Date : September 04, 2019

Certificate of Analysis – GC Profiling

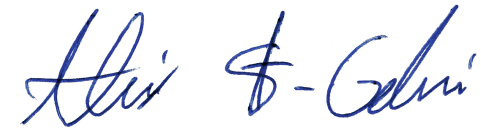
Sample identification

Internal code : 19H27-PTH02-1-SCC
Customer identification : Allspice - Jamaica - A1010485R
Type : Essential oil
Source : *Pimenta dioica*
Customer : Plant Therapy

Analysis

Method: PC-PA-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 : Lindsay Girard, B. Sc.
Analysis date : September 04, 2019

Checked and approved by :



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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia. 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.

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PHYSICOCHEMICAL DATA

Physical aspect: Yellow liquid
Refractive index: 1.5632 ± 0.0003 (20 °C)

CONCLUSION

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

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Analysis summary – Consolidated contents

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Classe
α-Thujene	0.03	Monoterpene
α-Pinene	0.06	Monoterpene
β-Pinene	0.02	Monoterpene
Myrcene	0.06	Monoterpene
α-Phellandrene	0.16	Monoterpene
Δ3-Carene	0.04	Monoterpene
α-Terpinene	0.06	Monoterpene
para-Cymene	0.26	Monoterpene
Limonene	0.05	Monoterpene
1,8-Cineole	0.17*	Monoterpenic ether
β-Phellandrene	[0.17]*	Monoterpene
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.06	Monoterpene
γ-Terpinene	0.05	Monoterpene
Terpinolene	0.17	Monoterpene
Linalool	0.03	Monoterpenic alcohol
Terpinen-4-ol	0.11	Monoterpenic alcohol
para-Cymen-8-ol	0.03	Monoterpenic alcohol
α-Terpineol	0.09	Monoterpenic alcohol
Methylchavicol	0.01	Phenylpropanoid
Geraniol	0.02	Monoterpenic alcohol
Chavicol	0.06	Phenylpropanoid
Eugenol	79.94	Phenylpropanoid
α-Copaene	0.11	Sesquiterpene
β-Elemene	0.22	Sesquiterpene
α-Gurjunene	0.01	Sesquiterpene
Methyleugenol	5.93	Phenylpropanoid
β-Caryophyllene	5.35	Sesquiterpene
β-Copaene	0.07	Sesquiterpene
Aromadendrene	0.06	Sesquiterpene
α-Humulene	1.05	Sesquiterpene
allo-Aromadendrene	0.20	Sesquiterpene
Selina-4,11-diene	0.19	Sesquiterpene
α-Amorphene	0.01	Sesquiterpene
γ-Muurolene	0.12	Sesquiterpene
β-Selinene	0.38	Sesquiterpene
α-Selinene	0.59	Sesquiterpene
γ-Cadinene	0.10	Sesquiterpene
trans-Calamenene	0.05	Sesquiterpene
δ-Cadinene	0.37	Sesquiterpene
trans-Cadina-1,4-diene	0.03	Sesquiterpene
α-Cadinene	0.03	Sesquiterpene
α-Calacorene	0.03	Sesquiterpene
Unknown	0.01	Unknown
Unknown	0.03	Oxygenated sesquiterpene
Spathulenol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.26	Sesquiterpenic ether

Caryophyllene oxide isomer	0.02	Sesquiterpenic ether
Globulol	0.08	Sesquiterpenic alcohol
Viridiflorol	0.05	Sesquiterpenic alcohol
Cubeban-11-ol	0.05	Sesquiterpenic alcohol
Eudesm-5-en-11-ol	0.07	Sesquiterpenic alcohol
Methoxyeugenol	0.06	Phenylpropanoid
Unknown	0.07	Oxygenated sesquiterpene
τ-Cadinol	0.05	Sesquiterpenic alcohol
τ-Muurolol	0.06	Sesquiterpenic alcohol
Selin-11-en-4α-ol	0.21	Sesquiterpenic alcohol
α-Cadinol	0.07	Sesquiterpenic alcohol
Consolidated total	**97.52%**	

*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total

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.

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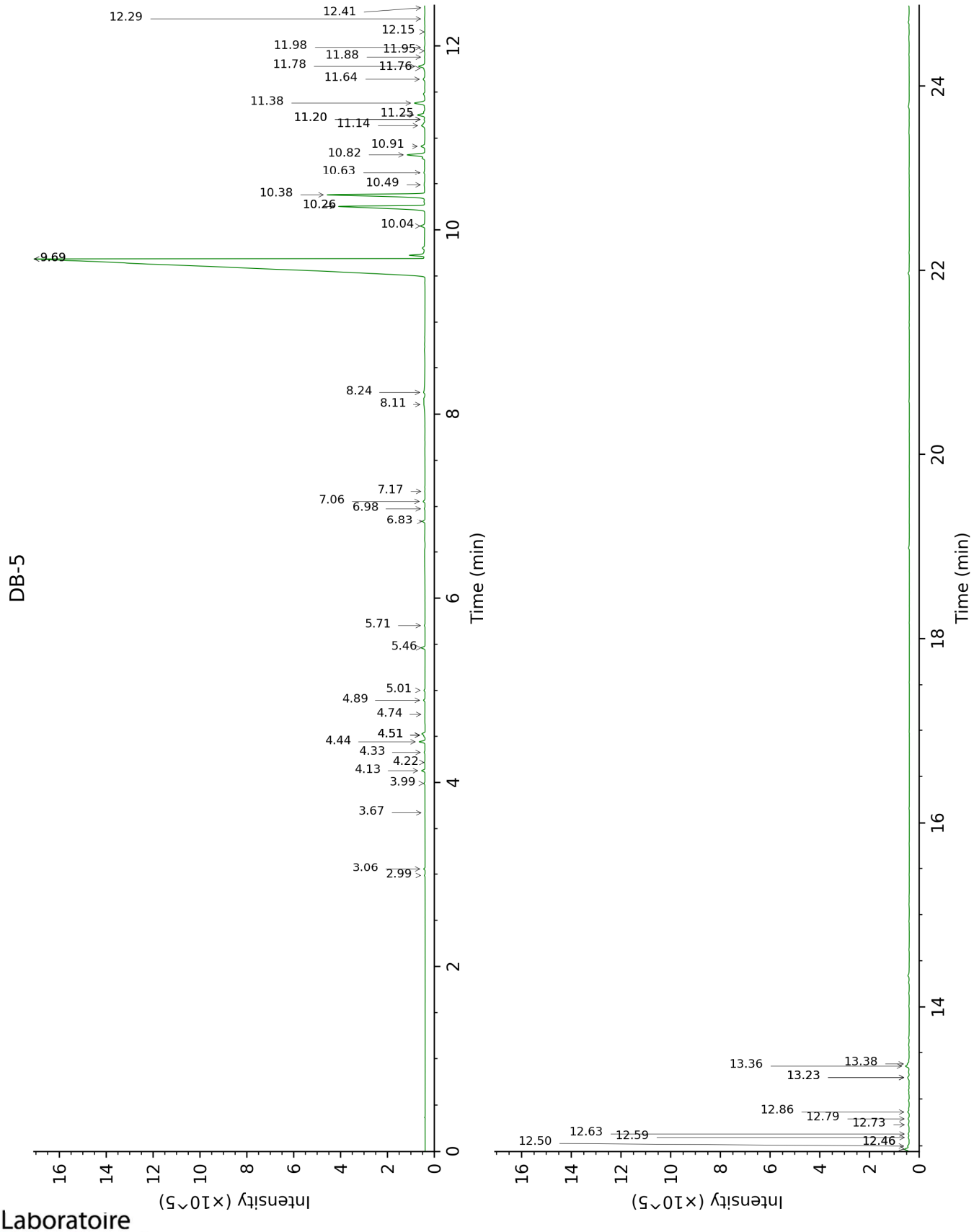
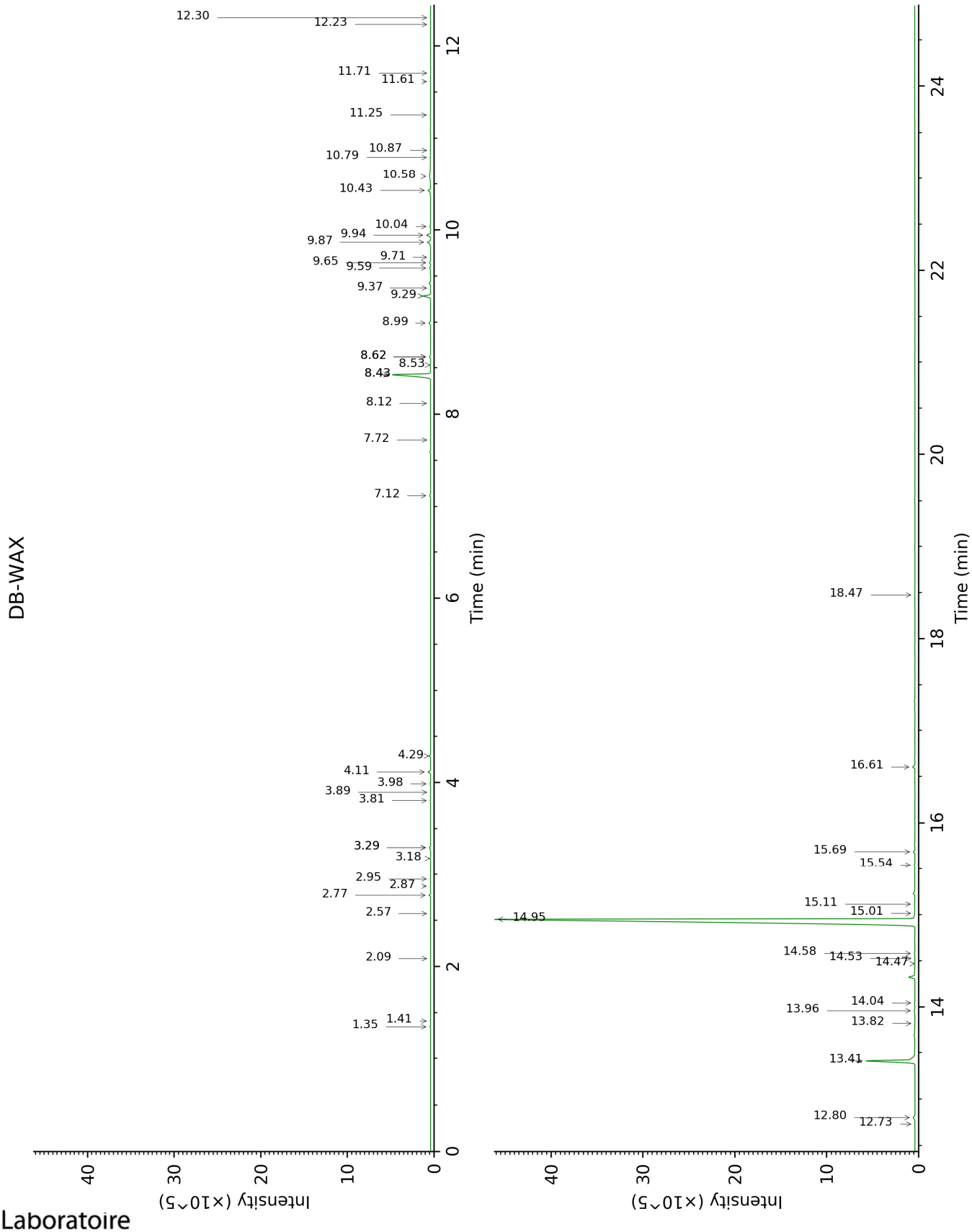

DB-5
12.29
12.41
12.15
11.98
11.95
11.88
11.78
11.76
11.64
11.38
11.20
11.25
11.14
10.91
10.82
10.63
10.49
10.38
10.26
10.04
9.69
8.24
8.11
7.17
7.06
6.98
6.83
5.71
5.46
5.01
4.89
4.74
4.51
4.44
4.33
4.22
4.13
3.99
3.67
3.06
2.99
Time (min)
Intensity (×10^5)
13.36
13.38
13.23
12.86
12.79
12.73
12.63
12.59
12.50
12.46
Time (min)
Intensity (×10^5)


DB-WAX
Time (min)
Intensity (×10^5)
12.30
12.23
11.71
11.61
11.25
10.87
10.79
10.58
10.43
10.04
9.94
9.87
9.71
9.65
9.59
9.37
9.29
8.99
8.62
8.53
8.43
8.12
7.72
7.12
4.29
4.11
3.98
3.89
3.81
3.29
3.18
2.95
2.87
2.77
2.57
2.09
1.41
1.35
18.47
16.61
15.69
15.54
15.11
15.01
14.95
14.58
14.53
14.47
14.04
13.96
13.82
13.41
12.80
12.73

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
α-Thujene	2.99	925	0.03	1.41	998	0.02
α-Pinene	3.06	930	0.06	1.35	989	0.05
β-Pinene	3.67	970	0.02	2.09	1065	0.01
Myrcene	3.99	991	0.06	2.87	1132	0.05
α-Phellandrene	4.13	1000	0.16	2.77	1124	0.14
Δ3-Carene	4.22	1006	0.04	2.57	1109	0.02
α-Terpinene	4.33	1013	0.06	2.95	1138	0.04
para-Cymene	4.44	1020	0.26	4.11	1226	0.24
Limonene	4.51*†	1024	0.22	3.18	1156	0.05
1,8-Cineole	4.51*†	1024	[0.22]	3.30*†	1165	0.17
β-Phellandrene	4.51*†	1024	[0.22]	3.30*†	1165	[0.17]
(*Z*)-β-Ocimene	4.74	1039	0.01	3.89	1210	0.01
(*E*)-β-Ocimene	4.89	1048	0.06	3.98	1217	0.07
γ-Terpinene	5.01	1056	0.05	3.80	1204	0.06
Terpinolene	5.46	1085	0.17	4.29	1239	0.15
Linalool	5.71	1100	0.03	8.12	1518	0.04
Terpinen-4-ol	6.83	1173	0.11	8.62*	1556	0.13
para-Cymen-8-ol	6.98	1182	0.03	11.61	1799	0.03
α-Terpineol	7.06	1188	0.09	9.87	1654	0.46
Methylchavicol	7.16	1195	0.01	9.37	1615	0.01
Geraniol	8.10	1259	0.02	11.70	1807	0.01
Chavicol	8.24	1268	0.06	16.60	2275	0.25
Eugenol	9.69*	1365	81.25	14.95	2107	79.94
α-Copaene	9.69*	1365	[81.25]	7.12	1444	0.11
β-Elemene	10.04	1390	0.22	8.43*	1541	5.31
α-Gurjunene	10.26*	1405	5.31	7.72	1488	0.01
Methyleugenol	10.26*	1405	[5.31]	13.41	1960	5.93
β-Caryophyllene	10.38	1414	5.35	8.43*	1541	[5.31]
β-Copaene	10.49	1422	0.07	8.53	1549	0.05
Aromadendrene	10.63	1433	0.06	8.62*	1556	[0.13]
α-Humulene	10.82	1447	1.05	9.29	1608	0.86
allo-Aromadendrene	10.91	1454	0.20	8.99	1585	0.19
Selina-4,11-diene	11.14	1471	0.19	9.59	1632	0.10
α-Amorphene	11.20*	1476	0.04	9.70	1641	0.01
γ-Muurolene	11.20*	1476	[0.04]	9.65	1637	0.12
β-Selinene	11.25	1480	0.38	9.94	1660	0.46
α-Selinene	11.38	1489	0.59	10.04	1668	0.08
γ-Cadinene	11.64	1509	0.10	10.43	1700	0.28
trans-Calamenene	11.76	1518	0.05	11.25	1769	0.05
δ-Cadinene	11.78	1520	0.37	10.58	1712	0.56
trans-Cadina-1,4-diene	11.88	1528	0.03	10.79	1730	0.05
α-Cadinene	11.95	1533	0.03	10.87	1736	0.01
α-Calacorene	11.98	1536	0.03	12.23	1854	0.02
Unknown [m/z	12.15	1549	0.01			

180, 93 (77), 55 (67), 125 (66), 208 (62), 65 (43)...]						
Unknown [m/z 138, 96 (100), 95 (85), 109 (74), 110 (60), 105 (57)... 220 (10)]	12.29	1560	0.03	12.30	1860	0.03
Spathulenol	12.42	1570	0.01	14.53	2065	0.02
Caryophyllene oxide	12.46*	1574	0.25	12.80	1904	0.26
Caryophyllene oxide isomer	12.46*	1574	[0.25]	12.73	1898	0.02
Globulol	12.50	1576	0.08	13.96	2011	0.16
Viridiflorol	12.59	1584	0.05	14.04	2019	0.08
Cubeban-11-ol	12.63	1587	0.05	13.82	1998	0.05
Eudesm-5-en-11-ol	12.73	1595	0.07	14.47	2060	0.03
Methoxyeugenol	12.79	1600	0.06	18.47	2480	0.03
Unknown [m/z 43, 81 (97), 135 (71), 95 (62), 204 (61), 71 (59), 207 (56)... 222 (3)]	12.86	1605	0.07	14.58	2071	0.08
τ-Cadinol	13.23*	1636	0.09	15.01	2113	0.05
τ-Muurolol	13.23*	1636	[0.09]	15.11	2123	0.06
Selin-11-en-4α-ol	13.36	1646	0.21	15.69	2180	0.17
α-Cadinol	13.38	1648	0.07	15.54	2166	0.08
Total identified		**97.83%**			**97.17%**	
Total reported		**97.95%**			**97.27%**	

*: 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

Note: no correction factor was applied
R.T.: Retention time (minutes)
R.I.: Retention index