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Chemical Composition of Panzeria lanata (L.) Bunge Essential Oil from Mongolian Gobi

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Chemical Composition of *Panzeria lanata* (L.) Bunge Essential Oil from Mongolian Gobi

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Abstract: The oil of the aerial parts of *Panzeria lanata* (L.) Bunge was analyzed by a combination of GC and GC-MS. The essential oil was rich in monoterpenoids (64.2 %), of which camphor (14.4 %), α-pinene (11.3 %), terpinenol-4 (5.3 %) and 1.8-cineole (2.6 %) were dominant. β-Caryophyllene (3.5 %), β-humulene (3.2 %), spathulenol (2.6 %), β-bourbonene (2.2 %) were main sesquiterpene components.

Key words: *Panzeria lanata*, Lamiaceae, essential oil, terpenoids.

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Inroduction

Panzeria lanata (L.) Bunge (Lamiaceae) is a wild growing plant in East and West Siberia, Kazakhstan and Mongolia [1,2]. Its application in Tibetan-Mongolian traditional medicine against gastritis, hepatitis, intoxication, kidney disease, as diuretic and diaphoretic agent etc. is well documented [3-5]. Pharmacological studies showed sedative properties as well as activity against cardiovascular neurosis, hypertension, and atherosclerosis [6]. Previous phytochemical studies of this species are quite limited and revealed presence of phenolic acids, flavonoids, and alkaloids [4]. The only data on essential oils concerned its yield (0.02-0.03 %)[7,8], but not its chemical composition. In the present communication we report the results of GC and GC-MS analysis of *P. lanata* essential oil of Mongolian origin.

Experimental

Plant material

Aerial parts of *P. lanata* were collected in August 2010 from Mongolian Middle Gobi. A voucher specimen (number S. Shatar-7824) has been deposited in the Herbarium of the Institute of Botany, Mongolian Academy of Sciences, Ulaanbaatar-51, Mongolia.

Isolation of the essential oil

The air dried aerial parts of the plant were hydrodistilled using a Clevenger-type apparatus[9] for 3 h to yield clear oil (0.04 % v/w). The oil was dried over anhydrous sodium sulphate and stored in a refrigerator before analysis.

Gas chromatography (GC)

GC analysis was carried out on HP 5890 Gas chromatograph fitted with an HP 5 MS capillary column (30 m x 0.25 mm, 0.25 μm film thickness), carrier gas-nitrogen, linear velocity 25 cm/s, split ratio 1:100. The injector and detector temperature was 260°C, column temperature was programmed from 50 to 230°C at a rate of 4°C/min and 10 min at 230°C. Quantitative data were

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obtained from the electronic integration of the FID peak areas.

Gas chromatography-Mass spectrometry (GC-MS)

GC-MS analysis was performed on HP 6890 plus instrument with MS detector 5973 of the same company which was operated in EI mode (70 eV). Retention indices (RI) of the oil components were calculated by using retention times of C_8-C_{22} n-alkanes at the same chromatographic conditions according to Van Den Dool method [10].

The individual components were identified by their RI referring to known compounds from the literature [11, 12] and also by comparison of their mass spectra with those of NIST 98 and home-made mass spectral databases.

Results and discussion

The essential oil obtained by hydrodistillation from the aerial parts of the plant was colourless with specific odour. Fifty six compounds accounting 91.1 % of the oil were identified. List of the oil components is presented in Table 1. As can be seen, the oil was rich of monoterpenoids (64.2 %) with domination of oxygenated monoterpenes (42.6 %). Among them, camphor (14.4 %) was found to be the major one, followed by terpineol-4 (5.3 %) and 1,8-cineole (2.6 %). α-Pinene (11.3 %) was the principal component among the monoterpene hydrocarbons which account for 21.6 %. The concentration of sesquiterpene hydrocarbons exceeded more than two times the content of oxygenated sesquiterpenes (14.0 % and 6.4 %, respectively). β-Caryophyllene (3.5 %) and β-humulene (3.2 %) followed by spathulenol (2.6 %) and β-bourbonene (2.2 %) were exhibited to be main sesquiterpenes. It should be noted the significant percentage of 6,10,14-trimethyl-2-pentadecanone (4.7 %) found previously in *E. prostrate* [13], *Minuartia meyeri* [14], etc.

Thus, the present study revealed the first data on essential oil composition from a species belonging to the genus *Panzeria*. The obtained results gave new phytochemical characteristic of *P. lanata*, which is well known as an herb in Mongolia. The oil was characterized by great variety in the type of components-hydrocarbons, alcohols, aldehydes, phenolic compounds, irregular terpenoids, etc.

Table 1. Components of the essential oil of *Panzeria lanata* (L.) Bunge from Mongolia

RI*	Compound	%
931	α-Thujene	3.1
939	α-Pinene	11.3
953	Camphene	t
961	Benzaldehyde	t
967	Verbenene	t
976	Sabinene	1.1
980	β-Pinene	1.3
991	Myrcene	1.7
1018	α-Terpinene	t
1026	p-Cymene	1.0
1031	Limonene	1.0
1033	1,8-Cineole	2.6
1040	*cis*-Ocimene	0.1
1048	Phenylacetaldehyde	0.4
1062	γ-Terpinene	t
1062	Artemisia ketone	0.8
1068	*cis*-Sabinene hydrate	0.1
1074	*cis*-Linalool oxide	0.7

table 1. (continued).

RI*	Compound	%
1088	Terpinolene	1.0
1098	Linalool	1.4
1102	β-Thujone	0.7
1114	α-Thujone	0.5
1125	α-Campholene aldehyde	0.2
1139	*trans*-Pinocarveol	0.8
1143	Camphor	14.4
1150	1,4-Dimethyl-3-cyclohexenyl methylketone	1.0
1165	Borneol	1.2
1171	Umbelulon	2.0
1175	Terpineol-4	5.3
1178	Isocitral (E)	1.1
1183	p-Cymen-8-ol	0.8
1189	α-Terpineol	1.4
1194	Myrtenol	0.4
1204	Verbenone	1.2
1217	*trans*- (+) Carveol	0.5
1240	Neral	0.7
1242	l-Carvone	1.7
1255	*trans*-Geraniol	1.2
1262	*cis*-Chrysanthenyl acetate	0.9
1285	Bornyl acetate	0.6
1290	Thymol	0.4
1372	α-Ylangene	1.0
1376	α-Copaene	1.0
1384	β-Bourbonene	2.2
1391	β-Elemene	0.4
1418	β-Caryophyllene	3.5
1440	β-Humulene	3.2
1480	Germacrene D	1.3
1485	β-Selinene	0.6
1524	δ-Cadinene	0.8
1554	13-nor-Caryophyllen-8-oe (Z)	1.0
1578	Spathulenol	2.6
1581	Caryophyllene oxide	1.5
1843	*trans*-Farnesyl acetate	1.3
1846	6,10,14-Trimethyl-2-pentadecanone	4.7
1449	Phytol	1.4
	Monoterpene hydrocarbons	21.6
	Oxygenated monoterpenes	42.6
	Sesquiterpene hydrocarbons	14.0
	Oxygenated sesquiterpenes	6.4
	Others	6.5
	Total	91.1

*RI= retention indices as determined on HP 5 MS column; t = traces (<0.1%)

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