COMPONENTS OF THE ESSENTIAL OIL OF *Thymus nummularius*

F. Yu. Kasumov and S. I. Gavrenkova

UDC 665.528:1

In recent years, a considerable amount of work has been devoted to the study of the chemical compositions of the essential oils of various species of thyme [1, 4]. However, the systematic information on the physicochemical properties and component compositions of the essential oils of species of thyme from the flora of Azerbaidzhan is inadequate [5, 6].

We give the results of a study of the component composition of the essential oils of *Thymus nummularius* M. B. [∿ money thyme], collected in the Belokany, Zakataly, and Kakhi regions, in the central mountain zone of the rivers Din-Din, Gamzigor, and Ili-su, and on the herbaceous slopes and the edges of the forest during the mass vegetation period.

The essential oils were determined quantitatively by Ginsberg's method. It was found that the essential oil content of this species is fairly considerable — 0.27-0.75% on the air-dry weight of the epigeal part of the plant. The physicochemical constants of the oil were determined by standard methods [7].

The results of a study of the dynamics of the accumulation of the essential oil of *Th. nummularius* showed that the maximum amount of oil, 0.70%, was present in the mass-flowering phase, 0.35% in the budding phase, and 0.22% in the fruit-bearing phase (on the air-dry mass of the plant).

The essential oil of *Th. nummularius* is a pale yellow liquid with a sharp smell of thymol, bitter to the taste, with astringent properties, crystallizing at −7°C.

Physicochemical constants of the oil: n_D^{20} 1.5013; D_D^{20} 0.9502; acid No. 4.9; ester No. 48.7; ester No. after acetylation 85.20.

The component composition of the essential oil was determined by the GLC method (LKhM. 8MD) using helium as the carrier gas at a rate of flow of 6 ml/min, and Carbowax 20 M and PEG with a molecular weight of 20,000; the length of the capillary column was 50 m and its internal diameter 0.25 mm, and the temperature of the evaporator was 200°C and that of the column 70-180°C.

Under the given conditions, 70 components were found in the essential oil of *Th. nummularius*, and their main representatives were identified by the addition of known compounds to a sample of oil and from their relative retention times [8].

The following components were detected in samples of the essential oil of *Th. nummularius*: α-pinene, 2.32%; camphene, 0.94%; β-pinene 0.30%; myrcene, 2.57%; 1,8-cineole, 0.71%; limonene, 0.66%; γ-terpinene, 0.65%; p-cymene, 5.72%; camphor, 4.42%; linalool, 7.0%; terterpineol-4, 4.65%; caryophyllene, 10.46%; borneol, 5.28%; α-terpineol, 4.41%, thymol, 8.36%; carvacrol, 2.33%.

LITERATURE CITED

1. R. Granger and J. Passet, Phytochemistry, 1683 (1973).
2. R. Granger, J. Passet, G. Teulada-Arbousset, and P. Auriol, Plant Med. Phytother., 225 (1973).
3. S. Rivas-Martinez, C. Garcia Vallejo, and D. Garcia Martin, Ann. Inst. Bot. Cavanilles, 317 (1974).
4. T. Adzet, R. Granger, J. Passet, and R. San Martin, Plant Med. Phytother., 275 (1977).
5. F. Yu. Kasumov, Khim. Prir. Soedin., 863 (1970).
6. F. Yu. Kasumov, Khim, Prir. Soedin., 522 (1981).
7. M. I. Goryaev and I. Pliva, Methods of Investigating Essential Oils [in Russian], Alma-Ata (1962).

V. L. Komarov Institute of Botany, Academy of Sciences of the Uzbek SSR, Baku. Translated from Khimiya Prirodnykh Soedinenii, No. 5, pp. 654-655, September-October, 1982. Original article submitted April 30, 1982.

 0009-3130/82/1805-0622$07.50

8. L. D. Litvinov and B. A. Rudenko, Gas Chromatography in Biology and Medicine [in Russian], Moscow (1971).

ARGLABIN — A NEW SESQUITERPENE LACTONE FROM *Artemisia glabella*

S. M. Adekenov, M. N. Mukhametzhanov,* A. D. Kagarlitskii, and A. N. Kupriyanov

UDC 547.314

The total extractive substances have been obtained from the epigeal part of *Artemesia glabella* Kar. et Kir. (∿ smooth wormwood) collected in August 1978 (Kent mountains, Karaganda province, Kazak SSR) by treatment with water [1] followed by extraction with chloroform. When the resin was chromatographed on a column of silica gel, we isolated from benzene fractions a substance with the composition $C_{15}H_{18}O_3$, mp 100-102°C (hexane), $[\alpha]_D^{20}$ + 45.6° (c 0.3; chloroform), which has proved to be a new sesquiterpene lactone and which has been called arglabin. In TLC [on Silufol; benzene—ethanol (9:1)], it has R_f 0.50. IR spectrum: ν_{max}^{KBr} (cm^{-1}) 1760 (C=O of a γ-lactone), 1660 (C=C). UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 204 nm, ε 19,800, characterizing an exocyclic methylene group conjugated with the carbonyl of the γ-lactone ring. The mass spectrum contains, with a low intensity, the peak of the molecular ion m/z 246, which corresponds to the molecular weight. The presence of a fragment with m/z 231 is due to the loss by the molecular ion of a methyl group at an epoxide system as this is less strongly attached to the neighboring carbon atom than a methyl group on a double bond. Fragments with m/z 213 $(M - CH_3 - H_2O)^+$, 203 $(M - CH_3 - CO)^+$, and 185 $(M - CH_3 - H_2O - CO)^+$ confirm the presence of a lactone carbonyl and of an epoxide group.

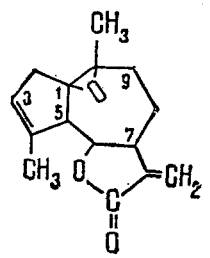
When the substance was dehydrogenated over selenium, chamazulene, identified by TLC with a marker, was obtained.

The presence of an epoxide group in arglabin was confirmed by its opening with oxalic acid [4].

The derivative obtained (II) had the composition $C_{15}H_{20}O_4$, mp 182-185°C (ether). IR spectrum, ν_{max}^{KBr} (cm^{-1}): 3450 (—OH), 1750 (C=O of a γ-lactone), 1665 (C=C).

In the NMR spectrum of arglabin (taken on a Varian HA-100D instrument in $CDCl_3$: the chemical shifts are given in the δ-scale from the signal of TMS taken as 0), there are two three-proton signals: one at 1.34 ppm (methyl at an epoxide ring) and the second at 1.94 ppm (methyl at a double bond); there are also one-proton doublets at 2.95 ppm with J = 10 Hz (proton at C_5), a one-proton triplet with its center at 3.97 ppm having $J_1 = J_2 = 10$ Hz (lactone proton), two one-proton doublets at 5.42 ppm with J = 3 Hz and at 6.10 ppm with J = 3 Hz (exomethylene at a lactone ring), and a one-proton signal at 5.56 ppm (vinyl proton).

On the basis of the physicochemical constants obtained, and also the results of a comparison of NMR spectra of the substance that we had isolated and sequiterpene lactones of similar structure described in the literature (arborescin, ludartin, and others) [2, 3], we propose for arglabin structure (I) as the most probable.



*Deceased.

Institute of Chemical Metallurgy, Academy of Sciences of the Kazakh SSR, Karaganda.
Translated from Khimiya Prirodnykh Soedinenii, No. 5, pp. 655-656, September-October, 1982. Original article submitted May 10, 1982.

0009-3130/82/1805-0623$07.50