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ESSENTIAL OILS FROM LEAVES OF SEVERAL *Heracleum* SPECIES GROWING IN LENINGRAD OBLAST

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The component composition of essential oils isolated from leaves of species such as *Heracleum mantegazzianum* Somm. et Levier growing in Germany [1], *H. dissectum* Ledeb. growing in Mongolia [2] and Holland [3], *H. spondylium* L. growing in Italy [4], *H. lehmannianum* Bunge, *H. ponticum* (Lipsky) Schischk., *H. stenenii* Manden, and *H. trachyloma* Fisch. et C. A. Mey introduced to Leningrad Oblast [5–7] has been reported.

Our goal was to study the component composition of essential oil from leaves of several *Heracleum* (Apiaceae) species introduced to Leningrad Oblast.

Plants providing essential oil were grown at the scientific experimental station of Komarov Botanical Institute, RAS (Leningrad Oblast, Priozersk Region). Seeds for growing plants were collected in their natural habitat by I. F. Satsyperova and T. K. Perfilova [8]. Their initial herbarium specimens are stored in the corresponding sectors of the Botanical Institute Herbarium (LE).

Essential oils were obtained by steam distillation from freshly collected leaves of *H. aconitifolium* Woronow, *H. antasiaticum* Manden., *H. leskovii* Grassh., *H. mantegazzianum* Somm. et Levier, *H. voroschilovii* Gorovoi, and *H. wilhelmsii* Fisch. et C. A. Mey [9]. The yields were 0.1, 0.2, 0.1, 0.3, 0.1, and 0.3%, respectively.

Results from studies of the component composition of essential oils by GC and GC/MS have been published in detail by us earlier. They include retention times of identified compounds and the main peaks of experimental mass spectra [6, 10–13].

Table 1 lists the experimental results.

The results for the studied species of the genus *Heracleum* show that each cow-parsnip had a unique characteristic set of compounds. Components such as α-pinene, β-pinene, limonene, *p*-cymene, and octylacetate were observed in all studied species.

The most characteristic and/or prevalent (main, dominant) compounds in essential oil of leaves from different cow-parsnip species within sections have not yet been found. Nevertheless, the component composition of essential oils from leaves of *Heracleum* species within sections were observed to be somewhat similar. However, the component composition of essential oils from the leaves varied so much (qualitatively and quantitatively) that it could not be used to resolve chemosystematic relationships among species of this genus.

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TABLE 1. Component Composition of Essential Oils from Leaves of Several Species of the Genus *Heracleum* L., %

Component	Section *Heracleum*		Section *Pubescentia*		Section *Villosa*	
	H. aconitifolium	*H. voroshilovii*	*H. mantegazzianum*	*H. wilhelmsii*	*H. antasiaticum*	*H. leskovii*
α-Thujene	2.1	0.1	–	7.1	–	2.0
α-Pinene	1.9	1.4	2.5	0.2	0.1	1.2
Camphene	1.3	–	0.4	–	0.3	0.9
Sabinene	2.3	3.6	0.1	5.2	–	0.7
β-Pinene	2.1	5.6	4.4	0.8	0.3	0.2
β-Myrcene	–	0.5	1.2	1.8	–	0.1
Isobutyl-2-methylbutanoate	–	1.2	–	–	–	–
Isobutyl-3-methylbutanoate	–	4.9	–	–	–	–
Isoamylisobutanoate	–	1.9	–	–	–	0.9
α-Phellandrene	0.1	–	–	0.2	–	–
α-Terpinene	0.6	–	–	1.3	–	–
p-Cymene	3.7	5.9	0.6	0.6	0.4	4.5
Limonene	13.9	7.9	50.4	60.2	0.3	15.3
cis-β-Ocimene	1.8	–	3.2	1.6	–	–
trans-β-Ocimene	1.9	1.4	3.3	0.3	–	2.1
γ-Terpinene	–	1.9	4.4	4.0	–	–
Butyl-3-methyl-2-butenoate	1.3	2.8	–	–	–	–
1-Octanol	0.4	1.9	–	–	4.3	2.2
Terpinolene	–	–	1.6	0.9	–	–
Isoamyl-2-methylbutanoate	0.7	1.9	–	–	–	–
Isoamyl-3-methylbutanoate	1.1	2.7	–	–	–	–
n-Amyl-3-methylbutanoate	1.4	10.5	–	0.1	–	–
Linalool	3.6	–	–	1.7	0.3	0.9
p-Menth-2-en-1-ol (A)	2.1	3.5	–	0.2	–	1.1
Terpinenol-4	–	2.1	–	5.9	–	0.2
n-Amyl-3-methyl-2-butenoate	0.8	3.0	–	–	–	–
Octylacetate	1.2	2.9	0.4	0.9	44.7	12.3
cis-Anethole	–	–	0.6	–	–	0.7
Bornylacetate	1.2	–	–	–	0.9	0.1
trans-Anethole	–	6.2	20.7	3.2	0.6	0.5
Lavandulylacetate	–	–	–	–	3.7	2.9
Nonylacetate	–	3.1	–		3.2	0.9
Citronellylacetate	0.3	–	–	–	0.2	9.5
α-Copaene	–	–	0.4	–	–	–
β-Burbonene	0.4	1.1	0.1	–	0.4	1.1
β-Cubebene	–	–	0.5	–	–	–
β-Elemene	9.2	10.8	–	0.1	5.0	–
Decylacetate	0.7	–	–	–	0.3	–
Caryophyllene	–	0.8	0.1	–	1.8	1.4
Selina-3,7(11)-diene	–	–	0.3	1.3	0.3	–
Humulene	2.1	–	–	–	0.1	–
γ-Muurolene	–	–	–	–	0.2	3.3
Germacrene-D	1.8	2.1	0.5	–	3.7	1.2
ar-Curcumene	–	–	–	–	0.3	–
β-Selinene	–	–	–	–	0.2	–
2-Phenylethyl-2-methylbutanoate	1.9	1.4	–	–	–	–
Bicyclogermacrene	–	–	–	0.3	–	–
2-Phenylethyl-3-methylbutanoate	–	1.5	–	–	0.2	–
α-Zingiberene	1.6	–	–	–	7.4	2.1
(*Z*,*E*)-α-Farnesene	–	–	0.8	–	–	–
(*E*,*E*)-α-Farnesene	–	–	0.4	–	–	–
β-Bisabolene	–	2.1	–	–	2.6	–
δ-Cadinene	1.1	–	0.3	–	–	–
trans-γ-Bisabolene	–	–	–	–	4.7	3.2
Myristicin	0.3	0.4	–	–	6.1	–
trans-Nerolidol	–	–	–	–	0.3	0.7

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