

Date : January 19, 2017

SAMPLE IDENTIFICATION

Internal code : 17A03-TOB28-1-DM

Customer identification : Tea Tree - 20-2000-BP

Type : Essential Oil

Source : *Melaleuca alternifolia*

Customer : TruIQ Global, LLC

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 : 2017-01-18

Checked and approved by :

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.	
Ethanol	0.33	636	0.08	0.09	834	0.79	Aliphatic alcohol
<i>cis</i> -Hex-3-en-1-ol	2.51	870	0.06	0.07	1330	5.90	Aliphatic alcohol
α -Thujene	3.26	922	0.81	0.83	958	1.33	Monoterpene
α -Pinene	3.36	929	2.22	2.22	947	1.28	Monoterpene
Camphene	3.65	946	0.01	0.01	993	1.59	Monoterpene
Sabinene	4.08	973	0.22	0.22	1068	2.16	Monoterpene
β -Pinene	4.14	977	0.64	0.65	1044	1.98	Monoterpene
Myrcene	4.43	995	0.82	0.79	1118	2.76	Monoterpene
α -Phellandrene	4.69	1008	0.39	0.38	1111	2.67	Monoterpene
α -Terpinene	4.91	1020	8.93	9.10	1127	2.90	Monoterpene
<i>para</i> -Cymene	5.10	1029	2.41	2.33	1212	4.07*	Monoterpene
Limonene	5.12	1030	0.62	0.74	1143	3.10	Monoterpene
β -Phellandrene	5.15	1032	0.71	2.52	1150	3.20*	Monoterpene
1,8-Cineole	5.17	1033	1.80	[2.52]	1150	3.20*	Monoterp. ether
<i>cis</i> - β -Ocimene	5.30	1040	0.01	19.34	1196	3.83*	Monoterpene
<i>trans</i> - β -Ocimene	5.48	1049	0.01	[2.33]	1212	4.07*	Monoterpene
γ -Terpinene	5.72	1062	19.08	[19.34]	1196	3.83*	Monoterpene
<i>cis</i> -Sabinene hydrate	6.04	1078	0.03	0.02	1403	7.21	Monoterp. alcohol
Terpinolene	6.15	1084	3.31	3.26	1227	4.29	Monoterpene
<i>para</i> -Cymenene	6.36	1095	0.05	0.05	1370	6.53	Monoterpene
Linalool	6.68*	1107	0.13	0.48	1498	9.69*	Monoterp. alcohol
<i>trans</i> -Sabinene hydrate	6.68*	1107	[0.13]	0.06	1489	9.32	Monoterp. alcohol
<i>cis</i> - <i>para</i> -Menth-2-en-1-ol	7.20	1126	0.42	[0.48]	1498	9.69*	Monoterp. alcohol
<i>cis</i> - <i>para</i> -Mentha-2,8-dien-1-ol	7.64	1143	0.08	0.11	1604	13.96	Monoterp. alcohol
<i>trans</i> - <i>para</i> -Menth-2-en-1-ol	7.79	1148	0.22	0.29	1560	12.03*	Monoterp. alcohol
Terpinen-4-ol	8.98	1192	42.66	44.34	1536	11.12*	Monoterp. alcohol
<i>para</i> -Cymen-8-ol	9.39	1203	0.08	0.04	1770	24.01	Monoterp. alcohol
α -Terpineol	9.52	1206	3.21	3.27	1626	15.09	Monoterp. alcohol
<i>trans</i> -Piperitol	9.98	1216	0.15	0.14	1672	17.60	Monoterp. alcohol
Piperitone	11.69	1254	0.04	0.04	1621	14.87	Monoterp. ketone
α -Cubebene	15.75	1329	0.05	0.08	1407	7.32	Sesquiterpene
α -Ylangene	17.03	1349	0.06	0.04	1423	7.71	Sesquiterpene
α -Copaene	17.45	1355	0.15	0.10	1426	7.78	Sesquiterpene
β -Elemene	18.69	1373	0.02	[44.34]	1536	11.12*	Sesquiterpene
α -Gurjunene	19.39	1384	0.32	0.32	1461	8.63	Sesquiterpene
β -Caryophyllene	20.32	1397	0.34	0.35	1517	10.39	Sesquiterpene
Methyleugenol	21.53	1412	0.03	0.02	1937	34.83	Phenylpropanoid
Aromadendrene	21.72	1414	0.97	[44.34]	1536	11.12*	Sesquiterpene
<i>trans</i> - α -Bergamotene	21.87	1416	0.13	[44.34]	1536	11.12*	Sesquiterpene
Seychellene	22.36	1422	0.13	[44.34]	1536	11.12*	Sesquiterpene

<i>cis</i> -Muurolo-3,5-diene	22.69	1426	0.10	0.10	1548	11.59	Sesquiterpene
<i>cis</i> -Cadina-1(6),4-diene	22.87	1428	0.03	[0.29]	1560	12.03*	Sesquiterpene
α -Humulene	23.11	1431	0.08	0.08	1599	13.68	Sesquiterpene
allo-Aromadendrene	23.36	1434	0.55	0.53	1557	11.93	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	24.76	1451	0.32	0.36	1580	12.80	Sesquiterpene
α -Amorphene	25.74	1463	0.09	0.08	1615	14.57	Sesquiterpene
β -Selinene	25.93	1465	0.09	0.09	1618	14.75	Sesquiterpene
Viridiflorene	26.15	1468	1.09	0.95	1608	14.18	Sesquiterpene
Bicyclogermacrene	26.58*	1473	1.00	0.87	1636	15.65*	Sesquiterpene
α -Selinene	26.58*	1473	[1.00]	0.14	1639	15.80	Sesquiterpene
α -Muurolole	27.33	1482	0.18	[0.87]	1636	15.65*	Sesquiterpene
γ -Cadinene	28.38	1494	0.03	0.28	1664	17.13*	Sesquiterpene
δ -Cadinene	29.08*	1504	1.28	1.19	1670	17.46	Sesquiterpene
<i>trans</i> -Calamenene	29.08*	1504	[1.28]	0.10	1727	21.11	Sesquiterpene
Zonarene	29.23	1506	0.26	[0.28]	1664	17.13*	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	30.18	1519	0.19	0.19	1686	18.34	Sesquiterpene
α -Elemol	32.92	1557	0.14	0.11	1996	37.46	Sesquiterp. alcohol
Spathulenol	33.89	1570	0.11	0.13	2018	38.17	Sesquiterp. alcohol
Globulol	34.24	1575	0.46	0.47	1967	36.23	Sesquiterp. alcohol
Viridiflorol	34.73	1582	0.30	0.25	1974	36.55	Sesquiterp. alcohol
Copaborneol?	34.89	1584	0.19	0.19	2007	37.82	Sesquiterp. alcohol
Rosifoliol	35.52	1593	0.12	0.13	1945	35.20	Sesquiterp. alcohol
1,10-diepi-Cubenol	36.33	1610	0.20	0.23	1951	35.48*	Sesquiterp. alcohol
1-epi-Cubenol	36.51	1615	0.28	0.27	1954	35.62	Sesquiterp. alcohol
Cubenol	37.11	1629	0.13	[0.23]	1951	35.48*	Sesquiterp. alcohol
τ -Cadinol	37.40	1636	0.02	0.01	2078	40.06	Sesquiterp. alcohol
τ -Muurolole	37.57	1640	0.04	0.03	2084	40.24	Sesquiterp. alcohol
α -Muurolole	37.69	1643	0.06	0.05	2099	40.69	Sesquiterp. alcohol
α -Cadinol	38.00	1651	0.03	0.02	2113	41.06	Sesquiterp. alcohol
Total identified			98.77%	99.15%			

*: 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 : Clear liquid

Refractive index : 1.4770 ± 0.0003 (20 °C)

COMPLIANCE WITH ISO 4730:2005 (OIL OF MELALEUCA, TERPINEN-4-OL TYPE (TEA TREE OIL))

Compound	Prescribed content		Observed %	Complies?
	Min. %	Max. %		
α-Pinene	1	6	2.2	Yes
Sabinene	tr	3.5	0.2	Yes
α-Terpinene	5	13	8.9	Yes
Limonene	0.5	1.5	0.6	Yes
para-Cymene	0.5	8	2.4	Yes
1,8-Cineole	tr	15	1.8	Yes
γ-Terpinene	10	28	19.1	Yes
Terpinolene	1.5	5	3.3	Yes
Terpinen-4-ol	30	48	42.7	Yes
α-Terpineol	1.5	8	3.2	Yes
Aromadendrene	tr	3	1.0	Yes
Viridiflorene	tr	3	1.1	Yes
δ-Cadinene	tr	3	1.2	Yes
Globulol	tr	1	0.5	Yes
Viridiflorol	tr	1	0.3	Yes
Refractive index	1.475	1.482	1.4770	Yes

CONCLUSION

No adulterant, contaminant or diluent were detected using this method. This oil complies with the ISO norm.



