

GC/MS BATCH NUMBER: LA0104

ESSENTIAL OIL: LIME

BOTANICAL NAME: CITRUS X AURANTIFOLIA

ORIGIN: MEXICO

KEY CONSTITUENTS PRESENT IN THIS BATCH OF LIME OIL	%
LIMONENE	46.3
β-PINENE	17.0
γ-TERPINENE	9.1
GERANIAL	3.5
SABINENE	2.5
NERAL	2.1
α-PINENE	2.1
β-BISABOLENE	2.0
trans-α-BERGAMOTENE	1.4
MYRCENE	1.2
(E,E)-α-FARNESENE	1.1
β-CARYOPHYLLENE	1.1

Comments from Robert Tisserand: Delicious sweet, fruity odor profile. Meets 16 of 18 ISO standards, with two borderline - not a concern.

Date : March 10, 2017

SAMPLE IDENTIFICATION

Internal code : 17B21-PTH1-1-DM

Customer identification : Lime Expressed - Mexico - LA010467R

Type : Essential oil

Source : *Citrus x aurantifolia*

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 : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2017-03-08

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.	
Nonane	2.89	896	0.01	0.01	796	0.69	Alkane
Tricyclene	3.21	916	0.01	0.01	927	1.09	Monoterpene
α -Thujene	3.29	921	0.39	0.42	963	1.25	Monoterpene
α -Pinene	3.40	928	2.06	2.01	953	1.20	Monoterpene
Camphene	3.68*	944	0.09	0.09	1002	1.50	Monoterpene
α -Fenchene	3.68*	944	[0.09]	tr	981	1.32	Monoterpene
Sabinene	4.11	970	2.47	2.44	1064	2.05	Monoterpene
β -Pinene	4.21	976	17.01	16.96	1049	1.91	Monoterpene
Myrcene	4.45	990	1.22	1.22	1120	2.62	Monoterpene
6-Methyl-5-hepten-2-one	4.52	995	0.02	0.02	1282	4.89	Aliphatic ketone
α -Phellandrene	4.72*	1006	0.05	0.04	1114	2.53	Monoterpene
Δ^3 -Carene	4.72*	1006	[0.05]	tr	1099	2.35	Monoterpene
Octanal	4.84	1012	0.02	0.02	1237	4.21	Aliphatic aldehyde
α -Terpinene	4.90	1016	0.18	0.20	1127	2.71	Monoterpene
Limonene	5.21*	1033	47.04	46.30	1154	3.06	Monoterpene
para-Cymene	5.21*	1033	[47.04]	0.56	1214	3.87	Monoterpene
1,8-Cineole	5.21*	1033	[47.04]	0.48	1155	3.08	Monoterp. ether
cis- β -Ocimene	5.31	1038	0.13	9.27	1197	3.64*	Monoterpene
trans- β -Ocimene	5.49	1048	0.31	0.33	1207	3.77	Monoterpene
γ -Terpinene	5.71	1060	9.14	[9.27]	1197	3.64*	Monoterpene
cis-Sabinene hydrate	5.97	1074	0.03	0.03	1412	6.95	Monoterp. alcohol
Terpinolene	6.14	1084	0.46	0.45	1228	4.08	Monoterpene
Linalool	6.56	1104	0.19	0.16	1502	9.12	Monoterp. alcohol
Nonanal	6.72	1110	0.03	0.02	1340	5.77	Aliphatic aldehyde
1-Terpineol	7.45	1137	0.02	0.02	1511	9.41	Monoterp. alcohol
Citronellal	7.87	1152	0.04	0.02	1420	7.16	Monoterp. aldehyde
Terpinen-4-ol	8.61	1179	0.39	0.36	1533	10.22	Monoterp. alcohol
α -Terpineol	9.20	1201	0.41	0.42	1630	14.10*	Monoterp. alcohol
Decanal	9.66	1211	0.17	0.15	1441	7.65	Aliphatic aldehyde
Nerol	10.32	1225	0.06	0.06	1737	20.08	Monoterp. alcohol
Neral	10.97	1240	2.10	2.12	1608	12.98	Monoterp. aldehyde
Geraniol	11.57	1253	0.10	0.09	1790	23.56	Monoterp. alcohol
Geranial	12.48	1273	3.51	3.53	1656	15.46	Monoterp. aldehyde
δ -Elemene	15.13	1322	0.22	0.23	1418	7.12	Sesquiterpene
Neryl acetate	17.63	1360	0.28	0.54	1666	15.96*	Monoterp. ester
β -Elemene	18.64	1375	0.18	0.15	1526	9.93	Sesquiterpene
Geranyl acetate	19.09	1382	0.24	1.36	1697	17.61*	Monoterp. ester
β -Caryophyllene	20.31	1401	1.09	1.11	1523	9.82	Sesquiterpene
trans- α -Bergamotene	21.92	1420	1.35	1.39	1529	10.06	Sesquiterpene
cis- β -Farnesene	22.16	1423	0.05	0.06	1581	11.99	Sesquiterpene
α -Humulene	23.03	1433	0.12	0.13	1584	12.12	Sesquiterpene

<i>trans</i> -β-Farnesene	24.21	1447	0.13	0.14	1619	13.55	Sesquiterpene
Germacrene D	25.20	1459	0.24	0.27	1623	13.79	Sesquiterpene
β-Selinene	25.92	1468	0.05	[0.42]	1630	14.10*	Sesquiterpene
α-Selinene	26.44	1474	0.06	0.04	1636	14.39	Sesquiterpene
<i>cis</i> -α-Bisabolene	27.34	1485	0.18	[0.54]	1666	15.96*	Sesquiterpene
γ-Cadinene	28.02	1493	0.16	0.13	1667	16.04	Sesquiterpene
β-Bisabolene	28.54	1499	2.03	2.08	1662	15.80	Sesquiterpene
(<i>E,E</i>)-α-Farnesene	28.76	1502	1.10	[1.36]	1697	17.61*	Sesquiterpene
δ-Cadinene	28.98	1505	0.17	0.18	1678	16.61	Sesquiterpene
Germacrene B	31.62	1542	0.55	0.50	1725	19.27	Sesquiterpene
β-Bisabolol	38.47	1666	0.10	0.07	2081	39.12	Sesquiterp. alcohol
α-Bisabolol	39.18	1683	0.11	0.11	2143	40.97	Sesquiterp. alcohol
Herniarin	40.49	1720	0.09				Coumarin
Citropten	47.66	1976	0.54				Coumarin
Bergapten	49.28	2044	0.10				Coumarin
Isopimpinellin	53.14	2218	0.27				Coumarin
Oxypeucedanin	57.98	2459	0.09				Coumarin
Isooxypeucedanin	59.40	2534	0.25				Coumarin
Total identified			97.41%	96.30%			

*: 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 : Yellow green liquid

Refractive index : 1.4820 ± 0.0003 (20 °C)

CONCLUSION

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



