

GC/MS BATCH NUMBER: B50102

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BLUE TANSY OIL	%
SABINENE	22.1
1,9-DIHYDROCHAMAZULENE	14.3
CHAMAZULENE	13.3
MYRCENE	4.9
β-PINENE	4.8
α-PHELLANDRENE	3.4
CAMPHOR	3.2
5,6-DIHYDROCHAMAZULENE	2.8
4,10-DIHYDROCHAMAZULENE	2.8
p-CYMENE	2.5
7,8-DIHYDROCHAMAZULENE	2.2
α-PINENE	2.1
β-CARYOPHYLLENE	1.8
γ-TERPINENE	1.3
BORNEOL	1.2
LIMONENE	1.1
GERMACRENE D	1.0

Comments from Robert Tisserand:
Very good odor quality, nice high content (35%) of total chamazulenes, with appropriate viscous texture.

Date : August 19, 2016

SAMPLE IDENTIFICATION

Internal code : 16H19-PTH2-1-DM

Customer identification : Blue Tansy - Morocco - B5010267R

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 : 2016-08-19

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.	
Hexanal	1.67	800	0.02	0.03	1014	1.16	Aliphatic aldehyde
Ethyl 2-methylbutyrate	2.21	843	0.04	0.03	981	1.01	Aliphatic ester
Hexanol	2.70	881	0.01	0.01	1309	4.45	Aliphatic alcohol
Tricyclene	3.16	913	0.03	0.03	929	0.79	Monoterpene
α -Thujene	3.25	918	0.37	0.53	956	0.90	Monoterpene
α -Pinene	3.36	924	2.05	1.94	948	0.87	Monoterpene
Camphene	3.64*	942	0.49	0.48	1000	1.09	Monoterpene
α -Fenchene	3.64*	942	[0.49]	0.01	988	1.04	Monoterpene
Thuja-2,4(10)-diene	3.73	947	0.01	22.73	1065	1.56*	Monoterpene
Sabinene	4.12	971	22.14	[22.73]	1065	1.56*	Monoterpene
β -Pinene	4.16	973	4.82	4.73	1042	1.39	Monoterpene
Myrcene	4.44	990	4.92	5.10	1119	2.02	Monoterpene
6-Methyl-5-hepten-2-one	4.47	992	0.02	0.02	1275	3.98	Aliphatic ketone
Octen-3-ol	4.50	994	0.03	0.02	1417	5.99	Aliphatic alcohol
α -Phellandrene	4.70*	1005	3.96	3.44	1112	1.95	Monoterpene
Δ 3-Carene	4.70*	1005	[3.96]	0.05	1095	1.81	Monoterpene
Octanal	4.81	1011	0.05	0.04	1236	3.44	Aliphatic aldehyde
α -Terpinene	4.88	1015	0.77	1.23	1124	2.08	Monoterpene
para-Cymene	5.08	1026	2.48	2.47	1209	3.07	Monoterpene
Limonene	5.11	1028	1.08	0.95	1141	2.29	Monoterpene
β -Phellandrene	5.13	1029	0.35	0.85	1146	2.35*	Monoterpene
1,8-Cineole	5.16	1031	0.27	[0.85]	1146	2.35*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.28	1038	0.01	1.28	1189	2.84*	Monoterpene
<i>trans</i> - β -Ocimene	5.46	1047	0.02	0.03	1204	3.01	Monoterpene
γ -Terpinene	5.65	1058	1.30	[1.28]	1189	2.84*	Monoterpene
<i>cis</i> -Sabinene hydrate	6.00	1076	0.08	0.32	1409	5.89	Monoterp. alcohol
Terpinolene	6.12	1083	0.44	0.42	1225	3.28	Monoterpene
Artemisia alcohol	6.19	1087	0.02	0.04	1450	6.61	Monoterp. alcohol
para-Cymenene	6.29	1092	tr	0.01	1381	5.49	Monoterpene
6,7-Epoxy-myrcene	6.36	1096	0.49	0.47	1352	5.05	Monoterp. ether
<i>trans</i> -Sabinene hydrate	6.54	1103	0.05	0.05	1481	7.19	Monoterp. alcohol
Linalool	6.65	1107	0.12	0.12	1494	7.44	Monoterp. alcohol
Nonanal	6.70	1109	0.02	0.01	1347	5.00	Aliphatic aldehyde
Unknown (m/z = 71, 43 (86), 81 (86), 79 (69), 67 (67), 41 (56), 53 (38)... 152 (7))	6.92	1117	0.22				Oxygenated monoterpene
Limona ketone	7.33*	1132	0.25	0.27	1466	6.92*	Simple phenolic
<i>trans</i> -Pinocarveol	7.52	1140	0.02	0.02	1568	9.33	Monoterp. alcohol
Camphor	7.67	1145	3.19	3.31	1425	6.14*	Monoterp. ketone
Isoborneol	8.09	1161	0.06	0.06	1603	10.39	Monoterp. alcohol

Borneol	8.60	1180	1.20	1.45	1631	11.31*	Monoterp. alcohol
Terpinen-4-ol	8.70	1184	0.85	1.12	1528	8.17*	Monoterp. alcohol
α -Terpineol	9.36	1203	0.11	[1.45]	1631	11.31*	Monoterp. alcohol
α -Phellandrene epoxide	9.69*	1211	0.09	0.05	1721	15.26	Monoterpene
γ -Terpineol	9.69*	1211	[0.09]	0.05	1639	11.65	Monoterp. alcohol
Decanal	9.89	1215	0.07	0.06	1441	6.45	Aliphatic aldehyde
Bornyl formate	10.20	1222	0.07	0.06	1455	6.70	Monoterp. ester
(Z)-Hex-3-en-1-yl isovalerate	10.44	1228	0.05	0.05	1439	6.41	Aliphatic ester
Cuminal	11.36	1249	0.10	0.10	1681	13.49	Monoterp. aldehyde
Bornyl acetate	12.66	1277	0.03	0.02	1504	7.63	Monoterp. ester
Thymol	15.59	1328	0.37	0.43	2117	37.48	Monoterp. alcohol
Carvacrol	15.98	1334	0.03	0.04	2137	38.14	Monoterp. alcohol
α -Copaene	17.38	1355	0.08	[3.31]	1425	6.14*	Sesquiterpene
β -Elemene	18.63	1374	0.11	[1.12]	1528	8.17*	Sesquiterpene
β -Caryophyllene	20.29	1399	1.76	1.62	1532	8.25	Sesquiterpene
Aromadendrene	21.76	1416	0.25	[1.12]	1528	8.17*	Sesquiterpene
<i>cis</i> - β -Farnesene	22.59	1427	0.24	0.31	1582	9.78	Sesquiterpene
α -Humulene	23.02	1432	0.14	0.20	1588	9.93	Sesquiterpene
<i>trans</i> - β -Farnesene	24.27	1447	0.05	0.06	1614	10.70	Sesquiterpene
Germacrene D	25.25	1459	1.00	1.46	1621	10.91*	Sesquiterpene
β -Selinene	25.84	1466	0.31	[1.46]	1621	10.91*	Sesquiterpene
Bicyclogermacrene	26.46*	1472	0.29	0.28	1649	12.07*	Sesquiterpene
α -Selinene	26.46*	1472	[0.29]	0.06	1645	11.90	Sesquiterpene
Valencene	27.25	1482	0.06	0.05	1670	13.01	Sesquiterpene
α -Muurolene	27.38	1484	0.10	[0.28]	1649	12.07*	Sesquiterpene
γ -Cadinene	28.30	1495	0.07	0.07	1675	13.24	Sesquiterpene
1,9-Dihydrochamazulene	29.09*	1506	14.44	14.27	1816	20.62	Azulene
(<i>E,E</i>)- α -Farnesene	29.09*	1506	[14.44]	0.37	1685	13.64	Sesquiterpene
δ -Cadinene	29.53	1512	0.06	0.04	1673	13.13	Sesquiterpene
β -Sesquiphellandrene	29.87	1516	0.38	0.40	1702	14.41	Sesquiterpene
3,6-Dihydrochamazulene	30.30	1522	0.11				Azulene
Himachalene oxide	32.74	1556	0.04	0.03	1849	22.67	Sesquiterp. ether
Caryophyllene oxide	33.51*	1566	0.24	0.17	1855	23.10	Sesquiterp. ether
Spathulenol	33.51*	1566	[0.24]	0.06	2026	33.89	Sesquiterp. alcohol
4,10-Dihydrochamazulene	35.95	1603	2.80	2.83	2019	33.54	Azulene
5,6-Dihydrochamazulene	36.40	1614	2.83	2.60	1978	31.14	Azulene
γ -Eudesmol	36.62	1620	0.16	0.20	2078	36.14	Sesquiterp. alcohol
τ -Cadinol	37.25	1635	0.03	0.01	2063	35.64	Sesquiterp. alcohol
7,8-Dihydrochamazulene	37.52*	1642	2.49	2.22	2016	33.32	Azulene
τ -Muurolol	37.52*	1642	[2.49]	0.09	2099	36.87	Sesquiterp. alcohol
β -Eudesmol	37.71	1646	0.48	0.45	2123	37.67	Sesquiterp. alcohol
α -Cadinol	37.83	1649	0.04	0.03	2134	38.05	Sesquiterp. alcohol
α -Bisabolol	39.32	1684	0.05	0.06	2146	38.45	Sesquiterp. alcohol

Chamazulene	40.58	1721	13.28	13.35	2247	41.12	Azulene
Unknown (m/z = 119, 121 (78), 132 (68), 93 (56)... 366? (2))	48.18	1995	1.06	1.13	2205	40.03	
Total identified			94.84%	95.82%			

*: 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 \pm 0.0003 (20 °C)

CONCLUSION

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



