

Date : 2026-10-16

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 26I18-PTH04

Customer Identification : Palo Santo - Ecuador - PJ0112

Type : Essential Oil

Source : *Bursera graveolens*

Customer : Plant Therapy

Checked and approved by:



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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The compliance status of the sample is provided to facilitate the reading of the report. The client remains ultimately responsible for reviewing the results presented within this report and to establish compliance of the tested batch against relevant quality criteria.

This report is an update of the version first issued on 2026-09-22 to make a modification in the sample identification section.

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 : 2026-09-21

PHYSICOCHEMICAL DATA

Refractive index : 1.4802 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2026-09-18

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
Toluene	tr	Simple phenolic
3-Methylcyclopentanone	0.02	Aliphatic ketone
α -Thujene	tr	Monoterpene
α -Pinene	0.07	Monoterpene
3-Methylcyclohexanone	0.02	Aliphatic ketone
Sabinene	0.01	Monoterpene
β -Pinene	0.01	Monoterpene
Hexahydroacetophenone epimer I	0.02	Aliphatic ketone
Hexahydroacetophenone epimer II	0.02	Aliphatic ketone
Dehydro-1,8-cineole	0.02	Monoterpenic ether
Myrcene	0.33	Monoterpene
α -Phellandrene	0.18	Monoterpene
Pseudolimonene	0.02	Monoterpene
α -Terpinene	0.02	Monoterpene
Carvomenthene	0.03	Aliphatic alcohol
<i>para</i> -Cymene	0.78	Monoterpene
Limonene	62.69	Monoterpene
β -Phellandrene	0.19	Monoterpene
1,8-Cineole	0.06	Monoterpenic ether
(<i>E</i>)- β -Ocimene	tr	Monoterpene
γ -Terpinene	0.03	Monoterpene
<i>para</i> -Cymenene	0.03	Monoterpene
Terpinolene	0.04	Monoterpene
Linalool	0.04	Monoterpenic alcohol
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.07	Monoterpenic alcohol
Limona ketone	0.01	Normonoterpenic ketone
<i>cis</i> -Limonene oxide	0.03	Monoterpenic ether
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.06	Monoterpenic alcohol
<i>trans</i> -Limonene oxide	0.03	Monoterpenic ether
<i>cis</i> - β -Terpineol	0.08	Monoterpenic alcohol
Menthone	0.10	Monoterpenic ketone
Menthofuran	16.33	Monoterpenic ether
Isomenthone	0.10	Monoterpenic ketone
<i>trans</i> - β -Terpineol	0.04	Monoterpenic alcohol
<i>trans</i> -Isopulegone	0.08	Monoterpenic ketone
Unknown	0.04	Oxygenated monoterpene
Terpinen-4-ol	0.03	Monoterpenic alcohol
<i>trans-para</i> -Mentha-1(7),8-dien-2-ol	0.01	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.04	Monoterpenic alcohol
<i>trans</i> -Isocarveol	0.02	Monoterpenic alcohol

α -Terpineol	8.01	Monoterpenic alcohol
<i>cis</i> -Dihydrocarvone	0.12	Monoterpenic ketone
Unknown	0.04	Unknown
<i>trans</i> -Dihydrocarvone	0.02	Monoterpenic ketone
<i>trans</i> -Isopiperitenol	0.01	Monoterpenic alcohol
<i>trans</i> -Piperitol	0.02	Monoterpenic alcohol
4,7-Dimethylbenzofuran?	0.01	Furan
<i>trans</i> -Carveol	0.08	Monoterpenic alcohol
<i>cis-para</i> -Mentha-1(7),8-dien-2-ol	0.02	Monoterpenic alcohol
<i>cis</i> -Carveol	0.05	Monoterpenic alcohol
Pulegone	0.76	Monoterpenic ketone
Carvone	1.02	Monoterpenic ketone
Unknown	0.06	Unknown
Unknown	0.01	Unknown
Perillaldehyde	0.01	Monoterpenic aldehyde
Limonen-10-ol	0.01	Monoterpenic alcohol
Perilla alcohol	0.01	Monoterpenic alcohol
<i>para</i> -Menth-5-en-1,2-diol isomer III	0.01	Monoterpenic alcohol
Unknown	0.05	Unknown
Unknown	0.08	Unknown
Menthofurolactone isomer I	0.17	Monoterpenic lactone
Menthofurolactone isomer II	0.18	Monoterpenic lactone
α -Ylangene	0.03	Sesquiterpene
α -Copaene	0.07	Sesquiterpene
<i>cis</i> - β -Elemene	0.01	Sesquiterpene
β -Cubebene	0.04	Sesquiterpene
β -Elemene	0.12	Sesquiterpene
α -Cedrene	0.03	Sesquiterpene
β -Ylangene	0.07	Sesquiterpene
Unknown	0.01	Unknown
8-Hydroxycarvotanacetone	0.01	Monoterpenic alcohol
β -Copaene	0.05	Sesquiterpene
<i>cis</i> -Thujopsene	0.06	Sesquiterpene
Menthofurolactone isomer III	0.09	Monoterpenic lactone
<i>cis</i> - β -Bergamotene?	0.03	Sesquiterpene
Unknown	0.16	Sesquiterpene
α -Humulene	0.03	Sesquiterpene
Unknown	0.02	Unknown
9- <i>epi</i> - β -Caryophyllene	0.03	Sesquiterpene
γ -Gurjunene	0.05	Sesquiterpene
γ -Murolene	0.19	Sesquiterpene
Germacrene D	3.05	Sesquiterpene
β -Selinene	0.04	Sesquiterpene
Unknown	0.01	Unknown
Menthallactone	0.34	Monoterpenic lactone

Bicyclogermacrene	0.06	Sesquiterpene
α -Selinene	0.06	Sesquiterpene
α -Muurolene	0.07	Sesquiterpene
Germacrene A	0.04	Sesquiterpene
γ -Cadinene	0.07	Sesquiterpene
(3E,6E)- α -Farnesene	0.36	Sesquiterpene
β -Bisabolene	0.08	Sesquiterpene
δ -Cadinene	0.27	Sesquiterpene
trans-Calamenene	0.01	Sesquiterpene
Menthofuro lactone analog	0.07	Monoterpenic lactone
Unknown	0.02	Oxygenated sesquiterpene
α -Cadinene	0.03	Sesquiterpene
α -Calacorene	0.01	Sesquiterpene
7 α -Hydroxymint lactone	0.15	Monoterpenic alcohol
1,5-Epoxy salvia-4(14)-ene	0.02	Sesquiterpenic ether
(E)-Nerolidol	0.02	Sesquiterpenic alcohol
Spathulenol	0.03	Sesquiterpenic alcohol
Unknown	0.03	Oxygenated sesquiterpene
Salvia-4(14)-en-1-one	0.01	Aliphatic alcohol
Viridiflorol	0.02	Sesquiterpenic alcohol
Unknown	0.03	Oxygenated sesquiterpene
Junenol	0.11	Sesquiterpenic alcohol
10-epi- γ -Eudesmol	0.03	Sesquiterpenic alcohol
1-epi-Cubenol	0.04	Sesquiterpenic alcohol
τ -Cadinol	0.02	Sesquiterpenic alcohol
Cubenol	0.01	Sesquiterpenic alcohol
τ -Muurolol	0.05	Sesquiterpenic alcohol
Unknown	0.05	Sesquiterpenic alcohol
α -Cadinol	0.05	Sesquiterpenic alcohol
Germacre-4(15),5,10(14)-trien-1 α -ol	0.02	Sesquiterpenic alcohol
Unknown	0.13	Unknown
Consolidated total	98.97	

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

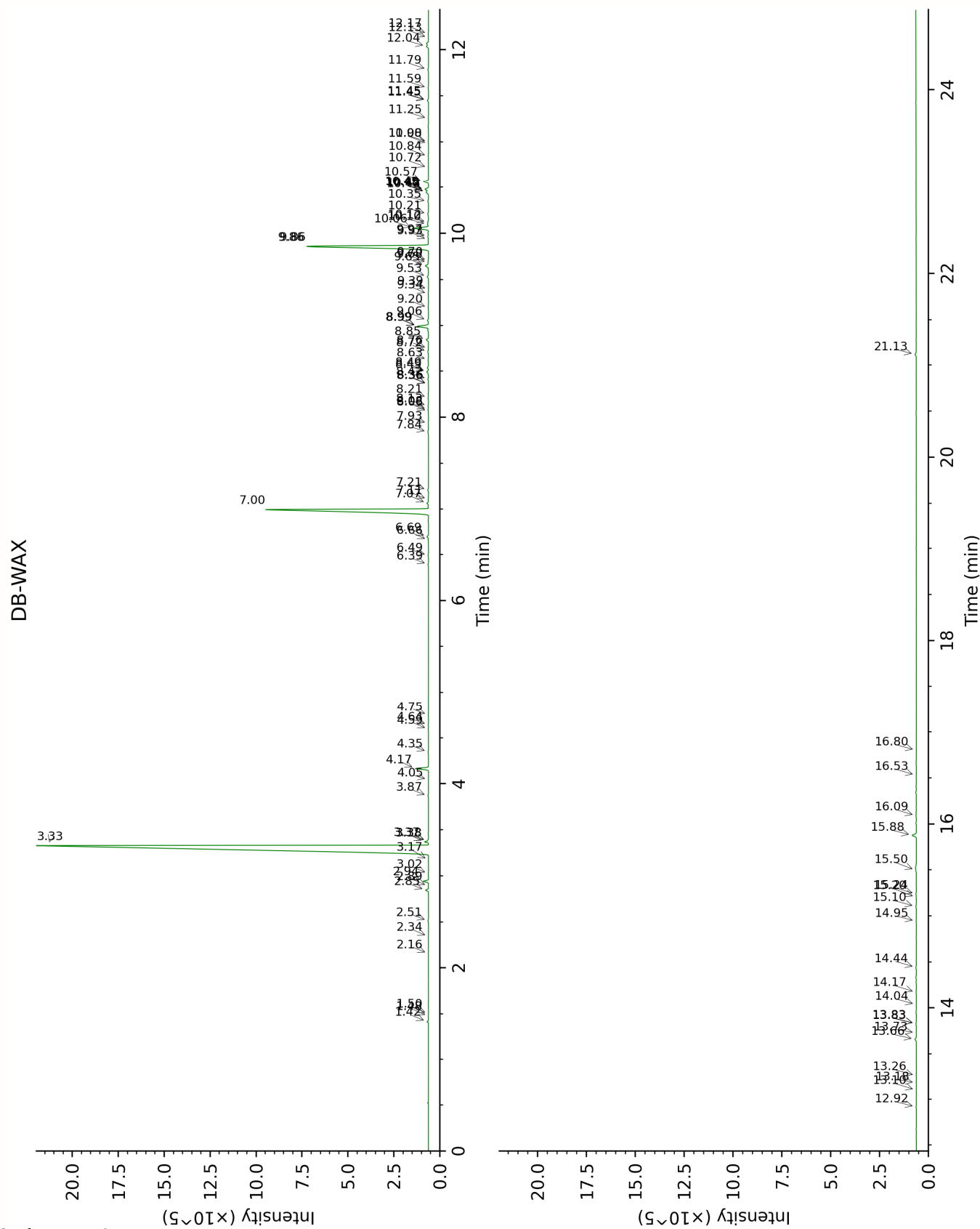
Note: no correction factor was applied

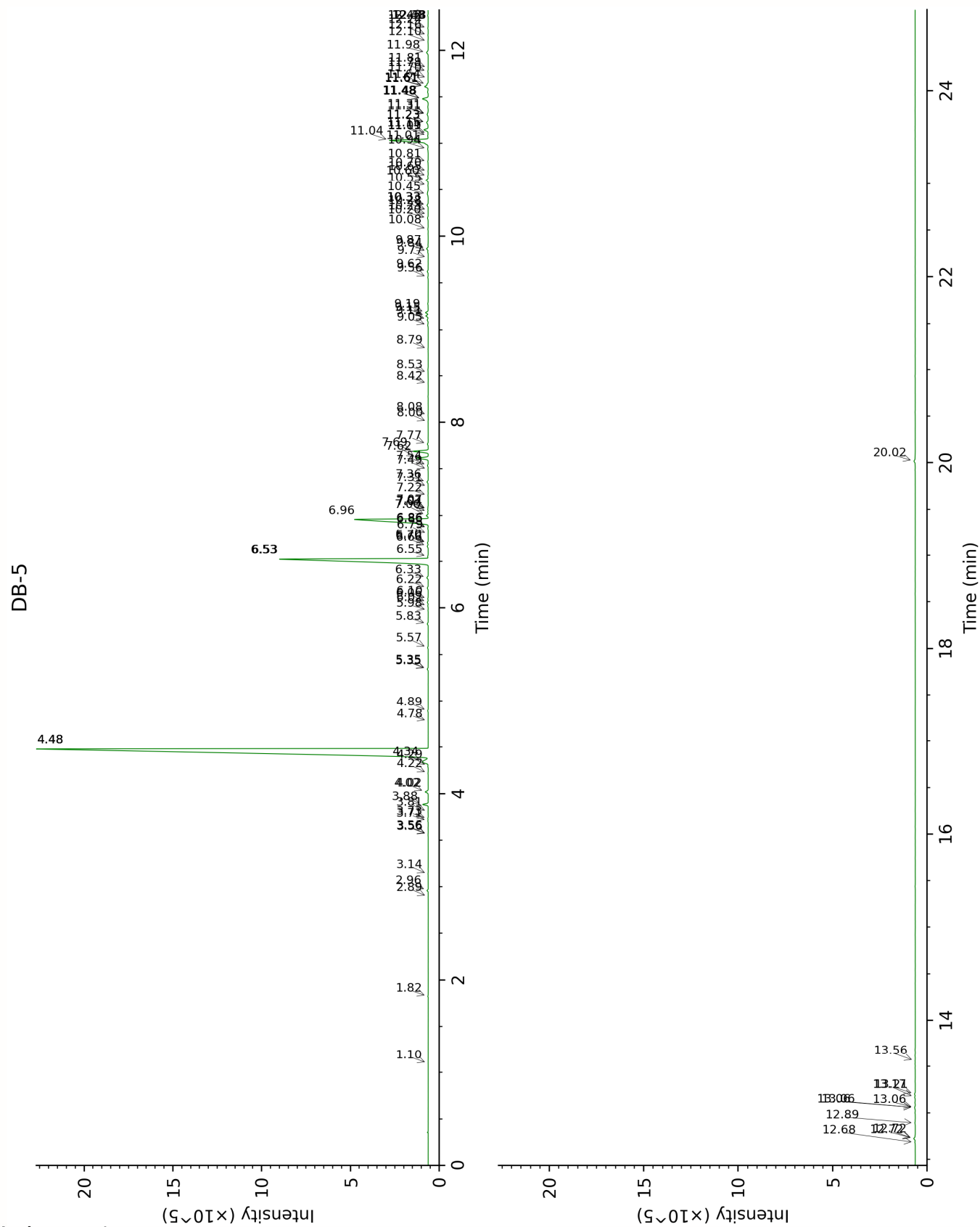
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Toluene	Column DB-WAX			Column DB-5		
	1.48	1000.1	tr	1.10	759.7	tr
3-Methylcyclopentanone	3.38*	1169.0	[0.04]	1.82	841.0	0.02
α-Thujene	1.50	1002.4	tr	2.89	926.5	tr
α-Pinene	1.42	992.0	0.06	2.96	931.1	0.07
3-Methylcyclohexanone	4.75	1272.2	0.02	3.14	942.8	0.02
Sabinene	2.34	1084.6	0.01	3.56*	971.5	[0.02]
β-Pinene	2.16	1066.4	0.01	3.56*	971.5	[0.02]
Hexahydroacetophenone epimer I	4.60	1260.6	0.02	3.71	981.4	0.02
Hexahydroacetophenone epimer II	4.64	1264.2	0.03	3.73	983.0	0.02
Dehydro-1,8-cineole	3.17	1152.3	0.01	3.81	987.9	0.02
Myrcene	2.94	1134.3	0.33	3.88	993.3	0.33
α-Phellandrene	2.85	1126.7	0.18	4.02*	1002.4	[0.21]
Pseudolimonene	2.89	1130.1	0.02	4.02*	1002.4	[0.21]
α-Terpinene	3.02	1140.7	0.02	4.22	1015.1	0.02
Carvomenthene	2.51	1100.6	0.03	4.29	1019.9	0.03
para-Cymene	4.17	1228.9	0.79	4.34	1022.9	0.78
Limonene	3.33	1164.9	62.69	4.48*	1031.8	[62.94]
β-Phellandrene	3.37	1168.0	0.19	4.48*	1031.8	[62.94]
1,8-Cineole	3.38*	1169.0	[0.04]	4.48*	1031.8	[62.94]
(E)-β-Ocimene	4.05	1220.0	0.01	4.78	1050.8	tr
γ-Terpinene	3.87	1207.0	0.04	4.89	1057.8	0.03
para-Cymenene	6.39	1387.7	0.03	5.35*	1086.8	[0.06]
Terpinolene	4.35	1242.3	0.04	5.35*	1086.8	[0.06]
Linalool	8.13	1516.5	0.04	5.57	1101.4	0.04
trans-para-Mentha-2,8- dien-1-ol	9.00*	1583.7	[0.83]	5.83	1118.0	0.07
Limona ketone	7.94	1501.8	0.02	5.98	1127.4	0.01
cis-Limonene oxide	6.49	1394.7	0.03	6.02	1130.4	0.03
cis-para-Mentha-2,8- dien-1-ol	9.53	1626.6	0.10	6.06	1133.0	0.06
trans-Limonene oxide	6.66	1406.9	0.03	6.10	1135.5	0.03
cis-β-Terpineol	9.06	1588.5	0.07	6.22	1143.0	0.08
Menthone	6.69	1409.7	0.10	6.33	1150.1	0.10
Menthofuran	7.00	1432.1	16.33	6.53*	1163.1	[16.39]
Isomenthone	7.07	1437.2	0.10	6.53*	1163.1	[16.39]
trans-β-Terpineol	9.70	1640.4	0.03	6.55	1165.0	0.04
trans-Isopulegone	9.00*	1583.7	[0.83]	6.66	1172.1	0.08
Unknown CASA XVIII [m/z 69, 84 (62), 41 (30), 123 (26), 97 (24), 109 (23)...]	9.68	1638.5	0.04	6.70*	1174.5	[0.05]

Terpinen-4-ol	8.63	1555.2	0.03	6.70*	1174.5	[0.05]
<i>trans-para</i> -Mentha-1(7),8-dien-2-ol	11.45*	1785.7	[0.08]	6.79	1180.6	0.01
<i>para</i> -Cymen-8-ol	11.59	1797.4	0.04	6.86*	1185.1	[0.04]
<i>trans</i> -Isocarveol	11.00	1747.8	0.02	6.86*	1185.1	[0.04]
α -Terpineol	9.86*	1653.1	[11.08]	6.96	1191.4	8.01
<i>cis</i> -Dihydrocarvone	8.49*†	1545.0	[0.13]	7.00	1194.1	0.12
Unknown MISC XXXII [m/z 121, 79 (61), 93 (55), 94 (40), 91 (39), 84 (37)...]	8.08	1513.2	0.05	7.04	1196.4	0.04
<i>trans</i> -Dihydrocarvone	8.76	1565.3	0.02	7.07*	1198.4	[0.03]
<i>trans</i> -Isopiperitenol	10.45*	1700.8	[0.21]	7.07*	1198.4	[0.03]
<i>trans</i> -Piperitol	10.48*	1703.5	[0.26]	7.22	1208.2	0.02
4,7-Dimethylbenzofuran?				7.31	1214.4	0.01
<i>trans</i> -Carveol	11.45*	1785.7	[0.08]	7.36	1218.1	0.08
<i>cis-para</i> -Mentha-1(7),8-dien-2-ol	12.04	1837.3	0.17	7.49	1227.1	0.02
<i>cis</i> -Carveol	11.79	1815.0	0.05	7.54	1230.2	0.05
Pulegone	9.00*	1583.7	[0.83]	7.62	1235.6	0.76
Carvone	10.06	1668.9	1.04	7.69	1240.7	1.02
Unknown BUGR I [m/z 112, 43 (70), 70 (63), 59 (53), 97 (46), 84 (25)...]	10.35	1692.4	0.06	7.77	1245.9	0.06
Unknown MEPU IV [m/z 112, 70 (63), 43 (59), 59 (51), 97 (45), 84 (22)...]	10.98	1745.9	0.01	8.00	1262.0	0.01
Perillaldehyde	10.72	1723.8	0.02	8.08	1267.2	0.01
Limonen-10-ol	13.18	1940.0	0.02	8.42	1290.3	0.01
Perilla alcohol	13.26	1947.3	0.01	8.53	1298.3	0.01
<i>para</i> -Menth-5-en-1,2-diol isomer III	15.24	2137.6	0.04	8.80	1313.2	0.01
Unknown BUGR II [m/z 124, 123 (43), 121 (35), 166 (30), 93 (30), 136 (17)...]				9.05	1331.3	0.05
Unknown BUGR III [m/z 150, 71 (67), 107 (54), 43 (44), 109 (42)...]				9.11	1335.4	0.08
Menthofurolactone isomer I				9.15	1338.5	0.17
Menthofurolactone isomer II				9.19	1341.1	0.18
α -Ylangene	7.11	1440.4	0.03	9.56	1367.8	0.03
α -Copaene	7.21	1448.0	0.06	9.62	1372.4	0.07
<i>cis</i> - β -Elemene	8.36*	1534.4	[0.02]	9.77	1382.7	0.01

β -Cubebene	7.84	1494.5	0.07	9.84	1387.3	0.04
β -Elemene	8.49*†	1545.0	[0.13]	9.87	1389.6	0.12
α -Cedrene	8.06	1511.6	0.02	10.08	1404.5	0.03
β -Ylangene	8.21	1523.2	0.04	10.20	1413.5	0.07
Unknown CAO V XXXII [m/z 43, 57 (37), 69 (30), 55 (29), 87 (23)... 168 (5)]	16.80	2297.9	0.01	10.23	1416.2	0.01
8-Hydroxycarvotanacetone	16.53	2269.4	0.02	10.28	1419.6	0.01
β -Copaene	8.42	1538.9	0.05	10.33*	1423.8	[0.09]
cis-Thujopsene	8.72	1562.3	0.06	10.33*	1423.8	[0.09]
Menthofuroolactone isomer III				10.45	1432.8	0.09
cis- β -Bergamotene?				10.55	1439.9	0.03
Unknown BOCA IV [m/z 91, 161 (92), 105 (85), 119 (63), 133 (53), 79 (49), 204 (46)]	8.85	1572.6	0.16	10.60	1444.2	0.16
α -Humulene	9.34	1611.2	0.03	10.65	1447.5	0.03
Unknown CALU X [m/z 109, 110 (33), 43 (30), 95 (23), 71 (20), 41 (19)...]				10.70	1451.7	0.02
9-epi- β -Caryophyllene	9.39	1615.4	0.01	10.81	1459.6	0.03
γ -Gurjunene	9.20	1599.5	0.05	10.94	1469.6	0.05
γ -Murolene	9.65	1636.1	0.24	11.01	1474.4	0.19
Germacrene D	9.86*	1653.1	[11.08]	11.04	1476.5	3.05
β -Selinene	9.93	1658.7	0.04	11.08	1480.3	0.04
Unknown BUGR IV [m/z 149, 161 (51), 93 (43), 91 (42), 164 (42), 105 (37)...204? (11)]	8.36*	1534.4	[0.02]	11.11	1482.3	0.01
Menthallactone	15.88	2201.8	0.31	11.15	1485.1	0.34
Bicyclogermacrene	10.12	1674.3	0.06	11.23*	1490.9	[0.16]
α -Selinene	9.97	1661.7	0.06	11.23*	1490.9	[0.16]
α -Murolene	10.10	1672.4	0.07	11.31*	1497.5	[0.11]
Germacrene A	10.45*	1700.8	[0.21]	11.31*	1497.5	[0.11]
γ -Cadinene	10.45*	1700.8	[0.21]	11.48*	1510.3	[0.51]
(3E,6E)- α -Farnesene	10.57	1710.9	0.36	11.48*	1510.3	[0.51]
β -Bisabolene	10.21	1681.5	0.08	11.48*	1510.3	[0.51]
δ -Cadinene	10.48*	1703.5	[0.26]	11.61*	1520.7	[0.28]
trans-Calamenene	11.25	1769.0	0.01	11.61*	1520.7	[0.28]
Menthofuroolactone analog				11.64	1522.5	0.07
Unknown CASA XXIV [m/z 122, 105 (39), 107				11.70	1527.7	0.02

(38), 91 (32), 81 (31), 161 (30), 119 (28)... 207? (20)]						
α -Cadinene	10.84	1734.4	0.03	11.78	1533.5	0.03
α -Calacorene	12.17	1849.2	0.03	11.81	1536.6	0.01
7 α -Hydroxymintlactone	21.13	2799.5	0.10	11.98	1549.6	0.15
1,5-Epoxyvalial-4(14)-ene	12.13	1845.5	0.02	12.10	1558.9	0.02
(E)-Nerolidol	13.83*	2000.5	[0.04]	12.16	1564.2	0.02
Spathulenol	14.44	2059.1	0.05	12.24	1570.3	0.03
Unknown BOCA XIX [m/z 161, 105 (61), 43 (51), 121 (45), 93 (39), 81 938), 95 (37), 122 (35)... 204 (25)...]	12.92	1915.9	0.03	12.38	1580.9	0.03
Salvial-4(14)-en-1-one	13.10	1932.7	0.01	12.43*	1585.6	[0.02]
Viridiflorol	14.04	2020.4	0.02	12.43*	1585.6	[0.02]
Unknown CULO XXIII [m/z 43, 93 (88), 91 (76), 79 (73), 69 (64), 41 (63), 95 (53).. 220 (3)]				12.68	1605.4	0.03
Junenol	13.66	1984.4	0.11	12.72*	1608.7	[0.14]
10-epi- γ -Eudesmol	14.17	2033.1	0.03	12.72*	1608.7	[0.14]
1-epi-Cubenol	13.83*	2000.5	[0.04]	12.89	1622.7	0.04
τ -Cadinol	14.94	2108.0	0.02	13.06*	1636.5	[0.07]
Cubenol	13.73	1990.9	0.01	13.06*	1636.5	[0.07]
τ -Muurolool	15.10	2124.0	0.05	13.06*	1636.5	[0.07]
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	15.20	2133.9	0.02	13.17	1645.6	0.05
α -Cadinol	15.50	2163.4	0.03	13.20	1648.6	0.05
Germacre-4(15),5,10(14)-trien-1 α -ol	16.09	2224.0	0.04	13.56	1678.3	0.02
Unknown MEPU XVI [m/z 165, 166 (48), 137 (11), 67 (9), 124 (7), 43 (7)...]				20.02	2298.5	0.13
Total reported	98.17%			98.90%		

*: 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