

Date : August 08, 2019

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 19H01-PTH04-1-SCC

Customer identification : Coriander Seed - Russia - CK0106811R

Type : Essential oil

Source : *Coriandrum sativum*

Customer : Plant Therapy

ANALYSIS

Method: PC-PA-014 - 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 : August 08, 2019

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Faintly yellow liquid

Refractive index: 1.4640 ± 0.0003 (20 °C)

ISO 3516:1997 - OIL OF CORIANDER FRUITS

Compound	Min. %	Max. %	Observed %	Complies?
Geranyl acetate	1.0	3.5	2.8	Yes
Geraniol	0.5	3.0	1.3	Yes
α-Terpineol	0.5	1.5	0.3	No
Camphor	4	6	5	Yes
Linalool	65	78	72	Yes
γ-Terpinene	2	7	4	Yes
Limonene	2	5	2	Yes
Myrcene	0.5	1.5	0.9	Yes
α-Pinene	3	7	6	Yes
Refractive index	1.4620	1.4700	1.4640	Yes

CONCLUSION

No adulterant, contaminant or diluent has been detected using this method. The oil marginally does not comply with the ISO standard for oil of coriander fruits.

ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

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

Identification	%	Classe
Hexanal	tr	Aliphatic aldehyde
Hexanol	0.01	Aliphatic alcohol
Tricyclene	0.03	Monoterpene
α -Thujene	0.05	Monoterpene
α -Pinene	5.81	Monoterpene
Camphene	0.94*	Monoterpene
α -Fenchene	[0.94]*	Monoterpene
Sabinene	0.21	Monoterpene
β -Pinene	0.53	Monoterpene
6-Methyl-5-hepten-2-one	0.04	Aliphatic ketone
Myrcene	0.92	Monoterpene
6-Methyl-5-hepten-2-ol	0.08	Aliphatic alcohol
α -Phellandrene	0.02	Monoterpene
Pseudolimonene	tr	Monoterpene
Δ^3 -Carene	0.01	Monoterpene
α -Terpinene	0.07	Monoterpene
para-Cymene	1.17	Monoterpene
Limonene	2.27	Monoterpene
1,8-Cineole	0.11*	Monoterpenic ether
β -Phellandrene	[0.11]*	Monoterpene
(Z)- β -Ocimene	0.02	Monoterpene
(E)- β -Ocimene	0.02	Monoterpene
γ -Terpinene	3.92	Monoterpene
cis-Sabinene hydrate	0.06	Monoterpenic alcohol
cis-Linalool oxide (fur.)	0.15	Monoterpenic alcohol
Octanol	0.01	Aliphatic alcohol
Terpinolene	0.52	Monoterpene
trans-Linalool oxide (fur.)	0.12	Monoterpenic alcohol
Linalool	72.36	Monoterpenic alcohol
Camphor	4.61	Monoterpenic ketone
Isopulegol	0.04	Monoterpenic alcohol
Pinocarvone	0.01	Monoterpenic ketone
Citronellal	0.02	Monoterpenic aldehyde
Isoborneol	0.02	Monoterpenic alcohol
Borneol	0.15	Monoterpenic alcohol
cis-Linalool oxide (pyr.)	0.01	Monoterpenic alcohol
Terpinen-4-ol	0.11	Monoterpenic alcohol
trans-Linalool oxide (pyr.)	0.03	Monoterpenic alcohol
para-Cymen-8-ol	0.02	Monoterpenic alcohol
α -Terpineol	0.26	Monoterpenic alcohol
Myrtenol	0.02	Monoterpenic alcohol
Verbenone	0.03	Monoterpenic ketone
Decanal	0.02	Aliphatic aldehyde
Nerol	0.03	Monoterpenic alcohol
Citronellol	0.05	Monoterpenic alcohol
(Z)-Isogeraniol	0.01	Monoterpenic alcohol
Geraniol	1.29	Monoterpenic alcohol

Myrtenyl acetate	0.09	Monoterpenic ester
Citronellyl acetate	0.03	Monoterpenic ester
Neryl acetate	0.04	Monoterpenic ester
Geranyl acetate	2.85	Monoterpenic ester
<i>trans</i> -Myrtanyl acetate	0.13	Monoterpenic ester
Caryophyllene oxide	0.01	Sesquiterpenic ether
Tetradecanal?	0.04	Aliphatic aldehyde
β -Caryophyllene	0.15	Sesquiterpene
Consolidated total	99.51%	

*: Individual compounds concentration could not be found due to overlapping coelutions on columns considered
[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated total

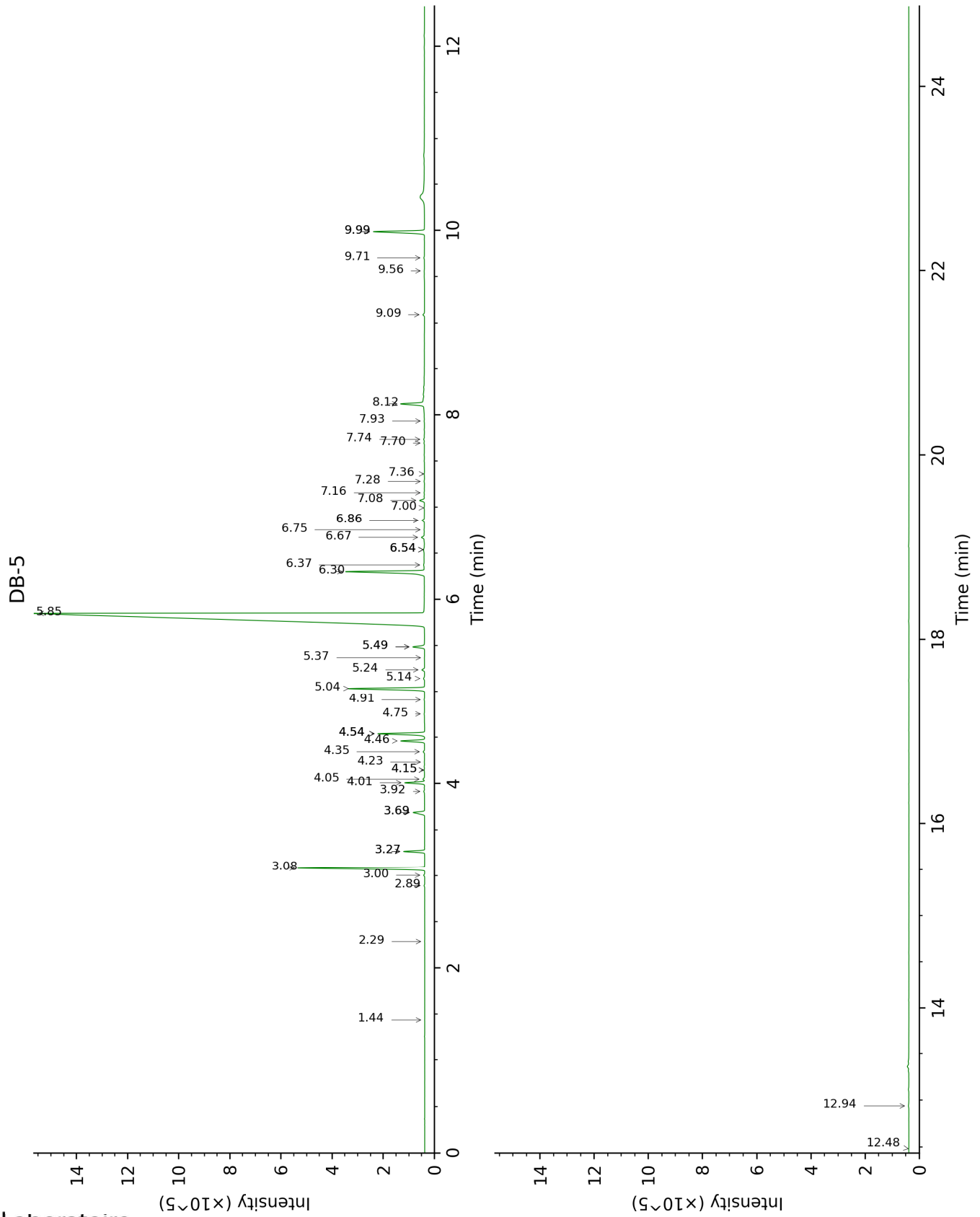
tr: The compound has been detected below 0.005% of total signal.

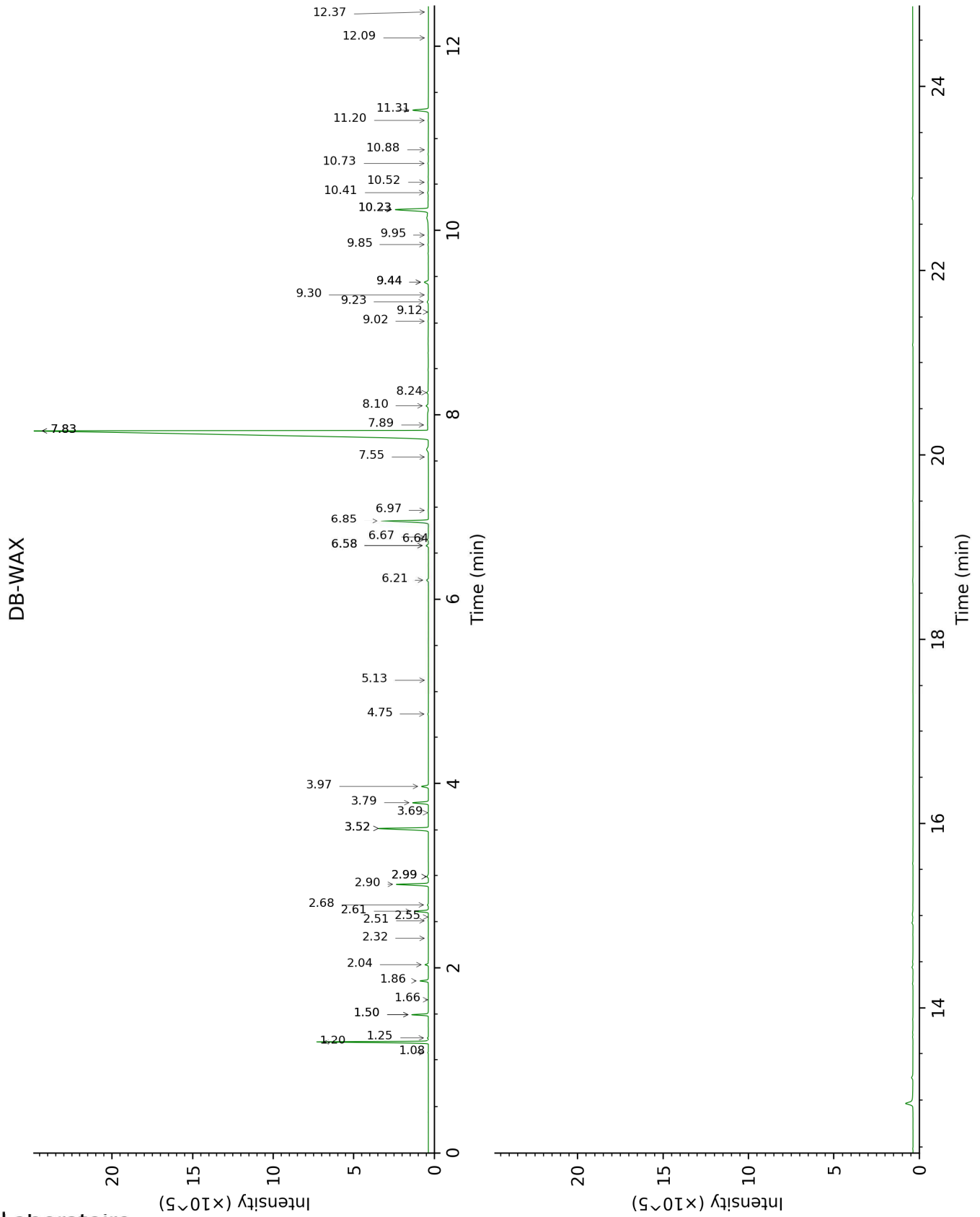
Note: no correction factor was applied

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.

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	%
Hexanal	1.44	800	tr	1.66	1043	tr
Hexanol	2.29	871	0.01	5.13	1324	0.01
Tricyclene	2.89	918	0.03	1.08	971	0.03
α -Thujene	3.00	925	0.05	1.24	1000	0.05
α -Pinene	3.08	930	5.81	1.20	992	5.92
Camphene	3.27*	942	0.94	1.50*	1026	0.95
α -Fenchene	3.27*	942	[0.94]	1.50*	1026	[0.95]
Sabinene	3.69*	970	0.72	2.04	1083	0.21
β -Pinene	3.69*	970	[0.72]	1.86	1065	0.53
6-Methyl-5-hepten-2-one	3.92	985	0.04	4.75	1300	0.04
Myrcene	4.01	991	0.92	2.61	1134	0.94
6-Methyl-5-hepten-2-ol	4.05	994	0.08	6.64	1435	0.08
α -Phellandrene	4.15*	1000	0.02	2.51	1125	0.02
Pseudolimonene	4.15*	1000	[0.02]	2.55	1128	tr
Δ 3-Carene	4.23	1006	0.01	2.32	1110	0.01
α -Terpinene	4.35	1013	0.07	2.68	1139	0.06
para-Cymene	4.46	1020	1.17	3.80	1227	1.20
Limonene	4.54*	1025	2.38	2.90	1157	2.27
1,8-Cineole	4.54*	1025	[2.38]	2.99*	1164	0.14
β -Phellandrene	4.54*	1025	[2.38]	2.99*	1164	[0.14]
(Z)- β -Ocimene	4.76	1039	0.02	3.52*	1207	3.96
(E)- β -Ocimene	4.91	1048	0.02	3.69	1219	0.03
γ -Terpinene	5.04	1056	3.92	3.52*	1207	[3.96]
cis-Sabinene hydrate	5.14	1063	0.06	6.58*	1431	0.18
cis-Linalool oxide (fur.)	5.24	1069	0.15	6.21	1403	0.15
Octanol	5.37	1077	0.01	7.89	1530	0.01
Terpinolene	5.49*	1085	0.65	3.97	1241	0.52
trans-Linalool oxide (fur.)	5.49*	1085	[0.65]	6.58*	1431	[0.18]
Linalool	5.85	1108	72.36	7.83*	1525	71.76
Camphor	6.30	1137	4.61	6.85	1451	4.39
Isopulegol	6.37	1142	0.04	7.83*	1525	[71.76]
Pinocarvone	6.54*	1153	0.06	7.55	1503	0.01
Citronellal	6.54*	1153	[0.06]	6.67	1438	0.02
Isoborneol	6.54*	1153	[0.06]	9.02	1618	0.02
Borneol	6.67	1162	0.15	9.44*	1653	0.39
cis-Linalool oxide (pyr.)	6.75	1167	0.01	9.95	1694	0.01
Terpinen-4-ol	6.86*	1174	0.13	8.24	1557	0.11
trans-Linalool oxide (pyr.)	6.86*	1174	[0.13]	10.23*	1717	2.87
para-Cymen-8-ol	7.00	1183	0.02	11.20	1800	0.02
α -Terpineol	7.08	1188	0.26	9.44*	1653	[0.39]
Myrtenol	7.16	1194	0.02	10.52	1742	0.02

Verbenone	7.28	1202	0.03	9.30	1642	0.02
Decanal	7.36	1207	0.02	6.97	1460	0.02
Nerol	7.70	1230	0.03	10.73	1760	0.03
Citronellol	7.74	1233	0.05	10.41	1733	0.05
(Z)-Isogeraniol	7.94	1246	0.01	10.88	1773	0.01
Geraniol	8.12	1259	1.29	11.31	1810	1.30
Myrtenyl acetate	9.09	1322	0.09	9.23	1635	0.11
Citronellyl acetate	9.56	1355	0.03	9.12	1626	0.02
Neryl acetate	9.71	1365	0.04	9.85	1686	0.03
Geranyl acetate	9.99*	1385	2.97	10.23*	1717	[2.87]
<i>trans</i> -Myrtanyl acetate	9.99*	1385	[2.97]			
Caryophyllene oxide	12.48	1574	0.01	12.37	1904	0.01
Tetradecanal?	12.94	1610	0.04	12.09	1879	0.01
β-Caryophyllene				8.10	1546	0.15
Total identified		99.35%			98.70%	
Total reported		99.35%			98.70%	

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken into account in the consolidated 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