

Date : 2026-02-23

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 26B05-PTH06

Customer Identification : Frankincense Frereana ORGANIC - Somalia - FE0114R

Type : Essential Oil

Source : *Boswellia frereana*

Customer : Plant Therapy

Checked and approved by:

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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The results only describe the samples that were submitted to the assays. The compliance status of the sample is provided to facilitate the reading of the report. The client remains ultimately responsible for reviewing the results presented within this report and to establish compliance of the tested batch against relevant quality criteria.

This report is an update of the version first issued on 2026-02-09 to make a correction in the sample identification section.



Laboratoire
PhytoChemia

GAS CHROMATOGRAPHIC ANALYSIS

Method : PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

✖ISO

Results : See analysis summary (next page)

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

Date : 2026-02-06

PHYSICOCHEMICAL DATA

Refractive index : 1.4665 ± 0.0003 (20 °C)

Method : PC-MAT-016 - Measure of the refractive index of a liquid.

Analyst : Cindy Caron B. Sc.

Date : 2026-02-05

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
2-Methyl-3-buten-2-ol	tr	Aliphatic alcohol
3-Methyl-2-butanone	0.01	Aliphatic ketone
4-Methyl-2-pentanone (Methyl isobutyl ketone)	tr	Aliphatic ketone
Toluene	0.03	Simple phenolic
Hexadiene isomer?	0.01	Alkene
Unknown	0.02	Alkene
(Z)-Salvene	0.01	Normonoterpene
Unknown	0.01	Unknown
Unknown	0.03	Unknown
Unknown	0.02	Monoterpene
Unknown	0.02	Unknown
Hashishene	0.34	Monoterpene
Tricyclene	0.08	Monoterpene
α -Thujene	26.91	Monoterpene
α -Pinene	35.78	Monoterpene
Thujadiene isomer	0.89	Monoterpene
Camphene	0.62	Monoterpene
Thuja-2,4(10)-diene	0.23	Monoterpene
Sabinene	5.87	Monoterpene
β -Pinene	1.96	Monoterpene
Pseudolimonene isomer	0.02	Monoterpene
Dehydro-1,8-cineole	0.04	Monoterpenic ether
6-Methyl-5-hepten-2-one	0.05	Aliphatic ketone
Myrcene	1.25	Monoterpene
6-Methyl-5-hepten-2-ol	0.03	Aliphatic alcohol
Pseudolimonene	0.01	Monoterpene
α -Phellandrene	2.67	Monoterpene
Octanal	0.02	Aliphatic aldehyde
<i>ortho</i> -Methylanisole	0.02	Simple phenolic
Δ^3 -Carene	0.03	Monoterpene
Unknown	0.01	Monoterpene
α -Terpinene	0.32	Monoterpene
<i>meta</i> -Cymene	0.08	Monoterpene
Carvomenthene	0.01	Aliphatic alcohol
<i>para</i> -Cymene	5.81	Monoterpene
Unknown	0.32	Unknown
Limonene	1.28	Monoterpene
β -Phellandrene	0.99	Monoterpene
1,8-Cineole	1.01	Monoterpenic ether

<i>ortho</i> -Cymene	0.03	Monoterpene
Unknown	0.01	Unknown
(<i>Z</i>)- β -Ocimene	0.04	Monoterpene
Unknown	0.16	Unknown
(<i>E</i>)- β -Ocimene	0.03	Monoterpene
γ -Terpinene	0.52	Monoterpene
<i>cis</i> -Sabinene hydrate	0.12	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
<i>cis</i> -Linalool oxide (fur.)	0.02	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
Terpinolene	0.17	Monoterpene
<i>para</i> -Cymenene	0.07	Monoterpene
α -Pinene oxide	0.02	Monoterpenic ether
<i>trans</i> -Sabinene hydrate	0.07	Monoterpenic alcohol
Linalool	0.41	Monoterpenic alcohol
α -Thujone	0.03	Monoterpenic ketone
Unknown	0.05	Oxygenated monoterpene
β -Thujone	0.32	Monoterpenic ketone
Dehydrosabinaketone	0.03	Normonoterpenic ketone
<i>cis-para</i> -Menth-2-en-1-ol	0.10	Monoterpenic alcohol
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.10	Monoterpenic alcohol
Unknown	0.13	Unknown
α -Campholenal	0.06	Monoterpenic aldehyde
Unknown	0.01	Unknown
<i>trans</i> -Pinocarveol	0.28	Monoterpenic alcohol
Camphor	0.03	Monoterpenic ketone
<i>trans</i> -Sabinol	0.17	Monoterpenic alcohol
<i>cis</i> -Verbenol	0.09	Monoterpenic alcohol
<i>trans</i> -Verbenol	0.40	Monoterpenic alcohol
<i>meta</i> -Mentha-4,6-dien-8-ol	0.09	Monoterpenic alcohol
Sabinaketone	0.04	Normonoterpenic ketone
Unknown	0.04	Oxygenated monoterpene
Pinocarvone	0.05	Monoterpenic ketone
Unknown	0.04	Oxygenated monoterpene
α -Phellandren-8-ol	0.16	Monoterpenic alcohol
<i>cis</i> -Sabinol	0.23	Monoterpenic alcohol
Umbellulone	0.18	Monoterpenic ketone
Unknown	0.03	Oxygenated monoterpene
Terpinen-4-ol	4.06	Monoterpenic alcohol
Thuj-3-en-10-al	0.05	Monoterpenic aldehyde
Cryptone	0.05	Normonoterpenic ketone
<i>para</i> -Cymen-8-ol	0.15	Monoterpenic alcohol
α -Terpineol	0.69	Monoterpenic alcohol
Myrtenal	0.11	Monoterpenic aldehyde
<i>cis</i> -Piperitol	0.14	Monoterpenic alcohol

Myrtenol	0.01	Monoterpenic alcohol
<i>cis</i> - α -Phellandrene epoxide (iPr vs Me)	0.19	Monoterpenic ether
Verbenone	0.24	Monoterpenic ketone
<i>trans</i> -Piperitol	0.07	Monoterpenic alcohol
<i>trans</i> -Carveol	0.10	Monoterpenic alcohol
Citronellol	0.05	Monoterpenic alcohol
Cuminal	0.07	Monoterpenic aldehyde
Carvone	0.02	Monoterpenic ketone
Carvotanacetone	0.03	Monoterpenic ketone
Unknown	0.04	Unknown
Unknown	0.04	Oxygenated monoterpene
Piperitone	0.06	Monoterpenic ketone
Unknown	0.02	Unknown
Unknown	0.02	Unknown
Bornyl acetate	0.60	Monoterpenic ester
Cuminol	0.04	Monoterpenic alcohol
Thymol	0.05	Monoterpenic alcohol
Carvacrol	0.08	Monoterpenic alcohol
<i>exo</i> -2-Hydroxycineole acetate	0.01	Monoterpenic ester
α -Cubebene	0.01	Sesquiterpene
Citronellyl acetate	0.04	Monoterpenic ester
α -Copaene	0.05	Sesquiterpene
β -Bourbonene	0.08	Sesquiterpene
1,5-diepi- β -Bourbonene	0.01	Sesquiterpene
β -Elemene	0.10	Sesquiterpene
β -Caryophyllene	0.03	Sesquiterpene
β -Ylangene	0.03	Sesquiterpene
β -Copaene	0.01	Sesquiterpene
α -Humulene	0.01	Sesquiterpene
Germacrene D	0.02	Sesquiterpene
β -Selinene	0.02	Sesquiterpene
δ -Cadinene	0.02	Sesquiterpene
α -Phellandrene dimer I	0.02	Diterpene
α -Phellandrene dimer II	0.31	Diterpene
α -Phellandrene dimer III	0.06	Diterpene
α -Phellandrene dimer IV	0.04	Diterpene
α -Phellandrene dimer VI	0.02	Diterpene
α -Phellandrene dimer VII	0.02	Diterpene
Consolidated total	99.09	

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

Note: no correction factor was applied

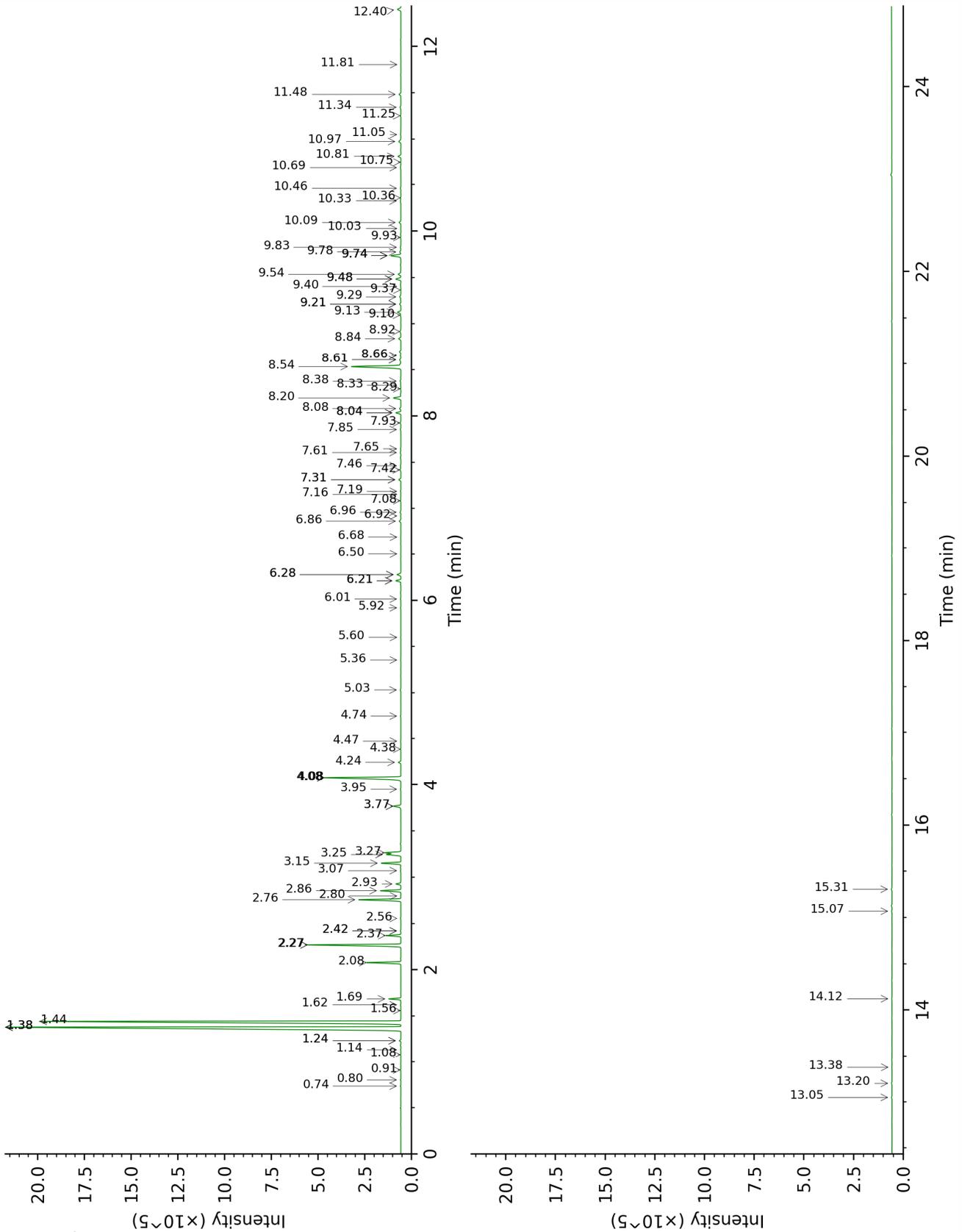
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

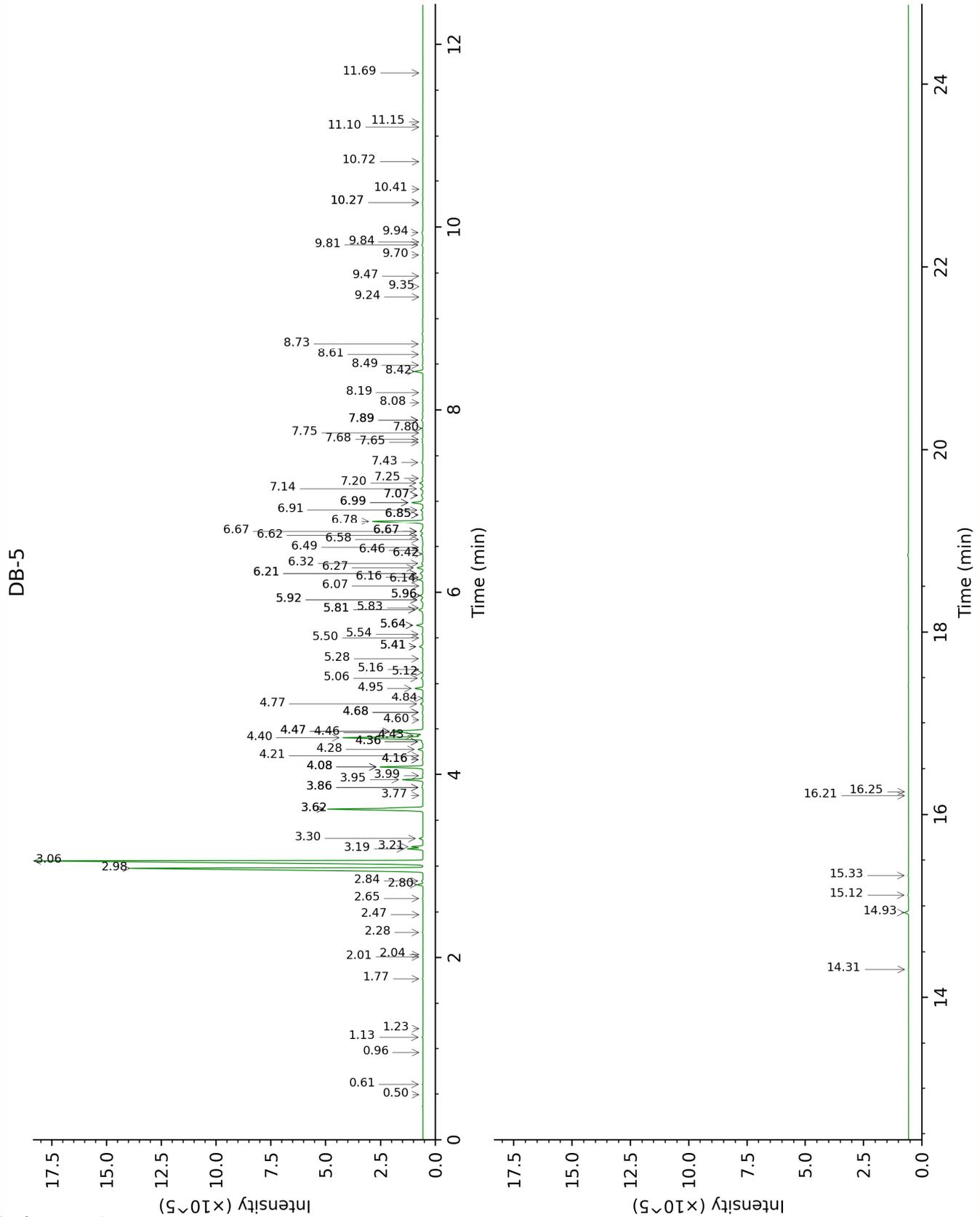
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

Bracketed value ([xx]): A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

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

DB-WAX





FULL ANALYSIS DATA

2-Methyl-3-buten-2-ol	Column DB-WAX			Column DB-5		
	1.56	1015.9	tr	0.50	607.3	tr
3-Methyl-2-butanone	0.80	903.6	0.01	0.61	648.4	0.01
4-Methyl-2-pentanone (Methyl isobutyl ketone)	1.24*	973.0	[0.08]	0.96	734.0	tr
Toluene	1.38*	996.7	[36.00]	1.13	759.4	0.03
Hexadiene isomer?				1.23	773.2	0.01
Unknown BOCA I [m/z 109, 67 (32), 81 (14), 41 (12), 124 (10)]	0.74	881.4	0.01	1.77	832.6	0.02
(Z)-Salvene	0.91	920.9	0.01	2.01	852.9	0.01
Unknown PRME II [m/z 109, 43 (28), 124 (28), 41 (14), 55 (11), 79 (9), 81 (8)...]	1.62	1022.0	0.02	2.04	855.1	0.01
Unknown BOCA II [m/z 79, 78 (45), 91 (28), 77 (28), 41 (13), 80 (12), 107 (11)... 122 (1)]	1.14	957.1	0.01	2.28	875.6	0.03
Unknown BOFR I [m/z 93, 91 (75), 121 (61), 77 (58), 79 (38), 92 (26), 43 (24), 41 (23), 105 (22), 107 (19), 136 (16)]	1.08	948.5	0.01	2.47	892.2	0.02
Unknown BOFR II [m/z 93, 91 (72), 121 (58), 77 (49), 79 (41), 43 (22), 105 (20), 107 (20), 41 (18), 136 (17), 92 (17)]				2.65	906.6	0.02
Hashishene	1.38*	996.7	[36.00]	2.80	916.7	0.34
Tricyclene	1.24*	973.0	[0.08]	2.84	919.3	0.08
α-Thujene	1.44	1004.4	26.82	2.98	928.7	26.91
α-Pinene	1.38*	996.7	[36.00]	3.06	934.1	35.78
Thujadiene isomer	2.37	1096.2	0.86	3.19	942.9	0.89
Camphene	1.69	1028.3	0.63	3.21	944.5	0.62
Thuja-2,4(10)-diene	2.27*	1086.2	[6.03]	3.30	950.5	0.23
Sabinene	2.27*	1086.2	[6.03]	3.62*	972.1	[7.83]
β-Pinene	2.08	1067.1	1.96	3.62*	972.1	[7.83]
Pseudolimonene isomer	2.42*	1101.0	[0.03]	3.77	982.2	0.02

Dehydro-1,8-cineole	3.07	1152.2	0.04	3.86*	988.0	[0.07]
6-Methyl-5-hepten-2-one	5.03	1300.4	0.05	3.86*	988.0	[0.07]
Myrcene	2.86	1135.1	1.24	3.95	993.7	1.25
6-Methyl-5-hepten-2-ol	6.92	1434.0	0.02	3.99	996.6	0.03
Pseudolimonene	2.80	1130.6	0.01	4.08*	1003.1	[2.72]
α -Phellandrene	2.76	1127.4	2.67	4.08*	1003.1	[2.72]
Octanal	4.38	1252.3	0.02	4.08*	1003.1	[2.72]
<i>ortho</i> -Methylanisole	5.92	1360.5	0.02	4.16*	1008.2	[0.05]
Δ 3-Carene	2.56	1111.6	0.03	4.16*	1008.2	[0.05]
Unknown BOSA III [m/z 117, 132 (88), 115 (68), 91 (55), 77 (20)]				4.21	1010.9	0.01
α -Terpinene	2.93	1140.8	0.31	4.28	1015.3	0.32
<i>meta</i> -Cymene	4.08*	1229.5	[5.88]	4.36*	1020.6	[0.09]
Carvomenthene	2.42*	1101.0	[0.03]	4.36*	1020.6	[0.09]
<i>para</i> -Cymene	4.08*	1229.5	[5.88]	4.40	1023.4	5.81
Unknown BODA IV [m/z 109, 43 (58), 95 (26)... 137 (15)...]	6.21*	1381.6	[0.37]	4.43	1024.8	0.32
Limonene	3.15	1158.5	1.28	4.46*†	1027.0	[0.91]
β -Phellandrene	3.25	1165.9	0.99	4.47*†	1027.8	[2.35]
1,8-Cineole	3.27	1167.4	1.01	4.47*†	1027.8	[2.35]
<i>ortho</i> -Cymene	4.47	1258.7	0.02	4.60	1035.7	0.03
Unknown ARAN I [m/z 43, 55 (65), 41 (34), 67 (32), 107 (30), 122 (26)... 125 (10)]	5.60	1337.3	0.01	4.68*	1040.9	[0.05]
(Z)- β -Ocimene	3.77*	1206.9	[0.55]	4.68*	1040.9	[0.05]
Unknown BOFR III [m/z 109, 43 (57), 91 (28), 67 (25), 93 (24), 95 (22), 77 (21), 137 (21), 41 (17), 79 (14)...]	7.31*	1463.2	[0.15]	4.77	1046.8	0.16
(E)- β -Ocimene	3.95	1220.4	0.03	4.84	1050.8	0.03
γ -Terpinene	3.77*	1206.9	[0.55]	4.95	1058.1	0.52
<i>cis</i> -Sabinene hydrate	6.86	1429.7	0.13	5.06	1065.1	0.12
Unknown PIMA I [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	4.74	1278.8	0.03	5.12	1069.0	0.03
<i>cis</i> -Linalool oxide (fur.)	6.50	1402.8	0.01	5.16	1071.3	0.02

Unknown BODA VI [m/z 43, 94 (63), 109 (61), 59 (55), 79 (51)...152 (2)]	7.19	1453.8	0.03	5.28	1078.7	0.03
Terpinolene	4.24	1241.8	0.17	5.41*	1087.1	[0.24]
<i>para</i> -Cymenene	6.28*	1386.5	[0.29]	5.41*	1087.1	[0.24]
α -Pinene oxide	5.36	1319.6	0.01	5.50	1093.2	0.02
<i>trans</i> -Sabinene hydrate	7.93	1509.4	0.07	5.54	1095.7	0.07
Linalool	8.04*	1517.9	[0.36]	5.64*	1101.9	[0.44]
α -Thujone	6.02	1367.3	0.03	5.64*	1101.9	[0.44]
Unknown BOSE I [m/z 109, 81 (54), 91 (32), 79 (22)...]	6.21*	1381.6	[0.37]	5.81*	1112.9	[0.37]
β -Thujone	6.28*	1386.5	[0.29]	5.81*	1112.9	[0.37]
Dehydrosabinaketone	8.61*	1562.8	[0.14]	5.83	1114.1	0.03
<i>cis-para</i> -Menth-2-en-1-ol	8.08	1521.5	0.10	5.92*	1119.8	[0.23]
<i>trans-para</i> -Mentha-2,8-dien-1-ol	8.92	1586.9	0.10	5.92*	1119.8	[0.23]
Unknown BOSE III [m/z 111, 43 (22), 55 (14), 41 (12), 110 (11)...]				5.96*	1122.9	[0.20]
α -Campholenal	6.96	1437.0	0.06	5.96*	1122.9	[0.20]
Unknown BONE I [m/z 95, 43 (41), 110 (36), 41 (19), 67 (18)... 150 (tr)]				6.07	1129.7	0.01
<i>trans</i> -Pinocarveol	9.13	1603.2	0.27	6.14	1134.1	0.28
Camphor	7.16	1451.5	0.01	6.16	1135.8	0.03
<i>trans</i> -Sabinol	9.74*	1652.8	[0.81]	6.21*	1138.5	[0.25]
<i>cis</i> -Verbenol	9.22*	1610.3	[0.10]	6.21*	1138.5	[0.25]
<i>trans</i> -Verbenol	9.48*	1632.3	[0.42]	6.27	1142.6	0.40
<i>meta</i> -Mentha-4,6-dien-8-ol	9.29	1616.7	0.11	6.32	1145.7	0.09
Sabinaketone	8.66*	1566.4	[0.05]	6.42	1152.4	0.04
Unknown BOCA III [m/z 97, 81 (96), 109 (80), 43 (53), 53 (40), 41 (36), 56 (29), 95 (25)... 152 (1)]	7.46	1474.5	0.04	6.46	1154.9	0.04
Pinocarvone	7.85	1503.8	0.04	6.49	1157.1	0.05
Unknown CALU II [m/z 95, 110 (38), 81	7.61	1485.2	0.06	6.58	1162.7	0.04

(21), 79 (16)... 152 (7)]						
α -Phellandren-8-ol	10.09	1681.9	0.16	6.62†	1165.5	0.21
<i>cis</i> -Sabinol	10.81	1742.4	0.23	6.67*†	1168.4	[0.27]
Umbellulone	8.84	1580.9	0.18	6.67*†	1168.4	[0.27]
Unknown CALU III						
[m/z 95, 110 (43), 81 (28), 41 (15)... 152 (8)]	7.65	1488.2	0.03	6.67*†	1168.4	[0.27]
Terpinen-4-ol	8.54	1556.9	4.08	6.78	1175.9	4.06
Thuj-3-en-10-al	8.66*	1566.4	[0.05]	6.85*	1180.6	[0.09]
Cryptone	9.10	1600.7	0.05	6.85*	1180.6	[0.09]
<i>para</i> -Cymen-8-ol	11.48	1799.4	0.15	6.91	1183.9	0.15
α -Terpineol	9.74*	1652.8	[0.81]	6.99*	1189.3	[0.79]
Myrtenal	8.61*	1562.8	[0.14]	6.99*	1189.3	[0.79]
<i>cis</i> -Piperitol	9.48*	1632.3	[0.42]	7.07*	1194.4	[0.15]
Myrtenol	10.75	1737.0	0.01	7.07*	1194.4	[0.15]
<i>cis</i> - α -Phellandrene epoxide (iPr vs Me)	10.97	1756.0	0.21	7.14	1199.1	0.19
Verbenone	9.54	1636.5	0.23	7.20	1203.2	0.24
<i>trans</i> -Piperitol	10.33	1700.8	0.07	7.25	1206.6	0.07
<i>trans</i> -Carveol	11.34	1787.5	0.09	7.43	1218.4	0.10
Citronellol	10.69	1732.0	0.06	7.65	1233.3	0.05
Cuminal	10.46	1712.4	0.05	7.68	1235.6	0.07
Carvone	9.93	1668.8	0.02	7.75	1240.4	0.02
Carvotanacetone	9.40	1625.8	0.02	7.80	1243.8	0.03
Unknown CALU IV						
[m/z 43, 97 (69), 107 (46), 41 (28), 55 (21), 109 (20)...]	11.05	1762.4	0.04	7.89*	1249.9	[0.11]
Unknown BODA V						
[m/z 109, 119 (84), 91 (81), 134 (55)... 137 (27)...]	11.25	1779.7	0.04	7.89*	1249.9	[0.11]
Piperitone	9.83	1660.2	0.06	7.89*	1249.9	[0.11]
Unknown CIGL III [m/z 43, 97 (78), 41 (45), 55 (35), 69 (28), 107 (24), 83 (23)...]	13.38	1970.3	0.02	8.08	1262.8	0.02
Unknown PECR X						
[m/z 109, 43 (83), 95 (70), 110 (70), 99 (53), 119 (48)...]				8.19	1270.4	0.02
Bornyl acetate	8.20	1530.5	0.60	8.42	1286.1	0.60
Cuminol	14.12	2041.1	0.05	8.49	1290.9	0.04
Thymol	15.07	2133.7	0.04	8.61	1298.9	0.05
Carvacrol	15.31	2157.6	0.07	8.73	1307.1	0.08

exo-2-Hydroxycineole acetate	10.03	1676.6	0.02	9.24	1340.2	0.01
α -Cubebene	6.68	1416.3	0.03	9.35	1348.3	0.01
Citronellyl acetate	9.37	1622.7	0.01	9.47	1356.4	0.04
α -Copaene	7.08	1446.2	0.03	9.70	1372.8	0.05
β -Bourbonene	7.42	1471.2	0.09	9.81	1380.5	0.08
1,5-diepi- β -Bourbonene	7.31*	1463.2	[0.15]	9.84	1382.7	0.01
β -Elemene	8.38	1544.7	0.07	9.94	1390.1	0.10
β -Caryophyllene	8.33	1541.1	0.03	10.27*†	1413.9	[0.04]
β -Ylangene	8.04*	1517.9	[0.36]	10.27*†	1413.9	[0.04]
β -Copaene	8.30	1538.2	0.02	10.41	1424.7	0.01
α -Humulene	9.22*	1610.3	[0.10]	10.72	1447.8	0.01
Germacrene D	9.74*	1652.8	[0.81]	11.10	1476.1	0.02
β -Selinene	9.78	1656.0	0.10	11.15	1480.3	0.02
δ -Cadinene	10.36	1703.6	0.03	11.69	1521.4	0.02
α -Phellandrene dimer I	11.81	1828.0	0.01	14.31	1735.8	0.02
α -Phellandrene dimer II	12.40	1881.0	0.31	14.93	1789.9	0.31
α -Phellandrene dimer III	13.05	1940.0	0.05	15.12	1806.5	0.06
α -Phellandrene dimer IV	13.20	1954.1	0.05	15.33	1826.1	0.04
α -Phellandrene dimer VI				16.21	1905.6	0.02
α -Phellandrene dimer VII				16.25	1909.7	0.02
Total reported		98.07%			98.97%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, only the first one is 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