CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 21D06-PTH02
Customer identification : Cedarwood Texas - USA - CB8106209R
Type : Essential oil
Source : *Juniperus mexicana*
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 : Alexis St-Gelais, M. Sc., chimiste
Analysis date : April 13, 2021

Checked and approved by :

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

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MÉTHODE CERTIFIÉE
✳ISO 17025:2017
CERTIFIED METHOD

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PHYSICOCHEMICAL DATA

Physical aspect: Light yellow viscous liquid
Refractive index: 1.5070 ± 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
Limonene	0.01	Monoterpene
para-Cymenene	0.01	Monoterpene
Terpinolene	tr	Monoterpene
Camphor	0.01	Monoterpenic ketone
meta-Mentha-4,6-dien-8-ol	0.01	Monoterpenic alcohol
Borneol	0.03	Monoterpenic alcohol
Terpinen-4-ol	0.01	Monoterpenic alcohol
para-Cymen-8-ol	0.01	Monoterpenic alcohol
α-Terpineol	0.30	Monoterpenic alcohol
Myrtenol	0.01	Monoterpenic alcohol
Verbenone	0.01	Monoterpenic ketone
Carvacrol methyl ether	0.02	Monoterpenic ether
Bornyl acetate	0.02	Monoterpenic ester
Brasila-1,10-diene	0.04	Sesquiterpene
African-1-ene	0.02	Sesquiterpene
α-Terpinyl acetate	0.10	Monoterpenic ester
2-epi-α-Funebrene	0.44	Sesquiterpene
α-Duprezianene	0.59	Sesquiterpene
7-epi-Sesquithujene?	0.02	Sesquiterpene
Isolongifolene	0.04	Sesquiterpene
β-Elemene	0.35	Sesquiterpene
α-Funebrene	0.05	Sesquiterpene
α-Chamipinene	0.10	Sesquiterpene
Unknown	0.08	Sesquiterpene
α-Cedrene	18.76	Sesquiterpene
β-Funebrene	1.40	Sesquiterpene
β-Caryophyllene	0.26	Sesquiterpene
β-Cedrene	4.42	Sesquiterpene
β-Duprezianene	0.76	Sesquiterpene
cis-Thujopsene	26.11	Sesquiterpene
Isobazzanene	0.27	Sesquiterpene
trans-α-Bergamotene	0.12	Sesquiterpene
Prezizaene	0.27	Sesquiterpene
7,8-Dehydro-α-acoradiene?	0.13	Sesquiterpene
α-Himachalene	0.17	Sesquiterpene
Cadina-4,11-diene	0.06	Sesquiterpene
α-Humulene	0.08	Sesquiterpene
Thujopsadiene?	0.18	Sesquiterpene
α-Acoradiene	0.28	Sesquiterpene
β-Acoradiene	0.51	Sesquiterpene
Thujopsene isomer	0.35	Sesquiterpene
β-Chamigrene	1.70	Sesquiterpene
γ-Himachalene	0.01	Sesquiterpene
Unknown	0.06	Sesquiterpene
Widdra-2,4(14)-diene?	0.06	Sesquiterpene

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Unknown	0.24	Sesquiterpene
ar-Curcumene	0.29	Sesquiterpene
Valencene	0.06	Sesquiterpene
Pseudowiddrene	0.33	Sesquiterpene
α-Chamigrene	2.10	Sesquiterpene
β-Himachalene	1.78	Sesquiterpene
α-Cuprenene	1.32	Sesquiterpene
Cuparene	4.21	Sesquiterpene
1,2-Dihydrocuparene	0.18	Sesquiterpene
Unknown	0.44	Sesquiterpene
α-Dehydro-ar-himachalene	0.04	Sesquiterpene
α-Alaskene	0.44	Sesquiterpene
1,4-Dihydrocuparene	0.27	Sesquiterpene
γ-Cadinene	0.16	Sesquiterpene
β-Curcumene	0.21	Sesquiterpene
γ-Dehydro-ar-himachalene	0.04	Sesquiterpene
δ-Cadinene	0.13	Sesquiterpene
β-Sesquiphellandrene	0.14	Sesquiterpene
γ-Cuprenene	1.36	Sesquiterpene
(*E*)-γ-Bisabolene	0.13	Sesquiterpene
ar-Himachalene	0.02	Sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
δ-Cuprenene epimer I	0.25	Sesquiterpene
δ-Cuprenene epimer II	0.21	Sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
Unknown	0.23	Oxygenated sesquiterpene
Caryophyllenyl alcohol	0.21	Sesquiterpenic alcohol
Unknown	0.44	Sesquiterpene
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Caryophyllene oxide	0.07	Sesquiterpenic ether
allo-Cedrol	0.53	Sesquiterpenic alcohol
α-Cedrol	10.14	Sesquiterpenic alcohol
Widdrol	1.96	Sesquiterpenic alcohol
β-Himachalene oxide	0.06	Sesquiterpenic ether
epi-Cedrol	0.45	Sesquiterpenic alcohol
β-Biotol	0.22	Sesquiterpenic alcohol
10-epi-Cubenol	0.11	Sesquiterpenic alcohol
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.31	Oxygenated sesquiterpene
α-Acorenol	0.25	Sesquiterpenic alcohol
Unknown	0.05	Oxygenated sesquiterpene
β-Acorenol	0.31	Sesquiterpenic alcohol
Unknown	0.51	Oxygenated sesquiterpene
Unknown	0.19	Oxygenated sesquiterpene
Unknown	0.52	Oxygenated sesquiterpene
Himachalol	0.13	Sesquiterpenic alcohol
Unknown	0.15	Oxygenated sesquiterpene
Unknown	0.21	Oxygenated sesquiterpene
Cedrenol analog	0.14	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(*E*)-caryophyllene	0.05	Sesquiterpenic alcohol
1,7-diepi-α-Cedrenal?	0.18	Sesquiterpenic aldehyde

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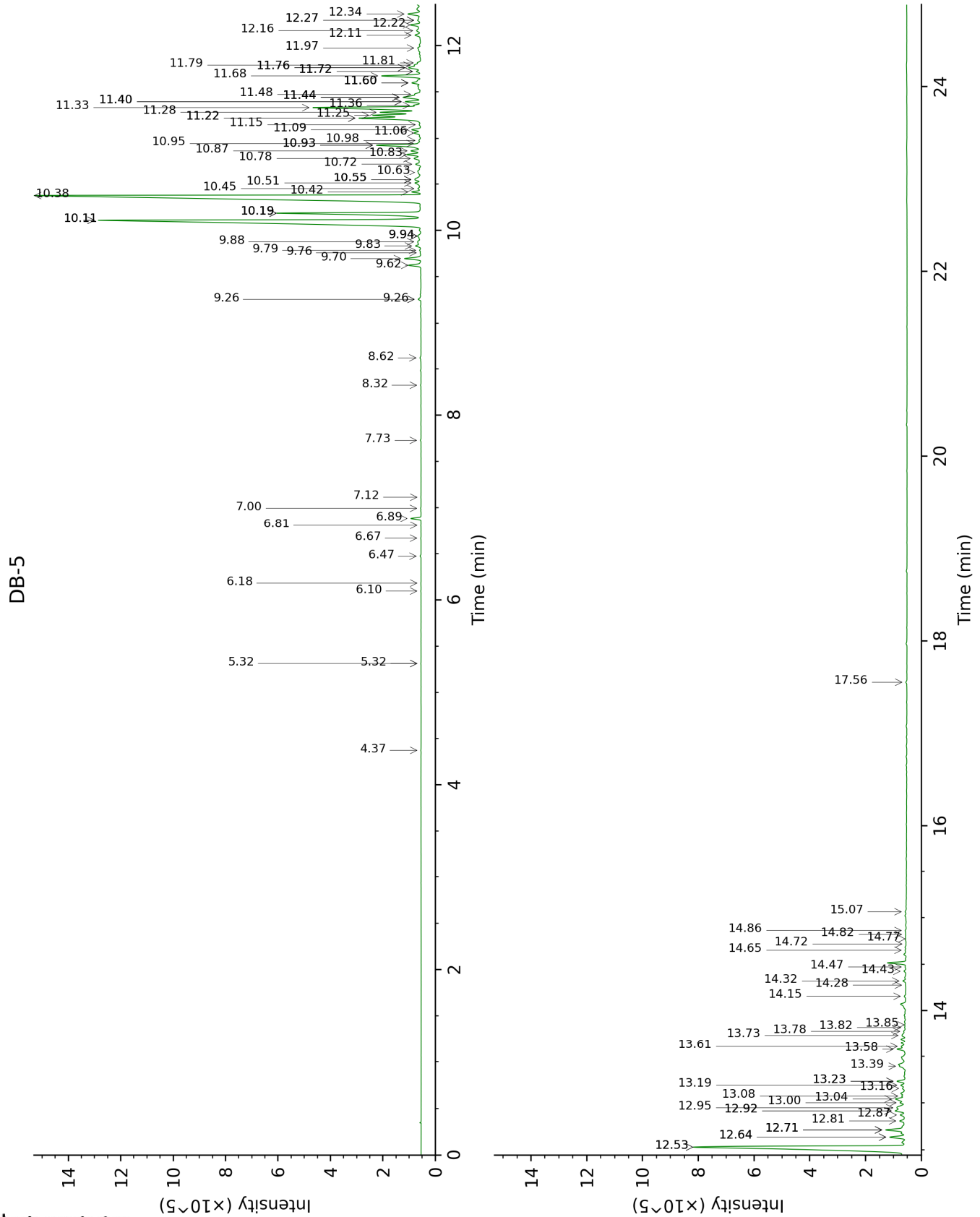|		
Cedr-8-en-13-ol	0.38	Sesquiterpenic alcohol
α-Cedrenol	0.18	Sesquiterpenic alcohol
Unknown	0.26	Oxygenated sesquiterpene
Mayurone?	0.09	Norsesquiterpenic ketone
Thujopsenal	0.06	Sesquiterpenic aldehyde
Unknown	0.06	Oxygenated sesquiterpene
Thujopsenal analog	0.09	Sesquiterpenic aldehyde
Unknown	0.03	Oxygenated sesquiterpene
Cuparenal	0.14	Sesquiterpenic aldehyde
Unknown	0.10	Oxygenated sesquiterpene
Cedryl acetate	0.05	Sesquiterpenic ester
Unknown	0.05	Oxygenated sesquiterpene
β-Acoradienol?	0.02	Sesquiterpenic alcohol
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Nootkatone analog	0.06	Sesquiterpenic ketone
Manool	0.04	Diterpenic alcohol
Consolidated total	**92.11%**	

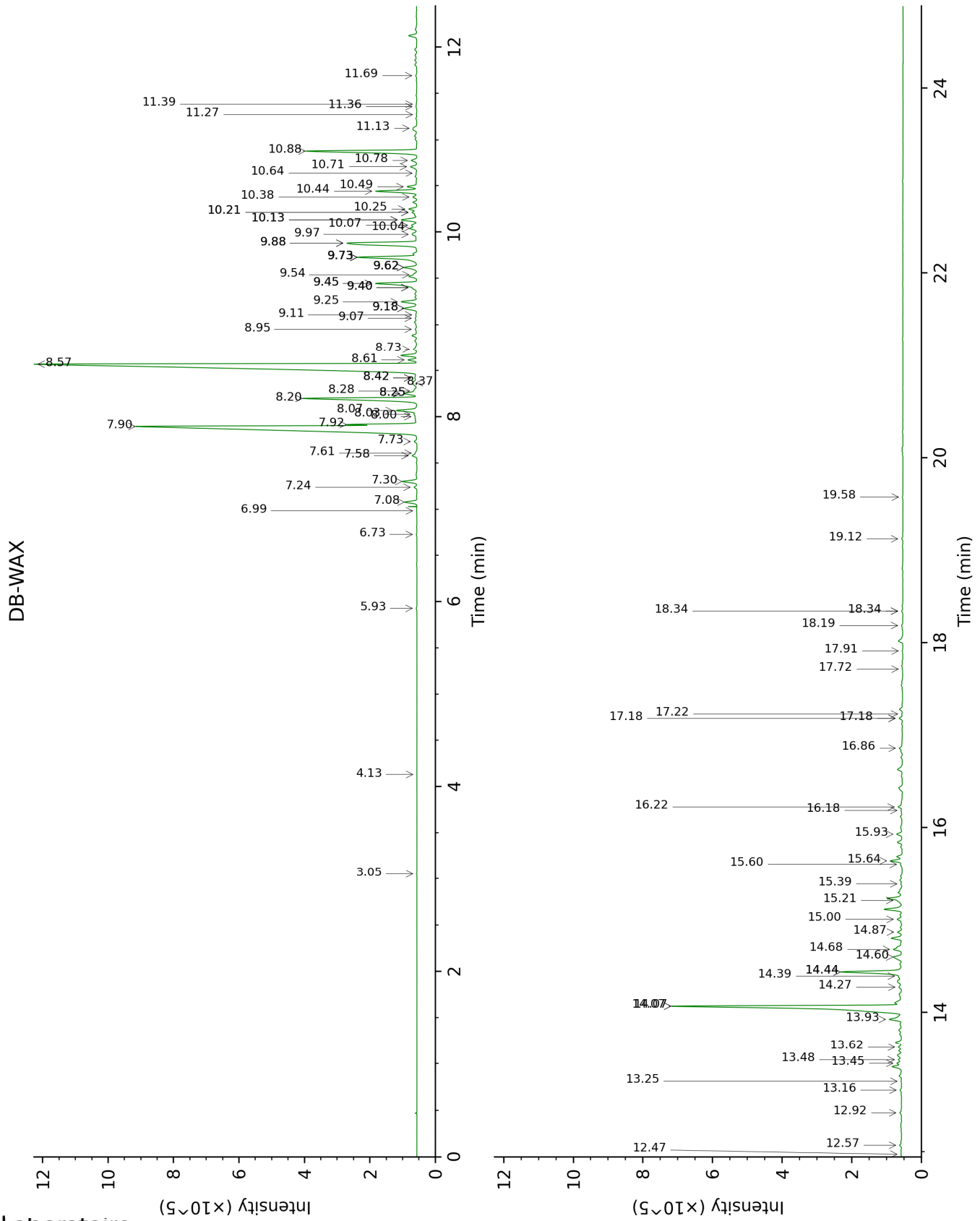tr: The compound has been detected below 0.005% of total signal.

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

Time (min)

Intensity (×10^5)

Time (min)

Intensity (×10^5)

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DB-WAX

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Limonene	4.37	1027	0.01	3.05	1158	0.01
para-Cymenene	5.32*	1087	0.01			
Terpinolene	5.32*	1087	[0.01]	4.13	1242	tr
Camphor	6.10	1137	0.01	6.99	1449	0.01
meta-Mentha-4,6-dien-8-ol	6.18	1142	0.01	9.11	1613	0.05
Borneol	6.47	1161	0.03	9.62*	1655	0.49
Terpinen-4-ol	6.67	1174	0.01	8.42*	1559	0.12
para-Cymen-8-ol	6.81	1182	0.01	11.27	1794	0.01
α-Terpineol	6.89	1188	0.30	9.62*	1655	[0.49]
Myrtenol	7.00	1195	0.01	10.64	1740	0.02
Verbenone	7.12	1202	0.01	9.45*	1640	1.71
Carvacrol methyl ether	7.73	1244	0.02	8.42*	1559	[0.12]
Bornyl acetate	8.32	1284	0.02	8.03	1528	0.11
Brasila-1,10-diene	8.62	1303	0.04	5.93	1371	0.02
African-1-ene	9.26*	1348	0.11	6.73	1429	0.02
α-Terpinyl acetate	9.26*	1348	[0.11]	9.54	1648	0.10
2-epi-α-Funebrene	9.62	1374	0.44	7.08	1456	0.41
α-Duprezianene	9.70	1380	0.59	7.30	1473	0.50
7-epi-Sesquithujene?	9.76	1384	0.02	7.58	1494	0.19
Isolongifolene	9.79	1386	0.04	7.24	1468	0.10
β-Elemene	9.83†	1389	0.40	8.25*	1545	0.54
α-Funebrene	9.88†	1392	[0.40]	7.61	1496	0.05
α-Chamipinene	9.94*	1397	0.16	7.73	1505	0.10
Unknown [m/z 107, 91 (86), 93 (83), 79 (81), 162 (74), 41 (73), 133 (72)... 204 (13)]	9.94*	1397	[0.16]	8.00	1526	0.08
α-Cedrene	10.11*	1409	20.48	7.90	1518	18.76
β-Funebrene	10.11*	1409	[20.48]	7.92	1519	1.40
β-Caryophyllene	10.19*	1415	5.44	8.25*	1545	[0.54]
β-Cedrene	10.19*	1415	[5.44]	8.20	1541	4.42
β-Duprezianene	10.19*	1415	[5.44]	8.07	1531	0.76
cis-Thujopsene	10.38	1429	26.11	8.57	1570	26.21
Isobazzanene	10.42	1432	0.27	8.37	1554	0.30
trans-α-Bergamotene	10.45	1434	0.12	8.28	1548	0.12
Prezizaene	10.51	1439	0.27	8.61	1574	0.27
7,8-Dehydro-α-acoradiene?	10.55*	1442	0.37	9.40*	1637	0.15
α-Himachalene	10.55*	1442	[0.37]	8.73	1583	0.17
Cadina-4,11-diene	10.55*	1442	[0.37]	8.95	1600	0.06
α-Humulene	10.63	1448	0.08	9.07	1610	0.07
Thujopsadiene?	10.72	1455	0.18	9.98	1684	0.22
α-Acoradiene	10.78	1459	0.28	9.18*	1618	0.55

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β-Acoradiene	10.83	1462	0.51	9.25	1624	0.56
Thujopsene isomer	10.87	1465	0.35	9.18*	1618	[0.55]
β-Chamigrene	10.93*	1470	1.64	9.45*	1640	[1.71]
γ-Himachalene	10.93*	1470	[1.64]	9.40*	1637	[0.15]
Unknown [m/z 91, 105 (93), 161 (77), 93 (73), 119 (71), 133 (69)... 204 (31)]	10.95	1471	0.06			
Widdra-2,4(14)-diene?	10.98	1474	0.06	9.62*	1655	[0.49]
Unknown [m/z 189, 91 (95), 105 (93), 133 (84), 119 (75), 41 (59), 93 (46)... 204 (33)]	11.06	1480	0.24	9.73*	1664	2.32
ar-Curcumene	11.09	1482	0.29	10.49	1727	0.32
Valencene	11.15	1486	0.06	9.73*	1664	[2.32]
Pseudowiddrene	11.22*	1492	2.43	9.73*	1664	[2.32]
α-Chamigrene	11.22*	1492	[2.43]	9.88*	1676	3.41
β-Himachalene	11.25	1494	1.78	9.73*	1664	[2.32]
α-Cuprenene	11.28	1496	1.32	9.88*	1676	[3.41]
Cuparene	11.33	1500	4.21	10.88	1760	4.01
1,2-Dihydrocuparene	11.36	1502	0.18	10.07	1692	0.21
Unknown [m/z 121, 123 (45), 91 (24), 107 (24), 122 (24), 95 (23)... 204 (11)]	11.40*	1505	0.48	10.13*	1697	0.59
α-Dehydro-ar-himachalene	11.40*	1505	[0.48]	11.36	1801	0.04
α-Alaskene	11.44*	1509	0.86	9.73*	1664	[2.32]
1,4-Dihydrocuparene	11.44*	1509	[0.86]	10.25	1706	0.27
γ-Cadinene	11.44*	1509	[0.86]	10.13*	1697	[0.59]
β-Curcumene	11.48	1511	0.21	10.04	1689	0.26
γ-Dehydro-ar-himachalene	11.60*	1521	0.31	11.69	1831	0.04
δ-Cadinene	11.60*	1521	[0.31]	10.21*	1703	0.24
β-Sesquiphellandrene	11.60*	1521	[0.31]	10.38	1717	0.14
γ-Cuprenene	11.68	1527	1.36	10.44	1723	1.41
(*E*)-γ-Bisabolene	11.72*	1531	0.14	10.21*	1703	[0.24]
ar-Himachalene	11.72*	1531	[0.14]	11.39	1804	0.02
Unknown [m/z 43, 95 (81), 207 (61), 41 (55), 55 (50)... 222 (3)]	11.76*	1534	0.55	13.62	2008	0.12
δ-Cuprenene epimer I	11.76*	1534	[0.55]	10.71	1746	0.25
δ-Cuprenene epimer II	11.79	1536	0.21	10.78	1752	0.20

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Compound	RT	RI	%	RT	RI	%
Unknown [m/z 106, 41 (86), 43 (84), 149 (75), 69 (75), 91 (63), 93 (61)... 220 (1)]	11.82	1538	0.09	11.13	1781	0.12
Unknown [m/z 91, 119 (98), 121 (91), 105 (85), 43 (82), 41 (76)... 205 (37), 220 (16)]	11.98	1551	0.12	13.16	1964	0.05
Unknown [m/z 95, 191 (52), 107 (50), 121 (32), 81 (31)...]	12.11	1562	0.23	13.92	2037	0.58
Caryophyllenyl alcohol	12.16	1565	0.21	13.45	1991	0.15
Unknown [m/z 95, 131 (96), 202 (64), 187 (61), 159 (55), 105 (50)...202 (64)]	12.22	1570	0.44			
Caryophyllene oxide isomer	12.27*	1574	0.13	12.47	1900	0.02
Caryophyllene oxide	12.27*	1574	[0.13]	12.57	1909	0.07
allo-Cedrol	12.34	1580	0.53	14.07*	2051	10.67
α-Cedrol	12.53*	1594	12.62	14.07*	2051	[10.67]
Widdrol	12.53*	1594	[12.62]	14.44*	2087	2.26
β-Himachalene oxide	12.64*	1603	0.61	12.92	1942	0.06
epi-Cedrol	12.64*	1603	[0.61]	14.60	2102	0.45
β-Biotol	12.71*	1609	0.80	15.93	2238	0.22
10-epi-Cubenol	12.71*	1609	[0.80]	13.48	1995	0.11
Unknown [m/z 138, 110 (77), 137 (75), 107 (62), 91 (61), 93 (60), 109 (57)... 220 (34)]	12.71*	1609	[0.80]	13.25	1973	0.02
Unknown [m/z 107, 41 (86), 123 (85), 82 (79), 95 (77), 93 (76), 91 (73), 69 (71)... 220 (13)]	12.81	1617	0.31	14.44*	2087	[2.26]
α-Acorenol	12.87	1622	0.25	14.27	2071	0.14
Unknown [m/z 132, 175 (22), 119 (18), 91 (18), 157 (18)... 219 (10)]	12.92*	1626	0.48	15.39	2182	0.05
β-Acorenol	12.92*	1626	[0.48]	14.68	2111	0.31
Unknown [m/z 105, 93 (78), 95 (75), 131 (72), 119 (71), 132 (70), 91 (67), 120 (49)... 202 (39), 220 (9)]	12.95	1628	0.51	15.64	2208	0.40

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Compound	RT	RI	%	RT	RI	%
Unknown [m/z 132, 91 (24), 119 (22), 105 (21), 133 (17), 117 (16)... 219 (3)]	13.00	1633	0.19			
Unknown [m/z 123, 81 (77), 95 (77), 107 (72), 41 (72), 93 (66), 55 (64)... 220? (13)]	13.04	1636	0.52			
Himachalol	13.08	1639	0.13	15.00	2143	0.22
Unknown [m/z 41, 91 (96), 79 (88), 69 (82), 123 (80), 93 (80)... 220 (8)]	13.16	1646	0.15	17.18*	2371	0.12
Unknown [m/z 43, 81 (84), 41 (64), 67 (62), 95 (58), 79 (58)... 204 (48), 220 (2)]	13.19	1648	0.21	15.21	2164	0.10
Cedrenol analog	13.23*	1652	0.36	16.22	2268	0.14
14-Hydroxy-9-epi-(*E*)-caryophyllene	13.23*	1652	[0.36]	16.18	2265	0.05
1,7-diepi-α-Cedrenal?	13.40	1665	0.18	14.87	2129	0.16
Cedr-8-en-13-ol	13.58	1680	0.38			
α-Cedrenol	13.61	1683	0.18			
Unknown [m/z 91, 105 (87), 123 (74), 135 (70), 107 (60), 79 (59)... 220 (13)]	13.73	1693	0.26			
Mayurone?	13.78	1697	0.09	16.86	2336	0.13
Thujopsenal	13.82	1700	0.06	15.60	2204	0.07
Unknown [m/z 105, 69 (77), 91 (66), 119 (65), 111 (56), 107 (45), 55 (45)... 220? (2)]	13.85	1703	0.06	17.22	2376	0.03
Thujopsenal analog	14.16	1729	0.09	17.18*	2371	[0.12]
Unknown [m/z 105, 91 (83), 79 (78), 135 (67), 107 (56), 67 (53)... 220 (9)]	14.28	1740	0.03			
Cuparenal	14.32	1744	0.14			
Unknown [m/z 105, 69 (79), 111 (66), 119 (60), 91 (50), 55 (41)... 203 (11), 220 (1)]	14.42	1753	0.10			
Cedryl acetate	14.47	1757	0.05	14.39	2082	0.11
Unknown [m/z 121, 136 (47), 119 (27), 91 (27), 105 (22), 41 (21)... 220 (4)]	14.65	1773	0.05	18.19	2483	0.05

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β-Acoradienol?	14.72	1778	0.02	17.91	2452	0.02
Unknown [m/z 189, 91 (48), 133 (40), 105 (40), 41 (34), 187 (34)... 220 (5)]	14.77	1783	0.05	18.34*	2501	0.04
Unknown [m/z 148, 141 (99), 91 (74), 105 (52), 41 (42), 121 (42), 133 (37)... 218 (32)]	14.82	1787	0.02	19.58	2646	0.02
Unknown [m/z 121, 136 (53), 91 (22), 93 (19), 79 (15), 105 (13)... 220 (3)]	14.86	1791	0.07	18.34*	2501	[0.04]
Nootkatone analog	15.07	1809	0.06	17.72	2430	0.01
Manool	17.56	2043	0.04	19.12	2591	0.04
Total identified	**90.20%**			**87.93%**		
Total reported	**93.90%**			**89.56%**		

*: 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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