

CHEMICAL COMPOSITION OF ESSENTIAL OILS OF THYME SPECIES
IN THE FLORA OF ARMENIA

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The flora of the Caucasus is rich in species of thyme (38 species) [1]. They differ greatly in chemical composition and aroma and represent potential sources of drugs and aromatizers for perfumery materials [2-4]. The component compositions of the essential oils of species of thyme from the Armenian flora and their useful properties have been studied inadequately [5]. We have investigated the chemical compositions of the essential oils of Thymus collinus Bieb, Th. transcaucasicus Ronn., Th. kotschyanus Boiss. et Hohen., and Th. fedtschenko Ronn. The materials for analysis were collected in the flowering phase: Th. collinus in the Krasnoselsk region, environs of the village of Dzhul, and on Mt. Novruzogly, environs of the village of Kelkend, in stony sites at a height of 2000-2300 m above sea level; Th. transcaucasicus in the environs of Erevan, on the highway close to the champagne wine factory, in rocky sites, at a height of 1000-1200 m; Th. kotschyanus in the Krasnoselsk region, environs of the village of Artanysh, on Mt. Ochag-bashy; at Lake Sevan, in the environs of the village of Kechamavan; and on Mt. Tokhmagli, in stony sites, at a height of 2000-2400 m; and Th. fedtschenko in the Vardinskii region, environs of the village of Babadzhan, on grassy sites, at a height of 2000-2200 m.

The essential oils were obtained from the epigeal parts of these species of thyme by steam distillation under semiindustrial conditions. The quantitative contents of essential oils were determined by Ginzberg's method, and their physicochemical constants by standard

TABLE 1

Thyme	Amt. of essential oils, % on air-dry wt. of the plant	No. of components	Phys.-chem. constants	Main components of the essential oils, %
<u>Th. collinus</u>	0.81-1.25	17	n_D^{20} 1.4970 d_{20}^{20} 0.8637 A.No. 2.55 E.No. 16.47 E.No.a.a 67.75	α -Pinene, 3.39; limonene, 2.51; 1,8-cineole, 6.66; terpinolene, 4.52; γ -terpinene, 4.39; p-cymene, 8.16; thymol, 57.03; carvacrol, 6.53
<u>Th. transcaucasicus</u>	0.48-0.88	32	n_D^{20} 1.4996 d_{20}^{20} 0.8998 A.No. 1.98 E.No. 28.75 E.No.a.a 72.65	α -Pinene, 5.79; limonene, 1.50; 1,8-cineole, 0.82; terpinolene, 6.93; γ -terpinene, 4.39; p-cymene, 4.11; linalool, 12.79; caryophyllene, 4.79; terpinen-4-ol, 2.07; thymol, 33.59; carvacrol, 11.72
<u>Th. kotschyanus</u>	0.25-0.32	28	n_D^{20} 1.5078 d_{20}^{20} 0.9022 A.No. 1.27 E.No. 38.62 E.No.a.a 58.15	α -Pinene, 8.83; limonene, 1.44; 1,8-cineole, 1.18; terpinolene, 0.03; terpinene, 2.47; p-cymene, 17.74; linalool, 1.02; caryophyllene, 2.05; terpinen-4-ol, 2.43; α -terpineol, 6.50; β -bisabolene, 1.02; thymol, 35.48; carvacrol, 11.65
<u>Th. fedtschenko</u>	0.76-1.27	19	n_D^{20} 1.5171 d_{20}^{20} 0.9118 A.No. 1.71 E.No. 25.75 E.No.a.a 79.32	α -Pinene, 4.13; limonene, 1.35; 1,8-cineole, 1.80; terpinolene, 3.23; γ -terpinene, 8.72; caryophyllene, 3.42; terpinen-4-ol, 1.4; thymol, 63.39; carvacrol, 6.20

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procedures [6, 7]. The chemical composition of the essential oils was studied by gas-liquid chromatography (LKhM-8 MD). In the essential oils of Th. collinus, Th. fedtschenko, Th. kotschyanus, and Th. transcaucasicus respectively, 17, 19, 28, and 32 components were detected. They were identified by the addition of authentic markers. The numbers of components identified in the essential oils of the given species of thyme were 8, 9, 13, and 11, respectively, and their percentage amounts were determined. Conditions of performing the analysis: carrier gas helium at a rate of flow of 6 ml/min; Carbowax 20 M (PEG with a molecular weight of 20,000); internal diameter of the capillary column 0.25 mm, length 50 m; temperature of the evaporator 200°C; temperature of the column 70-180°C at 2 deg/min. The comparative chemical compositions of the thyme species are given in Table 1.

The yields of essential oils from the epigeal parts of the species of thyme ranged from 0.25 to 1.27% (on the air-dry weight), depending on the species composition and the ecological conditions.

Among the identified components of the essential oils of the species of thyme investigated there were many compounds common to them all. However, linalool was found only in Th. transcaucasica and Th. kotschyanus, terpinen-4-ol only in Th. transcaucasica, and Th. fedtschenko, and β -bisabolene only in Th. kotschyanus. As can be seen from the table, the main substances in all the species were the phenolic compounds thymol and carvacrol. The highest total amounts of phenols were present in Th. fedtschenko (69.59%) and Th. collinus (63.56%).

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