

Date : March 06, 2018

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18B20-PLG18-1-CC

Customer identification : Clary Sage

Type : Essential oil

Source : *Salvia sclarea*

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 : Sarah-Eve Tremblay, M. Sc. A., Chimiste

Analysis date : March 01, 2018

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.4595 ± 0.0003 (20 °C)

CONCLUSION

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

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Isovaleral	0.01	0.01	Aliphatic aldehyde
2-Methylbutyral	0.01	0.01	Aliphatic aldehyde
Isoamyl alcohol	0.01	0.01	Aliphatic alcohol
2-Methylbutanol	tr	0.01*	Aliphatic alcohol
(2E)-Hexenal	0.01	[0.01]*	Aliphatic aldehyde
(3Z)-Hexenol	0.04	0.05	Aliphatic alcohol
(2E)-Hexenol	0.02	0.02	Aliphatic alcohol
Hexanol	0.04	0.04	Aliphatic alcohol
α-Pinene	0.06	0.06	Monoterpene
Camphene	0.02	0.02	Monoterpene
Benzaldehyde	0.01	0.01	Simple phenolic
β-Pinene	0.06*	0.03	Monoterpene
Sabinene	[0.06]*	0.03	Monoterpene
Octen-3-ol	0.04	0.07*	Aliphatic alcohol
Myrcene	1.14	1.02	Monoterpene
Octan-3-ol	0.01	0.01	Aliphatic alcohol
Octanal	tr	tr	Aliphatic aldehyde
cis-Dehydroxylinalool oxide	0.10	0.12*	Monoterpenic ether
Δ3-Carene	0.01		Monoterpene
para-Cymene	0.02	0.02	Monoterpene
Limonene	0.55*	0.55	Monoterpene
1,8-Cineole	[0.55]*	0.01*	Monoterpenic ether
β-Phellandrene	[0.55]*	[0.01]*	Monoterpene
(Z)-β-Ocimene	0.38	0.38	Monoterpene
(E)-β-Ocimene	0.74	0.75	Monoterpene
γ-Terpinene	0.02	[0.12]*	Monoterpene
cis-Sabinene hydrate	tr	0.01	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.06	0.08	Monoterpenic alcohol
Terpinolene	0.20	0.21	Monoterpene
trans-Linalool oxide (fur.)	0.03	0.03	Monoterpenic alcohol
Hotrienol	21.32*	0.07	Monoterpenic alcohol
Linalool	[21.32]*	76.27*	Monoterpenic alcohol
Dehydrosabinaketone	0.01	0.01	Normonoterpenic ketone
Unknown	0.01	0.01	Unknown
allo-Ocimene	0.01	0.01	Monoterpene
trans-Pinocarveol	0.02	0.01	Monoterpenic alcohol
Nerol oxide	0.07	0.07	Aliphatic ether
Borneol	0.03	5.07*	Monoterpenic alcohol
δ-Terpineol	tr	0.04*	Monoterpenic alcohol
Rosefuran oxide	0.04	0.04*	Monoterpenic ether
Terpinen-4-ol	0.01	[0.04]*	Monoterpenic alcohol
α-Terpineol	2.55	[5.07]*	Monoterpenic alcohol
Hodiendiol	0.03	0.52*	Monoterpenic alcohol
Unknown	0.05		Unknown
Unknown	0.01		Unknown
Linalyl formate	0.14	0.15	Monoterpenic ester
Nerol	0.55	0.57	Monoterpenic alcohol
Unknown	0.01	tr	Unknown

Linalyl acetate	57.23*	[76.27]*	Monoterpenic ester
Geraniol	[57.23]*	1.53	Monoterpenic alcohol
Unknown	0.07		Unknown
Geranial	0.03	1.02*	Monoterpenic aldehyde
Unknown	0.03		Unknown
Neryl formate	0.03	[0.04]*	Monoterpenic ester
Bornyl acetate	0.01	0.02	Monoterpenic ester
Thymol	0.06	0.04	Monoterpenic alcohol
Carvacrol	0.02	0.39*	Monoterpenic alcohol
δ-Elemene	0.02	tr	Sesquiterpene
Hodiendiol derivative	0.03	0.06	Oxygenated monoterpene
α-Cubebene	0.08	[0.07]*	Sesquiterpene
γ-Terpinyl acetate	0.02	0.03	Monoterpenic ester
Unknown	0.05		Monoterpenic ester
Unknown	0.01	0.02	Oxygenated monoterpene
Neryl acetate	1.02	[1.02]*	Monoterpenic ester
α-Copaene	0.54	0.53	Sesquiterpene
(Z)-8-Hydroxylinalool?	0.23*	0.01	Monoterpenic alcohol
β-Bourbonene	[0.23]*	0.19	Sesquiterpene
Geranyl acetate	2.07*	1.91	Monoterpenic ester
β-Cubebene	[2.07]*	0.14	Sesquiterpene
β-Elemene	0.10	2.26*	Sesquiterpene
α-Gurjunene	0.01	tr	Sesquiterpene
β-Caryophyllene	2.29	[2.26]*	Sesquiterpene
β-Copaene	0.06	0.06	Sesquiterpene
Coumarin	0.02	0.07	Coumarin
trans-α-Bergamotene	0.04	[2.26]*	Sesquiterpene
α-Humulene	0.13	0.11	Sesquiterpene
9-epi-β-Caryophyllene	0.02	0.02	Sesquiterpene
α-Amorphene	2.52*	0.03	Sesquiterpene
Germacrene D	[2.52]*	[5.07]*	Sesquiterpene
β-Selinene	0.11	0.09	Sesquiterpene
Hodiendiol derivative IV	0.01		Oxygenated monoterpene
Bicyclogermacrene	0.41	0.38*	Sesquiterpene
α-Murolene	0.07	[0.38]*	Sesquiterpene
(Z)-α-Bisabolene	0.05	0.07	Sesquiterpene
β-Bisabolene	0.17*	[1.02]*	Sesquiterpene
γ-Cadinene	[0.17]*	0.25*	Sesquiterpene
trans-Calamenene	0.18*	0.01	Sesquiterpene
δ-Cadinene	[0.18]*	[0.25]*	Sesquiterpene
β-Sesquiphellandrene	0.03	0.01	Sesquiterpene
Caryophyllene oxide	0.49*	[0.52]*	Sesquiterpenic ether
Caryophyllene oxide isomer	[0.49]*	0.04	Sesquiterpenic ether
Salvial-4(14)-en-1-one	0.04	0.02	Aliphatic alcohol
Guaiol	0.09	0.01	Sesquiterpenic alcohol
Hinesol	0.14	0.05	Sesquiterpenic alcohol
τ-Cadinol	0.02	0.01	Sesquiterpenic alcohol
β-Eudesmol	0.18	0.05	Sesquiterpenic alcohol
α-Eudesmol	[0.18]	[0.39]*	Sesquiterpenic alcohol
Unknown	tr		Unknown
Cyclocolorenone	0.01	0.06	Sesquiterpenic ketone
Phytone	0.04	0.06	Terpenic ketone

Sclareoloxide	0.02		Terpenic ether
Sclareol	0.71	0.68	Diterpenic alcohol
Total identified	97.69%	96.60%	

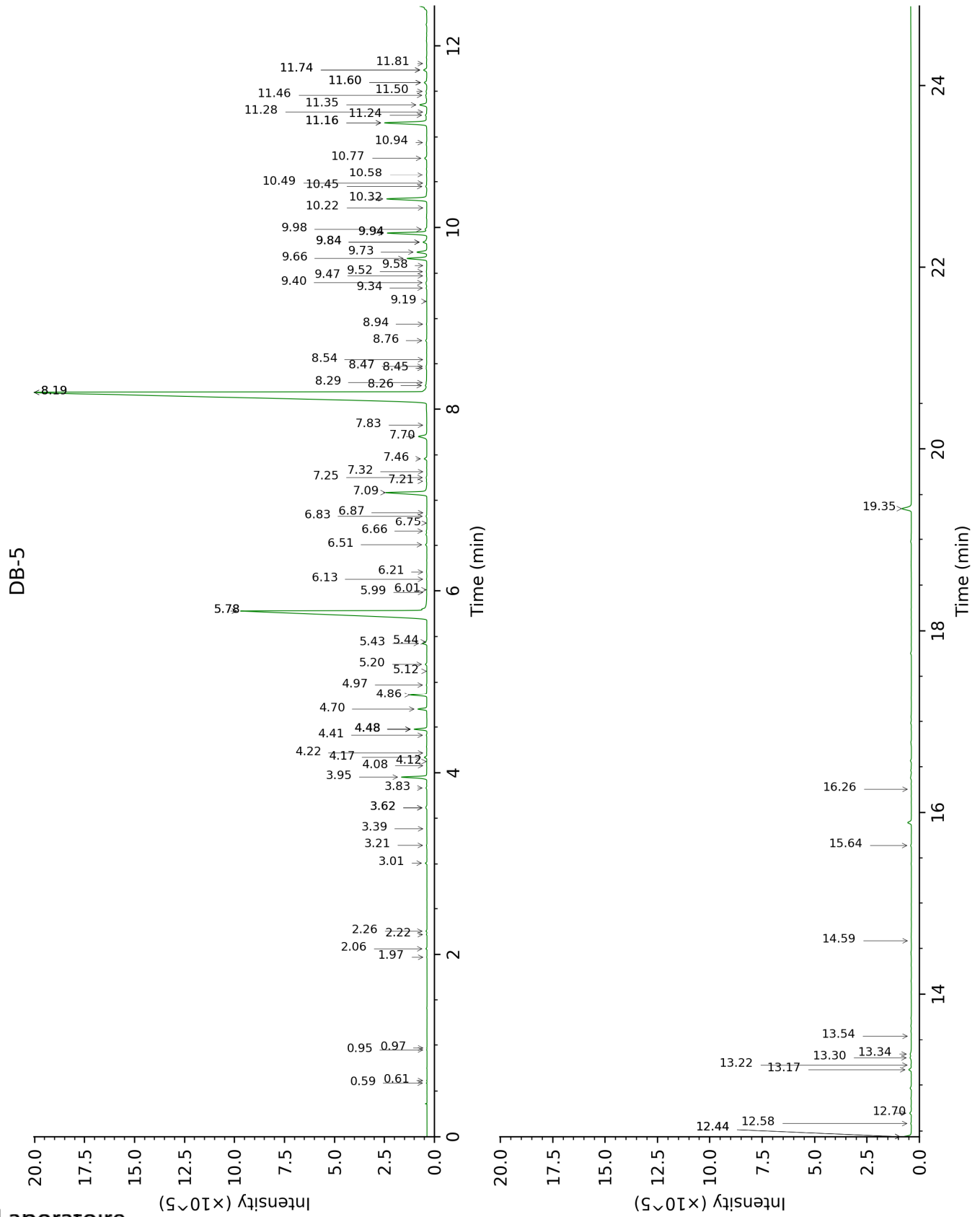
*: Two or more compounds are coeluting on this column

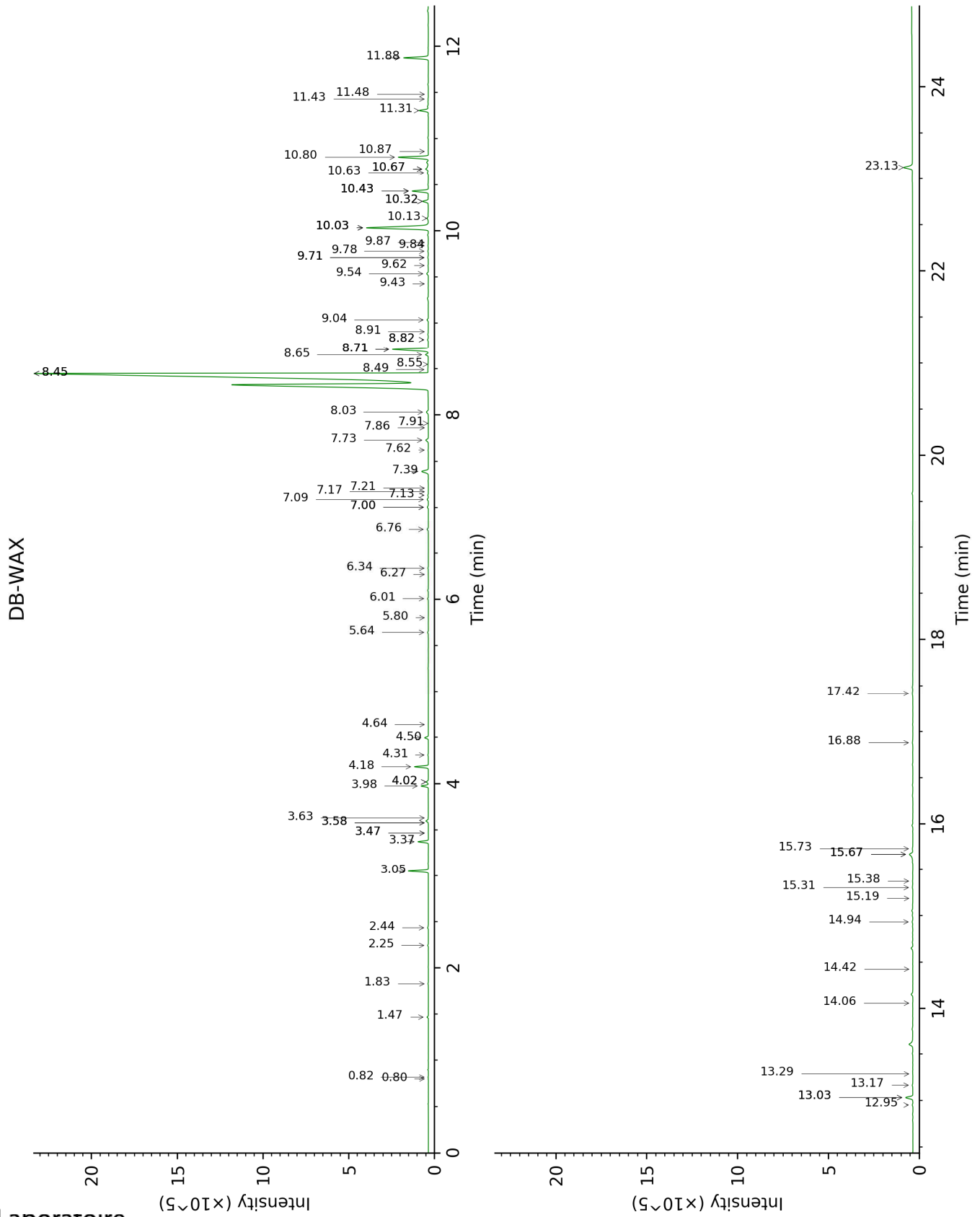
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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

Note: no correction factor was applied

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isovaleral	0.59	638	0.01	0.82	885	0.01
2-Methylbutyral	0.61	647	0.01	0.80	878	0.01
Isoamyl alcohol	0.95	727	0.01	3.63	1178	0.01
2-Methylbutanol	0.97	730	tr	3.58*	1174	0.01
(2E)-Hexenal	1.97	844	0.01	3.58*	1174	[0.01]
(3Z)-Hexenol	2.06	852	0.04	6.01	1348	0.05
(2E)-Hexenol	2.22	865	0.02	6.34	1372	0.02
Hexanol	2.26	868	0.04	5.64	1322	0.04
α-Pinene	3.01	925	0.06	1.47	994	0.06
Camphene	3.20	938	0.02	1.83	1030	0.02
Benzaldehyde	3.39	950	0.01	7.62	1466	0.01
β-Pinene	3.62*	965	0.06	2.24	1068	0.03
Sabinene	3.62*	965	[0.06]	2.44	1086	0.03
Octen-3-ol	3.83	980	0.04	7.00*	1420	0.07
Myrcene	3.95	988	1.14	3.05	1134	1.02
Octan-3-ol	4.08	996	0.01	6.27	1367	0.01
Octanal	4.12	999	tr	4.64	1251	tr
cis-Dehydroxylinalool oxide	4.17	1002	0.10	4.02*	1207	0.12
Δ ³ -Carene	4.22	1005	0.01			
para-Cymene	4.41	1017	0.02	4.31	1228	0.02
Limonene	4.48*	1021	0.55	3.37	1159	0.55
1,8-Cineole	4.48*	1021	[0.55]	3.47*	1166	0.01
β-Phellandrene	4.48*	1021	[0.55]	3.47*	1166	[0.01]
(Z)-β-Ocimene	4.70	1035	0.38	3.98	1204	0.38
(E)-β-Ocimene	4.86	1045	0.74	4.18	1219	0.75
γ-Terpinene	4.97	1052	0.02	4.02*	1207	[0.12]
cis-Sabinene hydrate	5.12	1062	tr	7.17	1432	0.01
cis-Linalool oxide (fur.)	5.20	1066	0.06	6.76	1402	0.08
Terpinolene	5.43	1081	0.20	4.50	1241	0.21
trans-Linalool oxide (fur.)	5.44	1082	0.03	7.13	1430	0.03
Hotrienol	5.78*	1103	21.32	9.04	1573	0.07
Linalool	5.78*	1103	[21.32]	8.45*	1528	76.27
Dehydrosabinaketone	5.99	1116	0.01	8.91	1564	0.01
Unknown [m/z 82, 81 (72), 43 (64), 54 (32), 41 (20)...]	6.01	1118	0.01	9.87	1640	0.01
allo-Ocimene	6.13	1125	0.01	5.80	1334	0.01
trans-Pinocarveol	6.21	1130	0.02	9.43	1604	0.01
Nerol oxide	6.51	1150	0.07	7.09	1426	0.07
Borneol	6.66	1159	0.03	10.03*	1653	5.07
δ-Terpineol	6.75	1165	tr	9.71*	1627	0.04
Rosefuran oxide	6.83	1170	0.04	8.82*	1557	0.04
Terpinen-4-ol	6.87	1172	0.01	8.82*	1557	[0.04]
α-Terpineol	7.09	1186	2.55	10.03*	1653	[5.07]
Hodiendiol	7.21	1194	0.03	13.03*	1910	0.52

Unknown [m/z 43, 71 (80), 67 (55), 59 (51), 68 (44), 41 (43)...]	7.25	1197	0.05			
Unknown [m/z 43, 71 (66), 59 (52), 41 (47), 68 (46)...]	7.32	1201	0.01			
Linalyl formate	7.46	1211	0.14	8.65	1544	0.15
Nerol	7.70	1227	0.55	11.31	1758	0.57
Unknown [m/z 43, 93 (49), 41 (22), 80 (22), 69 (17), 121 (14)...]	7.83	1235	0.01	7.86	1483	tr
Linalyl acetate	8.19*	1259	57.23	8.45*	1528	[76.27]
Geraniol	8.19*	1259	[57.23]	11.88	1807	1.53
Unknown [m/z 43, 111 (47), 93 (41), 55 (28), 67 (23), 41 (22)...]	8.26	1264	0.07			
Geranial	8.29	1266	0.03	10.43*	1685	1.02
Unknown [m/z 121, 43 (75), 95 (57), 41 (34), 93 (33), 69 (28)...]	8.45	1277	0.03			
Neryl formate	8.47	1278	0.03	9.71*	1627	[0.04]
Bornyl acetate	8.54	1283	0.01	8.55	1536	0.02
Thymol	8.76	1298	0.06	15.38	2132	0.04
Carvacrol	8.94	1310	0.02	15.67*	2162	0.39
δ-Elemene	9.19	1328	0.02	7.21	1435	tr
Hodiendiol derivative	9.34	1338	0.03	13.17	1922	0.06
α-Cubebene	9.40	1342	0.08	7.00*	1420	[0.07]
γ-Terpinyl acetate	9.47	1348	0.02	9.78	1632	0.03
Unknown [m/z 43, 121 (52), 93 (48), 79 (33), 41 (30), 136 (26), 81 (25)...]	9.52	1351	0.05			
Unknown [m/z 43, 79 (46), 71 (30), 94 (25), 41 (23), 81 (21)... 197 (0)]	9.58	1355	0.01	11.43	1769	0.02
Neryl acetate	9.66	1361	1.02	10.43*	1685	[1.02]
α-Copaene	9.73	1366	0.54	7.39	1449	0.53
(Z)-8-Hydroxylinalool?	9.84*	1374	0.23	14.06	2004	0.01
β-Bourbonene	9.84*	1374	[0.23]	7.73	1474	0.19
Geranyl acetate	9.94*	1380	2.07	10.80	1716	1.91
β-Cubebene	9.94*	1380	[2.07]	8.03	1496	0.14
β-Elemene	9.98	1383	0.10	8.71*	1548	2.26
α-Gurjunene	10.22	1400	0.01	7.91	1487	tr
β-Caryophyllene	10.32	1407	2.29	8.71*	1548	[2.26]
β-Copaene	10.45	1417	0.06	8.49	1531	0.06
Coumarin	10.49	1420	0.02	17.42	2344	0.07
trans-α-Bergamotene	10.58	1427	0.04	8.71*	1548	[2.26]
α-Humulene	10.77	1441	0.13	9.54	1613	0.11
9-epi-β-Caryophyllene	10.94	1454	0.02	9.62	1620	0.02
α-Amorphene	11.16*	1470	2.52	9.84	1637	0.03

Germacrene D	11.16*	1470	[2.52]	10.03*	1653	[5.07]
β-Selinene	11.24	1476	0.11	10.14	1661	0.09
Hodiendiol derivative IV	11.28	1478	0.01			
Bicyclogermacrene	11.35	1484	0.41	10.32*	1676	0.38
α-Muurolene	11.46	1492	0.07	10.32*	1676	[0.38]
(Z)-α-Bisabolene	11.50	1495	0.05	10.63	1702	0.07
β-Bisabolene	11.60*	1503	0.17	10.43*	1685	[1.02]
γ-Cadinene	11.60*	1503	[0.17]	10.67*†	1705	0.25
trans-Calamenene	11.74*	1513	0.18	11.48	1773	0.01
δ-Cadinene	11.74*	1513	[0.18]	10.67*†	1705	[0.25]
β-Sesquiphellandrene	11.81	1519	0.03	10.87	1721	0.01
Caryophyllene oxide	12.44*	1568	0.49	13.03*	1910	[0.52]
Caryophyllene oxide isomer	12.44*	1568	[0.49]	12.95	1902	0.04
Salvial-4(14)-en-1-one	12.58	1580	0.04	13.29	1933	0.02
Guaiol	12.70	1588	0.09	14.42	2039	0.01
Hinesol	13.17	1627	0.14	15.31	2125	0.05
τ-Cadinol	13.22	1631	0.02	15.19	2114	0.01
β-Eudesmol	13.30†	1638	0.18	15.73	2168	0.05
α-Eudesmol	13.34†	1641	[0.18]	15.67*	2162	[0.39]
Unknown [m/z 81, 41 (46), 79 (46), 93 (39), 91 (33), 107 (33)... 206 (8)]	13.54	1658	tr			
Cyclocolorenone	14.59	1746	0.01	16.88	2286	0.06
Phytone	15.64	1838	0.04	14.94	2088	0.06
Sclareoloxide	16.26	1894	0.02			
Sclareol	19.35	2199	0.71	23.13	3036	0.68
Total identified		97.69%			96.60%	
Total reported		97.92%			96.64%	

*: 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