

Date : February 07, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22B01-PTH01

Customer identification : Rosemary ORGANIC - Spain - R50111221R

Type : Essential oil

Source : *Rosmarinus officinalis* ct. 1,8-Cineole

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 : Seydou Ka, Ph. D.

Analysis date : February 04, 2022

Checked and approved by :

Alexis St-Gelais, Ph. D., 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.4669 ± 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
2-Ethylfuran	tr	Furan
(3Z)-Hexenol	0.01	Aliphatic alcohol
Hexanol	tr	Aliphatic alcohol
Bornylene	0.01	Monoterpene
Hashishene	0.02	Monoterpene
Tricyclene	0.16	Monoterpene
α -Thujene	0.19	Monoterpene
α -Pinene	12.15	Monoterpene
α -Fenchene	0.10	Monoterpene
Camphene	4.14	Monoterpene
Thuja-2,4(10)-diene	0.02	Monoterpene
Sabinene	0.07	Monoterpene
β -Pinene	7.09	Monoterpene
Dehydro-1,8-cineole	0.01	Monoterpenic ether
Octan-3-one	0.04	Aliphatic ketone
Myrcene	1.27	Monoterpene
Pseudolimonene	0.03	Monoterpene
α -Phellandrene	0.18	Monoterpene
Δ^3 -Carene	0.19	Monoterpene
α -Terpinene	0.43	Monoterpene
para-Cymene	1.52	Monoterpene
Limonene	2.88	Monoterpene
1,8-Cineole	45.14	Monoterpenic ether
(Z)- β -Ocimene	0.03	Monoterpene
(E)- β -Ocimene	0.05	Monoterpene
γ -Terpinene	0.59	Monoterpene
cis-Sabinene hydrate	0.05	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Fenchone	0.01	Monoterpenic ketone
Terpinolene	0.30	Monoterpene
para-Cymenene	0.03	Monoterpene
trans-Sabinene hydrate	0.03	Monoterpenic alcohol
Linalool	0.68	Monoterpenic alcohol
endo-Fenchol	0.01	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.01	Monoterpenic alcohol
Camphor	10.89	Monoterpenic ketone
Camphene hydrate	0.06	Monoterpenic alcohol
Isoborneol	0.01	Monoterpenic alcohol
Pinocarvone	0.02	Monoterpenic ketone
Borneol	2.55	Monoterpenic alcohol
δ -Terpineol	0.33	Monoterpenic alcohol
Terpinen-4-ol	0.61	Monoterpenic alcohol
para-Cymen-8-ol	0.03	Monoterpenic alcohol
α -Terpineol	1.74	Monoterpenic alcohol
Myrtanal	0.01	Monoterpenic aldehyde

Myrtenol	0.01	Monoterpenic alcohol
Verbenone	0.03	Monoterpenic ketone
<i>trans</i> -Carveol	tr	Monoterpenic alcohol
Bornyl formate	0.02	Monoterpenic ester
Citronellol	0.01	Monoterpenic alcohol
Carvone	tr	Monoterpenic ketone
Bornyl acetate	0.69	Monoterpenic ester
Unknown	0.01	Oxygenated monoterpene
α -Cubebene	0.03	Sesquiterpene
Eugenol	0.02	Phenylpropanoid
α -Ylangene	0.06	Sesquiterpene
α -Copaene	0.20	Sesquiterpene
Methyleugenol	0.01	Phenylpropanoid
β -Caryophyllene	3.16	Sesquiterpene
β -Copaene	0.03	Sesquiterpene
Aromadendrene	0.05	Sesquiterpene
α -Humulene	0.35	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.01	Sesquiterpene
γ -Muurolene	0.16	Sesquiterpene
α -Amorphene	0.01	Sesquiterpene
β -Selinene	0.01	Sesquiterpene
α -Selinene	0.07	Sesquiterpene
α -Muurolene	0.05	Sesquiterpene
β -Bisabolene	0.06	Sesquiterpene
γ -Cadinene	0.09	Sesquiterpene
<i>trans</i> -Calamenene	0.03	Sesquiterpene
δ -Cadinene	0.23	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	0.02	Sesquiterpene
α -Calacorene	0.02	Sesquiterpene
Caryophyllene oxide	0.10	Sesquiterpenic ether
Humulene epoxide II	0.01	Sesquiterpenic ether
Caryophylladienol II	0.01	Sesquiterpenic alcohol
14-Hydroxy-(<i>Z</i>)-caryophyllene	0.02	Sesquiterpenic alcohol
14-Hydroxy-(<i>E</i>)-caryophyllene	0.01	Sesquiterpenic alcohol
Consolidated total	99.32%	

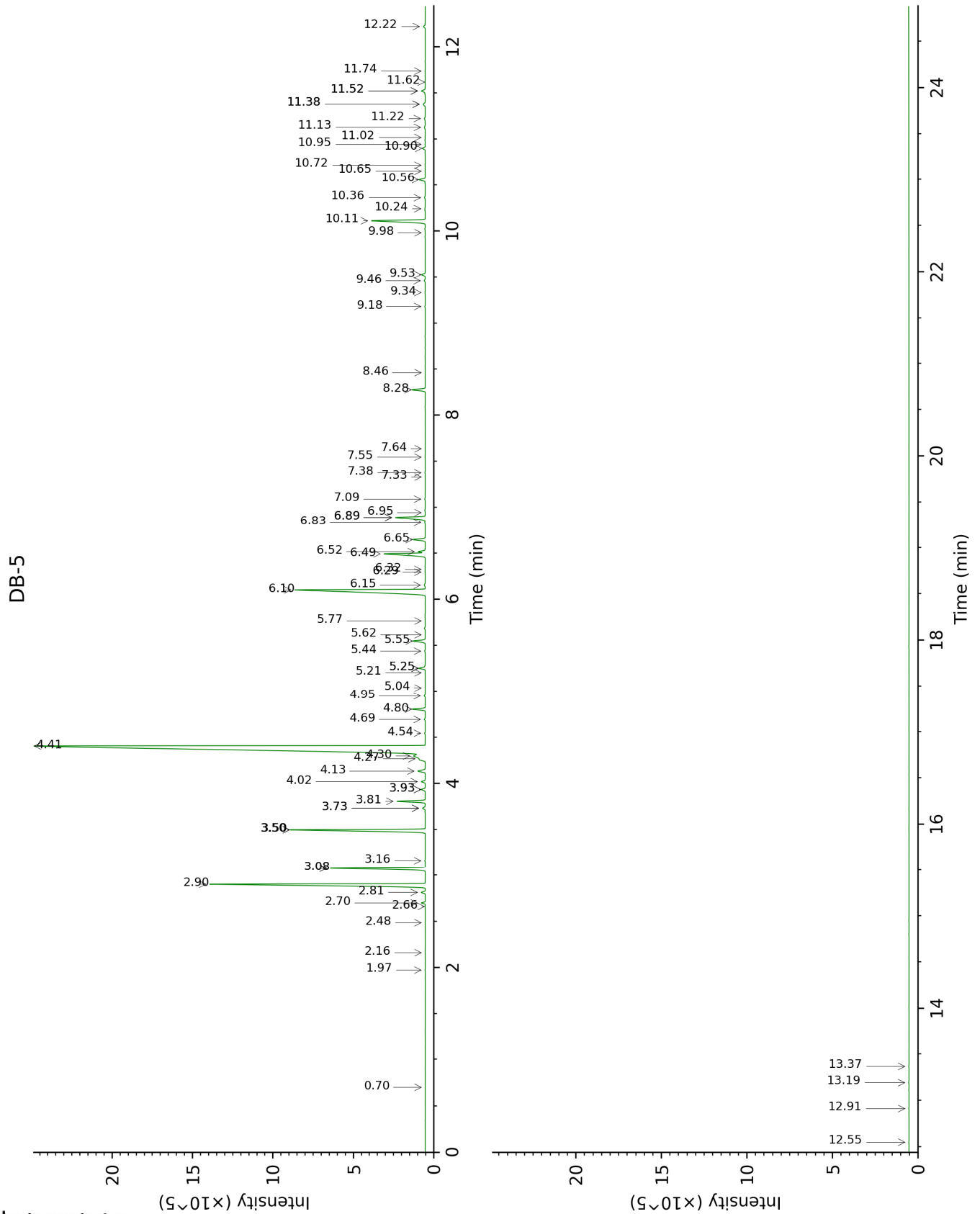
tr: The compound has been detected below 0.005% of total signal.

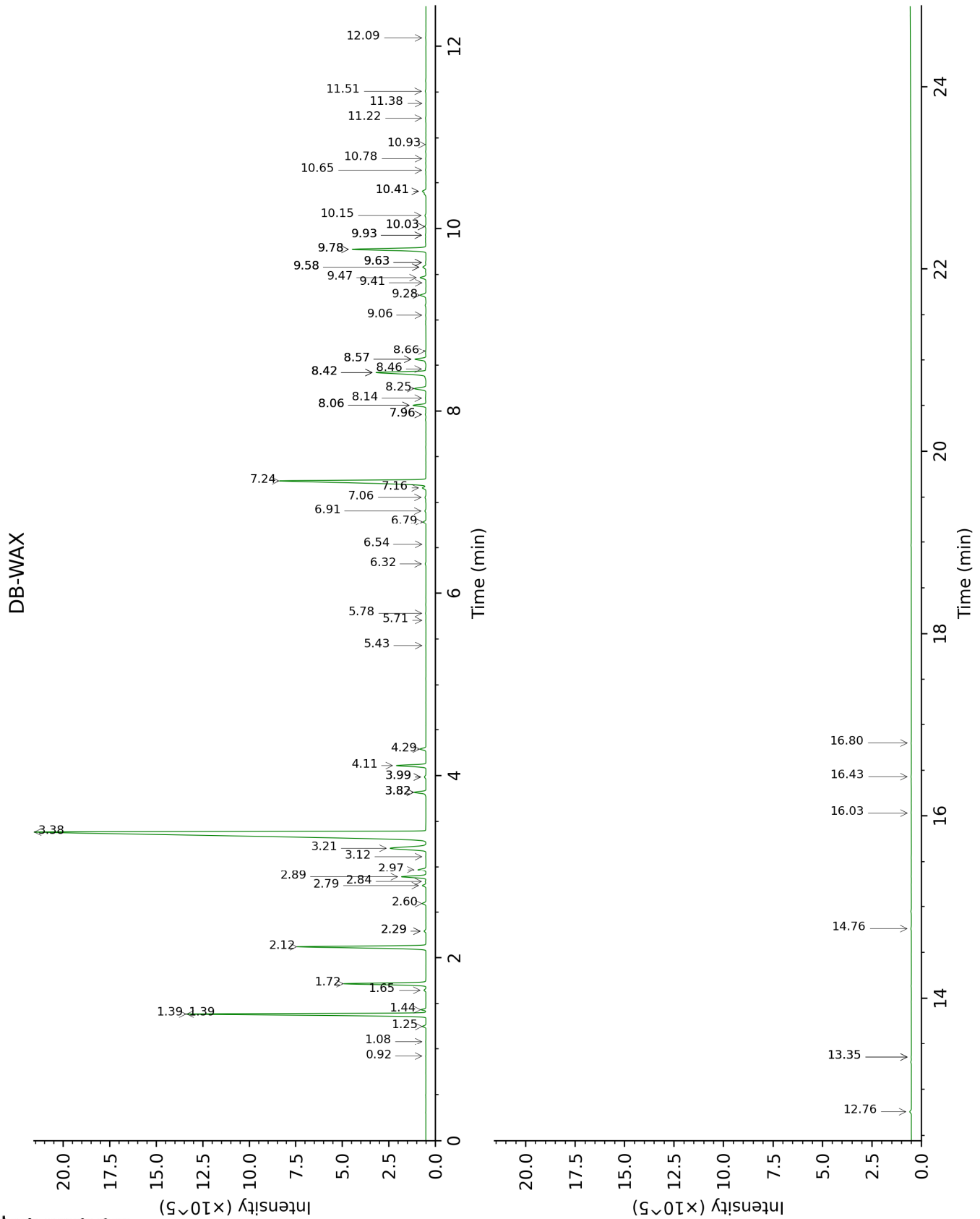
Note: no correction factor was applied

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	%
2-Ethylfuran	0.70	701	tr	0.92	918	tr
(3Z)-Hexenol	1.97	858	0.01	5.78	1346	0.01
Hexanol	2.16	875	tr	5.43	1320	tr
Bornylene	2.48	903	0.01	1.08	944	tr
Hashishene	2.66	916	0.02	1.39*	993	12.10
Tricyclene	2.70	918	0.16	1.25	971	0.16
α -Thujene	2.81	926	0.19	1.44	999	0.20
α -Pinene	2.90	932	12.15	1.39*	993	[12.10]
α -Fenchene	3.08*	944	4.26	1.65	1020	0.10
Camphene	3.08*	944	[4.26]	1.72	1027	4.14
Thuja-2,4(10)-diene	3.16	950	0.02	2.29*	1083	0.09
Sabinene	3.50*	972	7.19	2.29*	1083	[0.09]
β -Pinene	3.50*	972	[7.19]	2.12	1066	7.09
Dehydro-1,8-cineole	3.73*	988	0.16	3.12	1151	0.01
Octan-3-one	3.73*	988	[0.16]	3.99*	1218	0.09
Myrcene	3.81	993	1.27	2.89	1133	1.26
Pseudolimonene	3.93*	1002	0.21	2.84	1129	0.03
α -Phellandrene	3.93*	1002	[0.21]	2.79	1125	0.18
Δ 3-Carene	4.02	1008	0.19	2.60	1110	0.19
α -Terpinene	4.13	1015	0.43	2.97	1139	0.43
para-Cymene	4.27†	1023	49.52	4.11	1228	1.52
Limonene	4.30†	1025	[49.52]	3.21	1158	2.88
1,8-Cineole	4.40†	1032	[49.52]	3.38	1172	45.14
(Z)- β -Ocimene	4.54	1041	0.03	3.82*	1206	0.63
(E)- β -Ocimene	4.69	1050	0.05	3.99*	1218	[0.09]
γ -Terpinene	4.80	1057	0.59	3.82*	1206	[0.63]
cis-Sabinene hydrate	4.95	1066	0.05	6.91	1428	0.06
cis-Linalool oxide (fur.)	5.04	1072	0.01	6.54	1400	tr
Fenchone	5.20	1083	0.01	5.71	1340	tr
Terpinolene	5.25*	1086	0.34	4.29	1241	0.30
para-Cymenene	5.25*	1086	[0.34]	6.32	1385	0.03
trans-Sabinene hydrate	5.44	1098	0.03	7.96*	1507	0.03
Linalool	5.55	1104	0.68	8.06*	1514	0.68
endo-Fenchol	5.62	1109	0.01	8.42*	1542	3.25
cis-para-Menth-2-en-1-ol	5.77	1118	0.01	8.14	1521	0.05
Camphor	6.10	1140	10.89	7.24	1452	10.88
Camphene hydrate	6.15	1143	0.06	8.46	1545	0.03
Isoborneol	6.29	1152	0.01	9.41	1620	0.01
Pinocarvone	6.32	1154	0.02	7.96*	1507	[0.03]
Borneol	6.49	1165	2.55	9.78*	1650	4.31
δ -Terpineol	6.52	1167	0.33	9.47	1625	0.33

Terpinen-4-ol	6.65	1175	0.61	8.57*	1554	0.65
para-Cymen-8-ol	6.83	1187	0.03	11.51	1795	0.03
α -Terpineol	6.89*	1191	1.76	9.78*	1650	[4.31]
Myrtenal	6.89*	1191	[1.76]	8.66	1560	0.01
Myrtenol	6.94	1194	0.01	10.93	1745	tr
Verbenone	7.09	1204	0.03	9.63*	1638	0.03
<i>trans</i> -Carveol	7.33	1220	tr	11.38	1784	tr
Bornyl formate	7.38	1223	0.02	8.06*	1514	[0.68]
Citronellol	7.55	1234	0.01	10.78	1732	0.01
Carvone	7.64	1240	tr	10.02*	1670	0.05
Bornyl acetate	8.28	1283	0.69	8.25	1529	0.71
Unknown [m/z 43, 93 (66), 91 (44), 41 (38), 69 (35)... 152? (1)]	8.46	1296	0.01			
α -Cubebene	9.18	1346	0.03	6.79	1419	0.15
Eugenol	9.34	1357	0.02	14.76	2095	0.04
α -Ylangene	9.46	1366	0.06	7.06	1439	0.06
α -Copaene	9.53	1371	0.20	7.16	1447	0.20
Methyleugenol	9.98	1403	0.01	13.35*	1961	0.01
β -Caryophyllene	10.11	1412	3.16	8.42*	1542	[3.25]
β -Copaene	10.24	1422	0.03	8.42*	1542	[3.25]
Aromadendrene	10.36	1431	0.05	8.57*	1554	[0.65]
α -Humulene	10.56	1446	0.35	9.28	1609	0.36
allo- Aromadendrene	10.66	1453	0.01	9.06	1592	0.02
(<i>E</i>)- β -Farnesene	10.72	1458	0.01	9.58*	1634	0.20
γ -Muurolene	10.90	1472	0.16	9.58*	1634	[0.20]
α -Amorphene	10.95	1475	0.01	9.63*	1638	[0.03]
β -Selinene	11.02	1480	0.01	9.93*	1662	0.03
α -Selinene	11.13	1488	0.07	9.93*	1662	[0.03]
α -Muurolene	11.22	1496	0.05	10.02*	1670	[0.05]
β -Bisabolene	11.38*	1507	0.14	10.15	1680	0.06
γ -Cadinene	11.38*	1507	[0.14]	10.41*	1701	0.22
<i>trans</i> -Calamenene	11.52*	1519	0.25	11.22	1770	0.03
δ -Cadinene	11.52*	1519	[0.25]	10.41*	1701	[0.22]
<i>trans</i> -Cadina-1,4- diene	11.62	1526	0.02	10.65	1722	0.03
α -Calacorene	11.74	1536	0.02	12.09	1846	0.01
Caryophyllene oxide	12.22	1574	0.10	12.76	1906	0.10
Humulene epoxide II	12.55	1600	0.01	13.35*	1961	[0.01]
Caryophylladienol II	12.91	1629	0.01	16.03	2223	0.01
14-Hydroxy-(<i>Z</i>)- caryophyllene	13.19	1652	0.02	16.43	2264	0.02
14-Hydroxy-(<i>E</i>)- caryophyllene	13.37	1667	0.01	16.80	2303	0.01
Total identified		99.44%			99.29%	
Total reported		99.45%			99.29%	

*: 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