

Date : March 16, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 21B23-FEP22

Customer identification : Patchouli - Indonesia - 51048-03

Type : Essential oil

Source : *Pogostemon cablin*

Customer : Fern & Petal

ANALYSIS

Method: PC-MAT-014  - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Sylvain Mercier, M. Sc., Chimiste

Analysis date : March 15, 2021

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Orange viscous liquid

Refractive index: 1.5134 ± 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
α -Pinene	0.10	Monoterpene
β -Pinene	0.24	Monoterpene
Sabinene	0.01	Monoterpene
Octen-3-ol	0.01	Aliphatic alcohol
Octan-3-one	0.01	Aliphatic ketone
Myrcene	0.01	Monoterpene
Octan-3-ol	0.01	Aliphatic alcohol
Limonene	0.04	Monoterpene
Linalool	0.01	Monoterpenic alcohol
3-Methylpentyl isobutyrate	tr	Aliphatic ester
<i>trans</i> -Pinocarveol	0.01	Monoterpenic alcohol
Unknown	0.01	Unknown
δ -Elemene	0.08	Sesquiterpene
α -Copaene	0.01	Sesquiterpene
β -Patchoulene	1.34	Sesquiterpene
β -Bourbonene	0.02	Sesquiterpene
<i>cis</i> - β -Elemene	0.06	Sesquiterpene
β -Elemene	0.97	Sesquiterpene
Cycloseychellene	0.68	Sesquiterpene
β -Caryophyllene	1.88	Sesquiterpene
Seychellene	7.49	Sesquiterpene
γ -Elemene	0.06	Sesquiterpene
α -Guaiene	6.81	Sesquiterpene
Selina-5,11-diene	0.03	Sesquiterpene
Unknown	0.25	Sesquiterpene
α -Patchoulene	3.40	Sesquiterpene
α -Humulene	0.17	Sesquiterpene
Patchoulene analog I	1.15	Sesquiterpene
γ -Patchoulene	1.04	Sesquiterpene
9- <i>epi</i> - β -Caryophyllene	0.20	Sesquiterpene
Unknown	0.12	Sesquiterpene
Unknown	0.10	Sesquiterpene
Selina-4,11-diene	0.19	Sesquiterpene
β -Selinene	0.09	Sesquiterpene
Unknown	0.47	Sesquiterpene
α -Selinene	0.10	Sesquiterpene
Aciphyllene	1.53	Sesquiterpene
Eudesma-2,4(15),11-triene	0.04	Sesquiterpene
Pentadecane	0.07	Alkane
δ -Guaiene	10.58	Sesquiterpene
γ -Cadinene	0.32	Sesquiterpene
Nootkatene	0.08	Sesquiterpene
7- <i>epi</i> - α -Selinene	0.08	Sesquiterpene
Unknown	0.17	Oxygenated sesquiterpene
Unknown	0.19	Oxygenated sesquiterpene

Unknown	0.10	Oxygenated sesquiterpene
Norpatchoulol	0.83	Norsesquiterpenic alcohol
Unknown	0.20	Oxygenated sesquiterpene
Unknown	0.32	Oxygenated sesquiterpene
Unknown	1.15	Oxygenated sesquiterpene
Caryophyllene oxide	1.24	Sesquiterpenic ether
Caryophyllene oxide isomer	0.36	Sesquiterpenic ether
Unknown	0.48	Oxygenated sesquiterpene
Unknown	1.06	Oxygenated sesquiterpene
Unknown	0.54	Oxygenated sesquiterpene
Humulene epoxide II	0.26	Sesquiterpenic ether
Unknown	0.64	Oxygenated sesquiterpene
Unknown	0.36	Oxygenated sesquiterpene
Unknown	0.41	Oxygenated sesquiterpene
Unknown	0.94	Oxygenated sesquiterpene
Caryophylladienol I	0.67	Sesquiterpenic alcohol
Hinesol	0.46	Sesquiterpenic alcohol
Patchoulol	31.29	Sesquiterpenic alcohol
Pogostol	2.22	Sesquiterpenic alcohol
Unknown	0.29	Oxygenated sesquiterpene
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.17	Unknown
Unknown	0.32	Oxygenated sesquiterpene
Unknown	0.39	Oxygenated sesquiterpene
Rotundone	0.92	Sesquiterpenic ketone
Unknown	0.15	Oxygenated sesquiterpene
Unknown	0.14	Oxygenated sesquiterpene
Pogostone	1.15	Terpenic lactone
Unknown	0.23	Oxygenated sesquiterpene
Unknown	0.42	Oxygenated sesquiterpene
Unknown	0.74	Oxygenated sesquiterpene
Unknown	0.19	Oxygenated sesquiterpene
Unknown	0.13	Oxygenated sesquiterpene
Unknown	0.36	Oxygenated sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Unknown	0.38	Oxygenated sesquiterpene
Unknown	0.22	Oxygenated sesquiterpene
Unknown	0.40	Oxygenated sesquiterpene
Unknown	0.18	Oxygenated sesquiterpene
Unknown	0.32	Oxygenated sesquiterpene
Unknown	0.10	Oxygenated sesquiterpene
Unknown	0.17	Oxygenated sesquiterpene
Unknown	0.31	Oxygenated sesquiterpene
Corymbolone analog	0.17	Sesquiterpenic alcohol
Corymbolone	0.58	Sesquiterpenic alcohol
Phytol	0.02	Diterpenic alcohol
Unknown	0.06	Oxygenated sesquiterpene
Unknown	0.14	Oxygenated sesquiterpene
Consolidated total	92.53%	

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

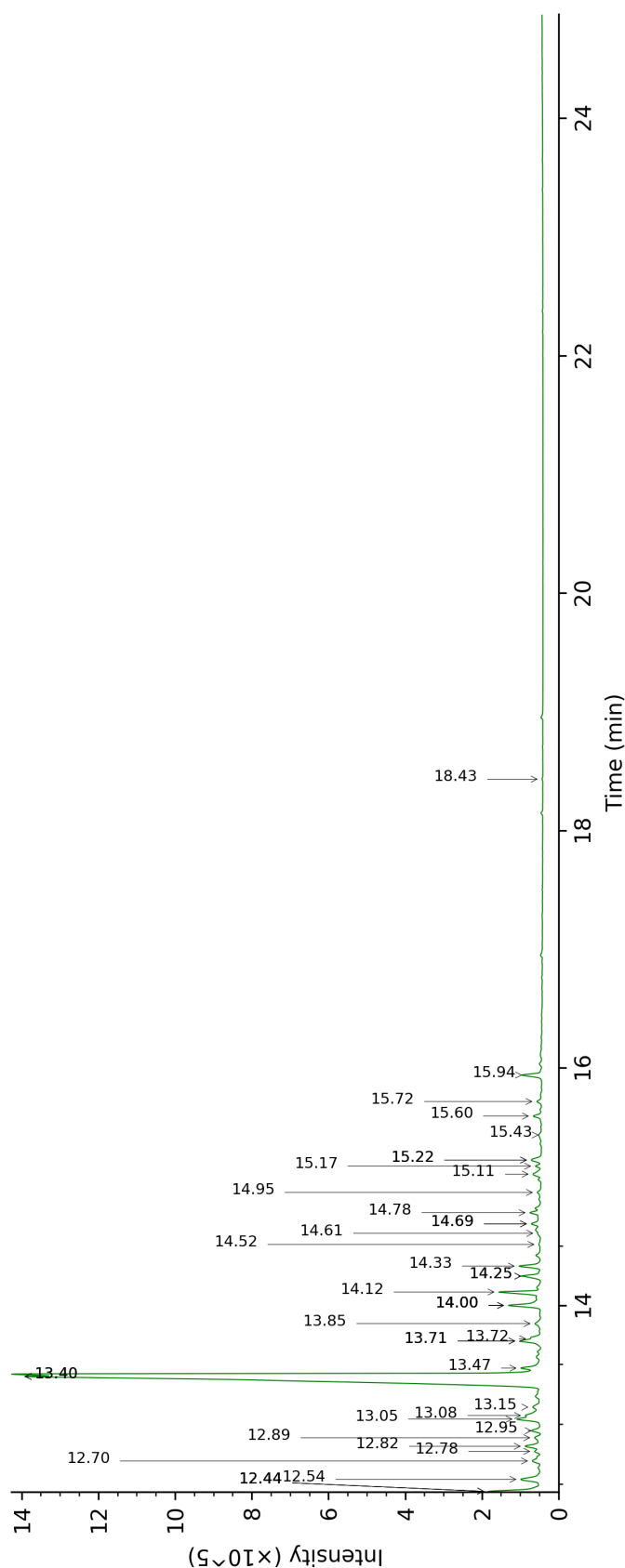
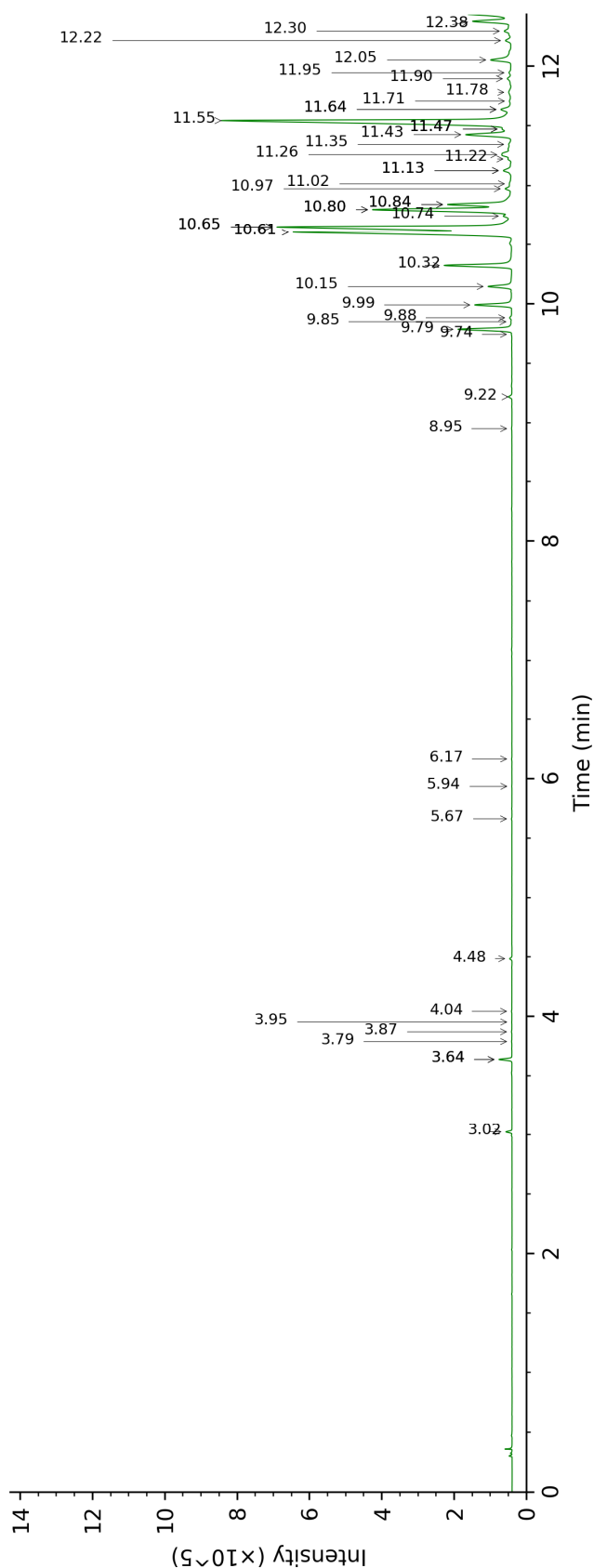
Note: no correction factor was applied

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.

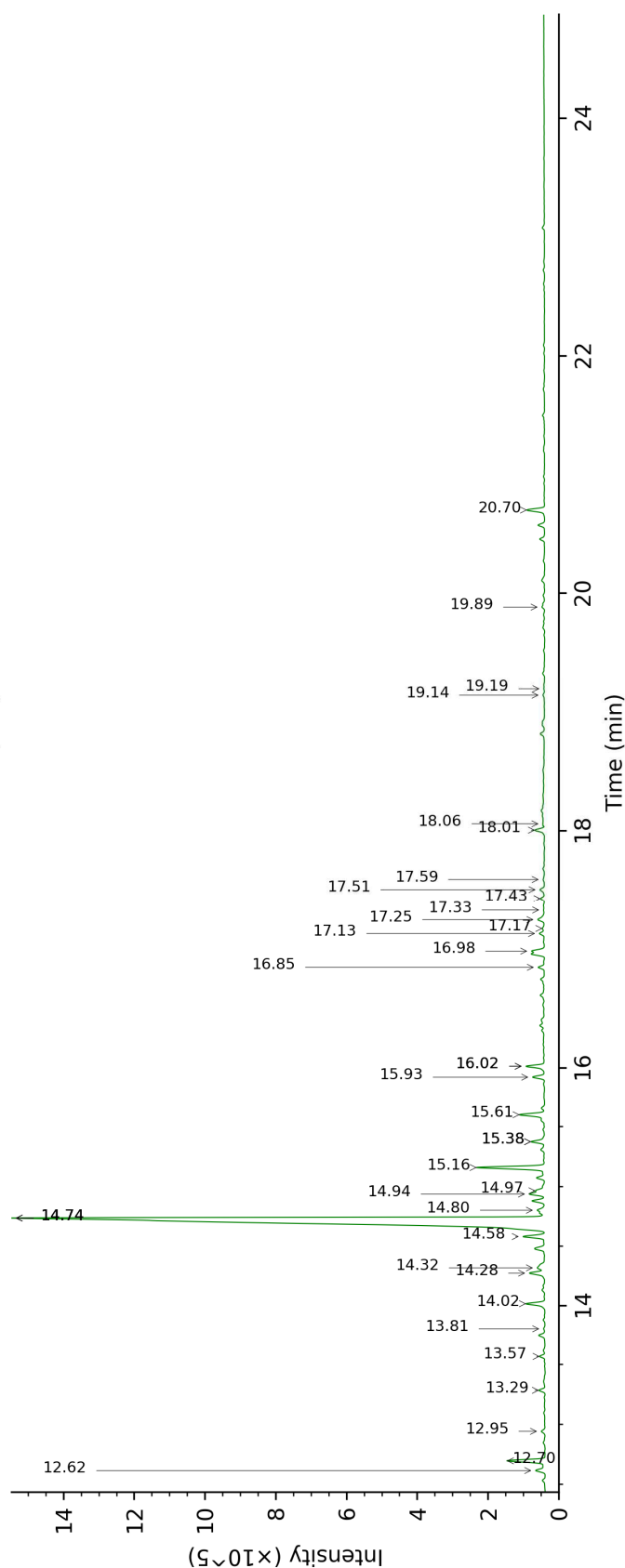
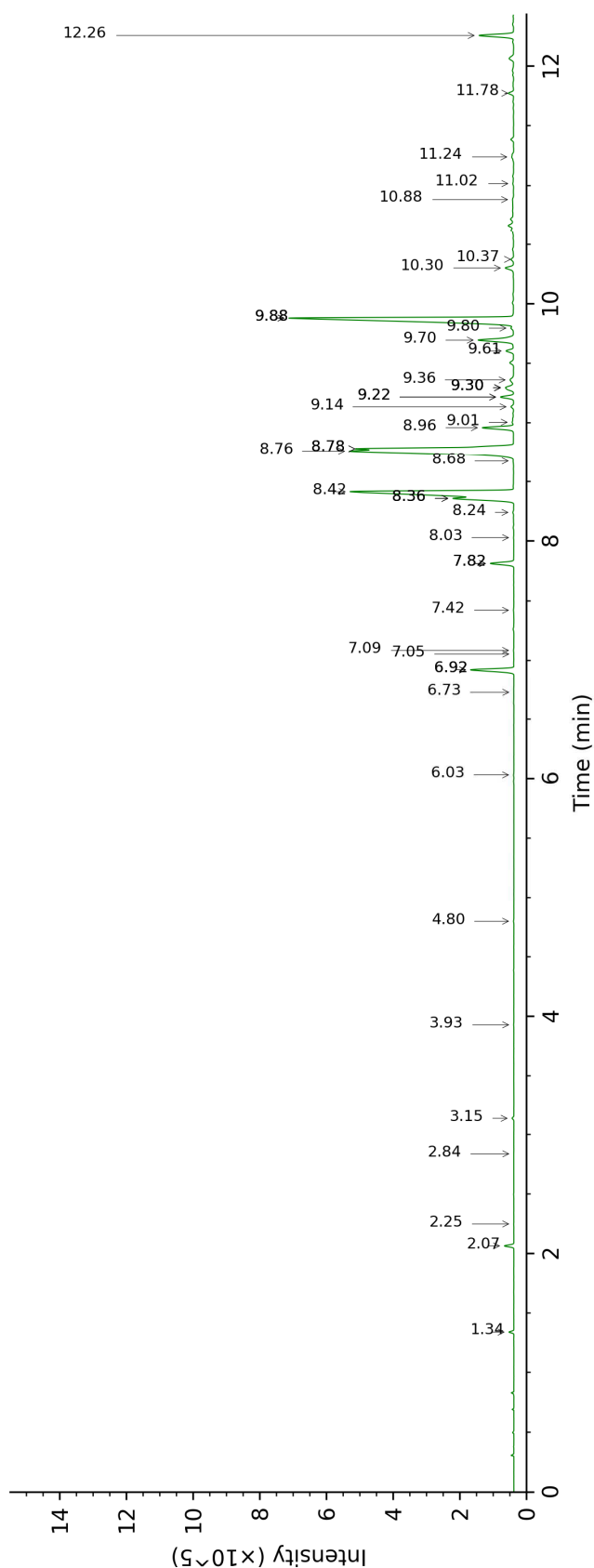
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

This page was intentionally left blank. The following pages present the complete data of the analysis.

DB-5



DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
α-Pinene	3.02	930	0.10	1.34	991	0.11
β-Pinene	3.64*	970	0.24	2.07	1066	0.24
Sabinene	3.64*	970	[0.24]	2.25	1084	0.01
Octen-3-ol	3.79	980	0.01	6.73	1419	0.01
Octan-3-one	3.87	986	0.01	3.93	1216	0.01
Myrcene	3.95	991	0.01	2.84	1133	0.01
Octan-3-ol	4.04	997	0.01	6.03	1368	0.01
Limonene	4.48	1026	0.04	3.14	1157	0.05
Linalool	5.66	1100	0.01	8.03	1517	0.01
3-Methylpentyl isobutyrate	5.94	1118	tr	4.80	1279	0.02
trans-Pinocarveol	6.17	1132	0.01	9.14	1604	0.10
Unknown [m/z 159, 117 (68), 132 (55), 200 (35)]	8.95	1319	0.01	7.09	1446	0.02
δ-Elementene	9.22	1333	0.08	6.92*	1434	1.46
α-Copaene	9.74	1370	0.01	7.06	1444	0.01
β-Patchoulene	9.79	1373	1.34	6.92*	1434	[1.46]
β-Bourbonene	9.85	1378	0.02	7.42	1471	0.03
cis-β-Elementene	9.88	1380	0.06	8.24	1534	0.03
β-Elementene	9.99	1388	0.97	8.36*†	1543	10.42
Cycloseychellene	10.15	1399	0.68	7.82*	1500	0.74
β-Caryophyllene	10.32	1412	1.88	8.36*†	1543	[10.42]
Seychellene	10.60*†	1432	14.38	8.76	1574	7.49
γ-Elementene	10.60*†	1432	[14.38]	9.01	1593	0.06
α-Guaiene	10.65*†	1436	[14.38]	8.42†	1548	[10.42]
Selina-5,11-diene	10.65*†	1436	[14.38]	8.68	1568	0.03
Unknown [m/z 91, 93 (98), 79 (82), 81 (82), 105 (71), 107 (70)... 204 (38)]	10.74	1443	0.25	9.22*	1610	0.43
α-Patchoulene	10.80*	1447	4.40	8.78*	1576	4.55
α-Humulene	10.80*	1447	[4.40]	9.22*	1610	[0.43]
Patchoulene analog I	10.84*	1450	2.18	8.78*	1576	[4.55]
γ-Patchoulene	10.84*	1450	[2.18]	8.96	1590	1.04
9-epi-β-Caryophyllene	10.97	1460	0.20	9.30*	1617	0.43
Unknown [m/z 159, 91 (88), 93 (72), 79 (69), 105 (68), 41 (66), 81 (54), 202? (50)...]	11.02	1463	0.12	9.30*	1617	[0.43]
Unknown [m/z 147, 93 (87), 107 (77), 105 (77), 91	11.13*	1471	0.35	9.30*	1617	[0.43]

(73), 79 (63)... 204 (21)]						
Selina-4,11-diene	11.13*	1471	[0.35]	9.36	1622	0.19
β-Selinene	11.22	1478	0.09	9.80	1657	0.10
Unknown [m/z 79, 107 (99), 91 (88), 93 (86), 81 (78), 105 (73), 41 (73)... 204? (12)]	11.26	1481	0.47	9.61	1642	0.27
α-Selinene	11.35	1488	0.10	9.88*	1664	10.63
Aciphyllene	11.43	1494	1.53	9.70	1649	1.43
Eudesma-2,4(15),11-triene	11.48*	1497	0.22	11.02	1759	0.04
Pentadecane	11.48*	1497	[0.22]	7.82*	1500	[0.74]
δ-Guaiene	11.55	1502	10.58	9.88*	1664	[10.63]
γ-Cadinene	11.64*	1510	0.43	10.30	1698	0.32
Nootkatene	11.64*	1510	[0.43]	10.88	1748	0.08
7-epi-α-Selinene	11.71	1515	0.08	10.37	1704	0.09
Unknown [m/z 161, 119 (92), 91 (69), 105 (52), 145 (49)... 218 (6)]	11.78	1521	0.17	11.24	1778	0.13
Unknown [m/z 91, 105 (98), 108 (83), 93 (82), 133 (79), 77 (64), 79 (57), 41 (56), 145 (55)... 218? (5)]	11.90	1530	0.19			
Unknown [m/z 145, 131 (91), 91 (86), 105 (68), 146 (66), 43 (54)... 220? (5)]	11.95	1534	0.10			
Norpatchoulénol	12.06	1542	0.83	14.02	2031	0.70
Unknown [m/z 191, 159 (66), 133 (53), 91 (45), 41 (42), 177 (35), 105 (33), 220 (32)]	12.22	1555	0.20	13.57	1989	0.18
Unknown [m/z 41, 67 (90), 55 (87), 79 (85), 107 (84), 81 (84), 93 (84), 121 (77), 91 (74)... 220 (7)]	12.30	1561	0.32			
Unknown [m/z 43, 107 (94), 81 (71), 41 (63), 67 (58), 111 (58), 93 (55), 83 (54)... 205 (8), 220 (1)]	12.38	1568	1.15	12.26	1868	1.18

Caryophyllene oxide	12.44*	1573	2.02	12.70	1909	1.24
Caryophyllene oxide isomer	12.44*	1573	[2.02]	12.62	1899	0.36
Unknown isomer	12.44*	1573	[2.02]	14.32	2060	0.48
Unknown [m/z 43, 79 (44), 81 (41), 93 (40), 91 (40)... 220 (5)]	12.54	1581	1.06	14.28	2056	0.63
Unknown [m/z 43, 105 (77), 91 (71), 93 (68), 41 (62), 107 (6)... 205 (41), 220 (7)]	12.70	1593	0.54	14.58	2085	0.73
Humulene epoxide II	12.78	1599	0.26	13.29	1963	0.21
Unknown [m/z 43, 161 (73), 91 (53), 95 (52), 79 (46), 119 (45)... 205 (29), 220? (1)]	12.82	1602	0.64	14.74*	2100	32.88
Unknown [m/z 41, 91 (92), 55 (81), 93 (81), 79 (74), 43 (71), 95 (68), 123 (65)... 220 (17)]	12.89	1608	0.36	14.80	2106	0.31
Unknown [m/z 43, 79 (41), 93 (39), 41 (39), 91 (38), 81 (36)... 220 (3)]	12.95	1613	0.41			
Unknown [m/z 41, 55 (92), 95 (80), 81 (76), 109 (76), 67 (66), 125 (65)... 220 (12)]	13.05	1621	0.94	14.74*	2100	[32.88]
Caryophylladienol I	13.08	1623	0.67	16.02*	2229	0.71
Hinesol	13.15	1629	0.46	14.94	2120	0.56
Patchoulol	13.40*†	1650	35.20	14.74*	2100	[32.88]
Pogostol	13.40*†	1650	[35.20]	15.16	2142	2.22
Unknown [m/z 175, 218 (59), 133 (49), 91 (43), 41 (38), 147 (36)]	13.47†	1656	[35.20]	14.97	2123	0.29
Unknown [m/z 95, 107 (99), 41 (85), 93 (82), 91 (82), 109 (71), 105 (71), 105 (71), 108 (66)... 220 (29)]	13.71*	1675	0.83	16.02*	2229	[0.71]

Unknown [m/z 111, 250 (38), 126 (27), 139 (26), 43 (16), 41 (15), 166 (15)]	13.71*	1675	[0.83]	11.78	1825	0.17
Unknown [m/z 91, 41 (100), 107 (98), 108 (95), 95 (87), 93 (87), 105 (85), 79 (77), 119 (72)... 220? (15)]	13.72	1677	0.32	15.93	2219	0.43
Unknown [m/z 43, 41 (95), 97 (89), 109 (71), 55 (71), 107 (70), 95 (69), 110 (65)... 222 (5)]	13.85	1687	0.39	15.38*	2164	0.53
Rotundone	14.00*	1700	1.21	15.61	2187	0.92
Unknown [m/z 105, 107 (98), 91 (95), 166 (80), 248 (80), 93 (76)... 233 (66)]	14.00*	1700	[1.21]	12.94	1932	0.15
Unknown [m/z 43, 41 (82), 137 (78), 109 (76), 95 (75), 91 (72), 55 (67)... 220? (14)]	14.00*	1700	[1.21]			
Pogostone	14.12	1709	1.15			
Unknown [m/z 107, 93 (87), 41 (83), 81 (82), 67 (80), 55 (76)... 204 (53), 207 (34), 222 (9)]	14.25*	1721	0.73	16.85	2315	0.23
Unknown [m/z 83, 43 (85), 55 (39), 41 (29), 121 (27), 120 (25)... 218 (3)]	14.25*	1721	[0.73]	16.98	2330	0.42
Unknown [m/z 133, 148 (68), 147 (59), 91 (56), 79 (45), 105 (44)... 218 (8)]	14.33	1728	0.74	17.13	2346	0.20
Unknown [m/z 43, 83 (93), 55 (42), 41 (37), 121 (34), 111 (28)... 222? (1)]	14.52	1744	0.19	17.43	2378	0.15
Unknown [m/z 134, 107 (96), 91	14.61	1752	0.13	17.33	2367	0.05

(84), 93 (78), 79 (77), 41 (74), 43 (66), 77 (65)...					
Unknown [m/z 43, 191 (68), 41 (62), 91 (51), 95 (49), 110 (44)... 234 (22)]	14.69*	1759	0.46		
Unknown [m/z 91, 105 (88), 95 (79), 93 (78), 81 (72), 79 (66)... 205 (33), 220 (7)...	14.69*	1759	[0.46]	17.59	2396 0.09
Unknown [m/z 149, 131 (54), 105 (48), 91 (46), 41 (30), 93 (27)... 218 (23)]	14.78	1767	0.38	17.25	2358 0.35
Unknown [m/z 43, 95 (58), 67 (50), 41 (47), 55 (38), 109 (37)... 221 (9)... 236? (3)]	14.95	1782	0.22	18.06	2448 0.08
Unknown [m/z 219, 43 (67), 91 (46), 79 (42), 41 (41), 55 (36)... 234 (6)]	15.11	1795	0.40	18.01	2442 0.36
Unknown [m/z 43, 91 (77), 79 (74), 109 (73), 110 (71)... 218 (52), 234? (1)]	15.17	1801	0.18	17.51	2386 0.21
Unknown [m/z 43, 91 (43), 41 (37), 79 (32), 219 (31)... 234 (14)]	15.22*	1805	0.42		
Unknown [m/z 91, 41 (79), 43 (74), 79 (72), 105 (65), 77 (64), 147 (64), 93 (61)... 218 (26), 234 (14)]	15.22*	1805	[0.42]	17.17	2350 0.10
Unknown [m/z 43, 69 (60), 41 (55), 55 (40), 95 (33), 163 (27)... 234 (17)]	15.43	1824	0.17	19.89	2660 0.10
Unknown [m/z 41, 110 (77), 55 (75), 69 (74), 43 (74), 95 (71), 97	15.60	1839	0.31		

(71), 123 (71), 67 (63), 136 (56)... 236? (7)]						
Corymbolone analog	15.72	1850	0.17	19.14	2571	0.06
Corymbolone	15.94	1871	0.58	20.70	2760	0.66
Phytol	18.44	2110	0.02	19.19	2578	0.02
Unknown [m/z 41, 79 (97), 43 (97), 69 (72), 93 (70), 91 (62), 95 (58)... 220 (2)]				13.81	2011	0.06
Unknown [m/z 163, 119 (50), 91 (48), 95 (47), 41 (44), 105 (41)... 220 (18)]				15.38*	2164	[0.53]
Total identified	85.05%			81.19%		
Total reported	95.42%			88.53%		

*: 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