



GC/MS BATCH NUMBER: MI0101

ESSENTIAL OIL: MANDARIN ORGANIC
BOTANICAL NAME: CITRUS RETICULATA
ORIGIN: UNITED KINGDOM

KEY CONSTITUENTS PRESENT IN THIS BATCH OF MANDARIN ORGANIC OIL	%
LIMONENE	73.4
γ-TERPINENE	15.7
α-PINENE	2.1
MYRCENE	1.9
β-PINENE	1.5
p-CYMENE	1.3

Comments from Robert Tisserand: Rich, smooth, mouth-watering citrus odor quality. Ten of eleven key ISO constituents are within range, with p-cymene slightly high.

Date : December 14, 2017

SAMPLE IDENTIFICATION

Internal code : 17L14-PTH1-1-CC

Customer identification : Mandarin Organic -UK - MI010167R

Type : Essential oil

Source : *Citrus reticulata*

Customer : Plant Therapy

ANALYSIS

Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

Analyst : Alexis St-Gelais, M. Sc., chimiste

Analysis date : 2017-12-14

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Heptanal	3.14	910	tr	2.13	1120	2.55†*	Aliphatic aldehyde
α-Thujene	3.31	920	0.73	2.77	954	1.16†	Monoterpene
α-Pinene	3.42	927	2.11	[2.77]	945	1.12†	Monoterpene
Camphene	3.71	944	0.02	0.03	1000	1.39	Monoterpene
Sabinene	4.14	969	0.26	0.32	1053	1.90	Monoterpene
β-Pinene	4.21	973	1.53	1.42	1038	1.74	Monoterpene
Myrcene	4.49	990	1.85	[2.13]	1115	2.48†	Monoterpene
α-Phellandrene	4.76	1005	0.07	0.03	1110	2.41	Monoterpene
Octanal	4.88	1012	0.10	0.18	1227	3.99	Aliphatic aldehyde
α-Terpinene	4.95	1016	0.31	[2.13]	1120	2.55†*	Monoterpene
Limonene	5.30*	1034	74.13	73.37	1151	2.95	Monoterpene
para-Cymene	5.30*	1034	[74.13]	1.33	1207	3.69*	Monoterpene
cis-β-Ocimene	5.37	1038	tr	15.68	1191	3.48*	Monoterpene
trans-β-Ocimene	5.55	1048	0.02	[1.33]	1207	3.69*	Monoterpene
γ-Terpinene	5.79	1061	15.71	[15.68]	1191	3.48*	Monoterpene
cis-Sabinene hydrate	6.08	1077	0.02	0.02	1399	6.61	Monoterp. alcohol
Terpinolene	6.21	1084	0.72	0.65	1222	3.91	Monoterpene
trans-Sabinene hydrate	6.44	1097	0.01	0.10	1485	8.60*	Monoterp. alcohol
Linalool	6.72	1107	0.14	[0.10]	1485	8.60*	Monoterp. alcohol
Nonanal	6.79	1110	0.03	0.02	1333	5.57	Aliphatic aldehyde
cis-Limonene oxide	7.36	1130	0.04	0.03	1378	6.28	Monoterp. ether
trans-Limonene oxide	7.48	1135	0.03	0.03	1388	6.44	Monoterp. ether
Epoxyterpinolene	7.63	1140	0.03				Monoterp. ether
Citronellal	7.98	1153	0.02	0.02	1413	6.88	Monoterp. aldehyde
Terpinen-4-ol	8.84	1184	0.09	0.17	1520	9.58*	Monoterp. alcohol
α-Terpineol	9.53	1205	0.18	0.23	1615	13.14	Monoterp. alcohol
Decanal	9.82	1211	0.07	0.08	1434	7.38	Aliphatic aldehyde
Geranial	12.92	1279	0.03	0.03	1661	15.52	Monoterp. aldehyde
Undecanal	14.52	1309	0.01				Aliphatic aldehyde
Thymol	15.32	1321	0.09	0.10	2093	39.48	Monoterp. alcohol
α-Copaene	17.74	1358	0.01	0.02	1429	7.26	Sesquiterpene
β-Caryophyllene	20.65	1401	0.08	[0.17]	1520	9.58*	Sesquiterpene
Dimethyl anthranilate	21.34	1409	0.35	0.37	1916	32.45	Phenolic ester
Dodecanal	21.80	1415	0.02	0.09	1639	14.37*	Aliphatic aldehyde
α-Selinene	26.98	1476	0.05	0.07	1631	14.00	Sesquiterpene
Bicyclogermacrene	27.18	1479	0.11	[0.09]	1639	14.37*	Sesquiterpene
(E,E)-α-Farnesene	29.17	1503	0.17	0.14	1691	17.07	Sesquiterpene
α-Sinensal	41.78	1754	0.26	0.29	2215	42.78	Sesquiterp. aldehyde
Tangeretin	70.33	3170	0.14				Flavonoid
Nobiletin	72.98	3329	0.03				Flavonoid
Heptamethoxyflavone	73.19	3339	0.05				Flavonoid

isomer?					
Hexamethoxyflavone isomer?	73.50	3355	0.06		Flavonoid
Total identified		99.68%	99.72%		

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

†: Peaks apexes were resolved, but peaks overlapped and were summed for analysis

Note: no correction factor was applied

OTHER DATA

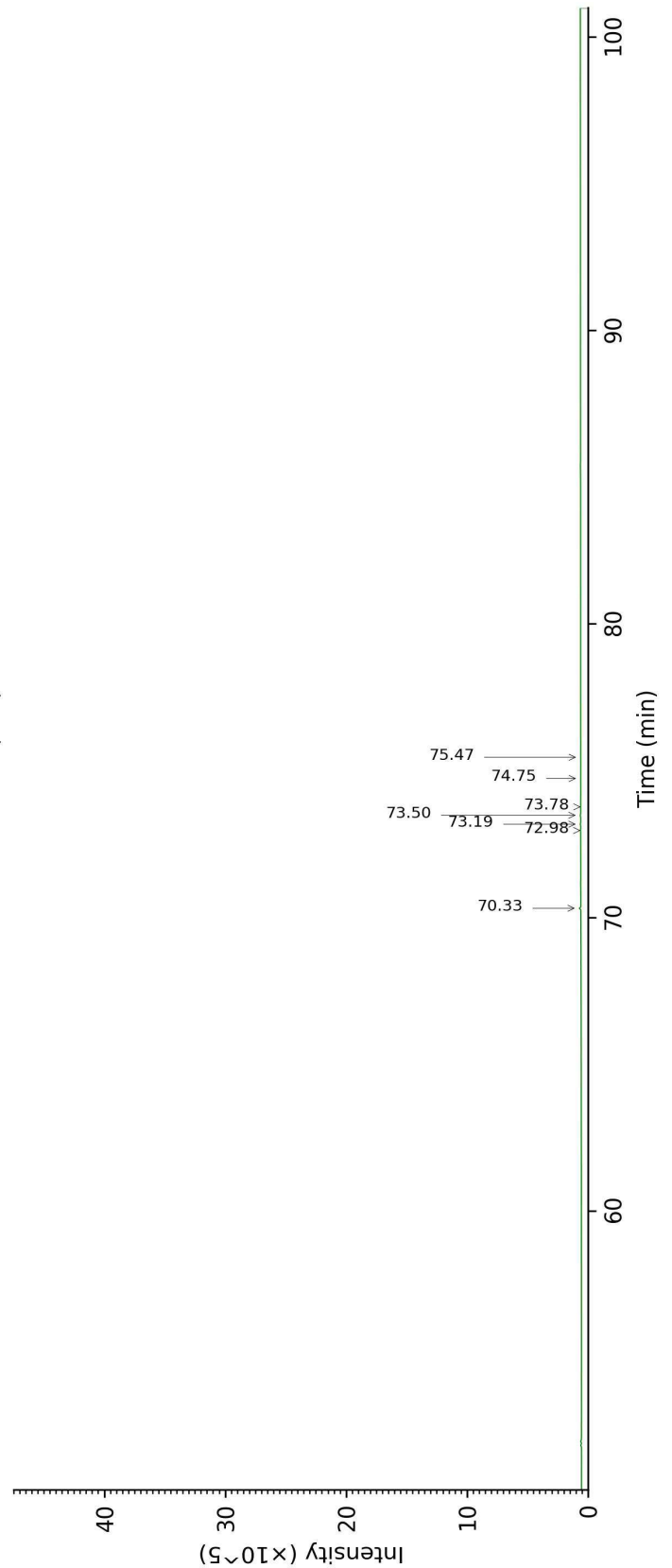
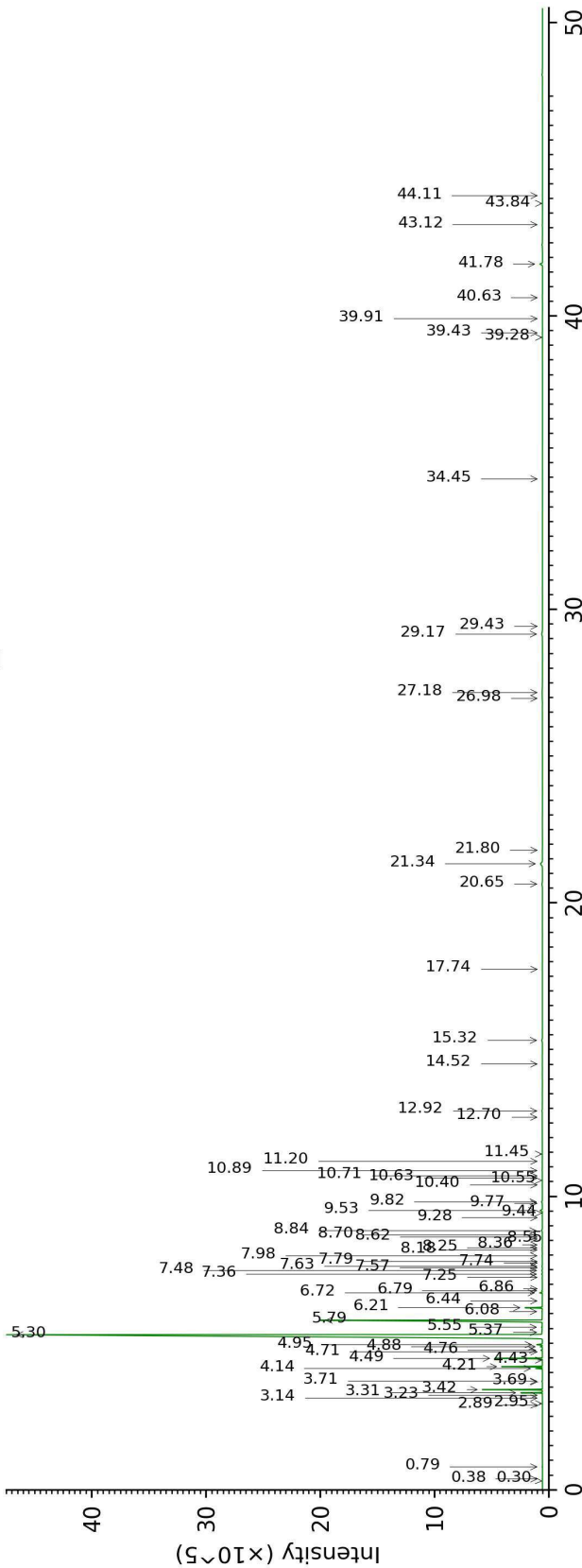
Physical aspect : Brown/yellow liquid

Refractive index : 1.4735 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent were detected using this method.

17L14-PTH1-1-CC_BP5



17L14-PTH1-1-CC_WAX

