

## GC-MS Profiling Analysis Prepared for Jade Bloom, Inc

**Date:** April 12, 2018

**Sample:** Clove Leaf

**Type:** Essential Oil

**Source:** *Syzygium aromaticum*

**Batch:** 041889419

Identification	DB-5 (%)	DB-WAX (%)	Classe
Isovaleral	0.01	tr	Aliphatic aldehyde
2-Methylbutyral	tr	tr	Aliphatic aldehyde
Toluene	tr		Simple phenolic
Hexanal	tr	tr	Aliphatic aldehyde
Furfural	0.03		Aliphatic alcohol
Benzaldehyde	tr		Simple phenolic
5-Methylfurfural	0.01	0.01	Furan
6-Methyl-5-hepten-2-one	0.01	0.01	Aliphatic ketone
Myrcene	tr		Monoterpene
Limonene	0.01	0.01	Monoterpene
(Z)- $\beta$ -Ocimene	0.01		Monoterpene
(E)- $\beta$ -Ocimene	tr		Monoterpene
Linalool	0.02	0.02	Monoterpenic alcohol
(E)-4,8-Dimethylnona-1,3,7-triene	0.01	0.01	Terpene derivative
Ethyl benzoate	tr	0.01	Phenolic ester
Methyl salicylate	0.06	0.06	Phenolic ester
Chavicol	0.07	0.08	Phenylpropanoid
$\alpha$ -Cubebene	0.01	0.01	Sesquiterpene
$\alpha$ -Copaene	80.98*	0.01	Sesquiterpene
Dihydroeugenol	[80.98]*	0.09	Phenylpropanoid
Eugenol	[80.98]*	80.99	Phenylpropanoid
$\beta$ -Bourbonene	0.01	tr	Sesquiterpene
$\beta$ -Elemene	0.02	0.01	Sesquiterpene
Vanillin	0.01		Simple phenolic
Isocaryophyllene	0.03	0.03	Sesquiterpene
Methyleugenol	0.02	0.02	Phenylpropanoid
$\beta$ -Caryophyllene	13.20	13.17	Sesquiterpene
Caryophylla-4(12),8(13)-diene	0.07	0.04	Sesquiterpene
9-epi-Isocaryophyllene	0.02	0.03	Sesquiterpene
$\alpha$ -Humulene	1.46	1.44	Sesquiterpene
allo-Aromadendrene	0.01		Sesquiterpene
$\gamma$ -Muurolene	0.01	0.01	Sesquiterpene
Germacrene D	0.01		Sesquiterpene
$\beta$ -Selinene	0.01	0.02	Sesquiterpene
$\alpha$ -Selinene	0.02	0.02	Sesquiterpene
$\alpha$ -Muurolene	0.02	0.01	Sesquiterpene
Cubebol	0.10*	0.01	Sesquiterpenic alcohol
$\gamma$ -Cadinene	[0.10]*	0.07	Sesquiterpene
$\delta$ -Cadinene	0.06*	0.03	Sesquiterpene
<i>trans</i> -Calamenene	[0.06]*	tr	Sesquiterpene
$\beta$ -Sesquiphellandrene	0.03	0.01	Sesquiterpene
Eugenyl acetate	0.98	0.98	Phenylpropanoid ester
$\alpha$ -Calacorene	0.02	0.01	Sesquiterpene
Unknown	0.13	0.07	Unknown
Unknown	0.02		Phenylpropanoid
Caryophyllenyl alcohol	0.17	0.16	Sesquiterpenic alcohol
Caryophyllene oxide	0.60*	0.48	Sesquiterpenic ether
Unknown	[0.60]*	0.06*	Oxygenated sesquiterpene

Caryophyllene oxide isomer	[0.60]*	0.06	Sesquiterpenic ether
Humulene epoxide I	0.03	0.03	Sesquiterpenic ether
Humulene epoxide II	0.09	0.08	Sesquiterpenic ether
(E)-Isoeugenyl acetate	0.06		Phenylpropanoid ester
1-epi-Cubenol	0.04	0.02	Sesquiterpenic alcohol
Caryophylladienol I	0.14	0.12	Sesquiterpenic alcohol
Caryophylladienol II	0.13	0.01	Sesquiterpenic alcohol
$\tau$ -Cadinol	0.01	[0.06]*	Sesquiterpenic alcohol
Unknown	0.02		Sesquiterpenic alcohol
14-Hydroxy-(Z)-caryophyllene	0.21	0.25	Sesquiterpenic alcohol
14-Hydroxy-(E)-caryophyllene	0.14	0.15	Sesquiterpenic alcohol
Trimethoxypropylbenzene analog	0.01		Phenylpropanoid
(E)-Coniferyl alcohol	0.02	0.02	Phenylpropanoid
(E)-4-(3-Hydroxy-1-propenyl)-2-methoxyphenyl acetate	0.03		Phenylpropanoid ester
<b>Total identified</b>	<b>99.01%</b>	<b>98.64%</b>	

\*: 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

#### PHYSICO-CHEMICAL DATA

**Physical aspect:** Light yellow liquid

**Refractive index:** 1.5320  $\pm$  0.0003 (20 °C)

COMPLIANCE WITH ISO 3142:1997 (SYZYGIUM AROMATICUM, CLOVE LEAVES)

Compound	Min. Content	Max. Content	Observed %	Complies?
<b>Eugenol</b>	80	92	81.0	Yes
<b><math>\beta</math>-Caryophyllene</b>	4	17	13.1	Yes
<b>Eugenyl acetate</b>	0.2	1	1.0	Yes
Refractive index	1.5280	1.5350	1.5320	Yes

#### CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil complies with the ISO standard for clove leaf oil.