PLANT THERAPY
100% PURE ESSENTIAL OILS

GC/MS BATCH NUMBER: F10108

ESSENTIAL OIL: FENNEL SWEET
BOTANICAL NAME: FOENICULUM VULGARE
ORIGIN: HUNGARY

KEY CONSTITUENTS PRESENT IN THIS BATCH OF FENNEL SWEET OIL	%
(E)-ANETHOLE	76.4
a-PINENE	7.8
LIMONENE	7.8
METHYLCHAVICOL	3.6
FENCHONE	2.8

Comments from Robert Tisserand: Radiant, sweet-green anise-like odor quality. Constituents are in expected amounts for sweet Fennel oil.

Date : June 29, 2018

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 18F21-PTH8-1-CC
Customer identification : Fennel Sweet - Hungary - 89518
Type : Essential oil
Source : *Foeniculum vulgare*
Customer : Plant Therapy

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 : Alexis St-Gelais, M. Sc., chimiste
Analysis date : June 23, 2018

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid
Refractive index: 1.5395 ± 0.0003 (20 °C)

CONCLUSION

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

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ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Isovaleral	tr	tr	Aliphatic aldehyde
2-Methylbutyral	tr	tr	Aliphatic aldehyde
Toluene	tr	0.01*	Simple phenolic
α-Thujene	0.02	[0.01]*	Monoterpene
α-Pinene	7.83	7.79	Monoterpene
Camphene	0.09*	0.09	Monoterpene
α-Fenchene	[0.09]*	0.01	Monoterpene
β-Pinene	0.12*	0.06	Monoterpene
Sabinene	[0.12]*	0.06	Monoterpene
Myrcene	0.19	0.19	Monoterpene
α-Phellandrene	0.11	0.10	Monoterpene
Δ3-Carene	tr	tr	Monoterpene
α-Terpinene	0.01	0.01	Monoterpene
para-Cymene	0.04	0.04	Monoterpene
Limonene	7.92*	7.77	Monoterpene
1,8-Cineole	[7.92]*	0.07	Monoterpenic ether
β-Phellandrene	[7.92]*	0.05	Monoterpene
γ-Terpinene	0.08	0.09	Monoterpene
cis-Sabinene hydrate	0.01	0.01	Monoterpenic alcohol
Octanol	0.01	0.01	Aliphatic alcohol
Fenchone	2.79	2.75	Aliphatic alcohol
Terpinolene	0.05	0.05	Monoterpene
Linalool	0.01	0.01	Monoterpenic alcohol
Camphor	0.05	0.06	Monoterpenic ketone
Terpinen-4-ol	tr	0.01	Monoterpenic alcohol
para-Cymen-8-ol	0.01	0.01	Monoterpenic alcohol
α-Terpineol	0.02	0.02	Monoterpenic alcohol
Methylchavicol	3.62*	3.63	Phenylpropanoid
para-Propylanisole	[3.62]*	0.10	Phenylpropanoid
(*Z*)-Anethole	0.11	0.09	Phenylpropanoid
para-Anisaldehyde	0.18	0.10	Simple phenolic
(*E*)-Anethole	76.43	76.17	Phenylpropanoid
Unknown	0.06		Phenylpropanoid
para-Acetonylanisole	0.01	0.02	Phenylpropanoid
β-Caryophyllene	0.02	0.03	Sesquiterpene
Unknown		0.06	Phenylpropanoid
Total identified	**99.74%**	**99.37%**	

*: 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

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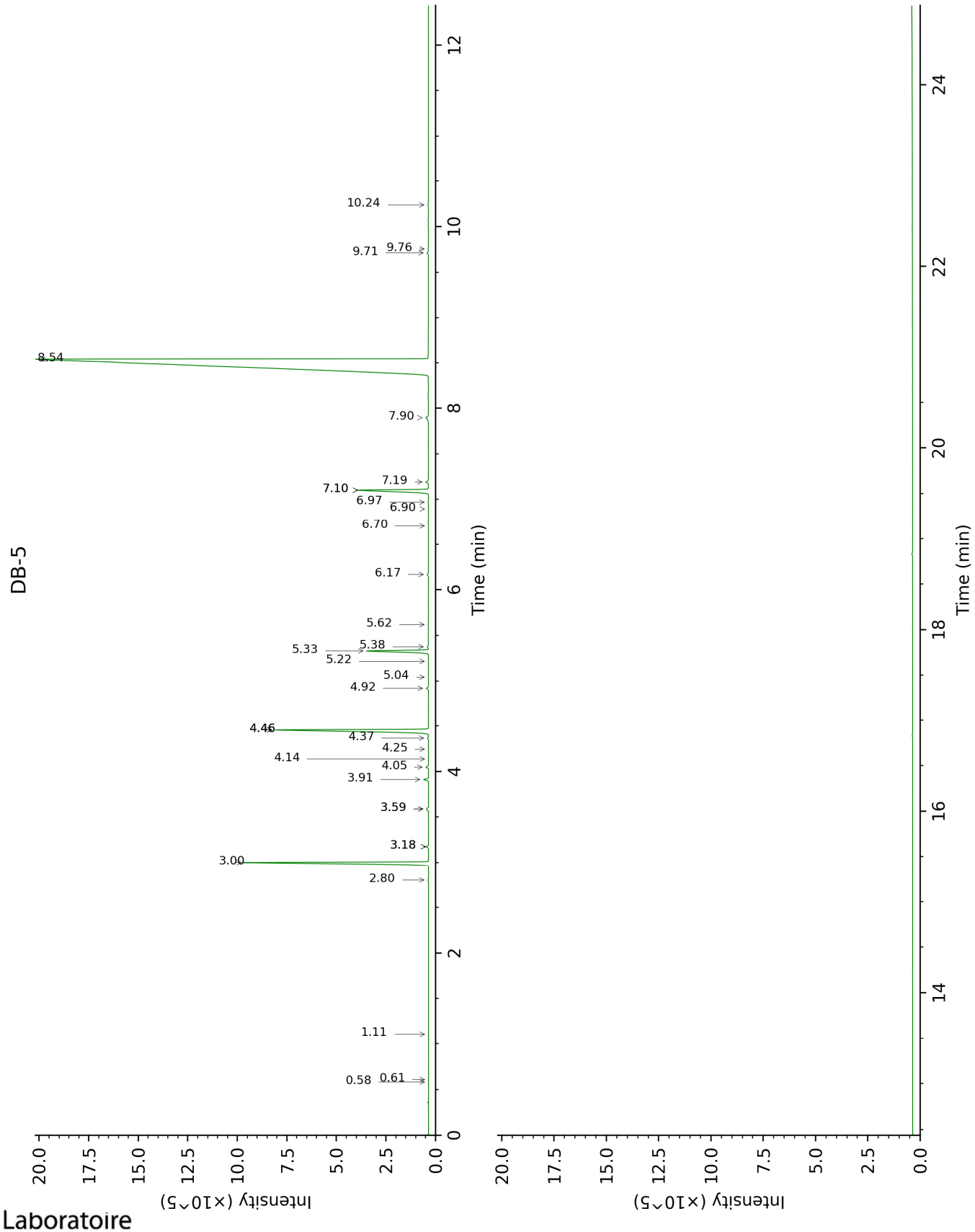
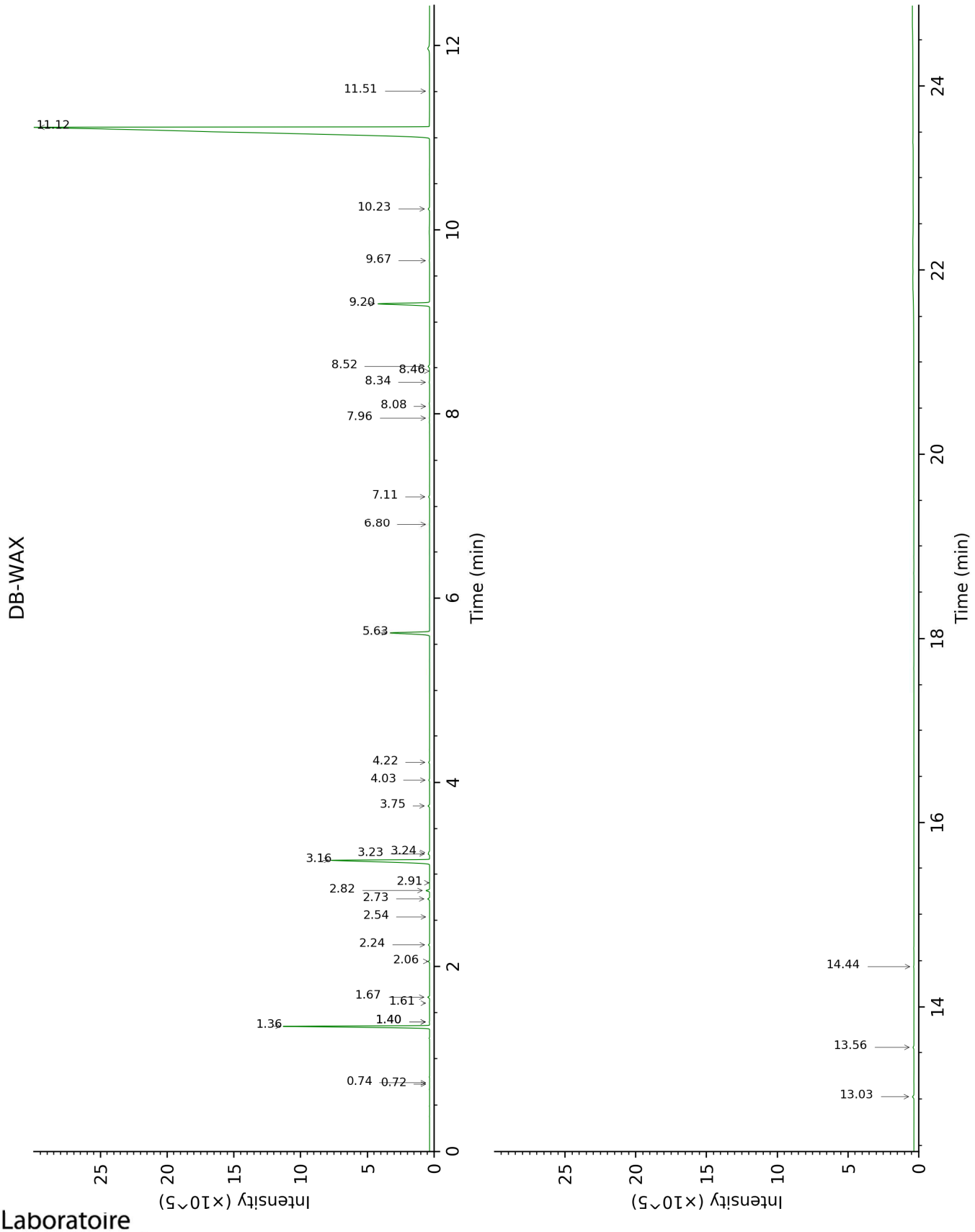

DB-5
10.24
9.71
9.76
8.54
7.90
7.19
7.10
6.97
6.90
6.70
6.17
5.62
5.33
5.38
5.22
5.04
4.92
4.46
4.37
4.25
4.14
4.05
3.91
3.59
3.18
3.00
2.80
1.11
0.58
0.61
Time (min)
Intensity (×10^5)
Time (min)
Intensity (×10^5)


DB-WAX
11.51
11.12
10.23
9.67
9.20
8.52
8.46
8.34
8.08
7.96
7.11
6.80
5.63
4.22
4.03
3.75
3.16
3.23
3.24
2.91
2.82
2.73
2.54
2.24
2.06
1.67
1.61
1.40
1.36
0.74
0.72
14.44
13.56
13.03
Time (min)
Intensity (×10^5)

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Isovaleral	0.58	640	tr	0.74	883	tr
2-Methylbutyral	0.61	650	tr	0.72	877	tr
Toluene	1.11	755	tr	1.40*	1002	0.01
α-Thujene	2.80	917	0.02	1.40*	1002	[0.01]
α-Pinene	3.00	931	7.83	1.36	995	7.79
Camphene	3.18*	942	0.09	1.67	1029	0.09
α-Fenchene	3.18*	942	[0.09]	1.61	1023	0.01
β-Pinene	3.59*	970	0.12	2.06	1067	0.06
Sabinene	3.59*	970	[0.12]	2.24	1085	0.06
Myrcene	3.91	992	0.19	2.82	1135	0.19
α-Phellandrene	4.05	1001	0.11	2.73	1128	0.10
Δ3-Carene	4.14	1007	tr	2.54	1112	tr
α-Terpinene	4.25	1014	0.01	2.91	1141	0.01
para-Cymene	4.37	1022	0.04	4.03	1226	0.04
Limonene	4.46*	1027	7.92	3.16	1161	7.77
1,8-Cineole	4.46*	1027	[7.92]	3.23	1166	0.07
β-Phellandrene	4.46*	1027	[7.92]	3.24	1167	0.05
γ-Terpinene	4.92	1057	0.08	3.75	1206	0.09
cis-Sabinene hydrate	5.04	1064	0.01	6.80	1427	0.01
Octanol	5.22	1076	0.01	8.08	1523	0.01
Fenchone	5.33	1083	2.79	5.63	1342	2.75
Terpinolene	5.38	1086	0.05	4.22	1240	0.05
Linalool	5.62	1101	0.01	7.96	1514	0.01
Camphor	6.17	1136	0.05	7.11	1450	0.06
Terpinen-4-ol	6.70	1171	tr	8.46	1553	0.01
para-Cymen-8-ol	6.90	1183	0.01	11.51	1803	0.01
α-Terpineol	6.97	1188	0.02	9.67	1649	0.02
Methylchavicol	7.10*	1196	3.62	9.20	1611	3.63
para-Propylanisole	7.10*	1196	[3.62]	8.52	1557	0.10
(*Z*)-Anethole	7.19	1202	0.11	10.23	1694	0.09
para-Anisaldehyde	7.90	1249	0.18	13.03	1940	0.10
(*E*)-Anethole	8.54	1293	76.43	11.12	1770	76.17
Unknown [121, 91 (60), 120 (39), 164 (37), 77 (34), 135 (26)]	9.71	1375	0.06			
para-Acetonylanisole	9.76	1378	0.01	14.44	2074	0.02
β-Caryophyllene	10.24	1413	0.02	8.34	1544	0.03
Unknown [121, 91 (60), 120 (39), 164 (37),				13.56	1989	0.06

77 (34), 135 (26)]		
Total identified	**99.74%**	**99.37%**
Total reported	**99.80%**	**99.43%**

*: 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
R.T.: Retention time (minutes)
R.I.: Retention index

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