

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

**Date:** February 23, 2018  
**Sample:** Sweet Fennel  
**Type:** Essential Oil  
**Source:** *Foeniculum vulgare*  
**Batch:** 1005814

### ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Isovaleral	tr	tr	Aliphatic aldehyde
2-Methylbutyral	tr	tr	Aliphatic aldehyde
Toluene	tr	tr	Simple phenolic
Tricyclene	0.02	0.02	Monoterpene
$\alpha$ -Thujene	0.03	0.03	Monoterpene
$\alpha$ -Pinene	6.27	6.28	Monoterpene
Camphene	0.16*	0.14	Monoterpene
$\alpha$ -Fenchene	[0.16]*	0.02	Monoterpene
$\beta$ -Pinene	0.53*	0.45	Monoterpene
Sabinene	[0.53]*	0.09	Monoterpene
Myrcene	1.00	0.99	Monoterpene
$\alpha$ -Phellandrene	2.16	2.16	Monoterpene
$\Delta$ 3-Carene	0.05	0.03	Monoterpene
$\alpha$ -Terpinene	0.04	0.04	Monoterpene
para-Cymene	0.23	0.24	Monoterpene
Limonene	5.05*	4.68	Monoterpene
1,8-Cineole	[5.05]*	0.06	Monoterpenic ether
$\beta$ -Phellandrene	[5.05]*	0.36	Monoterpene
(Z)- $\beta$ -Ocimene	0.17	0.17	Monoterpene
(E)- $\beta$ -Ocimene	0.02	0.02	Monoterpene
$\gamma$ -Terpinene	0.26	0.26	Monoterpene
cis-Sabinene hydrate	0.02	0.02	Monoterpenic alcohol
Fenchone	11.85	11.74	Aliphatic alcohol
Terpinolene	[11.85]*	0.07	Monoterpene
para-Cymenene	[11.85]*	tr	Monoterpene
Linalool	0.02	0.02	Monoterpenic alcohol
endo-Fenchol	0.01	0.01	Monoterpenic alcohol
allo-Ocimene	0.01	tr	Monoterpene
Camphor	0.22	0.22	Monoterpenic ketone
Terpinen-4-ol	0.03	0.04	Monoterpenic alcohol
$\alpha$ -Terpineol	0.02	0.01	Monoterpenic alcohol
Methylchavicol	2.34	2.35*	Phenylpropanoid
$\alpha$ -Phellandrene epoxide	0.03	0.01	Monoterpenic ether
para-Propylanisole	0.02	0.01	Phenylpropanoid
(Z)-Anethole	0.21*	0.12	Phenylpropanoid
para-Anisaldehyde	[0.21]*	0.10	Simple phenolic
(E)-Anethole	68.86	68.65	Phenylpropanoid
Unknown	0.01		Unknown
Unknown	0.01		Phenylpropanoid
para-Acetonylanisole	0.03	0.03	Phenylpropanoid
Unknown	0.01		Unknown
$\beta$ -Caryophyllene	0.02	0.03	Sesquiterpene
$\alpha$ -Humulene	0.01	[2.35]*	Sesquiterpene
<b>Total identified</b>	<b>99.67%</b>	<b>99.50%</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

PHYSICOCHEMICAL DATA

**Physical aspect:** Clear liquid

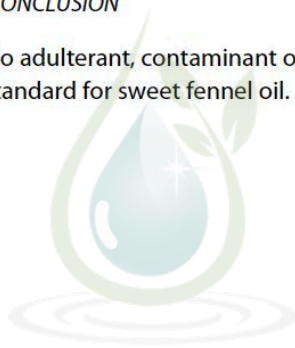
**Refractive index:**  $1.5313 \pm 0.0003$  (20 °C)

COMPLIANCE WITH NF T 75-257:2004 (SWEET FENNEL)

Compound	Min. %	Max. %	Observed %	Complies?
$\alpha$ -Pinene	1	8	6.3	Yes
$\beta$ -Pinene		1	0.5	Yes
Myrcene		1.5	1.0	Yes
$\alpha$ -Phellandrene	0.2	5	2.2	Yes
Limonene	1	8	4.7	Yes
$\gamma$ -Terpinene		1.5	0.3	Yes
Fenchone	8	20	11.7	Yes
Methylchavicol	2	6	2.3	Yes
<i>cis</i> -Anethole		0.5	0.1	Yes
<i>trans</i> -Anethole	60	80	68.7	Yes
para-Anisaldehyde		2	0.1	Yes
Refractive index	1.520	1.553	1.5313	Yes

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil complies with the AFNOR standard for sweet fennel oil.



Jade Bloom

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