

## GC/MS BATCH NUMBER: C80101

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**ESSENTIAL OIL:** GERMAN CHAMOMILE  
**BOTANICAL NAME:** MATRICARIA RECUTITA  
**ORIGIN:** EGYPT

KEY CONSTITUENTS PRESENT IN THIS BATCH OF GERMAN CHAMOMILE OIL	%
$\alpha$ -BISABOLOL OXIDE A	44.6
trans- $\beta$ -FARNESENE	16.0
$\alpha$ -BISABOLOL OXIDE B	5.5
$\alpha$ -BISABOLONE OXIDE	4.5
cis-SPIROETHER	4.2
CHAMAZULENE	2.8
PALMITIC ACID	2.1
$\alpha$ -BISABOLOL	1.6
CAPRIC ACID	1.3
PENTACOSANE	1.0

Comments from Robert Tisserand: This intensely colored oil has the rich, medicinal/hay odor typical of blue Chamomile oil. The analysis shows that all 6 key constituents conform to the ISO standard for Eavpt.

**Date :** September 9, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16H23-PTH9-1-DM

**Customer identification :** German Chamomile - C8010165R

**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).

**Analyst :** Alexis St-Gelais, M. Sc., chimiste

**Analysis date :** 2016-08-24

Checked and approved by :

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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.	
Isopropyl formate	0.65	609	0.04				Aliphatic ester
Ethyl 2-methylbutyrate	2.21	843	0.07	0.06	981	1.01	Aliphatic ester
$\alpha$ -Pinene	3.35	924	0.01	0.01	947	0.87	Monoterpene
Camphene	3.64	942	0.01	tr	1007	1.11	Monoterpene
Propyl 2-methylbutyrate	3.70	945	0.03	0.03	1082	1.70	Aliphatic ester
Sabinene	4.07	968	0.01	0.01	1056	1.50	Monoterpene
$\beta$ -Pinene	4.13	971	0.03	0.03	1040	1.37	Monoterpene
Myrcene	4.41	989	0.01	0.01	1116	1.98	Monoterpene
2-Pentylfuran	4.46	991	0.03	0.03	1174	2.67	Furan
6-Methyl-5-hepten-2-one	4.50	993	0.04	0.03	1274	3.97	Aliphatic ketone
Yomogi alcohol	4.70	1005	0.04	0.03	1357	5.13	Monoterp. alcohol
Octanal	4.81	1011	0.04	0.04	1232	3.38	Aliphatic aldehyde
para-Cymene	5.06	1025	0.09	0.10	1207	3.05	Monoterpene
Limonene	5.09	1027	0.03	0.02	1139	2.27	Monoterpene
<i>cis</i> - $\beta$ -Ocimene	5.28	1037	0.03	0.01	1183	2.78	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.46	1047	0.14	0.12	1201	2.99	Monoterpene
$\gamma$ -Terpinene	5.65	1058	0.11	0.11	1187	2.83	Monoterpene
Artemisia ketone	5.72	1062	0.21	0.21	1288	4.16	Monoterp. ketone
Artemisia alcohol	6.19	1087	0.08	0.08	1448	6.57*	Monoterp. alcohol
para-Cymenene	6.34	1095	0.01	0.01	1371	5.34*	Monoterpene
Isoamyl isovalerate	6.65	1107	0.02	0.01	1252	3.66	Aliphatic ester
Nonanal	6.70	1109	0.08	0.08	1339	4.87	Aliphatic aldehyde
Artemisyl acetate	8.31	1169	0.03	[0.01]	1371	5.34*	Monoterp. ester
Borneol	8.57	1179	0.06	0.07	1619	10.86	Monoterp. alcohol
$\alpha$ -Terpineol	9.36	1203	0.07	0.59	1633	11.39*	Monoterp. alcohol
( <i>Z</i> )-Hex-3-en-1-yl isovalerate	10.70	1234	0.03	0.01	1436	6.35*	Aliphatic ester
<i>trans</i> -Hex-2-en-1-yl isovalerate	11.17	1244	0.09	0.06	1465	6.90*	Aliphatic ester
Pelargonic acid	15.29	1323	0.11				Fatty acid
Modheph-2-ene	16.51	1342	0.03	[0.08]	1448	6.57*	Sesquiterpene
$\alpha$ -Copaene	17.40	1355	0.03	[0.01]	1436	6.35*	Sesquiterpene
$\alpha$ -Isocomene	17.99	1365	0.06	[0.06]	1465	6.90*	Sesquiterpene
$\beta$ -Elemene	18.64	1374	0.05	0.05	1528	8.15	Sesquiterpene
$\beta$ -Caryophyllene	20.25	1398	0.09	0.07	1531	8.22	Sesquiterpene
Capric acid	23.00	1432	1.33	1.59	2213	40.25	Fatty acid
$\alpha$ -Humulene	23.28	1435	0.06	0.06	1580	9.71	Sesquiterpene
<i>trans</i> - $\beta$ -Farnesene	24.49	1450	15.98	16.19	1631	11.29*	Sesquiterpene
Precocene I	24.99	1456	0.11				Chromene
Germacrene D	25.30	1459	0.56	[0.59]	1633	11.39*	Sesquiterpene
Dehydrosesquicineole	25.87*	1466	0.13	0.25	1650	12.11*	Sesquiterp. ether

$\beta$ -Selinene	25.87*	1466	[0.13]	[16.19]	1631	11.29*	Sesquiterpene
ar-Curcumene	26.07	1469	0.06	0.52	1699	14.29*	Sesquiterpene
$\alpha$ -Selinene	26.49*	1473	0.51	0.11	1637	11.53	Sesquiterpene
Bicyclogermacrene	26.49*	1473	[0.51]	0.26	1651	12.17	Sesquiterpene
$\alpha$ -Murolene	27.24	1482	0.06	[0.25]	1650	12.11*	Sesquiterpene
( <i>Z,E</i> )- $\alpha$ -Farnesene	27.40	1484	0.09	0.06	1672	13.10	Sesquiterpene
$\gamma$ -Cadinene	28.30	1495	0.13	0.11	1675	13.23	Sesquiterpene
$\beta$ -Bisabolene	28.50	1498	0.08	0.04	1666	12.81	Sesquiterpene
1,9-Dihydrochamazulene	28.80*	1502	1.15	0.67	1810	20.26	Azulene
( <i>E,E</i> )- $\alpha$ -Farnesene	28.80*	1502	[1.15]	[0.52]	1699	14.29*	Sesquiterpene
$\delta$ -Cadinene	28.97	1504	0.15	0.25	1680	13.45	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	29.83	1516	0.05	[0.52]	1699	14.29*	Sesquiterpene
Caryophyllene oxide	33.59	1567	0.07	0.18	1865	23.76*	Sesquiterp. ether
( <i>E</i> )-Nerolidol	33.79*	1570	1.20	0.09	1999	32.34	Sesquiterp. alcohol
Spathulenol	33.79*	1570	[1.20]	6.26	2031	34.20*	Sesquiterp. alcohol
Dendrolasin	34.05	1573	0.12	[0.18]	1865	23.76*	Sesquiterp. ether
4,10-Dihydrochamazulene	34.80	1584	0.04				Azulene
<i>M. recutita</i> biomarker	35.68	1597	0.06	0.06	1915	27.20	Oxygenated sesquiterpene
5,6-Dihydrochamazulene	35.90	1602	0.26	0.17	1976	30.99	Azulene
Isospathulenol	36.65	1620	0.13	1.41	2144	38.39*	Sesquiterp. alcohol
Bisabolol oxide isomer I	36.73	1622	0.32				Sesquiterp. alcohol
$\tau$ -Cadinol	37.42	1639	0.72	0.58	2081	36.26	Sesquiterp. alcohol
$\alpha$ -Bisabolol oxide B	37.77	1648	5.53	[6.26]	2031	34.20*	Sesquiterp. alcohol
$\alpha$ -Cadinol	37.95	1652	0.31	0.34	2136	38.11	Sesquiterp. alcohol
Bisabolol oxide isomer II	38.01	1653	0.48				Sesquiterp. alcohol
$\alpha$ -Bisabolone oxide	38.84	1673	4.50	4.75	2052	35.29	Sesquiterp. alcohol
$\alpha$ -Bisabolol	39.34	1685	1.57	[1.41]	2144	38.39*	Sesquiterp. alcohol
Chamazulene	40.46	1717	2.75	2.90	2242	41.00	Azulene
$\alpha$ -Bisabolol oxide A	41.62	1754	44.63	45.38	2326	42.93	Sesquiterp. alcohol
Phytone	44.27	1844	0.48				Terpenic ketone
<i>cis</i> -Spiroether	45.59	1891	4.18	4.30	2776	51.46	Polyyne
<i>trans</i> -Spiroether	46.20	1915	0.57				Polyyne
Palmitic acid	48.44	2006	2.11	2.44	2889	53.32	Fatty acid
Oleic acid	52.07	2166	0.60	0.25	3133	57.13	Fatty acid
Linoleic acid	52.22	2173	0.69	0.47	2935	54.07	Fatty acid
Tricosane	54.83	2296	0.35	0.28	2366	43.83	Alkane
Pentacosane	58.78	2497	1.02	1.01	2581	48.02	Alkane
<b>Total identified</b>			<b>94.89%</b>	<b>92.80%</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 :** Dark blue liquid

**Refractive index :** N/A (too dark)

*CONCLUSION*

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



