Date : October 20, 2022

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 22J13-PTH03
Customer identification : Sweet Fennel - Egypt - F10112R
Type : Essential oil
Source : *Foeniculum vulgare*
Customer : Plant Therapy

Analysis

Method: PC-MAT-014 ISO - Analysis of the composition of an essential oil or other volatile liquid by FAST GC-FID (in French); identifications validated by GC-MS.
Analyst : Amélie Simard, Analyste
Analysis date : October 17, 2022

Checked and approved by :

Alexis St-Gelais, Ph. D., Chimiste 2013-174

Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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. The results only describe the samples that were submitted to the assays.

Méthode certifiée ISO 17025:2017 Certified method

Laboratoire PhytoChemia
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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid
Refractive index: 1.5357 ± 0.0003 (20 °C; method PC-MAT-016)

CONCLUSION

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

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Analysis summary – Consolidated contents

New readers of similar reports are encouraged to read table footnotes at least once.

Identification	%	Class
Toluene	tr	Simple phenolic
Hashishene	0.01	Monoterpene
Tricyclene	0.01	Monoterpene
α-Thujene	0.05	Monoterpene
α-Pinene	8.23	Monoterpene
Camphene	0.08	Monoterpene
α-Fenchene	0.02	Monoterpene
Thuja-2,4(10)-diene	0.01	Monoterpene
Sabinene	0.04	Monoterpene
β-Pinene	0.11	Monoterpene
Myrcene	0.35	Monoterpene
α-Phellandrene	0.86	Monoterpene
Pseudolimonene	0.02	Monoterpene
Δ3-Carene	0.03	Monoterpene
α-Terpinene	0.01	Monoterpene
para-Cymene	0.05	Monoterpene
Limonene	12.50	Monoterpene
1,8-Cineole	0.20	Monoterpenic ether
γ-Terpinene	0.03	Monoterpene
Octanol	0.01	Aliphatic alcohol
Fenchone	2.38	Monoterpenic ketone
Terpinolene	0.02	Monoterpene
α-Pinene oxide	0.01	Monoterpenic ether
Linalool	0.01	Monoterpenic alcohol
trans-Pinene hydrate	0.01	Monoterpenic alcohol
trans-para-Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
cis-para-Mentha-2,8-dien-1-ol	0.01	Monoterpenic alcohol
Camphor	0.11	Monoterpenic ketone
Borneol	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.04	Monoterpenic alcohol
α-Terpineol	0.02	Monoterpenic alcohol
Methylchavicol	3.28	Phenylpropanoid
cis-α-Phellandrene epoxide (iPr vs Me)	0.02	Monoterpenic ether
Dihydroanethole	0.10	Phenylpropanoid
trans-Carveol	0.01	Monoterpenic alcohol
(*Z*)-Anethole	0.11	Phenylpropanoid
para-Anisaldehyde	1.28	Simple phenolic
(*E*)-Anethole	69.26	Phenylpropanoid
para-Mentha-1,8-diene-4-hydroperoxide	0.01	Monoterpenic peroxide
(*Z*)-Anethole epoxide?	0.01	Phenylpropanoid
Unknown	0.02	Phenylpropanoid
para-Acetonylanisole	0.05	Phenylpropanoid
cis-para-Mentha-6,8-diene-2-hydroperoxide	0.01	Monoterpenic peroxide
β-Caryophyllene	0.02	Sesquiterpene
trans-α-Bergamotene	0.02	Sesquiterpene

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α-Humulene	0.01	Sesquiterpene
(*Z*)-para-Methoxycinnamaldehyde?	0.03	Phenylpropanoid
Unknown	0.01	Phenylpropanoid
Unknown	0.01	Phenylpropanoid
1-(4-Methoxyphenyl)propane-1,2-diol isomer I	0.01	Phenylpropanoid
Unknown	0.01	Phenylpropanoid
Unknown	0.01	Phenylpropanoid
Unknown	0.01	Unknown
Consolidated total	**99.56%**	

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

Note: no correction factor was applied

About "consolidated" data: The table above presents the breakdown of the sample volatile constituents after applying an algorithm to collapse data acquired from the multi-columns system of PhytoChemia into a single set of consolidated contents. In case of discrepancies between columns, the algorithm is set to prioritize data from the most standard DB-5 column, and smallest values so as to avoid overestimating individual content. This process is semi-automatic. Advanced users are invited to consult the "Full analysis data" table after the chromatograms in this report to access the full untreated data and perform their own calculations if needed.

Unknowns: Unknown compounds' mass spectral data is presented in the "Full analysis data" table. The occurrence of unknown compounds is to be expected in many samples, and does not denote particular problems unless noted otherwise in the conclusion.

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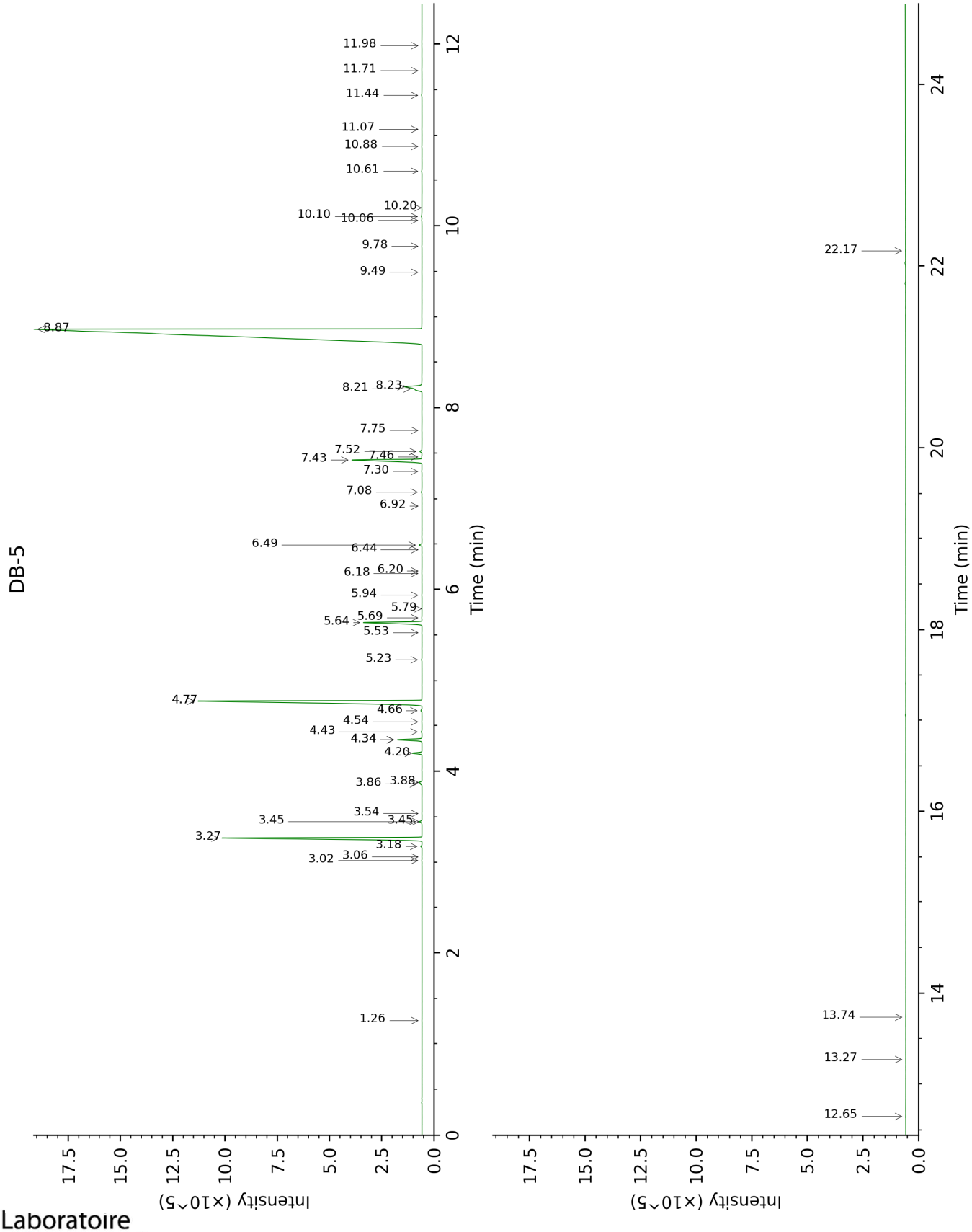
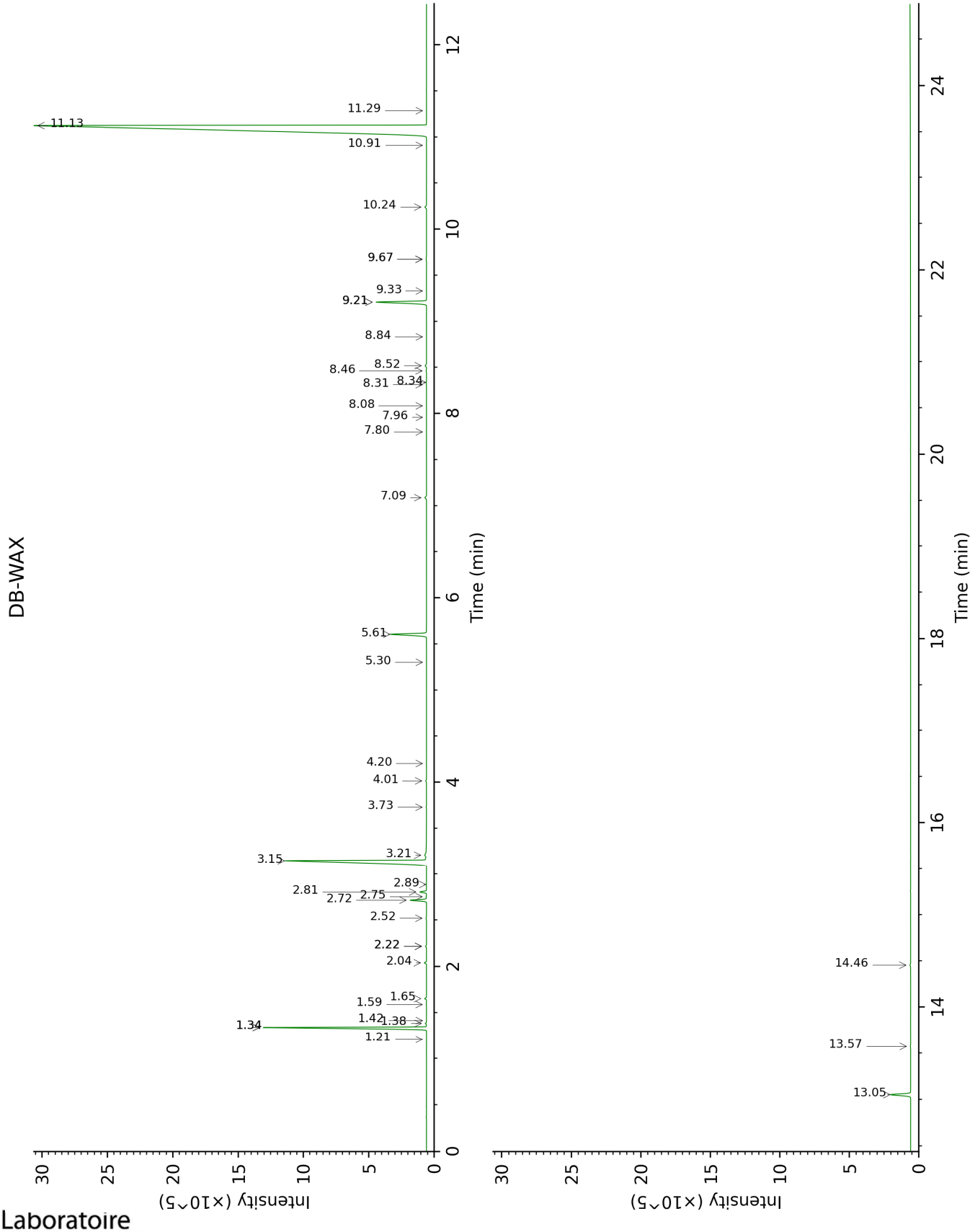

DB-5
Intensity (×10^5)
Time (min)
11.98
11.71
11.44
11.07
10.88
10.61
10.20
10.10
10.06
9.78
9.49
8.87
8.21
8.23
7.75
7.52
7.46
7.43
7.30
7.08
6.92
6.49
6.44
6.18
6.20
5.94
5.79
5.69
5.64
5.53
5.23
4.77
4.66
4.54
4.43
4.34
4.20
3.86
3.88
3.54
3.45
3.45
3.27
3.18
3.06
3.02
1.26
22.17
13.74
13.27
12.65


DB-WAX
Intensity (×10^5)
Time (min)
11.13
11.29
10.91
10.24
9.67
9.33
9.21
8.84
8.52
8.46
8.34
8.31
8.08
7.96
7.80
7.09
5.61
5.30
4.20
4.01
3.73
3.21
3.15
2.89
2.81
2.75
2.72
2.52
2.22
2.04
1.65
1.59
1.42
1.38
1.34
1.21
14.46
13.57
13.05

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Toluene	1.26	757	tr	1.42	1002	tr
Hashishene	3.02	916	0.01	1.34*	994	8.25
Tricyclene	3.06	919	0.01	1.21	972	tr
α-Thujene	3.18	926	0.05	1.38	999	0.05
α-Pinene	3.27	932	8.23	1.34*	994	[8.25]
Camphene	3.45*	944	0.10	1.65	1026	0.08
α-Fenchene	3.45*	944	[0.10]	1.59	1020	0.02
Thuja-2,4(10)-diene	3.54	950	0.01	2.22*	1083	0.05
Sabinene	3.86†	971	0.16	2.22*	1083	[0.05]
β-Pinene	3.88†	972	[0.16]	2.04	1065	0.11
Myrcene	4.20	993	0.35	2.81	1132	0.35
α-Phellandrene	4.34*	1003	0.90	2.72	1125	0.86
Pseudolimonene	4.34*	1003	[0.90]	2.75	1128	0.02
Δ3-Carene	4.43	1008	0.03	2.52	1110	0.03
α-Terpinene	4.54	1015	0.01	2.89	1139	0.01
para-Cymene	4.66	1023	0.05	4.01	1225	0.05
Limonene	4.77*	1030	12.77	3.15	1159	12.50
1,8-Cineole	4.77*	1030	[12.77]	3.21	1164	0.20
γ-Terpinene	5.23	1058	0.03	3.73	1204	0.02
Octanol	5.53	1077	0.01	8.08	1524	0.01
Fenchone	5.64	1084	2.38	5.61	1340	2.38
Terpinolene	5.69	1087	0.02	4.20	1238	0.01
α-Pinene oxide	5.79	1093	0.01	5.30	1318	tr
Linalool	5.94	1102	0.01	7.96	1515	0.01
trans-Pinene hydrate	6.18	1118	0.01	7.80	1502	0.01
trans-para-Mentha-2,8-dien-1-ol	6.20	1119	0.01	8.84	1583	0.01
cis-para-Mentha-2,8-dien-1-ol	6.44	1134	0.01	9.33	1623	0.01
Camphor	6.49	1138	0.11	7.09	1449	0.11
Borneol	6.92	1165	0.01	9.67*	1650	0.04
Terpinen-4-ol	7.08	1175	0.04	8.46	1554	0.03
α-Terpineol	7.30	1190	0.02	9.67*	1650	[0.04]
Methylchavicol	7.43	1198	3.28	9.21*	1613	3.32
cis-α-Phellandrene epoxide (iPr vs Me)	7.46	1200	0.02	10.91	1754	0.01
Dihydroanethole	7.52	1204	0.10	8.52	1558	0.09
trans-Carveol	7.75	1219	0.01	11.29	1785	0.01
(*Z*)-Anethole	8.21†	1249	1.38	10.24	1696	0.11
para-Anisaldehyde	8.23†	1251	[1.38]	13.05	1944	1.28
(*E*)-Anethole	8.87	1294	69.26	11.13	1772	69.60
para-Mentha-1,8-diene-4-hydroperoxide	9.49	1335	0.01			
(*Z*)-Anethole epoxide?	9.78	1355	0.01			
Unknown [121, 91 (60), 120 (39), 164 (37), 77 (34), 135 (26)]	10.06	1375	0.02	13.57	1991	0.02
para-Acetonylanisole	10.10	1378	0.05	14.46	2075	0.05

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cis-para-Mentha-6,8-diene-2-hydroperoxide	10.20	1385	0.01			
β-Caryophyllene	10.61	1414	0.02	8.31†	1542	0.03
trans-α-Bergamotene	10.88	1434	0.02	8.34†	1544	[0.03]
α-Humulene	11.07	1448	0.01	9.21*	1613	[3.32]
(*Z*)-para-Methoxycinnamaldehyde?	11.44	1476	0.03			
Unknown [m/z 135, 77 (22), 92 (12), 107 (10), 136 (10)... 194 (t)]	11.71	1496	0.01			
Unknown [m/z 137, 148 (14), 121 (14), 208 (13)]	11.98	1517	0.01			
1-(4-Methoxyphenyl)propane-1,2-diol isomer I	12.65	1569	0.01			
Unknown [m/z 137, 131 (46), 166 (44), 109 (26), 77 (21)...]	13.27	1619	0.01			
Unknown [m/z 137, 109 (19), 94 (13), 77 (12), 121 (11), 138 (9)...]	13.74	1657	0.01			
Unknown [m/z 165, 148 (36), 137 (21), 121 (14), 166 (11)...]	22.17	2487	0.01			
Total identified		**99.58%**			**99.73%**	
Total reported		**99.65%**			**99.75%**	

*: Two or more compounds are coeluting on this column
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated 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

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