

Date : 2024-08-29

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24H16-PTH08

Customer Identification : May Chang - China - M30112R

Type : Essential Oil

Source : *Litsea cubeba*

Customer : Plant Therapy

Checked and approved by:

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

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

Date : 2024-08-26

PHYSICOCHEMICAL DATA

Refractive index : 1.4845 ± 0.0003 (20 °C)

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

Analyst : Cassandra Baker

Date : 2024-08-19

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
2-Methyl-3-buten-2-ol	0.01	Aliphatic alcohol
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
Unknown	tr	Unknown
Unknown	tr	Unknown
2,6-Dimethyl-1,5-heptadiene	tr	Normonoterpene
Tricyclene	0.02	Monoterpene
α -Thujene	0.03	Monoterpene
α -Pinene	1.38	Monoterpene
Camphene	0.43	Monoterpene
α -Fenchene	0.01	Monoterpene
β -Pinene	1.02	Monoterpene
Sabinene	0.61	Monoterpene
6-Methyl-5-hepten-2-one	1.16	Aliphatic ketone
Dehydro-1,8-cineole	0.07	Monoterpenic ether
Myrcene	1.29	Monoterpene
6-Methyl-5-hepten-2-ol	0.04	Aliphatic alcohol
α -Phellandrene	0.06	Monoterpene
Δ^3 -Carene	0.01	Monoterpene
α -Terpinene	0.02	Monoterpene
<i>para</i> -Cymene	0.02	Monoterpene
Limonene	11.35	Monoterpene
1,8-Cineole	2.02	Monoterpenic ether
(<i>Z</i>)- β -Ocimene	0.02	Monoterpene
(<i>E</i>)- β -Ocimene	0.02	Monoterpene
2,6-Dimethyl-5-heptenal (melonal)	0.02	Aliphatic aldehyde
γ -Terpinene	0.04	Monoterpene
<i>cis</i> -Sabinene hydrate	0.03	Monoterpenic alcohol
Terpinolene	0.08	Monoterpene
6,7-Epoxyterpinene	0.01	Monoterpenic ether
<i>trans</i> -Sabinene hydrate	0.01	Monoterpenic alcohol
Rosefuran	0.02	Monoterpenic ether
Linalool	1.26	Monoterpenic alcohol
<i>cis</i> -Chrysanthamal?	0.02	Monoterpenic aldehyde
<i>cis-para</i> -Menth-2-en-1-ol	0.02	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.03	Monoterpenic ether
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.04	Monoterpenic alcohol
<i>trans</i> -Limonene oxide	0.03	Monoterpenic ether
<i>trans</i> -Chrysanthamal	0.02	Monoterpenic aldehyde
exo-Isocitral	0.05	Monoterpenic aldehyde

Citronellal	1.90	Monoterpenic aldehyde
Borneol	0.07	Monoterpenic alcohol
Isoneral	0.40	Monoterpenic aldehyde
δ -Terpineol	0.17	Monoterpenic alcohol
Terpinen-4-ol	[0.12]	Monoterpenic alcohol
Rosefuran oxide	[0.12]	Monoterpenic ether
Unknown	0.07	Oxygenated monoterpene
Isogeranial	0.80	Monoterpenic aldehyde
Myrtenal	tr	Monoterpenic aldehyde
α -Terpineol	0.56	Monoterpenic alcohol
Methyl salicylate	0.03	Phenolic ester
Myrtenol	0.02	Monoterpenic alcohol
<i>trans</i> -Isopiperitenol	0.04	Monoterpenic alcohol
<i>trans</i> -Piperitol	0.03	Monoterpenic alcohol
<i>cis</i> -Isopiperitenol	0.02	Monoterpenic alcohol
Nerol	0.56	Monoterpenic alcohol
Citronellol	0.22	Monoterpenic alcohol
Neral	29.62	Monoterpenic aldehyde
Piperitone	0.04	Monoterpenic ketone
Geraniol	1.59	Monoterpenic alcohol
Geranial	38.49	Monoterpenic aldehyde
Unknown	0.15	Oxygenated monoterpene
Thymol	0.02	Monoterpenic alcohol
Citronellic acid	0.02	Monoterpenic acid
Unknown	0.11	Unknown
Neric acid	0.02	Monoterpenic acid
α -Terpinyl acetate	0.04	Monoterpenic ester
Unknown	0.06	Unknown
Geranic acid	0.16	Aliphatic acid
Unknown	0.10	Unknown
α -Copaene	0.03	Sesquiterpene
Geranyl acetate	0.04	Monoterpenic ester
β -Elemene	0.19	Sesquiterpene
β -Caryophyllene	1.46	Sesquiterpene
α -Humulene	0.15	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.01	Sesquiterpene
Germacrene D	0.07	Sesquiterpene
Bicyclogermacrene	0.06	Sesquiterpene
α -Muurolene	0.08	Sesquiterpene
β -Bisabolene	0.03	Sesquiterpene
δ -Cadinene	0.02	Sesquiterpene
α -Elemol	0.01	Sesquiterpenic alcohol
(<i>E</i>)-Nerolidol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.12	Sesquiterpenic ether
Caryophyllene oxide isomer	0.03	Sesquiterpenic ether

Humulene epoxide II	0.02	Sesquiterpenic ether
Unknown	0.02	Unknown
Unknown	0.06	Unknown
Unknown	0.06	Unknown
Unknown	0.08	Unknown
Unknown	0.01	Unknown
6-Methyl-4,6-bis(4-methylpent-3-en-1-yl)cyclohexa-1,3-dienecarbaldehyde?	0.06	Diterpenic aldehyde
Unknown	0.01	Unknown
Unknown	0.12	Unknown
Consolidated total	99.43	

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

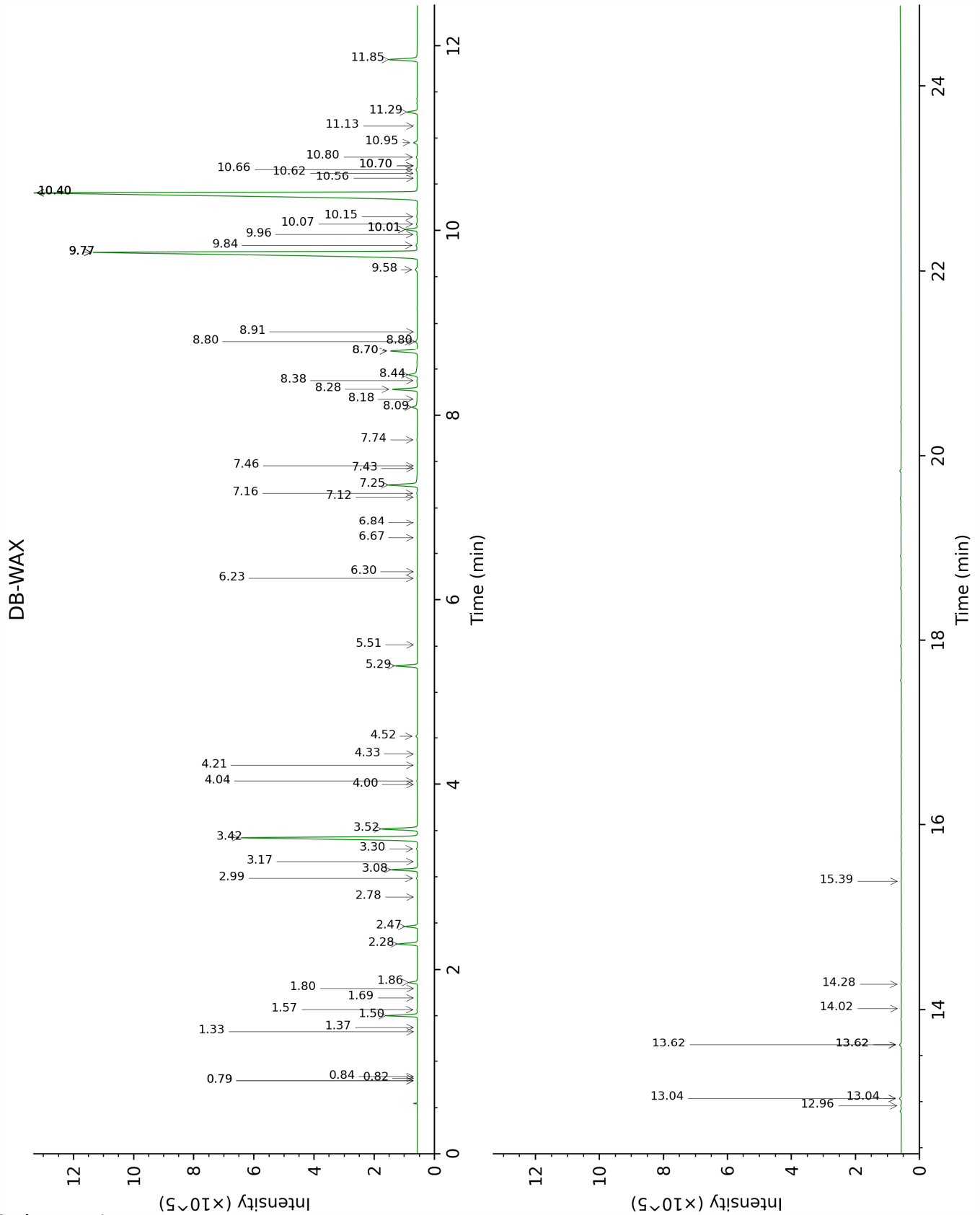
Note: no correction factor was applied

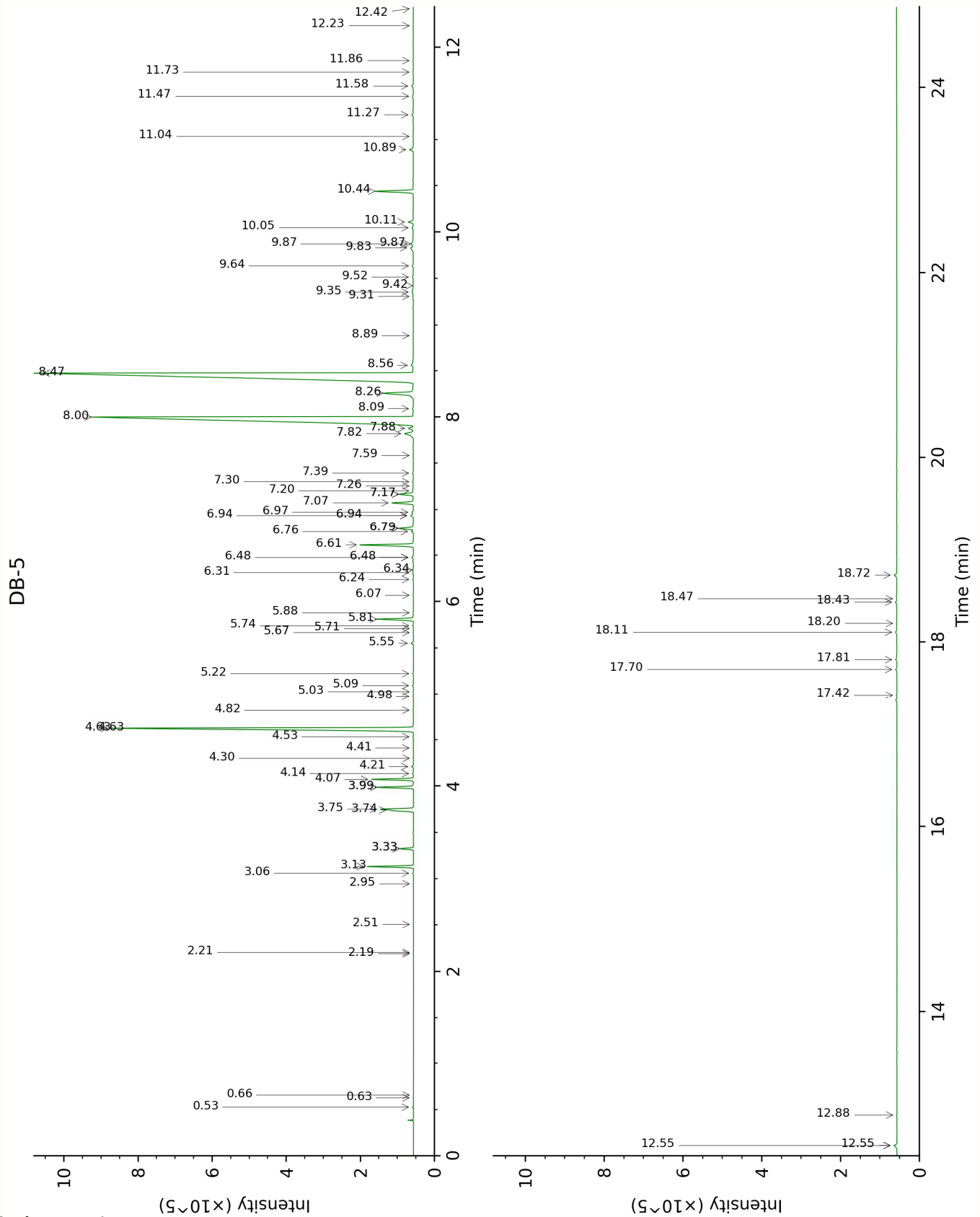
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

2-Methyl-3-buten-2-ol	Column DB-WAX			Column DB-5		
	1.69	1011.4	0.02	0.53	605.3	0.01
Isovaleral	0.84	884.8	0.01	0.63	640.2	tr
2-Methylbutyral	0.82	878.3	tr	0.66	650.6	tr
Unknown COCI I [m/z 55, 83 (89), 82 (70), 67 (66), 41 (55), 69 (46), 111 (37)... 126 (2)]	0.79*	869.3	[0.01]	2.19	859.0	tr
Unknown COCI II [m/z 55, 83 (79), 67 (65), 41 (63), 82 (60), 69 (58)... 111 (27), 126 (9)]	0.79*	869.3	[0.01]	2.21	860.2	tr
2,6-Dimethyl-1,5-heptadiene	1.33	965.6	tr	2.51	885.2	tr
Tricyclene	1.37	972.5	0.01	2.95	917.9	0.02
α -Thujene	1.57	999.2	0.03	3.06	925.3	0.03
α -Pinene	1.50	992.2	1.39	3.13	930.2	1.38
Camphene	1.86	1027.3	0.43	3.33*	942.9	[0.43]
α -Fenchene	1.80	1021.1	0.01	3.33*	942.9	[0.43]
β -Pinene	2.28	1066.9	1.02	3.74*†	970.4	[0.58]
Sabinene	2.47	1084.9	0.61	3.75*†	971.0	[1.02]
6-Methyl-5-hepten-2-one	5.29	1295.5	1.16	3.99*	986.7	[1.17]
Dehydro-1,8-cineole	3.30	1150.8	0.07	3.99*	986.7	[1.17]
Myrcene	3.08	1133.7	1.31	4.07	992.3	1.29
6-Methyl-5-hepten-2-ol	7.16	1430.0	0.05	4.14	996.4	0.04
α -Phellandrene	2.99	1126.5	0.06	4.21	1001.4	0.06
Δ^3 -Carene	2.78	1111.1	0.02	4.30	1007.1	0.01
α -Terpinene	3.17	1140.3	0.03	4.41	1014.0	0.02
<i>para</i> -Cymene	4.33	1226.8	0.03	4.53	1021.6	0.02
Limonene	3.42	1160.1	11.35	4.63*	1027.4	[13.20]
1,8-Cineole	3.52	1167.3	2.02	4.63*	1027.4	[13.20]
(Z)- β -Ocimene	4.00	1203.3	0.02	4.82	1039.6	0.02
(E)- β -Ocimene	4.21	1218.1	0.02	4.98	1049.2	0.02
2,6-Dimethyl-5-heptenal (melonal)	5.52	1311.7	0.02	5.03	1052.4	0.02
γ -Terpinene	4.04	1206.0	0.04	5.09	1056.6	0.04
<i>cis</i> -Sabinene hydrate	7.12	1426.9	0.03	5.22	1064.7	0.03
Terpinolene	4.52	1240.6	0.09	5.55	1085.3	0.08

6,7-Epoxy-myrcene	6.30	1367.9	0.01	5.67	1092.4	0.01
<i>trans</i> -Sabinene hydrate	8.18	1505.5	0.04	5.71	1095.2	0.01
Rosefuran	6.23	1362.8	0.03	5.74	1097.1	0.02
Linalool	8.28	1513.6	1.29	5.81	1101.5	1.26
<i>cis</i> -Chrysanthemal?				5.88	1105.8	0.02
<i>cis-para</i> -Menth-2-en-1-ol	8.38	1520.8	0.03	6.07	1117.9	0.02
<i>cis</i> -Limonene oxide	6.67	1394.1	0.03	6.24	1128.8	0.03
<i>cis-para</i> -Mentha-2,8-dien-1-ol	9.77*	1629.3	[29.79]	6.31	1133.5	0.04
<i>trans</i> -Limonene oxide	6.84	1406.2	0.02	6.34	1135.3	0.03
<i>trans</i> -Chrysanthemal	7.46	1451.9	0.02	6.48*	1143.9	[0.07]
exo-Isocitral	7.74	1472.5	0.05	6.48*	1143.9	[0.07]
Citronellal	7.25	1436.6	1.83	6.61	1152.6	1.90
Borneol	10.01*	1649.0	[0.65]	6.76	1161.8	0.07
Isoneral	8.09	1498.8	0.40	6.79*	1164.0	[0.57]
δ-Terpineol	9.77*	1629.3	[29.79]	6.79*	1164.0	[0.57]
Terpinen-4-ol	8.80*	1553.8	[0.12]	6.94*	1173.2	[0.12]
Rosefuran oxide	8.80*	1553.8	[0.12]	6.94*	1173.2	[0.12]
Unknown CYFL V [m/z 84, 83 (74), 137 (56), 41 (47), 93 (43), 108 (40)... 152 (2)]	9.84	1635.3	0.11	6.97	1175.5	0.07
Isogeranial	8.44	1525.7	0.69	7.07	1182.0	0.80
Myrtenal	8.91	1561.8	tr	7.17*	1187.9	[0.57]
α-Terpineol	10.01*	1649.0	[0.65]	7.17*	1187.9	[0.57]
Methyl salicylate	10.70*	1705.4	[0.03]	7.20	1190.2	0.03
Myrtenol	11.13	1741.6	0.02	7.26	1193.6	0.02
<i>trans</i> -Isopiperitenol	10.66	1701.9	0.09	7.30	1196.5	0.04
<i>trans</i> -Piperitol	10.62	1698.6	0.03	7.40	1202.4	0.03
<i>cis</i> -Isopiperitenol	10.56	1693.5	0.02	7.59	1215.2	0.02
Nerol	11.28	1754.3	0.59	7.82	1230.9	0.56
Citronellol	10.95	1726.5	0.23	7.88	1234.7	0.22
Neral	9.77*	1629.3	[29.79]	8.00	1242.9	29.62
Piperitone	10.15	1660.1	0.05	8.09	1248.9	0.04
Geraniol	11.85	1802.6	1.63	8.26	1260.1	1.59
Geranial	10.40*	1680.7	[38.82]	8.48	1274.5	38.49
Unknown CYFL VII [m/z 43, 69 (77), 41 (70), 109 (54)... 152 (6)]				8.56	1280.2	0.15
Thymol	15.39	2131.1	0.02	8.89	1302.0	0.02

Citronellic acid				9.31	1331.7	0.02
Unknown CYFL VIII [m/z 82, 59 (44), 41 (43), 95 (31), 43 (29), 81 (24)...]	13.04*	1907.6	[0.11]	9.35	1334.9	0.11
Neric acid				9.42	1339.8	0.02
α -Terpinyl acetate	9.96	1644.7	0.03	9.52	1346.3	0.04
Unknown LICU I [m/z 110, 95 (98), 109 (40), 43 (35), 111 (32)... 153 (13)...]	13.62*	1960.9	[0.11]	9.64	1354.8	0.06
Geranic acid				9.83	1368.5	0.16
Unknown ZIOF XI [m/z 81, 59 (94), 41 (74), 85 (40), 43 (55)...]	13.62*	1960.9	[0.11]	9.87*	1371.4	[0.13]
α -Copaene	7.43	1449.7	0.03	9.87*	1371.4	[0.13]
Geranyl acetate	10.80	1713.3	0.07	10.05	1383.6	0.04
β -Elemene	8.70*	1545.5	[1.67]	10.11	1388.0	0.19
β -Caryophyllene	8.70*	1545.5	[1.67]	10.44	1411.8	1.46
α -Humulene	9.58	1614.2	0.15	10.90	1445.7	0.15
(E)- β -Farnesene	9.77*	1629.3	[29.79]	11.04	1456.3	0.01
Germacrene D	10.07	1653.7	0.07	11.27	1473.7	0.07
Bicyclogermacrene	10.40*	1680.7	[38.82]	11.47	1488.5	0.06
α -Muurolene	10.40*	1680.7	[38.82]	11.58	1496.7	0.08
β -Bisabolene	10.40*	1680.7	[38.82]	11.73	1508.2	0.03
δ -Cadinene	10.70*	1705.4	[0.03]	11.86	1517.9	0.02
α -Elemol	14.28	2023.0	0.03	12.23	1547.4	0.01
(E)-Nerolidol	14.02	1997.9	0.01	12.42	1562.3	0.01
Caryophyllene oxide	13.04*	1907.6	[0.11]	12.55*	1572.2	[0.16]
Caryophyllene oxide isomer	12.96	1900.3	0.03	12.55*	1572.2	[0.16]
Humulene epoxide II	13.62*	1960.9	[0.11]	12.88	1597.9	0.02
Unknown LICU V [m/z 41, 69 (95), 109 (41), 95 (39), 55 (36), 121 (36)...]				17.42	1999.2	0.02
Unknown LICU VI [m/z 69, 41 (90), 95 (49), 109 (43), 219 (43), 55 (30)...]				17.70	2027.0	0.06
Unknown LICU VII [m/z 69, 41 (94), 81				17.81	2037.5	0.06

(42), 109 (39), 107 (33), 43 (31)...				
Unknown LICU VIII [m/z 69, 41 (73), 81 (55), 109 (26), 95 (25), 94 (20)...		18.11	2066.9	0.08
Unknown LICU IV [m/z 69, 41 (73), 55 (46), 95 (40), 109 (39), 91 (39)...		18.20	2076.3	0.01
6-Methyl-4,6-bis(4- methylpent-3-en-1- yl)cyclohexa-1,3- dienecarbaldehyde?		18.43	2099.0	0.06
Unknown LICU VIV [m/z 69, 41 (64), 81 (32), 109 (23), 94 (19), 95 (18)...		18.47	2102.8	0.01
Unknown LICU II [m/z 69, 41 (38), 151 (36), 123 (34), 82 (24), 43 (23), 109 (21)...		18.72	2129.2	0.12
Total reported	98.81%		99.15%	

*: 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