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 ✳ISO - 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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

MÉTHODE CERTIFIÉE
✳ISO 17025:2017
CERTIFIED METHOD

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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.

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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
cis-Dehydroxylinalool oxide	0.01	Monoterpenic ether
Δ3-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
(*Z*)-β-Ocimene	0.04	Monoterpene
(*E*)-β-Ocimene	0.17	Monoterpene
γ-Terpinene	3.37	Monoterpene
cis-Sabinene hydrate	0.08	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.07	Monoterpenic alcohol
Fenchone	0.01	Monoterpenic ketone
trans-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
cis-para-Menth-2-en-1-ol	0.04	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
Camphor	0.88	Monoterpenic ketone
cis-Verbenol	0.03	Monoterpenic alcohol
trans-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

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para-Cymen-8-ol	0.03	Monoterpenic alcohol
Unknown	0.03	Unknown
Myrtenal	tr	Monoterpenic aldehyde
α-Terpineol	1.18	Monoterpenic alcohol
cis-Dihydrocarvone	0.05	Monoterpenic ketone
Methylchavicol	0.02	Phenylpropanoid
trans-Dihydrocarvone	0.02	Monoterpenic ketone
Verbenone	0.36	Monoterpenic ketone
trans-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
trans-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%**	

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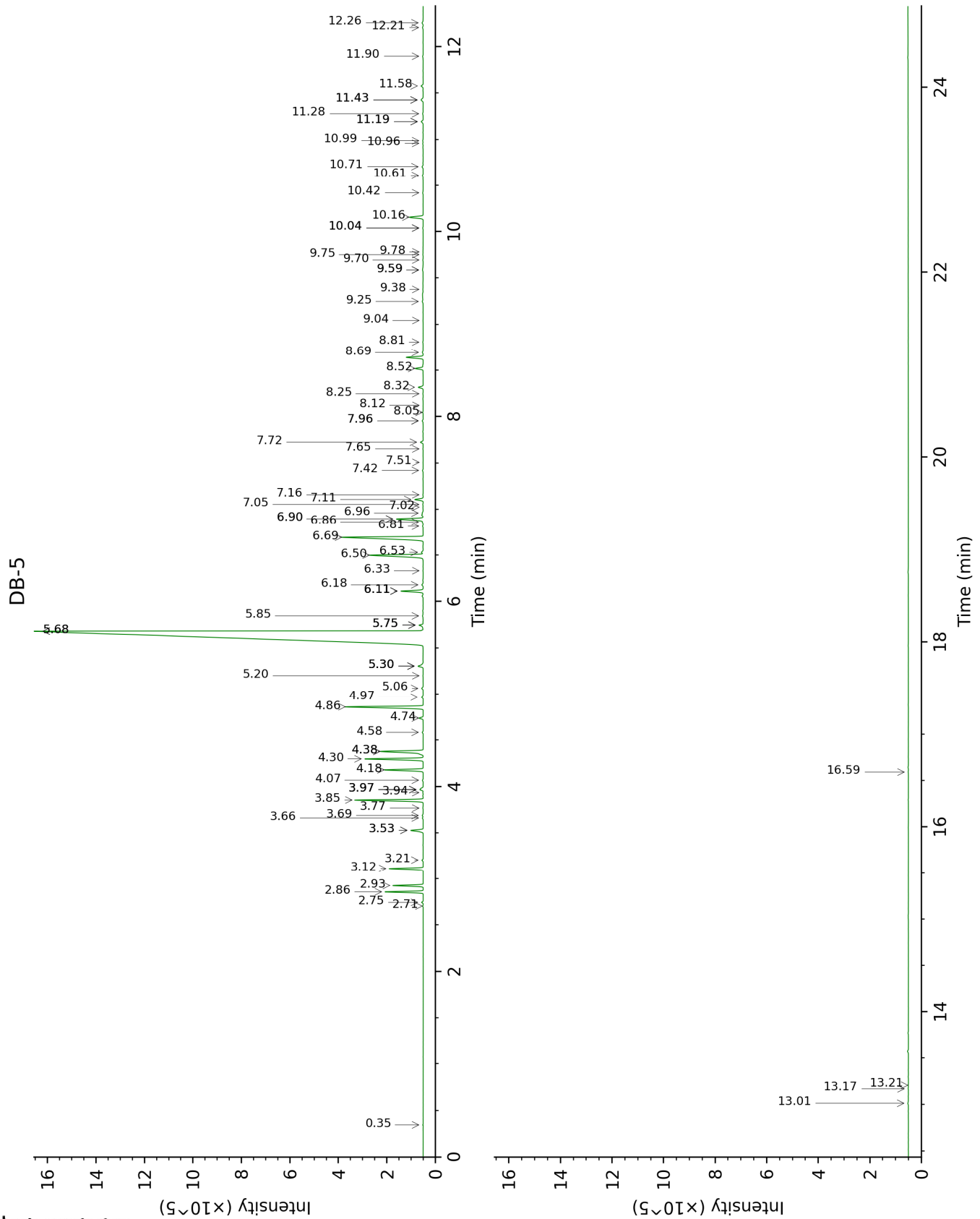Report prepared for
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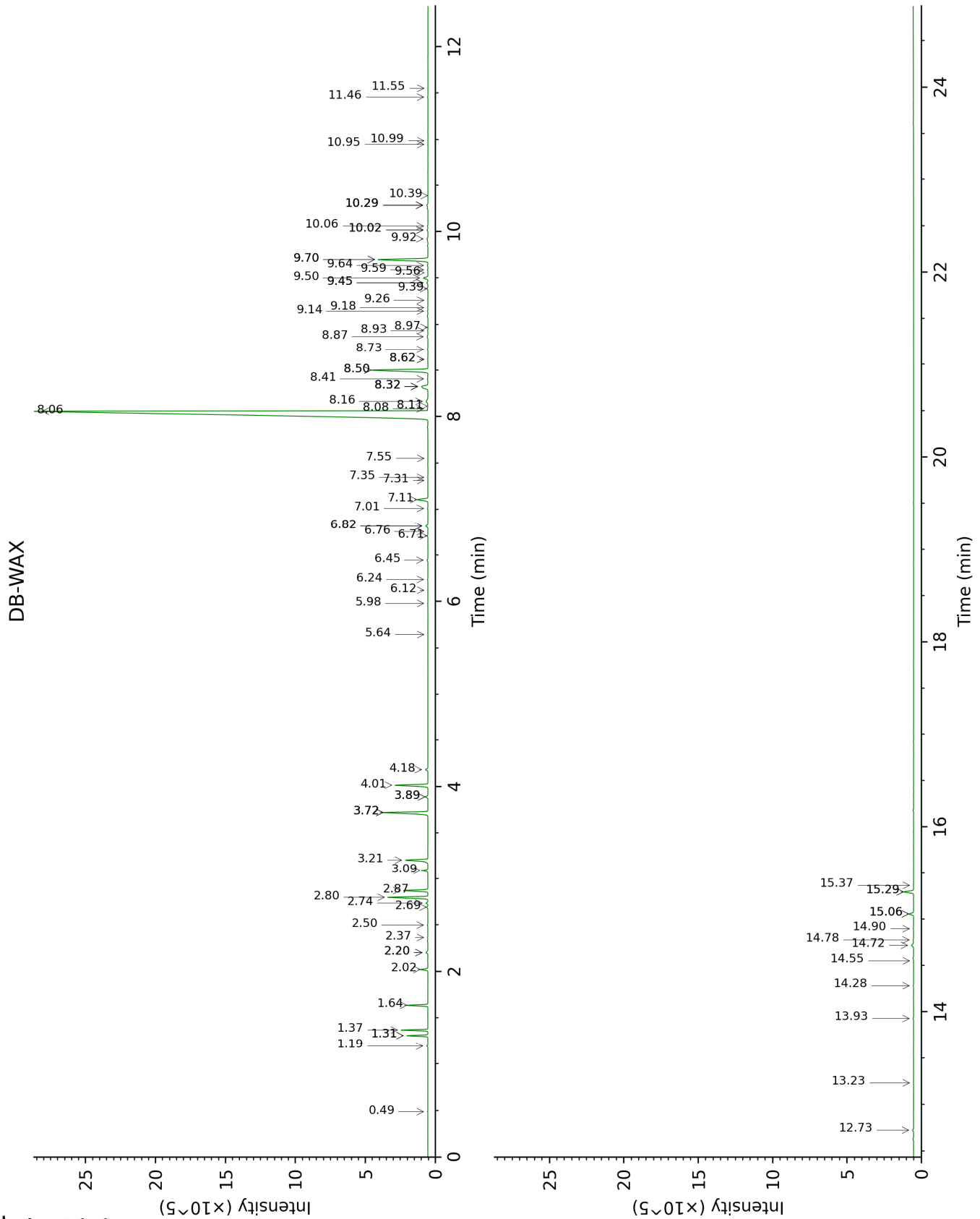tr: The compound has been detected below 0.005% of total signal.

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

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DB-WAX

Time (min)

Intensity (×10^5)

Time (min)

Intensity (×10^5)

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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
cis-Dehydroxylinalool oxide	3.97*	1000	[0.19]	3.72*	1206	3.36
Δ3-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
(*Z*)-β-Ocimene	4.58	1039	0.04	3.72*	1206	[3.36]
(*E*)-β-Ocimene	4.74	1049	0.17	3.89*	1219	[0.17]
γ-Terpinene	4.86	1057	3.37	3.72*	1206	[3.36]
cis-Sabinene hydrate	4.97	1064	0.08	6.82*	1430	0.17
cis-Linalool oxide (fur.)	5.06	1070	0.07	6.45	1402	0.07
Fenchone	5.20	1078	0.01	5.64	1344	tr
trans-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

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Unknown [m/z 109, 91 (57), 93 (47), 81 (44), 77 (40)... 154 (1)]	5.75*	1114	[0.19]			
cis-para-Menth-2-en-1-ol	5.85	1120	0.04	8.08	1525	0.05
trans-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
cis-Verbenol	6.11*	1137	[0.92]	9.14	1608	0.03
trans-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]
cis-Dihydrocarvone	6.96	1193	0.05	8.41	1550	0.04
Methylchavicol	7.02	1197	0.02	9.26	1617	0.01
trans-Dihydrocarvone	7.05	1199	0.02	8.62*	1566	[0.02]
Verbenone	7.11	1202	0.36	9.50	1637	0.37
trans-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

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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]
trans-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-Muurolene	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-Muurolene	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

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R.T.: Retention time (minutes)
R.I.: Retention index