

GC/MS BATCH NUMBER: LA0103

ESSENTIAL OIL: LIME
BOTANICAL NAME: CITRUS AURANTIFOLIA
ORIGIN: BRAZIL

KEY CONSTITUENTS PRESENT IN THIS BATCH OF LIME OIL	%
LIMONENE	52.6
β-PINENE	13.3
γ-TERPINENE	11.2
GERANIAL	2.7
SABINENE	2.1
α-PINENE	1.8
NERAL	1.7
β-BISABOLENE	1.6
MYRCENE	1.4
trans-α-BERGAMOTENE	1.1
β-CARYOPHYLLENE	0.9
NERYL ACETATE	0.9
α-FARNESCENE	0.5
p-CYMENE	0.4
α-TERPINEOL	0.4
GERANYL ACETATE	0.3
TERPINEN-4-OL	0.2
DECANAL	0.1

Comments from Robert Tisserand:
Excellent odor profile. The oil only conforms to 13 of 18 key ISO constituents, but all of these are slight and I believe this is a genuine oil.

Date : July 25, 2016

SAMPLE IDENTIFICATION

Internal code : 16G12-PTH1-1-DM

Customer identification : Lime expressed - Brazil - LA010362R

Type : Essential oil

Source : *Citrus aurantifolia*

Customer : Plant Therapy

ANALYSIS

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

Analyst : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2016-07-25

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.	
Tricyclene	3.16	917	0.01	tr	927	0.81	Monoterpene
α -Thujene	3.24	923	0.40	0.57	955	0.92	Monoterpene
α -Pinene	3.35	929	1.76	1.63	947	0.89	Monoterpene
Camphene	3.63	946	0.07	0.06	1001	1.11	Monoterpene
Sabinene	4.07	973	2.05	2.18	1058	1.56	Monoterpene
β -Pinene	4.15	978	13.34	13.42	1043	1.44	Monoterpene
Myrcene	4.41	993	1.40	1.35	1116	2.05	Monoterpene
6-Methyl-5-hepten-2-one	4.49	998	0.09	0.07	1276	4.07	Aliphatic ketone
α -Phellandrene	4.67*	1008	0.07	0.04	1109	1.98	Monoterpene
Δ^3 -Carene	4.67*	1008	[0.07]	0.01	1090	1.81	Monoterpene
Octanal	4.80	1016	0.01	tr	1233	3.47	Aliphatic aldehyde
α -Terpinene	4.86	1019	0.25	0.28	1123	2.13	Monoterpene
Limonene	5.17*	1036	53.46	52.62	1149	2.44	Monoterpene
para-Cymene	5.17*	1036	[53.46]	0.36	1210	3.15	Monoterpene
1,8-Cineole	5.19	1037	0.20	0.44	1151	2.46	Monoterp. ether
<i>cis</i> - β -Ocimene	5.28	1042	0.13	11.35	1193	2.95*	Monoterpene
<i>trans</i> - β -Ocimene	5.45	1052	0.22	0.26	1204	3.08	Monoterpene
γ -Terpinene	5.67	1064	11.16	[11.35]	1193	2.95*	Monoterpene
<i>cis</i> -Sabinene hydrate	5.98	1081	0.02	0.03	1418	6.13	Monoterp. alcohol
Terpinolene	6.10	1088	0.53	0.53	1225	3.35	Monoterpene
Linalool	6.62	1112	0.22	0.20	1494	7.57	Monoterp. alcohol
Nonanal	6.68	1114	0.01	0.01	1338	4.96	Aliphatic aldehyde
<i>cis</i> - β -Terpineol	7.84	1157	0.03	0.03	1581	9.98	Monoterp. alcohol
Borneol	8.54	1183	0.02	0.03	1634	11.87	Monoterp. alcohol
Terpinen-4-ol	8.63	1187	0.18	1.30	1530	8.45*	Monoterp. alcohol
α -Terpineol	9.30	1208	0.35	0.45	1624	11.41*	Monoterp. alcohol
Decanal	9.61	1215	0.05	0.03	1439	6.53	Aliphatic aldehyde
Nerol	10.51	1235	0.21	0.21	1728	16.20	Monoterp. alcohol
Neral	10.96	1245	1.68	1.68	1599	10.54	Monoterp. aldehyde
Geraniol	11.82	1265	0.30	0.28	1778	19.18	Monoterp. alcohol
Geranial	12.47	1280	2.72	2.76	1648	12.50	Monoterp. aldehyde
Bornyl acetate	12.90	1289	0.06	0.08	1515	8.01	Monoterp. ester
δ -Elemene	14.99	1326	0.08	0.08	1420	6.18	Sesquiterpene
Neryl acetate	17.59	1366	0.88	2.45	1659	12.95*	Monoterp. ester
β -Elemene	18.52	1381	0.08	[1.30]	1530	8.45*	Sesquiterpene
Geranyl acetate	19.05	1389	0.27	0.26	1689	14.32	Monoterp. ester
β -Caryophyllene	20.14	1405	0.88	0.89	1524	8.24	Sesquiterpene
<i>cis</i> - α -Bergamotene	20.22	1406	0.06	0.04	1504	7.77	Sesquiterpene
<i>trans</i> - α -Bergamotene	21.72	1424	1.07	[1.30]	1530	8.45*	Sesquiterpene
α -Humulene	22.87	1438	0.07	0.09	1583	10.06	Sesquiterpene
<i>trans</i> - β -Farnesene	24.07	1452	0.11	0.09	1620	11.19	Sesquiterpene

Germacrene D	25.06	1464	0.13	[0.45]	1624	11.41*	Sesquiterpene
Viridiflorene	26.28	1479	0.04	0.03	1615	11.02	Sesquiterpene
Valencene	27.19	1490	0.16	0.32	1663	13.15*	Sesquiterpene
γ-Cadinene	27.87	1498	0.13	[0.32]	1663	13.15*	Sesquiterpene
β-Bisabolene	28.36	1505	1.63	[2.45]	1659	12.95*	Sesquiterpene
(E,E)-α-Farnesene	28.61	1508	0.46	0.44	1692	14.47	Sesquiterpene
δ-Cadinene	28.81	1511	0.17	0.16	1675	13.67	Sesquiterpene
Germacrene B	31.47	1547	0.31	0.28	1722	15.84	Sesquiterpene
β-Bisabolol	38.65	1678	0.05	0.05	2076	36.82	Sesquiterp. alcohol
α-Bisabolol	39.18	1691	0.02	0.02	2127	38.60	Sesquiterp. alcohol
Citropten	47.88	1995	0.38				Coumarin
Bergapten	49.52	2065	0.18				Coumarin
Osthole	51.43	2150	0.04	0.04	2853	53.69	Coumarin
Isopimpinellin	53.35	2240	0.19				Coumarin
Total identified			98.39%	97.5%			

*: 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 green-brown liquid

Refractive index : 1.4818 ± 0.0003 (20 °C)

CONCLUSION

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



