

Date : 2024-04-26

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24D12-PTH02

Customer Identification : Orange Essence - USA - OQ0108R

Type : Essential Oil

Source : *Citrus sinensis*

Customer : Plant Therapy

Checked and approved by:

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

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GAS CHROMATOGRAPHIC ANALYSIS

Method : PC-MAT-014 - Analysis of the composition of an essential oil or other volatile liquide by FAST GC-FID

***ISO**

Results : See analysis summary (next page)

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

Date : 2024-04-25

PHYSICOCHEMICAL DATA

Refractive index : 1.4723 ± 0.0003 (20 °C)

Method : PC-MAT-016 - Measure of the refractive index of a liquid.

Analyst : Cindy Caron B. Sc.

Date : 2024-04-12

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
Ethyl acetate	tr	Aliphatic ester
Hexanal	0.02	Aliphatic aldehyde
Ethyl butyrate	0.07	Aliphatic ester
Ethyl 2-methylbutyrate	0.01	Aliphatic ester
α -Thujene	tr	Monoterpene
α -Pinene	0.50	Monoterpene
Camphene	tr	Monoterpene
β -Pinene	0.03	Monoterpene
Sabinene	0.32	Monoterpene
Myrcene	1.70	Monoterpene
Octanal	0.29	Aliphatic aldehyde
Δ^3 -Carene	0.14	Monoterpene
1,8-Cineole	0.01	Monoterpenic ether
<i>para</i> -Cymene	0.02	Monoterpene
β -Phellandrene	0.24	Monoterpene
Limonene	94.08	Monoterpene
(<i>Z</i>)- β -Ocimene	tr	Monoterpene
(<i>E</i>)- β -Ocimene	0.02	Monoterpene
γ -Terpinene	0.02	Monoterpene
<i>cis</i> -Sabinene hydrate	tr	Monoterpenic alcohol
Octanol	0.13	Aliphatic alcohol
Terpinolene	0.03	Monoterpene
Linalool	0.47	Monoterpenic alcohol
Nonanal	0.04	Aliphatic aldehyde
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.03	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.06	Monoterpenic ether
<i>trans</i> -Limonene oxide	0.04	Monoterpenic ether
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.03	Monoterpenic alcohol
Citronellal	0.02	Monoterpenic aldehyde
Borneol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.02	Monoterpenic alcohol
α -Terpineol	0.08	Monoterpenic alcohol
<i>cis</i> -Piperitol	0.02	Monoterpenic alcohol
<i>trans</i> -Isopiperitenol	0.01	Monoterpenic alcohol
Decanal	0.21	Aliphatic aldehyde
Octyl acetate	0.01	Aliphatic ester
<i>trans</i> -Carveol	0.04	Monoterpenic alcohol
<i>cis</i> -Carveol	0.03	Monoterpenic alcohol
Citronellol	0.03	Monoterpenic alcohol
Carvone	0.03	Monoterpenic ketone

Neral	0.06	Monoterpenic aldehyde
Geraniol	0.01	Monoterpenic alcohol
Geranial	0.07	Monoterpenic aldehyde
Decanol	0.05	Aliphatic alcohol
Undecanal	0.01	Aliphatic aldehyde
α -Cubebene	tr	Sesquiterpene
Neryl acetate	0.01	Monoterpenic ester
α -Copaene	0.03	Sesquiterpene
β -Cubebene	0.02	Sesquiterpene
β -Elemene	0.02	Sesquiterpene
Dodecanal	0.03	Aliphatic aldehyde
β -Caryophyllene	0.04	Sesquiterpene
β -Copaene	0.03	Sesquiterpene
α -Humulene	0.01	Sesquiterpene
Aristolochene	0.01	Sesquiterpene
Valencene	0.30	Sesquiterpene
(3Z,6E)- α -Farnesene	0.02	Sesquiterpene
γ -Cadinene	0.03	Sesquiterpene
δ -Cadinene	0.03	Sesquiterpene
Caryophyllene oxide	0.01	Sesquiterpenic ether
β -Sinensal	0.01	Sesquiterpenic aldehyde
α -Sinensal	0.01	Sesquiterpenic aldehyde
Nootkatone	0.01	Sesquiterpenic ketone
<i>meta</i> -Camphorene	tr	Diterpene
Consolidated total	99.62	

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

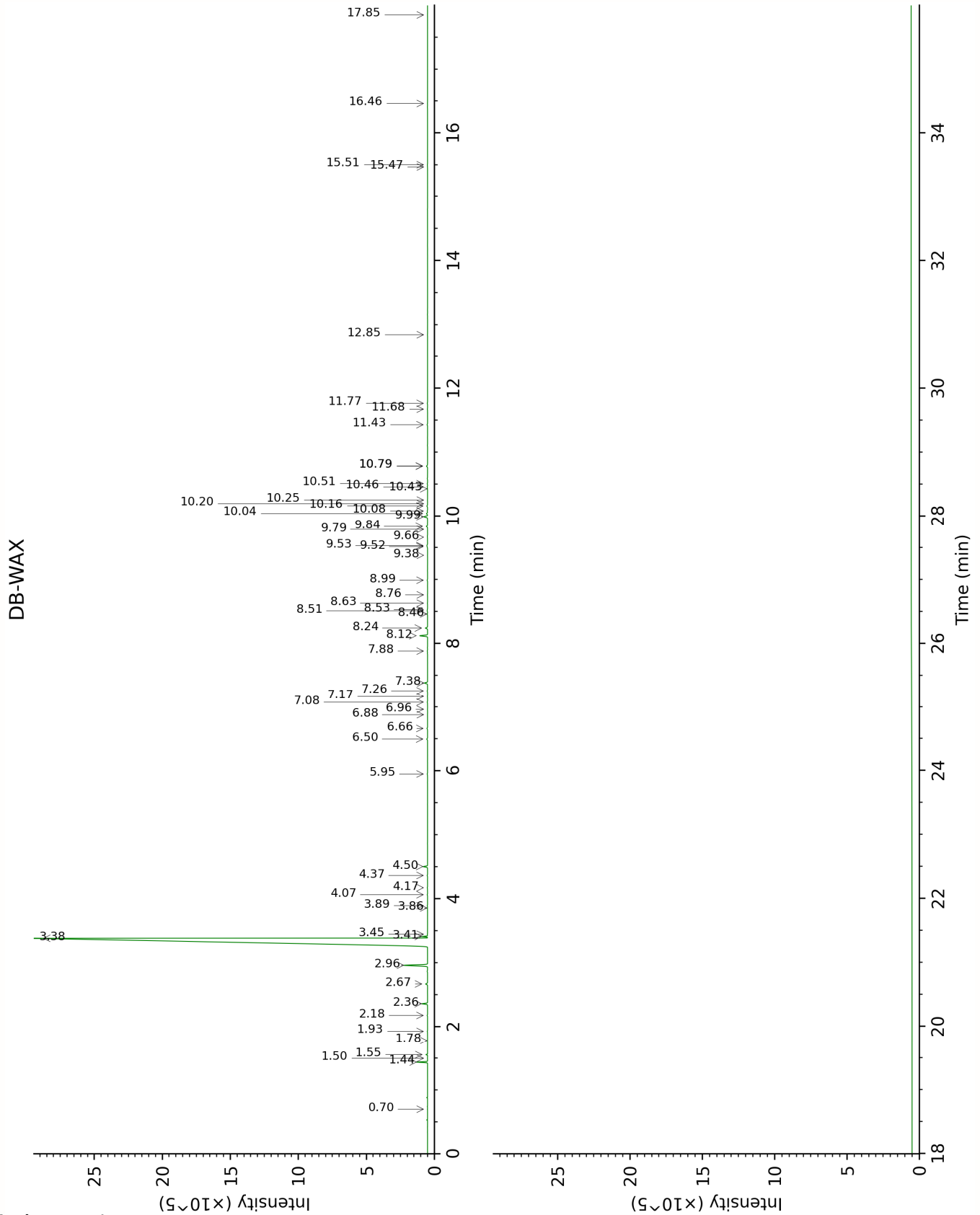
Note: no correction factor was applied

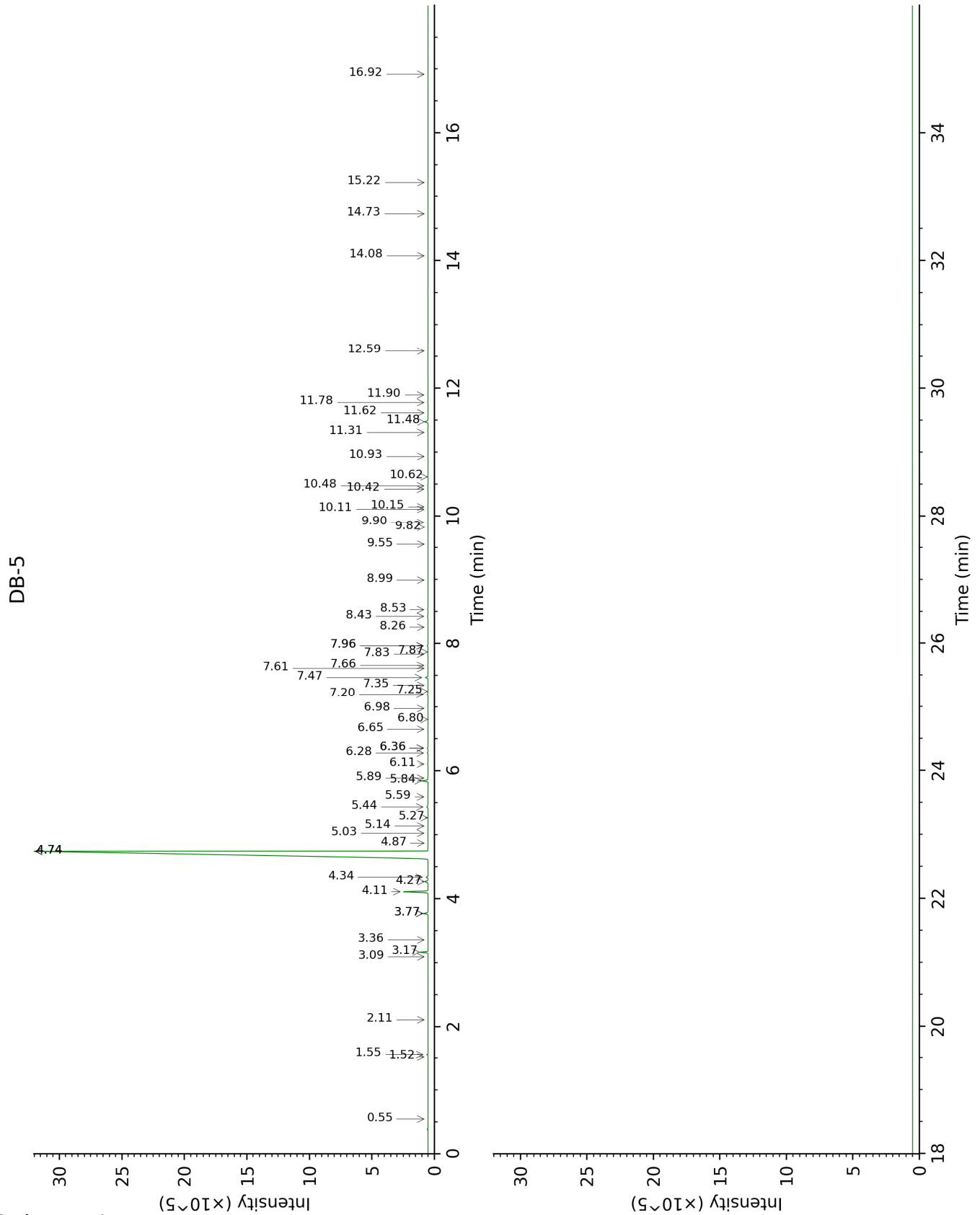
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Bracketed value ([xx]): A bracketed percent value indicate that two or more compound percentage could not be solved due to coelution.

This page was intentionally left blank. The following pages present the complete data of the analysis.





FULL ANALYSIS DATA

Ethyl acetate	Column DB-WAX			Column DB-5		
	0.70	852.8	tr	0.54	608.8	tr
Hexanal	1.93	1045.9	0.02	1.52	799.9	0.02
Ethyl butyrate	1.56	1011.1	0.07	1.55	804.9	0.07
Ethyl 2-methylbutyrate				2.11	850.9	0.01
α -Thujene	1.50	1003.6	tr	3.09	926.6	tr
α -Pinene	1.44	994.8	0.50	3.17	931.4	0.50
Camphene	1.78	1032.3	tr	3.36	944.0	tr
β -Pinene	2.18	1069.4	0.03	3.77*	971.3	[0.34]
Sabinene	2.36	1086.6	0.32	3.77*	971.3	[0.34]
Myrcene	2.96	1136.2	1.70	4.11	993.7	1.70
Octanal	4.50	1250.2	0.26	4.27	1004.1	0.29
Δ^3 -Carene	2.67	1114.1	0.13	4.34	1008.5	0.14
1,8-Cineole	3.45	1172.8	0.01	4.74*	1033.8	[94.65]
<i>para</i> -Cymene	4.17	1226.6	0.02	4.74*	1033.8	[94.65]
β -Phellandrene	3.41	1170.2	0.24	4.74*	1033.8	[94.65]
Limonene	3.38	1168.0	94.08	4.74*	1033.8	[94.65]
(<i>Z</i>)- β -Ocimene	3.86	1203.9	0.01	4.87	1041.8	tr
(<i>E</i>)- β -Ocimene	4.06	1218.9	0.02	5.02	1051.5	0.02
γ -Terpinene	3.89	1206.7	0.02	5.14	1058.5	0.02
<i>cis</i> -Sabinene hydrate	6.96	1427.8	0.01	5.27	1066.7	tr
Octanol	8.24	1524.7	0.15	5.44	1077.2	0.13
Terpinolene	4.37	1240.3	0.03	5.59	1087.0	0.03
Linalool	8.12	1515.4	0.50	5.84	1102.7	0.47
Nonanal	5.95	1353.9	0.02	5.89	1105.4	0.04
<i>trans-para</i> -Mentha-2,8-dien-1-ol	8.99	1583.7	0.03	6.11	1119.4	0.03
<i>cis</i> -Limonene oxide	6.50	1393.3	0.06	6.28	1130.4	0.06
<i>trans</i> -Limonene oxide	6.66	1405.3	0.04	6.36*	1135.3	[0.07]
<i>cis-para</i> -Mentha-2,8-dien-1-ol	9.52	1626.1	0.03	6.36*	1135.3	[0.07]
Citronellal	7.08	1436.2	0.03	6.65	1154.1	0.02
Borneol	9.79	1648.6	0.01	6.80	1164.0	0.01
Terpinen-4-ol	8.63	1555.4	0.02	6.98	1175.0	0.02
α -Terpineol	9.84	1652.5	0.09	7.20	1189.2	0.08
<i>cis</i> -Piperitol	9.66	1638.3	0.01	7.25	1192.5	0.02
<i>trans</i> -Isopiperitenol	10.43	1702.1	0.01	7.35	1198.5	0.01

Decanal	7.38	1459.3	0.21	7.47	1206.4	0.21
Octyl acetate	7.17	1443.1	0.01	7.61	1216.0	0.01
<i>trans</i> -Carveol	11.43	1779.3	0.04	7.66	1219.1	0.04
<i>cis</i> -Carveol	11.77	1808.7	0.02	7.84	1230.9	0.03
Citronellol	10.79*	1732.6	[0.09]	7.87	1233.2	0.03
Carvone	10.08	1673.1	0.03	7.96*	1239.6	[0.09]
Neral	9.53	1627.4	0.06	7.96*	1239.6	[0.09]
Geraniol	11.68	1800.6	0.02	8.26	1259.0	0.01
Geranial	10.16	1679.7	0.05	8.43	1270.4	0.07
Decanol	10.79*	1732.6	[0.09]	8.53	1277.4	0.05
Undecanal	8.76	1565.7	0.01	8.99	1308.4	0.01
α -Cubebene	6.88	1421.4	tr	9.55	1348.1	tr
Neryl acetate	10.20	1682.6	0.01	9.82	1366.9	0.01
α -Copaene	7.26	1449.9	0.03	9.90	1372.5	0.03
β -Cubebene	7.88	1496.9	0.02	10.11	1387.1	0.02
β -Elemene	8.53	1547.3	0.02	10.15	1389.8	0.02
Dodecanal	10.04	1669.8	0.09	10.42	1409.6	0.03
β -Caryophyllene	8.51	1546.0	0.03	10.48	1413.5	0.04
β -Copaene	8.46	1542.1	0.02	10.62	1424.0	0.03
α -Humulene	9.38	1614.8	0.01	10.93	1447.7	0.01
Aristolochene				11.31	1475.6	0.01
Valencene	9.99	1665.6	0.28	11.48	1488.1	0.30
(3Z,6E)- α -Farnesene	10.25	1687.4	0.01	11.62	1498.5	0.02
γ -Cadinene	10.46	1704.6	0.03	11.78	1510.7	0.03
δ -Cadinene	10.51	1708.9	0.03	11.90	1519.9	0.03
Caryophyllene oxide	12.85	1907.4	0.01	12.59	1574.2	0.01
β -Sinensal	15.51	2166.9	0.02	14.08	1695.6	0.01
α -Sinensal	16.46	2266.5	0.01	14.73	1751.8	0.01
Nootkatone	17.85	2415.9	0.01	15.22	1793.9	0.01
<i>meta</i> -Camphorene	15.47	2163.4	0.01	16.92	1950.2	tr
Total reported		99.65%			99.91%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, only the first one is 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