

Date : 2024-03-28

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24C14-PTH02

Customer Identification : Organic Australian Sandalwood - Australia - SW0106R

Type : Essential Oil

Source : *Santalum spicatum*

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

Date : 2024-03-28

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 : 2024-03-14

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
Santene	0.08	Normonoterpene
Tricyclene	0.01	Monoterpene
Limonene	0.01	Monoterpene
4-Hydroxy-4-methylcyclohex-2-enone	0.01	Aliphatic alcohol
4-Methylacetophenone	0.01	Simple phenolic
Unknown	0.03	Terpene derivative
Teresantalic acid	0.19	Monoterpenic acid
Unknown	0.07	Terpenic aldehyde
Tricycloekasantalal	0.12	Terpenic aldehyde
(1S,5S,6R)-2,6-Dimethylbicyclo[3.1.1]hept-2-ene-6-propanal?	0.07	Terpenic aldehyde
7-epi-Sesquithujene	0.02	Sesquiterpene
γ -4-Dimethylbenzenebutyral	0.02	Simple phenolic
Sesquithujene	0.06	Sesquiterpene
α -Cedrene	0.15	Sesquiterpene
<i>cis</i> - α -Bergamotene	0.05	Sesquiterpene
β -Cedrene	0.03	Sesquiterpene
α -Santalene	0.46	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.17	Sesquiterpene
Unknown	0.01	Sesquiterpene
epi- β -Santalene	0.29	Sesquiterpene
Geranylacetone	0.05	Monoterpenic ketone
α -Acoradiene	0.08	Sesquiterpene
β -Acoradiene	0.01	Sesquiterpene
β -Santalene	0.47	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.04	Sesquiterpene
10-epi- β -Acoradiene	0.06	Sesquiterpene
γ -Curcumene	0.20	Sesquiterpene
Unknown	0.23	Sesquiterpene
α -Curcumene	0.43	Sesquiterpene
β -Selinene	0.05	Sesquiterpene
Unknown	0.05	Sesquiterpene
Unknown	0.18	Sesquiterpene
Unknown	0.02	Sesquiterpene
β -Bisabolene	0.14	Sesquiterpene
α -Alaskene	0.04	Sesquiterpene
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	0.08	Sesquiterpene
β -Curcumene	0.46	Sesquiterpene
Sesquicineole	0.02	Sesquiterpenic ether
β -Sesquiphellandrene	0.15	Sesquiterpene

8,14-Cedranoxide	0.06	Sesquiterpenic ether
(E)- α -Bisabolene	0.07	Sesquiterpene
(E)-Nerolidol	2.07	Sesquiterpenic alcohol
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Dendrolasin	1.18	Sesquiterpenic ether
Unknown	0.03	Oxygenated sesquiterpene
Helifolen-12-al A	0.14	Sesquiterpenic aldehyde
α -Cedrol	0.14	Sesquiterpenic alcohol
Guaiol	0.26	Sesquiterpenic alcohol
Helifolen-12-al B	0.09	Sesquiterpenic aldehyde
Unknown	0.16	Oxygenated sesquiterpene
Unknown	0.22	Oxygenated sesquiterpene
α -Acorenol	0.27	Sesquiterpenic alcohol
β -Acorenol	0.06	Sesquiterpenic alcohol
γ -Eudesmol	0.11	Sesquiterpenic alcohol
β -Eudesmol	0.16	Sesquiterpenic alcohol
Unknown	0.55	Oxygenated sesquiterpene
α -Bisabolol oxide B, epimer 1	0.17	Sesquiterpenic alcohol
α -Bisabolol oxide B, epimer 2	0.38	Sesquiterpenic alcohol
Bulnesol	0.45	Sesquiterpenic alcohol
epi- β -Bisabolol	1.11	Sesquiterpenic alcohol
Unknown	0.47	Oxygenated sesquiterpene
β -Bisabolol	2.24	Sesquiterpenic alcohol
epi-Cyclosantalal	0.20	Sesquiterpenic aldehyde
(E)- α -Santalal	0.56	Sesquiterpenic aldehyde
Cedr-8-en-13-ol	0.68	Sesquiterpenic alcohol
(Z)- α -Santalol	14.26	Sesquiterpenic alcohol
α -Bisabolol	0.28	Sesquiterpenic alcohol
epi- α -Bisabolol	6.31	Sesquiterpenic alcohol
(Z)- α - <i>trans</i> -Bergamotol	3.28	Sesquiterpenic alcohol
Unknown	0.52	Oxygenated sesquiterpene
(E)- α -Santalol	0.27	Sesquiterpenic alcohol
Lanceoloxide isomer I	0.22	Sesquiterpenic ether
(Z)-epi- β -Santalol	1.26	Sesquiterpenic alcohol
(E)- α - <i>trans</i> -Bergamotol	1.08	Sesquiterpenic alcohol
Unknown	0.04	Oxygenated sesquiterpene
(Z)- β -Santalol	5.17	Sesquiterpenic alcohol
(2E,6E)-Farnesol	11.63	Sesquiterpenic alcohol
(Z)- γ -Curcumen-12-ol	4.47	Sesquiterpenic alcohol
(Z)-Nuciferol	10.66	Sesquiterpenic alcohol
(E)- β -Santalol	0.51	Sesquiterpenic alcohol
(2E,6E)-Farnesal	0.45	Sesquiterpenic aldehyde
Unknown	0.92	Oxygenated sesquiterpene
Unknown	1.19	Oxygenated sesquiterpene

Curcumen-12-ol analog	0.72	Sesquiterpenic alcohol
Unknown	1.29	Oxygenated sesquiterpene
(Z)- β -Curcumen-12-ol	5.21	Sesquiterpenic alcohol
(Z)-Lanceol	2.56	Sesquiterpenic alcohol
12-Hydroxy-(Z)-sesquicineole	0.14	Sesquiterpenic alcohol
Unknown	0.90	Oxygenated sesquiterpene
Unknown	0.72	Oxygenated sesquiterpene
Unknown	0.53	Oxygenated sesquiterpene
Bisabola-2,7(Z),10(Z)-trien-13-ol?	0.62	Oxygenated sesquiterpene
Unknown	0.39	Oxygenated sesquiterpene
Unknown	0.14	Oxygenated sesquiterpene
Unknown	0.17	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
(2E,6E)-Farnesyl acetate	0.08	Sesquiterpenic ester
Unknown	0.21	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.06	Oxygenated sesquiterpene
Consolidated total	92.96	

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

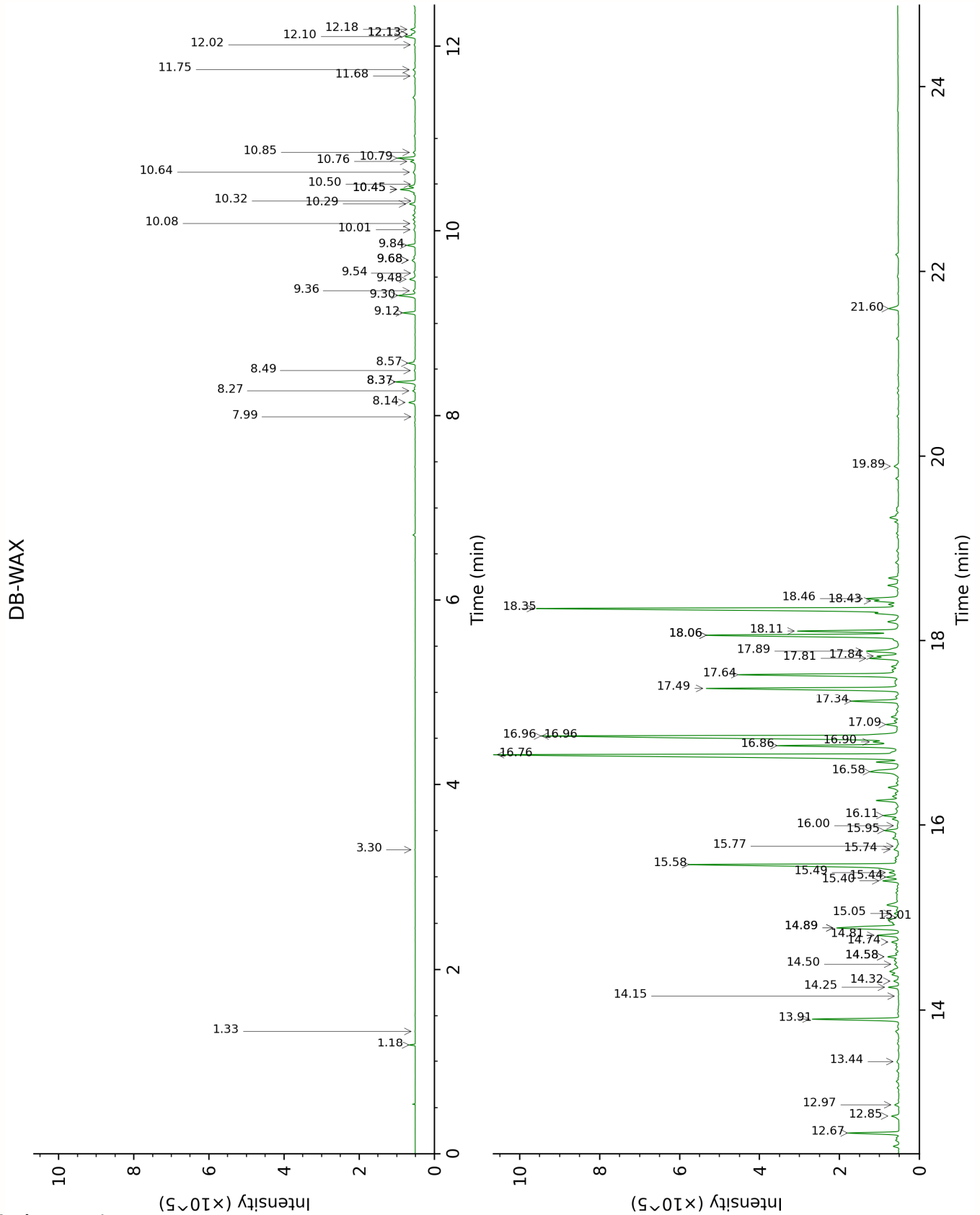
Note: no correction factor was applied

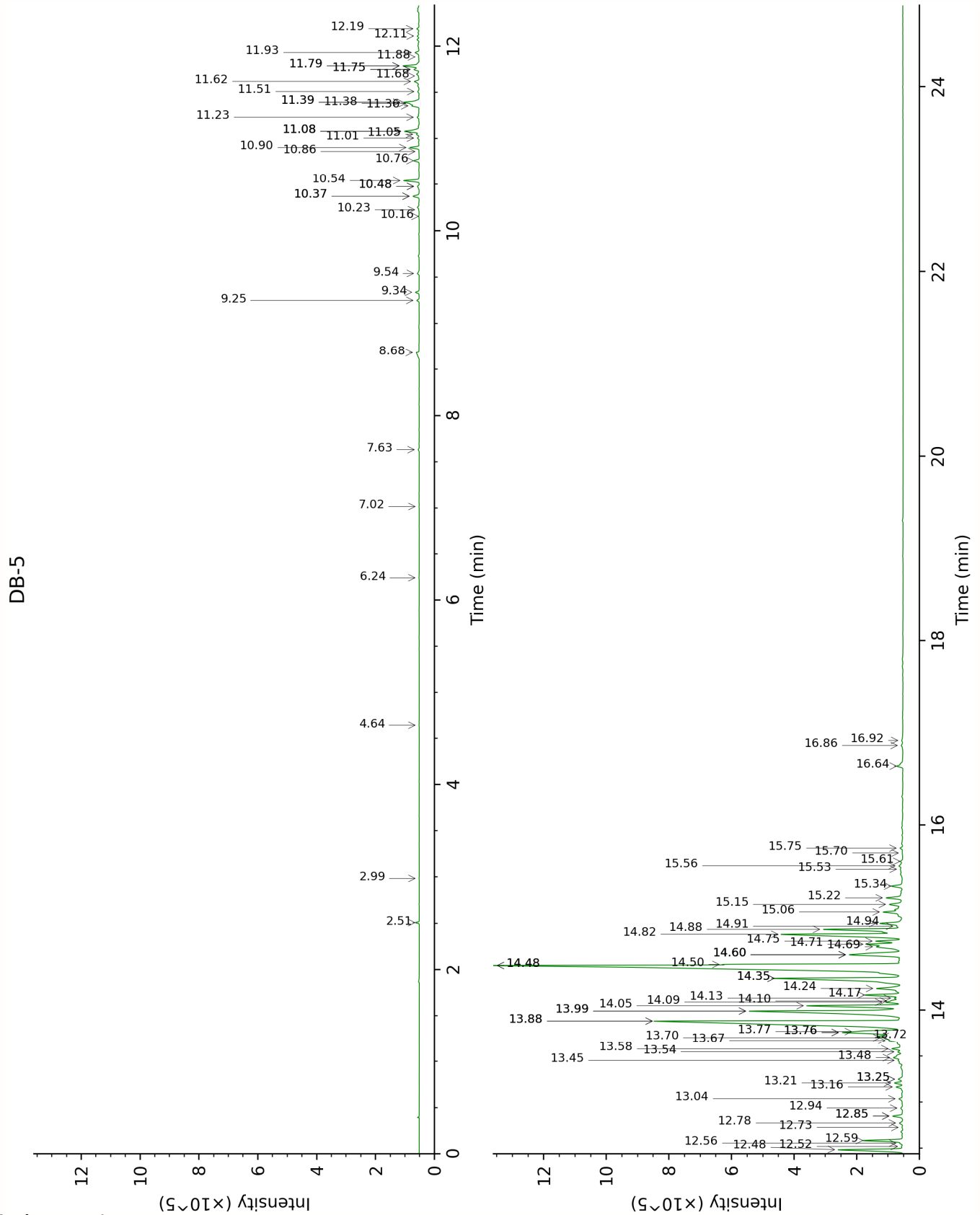
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Santene	Column DB-WAX			Column DB-5		
	1.18	953.1	0.08	2.51	883.3	0.08
Tricyclene	1.33	976.0	tr	2.99	919.1	0.01
Limonene	3.30	1159.1	0.01	4.64	1026.9	0.01
4-Hydroxy-4-methylcyclohex-2-enone	14.15	2027.7	0.02	6.24	1127.4	0.01
4-Methylacetophenone	10.50	1704.6	0.03	7.02	1177.0	0.01
Unknown SASP II [m/z 93, 91 (89), 94 (85), 105 (60)... 176? (10)]	9.36	1609.9	0.06	7.63	1216.7	0.03
Teresantalic acid	15.74	2186.1	0.17	8.68	1287.0	0.19
Unknown SASP III [m/z 121, 93 (77), 79 (43), 91 (43), 145 (35)... 178 (8)]				9.25	1326.0	0.07
Tricycloekasantalal (1S,5S,6R)-2,6-Dimethylbicyclo[3.1.1]hept-2-ene-6-propanal?	10.45*	1700.1	[0.44]	9.34	1332.1	0.12
7-epi-Sesquithujene	10.45*	1700.1	[0.44]	9.54	1346.4	0.07
γ-4-Dimethylbenzenebutyral				10.16	1389.7	0.02
Sesquithujene	8.27	1524.3	0.06	10.23	1394.7	0.02
α-Cedrene	8.27*	1524.3	0.06	10.37*	1405.0	[0.22]
cis-α-Bergamotene	8.14	1514.5	0.15	10.37*	1405.0	[0.22]
β-Cedrene	8.37*	1531.9	[0.49]	10.48*	1412.8	[0.08]
α-Santalene	8.49	1541.6	0.03	10.48*	1412.8	[0.08]
trans-α-Bergamotene	8.37*	1531.9	[0.49]	10.54	1417.5	0.46
Unknown SASP IV [m/z 93, 91 (80), 79 (68), 123 (68), 121 (56)... 204 (3)]	8.57	1547.8	0.16	10.76	1434.0	0.17
epi-β-Santalene				10.86	1441.3	0.01
Geranylacetone	9.12	1591.0	0.28	10.90	1444.6	0.29
α-Acoradiene	11.75	1802.9	0.05	11.01	1452.2	0.05
β-Acoradiene	9.48	1620.1	0.16	11.05	1455.2	0.08
β-Santalene	9.54	1625.5	0.01	11.08*	1457.7	[0.58]
(E)-β-Farnesene	9.30	1605.8	0.47	11.08*	1457.7	[0.58]
10-epi-β-Acoradiene	9.68*	1637.1	[0.11]	11.08*	1457.7	[0.58]
γ-Curcumene	9.68*	1637.1	[0.11]	11.23	1468.9	0.06
Unknown SASP V [m/z 119, 91 (24), 105 (16), 121 (16), 93 (15), 117 (15), 41 (14), 132 (14)... 204 (4)]	9.84	1650.3	0.20	11.36	1478.1	0.20
ar-Curcumene				11.38	1480.0	0.23
β-Selinene	10.79	1729.6	0.43	11.39*	1481.0	[0.54]
	10.01	1664.2	0.05	11.39*	1481.0	[0.54]

Unknown SASP VI [m/z 119, 105 (51), 91 (31), 132 (30), 121 (26), 145 (23), 134 (20)... 204 (2)]	12.13*	1837.7	[0.08]	11.51	1489.6	0.05
Unknown SASP VII [m/z 119, 93 (52), 105 (38), 91 (33), 41 (31), 79 (25)... 204 (2)]	12.10	1835.5	0.26	11.62	1497.7	0.18
Unknown CULO XII [m/z 119, 91 (14), 120 (10), 117 (9)... 200? (2)]	12.02	1827.4	0.03	11.68	1502.1	0.02
β-Bisabolene	10.29	1687.1	0.14	11.75*	1507.4	[0.18]
α-Alaskene	10.08	1669.7	0.04	11.75*	1507.4	[0.18]
(3E,6E)-α-Farnesene	10.64	1716.4	0.08	11.79*	1510.5	[0.55]
β-Curcumene				11.79*	1510.5	[0.55]
Sesquicineole	10.32	1689.7	0.01	11.88	1518.1	0.02
β-Sesquiphellandrene	10.76	1726.5	0.12	11.93	1521.8	0.15
8,14-Cedranoxide	11.68	1796.8	0.04	12.11	1535.8	0.06
(E)-α-Bisabolene	10.85	1735.0	0.05	12.19	1541.9	0.07
(E)-Nerolidol	13.91	2003.5	1.97	12.48	1565.2	2.07
Unknown SASP VIII [m/z 43, 125 (78), 107 (43), 132 (34), 67 (31)... 220 (3)]	12.13*	1837.7	[0.08]	12.52	1568.0	0.04
Unknown SASP IX [m/z 43, 125 (91), 107 (39), 41 (24), 67 (24), 93 (21)... 220 (4)]	12.18	1842.6	0.11	12.56	1570.8	0.07
Dendrolasin	12.67	1886.8	1.11	12.59	1573.1	1.18
Unknown COGU XII [m/z 93, 121 (68), 123 (45), 91 (41), 119 (32), 79 (30)...220 (9)]				12.73	1584.1	0.03
Helifolen-12-al A	12.97	1915.0	0.10	12.78	1587.9	0.14
α-Cedrol	14.32	2043.6	0.14	12.85*	1593.8	[0.36]
Guaiol	14.25	2037.2	0.26	12.85*	1593.8	[0.36]
Helifolen-12-al B	13.44	1959.3	0.08	12.94	1600.5	0.09
Unknown SASP X [m/z 81, 41 (40), 69 (36), 138 (27), 43 (26), 110 (25)... 222 (1)]				13.04	1608.6	0.16
Unknown SAUN IV [m/z 110, 68 (85), 109 971), 95 (67), 67 (56), 81 (53)... 220 (9)...]	12.85	1903.4	0.22	13.16	1619.2	0.22
α-Acorenol	14.58*	2069.5	[0.29]	13.21	1622.8	0.27
β-Acorenol	15.01	2111.4	0.06	13.25*	1626.1	[0.18]
γ-Eudesmol	15.05	2115.6	0.11	13.25*	1626.1	[0.18]

β-Eudesmol	15.44	2155.7	0.36	13.45	1642.9	0.16
Unknown SASP XI [m/z 91, 43 (89), 93 (84), 81 (81), 105 (79), 79 (70), 67 (68), 41 (68)...]				13.48†	1645.4	0.33
α-Bisabolol oxide B, epimer 1	14.50	2061.6	0.16	13.54	1650.5	0.17
α-Bisabolol oxide B, epimer 2	14.58*	2069.5	[0.29]	13.58	1653.4	0.38
Bulnesol	15.40	2151.5	0.39	13.67	1661.1	0.45
epi-β-Bisabolol	14.89*	2100.0	[2.20]	13.70*†	1663.6	[0.59]
Unknown CILI II [m/z 69, 95 (100), 41 (89), 109 (68), 67 (61)...222]	16.11	2223.9	0.47	13.72*†	1664.9	[0.99]
β-Bisabolol	14.89*	2100.0	[2.20]	13.76*†	1668.4	[2.08]
epi-Cyclosantalal	14.74	2085.1	0.20	13.76*†	1668.4	[2.08]
(E)-α-Santalal	14.81	2092.2	0.56	13.77*†	1669.2	[0.91]
Cedr-8-en-13-ol	16.90	2307.6	0.68	13.88*	1678.5	[15.38]
(Z)-α-Santalol	16.76	2293.1	14.26	13.88*	1678.5	[15.38]
α-Bisabolol	15.49	2160.6	0.28	13.99*	1687.5	[7.56]
epi-α-Bisabolol	15.58	2169.5	6.31	13.99*	1687.5	[7.56]
(Z)-α-trans-Bergamotol	16.86	2303.4	3.22	14.05	1692.3	3.28
Unknown SASP XII [m/z 43, 93 (68), 41 (61), 69 (58), 125 (54), 107 (50)...]				14.09	1695.5	0.52
(E)-α-Santalol	17.09	2328.0	0.34	14.10	1696.5	0.27
Lanceoloxide isomer I				14.13	1699.0	0.22
(Z)-epi-β-Santalol	17.34	2355.6	1.18	14.17	1701.9	1.26
(E)-α-trans-Bergamotol	17.89	2415.3	0.97	14.24	1707.8	1.08
Unknown SASP XIV [m/z 43, 189 (94), 81 (65), 93 (62), 95 (53), 119 (49)... 207 (43)...]	15.77	2189.5	0.04	14.35*	1717.3	[5.92]
(Z)-β-Santalol	17.49	2371.3	5.17	14.35*	1717.3	[5.92]
(2E,6E)-Farnesol	16.96*	2314.5	[12.82]	14.48*†	1729.3	[23.88]
(Z)-γ-Curcumen-12-ol	17.64	2387.4	4.47	14.48*†	1729.3	[23.88]
(Z)-Nuciferol	18.35	2467.1	10.66	14.50*†	1730.3	[2.27]
(E)-β-Santalol	17.84	2409.3	0.51	14.60*	1739.4	[2.68]
(2E,6E)-Farnesal	15.94	2207.0	0.45	14.60*	1739.4	[2.68]
Unknown SAAL X [m/z 91, 93 (65), 79 (57), 105 (49), 119 (47), 121 (44)...218 (1)]	18.46	2479.0	0.92	14.60*	1739.4	[2.68]
Unknown SAUN VII [m/z 119, 93 (73), 110 (64), 111 (62), 95 (50), 81 (45), 109 (943), 105 (43)... 220 (17),	16.96*	2314.5	[12.82]	14.69	1746.9	1.19

238 (20)]						
Curcumen-12-ol analog	17.81	2406.6	0.72	14.72*†	1749.2	[1.24]
Unknown SAUN VIII [m/z 119, 93 (70), 111 (61), 110 (60), 109 (45), 95 (43)... 220 (17), 238 (16)]	16.58	2273.8	1.29	14.75*†	1752.2	[0.84]
(Z)-β-Curcumen-12-ol	18.06*	2434.7	[5.81]	14.82	1758.5	5.21
(Z)-Lanceol	18.11	2439.7	2.54	14.88	1763.2	2.56
12-Hydroxy-(Z)-sesquicineole				14.91	1766.1	0.14
Unknown SASP XV [m/z 93, 107 (80), 43 (74), 91 (55), 41 (49), 79 (48), 119 (48)... 236 (3)]				14.94	1768.7	0.90
Unknown SASP XVI [m/z 93, 119 (89), 91 (63), 79 (63), 132 (53), 41 (52)... 236 (3)]	18.06*	2434.7	[5.81]	15.06	1779.4	0.72
Unknown SASP XVII [m/z 107, 93 (96), 79 (90), 55 (78), 41 (76)... 236 (6)]				15.15	1786.6	0.53
Bisabola-2,7(Z),10(Z)-trien-13-ol?	18.43	2476.3	0.58	15.22	1792.7	0.62
Unknown SASP XIX [m/z 119, 105 (78), 145 (60), 91 (50), 121 (44), 93 (38)... 216 (7)]	19.89	2645.6	0.16	15.34	1803.7	0.39
Unknown SASP XX [m/z 119, 145 (62), 105 (52), 91 (52), 121 (38)...]				15.53	1820.2	0.14
Unknown SASP XXI [m/z 43, 81 (61), 41 (49), 93 (47), 119 (39), 141 (35)...]				15.56	1823.4	0.17
Unknown SASP XXII [m/z 119, 43 (61), 132 (49), 105 (35), 141 (32)...]				15.61	1827.9	0.07
Unknown SASP XXIII [m/z 141, 43 (87), 123 (55), 81 (37)... 236 (t)]				15.70	1836.1	0.01
(2E,6E)-Farnesyl acetate	16.00	2212.3	0.07	15.75	1840.9	0.08
Unknown SAAU III [m/z 93, 43 (99), 109 (95), 68 (80), 95 (77), 81 (69), 110 (68)...220 (7)]	21.60	2854.7	0.32	16.64	1922.1	0.21
Unknown SAAU VII [m/z 43, 107 (23), 119 (23), 93 (22),				16.86	1943.4	0.07

125 (22), 132 (22)...220 (1)				
Unknown SAAU VIII [m/z 93, 94 (86), 91 (48), 121 (42), 79 (42), 107 (37)...218 (2)]		16.92	1948.5	0.06
Total reported	86.91%		95.44%	

*: 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