

Date : 2025-09-12

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25H29-PTH03

Customer Identification : Lemon Essence - USA - LX0109R

Type : Essential Oil

Source : *Citrus x limon* ct. Distilled

Customer : Plant Therapy

Checked and approved by:

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

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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 : Jean-Christophe Fortin, M. Sc.

Date : 2025-09-10

PHYSICOCHEMICAL DATA

Refractive index : 1.4736 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-08-29

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
Octane	0.01	Alkane
Nonane	tr	Alkane
Heptanal	0.01	Aliphatic aldehyde
Tricyclene	0.01	Monoterpene
α -Thujene	0.36	Monoterpene
α -Pinene	1.97	Monoterpene
Camphene	0.08	Monoterpene
α -Fenchene	0.01	Monoterpene
β -Pinene	14.74	Monoterpene
Sabinene	0.68	Monoterpene
6-Methyl-5-hepten-2-one	0.02	Aliphatic ketone
Myrcene	1.33	Monoterpene
Pseudolimonene	0.01	Monoterpene
α -Phellandrene	0.04	Monoterpene
Octanal	0.08	Aliphatic aldehyde
α -Terpinene	0.29	Monoterpene
<i>para</i> -Cymene	1.11	Monoterpene
Limonene	63.45	Monoterpene
1,8-Cineole	0.13	Monoterpenic ether
β -Phellandrene	0.34	Monoterpene
(Z)- β -Ocimene	0.04	Monoterpene
(E)- β -Ocimene	0.08	Monoterpene
γ -Terpinene	8.45	Monoterpene
Octanol	0.04	Aliphatic alcohol
Terpinolene	0.48	Monoterpene
Linalool	0.13	Monoterpenic alcohol
Nonanal	0.11	Aliphatic aldehyde
endo-Fenchol	0.04	Monoterpenic alcohol
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.06	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.05	Monoterpenic ether
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
<i>trans</i> -Limonene oxide	0.03	Monoterpenic ether
Camphor	0.03	Monoterpenic ketone
Epoxyterpinolene	0.02	Monoterpenic ether
Borneol	0.03	Monoterpenic alcohol
Terpinen-4-ol	1.04	Monoterpenic alcohol
Isogeranial	0.03	Monoterpenic aldehyde
α -Terpineol	0.70	Monoterpenic alcohol
Decanal	0.05	Aliphatic aldehyde
<i>trans</i> -Carveol	0.03	Monoterpenic alcohol

Nerol	0.06	Monoterpenic alcohol
2,3-Epoxygeranial?	0.02	Monoterpenic aldehyde
Neral	0.48	Monoterpenic aldehyde
Geraniol	0.04	Monoterpenic alcohol
Geranial	0.72	Monoterpenic aldehyde
Undecanal	0.02	Aliphatic aldehyde
Citronellyl acetate	0.04	Monoterpenic ester
Neryl acetate	0.42	Monoterpenic ester
Geranyl acetate	0.41	Monoterpenic ester
Dodecanal	0.02	Aliphatic aldehyde
<i>cis</i> - α -Bergamotene	tr	Sesquiterpene
β -Caryophyllene	0.15	Sesquiterpene
α -Santalene	0.01	Sesquiterpene
<i>trans</i> - α -Bergamotene	0.26	Sesquiterpene
Neryl propionate	0.01	Monoterpenic ester
α -Humulene	0.01	Sesquiterpene
β -Santalene	0.01	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.03	Sesquiterpene
<i>trans</i> - β -Bergamotene	0.02	Sesquiterpene
Valencene	0.07	Sesquiterpene
Bicyclogermacrene	0.02	Sesquiterpene
(<i>Z</i>)- α -Bisabolene	0.03	Sesquiterpene
β -Bisabolene	0.33	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.01	Sesquiterpene
Spathulenol	0.03	Sesquiterpenic alcohol
Caryophyllene oxide	0.02	Sesquiterpenic ether
Unknown	0.03	Oxygenated sesquiterpene
Unknown	0.01	Oxygenated sesquiterpene
α -Bisabolol	0.02	Sesquiterpenic alcohol
Consolidated total	99.43	

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

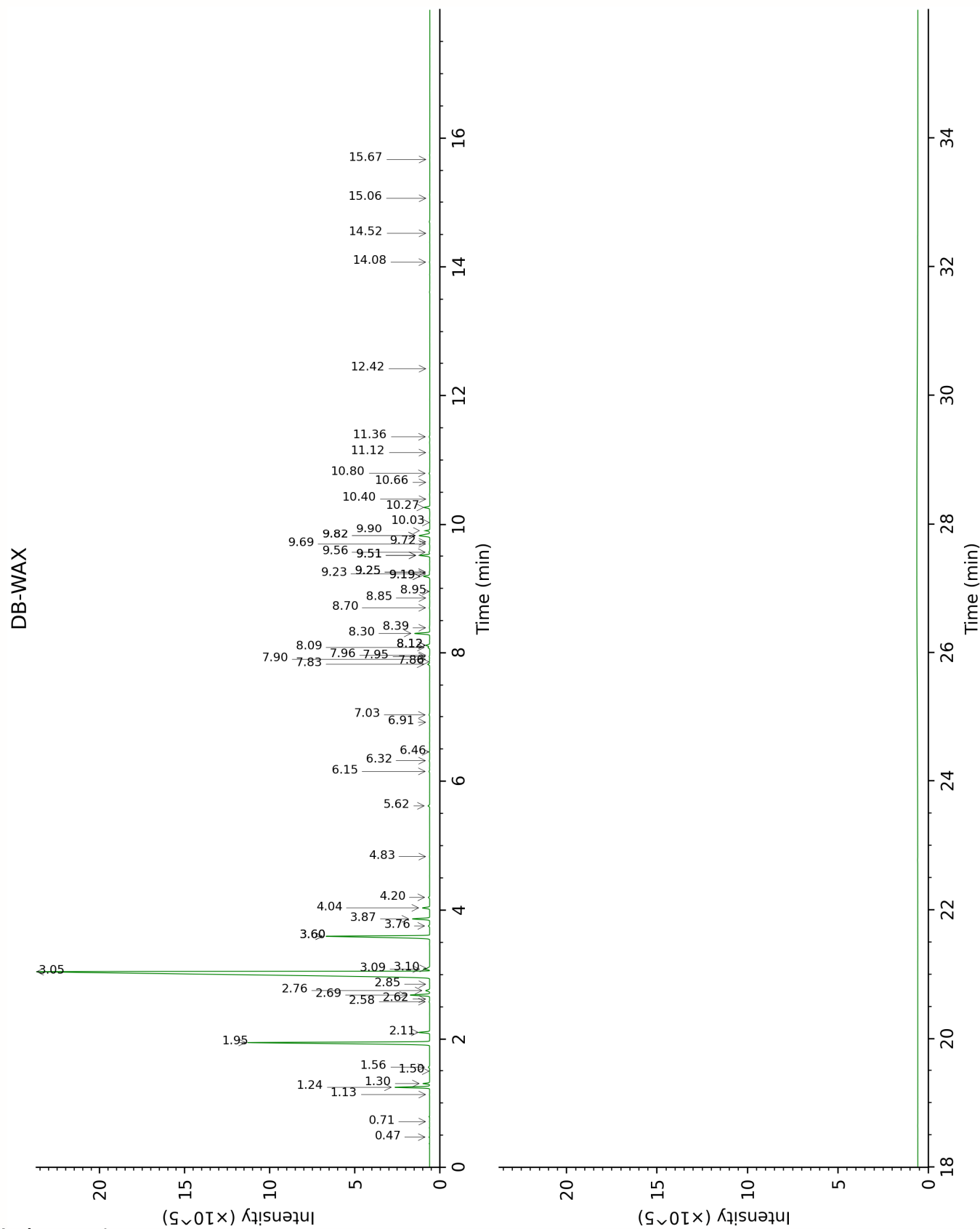
Note: no correction factor was applied

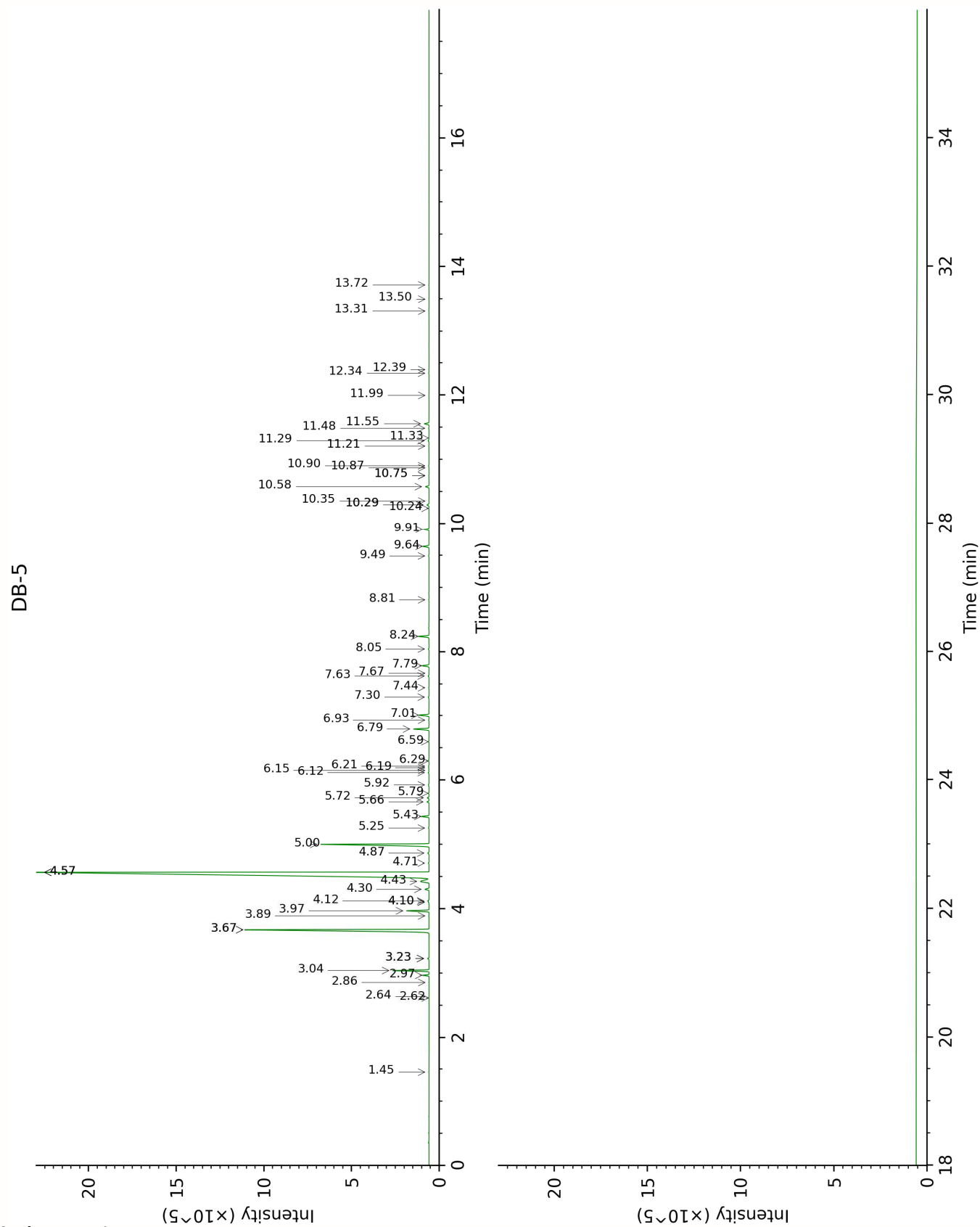
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Octane	Column DB-WAX			Column DB-5		
	0.47	785.9	0.02	1.45	803.2	0.01
Nonane	0.71	891.4	0.01	2.62	901.8	tr
Heptanal	2.85	1147.5	tr	2.64	903.4	0.01
Tricyclene	1.13	970.3	0.01	2.86	918.3	0.01
α -Thujene	1.30	1000.1	0.36	2.97	925.8	0.36
α -Pinene	1.24	990.2	1.98	3.04	930.7	1.97
Camphene	1.56	1026.5	0.08	3.23*	943.2	[0.09]
α -Fenchene	1.50	1020.1	0.01	3.23*	943.2	[0.09]
β -Pinene	1.95	1067.3	14.74	3.68*	973.1	[15.43]
Sabinene	2.11	1083.7	0.68	3.68*	973.1	[15.43]
6-Methyl-5-hepten-2-one	4.83	1299.4	0.01	3.89	987.6	0.02
Myrcene	2.69	1134.0	1.32	3.97	992.9	1.33
Pseudolimonene	2.62	1128.9	0.01	4.10*	1002.0	[0.04]
α -Phellandrene	2.58	1125.7	0.04	4.10*	1002.0	[0.04]
Octanal	4.20	1252.1	0.08	4.12	1003.1	0.08
α -Terpinene	2.76	1139.6	0.29	4.30	1014.7	0.29
<i>para</i> -Cymene	3.87	1227.3	1.14	4.43	1022.5	1.11
Limonene	3.05	1163.2	63.45	4.57*	1031.4	[64.08]
1,8-Cineole	3.10	1167.3	0.13	4.57*	1031.4	[64.08]
β -Phellandrene	3.09	1166.4	0.34	4.57*	1031.4	[64.08]
(Z)- β -Ocimene	3.60*	1207.2	[8.47]	4.71	1040.5	0.04
(E)- β -Ocimene	3.76	1219.1	0.08	4.87	1050.4	0.08
γ -Terpinene	3.60*	1207.2	[8.47]	5.00	1059.0	8.45
Octanol	7.94	1528.4	0.04	5.25	1075.1	0.04
Terpinolene	4.04	1239.9	0.48	5.43	1086.6	0.48
Linalool	7.83	1519.2	0.13	5.66	1101.0	0.13
Nonanal	5.62	1354.8	0.11	5.72	1105.1	0.11
endo-Fenchol	8.09†	1539.4	0.12	5.79	1109.6	0.04
<i>trans-para</i> -Mentha-2,8-dien-1-ol	8.70	1587.4	0.04	5.92	1118.1	0.06
<i>cis</i> -Limonene oxide	6.15	1393.6	0.04	6.12	1130.4	0.05
<i>cis-para</i> -Mentha-2,8-dien-1-ol	9.23	1629.7	0.02	6.15	1132.7	0.02
<i>trans</i> -Limonene oxide	6.32	1405.7	0.03	6.19	1135.3	0.03
Camphor	6.91	1450.2	0.01	6.22	1136.9	0.03
Epoxyterpinolene	6.46	1415.9	0.02	6.30	1142.1	0.02
Borneol	9.51*	1653.1	[0.72]	6.60	1161.7	0.03
Terpinen-4-ol	8.30	1556.5	1.05	6.79	1174.5	1.04
Isogeranial	7.90	1525.1	0.03	6.93	1183.5	0.03

α -Terpineol	9.51*	1653.1	[0.72]	7.01	1188.6	0.70
Decanal	7.03	1458.8	0.06	7.30	1207.6	0.05
<i>trans</i> -Carveol	11.12	1787.9	0.02	7.44	1217.5	0.03
Nerol	10.80	1760.5	0.05	7.63	1230.0	0.06
2,3-Epoxygeranial?				7.67	1232.9	0.02
Neral	9.19*	1626.7	[0.49]	7.79	1241.0	0.48
Geraniol	11.36	1809.3	0.05	8.05	1258.7	0.04
Geranial	9.82*	1678.1	[1.05]	8.24	1272.2	0.72
Undecanal	8.39	1563.2	0.03	8.81	1307.2	0.02
Citronellyl acetate	9.19*	1626.7	[0.49]	9.49	1355.8	0.04
Neryl acetate	9.90	1684.9	0.42	9.64	1366.4	0.42
Geranyl acetate	10.27	1715.4	0.40	9.91	1385.7	0.41
Dodecanal	9.69	1667.7	0.03	10.24	1409.4	0.02
<i>cis</i> - α -Bergamotene	7.96	1529.9	tr	10.29*	1413.5	[0.16]
β -Caryophyllene	8.12*†	1542.0	[0.29]	10.29*	1413.5	[0.16]
α -Santalene	7.86	1522.1	0.03	10.35	1417.9	0.01
<i>trans</i> - α -Bergamotene	8.12*†	1542.0	[0.29]	10.58	1434.7	0.26
Neryl propionate	10.66	1748.6	0.01	10.75*	1447.6	[0.02]
α -Humulene	8.95	1607.5	0.01	10.75*	1447.6	[0.02]
β -Santalene	8.85	1599.2	0.02	10.87	1456.6	0.01
(<i>E</i>)- β -Farnesene	9.25*	1631.9	[0.04]	10.90	1459.0	0.03
<i>trans</i> - β -Bergamotene	9.25*	1631.9	[0.04]	11.21	1482.0	0.02
Valencene	9.56	1657.1	0.07	11.29	1488.2	0.07
Bicyclogermacrene	9.72	1670.3	0.02	11.33	1491.4	0.02
(<i>Z</i>)- α -Bisabolene	10.03	1695.6	0.01	11.48	1502.8	0.03
β -Bisabolene	9.82*	1678.1	[1.05]	11.56	1508.2	0.33
(<i>E</i>)- α -Bisabolene	10.40	1726.4	0.01	12.00	1543.0	0.01
Spathulenol	14.08	2060.3	0.03	12.34	1570.2	0.03
Caryophyllene oxide	12.42	1903.7	0.02	12.40	1574.6	0.02
Unknown CILI I [m/z 94, 43 (89), 41 (67), 122 (46), 69 (41)...222]	14.52	2103.7	0.01	13.31	1649.3	0.03
Unknown CILI II [m/z 69, 95 (100), 41 (89), 109 (68), 67 (61)...222]	15.67	2220.8	0.01	13.50	1664.6	0.01
α -Bisabolol	15.06	2158.3	0.01	13.72	1682.8	0.02
Total reported		99.25%			99.59%	

*: 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