

Date : February 15, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22B10-PTH01


Customer identification : Bergamot (Bergapten Free) _ Italy - B30112212R

Type : Essential oil

Source : *Citrus aurantium* var. *bergamia*

Customer : Plant Therapy

ANALYSIS

Method: PC-MAT-014  - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Seydou Ka, Ph. D.

Analysis date : February 15, 2022

Checked and approved by :

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

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia. This report is digitally signed, it is only considered valid if the digital signature is intact. The results only describe the samples that were submitted to the assays.

PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid

Refractive index: 1.4645 ± 0.0003 (20 °C; method PC-MAT-016)

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	0.01	Monoterpene
α-Pinene	1.36	Monoterpene
Camphene	0.01	Monoterpene
Sabinene	1.33	Monoterpene
β-Pinene	6.67	Monoterpene
Myrcene	0.90	Monoterpene
α-Phellandrene	0.02	Monoterpene
α-Terpinene	tr	Monoterpene
para-Cymene	0.19	Monoterpene
1,8-Cineole	0.12	Monoterpenic ether
Limonene	40.90	Monoterpene
(Z)-β-Ocimene	0.11	Monoterpene
(E)-β-Ocimene	0.27	Monoterpene
γ-Terpinene	7.56	Monoterpene
cis-Sabinene hydrate	tr	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
trans-Linalool oxide (fur.)	0.01	Monoterpenic alcohol
Terpinolene	0.03	Monoterpene
Nonanal	0.07	Aliphatic aldehyde
Linalool	12.32	Monoterpenic alcohol
cis-Limonene oxide	0.03	Monoterpenic ether
trans-Limonene oxide	0.02	Monoterpenic ether
Camphor	0.01	Monoterpenic ketone
α-Terpineol	0.14	Monoterpenic alcohol
γ-Terpineol	0.01	Monoterpenic alcohol
Neral	0.21	Monoterpenic aldehyde
Geraniol	tr	Monoterpenic alcohol
Linalyl acetate	25.48	Monoterpenic ester
(trans?)-Linalool oxide acetate (fur.)?	0.07	Monoterpenic ester
Geranial	0.30	Monoterpenic aldehyde
Bornyl acetate	0.01	Monoterpenic ester
α-Terpinyl acetate	0.09	Monoterpenic ester
Unknown	0.01	Monoterpenic ester
Neryl acetate	0.26	Monoterpenic ester
Geranyl acetate	0.19	Monoterpenic ester
β-Caryophyllene	0.25	Sesquiterpene
cis-α-Bergamotene	0.03	Sesquiterpene
trans-α-Bergamotene	0.20	Sesquiterpene
(E)-β-Farnesene	tr	Sesquiterpene
β-Bisabolene	0.40	Sesquiterpene
Consolidated total	99.65%	

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

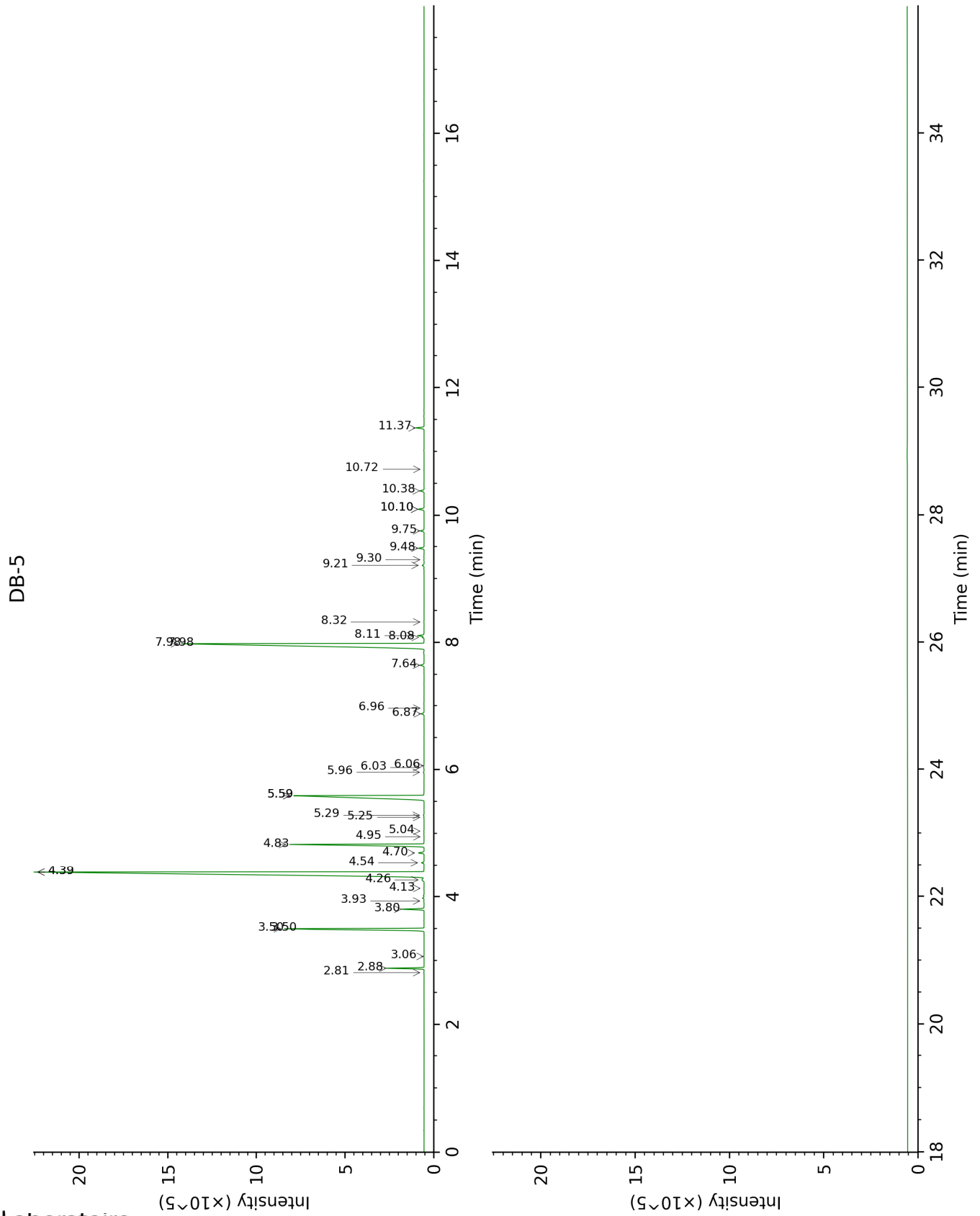
Note: no correction factor was applied

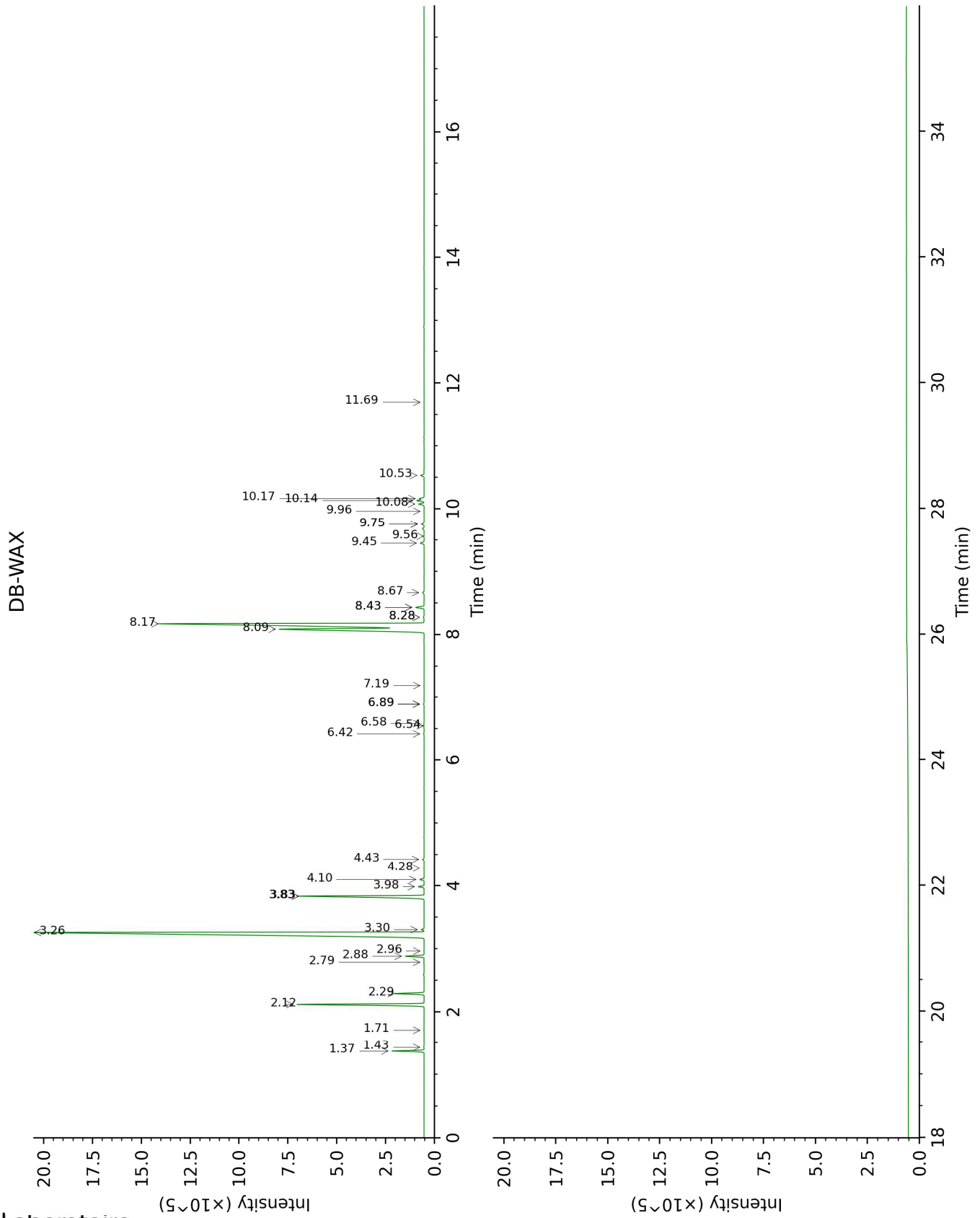
About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies

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.

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
α-Thujene	2.81	926	0.01	1.43	998	0.01
α-Pinene	2.88	930	1.36	1.37	990	1.35
Camphene	3.06	943	0.01	1.71	1025	0.01
Sabinene	3.50*	972	8.03	2.29	1083	1.33
β-Pinene	3.50*	972	[8.03]	2.12	1066	6.67
Myrcene	3.80	993	0.90	2.88	1132	0.91
α-Phellandrene	3.93	1002	0.02	2.79	1125	0.02
α-Terpinene	4.13	1015	tr	2.96	1139	0.01
para-Cymene	4.26	1023	0.19	4.10	1227	0.21
1,8-Cineole	4.39*	1031	41.03	3.30	1166	0.12
Limonene	4.39*	1031	[41.03]	3.26	1162	40.90
(Z)-β-Ocimene	4.54	1041	0.11	3.83*	1207	7.68
(E)-β-Ocimene	4.70	1050	0.27	3.98	1218	0.27
γ-Terpinene	4.83	1059	7.56	3.83*	1207	[7.68]
cis-Sabinene hydrate	4.95	1066	tr	6.89*	1426	0.03
cis-Linalool oxide (fur.)	5.04	1072	0.01	6.58	1403	0.02
trans-Linalool oxide (fur.)	5.25	1086	0.01	6.89*	1426	[0.03]
Terpinolene	5.29	1088	0.03	4.28	1241	0.02
Nonanal	5.59*	1107	12.39	4.43	1251	0.07
Linalool	5.59*	1107	[12.39]	8.09†	1516	37.89
cis-Limonene oxide	5.96	1131	0.03	6.42	1391	0.02
trans-Limonene oxide	6.03	1136	0.02	6.54	1401	0.01
Camphor	6.06	1137	0.01	7.19	1449	0.01
α-Terpineol	6.87	1190	0.14	9.75*	1648	0.15
γ-Terpineol	6.96	1195	0.01	9.96	1665	0.01
Neral	7.64	1241	0.21	9.45	1623	0.21
Geraniol	7.98*	1263	25.48	11.69	1811	tr
Linalyl acetate	7.98*	1263	[25.48]	8.17†	1523	[37.89]
(trans?)-Linalool oxide acetate (fur.)?	8.08	1270	0.07	8.67	1561	0.08
Geranial	8.11	1272	0.30	10.08	1674	0.30
Bornyl acetate	8.32	1286	0.01	8.28*	1531	0.04
α-Terpinyl acetate	9.21	1348	0.09	9.75*	1648	[0.15]
Unknown [m/z 43, 121 (52), 93 (48), 79 (33), 41 (30), 136 (26), 81 (25)...]	9.30	1354	0.01			
Neryl acetate	9.48	1367	0.26	10.17	1681	0.26
Geranyl acetate	9.75	1386	0.19	10.53	1712	0.19

β -Caryophyllene	10.10*	1411	0.29	8.43*	1543	0.49
<i>cis</i> - α -Bergamotene	10.10*	1411	[0.29]	8.28*	1531	[0.04]
<i>trans</i> - α -Bergamotene	10.38	1433	0.20	8.43*	1543	[0.49]
(<i>E</i>)- β -Farnesene	10.72	1458	tr	9.56	1632	0.01
β -Bisabolene	11.37	1507	0.40	10.14	1679	0.42
Total identified		99.69%			99.68%	
Total reported		99.70%			99.68%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not 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