

Date : June 20, 2018

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18F13-BKB2-1-CC

Customer identification : Patchouli - Indonesia - PC180601

Type : Essential oil

Source : *Pogostemon cablin*

Customer : Be Kind Botanicals, Inc.

ANALYSIS

Method: PC-PA-014-17J19 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Sarah-Eve Tremblay, M. Sc. A., Chimiste

Analysis date : June 18, 2018

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Yellow liquid

Refractive index: 1.5085 ± 0.0003 (20 °C)

CONCLUSION

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

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
5-Methyl-2-hexanone	tr	tr	Aliphatic ketone
α -Pinene	0.08	0.09	Monoterpene
Camphene	tr	tr	Monoterpene
β -Pinene	0.21*	0.21	Monoterpene
Sabinene	[0.21]*	tr	Monoterpene
Octen-3-ol	tr	0.01	Aliphatic alcohol
Octan-3-one	tr	tr	Aliphatic ketone
Limonene	0.02	0.02	Monoterpene
Terpinolene	tr	tr	Monoterpene
Linalool	0.01	0.01	Monoterpenic alcohol
α -Terpineol	tr	2.94*	Monoterpenic alcohol
Unknown	0.01	0.01	Unknown
δ -Elemene	tr	tr	Sesquiterpene
Unknown	0.01	tr	Sesquiterpene
α -Copaene	0.09	0.11	Sesquiterpene
β -Patchoulene	2.42	2.49	Sesquiterpene
β -Bourbonene	0.01	0.01	Sesquiterpene
<i>cis</i> - β -Elemene	0.04	0.05	Sesquiterpene
β -Elemene	0.75	3.63*	Sesquiterpene
Cycloseychellene	0.54	0.52	Sesquiterpene
Isocaryophyllene	0.01	0.02	Sesquiterpene
β -Caryophyllene	3.00	[3.63]*	Sesquiterpene
γ -Elemene	0.02	0.02	Sesquiterpene
α -Guaiene	18.11	12.49	Sesquiterpene
Selina-5,11-diene	[18.11]*	0.04	Sesquiterpene
Seychellene	[18.11]*	11.67	Sesquiterpene
Unknown	0.04	0.08	Sesquiterpene
α -Humulene	0.17	0.55*	Sesquiterpene
α -Patchoulene	4.88	[11.67]	Sesquiterpene
Patchoulene analog I	2.48*	[11.67]	Sesquiterpene
γ -Patchoulene	[2.48]*	0.87*	Sesquiterpene
9-epi- β -Caryophyllene	0.38*	0.39	Sesquiterpene
Unknown	[0.38]*	[0.55]*	Sesquiterpene
Unknown	0.57*	0.40	Sesquiterpene
Selina-4,11-diene	[0.57]*	0.21	Sesquiterpene
β -Selinene	0.24	0.23	Sesquiterpene
Patchoulene analog II	0.25	[2.94]*	Sesquiterpene
Unknown	0.26*	0.38*	Sesquiterpene
δ -Selinene	[0.26]*	[0.38]*	Sesquiterpene
Unknown	0.22		Sesquiterpene
α -Selinene	0.18	18.57*	Sesquiterpene
Aciphyllene	3.06*	[2.94]*	Sesquiterpene
Eudesma-2,4(15),11-triene	[3.06]*	0.04	Sesquiterpene
Pentadecane	0.10	0.14	Alkane
δ -Guaiene	18.26	[18.57]*	Sesquiterpene
γ -Cadinene	0.48*	0.42	Sesquiterpene
Nootkatene	[0.48]*	0.06	Sesquiterpene
7-epi- α -Selinene	0.04	0.21	Sesquiterpene

Unknown	0.07	0.19*	Sesquiterpene
Unknown	0.04	0.09	Oxygenated sesquiterpene
Unknown	0.02	0.02	Oxygenated sesquiterpene
Unknown	0.16*		Oxygenated sesquiterpene
Unknown	[0.16]*		Oxygenated sesquiterpene
Unknown	0.14		Oxygenated sesquiterpene
Isocaryophyllene epoxide B	0.01	0.01	Sesquiterpenic ether
α-Elemol	0.62*	0.02	Sesquiterpenic alcohol
Norpatchoulenol	[0.62]*	0.60	Norsesquiterpenic alcohol
Unknown	0.01	0.01	Oxygenated sesquiterpene
Unknown	0.03		Oxygenated sesquiterpene
Unknown	0.18	0.16	Oxygenated sesquiterpene
Caryophyllene oxide isomer	0.36*	0.02*	Sesquiterpenic ether
Caryophyllene oxide	[0.36]*	0.33	Sesquiterpenic ether
Unknown	[0.36]*	0.02	Oxygenated sesquiterpene
Unknown	0.49	0.41	Oxygenated sesquiterpene
Unknown	0.04	0.25	Oxygenated sesquiterpene
Hexadecane	0.11	[0.87]*	Alkane
Humulene epoxide II	0.08	0.04	Sesquiterpenic ether
Unknown	0.07	0.59	Oxygenated sesquiterpene
Unknown	0.23	0.34	Oxygenated sesquiterpene
Unknown	0.21		Oxygenated sesquiterpene
Unknown	0.62	32.13*	Oxygenated sesquiterpene
Hinesol	0.36	0.40	Sesquiterpenic alcohol
Patchoulol	34.67	[32.13]*	Sesquiterpenic alcohol
Pogostol	[34.67]*	2.33	Sesquiterpenic alcohol
Unknown	[34.67]*	0.29	Oxygenated sesquiterpene
Unknown	0.08	0.02	Oxygenated sesquiterpene
Unknown	0.17	0.14	Oxygenated sesquiterpene
Unknown	0.04	0.05	Oxygenated sesquiterpene
Unknown	0.05	0.06	Oxygenated sesquiterpene
Rotundone	0.19	0.15	Sesquiterpenic ketone
Unknown	0.09		Oxygenated sesquiterpene
Pogostone	1.40		Terpenic lactone
Unknown	0.21	0.19	Oxygenated sesquiterpene
Unknown	0.21	0.20	Oxygenated sesquiterpene
Unknown	0.05	0.03	Oxygenated sesquiterpene
Unknown	0.02		Oxygenated sesquiterpene
Unknown	0.02	0.01	Oxygenated sesquiterpene
Unknown	0.05		Oxygenated sesquiterpene
Unknown	0.11		Oxygenated sesquiterpene
Unknown	0.11	0.13	Oxygenated sesquiterpene
Unknown	0.06	0.05	Oxygenated sesquiterpene
Unknown	0.04		Oxygenated sesquiterpene
Unknown	0.04	0.02	Oxygenated sesquiterpene
Unknown	0.04	0.03	Oxygenated sesquiterpene
Unknown	0.01	tr	Oxygenated sesquiterpene
Unknown	0.04	0.02	Oxygenated sesquiterpene
Corymbolone analog	0.01	tr	Sesquiterpenic alcohol
Corymbolone	0.02	0.02	Sesquiterpenic alcohol
Drima-7,9(11)-diene?		[0.19]*	Sesquiterpene
Unknown		[0.02]*	Oxygenated sesquiterpene

Unknown		0.04	Oxygenated sesquiterpene
Unknown		0.02	Oxygenated sesquiterpene
Unknown		0.02	Oxygenated sesquiterpene
Total identified	94.69%	92.65%	

*: Two or more compounds are coeluting on this column

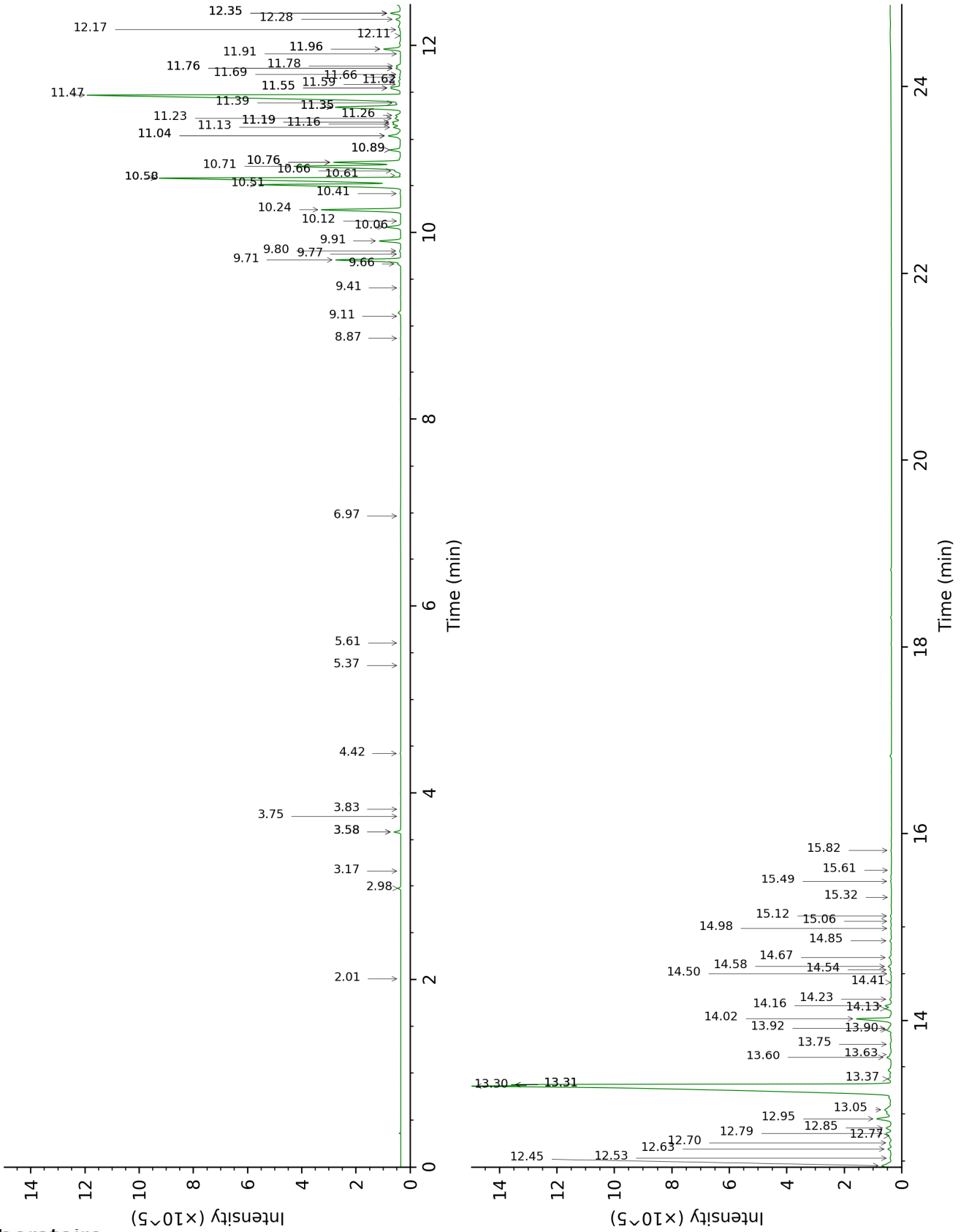
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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

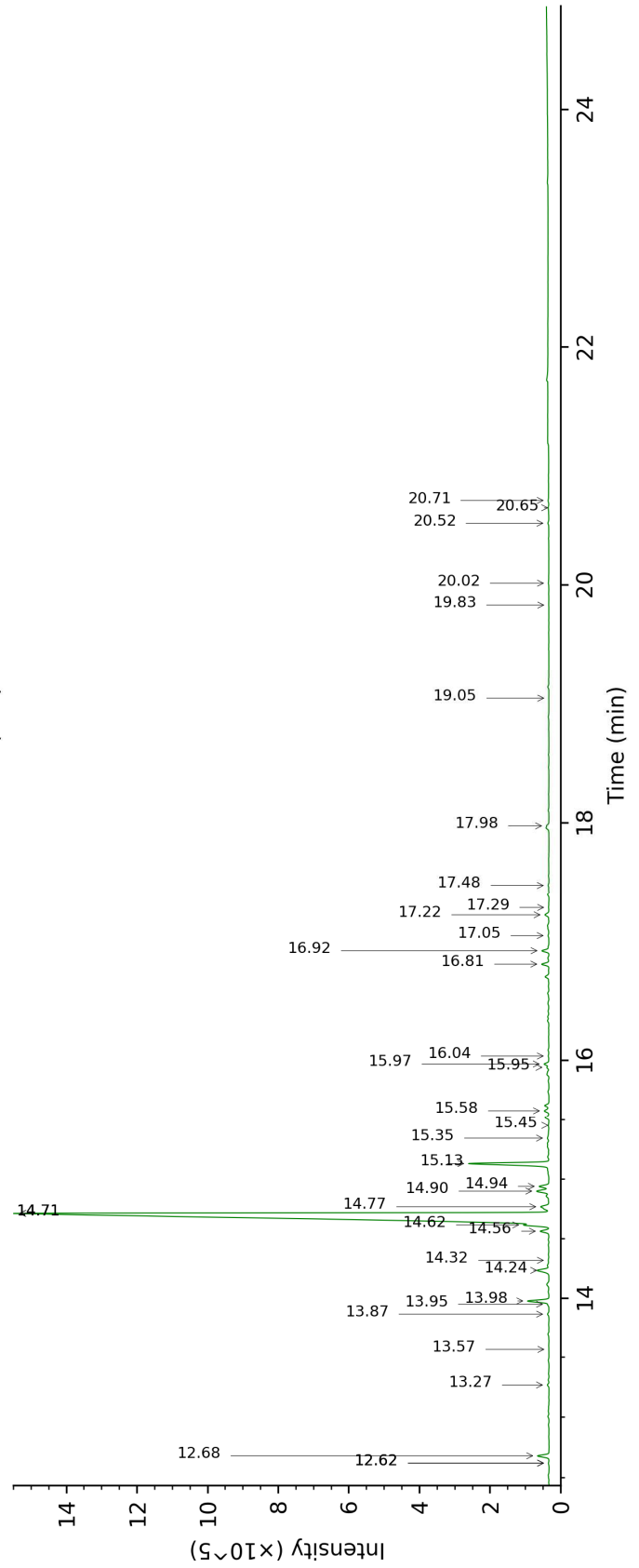
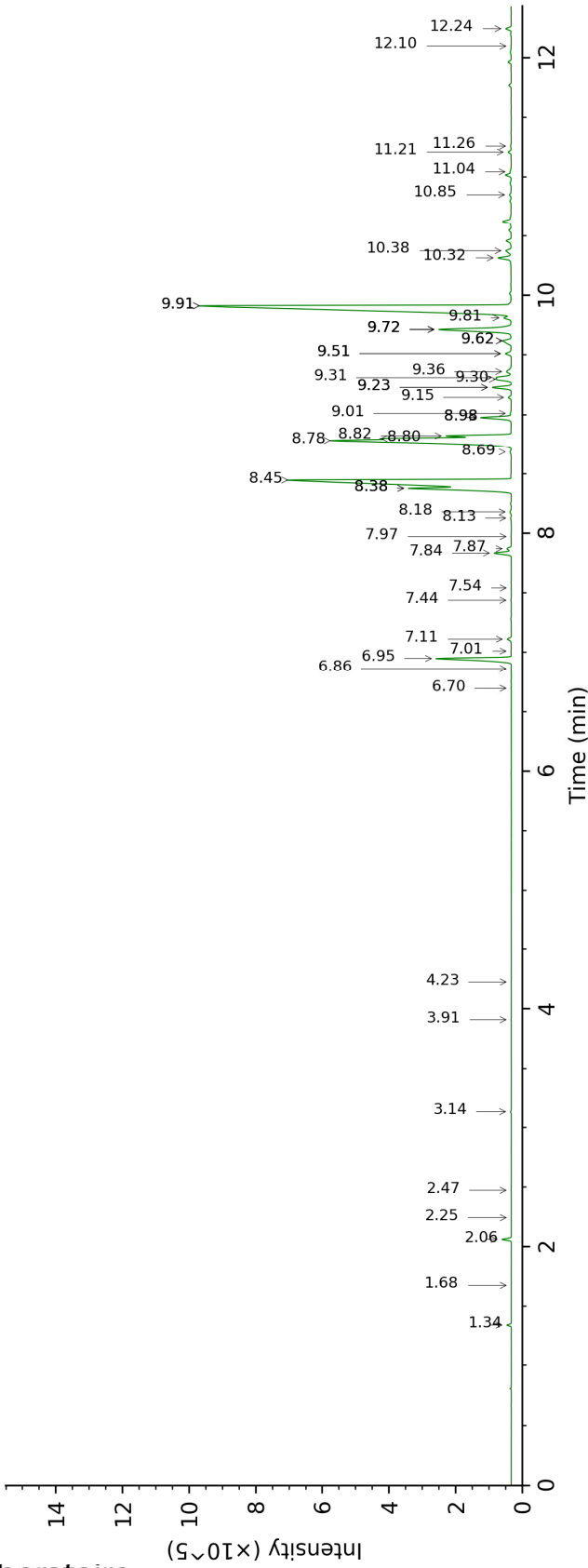
Note: no correction factor was applied

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DB-5



DB-WAX



FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
5-Methyl-2-hexanone	2.01	853	tr	2.47	1108	tr
α -Pinene	2.98	929	0.08	1.34	993	0.09
Camphene	3.17	942	tr	1.68	1030	tr
β -Pinene	3.58*	970	0.21	2.06	1068	0.21
Sabinene	3.58*	970	[0.21]	2.24	1086	tr
Octen-3-ol	3.75	981	tr	6.70	1419	0.01
Octan-3-one	3.83	986	tr	3.91	1218	tr
Limonene	4.42	1025	0.02	3.14	1159	0.02
Terpinolene	5.37	1085	tr	4.23	1241	tr
Linalool	5.61	1100	0.01	7.97	1515	0.01
α -Terpineol	6.97	1188	tr	9.72*	1653	2.94
Unknown [m/z 159, 117 (68), 132 (55), 200 (35)]	8.87	1316	0.01	7.01	1443	0.01
δ -Elemene	9.11	1332	tr	6.86	1432	tr
Unknown [m/z 145, 91 (67), 105 (57), 131 (56), 119 (52), 159 (49), 202 (45)]	9.41	1354	0.01	7.54	1482	tr
α -Copaene	9.66	1372	0.09	7.11	1450	0.11
β -Patchoulene	9.71	1375	2.42	6.95	1438	2.49
β -Bourbonene	9.77	1379	0.01	7.44	1475	0.01
<i>cis</i> - β -Elemene	9.80	1382	0.04	8.18	1531	0.05
β -Elemene	9.91	1389	0.75	8.38*	1546	3.63
Cycloseychellene	10.06	1400	0.54	7.84	1504	0.52
Isocaryophyllene	10.12	1404	0.01	8.13	1527	0.02
β -Caryophyllene	10.24	1413	3.00	8.38*	1546	[3.63]
γ -Elemene	10.42	1426	0.02	9.01	1596	0.02
α -Guaiene	10.51†	1433	18.11	8.45	1552	12.49
Selina-5,11-diene	10.58*†	1438	[18.11]	8.68	1570	0.04
Seychellene	10.58*†	1438	[18.11]	8.78†	1578	11.67
Unknown [m/z 91, 93 (98), 79 (82), 81 (82), 105 (71), 107 (70)... 204 (38)]	10.61	1441	0.04	9.15	1606	0.08
α -Humulene	10.66	1444	0.17	9.23*	1613	0.55
α -Patchoulene	10.71	1448	4.88	8.80†	1579	[11.67]
Patchoulene analog I	10.76*	1452	2.48	8.82†	1581	[11.67]
γ -Patchoulene	10.76*	1452	[2.48]	8.98*	1593	0.87
9-epi- β -Caryophyllene	10.89*	1461	0.38	9.31	1620	0.39
Unknown [m/z 10.89*]	10.89*	1461	[0.38]	9.23*	1613	[0.55]

159, 91 (88), 93 (72), 79 (69), 105 (68), 41 (66), 81 (54), 202? (50)...						
Unknown [m/z 147, 93 (87), 107 (77), 105 (77), 91 (73), 79 (63)... 204 (21)]	11.04*	1473	0.57	9.30	1619	0.40
Selina-4,11-diene	11.04*	1473	[0.57]	9.36	1624	0.21
β-Selinene	11.13	1479	0.24	9.81	1661	0.23
Patchoulene analog II	11.16	1482	0.25	9.72*	1653	[2.94]
Unknown [m/z 79, 107 (99), 91 (88), 93 (86), 81 (78), 105 (73), 41 (73)... 204? (12)]	11.18*	1484	0.26	9.62*	1645	0.38
δ-Selinene	11.18*	1484	[0.26]	9.62*	1645	[0.38]
Unknown [m/z 161, 189 (96), 91 (74), 204 (73), 105 (69), 41 (52)]	11.23	1486	0.22			
α-Selinene	11.26	1489	0.18	9.92*	1669	18.57
Aciphyllene	11.34*	1495	3.06	9.72*	1653	[2.94]
Eudesma-2,4(15),11-triene	11.34*	1495	[3.06]	11.04	1764	0.04
Pentadecane	11.39	1499	0.10	7.87	1507	0.14
δ-Guaiene	11.47	1505	18.26	9.92*	1669	[18.57]
γ-Cadinene	11.55*	1511	0.48	10.32	1702	0.42
Nootkatene	11.55*	1511	[0.48]	10.85	1747	0.06
7-epi-α-Selinene	11.59	1514	0.04	10.38	1707	0.21
Unknown [m/z 159, 91 (81), 117 (68), 131 (51), 105 (46)... 202 (37)]	11.62	1517	0.07	9.51*	1636	0.19
Unknown [m/z 41, 67 (95), 93 (92), 107 (91), 55 (77), 81 (77), 79 (73)... 205 (17)...	11.66	1520	0.04	11.21	1778	0.09
Unknown [m/z 161, 119 (92), 91 (69), 105 (52), 145 (49)... 218 (6)]	11.69	1522	0.02	11.26	1782	0.02
Unknown [m/z 91, 105 (78), 93 (77), 107 (71), 79 (64), 41 (63), 77	11.76*	1528	0.16			

(63), 145 (60)... 218 (17)]						
Unknown [m/z 91, 105 (98), 108 (83), 93 (82), 133 (79), 77 (64), 79 (57), 41 (56), 145 (55)... 218? (5)]	11.76*	1528	[0.16]			
Unknown [m/z 145, 131 (91), 91 (86), 105 (68), 146 (66), 43 (54)... 220? (5)]	11.78	1530	0.14			
Isocaryophyllene epoxide B	11.91	1540	0.01	12.10	1856	0.01
α-Elemol	11.96*	1544	0.62	13.95	2027	0.02
Norpatchoulenol	11.96*	1544	[0.62]	13.98	2030	0.60
Unknown [m/z 191, 159 (66), 133 (53), 91 (45), 41 (42), 177 (35), 105 (33), 220 (32)]	12.11	1555	0.01	13.57	1990	0.01
Unknown [m/z 41, 67 (90), 55 (87), 79 (85), 107 (84), 81 (84), 93 (84), 121 (77), 91 (74)... 220 (7)]	12.17	1560	0.03			
Unknown [m/z 43, 107 (94), 81 (71), 41 (63), 67 (58), 111 (58), 93 (55), 83 (54)... 205 (8), 220 (1)]	12.28	1569	0.18	12.24	1869	0.16
Caryophyllene oxide isomer	12.35*	1574	0.36	12.62*	1902	0.02
Caryophyllene oxide	12.35*	1574	[0.36]	12.68	1908	0.33
Unknown isomer	12.35*	1574	[0.36]	14.32	2063	0.02
Unknown [m/z 43, 79 (44), 81 (41), 93 (40), 91 (40)... 220 (5)]	12.45	1582	0.49	14.24	2054	0.41
Unknown [m/z 43, 105 (77), 91 (71), 93 (68), 41 (62), 107 (6)... 205 (41), 220 (7)]	12.53	1589	0.04	14.56	2086	0.25
Hexadecane	12.63	1596	0.11	8.98*	1593	[0.87]
Humulene epoxide II	12.70	1601	0.08	13.27	1963	0.04

Unknown [m/z 43, 161 (73), 91 (53), 95 (52), 79 (46), 119 (45)... 205 (29), 220? (1)]	12.77	1607	0.07	14.62	2091	0.59
Unknown [m/z 41, 91 (92), 55 (81), 93 (81), 79 (74), 43 (71), 95 (68), 123 (65)... 220 (17)]	12.80	1610	0.23	14.77	2106	0.34
Unknown [m/z 43, 79 (41), 93 (39), 41 (39), 91 (38), 81 (36)... 220 (3)]	12.85	1614	0.21			
Unknown [m/z 41, 55 (92), 95 (80), 81 (76), 109 (76), 67 (66), 125 (65)... 220 (12)]	12.95	1622	0.62	14.71*	2101	32.13
Hinesol	13.05	1630	0.36	14.90	2119	0.40
Patchoulol	13.30†	1651	34.67	14.71*	2101	[32.13]
Pogostol	13.31*†	1652	[34.67]	15.13	2143	2.33
Unknown [m/z 175, 218 (59), 133 (49), 91 (43), 41 (38), 147 (36)]	13.31*†	1652	[34.67]	14.94	2124	0.29
Unknown [m/z 43, 41 (87), 91 (64), 55 (63), 81 (58), 95 (54), 107 (52)... 222 (12)]	13.37	1657	0.08	20.02	2684	0.02
Unknown [m/z 95, 107 (99), 41 (85), 93 (82), 91 (82), 109 (71), 105 (71), 105 (71), 108 (66)... 220 (29)]	13.60	1676	0.17	15.97	2228	0.14
Unknown [m/z 91, 41 (100), 107 (98), 108 (95), 95 (87), 93 (87), 105 (85), 79 (77), 119 (72)... 220? (15)]	13.63	1679	0.04	15.94	2226	0.05
Unknown [m/z 43, 41 (95), 97 (89), 109 (71), 55 (71), 107 (70), 95 (69), 110 (65)...	13.75	1688	0.05	15.34	2164	0.06

222 (5)]						
Rotundone	13.90	1701	0.19	15.58	2188	0.15
Unknown [m/z 43, 41 (82), 137 (78), 109 (76), 95 (75), 91 (72), 55 (67)... 220? (14)]	13.92	1703	0.09			
Pogostone	14.02	1711	1.40			
Unknown [m/z 107, 93 (87), 41 (83), 81 (82), 67 (80), 55 (76)... 204 (53), 207 (34), 222 (9)]	14.13	1721	0.21	16.81	2316	0.19
Unknown [m/z 83, 43 (85), 55 (39), 41 (29), 121 (27), 120 (25)... 218 (3)]	14.16	1724	0.21	16.92	2329	0.20
Unknown [m/z 133, 148 (68), 147 (59), 91 (56), 79 (45), 105 (44)... 218 (8)]	14.23	1730	0.05	17.05	2342	0.03
Unknown [m/z 43, 83 (93), 55 (42), 41 (37), 121 (34), 111 (28)... 222? (1)]	14.41	1745	0.02			
Unknown [m/z 134, 107 (96), 91 (84), 93 (78), 79 (77), 41 (74), 43 (66), 77 (65)...]	14.50	1753	0.02	17.28	2368	0.01
Unknown [m/z 43, 191 (68), 41 (62), 91 (51), 95 (49), 110 (44)... 234 (22)]	14.54	1757	0.05			
Unknown [m/z 91, 105 (88), 95 (79), 93 (78), 81 (72), 79 (66)... 205 (33), 220 (7)...]	14.58	1760	0.11			
Unknown [m/z 149, 131 (54), 105 (48), 91 (46), 41 (30), 93 (27)... 218 (23)]	14.67	1768	0.11	17.22	2362	0.13
Unknown [m/z 43, 95 (58), 67	14.85	1784	0.06	17.98	2445	0.05

(50), 41 (47), 55 (38), 109 (37)... 221 (9)... 236? (3)]						
Unknown [m/z 219, 43 (67), 91 (46), 79 (42), 41 (41), 55 (36)... 234 (6)]	14.98	1795	0.04			
Unknown [m/z 43, 91 (77), 79 (74), 109 (73), 110 (71)... 218 (52), 234? (1)]	15.06	1802	0.04	17.48	2389	0.02
Unknown [m/z 43, 91 (43), 41 (37), 79 (32), 219 (31)... 234 (14)]	15.12	1807	0.04	20.52	2746	0.03
Unknown [m/z 43, 69 (60), 41 (55), 55 (40), 95 (33), 163 (27)... 234 (17)]	15.32	1825	0.01	19.83	2661	tr
Unknown [m/z 41, 110 (77), 55 (75), 69 (74), 43 (74), 95 (71), 97 (71), 123 (71), 67 (63), 136 (56)... 236? (7)]	15.49	1841	0.04	20.65	2762	0.02
Corymbolone analog	15.61	1852	0.01	19.05	2568	tr
Corymbolone	15.82	1871	0.02	20.71	2770	0.02
Drima-7,9(11)-diene?				9.51*	1636	[0.19]
Unknown [m/z 43, 41 (59), 109 (57), 79 (54), 95 (53), 107 (49), 93 (48), 67 (48)... 205 (18), 220 (4)]				12.62*	1902	[0.02]
Unknown [m/z 41, 79 (97), 43 (97), 69 (72), 93 (70), 91 (62), 95 (58)... 220 (2)]				13.87	2019	0.04
Unknown [m/z 163, 119 (50), 91 (48), 95 (47), 41 (44), 105 (41)... 220 (18)]				15.45	2175	0.02
Unknown [m/z				16.04	2235	0.02

91, 108 (86), 107 (85), 93 (80), 120 (75), 105 (71), 95 (72)... 218 (37)]		
Total identified	94.69%	92.65%
Total reported	98.55%	96.37%

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified 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