

**Date :** February 5, 2018

*SAMPLE IDENTIFICATION*

**Internal code :** 18A23-ALZ2-1-CC

**Customer identification :** Sweet Marjoram

**Type :** Essential oil

**Source :** *Origanum majorana*

**Customer :** Organic Aromas

*ANALYSIS*

**Method :** PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

**Analyst :** Sylvain Mercier, M. Sc., chimiste

**Analysis date :** 2018-01-26

Checked and approved by :

---

Alexis St-Gelais, M. Sc., chimiste 2013-174

*Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.*

*This report is digitally signed, it is only considered valid if the digital signature is intact.*

IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Methyl 2-methylbutyrate	1.41	771	0.03	0.04	925	0.94*	Aliphatic ester
(2E)-Hexenal	2.47	862	0.02				Aliphatic aldehyde
cis-Hex-3-en-1-ol	2.51	865	0.03	0.03	1333	5.20	Aliphatic alcohol
trans-Hex-2-en-1-ol	2.69	879	0.01	0.01	1358	5.56	Aliphatic alcohol
Tricyclene	3.22	914	0.01	[0.04]	925	0.94*	Monoterpene
α-Thujene	3.32	920	0.58	0.57	959	1.06	Monoterpene
α-Pinene	3.43	927	0.79	0.80	948	1.01	Monoterpene
Camphene	3.72	944	0.03	0.03	999	1.27	Monoterpene
Sabinene	4.17	970	7.69	7.63	1067	1.77	Monoterpene
β-Pinene	4.22	973	0.44	0.43	1044	1.59	Monoterpene
Myrcene	4.49	990	2.03	1.99	1120	2.28	Monoterpene
Octen-3-ol	4.54	992	0.05	4.24	1413	6.45*	Aliphatic alcohol
Pseudolimonene	4.71	1002	0.06	0.06	1114	2.22	Monoterpene
α-Phellandrene	4.77	1005	0.31	0.30	1112	2.19	Monoterpene
α-Terpinene	4.98	1017	7.61	7.55	1128	2.38	Monoterpene
para-Cymene	5.16	1026	1.63	1.61	1210	3.44	Monoterpene
Limonene	5.19	1028	2.13	2.07	1143	2.58	Monoterpene
1,8-Cineole	5.23	1030	1.75	1.79	1150	2.65	Monoterp. ether
cis-β-Ocimene	5.36	1037	0.03	12.57	1192	3.21*	Monoterpene
trans-β-Ocimene	5.54	1047	0.05	0.10	1203	3.34	Monoterpene
γ-Terpinene	5.78	1060	12.60	[12.57]	1192	3.21*	Monoterpene
cis-Linalool oxide (fur.)	6.01	1073	tr	tr	1385	5.96	Monoterp. alcohol
cis-Sabinene hydrate	6.11	1078	4.20	[4.24]	1413	6.45*	Monoterp. alcohol
Terpinolene	6.23	1084	2.90	2.88	1224	3.65	Monoterpene
trans-Linalool oxide (fur.)	6.33	1090	0.01	0.01	1405	6.29	Monoterp. alcohol
para-Cymenene	6.44	1096	0.02	0.01	1371	5.76	Monoterpene
trans-Sabinene hydrate	6.83*	1111	18.68	17.82	1498	8.13	Monoterp. alcohol
Linalool	6.83*	1111	[18.68]	3.02	1505	8.33*	Monoterp. alcohol
cis-para-Menth-2-en-1-ol	7.28	1127	1.55	[3.02]	1505	8.33*	Monoterp. alcohol
trans-Pinocarveol	7.65	1140	0.07	0.06	1576	10.57	Monoterp. alcohol
trans-para-Menth-2-en-1-ol	7.81	1146	0.87	0.87	1564	10.18	Monoterp. alcohol
Terpinen-4-ol	9.01	1189	22.71	22.76	1538	9.38*	Monoterp. alcohol
Unknown (m/z = 79, 91 (70), 93 (67), 121 (65), 94 (50)... 137 (17)...) )	9.45	1202	0.36				
α-Terpineol	9.58	1205	3.10	3.08	1631	12.72	Monoterp. alcohol
cis-Piperitol	9.88	1212	0.02				Monoterp. alcohol
trans-Piperitol	10.03	1215	0.45	0.46	1677	14.80	Monoterp. alcohol
Nerol	10.71	1230	0.03	0.02	1723	17.20	Monoterp. alcohol
Neral	11.34	1244	0.08	0.33	1610	11.73	Monoterp. aldehyde
Linalyl acetate	11.45	1246	2.12	1.66	1507	8.38	Monoterp. ester

Geraniol	11.90	1256	0.06	0.07	1791	21.30	Monoterp. alcohol
<i>trans</i> -Pinocarvyl acetate	13.43	1289	0.13	[22.76]	1538	9.38*	Monoterp. ester
Carvacrol	16.24	1334	0.12	0.13	2103	38.59	Monoterp. alcohol
Neryl acetate	17.89	1359	0.03	0.03	1662	14.13	Monoterp. ester
Geranyl acetate	19.38	1381	0.06	0.06	1695	15.66	Monoterp. ester
$\beta$ -Caryophyllene	20.69	1400	2.18	2.19	1520	8.79	Sesquiterpene
Aromadendrene	22.04	1416	0.02	[22.76]	1538	9.38*	Sesquiterpene
$\alpha$ -Humulene	23.46	1433	0.08	0.10	1580	10.68	Sesquiterpene
Viridiflorene	26.51	1470	0.02	0.03	1612	11.81	Sesquiterpene
Bicyclogermacrene	26.95	1475	0.95	0.95	1639	13.09	Sesquiterpene
$\delta$ -Cadinene	29.40	1505	0.01	0.02	1670	14.50	Sesquiterpene
Caryophyllene oxide	33.87	1568	0.08	0.08	1847	25.13	Sesquiterp. ether
Spathulenol	34.05	1571	0.08				Sesquiterp. alcohol
$\gamma$ -Eudesmol	37.12	1626	0.07	0.04	2074	37.58	Sesquiterp. alcohol
<b>Total identified</b>			<b>98.58%</b>	<b>98.50%</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 :** 1.4725  $\pm$  0.0003 (20 °C)

#### CONCLUSION

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

18A23-ALZ2-1-CC\_BP5



