

GC/MS BATCH NUMBER: L90104

ESSENTIAL OIL: LEMONGRASS ORGANIC
BOTANICAL NAME: CYMBOPOGON FLEXUOSUS
ORIGIN: INDIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF LEMONGRASS ORGANIC OIL	%
GERANIAL	41.1
NERAL	31.7
GERANIOL	6.0
GERANYL ACETATE	3.5
β-CARYOPHYLLENE	2.1
(E)-ISOCITRAL	1.3
6-METHYL-5-HEPTEN-2-ONE	1.3
γ-CADINENE	1.1
LINALOOL	1.0
LIMONENE	0.2

Comments from Robert Tisserand: Very good odor profile and 6 of 7 key constituents are in range for the ISO standard, with limonene being marginally low (not a problem).

Date : August 30, 2016

SAMPLE IDENTIFICATION

Internal code : 16H30-PTH4-1-DM

Customer identification : Org Lemongrass - L9010461R

Type : Essential oil

Source : *Cymbopogon flexuosus*

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 : 2016-08-30

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.	
Isovaleral	0.53	567	0.03	0.01	778	0.49	Aliphatic aldehyde
4-Heptanone	2.57	871	0.02	0.01	1057	1.51	Aliphatic ketone
Tricyclene	3.16	912	0.11	0.11	927	0.79	Monoterpene
α -Pinene	3.35	924	0.17	0.16	945	0.86	Monoterpene
Camphene	3.64	941	0.97	0.95	998	1.08	Monoterpene
Sabinene	4.07	967	0.01	tr	1056	1.50	Monoterpene
β -Pinene	4.13	971	tr	tr	1038	1.36	Monoterpene
Myrcene	4.41	988	0.09	0.05	1115	1.98	Monoterpene
6-Methyl-5-hepten-2-one	4.48	993	1.29	1.68	1274	3.97	Aliphatic ketone
Octanal	4.80	1011	0.08	0.07	1231	3.38	Aliphatic aldehyde
Limonene	5.09	1027	0.23	0.21	1139	2.26	Monoterpene
1,8-Cineole	5.12	1028	0.03	0.06	1145	2.33	Monoterp. ether
<i>cis</i> - β -Ocimene	5.28	1037	0.28	0.28	1185	2.79	Monoterpene
<i>trans</i> - β -Ocimene	5.46	1047	0.18	0.16	1200	2.98	Monoterpene
Bergamal	5.65	1058	0.01	0.01	1292	4.20	Aliphatic aldehyde
γ -Terpinene	5.67	1059	0.03				Monoterpene
<i>cis</i> -Linalool oxide (fur.)	5.94	1073	0.01	0.01	1377	5.42	Monoterp. alcohol
4-Nonanone	6.00	1076	0.82	0.49	1272	3.95	Aliphatic ketone
Terpinolene	6.12	1083	0.05	0.05	1223	3.26	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	6.34	1095	0.12	0.13	1405	5.84*	Monoterp. alcohol
Rose furan	6.46	1100	0.08	0.07	1358	5.15	Monoterp. ether
Perillene	6.62	1106	0.08	0.12	1344	4.95	Monoterp. ether
Linalool	6.65	1107	1.00	1.00	1492	7.41	Monoterp. alcohol
Nonanal	6.70	1109	0.04	0.04	1346	4.98	Aliphatic aldehyde
Unknown (m/z = 81, 70 (71), 67 (57), 109 (47), 41 (43), 82 (42)... 137 (8), 152 (0))	7.42	1136	0.14				Oxygenated monoterp.
exo-Isocitral	7.63	1143	0.09	0.13	1425	6.13*	Monoterp. aldehyde
<i>trans</i> -Chrysanthemal	7.71	1147	0.28	0.28	1429	6.23	Monoterp. aldehyde
Citronellal	7.86	1152	0.22	0.18	1419	6.03	Monoterp. aldehyde
(<i>Z</i>)-Isocitral	8.16	1163	0.80	0.74	1476	7.09	Monoterp. aldehyde
Rosefuran epoxide	8.39	1172	0.18	2.22	1529	8.19*	Monoterp. ether
Borneol	8.57	1179	0.22	0.22	1620	10.89	Monoterp. alcohol
Terpinen-4-ol	8.68	1183	0.05	[2.22]	1529	8.19*	Monoterp. alcohol
(<i>E</i>)-Isocitral	8.77	1186	1.31	1.05	1504	7.61	Monoterp. aldehyde
α -Terpineol	9.36	1203	0.15	0.20	1632	11.33	Monoterp. alcohol
Decanal	9.65*	1210	0.17	0.10	1440	6.43	Aliphatic aldehyde
endo-Fenchyl acetate	9.65*	1210	[0.17]	[0.13]	1405	5.84*	Monoterp. ester
Nerol	10.65	1233	0.07	0.14	1733	15.77	Monoterp. alcohol
Citronellol	10.71	1234	0.14	0.09	1709	14.71	Monoterp. alcohol

Neral	11.25	1246	31.73	32.76	1607	10.52	Monoterp. aldehyde
Piperitone	11.67	1255	0.06	0.21	1628	11.15*	Monoterp. ketone
Geraniol	12.23	1267	5.97	6.13	1785	18.82	Monoterp. alcohol
Geranial	12.87	1282	41.07	42.23	1660	12.52*	Monoterp. aldehyde
Geranyl formate	13.70	1299	0.14	[42.23]	1660	12.52*	Monoterp. ester
Cycloisosativene	16.70	1345	0.12	[0.13]	1425	6.13*	Sesquiterpene
α-Copaene	17.65	1359	0.04	0.04	1432	6.28	Sesquiterpene
β-Bourbonene	17.82	1362	0.08	0.06	1448	6.58	Sesquiterpene
β-Elemene	18.64	1374	0.10	[2.22]	1529	8.19*	Sesquiterpene
Geranyl acetate	19.22	1383	3.51	3.42	1694	14.07	Monoterp. ester
β-Caryophyllene	20.29*	1399	2.27	[2.22]	1529	8.19*	Sesquiterpene
Geranic acid	20.29*	1399	[2.27]	0.37	2262	41.51	Monoterp. acid
α-Humulene	23.02	1432	0.21	0.20	1592	10.06	Sesquiterpene
(E)-Isoeugenol	25.05	1456	0.50	0.51	2241	40.96	Phenylpropanoid
Germacrene D	25.21	1458	0.27	[0.21]	1628	11.15*	Sesquiterpene
4-epi-Cubebol	27.37	1483	0.09	0.07	1809	20.24	Sesquiterp. alcohol
γ-Cadinene	28.29	1495	1.13	0.91	1675	13.23	Sesquiterpene
δ-Cadinene	28.90*	1503	0.60	0.36	1680	13.45*	Sesquiterpene
Cubebol	28.90*	1503	[0.60]	0.25	1859	23.36	Sesquiterp. alcohol
trans-γ-Bisabolene	29.84	1516	0.14	[0.36]	1680	13.45*	Sesquiterpene
α-Elemol	32.39	1551	0.05	0.05	2008	32.83	Sesquiterp. alcohol
Caryophyllene oxide	33.51*	1566	0.59	0.30	1854	23.01	Sesquiterp. ether
Geranyl butyrate	33.51*	1566	[0.59]	0.06	1837	21.88	Monoterp. ester
Humulene epoxide II	35.21	1589	0.04	0.10	1897	25.99	Sesquiterp. ether
Geranylgeraniol isomer	51.11	2122	0.13	0.12	2630	48.92	Diterpenic alcohol
Total identified			98.25%	99.17%			

*: 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 liquid

Refractive index : 1.4825 ± 0.0003 (20 °C)

CONCLUSION

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



