

## GC/MS BATCH NUMBER: M30102

---

**ESSENTIAL OIL:** MAY CHANG  
**BOTANICAL NAME:** LITSEA CUBEBA  
**ORIGIN:** CHINA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF LEMON OIL	%
GERANIAL	39.7
NERAL	30.9
LIMONENE	11.0
CITRONELLAL	1.5
β-CARYOPHYLLENE	1.5
GERANIOL	1.3
LINALOOL	1.3
METHYL HEPTENONE	1.2
α-PINENE	1.2
1,8-CINEOLE	1.1
(E)-ISOCITRAL	1.1
MYRCENE	1.1
NEROL	0.6
CITRONELLOL	0.3

Comments from Robert Tisserand: Has a classic lemony, fruity odor. Slightly low on 3 of the 10 key ISO constituents, but not enough to be a concern.

**Date :** March 20, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16C09-PTH7-1-HM

**Customer identification :** Litsea - China - M3010247R

**Type :** Essential oil

**Source :** *Litsea cubeba*

**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 :** 2016-03-20

Checked and approved by :

---

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

*Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.*

*This report is digitally signed, it is only considered valid if the digital signature is intact.*

IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Tricyclene	2.91	910	0.01	tr	921	0.79	Monoterpene
$\alpha$ -Thujene	3.07	920	0.02	0.03	958	0.94	Monoterpene
$\alpha$ -Pinene	3.17	926	1.16	1.14	950	0.90	Monoterpene
Camphene	3.44	943	0.29	0.29	1005	1.13	Monoterpene
Sabinene	3.86	969	0.47	0.47	1060	1.58	Monoterpene
$\beta$ -Pinene	3.92	972	0.83	0.83	1043	1.43	Monoterpene
Myrcene	4.20	989	1.07	1.00	1119	2.08	Monoterpene
6-Methyl-5-hepten-2-one	4.26	993	1.16	1.11	1284	4.18	Aliphatic ketone
$\alpha$ -Phellandrene	4.46	1005	0.10	0.05	1110	1.99	Monoterpene
$\alpha$ -Terpinene	4.65	1015	0.01	0.01	1124	2.15	Monoterpene
Limonene	4.90*	1030	11.02	10.99	1146	2.40	Monoterpene
para-Cymene	4.90*	1030	[11.02]	0.04	1213	3.18	Monoterpene
1,8-Cineole	4.94	1032	1.09	1.16	1150	2.45	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.06	1038	0.02	0.06	1191	2.92*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.23	1048	0.02	0.02	1207	3.10	Monoterpene
$\gamma$ -Terpinene	5.41	1058	0.03	[0.06]	1191	2.92*	Monoterpene
Terpinolene	5.87	1084	0.07	0.07	1226	3.38	Monoterpene
para-Cymenene	6.08	1096	0.02	0.04	1379	5.55*	Monoterpene
Rose furan	6.17	1101	0.02	0.02	1354	5.17	Monoterp. ether
Linalool	6.27	1105	1.26	1.30	1507	7.83	Monoterp. alcohol
<i>cis</i> -Limonene oxide	6.91	1130	0.03	[0.04]	1379	5.55*	Monoterp. ether
<i>trans</i> -Limonene oxide	7.02	1135	0.02	0.02	1392	5.73	Monoterp. ether
exo-Isocitral	7.24	1144	0.08	0.08	1426	6.30	Monoterp. aldehyde
Camphor	7.29	1145	0.05	0.06	1430	6.35	Monoterp. ketone
Citronellal	7.47	1153	1.49	1.31	1423	6.24	Monoterp. aldehyde
( <i>Z</i> )-Isocitral	7.72	1162	0.66	0.46	1485	7.40	Monoterp. aldehyde
Rosefuran epoxide	8.04	1175	0.02	0.02	1539	8.71	Monoterp. ether
Borneol	8.14	1179	0.12	0.09	1629	11.62	Monoterp. alcohol
Terpinen-4-ol	8.20	1181	0.08	0.10	1537	8.64	Monoterp. alcohol
( <i>E</i> )-Isocitral	8.29	1185	1.08	0.76	1514	7.98	Monoterp. aldehyde
$\alpha$ -Terpineol	8.70	1201	0.52	0.48	1634	11.85	Monoterp. alcohol
Methyl salicylate	8.83	1205	0.04	0.05	1676	13.74	Phenolic ester
Nerol	9.85	1228	0.58	0.60	1740	16.92*	Monoterp. alcohol
Citronellol	10.14	1235	0.29	0.25	1719	15.69	Monoterp. alcohol
Neral	10.58	1245	30.91	31.03	1617	11.09	Monoterp. aldehyde
<i>cis</i> -Isogeraniol	10.97	1255	0.08	[0.60]	1740	16.92*	Monoterp. alcohol
Geraniol	11.10	1258	1.30	1.33	1793	20.04	Monoterp. alcohol
Geranial	12.07	1281	39.71	39.80	1665	13.22	Monoterp. aldehyde
$\beta$ -Elemene	18.02	1384	0.14	0.20	1528	8.38	Sesquiterpene

$\beta$ -Caryophyllene	19.18	1402	1.46	1.47	1525	8.29	Sesquiterpene
$\alpha$ -Humulene	21.77	1434	0.13	0.14	1586	10.15	Sesquiterpene
Caryophyllene oxide	32.20	1566	0.23	0.16	1850	23.71	Sesquiterp. ether
Geranylgeraniol isomer	50.52	2121	0.12	0.09	2607	49.30	Diterp. alcohol
<b>Total identified</b>	<b>97.81%</b>			<b>97.13%</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 :** Slightly yellow liquid

**Refractive index :**  $1.4845 \pm 0.0003$  (20 °C)

#### CONCLUSION

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



