Date : 2026-06-02

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 26D07-PTH11
Customer Identification : Spearmint - USA - S30117
Type : Essential Oil
Source : *Mentha spicata*
Customer : Plant Therapy

Checked an 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 2026-04-09 to make a correction in the sample identification section.

Méthode certifiée ISO 17025:2017 Certified method

Laboratoire PhytoChemia

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 : 2026-04-08

Physicochemical data

Refractive index : 1.4882 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2026-04-08

Conclusion

No adulterant, contaminant or diluent has been detected using this method.

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

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	tr	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Isoamyl alcohol	tr	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Methyl 2-methylbutyrate	tr	Aliphatic ester
Ethyl 2-methylbutyrate	tr	Aliphatic ester
trans-2,5-Diethyltetrahydrofuran	0.02	Furan
Hashishene	0.03	Monoterpene
α-Thujene	0.04	Monoterpene
α-Pinene	1.32	Monoterpene
α-Fenchene	0.01	Monoterpene
3-Methylcyclohexanone	0.01	Aliphatic ketone
Camphene	0.06	Monoterpene
Thuja-2,4(10)-diene	0.02	Monoterpene
β-Pinene	1.46	Monoterpene
Sabinene	0.64	Monoterpene
cis-Carane	0.02	Monoterpene
Octen-3-ol	0.02	Aliphatic alcohol
Octan-3-one	0.10	Aliphatic ketone
Myrcene	0.85	Monoterpene
Octan-3-ol	0.45	Aliphatic alcohol
Pseudolimonene	0.06	Monoterpene
Octanal	0.01	Aliphatic aldehyde
α-Phellandrene	0.01	Monoterpene
Δ3-Carene	0.03	Monoterpene
α-Terpinene	0.05	Monoterpene
Carvomenthene	0.05	Aliphatic alcohol
para-Cymene	0.48	Monoterpene
Limonene	18.98	Monoterpene
1,8-Cineole	0.83	Monoterpenic ether
β-Phellandrene	0.05	Monoterpene
2-Ethylhexanol	0.01	Aliphatic alcohol
(*Z*)-β-Ocimene	0.03	Monoterpene
(*E*)-β-Ocimene	0.02	Monoterpene
γ-Terpinene	0.08	Monoterpene
cis-Sabinene hydrate	0.09	Monoterpenic alcohol
Octanol	0.02	Aliphatic alcohol
para-Cymenene	0.02	Monoterpene
Terpinolene	0.03	Monoterpene

trans-Sabinene hydrate	0.01	Monoterpenic alcohol
Linalool	0.02	Monoterpenic alcohol
2-Methylbutyl 2-methylbutyrate	0.01	Aliphatic ester
Nonanal	tr	Aliphatic aldehyde
trans-para-Mentha-2,8-dien-1-ol	0.03	Monoterpenic alcohol
Octan-3-yl acetate	0.03	Aliphatic ester
cis-Limonene oxide	0.01	Monoterpenic ether
cis-para-Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
trans-Limonene oxide	0.02	Monoterpenic ether
Camphor	0.01	Monoterpenic ketone
Isopulegol	0.02	Monoterpenic alcohol
Menthone	1.00	Monoterpenic ketone
Menthofuran	0.05	Monoterpenic ether
Isomenthone	0.15	Monoterpenic ketone
neo-Menthol	0.25	Monoterpenic alcohol
Menthol	1.10	Monoterpenic alcohol
Terpinen-4-ol	0.16	Monoterpenic alcohol
Isomenthol	0.02	Monoterpenic alcohol
α-Terpineol	0.07	Monoterpenic alcohol
cis-Dihydrocarvone	2.31	Monoterpenic ketone
neo-Dihydrocarveol	0.29	Monoterpenic alcohol
Methylchavicol	0.23	Phenylpropanoid
cis-Piperitol	0.01	Monoterpenic alcohol
Dihydrocarveol	1.20	Monoterpenic alcohol
trans-Dihydrocarvone	0.51	Monoterpenic ketone
trans-Piperitol	0.03	Monoterpenic alcohol
iso-Dihydrocarveol ?	0.22	Monoterpenic alcohol
trans-Carveol	0.24	Monoterpenic alcohol
Pulegone	0.16	Monoterpenic ketone
Carvone	61.69	Monoterpenic ketone
Piperitone	0.08	Monoterpenic ketone
cis-Carvone oxide	0.02	Monoterpenic ketone
Isopiperitenone	0.02	Monoterpenic ketone
trans-Carvone oxide	0.01	Monoterpenic ketone
Decanol	0.03	Aliphatic alcohol
Dihydroedulan I	0.01	Terpenic ether
Menthyl acetate	0.17	Monoterpenic ester
Dihydroedulan II	0.02	Terpenic ether
neo-Dihydrocarvyl acetate	0.09	Monoterpenic ester
Isomenthyl acetate	0.02	Monoterpenic alcohol
Dihydrocarvyl acetate	1.26	Monoterpenic ester
Bicycloelemene	0.01	Sesquiterpene
trans-Carvyl acetate	0.01	Monoterpenic ester
α-Cubebene	0.01	Sesquiterpene
iso-Dihydrocarvyl acetate	0.08	Monoterpenic ester

cis-Carvyl acetate	0.07	Monoterpenic ester
α-Copaene	0.02	Sesquiterpene
β-Bourbonene	0.52	Sesquiterpene
1,5-diepi-β-Bourbonene	0.03	Sesquiterpene
β-Elemene	0.03	Sesquiterpene
(*Z*)-Jasmone	0.05	Jasmonate
Unknown	0.01	Sesquiterpene
Isocaryophyllene	0.01	Sesquiterpene
β-Ylangene	0.06	Sesquiterpene
β-Caryophyllene	0.39	Sesquiterpene
β-Copaene	0.05	Sesquiterpene
Isogermacrene D	0.01	Sesquiterpene
α-Humulene	0.02	Sesquiterpene
(*E*)-β-Farnesene	0.14	Sesquiterpene
Unknown	0.02	Sesquiterpene
Germacrene D	0.21	Sesquiterpene
Bicyclogermacrene	0.01	Sesquiterpene
Viridiflorene	0.01	Sesquiterpene
α-Muurolene	0.02	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
δ-Cadinene	0.02	Sesquiterpene
Caryophyllene oxide	0.02	Sesquiterpenic ether
Viridiflorol	0.03	Sesquiterpenic alcohol
meta-Camphorene	0.01	Diterpene
Consolidated total	**99.38**	

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

Note: no correction factor was applied

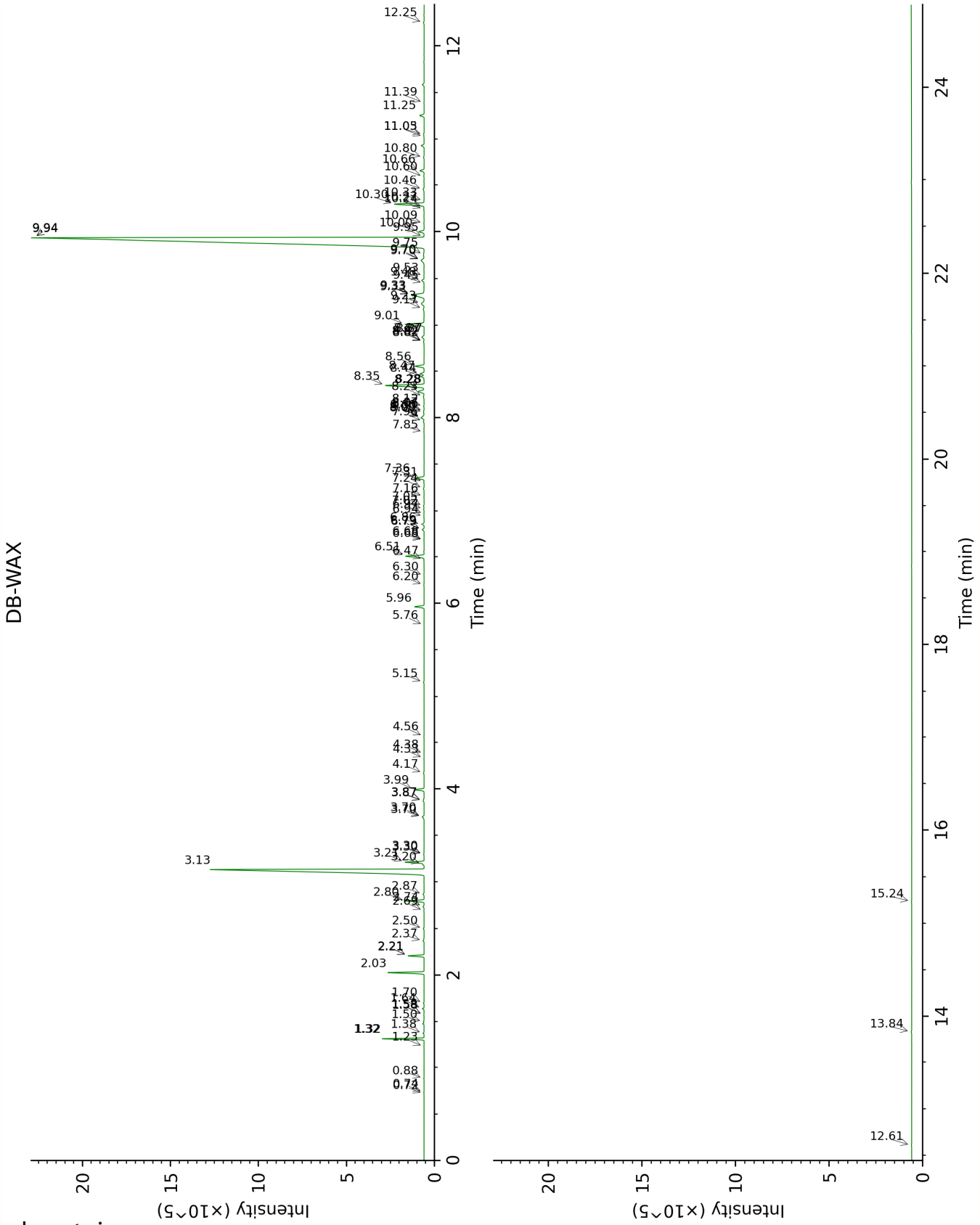
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

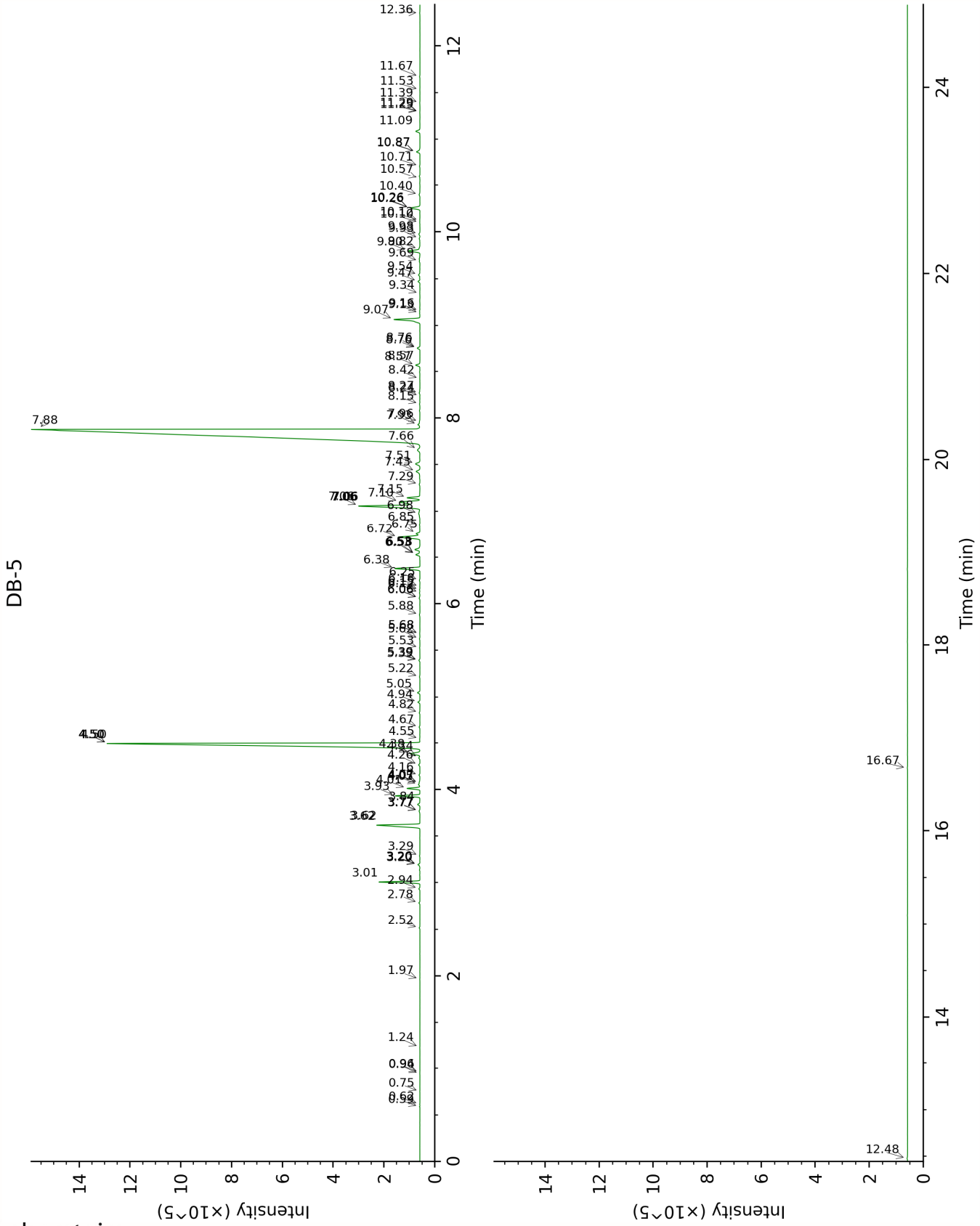
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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.

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


DB-WAX
Time (min)
Intensity (×10^5)
12.25
11.39
11.25
11.05
10.80
10.66
10.60
10.46
10.09
9.94
9.75
9.70
9.01
8.56
8.35
7.85
6.51
6.30
6.20
5.96
5.76
5.15
4.56
4.17
3.99
3.87
3.13
2.87
2.50
2.37
2.21
2.03
1.70
1.38
1.23
0.88
15.24
13.84
12.61


DB-5
Time (min)
Intensity (×10^5)
12.36
11.67
11.53
11.39
11.09
10.87
10.71
10.57
10.40
10.26
9.69
9.54
9.47
9.34
9.07
8.42
8.15
7.88
7.66
7.51
7.43
7.29
7.15
7.10
6.98
6.85
6.75
6.72
6.58
6.38
5.88
5.68
5.53
5.39
5.22
5.05
4.94
4.82
4.67
4.55
4.50
4.34
4.26
4.16
4.07
3.93
3.77
3.62
3.29
3.20
3.01
2.94
2.78
2.52
1.97
1.24
0.96
0.75
16.67
12.48

FULL ANALYSIS DATA

Isovaleral	Column DB-WAX			Column DB-5		
	0.74	885.4	0.01	0.59	642.8	0.01
2-Methylbutyral	0.72	879.2	tr	0.62	653.2	tr
2-Ethylfuran	0.88	920.3	0.01	0.75	702.4	tr
Isoamyl alcohol	3.30*	1173.1	[0.02]	0.94	732.3	tr
2-Methylbutanol	3.30*	1173.1	[0.02]	0.96	735.0	tr
Methyl 2-methylbutyrate	1.23	976.3	tr	1.24	775.2	tr
Ethyl 2-methylbutyrate	1.58*	1020.6	[0.01]	1.97	849.7	tr
trans-2,5-Diethyltetrahydrofuran	1.50	1013.4	0.02	2.52	896.4	0.02
Hashishene	1.32*	989.9	[1.37]	2.78	916.0	0.03
α-Thujene	1.38	999.3	0.03	2.94	926.1	0.04
α-Pinene	1.32*	989.9	[1.37]	3.01	931.0	1.32
α-Fenchene	1.58*	1020.6	[0.01]	3.20*	943.6	[0.08]
3-Methylcyclohexanone	4.56	1268.7	0.01	3.20*	943.6	[0.08]
Camphene	1.64	1027.0	0.06	3.20*	943.6	[0.08]
Thuja-2,4(10)-diene	2.21*	1083.0	[0.63]	3.29	949.8	0.02
β-Pinene	2.03	1065.2	1.46	3.62*	972.0	[2.10]
Sabinene	2.21*	1083.0	[0.63]	3.62*	972.0	[2.10]
cis-Carane	1.70	1032.9	0.02	3.77*	982.1	[0.04]
Octen-3-ol	6.68*	1418.9	[0.01]	3.77*	982.1	[0.04]
Octan-3-one	3.87*	1217.6	[0.07]	3.84	986.9	0.10
Myrcene	2.80	1133.6	0.85	3.93	993.2	0.85
Octan-3-ol	5.96	1366.5	0.46	4.01	998.5	0.45
Pseudolimonene	2.74	1128.7	0.05	4.06	1001.3	0.06
Octanal	4.33	1251.4	0.01	4.07*	1002.6	[0.04]
α-Phellandrene	2.69	1125.2	0.01	4.07*	1002.6	[0.04]
Δ3-Carene	2.50	1110.2	0.03	4.16	1007.9	0.03
α-Terpinene	2.87	1139.2	0.05	4.26	1014.8	0.05
Carvomenthene	2.37	1099.1	0.05	4.34	1019.5	0.05
para-Cymene	3.99	1226.4	0.47	4.38	1022.4	0.48
Limonene	3.14	1160.1	18.98	4.50*	1029.4	[19.87]
1,8-Cineole	3.21	1166.3	0.83	4.50*	1029.4	[19.87]
β-Phellandrene	3.20	1164.9	0.05	4.50*	1029.4	[19.87]
2-Ethylhexanol	7.16	1454.8	0.01	4.55	1032.6	0.01
(*Z*)-β-Ocimene	3.70*	1204.9	[0.11]	4.67	1040.6	0.03
(*E*)-β-Ocimene	3.87*	1217.6	[0.07]	4.82	1050.3	0.02
γ-Terpinene	3.70*	1204.9	[0.11]	4.94	1057.6	0.08
cis-Sabinene hydrate	6.79*	1427.3	[0.10]	5.05	1064.5	0.09
Octanol	8.06	1522.9	0.03	5.22	1075.2	0.02
para-Cymenene	6.20	1383.5	0.02	5.40*	1086.6	[0.04]
Terpinolene	4.17	1239.5	0.03	5.40*	1086.6	[0.04]

trans-Sabinene hydrate	7.85	1506.5	0.01	5.53	1095.3	0.01
Linalool	7.96	1515.4	0.04	5.62	1101.3	0.02
2-Methylbutyl 2-methylbutyrate	4.38	1254.9	0.01	5.68*	1104.7	[0.01]
Nonanal	5.76	1351.9	tr	5.68*	1104.7	[0.01]
trans-para-Mentha-2,8-dien-1-ol	8.82*	1582.8	[0.04]	5.88	1117.9	0.03
Octan-3-yl acetate	5.15	1307.6	0.03	6.06*	1129.6	[0.04]
cis-Limonene oxide	6.30	1390.7	0.01	6.06*	1129.6	[0.04]
cis-para-Mentha-2,8-dien-1-ol	9.33*	1622.9	[1.10]	6.12	1133.4	0.02
trans-Limonene oxide	6.47	1403.0	0.01	6.15	1135.4	0.02
Camphor	7.05	1446.9	0.03	6.18	1137.5	0.01
Isopulegol	8.00*	1518.5	[0.23]	6.25	1142.0	0.02
Menthone	6.51	1405.9	1.01	6.38	1150.2	1.00
Menthofuran	6.79*	1427.3	[0.10]	6.53*	1159.9	[0.19]
Isomenthone	6.86	1432.0	0.15	6.53*	1159.9	[0.19]
neo-Menthol	8.47	1555.5	0.21	6.58	1163.4	0.25
Menthol	9.01	1597.5	1.08	6.72	1172.1	1.10
Terpinen-4-ol	8.44	1553.1	0.15	6.75	1174.5	0.16
Isomenthol	8.82*	1582.8	[0.04]	6.85	1181.0	0.02
α-Terpineol	9.70*	1653.1	[0.28]	6.98	1189.0	0.07
cis-Dihydrocarvone	8.35	1545.7	2.31	7.06*	1194.3	[3.00]
neo-Dihydrocarveol	10.00	1678.2	0.29	7.06*	1194.3	[3.00]
Methylchavicol	9.23	1615.3	0.23	7.06*	1194.3	[3.00]
cis-Piperitol	9.45	1632.7	0.01	7.06*	1194.3	[3.00]
Dihydrocarveol	10.30	1702.3	1.64	7.10	1197.2	1.20
trans-Dihydrocarvone	8.56	1561.9	0.50	7.15	1200.1	0.51
trans-Piperitol	10.24	1697.8	0.02	7.29	1209.6	0.03
iso-Dihydrocarveol ?	10.66	1733.5	0.23	7.43	1219.1	0.22
trans-Carveol	11.25	1784.0	0.24	7.51	1224.7	0.24
Pulegone	8.87*	1586.7	[0.15]	7.66	1234.8	0.16
Carvone	9.94*	1672.9	[61.64]	7.88	1249.9	61.69
Piperitone	9.75	1658.0	0.06	7.93	1253.4	0.08
cis-Carvone oxide	10.80	1745.6	0.03	7.96	1255.7	0.02
Isopiperitenone	11.02	1764.5	0.02	8.15	1268.7	0.02
trans-Carvone oxide	11.05	1766.8	0.03	8.24	1274.4	0.01
Decanol	10.60	1728.0	0.03	8.27	1276.7	0.03
Dihydroedulan I	6.97	1440.3	0.01	8.42	1286.9	0.01
Menthyl acetate	8.00*	1518.5	[0.23]	8.57*	1297.2	[0.19]
Dihydroedulan II	7.31	1466.1	0.02	8.57*	1297.2	[0.19]
neo-Dihydrocarvyl acetate	8.87*	1586.7	[0.15]	8.76*	1306.9	[0.11]
Isomenthyl acetate	8.12	1528.2	0.02	8.76*	1306.9	[0.11]

Dihydrocarvyl acetate	9.33*	1622.9	[1.10]	9.07	1328.7	1.26
Bicycloelemene	6.94	1438.6	0.02	9.13	1333.5	0.01
trans-Carvyl acetate	10.09	1685.8	0.01	9.16	1335.4	0.01
α-Cubebene	6.68*	1418.9	[0.01]	9.34	1348.3	0.01
iso-Dihydrocarvyl acetate				9.47	1357.7	0.08
cis-Carvyl acetate	10.46	1715.8	0.05	9.54	1362.7	0.07
α-Copaene	7.02	1444.3	0.03	9.69	1373.0	0.02
β-Bourbonene	7.36	1469.5	0.52	9.80	1380.9	0.52
1,5-diepi-β-Bourbonene	7.24	1460.9	0.04	9.82	1382.4	0.03
β-Elemene	8.28*	1540.6	[0.41]	9.93	1390.4	0.03
(*Z*)-Jasmone	12.25	1872.1	0.04	9.98	1393.6	0.05
Unknown MEPI VIII [m/z 106, 119 (99), 43 (78), 91 (74), 105 (60), 134 (55)... 204 (19)]	11.39	1795.8	0.01	10.10	1402.6	0.01
Isocaryophyllene	8.07	1524.2	0.02	10.12	1404.2	0.01
β-Ylangene	8.00*	1518.5	[0.23]	10.26*	1414.0	[0.45]
β-Caryophyllene	8.28*	1540.6	[0.41]	10.26*	1414.0	[0.45]
β-Copaene	8.23	1536.3	0.05	10.40	1424.8	0.05
Isogermacrene D	8.82*	1582.8	[0.04]	10.58	1437.9	0.01
α-Humulene	9.17	1610.5	0.06	10.71	1448.4	0.02
(*E*)-β-Farnesene	9.48	1635.5	0.14	10.87*	1459.8	[0.17]
Unknown MISC XLIX [m/z 161, 105 (56), 91 (50), 93 (36), 119 (33), 79 (31)...204 (5)]				10.87*	1459.8	[0.17]
Germacrene D	9.70*	1653.1	[0.28]	11.09	1476.3	0.21
Bicyclogermacrene	9.95	1673.6	0.01	11.30*	1492.0	[0.01]
Viridiflorene	9.53	1639.6	0.01	11.30*	1492.0	[0.01]
α-Muurolene	9.94*	1672.9	[61.64]	11.39	1499.2	0.02
γ-Cadinene	10.26	1699.7	0.01	11.53	1510.1	0.01
δ-Cadinene	10.33	1705.4	0.01	11.67	1521.0	0.02
Caryophyllene oxide	12.61	1903.8	0.02	12.36	1575.2	0.02
Viridiflorol	13.84	2018.5	0.03	12.48	1584.7	0.03
meta-Camphorene	15.24	2156.3	0.01	16.67	1951.8	0.01
Total reported		99.26%			99.55%	

*: 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