

Date : March 28, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22C15-PTH14

Customer identification : Cypress - CL0110219R

Type : Essential oil

Source : *Cupressus sempervirens*

Customer : Plant Therapy

ANALYSIS

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

Analyst : Seydou Ka, Ph. D.

Analysis date : March 23, 2022

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.4714 ± 0.0003 (20 °C; method PC-MAT-016)

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
3-Methylfuran	tr	Furan
Toluene	0.01	Simple phenolic
Cyclofenchene	0.02	Monoterpene
Bornylene	0.06	Monoterpene
Tricyclene	0.18	Monoterpene
α -Thujene	0.73	Monoterpene
α -Pinene	48.96	Monoterpene
α -Fenchene	0.27	Monoterpene
Camphene	0.73	Monoterpene
Thuja-2,4(10)-diene	0.03	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.10	Monoterpene
β -Pinene	1.08	Monoterpene
Sabinene	1.33	Monoterpene
Pseudolimonene isomer	0.01	Monoterpene
Myrcene	2.46	Monoterpene
α -Phellandrene	0.10	Monoterpene
Pseudolimonene	0.01	Monoterpene
Δ^3 -Carene	23.27	Monoterpene
α -Terpinene	0.53	Monoterpene
meta-Cymene	0.36	Monoterpene
para-Cymene	0.04	Monoterpene
Sylvestrene	tr	Monoterpene
β -Phellandrene	0.38	Monoterpene
Limonene	2.79	Monoterpene
(Z)- β -Ocimene	0.01	Monoterpene
(E)- β -Ocimene	0.04	Monoterpene
Unknown	0.05	Monoterpene
γ -Terpinene	0.90	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
meta-Cymenene	0.02	Monoterpene
Terpinolene isomer	0.01	Monoterpene
Isoterpinolene	0.16	Monoterpene
Terpinolene	3.21	Monoterpene
para-Cymenene	0.09	Monoterpene
α -Pinene oxide	0.02	Monoterpenic ether
Unknown	0.01	Oxygenated monoterpene
Linalool	0.43	Monoterpenic alcohol
endo-Fenchol	0.02	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.02	Monoterpenic alcohol
4-Hydroxy-4-methylcyclohex-2-enone	0.02	Aliphatic alcohol
trans-Pinocarveol	0.04	Monoterpenic alcohol
Camphor	0.07	Monoterpenic ketone
trans-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol

Camphene hydrate	0.06	Monoterpenic alcohol
meta-Mentha-4,6-dien-8-ol	0.02	Monoterpenic alcohol
Karahanaenone	0.27	Monoterpenic ketone
Borneol	0.03	Monoterpenic alcohol
α -Phellandren-8-ol	0.03	Monoterpenic alcohol
Umbellulone	0.08	Monoterpenic ketone
Terpinen-4-ol	1.18	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
meta-Cymen-8-ol	0.02	Monoterpenic alcohol
para-Cymen-8-ol	0.09	Monoterpenic alcohol
α -Terpineol	0.32	Monoterpenic alcohol
Myrtenol	0.02	Monoterpenic alcohol
γ -Terpineol	0.01	Monoterpenic alcohol
Verbenone	0.04	Monoterpenic ketone
Unknown	0.03	Unknown
<i>trans</i> -Carveol	0.01	Monoterpenic alcohol
<i>cis</i> -Carveol	0.01	Monoterpenic alcohol
Unknown	0.04	Oxygenated monoterpene
Carvacrol methyl ether	0.01	Monoterpenic ether
Car-3-en-2-one	0.01	Monoterpenic ketone
(<i>cis</i> ?)-Linalool oxide acetate (fur.)?	0.02	Monoterpenic ester
Linalyl acetate	0.03	Monoterpenic ester
(<i>trans</i> ?)-Linalool oxide acetate (fur.)?	0.04	Monoterpenic ester
Unknown	0.01	Oxygenated monoterpene
Bornyl acetate	0.11	Monoterpenic ester
Cuminol	0.01	Monoterpenic alcohol
Unknown	0.29	Monoterpenic ester
Terpinen-4-yl acetate	0.02	Monoterpenic ester
Thymol	0.02	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Unknown	0.03	Unknown
Unknown	0.32	Monoterpenic ester
α -Terpinyl acetate	2.49	Monoterpenic ester
α -Ylangene	0.07	Sesquiterpene
α -Copaene	0.01	Sesquiterpene
α -Duprezianene	0.02	Sesquiterpene
β -Cubebene	0.03	Sesquiterpene
β -Funebrene	0.04	Sesquiterpene
α -Cedrene	0.46	Sesquiterpene
β -Cedrene	0.15	Sesquiterpene
β -Caryophyllene	0.19	Sesquiterpene
β -Copaene	0.05	Sesquiterpene
<i>cis</i> -Thujopsene	0.01	Sesquiterpene
<i>cis</i> -Muurolo-3,5-diene	0.02	Sesquiterpene
<i>trans</i> -Muurolo-3,5-diene	0.02	Sesquiterpene
α -Humulene	0.01	Sesquiterpene
<i>cis</i> -Muurolo-4(15),5-diene	0.11	Sesquiterpene
<i>cis</i> -Cadina-1(6),4-diene	0.06	Sesquiterpene
Unknown	0.02	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	0.18	Sesquiterpene
α -Amorphene	0.02	Sesquiterpene
Germacrene D	0.61	Sesquiterpene

<i>trans</i> -Muurolo-4(15),5-diene	0.03	Sesquiterpene
β-Alaskene	0.08	Sesquiterpene
Epizonarene	0.07	Sesquiterpene
α-Muurolole	0.10	Sesquiterpene
δ-Amorphene	0.03	Sesquiterpene
γ-Cadinene	0.14	Sesquiterpene
α-Alaskene	0.05	Sesquiterpene
δ-Cadinene	0.33	Sesquiterpene
<i>trans</i> -Calamenene	0.01	Sesquiterpene
Zonarene	0.01	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.02	Sesquiterpene
α-Cadinene	0.01	Sesquiterpene
Salviadienol?	0.02	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
allo-Cedrol	0.02	Sesquiterpenic alcohol
α-Cedrol	1.19	Sesquiterpenic alcohol
Widdrol	0.01	Sesquiterpenic alcohol
epi-Cedrol	0.01	Sesquiterpenic alcohol
10-epi-Cubenol	0.02	Sesquiterpenic alcohol
1-epi-Cubenol	0.01	Sesquiterpenic alcohol
α-Acorenol	0.02	Sesquiterpenic alcohol
Unknown	0.04	Unknown
τ-Cadinol	0.03	Sesquiterpenic alcohol
α-Muurolol	0.01	Sesquiterpenic alcohol
α-Cadinol	0.03	Sesquiterpenic alcohol
Unknown	0.04	Unknown
Isopimaradiene	0.04	Diterpene
Manoyl oxide	0.01	Diterpenic ether
7,13-Abietadiene	0.01	Diterpene
Unknown	0.03	Unknown
Consolidated total	98.83%	

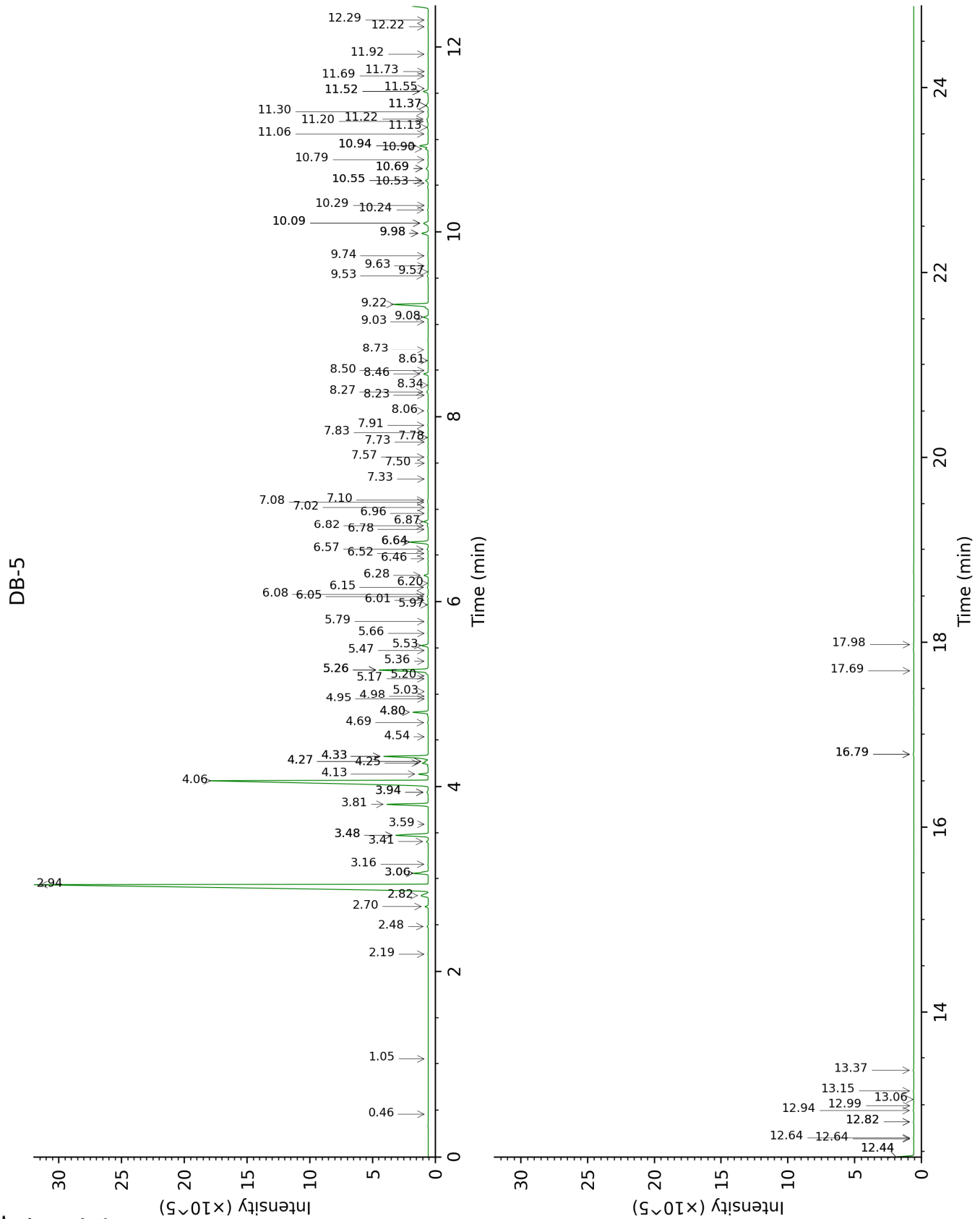
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

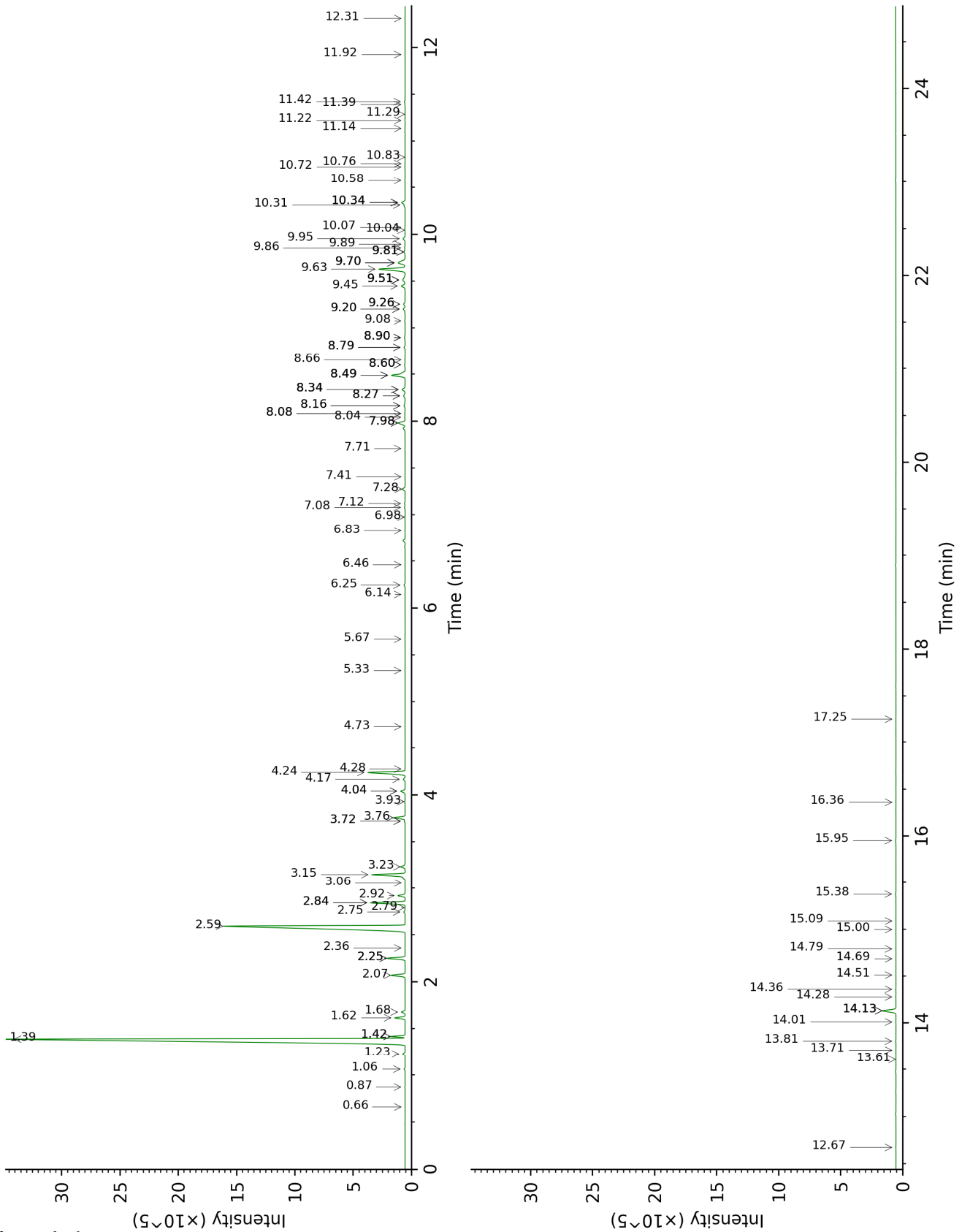
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

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



DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
3-Methylfuran	0.46	605	tr	0.66	857	tr
Toluene	1.05	757	0.01	1.42*	1002	0.76
Cyclofenchene	2.19	877	0.02	0.87	916	0.02
Bornylene	2.48	903	0.06	1.06	946	0.06
Tricyclene	2.70	917	0.18	1.23	972	0.18
α -Thujene	2.82	925	0.73	1.42*	1002	[0.76]
α -Pinene	2.94	933	48.96	1.39	998	48.89
α -Fenchene	3.06*	942	1.00	1.68	1027	0.27
Camphene	3.06*	942	[1.00]	1.62	1021	0.73
Thuja-2,4(10)-diene	3.16	949	0.03	2.25*	1084	1.36
3,7,7-Trimethylcyclohepta-1,3,5-triene	3.41	965	0.10	2.84*	1134	2.56
β -Pinene	3.48*	970	2.40	2.07	1066	1.08
Sabinene	3.48*	970	[2.40]	2.25*	1084	[1.36]
Pseudolimonene isomer	3.59	978	0.01	2.36	1094	0.01
Myrcene	3.81	993	2.46	2.84*	1134	[2.56]
α -Phellandrene	3.94*	1001	0.11	2.74	1126	0.10
Pseudolimonene	3.94*	1001	[0.11]	2.79	1130	0.01
Δ^3 -Carene	4.06	1009	23.27	2.59	1114	23.27
α -Terpinene	4.14	1014	0.53	2.92	1140	0.53
meta-Cymene	4.25	1022	0.36	4.04*	1227	0.39
para-Cymene	4.27*	1023	0.17	4.04*	1227	[0.39]
Sylvestrene	4.27*	1023	[0.17]	3.06	1150	tr
β -Phellandrene	4.33*	1026	2.96	3.23	1164	0.38
Limonene	4.33*	1026	[2.96]	3.15	1158	2.79
(Z)- β -Ocimene	4.54	1039	0.01	3.72*	1203	0.06
(E)- β -Ocimene	4.69	1049	0.04	3.93	1218	0.04
Unknown [m/z 93, 91 (54), 92 (31), 77 (29), 79 (17), 43 (13), 41 (10), 136 (9)]	4.80*	1056	0.89	3.72*	1203	[0.06]
γ -Terpinene	4.80*	1056	[0.89]	3.76	1206	0.90
cis-Sabinene hydrate	4.94	1065	0.01	6.83	1428	0.01
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	4.98	1068	0.01	4.73	1278	0.01
cis-Linalool oxide (fur.)	5.03	1071	0.01	6.46	1401	0.02
meta-Cymenene	5.17	1080	0.02	6.14	1379	0.02
Terpinolene isomer	5.20	1081	0.01	4.28	1244	0.01
Isoterpinolene	5.26*	1086	3.44	4.17	1236	0.16
Terpinolene	5.26*	1086	[3.44]	4.24	1242	3.21
para-Cymenene	5.26*	1086	[3.44]	6.24	1386	0.09
α -Pinene oxide	5.36	1092	0.02	5.33	1320	0.01

Unknown [m/z 95, 150 (45), 110 (35), 107 (23), 109 (21)]	5.47	1099	0.01	5.67	1344	0.01
Linalool	5.53	1102	0.43	7.98*†	1514	0.94
endo-Fenchol	5.66	1111	0.02	8.27*	1537	0.17
cis-para-Menth-2-en-1-ol	5.79	1119	0.02	8.08*	1522	0.04
4-Hydroxy-4-methylcyclohex-2-enone	5.97	1130	0.02	14.01	2032	0.01
trans-Pinocarveol	6.02	1134	0.04	9.08	1600	0.04
Camphor	6.05	1136	0.07	7.12	1450	0.06
trans-para-Menth-2-en-1-ol	6.08	1138	0.01	8.90*	1586	0.10
Camphene hydrate	6.15	1142	0.06	8.34*	1542	0.30
meta-Mentha-4,6-dien-8-ol	6.20	1145	0.02	9.26*	1614	0.16
Karahanaenone	6.28	1151	0.27	7.28	1462	0.27
Borneol	6.46	1162	0.03	9.70*	1650	0.96
α-Phellandren-8-ol	6.52	1166	0.03	10.07	1680	0.03
Umbellulone	6.56	1169	0.08	8.79*	1578	0.10
Terpinen-4-ol	6.64*	1174	1.26	8.49*	1554	1.48
Unknown [m/z 43, 137 (89), 109 (69), 91 (49), 152 (45), 67 (31), 119 (29)]	6.64*	1174	[1.26]	10.04	1678	0.03
meta-Cymen-8-ol	6.78	1183	0.02	11.39	1792	0.02
para-Cymen-8-ol	6.82	1185	0.09	11.42	1794	0.06
α-Terpineol	6.87	1188	0.32	9.70*	1650	[0.96]
Myrtenol	6.96	1194	0.02	10.76	1738	0.01
γ-Terpineol	7.02	1198	0.01	9.81*	1659	0.13
Verbenone	7.08	1202	0.04	9.51*	1635	0.37
Unknown [m/z 95, 93 (32), 121 (24), 79 (22), 91 (21), 105 (16)... 154 (2)]	7.10	1203	0.03	10.83	1744	0.01
trans-Carveol	7.33	1218	0.01	11.29	1783	0.01
cis-Carveol	7.50	1230	0.01			
Unknown [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	7.57	1234	0.04	11.22	1777	0.02
Carvacrol methyl ether	7.73	1245	0.01	8.49*	1554	[1.48]
Car-3-en-2-one	7.78	1248	0.01	10.34*	1702	0.35
(cis?)-Linalool oxide acetate (fur.)?	7.83	1252	0.02	8.16*	1529	0.13
Linalyl acetate	7.91	1257	0.03	8.08*	1522	[0.04]
(trans?)-Linalool oxide acetate (fur.)?	8.06	1268	0.04	8.60*	1563	0.06

Unknown [m/z 95, 67 (45), 41 (42), 110 (42), 43 (41), 59 (36)]	8.23	1279	0.01	12.31	1873	0.01
Bornyl acetate	8.27	1281	0.11	8.16*	1529	[0.13]
Cuminol	8.34	1286	0.01	14.13*	2043	1.23
Unknown [m/z 121, 93 (97), 43 (81), 136 (48), 107 (47), 108 (44)...]	8.46	1294	0.29	8.49*	1554	[1.48]
Terpinen-4-yl acetate	8.50	1297	0.02	8.66	1567	0.02
Thymol	8.60	1304	0.02	15.00	2128	0.01
Unknown [m/z 150, 107 (98), 91 (79), 108 (61)]	8.73	1313	0.01	11.92	1839	0.01
Unknown [m/z 93, 92 (34), 43 (31), 91 (27)...]	9.03	1334	0.03			
Unknown [m/z 93, 43 (50), 121 (50), 136 (35)...]	9.08	1338	0.32	9.45	1630	0.38
α-Terpinyl acetate	9.22	1348	2.49	9.63	1644	2.52
α-Ylangene	9.53	1369	0.07	6.98	1440	0.02
α-Copaene	9.57	1372	0.01	7.08	1447	0.06
α-Duprezianene	9.63	1377	0.02	7.41	1471	0.02
β-Cubebene	9.74	1384	0.03	7.71	1494	0.02
β-Funebrene	9.98*	1402	0.50	8.04	1519	0.04
α-Cedrene	9.98*	1402	[0.50]	7.98*†	1514	[0.94]
β-Cedrene	10.09*	1410	0.44	8.27*	1537	[0.17]
β-Caryophyllene	10.09*	1410	[0.44]	8.34*	1542	[0.30]
β-Copaene	10.24	1420	0.05	8.34*	1542	[0.30]
cis-Thujopsene	10.28	1424	0.01	8.60*	1563	[0.06]
cis-Muurolo-3,5-diene	10.53	1442	0.02	8.90*	1586	[0.10]
trans-Muurolo-3,5-diene	10.55*	1444	0.19	8.79*	1578	[0.10]
α-Humulene	10.55*	1444	[0.19]	9.20*	1610	0.19
cis-Muurolo-4(15),5-diene	10.69*	1454	0.18	9.26*	1614	[0.16]
cis-Cadina-1(6),4-diene	10.69*	1454	[0.18]	8.90*	1586	[0.10]
Unknown [m/z 161, 91 (57), 120 (46), 105 (42), 133 (25), 119 (22), 41 (21), 204 (21)]	10.78	1461	0.02	9.51*	1635	[0.37]
trans-Cadina-1(6),4-diene	10.90	1470	0.18	9.20*	1610	[0.19]
α-Amorphene	10.94*	1473	0.63	9.51*	1635	[0.37]
Germacrene D	10.94*	1473	[0.63]	9.70*	1650	[0.96]
trans-Muurolo-4(15),5-diene	11.06	1482	0.03	9.81*	1659	[0.13]
β-Alaskene	11.13	1488	0.08	9.51*	1635	[0.37]

Epizonarene	11.20	1492	0.07	9.81*	1659	[0.13]
α-Muurolene	11.22	1494	0.10	9.95	1671	0.21
δ-Amorphene	11.30	1500	0.03	9.90	1666	0.02
γ-Cadinene	11.37*	1505	0.19	10.34*	1702	[0.35]
α-Alaskene	11.37*	1505	[0.19]	9.86	1663	0.05
δ-Cadinene	11.52*	1517	0.35	10.34*	1702	[0.35]
<i>trans</i> -Calamenene	11.52*	1517	[0.35]	11.14	1770	0.01
Zonarene	11.55	1520	0.01	10.31	1700	0.09
<i>trans</i> -Cadina-1,4-diene	11.69	1530	0.02	10.58	1722	0.02
α-Cadinene	11.74	1534	0.01	10.72	1735	0.02
Salviadienol?	11.92	1549	0.02	14.28	2058	0.02
Caryophyllene oxide	12.22	1572	0.02	12.67	1906	0.02
allo-Cedrol	12.29	1578	0.02	14.13*	2043	[1.23]
α-Cedrol	12.44*	1590	1.21	14.13*	2043	[1.23]
Widdrol	12.44*	1590	[1.21]	14.51	2080	0.01
epi-Cedrol	12.64	1605	0.01	14.68	2097	0.01
10-epi-Cubenol	12.64	1606	0.02	13.61	1993	0.01
1-epi-Cubenol	12.82*	1620	0.03	13.71	2002	0.01
α-Acorenol	12.82*	1620	[0.03]	14.36	2065	0.02
Unknown [m/z 43, 93 (89), 91 (88), 79 (87), 123 (76), 81 (75)...]	12.94	1630	0.04	13.81	2012	0.03
τ-Cadinol	12.99	1634	0.03	14.79	2108	0.01
α-Muurolol	13.06	1640	0.01	15.09	2138	0.01
α-Cadinol	13.15	1647	0.03	15.38	2167	0.04
Unknown [m/z 85, 57 (59), 79 (26), 67 (18), 41 (16), 80 (15), 81 (10), 77 (8), 238 (7)]	13.37	1666	0.04			
Isopimaradiene	16.79*	1971	0.05	15.95	2226	0.04
Manoyl oxide	16.79*	1971	[0.05]	16.36	2269	0.01
7,13-Abietadiene	17.69	2060	0.01	17.25	2365	0.01
Unknown [m/z 191, 81 (47), 95 (41), 69 (39), 109 (32), 93 (32)...]	17.98	2088	0.03			
Total identified		98.10%			98.50%	
Total reported		98.99%			99.02%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not 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