

Date : September 10, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 21H27-PTH09

Customer identification : Cedarwood Himalayan - India - C50109121R

Type : Essential oil

Source : *Cedrus deodara*

Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014  - 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 : August 31, 2021

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Yellow viscous liquid

Refractive index: 1.5144 ± 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	0.02	Aliphatic ketone
α -Pinene	0.07	Monoterpene
Camphene	0.01	Monoterpene
β -Pinene	0.02	Monoterpene
3-Methylpentyl acetate	tr	Aliphatic ester
3-Methyl-3-cyclohexenone	tr	Aliphatic ketone
Limonene	0.03	Monoterpene
para-Cresol	tr	Simple phenolic
Terpinolene	0.01	Monoterpene
para-Cymenene	0.01	Monoterpene
α -Thujone	tr	Monoterpenic ketone
Unknown	0.01	Oxygenated monoterpene
endo-Fenchol	0.02	Monoterpenic alcohol
Limona ketone	0.69	Normonoterpenic ketone
$\alpha,4$ -Dimethyl-3-cyclohexene-1-methanol	0.05	Normonoterpenic alcohol
$\alpha,4$ -Dimethyl-3-cyclohexene-1-methanol epimer	0.04	Normonoterpenic alcohol
Borneol	0.02	Monoterpenic alcohol
4-Methylacetophenone	0.13	Simple phenolic
α -Terpineol	0.06	Monoterpenic alcohol
Unknown	0.01	Unknown
α -Longipinene	0.09	Sesquiterpene
Longicyclene	0.01	Sesquiterpene
α -Ylangene	0.06	Sesquiterpene
Unknown	0.02	Terpene derivative
Unknown	0.01	Terpene derivative
Unknown	0.11	Sesquiterpene
(3Z)-Hexenyl (3Z)-hexenoate	0.13	Aliphatic ester
Sativene	0.05	Sesquiterpene
Unknown	0.20	Sesquiterpene
Longifolene	0.02	Sesquiterpene
Sibirene	0.53	Sesquiterpene
α -Cedrene	0.01	Sesquiterpene
(Z?)-Vestitenone, or analog	0.19	Terpenic ketone
Unknown	0.03	Unknown
Unknown	0.22	Sesquiterpene
Himachala-2,4-diene	0.41	Sesquiterpene
Unknown	0.39	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.15	Sesquiterpene
Himachala-2,4-diene isomer	0.14	Sesquiterpene
α -Himachalene	13.46	Sesquiterpene
(E)-Vestitenone	0.75	Terpenic ketone
Unknown	0.20	Sesquiterpene
(E)- β -Farnesene	0.35	Sesquiterpene
Unknown	0.36	Sesquiterpene

Unknown	0.47	Sesquiterpene
γ -Himachalene	8.12	Sesquiterpene
11- α H-Himachala-1,4-diene	1.63	Sesquiterpene
Unknown	0.19	Sesquiterpenic ether
α -Muurolene	0.10	Sesquiterpene
β -Himachalene	34.00	Sesquiterpene
(Z)- α -Bisabolene	0.11	Sesquiterpene
Cycloisolongifol-5-ol	0.11	Sesquiterpenic alcohol
Unknown	0.10	Sesquiterpene
α -Dehydro-ar-himachalene	0.55	Sesquiterpene
<i>trans</i> -Calamenene	0.02	Sesquiterpene
γ -Dehydro-ar-himachalene	0.60	Sesquiterpene
δ -Cadinene	0.05	Sesquiterpene
Unknown	0.57	Sesquiterpene
Unknown	0.04	Sesquiterpene
ar-Himachalene	0.26	Sesquiterpene
α -Calacorene	0.14	Sesquiterpene
(E)- α -Bisabolene	1.10	Sesquiterpene
Unknown	0.11	Oxygenated sesquiterpene
(E)-Nerolidol	0.11	Sesquiterpenic alcohol
Unknown	0.20	Unknown
Himachalene epoxide	0.31	Sesquiterpenic ether
Unknown	0.04	Oxygenated sesquiterpene
Longiborneol	0.38	Sesquiterpenic alcohol
β -Himachalene oxide	0.32	Sesquiterpenic ether
Unknown	0.69	Oxygenated sesquiterpene
Unknown	0.23	Oxygenated sesquiterpene
1-epi-Cubenol	0.08	Sesquiterpenic alcohol
6-Methyl-6-meta-tolyl-heptan-2-one	0.12	Miscellaneous
Unknown	0.37	Oxygenated sesquiterpene
Himachalol	1.10	Sesquiterpenic alcohol
Unknown	0.19	Oxygenated sesquiterpene
Allohimachalol	0.94	Sesquiterpenic alcohol
β -Atlantone	0.67	Sesquiterpenic ketone
(E)-10,11-Dihydroatlantone	0.73	Sesquiterpenic ketone
Deodarone epimer I	0.63	Sesquiterpenic ketone
Deodarone epimer II	0.75	Sesquiterpenic ketone
(Z)- γ -Atlantone	4.00	Sesquiterpenic ketone
(E)- γ -Atlantone	4.28	Sesquiterpenic ketone
(Z)- α -Atlantone	2.41	Sesquiterpenic ketone
Unknown	0.24	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.16	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
(E)- α -Atlantone	9.96	Sesquiterpenic ketone
Unknown	0.22	Oxygenated sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Unknown	0.10	Oxygenated sesquiterpene
Unknown	0.06	Oxygenated sesquiterpene
Consolidated total	96.88%	

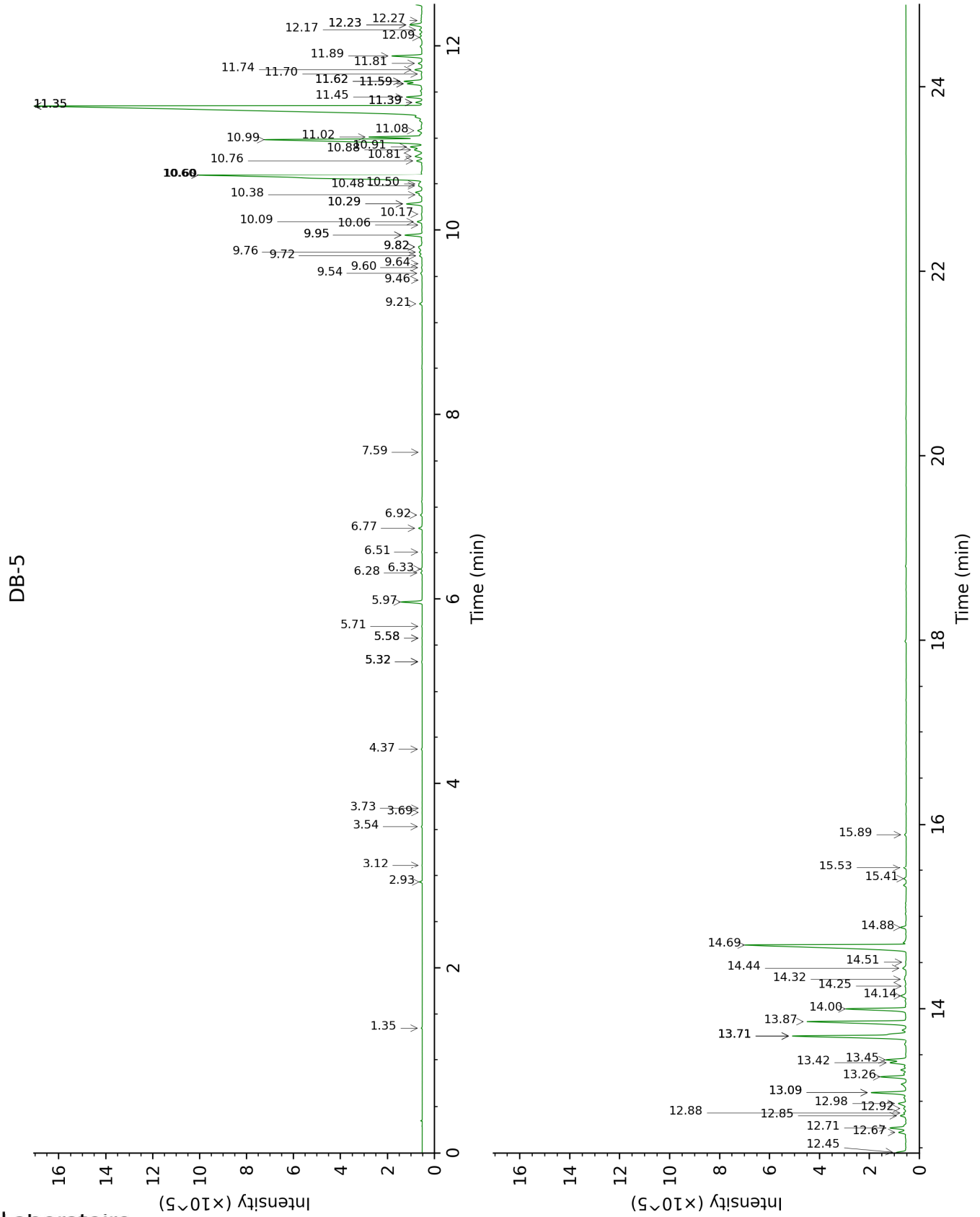
tr: The compound has been detected below 0.005% of total signal.

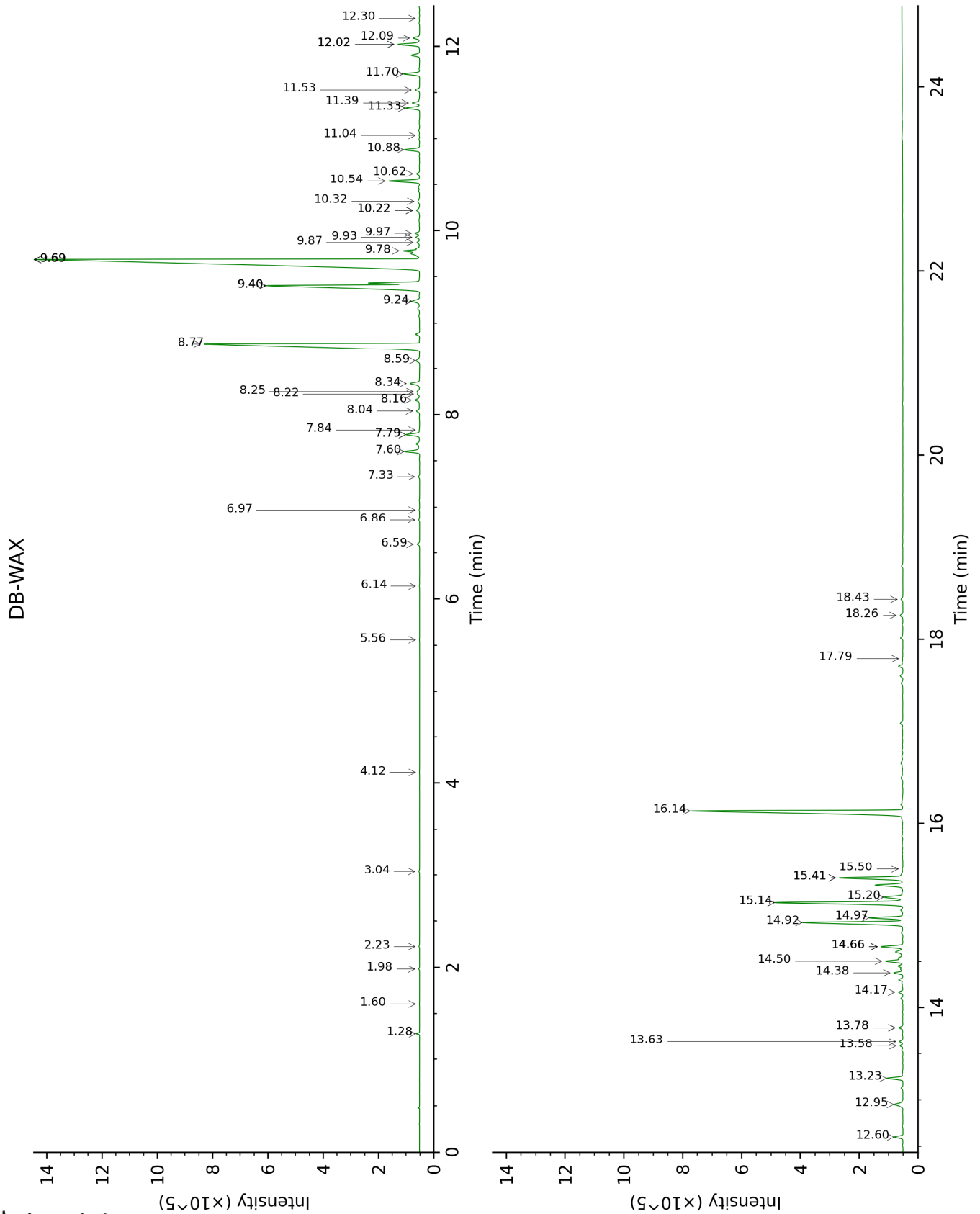
Note: no correction factor was applied

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.

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	1.35	799	0.02	2.23	1089	0.02
α -Pinene	2.93	930	0.07	1.28	990	0.07
Camphene	3.12	943	0.01	1.60	1026	0.01
β -Pinene	3.54	971	0.02	1.98	1064	0.02
3-Methylpentyl acetate	3.69	982	tr			
3-Methyl-3-cyclohexenone	3.73	984	tr			
Limonene	4.37	1026	0.03	3.04	1156	0.03
para-Cresol	5.32*	1086	0.02	13.78*	2018	0.15
Terpinolene	5.32*	1086	[0.02]	4.12	1240	0.01
para-Cymenene	5.32*	1086	[0.02]	6.14	1384	0.01
α -Thujone	5.58*	1102	0.01			
Unknown [m/z 95, 150 (45), 110 (35), 107 (23), 109 (21)]	5.58*	1102	[0.01]	5.56	1342	0.01
endo-Fenchol	5.71	1111	0.02	8.25	1543	0.11
Limona ketone	5.97	1128	0.69	7.60	1492	0.61
α ,4-Dimethyl-3-cyclohexene-1-methanol	6.28	1148	0.05			
α ,4-Dimethyl-3-cyclohexene-1-methanol epimer	6.32	1150	0.04			
Borneol	6.51	1162	0.02	9.69*	1657	34.07
4-Methylacetophenone	6.77	1179	0.13	10.32	1709	0.11
α -Terpineol	6.92	1188	0.06	9.69*	1657	[34.07]
Unknown [m/z 105, 145 (97), 160 (86), 119 (76), 91 (61)]	7.59	1233	0.01			
α -Longipinene	9.21	1343	0.09	6.59	1417	0.09
Longicyclene	9.46	1362	0.01	6.97	1445	0.02
α -Ylangene	9.54	1367	0.06	6.86	1437	0.03
Unknown [m/z 105, 120 (38), 145 (37), 121 (34), 93 (28), 91 (26)...]	9.60	1371	0.02			
Unknown [m/z 119, 161 (36), 43 (33), 176 (26), 91 (24), 105 (22)]	9.64	1374	0.01	12.30	1881	0.02
Unknown epimer I [m/z 131, 146 (36), 91 (22), 145 (19), 202 (18)]	9.72	1380	0.11	8.04	1526	0.14
(3Z)-Hexenyl (3Z)-hexenoate	9.76	1383	0.13	9.93	1677	0.15
Sativene	9.82*	1387	0.24	7.33	1472	0.05

Unknown epimer II [m/z 131, 146 (33), 91 (20), 202 (18)]	9.82*	1387	[0.24]	8.16	1536	0.20
Longifolene	9.95*	1396	0.61	7.84	1510	0.02
Sibirene	9.95*	1396	[0.61]	7.79*	1506	0.55
α -Cedrene	10.06	1404	0.01	7.79*	1506	[0.55]
(Z)-Vestitenone, or analog	10.09	1406	0.19	11.53	1812	0.18
Unknown [m/z 105, 93 (61), 120 (55), 145 (54), 91 (52)...]	10.17	1412	0.03	12.09	1862	0.26
Unknown [m/z 91, 93 (90), 105 (72), 202 (71), 131 (68), 77 (63), 107 (55), 187 (54)]	10.29*	1421	0.62			
Himachala-2,4-diene	10.29*	1421	[0.62]	8.34	1550	0.41
Unknown [m/z 105, 91 (70), 93 (65), 43 (61), 120 (57), 145 (50)... 204 (6)]	10.38	1428	0.39			
<i>trans</i> - α -Bergamotene	10.48	1435	0.15	8.22	1541	0.08
Himachala-2,4-diene isomer	10.50	1437	0.14	8.59	1569	0.19
α -Himachalene	10.60*	1444	14.39	8.77	1583	13.46
(E)-Vestitenone	10.60*	1444	[14.39]	12.02*	1856	0.90
Unknown [m/z 187, 131 (78), 202 (76), 105 (74), 91 (74), 117 (53), 145 (52)]	10.76	1456	0.20	9.78	1665	0.54
(E)- β -Farnesene	10.81	1460	0.35	9.40*†	1634	9.86
Unknown [m/z 119, 91 (85), 93 (77), 105 (76), 79 (61), 134 (60), 94 (49), 204 (46)]	10.88	1465	0.36	9.24	1620	0.35
Unknown [m/z 131, 202 (78), 91 (74), 105 (68), 187 (68), 119 (53), 145 (52)]	10.91	1467	0.47			
γ -Himachalene	10.99	1473	8.12	9.40*†	1634	[9.86]
11- α H-Himachala- 1,4-diene	11.02	1475	1.63	9.40*†	1634	[9.86]
Unknown [m/z 137, 43 (84), 138 (63), 109 (53), 95 (51), 93 (50), 207 (46)... 222 (21)]	11.08	1480	0.19	9.97	1680	0.16
α -Muurolene	11.35*	1500	33.94	9.87	1672	0.10
β -Himachalene	11.35*	1500	[33.94]	9.69*	1657	[34.07]
(Z)- α -Bisabolene	11.35*	1500	[33.94]	10.22*	1700	0.17
Cycloisolongifol-5-ol	11.39*	1503	0.22	10.62	1735	0.11
Unknown [m/z 105, 119 (89), 91 (69), 159	11.39*	1503	[0.22]			

(62), 131 (42), 93 (41), 202 (38)]						
α -Dehydro-ar-himachalene	11.45	1508	0.55	11.33	1795	0.53
<i>trans</i> -Calamenene	11.59*†	1519	1.24	11.04	1770	0.02
γ -Dehydro-ar-himachalene	11.59*†	1519	[1.24]	11.70	1828	0.60
δ -Cadinene	11.62*†	1521	[1.24]	10.22*	1700	[0.17]
Unknown [m/z 131, 202 (28), 91 (22), 159 (16), 145 (16), 132 (15), 115 (14)]	11.62*†	1521	[1.24]	10.88	1757	0.57
Unknown [m/z 93, 187 (70), 145 (59), 119 (42), 131 (39), 202 (33)]	11.70	1527	0.04			
ar-Himachalene	11.74	1531	0.26	11.39	1800	0.30
α -Calacorene	11.81	1536	0.14	12.02*	1856	[0.90]
(<i>E</i>)- α -Bisabolene	11.89	1542	1.10	10.54	1728	1.10
Unknown [m/z 189, 91 (85), 43 (74), 105 (67), 133 (66), 107 (63), 135 (52)... 220 (20)]	12.09	1558	0.11	13.78*	2018	[0.15]
(<i>E</i>)-Nerolidol	12.17	1565	0.11	13.63	2003	0.13
Unknown [m/z 96, 95 (18), 83 (15), 125 (13), 119 (12), 55 (12), 41 (11)... 218? (tr)]	12.23*	1569	0.50	14.66*†	2103	1.13
Himachalene epoxide	12.23*	1569	[0.50]	12.60	1908	0.31
Unknown [m/z 177, 202 (79), 91 (76), 159 (75), 43 (65), 107 (59), 105 (57)...]	12.27	1572	0.04	14.17	2055	0.17
Longiborneol	12.45	1587	0.38	14.38	2076	0.32
β -Himachalene oxide	12.67	1604	0.32	12.95	1940	0.45
Unknown [m/z 138, 110 (77), 137 (75), 107 (62), 91 (61), 93 (60), 109 (57)... 220 (34)]	12.72	1608	0.69	13.23	1966	0.57
Unknown [m/z 137, 119 (69), 43 (51), 95 (50), 109 (40)... 222 (1)]	12.85	1618	0.23	14.66*†	2103	[1.13]
1-epi-Cubenol	12.88	1621	0.08	13.58	1999	0.10
6-Methyl-6-metatolyl-heptan-2-one	12.92	1625	0.12	15.50	2187	0.03
Unknown [m/z 119, 163 (80), 107 (64), 95	12.98	1629	0.37			

(61), 93 (57), 91 (53)... 220 (11)]						
Himachalol	13.09*	1639	1.29	14.97	2134	1.10
Unknown [m/z 119, 91 (44), 94 (36), 107 (35), 93 (29)... 202 (19)...]	13.09*	1639	[1.29]			
Allohimachalol	13.26	1653	0.94	15.41*†	2178	3.46
β-Atlantone	13.42	1665	0.67	14.66*†	2103	[1.13]
(E)-10,11- Dihydroatlantone	13.45	1668	0.73	14.50	2088	0.83
Deodarone epimer I	13.71*	1690	5.47	15.14*	2151	4.91
Deodarone epimer II	13.71*	1690	[5.47]	15.20	2157	0.75
(Z)-γ-Atlantone	13.71*	1690	[5.47]	14.92	2129	4.00
(E)-γ-Atlantone	13.87	1703	4.28	15.14*	2151	[4.91]
(Z)-α-Atlantone	14.00	1714	2.41	15.41*†	2178	[3.46]
Unknown [m/z 105, 119 (89), 59 (68), 120 (65), 43 (65), 93 (62), 121 (61)...]	14.14	1727	0.24			
Unknown [m/z 91, 79 (83), 105 (68), 109 (63), 41 (590), 93 (58), 107 (57)...]	14.25	1736	0.03	17.79	2431	0.01
Unknown [m/z 83, 91 (28), 105 (25), 55 (21), 43 (17), 119 (17)...]	14.32	1742	0.07			
Unknown [m/z 83, 55 (17), 91 (14), 105 (9), 216 (6)...]	14.44	1753	0.16			
Unknown [m/z 91, 105 (74), 93 (67), 79 (59), 133 (54), 41 (47), 107 (46)...]	14.51	1758	0.02	18.26	2483	0.12
(E)-α-Atlantone	14.69	1774	9.96	16.14	2253	9.95
Unknown [m/z 95, 43 (59), 69, (57), 67 (43), 163 (42), 94 (37), 107 (37)... 178 (26), 218 (2)]	14.88	1791	0.22			
Unknown [m/z 83, 134 (28), 119 (19), 55 (18), 91 (14), 43 (11), 109 (10)... 216 (4), 249? (0)]	15.41	1838	0.09			
Unknown [m/z 83, 134 (30), 119 (19), 55 (18), 91 (12)... 216 (4)...]	15.53	1849	0.10			
Unknown [m/z 173, 83 (83), 91 (80), 201	15.89	1882	0.06	18.43	2503	0.09

(79), 115 (65)... 216 (31)]		
Total identified	92.64%	91.61%
Total reported	96.91%	94.81%

*: 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