



**PLANT THERAPY**  
100% PURE ESSENTIAL OILS

## GC/MS BATCH NUMBER: PJ0101

---

**ESSENTIAL OIL:** PALO SANTO  
**BOTANICAL NAME:** BURSERA GRAVEOLENS  
**ORIGIN:** ECUADOR

KEY CONSTITUENTS PRESENT IN THIS BATCH OF PALO SANTO OIL	%
LIMONENE	66.5
$\alpha$ -TERPINEOL	10.1
MENTHOFURAN	9.9
CARVONE	1.6
GERMACRENE D	1.4

Comments from Robert Tisserand: Very good woody/minty odor quality, with constituents in expected amounts.

**Date :** December 14, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16L01-PTH4-1-DM

**Customer identification :** Palo Santo - PJ010169R

**Type :** Essential oil

**Source :** *Bursera 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 :** Sylvain Mercier, M. Sc., chimiste

**Analysis date :** 2016-12-13

Checked and approved by :

---

Alexis St-Gelais, M. Sc., chimiste 2013-174

*Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.*

*This report is digitally signed, it is only considered valid if the digital signature is intact.*

IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
3-Methylcyclopentanone	2.36	855	0.06	0.05	1126	2.11	Aliphatic ketone
$\alpha$ -Thujene	3.28	920	0.02	0.04	956	0.90	Monoterpene
$\alpha$ -Pinene	3.38	926	0.18	0.16	951	0.88	Monoterpene
3-Methylcyclohexanone	4.00	963	0.01	0.02	1237	3.46	Aliphatic ketone
Sabinene	4.10	970	0.11	0.11	1058	1.52	Monoterpene
$\beta$ -Pinene	4.16	973	0.04	0.03	1042	1.39	Monoterpene
Myrcene	4.45	991	0.52	0.52	1117	2.00	Monoterpene
Dehydro-1,8-cineole	4.49	993	0.10	0.07	1129	2.15	Monoterp. ether
Hexahydroacetophenone	4.51	994	0.12	0.11	1234	3.42	Aliphatic ketone
$\Delta$ 3-Carene	4.72*	1006	0.08	0.02	1093	1.79	Monoterpene
$\alpha$ -Phellandrene	4.72*	1006	[0.08]	0.04	1112	1.96	Monoterpene
Limonene	5.24*	1035	67.59	66.53	1154	2.45	Monoterpene
para-Cymene	5.24*	1035	[67.59]	0.55	1208	3.06	Monoterpene
1,8-Cineole	5.24*	1035	[67.59]	0.20	1155	2.46	Monoterp. ether
$\gamma$ -Terpinene	5.69	1060	0.12	0.11	1192	2.88	Monoterpene
para-Cymenene	6.39	1097	0.06	0.07	1370	5.32	Monoterpene
Linalool	6.71	1109	0.04	0.05	1483	7.24	Monoterp. alcohol
cis-Limonene oxide	7.23	1129	0.23	0.21	1390	5.60	Monoterp. ether
Limona ketone	7.30	1131	0.08	0.06	1463	6.86	Simple phenolic
trans-Limonene oxide	7.42	1136	0.13	0.07	1383	5.50	Monoterp. ether
cis-para-Mentha-2,8-dien-1-ol	7.65	1144	0.20	0.13	1602	10.35	Monoterp. alcohol
Menthone	7.98	1157	0.22	0.64	1412	5.93*	Monoterp. ketone
Menthofuran	8.19	1164	9.91	9.96	1409	5.88	Monoterp. ether
Isomenthone	8.24	1166	0.24	[0.64]	1412	5.93*	Monoterp. ketone
Terpinen-4-ol	8.78	1187	0.03	0.14	1537	8.41*	Monoterp. alcohol
Limonen-4-ol	8.84	1189	0.15	0.16	1518	7.90*	Monoterp. alcohol
trans-para-Mentha-1(7),8-dien-2-ol	9.16	1199	0.03	0.03	1756	17.13	Monoterp. alcohol
cis-Dihydrocarvone	9.43	1205	0.13	1.07	1546	8.69*	Monoterp. ketone
$\alpha$ -Terpineol	9.62	1209	10.07	10.73	1623	10.98*	Monoterp. alcohol
trans-Isopiperitenol	9.68	1211	0.21				Monoterp. alcohol
cis-Isopiperitenol	10.27	1224	0.05				Monoterp. alcohol
Thymol methyl ether	10.59*	1231	0.41	0.04	1525	8.07	Monoterp. ether
trans-Carveol	10.59*	1231	[0.41]	0.40	1746	16.55	Monoterp. alcohol
Pulegone	10.94	1239	0.81	[1.07]	1546	8.69*	Monoterp. ketone
cis-Carveol	11.17	1244	0.22	0.27	1777	18.32	Monoterp. alcohol
Carvone	11.39	1249	1.56	1.79	1629	11.22	Monoterp. ketone
$\alpha$ -Cubebene	15.83	1331	0.05	0.05	1426	6.15	Sesquiterpene
Piperitenone	16.39	1340	0.02	0.03	1789	19.07	Monoterp. ketone
Evodone	16.75	1345	0.03				Monoterp. ketone

Menthofurolactone epimer I	16.94	1348	0.19				Monoterp. lactone
Menthofurolactone epimer II	17.00	1349	0.27				Monoterp. lactone
α-Copaene	17.55	1358	0.04	0.04	1432	6.27	Sesquiterpene
β-Elemene	18.81	1377	0.09	[0.14]	1537	8.41*	Sesquiterpene
β-Caryophyllene	20.45	1401	0.03	0.03	1529	8.18	Sesquiterpene
β-Copaene	21.35	1412	0.03	[0.16]	1518	7.90*	Sesquiterpene
β-Barbatene	22.89	1430	0.12				Sesquiterpene
γ-Murolene	25.37	1460	0.18	[10.73]	1623	10.98*	Sesquiterpene
Germacrene D	25.49	1462	1.44	1.50	1636	11.50	Sesquiterpene
α-Selinene	26.72	1476	0.12	0.17	1645	11.88	Sesquiterpene
α-Murolene	27.49	1485	0.07	0.04	1650	12.11	Sesquiterpene
γ-Cadinene	28.54	1498	0.11	0.18	1655	12.37	Sesquiterpene
Mint lactone	28.85	1502	0.64	0.64	2117	37.47	Monoterp. lactone
(E,E)-α-Farnesene	29.00	1504	0.23	0.29	1702	14.40	Sesquiterpene
δ-Cadinene	29.21	1507	0.17	0.11	1687	13.72	Sesquiterpene
trans-Calamenene	29.31	1509	0.03	0.04	1723	15.33	Sesquiterpene
iso-Mint lactone	31.36	1537	0.10	0.09	2163	38.95	Monoterp. lactone
Spathulenol	34.00	1573	0.04	0.06	2024	33.76	Sesquiterp. alcohol
Junenol	35.92	1603	0.14	0.10	1928	28.03	Sesquiterp. alcohol
Salvial-4(14)-en-1-one	36.65	1621	0.13				Sesquiterp. ketone
<b>Total identified</b>			<b>98.00%</b>	<b>97.75%</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 yellow liquid

**Refractive index :** 1.4768 ± 0.0003 (20 °C)

#### CONCLUSION

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



