Date : October 15, 2020

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 20J13-PTH03
Customer identification : Thyme Linalool - TL0106207R
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 : Benoit Roger, Ph. D.
Analysis date : October 14, 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

This report is an update of the first version issued on October 14, 2020, to correct the conclusion.

Méthode certifiée ISO 17025:2017 Certified method

Laboratoire PhytoChemia
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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid
Refractive index: 1.4742 ± 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
Isovaleral	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
Methyl 2-methylbutyrate	0.01	Aliphatic ester
Tricyclene	tr	Monoterpene
α-Thujene	0.02	Monoterpene
α-Pinene	1.36	Monoterpene
Camphene	1.10	Monoterpene
β-Pinene	0.22	Monoterpene
Sabinene	0.87	Monoterpene
Octen-3-ol	0.03	Aliphatic alcohol
Octan-3-one	0.01	Aliphatic ketone
Myrcene	7.01	Monoterpene
α-Phellandrene	0.44	Monoterpene
Pseudolimonene	0.03	Monoterpene
Δ3-Carene	0.02	Monoterpene
α-Terpinene	3.24	Monoterpene
para-Cymene	5.46	Monoterpene
1,8-Cineole	0.02	Monoterpenic ether
Limonene	2.05	Monoterpene
β-Phellandrene	0.06	Monoterpene
(*E*)-β-Ocimene	0.01	Monoterpene
γ-Terpinene	9.08	Monoterpene
cis-Sabinene hydrate	0.05	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.14	Monoterpenic alcohol
Fenchone	0.03	Monoterpenic ketone
para-Cymenene	0.01	Monoterpene
trans-Linalool oxide (fur.)	0.15	Monoterpenic alcohol
trans-Sabinene hydrate	0.01	Monoterpenic alcohol
Linalool	41.97	Monoterpenic alcohol
Hotrienol	0.01	Monoterpenic alcohol
endo-Fenchol	0.01	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
cis-para-Mentha-2,8-dien-1-ol	0.03	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
Camphor	0.08	Monoterpenic ketone
trans-Verbenol	0.02	Monoterpenic alcohol
Nerol oxide	0.01	Aliphatic ether
Borneol	0.11	Monoterpenic alcohol
Terpinen-4-ol	12.27	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α-Terpineol	1.90	Monoterpenic alcohol
cis-Dihydrocarvone	0.03	Monoterpenic ketone
trans-Dihydrocarvone	0.01	Monoterpenic ketone
Thymol methyl ether	0.04	Monoterpenic ether
Carvacrol methyl ether	0.04	Monoterpenic ether

Geraniol	0.01	Monoterpenic alcohol
Bornyl acetate	0.01	Monoterpenic ester
Thymol	5.71	Monoterpenic alcohol
Carvacrol	2.46	Monoterpenic alcohol
α-Copaene	0.03	Sesquiterpene
β-Bourbonene	0.01	Sesquiterpene
β-Cubebene	0.01	Sesquiterpene
β-Caryophyllene	2.46	Sesquiterpene
α-Humulene	0.51	Sesquiterpene
γ-Muurolene	0.02	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
Viridiflorene	0.01	Sesquiterpene
α-Muurolene	0.01	Sesquiterpene
γ-Cadinene	0.02	Sesquiterpene
δ-Cadinene	0.03	Sesquiterpene
Caryophyllene oxide	0.02	Sesquiterpenic ether
τ-Cadinol	0.01	Sesquiterpenic alcohol
Consolidated total	**99.38%**	

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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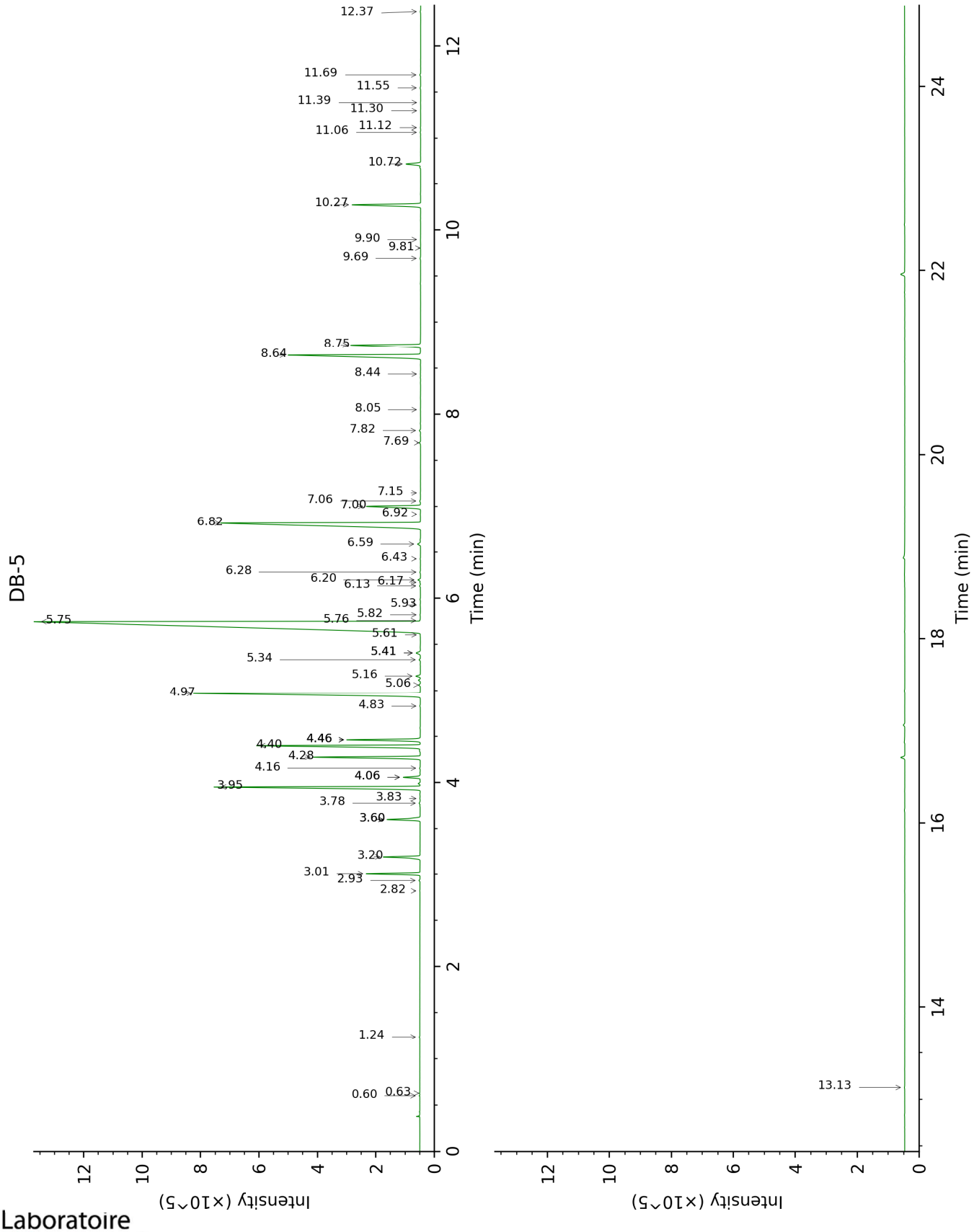
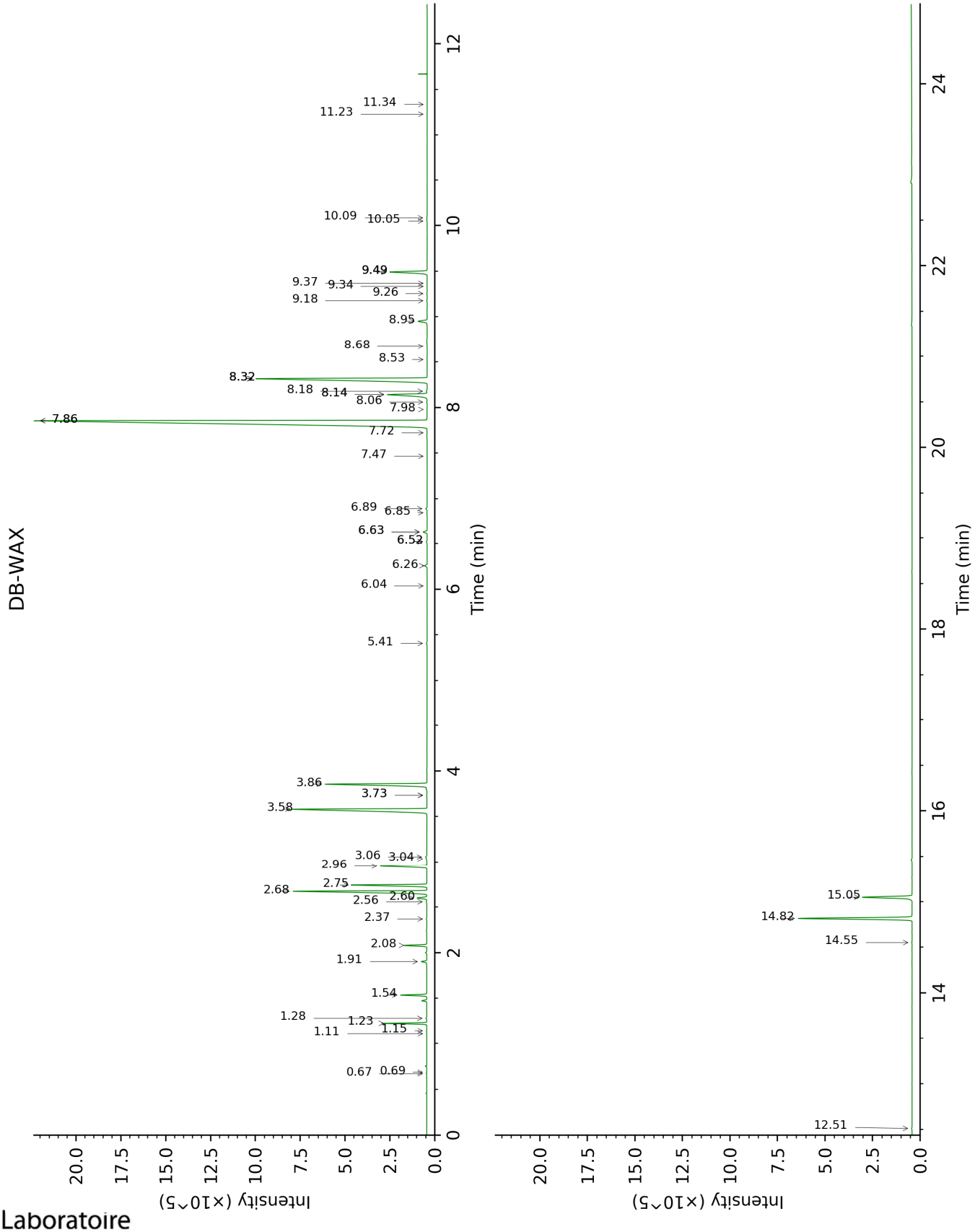

DB-5
12.37
11.69
11.55
11.39
11.30
11.06
11.12
10.72
10.27
9.90
9.81
9.69
8.75
8.64
8.44
8.05
7.82
7.69
7.15
7.06
7.00
6.92
6.82
6.59
6.43
6.28
6.20
6.13
6.17
5.93
5.82
5.76
5.75
5.61
5.41
5.34
5.16
5.06
4.97
4.83
4.46
4.40
4.28
4.16
4.06
3.95
3.83
3.78
3.60
3.20
3.01
2.93
2.82
1.24
0.63
0.60
13.13
Time (min)
Intensity (×10^5)


DB-WAX
Time (min)
Intensity (×10^5)
11.34
11.23
10.09
10.05
9.49
9.37
9.34
9.26
9.18
8.95
8.68
8.53
8.32
8.18
8.14
8.06
7.98
7.86
7.72
7.47
6.89
6.85
6.63
6.52
6.26
6.04
5.41
3.86
3.73
3.58
3.06
3.04
2.96
2.75
2.68
2.56
2.60
2.37
2.08
1.91
1.54
1.28
1.23
1.15
1.11
0.67
0.69
15.05
14.82
14.55
12.51

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isovaleral	0.60	640	0.01	0.69	885	0.01
2-Methylbutyral	0.63	650	0.01	0.67	878	0.01
Methyl 2-methylbutyrate	1.24	775	0.01	1.15	975	0.01
Tricyclene	2.82	919	tr	1.12	970	0.01
α-Thujene	2.93	927	0.02	1.28	998	0.03
α-Pinene	3.01	932	1.36	1.23	990	1.37
Camphene	3.20	944	1.10	1.54	1026	1.11
β-Pinene	3.60*	972	1.08	1.90	1064	0.22
Sabinene	3.60*	972	[1.08]	2.08	1083	0.87
Octen-3-ol	3.78	983	0.03	6.52*	1421	0.04
Octan-3-one	3.83	987	0.01	3.74*	1218	0.02
Myrcene	3.95	995	7.01	2.68	1134	7.02
α-Phellandrene	4.06*	1002	0.47	2.60	1128	0.44
Pseudolimonene	4.06*	1002	[0.47]	2.56	1125	0.03
Δ3-Carene	4.16	1009	0.02	2.37	1110	0.02
α-Terpinene	4.28	1016	3.24	2.74	1140	3.25
para-Cymene	4.40	1024	5.46	3.86	1227	5.49
1,8-Cineole	4.46*	1028	2.13	3.04	1164	0.02
Limonene	4.46*	1028	[2.13]	2.96	1157	2.05
β-Phellandrene	4.46*	1028	[2.13]	3.06	1165	0.06
(*E*)-β-Ocimene	4.83	1051	0.01	3.74*	1218	[0.02]
γ-Terpinene	4.97	1060	9.08	3.58	1207	9.09
cis-Sabinene hydrate	5.06	1066	0.05	6.63*	1429	0.20
cis-Linalool oxide (fur.)	5.16	1072	0.14	6.26	1401	0.14
Fenchone	5.34	1083	0.03	5.41	1339	0.04
para-Cymenene	5.41*	1088	0.16	6.04	1385	0.01
trans-Linalool oxide (fur.)	5.41*	1088	[0.16]	6.63*	1429	[0.20]
trans-Sabinene hydrate	5.61	1100	0.01	7.72	1511	0.01
Linalool	5.75	1109	41.97	7.86*	1521	41.95
Hotrienol	5.76	1110	0.01	8.53	1574	0.01
endo-Fenchol	5.82	1114	0.01	8.06	1537	0.03
cis-para-Menth-2-en-1-ol	5.93	1121	0.01	7.86*	1521	[41.95]
cis-para-Mentha-2,8-dien-1-ol	6.14	1134	0.03	9.18	1626	0.02
trans-para-Menth-2-en-1-ol	6.17	1136	0.02	8.68	1585	0.02
Camphor	6.20	1138	0.08	6.89	1448	0.07
trans-Verbenol	6.28	1144	0.02	9.26	1632	0.02
Nerol oxide	6.43	1153	0.01	6.52*	1421	[0.04]
Borneol	6.59	1163	0.11	9.49*	1651	2.00
Terpinen-4-ol	6.82	1178	12.27	8.32*	1557	12.30
para-Cymen-8-ol	6.92	1184	0.02	11.23	1797	0.01

α-Terpineol	7.00	1190	1.90	9.49*	1651	[2.00]
cis-Dihydrocarvone	7.06	1194	0.03	8.18	1546	0.05
trans-Dihydrocarvone	7.15	1199	0.01	8.32*	1557	[12.30]
Thymol methyl ether	7.69	1235	0.04	8.14*	1544	2.46
Carvacrol methyl ether	7.82	1244	0.04	8.32*	1557	[12.30]
Geraniol	8.05	1259	0.01	11.34	1806	0.01
Bornyl acetate	8.44	1285	0.01	7.98	1531	0.01
Thymol	8.64	1299	5.71	14.82	2131	5.66
Carvacrol	8.75	1306	2.46	15.05	2155	2.56
α-Copaene	9.69	1373	0.03	6.85	1445	0.02
β-Bourbonene	9.81	1381	0.01			
β-Cubebene	9.90	1387	0.01	7.47	1491	0.01
β-Caryophyllene	10.27	1414	2.46	8.14*	1544	[2.46]
α-Humulene	10.72	1448	0.51	8.95	1607	0.51
γ-Muurolene	11.06	1473	0.02	9.34	1638	0.01
Germacrene D	11.12	1477	0.01	9.49*	1651	[2.00]
Viridiflorene	11.30	1491	0.01	9.37	1641	0.01
α-Muurolene	11.39	1497	0.01			
γ-Cadinene	11.55	1510	0.02	10.05	1697	0.02
δ-Cadinene	11.69	1521	0.03	10.09	1700	0.03
Caryophyllene oxide	12.37	1574	0.02	12.51	1912	0.03
τ-Cadinol	13.13	1635	0.01	14.55	2105	0.02
Total identified		**99.37%**			**99.36%**	
Total reported		**99.37%**			**99.36%**	

*: Two or more compounds are coeluting on this column
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total
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