

Date : 2026-09-17

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 26H07-PTH03

Customer Identification : Spearmint ORGANIC - India - S40112

Type : Essential Oil

Source : *Mentha spicata*

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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 2026-08-14 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 : Jean-Christophe Fortin, M. Sc.

Date : 2026-08-11

PHYSICOCHEMICAL DATA

Refractive index : 1.489 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2026-08-07

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	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Isoamyl alcohol	0.01	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Methyl 2-methylbutyrate	0.01	Aliphatic ester
Ethyl 2-methylbutyrate	0.01	Aliphatic ester
(3Z)-Hexenol	0.01	Aliphatic alcohol
Hexanol	tr	Aliphatic alcohol
<i>trans</i> -2,5-Diethyltetrahydrofuran	0.06	Furan
Hashishene	0.09	Monoterpene
α -Thujene	0.04	Monoterpene
α -Pinene	0.76	Monoterpene
α -Fenchene	tr	Monoterpene
3-Methylcyclohexanone	0.04	Aliphatic ketone
Camphene	0.01	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
β -Pinene	0.85	Monoterpene
Sabinene	0.46	Monoterpene
Octen-3-ol	0.02	Aliphatic alcohol
Octan-3-one	0.05	Aliphatic ketone
Myrcene	1.80	Monoterpene
Octan-3-ol	0.43	Aliphatic alcohol
Pseudolimonene	0.06	Monoterpene
Octanal	0.02	Aliphatic aldehyde
α -Phellandrene	0.03	Monoterpene
Δ^3 -Carene	0.01	Monoterpene
α -Terpinene	0.14	Monoterpene
Carvomenthene	0.01	Aliphatic alcohol
<i>para</i> -Cymene	0.24	Monoterpene
1,8-Cineole	1.53	Monoterpenic ether
Limonene	19.51	Monoterpene
2-Ethylhexanol	0.01	Aliphatic alcohol
(Z)- β -Ocimene	0.09	Monoterpene
(E)- β -Ocimene	0.06	Monoterpene
γ -Terpinene	0.25	Monoterpene
<i>cis</i> -Sabinene hydrate	0.24	Monoterpenic alcohol
Octanol	0.05	Aliphatic alcohol
Terpinolene	0.10	Monoterpene
<i>para</i> -Cymenene	0.04	Monoterpene

<i>trans</i> -Sabinene hydrate	0.03	Monoterpenic alcohol
Linalool	0.05	Monoterpenic alcohol
2-Methylbutyl 2-methylbutyrate	0.01	Aliphatic ester
Nonanal	0.01	Aliphatic aldehyde
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.07	Monoterpenic alcohol
Octan-3-yl acetate	0.11	Aliphatic ester
<i>cis</i> -Limonene oxide	0.01	Monoterpenic ether
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.06	Monoterpenic alcohol
<i>trans</i> -Limonene oxide	0.04	Monoterpenic ether
Camphor	0.04	Monoterpenic ketone
Isopulegol	0.02	Monoterpenic alcohol
Menthone	0.21	Monoterpenic ketone
Menthofuran	0.01	Monoterpenic ether
Isomenthone	0.06	Monoterpenic ketone
neo-Menthol	0.07	Monoterpenic alcohol
δ -Terpineol	0.07	Monoterpenic alcohol
Menthol	0.59	Monoterpenic alcohol
Terpinen-4-ol	0.59	Monoterpenic alcohol
Isomenthol	0.02	Monoterpenic alcohol
α -Terpineol	0.27	Monoterpenic alcohol
neo-Dihydrocarveol	0.37	Monoterpenic alcohol
<i>cis</i> -Dihydrocarvone	1.50	Monoterpenic ketone
Methylchavicol	0.03	Phenylpropanoid
Dihydrocarveol	0.26	Monoterpenic alcohol
<i>trans</i> -Dihydrocarvone	0.24	Monoterpenic ketone
<i>trans</i> -Piperitol	0.01	Monoterpenic alcohol
iso-Dihydrocarveol ?	0.05	Monoterpenic alcohol
<i>trans</i> -Carveol	0.39	Monoterpenic alcohol
Pulegone	0.03	Monoterpenic ketone
<i>cis</i> -Carveol	0.19	Monoterpenic alcohol
Carvone	60.66	Monoterpenic ketone
Piperitone	0.18	Monoterpenic ketone
<i>cis</i> -Carvone oxide	0.04	Monoterpenic ketone
Isopiperitenone	0.05	Monoterpenic ketone
<i>trans</i> -Carvone oxide	0.06	Monoterpenic ketone
Decanol	0.08	Aliphatic alcohol
Dihydroedulan I	0.02	Terpenic ether
Menthyl acetate	0.05	Monoterpenic ester
Dihydroedulan II	0.06	Terpenic ether
Isomenthyl acetate	0.01	Monoterpenic alcohol
Dihydrocarvyl acetate	0.30	Monoterpenic ester
Bicycloelemene	0.03	Sesquiterpene
<i>trans</i> -Carvyl acetate	0.02	Monoterpenic ester
α -Cubebene	0.01	Sesquiterpene
iso-Dihydrocarvyl acetate	0.02	Monoterpenic ester

Eugenol	0.03	Phenylpropanoid
Piperitenone oxide	0.04	Monoterpenic ketone
cis-Carvyl acetate	0.20	Monoterpenic ester
α -Ylangene	0.04	Sesquiterpene
α -Copaene	0.06	Sesquiterpene
β -Bourbonene	1.06	Sesquiterpene
1,5-diepi- β -Bourbonene	0.07	Sesquiterpene
β -Elemene	0.14	Sesquiterpene
(Z)-Jasmone	0.14	Jasmonate
Unknown	0.01	Sesquiterpene
Isocaryophyllene	0.11	Sesquiterpene
Unknown MISC CCCXLII [m/z 108, 81 (93), 95 (81), 93 (58), 107 (57), 121 (53), 150 (52)... 220 (12)]	0.11	Oxygenated sesquiterpene
β -Caryophyllene	0.68	Sesquiterpene
β -Ylangene	0.23	Sesquiterpene
β -Copaene	0.16	Sesquiterpene
Isogermacrene D	0.11	Sesquiterpene
α -Humulene	0.10	Sesquiterpene
allo-Aromadendrene	0.04	Sesquiterpene
Unknown	0.08	Sesquiterpene
(E)- β -Farnesene	0.39	Sesquiterpene
Germacrene D	0.52	Sesquiterpene
Bicyclogermacrene	0.03	Sesquiterpene
Viridiflorene	0.05	Sesquiterpene
α -Murolene	0.07	Sesquiterpene
γ -Cadinene	0.03	Sesquiterpene
δ -Cadinene	0.08	Sesquiterpene
Spathulenol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Caryophyllene oxide	0.03	Sesquiterpenic ether
Viridiflorol	0.06	Sesquiterpenic alcohol
meta-Camphorene	0.01	Diterpene
Consolidated total	98.80	

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

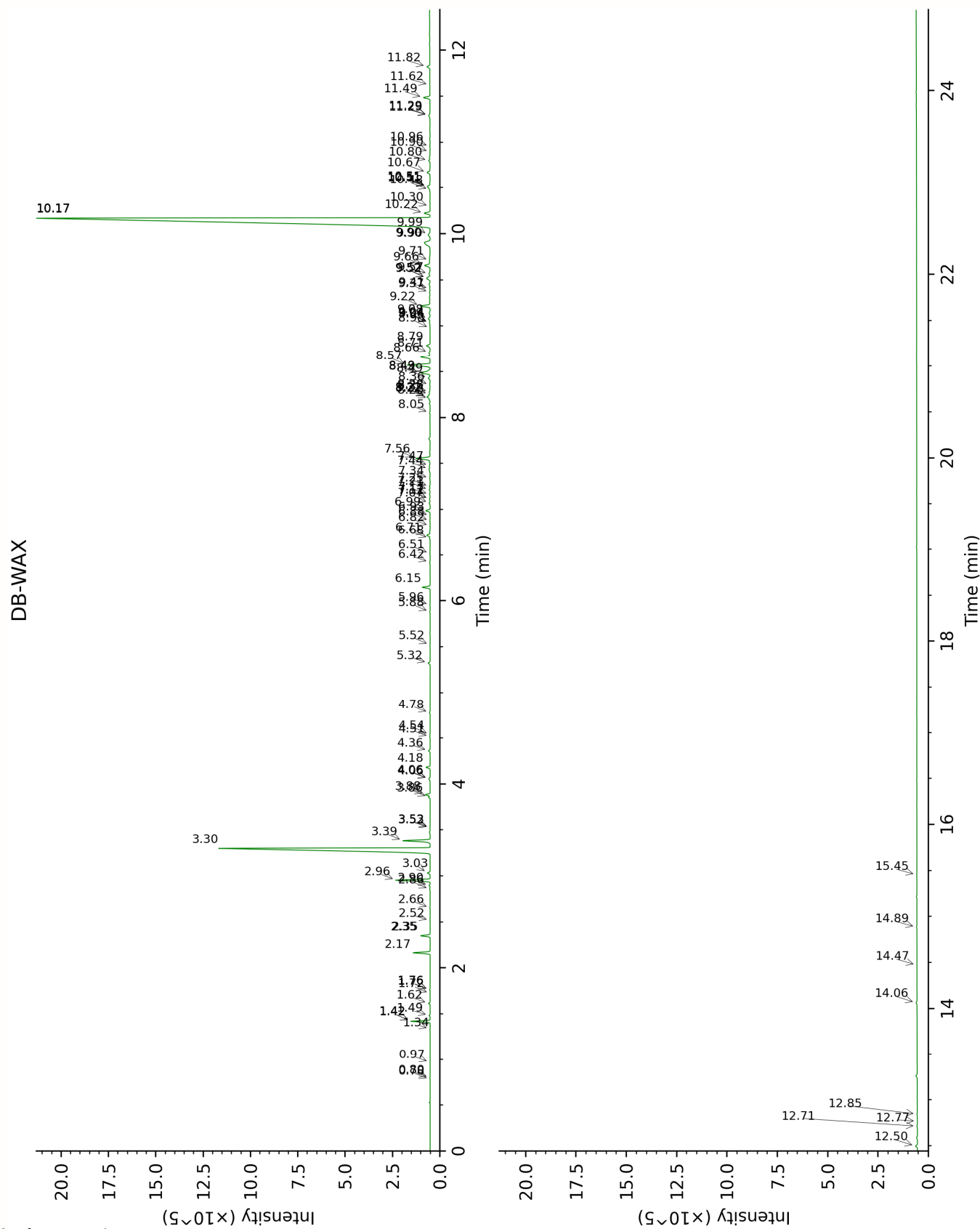
Note: no correction factor was applied

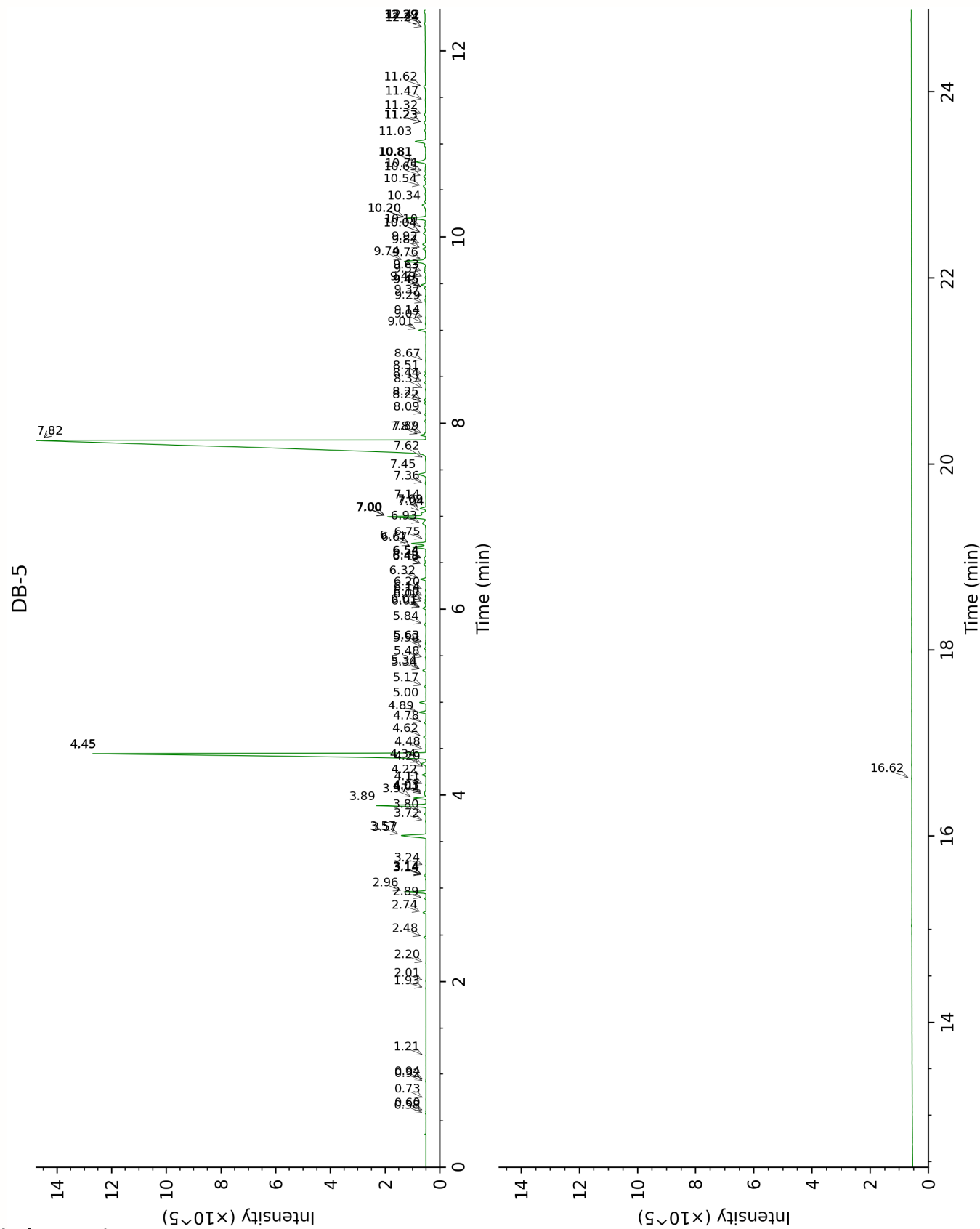
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Isovaleral	Column DB-WAX			Column DB-5		
	0.80	888.0	0.01	0.58	643.8	0.01
2-Methylbutyral	0.78	881.5	0.01	0.60	654.2	0.01
2-Ethylfuran	0.97	919.7	tr	0.74	704.1	tr
Isoamyl alcohol	3.53	1179.2	0.01	0.92	733.3	0.01
2-Methylbutanol	3.52	1178.4	0.01	0.94	736.1	tr
Methyl 2-methylbutyrate	1.34	977.7	tr	1.21	775.8	0.01
Ethyl 2-methylbutyrate	1.76*	1026.6	[0.02]	1.93	850.4	0.01
(3Z)-Hexenol	5.88	1350.5	0.02	2.01	856.9	0.01
Hexanol	5.52	1325.1	0.01	2.20	873.2	tr
trans-2,5-Diethyltetrahydrofuran	1.62	1012.1	0.06	2.48	897.0	0.06
Hashishene	1.42*	991.3	[0.86]	2.74	916.6	0.09
α-Thujene	1.48	999.3	0.04	2.89	926.6	0.04
α-Pinene	1.42*	991.3	[0.86]	2.96	931.4	0.76
α-Fenchene	1.72	1022.6	tr	3.14*	943.1	[0.06]
3-Methylcyclohexanone	4.78	1271.6	0.04	3.14*	943.1	[0.06]
Camphene	1.76*	1026.6	[0.02]	3.14*	943.1	[0.06]
Thuja-2,4(10)-diene	2.35*	1084.2	[0.47]	3.24	950.2	0.01
β-Pinene	2.17	1066.0	0.85	3.57*	972.2	[1.32]
Sabinene	2.35*	1084.2	[0.47]	3.57*	972.2	[1.32]
Octen-3-ol	6.88	1421.8	0.02	3.72	982.6	0.02
Octan-3-one	4.06*	1218.8	[0.10]	3.80	987.7	0.05
Myrcene	2.96	1133.9	1.80	3.89	993.9	1.80
Octan-3-ol	6.15	1369.4	0.44	3.97	999.3	0.43
Pseudolimonene	2.90	1129.4	0.05	4.01	1001.8	0.06
Octanal	4.51	1252.2	0.02	4.03*	1003.2	[0.07]
α-Phellandrene	2.86	1126.1	0.03	4.03*	1003.2	[0.07]
Δ3-Carene	2.66	1110.3	0.01	4.11	1008.5	0.01
α-Terpinene	3.03	1140.0	0.14	4.22	1015.3	0.14
Carvomenthene	2.52	1099.6	0.01	4.29	1019.9	0.01
para-Cymene	4.18	1227.9	0.23	4.34	1022.9	0.24
1,8-Cineole	3.39	1167.6	1.53	4.44*	1029.8	[21.02]
Limonene	3.30	1161.0	19.51	4.44*	1029.8	[21.02]
2-Ethylhexanol	7.34	1456.1	0.03	4.48	1032.1	0.01
(Z)-β-Ocimene	3.86	1204.2	0.09	4.62	1041.2	0.09
(E)-β-Ocimene	4.06*	1218.8	[0.10]	4.78	1050.9	0.06
γ-Terpinene	3.88	1206.1	0.27	4.89	1058.2	0.25
cis-Sabinene hydrate	6.99	1430.1	0.25	5.00	1065.3	0.24
Octanol	8.28	1526.0	0.06	5.17	1076.2	0.05
Terpinolene	4.36	1241.1	0.10	5.34*	1087.2	[0.12]
para-Cymenene	6.42	1388.7	0.04	5.34*	1087.2	[0.12]

<i>trans</i> -Sabinene hydrate	8.05	1508.8	0.03	5.48	1095.8	0.03
Linalool	8.20	1520.3	0.05	5.58	1102.1	0.05
2-Methylbutyl 2-methylbutyrate	4.54	1254.1	0.01	5.64*	1105.7	[0.03]
Nonanal	5.96	1355.9	0.01	5.64*	1105.7	[0.03]
<i>trans-para</i> -Mentha-2,8-dien-1-ol	9.04*	1584.1	[0.07]	5.84	1118.9	0.07
Octan-3-yl acetate	5.32	1311.1	0.11	6.01*	1130.1	[0.13]
<i>cis</i> -Limonene oxide	6.52	1395.5	0.01	6.01*	1130.1	[0.13]
<i>cis-para</i> -Mentha-2,8-dien-1-ol	9.57	1626.4	0.10	6.07	1134.1	0.06
<i>trans</i> -Limonene oxide	6.68	1407.5	0.04	6.10	1136.0	0.04
Camphor	7.25	1449.4	0.04	6.14	1138.3	0.04
Isopulegol	8.25	1523.9	0.06	6.20	1142.7	0.02
Menthone	6.71	1410.0	0.21	6.32	1150.5	0.21
Menthofuran	6.93	1425.8	0.01	6.48*	1160.5	[0.10]
Isomenthone	7.07	1436.1	0.06	6.48*	1160.5	[0.10]
neo-Menthol	8.71	1559.0	0.08	6.54	1164.3	0.07
δ -Terpineol	9.52*	1622.4	[0.31]	6.54	1164.7	0.07
Menthol	9.22	1598.4	0.63	6.67	1172.8	0.59
Terpinen-4-ol	8.66	1555.4	0.60	6.70	1175.3	0.59
Isomenthol	8.98	1579.5	0.01	6.75	1178.0	0.02
α -Terpineol	9.90*	1653.4	[0.76]	6.93	1189.9	0.27
neo-Dihydrocarveol	10.22	1678.9	0.37	7.00*	1194.5	[1.79]
<i>cis</i> -Dihydrocarvone	8.57	1548.6	1.50	7.00*	1194.5	[1.79]
Methylchavicol	9.41	1613.4	0.03	7.00*	1194.5	[1.79]
Dihydrocarveol	10.51*	1702.7	[0.26]	7.04	1196.9	0.26
<i>trans</i> -Dihydrocarvone	8.79	1565.0	0.25	7.09	1200.4	0.24
<i>trans</i> -Piperitol	10.48	1699.7	0.03	7.14	1203.8	0.01
iso-Dihydrocarveol ?	10.90	1734.8	0.02	7.36	1218.4	0.05
<i>trans</i> -Carveol	11.49	1784.5	0.41	7.45	1225.2	0.39
Pulegone	9.04*	1584.1	[0.07]	7.62	1236.2	0.03
<i>cis</i> -Carveol	11.82	1813.8	0.19	7.82*	1250.1	[60.84]
Carvone	10.17*	1674.5	[60.82]	7.82*	1250.1	[60.84]
Piperitone	9.99	1660.2	0.17	7.87	1253.8	0.18
<i>cis</i> -Carvone oxide	10.96	1740.0	0.01	7.89	1254.8	0.04
Isopiperitenone	11.29*	1768.3	[0.11]	8.09	1269.0	0.05
<i>trans</i> -Carvone oxide	11.29*	1768.3	[0.11]	8.22	1277.4	0.06
Decanol	10.80	1726.9	0.10	8.25	1279.6	0.08
Dihydroedulan I	7.16	1443.1	0.04	8.36	1287.6	0.02
Menthyl acetate	8.22*	1521.9	[0.24]	8.44	1292.6	0.05
Dihydroedulan II	7.47	1465.7	0.06	8.51	1297.8	0.06
Isomenthyl acetate	8.36	1532.1	0.03	8.67	1304.2	0.01
Dihydrocarvyl acetate	9.52*	1622.4	[0.31]	9.01	1328.3	0.30

Bicycloelemene	7.12*	1439.4	[0.05]	9.07	1333.0	0.03
<i>trans</i> -Carvyl acetate	10.30	1684.8	0.01	9.14	1337.7	0.02
α -Cubebene	6.82	1417.9	0.01	9.29	1348.4	0.01
<i>iso</i> -Dihydrocarvyl acetate				9.37	1354.2	0.02
Eugenol	14.89	2096.7	0.03	9.45*	1360.4	[0.06]
Piperitenone oxide	12.71	1892.2	0.04	9.45*	1360.4	[0.06]
<i>cis</i> -Carvyl acetate	10.67	1716.1	0.20	9.49	1362.8	0.20
α -Ylangene	7.12*	1439.4	[0.05]	9.57	1368.3	0.04
α -Copaene	7.22	1446.7	0.06	9.63	1372.9	0.06
β -Bourbonene	7.56	1471.8	0.95	9.74	1380.9	1.06
1,5-diepi- β -Bourbonene	7.44	1463.4	0.08	9.76	1382.3	0.07
β -Elemene	8.49*	1542.1	[0.82]	9.87	1390.4	0.14
(<i>Z</i>)-Jasmone	12.50	1872.9	0.12	9.92	1393.8	0.14
Unknown MEPI VIII [m/z 106, 119 (99), 43 (78), 91 (74), 105 (60), 134 (55)... 204 (19)]	11.62	1796.4	0.01	10.04*	1402.2	[0.13]
Isocaryophyllene	8.22*	1521.9	[0.24]	10.04*	1402.2	[0.13]
Unknown MISC CCCXLII [m/z 108, 81 (93), 95 (81), 93 (58), 107 (57), 121 (53), 150 (52)... 220 (12)]				10.10	1406.7	0.11
β -Caryophyllene	8.49*	1542.1	[0.82]	10.20*	1414.2	[0.91]
β -Ylangene	8.22*	1521.9	[0.24]	10.20*	1414.2	[0.91]
β -Copaene	8.43	1537.6	0.14	10.34	1424.8	0.16
Isogermacrene D	9.08	1587.6	0.13	10.54	1440.0	0.11
α -Humulene	9.37	1610.1	0.05	10.65	1448.2	0.10
<i>allo</i> -Aromadendrene	9.04*	1584.1	[0.07]	10.71	1452.7	0.04
Unknown MISC XLIX [m/z 161, 105 (56), 91 (50), 93 (36), 119 (33), 79 (31)...204 (5)]				10.81*	1460.2	[0.47]
(<i>E</i>)- β -Farnesene	9.66	1633.5	0.39	10.81*	1460.2	[0.47]
Germacrene D	9.90*	1653.4	[0.76]	11.03	1476.6	0.52
Bicyclogermacrene	10.17*	1674.5	[60.82]	11.23*	1491.8	[0.08]
Viridiflorene	9.71	1637.8	0.05	11.23*	1491.8	[0.08]
α -Muurolene	10.17*	1674.5	[60.82]	11.32	1498.4	0.07
γ -Cadinene	10.51*	1702.7	[0.26]	11.47	1510.2	0.03
δ -Cadinene	10.51*	1702.7	[0.26]	11.62	1521.5	0.08
Spathulenol	14.47	2056.7	tr	12.24	1571.4	0.01
Caryophyllene oxide isomer	12.77	1897.3	0.01	12.29*	1575.2	[0.04]

Caryophyllene oxide	12.85	1904.4	0.03	12.29*	1575.2	[0.04]
Viridiflorol	14.06	2017.4	0.07	12.42	1585.2	0.06
meta-Camphorene	15.45	2153.6	0.02	16.62	1952.8	0.01
Total reported		98.24%			98.70%	

*: 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