Date : May 25, 2020

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 20E21-PTH01
Customer identification : Ravintsara - Madagascar - RG010395R
Type : Essential oil
Source : *Cinnamomum camphora*
Customer : Plant Therapy

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 : May 25, 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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: 1.4660 ± 0.0003 (20 °C; method PC-MAT-016)

CONCLUSION

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

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Analysis summary – Consolidated contents

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

Identification	%	Class
Ethanol	0.02	Aliphatic alcohol
Acetone	0.01	Aliphatic ketone
Isovaleral	tr	Aliphatic aldehyde
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
(3*Z*)-Hexenol	0.01	Aliphatic alcohol
Hashishene	tr	Monoterpene
Tricyclene	0.01	Monoterpene
α-Thujene	0.81	Monoterpene
α-Pinene	4.86	Monoterpene
α-Fenchene	0.02	Monoterpene
Camphene	0.16	Monoterpene
β-Pinene	3.42	Monoterpene
Sabinene	12.90	Monoterpene
Myrcene	1.46	Monoterpene
α-Phellandrene	0.07	Monoterpene
α-Terpinene	0.62	Monoterpene
para-Cymene	0.76	Monoterpene
Limonene	0.83	Monoterpene
1,8-Cineole	54.46	Monoterpenic ether
(*Z*)-β-Ocimene	0.05	Monoterpene
(*E*)-β-Ocimene	0.25	Monoterpene
γ-Terpinene	1.08	Monoterpene
cis-Sabinene hydrate	0.69	Monoterpenic alcohol
trans-Linalool oxide (fur.)	tr	Monoterpenic alcohol
Terpinolene	0.31	Monoterpene
trans-Sabinene hydrate	0.56	Monoterpenic alcohol
Linalool	0.05	Monoterpenic alcohol
Unknown	0.01	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.12	Monoterpenic alcohol
cis-para-Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.08	Monoterpenic alcohol
Unknown	0.01	Unknown
Borneol	0.12	Monoterpenic alcohol
δ-Terpineol	0.69	Monoterpenic alcohol
Terpinen-4-ol	2.52	Monoterpenic alcohol
Cryptone	0.02	Normonoterpenic ketone
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α-Terpineol	8.23	Monoterpenic alcohol
cis-Piperitol	0.06	Monoterpenic alcohol
Unknown	0.01	Unknown
Nerol	0.09	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
trans-Ascaridole glycol	0.04	Monoterpenic alcohol
Safrole	0.01	Phenylpropanoid

cis-Ascaridole glycol	0.03	Monoterpenic alcohol
Unknown	0.06	Monoterpenic alcohol
α-Cubebene	0.02	Sesquiterpene
Eugenol	0.01	Phenylpropanoid
Unknown	0.02	Unknown
α-Ylangene	0.03	Sesquiterpene
α-Copaene	0.01	Sesquiterpene
β-Bourbonene	0.02	Sesquiterpene
β-Elemene	0.16	Sesquiterpene
Methyleugenol	0.02	Phenylpropanoid
β-Caryophyllene	0.66	Sesquiterpene
α-Santalene	0.01	Sesquiterpene
β-Gurjunene	0.01	Sesquiterpene
Aromadendrene	0.04	Sesquiterpene
6,9-Guaiadiene	0.02	Sesquiterpene
α-Humulene	0.84	Sesquiterpene
β-Santalene	0.02	Sesquiterpene
γ-Muurolene	0.05	Sesquiterpene
Germacrene D	0.27	Sesquiterpene
β-Selinene	0.23	Sesquiterpene
α-Selinene	0.15	Sesquiterpene
Viridiflorene	0.09	Sesquiterpene
Bicyclogermacrene	0.21	Sesquiterpene
Germacrene A	0.05	Sesquiterpene
γ-Cadinene	0.02	Sesquiterpene
δ-Cadinene	0.05	Sesquiterpene
Germacrene B	0.09	Sesquiterpene
Spathulenol	0.05	Sesquiterpenic alcohol
Caryophyllene oxide	0.06	Sesquiterpenic ether
Globulol	0.02	Sesquiterpenic alcohol
Viridiflorol	0.01	Sesquiterpenic alcohol
Guaiol	0.02	Sesquiterpenic alcohol
Humulene epoxide II	0.06	Sesquiterpenic ether
Isospathulenol	0.07	Sesquiterpenic alcohol
Neointermedeol	0.03	Sesquiterpenic alcohol
Consolidated total	**99.05%**	

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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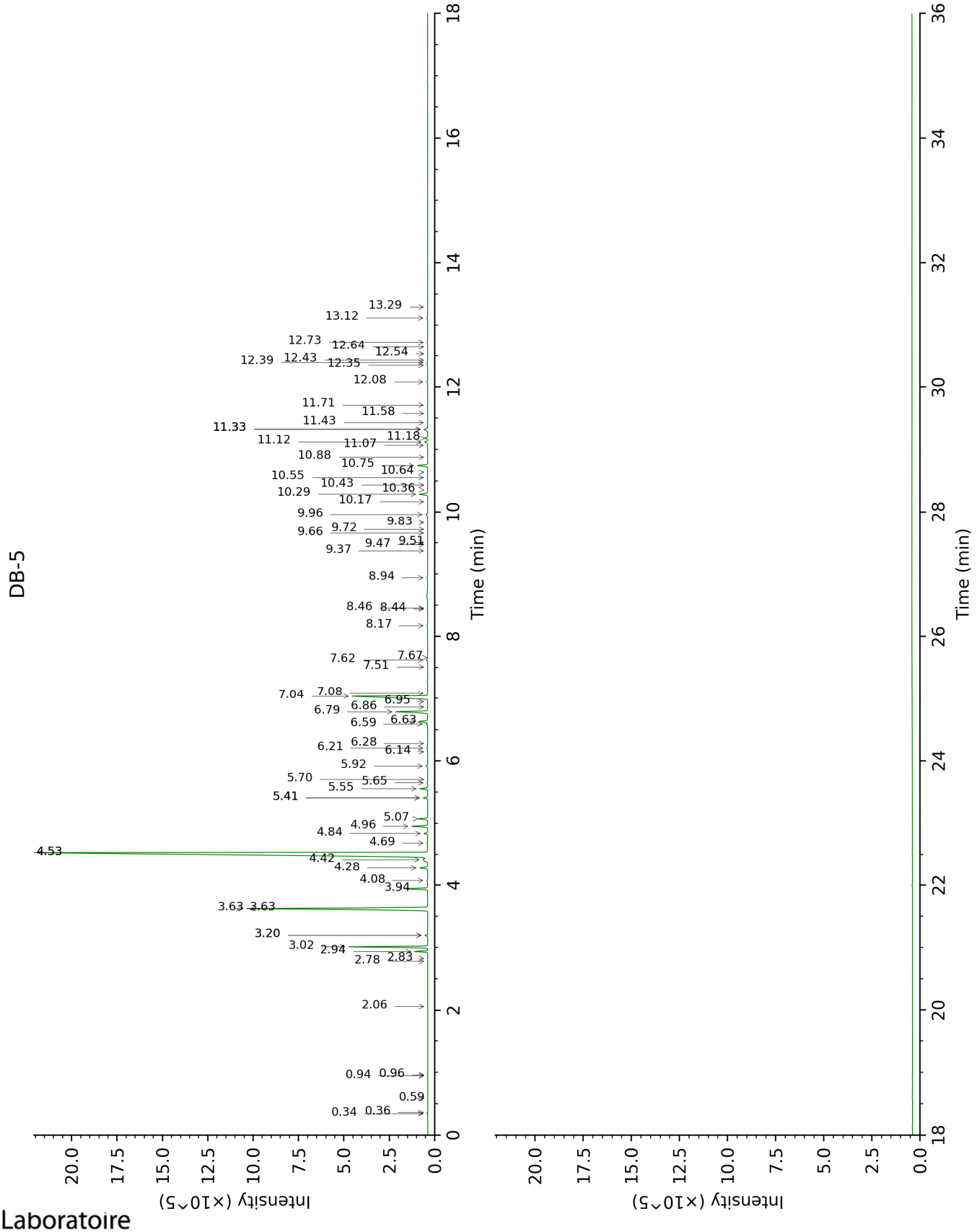
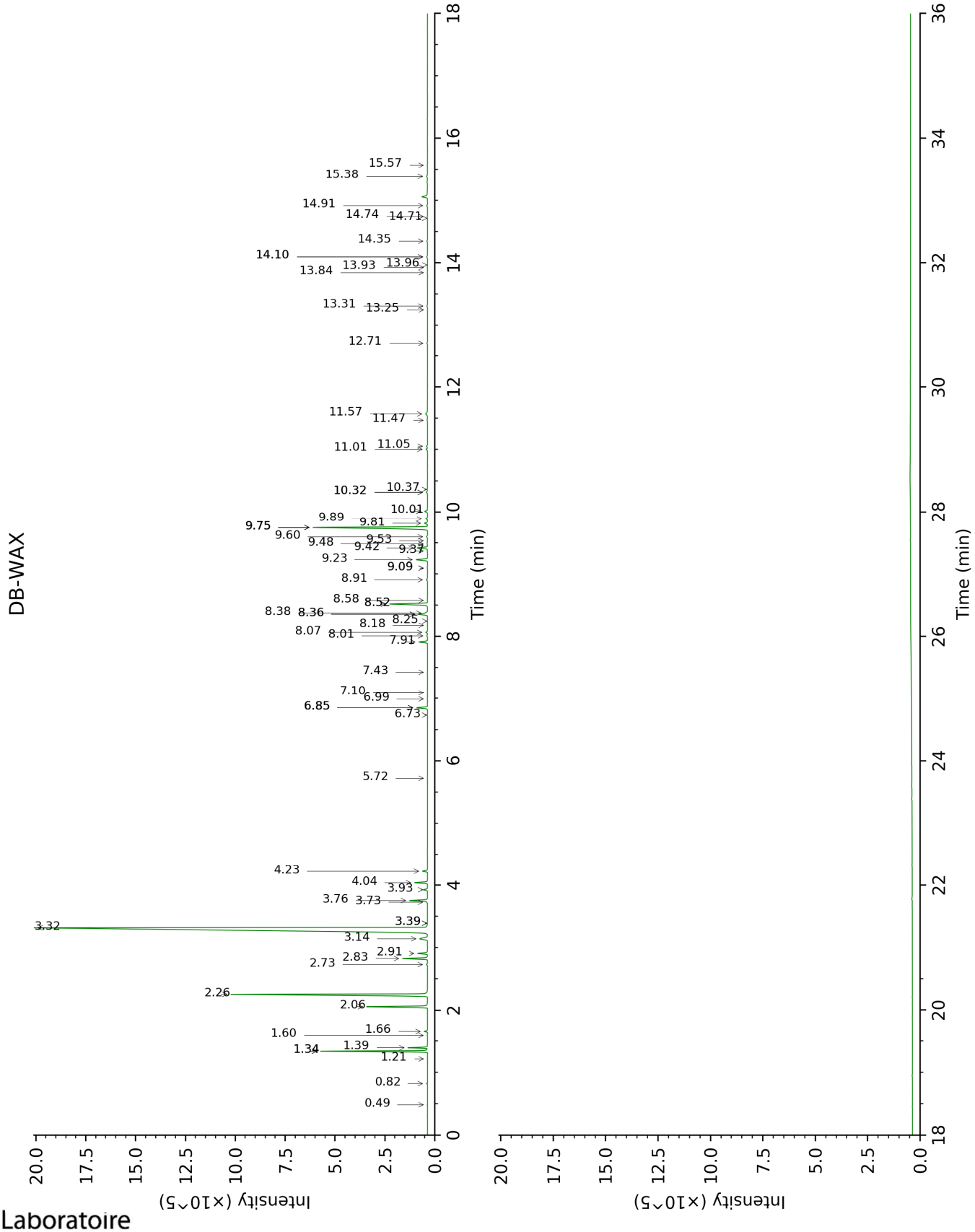

DB-5
Time (min)
Intensity (×10^5)
13.29
13.12
12.73
12.64
12.54
12.39
12.43
12.35
12.08
11.71
11.58
11.43
11.33
11.12
11.07
11.18
10.88
10.75
10.64
10.55
10.43
10.36
10.29
10.17
9.96
9.83
9.66
9.72
9.37
9.47
9.51
8.94
8.46
8.44
8.17
7.62
7.67
7.51
7.04
7.08
6.95
6.79
6.86
6.59
6.63
6.21
6.28
6.14
5.92
5.70
5.65
5.55
5.41
5.07
4.84
4.96
4.69
4.53
4.42
4.28
4.08
3.94
3.63
3.63
3.20
3.02
2.94
2.78
2.83
2.06
0.94
0.96
0.59
0.34
0.36


DB-WAX
Time (min)
Intensity (×10^5)
15.57
15.38
14.91
14.74
14.71
14.35
14.10
13.84
13.93
13.96
13.31
13.25
12.71
11.57
11.47
11.01
11.05
10.32
10.37
10.01
9.89
9.81
9.75
9.60
9.48
9.53
9.42
9.37
9.23
9.09
8.91
8.58
8.52
8.38
8.36
8.25
8.18
8.07
8.01
7.91
7.43
7.10
6.99
6.85
6.73
5.72
4.23
4.04
3.93
3.76
3.73
3.39
3.32
3.14
2.91
2.83
2.73
2.26
2.06
1.66
1.60
1.39
1.34
1.21
0.82
0.49

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Ethanol	0.34	522	0.02	0.82	910	0.03
Acetone	0.36	522	0.01	0.49	786	0.01
Isovaleral	0.59	641	tr			
Isoamyl alcohol	0.94	738	tr	3.39*	1179	0.01
2-Methylbutanol	0.96	740	tr	3.39*	1179	[0.01]
(3*Z*)-Hexenol	2.06	858	0.01	5.72	1347	0.02
Hashishene	2.78	915	tr	1.34*	993	4.78
Tricyclene	2.83	918	0.01	1.21	973	0.01
α-Thujene	2.94	925	0.81	1.39	1001	0.82
α-Pinene	3.02	930	4.86	1.34*	993	[4.78]
α-Fenchene	3.20*	942	0.19	1.60	1022	0.02
Camphene	3.20*	942	[0.19]	1.66	1028	0.16
β-Pinene	3.63*	971	16.48	2.06	1067	3.42
Sabinene	3.63*	971	[16.48]	2.26	1087	12.90
Myrcene	3.94	992	1.46	2.83	1135	1.48
α-Phellandrene	4.08	1000	0.07	2.73	1127	0.07
α-Terpinene	4.28	1013	0.62	2.91	1141	0.63
para-Cymene	4.42	1022	0.76	4.04	1229	0.80
Limonene	4.53*	1029	55.43	3.14	1160	0.83
1,8-Cineole	4.53*	1029	[55.43]	3.32	1174	54.46
(*Z*)-β-Ocimene	4.69	1039	0.05	3.73†	1206	1.13
(*E*)-β-Ocimene	4.84	1048	0.25	3.93	1220	0.26
γ-Terpinene	4.96	1056	1.08	3.76†	1208	[1.13]
cis-Sabinene hydrate	5.07	1063	0.69	6.85*	1430	0.71
trans-Linalool oxide (fur.)	5.41*	1084	0.31	6.85*	1430	[0.71]
Terpinolene	5.41*	1084	[0.31]	4.23	1242	0.31
trans-Sabinene hydrate	5.56	1094	0.56	7.91	1509	0.57
Linalool	5.65	1100	0.05	8.01	1517	0.06
Unknown [m/z 119, 109 (94), 43 (61), 95 (56), 91 (48), 77 (32), 152 (32), 137 (31), 134 (24)]	5.70	1103	0.01	8.38†	1546	[0.79]
cis-para-Menth-2-en-1-ol	5.92	1117	0.12	8.07	1522	0.13
cis-para-Mentha-2,8-dien-1-ol	6.14	1132	0.01	9.37	1624	0.03
trans-para-Menth-2-en-1-ol	6.21	1136	0.08	8.91	1587	0.08
Unknown [m/z 109, 124 (45), 119 (41), 43 (35), 91 (28), 95 (25)...]	6.28	1140	0.01	6.85*	1430	[0.71]
Borneol	6.59	1161	0.12	9.75*	1655	8.59

δ-Terpineol	6.63	1163	0.69	9.42	1628	0.69
Terpinen-4-ol	6.79	1174	2.52	8.52*	1557	2.56
Cryptone	6.86	1178	0.02	9.09*	1602	0.04
para-Cymen-8-ol	6.95	1184	0.02	11.47	1799	0.03
α-Terpineol	7.04	1190	8.23	9.75*	1655	[8.59]
cis-Piperitol	7.08	1193	0.06	9.48	1633	0.05
Unknown [m/z 83, 55 (23), 43 (15), 71 (14), 82 (13), 98 (11), ... 153 (4)]	7.51	1222	0.01			
Nerol	7.62	1230	0.09	11.01	1760	0.10
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.66	1232	0.01			
trans-Ascaridole glycol	8.17	1268	0.04	14.10*	2039	0.08
Safrole	8.44	1286	0.01	11.57	1808	0.23
cis-Ascaridole glycol	8.46	1287	0.03	14.74	2102	0.03
Unknown [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]	8.94	1317	0.06	14.91	2119	0.06
α-Cubebene	9.37	1347	0.02	6.73	1421	0.03
Eugenol	9.47	1354	0.01	14.71	2099	0.01
Unknown [m/z 43, 95 (62), 107 (45), 110 (41), 55 (28), 67 (25)...]	9.51	1357	0.02	13.93	2023	0.03
α-Ylangene	9.66	1367	0.03	6.99	1440	0.02
α-Copaene	9.72	1371	0.01	7.10	1448	0.02
β-Bourbonene	9.83	1379	0.02	7.43	1473	0.02
β-Elemene	9.96	1389	0.16	8.36*†	1544	0.79
Methyleugenol	10.17	1403	0.02	13.25	1959	0.01
β-Caryophyllene	10.29	1412	0.66	8.36*†	1544	[0.79]
α-Santalene	10.36	1417	0.01	8.18	1530	0.02
β-Gurjunene	10.43	1423	0.01	8.25	1535	0.01
Aromadendrene	10.55	1432	0.04	8.52*	1557	[2.56]
6,9-Guaiadiene	10.64	1438	0.02	8.58	1561	0.02
α-Humulene	10.75	1446	0.84	9.23	1613	0.83
β-Santalene	10.88	1456	0.02	9.09*	1602	[0.04]
γ-Muurolene	11.07	1470	0.05	9.53	1637	0.03
Germacrene D	11.12	1474	0.27	9.75*	1655	[8.59]
β-Selinene	11.18	1479	0.23	9.81	1660	0.24
α-Selinene	11.33*	1489	0.43	9.89	1666	0.15
Viridiflorene	11.33*	1489	[0.43]	9.60	1642	0.09
Bicyclogermacrene	11.33*	1489	[0.43]	10.01	1676	0.21
Germacrene A	11.43	1497	0.05	10.32*	1701	0.10
γ-Cadinene	11.58	1508	0.02	10.32*	1701	[0.10]
δ-Cadinene	11.71	1519	0.05	10.36	1705	0.04
Germacrene B	12.08	1548	0.09	11.06	1764	0.09

Spathulenol	12.35	1569	0.05	14.35	2064	0.05
Caryophyllene oxide	12.40	1572	0.06	12.71	1910	0.06
Globulol	12.43	1576	0.02	13.84	2015	0.03
Viridiflorol	12.54	1584	0.01	13.96	2027	0.01
Guaiol	12.64	1592	0.02	14.10*	2039	[0.08]
Humulene epoxide II	12.73	1599	0.06	13.31	1965	0.05
Isospathulenol	13.12	1630	0.07	15.38	2166	0.07
Neointermedeol	13.29	1645	0.03	15.57	2185	0.02
Total identified		**99.21%**			**99.13%**	
Total reported		**99.35%**			**99.22%**	

*: 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