

Date : December 17, 2020

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 20L04-PSC01

Customer identification : Mixed S4 and S3 - Frankincense

Type : Essential oil

Source : *Boswellia neglecta*

Customer : Pacha Soap Co.

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 : Alexis St-Gelais, M. Sc., chimiste

Analysis date : December 16, 2020

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: 1.4685 ± 0.0003 (20 °C; method PC-MAT-016)

Optical rotation: -2.0° (20 °C, methanol, $c = 1.8$)

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
Unknown	tr	Unknown
Toluene	0.08	Simple phenolic
Unknown	tr	Alkene
Unknown	0.02	Alkene
(Z)-Salvene	0.01	Normonoterpene
Unknown	tr	Unknown
Unknown	0.01	Unknown
Unknown	0.02	Unknown
Unknown	0.01	Monoterpene
Hashishene	0.03	Monoterpene
Tricyclene	0.06	Monoterpene
α -Thujene	16.95	Monoterpene
α -Pinene	51.04	Monoterpene
Thujadiene isomer	0.28	Monoterpene
α -Fenchene	0.04	Monoterpene
Camphene	0.75	Monoterpene
Thuja-2,4(10)-diene	0.25	Monoterpene
meta-Cymene	0.13	Monoterpene
Sabinene	0.92	Monoterpene
β -Pinene	1.62	Monoterpene
6-Methyl-5-hepten-2-one	0.03	Aliphatic ketone
Dehydro-1,8-cineole	0.02	Monoterpenic ether
Myrcene	1.77	Monoterpene
6-Methyl-5-hepten-2-ol	0.04	Aliphatic alcohol
Pseudolimonene	0.01	Monoterpene
α -Phellandrene	0.04	Monoterpene
Δ^3 -Carene	2.42	Monoterpene
ortho-Methylanisole	0.38	Simple phenolic
Unknown	0.03	Monoterpene
1,4-Cineole	0.06	Monoterpenic ether
α -Terpinene	0.11	Monoterpene
ortho-Cymene	0.02	Monoterpene
Carvomenthene	0.05	Aliphatic alcohol
para-Cymene	3.63	Monoterpene
Unknown	0.15	Unknown
1,8-Cineole	0.05	Monoterpenic ether
Limonene	1.52	Monoterpene
β -Phellandrene	0.28	Monoterpene
Cymene analog	0.02	Monoterpene
(Z)- β -Ocimene	0.03	Monoterpene
Unknown	0.05	Unknown
(E)- β -Ocimene	0.02	Monoterpene
γ -Terpinene	0.29	Monoterpene
cis-Sabinene hydrate	0.02	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene

Octanol	0.03	Aliphatic alcohol
Fenchone	0.03	Monoterpenic ketone
Terpinolene	0.13	Monoterpene
para-Cymenene	0.12	Monoterpene
α -Pinene oxide	0.22	Monoterpenic ether
<i>trans</i> -Sabinene hydrate	0.02	Monoterpenic alcohol
Linalool	0.05	Monoterpenic alcohol
α -Thujone	0.09	Monoterpenic ketone
Verbenol analog?	0.31	Monoterpenic alcohol
β -Thujone	0.30	Monoterpenic ketone
Dehydrosabinaketone	0.07	Normoterpenic ketone
α -Campholenal	0.04	Monoterpenic aldehyde
<i>cis</i> -para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
Myrcenol	0.01	Monoterpenic alcohol
Unknown	0.18	Unknown
1-Terpineol	0.02	Monoterpenic alcohol
<i>trans</i> -Pinocarveol	0.41	Monoterpenic alcohol
Camphor	0.09	Monoterpenic ketone
<i>cis</i> -Verbenol	0.07	Monoterpenic alcohol
<i>trans</i> -Sabinol	0.02	Monoterpenic alcohol
<i>trans</i> -Verbenol	0.37	Monoterpenic alcohol
meta-Mentha-4,6-dien-8-ol	0.07	Monoterpenic alcohol
Sabinaketone	0.02	Normoterpenic ketone
Unknown	0.02	Oxygenated monoterpene
Pinocarpone	0.01	Monoterpenic ketone
Phellandrenol analog I	0.08	Monoterpenic alcohol
Umbellulone	0.22	Monoterpenic ketone
Borneol	0.01	Monoterpenic alcohol
α -Phellandren-8-ol	0.05	Monoterpenic alcohol
δ -Terpineol	0.01	Monoterpenic alcohol
Terpinen-4-ol	7.52	Monoterpenic alcohol
4-Methylacetophenone	0.04	Simple phenolic
meta-Cymen-8-ol	0.09	Monoterpenic alcohol
para-Cymen-8-ol	0.22	Monoterpenic alcohol
α -Terpineol	1.35	Monoterpenic alcohol
Myrtenal	0.19	Monoterpenic aldehyde
Myrtenol	0.16	Monoterpenic alcohol
Verbenone	0.36	Monoterpenic ketone
<i>trans</i> -Carveol	0.07	Monoterpenic alcohol
<i>cis</i> -Carveol	0.02	Monoterpenic alcohol
Cuminal	0.04	Monoterpenic aldehyde
2,5-Dimethoxytoluene	0.04	Simple phenolic
Carvacrol methyl ether	0.02	Monoterpenic ether
Piperitone	0.02	Monoterpenic ketone
Unknown	0.25	Unknown
Linalyl acetate	0.06	Monoterpenic ester
3,5-Dimethoxytoluene	0.03	Simple phenolic
<i>trans</i> -Ascaridole glycol	0.08	Monoterpenic alcohol
Bornyl acetate	0.12	Monoterpenic ester
<i>cis</i> -Ascaridole glycol	0.05	Monoterpenic alcohol
Cuminol	0.02	Monoterpenic alcohol
Thymol	0.01	Monoterpenic alcohol

para-Menth-5-en-1,2-diol isomer II	0.01	Monoterpenic alcohol
Carvacrol	0.07	Monoterpenic alcohol
Unknown	0.10	Unknown
α -Terpinyl acetate	0.10	Monoterpenic ester
α -Copaene	0.08	Sesquiterpene
Unknown	0.06	Unknown
β -Elemene	0.23	Sesquiterpene
Unknown	0.08	Unknown
Ylanga-2,4(15)-diene?	0.01	Sesquiterpene
β -Caryophyllene	0.02	Sesquiterpene
γ -Elemene	0.02	Sesquiterpene
α -Humulene	0.01	Sesquiterpene
allo-Aromadendrene	0.05	Sesquiterpene
γ -Murolene	0.03	Sesquiterpene
β -Selinene	0.05	Sesquiterpene
α -Selinene	0.02	Sesquiterpene
γ -Cadinene	0.02	Sesquiterpene
δ -Cadinene	0.02	Sesquiterpene
Caryophyllene oxide	0.01	Sesquiterpenic ether
Germacrone	0.08	Sesquiterpenic ketone
Consolidated total	98.22%	

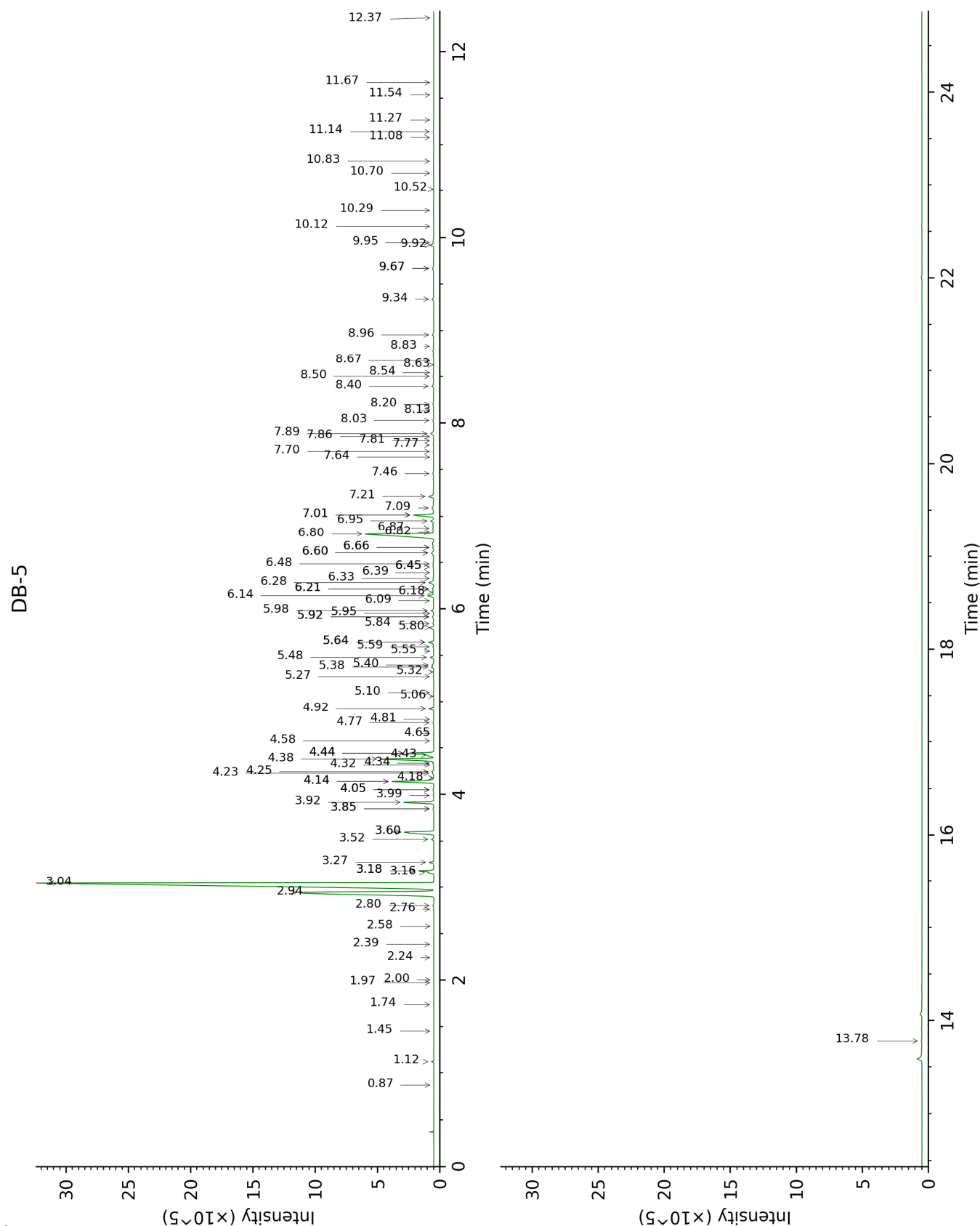
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

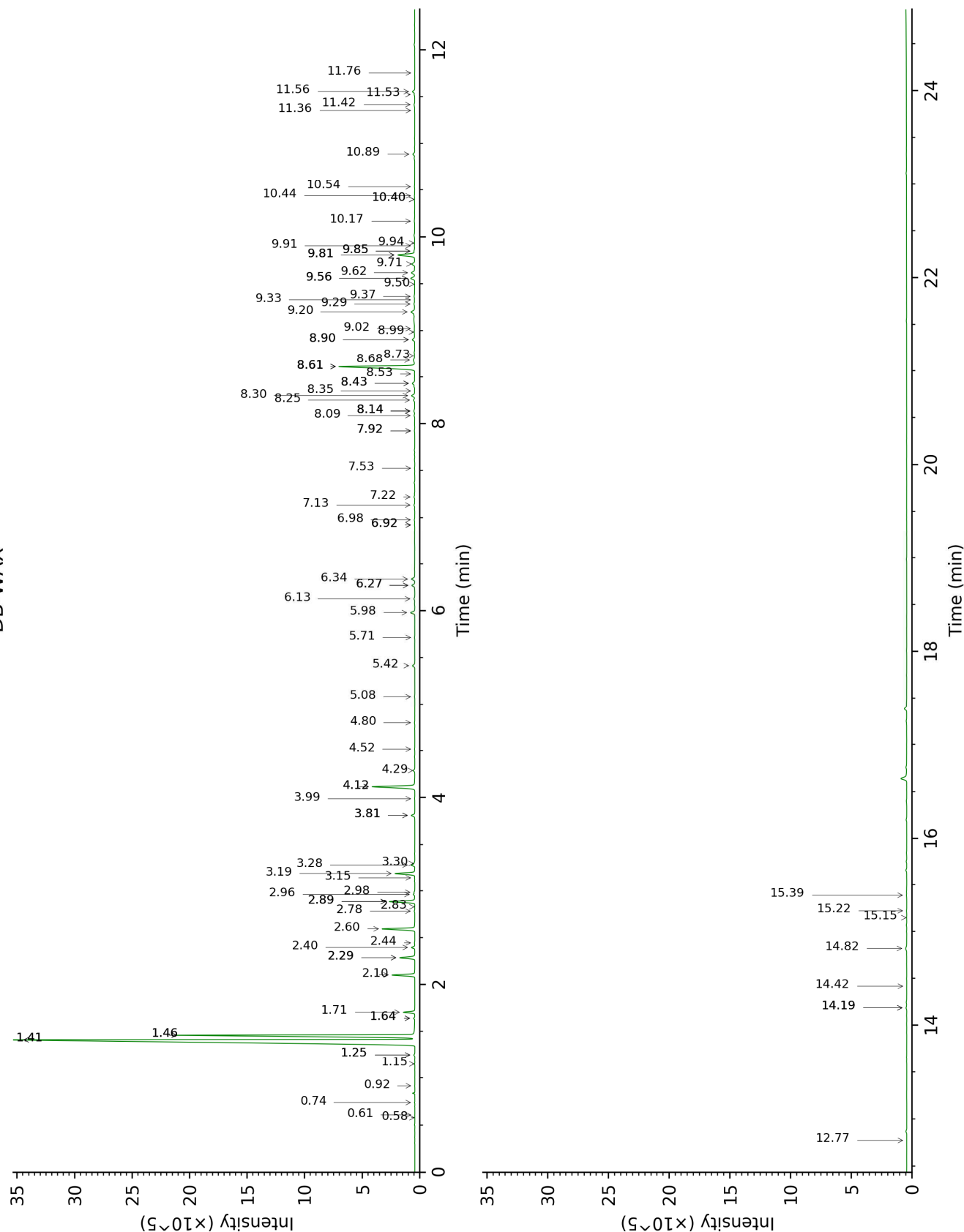
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

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DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Unknown [m/z 93, 91 (70), 77 (48), 108 (42)]	0.87	728	tr	0.58	822	tr
Toluene	1.12	764	0.08	1.46*†	1003	[67.14]
Unknown [m/z 109, 67 (33), 41 (16), 81 (13)... 124 (8)]	1.45	810	tr	0.61	832	tr
Unknown [m/z 109, 67 (32), 81 (14), 41 (12), 124 (10)]	1.74	834	0.02	0.74	880	0.01
(Z)-Salvene	1.97	853	0.01	0.92	918	0.01
Unknown [m/z 109, 43 (28), 124 (28), 41 (14), 55 (11), 79 (9), 81 (8)...]	2.00	856	tr	1.64*	1021	0.07
Unknown [m/z 79, 78 (45), 91 (28), 77 (28), 41 (13), 80 (12), 107 (11)... 122 (1)]	2.24	876	0.01	1.15	956	0.01
Unknown [m/z 119, 91 (35), 79 (17), 77 (13), 120 (11), 117 (9)... 134 (1)]	2.39	888	0.02	1.25*	973	0.07
Unknown [m/z 93, 91 (72), 121 (58), 77 (49), 79 (41), 43 (22), 105 (20), 107 (20), 41 (18), 136 (17), 92 (17)]	2.58	904	0.01			
Hashishene	2.76	916	0.03	1.41*†	998	67.14
Tricyclene	2.80	919	0.06	1.25*	973	[0.07]
α-Thujene	2.94	928	16.95	1.46*†	1003	[67.14]
α-Pinene	3.04	935	51.04	1.41*†	998	[67.14]
Thujadiene isomer	3.16	942	0.28	2.40	1096	0.24
α-Fenchene	3.18*	944	0.79	1.64*	1021	[0.07]
Camphene	3.18*	944	[0.79]	1.71	1027	0.75
Thuja-2,4(10)-diene	3.27	950	0.25	2.29*	1085	1.17
meta-Cymene	3.52	966	0.13	2.89*	1134	1.87
Sabinene	3.60*	971	2.59	2.29*	1085	[1.17]
β-Pinene	3.60*	971	[2.59]	2.10	1067	1.62
6-Methyl-5-hepten-2-one	3.85*	988	0.06	5.08	1297	0.03
Dehydro-1,8-cineole	3.85*	988	[0.06]	3.15	1155	0.02
Myrcene	3.92	992	1.77	2.89*	1134	[1.87]
6-Methyl-5-hepten-2-ol	3.99	997	0.04	6.92*	1431	0.03
Pseudolimonene	4.05*	1001	0.07	2.83	1130	0.01
α-Phellandrene	4.05*	1001	[0.07]	2.78	1126	0.04
Δ ³ -Carene	4.14*	1007	2.81	2.60	1112	2.42
ortho-Methylanisole	4.14*	1007	[2.81]	5.98	1362	0.38

Unknown [m/z 117, 132 (88), 115 (68), 91 (55), 77 (20)]	4.18	1009	0.03			
1,4-Cineole	4.23	1012	0.06	2.98	1142	0.07
α -Terpinene	4.25	1014	0.11	2.96	1140	0.11
ortho-Cymene	4.32	1018	0.02	4.12*	1230	3.63
Carvomenthene	4.34	1019	0.05	2.44	1100	0.03
para-Cymene	4.38	1022	3.63	4.12*	1230	[3.63]
Unknown [m/z 109, 43 (58), 95 (26)... 137 (15)...]	4.43†	1025	2.10	6.27*	1383	0.27
1,8-Cineole	4.44*†	1026	[2.10]	3.30	1167	0.05
Limonene	4.44*†	1026	[2.10]	3.19	1159	1.52
β -Phellandrene	4.44*†	1026	[2.10]	3.28	1166	0.28
Cymene analog	4.58	1034	0.02	4.52	1259	0.02
(Z)- β -Ocimene	4.65	1039	0.03	3.81*	1207	0.30
Unknown [m/z 109, 43 (57), 91 (28), 67 (25), 93 (24), 95 (22), 77 (21), 137 (21), 41 (17), 79 (14)...]	4.77	1046	0.05			
(E)- β -Ocimene	4.81	1049	0.02	3.99	1220	0.02
γ -Terpinene	4.92	1056	0.29	3.81*	1207	[0.30]
cis-Sabinene hydrate	5.06	1065	0.02	6.92*	1431	[0.03]
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.10	1067	0.03	4.80	1280	0.03
Octanol	5.27	1078	0.03	8.14*	1522	0.10
Fenchone	5.32	1081	0.03	5.72	1343	0.03
Terpinolene	5.38	1084	0.13	4.29	1242	0.14
para-Cymenene	5.40	1086	0.12	6.27*	1383	[0.27]
α -Pinene oxide	5.48	1091	0.22	5.42	1321	0.21
trans-Sabinene hydrate	5.55	1095	0.02	7.92*	1506	0.03
Linalool	5.59	1098	0.05	8.09	1518	0.06
α -Thujone	5.64*	1101	0.37	6.13	1372	0.09
Verbenol analog?	5.64*	1101	[0.37]	8.30	1535	0.31
β -Thujone	5.80	1111	0.30	6.34	1388	0.33
Dehydrosabinaketone	5.84	1114	0.07	8.61*	1559	7.44
α -Campholenal	5.92*	1119	0.11	6.98	1435	0.04
cis-para-Menth-2-en-1-ol	5.92*	1119	[0.11]	8.14*	1522	[0.10]
Myrcenol	5.95	1121	0.01	8.90*	1582	0.23
Unknown [m/z 95, 43 (41), 110 (36), 41 (19), 67 (18)... 150 (tr)]	5.98	1123	0.18			
1-Terpineol	6.09	1130	0.02	8.35	1539	0.02
trans-Pinocarveol	6.14	1133	0.41	9.20	1605	0.46
Camphor	6.18	1136	0.09	7.22	1453	0.07
cis-Verbenol	6.22*	1138	0.13	9.28	1612	0.07
trans-Sabinol	6.22*	1138	[0.13]	9.85*	1657	0.08

<i>trans</i> -Verbenol	6.28	1142	0.37	9.56*	1634	0.37
meta-Mentha-4,6-dien-8-ol	6.33	1145	0.07	9.37	1618	0.05
Sabinaketone	6.39	1149	0.02	8.73	1568	0.03
Unknown [m/z 97, 81 (96), 109 (80), 43 (53), 53 (40), 41 (36), 56 (29), 95 (25)... 152 (1)]	6.45*	1153	0.06	7.53	1476	0.02
Pinocarvone	6.45*	1153	[0.06]	7.92*	1506	[0.03]
Phellandrenol analog I	6.48	1155	0.08			
Umbellulone	6.60*	1163	0.23	8.90*	1582	[0.23]
Borneol	6.60*	1163	[0.23]	9.81*	1654	1.58
α -Phellandren-8-ol	6.66*	1166	0.08	10.17	1683	0.05
δ -Terpineol	6.66*	1166	[0.08]	9.50	1629	0.01
Terpinen-4-ol	6.80	1176	7.52	8.61*	1559	[7.44]
4-Methylacetophenone	6.82	1177	0.04	10.44	1705	0.03
meta-Cymen-8-ol	6.87	1180	0.09	11.52	1798	0.05
para-Cymen-8-ol	6.95	1185	0.22	11.56	1800	0.22
α -Terpineol	7.02*	1190	1.54	9.81*	1654	[1.58]
Myrtenal	7.02*	1190	[1.54]	8.68	1564	0.19
Myrtenol	7.09	1194	0.16	10.89	1744	0.18
Verbenone	7.21	1202	0.36	9.62	1639	0.32
<i>trans</i> -Carveol	7.46	1219	0.07	11.42	1788	0.09
<i>cis</i> -Carveol	7.64	1231	0.02	11.76	1818	0.01
Cuminal	7.70	1235	0.04	10.54	1714	0.03
2,5-Dimethoxytoluene	7.77	1240	0.04			
Carvacrol methyl ether	7.81	1243	0.02	8.53	1553	0.02
Piperitone	7.86	1246	0.02	9.94	1664	0.02
Unknown [m/z 43, 109 (63), 71 (50), 81 (31), 55 (29), 85 (26)...]	7.89	1248	0.25			
Linalyl acetate	8.03	1258	0.06	8.14*	1522	[0.10]
3,5-Dimethoxytoluene	8.13	1265	0.03	11.36	1783	0.02
<i>trans</i> -Ascaridole glycol	8.20	1270	0.08	14.19*	2041	0.08
Bornyl acetate	8.40	1283	0.12	8.25	1531	0.12
<i>cis</i> -Ascaridole glycol	8.50	1290	0.05	14.82	2102	0.16
Cuminol	8.54	1293	0.02	14.19*	2041	[0.08]
Thymol	8.63	1299	0.01	15.15	2135	0.01
para-Menth-5-en-1,2-diol isomer II	8.67	1302	0.01	14.42	2063	0.01
Carvacrol	8.83	1308	0.07	15.39	2159	0.04
Unknown [m/z 109, 43 (69), 87 (41), 41 (27), 81 (25), 115 (24)...]	8.96	1317	0.10			
α -Terpinyl acetate	9.34	1345	0.10	9.71	1646	0.28

α -Copaene	9.67*	1368	0.14	7.14	1447	0.08
Unknown [m/z 43, 84 (95), 71 (82), 81 (80), 109 (62)...]	9.67*	1368	[0.14]			
β -Elemene	9.92	1386	0.23	8.43*	1545	0.24
Unknown [m/z 125, 82 (78), 43 (68), 97 (45), 71 (28), 41 (27), 124 (26)...]	9.95	1388	0.08			
Ylanga-2,4(15)-diene?	10.12	1400	0.01	8.61*	1559	[7.44]
β -Caryophyllene	10.29	1414	0.02	8.43*	1545	[0.24]
γ -Elemene	10.52	1430	0.02	9.02	1591	0.04
α -Humulene	10.70	1444	0.01	9.33	1615	0.02
allo-Aromadendrene	10.83	1454	0.05	8.99	1588	0.06
γ -Murolene	11.08	1473	0.03	9.56*	1634	[0.37]
β -Selinene	11.14	1478	0.05	9.85*	1657	[0.08]
α -Selinene	11.27	1487	0.02	9.91	1662	0.03
γ -Cadinene	11.54	1507	0.02	10.40*	1702	0.04
δ -Cadinene	11.67	1518	0.02	10.40*	1702	[0.04]
Caryophyllene oxide	12.37	1573	0.01	12.77	1908	0.01
Germacrone	13.78	1689	0.08	15.22	2142	0.03
Total identified		95.62%			96.38%	
Total reported		98.50%			96.47%	

*: 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