



## GC/MS BATCH NUMBER: LI0102

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**ESSENTIAL OIL:** LEMON DISTILLED  
**BOTANICAL NAME:** CITRUS X LIMON  
**ORIGIN:** USA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF LEMON DISTILLED OIL	%
LIMONENE	69.4
$\beta$ -PINENE	11.5
$\gamma$ -TERPINENE	5.4
p-CYMENE	2.3
SABINENE	1.9
$\alpha$ -PINENE	1.8
MYRCENE	1.6

Comments from Robert Tisserand: Has the fruity sweetness of a distilled citrus oil.

**Date :** August 12, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16H03-PTH4-1-DM

**Customer identification :** Lemon Distilled - USA - L1010262R

**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 :** Sylvain Mercier, M. Sc., chimiste

**Analysis date :** 2016-08-12

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.	
$\alpha$ -Thujene	3.26	918	0.38	0.54	959	0.91	Monoterpene
$\alpha$ -Pinene	3.36	925	1.78	1.71	951	0.88	Monoterpene
Camphene	3.64	942	0.06	0.06	1004	1.10	Monoterpene
Sabinene	4.09	969	1.86	2.25	1061	1.54	Monoterpene
$\beta$ -Pinene	4.16	973	11.52	11.99	1046	1.42	Monoterpene
Myrcene	4.43	989	1.57	1.52	1119	2.03	Monoterpene
$\alpha$ -Phellandrene	4.69	1005	0.03	0.02	1114	1.96	Monoterpene
Octanal	4.82	1012	0.06	0.05	1235	3.43	Aliphatic aldehyde
$\alpha$ -Terpinene	4.88	1015	0.09	0.19	1126	2.10	Monoterpene
Limonene	5.21*	1033	73.03	69.36	1155	2.45	Monoterpene
para-Cymene	5.21*	1033	[73.03]	2.33	1213	3.12	Monoterpene
1,8-Cineole	5.21*	1033	[73.03]	0.47	1155	2.46	Monoterpene
<i>cis</i> - $\beta$ -Ocimene	5.30	1038	0.07	5.47	1195	2.91*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.48	1048	0.07	0.10	1208	3.06	Monoterpene
$\gamma$ -Terpinene	5.68	1059	5.35	[5.47]	1195	2.91*	Monoterpene
<i>cis</i> -Sabinene hydrate	6.02	1077	0.04	0.04	1411	5.92	Monoterp. alcohol
Terpinolene	6.13	1083	0.22	0.18	1228	3.33	Monoterpene
Linalool	6.66	1107	0.16	0.14	1496	7.49	Monoterp. alcohol
Nonanal	6.71	1109	0.07	0.07	1342	4.92	Aliphatic aldehyde
<i>cis</i> -Limonene oxide	7.25	1129	0.10	0.10	1376	5.41	Monoterp. ether
<i>trans</i> -Limonene oxide	7.37	1134	0.05	0.05	1389	5.60	Monoterp. ether
Citronellal	7.87	1153	0.03	0.02	1422	6.08	Monoterp. aldehyde
Terpinen-4-ol	8.70	1184	0.12	0.19	1538	8.45*	Monoterp. alcohol
$\alpha$ -Terpineol	9.38	1204	0.29	0.29	1631	11.28	Monoterp. alcohol
Decanal	9.66	1210	0.03	0.02	1443	6.50	Aliphatic aldehyde
Nerol	10.56	1231	0.11	0.11	1736	15.97	Monoterp. alcohol
Neral	11.01	1241	0.61	0.64	1604	10.41	Monoterp. aldehyde
Geraniol	11.88	1260	0.11	0.11	1787	18.93	Monoterp. alcohol
Geranial	12.52	1274	0.87	0.90	1654	12.33	Monoterp. aldehyde
Neryl acetate	17.68	1360	0.32	0.32	1665	12.78	Monoterp. ester
Geranyl acetate	19.16	1382	0.14	0.11	1697	14.17	Monoterp. ester
$\beta$ -Caryophyllene	20.27	1398	0.09	[0.19]	1538	8.45*	Sesquiterpene
<i>cis</i> - $\alpha$ -Bergamotene	20.53	1402	0.02	0.03	1507	7.68	Sesquiterpene
<i>trans</i> - $\alpha$ -Bergamotene	21.85	1418	0.17	0.16	1534	8.32	Sesquiterpene
$\beta$ -Bisabolene	28.51	1498	0.25	0.27	1669	12.98	Sesquiterpene
<b>Total identified</b>			<b>99.67%</b>	<b>99.34%</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 :** Clear liquid

**Refractive index :**  $1.4715 \pm 0.0003$  (20 °C)

*CONCLUSION*

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



