PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: C90107

ESSENTIAL OIL: ROMAN CHAMOMILE
BOTANICAL NAME: CHAMAMELUM NOBILE
ORIGIN: UK

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CLARY SAGE OIL	%
3-METHYLAMYL ANGELATE	20.9
METHALLYL ANGELATE	15.4
trans-PINOCARVEOL	8.6
ISOAMYL ANGELATE	7.2
2-METHYLBUTYL ANGELATE	6.6
ISOBUTYL ANGELATE	3.9
PINOCARVONE	2.0
3-METHYLPENTANOL	2.0
a-PINENE	1.9
2-METHYLBUTYL ISOBUTYRATE	1.6
3-METHYLAMYL METHACRYLATE	1.2
MYRTENAL	1.2
ISOAMYL ISOBUTYRATE	1.1

Date : July 28, 2016

SAMPLE IDENTIFICATION

Internal code : 16G19-PTH5-1-DM
Customer identification : Roman Chamomile - C9010765R
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 : 2016-07-28

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.	
2-Methylbutyral	0.57	587	0.11	0.09	778	0.50	Aliphatic aldehyde
Isopropyl formate	0.64	610	0.08				Aliphatic ester
Isoamyl alcohol	1.12	728	0.40	3.77	1147	2.41*	Aliphatic alcohol
2-Methylbutyl alcohol	1.15	732	0.39	[3.77]	1147	2.41*	Aliphatic alcohol
(*E*)-2-Penten-1-ol	1.20	739	0.02				Aliphatic alcohol
Ethyl isobutyrate	1.27	749	0.02	0.02	831	0.58	Aliphatic ester
Methyl 2-methylbutyrate	1.36	762	0.02	0.01	926	0.81	Aliphatic ester
Hexanal	1.66	802	0.11	0.11	1020	1.26	Aliphatic aldehyde
Butyric acid	1.89	820	0.12				Aliphatic acid
Methyl angelate	1.90	821	0.07	0.06	1049	1.48	Aliphatic ester
Ethyl 2-methylbutyrate	2.20	846	0.04	0.04	986	1.05	Aliphatic ester
3-Methylpentanol	2.36	858	1.97	2.09	1272	4.00*	Aliphatic alcohol
cis-Hex-3-en-1-ol	2.48	869	0.18	1.40	1335	4.91*	Aliphatic alcohol
Isoamyl acetate	2.63	881	0.27	0.35	1058	1.56*	Aliphatic ester
Hexanol	2.66	883	0.04	0.04	1301	4.41	Aliphatic alcohol
2-Methylbutyl acetate	2.69	885	0.04	[0.35]	1058	1.56*	Aliphatic ester
Propyl methacrylate	2.70	886	0.11	0.09	1053	1.52	Aliphatic ester
Ethyl angelate?	2.91	902	0.11				Aliphatic ester
Isobutyl isobutyrate	3.17	918	0.48	0.45	1033	1.35	Aliphatic ester
α-Pinene	3.34	928	1.86	1.86	945	0.88	Monoterpene
Prenyl acetate	3.46	935	0.35	0.49	1179	2.79	Aliphatic ester
Isobutyl methacrylate	3.60	944	0.30	0.31	1112	2.01	Aliphatic ester
Camphene	3.62	946	0.64	0.63	999	1.10	Monoterpene
Butyl isobutyrate	3.72	951	0.11	0.11	1104	1.92	Aliphatic ester
Angelic acid	3.88*	961	0.76	0.11	1704	14.98	Aliphatic acid
Methallyl methacrylate	3.88*	961	[0.76]	0.67	1201	3.04	Aliphatic ester
Sabinene	4.04	971	0.04	0.03	1066	1.63	Monoterpene
β-Pinene	4.11	975	0.18	0.21	1038	1.39	Monoterpene
Isoamyl propionate	4.16	978	0.09				Aliphatic ester
Methallyl isobutyrate	4.33	989	0.02	0.02	1187	2.88	Aliphatic ester
Myrcene	4.36*	990	0.51	0.42	1125	2.16	Monoterpene
Dehydro-1,8-cineole	4.36*	990	[0.51]	0.04	1135	2.27	Monoterp. ether
Propyl angelate	4.54	1001	0.79	0.81	1195	2.98*	Aliphatic ester
Isobutyl 2-methylbutyrate	4.67	1009	0.10	[3.77]	1147	2.41*	Aliphatic ester
Isoamyl isobutyrate	4.87	1020	1.10	[3.77]	1147	2.41*	Aliphatic ester
2-Methylbutyl isobutyrate	4.93	1023	1.60	[3.77]	1147	2.41*	Aliphatic ester
para-Cymene	5.04	1029	0.05	0.05	1207	3.11	Monoterpene
Limonene	5.07	1031	0.10	0.04	1138	2.31	Monoterpene
1,8-Cineole	5.14	1034	0.22	0.16	1142	2.35	Monoterp. ether
Isoamyl methacrylate + 2-Methylbutyl methacrylate	5.40	1049	1.25	1.30	1223	3.34	Aliphatic ester

Isobutyl angelate	5.58	1059	3.93	4.19	1238	3.54*	Aliphatic ester
Prenyl isobutyrate	5.62	1061	0.13	[2.09]	1272	4.00*	Aliphatic ester
γ-Terpinene	5.64	1062	0.03	[0.81]	1195	2.98*	Monoterpene
Methallyl angelate	5.90	1076	15.41	15.91	1323	4.73	Aliphatic ester
3-Methylamyl propionate?	6.02*	1083	0.32	0.32	1251	3.71*	Aliphatic ester
Butyl angelate	6.29	1098	0.36	0.36	1292	4.29	Aliphatic ester
Isobutyl tiglate	6.35	1102	0.07	0.12	1299	4.38	Aliphatic ester
Isoamyl 2-methylbutyrate	6.46	1106	0.19	0.12	1234	3.49	Aliphatic ester
2-Methylbutyl 2-methylbutyrate	6.52	1108	0.17	[4.19]	1238	3.54*	Aliphatic ester
α-Thujone	6.68	1114	0.05	0.05	1363	5.31	Monoterp. ketone
Methallyl tiglate?	6.75	1117	0.19	0.21	1391	5.72	Aliphatic ester
3-Methylamyl isobutyrate	6.84	1120	7.81	8.02	1262	3.87	Aliphatic ester
3-Methylamyl methacrylate	7.62*	1149	10.40	[1.40]	1335	4.91*	Aliphatic ester
trans-Pinocarveol	7.62*	1149	[10.40]	8.55	1567	9.55	Monoterp. alcohol
Isoamyl angelate	7.69	1152	7.24	8.46	1343	5.02	Aliphatic ester
2-Methylbutyl angelate	7.79	1156	6.59	7.16	1347	5.08	Aliphatic ester
Camphene hydrate	7.94*	1161	0.19	0.17	1520	8.14*	Monoterp. alcohol
C. nobile biomarker	8.01	1164	0.75	0.73	1409	5.98	Aliphatic ester
Isoborneol	8.10*	1167	2.06	0.15	1596	10.45	Monoterp. alcohol
Pinocarvone	8.10*	1167	[2.06]	1.99	1470	7.13	Monoterp. ketone
Isopinocamphone	8.19	1170	0.19	0.12	1497	7.65	Monoterp. alcohol
Borneol	8.54	1184	0.25	0.40	1618	11.12*	Monoterp. alcohol
Terpinen-4-ol	8.62	1187	0.14	0.88	1529	8.40*	Monoterp. alcohol
Isobutyl 3-hydroxy-2-methylenebutyrate	8.81	1194	0.08	0.05	1714	15.43	Aliphatic ester
Prenyl angelate	9.02	1201	0.12	21.09	1451	6.76*	Aliphatic ester
Isoamyl tiglate	9.14*	1204	0.98	0.19	1414	6.07	Aliphatic ester
Myrtenol	9.14*	1204	[0.98]	0.60	1701	14.84	Monoterp. alcohol
Myrtenal	9.31	1208	1.19	[0.88]	1529	8.40*	Monoterp. aldehyde
Verbenone	9.39*	1210	0.65	0.43	1611	10.90	Monoterp. ketone
Methylamyl valerate analog	9.39*	1210	[0.65]				Aliphatic ester
3-Methylamyl angelate	11.48	1257	20.86	[21.09]	1451	6.76*	Aliphatic ester
Bornyl acetate	12.62	1283	0.08	0.25	1504	7.77*	Monoterp. ester
Hexyl angelate	12.98	1291	0.04	[0.40]	1618	11.12*	Aliphatic ester
Isoamyl 3-hydroxy-2-methylenebutyrate	13.45	1302	0.26	0.23	1818	21.56	Aliphatic ester
3-Methylamyl tiglate	13.76	1306	0.15	[0.25]	1504	7.77*	Aliphatic ester
α-Copaene	17.32	1362	0.04	0.04	1431	6.38	Sesquiterpene
Phenylethyl isobutyrate	19.88	1401	0.05	0.05	1798	20.33	Phenolic ester
β-Caryophyllene	20.15	1405	0.36	0.21	1524	8.25	Sesquiterpene
Aromadendrene	21.43	1421	0.06	0.05	1527	8.35	Sesquiterpene
trans-β-Farnesene	24.06	1452	0.23	0.16	1624	11.40	Sesquiterpene

Germacrene D	25.06	1464	0.12	0.12	1628	11.58	Sesquiterpene
β-Selinene	25.64	1471	0.15	[0.40]	1618	11.12*	Sesquiterpene
(*E*,*E*)-α-Farnesene	28.60	1508	0.27	0.29	1692	14.47	Sesquiterpene
Total identified			**96.81%**	**97.45%**			

*: 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 blue liquid
Refractive index : 1.4440 ± 0.0003 (20 °C)

Conclusion

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

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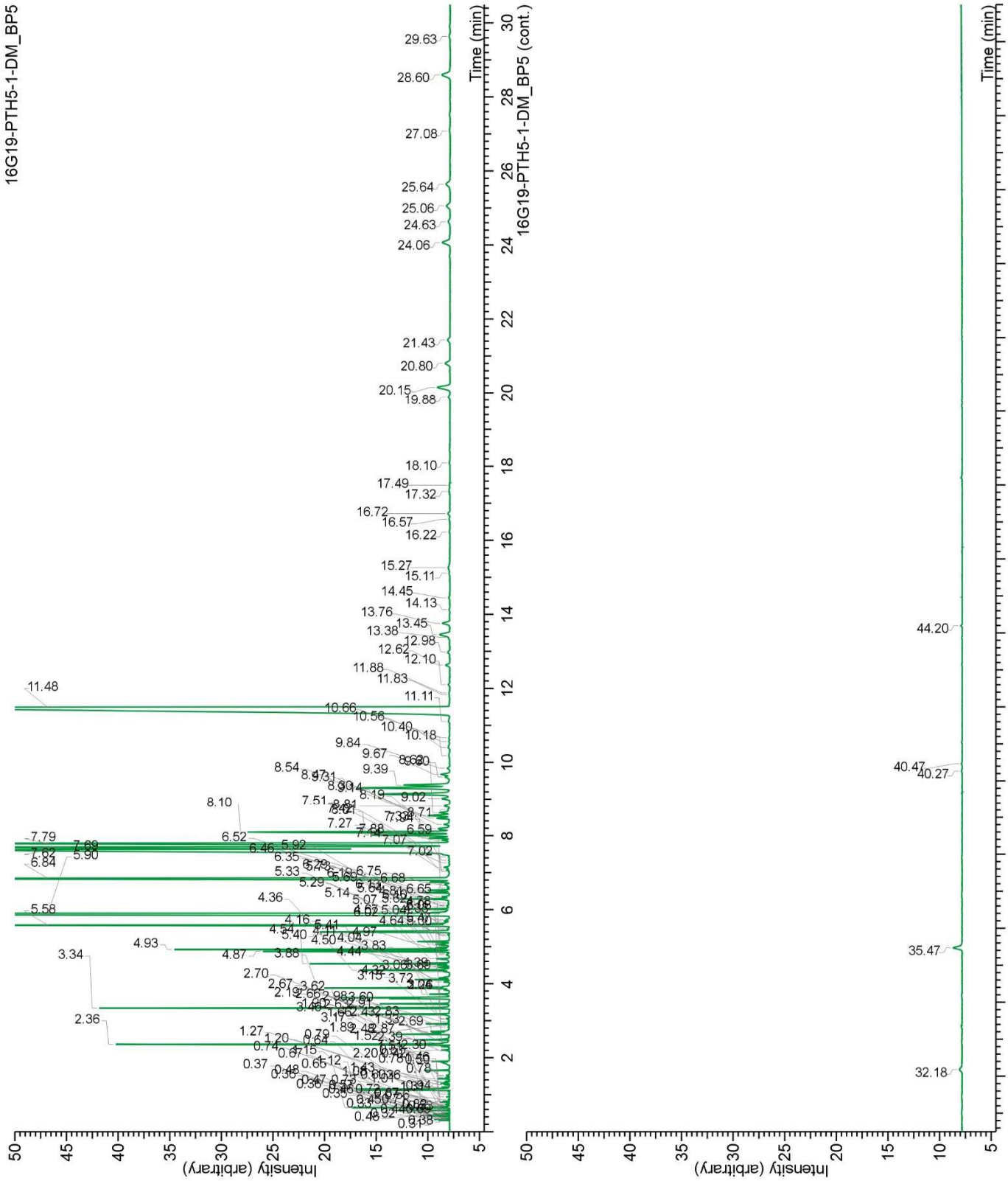
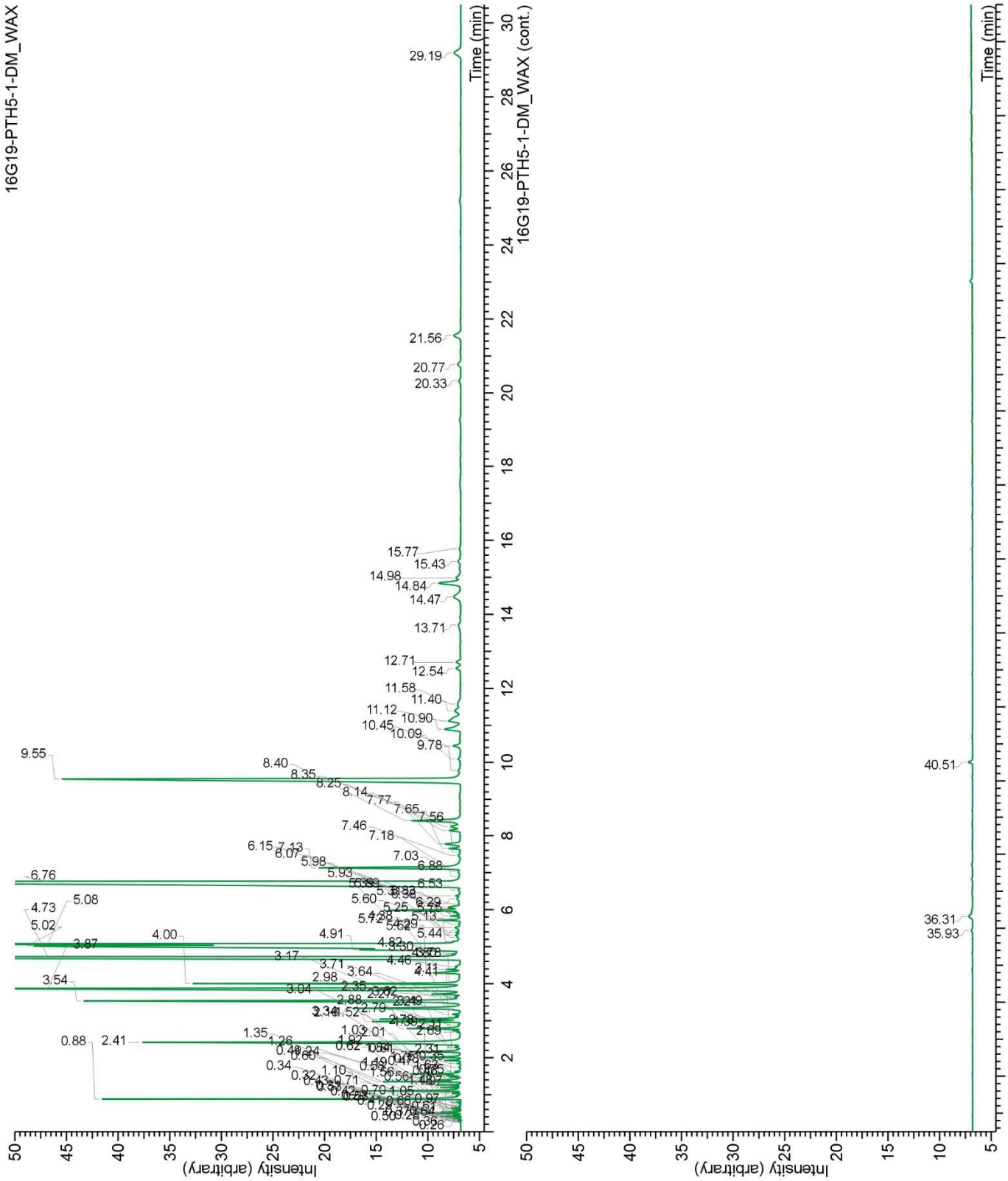

16G19-PTH5-1-DM_BP5
Time (min)
Intensity (arbitrary)
16G19-PTH5-1-DM_BP5 (cont.)
Time (min)
Intensity (arbitrary)



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