

## GC/MS BATCH NUMBER: L60104

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**ESSENTIAL OIL:** LEMON

**BOTANICAL NAME:** CITRUS X LIMON

**ORIGIN:** USA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF LEMON OIL	%
LIMONENE	67.4
β-PINENE	11.5
γ-TERPINENE	7.9
α-PINENE	1.8
SABINENE	1.8
MYRCENE	1.5
GERANIAL	1.0
β-BISABOLENE	0.6
NERAL	0.6
NERYL ACETATE	0.5
α-THUJENE	0.5
p-CYMENE	0.4
GERANYL ACETATE	0.3
α-TERPINEOL	0.1

Comments from Robert Tisserand: Has a delightful fresh, zesty odor. Matches the ISO for US Coast Type Lemon oil, except that gamma-terpinene is very slightly low – not a problem.

**Date :** March 3, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16B26-PTH3-1-LC

**Customer identification :** Lemon Cold Pressed - L6010454R - USA

**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., chimiste

**Analysis date :** 2016-03-01

Checked and approved by :

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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.	
Ethanol	0.30	485	0.12	0.11	801	0.58	Aliphatic alcohol
$\alpha$ -Thujene	2.72	918	0.38	0.40	957	0.97	Monoterpene
$\alpha$ -Pinene	2.81	924	1.83	1.81	947	0.93	Monoterpene
Camphene	3.07	940	0.06	0.06	1013	1.17	Monoterpene
$\beta$ -Pinene	3.57*	972	13.31	11.52	1054	1.51	Monoterpene
Sabinene	3.57*	972	[13.31]	1.79	1070	1.63	Monoterpene
Myrcene	3.85	990	1.51	1.51	1121	2.14	Monoterpene
$\alpha$ -Phellandrene	4.08	1004	0.04	0.03	1114	2.05	Monoterpene
Octanal	4.22	1012	0.05	0.05	1238	3.60	Aliphatic aldehyde
$\alpha$ -Terpinene	4.27	1015	0.15	0.15	1127	2.21	Monoterpene
Limonene	4.61*	1034	68.57	67.36	1157	2.56	Monoterpene
1,8-Cineole	4.61*	1034	[68.57]	0.32	1158	2.57	Monoterp. ether
para-Cymene	4.61*	1034	[68.57]	0.41	1214	3.27	Monoterpene
<i>cis</i> - $\beta$ -Ocimene	4.71	1039	0.19	7.88	1199	3.05*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	4.87	1049	0.08	0.08	1208	3.18	Monoterpene
$\gamma$ -Terpinene	5.07	1060	7.91	[7.88]	1199	3.05*	Monoterpene
Terpinolene	5.48	1084	0.30	0.31	1228	3.46	Monoterpene
Linalool	6.00*	1109	0.16	0.11	1506	7.94	Monoterp. alcohol
Nonanal	6.00*	1109	[0.16]	0.06	1342	5.09	Aliphatic aldehyde
<i>cis</i> -Limonene oxide	6.42	1128	0.01	0.01	1380	5.63	Monoterp. ether
<i>trans</i> -Limonene oxide	6.52	1133	0.01	0.01	1392	5.81	Monoterp. ether
Citronellal	6.94	1152	0.04	0.04	1420	6.30	Monoterp. aldehyde
Terpinen-4-ol	7.62	1183	0.12	0.11	1535	8.80	Monoterp. alcohol
$\alpha$ -Terpineol	8.21	1204	0.14	0.14	1632	12.07	Monoterp. alcohol
Decanal	8.40	1210	0.03	0.03	1441	6.68	Aliphatic aldehyde
Nerol	9.12	1229	0.03	0.03	1738	17.26	Monoterp. alcohol
Neral	9.53	1240	0.63	0.64	1608	11.03	Monoterp. aldehyde
Geraniol	10.21	1258	0.02	0.03	1792	20.41	Monoterp. alcohol
Geranial	10.81	1274	1.05	1.00	1655	13.10	Monoterp. aldehyde
Undecanal	12.47	1310	0.02	0.01	1544	9.07	Aliphatic aldehyde
Citronellyl acetate	14.68	1348	0.02	0.02	1612	11.23	Monoterp. ester
Neryl acetate	15.24	1358	0.48	0.55	1664	13.51	Monoterp. ester
Geranyl acetate	16.55	1381	0.35	0.35	1697	14.96	Monoterp. ester
$\beta$ -Caryophyllene	17.39	1396	0.22	0.22	1520	8.36	Sesquiterpene
<i>trans</i> - $\alpha$ -Bergamotene	18.85	1415	0.35	0.37	1527	8.57	Sesquiterpene
<i>trans</i> - $\beta$ -Farnesene	21.08	1444	0.02	0.02	1623	11.68	Sesquiterpene
Bicyclogermacrene	23.06	1470	0.03	0.04	1641	12.47	Sesquiterpene
$\beta$ -Bisabolene	25.05	1495	0.55	0.57	1658	13.25	Sesquiterpene
$\alpha$ -Bisabolol	37.76	1686	0.03	0.07	2138	39.15	Sesquiterp. alcohol

Nootkatone	41.18	1782	0.03	0.03	2366	44.73	Sesquiterp. ketone
Citropten	46.75	1984	0.03				Coumarin
<b>Total identified</b>			<b>98.87%</b>	<b>98.25%</b>			

\*: 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 :** 1.4715 ± 0.0003 (20 °C)

#### CONCLUSION

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



