

Date : March 07, 2018

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18B20-PLG26-1-CC

Customer identification : Cypress

Type : Essential oil

Source : *Cupressus sempervirens*

Customer : Plant Guru

ANALYSIS

Method: PC-PA-014-17J19 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Sylvain Mercier, M. Sc., Chimiste

Analysis date : February 28, 2018

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid

Refractive index: 1.4710 ± 0.0003 (20 °C)

CONCLUSION

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

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Toluene	0.01	0.01	Simple phenolic
Cyclofenchene	0.01	0.02	Monoterpene
Bornylene	0.02	0.02	Monoterpene
Hashishene	tr	48.92*	Monoterpene
Tricyclene	0.14	0.14	Monoterpene
α -Thujene	0.32	0.35	Monoterpene
α -Pinene	48.93	[48.92]*	Monoterpene
Camphene	3.49*	2.84	Monoterpene
α -Fenchene	[3.49]*	0.63	Monoterpene
Thuja-2,4(10)-diene	0.03	0.45*	Monoterpene
meta-Cymene	0.06	1.40*	Monoterpene
Sabinene	4.42*	[0.45]*	Monoterpene
β -Pinene	[4.42]*	4.00	Monoterpene
Pseudolimonene isomer	0.02	0.02	Monoterpene
Myrcene	1.33	[1.40]*	Monoterpene
2-Carene	0.01	0.02	Monoterpene
Pseudolimonene	0.03	0.04	Monoterpene
α -Phellandrene	0.10*	0.09	Monoterpene
Menthatriene isomer I	[0.10]*	0.01	Monoterpene
Δ 3-Carene	14.25	14.29	Monoterpene
α -Terpinene	1.93	1.90	Monoterpene
ortho-Cymene	0.04	1.88*	Simple phenolic
para-Cymene	1.88	[1.88]*	Monoterpene
Limonene	7.89*	7.66	Monoterpene
Sylvestrene	[7.89]*	0.04	Monoterpene
β -Phellandrene	[7.89]*	0.17	Monoterpene
1,8-Cineole	[7.89]*	0.07	Monoterpenic ether
(Z)- β -Ocimene	tr	0.35*	Monoterpene
(E)- β -Ocimene	0.01	0.02	Monoterpene
Unknown	0.01	0.02	Monoterpene
γ -Terpinene	0.34	[0.35]*	Monoterpene
Unknown	0.01	0.01	Oxygenated monoterpene
meta-Cymenene	0.01	0.01	Monoterpene
Isoterpinolene	0.04	0.05	Monoterpene
Terpinolene	1.64*	1.58	Monoterpene
para-Cymenene	[1.64]*	0.04	Monoterpene
α -Pinene oxide	0.04	0.03	Monoterpenic ether
Unknown	0.01	0.01*	Unknown
Linalool	0.20*	0.30*	Monoterpenic alcohol
Perillene	[0.20]*	[0.01]*	Monoterpenic ether
Unknown	0.03	0.01	Oxygenated monoterpene
endo-Fenchol	0.02	0.08*	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.01	0.02	Monoterpenic alcohol
4-Hydroxy-4-methylcyclohex-2-enone	0.02	0.03	Aliphatic alcohol
trans-Pinocarveol	0.04	0.03	Monoterpenic alcohol
Camphor	0.03	0.03	Monoterpenic ketone
Epoxyterpinolene	0.05	0.05	Monoterpenic ether

Karahanaenone	0.11	0.10	Monoterpenic ketone
Borneol	0.43	0.80*	Monoterpenic alcohol
α -Phellandren-8-ol	0.01	0.01	Monoterpenic alcohol
Umbellulone	0.04	0.04*	Monoterpenic ketone
Terpinen-4-ol	0.65	0.63*	Monoterpenic alcohol
meta-Cymen-8-ol	0.02	0.01	Monoterpenic alcohol
para-Cymen-8-ol	0.06	0.05	Monoterpenic alcohol
α -Terpineol	0.16	[0.80]*	Monoterpenic alcohol
Myrtenol	0.03	0.02	Monoterpenic alcohol
Unknown	0.06*	0.06	Oxygenated monoterpene
Verbenone	[0.06]*	0.12*	Monoterpenic ketone
<i>trans</i> -Carveol	0.01	0.01	Monoterpenic alcohol
Unknown	0.04	0.04	Oxygenated monoterpene
Carvacrol methyl ether	0.01	[0.63]*	Monoterpenic ether
Linalyl acetate	0.02	0.03	Monoterpenic ester
Unknown	0.03		Unknown
Bornyl acetate	0.46	0.49	Monoterpenic ester
Cuminol	0.01	5.73*	Monoterpenic alcohol
Unknown	0.10	[0.63]*	Monoterpenic ester
Terpinen-4-yl acetate	0.02	0.01	Monoterpenic ester
Unknown	0.02	0.03	Oxygenated monoterpene
Unknown	0.02		Unknown
Unknown	0.11	[0.12]*	Monoterpenic ester
α -Terpinyl acetate	1.73*	1.50	Monoterpenic ester
α -Cubebene	[1.73]*	0.06	Sesquiterpene
α -Ylangene	0.01	0.01	Sesquiterpene
α -Copaene	0.02	0.03	Sesquiterpene
β -Cubebene	0.02	0.01	Sesquiterpene
α -Cedrene	0.21*	0.09	Sesquiterpene
Sesquithujene	[0.21]*	[0.30]*	Sesquiterpene
β -Caryophyllene	0.16*	0.12	Sesquiterpene
β -Cedrene	[0.16]*	[0.08]*	Sesquiterpene
β -Copaene	0.02	[0.08]*	Sesquiterpene
<i>cis</i> -Muurolo-3,5-diene	0.02	0.01	Sesquiterpene
<i>trans</i> -Muurolo-3,5-diene	0.01	[0.04]*	Sesquiterpene
α -Humulene	0.08	0.08	Sesquiterpene
<i>cis</i> -Muurolo-4(15),5-diene	0.06	0.05	Sesquiterpene
Unknown	0.01	[0.12]*	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.01	0.01	Sesquiterpene
α -Amorphene	0.32	[0.12]*	Sesquiterpene
Germacrene D	[0.32]	[0.80]*	Sesquiterpene
<i>trans</i> -Muurolo-4(15),5-diene	0.01	0.01	Sesquiterpene
β -Alaskene	0.04	0.04	Sesquiterpene
Epizonarene	0.05	0.04	Sesquiterpene
α -Muurolole	0.06	0.08	Sesquiterpene
δ -Amorphene	0.01	0.02	Sesquiterpene
α -Alaskene	0.03	0.02	Sesquiterpene
γ -Cadinene	0.06	0.05	Sesquiterpene
Zonarene	0.17*	0.17*	Sesquiterpene
δ -Cadinene	[0.17]*	[0.17]*	Sesquiterpene
<i>trans</i> -Calamenene	[0.17]*	0.01	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.02	0.01	Sesquiterpene

α-Cadinene	0.01	0.01	Sesquiterpene
α-Calacorene	0.01	0.01	Sesquiterpene
Caryophyllene oxide	0.01	0.01	Sesquiterpenic ether
allo-Cedrol	0.03	[5.73]*	Sesquiterpenic alcohol
α-Cedrol	5.82	[5.73]*	Sesquiterpenic alcohol
epi-Cedrol	0.01	0.01	Sesquiterpenic alcohol
1-epi-Cubenol	0.01	0.01	Sesquiterpenic alcohol
τ-Cadinol	0.02*	0.01	Sesquiterpenic alcohol
τ-Muurolol	[0.02]*	0.01	Sesquiterpenic alcohol
α-Cadinol	0.02	0.02	Sesquiterpenic alcohol
Isopimaradiene	0.03*	0.02	Diterpene
Manoyl oxide	[0.03]*	0.02	Diterpenic ether
Total identified	98.56%	98.19%	

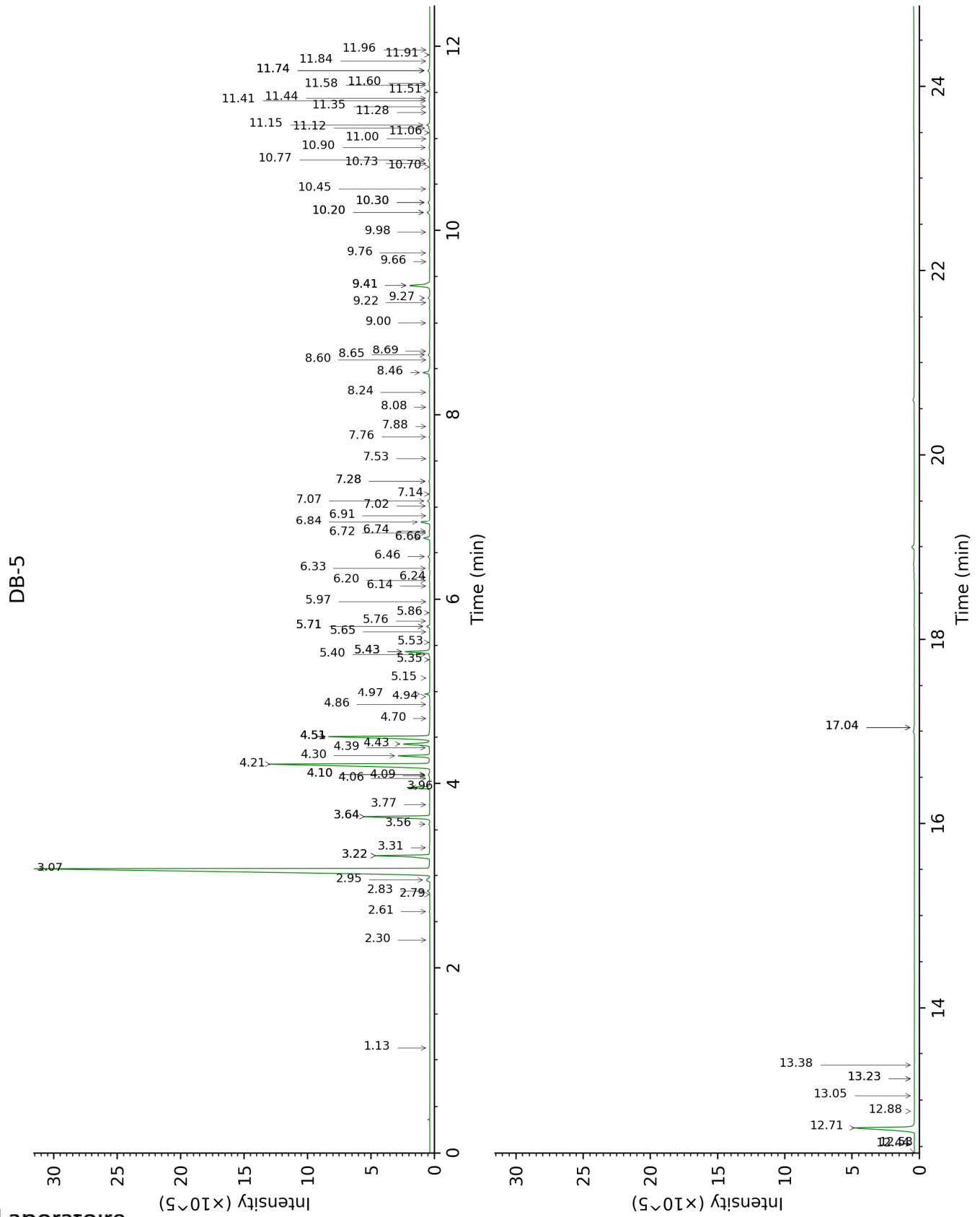
*: Two or more compounds are coeluting on this column

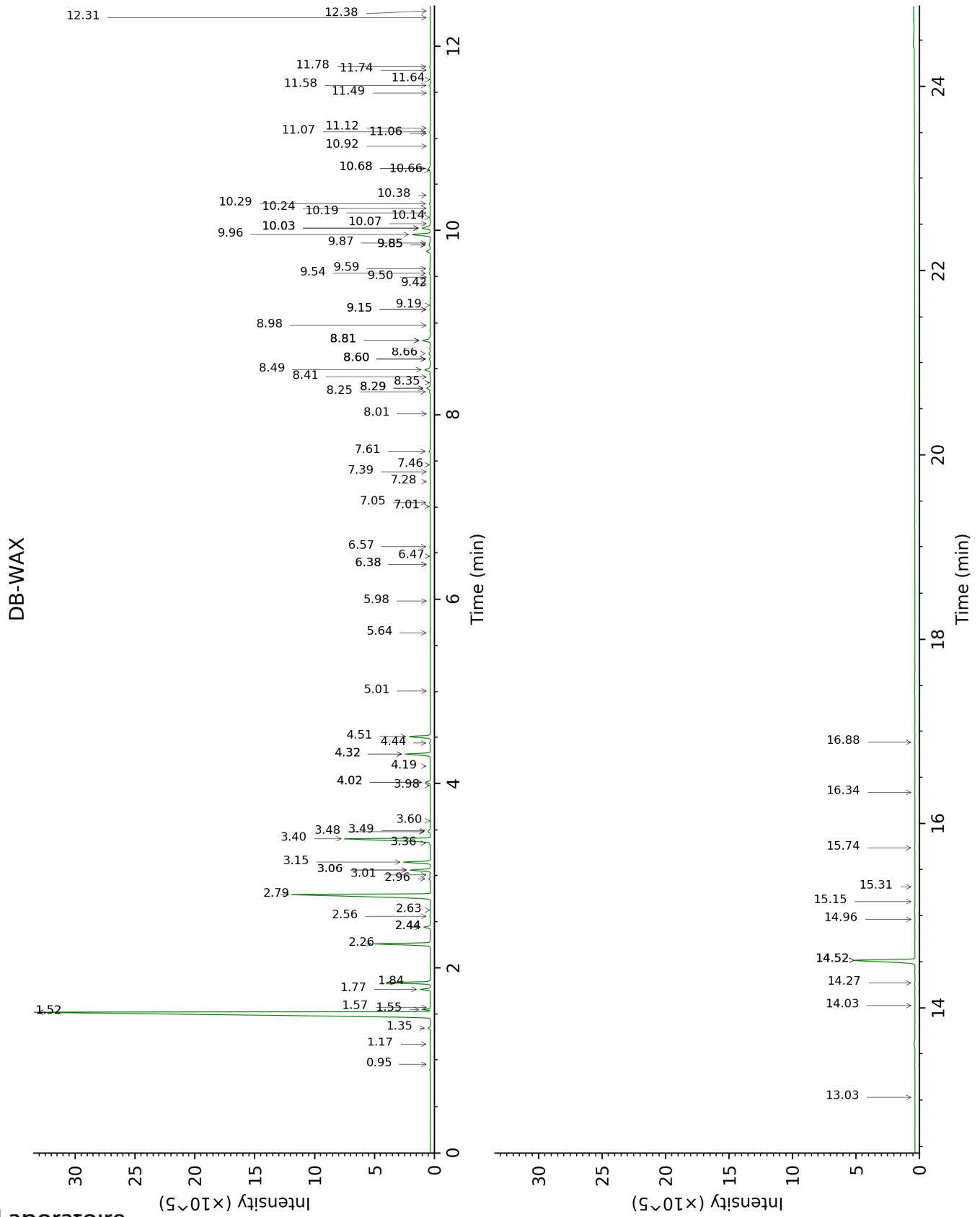
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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

Note: no correction factor was applied

This page was intentionally left blank. The following pages present the complete data of the analysis.





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Toluene	1.13	753	0.01	1.58	1005	0.01
Cyclofenchene	2.30	872	0.01	0.95	912	0.02
Bornylene	2.61	898	0.02	1.17	947	0.02
Hashishene	2.79	911	tr	1.52*	1000	48.92
Tricyclene	2.83	913	0.14	1.35	975	0.14
α -Thujene	2.95	921	0.32	1.55	1003	0.35
α -Pinene	3.07	929	48.93	1.52*	1000	[48.92]
Camphene	3.22*	939	3.49	1.84	1031	2.84
α -Fenchene	3.22*	939	[3.49]	1.77	1024	0.63
Thuja-2,4(10)-diene	3.31	945	0.03	2.44*	1087	0.45
meta-Cymene	3.56	962	0.06	3.06*	1135	1.40
Sabinene	3.64*	967	4.42	2.44*	1087	[0.45]
β -Pinene	3.64*	967	[4.42]	2.26	1070	4.00
Pseudolimonene isomer	3.77	976	0.02	2.63	1102	0.02
Myrcene	3.96	988	1.33	3.06*	1135	[1.40]
2-Carene	4.06	995	0.01	2.56	1097	0.02
Pseudolimonene	4.09	997	0.03	3.01	1131	0.04
α -Phellandrene	4.10*	997	0.10	2.96	1128	0.09
Menthatriene isomer I	4.10*	997	[0.10]	3.60	1176	0.01
Δ 3-Carene	4.21	1005	14.25	2.79	1115	14.29
α -Terpinene	4.30	1010	1.93	3.15	1142	1.90
ortho-Cymene	4.39	1016	0.04	4.32*	1228	1.88
para-Cymene	4.43	1018	1.88	4.32*	1228	[1.88]
Limonene	4.51*	1023	7.89	3.40	1161	7.66
Sylvestrene	4.51*	1023	[7.89]	3.36	1158	0.04
β -Phellandrene	4.51*	1023	[7.89]	3.48	1167	0.17
1,8-Cineole	4.51*	1023	[7.89]	3.49	1168	0.07
(Z)- β -Ocimene	4.70	1036	tr	4.02*	1207	0.35
(E)- β -Ocimene	4.86	1045	0.01	4.19	1219	0.02
Unknown [m/z 93, 91 (54), 92 (31), 77 (29), 79 (17), 43 (13), 41 (10), 136 (9)]	4.94	1050	0.01	3.98	1204	0.02
γ -Terpinene	4.97	1052	0.34	4.02*	1207	[0.35]
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.15	1064	0.01	5.01	1277	0.01
meta-Cymenene	5.35	1076	0.01	6.47	1381	0.01
Isoterpinolene	5.40	1079	0.04	4.44	1237	0.05
Terpinolene	5.44*	1081	1.64	4.51	1242	1.58
para-Cymenene	5.44*	1081	[1.64]	6.57	1388	0.04
α -Pinene oxide	5.53	1088	0.04	5.64	1322	0.03

Unknown [m/z 109, 43 (65), 95 (54), 119 (50), 91 (47)... 149 (8)...]	5.65	1095	0.01	6.38*	1375	0.01
Linalool	5.71*	1098	0.20	8.29*	1516	0.30
Perillene	5.71*	1098	[0.20]	6.38*	1375	[0.01]
Unknown [m/z 95, 150 (45), 110 (35), 107 (23), 109 (21)]	5.76	1102	0.03	5.98	1346	0.01
endo-Fenchol	5.86	1108	0.02	8.60*	1540	0.08
cis-para-Menth-2-en-1-ol	5.97	1116	0.01	8.41	1525	0.02
4-Hydroxy-4-methylcyclohex-2-enone	6.14	1126	0.02	14.27	2025	0.03
trans-Pinocarveol	6.20	1130	0.04	9.42	1604	0.03
Camphor	6.24	1132	0.03	7.46	1454	0.03
Epoxyterpinolene	6.34	1138	0.05	7.01	1421	0.05
Karahanaenone	6.46	1146	0.11	7.61	1465	0.10
Borneol	6.66	1159	0.43	10.03*	1652	0.80
α-Phellandren-8-ol	6.72	1163	0.01	10.38	1681	0.01
Umbellulone	6.74	1164	0.04	9.15*	1582	0.04
Terpinen-4-ol	6.84	1170	0.65	8.81*	1556	0.63
meta-Cymen-8-ol	6.91	1175	0.02	11.74	1795	0.01
para-Cymen-8-ol	7.02	1182	0.06	11.78	1798	0.05
α-Terpineol	7.07	1185	0.16	10.03*	1652	[0.80]
Myrtenol	7.14	1190	0.03	11.12	1742	0.02
Unknown [m/z 109, 91 (100), 81 (88), 94 (75), 119 (74), 96 (73), 41 (63)... 150 (2)]	7.28*	1199	0.06	11.08	1739	0.06
Verbenone	7.28*	1199	[0.06]	9.85*	1638	0.12
trans-Carveol	7.53	1215	0.01	11.64	1786	0.01
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.76	1231	0.04	11.58	1781	0.04
Carvacrol methyl ether	7.88	1238	0.01	8.81*	1556	[0.63]
Linalyl acetate	8.08	1252	0.02	8.35	1520	0.03
Unknown [m/z 43, 111 (47), 93 (41), 55 (28), 67 (23), 41 (22)...]	8.24	1263	0.03			
Bornyl acetate	8.46	1277	0.46	8.49	1531	0.49
Cuminol	8.60	1286	0.01	14.52*	2048	5.73
Unknown [m/z 121, 93 (97), 43 (81), 136 (48), 107	8.65	1290	0.10	8.81*	1556	[0.63]

(47), 108 (44)...						
Terpinen-4-yl acetate	8.69	1293	0.02	8.98	1569	0.01
Unknown [m/z 150, 107 (98), 91 (79), 108 (61)]	9.00	1314	0.02	12.31	1845	0.03
Unknown [m/z 93, 92 (34), 43 (31), 91 (27)...	9.22	1330	0.02			
Unknown [m/z 93, 43 (50), 121 (50), 136 (35)...	9.27	1333	0.11	9.85*	1638	[0.12]
α -Terpinyl acetate	9.41*†	1343	1.73	9.96	1647	1.50
α -Cubebene	9.41*†	1343	[1.73]	7.05	1424	0.06
α -Ylangene	9.66	1361	0.01	7.28	1440	0.01
α -Copaene	9.76	1368	0.02	7.39	1448	0.03
β -Cubebene	9.98	1384	0.02	8.01	1494	0.01
α -Cedrene	10.20*	1398	0.21	8.25	1513	0.09
Sesquithujene	10.20*	1398	[0.21]	8.29*	1516	[0.30]
β -Caryophyllene	10.30*	1406	0.16	8.66	1545	0.12
β -Cedrene	10.30*	1406	[0.16]	8.60*	1540	[0.08]
β -Copaene	10.45	1417	0.02	8.60*	1540	[0.08]
<i>cis</i> -Muurolo-3,5-diene	10.70	1436	0.02	9.19	1585	0.01
<i>trans</i> -Muurolo-3,5-diene	10.73	1438	0.01	9.15*	1582	[0.04]
α -Humulene	10.77	1441	0.08	9.54	1613	0.08
<i>cis</i> -Muurolo-4(15),5-diene	10.90	1451	0.06	9.59	1617	0.05
Unknown [m/z 161, 91 (57), 120 (46), 105 (42), 133 (25), 119 (22), 41 (21), 204 (21)]	11.00	1458	0.01	9.85*	1638	[0.12]
<i>trans</i> -Cadina-1(6),4-diene	11.06	1463	0.01	9.50	1610	0.01
α -Amorphene	11.12†	1467	0.32	9.85*	1638	[0.12]
Germacrene D	11.15†	1469	[0.32]	10.03*	1652	[0.80]
<i>trans</i> -Muurolo-4(15),5-diene	11.28	1479	0.01	10.08	1656	0.01
β -Alaskene	11.35	1484	0.04	9.87	1639	0.04
Epizonarene	11.41	1488	0.05	10.14	1662	0.04
α -Muurolole	11.44	1491	0.06	10.29	1673	0.08
δ -Amorphene	11.51	1496	0.01	10.19	1665	0.02
α -Alaskene	11.58	1501	0.03	10.24	1669	0.02
γ -Cadinene	11.60	1503	0.06	10.66	1704	0.05
Zonarene	11.74*	1514	0.17	10.68*	1705	0.17
δ -Cadinene	11.74*	1514	[0.17]	10.68*	1705	[0.17]
<i>trans</i> -Calamenene	11.74*	1514	[0.17]	11.49	1774	0.01
<i>trans</i> -Cadina-1,4-	11.84	1521	0.02	10.92	1726	0.01

diene						
α-Cadinene	11.91	1527	0.01	11.06	1737	0.01
α-Calacorene	11.96	1531	0.01	12.38	1851	0.01
Caryophyllene oxide	12.44	1568	0.01	13.03	1910	0.01
allo-Cedrol	12.53	1576	0.03	14.52*	2048	[5.73]
α-Cedrol	12.70	1589	5.82	14.52*	2048	[5.73]
epi-Cedrol	12.88	1603	0.01	14.96	2091	0.01
1-epi-Cubenol	13.05	1617	0.01	14.03	2001	0.01
τ-Cadinol	13.23*	1632	0.02	15.15	2110	0.01
τ-Muurolol	13.23*	1632	[0.02]	15.31	2126	0.01
α-Cadinol	13.38	1644	0.02	15.74	2168	0.02
Isopimaradiene	17.04*	1968	0.03	16.34	2230	0.02
Manoyl oxide	17.04*	1968	[0.03]	16.88	2286	0.02
Total identified		98.56%			98.19%	
Total reported		98.93%			98.35%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified 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