Date : 2024-03-14

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 24C07-PTH02
Customer Identification : Organic Frankincense Serrata - India - F50112R
Type : Essential Oil
Source : *Boswellia serrata*
Customer : Plant Therapy

Checked an approved by:

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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

Méthode certifiée ISO 17025:2017 Certified method

Laboratoire PhytoChemia

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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 : 2024-03-12

Physicochemical data

Refractive index : 1.4576 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Dany Massé B. Sc. Chimiste
Date : 2024-03-07

Conclusion

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

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Analysis Summary - Consolidated Contents

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
2-Methylfuran	tr	Furan
(*E*)-2-Methyl-1,3-pentadiene	0.01	Alkene
3-Methyl-2-butanone	tr	Aliphatic ketone
Toluene	0.01	Simple phenolic
Unknown	0.01	Unknown
Unknown	0.01	Monoterpene
Unknown	0.03	Unknown
Hashishene	0.16	Monoterpene
Tricyclene	0.01	Monoterpene
α-Thujene	73.93	Monoterpene
α-Pinene	5.47	Monoterpene
Unknown	0.38	Monoterpene
Camphene	0.06	Monoterpene
α-Fenchene	0.01	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.03	Monoterpene
β-Pinene	0.32	Monoterpene
Sabinene	5.48	Monoterpene
Pseudolimonene isomer	tr	Monoterpene
Myrcene	0.99	Monoterpene
2-Carene	0.01	Monoterpene
α-Phellandrene	1.09	Monoterpene
Pseudolimonene	0.01	Monoterpene
Δ3-Carene	3.27	Monoterpene
1,4-Cineole	0.01	Monoterpenic ether
α-Terpinene	0.28	Monoterpene
meta-Cymene	0.08	Monoterpene
Carvomenthene	0.01	Aliphatic alcohol
para-Cymene	1.42	Monoterpene
β-Phellandrene	0.30	Monoterpene
Limonene	1.65	Monoterpene
Unknown	0.01	Unknown
(*Z*)-β-Ocimene	0.34	Monoterpene
Unknown	0.05	Unknown
(*E*)-β-Ocimene	0.20	Monoterpene
Unknown	0.02	Unknown
γ-Terpinene	0.51	Monoterpene
cis-Sabinene hydrate	0.08	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Isoterpinolene	0.01	Monoterpene

Terpinolene	0.18	Monoterpene
para-Cymenene	0.16	Monoterpene
trans-Sabinene hydrate	0.07	Monoterpenic alcohol
Linalool	0.10	Monoterpenic alcohol
α-Thujone	0.03	Monoterpenic ketone
Unknown	0.04	Oxygenated monoterpene
Unknown	0.13	Oxygenated monoterpene
Dehydrosabinaketone	0.01	Normonoterpenic ketone
cis-para-Menth-2-en-1-ol	0.03	Monoterpenic alcohol
α-Campholenal	0.03	Monoterpenic aldehyde
Unknown	0.01	Unknown
allo-Ocimene	0.03	Monoterpene
trans-Pinocarveol	0.01	Monoterpenic alcohol
trans-Sabinol	0.04	Monoterpenic alcohol
trans-Verbenol	0.02	Monoterpenic alcohol
para-Menth-3-en-8-ol	0.01	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Unknown	0.02	Oxygenated monoterpene
Borneol	0.02	Monoterpenic alcohol
α-Phellandren-8-ol	0.01	Monoterpenic alcohol
cis-Sabinol	0.06	Monoterpenic alcohol
Terpinen-4-ol	0.41	Monoterpenic alcohol
Cryptone	0.01	Normonoterpenic ketone
meta-Cymen-8-ol	0.01	Monoterpenic alcohol
para-Cymen-8-ol	0.01	Monoterpenic alcohol
α-Terpineol	0.04	Monoterpenic alcohol
Methylchavicol	0.98	Phenylpropanoid
cis-α-Phellandrene epoxide (iPr vs Me)	0.02	Monoterpenic ether
Verbenone	0.01	Monoterpenic ketone
trans-Piperitol	0.01	Monoterpenic alcohol
Carvotanacetone	0.01	Monoterpenic ketone
Piperitone	0.03	Monoterpenic ketone
Linalyl acetate	0.07	Monoterpenic ester
Unknown	0.02	Oxygenated monoterpene
Bornyl acetate	0.01	Monoterpenic ester
Thymol	0.01	Monoterpenic alcohol
Carvacrol	0.01	Monoterpenic alcohol
α-Terpinyl acetate	0.02	Monoterpenic ester
α-Ylangene	0.01	Sesquiterpene
α-Copaene	0.04	Sesquiterpene
β-Bourbonene	0.23	Sesquiterpene
1,5-diepi-β-Bourbonene	0.01	Sesquiterpene
Unknown	0.05	Unknown
Methyleugenol	0.04	Phenylpropanoid
β-Caryophyllene	0.03	Sesquiterpene

β-Ylangene	0.02	Sesquiterpene
β-Copaene	0.03	Sesquiterpene
trans-α-Bergamotene	0.02	Sesquiterpene
Isogermacrene D	0.02	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
cis-Muurola-4(15),5-diene	0.01	Sesquiterpene
γ-Muurolene	0.01	Sesquiterpene
Germacrene D	0.07	Sesquiterpene
Unknown	0.05	Sesquiterpene
Bicyclogermacrene	0.01	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
δ-Cadinene	0.05	Sesquiterpene
Elemicin	0.01	Phenylpropanoid
Unknown	0.01	Unknown
α-Phellandrene dimer II	0.02	Diterpene
α-Phellandrene dimer III	0.01	Diterpene
(3*E*)-Cembrene A	0.01	Diterpene
Verticilla-4(20),7,11-triene	0.01	Diterpene
10,18-Bisnorabieta-5,7,9(10),11,13-pentaene?	0.01	Norditerpene
Cembrenol	0.01	Diterpenic alcohol
Serratol	0.03	Diterpenic alcohol
Consolidated total	**99.81**	

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.

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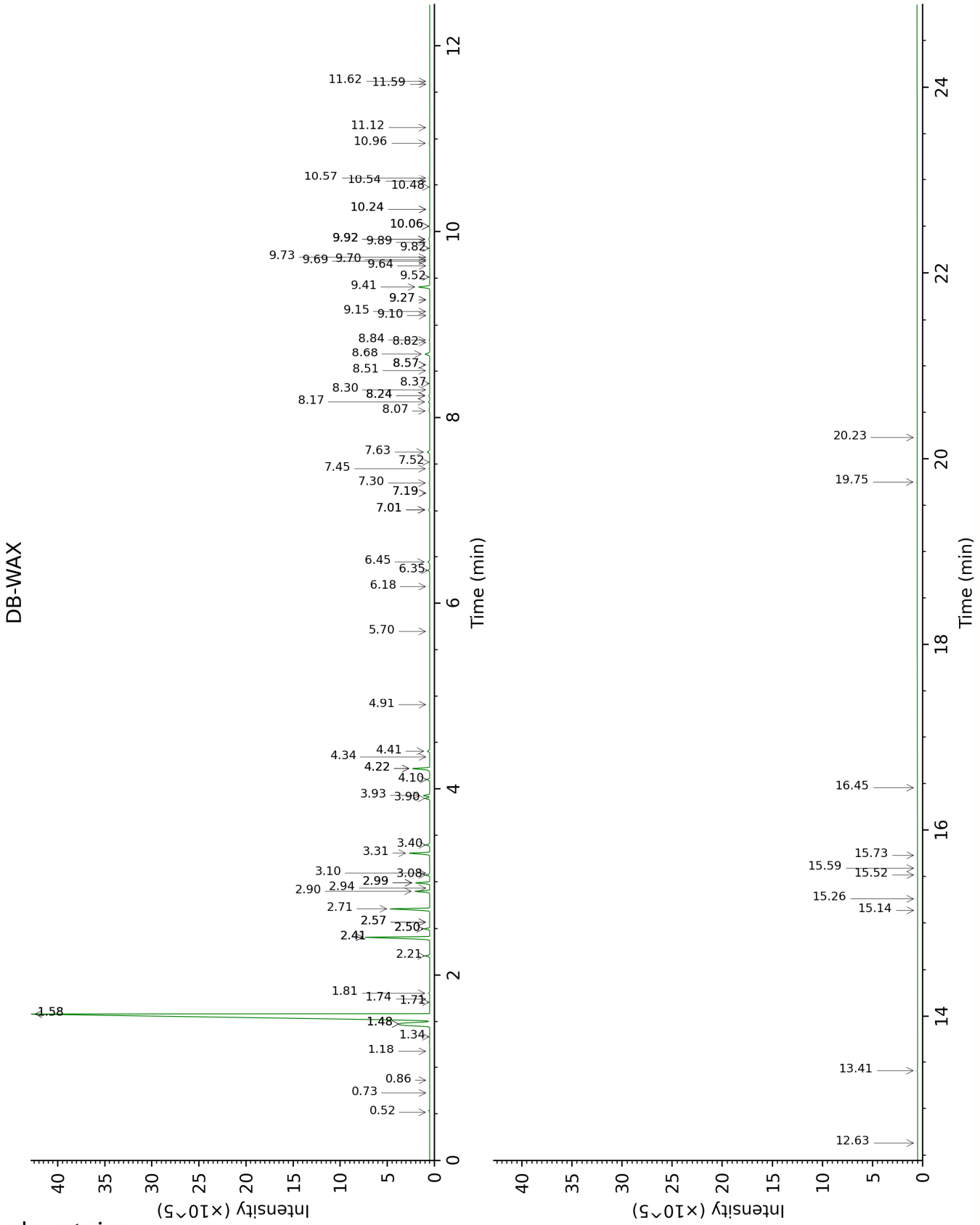
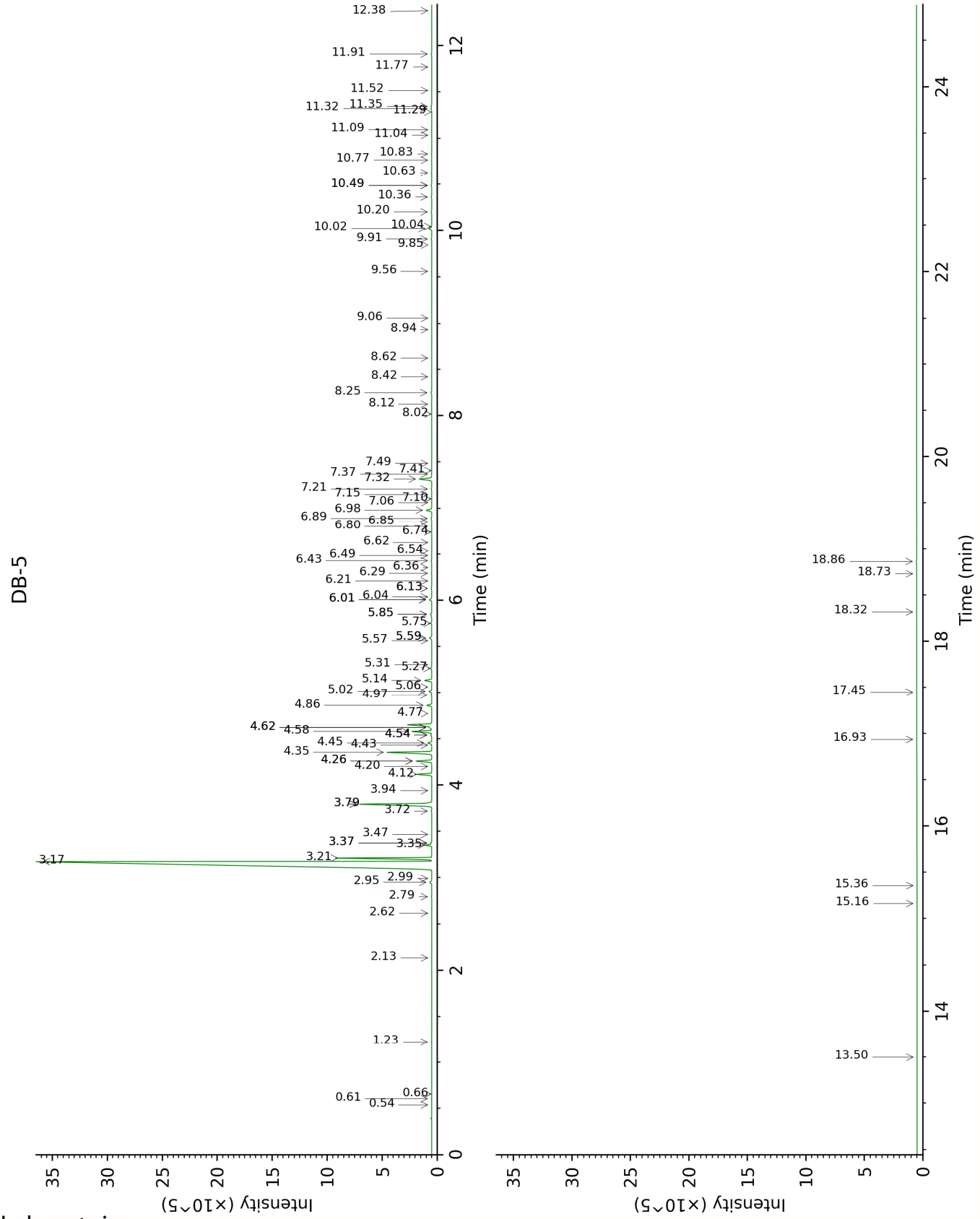

DB-WAX
Intensity (×10^5)
Time (min)
11.62
11.59
11.12
10.96
10.57
10.54
10.48
10.24
10.06
9.92
9.89
9.82
9.73
9.69
9.70
9.64
9.52
9.41
9.27
9.15
9.10
8.84
8.82
8.68
8.51
8.57
8.37
8.30
8.24
8.17
8.07
7.63
7.52
7.45
7.30
7.19
7.01
6.45
6.35
6.18
5.70
4.91
4.34
4.41
4.22
4.10
3.93
3.90
3.31
3.40
3.10
3.08
2.99
2.90
2.94
2.71
2.57
2.50
2.41
2.21
1.81
1.74
1.71
1.58
1.48
1.34
1.18
0.86
0.73
0.52
20.23
19.75
16.45
15.73
15.59
15.52
15.26
15.14
13.41
12.63


DB-5
Time (min)
Intensity (×10^5)
12.38
11.91
11.77
11.52
11.32
11.35
11.29
11.09
11.04
10.77
10.83
10.63
10.49
10.36
10.20
10.02
10.04
9.91
9.85
9.56
9.06
8.94
8.62
8.42
8.25
8.12
8.02
7.49
7.37
7.41
7.32
7.21
7.15
7.06
7.10
6.98
6.89
6.80
6.85
6.74
6.62
6.54
6.49
6.43
6.36
6.29
6.21
6.13
6.01
6.04
5.85
5.75
5.57
5.59
5.31
5.27
5.14
5.06
5.02
4.97
4.86
4.77
4.62
4.58
4.54
4.45
4.43
4.35
4.26
4.20
4.12
3.94
3.79
3.72
3.47
3.37
3.35
3.21
3.17
2.95
2.99
2.79
2.62
2.13
1.23
0.61
0.66
0.54
18.86
18.73
18.32
17.45
16.93
15.36
15.16
13.50

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
2-Methylfuran	0.73	854.8	tr	0.54	607.0	tr
(*E*)-2-Methyl-1,3-pentadiene	0.52	761.1	0.01	0.61	629.7	0.01
3-Methyl-2-butanone	0.86	899.6	tr	0.66	646.5	tr
Toluene	1.58*	1007.6	[73.80]	1.22	759.5	0.01
Unknown PRME II [m/z 109, 43 (28), 124 (28), 41 (14), 55 (11), 79 (9), 81 (8)...]	1.71	1019.5	tr	2.14	852.8	0.01
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)]	1.18	949.0	0.01	2.62	892.3	0.01
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)]				2.80	906.6	0.03
Hashishene	1.48*	994.1	[5.59]	2.95	916.9	0.16
Tricyclene	1.34	973.5	0.01	2.99	919.6	0.01
α-Thujene	1.58*	1007.6	[73.80]	3.17	931.5	73.93
α-Pinene	1.48*	994.1	[5.59]	3.21	934.1	5.47
Unknown SAOF I [m/z 91, 92 (47), 65 (11)... 134 (1)]	2.50*	1093.9	[0.40]	3.35*†	943.3	[0.39]
Camphene	1.81	1028.7	0.06	3.37*†	944.7	[0.06]
α-Fenchene	1.74	1022.6	0.01	3.37*†	944.7	[0.06]
Thuja-2,4(10)-diene	2.41*	1085.4	[5.49]	3.47	950.9	0.01
3,7,7-Trimethylcyclohepta-1,3,5-triene	2.99*	1133.2	[1.03]	3.72	967.4	0.03
β-Pinene	2.21	1066.5	0.32	3.79*	972.4	[5.80]
Sabinene	2.41*	1085.4	[5.49]	3.79*	972.4	[5.80]
Pseudolimonene isomer	2.57*	1100.7	[0.03]	3.94	981.9	tr
Myrcene	2.99*	1133.2	[1.03]	4.12	993.5	0.99
2-Carene	2.50*	1093.9	[0.40]	4.20	999.1	0.01
α-Phellandrene	2.90	1126.3	1.09	4.26*	1003.0	[1.10]
Pseudolimonene	2.94	1128.9	0.01	4.26*	1003.0	[1.10]
Δ3-Carene	2.71	1112.0	3.25	4.35	1009.0	3.27

1,4-Cineole	3.10	1141.2	0.01	4.43	1013.8	0.01
α-Terpinene	3.08	1139.6	0.28	4.45	1015.3	0.28
meta-Cymene	4.22*	1225.4	[1.49]	4.54*	1020.6	[0.09]
Carvomenthene	2.57*	1100.7	[0.03]	4.54*	1020.6	[0.09]
para-Cymene	4.22*	1225.4	[1.49]	4.58	1023.1	1.42
β-Phellandrene	3.40	1164.2	0.30	4.62*†	1025.7	[0.11]
Limonene	3.31	1157.5	1.65	4.62*†	1025.7	[0.11]
Unknown BOSA IV [m/z 67, 93 (70), 82 (70), 121 (42), 107 (39), 91 (33), 79 (28)...]				4.77	1035.1	0.01
(*Z*)-β-Ocimene	3.90	1202.4	0.34	4.86	1040.8	0.34
Unknown BOFR III [m/z 109, 43 (57), 91 (28), 67 (25), 93 (24), 95 (22), 77 (21), 137 (21), 41 (17), 79 (14)...]	7.45	1458.8	0.05	4.98	1047.9	0.05
(*E*)-β-Ocimene	4.10	1217.0	0.20	5.02	1050.5	0.20
Unknown BOFR IV [m/z 109 , 45 (67), 41 (40), 67 (39), 81 (33), 79 (27), 95 (24), 91 (23), 82 (21), 55 (21), 93 (20)...]	7.01*	1425.9	[0.09]	5.06	1053.4	0.02
γ-Terpinene	3.93	1204.7	0.52	5.14	1058.0	0.51
cis-Sabinene hydrate	7.01*	1425.9	[0.09]	5.27	1066.0	0.08
Unknown PIMA I [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	4.90	1274.7	0.01	5.31	1068.6	0.01
Isoterpinolene	4.34	1234.4	0.01	5.57	1084.8	0.01
Terpinolene	4.40	1238.8	0.18	5.59*	1086.6	[0.19]
para-Cymenene	6.44	1384.2	0.16	5.59*	1086.6	[0.19]
trans-Sabinene hydrate	8.07	1505.1	0.06	5.75	1096.5	0.07
Linalool	8.17	1512.7	0.10	5.85*	1102.6	[0.11]
α-Thujone	6.18	1365.1	0.03	5.85*	1102.6	[0.11]
Unknown BOSE II [m/z 109, 91 (57), 93 (47), 81 (44), 77 (40)... 154 (1)]				6.01*	1112.6	[0.17]
Unknown BOSE I [m/z 109, 81 (54), 91 (32), 79 (22)...]	6.35	1377.6	0.13	6.01*	1112.6	[0.17]
Dehydrosabinaketone	8.82	1562.9	0.01	6.04	1114.5	0.01

cis-para-Menth-2-en-1-ol	8.30	1522.8	0.03	6.13*	1120.3	[0.06]
α-Campholenal	7.19*	1439.3	[0.01]	6.13*	1120.3	[0.06]
Unknown BOSE III [m/z 111, 43 (22), 55 (14), 41 (12), 110 (11)...]				6.21	1125.4	0.01
allo-Ocimene	5.70	1330.3	0.02	6.29	1130.7	0.03
trans-Pinocarveol	9.27*	1598.4	[0.01]	6.36	1134.7	0.01
trans-Sabinol	9.92*	1650.8	[0.10]	6.43	1139.4	0.04
trans-Verbenol	9.68	1631.7	0.01	6.48	1143.0	0.02
para-Menth-3-en-8-ol	8.84	1564.9	0.04	6.54	1146.2	0.01
Unknown BOSE IV [m/z 109, 81 (39), 41 (38), 95 (24)... 152 (1)]				6.62	1151.9	0.01
Unknown RHGR XIX [m/z 109, 43 (75), 137 (46), 67 (31), 93 (25)... 152 (4)]				6.74	1159.3	0.02
Borneol	9.92*	1650.8	[0.10]	6.80	1163.3	0.02
α-Phellandren-8-ol	10.24*	1676.8	[0.01]	6.85	1166.3	0.01
cis-Sabinol	10.96	1736.6	0.04	6.89	1168.9	0.06
Terpinen-4-ol	8.68	1552.6	0.44	6.98	1174.6	0.41
Cryptone	9.27*	1598.4	[0.01]	7.06	1179.8	0.01
meta-Cymen-8-ol	11.59	1790.3	0.01	7.10	1182.4	0.01
para-Cymen-8-ol	11.62	1793.0	0.02	7.15	1185.4	0.01
α-Terpineol	9.92*	1650.8	[0.10]	7.21	1189.2	0.04
Methylchavicol	9.41	1609.4	1.03	7.32	1196.1	0.98
cis-α-Phellandrene epoxide (iPr vs Me)	11.12	1750.8	0.02	7.37	1199.5	0.02
Verbenone	9.73	1635.3	0.02	7.41	1201.9	0.01
trans-Piperitol	10.48	1696.3	0.01	7.49	1206.9	0.01
Carvotanacetone	9.64	1627.7	0.02	8.02	1242.5	0.01
Piperitone	10.06*	1662.2	[0.05]	8.12	1249.6	0.03
Linalyl acetate	8.24*	1518.0	[0.09]	8.25	1257.9	0.07
Unknown BOSE VI [m/z 109, 41 (22), 81 (14), 43 (11)... 152 (4)]				8.42	1269.4	0.02
Bornyl acetate	8.37	1528.1	0.02	8.62	1282.8	0.01
Thymol	15.26	2131.0	0.02	8.94	1303.8	0.01
Carvacrol	15.52	2156.6	0.01	9.06	1312.4	0.01
α-Terpinyl acetate	9.82	1643.0	0.02	9.56	1347.9	0.02
α-Ylangene	7.19*	1439.3	[0.01]	9.85	1367.9	0.01
α-Copaene	7.30	1447.4	0.05	9.91	1372.4	0.04
β-Bourbonene	7.63	1472.2	0.23	10.02	1380.3	0.23

1,5-diepi-β-Bourbonene	7.52	1464.1	0.02	10.04	1381.8	0.01
Unknown CALU VIII [m/z 71, 100 (92), 111 (79), 69 (46), 109 (45)...]				10.20	1392.9	0.05
Methyleugenol	13.41	1953.4	0.05	10.36	1404.2	0.04
β-Caryophyllene	8.57*	1543.6	[0.05]	10.49*	1413.4	[0.05]
β-Ylangene	8.24*	1518.0	[0.09]	10.49*	1413.4	[0.05]
β-Copaene	8.51	1538.8	0.03	10.63	1423.9	0.03
trans-α-Bergamotene	8.57*	1543.6	[0.05]	10.76	1434.2	0.02
Isogermacrene D	9.10	1585.3	0.01	10.83	1439.1	0.02
allo-Aromadendrene	9.15	1588.6	0.03	11.04	1454.3	0.01
cis-Muurola-4(15),5-diene	9.52	1618.0	0.01	11.09	1458.5	0.01
γ-Muurolene	9.70	1633.0	0.01	11.28	1472.9	0.01
Germacrene D	9.89	1648.1	0.04	11.32	1475.6	0.07
Unknown BOSE VII [m/z 91, 93 (92), 105 (71), 77 (69), 79 (68), 133 (63)... 204 (32)]	10.06*	1662.2	[0.05]	11.35	1477.4	0.05
Bicyclogermacrene	10.24*	1676.8	[0.01]	11.52	1490.1	0.01
γ-Cadinene	10.54	1701.3	0.01	11.77	1509.1	0.01
δ-Cadinene	10.57	1704.1	0.04	11.91	1520.1	0.05
Elemicin	15.59	2164.0	0.01	12.38	1557.0	0.01
Unknown CAIN XXXVI [m/z 214, 161 (86), 173 (82), 172 (79), 199 (75), 189 (75), 204 (70)...]	15.14	2118.5	tr	13.50	1646.8	0.01
α-Phellandrene dimer II	12.63	1882.2	0.02	15.16	1788.1	0.02
α-Phellandrene dimer III				15.36	1804.9	0.01
(3*E*)-Cembrene A	15.73	2177.8	0.01	16.93	1950.1	0.01
Verticilla-4(20),7,11-triene	16.46	2252.4	0.01	17.45	1999.2	0.01
10,18-Bisnorabieta-5,7,9(10),11,13-pentaene?				18.32	2085.0	0.01
Cembrenol	20.23	2675.6	tr	18.73	2126.7	0.01
Serratol	19.75	2618.5	0.03	18.86	2140.5	0.03
Total reported		99.43%			99.76%	

*: 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

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