

## GC/MS BATCH NUMBER: P50106

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**ESSENTIAL OIL:** PEPPERMINT  
**BOTANICAL NAME:** MENTHA X PIPERITA  
**ORIGIN:** INDIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF PEPPERMINT OIL	%
MENTHOL	46.1
MENTHONE	20.6
MENTHYL ACETATE	5.0
1,8-CINEOLE	4.7
ISOMENTHONE	3.4
NEO-MENTHOL	3.0
β-CARYOPHYLLENE	2.7
LIMONENE	2.2
MENTHOFURAN	2.0
β-PINENE	1.0

Comments from Robert Tisserand: A high menthol, exceptionally clean, fresh odor quality. Eleven of 12 key ISO constituents are within range, which is normal for Peppermint oil.

**Date :** December 8, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17L01-PTH1-1-CC

**Customer identification :** Peppermint India - India - P5010676R

**Type :** Essential oil

**Source :** *Mentha x piperita*

**Customer :** Plant Therapy

*ANALYSIS*

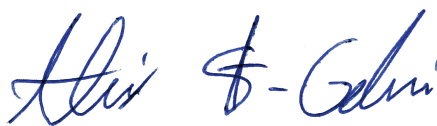
**Method :** PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

**Analyst :** Alexis St-Gelais, M. Sc., chimiste

**Analysis date :** 2017-12-01

Checked and approved by :



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

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*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.	
Isovaleral	0.68	675	0.01				Aliphatic aldehyde
2-Methylbutyral	0.71	679	0.01				Aliphatic aldehyde
cis-Hex-3-en-1-ol	2.53	867	0.01	tr	1336	5.62	Aliphatic alcohol
2,5-Diethyltetrahydrofuran	2.91	896	0.02	0.04	980	1.27	Furan
α-Thujene	3.31	920	0.03	0.69	947	1.13*	Monoterpene
α-Pinene	3.42	927	0.72	[0.69]	947	1.13*	Monoterpene
Camphene	3.71	944	0.03	0.02	1002	1.41	Monoterpene
Thuja-2,4(10)-diene	3.80	949	0.01	0.33	1055	1.93*	Monoterpene
3-Methylcyclohexanone	4.03	962	0.04	0.04	1243	4.23	Aliphatic ketone
Sabinene	4.14	969	0.31	[0.33]	1055	1.93*	Monoterpene
β-Pinene	4.20	973	1.04	0.95	1040	1.77	Monoterpene
Myrcene	4.48*	989	0.20	0.17	1117	2.51	Monoterpene
Octen-3-ol	4.48*	989	[0.20]	20.69	1392	6.51*	Aliphatic alcohol
Octan-3-one	4.54	993	0.04	0.02	1202	3.63*	Aliphatic ketone
α-Phellandrene	4.76	1005	0.02	0.01	1113	2.44	Monoterpene
Octan-3-ol	4.82	1008	0.14	0.14	1343	5.74	Aliphatic alcohol
α-Terpinene	4.94	1015	0.10	0.12	1123	2.58	Monoterpene
para-Cymene	5.18*	1028	2.30	0.10	1209	3.71	Monoterpene
Limonene	5.18*	1028	[2.30]	6.85	1146	2.88*	Monoterpene
1,8-Cineole	5.24	1031	4.68	[6.85]	1146	2.88*	Monoterp. ether
cis-β-Ocimene	5.35	1037	0.07	0.24	1189	3.45*	Monoterpene
trans-β-Ocimene	5.53	1047	0.03	[0.02]	1202	3.63*	Monoterpene
γ-Terpinene	5.72	1057	0.18	[0.24]	1189	3.45*	Monoterpene
cis-Linalool oxide (fur.)	5.98	1071	tr	[20.69]	1392	6.51*	Monoterp. alcohol
cis-Sabinene hydrate	6.07	1076	0.13	5.48	1413	6.87*	Monoterp. alcohol
Terpinolene	6.21*	1084	0.24	0.06	1224	3.94	Monoterpene
Octanol	6.21*	1084	[0.24]	5.67	1501	8.96*	Aliphatic alcohol
trans-Arbusculone	6.32	1090	tr	[5.48]	1413	6.87*	Furan
trans-Sabinene hydrate	6.61	1103	0.02	0.18	1492	8.74*	Monoterp. alcohol
Linalool	6.72	1107	0.16	[0.18]	1492	8.74*	Monoterp. alcohol
cis-para-Menth-2-en-1-ol	7.28	1127	0.03	[0.18]	1492	8.74*	Monoterp. alcohol
Isopulegol	7.89	1149	0.16	[5.67]	1501	8.96*	Monoterp. alcohol
Menthone	8.15	1159	20.59	[20.69]	1392	6.51*	Monoterp. ketone
Menthofuran	8.24	1162	2.00	[5.48]	1413	6.87*	Monoterp. ether
Isomenthone	8.34	1166	3.40	[5.48]	1413	6.87*	Monoterp. ketone
Lavandulol	8.40	1168	0.19	0.22	1612	12.96	Monoterp. alcohol
neo-Menthol	8.60	1175	3.02	3.29	1529	9.91*	Monoterp. alcohol
Borneol	8.67	1178	0.13	1.57	1620	13.39*	Monoterp. alcohol
Terpinen-4-ol	8.84	1184	0.37	[3.29]	1529	9.91*	Monoterp. alcohol
Menthol	9.18	1196	46.06	46.31	1577	11.67	Monoterp. alcohol
Isomenthol	9.25	1199	0.62	0.56	1554	10.80	Monoterp. alcohol

α-Terpineol	9.43	1203	0.27	[1.57]	1620	13.39*	Monoterp. alcohol
neoiso-Menthol	9.59	1206	0.38	0.36	1595	12.31	Monoterp. alcohol
Pulegone	11.05	1238	0.70	0.73	1546	10.52	Monoterp. ketone
Carvone	11.46	1247	0.08	0.10	1641	14.47*	Monoterp. ketone
Piperitone	11.86	1256	0.62	[1.57]	1620	13.39*	Monoterp. ketone
neo-Menthyl acetate	12.42	1268	0.19	0.17	1463	8.07	Monoterp. ester
Decanol	13.10	1283	0.20	0.23	1706	17.85	Aliphatic alcohol
Menthyl acetate	13.44	1291	5.00	[5.67]	1501	8.96*	Monoterp. ester
Isomenthyl acetate	14.06	1302	0.10	2.85	1522	9.65*	Monoterp. ester
Bicycloelemene	15.05	1317	0.09	0.15	1424	7.14	Sesquiterpene
α-Copaene	17.72	1357	0.08	0.07	1432	7.34	Sesquiterpene
β-Bourbonene	18.15	1364	0.20	0.23	1454	7.84	Sesquiterpene
β-Elemene	18.95	1376	0.09	[3.29]	1529	9.91*	Sesquiterpene
β-Caryophyllene	20.68	1401	2.74	[2.85]	1522	9.65*	Sesquiterpene
β-Copaene	21.55	1412	0.09	[2.85]	1522	9.65*	Sesquiterpene
cis-β-Farnesene	23.10	1430	0.12	0.14	1582	11.85	Sesquiterpene
α-Humulene	23.43	1434	0.19	0.28	1586	11.96	Sesquiterpene
trans-β-Farnesene	24.53	1447	0.10	[1.57]	1620	13.39*	Sesquiterpene
Germacrene D	25.65	1460	0.45	[1.57]	1620	13.39*	Sesquiterpene
Bicyclogermacrene	26.89	1475	0.09	[0.10]	1641	14.47*	Sesquiterpene
δ-Cadinene	29.37	1506	0.04	0.03	1673	16.15	Sesquiterpene
Caryophyllene oxide	33.85	1569	0.05	0.03	1843	27.06	Sesquiterp. ether
Viridiflorol	34.87	1583	0.04	0.04	1975	35.12	Sesquiterp. alcohol
<b>Total identified</b>			<b>99.02%</b>	<b>99.16%</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 :** Faintly yellow liquid

**Refractive index :** 1.4605 ± 0.0003 (20 °C)

#### CONCLUSION

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

