

Date : 2025-09-04

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25H20-PTH11

Customer Identification : Tea Tree (Melaleuca) - Australia - T20116R

Type : Essential Oil

Source : *Melaleuca alternifolia* ct. *Terpinen-4-ol* (Tea Tree)

Customer : Plant Therapy

Checked and approved by:

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

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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 : 2025-08-27

PHYSICOCHEMICAL DATA

Refractive index : 1.4777 ± 0.0003 (20 °C)

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

Analyst : Kassandra Baker

Date : 2025-08-21

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
Ethanol	0.19	Aliphatic alcohol
Isobutyral	0.02	Aliphatic aldehyde
Ethyl acetate	tr	Aliphatic ester
Isobutanol	tr	Aliphatic alcohol
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
Isoamyl alcohol	0.01	Aliphatic alcohol
Toluene	0.02	Simple phenolic
(3Z)-Hexenol	0.03	Aliphatic alcohol
α -Thujene	0.91	Monoterpene
α -Pinene	2.44	Monoterpene
Camphene	0.01	Monoterpene
α -Fenchene	0.01	Monoterpene
β -Pinene	0.71	Monoterpene
Sabinene	0.07	Monoterpene
3-Methyl-3-cyclohexenone	0.01	Aliphatic ketone
<i>cis</i> -Carane	0.01	Monoterpene
Myrcene	0.81	Monoterpene
α -Phellandrene	0.44	Monoterpene
Pseudolimonene	0.01	Monoterpene
(3Z)-Hexenyl acetate	0.01	Aliphatic ester
α -Terpinene	8.66	Monoterpene
Carvomenthene	0.01	Aliphatic alcohol
<i>para</i> -Cymene	2.90	Monoterpene
Limonene	0.90	Monoterpene
1,8-Cineole	3.37	Monoterpenic ether
(Z)- β -Ocimene	0.01	Monoterpene
(E)- β -Ocimene	0.02	Monoterpene
γ -Terpinene	19.89	Monoterpene
<i>cis</i> -Sabinene hydrate	0.03	Monoterpenic alcohol
<i>para</i> -Cymenene	0.07	Monoterpene
Terpinolene	3.20	Monoterpene
<i>trans</i> -Sabinene hydrate	0.03	Monoterpenic alcohol
Linalool	0.07	Monoterpenic alcohol
Unknown	0.01	Monoterpenic alcohol
<i>para</i> -Mentha-1,3,8-triene	0.02	Monoterpene
<i>cis-para</i> -Menth-2-en-1-ol	0.15	Monoterpenic alcohol
1-Terpineol	0.02	Monoterpenic alcohol
<i>trans</i> -Pinocarveol	0.03	Monoterpenic alcohol
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.04	Monoterpenic alcohol

<i>trans-para</i> -Menth-2-en-1-ol	0.10	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Unknown	0.02	Unknown
δ -Terpineol	0.02	Monoterpenic alcohol
Dill ether	0.01	Monoterpenic ether
Terpinen-4-ol	42.82	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.11	Monoterpenic alcohol
α -Terpineol	3.17	Monoterpenic alcohol
<i>cis</i> -Piperitol	0.05	Monoterpenic alcohol
<i>trans</i> -Piperitol	0.13	Monoterpenic alcohol
<i>exo</i> -2-Hydroxycineole	0.02	Monoterpenic alcohol
Nerol	0.03	Monoterpenic alcohol
Unknown	0.02	Oxygenated monoterpene
Piperitone	0.04	Monoterpenic ketone
<i>cis</i> -Carvenone oxide?	0.01	Monoterpenic ketone
<i>trans</i> -Ascaridole glycol	0.08	Monoterpenic alcohol
<i>cis</i> -Ascaridole glycol	0.06	Monoterpenic alcohol
Thymol	0.03	Monoterpenic alcohol
Carvacrol	0.03	Monoterpenic alcohol
Unknown	0.10	Monoterpenic alcohol
Myrtenyl acetate	0.01	Monoterpenic ester
Bicycloelemene	0.01	Sesquiterpene
α -Cubebene	0.06	Sesquiterpene
Unknown	0.02	Unknown
Isoledene	0.07	Sesquiterpene
α -Copaene	0.09	Sesquiterpene
7-Cubebene	0.05	Sesquiterpene
7-Cubebene epimer?	0.02	Aliphatic alcohol
β -Cubebene	0.01	Sesquiterpene
β -Elemene	0.02	Sesquiterpene
Methyleugenol	0.03	Phenylpropanoid
α -Gurjunene	0.30	Sesquiterpene
β -Maaliene	0.01	Sesquiterpene
β -Caryophyllene	0.30	Sesquiterpene
γ -Maaliene	0.07	Sesquiterpene
β -Gurjunene	0.02	Sesquiterpene
α -Maaliene	0.07	Sesquiterpene
Aromadendrene	0.89	Sesquiterpene
Selina-5,11-diene	0.11	Sesquiterpene
Cadina-3,5-diene isomer I?	0.12	Sesquiterpene
<i>trans</i> -Muurolo-3,5-diene	0.08	Sesquiterpene
α -Humulene	0.09	Sesquiterpene
allo-Aromadendrene	0.47	Sesquiterpene
Valerena-4,7(11)-diene	0.04	Sesquiterpene
γ -Gurjunene	0.04	Sesquiterpene

Selina-4,11-diene	0.03	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.26	Sesquiterpene
γ -Muurolene	0.03	Sesquiterpene
β -Selinene	0.10	Sesquiterpene
allo-Aromadendr-9-ene	0.09	Sesquiterpene
<i>trans</i> -Muurolo-4(15),5-diene	0.04	Sesquiterpene
δ -Selinene	0.10	Sesquiterpene
Bicyclogermacrene	0.29	Sesquiterpene
Viridiflorene	0.85	Sesquiterpene
α -Selinene	0.09	Sesquiterpene
α -Muurolene	0.13	Sesquiterpene
γ -Cadinene	0.02	Sesquiterpene
Cubebol	0.01	Sesquiterpenic alcohol
<i>trans</i> -Calamenene	0.10	Sesquiterpene
δ -Cadinene	0.89	Sesquiterpene
Zonarene	0.23	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.15	Sesquiterpene
α -Calacorene	0.02	Sesquiterpene
Epiglobulol	0.05	Sesquiterpenic alcohol
Maaliol	0.04	Sesquiterpenic alcohol
Eudesma-5,7(11)-diene	0.02	Sesquiterpene
Unknown	tr	Oxygenated sesquiterpene
Palustrol	0.05	Sesquiterpenic alcohol
Unknown	0.01	Oxygenated sesquiterpene
Spathulenol	0.07	Sesquiterpenic alcohol
Globulol	0.21	Sesquiterpenic alcohol
Gleenol	0.02	Sesquiterpenic alcohol
Viridiflorol	0.11	Sesquiterpenic alcohol
Cubeban-11-ol	0.08	Sesquiterpenic alcohol
Eudesm-5-en-11-ol analog	0.04	Sesquiterpenic alcohol
Ledol	0.04	Sesquiterpenic alcohol
1,10-diepi-Cubenol	0.01	Sesquiterpenic alcohol
Rosifoliol	0.08	Sesquiterpenic alcohol
1-epi-Cubenol	0.12	Sesquiterpenic alcohol
Isospathulenol	0.07	Sesquiterpenic alcohol
τ -Cadinol	0.01	Sesquiterpenic alcohol
Cubenol	0.05	Sesquiterpenic alcohol
α -Muurolol	0.02	Sesquiterpenic alcohol
Consolidated total	99.51	

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

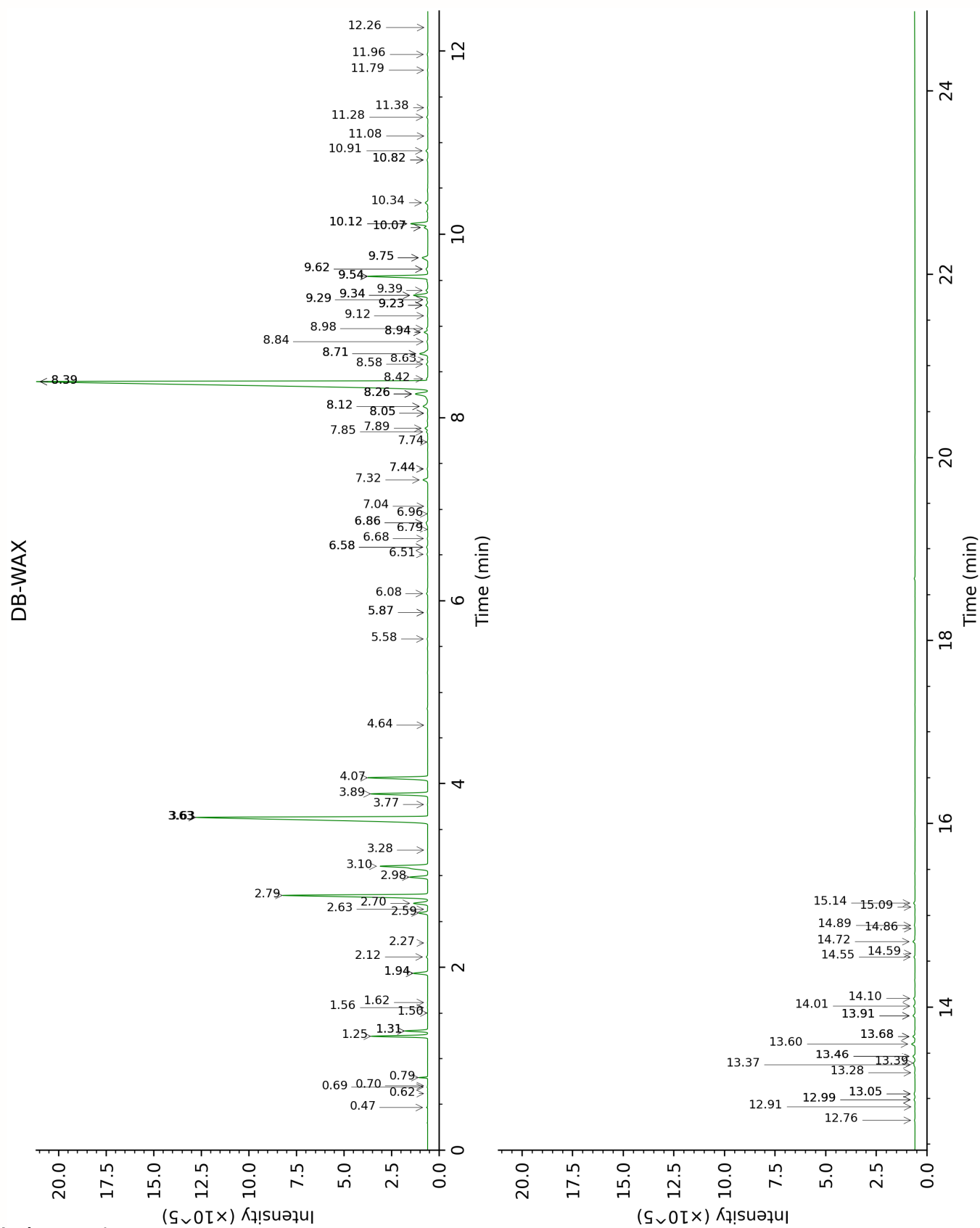
Note: no correction factor was applied

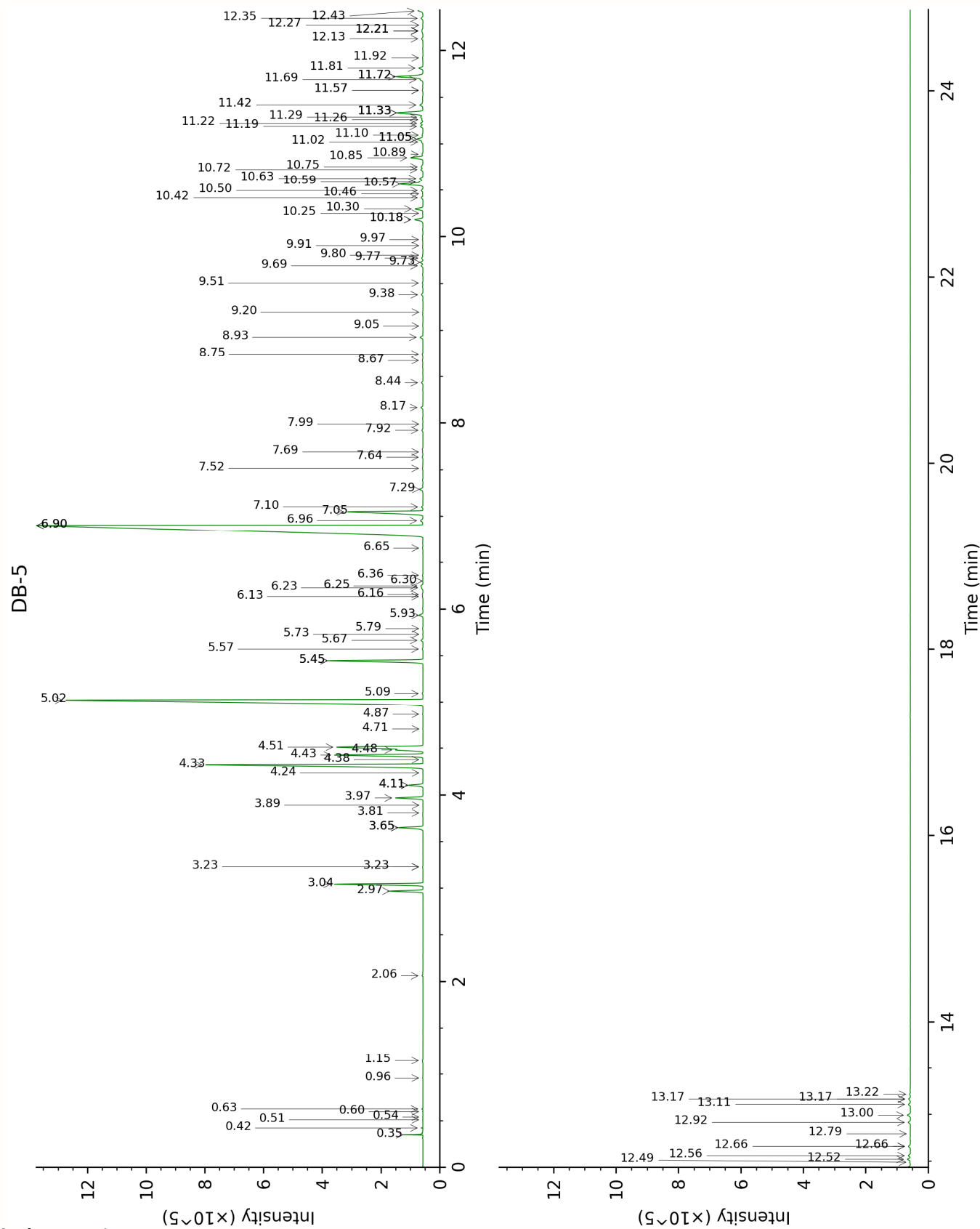
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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.

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





FULL ANALYSIS DATA

Ethanol	Column DB-WAX			Column DB-5		
	0.79	907.6	0.20	0.35	499.6	0.19
Isobutylal	0.47	774.5	0.02	0.42	534.5	0.02
Ethyl acetate	0.62	849.2	tr	0.51	607.4	tr
Isobutanol	1.94*	1065.1	[0.72]	0.54	618.0	tr
Isovaleral	0.70	884.7	tr	0.60	639.4	tr
2-Methylbutylal	0.69	878.2	0.01	0.63	649.7	0.01
Isoamyl alcohol	3.28	1180.5	0.02	0.96	730.6	0.01
Toluene	1.31*	999.3	[0.91]	1.15	757.9	0.02
(3Z)-Hexenol	5.58	1351.0	0.04	2.06	854.5	0.03
α -Thujene	1.31*	999.3	[0.91]	2.97	925.7	0.91
α -Pinene	1.25	989.9	2.43	3.04	930.7	2.44
Camphene	1.56	1026.0	0.01	3.23*	943.1	[0.02]
α -Fenchene	1.50	1019.8	0.01	3.23*	943.1	[0.02]
β -Pinene	1.94*	1065.1	[0.72]	3.65*	971.3	[0.78]
Sabinene	2.12	1083.7	0.07	3.65*	971.3	[0.78]
3-Methyl-3-cyclohexenone	5.87*	1371.8	[0.03]	3.81	981.9	0.01
cis-Carane	1.62	1031.8	0.01	3.89	987.5	0.01
Myrcene	2.70	1134.1	0.81	3.97	992.7	0.81
α -Phellandrene	2.59	1125.6	0.44	4.10*	1001.8	[0.46]
Pseudolimonene	2.63	1128.9	0.01	4.10*	1001.8	[0.46]
(3Z)-Hexenyl acetate	4.64	1281.6	0.01	4.24	1010.4	0.01
α -Terpinene	2.78	1141.0	8.61	4.32	1015.9	8.66
Carvomenthene	2.27	1099.4	0.01	4.38	1019.4	0.01
para-Cymene	3.89	1227.0	2.90	4.43	1022.5	2.90
Limonene	2.98	1157.0	0.90	4.48*†	1026.0	[0.79]
1,8-Cineole	3.10	1166.5	3.37	4.51*†	1027.9	[3.44]
(Z)- β -Ocimene	3.63*	1208.2	[19.74]	4.71	1040.2	0.01
(E)- β -Ocimene	3.78	1218.5	0.02	4.87	1050.3	0.02
γ -Terpinene	3.63*	1208.2	[19.74]	5.02	1060.2	19.89
cis-Sabinene hydrate	6.68	1431.1	0.03	5.10	1064.7	0.03
para-Cymenene	6.08	1386.8	0.07	5.45*	1087.1	[3.29]
Terpinolene	4.07	1239.8	3.20	5.45*	1087.1	[3.29]
trans-Sabinene hydrate	7.74	1510.6	0.03	5.57	1095.0	0.03
Linalool	7.85	1519.2	0.07	5.67	1101.0	0.07
Unknown ORMA I [m/z 119, 109 (94), 43 (61), 95 (56), 91 (48), 77 (32), 152 (32), 137 (31), 134	8.26*	1551.3	[1.04]	5.73	1105.1	0.01

(24)]						
<i>para</i> -Mentha-1,3,8-triene	5.87*	1371.8	[0.03]	5.79	1109.0	0.02
<i>cis-para</i> -Menth-2-en-1-ol	7.89	1522.2	0.15	5.93	1118.2	0.15
1-Terpineol	8.05*	1534.9	[0.02]	6.14	1131.2	0.02
<i>trans</i> -Pinocarveol	8.94*	1604.4	[0.20]	6.16	1132.7	0.03
<i>cis-para</i> -Mentha-2,8-dien-1-ol	9.23*	1628.2	[0.13]	6.23	1137.3	0.04
<i>trans-para</i> -Menth-2-en-1-ol	8.71*	1586.0	[0.60]	6.25	1138.6	0.10
Unknown PLOR I [m/z 109, 43 (73), 71 (54), 124 (51), 69 (37), 41 (35)...152 (5)]				6.30	1142.0	0.01
Unknown MEAL II [m/z 109, 124 (45), 119 (41), 43 (35), 91 (28), 95 (25)...]	6.58*	1424.1	[0.08]	6.36	1146.0	0.02
δ -Terpineol	9.23*	1628.2	[0.13]	6.65	1164.8	0.02
Dill ether	7.04	1457.9	0.01	6.90*	1180.9	[42.83]
Terpinen-4-ol	8.39*	1561.7	[42.95]	6.90*	1180.9	[42.83]
<i>para</i> -Cymen-8-ol	11.28	1799.8	0.06	6.96	1184.3	0.11
α -Terpineol	9.54*	1653.8	[3.23]	7.05	1190.5	3.17
<i>cis</i> -Piperitol	9.29*	1633.2	[0.07]	7.10	1193.9	0.05
<i>trans</i> -Piperitol	10.12*	1700.4	[1.01]	7.29	1206.2	0.13
exo-2-Hydroxycineole	11.38	1809.1	0.02	7.52	1221.3	0.02
Nerol	10.82*	1760.0	[0.05]	7.64	1229.4	0.03
Unknown CIAU II [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	11.08	1782.2	0.01	7.69	1233.2	0.02
Piperitone	9.62*	1660.2	[0.13]	7.92	1249.0	0.04
<i>cis</i> -Carvenone oxide?				7.99	1253.5	0.01
<i>trans</i> -Ascaridole glycol	13.91*	2041.7	[0.12]	8.17	1265.5	0.08
<i>cis</i> -Ascaridole glycol	14.55	2104.0	0.05	8.44	1283.6	0.06
Thymol	14.86	2135.1	0.01	8.67	1299.8	0.03
Carvacrol	15.09	2158.8	0.02	8.75	1304.8	0.03
Unknown MEAL I [m/z 97, 112 (92),	14.72	2120.9	0.11	8.93	1314.3	0.10

83 (62), 43 (44), 41 (25)... 170? (4)]						
Myrtenyl acetate	9.34*	1637.0	[0.87]	9.05	1322.9	0.01
Bicycloelemene	6.79	1439.1	0.01	9.20	1333.4	0.01
α -Cubebene	6.51	1418.3	0.05	9.38	1346.7	0.06
Unknown EUGL I [m/z 43, 95 (62), 107 (45), 110 (41), 55 (28), 67 (25)...]	13.68*	2019.8	[0.12]	9.51	1355.5	0.02
Isoledene	6.58*	1424.1	[0.08]	9.69	1368.7	0.07
α -Copaene	6.86*	1444.5	[0.14]	9.73	1371.3	0.09
7-Cubebene	6.86*	1444.5	[0.14]	9.77	1374.5	0.05
7-Cubebene epimer?	6.96	1451.7	0.02	9.80	1376.7	0.02
β -Cubebene	7.44*	1488.2	[0.04]	9.91	1384.0	0.01
β -Elemene	8.12*	1540.8	[0.40]	9.97	1388.6	0.02
Methyleugenol	13.05*	1960.1	[0.06]	10.18*	1403.8	[0.33]
α -Gurjunene	7.32	1479.3	0.30	10.18*	1403.8	[0.33]
β -Maaliene	7.44*	1488.2	[0.04]	10.25	1408.8	0.01
β -Caryophyllene	8.12*	1540.8	[0.40]	10.30	1412.3	0.30
γ -Maaliene	8.26*	1551.3	[1.04]	10.42	1421.4	0.07
β -Gurjunene	8.05*	1534.9	[0.02]	10.46	1424.5	0.02
α -Maaliene	8.42	1564.1	0.07	10.50	1427.2	0.07
Aromadendrene	8.26*	1551.3	[1.04]	10.57	1432.4	0.89
Selina-5,11-diene	8.39*	1561.7	[42.95]	10.59	1434.2	0.11
Cadina-3,5-diene isomer I?				10.63	1437.1	0.12
<i>trans</i> -Muuroala-3,5- diene	8.58	1576.5	0.08	10.72	1444.3	0.08
α -Humulene	8.98	1607.7	0.06	10.75	1446.6	0.09
allo- Aromadendrene	8.71*	1586.0	[0.60]	10.85	1453.9	0.47
Valerena-4,7(11)- diene	8.64	1580.5	0.03	10.89	1456.7	0.04
γ -Gurjunene	8.84	1596.2	0.06	11.02	1466.7	0.04
Selina-4,11-diene	9.12	1619.0	0.03	11.05*	1468.9	[0.29]
<i>trans</i> -Cadina- 1(6),4-diene	8.94*	1604.4	[0.20]	11.05*	1468.9	[0.29]
γ -Muurolene	9.29*	1633.2	[0.07]	11.10	1472.2	0.03
β -Selinene	9.54*	1653.8	[3.23]	11.19	1479.2	0.10
allo-Aromadendr- 9-ene	9.23*	1628.2	[0.13]	11.22	1481.7	0.09
<i>trans</i> -Muuroala- 4(15),5-diene	9.54*	1653.8	[3.23]	11.26	1484.6	0.04
δ -Selinene	9.39	1641.4	0.10	11.29	1486.6	0.10

Bicyclogermacrene	9.75*	1670.2	[0.42]	11.33*	1490.1	[1.16]
Viridiflorene	9.34*	1637.0	[0.87]	11.33*	1490.1	[1.16]
α -Selinene	9.62*	1660.2	[0.13]	11.33*	1490.1	[1.16]
α -Murolene	9.75*	1670.2	[0.42]	11.42	1496.4	0.13
γ -Cadinene	10.07*	1696.8	[0.21]	11.58*	1508.3	[0.03]
Cubebol	12.26	1886.8	0.01	11.58*	1508.3	[0.03]
<i>trans</i> -Calamenene	10.92	1768.5	0.11	11.69	1517.5	0.10
δ -Cadinene	10.12*	1700.4	[1.01]	11.72*	1520.0	[1.12]
Zonarene	10.07*	1696.8	[0.21]	11.72*	1520.0	[1.12]
<i>trans</i> -Cadina-1,4-diene	10.34	1719.7	0.16	11.81	1527.2	0.15
α -Calacorene	11.79	1845.4	0.03	11.92	1535.9	0.02
Epiglobulol	12.99*	1954.1	[0.05]	12.13	1552.1	0.05
Maaliol	12.76	1933.3	0.04	12.21*	1558.7	[0.08]
Eudesma-5,7(11)-diene	10.82*	1760.0	[0.05]	12.21*	1558.7	[0.08]
Unknown MEAL III [m/z 161, 109 (98), 82 (93), 43 (72), 105 (68), 93 (59), 69 (56), 119 (55)... 222 (7)]	12.99*	1954.1	[0.05]	12.21*	1558.7	[0.08]
Palustrol	11.96	1860.7	0.05	12.21*	1558.7	[0.08]
Unknown MEAL IV [m/z 107, 163 (88), 59 (60), 93 (49), 43 (47), 81 (46... 204 (5)...]	12.91	1947.0	0.02	12.27	1563.6	0.01
Spathulenol	14.10	2060.0	0.09	12.35	1569.4	0.07
Globulol	13.60	2011.9	0.20	12.43	1575.9	0.21
Gleenol	13.28	1981.6	0.02	12.49	1580.7	0.02
Viridiflorol	13.68*	2019.8	[0.12]	12.52	1583.2	0.11
Cubeban-11-ol	13.39	1991.3	0.09	12.56	1586.2	0.08
Eudesm-5-en-11-ol analog	13.91*	2041.7	[0.12]	12.66*	1594.1	[0.08]
Ledol	13.05*	1960.1	[0.06]	12.66*	1594.1	[0.08]
1,10-diepi- Cubenol	13.46*	1998.2	[0.13]	12.80	1604.8	0.01
Rosifoliol	14.01	2051.9	0.09	12.92	1614.9	0.08
1-epi-Cubenol	13.46*	1998.2	[0.13]	13.00	1621.4	0.12
Isospathulenol	15.14	2163.2	0.08	13.11	1630.9	0.07
τ -Cadinol	14.59	2107.9	0.01	13.17*	1635.7	[0.06]
Cubenol	13.37	1989.5	0.05	13.17*	1635.7	[0.06]
α -Murolol	14.89	2138.7	0.05	13.22	1640.0	0.02
Total reported		99.07%			99.43%	

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*: 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