



## GC/MS BATCH NUMBER: S40102

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**ESSENTIAL OIL:** ORGANIC SPEARMINT  
**BOTANICAL NAME:** MENTHA SPICATA  
**ORIGIN:** INDIA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF SPEARMINT ORGANIC OIL	%
CARVONE	61.2
LIMONENE	20.5
cis-DIHYDROCARVONE	2.3
MYRCENE	2.2
1,8-CINEOLE	1.8
$\beta$ -BOURBONENE	1.0
MENTHONE	0.1
VIRIDIFLOROL	0.1

**Date :** April 5, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16C24-PTH4-1-DM

**Customer identification :** Organic Spearmint - India - S4010257R

**Type :** Essential oil

**Source :** *Mentha spicata*

**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 :** 2016-03-31

Checked and approved by :

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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.	
<i>cis</i> -Hex-3-en-1-ol	2.32	864	0.02	0.01	1344	5.03*	Aliphatic alcohol
Hexanol	2.55	884	tr	tr	1311	4.55	Aliphatic alcohol
2,5-Diethyltetrahydrofuran	2.70	896	0.07	0.07	980	1.03	Furan
Hashishene	2.97	914	0.09	0.73	953	0.91*	Monoterpene
$\alpha$ -Thujene	3.08	920	0.05	0.06	961	0.95	Monoterpene
$\alpha$ -Pinene	3.18	926	0.65	[0.73]	953	0.91*	Monoterpene
Camphene	3.45	943	0.02	0.02	1006	1.15	Monoterpene
3-Methylcyclohexanone	3.75	962	0.11	0.10	1254	3.75	Aliphatic ketone
Sabinene	3.87	969	0.52	0.53	1062	1.59	Monoterpene
$\beta$ -Pinene	3.93	973	0.88	0.87	1045	1.45	Monoterpene
3-p-Menthene	4.07	981	0.01	tr	995	1.09	Monoterpene
Myrcene	4.22	991	2.16	2.14	1121	2.10	Monoterpene
Octen-3-ol	4.27*	993	0.10	0.02	1410	5.99	Aliphatic alcohol
Octan-3-one	4.27*	993	[0.10]	0.08	1206	3.10	Aliphatic ketone
Pseudolimonene	4.42	1003	0.08	0.02	1112	2.02	Monoterpene
$\Delta$ 3-Carene	4.47*	1006	0.11	0.03	1096	1.86	Monoterpene
$\alpha$ -Phellandrene	4.47*	1006	[0.11]	0.09	1116	2.04	Monoterpene
Octan-3-ol	4.51	1008	0.49	0.48	1358	5.24	Aliphatic alcohol
$\alpha$ -Terpinene	4.66	1016	0.21	0.21	1127	2.17	Monoterpene
<i>trans</i> -Hex-2-en-1-yl acetate	4.80	1024	0.01	0.01	1284	4.18	Aliphatic ester
para-Cymene	4.86	1027	0.12	0.29	1214	3.21	Monoterpene
Limonene	4.93	1032	20.48	20.43	1150	2.45	Monoterpene
1,8-Cineole	4.98	1034	1.77	1.99	1153	2.49	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.07	1039	0.08	0.42	1194	2.96*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.25	1049	0.05	0.05	1209	3.13	Monoterpene
$\gamma$ -Terpinene	5.43	1059	0.36	[0.42]	1194	2.96*	Monoterpene
<i>cis</i> -Sabinene hydrate	5.74	1077	0.36	0.35	1417	6.12	Monoterp. alcohol
Terpinolene	5.89	1085	0.18	0.12	1229	3.41	Monoterpene
para-Cymenene	6.06	1095	0.03	0.03	1375	5.49	Monoterpene
Linalool	6.31	1107	0.10	0.12	1505	7.81	Monoterp. alcohol
Nonanal	6.40	1110	0.01	[0.01]	1344	5.03*	Aliphatic aldehyde
Octen-3-yl acetate	6.43	1112	0.02	[0.01]	1344	5.03*	Aliphatic ester
Octan-3-yl acetate	6.69	1122	0.13	0.13	1300	4.39	Aliphatic ester
<i>cis</i> -para-Menth-2-en-1-ol	6.80	1126	0.04	0.04	1507	7.83	Monoterp. alcohol
<i>cis</i> -Limonene oxide	6.94	1131	0.04	0.06	1381	5.58	Monoterp. ether
<i>trans</i> -Limonene oxide	7.04	1136	0.04	0.03	1393	5.75	Monoterp. ether
<i>trans</i> -Pinocarveol	7.13	1139	0.06	0.04	1577	9.85	Monoterp. alcohol
<i>trans</i> -para-Menth-2-en-1-ol	7.25	1144	0.05	0.04	1565	9.50	Monoterp. alcohol
Camphor	7.34	1147	0.02	0.02	1431	6.37	Monoterp. ketone
Menthone	7.53	1155	0.10	0.09	1396	5.79	Monoterp. ketone
Isomenthone	7.78	1165	0.03	0.02	1419	6.15	Monoterp. ketone

<i>trans</i> -Isopulegone	8.02	1174	0.11	0.18	1514	7.98*	Monoterp. ketone
Terpinen-4-ol	8.21*	1182	1.30	0.83	1537	8.67	Monoterp. alcohol
Menthol	8.21*	1182	[1.30]	0.44	1581	9.98	Monoterp. alcohol
<i>cis</i> -Dihydrocarvone	8.85*	1205	1.89	2.26	1528	8.39*	Monoterp. ketone
$\alpha$ -Terpineol	8.85*	1205	[1.89]	0.58	1632	11.78*	Monoterp. alcohol
Dihydrocarveol	8.85*	1205	[1.89]	0.13	1682	14.00	Monoterp. alcohol
neo-Dihydrocarveol	8.97	1208	0.21	0.25	1692	14.49	Monoterp. alcohol
<i>trans</i> -Dihydrocarvone	9.03	1209	0.31	0.26	1540	8.75	Monoterp. ketone
Decanal	9.07	1210	0.07	0.04	1440	6.55	Aliphatic aldehyde
<i>trans</i> -Carveol	9.92	1230	0.46	0.43	1763	18.30	Monoterp. alcohol
Carvone	10.96*	1254	60.92	61.24	1647	12.47	Monoterp. ketone
<i>cis</i> -Carveol	10.96*	1254	[60.92]	0.21	1791	19.94	Monoterp. alcohol
<i>cis</i> -Piperitone epoxide	11.00	1255	0.02	0.03	1623	11.35	Monoterp. ketone
Piperitone	11.10	1258	0.27	0.35	1628	11.56*	Monoterp. ketone
Isopiperitenone	11.77	1274	0.03	0.02	1731	16.37	Monoterp. ketone
Bornyl acetate	12.09	1281	0.08	[0.18]	1514	7.98*	Monoterp. ester
Dihydroedulan I	12.24	1285	0.06	0.06	1450	6.74	Edulan
<i>trans</i> -Dihydrocarvyl acetate	14.43	1326	0.30	0.34	1607	10.79	Monoterp. ester
<i>cis</i> -Carvyl acetate	16.53	1360	0.26	0.34	1659	12.98	Monoterp. ester
$\beta$ -Bourbonene	16.95	1366	0.98	1.01	1461	6.97	Sesquiterpene
$\beta$ -Elemene	17.67	1378	0.10	0.10	1532	8.50	Sesquiterpene
( <i>Z</i> )-Jasmone	18.89	1398	0.14	0.12	1834	22.57	Jasmonate
$\beta$ -Caryophyllene	19.24	1403	0.81	[2.26]	1528	8.39*	Sesquiterpene
<i>trans</i> - $\beta$ -Farnesene	23.07	1450	0.34	[0.35]	1628	11.56*	Sesquiterpene
Germacrene D	23.99	1461	0.47	[0.58]	1632	11.78*	Sesquiterpene
<i>trans</i> -Calamenene	27.58	1505	0.04	0.06	1737	16.77	Sesquiterpene
<i>trans</i> - $\alpha$ -Bisabolene	30.16	1539	0.03	0.03	1698	14.74	Sesquiterpene
Viridiflorol	33.40	1581	0.06	0.07	1986	32.68	Sesquiterp. alcohol
<b>Total identified</b>			<b>98.91%</b>	<b>99.12%</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** : Clear liquid

**Refractive index** : 1.4865  $\pm$  0.0003 (20 °C)

#### CONCLUSION

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



