

GC/MS BATCH NUMBER: B50105

ESSENTIAL OIL: BLUE TANSY
BOTANICAL NAME: TANACETUM ANNUUM
ORIGIN: MOROCCO

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BLUE TANSY OIL	%
SABINENE	25.6
CAMPHOR	11.2
CHAMAZULENE	7.8
1,9-DIHYDROCHAMAZULENE	5.9
α -PHELLANDRENE	5.5
MYRCENE	5.5
p-CYMENE	4.4
β -PINENE	4.3
α -PINENE	2.5
1,8-CINEOLE	1.7
LIMONENE	1.7
4,10-DIHYDROCHAMAZULENE	1.6
TERPINEN-4-OL	1.5
γ -TERPINENE	1.4
β -CARYOPHYLLENE	1.3
BORNEOL	1.3
5,6-DIHYDROCHAMAZULENE	1.0
CAMPHENE	1.0

Comments from Robert Tisserand:
Excellent fruity/camphor odor quality. Relatively high in chamazulene (19%) and dihydrochamazulenes.

Date : September 23, 2016

SAMPLE IDENTIFICATION

Internal code : 16I16-PTH5-1-DM

Customer identification : Blue Tansy - Morocco - B5010566R

Type : Essential oil

Source : *Tanacetum annuum*

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 : 2016-09-22

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.	
Ethyl 2-methylbutyrate	2.21	843	0.04	1.00	996	1.07*	Aliphatic ester
Tricyclene	3.16	913	0.07	0.05	926	0.78	Monoterpene
α -Thujene	3.25	918	0.41	0.66	952	0.89	Monoterpene
α -Pinene	3.36	924	2.50	2.32	945	0.86	Monoterpene
Camphene	3.64	941	1.02	[1.00]	996	1.07*	Monoterpene
Sabinene	4.12	971	25.58	26.29	1061	1.54	Monoterpene
β -Pinene	4.16	973	4.27	4.22	1039	1.37	Monoterpene
Myrcene	4.43	990	5.47	5.89	1117	2.00	Monoterpene
6-Methyl-5-hepten-2-one	4.50	993	0.03	0.03	1272	3.94	Aliphatic ketone
α -Phellandrene	4.70*	1005	6.04	5.53	1110	1.93	Monoterpene
Δ^3 -Carene	4.70*	1005	[6.04]	0.02	1092	1.78	Monoterpene
α -Terpinene	4.87	1015	0.81	1.17	1122	2.06	Monoterpene
Isoamyl isobutyrate	4.94	1018	0.01	0.02	1159	2.51	Aliphatic ester
para-Cymene	5.08	1026	4.35	4.29	1207	3.04	Monoterpene
Limonene	5.11	1028	1.69	1.57	1139	2.26	Monoterpene
β -Phellandrene	5.14	1029	0.32	2.29	1143	2.32*	Monoterpene
1,8-Cineole	5.17	1031	1.72	[2.29]	1143	2.32*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.28	1037	0.01	1.36	1186	2.81*	Monoterpene
<i>trans</i> - β -Ocimene	5.46	1047	0.04	0.03	1200	2.98	Monoterpene
γ -Terpinene	5.65	1058	1.38	[1.36]	1186	2.81*	Monoterpene
<i>cis</i> -Sabinene hydrate	6.00	1076	0.15	0.36	1407	5.86	Monoterp. alcohol
Terpinolene	6.12	1083	0.48	0.47	1222	3.24	Monoterpene
Artemisia alcohol	6.18	1086	0.08	0.04	1456	6.73	Monoterp. alcohol
6,7-Epoxymenthyl acetate	6.36	1096	0.39	0.38	1348	5.01	Monoterp. ether
2-Methylbutyl 2-methylbutyrate	6.53	1103	0.07	0.07	1230	3.36	Aliphatic ester
Linalool	6.65	1107	0.21	0.17	1490	7.36	Monoterp. alcohol
Nonanal	6.73	1110	0.03	0.02	1344	4.95	Aliphatic aldehyde
Unknown (m/z = 71, 43 (86), 81 (86), 79 (69), 67 (67), 41 (56), 53 (38)... 152 (7))	6.91	1117	0.19				Oxygenated monoterpene
<i>cis</i> -para-Menth-2-en-1-ol	7.18	1127	0.15	0.10	1499	7.55	Monoterp. alcohol
Limona ketone	7.33	1132	0.32	0.32	1463	6.86	Simple phenolic
<i>trans</i> -Pinocarveol	7.54	1140	0.05	0.64	1578	9.66*	Monoterp. alcohol
Camphor	7.71	1147	11.23	11.57	1424	6.12	Monoterp. ketone
Isoborneol	8.08	1160	0.08	0.10	1598	10.25	Monoterp. alcohol
Umbellulone	8.47	1175	0.07	0.06	1548	8.75	Monoterp. ketone
Borneol	8.60	1180	1.26	1.42	1616	10.76*	Monoterp. alcohol
Terpinen-4-ol	8.70	1184	1.51	2.17	1528	8.17*	Monoterp. alcohol
α -Terpineol	9.35	1203	0.29	0.26	1628	11.15	Monoterp. alcohol

γ -Terpineol	9.66	1210	0.11	0.44	1631	11.32*	Monoterp. alcohol
Decanal	9.87	1215	0.08	0.09	1432	6.29	Aliphatic aldehyde
Bornyl formate	10.42	1227	0.03	0.04	1452	6.64	Monoterp. ester
(Z)-Hex-3-en-1-yl isovalerate	10.79	1236	0.07	0.05	1438	6.40	Aliphatic ester
Cuminal	11.36	1249	0.13	0.16	1680	13.44	Monoterp. aldehyde
Thymol	15.50	1326	0.56	0.60	2111	37.29	Monoterp. alcohol
Carvacrol	15.89	1332	0.04	0.03	2140	38.23	Monoterp. alcohol
α -Copaene	17.36	1355	0.02	0.02	1447	6.56	Sesquiterpene
β -Elemene	18.60	1374	0.19	[2.17]	1528	8.17*	Sesquiterpene
β -Caryophyllene	20.25	1398	1.31	0.83	1525	8.08	Sesquiterpene
Aromadendrene	21.72	1416	0.12	[2.17]	1528	8.17*	Sesquiterpene
<i>cis</i> - β -Farnesene	22.56	1426	0.60	[0.64]	1578	9.66*	Sesquiterpene
α -Humulene	23.00	1432	0.12	0.15	1582	9.77	Sesquiterpene
<i>trans</i> - β -Farnesene	24.25	1447	0.06	[1.42]	1616	10.76*	Sesquiterpene
Germacrene D	25.19	1458	0.30	0.39	1625	11.04	Sesquiterpene
β -Selinene	25.80	1465	0.43	[1.42]	1616	10.76*	Sesquiterpene
α -Selinene	26.41	1472	0.23	[0.44]	1631	11.32*	Sesquiterpene
Valencene	27.33	1483	0.15	0.10	1666	12.83	Sesquiterpene
1,9-Dihydrochamazulene	28.90*	1503	5.98	5.88	1808	20.18	Azulene
δ -Cadinene	28.90*	1503	[5.98]	0.06	1676	13.26	Sesquiterpene
β -Sesquiphellandrene	29.80	1515	0.33	0.35	1697	14.18	Sesquiterpene
3,6-Dihydrochamazulene	30.22	1521	0.04				Azulene
Caryophyllene oxide	33.48	1566	0.20	0.16	1851	22.78	Sesquiterp. ether
4,10-Dihydrochamazulene	35.89	1602	1.64	1.64	2014	33.23	Azulene
5,6-Dihydrochamazulene	36.32	1613	1.04	0.95	1971	30.72	Azulene
γ -Eudesmol	36.59	1619	0.07	0.07	2071	35.91	Sesquiterp. alcohol
7,8-Dihydrochamazulene	37.45	1640	0.87	0.66	2010	33.00	Azulene
β -Eudesmol	37.68	1645	0.42	0.36	2118	37.49	Sesquiterp. alcohol
α -Cadinol	37.94	1652	0.03	0.03	2128	37.87	Sesquiterp. alcohol
Chamazulene	40.51	1719	7.79	8.00	2240	40.93	Azulene
Unknown (m/z = 119, 121 (70), 105 (49), 93 (48), 91 (45), 109 (44), 41 (42)... 366?(4))	47.96	1986	0.13	0.12	2180	39.39	Diterpene
Unknown (m/z = 119, 121 (78), 132 (68), 93 (56)... 366?(2))	48.15	1994	0.73	0.63	2197	39.84	Diterpene
Unknown (m/z = 119, 132 (89), 109 (58), 145 (37), 105 (37)... 366?(4))	48.28	1999	0.14				Diterpene
Total identified			95.09%	95.95%			

*: 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.



