

Date : 2025-09-12

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25H29-PTH02

Customer Identification : May Chang - China - M30114R

Type : Essential Oil

Source : *Litsea cubeba*

Customer : Plant Therapy

Checked and approved by:

Sylvain Mercier, M. Sc., Chimiste 2014-005

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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 : Jean-Christophe Fortin, M. Sc.

Date : 2025-09-12

PHYSICOCHEMICAL DATA

Refractive index : 1.4846 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-08-29

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
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
2,6-Dimethyl-1,5-heptadiene	tr	Normonoterpene
Tricyclene	0.01	Monoterpene
α -Thujene	0.06	Monoterpene
α -Pinene	1.52	Monoterpene
Camphene	0.35	Monoterpene
β -Pinene	1.19	Monoterpene
Sabinene	2.43	Monoterpene
Dehydro-1,8-cineole	0.03	Monoterpenic ether
6-Methyl-5-hepten-2-one	0.61	Aliphatic ketone
Myrcene	1.19	Monoterpene
6-Methyl-5-hepten-2-ol	0.03	Aliphatic alcohol
α -Phellandrene	0.03	Monoterpene
α -Terpinene	0.04	Monoterpene
<i>para</i> -Cymene	0.04	Monoterpene
Limonene	12.53	Monoterpene
1,8-Cineole	0.80	Monoterpenic ether
β -Phellandrene	0.07	Monoterpene
(Z)- β -Ocimene	0.02	Monoterpene
(E)- β -Ocimene	0.02	Monoterpene
2,6-Dimethyl-5-heptenal (melonal)	0.01	Aliphatic aldehyde
γ -Terpinene	0.09	Monoterpene
<i>cis</i> -Sabinene hydrate	0.04	Monoterpenic alcohol
Terpinolene	0.09	Monoterpene
6,7-Epoxyterpinene	0.02	Monoterpenic ether
<i>trans</i> -Sabinene hydrate	0.03	Monoterpenic alcohol
Rosefuran	0.02	Monoterpenic ether
Linalool	1.07	Monoterpenic alcohol
<i>cis</i> -Chrysanthemal?	0.01	Monoterpenic aldehyde
<i>cis-para</i> -Menth-2-en-1-ol	0.04	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.03	Monoterpenic ether
<i>cis-para</i> -Menth-2,8-dien-1-ol	0.02	Monoterpenic alcohol
<i>trans</i> -Limonene oxide	0.03	Monoterpenic ether
<i>trans-para</i> -Menth-2-en-1-ol	0.04	Monoterpenic alcohol
<i>trans</i> -Chrysanthemal	0.01	Monoterpenic aldehyde
exo-Isocitral	0.10	Monoterpenic aldehyde
Citronellal	0.73	Monoterpenic aldehyde
Borneol	0.05	Monoterpenic alcohol
Isoneral	0.72	Monoterpenic aldehyde

Terpinen-4-ol	[0.29]	Monoterpenic alcohol
Rosefuran oxide	[0.29]	Monoterpenic ether
Unknown	0.07	Oxygenated monoterpene
Isogeranial	1.18	Monoterpenic aldehyde
α -Terpineol	0.40	Monoterpenic alcohol
Methyl salicylate	0.02	Phenolic ester
<i>trans</i> -Isopiperitenol	0.02	Monoterpenic alcohol
<i>trans</i> -Piperitol	0.03	Monoterpenic alcohol
<i>cis</i> -Isopiperitenol	0.01	Monoterpenic alcohol
Nerol	0.77	Monoterpenic alcohol
Citronellol	0.12	Monoterpenic alcohol
Neral	29.22	Monoterpenic aldehyde
Piperitone	0.03	Monoterpenic ketone
Geraniol	1.46	Monoterpenic alcohol
Geranial	38.07	Monoterpenic aldehyde
Unknown	0.08	Oxygenated monoterpene
Citronellic acid	0.06	Monoterpenic acid
Unknown	0.08	Unknown
α -Terpinyl acetate	0.08	Monoterpenic ester
Unknown	0.04	Unknown
Geranic acid	0.21	Aliphatic acid
α -Copaene	0.10	Sesquiterpene
Unknown	0.08	Unknown
Geranyl acetate	0.06	Monoterpenic ester
β -Elemene	0.12	Sesquiterpene
β -Caryophyllene	1.32	Sesquiterpene
α -Humulene	0.13	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.07	Sesquiterpene
Germacrene D	0.04	Sesquiterpene
Bicyclogermacrene	0.07	Sesquiterpene
Viridiflorene	0.01	Sesquiterpene
α -Muurolene	0.04	Sesquiterpene
β -Bisabolene	0.02	Sesquiterpene
γ -Cadinene	0.02	Sesquiterpene
δ -Cadinene	0.04	Sesquiterpene
Unknown	tr	Oxygenated sesquiterpene
α -Elemol	0.01	Sesquiterpenic alcohol
Spathulenol	0.05	Sesquiterpenic alcohol
Caryophyllene oxide	0.10	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Humulene epoxide II	0.02	Sesquiterpenic ether
Unknown	0.02	Unknown
Unknown	0.02	Unknown
Unknown	0.03	Unknown

Unknown	0.01	Unknown
Unknown	0.03	Unknown
Unknown	0.03	Unknown
Unknown	0.01	Unknown
Consolidated total	98.88	

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

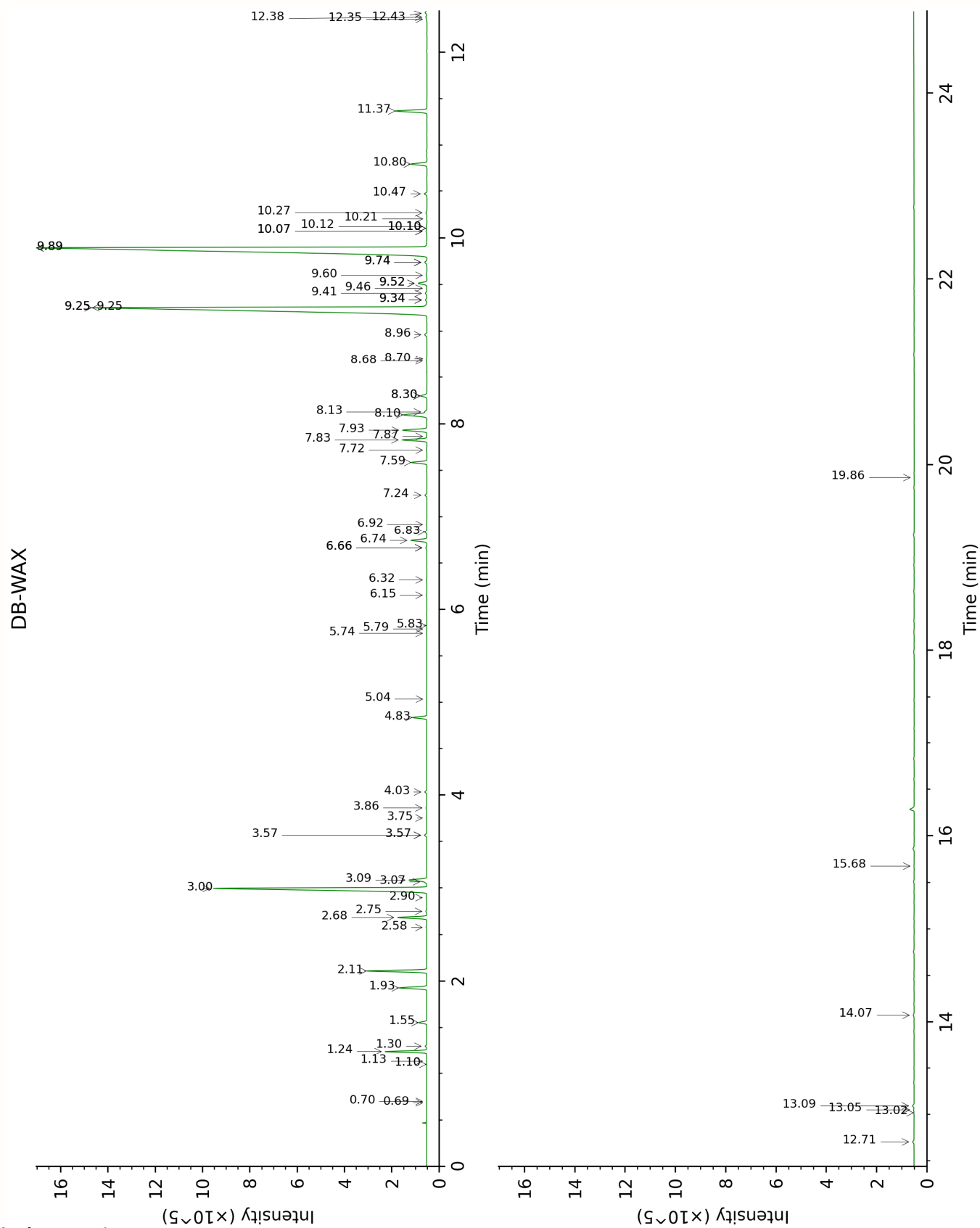
Note: no correction factor was applied

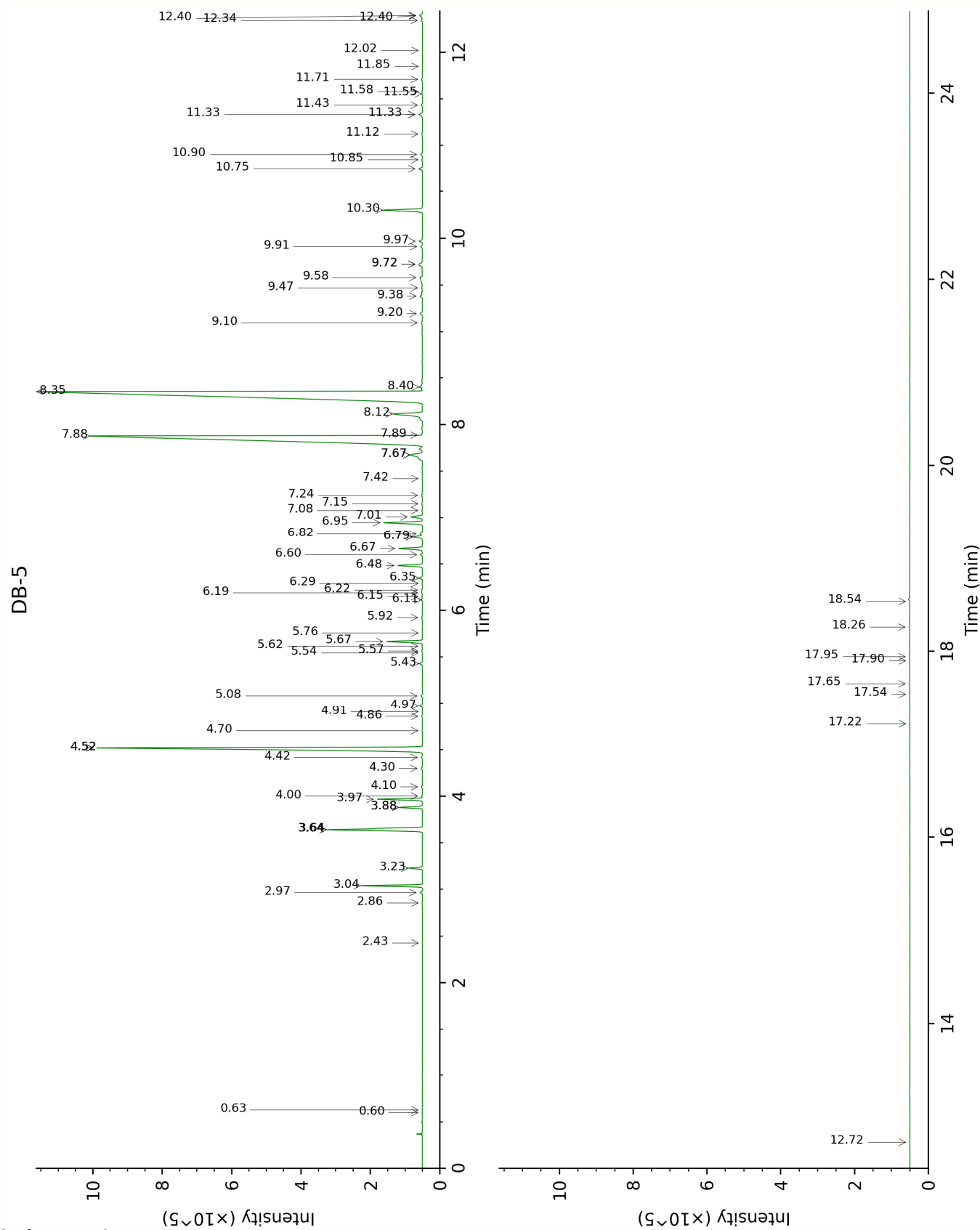
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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.





FULL ANALYSIS DATA

Isovaleral	Column DB-WAX			Column DB-5		
	0.70	887.4	tr	0.60	642.6	tr
2-Methylbutyral	0.69	881.1	tr	0.63	652.8	tr
2,6-Dimethyl-1,5-heptadiene	1.10	964.6	tr	2.43	885.8	tr
Tricyclene	1.13	970.5	0.01	2.86	918.3	0.01
α -Thujene	1.30	1000.1	0.06	2.97	925.8	0.06
α -Pinene	1.24	990.2	1.51	3.04	930.7	1.52
Camphene	1.56	1026.3	0.34	3.23	943.3	0.35
β -Pinene	1.93	1065.0	1.19	3.64*	970.9	[3.63]
Sabinene	2.11	1084.0	2.43	3.64*	970.9	[3.63]
Dehydro-1,8-cineole	2.90	1151.0	0.03	3.88*	987.0	[0.63]
6-Methyl-5-hepten-2-one	4.83	1299.3	0.61	3.88*	987.0	[0.63]
Myrcene	2.68	1133.8	1.18	3.97	992.8	1.19
6-Methyl-5-hepten-2-ol	6.66*	1431.4	[0.06]	4.00	995.2	0.03
α -Phellandrene	2.58	1125.2	0.03	4.10	1001.7	0.03
α -Terpinene	2.75	1139.1	0.04	4.30	1014.4	0.04
<i>para</i> -Cymene	3.86	1226.8	0.04	4.42	1021.9	0.04
Limonene	3.00	1159.1	12.53	4.52*	1028.4	[13.46]
1,8-Cineole	3.09	1166.3	0.80	4.52*	1028.4	[13.46]
β -Phellandrene	3.07	1164.8	0.07	4.52*	1028.4	[13.46]
(<i>Z</i>)- β -Ocimene	3.57*	1204.9	[0.11]	4.70	1040.1	0.02
(<i>E</i>)- β -Ocimene	3.75	1218.7	0.02	4.86	1049.9	0.02
2,6-Dimethyl-5-heptenal (melonal)	5.04	1312.7	0.01	4.91	1053.1	0.01
γ -Terpinene	3.57*	1204.9	[0.11]	4.97	1057.3	0.09
<i>cis</i> -Sabinene hydrate	6.66*	1431.4	[0.06]	5.08	1064.3	0.04
Terpinolene	4.03	1239.5	0.09	5.43	1086.4	0.09
6,7-Epoxymyrcene	5.79	1367.3	0.01	5.54	1093.6	0.02
<i>trans</i> -Sabinene hydrate	7.72	1510.8	0.03	5.56	1094.9	0.03
Rosefuran	5.74	1363.9	0.02	5.62	1098.2	0.02
Linalool	7.83	1519.4	1.08	5.67	1101.4	1.07
<i>cis</i> -Chrysanthemal?	5.83	1369.9	0.01	5.76	1107.3	0.01
<i>cis-para</i> -Menth-2-en-1-ol	7.87	1522.3	0.02	5.92	1118.0	0.04
<i>cis</i> -Limonene oxide	6.15	1393.6	0.03	6.11	1130.3	0.03
<i>cis-para</i> -Mentha-	9.25*	1632.0	[29.36]	6.15	1132.7	0.02

2,8-dien-1-ol						
<i>trans</i> -Limonene oxide	6.32	1405.6	0.03	6.19	1135.3	0.03
<i>trans</i> - <i>para</i> -Menth-2-en-1-ol	8.68	1585.7	0.04	6.22	1137.1	0.04
<i>trans</i> -Chrysanthemal	6.92	1450.6	0.02	6.29	1141.8	0.01
exo-Isocitral	7.24	1474.2	0.09	6.35	1145.5	0.10
Citronellal	6.74	1437.4	0.75	6.48	1154.3	0.73
Borneol	9.52*	1653.3	[0.44]	6.60	1161.9	0.05
Isoneral	7.59	1500.5	0.70	6.66	1166.2	0.72
Terpinen-4-ol	8.30*	1556.3	[0.31]	6.79*	1174.4	[0.29]
Rosefuran oxide	8.30*	1556.3	[0.31]	6.79*	1174.4	[0.29]
Unknown CYFL V [m/z 84, 83 (74), 137 (56), 41 (47), 93 (43), 108 (40)... 152 (2)]	9.34*	1638.7	[0.09]	6.82	1176.5	0.07
Isogeranial	7.93	1527.5	1.16	6.95	1184.8	1.18
α -Terpineol	9.52*	1653.3	[0.44]	7.01	1188.8	0.40
Methyl salicylate	10.20	1710.0	0.02	7.08	1193.2	0.02
<i>trans</i> -Isopiperitenol	10.12	1703.1	0.02	7.15	1198.0	0.02
<i>trans</i> -Piperitol	10.10*	1701.3	[0.04]	7.24	1203.8	0.03
<i>cis</i> -Isopiperitenol	10.07*	1698.6	[0.06]	7.42	1216.0	0.01
Nerol	10.80	1760.6	0.77	7.68*†	1233.3	[0.63]
Citronellol	10.47	1732.8	0.12	7.68*†	1233.3	[0.63]
Neral	9.25*	1632.0	[29.36]	7.88	1247.3	29.22
Piperitone	9.60	1660.3	0.06	7.89	1247.9	0.03
Geraniol	11.37	1809.8	1.47	8.12†	1263.4	1.36
Geranial	9.89*	1684.2	[38.22]	8.35	1279.8	38.07
Unknown CYFL VII [m/z 43, 69 (77), 41 (70), 109 (54)... 152 (6)]	12.70	1930.3	0.07	8.40	1283.2	0.08
Citronellic acid	15.68	2221.1	0.01	9.10	1327.8	0.06
Unknown CYFL VIII [m/z 82, 59 (44), 41 (43), 95 (31), 43 (29), 81 (24)...]	12.38	1899.8	0.07	9.20	1334.8	0.08
α -Terpinyl acetate	9.41	1644.6	0.09	9.38	1348.2	0.08
Unknown LICU I [m/z 110, 95 (98), 109 (40), 43 (35), 111 (32)... 153	13.05	1962.4	0.02	9.47	1354.4	0.04

(13)...						
Geranic acid				9.58	1362.3	0.21
α -Copaene	6.84	1444.3	0.10	9.72*	1372.4	[0.18]
Unknown ZIOF XI [m/z 81, 59 (94), 41 (74), 85 (40), 43 (55)...	13.09	1966.4	0.08	9.72*	1372.4	[0.18]
Geranyl acetate	10.27	1715.6	0.06	9.91	1385.9	0.06
β -Elemene	8.13	1542.8	0.09	9.97	1390.0	0.12
β -Caryophyllene	8.10	1540.4	1.34	10.30	1414.0	1.32
α -Humulene	8.96	1608.4	0.12	10.75	1447.8	0.13
allo- Aromadendrene	8.70	1587.3	0.01	10.85	1455.0	0.02
(E)- β -Farnesene	9.25*	1632.0	[29.36]	10.90	1459.2	0.07
Germacrene D	9.46	1649.0	0.04	11.12	1475.7	0.04
Bicyclogermacrene	9.74*	1671.5	[0.12]	11.33*	1491.4	[0.15]
Viridiflorene	9.34*	1638.7	[0.09]	11.33*	1491.4	[0.15]
α -Muurolene	9.74*	1671.5	[0.12]	11.43	1499.0	0.04
β -Bisabolene	9.89*	1684.2	[38.22]	11.55	1508.1	0.02
γ -Cadinene	10.07*	1698.6	[0.06]	11.58	1510.1	0.02
δ -Cadinene	10.10*	1701.3	[0.04]	11.71	1520.4	0.04
Unknown ZIOF XVIII [m/z 69, 41 (80), 82 (63), 43 (57), 98 (54)... 220 (t)]				11.85	1531.4	tr
α -Elemol				12.02	1545.0	0.01
Spathulenol	14.08	2060.3	0.05	12.34	1570.4	0.05
Caryophyllene oxide	12.43	1904.4	0.10	12.40*	1574.7	[0.13]
Caryophyllene oxide isomer	12.35	1897.7	0.02	12.40*	1574.7	[0.13]
Humulene epoxide II	13.02	1959.5	0.01	12.72	1600.4	0.02
Unknown LICU V [m/z 41, 69 (95), 109 (41), 95 (39), 55 (36), 121 (36)...				17.22	1999.5	0.02
Unknown LICU VI [m/z 69, 41 (90), 95 (49), 109 (43), 219 (43), 55 (30)...				17.54	2031.2	0.02
Unknown LICU VII [m/z 69, 41 (94), 81 (42), 109 (39), 107				17.65	2042.5	0.03

(33), 43 (31)...						
Unknown LICU VIII [m/z 69, 41 (73), 81 (55), 109 (26), 95 (25), 94 (20)...				17.90	2067.0	0.01
Unknown LICU IV [m/z 69, 41 (73), 55 (46), 95 (40), 109 (39), 91 (39)...				17.95	2071.5	0.03
Unknown LICU VIV [m/z 69, 41 (64), 81 (32), 109 (23), 94 (19), 95 (18)...				18.26	2103.0	0.03
Unknown LICU II [m/z 69, 41 (38), 151 (36), 123 (34), 82 (24), 43 (23), 109 (21)...	19.86	2692.9	0.01	18.54	2131.3	0.01
Total reported	98.49%			98.78%		

*: 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