

GC/MS BATCH NUMBER: L60103

ESSENTIAL OIL: LEMON
BOTANICAL NAME: CITRUS X LIMON
ORIGIN: ITALY

KEY CONSTITUENTS PRESENT IN THIS BATCH OF LEMON OIL	%
LIMONENE	68.6
β -PINENE	11.4
γ -TERPINENE	8.0
SABINENE	1.8
α -PINENE	1.8
MYRCENE	1.6
GERANIAL	1.1
β -BISABOLENE	0.6
NERAL	0.6
p-CYMENE	0.5
NERYL ACETATE	0.5
α -THUJENE	0.4
GERANYL ACETATE	0.3
α -TERPINEOL	0.1

Comments from Robert Tisserand: An excellent quality odor profile. Conforms to the ISO standard for Coastal USA type lemon oil, except that p-cymene is slightly high at 0.5%, against the maximum of 0.35%. This does not concern me, especially as all 12 of the other key constituents meet the standard.

Date : August 19, 2015

SAMPLE IDENTIFICATION

Internal code : 15H10-PTH2-1-AS

Customer identification : Lemon USA - L6010354

Type : Essential Oil

Source : *Citrus x limon*

Customer : Plant Therapy

ANALYSIS

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

Analyst : Alexis St-Gelais, M. Sc.

Analysis date : 2015-08-12

IDENTIFIED COMPOUNDS

Identification	Colonne: BP5			Colonne: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Heptanal	2.57	911	0.00	0.01	1147	2.60	Aliphatic aldehyde
Tricyclene	2.63	915	0.01	0.01	955	0.92	Monoterpene
α -Thujene	2.72	921	0.38	0.40	988	1.08	Monoterpene
α -Pinene	2.81	926	1.81	1.84	977	1.03	Monoterpene
Camphene	3.07	943	0.06	0.06	1019	1.31	Monoterpene
β -Pinene	3.56*	974	13.09	11.37	1062	1.68	Monoterpene
Sabinene	3.56*	974	[13.09]	1.83	1079	1.84	Monoterpene
Myrcene	3.84	992	1.58	1.55	1132	2.42	Monoterpene
α -Phellandrene	4.07	1006	0.04	0.03	1122	2.30	Monoterpene
Octanal	4.20	1013	0.05	0.05	1251	4.01	Aliphatic aldehyde
α -Terpinene	4.26	1016	0.17	0.18	1136	2.47	Monoterpene
Limonene	4.59*	1036	69.06	68.63	1165	2.83	Monoterpene
cis- β -Ocimene	4.59*	1036	[69.06]	8.11	1207	3.37*	Monoterpene
para-Cymene	4.59*	1036	[69.06]	0.48	1226	3.65*	Monoterpene
1,8-Cineole	4.69	1041	0.32	0.36	1166	2.85	Monoterp. ether
trans- β -Ocimene	4.85	1050	0.12	[0.48]	1226	3.65*	Monoterpene
γ -Terpinene	5.05	1061	8.04	[8.11]	1207	3.37*	Monoterpene
Terpinolene	5.46	1085	0.34	0.34	1237	3.81	Monoterpene
Nonanal	5.92	1109	0.08	0.07	1354	5.54	Monoterp. aldehyde
Linalool	5.98	1112	0.09	0.11	1516	8.82	Monoterp. alcohol
cis-Limonene oxide	6.30	1127	0.01	0.01	1395	6.14	Monoterp. ether
trans-Limonene oxide	6.39	1131	0.02	0.01	1403	6.28	Monoterp. ether
Citronellal	6.91	1154	0.04	0.04	1433	6.90	Monoterp. aldehyde
Terpinen-4-ol	7.54	1183	0.11	0.11	1544	9.75	Monoterp. alcohol
α -Terpineol	8.08	1205	0.14	0.14	1641	13.49	Monoterp. alcohol
Decanal	8.36	1212	0.04	0.03	1452	7.31	Aliphatic aldehyde
Nerol	8.98	1229	0.04	0.04	1750	19.40	Monoterp. alcohol
Neral	9.45	1242	0.63	0.68	1618	12.40	Monoterp. aldehyde
Geranial	10.70	1275	1.09	0.99	1667	14.76	Monoterp. aldehyde
Undecanal	12.38	1313	0.02				Aliphatic aldehyde
Citronellyl acetate	14.61	1352	0.03	0.03	1625	12.77	Monoterp. ester
Neryl acetate	15.15	1362	0.51	0.53	1679	15.30	Monoterp. ester
Geranyl acetate	16.45	1385	0.32	0.34	1710	16.95	Monoterp. ester
β -Caryophyllene	17.29	1399	0.23	0.22	1525	9.11	Sesquiterpene
Dodecanal	17.43	1401	0.03	0.02	1670	14.88	Aliphatic aldehyde
trans- α -Bergamotene	18.76	1419	0.35	0.38	1531	9.32	Sesquiterpene
β -Bisabolene	24.89	1499	0.55	0.60	1666	14.71	Sesquiterpene
Total identified			99.40%	99.60%			

*: Two or more compounds are coeluting on this column

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

Note: no correction factor was applied

OTHER DATA

Physical aspect : Bright yellow liquid

Refractive index : 1.4742 ± 0.0003 (20 °C)

CONCLUSION

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

Checked and approved by :

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

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