

Date : 2025-05-20

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25E05-PTH04

Customer Identification : Organic Atlas Cedarwood - Morocco - C60109R

Type : Essential Oil

Source : *Cedrus atlantica*

Customer : Plant Therapy

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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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

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 : Sylvain Mercier, M. Sc., Chimiste 2014-005

Date : 2025-05-13

PHYSICOCHEMICAL DATA

Refractive index : 1.5123 ± 0.0003 (20 °C)

Method : PC-MAT-016 - Measure of the refractive index of a liquid.

Analyst : Cindy Caron B. Sc.

Date : 2025-05-06

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
Methyl isobutyl ketone	tr	Aliphatic ketone
Toluene	tr	Simple phenolic
Mesityl oxide	0.13	Aliphatic ketone
α -Pinene	0.04	Monoterpene
Camphene	0.01	Monoterpene
3-Methyl-3-cyclohexenone	0.01	Aliphatic ketone
Myrcene	0.01	Monoterpene
1,8-Cineole	0.01	Monoterpenic ether
Limonene	0.02	Monoterpene
Terpinolene	0.01	Monoterpene
<i>para</i> -Cymenene	0.02	Monoterpene
Unknown CEAT III [m/z 85, 56 (50), 43 (50), 125 (36), 140 (35)...]	0.01	Unknown
Phenylethyl alcohol	0.01	Simple phenolic
4-Hydroxy-4-methylcyclohex-2-enone	0.02	Aliphatic alcohol
Limona ketone	0.89	Normonoterpenic ketone
α ,4-Dimethyl-3-cyclohexene-1-methanol	0.08	Normonoterpenic alcohol
α ,4-Dimethyl-3-cyclohexene-1-methanol epimer	0.07	Normonoterpenic alcohol
Borneol	0.02	Monoterpenic alcohol
Terpinen-4-ol	0.01	Monoterpenic alcohol
4-Methylacetophenone	0.13	Simple phenolic
α -Terpineol	0.05	Monoterpenic alcohol
Unknown CEAT V [m/z 121, 91 (58), 136 (45), 77 (40), 43 (40)...]	0.02	Unknown
Unknown	0.02	Unknown
α -Longipinene	0.09	Sesquiterpene
Longicyclene	0.01	Sesquiterpene
α -Ylangene	0.06	Sesquiterpene
α -Copaene	0.03	Sesquiterpene
Unknown	0.01	Terpene derivative
Unknown	0.27	Sesquiterpene
(3Z)-Hexenyl (3Z)-hexenoate	0.16	Aliphatic ester
β -Elemene	0.04	Sesquiterpene
Unknown	0.45	Sesquiterpene
Sativene	0.04	Sesquiterpene
Longifolene	0.55	Sesquiterpene
Sibirene	0.64	Sesquiterpene
(Z?)-Vestitenone, or analog	0.10	Terpenic ketone
α -Cedrene	0.03	Sesquiterpene

Unknown	0.02	Unknown
β -Caryophyllene	0.05	Sesquiterpene
Himachala-2,4-diene	0.52	Sesquiterpene
Unknown	0.04	Sesquiterpene
Unknown	0.14	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.03	Sesquiterpene
Himachala-2,4-diene isomer	0.19	Sesquiterpene
α -Himachalene	15.88	Sesquiterpene
(<i>E</i>)-Vestitenone	0.47	Terpenic ketone
α -Humulene	0.05	Sesquiterpene
Unknown	0.02	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.37	Sesquiterpene
Unknown	0.10	Sesquiterpene
Unknown	0.42	Sesquiterpene
γ -Himachalene	9.98	Sesquiterpene
11- α H-Himachala-1,4-diene	1.60	Sesquiterpene
Unknown	0.37	Sesquiterpenic ether
Unknown	0.46	Sesquiterpene
Cycloisolongifol-5-ol	0.26	Sesquiterpenic alcohol
α -Muurolene	0.05	Sesquiterpene
(<i>Z</i>)- α -Bisabolene	0.02	Sesquiterpene
β -Himachalene	42.30	Sesquiterpene
Unknown	0.40	Sesquiterpene
α -Dehydro-ar-himachalene	1.27	Sesquiterpene
γ -Cadinene	0.03	Sesquiterpene
Unknown CEAT IV [m/z 146, 193 (97), 131 (89), 91 (54), 159 (54)...	0.16	Unknown
<i>trans</i> -Calamenene	0.14	Sesquiterpene
γ -Dehydro-ar-himachalene	1.28	Sesquiterpene
Unknown	1.33	Sesquiterpene
δ -Cadinene	2.16	Sesquiterpene
Unknown	0.21	Sesquiterpene
ar-Himachalene	0.41	Sesquiterpene
α -Calacorene	0.70	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.69	Sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
(<i>E</i>)-Nerolidol	0.02	Sesquiterpenic alcohol
Unknown	0.24	Unknown
Himachalene epoxide	0.37	Sesquiterpenic ether
Unknown	0.03	Oxygenated sesquiterpene
Longiborneol	0.28	Sesquiterpenic alcohol
ar-Dihydroturmerone	0.03	Sesquiterpenic ketone
β -Himachalene oxide	0.28	Sesquiterpenic ether
Unknown	0.72	Oxygenated sesquiterpene
Unknown	0.17	Oxygenated sesquiterpene

1-epi-Cubenol	0.65	Sesquiterpenic alcohol
6-Methyl-6- <i>meta</i> -tolyl-heptan-2-one	0.01	Miscellaneous
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Himachalol	0.45	Sesquiterpenic alcohol
Allohimachalol	0.70	Sesquiterpenic alcohol
β -Atlantone	0.07	Sesquiterpenic ketone
(<i>E</i>)-10,11-Dihydroatlantone	0.12	Sesquiterpenic ketone
Unknown	0.29	Unknown
(<i>Z</i>)- γ -Atlantone	0.78	Sesquiterpenic ketone
Deodarone epimer I	0.81	Sesquiterpenic ketone
Deodarone epimer II	0.64	Sesquiterpenic ketone
(<i>E</i>)- γ -Atlantone	0.86	Sesquiterpenic ketone
(<i>Z</i>)- α -Atlantone	0.64	Sesquiterpenic ketone
Unknown	0.13	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
(<i>E</i>)- α -Atlantone	2.65	Sesquiterpenic ketone
Unknown	0.12	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Consolidated total	97.64	

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

Note: no correction factor was applied

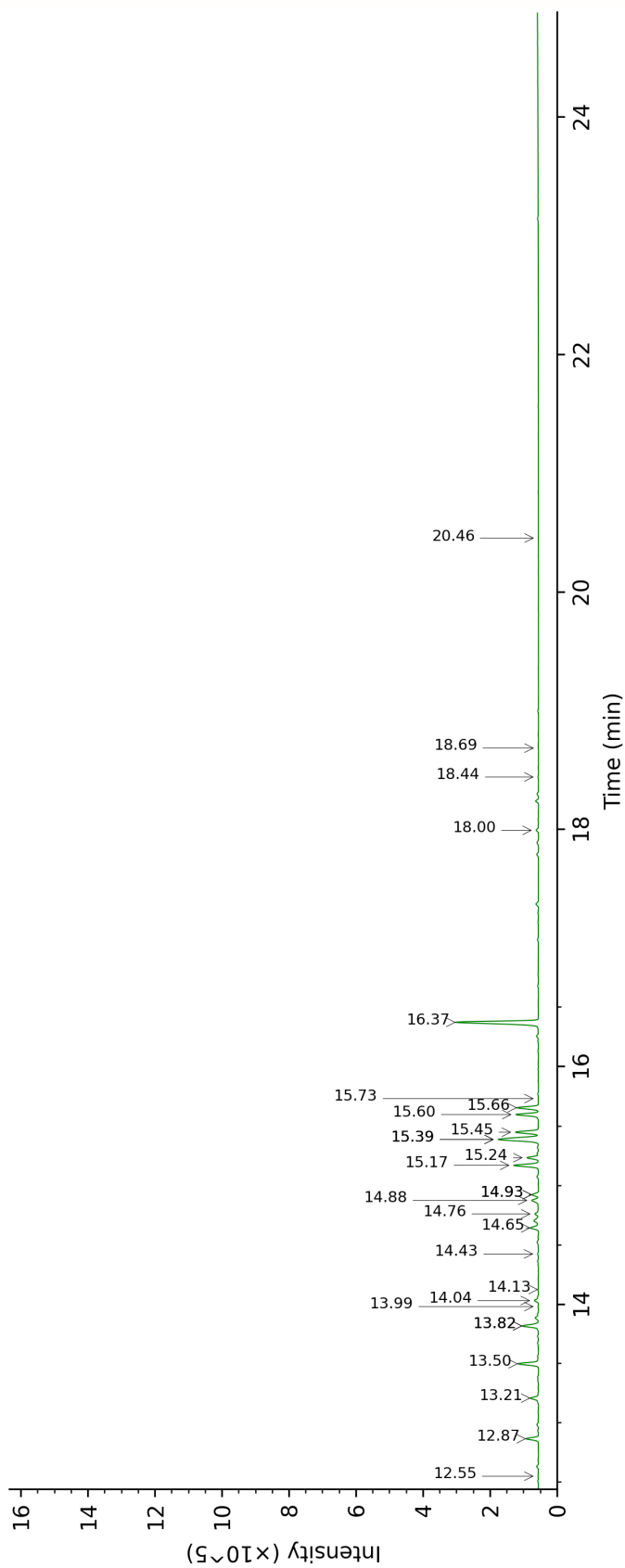
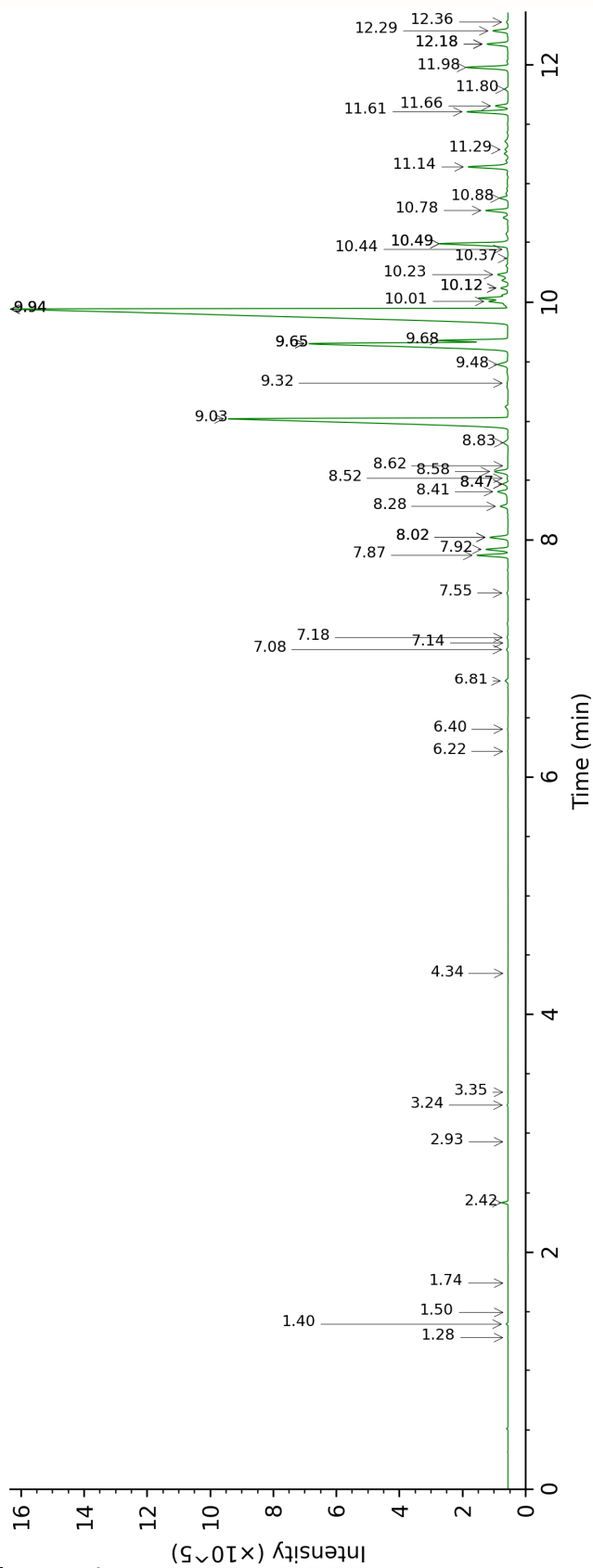
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

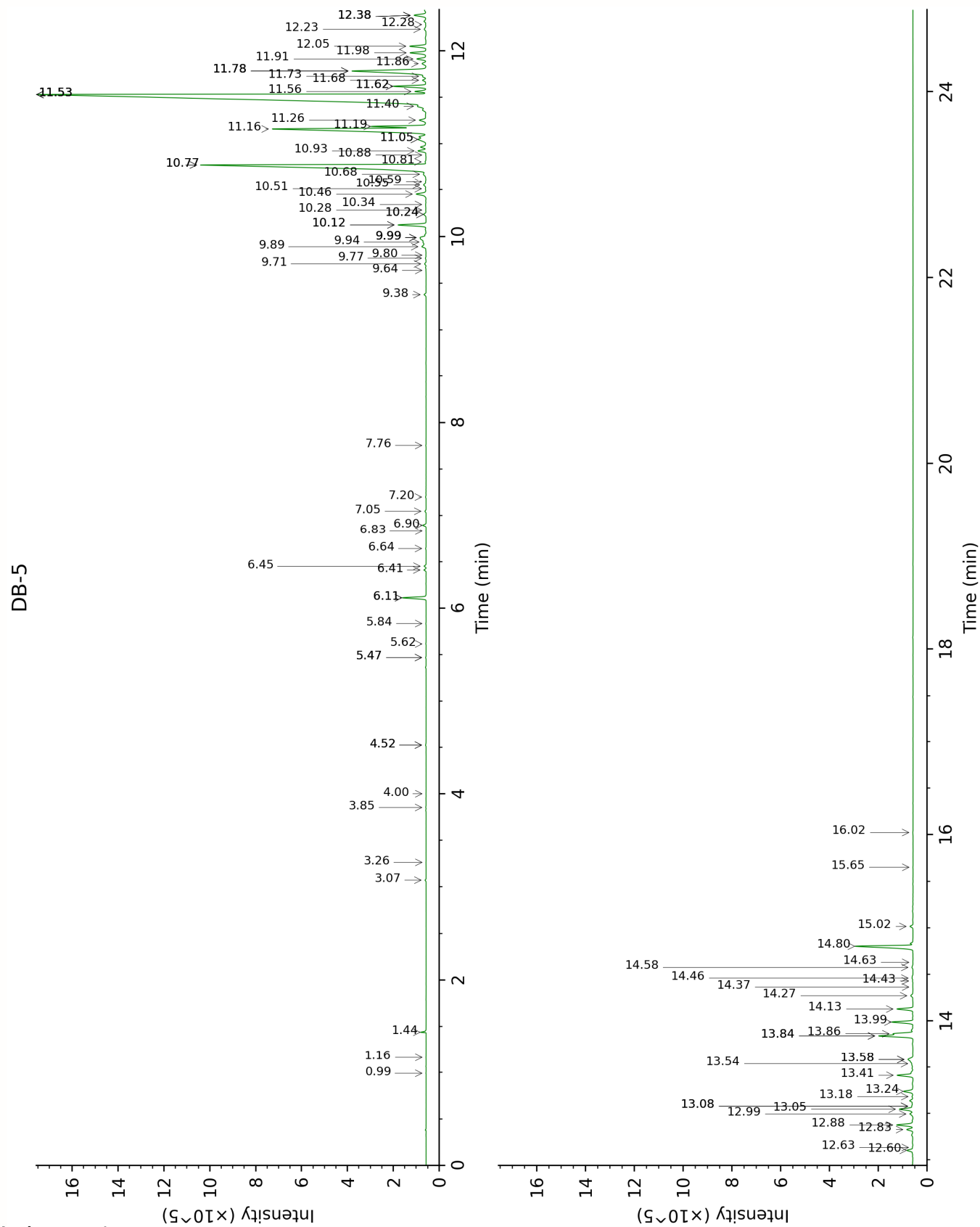
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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.

DB-WAX





FULL ANALYSIS DATA

Methyl isobutyl ketone	Column DB-WAX			Column DB-5		
	1.28	973.2	0.01	0.99	734.2	tr
Toluene	1.50	1002.1	tr	1.16	758.7	tr
Mesityl oxide	2.42	1093.6	0.13	1.44	798.3	0.13
α -Pinene	1.40	991.6	0.03	3.07	930.9	0.04
Camphene	1.74	1026.5	tr	3.26	943.7	0.01
3-Methyl-3-cyclohexenone	6.22	1376.5	0.02	3.85	983.2	0.01
Myrcene	2.93	1133.8	0.01	4.00	993.1	0.01
1,8-Cineole	3.35	1166.6	0.01	4.52*	1026.8	[0.03]
Limonene	3.24	1158.1	0.02	4.52*	1026.8	[0.03]
Terpinolene	4.34	1241.6	0.01	5.47*	1086.9	[0.02]
<i>para</i> -Cymenene	6.40	1389.8	0.02	5.47*	1086.9	[0.02]
Unknown CEAT III [m/z 85, 56 (50), 43 (50), 125 (36), 140 (35)...]				5.62	1096.2	0.01
Phenylethyl alcohol	12.18*	1847.9	[0.66]	5.84	1110.3	0.01
4-Hydroxy-4-methylcyclohex-2-enone	14.13	2027.4	0.02	6.11*	1128.2	[0.90]
Limona ketone	7.87	1497.4	0.89	6.11*	1128.2	[0.90]
α ,4-Dimethyl-3-cyclohexene-1-methanol				6.41	1147.6	0.08
α ,4-Dimethyl-3-cyclohexene-1-methanol epimer				6.45	1150.2	0.07
Borneol	9.94*	1659.2	[42.36]	6.64	1162.5	0.02
Terpinen-4-ol	8.62	1555.1	0.02	6.83	1174.8	0.01
4-Methylacetophenone	10.49*	1703.7	[2.23]	6.90	1179.2	0.13
α -Terpineol	9.94*	1659.2	[42.36]	7.05	1189.0	0.05
Unknown CEAT V [m/z 121, 91 (58), 136 (45), 77 (40), 43 (40)...]				7.20	1199.0	0.02
Unknown CEDE XXVIII [m/z 105, 145 (97), 160 (86), 119 (76), 91 (61)]				7.76	1236.4	0.02
α -Longipinene	6.81	1419.4	0.08	9.38	1345.3	0.09
Longicyclene	7.14	1443.2	0.01	9.64	1363.8	0.01
α -Ylangene	7.08	1439.2	0.04	9.71	1368.7	0.06

α -Copaene	7.18	1446.6	0.03	9.77	1373.1	0.03
Unknown CULO IV [m/z 119, 161 (36), 43 (33), 176 (26), 91 (24), 105 (22)]	12.55	1881.0	0.02	9.80	1375.4	0.01
Unknown CEDE XXVII epimer I [m/z 131, 146 (36), 91 (22), 145 (19), 202 (18)]	8.28	1529.0	0.28	9.89	1381.8	0.27
(3Z)-Hexenyl (3Z)- hexenoate	10.12*	1673.4	[0.21]	9.94	1385.4	0.16
β -Elemene	8.47*	1543.3	[0.19]	9.99*	1388.7	[0.53]
Unknown CEDE XXVII epimer II [m/z 131, 146 (33), 91 (20), 202 (18)]	8.41	1538.4	0.45	9.99*	1388.7	[0.53]
Sativene	7.56	1474.0	0.04	9.99*	1388.7	[0.53]
Longifolene	8.02*	1509.0	[0.57]	10.12*	1398.4	[1.18]
Sibirene	7.92	1501.3	0.64	10.12*	1398.4	[1.18]
(Z?)-Vestitenone, or analog	11.80	1814.7	0.10	10.24*	1406.5	[0.13]
α -Cedrene	8.02*	1509.0	[0.57]	10.24*	1406.5	[0.13]
Unknown CEDE II [m/z 105, 93 (61), 120 (55), 145 (54), 91 (52)...]	12.36	1864.2	0.04	10.28	1410.0	0.02
β -Caryophyllene	8.47*	1543.3	[0.19]	10.34	1414.5	0.05
Himachala-2,4-diene	8.58	1551.4	0.49	10.46	1422.8	0.52
Unknown CEDE III [m/z 91, 93 (90), 105 (72), 202 (71), 131 (68), 77 (63), 107 (55), 187 (54)]				10.51	1427.2	0.04
Unknown CEDE IV [m/z 105, 91 (70), 93 (65), 43 (61), 120 (57), 145 (50)... 204 (6)]				10.55	1430.2	0.14
<i>trans</i> - α -Bergamotene	8.52	1547.0	0.03	10.59	1432.8	0.03
Himachala-2,4-diene isomer	8.83	1570.5	0.18	10.68	1439.4	0.19
α -Himachalene	9.03	1585.8	15.88	10.77*	1446.8	[16.33]
(E)-Vestitenone	12.29	1857.7	0.47	10.77*	1446.8	[16.33]
α -Humulene	9.32	1609.5	0.03	10.81	1449.3	0.05
Unknown CEDE V [m/z 187, 131 (78),	10.01	1664.4	0.56	10.88	1454.8	0.02

202 (76), 105 (74), 91 (74), 117 (53), 145 (52)]						
(E)- β -Farnesene	9.66*	1636.0	[9.89]	10.93	1458.2	0.37
Unknown CEDE VII [m/z 131, 202 (78), 91 (74), 105 (68), 187 (68), 119 (53), 145 (52)]				11.05*	1467.4	[0.52]
Unknown CEDE VI [m/z 119, 91 (85), 93 (77), 105 (76), 79 (61), 134 (60), 94 (49), 204 (46)]	9.48	1622.0	0.42	11.05*	1467.4	[0.52]
γ -Himachalene	9.66*	1636.0	[9.89]	11.16*†	1475.8	[9.58]
11- α H-Himachala-1,4-diene	9.68*	1638.2	[1.60]	11.19*†	1477.9	[2.00]
Unknown CEDE VIII [m/z 137, 43 (84), 138 (63), 109 (53), 95 (51), 93 (50), 207 (46)... 222 (21)]	10.23	1682.4	0.39	11.26	1482.9	0.37
Unknown CULA III [m/z 161, 119 (97), 93 (74), 105 (70), 91 (59), 120 (40), 79 934), 77 (28)... 204 (26)]				11.40	1494.1	0.46
Cycloisolongifol-5-ol	10.88	1736.5	0.26	11.53*	1503.6	[42.34]
α -Muurolene	10.12*	1673.4	[0.21]	11.53*	1503.6	[42.34]
(Z)- α -Bisabolene	10.37	1693.5	0.02	11.53*	1503.6	[42.34]
β -Himachalene	9.94*	1659.2	[42.36]	11.53*	1503.6	[42.34]
Unknown CEAT I [m/z 105, 119 (89), 91 (69), 159 (62), 131 (42), 93 (41), 202 (38)]				11.56	1506.1	0.40
α -Dehydro-ar-himachalene	11.61	1798.0	1.27	11.62*	1510.5	[1.32]
γ -Cadinene	10.44	1699.8	0.03	11.62*	1510.5	[1.32]
Unknown CEAT IV [m/z 146, 193 (97), 131 (89), 91 (54), 159 (54)...]				11.68	1515.6	0.16
<i>trans</i> -Calamenene	11.29	1770.9	0.11	11.73	1519.0	0.14
γ -Dehydro-ar-himachalene	11.98	1830.7	1.28	11.78*	1523.5	[4.77]

Unknown CEDE IX [m/z 131, 202 (28), 91 (22), 159 (16), 145 (16), 132 (15), 115 (14)]	11.14	1758.6	1.33	11.78*	1523.5	[4.77]
δ-Cadinene	10.49*	1703.7	[2.23]	11.78*	1523.5	[4.77]
Unknown CEAT II [m/z 93, 187 (70), 145 (59), 119 (42), 131 (39), 202 (33)]				11.86	1529.7	0.21
ar-Himachalene	11.66	1802.3	0.37	11.91	1533.7	0.41
α-Calacorene	12.18*	1847.9	[0.66]	11.98	1538.9	0.70
(E)-α-Bisabolene	10.78	1727.8	0.67	12.05	1544.5	0.69
Unknown CEDE X [m/z 189, 91 (85), 43 (74), 105 (67), 133 (66), 107 (63), 135 (52)... 220 (20)]	14.04	2018.6	0.14	12.23	1558.9	0.12
(E)-Nerolidol	13.82*	1998.1	[0.56]	12.28	1562.9	0.02
Unknown CEDE XI [m/z 96, 95 (18), 83 (15), 125 (13), 119 (12), 55 (12), 41 (11)... 218? (tr)]	14.88	2099.9	0.24	12.38*	1570.8	[0.60]
Himachalene epoxide	12.87	1909.7	0.37	12.38*	1570.8	[0.60]
Unknown CEDE XII [m/z 177, 202 (79), 91 (76), 159 (75), 43 (65), 107 (59), 105 (57)...]	14.43	2056.1	0.03	12.38*	1570.8	[0.60]
Longiborneol	14.65	2077.1	0.27	12.60	1588.3	0.28
ar-Dihydroturmerone	13.99	2013.7	0.02	12.63	1590.7	0.03
β-Himachalene oxide	13.21	1941.1	0.28	12.83	1605.9	0.28
Unknown CEDE XIII [m/z 138, 110 (77), 137 (75), 107 (62), 91 (61), 93 (60), 109 (57)... 220 (34)]	13.50	1967.7	0.66	12.88	1610.0	0.72
Unknown CEDE XIV [m/z 137, 119 (69), 43 (51), 95 (50), 109 (40)... 222 (1)]	14.93*	2104.6	[0.20]	12.99	1619.9	0.17
1-epi-Cubenol	13.82*	1998.1	[0.56]	13.05	1624.2	0.65
6-Methyl-6- <i>meta</i> - tolyl-heptan-2-one	15.73	2185.4	0.01	13.08*	1626.8	[0.05]

Unknown CEDE XV [m/z 119, 163 (80), 107 (64), 95 (61), 93 (57), 91 (53)... 220 (11)]				13.08*	1626.8	[0.05]
Unknown CEDE XVI [m/z 119, 91 (44), 94 (36), 107 (35), 93 (29)... 202 (19)...]				13.18	1635.5	0.05
Himachalol	15.24	2135.7	0.34	13.24	1640.1	0.45
Allohimachalol	15.60	2171.9	0.68	13.41	1654.5	0.70
β-Atlantone	14.93*	2104.6	[0.20]	13.54	1664.9	0.07
(E)-10,11- Dihydroatlantone	14.76	2088.5	0.12	13.58*	1668.6	[0.40]
Unknown UNKN CLXVII [m/z 163, 69 (85), 95 (54), 107 (24), 67 (23), 93 (20)...]				13.58*	1668.6	[0.40]
(Z)-γ-Atlantone	15.17	2129.3	0.78	13.84*	1690.2	[1.58]
Deodarone epimer I	15.39*	2151.0	[1.61]	13.84*	1690.2	[1.58]
Deodarone epimer II	15.45	2157.1	0.72	13.86	1692.1	0.64
(E)-γ-Atlantone	15.39*	2151.0	[1.61]	13.99	1702.6	0.86
(Z)-α-Atlantone	15.66	2177.7	0.64	14.13	1714.6	0.64
Unknown CEDE XVII [m/z 105, 119 (89), 59 (68), 120 (65), 43 (65), 93 (62), 121 (61)...]				14.27	1727.1	0.13
Unknown CEDE XVIII [m/z 91, 79 (83), 105 (68), 109 (63), 41 (590), 93 (58), 107 (57)...]	18.00	2427.5	0.07	14.37	1735.2	0.01
Unknown CEDE XIX [m/z 83, 91 (28), 105 (25), 55 (21), 43 (17), 119 (17)...]				14.43	1740.9	0.02
Unknown CEDE XX [m/z 43, 105 (99), 119 (90), 91 (87), 147 (76), 41 (69), 93 (63)...]				14.46	1743.5	0.07
Unknown CEDE XXI [m/z 83, 55 (17), 91 (14), 105 (9), 216 (6)...]				14.58	1753.6	0.07
Unknown CEDE XXII	18.44	2477.8	0.02	14.63	1758.3	0.02

[m/z 91, 105 (74), 93 (67), 79 (59), 133 (54), 41 (47), 107 (46)...]						
(E)- α -Atlantone	16.37	2252.1	2.68	14.80	1773.4	2.65
Unknown CEDE XXIII [m/z 95, 43 (59), 69, (57), 67 (43), 163 (42), 94 (37), 107 (37)... 178 (26), 218 (2)]				15.02	1791.9	0.12
Unknown CEDE XXV [m/z 83, 134 (30), 119 (19), 55 (18), 91 (12)... 216 (4)...]	20.46	2717.9	0.01	15.65	1849.1	0.01
Unknown CEDE XXVI [m/z 173, 83 (83), 91 (80), 201 (79), 115 (65)... 216 (31)]	18.69	2505.9	0.01	16.02	1883.1	0.02
Total reported	94.86%			97.30%		

*: 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