

Date : January 26, 2021

CERTIFICATE OF ANALYSIS – GC PROFILING

SAMPLE IDENTIFICATION

Internal code : 21A12-MPE02

Customer identification : Orange - Italy - 105

Type : Essential oil

Source : *Citrus sinensis*

Customer : My Pure Earth Pte Ltd

ANALYSIS

Method: PC-MAT-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 : Sylvain Mercier, M. Sc., Chimiste

Analysis date : January 24, 2021

Checked and approved by :

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

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PHYSICOCHEMICAL DATA

Physical aspect: Bright yellow liquid

Refractive index: 1.4735 ± 0.0003 (20 °C; method PC-MAT-016)

CONCLUSION

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

ANALYSIS SUMMARY – CONSOLIDATED CONTENTS

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

Identification	%	Class
Hexanal	tr	Aliphatic aldehyde
Heptanal	0.01	Aliphatic aldehyde
α -Thujene	0.01	Monoterpene
α -Pinene	0.50	Monoterpene
Camphene	tr	Monoterpene
Sabinene	0.46	Monoterpene
β -Pinene	0.04	Monoterpene
Myrcene	1.80	Monoterpene
α -Phellandrene	0.04	Monoterpene
Octanal	0.24	Aliphatic aldehyde
Δ^3 -Carene	0.19	Monoterpene
para-Cymene	0.01	Monoterpene
Limonene	92.86	Monoterpene
β -Phellandrene	0.32	Monoterpene
(<i>E</i>)- β -Ocimene	0.03	Monoterpene
γ -Terpinene	0.01	Monoterpene
<i>cis</i> -Sabinene hydrate	0.01	Monoterpenic alcohol
Octanol	0.01	Aliphatic alcohol
Isoterpinolene	0.01	Monoterpene
Terpinolene	0.03	Monoterpene
Linalool	0.19	Monoterpenic alcohol
Nonanal	0.04	Aliphatic aldehyde
<i>trans</i> -para-Mentha-2,8-dien-1-ol	0.02	Monoterpenic alcohol
<i>cis</i> -Limonene oxide	0.03	Monoterpenic ether
<i>trans</i> -Limonene oxide	0.05	Monoterpenic ether
Citronellal	0.05	Monoterpenic aldehyde
Terpinen-4-ol	0.01	Monoterpenic alcohol
α -Terpineol	0.03	Monoterpenic alcohol
<i>cis</i> -Piperitol	0.01	Monoterpenic alcohol
Decanal	0.32	Aliphatic aldehyde
<i>trans</i> -Carveol	0.04	Monoterpenic alcohol
Neral	0.06	Monoterpenic aldehyde
Perillaldehyde	0.01	Monoterpenic aldehyde
Geranial	0.09	Monoterpenic aldehyde
Undecanal	0.01	Aliphatic aldehyde
Neryl acetate	0.01	Monoterpenic ester
α -Copaene	0.02	Sesquiterpene
Geranyl acetate	0.03	Monoterpenic ester
Dodecanal	0.07	Aliphatic aldehyde
β -Caryophyllene	0.05	Sesquiterpene
β -Copaene	0.03	Sesquiterpene
α -Humulene	0.01	Sesquiterpene
(<i>E</i>)- β -Farnesene	0.01	Sesquiterpene
Germacrene D	0.02	Sesquiterpene
Valencene	0.18	Sesquiterpene

α -Muurolene	0.02	Sesquiterpene
γ -Cadinene	0.01	Sesquiterpene
δ -Cadinene	0.02	Sesquiterpene
Caryophyllene oxide	0.02	Sesquiterpenic ether
β -Sinensal	0.03	Sesquiterpenic aldehyde
α -Sinensal	0.02	Sesquiterpenic aldehyde
Myristic acid	0.04	Aliphatic acid
Nootkatone	0.01	Sesquiterpenic ketone
Hexadecanal	0.01	Aliphatic aldehyde
meta-Camphorene	0.01	Diterpene
Palmitic acid	0.17	Aliphatic acid
Linoleic acid	0.10	Aliphatic acid
Oleic acid	0.09	Aliphatic acid
<i>cis</i> -Vaccenic acid?	0.10	Aliphatic acid
Stearic acid	0.14	Aliphatic acid
Tetramethoxyflavone isomer	0.04	Flavonoid
3,5,6,7,8,3',4'-Heptamethoxyflavone?	0.06	Flavonoid
3,3',4',5,6,7,8-Heptamethoxyflavone	0.04	Flavonoid
Consolidated total	98.89%	

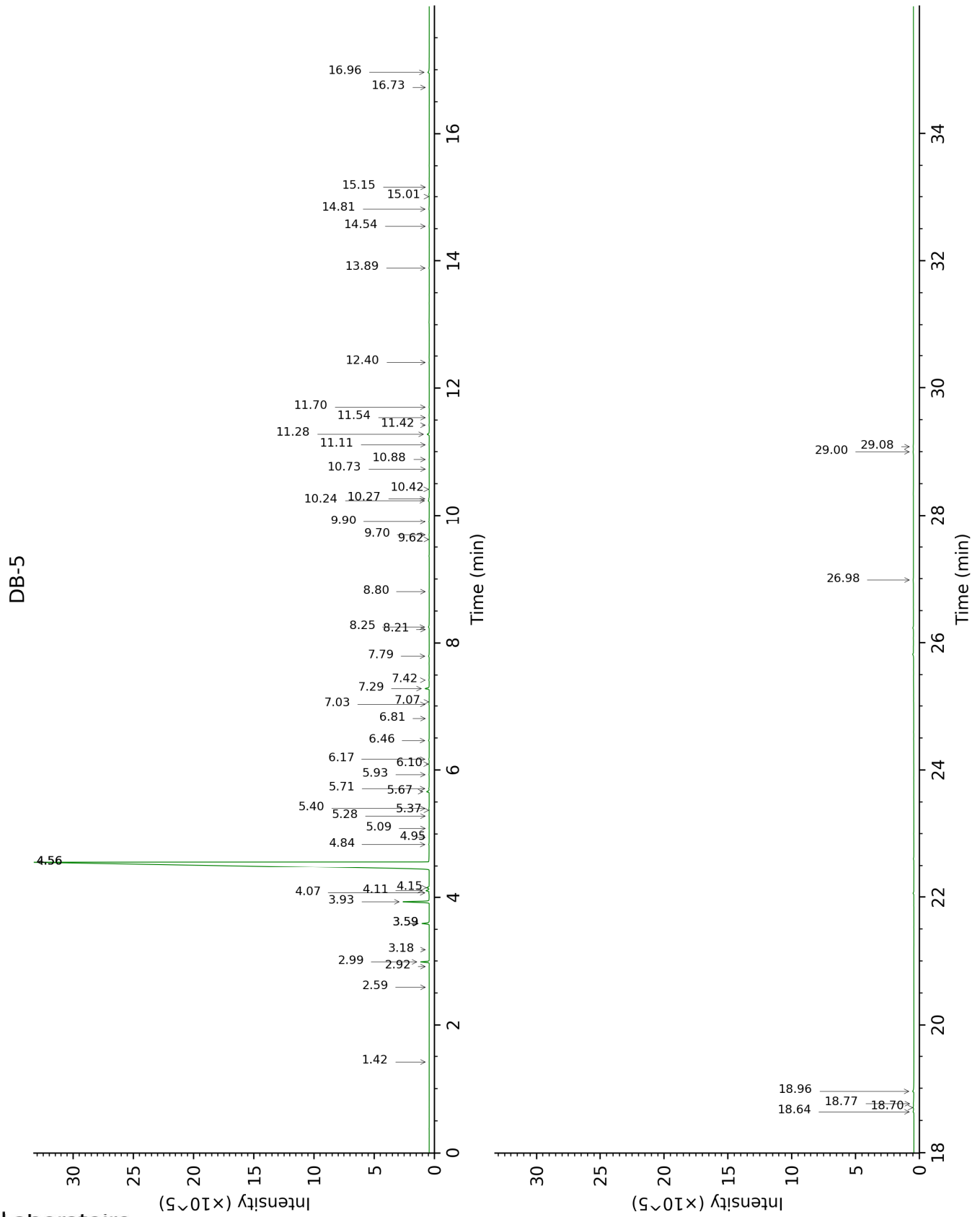
tr: The compound has been detected below 0.005% of total signal.

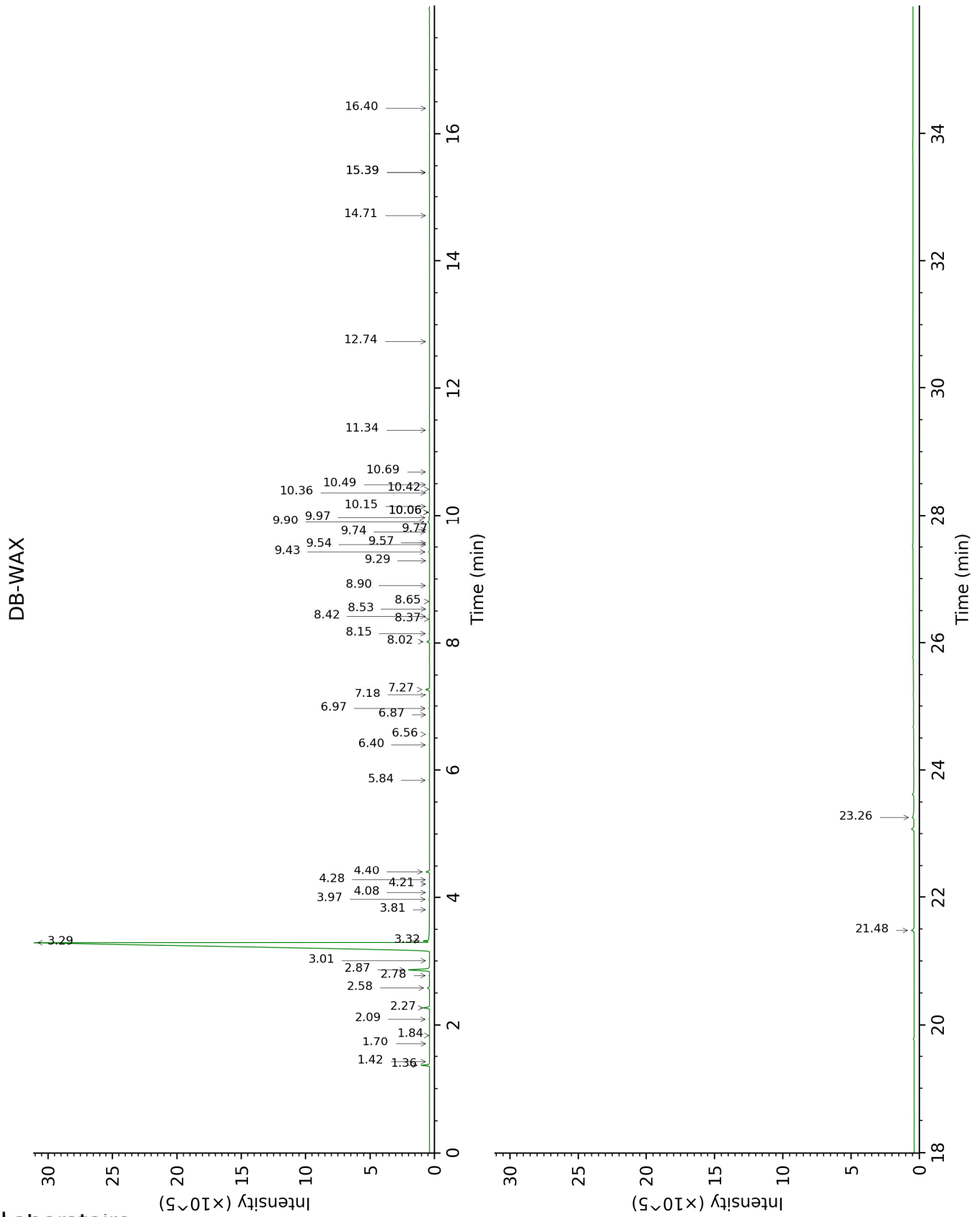
Note: no correction factor was applied

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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FULL ANALYSIS DATA

Identification	Column DB-5			Column DB-WAX		
	R.T	R.I	%	R.T	R.I	%
Hexanal	1.42	806	tr	1.84	1040	tr
Heptanal	2.59	905	0.01	3.01	1144	0.01
α -Thujene	2.92	926	0.01	1.42	999	0.01
α -Pinene	2.99	931	0.50	1.36	992	0.50
Camphene	3.18	944	tr	1.70	1026	tr
Sabinene	3.59*	971	0.49	2.27	1084	0.46
β -Pinene	3.59*	971	[0.49]	2.09	1066	0.04
Myrcene	3.93	993	1.80	2.87	1133	1.83
α -Phellandrene	4.07	1002	0.04	2.78	1126	0.04
Octanal	4.10	1005	0.24	4.40	1250	0.27
Δ^3 -Carene	4.15	1008	0.19	2.58	1111	0.18
para-Cymene	4.56*	1033	93.22	4.08	1227	0.01
Limonene	4.56*	1033	[93.22]	3.29	1166	92.86
β -Phellandrene	4.56*	1033	[93.22]	3.32	1169	0.32
(E)- β -Ocimene	4.84	1050	0.03	3.97	1219	0.04
γ -Terpinene	4.95	1058	0.01	3.81	1207	0.01
cis-Sabinene hydrate	5.09	1066	0.01	6.87	1427	0.01
Octanol	5.28	1078	0.01	8.15	1523	0.02
Isoterpinolene	5.37	1084	0.01	4.21	1236	0.01
Terpinolene	5.40	1086	0.03	4.28	1241	0.03
Linalool	5.66	1103	0.19	8.02	1513	0.21
Nonanal	5.71	1106	0.04	5.84	1352	0.04
trans-para-Mentha-2,8-dien-1-ol	5.93	1120	0.02	8.90	1581	0.02
cis-Limonene oxide	6.10	1130	0.03	6.40	1392	0.03
trans-Limonene oxide	6.17	1135	0.05	6.56	1404	0.03
Citronellal	6.46	1154	0.05	6.97	1434	0.06
Terpinen-4-ol	6.81	1176	0.01	8.53	1553	0.01
α -Terpineol	7.03	1190	0.03	9.74	1648	0.03
cis-Piperitol	7.07	1193	0.01	9.54	1632	0.01
Decanal	7.29	1207	0.32	7.27	1457	0.32
trans-Carveol	7.42	1216	0.04	11.34	1782	0.03
Neral	7.80	1242	0.06	9.43	1623	0.08
Perillaldehyde	8.21	1270	0.01	10.69	1727	0.02
Geranial	8.25	1273	0.09	10.06*	1674	0.09
Undecanal	8.80	1306	0.01	8.65	1562	0.02
Neryl acetate	9.62	1365	0.01	10.15	1681	0.02
α -Copaene	9.70	1370	0.02	7.18	1450	0.02
Geranyl acetate	9.90	1385	0.03	10.49	1710	0.03
Dodecanal	10.24	1409	0.07	9.97	1667	0.06
β -Caryophyllene	10.27	1412	0.05	8.42	1544	0.04
β -Copaene	10.42	1423	0.03	8.37	1540	0.02
α -Humulene	10.73	1447	0.01	9.29	1612	0.01
(E)- β -Farnesene	10.88	1458	0.01	9.57	1634	0.02
Germacrene D	11.11	1475	0.02	9.77	1651	0.02
Valencene	11.28	1488	0.18	9.90	1661	0.16
α -Muurolene	11.42	1498	0.02	10.06*	1674	[0.09]
γ -Cadinene	11.54	1507	0.01	10.36	1699	0.03

δ-Cadinene	11.70	1520	0.02	10.42	1704	0.02
Caryophyllene oxide	12.40	1576	0.02	12.74	1905	0.02
β-Sinensal	13.89	1697	0.03	15.40*	2159	0.04
α-Sinensal	14.54	1754	0.02	16.40	2262	0.01
Myristic acid	14.81	1777	0.04			
Nootkatone	15.01	1794	0.01			
Hexadecanal	15.15	1807	0.01	14.71	2091	0.02
meta-Camphorene	16.72	1951	0.01	15.40*	2159	[0.04]
Palmitic acid	16.96	1973	0.17	21.48	2852	0.27
Linoleic acid	18.64	2137	0.10			
Oleic acid	18.70	2144	0.09			
cis-Vaccenic acid?	18.76	2150	0.10			
Stearic acid	18.96	2169	0.14	23.26	3088	0.18
Tetramethoxyflavone isomer	26.98	3109	0.04			
3,5,6,7,8,3',4'-Heptamethoxyflavone?	29.00	3279	0.06			
3,3',4',5,6,7,8-Heptamethoxyflavone	29.08	3284	0.04			
Total identified		98.91%			98.61%	
Total reported		98.91%			98.61%	

*: 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