

Date : December 01, 2020

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 20K24-PTH02


Customer identification : Patchouli ORGANIC - PI0102710R

Type : Essential oil

Source : *Pogostemon cablin*

Customer : Plant Therapy

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 : Fanny Charlier, B. Sc., chimiste à l'entraînement

Analysis date : November 25, 2020

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; method PC-MAT-016)

ISO 3757:2004 - OIL OF PATCHOULI

Compound	Min. %	Max. %	Observed %	Complies?
Pogostol	1.0	2.5	2.1	Yes
Patchoulol	27	35	29	Yes
Norpatchoulénol	0.35	1.00	0.40	Yes
δ-Guaiène	13	21	18	Yes
β-Caryophyllène	2	5	3	Yes
α-Guaiène	11	16	13	Yes
α-Copaène	tr	1.00	0.02	Yes
β-Patchoulène	1.8	3.5	2.3	Yes
Refractive index	1.5050	1.5150	1.5085	Yes

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
Isovaleral	tr	Aliphatic aldehyde
2-Methylbutyral	tr	Aliphatic aldehyde
5-Methyl-2-hexanone	tr	Aliphatic ketone
α -Pinene	0.11	Monoterpene
Camphene	tr	Monoterpene
4-Methylvaleric acid	0.01	Aliphatic acid
β -Pinene	0.25	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	0.02	Monoterpene
Linalool	0.01	Monoterpenic alcohol
α -Terpineol	0.01	Monoterpenic alcohol
δ -Elemene	0.14	Sesquiterpene
α -Copaene	0.02	Sesquiterpene
β -Patchoulene	2.34	Sesquiterpene
β -Bourbonene	0.01	Sesquiterpene
<i>cis</i> - β -Elemene	0.05	Sesquiterpene
β -Elemene	1.05	Sesquiterpene
Cycloseychellene	0.59	Sesquiterpene
Isocaryophyllene	0.01	Sesquiterpene
β -Caryophyllene	3.36	Sesquiterpene
Seychellene	6.24	Sesquiterpene
Selina-5,11-diene	0.08	Sesquiterpene
α -Guaiene	12.88	Sesquiterpene
Unknown	0.05	Sesquiterpene
α -Humulene	0.01	Sesquiterpene
α -Patchoulene	5.16	Sesquiterpene
Patchoulene analog I	0.81	Sesquiterpene
γ -Patchoulene	0.95	Sesquiterpene
9-epi- β -Caryophyllene	0.41	Sesquiterpene
Unknown	0.03	Sesquiterpene
Selina-4,11-diene	0.14	Sesquiterpene
Unknown	0.41	Sesquiterpene
β -Selinene	0.09	Sesquiterpene
Patchoulene analog II	0.25	Sesquiterpene
Unknown	0.29	Sesquiterpene
δ -Selinene	0.12	Sesquiterpene
Unknown	0.13	Sesquiterpene
α -Selinene	0.09	Sesquiterpene
Aciphyllene	2.86	Sesquiterpene
Eudesma-2,4(15),11-triene	0.18	Sesquiterpene
Pentadecane	0.31	Alkane
δ -Guaiene	17.67	Sesquiterpene

Nootkatene	0.04	Sesquiterpene
7-epi- α -Selinene	0.49	Sesquiterpene
Unknown	0.11	Sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.13	Oxygenated sesquiterpene
Unknown	0.11	Oxygenated sesquiterpene
Unknown	0.01	Sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
Norpatchoulenol	0.40	Norsesquiterpenic alcohol
Isocaryophyllene epoxide B	0.03	Sesquiterpenic ether
α -Elemol	0.05	Sesquiterpenic alcohol
Unknown	0.01	Oxygenated sesquiterpene
Unknown	0.08	Oxygenated sesquiterpene
Unknown	0.20	Oxygenated sesquiterpene
Caryophyllene oxide	0.14	Sesquiterpenic ether
Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Unknown	0.47	Oxygenated sesquiterpene
Unknown	0.08	Oxygenated sesquiterpene
Humulene epoxide II	0.01	Sesquiterpenic ether
Hexadecane	0.08	Alkane
Unknown	0.10	Oxygenated sesquiterpene
Unknown	0.24	Oxygenated sesquiterpene
Unknown	0.22	Oxygenated sesquiterpene
Unknown	0.61	Oxygenated sesquiterpene
Patchoulol	29.44	Sesquiterpenic alcohol
Pogostol	2.08	Sesquiterpenic alcohol
Unknown	0.11	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.16	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.04	Oxygenated sesquiterpene
Rotundone	0.17	Sesquiterpenic ketone
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.04	Oxygenated sesquiterpene
Pogostone	2.09	Terpenic lactone
Unknown	0.06	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.05	Oxygenated sesquiterpene
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.04	Oxygenated sesquiterpene
Unknown	0.11	Oxygenated sesquiterpene
Unknown	0.09	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Unknown	0.02	Oxygenated sesquiterpene
Corymbolone	0.02	Sesquiterpenic alcohol
Phytol	0.03	Diterpenic alcohol
Unknown	0.02	Oxygenated sesquiterpene

Unknown	0.10	Oxygenated sesquiterpene
Consolidated total	95.81%	

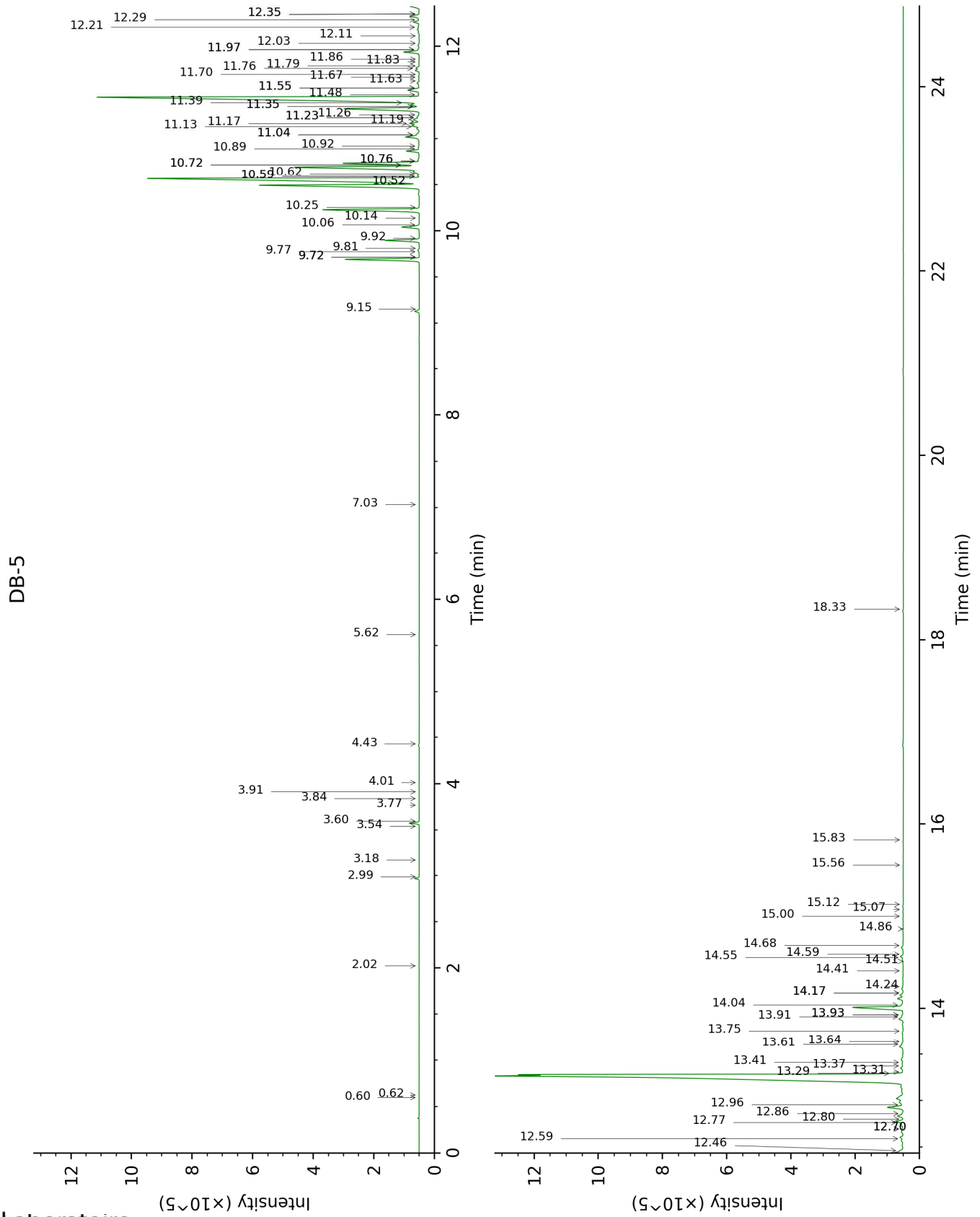
tr: The compound has been detected below 0.005% of total signal.

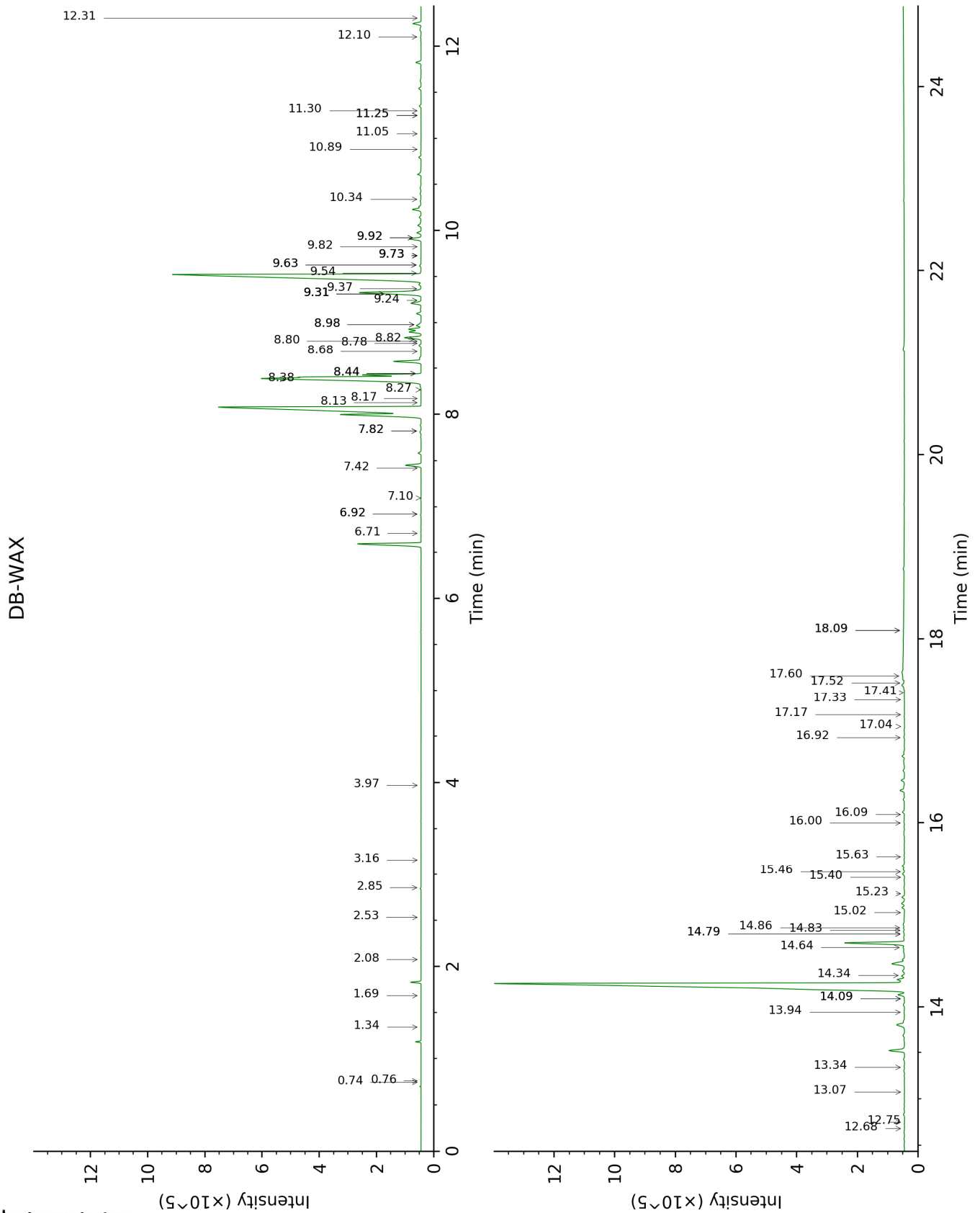
Note: no correction factor was applied

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.





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isovaleral	0.60	641	tr	0.76	888	tr
2-Methylbutyral	0.62	652	tr	0.74	882	tr
5-Methyl-2-hexanone	2.02	855	tr	2.53	1107	0.01
α -Pinene	2.99	930	0.11	1.34	990	0.12
Camphene	3.18	942	tr	1.69	1025	tr
4-Methylvaleric acid	3.54	967	0.01	11.30	1780	0.01
β -Pinene	3.60	970	0.25	2.08	1065	0.28
Octen-3-ol	3.77	982	0.01	6.71	1416	tr
Octan-3-one	3.84	987	0.01	3.97	1219	0.01
Myrcene	3.91	992	0.01	2.86	1133	tr
Octan-3-ol	4.01	998	0.01			
Limonene	4.43	1025	0.02	3.16	1157	0.03
Linalool	5.62	1101	0.01	8.13	1523	0.02
α -Terpineol	7.03	1192	0.01	9.73*	1649	2.94
δ -Elemene	9.15	1334	0.14	6.92*	1432	2.66
α -Copaene	9.72*	1374	2.36	7.10	1445	0.02
β -Patchoulene	9.72*	1374	[2.36]	6.92*	1432	[2.66]
β -Bourbonene	9.77	1378	0.01	7.42	1469	0.01
<i>cis</i> - β -Elemene	9.81	1380	0.05	8.27	1534	0.04
β -Elemene	9.92	1388	1.05	8.44*	1547	13.93
Cycloseychellene	10.06	1398	0.59	7.82*	1499	0.61
Isocaryophyllene	10.14	1404	0.01	8.17	1526	0.06
β -Caryophyllene	10.25	1412	3.36	8.38	1542	4.50
Seychellene	10.52	1432	6.24	8.78	1573	7.56
Selina-5,11-diene	10.59*	1438	13.43	8.68	1566	0.08
α -Guaiene	10.59*	1438	[13.43]	8.44*	1547	[13.93]
Unknown [m/z 91, 93 (98), 79 (82), 81 (82), 105 (71), 107 (70)... 204 (38)]	10.62	1440	0.05	9.24	1610	0.60
α -Humulene	10.72*	1447	5.17	9.31*	1615	0.85
α -Patchoulene	10.72*	1447	[5.17]	8.80†	1575	5.97
Patchoulene analog I	10.76*	1450	2.66	8.82†	1576	[5.97]
γ -Patchoulene	10.76*	1450	[2.66]	8.98*	1589	1.03
9-epi- β -Caryophyllene	10.89	1460	0.41	9.31*	1615	[0.85]
Unknown [m/z 159, 91 (88), 93 (72), 79 (69), 105 (68), 41 (66), 81 (54), 202? (50)...]	10.92	1462	0.03	9.31*	1615	[0.85]
Selina-4,11-diene	11.04*	1472	0.55	9.37	1620	0.14

Unknown [m/z 147, 93 (87), 107 (77), 105 (77), 91 (73), 79 (63)... 204 (21)]	11.04*	1472	[0.55]	9.31*	1615	[0.85]
β-Selinene	11.13	1478	0.09	9.82	1657	0.10
Patchoulene analog II	11.17	1481	0.25	9.73*	1649	[2.94]
Unknown [m/z 79, 107 (99), 91 (88), 93 (86), 81 (78), 105 (73), 41 (73)... 204? (12)]	11.19	1482	0.29	9.63*	1641	0.41
δ-Selinene	11.23*	1485	0.25	9.63*	1641	[0.41]
Unknown [m/z 161, 189 (96), 91 (74), 204 (73), 105 (69), 41 (52)]	11.23*	1485	[0.25]	9.73*	1649	[2.94]
α-Selinene	11.26	1488	0.09	9.92*	1664	18.46
Aciphyllene	11.35*	1494	3.04	9.73*	1649	[2.94]
Eudesma-2,4(15),11-triene	11.35*	1494	[3.04]	11.05	1759	0.18
Pentadecane	11.39	1497	0.31	7.82*	1499	[0.61]
δ-Guaiene	11.48	1504	17.67	9.92*	1664	[18.46]
Nootkatene	11.55*	1510	0.51	10.89	1745	0.04
7-epi-α-Selinene	11.55*	1510	[0.51]	10.34	1698	0.49
Unknown [m/z 159, 91 (81), 117 (68), 131 (51), 105 (46)... 202 (37)]	11.63	1516	0.11	9.54	1634	0.22
Unknown [m/z 41, 67 (95), 93 (92), 107 (91), 55 (77), 81 (77), 79 (73)... 205 (17)...]	11.67	1519	0.02	11.25*	1776	0.06
Unknown [m/z 161, 119 (92), 91 (69), 105 (52), 145 (49)... 218 (6)]	11.70	1521	0.03	11.25*	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)]	11.76	1526	0.13			
Unknown [m/z 91, 105 (78), 93 (77), 107 (71), 79 (64), 41 (63), 77	11.79	1529	0.11			

(63), 145 (60)... 218 (17)]						
Unknown [m/z 133, 105 (70), 146 (69), 145 (61), 91 (55), 131 (45), 187 (42), 159 (39), 119 (33), 202 (30)...]	11.83	1532	0.01			
Unknown [m/z 145, 131 (91), 91 (86), 105 (68), 146 (66), 43 (54)... 220? (5)]	11.86	1534	0.01			
Norpatchoulenol	11.97*	1542	0.56	14.09*	2032	0.45
Isocaryophyllene epoxide B	11.97*	1542	[0.56]	12.10	1850	0.03
α-Elemol	12.03	1548	0.05	14.09*	2032	[0.45]
Unknown [m/z 191, 159 (66), 133 (53), 91 (45), 41 (42), 177 (35), 105 (33), 220 (32)]	12.11	1554	0.01			
Unknown [m/z 41, 67 (90), 55 (87), 79 (85), 107 (84), 81 (84), 93 (84), 121 (77), 91 (74)... 220 (7)]	12.21	1562	0.08			
Unknown [m/z 43, 107 (94), 81 (71), 41 (63), 67 (58), 111 (58), 93 (55), 83 (54)... 205 (8), 220 (1)]	12.29	1568	0.20	12.31	1868	0.13
Caryophyllene oxide	12.35*	1573	0.37	12.75	1908	0.14
Caryophyllene oxide isomer	12.35*	1573	[0.37]	12.68	1901	0.02
Unknown [m/z 43, 79 (44), 81 (41), 93 (40), 91 (40)... 220 (5)]	12.46	1582	0.47	14.34	2056	0.34
Unknown [m/z 43, 105 (77), 91 (71), 93 (68), 41 (62), 107 (6)... 205 (41), 220 (7)]	12.59	1592	0.08	14.64	2085	0.14
Humulene epoxide II	12.70*	1600	0.09	13.34	1962	0.01
Hexadecane	12.70*	1600	[0.09]	8.98*	1589	[1.03]

Unknown [m/z 43, 161 (73), 91 (53), 95 (52), 79 (46), 119 (45)... 205 (29), 220? (1)]	12.76	1606	0.10	14.79*†	2100	30.67
Unknown [m/z 41, 91 (92), 55 (81), 93 (81), 79 (74), 43 (71), 95 (68), 123 (65)... 220 (17)]	12.80	1609	0.24	14.83†	2104	[30.67]
Unknown [m/z 43, 79 (41), 93 (39), 41 (39), 91 (38), 81 (36)... 220 (3)]	12.86	1614	0.22			
Unknown [m/z 41, 55 (92), 95 (80), 81 (76), 109 (76), 67 (66), 125 (65)... 220 (12)]	12.96	1621	0.61	14.86	2106	0.35
Patchoulol	13.29†	1649	31.53	14.79*†	2100	[30.67]
Pogostol	13.31†	1651	[31.53]	15.23	2143	2.08
Unknown [m/z 175, 218 (59), 133 (49), 91 (43), 41 (38), 147 (36)]	13.37	1656	0.11	15.02	2123	0.74
Unknown [m/z 43, 41 (87), 91 (64), 55 (63), 81 (58), 95 (54), 107 (52)... 222 (12)]	13.41	1659	0.02			
Unknown [m/z 95, 107 (99), 41 (85), 93 (82), 91 (82), 109 (71), 105 (71), 105 (71), 108 (66)... 220 (29)]	13.61	1675	0.16	16.09	2230	0.10
Unknown [m/z 91, 41 (100), 107 (98), 108 (95), 95 (87), 93 (87), 105 (85), 79 (77), 119 (72)... 220? (15)]	13.64	1678	0.05	16.00	2221	0.04
Unknown [m/z 43, 41 (95), 97 (89), 109 (71), 55 (71), 107 (70), 95 (69), 110 (65)... 222 (5)]	13.75	1688	0.04	15.40	2161	0.03

Rotundone	13.91	1700	0.17	15.63	2183	0.04
Unknown [m/z 105, 107 (98), 91 (95), 166 (80), 248 (80), 93 (76)... 233 (66)]	13.93*	1702	0.06	13.07	1937	0.02
Unknown [m/z 43, 41 (82), 137 (78), 109 (76), 95 (75), 91 (72), 55 (67)... 220? (14)]	13.93*	1702	[0.06]			
Pogostone	14.04	1712	2.09	17.60	2390	0.17
Unknown [m/z 107, 93 (87), 41 (83), 81 (82), 67 (80), 55 (76)... 204 (53), 207 (34), 222 (9)]	14.17*	1723	0.12	16.92	2317	0.06
Unknown [m/z 83, 43 (85), 55 (39), 41 (29), 121 (27), 120 (25)... 218 (3)]	14.17*	1723	[0.12]	17.04	2330	0.05
Unknown [m/z 133, 148 (68), 147 (59), 91 (56), 79 (45), 105 (44)... 218 (8)]	14.24	1729	0.05	17.17	2344	0.01
Unknown [m/z 43, 83 (93), 55 (42), 41 (37), 121 (34), 111 (28)... 222? (1)]	14.41	1744	0.03	17.52	2381	0.01
Unknown [m/z 134, 107 (96), 91 (84), 93 (78), 79 (77), 41 (74), 43 (66), 77 (65)...]	14.51	1752	0.02	17.41	2370	0.01
Unknown [m/z 43, 191 (68), 41 (62), 91 (51), 95 (49), 110 (44)... 234 (22)]	14.55	1756	0.04			
Unknown [m/z 91, 105 (88), 95 (79), 93 (78), 81 (72), 79 (66)... 205 (33), 220 (7)...]	14.59	1759	0.11			
Unknown [m/z 149, 131 (54), 105 (48), 91 (46),	14.68	1768	0.09	17.33	2361	0.05

41 (30), 93 (27)... 218 (23)]						
Unknown [m/z 43, 95 (58), 67 (50), 41 (47), 55 (38), 109 (37)... 221 (9)... 236? (3)]	14.86	1783	0.02	18.09*	2444	0.09
Unknown [m/z 219, 43 (67), 91 (46), 79 (42), 41 (41), 55 (36)... 234 (6)]	15.00	1795	0.02	18.09*	2444	[0.09]
Unknown [m/z 43, 91 (77), 79 (74), 109 (73), 110 (71)... 218 (52), 234? (1)]	15.07	1801	0.02			
Unknown [m/z 43, 91 (43), 41 (37), 79 (32), 219 (31)... 234 (14)]	15.12	1806	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)]	15.56	1846	0.02			
Corymbolone	15.83	1871	0.02			
Phytol	18.33	2113	0.03			
Unknown [m/z 41, 79 (97), 43 (97), 69 (72), 93 (70), 91 (62), 95 (58)... 220 (2)]				13.94	2018	0.02
Unknown [m/z 163, 119 (50), 91 (48), 95 (47), 41 (44), 105 (41)... 220 (18)]				15.46	2167	0.10
Total identified		93.79%			94.33%	
Total reported		97.41%			97.34%	

*: 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