

Analysis Spearmint Essential Oil

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Date : June 19, 2017

SAMPLE IDENTIFICATION

Internal code : 17F08-FSE9-1-DM

Customer identification : Spearmint - Lot #202BC9205016B

Type : Essential oil

Source : *Mentha spicata*

Customer : Flowers Shining Everywhere Inc.



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 : 2017-06-15



Checked and approved by :



Alexis St-Gelais

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.	
Methyl 2-methylbutyrate	1.41	771	0.01	0.01	909	0.94	Aliphatic ester
Ethyl 2-methylbutyrate	2.26	849	0.01	0.01	976	1.23	Aliphatic ester
cis-Hex-3-en-1-ol	2.48	866	0.02	0.01	1316	5.13	Aliphatic alcohol
Hexanol	2.72	884	0.01	0.01	1299	4.89	Aliphatic alcohol
2,5-Diethyltetrahydrofuran	2.90	898	0.09	0.08	964	1.17	Furan
Hashishene	3.20	916	0.11	0.84	936	1.04*	Monoterpene
α -Thujene	3.31	922	0.05	0.07	945	1.08	Monoterpene
α -Pinene	3.41	929	0.77	[0.84]	936	1.04*	Monoterpene
Camphene	3.70	946	0.02	0.02	990	1.30	Monoterpene
Thuja-2,4(10)-diene	3.79	951	0.01	0.53	1054	1.78*	Monoterpene
Sabinene	4.13	971	0.56	[0.53]	1054	1.78*	Monoterpene
β -Pinene	4.19	975	0.91	0.87	1037	1.63	Monoterpene
Octen-3-ol	4.47*	992	1.74	0.04	1404	6.52	Aliphatic alcohol
Myrcene	4.47*	992	[1.74]	1.68	1110	2.33	Monoterpene
Octan-3-one	4.52	995	0.02	0.01	1191	3.37	Aliphatic ketone
α -Phellandrene	4.74	1007	0.04	0.05	1105	2.27	Monoterpene
Octan-3-ol	4.77	1009	0.40	0.42	1338	5.50	Aliphatic alcohol
Octanal	4.87	1014	0.01	0.03	1227	3.85	Aliphatic aldehyde
α -Terpinene	4.93	1017	0.11	0.14	1117	2.41	Monoterpene
Limonene	5.21*	1033	20.13	19.68	1140	2.70	Monoterpene
para-Cymene	5.21*	1033	[20.13]	0.25	1200	3.48	Monoterpene
1,8-Cineole	5.24	1034	1.69	1.85	1142	2.72	Monoterpene ether
cis- β -Ocimene	5.34	1040	0.07	0.29	1180	3.23*	Monoterpene
trans- β -Ocimene	5.52	1050	0.04	0.04	1194	3.40	Monoterpene
γ -Terpinene	5.71	1060	0.24	[0.29]	1180	3.23*	Monoterpene
cis-Sabinene hydrate	6.02	1077	0.39	0.40	1397	6.40*	Monoterp. alcohol
Octanol	6.15	1084	0.04	0.16	1496	8.53	Aliphatic alcohol
Terpinolene	6.18	1086	0.10	0.09	1216	3.70	Monoterpene
para-Cymenene	6.38	1097	0.03	0.03	1360	5.83	Monoterpene
Linalool	6.65	1108	0.11	0.09	1483	8.24	Monoterp. alcohol
Nonanal	6.76	1112	0.02	0.01	1330	5.37	Aliphatic aldehyde
Octen-3-yl acetate	6.83	1114	0.01	0.01	1323	5.25	Aliphatic ester
Octan-3-yl acetate	7.01	1121	0.09	0.09	1284	4.68	Aliphatic ester
trans-para-Mentha-2,8-dien-1-ol	7.14	1126	0.04	0.17	1557	10.39*	Monoterp. alcohol
cis-Limonene oxide	7.31	1132	0.02	0.02	1363	5.88	Monoterp. ether
trans-Limonene oxide	7.35	1133	0.01	0.01	1387	6.26	Monoterp. ether
cis-para-Mentha-2,8-dien-1-ol	7.43	1136	0.05	0.05	1603	12.07	Monoterp. alcohol
trans-Pinocarveol	7.55	1140	0.08	[0.17]	1557	10.39*	Monoterp. alcohol
Menthone	7.98	1156	0.15	0.16	1380	6.14	Monoterp. ketone

Isomenthone	8.24	1166	0.07	[0.40]	1397	6.40*	Monoterp. ketone
neg-Menthol	8.46	1174	0.06	0.19	1528	9.35*	Monoterp. alcohol
Borneol	8.54	1177	0.12	62.13	1636	13.41*	Monoterp. alcohol
Terpinen-4-ol	8.74*	1184	1.67	0.89	1524	9.19*	Monoterp. alcohol
Menthol	8.74*	1184	[1.67]	0.34	1591	11.60*	Monoterp. alcohol
neois-Menthol	9.43*	1206	1.56	0.04	1609	12.28	Monoterp. alcohol
α -Terpineol	9.43*	1206	[1.56]	[62.13]	1636	13.41*	Monoterp. alcohol
neo-Dihydrocarveol	9.48	1207	0.20	0.20	1678	15.56	Monoterp. alcohol
cis-Dihydrocarvone	9.62	1210	0.37	2.22	1515	8.97*	Monoterp. ketone
trans-Dihydrocarvone	9.72	1212	0.07	[0.19]	1528	9.35*	Monoterp. ketone
trans-Carveol	10.63	1232	0.55	0.51	1749	19.36	Monoterp. alcohol
Pulegone	10.81	1236	0.05	[0.17]	1557	10.39*	Monoterp. ketone
Carvone	11.72*	1256	60.93	[62.13]	1636	13.41*	Monoterp. ketone
cis-Carveol	11.72*	1256	[60.93]	0.26	1775	21.06	Monoterp. alcohol
Piperitone	11.86	1260	0.36	[62.13]	1636	13.41*	Monoterp. ketone
Isopiperitenone	12.57	1275	0.05	0.04	1717	17.52	Monoterp. ketone
Dihydroedulan I	12.96	1284	0.11	0.15	1438	7.18	Edulan
Menthyl acetate	13.31	1292	0.05	0.05	1489	8.36	Monoterp. ester
trans-Dihydrocarvyl acetate	15.36	1325	0.18	[0.34]	1591	11.60*	Monoterp. ester
α -Cubebene	15.96	1335	0.01	0.01	1412	6.65	Sesquiterpene
cis-Carvyl acetate	17.60	1360	0.23	0.34	1645	13.83	Monoterp. ester
β -Bourbonene	18.08	1367	1.22	1.24	1447	7.38	Sesquiterpene
β -Elemene	18.83	1378	0.09	[2.22]	1515	8.97*	Sesquiterpene
(Z)-Jasmone	20.06	1397	0.15	0.16	1821	24.07	Jasmonate
β -Caryophyllene	20.51	1403	0.88	[2.22]	1515	8.97*	Sesquiterpene
Aromadendrene	21.40	1414	0.12	[0.89]	1524	9.19*	Sesquiterpene
cis- β -Farnesene	22.46	1426	0.12	0.08	1583	11.36	Sesquiterpene
α -Humulene	23.25	1436	0.06	0.07	1577	11.11	Sesquiterpene
trans- β -Farnesene	24.42	1450	0.47	0.57	1619	12.63	Sesquiterpene
Germaacrene D	25.47	1462	0.52	[62.13]	1636	13.41*	Sesquiterpene
Caryophyllene oxide	33.65	1571	0.10	0.07	1843	25.50	Sesquiterp. ether
Viridifloral	34.62	1584	0.10	0.11	1972	33.98	Sesquiterp. alcohol
Total identified			98.67%	97.89%			

*: 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 : Light yellow liquid

Refractive Index : 1.4880 \pm 0.0003 (20 °C)

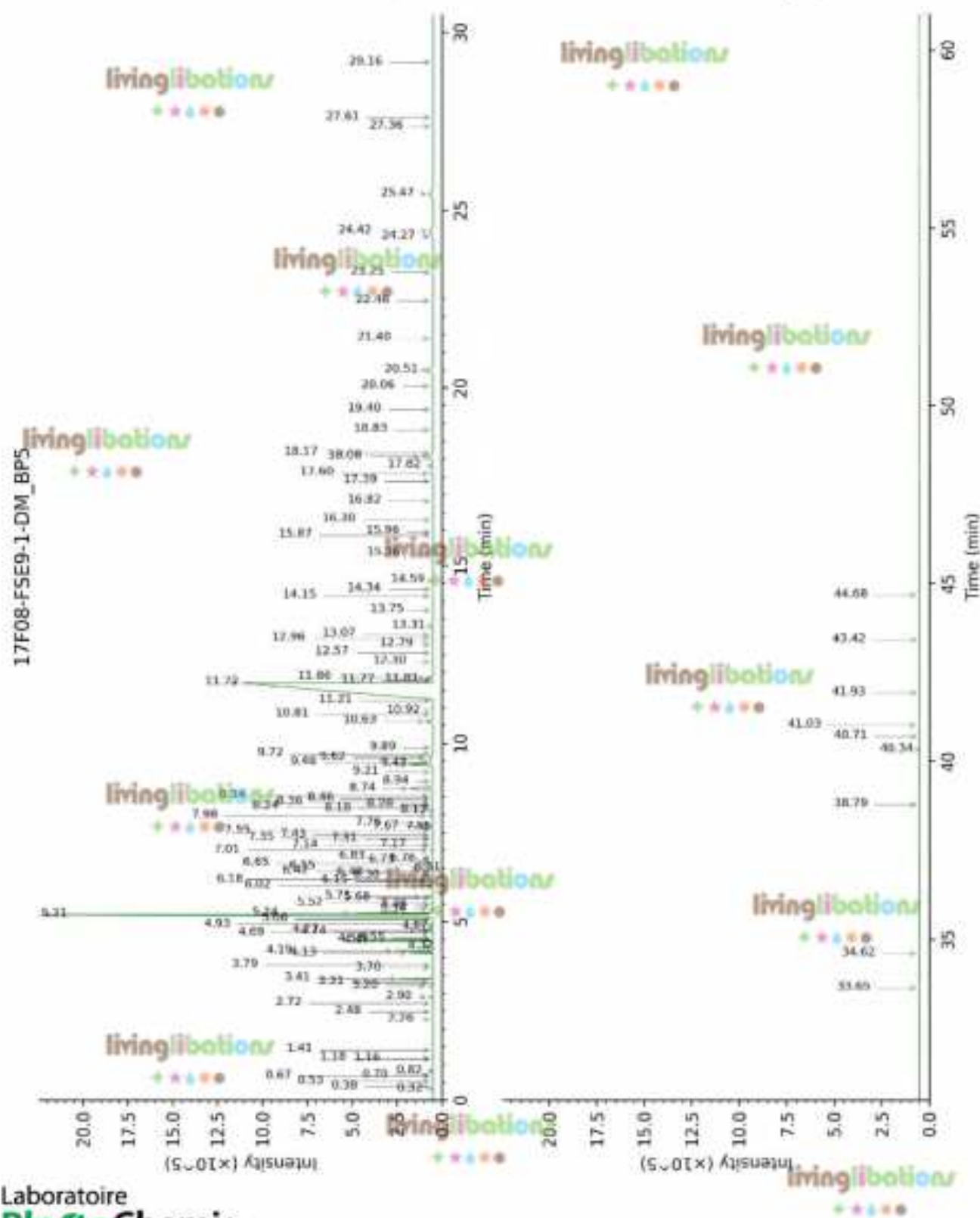
CONCLUSION

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

Essential oil, *Mentha spicata*
Internal Code: 17F08-FSE9-1-DM

Customer Identification:
Spearmint - Lot 4202BC92050168

Report prepared for
Flowers Shining Everywhere Inc.



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