

GC/MS BATCH NUMBER: G30103

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF GERANIUM EGYPTIAN OIL	%
CITRONELLOL	31.6
GERANIOL	15.6
CITRONELLYL FORMATE	7.2
LINALOOL	5.0
ISOMENTHONE	4.7
GERANYL FORMATE	3.1
MENTHONE	2.1
GERMACRENE D + γ -MUUROLENE	1.4
β -CARYOPHYLLENE	1.3
β -BOURBONENE	1.1
Cis-ROSE OXIDE	1.0

Comments from Robert Tisserand: Delightful fresh, green, watery odor profile. All fifteen key ISO constituents are within range.

Date : May 19, 2017

SAMPLE IDENTIFICATION

Internal code : 17E10-PTH17-1-DM

Customer identification : Geranium Egyptian - Egypt - G3010372R

Type : Essential oil

Source : *Pelargonium graveolens*

Customer : Plant Therapy

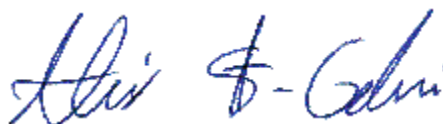
ANALYSIS

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

Analyst : Benoit Roger Ph. D.

Analysis date : 2017-05-17

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.	
3-Methylpentanol	2.34	855	0.05	0.03	1270	4.54	Aliphatic alcohol
<i>cis</i> -Hex-3-en-1-ol	2.48	865	0.02	0.03	1322	5.31	Aliphatic alcohol
<i>trans</i> -Hex-2-en-1-ol	2.65	878	0.01	0.02	1355	5.84	Aliphatic alcohol
Heptanal	3.03	906	0.01	0.01	1128	2.59	Aliphatic aldehyde
α -Pinene	3.41	929	0.47	0.45	942	1.09	Monoterpene
Geranic oxide	4.08	968	0.05	0.05	1046	1.80	Monoterp. ether
β -Pinene	4.19	975	0.01	0.01	1037	1.71	Monoterpene
Myrcene	4.47*	991	0.15	0.08	1114	2.42	Monoterpene
<i>trans</i> -Dehydroxylinalool oxide	4.47*	991	[0.15]	0.04	1151	2.91	Monoterp. ether
6-Methyl-5-hepten-2-one	4.54	995	0.05	0.05	1274	4.61	Aliphatic ketone
α -Phellandrene	4.74	1007	0.07	0.06	1108	2.34	Monoterpene
α -Terpinene	4.93	1017	0.01	0.01	1121	2.51	Monoterpene
para-Cymene	5.11	1027	0.08	0.07	1206	3.61	Monoterpene
Limonene	5.15	1029	0.16	0.15	1139	2.74	Monoterpene
β -Phellandrene	5.18	1031	0.05	0.05	1144	2.81*	Monoterpene
1,8-Cineole	5.22	1033	0.01	[0.05]	1144	2.81*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.33	1039	0.10	0.15	1183	3.32*	Monoterpene
<i>trans</i> - β -Ocimene	5.51	1049	0.13	0.10	1199	3.53	Monoterpene
γ -Terpinene	5.70	1059	0.03	[0.15]	1183	3.32*	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	5.97	1074	0.24	0.21	1373	6.12	Monoterp. alcohol
Terpinolene	6.18	1085	0.04	0.03	1221	3.83	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	6.28	1091	0.12	0.28	1404	6.61*	Monoterp. alcohol
para-Cymenene	6.38	1097	0.03	0.03	1364	5.98	Monoterpene
6,7-Epoxygeranyl	6.50	1102	0.02	0.01	1346	5.69	Monoterp. ether
Linalool	6.66	1108	4.96	5.02	1491	8.59	Monoterp. alcohol
<i>cis</i> -Rose oxide	6.77	1112	0.98	0.97	1292	4.87	Monoterp. ether
<i>trans</i> -Rose oxide	7.12	1125	0.40	0.41	1304	5.04	Monoterp. ether
Citronellal	7.75	1148	0.10	0.12	1416	6.80	Monoterp. aldehyde
Menthone	7.97	1156	2.08	1.95	1385	6.31	Monoterp. ketone
Isomenthone	8.25	1166	4.66	4.63	1413	6.75	Monoterp. ketone
Terpinen-4-ol	8.70	1183	0.04	0.10	1527	9.54*	Monoterp. alcohol
Menthol	9.00	1194	0.13	0.45	1577	11.40*	Monoterp. alcohol
α -Terpineol	9.32	1203	0.37	0.61	1623	13.11*	Monoterp. alcohol
Nerol	10.45	1228	0.32	0.34	1730	18.71*	Monoterp. alcohol
Citronellol	10.99	1240	31.60	31.85	1713	17.78	Monoterp. alcohol
Neral	11.11	1243	0.46	0.50	1596	12.09	Monoterp. aldehyde
Geraniol	12.01	1263	15.58	15.62	1784	22.25	Monoterp. alcohol
Citronellyl formate	12.74*	1279	7.72	7.17	1556	10.61	Monoterp. ester
Geranial	12.74*	1279	[7.72]	0.77	1647	14.36	Monoterp. aldehyde
Neryl formate	12.79	1280	0.06				Monoterp. ester

Geranyl formate	14.02	1305	3.12	3.09	1636	13.74	Monoterp. ester
α -Cubebene	15.91	1334	0.16	[0.28]	1404	6.61*	Sesquiterpene
Citronellyl acetate	17.16	1353	0.32	0.42	1600	12.22	Monoterp. ester
α -Copaene	17.62	1360	0.52	0.55	1429	7.11	Sesquiterpene
β -Bourbonene	18.04	1366	1.07	1.10	1449	7.57	Sesquiterpene
β -Cubebene	18.56	1374	0.02	0.01	1477	8.24	Sesquiterpene
β -Elemene	18.72	1376	0.07	0.05	1522	9.37	Sesquiterpene
Geranyl acetate	19.24*	1384	0.41	0.57	1688	16.47*	Monoterp. ester
Geranic acid	19.24*	1384	[0.41]	0.16	2249	43.29	Monoterp. acid
β -Caryophyllene	20.48	1403	1.25	1.34	1519	9.26	Sesquiterpene
β -Copaene	21.37	1413	0.13	0.17	1500	8.79	Sesquiterpene
Aromadendrene	21.81	1419	0.07	[0.09]	1527	9.56*	Sesquiterpene
6,9-Guaiadiene	22.44	1426	0.40	0.27	1535	9.82	Sesquiterpene
Seychellene	22.92	1432	0.46	0.37	1544	10.16	Sesquiterpene
α -Humulene	23.22	1435	0.25	[0.45]	1577	11.40*	Sesquiterpene
allo-Aromadendrene	23.49	1439	0.20	0.35	1558	10.71	Sesquiterpene
Citronellyl propionate	23.87	1443	0.33				Monoterp. ester
<i>trans</i> - β -Farnesene	24.23	1448	0.05	1.34	1620	12.98*	Sesquiterpene
Neryl propionate	24.90	1456	0.31	[0.34]	1730	18.71*	Monoterp. ester
Germacrene D	25.44*	1462	1.35	[1.34]	1620	12.98*	Sesquiterpene
γ -Muurolene	25.44*	1462	[1.35]	0.17	1606	12.46	Sesquiterpene
β -Selinene	25.68	1465	0.17	[0.61]	1623	13.11*	Sesquiterpene
Viridiflorene	26.23	1472	0.24	0.19	1612	12.68	Sesquiterpene
Geranyl propionate	26.48	1475	0.59	0.66	1754	20.28	Monoterp. ester
Bicyclgermacrene	26.66*	1477	0.39	0.34	1639	13.94	Sesquiterpene
α -Selinene	26.66*	1477	[0.39]	0.04	1631	13.49	Sesquiterpene
α -Muurolene	27.07	1482	0.08	0.16	1643	14.15	Sesquiterpene
β -Dihydroagarofuran	27.43	1486	0.18				Sesquiterp. ether
γ -Cadinene	28.46	1498	0.25	0.69	1665	15.26*	Sesquiterpene
(<i>E,E</i>)- α -Farnesene	28.92	1505	0.12	0.05	1698	16.96	Sesquiterpene
δ -Cadinene	29.15	1508	0.91	0.94	1671	15.58	Sesquiterpene
Zonarene	29.33	1510	0.17	[0.69]	1665	15.26*	Sesquiterpene
<i>trans</i> -Calamenene	29.47	1512	0.24	0.23	1734	18.98	Sesquiterpene
Geranyl isobutyrate	29.73	1516	0.10	0.07	1800	23.33	Monoterp. ester
<i>trans</i> - γ -Bisabolene	30.06	1520	0.10	0.08	1678	15.98	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	30.23	1523	0.14	[0.57]	1688	16.47*	Sesquiterpene
α -Agarofuran	30.92	1533	0.27	0.25	1763	20.85	Sesquiterp. ether
Citronellyl butyrate	31.28	1537	0.42	0.45	1741	19.44	Monoterp. ester
Neryl butyrate	31.84	1545	0.05				Monoterp. ester
α -Elemol	32.50	1555	0.06	0.04	1994	35.44	Sesquiterp. alcohol
Caryophyllene oxide	33.64*	1570	1.22	0.09	1846	26.41	Sesquiterp. ether
Spathulenol	33.64*	1570	[1.22]	0.20	2018	36.50*	Sesquiterp. alcohol
Geranyl butyrate	33.64*	1570	[1.22]	0.93	1829	25.20	Monoterp. ester
Europelargone B	34.07	1576	0.10	5.15	1982	34.87*	Sesquiterp. ketone

Viridiflorol	34.54	1583	0.06	[5.15]	1982	34.87*	Sesquiterp. alcohol
Phenylethyl tiglate	35.04	1590	0.86	0.87	2075	38.48	Phenolic ester
Geranyl isovalerate	35.78	1600	0.13	0.15	1834	25.60	Monoterp. ester
10-epi- γ -Eudesmol	35.99	1606	4.92	[5.15]	1982	34.87*	Sesquiterp. alcohol
1,10-diepi-Cubenol	36.44	1617	0.11	0.12	1952	33.57	Sesquiterp. alcohol
1-epi-Cubenol	36.71	1623	0.10	0.07	1968	34.28	Sesquiterp. alcohol
Hinesol	36.80	1625	0.06	0.26	2103	39.36	Sesquiterp. alcohol
Cubenol	36.85	1627	0.20	0.18	1949	33.41	Sesquiterp. alcohol
τ -Cadinol	37.30	1638	0.24	0.17	2068	38.27	Sesquiterp. alcohol
τ -Muurolol	37.41	1640	0.07	0.07	2084	38.77	Sesquiterp. alcohol
β -Eudesmol	37.62*	1645	0.67	0.26	2109	39.54	Sesquiterp. alcohol
α -Eudesmol	37.62*	1645	[0.67]	0.11	2119	39.86	Sesquiterp. alcohol
α -Muurolol	37.62*	1645	[0.67]	0.21	2098	39.20	Sesquiterp. alcohol
α -Cadinol	37.84	1651	0.14	0.27	2122	39.96	Sesquiterp. alcohol
Geranyl valerate	38.29	1662	0.14	0.11	1925	32.15	Monoterp. ester
Citronellyl tiglate	38.58	1669	0.26	0.25	1932	32.68	Monoterp. ester
Geranyl tiglate	39.92	1702	1.27	1.37	2032	37.08	Monoterp. ester
Geranyl caproate isomer	40.49	1720	0.17	[0.20]	2018	36.50*	Monoterp. ester
Geranyl caproate	41.65	1757	0.08	0.11	2024	36.78	Monoterp. ester
Citronellyl heptanoate	43.52	1818	0.05				Monoterp. ester
Geranyl heptanoate	44.48	1853	0.10				Monoterp. ester
Geranyl caprylate	47.02	1951	0.05	0.08	2223	42.62	Monoterp. ester
Total identified			97.34%	97.61%			

*: 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 : 1.4670 \pm 0.0003 (20 °C)

CONCLUSION

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

