TERPENOIDS OF THE ESSENTIAL OIL OF *Artemisia vulgaris*

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The essential oil for analysis was obtained by the steam distillation method from the herbage of *Artemisia vulgaris* L. collected in the flowering phase in the environs of Tomsk. The oil consisted of a clear mobile light green liquid with a burning taste and the sharp smell of the fresh plant.

A terpene fraction was obtained by the successive treatment of the whole essential oil with a saturated solution of sodium hydrogen carbonate and a 5% solution of caustic potash.

The natural substances were separated by chromatography on silica gel into hydrocarbons (eluted by petroleum ether) and oxygen-containing compounds (eluted by diethyl ether).

The hydrocarbons were separated by fractional vacuum distillation (70-100°C, 10 mm Hg) into monoterpenes and still residue.

Analytical GLC was performed on a Chrom-5 instrument using glass capillary columns with XE-60 (50 m) and with OV-101 (20 m). The temperature for the analysis of the monoterpenes was 80°C and for the sesquiterpene hydrocarbons and oxygen-containing compounds it was 80-180°C/3°C per minute, with a rate of flow of carrier gas (nitrogen) of 5 ml/min.

Preparative GLC was performed on a Pye-105 instrument using a 6 mm × 2.5 m column with 5% of DS-550 on Chromaton N (0-20-0.25 mm). The column temperature was 70°C and the rate of flow of carrier gas (nitrogen) 60 ml/min.

Identification of the Monoterpenes. From the relative retention times (GLC), the following were identified in the monoterpene fraction: α-pinene, camphene, β-pinene, sabiene, Δ^3-carene, limonene, β-phellandrene, γ-terpinene, α-terpinene, p-cymene, and terpinolene. Camphene, sabinene, and Δ^3-carene were isolated in the individual form by preparative GLC.

Chromatography of the still residue on silica gel impregnated with a 20% solution of silver nitrate using gradient elution (petroleum ether–diethyl ether) yielded in the individual form β-farnesene, β-selinene, and α-humulene. The following were identified in the still residue from their relative retention times (RRTs) and by the method of additives: α-copaene, caryophyllene, α-muurolene, α-humulene, β-farnesene, β-selinene, and germacrene D.

The following individual compounds were isolated by chromatographing the fraction of oxygen-containing compounds on silica gel: 1,8-cineole, camphane [eluted by petroleum ether–diethyl ether (95:5)]. GLC using additives showed the following components: 1,8-cineole, linalool, camphane, borneol, terpineol-4, α-terpineol, thymol methyl ether, bornyl acetate, α-terpenyl acetate, cubebol, epicubebol, 5S,8S-germacra-1E,6E-dien-5α-ol eudesmol, and σ-cadinol.*

All the compounds isolated in the individual form were identified by their PMR spectra.

The PMR spectra were recorded on a Varian HA-56/60A instrument using solutions in CCl_4 with HMDS as internal standard, the chemical shift of which was taken as 0.05 ppm.

In the essential oil of mugwort wormwood [*A. vulgaris*] we identified 32 compounds of which 27 have not previously been reported in the literature for this species of wormwood [1, 2].

LITERATURE CITED

1. M. I. Goryaev, Essential Oils of the Flora of the USSR [in Russian], Alma-Ata (1952), p. 380.
2. A. A. Altymashev, Natural Medical Agents [in Russian], Frunze, Kyrgyzstan (1985), p. 153.

*As in Russian original.

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