

GC/MS BATCH NUMBER: G30102

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF GERANIUM EGYPTIAN OIL	%
CITRONELLOL	31.6
GERANIOL	15.6
CITRONELLYL FORMATE	7.1
10-EPI- γ -EUDESMOL	5.6
ISOMENTHONE	5.2
LINALOOL	4.7
GERANYL FORMATE	2.9
GERANYL TIGLATE	1.5
MENTHONE	1.2
GERMACRENE D	1.1
β -CARYOPHYLLENE	1.1
GERANYL BUTYRATE	1.0

Comments from Robert Tisserand: Excellent "sweetgrass" odor profile, and conforms to all 15 key ISO constituents for North African Geranium oil.

Date : March 19, 2016

SAMPLE IDENTIFICATION

Internal code : 16C09-PTH8-1-LC

Customer identification : Geranium Egyptian - Egypt - G30102512R

Type : Essential oil

Source : *Pelargonium x asperum*

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 : 2016-03-18

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.	
2-Methyl-3-buten-2-ol	0.43	535	tr	0.01	978	1.02	Aliphatic alcohol
Isoamyl alcohol	1.05	727	0.02	0.02	1161	2.57*	Aliphatic alcohol
3-Methylpentanol	2.17	852	0.03	0.09	1284	4.17*	Aliphatic alcohol
cis-Hex-3-en-1-ol	2.31	863	0.02	0.02	1336	4.92	Aliphatic alcohol
trans-Hex-2-en-1-ol	2.43	874	0.01	0.02	1366	5.36	Aliphatic alcohol
Heptanal	2.81	904	0.01	0.01	1136	2.28	Aliphatic aldehyde
α-Pinene	3.17	926	0.49	0.47	950	0.90	Monoterpene
Camphene	3.45	943	tr	tr	1012	1.19	Monoterpene
Geranic oxide	3.83*	966	0.06	0.06	1053	1.52	Monoterp. ether
Sabinene	3.83*	966	[0.06]	0.01	1060	1.57	Monoterpene
β-Pinene	3.86	968	0.01	0.01	1042	1.43	Monoterpene
trans-Dehydroxylinalool oxide	4.20*	989	0.12	[0.02]	1161	2.57*	Monoterp. ether
Myrcene	4.20*	989	[0.12]	0.09	1118	2.07	Monoterpene
6-Methyl-5-hepten-2-one	4.29	995	0.05	[0.09]	1284	4.17*	Aliphatic ketone
α-Phellandrene	4.46*	1005	0.05	0.04	1110	1.99	Monoterpene
Δ3-Carene	4.46*	1005	[0.05]	0.03	1092	1.83	Monoterpene
α-Terpinene	4.65	1015	0.01	0.01	1124	2.15	Monoterpene
para-Cymene	4.82	1025	0.09	0.10	1213	3.18	Monoterpene
Limonene	4.86*	1028	0.17	0.05	1148	2.43	Monoterpene
β-Phellandrene	4.86*	1028	[0.17]	0.04	1157	2.53*	Monoterpene
1,8-Cineole	4.89	1029	0.04	[0.04]	1157	2.53*	Monoterp. ether
cis-β-Ocimene	5.05	1038	0.09	0.11	1190	2.91*	Monoterpene
trans-β-Ocimene	5.23	1048	0.09	0.09	1207	3.10	Monoterpene
γ-Terpinene	5.37	1056	0.03	[0.11]	1190	2.91*	Monoterpene
cis-Linalool oxide (fur.)	5.68	1073	0.24	0.21	1389	5.69	Monoterp. alcohol
Terpinolene	5.87	1084	0.04	0.03	1226	3.38	Monoterpene
trans-Linalool oxide (fur.)	5.99	1091	0.11	5.09	1420	6.18*	Monoterp. alcohol
para-Cymenene	6.05	1094	0.02	0.02	1379	5.54	Monoterpene
6,7-Epoxymenthyl	6.18	1101	0.01	0.01	1349	5.10	Monoterp. ether
Linalool	6.30	1106	4.72	4.95	1508	7.86	Monoterp. alcohol
cis-Rose oxide	6.43	1112	0.97	0.94	1301	4.41	Monoterp. ether
trans-Rose oxide	6.75	1124	0.39	0.38	1313	4.57	Monoterp. ether
Camphor	7.29	1145	0.10	0.19	1422	6.22*	Monoterp. ketone
Menthone	7.50*	1154	1.33	1.17	1395	5.78	Monoterp. ketone
Citronellal	7.50*	1154	[1.33]	[0.19]	1422	6.22*	Monoterp. aldehyde
Isomenthyl	7.76	1164	5.22	[5.09]	1420	6.18*	Monoterp. ketone
Terpinen-4-ol	8.15	1179	0.08	0.08	1537	8.64	Monoterp. alcohol
cis-Hex-3-en-1-yl butyrate	8.39	1189	0.13	0.10	1416	6.11	Aliphatic ester
α-Terpineol	8.69	1201	0.36	0.47	1634	11.84	Monoterp. alcohol
Nerol	9.77	1227	0.29	0.34	1741	16.98*	Monoterp. alcohol

Citronellol	10.25	1238	31.55	31.64	1726	16.11	Monoterp. alcohol
Neral	10.39	1241	0.42	0.49	1608	10.82	Monoterp. aldehyde
<i>cis</i> -Isogeraniol	10.88	1253	0.02	[0.34]	1741	16.98*	Monoterp. alcohol
Geraniol	11.21	1260	15.60	15.37	1798	20.32	Monoterp. alcohol
Citronellyl formate	11.92*	1277	7.54	7.06	1565	9.50*	Monoterp. ester
Geranial	11.92*	1277	[7.54]	0.78	1656	12.83	Monoterp. aldehyde
Geranyl formate	13.11	1304	2.90	2.89	1643	12.27	Monoterp. ester
α -Cubebene	14.90	1334	0.17	0.21	1412	6.03	Sesquiterpene
Citronellyl acetate	16.10	1353	0.30	0.37	1610	10.87	Monoterp. ester
α -Copaene	16.48	1359	0.51	0.48	1434	6.44	Sesquiterpene
β -Bourbonene	16.88*	1365	1.07	0.97	1454	6.83	Sesquiterpene
Neryl acetate	16.88*	1365	[1.07]	0.06	1665	13.22	Monoterp. ester
β -Cubebene	16.96	1367	0.07	0.02	1478	7.27	Sesquiterpene
β -Elemene	17.58	1377	0.05	0.05	1527	8.36	Sesquiterpene
Geranyl acetate	18.08	1385	0.42	0.51	1697	14.68	Monoterp. ester
β -Caryophyllene	19.17*	1402	1.23	1.07	1524	8.27	Sesquiterpene
Geranic acid	19.17*	1402	[1.23]	0.17	2269	42.31	Monoterp. acid
Aromadendrene	20.04	1413	0.12	0.05	1532	8.51	Sesquiterpene
<i>trans</i> - α -Bergamotene	20.44	1418	0.06	0.07	1526	8.30	Sesquiterpene
6,9-Guaiadiene	21.09	1426	0.39	0.33	1540	8.74	Sesquiterpene
<i>cis</i> - β -Farnesene	21.53*	1431	0.41	0.39	1584	10.07*	Sesquiterpene
Seychellene	21.53*	1431	[0.41]	0.35	1549	9.03	Sesquiterpene
α -Humulene	21.78	1434	0.26	[0.39]	1584	10.07*	Sesquiterpene
allo-Aromadendrene	22.05	1437	0.19	[7.06]	1565	9.50*	Sesquiterpene
Citronellyl propionate	22.52	1443	0.29				Monoterp. ester
<i>trans</i> - β -Farnesene	22.77	1446	0.05	0.14	1615	11.00*	Sesquiterpene
Neryl propionate	23.42	1454	0.23	0.33	1738	16.82	Monoterp. ester
Germacrene D	23.92*	1460	1.23	1.28	1625	11.43	Sesquiterpene
γ -Muurolene	23.92*	1460	[1.23]	[0.14]	1615	11.00*	Sesquiterpene
β -Selinene	24.16	1463	0.15	0.20	1629	11.60*	Sesquiterpene
Viridiflorene	24.45	1467	0.10	0.19	1619	11.16	Sesquiterpene
α -Selinene	24.69	1470	0.25	0.11	1631	11.72	Sesquiterpene
Geranyl propionate	25.05*	1474	1.08	0.67	1761	18.13	Monoterp. ester
Bicyclgermacrene	25.05*	1474	[1.08]	0.27	1644	12.33	Sesquiterpene
4- <i>epi-cis</i> - Dihydroagarofuran	25.47	1479	0.09				Sesquiterp. ether
Epizonarene	25.84*	1484	0.24	[0.20]	1629	11.60*	Sesquiterpene
α -Muurolene	25.84*	1484	[0.24]	0.20	1647	12.46	Sesquiterpene
β -Dihydroagarofuran	26.33	1490	0.08				Sesquiterp. ether
γ -Cadinene	26.81	1496	0.27	0.66	1671	13.52*	Sesquiterpene
δ -Cadinene	27.51	1504	0.91	0.90	1677	13.77	Sesquiterpene
Zonarene	27.77*	1508	0.47	[0.66]	1671	13.52*	Sesquiterpene
<i>trans</i> -Calamenene	27.77*	1508	[0.47]	0.05	1729	16.26	Sesquiterpene
Geranyl isobutyrate	28.21	1513	0.11	0.04	1802	20.58	Monoterp. ester

<i>trans</i> - γ -Bisabolene	28.47	1517	0.11	0.09	1684	14.09	Sesquiterpene
α -Agarofuran	29.16	1526	0.36	0.28	1767	18.54	Sesquiterp. ether
Citronellyl butyrate	29.72	1533	0.53	0.47	1747	17.30	Monoterp. ester
Caryophyllene oxide	31.24	1553	0.07	0.14	1850	23.74	Sesquiterp. ether
Spathulenol	32.19	1565	0.36				Sesquiterp. alcohol
Geranyl butyrate	32.44	1569	1.02	1.03	1835	22.67	Monoterp. ester
Phenylethyl tiglate	33.89	1588	0.98	0.93	2083	37.07	Phenolic ester
10-epi- γ -Eudesmol	34.90	1601	5.58	5.69	1990	32.89	Sesquiterp. alcohol
1,10-diepi-Cubenol	35.66	1617	0.13	0.14	1960	31.16	Sesquiterp. alcohol
Hinesol	35.80	1621	0.28	0.30	2112	38.06	Sesquiterp. alcohol
Cubenol	36.08	1627	0.17	0.20	1957	30.97	Sesquiterp. alcohol
τ -Cadinol	36.28	1632	0.26	0.26	2077	36.87	Sesquiterp. alcohol
τ -Muurolol	36.41	1635	0.05	0.05	2092	37.40	Sesquiterp. alcohol
α -Muurolol	36.58	1639	0.24	0.23	2106	37.84	Sesquiterp. alcohol
β -Eudesmol	36.62*	1640	0.53	0.31	2116	38.23	Sesquiterp. alcohol
α -Eudesmol	36.62*	1640	[0.53]	0.27	2127	38.60	Sesquiterp. alcohol
α -Cadinol	36.87	1645	0.15	0.20	2130	38.70	Sesquiterp. alcohol
Geranyl valerate	37.52	1661	0.21	0.17	1931	29.32	Monoterp. ester
Citronellyl tiglate	37.80	1667	0.31	0.30	1940	29.91	Monoterp. ester
Geranyl tiglate	39.19	1700	1.50	1.54	2037	35.45	Monoterp. ester
Geranyl caproate isomer	39.79	1718	0.21	0.25	2023	34.89	Monoterp. ester
Geranyl caproate	40.98	1754	0.11	0.10	2027	35.09	Monoterp. ester
Geranyl caprylate	46.42	1948	0.06	0.09	2229	41.37	Monoterp. ester
Total identified			97.45%	96.67%			

*: 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.



