

Date : 2025-05-20

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 25E05-PTH03

Customer Identification : Pink Grapefruit - USA - G50114R

Type : Essential Oil

Source : *Citrus x paradisi* cv. Red

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 : Anne Retailaud

Date : 2025-05-20

PHYSICOCHEMICAL DATA

Refractive index : 1.4766 ± 0.0003 (20 °C)

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

Analyst : Cindy Caron B. Sc.

Date : 2025-05-06

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
Heptanal	0.01	Aliphatic aldehyde
α -Thujene	0.01	Monoterpene
α -Pinene	0.57	Monoterpene
Sabinene	0.42	Monoterpene
β -Pinene	0.06	Monoterpene
Heptanol	0.01	Aliphatic alcohol
Myrcene	1.85	Monoterpene
α -Phellandrene	0.03	Monoterpene
Octanal	0.37	Aliphatic aldehyde
Pseudolimonene	0.01	Monoterpene
<i>para</i> -Cymene	0.01	Monoterpene
β -Phellandrene	0.25	Monoterpene
Limonene	91.79	Monoterpene
(Z)- β -Ocimene	0.01	Monoterpene
(E)- β -Ocimene	0.09	Monoterpene
γ -Terpinene	0.01	Monoterpene
<i>cis</i> -Sabinene hydrate	0.01	Monoterpenic alcohol
<i>cis</i> -Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Octanol	0.03	Aliphatic alcohol
Terpinolene	0.01	Monoterpene
Linalool	0.06	Monoterpenic alcohol
Nonanal	0.05	Aliphatic aldehyde
<i>trans-para</i> -Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.03	Monoterpenic ether
<i>cis-para</i> -Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
<i>trans</i> -Limonene oxide	0.02	Monoterpenic ether
Citronellal	0.04	Monoterpenic aldehyde
<i>para</i> -Cymen-8-ol	0.01	Monoterpenic alcohol
α -Terpineol	0.03	Monoterpenic alcohol
<i>trans</i> -Isopiperitenol	0.01	Monoterpenic alcohol
Decanal	0.13	Aliphatic aldehyde
<i>trans</i> -Carveol	0.02	Monoterpenic alcohol
Octyl acetate	0.02	Aliphatic ester
<i>cis</i> -Carveol	0.01	Monoterpenic alcohol
Neral	0.04	Monoterpenic aldehyde
Perillaldehyde	0.01	Monoterpenic aldehyde
Geranial	0.03	Monoterpenic aldehyde
Undecanal	0.01	Aliphatic aldehyde
α -Terpinyl acetate	0.01	Monoterpenic ester
Limonene hydroperoxide IV	0.01	Monoterpenic peroxide

α -Copaene	0.05	Sesquiterpene
Geranyl acetate	0.02	Monoterpenic ester
β -Cubebene	0.03	Sesquiterpene
β -Elemene	0.02	Sesquiterpene
Dodecanal	0.02	Aliphatic aldehyde
β -Caryophyllene	0.25	Sesquiterpene
α -Humulene	0.02	Sesquiterpene
(E)- β -Farnesene	0.01	Sesquiterpene
Germacrene D	0.02	Sesquiterpene
Bicyclogermacrene	0.01	Sesquiterpene
δ -Cadinene	0.05	Sesquiterpene
α -Elemol	0.02	Sesquiterpenic alcohol
Germacrene D-4-ol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
β -Sinensal	0.02	Sesquiterpenic aldehyde
Myristic acid	0.01	Aliphatic acid
Nootkatone	0.04	Sesquiterpenic ketone
Hexadecanal	0.03	Aliphatic aldehyde
Palmitic acid	0.06	Aliphatic acid
Bergapten	0.01	Furanocoumarin
Osthole	0.04	Coumarin
Linoleic acid	0.07	Aliphatic acid
Oleic acid	0.08	Aliphatic acid
cis-Vaccenic acid?	0.11	Aliphatic acid
Stearic acid	0.11	Aliphatic acid
7-Methoxy-8-(2-formyl-2-methylpropyl)coumarin	0.02	Coumarin
Isoauraptene	0.08	Coumarin
Meranzin	0.15	Coumarin
Auraptene	0.78	Coumarin
Epoxyauraptene	0.19	Coumarin
Tangeretin	0.09	Flavonoid
3,5,6,7,8,3',4'-Heptamethoxyflavone?	0.03	Flavonoid
Consolidated total	98.59	

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

Note: no correction factor was applied

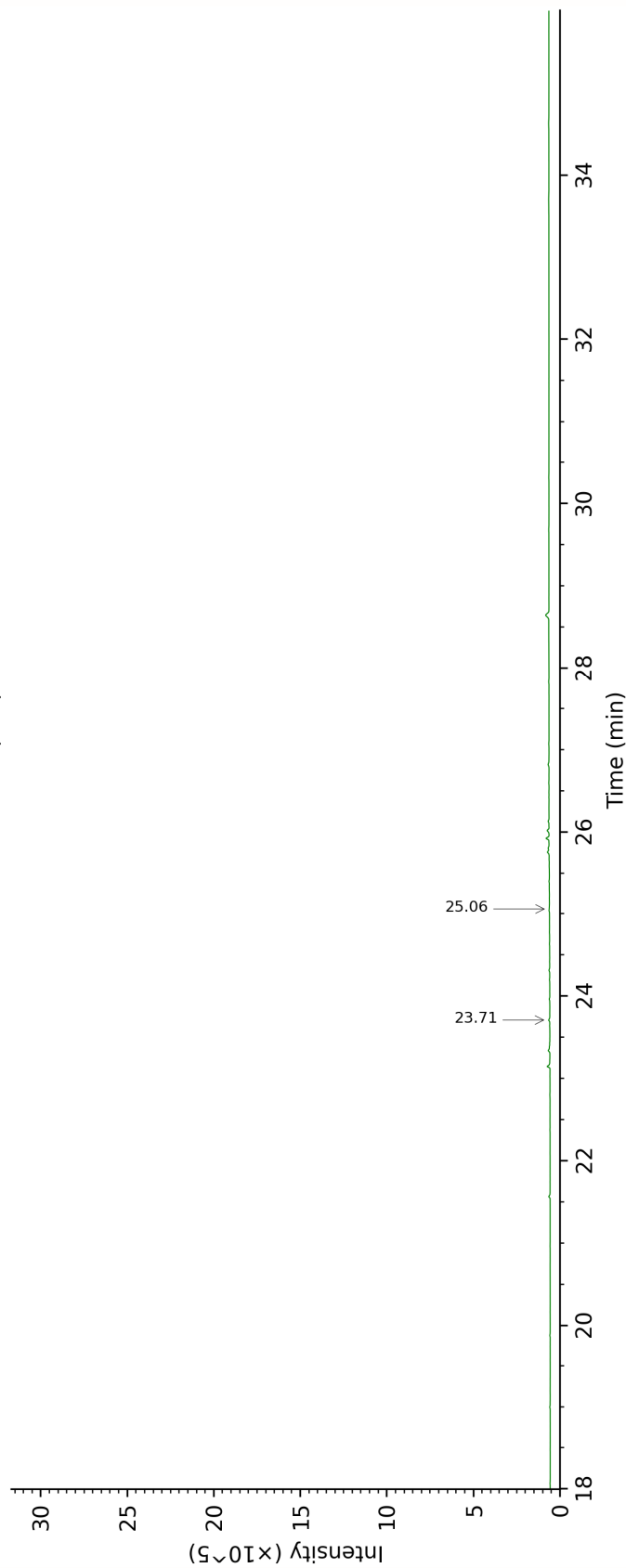
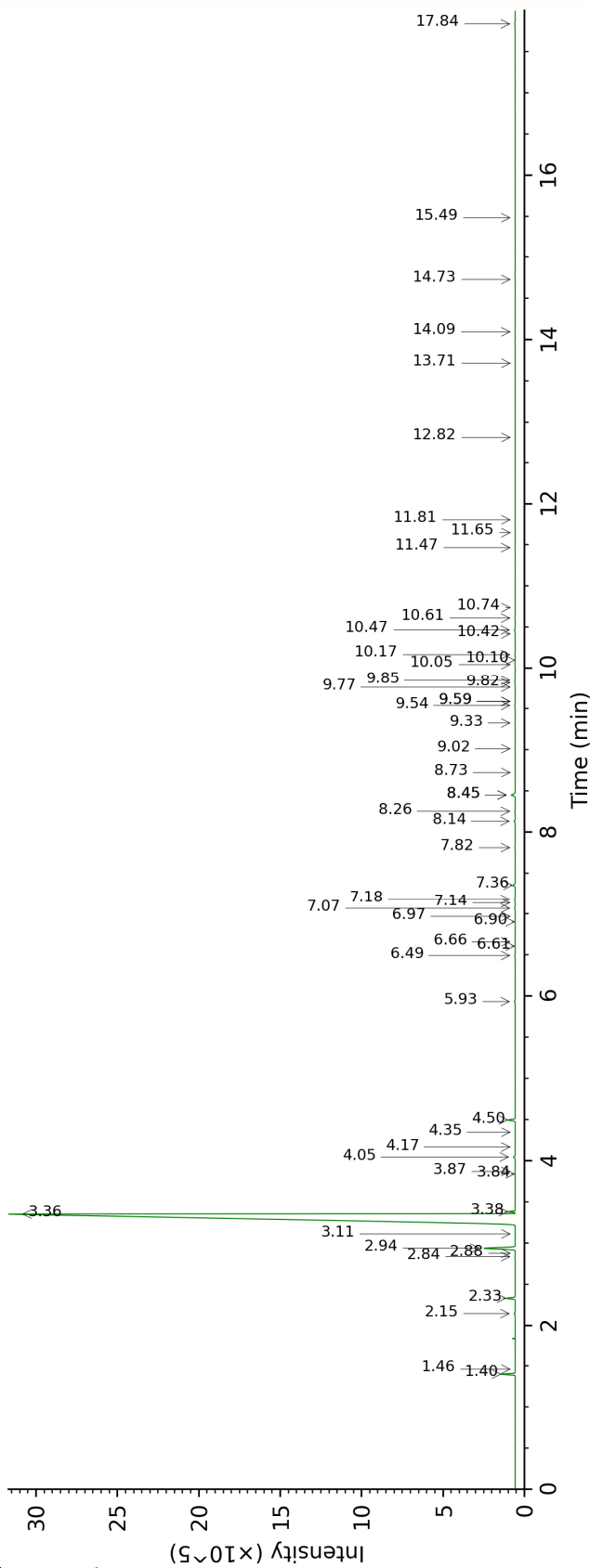
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm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

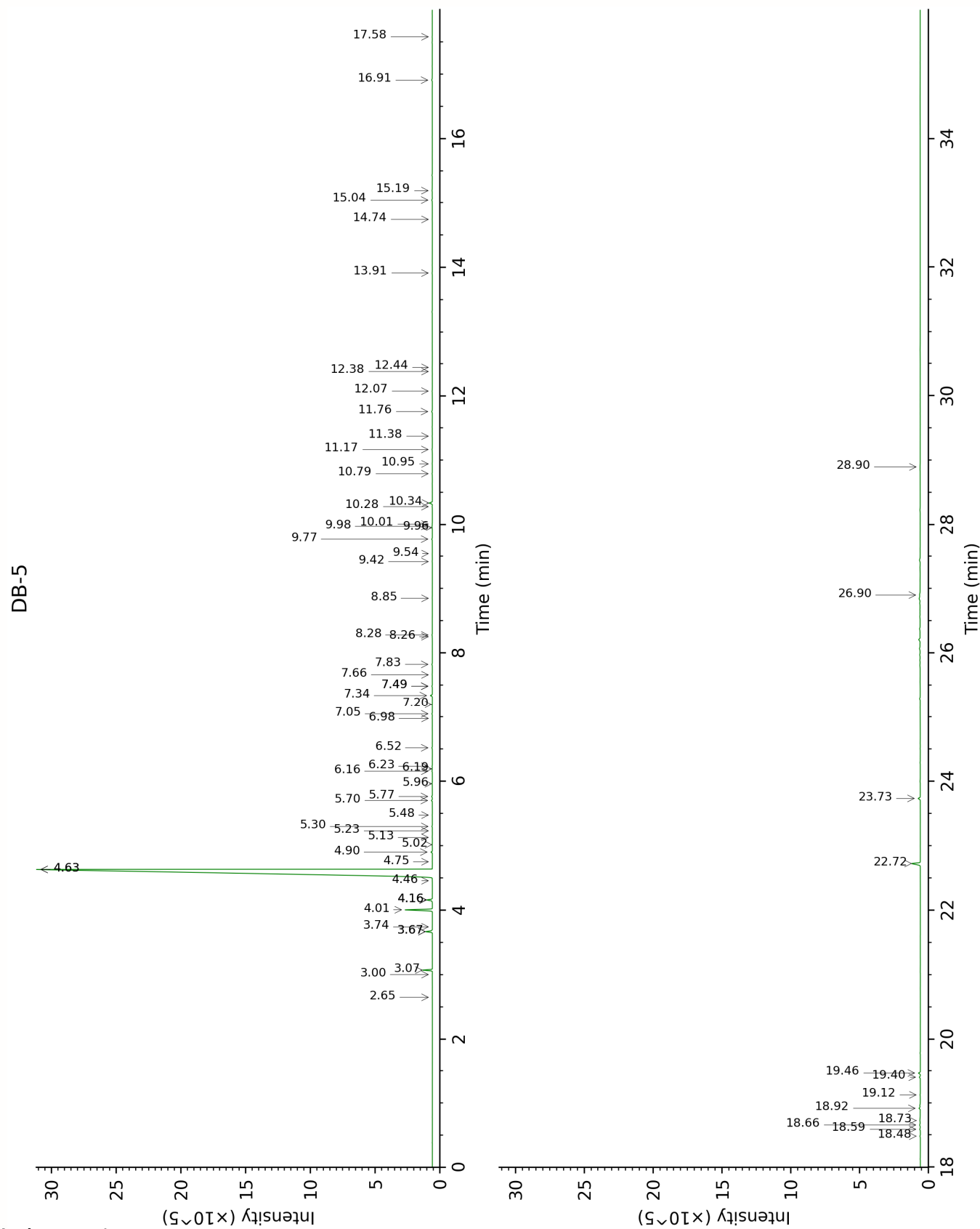
Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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.

DB-WAX





FULL ANALYSIS DATA

Heptanal	Column DB-WAX			Column DB-5		
	3.11	1148.3	0.01	2.65	902.4	0.01
α -Thujene	1.46	998.6	0.01	3.00	926.3	0.01
α -Pinene	1.40	991.9	0.56	3.07	930.9	0.57
Sabinene	2.33	1085.1	0.42	3.67*	970.9	[0.47]
β -Pinene	2.15	1066.6	0.06	3.67*	970.9	[0.47]
Heptanol	6.90	1426.3	0.01	3.74	975.9	0.01
Myrcene	2.94	1134.7	1.86	4.01	993.6	1.85
α -Phellandrene	2.84	1126.6	0.03	4.16*	1003.9	[0.40]
Octanal	4.50	1252.9	0.37	4.16*	1003.9	[0.40]
Pseudolimonene	2.88	1129.8	0.01	4.16*	1003.9	[0.40]
<i>para</i> -Cymene	4.17	1228.8	0.02	4.46	1022.7	0.01
β -Phellandrene	3.38	1169.6	0.25	4.63*	1033.8	[91.63]
Limonene	3.36	1167.3	91.79	4.63*	1033.8	[91.63]
(<i>Z</i>)- β -Ocimene	3.84	1204.9	0.01	4.75	1041.4	0.01
(<i>E</i>)- β -Ocimene	4.05	1219.9	0.09	4.90	1050.9	0.09
γ -Terpinene	3.87	1207.1	0.02	5.02	1058.2	0.01
<i>cis</i> -Sabinene hydrate	6.97	1431.1	0.01	5.13	1065.3	0.01
<i>cis</i> -Linalool oxide (fur.)	6.61	1404.6	0.01	5.23	1071.8	0.01
Octanol	8.26	1526.9	0.03	5.30	1076.1	0.03
Terpinolene	4.35	1241.9	0.01	5.48	1087.4	0.01
Linalool	8.14	1517.6	0.06	5.70	1101.7	0.06
Nonanal	5.94	1356.5	0.05	5.77	1105.7	0.05
<i>trans-para</i> -Mentha-2,8-dien-1-ol	9.02	1585.1	0.02	5.96	1118.5	0.02
<i>cis</i> -Limonene oxide	6.49	1396.2	0.03	6.16	1131.2	0.03
<i>cis-para</i> -Mentha-2,8-dien-1-ol	9.59*	1631.0	[0.02]	6.19	1133.5	0.01
<i>trans</i> -Limonene oxide	6.66	1408.5	0.02	6.23	1136.1	0.02
Citronellal	7.07	1438.5	0.04	6.52	1154.7	0.04
<i>para</i> -Cymen-8-ol	11.65	1801.8	0.01	6.98	1184.4	0.01
α -Terpineol	9.85	1651.7	0.03	7.05	1189.0	0.03
<i>trans</i> -Isopiperitenol	10.42	1697.9	0.01	7.20	1198.8	0.01
Decanal	7.36	1459.5	0.13	7.34	1208.2	0.13
<i>trans</i> -Carveol	11.47	1786.0	0.02	7.49*	1218.1	[0.04]
Octyl acetate	7.14	1443.4	0.02	7.49*	1218.1	[0.04]
<i>cis</i> -Carveol	11.81	1815.6	0.01	7.66	1230.1	0.01
Neral	9.54	1626.9	0.04	7.83	1241.2	0.04
Perillaldehyde	10.74	1724.8	0.01	8.26	1270.5	0.01
Geranial	10.17	1677.4	0.03	8.28	1272.3	0.03
Undecanal	8.73	1563.0	0.01	8.85	1307.5	0.01
α -Terpinyl acetate	9.77	1645.0	0.01	9.42	1348.2	0.01
Limonene hydroperoxide IV				9.54	1357.0	0.01

α -Copaene	7.18	1446.7	0.05	9.77	1373.0	0.05
Geranyl acetate	10.61	1714.0	0.03	9.96	1386.4	0.02
β -Cubebene	7.82	1493.1	0.03	9.98	1387.9	0.03
β -Elemene	8.45*	1542.0	[0.27]	10.01	1390.4	0.02
Dodecanal	10.05	1667.5	0.01	10.28	1410.0	0.02
β -Caryophyllene	8.45*	1542.0	[0.27]	10.34	1414.1	0.25
α -Humulene	9.33	1609.8	0.02	10.79	1448.3	0.02
(E)- β -Farnesene	9.59*	1631.0	[0.02]	10.95	1459.7	0.01
Germacrene D	9.82	1649.3	0.03	11.17	1476.4	0.02
Bicyclogermacrene	10.10	1672.0	0.01	11.38	1491.9	0.01
δ -Cadinene	10.47	1701.9	0.06	11.76	1521.4	0.05
α -Elemol	14.09	2024.1	0.02	12.08	1546.5	0.02
Germacrene D-4-ol	13.71	1987.6	0.01	12.38	1570.6	0.01
Caryophyllene oxide	12.82	1905.2	0.01	12.44	1575.6	0.01
β -Sinensal	15.49	2160.6	0.02	13.91	1696.1	0.02
Myristic acid				14.74	1767.8	0.01
Nootkatone	17.84	2410.1	0.04	15.04	1793.8	0.04
Hexadecanal	14.73	2084.9	0.01	15.18	1806.6	0.03
Palmitic acid				16.91	1966.2	0.06
Bergapten	25.06	3347.2	0.03	17.58	2031.3	0.01
Osthole				18.48	2121.6	0.04
Linoleic acid				18.59	2132.6	0.07
Oleic acid	23.71	3149.9	0.09	18.66	2139.5	0.08
cis-Vaccenic acid?				18.73	2146.7	0.11
Stearic acid				18.92	2166.3	0.11
7-Methoxy-8-(2-formyl-2-methylpropyl)coumarin				19.12	2187.8	0.02
Isoauraptene				19.40	2216.7	0.08
Meranzin				19.46	2223.7	0.15
Auraptene				22.72	2594.2	0.78
Epoxyaurapten				23.73	2720.1	0.19
Tangeretin				26.90	3130.7	0.09
3,5,6,7,8,3',4'-Heptamethoxyflavone?				28.90	3310.8	0.03
Total reported		96.88%			98.17%	

*: 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