

Date : December 17, 2015

SAMPLE IDENTIFICATION

Internal code : 15L08-PTH6-1-LC

Customer identification : Lemongrass - India - L80102412R

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 : Alexis St-Gelais, M. Sc., chimiste

Analysis date : 2015-12-12

IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
2-Methyl-3-buten-2-ol	0.42	531	0.03	0.03	1008	1.21	Aliphatic alcohol
<i>cis</i> -Hex-3-en-1-ol	1.98	863	0.00	0.01	1346	5.42	Aliphatic alcohol
4-Heptanone	2.10	874	0.02	0.02	1091	1.94	Aliphatic ketone
Tricyclene	2.61	914	0.17	0.18	969	0.99	Monoterpene
α -Pinene	2.79	925	0.19	0.18	990	1.09	Monoterpene
Camphene	3.05*	942	1.26	1.24	1028	1.38	Monoterpene
α -Fenchene	3.05*	942	[1.26]	0.01	1021	1.32	Monoterpene
Sabinene	3.47	968	0.01	0.01	1086	1.90	Monoterpene
β -Pinene	3.51	971	0.01	0.01	1067	1.73	Monoterpene
Dehydro-1,8-cineole	3.80	989	0.03	0.04	1150	2.64	Monoterp. ether
Myrcene	3.81	990	0.12	0.12	1137	2.48	Monoterpene
6-Methyl-5-hepten-2-one	3.89	995	1.03	1.03	1301	4.73	Aliphatic ketone
Pseudolimonene	4.01	1002	0.01	0.00	1129	2.38	Monoterpene
α -Phellandrene	4.05	1005	0.00	0.00	1132	2.41	Monoterpene
6-Methyl-5-hepten-2-ol	4.08	1006	0.04	0.05	1432	6.88	Aliphatic alcohol
Octanal	4.18	1012	0.05	0.05	1254	4.04*	Aliphatic aldehyde
Limonene	4.44*	1027	0.32	0.29	1161	2.78	Monoterpene
para-Cymene	4.44*	1027	[0.32]	0.01	1230	3.70	Monoterpene
1,8-Cineole	4.49	1030	0.11	0.10	1165	2.84	Monoterp. ether
<i>cis</i> - β -Ocimene	4.65	1039	0.28	0.27	1209	3.40*	Monoterpene
<i>trans</i> - β -Ocimene	4.82	1049	0.16	0.16	1223	3.60	Monoterpene
γ -Terpinene	4.99	1058	0.01	[0.27]	1209	3.40*	Monoterpene
Bergamal	5.02	1060	0.02	0.02	1315	4.95	Aliphatic aldehyde
<i>cis</i> -Linalool oxide (fur.)	5.17	1068	0.02	0.01	1400	6.23	Monoterp. alcohol
4-Nonanone	5.35	1079	1.03	1.01	1293	4.62	Aliphatic ketone
Terpinolene	5.44	1084	0.04	0.04	1243	3.90	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	5.60	1093	0.01	0.01	1428	6.80	Monoterp. alcohol
Rose furan	5.67	1097	0.09	0.08	1364	5.69	Monoterp. ether
Perillene	5.76	1102	0.07				Monoterp. ether
2-Methylbutyl 2-methylbutyrate	5.87	1107	0.08	[0.05]	1254	4.04*	Aliphatic ester
Linalool	5.92	1109	1.22	1.16	1516	8.82	Monoterp. alcohol
endo-Fenchol	6.21	1122	0.02	1.01	1526	9.14*	Monoterp. alcohol
Unknown (m/z = 81, 70 (71), 67 (57), 109 (47), 41 (43), 82 (42)... 137 (8), 152 (0))	6.52	1136	0.11				Oxygenated monoterpene
exo-Isocitral	6.70	1145	0.10	0.28	1435	6.95*	Monoterp. aldehyde
<i>trans</i> -Chrysanthemal	6.76	1147	0.25	0.27	1449	7.24	Monoterp. aldehyde
Citronellal	6.89	1153	0.26	[0.28]	1435	6.95*	Monoterp. aldehyde
(<i>Z</i>)-Isocitral	7.13	1165	0.78	0.66	1504	8.42	Monoterp. aldehyde

Rosefuran epoxide	7.32	1173	0.12	0.12	1552	10.00	Monoterp. ether
Borneol	7.38	1176	0.14	0.15	1636	13.29	Monoterp. alcohol
Terpinen-4-ol	7.52	1182	0.04	0.04	1546	9.79	Monoterp. alcohol
(<i>E</i>)-Isocitral	7.62	1187	1.26	[1.01]	1526	9.14*	Monoterp. aldehyde
α -Terpineol	8.08	1205	0.16	0.16	1640	13.45	Monoterp. alcohol
β -Phellandren-8-ol	8.12	1206	0.09	0.12	1726	17.92	Monoterp. alcohol
Decanal	8.33	1211	0.16	0.10	1457	7.41	Aliphatic aldehyde
Linalyl formate	8.68	1221	0.08	0.13	1474	7.75	Monoterp. ester
Nerol	9.14	1233	0.09	0.13	1748	19.31	Monoterp. alcohol
Neral	9.70	1248	31.98	31.68	1625	12.76	Monoterp. aldehyde
Linalyl acetate	9.76	1250	0.02	0.04	1520	8.96	Monoterp. ester
Piperitone	10.00	1256	0.07	0.24	1641	13.52*	Monoterp. ketone
Geraniol	10.45	1269	5.90	6.42	1805	22.88	Monoterp. alcohol
Geranial	11.09	1286	42.84	42.94	1678	15.25	Monoterp. aldehyde
Geranyl formate	11.66	1301	0.13				Monoterp. ester
Cycloisositivene	14.23	1346	0.14	0.13	1424	6.72	Sesquiterpene
Geranyl acetate	16.48	1385	3.15	3.05	1714	17.19	Monoterp. ester
Geranic acid	16.88	1392	0.14	0.29	2277	43.66	Monoterp. acid
β -Caryophyllene	17.26	1399	1.16	1.13	1537	9.51	Sesquiterpene
α -Humulene	19.69	1431	0.12	0.15	1607	11.88	Sesquiterpene
(<i>E</i>)-Isoeugenol	21.54	1456	0.21	0.28	2260	43.24	Phenylpropanoid
Germacrene D	21.68	1457	0.17	[0.24]	1641	13.52*	Sesquiterpene
γ -Cadinene	24.55	1495	0.77	0.87	1688	15.75	Sesquiterpene
Cubebol	25.14*	1503	0.29	0.12	1866	27.29	Sesquiterp. alcohol
δ -Cadinene	25.14*	1503	[0.29]	0.18	1694	16.02	Sesquiterpene
<i>trans</i> - γ -Bisabolene	26.03	1513	0.09	0.07	1704	16.54	Sesquiterpene
Caryophyllene oxide	29.83	1559	0.47	0.39	1863	27.06	Sesquiterp. ether
Geranyl butyrate	30.15	1562	0.09	0.09	1847	25.93	Monoterp. ester
13-epi-Manoyl oxide	46.56	1986	0.06	0.04	2245	42.88	Diterp. ether
Manool	47.56	2028	0.14	0.12	2568	49.78	Diterp. alcohol
Geranylgeraniol isomer	49.68	2119	0.43	0.39	2617	50.76	Diterp. alcohol
Total identified			98.35%	97.93%			

*: 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 : 1.4853 \pm 0.0003 (20 °C)

CONCLUSION

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

Checked and approved by :

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

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