

**Lemon Petitgrain Essential Oil**

# **ESSENTIAL OIL ANALYSIS**

Laboratoire  
**PhytoChemia**





Date : April 19, 2017

SAMPLE IDENTIFICATION

**Internal code :** 17D10-FSE2-1-DM

**Customer identification :** Petitgrain, Lemon - Zayat Aroma - Lot EA248541 ES56914A

**Type :** Essential oil

**Source :** Citrus limon

**Customer :** Flowers Shining Everywhere Inc.



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 :** 2017-04-11



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.	
cis-Hex-3-en-1-ol	2.49	866	0.01	0.01	1328	5.57	Aliphatic alcohol
trans-Hex-2-en-1-ol	2.66	879	0.01	tr	1356	6.02	Aliphatic alcohol
Hexanol	2.69	881	0.02	0.03	1295	5.07	Aliphatic alcohol
Tricyclene	3.22	917	0.01	0.01	913	1.04	Monoterpene
$\alpha$ -Thujene	3.30	922	0.10	0.14	949	1.18	Monoterpene
$\alpha$ -Pinene	3.41	928	1.44	1.38	939	1.14	Monoterpene
$\alpha$ -Fenchene	3.68	944	0.01	0.01	986	1.36	Monoterpene
Camphene	3.69	945	0.10	0.09	994	1.42	Monoterpene
Sabinene	4.13	971	2.67	2.67	1054	1.95	Monoterpene
$\beta$ -Pinene	4.22	976	14.66	14.53	1039	1.82	Monoterpene
Myrcene	4.46	991	1.06	1.00	1112	2.51	Monoterpene
6-Methyl-5-hepten-2-one	4.51	994	1.73	1.69	1273	4.74	Aliphatic ketone
$\alpha$ -Phellandrene	4.74*	1007	1.41	0.09	1106	2.43	Monoterpene
$\Delta^3$ -Carene	4.74*	1007	[1.41]	1.27	1083	2.25	Monoterpene
Octanal	4.85	1013	0.01	0.01	1228	4.08	Aliphatic aldehyde
$\alpha$ -Terpinene	4.92	1017	0.18	0.18	1119	2.60	Monoterpene
Limonene	5.22*	1033	39.99	39.69	1145	2.94	Monoterpene
para-Cymene	5.22*	1033	[39.99]	0.30	1204	3.73	Monoterpene
1,8-Cineole	5.25	1035	1.74	1.84	1147	2.96	Monoterp. ether
cis- $\beta$ -Ocimene	5.33	1039	0.41	0.39	1182	3.43	Monoterpene
trans- $\beta$ -Ocimene	5.52	1049	2.09	2.06	1198	3.65	Monoterpene
$\gamma$ -Terpinene	5.70	1059	0.58	0.59	1184	3.46	Monoterpene
cis-Linalool oxide (fur.)	5.96	1074	0.01	0.01	1382	6.44	Monoterp. alcohol
cis-Sabinene hydrate	6.00	1076	0.01	0.02	1402	6.74	Monoterp. alcohol
Isoterpinolene	6.09	1081	0.02	0.02	1214	3.88	Monoterpene
Terpinolene	6.17	1085	0.54	0.53	1219	3.94	Monoterpene
Linalool	6.61	1106	1.12	1.15	1488	8.79	Monoterp. alcohol
trans-para-Mentha-2,8-dien-1-ol	7.09	1124	0.02	0.02	1562	11.25	Monoterp. alcohol
cis-para-Mentha-2,8-dien-1-ol	7.49	1138	0.03	0.03	1601	12.73	Monoterp. alcohol
Citronellal	7.90	1153	0.58	0.53	1412	6.96	Monoterp. aldehyde
Borneol	8.41	1172	0.01	0.02	1614	13.25	Monoterp. alcohol
Terpinen-4-ol	8.66	1181	0.54	0.55	1523	9.82	Monoterp. alcohol
$\alpha$ -Terpineol	9.27	1202	0.59	0.60	1619	13.53	Monoterp. alcohol
Verbenone	9.71	1212	0.06	6.64	1596	12.55*	Monoterp. ketone
Nerol	10.43	1228	1.95	2.00	1726	19.29	Monoterp. alcohol
Citronellol	10.66*	1233	0.51	0.43	1703	17.90*	Monoterp. alcohol
Neral	11.10	1243	6.43	[6.64]	1596	12.55*	Monoterp. aldehyde
Geraniol	11.72	1256	1.53	1.51	1777	22.65	Monoterp. alcohol
Geranial	12.64	1277	9.87	9.94	1646	14.95*	Monoterp. aldehyde



Neryl formate	12.71	1278	0.06				Monoterp. ester
Undecanal	14.57	1313	0.04	0.04	1549	10.80	Aliphatic aldehyde
Citronellic acid	15.92	1334	0.06	0.09	2171	41.70	Monoterp. acid
Neric acid	16.10*	1337	0.02	0.03	2202	42.48*	Monoterp. acid
Citronellyl acetate	17.08	1352	0.11				Monoterp. ester
Neryl acetate	17.73	1361	1.90	2.34	1654	15.38	Monoterp. ester
Geranic acid	18.54	1374	0.17	0.22	2249	43.64	Monoterp. acid
Geranyl acetate	19.20	1384	1.59	1.67	1685	17.01	Monoterp. ester
β-Caryophyllene	20.43	1402	1.81	1.88	1515	9.52	Sesquiterpene
Dimethyl anthranilate	20.72	1405	0.03	0.02	1929	33.17	Phenolic ester
trans-α-Bergamotene	21.97*	1420	0.15	0.16	1520	9.71	Sesquiterpene
α-Humulene	23.14	1434	0.15	0.15	1574	11.71	Sesquiterpene
Geranyl propionate	26.36	1473	0.04	0.06	1749	20.82	Monoterp. ester
Bicyclogermacrene	26.55	1476	0.14	0.12	1635	14.33	Sesquiterpene
γ-Cadinene	28.11	1494	0.02	0.01	1660	15.68	Sesquiterpene
β-Bisabolene	28.57	1500	0.24	[9.94]	1646	14.95*	Sesquiterpene
δ-Cadinene	29.01	1506	0.04	0.03	1666	15.98	Sesquiterpene
Caryophyllene oxide	33.50*	1568	0.18	0.10	1841	27.06	Sesquiterp. ether
Spathulenol	33.50*	1568	[0.18]	0.06	2013	36.90	Sesquiterp. alcohol
Citronellol	10.66*	1233	[0.51]	[0.43]	1703	17.90*	Monoterp. alcohol
Neric acid	16.10*	1337	[0.02]	[0.03]	2202	42.48*	Monoterp. acid
<b>Total identified</b>			<b>98.8%</b>	<b>98.96%</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 :** Light yellow liquid

**Refractive index :** 1.4755 ± 0.0003 (20 °C)

#### CONCLUSION

No adulterant, diluent or contaminant has been detected using this method.



