PhytoChemia

Date : 2026-11-09

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 26I25-PTH01
Customer Identification : Spearmint - USA - S30118
Type : Essential Oil
Source : *Mentha spicata*
Customer : Plant Therapy

Checked and approved by:

Alexis St-Gelais, Ph. D., 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. 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 from the first version issued on 2026-09-29 to correct the customer identification.

Méthode certifiée ISO 17025:2017 Certified Method

628 Boulevard du Saguenay Ouest, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

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 : Jean-Christophe Fortin, M. Sc.
Date : 2026-09-29

Physicochemical data

Physical aspect : Faintly yellow liquid
Analyst : Cindy Caron B. Sc.
Date : 2026-09-25

Refractive index : 1.4898 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2026-09-25

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
Isovaleral	0.07	Aliphatic aldehyde
2-Methylbutyral	0.05	Aliphatic aldehyde
2-Ethylfuran	0.02	Furan
Isoamyl alcohol	0.02	Aliphatic alcohol
2-Methylbutanol	0.02	Aliphatic alcohol
Methyl 2-methylbutyrate	0.02	Aliphatic ester
(2*E*)-Hexenal	0.03	Aliphatic aldehyde
Ethyl 2-methylbutyrate	0.03	Aliphatic ester
(3*Z*)-Hexenol	0.04	Aliphatic alcohol
(2*E*)-Hexenol	0.03	Aliphatic alcohol
Hexanol	0.02	Aliphatic alcohol
trans-2,5-Diethyltetrahydrofuran	0.07	Furan
Hashishene	0.14	Monoterpene
α-Thujene	0.06	Monoterpene
α-Pinene	0.54	Monoterpene
3-Methylcyclohexanone	tr	Aliphatic ketone
Camphene	0.02	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Sabinene	0.43	Monoterpene
β-Pinene	0.64	Monoterpene
Octen-3-ol	0.02	Aliphatic alcohol
Octan-3-one	0.02	Aliphatic ketone
Myrcene	2.50	Monoterpene
Octan-3-ol	0.88	Aliphatic alcohol
Pseudolimonene	0.03	Monoterpene
Octanal	0.04	Aliphatic aldehyde
α-Phellandrene	0.02	Monoterpene
Δ3-Carene	tr	Monoterpene
α-Terpinene	0.33	Monoterpene
para-Cymene	0.09	Monoterpene
β-Phellandrene	[1.70]	Monoterpene
1,8-Cineole	[1.70]	Monoterpenic ether
Limonene	10.66	Monoterpene
2-Ethylhexanol	0.01	Aliphatic alcohol
(*Z*)-β-Ocimene	0.22	Monoterpene
(*E*)-β-Ocimene	0.11	Monoterpene

γ-Terpinene	0.55	Monoterpene
cis-Sabinene hydrate	1.07	Monoterpenic alcohol
cis-Linalool oxide (fur.)	tr	Monoterpenic alcohol
Octanol	0.04	Aliphatic alcohol
Terpinolene	0.16	Monoterpene
para-Cymenene	0.02	Monoterpene
trans-Sabinene hydrate	0.10	Monoterpenic alcohol
Linalool	0.08	Monoterpenic alcohol
Nonanal	0.06	Aliphatic aldehyde
2-Methylbutyl 2-methylbutyrate	0.03	Aliphatic ester
trans-*para*-Mentha-2,8-dien-1-ol	0.11	Monoterpenic alcohol
Octan-3-yl acetate	0.28	Aliphatic ester
cis-Limonene oxide	0.01	Monoterpenic ether
cis-*para*-Mentha-2,8-dien-1-ol	0.06	Monoterpenic alcohol
trans-Limonene oxide	0.04	Monoterpenic ether
Camphor	0.04	Monoterpenic ketone
trans-*para*-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
Isopulegol	0.03	Monoterpenic alcohol
Menthone	0.02	Monoterpenic ketone
Pinocarvone	0.02	Monoterpenic ketone
Isomenthone	0.04	Monoterpenic ketone
Menthofuran	0.06	Monoterpenic ether
neo-Menthol	0.13	Monoterpenic alcohol
Menthol	0.09	Monoterpenic alcohol
Terpinen-4-ol	0.98	Monoterpenic alcohol
α-Terpineol	0.30	Monoterpenic alcohol
cis-Dihydrocarvone	1.04	Monoterpenic ketone
neo-Dihydrocarveol	0.35	Monoterpenic alcohol
Dihydrocarveol	0.29	Monoterpenic alcohol
Methylchavicol	0.04	Phenylpropanoid
trans-Dihydrocarvone	0.12	Monoterpenic ketone
trans-Piperitol	0.02	Monoterpenic alcohol
iso-Dihydrocarveol ?	0.03	Monoterpenic alcohol
trans-Carveol	0.32	Monoterpenic alcohol
Pulegone	0.02	Monoterpenic ketone
cis-Carveol	0.26	Monoterpenic alcohol
Carvone	65.37	Monoterpenic ketone
Piperitone	0.13	Monoterpenic ketone
cis-Carvone oxide	0.03	Monoterpenic ketone
Isopiperitenone	0.05	Monoterpenic ketone
trans-Carvone oxide	0.09	Monoterpenic ketone

Decanol	0.01	Aliphatic alcohol
Dihydroedulan I	0.04	Terpenic ether
Menthyl acetate	0.07	Monoterpenic ester
Isomenthyl acetate	0.01	Monoterpenic alcohol
Dihydrocarvyl acetate	0.31	Monoterpenic ester
Bicycloelemene	0.01	Sesquiterpene
trans-Carvyl acetate	0.01	Monoterpenic ester
α-Cubebene	0.01	Sesquiterpene
iso-Dihydrocarvyl acetate	0.06	Monoterpenic ester
cis-Carvyl acetate	0.35	Monoterpenic ester
α-Copaene	0.06	Sesquiterpene
β-Bourbonene	1.66	Sesquiterpene
1,5-diepi-β-Bourbonene	0.11	Sesquiterpene
β-Elemene	0.12	Sesquiterpene
(*Z*)-Jasmone	0.43	Jasmonate
Unknown	0.01	Sesquiterpene
Isocaryophyllene	0.05	Sesquiterpene
β-Caryophyllene	1.14	Sesquiterpene
β-Ylangene	0.16	Sesquiterpene
β-Copaene	0.18	Sesquiterpene
Aromadendrene	0.04	Sesquiterpene
Isogermacrene D	0.18	Sesquiterpene
α-Humulene	0.09	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
Unknown	0.12	Sesquiterpene
(*E*)-β-Farnesene	0.85	Sesquiterpene
Germacrene D	1.22	Sesquiterpene
Bicyclogermacrene	tr	Sesquiterpene
Viridiflorene	0.03	Sesquiterpene
α-Muurolene	0.06	Sesquiterpene
γ-Cadinene	0.03	Sesquiterpene
δ-Cadinene	0.08	Sesquiterpene
α-Cadinene	0.01	Sesquiterpene
1,5-Epoxysalvial-4(14)-ene	0.02	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.04	Sesquiterpenic ether
Viridiflorol	0.28	Sesquiterpenic alcohol
Isospathulenol	0.01	Sesquiterpenic alcohol
τ-Cadinol	0.01	Sesquiterpenic alcohol
α-Cadinol	0.01	Sesquiterpenic alcohol
meta-Camphorene	0.01	Diterpene

para-Camphorene	0.01	Diterpene
Phytol	0.01	Diterpenic alcohol
Consolidated total	99.29	

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

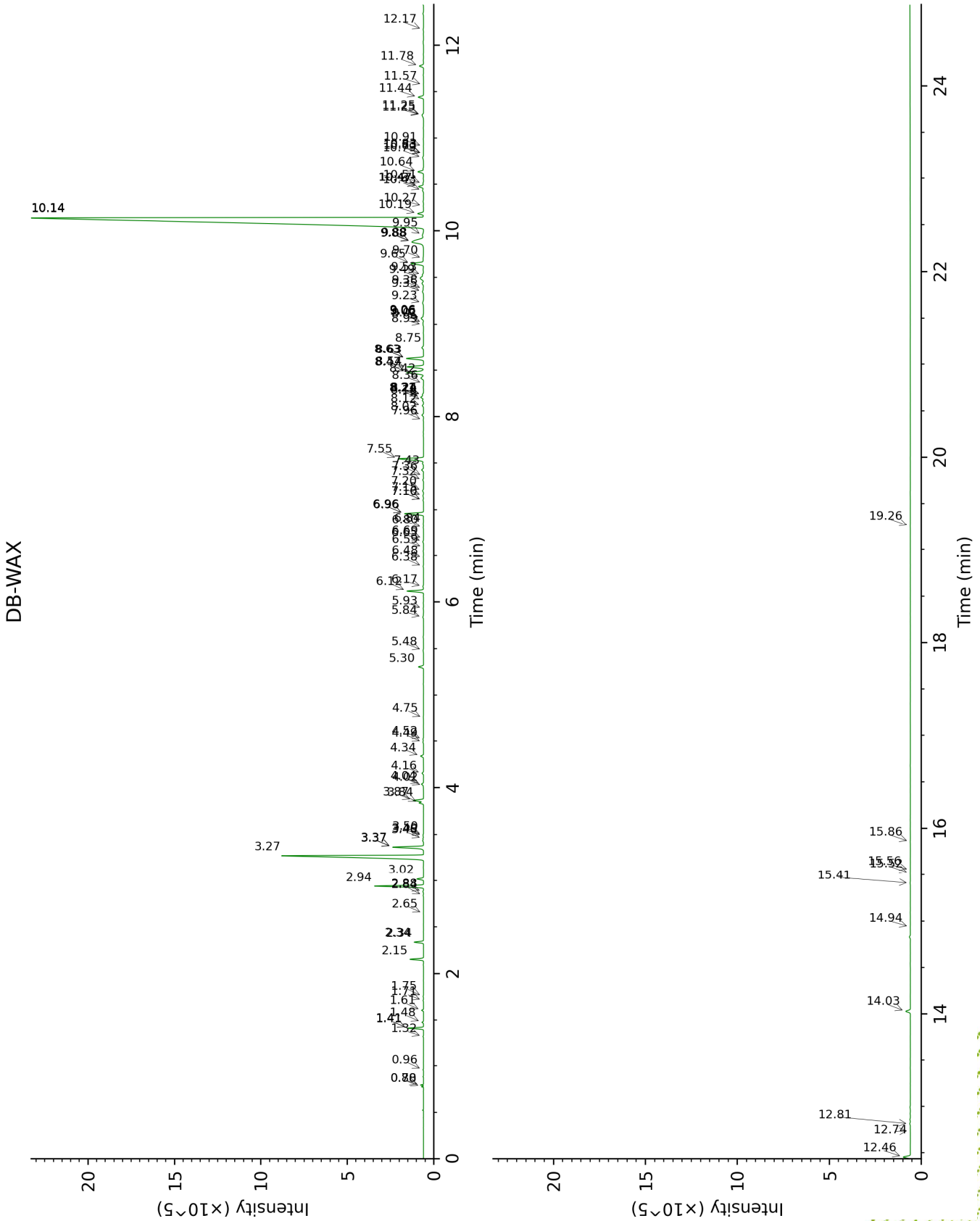
Note: no correction factor was applied

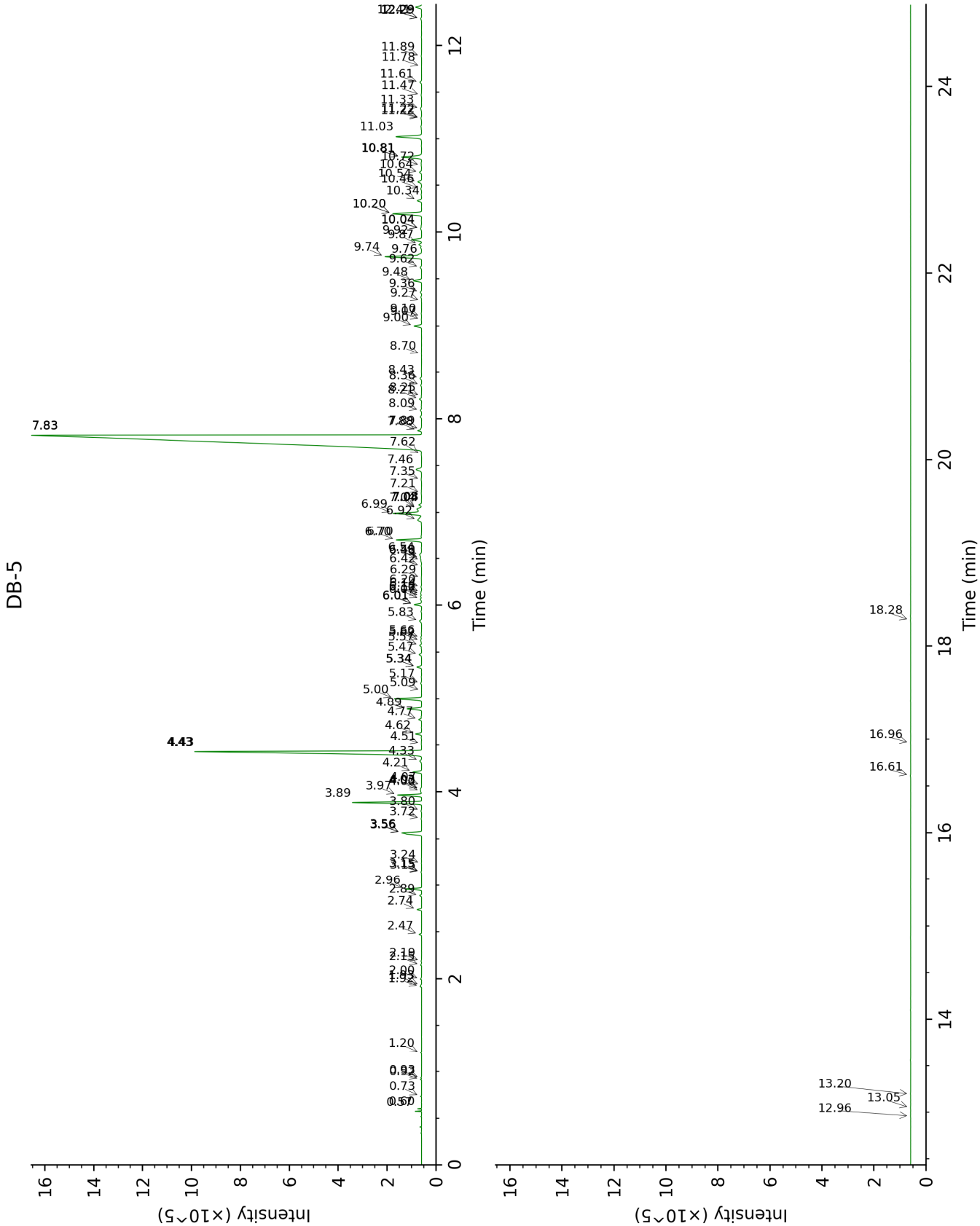
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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


DB-WAX
Time (min)
Intensity (×10^5)
10.14
3.27
19.26
15.86
15.41
14.94
14.03
12.81
12.74
12.46


DB-5
Time (min)
Intensity (×10^5)
7.83
4.43
3.89
18.28
16.96
16.61
13.20
13.05
12.96

Full analysis data

Isovaleral	Column DB-WAX			Column DB-5		
	0.80	887.8	0.07	0.58	642.8	0.07
2-Methylbutyral	0.78	881.4	0.05	0.60	653.2	0.05
2-Ethylfuran	0.96	919.9	0.02	0.74	703.6	0.02
Isoamyl alcohol	3.50	1178.0	0.02	0.92	732.1	0.02
2-Methylbutanol	3.49	1177.3	0.02	0.93	734.8	0.02
Methyl 2-methylbutyrate	1.32	977.3	0.02	1.20	775.1	0.02
(2*E*)-Hexenal	3.46	1174.7	0.03	1.92	848.9	0.03
Ethyl 2-methylbutyrate	1.71	1022.8	0.02	1.93	849.9	0.03
(3*Z*)-Hexenol	5.84	1347.9	0.04	2.00	855.6	0.04
(2*E*)-Hexenol	6.17	1371.7	0.04	2.15	868.5	0.03
Hexanol	5.48	1322.4	0.03	2.19	872.0	0.02
trans-2,5-Diethyltetrahydrofuran	1.61	1012.5	0.07	2.47	896.6	0.07
Hashishene	1.41*	991.5	[0.67]	2.74	916.1	0.14
α-Thujene	1.48	1000.0	0.06	2.89	926.2	0.06
α-Pinene	1.41*	991.5	[0.67]	2.96	931.0	0.54
3-Methylcyclohexanone	4.75	1271.9	tr	3.15*	943.6	[0.02]
Camphene	1.76	1027.1	0.02	3.15*	943.6	[0.02]
Thuja-2,4(10)-diene	2.34*	1084.2	[0.43]	3.24	949.8	0.01
Sabinene	2.34*	1084.2	[0.43]	3.56*	971.7	[1.08]
β-Pinene	2.16	1066.2	0.64	3.56*	971.7	[1.08]
Octen-3-ol	6.84	1420.5	0.03	3.72	981.9	0.02
Octan-3-one	4.02	1218.0	0.01	3.80	987.5	0.02
Myrcene	2.94	1134.2	2.49	3.89	993.6	2.50
Octan-3-ol	6.12	1368.1	0.89	3.97	998.9	0.88
Pseudolimonene	2.88	1129.5	0.03	4.00†	1001.4	0.03
Octanal	4.49	1252.6	0.04	4.03*†	1003.0	[0.07]
α-Phellandrene	2.84	1126.1	0.02	4.03*†	1003.0	[0.07]
Δ3-Carene	2.65	1111.1	tr	4.07	1005.9	tr
α-Terpinene	3.02	1140.2	0.33	4.21	1014.8	0.33
para-Cymene	4.16	1228.2	0.08	4.33	1022.2	0.09
β-Phellandrene	3.37*	1167.6	[1.67]	4.43*	1028.6	[12.37]
1,8-Cineole	3.37*	1167.6	[1.67]	4.43*	1028.6	[12.37]
Limonene	3.27	1160.3	10.66	4.43*	1028.6	[12.37]
2-Ethylhexanol	7.36	1459.1	0.01	4.51	1033.8	0.01

(*Z*)-β-Ocimene	3.84	1204.7	0.22	4.62	1040.6	0.22
(*E*)-β-Ocimene	4.04	1219.5	0.11	4.77	1050.3	0.11
γ-Terpinene	3.87	1206.6	0.55	4.89	1057.6	0.55
cis-Sabinene hydrate	6.96*	1429.2	[1.07]	5.00	1064.9	1.07
cis-Linalool oxide (fur.)	6.59	1402.1	0.01	5.09	1070.5	tr
Octanol	8.24*	1525.2	[0.07]	5.16	1075.3	0.04
Terpinolene	4.34	1241.7	0.16	5.34*	1086.5	[0.19]
para-Cymenene	6.38	1387.0	0.02	5.34*	1086.5	[0.19]
trans-Sabinene hydrate	8.02	1508.2	0.10	5.47	1095.0	0.10
Linalool	8.12	1516.1	0.07	5.57	1101.2	0.08
Nonanal	5.93	1354.7	0.02	5.62	1104.5	0.06
2-Methylbutyl 2-methylbutyrate	4.52	1255.1	0.03	5.66	1106.9	0.03
trans-para-Mentha-2,8-dien-1-ol	9.06*	1589.1	[0.19]	5.83	1118.1	0.11
Octan-3-yl acetate	5.30	1309.7	0.28	6.01*	1129.5	[0.30]
cis-Limonene oxide	6.48	1393.9	0.01	6.01*	1129.5	[0.30]
cis-para-Mentha-2,8-dien-1-ol	9.53	1626.3	0.08	6.06	1133.2	0.06
trans-Limonene oxide	6.65	1406.3	0.05	6.10	1135.2	0.04
Camphor	7.32	1456.1	0.05	6.12	1137.0	0.04
trans-para-Menth-2-en-1-ol	9.06*	1589.1	[0.19]	6.14	1138.2	0.02
Isopulegol	8.21*	1522.9	[0.19]	6.20	1141.9	0.03
Menthone	6.69	1409.1	0.01	6.30	1148.1	0.02
Pinocarvone	7.96	1503.8	0.02	6.42	1156.3	0.02
Isomenthone	7.10*	1440.0	[0.03]	6.48	1160.0	0.04
Menthofuran	6.96*	1429.2	[1.07]	6.50	1161.7	0.06
neo-Menthol	8.63*	1555.2	[1.04]	6.54	1164.2	0.13
Menthol	9.23	1602.0	0.09	6.70*†	1174.5	[1.05]
Terpinen-4-ol	8.63*	1555.2	[1.04]	6.70*†	1174.5	[1.05]
α-Terpineol	9.88*	1654.8	[1.52]	6.92*†	1188.7	[0.31]
cis-Dihydrocarvone	8.54	1548.3	1.04	6.99*†	1193.4	[1.33]
neo-Dihydrocarveol	10.18	1679.3	0.35	7.04*†	1196.3	[0.30]
Dihydrocarveol	10.47*	1703.1	[0.32]	7.04*†	1196.3	[0.30]
Methylchavicol	9.38	1614.4	0.04	7.08*†	1199.3	[0.12]
trans-Dihydrocarvone	8.75	1564.7	0.12	7.08*†	1199.3	[0.12]
trans-Piperitol	10.43	1699.4	0.08	7.21	1207.6	0.02
iso-Dihydrocarveol ?	10.83*	1733.5	[0.01]	7.35	1217.5	0.03

trans-Carveol	11.44	1785.0	0.33	7.46	1224.9	0.32
Pulegone	8.99	1583.6	0.03	7.62	1235.7	0.02
cis-Carveol	11.78	1814.2	0.26	7.83*	1249.8	[65.62]
Carvone	10.14*	1675.5	[65.19]	7.83*	1249.8	[65.62]
Piperitone	9.95	1660.5	0.11	7.88	1253.2	0.13
cis-Carvone oxide	10.92	1740.4	0.01	7.89	1254.1	0.03
Isopiperitenone	11.25*	1768.8	[0.15]	8.09	1268.0	0.05
trans-Carvone oxide	11.25*	1768.8	[0.15]	8.21	1276.3	0.09
Decanol	10.79	1729.9	0.07	8.25	1278.6	0.01
Dihydroedulan I	7.15	1443.5	0.04	8.36	1286.4	0.04
Menthyl acetate	8.18	1520.3	0.07	8.43	1291.5	0.07
Isomenthyl acetate	8.36	1534.5	tr	8.70	1306.1	0.01
Dihydrocarvyl acetate	9.50	1623.6	0.34	9.00	1327.8	0.31
Bicycloelemene	7.10*	1440.0	[0.03]	9.07	1332.6	0.01
trans-Carvyl acetate	10.27	1686.0	0.01	9.10	1335.2	0.01
α-Cubebene	6.80	1417.7	0.02	9.27	1346.8	0.01
iso-Dihydrocarvyl acetate				9.36	1353.4	0.06
cis-Carvyl acetate	10.64	1717.1	0.35	9.48	1362.2	0.35
α-Copaene	7.20	1447.4	0.06	9.62	1372.2	0.06
β-Bourbonene	7.55	1472.9	1.65	9.74	1380.4	1.66
1,5-diepi-β-Bourbonene	7.43	1464.0	0.12	9.76	1381.7	0.11
β-Elemene	8.47*	1543.4	[1.26]	9.87	1389.6	0.12
(*Z*)-Jasmone	12.46	1874.1	0.43	9.92	1393.2	0.43
Unknown MEPI VIII [m/z 106, 119 (99), 43 (78), 91 (74), 105 (60), 134 (55)... 204 (19)]	11.58	1796.3	0.01	10.04*	1401.7	[0.06]
Isocaryophyllene	8.24*	1525.2	[0.07]	10.04*	1401.7	[0.06]
β-Caryophyllene	8.47*	1543.4	[1.26]	10.20*	1413.5	[1.35]
β-Ylangene	8.21*	1522.9	[0.19]	10.20*	1413.5	[1.35]
β-Copaene	8.42	1539.0	0.21	10.34	1424.0	0.18
Aromadendrene	8.63*	1555.2	[1.04]	10.46	1433.5	0.04
Isogermacrene D	9.06*	1589.1	[0.19]	10.54	1439.0	0.18
α-Humulene	9.35	1611.7	0.09	10.64	1447.2	0.09
allo-Aromadendrene	9.01	1585.1	0.04	10.72	1452.8	0.02
Unknown MISC XLIX [m/z 161, 105 (56), 91 (50), 93 (36), 119				10.81*	1459.4	[0.97]

(33), 79 (31)...204 (5)]						
(*E*)-β-Farnesene	9.65	1636.2	0.85	10.81*	1459.4	[0.97]
Germacrene D	9.88*	1654.8	[1.52]	11.03	1475.8	1.22
Bicyclogermacrene	10.14*	1675.5	[65.19]	11.22*	1490.6	[0.04]
Viridiflorene	9.70	1640.4	0.03	11.22*	1490.6	[0.04]
α-Muurolene	10.14*	1675.5	[65.19]	11.33	1498.5	0.06
γ-Cadinene	10.47*	1703.1	[0.32]	11.47	1509.4	0.03
δ-Cadinene	10.51	1706.0	0.03	11.61	1520.3	0.08
α-Cadinene	10.83*	1733.5	[0.01]	11.78	1533.7	0.01
1,5-Epoxysalvial-4(14)-ene	12.17	1848.7	0.03	11.89	1542.3	0.02
Caryophyllene oxide isomer	12.74	1899.4	0.01	12.29*	1573.9	[0.05]
Caryophyllene oxide	12.81	1906.3	0.04	12.29*	1573.9	[0.05]
Viridiflorol	14.03	2019.6	0.29	12.41	1583.7	0.28
Isospathulenol	15.52	2165.4	0.01	12.96	1628.4	0.01
τ-Cadinol	14.94	2107.3	0.01	13.05	1635.6	0.01
α-Cadinol	15.56	2169.4	tr	13.20	1648.0	0.01
meta-Camphorene	15.41	2154.8	0.02	16.61	1951.0	0.01
para-Camphorene	15.86	2199.9	0.01	16.96	1984.0	0.01
Phytol	19.26	2571.8	0.01	18.28	2114.6	0.01
Total reported		98.69%			99.25%	

*: 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