

Date : 2024-10-03

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24119-PTH03

Customer Identification : Amyris - Haiti - AH0110R

Type : Essential Oil

Source : *Amyris balsamifera*

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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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 : 2024-09-24

PHYSICOCHEMICAL DATA

Refractive index : 1.5063 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2024-09-19

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
Toluene	0.01	Simple phenolic
Limonene	0.01	Monoterpene
α -Terpineol	0.01	Monoterpenic alcohol
Cogeijerene	0.05	Terpene derivative
Unknown	0.20	Apocarotenoid
Unknown	0.08	Sesquiterpene
Neryl acetate	0.02	Monoterpenic ester
Unknown	0.16	Sesquiterpene
β -Elemene	0.22	Sesquiterpene
7-epi-Sesquithujene	0.13	Sesquiterpene
Unknown	0.18	Sesquiterpene
Isocaryophyllene	0.01	Sesquiterpene
α -Gurjunene	0.06	Sesquiterpene
Sesquithujene	0.10	Sesquiterpene
β -Caryophyllene	0.11	Sesquiterpene
<i>cis</i> - α -Bergamotene	0.16	Sesquiterpene
α -Santalene	0.06	Sesquiterpene
β -Copaene	0.04	Sesquiterpene
γ -Elemene	0.08	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.08	Sesquiterpene
Unknown	0.03	Sesquiterpene
Sesquisabinene A	0.09	Sesquiterpene
epi- β -Santalene	0.17	Sesquiterpene
Cadina-4,11-diene	1.11	Sesquiterpene
α -Humulene	0.12	Sesquiterpene
Unknown	0.34	Sesquiterpenic ether
Muurola-4,11-diene	2.30	Sesquiterpene
Amorpha-4,11-diene	0.35	Sesquiterpene
allo-Aromadendrene	0.13	Sesquiterpene
Unknown	0.19	Sesquiterpenic ether
Selina-4,11-diene	0.96	Sesquiterpene
Unknown	[0.60]	Sesquiterpene
Amorpha-4,7(11)-diene?	0.09	Sesquiterpene
γ -Curcumene	1.76	Sesquiterpene
γ -Murolene	0.49	Sesquiterpene
<i>ar</i> -Curcumene	2.42	Sesquiterpene
β -Selinene	[0.60]	Sesquiterpene
Valencene	1.10	Sesquiterpene
Unknown	0.51	Oxygenated sesquiterpene
α -Selinene	0.70	Sesquiterpene

Unknown	0.52	Oxygenated sesquiterpene
4-epi- <i>cis</i> -Dihydroagarofuran	0.96	Sesquiterpenic ether
α -Zingiberene	1.88	Sesquiterpene
(<i>Z</i>)- α -Bisabolene	0.11	Sesquiterpene
β -Dihydroagarofuran	0.09	Sesquiterpenic ether
β -Bisabolene	1.25	Sesquiterpene
Unknown	1.10	Oxygenated sesquiterpene
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	0.48	Sesquiterpene
7-epi- α -Selinene	0.36	Sesquiterpene
δ -Cadinene	0.52	Sesquiterpene
β -Sesquiphellandrene	1.93	Sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
α -Agarofuran	0.68	Sesquiterpenic ether
Selina-3,7(11)-diene	3.29	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.04	Sesquiterpene
α -Elemol	7.82	Sesquiterpenic alcohol
Unknown	0.23	Unknown
(<i>E</i>)-Nerolidol	0.49	Sesquiterpenic alcohol
Spathulenol	0.18	Sesquiterpenic alcohol
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Caryophyllene oxide	0.01	Sesquiterpenic ether
Unknown	0.95	Oxygenated sesquiterpene
Humulene epoxide II	0.02	Sesquiterpenic ether
Unknown	0.16	Oxygenated sesquiterpene
10-epi- γ -Eudesmol	6.31	Sesquiterpenic alcohol
Unknown	0.83	Oxygenated sesquiterpene
Eremoligenol?	0.44	Sesquiterpenic alcohol
γ -Eudesmol	6.96	Sesquiterpenic alcohol
Unknown	0.22	Oxygenated sesquiterpene
Eremoligenol	0.06	Sesquiterpenic alcohol
Hinesol	0.34	Sesquiterpenic alcohol
Unknown	0.53	Oxygenated sesquiterpene
Unknown	0.25	Oxygenated sesquiterpene
Agarospinol?	0.83	Sesquiterpenic alcohol
β -Eudesmol	8.56	Sesquiterpenic alcohol
α -Eudesmol	3.86	Sesquiterpenic alcohol
Valerianol	18.18	Sesquiterpenic alcohol
7-epi- α -Eudesmol	5.33	Sesquiterpenic alcohol
4 α -Hydroxydihydroagarofuran	0.08	Sesquiterpenic alcohol
<i>trans</i> -Calamene-10-ol	0.16	Sesquiterpenic alcohol
Dehydrojinkoh-eremol	0.61	Sesquiterpenic alcohol
Unknown	0.29	Oxygenated sesquiterpene
Unknown	0.19	Oxygenated sesquiterpene
Unknown	0.13	Oxygenated sesquiterpene
Unknown	0.06	Oxygenated sesquiterpene

Unknown	0.22	Oxygenated sesquiterpene
(2E,6E)-Farnesol	0.16	Sesquiterpenic alcohol
(6R,7R)-Bisabolone	0.35	Sesquiterpenic ketone
(6S,7R)-Bisabolone	0.21	Sesquiterpenic ketone
Unknown	0.04	Oxygenated sesquiterpene
Drimenol	1.32	Sesquiterpenic alcohol
Cryptomeridiol analog	0.03	Sesquiterpenic alcohol
Unknown	0.01	Oxygenated sesquiterpene
Cryptomeridiol	0.04	Sesquiterpenic alcohol
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Carissone analog I	0.02	Sesquiterpenic alcohol
Carissone analog II	0.01	Sesquiterpenic alcohol
Unknown	0.02	Oxygenated sesquiterpene
Consolidated total	95.14	

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

Note: no correction factor was applied

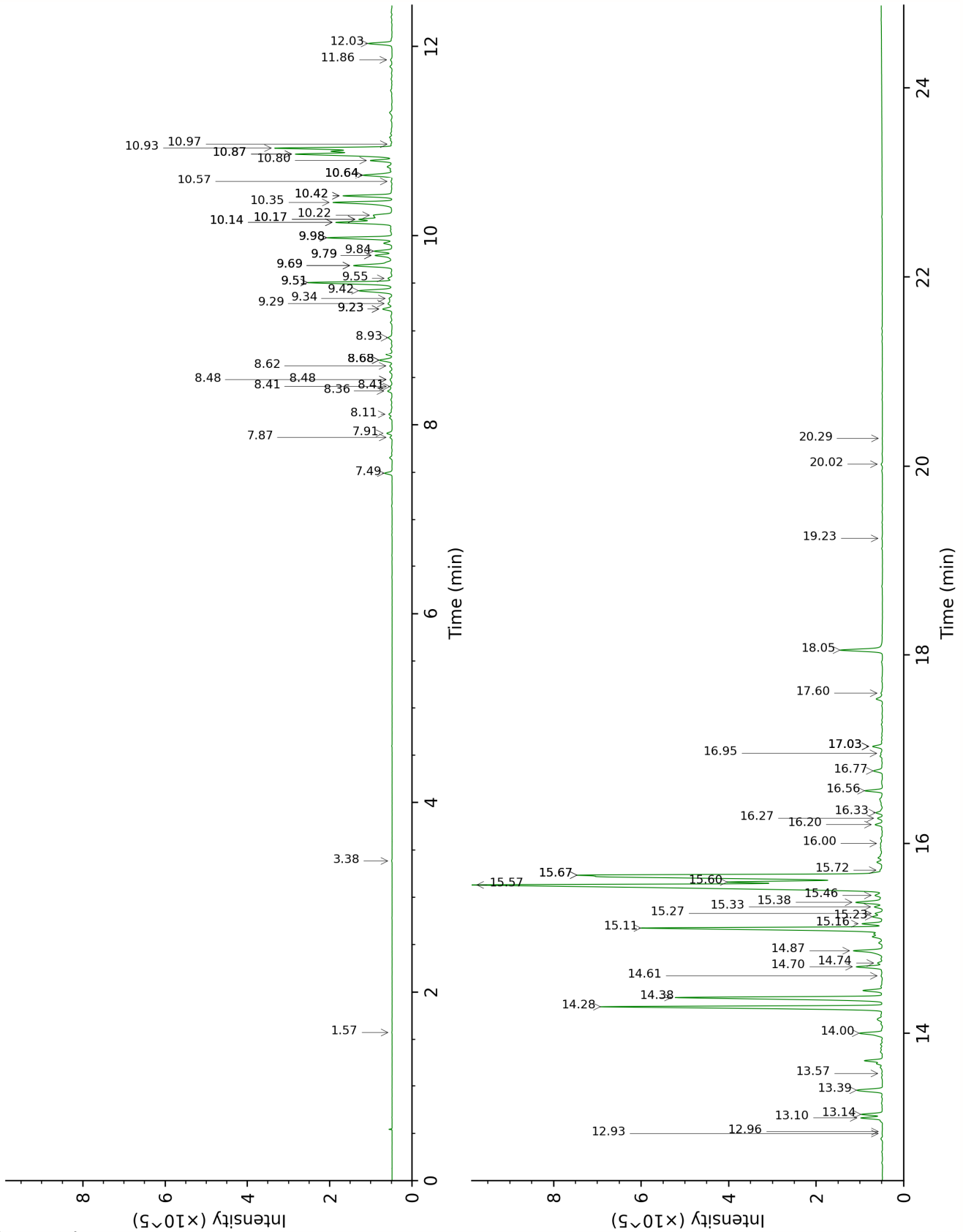
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

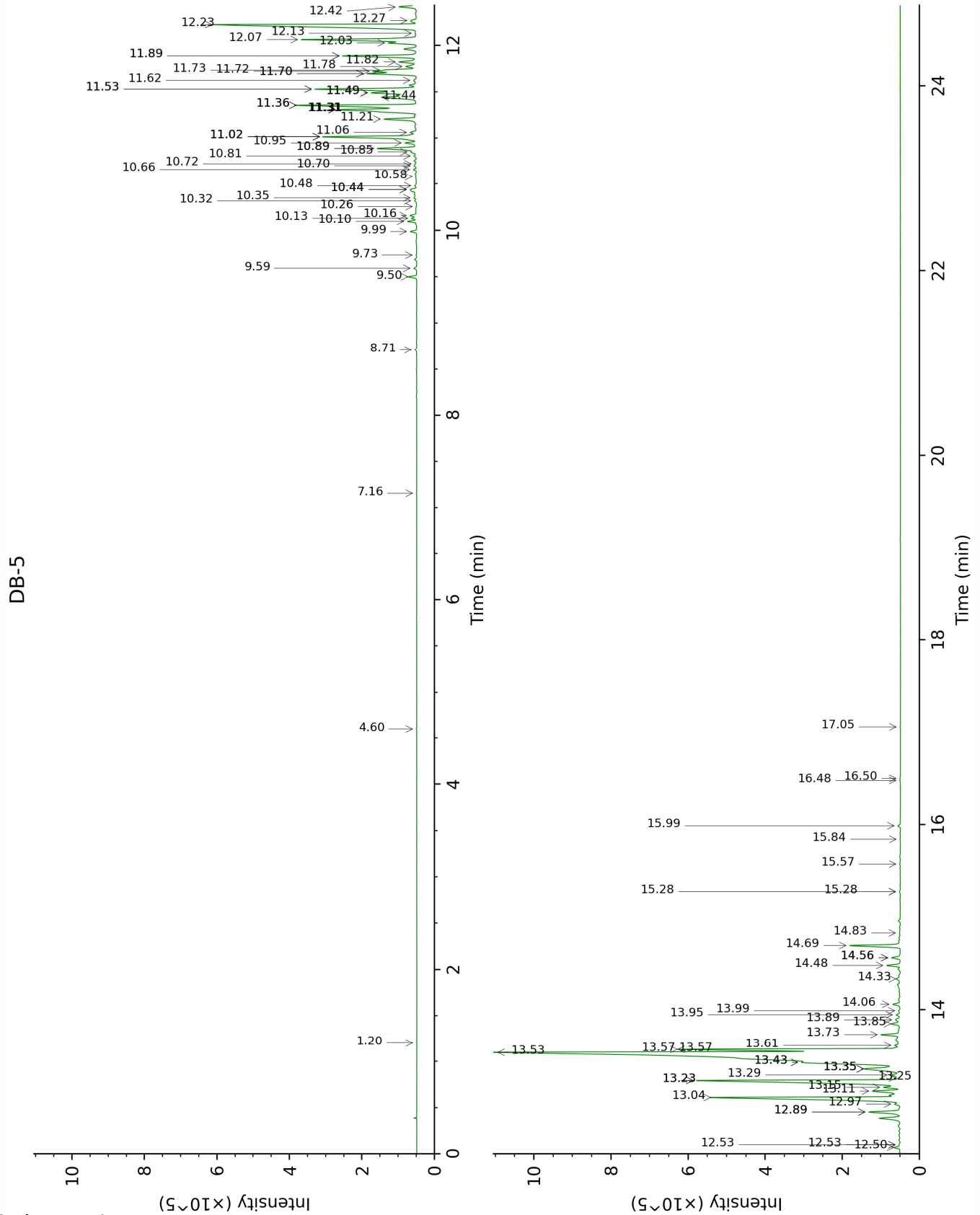
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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

Toluene	Column DB-WAX			Column DB-5		
	1.58	1001.9	tr	1.20	758.6	0.01
Limonene	3.38	1158.3	0.01	4.60	1025.9	0.01
α -Terpineol	9.98*	1649.2	[1.77]	7.16	1188.1	0.01
Cogeijerene	8.41*	1525.3	[0.05]	8.71	1291.3	0.05
Unknown AMBA I [m/z 177, 107 (57), 81 (55), 95 (50), 41 (34), 93 (34), 123 (32)... 192 (23)]	7.49	1456.3	0.20	9.50	1346.3	0.20
Unknown AMBA XXVII [m/z 123, 81 (45), 107 (30), 79 (28), 41 (28)... 204 (5)]				9.59	1352.8	0.08
Neryl acetate	10.42*	1684.8	[1.27]	9.73	1362.8	0.02
Unknown AMBA II [m/z 189, 105 (79), 91 (73), 107 (67), 93 (65), 133 (65)... 204 (38)]	7.91	1487.4	0.14	9.99	1380.7	0.16
β -Elemene	8.68*	1546.8	[0.41]	10.10	1388.4	0.22
7-epi-Sesquithujene	8.11	1502.6	0.10	10.13	1390.7	0.13
Unknown CULA II [m/z 119, 93 (82), 161 (71), 105 (68), 91 (65), 133 (56)... 204 (15)]	8.93	1565.6	0.15	10.16	1392.8	0.18
Isocaryophyllene	8.41*	1525.3	[0.05]	10.26	1399.6	0.01
α -Gurjunene	7.87	1484.2	0.06	10.32	1404.0	0.06
Sesquithujene	8.36	1521.6	0.16	10.35	1406.5	0.10
β -Caryophyllene	8.68*	1546.8	[0.41]	10.44*	1413.1	[0.28]
<i>cis</i> - α -Bergamotene	8.48*	1530.9	[0.08]	10.44*	1413.1	[0.28]
α -Santalene	8.48*	1530.9	[0.08]	10.48	1416.2	0.06
β -Copaene	8.62	1542.1	0.07	10.58	1423.5	0.04
γ -Elemene	9.29	1593.3	0.16	10.66	1429.6	0.08
<i>trans</i> - α -Bergamotene	8.68*	1546.8	[0.41]	10.70	1432.6	0.08
Unknown CULO LXIII [m/z 121, 93 (80), 91 (25), 79 (20), 77 (16), 119 (15)... 202 (3)]				10.72	1434.2	0.03
Sesquisabinene A	9.34	1597.6	0.09	10.81	1440.6	0.09
epi- β -Santalene	9.23*	1588.9	[0.30]	10.85	1443.8	0.17
Cadina-4,11-diene	9.42	1604.2	1.11	10.89*	1446.6	[1.18]
α -Humulene	9.55	1614.7	0.12	10.89*	1446.6	[1.18]
Unknown AMBA III [m/z 109, 81 (84), 207 (73), 43 (55), 41 (52), 69 (48), 55 (47), 124 (39)]	9.69*	1625.5	[1.42]	10.95	1451.1	0.34
Muurola-4,11-diene	9.51*	1611.1	[2.39]	11.02*	1456.0	[2.78]

Amorpha-4,11-diene	9.79*	1634.1	[0.54]	11.02*	1456.0	[2.78]
allo-Aromadendrene	9.23*	1588.9	[0.30]	11.02*	1456.0	[2.78]
Unknown AMBA IV [m/z 109, 207 (91), 81 (91), 43 (79), 41 (71), 69 (57), 55 (54), 124 (47)]	9.79*	1634.1	[0.54]	11.06	1459.5	0.19
Selina-4,11-diene	9.69*	1625.5	[1.42]	11.21	1470.2	0.96
Unknown AMBA V [m/z 189, 91 (95), 105 (93), 133 (84), 119 (75), 41 (59), 93 (46)... 204 (33)]	10.17*†	1664.8	[0.90]	11.31*†	1477.8	[3.07]
Amorpha-4,7(11)-diene?	9.51*	1611.1	[2.39]	11.31*†	1477.8	[3.07]
γ-Curcumene	9.98*	1649.2	[1.77]	11.31*†	1477.8	[3.07]
γ-Muurolene	9.84	1637.8	0.49	11.31*†	1477.8	[3.07]
ar-Curcumene	10.93*†	1727.5	[3.00]	11.36*†	1481.3	[3.45]
β-Selinene	10.14*†	1662.2	[1.69]	11.36*†	1481.3	[3.45]
Valencene	10.14*†	1662.2	[1.69]	11.44	1487.7	1.10
Unknown AMBA VII [m/z 71, 93 (86), 109 (84), 69 (77), 41 (75), 43 (72), 81 (63), 55 (54), 79 (51)... 189 (36), 204 (3), 207 (2)]	13.14	1920.7	0.51	11.49*†	1491.4	[1.36]
α-Selinene	10.22*†	1668.3	[0.47]	11.49*†	1491.4	[1.36]
Unknown AMBA VI [m/z 71, 69 (84), 93 (82), 109 (82), 41 (72), 43 (69), 81 (66), 55 (56), 79 (49)... 189 (37), 204 (3), 207 (3)]	13.10	1917.2	0.52	11.49*†	1491.4	[1.36]
4-epi-cis-Dihydroagarofuran	10.17*†	1664.8	[0.90]	11.53*	1494.3	[2.84]
α-Zingiberene	10.35	1679.1	1.88	11.53*	1494.3	[2.84]
(Z)-α-Bisabolene	10.57	1697.1	0.03	11.62	1501.3	0.11
β-Dihydroagarofuran	10.64*	1703.3	[0.89]	11.70*	1507.0	[1.34]
β-Bisabolene	10.42*	1684.8	[1.27]	11.70*	1507.0	[1.34]
Unknown AMBA VIII [m/z 136, 121, (59), 93 (55), 80 (51), 81 (50), 71 (44), 123 (40)... 204 (3), 207 (1)]	13.39	1944.1	0.84	11.72	1509.0	1.10
(3E,6E)-α-Farnesene	10.80	1716.4	0.56	11.74	1509.9	0.48
7-epi-α-Selinene	10.64*	1703.3	[0.89]	11.78	1513.0	0.36
δ-Cadinene	10.64*	1703.3	[0.89]	11.82	1516.9	0.52
β-Sesquiphellandrene	10.87*†	1722.1	[3.13]	11.89*	1522.0	[1.99]
Unknown AMBA XXVI [m/z 124, 109 (77), 123 (62), 105 (56), 91 (56), 41 (55), 43	11.86	1806.8	0.05	11.89*	1522.0	[1.99]

(51), 205 (50)... 220 (21)]						
α -Agarofuran	12.03	1822.1	0.67	12.03	1533.0	0.68
Selina-3,7(11)-diene	10.87*†	1722.1	[3.13]	12.07	1535.8	3.29
(E)- α -Bisabolene	10.97	1731.0	0.03	12.13	1541.2	0.04
α -Elemol	14.28	2027.5	7.79	12.23	1548.5	7.82
Unknown AMBA XXVIII [m/z 123, 81 (30), 93 (19), 121 (17), 43 (16), 95 (14)...]				12.27	1551.9	0.23
(E)-Nerolidol	14.00	2000.7	0.74	12.42	1563.7	0.49
Spathulenol	14.61	2058.8	0.06	12.50	1570.2	0.18
Caryophyllene oxide isomer	12.93	1901.9	0.02	12.53*	1572.5	[0.03]
Caryophyllene oxide	12.96	1903.9	0.01	12.53*	1572.5	[0.03]
Unknown AMBA IX [m/z 59, 91 (59), 105 (53), 93 (48), 161 (46), 79 (39), 123 (37)... 204 (12), 222 (1)]	14.87	2084.2	0.95	12.89*	1600.3	[0.97]
Humulene epoxide II	13.57	1960.4	0.02	12.89*	1600.3	[0.97]
Unknown MIAL II [m/z 43, 81 (97), 135 (71), 95 (62), 204 (61), 71 (59), 207 (56)... 222 (3)]	14.74	2071.7	0.13	12.97	1607.3	0.16
10-epi- γ -Eudesmol	14.38	2036.8	6.10	13.04	1613.2	6.31
Unknown AMBA X [m/z 161, 59 (59), 81 (50), 204 (49), 93 (36), 189 (34)... 220 (t)]	14.70	2068.0	0.70	13.11	1618.9	0.83
Eremoligenol?	15.16	2112.4	0.51	13.15	1622.3	0.44
γ -Eudesmol	15.11	2107.8	6.96	13.23*	1628.4	[7.24]
Unknown MYGA VIII [m/z 105, 161 (51), 91 (36), 59 (30), 147 (29), 189 (24), 204 (23)... 218 (t)]	15.33	2130.1	0.22	13.23*	1628.4	[7.24]
Eremoligenol	15.27	2123.2	0.20	13.25	1630.6	0.06
Hinesol	15.23	2119.8	0.28	13.29	1633.3	0.34
Unknown AMBA XII [m/z 43, 41 (64), 109 (49), 69 (46), 95 (45), 55 (45)... 221 (23), 236 (31)]				13.35*	1638.8	[1.61]
Unknown AMBA XI [m/z 105, 59 (72), 161 (65), 147 (64), 91 (54), 43 (34), 189 (34)... 204 (30), 220 (1)]	15.46	2142.2	0.25	13.35*	1638.8	[1.61]
Agarospinol?	15.38	2134.9	0.83	13.35*	1638.8	[1.61]
β -Eudesmol	15.67*	2163.5	[13.88]	13.42*†	1644.6	[3.41]

α-Eudesmol	15.60	2156.3	3.86	13.42*†	1644.6	[3.41]
Valerianol	15.57	2153.2	18.18	13.53*†	1653.6	[27.13]
7-epi-α-Eudesmol	15.67*	2163.5	[13.88]	13.57*	1656.3	[5.41]
4α-Hydroxydihydroagarofuran	15.72	2168.7	0.08	13.57*	1656.3	[5.41]
trans-Calamenen-10-ol	17.03*	2303.9	[0.31]	13.61	1659.9	0.16
Dehydrojinkoh-eremol	16.56	2254.8	0.44	13.73	1669.9	0.61
Unknown AMBA XIV [m/z 109, 81 (67), 69 (64), 41 (63), 95 (46), 67 (35)... 207 (15)...]	16.77	2276.5	0.29	13.85	1679.6	0.29
Unknown AMBA XV [m/z 69, 41 (90), 123 (74), 122 (51)... 206 (14), 218 (2)]	16.00	2197.1	0.09	13.89	1683.2	0.19
Unknown ZIOF XXXVIII [m/z 137, 119 (70), 84 (69), 41 (68), 69 (53), 55 (45), 109 (38)... 222 (2)]	16.27	2224.7	0.14	13.95	1687.6	0.13
Unknown ZIOF XXVI [m/z 69, 41 (59), 118 (33), 43 (32), 55 (31)... 234? (t)]	16.96	2296.0	0.06	13.99	1691.3	0.06
Unknown AMBA XVI [m/z 81, 136 (77), 109 (68), 121 (61), 41 (48), 93 (41), 79 (35), 107 (34), 123 (30)... 222 (1)]	17.03*	2303.9	[0.31]	14.06	1697.1	0.22
(2E,6E)-Farnesol	17.03*	2303.9	[0.31]	14.33	1720.6	0.16
(6R,7R)-Bisabolone	16.20	2217.8	0.21	14.48	1733.1	0.35
(6S,7R)-Bisabolone	16.33	2230.8	0.21	14.56*	1740.4	[0.25]
Unknown AMBA XVII [m/z 137, 81 (78), 41 (74), 95 (74), 69 (55), 91 (51)... 222 (8)]	17.60	2365.1	0.04	14.56*	1740.4	[0.25]
Drimenol	18.05	2414.9	1.31	14.69	1751.8	1.32
Cryptomeridiol analog	19.23	2548.4	0.03	14.83	1763.6	0.03
Unknown AMBA XVIII [m/z 69, 43 (95), 41 (84), 109 (78), 95 (54), 93 (49)... 177 (36), 220 (2)...]	20.29	2674.0	0.01	15.28*	1802.2	[0.03]
Cryptomeridiol	20.02	2641.5	0.04	15.28*	1802.2	[0.03]
Unknown AMBA XIX [m/z 177, 43 (51), 138 (40), 59 (40), 205 (32)... 238 (5)]				15.57	1829.3	0.02
Unknown AMBA XX [m/z 59, 43 (75), 121 (73), 105				15.84	1853.6	0.02

(68), 107 (57), 177 (55), 123 (46)... 220 (39), 236 (1)]					
Unknown AMBA XXI [m/z 59, 45 (92), 43 (70), 177 (58), 121 (58), 220 (57)... 236 (3)]			15.99	1866.9	0.07
Carissone analog I			16.48	1911.8	0.02
Carissone analog II			16.50	1913.9	0.01
Unknown AMBA XXV [m/z 59, 121 (66), 218 (27), 136 (26), 178 (26), 43 (24), 91 (24), 123 (23)... 238 (t)]			17.06	1966.7	0.02
Total reported		93.03%		96.25%	

*: 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