Journal of Essential Oil Research

ISSN: 1041-2905 (Print) 2163-8152 (Online) Journal homepage: https://www.tandfonline.com/loi/tjeo20

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To cite this article: K. Hüsnü Can Baser , Temel Oözek , Betül Bemirci & Gülendam Tümen (2001) Composition of the Essential Oil of *Nepeta betonicifolia* C.A. Meyer from Turkey, Journal of Essential Oil Research, 13:1, 35-36, DOI: 10.1080/10412905.2001.9699598

To link to this article: https://doi.org/10.1080/10412905.2001.9699598

Published online: 09 Dec 2011.

J. Essent. Oil Res., **13**, 35-36 (Jan/Feb 2001)

Composition of the Essential Oil of *Nepeta betonicifolia* C.A. Meyer from Turkey

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Abstract

Water distilled essential oil of *Nepeta betonicifolia* C.A. Meyer (Labiatae) from Turkey was analyzed by GC/MS. Forty-two compounds representing 90.7% of the oil were identified. Caryophyllene oxide (39.2%), spathulenol (9.7%), caryophyllenol-II (5.1%), humulene epoxide-II (4.7%) and isocaryophyllene oxide (4.3%) were major constituents of the oil obtained in 0.001% yield.

Key Word Index

Nepeta betonicifolia, Labiatae, essential oil composition, caryophyllene oxide.

Plant Name

Nepeta betonicifolia C.A. Meyer (1).

Source

The plant was collected from Sivas:Taslidere at an altitude of ca.1400 m in Turkey on 5 August 1997. Voucher specimens have been deposited at the Herbarium of the Faculty of Pharmacy, Anadolu University in Eskisehir, Turkey (ESSE 12464).

Plant Part

Aerial parts of the plant was subjected to hydro-distillation for 3 h using a Clevenger-type apparatus to produce the oil in 0.001% yield.

Previous Work

There is no work on this species in the literature.

Present Work

The oil was analyzed by GC/MS using a Hewlett Packard GCD system. Innowax FSC column (60 m x 0.25 mm, with 0.25 μm film thickness) was used with helium as a carrier gas (1 mL/min). GC oven temperature was kept at 60°C for 10 min and programmed to 220°C at a rate of 4°C/min, then kept constant at 220°C for 10 min and then programmed to 240°C at a rate of 1°C/min. Split ratio was adjusted at 50:1. The injector and detector temperatures were at 250°C. MS were taken at 70 eV. Mass range was from 35 to 425 m/z. Library search was carried out using Wiley GC/MS Library and TBAM Library of Essential Oil Constituents. Relative percentage amount were calculated from TIC by the computer. The compounds identified in the oil can be seen in Table I.

Reference

1. P. H. Davis, *Flora of Turkey and the East Aegean Islands*. Vol. 7, pp 277-278, University Press, Edinburgh (1982).

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Received: December 1998
Accepted: February 1999

Table I. Chemical composition of *Nepeta betonicifolia* oil from Turkey

Compound	RI†	Percentage	Compound	RI†	Percentage
1,8-cineole	1213	0.3	humulene epoxide-III	2081	0.1
α-copaene	1497	0.4	hexahydrofarnesylacetone	2131	0.9
β-bourbonene	1535	2.9	spathulenol	2144	9.7
pinocarvone	1586	0.1	(Z)-3-hexenyl benzoate	2148	0.1
β -caryophyllene	1612	2.7	3,4-dimethyl-5-pentylidene-2(5H)-furanone	2176	0.3
myrtenal	1648	0.2	nor-copaanone*	2181	0.4
isohumulene*	1662	0.3	thymol	2205	1.2
(Z)-β-farnesene	1671	0.5	carvacrol	2246	1.0
trans-verbenol	1684	0.1	α-bisabolol	2248	0.2
α-humulene	1687	0.5	α-eudesmol	2250	0.3
germacrene D	1726	3.8	α-cadinol	2255	0.1
bicyclogermacrene	1751	1.3	oxo-α-ylangene*	2289	0.8
naphthalene	1765	0.2	tricosane	2300	0.7
myrtenol	1797	0.2	caryophylladienol-II (= caryophylla-2(12),6(13)-dien-5-α-ol)	2324	0.4
(E)-geranylacetone	1868	0.2	caryophyllenol-I (= caryophylla-2(12),6-dien-5-α-ol)	2392	0.3
isohumulene oxide*	1946	3.0	caryophyllenol-II (= caryophylla-2(12),6-dien-5-β-ol)	2396	5.1
β-ionone	1957	0.5	pentacosane	2500	0.7
isocaryophyllene oxide	2000	4.3	phytol	2622	1.4
caryophyllene oxide	2008	39.2	heptacosane	2700	0.4
norbourbonone	2045	0.6	hexadecanoic acid	2931	0.5
(E)-nerolidol	2053	0.1			
humulene epoxide-II	2069	4.7			

† Retention indices on polar column;
* tentative identification
isohumulene: 204(M^+, $C_{15}H_{24}$, 27%), 189(18), 161(36), 147(17), 133(43), 121(19), 119(40), 107(38), 105(65), 93(68), 92(96), 79(70), 77(62), 67(66), 55(43), 41(100);
isohumulene oxide: 220(M^+, $C_{15}H_{24}O$,%), 205(5), 187(6), 177(13), 159(10), 149(16), 135(17), 133(14), 123(18), 121(29), 107(43), 106(88), 93(65), 91(76), 79(100), 77(40), 69(43), 67(36), 55(37), 43(89), 41(90);
nor-copaanone: 206(M^+, $C_{14}H_{22}O$, 25%), 164(36), 163(32), 149(21), 145(26), 123(43), 122(55), 121(52), 110(35), 107(49), 93(84), 91(52), 81(70), 79(92), 67(44), 55(71), 41(100);
oxo-α-ylangene: 218(M^+, $C_{15}H_{22}O$, 14%), 203(27), 175(70), 161(38), 148(53), 147(100), 135(52), 133(60), 122(77), 119(36), 107(21), 105(59), 93(40), 91(56), 79(28), 77(35), 55(28), 41(40)