

Analysis Cinnamon Bark Essential Oil

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SAMPLE IDENTIFICATION

Internal code : 16L05-FSE7-1-DM

Customer identification : Cinnamon CO2 - Lot#7318

Type : Essential oil

Source : *Cinnamomum zeylanicum*

Customer : Flowers Shining Everywhere Inc.



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., chimiste

Analysis date : 2016-12-08



Checked and approved by :

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



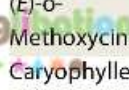
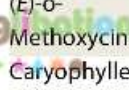
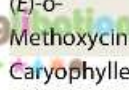
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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Acetic acid	0.60	593	0.04	0.03	1372	5.36*	Aliphatic acid
Styrene	2.87	894	0.01	0.31	1205	3.03*	Phenylpropanoid
α -Thujene	3.27	919	0.04	0.06	955	0.90	Monoterpene
α -Pinene	3.37	925	0.12	0.10	949	0.87	Monoterpene
Camphene	3.66	943	0.05	0.05	1000	1.09	Monoterpene
Sabinene	4.09	969	0.02	0.01	1057	1.51	Monoterpene
β -Pinene	4.15	972	0.06	0.06	1040	1.37	Monoterpene
Benzaldehyde	4.20	976	0.05	0.05	1424	6.13	Simple phenolic
6-Methyl-5-hepten-2-one	4.52	995	0.01	tr	1269	3.89	Aliphatic ketone
α -Phellandrene	4.70	1005	0.25	0.23	1110	1.93*	Monoterpene
Δ^3 -Carene	4.83	1012	0.01	0.01	1091	1.77	Monoterpene
α -Terpinene	4.89	1016	0.15	0.15	1123	2.08	Monoterpene
meta-Cymene	4.99	1021	tr	[0.23]	1110	1.93*	Monoterpene
para-Cymene	5.09	1027	0.31	[0.31]	1205	3.03*	Monoterpene
Limonene	5.12	1028	0.16	0.16	1141	2.29	Monoterpene
β -Phellandrene	5.15	1030	0.80	0.86	1147	2.35*	Monoterpene
1,8-Cineole	5.18	1031	0.07	[0.86]	1147	2.35*	Monoterp. ether
cis- β -Ocimene	5.30	1038	0.02	0.01	1178	2.71	Monoterpene
trans- β -Ocimene	5.48	1049	tr	[0.31]	1205	3.03*	Monoterpene
γ -Terpinene	5.67	1059	0.02	0.03	1188	2.83	Monoterpene
cis-Linalool oxide (fur.)	6.03	1078	0.01	[0.03]	1372	5.36*	Monoterp. alcohol
Terpinolene	6.14	1084	0.03	0.02	1224	3.28	Monoterpene
trans-Linalool oxide (fur.)	6.28	1092	0.01	0.01	1401	5.77	Monoterp. alcohol
trans-Sabinene hydrate	6.56	1104	0.01				Monoterp. alcohol
Linalool	6.69*	1109	1.11	1.16	1484	7.25*	Monoterp. alcohol
2-Methylbutyl 2-methylbutyrate	6.69*	1109	[1.11]	0.01	1235	3.43	Aliphatic ester
cis-para-Menth-2-en-1-ol	7.19	1127	0.03	[1.16]	1484	7.25*	Monoterp. alcohol
Camphor	7.72*	1147	0.04	0.01	1419	6.03	Monoterp. ketone
trans-para-Menth-2-en-1-ol	7.72*	1147	[0.04]	0.03	1548	8.76	Monoterp. alcohol
Hydrocinnamaldehyde	8.44	1174	0.21				Phenylpropanoid
Borneol	8.63	1181	0.03	0.02	1607	10.53*	Monoterp. alcohol
Terpinen-4-ol	8.74	1185	0.14	0.14	1525	8.06	Monoterp. alcohol
para-Cymen-8-ol	9.10*	1198	0.01	0.04	1762	17.47*	Monoterp. alcohol
Cryptone	9.10*	1198	[0.01]	0.01	1559	9.05	Monoterp. ketone
α -Terpineol	9.43	1205	0.28	0.24	1619	10.85	Monoterp. alcohol
α -Phellandrene epoxide	9.74	1212	0.04	0.03	1709	14.68	Monoterpene
trans-Piperitol	9.95	1217	0.02	0.02	1681	13.52	Monoterp. alcohol
(Z)-Cinnamaldehyde	10.48	1229	0.04	[0.04]	1762	17.47*	Phenylpropanoid
Hydrocinnamyl alcohol	11.30	1247	0.05				Phenylpropanoid
(E)-Cinnamaldehyde	13.92	1302	63.75	66.03	1906	26.57*	Phenylpropanoid

Safrole	14.22	1307	0.01	0.02	1756	17.15	Phenylpropanoid
(E)-Cinnamyl alcohol	15.84	1331	0.70	0.80	2156	38.76	Phenylpropanoid
Unknown (m/z = 111, 126 (90), 43 (86), 71 (50), 109 (32)...) 	16.46	1341	0.07	0.05	2100	36.88	
α-Copaene	17.51	1357	0.36	0.35	1448	6.57	Sesquiterpene
Eugenol	17.88	1363	2.11	2.16	2045	34.98	Phenylpropanoid
β-Elemene	18.65*	1375	0.07	2.83	1534	8.31*	Sesquiterpene
Hydrocinnamyl acetate	18.65*	1375	[0.07]				Phenylpropanoid
β-Caryophyllene	20.46	1401	2.88	[2.83]	1534	8.31*	Sesquiterpene
α-Humulene	23.18 	1434	0.46	0.47	1592	10.06	Sesquiterpene
(E)-Cinnamyl acetate	25.13	1457	3.22	3.29	2033	34.33	Phenylpropanoid ester
Viridiflorene	26.19	1470	0.02	[0.02]	1607	10.53*	Sesquiterpene
α-Curcumene	26.39	1472	0.06	0.07	1701	14.36	Sesquiterpene
δ-Cadinene	28.80	1502	0.07	0.04	1684	13.62	Sesquiterpene
(E)-o-Methoxycinnamaldehyde	32.44	1551	1.70	1.73	2295	42.24	Phenylpropanoid
Caryophyllene oxide	33.66*	1568	0.50	0.38	1854	23.01	Sesquiterp. ether
Caryophyllenyl alcohol	33.66*	1568	[0.50]				Sesquiterp. alcohol
Humulene epoxide II	35.34	1591	0.06	[66.03]	1906	26.57*	Sesquiterp. ether
Methoxyeugenol	36.44	1615	0.39	0.40	2432	45.17	Phenylpropanoid
Tetradecanal	36.71	1622	0.07 				Alkane
14-Hydroxy-β-caryophyllene?	38.81	1673	0.05	0.02	2249	41.17	Sesquiterpene
(E)-o-Methoxycinnamyl acetate	39.49	1688	0.11	0.11	2401	44.52	Phenylpropanoid ester
Benzyl benzoate	42.28	1774	1.63	1.65	2477	46.06	Phenolic ester
Palmitic acid	48.46	2007	1.10	1.46	2870	53.02	Fatty acid
Linoleic acid	52.19	2171	0.81	0.64	3112	56.82	Fatty acid
Oleic acid	52.32	2177	0.67				Fatty acid
γ-Sitosterone	74.28	3411	2.95				Sterol
Total identified			88.00%	86.31%			

*: 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 : Bright yellow liquid

Refractive index : 1.5813 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent were detected using this method. The unidentified fraction of the sample corresponds to heavy compounds not usually present in cinnamon essential oils, which are extracted by CO2 and not well characterized in MS databases.

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Report prepared for
Flowers Shining Everywhere Inc.

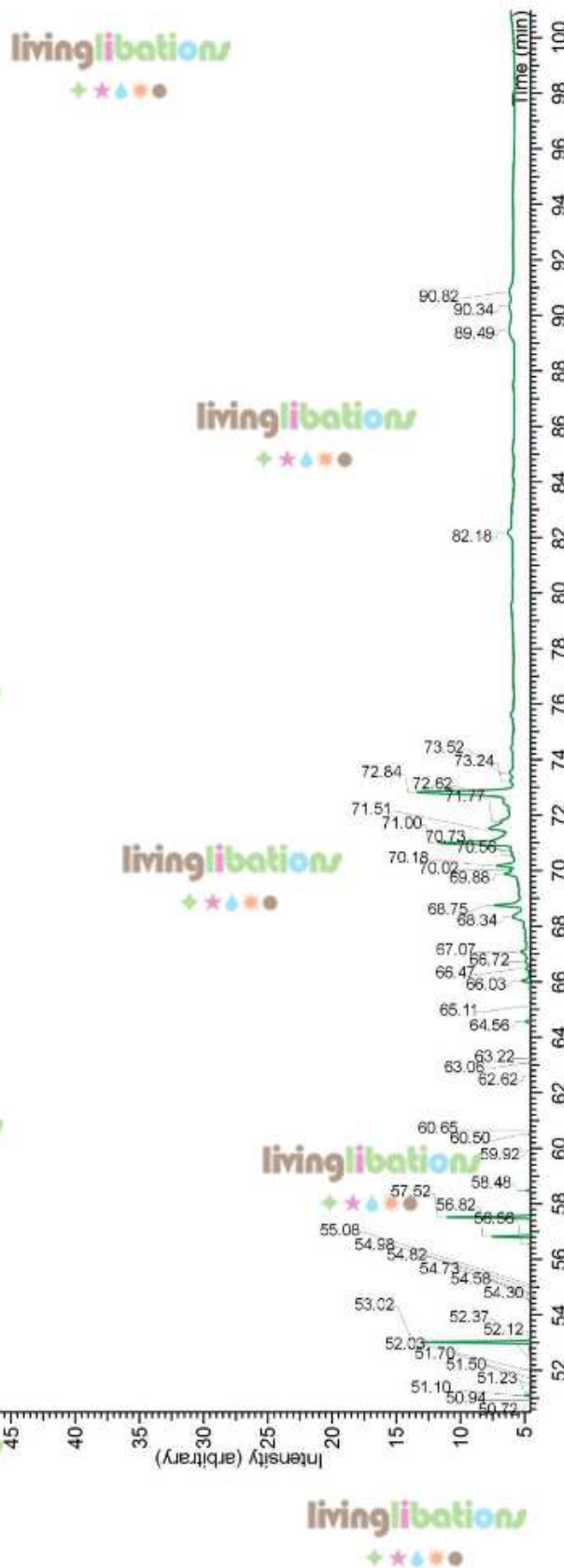
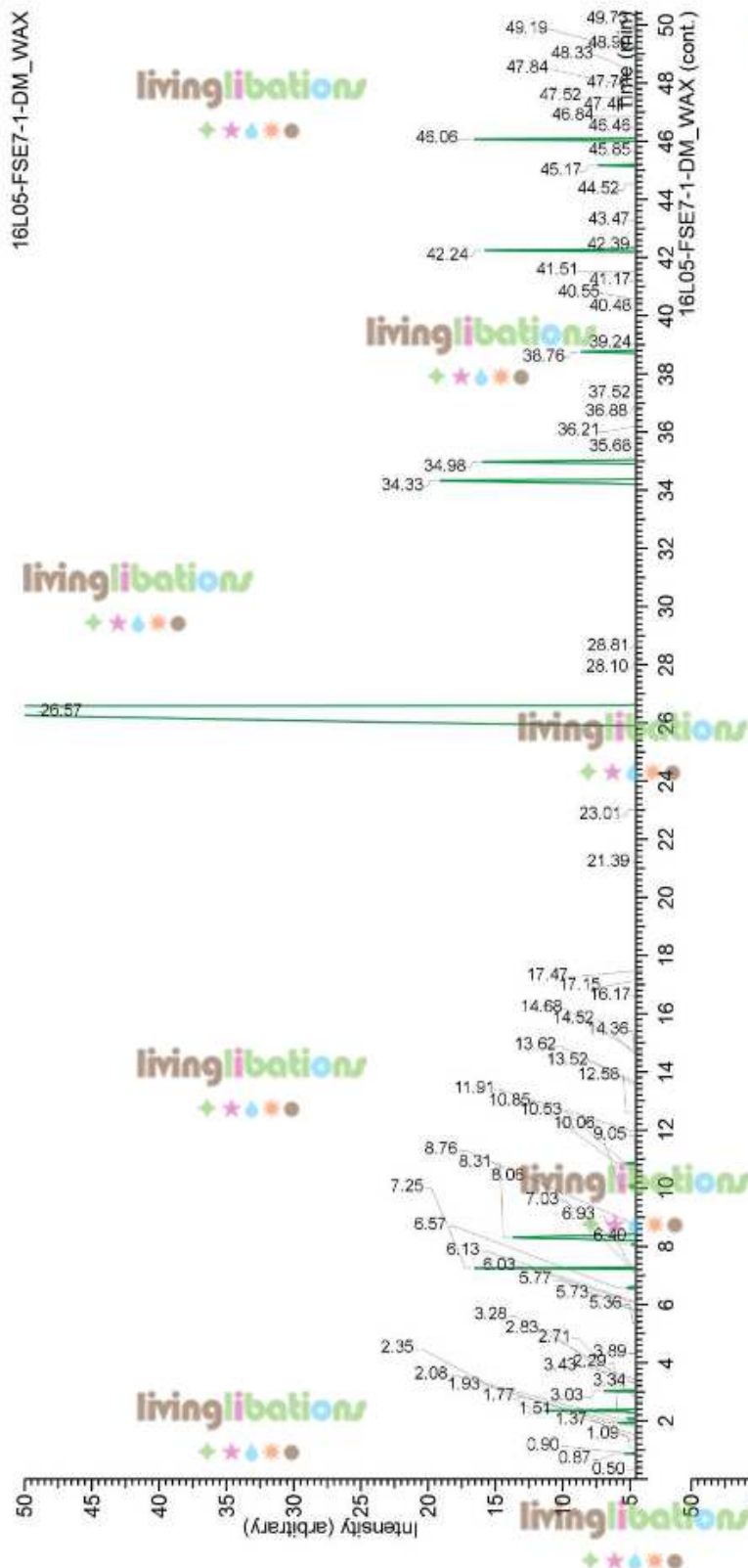


Essential oil, *Cinnamomum zeylanicum*
Internal Code: 16L05-FSE7-1-DM

Customer Identification:
Cinnamon CO2 - Lot#7318

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16L05-FSE7-1-DM_WAX



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