

Analysis Tansy Essential Oil

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Date : January 26, 2017

SAMPLE IDENTIFICATION livinglibotier

Internal code : 17A12-FSE3-1-DM + + + +

Customer identification : Blue Tansy - Lot #52CM9231415B

Type : Essential Oil

Source : Tanacetum annuum

Customer : Flowers Shining Everywhere Inc.

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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 : 2017-01-24

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Checked and approved by :

Alexis St-Gelais

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	807	0.01	0.01	1010	1.72	Aliphatic aldehyde
Ethyl 2-methylbutyrate	2.19	846	0.03	0.62	989	1.57*	Aliphatic ester
Hexanol	2.69	885	0.01	0.01	1306	5.52	Aliphatic alcohol
Tricyclene	3.15	916	0.04	0.03	916	1.14	Monoterpene
α -Thujene	3.24	921	0.47	0.51	954	1.30	Monoterpene
α -Pinene	3.35	928	2.59	2.67	942	1.26	Monoterpene
Camphene	3.63*	945	0.61	[0.62]	989	1.57*	Monoterpene
α -Fenchene	3.63*	945	[0.61]	0.01	981	1.50	Monoterpene
Sabinene	4.12	976	25.09	26.09	1072	2.19	Monoterpene
β -Pinene	4.16	979	5.87	6.07	1043	1.97	Monoterpene
Myrcene	4.43	995	5.10	5.24	1117	2.75	Monoterpene
Octen-3-ol	4.46	997	0.03	0.03	1397	7.05	Aliphatic alcohol
6-Methyl-5-hepten-2-one	4.50	999	0.03	0.02	1277	5.05	Aliphatic ketone
α -Phellandrene	4.70*	1008	4.70	4.84	1110	2.66	Monoterpene
Δ^3 -Carene	4.70*	1008	[4.70]	0.02	1094	2.44	Monoterpene
Octanal	4.81	1014	0.04	0.10	1230	4.34*	Aliphatic aldehyde
α -Terpinene	4.87	1017	1.08	1.12	1122	2.83	Monoterpene
para-Cymene	5.08	1028	2.78	2.70	1208	4.01	Monoterpene
Limonene	5.11	1030	2.19	2.44	1140	3.07	Monoterpene
β -Phellandrene	5.13	1031	0.42	0.89	1146	3.13*	Monoterpene
1,8-Cineole	5.16	1032	0.43	[0.89]	1146	3.15*	Monoterp. ether
cis- β -Ocimene	5.28	1039	0.01	0.01	1183	3.64	Monoterpene
trans- β -Ocimene	5.46	1048	0.02	0.02	1200	3.89	Monoterpene
γ -Terpinene	5.65	1058	1.78	1.83	1189	3.71	Monoterpene
cis-Sabinene hydrate	6.01	1077	0.07	0.05	1413	7.45	Monoterp. alcohol
Terpinolene	6.11	1082	0.69	0.70	1222	4.21	Monoterpene
Artemisia alcohol	6.18	1085	0.05	0.05	1453	8.45	Monoterp. alcohol
6,7-Epoxynerone	6.35	1095	0.32	0.30	1347	6.15	Monoterp. ether
2-Methylbutyl 2-methylbutyrate	6.53	1101	0.07	[0.10]	1230	4.34*	Aliphatic ester
Linalool	6.65	1106	0.15	0.19	1494	9.51	Monoterp. alcohol
Nonanal	6.70	1108	0.03	0.02	1341	6.06	Aliphatic aldehyde
Unknown (m/z = 71, 43 (86), 81 (86), 79 (69), 67 (67), 44 (58), 53 (38), 152 (7))	6.91	1116	0.19				Oxygenated monoterpene
cis-para-Menth-2-en-1-ol	7.17	1125	0.11	0.08	1501	9.79	Monoterp. alcohol
Limona ketone	7.33	1131	0.14	0.14	1467	8.79	Simple phenolic
Camphor	7.68	1144	4.45	4.63	1422	7.68*	Monoterp. ketone
Isoborneol	8.25	1165	0.03	0.03	1596	13.54	Monoterp. alcohol
Umbellulone	8.47	1173	0.06	0.06	1554	11.79	Monoterp. ketone

Borneol	8.60	1178	1.08	1.39	1615	14.55*	Monoterp. alcohol
Terpinen-4-ol	8.72	1183	1.78	1.78	1525	10.68*	Monoterp. alcohol
α -Terpineol	9.37	1203	0.18	0.15	1618	14.75	Monoterp. alcohol
Bornyl formate	10.20	1221	0.05	0.04	1458	8.55	Monoterp. ester
(Z)-Hex-3-en-1-yl isovalerate	10.42	1226	0.06	0.06	1436	8.01	Aliphatic ester
Pulegone	10.81	1235	0.85	0.88	1545	11.48	Monoterp. ketone
Cuminal	11.18	1243	0.08	0.07	1676	17.77	Monoterp. aldehyde
para-Menth-1(7)-en-2-one?	11.39	1248	0.13	0.09	1576	12.65	Monoterp. ketone
Thymol	15.50	1326	0.39	0.65	2105	40.85*	Monoterp. alcohol
α -Cubebene	15.66	1328	0.02	0.02	1409	7.37	Sesquiterpene
Carvacrol	16.31	1338	0.05	0.03	2126	41.39	Monoterp. alcohol
α -Copaene	17.36	1354	0.09	[4.63]	1422	7.68*	Sesquiterpene
β -Elemene	18.60	1372	0.16	0.11	1514	10.26	Sesquiterpene
β -Caryophyllene	20.26	1397	1.72	1.68	1511	10.17	Sesquiterpene
Aromadendrene	21.72	1414	0.25	[1.78]	1525	10.68*	Sesquiterpene
cis- β -Farnesene	22.54	1424	0.31	0.32	1568	12.35	Sesquiterpene
α -Humulene	22.99	1430	0.19	0.20	1574	12.55	Sesquiterpene
allo-Aromadendrene	23.23	1432	0.04	0.04	1551	11.70	Sesquiterpene
trans- β -Farnesene	24.15	1443	0.07	0.07	1621	14.88	Sesquiterpene
Germacrene D	25.24	1457	1.89	1.84	1610	14.31	Sesquiterpene
β -Selinene	25.82	1464	0.33	[1.39]	1615	14.55*	Sesquiterpene
α -Selinene	26.43*	1471	0.44	0.10	1626	15.12	Sesquiterpene
Bicyclgermacrene	26.43*	1471	[0.44]	0.36	1631	15.39	Sesquiterpene
α -Murolene	27.21	1480	0.06	0.08	1653	16.57	Sesquiterpene
Valencene	27.35	1482	0.11	0.09	1658	16.81	Sesquiterpene
γ -Cadinene	28.25	1493	0.09	0.05	1668	17.38	Sesquiterpene
1,9-Dihydrochamazulene	29.03*	1503	11.59	10.77	1803	26.25	Azulene
δ -Cadinene	29.03*	1503	[11.59]	0.02	1672	17.59	Sesquiterpene
β -Sesquiphellandrene	29.82	1514	0.42	0.42	1684	18.22	Sesquiterpene
3,6-Dihydrochamazulene	30.25	1520	0.09				Azulene
Himachalene oxide	32.63	1553	0.06	0.05	1863	30.76	Sesquiterp. ether
Caryophyllene oxide	33.51*	1565	0.26	0.18	1839	28.98	Sesquiterp. ether
Spathulenol	33.51*	1565	[0.26]	0.05	2012	37.97	Sesquiterp. alcohol
4,10-Dihydrochamazulene	35.93	1600	1.57	1.56	2001	37.62*	Azulene
5,6-Dihydrochamazulene	36.38	1612	2.45	2.36	1963	36.03	Azulene
γ -Eudesmol	36.62	1617	0.13	0.13	2061	39.54	Sesquiterp. alcohol
7,8-Dihydrochamazulene	37.51*	1639	1.93	[1.56]	2001	37.62*	Azulene
ϵ -Murolol	37.51*	1639	[1.93]	0.05	2099	40.68	Sesquiterp. alcohol
β -Eudesmol	37.71	1644	0.27	[0.65]	2105	40.85*	Sesquiterp. alcohol
α -Cadinol	38.03	1652	0.03	0.06	2119	41.22	Sesquiterp. alcohol
α -Bisabolol	39.46	1680	0.02	0.02	2138	41.71	Sesquiterp. alcohol
Chamazulene	40.52	1717	5.42	5.42	2230	44.02	Azulene

Unknown (m/z = 119, 121 (70), 105 (49), 93 (48), 91 (45), 109 (44), 41 (42)... 3667(4))	47.96	1982	0.13	0.10	2160	42.30	
Unknown (m/z = 119, 121 (78), 132 (68), 93 (56)... 3667 (2))	48.15	1990	0.56	0.60	2165	42.42	
Unknown (m/z = 119, 132 (89), 109 (58), 145 (37), 105 (37)... 3667(4))	48.29	1995	0.04	0.06	2173	42.63	
Matricarine derivative I?	56.90	2392	0.31	0.31	2751	54.53	Sesquiterp. lactone
Matricarine derivative II?	58.27	2462	1.26	1.16	2851	56.28	Sesquiterp. lactone
Total identified			95.73%	94.19%			

* 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.

Essential Oil, *Tomocetum annuum*
Internal Code: 17A12-FSE3-1-DM

Customer Identification:
Blue Tansy - Lot #52CM9231415B

Report prepared for
Flowers Shining Everywhere Inc.



