

Date : 2025-09-04

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25H20-PTH07

Customer Identification : Lime Steam Distilled - Mexico - LL0113R

Type : Essential Oil

Source : *Citrus aurantifolia* ct. Distilled

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 : 2025-09-04

PHYSICOCHEMICAL DATA

Refractive index : 1.476 ± 0.0003 (20 °C)

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

Analyst : Kassandra Baker

Date : 2025-08-21

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
Toluene	tr	Simple phenolic
4,5-Dihydrotoluene	0.05	Alkene
3-Methylenecyclohexadiene	0.01	Alkene
Cyclofenchene	tr	Monoterpene
Bornylene	0.01	Monoterpene
Nonane	0.01	Alkane
Tricyclene	0.02	Monoterpene
α -Thujene	0.02	Monoterpene
α -Pinene	1.08	Monoterpene
β -Fenchene?	tr	Monoterpene
α -Fenchene	0.14	Monoterpene
Camphene	0.35	Monoterpene
1,4-Dimethyl-4-vinylcyclohexene?	0.01	Monoterpene
Unknown	0.02	Monoterpene
β -Pinene	2.84	Monoterpene
Sabinene	0.30	Monoterpene
Geranic oxide	0.14	Monoterpenic ether
3-Methyl-3-cyclohexenone	0.03	Aliphatic ketone
6-Methyl-5-hepten-2-one	0.01	Aliphatic ketone
Dehydro-1,8-cineole	0.01	Monoterpenic ether
<i>trans</i> -Dehydroxylinalool oxide	0.04	Monoterpenic ether
Myrcene	1.44	Monoterpene
α -Phellandrene	0.27	Monoterpene
Pseudolimonene	0.06	Monoterpene
Menthatriene isomer I	0.03	Monoterpene
Octanal	0.02	Aliphatic aldehyde
Δ^3 -Carene	0.03	Monoterpene
α -Terpinene	2.00	Monoterpene
1,4-Cineole	1.44	Monoterpenic ether
<i>para</i> -Cymene	2.03	Monoterpene
β -Phellandrene	0.26	Monoterpene
Limonene	46.25	Monoterpene
1,8-Cineole	1.19	Monoterpenic ether
(Z?)-Citroside	0.01	Monoterpenic ether
(Z)- β -Ocimene	0.14	Monoterpene
(E?)-Citroside	0.16	Monoterpenic ether
(E)- β -Ocimene	0.35	Monoterpene
γ -Terpinene	13.40	Monoterpene
<i>para</i> -Mentha-3,8-diene	0.02	Monoterpene
Unknown	0.03	Oxygenated monoterpene

<i>cis</i> -Linalool oxide (fur.)	0.03	Monoterpenic alcohol
Octanol	0.01	Aliphatic alcohol
Terpinolene isomer	0.15	Monoterpene
<i>para</i> -Cymenene	0.15	Monoterpene
Terpinolene	10.95	Monoterpene
Linalool	0.16	Monoterpenic alcohol
Nonanal	0.01	Aliphatic aldehyde
Unknown	0.03	Oxygenated monoterpene
endo-Fenchol	0.63	Monoterpenic alcohol
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
Myrcenol	0.01	Monoterpenic alcohol
Limona ketone	0.01	Normonoterpenic ketone
<i>cis</i> -Limonene oxide	0.01	Monoterpenic ether
allo-Ocimene	0.01	Monoterpene
<i>trans</i> -Limonene oxide	tr	Monoterpenic ether
1-Terpineol	0.23	Monoterpenic alcohol
Epoxyterpinolene	0.01	Monoterpenic ether
<i>cis</i> - β -Terpineol	0.35	Monoterpenic alcohol
Unknown	0.07	Unknown
Isoborneol	0.03	Monoterpenic alcohol
Borneol	0.77	Monoterpenic alcohol
<i>trans</i> - β -Terpineol	0.06	Monoterpenic alcohol
Terpinen-4-ol	0.15	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.05	Monoterpenic alcohol
α -Terpineol	6.62	Monoterpenic alcohol
γ -Terpineol	0.69	Monoterpenic alcohol
Decanal	0.02	Aliphatic aldehyde
<i>trans</i> -Carveol	0.01	Monoterpenic alcohol
2,3-Epoxyneral?	0.01	Monoterpenic aldehyde
Nerol	0.01	Monoterpenic alcohol
<i>cis</i> -Carveol	tr	Monoterpenic alcohol
Unknown	0.03	Oxygenated monoterpene
Neral	0.23	Monoterpenic aldehyde
Geraniol	0.03	Monoterpenic alcohol
<i>trans</i> -Ascaridole glycol	0.02	Monoterpenic alcohol
Geranial	0.36	Monoterpenic aldehyde
Unknown	0.01	Unknown
Unknown	0.02	Oxygenated monoterpene
<i>cis</i> -Ascaridole glycol	0.02	Monoterpenic alcohol
Unknown	0.05	Unknown
Unknown	0.01	Monoterpenic alcohol
δ -Elemene	0.02	Sesquiterpene
Citronellyl acetate	0.01	Monoterpenic ester
Neryl acetate	0.10	Monoterpenic ester
7-Cubebene	0.01	Sesquiterpene

Geranyl acetate	0.16	Monoterpenic ester
β-Elementene	0.02	Sesquiterpene
Dodecanal	0.05	Aliphatic aldehyde
β-Caryophyllene	0.74	Sesquiterpene
α-Santalene	[0.04]	Sesquiterpene
cis-α-Bergamotene	[0.04]	Sesquiterpene
γ-Elementene	tr	Sesquiterpene
trans-α-Bergamotene	0.63	Sesquiterpene
α-Humulene	0.01	Sesquiterpene
β-Santalene	0.03	Sesquiterpene
(E)-β-Farnesene	0.09	Sesquiterpene
Selina-4,11-diene	0.01	Sesquiterpene
Germacrene D	0.01	Sesquiterpene
β-Selinene	0.07	Sesquiterpene
δ-Selinene	0.02	Sesquiterpene
α-Selinene	0.01	Sesquiterpene
(3E,6E)-α-Farnesene	0.04	Sesquiterpene
β-Curcumene	0.01	Sesquiterpene
β-Bisabolene	1.23	Sesquiterpene
(Z)-γ-Bisabolene	0.01	Sesquiterpene
δ-Cadinene	0.08	Sesquiterpene
Selina-4(15),7(11)-diene	0.04	Sesquiterpene
Selina-4,7(11)-diene	0.01	Sesquiterpene
Selina-3,7(11)-diene	0.01	Sesquiterpene
(E)-α-Bisabolene	0.02	Sesquiterpene
Germacrene B	0.01	Sesquiterpene
Caryophyllene oxide	0.02	Sesquiterpenic ether
Consolidated total	99.75	

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

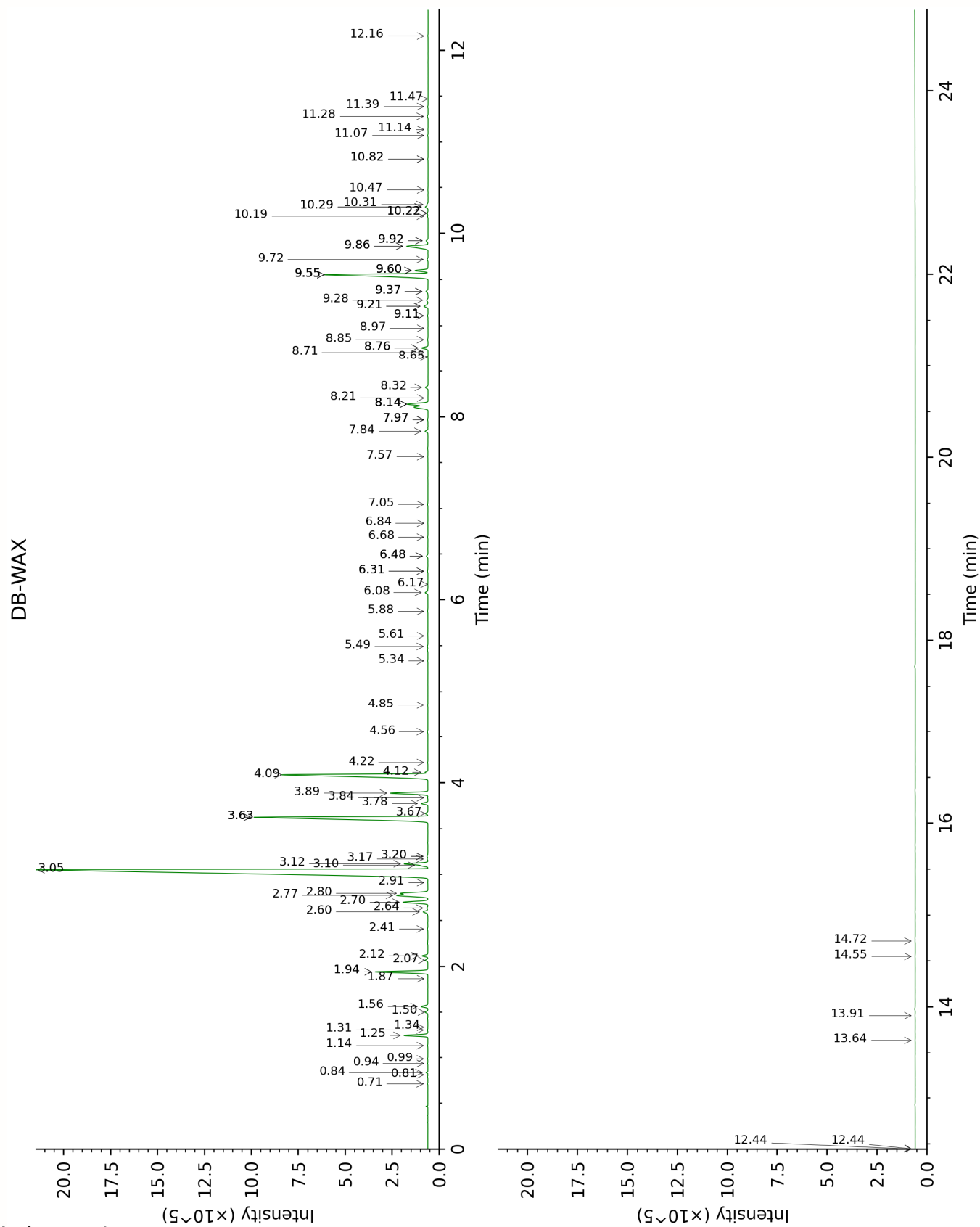
Note: no correction factor was applied

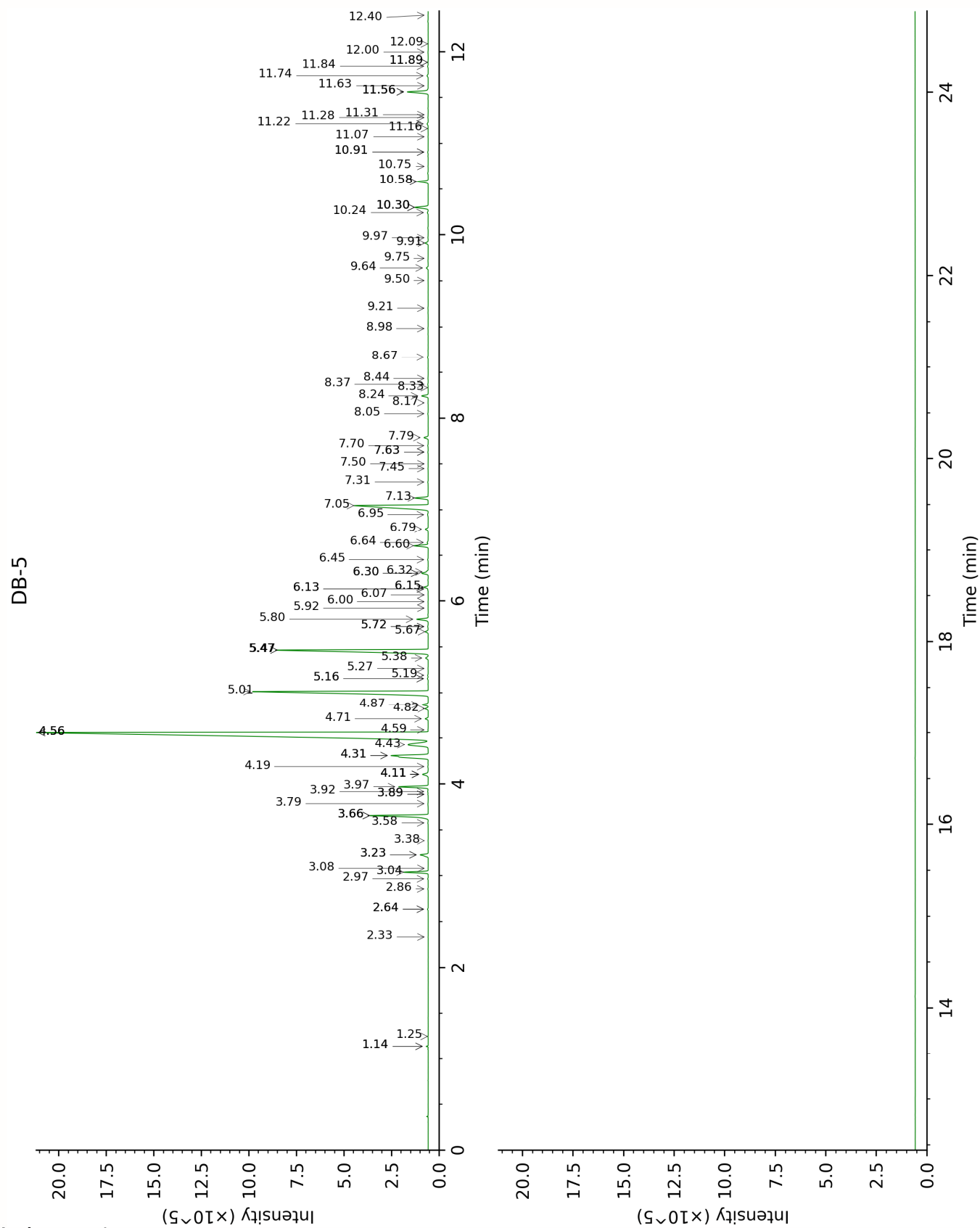
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

Toluene	Column DB-WAX			Column DB-5		
	1.34	1002.5	tr	1.14*	757.1	[0.05]
4,5-Dihydrotoluene	0.84	915.4	0.05	1.14*	757.1	[0.05]
3-Methylenecyclohexadiene	0.94	933.2	0.01	1.25	772.8	0.01
Cyclofenchene	0.81	911.0	tr	2.33	877.5	tr
Bornylene	0.99	942.2	0.01	2.64*	903.1	[0.03]
Nonane	0.72	888.8	0.01	2.64*	903.1	[0.03]
Tricyclene	1.14	969.5	0.02	2.86	918.1	0.02
α -Thujene	1.31	999.2	0.02	2.97	925.5	0.02
α -Pinene	1.25	989.6	1.09	3.04	930.4	1.08
β -Fenchene?				3.08	933.1	tr
α -Fenchene	1.50	1019.8	0.14	3.23*	943.0	[0.50]
Camphene	1.56	1026.1	0.35	3.23*	943.0	[0.50]
1,4-Dimethyl-4-vinylcyclohexene?	1.87	1057.7	0.01	3.38	953.4	0.01
Unknown CIAU I [m/z 93, 91 (60), 121 (55), 136 (42), 79 (40)]	1.94*	1065.6	[2.87]	3.58	966.3	0.02
β -Pinene	1.94*	1065.6	[2.87]	3.66*	971.7	[3.27]
Sabinene	2.12	1083.8	0.30	3.66*	971.7	[3.27]
Geranic oxide	2.07	1078.8	0.14	3.66*	971.7	[3.27]
3-Methyl-3-cyclohexenone	5.88	1372.0	0.02	3.79	980.4	0.03
6-Methyl-5-hepten-2-one	4.85	1296.9	0.01	3.89*	987.3	[0.02]
Dehydro-1,8-cineole	2.91	1151.4	0.01	3.89*	987.3	[0.02]
<i>trans</i> -Dehydroxylinalool oxide	3.20*	1174.3	[0.05]	3.92	989.3	0.04
Myrcene	2.70	1134.2	1.43	3.97	992.8	1.44
α -Phellandrene	2.60	1125.7	0.27	4.11*	1001.9	[0.38]
Pseudolimonene	2.64	1129.1	0.06	4.11*	1001.9	[0.38]
Menthatriene isomer I	3.17	1171.9	0.03	4.11*	1001.9	[0.38]
Octanal	4.22	1251.1	0.02	4.11*	1001.9	[0.38]
Δ^3 -Carene	2.41	1110.8	0.03	4.19	1007.4	0.03
α -Terpinene	2.78	1140.2	2.00	4.31*	1015.0	[3.41]
1,4-Cineole	2.80	1141.9	1.44	4.31*	1015.0	[3.41]
<i>para</i> -Cymene	3.89	1226.8	2.00	4.43	1022.6	2.03
β -Phellandrene	3.10	1166.6	0.26	4.56*	1030.9	[47.67]
Limonene	3.05	1162.6	46.25	4.56*	1030.9	[47.67]
1,8-Cineole	3.12	1167.8	1.19	4.56*	1030.9	[47.67]
(Z?)-Citroside	3.20*	1174.3	[0.05]	4.59	1032.7	0.01
(Z)- β -Ocimene	3.63*	1207.6	[13.58]	4.71	1040.4	0.14
(E?)-Citroside	3.67	1210.6	0.13	4.82	1047.5	0.16
(E)- β -Ocimene	3.78	1218.6	0.34	4.87	1050.4	0.35

γ -Terpinene	3.63*	1207.6	[13.58]	5.02	1059.7	13.40
<i>para</i> -Mentha-3,8-diene	3.84	1223.1	0.02	5.16*	1068.6	[0.04]
Unknown PIMA I [m/z 79, 93 (60), 43 (40), 94 (35), 137 (33), 77 (26), 91 (20), 152 (18)]	4.56	1275.7	0.03	5.16*	1068.6	[0.04]
<i>cis</i> -Linalool oxide (fur.)	6.31*	1403.8	[0.03]	5.19	1070.9	0.03
Octanol	7.97*	1528.7	[0.03]	5.27	1075.6	0.01
Terpinolene isomer	4.12	1243.4	0.11	5.38	1082.9	0.15
<i>para</i> -Cymenene	6.08	1386.9	0.15	5.47*	1088.4	[11.11]
Terpinolene	4.09	1241.4	10.95	5.47*	1088.4	[11.11]
Linalool	7.84	1518.9	0.15	5.67	1101.1	0.16
Nonanal	5.61	1352.7	0.01	5.72*	1104.6	[0.03]
Unknown CEDE I [m/z 95, 150 (45), 110 (35), 107 (23), 109 (21)]	5.49	1344.4	0.03	5.72*	1104.6	[0.03]
<i>endo</i> -Fenchol	8.14*	1542.0	[2.23]	5.80	1109.8	0.63
<i>trans-para</i> -Mentha-2,8-dien-1-ol	8.71	1586.2	0.01	5.92	1117.6	0.01
Myrcenol	8.65	1582.1	0.01	6.00	1122.2	0.01
Limona ketone	7.57	1497.4	0.01	6.07	1126.9	0.01
<i>cis</i> -Limonene oxide	6.17	1393.4	0.01	6.13*	1131.1	[0.02]
allo-Ocimene	5.34	1333.1	0.01	6.13*	1131.1	[0.02]
<i>trans</i> -Limonene oxide	6.31*	1403.8	[0.03]	6.15*	1132.4	[0.23]
1-Terpineol	8.14*	1542.0	[2.23]	6.15*	1132.4	[0.23]
Epoxyterpinolene	6.48*	1416.2	[0.09]	6.30*	1142.2	[0.36]
<i>cis</i> - β -Terpineol	8.76*	1590.2	[0.35]	6.30*	1142.2	[0.36]
Unknown MEAL II [m/z 109, 124 (45), 119 (41), 43 (35), 91 (28), 95 (25)...]	6.48*	1416.2	[0.09]	6.32	1143.1	0.07
Isoborneol	9.11*	1618.2	[0.03]	6.45	1151.8	0.03
Borneol	9.55*	1654.6	[7.31]	6.60	1161.6	0.77
<i>trans</i> - β -Terpineol	9.37*	1639.7	[0.14]	6.64	1163.9	0.06
Terpinen-4-ol	8.32	1556.2	0.15	6.79	1173.7	0.15
<i>para</i> -Cymen-8-ol	11.28	1799.9	0.05	6.95	1183.9	0.05
α -Terpineol	9.55*	1654.6	[7.31]	7.05	1190.4	6.62
γ -Terpineol	9.60*	1658.2	[0.71]	7.13	1195.8	0.69
Decanal	7.05	1458.7	0.03	7.31	1207.1	0.02
<i>trans</i> -Carveol	11.14	1787.6	0.01	7.45	1217.0	0.01
2,3-Epoxyneral?				7.50	1220.5	0.01
Nerol	10.82*	1760.1	[0.02]	7.63*	1229.2	[0.02]
<i>cis</i> -Carveol	11.47	1816.8	tr	7.63*	1229.2	[0.02]
Unknown CIAU II [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	11.07	1782.0	0.02	7.70	1233.9	0.03

Neral	9.21*	1626.7	[0.27]	7.79	1239.9	0.23
Geraniol	11.39	1809.4	0.02	8.05	1257.5	0.03
<i>trans</i> -Ascaridole glycol	13.91	2041.6	0.01	8.17	1265.5	0.02
Geranial	9.86*	1679.6	[1.59]	8.24	1270.6	0.36
Unknown CIAU IV [m/z 43, 79 (78), 128 (46), 58 (42), 127 (42)...]	12.44*	1903.7	[tr]	8.33	1276.7	0.01
Unknown CIAU V [m/z 95, 67 (45), 41 (42), 110 (42), 43 (41), 59 (36)]	12.16	1877.9	0.02	8.37	1279.2	0.02
<i>cis</i> -Ascaridole glycol	14.55	2104.3	0.01	8.44	1283.6	0.02
Unknown CICA VI [m/z 112, 97 (93), 83 (60), 43 (46), 41 (20), 69 (19)...]	13.64	2015.5	0.01	8.67	1299.6	0.05
Unknown MEAL I [m/z 97, 112 (92), 83 (62), 43 (44), 41 (25)... 170? (4)]	14.72	2121.2	0.01	8.98	1318.3	0.01
δ -Elemene	6.68	1431.5	0.02	9.20	1334.0	0.02
Citronellyl acetate	9.21*	1626.7	[0.27]	9.50	1355.4	0.01
Neryl acetate	9.92*	1684.6	[0.11]	9.64	1365.1	0.10
7-Cubebene	6.84	1443.4	0.01	9.75	1372.6	0.01
Geranyl acetate	10.29*	1715.1	[0.17]	9.91	1384.4	0.16
β -Elemene	8.21	1547.1	0.01	9.97	1388.5	0.02
Dodecanal	9.72	1667.9	0.05	10.24	1408.2	0.05
β -Caryophyllene	8.14*	1542.0	[2.23]	10.30*	1412.5	[0.78]
α -Santalene	7.97*	1528.7	[0.03]	10.30*	1412.5	[0.78]
<i>cis</i> - α -Bergamotene	7.97*	1528.7	[0.03]	10.30*	1412.5	[0.78]
γ -Elemene	8.76*	1590.2	[0.35]	10.58*	1433.7	[0.63]
<i>trans</i> - α -Bergamotene	8.14*	1542.0	[2.23]	10.58*	1433.7	[0.63]
α -Humulene	8.97	1607.2	0.01	10.75	1446.4	0.01
β -Santalene	8.85	1597.1	0.03	10.91*	1458.1	[0.03]
(<i>E</i>)- β -Farnesene	9.28	1632.0	0.09	10.91*	1458.1	[0.03]
Selina-4,11-diene	9.11*	1618.2	[0.03]	11.08	1470.6	0.01
Germacrene D	9.55*	1654.6	[7.31]	11.16	1477.3	0.01
β -Selinene	9.55*	1654.6	[7.31]	11.22	1481.2	0.07
δ -Selinene	9.37*	1639.7	[0.14]	11.28	1486.3	0.02
α -Selinene	9.60*	1658.2	[0.71]	11.32	1488.6	0.01
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	10.22*	1709.4	[0.05]	11.56*	1507.5	[1.28]
β -Curcumene	9.92*	1684.6	[0.11]	11.56*	1507.5	[1.28]
β -Bisabolene	9.86*	1679.6	[1.59]	11.56*	1507.5	[1.28]
(<i>Z</i>)- γ -Bisabolene	9.60*	1658.2	[0.71]	11.63	1512.7	0.01
δ -Cadinene	10.19	1706.6	0.03	11.74	1521.3	0.08
Selina-4(15),7(11)-diene	10.32	1717.4	0.06	11.84	1529.5	0.04
Selina-4,7(11)-diene	10.22*	1709.4	[0.05]	11.89*	1532.9	[0.02]
Selina-3,7(11)-diene	10.29*	1715.1	[0.17]	11.89*	1532.9	[0.02]

(E)- α -Bisabolene	10.47	1730.9	0.02	12.00	1541.7	0.02
Germacrene B	10.82*	1760.1	[0.02]	12.09	1548.8	0.01
Caryophyllene oxide	12.44*	1903.7	[tr]	12.40	1573.7	0.02
Total reported		99.45%			99.61%	

*: 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