

COMPOSITION OF THE ESSENTIAL OILS OF LIBANOTIS TRANSCAUCASICA. V

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The composition of the sesquiterpene hydrocarbon fractions [1] and the oxygen-containing compounds [2] of the essential oils of a number of ecological forms of Libanotis transcaucasica Schisch. has been investigated previously.

Table 1

Properties of the Monoterpene Fractions of the Essential Oils of Libanotis transcaucasica

Location at which the plant was collected, year	bp, °C, mm Hg	% of the essential coal	n_D^{20}	
			deg	
Village of Kardonikskaya, Stavropol territory (1954)	40-67/8	18.0	1.4720	+71.0
Golubye ozera, Kabardino-Balkaria ASSR, introduced by Alekseev Zonal Experimental Breeding Station (ZEBS) (1955)	40-65/3	4.14	1.4680	
Krasnaya Polyana, Kabardino-Balkaria ASSR, introduced by Alekseev ZEBS (1954)	40-46/6	2.76	1.4685	+33.0
Southern Osetiya	up to 65/3	23.6	1.4745	+31.3
Elbrus (foothills)	up to 40/8	2.34	1.472	+67.0
Armenia (1955)	41-56/9	23.4	1.4750	+18.0
Cultivated form	40-62/5	23.2	1.4815	+21.0

However, the monoterpene hydrocarbon fractions (amounting in some cases to 50% of the oil) has been little studied [3-6].

We have investigated the monoterpene fractions of the essential oils of this plant. It has been established that these fractions have a complicated composition [7]. By careful chromatographic separation of the total monoterpene hydrocarbons on alumina with spectroscopic monitoring of the fractions, we have isolated from the essential oil of Libanotis transcaucasica in its Kardonikskaya form, and have identified, d- α -pinene, d- α -phellandrene, d- β -phellandrene, and myrcene. In the essential oil of the golubye ozera form (introduced by the Alekseev ZEBS) we have found and identified from their physicochemical constants and IR absorption spectra d- α -pinene, p-cymene, and myrcene. From the monoterpene fraction of the Armenian form we have isolated d- α -pinene and d- β -phellandrene, and from the Southern Osetiya form d- α -pinene, d- β -phellandrene, and myrcene [7].

Table 2

Composition of the Monoterpene Hydrocarbon Fractions of the Essential Oils of L. transcaucasica, %

Compound	Rel. retention vols.		Kardonikskaya	Golubye ozera	Krasnaya polyana	Southern Osetiya	Elbrus (foothills)	Armenia	Cultivated form
	PEG-1000	silicone oil							
α -Pinene	0.37	0.58	28.0	43.7	32.4	39.4	21.0	17.7	27.4
Camphene	0.46	0.64	2.1	5.4	4.4	4.5	1.6	1.3	2.9
β -Pinene	0.64	0.74	4.5	3.5	9.2	22.0	2.3	0.7	22.2
Myrcene	0.79	0.77	2.0	1.0	4.1	2.6	2.4	1.2	5.1
α -Phellandrene	0.85	0.89	42.0	—	24.2	15.2	37.5	10.0	—
Limonene	1.00	1.00	4.4	14.8	6.4	2.4	8.8	—	17.2
β -Phellandrene	1.12	1.02	10.9	traces	9.0	10.0	15.2	59.8	4.3
Unidentified compound	1.29	1.22(?)	2.7	—	4.0	1.4	5.6	5.6	—
p-Cymene	1.56	0.94	3.1	31.3	5.8	1.8	5.6	3.6	20.8

Nevertheless the IR spectra of some intermediate fractions contained additional absorption bands not belonging to the hydrocarbons mentioned above. We have obtained a more complete idea of the composition of the monoterpene

fractions of the essential oils of the seven ecological forms of *L. transcaucasica* by means of a more sensitive method—gas-liquid chromatography (Table 1).

To separate and identify the hydrocarbons we used stationary phases of different polarities, polyethylene glycol (PEG)-1000 and silicone oil. The relative retention volumes of pure samples of the hydrocarbons (calculated with respect to limonene) that we found are fairly close to those given for similar conditions [8] (Table 2).

Experimental

The monoterpene hydrocarbon fractions were obtained by vacuum distillation of samples of the essential oils under investigation.

The experiments were carried out with an "Argon Chromatograph" (W. G. Pye and Co.). The carrier gas was argon and the rate of flow 40 ml/min. An ionization detector was used. The column dimensions were: length 120 cm, diameter 0.4 cm, solid support Celite 545, 100/120 mesh. Stationary phase 1: PEG-1000 (18.8:100), temperature 100°C, sample size 0.1 µl.

The ratio of the components was calculated by Cremer and Muller's method [9].

Summary

The compositions of the monoterpene hydrocarbon fractions of the essential oils of the fruit of seven ecological forms of *Libanotis transcaucasica* Schisch. have been studied.

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