CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24C05-PTH01
Customer Identification : Thyme Linalool - Bulgaria - TL0109R
Type : Essential Oil
Source : *Thymus vulgaris ct. Linalool*
Customer : Plant Therapy

Checked an approved by:

_____
Alexis St-Gelais, Ph. D., Chimiste 2013-174

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ISO 17025:2017 CERTIFIED METHOD
MÉTHODE CERTIFIÉE

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GAS CHROMATOGRAPHIC ANALYSIS

Method : PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

✳ISO

Results : See analysis summary (next page)

Analyst : Sylvain Mercier, M. Sc., Chimiste 2014-005

Date : 2024-03-13

PHYSICOCHEMICAL DATA

Refractive index : 1.4668 ± 0.0003 (20 ℃)

Method : PC-MAT-016 - Measure of the refractive index of a liquid.

Analyst : Cindy Caron B. Sc.

Date : 2024-03-06

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
Hashishene	0.01	Monoterpene
Tricyclene	0.15	Monoterpene
α-Thujene	1.58	Monoterpene
α-Pinene	1.04	Monoterpene
α-Fenchene	0.02	Monoterpene
Camphene	1.31	Monoterpene
Unknown	0.03	Monoterpene
Thuja-2,4(10)-diene	0.03	Monoterpene
Sabinene	0.15	Monoterpene
β-Pinene	0.21	Monoterpene
Unknown	0.05	Monoterpene
Octen-3-ol	0.07	Aliphatic alcohol
Octan-3-one	0.02	Aliphatic ketone
Myrcene	2.83	Monoterpene
Pseudolimonene	0.17	Monoterpene
α-Phellandrene	0.08	Monoterpene
cis-Dehydroxylinalool oxide	0.01	Monoterpenic ether
Δ3-Carene	0.04	Monoterpene
α-Terpinene	1.43	Monoterpene
para-Cymene	2.51	Monoterpene
β-Phellandrene	[1.84]	Monoterpene
Limonene	0.38	Monoterpene
1,8-Cineole	[1.84]	Monoterpenic ether
(*Z*)-β-Ocimene	0.04	Monoterpene
(*E*)-β-Ocimene	0.20	Monoterpene
γ-Terpinene	3.58	Monoterpene
cis-Sabinene hydrate	0.31	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.06	Monoterpenic alcohol
Fenchone	0.02	Monoterpenic ketone
trans-Linalool oxide (fur.)	0.18	Monoterpenic alcohol
Terpinolene	0.15	Monoterpene
para-Cymenene	0.03	Monoterpene
trans-Sabinene hydrate	0.02	Monoterpenic alcohol
end*o*-Fenchol	0.02	Monoterpenic alcohol
Linalool	69.02	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
cis-para-Menth-2-en-1-ol	0.06	Monoterpenic alcohol
trans-para-Menth-2-en-1-ol	0.05	Monoterpenic alcohol
Camphor	0.39	Monoterpenic ketone
trans-Verbenol	0.02	Monoterpenic alcohol

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Nerol oxide	0.01	Aliphatic ether
Borneol	1.54	Monoterpenic alcohol
cis-Linalool oxide (pyr.)	0.02	Monoterpenic alcohol
Unknown	0.06	Oxygenated monoterpene
Terpinen-4-ol	4.74	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol
Unknown	0.01	Unknown
α-Terpineol	1.15	Monoterpenic alcohol
cis-Dihydrocarvone	0.03	Monoterpenic ketone
trans-Dihydrocarvone	0.02	Monoterpenic ketone
Verbenone	0.32	Monoterpenic ketone
trans-Piperitol	0.02	Monoterpenic alcohol
trans-Carveol	tr	Monoterpenic alcohol
Bornyl formate	0.01	Monoterpenic ester
Unknown	0.01	Oxygenated monoterpene
Thymol methyl ether	0.01	Monoterpenic ether
Neral	0.02	Monoterpenic aldehyde
Carvacrol methyl ether	0.08	Monoterpenic ether
Linalyl acetate	0.03	Monoterpenic ester
Unknown	0.01	Unknown
Geranial	0.02	Monoterpenic aldehyde
Bornyl acetate	0.08	Monoterpenic ester
Thymol analogue I (isothymol?)	0.01	Monoterpenic alcohol
Thymol	0.50	Monoterpenic alcohol
Carvacrol	0.90	Monoterpenic alcohol
Unknown	0.01	Unknown
α-Terpinyl acetate	0.03	Monoterpenic ester
α-Copaene	0.01	Sesquiterpene
Bornyl propionate	0.02	Monoterpenic ester
β-Bourbonene	0.02	Sesquiterpene
α-Gurjunene	0.02	Sesquiterpene
β-Caryophyllene	0.61	Sesquiterpene
β-Copaene	0.01	Sesquiterpene
Aromadendrene	0.05	Sesquiterpene
α-Humulene	0.03	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
γ-Muurolene	0.01	Sesquiterpene
Germacrene D	0.03	Sesquiterpene
allo-Aromadendr-9-ene	0.01	Sesquiterpene
Viridiflorene	0.02	Sesquiterpene
Bicyclogermacrene	0.07	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
γ-Cadinene	0.04	Sesquiterpene
β-Bisabolene	0.24	Sesquiterpene
δ-Cadinene	0.06	Sesquiterpene

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α-Elemol	0.02	Sesquiterpenic alcohol
Geranyl butyrate	0.01	Monoterpenic ester
Spathulenol	0.04	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.07	Sesquiterpenic ether
Humulene epoxide II	0.01	Sesquiterpenic ether
Isospathulenol	0.01	Sesquiterpenic alcohol
τ-Cadinol	0.05	Sesquiterpenic alcohol
β-Eudesmol	0.01	Sesquiterpenic alcohol
α-Eudesmol	0.01	Sesquiterpenic alcohol
α-Cadinol	0.01	Sesquiterpenic alcohol
(3Z)-Caryophylla-3,8(13)-dien-5β-ol	0.01	Sesquiterpenic alcohol
α-Bisabolol	0.02	Sesquiterpenic alcohol
meta-Camphorene	0.03	Diterpene
para-Camphorene	0.02	Diterpene
Consolidated total	**99.40**	

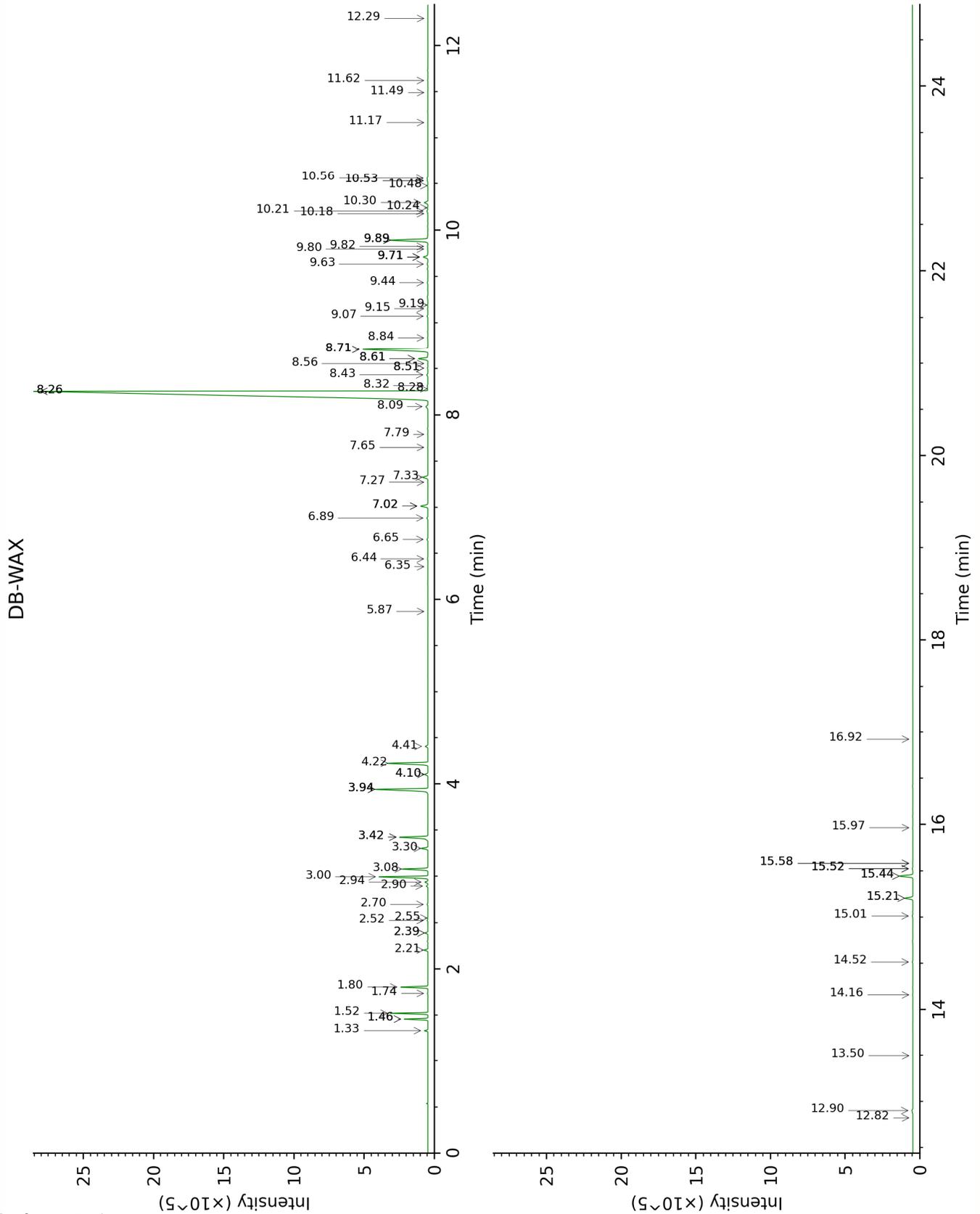tr: The compound has been detected below 0.005% of the total signal

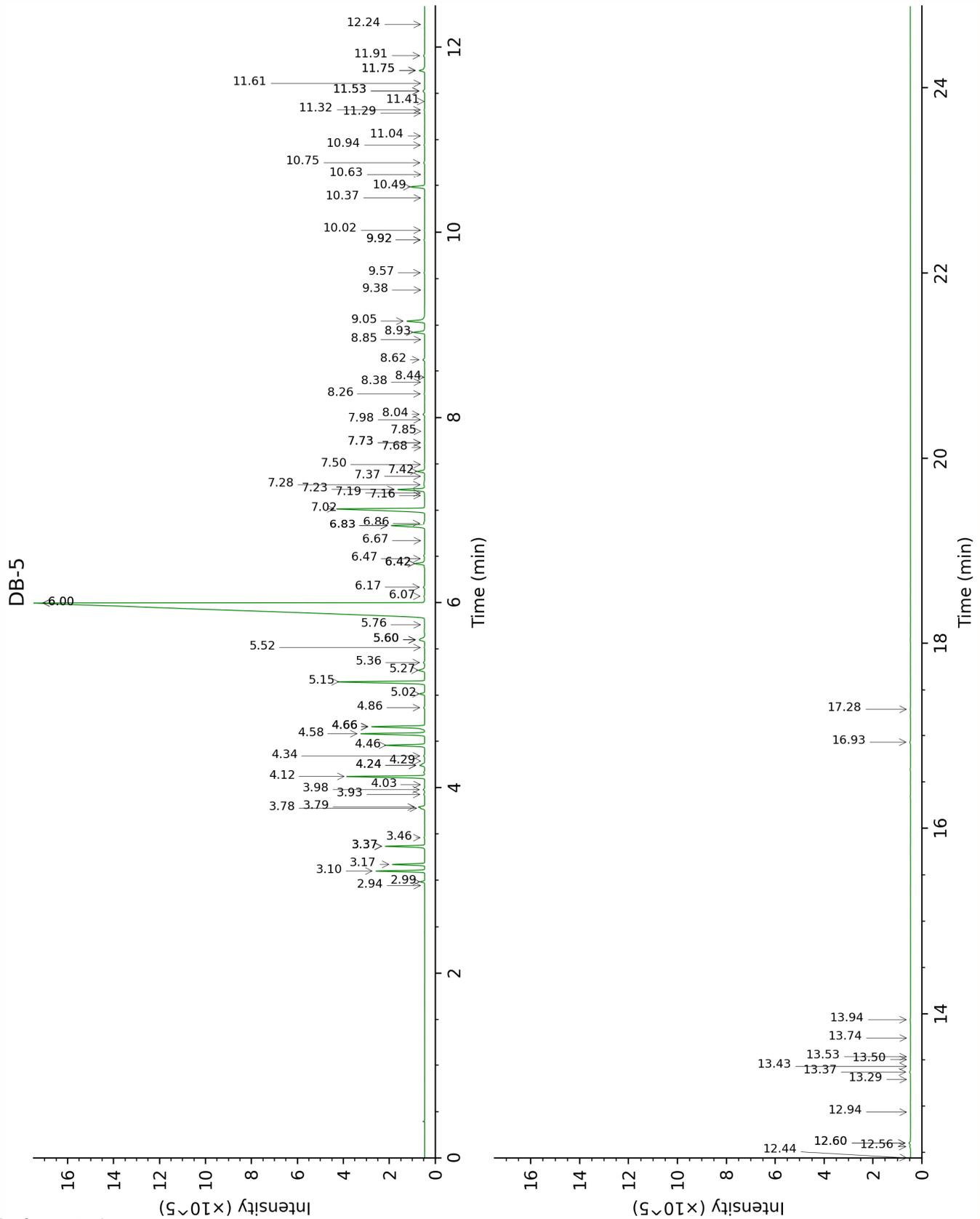Note: no correction factor was applied

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.

Bracketed value ([xx]): A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

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

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DB-WAX

Time (min)

Intensity (×10^5)

Time (min)

Intensity (×10^5)

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DB-5

Chromatogram peaks (top panel):
12.24, 11.91, 11.75, 11.61, 11.53, 11.41, 11.32, 11.29, 11.04, 10.94, 10.75, 10.63, 10.49, 10.37, 10.02, 9.92, 9.57, 9.38, 9.05, 8.93, 8.85, 8.62, 8.44, 8.38, 8.26, 8.04, 7.98, 7.85, 7.73, 7.68, 7.50, 7.42, 7.37, 7.28, 7.23, 7.19, 7.16, 7.02, 6.86, 6.83, 6.67, 6.47, 6.42, 6.17, 6.07, 6.00, 5.76, 5.60, 5.52, 5.36, 5.27, 5.15, 5.02, 4.86, 4.66, 4.58, 4.46, 4.34, 4.29, 4.24, 4.12, 4.03, 3.98, 3.93, 3.78, 3.79, 3.46, 3.37, 3.17, 3.10, 2.99, 2.94

Chromatogram peaks (bottom panel):
17.28, 16.93, 13.94, 13.74, 13.53, 13.50, 13.43, 13.37, 13.29, 12.94, 12.60, 12.56, 12.44

Time (min)

Intensity (×10^5)

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FULL ANALYSIS DATA

Hashishene	Column DB-WAX			Column DB-5		
	1.46*	991.6	[1.04]	2.94	916.5	0.01
Tricyclene	1.33	972.9	0.15	2.99	919.2	0.15
α-Thujene	1.52	1001.2	1.58	3.10	926.8	1.58
α-Pinene	1.46*	991.6	[1.04]	3.17	931.5	1.04
α-Fenchene	1.74	1022.1	0.02	3.37*	944.4	[1.35]
Camphene	1.80	1028.5	1.31	3.37*	944.4	[1.35]
Unknown SAOF I [m/z 91, 92 (47), 65 (11)... 134 (1)]	2.52	1096.5	0.03	3.37*	944.4	[1.35]
Thuja-2,4(10)-diene	2.39*	1083.7	[0.15]	3.46	950.4	0.03
Sabinene	2.39*	1083.7	[0.15]	3.78*†	971.3	[0.11]
β-Pinene	2.20	1066.3	0.21	3.79*†	972.2	[0.24]
Unknown ORVU I [m/z 93, 79 (73), 67 (49), 95 (42), 91 (41), 121 (38)...]	2.55	1099.0	0.01	3.93	981.1	0.05
Octen-3-ol	6.89	1416.6	0.07	3.98	984.5	0.07
Octan-3-one	4.10*	1217.1	[0.20]	4.03	988.0	0.02
Myrcene	3.00	1133.6	2.83	4.12	993.9	2.83
Pseudolimonene	2.94	1129.2	0.17	4.24*	1001.7	[0.27]
α-Phellandrene	2.90	1125.9	0.08	4.24*	1001.7	[0.27]
cis-Dehydroxylinalool oxide	3.94*	1205.5	[3.62]	4.29	1004.8	0.01
Δ3-Carene	2.70	1110.9	0.04	4.34	1008.2	0.04
α-Terpinene	3.08	1139.9	1.42	4.46	1015.5	1.43
para-Cymene	4.22	1225.7	2.53	4.58	1023.2	2.51
β-Phellandrene	3.42*	1166.3	[1.84]	4.66*	1028.0	[2.23]
Limonene	3.30	1157.0	0.38	4.66*	1028.0	[2.23]
1,8-Cineole	3.42*	1166.3	[1.84]	4.66*	1028.0	[2.23]
(*Z*)-β-Ocimene	3.94*	1205.5	[3.62]	4.86	1040.8	0.04
(*E*)-β-Ocimene	4.10*	1217.1	[0.20]	5.02	1050.6	0.20
γ-Terpinene	3.94*	1205.5	[3.62]	5.15	1058.7	3.58
cis-Sabinene hydrate	7.02*	1426.2	[0.53]	5.27	1066.5	0.31
cis-Linalool oxide (fur.)	6.65	1398.9	0.06	5.36	1071.6	0.06
Fenchone	5.87	1342.7	0.01	5.52	1081.7	0.02
trans-Linalool oxide (fur.)	7.02*	1426.2	[0.53]	5.60*	1086.9	[0.36]
Terpinolene	4.40	1238.8	0.15	5.60*	1086.9	[0.36]
para-Cymenene	6.44	1383.7	0.03	5.60*	1086.9	[0.36]

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trans-Sabinene hydrate	8.09	1506.6	0.18	5.76	1097.0	0.02
end*o*-Fenchol	8.51*	1538.8	[0.03]	6.00*	1111.9	[69.04]
Linalool	8.26*	1519.4	[68.73]	6.00*	1111.9	[69.04]
Unknown SASC I [m/z 41, 67 (75), 69 (59), 79 (55), 81 (44), 71 (41)... 150 (5)]	6.35	1377.6	0.01	6.07	1116.5	0.03
cis-para-Menth-2-en-1-ol	8.32	1524.2	0.03	6.17	1122.7	0.06
trans-para-Menth-2-en-1-ol	9.07	1582.9	0.05	6.42*	1139.0	[0.44]
Camphor	7.33	1449.5	0.39	6.42*	1139.0	[0.44]
trans-Verbenol	9.71*	1633.8	[0.35]	6.47	1142.3	0.02
Nerol oxide	7.02*	1426.2	[0.53]	6.67	1154.6	0.01
Borneol	9.89*	1648.6	[2.74]	6.83*	1165.1	[1.56]
cis-Linalool oxide (pyr.)	10.48	1696.3	0.02	6.83*	1165.1	[1.56]
Unknown MISC XCIII [m/z 43, 71 (87), 95 (50), 81 (38), 109 (30), 41 (27)...152 (5)]				6.86	1167.0	0.06
Terpinen-4-ol	8.71*	1554.8	[4.85]	7.02	1177.0	4.74
para-Cymen-8-ol	11.62	1793.1	0.02	7.16	1186.2	0.02
Unknown UNKN VI [m/z 43, 135 (73), 59 (46), 93 (39), 91 (35), 81 (32)...]				7.19	1187.9	0.01
α-Terpineol	9.89*	1648.6	[2.74]	7.23	1190.4	1.15
cis-Dihydrocarvone	8.61*	1546.9	[0.64]	7.28	1193.6	0.03
trans-Dihydrocarvone	8.84	1564.7	0.03	7.37	1199.4	0.02
Verbenone	9.71*	1633.8	[0.35]	7.42	1202.8	0.32
trans-Piperitol	10.53*	1700.8	[0.04]	7.50	1207.6	0.02
trans-Carveol	11.49	1782.1	0.01	7.68	1219.8	tr
Bornyl formate	8.26*	1519.4	[68.73]	7.73*	1223.3	[0.02]
Unknown DACA VI [m/z 119, 43 (52), 59 (45), 91 (36), 79 (24), 134 (23)...]	11.17	1754.6	0.01	7.73*	1223.3	[0.02]
Thymol methyl ether	8.56	1542.7	0.01	7.85	1231.5	0.01

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Compound						
Neral	9.64	1627.7	0.05	7.98	1239.9	0.02
Carvacrol methyl ether	8.71*	1554.8	[4.85]	8.04	1243.7	0.08
Linalyl acetate	8.28	1521.5	0.03	8.26	1258.4	0.03
Unknown THVU XV [m/z 82, 109 (35), 135 (22), 127 (19), 54 (16), 43 (14)...]				8.38	1266.8	0.01
Geranial	10.24	1677.0	0.03	8.44	1270.4	0.02
Bornyl acetate	8.43	1533.2	0.08	8.62	1283.0	0.08
Thymol analogue I (isothymol?)	15.21*	2125.3	[0.51]	8.85	1298.0	0.01
Thymol	15.21*	2125.3	[0.51]	8.93	1303.3	0.50
Carvacrol	15.44*	2149.2	[0.89]	9.05	1311.6	0.90
Unknown BUGR III [m/z 150, 71 (67), 107 (54), 43 (44), 109 (42)...]				9.38	1335.1	0.01
α-Terpinyl acetate	9.82	1643.1	0.02	9.57	1348.1	0.03
α-Copaene	7.27	1445.4	0.01	9.92*	1372.9	[0.04]
Bornyl propionate	9.19	1592.3	0.02	9.92*	1372.9	[0.04]
β-Bourbonene	7.65	1473.5	0.02	10.02	1380.3	0.02
α-Gurjunene	7.79	1484.0	0.02	10.37	1404.7	0.02
β-Caryophyllene	8.61*	1546.9	[0.64]	10.49	1413.6	0.61
β-Copaene	8.51*	1538.8	[0.03]	10.63	1423.9	0.01
Aromadendrene	8.71*	1554.8	[4.85]	10.75	1433.4	0.05
α-Humulene	9.44	1611.4	0.04	10.94	1447.5	0.03
allo-Aromadendrene	9.16	1589.2	0.02	11.04	1454.8	0.02
γ-Muurolene	9.71*	1633.8	[0.35]	11.29	1473.1	0.01
Germacrene D	9.89*	1648.6	[2.74]	11.32	1475.8	0.03
allo-Aromadendr-9-ene	9.71*	1633.8	[0.35]	11.41	1482.5	0.01
Viridiflorene	9.80	1640.8	0.02	11.53*	1490.8	[0.09]
Bicyclogermacrene	10.20	1674.0	0.07	11.53*	1490.8	[0.09]
α-Muurolene	10.18	1671.8	0.01	11.61	1497.0	0.02
γ-Cadinene	10.53*	1700.8	[0.04]	11.75*	1507.4	[0.28]
β-Bisabolene	10.30	1681.5	0.24	11.75*	1507.4	[0.28]
δ-Cadinene	10.56	1703.0	0.06	11.91	1519.9	0.06
α-Elemol	14.16	2023.8	0.02	12.24	1546.3	0.02
Geranyl butyrate	12.29	1852.2	0.01	12.44	1561.7	0.01
Spathulenol	14.52	2058.0	0.04	12.56	1571.4	0.04
Caryophyllene oxide isomer	12.82	1899.3	0.01	12.60*	1574.4	[0.07]

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	R.T.	R.I.	%	R.T.	R.I.	%
Caryophyllene oxide	12.90	1906.5	0.07	12.60*	1574.4	[0.07]
Humulene epoxide II	13.50	1961.4	0.01	12.94	1600.5	0.01
Isospathulenol	15.58*	2163.0	[0.02]	13.29	1629.4	0.01
τ-Cadinol	15.01	2106.0	0.04	13.37	1636.0	0.05
β-Eudesmol	15.52*	2157.1	[0.04]	13.43	1641.1	0.01
α-Eudesmol	15.44*	2149.2	[0.89]	13.50	1647.1	0.01
α-Cadinol	15.58*	2163.0	[0.02]	13.53	1649.7	0.01
(3Z)-Caryophylla-3,8(13)-dien-5β-ol	16.92	2301.1	0.01	13.74	1666.8	0.01
α-Bisabolol	15.52*	2157.1	[0.04]	13.94	1683.1	0.02
meta-Camphorene	15.52*	2157.1	[0.04]	16.93	1949.7	0.03
para-Camphorene	15.97	2201.6	0.01	17.28	1983.4	0.02
Total reported		99.07%			99.40%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, only the first one is 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

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