

GC-MS Profiling Analysis Prepared for Jade Bloom, Inc

Date: January 30, 2018
Sample: German Chamomile
Type: Essential Oil
Source: *Matricaria recutita*
Batch: D16040-AA-827

IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Isovaleral	0.67	674	0.05	0.07	771	0.58	Aliphatic aldehyde
2-Methylbutyral	0.70	678	0.05	0.03	762	0.57	Aliphatic aldehyde
Hexanal	1.71	805	0.02	0.01	1011	1.35	Aliphatic aldehyde
Ethyl 2-methylbutyrate	2.24	845	0.29	0.29	990	1.20	Aliphatic ester
Ethyl isovalerate	2.33	852	0.03	0.02	1016	1.38	Aliphatic ester
α -Thujene	3.30	919	0.01	tr	958	1.05	Monoterpene
α -Pinene	3.41	926	0.03	0.03	941	1.00	Monoterpene
Camphene	3.70	943	0.03	0.03	996	1.24	Monoterpene
Propyl 2-methylbutyrate	3.75	946	0.10	0.10	1092	1.97	Aliphatic ester
Sabinene	4.13	968	0.04	0.04	1059	1.71	Monoterpene
β -Pinene	4.20	972	tr	tr	1040	1.56	Monoterpene
Myrcene	4.47	988	0.02	0.02	1116	2.24	Monoterpene
2-Pentylfuran	4.52	991	0.07	0.05	1175	3.00	Furan
6-Methyl-5-hepten-2-one	4.55	993	0.08	0.06	1278	4.40	Aliphatic ketone
Yomogi alcohol	4.72	1002	0.05	0.05	1361	5.60	Monoterp. alcohol
α -Phellandrene	4.76*	1005	0.02	0.02	1108	2.15	Monoterpene
Δ 3-Carene	4.76*	1005	[0.02]	tr	1098	2.02	Monoterpene
Octanal	4.87	1011	0.08	0.09	1231	3.74	Aliphatic aldehyde
α -Terpinene	4.94	1014	0.01	0.01	1122	2.31	Monoterpene
para-Cymene	5.14	1025	0.10	0.10	1206	3.39	Monoterpene
Limonene	5.17	1027	0.04	0.05	1139	2.52	Monoterpene
β -Phellandrene	5.20	1028	tr	0.03	1146	2.60*	Monoterpene
1,8-Cineole	5.23	1030	0.02	[0.03]	1146	2.60*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.35	1037	0.10	0.31	1184	3.12*	Monoterpene
Butyl 2-methylbutyrate	5.45	1042	0.02	0.02	1182	3.08	Aliphatic ester
<i>trans</i> - β -Ocimene	5.53	1046	0.55	0.55	1200	3.30	Monoterpene
γ -Terpinene	5.72	1057	0.22	[0.31]	1184	3.12*	Monoterpene
Artemisia ketone	5.78	1060	0.49	0.49	1291	4.57	Monoterp. ketone
Artemisia alcohol	6.22*	1084	0.17	0.15	1452	7.21*	Monoterp. alcohol
Terpinolene	6.22*	1084	[0.17]	0.01	1220	3.58	Monoterpene
Linalool	6.71	1106	0.04	0.04	1500	8.17	Monoterp. alcohol
Nonanal	6.78	1109	0.11	0.10	1336	5.24	Aliphatic aldehyde
Pinocarvone	8.19	1160	0.02	0.02	1486	7.91	Monoterp. ketone
Artemisyl acetate	8.31	1164	0.01	0.02	1371	5.75	Monoterp. ester
Borneol	8.66	1176	0.08	22.42	1620	12.20*	Monoterp. alcohol
Terpinen-4-ol	8.81	1182	0.01	0.02	1529	9.09	Monoterp. alcohol
α -Terpineol	9.49	1203	0.04	0.32	1622	12.28*	Monoterp. alcohol
Decanal	9.80	1210	0.04	0.04	1431	6.80	Aliphatic aldehyde
(Z)-Hex-3-en-1-yl isovalerate	10.68	1229	0.01	0.02	1442	7.01	Aliphatic ester
Hexyl isovalerate	11.12	1239	0.02	0.01	1413	6.44	Aliphatic ester

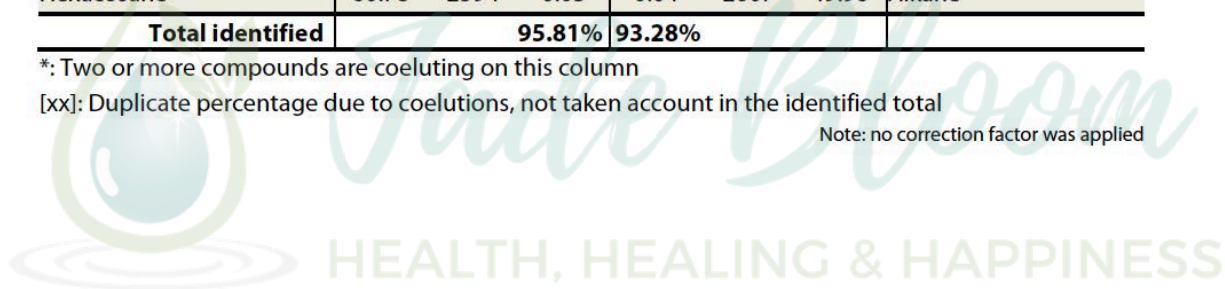
(E)-Hex-2-en-1-yl isovalerate	11.31	1243	0.02	[0.15]	1452	7.21*	Aliphatic ester
(E)-4,8-Dimethylnona-3,7-dien-2-one?	12.51	1269	0.05	0.03	1598	11.24	Aliphatic ketone
Pelargonic acid	14.53	1309	0.05	0.07	2112	38.87	Fatty acid
Bicycloelemene	15.01	1316	0.01	0.01	1422	6.63	Sesquiterpene
δ -Elemene	15.24	1319	0.06	0.05	1424	6.67	Sesquiterpene
α -Cubebene	15.96	1330	0.01	tr	1408	6.35	Sesquiterpene
Piperitenone	16.58	1339	0.02	0.01	1795	21.56	Monoterp. ketone
α -Copaene	17.68*	1356	0.05	0.02	1434	6.88	Sesquiterpene
Modheph-2-ene	17.68*	1356	[0.05]	0.02	1446	7.08	Sesquiterpene
α -Isocomene	18.31	1365	0.05	0.04	1454	7.24	Sesquiterpene
β -Elemene	18.92	1375	0.08	0.08	1519	8.75	Sesquiterpene
Benzyl isovalerate	19.67	1386	0.07	1.02	1806	22.17*	Phenolic ester
β -Caryophyllene	20.59	1399	0.10	0.09	1514	8.61	Sesquiterpene
Capric acid	22.00*	1416	0.84	0.86	2212	41.60	Fatty acid
Aromadendrene	22.00*	1416	[0.84]	0.07	1523	8.90	Sesquiterpene
α -Humulene	23.39	1433	0.02	0.01	1586	10.86	Sesquiterpene
allo-Aromadendrene	23.66	1436	0.11	0.12	1555	9.88	Sesquiterpene
<i>trans</i> - β -Farnesene	24.86	1450	20.93	[22.42]	1620	12.20*	Sesquiterpene
γ -Murolene	25.34	1456	0.16	0.14	1607	11.59	Sesquiterpene
Germacrene D	25.76	1461	2.04	[22.42]	1620	12.20*	Sesquiterpene
β -Selinene	26.32	1467	0.16	[0.32]	1622	12.28*	Sesquiterpene
Dehydrosesquicineole	26.50*	1470	0.14	0.06	1649	13.49	Sesquiterp. ether
<i>ar</i> -Curcumene	26.50*	1470	[0.14]	1.06	1690	15.42*	Sesquiterpene
Bicyclgermacrene	26.95*	1475	1.35	1.21	1638	13.05	Sesquiterpene
α -Selinene	26.95*	1475	[1.35]	0.03	1630	12.64	Sesquiterpene
α -Murolene	27.83	1485	0.17	0.15	1642	13.23	Sesquiterpene
(<i>Z,E</i>)- α -Farnesene	28.02	1488	0.10	0.38	1669	14.45*	Sesquiterpene
γ -Cadinene	28.74	1496	0.20	0.17	1663	14.17	Sesquiterpene
β -Bisabolene	28.87	1498	0.07	0.07	1659	13.99	Sesquiterpene
1,9-Dihydrochamazulene	29.19*	1502	2.14	[1.02]	1806	22.17*	Azulene
(<i>E,E</i>)- α -Farnesene	29.19*	1502	[2.14]	[1.06]	1690	15.42*	Sesquiterpene
δ -Cadinene	29.42	1505	0.29	[0.38]	1669	14.45*	Sesquiterpene
β -Sesquiphellandrene	30.51	1521	0.03	0.03	1693	15.56	Sesquiterpene
α -Cadinene	30.90	1526	0.03	0.03	1698	15.76	Sesquiterpene
(<i>E</i>)-Nerolidol	33.89	1569	0.05	0.11	1990	34.25	Sesquiterp. alcohol
Spathulenol	34.05	1571	0.38	5.42	2020	35.73*	Sesquiterp. alcohol
Dendrolasin	34.18	1573	0.10	0.08	1868	26.61	Sesquiterp. ether
Globulol	34.40	1576	0.17	0.22	1969	33.00	Sesquiterp. alcohol
Viridiflorol	34.89	1583	0.06	0.05	1980	33.63	Sesquiterp. alcohol
4,10-Dihydrochamazulene	36.16	1603	0.34	0.41	2005	35.07	Azulene
<i>M. recutita</i> biomarker	36.38	1608	0.04	0.04	1918	30.04	Oxygenated sesquiterpene

5,6-Dihydrochamazulene	36.53	1612	0.06	0.09	1973	33.24	Azulene
Bisabolol oxide isomer I	36.61	1614	0.32				Sesquiterp. alcohol
τ -Cadinol	37.66	1640	0.69	0.81	2073	37.56*	Sesquiterp. alcohol
7,8-Dihydrochamazulene	37.73	1641	0.14	0.22	2000	34.79	Azulene
α -Bisabolol oxide B	37.99*	1648	5.48	[5.42]	2020	35.73*	Sesquiterp. alcohol
α -Cadinol	37.99*	1648	[5.48]	0.27	2128	39.32	Sesquiterp. alcohol
Bisabolol oxide isomer II	38.20	1653	0.57				Sesquiterp. alcohol
epi- β -Bisabolol	38.76	1667	0.07	0.05	2088	38.07	Sesquiterp. alcohol
α -Bisabolone oxide	39.06	1674	4.21	4.25	2047	36.68	Sesquiterp. alcohol
α -Bisabolol	39.53	1686	1.29	1.31	2135	39.53	Sesquiterp. alcohol
Chamazulene	40.73	1720	2.90	2.85	2233	42.12	Azulene
α -Bisabolol oxide A	41.81	1755	38.08	38.35	2315	44.03*	Sesquiterp. alcohol
Myristic acid	43.14	1796	0.14	0.19	2640	50.58	Fatty acid
Phytone	44.42	1843	0.20	[0.81]	2073	37.56*	Aliphatic ketone
<i>cis</i> -Spiroether	45.77	1892	4.46	4.11	2762	52.79	Polyyne
<i>trans</i> -Spiroether	46.35	1915	0.57				Polyyne
(<i>Z</i>)-Tibetin spiroether	47.40	1957	0.13				Polyyne
Palmitic acid	48.36	1995	1.09	1.36	2855	54.39	Fatty acid
Phytol	51.16	2117	0.02	0.02	2586	49.57	Diterp. alcohol
Linoleic acid	52.04	2157	0.29	0.22	3089	58.24	Fatty acid
Oleic acid	52.20	2164	0.51	0.50	3137	59.01	Fatty acid
Tricosane	54.99	2295	0.27	[38.35]	2315	44.03*	Alkane
Tetracosane	56.99	2394	0.07	0.08	2405	45.98	Alkane
Pentacosane	58.94	2494	0.66	0.76	2508	48.08	Alkane
Hexacosane	60.78	2594	0.03	0.04	2607	49.96	Alkane
Total identified			95.81%	93.28%			

*: 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 viscous liquid

Refractive index : N/A (Too dark)

COMPLIANCE WITH ISO 19332:2008 – MATRICARIA RECUTITA

Compound	Hungary type		Egypt type		Observed %	Complies?
	Min. %	Max. %	Min. %	Max. %		
<i>trans</i> - β -Farnesene	20	51	15	35	20.9	Yes
α -Bisabolol oxide B	2	21	2	8	5.2	Yes
α -Bisabolone oxide	1	4	2	6.5	4.2	Egypt
α -Bisabolol	15	40	1	10	1.3	Egypt
Chamazulene	5	22	2	5	2.9	Egypt
α -Bisabolol oxide A	2	27	35	50	38.1	Egypt

CONCLUSION

No adulterant, contaminant or diluent were detected using this method. The oil complies with the ISO norm for an egyptian chamomile oil.