CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 24I19-PTH02
Customer Identification : Organic Blood Orange - Italy - OH0105R
Type : Essential Oil
Source : *Citrus sinensis*
Customer : Plant Therapy

Checked an 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 : Rachel Fontaine, B. Sc. Chimiste, 2019-109
Date : 2024-10-03

PHYSICOCHEMICAL DATA

Refractive index : 1.4732 ± 0.0003 (20 ℃)
Method : PC-MAT-016 - Measure of the refractive index of a liquid.
Analyst : Cindy Caron B. Sc.
Date : 2024-09-19

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

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ANALYSIS SUMMARY - CONSOLIDATED CONTENTS

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
α-Thujene	tr	Monoterpene
α-Pinene	0.58	Monoterpene
Camphene	tr	Monoterpene
Sabinene	0.36	Monoterpene
β-Pinene	0.13	Monoterpene
Myrcene	1.92	Monoterpene
α-Phellandrene	0.03	Monoterpene
Octanal	0.31	Aliphatic aldehyde
Δ3-Carene	0.12	Monoterpene
para-Cymene	0.02	Monoterpene
β-Phellandrene	0.30	Monoterpene
Limonene	94.34	Monoterpene
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.03	Monoterpene
γ-Terpinene	0.02	Monoterpene
cis-Sabinene hydrate	0.01	Monoterpenic alcohol
Octanol	0.03	Aliphatic alcohol
Terpinolene	0.02	Monoterpene
Linalool	0.33	Monoterpenic alcohol
Nonanal	0.04	Aliphatic aldehyde
trans-para-Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
cis-Limonene oxide	0.02	Monoterpenic ether
trans-Limonene oxide	0.02	Monoterpenic ether
Citronellal	0.04	Monoterpenic aldehyde
α-Terpineol	0.03	Monoterpenic alcohol
cis-Piperitol	0.01	Monoterpenic alcohol
Decanal	0.26	Aliphatic aldehyde
trans-Carveol	0.01	Monoterpenic alcohol
cis-Carveol	0.01	Monoterpenic alcohol
Neral	0.04	Monoterpenic aldehyde
Geranial	0.07	Monoterpenic aldehyde
Limonen-10-ol	0.01	Monoterpenic alcohol
Undecanal	0.01	Aliphatic aldehyde
α-Copaene	0.02	Sesquiterpene
Geranyl acetate	0.02	Monoterpenic ester
Dodecanal	0.03	Aliphatic aldehyde
β-Caryophyllene	0.02	Sesquiterpene
β-Copaene	0.02	Sesquiterpene
α-Humulene	0.01	Sesquiterpene
(*E*)-β-Farnesene	0.01	Sesquiterpene

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Germacrene D	0.02	Sesquiterpene
Valencene	0.09	Sesquiterpene
Bicyclogermacrene	0.01	Sesquiterpene
α-Muurolene	0.01	Sesquiterpene
γ-Cadinene	0.02	Sesquiterpene
δ-Cadinene	0.02	Sesquiterpene
α-Elemol	0.01	Sesquiterpenic alcohol
β-Sinensal	0.03	Sesquiterpenic aldehyde
α-Sinensal	0.02	Sesquiterpenic aldehyde
Palmitic acid	0.02	Aliphatic acid
Linoleic acid	0.03	Aliphatic acid
Oleic acid	0.07	Aliphatic acid
Stearic acid	0.14	Aliphatic acid
Tangeretin isomer	0.02	Flavonoid
Tangeretin	0.03	Flavonoid
3,3',4',5,6,7,8-Heptamethoxyflavone	0.07	Flavonoid
Nobiletin	0.04	Flavonoid
Consolidated total	**99.94**	

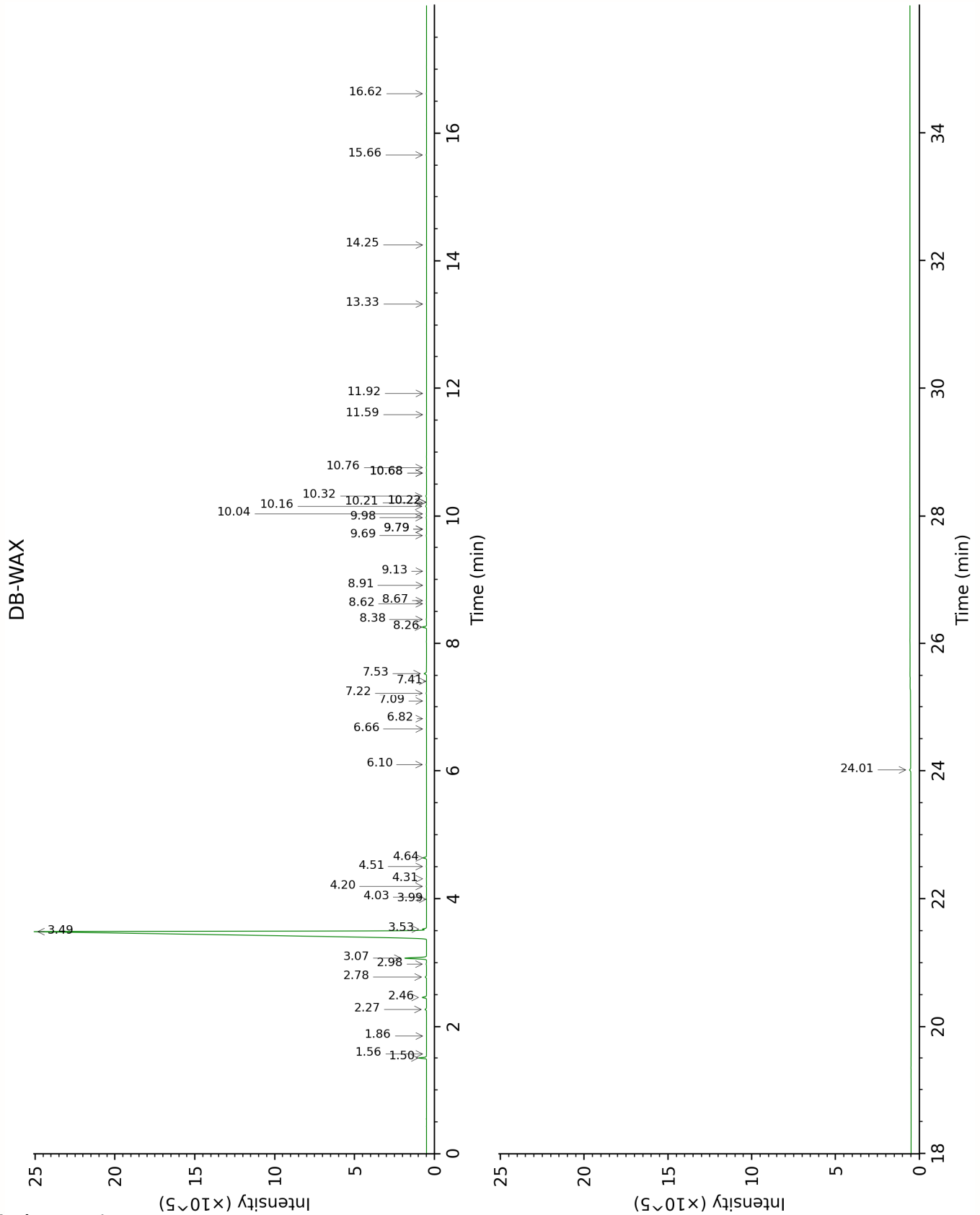tr: The compound has been detected below 0.005% of the total signal
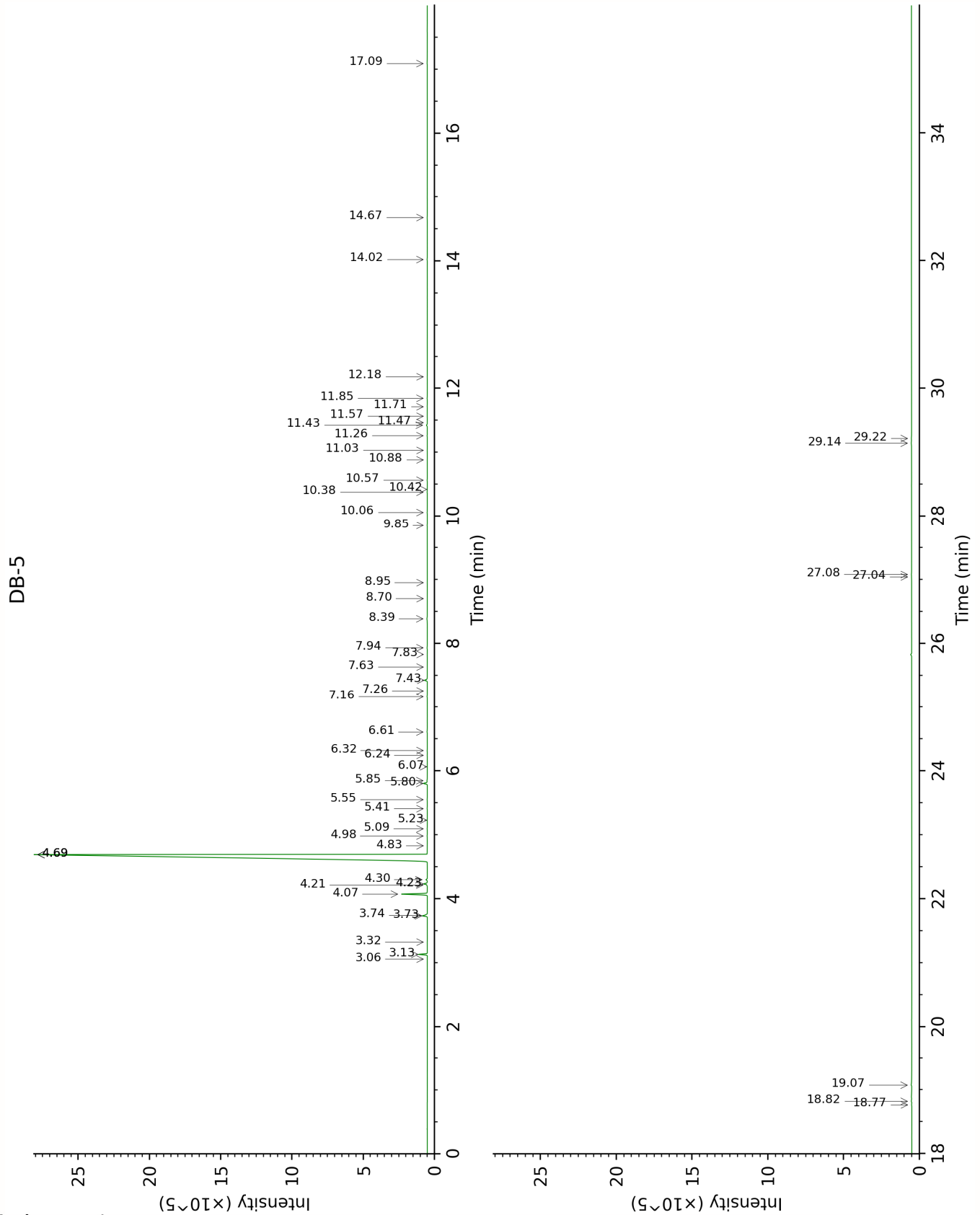
Note: no correction factor was applied

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.

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This page was intentionally left blank. The following pages present the complete data of the analysis.

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DB-WAX

16.62
15.66
14.25
13.33
11.92
11.59
10.76 — 10.68
10.04 10.16 10.32 10.21 10.22
9.98
9.69 9.79
9.13
8.91
8.62 8.67
8.38 8.26
7.53 7.41
7.22 7.09
6.66 6.82
6.10
4.51 4.64
4.20 4.31
4.03 3.99
3.49 3.53
3.07 2.98
2.78
2.46
2.27
1.86
1.56 1.50

24.01

Time (min)

Intensity (×10^5)

DB-5

Time (min)

Intensity (×10^5)

Time (min)

Intensity (×10^5)

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FULL ANALYSIS DATA

	Column DB-WAX			Column DB-5		
α-Thujene	1.56	1000.9	0.01	3.06	925.4	tr
α-Pinene	1.50	993.8	0.58	3.13	930.3	0.58
Camphene	1.86	1028.8	0.01	3.32	942.9	tr
Sabinene	2.46	1086.2	0.36	3.74*†	970.1	[0.33]
β-Pinene	2.27	1068.4	0.13	3.74*†	970.7	[0.14]
Myrcene	3.07	1134.8	1.95	4.07	992.6	1.92
α-Phellandrene	2.98	1127.7	0.04	4.22	1001.9	0.03
Octanal	4.64	1248.9	0.29	4.23	1003.1	0.31
Δ3-Carene	2.78	1112.5	0.11	4.30	1007.3	0.12
para-Cymene	4.31	1226.1	0.02	4.69*	1031.8	[94.19]
β-Phellandrene	3.53	1169.1	0.30	4.69*	1031.8	[94.19]
Limonene	3.49	1166.1	94.34	4.69*	1031.8	[94.19]
(*Z*)-β-Ocimene	3.99	1203.6	tr	4.83	1040.5	0.01
(*E*)-β-Ocimene	4.20	1217.7	0.02	4.98	1050.1	0.03
γ-Terpinene	4.03	1205.9	0.01	5.10	1057.1	0.02
cis-Sabinene hydrate	7.09	1426.8	0.01	5.23	1065.6	0.01
Octanol	8.38	1523.1	0.03	5.41	1076.8	0.03
Terpinolene	4.51	1239.5	0.03	5.55	1085.7	0.02
Linalool	8.26	1513.8	0.36	5.80	1101.6	0.33
Nonanal	6.10	1354.6	0.03	5.85	1104.3	0.04
trans-para-Mentha-2,8-dien-1-ol	9.13	1581.3	0.01	6.06	1118.2	0.01
cis-Limonene oxide	6.66	1394.4	0.02	6.24	1129.6	0.02
trans-Limonene oxide	6.82	1406.3	0.02	6.32	1134.4	0.02
Citronellal	7.22	1436.5	0.04	6.61	1152.9	0.04
α-Terpineol	9.98	1649.4	0.04	7.16	1188.3	0.03
cis-Piperitol	9.79*	1633.8	[0.01]	7.26	1194.5	0.01
Decanal	7.53	1459.2	0.24	7.43	1205.3	0.26
trans-Carveol	11.59	1783.3	0.01	7.63	1219.2	0.01
cis-Carveol	11.92	1812.2	tr	7.83	1232.4	0.01
Neral	9.69	1625.8	0.04	7.94	1239.4	0.04
Geranial	10.32	1676.6	0.07	8.39	1269.6	0.07
Limonen-10-ol	13.33	1938.2	0.01	8.70	1290.8	0.01
Undecanal	8.91	1564.3	0.01	8.95	1307.7	0.01
α-Copaene	7.41	1450.4	0.02	9.85	1371.0	0.02
Geranyl acetate	10.76	1713.4	0.04	10.06	1385.8	0.02
Dodecanal	10.22*	1668.8	[0.02]	10.38	1408.5	0.03
β-Caryophyllene	8.67	1545.9	0.02	10.42	1411.8	0.02
β-Copaene	8.62	1542.0	0.02	10.57	1422.5	0.02
α-Humulene				10.88	1446.1	0.01
(*E*)-β-Farnesene	9.79*	1633.8	[0.01]	11.03	1457.2	0.01
Germacrene D	10.04	1654.1	0.03	11.26	1474.3	0.02
Valencene	10.16	1663.6	0.08	11.43	1486.5	0.09

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Bicyclogermacrene	10.22*	1668.8	[0.02]	11.47	1489.5	0.01
α-Muurolene	10.21	1668.0	0.02	11.57	1496.9	0.01
γ-Cadinene	10.68*	1706.1	[0.02]	11.71	1508.2	0.02
δ-Cadinene	10.68*	1706.1	[0.02]	11.85	1518.6	0.02
α-Elemol	14.25	2024.1	0.01	12.18	1545.0	0.01
β-Sinensal	15.66	2162.6	0.03	14.02	1693.8	0.03
α-Sinensal	16.62	2260.8	0.02	14.67	1750.1	0.02
Palmitic acid				17.09	1969.9	0.02
Linoleic acid				18.76	2136.4	0.03
Oleic acid	24.01	3158.4	0.14	18.82	2142.2	0.07
Stearic acid				19.07	2168.3	0.14
Tangeretin isomer				27.04	3136.0	0.02
Tangeretin				27.08	3139.9	0.03
3,3',4',5,6,7,8-Heptamethoxyflavone				29.14	3321.6	0.07
Nobiletin				29.22	3326.6	0.04
Total reported		99.60%			99.46%	

*: 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

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