

COMPONENT COMPOSITION OF THE ESSENTIAL OILS OF *Ziziphora* SPECIES

F. Yu. Kasumov, I. M. Kyazimov,
A. D. Dembitskii, and N. M. Ismailov

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The chemical composition of the essential oils of species of the genus *Ziziphora* which are common in the flora of Azerbaidzhan, their useful properties, and their raw material resources have hitherto been studied inadequately [1-3]. We have studied the component composition of the essential oils of the following species of this genus: *Z. capitata* L, *Z. serpyllaceae* Bieb, *Z. puschkinii* Adams, *Z. persica* Bge, *Z. rigida* (Boiss, H. Braun), and *Z. denticulata* Juz. For analysis we used material gathered in the mass flowering phase in the foothills and low and medium mountain slopes of the Apsheron, Zangelan, Divichi, Shemakha, Stepanakert, and Sheki regions.

TABLE 1. Comparative Component Compositions of the Essential Oils of Species of the Genus *Ziziphora*

Species of <i>Ziziphora</i> and region where raw material was collected	Amount of essential oil, % on the air-dry weight of the plant	Physicochem. constants	Number of components	Components identified
<i>capitata</i> (Apsheron region, Ilkhydag)	0.23-0.32	n_D^{20} 1.4872 d_{20}^{20} 0.9267 A.no. 5.49 E.no. 17.71 E.no.a.a. 46.31	19	Cinneole, menthone, isomenthone, neoisomenthone, pulegone, piperitone, cis-piperitol, piperitenone, thymol, carvacrol
<i>serpyllaceae</i> (Divichi region, environs of the village of Ugakh)	0.90-1.13	n_D^{20} 1.4860 d_{20}^{20} 0.8457 A.no. 4.95 E.no. 27.23 E.no.a.a. 53.44	22	α -Pinene, camphene, β -pinene, sabinene, α -terpinene, limonene, cinneol, menthone, isomenthone, neoisomenthone, pulegone, cis-piperitol, piperitenone, piperitenone oxide, thymol, carvacrol
<i>persica</i> (Zangelan region, environs of the village of Zangelan)	0.82-1.15	n_D^{20} 1.4908 d_{20}^{20} 0.9207 A.no. 3.78 E.no. 21.67 E.no.a.a. 47.64	12	α -Pinene, camphene, β -pinene, sabinene, myrcene, menthone, isomenthone, pulegone, piperitone, thymol, carvacrol
<i>puschkinii</i> (Shemakha region, environs of the village of Astrakhanovka)	0.45-0.60	n_D^{20} 1.4890 d_{20}^{20} 0.9168 A.no. 4.43 E.no. 28.71 E.no.a.a. 50.49	20	α -Pinene, camphene, β -pinene, sabinene, α -terpinene, limonene, cymene, p-cymene, terpinolene, methone, isomenthone, neoisomenthone, cis-piperitone, pulegone, piperitone, piperitenone, piperitenone oxide, thymol, carvacrol
<i>rigida</i> (Sheki region, environs of the S. Ordzhonikidze communal farm, hill of Bayan)	0.86-0.99	n_D^{20} 1.4900 d_{20}^{20} 0.9338 A.no. 6.52 E.no. 21.93 E.no.a.a. 74.66	18	α -Pinene, camphene, β -pinene, sabinene, β -myrcene, α -terpinene, limonene, cinneol, p-cymene, artemesia ketone, menthone, isomenthone, neoisomenthone, pulegone, piperitol, cis-piperitol, piperitenone, piperitenone oxide, thymol, carvacrol
<i>denticulata</i> (Stepanakert region, Chemchabulag)	0.85-0.96	n_D^{20} 1.4870 d_{20}^{20} 0.9202 A.no. 5.63 E.no. 19.75 E.no.a.a. 67.43	20	Cinneol, menthone, isomenthone, neoisomenthone, pulegone, piperitone, cis-piperitol, piperitenone, piperitenone oxide, thymol, carvacrol, a sesquiterpene alcohol

V. L. Komarov Institute of Botany of the Azerbaidzhan Academy of Sciences, Baku. Translated from *Khimiya Prirodnikh Soedinenii*, No. 5, pp. 760-761, September-October, 1987. Original article submitted February 20, 1987.

The quantitative amounts of the essential oils were determined by Ginzberg's method, and their physicochemical constants by standard methods [4, 5]. The quantitative compositions of the essential oils were studied by gas-liquid chromatography (Vyukhrom). The main components were identified by the introduction of known compounds into samples of the oils and from their relative retention times (Table 1).

It was found that the amounts of essential oils in the epigeal parts of the species of *Ziziphora* ranged between 0.23 and 1.15% (on the air-dry weight), depending on the species involved. The results of a study of the qualitative compositions of the essential oils of the *Ziziphora* species showed that they all contained as the main components menthone, isomenthone, pulegone, thymol, and carvacrol. The largest number of components (22), including unidentified compounds, was found in *Z. serpyllaceae*, and the smallest number (12) in *Z. persica*.

As can be seen from Table 1, the chemical compositions of the essential oils of these *Ziziphora* species have many similar components, but α -pinene, camphene, β -pinene, sabinene, α -terpinene, and limonene were not found in *Z. capitata* and *Z. denticulata*.

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COMPONENT COMPOSITIONS OF THE ESSENTIAL OILS OF SOME SPECIES OF THE GENUS *Thymus*

F. Yu. Kasumov

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The genus *Thymus* L. is represented in the flora of the USSR by 172 species, 38 of which grow in the Caucasus.

There is much information in the literature on the use of herbs of the *Thymus* species and their essential oils in folk medicine, perfumery, and the food industry [1-3]. The essential oil content of the *Thymus* species of the flora of Georgia have not been previously studied. We have investigated the essential oils of *Thymus coriifolius* Ronn., *Th. transcaucasicus* Ronn., *Th. marshallianus* Willd., *Th. tiflisensis* Klok. et Shost. gathered in eastern Georgia in the period of mass flowering.

The essential oils were obtained by the method of A. S. Ginzberg [3] from the epigeal parts of the plants. The physicochemical constants of the oils were determined by generally adopted methods [4]. The qualitative compositions of the oils and the amounts of the components were determined by the GLC method on a Chrom-5 chromatograph. The components were identified by the increase in the size of the corresponding peak on the addition of known substances and also from their retention times.

In order to determine more accurately the optimum time of collecting the species of thyme from their natural growth sites, we studied the dynamics of the accumulation of the essential oils. It was found that the maximum amounts of essential oils accumulated in the mass flowering phase.

As can be seen from Table 1, among the compounds identified in the essential oils of the thyme species, the main components were: in *Th. marshallianus*, geraniol (30.28%); in

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