Date : April 08, 2021

Certificate of Analysis – GC Profiling

Sample identification

Internal code : 21C23-PTH06
Customer identification : Yuzu - Japan - Y40103202R
Type : Essential oil
Source : *Citrus junos* ct. Distilled
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 : Seydou Ka, M. Sc.
Analysis date : April 07, 2021

Checked and approved by :

Alexis St-Gelais, M. Sc., 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Notes: This report may not be published, including online, without the written consent from Laboratoire PhytoChemia.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.

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PHYSICOCHEMICAL DATA

Physical aspect: Clear liquid
Refractive index: 1.4734 ± 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
α-Thujene	0.31	Monoterpene
α-Pinene	1.08	Monoterpene
Camphene	0.01	Monoterpene
Sabinene	0.16	Monoterpene
β-Pinene	0.62	Monoterpene
Myrcene	1.40	Monoterpene
α-Phellandrene	0.35	Monoterpene
Pseudolimonene	0.02	Monoterpene
Δ3-Carene	0.01	Monoterpene
α-Terpinene	0.18	Monoterpene
para-Cymene	0.63	Monoterpene
β-Phellandrene	2.48	Monoterpene
Limonene	79.02	Monoterpene
(*Z*)-β-Ocimene	0.01	Monoterpene
(*E*)-β-Ocimene	0.19	Monoterpene
γ-Terpinene	8.91	Monoterpene
para-Cymenene	0.39	Monoterpene
Linalool	1.74	Monoterpenic alcohol
Nonanal	0.01	Aliphatic aldehyde
trans-para-Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
cis-Limonene oxide	0.02	Monoterpenic ether
trans-Limonene oxide	0.01	Monoterpenic ether
Cosmene isomer II	0.01	Monoterpene
trans-Sabinol	0.03	Monoterpenic alcohol
Epoxyterpinolene	tr	Monoterpenic ether
Terpinen-4-ol	0.09	Monoterpenic alcohol
Cryptone	tr	Normonoterpenic ketone
α-Terpineol	0.08	Monoterpenic alcohol
Decanal	0.01	Aliphatic aldehyde
trans-Carveol	0.01	Monoterpenic alcohol
Thymol	0.06	Monoterpenic alcohol
δ-Elemene	0.04	Sesquiterpene
α-Copaene	0.02	Sesquiterpene
β-Cubebene	0.02	Sesquiterpene
β-Elemene	0.02	Sesquiterpene
Sesquithujene	0.01	Sesquiterpene
β-Caryophyllene	0.12	Sesquiterpene
α-Humulene	0.03	Sesquiterpene
allo-Aromadendrene	0.01	Sesquiterpene
(*E*)-β-Farnesene	0.23	Sesquiterpene
Germacrene D	0.10	Sesquiterpene
Bicyclogermacrene	0.35	Sesquiterpene
α-Muurolene	0.04	Sesquiterpene
γ-Cadinene	0.02	Sesquiterpene
δ-Cadinene	0.05	Sesquiterpene

β-Sesquiphellandrene	0.04	Sesquiterpene
Germacrene B	0.07	Sesquiterpene
Spathulenol	0.07	Sesquiterpenic alcohol
Isospathulenol	0.01	Sesquiterpenic alcohol
τ-Muurolol	0.02	Sesquiterpenic alcohol
τ-Cadinol	0.01	Sesquiterpenic alcohol
β-Eudesmol	0.02	Sesquiterpenic alcohol
α-Cadinol	0.02	Sesquiterpenic alcohol
Consolidated total	**99.18%**	

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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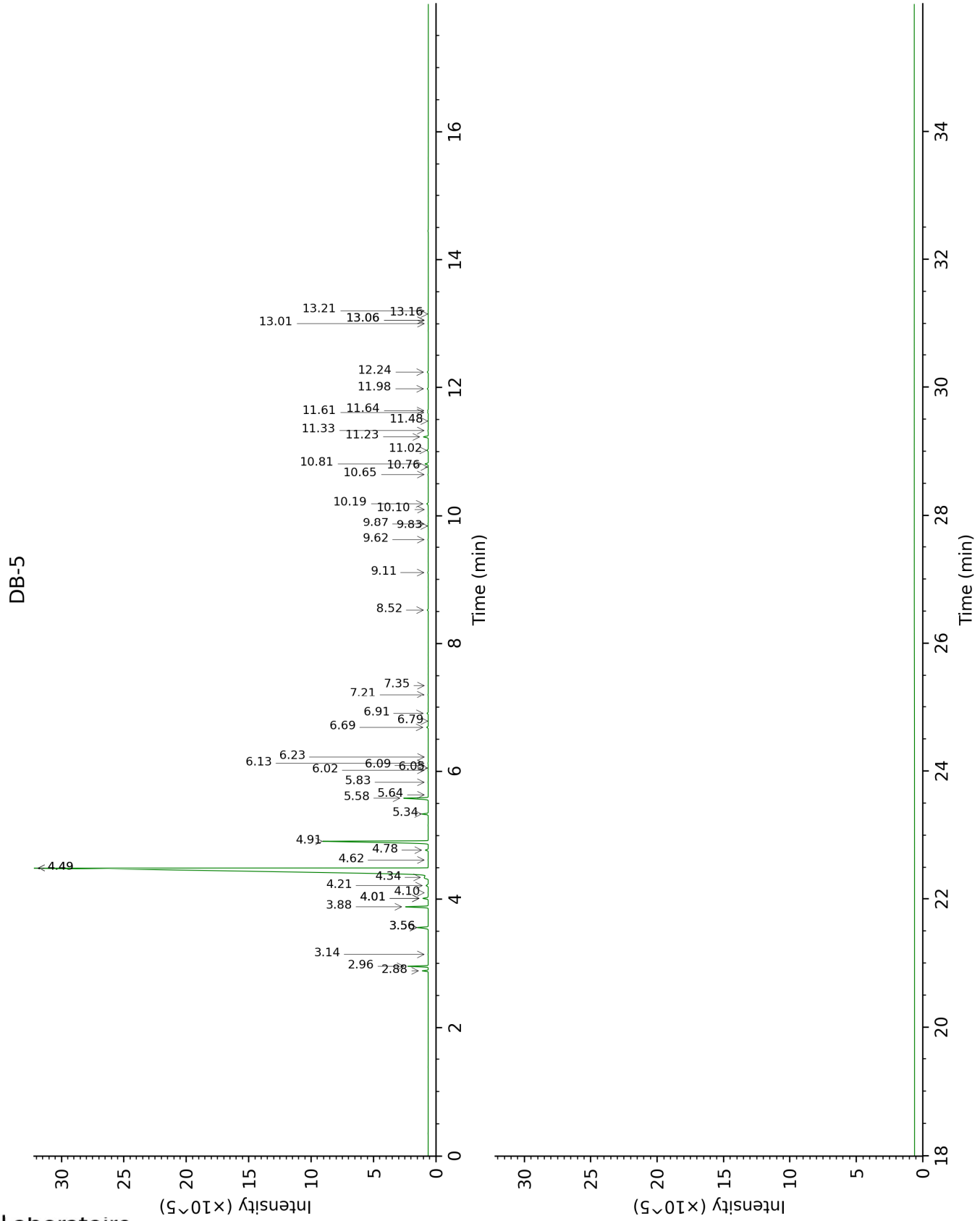
DB-5
Time (min)
Intensity (×10^5)
13.21
13.16
13.06
13.01
12.24
11.98
11.64
11.61
11.48
11.33
11.23
11.02
10.81
10.76
10.65
10.19
10.10
9.87
9.83
9.62
9.11
8.52
7.35
7.21
6.91
6.79
6.69
6.23
6.13
6.09
6.05
6.02
5.83
5.64
5.58
5.34
4.91
4.78
4.62
4.49
4.34
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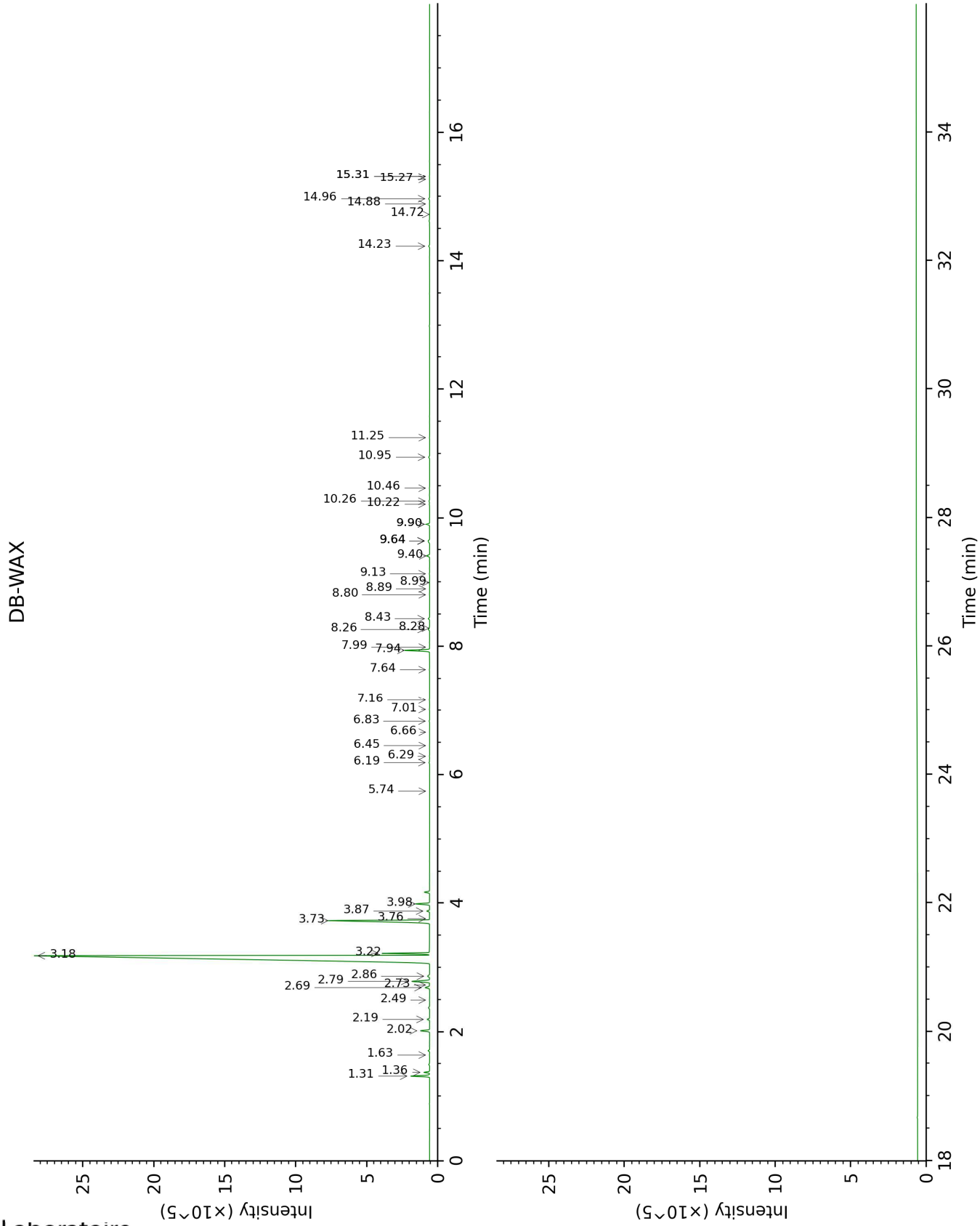
4.01
3.88
3.56
3.14
2.96
2.88


DB-WAX
Intensity (×10^5)
Time (min)
15.31
15.27
14.96
14.88
14.72
14.23
11.25
10.95
10.46
10.26
10.22
9.90
9.64
9.40
9.13
8.99
8.80
8.89
8.43
8.26
8.28
7.99
7.94
7.64
7.16
7.01
6.83
6.66
6.45
6.29
6.19
5.74
3.98
3.87
3.76
3.73
3.22
3.18
2.86
2.79
2.73
2.69
2.49
2.19
2.02
1.63
1.36
1.31

FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
α-Thujene	2.88	927	0.31	1.36	1001	0.32
α-Pinene	2.96	931	1.08	1.31	992	1.15
Camphene	3.14	944	0.01	1.63	1028	0.01
Sabinene	3.56*	972	0.77	2.20	1085	0.16
β-Pinene	3.56*	972	[0.77]	2.02	1067	0.62
Myrcene	3.88	994	1.40	2.78	1135	1.39
α-Phellandrene	4.01*	1003	0.38	2.69	1127	0.35
Pseudolimonene	4.01*	1003	[0.38]	2.73	1130	0.02
Δ3-Carene	4.10	1008	0.01	2.49	1112	0.01
α-Terpinene	4.21	1016	0.18	2.86	1141	0.18
para-Cymene	4.34	1024	0.63	3.98	1227	0.93
β-Phellandrene	4.49*	1033	82.08	3.22	1169	2.48
Limonene	4.49*	1033	[82.08]	3.18	1166	79.02
(*Z*)-β-Ocimene	4.62	1042	0.01	3.76	1210	0.01
(*E*)-β-Ocimene	4.78	1051	0.19	3.87	1219	0.18
γ-Terpinene	4.91	1060	8.91	3.73	1208	8.83
para-Cymenene	5.34	1087	0.39	6.19	1387	0.04
Linalool	5.58	1102	1.74	7.94	1518	1.74
Nonanal	5.64	1106	0.01	5.74	1354	0.01
trans-para-Mentha-2,8-dien-1-ol	5.83	1118	0.02	8.80	1585	0.01
cis-Limonene oxide	6.02	1130	0.02	6.28	1394	0.02
trans-Limonene oxide	6.05	1133	0.01	6.45	1406	0.01
Cosmene isomer II	6.10	1135	0.01			
trans-Sabinol	6.13	1137	0.03	9.64*	1653	0.18
Epoxyterpinolene	6.23	1144	tr	6.66	1421	tr
Terpinen-4-ol	6.69	1173	0.09	8.43	1556	0.10
Cryptone	6.78	1180	tr	8.99	1600	0.01
α-Terpineol	6.91	1187	0.08	9.64*	1653	[0.18]
Decanal	7.20	1207	0.01	7.16	1459	0.02
trans-Carveol	7.35	1216	0.01	11.25	1788	0.01
Thymol	8.52	1295	0.06	14.96	2135	0.07
δ-Elemene	9.11	1336	0.04	6.83	1434	0.03
α-Copaene	9.62	1373	0.02	7.01	1448	0.02
β-Cubebene	9.83	1388	0.02	7.64	1495	0.02
β-Elemene	9.87	1390	0.02	8.28	1545	0.02
Sesquithujene	10.10	1407	0.01	7.99	1522	0.02
β-Caryophyllene	10.19	1413	0.12	8.26	1543	0.11
α-Humulene	10.65	1447	0.03	9.13	1611	0.02
allo-Aromadendrene	10.76	1456	0.01	8.89	1592	tr
(*E*)-β-Farnesene	10.81	1460	0.23	9.40	1634	0.23
Germacrene D	11.02	1476	0.10	9.64*	1653	[0.18]
Bicyclogermacrene	11.23	1491	0.35	9.90*	1674	0.36
α-Muurolene	11.33	1499	0.04	9.90*	1674	[0.36]
γ-Cadinene	11.48	1510	0.02	10.22	1700	0.03
δ-Cadinene	11.61	1520	0.05	10.26	1704	0.05

β-Sesquiphellandrene	11.64	1523	0.04	10.46	1721	0.02
Germacrene B	11.98	1549	0.07	10.94	1762	0.07
Spathulenol	12.24	1570	0.07	14.23	2062	0.07
Isospathulenol	13.01	1632	0.01	15.31*	2170	0.02
τ-Muurolol	13.06*	1636	0.02	14.88	2127	0.02
τ-Cadinol	13.06*	1636	[0.02]	14.72	2111	0.01
β-Eudesmol	13.16	1644	0.02	15.26	2165	0.01
α-Cadinol	13.20	1648	0.02	15.31*	2170	[0.02]
Total identified		**99.75%**			**98.99%**	
Total reported		**99.75%**			**98.99%**	

*: 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