

GC/MS BATCH NUMBER: CA3101

ESSENTIAL OIL: CARDAMOM
BOTANICAL NAME: Elettaria cardamomum
ORIGIN: GUATEMALA

KEY CONSTITUENTS PRESENT IN THIS BATCH OF CARDAMOM OIL	%
α -TERPINYL ACETATE	39.2
1,8-CINEOLE	28.8
LINALYL ACETATE	5.4
SABINENE	5.2
LINALOOL	4.1
MYRCENE	2.5
LIMONENE	2.1
α -TERPINEOL	1.8
α -PINENE	1.8
GERANIOL	1.1
(E)-NEROLIDOL	1.0
TERPINEN-4-OL	0.7

Comments from Robert Tisserand: Excellent vibrant odor. All 11 key constituents conform to the ISO standard for Guatemalan Cardamom oil, with two being very slightly marginal.

Date : June 9, 2016

SAMPLE IDENTIFICATION

Internal code : 16E26-PTH4-1-SM

Customer identification : Cardamom - Guatemala - CA3101510

Type : Essential oil

Source : *Elettaria cardamomum*

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 : 2016-06-08

Checked and approved by :

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	803	0.02	0.01	1016	1.23	Aliphatic aldehyde
α -Thujene	3.24	922	0.24	0.48	959	0.94	Monoterpene
α -Pinene	3.35	929	1.76	1.54	951	0.91	Monoterpene
Camphene	3.63*	946	0.03	0.02	1005	1.14	Monoterpene
α -Fenchene	3.63*	946	[0.03]	0.01	995	1.09	Monoterpene
Sabinene	4.06	972	5.21	5.29	1062	1.59	Monoterpene
β -Pinene	4.12	975	0.43	0.40	1043	1.43	Monoterpene
Myrcene	4.40	992	2.47	2.42	1119	2.08	Monoterpene
6-Methyl-5-hepten-2-one	4.46	997	0.02	0.02	1279	4.11	Aliphatic ketone
Octanal	4.77	1014	0.18	0.17	1235	3.50	Aliphatic aldehyde
α -Terpinene	4.85	1018	0.12	0.12	1125	2.16	Monoterpene
para-Cymene	5.10*	1032	2.22	0.10	1212	3.18	Monoterpene
Limonene	5.10*	1032	[2.22]	29.97	1155	2.51*	Monoterpene
1,8-Cineole	5.19	1037	28.77	[29.97]	1155	2.51*	Monoterp. ether
<i>trans</i> - β -Ocimene	5.43	1051	0.06	0.05	1207	3.11	Monoterpene
γ -Terpinene	5.61	1061	0.26	0.28	1192	2.94	Monoterpene
<i>cis</i> -Linalool oxide (fur.)	5.81	1072	0.02	0.01	1395	5.77	Monoterp. alcohol
<i>cis</i> -Sabinene hydrate	5.91	1077	0.49	1.12	1412	6.02	Monoterp. alcohol
Terpinolene	6.08	1087	0.10	0.10	1227	3.39	Monoterpene
6,7-Epoxyterpinene	6.31	1100	0.05	0.05	1354	5.18	Monoterp. ether
Linalool	6.54	1109	4.05	3.90	1500	7.70	Monoterp. alcohol
<i>cis</i> -para-Menth-2-en-1-ol	7.03	1127	0.03	5.55	1507	7.83*	Monoterp. alcohol
Camphor	7.51	1145	0.01	tr	1426	6.29	Monoterp. ketone
Borneol	8.33	1176	0.11	1.70	1631	11.70*	Monoterp. alcohol
Terpinen-4-ol	8.53	1183	0.69	0.71	1533	8.52*	Monoterp. alcohol
α -Terpineol	9.15	1205	1.82	[1.70]	1631	11.70*	Monoterp. alcohol
Decanal	9.55	1214	0.05	0.04	1442	6.59	Aliphatic aldehyde
γ -Terpineol	9.64	1216	0.61	40.08	1629	11.63*	Monoterp. alcohol
Neral	10.84	1243	0.40	0.52	1602	10.65*	Monoterp. aldehyde
Linalyl acetate	11.19	1251	5.44	[5.55]	1507	7.83*	Monoterp. ester
Geraniol	11.46	1257	1.14	1.13	1783	19.49	Monoterp. alcohol
Geranial	12.29	1276	0.58	0.57	1651	12.66	Monoterp. aldehyde
δ -Terpinyl acetate	14.21	1313	0.12	0.13	1573	9.74	Monoterp. ester
<i>trans</i> - β -Terpinyl acetate	15.05	1327	0.04	[0.52]	1602	10.65*	Monoterp. ester
α -Terpinyl acetate	16.57*	1351	39.16	[40.08]	1629	11.63*	Monoterp. ester
γ -Terpinyl acetate	16.57*	1351	[39.16]				Monoterp. ester
β -Elemene	18.48	1380	0.05	[0.71]	1533	8.52*	Sesquiterpene
Geranyl acetate	18.90*	1386	0.59	0.58	1693	14.52	Monoterp. ester
Longifolene	18.90*	1386	[0.59]	0.30	1485	7.41	Sesquiterpene
β -Selinene	25.57	1471	0.16	[40.08]	1629	11.63*	Sesquiterpene
α -Selinene	26.19	1478	0.05	0.05	1639	12.07	Sesquiterpene

γ -Cadinene	27.98	1500	0.08	0.05	1672	13.57	Sesquiterpene
(E)-Nerolidol	33.29	1572	1.00	1.01	1993	33.08	Sesquiterp. alcohol
(2E,6E)-Farnesol	40.30	1722	0.17	0.21	2288	42.75	Sesquiterp. alcohol
(2E,6E)-Farnesyl acetate	43.89	1841	0.05	0.09	2195	40.44	Sesquiterp. ester
Total identified			98.85%	98.78%			

*: 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 : 1.4623 ± 0.0003 (20 °C)

CONCLUSION

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



