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ESSENTIAL OILS OF Pimpinella aromatica

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One of the genera of the Umbelliferae family of interest from the point of view of its essential oil content is the pimpinella genus Pimpinella L., some species of which have been known since ancient times as aromatic spice plants [1].

Literature information on the essential oil content of pimpinella speices is sparse. According to Ya. Matsku [1], M. Kotov [2], and Shukla [3], the fruit of P. anisum contains from 2 to 3.2% of essential oil (EO). The yield of EO from the roots of P. saxifraga amounts to 0.02-0.11% [2, 4].

The EO from the whole plants and fruit of P. anisum and P. saxifraga has been shown to contain α-pinene, limonene, dipentene, α-phellandrene, bergamotene, copaene, anethole, pregei-

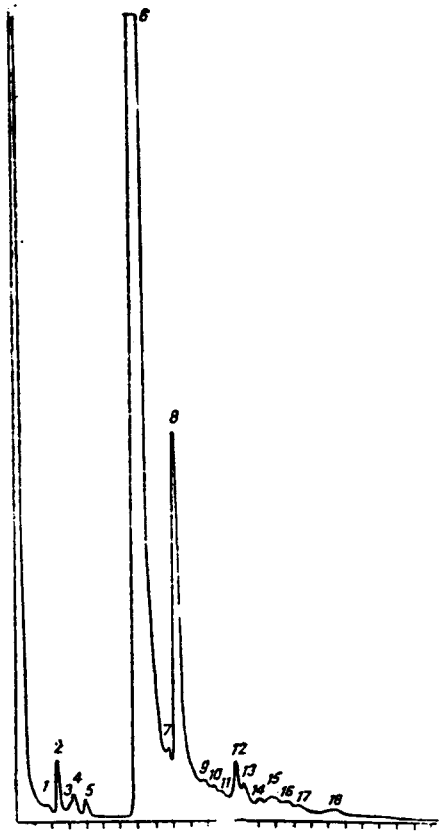

Fig. 1. GLC of the ssential oil from whole Pimpinella aromatica plants: 1) α-thujene; 2) α-pinene; 3) camphene; 4) α-terpinene; 5) limonene; 6) methylchavicol; 7) cis-anethole; 8) trans-anethole; 12) anisaldehyde; 13) anisic acid; 14) eugenol; 15) chamazulene; 16) thymol; 9, 10, 11, 17, 18) unidentified components.

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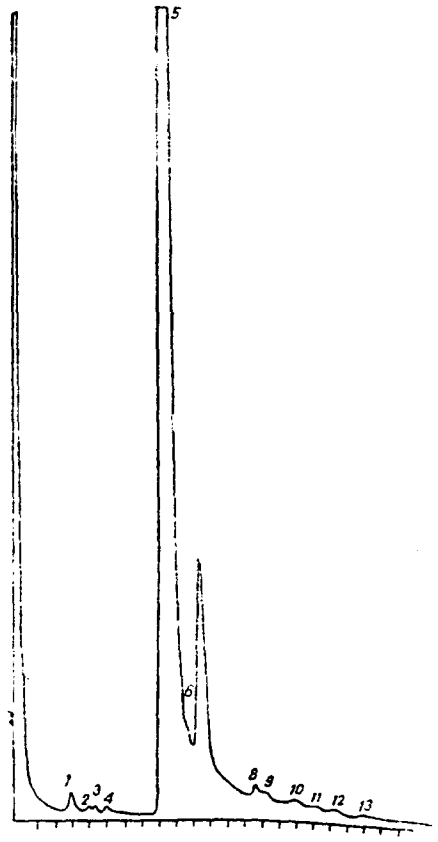

Fig. 2. GLC of the essential oil from fruit of Pimpinella aromatika: 1) α-pinene; 2) camphene; 3) α-terpinene; 4) limonene; 5) methylchavicol; 6) cis-anethole; 7) trans-anethole; 8) anisaldehyde; 9) anisic acid; 10) eugenol; 11) thymol; 12, 13) unidentified components.

jerene, geijerene, β-sesquiphellandrene, ar-curcumene, saxazulene, and other components [5, 6].

There is no information in the literature on the biological characteristics and essential oil content of aromatic pimpinella, P. aromatica, for which reason we set ourselves the aim of studying them.

The EO for analysis was obtained by the steam-distillation method [7] both from whole plants and from individual organs of aromatic pimpinella collected in the Kuba region of the Azerbaidzhan SSR. The EO isolated from the fruit consisted of a colorless, and that from the whole plants of a bright blue, clear sweet-tasting liquid with a characteristic pleasant odor. The physicochemical constants were determined in accordance with the ratified GOSTs [State Standards] [8]: acid No. 4.49; ester No. 28.05; D^{26} 0.9632, n_D^{20} 1.520. The yield of EO (on the air-dry raw material) from the whole plants was 2.31-3%, from the epigeal mass 2.64-3.16%, from the stems and leaves 0.08-0.09%, from the flowers 1.30-1.69%, and from the fruit 8.70-9.73%.

The composition of the EO was determined, without its preliminary separation into fractions, by the GLC method on a Janaco chromatograph using aflame-ionization detector and a cop-column (3 mm × 0.75 m) filled with Silicone DC 702 (30%) on Celite 545 (80-100 mesh). The temperature of the evaporator was 250°C and that of the column was programmed at 6°/min from 70 to 220°C, the dose of EO injected into the apparatus being 0.03-0.1 μl. The components were identified by the method of adding pure substances and from relative retention times. The amounts of the components were calculated from the areas of the peaks by the internal normalization method [9], the sum of the areas of the peaks being taken as 100%.

The EO from the whole plants was found to contain 18 components. The monoterpene hydrocarbons made up 2.8%, and of these: thujene, 0.2; α-pinene, 0.8; camphene, 0.8; α-terpenene,

0.5; and limonene; 0.5. Oxygen-containing compound made up 95.2%, including methylchavicol, 81.5; cis-anethole, 1.1; trans-anethole, 9.8; anisaldehyde, 1.5; anisic acid, 0.6; eugenol, 0.4; thymol, 0.3; chamazulene, 0.5; and unidentified components, 1.5% (Fig. 1).

Fewer components (13) were detected in the EO from the fruit Monoterpene hydrocarbons made up 1.8%, including α-pinene, 1.0; camphene, 0.2; α-terpene, 0.3; and limonene, 0.3. Oxygen-containing compounds made up 97.8% including: methylchavicol, 82.6; cis-anethole, 2.3; trans-anethole, 10.0; anisaldehyde, 1.2; anisic acid, 0.8; eugenol, 0.5; and thymol 0.4; the total amount of unidentified components being 0.4% (Fig. 2).

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ESSENTIAL OIL OF Achillea cuneatiloba

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In the Azerbaidzhan SSR, the yarrow Achillea cuneatiloba Boiss. et Buhse grows in the Nakhichevan ASSR and on the Apsheron Peninsula. There is information in the literature on the chemical composition of A. filipendulina Lam., A. millefolium L., A. nobilis L., and A. biebersteinii Afan. [1-3], but none of the chemical composition of the essential oil (EO) of A. cuneatiloba which grows in the USSR.

We give the results of an investigation of the chemical composition of the EO isolated by steam distillation [4] from the epigeal parts and inflorescences of A. cuneatiloba collected in the environs of the villages of Novkharny, Bil'gya, Zagul'ba, and Buzovny in the Apsheron region. The EO consisted of an aromatic blue-green liquid slightly burning to the taste.

We have studied the dynamics of the EO content in A. cuneatiloba. The maximum amount of EO was found in the mass-flowering phase (1.0%).

The chemical composition of the EO was determined by gas-liquid chromatography on a Janaco chromatograph under the following conditions: copper column 3 mm 0.75 m; stationary phase PEG 2000 (5%); column temperature programmed at 6°C per minute from 70 to 190°C; temperature of the flame-ionization detector 210°C and of the evaporator 210°C. Identification was carried out by the method of adding pure substances and from relative retention times in accordance with literature information. The amounts of the components were calculated from the areas of the peaks by the internal-normalization method [6].

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