

Date : November 15, 2022

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 22K11-PTH01

Customer identification : Tangerine - Brazil - T10110R

Type : Essential oil

Source : *Citrus reticulata* cv. Tangerine

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 : Amélie Simard, Analyste

Analysis date : November 14, 2022

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Bright orange liquid

Refractive index: 1.4739 ± 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	0.12	Monoterpene
α -Pinene	0.76	Monoterpene
Camphene	0.01	Monoterpene
Sabinene	0.23	Monoterpene
β -Pinene	0.29	Monoterpene
Myrcene	1.60	Monoterpene
Octanal	0.08	Aliphatic aldehyde
α -Phellandrene	0.03	Monoterpene
Δ^3 -Carene	0.04	Monoterpene
α -Terpinene	0.06	Monoterpene
para-Cymene	0.44	Monoterpene
Limonene	90.83	Monoterpene
1,8-Cineole	0.39	Monoterpenic ether
(<i>E</i>)- β -Ocimene	0.07	Monoterpene
γ -Terpinene	3.02	Monoterpene
Octanol	0.02	Aliphatic alcohol
Terpinolene	0.17	Monoterpene
Linalool	0.17	Monoterpenic alcohol
Nonanal	0.03	Aliphatic aldehyde
<i>trans</i> -para-Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.05	Monoterpenic ether
<i>trans</i> -Limonene oxide	0.05	Monoterpenic ether
Epoxyterpinolene	0.01	Monoterpenic ether
Citronellal	0.02	Monoterpenic aldehyde
Terpinen-4-ol	0.01	Monoterpenic alcohol
α -Terpineol	0.04	Monoterpenic alcohol
Unknown	0.01	Unknown
Decanal	0.11	Aliphatic aldehyde
Octyl acetate	0.01	Aliphatic ester
<i>trans</i> -Carveol	0.01	Monoterpenic alcohol
Nerol	0.01	Monoterpenic alcohol
<i>cis</i> -Carveol	0.01	Monoterpenic alcohol
Neral	0.03	Monoterpenic aldehyde
Geraniol	0.01	Monoterpenic alcohol
Geranial	0.02	Monoterpenic aldehyde
Limonen-10-ol	0.01	Monoterpenic alcohol
Undecanal	0.01	Aliphatic aldehyde
Unknown	0.01	Sesquiterpene
Neryl acetate	0.02	Monoterpenic ester
α -Copaene	0.04	Sesquiterpene
Geranyl acetate	0.03	Monoterpenic ester
β -Elemene	0.01	Sesquiterpene
Dimethyl anthranilate	0.05	Phenolic ester
Dodecanal	0.04	Aliphatic aldehyde
β -Copaene	0.02	Sesquiterpene

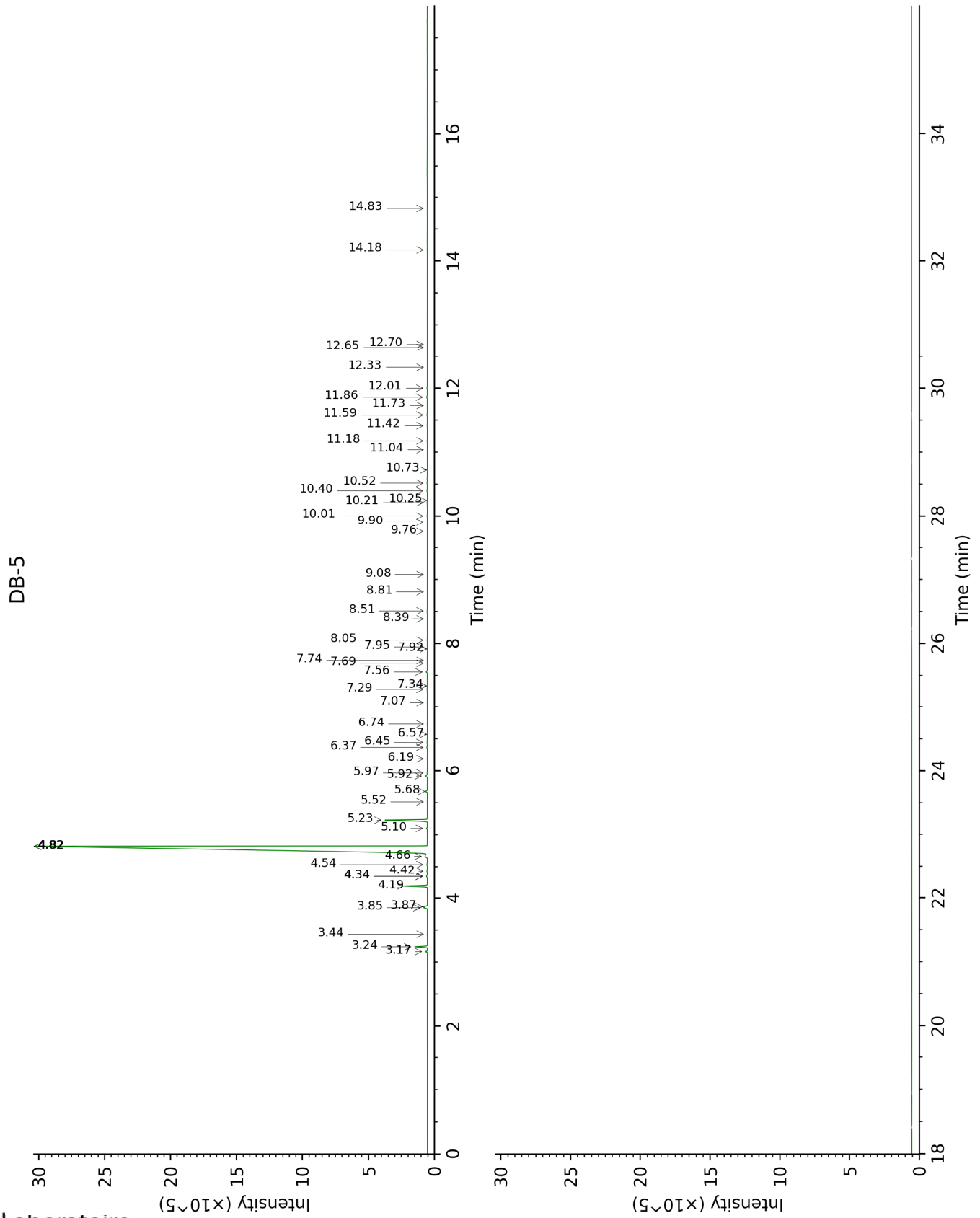
α-Humulene	0.02	Sesquiterpene
(E)-β-Farnesene	0.03	Sesquiterpene
Germacrene D	0.03	Sesquiterpene
Valencene	0.07	Sesquiterpene
α-Murolene	0.01	Sesquiterpene
(3E,6E)-α-Farnesene	0.09	Sesquiterpene
δ-Cadinene	0.05	Sesquiterpene
α-Elemol	0.01	Sesquiterpenic alcohol
Germacrene D-4-ol	0.01	Sesquiterpenic alcohol
Caryophyllene oxide	0.01	Sesquiterpenic ether
β-Sinensal	0.03	Sesquiterpenic aldehyde
α-Sinensal	0.02	Sesquiterpenic aldehyde
Consolidated total	99.37%	

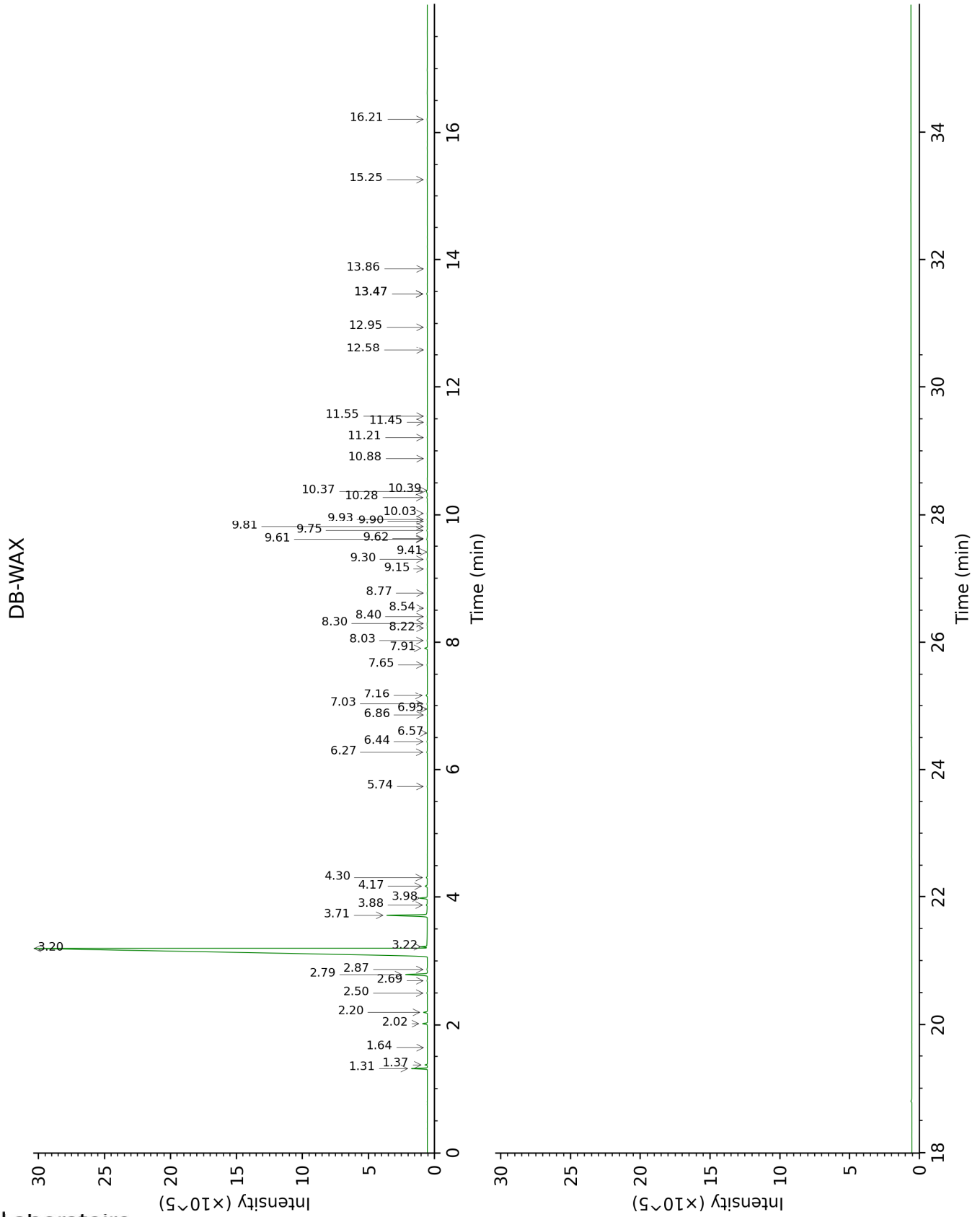
Note: no correction factor was applied

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	3.16	925	0.12	1.37	999	0.11
α-Pinene	3.24	930	0.76	1.31	992	0.76
Camphene	3.44	943	0.01	1.64	1026	0.01
Sabinene	3.85†	970	0.51	2.20	1083	0.23
β-Pinene	3.87†	971	[0.51]	2.02	1065	0.29
Myrcene	4.19	992	1.60	2.79	1134	1.62
Octanal	4.34*	1003	0.11	4.30	1253	0.08
α-Phellandrene	4.34*	1003	[0.11]	2.69	1126	0.03
Δ3-Carene	4.42	1008	0.04	2.50	1110	0.04
α-Terpinene	4.54	1015	0.06	2.87	1140	0.05
para-Cymene	4.66	1023	0.44	3.98	1228	0.47
Limonene	4.82*	1033	90.98	3.20	1167	90.83
1,8-Cineole	4.82*	1033	[90.98]	3.22	1169	0.39
(E)-β-Ocimene	5.10	1050	0.07	3.88	1220	0.05
γ-Terpinene	5.23	1058	3.02	3.72	1208	2.85
Octanol	5.52	1076	0.02	8.03	1523	0.02
Terpinolene	5.68	1086	0.17	4.17	1243	0.18
Linalool	5.92	1101	0.17	7.91	1514	0.19
Nonanal	5.97	1104	0.03	5.74	1352	0.02
<i>trans</i> -para-Mentha-2,8-dien-1-ol	6.19	1118	0.02	8.77	1581	0.02
<i>cis</i> -Limonene oxide	6.37	1130	0.05	6.27	1391	0.05
<i>trans</i> -Limonene oxide	6.44	1135	0.05	6.44	1403	0.04
Epoxyterpinolene	6.57	1143	0.01	6.57	1413	0.01
Citronellal	6.74	1153	0.02	6.86	1434	0.02
Terpinen-4-ol	7.07	1174	0.01	8.40	1552	0.01
α-Terpineol	7.29	1188	0.04	9.61	1649	0.05
Unknown [m/z 121, 79 (98), 93 (87), 94 (73), 91 (63), 105 (45)...]	7.34	1192	0.01	7.65	1494	0.04
Decanal	7.56	1206	0.11	7.16	1457	0.10
Octyl acetate	7.69	1215	0.01	6.95	1441	0.01
<i>trans</i> -Carveol	7.74	1218	0.01	11.21	1783	0.02
Nerol	7.92	1230	0.01	10.88	1755	0.01
<i>cis</i> -Carveol	7.95	1232	0.01	11.55	1812	0.02
Neral	8.06	1239	0.03	9.30	1623	0.04
Geraniol	8.39	1261	0.01	11.45	1804	0.01
Geranial	8.51	1269	0.02	9.93	1675	0.02
Limonen-10-ol	8.81	1289	0.01	12.95	1938	0.02
Undecanal	9.08	1305	0.01	8.54	1563	0.01
Unknown [m/z 43, 81 (96), 95 (85), 67 (74), 69	9.76	1353	0.01			

(68), 41 (66)...204 (1)]						
Neryl acetate	9.90	1363	0.02	10.03	1683	0.03
α -Copaene	10.00	1370	0.04	7.03	1447	0.04
Geranyl acetate	10.22	1385	0.03	10.39	1713	0.02
β -Elemene	10.25	1388	0.01	8.30	1544	0.02
Dimethyl anthranilate	10.40	1398	0.05	13.47*	1987	0.06
Dodecanal	10.52	1407	0.04	9.81	1665	0.02
β -Copaene	10.73	1422	0.02	8.22	1538	0.02
α -Humulene	11.04	1446	0.02	9.15	1611	0.02
(<i>E</i>)- β -Farnesene	11.18	1456	0.03	9.41	1633	0.03
Germacrene D	11.42	1474	0.03	9.62	1650	0.02
Valencene	11.58	1486	0.07	9.75	1660	0.05
α -Muurolene	11.73	1497	0.01	9.90	1672	0.01
(3 <i>E</i> ,6 <i>E</i>)- α - Farnesene	11.86	1507	0.09	10.37	1711	0.10
δ -Cadinene	12.00	1518	0.05	10.28	1703	0.05
α -Elemol	12.33	1544	0.01	13.86	2024	0.01
Germacrene D-4- ol	12.65	1569	0.01	13.47*	1987	[0.06]
Caryophyllene oxide	12.70	1572	0.01	12.58	1905	0.01
β -Sinensal	14.18	1693	0.03	15.25	2161	0.02
α -Sinensal	14.83	1748	0.02	16.21	2259	0.03
Total identified		99.10%			99.28%	
Total reported		99.11%			99.32%	

*: 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

Note: no correction factor was applied

R.T.: Retention time (minutes)

R.I.: Retention index