

Date : May 21, 2019

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 19E10-PTH03-1-SCC

Customer identification : Lemon Myrtle - LP010194R

Type : Essential oil

Source : *Backhousia citriodora*

Customer : Plant Therapy

ANALYSIS

Method: PC-PA-014-17J19 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Benoit Roger, Ph. D.

Analysis date : May 21, 2019

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.4875 ± 0.0003 (20 °C)

AS 4941:2001 - LEMON MYRTLE OIL

Compound	Min. %	Max. %	Observed %	Complies?
Geraniol	0.5	2.5	1.8	Yes
Geranial	44.0		50.5	Yes
Neral	32.0		37.4	Yes
Isogeranial	tr	4.30	1.11	Yes
Isoneral	tr	2.70	0.59	Yes
Citronellal	tr	1.00	0.67	Yes
exo-Isocitral	tr	2.00	0.14	Yes
Linalool	tr	1.00	1.02	No
Myrcene	tr	0.70	0.13	Yes
Dehydro-1,8-cineole	tr	0.90	0.02	Yes
6-Methyl-5-hepten-2-one	tr	2.90	0.91	Yes
Total citrals	85		90	Yes
Refractive index	1.4840	1.4910	1.4875	Yes

CONCLUSION

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

The oil complies with the Australian standard for lemon myrtle oil.

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
2,6-Dimethyl-1,5-heptadiene	0.01	0.01	Normonoterpene
Unknown	0.01	0.01	Unknown
β -Pinene	0.01	0.01	Monoterpene
Dehydro-1,8-cineole	0.93*	0.02	Monoterpenic ether
6-Methyl-5-hepten-2-one	[0.93]*	0.91	Aliphatic ketone
Myrcene	0.13	0.12	Monoterpene
Octan-3-ol	0.02*	0.01	Aliphatic alcohol
α -Phellandrene	[0.02]*	0.01	Monoterpene
para-Cymene	0.01	0.01	Monoterpene
Limonene	0.07*	0.06	Monoterpene
β -Phellandrene	[0.07]*	0.01*	Monoterpene
1,8-Cineole	[0.07]*	[0.01]*	Monoterpenic ether
(Z)- β -Ocimene	0.01	0.01	Monoterpene
Seudenone?	0.01	0.02	Aliphatic ketone
(E)- β -Ocimene	0.01	tr	Monoterpene
Linalool	1.02	1.02	Monoterpenic alcohol
cis-Chrysanthemal?	0.03	0.03	Monoterpenic aldehyde
α -Cyclocitral	0.01		Monoterpenic aldehyde
trans-para-Mentha-2,8-dien-1-ol	0.02	0.02	Monoterpenic alcohol
cis-para-Mentha-2,8-dien-1-ol	0.02	37.40*	Monoterpenic alcohol
Isopulegol	0.03	0.03	Monoterpenic alcohol
trans-Chrysanthemal	0.16*	0.01	Monoterpenic aldehyde
exo-Isocitral	[0.16]*	0.14	Monoterpenic aldehyde
Citronellal	0.73*	0.67	Monoterpenic aldehyde
iso-Isopulegol	[0.73]*	0.03	Monoterpenic alcohol
Borneol	0.06	0.56*	Monoterpenic alcohol
Isoneral	0.70*	0.59	Monoterpenic aldehyde
α -Phellandren-8-ol	[0.70]*	50.96*	Monoterpenic alcohol
trans- β -Terpineol	[0.70]*	0.02	Monoterpenic alcohol
Terpinen-4-ol	0.14	0.14	Monoterpenic alcohol
Unknown	0.11	0.13	Oxygenated monoterpene
Isogeranial	1.21*	1.11	Monoterpenic aldehyde
para-Cymen-8-ol	[1.21]*	0.01	Monoterpenic alcohol
α -Terpineol	0.50	[0.56]*	Monoterpenic alcohol
β -Phellandren-8-ol	0.03	0.21	Monoterpenic alcohol
trans-Isopiperitenol	0.04	0.06	Monoterpenic alcohol
Unknown	0.06		Oxygenated monoterpene
cis-Isopiperitenol	0.02	0.03	Monoterpenic alcohol
Nerol	0.60	0.61	Monoterpenic alcohol
Neral	37.45*	[37.40]*	Monoterpenic aldehyde
Piperitone	[37.45]*	0.08	Monoterpenic ketone
(E)-Isogeraniol?	0.06	0.04	Monoterpenic alcohol
Geraniol	1.80	1.84	Monoterpenic alcohol
Unknown	50.53*	0.01	Oxygenated monoterpene
Geranial	[50.53]*	[50.96]*	Monoterpenic aldehyde
Unknown	0.10	0.09	Unknown
α -Terpinyl acetate	0.06	0.07	Monoterpenic ester
Unknown	0.07	0.15*	Unknown

Geranic acid	0.12	0.10	Aliphatic acid
α -Copaene	0.11	0.06	Sesquiterpene
Unknown	0.05	[0.15]*	Unknown
Geranyl acetate	0.06	0.06*	Monoterpenic ester
β -Elemene	0.12	1.20*	Sesquiterpene
β -Caryophyllene	1.09	[1.20]*	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.01	[1.20]*	Sesquiterpene
α -Humulene	0.11	0.10	Sesquiterpene
allo-Aromadendrene	0.03	0.03	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.04	[37.40]*	Sesquiterpene
Selina-4,11-diene	0.02	[37.40]*	Sesquiterpene
Germacrene D	0.02	[0.56]*	Sesquiterpene
Bicyclogermacrene	0.13	[50.96]*	Sesquiterpene
γ -Cadinene	0.02	0.02	Sesquiterpene
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	0.01	[0.06]*	Sesquiterpene
δ -Cadinene	0.02	0.02	Sesquiterpene
Spathulenol	0.03	0.03	Sesquiterpenic alcohol
Caryophyllene oxide	0.06	0.05	Sesquiterpenic ether
Humulene epoxide II	0.01	[0.15]*	Sesquiterpenic ether
Isospathulenol	0.01	0.01	Sesquiterpenic alcohol
Unknown	0.05		Unknown
Total identified	98.48%	98.67%	

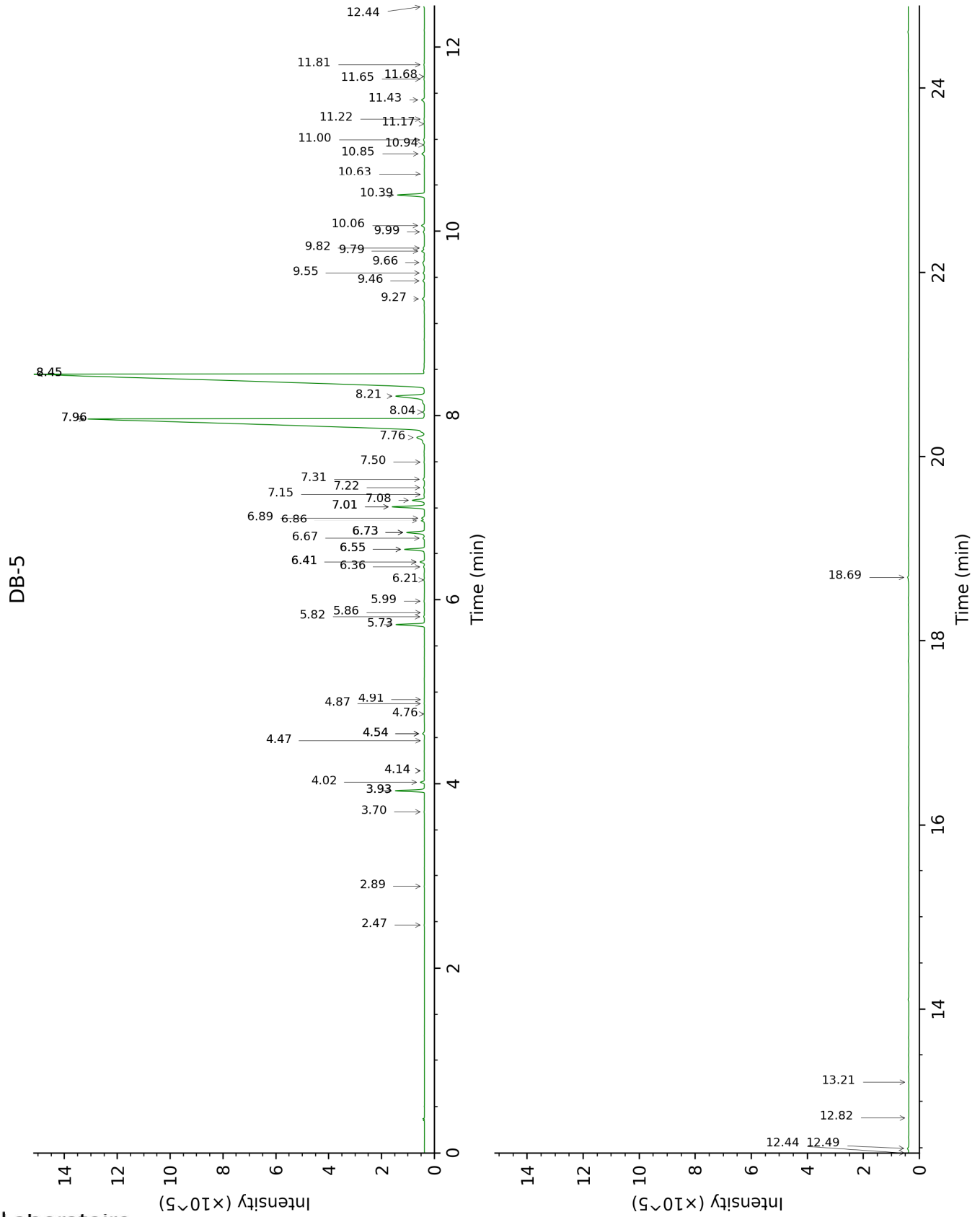
*: Two or more compounds are coeluting on this column

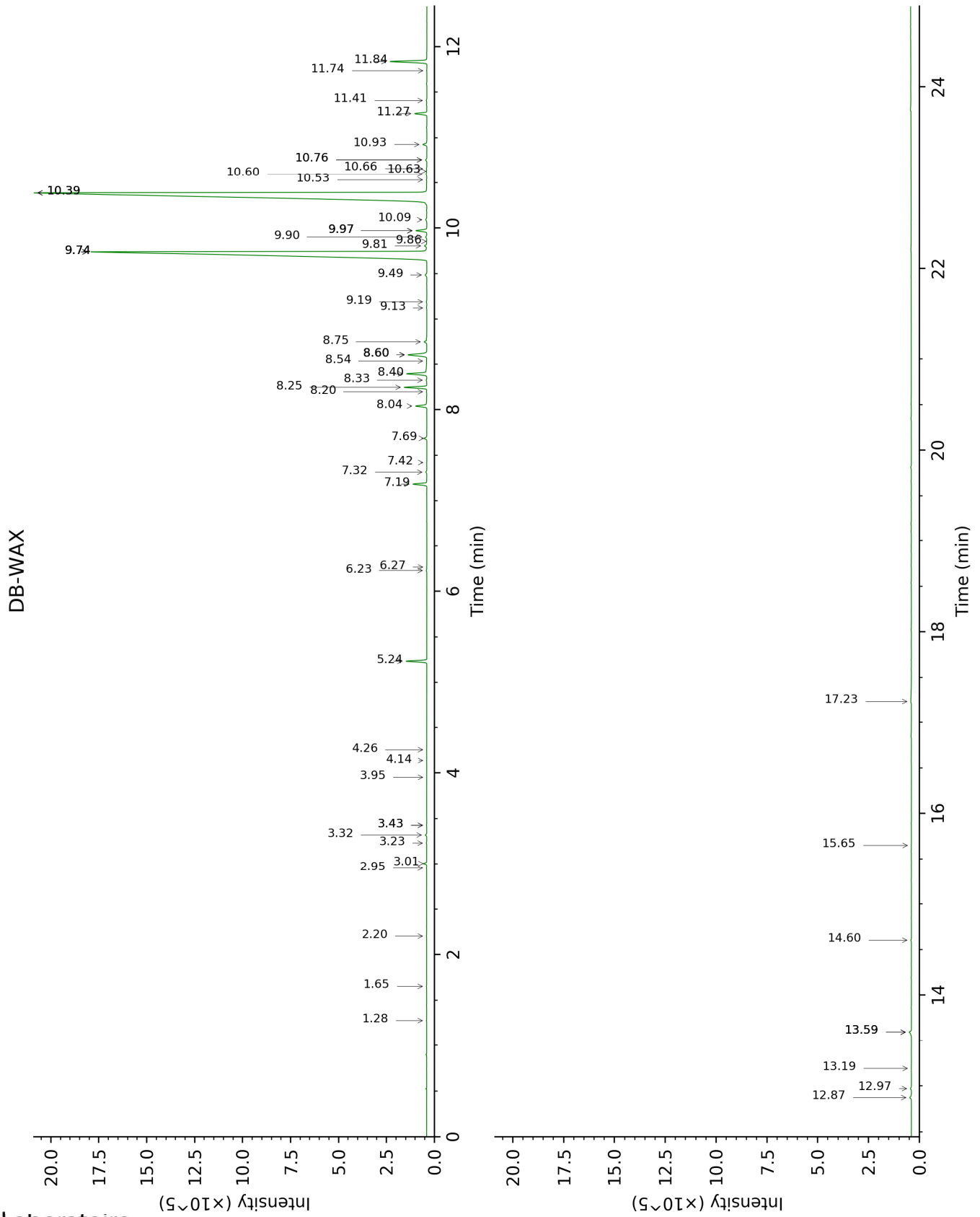
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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

Note: no correction factor was applied

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
2,6-Dimethyl-1,5-heptadiene	2.47	886	0.01	1.28	965	0.01
Unknown [m/z 67, 109 (89), 124 (85), 41 (41), 81 (35), 55 (24)...]	2.89	917	0.01	1.65	1013	0.01
β-Pinene	3.70	970	0.01	2.20	1066	0.01
Dehydro-1,8-cineole	3.93*	986	0.93	3.23	1150	0.02
6-Methyl-5-hepten-2-one	3.93*	986	[0.93]	5.24	1296	0.91
Myrcene	4.02	992	0.13	3.01	1133	0.12
Octan-3-ol	4.14*	1000	0.02	6.27	1369	0.01
α-Phellandrene	4.14*	1000	[0.02]	2.95	1129	0.01
para-Cymene	4.47	1020	0.01	4.26	1226	0.01
Limonene	4.54*	1025	0.07	3.32	1157	0.06
β-Phellandrene	4.54*	1025	[0.07]	3.43*	1165	0.01
1,8-Cineole	4.54*	1025	[0.07]	3.43*	1165	[0.01]
(Z)-β-Ocimene	4.76	1039	0.01	3.95	1204	0.01
Seudenone?	4.87	1046	0.01	8.54	1537	0.02
(E)-β-Ocimene	4.91	1049	0.01	4.14	1218	tr
Linalool	5.73	1101	1.02	8.25	1515	1.02
cis-Chrysanthemal?	5.82	1106	0.03	6.23	1366	0.03
α-Cyclocitral	5.86	1109	0.01			
trans-para-Mentha-2,8-dien-1-ol	5.98	1117	0.02	9.13	1583	0.02
cis-para-Mentha-2,8-dien-1-ol	6.22	1132	0.02	9.74*	1632	37.40
Isopulegol	6.36	1141	0.03	8.33	1521	0.03
trans-Chrysanthemal	6.41*	1145	0.16	7.42	1454	0.01
exo-Isocitral	6.41*	1145	[0.16]	7.69	1473	0.14
Citronellal	6.55*	1154	0.73	7.19	1436	0.67
iso-Isopulegol	6.55*	1154	[0.73]	8.20	1512	0.03
Borneol	6.67	1162	0.06	9.97*	1651	0.56
Isoneral	6.73*	1166	0.70	8.04	1499	0.59
α-Phellandren-8-ol	6.73*	1166	[0.70]	10.39*	1684	50.96
trans-β-Terpineol	6.73*	1166	[0.70]	9.86	1641	0.02
Terpinen-4-ol	6.86	1174	0.14	8.75	1554	0.14
Unknown [m/z 84, 83 (74), 137 (56), 41 (47), 93 (43), 108 (40)... 152 (2)]	6.89	1176	0.11	9.81	1637	0.13
Isogeranial	7.01*	1184	1.21	8.40	1527	1.11
para-Cymen-8-ol	7.01*	1184	[1.21]	11.74	1797	0.01
α-Terpineol	7.08	1189	0.50	9.97*	1651	[0.56]

β -Phellandren-8-ol	7.15	1193	0.03	10.93	1729	0.21
<i>trans</i> -Isopiperitenol	7.22	1198	0.04	10.60	1701	0.06
Unknown [m/z 84, 41 (83), 83 (79), 91 (76), 93 (67), 119 (64), 137 (63), 109 (54), 108 (54)... 152 (4)]	7.31	1204	0.06			
<i>cis</i> -Isopiperitenol	7.50	1217	0.02	10.53	1696	0.03
Nerol	7.76	1235	0.60	11.26	1757	0.61
Neral	7.96*	1249	37.45	9.74*	1632	[37.40]
Piperitone	7.96*	1249	[37.45]	10.09	1660	0.08
(<i>E</i>)-Isogeraniol?	8.04	1254	0.06	11.41	1770	0.04
Geraniol	8.21	1266	1.80	11.84	1806	1.84
Unknown [m/z 43, 69 (77), 41 (70), 109 (54)... 152 (6)]	8.45*	1283	50.53	13.19	1927	0.01
Geranial	8.45*	1283	[50.53]	10.39*	1684	[50.96]
Unknown [m/z 82, 59 (44), 41 (43), 95 (31), 43 (29), 81 (24)...]	9.27	1335	0.10	12.87	1898	0.09
α -Terpinyl acetate	9.46	1348	0.06	9.90	1645	0.07
Unknown [m/z 110, 95 (98), 109 (40), 43 (35), 111 (32)... 153 (13)...]	9.55	1354	0.07	13.59*	1964	0.15
Geranic acid	9.66	1363	0.12	17.23	2326	0.10
α -Copaene	9.79	1371	0.11	7.32	1446	0.06
Unknown [m/z 81, 59 (94), 41 (74), 85 (40), 43 (55)...]	9.82	1374	0.05	13.59*	1964	[0.15]
Geranyl acetate	10.00	1386	0.06	10.76*	1715	0.06
β -Elemene	10.06	1391	0.12	8.60*	1543	1.20
β -Caryophyllene	10.39	1415	1.09	8.60*	1543	[1.20]
<i>trans</i> - α -Bergamotene	10.63	1432	0.01	8.60*	1543	[1.20]
α -Humulene	10.85	1449	0.11	9.49	1612	0.10
allo-Aromadendrene	10.94	1456	0.03	9.19	1588	0.03
(<i>E</i>)- β -Farnesene	11.00	1460	0.04	9.74*	1632	[37.40]
Selina-4,11-diene	11.17	1473	0.02	9.74*	1632	[37.40]
Germacrene D	11.22	1477	0.02	9.97*	1651	[0.56]
Bicyclogermacrene	11.43	1492	0.13	10.39*	1684	[50.96]
γ -Cadinene	11.66	1510	0.02	10.63	1704	0.02
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	11.68	1512	0.01	10.76*	1715	[0.06]
δ -Cadinene	11.81	1522	0.02	10.66	1706	0.02
Spathulenol	12.44	1572	0.03	14.60	2059	0.03
Caryophyllene oxide	12.49	1576	0.06	12.97	1907	0.05

Humulene epoxide II	12.82	1602	0.01	13.59*	1964	[0.15]
Isospathulenol	13.21	1633	0.01	15.65	2162	0.01
Unknown [m/z 69, 41 (38), 151 (36), 123 (34), 82 (24), 43 (23), 109 (21)...]	18.69	2135	0.05			
Total identified	98.48%			98.67%		
Total reported	98.92%			98.92%		

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified 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