

Date : 2024-12-03

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24K20-PTH01

Customer Identification : Persian Lime - Mexico - PW0103R

Type : Essential Oil

Source : *Citrus latifolia*

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

Date : 2024-12-02

PHYSICOCHEMICAL DATA

Refractive index : 1.4866 ± 0.0003 (20 °C)

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

Analyst : Dany Massé B. Sc. Chimiste

Date : 2024-11-20

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	tr	Alkane
Tricyclene	0.01	Monoterpene
α -Thujene	0.44	Monoterpene
α -Pinene	1.80	Monoterpene
α -Fenchene	tr	Monoterpene
Camphene	0.06	Monoterpene
Thuja-2,4(10)-diene	0.02	Monoterpene
Sabinene	1.85	Monoterpene
β -Pinene	10.83	Monoterpene
6-Methyl-5-hepten-2-one	0.08	Aliphatic ketone
Myrcene	1.40	Monoterpene
Octanal	0.01	Aliphatic aldehyde
α -Phellandrene	0.05	Monoterpene
Δ^3 -Carene	0.01	Monoterpene
α -Terpinene	0.23	Monoterpene
<i>para</i> -Cymene	0.26	Monoterpene
Limonene	52.79	Monoterpene
β -Phellandrene	0.54	Monoterpene
(<i>Z</i>)- β -Ocimene	0.07	Monoterpene
(<i>E</i>)- β -Ocimene	0.14	Monoterpene
γ -Terpinene	11.16	Monoterpene
<i>cis</i> -Sabinene hydrate	0.06	Monoterpenic alcohol
Terpinolene	0.55	Monoterpene
<i>trans</i> -Sabinene hydrate	0.06	Monoterpenic alcohol
Nonanal	0.01	Aliphatic aldehyde
Linalool	0.24	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.01	Monoterpenic ether
Epoxyterpinolene	0.01	Monoterpenic ether
Citronellal	0.06	Monoterpenic aldehyde
Borneol	0.03	Monoterpenic alcohol
Isoneral	0.01	Monoterpenic aldehyde
Isopinocampone	0.01	Monoterpenic ketone
Terpinen-4-ol	0.10	Monoterpenic alcohol
Isogeranial	0.02	Monoterpenic aldehyde
α -Terpineol	0.38	Monoterpenic alcohol
γ -Terpineol	0.02	Monoterpenic alcohol
Decanal	0.07	Aliphatic aldehyde
2,3-Epoxyneral?	0.03	Monoterpenic aldehyde
Nerol	0.44	Monoterpenic alcohol
2,3-Epoxygeranial?	0.10	Monoterpenic aldehyde

Unknown	0.01	Oxygenated monoterpene
Neral	1.57	Monoterpenic aldehyde
Geraniol	0.31	Monoterpenic alcohol
Unknown	0.01	Unknown
Geranial	2.49	Monoterpenic aldehyde
Unknown	0.02	Oxygenated monoterpene
Undecanal	0.02	Aliphatic aldehyde
<i>para</i> -Mentha-1,8-diene-4-hydroperoxide	0.01	Monoterpenic peroxide
δ -Elemene	0.15	Sesquiterpene
Citronellyl acetate	0.03	Monoterpenic ester
Neryl acetate	1.39	Monoterpenic ester
Geranyl acetate	0.32	Monoterpenic ester
β -Elemene	0.14	Sesquiterpene
Dodecanal	0.05	Aliphatic aldehyde
β -Caryophyllene	0.94	Sesquiterpene
<i>cis</i> - α -Bergamotene	0.09	Sesquiterpene
α -Santalene	0.03	Sesquiterpene
γ -Elemene	0.02	Sesquiterpene
<i>trans</i> - α -Bergamotene	1.30	Sesquiterpene
α -Humulene	0.10	Sesquiterpene
β -Santalene	0.06	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.15	Sesquiterpene
Germacrene D	0.11	Sesquiterpene
γ -Curcumene	0.04	Sesquiterpene
<i>trans</i> - β -Bergamotene	0.09	Sesquiterpene
α -Selinene	0.05	Sesquiterpene
Bicyclogermacrene	0.01	Sesquiterpene
(3 <i>Z</i> ,6 <i>E</i>)- α -Farnesene	0.13	Sesquiterpene
(<i>Z</i>)- α -Bisabolene	0.18	Sesquiterpene
β -Bisabolene	1.93	Sesquiterpene
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	0.24	Sesquiterpene
(<i>Z</i>)- γ -Bisabolene	0.04	Sesquiterpene
δ -Cadinene	0.01	Sesquiterpene
Selina-4(15),7(11)-diene	0.02	Sesquiterpene
(<i>E</i>)- α -Bisabolene	0.07	Sesquiterpene
Germacrene B	0.22	Sesquiterpene
Caryophyllenyl alcohol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
10- <i>epi</i> - γ -Eudesmol	0.01	Sesquiterpenic alcohol
Tetradecanal	0.03	Aliphatic aldehyde
Alismol	0.04	Sesquiterpenic alcohol
Unknown	0.03	Sesquiterpenic alcohol
Unknown	0.07	Oxygenated sesquiterpene
Unknown	0.07	Oxygenated sesquiterpene
α -Bisabolol	0.11	Sesquiterpenic alcohol

Herniarin	0.33	Coumarin
(2E,6E)-Farnesol	0.02	Sesquiterpenic alcohol
(2E,6E)-Farnesal	0.02	Sesquiterpenic aldehyde
Myristic acid	0.01	Aliphatic acid
Citropten	0.42	Furanocoumarin
Palmitic acid	0.07	Aliphatic acid
Bergapten	0.20	Furanocoumarin
Linoleic acid	0.04	Aliphatic acid
Oleic acid	0.03	Aliphatic acid
<i>cis</i> -Vaccenic acid?	0.03	Aliphatic acid
Stearic acid	0.04	Aliphatic acid
Isopimpinellin	0.19	Furanocoumarin
Heraclenin	0.27	Furanocoumarin
Consolidated total	98.36	

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

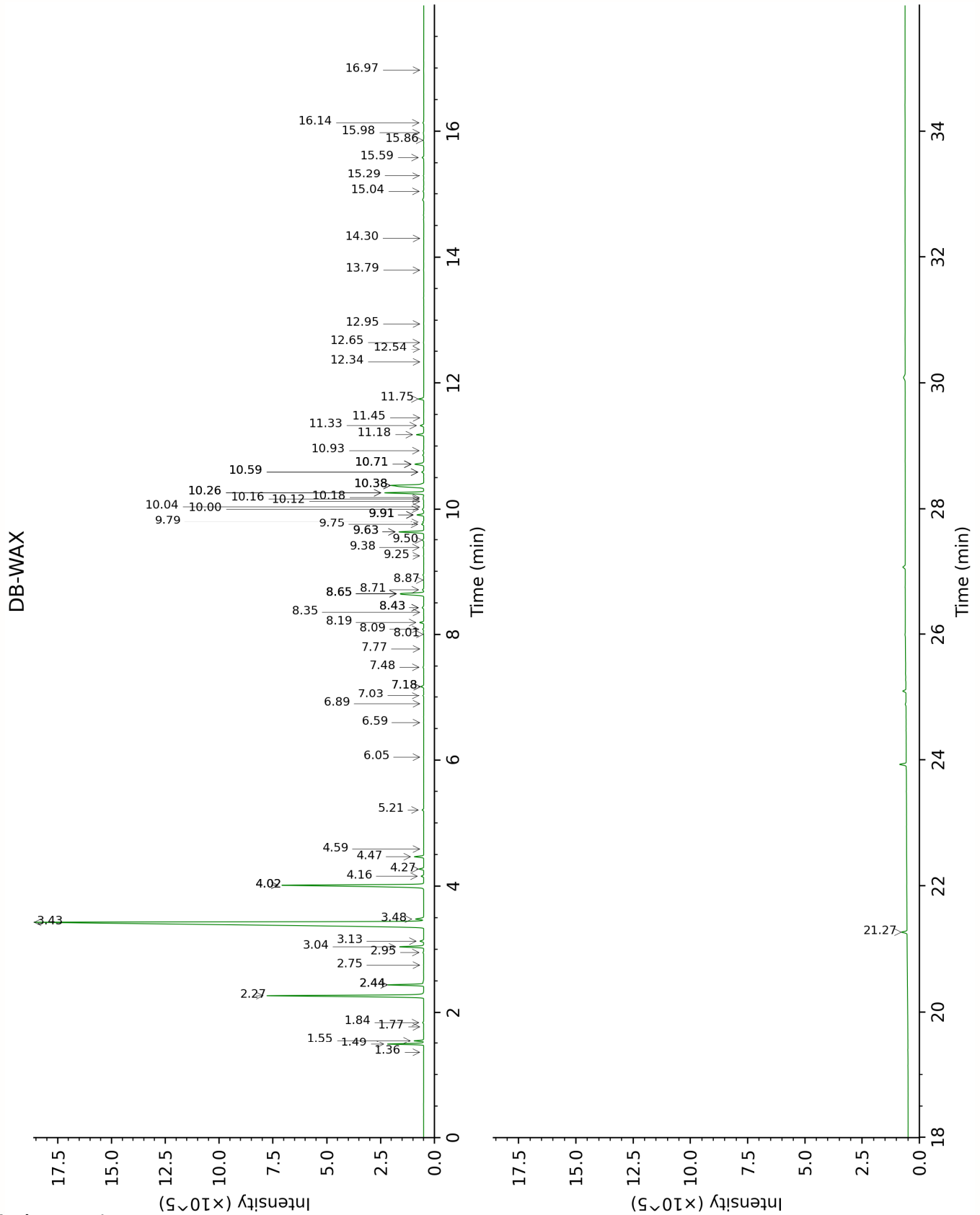
Note: no correction factor was applied

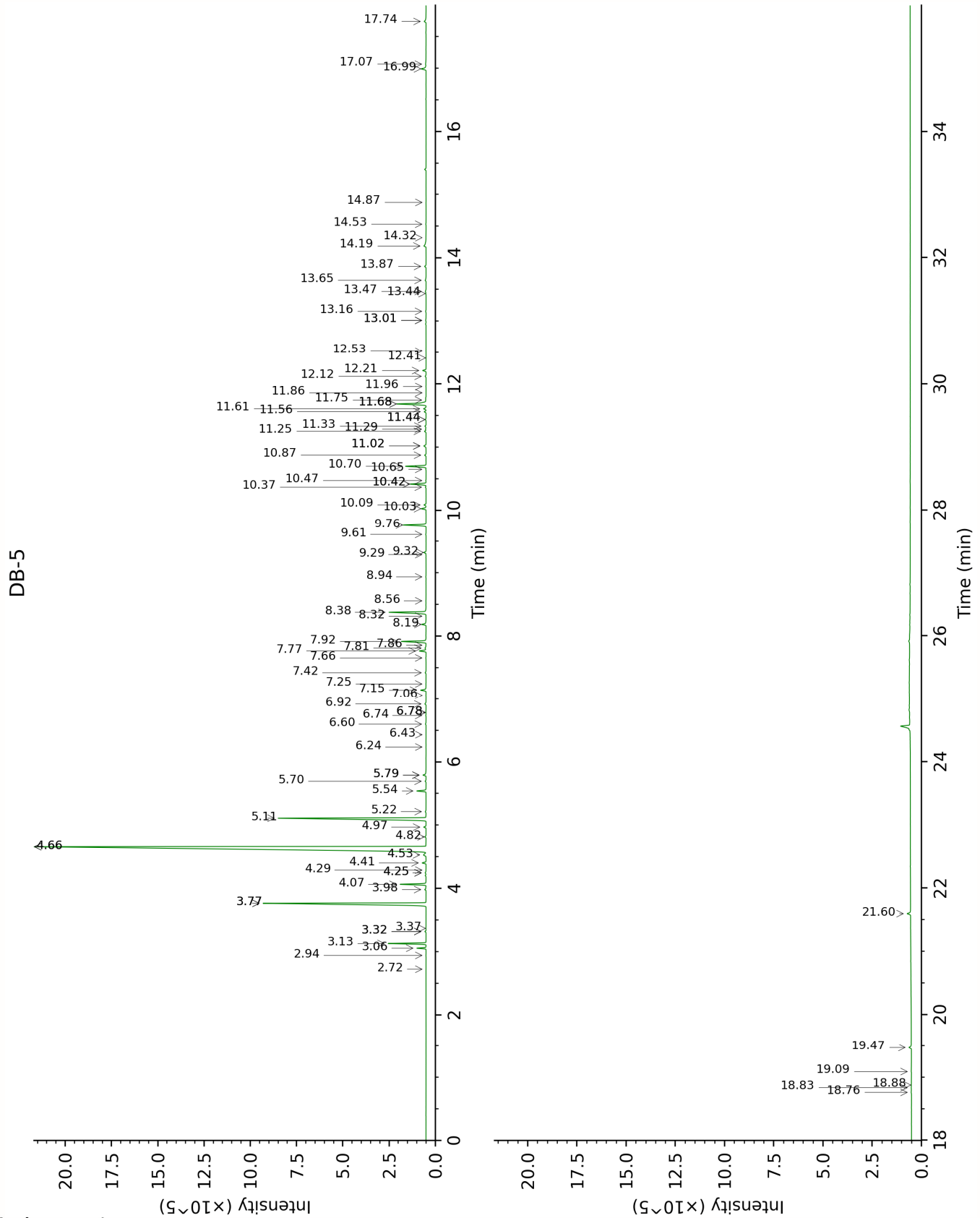
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm 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		
				2.72	904.5	tr
Tricyclene	1.36	975.1	0.01	2.94	919.0	0.01
α -Thujene	1.55	1002.4	0.46	3.06	926.6	0.44
α -Pinene	1.49	994.8	1.82	3.13	931.5	1.80
α -Fenchene	1.77	1023.3	tr	3.32*	944.0	[0.06]
Camphene	1.84	1029.6	0.06	3.32*	944.0	[0.06]
Thuja-2,4(10)-diene	2.44*	1086.7	[1.98]	3.37	947.3	0.02
Sabinene	2.44*	1086.7	[1.98]	3.77*	973.6	[12.68]
β -Pinene	2.27	1070.3	10.83	3.77*	973.6	[12.68]
6-Methyl-5-hepten-2-one	5.21	1302.0	0.10	3.98	988.0	0.08
Myrcene	3.04	1136.1	1.42	4.07	993.5	1.40
Octanal	4.59	1255.2	0.01	4.25*	1005.4	[0.07]
α -Phellandrene	2.95	1129.0	0.05	4.25*	1005.4	[0.07]
Δ^3 -Carene	2.75	1113.4	0.01	4.29	1008.1	0.01
α -Terpinene	3.13	1143.0	0.24	4.40	1015.3	0.23
<i>para</i> -Cymene	4.27	1231.4	0.28	4.53	1023.3	0.26
Limonene	3.43	1166.5	52.79	4.66*	1031.4	[52.83]
β -Phellandrene	3.48	1170.5	0.54	4.66*	1031.4	[52.83]
(<i>Z</i>)- β -Ocimene	4.02*	1212.3	[11.35]	4.82	1041.1	0.07
(<i>E</i>)- β -Ocimene	4.16	1222.9	0.15	4.97	1050.8	0.14
γ -Terpinene	4.02*	1212.3	[11.35]	5.11	1059.7	11.16
<i>cis</i> -Sabinene hydrate	7.03	1425.8	0.06	5.22	1066.2	0.06
Terpinolene	4.47	1246.0	0.56	5.54	1086.7	0.55
<i>trans</i> -Sabinene hydrate	8.09	1505.1	0.06	5.70	1096.3	0.06
Nonanal	6.05	1354.2	0.01	5.79*	1102.4	[0.25]
Linalool	8.19	1513.5	0.24	5.79*	1102.4	[0.25]
<i>cis</i> -Limonene oxide	6.59	1393.7	0.01	6.24	1130.8	0.01
Epoxyterpinolene	6.89	1415.9	tr	6.43	1143.3	0.01
Citronellal	7.18*	1437.0	[0.19]	6.60	1154.0	0.06
Borneol	9.91*	1649.3	[0.45]	6.74	1162.7	0.03
Isoneral	8.00	1498.8	0.01	6.78*	1165.7	[0.01]
Isopinocampone	7.77	1481.6	0.01	6.78*	1165.7	[0.01]
Terpinen-4-ol	8.71	1553.9	0.09	6.92	1174.4	0.10
Isogeranial	8.35	1526.0	0.01	7.06	1183.6	0.02
α -Terpineol	9.91*	1649.3	[0.45]	7.15	1188.9	0.38
γ -Terpineol	10.04	1659.6	0.01	7.24	1195.3	0.02
Decanal	7.48	1459.9	0.07	7.42	1206.7	0.07
2,3-Epoxyneral?				7.66	1222.5	0.03

Nerol	11.18	1755.2	0.49	7.77	1229.8	0.44
2,3-Epoxygeranial?				7.81	1232.8	0.10
Unknown CIAU II [m/z 137, 152 (28), 43 (25), 91 (24), 109 (23), 119 (19)]	11.45	1777.9	0.01	7.86	1235.9	0.01
Neral	9.63*	1626.5	[1.61]	7.92	1239.9	1.57
Geraniol	11.75	1803.5	0.35	8.19	1257.9	0.31
Unknown CIAU III [m/z 43, 128 (61), 79 (60), 127 (52), 58 (50)...]	12.34	1855.6	0.01	8.32	1266.7	0.01
Geranial	10.26*	1677.8	[2.51]	8.38	1270.8	2.49
Unknown CIAU V [m/z 95, 67 (45), 41 (42), 110 (42), 43 (41), 59 (36)]	12.54	1873.8	tr	8.56	1282.9	0.02
Undecanal	8.87	1565.9	0.02	8.94	1308.5	0.02
<i>para</i> -Mentha-1,8- diene-4- hydroperoxide				9.29	1333.4	0.01
δ -Elemene	7.18*	1437.0	[0.19]	9.32	1335.7	0.15
Citronellyl acetate	9.63*	1626.5	[1.61]	9.61	1356.0	0.03
Neryl acetate	10.38*	1687.3	[3.45]	9.76	1366.5	1.39
Geranyl acetate	10.71*	1715.3	[0.70]	10.03	1385.4	0.32
β -Elemene	8.65*	1548.9	[2.31]	10.09	1389.6	0.14
Dodecanal	10.16	1669.8	0.05	10.37	1409.7	0.05
β -Caryophyllene	8.65*	1548.9	[2.31]	10.42*	1413.4	[1.03]
<i>cis</i> - α -Bergamotene	8.43*	1531.7	[0.12]	10.42*	1413.4	[1.03]
α -Santalene	8.43*	1531.7	[0.12]	10.47	1417.5	0.03
γ -Elemene	9.25	1595.7	0.02	10.65	1430.8	0.02
<i>trans</i> - α - Bergamotene	8.65*	1548.9	[2.31]	10.70	1434.4	1.30
α -Humulene	9.50	1616.0	0.09	10.87	1447.4	0.10
β -Santalene	9.38	1606.3	0.06	11.02*	1458.4	[0.18]
(<i>E</i>)- β -Farnesene	9.75	1636.3	0.15	11.02*	1458.4	[0.18]
Germacrene D	10.00	1656.5	0.12	11.25	1475.6	0.11
γ -Curcumene	9.91*	1649.3	[0.45]	11.29	1478.0	0.04
<i>trans</i> - β - Bergamotene	9.79	1639.7	0.09	11.33	1481.7	0.09
α -Selinene	10.18	1671.6	0.05	11.44*	1489.4	[0.05]
Bicyclogermacrene	10.26*	1677.8	[2.51]	11.44*	1489.4	[0.05]
(3 <i>Z</i> ,6 <i>E</i>)- α - Farnesene	10.38*	1687.3	[3.45]	11.56	1498.7	0.13
(<i>Z</i>)- α -Bisabolene	10.59*	1704.7	[0.14]	11.61	1502.1	0.18

β-Bisabolene	10.38*	1687.3	[3.45]	11.68*	1508.0	[2.17]
(3E,6E)-α-Farnesene	10.71*	1715.3	[0.70]	11.68*	1508.0	[2.17]
(Z)-γ-Bisabolene	10.12	1666.7	0.02	11.75	1512.8	0.04
δ-Cadinene	10.59*	1704.7	[0.14]	11.86	1521.8	0.01
Selina-4(15),7(11)-diene	10.71*	1715.3	[0.70]	11.96	1529.6	0.02
(E)-α-Bisabolene	10.93	1733.6	0.05	12.12	1542.3	0.07
Germacrene B	11.33	1767.4	0.24	12.21	1549.5	0.22
Caryophyllenyl alcohol	13.79	1988.8	0.03	12.41	1565.3	0.01
Caryophyllene oxide	12.95	1910.3	0.01	12.52	1574.0	0.01
10-epi-γ-Eudesmol	14.30	2036.7	0.01	13.01*	1612.9	[0.05]
Tetradecanal	12.65	1883.8	0.03	13.01*	1612.9	[0.05]
Alismol	15.86	2190.7	0.04	13.16	1624.7	0.04
Unknown cadinol analog II [m/z 95, 121 (73), 43 (57), 79 (43), 161 (43), 109 (40)... 204 (35), 222 (2)]	15.29	2133.7	0.04	13.44	1647.8	0.03
Unknown CILI I [m/z 94, 43 (89), 41 (67), 122 (46), 69 (41)...222]	15.04	2108.7	0.06	13.47	1650.6	0.07
Unknown CILI II [m/z 69, 95 (100), 41 (89), 109 (68), 67 (61)...222]	16.14	2219.2	0.08	13.65	1665.1	0.07
α-Bisabolol	15.58	2163.3	0.12	13.87	1683.3	0.11
Herniarin	21.27	2802.9	0.37	14.19	1710.1	0.33
(2E,6E)-Farnesol	16.97	2306.3	0.02	14.32	1721.5	0.02
(2E,6E)-Farnesal	15.98	2203.0	0.05	14.53	1739.8	0.02
Myristic acid				14.87	1769.7	0.01
Citropten				16.99	1963.5	0.42
Palmitic acid				17.07	1970.6	0.07
Bergapten				17.74	2036.2	0.20
Linoleic acid				18.76	2138.7	0.04
Oleic acid				18.83	2146.4	0.03
cis-Vaccenic acid?				18.88	2150.8	0.03
Stearic acid				19.09	2172.9	0.04
Isopimpinellin				19.47	2212.9	0.19
Heraclenin				21.60	2449.5	0.27
Total reported		97.43%			97.85%	

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*: 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