

Date : January 17, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22A13-PTH01

Customer identification : Cedarwood Texas Crude - CB81082111R

Type : Essential oil

Source : *Juniperus mexicana*

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 : January 17, 2022

Checked and approved by :

Alexis St-Gelais, Ph. D., Chimiste 2013-174

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid

Refractive index: 1.5058 ± 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
Unknown	0.01	Monoterpene
α -Pinene	0.03	Monoterpene
Camphene	tr	Monoterpene
α -Fenchene	0.01	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
α -Methylstyrene	tr	Normonoterpene
Δ^3 -Carene	0.01	Monoterpene
para-Cymene	0.01	Monoterpene
Limonene	0.01	Monoterpene
γ -Terpinene	tr	Monoterpene
para-Cymenene	0.01	Monoterpene
Terpinolene	tr	Monoterpene
Linalool	tr	Monoterpenic alcohol
α -Campholenal	tr	Monoterpenic aldehyde
<i>trans</i> -Pinocarveol	0.02	Monoterpenic alcohol
Camphor	0.09	Monoterpenic ketone
meta-Mentha-4,6-dien-8-ol	0.01	Monoterpenic alcohol
Borneol	0.02	Monoterpenic alcohol
α -Phellandren-8-ol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.03	Monoterpenic alcohol
para-Cymen-8-ol	0.04	Monoterpenic alcohol
α -Terpineol	0.04	Monoterpenic alcohol
Myrtenol	0.03	Monoterpenic alcohol
Verbenone	0.04	Monoterpenic ketone
Carvacrol methyl ether	0.05	Monoterpenic ether
Carvenone	tr	Monoterpenic ketone
Bornyl acetate	0.02	Monoterpenic ester
Carvacrol	tr	Monoterpenic alcohol
α -Terpinyl acetate	0.06	Monoterpenic ester
African-1-ene	0.01	Sesquiterpene
2-epi- α -Funebrene	0.33	Sesquiterpene
α -Duprezianene	0.57	Sesquiterpene
Isolongifolene	0.05	Sesquiterpene
7-epi-Sesquithujene	0.16	Sesquiterpene
β -Elemene	0.93	Sesquiterpene
α -Chamipinene	0.13	Sesquiterpene
Unknown	0.03	Sesquiterpene
β -Funebrene	1.67	Sesquiterpene
α -Cedrene	16.44	Sesquiterpene
β -Caryophyllene	0.66	Sesquiterpene
β -Cedrene	4.22	Sesquiterpene
β -Duprezianene	0.65	Sesquiterpene
<i>cis</i> -Thujopsene	32.29	Sesquiterpene
Isobazzanene	0.10	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.03	Sesquiterpene

Prezizaene	0.12	Sesquiterpene
7,8-Dehydro- α -acoradiene?	0.70	Sesquiterpene
α -Humulene	0.06	Sesquiterpene
Thujopsadiene?	0.18	Sesquiterpene
α -Acoradiene	1.01	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.08	Sesquiterpene
β -Acoradiene	0.38	Sesquiterpene
Thujopsene isomer	0.37	Sesquiterpene
β -Chamigrene	1.10	Sesquiterpene
Unknown	0.41	Sesquiterpene
Widdra-2,4(14)-diene?	0.16	Sesquiterpene
Unknown	0.27	Sesquiterpene
ar-Curcumene	0.16	Sesquiterpene
Pseudowiddrene	1.21	Sesquiterpene
α -Chamigrene	0.70	Sesquiterpene
α -Cuprenene	1.89	Sesquiterpene
β -Himachalene	0.68	Sesquiterpene
Cuparene	1.71	Sesquiterpene
1,2-Dihydrocuparene	0.23	Sesquiterpene
β -Curcumene	0.06	Sesquiterpene
α -Dehydro-ar-himachalene	0.04	Sesquiterpene
α -Alaskene	0.19	Sesquiterpene
γ -Cadinene	0.18	Sesquiterpene
Unknown	0.28	Sesquiterpene
1,4-Dihydrocuparene	0.13	Sesquiterpene
γ -Dehydro-ar-himachalene	0.05	Sesquiterpene
δ -Cadinene	0.06	Sesquiterpene
γ -Cuprenene	0.29	Sesquiterpene
Unknown	0.06	Oxygenated sesquiterpene
(<i>E</i>)- γ -Bisabolene	0.19	Sesquiterpene
ar-Himachalene	0.02	Sesquiterpene
Unknown	0.15	Oxygenated sesquiterpene
δ -Cuprenene epimer I	0.09	Sesquiterpene
δ -Cuprenene epimer II	0.17	Sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Caryophyllenyl alcohol	0.06	Sesquiterpenic alcohol
Caryophyllene oxide	0.04	Sesquiterpenic ether
allo-Cedrol	0.34	Sesquiterpenic alcohol
Widdrol	1.98	Sesquiterpenic alcohol
α -Cedrol	16.06	Sesquiterpenic alcohol
β -Himachalene oxide	0.01	Sesquiterpenic ether
epi-Cedrol	0.16	Sesquiterpenic alcohol
Unknown	0.08	Oxygenated sesquiterpene
β -Biotol	0.03	Sesquiterpenic alcohol
Unknown	0.05	Oxygenated sesquiterpene
α -Acorenol	1.16	Sesquiterpenic alcohol
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.08	Oxygenated sesquiterpene
β -Acorenol	0.12	Sesquiterpenic alcohol
Unknown	0.32	Oxygenated sesquiterpene

Himachalol	0.34	Sesquiterpenic alcohol
Unknown	0.24	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.24	Oxygenated sesquiterpene
Cedrenol analog	0.33	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(<i>E</i>)-caryophyllene	0.10	Sesquiterpenic alcohol
1,7-diepi- α -Cedrenal?	0.17	Sesquiterpenic aldehyde
Cedr-8-en-13-ol	0.09	Sesquiterpenic alcohol
epi- α -Bisabolol	0.09	Sesquiterpenic alcohol
α -Cedrenol	0.17	Sesquiterpenic alcohol
Unknown	0.64	Oxygenated sesquiterpene
Mayurone?	0.03	Norsesquiterpenic ketone
Thujopsenal	0.38	Sesquiterpenic aldehyde
Unknown	0.03	Oxygenated sesquiterpene
Thujopsenal analog	0.12	Sesquiterpenic aldehyde
Unknown	0.07	Oxygenated sesquiterpene
Cuparenal	0.03	Sesquiterpenic aldehyde
Cedryl acetate	0.05	Sesquiterpenic ester
Unknown	0.06	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.16	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Nootkatone analog	0.01	Sesquiterpenic ketone
Manool	0.01	Diterpenic alcohol
7,13-Abietadiene	0.01	Diterpene
Consolidated total	96.33%	

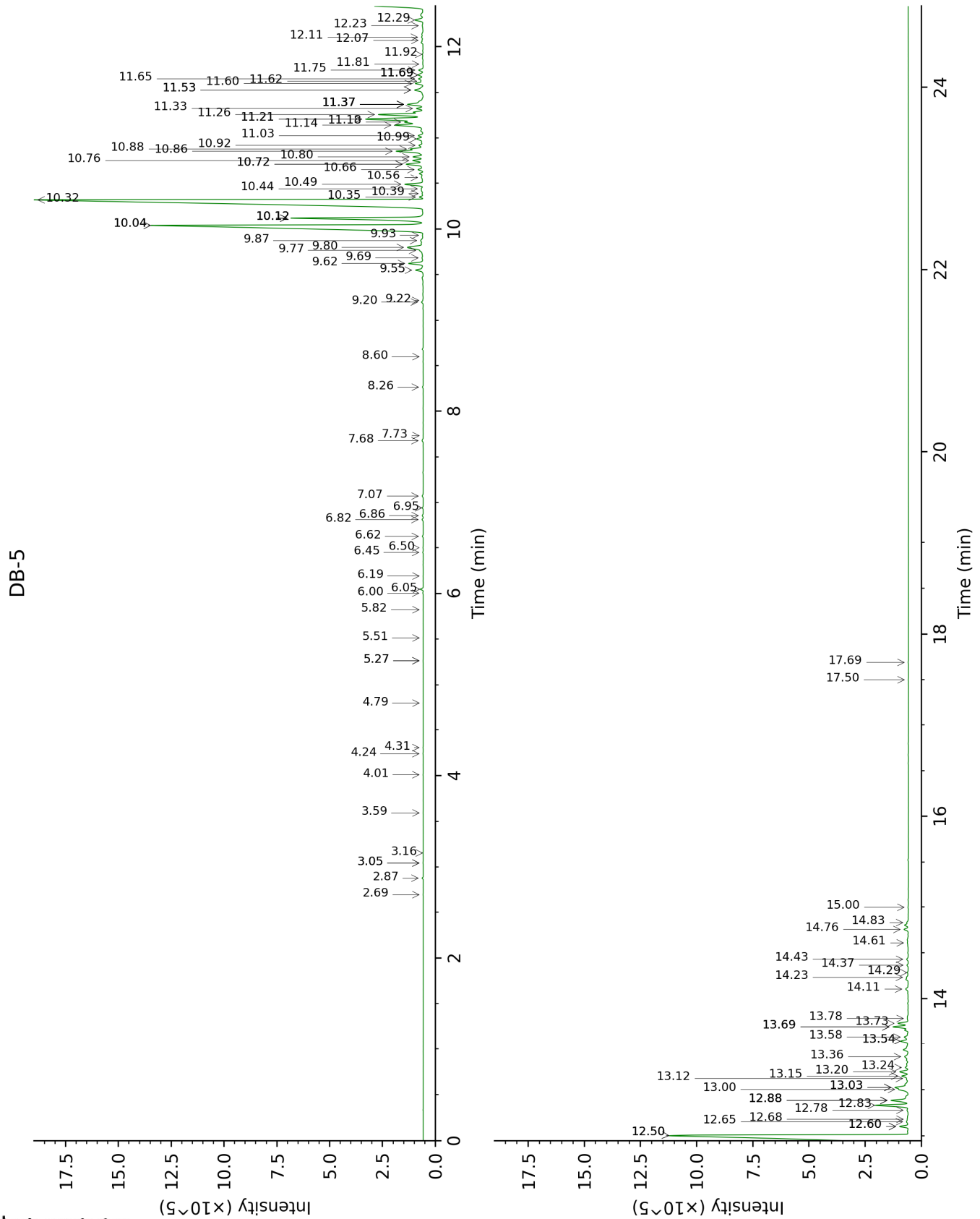
tr: The compound has been detected below 0.005% of total signal.

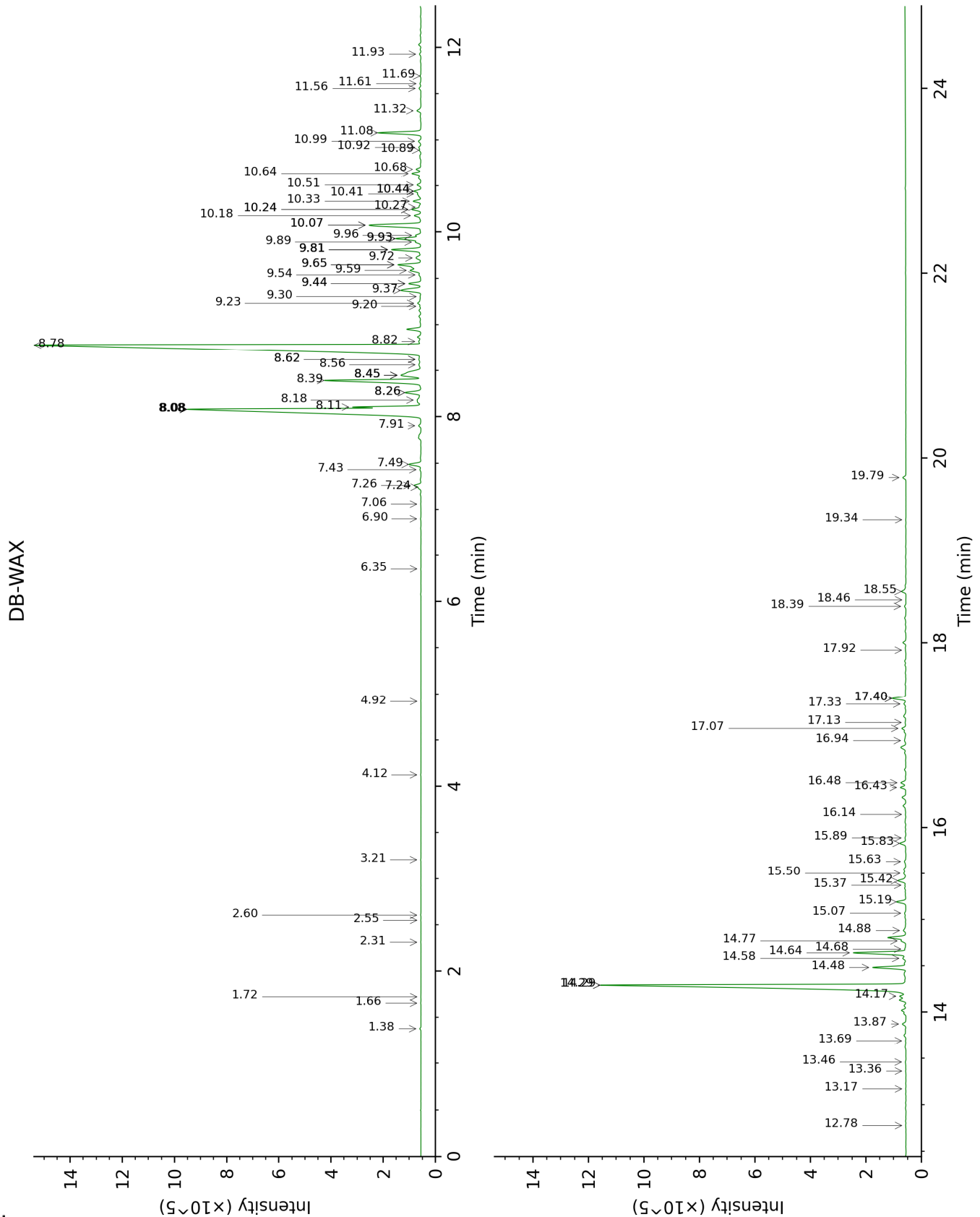
Note: no correction factor was applied

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	%
Unknown [m/z 105, 79 (80), 91 (78), 77 (69), 78 (56), 93 (46), 120 (44)... 136 (4)]	2.69	918	0.01	2.55	1106	tr
α -Pinene	2.87	930	0.03	1.38	991	0.03
Camphene	3.05*	942	0.01	1.72	1027	tr
α -Fenchene	3.05*	942	[0.01]	1.66	1020	0.01
Thuja-2,4(10)-diene	3.16	949	0.01	2.31	1085	0.01
α -Methylstyrene	3.59	979	tr	4.92	1288	tr
Δ^3 -Carene	4.01	1007	0.01	2.60	1110	0.01
para-Cymene	4.24	1022	0.01	4.12	1229	0.01
Limonene	4.31	1026	0.01	3.21	1158	0.01
γ -Terpinene	4.80	1057	tr			
para-Cymenene	5.27*	1086	0.01	6.35	1387	0.01
Terpinolene	5.27*	1086	[0.01]			
Linalool	5.52	1102	tr	8.08*	1516	16.58
α -Campholenal	5.82	1122	tr	7.06	1439	0.01
trans-Pinocarveol	6.00	1134	0.02	9.20	1603	0.03
Camphor	6.05	1137	0.09	7.24	1453	0.09
meta-Mentha-4,6-dien-8-ol	6.19	1146	0.01	9.30	1612	0.03
Borneol	6.45	1162	0.02	9.81*	1652	1.16
α -Phellandren-8-ol	6.50	1166	0.01	10.18	1682	0.28
Terpinen-4-ol	6.62	1174	0.03	8.62*	1558	0.14
para-Cymen-8-ol	6.82	1186	0.04	11.56	1799	0.07
α -Terpineol	6.86	1189	0.04	9.81*	1652	[1.16]
Myrtenol	6.94	1194	0.03	10.89	1742	0.05
Verbenone	7.07	1202	0.04	9.65*	1639	1.14
Carvacrol methyl ether	7.68	1243	0.05	8.62*	1558	[0.14]
Carvenone	7.73	1247	tr	9.89	1659	0.17
Bornyl acetate	8.26	1282	0.02	8.26*	1530	0.67
Carvacrol	8.60	1305	tr	15.37	2156	0.03
α -Terpinyl acetate	9.20	1348	0.06	9.72	1645	0.25
African-1-ene	9.22	1349	0.01	6.90	1427	0.01
2-epi- α -Funebrene	9.55	1372	0.33	7.26	1454	0.26
α -Duprezianene	9.62	1378	0.57	7.49	1471	0.51
Isolongifolene	9.68	1382	0.05	7.43	1467	0.04
7-epi-Sesquithujene	9.77	1388	0.16	7.90	1502	0.10
β -Elemene	9.80	1390	0.93	8.45*	1544	1.63
α -Chamipinene	9.87	1395	0.13	8.08*	1516	[16.58]

Unknown [m/z 107, 91 (86), 93 (83), 79 (81), 162 (74), 41 (73), 133 (72)... 204 (13)]	9.93	1399	0.03	8.18	1524	0.22
β -Funebrene	10.04*	1407	18.68	8.11	1518	1.67
α -Cedrene	10.04*	1407	[18.68]	8.08*	1516	[16.58]
β -Caryophyllene	10.12*	1413	5.53	8.45*	1544	[1.63]
β -Cedrene	10.12*	1413	[5.53]	8.39	1540	4.22
β -Duprezianene	10.12*	1413	[5.53]	8.26*	1530	[0.67]
<i>cis</i> -Thujopsene	10.32	1428	32.29	8.78	1570	31.94
Isobazzanene	10.35	1430	0.10	8.56	1553	0.12
<i>trans</i> - α - Bergamotene	10.39	1433	0.03	8.45*	1544	[1.63]
Prezizaene	10.44	1437	0.12	8.82	1573	0.10
7,8-Dehydro- α - acoradiene?	10.49	1441	0.70	9.59	1634	0.49
α -Humulene	10.56	1446	0.06	9.23	1606	0.15
Thujopsadiene?	10.66	1453	0.18	10.24*	1688	0.34
α -Acoradiene	10.72*	1458	0.72	9.37	1617	1.01
(<i>E</i>)- β -Farnesene	10.72*	1458	[0.72]	9.54	1630	0.08
β -Acoradiene	10.76	1461	0.38	9.44*	1623	0.45
Thujopsene isomer	10.80	1464	0.37	9.44*	1623	[0.45]
β -Chamigrene	10.86†	1468	1.51	9.65*	1639	[1.14]
Unknown [m/z 91, 105 (93), 161 (77), 93 (73), 119 (71), 133 (69)... 204 (31)]	10.88†	1470	[1.51]			
Widdra-2,4(14)- diene?	10.92	1473	0.16	9.81*	1652	[1.16]
Unknown [m/z 189, 91 (95), 105 (93), 133 (84), 119 (75), 41 (59), 93 (46)... 204 (33)]	10.99	1478	0.27	9.93*†	1662	1.20
<i>ar</i> -Curcumene	11.03	1481	0.16	10.68	1725	0.17
Pseudowiddrene	11.14	1490	1.21	9.93*†	1662	[1.20]
α -Chamigrene	11.18	1492	0.70	10.08*	1674	2.58
α -Cuprenene	11.21*	1494	2.57	10.08*	1674	[2.58]
β -Himachalene	11.21*	1494	[2.57]	9.81*	1652	[1.16]
Cuparene	11.26	1498	1.71	11.08	1758	1.60
1,2- Dihydrocuparene	11.33	1503	0.23	10.24*	1688	[0.34]
β -Curcumene	11.37*	1507	0.87	10.27	1690	0.06
α -Dehydro- <i>ar</i> - himachalene	11.37*	1507	[0.87]	11.61	1803	0.04
α -Alaskene	11.37*	1507	[0.87]	9.96†	1665	[1.20]
γ -Cadinene	11.37*	1507	[0.87]	10.41	1702	0.18
Unknown [m/z 121, 123 (45), 91	11.37*	1507	[0.87]	10.33	1695	0.28

(24), 107 (24), 122 (24), 95 (23)... 204 (11)]						
1,4- Dihydrocuparene	11.37*	1507	[0.87]	10.51	1710	0.13
γ-Dehydro-ar- himachalene	11.53*	1519	0.49	11.93	1832	0.05
δ-Cadinene	11.53*	1519	[0.49]	10.44*	1704	0.25
γ-Cuprenene	11.60	1525	0.29	10.64	1721	0.34
Unknown [m/z 91, 107 (97), 105 (93), 41 (92), 109 (78), 43 (78), 121 (76), 135 (75)... 220 (21)]	11.62	1527	0.06			
(E)-γ-Bisabolene	11.65	1529	0.19	10.44*	1704	[0.25]
ar-Himachalene	11.69*	1532	0.24	11.69	1811	0.02
Unknown [m/z 43, 95 (81), 207 (61), 41 (55), 55 (50)... 222 (3)]	11.69*	1532	[0.24]	13.87	2009	0.15
δ-Cuprenene epimer I	11.69*	1532	[0.24]	10.92	1745	0.09
δ-Cuprenene epimer II	11.75	1536	0.17	10.99	1750	0.11
Unknown [m/z 106, 41 (86), 43 (84), 149 (75), 69 (75), 91 (63), 93 (61)... 220 (1)]	11.81	1541	0.01	11.32	1778	0.17
Unknown [m/z 91, 119 (98), 121 (91), 105 (85), 43 (82), 41 (76)... 205 (37), 220 (16)]	11.92	1550	0.02	13.36	1962	0.01
Unknown [m/z 95, 191 (52), 107 (50), 121 (32), 81 (31)...]	12.07	1562	0.03	14.17	2038	0.25
Caryophyllenyl alcohol	12.10	1564	0.06	13.69	1992	0.02
Caryophyllene oxide	12.23	1574	0.04	12.78	1908	0.01
allo-Cedrol	12.29	1579	0.34	14.29*	2050	16.48
Widdrol	12.50*	1596	18.04	14.64	2083	1.98
α-Cedrol	12.50*	1596	[18.04]	14.29*	2050	[16.48]
β-Himachalene oxide	12.60*	1604	0.27	13.17	1944	0.01
epi-Cedrol	12.60*	1604	[0.27]	14.77	2096	0.16
Unknown [m/z 138, 110 (77), 137 (75), 107 (62), 91	12.65	1608	0.08	13.46	1970	0.03

(61), 93 (60), 109 (57)... 220 (34)]						
β-Biotol	12.68	1610	0.03	16.14	2235	0.01
Unknown [m/z 107, 41 (86), 123 (85), 82 (79), 95 (77), 93 (76), 91 (73), 69 (71)... 220 (13)]	12.78	1618	0.05	14.68	2087	0.04
α-Acorenol	12.83	1622	1.16	14.48	2068	1.17
Unknown [m/z 105, 93 (78), 95 (75), 131 (72), 119 (71), 132 (70), 91 (67), 120 (49)... 202 (39), 220 (9)]	12.88*	1627	0.77	15.89	2208	0.04
Unknown [m/z 132, 175 (22), 119 (18), 91 (18), 157 (18)... 219 (10)]	12.88*	1627	[0.77]	15.63	2182	0.08
β-Acorenol	12.88*	1627	[0.77]	14.88	2107	0.12
Unknown [m/z 132, 91 (24), 119 (22), 105 (21), 133 (17), 117 (16)... 219 (3)]	13.00	1637	0.32			
Himachalol	13.02*	1638	0.58	15.19	2138	0.34
Unknown [m/z 123, 81 (77), 95 (77), 107 (72), 41 (72), 93 (66), 55 (64)... 220? (13)]	13.02*	1638	[0.58]			
Unknown [m/z 41, 91 (96), 79 (88), 69 (82), 123 (80), 93 (80)... 220 (8)]	13.12	1647	0.05	17.40*	2368	0.50
Unknown [m/z 43, 81 (84), 41 (64), 67 (62), 95 (58), 79 (58)... 204 (48), 220 (2)]	13.15	1649	0.24	15.42	2161	0.37
Cedrenol analog	13.20	1653	0.33	16.48	2270	0.21
14-Hydroxy-9-epi-(E)-caryophyllene	13.24	1656	0.10	16.43	2265	0.20
1,7-diepi-α-Cedrenal?	13.36	1666	0.17	15.07	2126	0.05
Cedr-8-en-13-ol	13.54*	1681	0.28	16.94	2318	0.09
epi-α-Bisabolol	13.54*	1681	[0.28]	15.50	2169	0.09
α-Cedrenol	13.58	1684	0.17	17.07	2332	0.15

Unknown [m/z 91, 105 (87), 123 (74), 135 (70), 107 (60), 79 (59)... 220 (13)]	13.69*†	1694	0.67			
Mayurone?	13.69*†	1694	[0.67]	17.13	2339	0.03
Thujopsenal	13.73	1697	0.38	15.83	2202	0.26
Unknown [m/z 105, 69 (77), 91 (66), 119 (65), 111 (56), 107 (45), 55 (45)... 220? (2)]	13.78	1701	0.03			
Thujopsenal analog	14.10	1729	0.12	17.40*	2368	[0.50]
Unknown [m/z 105, 91 (83), 79 (78), 135 (67), 107 (56), 67 (53)... 220 (9)]	14.23	1740	0.07			
Cuparenal	14.28	1745	0.03			
Cedryl acetate	14.37	1752	0.05	14.58	2078	0.13
Unknown [m/z 91, 105 (74), 93 (67), 79 (59), 133 (54), 41 (47), 107 (46)...]	14.43	1758	0.06	18.39	2478	0.06
Unknown [m/z 121, 136 (47), 119 (27), 91 (27), 105 (22), 41 (21)... 220 (4)]	14.61	1773	0.07	18.46	2486	0.01
Unknown [m/z 148, 141 (99), 91 (74), 105 (52), 41 (42), 121 (42), 133 (37)... 218 (32)]	14.76	1786	0.16	19.79	2641	0.12
Unknown [m/z 121, 136 (53), 91 (22), 93 (19), 79 (15), 105 (13)... 220 (3)]	14.83	1792	0.05	18.55	2496	0.19
Nootkatone analog	15.00	1807	0.01	17.92	2425	0.01
Manool	17.50	2043	0.01	19.34	2587	0.01
7,13-Abietadiene	17.69	2062	0.01	17.33	2361	0.08
Total identified		96.01%			92.83%	
Total reported		97.63%			94.84%	

*: 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