

GC/MS BATCH NUMBER: P50104

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF PEPPERMINT OIL	%
MENTHOL	44.8
MENTHONE	20.8
MENTHYL ACETATE	5.4
1,8-CINEOLE	5.1
ISOMENTHONE	3.5
MENTHOFURAN	2.9
NEOMENTHOL	2.6
β-CARYOPHYLLENE	2.2
LIMONENE	2.1
PULEGONE	1.3
cis-SABINENE HYDRATE	0.2
3-OCTANOL	0.1

Comments from Robert Tisserand: Excellent odor profile. Conforms to 11 of 12 key ISO constituents for non-US Peppermint oil. cis-sabinene hydrate is slightly low, but this is actually normal.

Date : December 22, 2016

SAMPLE IDENTIFICATION

Internal code : 16L12-PTH4-1-DM

Customer identification : Peppermint - P5010467R

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 : Sylvain Mercier, M. Sc., chimiste

Analysis date : 2016-12-20

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.	
Isoamyl alcohol	1.16	731	0.01	7.27	1146	2.35*	Aliphatic alcohol
2-Methylbutyl alcohol	1.19	734	0.01	[7.27]	1146	2.35*	Aliphatic alcohol
cis-Hex-3-en-1-ol	2.54	868	0.01	0.01	1311	4.47	Aliphatic alcohol
Hexanol	2.75	885	0.04	0.03	1289	4.17	Aliphatic alcohol
2,5-Diethyltetrahydrofuran	2.87	894	0.02	0.66	951	0.88*	Furane
α -Thujene	3.28	919	0.03	0.03	970	0.96	Monoterpene
α -Pinene	3.38	926	0.65	[0.66]	951	0.88*	Monoterpene
Camphene	3.67	943	0.02	0.02	1003	1.10	Monoterpene
3-Methylcyclohexanone	3.99	963	0.03	0.02	1253	3.67	Aliphatic ketone
Sabinene	4.10	970	0.34	0.35	1058	1.52	Monoterpene
β -Pinene	4.16	973	0.95	0.94	1042	1.39	Monoterpene
Myrcene	4.45	990	0.14	0.13	1116	1.99	Monoterpene
Octan-3-one	4.50	994	0.01	0.14	1206	3.04*	Aliphatic ketone
Octen-3-ol	4.56	998	0.03	21.17	1395	5.68*	Aliphatic alcohol
α -Phellandrene	4.72	1006	0.02	0.02	1112	1.95	Monoterpene
Octan-3-ol	4.82	1012	0.14	0.14	1341	4.90	Aliphatic alcohol
α -Terpinene	4.91	1017	0.12	0.12	1125	2.09	Monoterpene
para-Cymene	5.15*	1030	2.22	[0.14]	1206	3.04*	Monoterpene
Limonene	5.15*	1030	[2.22]	[7.27]	1146	2.35*	Monoterpene
1,8-Cineole	5.20	1033	5.14	[7.27]	1146	2.35*	Monoterp. ether
cis- β -Ocimene	5.32	1040	0.12	0.25	1190	2.86*	Monoterpene
trans- β -Ocimene	5.50	1050	0.03	0.02	1203	3.00	Monoterpene
γ -Terpinene	5.69	1060	0.22	[0.25]	1190	2.86*	Monoterpene
cis-Linalool oxide (fur.)	5.98*	1075	0.02	0.02	1370	5.33*	Monoterp. alcohol
cis-Sabinene hydrate	6.05	1079	0.19	0.31	1402	5.78	Monoterp. alcohol
Terpinolene	6.16	1085	0.09	0.08	1226	3.30	Monoterpene
Octanol	6.23	1089	0.06	5.32	1503	7.60*	Aliphatic alcohol
Linalool	6.72*	1109	0.19	0.18	1486	7.28*	Monoterp. alcohol
Camphor	7.80	1150	0.05	0.07	1428	6.20	Monoterp. ketone
Isopulegol	7.87	1153	0.15	0.10	1492	7.41	Monoterp. alcohol
Menthone	8.08	1161	20.80	[21.17]	1395	5.68*	Monoterp. ketone
Menthofuran	8.18	1164	2.90	2.82	1408	5.87	Monoterp. ether
Isomenthone	8.28	1168	3.47	3.69	1415	5.96	Monoterp. ketone
Lavandulol	8.41*	1173	0.14	0.10	1602	10.35*	Monoterp. alcohol
neo-Menthol	8.59	1179	2.59	2.69	1529	8.17	Monoterp. alcohol
Borneol	8.68	1183	0.21	0.71	1620	10.90*	Monoterp. alcohol
Terpinen-4-ol	8.81	1188	0.52	0.48	1525	8.08	Monoterp. alcohol
Menthol	9.17	1199	44.84	45.55	1575	9.54	Monoterp. alcohol
Isomenthol	9.24	1201	0.54	0.50	1550	8.82	Monoterp. alcohol
α -Terpineol	9.43	1205	0.22	0.17	1629	11.21	Monoterp. alcohol
neiso-Menthol	9.58	1208	0.30	0.33	1590	9.98	Monoterp. alcohol

Pulegone	10.98	1240	1.34	1.26	1547	8.71	Monoterp. ketone
Carvone	11.39	1249	0.10	0.44	1637	11.53*	Monoterp. ketone
Piperitone	11.78	1258	0.50	[0.44]	1637	11.53*	Monoterp. ketone
neo-Menthyl acetate	12.34	1270	0.17	0.27	1475	7.08	Monoterp. ester
Dihydroedulan I	13.15	1288	0.07	0.06	1435	6.33	Edulan
Menthyl acetate	13.36	1293	5.36	[5.32]	1503	7.60*	Monoterp. ester
Isomenthyl acetate	13.96	1303	0.09	0.09	1513	7.79	Monoterp. ester
Bicycloelemene	14.94	1318	0.03	0.03	1426	6.15	Sesquiterpene
Menthofurolactone	17.02	1350	0.04				Monoterp. lactone
α-Copaene	17.57	1358	0.04	0.04	1431	6.25	Sesquiterpene
Eugenol	17.85	1362	0.02	0.02	2044	34.96	Phenylpropanoid
β-Bourbonene	18.00	1365	0.16	0.17	1465	6.91	Sesquiterpene
β-Elemene	18.83	1377	0.06	2.04	1539	8.45*	Sesquiterpene
β-Caryophyllene	20.51	1401	2.17	[2.04]	1539	8.45*	Sesquiterpene
β-Copaene	21.38	1412	0.06	0.06	1515	7.84	Sesquiterpene
α-Humulene	23.27	1435	0.14	0.08	1595	10.16	Sesquiterpene
trans-β-Farnesene	24.42	1449	0.12	[0.71]	1620	10.90*	Sesquiterpene
Germacrene D	25.49	1462	0.59	[0.71]	1620	10.90*	Sesquiterpene
Bicyclogermaacrene	26.73	1476	0.11	0.10	1653	12.26	Sesquiterpene
γ-Cadinene	28.56	1498	0.03	0.03	1655	12.35	Sesquiterpene
Mint lactone	28.80	1502	0.03	0.04	2118	37.50	Monoterp. lactone
δ-Cadinene	29.22	1507	0.09	0.06	1687	13.74	Sesquiterpene
Caryophyllene oxide	33.74	1569	0.06	0.03	1853	22.98	Sesquiterp. ether
Viridiflorol	34.85	1584	0.05	0.05	1984	31.41	Sesquiterp. alcohol
Total identified			99.01%	99.31%			

*: 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

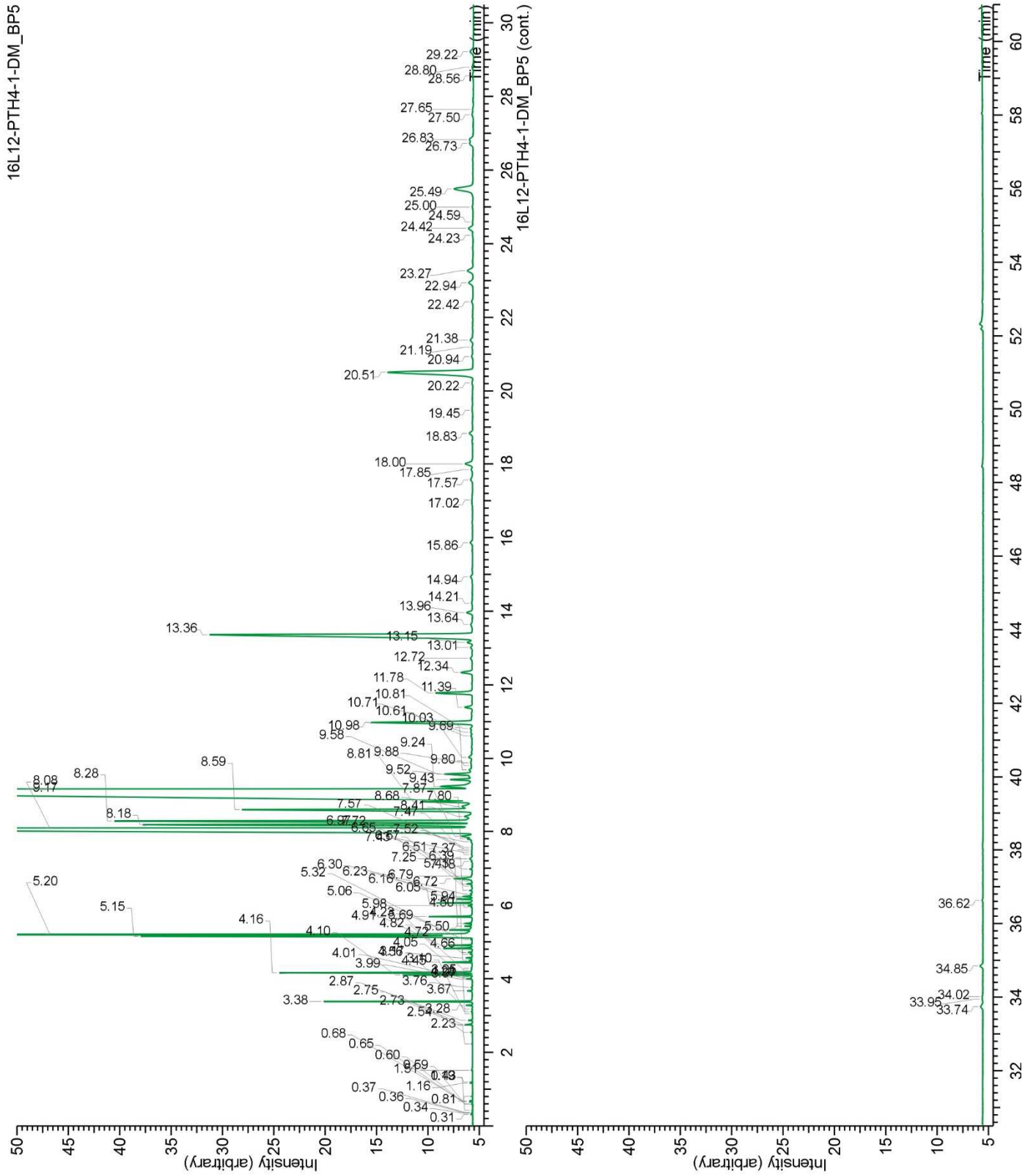
OTHER DATA

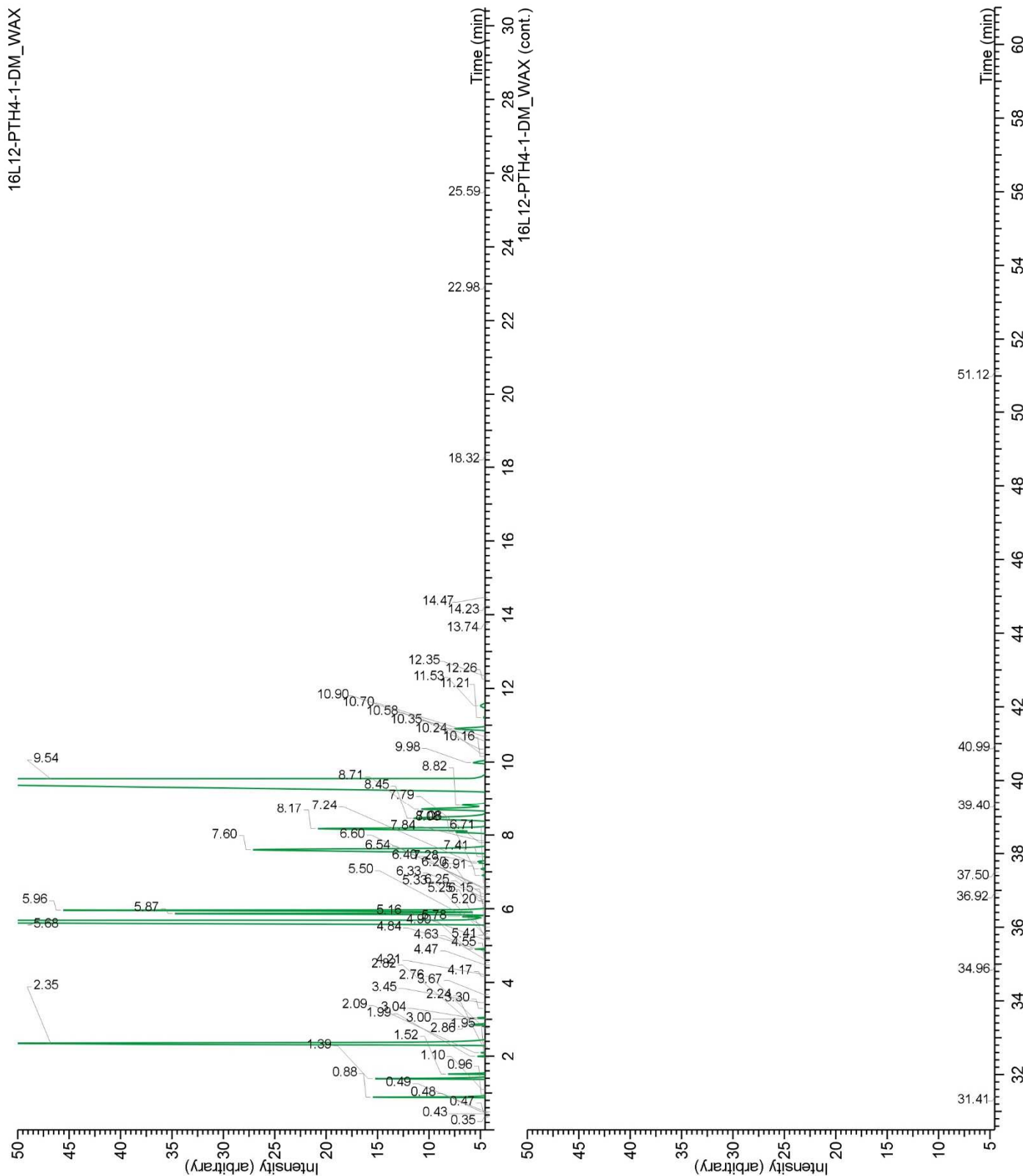
Physical aspect : Faintly yellow liquid

Refractive index : 1.4613 ± 0.0003 (20 °C)

CONCLUSION

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





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