Date : April 14, 2022

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 22D07-PTH09
Customer identification : Myrrh - France - M40112R
Type : Essential oil
Source : *Commiphora myrrha*
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 : Pamela Lavoie, M.Sc., Chimiste
Analysis date : April 13, 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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: Yellow brownish viscous liquid
Refractive index: 1.5256 ± 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
para-Xylene	0.01	Simple phenolic
α-Thujene	tr	Monoterpene
α-Pinene	0.01	Monoterpene
Camphene	tr	Monoterpene
β-Pinene	tr	Monoterpene
Myrcene	0.01	Monoterpene
Δ3-Carene	0.01	Monoterpene
para-Cymene	0.01	Monoterpene
Limonene	0.02	Monoterpene
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.22	Monoterpene
Terpinen-4-ol	tr	Monoterpenic alcohol
α-Terpineol	0.01	Monoterpenic alcohol
Verbenone	tr	Monoterpenic ketone
Dimethylbenzofuran isomer I	0.01	Furan
Unknown	0.01	Unknown
Carvone	0.01	Monoterpenic ketone
Bornyl acetate	0.01	Monoterpenic ester
δ-Elemene isomer	0.02	Sesquiterpene
δ-Elemene	1.01	Sesquiterpene
Limonene *trans*-glycol	0.05	Monoterpenic alcohol
α-Cubebene	0.01	Sesquiterpene
α-Ylangene	0.02	Sesquiterpene
α-Copaene	0.12	Sesquiterpene
β-Bourbonene	0.30	Sesquiterpene
cis-β-Elemene	0.10	Sesquiterpene
1,5-diepi-β-Bourbonene	0.03	Sesquiterpene
β-Cubebene	0.02	Sesquiterpene
β-Elemene	3.89	Sesquiterpene
α-Gurjunene	0.02	Sesquiterpene
β-Caryophyllene	0.34	Sesquiterpene
β-Ylangene	0.10	Sesquiterpene
α-Santalene	0.33*	Sesquiterpene
cis-α-Bergamotene	0.33*	Sesquiterpene
β-Copaene	0.04	Sesquiterpene
γ-Elemene	0.77	Sesquiterpene
trans-α-Bergamotene	0.11	Sesquiterpene
Isogermacrene D	0.07	Sesquiterpene
6,9-Guaiadiene	0.01	Sesquiterpene
Unknown	0.06	Sesquiterpene
α-Humulene	0.21	Sesquiterpene
Rotundene	0.05	Sesquiterpene
allo-Aromadendrene	0.04	Sesquiterpene
4,5-diepi-Aristolochene	0.05	Sesquiterpene
trans-Cadina-1(6),4-diene	0.05	Sesquiterpene

γ-Muurolene	0.03	Sesquiterpene
Selina-4,11-diene	0.16	Sesquiterpene
Germacrene D	0.93	Sesquiterpene
β-Selinene	0.56	Sesquiterpene
δ-Selinene	0.07	Sesquiterpene
α-Selinene	0.50	Sesquiterpene
Bicyclogermacrene	0.12	Sesquiterpene
Curzerene	22.08	Sesquiterpenic ether
Germacrene A	0.12	Sesquiterpene
ε-Amorphene	0.36	Sesquiterpene
δ-Amorphene	0.04	Sesquiterpene
γ-Cadinene	0.41	Sesquiterpene
(*Z*)-γ-Bisabolene	0.05	Sesquiterpene
δ-Cadinene	0.26	Sesquiterpene
trans-Calamenene	0.02	Sesquiterpene
Selina-4(15),7(11)-diene	0.14	Sesquiterpene
Selina-4,7(11)-diene?	0.05	Sesquiterpene
Selina-3,7(11)-diene	0.10	Sesquiterpene
Germacrene B	2.57	Sesquiterpene
α-Elemol	0.16	Sesquiterpenic alcohol
1,5-Epoxysalvial-4(14)-ene	0.04	Sesquiterpenic ether
Furanoeudesma-1,4-diene	0.50	Sesquiterpenic ether
Caryophyllene oxide	0.05	Sesquiterpenic ether
Viridiflorol	0.06	Sesquiterpenic alcohol
Unknown	0.10	Oxygenated sesquiterpene
β-Elemenone	0.64	Sesquiterpenic ketone
Furanoeudesma-1,3-diene	24.95	Sesquiterpenic ether
Lindestrene	8.18	Sesquiterpenic ether
τ-Muurolol	0.33	Sesquiterpenic alcohol
τ-Cadinol	0.86	Sesquiterpenic alcohol
β-Eudesmol	0.16	Sesquiterpenic alcohol
α-Eudesmol	0.19	Sesquiterpenic alcohol
Furanodiene	0.62	Sesquiterpenic ether
Atractylone?	0.77	Sesquiterpenic ether
Unknown	0.21	Unknown
α-Elemyl acetate	1.28	Sesquiterpenic ester
Unknown	5.11	Oxygenated sesquiterpene
Germacrone	0.85	Sesquiterpenic ketone
Juniper camphor	0.21	Sesquiterpenic alcohol
Unknown	0.05	Oxygenated sesquiterpene
Aromadendrane-4,10-diol	0.22	Sesquiterpenic alcohol
2-Methoxyfuranodiene	3.99	Sesquiterpenic ether
Oplopanone	0.05	Sesquiterpenic alcohol
Benzyl benzoate	0.17	Phenolic ester
Unknown	0.03	Unknown
Unknown	0.15	Sesquiterpenic ester
Unknown	0.14	Sesquiterpenic ester
Isofuranodienone	0.23	Sesquiterpenic ketone
Cryptomeridiol	0.17	Sesquiterpenic alcohol
Unknown	0.94	Oxygenated sesquiterpene
2-Acetoxyfuranodiene?	1.90	Sesquiterpenic ester
Myrrhanolide C?	0.12	Sesquiterpenic alcohol

Unknown	0.31	Unknown
Serratol	0.02	Diterpenic alcohol
Consolidated total	**90.50%**	

*: 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.

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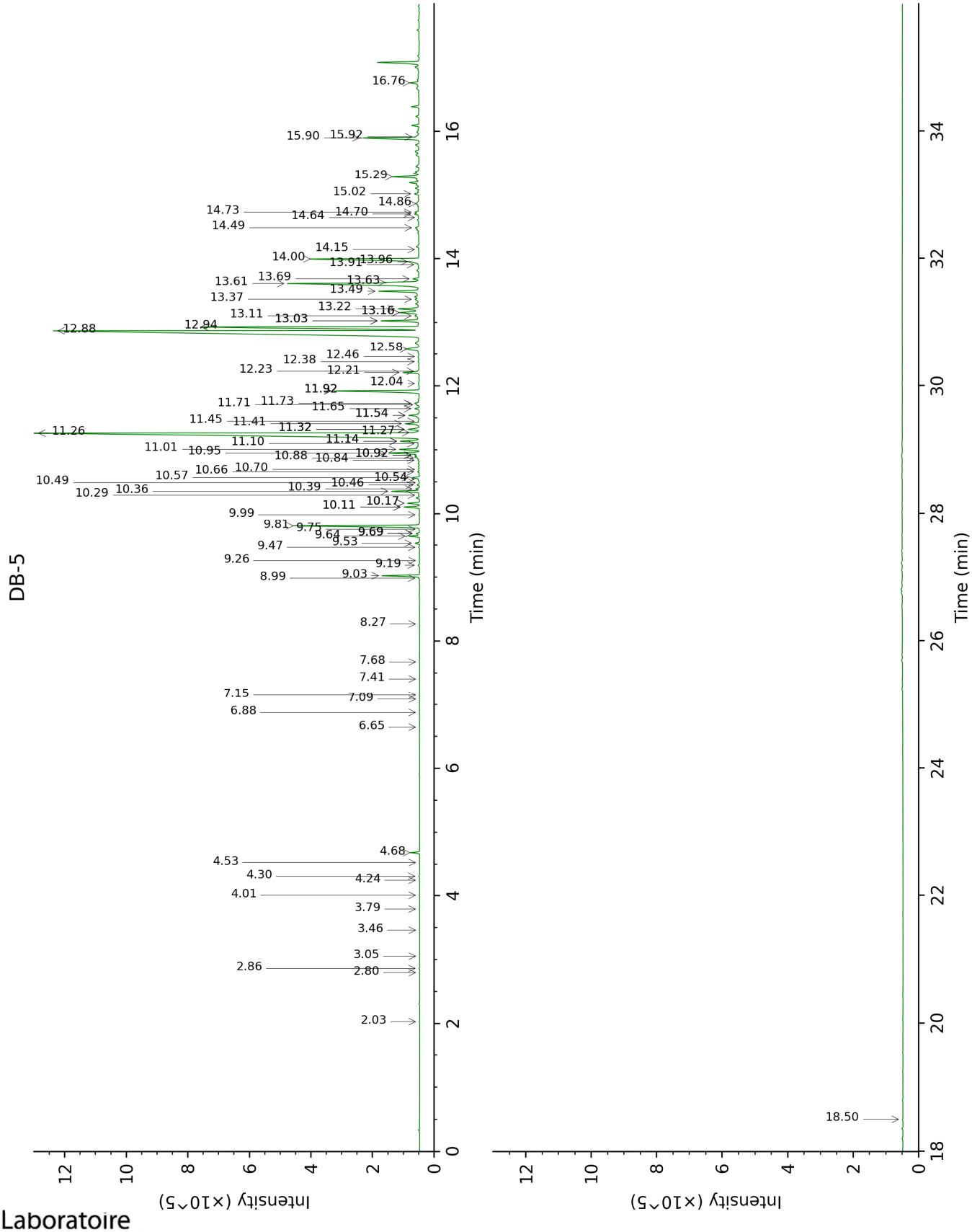
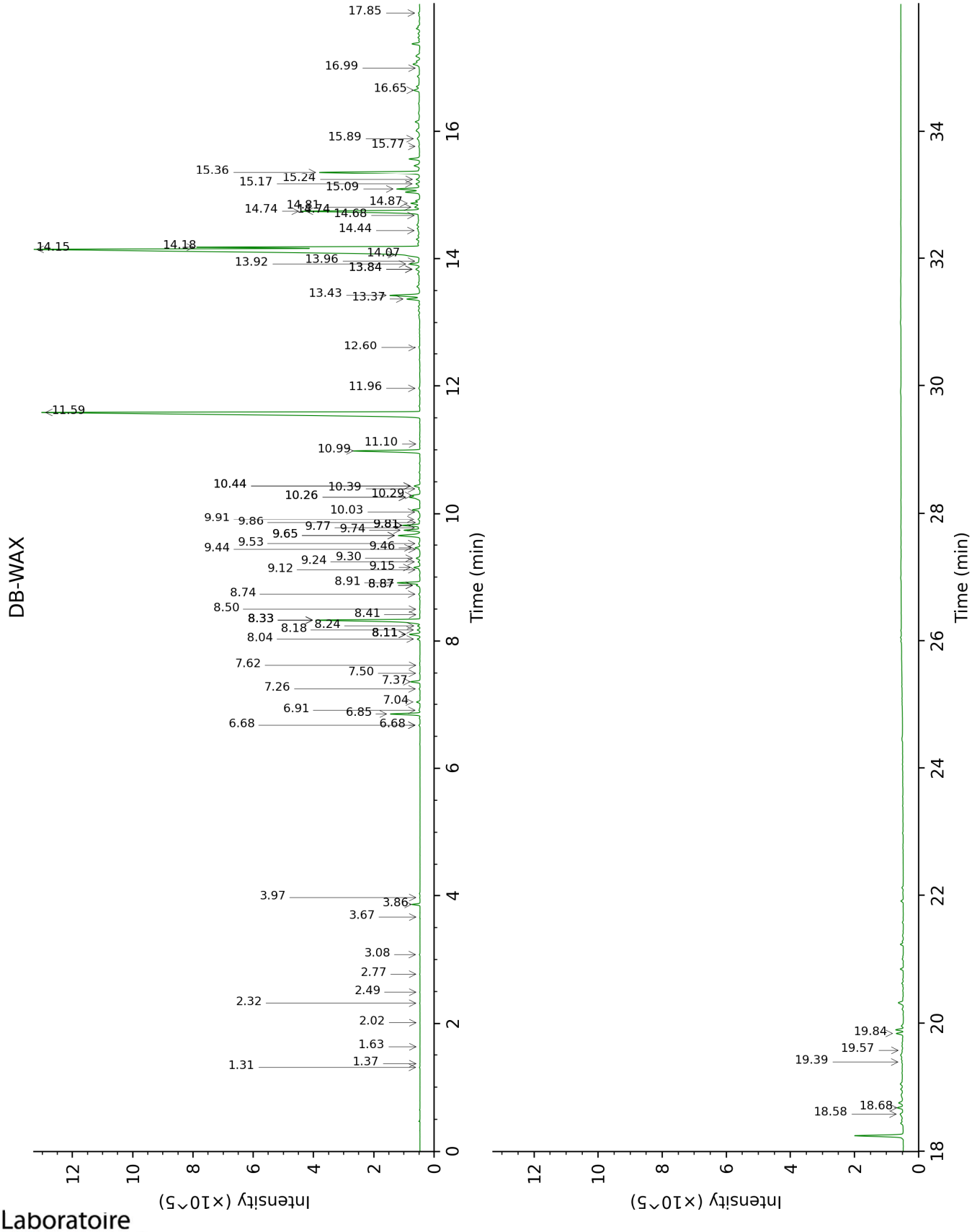

DB-5
16.76
15.90
15.92
15.29
15.02
14.86
14.73
14.64
14.70
14.49
14.15
14.00
13.91
13.96
13.61
13.69
13.63
13.49
13.37
13.22
13.16
13.11
13.03
12.94
12.88
12.58
12.38
12.46
12.23
12.21
12.04
11.92
11.71
11.73
11.65
11.54
11.45
11.41
11.32
11.27
11.26
11.10
11.14
11.01
10.95
10.88
10.84
10.92
10.57
10.66
10.70
10.54
10.49
10.39
10.46
10.29
10.36
10.11
10.17
9.99
9.81
9.75
9.64
9.69
9.53
9.47
9.26
9.19
8.99
9.03
8.27
7.68
7.41
7.15
7.09
6.88
6.65
4.68
4.53
4.30
4.24
4.01
3.79
3.46
3.05
2.86
2.80
2.03
18.50
Time (min)
Intensity (×10^5)


DB-WAX
Intensity (×10^5)
Time (min)
17.85
16.99
16.65
15.89
15.77
15.36
15.17
15.24
15.09
14.87
14.74
14.81
14.74
14.68
14.44
14.15
14.18
14.07
13.92
13.96
13.84
13.43
13.37
12.60
11.96
11.59
11.10
10.99
10.44
10.39
10.26
10.29
10.03
9.91
9.86
9.77
9.74
9.81
9.65
9.53
9.46
9.44
9.24
9.30
9.12
9.15
8.91
8.87
8.74
8.50
8.41
8.33
8.18
8.24
8.11
8.04
7.62
7.50
7.37
7.26
7.04
6.91
6.85
6.68
6.68
3.97
3.86
3.67
3.08
2.77
2.49
2.32
2.02
1.63
1.37
1.31
19.84
19.57
19.39
18.58
18.68

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
para-Xylene	2.03	864	0.01	2.32	1097	0.01
α-Thujene	2.80	925	tr	1.37	1002	tr
α-Pinene	2.86	929	0.01	1.31	993	0.01
Camphene	3.05	942	tr	1.63	1028	tr
β-Pinene	3.46	969	tr	2.02	1067	tr
Myrcene	3.79	992	0.01	2.77	1134	0.01
Δ3-Carene	4.01	1006	0.01	2.49	1112	0.01
para-Cymene	4.24	1021	0.01	3.97	1228	0.01
Limonene	4.30	1025	0.02	3.08	1158	0.02
(*Z*)-β-Ocimene	4.53	1039	0.01	3.67	1205	0.01
(*E*)-β-Ocimene	4.68	1049	0.22	3.86	1220	0.24
Terpinen-4-ol	6.65	1174	tr	8.42	1554	0.02
α-Terpineol	6.88	1188	0.01	9.65*	1652	1.03
Verbenone	7.09	1202	tr	9.46	1636	0.18
Dimethylbenzofuran isomer I	7.15	1206	0.01			
Unknown [m/z 148, 105 (70), 133 (36), 119 (35), 91 (22), 77 (16)]	7.41	1223	0.01			
Carvone	7.68	1241	0.01	9.86	1669	0.03
Bornyl acetate	8.27	1281	0.01	8.11*	1530	0.40
δ-Elemene isomer	8.99	1330	0.02	6.68*	1423	0.04
δ-Elemene	9.02	1333	1.01	6.85	1436	1.00
Limonene *trans*-glycol	9.19	1344	0.05	15.77	2216	0.05
α-Cubebene	9.26	1349	0.01	6.68*	1423	[0.04]
α-Ylangene	9.47	1364	0.02	6.91	1440	0.04
α-Copaene	9.53	1369	0.12	7.04	1450	0.12
β-Bourbonene	9.64	1376	0.30	7.37	1474	0.33
cis-β-Elemene	9.68*	1379	0.10	8.18	1535	0.10
1,5-diepi-β-Bourbonene	9.68*	1379	[0.10]	7.26	1466	0.03
β-Cubebene	9.75	1384	0.02	7.62	1493	0.01
β-Elemene	9.81	1388	3.89	8.33*	1547	4.33
α-Gurjunene	9.99	1401	0.02	7.50	1484	0.02
β-Caryophyllene	10.11*	1410	0.46	8.33*	1547	[4.33]
β-Ylangene	10.11*	1410	[0.46]	8.04	1524	0.10
α-Santalene	10.17*	1414	0.33	8.11*	1530	[0.40]
cis-α-Bergamotene	10.17*	1414	[0.33]	8.11*	1530	[0.40]
β-Copaene	10.29	1423	0.04	8.24	1540	0.09
γ-Elemene	10.36	1428	0.77	8.91	1592	0.78
trans-α-Bergamotene	10.39	1431	0.11	8.33*	1547	[4.33]
Isogermacrene D	10.46	1435	0.07	8.87*	1589	0.14
6,9-Guaiadiene	10.49	1438	0.01	8.50	1560	0.02
Unknown [m/z 93, 107 (85), 105 (82),	10.54	1442	0.06	10.03	1683	0.05

189 (79), 91 (69), 81 (68), 79 (60), 161 (55)... 204 (31)]						
α-Humulene	10.57	1444	0.21	9.15	1611	0.23
Rotundene	10.66	1450	0.05	8.74	1579	0.06
allo-Aromadendrene	10.70	1453	0.04	8.87*	1589	[0.14]
4,5-diepi-Aristolochene	10.84	1464	0.05	9.24	1619	0.07
trans-Cadina-1(6),4-diene	10.88	1466	0.05	9.12	1608	0.03
γ-Muurolene	10.92*†	1470	0.26	9.44	1634	0.03
Selina-4,11-diene	10.92*†	1470	[0.26]	9.30	1623	0.16
Germacrene D	10.95	1472	0.93	9.65*	1652	[1.03]
β-Selinene	11.01	1476	0.56	9.74	1659	0.57
δ-Selinene	11.10	1483	0.07	9.53	1642	0.07
α-Selinene	11.14*	1486	0.62	9.81*	1665	0.65
Bicyclogermacrene	11.14*	1486	[0.62]	9.91	1673	0.12
Curzerene	11.26	1495	22.08	11.59	1815	22.55
Germacrene A	11.27	1496	0.12	10.26*	1702	0.50
ε-Amorphene	11.32*	1500	0.40	9.81*	1665	[0.65]
δ-Amorphene	11.32*	1500	[0.40]	9.77	1662	0.04
γ-Cadinene	11.41	1507	0.41	10.26*	1702	[0.50]
(*Z*)-γ-Bisabolene	11.45	1510	0.05	9.81*	1665	[0.65]
δ-Cadinene	11.54*	1517	0.31	10.29	1704	0.26
trans-Calamenene	11.54*	1517	[0.31]	11.10	1773	0.02
Selina-4(15),7(11)-diene	11.65	1525	0.14	10.44*	1717	0.24
Selina-4,7(11)-diene?	11.71†	1530	0.22	10.39	1713	0.05
Selina-3,7(11)-diene	11.73†	1532	[0.22]	10.44*	1717	[0.24]
Germacrene B	11.92*	1547	2.76	10.99	1764	2.57
α-Elemol	11.92*	1547	[2.76]	13.84*	2022	0.23
1,5-Epoxysalvial-4(14)-ene	12.04	1556	0.04	11.96	1849	0.06
Furanoeudesma-1,4-diene	12.21	1569	0.50	13.37	1978	0.48
Caryophyllene oxide	12.23	1571	0.05	12.60	1906	0.02
Viridiflorol	12.38	1582	0.06	13.84*	2022	[0.23]
Unknown [m/z 43, 119 (94), 93 (68), 105 (64), 91 (60), 162 (59), 147 (59)... 220 (9)]	12.46	1589	0.10	13.96	2035	0.07
β-Elemenone	12.58	1598	0.64	13.92	2030	0.45
Furanoeudesma-1,3-diene	12.88	1622	24.95	14.15†	2053	33.62
Lindestrene	12.94	1627	8.18	14.18†	2056	[33.62]
τ-Muurolol	13.03*	1635	1.19	14.87	2124	0.33
τ-Cadinol	13.03*	1635	[1.19]	14.74*	2111	4.97
β-Eudesmol	13.11	1642	0.16	15.24	2162	0.16
α-Eudesmol	13.16*	1646	0.78	15.17	2155	0.19
Furanodiene	13.16*	1646	[0.78]	14.07	2045	0.62
Atractylone?	13.22	1651	0.77			

Unknown [m/z 43, 93 (76), 161 (76), 121 (51), 107 (51), 81 (38), 105 (37)...]	13.37	1663	0.21			
α-Elemyl acetate	13.50	1673	1.28	13.43	1984	1.22
Unknown [m/z 108, 216 (29), 93 (26), 109 (21), 91 (21)]	13.61†	1683	5.95	14.74*	2111	[4.97]
Germacrone	13.63†	1685	[5.95]	15.09	2147	0.85
Juniper camphor	13.69	1689	0.21	15.89	2228	0.19
Unknown [m/z 93, 81 (90), 95 (86), 91 (83), 41 (83), 107 (81)... 220 (29), 238? (4)]	13.91	1708	0.05	16.99	2347	0.03
Aromadendrane-4,10-diol	13.96	1712	0.22	16.65	2309	0.29
2-Methoxyfuranodiene	14.00	1716	3.99	15.36	2174	4.03
Oplopanone	14.15	1728	0.05	17.85	2443	0.05
Benzyl benzoate	14.49	1758	0.17	18.58	2527	0.26
Unknown [m/z 161, 189 (92), 204 (80), 43 (35), 133 (31), 105 (29)...]	14.64	1772	0.03	14.44	2081	0.08
Unknown [m/z 161, 189 (59), 204 (54), 43 (50), 107 (28), 149 (24), 122 (24)...]	14.70	1776	0.15	14.81	2118	0.26
Unknown [m/z 161, 43 (96), 204 (71), 189 (53), 105 (34), 133 (32), 91 (29)...]	14.73	1779	0.14	14.68	2105	0.10
Isofuranodienone	14.86	1790	0.23			
Cryptomeridiol	15.02	1804	0.17	19.57	2646	0.07
Unknown [m/z 108, 109 (74), 106 (58), 148 (48), 43 (42), 91 (40), 105 (29), 230 (26)... 274 (13)]	15.28	1828	0.94			
2-Acetoxyfuranodiene?	15.90	1884	1.90			
Myrrhanolide C?	15.92	1886	0.12	18.68	2538	0.27
Unknown [m/z 197, 108 (83), 212 (50), 43 (42), 169 (38), 183 (31), 155 (30), 79 (26), 105 (26)]	16.76	1965	0.31	19.84	2680	0.30
Serratol	18.50	2137	0.02	19.39	2623	0.09
Total identified		**82.72%**			**85.84%**	
Total reported		**90.67%**			**86.73%**	

*: 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

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