H ($CH_3-\overset{O}{\overset{\diagup\diagdown}{C}}-C-$), 1.79 and 1.86, s, 3 H each ($2CH_3-C=C-$); 1.96, d, 3 H, J = 7 Hz ($CH_3-CH=C-$); 2.76, q, 1 H, J_1 = 2.5, J_2 = 10 Hz ($-HC\overset{O}{\overset{\diagup\diagdown}{}}C-$); 3.36, m, 1 H (H-7); 4.41, m, 1 H (H08); 5.27, q, 1 H, J_1 = 3, J_2 = 10 Hz (H-3); 5.58, m 1 H (H-6); 5.80, d, 1 H, J = 3 Hz (H-13); 5.92, m, 1 H (H-18); 9.30, d, 1 H, J = 3 Hz (H-13').

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR, Tashkent.

Translated from Khimiya Prirodnykh Soedinenii, No. 3, pp. 411-412, May-June, 1979. Original article submitted February 2, 1971.

0009-3130/79/1503-0361$07.50