

# Analysis Rose over Geranium Essential Oil

Laboratoire  
**Phyto**Chemia





**Date :** February 23, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17B16-FSE2-1-DM

**Customer identification :** Roses Over Geranium - Lot #1014104

**Type :** Essential oil

**Source :** *Pelargonium graveolens*

**Customer :** Flowers Shining Everywhere Inc.



*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 :** 2017-02-20

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	2.42	852	0.02	0.02	1275	4.97	Aliphatic alcohol
cis-Hex-3-en-1-ol	2.55	862	0.02	0.02	1326	5.77	Aliphatic alcohol
Heptanal	3.11	903	0.01	0.02	1136	2.96	Aliphatic aldehyde
$\alpha$ -Pinene	3.50	926	1.51	1.51	955	1.26	Monoterpene
$\alpha$ -Fenchene	3.79*	943	0.01	0.01	993	1.54	Monoterpene
Camphene	3.79*	943	[0.01]	0.01	998	1.57	Monoterpene
Geranic oxide	4.17	966	0.30	0.29	1051	2.05	Monoterp. ether
Sabinene	4.21	968	0.01	0.01	1059	2.13	Monoterpene
$\beta$ -Pinene	4.28	972	0.05	0.04	1040	1.95	Monoterpene
Myrcene	4.55	988	0.41	0.38	1118	2.72	Monoterpene
trans-Dehydroxylinalool oxide	4.59	991	0.11	0.09	1157	3.25	Monoterp. ether
6-Methyl-5-hepten-2-one	4.62	993	0.09	0.06	1279	5.03	Aliphatic ketone
$\alpha$ -Phellandrene	4.82	1004	0.05	0.05	1111	2.63	Monoterpene
$\Delta^3$ -Carene	4.85	1005	0.08	0.08	1097	2.44	Monoterpene
para-Cymene	5.19	1024	0.22	0.24	1210	3.99	Monoterpene
Limonene	5.24	1026	0.48	0.46	1142	3.06	Monoterpene
$\beta$ -Phellandrene	5.27	1028	0.11	0.17	1149	3.14*	Monoterpene
1,8-Cineole	5.32	1030	0.07	[0.17]	1149	3.14*	Monoterp. ether
cis- $\beta$ -Ocimene	5.42	1036	0.59	0.63	1189	3.67*	Monoterpene
trans- $\beta$ -Ocimene	5.60	1046	0.31	0.28	1203	3.89	Monoterpene
$\gamma$ -Terpinene	5.78	1056	0.01	[0.63]	1189	3.67*	Monoterpene
cis-Linalool oxide (fur.)	6.06	1071	0.22	0.20	1379	6.64	Monoterp. alcohol
Terpinolene	6.27	1082	0.07	0.07	1225	4.21	Monoterpene
trans-Linalool oxide (fur.)	6.39	1089	0.11	0.10	1405	7.16	Monoterp. alcohol
para-Cymenene	6.46	1093	0.09	0.05	1368	6.44	Monoterpene
6,7-Epoxygeranyl	6.57	1097	0.05	0.03	1349	6.14	Monoterp. ether
Linalool	6.79	1105	13.62	13.92	1499	9.55*	Monoterp. alcohol
cis-Rose oxide	6.90	1109	1.71	1.70	1296	5.28	Monoterp. ether
trans-Rose oxide	7.26	1122	0.66	0.61	1307	5.46	Monoterp. ether
neo-Isopulegol	7.91	1146	0.05	1.46	1516	10.21*	Monoterp. alcohol
Isopulegol	7.98	1148	0.03	[13.92]	1499	9.55*	Monoterp. alcohol
Menthone	8.12	1153	2.69	2.65	1391	6.83	Monoterp. ketone
Citronellal	8.25	1158	0.05	0.03	1419	7.51	Monoterp. aldehyde
Isomenthone	8.44	1165	10.06	10.36	1414	7.37	Monoterp. ketone
Terpinen-4-ol	8.76	1177	0.03	0.02	1538	11.06	Monoterp. alcohol
Menthol	9.13	1190	0.32	0.30	1579	12.61	Monoterp. alcohol
$\alpha$ -Terpineol	9.45	1198	0.90	1.22	1621	14.64*	Monoterp. alcohol
Nerol	10.62	1224	0.63	0.79	1729	20.85*	Monoterp. alcohol
Citronellol	11.07	1234	19.63	19.93	1711	19.66	Monoterp. alcohol
Neral	11.30	1239	0.44	0.52	1601	13.56	Monoterp. aldehyde



cis-Isogeraniol	11.87	1252	0.09	[0.79]	1729	20.85*	Monoterp. alcohol
Geraniol	12.14	1258	11.33	11.33	1785	24.58	Monoterp. alcohol
Citronellyl formate	13.00*	1277	9.37	9.25	1558*	11.79	Monoterp. ester
Geranial	13.00*	1277	[9.37]	0.78	1646	15.97	Monoterp. aldehyde
Neryl formate	13.05	1278	0.23				Monoterp. ester
Geranyl formate	14.32	1302	4.68	4.69	1635	15.35	Monoterp. ester
$\alpha$ -Cubebene	16.25	1331	0.09	0.16	1406	7.19	Sesquiterpene
Citronellyl acetate	17.51	1350	0.30	0.47	1599	13.44*	Monoterp. ester
$\alpha$ -Copaene	17.97	1357	0.67	0.73	1427	7.70	Sesquiterpene
$\beta$ -Bourbonene	18.41	1364	1.60	1.58	1449	8.24	Sesquiterpene
$\beta$ -Elemene	19.15	1375	0.16	0.98	1520	10.34*	Sesquiterpene
Geranyl acetate	19.63	1382	0.35	0.36	1690	18.28	Monoterp. ester
Isocaryophyllene	19.96	1387	0.09	0.11	1501	9.63	Sesquiterpene
$\beta$ -Caryophyllene	20.87	1399	1.38	[1.46]	1516	10.21*	Sesquiterpene
$\beta$ -Copaene	21.77	1410	0.13	0.18	1503	9.70	Sesquiterpene
Aromadendrene	22.42	1418	0.80	[0.98]	1520	10.34*	Sesquiterpene
6,9-Guaiadiene	23.00	1425	5.83	5.87	1535	10.92	Sesquiterpene
Guaiadiene analog	23.38	1429	0.31				Sesquiterpene
$\alpha$ -Humulene	23.65	1433	0.27	[0.47]	1599	13.44*	Sesquiterpene
allo-Aromadendrene	23.92	1436	0.14	0.13	1559	11.85	Sesquiterpene
Citronellyl propionate	24.32	1441	0.16				Monoterp. ester
Neryl propionate	25.23	1452	0.07	0.06	1747	22.09	Monoterp. ester
$\gamma$ -Murolene	25.73	1458	0.04	0.10	1609	13.98*	Sesquiterpene
Germacrene D	25.84	1459	0.52	0.58	1615	14.31	Sesquiterpene
$\beta$ -Selinene	26.44	1466	0.11	[1.22]	1621	14.64*	Sesquiterpene
Viridiflorene	26.64	1469	0.08	[0.10]	1609	13.98*	Sesquiterpene
Geranyl propionate	26.94	1472	0.39	0.33	1750	22.33*	Monoterp. ester
$\alpha$ -Murolene	27.84	1483	0.11	0.09	1639	15.61	Sesquiterpene
$\gamma$ -Cadinene	28.87	1496	0.08	0.29	1662	16.82*	Sesquiterpene
$\delta$ -Cadinene	29.56	1505	0.26	0.27	1669	17.18	Sesquiterpene
Zonarene	29.87	1510	0.18	[0.29]	1662	16.82*	Sesquiterpene
Furopolargone A	30.96	1525	0.03				Sesquiterp. ketone
Citronellyl butyrate	31.75	1536	0.15	0.15	1736	21.32	Monoterp. ester
Spathulenol	33.96*	1567	0.54	0.04	2018	37.98	Sesquiterp. alcohol
Caryophyllene oxide	33.96*	1567	[0.54]	0.16	1843	28.91	Sesquiterp. ether
Geranyl butyrate	33.96*	1567	[0.54]	0.30	1825	27.53	Monoterp. ester
Furopolargone B	34.52	1575	0.09				Sesquiterp. ketone
Phenylethyl tiglate	35.25	1585	0.08	0.08	2075	39.80	Phenolic ester
10-epi- $\gamma$ -Eudesmol	36.04	1599	0.09	0.11	1978	36.50	Sesquiterp. alcohol
1,10-diepi-Cubenol	36.45	1609	0.02	0.03	1958	35.58*	Sesquiterp. alcohol
1-epi-Cubenol	36.65	1614	0.01	0.02	1971	36.18	Sesquiterp. alcohol
Cubenol	37.26	1629	0.02	[0.03]	1958	35.58*	Sesquiterp. alcohol
Citronellyl tiglate	38.78	1666	0.03	0.04	1934	34.47	Monoterp. ester

Essential oil, *Pelargonium graveolens*  
Internal Code: 17B16-FSE2-1-DM

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Report prepared for  
Flowers Shining Everywhere Inc.

Geranyl tiglate	40.09	1699	0.12	0.09	2029	38.34	Monoterp. ester
<b>Total identified</b>	<b>96.82%</b>						<b>97.69%</b>

\*: 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

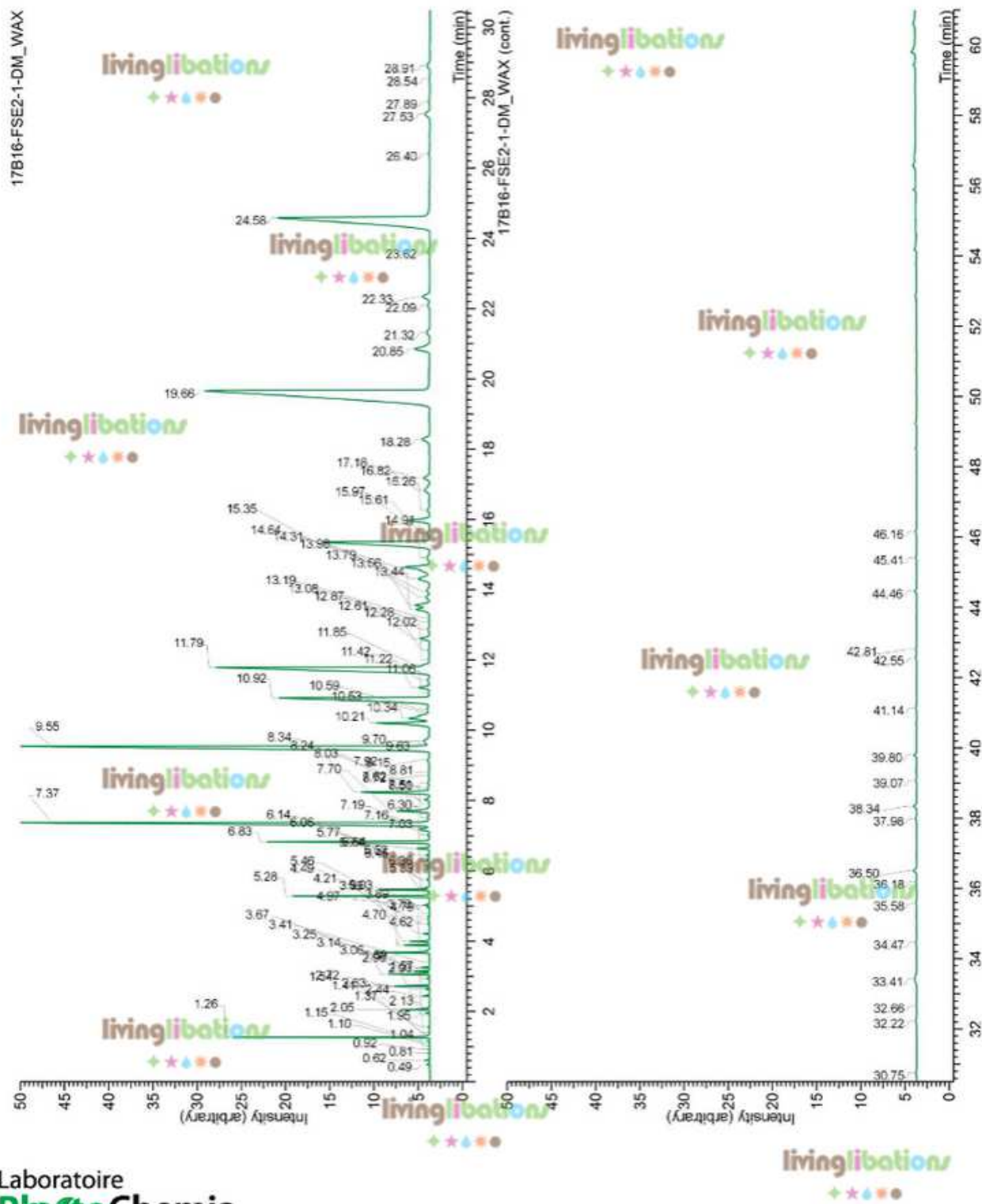
#### OTHER DATA

**Physical aspect :** Faintly yellow liquid

**Refractive index :**  $1.4645 \pm 0.0003$  (20 °C)

#### CONCLUSION

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





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