

Date : mai 31, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 21E21-PTH01

Customer identification : Thyme Linalool - Spain - TL0107208R

Type : Essential oil

Source : *Thymus vulgaris* ct. Linalool

Customer : Plant Therapy

ANALYSIS

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

Analyst : Seydou Ka, M. Sc.

Analysis date : mai 28, 2021

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid

Refractive index: 1.4669 ± 0.0003 (20 °C; method PC-MAT-016)

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
Acetone	0.01	Aliphatic ketone
Hashishene	0.02	Monoterpene
Tricyclene	0.06	Monoterpene
α -Thujene	1.28	Monoterpene
α -Pinene	1.03	Monoterpene
Camphene	1.19	Monoterpene
Thuja-2,4(10)-diene	0.05	Monoterpene
β -Pinene	0.43	Monoterpene
Sabinene	0.10	Monoterpene
Unknown	0.03	Monoterpene
Octen-3-ol	0.04	Aliphatic alcohol
Octan-3-one	0.02	Aliphatic ketone
Myrcene	2.61	Monoterpene
Octan-3-ol	0.01	Aliphatic alcohol
α -Phellandrene	0.11	Monoterpene
Pseudolimonene	0.07	Monoterpene
<i>cis</i> -Dehydroxylinalool oxide	0.01	Monoterpenic ether
Δ^3 -Carene	0.03	Monoterpene
α -Terpinene	1.51	Monoterpene
para-Cymene	2.32	Monoterpene
1,8-Cineole	1.65	Monoterpenic ether
Limonene	0.46	Monoterpene
(<i>Z</i>)- β -Ocimene	0.04	Monoterpene
(<i>E</i>)- β -Ocimene	0.17	Monoterpene
γ -Terpinene	3.37	Monoterpene
<i>cis</i> -Sabinene hydrate	0.08	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.07	Monoterpenic alcohol
Fenchone	0.01	Monoterpenic ketone
<i>trans</i> -Linalool oxide (fur.)	0.09	Monoterpenic alcohol
para-Cymenene	0.03	Monoterpene
Terpinolene	0.16	Monoterpene
Hotrienol	0.04	Monoterpenic alcohol
Linalool	68.79	Monoterpenic alcohol
endo-Fenchol	0.17	Monoterpenic alcohol
Unknown	tr	Oxygenated monoterpene
Unknown	0.02	Oxygenated monoterpene
<i>cis</i> -para-Menth-2-en-1-ol	0.04	Monoterpenic alcohol
<i>trans</i> -para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
Camphor	0.88	Monoterpenic ketone
<i>cis</i> -Verbenol	0.03	Monoterpenic alcohol
<i>trans</i> -Verbenol	0.07	Monoterpenic alcohol
Nerol oxide	0.01	Aliphatic ether
Borneol	2.81	Monoterpenic alcohol
Unknown	0.08	Oxygenated monoterpene
Terpinen-4-ol	4.51	Monoterpenic alcohol

para-Cymen-8-ol	0.03	Monoterpenic alcohol
Unknown	0.03	Unknown
Myrtenal	tr	Monoterpenic aldehyde
α -Terpineol	1.18	Monoterpenic alcohol
<i>cis</i> -Dihydrocarvone	0.05	Monoterpenic ketone
Methylchavicol	0.02	Phenylpropanoid
<i>trans</i> -Dihydrocarvone	0.02	Monoterpenic ketone
Verbenone	0.36	Monoterpenic ketone
<i>trans</i> -Piperitol	0.01	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
Nerol	0.01	Monoterpenic alcohol
Neral	0.01	Monoterpenic aldehyde
Carvacrol methyl ether	0.12	Monoterpenic ether
Linalyl acetate	0.01	Monoterpenic ester
Geraniol	0.01	Monoterpenic alcohol
Unknown	0.02	Unknown
Geranial	tr	Monoterpenic aldehyde
2,6-Dimethyl-1,7-octadiene-3,6-diol	0.02	Monoterpenic alcohol
Bornyl acetate	0.22	Monoterpenic ester
Thymol	0.33	Monoterpenic alcohol
Carvacrol	0.77	Monoterpenic alcohol
Unknown	0.02	Monoterpenic alcohol
Unknown	0.01	Unknown
α -Terpinyl acetate	0.03	Monoterpenic ester
Eugenol	0.01	Phenylpropanoid
Bornyl propionate	tr	Monoterpenic ester
α -Copaene	0.03	Sesquiterpene
β -Bourbonene	0.01	Sesquiterpene
1,5-diepi- β -Bourbonene	0.01	Sesquiterpene
Geranyl acetate	tr	Monoterpenic ester
α -Gurjunene	tr	Sesquiterpene
Methyleugenol	0.01	Phenylpropanoid
β -Caryophyllene	0.65	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.03	Sesquiterpene
α -Humulene	0.04	Sesquiterpene
allo-Aromadendrene	0.05	Sesquiterpene
γ -Muurolene	0.02	Sesquiterpene
Germacrene D	0.02	Sesquiterpene
Bicyclogermacrene	0.09	Sesquiterpene
Viridiflorene	0.01	Sesquiterpene
α -Muurolene	0.03	Sesquiterpene
γ -Cadinene	0.05	Sesquiterpene
β -Bisabolene	0.07	Sesquiterpene
δ -Cadinene	0.09	Sesquiterpene
α -Elemol	0.03	Sesquiterpenic alcohol
Spathulenol	0.04	Sesquiterpenic alcohol
Caryophyllene oxide	0.07	Sesquiterpenic ether
τ -Cadinol	0.03	Sesquiterpenic alcohol
Unknown	0.01	Sesquiterpenic alcohol
α -Cadinol	tr	Sesquiterpenic alcohol
meta-Camphorene	0.01	Diterpene
Consolidated total	99.22%	

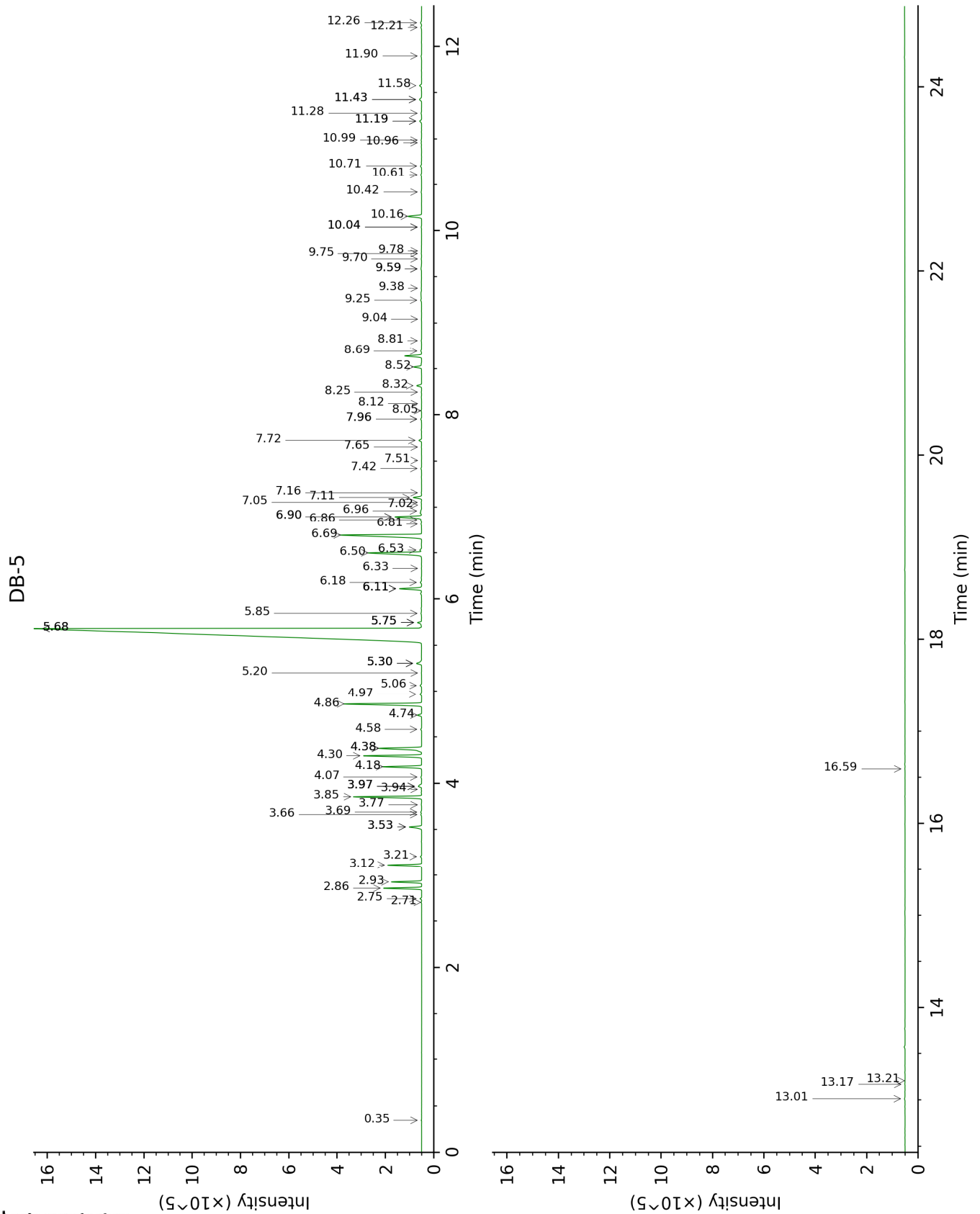
tr: The compound has been detected below 0.005% of total signal.

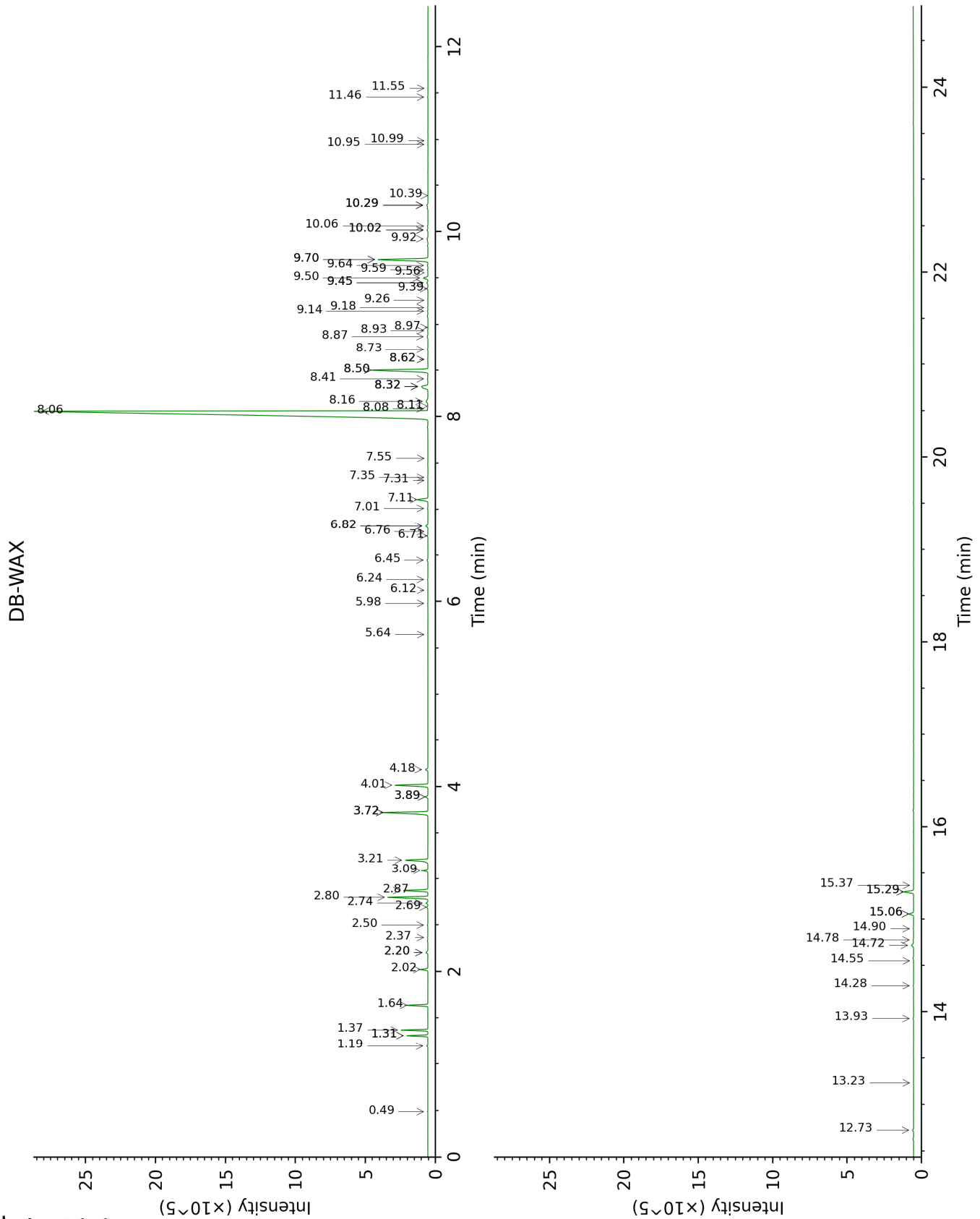
Note: no correction factor was applied

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.

This page was intentionally left blank. The following pages present the complete data of the analysis.





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Acetone	0.35	504	0.01	0.49	782	0.01
Hashishene	2.70	914	0.02	1.31*	990	1.03
Tricyclene	2.74	917	0.06	1.19	969	0.05
α -Thujene	2.86	925	1.28	1.37	997	1.26
α -Pinene	2.93	929	1.03	1.31*	990	[1.03]
Camphene	3.12	942	1.19	1.64	1025	1.17
Thuja-2,4(10)-diene	3.21	948	0.05	2.20*	1083	0.15
β -Pinene	3.53*	970	0.56	2.02	1064	0.43
Sabinene	3.53*	970	[0.56]	2.20*	1083	[0.15]
Unknown [m/z 93, 79 (73), 67 (49), 95 (42), 91 (41), 121 (38)...]	3.66	979	0.03	2.37	1098	0.02
Octen-3-ol	3.69	981	0.04	6.71	1422	0.04
Octan-3-one	3.77	986	0.02	3.89*	1219	0.17
Myrcene	3.86	992	2.61	2.80	1133	2.57
Octan-3-ol	3.94	998	0.01	5.98	1368	0.01
α -Phellandrene	3.97*	1000	0.19	2.74	1128	0.11
Pseudolimonene	3.97*	1000	[0.19]	2.69	1125	0.07
<i>cis</i> -Dehydroxylinalool oxide	3.97*	1000	[0.19]	3.72*	1206	3.36
Δ^3 -Carene	4.07	1006	0.03	2.50	1109	0.03
α -Terpinene	4.18	1013	1.51	2.87	1139	1.48
para-Cymene	4.30	1021	2.32	4.02	1228	2.29
1,8-Cineole	4.38*	1026	2.12	3.21	1166	1.65
Limonene	4.38*	1026	[2.12]	3.09	1157	0.46
(<i>Z</i>)- β -Ocimene	4.58	1039	0.04	3.72*	1206	[3.36]
(<i>E</i>)- β -Ocimene	4.74	1049	0.17	3.89*	1219	[0.17]
γ -Terpinene	4.86	1057	3.37	3.72*	1206	[3.36]
<i>cis</i> -Sabinene hydrate	4.97	1064	0.08	6.82*	1430	0.17
<i>cis</i> -Linalool oxide (fur.)	5.06	1070	0.07	6.45	1402	0.07
Fenchone	5.20	1078	0.01	5.64	1344	tr
<i>trans</i> -Linalool oxide (fur.)	5.30*	1085	0.28	6.82*	1430	[0.17]
para-Cymenene	5.30*	1085	[0.28]	6.24	1387	0.03
Terpinolene	5.30*	1085	[0.28]	4.18	1240	0.16
Hotrienol	5.68*	1109	68.90	8.73	1575	0.04
Linalool	5.68*	1109	[68.90]	8.06	1523	68.79
endo-Fenchol	5.75*	1114	0.19	8.32*	1544	0.85
Unknown [m/z 41, 67 (75), 69 (59), 79 (55), 81 (44), 71 (41)... 150 (5)]	5.75*	1114	[0.19]	6.12	1379	tr

Unknown [m/z 109, 91 (57), 93 (47), 81 (44), 77 (40)... 154 (1)]	5.75*	1114	[0.19]			
<i>cis</i> -para-Menth-2-en-1-ol	5.85	1120	0.04	8.08	1525	0.05
<i>trans</i> -para-Menth-2-en-1-ol	6.11*	1137	0.92	8.93	1591	0.02
Camphor	6.11*	1137	[0.92]	7.11	1451	0.88
<i>cis</i> -Verbenol	6.11*	1137	[0.92]	9.14	1608	0.03
<i>trans</i> -Verbenol	6.18	1142	0.07	9.45*	1632	0.08
Nerol oxide	6.33	1152	0.01	6.76	1425	0.01
Borneol	6.50	1163	2.81	9.70*	1653	3.99
Unknown [m/z 43, 71 (87), 95 (50), 81 (38), 109 (30), 41 (27)...152 (5)]	6.53	1164	0.08			
Terpinen-4-ol	6.69	1175	4.51	8.50*	1557	4.62
para-Cymen-8-ol	6.81	1183	0.03	11.46	1799	0.03
Unknown [m/z 43, 135 (73), 59 (46), 93 (39), 91 (35), 81 (32)...]	6.86	1186	0.03			
Myrtenal	6.90*	1188	1.19	8.62*	1566	0.02
α -Terpineol	6.90*	1188	[1.19]	9.70*	1653	[3.99]
<i>cis</i> -Dihydrocarvone	6.96	1193	0.05	8.41	1550	0.04
Methylchavicol	7.02	1197	0.02	9.26	1617	0.01
<i>trans</i> -Dihydrocarvone	7.05	1199	0.02	8.62*	1566	[0.02]
Verbenone	7.11	1202	0.36	9.50	1637	0.37
<i>trans</i> -Piperitol	7.16	1206	0.01	10.28*†	1700	0.16
Unknown [m/z 119, 43 (52), 59 (45), 91 (36), 79 (24), 134 (23)...]	7.42	1224	0.03	10.99	1759	0.01
Nerol	7.51	1229	0.01	10.95	1756	0.01
Neral	7.65	1239	0.01	9.39	1627	0.05
Carvacrol methyl ether	7.72	1244	0.12	8.50*	1557	[4.62]
Linalyl acetate	7.96*	1260	0.04	8.11	1527	0.01
Geraniol	7.96*	1260	[0.04]	11.55	1808	0.01
Unknown [m/z 82, 109 (35), 135 (22), 127 (19), 54 (16), 43 (14)...]	8.05	1266	0.02			
Geranial	8.12	1272	tr	10.06	1682	0.04
2,6-Dimethyl-1,7-octadiene-3,6-diol	8.25	1280	0.02	14.55	2083	0.01
Bornyl acetate	8.32	1285	0.22	8.16	1531	0.22
Thymol	8.52	1299	0.33	15.06*	2133	0.34
Carvacrol	8.69	1307	0.77	15.30*	2157	0.75

Unknown [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]	8.81	1315	0.02	14.90	2118	0.03
Unknown [m/z 150, 71 (67), 107 (54), 43 (44), 109 (42)...]	9.04	1332	0.01			
α -Terpinyl acetate	9.25	1346	0.03	9.59	1644	0.03
Eugenol	9.38	1356	0.01	14.72	2100	0.22
Bornyl propionate	9.59*	1370	0.03	8.97	1594	tr
α -Copaene	9.59*	1370	[0.03]	7.01	1444	0.03
β -Bourbonene	9.70	1378	0.01	7.35	1469	0.02
1,5-diepi- β -Bourbonene	9.75	1382	0.01	7.31	1467	0.01
Geranyl acetate	9.78	1384	tr	10.39	1709	0.01
α -Gurjunene	10.04*	1402	0.02	7.55	1484	tr
Methyleugenol	10.04*	1402	[0.02]	13.23	1958	0.01
β -Caryophyllene	10.16	1411	0.65	8.32*	1544	[0.85]
<i>trans</i> - α -Bergamotene	10.42	1431	0.03	8.32*	1544	[0.85]
α -Humulene	10.61	1445	0.04	9.18	1611	0.02
allo-Aromadendrene	10.71	1452	0.05	8.87	1586	0.07
γ -Murolene	10.96	1471	0.02	9.45*	1632	[0.08]
Germacrene D	10.99	1473	0.02	9.64	1648	0.04
Bicyclogermacrene	11.19*	1489	0.10	10.02*	1678	0.07
Viridiflorene	11.19*	1489	[0.10]	9.56	1641	0.01
α -Murolene	11.28	1495	0.03	9.92	1670	0.09
γ -Cadinene	11.43*	1506	0.12	10.28*†	1700	[0.16]
β -Bisabolene	11.43*	1506	[0.12]	10.02*	1678	[0.07]
δ -Cadinene	11.58	1518	0.09	10.28*†	1700	[0.16]
α -Elemol	11.90	1543	0.03	13.93	2024	0.03
Spathulenol	12.21	1568	0.04	14.28	2058	0.03
Caryophyllene oxide	12.26	1572	0.07	12.73	1912	0.07
τ -Cadinol	13.01	1633	0.03	14.78	2106	0.04
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	13.17	1646	0.01	15.06*	2133	[0.34]
α -Cadinol	13.21	1649	tr	15.36	2164	0.01
meta-Camphorene	16.59	1949	0.01	15.30*	2157	[0.75]
Total identified		99.12%			99.01%	
Total reported		99.34%			99.06%	

*: 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

