

Date : 2023-07-28

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 23G21-PTH01

Customer Identification : Organic Bergamot - Italy - BQ0109R

Type : Essential Oil

Source : *Citrus aurantium var. bergamia*

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 : 2023-07-28

PHYSICOCHEMICAL DATA

Refractive index : 1.4636 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2023-07-24

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
Tricyclene	0.01	Monoterpene
α -Thujene	0.23	Monoterpene
α -Pinene	1.13	Monoterpene
Camphene	0.05	Monoterpene
β -Pinene	7.38	Monoterpene
Sabinene	1.40	Monoterpene
6-Methyl-5-hepten-2-one	tr	Aliphatic ketone
Myrcene	0.99	Monoterpene
α -Phellandrene	0.02	Monoterpene
Octanal	0.06	Aliphatic aldehyde
Δ^3 -Carene	0.01	Monoterpene
α -Terpinene	0.09	Monoterpene
<i>para</i> -Cymene	0.39	Monoterpene
1,8-Cineole	0.02	Monoterpenic ether
Limonene	39.41	Monoterpene
β -Phellandrene	0.18	Monoterpene
(<i>Z</i>)- β -Ocimene	0.04	Monoterpene
(<i>E</i>)- β -Ocimene	0.07	Monoterpene
γ -Terpinene	5.55	Monoterpene
<i>cis</i> -Sabinene hydrate	0.02	Monoterpenic alcohol
<i>para</i> -Mentha-3,8-diene	0.01	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	0.03	Monoterpenic alcohol
Octanol	0.01	Aliphatic alcohol
<i>trans</i> -Linalool oxide (fur.)	0.04	Monoterpenic alcohol
Terpinolene	0.07	Monoterpene
<i>trans</i> -Sabinene hydrate	0.01	Monoterpenic alcohol
Linalool	13.31	Monoterpenic alcohol
Nonanal	0.03	Aliphatic aldehyde
<i>cis</i> -Limonene oxide	0.02	Monoterpenic ether
<i>trans</i> -Limonene oxide	0.01	Monoterpenic ether
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
Camphor	0.01	Monoterpenic ketone
Epoxyterpinolene	0.01	Monoterpenic ether
Borneol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.01	Monoterpenic alcohol
α -Terpineol	0.12	Monoterpenic alcohol
Hodiendiol (2,6-dimethylocta-3,7-diene-2,6-diol)	0.03	Monoterpenic alcohol
Unknown	0.01	Unknown
Decanal	0.04	Aliphatic aldehyde

Octyl acetate	0.26	Aliphatic ester
Nerol	0.07	Monoterpenic alcohol
Citronellol	0.01	Monoterpenic alcohol
Neral	0.07	Monoterpenic aldehyde
(E)-Isogeraniol?	0.05	Monoterpenic alcohol
Linalyl acetate	26.92	Monoterpenic ester
Geraniol	0.05	Monoterpenic alcohol
(trans?)-Linalool oxide acetate (fur.)?	0.05	Monoterpenic ester
Geranial	0.08	Monoterpenic aldehyde
Unknown	0.01	Unknown
Bornyl acetate	0.01	Monoterpenic ester
Linalyl propionate	0.01	Monoterpenic ester
Hodiendiol derivative	0.02	Oxygenated monoterpene
α -Terpinyl acetate	0.13	Monoterpenic ester
Unknown	0.02	Monoterpenic ester
Citronellyl acetate	0.02	Monoterpenic ester
Neryl acetate	0.30	Monoterpenic ester
Geranyl acetate	0.50	Monoterpenic ester
β -Caryophyllene	0.25	Sesquiterpene
trans- α -Bergamotene	0.04	Sesquiterpene
α -Humulene	0.01	Sesquiterpene
(E)- β -Farnesene	0.01	Sesquiterpene
Hodiendiol derivative II	0.03	Oxygenated monoterpene
β -Bisabolene	0.03	Sesquiterpene
Consolidated total	99.80	

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

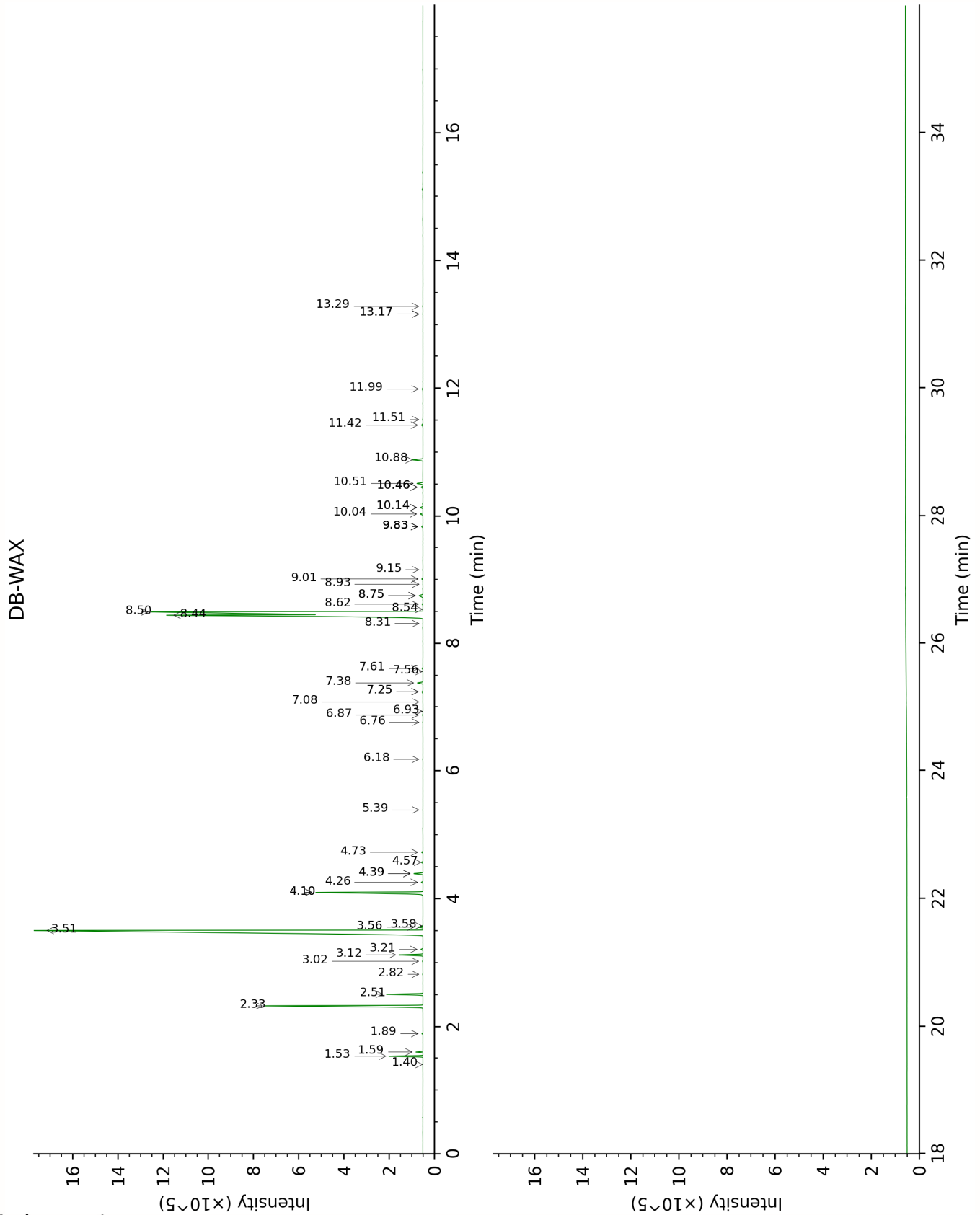
Note: no correction factor was applied

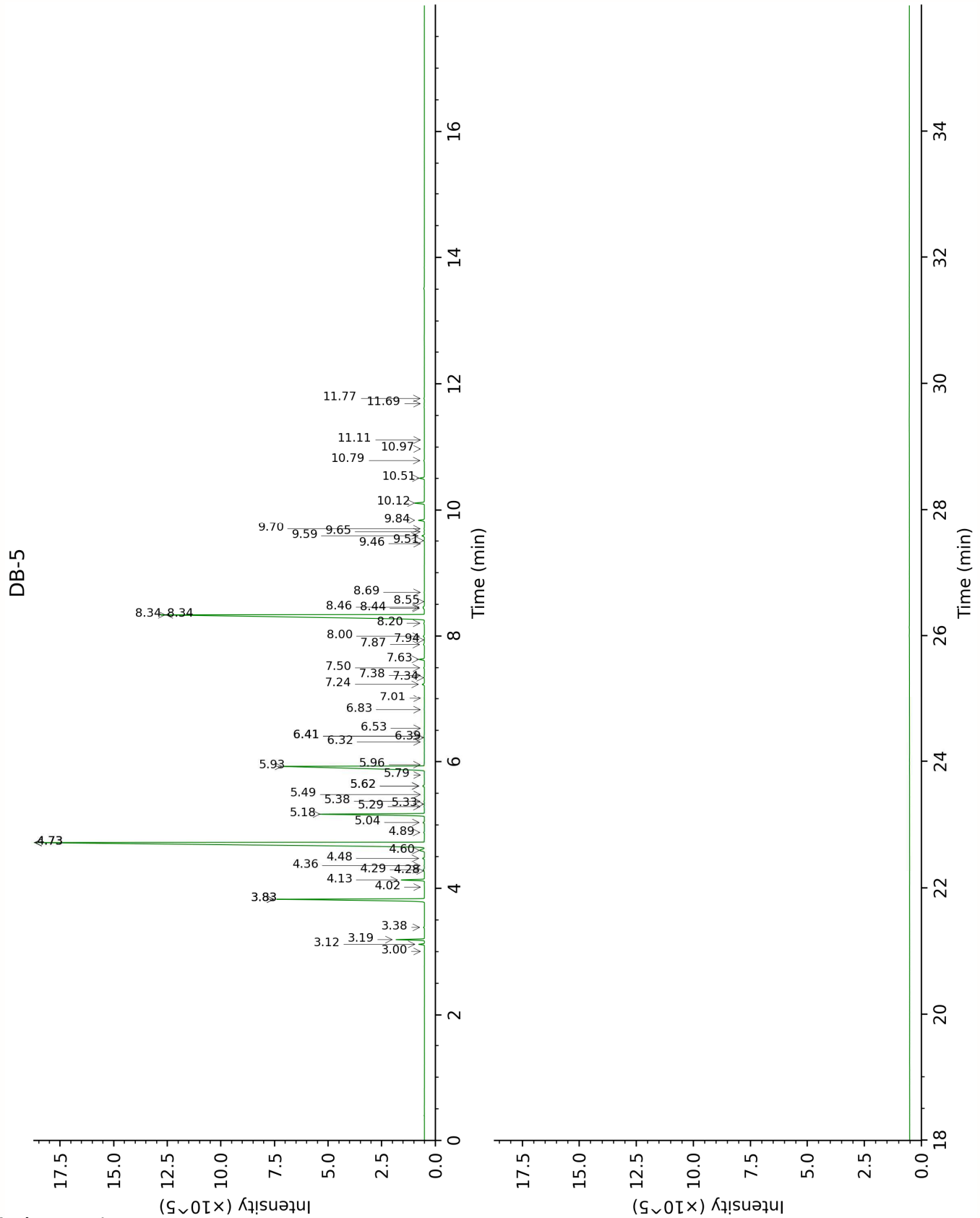
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Tricyclene	Column DB-WAX			Column DB-5		
	1.40	970.6	tr	3.00	918.8	0.01
α -Thujene	1.60	996.7	0.23	3.12	926.2	0.23
α -Pinene	1.53	990.2	1.13	3.19	931.1	1.13
Camphene	1.89	1025.2	0.04	3.38	943.8	0.05
β -Pinene	2.33	1066.5	7.38	3.83*	973.1	[8.75]
Sabinene	2.51	1083.8	1.40	3.83*	973.1	[8.75]
6-Methyl-5-hepten-2-one	5.39	1296.0	0.01	4.02	985.7	tr
Myrcene	3.12	1132.7	0.99	4.14	993.1	0.99
α -Phellandrene	3.02	1125.0	0.02	4.28	1002.4	0.02
Octanal	4.73	1253.1	0.06	4.30	1003.6	0.06
Δ^3 -Carene	2.82	1109.3	0.02	4.36	1007.8	0.01
α -Terpinene	3.21	1139.3	0.09	4.48	1014.9	0.09
<i>para</i> -Cymene	4.39*	1228.8	[0.39]	4.60	1022.8	0.39
1,8-Cineole	3.58	1167.8	0.02	4.73*	1030.5	[39.61]
Limonene	3.51	1162.2	39.41	4.73*	1030.5	[39.61]
β -Phellandrene	3.56	1166.2	0.18	4.73*	1030.5	[39.61]
(<i>Z</i>)- β -Ocimene	4.10*	1207.3	[5.59]	4.89	1040.5	0.04
(<i>E</i>)- β -Ocimene	4.26	1218.9	0.07	5.04	1050.3	0.07
γ -Terpinene	4.10*	1207.3	[5.59]	5.18	1058.6	5.55
<i>cis</i> -Sabinene hydrate	7.25*	1430.6	[0.06]	5.29	1066.0	0.02
<i>para</i> -Mentha-3,8-diene	4.39*	1228.8	[0.39]	5.33	1068.5	0.01
<i>cis</i> -Linalool oxide (fur.)	6.87	1402.9	0.03	5.38	1071.2	0.03
Octanol	8.54	1527.4	0.02	5.48	1077.9	0.01
<i>trans</i> -Linalool oxide (fur.)	7.25*	1430.6	[0.06]	5.62*	1086.4	[0.11]
Terpinolene	4.57	1241.6	0.07	5.62*	1086.4	[0.11]
<i>trans</i> -Sabinene hydrate	8.31	1510.2	0.01	5.79	1097.2	0.01
Linalool	8.44*†	1520.4	[16.65]	5.93	1105.8	13.31
Nonanal	6.18	1352.9	0.01	5.96	1107.5	0.03
<i>cis</i> -Limonene oxide	6.76	1394.5	0.01	6.32	1130.3	0.02
<i>trans</i> -Limonene oxide	6.93	1407.1	0.01	6.39	1134.8	0.01
<i>cis-para</i> -Mentha-2,8-dien-1-ol	9.83*	1628.6	[0.07]	6.41*	1136.2	[0.03]
Camphor	7.56	1454.0	0.01	6.41*	1136.2	[0.03]
Epoxyterpinolene	7.08	1418.0	0.01	6.53	1144.1	0.01
Borneol	10.14*	1653.4	[0.12]	6.83	1162.9	0.01

Terpinen-4-ol	8.93	1557.6	0.01	7.01	1174.5	0.01
α -Terpineol	10.14*	1653.4	[0.12]	7.24	1189.1	0.12
Hodiendiol (2,6-dimethylocta-3,7-diene-2,6-diol)	13.17*	1911.9	[0.01]	7.34	1195.8	0.03
Unknown SASC VI [m/z 43, 71 (80), 67 (55), 59 (51), 68 (44), 41 (43)...]				7.38	1198.1	0.01
Decanal	7.61	1457.5	0.04	7.50	1205.8	0.04
Octyl acetate	7.38	1440.8	0.26	7.63	1214.8	0.26
Nerol	11.42	1759.7	0.09	7.87	1230.4	0.07
Citronellol				7.94	1235.3	0.01
Neral	9.83*	1628.6	[0.07]	8.00	1239.2	0.07
(E)-Isogeraniol?	11.51	1767.0	0.02	8.20	1252.9	0.05
Linalyl acetate	8.50*†	1524.4	[23.60]	8.34*	1261.8	[26.97]
Geraniol	11.99	1807.9	0.05	8.34*	1261.8	[26.97]
(trans?)-Linalool oxide acetate (fur.)?	9.01	1563.9	0.06	8.44	1268.6	0.05
Geranial	10.46*	1678.9	[0.09]	8.46	1269.8	0.08
Unknown MISC CCLXXIV [m/z 43, 121 (79), 136 (42), 107 (37), 68 (35), 95 (27), 93 (24)...]				8.55	1275.7	0.01
Bornyl acetate	8.62	1533.5	0.04	8.69	1285.5	0.01
Linalyl propionate	9.15	1575.0	0.01	9.46	1338.7	0.01
Hodiendiol derivative	13.29	1922.8	0.02	9.51	1342.0	0.02
α -Terpinyl acetate	10.04	1645.2	0.13	9.59	1347.4	0.13
Unknown MISC VII [m/z 43, 121 (52), 93 (48), 79 (33), 41 (30), 136 (26), 81 (25)...]				9.65	1352.0	0.02
Citronellyl acetate	9.83*	1628.6	[0.07]	9.70	1355.3	0.02
Neryl acetate	10.51	1683.7	0.29	9.84	1365.5	0.30
Geranyl acetate	10.88	1714.5	0.49	10.12	1384.7	0.50
β -Caryophyllene	8.75*	1543.9	[0.28]	10.51	1412.9	0.25
trans- α -	8.75*	1543.9	[0.28]	10.79	1433.6	0.04

Bergamotene						
α -Humulene				10.97	1447.2	0.01
(E)- β -Farnesene	9.83*	1628.6	[0.07]	11.11	1457.8	0.01
Hodiendiol derivative II	13.17*	1911.9	[0.01]	11.69	1500.4	0.03
β -Bisabolene	10.46*	1678.9	[0.09]	11.77	1506.7	0.03
Total reported		99.62%			99.77%	

*: 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