

Date : April 06, 2023

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

**Internal code** : 23D04-NPA01


**Customer identification** : NPS00049-Pogostemon Cablin - Indonesia- lo#NP0122

**Type** : Essential oil

**Source** : Pogostemon cablin

**Customer** : Nature Packaged

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 2014-005

**Analysis date** : April 05, 2023

Checked and approved by :

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

*Notes* 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.

*This report is an update from the first version issued on April 6, 2023, to format it for online publication.*

*PHYSICOCHEMICAL DATA*

**Physical aspect:** Orange yellow liquid

**Refractive index:**  $1.5091 \pm 0.0003$  (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
5-Methyl-2-hexanone	0.01	Aliphatic ketone
$\alpha$ -Pinene	0.10	Monoterpene
Camphene	0.01	Monoterpene
Sabinene	tr	Monoterpene
$\beta$ -Pinene	0.25	Monoterpene
Octen-3-ol	0.01	Aliphatic alcohol
Octan-3-one	0.01	Aliphatic ketone
Octan-3-ol	0.01	Aliphatic alcohol
Limonene	0.03	Monoterpene
Linalool	0.01	Monoterpenic alcohol
$\alpha$ -Terpineol	0.01	Monoterpenic alcohol
Unknown	0.01	Unknown
$\delta$ -Elemene	0.14	Sesquiterpene
Eugenol	0.01	Phenylpropanoid
$\alpha$ -Copaene	0.01	Sesquiterpene
$\beta$ -Patchoulene	2.52	Sesquiterpene
$\beta$ -Bourbonene	0.01	Sesquiterpene
<i>cis</i> - $\beta$ -Elemene	0.06	Sesquiterpene
$\beta$ -Elemene	0.87	Sesquiterpene
Cycloseychellene	0.23	Sesquiterpene
Isocaryophyllene	0.02	Sesquiterpene
$\beta$ -Caryophyllene	3.15	Sesquiterpene
Seychellene	8.88	Sesquiterpene
$\alpha$ -Guaiene	13.63	Sesquiterpene
Selina-5,11-diene	0.04	Sesquiterpene
$\alpha$ -Humulene	0.25	Sesquiterpene
$\alpha$ -Patchoulene	2.90	Sesquiterpene
Patchoulene analog I	1.47	Sesquiterpene
$\gamma$ -Patchoulene	1.00	Sesquiterpene
9- <i>epi</i> - $\beta$ -Caryophyllene	0.02	Sesquiterpene
Unknown	0.38	Sesquiterpene
Selina-4,11-diene	0.03	Sesquiterpene
Unknown	0.51	Sesquiterpene
$\beta$ -Selinene	0.12	Sesquiterpene
Patchoulene analog II	0.54	Sesquiterpene
Unknown	0.01	Sesquiterpene
$\delta$ -Selinene	0.24	Sesquiterpene
$\alpha$ -Selinene	0.12	Sesquiterpene
Aciphyllene	2.38	Sesquiterpene
Eudesma-2,4(15),11-triene	0.14	Sesquiterpene
Pentadecane	0.39	Alkane
$\delta$ -Guaiene	16.98	Sesquiterpene
Nootkatene	0.04	Sesquiterpene
$\gamma$ -Cadinene	0.30	Sesquiterpene
7- <i>epi</i> - $\alpha$ -Selinene	0.23	Sesquiterpene

Unknown	0.09	Sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.11	Oxygenated sesquiterpene
Unknown	0.08	Oxygenated sesquiterpene
Unknown	0.01	Sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Norpatchoulanol	0.63	Norsesquiterpenic alcohol
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.35	Oxygenated sesquiterpene
Caryophyllene oxide	0.41	Sesquiterpenic ether
Caryophyllene oxide isomer	0.08	Sesquiterpenic ether
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.52	Oxygenated sesquiterpene
Unknown	0.04	Oxygenated sesquiterpene
Humulene epoxide II	0.07	Sesquiterpenic ether
Unknown	0.03	Oxygenated sesquiterpene
Hexadecane	0.05	Alkane
Unknown	0.22	Oxygenated sesquiterpene
Unknown	0.25	Oxygenated sesquiterpene
Caryophylladienol I	0.04	Sesquiterpenic alcohol
Unknown	0.59	Oxygenated sesquiterpene
Hinesol	0.30	Sesquiterpenic alcohol
Patchoulol	29.80	Sesquiterpenic alcohol
Pogostol	2.00	Sesquiterpenic alcohol
Unknown	0.15	Oxygenated sesquiterpene
Unknown	0.16	Oxygenated sesquiterpene
Unknown	0.08	Unknown
Unknown	0.11	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Rotundone	0.22	Sesquiterpenic ketone
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Pogostone	0.68	Terpenic lactone
Unknown	0.18	Oxygenated sesquiterpene
Unknown	0.21	Oxygenated sesquiterpene
Unknown	0.12	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.06	Oxygenated sesquiterpene
Unknown	0.13	Oxygenated sesquiterpene
Unknown	0.08	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
Corymbolone analog	0.02	Sesquiterpenic alcohol
Phytol	0.02	Diterpenic alcohol

<b>Consolidated total</b>	<b>96.57%</b>	
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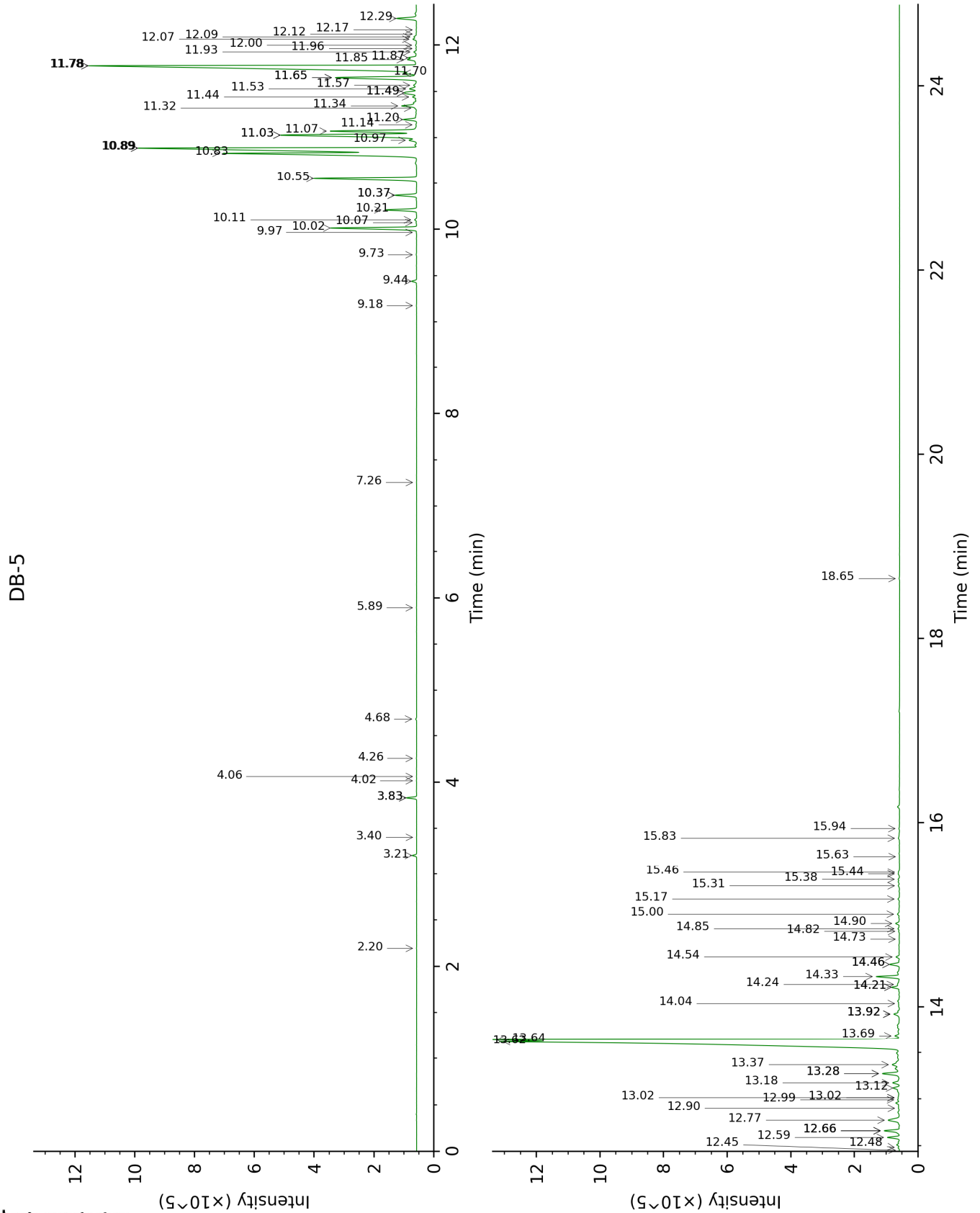
tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

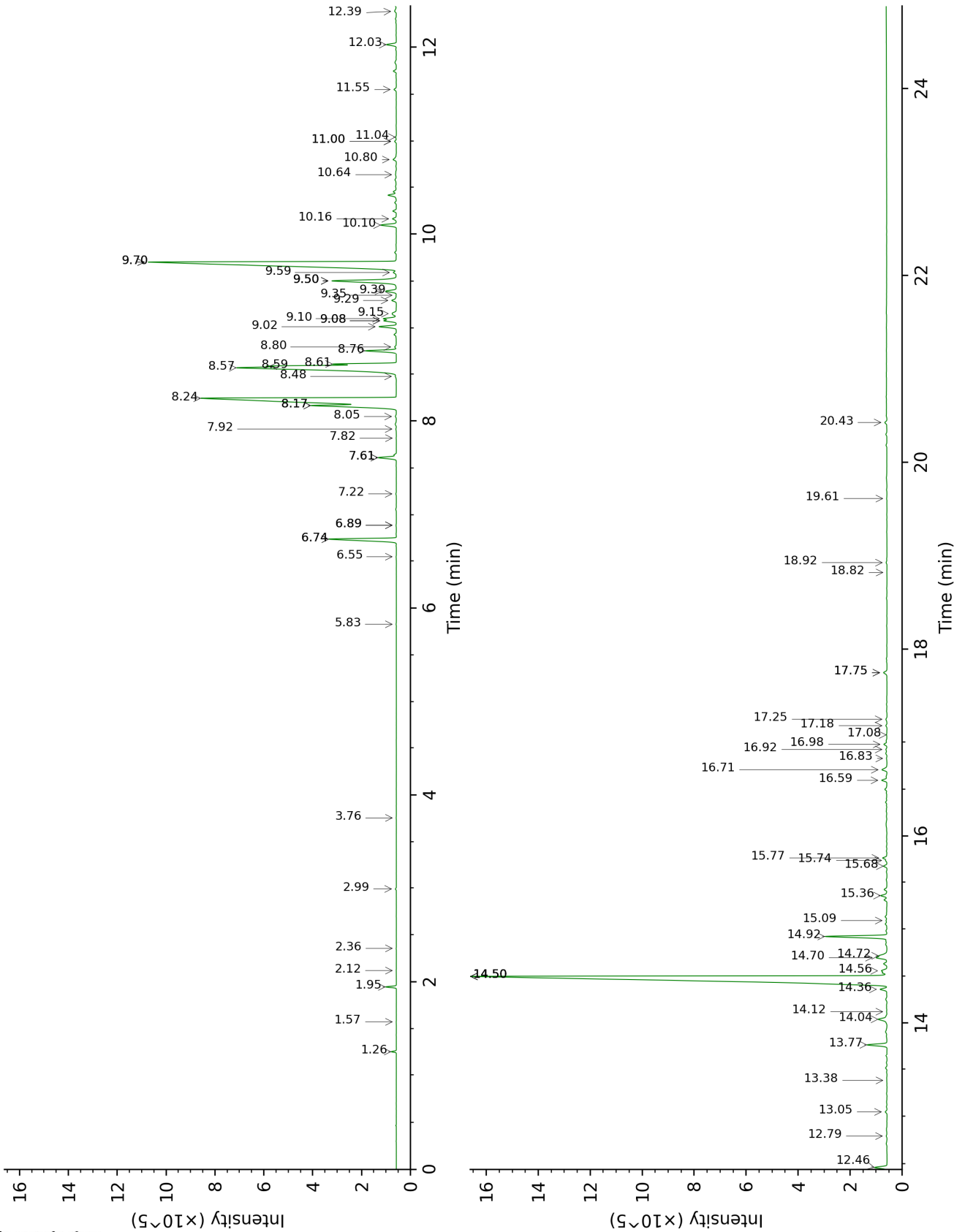
**About "consolidated" data:** The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
5-Methyl-2-hexanone	2.20	855	0.01	2.36	1106	0.01
$\alpha$ -Pinene	3.21	931	0.10	1.26	991	0.10
Camphene	3.40	944	0.01	1.57	1026	tr
Sabinene	3.83*	972	0.25	2.12	1084	tr
$\beta$ -Pinene	3.83*	972	[0.25]	1.95	1065	0.25
Octen-3-ol	4.02	984	0.01	6.55	1421	0.01
Octan-3-one	4.06	987	0.01	3.76	1220	0.01
Octan-3-ol	4.26	1000	0.01	5.83	1368	0.01
Limonene	4.68	1027	0.03	2.99	1158	0.02
Linalool	5.89	1102	0.01	7.82	1517	0.01
$\alpha$ -Terpineol	7.26	1189	0.01	9.50*	1651	2.92
Unknown [m/z 159, 117 (68), 132 (55), 200 (35)]	9.18	1317	0.01	6.89*	1447	0.01
$\delta$ -Elemene	9.44	1336	0.14	6.74*	1435	2.66
Eugenol	9.73	1356	0.01	14.50*	2099	29.97
$\alpha$ -Copaene	9.97	1373	0.01	6.89*	1447	[0.01]
$\beta$ -Patchoulene	10.02	1376	2.52	6.74*	1435	[2.66]
$\beta$ -Bourbonene	10.07	1380	0.01	7.22	1472	0.02
<i>cis</i> - $\beta$ -Elemene	10.10	1382	0.06	8.05	1535	0.04
$\beta$ -Elemene	10.21	1390	0.87	8.17*	1544	3.65
Cycloseychellene	10.37*	1401	0.63	7.61*	1501	0.62
Isocaryophyllene	10.37*	1401	[0.63]	7.92	1525	0.02
$\beta$ -Caryophyllene	10.55	1415	3.15	8.17*	1544	[3.65]
Seychellene	10.83†	1435	19.90	8.57	1576	8.88
$\alpha$ -Guaiene	10.89*†	1439	[19.90]	8.24	1550	13.63
Selina-5,11-diene	10.89*†	1439	[19.90]	8.48	1568	0.04
$\alpha$ -Humulene	10.97	1446	0.25	9.02	1611	0.56
$\alpha$ -Patchoulene	11.03*†	1450	8.16	8.59	1577	2.90
Patchoulene analog I	11.03*†	1450	[8.16]	8.61	1579	1.47
$\gamma$ -Patchoulene	11.07†	1453	[8.16]	8.76	1590	1.00
9-epi- $\beta$ -Caryophyllene	11.14	1458	0.02	9.08*	1616	0.40
Unknown [m/z 159, 91 (88), 93 (72), 79 (69), 105 (68), 41 (66), 81 (54), 202? (50)...]	11.20	1462	0.38	9.08*	1616	[0.40]
Selina-4,11-diene	11.32	1472	0.03	9.15	1622	0.22
Unknown [m/z 147, 93 (87), 107 (77), 105 (77), 91 (73), 79 (63)... 204 (21)]	11.34	1473	0.51	9.10	1618	0.41
$\beta$ -Selinene	11.44	1481	0.12	9.59	1658	0.11

Patchoulene analog II	11.49*	1484	0.55	9.50*	1651	[2.92]
Unknown [m/z 79, 107 (99), 91 (88), 93 (86), 81 (78), 105 (73), 41 (73)... 204? (12)]	11.49*	1484	[0.55]	9.35	1638	0.01
δ-Selinene	11.53	1487	0.24	9.39	1642	0.38
α-Selinene	11.57	1490	0.12	9.70*	1667	17.29
Aciphyllene	11.65*	1496	2.97	9.50*	1651	[2.92]
Eudesma-2,4(15),11-triene	11.65*	1496	[2.97]	10.80	1760	0.14
Pentadecane	11.70	1500	0.39	7.61*	1501	[0.62]
δ-Guaiene	11.78*	1506	17.02	9.70*	1667	[17.29]
Nootkatene	11.78*	1506	[17.02]	10.64	1746	0.04
γ-Cadinene	11.84	1511	0.30	10.10	1700	0.55
7-epi-α-Selinene	11.86	1512	0.23	10.16	1705	0.14
Unknown [m/z 159, 91 (81), 117 (68), 131 (51), 105 (46)... 202 (37)]	11.93	1517	0.09	9.30	1634	0.18
Unknown [m/z 41, 67 (95), 93 (92), 107 (91), 55 (77), 81 (77), 79 (73)... 205 (17)...]	11.96	1520	0.02	11.04	1780	0.03
Unknown [m/z 161, 119 (92), 91 (69), 105 (52), 145 (49)... 218 (6)]	12.00	1523	0.03	11.00*	1776	0.06
Unknown [m/z 91, 105 (98), 108 (83), 93 (82), 133 (79), 77 (64), 79 (57), 41 (56), 145 (55)... 218? (5)]	12.07	1528	0.11			
Unknown [m/z 91, 105 (78), 93 (77), 107 (71), 79 (64), 41 (63), 77 (63), 145 (60)... 218 (17)]	12.09	1530	0.08			
Unknown [m/z 133, 105 (70), 146 (69), 145 (61), 91 (55), 131 (45), 187 (42), 159 (39), 119 (33), 202 (30)...]	12.12	1533	0.01	11.00*	1776	[0.06]
Unknown [m/z 145, 131 (91), 91 (86), 105 (68), 146	12.17	1536	0.02			

(66), 43 (54)... 220? (5)]						
Norpatchoulenol	12.29	1546	0.63	13.77	2028	0.66
Unknown [m/z 191, 159 (66), 133 (53), 91 (45), 41 (42), 177 (35), 105 (33), 220 (32)]	12.45	1558	0.02	13.38	1992	0.01
Unknown [m/z 41, 67 (90), 55 (87), 79 (85), 107 (84), 81 (84), 93 (84), 121 (77), 91 (74)... 220 (7)]	12.48	1561	0.05			
Unknown [m/z 43, 107 (94), 81 (71), 41 (63), 67 (58), 111 (58), 93 (55), 83 (54)... 205 (8), 220 (1)]	12.59	1569	0.35	12.03	1867	0.33
Caryophyllene oxide	12.66*	1575	0.51	12.46	1906	0.41
Caryophyllene oxide isomer	12.66*	1575	[0.51]	12.39	1899	0.08
Unknown isomer	12.66*	1575	[0.51]	14.12	2063	0.02
Unknown [m/z 43, 79 (44), 81 (41), 93 (40), 91 (40)... 220 (5)]	12.77	1584	0.52	14.04	2055	0.42
Unknown [m/z 43, 105 (77), 91 (71), 93 (68), 41 (62), 107 (6)... 205 (41), 220 (7)]	12.90	1594	0.04	14.36	2086	0.24
Humulene epoxide II	12.99	1601	0.07	13.05	1961	0.06
Unknown [m/z 43, 161 (73), 91 (53), 95 (52), 79 (46), 119 (45)... 205 (29), 220? (1)]	13.02*	1603	0.08	14.50*	2099	[29.97]
Hexadecane	13.02*	1603	[0.08]	8.80	1594	0.05
Unknown [m/z 41, 91 (92), 55 (81), 93 (81), 79 (74), 43 (71), 95 (68), 123 (65)... 220 (17)]	13.12	1611	0.22	14.56	2105	0.21
Unknown [m/z 43, 79 (41), 93 (39), 41 (39), 91	13.18	1616	0.25			

(38), 81 (36)... 220 (3)]						
Caryophylladienol	13.28*	1624	0.63	15.74	2225	0.04
Unknown [m/z 41, 55 (92), 95 (80), 81 (76), 109 (76), 67 (66), 125 (65)... 220 (12)]	13.28*	1624	[0.63]	14.50*	2099	[29.97]
Hinesol	13.37	1632	0.30	14.72	2121	0.25
Patchoulol	13.62†	1652	31.80	14.50*	2099	[29.97]
Pogostol	13.64†	1654	[31.80]	14.92	2142	2.00
Unknown [m/z 175, 218 (59), 133 (49), 91 (43), 41 (38), 147 (36)]	13.69	1658	0.15	14.70	2119	0.43
Unknown [m/z 95, 107 (99), 41 (85), 93 (82), 91 (82), 109 (71), 105 (71), 105 (71), 108 (66)... 220 (29)]	13.92*	1678	0.23	15.77	2228	0.16
Unknown [m/z 111, 250 (38), 126 (27), 139 (26), 43 (16), 41 (15), 166 (15)]	13.92*	1678	[0.23]	11.55	1825	0.08
Unknown [m/z 91, 41 (100), 107 (98), 108 (95), 95 (87), 93 (87), 105 (85), 79 (77), 119 (72)... 220? (15)]	13.92*	1678	[0.23]	15.68	2219	0.11
Unknown [m/z 43, 41 (95), 97 (89), 109 (71), 55 (71), 107 (70), 95 (69), 110 (65)... 222 (5)]	14.04	1687	0.03	15.09	2159	0.04
Rotundone	14.21*	1702	0.25	15.36	2186	0.22
Unknown [m/z 105, 107 (98), 91 (95), 166 (80), 248 (80), 93 (76)... 233 (66)]	14.21*	1702	[0.25]	12.79	1937	0.03
Unknown [m/z 43, 41 (82), 137 (78), 109 (76), 95 (75), 91 (72), 55 (67)... 220? (14)]	14.24	1704	0.09			
Pogostone	14.33	1711	0.68			

Unknown [m/z 107, 93 (87), 41 (83), 81 (82), 67 (80), 55 (76)... 204 (53), 207 (34), 222 (9)]	14.46*	1723	0.33	16.60	2315	0.18
Unknown [m/z 83, 43 (85), 55 (39), 41 (29), 121 (27), 120 (25)... 218 (3)]	14.46*	1723	[0.33]	16.71	2327	0.21
Unknown [m/z 133, 148 (68), 147 (59), 91 (56), 79 (45), 105 (44)... 218 (8)]	14.54	1730	0.12	16.83	2340	0.03
Unknown [m/z 43, 83 (93), 55 (42), 41 (37), 121 (34), 111 (28)... 222? (1)]	14.73	1746	0.01	17.18	2378	0.04
Unknown [m/z 134, 107 (96), 91 (84), 93 (78), 79 (77), 41 (74), 43 (66), 77 (65)...]	14.82	1754	0.03	17.08	2368	0.02
Unknown [m/z 43, 191 (68), 41 (62), 91 (51), 95 (49), 110 (44)... 234 (22)]	14.85	1756	0.06			
Unknown [m/z 91, 105 (88), 95 (79), 93 (78), 81 (72), 79 (66)... 205 (33), 220 (7)...]	14.90	1761	0.13			
Unknown [m/z 149, 131 (54), 105 (48), 91 (46), 41 (30), 93 (27)... 218 (23)]	15.00	1770	0.08	16.98	2357	0.11
Unknown [m/z 43, 95 (58), 67 (50), 41 (47), 55 (38), 109 (37)... 221 (9)... 236? (3)]	15.17	1784	0.05	17.75*	2442	0.14
Unknown [m/z 219, 43 (67), 91 (46), 79 (42), 41 (41), 55 (36)... 234 (6)]	15.31	1796	0.05	17.75*	2442	[0.14]

Unknown [m/z 43, 91 (77), 79 (74), 109 (73), 110 (71)... 218 (52), 234? (1)]	15.38	1802	0.04	17.25	2386	0.04
Unknown [m/z 43, 91 (43), 41 (37), 79 (32), 219 (31)... 234 (14)]	15.44	1808	0.05			
Unknown [m/z 91, 41 (79), 43 (74), 79 (72), 105 (65), 77 (64), 147 (64), 93 (61)... 218 (26), 234 (14)]	15.46	1809	0.03	16.92	2351	0.04
Unknown [m/z 43, 69 (60), 41 (55), 55 (40), 95 (33), 163 (27)... 234 (17)]	15.63	1825	0.01	19.61	2659	0.01
Unknown [m/z 41, 110 (77), 55 (75), 69 (74), 43 (74), 95 (71), 97 (71), 123 (71), 67 (63), 136 (56)... 236? (7)]	15.83	1843	0.07	20.42	2758	0.07
Corymbolone analog	15.94	1853	0.02	18.82	2564	0.01
Phytol	18.65	2113	0.02	18.92	2576	0.03
<b>Total identified</b>		<b>93.67%</b>			<b>92.10%</b>	
<b>Total reported</b>		<b>97.36%</b>			<b>95.56%</b>	

\*: 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