

Date : 2025-12-22

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25K07-PTH15

Customer Identification : Org Bergamot - Italy - BQ0114R

Type : Essential Oil

Source : *Citrus aurantium* var. *bergamia*

Customer : Plant Therapy

Checked and approved by:

Sylvain Mercier, M. Sc., Chimiste 2014-005

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The compliance status of the sample is provided to facilitate the reading of the report. The client remains ultimately responsible for reviewing the results presented within this report and to establish compliance of the tested batch against relevant quality criteria.

This report is an update of the version first issued on 2025-11-11 to make a correction in the sample identification section.

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 : 2025-11-11

PHYSICOCHEMICAL DATA

Refractive index : 1.4638 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-11-07

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
Nonane	0.01	Alkane
Tricyclene	tr	Monoterpene
α -Thujene	0.29	Monoterpene
α -Pinene	1.08	Monoterpene
Camphene	0.03	Monoterpene
Sabinene	1.03	Monoterpene
β -Pinene	5.74	Monoterpene
6-Methyl-5-hepten-2-one	0.02	Aliphatic ketone
Myrcene	0.89	Monoterpene
α -Phellandrene	0.02	Monoterpene
Octanal	0.03	Aliphatic aldehyde
α -Terpinene	0.12	Monoterpene
<i>meta</i> -Cymene	0.01	Monoterpene
<i>para</i> -Cymene	0.95	Monoterpene
β -Phellandrene	0.16	Monoterpene
1,8-Cineole	0.02	Monoterpenic ether
Limonene	40.06	Monoterpene
(<i>Z</i>)- β -Ocimene	0.03	Monoterpene
(<i>E</i>)- β -Ocimene	0.22	Monoterpene
γ -Terpinene	6.30	Monoterpene
<i>cis</i> -Sabinene hydrate	0.03	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.03	Monoterpenic alcohol
Octanol	0.02	Aliphatic alcohol
<i>trans</i> -Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Terpinolene	0.30	Monoterpene
<i>trans</i> -Sabinene hydrate	0.01	Monoterpenic alcohol
Linalool	11.61	Monoterpenic alcohol
Nonanal	0.02	Aliphatic aldehyde
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.03	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.03	Monoterpenic ether
<i>trans</i> -Limonene oxide	0.01	Monoterpenic ether
Camphor	0.02	Monoterpenic ketone
Epoxyterpinolene	0.01	Monoterpenic ether
Citronellal	0.01	Monoterpenic aldehyde
Terpinen-4-ol	0.04	Monoterpenic alcohol
α -Terpineol	0.21	Monoterpenic alcohol
Decanal	0.03	Aliphatic aldehyde
Octyl acetate	0.12	Aliphatic ester
Nerol	0.09	Monoterpenic alcohol
Citronellol	0.02	Monoterpenic alcohol

Neral	0.20	Monoterpenic aldehyde
Geraniol	0.05	Monoterpenic alcohol
Linalyl acetate	27.19	Monoterpenic ester
Geranial	0.28	Monoterpenic aldehyde
Unknown	0.02	Unknown
<i>cis-para</i> -Mentha-2,8-diene-1-hydroperoxide	0.01	Monoterpenic peroxide
<i>para</i> -Mentha-1,8-diene-4-hydroperoxide	0.01	Monoterpenic peroxide
Hodiendiol derivative	0.01	Oxygenated monoterpene
Linalyl propionate	0.04	Monoterpenic ester
α -Terpinyl acetate	0.14	Monoterpenic ester
Unknown	0.03	Monoterpenic ester
Unknown	0.05	Oxygenated monoterpene
Neryl acetate	0.37	Monoterpenic ester
Geranyl acetate	0.29	Monoterpenic ester
β -Elemene	0.01	Sesquiterpene
Dodecanal	0.01	Aliphatic aldehyde
<i>cis</i> - α -Bergamotene	0.04	Sesquiterpene
β -Caryophyllene	0.26	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.27	Sesquiterpene
α -Humulene	0.03	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.06	Sesquiterpene
Germacrene D	0.03	Sesquiterpene
β -Bisabolene	0.35	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.01	Sesquiterpene
(<i>E</i>)-Nerolidol	0.02	Sesquiterpenic alcohol
Spathulenol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
Caryophyllene oxide isomer	0.01	Sesquiterpenic ether
Unknown	0.01	Oxygenated sesquiterpene
α -Bisabolol	0.01	Sesquiterpenic alcohol
Nootkatone	0.01	Sesquiterpenic ketone
Consolidated total	99.50	

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

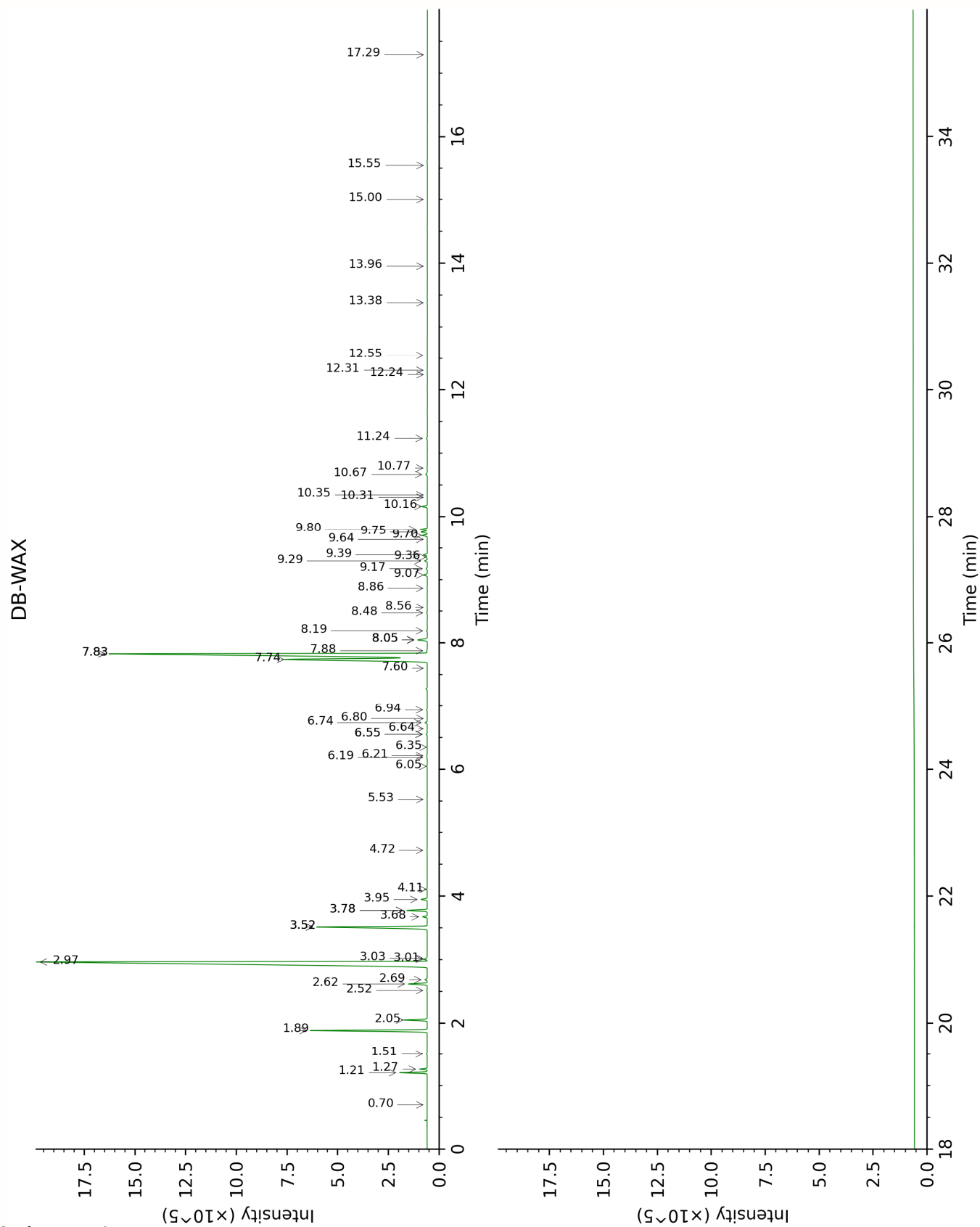
Note: no correction factor was applied

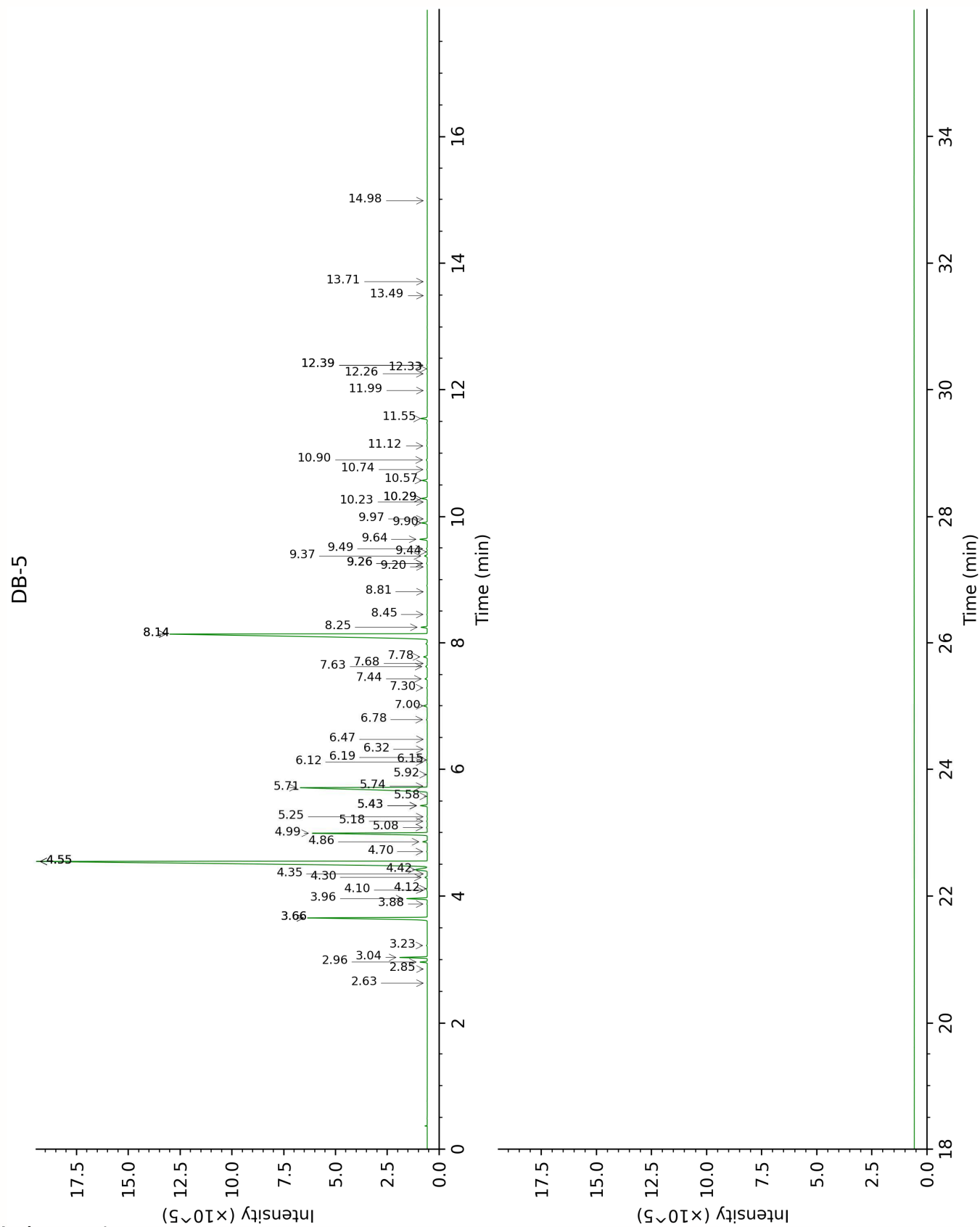
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Nonane	Column DB-WAX			Column DB-5		
	0.70	895.8	tr	2.63	903.8	0.01
Tricyclene				2.85	918.9	tr
α -Thujene	1.27	1001.1	0.28	2.96	926.2	0.29
α -Pinene	1.21	991.3	1.08	3.04	931.1	1.08
Camphene	1.51	1028.6	0.03	3.22	943.7	0.03
Sabinene	2.05	1084.1	1.03	3.66*	972.8	[6.77]
β -Pinene	1.88	1067.0	5.74	3.66*	972.8	[6.77]
6-Methyl-5-hepten-2-one	4.72	1295.7	0.02	3.88	987.5	0.02
Myrcene	2.62	1134.5	0.88	3.96	993.2	0.89
α -Phellandrene	2.52	1126.3	0.02	4.10	1002.2	0.02
Octanal	4.11	1250.3	0.02	4.12	1003.6	0.03
α -Terpinene	2.69	1139.8	0.12	4.30	1015.1	0.12
<i>meta</i> -Cymene	3.78*	1225.6	[0.96]	4.35	1018.5	0.01
<i>para</i> -Cymene	3.78*	1225.6	[0.96]	4.42	1022.7	0.95
β -Phellandrene	3.01	1165.6	0.16	4.55*	1031.0	[40.40]
1,8-Cineole	3.03	1167.0	0.02	4.55*	1031.0	[40.40]
Limonene	2.97	1162.2	40.06	4.55*	1031.0	[40.40]
(Z)- β -Ocimene	3.52*	1206.4	[6.30]	4.70	1040.7	0.03
(E)- β -Ocimene	3.68	1218.3	0.22	4.86	1050.6	0.22
γ -Terpinene	3.52*	1206.4	[6.30]	4.99	1059.2	6.30
<i>cis</i> -Sabinene hydrate	6.55*	1429.1	[0.06]	5.08	1064.9	0.03
<i>cis</i> -Linalool oxide (fur.)	6.19	1401.7	0.03	5.18	1071.2	0.03
Octanol	7.83*†	1527.0	[26.97]	5.25	1075.7	0.02
<i>trans</i> -Linalool oxide (fur.)	6.55*	1429.1	[0.06]	5.43*	1086.8	[0.31]
Terpinolene	3.95	1238.4	0.30	5.43*	1086.8	[0.31]
<i>trans</i> -Sabinene hydrate	7.60	1509.0	0.01	5.58	1096.2	0.01
Linalool	7.74*†	1519.9	[11.88]	5.71	1104.8	11.61
Nonanal	5.53	1352.9	0.02	5.74	1106.4	0.02
<i>trans-para</i> -Mentha-2,8-dien-1-ol	8.56	1584.7	0.02	5.92	1118.2	0.03
<i>cis</i> -Limonene oxide	6.05	1391.3	0.03	6.12	1131.0	0.03
<i>trans</i> -Limonene oxide	6.21	1403.6	0.03	6.15	1133.1	0.01
Camphor	6.80	1448.0	0.01	6.19	1135.6	0.02
Epoxyterpinolene	6.35	1413.7	0.01	6.32	1144.0	0.01
Citronellal	6.64	1435.8	0.01	6.47	1154.2	0.01

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Terpinen-4-ol	8.19	1555.6	0.04	6.78	1174.4	0.04
α -Terpineol	9.39	1652.2	0.20	7.00	1188.6	0.21
Decanal	6.94	1458.5	0.03	7.30	1207.8	0.03
Octyl acetate	6.74	1443.1	0.11	7.44	1217.4	0.12
Nerol	10.67	1759.7	0.10	7.63	1230.6	0.09
Citronellol	10.31	1728.7	0.01	7.68	1233.9	0.02
Neral	9.07	1625.9	0.20	7.78	1241.0	0.20
Geraniol	11.24	1808.8	0.05	8.14*	1265.5	[27.24]
Linalyl acetate	7.83*†	1527.0	[26.97]	8.14*	1265.5	[27.24]
Geranial	9.70	1677.5	0.28	8.25	1272.9	0.28
Unknown MISC VI [m/z 43, 121 (74), 93 (42), 95 (38), 107 (29), 41 (29), 136 (28)...]				8.45	1286.7	0.02
<i>cis</i> - <i>para</i> -Mentha- 2,8-diene-1- hydroperoxide				8.81	1308.1	0.01
<i>para</i> -Mentha-1,8- diene-4- hydroperoxide				9.20	1336.0	0.01
Hodiendiol derivative	12.55	1927.9	0.01	9.26*	1339.9	[0.05]
Linalyl propionate	8.48	1578.0	0.04	9.26*	1339.9	[0.05]
α -Terpinyl acetate	9.30	1644.2	0.14	9.37	1348.2	0.14
Unknown MISC VII [m/z 43, 121 (52), 93 (48), 79 (33), 41 (30), 136 (26), 81 (25)...]				9.44	1352.8	0.03
Unknown SASC III [m/z 43, 79 (46), 71 (30), 94 (25), 41 (23), 81 (21)... 197 (0)]	10.77	1768.5	0.03	9.49	1356.3	0.05
Neryl acetate	9.80	1685.8	0.40	9.64	1366.9	0.37
Geranyl acetate	10.16	1716.2	0.28	9.90	1386.1	0.29
β -Elemene	8.05*	1544.3	[0.54]	9.97	1390.6	0.01
Dodecanal	9.64	1672.3	0.02	10.23	1409.7	0.01
<i>cis</i> - α - Bergamotene	7.88	1530.8	0.04	10.29*	1413.9	[0.30]
β -Caryophyllene	8.05*	1544.3	[0.54]	10.29*	1413.9	[0.30]
<i>trans</i> - α -	8.05*	1544.3	[0.54]	10.57	1435.2	0.27

Bergamotene						
α -Humulene	8.86	1608.6	0.02	10.74	1448.0	0.03
(E)- β -Farnesene	9.17	1634.1	0.06	10.90	1459.4	0.06
Germacrene D	9.36	1649.2	0.05	11.12	1475.9	0.03
β -Bisabolene	9.75	1682.1	0.34	11.55	1508.3	0.35
(E)- α -Bisabolene	10.35	1732.0	0.01	11.99	1543.1	0.01
(E)-Nerolidol	13.38	2006.0	0.02	12.26	1564.0	0.02
Spathulenol	13.96	2061.8	0.01	12.33	1570.2	0.01
Caryophyllene oxide	12.31	1905.7	0.02	12.39*	1574.6	[0.03]
Caryophyllene oxide isomer	12.24	1899.5	0.01	12.39*	1574.6	[0.03]
Unknown CILI II [m/z 69, 95 (100), 41 (89), 109 (68), 67 (61)...222]	15.55	2222.1	0.01	13.49	1664.7	0.01
α -Bisabolol	15.00	2166.2	0.01	13.71	1682.9	0.01
Nootkatone	17.29	2408.3	0.01	14.98	1792.2	0.01
Total reported		99.43%			99.66%	

*: 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