

Date : July 17, 2020

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 20G16-PTH16


Customer identification : Cedarwood Atlas - Moroco - C61104201R

Type : Essential oil

Source : *Cedrus atlantica*

Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014  - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Fanny Charlier, B. Sc., chimiste à l'entraînement

Analysis date : July 16, 2020

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

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PHYSICOCHEMICAL DATA

Physical aspect: Dakr orange liquid

Refractive index: 1.5733 ± 0.0003 (20 °C; method PC-MAT-016)

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
Mesityl oxide	0.37	Aliphatic ketone
α -Pinene	0.03	Monoterpene
Camphene	0.01	Monoterpene
para-Cymene	0.02	Monoterpene
Limonene	0.04	Monoterpene
para-Cymenene	0.06	Monoterpene
Linalool	0.05	Monoterpenic alcohol
Phenylethyl alcohol	0.01	Simple phenolic
Limona ketone	2.75	Normonoterpenic ketone
α ,4-Dimethyl-3-cyclohexene-1-methanol	0.06	Normonoterpenic alcohol
α ,4-Dimethyl-3-cyclohexene-1-methanol epimer	0.06	Normonoterpenic alcohol
4-Methylacetophenone	0.21	Simple phenolic
α -Terpineol	0.03	Monoterpenic alcohol
α -Longipinene	0.06	Sesquiterpene
Longicyclene	0.04	Sesquiterpene
α -Ylangene	0.03	Sesquiterpene
Unknown	0.34	Sesquiterpene
Unknown	0.15	Sesquiterpene
Sativene	0.03	Sesquiterpene
Sibirene	0.41	Sesquiterpene
Longifolene	0.07	Sesquiterpene
(Z?)-Vestitenone, or analog	0.51	Terpenic ketone
β -Caryophyllene	0.10	Sesquiterpene
Himachala-2,4-diene	0.27	Sesquiterpene
Unknown	0.89	Sesquiterpene
Unknown	0.98	Sesquiterpene
α -Himachalene	9.86	Sesquiterpene
(E)-Vestitenone	2.95	Terpenic ketone
Unknown	0.16	Sesquiterpene
(E)- β -Farnesene	0.14	Sesquiterpene
Unknown	0.82	Sesquiterpene
γ -Himachalene	6.06	Sesquiterpene
11- α H-Himachala-1,4-diene	1.65	Sesquiterpene
Unknown	0.19	Sesquiterpenic ether
β -Himachalene	27.63	Sesquiterpene
α -Muurolene	0.10	Sesquiterpene
Cycloisolongifol-5-ol	0.15	Sesquiterpenic alcohol
α -Dehydro-ar-himachalene	0.47	Sesquiterpene
γ -Cadinene	0.05	Sesquiterpene
δ -Cadinene	0.05	Sesquiterpene
<i>trans</i> -Calamenene	0.05	Sesquiterpene
γ -Dehydro-ar-himachalene	0.67	Sesquiterpene
Unknown	0.47	Sesquiterpene
10-epi-Cubebol?	0.07	Sesquiterpenic alcohol

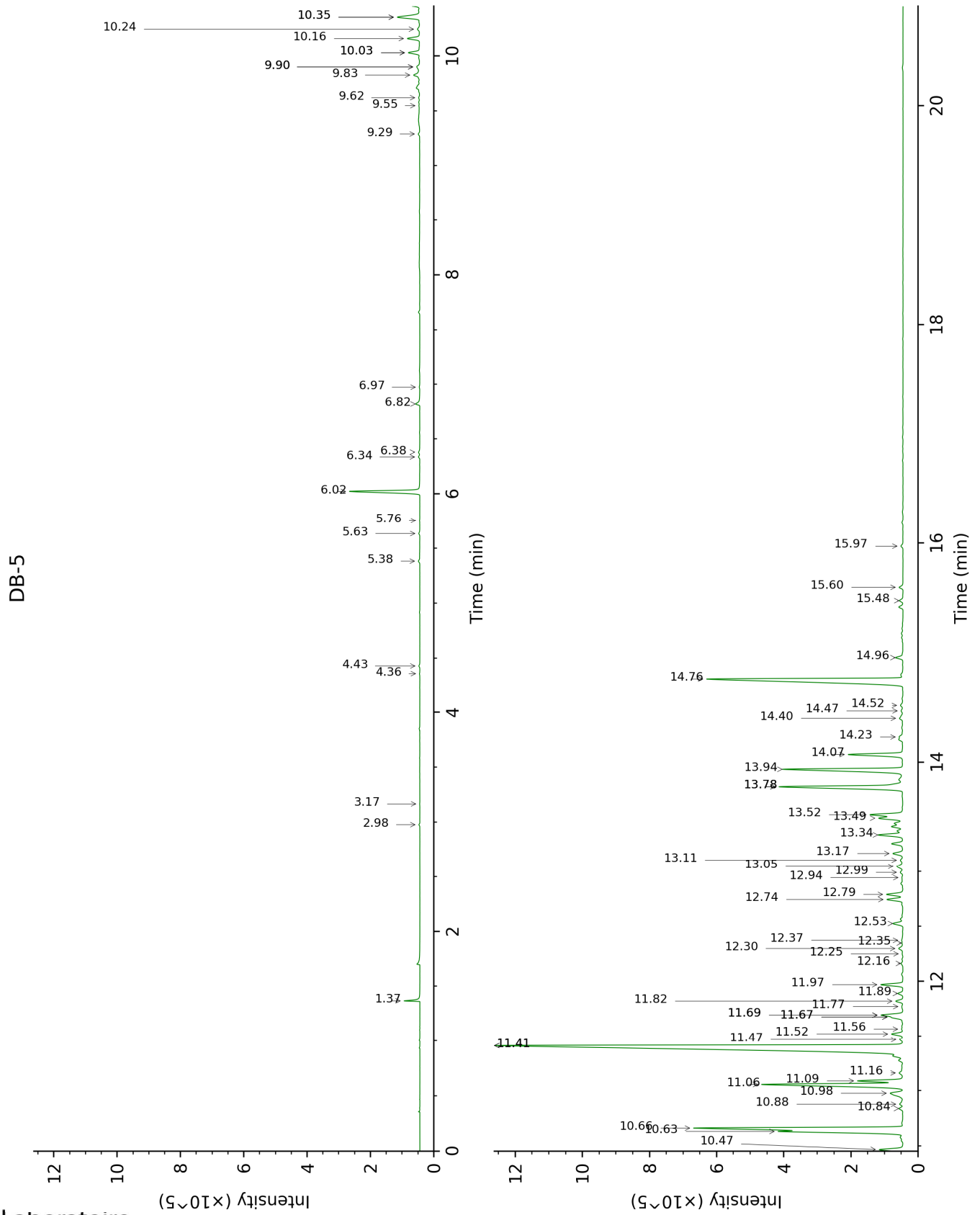
ar-Himachalene	0.29	Sesquiterpene
α -Calacorene	0.20	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.85	Sesquiterpene
Unknown	0.08	Oxygenated sesquiterpene
(<i>E</i>)-Nerolidol	0.04	Sesquiterpenic alcohol
Unknown	0.21	Unknown
Himachalene epoxide	0.03	Sesquiterpenic ether
Unknown	0.08	Oxygenated sesquiterpene
Longiborneol	0.44	Sesquiterpenic alcohol
β -Himachalene oxide	0.67	Sesquiterpenic ether
Unknown	0.68	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
1-epi-Cubenol	0.12	Sesquiterpenic alcohol
Unknown	0.36	Oxygenated sesquiterpene
Unknown	0.13	Oxygenated sesquiterpene
Himachalol	0.47	Sesquiterpenic alcohol
Allohimachalol	1.05	Sesquiterpenic alcohol
β -Atlantone	1.13	Sesquiterpenic ketone
(<i>E</i>)-10,11-Dihydroatlantone	1.20	Sesquiterpenic ketone
Deodarone epimer I	0.40	Sesquiterpenic ketone
(<i>Z</i>)- γ -Atlantone	4.38	Sesquiterpenic ketone
(<i>E</i>)- γ -Atlantone	5.41	Sesquiterpenic ketone
(<i>Z</i>)- α -Atlantone	2.28	Sesquiterpenic ketone
Unknown	0.19	Oxygenated sesquiterpene
Unknown	0.23	Oxygenated sesquiterpene
Unknown	0.10	Oxygenated sesquiterpene
Unknown	0.13	Oxygenated sesquiterpene
(<i>E</i>)- α -Atlantone	11.67	Sesquiterpenic ketone
Unknown	0.31	Oxygenated sesquiterpene
Unknown	0.16	Oxygenated sesquiterpene
Unknown	0.17	Oxygenated sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Consolidated total	92.68%	

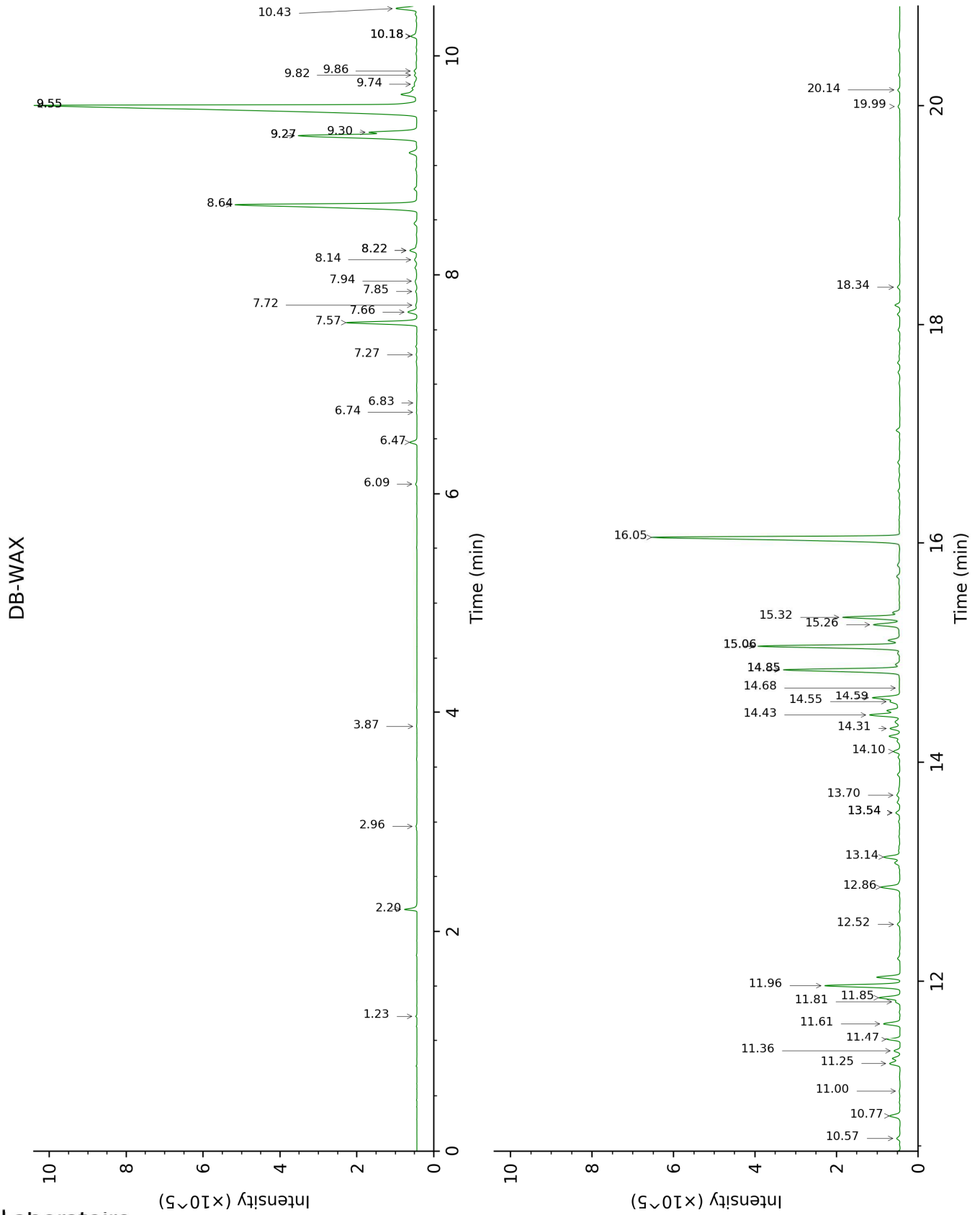
Note: no correction factor was applied

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.

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





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Mesityl oxide	1.37	801	0.37	2.20	1094	0.39
α -Pinene	2.98	930	0.03	1.23	989	0.03
Camphene	3.17	943	0.01			
para-Cymene	4.36	1020	0.02	3.87	1228	0.02
Limonene	4.43	1025	0.04	2.96	1157	0.04
para-Cymenene	5.38	1085	0.06	6.09	1385	0.06
Linalool	5.64	1100	0.05	7.85	1517	0.05
Phenylethyl alcohol	5.76	1108	0.01	11.81	1845	0.17
Limona ketone	6.02	1126	2.75	7.57	1495	2.81
α ,4-Dimethyl-3-cyclohexene-1-methanol	6.34	1146	0.06			
α ,4-Dimethyl-3-cyclohexene-1-methanol epimer	6.38	1149	0.06			
4-Methylacetophenone	6.82	1177	0.21	10.18*	1704	0.32
α -Terpineol	6.97	1187	0.03	9.55*†	1652	28.47
α -Longipinene	9.29	1342	0.06	6.47	1413	0.27
Longicyclene	9.55	1360	0.04	6.83	1440	0.01
α -Ylangene	9.62	1366	0.03	6.74	1433	0.02
Unknown epimer I [m/z 131, 146 (36), 91 (22), 145 (19), 202 (18)]	9.83	1380	0.34	7.94	1524	0.14
Unknown epimer II [m/z 131, 146 (33), 91 (20), 202 (18)]	9.90*	1385	0.18	8.14	1539	0.15
Sativene	9.90*	1385	[0.18]	7.27	1472	0.03
Sibirene	10.03*	1395	0.49	7.66	1502	0.41
Longifolene	10.03*	1395	[0.49]	7.72	1507	0.07
(Z?)-Vestitenone, or analog	10.16	1404	0.51	11.47	1814	0.50
β -Caryophyllene	10.24	1410	0.10	8.22*	1546	0.37
Himachala-2,4-diene	10.35*	1418	1.16	8.22*	1546	[0.37]
Unknown [m/z 91, 93 (90), 105 (72), 202 (71), 131 (68), 77 (63), 107 (55), 187 (54)]	10.35*	1418	[1.16]			
Unknown [m/z 105, 91 (70), 93 (65), 43 (61), 120 (57), 145 (50)... 204 (6)]	10.47	1427	0.98			
α -Himachalene	10.63†	1439	12.73	8.64	1578	9.86
(E)-Vestitenone	10.66†	1442	[12.73]	11.96	1858	2.95
Unknown [m/z 187, 131 (78), 202 (76), 105 (74), 91 (74), 117	10.84	1455	0.16	9.74	1668	0.16

(53), 145 (52)]						
(E)-β-Farnesene	10.88	1458	0.14	9.27*	1629	6.20
Unknown [m/z 131, 202 (78), 91 (74), 105 (68), 187 (68), 119 (53), 145 (52)]	10.98	1465	0.82			
γ-Himachalene	11.06†	1471	7.85	9.27*	1629	[6.20]
11-αH-Himachala-1,4-diene	11.09†	1473	[7.85]	9.30	1632	1.65
Unknown [m/z 137, 43 (84), 138 (63), 109 (53), 95 (51), 93 (50), 207 (46)... 222 (21)]	11.16	1479	0.19	9.86	1677	0.12
β-Himachalene	11.41*†	1497	27.89	9.55*†	1652	[28.47]
α-Muurolene	11.41*†	1497	[27.89]	9.82	1674	0.10
Cycloisolongifol-5-ol	11.47†	1501	[27.89]	10.57	1737	0.15
α-Dehydro-arhimachalene	11.52	1506	0.47	11.25	1794	0.50
γ-Cadinene	11.56	1509	0.05	10.18*	1704	[0.32]
δ-Cadinene	11.67*†	1518	1.28	10.18*	1704	[0.32]
trans-Calamenene	11.67*†	1518	[1.28]	11.00	1773	0.05
γ-Dehydro-arhimachalene	11.69*†	1519	[1.28]	11.61	1827	0.67
Unknown [m/z 131, 202 (28), 91 (22), 159 (16), 145 (16), 132 (15), 115 (14)]	11.69*†	1519	[1.28]	10.77	1754	0.47
10-epi-Cubebol?	11.77	1525	0.07	13.54*	2003	0.17
ar-Himachalene	11.82	1529	0.29	11.36	1805	0.23
α-Calacorene	11.89	1535	0.20	11.85	1848	0.86
(E)-α-Bisabolene	11.97	1541	0.85	10.43	1725	0.85
Unknown [m/z 189, 91 (85), 43 (74), 105 (67), 133 (66), 107 (63), 135 (52)... 220 (20)]	12.16	1556	0.08	13.70	2018	0.17
(E)-Nerolidol	12.25	1563	0.04	13.54*	2003	[0.17]
Unknown [m/z 96, 95 (18), 83 (15), 125 (13), 119 (12), 55 (12), 41 (11)... 218? (tr)]	12.30	1567	0.21	14.55	2101	0.45
Himachalene epoxide	12.35	1571	0.03	12.52	1908	0.11
Unknown [m/z 177, 202 (79), 91 (76), 159 (75), 43 (65), 107 (59), 105 (57)...]	12.37	1573	0.08	14.10	2057	0.26
Longiborneol	12.53	1585	0.44	14.31	2077	0.39
β-Himachalene oxide	12.74	1602	0.67	12.86	1939	0.87
Unknown [m/z 138, 110 (77), 137 (75), 107 (62), 91 (61), 93	12.79	1606	0.68	13.14	1965	0.69

(60), 109 (57)... 220 (34] Unknown [m/z 137, 119 (69), 43 (51), 95 (50), 109 (40)... 222 (1)]	12.94	1618	0.05	14.68	2114	0.03
1-epi-Cubenol	12.99	1622	0.12	13.54*	2003	[0.17]
Unknown [m/z 119, 163 (80), 107 (64), 95 (61), 93 (57), 91 (53)... 220 (11)]	13.05	1627	0.36			
Unknown [m/z 119, 91 (44), 94 (36), 107 (35), 93 (29)... 202 (19)...]	13.11	1632	0.13			
Himachalol	13.17	1637	0.47	14.85*	2131	4.84
Allohimachalol	13.34	1651	1.05	15.26	2172	1.12
β -Atlantone	13.49†	1664	2.41	14.59	2104	1.13
(E)-10,11-Dihydroatlantone	13.52†	1666	[2.41]	14.43	2089	1.20
Deodarone epimer I	13.78*	1687	5.92	15.06*	2152	5.81
(Z)- γ -Atlantone	13.78*	1687	[5.92]	14.85*	2131	[4.84]
(E)- γ -Atlantone	13.94	1700	5.41	15.06*	2152	[5.81]
(Z)- α -Atlantone	14.07	1712	2.28	15.32	2178	2.19
Unknown [m/z 105, 119 (89), 59 (68), 120 (65), 43 (65), 93 (62), 121 (61)...]	14.23	1726	0.19			
Unknown [m/z 83, 91 (28), 105 (25), 55 (21), 43 (17), 119 (17)...]	14.40	1741	0.23			
Unknown [m/z 43, 105 (99), 119 (90), 91 (87), 147 (76), 41 (69), 93 (63)...]	14.47	1746	0.10			
Unknown [m/z 83, 55 (17), 91 (14), 105 (9), 216 (6)...]	14.52	1751	0.13			
(E)- α -Atlantone	14.76	1772	11.67	16.05	2254	11.76
Unknown [m/z 95, 43 (59), 69, (57), 67 (43), 163 (42), 94 (37), 107 (37)... 178 (26), 218 (2)]	14.96	1789	0.31			
Unknown [m/z 83, 134 (28), 119 (19), 55 (18), 91 (14), 43 (11), 109 (10)... 216 (4), 249? (0)]	15.48	1836	0.16	19.99	2698	0.09
Unknown [m/z 83, 134 (30), 119 (19), 55 (18), 91 (12)... 216	15.60	1847	0.17	20.14	2717	0.09

(4)...] Unknown [m/z 173, 83 (83), 91 (80), 201 (79), 115 (65)... 216 (31)]	15.97	1881	0.09	18.34	2504	0.11
Total identified	88.57%			87.71%		
Total reported	94.01%			90.63%		

*: 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

Note: no correction factor was applied

R.T.: Retention time (minutes)

R.I.: Retention index