

GC/MS & COA

Peppermint Oil – 200901688

November 26, 2020

ANALYSIS

Type: Essential oil

Source: Mentha x piperita

Analysis date: November 26, 2020 Physical aspect: Faintly yellow liquid

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. This oil

complies with ISO specifications for Peppermint Oil.

Physico-Chemical Properties: -

Properties	Results
Refractive Index at 20°C	1.45603
Specific Gravity at 20°C	0.9019
Optical Rotation at 20°C	-25.08°

Peak	Compound	RT	Area Sum %
1	cis-2-Hexenol	7.602	0.04
2	lpha -Thujene	8.966	0.03
3	lpha -Pinene	9.232	0.91
4	cis-3-Methylcyclohexanol	9.759	0.07
5	Camphene analog	9.961	0.02

7 Sabinene + β - Pinene 11.537 1.73 8 1-Octen-3-ol 12.096 0.05 9 1-Octen-3-ol 12.528 0.03 10 β - Myrcene 12.739 0.3 11 3-Octanol 13.097 0.29 12 α - Phellandrene 13.32 0.04 13 α - Terpinene 14.192 0.2 14 p-Cymene 14.752 0.12 15 Limonene 15.037 2.13 16 1,8-Cineole 15.162 5.84 17 (Z)-β - Ocimene 15.984 0.1 18 (E)-β - Ocimene 16.693 0.03 19 γ - Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α - Terpinolene 19.42 0.06 23 trans-Sa 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03	6	3-Methylcyclohexanone	10.091	0.13
9 1-Octen-3-ol 12.528 0.03 10 β-Myrcene 12.739 0.3 11 3-Octanol 13.097 0.29 12 α-Phellandrene 13.32 0.04 13 α-Terpinene 14.192 0.2 14 p-Cymene 14.752 0.12 15 Limonene 15.037 2.13 16 1,8-Cineole 15.162 5.84 17 (Z)-β-Ocimene 15.984 0.1 18 (E)-β-Ocimene 16.693 0.03 19 γ-Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sa 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28	7	Sabinene + eta -Pinene	11.537	1.73
10 β-Myrcene 12.739 0.3 11 3-Octanol 13.097 0.29 12 α-Phellandrene 13.32 0.04 13 α-Terpinene 14.192 0.2 14 p-Cymene 15.037 2.13 16 1,8-Cineole 15.162 5.84 17 (Z)-β-Ocimene 16.693 0.03 19 γ-Terpinene 17.236 0.35 19 γ-Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sa 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 26.657 45.98 31 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.702 0.05	8	1-Octen-3-ol	12.096	0.05
11 3-Octanol 13.097 0.29 12 α-Phellandrene 13.32 0.04 13 α-Terpinene 14.192 0.2 14 p-Cymene 14.752 0.12 15 Limonene 15.037 2.13 16 1,8-Cineole 15.162 5.84 17 (2)-β-Ocimene 15.984 0.1 18 (Ε)-β-Ocimene 16.693 0.03 19 γ-Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sa 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05	9	1-Octen-3-ol	12.528	0.03
12 α - Phellandrene 13.32 0.04 13 α - Terpinene 14.192 0.2 14 p-Cymene 14.752 0.12 15 Limonene 15.037 2.13 16 1,8-Cineole 15.162 5.84 17 (Z)- β - Ocimene 15.984 0.1 18 (E)- β - Ocimene 16.693 0.03 19 γ - Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α - Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthore 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 </td <td>10</td> <td>eta -Myrcene</td> <td>12.739</td> <td>0.3</td>	10	eta -Myrcene	12.739	0.3
13 α-Terpinene 14.192 0.2 14 p-Cymene 14.752 0.12 15 Limonene 15.037 2.13 16 1,8-Cineole 15.162 5.84 17 (Z)-β-Ocimene 15.984 0.1 18 (E)-β-Ocimene 16.693 0.03 19 γ-Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sa 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 <	11	3-Octanol	13.097	0.29
14 p-Cymene 14.752 0.12 15 Limonene 15.037 2.13 16 1,8-Cineole 15.162 5.84 17 (Z)-β-Ocimene 15.984 0.1 18 (E)-β-Ocimene 16.693 0.03 19 γ-Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28	12	lpha -Phellandrene	13.32	0.04
15 Limonene 15.037 2.13 16 1,8-Cineole 15.162 5.84 17 (Z)-β-Ocimene 15.984 0.1 18 (E)-β-Ocimene 16.693 0.03 19 γ-Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sa 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthoruran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05	13	lpha -Terpinene	14.192	0.2
16 1,8-Cineole 15.162 5.84 17 (Z)-β-Ocimene 15.984 0.1 18 (E)-β-Ocimene 16.693 0.03 19 γ-Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.769 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24 <td>14</td> <td>p-Cymene</td> <td>14.752</td> <td>0.12</td>	14	p-Cymene	14.752	0.12
17 (Z)-β-Ocimene 15.984 0.1 18 (E)-β-Ocimene 16.693 0.03 19 γ -Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α -Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α -Terpineol 27.788 0.24	15	Limonene	15.037	2.13
18 (E)- β - Ocimene 16.693 0.03 19 γ - Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α - Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α - Terpineol 27.788 0.24	16	1,8-Cineole	15.162	5.84
19 γ-Terpinene 17.236 0.35 20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	17	(Z)- eta -Ocimene	15.984	0.1
20 cis-Sabinene hydrate 17.81 0.23 21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	18	(E)- eta -Ocimene	16.693	0.03
21 Octanol 18.627 0.03 22 α-Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	19	γ -Terpinene	17.236	0.35
22 α-Terpinolene 19.42 0.06 23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	20	cis-Sabinene hydrate	17.81	0.23
23 trans-Sal 20.211 0.03 24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	21	Octanol	18.627	0.03
24 Linalool 20.657 0.1 25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	22	lpha -Terpinolene	19.42	0.06
25 Amyl isovalerate 21.066 0.03 26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	23	trans-Sal	20.211	0.03
26 unknown 22.012 0.03 27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	24	Linalool	20.657	0.1
27 Isopulegol 23.896 0.14 28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	25	Amyl isovalerate	21.066	0.03
28 Menthone 24.816 21.96 29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	26	unknown	22.012	0.03
29 Menthofuran + Isomenthone 25.462 5.18 30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	27	Isopulegol	23.896	0.14
30 Neo-Menthol 25.642 3.78 31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	28	Menthone	24.816	21.96
31 Menthol 26.857 45.98 32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	29	Menthofuran + Isomenthone	25.462	5.18
32 Isomenthol 27.169 0.28 33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	30	Neo-Menthol	25.642	3.78
33 Neoisomenthol 27.702 0.05 34 α-Terpineol 27.788 0.24	31	Menthol	26.857	45.98
α -Terpineol α -	32	Isomenthol	27.169	0.28
a - respineor	33	Neoisomenthol	27.702	0.05
35 Pulegone 31.596 0.68	34	lpha -Terpineol	27.788	0.24
	35	Pulegone	31.596	0.68

36	Carvone	32.038	0.08
37	Piperitenone	32.802	0.25
38	neo-Menthyl acetate	34.917	0.1
39	Dihydroedulan I	35.475	0.06
40	Dihydroedulan II	35.898	0.02
41	Menthyl acetate	36.612	5.36

	Total identified		99.97%
55	Viridiflorol	58.821	0.06
54	Caryophyllene oxide	58.142	0.02
53	δ -Cadinene	54.246	0.04
52	Bicyclogermacrene	51.908	0.08
51	Germacrene D	50.703	0.54
50	(E)- eta -Famesene	49.718	0.11
49	lpha -Humulene	48.484	0.07
48	eta -Copaene	46.678	0.06
47	eta -Caryophyllene	45.847	1.63
46	eta -Elemene	44.072	0.05
45	eta -Bourbonene	43.191	0.09
44	lpha -Copaene	42.569	0.06
43	Bicycloelemenene	39.618	0.04
42	Isomenthyl acetate	37.475	0.06

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