Date : July 06, 2022

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 22F28-PTH01
Customer identification : Frankincense Serrata ORGANIC - India - F50109R
Type : Essential oil
Source : *Boswellia serrata*
Customer : Plant Therapy

Analysis

Method: PC-MAT-014 ISO - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.
Analyst : Seydou Ka, Ph. D.
Analysis date : June 29, 2022

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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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

Physical aspect: Clear liquid
Refractive index: 1.4594 ± 0.0003 (20 °C; method PC-MAT-016)

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
(*E*)-2-Methyl-1,3-pentadiene	0.01	Alkene
Toluene	0.01	Simple phenolic
Unknown	0.02	Unknown
Hashishene	0.11	Monoterpene
Tricyclene	tr	Monoterpene
α-Thujene	69.09	Monoterpene
α-Pinene	5.63	Monoterpene
Camphene	0.07	Monoterpene
Unknown	0.42	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
3,7,7-Trimethylcyclohepta-1,3,5-triene	0.03	Monoterpene
Sabinene	4.91	Monoterpene
β-Pinene	0.36	Monoterpene
Myrcene	0.91	Monoterpene
2-Carene	0.01	Monoterpene
α-Phellandrene	1.53	Monoterpene
Δ3-Carene	4.32	Monoterpene
α-Terpinene	0.38	Monoterpene
Carvomenthene	0.02	Aliphatic alcohol
meta-Cymene	0.06	Monoterpene
para-Cymene	1.61	Monoterpene
Unknown	0.12	Unknown
Limonene	1.74	Monoterpene
β-Phellandrene	0.40	Monoterpene
(*Z*)-β-Ocimene	0.56	Monoterpene
Unknown	0.05	Unknown
(*E*)-β-Ocimene	0.28	Monoterpene
Unknown	0.05	Unknown
γ-Terpinene	0.80	Monoterpene
cis-Sabinene hydrate	0.05	Monoterpenic alcohol
Unknown	0.01	Oxygenated monoterpene
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Isoterpinolene	0.01	Monoterpene
para-Cymenene	0.02	Monoterpene
Terpinolene	0.28	Monoterpene
trans-Sabinene hydrate	0.04	Monoterpenic alcohol
Linalool	0.09	Monoterpenic alcohol
α-Thujone	0.02	Monoterpenic ketone
Unknown	0.03	Oxygenated monoterpene
β-Thujone	0.15	Monoterpenic ketone
α-Campholenal	0.01	Monoterpenic aldehyde
cis-para-Menth-2-en-1-ol	0.05	Monoterpenic alcohol
Unknown	0.01	Unknown
allo-Ocimene	0.02	Monoterpene
trans-Sabinol	0.05	Monoterpenic alcohol

trans-Verbenol	0.01	Monoterpenic alcohol
para-Menth-3-en-8-ol	0.02	Monoterpenic alcohol
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	0.72	Monoterpenic alcohol
meta-Cymen-8-ol	0.02	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α-Terpineol	0.05	Monoterpenic alcohol
Methylchavicol	1.38	Phenylpropanoid
cis-α-Phellandrene epoxide (iPr vs Me)	0.03	Monoterpenic ether
Verbenone	0.02	Monoterpenic ketone
trans-Piperitol	0.02	Monoterpenic alcohol
Unknown	0.02	Unknown
Piperitone	0.01	Monoterpenic ketone
Linalyl acetate	0.02	Monoterpenic ester
Unknown	0.01	Oxygenated monoterpene
Bornyl acetate	0.03	Monoterpenic ester
Thymol	0.01	Monoterpenic alcohol
Carvacrol	0.01	Monoterpenic alcohol
para-Menth-5-en-1,2-diol isomer III	0.02	Monoterpenic alcohol
α-Terpinyl acetate	0.04	Monoterpenic ester
α-Copaene	0.10	Sesquiterpene
β-Bourbonene	0.55	Sesquiterpene
1,5-diepi-β-Bourbonene	0.04	Sesquiterpene
β-Elemene	0.02	Sesquiterpene
Methyleugenol	0.09	Phenylpropanoid
β-Ylangene	0.01	Sesquiterpene
β-Copaene	0.06	Sesquiterpene
Isogermacrene D	0.04	Sesquiterpene
cis-Muurola-4(15),5-diene	0.01	Sesquiterpene
γ-Muurolene	0.04	Sesquiterpene
Germacrene D	0.15	Sesquiterpene
Unknown	0.13	Sesquiterpene
Bicyclogermacrene	0.04	Sesquiterpene
α-Muurolene	0.01	Sesquiterpene
γ-Cadinene	0.04	Sesquiterpene
δ-Cadinene	0.13	Sesquiterpene
Elemicin	0.02	Phenylpropanoid
4,10-diepi-Guaiol	0.01	Sesquiterpenic alcohol
α-Phellandrene dimer II	0.03	Diterpene
α-Phellandrene dimer III	0.04	Diterpene
(3*E*)-Cembrene A	0.02	Diterpene
Verticilla-4(20),7,11-triene	0.02	Diterpene
Cembrenol	0.01	Diterpenic alcohol
Serratol	0.06	Diterpenic alcohol
Consolidated total	**98.61%**	

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

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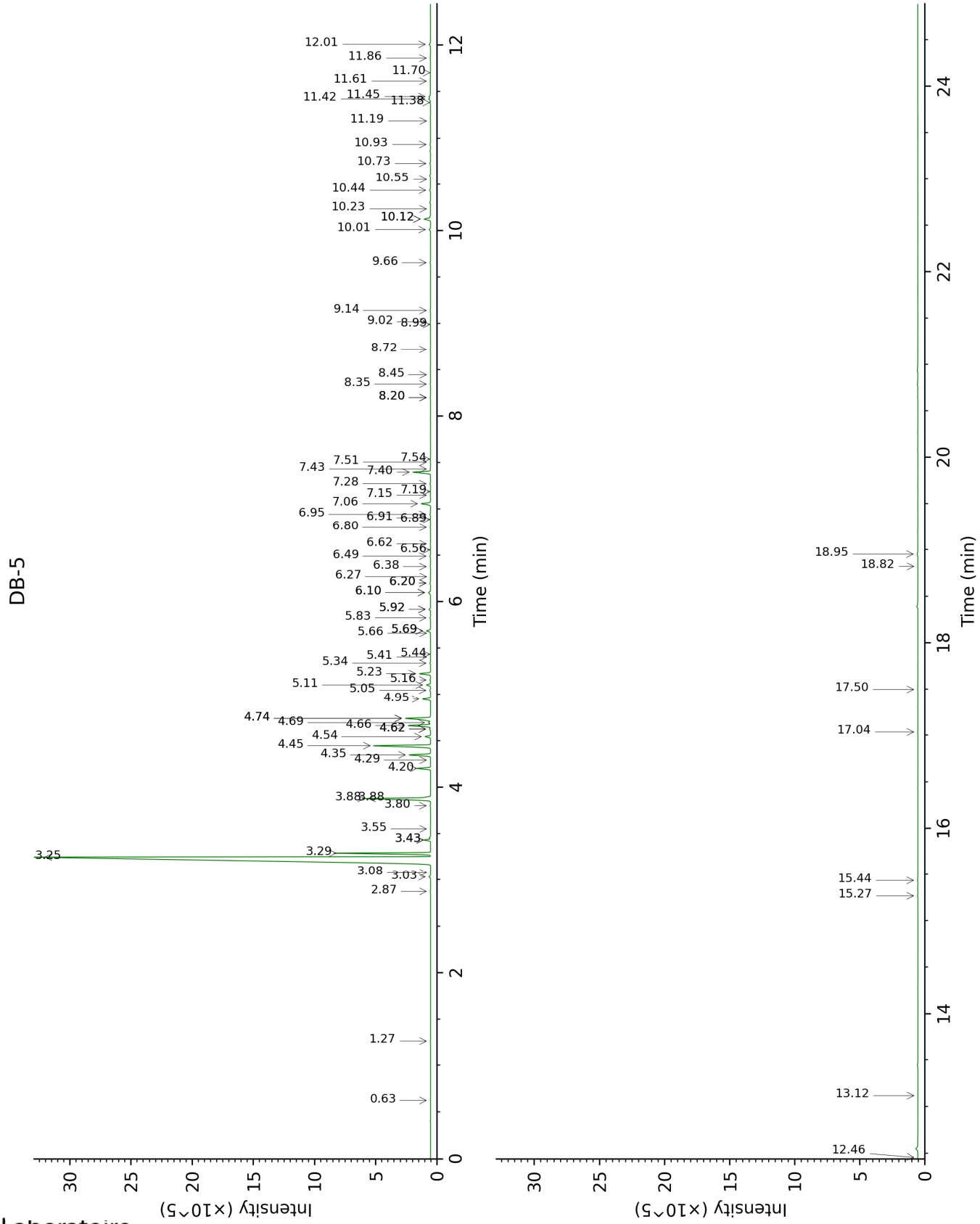
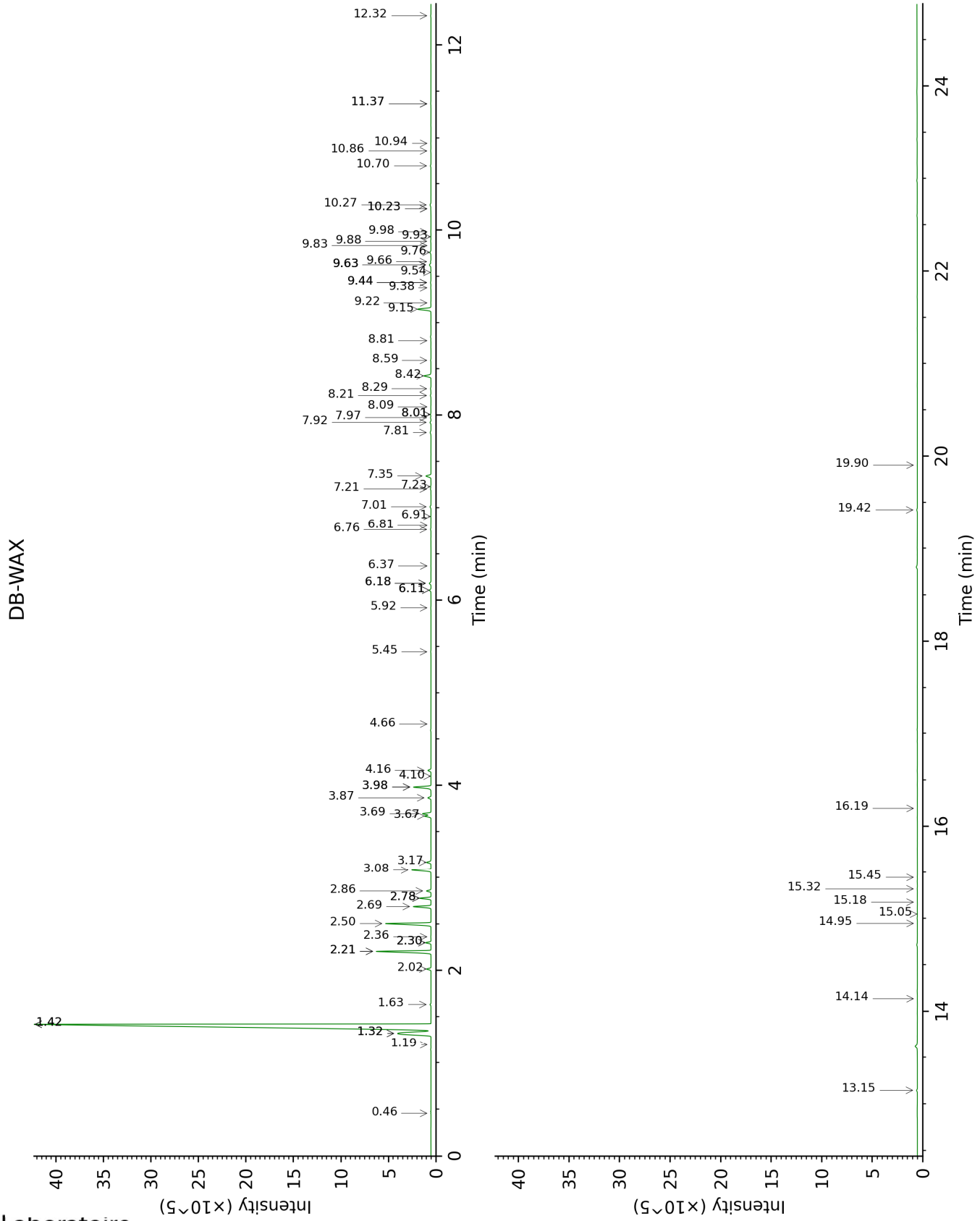

DB-5
12.01
11.86
11.70
11.61
11.42
11.45
11.38
11.19
10.93
10.73
10.55
10.44
10.23
10.12
10.01
9.66
9.14
9.02
8.99
8.72
8.45
8.35
8.20
7.51
7.54
7.43
7.40
7.28
7.15
7.19
7.06
6.95
6.91
6.89
6.80
6.62
6.56
6.49
6.38
6.27
6.20
6.10
5.92
5.83
5.66
5.69
5.41
5.44
5.34
5.23
5.16
5.11
5.05
4.95
4.74
4.69
4.66
4.62
4.54
4.45
4.35
4.29
4.20
3.88
3.88
3.80
3.55
3.43
3.25
3.29
3.08
3.03
2.87
1.27
0.63
Time (min)
Intensity (×10^5)
18.95
18.82
17.50
17.04
15.44
15.27
13.12
12.46
Time (min)
Intensity (×10^5)


DB-WAX
Intensity (×10^5)
Time (min)
12.32
11.37
10.94
10.86
10.70
10.27
10.23
9.98
9.93
9.88
9.83
9.76
9.66
9.63
9.54
9.44
9.38
9.22
9.15
8.81
8.59
8.42
8.29
8.21
8.09
8.01
7.97
7.92
7.81
7.35
7.23
7.21
7.01
6.91
6.81
6.76
6.37
6.18
6.11
5.92
5.45
4.66
4.16
4.10
3.98
3.87
3.69
3.67
3.17
3.08
2.86
2.78
2.69
2.50
2.36
2.30
2.21
2.02
1.63
1.42
1.32
1.19
0.46
19.90
19.42
16.19
15.45
15.32
15.18
15.05
14.95
14.14
13.15

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
(*E*)-2-Methyl-1,3-pentadiene	0.63	631	0.01	0.46	764	0.01
Toluene	1.27	758	0.01	1.42*	1006	69.11
Unknown [m/z 93, 91 (72), 121 (58), 77 (49), 79 (41), 43 (22), 105 (20),107 (20), 41 (18), 136 (17), 92 (17)]	2.87	905	0.02			
Hashishene	3.03	916	0.11	1.32*	993	5.69
Tricyclene	3.08	919	tr	1.19	972	0.01
α-Thujene	3.25	930	69.09	1.42*	1006	[69.11]
α-Pinene	3.29	933	5.63	1.32*	993	[5.69]
Camphene	3.43*†	942	0.50	1.63	1027	0.07
Unknown [m/z 91, 92 (47), 65 (11)... 134 (1)]	3.43*†	942	[0.50]	2.30*	1094	0.43
Thuja-2,4(10)-diene	3.55	950	0.01	2.20*	1084	4.92
3,7,7-Trimethylcyclohepta-1,3,5-triene	3.80	966	0.03	2.78*	1133	0.94
Sabinene	3.88*	971	5.28	2.20*	1084	[4.92]
β-Pinene	3.88*	971	[5.28]	2.02	1065	0.36
Myrcene	4.20	992	0.91	2.78*	1133	[0.94]
2-Carene	4.29	998	0.01	2.30*	1094	[0.43]
α-Phellandrene	4.35	1002	1.53	2.69	1126	1.52
Δ3-Carene	4.45	1008	4.32	2.50	1111	4.31
α-Terpinene	4.54	1014	0.38	2.86	1139	0.38
Carvomenthene	4.62*	1020	0.08	2.36	1100	0.02
meta-Cymene	4.62*	1020	[0.08]	3.98*	1226	1.69
para-Cymene	4.66	1022	1.61	3.98*	1226	[1.69]
Unknown [m/z 109, 43 (58), 95 (26)... 137 (15)...]	4.69†	1024	2.26	6.11*	1379	0.15
Limonene	4.74*†	1027	[2.26]	3.08	1157	1.74
β-Phellandrene	4.74*†	1027	[2.26]	3.17	1164	0.40
(*Z*)-β-Ocimene	4.95	1040	0.56	3.67	1204	0.58
Unknown [m/z 109, 43 (57), 91 (28), 67 (25), 93 (24), 95 (22), 77 (21), 137 (21), 41 (17), 79 (14)...]	5.05	1046	0.05	7.20	1461	0.06
(*E*)-β-Ocimene	5.11	1050	0.28	3.87	1218	0.29
Unknown [m/z 109 , 45 (67), 41 (40), 67 (39), 81 (33), 79 (27), 95 (24), 91 (23), 82 (21), 55 (21), 93 (20)...]	5.16	1053	0.05	6.76	1428	0.04
γ-Terpinene	5.23	1057	0.80	3.70	1205	0.78

cis-Sabinene hydrate	5.34	1064	0.05	6.81	1431	0.01
Unknown [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	5.41	1069	0.01	4.66	1277	0.01
cis-Linalool oxide (fur.)	5.44	1070	0.01	6.37	1398	0.01
Isoterpinolene	5.66	1085	0.01	4.10	1235	0.01
para-Cymenene	5.69*	1086	0.30	6.18*	1385	0.17
Terpinolene	5.69*	1086	[0.30]	4.16	1240	0.28
trans-Sabinene hydrate	5.83	1095	0.04	7.81	1506	0.10
Linalool	5.92*	1101	0.12	7.92	1515	0.09
α-Thujone	5.92*	1101	[0.12]	5.92	1366	0.02
Unknown [m/z 109, 81 (54), 91 (32), 79 (22)...]	6.10*	1112	0.19	6.11*	1379	[0.15]
β-Thujone	6.10*	1112	[0.19]	6.18*	1385	[0.17]
α-Campholenal	6.20*	1119	0.06	6.91	1439	0.01
cis-para-Menth-2-en-1-ol	6.20*	1119	[0.06]	7.97	1519	0.05
Unknown [m/z 111, 43 (22), 55 (14), 41 (12), 110 (11)...]	6.27	1124	0.01			
allo-Ocimene	6.38	1130	0.02	5.44	1331	0.03
trans-Sabinol	6.49	1138	0.05	9.66	1653	0.04
trans-Verbenol	6.56	1142	0.01	9.38	1630	0.03
para-Menth-3-en-8-ol	6.62	1146	0.02	8.59	1567	0.04
Unknown [m/z 109, 43 (75), 137 (46), 67 (31), 93 (25)... 152 (4)]	6.80	1158	0.02			
Borneol	6.89	1164	0.02	9.63*	1650	0.20
α-Phellandren-8-ol	6.91	1165	0.01	9.98	1679	0.02
cis-Sabinol	6.94	1167	0.06	10.70	1739	0.06
Terpinen-4-ol	7.06	1175	0.72	8.42	1554	0.74
meta-Cymen-8-ol	7.15	1181	0.02	11.37*	1796	0.04
para-Cymen-8-ol	7.19	1183	0.02	11.37*	1796	[0.04]
α-Terpineol	7.28	1189	0.05	9.63*	1650	[0.20]
Methylchavicol	7.40	1197	1.38	9.15	1611	1.42
cis-α-Phellandrene epoxide (iPr vs Me)	7.43	1199	0.03	10.86	1753	0.03
Verbenone	7.51	1204	0.02	9.44*	1634	0.05
trans-Piperitol	7.54	1206	0.02	10.23*	1699	0.04
Unknown [m/z 43, 97 (69), 107 (46), 41 (28), 55 (21), 109 (20)...]	8.20*	1251	0.03	10.94	1760	0.02
Piperitone	8.20*	1251	[0.03]	9.83	1667	0.01
Linalyl acetate	8.34	1261	0.02	8.01*	1522	0.05
Unknown [m/z 109, 41 (22), 81 (14), 43 (11)... 152 (4)]	8.45	1268	0.01			

Bornyl acetate	8.72	1286	0.03	8.09	1528	0.02
Thymol	8.99	1305	0.01	14.95	2130	tr
Carvacrol	9.02	1307	0.01	15.18	2153	0.01
para-Menth-5-en-1,2-diol isomer III	9.14	1311	0.02	15.05	2140	tr
α-Terpinyl acetate	9.66	1347	0.04	9.54	1643	0.03
α-Copaene	10.01	1372	0.10	7.01	1446	0.11
β-Bourbonene	10.12*	1380	0.58	7.35	1471	0.55
1,5-diepi-β-Bourbonene	10.12*	1380	[0.58]	7.23	1463	0.04
β-Elemene	10.23	1388	0.02	8.28	1543	0.06
Methyleugenol	10.44	1402	0.09	13.15	1957	0.07
β-Ylangene	10.55	1411	0.01	8.01*	1522	[0.05]
β-Copaene	10.73	1424	0.06	8.21	1538	0.07
Isogermacrene D	10.93	1439	0.04	8.81	1584	0.02
cis-Muurola-4(15),5-diene	11.19	1458	0.01	9.22	1617	0.02
γ-Muurolene	11.38	1473	0.04	9.44*	1634	[0.05]
Germacrene D	11.42	1476	0.15	9.63*	1650	[0.20]
Unknown [m/z 91, 93 (92), 105 (71), 77 (69), 79 (68), 133 (63)... 204 (32)]	11.45	1478	0.13	9.76	1661	0.13
Bicyclogermacrene	11.61	1490	0.04	9.88	1671	0.04
α-Muurolene	11.70	1497	0.01	9.93	1675	0.01
γ-Cadinene	11.86	1509	0.04	10.23*	1699	[0.04]
δ-Cadinene	12.01	1520	0.13	10.27	1703	0.12
Elemicin	12.46	1556	0.02	15.32	2168	0.02
4,10-diepi-Guaiol	13.12	1608	0.01	14.14	2051	0.01
α-Phellandrene dimer II	15.27	1790	0.03	12.32	1881	0.03
α-Phellandrene dimer III	15.44	1804	0.04			
(3*E*)-Cembrene A	17.04	1952	0.02	15.44	2180	0.01
Verticilla-4(20),7,11-triene	17.50	1996	0.02	16.19	2258	tr
Cembrenol	18.82	2128	0.01	19.90	2676	0.01
Serratol	18.95	2142	0.06	19.42	2618	0.06
Total identified		**96.07%**			**98.29%**	
Total reported		**98.63%**			**98.54%**	

*: 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