

GC/MS BATCH NUMBER: P40106

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF PEPPERMINT ORGANIC OIL	%
MENTHOL	33.8
MENTHONE	25.0
MENTHYL ACETATE	5.6
1,8-CINEOLE	5.0
ISOMENTHONE	4.3
NEO-MENTHOL	3.6
β-CARYOPHYLLENE	3.4
MENTHOFURAN	3.1
LIMONENE	2.7
β-PINENE	1.3
PULEGONE	1.1

Comments from Robert Tisserand: Mouth-watering green, creamy, minty odor quality. Eleven of twelve key ISO constituents are within range (low sabinene hydrate), which is actually normal for Peppermint oil.

Date : December 4, 2017

SAMPLE IDENTIFICATION

Internal code : 17L01-PTH2-1-CC

Customer identification : Peppermint Organic - India - P4010674R

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 : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2017-12-04

Checked and approved by :

Sylvain Merciers, M. Sc., chimiste 2014-005

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
<i>cis</i> -Hex-3-en-1-ol	2.52	867	0.01	0.02	1319	5.35	Aliphatic alcohol
2,5-Diethyltetrahydrofuran	2.91	896	0.03	0.05	981	1.27	Furan
α -Thujene	3.32	920	0.03	0.82	947	1.13*	Monoterpene
α -Pinene	3.42	927	0.85	[0.82]	947	1.13*	Monoterpene
Camphene	3.71*	944	0.03	0.02	1002	1.41	Monoterpene
α -Fenchene	3.71*	944	[0.03]	0.01	996	1.36	Monoterpene
Thuja-2,4(10)-diene	3.81	949	0.01	0.45	1055	1.93*	Monoterpene
3-Methylcyclohexanone	4.02	962	0.07	0.06	1243	4.22	Aliphatic ketone
Sabinene	4.14	969	0.42	[0.45]	1055	1.93*	Monoterpene
β -Pinene	4.20	973	1.27	1.15	1040	1.77	Monoterpene
Myrcene	4.48	989	0.20	0.16	1117	2.51	Monoterpene
Octen-3-ol	4.54	993	0.05	25.27	1393	6.53*	Aliphatic alcohol
α -Phellandrene	4.76	1005	0.03	0.02	1113	2.45	Monoterpene
Octan-3-ol	4.82	1008	0.18	0.18	1343	5.74	Aliphatic alcohol
α -Terpinene	4.95	1015	0.14	0.17	1124	2.59	Monoterpene
para-Cymene	5.18*	1028	2.79	0.14	1209	3.72	Monoterpene
Limonene	5.18*	1028	[2.79]	7.62	1146	2.88*	Monoterpene
1,8-Cineole	5.25	1031	4.95	[7.62]	1146	2.88*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.35	1037	0.09	0.34	1189	3.45*	Monoterpene
<i>trans</i> - β -Ocimene	5.53	1047	0.04	0.03	1204	3.64	Monoterpene
γ -Terpinene	5.72	1057	0.24	[0.34]	1189	3.45*	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	6.01	1073	0.02	0.01	1374	6.22	Monoterp. alcohol
Octanol	6.21	1084	0.18	6.51	1502	8.98*	Aliphatic alcohol
Terpinolene	6.22	1085	0.14	0.08	1225	3.95	Monoterpene
<i>trans</i> -Linalool oxide (fur.)	6.33	1090	tr	7.53	1413	6.89*	Monoterp. alcohol
para-Cymenene	6.43	1096	0.01	0.02	1365	6.07	Monoterpene
Linalool	6.73*	1107	0.22	0.16	1492	8.74*	Monoterp. alcohol
<i>trans</i> -Sabinene hydrate	6.73*	1107	[0.22]	0.14	1475	8.36	Monoterp. alcohol
<i>cis</i> -para-Menth-2-en-1-ol	7.29	1128	0.04	[0.16]	1492	8.74*	Monoterp. alcohol
Isopulegol	7.90	1150	0.13	[0.16]	1492	8.74*	Monoterp. alcohol
Menthone	8.17	1160	24.98	[25.27]	1393	6.53*	Monoterp. ketone
Menthofuran	8.25	1163	3.11	[7.53]	1413	6.89*	Monoterp. ether
Isomenthone	8.36	1166	4.31	[7.53]	1413	6.89*	Monoterp. ketone
Lavandulol	8.41	1168	0.16	0.20	1612	12.97	Monoterp. alcohol
neo-Menthol	8.62	1176	3.58	3.94	1530	9.93*	Monoterp. alcohol
Borneol	8.68	1178	0.18	2.07	1620	13.39*	Monoterp. alcohol
<i>trans</i> -Isopulegone	8.74	1180	0.08	[6.51]	1502	8.98*	Monoterp. ketone
Terpinen-4-ol	8.85	1184	0.49	[3.94]	1530	9.93*	Monoterp. alcohol
Menthol	9.14	1195	33.82	34.23	1575	11.62	Monoterp. alcohol
Isomenthol	9.24	1198	0.68	0.60	1554	10.81	Monoterp. alcohol
neoiso-Menthol	9.42	1202	0.50	[2.07]	1620	13.39*	Monoterp. alcohol

α -Terpineol	9.58	1206	0.45	[2.07]	1620	13.39*	Monoterp. alcohol
(Z)-Hex-3-en-1-yl isovalerate	10.56	1227	0.03	0.04	1441	7.57	Aliphatic ester
Pulegone	11.05	1238	1.14	1.18	1547	10.54	Monoterp. ketone
Carvone	11.46	1247	0.10	0.10	1626	13.70	Monoterp. ketone
Piperitone	11.86	1256	0.84	[2.07]	1620	13.39*	Monoterp. ketone
neo-Menthyl acetate	12.42	1268	0.25	0.24	1464	8.08	Monoterp. ester
Decanol	13.11	1283	0.27	0.28	1706	17.87	Aliphatic alcohol
Menthyl acetate	13.45	1291	5.56	[6.51]	1502	8.98*	Monoterp. ester
Isomenthyl acetate	14.06	1302	0.14	3.57	1523	9.67*	Monoterp. ester
Bicycloelemene	15.06	1317	0.09	0.14	1424	7.15	Sesquiterpene
α -Copaene	17.72	1357	0.09	0.09	1433	7.35	Sesquiterpene
β -Bourbonene	18.15	1364	0.28	0.30	1454	7.84	Sesquiterpene
β -Elemene	18.96	1376	0.14	[3.94]	1530	9.93*	Sesquiterpene
β -Caryophyllene	20.70	1401	3.42	[3.57]	1523	9.67*	Sesquiterpene
β -Copaene	21.55	1412	0.11	[3.57]	1523	9.67*	Sesquiterpene
cis- β -Farnesene	23.10	1430	0.16	0.33	1584	11.94*	Sesquiterpene
α -Humulene	23.43	1434	0.21	[0.33]	1584	11.94*	Sesquiterpene
trans- β -Farnesene	24.53	1447	0.16	[2.07]	1620	13.39*	Sesquiterpene
Germacrene D	25.66	1461	0.62	[2.07]	1620	13.39*	Sesquiterpene
Bicyclgermacrene	26.90	1475	0.13	0.15	1641	14.46*	Sesquiterpene
α -Selinene	27.02	1477	0.12	0.15	1635	14.16	Sesquiterpene
α -Muuroleone	27.68	1485	0.02	[0.15]	1641	14.46*	Sesquiterpene
γ -Cadinene	28.72	1497	0.03	0.04	1667	15.84	Sesquiterpene
δ -Cadinene	29.37	1506	0.11	0.09	1673	16.16	Sesquiterpene
Caryophyllene oxide	33.86*	1569	0.10	0.06	1844	27.09	Sesquiterp. ether
(E)-Nerolidol	33.86*	1569	[0.10]	0.03	1985	35.58	Sesquiterp. alcohol
Spathulenol	34.03	1572	0.02	0.02	2021	37.20	Sesquiterp. alcohol
Viridiflorol	34.88	1583	0.07	0.07	1975	35.11	Sesquiterp. alcohol
Total identified			98.72%	98.88%			

*: 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 : 1.4615 \pm 0.0003 (20 °C)

CONCLUSION

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



