

Date : 2025-02-10

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25A27-PTH01

Customer Identification : Balsam Fir - Canada - BN0112R

Type : Essential Oil

Source : *Abies balsamea* ct. Eastern / Low thymol

Customer : Plant Therapy

Checked and approved by:

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

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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 : 2025-02-10

PHYSICOCHEMICAL DATA

Refractive index : 1.4744 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-01-28

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
2-Methylfuran	0.01	Furan
Isovaleral	tr	Aliphatic aldehyde
2-Ethylfuran	tr	Furan
Toluene	0.01	Simple phenolic
Unknown	0.01	Unknown
Hexanal	tr	Aliphatic aldehyde
Octane	tr	Alkane
(3Z)-Hexenol	0.01	Aliphatic alcohol
Hexanol	0.01	Aliphatic alcohol
Santene	1.44	Normonoterpene
Styrene	0.01	Simple phenolic
Unknown	0.01	Normonoterpene
Bornylene	0.01	Monoterpene
Tricyclene	0.76	Monoterpene
α -Thujene	0.17	Monoterpene
α -Pinene	16.56	Monoterpene
α -Fenchene	0.08	Monoterpene
Camphene	5.02	Monoterpene
Thuja-2,4(10)-diene	0.06	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.05	Monoterpene
Sabinene	0.14	Monoterpene
β -Pinene	33.13	Monoterpene
Unknown	0.01	Monoterpene
Myrcene	1.98	Monoterpene
2-Carene	0.01	Monoterpene
Pseudolimonene	0.02	Monoterpene
α -Phellandrene	0.16	Monoterpene
(3Z)-Hexenyl acetate	0.01	Aliphatic ester
Δ^3 -Carene	13.09	Monoterpene
α -Terpinene	0.15	Monoterpene
Carvomenthene	0.02	Aliphatic alcohol
<i>meta</i> -Cymene	0.02	Monoterpene
<i>para</i> -Cymene	0.20	Monoterpene
Limonene	9.85	Monoterpene
β -Phellandrene	5.27	Monoterpene
γ -Terpinene	0.27	Monoterpene
Unknown	0.01	Oxygenated monoterpene
<i>meta</i> -Cymenene	0.01	Monoterpene
Fenchone	0.11	Monoterpenic ketone
Isoterpinolene	0.06	Monoterpene

Terpinolene	1.02	Monoterpene
<i>para</i> -Cymenene	0.08	Monoterpene
α -Pinene oxide	0.01	Monoterpenic ether
α -Thujone	0.03	Monoterpenic ketone
Linalool	0.06	Monoterpenic alcohol
endo-Fenchol	0.08	Monoterpenic alcohol
<i>cis-para</i> -Menth-2-en-1-ol	0.02	Monoterpenic alcohol
α -Campholenal	0.02	Monoterpenic aldehyde
Nopinone	0.01	Normonoterpenic ketone
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
<i>trans</i> -Pinocarveol	0.13	Monoterpenic alcohol
Camphor	0.21	Monoterpenic ketone
<i>trans-para</i> -Menth-2-en-1-ol	0.01	Monoterpenic alcohol
Camphene hydrate	0.08	Monoterpenic alcohol
<i>meta</i> -Mentha-4,6-dien-8-ol	0.02	Monoterpenic alcohol
Isoborneol	0.04	Monoterpenic alcohol
Pinocarvone	0.04	Monoterpenic ketone
Borneol	0.39	Monoterpenic alcohol
α -Phellandren-8-ol	0.03	Monoterpenic alcohol
Isopinocampone	0.06	Monoterpenic ketone
Terpinen-4-ol	0.24	Monoterpenic alcohol
Cryptone	0.03	Normonoterpenic ketone
<i>meta</i> -Cymen-8-ol	0.02	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.02	Monoterpenic alcohol
α -Terpineol	0.63	Monoterpenic alcohol
Myrtenal	0.07	Monoterpenic aldehyde
Myrtenol	0.08	Monoterpenic alcohol
Methylchavicol	0.03	Phenylpropanoid
Verbenone	0.05	Monoterpenic ketone
Unknown	0.02	Unknown
endo-Fenchyl acetate	0.04	Monoterpenic ester
<i>trans</i> -Carveol	0.01	Monoterpenic alcohol
Citronellol	0.01	Monoterpenic alcohol
Thymol methyl ether	0.05	Monoterpenic ether
Carvone	0.02	Monoterpenic ketone
Piperitone	0.10	Monoterpenic ketone
Phellandral	0.03	Monoterpenic aldehyde
Isopulegyl acetate	0.01	Monoterpenic ester
Isobornyl acetate	0.02	Monoterpenic ester
Bornyl acetate	5.53	Monoterpenic ester
<i>para</i> -Cymen-7-ol	0.01	Monoterpenic alcohol
2-Undecanone	0.01	Aliphatic ketone
Methyl myrtenate	0.01	Monoterpenic ester
Thymol	0.03	Monoterpenic alcohol
Isohexyl isocaproate	0.01	Aliphatic ester

Myrtenyl acetate	0.01	Monoterpenic ester
Unknown	0.01	Unknown
α -Longipinene	0.06	Sesquiterpene
α -Terpinyl acetate	0.01	Monoterpenic ester
Citronellyl acetate	0.03	Monoterpenic ester
α -Ylangene	0.02	Sesquiterpene
α -Copaene	0.02	Sesquiterpene
β -Bourbonene	0.01	Sesquiterpene
Geranyl acetate	0.02	Monoterpenic ester
Sativene	0.03	Sesquiterpene
β -Elemene	0.01	Sesquiterpene
β -Longipinene	0.02	Sesquiterpene
Longifolene	0.32	Sesquiterpene
β -Caryophyllene	0.17	Sesquiterpene
β -Copaene	0.01	Sesquiterpene
Aromadendrene	0.01	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.02	Sesquiterpene
α -Himachalene	0.02	Sesquiterpene
α -Humulene	0.09	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.02	Sesquiterpene
β -Selinene	0.02	Sesquiterpene
<i>trans</i> - β -Bergamotene	0.02	Sesquiterpene
α -Selinene	0.02	Sesquiterpene
β -Himachalene	0.03	Sesquiterpene
α -Muurolene	0.02	Sesquiterpene
δ -Amorphene	0.02	Sesquiterpene
γ -Cadinene	0.02	Sesquiterpene
β -Bisabolene	0.25	Sesquiterpene
δ -Cadinene	0.05	Sesquiterpene
Citronellyl butyrate	0.01	Monoterpenic ester
(<i>E</i>)- α -Bisabolene	0.07	Sesquiterpene
(<i>E</i>)-Nerolidol	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
Trachylobane?	0.01	Diterpene
18-Norabieta-8,11,13-triene?	0.01	Norditerpene
(<i>Z</i>)-Abienol	0.03	Diterpenic alcohol
Consolidated total	99.70	

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

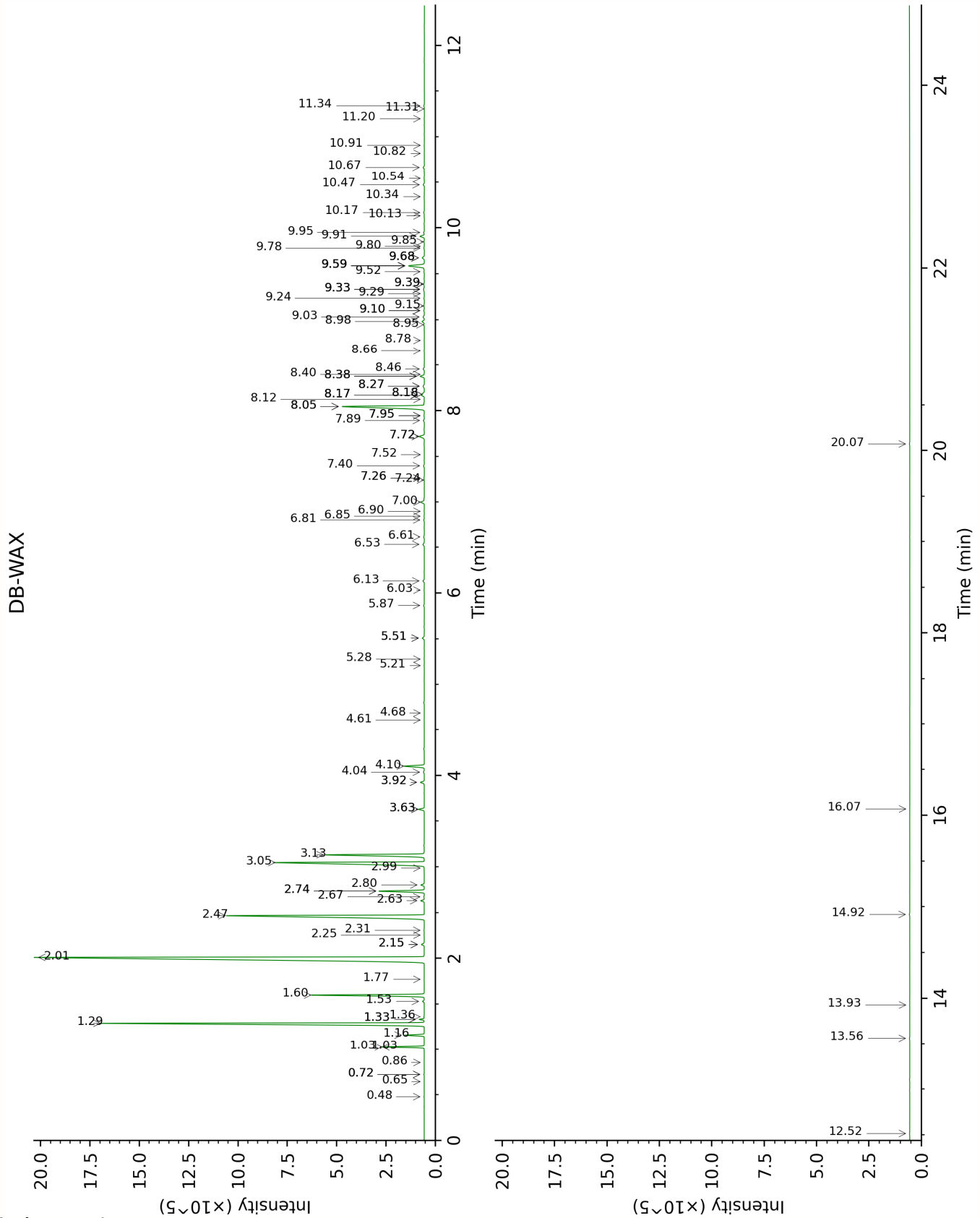
Note: no correction factor was applied

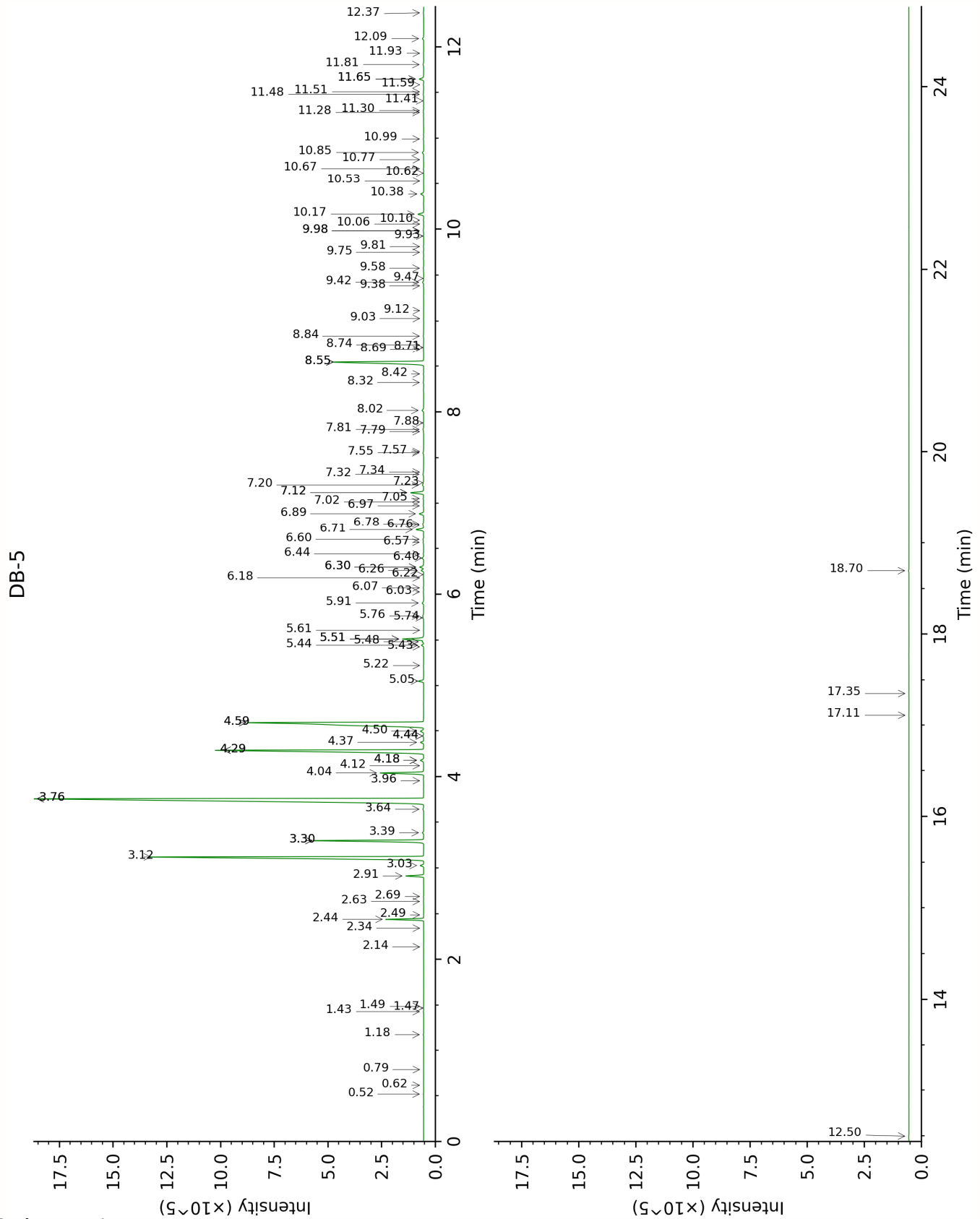
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

2-Methylfuran	Column DB-WAX			Column DB-5		
	0.65	856.2	tr	0.52	604.8	0.01
Isovaleral	0.72*	887.0	[0.01]	0.62	638.9	tr
2-Ethylfuran	0.86	916.0	0.01	0.79	699.4	tr
Toluene	1.36	1001.6	0.01	1.18	757.7	0.01
Unknown ABBA IV [m/z 56, 45 (99), 41 (24), 84 (24), 69 (19), 43 (17)...]	0.72*	887.0	[0.01]	1.43	793.5	0.01
Hexanal	1.77	1043.3	0.01	1.47	799.0	tr
Octane	0.48	780.8	0.01	1.49	801.5	tr
(3Z)-Hexenol	5.51*	1342.8	[0.12]	2.14	857.0	0.01
Hexanol	5.28	1326.3	0.01	2.34	874.2	0.01
Santene	1.03*	945.4	[1.44]	2.44	882.2	1.44
Styrene	3.63*	1203.9	[0.28]	2.49	886.3	0.01
Unknown ABBA I [m/z 79, 93 (66), 94 (52), 91 (39), 77 (37), 122 (31)]	1.33*	998.6	[0.18]	2.64	898.5	0.01
Bornylene	1.03*	945.4	[1.44]	2.69	903.1	0.01
Tricyclene	1.16	968.8	0.76	2.91	918.2	0.76
α -Thujene	1.33*	998.6	[0.18]	3.03	925.8	0.17
α -Pinene	1.29	991.3	16.45	3.12	932.0	16.56
α -Fenchene	1.53	1018.7	0.08	3.30*	943.9	[5.11]
Camphene	1.60	1025.8	5.02	3.30*	943.9	[5.11]
Thuja-2,4(10)-diene	2.15*	1082.3	[0.15]	3.39	949.6	0.06
3,7,7- Trimethylcyclohepta- 1,3,5-triene	2.74*	1132.7	[2.05]	3.64	966.7	0.05
Sabinene	2.15*	1082.3	[0.15]	3.76*	974.3	[33.27]
β -Pinene	2.01	1067.9	33.13	3.76*	974.3	[33.27]
Unknown ABBA II [m/z 91, 119 (65), 109 (51), 134 (47)]	2.99	1152.7	0.01	3.96	987.4	0.01
Myrcene	2.74*	1132.7	[2.05]	4.04	993.0	1.98
2-Carene	2.26	1092.8	0.01	4.12	998.3	0.01
Pseudolimonene	2.67	1127.7	0.02	4.18*	1002.2	[0.19]
α -Phellandrene	2.63	1124.3	0.16	4.18*	1002.2	[0.19]
(3Z)-Hexenyl acetate	4.68	1281.8	0.01	4.29*	1009.2	[13.10]
Δ 3-Carene	2.47	1111.3	13.09	4.29*	1009.2	[13.10]
α -Terpinene	2.80	1138.0	0.16	4.37	1014.6	0.15
Carvomenthene	2.31	1098.2	0.02	4.44*	1019.0	[0.04]
<i>meta</i> -Cymene	3.92*	1225.7	[0.20]	4.44*	1019.0	[0.04]
<i>para</i> -Cymene	3.92*	1225.7	[0.20]	4.50	1022.3	0.20

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Limonene	3.05	1157.6	9.85	4.59*	1028.2	[15.13]
β -Phellandrene	3.13	1164.4	5.27	4.59*	1028.2	[15.13]
γ -Terpinene	3.63*	1203.9	[0.28]	5.05	1057.2	0.27
Unknown PIMA I [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	4.60	1276.1	0.01	5.22	1067.8	0.01
<i>meta</i> -Cymenene	6.03	1380.4	0.02	5.43	1080.7	0.01
Fenchone	5.51*	1342.8	[0.12]	5.44	1081.8	0.11
Isoterpinolene	4.04	1233.9	0.05	5.48	1084.2	0.06
Terpinolene	4.10	1238.8	1.02	5.51*	1086.0	[1.10]
<i>para</i> -Cymenene	6.13	1387.6	0.08	5.51*	1086.0	[1.10]
α -Pinene oxide	5.21	1321.3	0.01	5.61	1092.1	0.01
α -Thujone	5.86	1368.4	0.03	5.74	1100.6	0.03
Linalool	7.89	1518.3	0.06	5.76	1101.8	0.06
endo-Fenchol	8.18*	1540.6	[0.09]	5.90	1110.9	0.08
<i>cis-para</i> -Menth-2-en- 1-ol	7.95*	1522.4	[0.03]	6.03	1118.7	0.02
α -Campholenal	6.85	1440.1	0.02	6.07	1121.5	0.02
Nopinone	8.05*	1530.2	[5.53]	6.18	1128.4	0.01
<i>cis-para</i> -Mentha-2,8- dien-1-ol	9.29	1627.4	0.01	6.22	1130.7	0.01
<i>trans</i> -Pinocarveol	8.98	1602.7	0.13	6.26	1133.7	0.13
Camphor	7.00	1451.5	0.21	6.30*	1135.9	[0.22]
<i>trans-para</i> -Menth-2- en-1-ol	8.78	1586.6	0.01	6.30*	1135.9	[0.22]
Camphene hydrate	8.27*	1547.4	[0.09]	6.40	1142.3	0.08
<i>meta</i> -Mentha-4,6- dien-8-ol	9.10*	1612.4	[0.03]	6.44	1145.2	0.02
Isoborneol	9.15	1616.5	0.03	6.57	1153.3	0.04
Pinocarvone	7.72*	1504.9	[0.34]	6.60	1155.4	0.04
Borneol	9.59*	1651.9	[1.03]	6.71	1162.3	0.39
α -Phellandren-8-ol	9.95	1681.3	0.04	6.76	1165.2	0.03
Isopinocampone	7.40	1480.9	0.05	6.78	1166.5	0.06
Terpinen-4-ol	8.38*	1555.8	[0.23]	6.89	1173.7	0.24
Cryptone	8.95	1599.9	0.04	6.98	1179.3	0.03
<i>meta</i> -Cymen-8-ol	11.31	1795.6	0.01	7.02	1181.9	0.02
<i>para</i> -Cymen-8-ol	11.34	1798.4	0.04	7.06	1184.4	0.02
α -Terpineol	9.59*	1651.9	[1.03]	7.12*	1188.5	[0.70]
Myrtenal	8.46	1561.9	0.07	7.12*	1188.5	[0.70]
Myrtenol	10.67	1741.2	0.07	7.20	1193.9	0.08
Methylchavicol	9.10*	1612.4	[0.03]	7.23	1195.4	0.03
Verbenone	9.39*	1635.8	[0.04]	7.32	1201.3	0.05
Unknown ABBA V	10.82	1754.2	0.01	7.34	1202.9	0.02

[m/z 93, 121 (98), 79 (64), 91 (41), 77 (35), 124 (24)...]						
endo-Fenchyl acetate	6.61	1422.7	0.04	7.56	1216.9	0.04
trans-Carveol	11.20	1786.4	0.01	7.57	1217.9	0.01
Citronellol	10.54	1730.6	0.03	7.79	1232.4	0.01
Thymol methyl ether	8.27*	1547.4	[0.09]	7.81	1234.1	0.05
Carvone	9.80	1669.1	0.01	7.88	1238.8	0.02
Piperitone	9.68*	1658.9	[0.14]	8.02	1248.0	0.10
Phellandral	9.78	1667.4	0.03	8.32	1268.4	0.03
Isopulegyl acetate	7.95*	1522.4	[0.03]	8.42	1274.7	0.01
Isobornyl acetate	8.12	1536.2	0.02	8.55*	1283.4	[5.55]
Bornyl acetate	8.05*	1530.2	[5.53]	8.55*	1283.4	[5.55]
para-Cymen-7-ol	13.93	2035.7	0.01	8.69	1293.2	0.01
2-Undecanone	8.40	1557.3	0.01	8.71	1294.5	0.01
Methyl myrtenate	9.33*	1631.2	[0.07]	8.74	1296.4	0.01
Thymol	14.92	2132.8	0.03	8.84	1302.8	0.03
Isohexyl isocaproate	7.26*	1471.0	[0.03]	9.03	1316.3	0.01
Myrtenyl acetate	9.39*	1635.8	[0.04]	9.12	1322.4	0.01
Unknown ABBA III [m/z 121, 93 (84), 43 (81), 79 (48), 117 (40), 56 (37)...]				9.38	1341.4	0.01
α -Longipinene	6.53	1416.7	0.09	9.42	1344.1	0.06
α -Terpinyl acetate	9.52	1646.7	0.02	9.47	1347.1	0.01
Citronellyl acetate	9.24	1623.3	0.03	9.58	1354.9	0.03
α -Ylangene	6.81	1437.1	0.03	9.75	1367.2	0.02
α -Copaene	6.90	1444.0	0.01	9.81	1371.6	0.02
β -Bourbonene	7.24	1469.4	0.01	9.93	1379.6	0.01
Geranyl acetate	10.34	1713.6	0.02	9.98*	1383.7	[0.04]
Sativene	7.26*	1471.0	[0.03]	9.98*	1383.7	[0.04]
β -Elemene	8.18*	1540.6	[0.09]	10.06	1388.9	0.01
β -Longipinene	7.52	1489.9	0.01	10.10	1391.8	0.02
Longifolene	7.72*	1504.9	[0.34]	10.17	1396.5	0.32
β -Caryophyllene	8.17*	1539.8	[0.16]	10.38	1412.4	0.17
β -Copaene	8.17*	1539.8	[0.16]	10.53	1423.0	0.01
Aromadendrene	8.38*	1555.8	[0.23]	10.62	1429.9	0.01
trans- α -Bergamotene	8.17*	1539.8	[0.16]	10.67	1433.5	0.02
α -Himachalene	8.66	1577.5	0.02	10.77	1440.9	0.02
α -Humulene	9.03	1606.8	0.08	10.84	1446.7	0.09
(E)- β -Farnesene	9.33*	1631.2	[0.07]	10.99	1457.8	0.02
β -Selinene	9.59*	1651.9	[1.03]	11.28	1479.3	0.02
trans- β -	9.33*	1631.2	[0.07]	11.30	1480.9	0.02

Bergamotene						
α -Selinene	9.68*	1658.9	[0.14]	11.41	1488.8	0.02
β -Himachalene	9.59*	1651.9	[1.03]	11.48	1494.1	0.03
α -Muurolene	9.85	1673.1	0.03	11.51	1496.2	0.02
δ -Amorphene	9.68*	1658.9	[0.14]	11.59	1501.9	0.02
γ -Cadinene	10.13	1696.0	0.02	11.65*	1506.7	[0.26]
β -Bisabolene	9.91	1678.0	0.25	11.65*	1506.7	[0.26]
δ -Cadinene	10.17	1698.9	0.04	11.81	1519.2	0.05
Citronellyl butyrate	10.91	1761.7	0.02	11.93	1528.8	0.01
(<i>E</i>)- α -Bisabolene	10.47	1724.6	0.07	12.09	1541.4	0.07
(<i>E</i>)-Nerolidol	13.56	2000.5	0.02	12.37	1563.7	0.02
Caryophyllene oxide	12.52	1903.1	0.01	12.50	1573.3	0.02
Trachylobane?	16.07	2250.9	0.01	17.11	1976.1	0.01
18-Norabieta- 8,11,13-triene?				17.35	1999.5	0.01
(<i>Z</i>)-Abienol	20.07	2707.2	0.02	18.70	2133.9	0.03
Total reported		99.33%			99.73%	

*: 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