GC/MS BATCH NUMBER: TL0103

ESSENTIAL OIL: THYME LINALOOL
BOTANICAL NAME: THYMUS VULGARIS
ORIGIN: SPAIN

KEY CONSTITUENTS PRESENT IN THIS BATCH OF THYME LINALOOL OIL	%
LINALOOL	72.9
TERPINEN-4-ol	5.5
γ-TERPINENE	3.7
MYRCENE	3.1
p-CYMENE	2.1
α-TERPINENE	1.8
α-THUJENE	1.2

Comments from Robert Tisserand: Beautiful, "sweet thyme" odor quality. Constituents are in expected amounts.

CERTIFICATE OF ANALYSIS - GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 18B13-PTH4-1-CC
Customer identification : Thyme Linalool - Spain - TL010377R
Type : Essential oil
Source : *Thymus vulgaris* ct. Linalool
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 : Sarah-Eve Tremblay, M. Sc. A., Chimiste
Analysis date : February 14, 2018

Checked and approved by :

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

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CONCLUSION

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

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ANALYSIS SUMMARY

Identification	DB-5 (%)	DB-WAX (%)	Classe
Acetone	tr		Aliphatic ketone
3-Methylbutyral	tr	tr	Aliphatic aldehyde
Methyl 2-methylbutyrate	tr	0.01*	Aliphatic ester
Hexanol	tr	tr	Aliphatic alcohol
Hashishene	0.06	0.95*	Monoterpene
Tricyclene	0.01	[0.01]*	Monoterpene
α-Thujene	1.16	1.17	Monoterpene
α-Pinene	0.88	[0.95]*	Aliphatic alcohol
Camphene	0.24	0.23	Monoterpene
Thuja-2,4(10)-diene	0.02	0.22*	Monoterpene
Sabinene	0.47*	[0.22]*	Monoterpene
β-Pinene	[0.47]*	0.26	Monoterpene
Octen-3-ol	0.02	0.02	Aliphatic alcohol
Octan-3-one	0.03	0.10*	Aliphatic ketone
Myrcene	3.14	3.11	Monoterpene
Pseudolimonene	0.31*	0.15	Monoterpene
α-Phellandrene	[0.31]*	0.15	Monoterpene
Δ3-Carene	0.02	0.01	Monoterpene
α-Terpinene	1.80	1.81	Monoterpene
para-Cymene	2.12	2.14	Monoterpene
1,8-Cineole	1.15*	0.51*	Monoterpenic ether
β-Phellandrene	[1.15]*	[0.51]*	Monoterpene
Limonene	[1.15]*	0.62	Monoterpene
(Z)-β-Ocimene	0.03	3.72*	Monoterpene
(E)-β-Ocimene	0.09	[0.10]*	Monoterpene
γ-Terpinene	3.68	[3.72]*	Monoterpene
cis-Sabinene hydrate	0.30	0.63*	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.14	0.14	Monoterpenic alcohol
Terpinolene	0.31	0.31	Monoterpene
trans-Linalool oxide (fur.)	0.33*	[0.63]*	Monoterpenic alcohol
para-Cymenene	[0.33]*	0.03	Monoterpene
trans-Sabinene hydrate	tr	0.09	Monoterpenic alcohol
Linalool	72.88	72.47*	Monoterpenic alcohol
cis-para-Menth-2-en-1-ol	0.07	[72.47]*	Monoterpenic alcohol
Camphor	0.15	0.14	Monoterpenic ketone
trans-para-Menth-2-en-1-ol	0.08	0.07	Monoterpenic alcohol
Borneol	0.95	1.92*	Monoterpenic alcohol
Terpinen-4-ol	5.47	5.45*	Monoterpenic alcohol
para-Cymen-8-ol	0.03	0.03	Monoterpenic alcohol
α-Terpineol	0.97	[1.92]*	Monoterpenic alcohol
cis-Piperitol	0.09	0.05	Monoterpenic alcohol
Verbenone	0.16	0.18	Monoterpenic ketone
Bornyl formate	0.04		Monoterpenic ester
Carvacrol methyl ether	0.03	[5.45]*	Monoterpenic ether
Linalyl acetate	0.18	0.21	Monoterpenic ester
Bornyl acetate	0.05	0.05	Monoterpenic ester
Thymol	0.91	0.91	Monoterpenic alcohol
Carvacrol	0.09	0.09	Monoterpenic alcohol

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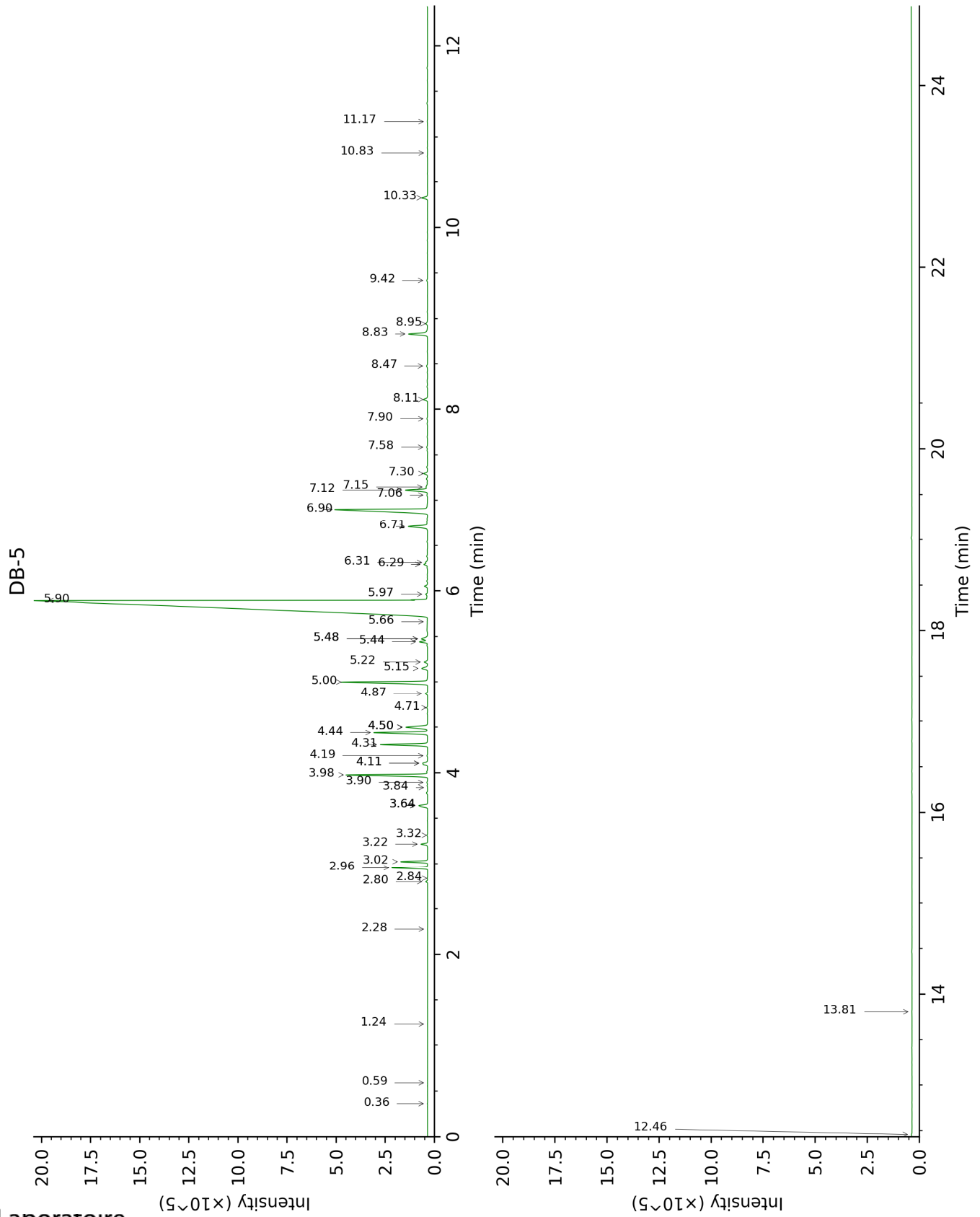|			
α-Terpinyl acetate	0.04	0.04	Monoterpenic ester
β-Caryophyllene	0.26	0.28	Sesquiterpene
α-Humulene	tr	0.02	Sesquiterpene
Germacrene D	0.01	[1.92]*	Sesquiterpene
Caryophyllene oxide	0.04	0.04	Sesquiterpenic ether
α-Bisabolol	0.01	0.01	Sesquiterpenic alcohol
Total identified	**98.85%**	**98.32%**	

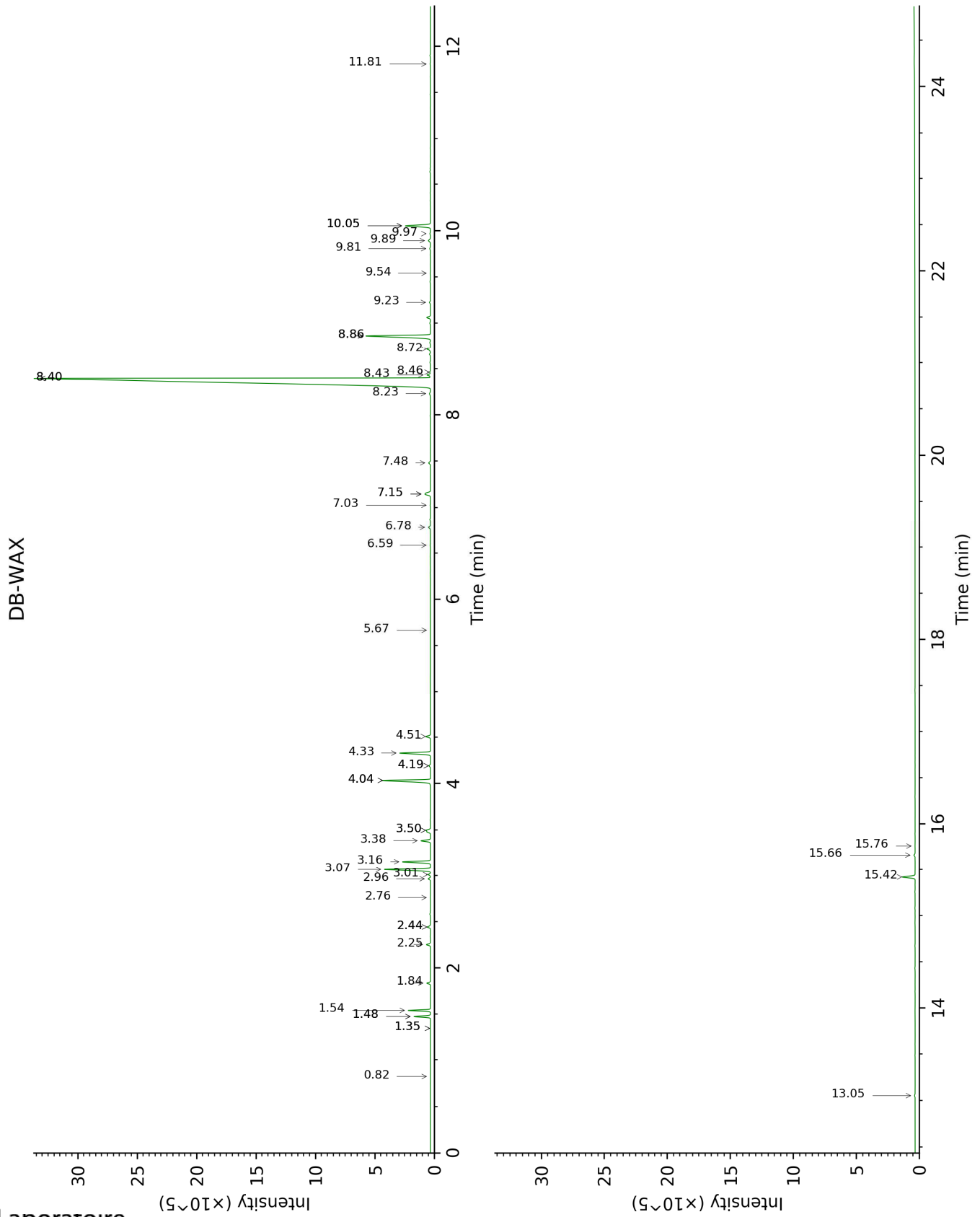*: Two or more compounds are coeluting on this column

[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

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DB-WAX

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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Acetone	0.36	495	tr			
3-Methylbutyral	0.59	639	tr	0.82	888	tr
Methyl 2-methylbutyrate	1.24	769	tr	1.35*	975	0.01
Hexanol	2.28	870	tr	5.67	1324	tr
Hashishene	2.80	911	0.06	1.48*	995	0.95
Tricyclene	2.84	914	0.01	1.35*	975	[0.01]
α-Thujene	2.96	921	1.16	1.54	1002	1.17
α-Pinene	3.02	926	0.88	1.48*	995	[0.95]
Camphene	3.22	939	0.24	1.84	1030	0.23
Thuja-2,4(10)-diene	3.32	945	0.02	2.44*	1087	0.22
Sabinene	3.64*	967	0.47	2.44*	1087	[0.22]
β-Pinene	3.64*	967	[0.47]	2.25	1069	0.26
Octen-3-ol	3.84	980	0.02	7.03	1422	0.02
Octan-3-one	3.90	984	0.03	4.19*	1219	0.10
Myrcene	3.98	989	3.14	3.07	1136	3.11
Pseudolimonene	4.11*	998	0.31	3.01	1131	0.15
α-Phellandrene	4.11*	998	[0.31]	2.96	1128	0.15
Δ3-Carene	4.19	1003	0.02	2.76	1112	0.01
α-Terpinene	4.31	1011	1.80	3.16	1142	1.81
para-Cymene	4.44	1019	2.12	4.33	1229	2.14
1,8-Cineole	4.50*	1023	1.15	3.50*	1168	0.51
β-Phellandrene	4.50*	1023	[1.15]	3.50*	1168	[0.51]
Limonene	4.50*	1023	[1.15]	3.38	1160	0.62
(*Z*)-β-Ocimene	4.72	1036	0.03	4.04*	1208	3.72
(*E*)-β-Ocimene	4.87	1046	0.09	4.19*	1219	[0.10]
γ-Terpinene	5.00	1054	3.68	4.04*	1208	[3.72]
cis-Sabinene hydrate	5.15	1064	0.30	7.15*	1431	0.63
cis-Linalool oxide (fur.)	5.22	1068	0.14	6.78	1404	0.14
Terpinolene	5.44	1082	0.31	4.51	1242	0.31
trans-Linalool oxide (fur.)	5.48*	1084	0.33	7.15*	1431	[0.63]
para-Cymenene	5.48*	1084	[0.33]	6.59	1389	0.03
trans-Sabinene hydrate	5.66	1096	tr	8.23	1511	0.09
Linalool	5.90	1110	72.88	8.40*	1524	72.47
cis-para-Menth-2-en-1-ol	5.97	1115	0.07	8.40*	1524	[72.47]
Camphor	6.29	1136	0.15	7.48	1455	0.14
trans-para-Menth-2-en-1-ol	6.31	1137	0.08	9.23	1588	0.07
Borneol	6.71	1162	0.95	10.05*	1654	1.92
Terpinen-4-ol	6.90	1175	5.47	8.86*	1560	5.45
para-Cymen-8-ol	7.06	1185	0.03	11.81	1801	0.03
α-Terpineol	7.12	1188	0.97	10.05*	1654	[1.92]

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	R.T.	R.I.	%	R.T.	R.I.	%
cis-Piperitol	7.15	1190	0.09	9.81	1634	0.05
Verbenone	7.30	1200	0.16	9.89	1641	0.18
Bornyl formate	7.58	1219	0.04			
Carvacrol methyl ether	7.90	1240	0.03	8.86*	1560	[5.45]
Linalyl acetate	8.11	1254	0.18	8.43	1527	0.21
Bornyl acetate	8.48	1278	0.05	8.46	1529	0.05
Thymol	8.83	1303	0.91	15.42	2137	0.91
Carvacrol	8.95	1311	0.09	15.66	2161	0.09
α-Terpinyl acetate	9.42	1344	0.04	9.97	1647	0.04
β-Caryophyllene	10.33	1408	0.26	8.72	1549	0.28
α-Humulene	10.83	1445	tr	9.54	1613	0.02
Germacrene D	11.17	1471	0.01	10.05*	1654	[1.92]
Caryophyllene oxide	12.46	1570	0.04	13.05	1911	0.04
α-Bisabolol	13.81	1680	0.01	15.76	2171	0.01
Total identified		**98.85%**			**98.32%**	
Total reported		**98.85%**			**98.32%**	

*: 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

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