

GC/MS BATCH NUMBER: C90112

ESSENTIAL OIL: CHAMOMILE ROMAN
BOTANICAL NAME: CHAMAEMELUM NOBILE
ORIGIN: FRANCE

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CHAMOMILE ROMAN OIL	%
2-METHYLBUTYL ANGELATE	15.8
ISOBUTYL ANGELATE	14.9
METHALLYL ANGELATE	9.5
3-METHYLAMYL ANGELATE	8.8
trans-PINOCARVEOL	6.9
ISOAMYL ANGELATE + 3-METHYLAMYL METHACRYLATE	5.8
α -PINENE	3.7
ISOAMYL METHACRYLATE + 2- METHYLBUTYL METHACRYLATE	3.7
GERMACRENE D	2.4
2-METHYLBUTYL ISOBUTYRATE	2.2
PINOCARVONE	2.2
ISOBUTYL METHACRYLATE	2.1
PRENYL ANGELATE	1.8
ISOBUTYL ISOBUTYRATE	1.5
CAMPHENE	1.2

Comments from Robert Tisserand: A French, Roman Chamomile oil with the classic fresh-apple-fruity odor profile. Constituents are in expected amounts.

Date : November 22, 2017

SAMPLE IDENTIFICATION

Internal code : 17K17-PTH6-1-CC

Customer identification : Chamomile roman - France - C9011278R

Type : Essential oil

Source : *Chamaemelum nobile*

Customer : Plant Therapy

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 : 2017-11-22

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Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.	
Ethanol	0.59	664	0.05	0.07	767	0.66	Aliphatic alcohol
Isovaleral	0.66	673	0.01	0.02	738	0.62	Aliphatic aldehyde
Isopropyl formate	0.68	675	0.07				Aliphatic ester
Isoamyl alcohol	1.15	737	0.03	3.15	1148	2.92*	Aliphatic alcohol
2-Methylbutyl alcohol	1.17	739	0.17	[3.15]	1148	2.92*	Aliphatic alcohol
Methyl 2-methylbutyrate	1.40	770	0.03	0.02	925	1.04	Aliphatic ester
Isobutyl acetate	1.48	780	0.03				Aliphatic ester
Butyl acetate	1.57	792	0.02				Aliphatic ester
Hexanal	1.71	805	0.04	1.18	1002	1.41*	Aliphatic aldehyde
Methyl angelate	1.95	823	0.04	0.05	1049	1.86	Aliphatic ester
Ethyl 2-methylbutyrate	2.25	846	0.09	[1.18]	1002	1.41*	Aliphatic ester
3-Methylpentanol	2.35	854	0.02	0.69	1265	4.54*	Aliphatic alcohol
Propyl isobutyrate	2.36	855	0.14	0.12	993	1.33	Aliphatic ester
cis-Hex-3-en-1-ol	2.48	863	0.20	9.59	1321	5.39*	Aliphatic alcohol
Isoamyl acetate	2.66	877	0.06	0.06	1065	2.03	Aliphatic ester
Hexanol	2.69	879	0.04	0.22	1305	5.12*	Aliphatic alcohol
2-Methylbutyl acetate	2.71	881	0.13	0.17	1057	1.95*	Aliphatic ester
Propyl methacrylate	2.74	883	0.07	[0.17]	1057	1.95*	Aliphatic ester
Ethyl angelate?	2.98	900	0.06				Aliphatic ester
Isobutyl isobutyrate	3.23	915	1.48	1.68	1035	1.71*	Aliphatic ester
α-Pinene	3.42	927	3.66	3.39	947	1.13	Monoterpene
Prenyl acetate	3.51	932	0.29	0.50	1197	3.55	Aliphatic ester
Isobutyl methacrylate	3.66	941	2.11	2.04	1116	2.49*	Aliphatic ester
Camphene	3.70	943	1.19	[1.18]	1002	1.41*	Monoterpene
Propyl 2-methylbutyrate	3.75	946	0.03	0.02	1076	2.18	Aliphatic ester
Thuja-2,4(10)-diene	3.80	949	0.03	[0.17]	1057	1.95*	Monoterpene
Isobutyl butyrate	3.89	955	0.03	0.04	1109	2.39	Aliphatic ester
Methallyl methacrylate	3.95	958	0.99	1.36	1204	3.63*	Aliphatic ester
Sabinene	4.13	969	0.06	[0.17]	1057	1.95*	Monoterpene
β-Pinene	4.20	972	0.29	[1.68]	1035	1.71*	Monoterpene
Isoamyl propionate	4.24	975	0.03				Aliphatic ester
Methallyl isobutyrate	4.43	986	0.10	0.12	1181	3.34	Aliphatic ester
Myrcene	4.47	989	0.04	[2.04]	1116	2.49*	Monoterpene
Dehydro-1,8-cineole	4.53	992	0.15	0.86	1129	2.66*	Monoterp. ether
Propyl angelate	4.61	997	0.63	[1.36]	1204	3.63*	Aliphatic ester
Isobutyl 2-methylbutyrate	4.74	1004	0.53	[0.86]	1129	2.66*	Aliphatic ester
Isobutyl isovalerate	4.87	1011	0.09	[3.15]	1148	2.92*	Aliphatic ester
Isoamyl isobutyrate	4.94	1015	0.34	[3.15]	1148	2.92*	Aliphatic ester
2-Methylbutyl isobutyrate	5.00	1018	2.24	[3.15]	1148	2.92*	Aliphatic ester
meta-Cymene	5.04	1020	0.11	[0.86]	1129	2.66*	Monoterpene
para-Cymene	5.13	1025	0.19	[1.36]	1204	3.63*	Monoterpene

Limonene	5.17	1027	0.17	[3.15]	1148	2.92*	Monoterpene
β-Phellandrene	5.20	1029	0.04	[3.15]	1148	2.92*	Monoterpene
1,8-Cineole	5.23	1030	0.02	[3.15]	1148	2.92*	Monoterp. ether
Isoamyl methacrylate + 2-Methylbutyl methacrylate	5.50	1045	3.65	3.68	1224	3.94	Aliphatic ester
Isobutyl angelate	5.69	1055	14.48	15.75	1240	4.18*	Aliphatic ester
γ-Terpinene	5.73	1058	0.04	0.14	1190	3.46	Monoterpene
Prenyl isobutyrate	5.76	1059	0.41	[0.69]	1265	4.54*	Aliphatic ester
Methallyl angelate	5.96	1070	9.52	[9.59]	1321	5.39*	Aliphatic ester
3-Methylamyl propionate?	6.09	1077	0.08	0.98	1259	4.45*	Aliphatic ester
Unknown (m/z = 69, 41 (59), 67 (32), 68 (27), 53 (12)... 154 (5))	6.30	1089	0.50				
Butyl angelate	6.38	1093	0.51	0.71	1292	4.95	Aliphatic ester
Isobutyl tiglate	6.44	1096	0.19	[0.22]	1305	5.12*	Aliphatic ester
Isoamyl 2-methylbutyrate	6.55	1101	0.11	[15.75]	1240	4.18*	Aliphatic ester
2-Methylbutyl 2-methylbutyrate	6.61	1103	0.66	[15.75]	1240	4.18*	Aliphatic ester
Methallyl tiglate?	6.78	1109	0.06	0.08	1397	6.58	Aliphatic ester
α-Thujone	6.83	1111	0.14	0.13	1361	6.02	Monoterp. ketone
3-Methylamyl isobutyrate	6.91	1114	0.89	[0.98]	1259	4.45*	Aliphatic ester
α-Campholenal	7.26	1127	0.18				Monoterp. aldehyde
trans-Pinocarveol	7.71	1143	6.87	4.37	1565	11.24	Monoterp. alcohol
Isoamyl angelate	7.80*	1146	5.75	25.64	1347	5.79*	Aliphatic ester
3-Methylamyl methacrylate	7.80*	1146	[5.75]	[25.64]	1347	5.79*	Aliphatic ester
2-Methylbutyl angelate	7.95	1152	15.80	[25.64]	1347	5.79*	Aliphatic ester
Camphene hydrate	8.09	1157	0.53	0.76	1527	9.83*	Monoterp. alcohol
<i>C. nobile</i> biomarker	8.15	1159	0.41	0.54	1410	6.80	Aliphatic ester
Pinocarvone	8.25	1163	2.22	2.10	1471	8.27	Monoterp. ketone
Isopinocampone	8.44	1169	0.28	0.21	1505	9.07*	Monoterp. alcohol
Borneol	8.66	1177	0.84	2.73	1623	13.54*	Monoterp. alcohol
Terpinen-4-ol	8.82	1183	0.11	[0.76]	1527	9.83*	Monoterp. alcohol
Isobutyl 3-hydroxy-2-methylenebutyrate	9.06	1192	0.10	0.27	1715	18.40	Aliphatic ester
Prenyl angelate	9.20	1197	1.81	1.74	1453	7.81	Aliphatic ester
Isoamyl tiglate	9.33	1200	0.49	0.49	1415	6.92	Aliphatic ester
Myrtenal	9.47*	1203	0.61	[0.76]	1527	9.83*	Monoterp. aldehyde
Myrtenol	9.47*	1203	[0.61]	0.25	1702	17.66	Monoterp. alcohol
α-Terpineol	9.47*	1203	[0.61]	[2.73]	1623	13.54*	Monoterp. alcohol
Verbenone	9.80	1211	0.09	0.09	1595	12.33	Monoterp. ketone
2-Hydroxy-2-methylbut-3-enyl 2-methyl-(2Z)-butenoate + 3-Methylamyl angelate	11.48	1248	0.62	9.18	1447	7.69*	Aliphatic ester

3-Methylamyl angelate	11.64	1251	8.75	[9.18]	1447	7.69*	Aliphatic ester
(Z)-Hex-3-en-1-yl angelate	12.86	1278	0.34	[0.76]	1527	9.83*	Aliphatic ester
Hexyl angelate	13.23	1286	0.10	[2.73]	1623	13.54*	Aliphatic ester
Isoamyl 3-hydroxy-2-methylenebutyrate	13.58	1294	0.18	0.17	1820	25.34	Aliphatic ester
3-Methylamyl tiglate	14.02	1302	0.08	[0.21]	1505	9.07*	Aliphatic ester
α -Copaene	17.68	1357	0.11	0.07	1434	7.39	Sesquiterpene
β -Caryophyllene	20.58	1400	0.18	0.70	1518	9.48	Sesquiterpene
<i>trans</i> - β -Farnesene	24.52	1447	0.04	[2.73]	1623	13.54*	Sesquiterpene
Germacrene D	25.67	1461	2.41	[2.73]	1623	13.54*	Sesquiterpene
β -Selinene	26.22	1467	0.10	[2.73]	1623	13.54*	Sesquiterpene
Bicyclogermaacrene	26.86	1475	0.11	0.09	1642	14.50	Sesquiterpene
α -Muurolene	27.78	1486	0.06	0.08	1653	15.09	Sesquiterpene
(<i>E,E</i>)- α -Farnesene	29.10	1502	0.44	0.53	1695	17.32	Sesquiterpene
δ -Cadinene	29.35	1506	0.08	0.07	1664	15.67	Sesquiterpene
Copaborneol	35.80	1596	0.09				Sesquiterp. alcohol
Chamazulene	40.62	1718	0.01				Azulene
Phytone	44.39	1843	0.09	0.08	2078	39.00	Aliphatic ketone
Total identified			96.76%	96.98%			

*: 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

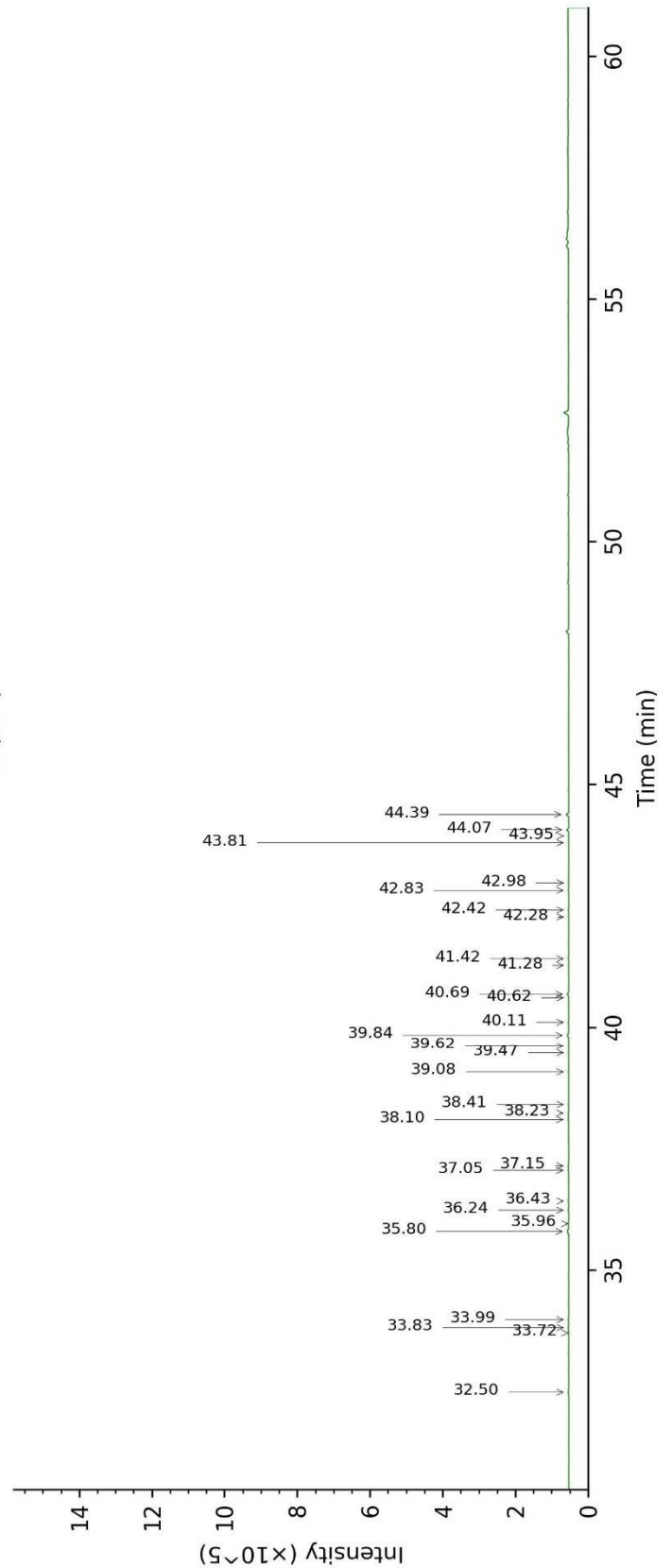
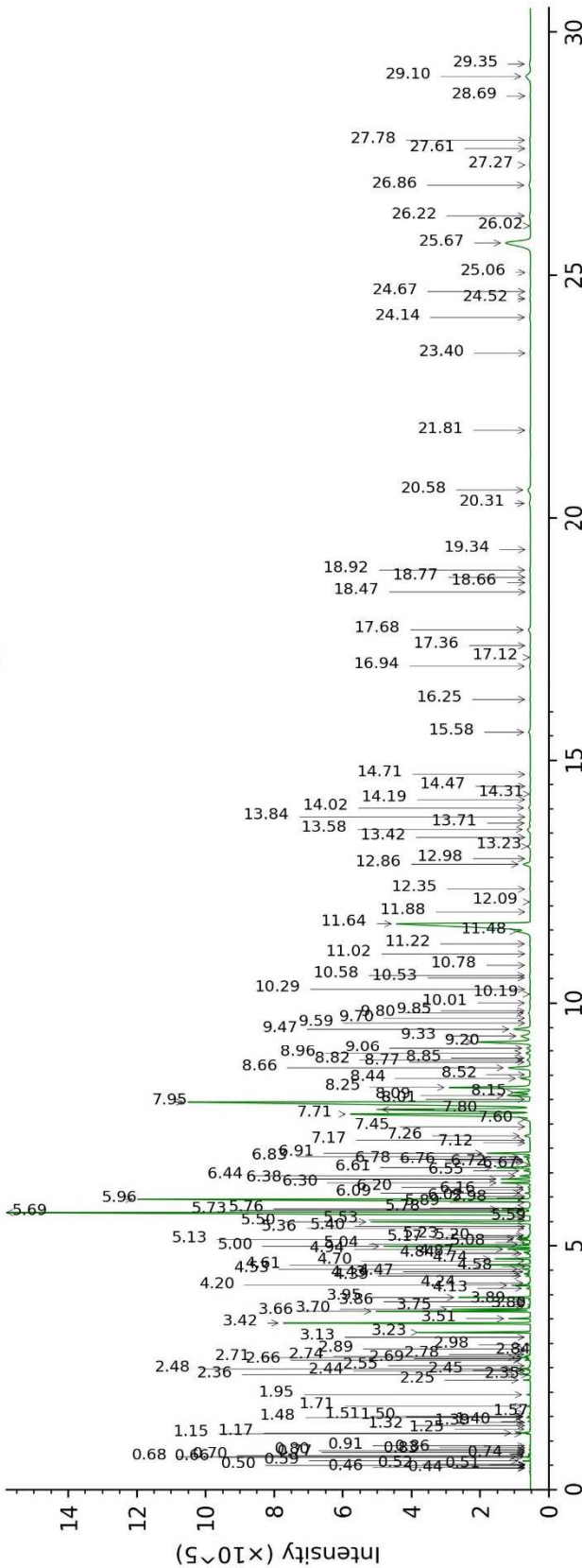
Physical aspect : Light green liquid

Refractive index : 1.4465 \pm 0.0003 (20 °C)

CONCLUSION

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

17K17-PTH6-1-CC_BP5



17K17-PTH6-1-CC_WAX

