



**PLANT THERAPY**  
100% PURE ESSENTIAL OILS

## GC/MS BATCH NUMBER: BH0103

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

KEY CONSTITUENTS PRESENT IN THIS BATCH OF BLUE TANSY ORGANIC OIL	%
SABINENE	20.6
CAMPHOR	10.9
β-PINENE	7.0
1,9-DIHYDROCHAMAZULENE	6.4
α-PHELLANDRENE	6.5
CHAMAZULENE	5.7
MYRCENE	5.8
p-CYMENE	3.9
α-PINENE	3.4
4,10-DIHYDROCHAMAZULENE	3.3
5,6-DIHYDROCHAMAZULENE	2.6
BORNEOL	2.2
LIMONENE	1.6
7,8-DIHYDROCHAMAZULENE	1.5
β-CARYOPHYLLENE	1.4
TERPINEN-4-ol	1.3
γ-TERPINENE	1.1
CAMPHENE	1.1

**Date :** January 11, 2017

*SAMPLE IDENTIFICATION*

**Internal code :** 17A10-PTH13-1-DM

**Customer identification :** Organic Blue Tansy - BHO10369R

**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 :** 2017-01-11

Checked and approved by :

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Sylvain Mercier, M. Sc., chimiste 2014-005

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Hexanal	1.68	807	0.01	0.01	1013	1.75	Aliphatic aldehyde
Ethyl 2-methylbutyrate	2.21	848	0.05	0.05	984	1.52	Aliphatic ester
Tricyclene	3.16	916	0.07	0.07	920	1.16	Monoterpene
$\alpha$ -Thujene	3.25	922	0.36	0.42	956	1.32	Monoterpene
$\alpha$ -Pinene	3.36	929	3.40	3.45	946	1.27	Monoterpene
Camphene	3.64	946	1.06	1.06	992	1.59	Monoterpene
Thuja-2,4(10)-diene	3.70	950	0.04	21.32	1075	2.21*	Monoterpene
Sabinene	4.13	976	20.58	[21.32]	1075	2.21*	Monoterpene
$\beta$ -Pinene	4.17	979	6.99	7.19	1047	2.00	Monoterpene
Myrcene	4.44	996	5.83	6.00	1119	2.78	Monoterpene
6-Methyl-5-hepten-2-one	4.47	998	0.05	0.05	1280	5.09	Aliphatic ketone
$\alpha$ -Phellandrene	4.72*	1009	6.49	6.53	1112	2.69	Monoterpene
$\Delta^3$ -Carene	4.72*	1009	[6.49]	0.02	1096	2.47	Monoterpene
Octanal	4.82	1015	0.08	0.11	1233	4.38*	Aliphatic aldehyde
$\alpha$ -Terpinene	4.88	1018	0.67	0.73	1125	2.86	Monoterpene
para-Cymene	5.10	1029	3.90	3.65	1211	4.05	Monoterpene
Limonene	5.12	1030	1.60	1.97	1142	3.10	Monoterpene
$\beta$ -Phellandrene	5.15	1032	0.35	0.96	1149	3.18*	Monoterpene
1,8-Cineole	5.17	1033	0.56	[0.96]	1149	3.18*	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.29	1039	tr	0.01	1186	3.67	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.47	1049	0.02	0.02	1202	3.92	Monoterpene
$\gamma$ -Terpinene	5.66	1058	1.12	1.12	1191	3.74	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	5.95	1074	0.04	0.04	1382	6.73	Monoterp. alcohol
<i>cis</i> -Sabinene hydrate	6.02	1077	0.15	0.45	1407	7.30	Monoterp. alcohol
Terpinolene	6.13	1083	0.44	0.44	1224	4.25	Monoterpene
Artemisia alcohol	6.20	1087	0.05	0.05	1457	8.53	Monoterp. alcohol
<i>trans</i> -Linalool oxide (fur.)	6.27	1090	0.03	0.03	1416	7.52	Monoterp. alcohol
6,7-Epoxymenthyl 2-methylbutyrate	6.37	1095	0.59	0.57	1350	6.20	Monoterp. ether
2-Methylbutyl 2-methylbutyrate	6.54	1102	0.07	[0.11]	1233	4.38*	Aliphatic ester
Linalool	6.68	1107	0.23	0.18	1497	9.62	Monoterp. alcohol
Nonanal	6.74	1109	0.02	0.03	1343	6.10	Aliphatic aldehyde
Unknown (m/z = 71, 43 (86), 81 (86), 79 (69), 67 (67), 41 (56), 53 (38)... 152 (7))	6.93	1116	0.27				Oxygenated monoterpene
<i>cis</i> -para-Menth-2-en-1-ol	7.21	1127	0.12	0.10	1487	9.25	Monoterp. alcohol
Limona ketone	7.36	1132	0.35	0.34	1471	8.88	Simple phenolic
Camphor	7.73	1146	10.86	11.11	1427	7.80*	Monoterp. ketone
Isoborneol	8.30	1167	0.06	0.07	1590	13.21	Monoterp. alcohol
Umbellulone	8.50	1174	0.06	0.05	1557	11.92	Monoterp. ketone

Borneol	8.65	1180	2.21	2.75	1618	14.74*	Monoterp. alcohol
Terpinen-4-ol	8.75	1184	1.28	1.25	1527	10.79*	Monoterp. alcohol
$\alpha$ -Terpineol	9.41	1203	0.23	0.20	1622	14.92	Monoterp. alcohol
Decanal	9.67	1209	0.03	0.07	1433	7.96*	Aliphatic aldehyde
$\alpha$ -Phellandrene epoxide	9.72	1210	0.10	0.10	1719	20.54	Monoterpene
Bornyl formate	9.92	1215	0.08	0.05	1461	8.63	Monoterp. ester
(Z)-Hex-3-en-1-yl isovalerate	10.23	1222	0.07	[11.11]	1427	7.80*	Aliphatic ester
Cuminal	11.22	1244	0.03	0.03	1672	17.57	Monoterp. aldehyde
para-Menth-1(7)-en-2-one?	11.41	1248	0.10	0.11	1580	12.78	Monoterp. ketone
Bornyl acetate	12.71	1277	0.03	0.03	1518	10.45	Monoterp. ester
Thymol	15.61	1327	0.53	0.80	2110	40.99*	Monoterp. alcohol
Carvacrol	16.00	1333	0.03	0.02	2124	41.34	Monoterp. alcohol
$\alpha$ -Copaene	17.40	1355	0.03	[0.07]	1433	7.96*	Sesquiterpene
$\beta$ -Elemene	18.65	1373	0.19	0.14	1516	10.35	Sesquiterpene
$\beta$ -Caryophyllene	20.30	1397	1.35	1.30	1513	10.25	Sesquiterpene
Aromadendrene	21.78	1415	0.14	[1.25]	1527	10.79*	Sesquiterpene
cis- $\beta$ -Farnesene	22.60	1425	0.54	0.57	1572	12.48	Sesquiterpene
$\alpha$ -Humulene	23.06	1430	0.12	0.11	1577	12.67	Sesquiterpene
allo-Aromadendrene	23.31	1433	0.02	0.02	1554	11.80	Sesquiterpene
trans- $\beta$ -Farnesene	24.32	1446	0.05	0.05	1623	15.02	Sesquiterpene
Germacrene D	25.27	1457	0.55	0.56	1612	14.40	Sesquiterpene
$\beta$ -Selinene	25.89	1464	0.43	[2.75]	1618	14.74*	Sesquiterpene
$\alpha$ -Selinene	26.48*	1472	0.26	0.05	1629	15.29	Sesquiterpene
Bicyclgermacrene	26.48*	1472	[0.26]	0.20	1634	15.53	Sesquiterpene
Valencene	27.33	1482	0.04	0.03	1670	17.47	Sesquiterpene
$\alpha$ -Muurolene	27.41	1483	0.11	0.10	1656	16.72	Sesquiterpene
$\gamma$ -Cadinene	28.23	1493	0.07	0.08	1667	17.31	Sesquiterpene
1,9-Dihydrochamazulene	29.02*	1503	6.79	6.37	1804	26.37	Azulene
$\delta$ -Cadinene	29.02*	1503	[6.79]	0.05	1679	17.93	Sesquiterpene
(E,E)- $\alpha$ -Farnesene	29.02*	1503	[6.79]	0.03	1690	18.57	Sesquiterpene
$\beta$ -Sesquiphellandrene	29.88	1515	0.37	0.39	1687	18.38	Sesquiterpene
3,6-Dihydrochamazulene	30.34	1521	0.06				Azulene
Himachalene oxide	32.71	1554	0.10	0.08	1866	31.00	Sesquiterp. ether
Caryophyllene oxide	33.55*	1565	0.18	0.09	1842	29.21	Sesquiterp. ether
Spathulenol	33.55*	1565	[0.18]	0.02	2036	38.74	Sesquiterp. alcohol
4,10-Dihydrochamazulene	36.01	1603	3.25	3.46	2006	37.78	Azulene
5,6-Dihydrochamazulene	36.44	1613	2.57	2.15	1966	36.16	Azulene
$\gamma$ -Eudesmol	36.78	1621	0.10	0.13	2065	39.66	Sesquiterp. alcohol
$\tau$ -Cadinol	37.27	1633	0.02	0.01	2079	40.08	Sesquiterp. alcohol
7,8-Dihydrochamazulene	37.55	1640	1.50	1.32	1998	37.54	Azulene
$\beta$ -Eudesmol	37.76	1645	0.35	[0.80]	2110	40.99*	Sesquiterp. alcohol
$\alpha$ -Cadinol	37.99	1651	0.04	0.05	2131	41.53	Sesquiterp. alcohol
Chamazulene	40.59	1719	5.70	5.83	2235	44.12	Azulene

Unknown (m/z = 119, 121 (70), 105 (49), 93 (48), 91 (45), 109 (44), 41 (42)... 366?(4))	47.99	1983	0.10	0.08	2163	42.39	
Unknown (m/z = 119, 121 (78), 132 (68), 93 (56)... 366?(2))	48.18	1991	0.46	0.44	2168	42.50	
Unknown (m/z = 119, 132 (89), 109 (58), 145 (37), 105 (37)... 366?(4))	48.30	1995	0.07	0.05	2177	42.74	
<b>Total identified</b>			<b>95.95%</b>	<b>96.80%</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.



