

Date : 2025-04-24

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25D08-PTH09

Customer Identification : Pine - Austria - P70113R

Type : Essential Oil

Source : *Pinus sylvestris*

Customer : Plant Therapy

Checked and approved by:

Alexis St-Gelais, Ph. D., Chimiste 2013-174

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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 : 2025-04-16

PHYSICOCHEMICAL DATA

Refractive index : 1.4706 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-04-09

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
Toluene	0.01	Simple phenolic
Cyclofenchene	tr	Monoterpene
Santene	0.05	Normonoterpene
Tricyclene	0.12	Monoterpene
α -Thujene	0.06	Monoterpene
α -Pinene	56.51	Monoterpene
Camphene	1.26	Monoterpene
α -Fenchene	0.07	Monoterpene
Thuja-2,4(10)-diene	0.04	Monoterpene
Unknown	0.01	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.02	Monoterpene
β -Pinene	8.98	Monoterpene
Sabinene	tr	Monoterpene
Unknown	0.10	Monoterpene
<i>cis</i> -Carane	0.01	Monoterpene
Dehydro-1,8-cineole	0.01	Monoterpenic ether
Myrcene	3.95	Monoterpene
2,7-Dimethyl-2,6-octadiene	0.06	Monoterpene
Octan-3-ol	0.01	Aliphatic alcohol
α -Phellandrene	0.07	Monoterpene
Pseudolimonene	0.20	Monoterpene
Δ^3 -Carene	9.63	Monoterpene
1,4-Cineole	0.04	Monoterpenic ether
α -Terpinene	0.13	Monoterpene
Carvomenthene	0.07	Aliphatic alcohol
<i>para</i> -Cymene	1.44	Monoterpene
1,8-Cineole	0.06	Monoterpenic ether
Limonene	9.17	Monoterpene
β -Phellandrene	0.86	Monoterpene
<i>ortho</i> -Cymene	0.01	Monoterpene
(<i>Z</i>)- β -Ocimene	0.01	Monoterpene
(<i>E</i>)- β -Ocimene	0.02	Monoterpene
γ -Terpinene	0.14	Monoterpene
Unknown	0.01	Oxygenated monoterpene
Terpinolene isomer	0.02	Monoterpene
Fenchone	0.01	Monoterpenic ketone
Terpinolene	0.65	Monoterpene
<i>para</i> -Cymenene	0.02	Monoterpene
α -Pinene oxide	0.01	Monoterpenic ether
Linalool	0.02	Monoterpenic alcohol

endo-Fenchol	0.05	Monoterpenic alcohol
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
<i>trans</i> -Pinocarveol	0.05	Monoterpenic alcohol
Camphor	0.01	Monoterpenic ketone
<i>cis</i> -Verbenol	0.02	Monoterpenic alcohol
Camphene hydrate	0.01	Monoterpenic alcohol
<i>trans</i> -Verbenol	0.09	Monoterpenic alcohol
Isoborneol	0.01	Monoterpenic alcohol
Pinocarpone	0.02	Monoterpenic ketone
Borneol	0.06	Monoterpenic alcohol
α -Phellandren-8-ol	0.02	Monoterpenic alcohol
Terpinen-4-ol	0.03	Monoterpenic alcohol
Cryptone	0.01	Normoterpenic ketone
<i>meta</i> -Cymen-8-ol	0.01	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.04	Monoterpenic alcohol
Myrtenal	0.02	Monoterpenic aldehyde
α -Terpineol	0.41	Monoterpenic alcohol
Myrtenol	0.02	Monoterpenic alcohol
Methylchavicol	0.02	Phenylpropanoid
Verbenone	0.02	Monoterpenic ketone
<i>trans</i> -Carveol	0.02	Monoterpenic alcohol
Thymol methyl ether	tr	Monoterpenic ether
Unknown	0.01	Oxygenated monoterpene
Carvone	0.01	Monoterpenic ketone
Bornyl acetate	1.22	Monoterpenic ester
α -Longipinene	0.05	Sesquiterpene
α -Cubebene	0.02	Sesquiterpene
Longicyclene	0.02	Sesquiterpene
α -Ylangene	0.01	Sesquiterpene
α -Copaene	0.04	Sesquiterpene
Sativene	0.02	Sesquiterpene
Longifolene	0.40	Sesquiterpene
β -Caryophyllene	2.20	Sesquiterpene
β -Copaene	0.01	Sesquiterpene
α -Humulene	0.07	Sesquiterpene
<i>cis</i> -Muurolo-4(15),5-diene	0.01	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.01	Sesquiterpene
γ -Muurolole	0.01	Sesquiterpene
α -Selinene	0.01	Sesquiterpene
β -Himachalene	0.01	Sesquiterpene
α -Muurolole	0.02	Sesquiterpene
γ -Cadinene	0.01	Sesquiterpene
δ -Cadinene	0.07	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.01	Sesquiterpene
Isocaryophyllene epoxide B	0.01	Sesquiterpenic ether

Caryophyllene oxide	0.07	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Longiborneol	0.01	Sesquiterpenic alcohol
Guaial	0.03	Sesquiterpenic alcohol
Caryophylladienol II	0.01	Sesquiterpenic alcohol
Bulnesol	0.03	Sesquiterpenic alcohol
α -Bisabolol	0.01	Sesquiterpenic alcohol
Caryolane-1,9 β -diol	0.02	Sesquiterpenic alcohol
Sandaracopimaradiene?	0.01	Diterpene
<i>meta</i> -Camphorene	0.02	Diterpene
<i>para</i> -Camphorene	0.02	Diterpene
Isoabienol?	0.01	Diterpenic alcohol
Consolidated total	99.28	

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

Note: no correction factor was applied

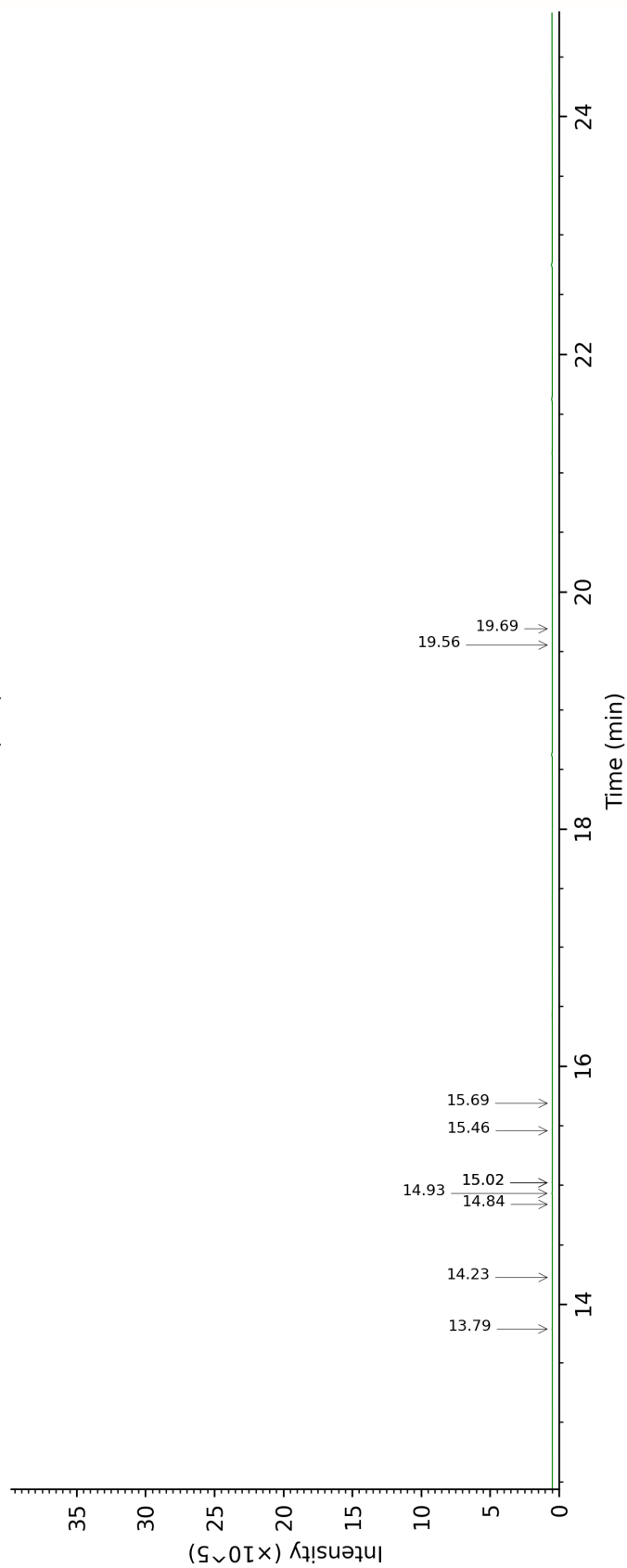
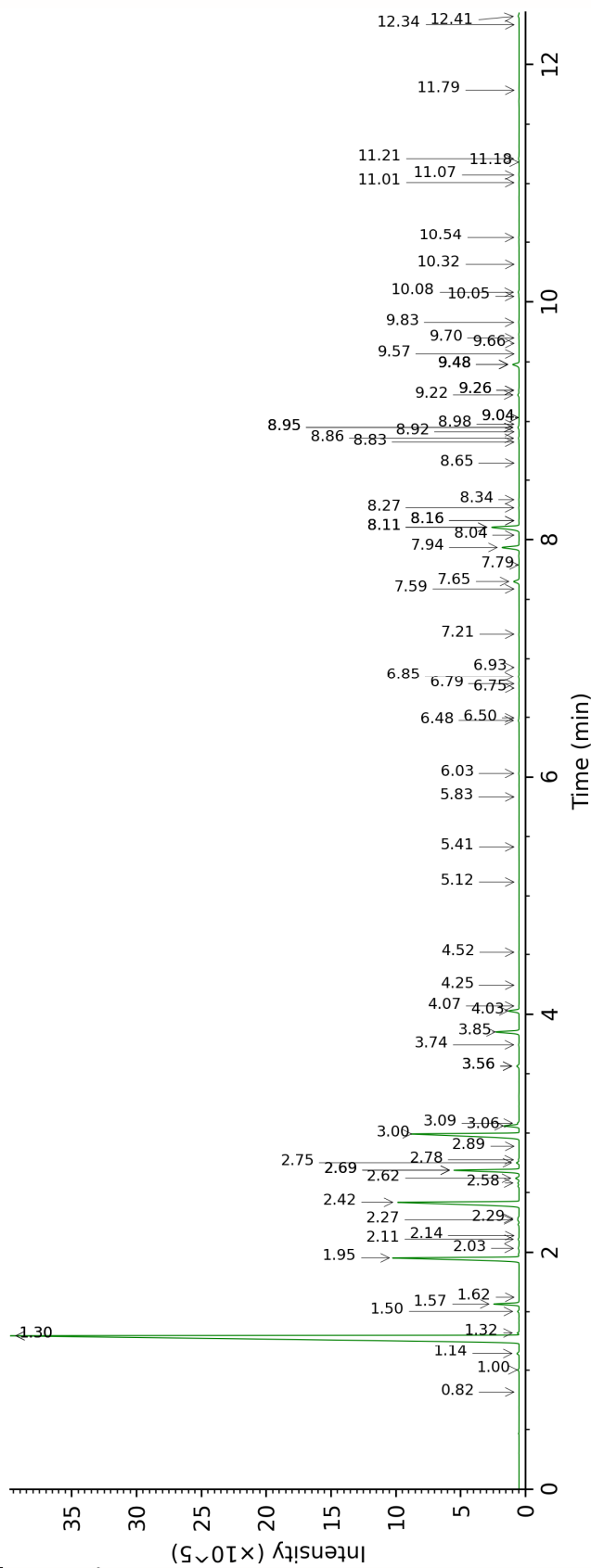
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

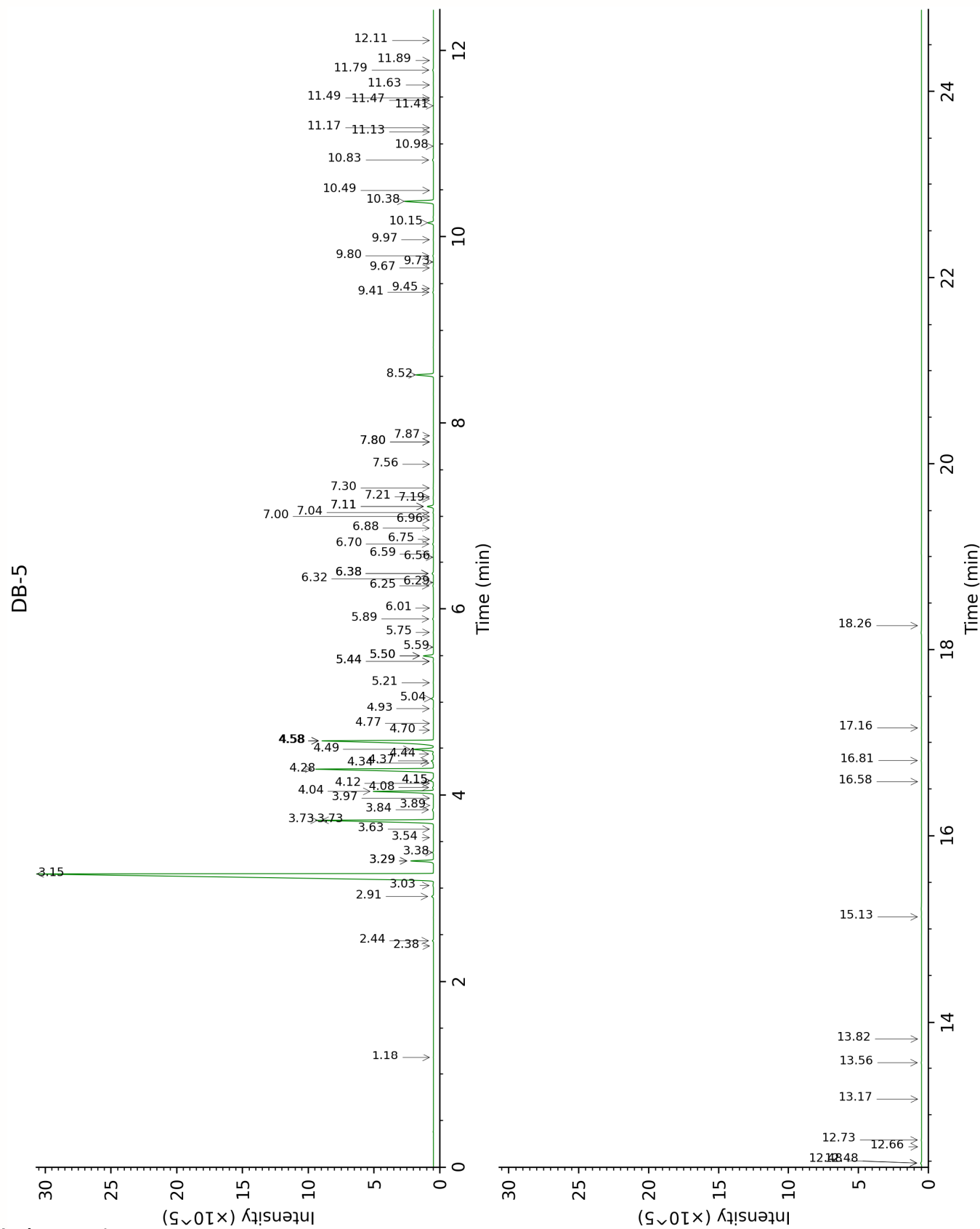
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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





FULL ANALYSIS DATA

Toluene	Column DB-WAX			Column DB-5		
	1.30*	996.5	[56.40]	1.18	756.5	0.01
Cyclofenchene	0.82	910.1	tr	2.38	876.8	tr
Santene	1.00	943.8	0.06	2.44	881.6	0.05
Tricyclene	1.14	968.9	0.12	2.91	917.7	0.12
α -Thujene	1.32	999.0	0.07	3.03	925.6	0.06
α -Pinene	1.30*	996.5	[56.40]	3.15	933.9	56.51
Camphene	1.57	1024.6	1.26	3.29*	943.3	[1.33]
α -Fenchene	1.50	1018.0	0.07	3.29*	943.3	[1.33]
Thuja-2,4(10)-diene	2.11	1081.7	0.04	3.38	949.3	0.04
Unknown BOSE VIII [m/z 121, 93 (86), 79 (71), 67 (62), 55 (49)... 136 (24)]				3.54	960.0	0.01
3,7,7- Trimethylcyclohepta- 1,3,5-triene	2.69*	1131.9	[3.96]	3.63	966.1	0.02
β -Pinene	1.95	1065.3	8.98	3.73*	972.4	[9.02]
Sabinene	2.14	1084.9	tr	3.73*	972.4	[9.02]
Unknown ORVU I [m/z 93, 79 (73), 67 (49), 95 (42), 91 (41), 121 (38)...]	2.27	1098.3	0.07	3.84	980.0	0.10
<i>cis</i> -Carane	1.62	1030.5	tr	3.89	983.1	0.01
Dehydro-1,8-cineole	2.89	1148.2	tr	3.97	988.3	0.01
Myrcene	2.69*	1131.9	[3.96]	4.04	993.2	3.95
2,7-Dimethyl-2,6- octadiene	2.03	1073.7	0.05	4.08	996.0	0.06
Octan-3-ol	5.83	1369.2	0.01	4.12	998.9	0.01
α -Phellandrene	2.58	1123.3	0.07	4.15*	1000.9	[0.28]
Pseudolimonene	2.62	1126.5	0.20	4.15*	1000.9	[0.28]
Δ 3-Carene	2.42	1110.1	9.60	4.28	1008.8	9.63
1,4-Cineole	2.78	1139.0	0.03	4.34	1012.9	0.04
α -Terpinene	2.75	1137.0	0.13	4.37	1014.4	0.13
Carvomenthene	2.28	1099.2	0.08	4.44	1019.0	0.07
<i>para</i> -Cymene	3.85	1223.3	1.46	4.49	1022.2	1.44
1,8-Cineole	3.09	1163.8	0.06	4.58*	1028.0	[10.21]
Limonene	3.00	1156.6	9.17	4.58*	1028.0	[10.21]
β -Phellandrene	3.06	1162.0	0.86	4.58*	1028.0	[10.21]
<i>ortho</i> -Cymene	4.24	1252.2	0.01	4.70	1035.2	0.01
(Z)- β -Ocimene	3.56*	1202.0	[0.15]	4.77	1039.8	0.01
(E)- β -Ocimene	3.74	1215.3	0.03	4.93	1049.8	0.02
γ -Terpinene	3.56*	1202.0	[0.15]	5.04	1057.1	0.14
Unknown PIMA I [m/z 79, 93 (60), 43 (40), 94	4.52	1272.6	0.01	5.21	1067.8	0.01

(35), 137 (33), 77 (26), 91
(20), 152 (18)]

Terpinolene isomer	4.07	1239.3	0.02	5.44*	1082.3	[0.02]
Fenchone	5.41	1338.3	0.01	5.44*	1082.3	[0.02]
Terpinolene	4.03	1236.3	0.65	5.50*	1086.0	[0.67]
<i>para</i> -Cymenene	6.03	1383.7	0.02	5.50*	1086.0	[0.67]
α -Pinene oxide	5.12	1316.6	0.01	5.59	1091.9	0.01
Linalool	7.79	1517.0	0.01	5.75	1101.9	0.02
endo-Fenchol	8.11*	1541.9	[2.24]	5.89	1111.1	0.05
<i>trans-para</i> -Mentha-2,8-dien-1-ol	8.65	1584.4	0.01	6.01	1118.6	0.01
<i>trans</i> -Pinocarveol	8.86	1601.4	0.04	6.25	1134.0	0.05
Camphor	6.93	1451.1	0.01	6.28	1136.2	0.01
<i>cis</i> -Verbenol	8.95*	1608.9	[0.09]	6.32	1138.7	0.02
Camphene hydrate	8.16*	1546.3	[0.02]	6.38*	1142.4	[0.10]
<i>trans</i> -Verbenol	9.22	1631.2	0.09	6.38*	1142.4	[0.10]
Isoborneol	9.04*	1615.7	[0.01]	6.56	1153.6	0.01
Pinocarvone	7.59	1501.1	0.02	6.59	1155.9	0.02
Borneol	9.48*	1652.2	[0.47]	6.70	1162.7	0.06
α -Phellandren-8-ol	9.83	1681.2	0.03	6.75	1166.0	0.02
Terpinen-4-ol	8.27	1554.8	0.03	6.88	1174.1	0.03
Cryptone	8.83	1598.8	0.02	6.96	1179.7	0.01
<i>meta</i> -Cymen-8-ol	11.18	1796.3	0.01	7.00	1182.2	0.01
<i>para</i> -Cymen-8-ol	11.21	1798.8	0.05	7.04	1184.9	0.04
Myrtenal	8.34	1560.2	0.02	7.11*	1189.0	[0.43]
α -Terpineol	9.48*	1652.2	[0.47]	7.11*	1189.0	[0.43]
Myrtenol	10.54	1741.4	0.02	7.19	1194.3	0.02
Methylchavicol	8.98	1611.1	0.01	7.21	1195.7	0.02
Verbenone	9.26*	1634.5	[0.04]	7.30	1201.7	0.02
<i>trans</i> -Carveol	11.07	1787.1	0.02	7.56	1218.8	0.02
Thymol methyl ether	8.16*	1546.3	[0.02]	7.80*	1234.8	[0.02]
Unknown CIAU II [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	11.01	1781.6	0.01	7.80*	1234.8	[0.02]
Carvone	9.66	1666.8	0.01	7.87	1239.3	0.01
Bornyl acetate	7.94	1528.5	1.22	8.52	1283.1	1.22
α -Longipinene	6.48	1416.9	0.04	9.41	1345.0	0.05
α -Cubebene	6.50	1418.6	0.01	9.45	1347.9	0.02
Longicyclene	6.79	1440.3	0.01	9.67	1363.4	0.02
α -Ylangene	6.75	1437.5	tr	9.73	1367.9	0.01
α -Copaene	6.85	1445.1	0.04	9.80	1372.5	0.04
Sativene	7.21	1472.3	0.02	9.97	1384.7	0.02
Longifolene	7.65	1506.0	0.41	10.15	1397.5	0.40
β -Caryophyllene	8.11*	1541.9	[2.24]	10.38	1414.2	2.20
β -Copaene	8.04	1536.7	0.01	10.50	1422.9	0.01

α -Humulene	8.95*	1608.9	[0.09]	10.83	1447.7	0.07
<i>cis</i> -Muurolo-4(15),5-diene	9.04*	1615.7	[0.01]	10.98	1458.8	0.01
<i>trans</i> -Cadina-1(6),4-diene	8.92	1605.9	0.01	11.13	1470.1	0.01
γ -Muurolole	9.26*	1634.5	[0.04]	11.17	1473.5	0.01
α -Selinene	9.57	1659.5	0.02	11.41	1491.0	0.01
β -Himachalene	9.48*	1652.2	[0.47]	11.47	1495.4	0.01
α -Muurolole	9.70	1670.5	0.02	11.49	1497.3	0.02
γ -Cadinene	10.05	1699.0	0.02	11.63	1507.9	0.01
δ -Cadinene	10.08	1702.0	0.05	11.79	1520.5	0.07
<i>trans</i> -Cadina-1,4-diene	10.32	1722.0	0.01	11.90	1528.5	0.01
Isocaryophyllene epoxide B	11.79	1850.3	0.01	12.11	1545.4	0.01
Caryophyllene oxide	12.41	1906.4	0.07	12.48*	1574.7	[0.07]
Caryophyllene oxide isomer	12.34	1899.5	0.01	12.48*	1574.7	[0.07]
Longiborneol	14.23	2079.3	0.01	12.66	1588.5	0.01
Guaiol	13.79	2037.2	0.02	12.73	1594.3	0.03
Caryophylladienol II	15.69	2226.9	0.01	13.17	1630.0	0.01
Bulnesol	14.93	2149.6	0.03	13.56	1662.2	0.03
α -Bisabolol	15.02*	2158.6	[0.02]	13.82	1683.8	0.01
Caryolane-1,9 β -diol	19.69	2675.5	0.01	15.13	1796.2	0.02
Sandaracopimaradiene?	14.84	2140.3	0.01	16.58	1928.4	0.01
<i>meta</i> -Camphorene	15.02*	2158.6	[0.02]	16.81	1949.7	0.02
<i>para</i> -Camphorene	15.46	2202.7	0.01	17.16	1982.8	0.02
Isoabienol?	19.56	2659.2	0.01	18.26	2091.2	0.01
Total reported		99.02%			99.44%	

*: 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