

GC/MS BATCH NUMBER: C80102

ESSENTIAL OIL: CHAMOMILE GERMAN
BOTANICAL NAME: MATRICARIA CHAMOMILLA
ORIGIN: EGYPT

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CHAMOMILE GERMAN OIL	%
α -BISABOLOL OXIDE A	45.5
TRANS- β -FARNESENE	18.2
CIS-SPIROETHER	5.3
α -BISABOLOL OXIDE B	5.1
α -BISABOLONE OXIDE	4.5
CHAMAZULENE	2.8
GERMACRENE D + PRECOCENE I	1.8
BICYCLOGERMACRENE	1.2
α -BISABOLOL	1.4

Comments from Robert Tisserand: Hay-like, chamomile tea odor quality. All six key ISO constituents are within range for Egyptian *Matricaria recutita*.

Date : December 12, 2017

SAMPLE IDENTIFICATION

Internal code : 17L11-PTH1-1-CC

Customer identification : Chamomile German - Egypt - C8010279R

Type : Essential oil

Source : *Matricaria recutita*

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 : 2017-12-12

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.	
Isovaleral	0.67	674	0.03	0.04	726	0.61	Aliphatic aldehyde
2-Methylbutyral	0.70	678	0.03	0.02	746	0.63	Aliphatic aldehyde
Hexanal	1.72	806	0.01	0.02	1011	1.49	Aliphatic aldehyde
Ethyl 2-methylbutyrate	2.25	846	0.19	0.16	988	1.30	Aliphatic ester
α -Thujene	3.30	920	0.01	0.02	945	1.12*	Monoterpene
α -Pinene	3.42	926	0.02	[0.02]	945	1.12*	Monoterpene
Camphene	3.70	943	0.02	0.04	998	1.38	Monoterpene
Propyl 2-methylbutyrate	3.75	946	0.07	0.06	1073	2.14	Aliphatic ester
Sabinene	4.13	969	0.03	0.02	1053	1.90*	Monoterpene
β -Pinene	4.20	972	0.01	[0.02]	1053	1.90*	Monoterpene
Myrcene	4.47	989	0.02				Monoterpene
2-Pentylfuran	4.52	991	0.05	0.03	1174	3.25	Furan
6-Methyl-5-hepten-2-one	4.55	993	0.06	0.04	1271	4.62	Aliphatic ketone
Yomogi alcohol	4.72	1003	0.06	0.04	1349	5.82	Monoterp. alcohol
Octanal	4.87	1011	0.07	0.06	1228	4.00*	Aliphatic aldehyde
α -Terpinene	4.94	1015	0.01				Monoterpene
para-Cymene	5.13	1025	0.08	0.47	1200	3.60*	Monoterpene
Limonene	5.17	1027	0.03	0.04	1140	2.81*	Monoterpene
β -Phellandrene	5.20	1029	tr	[0.04]	1140	2.81*	Monoterpene
1,8-Cineole	5.22	1030	0.02	[0.04]	1140	2.81*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.35	1037	0.08	0.24	1186	3.41*	Monoterpene
Butyl 2-methylbutyrate	5.45	1043	0.02	[0.24]	1186	3.41*	Aliphatic ester
<i>trans</i> - β -Ocimene	5.53	1047	0.41	[0.47]	1200	3.60*	Monoterpene
γ -Terpinene	5.72	1057	0.18	[0.24]	1186	3.41*	Monoterpene
Artemisia ketone	5.78	1060	0.40	0.36	1286	4.85	Monoterp. ketone
Terpinolene	6.22*	1084	0.13	[0.06]	1228	4.00*	Monoterpene
Artemisia alcohol	6.22*	1084	[0.13]	0.12	1441	7.57*	Monoterp. alcohol
Linalool	6.71*	1107	0.03				Monoterp. alcohol
Isoamyl isovalerate	6.71*	1107	[0.03]				Aliphatic ester
Nonanal	6.78	1109	0.06	0.05	1333	5.57	Aliphatic aldehyde
Artemisyl acetate	8.19	1160	0.02	0.03	1365	6.07	Monoterp. ester
Borneol	8.66	1177	0.08	19.12	1622	13.53*	Monoterp. alcohol
Myrtenal	9.17	1196	0.02	0.03	1529	9.92*	Monoterp. aldehyde
α -Terpineol	9.50	1204	0.04	[19.12]	1622	13.53*	Monoterp. alcohol
(<i>Z</i>)-Hex-3-en-1-yl isovalerate	10.83	1233	0.04	[0.12]	1441	7.57*	Aliphatic ester
Hexyl isovalerate	11.12	1239	0.02	0.02	1403	6.67	Aliphatic ester
(<i>E</i>)-Hex-2-en-1-yl isovalerate	11.31	1244	0.03	[0.12]	1441	7.57*	Aliphatic ester
Pelargonic acid	14.51	1309	0.05	0.20	2115	40.14	Fatty acid
α -Cubebene	15.85	1329	0.02	0.02	1409	6.78	Sesquiterpene

α -Copaene	17.70	1357	0.04	0.05	1432	7.34	Sesquiterpene
α -Isocomene	18.32	1366	0.04	0.03	1461	8.02	Sesquiterpene
β -Elemene	18.93	1376	0.06	0.17	1522	9.63*	Sesquiterpene
Benzyl isovalerate	19.68	1387	0.06	0.90	1801	24.06*	Phenolic ester
β -Caryophyllene	20.59	1400	0.09	[0.17]	1522	9.63*	Sesquiterpene
Aromadendrene	21.99*	1417	1.02	[0.03]	1529	9.92*	Sesquiterpene
Capric acid	21.99*	1417	[1.02]	0.97	2190	42.15	Fatty acid
α -Humulene	23.42	1434	0.02	0.03	1584	11.95	Sesquiterpene
allo-Aromadendrene	23.67	1437	0.10	0.09	1560	11.04	Sesquiterpene
<i>trans</i> - β -Farnesene	24.82	1451	18.24	[19.12]	1622	13.53*	Sesquiterpene
γ -Muuroleone	25.33	1457	0.13	[19.12]	1622	13.53*	Sesquiterpene
Germacrene D	25.75*	1462	1.81	[19.12]	1622	13.53*	Sesquiterpene
Precocene I	25.75*	1462	[1.81]				Chromene
β -Selinene	26.09	1466	0.06	[19.12]	1622	13.53*	Sesquiterpene
Dehydrosesquicineole	26.31	1468	0.12	1.14	1642	14.51*	Sesquiterp. ether
α -Curcumene	26.50	1471	0.14	0.97	1692	17.13*	Sesquiterpene
Bicyclogermacrene	26.94	1476	1.20	[1.14]	1642	14.51*	Sesquiterpene
α -Muuroleone	27.69	1485	0.08	[1.14]	1642	14.51*	Sesquiterpene
(<i>Z,E</i>)- α -Farnesene	27.84	1487	0.13	0.33	1672	16.13*	Sesquiterpene
γ -Cadinene	28.74	1497	0.18	[0.33]	1672	16.13*	Sesquiterpene
(<i>E,E</i>)- α -Farnesene	29.19*	1503	1.94	[0.97]	1692	17.13*	Sesquiterpene
δ -Cadinene	29.19*	1503	[1.94]	[0.33]	1672	16.13*	Sesquiterpene
1,9-Dihydrochamazulene	29.19*	1503	[1.94]	[0.90]	1801	24.06*	Azulene
<i>trans</i> -Cadina-1,4-diene	29.42	1507	0.26	[0.97]	1692	17.13*	Sesquiterpene
β -Sesquiphellandrene	30.24	1518	0.03	[0.97]	1692	17.13*	Sesquiterpene
α -Cadinene	30.51	1522	0.04	[0.97]	1692	17.13*	Sesquiterpene
Caryophyllene oxide	33.82	1569	0.07	0.13	1855	27.93	Sesquiterp. ether
(<i>E</i>)-Nerolidol	34.07*	1572	0.44	0.48	2000	36.27*	Sesquiterp. alcohol
Spathulenol	34.07*	1572	[0.44]	5.61	2011	36.80*	Sesquiterp. alcohol
Dendrolasin	34.19	1574	0.07	0.08	1866	28.73	Sesquiterp. ether
Globulol	34.41	1577	0.13	0.08	1981	35.41	Sesquiterp. alcohol
Viridiflorol	34.89	1584	0.04	0.04	1971	34.94	Sesquiterp. alcohol
4,10-Dihydrochamazulene	36.16	1604	0.29	[0.48]	2000	36.27*	Azulene
<i>M. recutita</i> biomarker	36.29	1607	0.03	0.04	1917	32.49	Oxygenated sesquiterpene
Isospathulenol	36.60*	1615	0.33	0.10	2142	40.89	Sesquiterp. alcohol
5,6-Dihydrochamazulene	36.60*	1615	[0.33]	0.29	1962	34.59	Azulene
Bisabolol oxide isomer I	36.94	1623	0.43				Sesquiterp. alcohol
τ -Cadinol	37.65	1641	0.67	0.58	2063	38.52	Sesquiterp. alcohol
7,8-Dihydrochamazulene	37.71	1642	0.18	[0.48]	2000	36.27*	Azulene
α -Bisabolol oxide B	37.98*	1649	5.42	[5.61]	2011	36.80*	Sesquiterp. alcohol
α -Muurolol	37.98*	1649	[5.42]	0.35	2094	39.52	Sesquiterp. alcohol
α -Cadinol	38.19*	1654	0.64	1.42	2122	40.37*	Sesquiterp. alcohol
Bisabolol oxide isomer II	38.19*	1654	[0.64]				Sesquiterp. alcohol

epi-β-Bisabolol	38.59	1664	0.11	0.06	2085	39.21	Sesquiterp. alcohol
α-Bisabolone oxide	39.05	1675	4.51	4.83	2039	37.77	Sesquiterp. alcohol
α-Bisabolol	39.53	1687	1.39	[1.42]	2122	40.37*	Sesquiterp. alcohol
Chamazulene	40.72	1721	2.83	2.75	2219	42.90*	Azulene
α-Bisabolol oxide A	41.81	1755	43.45	44.42	2299	44.75	Sesquiterp. alcohol
Myristic acid	42.37	1773	0.08	0.12	2618	51.25	Fatty acid
<i>M. recutita</i> biomarker	43.36	1805	0.12	[2.75]	2219	42.90*	Oxygenated sesquiterpene
Phytone	44.41	1843	0.18	0.22	2078	39.00	Aliphatic ketone
<i>cis</i> -Spiroether	45.76	1893	5.26	5.11	2729	53.30	Polyyne
<i>trans</i> -Spiroether	46.34	1915	0.74				Polyyne
Linoleic acid	51.26	2122	0.12	0.21	3047	58.70	Fatty acid
Oleic acid	52.72	2188	0.14	0.28	3113	59.74	Fatty acid
Tricosane	54.97	2295	0.29	0.49	2326	45.37	Alkane
Pentacosane	58.91	2493	0.59	0.76	2530	49.58	Alkane
Hexacosane	60.76	2593	0.03	0.02	2631	51.50	Alkane
Total identified			96.82%	94.40%			

*: 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

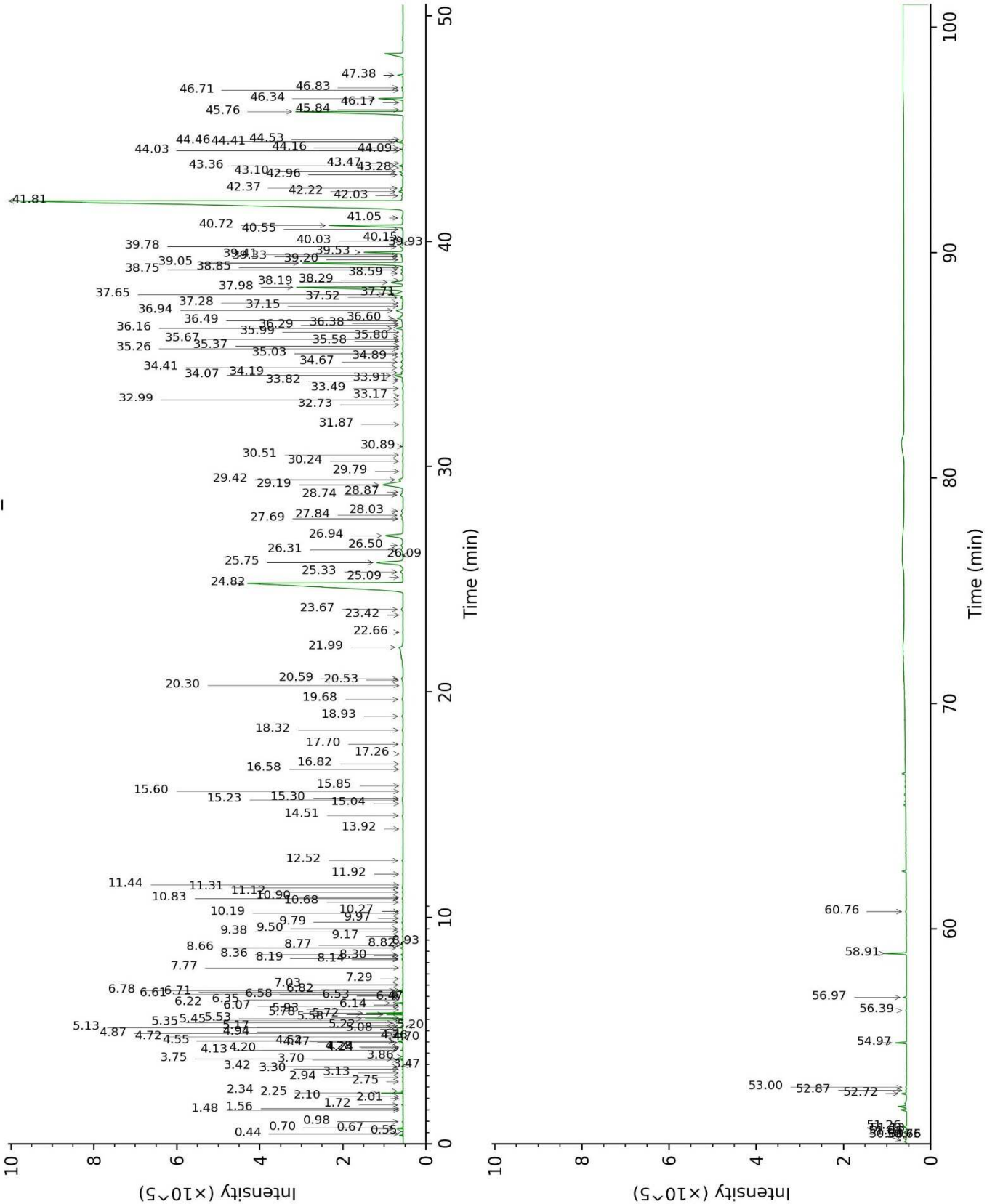
Physical aspect : Dark blue liquid

Refractive index : N/A (Too dark)

CONCLUSION

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

17L11-PTH1-1-CC_BP5



17L11-PTH1-1-CC_WAX

