

**Date :** December 21, 2016

*SAMPLE IDENTIFICATION*

**Internal code :** 16L15-GUR5-1-DM

**Customer identification :** Tea Tree (Australian) - Lot #10332511

**Type :** Essential oil

**Source :** *Melaleuca alternifolia*

**Customer :** HealthLand 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 :** 2016-12-19

Checked and approved by :

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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.	
Ethanol	0.33	497	0.18	0.17	785	0.50	Aliphatic alcohol
<i>cis</i> -Hex-3-en-1-ol	2.53	867	0.05	0.04	1310	4.46	Aliphatic alcohol
$\alpha$ -Thujene	3.29	920	0.85	1.12	955	0.90	Monoterpene
$\alpha$ -Pinene	3.39	927	2.42	2.14	949	0.87	Monoterpene
Camphene	3.68*	944	0.01	0.01	998	1.08	Monoterpene
$\alpha$ -Fenchene	3.68*	944	[0.01]	tr	987	1.03	Monoterpene
Sabinene	4.11	970	0.18	0.17	1055	1.50	Monoterpene
$\beta$ -Pinene	4.17	974	0.72	0.69	1039	1.37	Monoterpene
Myrcene	4.46	991	0.86	0.88	1115	1.98	Monoterpene
$\alpha$ -Phellandrene	4.73	1007	0.38	0.31	1110	1.93	Monoterpene
$\alpha$ -Terpinene	4.94	1019	8.69	8.69	1125	2.10	Monoterpene
<i>para</i> -Cymene	5.14	1029	3.12	3.15	1207	3.05*	Monoterpene
Limonene	5.16	1031	0.68	5.67	1145	2.33*	Monoterpene
1,8-Cineole	5.21	1033	4.64	[5.67]	1145	2.33*	Monoterp. ether
<i>cis</i> - $\beta$ -Ocimene	5.33	1040	0.01	19.10	1194	2.91*	Monoterpene
<i>trans</i> - $\beta$ -Ocimene	5.51	1050	0.02	[3.15]	1207	3.05*	Monoterpene
$\gamma$ -Terpinene	5.75	1063	19.09	[19.10]	1194	2.91*	Monoterpene
<i>cis</i> -Sabinene hydrate	6.07	1080	0.04	0.04	1395	5.69	Monoterp. alcohol
Terpinolene	6.19	1087	3.34	3.49	1225	3.29	Monoterpene
<i>para</i> -Cymenene	6.41	1098	0.05	0.05	1364	5.23	Monoterpene
Linalool	6.72*	1110	0.12	0.41	1484	7.24*	Monoterp. alcohol
<i>cis</i> - <i>para</i> -Menth-2-en-1-ol	7.24	1129	0.27	[0.41]	1484	7.24*	Monoterp. alcohol
<i>trans</i> - <i>para</i> -Menth-2-en-1-ol	7.78	1149	0.10	0.11	1564	9.21	Monoterp. alcohol
Unknown (m/z = 109, 124 (39), 119 (35), 43 (35), 91 (31)...) )	7.84	1151	0.11				
Terpinen-4-ol	9.04	1196	40.95	41.82	1532	8.24*	Monoterp. alcohol
$\alpha$ -Terpineol	9.59	1209	3.21	3.17	1619	10.86*	Monoterp. alcohol
<i>trans</i> -Piperitol	10.05	1219	0.14	0.17	1658	12.52	Monoterp. alcohol
Piperitone	11.77	1258	0.03	[3.17]	1619	10.86*	Monoterp. ketone
$\alpha$ -Cubebene	15.88	1332	0.05	0.05	1400	5.76	Sesquiterpene
$\alpha$ -Ylangene	17.17	1352	0.05	0.06	1430	6.24	Sesquiterpene
$\alpha$ -Copaene	17.60	1358	0.14	0.09	1449	6.59	Sesquiterpene
$\beta$ -Elemene	18.85	1378	0.02	[41.82]	1532	8.24*	Sesquiterpene
$\alpha$ -Gurjunene	19.55	1388	0.30	0.21	1477	7.11	Sesquiterpene
$\beta$ -Caryophyllene	20.49	1401	0.34	[41.82]	1532	8.24*	Sesquiterpene
Aromadendrene	21.89*	1418	0.94	0.99	1543	8.61	Sesquiterpene
Methyleugenol	21.89*	1418	[0.94]	0.12	1915	27.16	Phenylpropanoid
<i>trans</i> - $\alpha$ -Bergamotene	22.04	1420	0.13	[41.82]	1532	8.24*	Sesquiterpene
Seychellene	22.31	1423	0.04	0.71	1548	8.75*	Sesquiterpene
<i>cis</i> -Muurola-3,5-diene	22.55	1426	0.11	[0.71]	1548	8.75*	Sesquiterpene

<i>cis</i> -Cadina-1(6),4-diene	22.87	1430	0.09	[0.71]	1548	8.75*	Sesquiterpene
$\alpha$ -Humulene	23.30	1435	0.08	0.07	1582	9.79	Sesquiterpene
allo-Aromadendrene	23.54	1438	0.51	0.50	1572	9.45	Sesquiterpene
<i>trans</i> -Cadina-1(6),4-diene	24.95	1455	0.25	0.36	1592	10.06	Sesquiterpene
$\alpha$ -Amorphene	25.95	1467	0.09	0.10	1601	10.32	Sesquiterpene
$\beta$ -Selinene	26.14	1470	0.08	[3.17]	1619	10.86*	Sesquiterpene
Viridiflorene	26.36	1471	1.00	0.94	1628	11.17	Sesquiterpene
Bicyclgermacrene	26.78*	1476	0.68	0.49	1650	12.14	Sesquiterpene
$\alpha$ -Selinene	26.78*	1476	[0.68]	0.21	1637	11.54	Sesquiterpene
$\alpha$ -Muurolene	27.55	1486	0.16	0.13	1655	12.37	Sesquiterpene
$\gamma$ -Cadinene	28.61	1499	0.03	0.04	1664	12.74	Sesquiterpene
Zonarene	29.31*	1509	1.06	1.00	1682	13.56*	Sesquiterpene
$\delta$ -Cadinene	29.31*	1509	[1.06]	0.18	1677	13.32	Sesquiterpene
<i>trans</i> -Calamenene	29.46	1511	0.22	0.09	1741	16.29	Sesquiterpene
<i>trans</i> -Cadina-1,4-diene	29.68	1514	0.12	[1.00]	1682	13.56*	Sesquiterpene
$\alpha$ -Cadinene	30.42	1524	0.17	0.12	1702	14.41	Sesquiterpene
$\alpha$ -Elemol	33.11	1560	0.10	0.11	2005	32.65	Sesquiterp. alcohol
Globulol	34.40	1578	0.37	0.32	1971	30.71	Sesquiterp. alcohol
Viridiflorol	34.89	1585	0.23	0.14	1980	31.26	Sesquiterp. alcohol
Guaiol	35.03	1587	0.16	0.16	2014	33.24	Sesquiterp. alcohol
1,10-diepi-Cubenol	36.47	1616	0.16	0.17	1952	29.59	Sesquiterp. alcohol
1-epi-Cubenol	36.64	1620	0.21	0.21	1956	29.84	Sesquiterp. alcohol
Cubenol	37.14	1632	0.06	0.07	1948	29.35	Sesquiterp. alcohol
$\tau$ -Cadinol	37.25	1635	0.09	0.06	2078	36.13	Sesquiterp. alcohol
$\tau$ -Muurolol	37.53	1642	0.01	0.01	2094	36.71	Sesquiterp. alcohol
$\alpha$ -Muurolol	37.70	1646	0.03	0.02	2117	37.46	Sesquiterp. alcohol
Linalool	6.72*	1110	[0.12]	[0.41]	1484	7.24*	Monoterp. alcohol
<b>Total identified</b>			<b>98.23%</b>	<b>99.13%</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 :** Clear liquid

**Refractive index :** 1.4755 ± 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	2.4	Yes
Sabinene	tr	3.5	0.2	Yes
α-Terpinene	5	13	8.7	Yes
Limonene	0.5	1.5	0.7	Yes
para-Cymene	0.5	8	3.1	Yes
1,8-Cineole	tr	15	4.6	Yes
γ-Terpinene	10	28	19.1	Yes
Terpinolene	1.5	5	3.3	Yes
Terpinen-4-ol	30	48	41.0	Yes
α-Terpineol	1.5	8	3.2	Yes
Aromadendrene	tr	3	0.9	Yes
Viridiflorene	tr	3	1.0	Yes
δ-Cadinene	tr	3	0.2	Yes
Globulol	tr	1	0.4	Yes
Viridiflorol	tr	1	0.2	Yes
<b>Refractive index</b>	1.475	1.482	1.4755	Yes

### CONCLUSION

No adulterant, contaminant or diluent were detected using this method. The oil complies with the ISO norm for tea tree oil.



