

Date : 2025-07-15

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25G02-PTH01

Customer Identification : Organic Green Mandarin - Brazil - MI0108R

Type : Essential Oil

Source : *Citrus reticulata* cv. Mandarine

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 : 2025-07-15

PHYSICOCHEMICAL DATA

Refractive index : 1.4761 ± 0.0003 (20 °C)

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

Analyst : Alexis St-Gelais, Ph. D., Chimiste 2013-174

Date : 2025-07-03

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
α -Thujene	0.77	Monoterpene
α -Pinene	2.06	Monoterpene
Camphene	0.02	Monoterpene
α -Fenchene	tr	Monoterpene
β -Pinene	1.52	Monoterpene
Sabinene	0.25	Monoterpene
Myrcene	1.72	Monoterpene
α -Phellandrene	0.07	Monoterpene
Octanal	0.08	Aliphatic aldehyde
α -Terpinene	0.41	Monoterpene
<i>para</i> -Cymene	0.63	Monoterpene
β -Phellandrene	0.21	Monoterpene
Limonene	68.63	Monoterpene
(Z)- β -Ocimene	0.01	Monoterpene
(E)- β -Ocimene	0.03	Monoterpene
γ -Terpinene	18.82	Monoterpene
<i>cis</i> -Sabinene hydrate	0.04	Monoterpenic alcohol
Octanol	0.01	Aliphatic alcohol
<i>para</i> -Cymenene	0.01	Monoterpene
Terpinolene	0.86	Monoterpene
<i>trans</i> -Sabinene hydrate	0.06	Monoterpenic alcohol
Linalool	0.14	Monoterpenic alcohol
Nonanal	0.03	Aliphatic aldehyde
<i>trans</i> -Limonene oxide	0.01	Monoterpenic ether
Epoxyterpinolene	0.01	Monoterpenic ether
Citronellal	0.02	Monoterpenic aldehyde
Borneol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.07	Monoterpenic alcohol
<i>para</i> -Cymen-8-ol	0.01	Monoterpenic alcohol
α -Terpineol	0.20	Monoterpenic alcohol
Unknown	0.01	Unknown
Unknown	0.01	Unknown
Decanal	0.09	Aliphatic aldehyde
<i>trans</i> -Carveol	0.01	Monoterpenic alcohol
Nerol	0.01	Monoterpenic alcohol
Citronellol	0.03	Monoterpenic alcohol
Thymol methyl ether	0.01	Monoterpenic ether
Neral	0.01	Monoterpenic aldehyde
Piperitone	0.01	Monoterpenic ketone
(2E)-Decenal	0.01	Aliphatic aldehyde

Geranial	0.01	Monoterpenic aldehyde
<i>trans</i> -Ascaridole glycol	tr	Monoterpenic alcohol
Perillaldehyde	0.05	Monoterpenic aldehyde
Thymol	0.10	Monoterpenic alcohol
Undecanal	0.01	Aliphatic aldehyde
Carvacrol	0.01	Monoterpenic alcohol
<i>para</i> -Mentha-1,8-diene-4-hydroperoxide	0.01	Monoterpenic peroxide
α -Copaene	0.02	Sesquiterpene
Geranyl acetate	tr	Monoterpenic ester
β -Cubebene	0.02	Sesquiterpene
β -Elemene	0.01	Sesquiterpene
Dimethyl anthranilate	0.58	Phenolic ester
Dodecanal	0.03	Aliphatic aldehyde
β -Caryophyllene	0.16	Sesquiterpene
α -Humulene	0.02	Sesquiterpene
(2 <i>E</i>)-Dodecenal	0.02	Aliphatic aldehyde
Germacrene D	0.02	Sesquiterpene
α -Selinene	0.08	Sesquiterpene
Bicyclogermacrene	0.02	Sesquiterpene
(3 <i>E</i> ,6 <i>E</i>)- α -Farnesene	0.32	Sesquiterpene
δ -Cadinene	0.02	Sesquiterpene
Spathulenol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
Tetradecanal?	0.01	Aliphatic aldehyde
(2 <i>E</i>)-Tetradecenal	0.01	Aliphatic aldehyde
α -Sinensal	0.37	Sesquiterpenic aldehyde
Myristic acid	0.03	Aliphatic acid
Palmitic acid	0.08	Aliphatic acid
Phytol	0.02	Diterpenic alcohol
Linoleic acid	0.06	Aliphatic acid
Oleic acid	0.06	Aliphatic acid
Stearic acid	0.05	Aliphatic acid
Tangeretin	0.30	Flavonoid
3,3',4',5,6,7,8-Heptamethoxyflavone	0.05	Flavonoid
Nobiletin	0.13	Flavonoid
Consolidated total	99.59	

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

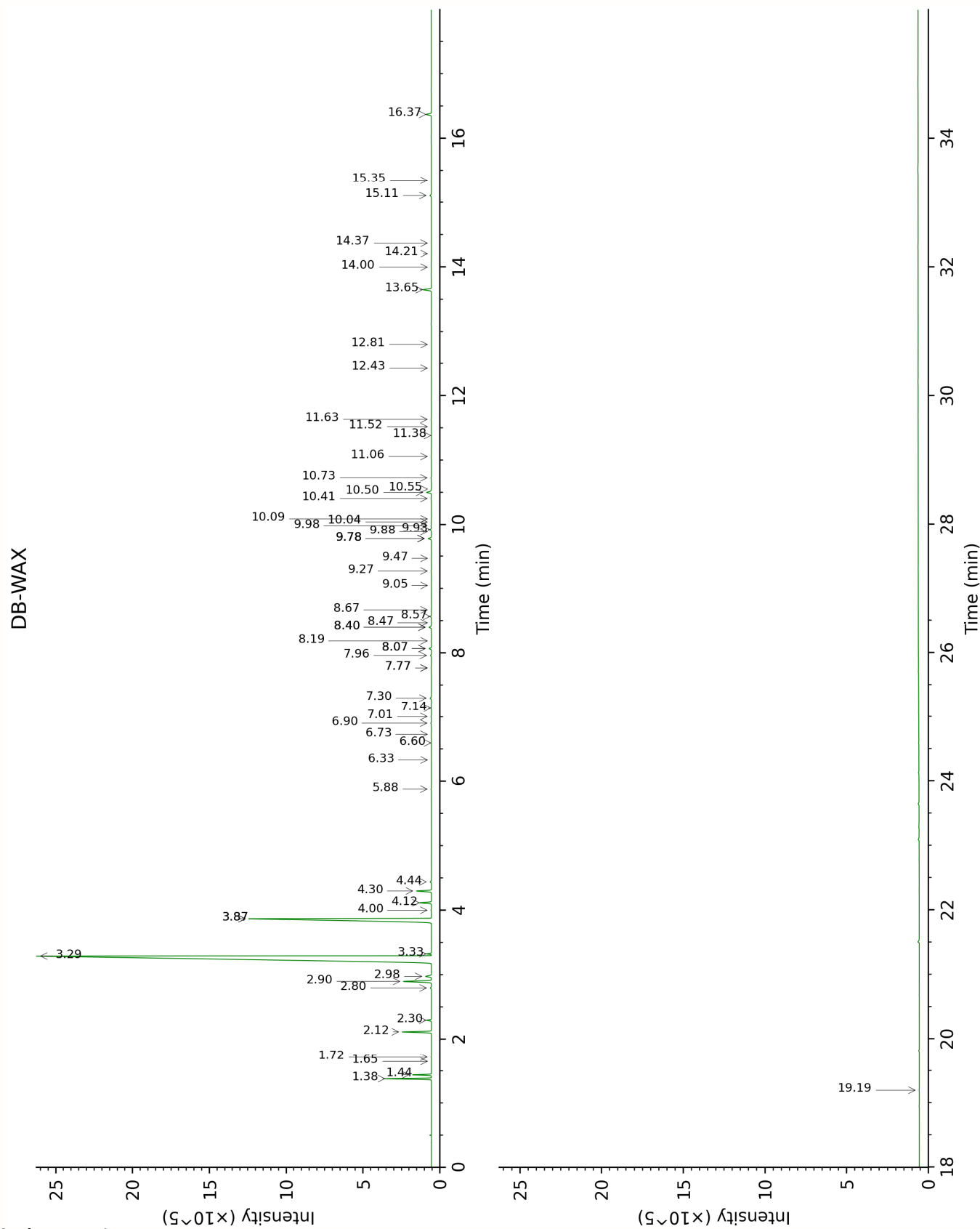
Note: no correction factor was applied

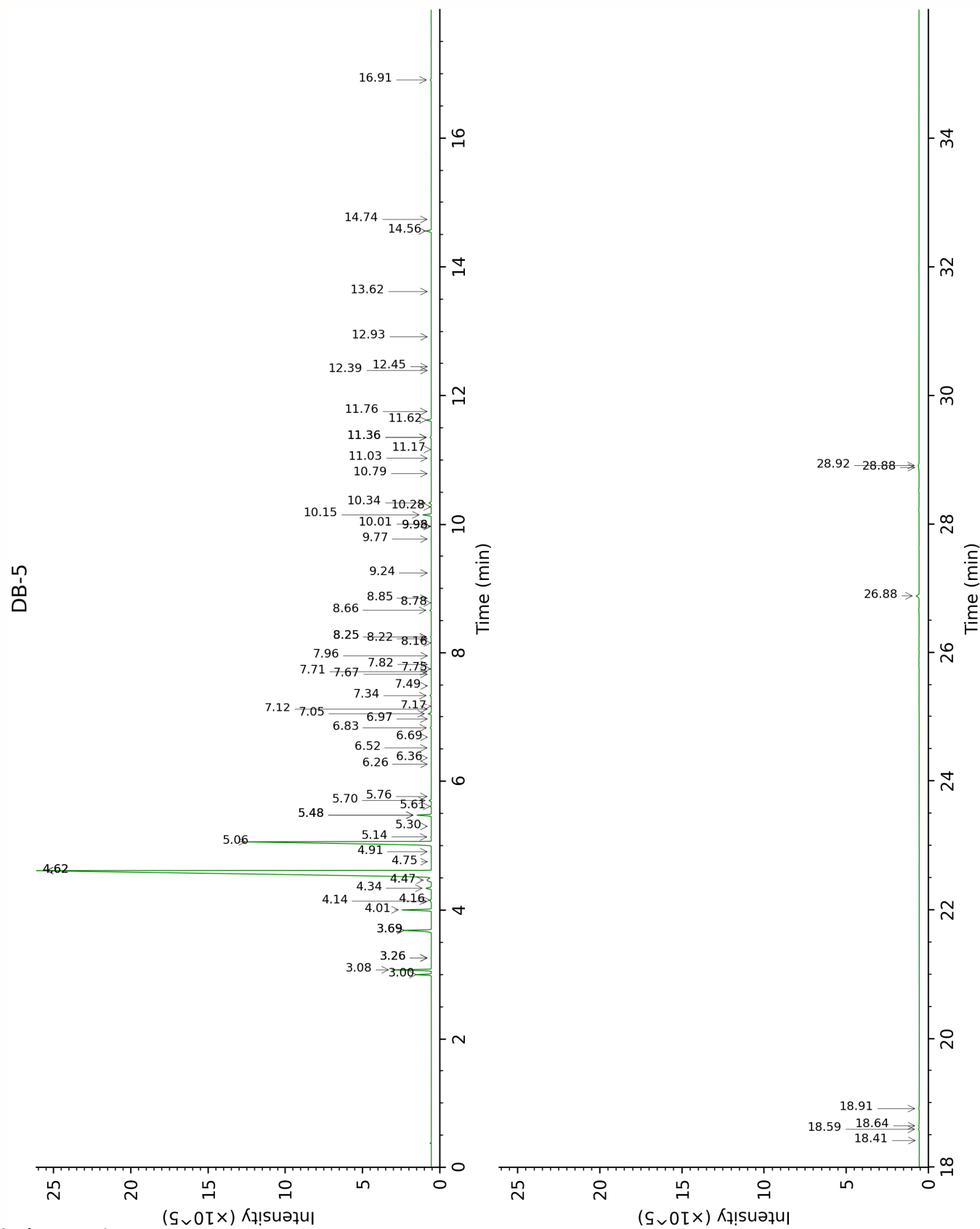
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

α-Thujene	Column DB-WAX			Column DB-5		
	1.44	1000.0	0.77	3.00	926.3	0.77
α -Pinene	1.38	992.0	2.06	3.08	931.2	2.06
Camphene	1.72	1027.2	0.02	3.26*	943.6	[0.02]
α -Fenchene	1.65	1020.7	tr	3.26*	943.6	[0.02]
β -Pinene	2.12	1066.8	1.52	3.69*	972.2	[1.76]
Sabinene	2.30	1084.7	0.25	3.69*	972.2	[1.76]
Myrcene	2.90	1134.8	1.73	4.01	993.5	1.72
α -Phellandrene	2.80	1126.7	0.07	4.14	1002.5	0.07
Octanal	4.44	1253.1	0.07	4.16	1003.7	0.08
α -Terpinene	2.98	1141.0	0.41	4.34	1015.3	0.41
<i>para</i> -Cymene	4.12	1229.1	0.66	4.47	1023.3	0.63
β -Phellandrene	3.33	1168.6	0.21	4.62*	1032.6	[68.66]
Limonene	3.29	1165.8	68.63	4.62*	1032.6	[68.66]
(<i>Z</i>)- β -Ocimene	3.87*	1210.8	[18.89]	4.75	1041.4	0.01
(<i>E</i>)- β -Ocimene	4.00	1220.6	0.03	4.91	1051.2	0.03
γ -Terpinene	3.87*	1210.8	[18.89]	5.06	1061.0	18.82
<i>cis</i> -Sabinene hydrate	6.90	1428.8	0.04	5.14	1065.7	0.04
Octanol	8.19	1525.5	0.01	5.30	1076.2	0.01
<i>para</i> -Cymenene	6.33	1386.7	0.01	5.48*	1087.3	[0.86]
Terpinolene	4.30	1242.6	0.86	5.48*	1087.3	[0.86]
<i>trans</i> -Sabinene hydrate	7.96	1508.0	0.06	5.61	1095.9	0.06
Linalool	8.07*	1516.2	[0.14]	5.70	1101.7	0.14
Nonanal	5.88	1354.2	0.02	5.76	1105.6	0.03
<i>trans</i> -Limonene oxide	6.60	1405.9	0.01	6.26	1138.0	0.01
Epoxyterpinolene	6.73	1415.8	0.01	6.36	1144.4	0.01
Citronellal	7.01	1436.5	0.02	6.52	1154.5	0.02
Borneol	9.78*	1650.9	[0.21]	6.69	1165.3	0.01
Terpinen-4-ol	8.57	1554.9	0.06	6.83	1174.6	0.07
<i>para</i> -Cymen-8-ol	11.52	1796.9	0.01	6.97	1183.6	0.01
α -Terpineol	9.78*	1650.9	[0.21]	7.05	1188.9	0.20
Unknown MISC XXXI [m/z 121, 79 (98), 93 (87), 94 (73), 91 (63), 105 (45)...]	7.77*	1493.1	[0.02]	7.12	1193.5	0.01
Unknown MISC XXXII [m/z 121, 79 (61), 93 (55), 94 (40), 91 (39), 84 (37)...]	8.07*	1516.2	[0.14]	7.16	1196.5	0.01
Decanal	7.30	1458.3	0.09	7.34	1208.0	0.09
<i>trans</i> -Carveol	11.38	1785.3	tr	7.49	1218.2	0.01
Nerol	11.06	1757.6	0.01	7.67	1230.5	0.01
Citronellol	10.73	1729.6	0.03	7.71	1233.2	0.03

Thymol methyl ether	8.47	1547.2	0.01	7.76	1236.2	0.01
Neral	9.47	1626.0	0.01	7.82	1240.9	0.01
Piperitone	9.88	1659.7	0.01	7.96	1250.1	0.01
(2E)-Decenal	9.05	1592.1	0.01	8.16	1263.7	0.01
Geranial	10.09	1676.4	0.01	8.22	1268.0	0.01
trans-Ascaridole glycol	14.21	2043.1	tr	8.25*	1270.0	[0.06]
Perillaldehyde				8.25*	1270.0	[0.06]
Thymol	15.11	2131.1	0.09	8.66	1298.1	0.10
Undecanal	8.67	1562.8	0.01	8.78	1306.0	0.01
Carvacrol	15.35	2155.1	0.01	8.85	1307.5	0.01
para-Mentha-1,8-diene-4-hydroperoxide				9.24	1335.3	0.01
α -Copaene	7.14	1446.2	0.02	9.77	1372.7	0.02
Geranyl acetate	10.55	1714.8	tr	9.98*	1387.5	[0.02]
β -Cubebene	7.77*	1493.1	[0.02]	9.98*	1387.5	[0.02]
β -Elemene	8.40*	1541.9	[0.16]	10.01	1390.1	0.01
Dimethyl anthranilate	13.65	1989.7	0.59	10.16	1400.3	0.58
Dodecanal	9.98	1667.8	0.03	10.28	1409.3	0.03
β -Caryophyllene	8.40*	1541.9	[0.16]	10.34	1413.9	0.16
α -Humulene	9.27	1610.1	0.02	10.79	1448.0	0.02
(2E)-Dodecenal	11.64	1807.0	0.02	11.03	1465.8	0.02
Germacrene D	9.78*	1650.9	[0.21]	11.17	1476.0	0.02
α -Selinene	9.92	1663.0	0.08	11.36*	1490.0	[0.09]
Bicyclogermacrene	10.04	1672.6	0.02	11.36*	1490.0	[0.09]
(3E,6E)- α -Farnesene	10.50	1710.5	0.37	11.62	1510.3	0.32
δ -Cadinene	10.41	1702.4	0.02	11.76	1520.9	0.02
Spathulenol	14.37	2058.8	0.01	12.39	1571.1	0.01
Caryophyllene oxide	12.81	1911.4	tr	12.45	1575.8	0.01
Tetradecanal?	12.43	1877.3	0.01	12.92	1613.5	0.01
(2E)-Tetradecenal	14.00	2022.9	0.01	13.62	1671.5	0.01
α -Sinensal	16.37	2260.7	0.37	14.56	1751.3	0.37
Myristic acid				14.74	1766.7	0.03
Palmitic acid				16.91	1965.4	0.08
Phytol	19.19	2573.5	0.02	18.41	2113.4	0.02
Linoleic acid				18.59	2131.5	0.06
Oleic acid				18.64	2137.1	0.06
Stearic acid				18.91	2164.7	0.05
Tangeretin				26.88	3129.6	0.30
3,3',4',5,6,7,8-Heptamethoxyflavone				28.88	3311.3	0.05
Nobiletin				28.92	3313.5	0.13
Total reported		98.83%			99.40%	

*: 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