

GC/MS BATCH NUMBER: P50103

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF PEPPERMINT OIL	%
MENTHOL	46.0
MENTHONE	21.2
MENTHYL ACETATE	5.3
1,8-CINEOLE	5.1
ISOMENTHONE	3.5
MENTHOFURAN	3.0
NEOMENTHOL	2.3
LIMONENE	2.0
β-CARYOPHYLLENE	2.0
PULEGONE	1.4
3-OCTANOL	0.1
trans-SABINENE HYDRATE	0.03

Comments from Robert Tisserand: This oil has an excellent odor profile, and conforms to 11 of 12 key ISO constituents for non-USA Peppermint oil. Trans-Sabinene hydrate is low, but this is seen in almost all Peppermint oils.

Date : March 3, 2016

SAMPLE IDENTIFICATION

Internal code : 16B26-PTH4-1-LC

Customer identification : Peppermint - P5010357s2R - India

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).

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

Analysis date : 2016-03-03

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.	
Isovaleral	0.51	562	0.01	0.01	764	0.54	Aliphatic aldehyde
2-Methylbutyral	0.53	570	0.01	0.01	756	0.53	Aliphatic aldehyde
Isoamyl alcohol	0.87	732	0.01	0.03	1164	2.64	Aliphatic alcohol
2-Methylbutyl alcohol	0.89	735	0.01	0.01	1160	2.59	Aliphatic alcohol
cis-Hex-3-en-1-ol	1.97	861	tr	0.01	1342	5.09	Aliphatic alcohol
α -Thujene	2.72	918	0.03	0.04	957	0.97	Monoterpene
α -Pinene	2.81	924	0.64	0.64	946	0.93	Monoterpene
Camphene	3.07	940	0.03	0.03	1012	1.17	Monoterpene
3-Methylcyclohexanone	3.37	960	0.05	0.07	1255	3.83	Aliphatic ketone
Sabinene	3.49	967	0.36	0.38	1067	1.62	Monoterpene
β -Pinene	3.53	970	0.93	0.92	1050	1.48	Monoterpene
Myrcene	3.84	989	0.22	0.22	1120	2.13	Monoterpene
Octan-3-one	3.89	992	0.02	0.01	1206	3.15	Aliphatic ketone
Octen-3-ol	3.94	995	0.04	0.03	1409	6.09	Aliphatic alcohol
Pseudolimonene	4.02	1001	0.01	0.01	1116	2.07	Monoterpene
α -Phellandrene	4.07*	1003	0.07	0.02	1113	2.04	Monoterpene
Δ 3-Carene	4.07*	1003	[0.07]	0.02	1104	1.93	Monoterpene
Octan-3-ol	4.21	1011	0.11	0.12	1357	5.31	Aliphatic alcohol
α -Terpinene	4.26	1014	0.17	0.17	1126	2.20	Monoterpene
1,8-Cineole	4.54*	1030	7.29	5.09	1154	2.53	Monoterp. ether
Limonene	4.54*	1030	[7.29]	2.01	1146	2.42	Monoterpene
para-Cymene	4.54*	1030	[7.29]	0.14	1213	3.25	Monoterpene
cis- β -Ocimene	4.69	1038	0.20	0.44	1194	2.99*	Monoterpene
2-Ethylhexanol	4.77	1043	0.03	0.03	1446	6.78	Aliphatic alcohol
trans- β -Ocimene	4.86	1048	0.04	0.05	1207	3.16	Monoterpene
γ -Terpinene	5.02	1057	0.29	[0.44]	1194	2.99*	Monoterpene
cis-Sabinene hydrate	5.38	1078	0.24	3.53	1418	6.27*	Monoterp. alcohol
Terpinolene	5.48	1083	0.10	0.10	1227	3.45	Monoterpene
para-Cymenene	5.71	1097	0.01	tr	1373	5.55	Monoterpene
trans-Sabinene hydrate	5.96	1107	0.03	0.02	1493	7.68	Monoterp. alcohol
Linalool	5.99	1108	0.16	0.17	1514	8.16	Monoterp. alcohol
cis-para-Menth-2-en-1-ol	6.40	1127	0.05	0.12	1509	8.01*	Monoterp. alcohol
trans-Sabinol	6.74	1143	0.01				Monoterp. alcohol
trans-para-Menth-2-en-1-ol	6.83	1147	0.04	0.33	1564	9.66*	Monoterp. alcohol
Isopulegol	6.88	1149	0.09	[0.12]	1509	8.01*	Monoterp. ketone
Menthone	7.07	1158	21.23	21.20	1401	5.95	Monoterp. ketone
Menthofuran	7.14	1161	3.01	2.79	1413	6.17	Monoterp. ether
Isomenthone	7.22	1164	3.46	[3.53]	1418	6.27*	Monoterp. ketone
neo-Menthol	7.46	1176	2.34	2.40	1538	8.91	Monoterp. alcohol
trans-Isopulegone	7.54	1179	0.13				Monoterp. ketone
Terpinen-4-ol	7.65	1184	0.51	0.54	1535	8.82*	Monoterp. alcohol

Menthol	7.99*	1198	45.96	45.67	1592	10.52	Monoterp. alcohol
Isomenthol	7.99*	1198	[45.96]	[0.33]	1564	9.66*	Monoterp. alcohol
neoiso-Menthol	8.17	1203	0.15	0.16	1618	11.48	Monoterp. alcohol
α-Terpineol	8.31	1207	0.24	0.29	1633	12.11	Monoterp. alcohol
γ-Terpineol	8.36	1208	0.02	0.03	1635	12.22	Monoterp. alcohol
Pulegone	9.41	1236	1.36	1.35	1555	9.43	Monoterp. ketone
Carvone	9.76	1246	0.11	0.11	1642	12.50	Monoterp. ketone
Piperitone	10.08	1254	0.49	0.47	1630	11.97	Monoterp. ketone
neo-Menthyl acetate	10.53	1266	0.18	0.18	1467	7.20	Monoterp. ester
Dihydroedulan I	11.04	1280	0.03	0.02	1443	6.73	Edulan
Menthyl acetate	11.40	1290	5.33	5.51	1508	7.98*	Monoterp. ester
Isomenthyl acetate	11.87	1300	0.10	[5.51]	1508	7.98*	Monoterp. ester
α-Terpinyol acetate	14.47	1345	0.03	0.03	1616	11.38	Monoterp. ester
α-Copaene	14.91	1352	0.02	0.01	1428	6.47	Sesquiterpene
β-Bourbonene	15.27	1359	0.15	0.16	1453	6.91	Sesquiterpene
β-Elemene	16.05	1372	0.05	0.06	1525	8.51	Sesquiterpene
β-Caryophyllene	17.45	1396	1.97	1.87	1522	8.43	Sesquiterpene
6,9-Guaiadiene	19.65	1425	0.03	[0.54]	1535	8.82*	Sesquiterpene
α-Humulene	19.92	1429	0.09	0.07	1593	10.56	Sesquiterpene
trans-β-Farnesene	21.11	1444	0.14	0.81	1623	11.67*	Sesquiterpene
Germacrene D	21.97*	1456	0.77	[0.81]	1623	11.67*	Sesquiterpene
γ-Murolene	21.97*	1456	[0.77]	0.18	1609	11.06	Sesquiterpene
Bicyclgermacrene	23.07	1470	0.14	0.12	1638	12.33	Sesquiterpene
Valencene	23.91*	1481	0.04	0.02	1663	13.47	Sesquiterpene
α-Murolene	23.91*	1481	[0.04]	0.01	1645	12.66	Sesquiterpene
δ-Cadinene	25.44	1500	0.05	0.06	1673	13.93	Sesquiterpene
Caryophyllene oxide	30.19	1556	0.03	0.03	1848	24.14	Sesquiterp. ether
Viridiflorol	31.86	1576	0.06	0.08	1982	33.00	Sesquiterp. alcohol
Total identified			99.52%	99.01%			

*: 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 : Clear liquid

Refractive index : 1.4585 ± 0.0003 (20 °C)

CONCLUSION

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



