

# Analysis Geranium Essential Oil

Laboratoire  
**Phyto**Chemia





# IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
3-Methylpentanol	2.35	856	0.03	0.02	1271	4.57	Aliphatic alcohol
cis-Hex-3-en-1-ol	2.47	865	0.03	0.04	1324	5.34	Aliphatic alcohol
trans-Hex-2-en-1-ol	2.65	878	0.01	0.01	1361	5.93	Aliphatic alcohol
Heptanal	3.03	906	0.01	0.01	1133	2.66	Aliphatic aldehyde
Tricyclene	3.22	917	0.01	0.01	920	1.01	Monoterpene
α-Thujene	3.31	922	tr	0.01	955	1.15	Monoterpene
α-Pinene	3.41	928	0.56	0.53	944	1.10	Monoterpene
Camphene	3.70*	946	0.01	tr	1000	1.38	Monoterpene
α-Fenchene	3.70*	946	[0.01]	0.01	995	1.34	Monoterpene
Thuja-2,4(10)-diene	3.79	951	tr	0.08	1048	1.81*	Monoterpene
Geranic oxide	4.08	968	0.08	[0.08]	1048	1.81*	Monoterp. ether
Sabinene	4.13	971	0.01	[0.08]	1048	1.81*	Monoterpene
β-Pinene	4.19	975	0.02	0.01	1039	1.72	Monoterpene
Myrcene	4.47*	991	0.24	0.17	1116	2.44	Monoterpene
trans-Dehydroxylinalool oxide	4.47*	991	[0.24]	0.04	1153	2.93	Monoterp. ether
6-Methyl-5-hepten-2-one	4.53	995	0.06	0.04	1276	4.64	Aliphatic ketone
α-Phellandrene	4.74*	1007	0.10	0.08	1110	2.36	Monoterpene
Δ3-Carene	4.74*	1007	[0.10]	0.02	1080	2.17	Monoterpene
α-Terpinene	4.93	1017	0.01	0.01	1122	2.52	Monoterpene
para-Cymene	5.11	1027	0.08	0.08	1208	3.64	Monoterpene
Limonene	5.15	1029	0.19	0.17	1140	2.76	Monoterpene
β-Phellandrene	5.18	1031	0.07	0.10	1146	2.84*	Monoterpene
1,8-Cineole	5.22	1033	0.02	[0.10]	1146	2.84*	Monoterp. ether
cis-β-Ocimene	5.33	1039	0.19	0.22	1185	3.35*	Monoterpene
trans-β-Ocimene	5.51	1049	0.17	0.15	1201	3.55	Monoterpene
γ-Terpinene	5.70	1059	0.01	[0.22]	1185	3.35*	Monoterpene
cis-Linalool oxide (fur.)	5.97	1074	0.18	0.15	1376	6.15	Monoterp. alcohol
Isoterpinolene	6.10	1081	tr	0.01	1210	3.67	Monoterpene
Terpinolene	6.18	1085	0.06	0.04	1223	3.85	Monoterpene
trans-Linalool oxide (fur.)	6.28	1091	0.09	0.20	1408	6.66	Monoterp. alcohol
para-Cymenene	6.38	1096	0.03	0.02	1366	6.01	Monoterpene
6,7-Epoxyterpinene	6.47	1101	0.02	0.02	1348	5.71	Monoterp. ether
Linalool	6.67	1108	6.39	6.38	1494	8.66	Monoterp. alcohol
cis-Rose oxide	6.77	1112	0.79	0.77	1294	4.89	Monoterp. ether
trans-Rose oxide	7.12	1125	0.30	0.29	1305	5.07	Monoterp. ether
Citronellal	7.77	1149	0.08	0.10	1418	6.83	Monoterp. aldehyde
Menthone	7.96	1156	1.01	0.93	1387	6.33	Monoterp. ketone
Isomenthone	8.26	1166	6.47	6.47	1416	6.80*	Monoterp. ketone
Menthol	8.70	1183	0.04	0.03	1570	11.13	Monoterp. alcohol
Isomenthol	8.99	1193	0.19	9.50	1559	10.73*	Monoterp. alcohol



$\alpha$ -Terpineol	9.32	1203	0.57	0.94	1626	13.21*	Monoterp. alcohol
Nerol	10.45	1228	0.70	0.69	1732	18.85	Monoterp. alcohol
Citronellol	10.95	1239	24.55	24.68	1714	17.87	Monoterp. alcohol
Neral	11.09	1242	0.40	0.46	1599	12.18	Monoterp. aldehyde
Geraniol	11.99	1262	13.00	12.98	1786	22.39	Monoterp. alcohol
<i>trans</i> -Myrtenol	12.30	1269	0.18	0.18	1771	21.39	Monoterp. alcohol
Citronellyl formate	12.76*	1280	9.87	[9.50]	1559	10.73*	Monoterp. ester
Geranial	12.76*	1280	[9.87]	0.64	1649	14.47	Monoterp. aldehyde
Neryl formate	12.81	1281	0.20				Monoterp. ester
Geranyl formate	14.04	1305	4.55	4.55	1638	13.88*	Monoterp. ester
$\alpha$ -Cubebene	15.92	1334	0.13	[6.47]	1416	6.80*	Sesquiterpene
Citronellyl acetate	17.15	1353	0.30	0.63	1601	12.27*	Monoterp. ester
$\alpha$ -Copaene	17.62	1360	0.47	0.52	1431	7.15	Sesquiterpene
$\beta$ -Bourbonene	18.05	1366	1.25	1.25	1451	7.63	Sesquiterpene
Geranic acid	18.80*	1378	0.37	0.23	2253	43.36	Monoterp. acid
$\beta$ -Elemene	18.80*	1378	[0.37]	1.85	1521	9.35*	Sesquiterpene
Geranyl acetate	19.24	1384	0.33	0.44	1691	16.60*	Monoterp. ester
$\beta$ -Caryophyllene	20.49	1403	1.81	[1.85]	1521	9.35*	Sesquiterpene
$\beta$ -Copaene	21.37	1413	0.13	1.03	1525	9.47*	Sesquiterpene
Aromadendrene	22.00	1421	0.78	[1.03]	1525	9.47*	Sesquiterpene
6,9-Guaiadiene	22.60	1428	7.77	7.71	1541	10.05	Sesquiterpene
Seychellene	22.96*	1432	0.52	0.42	1547	10.28	Sesquiterpene
<i>cis</i> - $\beta$ -Farnesene	22.96*	1432	[0.52]	0.09	1586	11.73	Sesquiterpene
$\alpha$ -Humulene	23.25	1436	0.43	0.54	1580	11.50	Sesquiterpene
allo-Aromadendrene	23.51	1439	0.16	0.30	1561	10.83	Sesquiterpene
Citronellyl propionate	23.87	1443	0.31				Monoterp. ester
<i>trans</i> - $\beta$ -Farnesene	24.24	1448	0.07	0.06	1616	12.82	Sesquiterpene
Neryl propionate	24.39	1450	0.03	0.03	1727	18.53	Monoterp. ester
$\gamma$ -Murolene	24.91	1456	0.29	[0.63]	1601	12.27*	Sesquiterpene
Germacrene D	25.45	1462	1.62	1.64	1623	13.09	Sesquiterpene
$\beta$ -Selinene	26.03	1469	0.30	[0.94]	1626	13.21*	Sesquiterpene
Viridiflorene	26.21	1471	0.16	0.23	1609	12.57	Sesquiterpene
Geranyl propionate	26.47	1475	0.76	0.76	1756	20.43	Monoterp. ester
Bicyclogermacrene	26.66*	1477	0.08	0.03	1642	14.06	Sesquiterpene
$\alpha$ -Selinene	26.66*	1477	[0.08]	[4.55]	1638	13.88*	Sesquiterpene
$\alpha$ -Murolene	27.44	1486	0.15	0.13	1645	14.25	Sesquiterpene
<i>cis</i> - $\alpha$ -Bisabolene	27.57	1488	0.18	0.21	1663	15.14	Sesquiterpene
$\gamma$ -Cadinene	28.45	1498	0.18	0.74	1667	15.36	Sesquiterpene
( <i>E,E</i> )- $\alpha$ -Farnesene	28.91	1504	0.09	[0.44]	1691	16.60*	Sesquiterpene
$\delta$ -Cadinene	29.14	1508	0.63	0.63	1673	15.69*	Sesquiterpene
<i>trans</i> -Calamenene	29.32	1510	0.15	0.14	1736	19.10	Sesquiterpene
Geranyl isobutyrate	29.46	1512	0.14	0.11	1796	23.06	Monoterp. ester
<i>trans</i> - $\gamma$ -Bisabolene	29.73	1516	0.31	[0.63]	1673	15.69*	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	30.03	1520	0.05	0.05	1681	16.10	Sesquiterpene

Europelargone A	30.21	1523	0.10				Sesquiterp. ketone
Citronellyl butyrate	31.27	1537	0.52	0.55	1743	19.57	Monoterp. ester
Caryophyllene oxide	33.64*	1570	1.20	0.17	1848	26.58	Sesquiterp. ether
Spathulenol	33.64*	1570	[1.20]	0.04	2019	36.56	Sesquiterp. alcohol
Geranyl butyrate	33.64*	1570	[1.20]	1.06	1831	25.38	Monoterp. ester
Europelargone B	34.23	1579	0.45	0.55	1985	35.05	Sesquiterp. ketone
Phenylethyl tiglate	35.01	1589	0.43	0.44	2078	38.57	Phenolic ester
10-epi-γ-Eudesmol	35.76*	1600	0.39	0.04	1996	35.55	Sesquiterp. alcohol
Geranyl isovalerate	35.76*	1600	[0.39]	0.31	1836	25.77	Monoterp. ester
1,10-diepi-Cubenol	36.18	1610	0.11	0.13	1951	33.52	Sesquiterp. alcohol
1-epi-Cubenol	36.43	1616	0.08	0.07	1954	33.68	Sesquiterp. alcohol
Hinesol	36.93	1628	0.02	0.03	2102	39.31	Sesquiterp. alcohol
Cubenol	37.05	1631	0.06	0.11	1944	33.22	Sesquiterp. alcohol
τ-Cadinol	37.28	1637	0.02	0.03	2072	38.39	Sesquiterp. alcohol
τ-Muurolool	37.39	1640	0.05	0.07	2086	38.85	Sesquiterp. alcohol
α-Muurolool	37.54	1643	0.03	0.13	2108	39.50*	Sesquiterp. alcohol
β-Eudesmol	37.82*	1650	0.15	[0.13]	2108	39.50*	Sesquiterp. alcohol
α-Eudesmol	37.82*	1650	[0.15]	0.09	2133	40.28*	Sesquiterp. alcohol
α-Cadinol	37.89	1652	0.06	[0.09]	2133	40.28*	Sesquiterp. alcohol
Geranyl valerate	38.29	1662	0.06	0.06	1927	32.29	Monoterp. ester
Citronellyl tiglate	38.58	1669	0.28	0.31	1934	32.81	Monoterp. ester
Geranyl tiglate	39.92	1702	1.13	1.20	2034	37.18*	Monoterp. ester
Geranyl caproate isomer	40.49	1720	0.14	[1.20]	2034	37.18*	Monoterp. ester
Geranyl caproate	41.64	1756	0.07	0.08	2026	36.88	Monoterp. ester
Geranyl caprylate	47.02	1950	0.06	0.08	2226	42.70	Monoterp. ester
<b>Total identified</b>			<b>96.94%</b>	<b>97.16%</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** : Light green liquid

**Refractive index** : 1.4650 ± 0.0003 (20 °C)

#### CONCLUSION

No adulterant, contaminant or diluent were detected using this method. This sample correspond to the Bourbon-type geranium.





