

GC/MS BATCH NUMBER: G30104

ESSENTIAL OIL: GERANIUM EGYPTIAN
BOTANICAL NAME: PELARGONIUM X ASPERUM
ORIGIN: EGYPT

KEY CONSTITUENTS PRESENT IN THIS BATCH OF GERANIUM EGYPTIAN OIL	%
CITRONELLOL	33.39
GERANIOL	14.0
LINALOOL	5.23
CITRONELLYL FORMATE	4.96
ISOMENTHONE	4.77
10-EPI- γ -EUDESMOL	4.23
GERANIAL	3.14
GERANYL FORMATE	2.81
MENTHONE	2.61
β -CARYOPHYLLENE	1.23
cis-ROSE OXIDE	1.17
β -BOURBONENE	1.09
GERANYL TIGLATE	1.02

Comments from Robert Tisserand: Beautiful fresh, green, watery odor profile. Fourteen of fifteen key ISO constituents are within range for N. African Geranium oil, with slightly high menthone - not a concern.

Date : November 2, 2017

SAMPLE IDENTIFICATION

Internal code : 17J31-PTH3-1-CC

Customer identification : Geranium Egyptian - Egypt - G3010476R

Type : Essential oil

Source : *Pelargonium graveolens*

Customer : Plant Therapy

ANALYSIS

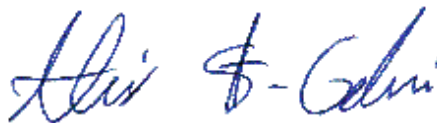
Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

Analyst : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2017-11-01

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.	
Isoamyl alcohol	1.16	738	0.02	0.04	1154	3.05*	Aliphatic alcohol
Dimethyl sulfoxide	1.87	817	0.02				Sulfoxide
3-Methylpentanol	2.38	856	0.05	0.04	1270	4.69	Aliphatic alcohol
cis-Hex-3-en-1-ol	2.50	865	0.03	0.04	1322	5.48	Aliphatic alcohol
α-Pinene	3.42	926	0.57	0.55	950	1.16	Monoterpene
Geranic oxide	4.09	966	0.06	0.06	1048	1.90*	Monoterp. ether
β-Pinene	4.20	973	0.01	[0.06]	1048	1.90*	Monoterpene
Myrcene	4.48	989	0.08	0.08	1117	2.57	Monoterpene
trans-Dehydroxylinalool oxide	4.50	990	0.04	[0.04]	1154	3.05*	Monoterp. ether
6-Methyl-5-hepten-2-one	4.56	994	0.05	0.07	1276	4.78	Aliphatic ketone
α-Phellandrene	4.76*	1005	0.05	0.04	1111	2.49	Monoterpene
Δ3-Carene	4.76*	1005	[0.05]	0.02	1095	2.29	Monoterpene
para-Cymene	5.14	1026	0.09	0.11	1210	3.80	Monoterpene
Limonene	5.17	1027	0.17	0.14	1141	2.89	Monoterpene
β-Phellandrene	5.21	1029	0.04	0.07	1146	2.96*	Monoterpene
1,8-Cineole	5.24	1031	0.01	[0.07]	1146	2.96*	Monoterp. ether
cis-β-Ocimene	5.36	1037	0.06	0.11	1188	3.51*	Monoterpene
trans-β-Ocimene	5.54	1047	0.10	0.07	1204	3.72	Monoterpene
γ-Terpinene	5.73	1058	0.03	[0.11]	1188	3.51*	Monoterpene
cis-Linalool oxide (fur.)	6.01	1073	0.26	0.23	1375	6.32*	Monoterp. alcohol
Terpinolene	6.21	1084	0.05	0.02	1225	4.02	Monoterpene
trans-Linalool oxide (fur.)	6.33	1090	0.12	0.11	1405	6.81	Monoterp. alcohol
para-Cymenene	6.43	1096	0.01	[0.23]	1375	6.32*	Monoterpene
6,7-Epoxygeraniol	6.47	1098	0.02	0.01	1346	5.85	Monoterp. ether
Linalool	6.76	1108	5.23	5.33	1496	8.96*	Monoterp. alcohol
cis-Rose oxide	6.82	1111	1.17	1.17	1296	5.06	Monoterp. ether
trans-Rose oxide	7.17	1123	0.49	0.49	1307	5.24	Monoterp. ether
Isopulegol	7.85	1148	0.12	[5.33]	1496	8.96*	Monoterp. alcohol
Citronellal	8.02	1154	0.08	5.09	1412	6.98*	Monoterp. aldehyde
Menthone	8.06	1156	2.61	2.60	1388	6.53	Monoterp. ketone
Isomenthone	8.34	1166	4.77	[5.09]	1412	6.98*	Monoterp. ketone
Menthol	8.84	1184	0.03	8.04	1559	11.18*	Monoterp. alcohol
Isomenthol	9.17	1196	0.14	0.38	1549	10.80*	Monoterp. alcohol
α-Terpineol	9.52	1204	0.38	2.18	1622	13.76*	Monoterp. alcohol
Nerol	10.65	1229	0.33	0.30	1729	19.61	Monoterp. alcohol
Citronellol	11.22*	1242	33.43	33.39	1714	18.63	Monoterp. alcohol
Neral	11.22*	1242	[33.43]	0.63	1606	12.93*	Monoterp. aldehyde
Geraniol	12.24	1264	14.00	14.18	1783	23.17	Monoterp. alcohol
Citronellyl formate	12.87*	1278	8.10	[8.04]	1559	11.18*	Monoterp. ester
Geranial	12.87*	1278	[8.10]	3.14	1637	14.53*	Monoterp. aldehyde

Geranyl formate	14.17	1304	2.81	[3.14]	1637	14.53*	Monoterp. ester
α -Cubebene	16.04	1332	0.16	[5.09]	1412	6.98*	Sesquiterpene
Citronellic acid	17.01	1347	0.05	0.12	2176	41.92	Monoterp. acid
Citronellyl acetate	17.32	1351	0.39	0.53	1598	12.63	Monoterp. ester
α -Copaene	17.77	1358	0.52	0.57	1432	7.47	Sesquiterpene
β -Bourbonene	18.21	1365	1.09	1.08	1454	7.98	Sesquiterpene
β -Cubebene	18.74	1373	0.03	0.04	1482	8.65	Sesquiterpene
β -Elemene	18.99	1377	0.06	1.55	1521	9.81*	Sesquiterpene
Geranyl acetate	19.43*	1383	0.51	0.44	1693	17.45*	Monoterp. ester
Geranic acid	19.43*	1383	[0.51]	0.18	2254	43.81	Monoterp. acid
β -Caryophyllene	20.69	1401	1.23	[1.55]	1521	9.81*	Sesquiterpene
Aromadendrene	22.07	1418	0.07	[1.55]	1521	9.81*	Sesquiterpene
6,9-Guaiadiene	22.65	1425	0.38	0.31	1539	10.44	Sesquiterpene
Seychellene	23.13*	1430	0.45	[0.38]	1549	10.80*	Sesquiterpene
<i>cis</i> - β -Farnesene	23.13*	1430	[0.45]	0.46	1585	12.13*	Sesquiterpene
α -Humulene	23.48	1435	0.25	[0.46]	1585	12.13*	Sesquiterpene
allo-Aromadendrene	23.74	1438	0.22	[8.04]	1559	11.18*	Sesquiterpene
Citronellyl propionate	24.08	1442	0.36				Monoterp. ester
Neryl propionate	25.14	1454	0.24	0.23	1736	20.10	Monoterp. ester
γ -Muuroolene	25.59	1460	0.11	[0.63]	1606	12.93*	Sesquiterpene
Germacrene D	25.72	1461	0.92	[2.18]	1622	13.76*	Sesquiterpene
β -Selinene	26.32	1468	0.13	[2.18]	1622	13.76*	Sesquiterpene
Viridiflorene	26.53	1471	0.26	[2.18]	1622	13.76*	Sesquiterpene
Geranyl propionate	26.72	1473	0.62	0.65	1756	21.45	Monoterp. ester
Bicyclgermacrene	26.96	1476	0.34	[3.14]	1637	14.53*	Sesquiterpene
α -Muuroolene	27.74	1485	0.28	[3.14]	1637	14.53*	Sesquiterpene
γ -Cadinene	28.79	1498	0.29	0.64	1669	16.25*	Sesquiterpene
(<i>E,E</i>)- α -Farnesene	29.20	1504	0.07	[0.44]	1693	17.45*	Sesquiterpene
δ -Cadinene	29.47	1507	0.89	0.98	1678	16.64*	Sesquiterpene
Zonarene	29.63	1510	0.12	[0.64]	1669	16.25*	Sesquiterpene
<i>trans</i> -Calamenene	29.84	1513	0.40	0.45	1744	20.60	Sesquiterpene
<i>trans</i> - γ -Bisabolene	30.36	1520	0.09	[0.98]	1678	16.64*	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	30.59	1523	0.10	[0.44]	1693	17.45*	Sesquiterpene
α -Agarofuran	31.32	1533	0.27	0.24	1765	22.00	Sesquiterp. ether
Citronellyl butyrate	31.51	1536	0.52				Monoterp. ester
Caryophyllene oxide	33.83*	1569	1.07	0.21	1846	27.66	Sesquiterp. ether
Geranyl butyrate	33.83*	1569	[1.07]	0.92	1832	26.58	Monoterp. ester
Spathulenol	34.08	1572	0.21	0.23	2015	37.15*	Sesquiterp. alcohol
Phenylethyl tiglate	35.34	1590	0.77	0.83	2077	39.13*	Phenolic ester
Geranyl isovalerate	35.96	1599	0.13	0.17	1838	27.06	Monoterp. ester
10- <i>epi</i> - γ -Eudesmol	36.26	1607	4.23	4.47	1981	35.65	Sesquiterp. alcohol
1,10- <i>diepi</i> -Cubenol	36.49	1612	0.04	0.43	1953	34.40*	Sesquiterp. alcohol
1- <i>epi</i> -Cubenol	36.72	1618	0.10	[0.43]	1953	34.40*	Sesquiterp. alcohol
Cubenol	37.09	1627	0.19	[0.43]	1953	34.40*	Sesquiterp. alcohol

Hinesol	37.17	1629	0.22	0.24	2109	40.11	Sesquiterp. alcohol
τ -Cadinol	37.62	1640	0.22	0.26	2070	38.89	Sesquiterp. alcohol
τ -Muurolol	37.73	1643	0.07	[0.83]	2077	39.13*	Sesquiterp. alcohol
α -Muurolol	37.95*	1648	0.65	0.46	2103	39.94	Sesquiterp. alcohol
β -Eudesmol	37.95*	1648	[0.65]	0.37	2122	40.50*	Sesquiterp. alcohol
α -Cadinol	38.18	1653	0.16	[0.37]	2122	40.50*	Sesquiterp. alcohol
Geranyl valerate	38.45	1660	0.13	0.18	1931	33.37	Monoterp. ester
Citronellyl tiglate	38.75	1668	0.28	0.32	1941	33.82	Monoterp. ester
Geranyl tiglate	40.09	1701	1.02	1.20	2036	37.84	Monoterp. ester
Geranyl caproate isomer	40.63	1718	0.14	[0.23]	2015	37.15*	Monoterp. ester
Geranyl caproate	41.80	1755	0.08	0.05	2028	37.58	Monoterp. ester
Geranyl caprylate	47.18	1949	0.03	0.08	2227	43.22	Monoterp. ester
Total identified			96.79%	97.62%			

*: 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 : 1.4680 \pm 0.0003 (20 °C)

CONCLUSION

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

