GC-MS Profiling Analysis
Prepared for Jade Bloom, Inc

Date: March 28, 2018
Sample: Cassia
Type: Essential Oil
Source: *Cinnamomum cassia*
Batch: 20171222

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Hexanal	0.01	0.01	Aliphatic aldehyde
Furfural	tr	tr	Aliphatic alcohol
(2*E*)-Hexenal	tr	tr	Aliphatic aldehyde
Ethylbenzene	tr	tr	Simple phenolic
Styrene	0.18	0.19*	Simple phenolic
α-Thujene	tr	tr	Monoterpene
α-Pinene	0.06	0.06	Monoterpene
Camphene	0.03	0.03	Monoterpene
Benzaldehyde	0.97	0.98	Simple phenolic
β-Pinene	0.03*	0.02	Monoterpene
Sabinene	[0.03]*	tr	Monoterpene
6-Methyl-5-hepten-2-one	0.01	0.01	Aliphatic ketone
Benzofuran	0.01*		Simple phenolic
Myrcene	[0.01]*	tr	Monoterpene
Octanal	0.01	0.01	Aliphatic aldehyde
Δ3-Carene	0.01	tr	Monoterpene
para-Cymene	0.04	0.04	Monoterpene
Limonene	0.04*	0.02	Monoterpene
1,8-Cineole	[0.04]*	0.01*	Monoterpenic ether
β-Phellandrene	[0.04]*	[0.01]*	Monoterpene
(*Z*)-β-Ocimene	0.29*	[0.19]*	Monoterpene
Salicylaldehyde	[0.29]*	0.27	Simple phenolic
Benzyl alcohol	[0.29]*	0.01	Simple phenolic
(*E*)-β-Ocimene	tr	tr	Monoterpene
γ-Terpinene	tr	[0.19]*	Monoterpene
Acetophenone	0.04	0.03	Simple phenolic
Terpinolene	tr	tr	Monoterpene
ortho-Guaiacol	0.02	0.02	Simple phenolic
Linalool	0.01	0.01	Monoterpenic alcohol
Nonanal	0.01	0.01	Aliphatic aldehyde
Phenylethyl alcohol	0.34	0.37	Simple phenolic
ortho-Vinylanisole	0.02	0.04	Simple phenolic
trans-Pinocarveol	0.01	0.01	Monoterpenic alcohol
2-Methylbenzofuran	0.03	0.01	Phenylpropanoid
Unknown	0.01	0.01*	Phenylpropanoid
Hydrocinnamal	0.62	0.72*	Phenylpropanoid
Borneol	0.08	0.08	Monoterpenic alcohol
3-Methylbenzofuran?	0.04	0.04	Phenylpropanoid
Terpinen-4-ol	0.01	0.01	Monoterpenic alcohol
para-Cymen-8-ol	0.01	tr	Monoterpenic alcohol
α-Terpineol	0.04	0.03	Monoterpenic alcohol
Methyl salicylate	0.01	0.01	Phenolic ester
(*Z*)-Cinnamal	0.51	0.51	Phenylpropanoid
Hydrocinnamyl alcohol	0.08	0.01	Phenylpropanoid
ortho-Anisaldehyde	0.27	0.25*	Simple phenolic
Phenylethyl acetate	0.02	0.01	Phenolic ester
(*E*)-Cinnamal	84.26	84.51*	Phenylpropanoid
(*E*)-Cinnamyl alcohol	0.14	0.14	Phenylpropanoid

Hydrocinnamic acid	tr		Phenylpropanoid
Eugenol	0.09*	0.03	Phenylpropanoid
Cyclosativene I	[0.09]*	0.01	Sesquiterpene
α-Ylangene	0.01	0.01	Sesquiterpene
ortho-Methoxyhydrocinnamal?	0.02	0.03	Phenylpropanoid
α-Copaene	0.41	0.28	Sesquiterpene
β-Elemene	0.02	0.15*	Sesquiterpene
β-Caryophyllene	0.10	[0.15]*	Sesquiterpene
trans-α-Bergamotene	3.05*	0.01	Sesquiterpene
Coumarin	[3.05]*	2.97	Coumarin
(*E*)-Cinnamyl acetate	0.51	0.44	Phenylpropanoid ester
(*E*)-Cinnamic acid	0.33*	0.22	Phenylpropanoid
(*Z*)-ortho-Methoxycinnamal	[0.33]*	0.05	Phenylpropanoid
allo-Aromadendrene	[0.33]*	0.08	Sesquiterpene
γ-Muurolene	0.12	0.14*	Sesquiterpene
ar-Curcumene	0.08	0.06	Sesquiterpene
Viridiflorene	0.06	[0.14]*	Sesquiterpene
α-Muurolene	0.08	0.08	Sesquiterpene
(3-Phenyloxiran-2-yl)methyl acetate	0.01	0.02*	Aliphatic alcohol
β-Bisabolene	0.14	0.14	Sesquiterpene
γ-Cadinene	0.09	0.03	Sesquiterpene
trans-Calamenene	0.18*	0.01	Sesquiterpene
δ-Cadinene	[0.18]*	[0.72]*	Sesquiterpene
(*E*)-ortho-Methoxycinnamal	4.49	4.40	Phenylpropanoid
α-Calacorene	0.03	0.03	Sesquiterpene
(*E*)-Nerolidol	0.12	0.11	Sesquiterpenic alcohol
Spathulenol	0.08	0.08	Sesquiterpenic alcohol
Caryophyllene oxide	0.07*	0.07	Sesquiterpenic ether
Caryophyllene oxide isomer	[0.07]*	[0.01]*	Sesquiterpenic ether
Humulene epoxide II	0.01	[84.51]*	Sesquiterpenic ether
Tetradecanal?	0.04	[0.25]*	Aliphatic aldehyde
1-epi-Cubenol	0.02	0.11	Sesquiterpenic alcohol
Caryophylladienol II	0.02	0.02	Sesquiterpenic alcohol
τ-Cadinol	0.04	0.02	Sesquiterpenic alcohol
α-Cadinol	0.03	0.02*	Sesquiterpenic alcohol
(3*Z*)-Caryophylla-3,8(13)-dien-5β-ol	0.01	tr	Sesquiterpenic alcohol
Cadalene	0.05	0.05	Sesquiterpene
Mustakone?	0.01		Sesquiterpenic ketone
α-Bisabolol	0.03	[0.02]*	Sesquiterpenic alcohol
Benzyl benzoate	0.05	0.04	Phenolic ester
Phenylethyl benzoate	0.04	0.02	Phenolic ester
Benzyl salicylate	0.01	0.01	Phenolic ester
Dolabradiene	0.06*	0.05	Diterpene
Manoyl oxide	[0.06]*	[0.02]*	Diterpenic ether
Kaurene?	0.01		Diterpene
Phenylethyl (*E*)-cinnamate	0.03	0.01	Phenylpropanoid ester
Total identified	**98.82%**	**98.30%**	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

tr: The compound has been detected below 0.005% of total signal.

Note: no correction factor was applied

PHYSICOCHEMICAL DATA

Physical aspect: Light yellow liquid
Refractive index: 1.6098 ± 0.0003 (20 °C)

COMPLIANCE WITH ISO 3216:1997 (CASSIA – CHINA)

Compounds	China		Observed %	Satisfied?
	% min	% max		
(E)-Cinnamaldehyde	70	88	84.3	Yes
Eugenol		0.5	0.03	Yes
Coumarin	1.5	4	3.0	Yes
(E)-*o*-Methoxycinnamaldehyde	3	15	4.4	Yes
(E)-*o*-Methoxycinnamyl acetate		2	ND	Yes
Benzaldehyde	0.5	2	1.0	Yes
Acetophenone		0.1	0.03	Yes
Salicylaldehyde	0.2	1	0.3	Yes
Phenylethyl alcohol		0.5	0.3	Yes
(E)-Cinnamyl acetate		6	0.4	Yes
(E)-Cinnamyl alcohol		1	0.1	Yes
Styrene		0.15	0.18	No
Phenylethyl aldehyde		0.7	ND	Yes
(Z)-Cinnamaldehyde		0.7	0.5	Yes
Refractive index	1.600	1.614	1.6098	Yes

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil marginally does not comply with the ISO standard for cassia oil, but nevertheless corresponds to the expectations for the species.