

GC/MS BATCH NUMBER: R10102

ESSENTIAL OIL: RAVENSARA
BOTANICAL NAME: RAVENSARA AROMATICA
ORIGIN: MADAGASCAR

KEY CONSTITUENTS PRESENT IN THIS BATCH OF RAVENSARA OIL	%
LIMONENE	16.7
SABINENE	15.5
GERMACRENE D	7.9
Δ^3 -CARENE	6.0
α -PINENE	5.6
β -CARYOPHYLLENE	4.5
MYRCENE	4.3
LINALOOL	3.5
SABINENE	3.2
α -PHELLANDRENE	2.9
TERPINEN-4-OL	2.4
METHYLEUGENOL	2.1
β -PHELLANDRENE	2.0
CAMPHENE	1.5
γ -TERPINENE	1.3
α -TERPINENE	1.3
<i>cis</i> - β -OCIMENE	1.1
δ -CADINENE	1.1

α -COPAENE	1.1
α -HUMULENE	1.1
α -THUJENE	1.0
1,8-CINEOLE	1.0
ESTRAGOLE (METHYL CHAVICOL)	1.0

Comments from Robert Tisserand: A good quality Ravensara leaf oil. This complex essential oil from Madagascar is not dominated by any single constituent.

Date : November 6, 2015

SAMPLE IDENTIFICATION

Internal code : 15J30-PTH3-1-HM

Customer identification : Ravensara - Madagascar - R10102

Type : Essential oil

Source : *Ravensara aromatica*

Customer : Plant Therapy

ANALYSIS

Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

Analyst : Alexis St-Gelais, M. Sc.

Analysis date : 2015-11-01

IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Tricyclene	2.60	913	0.03	0.02	964	0.97	Monoterpene
α -Thujene	2.70	919	1.02	1.07	997	1.12	Monoterpene
α -Pinene	2.80	925	5.62	5.64	988	1.08	Monoterpene
Camphene	3.05*	941	1.61	1.51	1025	1.35	Monoterpene
α -Fenchene	3.05*	941	[1.61]	0.08	1018	1.29	Monoterpene
Sabinene	3.50	970	15.50	15.75	1088	1.91	Monoterpene
β -Pinene	3.53	972	3.21	3.09	1065	1.71	Monoterpene
Myrcene	3.82	991	4.34	4.35	1136	2.47	Monoterpene
2-Carene	4.00	1002	0.03	0.03	1095	1.98	Monoterpene
Δ 3-Carene	4.07*	1006	8.66	5.95	1113	2.18	Monoterpene
α -Phellandrene	4.07*	1006	[8.66]	2.86	1128	2.36	Monoterpene
α -Terpinene	4.23	1015	1.27	1.30	1141	2.53	Monoterpene
meta-Cymene	4.34	1021	0.18	0.76	1228	3.68*	Monoterpene
Limonene	4.50*	1030	19.07	16.72	1163	2.80	Monoterpene
β -Phellandrene	4.50*	1030	[19.07]	2.99	1167	2.86*	Monoterpene
para-Cymene	4.50*	1030	[19.07]	[0.76]	1228	3.68*	Monoterpene
1,8-Cineole	4.52	1031	1.00	[2.99]	1167	2.86*	Monoterp. ether
<i>cis</i> - β -Ocimene	4.65	1039	1.13	2.46	1208	3.38*	Monoterpene
<i>trans</i> - β -Ocimene	4.82	1048	0.16	0.17	1221	3.57	Monoterpene
γ -Terpinene	4.98	1058	1.31	[2.46]	1208	3.38*	Monoterpene
<i>cis</i> -Sabinene hydrate	5.31	1076	0.24	0.26	1422	6.68*	Monoterp. alcohol
Isoterpinolene	5.35	1079	0.03	0.09	1236	3.80	Monoterpene
Terpinolene	5.43	1083	0.57	0.57	1241	3.86	Monoterpene
Linalool	5.93*	1109	3.57	3.49	1516	8.83*	Monoterp. alcohol
<i>trans</i> -Sabinene hydrate	5.93*	1109	[3.57]	0.21	1503	8.40	Monoterp. alcohol
<i>cis</i> -para-Menth-2-en-1-ol	6.28	1125	0.12	[3.49]	1516	8.83*	Monoterp. alcohol
<i>trans</i> -para-Menth-2-en-1-ol	6.68	1144	0.06	0.09	1576	10.76	Monoterp. alcohol
Borneol	7.37	1175	0.25	0.36	1641	13.49*	Monoterp. alcohol
Terpinen-4-ol	7.53	1183	2.36	2.33	1546	9.79	Monoterp. alcohol
Methylchavicol	8.08*	1205	1.23	0.86	1607	11.91	Phenylpropanoid
α -Terpineol	8.08*	1205	[1.23]	0.11	1643	13.62	Monoterp. alcohol
Piperitone	9.89	1253	0.01	[0.36]	1641	13.49*	Monoterp. ketone
Bornyl acetate	10.79	1278	0.39	0.43	1521	8.98	Monoterp. ester
Dihydroedulan I	10.89	1281	0.09	0.08	1459	7.44	
Bicycloelemene	12.56	1317	0.02				Sesquiterpene
δ -Elemene	12.75	1320	0.56	0.53	1430	6.84	Sesquiterpene
α -Cubebene	13.29	1329	0.28	0.27	1419	6.61	Sesquiterpene
α -Terpinyl acetate	13.93	1341	0.17	0.13	1637	13.33	Monoterp. ester
α -Ylangene	14.31	1347	0.05	[0.26]	1422	6.68*	Monoterp. ester
α -Copaene	14.72	1354	1.11	1.02	1442	7.10	Sesquiterpene
β -Bourbonene	15.05*	1360	0.07	0.06	1465	7.58	Sesquiterpene

Eugenol	15.05*	1360	[0.07]	0.03	2089	38.66*	Phenylpropanoid
β -Cubebene	15.58	1369	0.46	0.49	1492	8.12	Sesquiterpene
β -Elemene	15.83	1374	0.55	0.58	1537	9.50	Sesquiterpene
β -Caryophyllene	17.24	1399	4.54	4.31	1533	9.39	Sesquiterpene
Methyleugenol	18.46	1415	2.11	2.09	1962	33.34	Phenylpropanoid
α -Humulene	19.66	1431	1.05	1.12	1599	11.52	Sesquiterpene
allo-Aromadendrene	19.86	1433	0.49	0.45	1573	10.69	Sesquiterpene
Germacrene D	21.81*	1459	7.97	7.94	1635	13.23	Sesquiterpene
γ -Muurolene	21.81*	1459	[7.97]	0.29	1622	12.61	Sesquiterpene
β -Selinene	22.36	1466	0.16	[0.36]	1641	13.49*	Sesquiterpene
Bicyclgermacrene	22.76	1472	0.36	0.26	1652	14.05	Sesquiterpene
4-epi-Cubebol	23.47	1481	0.15	0.15	1815	23.62	Sesquiterp. alcohol
γ -Cadinene	24.45	1494	0.17	0.18	1681	15.39	Sesquiterpene
δ -Cadinene	25.10*	1502	1.21	1.11	1688	15.74	Sesquiterpene
<i>trans</i> -Calamenene	25.10*	1502	[1.21]	0.05	1747	19.22	Sesquiterpene
Methyl (<i>E</i>)-isoeugenol	25.91	1512	0.13	0.15	2123	39.69	Phenylpropanoid
<i>trans</i> -Cadina-1,4-diene	26.12	1514	0.08	0.08	1704	16.53	Sesquiterpene
Germacrene B	27.51	1531	0.17	0.19	1731	18.23	Sesquiterpene
α -Elemol	28.48	1542	0.74	0.80	2009	35.86	Sesquiterp. alcohol
Caryophyllene oxide	29.75	1558	0.07	0.08	1859	26.78	Sesquiterp. ether
Elemicin	30.38	1565	0.34	0.42	2169	40.95	Phenylpropanoid
Guaiol	32.20	1587	0.09	0.09	2015	36.10	Sesquiterp. alcohol
γ -Eudesmol	34.39	1622	0.12	0.13	2082	38.42	Sesquiterp. alcohol
τ -Cadinol	35.00	1635	0.05	[0.03]	2089	38.66*	Sesquiterp. alcohol
τ -Muurolol	35.13	1638	0.10	0.07	2100	39.05	Sesquiterp. alcohol
α -Muurolol	35.37	1643	0.34	0.17	2115	39.48	Sesquiterp. alcohol
α -Cadinol	35.66	1649	0.24	0.18	2144	40.26	Sesquiterp. alcohol
Unknown not seen in MS	36.16	1659	0.34	0.35	2173	41.07	
Total identified			97.35%	97.40%			

*: 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 : Fainly yellow liquid

Refractive index : 1.4810 ± 0.0003 (20 °C)

CONCLUSION

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

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

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