

GC/MS BATCH NUMBER: M20102

ESSENTIAL OIL: MARJORAM
BOTANICAL NAME: ORIGANUM MARJORANA
ORIGIN: EGYPT

KEY CONSTITUENTS PRESENT IN THIS BATCH OF MARJORAM OIL	%
TERPINEN-4-OL	24.5
γ-TERPINENE	13.9
trans-SABINENE HYDRATE	10.8
α-TERPINENE	8.6
SABINENE	6.6
cis-SABINENE HYDRATE	3.9
LINALOOL	3.3
TERPINOLENE	3.2
α-TERPINEOL	3.0
LINALYL ACETATE	3.0
β-CARYOPHYLLENE	2.6
MYRCENE	1.9
LIMONENE	1.8
β-PHELLANDRENE	1.8
BICYCLOGERMACRENE	1.6
cis-PARA-MENTH-2-EN-1-OL	1.5
p-CYMENE	1.4

Comments from Robert Tisserand:
 Has the characteristic green,
 herbal odor quality Marjoram oil,
 and the composition looks normal.

Date : June 9, 2016

SAMPLE IDENTIFICATION

Internal code : 16E26-PTH1-1-SM

Customer identification : Marjoram - Egypt - m2010256

Type : Essential oil

Source : *Origanum marjorana*

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 : 2016-06-07

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.	
<i>cis</i> -Hex-3-en-1-ol	2.39	860	0.01	0.01	1342	5.00	Aliphatic alcohol
<i>trans</i> -Hex-2-en-1-ol	2.58	876	tr	0.01	1363	5.30	Aliphatic alcohol
Tricyclene	3.13	916	0.01	0.01	925	0.80	Monoterpene
α -Thujene	3.24	922	0.58	0.62	959	0.94	Monoterpene
α -Pinene	3.34	928	0.70	0.64	951	0.91	Monoterpene
Camphene	3.62	946	0.04	0.03	1005	1.14	Monoterpene
Sabinene	4.06	972	6.61	6.49	1063	1.59	Monoterpene
β -Pinene	4.11	975	0.43	0.37	1043	1.44	Monoterpene
Myrcene	4.39	992	1.86	1.80	1119	2.08	Monoterpene
α -Phellandrene	4.65	1008	0.37	0.40	1112	2.01	Monoterpene
α -Terpinene	4.86	1019	8.55	8.45	1128	2.19	Monoterpene
<i>para</i> -Cymene	5.03	1028	1.36	1.45	1213	3.19	Monoterpene
Limonene	5.07	1031	1.78	1.63	1144	2.38	Monoterpene
β -Phellandrene	5.10	1032	1.78	2.07	1150	2.45*	Monoterpene
1,8-Cineole	5.14	1034	0.19	[2.07]	1150	2.45*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.25	1040	0.03	13.70	1197	3.00*	Monoterpene
<i>trans</i> - β -Ocimene	5.43	1050	0.06	0.06	1208	3.12	Monoterpene
γ -Terpinene	5.65	1063	13.93	[13.70]	1197	3.00*	Monoterpene
<i>cis</i> -Sabinene hydrate	5.94	1079	3.92	4.01	1413	6.05	Monoterp. alcohol
Terpinolene	6.09	1087	3.17	3.11	1229	3.41	Monoterpene
Fenchone	6.16*	1091	0.03	0.01	1327	4.79	Monoterp. ketone
<i>trans</i> -Linalool oxide (fur.)	6.16*	1091	[0.03]	0.01	1418	6.15	Monoterp. alcohol
<i>para</i> -Cymenene	6.27	1097	0.02	0.01	1372	5.44	Monoterpene
<i>trans</i> -Sabinene hydrate	6.58	1110	10.76	12.79	1490	7.50*	Monoterp. alcohol
Linalool	6.60	1111	3.28	3.42	1500	7.70	Monoterp. alcohol
endo-Fenchol	6.91	1122	0.01	0.01	1523	8.21	Monoterp. alcohol
<i>cis</i> - <i>para</i> -Menth-2-en-1-ol	7.05	1128	1.51	[12.79]	1490	7.50*	Monoterp. alcohol
<i>trans</i> -Pinocarveol	7.36	1139	0.01	0.02	1584	10.09	Monoterp. alcohol
<i>trans</i> - <i>para</i> -Menth-2-en-1-ol	7.54	1146	0.85	0.90	1559	9.35	Monoterp. alcohol
δ -Terpineol	8.44	1180	0.04	0.03	1617	11.09	Monoterp. alcohol
Terpinen-4-ol	8.69	1189	24.47	26.79	1538	8.67*	Monoterp. alcohol
α -Terpineol	9.19	1206	3.03	3.04	1629	11.63	Monoterp. alcohol
<i>trans</i> -Piperitol	9.63	1216	0.47	0.46	1671	13.49	Monoterp. alcohol
Nerol	10.25	1229	0.04	0.05	1731	16.41	Monoterp. alcohol
Neral	11.06	1248	0.74	0.30	1606	10.75	Monoterp. aldehyde
Linalyl acetate	11.17	1250	3.00	3.09	1507	7.83	Monoterp. ester
Geraniol	11.46	1257	0.06	0.05	1782	19.44	Monoterp. alcohol
Bornyl acetate	12.72	1285	0.10	0.07	1512	7.93	Monoterp. ester
<i>trans</i> -Pinocarvyl acetate	13.28	1298	0.22	0.19	1545	8.90	Monoterp. ester
Neryl acetate	17.42	1364	0.04	0.04	1662	13.08	Monoterp. ester
Geranyl acetate	18.89	1386	0.08	0.08	1693	14.50	Monoterp. ester

β -Caryophyllene	20.11	1405	2.58	[26.79]	1538	8.67*	Sesquiterpene
α -Humulene	22.79	1437	0.09	0.08	1588	10.22	Sesquiterpene
Bicyclogermacrene	26.23	1479	1.61	1.62	1647	12.43	Sesquiterpene
Spathulenol	33.24*	1571	0.17	0.08	2019	34.65	Sesquiterp. alcohol
Caryophyllene oxide	33.24*	1571	[0.17]	0.06	1849	23.67	Sesquiterp. ether
Total identified			98.59%	98.06%			

*: 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 : 1.4720 \pm 0.0003 (20 °C)

CONCLUSION

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



