CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24D12-PTH03
Customer Identification : Virginian Cedarwood - USA - C70111R
Type : Essential Oil
Source : *Juniperus virginiana*
Customer : Plant Therapy

Checked an approved by:

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

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ISO 17025:2017 CERTIFIED METHOD — MÉTHODE CERTIFIÉE

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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 : Alexis St-Gelais, Ph. D., Chimiste 2013-174
Date : 2024-04-26

PHYSICOCHEMICAL DATA

Refractive index : 1.5043 ± 0.0003 (20 ℃)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-04-12

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

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ANALYSIS SUMMARY - CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
α-Pinene	0.13	Monoterpene
Camphene	0.01	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Δ3-Carene	0.01	Monoterpene
para-Cymene	tr	Monoterpene
Limonene	0.01	Monoterpene
para-Cymenene	0.01	Monoterpene
Terpinolene	0.01	Monoterpene
trans-Pinocarveol	0.01	Monoterpenic alcohol
Borneol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.03	Monoterpenic alcohol
para-Cymen-8-ol	0.03	Monoterpenic alcohol
α-Terpineol	0.05	Monoterpenic alcohol
Verbenone	0.02	Monoterpenic ketone
Carvacrol methyl ether	0.08	Monoterpenic ether
Bornyl acetate	0.01	Monoterpenic ester
Brasila-1,10-diene	0.03	Sesquiterpene
African-1-ene	0.08	Sesquiterpene
Cyclosativene II	0.03	Sesquiterpene
2-epi-α-Funebrene	0.74	Sesquiterpene
α-Duprezianene	0.87	Sesquiterpene
Isolongifolene	0.06	Sesquiterpene
β-Elemene	0.84	Sesquiterpene
α-Funebrene	0.69	Sesquiterpene
α-Chamipinene	0.14	Sesquiterpene
Unknown	0.28	Sesquiterpene
α-Cedrene	21.84	Sesquiterpene
β-Funebrene	3.39	Sesquiterpene
β-Cedrene	0.89	Sesquiterpene
β-Duprezianene	0.16	Sesquiterpene
β-Caryophyllene	5.79	Sesquiterpene
cis-Thujopsene	29.16	Sesquiterpene
Isobazzanene	0.23	Sesquiterpene
trans-α-Bergamotene	0.10	Sesquiterpene
Prezizaene	0.19	Sesquiterpene
7,8-Dehydro-α-acoradiene?	0.04	Sesquiterpene
α-Himachalene	0.31	Sesquiterpene
α-Humulene	0.10	Sesquiterpene
α-Acoradiene	0.26	Sesquiterpene
(*E*)-β-Farnesene	0.50	Sesquiterpene

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β-Acoradiene	0.35	Sesquiterpene
Thujopsene isomer	0.25	Sesquiterpene
γ-Himachalene	0.27	Sesquiterpene
Unknown	0.15	Sesquiterpene
β-Chamigrene	0.78	Sesquiterpene
Unknown	0.16	Sesquiterpene
ar-Curcumene	0.38	Sesquiterpene
Valencene	0.05	Sesquiterpene
Pseudowiddrene	0.81	Sesquiterpene
α-Chamigrene	1.16	Sesquiterpene
β-Himachalene	0.40	Sesquiterpene
α-Cuprenene	1.12	Sesquiterpene
Cuparene	1.39	Sesquiterpene
1,2-Dihydrocuparene	0.11	Sesquiterpene
α-Alaskene	0.15	Sesquiterpene
γ-Cadinene	0.13	Sesquiterpene
Unknown	0.24	Sesquiterpene
α-Dehydro-ar-himachalene	0.04	Sesquiterpene
1,4-Dihydrocuparene	0.12	Sesquiterpene
β-Curcumene	0.17	Sesquiterpene
7-epi-α-Selinene	0.04	Sesquiterpene
δ-Cadinene	0.36	Sesquiterpene
γ-Dehydro-ar-himachalene	0.04	Sesquiterpene
β-Sesquiphellandrene	tr	Sesquiterpene
γ-Cuprenene	0.61	Sesquiterpene
ar-Himachalene	0.16	Sesquiterpene
δ-Cuprenene epimer I	0.07	Sesquiterpene
Unknown	0.11	Oxygenated sesquiterpene
Unknown	0.10	Oxygenated sesquiterpene
δ-Cuprenene epimer II	0.07	Sesquiterpene
Unknown	0.06	Oxygenated sesquiterpene
Unknown	0.10	Oxygenated sesquiterpene
Caryophyllenyl alcohol	0.08	Sesquiterpenic alcohol
Caryophyllene oxide	0.03	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
allo-Cedrol	0.28	Sesquiterpenic alcohol
α-Cedrol	15.02	Sesquiterpenic alcohol
Widdrol	1.26	Sesquiterpenic alcohol
β-Himachalene oxide	0.02	Sesquiterpenic ether
epi-Cedrol	0.26	Sesquiterpenic alcohol
Unknown	0.16	Oxygenated sesquiterpene
Unknown	0.10	Oxygenated sesquiterpene
α-Acorenol	0.40	Sesquiterpenic alcohol
β-Acorenol	0.14	Sesquiterpenic alcohol
Unknown	0.18	Oxygenated sesquiterpene

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Unknown	0.31	Oxygenated sesquiterpene
Unknown	0.16	Oxygenated sesquiterpene
Himachalol	0.10	Sesquiterpenic alcohol
Unknown	0.06	Oxygenated sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Cedrenol analog	0.20	Sesquiterpenic alcohol
14-Hydroxy-9-epi-(*E*)-caryophyllene	0.07	Sesquiterpenic alcohol
1,7-diepi-α-Cedrenal?	0.06	Sesquiterpenic aldehyde
Khusiol	0.16	Sesquiterpenic alcohol
Cedr-8-en-13-ol	0.08	Sesquiterpenic alcohol
α-Bisabolol	0.19	Sesquiterpenic alcohol
α-Cedrenol	0.06	Sesquiterpenic alcohol
Unknown	0.04	Oxygenated sesquiterpene
Mayurone?	0.22	Norsesquiterpenic ketone
Thujopsenal	0.11	Sesquiterpenic aldehyde
Unknown	0.04	Oxygenated sesquiterpene
Thujopsenal analog	0.04	Sesquiterpenic aldehyde
Unknown	0.04	Oxygenated sesquiterpene
Cuparenal	0.02	Sesquiterpenic aldehyde
Unknown	0.01	Oxygenated sesquiterpene
Cedryl acetate	0.02	Sesquiterpenic ester
Unknown	0.03	Oxygenated sesquiterpene
β-Acoradienol?	0.07	Sesquiterpenic alcohol
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Nootkatone analog	0.02	Sesquiterpenic ketone
Consolidated total	**97.27**	

tr: The compound has been detected below 0.005% of the total signal
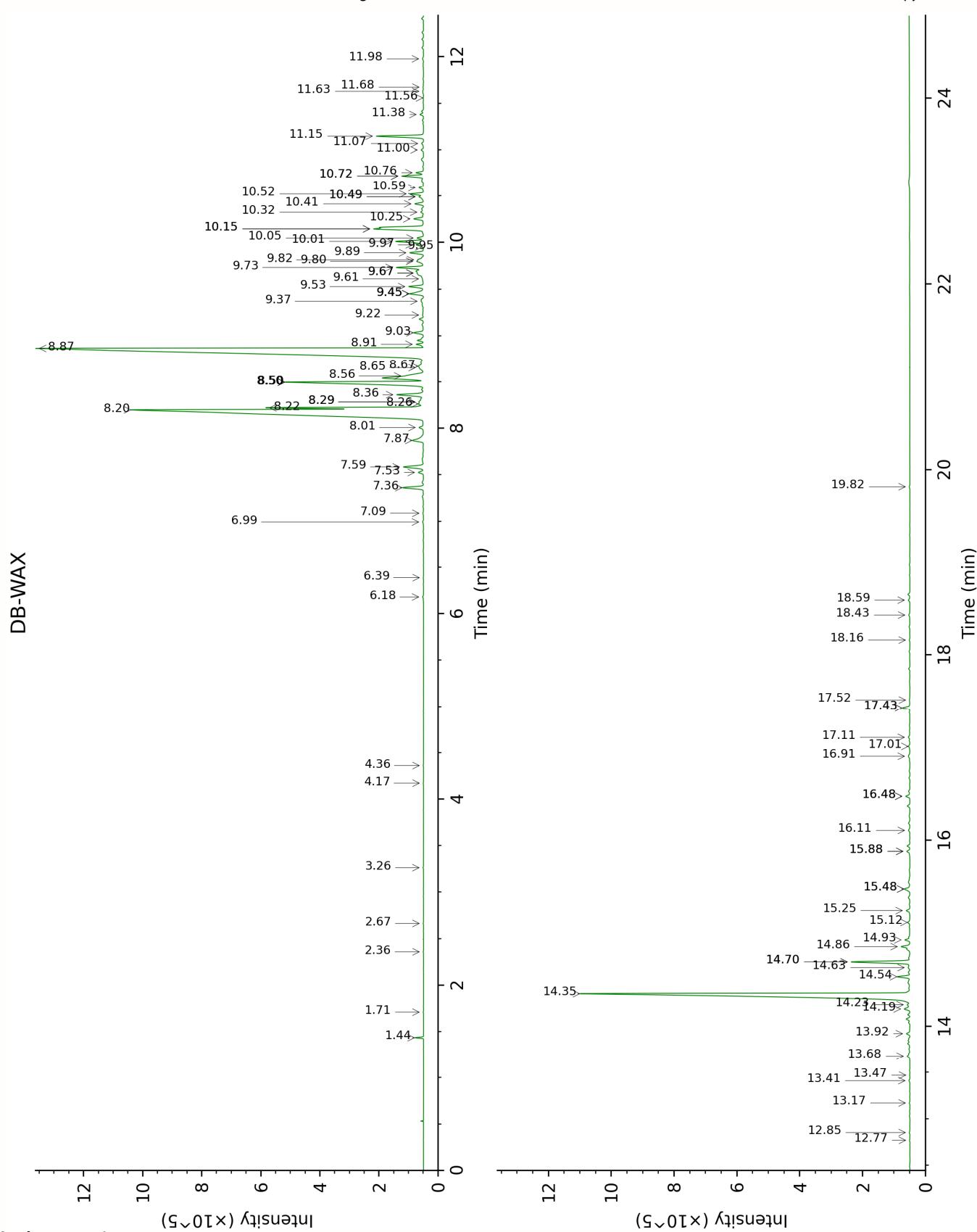
Note: no correction factor was applied
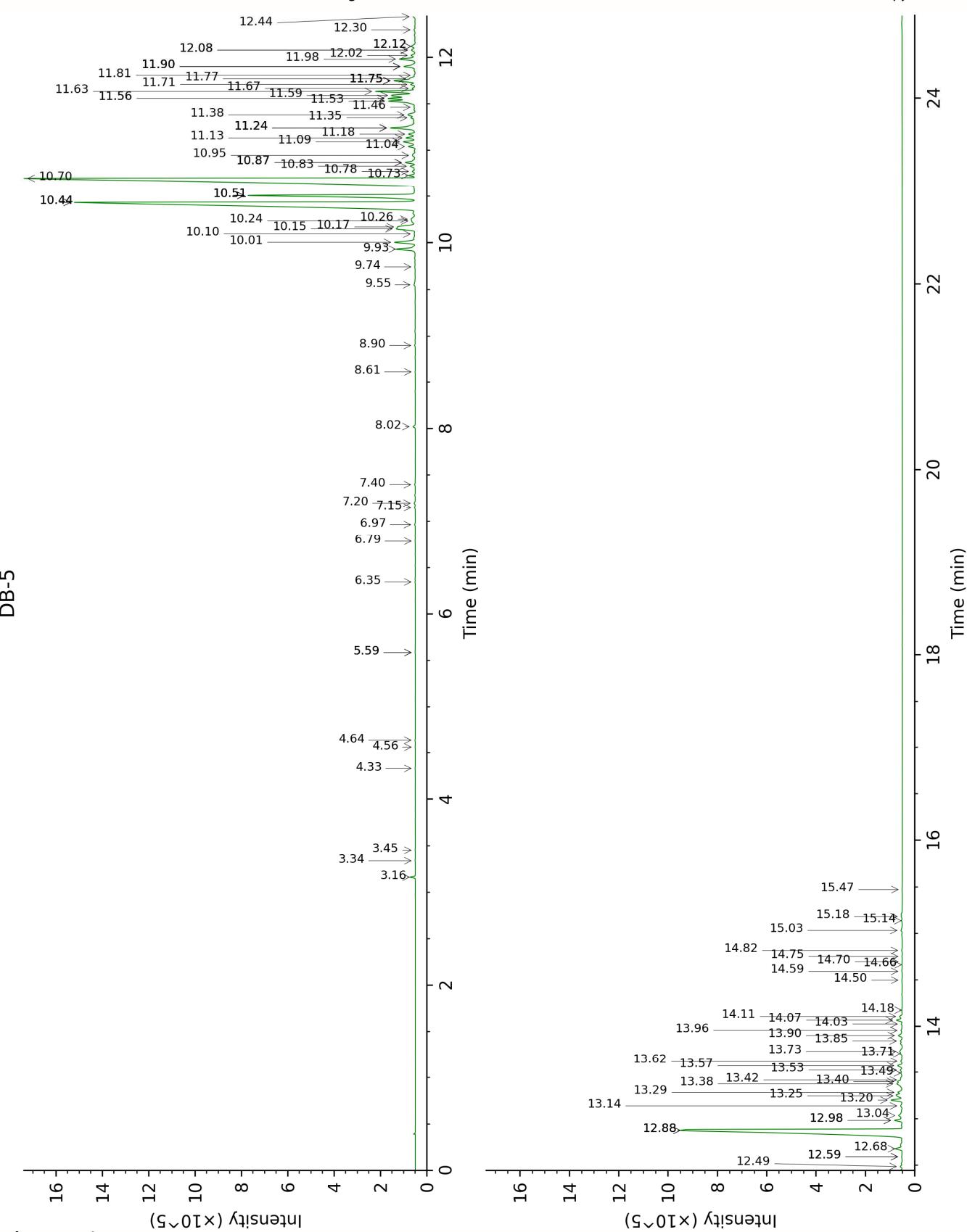
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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.

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DB-WAX

Time (min)

Intensity (×10^5)

11.98
11.63 11.68 11.56
11.38
11.15 11.07 11.00
10.72 10.76
10.52 10.49 10.59
10.41
10.32 10.25
10.15
10.05 10.01
9.97 9.95
9.73 9.82 9.80 9.89
9.61 9.67
9.53 9.45
9.37
9.22
9.03
8.91
8.87
8.65 8.67
8.56
8.50
8.36
8.29 8.26
8.20 8.22
8.01
7.87
7.59 7.53
7.36
7.09
6.99
6.39
6.18
4.36
4.17
3.26
2.67
2.36
1.71
1.44

Time (min)

Intensity (×10^5)

19.82
18.59
18.43
18.16
17.52 17.43
17.11 17.01
16.91
16.48
16.11
15.88
15.48
15.25 15.12
14.86 14.93
14.70 14.63
14.54
14.35
14.23 14.19
13.92
13.68
13.41 13.47
13.17
12.85 12.77

DB-5

FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
α-Pinene	1.44	995.3	0.13	3.16	931.6	0.13
Camphene	1.71	1026.5	0.01	3.34	943.2	0.01
Thuja-2,4(10)-diene	2.36	1087.1	0.01	3.45	950.6	0.01
Δ3-Carene	2.66	1114.2	0.01	4.33	1008.5	0.01
para-Cymene	4.17	1226.6	0.01	4.56	1022.7	tr
Limonene	3.26	1159.3	0.01	4.64	1027.4	0.01
para-Cymenene	6.39	1386.6	0.01	5.59*	1086.9	[0.01]
Terpinolene	4.36	1240.0	0.01	5.59*	1086.9	[0.01]
trans-Pinocarveol	9.22	1603.0	0.03	6.35	1135.0	0.01
Borneol	9.82	1651.2	0.17	6.79	1163.1	0.01
Terpinen-4-ol	8.65	1558.3	0.15	6.97	1174.8	0.03
para-Cymen-8-ol	11.56	1797.9	0.01	7.15	1186.6	0.03
α-Terpineol	9.80	1649.9	0.25	7.20	1189.5	0.05
Verbenone	9.67*	1639.5	[0.29]	7.40	1202.2	0.02
Carvacrol methyl ether	8.67	1559.5	0.22	8.02	1243.8	0.08
Bornyl acetate	8.28*	1529.4	[0.17]	8.61	1283.2	0.01
Brasila-1,10-diene	6.18	1371.5	0.02	8.90	1302.6	0.03
African-1-ene	6.99	1431.5	0.04	9.55	1348.3	0.08
Cyclosativene II	7.09	1438.5	0.02	9.74	1361.8	0.03
2-epi-α-Funebrene	7.36	1459.2	0.66	9.93	1375.2	0.74
α-Duprezianene	7.59	1476.0	0.70	10.01	1380.4	0.87
Isolongifolene	7.53	1471.5	0.17	10.10	1386.7	0.06
β-Elemene	8.50*†	1546.1	[5.05]	10.15	1390.6	0.84
α-Funebrene	7.87	1497.4	0.57	10.17	1392.0	0.69
α-Chamipinene	8.01	1507.9	0.16	10.24	1396.5	0.14
Unknown JUOX II [m/z 107, 91 (86), 93 (83), 79 (81), 162 (74), 41 (73), 133 (72)... 204 (13)]	8.26	1527.7	0.16	10.26	1397.8	0.28
α-Cedrene	8.20	1522.7	21.84	10.44*	1410.8	[25.49]
β-Funebrene	8.22	1524.4	3.39	10.44*	1410.8	[25.49]
β-Cedrene	8.36	1535.5	0.89	10.51*	1416.3	[6.96]
β-Duprezianene	8.28*	1529.4	[0.17]	10.51*	1416.3	[6.96]
β-Caryophyllene	8.50*†	1546.1	[5.05]	10.51*	1416.3	[6.96]
cis-Thujopsene	8.87	1575.0	28.97	10.70	1430.4	29.16
Isobazzanene	8.56	1551.3	0.48	10.73	1432.7	0.23
trans-α-Bergamotene	8.50*†	1546.1	[5.05]	10.78	1436.1	0.10
Prezizaene	8.91	1578.5	0.21	10.83	1440.2	0.19
7,8-Dehydro-α-acoradiene?	9.61	1634.4	0.04	10.87*	1443.1	[0.44]

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Compound						
α-Himachalene	9.03	1588.1	0.31	10.87*	1443.1	[0.44]
α-Humulene	9.37	1614.8	0.08	10.95	1448.9	0.10
α-Acoradiene	9.45*	1621.3	[0.57]	11.04	1456.0	0.26
(*E*)-β-Farnesene	9.53	1627.6	0.43	11.09	1459.8	0.50
β-Acoradiene	9.45*	1621.3	[0.57]	11.14	1462.9	0.35
Thujopsene isomer	9.45*	1621.3	[0.57]	11.18	1465.9	0.25
γ-Himachalene	9.67*	1639.5	[0.29]	11.24*	1470.9	[1.19]
Unknown JUVI IV [m/z 91, 105 (93), 161 (77), 93 (73), 119 (71), 133 (69)... 204 (31)]				11.24*	1470.9	[1.19]
β-Chamigrene	9.73	1644.5	0.78	11.24*	1470.9	[1.19]
Unknown AMBA V [m/z 189, 91 (95), 105 (93), 133 (84), 119 (75), 41 (59), 93 (46)... 204 (33)]	9.98	1664.3	0.20	11.35	1479.0	0.16
ar-Curcumene	10.76	1729.0	0.20	11.38	1481.3	0.38
Valencene	9.95	1662.5	0.02	11.46	1487.4	0.05
Pseudowiddrene	10.01	1667.3	0.81	11.53*†	1492.3	[1.14]
α-Chamigrene	10.15*†	1678.3	[1.40]	11.56*†	1494.5	[0.95]
β-Himachalene	9.89	1657.3	0.40	11.56*†	1494.5	[0.95]
α-Cuprenene	10.15*†	1678.3	[1.40]	11.59	1496.9	1.12
Cuparene	11.15	1762.7	1.33	11.64	1500.1	1.39
1,2-Dihydrocuparene	10.32	1693.0	0.08	11.67	1502.5	0.11
α-Alaskene	10.05	1670.3	0.18	11.71	1505.6	0.15
γ-Cadinene	10.49*	1706.6	[0.17]	11.75*	1508.8	[0.89]
Unknown JUVI V [m/z 121, 123 (45), 91 (24), 107 (24), 122 (24), 95 (23)... 204 (11)]	10.41	1700.3	0.24	11.75*	1508.8	[0.89]
α-Dehydro-ar-himachalene	11.63	1804.0	0.04	11.75*	1508.8	[0.89]
1,4-Dihydrocuparene	10.59	1714.8	0.12	11.75*	1508.8	[0.89]
β-Curcumene	10.25	1687.1	0.28	11.77	1510.4	0.17
7-epi-α-Selinene	10.49*	1706.6	[0.17]	11.81	1513.3	0.04
δ-Cadinene	10.52	1709.1	0.36	11.90*	1520.7	[0.52]
γ-Dehydro-ar-himachalene	11.98	1834.9	0.04	11.90*	1520.7	[0.52]
β-Sesquiphellandrene	10.72*	1725.9	[0.60]	11.90*	1520.7	[0.52]

Compound						
γ-Cuprenene	10.72*	1725.9	[0.60]	11.98	1527.0	0.61
ar-Himachalene	11.68	1807.8	0.02	12.02	1530.2	0.16
δ-Cuprenene epimer I	11.00	1750.0	0.07	12.08*	1534.6	[0.19]
Unknown JUVI VII [m/z 43, 95 (81), 207 (61), 41 (55), 55 (50)... 222 (3)]	13.92	2012.8	0.11	12.08*	1534.6	[0.19]
Unknown JUOX VI [m/z 106, 41 (86), 43 (84), 149 (75), 69 (75), 91 (63), 93 (61)... 220 (1)]	11.38	1782.7	0.10	12.12*	1537.8	[0.19]
δ-Cuprenene epimer II	11.07	1756.0	0.07	12.12*	1537.8	[0.19]
Unknown JUVI VIII [m/z 91, 119 (98), 121 (91), 105 (85), 43 (82), 41 (76)... 205 (37), 220 (16)]	13.41	1965.1	0.03	12.30	1551.7	0.06
Unknown JUVI IX [m/z 95, 191 (52), 107 (50), 121 (32), 81 (31)...]	14.24	2043.1	0.09	12.44	1563.0	0.10
Caryophyllenyl alcohol	13.68	1990.2	0.09	12.49	1566.5	0.08
Caryophyllene oxide	12.85	1913.0	0.03	12.59*	1574.9	[0.05]
Caryophyllene oxide isomer	12.77	1905.5	0.01	12.59*	1574.9	[0.05]
allo-Cedrol	14.19	2038.6	0.20	12.68	1581.6	0.28
α-Cedrol	14.35	2054.5	15.02	12.88*	1597.1	[16.28]
Widdrol	14.70*	2087.7	[1.62]	12.88*	1597.1	[16.28]
β-Himachalene oxide	13.17	1942.7	0.02	12.98*	1605.6	[0.29]
epi-Cedrol	14.86	2103.6	0.26	12.98*	1605.6	[0.29]
Unknown CEDE XIII [m/z 138, 110 (77), 137 (75), 107 (62), 91 (61), 93 (60), 109 (57)... 220 (34)]	13.47	1970.7	0.01	13.04	1609.9	0.16
Unknown JUVI XI [m/z 107, 41 (86), 123 (85), 82 (79), 95 (77), 93 (76), 91 (73),	14.70*	2087.7	[1.62]	13.14	1618.4	0.10

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69 (71)... 220 (13)]						
α-Acorenol	14.54	2072.2	0.35	13.20	1623.6	0.40
β-Acorenol	14.93	2110.6	0.14	13.25	1627.3	0.14
Unknown JUVI X [m/z 105, 93 (78), 95 (75), 131 (72), 119 (71), 132 (70), 91 (67), 120 (49)... 202 (39), 220 (9)]	15.88*	2206.6	[0.10]	13.28	1630.4	0.18
Unknown JUVI XIII [m/z 132, 91 (24), 119 (22), 105 (21), 133 (17), 117 (16)... 219 (3)]				13.38	1638.0	0.31
Unknown JUVI XV [m/z 123, 81 (77), 95 (77), 107 (72), 41 (72), 93 (66), 55 (64)... 220? (13)]				13.40	1640.1	0.16
Himachalol	15.25	2142.3	0.13	13.42	1641.5	0.10
Unknown JUVI XIV [m/z 41, 91 (96), 79 (88), 69 (82), 123 (80), 93 (80)... 220 (8)]	17.43*	2370.4	[0.22]	13.49	1647.7	0.06
Unknown JUVI XVI [m/z 43, 81 (84), 41 (64), 67 (62), 95 (58), 79 (58)... 204 (48), 220 (2)]	15.48*	2165.7	[0.22]	13.53	1650.3	0.09
Cedrenol analog	16.48*	2268.3	[0.13]	13.57	1654.3	0.20
14-Hydroxy-9-epi-(*E*)-caryophyllene	16.48*	2268.3	[0.13]	13.62	1658.3	0.07
1,7-diepi-α-Cedrenal?	15.12	2129.4	0.08	13.71	1665.3	0.06
Khusiol	16.11	2229.9	0.05	13.73	1667.3	0.16
Cedr-8-en-13-ol	16.90	2313.4	0.07	13.84	1676.7	0.08
α-Bisabolol	15.48*	2165.7	[0.22]	13.90	1681.5	0.19
α-Cedrenol	17.01	2324.9	0.05	13.96	1686.1	0.06
Unknown JUVI XVII [m/z 91, 105 (87), 123 (74), 135 (70), 107 (60), 79 (59)... 220 (13)]				14.03	1691.8	0.04
Mayurone?	17.11	2335.6	0.05	14.07	1695.2	0.22

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Compound	R.T.	R.I.	%	R.T.	R.I.	%
Thujopsenal	15.88*	2206.6	[0.10]	14.11	1698.4	0.11
Unknown JUVI XVIII [m/z 105, 69 (77), 91 (66), 119 (65), 111 (56), 107 (45), 55 (45)... 220? (2)]	17.52	2379.8	0.03	14.18	1704.1	0.04
Thujopsenal analog	17.43*	2370.4	[0.22]	14.50	1731.9	0.04
Unknown JUVI XIX [m/z 105, 91 (83), 79 (78), 135 (67), 107 (56), 67 (53)... 220 (9)]				14.59	1740.1	0.04
Cuparenal				14.66	1746.3	0.02
Unknown JUVI XX [m/z 105, 69 (79), 111 (66), 119 (60), 91 (50), 55 (41)... 203 (11), 220 (1)]				14.70	1749.1	0.01
Cedryl acetate	14.63	2081.8	0.07	14.75	1754.0	0.02
Unknown CEDE XXII [m/z 91, 105 (74), 93 (67), 79 (59), 133 (54), 41 (47), 107 (46)...]	18.43	2481.5	0.04	14.82	1759.6	0.03
β-Acoradienol?	18.16	2451.2	0.02	15.03	1778.3	0.07
Unknown JUVI XXIII [m/z 148, 141 (99), 91 (74), 105 (52), 41 (42), 121 (42), 133 (37)... 218 (32)]	19.82	2642.7	0.02	15.14	1787.3	0.04
Unknown JUVI XXIV [m/z 121, 136 (53), 91 (22), 93 (19), 79 (15), 105 (13)... 220 (3)]	18.59	2499.5	0.05	15.18	1791.3	0.05
Nootkatone analog				15.47	1816.9	0.02
Total reported		95.62%			97.98%	

*: 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

Laboratoire PhytoChemia

Plus que des analyses... des conseils