

Date : 2024-06-26

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24F11-PTH02

Customer Identification : Virginian Cedarwood - USA - C70112R

Type : Essential Oil

Source : *Juniperus virginiana*

Customer : Plant Therapy

Checked and approved by:

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

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

Date : 2024-06-26

PHYSICOCHEMICAL DATA

Refractive index : 1.5047 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2024-06-14

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
α -Pinene	0.04	Monoterpene
Thuja-2,4(10)-diene	tr	Monoterpene
Limonene	0.01	Monoterpene
Terpinolene	0.01	Monoterpene
Terpinen-4-ol	0.03	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.02	Monoterpenic alcohol
Myrtenol	0.02	Monoterpenic alcohol
Verbenone	0.02	Monoterpenic ketone
Carvacrol methyl ether	0.12	Monoterpenic ether
Brasila-1,10-diene	0.03	Sesquiterpene
Carvacrol	0.02	Monoterpenic alcohol
α -Terpinyl acetate	0.03	Monoterpenic ester
African-1-ene	0.03	Sesquiterpene
Cyclosativene II	0.02	Sesquiterpene
2-epi- α -Funebrene	0.65	Sesquiterpene
α -Duprezianene	0.70	Sesquiterpene
Isolongifolene	0.04	Sesquiterpene
α -Funebrene	0.13	Sesquiterpene
β -Elemene	0.81	Sesquiterpene
α -Chamipinene	0.12	Sesquiterpene
Unknown	0.09	Sesquiterpene
β -Funebrene	3.14	Sesquiterpene
α -Cedrene	21.60	Sesquiterpene
β -Duprezianene	0.76	Sesquiterpene
β -Caryophyllene	0.77	Sesquiterpene
β -Cedrene	5.10	Sesquiterpene
<i>cis</i> -Thujopsene	22.64	Sesquiterpene
Isobazzanene	0.19	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.15	Sesquiterpene
Prezizaene	0.24	Sesquiterpene
α -Himachalene	0.26	Sesquiterpene
7,8-Dehydro- α -acoradiene?	0.15	Sesquiterpene
α -Humulene	0.20	Sesquiterpene
Thujopsadiene?	0.03	Sesquiterpene
α -Acoradiene	0.23	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.46	Sesquiterpene
β -Acoradiene	0.42	Sesquiterpene
Thujopsene isomer	0.27	Sesquiterpene
β -Chamigrene	0.98	Sesquiterpene
Unknown	0.38	Sesquiterpene

γ -Himachalene	0.08	Sesquiterpene
ar-Curcumene	0.26	Sesquiterpene
Unknown	[0.26]	Sesquiterpene
β -Selinene	[0.26]	Sesquiterpene
Valencene	0.04	Sesquiterpene
Pseudowiddrene	1.19	Sesquiterpene
Unknown	0.10	Unknown
α -Chamigrene	2.15	Sesquiterpene
α -Cuprenene	0.85	Sesquiterpene
β -Himachalene	0.38	Sesquiterpene
Cuparene	1.79	Sesquiterpene
1,2-Dihydrocuparene	0.14	Sesquiterpene
α -Alaskene	0.24	Sesquiterpene
1,4-Dihydrocuparene	0.03	Sesquiterpene
α -Dehydro-ar-himachalene	0.02	Sesquiterpene
β -Curcumene	0.07	Sesquiterpene
Unknown	1.44	Sesquiterpene
7-epi- α -Selinene	0.05	Sesquiterpene
β -Sesquiphellandrene	0.01	Sesquiterpene
γ -Dehydro-ar-himachalene	0.03	Sesquiterpene
δ -Cadinene	0.70	Sesquiterpene
γ -Cuprenene	0.82	Sesquiterpene
ar-Himachalene	0.02	Sesquiterpene
(E)- γ -Bisabolene	0.19	Sesquiterpene
α -Cadinene	0.09	Sesquiterpene
δ -Cuprenene epimer I	0.10	Sesquiterpene
Unknown	0.10	Oxygenated sesquiterpene
δ -Cuprenene epimer II	0.08	Sesquiterpene
Unknown	0.08	Oxygenated sesquiterpene
α -Elemol	0.01	Sesquiterpenic alcohol
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
Caryophyllenyl alcohol	0.12	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
allo-Cedrol	0.29	Sesquiterpenic alcohol
Widdrol	1.75	Sesquiterpenic alcohol
α -Cedrol	18.38	Sesquiterpenic alcohol
epi-Cedrol	0.32	Sesquiterpenic alcohol
Unknown	0.05	Oxygenated sesquiterpene
1,10-diepi-Cubenol	0.19	Sesquiterpenic alcohol
Junenol	0.15	Sesquiterpenic alcohol
Unknown	0.09	Oxygenated sesquiterpene
2-epi- α -Cedren-3-one	0.04	Sesquiterpenic ketone
α -Acorenol	0.35	Sesquiterpenic alcohol

β-Acorenol	0.36	Sesquiterpenic alcohol
Unknown	0.18	Oxygenated sesquiterpene
Unknown	0.26	Oxygenated sesquiterpene
Unknown	0.49	Oxygenated sesquiterpene
Himachalol	0.14	Sesquiterpenic alcohol
Unknown	0.22	Oxygenated sesquiterpene
Unknown	0.21	Oxygenated sesquiterpene
Cedrenol analog	0.06	Sesquiterpenic alcohol
Unknown	0.18	Oxygenated sesquiterpene
14-Hydroxy-9-epi-(E)-caryophyllene	0.10	Sesquiterpenic alcohol
1,7-diepi-α-Cedrenal?	0.16	Sesquiterpenic aldehyde
Cedr-8-en-13-ol	0.11	Sesquiterpenic alcohol
α-Bisabolol	0.19	Sesquiterpenic alcohol
α-Cedrenol	0.13	Sesquiterpenic alcohol
Unknown	0.15	Oxygenated sesquiterpene
Mayurone?	0.02	Norsesquiterpenic ketone
Thujopsenal	0.12	Sesquiterpenic aldehyde
Unknown	0.06	Oxygenated sesquiterpene
Thujopsenal analog	0.02	Sesquiterpenic aldehyde
Unknown	0.04	Oxygenated sesquiterpene
Cuparenal	0.01	Sesquiterpenic aldehyde
Unknown	0.02	Oxygenated sesquiterpene
Cedryl acetate	0.08	Sesquiterpenic ester
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
β-Acoradienol?	0.09	Sesquiterpenic alcohol
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.06	Oxygenated sesquiterpene
Nootkatone analog	0.02	Sesquiterpenic ketone
Manool	0.03	Diterpenic alcohol
7,13-Abietadiene	0.06	Diterpene
Consolidated total	97.87	

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

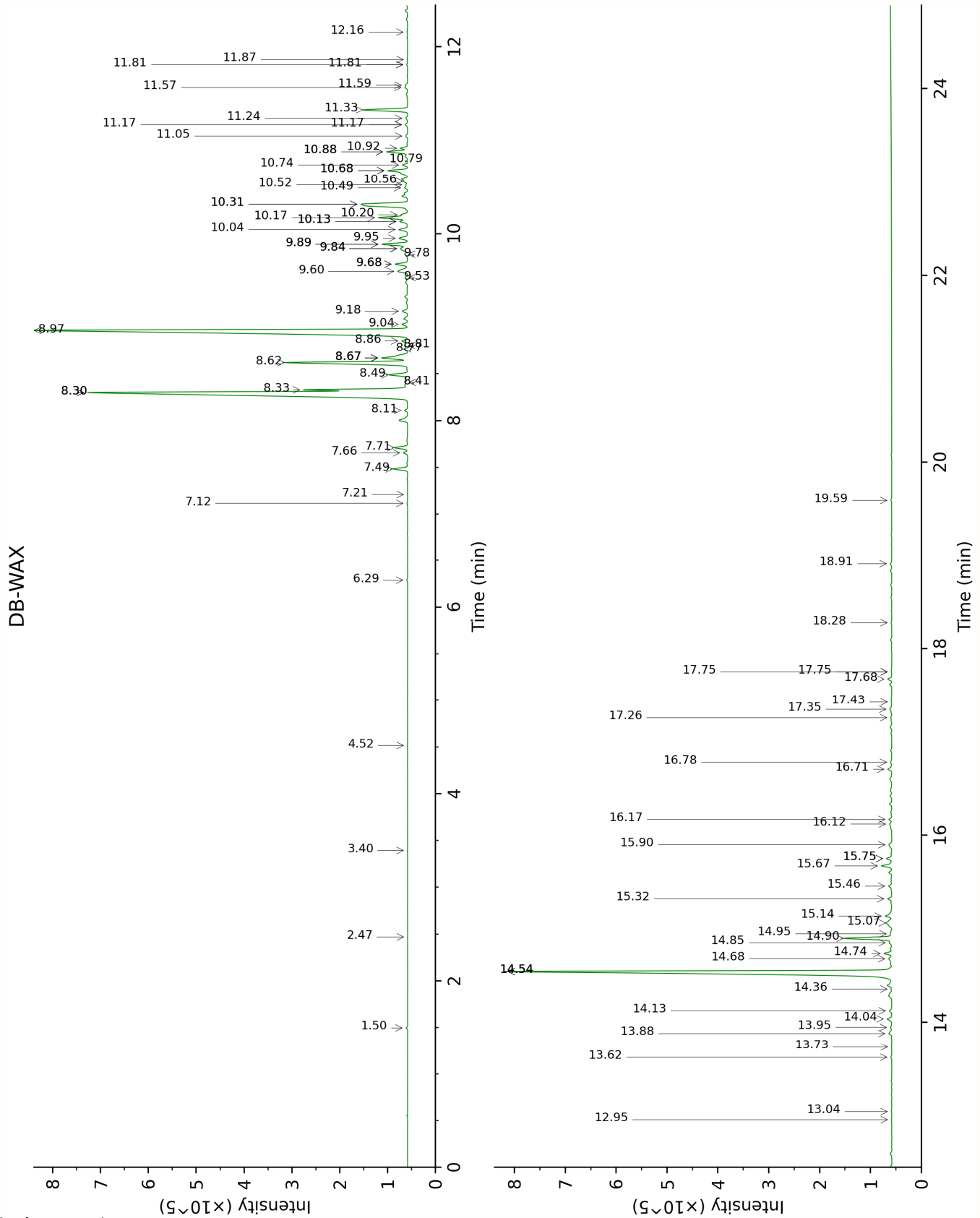
Note: no correction factor was applied

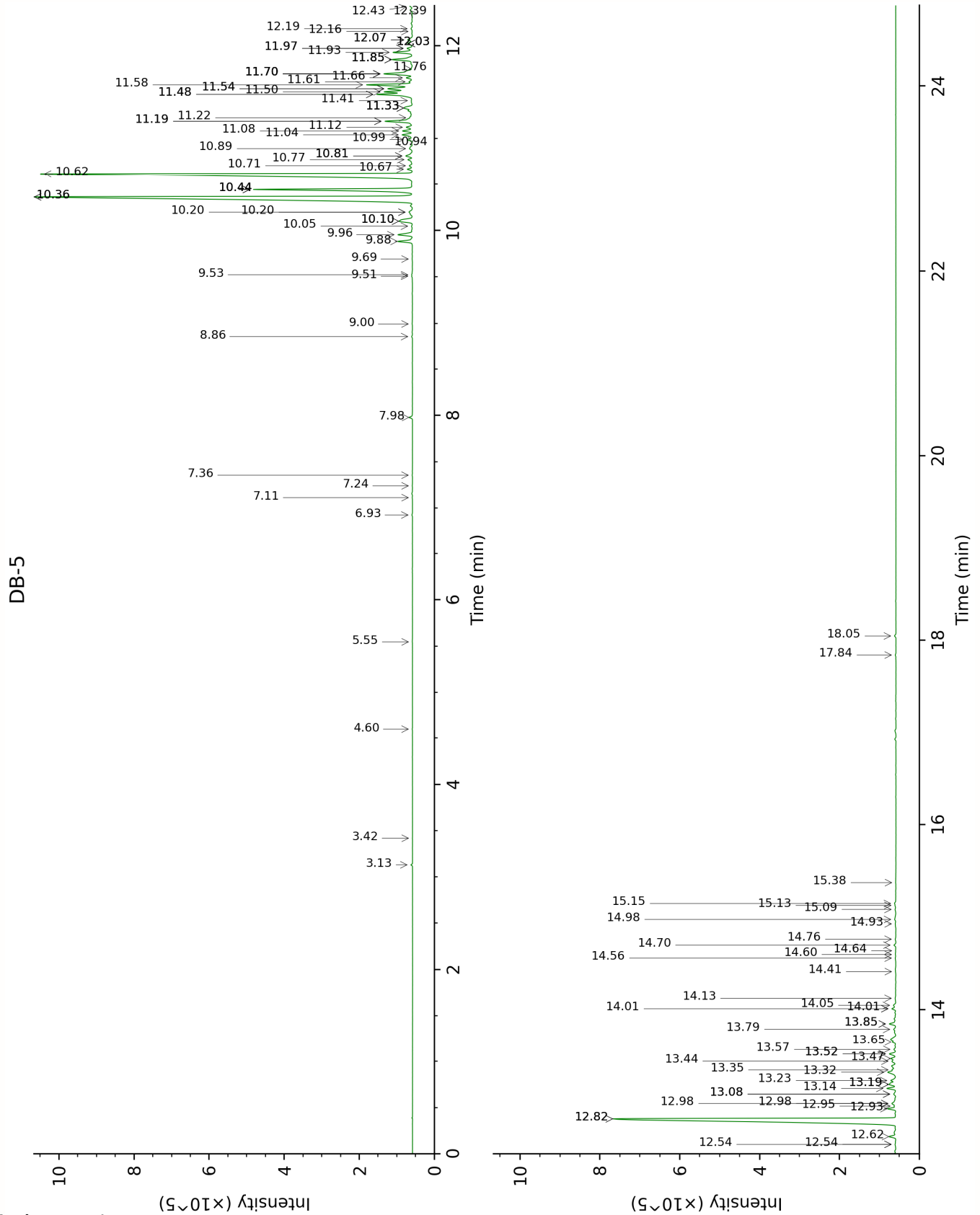
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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





FULL ANALYSIS DATA

α-Pinene	Column DB-WAX			Column DB-5		
	1.50	989.9	0.04	3.13	931.1	0.04
Thuja-2,4(10)-diene	2.47	1084.2	0.01	3.42	950.2	tr
Limonene	3.40	1156.0	0.02	4.60	1026.9	0.01
Terpinolene	4.52	1236.9	0.02	5.55	1086.5	0.01
Terpinen-4-ol	8.81	1553.3	0.16	6.93	1174.4	0.03
<i>para</i> -Cymen-8-ol	11.81*	1797.5	[0.03]	7.11	1186.3	0.02
Myrtenol	11.17*	1743.3	[0.11]	7.24	1194.5	0.02
Verbenone	9.89*	1638.1	[0.99]	7.36	1201.8	0.02
Carvacrol methyl ether	8.86	1556.9	0.26	7.98	1243.5	0.12
Brasila-1,10-diene	6.29	1365.4	0.04	8.86	1302.5	0.03
Carvacrol	15.67	2154.9	0.44	9.00	1312.0	0.02
α -Terpinyl acetate	9.95	1643.2	0.39	9.51	1348.2	0.03
African-1-ene	7.12	1425.7	0.02	9.52	1349.3	0.03
Cyclosativene II	7.21	1432.6	0.01	9.69	1361.3	0.02
2-epi- α -Funebrene	7.49	1452.8	0.56	9.88	1374.7	0.65
α -Duprezianene	7.71	1469.5	0.53	9.96	1379.8	0.70
Isolongifolene	7.66	1465.5	0.17	10.05	1386.2	0.04
α -Funebrene	8.11	1499.2	0.13	10.10*	1390.0	[0.93]
β -Elemene	8.67*	1542.4	[1.43]	10.10*	1390.0	[0.93]
α -Chamipinene	8.30*	1513.9	[21.40]	10.20*	1396.9	[0.21]
Unknown JUOX II [m/z 107, 91 (86), 93 (83), 79 (81), 162 (74), 41 (73), 133 (72)... 204 (13)]	8.41	1522.3	0.09	10.20*	1396.9	[0.21]
β -Funebrene	8.33	1516.2	3.14	10.36*	1408.7	[24.73]
α -Cedrene	8.30*	1513.9	[21.40]	10.36*	1408.7	[24.73]
β -Duprezianene	8.49	1528.5	0.76	10.44*	1414.7	[6.63]
β -Caryophyllene	8.67*	1542.4	[1.43]	10.44*	1414.7	[6.63]
β -Cedrene	8.62	1538.6	5.10	10.44*	1414.7	[6.63]
<i>cis</i> -Thujopsene	8.97	1565.5	22.37	10.62	1427.5	22.64
Isobazzanene	8.77	1549.9	0.20	10.67	1431.4	0.19
<i>trans</i> - α - Bergamotene	8.67*	1542.4	[1.43]	10.71	1434.3	0.15
Prezizaene	9.04	1570.5	0.23	10.77	1439.2	0.24
α -Himachalene	9.18	1581.2	0.26	10.81*	1442.2	[0.38]
7,8-Dehydro- α - acoradiene?	9.78	1629.6	0.15	10.81*	1442.2	[0.38]
α -Humulene	9.53	1609.5	0.12	10.89	1448.1	0.20
Thujopsadiene?	10.49	1686.3	0.13	10.94	1452.0	0.03
α -Acoradiene	9.60	1614.9	0.57	10.99	1455.3	0.23
(<i>E</i>)- β -Farnesene	9.84*	1634.3	[0.46]	11.04	1459.2	0.46

β -Acoradiene	9.68*	1621.1	[0.50]	11.08	1462.3	0.42
Thujopsene isomer	9.68*	1621.1	[0.50]	11.12	1465.3	0.27
β -Chamigrene	9.89*	1638.1	[0.99]	11.19*	1470.1	[1.36]
Unknown JUVI IV [m/z 91, 105 (93), 161 (77), 93 (73), 119 (71), 133 (69)... 204 (31)]				11.19*	1470.1	[1.36]
γ -Himachalene	9.84*	1634.3	[0.46]	11.22	1472.9	0.08
ar-Curcumene	10.92	1722.2	0.26	11.33*	1480.7	[0.51]
Unknown AMBA V [m/z 189, 91 (95), 105 (93), 133 (84), 119 (75), 41 (59), 93 (46)... 204 (33)]	10.13*	1657.5	[0.33]	11.33*	1480.7	[0.51]
β -Selinene	10.13*	1657.5	[0.33]	11.33*	1480.7	[0.51]
Valencene	10.13*	1657.5	[0.33]	11.41	1486.7	0.04
Pseudowiddrene	10.17	1660.8	1.19	11.48*†	1491.7	[1.66]
Unknown JUVI XXV [m/z 203, 119 (83), 145 (51), 135 (51)]	11.57	1776.6	0.10	11.48*†	1491.7	[1.66]
α -Chamigrene	10.31*	1672.3	[3.00]	11.50*†	1493.8	[1.11]
α -Cuprenene	10.31*	1672.3	[3.00]	11.54*	1496.3	[1.23]
β -Himachalene	10.04	1650.5	0.38	11.54*	1496.3	[1.23]
Cuparene	11.33	1756.6	1.68	11.58	1499.4	1.79
1,2- Dihydrocuparene	10.56	1692.1	0.15	11.61	1501.9	0.14
α -Alaskene	10.20	1663.2	0.21	11.66	1505.1	0.24
1,4- Dihydrocuparene	10.79	1711.3	0.03	11.70*†	1508.5	[1.37]
α -Dehydro-ar- himachalene	11.81*	1797.5	[0.03]	11.70*†	1508.5	[1.37]
β -Curcumene	10.52	1688.9	0.07	11.70*†	1508.5	[1.37]
Unknown JUVI V [m/z 121, 123 (45), 91 (24), 107 (24), 122 (24), 95 (23)... 204 (11)]				11.70*†	1508.5	[1.37]
7-epi- α -Selinene	10.68*	1702.0	[0.75]	11.76	1513.0	0.05
β - Sesquiphellandrene	10.88*	1719.0	[0.83]	11.85*	1520.6	[1.00]
γ -Dehydro-ar- himachalene	12.16	1827.9	0.03	11.85*	1520.6	[1.00]
δ -Cadinene	10.68*	1702.0	[0.75]	11.85*	1520.6	[1.00]
γ -Cuprenene	10.88*	1719.0	[0.83]	11.93	1526.7	0.82

ar-Himachalene	11.87	1802.3	0.02	11.97*	1530.1	[0.23]
(E)- γ -Bisabolene	10.74	1707.1	0.19	11.97*	1530.1	[0.23]
α -Cadinene	11.05	1733.1	0.09	12.03*	1534.2	[0.26]
δ -Cuprenene epimer I	11.17*	1743.3	[0.11]	12.03*	1534.2	[0.26]
Unknown JUVI VII [m/z 43, 95 (81), 207 (61), 41 (55), 55 (50)... 222 (3)]	14.13	2005.5	0.10	12.03*	1534.2	[0.26]
δ -Cuprenene epimer II	11.24	1749.0	0.08	12.07*	1537.3	[0.25]
Unknown JUOX VI [m/z 106, 41 (86), 43 (84), 149 (75), 69 (75), 91 (63), 93 (61)... 220 (1)]	11.59	1778.6	0.08	12.07*	1537.3	[0.25]
α -Elemol	14.36	2027.6	0.02	12.16	1544.4	0.01
Unknown JUVI VIII [m/z 91, 119 (98), 121 (91), 105 (85), 43 (82), 41 (76)... 205 (37), 220 (16)]	13.62	1958.9	0.04	12.19	1546.8	0.07
Unknown JUVI IX [m/z 95, 191 (52), 107 (50), 121 (32), 81 (31)...]	14.54*	2045.3	[18.99]	12.39	1562.5	0.12
Caryophyllenyl alcohol	13.95	1988.8	0.05	12.43	1566.0	0.12
Caryophyllene oxide	13.04	1905.9	0.02	12.54*	1574.5	[0.06]
Caryophyllene oxide isomer	12.95	1898.0	0.02	12.54*	1574.5	[0.06]
allo-Cedrol	14.54*	2045.3	[18.99]	12.62	1581.1	0.29
Widdrol	14.90	2079.0	1.75	12.82*	1596.2	[20.13]
α -Cedrol	14.54*	2045.3	[18.99]	12.82*	1596.2	[20.13]
epi-Cedrol	15.07	2095.0	0.46	12.92	1604.9	0.32
Unknown CEDE XIII [m/z 138, 110 (77), 137 (75), 107 (62), 91 (61), 93 (60), 109 (57)... 220 (34)]	13.74	1969.1	0.02	12.95	1607.1	0.05
1,10-diepi-Cubenol	14.04	1997.3	0.19	12.98*	1609.5	[0.26]
Junenol	13.88	1982.4	0.15	12.98*	1609.5	[0.26]
Unknown JUVI XI [m/z 107, 41 (86),	14.95	2083.6	0.09	13.08*	1617.9	[0.13]

123 (85), 82 (79), 95 (77), 93 (76), 91 (73), 69 (71)... 220 (13)]						
2-epi- α -Cedren-3-one				13.08*	1617.9	[0.13]
α -Acorenol	14.74	2063.6	0.29	13.14	1623.0	0.35
β -Acorenol	15.14	2102.2	0.36	13.19*	1626.6	[0.42]
Unknown JUVI XII [m/z 132, 175 (22), 119 (18), 91 (18), 157 (18)... 219 (10)]	15.90	2177.1	0.18	13.19*	1626.6	[0.42]
Unknown JUVI X [m/z 105, 93 (78), 95 (75), 131 (72), 119 (71), 132 (70), 91 (67), 120 (49)... 202 (39), 220 (9)]	16.17	2204.6	0.10	13.23	1630.0	0.26
Unknown JUVI XV [m/z 123, 81 (77), 95 (77), 107 (72), 41 (72), 93 (66), 55 (64)... 220? (13)]				13.32	1637.5	0.49
Himachalol	15.46	2133.7	0.12	13.35	1639.6	0.14
Unknown JUVI XIV [m/z 41, 91 (96), 79 (88), 69 (82), 123 (80), 93 (80)... 220 (8)]	17.75*	2369.3	[0.04]	13.44	1647.4	0.22
Unknown JUVI XVI [m/z 43, 81 (84), 41 (64), 67 (62), 95 (58), 79 (58)... 204 (48), 220 (2)]	15.75*	2162.5	[0.21]	13.47	1649.7	0.21
Cedrenol analog	16.78	2266.9	0.06	13.52*	1653.9	[0.32]
Unknown UNKN CLIII [m/z 135, 177 (86), 109 (78), 220 (68), 121 (66), 69 (60)...]	14.68	2058.3	0.18	13.52*	1653.9	[0.32]
14-Hydroxy-9-epi-(E)-caryophyllene	16.71	2259.3	0.17	13.57	1657.9	0.10
1,7-diepi- α -Cedrenal?	15.32	2120.3	0.15	13.65	1664.8	0.16
Cedr-8-en-13-ol	17.26	2316.9	0.04	13.79	1676.4	0.11
α -Bisabolol	15.75*	2162.5	[0.21]	13.85*	1681.3	[0.31]

α -Cedrenol	17.35	2326.5	0.13	13.85*	1681.3	[0.31]
Unknown JUVI XVII [m/z 91, 105 (87), 123 (74), 135 (70), 107 (60), 79 (59)... 220 (13)]				14.01*	1694.9	[0.17]
Mayurone?	17.43	2334.7	0.02	14.01*	1694.9	[0.17]
Thujopsenal	16.12	2199.6	0.16	14.05	1697.9	0.12
Unknown JUVI XVIII [m/z 105, 69 (77), 91 (66), 119 (65), 111 (56), 107 (45), 55 (45)... 220? (2)]				14.13	1704.2	0.06
Thujopsenal analog	17.75*	2369.3	[0.04]	14.41	1729.2	0.02
Unknown JUVI XIX [m/z 105, 91 (83), 79 (78), 135 (67), 107 (56), 67 (53)... 220 (9)]				14.56	1741.8	0.04
Cuparenal				14.60	1745.2	0.01
Unknown JUVI XX [m/z 105, 69 (79), 111 (66), 119 (60), 91 (50), 55 (41)... 203 (11), 220 (1)]				14.64	1748.7	0.02
Cedryl acetate	14.85	2074.5	0.11	14.70	1754.0	0.08
Unknown CEDE XXII [m/z 91, 105 (74), 93 (67), 79 (59), 133 (54), 41 (47), 107 (46)...]				14.76	1759.6	0.03
Unknown JUVI XXI [m/z 121, 136 (47), 119 (27), 91 (27), 105 (22), 41 (21)... 220 (4)]				14.93	1774.0	0.03
β -Acoradienol?				14.98	1778.1	0.09
Unknown JUVI XXII [m/z 189, 91 (48), 133 (40), 105 (40), 41 (34), 187 (34)... 220 (5)]				15.09	1787.5	0.04
Unknown JUVI XXIII [m/z 148, 141 (99), 91 (74), 105 (52), 41				15.13	1791.3	0.03

(42), 121 (42), 133 (37)... 218 (32)]						
Unknown JUVI XXIV [m/z 121, 136 (53), 91 (22), 93 (19), 79 (15), 105 (13)... 220 (3)]	18.91	2496.2	0.07	15.15	1793.1	0.06
Nootkatone analog	18.28	2426.5	0.03	15.38	1813.0	0.02
Manool	19.59	2573.7	0.04	17.84	2045.1	0.03
7,13-Abietadiene	17.68	2361.0	0.15	18.05	2065.6	0.06
Total reported		94.82%			97.40%	

*: 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