

Date : February 23, 2023

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 23B02-NSO02

Customer identification : Opopanax - OP21.44 - Commiphora guidottii

Type : Essential oil

Source : Commiphora guidottii

Customer : Natural Sourcing LLC

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 : Sylvain Mercier, M. Sc., Chimiste 2014-005

Analysis date : February 07, 2023

Checked and approved by :

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

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This report is an update from the first version issued on February 13, 2023, to correct the botanical identification.

PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.4902 ± 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	0.01	Furan
2-Methylfuran	0.02	Furan
2-Methyl-3-buten-2-ol	0.02	Aliphatic alcohol
2,5-Dimethylfuran	tr	Furan
2-Methylcrotonaldehyde?	tr	Aliphatic aldehyde
Toluene	0.03	Simple phenolic
1-Methylcyclohexene	0.02	Alkene
5-Hexen-2-one?	0.02	Aliphatic ketone
3-Methylcrotonaldehyde	0.01	Aliphatic aldehyde
Unknown	0.01	Unknown
Hashishene	0.01	Monoterpene
Tricyclene	0.03	Monoterpene
α -Thujene	0.02	Monoterpene
α -Pinene	0.27	Monoterpene
Unknown	0.09	Unknown
Camphene	0.01	Monoterpene
Sabinene	0.03	Monoterpene
β -Pinene	0.03	Monoterpene
6-Methyl-5-hepten-2-one	0.02	Aliphatic ketone
Myrcene	0.18	Monoterpene
α -Phellandrene	0.02	Monoterpene
Δ^3 -Carene	0.02	Monoterpene
α -Terpinene	0.01	Monoterpene
para-Cymene	0.06	Monoterpene
(2E,4E)-3,7-Dimethylocta-2,4-diene?	0.08	Monoterpene
Limonene	0.11	Monoterpene
1,8-Cineole	0.01	Monoterpenic ether
(Z)- β -Ocimene	0.80	Monoterpene
(E)- β -Ocimene	58.18	Monoterpene
γ -Terpinene	0.06	Monoterpene
Unknown	0.04	Oxygenated monoterpene
Unknown	0.01	Unknown
α -Pinene oxide analog	0.02	Monoterpenic ether
Terpinolene	0.02	Monoterpene
Rosefuran	0.21	Monoterpenic ether
(Z)-6-Methyl-3,5-heptadien-2-one	0.18	Aliphatic ketone
(E)-6-Methyl-3,5-heptadien-2-one	0.10	Aliphatic ketone
Limona ketone	0.27	Normonoterpenic ketone
Unknown	0.05	Unknown
(Z)-Myroxide	0.08	Monoterpenic ether
(E)-Myroxide	0.12	Monoterpenic ether
α -Phellandren-8-ol	0.04	Monoterpenic alcohol
Terpinen-4-ol	0.03	Monoterpenic alcohol
4-Methylacetophenone	0.05	Simple phenolic
Unknown	0.04	Unknown

α-Terpineol	0.03	Monoterpenic alcohol
Unknown	0.06	Oxygenated monoterpene
(3Z,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol?	0.04	Monoterpenic alcohol
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	0.12	Monoterpenic alcohol
<i>trans</i> -Carveol	0.02	Monoterpenic alcohol
<i>cis</i> -Carveol	0.02	Monoterpenic alcohol
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Unknown	0.10	Oxygenated monoterpene
Decanol	0.39	Aliphatic alcohol
Thymol	0.02	Monoterpenic alcohol
Unknown	0.01	Unknown
Unknown	0.03	Unknown
Unknown	0.17	Unknown
δ-Elemene	0.01	Sesquiterpene
α-Longipinene	0.03	Sesquiterpene
α-Cubebene	0.04	Sesquiterpene
Longicyclene	0.07	Sesquiterpene
α-Copaene	0.06	Sesquiterpene
Unknown	0.06	Sesquiterpene
β-Bourbonene	0.04	Sesquiterpene
<i>cis</i> -β-Elemene	0.02	Sesquiterpene
7-epi-Sesquithujene	0.03	Sesquiterpene
β-Elemene	0.22	Sesquiterpene
Longifolene	0.03	Sesquiterpene
Unknown	0.01	Sesquiterpene
α-Gurjunene	0.09	Sesquiterpene
β-Caryophyllene	0.34	Sesquiterpene
<i>cis</i> -α-Bergamotene	1.30	Sesquiterpene
α-Santalene	9.67	Sesquiterpene
β-Copaene	0.02	Sesquiterpene
<i>trans</i> -α-Bergamotene	2.81	Sesquiterpene
Sesquisabinene A	0.13	Sesquiterpene
epi-β-Santalene	0.31	Sesquiterpene
α-Humulene	0.05	Sesquiterpene
allo-Aromadendrene	0.02	Sesquiterpene
Sesquisabinene B	0.38	Sesquiterpene
β-Santalene	0.33	Sesquiterpene
γ-Murolene	0.04	Sesquiterpene
Germacrene D	1.02	Sesquiterpene
Dodecanol	0.18	Aliphatic alcohol
<i>trans</i> -β-Bergamotene	0.40	Sesquiterpene
β-Selinene	0.04	Sesquiterpene
Curzerene	0.11	Sesquiterpenic ether
(Z)-α-Bisabolene	9.68	Sesquiterpene
γ-Cadinene	0.17	Sesquiterpene
β-Bisabolene	0.93	Sesquiterpene
β-Curcumene	0.10	Sesquiterpene
(Z)-γ-Bisabolene	0.16	Sesquiterpene
Unknown	1.32	Oxygenated sesquiterpene
δ-Cadinene	0.31	Sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene

Unknown	0.07	Unknown
Unknown	0.20	Sesquiterpene
Unknown	0.07	Sesquiterpene
α -Cadinene	0.01	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.12	Sesquiterpene
α -Elemol	0.04	Sesquiterpenic alcohol
Unknown	0.13	Oxygenated sesquiterpene
(<i>E</i>)-Nerolidol	0.04	Sesquiterpenic alcohol
Spathulenol	0.09	Sesquiterpenic alcohol
Unknown	0.20*	Oxygenated sesquiterpene
Unknown	0.20*	Oxygenated sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Ledol	0.02	Sesquiterpenic alcohol
Torilenol?	0.10	Oxygenated sesquiterpene
Furanoedesma-1,3-diene	0.20	Sesquiterpenic ether
τ -Cadinol	0.01	Sesquiterpenic alcohol
τ -Muurolol	0.04	Sesquiterpenic alcohol
Unknown	0.09	Unknown
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.24	Oxygenated sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.67	Oxygenated sesquiterpene
(<i>E</i>)- α -Santalal	0.47	Sesquiterpenic aldehyde
Eudesma-4(15),7-dien-1 β -ol	0.09	Sesquiterpenic alcohol
epi- α -Bisabolol	0.16	Sesquiterpenic alcohol
Unknown	0.03	Unknown
Unknown	0.03	Unknown
Unknown	0.04	Unknown
Unknown	0.08	Unknown
Benzyl benzoate	0.02	Phenolic ester
Unknown	0.08	Unknown
Unknown	0.27	Unknown
Serratol	0.28	Diterpenic alcohol
Consolidated total	97.17%	

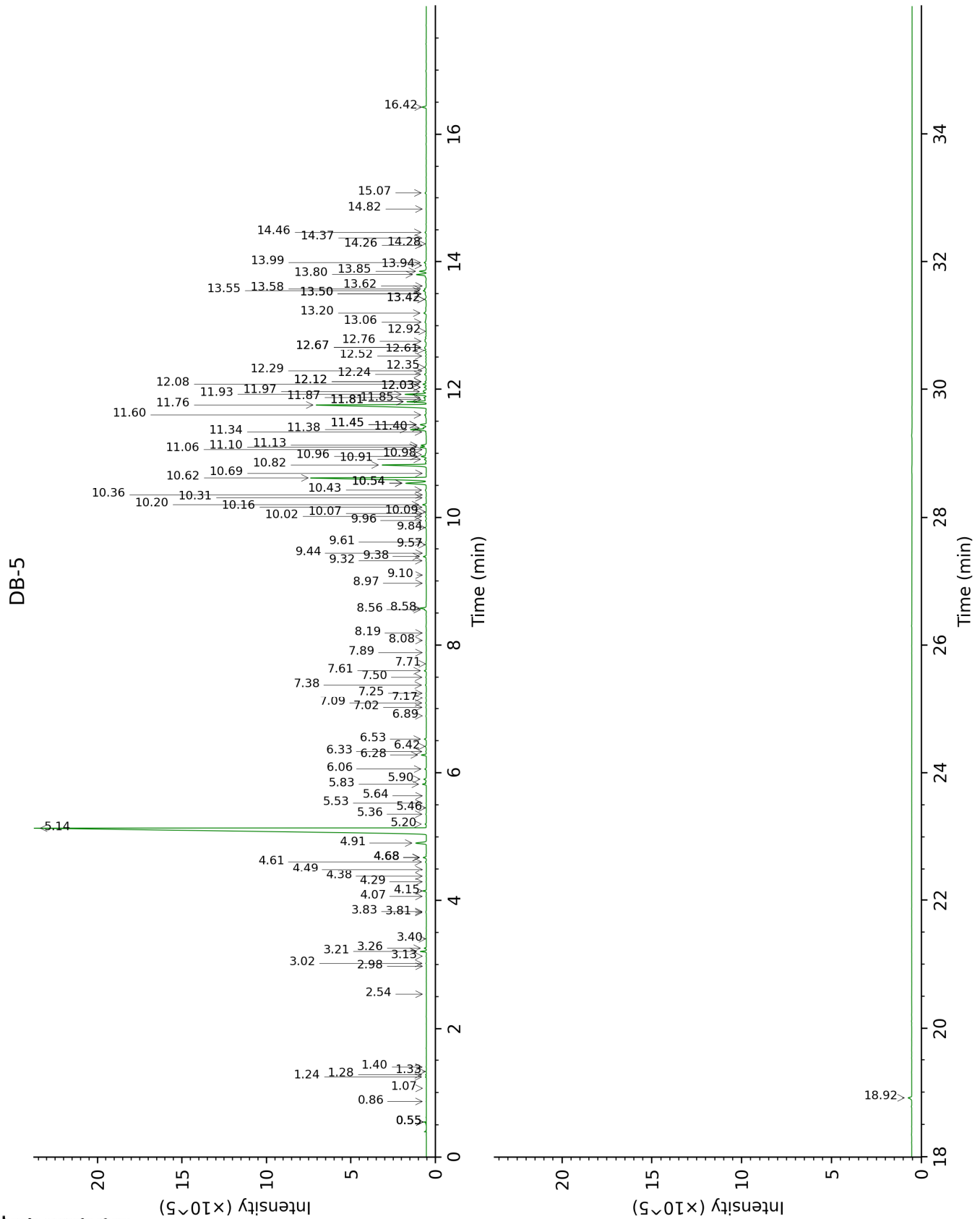
*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total
tr: The compound has been detected below 0.005% of total signal.

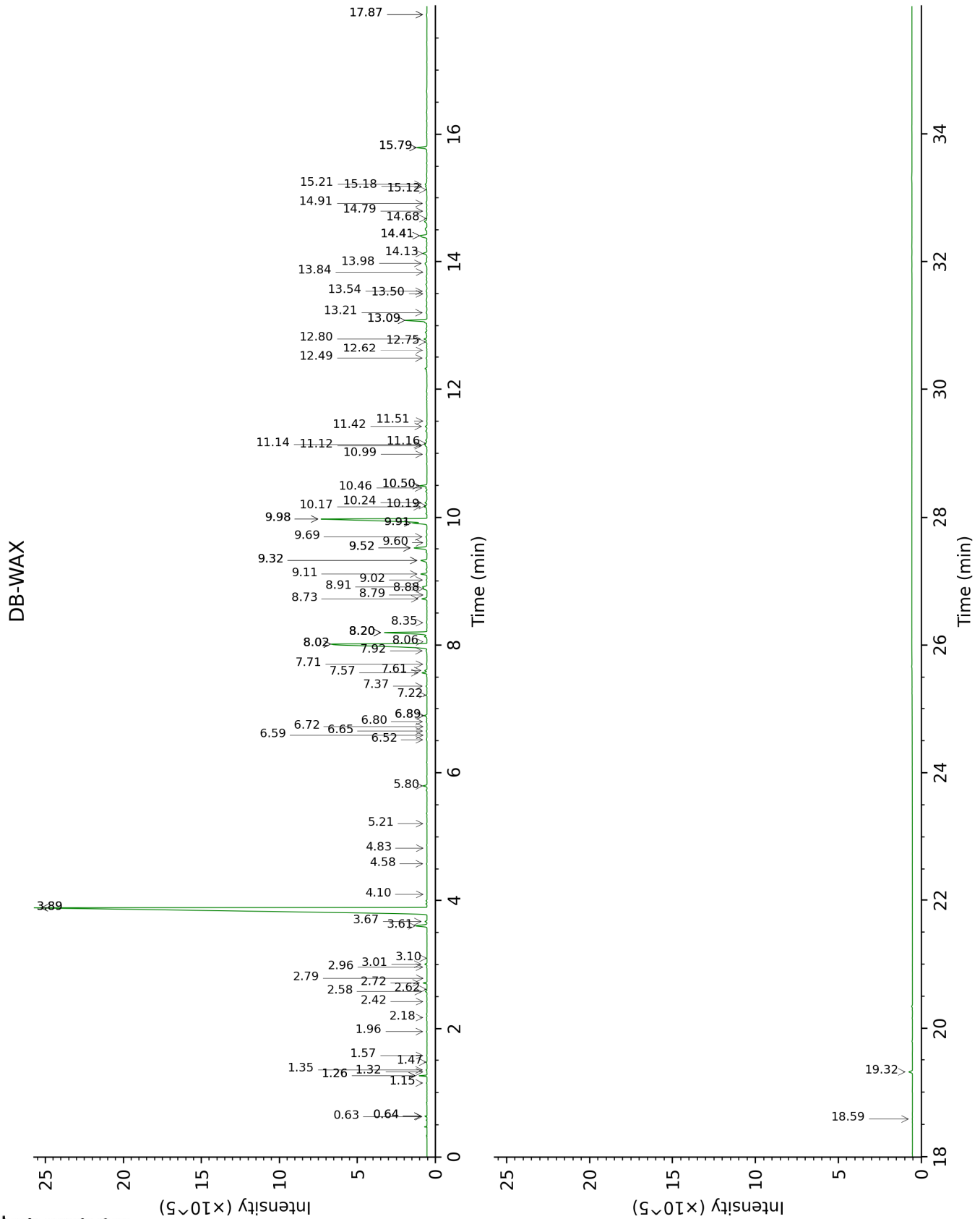
Note: no correction factor was applied

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.





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
3-Methylfuran	0.55*	606	0.05	0.64*	859	0.04
2-Methylfuran	0.55*	606	[0.05]	0.63	855	0.02
2-Methyl-3-buten-2-ol	0.55*	606	[0.05]	1.47	1014	0.02
2,5-Dimethylfuran	0.86	707	tr			
2-Methylcrotonaldehyde?	1.07	735	tr			
Toluene	1.24	758	0.03	1.35	1001	0.03
1-Methylcyclohexene	1.28	763	0.02	0.64*	859	[0.04]
5-Hexen-2-one?	1.33	770	0.02			
3-Methylcrotonaldehyde	1.40	779	0.01	2.96	1153	0.02
Unknown [m/z 109, 124 (34), 43 (13), 110 (8), 79 (4), 123 (4)...]	2.54	883	0.01			
Hashishene	2.98	915	0.01	1.26*	990	0.28
Tricyclene	3.02	918	0.03	1.15	970	0.02
α -Thujene	3.13	926	0.02	1.32	998	0.01
α -Pinene	3.21	930	0.27	1.26*	990	[0.28]
Unknown [m/z 122, 107 (38), 121 (35), 79 (28), 77 (27), 43 (26)...]	3.26	934	0.09			
Camphene	3.40	943	0.01	1.57	1024	0.02
Sabinene	3.81†	970	0.05	2.18	1087	0.03
β -Pinene	3.83†	971	[0.05]	1.96	1064	0.03
6-Methyl-5-hepten-2-one	4.06	987	0.02	4.83	1300	0.01
Myrcene	4.15	992	0.18	2.72	1133	0.18
α -Phellandrene	4.29	1002	0.02	2.62	1125	0.01
Δ^3 -Carene	4.38	1007	0.02	2.42	1109	0.02
α -Terpinene	4.49	1014	0.01	2.79	1139	0.01
para-Cymene	4.61	1022	0.06	3.89*	1227	58.05
(2E,4E)-3,7-Dimethylocta-2,4-diene?	4.68*	1026	0.19	2.58	1122	0.08
Limonene	4.68*	1026	[0.19]	3.01	1157	0.11
1,8-Cineole	4.68*	1026	[0.19]	3.10	1165	0.01
(Z)- β -Ocimene	4.91	1040	0.80	3.61	1206	0.81
(E)- β -Ocimene	5.14	1055	58.18	3.89*	1227	[58.05]
γ -Terpinene	5.20	1059	0.06	3.67	1211	0.10
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.36	1068	0.04	4.58	1281	0.03
Unknown [m/z 69, 84 (70), 41 (57), 81 (23), 67 (20), 68 (17)...]	5.46	1074	0.01			
α -Pinene oxide analog	5.53	1079	0.02	5.21	1322	0.02
Terpinolene	5.64	1086	0.02	4.10	1243	0.01

Rosefuran	5.82	1098	0.21	5.80	1365	0.22
(Z)-6-Methyl-3,5-heptadien-2-one	5.90	1102	0.18	8.02*	1530	11.14
(E)-6-Methyl-3,5-heptadien-2-one	6.06	1112	0.10	7.92	1522	0.08
Limona ketone	6.28	1126	0.27	7.57	1496	0.29
Unknown [m/z 95, 123 (73), 67 (64), 82 (54), 41 (47), 55 (27)...]	6.33	1130	0.05			
(Z)-Myroxide	6.42	1135	0.08	6.65	1427	0.05
(E)-Myroxide	6.53	1142	0.12	6.89*	1445	0.16
α-Phellandren-8-ol	6.89	1165	0.04	9.91*	1680	1.13
Terpinen-4-ol	7.02	1174	0.03	8.35	1556	0.03
4-Methylacetophenone	7.09	1178	0.05	10.19	1704	0.03
Unknown [m/z 43, 135 (73), 59 (46), 93 (39), 91 (35), 81 (32)...]	7.17	1183	0.04			
α-Terpineol	7.25	1188	0.03	9.52*	1649	1.05
Unknown [m/z 121, 43 (99), 91 (85), 77 (73), 93 (41), 136 (33)... 166 (3)]	7.38	1196	0.06			
(3Z,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol?	7.50	1204	0.04	10.99	1771	0.06
(3E,5E)-2,6-Dimethylocta-3,5,7-trien-2-ol	7.60	1211	0.12	11.14	1784	0.16
trans-Carveol	7.71	1218	0.02	11.16	1786	0.06
cis-Carveol	7.89	1230	0.02	11.51	1816	0.02
Unknown [m/z 72, 43 (75), 81 (52), 71 (41), 41 (36), 55 (36), 69 (26)... 150 (5)]	8.08	1242	0.01	12.62	1915	0.01
Unknown [m/z 72, 43 (77), 81 (53), 71 (42), 55 (34), 41 (42), 69 (25)...]	8.19	1250	0.01			
Unknown [m/z 41, 43 (84), 72 (81), 97 (90), 95 (60)... 150 (4)]	8.56	1274	0.10	12.49	1904	0.06
Decanol	8.58	1276	0.39	10.50*	1730	0.41
Thymol	8.97	1302	0.02	14.91	2135	0.03
Unknown [m/z 43, 111 (83), 55 (25), 93 (24), 41 (20), 789 (20), 77 (20), 109 (17)...]	9.10	1311	0.01			
Unknown [m/z 93, 94 (66), 95 (46), 91 (41), 107 (38), 79 (36)...]	9.32	1326	0.03			
Unknown [m/z 55, 69 (79), 70 (78), 56 (76), 41 (70), 83 (66)...]	9.38	1331	0.17			
δ-Elemene	9.44	1335	0.01	6.72	1432	0.01

α -Longipinene	9.57	1344	0.03	6.52	1417	0.05
α -Cubebene	9.61	1347	0.04	6.59	1422	0.01
Longicyclene	9.84	1363	0.07	6.80	1438	0.05
α -Copaene	9.96	1371	0.06	6.89*	1445	[0.16]
Unknown [m/z 91, 79 (96), 147 (83), 105 (78), 93 (66), 95 (65)...204 (1)]	10.02	1376	0.06			
β -Bourbonene	10.07	1379	0.04	7.22	1470	0.04
<i>cis</i> - β -Elemene	10.09	1381	0.02	8.06	1533	0.01
7- <i>epi</i> -Sesquithujene	10.16	1386	0.03	7.61	1498	0.13
β -Elemene	10.20	1389	0.22	8.20*	1544	2.88
Longifolene	10.31	1396	0.03	7.71	1506	0.04
Unknown [m/z 123, 119 (61), 91 (48), 105 (43), 93 (36), 79 (32), 81 (28)... 204 (10)]	10.36	1400	0.01			
α -Gurjunene	10.43	1405	0.09	7.36	1480	0.06
β -Caryophyllene	10.54*	1413	1.64	8.20*	1544	[2.88]
<i>cis</i> - α -Bergamotene	10.54*	1413	[1.64]	8.02*	1530	[11.14]
α -Santalene	10.62	1419	9.67	8.02*	1530	[11.14]
β -Copaene	10.69	1424	0.02	8.20*	1544	[2.88]
<i>trans</i> - α -Bergamotene	10.82	1434	2.81	8.20*	1544	[2.88]
Sesquisabinene A	10.91	1440	0.13	8.88	1597	0.27
<i>epi</i> - β -Santalene	10.96	1444	0.31	8.73	1585	0.32
α -Humulene	10.98	1446	0.05	9.02	1608	0.05
allo-Aromadendrene	11.06	1452	0.02	8.79	1590	0.01
Sesquisabinene B	11.10	1454	0.38	9.11	1616	0.37
β -Santalene	11.13	1457	0.33	8.91	1599	0.33
γ -Murolene	11.34	1472	0.04	9.32*	1633	0.47
Germacrene D	11.38	1475	1.02	9.52*	1649	[1.05]
Dodecanol	11.40	1477	0.18	12.80	1932	0.18
<i>trans</i> - β -Bergamotene	11.45*	1481	0.43	9.32*	1633	[0.47]
β -Selinene	11.45*	1481	[0.43]	9.60	1655	0.04
Curzerene	11.60	1492	0.11	11.42	1809	0.10
(<i>Z</i>)- α -Bisabolene	11.76	1503	9.68	9.98*	1686	9.74
γ -Cadinene	11.81*	1507	1.11	10.17	1702	0.17
β -Bisabolene	11.81*	1507	[1.11]	9.91*	1680	[1.13]
β -Curcumene	11.85	1510	0.10	9.98*	1686	[9.74]
(<i>Z</i>)- γ -Bisabolene	11.87	1512	0.16	9.69	1663	0.11
Unknown [m/z 121, 93 (56), 91 (12), 94 (11), 122 (10)...220]	11.92	1516	1.32	13.09*	1959	1.38
δ -Cadinene	11.97	1520	0.31	10.24	1707	0.12
Unknown [m/z 93, 91 (59), 43 (55), 79 (49), 105 (40)... 220? (t)]	12.03*	1525	0.13	13.21	1970	0.05
Unknown [m/z 93, 43 (95), 163 (57), 95 (54), 69 (39), 41 (28)...]	12.03*	1525	[0.13]			
Unknown [m/z 93, 107 (57), 91 (43), 119 (42),	12.08	1529	0.20			

79 (32), 138 (32)...204 (11)]						
Unknown [m/z 138, 93 (98), 95 (55), 91 (52), 121 (49), 105 (45)...204 (1)]	12.12*	1532	0.08	11.12	1783	0.07
α -Cadinene	12.12*	1532	[0.08]	10.50*	1730	[0.41]
(E)- α -Bisabolene	12.24	1541	0.12	10.46	1727	0.08
α -Elemol	12.29	1545	0.04	13.84	2030	0.03
Unknown [m/z 93, 121 (84), 79 (41), 119 (38), 107 (38), 91 (37)...222 (4)]	12.35	1550	0.13			
(E)-Nerolidol	12.52	1563	0.04	13.54	2001	0.07
Spathulenol	12.61	1570	0.09	14.13	2058	0.31
Unknown [m/z 85, 119 (66), 93 (53), 94 (40), 91 (37), 95 (29)...220 (2)]	12.67*	1575	0.20			
Unknown [m/z 109, 43 (95), 81 (81), 93 (76), 69 (75), 95 (74), 107 (71)...204 (22), 220 (6)]	12.67*	1575	[0.20]			
Unknown [m/z 93, 121 (68), 123 (45), 91 (41), 119 (32), 79 (30)...220 (9)]	12.76	1582	0.09			
Ledol	12.92	1594	0.02	13.09*	1959	[1.38]
Torilenol?	13.06	1606	0.10	15.18	2162	0.10
Furanoeudesma-1,3-diene	13.20	1617	0.20	13.98	2043	0.19
τ -Cadinol	13.42*	1635	0.12	14.68	2111	0.01
τ -Muurolol	13.42*	1635	[0.12]	14.79	2123	0.04
Unknown [m/z 123, 43 (86), 81 (75), 95 (73), 82 (68), 161 (64), 105 (63)...220 (6)]	13.50*	1642	0.13	12.75	1928	0.09
Unknown [m/z 109, 95 (85), 69 (79), 132 (65), 41 (59), 135 (58)...220 (40)]	13.50*	1642	[0.13]			
Unknown [m/z 95, 121 (90), 81 (65), 91 (64), 93 (62), 43 (59)...220 (11)]	13.55	1646	0.24			
Unknown [m/z 109, 121 (99), 107 (88), 105 (84), 91 (81), 81 (78)...220 (13)]	13.58	1648	0.12			
Unknown [m/z 109, 43 (65), 93 (62), 159 (61), 91 (57), 79 (57)...220 (7)]	13.62	1652	0.01	13.50	1997	0.02

Unknown [m/z 95, 96 (40), 69 (26), 109 (24), 41 (23)...222 (6)]	13.80	1667	0.67	15.79*	2225	0.67
(E)- α -Santalal	13.85	1671	0.47	14.41*	2085	0.71
Eudesma-4(15),7-dien-1 β -ol	13.94	1678	0.09	15.79*	2225	[0.67]
epi- α -Bisabolol	13.99	1682	0.16	15.21	2165	0.17
Unknown [m/z 59, 93 (76), 123 (74), 121 (64), 91 (30), 105 (25)...]	14.26	1704	0.03	17.87*	2449	0.06
Unknown [m/z 59, 93 (86), 121 (75), 123 (74), 109 (54), 91 (39), 43 (37)...]	14.28	1706	0.03	17.87*	2449	[0.06]
Unknown [m/z 123, 45 (53), 107 (50), 159 (39), 91 (38), 125 (29)...]	14.37	1714	0.04	15.12	2156	0.04
Unknown [m/z 95, 119 (80), 69 (76), 93 (61), 41 (59), 82 (56)...]	14.46	1722	0.08			
Benzyl benzoate	14.82	1753	0.02	18.59	2531	0.02
Unknown [m/z 95, 195 (79), 43 (78), 93 (63), 69 (57), 107 (53)...]	15.08	1775	0.08			
Unknown [m/z 93, 69 (93), 109 (84), 135 (82), 203 (74), 41 (49)...]	16.42	1896	0.27	14.41*	2085	[0.71]
Serratol	18.92	2140	0.28	19.32	2617	0.24
Total identified		93.22%			94.47%	
Total reported		97.23%			94.85%	

*: 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