PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: C90110

ESSENTIAL OIL: CHAMOMILE ROMAN
BOTANICAL NAME: CHAMAEMELUM NOBILE
ORIGIN: UNITED KINGDOM

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CHAMOMILE ROMAN OIL	%
3-METHYLAMYL ANGELATE	16.6
METHALLYL ANGELATE	13.3
ISOBUTYL ANGELATE	8.4
2-METHYLBUTYL ANGELATE	7.4
trans-PINOCARVEOL	7.2
ISOAMYL ANGELATE	6.5
3-METHYLAMYL ISOBUTYRATE + β-THUJONE	4.4
α-PINENE	4.1
PINOCARVONE	3.4
3-METHYLAMYL METHACRYLATE	2.2
2-METHYLBUTYL ISOBUTYRATE	1.7
ISOBUTYL ISOBUTYRATE	1.2

Comments from Robert Tisserand: Delightful fine, powdery floral odor profile. Constituents are in expected amounts for English Chamomile. No red flags.

Date : April 10, 2017

SAMPLE IDENTIFICATION

Internal code : 17D03-PTH1-1-DM
Customer identification : Roman Chamomile - United Kingdom - C90110611R
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).
Analyst : Sylvain Mercier, M. Sc., chimiste
Analysis date : 2017-04-06

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.	
Ethanol	0.35	632	0.01	0.01	801	0.70	Aliphatic alcohol
2-Methylbutyral	0.59	663	0.09	0.10	761	0.64	Aliphatic aldehyde
Isoamyl alcohol	1.11	732	0.17	0.51	1148	2.98*	Aliphatic alcohol
2-Methylbutyl alcohol	1.13	735	0.25	[0.51]	1148	2.98*	Aliphatic alcohol
(*E*)-2-Penten-1-ol	1.17	740	0.03				Aliphatic alcohol
Ethyl isobutyrate	1.25	750	0.02	0.02	838	0.76	Aliphatic ester
Methyl 2-methylbutyrate	1.41*	771	0.13	0.02	921	1.07	Aliphatic ester
Isobutyl acetate	1.41*	771	[0.13]				Aliphatic ester
Butyric acid	1.41*	771	[0.13]				Aliphatic acid
Hexanal	1.70	806	0.08	0.08	1021	1.66	Aliphatic aldehyde
Methyl angelate	1.94	824	0.07	0.05	1049	1.92	Aliphatic ester
Ethyl 2-methylbutyrate	2.25	848	0.07	0.05	985	1.36	Aliphatic ester
3-Methylpentanol	2.28	850	0.83	0.86	1269	4.68	Aliphatic alcohol
Propyl isobutyrate	2.35	855	0.08	0.06	986	1.37	Aliphatic ester
cis-Hex-3-en-1-ol	2.45	863	0.06	0.06	1323	5.51	Aliphatic alcohol
Isoamyl acetate	2.68	880	0.22	0.28	1058	1.99	Aliphatic ester
Hexanol	2.71	883	0.09	0.08	1300	5.13*	Aliphatic alcohol
2-Methylbutyl acetate	2.73	885	0.06	0.05	1066	2.07	Aliphatic ester
Ethyl angelate?	2.96	901	0.08				Aliphatic ester
Isobutyl isobutyrate	3.22*	917	1.31	1.22	1030	1.73	Aliphatic ester
Tricyclene	3.22*	917	[1.31]	0.02	913	1.04	Monoterpene
α-Pinene	3.41*	928	4.34	4.14	939	1.14	Monoterpene
Prenyl acetate	3.41*	928	[4.34]	0.12	1204	3.73	Aliphatic ester
C. nobile biomarker	3.50	934	0.60	[0.51]	1148	2.98*	Aliphatic ester
Isobutyl methacrylate	3.64	942	0.93	0.94	1112	2.51	Aliphatic ester
Camphene	3.69	945	0.60	0.56	994	1.42	Monoterpene
Propyl 2-methylbutyrate	3.75	949	0.03	0.03	1088	2.30	Aliphatic ester
Thuja-2,4(10)-diene	3.78	950	0.08	0.12	1052	1.94*	Monoterpene
Methallyl methacrylate	3.92	959	0.97	0.92	1199	3.66	Aliphatic ester
Sabinene	4.11	970	0.05	[0.12]	1052	1.94*	Monoterpene
β-Pinene	4.18	974	0.45	0.44	1034	1.77	Monoterpene
Isoamyl propionate	4.20	976	0.03				Aliphatic ester
Dehydro-1,8-cineole	4.41*	988	0.47	0.04	1133	2.80	Monoterp. ether
Methallyl isobutyrate	4.41*	988	[0.47]	0.37	1177	3.37	Aliphatic ester
Myrcene	4.41*	988	[0.47]	0.09	1105	2.42	Monoterpene
Propyl angelate	4.59	998	0.79	0.79	1193	3.58	Aliphatic ester
Isobutyl 2-methylbutyrate	4.73	1006	0.60	2.67	1144	2.94*	Aliphatic ester
Isobutyl isovalerate	4.84	1012	0.09	[0.51]	1148	2.98*	Aliphatic ester
Isoamyl isobutyrate	4.93	1017	0.79	[2.67]	1144	2.94*	Aliphatic ester
2-Methylbutyl isobutyrate	4.98	1020	1.68	[2.67]	1144	2.94*	Aliphatic ester
meta-Cymene	5.02	1022	0.19	1.18	1124	2.68	Monoterpene

para-Cymene	5.09	1026	0.12	0.18	1207	3.78	Monoterpene
Limonene	5.14	1029	0.30	0.23	1135	2.83	Monoterpene
β-Phellandrene	5.18	1031	0.06	0.07	1139	2.87	Monoterpene
1,8-Cineole	5.20	1032	0.11	[2.67]	1144	2.94*	Monoterp. ether
Isoamyl methacrylate	5.45	1046	0.83	1.83	1219	3.95*	Aliphatic ester
2-Methylbutyl methacrylate	5.47	1047	0.90	[1.83]	1219	3.95*	Aliphatic ester
Isobutyl angelate	5.64	1056	8.42	9.10	1235	4.18*	Aliphatic ester
γ-Terpinene	5.69	1059	0.02	0.01	1183	3.45	Monoterpene
Prenyl isobutyrate	5.74	1062	0.29	0.29	1260	4.55	Aliphatic ester
Methallyl angelate	5.93	1072	13.27	12.98	1317	5.42	Aliphatic ester
3-Methylamyl propionate?	6.07	1079	0.23	4.64	1254	4.46*	Aliphatic ester
Terpinolene	6.17	1085	0.01	[1.83]	1219	3.95*	Monoterpene
Unknown (m/z = 69, 41 (59), 67 (32), 68 (27), 53 (12)... 154 (5))	6.26	1090	0.18				Aliphatic ester
Butyl angelate	6.34	1094	0.40	0.36	1286	4.95	Aliphatic ester
Isobutyl tiglate	6.41	1098	0.08	[0.08]	1300	5.13*	Aliphatic ester
Isoamyl 2-methylbutyrate	6.53	1103	0.21	[9.10]	1235	4.18*	Aliphatic ester
2-Methylbutyl 2-methylbutyrate	6.59*	1105	0.48	[9.10]	1235	4.18*	Aliphatic ester
Linalool	6.59*	1105	[0.48]	0.02	1489	8.81	Monoterp. alcohol
α-Thujone	6.74	1111	0.09	0.06	1351	5.95	Monoterp. ketone
Methallyl tiglate?	6.78	1112	0.20	0.65	1404	6.78*	Aliphatic ester
3-Methylamyl isobutyrate	6.90*	1117	4.43	[4.64]	1254	4.46*	Aliphatic ester
β-Thujone	6.90*	1117	[4.43]	0.04	1366	6.17	Monoterp. ketone
α-Campholenal	7.19	1127	0.07				Monoterp. aldehyde
trans-Pinocarveol	7.54	1140	7.15	6.99	1564	11.36	Monoterp. alcohol
3-Methylamyl methacrylate	7.64	1144	2.16	2.02	1329	5.60	Aliphatic ester
Isoamyl angelate	7.75	1148	6.45	6.82	1335	5.69	Aliphatic ester
2-Methylbutyl angelate	7.87	1152	7.43	8.44	1340	5.76	Aliphatic ester
Camphene hydrate	7.96	1155	0.20	0.10	1521	9.74	Monoterp. alcohol
C. nobile biomarker	8.08	1160	0.74	[0.65]	1404	6.78*	Aliphatic ester
Pinocarvone	8.15	1163	3.42	3.30	1469	8.34	Monoterp. ketone
Isoborneol	8.31	1168	0.01	0.02	1582	12.01	Monoterp. alcohol
Isopinocamphone	8.45	1173	0.24	0.30	1502	9.13	Monoterp. alcohol
Borneol	8.53	1176	0.29	0.55	1610	13.06*	Monoterp. alcohol
Terpinen-4-ol	8.76	1185	0.01	0.01	1531	10.12	Monoterp. alcohol
Isobutyl 3-hydroxy-2-methylenebutyrate	8.88	1189	0.17	0.49	1700	17.79*	Aliphatic ester
Prenyl angelate	9.11	1197	0.59	0.82	1447	7.80	Aliphatic ester
Myrtenal	9.20	1200	0.76	0.76	1526	9.92	Monoterp. aldehyde
Isoamyl tiglate	9.24*	1201	0.64	[0.65]	1404	6.78*	Aliphatic ester
Myrtenol	9.24*	1201	[0.64]	[0.49]	1700	17.79*	Monoterp. alcohol

3-Methylamyl valerate	9.42*	1205	0.97	0.06	1393	6.62	Aliphatic ester
α-Terpineol	9.42*	1205	[0.97]	0.92	1614	13.29	Monoterp. alcohol
Verbenone	9.71	1212	0.11	0.12	1606	12.89	Monoterp. ketone
2-Hydroxy-2-methylbut-3-enyl 2-methyl-(2*Z*)-butenoate + 3-Methylamyl angelate	11.23	1245	0.29	16.88	1443	7.70*	Aliphatic ester
3-Methylamyl angelate	11.58	1253	16.55	[16.88]	1443	7.70*	Aliphatic ester
Bornyl acetate	12.73	1279	0.04	0.05	1514	9.46	Monoterp. ester
Isoamyl 3-hydroxy-2-methylenebutyrate	13.23	1290	0.20	0.16	1818	25.39	Aliphatic ester
3-Methylamyl tiglate	13.88	1303	0.12	0.31	1516	9.54*	Aliphatic ester
α-Copaene	17.51	1358	0.03	0.04	1431	7.44	Sesquiterpene
C. nobile biomarker	19.84	1393	0.22	0.18	1930	33.21	Aliphatic ester
β-Caryophyllene	20.35	1401	0.05	[0.31]	1516	9.54*	Sesquiterpene
trans-β-Farnesene	24.27	1448	0.32	[0.55]	1610	13.06*	Sesquiterpene
Germacrene D	25.29	1460	0.59	[0.55]	1610	13.06*	Sesquiterpene
β-Selinene	25.87	1467	0.16	0.12	1619	13.52	Sesquiterpene
Bicyclogermacrene	26.51	1475	0.02	0.03	1647	14.99	Sesquiterpene
α-Muurolene	27.71	1489	0.03	0.04	1634	14.29	Sesquiterpene
(*E*,*E*)-α-Farnesene	28.79	1503	0.23	0.36	1684	16.93*	Sesquiterpene
δ-Cadinene	28.98	1505	0.02	0.02	1688	17.15	Sesquiterpene
trans-Cadina-1,4-diene	29.86	1518	0.09	[0.36]	1684	16.93*	Sesquiterpene
(*E*,*E*)-Matricaria ester?	31.99	1547	0.22	0.20	2202	42.49	Polyyne
Spathulenol	33.47	1568	0.03	0.04	2010	36.79	Sesquiterp. alcohol
Copaborneol	35.32	1594	0.11				Sesquiterp. alcohol
Chamazulene	40.53	1721	0.02				Azulene
Total identified			**97.54%**	**96.49%**			

*: 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

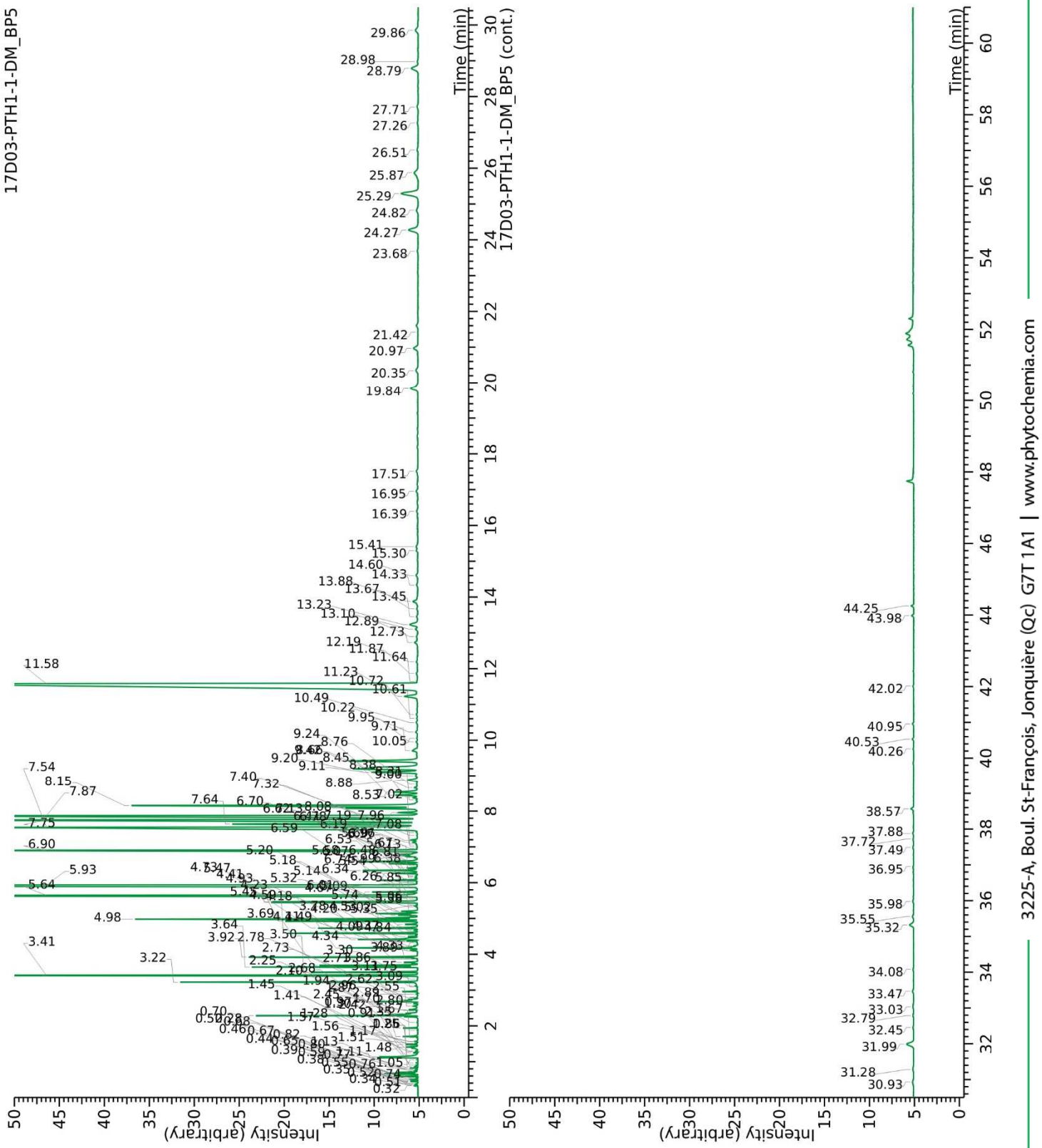
Other Data

Physical aspect : Faintly blue liquid

Refractive index : 1.4458 ± 0.0003 (20 °C)

Conclusion

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



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