Date : 2024-05-27

Certificate of Analysis - GC Profiling

Sample Identification

Internal code : 24E10-PTH04
Customer Identification : Frankincense Serrata - India - F40112R
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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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

628 Boulevard du Saguenay Ouest, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

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 : Alexis St-Gelais, Ph. D., Chimiste 2013-174
Date : 2024-05-27

Physicochemical data

Refractive index : 1.459 ± 0.0003 (20 °C)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-05-13

Conclusion

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

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com

Analysis Summary - Consolidated Contents

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

Identification	%	Class
Ethyl acetate	0.01	Aliphatic ester
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
Toluene	0.03	Simple phenolic
Unknown	tr	Unknown
Unknown	tr	Monoterpene
Unknown	0.02	Unknown
Hashishene	0.10	Monoterpene
Tricyclene	0.02	Monoterpene
α-Thujene	67.81	Monoterpene
α-Pinene	7.64	Monoterpene
Unknown	0.66	Monoterpene
α-Fenchene	tr	Monoterpene
Camphene	0.12	Monoterpene
Thuja-2,4(10)-diene	0.03	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.04	Monoterpene
β-Pinene	0.63	Monoterpene
Sabinene	4.36	Monoterpene
Pseudolimonene isomer	0.01	Monoterpene
Myrcene	1.04	Monoterpene
2-Carene	0.02	Monoterpene
α-Phellandrene	3.53	Monoterpene
Δ3-Carene	2.57	Monoterpene
α-Terpinene	0.86	Monoterpene
meta-Cymene	0.07	Monoterpene
para-Cymene	1.70	Monoterpene
Limonene	2.68	Monoterpene
β-Phellandrene	0.60	Monoterpene
(*Z*)-β-Ocimene	0.22	Monoterpene
Unknown	0.02	Unknown
(*E*)-β-Ocimene	0.18	Monoterpene
γ-Terpinene	1.49	Monoterpene
cis-Sabinene hydrate	0.08	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
para-Cymenene	0.04	Monoterpene
Terpinolene	0.34	Monoterpene
trans-Sabinene hydrate	0.06	Monoterpenic alcohol
α-Thujone	0.04	Monoterpenic ketone
Linalool	0.05	Monoterpenic alcohol
β-Thujone	0.09	Monoterpenic ketone

cis-para-Menth-2-en-1-ol	0.03	Monoterpenic alcohol
allo-Ocimene	0.02	Monoterpene
trans-Sabinol	0.03	Monoterpenic alcohol
trans-Verbenol	0.03	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
Borneol	tr	Monoterpenic alcohol
cis-Sabinol	0.03	Monoterpenic alcohol
Terpinen-4-ol	0.44	Monoterpenic alcohol
α-Terpineol	0.02	Monoterpenic alcohol
Methylchavicol	1.61	Phenylpropanoid
cis-α-Phellandrene epoxide (iPr vs Me)	0.03	Monoterpenic ether
Verbenone	0.02	Monoterpenic ketone
trans-Piperitol	0.01	Monoterpenic alcohol
Piperitone	0.03	Monoterpenic ketone
para-Menth-5-en-1,2-diol isomer III	0.02	Monoterpenic alcohol
α-Cubebene	0.02	Sesquiterpene
α-Copaene	0.03	Sesquiterpene
β-Bourbonene	0.09	Sesquiterpene
Methyleugenol	0.02	Phenylpropanoid
β-Caryophyllene	0.03	Sesquiterpene
β-Copaene	0.01	Sesquiterpene
γ-Muurolene	tr	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
Unknown	0.01	Sesquiterpene
γ-Cadinene	0.01	Sesquiterpene
Kessane	0.01	Sesquiterpenic ether
(*E*)-Nerolidol	0.03	Sesquiterpenic alcohol
Guaiol	0.02	Sesquiterpenic alcohol
Consolidated total	**99.81**	

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

Note: no correction factor was applied

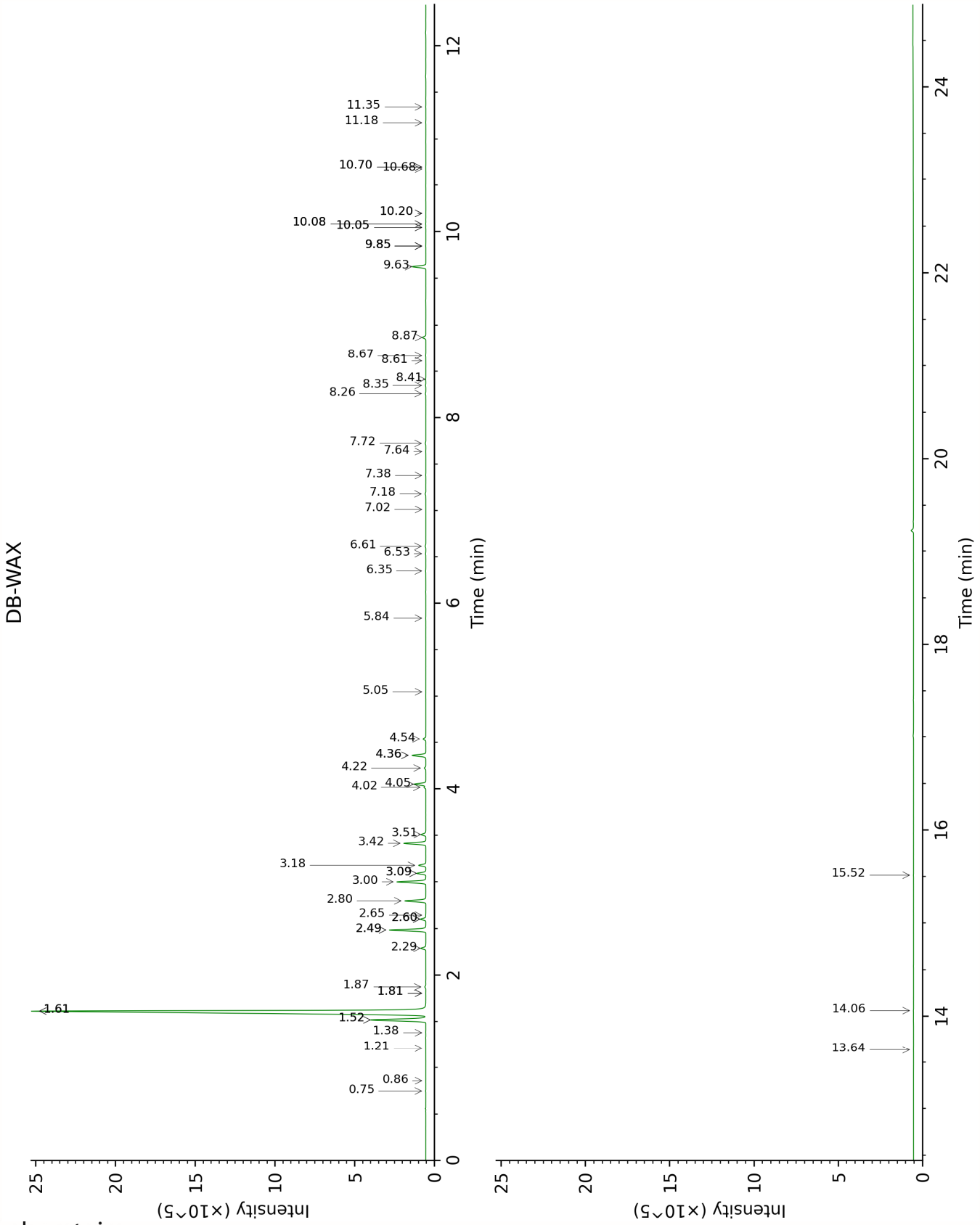
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

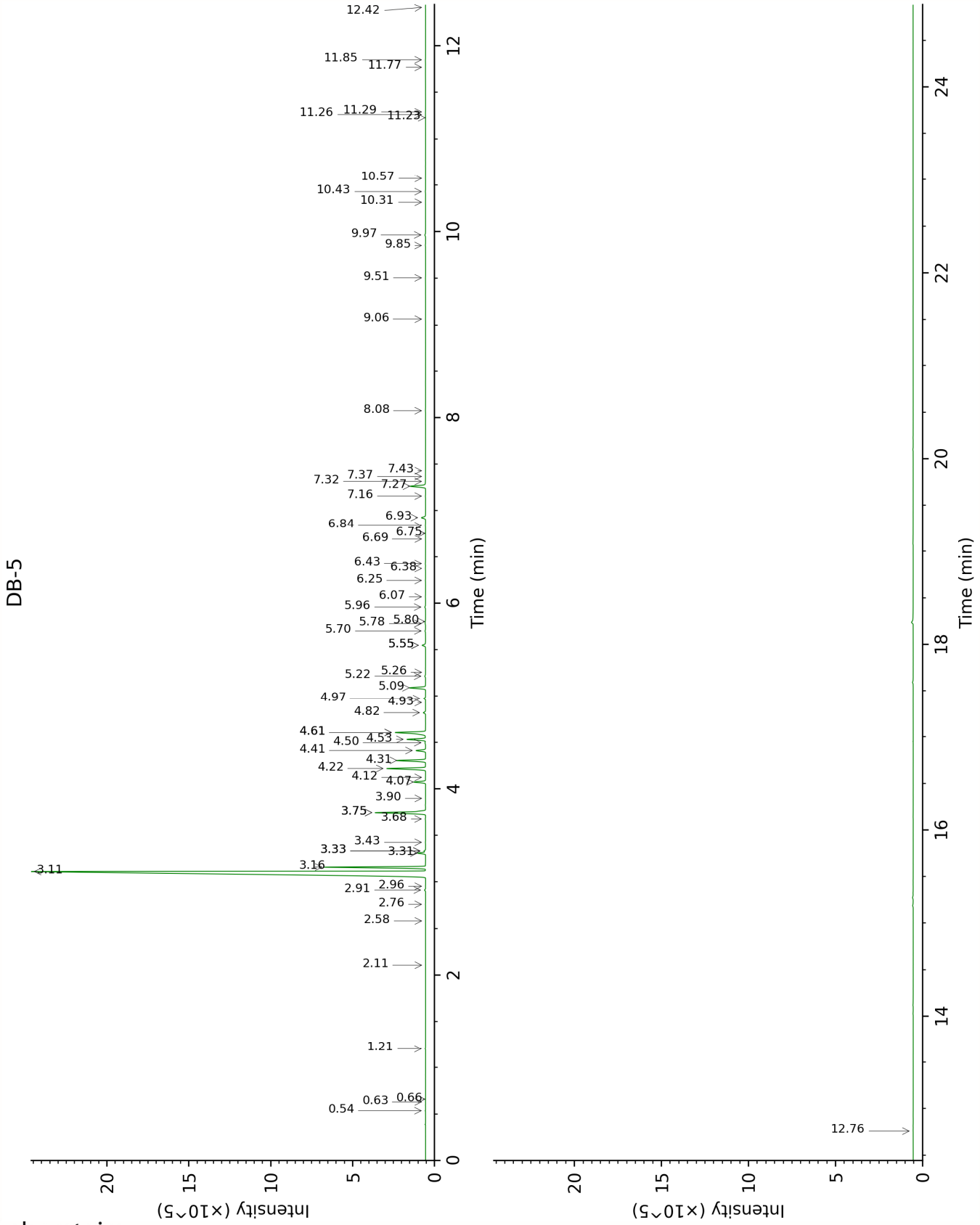
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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

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

628 Boulevard du Saguenay, Saguenay (Qc) G7J 1H4 | www.phytochemia.com


DB-WAX
Time (min)
Intensity (×10^5)
11.35
11.18
10.70
10.68
10.20
10.08
10.05
9.85
9.63
8.87
8.67
8.61
8.41
8.35
8.26
7.72
7.64
7.38
7.18
7.02
6.61
6.53
6.35
5.84
5.05
4.54
4.36
4.22
4.02
4.05
3.51
3.42
3.18
3.09
3.00
2.80
2.65
2.60
2.49
2.29
1.87
1.81
1.61
1.52
1.38
1.21
0.86
0.75
15.52
14.06
13.64


DB-5
12.42
11.85
11.77
11.26
11.29
11.23
10.57
10.43
10.31
9.97
9.85
9.51
9.06
8.08
7.32
7.37
7.43
7.27
7.16
6.93
6.84
6.75
6.69
6.43
6.38
6.25
6.07
5.96
5.78
5.80
5.70
5.55
5.22
5.26
5.09
4.97
4.93
4.82
4.61
4.50
4.53
4.41
4.31
4.22
4.12
4.07
3.90
3.75
3.68
3.43
3.33
3.31
3.16
3.11
2.91
2.96
2.76
2.58
2.11
1.21
0.63
0.66
0.54
12.76
Time (min)
Intensity (×10^5)

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
Ethyl acetate	0.75	849.9	0.02	0.54	608.8	0.01
Isovaleral	0.86	888.5	tr	0.63	641.8	tr
2-Methylbutyral				0.66	651.9	tr
Toluene	1.62*	1002.3	[67.66]	1.21	759.7	0.03
Unknown PRME II [m/z 109, 43 (28), 124 (28), 41 (14), 55 (11), 79 (9), 81 (8)...]	1.81*	1020.7	[0.01]	2.11	852.9	tr
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)]	1.21	945.4	0.01	2.58	892.3	tr
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)]				2.76	906.6	0.02
Hashishene	1.52*	993.1	[7.63]	2.91	916.7	0.10
Tricyclene	1.38	971.7	0.02	2.96	919.4	0.02
α-Thujene	1.62*	1002.3	[67.66]	3.11	929.9	67.81
α-Pinene	1.52*	993.1	[7.63]	3.16	933.1	7.64
Unknown SAOF I [m/z 91, 92 (47), 65 (11)... 134 (1)]	2.60*	1095.9	[0.65]	3.31	943.0	0.66
α-Fenchene	1.81*	1020.7	[0.01]	3.33*	944.5	[0.13]
Camphene	1.87	1027.2	0.12	3.33*	944.5	[0.13]
Thuja-2,4(10)-diene	2.49*	1085.5	[4.36]	3.43	950.7	0.03
3,7,7-Trimethylcyclohepta-1,3,5-triene	3.09*	1133.3	[1.08]	3.68	967.3	0.04
β-Pinene	2.29	1066.8	0.63	3.75*†	971.8	[4.58]
Sabinene	2.49*	1085.5	[4.36]	3.75*†	971.8	[4.58]
Pseudolimonene isomer	2.64	1099.2	0.02	3.90	981.9	0.01
Myrcene	3.09*	1133.3	[1.08]	4.07	993.5	1.04
2-Carene	2.60*	1095.9	[0.65]	4.12	996.9	0.02
α-Phellandrene	3.00	1126.3	3.52	4.22	1003.1	3.53
Δ3-Carene	2.80	1110.9	2.55	4.31	1008.6	2.57
α-Terpinene	3.18	1139.8	0.86	4.41	1015.3	0.86
meta-Cymene	4.36*	1226.1	[1.77]	4.50	1020.6	0.07

para-Cymene	4.36*	1226.1	[1.77]	4.53	1022.9	1.70
Limonene	3.42	1157.6	2.68	4.61*	1027.5	[3.33]
β-Phellandrene	3.51	1164.7	0.60	4.61*	1027.5	[3.33]
(*Z*)-β-Ocimene	4.02*†	1202.1	[0.19]	4.82	1040.8	0.22
Unknown BOFR III [m/z 109, 43 (57), 91 (28), 67 (25), 93 (24), 95 (22), 77 (21), 137 (21), 41 (17), 79 (14)...]	7.64	1463.9	0.03	4.93	1047.8	0.02
(*E*)-β-Ocimene	4.22	1216.5	0.18	4.98	1050.6	0.18
γ-Terpinene	4.05*†	1204.4	[1.51]	5.09	1058.1	1.49
cis-Sabinene hydrate	7.18	1430.5	0.09	5.22	1065.8	0.08
Unknown PIMA I [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.05	1274.0	0.01	5.26	1068.5	0.01
para-Cymenene	6.53	1382.8	0.04	5.55*	1086.7	[0.36]
Terpinolene	4.54	1238.3	0.34	5.55*	1086.7	[0.36]
trans-Sabinene hydrate	8.26	1510.7	0.06	5.70	1096.4	0.06
α-Thujone	6.35	1369.5	0.05	5.78	1101.3	0.04
Linalool	8.35	1517.5	0.04	5.80	1102.7	0.05
β-Thujone	6.61	1388.4	0.09	5.96	1112.6	0.09
cis-*para*-Menth-2-en-1-ol	8.41	1522.6	0.03	6.07	1119.6	0.03
allo-Ocimene	5.84	1333.2	0.03	6.25	1130.9	0.02
trans-Sabinol	10.08*	1653.6	[0.03]	6.38	1139.1	0.03
trans-Verbenol	9.85*	1634.7	[0.02]	6.43	1142.5	0.03
Unknown RHGR XIX [m/z 109, 43 (75), 137 (46), 67 (31), 93 (25)... 152 (4)]				6.69	1159.4	0.01
Borneol	10.08*	1653.6	[0.03]	6.75	1163.2	tr
cis-Sabinol	11.18	1743.7	0.02	6.84	1168.8	0.03
Terpinen-4-ol	8.87	1557.6	0.44	6.93	1174.5	0.44
α-Terpineol	10.05*	1650.7	[0.02]	7.16	1189.3	0.02
Methylchavicol	9.63	1617.0	1.70	7.27	1196.1	1.61
cis-α-Phellandrene epoxide (iPr vs Me)	11.34	1758.0	0.02	7.32	1199.3	0.03
Verbenone	9.85*	1634.7	[0.02]	7.37	1202.8	0.02
trans-Piperitol	10.70*	1703.8	[0.01]	7.43	1206.8	0.01
Piperitone	10.20*	1662.8	[0.02]	8.08	1250.0	0.03
para-Menth-5-en-	15.52	2139.3	0.02	9.06	1316.9	0.02

1,2-diol isomer III						
α-Cubebene	7.02	1418.1	0.01	9.51	1348.0	0.02
α-Copaene	7.38	1445.1	0.03	9.85	1372.5	0.03
β-Bourbonene	7.72	1470.5	0.08	9.97	1380.5	0.09
Methyleugenol	13.64	1960.1	0.02	10.32	1405.2	0.02
β-Caryophyllene	8.67	1542.2	0.03	10.43	1413.7	0.03
β-Copaene	8.61	1537.9	0.01	10.57	1424.4	0.01
γ-Muurolene	9.85*	1634.7	[0.02]	11.23	1473.3	tr
Germacrene D	10.05*	1650.7	[0.02]	11.26	1475.8	0.01
Unknown BOSE VII [m/z 91, 93 (92), 105 (71), 77 (69), 79 (68), 133 (63)... 204 (32)]	10.20*	1662.8	[0.02]	11.29	1477.9	0.01
γ-Cadinene	10.68	1702.0	0.02	11.77	1514.1	0.01
Kessane	10.70*	1703.8	[0.01]	11.85	1520.4	0.01
(*E*)-Nerolidol	14.06	1999.4	0.02	12.42	1564.9	0.03
Guaiol				12.76	1591.8	0.02
Total reported		99.41%			99.83%	

*: 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