Date : March 24, 2020

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 20C11-PSC10
Customer identification : Rosalina - Australia - JF21148
Type : Essential oil
Source : *Melaleuca ericifolia* ct. Linalool
Customer : Pacha Soap Co.

Analysis

Method: PC-MAT-007 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID (in French); identifications validated by GC-MS.
Analyst : Sylvain Mercier, M. Sc., Chimiste
Analysis date : March 23, 2020

Checked and approved by :

Alexis St-Gelais, M. Sc., 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid
Refractive index: 1.4652 ± 0.0003 (20 °C)

CONCLUSION

The sample contains plinol isomers, which are considered by some authors as being indicative of addition of foreign linalool. We recommend this observation is considered when evaluating this batch.

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Analysis summary – Consolidated contents

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

Identification	%	Classe
Tricyclene	0.03	Monoterpene
α-Thujene	0.11	Monoterpene
α-Pinene	14.26	Monoterpene
Camphene	0.22	Monoterpene
α-Fenchene	0.01	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
β-Pinene	0.39	Monoterpene
Sabinene	0.04	Monoterpene
Myrcene	0.36	Monoterpene
α-Phellandrene	0.18	Monoterpene
Pseudolimonene	tr	Monoterpene
Δ3-Carene	0.01	Monoterpene
α-Terpinene	0.82	Monoterpene
para-Cymene	1.33	Monoterpene
1,8-Cineole	15.99	Monoterpenic ether
Limonene	13.71	Monoterpene
(*Z*)-β-Ocimene	0.02	Monoterpene
(*E*)-β-Ocimene	0.01	Monoterpene
γ-Terpinene	2.03	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.02	Monoterpenic alcohol
para-Cymenene	0.01	Monoterpene
Terpinolene	0.33	Monoterpene
trans-Linalool oxide (fur.)	0.03	Monoterpenic alcohol
α-Pinene oxide	0.05	Monoterpenic ether
trans-Sabinene hydrate	0.02	Monoterpenic alcohol
Linalool	42.48	Monoterpenic alcohol
endo-Fenchol	0.04	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.07	Monoterpenic alcohol
Unknown	0.02	Unknown
Plinol (C?)	0.05	Monoterpenic alcohol
cis-Limonene oxide	0.03	Monoterpenic ether
trans-Limonene oxide	0.02	Monoterpenic ether
Unknown	0.03	Unknown
trans-para-Menth-2-en-1-ol	0.03	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
Terpinen-4-ol	4.04	Monoterpenic alcohol
trans-Linalool oxide (pyr.)	0.02	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α-Terpineol	0.33	Monoterpenic alcohol
cis-Piperitol	0.04	Monoterpenic alcohol
Unknown	0.03	Unknown
Unknown	0.01	Oxygenated monoterpene
trans-Piperitol	0.05	Monoterpenic alcohol
trans-Carveol	0.02	Monoterpenic alcohol
Nerol	0.02	Monoterpenic alcohol
Citronellol	0.01	Monoterpenic alcohol

Neral	0.03	Monoterpenic aldehyde
Geranial	0.02	Monoterpenic aldehyde
Geranyl formate	0.01	Monoterpenic ester
Unknown	0.01	Monoterpenic alcohol
Methyl geranate	0.02	Monoterpenic ester
Isoledene	0.03	Sesquiterpene
α-Copaene	0.02	Sesquiterpene
7-Cubebene	0.02	Sesquiterpene
Geranyl acetate	0.01	Monoterpenic ester
β-Elemene	0.02	Sesquiterpene
Unknown	0.01	Sesquiterpene
α-Gurjunene	0.05	Sesquiterpene
Unknown	0.01	Sesquiterpene
β-Caryophyllene	0.06	Sesquiterpene
γ-Maaliene	0.01	Sesquiterpene
α-Maaliene	0.01	Sesquiterpene
Aromadendrene	0.13	Sesquiterpene
Unknown	0.02	Sesquiterpene
α-Humulene	0.02	Sesquiterpene
allo-Aromadendrene	0.06	Sesquiterpene
trans-Cadina-1(6),4-diene	0.04	Sesquiterpene
β-Selinene	0.02	Sesquiterpene
allo-Aromadendr-9-ene	0.02	Sesquiterpene
δ-Selinene	0.01	Sesquiterpene
α-Selinene	0.02	Sesquiterpene
Bicyclogermacrene	0.09	Sesquiterpene
Viridiflorene	0.11	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
γ-Cadinene	0.02	Sesquiterpene
δ-Cadinene	0.11	Sesquiterpene
trans-Calamenene	0.02	Sesquiterpene
Zonarene	0.02	Sesquiterpene
trans-Cadina-1,4-diene	0.01	Sesquiterpene
Unknown	0.02	Unknown
α-Elemol	0.02	Sesquiterpenic alcohol
Epiglobulol	0.01	Sesquiterpenic alcohol
Maaliol	0.01	Sesquiterpenic alcohol
Palustrol	0.01	Sesquiterpenic alcohol
(*E*)-Nerolidol	0.22	Sesquiterpenic alcohol
Spathulenol	0.04	Sesquiterpenic alcohol
Globulol	0.05	Sesquiterpenic alcohol
Viridiflorol	0.02	Sesquiterpenic alcohol
Cubeban-11-ol	0.02	Sesquiterpenic alcohol
Ledol	0.11	Sesquiterpenic alcohol
Rosifoliol	0.02	Sesquiterpenic alcohol
Eremoligenol?	0.03	Sesquiterpenic alcohol
γ-Eudesmol	0.05	Sesquiterpenic alcohol
Isospathulenol	0.02	Sesquiterpenic alcohol
Cubenol	0.02	Sesquiterpenic alcohol
β-Eudesmol	0.05	Sesquiterpenic alcohol
α-Eudesmol	0.06	Sesquiterpenic alcohol
Consolidated total	**99.24%**	

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

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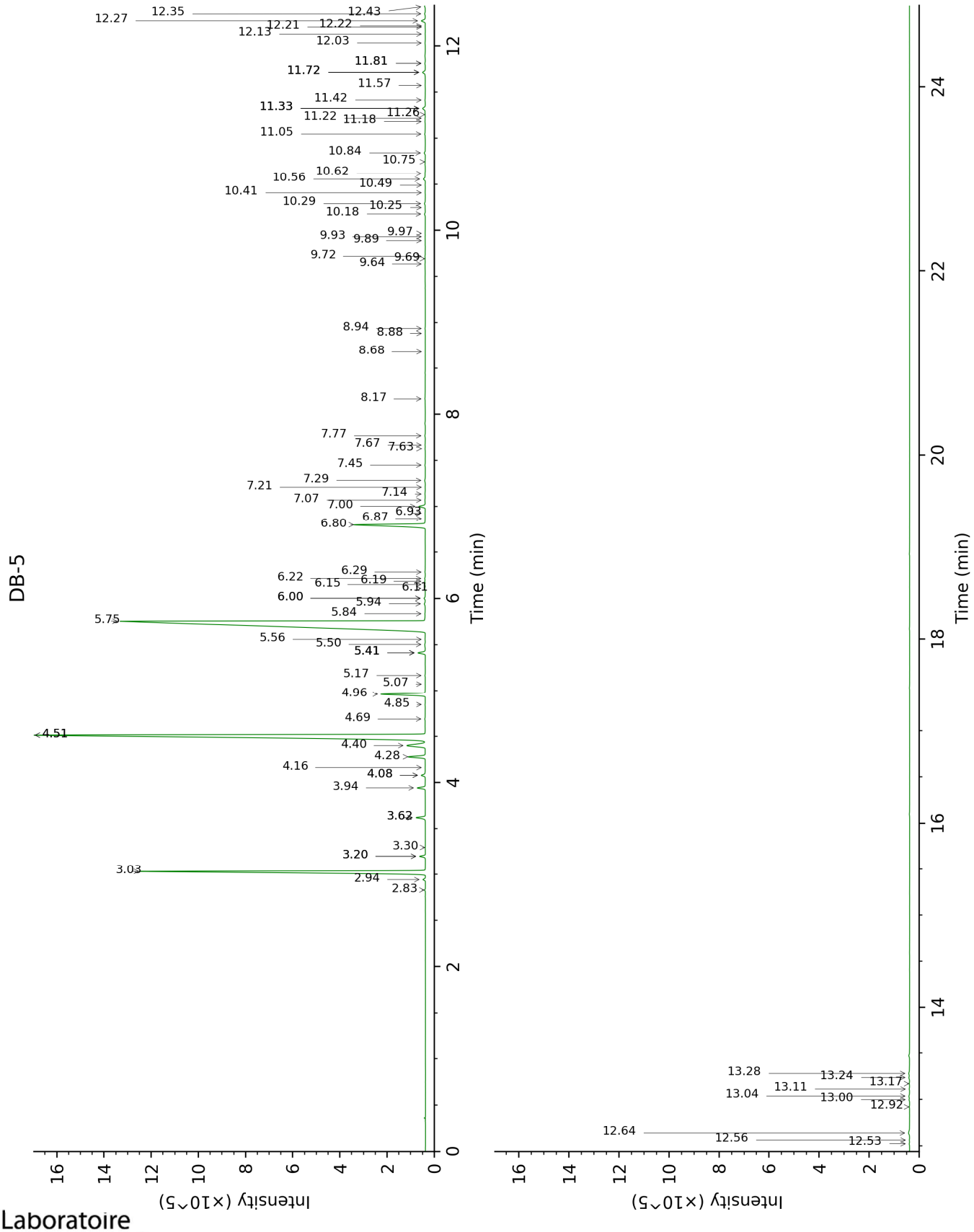
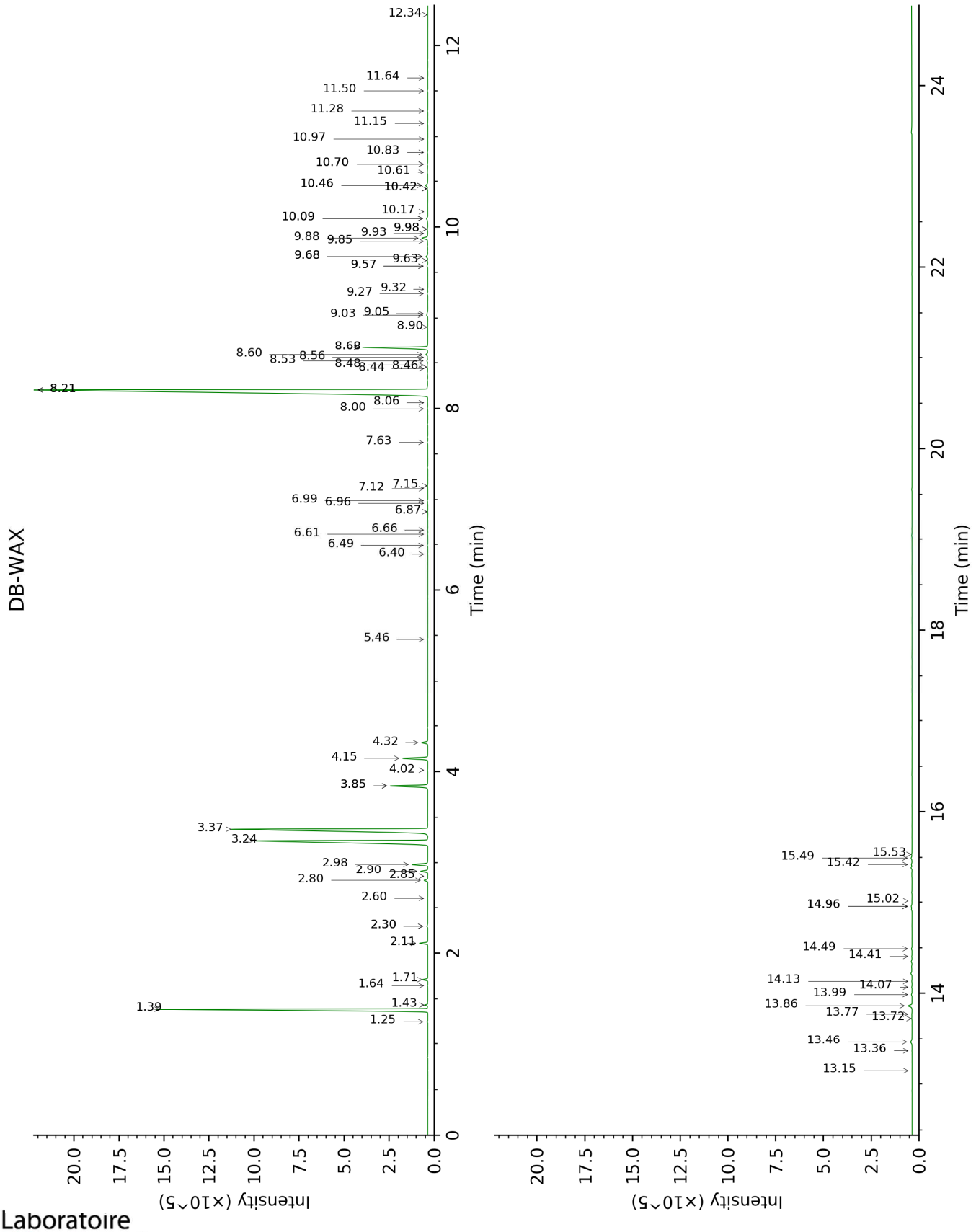

DB-5
Time (min)
Intensity (×10^5)
12.27
12.35
12.43
12.13
12.21
12.22
12.03
11.81
11.72
11.57
11.33
11.42
11.22
11.18
11.26
11.05
10.84
10.75
10.56
10.62
10.49
10.41
10.29
10.25
10.18
9.93
9.89
9.97
9.72
9.64
9.69
8.94
8.88
8.68
8.17
7.77
7.67
7.63
7.45
7.21
7.29
7.14
7.07
7.00
6.87
6.93
6.80
6.22
6.29
6.15
6.19
6.11
6.00
5.94
5.84
5.75
5.56
5.50
5.41
5.17
5.07
4.96
4.85
4.69
4.51
4.40
4.28
4.16
4.08
3.94
3.62
3.30
3.20
3.03
2.94
2.83
13.28
13.24
13.17
13.11
13.04
13.00
12.92
12.64
12.56
12.53


DB-WAX
Time (min)
Intensity (×10^5)
12.34
11.64
11.50
11.28
11.15
10.97
10.83
10.70
10.61
10.46
10.42
10.17
10.09
9.98
9.93
9.88
9.85
9.68
9.63
9.57
9.32
9.27
9.05
9.03
8.90
8.68
8.60
8.56
8.53
8.48
8.46
8.44
8.21
8.06
8.00
7.63
7.15
7.12
6.99
6.96
6.87
6.66
6.61
6.49
6.40
5.46
4.32
4.15
4.02
3.85
3.37
3.24
2.98
2.90
2.85
2.80
2.60
2.30
2.11
1.71
1.64
1.43
1.39
1.25
15.53
15.49
15.42
15.02
14.96
14.49
14.41
14.13
14.07
13.99
13.86
13.77
13.72
13.46
13.36
13.15

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Tricyclene	2.83	918	0.03	1.25	973	0.03
α-Thujene	2.94	925	0.11	1.43	1000	0.12
α-Pinene	3.03	931	14.26	1.39	995	14.08
Camphene	3.20*	942	0.24	1.71	1027	0.22
α-Fenchene	3.20*	942	[0.24]	1.64	1021	0.01
Thuja-2,4(10)-diene	3.30	949	0.01	2.30*	1085	0.05
β-Pinene	3.62*	970	0.43	2.11	1067	0.39
Sabinene	3.62*	970	[0.43]	2.30*	1085	[0.05]
Myrcene	3.94	991	0.36	2.90	1134	0.35
α-Phellandrene	4.08*	1000	0.20	2.80	1126	0.18
Pseudolimonene	4.08*	1000	[0.20]	2.85	1130	tr
Δ3-Carene	4.16	1006	0.01	2.60	1111	tr
α-Terpinene	4.28	1013	0.82	2.98	1140	0.81
para-Cymene	4.40	1021	1.33	4.15	1228	1.34
1,8-Cineole	4.51*	1028	29.93	3.37	1170	15.99
Limonene	4.51*	1028	[29.93]	3.24	1160	13.71
(*Z*)-β-Ocimene	4.69	1039	0.02	3.84*	1206	2.05
(*E*)-β-Ocimene	4.85	1049	0.01	4.02	1218	0.01
γ-Terpinene	4.96	1056	2.03	3.84*	1206	[2.05]
cis-Sabinene hydrate	5.07	1063	0.01	6.96	1430	0.02
cis-Linalool oxide (fur.)	5.17	1069	0.02	6.61	1404	0.02
para-Cymenene	5.41*	1085	0.35	6.40	1388	0.01
Terpinolene	5.41*	1085	[0.35]	4.32	1240	0.33
trans-Linalool oxide (fur.)	5.41*	1085	[0.35]	6.99	1432	0.03
α-Pinene oxide	5.50	1091	0.05	5.46	1321	0.02
trans-Sabinene hydrate	5.56	1094	0.02	8.06	1512	0.01
Linalool	5.75	1107	42.48	8.21*	1523	42.24
endo-Fenchol	5.84	1112	0.04	8.46	1542	0.03
cis-para-Menth-2-en-1-ol	5.94	1119	0.07	8.21*	1523	[42.24]
Unknown [m/z 43, 70 (95), 81 (71), 55 (55), 41 (47)...]	6.00*	1123	0.07			
Plinol (C?)	6.00*	1123	[0.07]	8.52	1548	0.05
cis-Limonene oxide	6.11	1130	0.03	6.49	1395	0.04
trans-Limonene oxide	6.15	1133	0.02	6.66	1408	0.02
Unknown [Not seen in MS]	6.19	1135	0.03	8.00	1507	0.03
trans-para-Menth-2-en-1-ol	6.22	1137	0.03	9.05†	1588	[0.11]
Unknown [m/z 83,	6.29	1141	0.02			

55 (69), 41 (60), 71 (59), 81 (57), 95 (56), 69 (56)...154 (3)]						
Terpinen-4-ol	6.80	1175	4.04	8.68*	1559	4.04
trans-Linalool oxide (pyr.)	6.87	1180	0.02	10.70*	1722	0.03
para-Cymen-8-ol	6.93	1184	0.02	11.64	1803	0.02
α-Terpineol	7.00	1189	0.33	9.88	1655	0.36
cis-Piperitol	7.07	1193	0.04	9.63	1635	0.03
Unknown [m/z 43, 71 (80), 67 (55), 59 (51), 68 (44), 41 (43)...]	7.14	1197	0.03	10.97	1745	tr
Unknown [m/z 84, 41 (83), 83 (79), 91 (76), 93 (67), 119 (64), 137 (63), 109 (54), 108 (54)... 152 (4)]	7.21	1202	0.01			
trans-Piperitol	7.29	1207	0.05	10.46*	1702	0.16
trans-Carveol	7.45	1219	0.02	11.50	1790	0.03
Nerol	7.63	1231	0.02	11.15	1760	0.02
Citronellol	7.67	1234	0.01	10.83	1733	0.02
Neral	7.77	1241	0.03	9.57*	1630	0.05
Geranial	8.17	1268	0.02	10.17	1678	0.01
Geranyl formate	8.68	1304	0.01	9.98*	1663	0.03
Unknown [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]	8.88	1319	0.01	15.02	2115	0.02
Methyl geranate	8.94	1323	0.02	9.84	1652	0.02
Isoledene	9.64	1366	0.03	6.87	1423	0.01
α-Copaene	9.69	1370	0.02	7.15	1444	0.02
7-Cubebene	9.72	1372	0.02	7.12	1442	0.01
Geranyl acetate	9.89	1384	0.01	10.61	1715	0.06
β-Elemene	9.93	1387	0.02	8.44	1541	0.01
Unknown [m/z 93, 122 (98), 161 (98), 107 (86), 95 (46), 105 (72)... 204 (34)]	9.97	1389	0.01			
α-Gurjunene	10.18	1404	0.05	7.63	1479	0.04
Unknown [m/z 119, 107 (86), 105 (85), 93 (78), 189 (66), 81 (65), 121 (64)... 204 (23)]	10.25	1409	0.01			
β-Caryophyllene	10.29	1413	0.06	8.48	1544	0.04
γ-Maaliene	10.41	1421	0.01	8.56	1551	0.02
α-Maaliene	10.49	1428	0.01	8.68*	1559	[4.04]
Aromadendrene	10.56	1432	0.13	8.60	1553	0.11
Unknown [m/z	10.62	1437	0.02	8.90	1577	0.01

161, 105 (69), 119 (42), 91 (41), 204 (38)]						
α-Humulene	10.75	1447	0.02	9.32	1610	0.01
allo-Aromadendrene	10.84	1454	0.06	9.03†	1587	0.11
trans-Cadina-1(6),4-diene	11.05	1469	0.04	9.27	1606	0.04
β-Selinene	11.18	1479	0.02	9.93	1659	0.01
allo-Aromadendr-9-ene	11.22	1482	0.02	9.57*	1630	[0.05]
δ-Selinene	11.26	1485	0.01	9.68*	1639	0.12
α-Selinene	11.33*	1490	0.18	9.98*	1663	[0.03]
Bicyclogermacrene	11.33*	1490	[0.18]	10.09*	1672	0.11
Viridiflorene	11.33*	1490	[0.18]	9.68*	1639	[0.12]
α-Muurolene	11.42	1497	0.02	10.09*	1672	[0.11]
γ-Cadinene	11.57	1508	0.02	10.42*	1699	0.03
δ-Cadinene	11.72*	1520	0.18	10.46*	1702	[0.16]
trans-Calamenene	11.72*	1520	[0.18]	11.28	1771	0.02
Zonarene	11.72*	1520	[0.18]	10.42*	1699	[0.03]
trans-Cadina-1,4-diene	11.81*	1527	0.03	10.70*	1722	[0.03]
Unknown [m/z 93, 107 (82), 108 (53), 119 (45), 43 (44), 135 (40)...222]	11.81*	1527	[0.03]			
α-Elemol	12.03	1545	0.02	14.13	2029	0.03
Epiglobulol	12.13	1552	0.01	13.36	1957	0.01
Maaliol	12.21	1558	0.01	13.15	1937	0.01
Palustrol	12.22	1559	0.01	12.34	1864	0.01
(*E*)-Nerolidol	12.27	1564	0.22	13.86	2003	0.26
Spathulenol	12.35	1570	0.04	14.49	2063	0.05
Globulol	12.43	1576	0.05	13.99	2015	0.05
Viridiflorol	12.52	1583	0.02	14.07	2023	0.02
Cubeban-11-ol	12.56	1586	0.02	13.77	1994	0.04
Ledol	12.64	1592	0.11	13.46	1966	0.15
Rosifoliol	12.92	1615	0.02	14.41	2055	0.03
Eremoligenol?	13.00	1621	0.03	14.96*	2108	0.08
γ-Eudesmol	13.04	1624	0.05	14.96*	2108	[0.08]
Isospathulenol	13.11	1631	0.02	15.53	2166	0.02
Cubenol	13.17	1636	0.02	13.72	1990	0.03
β-Eudesmol	13.24	1641	0.05	15.49	2162	0.07
α-Eudesmol	13.28	1645	0.06	15.42	2155	0.05
Total identified		**99.31%**			**98.64%**	
Total reported		**99.45%**			**98.70%**	

*: Two or more compounds are coeluting on this column
[xx]: Duplicate percentage due to coelutions, not 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