

Date : 2026-01-05

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25L08-PTH04

Customer Identification : Peppermint ORGANIC - India - P40116R

Type : Essential Oil

Source : *Mentha x piperita*

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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 2025-12-10 to correct the customer identification.

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 : 2025-12-10

PHYSICOCHEMICAL DATA

Refractive index : 1.4611 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-12-09

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
Isoamyl alcohol	0.01	Aliphatic alcohol
2-Methylbutanol	tr	Aliphatic alcohol
Ethyl 2-methylbutyrate	tr	Aliphatic ester
(3Z)-Hexenol	0.01	Aliphatic alcohol
Hexanol	0.01	Aliphatic alcohol
<i>trans</i> -2,5-Diethyltetrahydrofuran	0.01	Furan
α -Thujene	0.03	Monoterpene
α -Pinene	0.43	Monoterpene
<i>trans</i> -3-Methylcyclohexanol	0.01	Aliphatic alcohol
Camphene	0.01	Monoterpene
3-Methylcyclohexanone	0.05	Aliphatic ketone
Thuja-2,4(10)-diene	0.01	Monoterpene
β -Pinene	0.98	Monoterpene
Sabinene	0.44	Monoterpene
Octen-3-ol	0.08	Aliphatic alcohol
<i>cis</i> -Carane	0.01	Monoterpene
Octan-3-one	0.04	Aliphatic ketone
Myrcene	0.19	Monoterpene
Octan-3-ol	0.20	Aliphatic alcohol
Pseudolimonene	0.02	Monoterpene
α -Phellandrene	0.03	Monoterpene
Δ^3 -Carene	0.01	Monoterpene
α -Terpinene	0.21	Monoterpene
Carvomenthene	0.01	Aliphatic alcohol
<i>para</i> -Cymene	0.30	Monoterpene
Limonene	2.11	Monoterpene
1,8-Cineole	5.22	Monoterpenic ether
2-Ethylhexanol	0.01	Aliphatic alcohol
(Z)- β -Ocimene	0.07	Monoterpene
(E)- β -Ocimene	0.05	Monoterpene
γ -Terpinene	0.37	Monoterpene
<i>cis</i> -Sabinene hydrate	0.34	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Octanol	0.03	Aliphatic alcohol
<i>para</i> -Cymenene	0.01	Monoterpene
Terpinolene	0.13	Monoterpene
<i>trans</i> -Sabinene hydrate	0.04	Monoterpenic alcohol
Linalool	0.24	Monoterpenic alcohol
Nonan-3-ol	0.01	Aliphatic alcohol
2-Methylbutyl 2-methylbutyrate	0.05	Aliphatic ester

β -Thujone	0.01	Monoterpenic ketone
Amyl isovalerate	0.04	Aliphatic ester
Octen-3-yl acetate	0.01	Aliphatic ester
<i>cis-para</i> -Menth-2-en-1-ol	0.05	Monoterpenic alcohol
Octan-3-yl acetate	0.01	Aliphatic ester
allo-Ocimene	0.08	Monoterpene
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.03	Monoterpenic alcohol
<i>trans</i> -Sabinol	0.08	Monoterpenic alcohol
Isopulegol	0.16	Monoterpenic alcohol
Menthone	23.54	Monoterpenic ketone
Isomenthone	5.03	Monoterpenic ketone
Menthofuran	3.12	Monoterpenic ether
neo-Menthol	3.50	Monoterpenic alcohol
Terpinen-4-ol	0.76	Monoterpenic alcohol
Menthol	35.33	Monoterpenic alcohol
Isomenthol	0.54	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.04	Monoterpenic alcohol
α -Terpineol	0.40	Monoterpenic alcohol
neoiso-Menthol	0.16	Monoterpenic alcohol
Myrtenal	0.01	Monoterpenic aldehyde
<i>trans</i> -Isopiperitenol	0.02	Monoterpenic alcohol
Unknown	0.01	Unknown
<i>trans</i> -Piperitol	0.02	Monoterpenic alcohol
Dimethylbenzofuran isomer?	0.03	Simple phenolic
Unknown UNKN CCCXCVIII [m/z 43, 99 (91), 81 (48), 86 (45), 126 (36)...]	0.05	Unknown
(3Z)-Hexenyl 2-methylbutyrate	0.02	Aliphatic ester
Citronellol	0.03	Monoterpenic alcohol
Pulegone	1.62	Monoterpenic ketone
(3Z)-Hexenyl isovalerate	0.03	Aliphatic ester
Carvone	0.08	Monoterpenic ketone
Piperitone	0.56	Monoterpenic ketone
<i>trans</i> -Ascaridole glycol	0.01	Monoterpenic alcohol
Decanol	0.06	Aliphatic alcohol
neo-Menthyl acetate	0.33	Monoterpenic ester
Thymol	0.04	Monoterpenic alcohol
Menthyl acetate	5.59	Monoterpenic ester
Dihydroedulan II	0.05	Terpenic ether
Isomenthyl acetate	0.24	Monoterpenic alcohol
Unknown	0.03	Unknown
neoiso-Menthyl acetate?	0.01	Monoterpenic ester
Bicycloelemene	0.05	Sesquiterpene
α -Cubebene	0.02	Sesquiterpene
Eugenol	0.01	Phenylpropanoid
α -Ylangene	0.02	Sesquiterpene

α -Copaene	0.06	Sesquiterpene
β -Bourbonene isomer	0.01	Sesquiterpene
β -Bourbonene	0.23	Sesquiterpene
1,5-diepi- β -Bourbonene	0.02	Sesquiterpene
β -Cubebene	0.02	Sesquiterpene
β -Elemene	0.12	Sesquiterpene
Cyperene	0.04	Sesquiterpene
Longifolene	0.02	Sesquiterpene
Isocaryophyllene	0.03	Sesquiterpene
Perillyl acetate	0.02	Monoterpenic ester
β -Ylangene	0.15	Sesquiterpene
β -Caryophyllene	2.46	Sesquiterpene
β -Copaene	0.07	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.03	Sesquiterpene
Isogermacrene D	0.03	Sesquiterpene
α -Humulene	0.10	Sesquiterpene
ϵ -Murolene?	0.07	Sesquiterpene
Muurolo-4,11-diene	0.02	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.21	Sesquiterpene
9-epi- β -Caryophyllene	0.04	Sesquiterpene
γ -Murolene	0.04	Sesquiterpene
Germacrene D	0.87	Sesquiterpene
Bicyclogermacrene	0.19	Sesquiterpene
Viridiflorene	0.08	Sesquiterpene
α -Murolene	0.04	Sesquiterpene
γ -Cadinene	0.03	Sesquiterpene
δ -Cadinene	0.10	Sesquiterpene
Isocaryophyllene epoxide B	0.02	Sesquiterpenic ether
(<i>E</i>)-Nerolidol	0.01	Sesquiterpenic alcohol
Spathulenol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.07	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Viridiflorol	0.10	Sesquiterpenic alcohol
Isospathulenol	0.01	Sesquiterpenic alcohol
τ -Cadinol	0.01	Sesquiterpenic alcohol
β -Eudesmol	0.01	Sesquiterpenic alcohol
α -Cadinol	0.01	Sesquiterpenic alcohol
Ageratochromene	0.01	Chromane
Menthallactone	0.01	Monoterpenic lactone
Consolidated total	99.04	

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

Note: no correction factor was applied

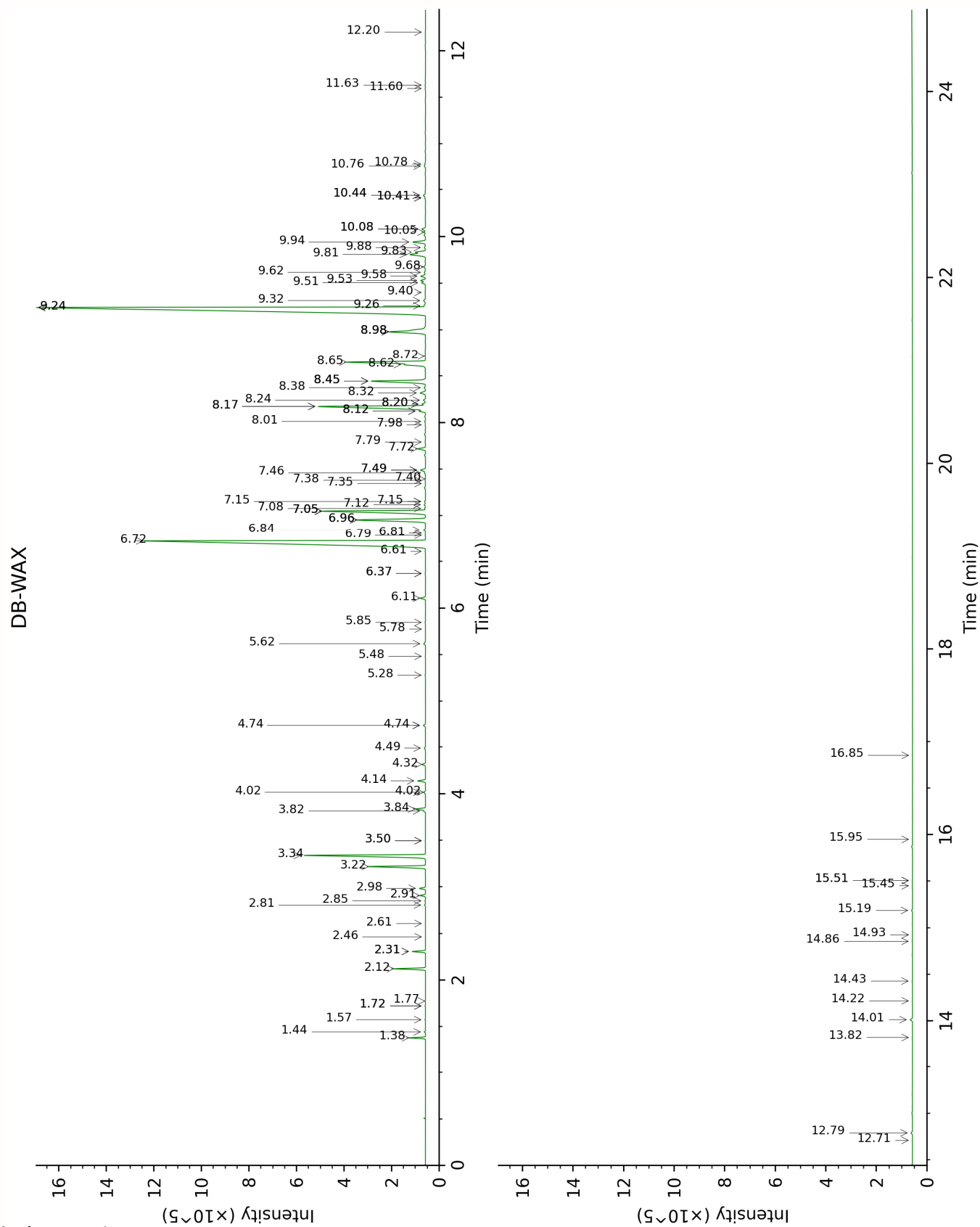
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

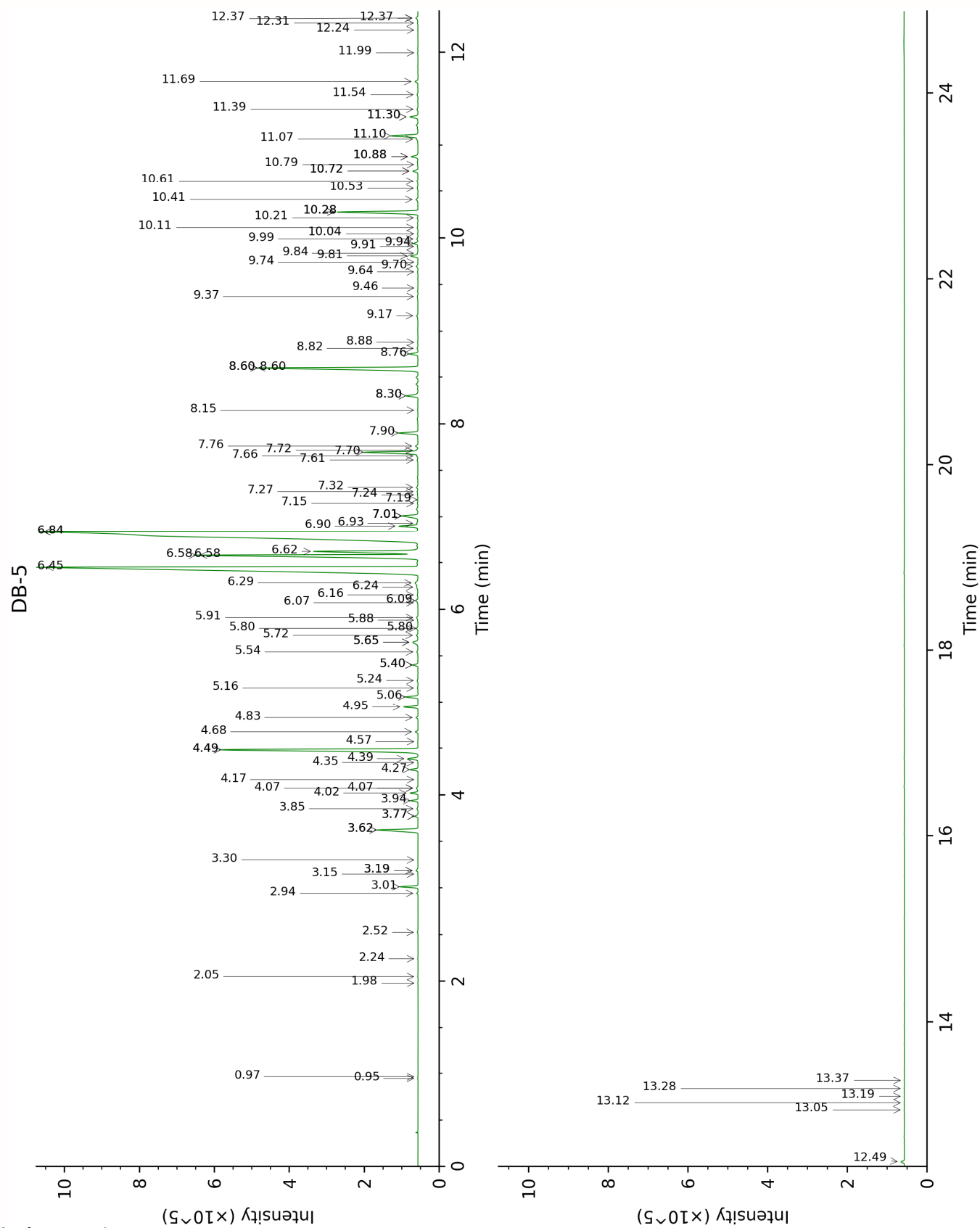
chromatograms in this report to access the full untreated data and perform their own calculations if needed.

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

Isoamyl alcohol	Column DB-WAX			Column DB-5		
	3.50*	1180.4	[0.02]	0.95	733.2	0.01
2-Methylbutanol	3.50*	1180.4	[0.02]	0.97	735.7	tr
Ethyl 2-methylbutyrate	1.72*	1026.2	[0.01]	1.98	850.5	tr
(3Z)-Hexenol	5.78	1345.7	0.01	2.05	856.5	0.01
Hexanol	5.48	1324.9	0.01	2.24	872.7	0.01
trans-2,5-Diethyltetrahydrofuran	1.58	1011.5	0.01	2.52	896.8	0.01
α-Thujene	1.44	998.6	0.03	2.94	926.4	0.03
α-Pinene	1.38	990.7	0.43	3.01	931.2	0.43
trans-3-Methylcyclohexanol	6.81	1420.0	0.01	3.15	940.3	0.01
Camphene	1.72*	1026.2	[0.01]	3.19*	942.8	[0.06]
3-Methylcyclohexanone	4.74*	1272.6	[0.09]	3.19*	942.8	[0.06]
Thuja-2,4(10)-diene	2.31*	1084.5	[0.41]	3.30	950.5	0.01
β-Pinene	2.12	1066.0	0.98	3.62*	972.1	[1.42]
Sabinene	2.31*	1084.5	[0.41]	3.62*	972.1	[1.42]
Octen-3-ol	6.84	1422.7	0.08	3.77*	982.0	[0.09]
cis-Carane	1.78	1031.4	0.01	3.77*	982.0	[0.09]
Octan-3-one	4.02*	1219.8	[0.08]	3.85	987.4	0.04
Myrcene	2.91	1134.0	0.18	3.94	993.2	0.19
Octan-3-ol	6.11	1369.4	0.20	4.02	998.7	0.20
Pseudolimonene	2.85	1129.5	0.02	4.07*	1002.3	[0.07]
α-Phellandrene	2.81	1125.9	0.03	4.07*	1002.3	[0.07]
Δ3-Carene	2.61	1110.3	0.01	4.16	1008.2	0.01
α-Terpinene	2.98	1140.0	0.21	4.27	1015.0	0.21
Carvomenthene	2.46	1099.1	tr	4.35	1019.8	0.01
para-Cymene	4.14	1228.8	0.29	4.39	1022.4	0.30
Limonene	3.22	1158.5	2.11	4.49*	1028.5	[7.30]
1,8-Cineole	3.34	1168.0	5.22	4.49*	1028.5	[7.30]
2-Ethylhexanol	7.35	1459.6	0.01	4.57	1034.1	0.01
(Z)-β-Ocimene	3.82	1205.0	0.05	4.68	1040.7	0.07
(E)-β-Ocimene	4.02*	1219.8	[0.08]	4.83	1050.5	0.05
γ-Terpinene	3.84	1206.5	0.38	4.95	1057.8	0.37
cis-Sabinene hydrate	6.96*	1430.8	[3.46]	5.06	1065.0	0.34
cis-Linalool oxide (fur.)	6.61	1405.5	0.02	5.16	1071.0	0.02
Octanol	8.24	1526.7	0.09	5.24	1076.2	0.03
para-Cymenene	6.37*	1388.2	[0.02]	5.40*	1086.8	[0.14]
Terpinolene	4.32	1241.8	0.13	5.40*	1086.8	[0.14]
trans-Sabinene hydrate	8.01	1509.2	0.03	5.54	1095.7	0.04
Linalool	8.12*	1517.7	[0.24]	5.65*	1102.3	[0.25]
Nonan-3-ol	7.40	1463.3	0.01	5.65*	1102.3	[0.25]

2-Methylbutyl 2-methylbutyrate	4.49	1254.6	0.05	5.72	1107.1	0.05
β-Thujone	6.37*	1388.2	[0.02]	5.80*	1111.9	[0.05]
Amyl isovalerate	4.74*	1272.6	[0.09]	5.80*	1111.9	[0.05]
Octen-3-yl acetate	5.85	1350.8	0.02	5.88	1117.7	0.01
cis-para-Menth-2-en-1-ol	8.20*	1523.5	[0.13]	5.91	1119.5	0.05
Octan-3-yl acetate	5.28	1310.5	0.02	6.07	1129.8	0.01
allo-Ocimene	5.62	1334.5	0.09	6.10	1131.3	0.08
cis-para-Mentha-2,8-dien-1-ol	9.53	1627.4	0.20	6.16	1135.2	0.03
trans-Sabinol	9.88	1655.7	0.06	6.24	1140.7	0.08
Isopulegol	8.17*	1521.6	[5.79]	6.28	1143.6	0.16
Menthone	6.72	1413.7	23.55	6.45	1154.6	23.54
Isomenthone	7.05*	1437.8	[5.10]	6.58*	1162.9	[8.25]
Menthofuran	6.96*	1430.8	[3.46]	6.58*	1162.9	[8.25]
neo-Menthol	8.65	1558.2	3.43	6.62	1165.6	3.50
Terpinen-4-ol	8.62	1556.1	0.76	6.84*	1179.4	[36.09]
Menthol	9.24*	1604.1	[35.19]	6.84*	1179.4	[36.09]
Isomenthol	8.98*	1583.7	[2.27]	6.90	1183.7	0.54
para-Cymen-8-ol	11.60	1798.5	0.02	6.93	1185.6	0.04
α-Terpineol	9.83	1651.7	0.40	7.01*	1190.8	[0.60]
neoiso-Menthol	9.51	1625.4	0.16	7.01*	1190.8	[0.60]
Myrtenal	8.72	1563.4	0.01	7.01*	1190.8	[0.60]
trans-Isopiperitenol	10.44*	1701.1	[0.11]	7.15	1199.6	0.02
Unknown MEPI V [m/z 43, 99 (84), 81 (46), 986 (43), 126 (36), 71 (28)... 170 (12)]				7.19	1202.1	0.01
trans-Piperitol	10.41*	1698.8	[0.03]	7.24	1205.5	0.02
Dimethylbenzofuran isomer?				7.27	1207.9	0.03
Unknown UNKN CCCXCVIII [m/z 43, 99 (91), 81 (48), 86 (45), 126 (36)...]				7.32	1211.0	0.05
(3Z)-Hexenyl 2-methylbutyrate	7.08	1439.8	0.04	7.61	1231.0	0.02
Citronellol	10.78	1729.9	0.04	7.66	1234.0	0.03
Pulegone	8.98*	1583.7	[2.27]	7.70	1236.8	1.62
(3Z)-Hexenyl isovalerate	7.15*	1445.4	[0.04]	7.72	1238.1	0.03
Carvone	10.05	1669.0	0.05	7.76	1241.2	0.08
Piperitone	9.94	1660.5	0.57	7.90	1250.9	0.56
trans-Ascaridole glycol	14.22	2037.4	0.01	8.15	1267.5	0.01

Decanol	10.76	1728.0	0.06	8.30*	1278.1	[0.38]
neo-Menthyl acetate	7.72	1487.0	0.33	8.30*	1278.1	[0.38]
Thymol	15.19	2132.3	0.04	8.60*	1298.6	[5.68]
Menthyl acetate	8.17*	1521.6	[5.79]	8.60*	1298.6	[5.68]
Dihydroedulan II	7.46	1468.0	0.05	8.60*	1298.6	[5.68]
Isomenthyl acetate	8.32	1532.8	0.26	8.76	1305.4	0.24
Unknown MISC CLVIII [m/z 43, 136 (55), 121 (55), 107 (48), 93 (48), 81 (30), 79 (29)...]				8.82	1309.7	0.03
neoiso-Menthyl acetate?				8.88	1314.3	0.01
Bicycloelemene	7.05*	1437.8	[5.10]	9.17	1334.5	0.05
α -Cubebene	6.78	1418.3	0.01	9.37	1349.1	0.02
Eugenol	14.86	2099.2	0.02	9.46	1355.6	0.01
α -Ylangene	7.05*	1437.8	[5.10]	9.64	1367.9	0.02
α -Copaene	7.12	1442.8	0.05	9.70	1372.1	0.06
β -Bourbonene isomer	7.15*	1445.4	[0.04]	9.74	1375.4	0.01
β -Bourbonene	7.49*	1470.2	[0.23]	9.81	1380.0	0.23
1,5-diepi- β - Bourbonene	7.38	1462.2	0.02	9.84	1382.1	0.02
β -Cubebene	7.79	1492.3	0.02	9.91	1387.3	0.02
β -Elemene	8.45*	1542.6	[2.61]	9.94	1389.6	0.12
Cyperene	7.49*	1470.2	[0.23]	9.99	1393.0	0.04
Longifolene	7.98	1506.5	0.02	10.04	1396.9	0.02
Isocaryophyllene	8.20*	1523.5	[0.13]	10.11	1401.8	0.03
Perillyl acetate	11.63	1801.7	0.02	10.22	1409.3	0.02
β -Ylangene	8.12*	1517.7	[0.24]	10.28*	1414.0	[2.60]
β -Caryophyllene	8.45*	1542.6	[2.61]	10.28*	1414.0	[2.60]
β -Copaene	8.38	1537.0	0.06	10.41	1424.1	0.07
<i>trans</i> - α -Bergamotene	8.45*	1542.6	[2.61]	10.53	1433.2	0.03
Isogermacrene D	8.98*	1583.7	[2.27]	10.61	1439.2	0.03
α -Humulene	9.32	1610.1	0.10	10.72*	1447.5	[0.17]
ϵ -Murolene?	9.24*	1604.1	[35.19]	10.72*	1447.5	[0.17]
Murola-4,11-diene	9.26	1605.5	0.06	10.79	1452.7	0.02
(<i>E</i>)- β -Farnesene	9.58	1631.1	0.21	10.88*	1459.1	[0.22]
9-epi- β -Caryophyllene	9.40	1617.1	0.04	10.88*	1459.1	[0.22]
γ -Murolene	9.62	1634.4	0.06	11.07	1473.3	0.04
Germacrene D	9.81	1649.8	0.84	11.10	1475.9	0.87
Bicyclgermacrene	10.08*	1671.6	[0.17]	11.30*	1491.2	[0.27]
Viridiflorene	9.68	1639.1	0.08	11.30*	1491.2	[0.27]
α -Murolene	10.08*	1671.6	[0.17]	11.39	1497.3	0.04
γ -Cadinene	10.41*	1698.8	[0.03]	11.54	1509.4	0.03
δ -Cadinene	10.44*	1701.1	[0.11]	11.68	1520.5	0.10
Isocaryophyllene	12.20	1851.8	0.01	11.99	1544.9	0.02

epoxide B						
(E)-Nerolidol	13.82	1999.7	0.01	12.24	1564.1	0.01
Spathulenol	14.43	2057.8	0.02	12.31	1570.1	0.02
Caryophyllene oxide	12.79	1904.4	0.07	12.37*	1574.4	[0.08]
Caryophyllene oxide isomer	12.71	1897.0	0.01	12.37*	1574.4	[0.08]
Viridiflorol	14.01	2018.0	0.10	12.49	1584.1	0.10
Isospathulenol	15.51*	2164.3	[0.02]	13.05	1629.4	0.01
τ-Cadinol	14.93	2106.2	0.01	13.12	1635.8	0.01
β-Eudesmol	15.45	2158.7	0.01	13.19	1641.5	0.01
α-Cadinol	15.51*	2164.3	[0.02]	13.28	1648.5	0.01
Ageratochromene	16.85	2303.6	0.01	13.37	1655.8	0.01
Menthyl lactone	15.95	2209.3	0.01			
Total reported		98.72%			99.11%	

*: 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