

Date : 2023-10-05

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

**Internal code :** 23I29-PTH01

**Customer Identification :** Catnip - Canada - CW0107R

**Type :** Essential Oil

**Source :** *Nepeta cataria*

**Customer :** Plant Therapy

Checked and approved by:

---

Alexis St-Gelais, Ph. D., Chimiste 2013-174

*Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia. This report is digitally signed, it is only considered valid if the digital signature is intact. The results only describe the samples that were submitted to the assays.*

## GAS CHROMATOGRAPHIC ANALYSIS

**Method :** PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

**\*ISO**

**Results :** See analysis summary (next page)

**Analyst :** Sylvain Mercier, M. Sc., Chimiste 2014-005

**Date :** 2023-10-05

## PHYSICOCHEMICAL DATA

**Refractive index :**  $1.4878 \pm 0.0003$  (20 °C)

**Method :** PC-MAT-016 - Measure of the refractive index of a liquid.

**Analyst :** Cindy Caron B. Sc.

**Date :** 2023-09-29

## CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

## ANALYSIS SUMMARY - CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
Dimethylsulfide	0.02	Aliphatic sulfide
Isobutyral	0.01	Aliphatic aldehyde
Isovaleral	0.05	Aliphatic aldehyde
2-Methylbutyral	0.05	Aliphatic aldehyde
3-Pentanone	0.03	Aliphatic ketone
2-Ethylfuran	0.05	Furan
2-Methylbutanol	tr	Aliphatic alcohol
Senecionitrile	0.44	Aliphatic nitrile
Methyl 2-methylbutyrate	0.02	Aliphatic ester
Hexanal	0.02	Aliphatic aldehyde
Dimethyl sulfoxide	0.01	Aliphatic sulfoxide
(2E)-Hexenal	0.15	Aliphatic aldehyde
(3Z)-Hexenol	0.01	Aliphatic alcohol
Styrene	0.03	Simple phenolic
$\alpha$ -Thujene	0.01	Monoterpene
$\alpha$ -Pinene	0.87	Monoterpene
Camphene	0.03	Monoterpene
$\beta$ -Pinene	0.52	Monoterpene
Sabinene	0.07	Monoterpene
Octan-3-one	0.02	Aliphatic ketone
2-Pentylfuran	0.01	Furan
Myrcene	0.02	Monoterpene
$\alpha$ -Phellandrene	0.07	Monoterpene
$\alpha$ -Terpinene	0.02	Monoterpene
<i>para</i> -Cymene	0.03	Monoterpene
$\beta$ -Phellandrene	0.02	Monoterpene
Limonene	0.23	Monoterpene
(Z)- $\beta$ -Ocimene	0.06	Monoterpene
(E)- $\beta$ -Ocimene	0.15	Monoterpene
$\gamma$ -Terpinene	0.03	Monoterpene
Terpinolene	0.01	Monoterpene
Linalool	0.03	Monoterpenic alcohol
Nonanal	0.03	Aliphatic aldehyde
<i>trans</i> -Verbenol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.03	Monoterpenic alcohol
Dill ether	0.03	Monoterpenic ether
Methyl salicylate	0.09	Phenolic ester
<i>cis</i> -Dihydrocarvone	0.02	Monoterpenic ketone
Hexyl butyrate	0.02	Aliphatic ester
Dihydrocarveol	0.02	Monoterpenic alcohol

Unknown	0.39	Oxygenated monoterpene
$\beta$ -Cyclocitral	0.03	Monoterpenic aldehyde
(3Z)-Hexenyl isovalerate	0.05	Aliphatic ester
Carvone	0.34	Monoterpenic ketone
Geranial	0.03	Monoterpenic aldehyde
Bornyl acetate	0.04	Monoterpenic ester
Tridecane	0.04	Alkane
4 $\alpha$ ,7 $\alpha$ ,7 $\alpha$ -Nepetalactone	16.63	Monoterpenic lactone
Eugenol	0.05	Phenylpropanoid
Nepetalactone isomer I	0.54	Unknown
4 $\alpha$ ,7 $\alpha$ ,7 $\beta$ -Nepetalactone	52.98	Monoterpenic lactone
4 $\alpha$ ,7 $\beta$ ,7 $\alpha$ -Nepetalactone	1.17	Monoterpenic lactone
Isocaryophyllene	0.18	Sesquiterpene
Isodihydronepetalactone	0.06	Monoterpenic lactone
$\beta$ -Caryophyllene	5.72	Sesquiterpene
Nepetalactone analog I	0.38	Monoterpenic lactone
Isodihydronepetalactone analog I	0.04	Monoterpenic lactone
Unknown	0.03	Unknown
$\alpha$ -Humulene	0.52	Sesquiterpene
Unknown	0.04	Unknown
(E)- $\beta$ -Farnesene	0.31	Sesquiterpene
(E)- $\beta$ -Ionone	0.03	Apocarotenoid
Nepetalic acid A	0.19	Monoterpenic acid
Dehydromenthofuroolactone	0.19	Monoterpenic lactone
$\beta$ -Bisabolene	0.07	Sesquiterpene
(3E,6E)- $\alpha$ -Farnesene	0.03	Sesquiterpene
Nepetalic acid B	0.90	Monoterpenic acid
Isocaryophyllene epoxide B	0.02	Sesquiterpenic ether
Nepetalic acid C	3.28	Monoterpenic acid
(E)-Nerolidol	0.06	Sesquiterpenic alcohol
Nepetalactone analog VII	0.06	Monoterpenic lactone
Caryophyllene oxide	0.58	Sesquiterpenic ether
Humulene epoxide II	0.04	Sesquiterpenic ether
Unknown	0.11	Unknown
Unknown	0.03	Unknown
Unknown	0.08	Unknown
Nepetalactone analog II	0.04	Monoterpenic lactone
Unknown	0.08	Unknown
Unknown	0.03	Unknown
Unknown	0.11	Unknown
Unknown	0.94	Unknown
Unknown	0.20	Unknown
Unknown	0.31	Unknown
Unknown	2.43	Unknown
Unknown	0.40	Unknown

Unknown	0.01	Unknown
Unknown	0.04	Unknown
Phytone	0.09	Terpenic ketone
Nepetalactone analog III	0.15	Monoterpenic lactone
Unknown	0.18	Unknown
Unknown	0.22	Unknown
Unknown	0.72	Unknown
Unknown	0.26	Unknown
Nepetalactone analog IV	0.03	Monoterpenic lactone
Nepetalactone analog V	0.05	Aliphatic lactone
Nepetalactone analog VI	0.06	Monoterpenic lactone
Unknown	0.09	Unknown
Unknown	0.19	Unknown
Unknown	0.02	Unknown
Unknown	0.04	Unknown
Unknown	0.04	Unknown
Unknown	0.05	Unknown
Unknown	0.02	Unknown
Unknown	0.07	Unknown
Unknown	0.04	Unknown
Unknown	0.19	Unknown
Unknown	0.06	Unknown
Unknown NECA XXXIX [m/z 81, 167 (76), 110 (13), 82 (11), 41 (10)...]	0.32	Unknown
Unknown NECA XXXVIII [m/z 167, 81 (48), 168 (11), 123 (11)...]	0.45	Unknown
Unknown NECA XL [m/z 167, 81 (52), 168 (12), 123 (11), 67 (8)...]	0.42	Unknown
<b>Consolidated total</b>	<b>96.98</b>	

tr: The compound has been detected below 0.005% of the total signal

Note: no correction factor was applied

**About "consolidated" data:** The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm is set to prioritize data from the most standard DB-5 column, and smallest values so as to avoid overestimating individual content. This process is semi-automatic. Advanced users are invited to consult the "Full analysis data" table after the chromatograms in this report to access the full untreated data and perform their own calculations if needed.

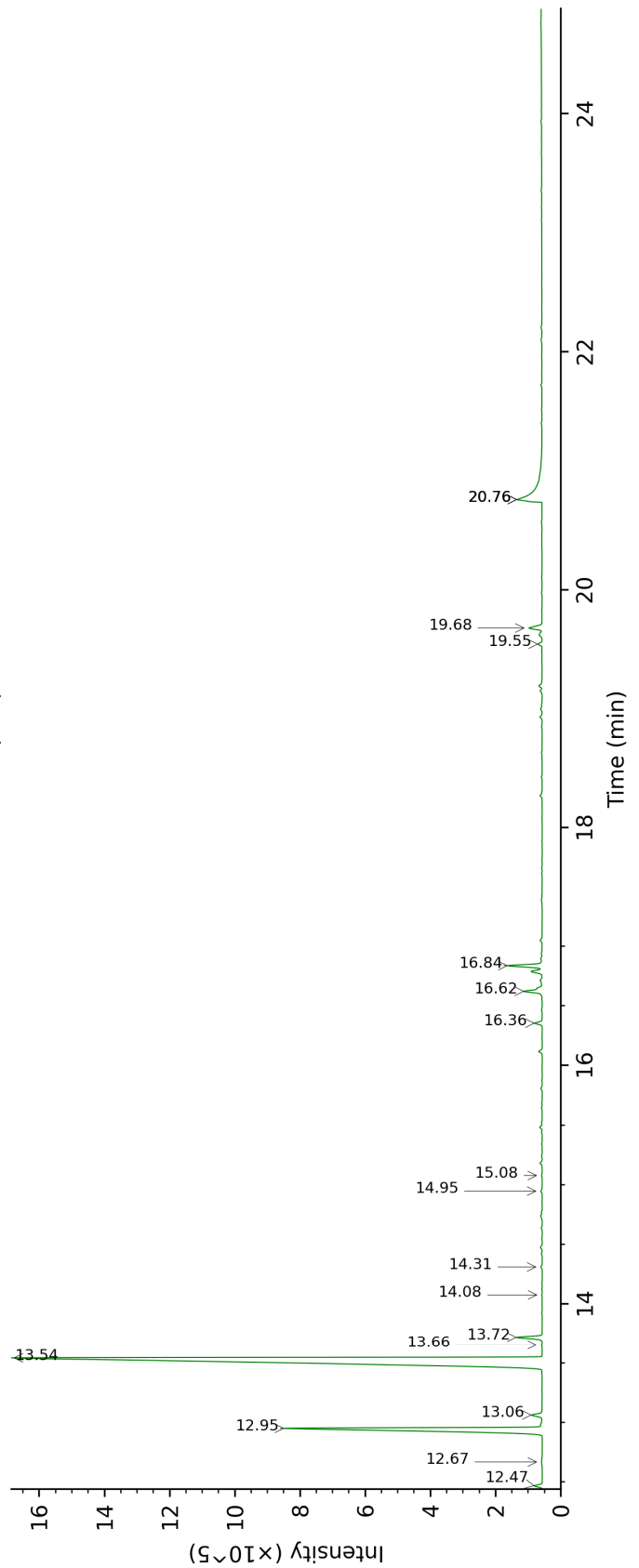
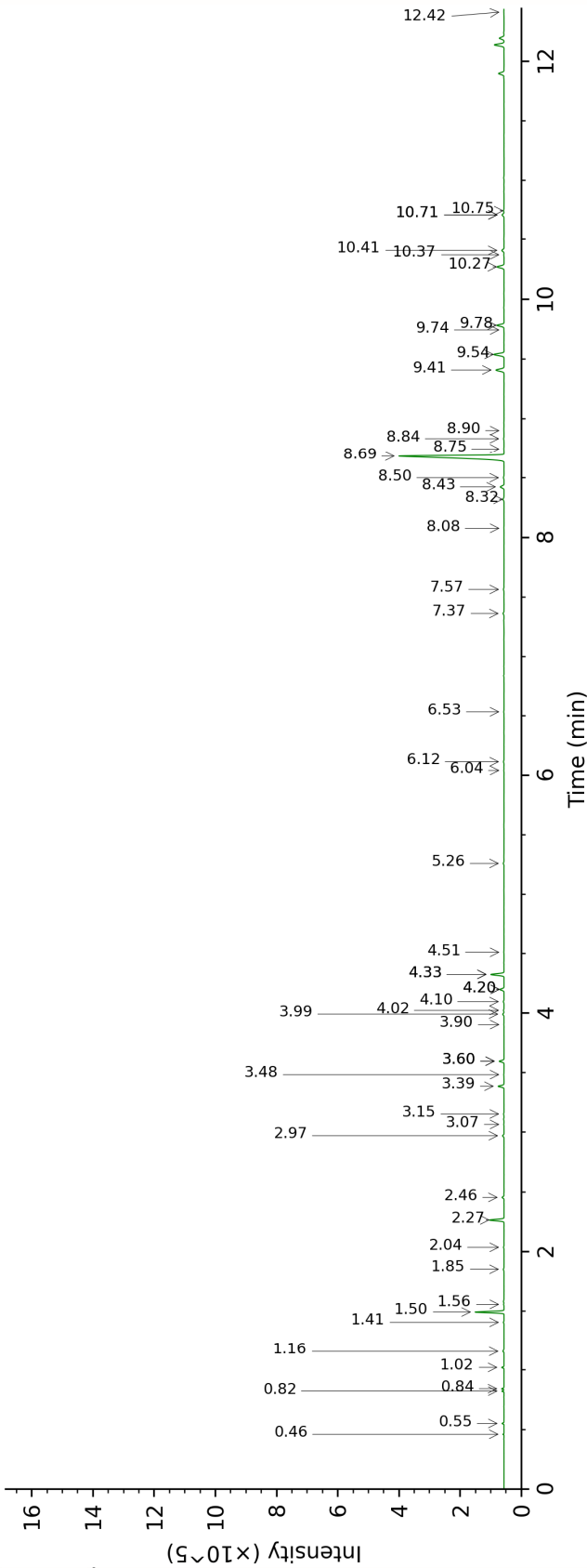
**Unknowns:** Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

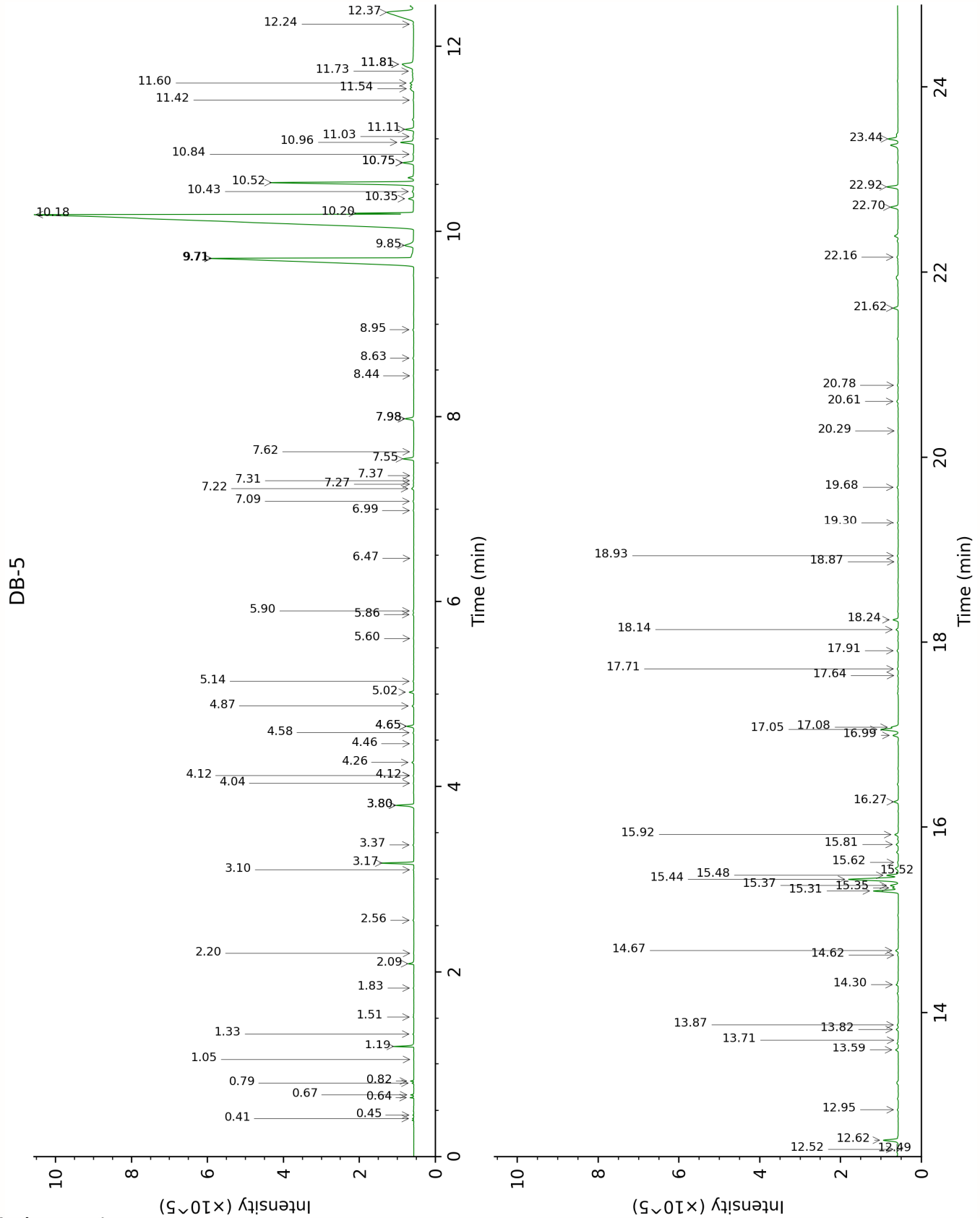
**Bracketed value (xx):** A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

This page was intentionally left blank. The following pages present the complete data of the analysis.

Catnip - Canada - CW0107R

DB-WAX







FULL ANALYSIS DATA

Dimethylsulfide	Column DB-WAX			Column DB-5		
	0.46	710.6	0.02	0.41	501.9	0.02
Isobutylal	0.55	778.3	0.04	0.45	535.7	0.01
Isovaleral	0.84	887.7	0.05	0.64	640.8	0.05
2-Methylbutylal	0.82	881.1	0.04	0.67	650.8	0.05
3-Pentanone	1.16	941.5	0.04	0.79	693.0	0.03
2-Ethylfuran	1.02	921.0	0.06	0.82	700.8	0.05
2-Methylbutanol	3.60*	1173.7	[0.18]	1.05	735.8	tr
Senecionitrile	4.32*	1226.6	[0.51]	1.19	755.1	0.44
Methyl 2-methylbutyrate	1.41	979.1	0.02	1.33	774.4	0.02
Hexanal	2.04	1045.6	0.02	1.52	799.6	0.02
Dimethyl sulfoxide	8.08	1499.1	0.01	1.83	827.6	0.01
(2E)-Hexenal	3.60*	1173.7	[0.18]	2.09	849.1	0.15
(3Z)-Hexenol	6.04	1351.2	0.01	2.20	858.2	0.01
Styrene	4.10	1210.4	0.04	2.56	887.4	0.03
α-Thujene	1.56	1000.5	0.01	3.10	926.6	0.01
α-Pinene	1.50	992.2	0.89	3.18	931.4	0.87
Camphene	1.85	1028.2	0.03	3.37	944.2	0.03
β-Pinene	2.27	1067.2	0.52	3.80*	972.2	[0.57]
Sabinene	2.46	1085.0	0.07	3.80*	972.2	[0.57]
Octan-3-one	4.20*	1217.7	[0.17]	4.04	987.9	0.02
2-Pentylfuran	3.90	1196.8	0.01	4.12*	993.3	[0.03]
Myrcene	3.07	1133.7	0.02	4.12*	993.3	[0.03]
α-Phellandrene	2.97	1126.5	0.06	4.26	1002.6	0.07
α-Terpinene	3.16	1140.3	0.02	4.46	1015.3	0.02
para-Cymene	4.32*	1226.6	[0.51]	4.58	1022.7	0.03
β-Phellandrene	3.48	1165.2	0.02	4.65*	1027.1	[0.24]
Limonene	3.39	1157.8	0.23	4.65*	1027.1	[0.24]
(Z)-β-Ocimene	3.99	1203.0	0.06	4.87	1040.7	0.06
(E)-β-Ocimene	4.20*	1217.7	[0.17]	5.02	1050.4	0.15
γ-Terpinene	4.02	1205.3	0.03	5.14	1057.8	0.03
Terpinolene	4.51	1239.6	0.02	5.60	1086.5	0.01
Linalool	8.32	1517.6	0.06	5.86	1102.6	0.03
Nonanal	6.12	1356.4	0.03	5.90	1105.1	0.03
trans-Verbenol	9.74	1628.1	0.01	6.47	1141.1	0.01
Terpinen-4-ol	8.84	1557.0	0.03	6.99	1174.4	0.03
Dill ether	7.57	1461.3	0.03	7.09	1180.8	0.03
Methyl salicylate	10.71*	1706.4	[0.11]	7.22	1189.4	0.09
cis-Dihydrocarvone	8.75	1550.4	0.02	7.27	1192.4	0.02
Hexyl butyrate	6.53	1386.0	0.02	7.31	1194.9	0.02
Dihydrocarveol	10.71*	1706.4	[0.11]	7.36	1198.3	0.02
Unknown VAWA X [m/z 123, 138 (67), 81 (60), 95 (42), 67 (41), 80 (33)]	9.41	1601.3	0.40	7.55	1210.1	0.39

β-Cyclocitral	8.90	1562.2	0.01	7.62	1215.2	0.03
(3Z)-Hexenyl isovalerate	7.36	1446.5	0.05	7.98*	1238.9	[0.35]
Carvone	10.27	1670.4	0.34	7.98*	1238.9	[0.35]
Geranial	10.37	1678.5	0.02	8.44	1269.8	0.03
Bornyl acetate	8.50	1531.5	0.03	8.63	1282.5	0.04
Tridecane	5.26	1292.8	0.03	8.94	1303.4	0.04
4α,7α,7α-Nepetalactone	12.95	1899.4	16.63	9.71*	1357.2	[16.48]
Eugenol	15.08	2099.5	0.05	9.71*	1357.2	[16.48]
Nepetalactone isomer I				9.85	1367.0	0.54
4α,7α,7αβ-Nepetalactone	13.54	1953.7	53.95	10.18	1390.3	52.98
4α,7β,7α-Nepetalactone	13.72	1970.1	1.22	10.20	1391.4	1.17
Isocaryophyllene	8.43	1525.6	0.18	10.35	1402.3	0.18
Isodihydronepetalactone	14.31	2025.7	0.08	10.43	1407.9	0.06
β-Caryophyllene	8.69	1545.5	5.87	10.52	1415.0	5.72
Nepetalactone analog I	12.47	1856.7	0.38	10.75*	1431.5	[0.42]
Isodihydronepetalactone analog I				10.75*	1431.5	[0.42]
Unknown NECA XXXIV [m/z 57, 71 (93), 43 (87), 85 (48), 41 (40), 81 (36), 55 (30)...]				10.84	1438.2	0.03
α-Humulene	9.54	1611.7	0.48	10.96	1447.8	0.52
Unknown NECA III [m/z 57, 71 (92), 43 (69), 85 (49), 41 (31), 55 (23)...]				11.03	1452.4	0.04
(E)-β-Farnesene	9.78	1631.3	0.31	11.10	1458.2	0.31
(E)-β-Ionone	12.67	1874.2	0.06	11.42	1481.5	0.03
Nepetalic acid A	20.76*	2727.0	[4.86]	11.54	1490.7	0.19
Dehydromenthofuroolactone				11.60	1495.2	0.19
β-Bisabolene	10.41	1681.4	0.11	11.73	1504.8	0.07
(3E,6E)-α-Farnesene	10.75	1709.4	0.03	11.81*	1510.6	[0.93]
Nepetalic acid B	20.76*	2727.0	[4.86]	11.81*	1510.6	[0.93]
Isocaryophyllene epoxide B	12.42	1852.0	0.02	12.24	1544.4	0.02
Nepetalic acid C	20.76*	2727.0	[4.86]	12.37	1554.5	3.28
(E)-Nerolidol	14.08	2003.3	0.02	12.49	1564.2	0.06
Nepetalactone analog VII				12.52	1566.5	0.06
Caryophyllene oxide	13.06	1909.7	0.60	12.62	1574.3	0.58
Humulene epoxide II	13.66	1964.0	0.04	12.95	1600.0	0.04
Unknown NECA IV [m/z 81, 95 (42), 43 (41), 137 (40), 123 (35), 41 (34)...]				13.59	1653.1	0.11
Unknown NECA XXVIII [m/z 81, 43 (86), 109 (82), 166 (81), 71 (54), 41 (47)...]				13.70	1662.2	0.03
Unknown NECA V [m/z 81, 43 (84), 166 (84), 109 (74),				13.82	1671.7	0.08

71 (58), 41 (58)...						
Nepetalactone analog II				13.87	1675.9	0.04
Unknown NECA VI [m/z 81, 109 (68), 41 (57), 69 (53), 167 (36), 67 (31)...				14.30	1712.0	0.08
Unknown NECA VII [m/z 153, 82 (85), 43 (81), 67 (69), 81 (46)...				14.62	1739.5	0.03
Unknown NECA VIII [m/z 153, 43 (81), 81 (59), 55 (40), 41 (37), 82 (33)...				14.67	1743.8	0.11
Unknown NECA IX [m/z 82, 81 (67), 67 (64), 55 (42), 167 (39), 41 (24), 83 (23)...	16.62	2256.1	1.00	15.31	1799.5	0.94
Unknown NECA X [m/z 81, 96 (74), 43 (57), 87 (50), 109 (46), 166 (43)...				15.35	1802.3	0.20
Unknown NECA XI [m/z 81, 109 (56), 55 (56), 41 (40), 82 (36), 67 (35)...				15.37	1804.6	0.31
Unknown NECA XII [m/z 82, 81 (68), 67 (65), 55 (46), 167 (34)...	16.84	2278.4	1.77	15.44	1810.6	2.43
Unknown NECA XIII [m/z 81, 166 (95), 109 (80), 43 (64), 96 (51), 87 (41)...	16.36	2228.3	0.38	15.48	1814.6	0.40
Unknown NECA XIV [m/z 82, 81 (64), 67 (61), 55 (37), 41 (24), 167 (23)...				15.52	1817.9	0.01
Unknown NECA XXIX [m/z 81, 166 (64), 109 (60), 43 (55), 55 (45), 96 (43), 41 (42)...				15.62	1827.2	0.04
Phytone	14.95	2086.5	0.09	15.82	1844.7	0.09
Nepetalactone analog III				15.92	1854.4	0.15
Unknown NECA XV [m/z 82, 81 (73), 67 (50), 55 (49), 83 (46), 41 (35)...				16.28	1886.5	0.18
Unknown NECA XVI [m/z 82, 81 (84), 58 (57), 55 (48), 83 (47), 67 (46)...				16.99	1953.8	0.22
Unknown NECA XVII [m/z 82, 81 (65), 83 (47), 55 (42), 67 (41), 167 (38)...	19.68	2596.4	0.83	17.06	1959.9	0.72
Unknown NECA XVIII [m/z				17.08	1962.1	0.26

82, 81 (76), 83 (45), 55 (39), 167 (36), 67 (30)...						
Nepetalactone analog IV				17.64	2016.3	0.03
Nepetalactone analog V				17.72	2023.4	0.05
Nepetalactone analog VI				17.91	2042.8	0.06
Unknown NECA XIX [m/z 93, 81 (59), 69 (52), 121 (38), 80 (35), 41 (33)...				18.14	2065.4	0.09
Unknown NECA XX [m/z 93, 69 (55), 81 (52), 80 (41), 121 (35), 41 (28)...	19.55	2580.4	0.21	18.24	2075.9	0.19
Unknown NECA XXI [m/z 81, 69 (68), 41 (64), 55 (57), 67 (51), 43 (42)...				18.87	2139.3	0.02
Unknown NECA XXII [m/z 69, 81 (98), 93 (92), 41 (55), 80 (52), 68 (43)...				18.93	2146.1	0.04
Unknown NECA XXIV [m/z 69, 81 (80), 93 (65), 41 (49), 80 (42), 121 (40)...				19.30	2183.5	0.04
Unknown NECA XXV [m/z 81, 93 (68), 69 (61), 83 (48), 41 (47), 67 (42)...				19.68	2224.1	0.05
Unknown NECA XXXI [m/z 81, 43 (86), 44 (67), 166 (58), 55 (57), 67 (55)...				20.29	2289.6	0.02
Unknown NECA XXVI [m/z 81, 91 (64), 131 (54), 120 (38), 195 (32), 41 (31)...				20.60	2324.6	0.07
Unknown NECA XXVII [m/z 81, 166 (96), 55 (62), 69 (52), 109 (51), 41 (50)...				20.78	2344.2	0.04
Unknown NECA XXXII [m/z 81, 167 (96), 166 (23), 123 (19), 43 (17), 55 (17)...				21.62	2439.5	0.19
Unknown NECA XXXIII [m/z 81, 167 (44), 91 (31), 131 (29), 93 (27), 105 (26), 146 (26)...				22.16	2503.2	0.06
Unknown NECA XXXIX [m/z 81, 167 (76), 110 (13), 82 (11), 41 (10)...				22.70	2568.3	0.32
Unknown NECA XXXVIII [m/z 167, 81 (48), 168 (11), 123 (11)...				22.92	2594.6	0.45

Unknown NECA XL [m/z 167, 81 (52), 168 (12), 123 (11), 67 (8)...]			23.44	2659.9	0.42
Total reported		93.57%		96.71%	

\*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, only the first one is taken into account in the consolidated total

†: Peaks apexes were resolved, but peaks overlapped and were summed for analysis

tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied  
R.T.: Retention time (minutes)  
R.I.: Retention index