

**Date :** March 06, 2018

**CERTIFICATE OF ANALYSIS - GC PROFILING**

*SAMPLE IDENTIFICATION*

**Internal code :** 18B20-PLG16-1-CC  
**Customer identification :** Patchouli Dark  
**Type :** Essential oil  
**Source :** *Pogostemon cablin*  
**Customer :** Plant Guru

*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 :** February 28, 2018

Checked and approved by :

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

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*PHYSICOCHEMICAL DATA*

**Physical aspect:** Yellow/orange viscous liquid

**Refractive index:**  $1.5095 \pm 0.0003$  (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
$\alpha$ -Pinene	0.07	0.07	Monoterpene
Camphene	tr	tr	Monoterpene
Sabinene	0.16*	tr	Monoterpene
$\beta$ -Pinene	[0.16]*	0.17	Monoterpene
Octen-3-ol	tr	0.01	Aliphatic alcohol
Octan-3-one	tr	tr	Aliphatic ketone
Octan-3-ol	0.01	0.01	Aliphatic alcohol
Limonene	0.02	0.02	Monoterpene
Linalool	0.01		Monoterpenic alcohol
$\alpha$ -Terpineol	tr	2.71*	Monoterpenic alcohol
Unknown	0.02	0.02*	Unknown
$\delta$ -Elemene	0.12	2.32*	Sesquiterpene
Unknown	0.02	0.01	Sesquiterpene
$\beta$ -Patchoulene	2.22*	[2.32]*	Sesquiterpene
$\alpha$ -Copaene	[2.22]*	[0.02]*	Sesquiterpene
$\beta$ -Bourbonene	0.06*	0.01	Sesquiterpene
<i>cis</i> - $\beta$ -Elemene	[0.06]*	0.03	Sesquiterpene
$\beta$ -Elemene	1.01	4.43*	Sesquiterpene
Cycloseychellene	0.64	0.60	Sesquiterpene
$\beta$ -Caryophyllene	2.86	[4.43]*	Sesquiterpene
$\alpha$ -Guaiene	19.49	11.93	Sesquiterpene
Seychellene	[19.49]*	8.05	Sesquiterpene
Selina-5,11-diene	[19.49]*	0.01	Sesquiterpene
Unknown	8.28*	0.08	Sesquiterpene
$\alpha$ -Humulene	[8.28]*	0.53*	Sesquiterpene
$\alpha$ -Patchoulene	[8.28]*	4.96*	Sesquiterpene
Patchoulene analog I	[8.28]*	[4.96]*	Sesquiterpene
$\gamma$ -Patchoulene	[8.28]*	1.01	Sesquiterpene
9-epi- $\beta$ -Caryophyllene	0.38	0.75*	Sesquiterpene
Unknown	0.02	[0.53]*	Sesquiterpene
Selina-4,11-diene	0.56*	0.11	Sesquiterpene
Unknown	[0.56]*	[0.75]*	Sesquiterpene
$\beta$ -Selinene	0.63	16.75*	Sesquiterpene
Unknown	0.22	0.25	Sesquiterpene
$\delta$ -Selinene	0.09	0.12	Sesquiterpene
Aciphyllene	2.84*	[2.71]*	Sesquiterpene
Eudesma-2,4(15),11-triene	[2.84]*	0.05	Sesquiterpene
$\delta$ -Guaiene	17.08	[16.75]*	Sesquiterpene
Nootkatene	0.53*	0.09	Sesquiterpene
$\gamma$ -Cadinene	[0.53]*	0.42	Sesquiterpene
7-epi- $\alpha$ -Selinene	0.08	0.14	Sesquiterpene
Unknown	0.04	0.04	Oxygenated sesquiterpene
Unknown	0.13	0.05	Oxygenated sesquiterpene
Unknown	0.10		Oxygenated sesquiterpene
Unknown	0.01		Oxygenated sesquiterpene
Isocaryophyllene epoxide B	0.66*	0.13	Sesquiterpenic ether
$\alpha$ -Elemol	[0.66]*	0.62	Sesquiterpenic alcohol

Norpatchoulénol	[0.66]*	0.02	Norsesquiterpénic alcohol
Unknown	0.02	0.01	Oxygéné sesquiterpène
Unknown	0.10		Oxygéné sesquiterpène
Unknown	0.49	0.49	Oxygéné sesquiterpène
Caryophyllène oxide	0.70*	0.54	Sesquiterpénic éther
Caryophyllène oxide isomère	[0.70]*	0.15*	Sesquiterpénic éther
Unknown	[0.70]*	0.01	Oxygéné sesquiterpène
Unknown	0.53	0.39	Oxygéné sesquiterpène
Unknown	0.13	0.28	Oxygéné sesquiterpène
Hexadécane	0.08	0.06	Alcane
Humulène époxyde II	0.10	0.09	Sesquiterpénic éther
Unknown	0.24	0.54	Oxygéné sesquiterpène
Unknown	0.27*	0.33	Oxygéné sesquiterpène
Unknown	[0.27]*		Oxygéné sesquiterpène
Unknown	0.86	30.77*	Oxygéné sesquiterpène
Patchoulol	33.35	[30.77]*	Sesquiterpénic alcohol
Unknown	[33.35]*	0.33	Oxygéné sesquiterpène
Pogostol	[33.35]*	2.09	Sesquiterpénic alcohol
Unknown	0.04	0.02	Oxygéné sesquiterpène
Unknown	0.38	0.25*	Oxygéné sesquiterpène
Unknown	0.02	0.07	Oxygéné sesquiterpène
Unknown	0.09	0.06	Oxygéné sesquiterpène
Rotundone	0.40	0.39	Sesquiterpénic cétone
Unknown	0.02		Oxygéné sesquiterpène
Pogostone	0.43		Terpénic lactone
Unknown	0.35*	0.17	Oxygéné sesquiterpène
Unknown	[0.35]*	0.19	Oxygéné sesquiterpène
Unknown	0.21	0.24	Oxygéné sesquiterpène
Unknown	0.02		Oxygéné sesquiterpène
Unknown	0.07	0.16	Oxygéné sesquiterpène
Unknown	0.13		Oxygéné sesquiterpène
Unknown	0.04	0.03	Oxygéné sesquiterpène
Unknown	0.04	0.02	Oxygéné sesquiterpène
Unknown	0.02	tr	Oxygéné sesquiterpène
Unknown	0.02		Oxygéné sesquiterpène
Unknown	0.10	0.05	Oxygéné sesquiterpène
Unknown	0.06	0.05	Oxygéné sesquiterpène
Unknown	0.05	0.02	Oxygéné sesquiterpène
Unknown	0.02	0.02	Oxygéné sesquiterpène
Unknown	0.07	0.07	Oxygéné sesquiterpène
Corymbolone analoge	0.02		Sesquiterpénic alcohol
Corymbolone	0.09		Sesquiterpénic alcohol
Drima-7,9(11)-diène?		0.01	Sesquiterpène
Unknown		0.19	Sesquiterpène
Unknown		[0.15]*	Oxygéné sesquiterpène
Unknown		0.02	Oxygéné sesquiterpène
Unknown		[0.25]*	Oxygéné sesquiterpène
<b>Total identifié</b>	<b>93.75%</b>	<b>90.63%</b>	

\*: Two or more compounds are coeluting on this column

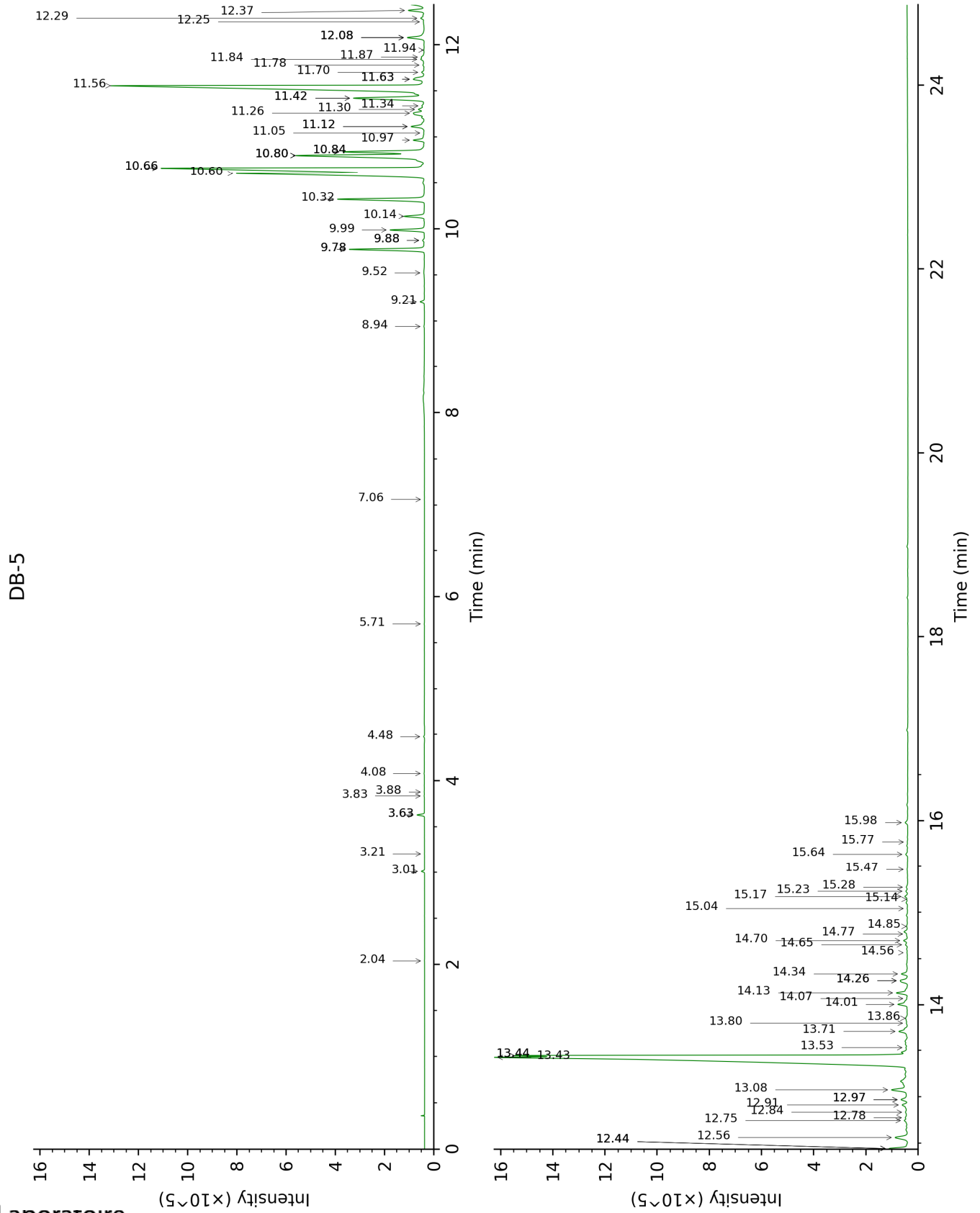
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

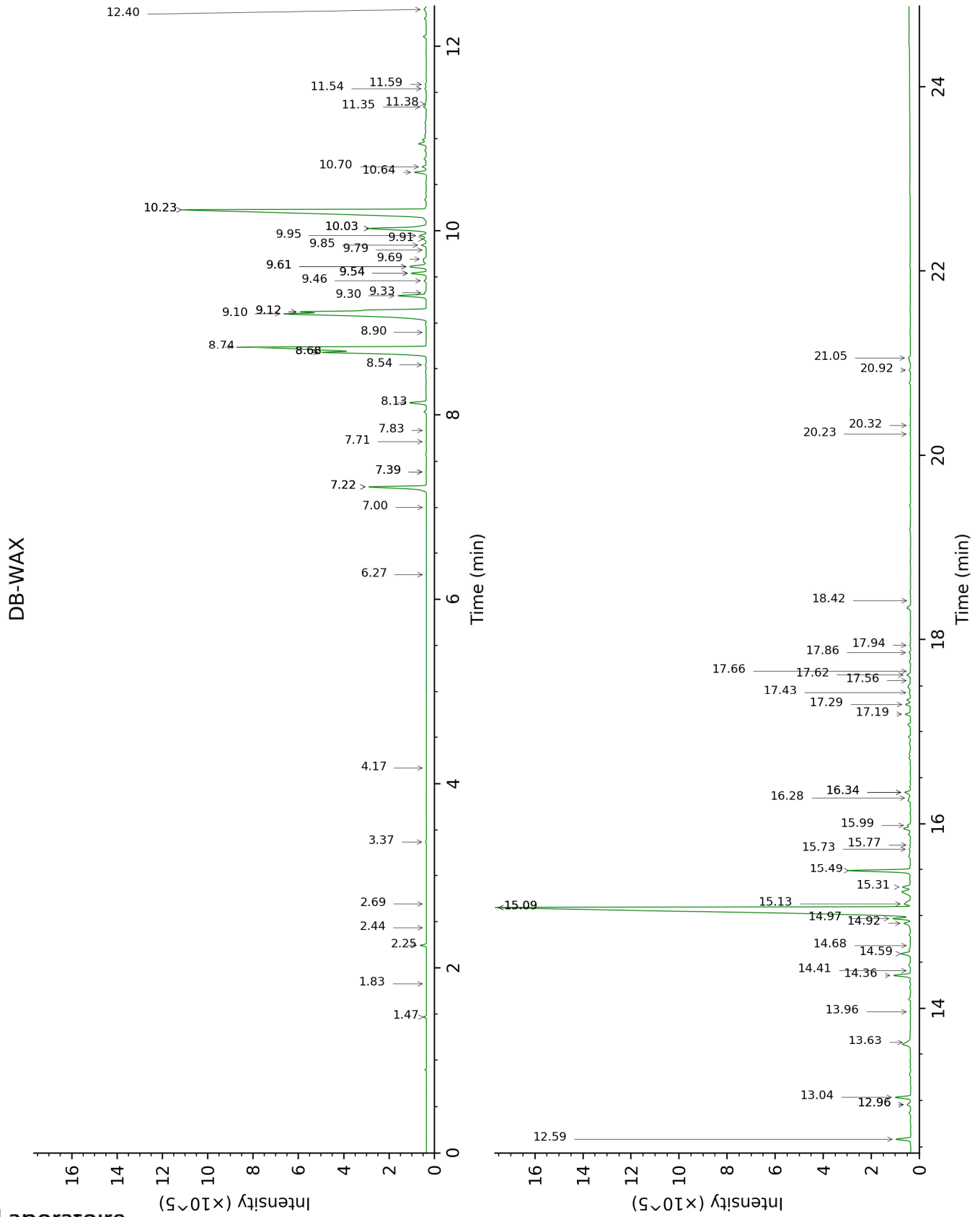
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied



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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
5-Methyl-2-hexanone	2.04	850	tr	2.69	1107	tr
$\alpha$ -Pinene	3.01	925	0.07	1.47	994	0.07
Camphene	3.21	938	tr	1.83	1030	tr
Sabinene	3.63*	966	0.16	2.44	1086	tr
$\beta$ -Pinene	3.63*	966	[0.16]	2.25	1069	0.17
Octen-3-ol	3.83	980	tr	7.00	1420	0.01
Octan-3-one	3.88	983	tr	4.17	1218	tr
Octan-3-ol	4.08	996	0.01	6.27	1367	0.01
Limonene	4.48	1021	0.02	3.37	1159	0.02
Linalool	5.71	1098	0.01			
$\alpha$ -Terpineol	7.06	1185	tr	10.02*	1652	2.71
Unknown [m/z 159, 117 (68), 132 (55), 200 (35)]	8.94	1310	0.02	7.39*	1448	0.02
$\delta$ -Elemene	9.21	1329	0.12	7.22*	1436	2.32
Unknown [m/z 145, 91 (67), 105 (57), 131 (56), 119 (52), 159 (49), 202 (45)]	9.52	1351	0.02	7.83	1481	0.01
$\beta$ -Patchoulene	9.78*	1369	2.22	7.22*	1436	[2.32]
$\alpha$ -Copaene	9.78*	1369	[2.22]	7.39*	1448	[0.02]
$\beta$ -Bourbonene	9.88*	1376	0.06	7.71	1472	0.01
<i>cis</i> - $\beta$ -Elemene	9.88*	1376	[0.06]	8.54	1535	0.03
$\beta$ -Elemene	9.99	1384	1.01	8.68*	1546	4.43
Cycloseychellene	10.14	1394	0.64	8.13	1504	0.60
$\beta$ -Caryophyllene	10.32	1408	2.86	8.68*	1546	[4.43]
$\alpha$ -Guaiene	10.60†	1429	19.49	8.74	1550	11.93
Seychellene	10.66*†	1433	[19.49]	9.10	1578	8.05
Selina-5,11-diene	10.66*†	1433	[19.49]	8.90	1563	0.01
Unknown [m/z 91, 93 (98), 79 (82), 81 (82), 105 (71), 107 (70)... 204 (38)]	10.80*†	1443	8.28	9.46	1606	0.08
$\alpha$ -Humulene	10.80*†	1443	[8.28]	9.54*	1613	0.53
$\alpha$ -Patchoulene	10.80*†	1443	[8.28]	9.12*	1580	4.96
Patchoulene analog I	10.84*†	1446	[8.28]	9.12*	1580	[4.96]
$\gamma$ -Patchoulene	10.84*†	1446	[8.28]	9.30	1594	1.01
9-epi- $\beta$ -Caryophyllene	10.97	1456	0.38	9.61*	1619	0.75
Unknown [m/z 159, 91 (88), 93 (72), 79 (69), 105	11.05	1462	0.02	9.54*	1613	[0.53]

(68), 41 (66), 81 (54), 202? (50)...						
Selina-4,11-diene	11.12*	1467	0.56	9.69	1625	0.11
Unknown [m/z 147, 93 (87), 107 (77), 105 (77), 91 (73), 79 (63)... 204 (21)]	11.12*	1467	[0.56]	9.61*	1619	[0.75]
β-Selinene	11.26	1477	0.63	10.23*	1668	16.75
Unknown [m/z 79, 107 (99), 91 (88), 93 (86), 81 (78), 105 (73), 41 (73)... 204? (12)]	11.30	1480	0.22	9.95	1646	0.25
δ-Selinene	11.34	1483	0.09	9.91	1643	0.12
Aciphyllene	11.42*	1490	2.84	10.02*	1652	[2.71]
Eudesma-2,4(15),11-triene	11.42*	1490	[2.84]	11.38	1764	0.05
δ-Guaiene	11.56	1500	17.08	10.23*	1668	[16.75]
Nootkatene	11.63*	1505	0.53	11.35	1762	0.09
γ-Cadinene	11.63*	1505	[0.53]	10.64	1702	0.42
7-epi-α-Selinene	11.70	1511	0.08	10.70	1707	0.14
Unknown [m/z 41, 67 (95), 93 (92), 107 (91), 55 (77), 81 (77), 79 (73)... 205 (17)...	11.78	1517	0.04	11.59	1782	0.04
Unknown [m/z 161, 119 (92), 91 (69), 105 (52), 145 (49)... 218 (6)]	11.84	1522	0.13	11.54	1778	0.05
Unknown [m/z 91, 105 (98), 108 (83), 93 (82), 133 (79), 77 (64), 79 (57), 41 (56), 145 (55)... 218? (5)]	11.87	1524	0.10			
Unknown [m/z 145, 131 (91), 91 (86), 105 (68), 146 (66), 43 (54)... 220? (5)]	11.94	1530	0.01			
Isocaryophyllene epoxide B	12.08*	1540	0.66	12.40	1853	0.13
α-Elemol	12.08*	1540	[0.66]	14.36	2033	0.62
Norpatchoulenol	12.08*	1540	[0.66]	14.41	2038	0.02
Unknown [m/z 191, 159 (66), 133 (53), 91 (45), 41 (42), 177 (35),	12.25	1554	0.02	13.96	1995	0.01

105 (33), 220 (32)]						
Unknown [m/z 41, 67 (90), 55 (87), 79 (85), 107 (84), 81 (84), 93 (84), 121 (77), 91 (74)... 220 (7)]	12.29	1557	0.10			
Unknown [m/z 43, 107 (94), 81 (71), 41 (63), 67 (58), 111 (58), 93 (55), 83 (54)... 205 (8), 220 (1)]	12.37	1563	0.49	12.59	1869	0.49
Caryophyllene oxide	12.44*	1569	0.70	13.04	1910	0.54
Caryophyllene oxide isomer	12.44*	1569	[0.70]	12.96*	1903	0.15
Unknown isomer	12.44*	1569	[0.70]	14.68	2064	0.01
Unknown [m/z 43, 79 (44), 81 (41), 93 (40), 91 (40)... 220 (5)]	12.56	1578	0.53	14.59	2055	0.39
Unknown [m/z 43, 105 (77), 91 (71), 93 (68), 41 (62), 107 (6)... 205 (41), 220 (7)]	12.75	1592	0.13	14.92	2087	0.28
Hexadecane	12.78	1595	0.08	9.33	1596	0.06
Humulene epoxide II	12.84	1599	0.10	13.63	1964	0.09
Unknown [m/z 43, 161 (73), 91 (53), 95 (52), 79 (46), 119 (45)... 205 (29), 220? (1)]	12.91	1606	0.24	14.97	2092	0.54
Unknown [m/z 41, 91 (92), 55 (81), 93 (81), 79 (74), 43 (71), 95 (68), 123 (65)... 220 (17)]	12.97*	1610	0.27	15.13	2108	0.33
Unknown [m/z 43, 79 (41), 93 (39), 41 (39), 91 (38), 81 (36)... 220 (3)]	12.97*	1610	[0.27]			
Unknown [m/z 41, 55 (92), 95 (80), 81 (76), 109 (76), 67 (66), 125	13.08	1619	0.86	15.09*	2104	30.77

(65)... 220 (12)] Patchoulol	13.42†	1648	33.35	15.09*	2104	[30.77]
Unknown [m/z 175, 218 (59), 133 (49), 91 (43), 41 (38), 147 (36)]	13.44*†	1650	[33.35]	15.31	2126	0.33
Pogostol	13.44*†	1650	[33.35]	15.49	2144	2.09
Unknown [m/z 43, 41 (87), 91 (64), 55 (63), 81 (58), 95 (54), 107 (52)... 222 (12)]	13.53	1657	0.04	20.32	2676	0.02
Unknown [m/z 95, 107 (99), 41 (85), 93 (82), 91 (82), 109 (71), 105 (71), 105 (71), 108 (66)... 220 (29)]	13.71	1672	0.38	16.34*	2230	0.25
Unknown [m/z 91, 41 (100), 107 (98), 108 (95), 95 (87), 93 (87), 105 (85), 79 (77), 119 (72)... 220? (15)]	13.80	1679	0.02	16.28	2224	0.07
Unknown [m/z 43, 41 (95), 97 (89), 109 (71), 55 (71), 107 (70), 95 (69), 110 (65)... 222 (5)]	13.86	1683	0.09	15.73	2167	0.06
Rotundone	14.00	1696	0.40	15.99	2193	0.39
Unknown [m/z 43, 41 (82), 137 (78), 109 (76), 95 (75), 91 (72), 55 (67)... 220? (14)]	14.07	1701	0.02			
Pogostone	14.13	1706	0.43			
Unknown [m/z 83, 43 (85), 55 (39), 41 (29), 121 (27), 120 (25)... 218 (3)]	14.26*	1718	0.35	17.29	2330	0.17
Unknown [m/z 107, 93 (87), 41 (83), 81 (82), 67 (80), 55 (76)... 204 (53), 207 (34), 222 (9)]	14.26*	1718	[0.35]	17.19	2319	0.19
Unknown [m/z 133, 148 (68), 147 (59), 91 (56),	14.34	1724	0.21	17.43	2345	0.24

79 (45), 105 (44)... 218 (8)] Unknown [m/z 43, 83 (93), 55 (42), 41 (37), 121 (34), 111 (28)... 222? (1)]	14.56	1744	0.02			
Unknown [m/z 134, 107 (96), 91 (84), 93 (78), 79 (77), 41 (74), 43 (66), 77 (65)...]	14.65	1751	0.07	17.62	2365	0.16
Unknown [m/z 43, 191 (68), 41 (62), 91 (51), 95 (49), 110 (44)... 234 (22)]	14.70	1755	0.13			
Unknown [m/z 91, 105 (88), 95 (79), 93 (78), 81 (72), 79 (66)... 205 (33), 220 (7)...]	14.77	1761	0.04	17.94	2400	0.03
Unknown [m/z 149, 131 (54), 105 (48), 91 (46), 41 (30), 93 (27)... 218 (23)]	14.85	1768	0.04	17.66	2370	0.02
Unknown [m/z 43, 95 (58), 67 (50), 41 (47), 55 (38), 109 (37)... 221 (9)... 236? (3)]	15.04	1785	0.02	18.42	2454	tr
Unknown [m/z 219, 43 (67), 91 (46), 79 (42), 41 (41), 55 (36)... 234 (6)]	15.14	1794	0.02			
Unknown [m/z 43, 91 (77), 79 (74), 109 (73), 110 (71)... 218 (52), 234? (1)]	15.17	1796	0.10	17.86	2392	0.05
Unknown [m/z 43, 91 (43), 41 (37), 79 (32), 219 (31)... 234 (14)]	15.23	1801	0.06	20.92	2749	0.05
Unknown [m/z 91, 41 (79), 43 (74), 79 (72), 105 (65), 77 (64), 147	15.28	1805	0.05	17.56	2359	0.02

(64), 93 (61)... 218 (26), 234 (14)]						
Unknown [m/z 43, 69 (60), 41 (55), 55 (40), 95 (33), 163 (27)... 234 (17)]	15.47	1823	0.02	20.23	2664	0.02
Unknown [m/z 41, 110 (77), 55 (75), 69 (74), 43 (74), 95 (71), 97 (71), 123 (71), 67 (63), 136 (56)... 236? (7)]	15.64	1838	0.07	21.05	2765	0.07
Corymbolone analog	15.77	1850	0.02			
Corymbolone	15.98	1869	0.09			
Drima-7,9(11)- diene?				9.79	1633	0.01
Unknown [m/z 159, 91 (81), 117 (68), 131 (51), 105 (46)... 202 (37)]				9.84	1638	0.19
Unknown [m/z 43, 41 (59), 109 (57), 79 (54), 95 (53), 107 (49), 93 (48), 67 (48)... 205 (18), 220 (4)]				12.96*	1903	[0.15]
Unknown [m/z 163, 119 (50), 91 (48), 95 (47), 41 (44), 105 (41)... 220 (18)]				15.77	2172	0.02
Unknown [m/z 91, 108 (86), 107 (85), 93 (80), 120 (75), 105 (71), 95 (72)... 218 (37)]				16.34*	2230	[0.25]
<b>Total identified</b>		<b>93.75%</b>			<b>90.63%</b>	
<b>Total reported</b>		<b>97.93%</b>			<b>94.67%</b>	

\*: 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