

Date : March 07, 2018

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18B20-PLG36-1-CC

Customer identification : Fennel Sweet

Type : Essential oil

Source : *Foeniculum vulgare*

Customer : Plant Guru

ANALYSIS

Method: PC-PA-014-17J19 - Analysis of the composition of an essential oil, or other volatile liquid, by FAST GC-FID (in French); identifications validated by GC-MS.

Analyst : Sylvain Mercier, M. Sc., Chimiste

Analysis date : March 05, 2018

Checked and approved by :

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

Note: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.

This report is digitally signed, it is only considered valid if the digital signature is intact.

PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid

Refractive index: 1.5380 ± 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method.

ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Acetaldehyde	0.03		Aliphatic aldehyde
Isovaleral	tr		Aliphatic aldehyde
2-Methylbutyral	tr		Aliphatic aldehyde
Toluene	tr	0.02*	Simple phenolic
Tricyclene	0.02	0.02	Monoterpene
α -Thujene	tr	[0.02]*	Monoterpene
α -Pinene	7.85	7.87	Monoterpene
Camphene	0.05*	0.05	Monoterpene
α -Fenchene	[0.05]*	0.01	Monoterpene
Sabinene	0.07	0.03	Monoterpene
β -Pinene	[0.07]	0.05	Monoterpene
Myrcene	0.17	0.18	Monoterpene
α -Phellandrene	0.10	0.10	Monoterpene
Δ^3 -Carene	0.01	0.01	Monoterpene
α -Terpinene	0.01	0.01	Monoterpene
para-Cymene	0.05	0.06	Monoterpene
Limonene	7.99*	8.01	Monoterpene
1,8-Cineole	[7.99]*	0.07	Monoterpenic ether
(Z)- β -Ocimene	tr	tr	Monoterpene
(E)- β -Ocimene	0.01	tr	Monoterpene
γ -Terpinene	0.06	0.05	Monoterpene
cis-Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Fenchone	2.66	2.69	Aliphatic alcohol
Terpinolene	0.04*	0.02	Monoterpene
para-Cymenene	[0.04]*	tr	Monoterpene
α -Pinene oxide	0.01	0.01	Monoterpenic ether
Linalool	0.02	0.02	Monoterpenic alcohol
endo-Fenchol	tr	tr	Monoterpenic alcohol
Camphor	0.13	0.13	Monoterpenic ketone
Unknown	tr	tr	Oxygenated monoterpene
Terpinen-4-ol	0.01	0.02	Monoterpenic alcohol
meta-Cymen-8-ol	tr	tr	Monoterpenic alcohol
α -Terpineol	0.01	0.01	Monoterpenic alcohol
Methylchavicol	3.33*	3.35*	Phenylpropanoid
α -Phellandrene epoxide	[3.33]*	tr	Monoterpenic ether
(Z)-Anethole	0.05	0.09	Phenylpropanoid
para-Anisaldehyde	0.44	0.41	Simple phenolic
(E)-Anethole	75.83	75.68	Phenylpropanoid
Unknown	0.60	0.60	Phenylpropanoid
para-Acetonylanisole	0.03	0.03	Phenylpropanoid
Unknown	0.02		Unknown
β -Caryophyllene	0.02	0.03*	Sesquiterpene
trans- α -Bergamotene	tr	[0.03]*	Sesquiterpene
α -Humulene	0.01	[3.35]*	Sesquiterpene
Total identified	99.05%	99.03%	

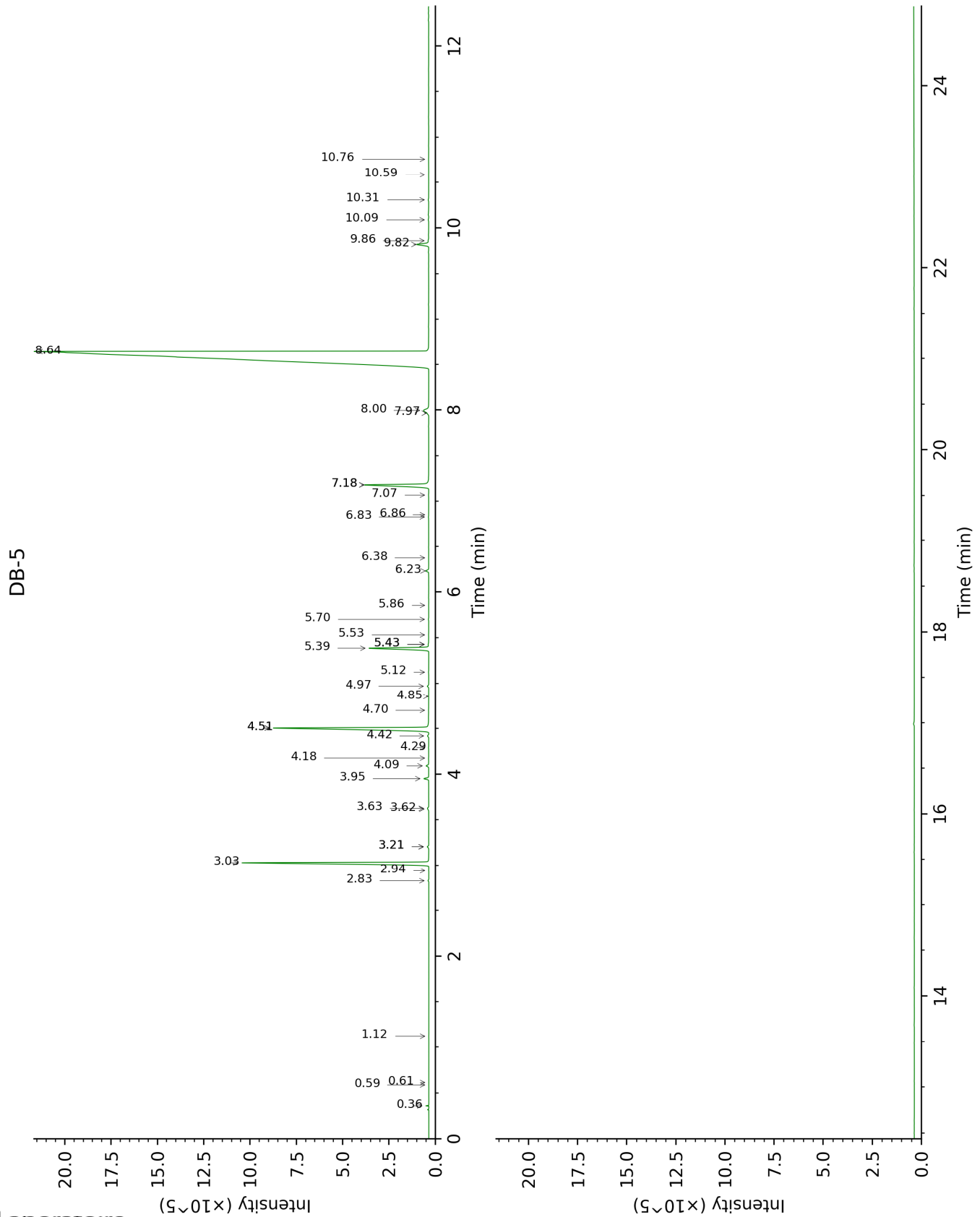
*: Two or more compounds are coeluting on this column

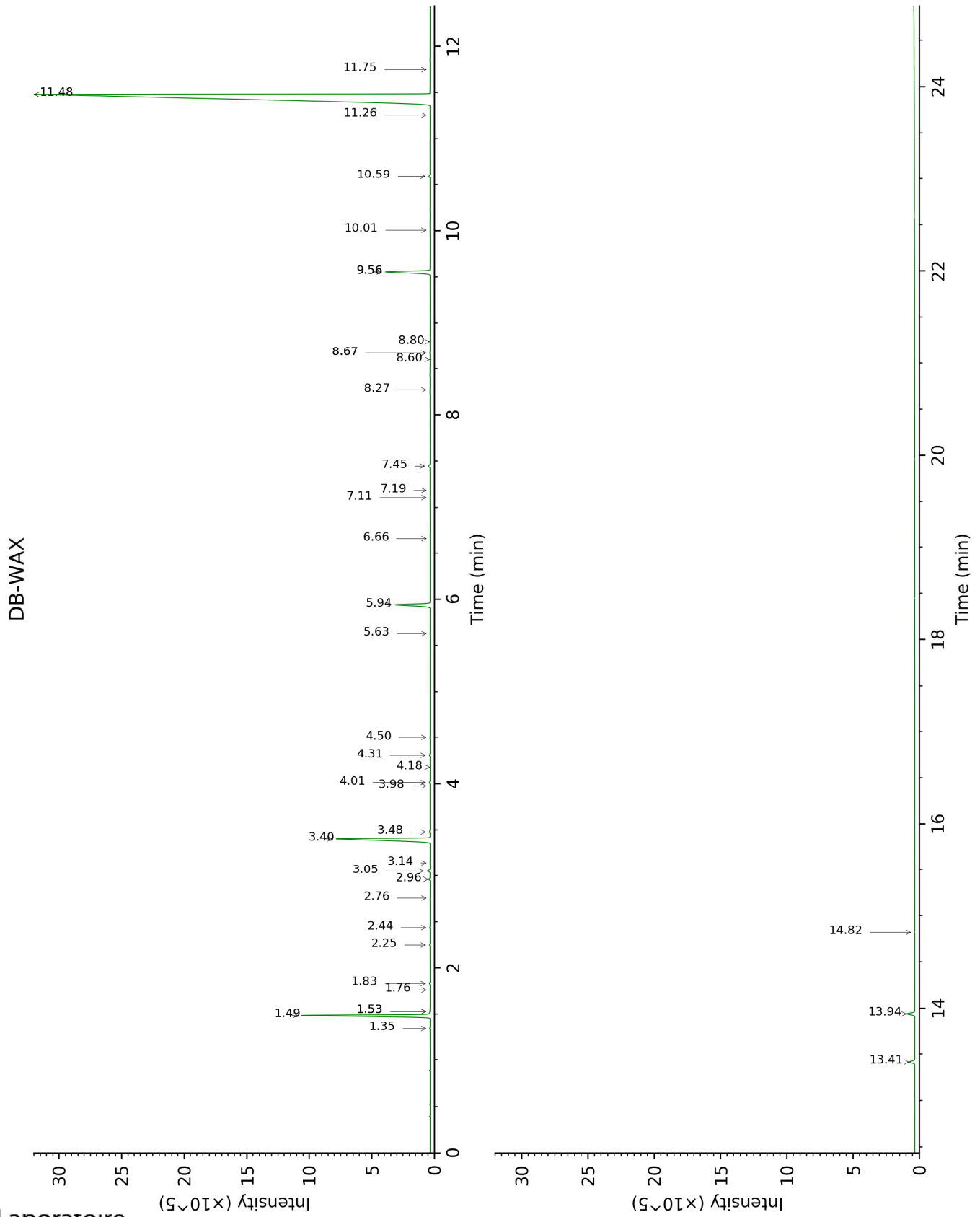
[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

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

Note: no correction factor was applied

This page was intentionally left blank. The following pages present the complete data of the analysis.





FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Acetaldehyde	0.36	495	0.03			
Isovaleral	0.59	638	tr			
2-Methylbutyral	0.61	647	tr			
Toluene	1.12	753	tr	1.53*	1001	0.02
Tricyclene	2.83	913	0.02	1.35	975	0.02
α -Thujene	2.94	920	tr	1.53*	1001	[0.02]
α -Pinene	3.03	926	7.85	1.49	997	7.87
Camphene	3.21*†	938	0.05	1.83	1030	0.05
α -Fenchene	3.21*†	938	[0.05]	1.76	1023	0.01
Sabinene	3.62†	965	0.07	2.44	1086	0.03
β -Pinene	3.63†	966	[0.07]	2.25	1069	0.05
Myrcene	3.95	988	0.17	3.05	1134	0.18
α -Phellandrene	4.09	997	0.10	2.96	1127	0.10
Δ^3 -Carene	4.18	1002	0.01	2.76	1112	0.01
α -Terpinene	4.29	1010	0.01	3.14	1141	0.01
para-Cymene	4.42	1018	0.05	4.31	1227	0.06
Limonene	4.51*	1023	7.99	3.40	1161	8.01
1,8-Cineole	4.51*	1023	[7.99]	3.48	1167	0.07
(Z)- β -Ocimene	4.70	1035	tr	3.98	1204	tr
(E)- β -Ocimene	4.85	1045	0.01	4.18	1218	tr
γ -Terpinene	4.97	1052	0.06	4.01	1206	0.05
cis-Sabinene hydrate	5.12	1062	0.01	7.11	1428	0.01
Fenchone	5.39	1078	2.66	5.94	1344	2.69
Terpinolene	5.43*	1081	0.04	4.50	1241	0.02
para-Cymenene	5.43*	1081	[0.04]	6.66	1395	tr
α -Pinene oxide	5.53	1088	0.01	5.63	1321	0.01
Linalool	5.70	1098	0.02	8.27	1514	0.02
endo-Fenchol	5.86	1108	tr	8.60	1540	tr
Camphor	6.23	1132	0.13	7.45	1453	0.13
Unknown [m/z 95, 43 (74), 109 (72), 82 (62), 110 (50)... 152 (14)]	6.38	1141	tr	7.19	1434	tr
Terpinen-4-ol	6.83	1170	0.01	8.80	1555	0.02
meta-Cymen-8-ol	6.86	1172	tr	11.75	1796	tr
α -Terpineol	7.07	1185	0.01	10.01	1650	0.01
Methylchavicol	7.18*	1192	3.33	9.56*	1614	3.35
α -Phellandrene epoxide	7.18*	1192	[3.33]	11.26	1754	tr
(Z)-Anethole	7.97	1245	0.05	10.59	1698	0.09
para-Anisaldehyde	8.00	1247	0.44	13.41	1944	0.41
(E)-Anethole	8.64	1290	75.83	11.48	1773	75.68
Unknown [121, 91 (60), 120	9.82	1372	0.60	13.94	1993	0.60

(39), 164 (37), 77 (34), 135 (26)]						
para- Acetonylanisole	9.86	1375	0.03	14.82	2078	0.03
Unknown [m/z 71, 100 (92), 111 (79), 69 (46), 109 (45)...]	10.09	1391	0.02			
β- Caryophyllene	10.31	1407	0.02	8.67*	1545	0.03
<i>trans</i> -α- Bergamotene	10.59	1428	tr	8.67*	1545	[0.03]
α-Humulene	10.76	1440	0.01	9.56*	1614	[3.35]
Total identified		99.05%			99.03%	
Total reported		99.67%			99.63%	

*: Two or more compounds are coeluting on this column

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

†: Peaks apexes were resolved, but peaks overlapped and were summed for analysis

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

Note: no correction factor was applied

R.T.: Retention time (minutes)

R.I.: Retention index