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International Cooperative Programme on
Assessment and Monitoring of
Air Pollution Effects on Forests

Technical Report QA-RFoliar21

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

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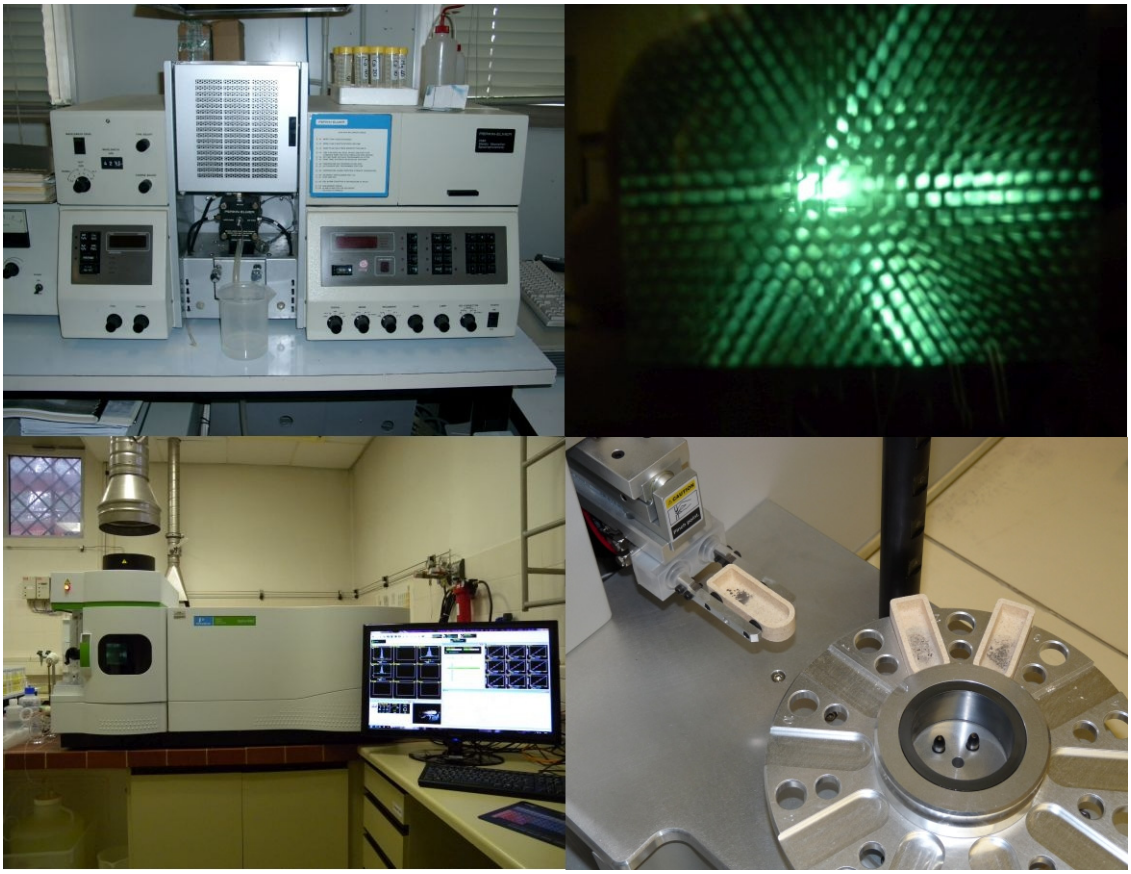

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1 INTRODUCTION

A high quality and comparable laboratory standard in all countries is indispensable for a European-wide survey of the state of forests. Small changes in nature should be detected and not the changes in laboratory quality. Important issues on this way are method harmonisations, QA/QC in the laboratory daily routines and an implementation of a regular performed Interlaboratory Comparison Tests programme.

This Needle/Leaf Interlaboratory Comparison Test programme started with the first European Foliar-Interlaboratory Comparison Test on two certified standards (BCR 100-*beech leaves* and BCR 101 - *spruce needles*) in 1993. The data were submitted by post or fax and had to be rechecked from the laboratories. All the data collection and evaluation had to be done manually. The final report was available after some month. The Interlaboratory Comparison Tests were performed biannually till 2002.

Beginning with 2003/2004 (6th Interlaboratory Comparison Test) an annual test program was set up and the tests were performed from the Forest Foliar Co-ordinating Centre/Austria (FFCC). The data collection was done via internet. The Needle/Leaf Interlaboratory Comparison Test program was opened for every interested laboratory.

Beginning in 2012 an internet based web interface was used for the data collection, to collect the billing information for the participation fee, for the data evaluation and for the creation of online qualification reports. The interface offers the possibility for first data checks (decimal errors, non plausible results, max LOQ) immediately before the final evaluation. At present the results of the recent ringtest are available within some days, so the laboratories can react – in case of unsatisfactory results – very fast. For this case a re-qualification procedure was set up, starting with the 11th Test in 2009 (see: http://bfw.ac.at/rz/bfwcms2.web?dok=7830). This feedback procedure is mandatory for all *ICP-Forests laboratories* and showed very a positive effect on the data quality.

To support the participating laboratories and to exchange knowledge between them, meetings of the heads of the laboratories at regular intervals are organized from the ICP-Forests Working Group on quality assurance and quality control in laboratories. Leaf and needle reference materials for method validation and method verification are offered by FFCC (see: http://bfw.ac.at/rz/bfwcms2.web?dok=5146).

Today this interlaboratory test program is open for every laboratory and is financed by participation fee, by advertising, by selling reference materials, by ringtest sample collection and/or sample preparation from participating laboratories. An overview is given on the ICP-Forests webpage, by following link:
http://icp-forests.net/group/qualityinlaboratories/page/foliage-and-litterfall-ringtest-and-qa-qc-information

2 TASK, MATERIAL, PARTICIPANTS AND EVALUATION

2.1 Task

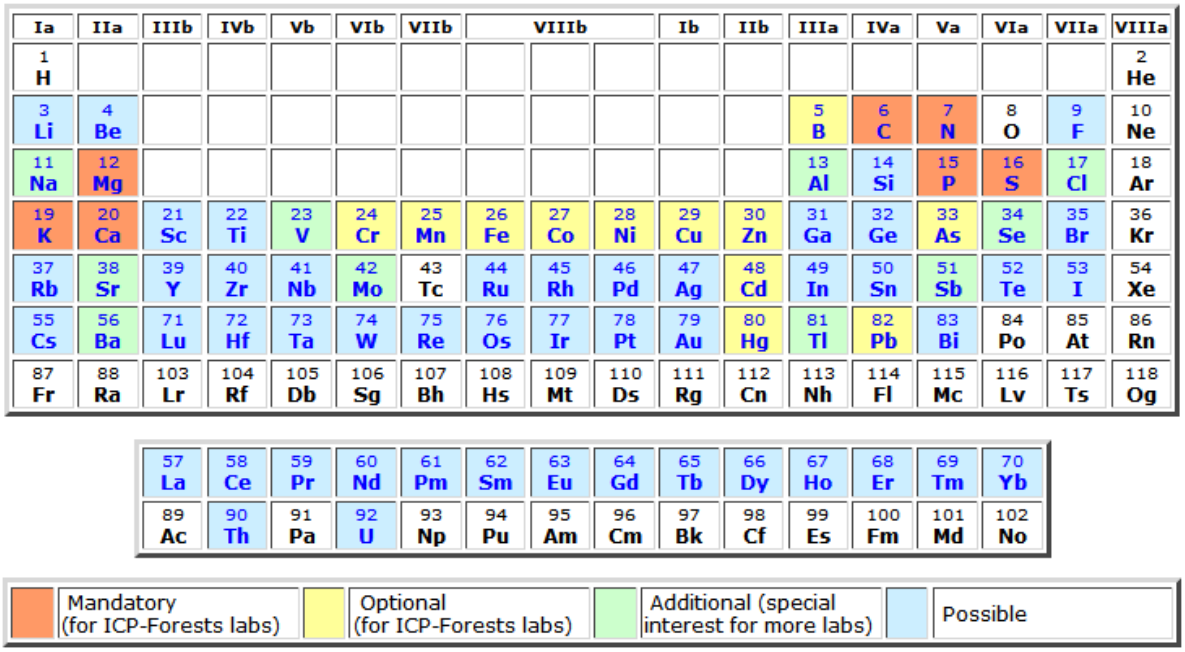
The Forest Foliar Co-ordinating Centre established the following timetable:

- Information of the participating labs (March 2020)
- Registration of the participants via internet (1st July 2020)
- Submission of the ring test samples (July 2020)
- Submission of the results from the labs (October-December 2020)
- Deadline of data input (3rd January 2021)
- Evaluation according to DIN 38402-42:2005-09 (January 2021)
- Submission of the final report and the online qualification reports (February 2021)
- Re-qualification process finished (1st September 2021)

The mandatory parameters C, Ca, K, Mg, N, P and S had to be analysed from all *ICP-Forests laboratories*, optional parameters were As, B, Cd, Cr, Co, Cu, Fe, Hg, Mn, Ni, Pb and Zn.

Results from a lot of other elements could be submitted too. All possible elements are shown in figure 1.

Figure 1: Possible elements



For each parameter four replicates per sample are necessary. Minimum sample weight for mandatory and optional elements should be 250 mg per replicate, in order to ensure the homogeneity of the sample material. All results must be calculated on a dry weight basis (105°C).

In case that an extra milling step is needed for C, N, S determination with a micro elemental-analyzer for C, N or S for solids (sample weight < 100mg), a subsample of the whole sample for milling is recommended to avoid a possible contamination (Cr, Ni, Fe).

The used pre-treatment method and the determination method must be specified by a code. This code was harmonized for all ringtests (foliage & litterfall, deposition & soil solution and soil) after the 4th Meeting of the Heads of the Laboratories in Zadar 2013.

For a deeper evaluation - all participant laboratories had to answer a questionnaire to get more information about the status of their quality control systems, about their instrumentation, about their sample number/year and about their methodical knowledge. *ICP-Forests laboratories* had to mark all parameters, if the plan to analyse and submit monitoring results to ICP-FORESTS PCC from the growing season 2020.

2.2 Material

In July 2020 the Austrian Federal Research Centre for Forests, Natural Hazards and Landscape (BFW) sent out four dried and powdered plant samples to 48 laboratories in 23 countries.

The samples consisted of:

1. Beech leaves (Austria)
2. Spruce needles (Slovenia) - same sample like in the 19th Test (Sample 1)
3. Spruce needles (Austria)
4. Ash leaves (Belgium)

Sample 1 was collected in Lower Austria (Reinhard Hagen & Michael Fransche). **Sample 2** was collected and prepared in Slovenia (Daniel Zlindra). **Sample 3** was collected and prepared from BFW/Austria. **Sample 4** was collected and prepared from Belgum (Bruno de Vos).

Special thanks to all colleagues for collecting and preparing samples for this ringtest. The further sample preparation (drying and grinding) - if necessary - was done in the BFW laboratory for air pollution monitoring and plant analyses. Before the samples were sent out they were once more homogenized and filled in PE-bags. Homogeneity was tested for these samples by analysing the B, Ca, Cr, Cu, Fe, K, Hg, Mg, Mn, N, Ni, S and Zn content in eight randomly selected sub samples. No significant variation (Kruskal-Wallis Test - 95% significance level) could be found between the results of these eight sub samples, and they were therefore considered to be homogeneous.

2.3 Participants

Table 1 shows the number of countries and laboratories taking part in the interlaboratory comparison test program.

Table 1: Number of countries and laboratories taking part in the interlaboratory comparison test program

Interlaboratory Comparison Test	Year	Number of countries	Number of laboratories
1st	1993/94	21	24
2nd	1995/96	25	39
3rd	1997/98	29	51
4th	1999/00	29	52
5th	2001/02	29	53
6th	2003/04	26	46
7th	2004/05	23	43
8th	2005/06	30	52
9th	2006/07	28	53
10th	2007/08	29	54
11th	2008/09	28	56
12th	2009/10	30	56
13th	2010/11	29	60
14th	2011/12	28	62
15th	2012/13	28	61
16th	2013/14	25	57
17th	2014/15	25	54
18th	2015/16	25	53
19th	2016/17	22	45
20th	2017/18	23	48
21st	2018/19	24	52
22nd	2019/20	23	47
23rd	2020/21	23	48

One participating laboratory didn't send any results till the end of the deadline (A97). With a few exceptions, all other laboratories analysed the complete list of mandatory elements in the 23rd Interlaboratory Comparison Test (s. Table 2).

Table 2: Analysed elements from the participant laboratories (green); no results were submitted (grey); red "X": monitoring samples will be analyzed from the growing season 2020 and these results will be sent to PCC in 2021 ("*ICP-Forests laboratory*")

Labcode	N	S	P	Ca	Mg	K	C	Zn	Mn	Fe	Cu	Pb	Cd	B	As	Cr	Co	Hg	Ni
A36																			
A39																			
A42																			
A43																			
A45	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X
A47	X	X	X	X	X	X	X	X	X	X	X			X					
A49																			
A56																			
A57																			
A58	X	X	X	X	X	X	X	X	X	X	X								
A59																			
A60	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X
A61	X	X	X	X	X	X	X	X	X		X			X					
A62																			
A65																			
A71																			
A79																			
A80																			
A82																			
A85	X	X	X	X	X	X	X												
A86	X	X					X												
A88																			
A93																			
A97																			
F01	X		X	X	X	X													
F02	X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
F03																			
F05	X	X	X	X	X	X	X	X	X	X									
F06	X	X	X	X	X	X	X	X	X	X	X	X	X						
F07	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
F08	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	
F09																			
F12	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X		X
F13	X	X	X	X	X	X	X	X	X	X	X	X	X						
F14	X	X	X		X	X	X	X	X	X	X								
F15	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
F16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
F18	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X
F19	X	X	X	X	X	X	X												
F21																			
F22	X			X	X	X	X												
F24	X	X	X	X	X	X	X	X	X	X			X			X			X
F25	X	X	X	X	X	X	X		X		X								
F26	X		X	X	X	X	X												
F27	X	X	X	X	X	X	X												
F32	X	X	X	X	X	X	X	X	X	X	X	X	X			X			X
F33	X	X	X	X	X	X	X	X	X	X	X								
S22	X	X	X	X	X	X		X	X	X	X	X		X	X	X			X

2.4 Data Evaluation

Only four replicates above the quantification limits can be used for calculating an outlier free laboratory mean value. Results below the quantification limit are marked with "<", followed by the quantification limit of the laboratory (e.g. <0.1).

The results of the interlaboratory comparison test were evaluated according to DIN 38402-42:2005-09. This method identifies three types of outliers. With the Grubbs-test the four replicates from each laboratory can first be checked for outliers (outlier type 1). The next step is to compare the recalculated mean values of each lab with the mean value from all labs as well as with the Grubb-test for outliers (outlier type 2). Now the outlier free total mean value and the outlier free maximum and minimum mean values of all labs can be calculated. Marked outliers type 1 between the outlier free maximum and minimum mean values are not longer outliers, following they are included again and will be used for the further evaluation of the interlaboratory comparison test. Finally, the recalculated standard deviation from the laboratories must be compared with the total standard deviation (Cochran test) to eliminate laboratories with an excessive standard deviation (outlier type 3). In case of detected outliers type 3, a re-check for outliers type 2 must be performed. The last step is to calculate the outlier free statistical values.

After calculation of the outlier free mean value for each element/sample and the laboratory mean value the recovery is calculated and compared with the tolerable limits from table 3 and 4. Laboratory results inside these tolerable limits are marked green (pass the test); outside they are marked orange (fail the test). This type of evaluation was fixed in the Foliar Expert Panel Meetings of As (1994) and Vienna (1997).

Table 3: Tolerable limits for **normal concentration** in foliage for the mandatory and optional elements

Element	Tolerable deviation from mean in %	Adopted by the Expert Panel Foliage and Litterfall
As	80-120	15th Meeting - Zagreb 2017
B	80-120	6th Meeting - Bonn 1999
C	95-105	6th Meeting - Bonn 1999
Ca	90-110	10th Meeting - Madrid 2007
Cd	70-130	6th Meeting - Bonn 1999
Co	75-125	15th Meeting - Zagreb 2017
Cr	75-125	15th Meeting - Zagreb 2017
Cu	80-120	8th Meeting - Prague 2003
Fe	80-120	6th Meeting - Bonn 1999
Hg	80-120	15th Meeting - Zagreb 2017
K	90-110	10th Meeting - Madrid 2007
Mg	90-110	10th Meeting - Madrid 2007
Mn	85-115	8th Meeting - Prague 2003
N	90-110	6th Meeting - Bonn 1999
Ni	80-120	15th Meeting - Zagreb 2017
P	90-110	10th Meeting - Madrid 2007
Pb	70-130	6th Meeting - Bonn 1999
S	85-115	10th Meeting - Madrid 2007
Zn	85-115	8th Meeting - Prague 2003

Table 4: Tolerable limits for **low concentrations** for the mandatory and optional elements (e.g. for non-foliage litterfall) the limits were fixed in Hamburg 2009 (11th Meeting of the Expert Panel Foliage and Litterfall) and in Zagreb 2017 (15th Meeting of the Expert Panel Foliage and Litterfall)

Element	Tolerable deviation from mean in %	for concentrations below
As	70-130	50 ng/g
B	70-130	5 µg/g
Ca	85-115	3 mg/g
Co	65-135	0.1 µg/g
Cr	65-135	1 µg/g
Fe	70-130	20 µg/g
Hg	70-130	50ng/g
K	85-115	1 mg/kg
Mg	85-115	0.5 mg/g
Mn	80-120	20 µg/g
N	85-115	5 mg/g
Ni	70-130	1 µg/g
P	85-115	0.5 mg/g
Pb	60-140	0.5 µg/g
S	80-120	0.5 mg/g
Zn	80-120	20 µg/g

If a limit of quantification (LOQ) is given from the laboratory, it will be checked first against the maximum acceptable LOQ from table 5. Is it higher than the maximum acceptable LOQ, the lab will fail (marked in orange) - is it equal or lower it will be checked then against the outlier free mean. Is the submitted LOQ within the tolerable limits the lab will pass (marked in green). Is it outside the lab will fail (marked in orange) for this parameter/sample combination. This evaluation of LOQ values was fixed in the 3rd Meeting of the Heads of the Laboratories in Arcachon (2011).

In case of very low concentrations, interlaboratory comparison test samples will be excluded from evaluation (see table 5). This procedure is needed to avoid wrong qualification results influenced by inaccurate results. On the other hand there is often no practical need to detect these low concentrations in real samples, because it gives no additional information of the nutrient status (e.g. < 1 µg Cu/g is always deficiency) or of the pollution impact situation (e.g. < 20 ng Cd/g, < 1 µg Cu/g, < 0.2 µg Pb/g is always not polluted).

Table 5: Maximum acceptable limit of quantification and lowest evaluated interlaboratory sample result fixed in Arcachon 2011 (3rd Meeting of the Heads of the Laboratories) and in Pallanza 2017 (6th Meeting of the Heads of the Laboratories)

Element	Maximum acceptable limit of quantification	Lowest evaluated result
As	50 ng/g	20 ng/g
B	1 µg/g	-
C	10 g/100g	-
Ca	0,5 mg/g	-
Cd	50 ng/g	20 ng/g
Co	0.1 µg/g	0.05 µg/g
Cr	1 µg/g	0.5 µg/g
Cu	1 µg/g	1 µg/g
Fe	5 µg/g	-
Hg	20 ng/g	10 ng/g
K	0.5 mg/kg	-
Mg	0.3 mg/g	-
Mn	5 µg/g	-
N	2 mg/g	-
Ni	1 µg/g	0.5 µg/g
P	0.3 mg/g	-
Pb	0.5 µg/g	0.20 µg/g
S	0.3 mg/g	-
Zn	5 µg/g	-

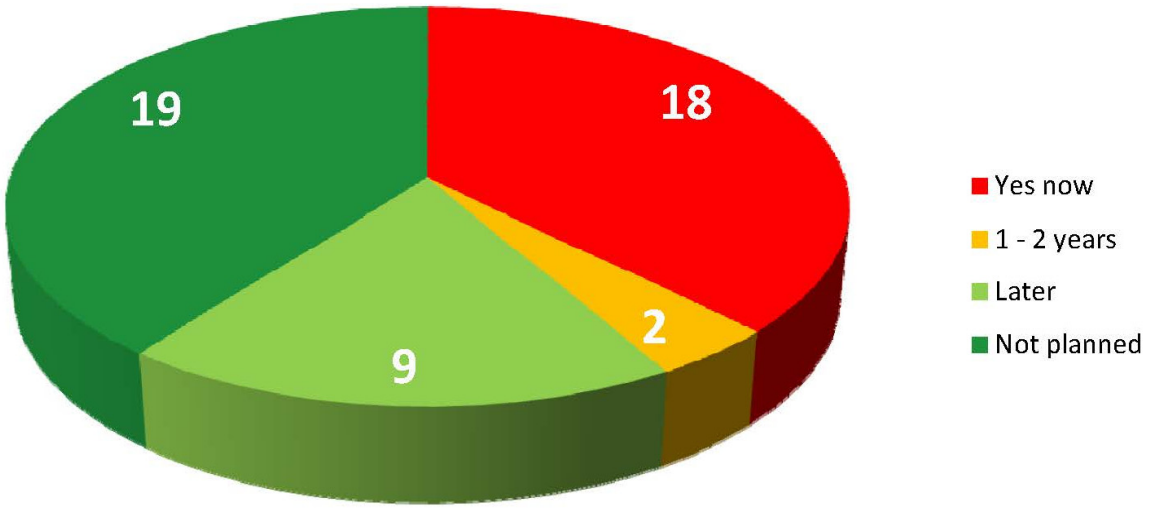
3 RESULTS

3.1 Main results of the questionnaire

All participating laboratories answered a questionnaire in order to obtain information about the status and changes of their quality control systems and their instrumentation.

The first questions dealt with the accreditation status of the laboratories and the summarized results are shown in figure 2.

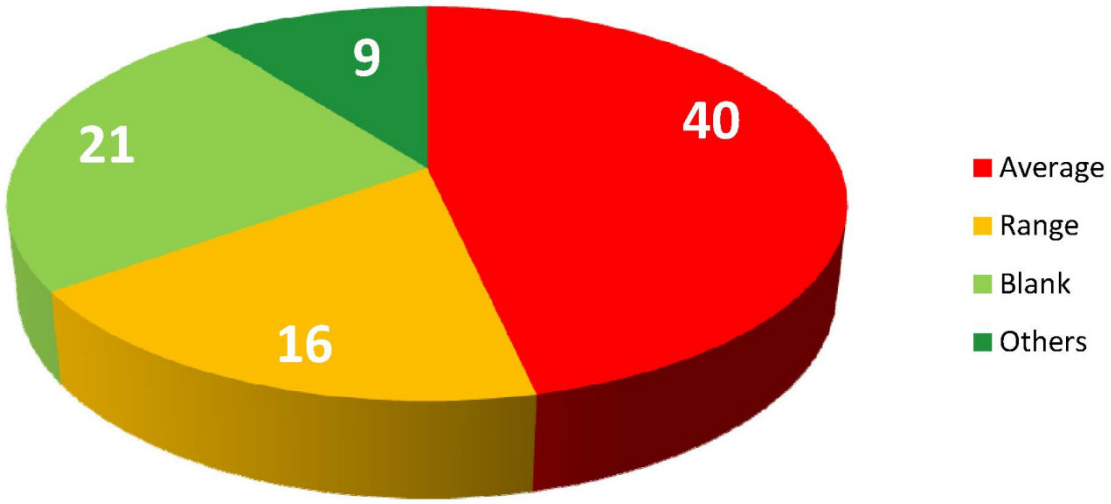
Figure 2: Accreditation status according EN 17025 (n=48)



41.7% of the laboratories are accredited now (18 labs) or plan an accreditation within 1-2 years (2 labs) - 19 laboratories (39.6%) don't plan an accreditation in future.

The next important question was about the usage of control charts for routine quality control (Hovind et al. 2007). 91.7% of these 48 laboratories (say that they) are using control charts, and most of them are using average control chart – 4 of this 48 laboratories are still using no control chart. Some of the laboratories are using more than one type of control charts (see Figure 3).

Figure 3: Types of control charts used in foliar laboratories



3.2 Results of the 23rd Interlaboratory Comparison Test

Table 6 gives an overview which laboratories analysed the test samples well and which laboratory encountered quality problems. This evaluation is based on the tolerable limits from table 3 and table 4 and on the maximum acceptable limit of quantification (LOQ) from table 5. A green marked field means all samples are analysed well, a grey marked field means no results were sent from this laboratory till 3rd of January 2021. The red marked "<" or ">" mean number of results lower or higher the tolerable limits.

If a LOQ is given from the laboratory, it will be first checked against the maximum acceptable LOQ from table 5. Is it higher than the maximum acceptable LOQ the lab will fail (marked with "L"). Then it was checked against the lower tolerable limit, is it lower the lab will fail too.

The following participants, which have a lower percentage of correct results (lower than 80% of correct results), have bigger QC/QA-problems in their laboratory:

A85 (78.6%), **F09** (75.0%), **F24** (69.8%), **F07** (61.2%), **A88** (58.0%), **A56** (51.1%) and **S22** (25.9%)

Some results are within the tolerable limits, but the statistical evaluation shows an excessive standard deviation (outlier type 1 or 3) or a high Vi (> 10%), that means these labs have e.g. contamination influences or methodical problems. These results are marked with "a" or with "c" or a red marked Vi in the detailed evaluation in the annex.

Table 6: Results of the 23rd Needle/Leaf Interlaboratory Comparison Test – results marked with the limits from tables 3 and 4 (green = all samples were analysed well; < = too low; > = too high; grey = no results were submitted) and with the maximum acceptable LOQ from table 5 (L = too high LOQ)

Labcode	N	S	P	Ca	Mg	K	C	Zn	Mn	Fe	Cu	Pb	Cd	B	As	Cr	Co	Hg	Ni
A36																		<	
A39																			
A42				>>															
A43			>>>						>										
A45															<		>		
A47	>>					<<					<<			>>					
A49													LL				LL		
A56		<<<<		<<<<		<<		>>>>	<<	<<<									>>>>
A57			<																
A58		>																	
A59	<<<<						<<<<												
A60			>							>									
A61																			
A62			<<<<	<															
A65												>>>				>			LL
A71		<<					<<		>									>>	>
A79		>>																	
A80									>						LLLL			>	
A82						<													
A85		<<<	<		>>														
A86		>																	
A88	<		<<<<	<<<<	<<<<	<<<<		<<<	<										
A93																			
A97																			
F01																			
F02												>							
F03												>>							
F05		<										>>				>			
F06		<																	
F07			>>>>	<>>	>>	>>>>		>	>>	>	>>>>	>			L>>>				
F08																		>	
F09		>>	>>	>>>>	>														
F12																	<<		
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F14																	>		
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F16									<										>>
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F25																			
F26																			
F27		<		>>								<	>>			>			
F32						>													
F33																			
S22		>	<<<<	<<<<	<<<<	<<<<		<<	<<<<	<<<<	<<<			<<<<	<<<<	<<			<<<

The following mean element concentrations were found in the test samples and the percentage of the laboratory results out of the tolerable limits are provided in table 7.

Sample 1 had a too low concentration for Co, sample 2 for Pb, sample 3 for Cd and sample 4 for Cd and Cr. Consequently, their results were excluded from the evaluation.

All samples in this test were foliage samples. The concentration ranges for some heavy metals were low. This explains the higher amount of non-tolerable results for these parameters and samples.

Table 7: Mean element concentrations and percentage of non-tolerable results (results evaluated with the tolerable limits for low concentrations are marked in blue; not evaluated samples with very low concentrations are marked in grey)

Element	Unit	Sample 1 *Beech leaves*	Sample 2 *Spruce needles*	Sample 3 *Spruce needles*	Sample 4 *Ash leaves*
N	**mg/g**	24.89	13.84	12.63	22.83
	%	4.65	4.65	2.33	6.98
S	**mg/g**	1.65	0.93	0.83	2.69
	%	12.50	12.50	7.50	15.00
P	**mg/g**	1.20	0.97	1.38	2.65
	%	16.67	16.67	19.05	14.29
Ca	**mg/g**	10.13	3.65	4.46	15.52
	%	13.64	18.18	15.91	13.64
Mg	**mg/g**	2.26	0.92	0.63	2.09
	%	6.82	6.82	6.82	9.09
K	**mg/g**	8.91	6.70	7.75	21.52
	%	6.82	13.64	15.91	9.09
C	**g/100g**	50.04	51.81	52.29	47.27
	%	5.13	2.56	2.56	5.13
Zn	**µg/g**	42.59	23.46	22.93	19.98
	%	13.89	11.11	5.56	5.56
Mn	**µg/g**	1003.4	1475.4	47.78	*11.41*
	%	7.90	5.26	7.90	15.79
Fe	**µg/g**	102.96	80.04	77.48	101.47
	%	5.88	8.82	5.88	11.76
Cu	**µg/g**	6.17	3.17	3.00	9.16
	%	8.57	5.71	8.57	8.57
Pb	**µg/g**	*0.25*	*0.16*	*0.22*	*0.36*
	%	19.23	-	11.54	19.23
Cd	**ng/g**	73.04	74.39	*8.87*	*12.42*
	%	4.00	8.00	-	-
B	**µg/g**	40.61	21.87	15.53	27.47
	%	13.04	8.70	13.04	8.70
As	**ng/g**	*29.93*	*28.54*	*39.08*	78.31
	%	33.3	25.0	25.0	33.3
Cr	**µg/g**	1.14	3.60	1.78	*0.48*
	%	13.04	8.70	0.00	-
Co	**µg/g**	*0.039*	0,48	*0.054*	*0.058*
	%	-	0.00	28.57	28.57
Hg	**ng/g**	*16.48*	*23.07*	*12.93*	*29.84*
	%	13.33	6.67	13.33	0.00
Ni	**µg/g**	7.71	1.94	*0.55*	1.14
	%	8.00	8.00	12.00	24.00

3.3 Comparison between of the 23rd Interlaboratory Comparison Test with former tests

Sample 1 of the 19th Interlaboratory Comparison Test and sample 2 of the 23rd Interlaboratory Comparison Test are identical (*Spruce needles - Slovenia*). For most of the elements the mean values are identical (see Table 8). The results are well comparable and the composition of the sample is stable.

The ringtest is evaluated on the basis of fixed limits (table 3 and 4). These tolerable deviations from the mean were updated in Foliage Expert Panel Meetings in Bonn (1999), Prague (2003), Madrid (2007) and Zagreb (2017) and in the 1st Meeting of the Heads of the Laboratories in Hamburg (2009) for some elements. Maximum acceptable limits of quantification (table 5) were defined in the 3rd Meeting of the Heads of the Laboratories in Arcachon (2011) and in the 6th Meeting of the Heads of the Laboratories in Pallanza (2017) and are used from the 14th to 22nd test. These changes of the tolerable limits from the 9th to the 22nd test are shown in tables 9a and 9b.

Table 8: Comparison between the 19th and 23rd Interlaboratory Comparison Test

Element (Unit)	19th Interlaboratory Comparison Test 2016/17 (Sample 1) Mean	Number of Labs	23rd Interlaboratory Comparison Test 2020/21 (Sample 2) Mean	Number of Labs
N mg/g	13.90	*38*	13.84	*43*
S mg/g	0.92	*37*	0.93	*40*
P mg/g	0.99	*41*	0.97	*42*
Ca mg/g	3.68	*42*	3.65	*44*
Mg mg/g	0.91	*42*	0.92	*44*
K mg/g	6.69	*42*	6.70	*44*
C g/100g	52.00	*34*	51.81	*39*
Zn µg/g	23.58	*33*	23.46	*36*
Mn µg/g	1483.5	*34*	1475.4	*38*
Fe µg/g	80.55	*32*	80.04	*34*
Cu µg/g	3.26	*33*	3.17	*35*
Pb µg/g	*0.18*	*26*	*0.16*	*26*
Cd ng/g	73.71	*24*	74.39	*25*
B µg/g	22.56	*18*	21.87	*23*
As ng/g	25.97	*13*	28.54	*12*
Cr µg/g	3.79	*23*	3.60	*23*
Co µg/g	0.47	*17*	0.48	*14*
Hg ng/g	23.47	*14*	23.07	*15*
Ni µg/g	2.01	*23*	1.94	*25*

Table 9a: Percentage of non tolerable results from 10th to 16th test

Element	Tolerable limits [1]	10th Labtest 2007/2008		11th Labtest 2008/2009		12th Labtest 2009/2010		13th Labtest 2010/2011		14th Labtest 2011/2012		15th Labtest 2012/2013		16th Labtest 2013/2014	
	normal (low) (± %)	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number
N	10 (15)	**2,6**	*196*	**10,9**	*192*	**7,6**	*212*	**4,9**	*224*	**8,9**	*224*	**6,0**	*216*	**3,1**	*196*
S	15 (20)	**15,4**	*188*	**14,4**	*188*	**16,5**	*200*	**13,9**	*208*	**12,7**	*220*	**13,9**	*208*	**14,8**	*196*
P	10 (15)	**13,2**	*204*	**14,2**	*204*	**13,7**	*212*	**7,4**	*216*	**15,9**	*220*	**9,4**	*224*	**18,8**	*208*
Ca	10 (15)	**17,2**	*204*	**19,1**	*204*	**9,7**	*216*	**8,0**	*212*	**14,7**	*224*	**12,1**	*224*	**16,3**	*208*
Mg	10 (15)	**10,8**	*204*	**18,6**	*204*	**14,4**	*216*	**5,7**	*212*	**19,3**	*228*	**5,9**	*220*	**8,8**	*204*
K	10 (15)	**16,8**	*208*	**17,5**	*200*	**6,0**	*216*	**8,5**	*212*	**21,0**	*228*	**18,0**	*228*	**9,1**	*208*
C	5	**3,2**	*156*	**16,9**	*148*	**8,5**	*188*	**6,3**	*192*	**15,4**	*208*	**7,7**	*196*	**10,0**	*180*
Zn	15 (20)	**10,2**	*176*	**6,7**	*164*	**6,4**	*172*	**9,7**	*176*	**4,4**	*184*	**5,4**	*184*	**5,6**	*180*
Mn	15 (20)	**2,8**	*180*	**6,5**	*168*	**2,7**	*176*	**4,8**	*188*	**6,8**	*192*	**0,5**	*188*	**8,7**	*184*
Fe	20 (30)	**5,7**	*176*	**13,1**	*160*	**4,8**	*168*	**0,0**	*180*	**14,1**	*184*	**3,7**	*188*	**9,4**	*180*
Cu	20	**4,9**	*164*	**17,1**	*164*	**21,3**	*160*	**9,1**	*176*	**10,3**	*184*	**9,1**	*176*	**14,5**	*172*
Pb	30 (40)	**13,0**	*100*	**9,8**	*92*	**13,3**	*120*	**12,5**	*112*	**15,6**	*128*	**8,6**	*105* [2]	**10,7**	*56* [2]
Cd	30	**17,0**	*100*	**7,7**	*104*	**10,7**	*112*	**9,5**	*116*	**10,0**	*140*	**7,1**	*140*	**4,8**	*62* [2]
B	20 (30)	**13,5**	*96*	**12,5**	*88*	**5,4**	*92*	**3,3**	*92*	**12,0**	*100*	**5,0**	*100*	**6,3**	*96*

[1] special tolerable limits for low concentrations from the 11th to 16th test

[2] sample/s excluded because of very low concentration

Table 9b: Percentage of non tolerable results from the 17th to the 23rd test

Element	Tolerable limits [1]	17th Labtest 2014/2015		18th Labtest 2015/2016		19th Labtest 2016/2017		20th Labtest 2017/2018		21st Labtest 2018/2019		22nd Labtest 2019/2020		23rd Labtest 2020/2021	
	normal (low) (± %)	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values
N	10 (15)	**2,1**	*192*	**7,9**	*164*	**4,6**	*152*	**3,7**	*164*	**16,1**	*180*	**5,1**	*156*	**4,7**	*172*
S	15 (20)	**9,9**	*192*	**6,4**	*156*	**7,4**	*148*	**16,7**	*156*	**16,9**	*172*	**11,4**	*140*	**11,9**	*160*
P	10 (15)	**14,7**	*204*	**15,5**	*168*	**15,4**	*164*	**18,3**	*180*	**16,3**	*184*	**9,0**	*156*	**16,7**	*168*
Ca	10 (15)	**17,7**	*212*	**9,1**	*176*	**11,3**	*168*	**12,0**	*184*	**15,8**	*184*	**12,5**	*160*	**15,3**	*176*
Mg	10 (15)	**12,3**	*212*	**14,2**	*176*	**13,1**	*168*	**10,9**	*184*	**10,1**	*188*	**10,6**	*160*	**7,4**	*176*
K	10 (15)	**11,5**	*208*	**15,6**	*180*	**16,7**	*168*	**14,7**	*184*	**16,5**	*188*	**12,5**	*160*	**11,4**	*176*
C	5	**7,8**	*180*	**9,5**	*148*	**8,1**	*136*	**7,9**	*152*	**14,3**	*168*	**2,9**	*140*	**3,8**	*156*
Zn	15 (20)	**8,1**	*172*	**13,5**	*148*	**12,1**	*132*	**6,3**	*144*	**5,3**	*152*	**10,0**	*140*	**9,0**	*144*
Mn	15 (20)	**3,9**	*180*	**6,1**	*148*	**8,8**	*136*	**10,5**	*152*	**3,2**	*156*	**11,5**	*148*	**9,2**	*152*
Fe	20 (30)	**6,5**	*168*	**12,2**	*148*	**13,3**	*128*	**4,2**	*144*	**5,0**	*140*	**6,9**	*144*	**8,1**	*136*
Cu	20	**15,7**	*172*	**4,2**	*144*	**15,2**	*132*	**8,8**	*136*	**6,8**	*148*	**12,5**	*136*	**7,9**	*140*
Pb	30 (40)	**7,8**	*87* [2]	**16,0**	*75* [2]	**7,7**	*24* [2]	**8,3**	*24* [2]	**7,1**	*84* [2]	**22,7**	*75* [2]	**16,7**	*78* [2]
Cd	30	**14,3**	*112*	**8,0**	*112*	**2,1**	*96*	**2,7**	*75* [2]	**10,3**	*116*	**14,6**	*48* [2]	**8,0**	*50* [2]
B	20 (30)	**5,0**	*100*	**11,9**	*84*	**13,9**	*72*	**6,8**	*88*	**4,3**	*92*	**13,1**	*84*	**10,9**	*92*
As	20 (30)			**19,2**	*52*	**25,6**	*39* [2]	**48,7**	*39* [2]	**19,6**	*56*	**37,5**	*48*	**27,1**	*48*
Co	25 (35)			**13,2**	*68*	**4,4**	*68*	**11,8**	*51* [2]	**20,6**	*63* [2]	**21,9**	*48* [2]	**19,0**	*42* [2]
Cr	25 (35)			**10,9**	*46* [2]	**16,3**	*92*	**15,2**	*92*	**21,7**	*92*	**6,3**	*32* [2]	**7,2**	*69* [2]
Hg	20 (30)			**4,5**	*44*	**19,6**	*56*	**0,0**	*36* [2]	**6,3**	*48* [2]	**9,5**	*42* [2]	**8,3**	*60*
Ni	20 (30)			**8,3**	*96*	**7,6**	*92*	**16,3**	*92*	**9,0**	*100*	**18,0**	*100*	**13,0**	*100*

[1] special tolerable limits for low concentrations [2] sample/s excluded because of very low concentration

3.4 Evaluation by element

3.4.1 Nitrogen

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results of all laboratories is similar (5.1 → 4.7%).
One laboratory (A59) failed in analyzing all four samples correctly. All four sample results were too low. There is a correlation between the sample content and the recovery, it seems to be a calibration problem of the element analyzer.

3.4.2 Sulphur

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results of all laboratories is similar (11.4 → 11.9%). The laboratories A56 and A85 failed in analyzing three or four samples correctly.
A requalification is obligatory for the *ICP-Forests laboratory* A85.

3.4.3 Phosphorus

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is higher again (21st Labtest: 16.3% → 22nd Labtest: 9.0% → 23rd Labtest: 16.7%). Six laboratories A43, A62, A88, F07, F24 and S22 failed in analyzing three or four samples correctly. The laboratories A43 and A88 failed in the last test, too - their methodical problems are still not solved!
A re-qualification is obligatory for the *ICP-Forests laboratories* F07, F24 and S22.

3.4.4 Calcium

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results remains on a comparably high level (21st Labtest: 15.8 → 22nd Labtest: 12.5 → 23rd Labtest: 15.3%). The laboratories A56, A88, F07, F09 and S22 failed in analyzing three or four samples correctly. The laboratory A88 failed in the last test, too - its methodical problems are still not solved!
A re-qualification is obligatory for the *ICP-Forests laboratories* F07 and S22.

3.4.5 Magnesium

In comparison with the last test the percentage of non-tolerable results are lower (10.6 → 7.4%). The laboratories A88 and S22 failed with all four samples. The laboratory A88 failed in the last test, too - its methodical problems are still not solved!
A requalification is obligatory for the *ICP-Forests laboratory* S22.

3.4.6 Potassium

In comparison with the last test the percentage of non-tolerable results is similar (12.5 → 11.4%). The laboratories A88, F07 and S22 failed in analyzing all four samples correctly. The laboratory A88 failed in the last test, too - its methodical problems are still not solved!
A re-qualification is obligatory for the ICP-Forests laboratories F07 and S22.

3.4.7 Carbon

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is similar (2.9 → 3.8%). Only laboratory A59 failed in analyzing all four samples correctly. The laboratory A59 failed with this in the last test, too - its methodical problems are still not solved!

3.4.8 Zinc

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is similar (10.0 → 9.0%). The laboratories A56, A88 and F24 failed in analyzing three or four samples correctly. The laboratory A88 failed in the last test, too - its methodical problems are still not solved!
A requalification is obligatory for the *ICP-Forests laboratory* F24.

3.4.9 Manganese

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is lower (11.5 → 9.2%). Only laboratory S22 failed with all four samples.
A requalification is obligatory for the *ICP-Forests laboratory* S22.

3.4.10 Iron

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is higher (6.9 → 8.1%). The laboratories A56 and S22 failed in analyzing three or four samples correctly.
A requalification is obligatory for the *ICP-Forests laboratory* S22.

3.4.11 Copper

In comparison with the last test the percentage of non-tolerable results is lower (12.5 → 7.9%). The laboratories F07 and S22 failed with three or four samples.
A requalification is obligatory for the *ICP-Forests laboratories* F07 and S22.

3.4.12 Lead

In comparison with the last test the percentage of non-tolerable results is lower (22.7 → 16.7%). Sample 2 was excluded from the ringtest evaluation, because of the too low lead concentration. All other samples have a lower lead concentration (< 0.5 µg/g). The best analytical choice to analyze these low concentrations is the ICP-MS method. All other methods like flameless AAS or especially ICP-AES are here close to their determination limit. This can be seen in the higher lab standard deviation (V_i) of sample 3.
The laboratories A65, F03, F05 and F24 failed with this parameter. The laboratory A65 failed in the last test, too - its methodical problems are still not solved!

3.4.13 Cadmium

The samples 3 and 4 were excluded from the ringtest evaluation, because of the too low cadmium content. In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is decreasing (14.6 → 8.0%). The laboratories A49 and F27 failed; laboratory A49 failed because of a too high LOQ.

3.4.14 Boron

In comparison with the last test the percentage of non-tolerable results is lower (13.1 → 10.9%). The laboratories F24 and S22 failed in analyzing all four samples. A requalification is obligatory for the *ICP-Forests laboratory* S22.

3.4.15 Arsenic

In comparison with the last test the percentage of non-tolerable results is lower (37.5 → 27.1%). The laboratories A80, F07, S22 and A80 failed in analyzing all four samples correctly and/or because of a too high LOQ. The laboratories F07 and S22 are using an ICP-AES. ICP-AES is not sensitive enough to detect arsenic in these low concentrations. The laboratory F07 failed in the last tests for arsenic too – the methodical problem (probably a change of the method) is still not solved!
A requalification is obligatory for the *ICP-Forests laboratories* F07 and S22.

3.4.16 Chromium

Sample 4 was excluded from the ringtest evaluation, because of too low chromium content. In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is slightly higher (6.3 → 7.2%). The laboratory S22 failed in analyzing two samples.
A requalification is obligatory for the *ICP-Forests laboratory* S22.

3.4.17 Cobalt

Sample 1 was excluded from the ringtest evaluation, because of too low cobalt content. In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is similar (21.9 → 19.0%). The laboratories A49, F12 and F24 failed with this parameter; laboratory A49 failed because of a too high LOQ.
A requalification is obligatory for the *ICP-Forests laboratory* F12.

3.4.18 Mercury

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is similar (9.5 → 8.3%); a really good result for the comparably low mercury content of all four determined samples.

3.4.19 Nickel

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is decreasing (18.0 → 13.0%). The laboratories A56 and S22 failed with this parameter.
A requalification is obligatory for the *ICP-Forests laboratory* S22.

4 CONCLUSIONS

48 laboratories in 23 countries participated in the 23rd Needle/Leaf Interlaboratory Test, but only 47 laboratories submitted their results in time.

A new system for qualification and re-qualification started with the 11th test in 2009. This system was enlarged after the manual update in 2010 to all ICP-Forests partners (see König et al. 2010 and 2013, Rautio et al. 2010 and 2013 Pitman et al. 2010). With the ring test report, each participant received a qualification report which can be downloaded from the webpage (https://bfw.ac.at/ws/ring_nadel.login). It has been decided to qualify the results of each parameter separately. A laboratory is qualified when 50% or more (generally two, three or all four samples) of the results for this parameter for all the samples of the ring test are within the tolerable limits. Re-qualification is mandatory for all *ICP-Forests laboratories*, if monitoring results (foliage, litterfall, ground vegetation) from the vegetation period 2020 will be submitted to PCC. **When an *ICP-Forests laboratory* did not qualify and did not make efforts to improve the data quality, ICP Forests PCC will send a letter to the National Focal Centre and inform them about the consequence that their data possibly cannot be used for evaluations on a European level.**

The usage of maximum acceptable limits of quantification (LOQ) has been included since the 14th Interlaboratory Test. These limits are needed, because many laboratories are using multi element methods (mostly ICP-AES) with higher LOQs for some elements. But for evaluation and classification of the monitoring samples *real* measured results and lower LOQ are sometimes needed. The Working Group QA/QC in Laboratories received a task to fix this problem from the Expert Panel Foliage and Litterfall (12th Meeting - Tallinn 2011). Maximum acceptable LOQs for mandatory and optional parameters for foliage, litterfall and ground vegetation were discussed and accepted in the 3rd Meeting of the Heads of the Laboratories (Arcachon 2011) and in the 6th Meeting of the Heads of the Laboratories (Pallanza 2017).

This problem is more or less fixed now - only four laboratories submitted LOQs higher than the maximum acceptable LOQs (**A49** for Cd and Co; **A65** for Ni; **A80** for As and **F07** for As).

In case of very low concentrations in the test samples, results of these samples will be excluded from the evaluation (this was the case for **sample 1:** Co; **sample 2:** Pb; **sample 3:** Cd; **sample 4**: Cd and Cr). This procedure is needed to avoid wrong qualification results influenced by inaccurate measurements. On the other hand, there is no real need to detect these very low concentrations in real monitoring samples, because it gives no additional information of the nutrient status or about the pollution impact situation.

The following participating laboratories with a percentage of correct results below 80% have severe QC/QA-problems, a miscalculation of the results and/or methodical problems:

A85 (78.6%), **F09** (75.0%), **F24** (69.8%), **F07** (61.2%), **A88** (58.0%), **A56** (51.1%) and **S22** (25.9%)

Some of the *ICP-Forests laboratories* failed and a re-qualification **is obligatory** for certain parameters (**A85**: S; **F07**: P, Ca, K, Cu, As; **F12**: Co; **F24**: P, Zn; **S22**: P, Ca, Mg, K, Mn, Fe, Cu, B, As, Cr, Ni). These *ICP-Forests laboratories* have to check and re-validate their methods or

employ better applicable methods. FFCC offers old ringtest materials, if a reference material is needed for this purpose (see: http://bfw.ac.at/rz/bfwcms2.web?dok=5146).

The laboratories **A43** (P), **A88** (P, Ca, Mg, K, Zn), **A59** (C), **A65** (Pb) and **F07** (As) failed with the identical parameters in the last test(s). **Therefore, their QC/QA-problem or their methodical problem is still not solved!**

All laboratories are invited to take part in the re-qualification program that starts up from now till 1st of August 2021 (see details to the procedure and the needed documents: http://bfw.ac.at/rz/bfwcms2.web?dok=7830).

Some words to the used analytical equipment: The microwave digestion method is the most common digestion method. A clear recommendation for ICP-AES as determination method can be given. Where ICP-AES is not sensitive enough, ICP-AES with ultrasonic nebulizer or better ICP-MS should be used. For nitrogen and carbon, element analyzers are the best choice.

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Method Code – Pretreatment (P)

Extraction methods	
PA06	Extraction with diluted HNO_3
PA99	Other extraction method
Digestion methods (open system)	
PB02	Open digestion with H_2SO_4/H_2O_2
PB03	Open digestion with HNO_3
PB04	Open digestion with HNO_3 /H_2SO_4
PB05	Open digestion with HNO_3/H_2O_2
PB06	Open digestion with $HNO_3/HClO_4$
PB07	Kjeldahl H_2SO_4 with Se or Cu catalyst
PB08	Modified Kjeldahl H_2SO_4 with Ti/Cu catalyst
PB99	Other digestion method (open system)
Pressure digestion methods	
PC01	Pressure digestion HNO_3
PC02	Pressure digestion HNO_3/H_2O_2
PC03	Pressure digestion HNO_3/HF (total digestion)
PC99	Other pressure digestion method
Microwave pressure digestion methods	
PD01	Microwave pressure digestion HNO_3
PD02	Microwave pressure digestion HNO_3/H_2O_2
PD03	Microwave pressure digestion HNO_3/H_2O_2/HCl
PD04	Microwave digestion $HNO_3/HClO_4$
PD05	Microwave pressure digestion HNO_3/HF (total digestion)
PD99	Other microwave pressure digestion method
Dry ashing digestion methods	
PE01	Oxygen ashing (Schöniger)
PE99	Other dry ashing method
Other methods	
PZ01	Material melted and formed (tablet) for XRF methods
PZ02	Material pressed (pellet) for XRF methods
PZ98	No pretreatment
PZ99	Pretreatment method not in this list

Method Code – Determination (D)

Element analyzer	
DA01	Macro Elemental-analyzers for C, N or S for solids (Sample > 100mg)
DA02	Micro Elemental-analyzers for C, N or S for solids (Sample ≤ 100mg) with an extra milling step
DA05	Hg-Analyzer
DA99	Other Element analyzer method
Atomic Absorption or Emission Spectroscopy	
DB01	AAS-flame technique (C_2H_2/Air)
DB02	AAS-flame technique (C_2H_2/N_2O)
DB03	AAS-cold vapor technique
DB04	AAS-hydride technique
DB05	AAS-flameless (electrothermal technique)
DB06	AES-Flame technique (Flame photometry)
DB07	AFS-hydride-technique
DB08	ICP-AES without Ultrasonic nebulisation
DB09	ICP-AES with Ultrasonic nebulisation
DB10	ICP-MS
DB99	Other Atomic Absorption or Emission Spectroscopy method
Physical techniques	
DD01	X-ray-energy dispersive
DD02	X-ray-wavelength dispersive
DD99	Other physical technique
UV-VIS Spectrophotometry techniques	
DE01	UV-VIS-spectrophotometry-technique
DE03	Continous flow UV-VIS-spectrophotometry-technique
DE05	Flow injection UV-VIS-spectrophotometry-technique
DE99	Other UV-VIS Spectrophotometry technique
Electrochemical methods	
DF03	Ion selective electrodes (except pH-Electrodes)
DF08	Other Potentiometric titration
DF99	Other Electrochemical method
Other methods	
DZ02	N-Determination (after Kjeldahl digestion)
DZ99	Detection method not in this list

List of abbreviations

No.	Number of results ordered by Lab. mean
Lab. Code	Code of the laboratory / Laboratory which are analysing level II samples are marked with x
P	Code for pre-treatment method (s. method code pre-treatment)
D	Code for determination method (s. method code determination)
Lab. mean	Mean of the results of each laboratory without outliers type 1
n	Number of all results from all laboratories without outliers type 1, 2, 3
l	Number of all laboratories without outliers type 2, 3
Mean	Total mean value from all results without outliers type 1, 2, 3
s_i	Standard deviation from each laboratory without outliers type 1
s_r	Mean Standard deviation for all laboratories without outliers type 1, 2, 3
V_i	s_i*100/Lab. Mean (marked in red if >10%)
CV_r	s_r*100/Mean
s_R	Standard deviation from all results without outliers
CV_R	s_R *100/Mean
Recovery %	Lab.mean * 100/Mean
a	Outlier type 1
b	Outlier type 2
c	Outlier type 3
*	Not tolerable mean value from one laboratory (see tables 3 & 4)
**	Higher than maximum acceptable limit of quantification (see table 5)

Annex - Results

Mandatory parameters (N, S, P, Ca, Mg, K, C)

Optional parameters (Zn, Mn, Fe, Cu, Pb, Cd, B, As, Cr, Co, Hg, Ni)

Additional parameters

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: N **Sample: 1** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	A59	PZ98	DA02	22,23	22,16	22,34	22,35	4	22,27	*	0,09	0,41	89,48
2	A88	PD01	DZ02	22,21	22,86	22,21	22,86	4	22,54		0,38	1,67	90,55
3	S22x	PB07	DZ02	22,73	22,83	22,67	22,89	4	22,78		0,10	0,43	91,53
4	A43	PB08	DZ02	23,83	22,94	23,83	23,72	4	23,58		0,43	1,82	94,75
5	A71	PB07	DZ02	23,95	23,93	23,97	23,97	4	23,95		0,02	0,09	96,25
6	F13x	PZ98	DA01	23,94	24,04	23,89	23,95	4	23,96		0,06	0,26	96,25
7	A62	PZ98	DA01	24,50	24,20	24,20	24,20	4	24,28		0,15	0,62	97,54
8	F33x	PZ98	DA02	24,60	24,10	24,60	23,90	4	24,30		0,36	1,46	97,64
9	F12x	PZ98	DA02	23,08	24,12	26,00	24,40	0	24,40	*c*	1,21	4,95	98,04
10	F25x	PZ98	DA01	24,23	24,44	24,41	24,64	4	24,43		0,17	0,69	98,16
11	F01x	PB08	DZ02	24,40	24,52	24,40	24,52	4	24,46		0,07	0,28	98,28
12	F15x	PZ98	DA01	24,59	24,59	24,38	24,49	4	24,51		0,10	0,41	98,49
13	A49	PZ98	DA02	25,07	24,74	24,37	23,98	4	24,54		0,47	1,92	98,60
14	F07x	PZ98	DA01	24,47	24,63	24,41	24,77	4	24,57		0,16	0,66	98,72
15	A42	PZ98	DA01	24,56	25,07	24,32	24,54	4	24,62		0,32	1,29	98,94
16	A58x	PZ98	DA99	24,60	24,70	24,70	24,60	4	24,65		0,06	0,23	99,05
17	A85x	PZ98	DA01	24,80	24,81	24,74	24,74	4	24,77		0,03	0,14	99,54
18	F19x	PZ98	DA01	24,80	24,90	24,60	24,80	4	24,78		0,13	0,51	99,55
19	A65	PD01	DB08	25,25	25,04	24,40	24,72	4	24,85		0,37	1,50	99,86
20	F03	PZ98	DA01	24,54	24,83	25,20	24,92	4	24,87		0,27	1,09	99,94
21	A60x	PZ98	DA02	24,95	24,96	24,95	24,79	4	24,91		0,08	0,33	100,10
22	A36	PZ02	DD02	24,97	24,76	24,97	24,97	4	24,92		0,10	0,42	100,12
23	A45x	PZ98	DA02	25,10	24,90	25,00	25,10	4	25,03		0,10	0,38	100,55
24	F06x	PZ98	DA02	25,10	25,60	24,70	24,80	4	25,05		0,40	1,61	100,65
25	F26x	PB07	DZ02	25,11	25,11	25,13	25,14	4	25,12		0,02	0,06	100,94
26	F32x	PZ98	DA02	25,00	25,20	25,10	25,20	4	25,13		0,10	0,38	100,95
27	A61x	PZ98	DA02	25,20	25,28	25,29	24,99	4	25,19		0,14	0,55	101,22
28	F24x	PZ98	DA02	25,00	25,30	25,40	25,20	4	25,23		0,17	0,68	101,36
29	A57	PZ98	DA01	24,76	25,81	25,30	25,20	4	25,27		0,43	1,71	101,53
30	F18x	PB07	DZ02	25,30	25,30	25,30	25,20	4	25,28		0,05	0,20	101,56
31	F05x	PZ98	DA01	25,30	25,30	25,20	25,30	4	25,28		0,05	0,20	101,56
32	A56	PZ98	DA01	25,40	25,30	24,80	25,70	4	25,30		0,37	1,48	101,66
33	A39	PZ98	DA02	25,30	25,47	25,29	25,44	4	25,38		0,09	0,37	101,96
34	F22x	PZ98	DA01	25,74	26,14	24,81	25,09	4	25,45		0,61	2,38	102,24
35	F27x	PZ98	DA01	25,48	25,58	25,39	25,35	4	25,45		0,10	0,40	102,26
36	F02x	PZ98	DA01	25,31	25,82	25,39	25,43	4	25,49		0,23	0,89	102,41
37	A82	PZ98	DA02	25,80	25,50	25,80	25,10	4	25,55		0,33	1,30	102,66
38	F14x	PZ98	DA01	26,00	25,80	25,70	25,60	4	25,78		0,17	0,66	103,57
39	A86x	PZ98	DA01	25,90	25,90	26,00	25,40	4	25,80		0,27	1,05	103,67
40	F21	PZ98	DA01	26,24	25,90	26,18	26,29	4	26,15		0,17	0,67	105,08
41	F16x	PZ98	DA02	26,13	25,95	26,33	26,25	4	26,17		0,17	0,63	105,13
42	F08x	PZ98	DA01	26,20	26,21	26,41	26,08	4	26,23		0,14	0,52	105,37
43	A47x	PZ98	DA01	27,34	27,97	27,36	27,16	4	27,46	*	0,35	1,29	110,33
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**168**	**24,89**	**0,199**	**0,802**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
42	**0,960**	**3,858**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: N **Sample: 2** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	F13x	PZ98	DA01	11,50	11,44	11,46	11,48	0	11,47	*b*	*	0,03	0,23	82,90
2	A59	PZ98	DA02	11,65	11,42	11,74	11,64	0	11,61	*b*	*	0,14	1,17	83,92
3	S22x	PB07	DZ02	12,53	13,36	12,88	13,01	4	12,95			0,34	2,65	93,56
4	A62	PZ98	DA01	13,40	13,30	13,20	13,10	4	13,25			0,13	0,97	95,76
5	F26x	PB07	DZ02	13,25	13,27	13,28	13,26	4	13,27			0,01	0,10	95,87
6	F01x	PB08	DZ02	13,24	13,41	13,12	13,30	4	13,27			0,12	0,94	95,87
7	A43	PB08	DZ02	13,60	13,60	12,80	13,20	4	13,30			0,38	2,88	96,12
8	F06x	PZ98	DA02	13,50	13,10	13,60	13,30	4	13,38			0,22	1,66	96,66
9	F15x	PZ98	DA01	13,48	13,37	13,58	13,27	4	13,43			0,13	1,00	97,02
10	F07x	PZ98	DA01	13,08	13,42	13,71	13,56	4	13,44			0,27	2,00	97,15
11	F25x	PZ98	DA01	13,54	13,59	13,28	13,39	4	13,45			0,14	1,05	97,20
12	A58x	PZ98	DA99	13,80	13,50	13,60	13,30	4	13,55			0,21	1,54	97,93
13	F19x	PZ98	DA01	13,50	13,60	13,60	13,60	4	13,58			0,05	0,37	98,11
14	F22x	PZ98	DA01	13,44	13,90	13,81	13,16	4	13,58			0,34	2,52	98,13
15	A88	PD01	DZ02	13,16	14,00	13,16	14,00	4	13,58			0,48	3,57	98,14
16	A71	PB07	DZ02	13,77	13,65	13,47	13,48	4	13,59			0,15	1,08	98,23
17	A49	PZ98	DA02	13,88	13,61	13,61	13,69	4	13,70			0,13	0,93	98,99
18	A60x	PZ98	DA02	13,66	13,79	13,65	13,78	4	13,72			0,08	0,55	99,16
19	F03	PZ98	DA01	13,64	13,51	13,78	14,04	4	13,74			0,23	1,65	99,32
20	F12x	PZ98	DA02	13,90	14,23	13,11	13,75	4	13,75			0,47	3,42	99,35
21	F05x	PZ98	DA01	13,70	13,80	13,80	13,70	4	13,75			0,06	0,42	99,37
22	A85x	PZ98	DA01	13,83	13,83	13,81	13,85	4	13,83			0,02	0,12	99,96
23	A39	PZ98	DA02	14,01	13,84	13,69	13,81	4	13,84			0,13	0,95	100,01
24	A45x	PZ98	DA02	14,00	13,80	13,90	13,70	4	13,85			0,13	0,93	100,10
25	F32x	PZ98	DA02	13,80	13,80	14,00	14,00	4	13,90			0,12	0,83	100,46
26	A36	PZ02	DD02	14,01	13,90	13,69	14,01	4	13,90			0,15	1,09	100,48
27	F18x	PB07	DZ02	13,90	14,00	13,90	14,00	4	13,95			0,06	0,41	100,82
28	F14x	PZ98	DA01	14,00	13,90	13,90	14,00	4	13,95			0,06	0,41	100,82
29	A56	PZ98	DA01	13,50	14,30	14,20	14,00	4	14,00			0,36	2,54	101,18
30	F24x	PZ98	DA02	13,90	14,10	14,10	14,00	4	14,03			0,10	0,68	101,36
31	F33x	PZ98	DA02	14,00	14,40	13,70	14,30	4	14,10			0,32	2,24	101,90
32	F27x	PZ98	DA01	14,17	14,14	14,02	14,11	4	14,11			0,06	0,46	101,97
33	A65	PD01	DB08	13,71	14,56	14,03	14,24	4	14,14			0,36	2,53	102,16
34	A42	PZ98	DA01	13,35	14,37	14,60	14,27	4	14,15			0,55	3,88	102,25
35	F02x	PZ98	DA01	14,05	14,18	14,36	14,15	4	14,19			0,13	0,91	102,52
36	A61x	PZ98	DA02	14,18	14,21	14,33	14,11	4	14,21			0,09	0,65	102,68
37	A86x	PZ98	DA01	14,20	14,30	14,30	14,20	4	14,25			0,06	0,41	102,99
38	A82	PZ98	DA02	14,30	14,30	14,20	14,50	4	14,33			0,13	0,88	103,53
39	A57	PZ98	DA01	14,31	14,14	14,47	14,47	4	14,35			0,16	1,10	103,69
40	F16x	PZ98	DA02	14,09	14,11	14,61	14,64	4	14,36			0,30	2,11	103,80
41	F08x	PZ98	DA01	14,43	14,36	14,56	14,19	4	14,39			0,15	1,07	103,96
42	F21	PZ98	DA01	14,42	14,47	14,33	14,32	4	14,39			0,07	0,50	103,96
43	A47x	PZ98	DA01	14,66	14,89	15,23	14,71	4	14,87			0,26	1,73	107,49
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**164**	**13,84**	**0,188**	**1,357**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
41	**0,402**	**2,908**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: N **Sample: 3** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean		Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A59	PZ98	DA02	10,59	10,52	10,59	10,49	0	10,55	*b* *	0,05	0,48	83,52
2	F13x	PZ98	DA01	11,79	11,74	11,73	11,78	4	11,76		0,03	0,25	93,12
3	A88	PD01	DZ02	11,95	11,67	11,95	11,67	4	11,81		0,16	1,37	93,52
4	F25x	PZ98	DA01	12,14	11,93	*13,97a*	12,22	3	12,10		0,15	1,24	95,79
5	A62	PZ98	DA01	12,20	12,10	12,10	12,10	4	12,13		0,05	0,41	96,01
6	F15x	PZ98	DA01	12,10	12,21	12,21	12,21	4	12,18		0,06	0,45	96,47
7	F07x	PZ98	DA01	11,83	12,33	12,36	12,31	4	12,21		0,25	2,07	96,66
8	F01x	PB08	DZ02	12,15	12,38	12,14	12,27	4	12,23		0,11	0,91	96,87
9	F22x	PZ98	DA01	12,44	12,09	12,24	12,25	4	12,26		0,14	1,17	97,04
10	A71	PB07	DZ02	12,26	12,13	12,31	12,33	4	12,26		0,09	0,74	97,04
11	F06x	PZ98	DA02	11,90	12,40	12,10	12,80	4	12,30		0,39	3,18	97,40
12	F12x	PZ98	DA02	12,82	12,11	12,18	12,37	4	12,37		0,32	2,58	97,95
13	F19x	PZ98	DA01	12,30	12,50	12,40	12,40	4	12,40		0,08	0,66	98,19
14	A65	PD01	DB08	12,61	12,51	11,98	12,51	4	12,40		0,29	2,30	98,21
15	A42	PZ98	DA01	12,92	12,38	12,46	12,35	4	12,53		0,27	2,12	99,20
16	F03	PZ98	DA01	12,42	12,38	12,75	12,64	4	12,55		0,18	1,41	99,36
17	A58x	PZ98	DA99	12,30	12,60	12,80	12,50	4	12,55		0,21	1,66	99,38
18	A60x	PZ98	DA02	12,61	12,49	12,53	12,57	4	12,55		0,05	0,41	99,38
19	S22x	PB07	DZ02	11,84	13,29	12,50	12,63	0	12,57	*c*	0,59	4,73	99,49
20	F26x	PB07	DZ02	12,56	12,56	12,59	12,57	4	12,57		0,01	0,11	99,53
21	A49	PZ98	DA02	12,63	12,52	12,66	12,62	4	12,61		0,06	0,48	99,83
22	A85x	PZ98	DA01	12,65	12,65	12,54	12,74	4	12,64		0,08	0,65	100,11
23	F24x	PZ98	DA02	12,70	12,50	12,70	12,70	4	12,65		0,10	0,79	100,17
24	F05x	PZ98	DA01	12,70	12,60	12,60	12,70	4	12,65		0,06	0,46	100,17
25	A45x	PZ98	DA02	12,60	12,70	12,80	12,60	4	12,68		0,10	0,76	100,36
26	A36	PZ02	DD02	12,87	12,55	12,44	12,87	4	12,68		0,22	1,74	100,42
27	F27x	PZ98	DA01	12,79	12,76	12,76	12,57	4	12,72		0,10	0,79	100,72
28	F32x	PZ98	DA02	12,60	12,70	12,80	12,80	4	12,73		0,10	0,75	100,76
29	A82	PZ98	DA02	12,80	12,90	12,60	12,60	4	12,73		0,15	1,18	100,76
30	A61x	PZ98	DA02	12,69	12,85	12,83	12,65	4	12,76		0,10	0,78	101,00
31	F14x	PZ98	DA01	12,90	12,90	12,70	12,70	4	12,80		0,12	0,90	101,35
32	A57	PZ98	DA01	12,48	13,46	12,73	12,54	4	12,80		0,45	3,52	101,37
33	F33x	PZ98	DA02	12,80	12,90	12,90	*13,7a*	3	12,87		0,06	0,45	101,88
34	A86x	PZ98	DA01	13,00	12,90	13,00	13,00	4	12,98		0,05	0,39	102,74
35	F21	PZ98	DA01	12,91	13,12	13,04	12,92	4	13,00		0,10	0,78	102,92
36	A43	PB08	DZ02	12,83	12,38	13,27	13,60	0	13,02	*c*	0,53	4,08	103,10
37	F18x	PB07	DZ02	13,00	13,00	13,10	13,10	4	13,05		0,06	0,44	103,33
38	F02x	PZ98	DA01	13,14	13,05	13,09	13,10	4	13,10		0,04	0,28	103,69
39	A56	PZ98	DA01	12,90	13,30	13,40	13,00	4	13,15		0,24	1,81	104,13
40	F16x	PZ98	DA02	13,27	13,28	13,05	13,12	4	13,18		0,11	0,86	104,36
41	F08x	PZ98	DA01	13,46	13,07	13,23	13,32	4	13,27		0,16	1,23	105,08
42	A39	PZ98	DA02	13,24	13,55	13,25	13,15	4	13,30		0,17	1,31	105,29
43	A47x	PZ98	DA01	14,06	13,69	13,37	13,37	4	13,62		0,33	2,41	107,87
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	n	Mean	s_r	CV_r
all labs	**158**	**12,63**	**0,145**	**1,146**
* = non tolerable mean because more than +/- **10** % from the mean				
	l		s_R	CV_R
	40		**0,403**	**3,189**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: N **Sample: 4** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A88	PD01	DZ02	17,31	17,45	17,31	17,45	0	17,38	*b*	*	0,08	0,47	76,11
2	A59	PZ98	DA02	19,47	19,42	19,67	19,35	0	19,48	*b*	*	0,14	0,71	85,30
3	A58x	PZ98	DA99	20,80	20,70	20,90	21,00	4	20,85			0,13	0,62	91,31
4	A61x	PZ98	DA02	21,65	21,25	21,50	21,45	4	21,46			0,17	0,77	93,99
5	F13x	PZ98	DA01	21,70	21,67	21,52	21,50	4	21,60			0,10	0,47	94,58
6	F33x	PZ98	DA02	21,60	21,60	21,70	21,60	4	21,63			0,05	0,23	94,70
7	A71	PB07	DZ02	21,71	21,75	22,02	21,36	4	21,71			0,27	1,26	95,07
8	A49	PZ98	DA02	21,60	21,62	22,02	21,71	4	21,74			0,19	0,89	95,20
9	F06x	PZ98	DA02	21,80	21,70	21,90	21,70	4	21,78			0,10	0,44	95,36
10	F15x	PZ98	DA01	23,01	21,14	22,07	21,45	4	21,92			0,82	3,76	95,98
11	S22x	PB07	DZ02	21,43	22,78	22,00	22,22	4	22,11			0,56	2,53	96,82
12	A45x	PZ98	DA02	21,80	21,60	22,50	22,60	4	22,13			0,50	2,26	96,89
13	F12x	PZ98	DA02	22,35	21,87	22,30	22,17	4	22,17			0,22	0,97	97,10
14	A43	PB08	DZ02	22,64	22,34	21,90	22,42	4	22,33			0,31	1,39	97,77
15	F25x	PZ98	DA01	22,87	22,31	22,56	21,71	4	22,36			0,49	2,20	97,93
16	A82	PZ98	DA02	21,50	23,40	23,00	22,40	4	22,58			0,83	3,66	98,86
17	F16x	PZ98	DA02	22,74	22,93	22,60	22,80	4	22,77			0,14	0,60	99,71
18	A62	PZ98	DA01	23,10	22,80	22,70	22,50	4	22,78			0,25	1,10	99,74
19	F01x	PB08	DZ02	22,91	22,97	22,85	22,69	4	22,86			0,12	0,52	100,09
20	F19x	PZ98	DA01	22,10	22,90	23,60	22,90	4	22,88			0,61	2,68	100,18
21	A42	PZ98	DA01	23,20	23,30	22,01	23,05	4	22,89			0,60	2,60	100,24
22	F22x	PZ98	DA01	22,90	22,60	23,17	23,02	4	22,92			0,24	1,05	100,39
23	F03	PZ98	DA01	23,31	22,23	23,47	22,71	4	22,93			0,57	2,49	100,42
24	F26x	PB07	DZ02	23,04	23,02	23,02	23,03	4	23,03			0,01	0,04	100,85
25	A36	PZ02	DD02	23,16	22,18	23,16	23,71	4	23,05			0,64	2,76	100,95
26	A57	PZ98	DA01	22,97	22,35	22,82	24,07	4	23,05			0,73	3,16	100,95
27	A86x	PZ98	DA01	23,10	22,90	23,40	23,00	4	23,10			0,22	0,94	101,16
28	F24x	PZ98	DA02	23,40	23,10	22,80	23,20	4	23,13			0,25	1,08	101,27
29	F08x	PZ98	DA01	23,81	23,81	22,20	22,75	4	23,14			0,80	3,47	101,35
30	F32x	PZ98	DA02	23,00	23,20	23,40	23,00	4	23,15			0,19	0,83	101,38
31	A56	PZ98	DA01	22,40	23,40	23,20	23,60	4	23,15			0,53	2,27	101,38
32	A60x	PZ98	DA02	23,11	23,60	23,29	23,05	4	23,26			0,25	1,06	101,87
33	F14x	PZ98	DA01	23,40	23,20	23,20	23,30	4	23,28			0,10	0,41	101,93
34	A65	PD01	DB08	22,20	23,39	23,17	24,46	4	23,31			0,93	3,98	102,06
35	F05x	PZ98	DA01	23,10	23,60	23,10	23,50	4	23,33			0,26	1,13	102,15
36	F07x	PZ98	DA01	23,84	24,17	23,64	23,10	4	23,69			0,45	1,89	103,74
37	F27x	PZ98	DA01	24,26	23,84	23,29	23,63	4	23,76			0,41	1,71	104,03
38	F02x	PZ98	DA01	24,08	23,61	23,55	24,17	4	23,85			0,32	1,33	104,46
39	A39	PZ98	DA02	24,47	24,05	23,97	24,67	4	24,29			0,34	1,38	106,37
40	A85x	PZ98	DA01	24,15	24,22	24,73	24,29	4	24,35			0,26	1,08	106,63
41	F18x	PB07	DZ02	24,40	24,40	24,30	24,40	4	24,38			0,05	0,21	106,75
42	F21	PZ98	DA01	24,42	25,05	24,59	24,92	4	24,75			0,29	1,17	108,37
43	A47x	PZ98	DA01	25,81	27,58	25,19	25,41	0	26,00	*b*	*	1,09	4,18	113,85
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	n	Mean	s_r	CV_r
all labs	**160**	**22,83**	**0,357**	**1,562**
10	% from the mean			

l	s_R	CV_R
40	**0,874**	**3,826**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: S **Sample: 1** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A85x	PZ98	DA01	1,23	1,23	1,26	1,20	0	1,23	*b*	*	0,02	2,00	74,23
2	A56	PC01	DB08	1,34	1,35	1,33	1,35	4	1,34		*	0,01	0,83	81,14
3	A71	PD02	DB10	1,37	1,41	1,42	1,40	4	1,40		*	0,02	1,60	84,78
4	F06x	PD02	DB08	1,44	1,40	1,45	1,40	4	1,42			0,03	1,86	85,99
5	F24x	PZ98	DA02	1,43	1,46	1,49	1,50	4	1,47			0,03	2,15	88,86
6	F21	PZ98	DA01	1,39	1,53	1,49	1,48	4	1,47			0,06	4,01	89,01
7	S22x	PD02	DB08	1,53	1,44	1,46	1,77	0	1,55	*c*		0,15	9,78	93,70
8	F33x	PD01	DB10	1,58	1,54	1,53	1,61	4	1,57			0,04	2,36	94,60
9	F08x	PZ99	DB08	1,58	1,64	1,52	1,52	4	1,57			0,06	3,56	94,74
10	A62	PZ98	DA01	1,60	1,56	1,63	1,55	4	1,59			0,04	2,33	95,81
11	A60x	PD01	DB10	1,50	1,60	1,60	1,71	4	1,60			0,09	5,41	96,74
12	A86x	PZ98	DA01	1,56	1,64	1,55	1,67	4	1,60			0,06	3,64	96,96
13	A57	PZ02	DD02	1,61	1,60	1,60	1,61	4	1,61			0,01	0,36	97,02
14	A59	PC01	DB08	1,63	1,64	1,63	1,60	4	1,63			0,02	1,21	98,28
15	F19x	PD02	DB08	1,64	1,64	1,64	1,64	4	1,64			0,00	0,00	99,14
16	A45x	PE99	DB08	1,65	1,66	1,63	1,64	4	1,65			0,01	0,78	99,44
17	F13x	PD01	DB08	1,65	1,65	1,66	1,64	4	1,65			0,01	0,46	99,65
18	F02x	PZ98	DA01	1,66	1,63	1,66	1,65	4	1,65			0,01	0,86	99,74
19	A65	PD01	DB08	1,68	1,63	1,67	1,63	4	1,65			0,03	1,59	99,89
20	F14x	PC01	DB08	1,66	1,66	1,65	1,65	4	1,66			0,01	0,35	100,04
21	F12x	PC01	DB08	1,63	1,68	1,66	1,66	4	1,66			0,02	1,24	100,17
22	F32x	PC01	DB08	1,67	1,66	1,67	1,65	4	1,66			0,01	0,63	100,27
23	F27x	PZ98	DA01	1,68	1,65	1,56	1,75	4	1,66			0,08	4,74	100,35
24	F05x	PZ98	DA01	1,68	1,68	1,65	1,65	4	1,67			0,02	1,04	100,65
25	A47x	PD01	DB08	1,69	1,64	1,65	1,69	4	1,67			0,03	1,59	100,76
26	A36	PD02	DB08	1,68	1,65	1,70	1,65	4	1,67			0,02	1,47	100,95
27	A39	PC02	DB08	1,67	1,68	1,65	1,68	4	1,67			0,01	0,84	101,04
28	F16x	PC01	DB08	1,71	1,69	1,67	1,69	4	1,69			0,02	1,05	102,19
29	F15x	PB03	DB08	1,70	1,70	1,70	1,67	4	1,69			0,02	0,89	102,31
30	A61x	PD01	DB08	1,72	1,69	1,71	1,77	4	1,72			0,03	1,78	104,10
31	F07x	PD99	DB08	1,67	1,70	1,77	1,76	4	1,72			0,05	2,85	104,25
32	A49	PD05	DB08	1,74	1,72	1,73	1,73	4	1,73			0,01	0,47	104,58
33	A82	PD01	DB08	1,69	1,69	1,74	1,81	4	1,73			0,06	3,28	104,73
34	F03	PD02	DB08	1,75	1,78	1,72	1,73	4	1,75			0,03	1,51	105,59
35	F18x	PD99	DB08	1,78	1,73	1,78	1,73	4	1,76			0,03	1,64	106,09
36	A88	PZ98	DA01	1,81	1,73	1,81	1,73	4	1,77			0,04	2,48	106,82
37	F25x	PB06	DB08	1,80	1,80	1,81	1,83	4	1,81			0,01	0,78	109,41
38	A58x	PZ98	DA99	1,83	1,85	1,82	1,85	4	1,84			0,02	0,82	111,08
39	F09	PZ02	DD02	1,93	1,93	1,93	1,93	4	1,93		*	0,00	0,00	116,37
40	A79	PD03	DB99	1,98	1,96	1,88	1,88	4	1,93		*	0,05	2,75	116,45
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	n	Mean	s_r	CV_r
all labs	**152**	**1,65**	**0,028**	**1,700**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
38	**0,124**	**7,519**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: S **Sample: 2** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A85x	PZ98	DA01	0,67	0,68	0,71	0,72	0	0,69	*b*	*	0,03	3,70	74,17
2	A56	PC01	DB08	0,74	0,74	0,74	0,74	4	0,74		*	0,00	0,13	79,34
3	F06x	PD02	DB08	0,76	0,77	0,79	0,75	4	0,77		*	0,02	2,05	82,45
4	F13x	PD01	DB08	0,81	0,81	0,82	0,81	4	0,81			0,00	0,47	86,83
5	A60x	PD01	DB10	0,77	0,85	0,90	0,89	4	0,85			0,06	6,92	91,48
6	F16x	PC01	DB08	0,85	0,86	0,85	0,87	4	0,86			0,01	1,55	91,87
7	F08x	PZ99	DB08	0,89	0,91	0,85	0,84	4	0,87			0,03	4,01	93,49
8	A36	PD02	DB08	0,88	0,88	0,90	0,87	4	0,88			0,01	1,43	94,59
9	F14x	PC01	DB08	0,88	0,90	0,90	0,90	4	0,90			0,01	1,12	95,93
10	A59	PC01	DB08	0,92	0,90	0,89	0,89	4	0,90			0,01	1,19	96,61
11	A65	PD01	DB08	0,88	0,86	0,93	0,96	4	0,91			0,05	5,04	97,27
12	A62	PZ98	DA01	0,89	0,93	0,90	0,91	4	0,91			0,02	1,88	97,27
13	F02x	PZ98	DA01	0,93	0,89	0,93	0,89	4	0,91			0,02	2,60	97,48
14	F05x	PZ98	DA01	0,91	0,92	0,91	0,91	4	0,91			0,00	0,32	97,75
15	F12x	PC01	DB08	0,92	0,92	0,91	0,91	4	0,91			0,01	0,61	97,94
16	F15x	PB03	DB08	0,91	0,91	0,92	0,93	4	0,92			0,01	1,04	98,34
17	F32x	PC01	DB08	0,92	0,91	0,94	0,90	4	0,92			0,01	1,62	98,39
18	A39	PC02	DB08	0,92	0,92	0,91	0,93	4	0,92			0,01	0,90	98,50
19	A71	PD02	DB10	0,98	0,87	0,82	1,01	0	0,92	*c*		0,09	9,66	98,63
20	F19x	PD02	DB08	0,91	0,91	0,93	0,93	4	0,92			0,01	1,12	98,79
21	A45x	PE99	DB08	0,92	0,92	0,92	0,93	4	0,92			0,00	0,38	98,82
22	A47x	PD01	DB08	0,92	0,93	0,94	0,90	4	0,92			0,02	1,88	99,01
23	A49	PD05	DB08	0,94	0,93	0,93	0,93	4	0,93			0,00	0,54	99,95
24	F27x	PZ98	DA01	0,94	0,92	0,97	0,90	4	0,93			0,03	3,20	99,95
25	A82	PD01	DB08	0,93	0,93	0,95	0,95	4	0,94			0,01	1,39	100,62
26	F21	PZ98	DA01	0,91	0,98	0,97	0,96	4	0,96			0,03	3,26	102,36
27	F18x	PD99	DB08	0,97	0,94	0,96	0,95	4	0,96			0,01	1,36	102,47
28	F03	PD02	DB08	0,95	0,98	0,94	0,96	4	0,96			0,02	1,83	102,55
29	A61x	PD01	DB08	0,99	0,95	0,97	0,94	4	0,96			0,02	2,47	102,84
30	F07x	PD99	DB08	0,92	0,94	0,98	1,01	4	0,97			0,04	4,14	103,45
31	A88	PZ98	DA01	1,00	0,95	1,00	0,95	4	0,98			0,03	2,97	104,70
32	F24x	PZ98	DA02	0,95	0,98	1,01	0,98	4	0,98			0,02	2,50	105,04
33	A57	PZ02	DD02	0,99	1,00	1,00	0,99	4	1,00			0,01	0,58	106,65
34	F25x	PB06	DB08	0,99	1,03	0,99	0,98	4	1,00			0,02	2,22	106,91
35	F33x	PD01	DB10	0,98	1,06	1,04	0,96	4	1,01			0,05	4,71	108,25
36	A79	PD03	DB99	1,04	1,05	0,98	0,98	4	1,01			0,04	3,71	108,45
37	A86x	PZ98	DA01	1,01	1,02	1,00	1,03	4	1,01			0,01	1,37	108,65
38	S22x	PD02	DB08	1,07	0,96	0,98	1,07	4	1,02			0,06	5,72	109,32
39	F09	PZ02	DD02	1,06	1,08	1,11	1,11	4	1,09		*	0,03	2,38	117,02
40	A58x	PZ98	DA99	1,08	1,16	1,10	1,09	4	1,11		*	0,04	3,25	118,70
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	n	Mean	s_r	CV_r
all labs	**152**	**0,93**	**0,021**	**2,240**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
38	**0,074**	**7,897**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: S **Sample: 3** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean		Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A85x	PZ98	DA01	0,64	0,64	*0,551a*	0,66	3	0,64	*	0,01	1,89	77,36
2	A56	PC01	DB08	0,65	0,67	0,68	0,66	4	0,67	*	0,01	1,98	80,04
3	F06x	PD02	DB08	0,72	0,74	0,73	0,72	4	0,73		0,01	1,15	87,64
4	F16x	PC01	DB08	0,76	0,76	0,76	0,76	4	0,76		0,00	0,29	91,37
5	A60x	PD01	DB10	0,84	0,63	0,74	0,88	0	0,77	*c*	0,11	**14,66**	92,92
6	F08x	PZ99	DB08	0,80	0,81	0,73	0,76	4	0,77		0,04	4,61	93,00
7	A71	PD02	DB10	0,81	0,79	0,72	0,79	4	0,78		0,04	5,23	93,33
8	A36	PD02	DB08	0,79	0,80	0,80	0,75	4	0,79		0,02	3,03	94,45
9	F32x	PC01	DB08	0,79	0,80	0,79	0,80	4	0,79		0,00	0,60	95,38
10	A59	PC01	DB08	0,81	0,82	0,80	0,78	4	0,80		0,02	1,93	96,45
11	A45x	PE99	DB08	0,81	0,80	0,80	0,80	4	0,80		0,00	0,28	96,46
12	F13x	PD01	DB08	0,80	0,80	0,81	0,81	4	0,81		0,01	0,75	97,13
13	F14x	PC01	DB08	0,81	0,80	0,81	0,81	4	0,81		0,01	0,62	97,15
14	F05x	PZ98	DA01	0,81	0,80	0,82	0,81	4	0,81		0,01	0,85	97,42
15	F33x	PD01	DB10	0,75	0,85	0,84	0,80	4	0,81		0,05	5,61	97,45
16	A47x	PD01	DB08	0,82	0,82	0,80	0,81	4	0,81		0,01	1,46	97,51
17	A39	PC02	DB08	0,82	0,82	0,81	0,81	4	0,82		0,00	0,61	98,06
18	A61x	PD01	DB08	0,84	0,82	0,81	0,82	4	0,82		0,01	1,68	98,66
19	F15x	PB03	DB08	0,82	0,82	0,82	0,84	4	0,83		0,01	1,21	99,26
20	F19x	PD02	DB08	0,83	0,83	0,82	0,83	4	0,83		0,00	0,32	99,41
21	F12x	PC01	DB08	0,82	0,84	0,81	0,83	4	0,83		0,01	1,53	99,47
22	F02x	PZ98	DA01	0,85	0,86	0,80	0,81	4	0,83		0,03	3,55	99,83
23	A62	PZ98	DA01	0,85	0,86	0,83	0,81	4	0,84		0,02	2,65	100,76
24	A49	PD05	DB08	0,84	0,85	0,83	0,86	4	0,85		0,01	1,53	101,66
25	F03	PD02	DB08	0,85	0,87	0,84	0,83	4	0,85		0,02	2,08	101,88
26	F07x	PD99	DB08	0,82	0,85	0,85	0,88	4	0,85		0,03	3,09	102,46
27	A65	PD01	DB08	0,85	0,85	0,86	0,85	4	0,85		0,01	0,59	102,57
28	A57	PZ02	DD02	0,87	0,90	0,86	0,82	4	0,86		0,03	3,83	103,77
29	A88	PZ98	DA01	0,85	0,85	0,89	0,89	4	0,87		0,02	2,47	105,11
30	F27x	PZ98	DA01	0,91	0,85	0,85	0,91	4	0,88		0,03	3,94	105,88
31	F24x	PZ98	DA02	0,87	0,88	0,90	0,89	4	0,89		0,01	1,46	106,48
32	F21	PZ98	DA01	0,88	0,89	0,91	0,87	4	0,89		0,02	1,92	106,78
33	F18x	PD99	DB08	0,90	0,88	0,91	0,87	4	0,89		0,02	2,02	106,96
34	A82	PD01	DB08	0,89	0,89	0,89	0,89	4	0,89		0,00	0,25	107,05
35	A86x	PZ98	DA01	0,87	0,89	0,91	0,90	4	0,89		0,02	2,13	107,35
36	F25x	PB06	DB08	0,89	0,90	0,90	0,91	4	0,90		0,01	0,91	108,28
37	A79	PD03	DB99	0,96	0,97	0,89	0,89	4	0,93		0,04	4,49	111,67
38	A58x	PZ98	DA99	0,96	0,94	0,93	0,97	4	0,95		0,02	1,92	114,30
39	F09	PZ02	DD02	0,96	0,95	0,95	0,94	4	0,95		0,01	0,90	114,57
40	S22x	PD02	DB08	1,28	1,24	1,23	1,16	0	1,23	*b* *	0,05	4,07	147,68
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	n	Mean	s_r	CV_r
all labs	**151**	**0,83**	**0,016**	**1,982**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
38	**0,066**	**7,907**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: S **Sample: 4** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean		Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A71	PD02	DB10	1,43	1,43	1,49	1,33	0	1,42	*b* *	0,06	4,51	52,77
2	F27x	PZ98	DA01	2,13	2,23	2,10	2,18	4	2,16	*	0,06	2,65	80,15
3	A56	PC01	DB08	2,18	2,19	*2,155a*	2,19	3	2,19	*	0,00	0,15	81,14
4	F05x	PZ98	DA01	2,25	2,23	2,24	2,26	4	2,25	*	0,01	0,58	83,31
5	F33x	PD01	DB10	2,25	2,24	2,28	2,44	4	2,30		0,09	4,05	85,44
6	F24x	PZ98	DA02	2,29	2,31	2,32	2,30	4	2,31		0,01	0,56	85,53
7	F06x	PD02	DB08	2,36	2,33	2,40	2,36	4	2,36		0,03	1,23	87,65
8	A85x	PZ98	DA01	2,56	2,51	2,52	2,54	4	2,53		0,02	0,92	93,90
9	F08x	PZ99	DB08	2,59	2,57	2,57	2,47	4	2,55		0,05	2,11	94,56
10	A62	PZ98	DA01	2,47	2,53	2,65	2,59	4	2,56		0,08	3,03	94,99
11	A59	PC01	DB08	2,59	2,51	2,61	2,62	4	2,58		0,05	1,84	95,77
12	A60x	PD01	DB10	2,70	2,46	2,49	2,70	4	2,58		0,13	5,07	95,89
13	A47x	PD01	DB08	2,59	2,58	2,59	2,59	4	2,59		0,01	0,30	95,93
14	A58x	PZ98	DA99	2,62	2,58	2,60	2,57	4	2,59		0,02	0,86	96,20
15	F16x	PC01	DB08	2,59	2,65	2,62	2,56	4	2,61		0,04	1,46	96,67
16	A57	PZ02	DD02	2,67	2,60	2,65	2,58	4	2,63		0,04	1,60	97,41
17	S22x	PD02	DB08	2,73	2,45	2,52	2,83	0	2,63	*c*	0,18	6,74	97,69
18	F15x	PB03	DB08	2,71	2,59	2,66	2,69	4	2,66		0,05	1,97	98,80
19	F19x	PD02	DB08	2,60	2,78	2,71	2,68	4	2,69		0,07	2,77	99,91
20	A39	PC02	DB08	2,67	2,73	2,68	2,72	4	2,70		0,03	1,03	100,15
21	A88	PZ98	DA01	2,71	2,69	2,71	2,69	4	2,70		0,01	0,41	100,28
22	F13x	PD01	DB08	2,69	2,73	2,71	2,69	4	2,70		0,02	0,66	100,37
23	F02x	PZ98	DA01	2,83	2,64	2,80	2,62	4	2,72		0,11	3,96	101,02
24	A45x	PE99	DB08	2,76	2,71	2,70	2,72	4	2,72		0,03	0,97	101,02
25	F12x	PC01	DB08	2,69	2,75	2,73	2,72	4	2,72		0,03	1,03	101,03
26	F32x	PC01	DB08	2,79	2,76	2,71	2,75	4	2,75		0,03	1,20	102,14
27	A36	PD02	DB08	2,73	2,78	2,85	2,74	4	2,78		0,05	1,96	102,97
28	F14x	PC01	DB08	2,74	2,83	2,74	2,83	4	2,79		0,05	1,87	103,34
29	F18x	PD99	DB08	2,78	2,78	2,81	2,81	4	2,80		0,02	0,62	103,72
30	A65	PD01	DB08	2,77	2,87	2,88	2,85	4	2,84		0,05	1,76	105,48
31	F21	PZ98	DA01	2,82	2,93	2,90	2,83	4	2,87		0,05	1,87	106,50
32	F03	PD02	DB08	2,77	2,97	2,90	3,01	4	2,91		0,10	3,56	108,06
33	F25x	PB06	DB08	2,94	2,97	2,90	2,88	4	2,92		0,04	1,38	108,45
34	F09	PZ02	DD02	2,93	2,94	2,87	3,00	4	2,93		0,05	1,80	108,84
35	A61x	PD01	DB08	2,90	2,98	3,00	3,02	4	2,97		0,05	1,78	110,28
36	A49	PD05	DB08	2,94	2,99	2,94	3,05	4	2,98		0,05	1,75	110,58
37	F07x	PD99	DB08	3,00	2,88	2,99	3,11	4	2,99		0,09	3,09	111,10
38	A82	PD01	DB08	3,10	3,15	2,93	3,03	4	3,05		0,10	3,12	113,27
39	A86x	PZ98	DA01	3,07	3,08	3,18	3,15	4	3,12	*	0,05	1,68	115,67
40	A79	PD03	DB99	3,26	3,27	3,07	3,09	4	3,17	*	0,11	3,38	117,76
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	n	Mean	s_r	CV_r
all labs	**151**	**2,69**	**0,050**	**1,863**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
38	**0,250**	**9,289**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: P **Sample: 1** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	0,94	0,96	0,95	0,94	4	0,95		*	0,01	1,01	78,68
2	A88	PD01	DB08	0,98	0,97	0,95	0,99	4	0,97		*	0,02	1,89	80,60
3	A62	PD02	DE01	1,02	1,05	0,95	0,92	0	0,99	*c*	*	0,06	6,12	81,80
4	F24x	PD01	DB99	1,03	1,04	1,04	1,06	4	1,04		*	0,01	1,29	86,59
5	A85x	PD02	DB08	1,08	1,06	1,08	1,07	4	1,07		*	0,01	0,58	89,11
6	F06x	PD02	DB08	1,15	1,07	1,06	1,07	4	1,09			0,04	3,87	90,37
7	A56	PC01	DB08	1,13	1,13	1,11	1,14	4	1,13			0,01	1,16	93,63
8	F21	PD02	DE01	1,15	1,14	1,08	1,16	4	1,13			0,04	3,17	94,05
9	A49	PD05	DB08	1,14	1,13	1,16	1,14	4	1,14			0,01	1,10	94,88
10	A57	PZ02	DD02	1,15	1,15	1,14	1,14	4	1,15			0,01	0,50	95,08
11	A61x	PD01	DB08	1,15	1,14	1,15	1,17	4	1,15			0,01	0,90	95,77
12	F02x	PD02	DB08	1,15	1,15	1,20	1,12	4	1,15			0,04	3,03	95,87
13	A45x	PE99	DB08	1,18	1,19	1,17	1,17	4	1,18			0,01	0,81	97,78
14	A82	PD01	DB08	1,16	1,18	1,20	1,21	4	1,19			0,02	1,87	98,61
15	F19x	PD02	DB08	1,19	1,19	1,20	1,20	4	1,20			0,01	0,48	99,24
16	F05x	PD02	DB08	1,20	1,20	1,20	1,20	4	1,20			0,00	0,00	99,65
17	F32x	PC01	DB08	1,20	1,20	1,21	1,20	4	1,20			0,01	0,42	99,86
18	A59	PC01	DB08	1,20	1,21	1,21	1,20	4	1,21			0,01	0,55	100,07
19	F13x	PC01	DB08	1,22	1,21	1,21	1,21	4	1,21			0,00	0,28	100,83
20	A47x	PD01	DB08	1,24	1,21	1,21	1,20	4	1,22			0,02	1,43	100,90
21	F01x	PD02	DB01	1,23	1,19	1,24	1,20	4	1,22			0,02	1,94	101,14
22	F16x	PC01	DB08	1,21	1,21	1,23	1,22	4	1,22			0,01	0,58	101,15
23	A71	PB03	DE01	1,19	1,28	1,23	1,21	4	1,23			0,04	3,40	101,89
24	F15x	PC01	DB08	1,23	1,23	1,24	1,21	4	1,23			0,01	1,03	101,94
25	F14x	PC01	DB08	1,23	1,24	1,23	1,22	4	1,23			0,01	0,66	102,14
26	F12x	PC01	DB08	1,21	1,26	1,23	1,23	4	1,23			0,02	1,63	102,21
27	A65	PD01	DB08	1,23	1,21	1,27	1,22	4	1,23			0,03	2,13	102,35
28	F27x	PD01	DE01	1,23	1,25	1,25	1,21	4	1,23			0,02	1,31	102,43
29	A79	PD03	DB99	1,24	1,24	1,22	1,25	4	1,24			0,01	0,77	102,81
30	F08x	PE99	DB08	1,26	1,25	1,23	1,23	4	1,24			0,02	1,30	103,18
31	A36	PD02	DB08	1,24	1,23	1,28	1,22	4	1,24			0,03	2,12	103,18
32	F26x	PD02	DB09	1,26	1,24	1,25	1,25	4	1,25			0,01	0,65	103,80
33	A39	PC02	DB08	1,25	1,27	1,25	1,28	4	1,26			0,01	0,94	104,70
34	F18x	PD99	DB08	1,26	1,26	1,25	1,28	4	1,26			0,01	1,00	104,84
35	F25x	PB06	DB08	1,28	1,26	1,28	1,24	4	1,27			0,02	1,51	105,05
36	F03	PD02	DB08	1,31	1,32	1,20	1,24	4	1,27			0,06	4,51	105,38
37	A58x	PD02	DE01	1,24	1,28	1,29	1,29	4	1,28			0,02	1,87	105,88
38	F33x	PD01	DB10	1,26	1,31	1,26	1,31	4	1,29			0,03	2,25	106,71
39	F09	PZ02	DD02	1,29	1,29	1,29	1,29	4	1,29			0,00	0,00	107,46
40	A60x	PD01	DB10	1,30	1,26	1,29	1,34	4	1,30			0,03	2,64	107,81
41	F07x	PD99	DB08	1,32	1,37	1,40	1,40	4	1,37		*	0,04	2,70	114,02
42	A43	PB06	DE99	1,46	1,44	1,39	1,41	4	1,43		*	0,03	2,20	118,36
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	n	Mean	s_r	CV_r
all labs	**164**	**1,20**	**0,018**	**1,508**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
41	**0,091**	**7,575**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: P **Sample: 2** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	A62	PD02	DE01	0,78	0,75	0,75	0,71	4	0,75		*	0,03	3,84	76,71
2	S22x	PD02	DB08	0,75	0,79	0,78	0,77	4	0,77		*	0,02	2,21	79,28
3	A88	PD01	DB08	0,79	0,80	0,75	0,76	4	0,78		*	0,02	2,76	79,57
4	F24x	PD01	DB99	0,84	0,82	0,85	0,84	4	0,84		*	0,01	1,67	86,05
5	A85x	PD02	DB08	0,89	0,89	0,89	0,90	4	0,89			0,01	0,84	91,49
6	A49	PD05	DB08	0,90	0,90	0,90	0,90	4	0,90			0,00	0,00	92,36
7	A56	PC01	DB08	0,91	0,91	0,90	0,90	4	0,90			0,01	0,60	92,74
8	F13x	PC01	DB08	0,91	0,91	0,91	0,91	4	0,91			0,00	0,38	93,30
9	F06x	PD02	DB08	0,94	0,90	0,92	0,91	4	0,92			0,02	2,00	94,32
10	A61x	PD01	DB08	0,94	0,96	0,94	0,97	4	0,95			0,01	1,36	97,57
11	F16x	PC01	DB08	0,94	0,96	0,94	0,97	4	0,95			0,02	1,82	97,59
12	F19x	PD02	DB08	0,97	0,96	0,98	0,98	4	0,97			0,01	0,73	99,75
13	A59	PC01	DB08	0,99	0,99	0,96	0,96	4	0,97			0,02	1,76	99,86
14	A45x	PE99	DB08	0,98	0,98	0,97	0,97	4	0,97			0,00	0,44	99,95
15	F02x	PD02	DB08	0,97	0,94	0,95	1,04	4	0,97			0,05	4,68	100,01
16	F21	PD02	DE01	0,94	0,98	1,00	0,99	4	0,98			0,03	2,69	100,31
17	A36	PD02	DB08	0,98	0,98	1,00	0,96	4	0,98			0,02	1,67	100,57
18	A82	PD01	DB08	0,97	0,98	0,99	0,99	4	0,98			0,01	0,84	100,67
19	F01x	PD02	DB01	0,98	0,97	0,99	0,99	4	0,98			0,01	1,04	100,75
20	F32x	PC01	DB08	0,99	0,99	0,99	0,98	4	0,99			0,00	0,08	101,08
21	A58x	PD02	DE01	0,98	0,98	0,97	1,03	4	0,99			0,03	2,74	101,60
22	A47x	PD01	DB08	0,99	1,00	1,01	0,97	4	0,99			0,02	1,72	101,85
23	A65	PD01	DB08	0,97	0,95	1,02	1,04	4	1,00			0,04	4,22	102,11
24	F15x	PC01	DB08	0,99	0,98	1,00	1,01	4	1,00			0,01	1,30	102,11
25	F05x	PD02	DB08	1,00	1,00	0,99	1,00	4	1,00			0,01	0,50	102,37
26	F14x	PC01	DB08	1,01	0,99	0,98	1,01	4	1,00			0,02	1,50	102,37
27	F25x	PB06	DB08	1,07	1,09	0,93	0,93	0	1,01	*c*		0,09	8,66	103,14
28	A79	PD03	DB99	1,01	1,01	1,00	1,01	4	1,01			0,01	0,64	103,20
29	F12x	PC01	DB08	1,00	1,01	1,01	1,01	4	1,01			0,01	0,53	103,37
30	F18x	PD99	DB08	1,01	1,02	1,01	1,01	4	1,01			0,01	0,49	103,90
31	F26x	PD02	DB09	1,00	1,02	1,02	1,01	4	1,01			0,01	0,95	103,90
32	A71	PB03	DE01	1,03	1,02	1,02	1,00	4	1,01			0,01	1,22	104,11
33	F03	PD02	DB08	1,03	1,04	1,00	1,02	4	1,02			0,02	1,52	105,11
34	F08x	PE99	DB08	1,03	1,02	1,03	1,03	4	1,02			0,01	0,54	105,11
35	A39	PC02	DB08	1,06	1,02	1,03	1,03	4	1,03			0,02	1,77	106,09
36	A60x	PD01	DB10	1,03	1,04	1,06	1,03	4	1,04			0,01	1,31	106,78
37	F33x	PD01	DB10	1,02	1,06	1,10	1,02	4	1,05			0,04	3,65	107,75
38	F27x	PD01	DE01	1,07	1,07	1,03	1,03	4	1,05			0,02	1,93	107,80
39	A57	PZ02	DD02	1,06	1,06	1,07	1,06	4	1,06			0,01	0,47	109,04
40	F07x	PD99	DB08	1,06	1,11	1,14	1,15	4	1,12		*	0,04	3,71	114,50
41	F09	PZ02	DD02	1,18	1,19	1,21	1,22	4	1,20		*	0,02	1,63	122,99
42	A43	PB06	DE99	1,34	1,32	1,35	1,32	0	1,33	*b*	*	0,01	0,87	136,69
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	n	Mean	s_r	CV_r
all labs	**160**	**0,97**	**0,015**	**1,584**

* = non tolerable mean because more than +/- **10** % from the mean

l	s_R	CV_R
40	**0,086**	**8,816**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: P **Sample: 3** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	A88	PD01	DB08	1,11	1,14	1,10	1,09	4	1,11		*	0,02	1,87	80,56
2	A62	PD02	DE01	1,15	1,12	1,12	1,09	4	1,12		*	0,02	2,19	81,43
3	S22x	PD02	DB08	1,10	1,26	1,16	1,18	4	1,18		*	0,07	5,62	85,43
4	F24x	PD01	DB99	1,21	1,20	1,20	1,21	4	1,21		*	0,01	0,54	87,63
5	F21	PD02	DE01	1,28	1,24	1,25	1,26	4	1,26			0,02	1,36	91,42
6	A56	PC01	DB08	1,25	1,30	1,29	1,26	4	1,28			0,02	1,74	92,72
7	A49	PD05	DB08	1,30	1,30	1,28	1,29	4	1,29			0,01	0,74	93,97
8	A58x	PD02	DE01	1,30	1,30	1,29	1,28	4	1,29			0,01	0,74	93,97
9	F06x	PD02	DB08	1,37	1,31	1,32	1,28	4	1,32			0,03	2,57	96,04
10	F02x	PD02	DB08	1,34	1,25	1,35	1,37	4	1,33			0,05	4,02	96,35
11	A61x	PD01	DB08	1,35	1,34	1,34	1,33	4	1,34			0,01	0,71	97,37
12	A85x	PD02	DB08	1,34	1,36	1,35	1,33	4	1,34			0,01	0,98	97,70
13	A59	PC01	DB08	1,36	1,38	1,33	1,33	4	1,35			0,03	1,87	98,12
14	F19x	PD02	DB08	1,35	1,37	1,35	1,35	4	1,36			0,01	0,74	98,51
15	F16x	PC01	DB08	1,35	1,37	1,34	1,36	4	1,36			0,01	0,94	98,55
16	A36	PD02	DB08	1,36	1,38	1,40	1,31	4	1,36			0,04	2,83	99,06
17	F32x	PC01	DB08	1,37	1,38	1,38	1,38	4	1,38			0,00	0,36	100,15
18	A45x	PE99	DB08	1,39	1,38	1,37	1,38	4	1,38			0,01	0,59	100,33
19	F05x	PD02	DB08	1,38	1,39	1,38	1,38	4	1,38			0,01	0,36	100,51
20	F13x	PC01	DB08	1,38	1,38	1,39	1,39	4	1,38			0,00	0,26	100,68
21	F27x	PD01	DE01	1,38	1,38	1,38	1,40	4	1,38			0,01	0,87	100,68
22	A47x	PD01	DB08	1,38	1,40	1,37	1,40	4	1,39			0,01	1,08	100,88
23	F15x	PC01	DB08	1,38	1,38	1,39	1,42	4	1,39			0,02	1,36	101,24
24	A71	PB03	DE01	1,49	1,34	1,34	1,50	0	1,42	*c*		0,09	6,16	102,98
25	A79	PD03	DB99	1,41	1,43	1,43	1,41	4	1,42			0,01	0,62	103,18
26	A82	PD01	DB08	1,43	1,42	1,41	1,44	4	1,43			0,01	0,91	103,60
27	F14x	PC01	DB08	1,43	1,42	1,42	1,43	4	1,43			0,01	0,41	103,60
28	A57	PZ02	DD02	1,43	1,48	1,43	1,37	4	1,43			0,04	3,15	103,78
29	F03	PD02	DB08	1,44	1,47	1,41	1,40	4	1,43			0,03	2,33	103,91
30	F18x	PD99	DB08	1,44	1,42	1,42	1,44	4	1,43			0,01	0,81	103,97
31	F08x	PE99	DB08	1,47	1,42	1,43	1,42	4	1,43			0,03	1,76	104,18
32	F12x	PC01	DB08	1,44	1,45	1,41	1,43	4	1,43			0,02	1,07	104,24
33	A39	PC02	DB08	1,44	1,43	1,44	1,47	4	1,44			0,02	1,30	105,00
34	F01x	PD02	DB01	1,41	1,48	1,47	1,43	4	1,45			0,03	2,34	105,08
35	A65	PD01	DB08	1,44	1,45	1,46	1,44	4	1,45			0,01	0,66	105,24
36	F33x	PD01	DB10	1,44	1,42	1,50	1,43	4	1,45			0,04	2,48	105,24
37	F26x	PD02	DB09	1,46	1,44	1,45	1,46	4	1,45			0,01	0,66	105,60
38	F25x	PB06	DB08	1,51	1,51	1,51	1,51	4	1,51			0,00	0,00	109,78
39	A60x	PD01	DB10	1,46	1,49	1,47	1,64	0	1,51	*c*	*	0,08	5,50	110,09
40	A43	PB06	DE99	1,53	1,50	1,52	1,52	4	1,52		*	0,01	0,87	110,49
41	F07x	PD99	DB08	1,44	1,55	1,53	1,58	4	1,53		*	0,06	4,12	110,95
42	F09	PZ02	DD02	1,64	1,64	1,64	1,62	4	1,63		*	0,01	0,64	118,85
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	n	Mean	s_r	CV_r
all labs	**160**	**1,38**	**0,020**	**1,441**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
40	**0,105**	**7,640**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: P **Sample: 4** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	A62	PD02	DE01	2,17	2,17	1,90	2,00	0	2,06	*c*	*	0,13	6,48	77,67
2	A88	PD01	DB08	2,05	2,05	2,14	2,07	0	2,08	*b*	*	0,04	2,14	78,35
3	A57	PZ02	DD02	2,18	2,17	2,17	2,14	4	2,17		*	0,02	0,80	81,63
4	S22x	PD02	DB08	2,09	2,21	2,32	2,20	4	2,21		*	0,09	4,26	83,13
5	F24x	PD01	DB99	2,31	2,32	2,30	2,25	4	2,30		*	0,03	1,41	86,58
6	A56	PC01	DB08	2,41	2,39	2,44	2,41	4	2,41			0,02	0,86	91,04
7	F09	PZ02	DD02	2,41	2,45	2,47	2,47	4	2,45			0,03	1,25	92,38
8	F06x	PD02	DB08	2,58	2,47	2,47	2,48	4	2,50			0,05	2,19	94,23
9	A49	PD05	DB08	2,52	2,52	2,55	2,48	4	2,52			0,03	1,14	94,92
10	A59	PC01	DB08	2,61	2,51	2,48	2,58	4	2,55			0,06	2,42	96,05
11	A58x	PD02	DE01	2,53	2,56	2,57	2,56	4	2,56			0,02	0,68	96,33
12	A45x	PE99	DB08	2,59	2,57	2,57	2,59	4	2,58			0,01	0,45	97,27
13	F02x	PD02	DB08	2,76	2,48	2,63	2,53	4	2,60			0,12	4,66	98,05
14	A61x	PD01	DB08	2,60	2,61	2,60	2,61	4	2,61			0,01	0,19	98,23
15	F13x	PC01	DB08	2,62	2,63	2,62	2,62	4	2,62			0,01	0,20	98,91
16	F27x	PD01	DE01	2,66	2,63	2,64	2,63	4	2,64			0,02	0,63	99,55
17	F19x	PD02	DB08	2,62	2,61	2,70	2,64	4	2,64			0,04	1,53	99,63
18	F32x	PC01	DB08	2,62	2,65	2,65	2,66	4	2,65			0,02	0,65	99,72
19	F05x	PD02	DB08	2,63	2,70	2,70	2,63	4	2,67			0,04	1,52	100,48
20	F15x	PC01	DB08	2,62	2,69	2,68	2,68	4	2,67			0,03	1,20	100,57
21	A39	PC02	DB08	2,72	2,72	2,65	2,64	4	2,68			0,04	1,53	101,14
22	F08x	PE99	DB08	2,68	2,71	2,69	2,67	4	2,68			0,02	0,69	101,18
23	F01x	PD02	DB01	2,72	2,75	2,65	2,69	4	2,70			0,04	1,60	101,91
24	A47x	PD01	DB08	2,67	2,70	2,72	2,75	4	2,71			0,03	1,24	102,17
25	F12x	PC01	DB08	2,66	2,76	2,72	2,71	4	2,71			0,04	1,43	102,30
26	F18x	PD99	DB08	2,74	2,74	2,71	2,67	4	2,72			0,03	1,22	102,36
27	A85x	PD02	DB08	2,66	2,72	2,71	2,78	4	2,72			0,05	1,75	102,43
28	F21	PD02	DE01	2,78	2,79	2,67	2,64	4	2,72			0,08	2,80	102,55
29	F16x	PC01	DB08	2,68	2,72	2,73	2,74	4	2,72			0,03	0,94	102,55
30	A71	PB03	DE01	2,75	2,76	2,72	2,69	4	2,73			0,03	1,13	102,91
31	A79	PD03	DB99	2,72	2,74	2,74	2,74	4	2,74			0,01	0,34	103,24
32	F03	PD02	DB08	2,64	2,90	2,72	2,71	4	2,74			0,11	4,07	103,47
33	A65	PD01	DB08	2,70	2,73	2,76	2,79	4	2,75			0,04	1,41	103,49
34	A36	PD02	DB08	2,73	2,82	2,80	2,70	4	2,76			0,06	2,06	104,15
35	F14x	PC01	DB08	2,71	2,74	2,84	2,76	4	2,76			0,06	2,01	104,15
36	F26x	PD02	DB09	2,75	2,76	2,78	2,79	4	2,77			0,02	0,66	104,44
37	A82	PD01	DB08	2,75	2,77	2,83	2,80	4	2,79			0,04	1,26	105,10
38	A60x	PD01	DB10	2,87	2,82	2,81	2,82	4	2,83			0,03	0,98	106,63
39	A43	PB06	DE99	2,84	2,83	2,83	2,82	4	2,83			0,01	0,29	106,72
40	F25x	PB06	DB08	2,83	2,84	2,84	2,83	4	2,84			0,01	0,20	106,89
41	F33x	PD01	DB10	2,89	2,87	2,85	2,93	4	2,89			0,03	1,18	108,77
42	F07x	PD99	DB08	2,92	3,02	3,05	2,97	4	2,99		*	0,06	1,86	112,73
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	n	Mean	s_r	CV_r
all labs	**160**	**2,65**	**0,037**	**1,407**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
40	**0,169**	**6,375**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Ca **Sample: 1** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	S22x	PD02	DB08	6,91	6,33	7,48	6,91	0	6,91	*b*	*	0,47	6,80	68,16
2	A56	PC01	DB08	8,89	8,96	8,70	9,04	4	8,90		*	0,15	1,63	87,78
3	A88	PD01	DB08	9,12	8,97	8,94	9,03	4	9,02		*	0,08	0,88	88,98
4	A57	PZ02	DD02	9,36	9,36	9,35	9,42	4	9,37			0,03	0,34	92,48
5	A85x	PD02	DB08	9,35	9,45	9,45	9,40	4	9,41			0,05	0,49	92,86
6	A65	PD01	DB09	9,37	9,25	10,19	9,15	4	9,49			0,48	5,01	93,64
7	F22x	PD02	DB01	9,44	9,59	9,37	9,82	4	9,56			0,20	2,08	94,28
8	A60x	PD01	DB10	9,49	9,59	9,41	9,84	4	9,58			0,19	1,99	94,53
9	F13x	PD01	DB08	9,72	9,69	9,64	9,67	4	9,68			0,03	0,35	95,50
10	A47x	PD01	DB08	9,94	9,78	9,88	9,86	4	9,87			0,07	0,67	97,34
11	F19x	PD02	DB08	9,92	9,90	9,95	9,86	4	9,91			0,04	0,38	97,76
12	F05x	PD02	DB08	9,98	9,89	9,89	9,98	4	9,94			0,05	0,52	98,03
13	A82	PD01	DB08	9,79	9,88	10,00	10,20	4	9,97			0,18	1,78	98,35
14	A59	PC01	DB08	10,07	10,02	9,97	9,83	4	9,97			0,10	1,05	98,40
15	F21	PD02	DB09	9,96	10,04	10,03	9,89	4	9,98			0,07	0,70	98,47
16	F02x	PD02	DB08	9,78	10,04	10,21	9,91	4	9,99			0,18	1,84	98,52
17	F03	PD02	DB08	10,00	10,00	9,88	10,18	4	10,02			0,12	1,24	98,82
18	A61x	PD01	DB08	10,15	10,03	9,97	10,13	4	10,07			0,09	0,85	99,36
19	A71	PB03	DB99	10,28	9,90	9,33	10,85	0	10,09	*c*		0,64	6,36	99,53
20	F06x	PD02	DB08	10,06	10,01	10,23	10,06	4	10,09			0,10	0,95	99,56
21	F18x	PD99	DB08	10,10	10,10	10,10	10,10	4	10,10			0,00	0,00	99,66
22	F15x	PC01	DB08	10,11	10,19	10,25	9,96	4	10,13			0,13	1,24	99,93
23	F16x	PC01	DB08	10,13	10,08	10,23	10,10	4	10,14			0,07	0,66	100,00
24	A43	PB06	DB01	10,16	10,32	10,00	10,22	4	10,18			0,13	1,32	100,40
25	F32x	PC01	DB08	10,23	10,20	10,24	10,28	4	10,24			0,03	0,32	101,02
26	A45x	PE99	DB08	10,20	10,30	10,20	10,30	4	10,25			0,06	0,56	101,14
27	F12x	PC01	DB08	10,08	10,52	10,26	10,29	4	10,29			0,18	1,78	101,49
28	F08x	PE99	DB08	10,34	10,31	10,27	10,24	4	10,29			0,04	0,43	101,53
29	F25x	PB06	DB08	10,26	10,38	10,22	10,35	4	10,30			0,08	0,73	101,66
30	A49	PD05	DB08	10,21	10,35	10,42	10,40	4	10,34			0,10	0,93	102,04
31	F14	PC01	DB08	10,40	10,40	10,30	10,30	4	10,35			0,06	0,56	102,13
32	A79	PD03	DB99	10,46	10,39	10,32	10,50	4	10,42			0,08	0,73	102,79
33	F33x	PD01	DB10	10,27	10,79	10,47	10,72	4	10,56			0,24	2,26	104,22
34	A62	PD02	DB01	10,74	10,72	10,54	10,27	4	10,57			0,22	2,06	104,27
35	A58x	PD02	DB02	10,46	10,89	10,71	10,46	4	10,63			0,21	1,97	104,89
36	A42	PB04	DB01	10,64	10,84	10,65	10,43	4	10,64			0,17	1,57	104,99
37	A36	PD02	DB08	10,61	10,54	11,14	10,66	4	10,74			0,27	2,54	105,95
38	A39	PC02	DB08	10,61	10,88	10,84	10,85	4	10,80			0,12	1,15	106,52
39	F24x	PD01	DB99	10,64	10,80	10,96	10,99	4	10,85			0,16	1,51	107,04
40	F26x	PD02	DB09	10,87	10,89	10,91	10,96	4	10,91			0,04	0,35	107,63
41	F01x	PD02	DB01	10,91	11,13	11,02	10,77	4	10,96			0,15	1,40	108,12
42	F27x	PD01	DB01	10,81	10,63	11,54	11,73	0	11,18	*c*	*	0,54	4,83	110,29
43	F09	PZ02	DD02	11,20	11,21	*11,72a*	11,21	3	11,21		*	0,01	0,05	110,58
44	F07x	PD99	DB08	11,43	12,27	12,40	11,63	0	11,93	*b*	*	0,47	3,98	117,74
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	n	Mean	s_r	CV_r
all labs	**159**	**10,13**	**0,118**	**1,169**
10	% from the mean			
	l		s_R	CV_R
	40		**0,514**	**5,070**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Ca **Sample: 2** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	2,04	2,45	2,48	2,32	0	2,32	*b*	*	0,20	8,64	63,71
2	A88	PD01	DB08	3,22	3,16	2,97	3,03	4	3,09		*	0,12	3,76	84,84
3	A56	PC01	DB08	3,21	3,02	3,06	3,09	4	3,09		*	0,08	2,61	84,86
4	F13x	PD01	DB08	3,19	3,20	3,19	3,18	4	3,19		*	0,01	0,25	87,52
5	F07x	PD99	DB08	3,19	3,40	3,23	3,18	4	3,25		*	0,10	3,14	89,11
6	A62	PD02	DB01	3,43	3,34	3,29	3,17	4	3,31			0,11	3,28	90,73
7	A49	PD05	DB08	3,36	3,38	3,40	3,36	4	3,37			0,02	0,52	92,53
8	A60x	PD01	DB10	3,36	3,39	3,45	3,36	4	3,39			0,04	1,15	93,00
9	A65	PD01	DB09	3,26	3,31	3,58	3,63	4	3,45			0,19	5,43	94,50
10	F19x	PD02	DB08	3,50	3,49	3,54	3,56	4	3,52			0,03	0,94	96,62
11	A58x	PD02	DB02	3,62	3,46	3,50	3,53	4	3,53			0,07	1,93	96,76
12	A59	PC01	DB08	3,59	3,53	3,55	3,49	4	3,54			0,04	1,10	97,06
13	F15x	PC01	DB08	3,56	3,54	3,56	3,53	4	3,55			0,02	0,42	97,31
14	F06x	PD02	DB08	3,56	3,64	3,55	3,52	4	3,57			0,05	1,41	97,84
15	A61x	PD01	DB08	3,59	3,56	3,61	3,52	4	3,57			0,04	1,12	97,95
16	F14	PC01	DB08	3,55	3,59	3,60	3,62	4	3,59			0,03	0,82	98,48
17	A85x	PD02	DB08	3,65	3,61	3,58	3,58	4	3,60			0,03	0,87	98,84
18	F16x	PC01	DB08	3,56	3,66	3,60	3,61	4	3,61			0,04	1,15	98,91
19	A47x	PD01	DB08	3,47	3,54	3,79	3,66	4	3,62			0,14	3,89	99,16
20	F05x	PD02	DB08	3,63	3,62	3,62	3,63	4	3,63			0,01	0,16	99,44
21	A79	PD03	DB99	3,62	3,65	3,64	3,61	4	3,63			0,02	0,45	99,56
22	A82	PD01	DB08	3,62	3,64	3,65	3,66	4	3,64			0,02	0,47	99,92
23	A45x	PE99	DB08	3,65	3,64	3,67	3,64	4	3,65			0,01	0,39	100,12
24	F12x	PC01	DB08	3,68	3,68	3,63	3,66	4	3,66			0,03	0,72	100,46
25	F18x	PD99	DB08	3,67	3,67	3,66	3,66	4	3,67			0,01	0,16	100,53
26	A43	PB06	DB01	3,58	3,79	3,69	3,65	4	3,68			0,09	2,38	100,88
27	F01x	PD02	DB01	3,58	3,70	3,82	3,69	4	3,70			0,10	2,65	101,42
28	F25x	PB06	DB08	3,69	3,74	3,71	3,70	4	3,71			0,02	0,58	101,77
29	F32x	PC01	DB08	3,73	3,74	3,74	3,68	4	3,72			0,03	0,77	102,11
30	F02x	PD02	DB08	3,51	3,82	3,65	3,98	4	3,74			0,20	5,37	102,61
31	F21	PD02	DB09	3,77	3,75	3,76	3,81	4	3,77			0,03	0,70	103,48
32	F03	PD02	DB08	3,80	3,73	3,79	3,77	4	3,77			0,03	0,82	103,48
33	F08x	PE99	DB08	3,83	3,81	3,73	3,76	4	3,78			0,04	1,19	103,74
34	A36	PD02	DB08	3,72	3,75	3,93	3,74	4	3,79			0,10	2,58	103,82
35	A71	PB03	DB99	3,80	3,80	3,75	3,85	4	3,80			0,04	1,05	104,32
36	A57	PZ02	DD02	3,89	3,82	3,82	3,84	4	3,84			0,03	0,86	105,40
37	F26x	PD02	DB09	3,83	3,86	3,88	3,80	4	3,84			0,04	0,91	105,40
38	A42	PB04	DB01	3,84	3,85	3,99	3,80	4	3,87			0,08	2,14	106,16
39	F24x	PD01	DB99	3,79	3,89	3,93	3,96	4	3,89			0,07	1,89	106,75
40	A39	PC02	DB08	4,00	3,89	3,95	3,89	4	3,93			0,05	1,37	107,85
41	F33x	PD01	DB10	3,96	4,08	4,03	3,80	4	3,97			0,12	3,08	108,83
42	F27x	PD01	DB01	4,00	3,91	4,45	4,26	0	4,15	*c*	*	0,25	5,96	113,93
43	F09	PZ02	DD02	4,26	4,29	4,29	4,28	4	4,28		*	0,02	0,35	117,44
44	F22x	PD02	DB01	4,27	4,16	4,42	4,43	4	4,32		*	0,13	2,99	118,50
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	n	Mean	s_r	CV_r
all labs	**168**	**3,65**	**0,058**	**1,603**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
42	**0,256**	**7,026**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Ca **Sample: 3** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	2,80	3,24	3,26	3,43	0	3,18	*b*	*	0,27	8,45	71,29
2	A56	PC01	DB08	3,73	3,77	3,94	3,81	4	3,81		*	0,09	2,33	85,39
3	A88	PD01	DB08	3,87	3,96	3,93	3,91	4	3,92		*	0,04	1,00	87,80
4	A62	PD02	DB01	4,04	4,05	3,90	3,85	4	3,96		*	0,10	2,53	88,70
5	F07x	PD99	DB08	3,95	4,12	3,98	4,02	4	4,02			0,08	1,88	90,03
6	A65	PD01	DB09	4,21	4,15	4,12	4,13	4	4,15			0,04	0,97	93,01
7	F13x	PD01	DB08	4,18	4,17	4,16	4,17	4	4,17			0,01	0,24	93,37
8	A49	PD05	DB08	4,14	4,21	4,17	4,17	4	4,17			0,03	0,70	93,51
9	A47x	PD01	DB08	4,13	4,18	4,21	4,22	4	4,19			0,04	0,97	93,74
10	A60x	PD01	DB10	4,11	4,15	4,15	4,54	4	4,24			0,20	4,84	94,86
11	F15x	PC01	DB08	4,22	4,30	4,29	4,36	4	4,29			0,06	1,34	96,15
12	F19x	PD02	DB08	4,29	4,31	4,28	4,30	4	4,30			0,01	0,30	96,21
13	F05x	PD02	DB08	4,25	4,39	4,30	4,26	4	4,30			0,06	1,48	96,32
14	A59	PC01	DB08	4,41	4,34	4,35	4,21	4	4,33			0,09	2,01	96,95
15	A61x	PD01	DB08	4,33	4,32	4,35	4,32	4	4,33			0,01	0,31	96,95
16	A79	PD03	DB99	4,34	4,41	4,40	4,36	4	4,38			0,03	0,73	98,04
17	F02x	PD02	DB08	4,46	4,25	4,58	4,27	4	4,39			0,16	3,64	98,35
18	F32x	PC01	DB08	4,36	4,45	4,40	4,38	4	4,40			0,04	0,88	98,50
19	A58x	PD02	DB02	4,35	4,35	4,47	4,42	4	4,40			0,06	1,33	98,50
20	F14	PC01	DB08	4,44	4,43	4,46	4,42	4	4,44			0,02	0,38	99,40
21	F16x	PC01	DB08	4,42	4,50	4,36	4,48	4	4,44			0,06	1,40	99,48
22	F06x	PD02	DB08	4,45	4,50	4,41	4,43	4	4,45			0,04	0,82	99,58
23	A45x	PE99	DB08	4,47	4,43	4,45	4,47	4	4,46			0,02	0,43	99,79
24	F18x	PD99	DB08	4,46	4,47	4,46	4,47	4	4,47			0,01	0,13	100,01
25	F12x	PC01	DB08	4,42	4,52	4,46	4,47	4	4,47			0,04	0,93	100,12
26	A85x	PD02	DB08	4,44	4,50	4,49	4,48	4	4,48			0,03	0,63	100,29
27	F27x	PD01	DB01	4,63	4,34	4,55	4,41	4	4,48			0,13	2,92	100,41
28	F25x	PB06	DB08	4,51	4,52	4,52	4,50	4	4,51			0,01	0,21	101,08
29	A36	PD02	DB08	4,50	4,57	4,77	4,43	4	4,57			0,15	3,21	102,31
30	A82	PD01	DB08	4,56	4,55	4,60	4,57	4	4,57			0,02	0,47	102,37
31	F33x	PD01	DB10	4,57	4,45	4,76	4,60	4	4,60			0,13	2,78	102,93
32	F03	PD02	DB08	4,59	4,59	4,59	4,62	4	4,60			0,02	0,33	102,98
33	F21	PD02	DB09	4,69	4,78	4,48	4,52	4	4,62			0,14	3,06	103,43
34	F08x	PE99	DB08	4,70	4,71	4,54	4,57	4	4,63			0,09	1,87	103,65
35	F01x	PD02	DB01	4,50	4,77	4,68	4,60	4	4,64			0,12	2,48	103,88
36	A57	PZ02	DD02	4,67	4,64	4,61	4,66	4	4,65			0,03	0,57	104,05
37	F24x	PD01	DB99	4,62	4,60	4,72	4,73	4	4,67			0,06	1,36	104,50
38	F26x	PD02	DB09	4,66	4,67	4,69	4,68	4	4,68			0,01	0,28	104,72
39	A43	PB06	DB01	4,74	5,08	4,69	4,70	4	4,80			0,19	3,88	107,57
40	A39	PC02	DB08	4,79	4,81	4,84	4,94	4	4,84			0,07	1,38	108,46
41	A71	PB03	DB99	4,97	4,83	4,87	4,97	4	4,91			0,07	1,49	109,99
42	A42	PB04	DB01	4,86	4,99	5,02	4,96	4	4,96		*	0,07	1,40	111,04
43	F22x	PD02	DB01	5,22	5,22	5,16	5,07	4	5,17		*	0,07	1,37	115,75
44	F09	PZ02	DD02	5,18	5,18	5,16	5,18	4	5,17		*	0,01	0,11	115,86
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	n	Mean	s_r	CV_r
all labs	**172**	**4,46**	**0,064**	**1,423**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
43	**0,296**	**6,623**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Ca **Sample: 4** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	11,31	12,07	13,94	12,44	0	12,44	*b*	*	1,11	8,88	80,15
2	A56	PC01	DB08	13,91	13,79	13,81	13,75	4	13,82		*	0,07	0,51	89,01
3	A88	PD01	DB08	14,01	13,56	14,42	13,83	4	13,95		*	0,36	2,60	89,90
4	F13x	PD01	DB08	14,36	14,30	14,23	14,17	4	14,26			0,08	0,56	91,90
5	F22x	PD02	DB01	14,64	14,22	14,45	14,30	4	14,40			0,18	1,28	92,79
6	F27x	PD01	DB01	14,00	14,41	15,78	14,01	4	14,55			0,84	5,78	93,75
7	A60x	PD01	DB10	14,85	14,46	14,48	14,51	4	14,57			0,18	1,26	93,90
8	A47x	PD01	DB08	14,56	14,59	14,18	15,32	4	14,66			0,48	3,25	94,46
9	A65	PD01	DB09	14,49	14,53	15,08	14,88	4	14,75			0,28	1,93	95,00
10	F15x	PC01	DB08	14,95	14,52	14,90	14,83	4	14,80			0,19	1,30	95,35
11	A59	PC01	DB08	15,11	14,75	14,93	15,18	4	14,99			0,19	1,27	96,60
12	A62	PD02	DB01	15,39	15,04	15,17	14,44	4	15,01			0,41	2,71	96,70
13	F21	PD02	DB09	15,27	14,99	14,95	14,96	4	15,04			0,15	1,01	96,91
14	F19x	PD02	DB08	14,70	15,30	15,00	15,20	4	15,05			0,26	1,76	96,96
15	A43	PB06	DB01	15,00	15,53	14,90	15,01	4	15,11			0,28	1,88	97,35
16	F06x	PD02	DB08	15,15	15,07	15,12	15,28	4	15,16			0,09	0,59	97,64
17	A49	PD05	DB08	15,50	15,39	15,00	15,40	4	15,32			0,22	1,42	98,71
18	A57	PZ02	DD02	15,65	15,38	15,32	15,17	4	15,38			0,20	1,30	99,09
19	A85x	PD02	DB08	15,42	15,23	15,45	15,69	4	15,45			0,19	1,23	99,51
20	A45x	PE99	DB08	15,50	15,70	15,20	15,50	4	15,48			0,21	1,33	99,70
21	F32x	PC01	DB08	15,72	15,51	15,29	15,51	4	15,51			0,18	1,13	99,91
22	F16x	PC01	DB08	15,74	15,40	15,71	15,70	4	15,64			0,16	1,02	100,75
23	A58x	PD02	DB02	15,92	15,40	15,34	15,91	4	15,64			0,32	2,02	100,78
24	F02x	PD02	DB08	15,73	15,88	15,79	15,24	4	15,66			0,29	1,83	100,90
25	F03	PD02	DB08	15,66	15,69	15,68	15,86	4	15,72			0,09	0,59	101,29
26	F12x	PC01	DB08	15,46	16,09	15,77	15,77	4	15,77			0,26	1,63	101,59
27	F25x	PB06	DB08	15,89	15,72	15,73	16,01	4	15,84			0,14	0,88	102,03
28	A79	PD03	DB99	15,95	15,99	15,63	15,82	4	15,85			0,16	1,02	102,10
29	A82	PD01	DB08	15,70	16,20	15,90	15,80	4	15,90			0,22	1,36	102,44
30	F05x	PD02	DB08	16,00	16,00	16,00	16,00	4	16,00			0,00	0,00	103,08
31	F33x	PD01	DB10	15,88	15,72	16,11	16,61	4	16,08			0,39	2,41	103,60
32	F01x	PD02	DB01	16,41	16,04	15,90	16,10	4	16,11			0,22	1,34	103,81
33	A61x	PD01	DB08	16,08	16,09	16,15	16,18	4	16,13			0,05	0,30	103,90
34	F18x	PD99	DB08	16,00	16,30	16,20	16,10	4	16,15			0,13	0,80	104,05
35	F08x	PE99	DB08	16,68	16,57	15,83	15,80	4	16,22			0,47	2,91	104,49
36	A36	PD02	DB08	16,05	16,53	16,84	15,96	4	16,35			0,41	2,53	105,30
37	A71	PB03	DB99	15,76	16,53	16,92	16,34	4	16,39			0,48	2,93	105,57
38	F14	PC01	DB08	16,60	16,50	16,30	16,90	4	16,58			0,25	1,51	106,79
39	F26x	PD02	DB09	16,67	16,50	16,60	16,60	4	16,59			0,07	0,42	106,90
40	F24x	PD01	DB99	16,64	16,44	16,56	16,78	4	16,60			0,14	0,85	106,97
41	A39	PC02	DB08	16,63	16,87	16,79	16,50	4	16,70			0,17	0,99	107,57
42	F09	PZ02	DD02	17,32	17,15	16,99	17,44	4	17,23		*	0,20	1,14	110,97
43	A42	PB04	DB01	18,42	18,42	18,55	18,50	0	18,47	*b*	*	0,06	0,35	119,01
44	F07x	PD99	DB08	23,66	21,22	20,79	20,13	0	21,45	*b*	*	1,54	7,18	138,19
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	n	Mean	s_r	CV_r
all labs	**164**	**15,52**	**0,235**	**1,517**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
41	**0,791**	**5,098**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Mg **Sample: 1** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	S22x	PD02	DB08	1,48	1,41	1,60	1,50	0	1,50	*b*	*	0,08	5,24	66,14
2	A88	PD01	DB08	1,94	1,93	1,90	1,97	0	1,93	*b*	*	0,03	1,40	85,42
3	F22x	PD02	DB01	2,05	2,11	2,08	1,98	4	2,06			0,06	2,71	90,77
4	F06x	PD02	DB08	2,13	2,08	2,14	2,08	4	2,11			0,03	1,43	93,08
5	A62	PD02	DB01	2,14	2,15	2,09	2,08	4	2,12			0,04	1,66	93,42
6	A65	PD01	DB08	2,13	2,08	2,32	2,09	0	2,15	*c*		0,11	5,20	95,10
7	A39	PC02	DB08	2,12	2,17	2,19	2,15	4	2,16			0,03	1,36	95,36
8	A47x	PD01	DB08	2,16	2,14	2,19	2,18	4	2,17			0,02	1,02	95,74
9	A57	PZ02	DD02	2,18	2,20	2,17	2,19	4	2,19			0,01	0,59	96,51
10	F21	PD02	DB09	2,18	2,19	2,19	2,18	4	2,19			0,01	0,26	96,51
11	A42	PB04	DB01	2,16	2,21	2,20	2,18	4	2,19			0,02	1,01	96,62
12	F13x	PD01	DB08	2,21	2,19	2,18	2,18	4	2,19			0,01	0,52	96,76
13	F02x	PD02	DB08	2,19	2,26	2,14	2,23	4	2,20			0,05	2,26	97,36
14	F19x	PD02	DB08	2,21	2,20	2,22	2,21	4	2,21			0,01	0,37	97,61
15	A61x	PD01	DB08	2,25	2,18	2,21	2,22	4	2,22			0,03	1,28	97,87
16	F03	PD02	DB08	2,22	2,23	2,19	2,25	4	2,22			0,03	1,14	98,20
17	A58x	PD02	DB01	2,23	2,22	2,22	2,23	4	2,23			0,01	0,26	98,28
18	F08x	PE99	DB08	2,23	2,26	2,22	2,21	4	2,23			0,02	0,81	98,55
19	A71	PB03	DB99	2,22	2,27	2,22	2,22	4	2,23			0,02	1,01	98,60
20	A59	PC01	DB08	2,24	2,23	2,28	2,19	4	2,24			0,04	1,57	98,77
21	A43	PB06	DB01	2,29	2,18	2,23	2,25	4	2,24			0,05	2,04	98,83
22	A60x	PC01	DB10	2,14	2,22	2,28	2,39	4	2,26			0,11	4,67	99,68
23	A49	PD05	DB08	2,27	2,28	2,25	2,26	4	2,27			0,01	0,57	100,04
24	A45x	PE99	DB08	2,29	2,27	2,26	*2,6a*	3	2,27			0,02	0,67	100,41
25	F26x	PD02	DB09	2,28	2,29	2,27	2,28	4	2,28			0,01	0,36	100,71
26	F12x	PC01	DB08	2,22	2,35	2,30	2,29	4	2,29			0,05	2,30	101,05
27	A82	PD01	DB08	2,24	2,28	2,30	2,34	4	2,29			0,04	1,82	101,15
28	F01x	PD02	DB01	2,31	2,28	2,30	2,27	4	2,29			0,02	0,80	101,15
29	A79	PD03	DB99	2,30	2,29	2,28	2,33	4	2,30			0,02	0,94	101,52
30	F16x	PC01	DB08	2,29	2,33	2,27	2,32	4	2,30			0,03	1,22	101,67
31	F18x	PD99	DB08	2,31	2,30	2,31	2,30	4	2,31			0,01	0,25	101,81
32	F05x	PD02	DB08	2,32	2,30	2,31	2,32	4	2,31			0,01	0,41	102,14
33	F14x	PC01	DB08	2,33	2,32	2,32	2,31	4	2,32			0,01	0,35	102,47
34	F33x	PD01	DB10	2,27	2,35	2,33	2,36	4	2,33			0,04	1,73	102,80
35	F25x	PB06	DB08	2,36	2,33	2,33	2,33	4	2,34			0,01	0,64	103,25
36	F32x	PC01	DB08	2,34	2,34	2,35	2,34	4	2,34			0,01	0,24	103,26
37	F15x	PC01	DB08	2,33	2,35	2,37	2,31	4	2,34			0,03	1,10	103,36
38	A36	PD02	DB08	2,35	2,34	2,38	2,33	4	2,35			0,02	0,92	103,80
39	A56	PC01	DB08	2,36	2,36	2,33	2,38	4	2,36			0,02	0,87	104,08
40	F27x	PD01	DB01	2,28	2,40	2,49	2,35	4	2,38			0,09	3,69	105,24
41	F24x	PD01	DB99	2,37	2,41	2,38	2,43	4	2,40			0,03	1,14	105,80
42	F09	PZ02	DD02	2,44	2,44	2,45	2,41	4	2,43			0,02	0,76	107,45
43	F07x	PD99	DB08	2,43	2,53	2,45	2,40	4	2,46			0,06	2,32	108,45
44	A85x	PD02	DB08	2,45	2,65	2,50	2,70	0	2,57	*b*	*	0,12	4,57	113,63
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**159**	**2,26**	**0,028**	**1,227**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
40	**0,087**	**3,842**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Mg **Sample: 2** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	S22x	PD02	DB08	0,50	0,60	0,61	0,57	0	0,57	*b*	*	0,05	8,71	62,10
2	A88	PD01	DB08	0,79	0,80	0,74	0,76	0	0,77	*b*	*	0,03	3,37	84,07
3	F19x	PD02	DB08	0,85	0,85	0,86	0,86	4	0,86			0,01	0,79	93,15
4	F06x	PD02	DB08	0,85	0,86	0,88	0,83	4	0,86			0,02	2,45	93,20
5	A62	PD02	DB01	0,88	0,85	0,87	0,83	4	0,86			0,02	2,59	93,42
6	A47x	PD01	DB08	0,87	0,86	0,88	0,87	4	0,87			0,01	0,94	94,78
7	A39	PC02	DB08	0,88	0,86	0,87	0,87	4	0,87			0,01	1,15	94,86
8	A49	PD05	DB08	0,88	0,87	0,89	0,87	4	0,88			0,01	1,09	95,60
9	F13x	PD01	DB08	0,88	0,88	0,87	0,88	4	0,88			0,00	0,48	95,82
10	F21	PD02	DB09	0,86	0,89	0,91	0,87	4	0,88			0,02	2,51	96,14
11	A58x	PD02	DB01	0,89	0,88	0,88	0,88	4	0,88			0,01	0,57	96,14
12	F16x	PC01	DB08	0,88	0,90	0,88	0,89	4	0,89			0,01	1,04	96,42
13	A43	PB06	DB01	0,90	0,90	0,90	0,90	4	0,90			0,00	0,06	97,56
14	A60x	PC01	DB10	0,86	0,89	0,94	0,91	4	0,90			0,03	3,73	97,89
15	A61x	PD01	DB08	0,90	0,91	0,89	0,89	4	0,90			0,01	0,97	97,89
16	A65	PD01	DB08	0,86	0,87	0,94	0,92	4	0,90			0,04	4,15	97,94
17	A59	PC01	DB08	0,93	0,90	0,89	0,90	4	0,90			0,02	1,81	98,51
18	F08x	PE99	DB08	0,91	0,92	0,91	0,91	4	0,91			0,01	0,60	99,33
19	A85x	PD02	DB08	0,92	0,91	0,91	0,92	4	0,91			0,00	0,42	99,38
20	A56	PC01	DB08	0,92	0,93	0,90	0,91	4	0,91			0,01	1,15	99,60
21	F14x	PC01	DB08	0,91	0,92	0,92	0,92	4	0,92			0,01	0,54	99,96
22	A57	PZ02	DD02	0,92	0,92	0,91	0,92	4	0,92			0,01	0,54	99,96
23	F18x	PD99	DB08	0,92	0,92	0,92	0,92	4	0,92			0,00	0,37	100,23
24	A71	PB03	DB99	0,93	0,92	0,92	0,93	4	0,92			0,01	0,92	100,55
25	F03	PD02	DB08	0,93	0,94	0,92	0,92	4	0,93			0,01	1,09	100,94
26	A45x	PE99	DB08	0,93	0,92	0,93	0,93	4	0,93			0,00	0,24	101,02
27	F26x	PD02	DB09	0,92	0,94	0,91	0,95	4	0,93			0,02	1,96	101,32
28	F02x	PD02	DB08	0,92	0,88	0,95	0,98	4	0,93			0,04	4,21	101,51
29	F05x	PD02	DB08	0,94	0,94	0,94	0,93	4	0,93			0,00	0,25	101,81
30	A79	PD03	DB99	0,93	0,93	0,94	0,95	4	0,94			0,01	0,89	101,87
31	F12x	PC01	DB08	0,94	0,94	0,94	0,94	4	0,94			0,00	0,38	102,19
32	A36	PD02	DB08	0,94	0,94	0,95	0,93	4	0,94			0,01	0,87	102,41
33	A82	PD01	DB08	0,93	0,95	0,94	0,95	4	0,94			0,01	0,91	102,65
34	F32x	PC01	DB08	0,95	0,95	0,94	0,93	4	0,94			0,01	1,02	102,90
35	F15x	PC01	DB08	0,95	0,94	0,95	0,94	4	0,95			0,01	0,61	102,95
36	F22x	PD02	DB01	0,91	0,98	0,89	1,01	0	0,95	*c*		0,06	5,99	103,22
37	F01x	PD02	DB01	0,95	0,97	0,93	0,96	4	0,95			0,02	1,79	103,77
38	F24x	PD01	DB99	0,95	0,96	0,96	0,95	4	0,96			0,01	0,87	104,10
39	F09	PZ02	DD02	0,95	0,94	0,96	0,97	4	0,96			0,01	1,43	104,37
40	F33x	PD01	DB10	0,96	0,98	0,98	0,92	4	0,96			0,03	2,95	104,59
41	F25x	PB06	DB08	0,97	0,97	0,98	0,98	4	0,98			0,01	0,59	106,22
42	A42	PB04	DB01	0,97	0,98	0,98	0,97	4	0,98			0,01	0,59	106,22
43	F27x	PD01	DB01	0,91	0,96	1,06	1,08	0	1,00	*c*		0,08	7,83	108,94
44	F07x	PD99	DB08	0,98	1,03	1,04	1,02	4	1,02		*	0,03	2,60	110,85
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55														

	n	Mean	s_r	CV_r
all labs	**160**	**0,92**	**0,012**	**1,303**
* = non tolerable mean because more than +/- **10** % from the mean				

l	s_R	CV_R
40	**0,036**	**3,942**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Mg **Sample: 3** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	S22x	PD02	DB08	*0,37a*	0,45	0,45	0,46	0	0,45	*b* *	0,01	1,27	71,63
2	A88	PD01	DB08	0,52	0,54	0,53	0,52	0	0,53	*b* *	0,01	1,57	83,52
3	F19x	PD02	DB08	0,57	0,59	0,58	0,57	4	0,58		0,01	1,06	91,21
4	A47x	PD01	DB08	0,59	0,59	0,58	0,59	4	0,59		0,01	0,85	92,83
5	A57	PZ02	DD02	0,59	0,61	0,59	0,57	4	0,59		0,02	2,77	93,23
6	A39	PC02	DB08	0,59	0,59	0,59	0,60	4	0,59		0,01	0,99	93,54
7	F16x	PC01	DB08	0,61	0,60	0,61	0,61	4	0,61		0,00	0,78	96,05
8	A49	PD05	DB08	0,61	0,61	0,61	0,61	4	0,61		0,00	0,00	96,39
9	A61x	PD01	DB08	0,62	0,61	0,61	0,61	4	0,61		0,01	0,94	96,55
10	A43	PB06	DB01	0,61	0,63	0,61	0,61	4	0,61		0,01	2,13	96,78
11	A62	PD02	DB01	0,62	0,63	0,62	0,58	4	0,61		0,02	3,62	96,78
12	F06x	PD02	DB08	0,61	0,62	0,62	0,61	4	0,61		0,01	1,07	96,99
13	F02x	PD02	DB08	0,60	0,61	0,64	0,61	4	0,62		0,02	3,14	97,22
14	F05x	PD02	DB08	0,61	0,63	0,62	0,61	4	0,62		0,01	1,45	97,42
15	F08x	PE99	DB08	0,64	0,63	0,60	0,61	4	0,62		0,02	3,05	97,57
16	A56	PC01	DB08	0,60	0,62	0,63	0,62	4	0,62		0,01	2,02	97,57
17	F09	PZ02	DD02	0,61	0,64	0,62	0,61	4	0,62		0,01	1,61	98,25
18	F13x	PD01	DB08	0,63	0,62	0,62	0,62	4	0,62		0,00	0,43	98,57
19	A65	PD01	DB08	0,63	0,63	0,63	0,62	4	0,63		0,00	0,68	98,76
20	A59	PC01	DB08	0,63	0,64	0,62	0,61	4	0,63		0,01	1,98	98,91
21	F14x	PC01	DB08	0,63	0,62	0,63	0,63	4	0,63		0,01	0,80	99,15
22	F15x	PC01	DB08	0,62	0,63	0,63	0,64	4	0,63		0,01	1,30	99,55
23	A58x	PD02	DB01	0,63	0,63	0,63	0,63	4	0,63		0,00	0,00	99,55
24	F18x	PD99	DB08	0,63	0,64	0,63	0,63	4	0,63		0,00	0,60	100,14
25	F03	PD02	DB08	0,64	0,64	0,63	0,63	4	0,64		0,01	1,27	100,34
26	F27x	PD01	DB01	0,64	0,62	0,65	0,64	4	0,64		0,01	2,33	100,77
27	A36	PD02	DB08	0,64	0,65	0,65	0,62	4	0,64		0,01	2,21	101,13
28	A71	PB03	DB99	0,65	0,63	0,65	0,63	4	0,64		0,01	1,59	101,22
29	A79	PD03	DB99	0,63	0,64	0,66	0,63	4	0,64		0,02	2,33	101,58
30	F32x	PC01	DB08	0,64	0,64	0,64	0,65	4	0,64		0,01	1,10	101,60
31	A45x	PE99	DB08	0,65	0,64	0,65	0,65	4	0,65		0,00	0,58	101,92
32	F33x	PD01	DB10	0,63	0,67	0,66	0,62	4	0,65		0,02	3,69	101,92
33	F26x	PD02	DB09	0,64	0,65	0,65	0,64	4	0,65		0,01	0,90	101,92
34	A60x	PC01	DB10	0,61	0,63	0,64	0,70	0	0,65	*c*	0,04	6,40	102,00
35	F12x	PC01	DB08	0,65	0,66	0,64	0,65	4	0,65		0,01	1,14	102,08
36	F21	PD02	DB09	0,66	0,63	0,62	0,68	4	0,65		0,03	4,25	102,31
37	A85x	PD02	DB08	0,65	0,65	0,65	0,65	4	0,65		0,00	0,45	102,87
38	F01x	PD02	DB01	0,66	0,65	0,67	0,65	4	0,66		0,01	1,46	103,89
39	F24x	PD01	DB99	0,66	0,65	0,68	0,65	4	0,66		0,02	2,34	104,37
40	A82	PD01	DB08	0,66	0,66	0,66	0,68	4	0,67		0,01	1,08	105,16
41	F25x	PB06	DB08	0,66	0,67	0,68	0,67	4	0,67		0,01	1,22	105,87
42	A42	PB04	DB01	0,67	0,67	0,69	0,69	4	0,68		0,01	1,70	107,45
43	F22x	PD02	DB01	0,67	0,72	0,71	0,66	4	0,69		0,03	4,27	109,03
44	F07x	PD99	DB08	0,71	0,72	0,69	0,71	4	0,71	*	0,01	1,93	111,56
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53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**164**	**0,63**	**0,010**	**1,646**
10	% from the mean			

l	s_R	CV_R
41	**0,027**	**4,258**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Mg **Sample: 4** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	1,45	1,53	1,79	1,59	0	1,59	*b*	*	0,15	9,13	76,09
2	A88	PD01	DB08	1,75	1,77	1,85	1,82	4	1,79		*	0,05	2,66	85,88
3	A47x	PD01	DB08	1,87	1,86	1,96	1,95	4	1,91			0,05	2,74	91,40
4	F27x	PD01	DB01	1,91	2,06	1,99	1,83	4	1,95			0,10	5,06	93,30
5	A62	PD02	DB01	2,03	2,00	2,00	1,80	4	1,96			0,11	5,41	93,68
6	F13x	PD01	DB08	1,98	1,98	1,96	1,95	4	1,97			0,01	0,66	94,11
7	A39	PC02	DB08	1,91	1,90	2,04	2,01	4	1,97			0,07	3,55	94,16
8	F06x	PD02	DB08	1,98	1,95	1,97	1,97	4	1,97			0,01	0,55	94,18
9	F19x	PD02	DB08	1,92	2,02	1,97	2,00	4	1,98			0,04	2,20	94,64
10	F21	PD02	DB09	2,07	1,95	1,94	1,96	4	1,98			0,06	3,06	94,75
11	A59	PC01	DB08	2,00	1,95	2,01	2,02	4	2,00			0,03	1,59	95,50
12	A65	PD01	DB08	1,96	1,99	2,05	2,05	4	2,01			0,04	2,21	96,27
13	F15x	PC01	DB08	2,05	1,98	2,02	2,02	4	2,02			0,03	1,42	96,55
14	A79	PD03	DB99	2,06	2,05	2,07	2,04	4	2,05			0,01	0,54	98,25
15	A58x	PD02	DB01	2,08	2,06	2,07	2,06	4	2,07			0,01	0,46	98,94
16	F16x	PC01	DB08	2,04	2,10	2,06	2,09	4	2,07			0,03	1,23	99,18
17	A61x	PD01	DB08	2,10	2,07	2,06	2,07	4	2,07			0,02	0,95	99,24
18	F08x	PE99	DB08	2,06	2,04	2,10	2,09	4	2,07			0,03	1,44	99,25
19	F03	PD02	DB08	2,05	2,08	2,07	2,10	4	2,07			0,02	1,05	99,27
20	F24x	PD01	DB99	2,07	2,11	2,11	2,02	4	2,08			0,04	2,14	99,35
21	A45x	PE99	DB08	2,07	2,09	2,08	2,08	4	2,08			0,01	0,39	99,54
22	F02x	PD02	DB08	2,13	2,02	2,14	2,06	4	2,09			0,06	2,77	99,97
23	F18x	PD99	DB08	2,10	2,12	2,11	2,09	4	2,11			0,01	0,61	100,74
24	A49	PD05	DB08	2,10	2,12	2,09	2,14	4	2,11			0,02	1,05	101,10
25	F05x	PD02	DB08	2,11	2,12	2,14	2,12	4	2,12			0,01	0,59	101,57
26	A56	PC01	DB08	2,14	2,12	2,12	2,12	4	2,12			0,01	0,36	101,63
27	F12x	PC01	DB08	2,10	2,16	2,11	2,13	4	2,13			0,02	1,10	101,71
28	F22x	PD02	DB01	2,14	2,09	2,17	2,11	4	2,13			0,04	1,65	101,81
29	A43	PB06	DB01	2,13	2,18	2,13	2,14	4	2,15			0,02	1,11	102,65
30	F25x	PB06	DB08	2,15	2,14	2,14	2,17	4	2,15			0,01	0,66	102,89
31	F33x	PD01	DB10	2,13	2,11	2,16	2,21	4	2,15			0,04	2,02	103,01
32	F01x	PD02	DB01	2,15	2,12	2,22	2,13	4	2,16			0,05	2,09	103,13
33	F32x	PC01	DB08	2,17	2,17	2,14	2,15	4	2,16			0,01	0,70	103,25
34	A60x	PC01	DB10	2,14	2,12	2,20	2,20	4	2,17			0,04	1,77	103,63
35	F14x	PC01	DB08	2,19	2,17	2,13	2,18	4	2,17			0,03	1,21	103,73
36	A57	PZ02	DD02	2,15	2,14	2,23	2,16	4	2,17			0,04	1,88	103,85
37	F26x	PD02	DB09	2,17	2,18	2,17	2,19	4	2,18			0,01	0,44	104,21
38	A36	PD02	DB08	2,15	2,21	2,21	2,16	4	2,18			0,03	1,47	104,45
39	A42	PB04	DB01	2,21	2,23	2,18	2,24	4	2,22			0,03	1,19	106,00
40	F07x	PD99	DB08	2,15	2,27	2,24	2,25	4	2,23			0,05	2,46	106,59
41	A71	PB03	DB99	2,24	2,33	2,20	2,15	4	2,23			0,08	3,44	106,80
42	A82	PD01	DB08	2,29	2,36	2,26	2,26	4	2,29			0,05	2,06	109,71
43	F09	PZ02	DD02	2,30	2,30	2,29	2,32	4	2,30		*	0,01	0,58	110,14
44	A85x	PD02	DB08	2,44	2,48	2,40	2,50	0	2,46	*b*	*	0,04	1,78	117,58
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	n	Mean	s_r	CV_r
all labs	**168**	**2,09**	**0,035**	**1,659**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
42	**0,105**	**5,013**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: K **Sample: 1** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	4,72	4,44	5,59	4,92	0	4,92	*b*	*	0,49	9,96	55,17
2	A88	PD01	DB08	7,41	7,52	7,37	7,67	0	7,49	*b*	*	0,14	1,81	84,06
3	A47x	PD01	DB08	8,12	8,00	8,05	7,95	4	8,03			0,07	0,90	90,09
4	F06x	PD02	DB08	8,46	7,92	7,86	8,18	4	8,10			0,27	3,38	90,90
5	A56	PC01	DB08	8,30	8,34	8,13	8,31	4	8,27			0,10	1,17	92,79
6	F26x	PD02	DB09	8,45	8,45	8,46	8,47	4	8,46			0,01	0,11	94,88
7	A71	PB03	DB99	8,26	8,26	8,66	8,66	4	8,46			0,23	2,73	94,93
8	A49	PD05	DB08	8,62	8,49	8,46	8,50	4	8,52			0,07	0,83	95,56
9	F27x	PD01	DB06	8,51	8,97	8,38	8,26	4	8,53			0,31	3,65	95,69
10	A82	PD01	DB08	8,33	8,50	8,58	8,73	4	8,54			0,17	1,95	95,75
11	A57	PZ02	DD02	8,53	8,56	8,57	8,61	4	8,57			0,03	0,39	96,12
12	A85x	PD02	DB08	8,54	8,54	8,62	8,70	4	8,60			0,08	0,90	96,48
13	A42	PB04	DB01	8,47	8,72	8,65	8,62	4	8,62			0,11	1,22	96,65
14	A65	PD01	DB08	8,62	8,53	8,85	8,52	4	8,63			0,15	1,78	96,82
15	A58x	PD02	DB01	8,68	8,63	8,72	8,64	4	8,67			0,04	0,47	97,24
16	F08x	PE99	DB08	8,96	8,93	8,57	8,61	4	8,77			0,20	2,33	98,34
17	A61x	PD01	DB08	9,00	8,76	8,73	8,78	4	8,82			0,12	1,40	98,91
18	F13x	PZ02	DD01	8,78	8,82	8,83	8,86	4	8,82			0,03	0,39	98,99
19	A60x	PD01	DB10	8,68	8,73	8,74	9,17	4	8,83			0,23	2,56	99,04
20	A79	PD03	DB99	8,86	8,65	8,96	9,06	4	8,88			0,17	1,93	99,64
21	F12x	PC01	DB08	8,42	9,13	9,13	8,90	4	8,90			0,34	3,78	99,80
22	F03	PD02	DB08	8,93	8,85	8,76	9,07	4	8,90			0,13	1,47	99,86
23	A59	PC01	DB08	8,95	8,99	9,05	8,71	4	8,93			0,15	1,66	100,17
24	F18x	PD99	DB08	9,07	8,95	8,98	8,80	4	8,95			0,11	1,25	100,41
25	F02x	PD02	DB08	8,80	8,63	9,32	9,12	4	8,97			0,31	3,46	100,62
26	F01x	PD02	DB01	8,84	9,00	9,01	9,08	4	8,98			0,10	1,13	100,77
27	F15x	PC01	DB08	8,98	9,02	9,16	8,92	4	9,02			0,10	1,13	101,20
28	A39	PC02	DB08	8,96	9,05	9,14	8,95	4	9,02			0,09	0,97	101,24
29	A45x	PE99	DB08	9,04	9,01	9,03	9,03	4	9,03			0,01	0,14	101,28
30	A43	PB06	DB01	9,10	9,04	9,10	9,05	4	9,07			0,03	0,35	101,78
31	F16x	PC01	DB08	9,12	8,98	9,16	9,10	4	9,09			0,08	0,86	101,95
32	F33x	PD01	DB10	8,83	9,32	9,11	9,27	4	9,13			0,22	2,42	102,46
33	F14x	PC01	DB08	9,18	9,18	9,16	9,12	4	9,16			0,03	0,31	102,77
34	A62	PD02	DB01	9,21	9,41	9,09	9,04	4	9,19			0,16	1,79	103,07
35	F21	PD02	DB09	9,20	9,14	9,15	9,28	4	9,19			0,06	0,70	103,13
36	F05x	PD02	DB08	9,23	9,20	9,21	9,26	4	9,23			0,03	0,29	103,50
37	F25x	PB06	DB08	9,31	9,37	9,01	9,36	4	9,26			0,17	1,84	103,92
38	F19x	PD02	DB08	9,29	9,30	9,43	9,36	4	9,35			0,06	0,69	104,84
39	A36	PD02	DB08	9,42	9,47	9,40	9,21	4	9,38			0,11	1,21	105,18
40	F32x	PC01	DB08	9,37	9,52	9,60	9,48	4	9,49			0,10	1,01	106,50
41	F24x	PD01	DB99	9,42	9,68	9,76	9,85	4	9,68			0,19	1,92	108,57
42	F09	PZ02	DD02	9,61	9,68	9,69	9,73	4	9,68			0,05	0,50	108,58
43	F22x	PD02	DB01	9,73	9,64	9,80	9,90	4	9,77			0,11	1,13	109,58
44	F07x	PD99	DB08	11,23	11,72	11,49	11,49	0	11,48	*b*	*	0,20	1,74	128,82
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	n	Mean	s_r	CV_r
all labs	**164**	**8,91**	**0,126**	**1,409**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
41	**0,401**	**4,495**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: K **Sample: 2** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	S22x	PD02	DB08	3,41	3,76	3,61	3,60	0	3,60	*b*	*	0,14	3,99	53,67
2	A88	PD01	DB08	5,67	5,59	5,27	5,37	0	5,48	*b*	*	0,19	3,40	81,75
3	A56	PC01	DB08	6,06	5,83	5,99	5,92	4	5,95		*	0,10	1,67	88,83
4	A47x	PD01	DB08	5,95	6,05	6,15	5,84	4	6,00		*	0,13	2,22	89,54
5	A49	PD05	DB08	6,07	6,18	6,12	6,07	4	6,11			0,05	0,86	91,22
6	F27x	PD01	DB06	5,92	6,42	5,94	6,50	0	6,20	*c*		0,31	5,03	92,49
7	F26x	PD02	DB09	6,37	6,38	6,37	6,38	4	6,38			0,01	0,09	95,17
8	A58x	PD02	DB01	6,42	6,40	6,43	6,34	4	6,40			0,04	0,63	95,51
9	F06x	PD02	DB08	6,45	6,31	6,40	6,43	4	6,40			0,06	0,95	95,51
10	A60x	PD01	DB10	6,39	6,40	6,65	6,36	4	6,45			0,13	2,09	96,35
11	A65	PD01	DB08	6,17	6,20	6,68	6,80	0	6,46	*c*		0,32	5,02	96,48
12	F21	PD02	DB09	6,45	6,41	6,49	6,52	4	6,47			0,05	0,74	96,55
13	F08x	PE99	DB08	6,54	6,57	6,48	6,44	4	6,51			0,06	0,88	97,15
14	A43	PB06	DB01	6,58	6,69	6,37	6,42	4	6,52			0,15	2,26	97,26
15	A82	PD01	DB08	6,59	6,50	6,53	6,58	4	6,55			0,04	0,65	97,78
16	A61x	PD01	DB08	6,51	6,62	6,54	6,55	4	6,55			0,05	0,70	97,86
17	A79	PD03	DB99	6,39	6,47	6,74	6,65	4	6,56			0,16	2,47	97,96
18	A85x	PD02	DB08	6,61	6,61	6,59	6,59	4	6,60			0,01	0,16	98,51
19	F01x	PD02	DB01	6,57	6,66	6,60	6,73	4	6,64			0,07	1,06	99,13
20	F16x	PC01	DB08	6,69	6,60	6,69	6,63	4	6,65			0,04	0,64	99,32
21	F02x	PD02	DB08	6,52	6,72	7,04	6,45	4	6,68			0,26	3,94	99,77
22	A59	PC01	DB08	6,80	6,75	6,57	6,63	4	6,69			0,11	1,62	99,86
23	F18x	PD99	DB08	6,65	6,73	6,75	6,73	4	6,72			0,04	0,66	100,25
24	F14x	PC01	DB08	6,67	6,72	6,72	6,77	4	6,72			0,04	0,61	100,32
25	A39	PC02	DB08	6,76	6,69	6,70	6,75	4	6,72			0,03	0,48	100,39
26	A42	PB04	DB01	6,81	6,88	6,36	6,92	4	6,74			0,26	3,84	100,66
27	F05x	PD02	DB08	6,74	6,73	6,74	6,77	4	6,75			0,02	0,26	100,70
28	F15x	PC01	DB08	6,79	6,66	6,79	6,74	4	6,75			0,06	0,91	100,70
29	F03	PD02	DB08	6,68	6,79	6,80	6,77	4	6,76			0,05	0,80	100,90
30	A62	PD02	DB01	6,91	6,74	6,77	6,68	4	6,78			0,10	1,44	101,14
31	A57	PZ02	DD02	6,86	6,70	6,78	6,80	4	6,79			0,07	0,97	101,29
32	A45x	PE99	DB08	6,79	6,80	6,80	6,80	4	6,80			0,00	0,07	101,48
33	A36	PD02	DB08	6,79	6,91	6,85	6,75	4	6,83			0,07	1,03	101,89
34	F12x	PC01	DB08	6,88	6,92	6,93	6,91	4	6,91			0,02	0,33	103,18
35	F19x	PD02	DB08	6,87	6,87	6,96	6,99	4	6,92			0,06	0,89	103,35
36	F25x	PB06	DB08	6,93	6,98	6,95	6,92	4	6,95			0,03	0,38	103,68
37	F13x	PZ02	DD01	6,94	6,99	7,02	6,87	4	6,96			0,07	0,97	103,86
38	F33x	PD01	DB10	7,02	7,23	7,14	6,72	4	7,03			0,22	3,16	104,91
39	F32x	PC01	DB08	7,04	6,98	7,19	7,24	4	7,11			0,12	1,72	106,18
40	F24x	PD01	DB99	7,03	7,17	7,20	7,23	4	7,16			0,09	1,26	106,87
41	A71	PB03	DB99	7,04	7,32	7,32	7,32	4	7,25			0,14	1,91	108,25
42	F09	PZ02	DD02	7,25	7,29	7,36	7,35	4	7,31			0,06	0,76	109,17
43	F22x	PD02	DB01	*7,83a*	7,40	7,33	7,39	3	7,37		*	0,04	0,51	110,08
44	F07x	PD99	DB08	8,65	8,52	8,71	8,58	0	8,61	*b*	*	0,08	0,96	128,59
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	n	Mean	s_r	CV_r
all labs	**155**	**6,70**	**0,080**	**1,194**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
39	**0,318**	**4,746**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: K **Sample: 3** Unit: mg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	S22x	PD02	DB08	3,94	4,56	4,78	4,09	0	4,34	*b*	*	0,39	9,06	56,03
2	A88	PD01	DB08	6,45	6,63	6,59	6,53	4	6,55		*	0,08	1,15	84,50
3	A56	PC01	DB08	6,73	6,79	6,86	6,75	4	6,78		*	0,06	0,82	87,52
4	A47x	PD01	DB08	6,82	6,84	7,06	6,97	4	6,92		*	0,11	1,64	89,32
5	A71	PB03	DB99	7,09	7,09	6,95	7,11	4	7,06			0,07	1,01	91,06
6	F27x	PD01	DB06	6,94	7,69	7,51	6,95	4	7,27			0,38	5,27	93,84
7	A49	PD05	DB08	7,19	7,36	7,45	7,45	4	7,36			0,12	1,66	95,00
8	F08x	PE99	DB08	7,50	7,49	7,36	7,33	4	7,42			0,09	1,17	95,74
9	A43	PB06	DB01	7,53	7,74	6,90	7,52	4	7,42			0,36	4,89	95,77
10	F06x	PD02	DB08	7,75	7,51	7,53	7,18	4	7,49			0,24	3,14	96,63
11	F26x	PD02	DB09	7,52	7,54	7,56	7,60	4	7,56			0,03	0,45	97,48
12	A58x	PD02	DB01	7,52	7,53	7,60	7,61	4	7,57			0,05	0,62	97,61
13	A57	PZ02	DD02	7,63	7,62	7,61	7,57	4	7,61			0,03	0,35	98,16
14	F21	PD02	DB09	7,66	7,59	7,64	7,62	4	7,63			0,03	0,39	98,42
15	F05x	PD02	DB08	7,64	7,75	7,69	7,60	4	7,67			0,06	0,84	98,97
16	F01x	PD02	DB01	7,63	7,86	7,70	7,59	4	7,70			0,12	1,55	99,29
17	A59	PC01	DB08	7,76	7,80	7,71	7,54	4	7,71			0,12	1,50	99,42
18	A39	PC02	DB08	7,74	7,66	7,68	7,76	4	7,71			0,05	0,60	99,50
19	A42	PB04	DB01	7,71	7,65	7,80	7,78	4	7,74			0,07	0,89	99,80
20	A61x	PD01	DB08	7,78	7,67	7,63	7,88	4	7,74			0,11	1,44	99,88
21	A79	PD03	DB99	7,39	7,62	7,90	8,07	4	7,74			0,30	3,87	99,90
22	F15x	PC01	DB08	7,64	7,73	7,73	7,88	4	7,75			0,10	1,28	99,93
23	F16x	PC01	DB08	7,74	7,79	7,74	7,78	4	7,76			0,03	0,34	100,11
24	F33x	PD01	DB10	7,71	7,56	8,17	7,76	4	7,80			0,26	3,34	100,64
25	A65	PD01	DB08	7,83	7,75	7,83	7,87	4	7,82			0,05	0,64	100,90
26	A60x	PD01	DB10	7,59	7,62	7,63	8,45	0	7,82	*c*		0,42	5,32	100,92
27	F02x	PD02	DB08	7,77	7,97	7,82	7,79	4	7,84			0,09	1,13	101,15
28	A36	PD02	DB08	7,90	7,99	7,93	7,57	4	7,85			0,19	2,41	101,26
29	F18x	PD99	DB08	7,93	7,95	7,84	7,84	4	7,89			0,06	0,74	101,80
30	F03	PD02	DB08	7,87	7,99	7,82	7,92	4	7,90			0,07	0,89	101,93
31	F14x	PC01	DB08	7,97	7,91	7,93	7,98	4	7,95			0,03	0,42	102,55
32	A85x	PD02	DB08	8,06	7,97	7,85	7,93	4	7,95			0,09	1,10	102,61
33	A45x	PE99	DB08	7,98	7,96	7,97	7,96	4	7,97			0,01	0,12	102,80
34	A82	PD01	DB08	7,96	7,98	8,02	8,07	4	8,01			0,05	0,61	103,32
35	A62	PD02	DB01	8,20	8,17	8,04	7,95	4	8,09			0,12	1,44	104,39
36	F19x	PD02	DB08	8,04	8,22	8,12	8,09	4	8,12			0,08	0,93	104,74
37	F12x	PC01	DB08	8,22	8,19	7,96	8,12	4	8,12			0,11	1,41	104,81
38	F09	PZ02	DD02	8,17	8,18	8,22	8,12	4	8,17			0,04	0,53	105,44
39	F25x	PB06	DB08	8,29	8,13	8,24	8,34	4	8,25			0,09	1,09	106,45
40	F13x	PZ02	DD01	8,31	8,23	8,23	8,24	4	8,25			0,04	0,44	106,46
41	F24x	PD01	DB99	8,17	8,22	8,27	8,46	4	8,28			0,13	1,57	106,83
42	F22x	PD02	DB01	8,28	8,81	8,32	8,72	4	8,53		*	0,27	3,18	110,09
43	F32x	PC01	DB08	8,90	8,80	8,77	8,86	4	8,83		*	0,06	0,66	113,97
44	F07x	PD99	DB08	9,77	10,08	9,75	10,06	0	9,92	*b*	*	0,18	1,79	127,95
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	n	Mean	s_r	CV_r
all labs	**164**	**7,75**	**0,108**	**1,393**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
41	**0,439**	**5,668**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: K **Sample: 4** Unit: mg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	11,69	12,67	12,44	13,27	0	12,52	*b*	*	0,65	5,22	58,17
2	A88	PD01	DB08	17,96	17,70	18,39	17,69	4	17,93		*	0,33	1,81	83,34
3	A82	PD01	DB08	18,70	18,90	20,10	19,50	4	19,30		*	0,63	3,28	89,69
4	A56	PC01	DB08	19,32	19,10	19,54	19,82	4	19,44			0,31	1,57	90,36
5	F25x	PB06	DB08	18,80	19,63	20,40	20,00	4	19,71			0,68	3,46	91,58
6	A47x	PD01	DB08	19,95	19,86	20,05	19,78	4	19,91			0,12	0,58	92,52
7	A62	PD02	DB01	20,49	20,18	19,73	19,68	4	20,02			0,39	1,93	93,03
8	A57	PZ02	DD02	20,32	20,18	20,28	20,21	4	20,25			0,06	0,32	94,09
9	F13x	PZ02	DD01	20,11	20,27	20,24	20,39	4	20,25			0,12	0,57	94,11
10	F08x	PE99	DB08	20,42	20,52	20,41	20,52	4	20,47			0,06	0,30	95,11
11	F18x	PD99	DB08	20,70	20,20	20,50	20,50	4	20,48			0,21	1,01	95,15
12	A42	PB04	DB01	20,78	20,41	20,31	20,82	4	20,58			0,26	1,25	95,64
13	F26x	PD02	DB09	20,76	20,78	20,74	20,76	4	20,76			0,02	0,08	96,47
14	A49	PD05	DB08	20,93	20,79	20,98	20,60	4	20,83			0,17	0,82	96,77
15	A60x	PD01	DB10	21,09	20,71	20,73	20,84	4	20,84			0,17	0,83	96,86
16	A65	PD01	DB08	20,88	20,61	21,11	21,36	4	20,99			0,32	1,53	97,54
17	A59	PC01	DB08	21,60	20,96	20,91	21,28	4	21,19			0,32	1,51	98,47
18	A45x	PE99	DB08	21,20	21,50	21,30	21,60	4	21,40			0,18	0,85	99,45
19	F01x	PD02	DB01	21,50	21,42	21,38	21,32	4	21,41			0,08	0,35	99,47
20	F15x	PC01	DB08	21,08	21,83	21,66	21,48	4	21,51			0,32	1,50	99,97
21	A58x	PD02	DB01	21,65	21,49	21,61	21,31	4	21,52			0,15	0,71	99,98
22	A39	PC02	DB08	21,50	21,53	21,18	21,87	4	21,52			0,28	1,31	100,00
23	A61x	PD01	DB08	21,66	21,51	21,53	21,57	4	21,57			0,07	0,32	100,22
24	F06x	PD02	DB08	20,57	21,19	22,26	22,31	4	21,58			0,85	3,94	100,29
25	A79	PD03	DB99	21,51	21,69	21,87	21,55	4	21,65			0,16	0,76	100,62
26	A71	PB03	DB99	22,03	21,70	22,60	21,95	4	22,07			0,38	1,73	102,56
27	A43	PB06	DB01	22,24	21,81	22,45	21,86	4	22,09			0,31	1,39	102,65
28	F12x	PC01	DB08	22,58	22,24	21,86	22,23	4	22,23			0,30	1,33	103,29
29	F16x	PC01	DB08	22,36	21,89	22,62	22,20	4	22,27			0,31	1,37	103,48
30	A85x	PD02	DB08	22,11	22,47	22,00	22,74	4	22,33			0,34	1,53	103,77
31	F33x	PD01	DB10	21,97	21,94	22,65	23,03	4	22,40			0,53	2,38	104,08
32	F05x	PD02	DB08	22,50	22,70	22,50	22,30	4	22,50			0,16	0,73	104,56
33	F21	PD02	DB09	22,32	22,79	22,40	22,60	4	22,53			0,21	0,94	104,69
34	F27x	PD01	DB06	24,08	23,30	22,76	20,08	0	22,55	*c*		1,74	7,71	104,81
35	F09	PZ02	DD02	22,27	22,62	22,89	22,45	4	22,56			0,26	1,17	104,83
36	F03	PD02	DB08	22,60	22,85	22,63	22,41	4	22,62			0,18	0,79	105,12
37	F24x	PD01	DB99	22,05	22,43	22,79	23,31	4	22,65			0,54	2,37	105,24
38	A36	PD02	DB08	22,56	22,88	23,03	22,40	4	22,72			0,29	1,27	105,57
39	F32x	PC01	DB08	22,78	22,78	22,67	22,67	4	22,73			0,06	0,28	105,60
40	F14x	PC01	DB08	22,70	22,80	23,30	23,00	4	22,95			0,26	1,15	106,65
41	F22x	PD02	DB01	23,01	23,28	22,74	22,89	4	22,98			0,23	0,99	106,79
42	F02x	PD02	DB08	23,89	22,13	22,12	24,02	4	23,04			1,06	4,59	107,07
43	F19x	PD02	DB08	23,50	23,00	23,30	23,80	4	23,40			0,34	1,44	108,74
44	F07x	PD99	DB08	23,88	24,05	25,59	25,09	4	24,65		*	0,82	3,34	114,56
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	n	Mean	s_r	CV_r
all labs	**168**	**21,52**	**0,306**	**1,420**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
42	**1,305**	**6,066**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: C **Sample: 1** Unit: g/100g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	A71	PB99	DZ99	45,43	44,57	45,50	45,18	0	45,17	*b* *	0,42	0,94	90,27
2	A59	PZ98	DA02	46,61	46,08	46,07	46,90	0	46,42	*b* *	0,41	0,88	92,75
3	A62	PZ98	DA01	48,60	48,50	48,40	48,40	4	48,48		0,10	0,20	96,87
4	A49	PZ98	DA02	48,50	48,50	48,50	48,50	4	48,50		0,00	0,00	96,92
5	F02x	PZ98	DA01	49,00	48,92	48,89	48,80	4	48,90		0,08	0,17	97,72
6	A82	PZ98	DA02	49,32	49,41	49,43	49,24	4	49,35		0,09	0,18	98,62
7	F13x	PZ98	DA01	49,35	49,42	49,35	49,40	4	49,38		0,04	0,07	98,68
8	A58x	PZ98	DA99	49,34	49,62	49,37	49,21	4	49,39		0,17	0,35	98,69
9	F07x	PZ98	DA01	49,29	49,50	49,57	49,43	4	49,45		0,12	0,24	98,81
10	A85x	PZ98	DA01	49,45	49,45	49,45	49,46	4	49,45		0,01	0,02	98,82
11	A61x	PZ98	DA02	49,33	49,47	49,46	49,75	4	49,50		0,18	0,36	98,92
12	A56	PZ98	DA01	49,41	49,54	49,66	49,51	4	49,53		0,10	0,21	98,98
13	F32x	PZ98	DA02	49,60	49,60	49,60	49,50	4	49,58		0,05	0,10	99,07
14	A45x	PZ98	DA02	49,80	49,70	49,60	49,50	4	49,65		0,13	0,26	99,22
15	F24x	PZ98	DA02	49,93	49,39	49,59	49,71	4	49,66		0,23	0,45	99,23
16	F06x	PZ98	DA02	49,69	49,76	49,76	49,69	4	49,73		0,04	0,08	99,37
17	F22x	PZ98	DA01	49,82	50,00	49,68	49,88	4	49,85		0,13	0,27	99,61
18	F12x	PZ98	DA02	49,52	50,16	49,98	49,89	4	49,89		0,27	0,54	99,69
19	A39	PZ98	DA02	49,96	49,85	49,97	49,97	4	49,94		0,06	0,12	99,79
20	F19x	PZ98	DA01	50,00	49,90	49,90	50,00	4	49,95		0,06	0,12	99,82
21	F08x	PZ98	DA01	50,11	49,92	49,95	50,07	4	50,01		0,09	0,18	99,95
22	F05x	PZ98	DA01	50,10	50,20	50,00	50,10	4	50,10		0,08	0,16	100,12
23	F15x	PZ98	DA01	50,10	50,20	50,00	50,10	4	50,10		0,08	0,16	100,12
24	F25x	PZ98	DA01	50,31	50,08	49,94	50,29	4	50,16		0,18	0,35	100,23
25	A60x	PZ98	DA02	50,04	50,30	50,14	50,18	4	50,16		0,11	0,22	100,24
26	F18x	PZ98	DA01	50,00	50,30	50,30	50,10	4	50,18		0,15	0,30	100,27
27	A65	PD01	DB08	50,22	50,27	50,29	50,24	4	50,26		0,03	0,06	100,43
28	A57	PZ98	DA01	50,07	50,56	50,63	50,45	4	50,43		0,25	0,49	100,77
29	F14x	PZ98	DA01	50,50	50,60	50,60	50,50	4	50,55		0,06	0,11	101,02
30	F16x	PZ98	DA02	50,58	50,86	50,78	50,54	4	50,69		0,15	0,30	101,30
31	A86x	PZ98	DA01	50,74	50,74	50,80	50,63	4	50,73		0,07	0,14	101,37
32	F03	PZ98	DA01	50,82	50,81	50,85	50,74	4	50,81		0,05	0,09	101,53
33	A42	PZ98	DA01	50,20	50,10	51,70	51,80	0	50,95	*c*	0,93	1,82	101,82
34	F33x	PZ98	DA02	51,10	50,90	51,10	51,00	4	51,03		0,10	0,19	101,97
35	F27x	PZ98	DA01	51,05	51,11	51,11	51,15	4	51,11		0,04	0,08	102,13
36	A88	PZ98	DA01	53,21	49,63	51,42	50,64	0	51,23	*c*	1,51	2,95	102,36
37	F21	PZ98	DA01	51,44	51,47	51,51	51,52	4	51,49		0,04	0,07	102,88
38	F26x	PZ98	DA02	51,80	51,50	51,70	51,60	4	51,65		0,13	0,25	103,21
39	A47x	PZ98	DA01	51,92	51,91	51,37	52,31	4	51,88		0,39	0,74	103,67
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	n	Mean	s_r	CV_r
all labs	**140**	**50,04**	**0,110**	**0,219**
5	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
35	**0,796**	**1,591**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: C **Sample: 2** Unit: g/100g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	A59	PZ98	DA02	48,61	48,60	48,20	48,12	0	48,38	*b* *	0,26	0,54	93,38
2	A49	PZ98	DA02	*50,1a*	50,20	50,20	50,20	3	50,20		0,00	0,00	96,89
3	A62	PZ98	DA01	50,60	50,40	50,50	50,50	4	50,50		0,08	0,16	97,47
4	A71	PB99	DZ99	50,43	50,57	50,47	50,74	4	50,55		0,14	0,27	97,57
5	F13x	PZ98	DA01	50,59	50,55	50,58	50,56	4	50,57		0,02	0,04	97,61
6	F02x	PZ98	DA01	51,24	51,17	50,90	50,85	4	51,04		0,19	0,38	98,51
7	F07x	PZ98	DA01	51,20	51,33	51,61	51,35	4	51,37		0,17	0,33	99,15
8	A56	PZ98	DA01	51,26	51,40	51,52	51,38	4	51,39		0,11	0,21	99,19
9	A45x	PZ98	DA02	51,50	51,30	51,40	51,40	4	51,40		0,08	0,16	99,21
10	F24x	PZ98	DA02	51,80	51,15	51,39	51,54	4	51,47		0,27	0,53	99,34
11	F32x	PZ98	DA02	51,50	51,50	51,40	51,50	4	51,48		0,05	0,10	99,35
12	A82	PZ98	DA02	51,51	51,46	51,49	51,50	4	51,49		0,02	0,04	99,38
13	F12x	PZ98	DA02	51,52	51,49	51,48	51,50	4	51,50		0,02	0,03	99,40
14	A85x	PZ98	DA01	51,62	51,63	51,68	51,71	4	51,66		0,04	0,08	99,71
15	F06x	PZ98	DA02	51,63	51,67	51,70	51,67	4	51,67		0,03	0,06	99,72
16	F22x	PZ98	DA01	51,66	51,72	51,71	51,65	4	51,69		0,04	0,07	99,76
17	F05x	PZ98	DA01	51,70	51,70	51,70	51,70	4	51,70		0,00	0,00	99,79
18	A58x	PZ98	DA99	51,55	51,71	51,95	51,72	4	51,73		0,16	0,32	99,85
19	A61x	PZ98	DA02	51,75	51,71	51,57	51,93	4	51,74		0,15	0,29	99,86
20	A88	PZ98	DA01	51,56	51,97	51,77	51,66	4	51,74		0,18	0,34	99,86
21	A60x	PZ98	DA02	51,58	51,72	51,87	51,82	4	51,75		0,13	0,25	99,87
22	F33x	PZ98	DA02	51,90	51,90	51,80	51,70	4	51,83		0,10	0,18	100,03
23	A39	PZ98	DA02	51,71	51,95	51,77	51,88	4	51,83		0,11	0,21	100,03
24	F18x	PZ98	DA01	52,00	51,80	51,80	52,20	4	51,95		0,19	0,37	100,27
25	F19x	PZ98	DA01	52,00	52,00	51,90	52,10	4	52,00		0,08	0,16	100,37
26	F15x	PZ98	DA01	52,00	52,00	52,00	52,10	4	52,03		0,05	0,10	100,41
27	F08x	PZ98	DA01	51,90	52,10	51,96	52,31	4	52,07		0,19	0,36	100,50
28	A42	PZ98	DA01	52,70	52,20	51,70	51,80	4	52,10		0,45	0,87	100,56
29	F14x	PZ98	DA01	52,30	52,30	52,30	52,30	4	52,30		0,00	0,00	100,94
30	A65	PD01	DB08	52,47	52,48	52,33	52,28	4	52,39		0,10	0,19	101,12
31	A86x	PZ98	DA01	51,86	52,76	52,59	52,56	4	52,44		0,40	0,76	101,22
32	F16x	PZ98	DA02	53,10	52,32	52,15	52,20	4	52,44		0,44	0,85	101,22
33	F26x	PZ98	DA02	52,30	52,60	52,50	52,60	4	52,50		0,14	0,27	101,33
34	A57	PZ98	DA01	52,20	52,66	52,85	52,61	4	52,58		0,27	0,52	101,49
35	F25x	PZ98	DA01	52,71	52,77	52,49	52,47	4	52,61		0,15	0,29	101,54
36	F03	PZ98	DA01	52,45	52,78	52,57	52,86	4	52,67		0,19	0,36	101,65
37	F27x	PZ98	DA01	53,13	53,06	53,05	53,13	4	53,09		0,04	0,08	102,47
38	F21	PZ98	DA01	53,11	53,19	53,09	53,16	4	53,14		0,05	0,09	102,56
39	A47x	PZ98	DA01	54,08	54,59	53,68	53,15	0	53,88	*c*	0,61	1,13	103,98
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	n	Mean	s_r	CV_r
all labs	**147**	**51,81**	**0,130**	**0,252**
5	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
37	**0,678**	**1,309**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: C **Sample: 3** Unit: g/100g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	A59	PZ98	DA02	49,08	48,73	48,75	49,33	0	48,97	*b* *	0,29	0,59	93,65
2	A71	PB99	DZ99	49,99	49,86	50,99	49,96	0	50,20	*b*	0,53	1,05	96,00
3	A49	PZ98	DA02	50,80	50,90	50,70	50,70	4	50,78		0,10	0,19	97,10
4	A62	PZ98	DA01	51,20	51,20	51,10	51,10	4	51,15		0,06	0,11	97,82
5	F24x	PZ98	DA02	51,73	51,08	51,30	51,46	4	51,39		0,27	0,53	98,28
6	F02x	PZ98	DA01	51,10	51,05	51,63	51,83	4	51,40		0,39	0,75	98,30
7	F13x	PZ98	DA01	51,53	51,49	51,55	51,47	4	51,51		0,04	0,07	98,51
8	F12x	PZ98	DA02	51,84	51,56	51,68	51,70	4	51,70		0,11	0,22	98,86
9	F07x	PZ98	DA01	51,60	51,83	51,85	51,73	4	51,75		0,11	0,22	98,97
10	F22x	PZ98	DA01	51,80	51,91	51,96	51,84	4	51,88		0,07	0,14	99,21
11	F32x	PZ98	DA02	51,90	52,10	51,90	51,90	4	51,95		0,10	0,19	99,35
12	A85x	PZ98	DA01	51,96	51,85	51,98	52,02	4	51,95		0,07	0,14	99,35
13	A39	PZ98	DA02	52,02	52,09	52,05	51,91	4	52,02		0,08	0,15	99,48
14	A45x	PZ98	DA02	52,00	52,10	52,00	52,00	4	52,03		0,05	0,10	99,49
15	A82	PZ98	DA02	52,33	52,28	51,50	52,24	4	52,09		0,39	0,76	99,61
16	F06x	PZ98	DA02	52,15	52,03	52,13	52,14	4	52,11		0,06	0,11	99,66
17	A58x	PZ98	DA99	52,09	52,24	52,35	51,98	4	52,17		0,16	0,31	99,76
18	A56	PZ98	DA01	52,29	51,99	52,08	52,33	4	52,17		0,16	0,31	99,77
19	A61x	PZ98	DA02	52,34	52,41	52,15	52,19	4	52,27		0,12	0,24	99,96
20	F19x	PZ98	DA01	52,30	52,20	52,30	52,30	4	52,28		0,05	0,10	99,97
21	A60x	PZ98	DA02	52,21	52,38	52,27	52,27	4	52,28		0,07	0,14	99,99
22	F05x	PZ98	DA01	52,30	52,40	52,30	52,30	4	52,33		0,05	0,10	100,07
23	F15x	PZ98	DA01	52,40	52,40	52,40	52,40	4	52,40		0,00	0,00	100,21
24	F08x	PZ98	DA01	52,47	52,33	52,41	52,55	4	52,44		0,09	0,18	100,28
25	A88	PZ98	DA01	52,87	52,29	52,58	52,42	4	52,54		0,25	0,48	100,48
26	F18x	PZ98	DA01	52,60	52,60	52,50	52,50	4	52,55		0,06	0,11	100,50
27	F25x	PZ98	DA01	52,70	52,60	*54,08a*	52,62	3	52,64		0,05	0,10	100,67
28	F16x	PZ98	DA02	52,59	52,60	52,74	52,71	4	52,66		0,08	0,14	100,71
29	A42	PZ98	DA01	52,20	52,40	53,10	53,10	4	52,70		0,47	0,89	100,78
30	A65	PD01	DB08	52,88	52,71	52,42	52,99	4	52,75		0,25	0,47	100,88
31	F14x	PZ98	DA01	52,80	52,80	52,80	52,80	4	52,80		0,00	0,00	100,97
32	A57	PZ98	DA01	52,42	53,02	53,03	52,83	4	52,83		0,29	0,54	101,02
33	A86x	PZ98	DA01	52,87	52,99	53,03	52,87	4	52,94		0,08	0,16	101,24
34	F33x	PZ98	DA02	53,00	53,20	53,10	52,90	4	53,05		0,13	0,24	101,45
35	F03	PZ98	DA01	53,03	53,08	53,07	53,14	4	53,08		0,05	0,09	101,51
36	F21	PZ98	DA01	53,09	53,19	53,18	53,12	4	53,15		0,05	0,09	101,63
37	F27x	PZ98	DA01	53,17	53,23	53,11	53,29	4	53,20		0,08	0,15	101,74
38	F26x	PZ98	DA02	53,70	53,80	53,50	53,60	4	53,65		0,13	0,24	102,60
39	A47x	PZ98	DA01	55,06	54,16	54,35	54,57	0	54,54	*b*	0,39	0,71	104,29
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	n	Mean	s_r	CV_r
all labs	**143**	**52,29**	**0,127**	**0,243**
5	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
36	**0,620**	**1,186**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: C **Sample: 4** Unit: g/100g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	A59	PZ98	DA02	43,60	43,38	43,26	43,32	0	43,39	*b*	*	0,15	0,34	91,79
2	A71	PB99	DZ99	43,74	43,66	43,94	43,52	0	43,72	*b*	*	0,18	0,40	92,48
3	A62	PZ98	DA01	45,40	45,30	45,40	45,50	0	45,40	*b*		0,08	0,18	96,04
4	A86x	PZ98	DA01	44,61	45,74	45,78	46,60	0	45,68	*c*		0,82	1,79	96,64
5	A49	PZ98	DA02	45,80	46,00	45,80	45,20	4	45,70			0,35	0,76	96,68
6	A56	PZ98	DA01	46,30	46,50	46,31	46,49	4	46,40			0,11	0,24	98,16
7	F13x	PZ98	DA01	46,51	46,50	46,52	46,50	4	46,51			0,01	0,02	98,39
8	A82	PZ98	DA02	46,39	46,88	46,62	46,38	4	46,57			0,24	0,51	98,51
9	F24x	PZ98	DA02	46,83	46,53	46,65	46,71	4	46,68			0,12	0,27	98,75
10	F32x	PZ98	DA02	47,00	46,90	46,80	46,70	4	46,85			0,13	0,28	99,11
11	F02x	PZ98	DA01	46,69	46,89	46,89	46,98	4	46,86			0,12	0,26	99,14
12	A45x	PZ98	DA02	46,80	47,00	46,90	47,00	4	46,93			0,10	0,20	99,27
13	F12x	PZ98	DA02	47,14	46,82	47,01	46,99	4	46,99			0,13	0,28	99,41
14	F06x	PZ98	DA02	47,01	47,06	47,02	46,97	4	47,02			0,04	0,08	99,46
15	A61x	PZ98	DA02	47,22	46,84	47,04	47,04	4	47,04			0,16	0,33	99,50
16	A85x	PZ98	DA01	47,02	47,08	47,02	47,05	4	47,04			0,03	0,06	99,51
17	F07x	PZ98	DA01	46,95	47,20	47,18	46,87	4	47,05			0,17	0,35	99,54
18	F08x	PZ98	DA01	47,60	46,77	47,09	47,10	4	47,14			0,34	0,72	99,72
19	F25x	PZ98	DA01	47,25	47,05	47,34	47,03	4	47,17			0,15	0,32	99,78
20	F19x	PZ98	DA01	47,20	47,10	47,20	47,20	4	47,18			0,05	0,11	99,80
21	F33x	PZ98	DA02	47,40	46,40	47,50	47,60	4	47,23			0,56	1,18	99,91
22	F22x	PZ98	DA01	47,28	47,32	47,03	47,40	4	47,26			0,16	0,34	99,97
23	A58x	PZ98	DA99	47,15	47,14	47,56	47,35	4	47,30			0,20	0,42	100,06
24	A88	PZ98	DA01	47,54	47,04	47,29	47,49	4	47,34			0,23	0,48	100,15
25	A60x	PZ98	DA02	47,35	47,33	47,52	47,38	4	47,40			0,08	0,18	100,27
26	F15x	PZ98	DA01	47,50	47,30	47,40	47,40	4	47,40			0,08	0,17	100,28
27	F05x	PZ98	DA01	47,40	47,40	47,40	47,40	4	47,40			0,00	0,00	100,28
28	F16x	PZ98	DA02	47,61	47,61	47,54	47,54	4	47,58			0,04	0,08	100,65
29	A39	PZ98	DA02	47,74	47,54	47,36	47,82	4	47,62			0,21	0,43	100,73
30	F14x	PZ98	DA01	47,70	47,70	47,70	47,70	4	47,70			0,00	0,00	100,91
31	A65	PD01	DB08	47,58	47,87	47,62	47,86	4	47,73			0,15	0,32	100,98
32	A57	PZ98	DA01	47,49	47,86	47,90	48,09	4	47,84			0,25	0,52	101,20
33	F18x	PZ98	DA01	47,90	48,00	47,60	47,90	4	47,85			0,17	0,36	101,23
34	A42	PZ98	DA01	48,30	48,20	47,40	47,70	4	47,90			0,42	0,89	101,33
35	F03	PZ98	DA01	48,02	48,12	48,17	47,94	4	48,06			0,10	0,21	101,68
36	F21	PZ98	DA01	48,14	48,13	48,00	48,17	4	48,11			0,08	0,16	101,78
37	F27x	PZ98	DA01	48,11	48,15	48,07	48,25	4	48,15			0,08	0,16	101,85
38	F26x	PZ98	DA02	48,30	48,20	48,10	48,30	4	48,23			0,10	0,20	102,02
39	A47x	PZ98	DA01	49,12	49,90	49,49	49,30	0	49,45	*b*		0,33	0,68	104,62
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	n	Mean	s_r	CV_r
all labs	**136**	**47,27**	**0,151**	**0,320**
5	% from the mean			

l	s_R	CV_R
34	**0,555**	**1,175**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Zn **Sample: 1** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	A88	PD01	DB08	32,40	32,50	32,00	32,10	0	32,25	*b*	*	0,24	0,74	75,73
2	F24x	PD01	DB99	31,00	40,00	34,00	38,00	0	35,75	*c*	*	4,03	**11,28**	83,95
3	S22x	PD02	DB08	35,32	35,66	36,55	35,84	4	35,84		*	0,52	1,45	84,16
4	F09	PZ02	DD02	37,54	37,46	37,86	37,16	4	37,51			0,29	0,77	88,07
5	F12x	PC01	DB10	39,24	38,99	40,32	39,52	4	39,52			0,58	1,46	92,79
6	A39	PC02	DB08	39,81	40,57	40,44	40,16	4	40,25			0,34	0,84	94,50
7	A65	PD01	DB08	39,50	38,90	43,20	39,50	4	40,28			1,97	4,89	94,57
8	F13x	PD01	DB08	40,32	40,31	40,44	40,34	4	40,35			0,06	0,15	94,75
9	F08x	PE99	DB08	40,27	41,13	40,36	41,49	4	40,81			0,59	1,46	95,83
10	A71	PB03	DB01	39,37	41,91	40,81	41,77	4	40,97			1,17	2,86	96,19
11	A79	PD03	DB10	42,78	43,05	38,30	39,84	4	40,99			2,31	5,63	96,25
12	A47x	PD01	DB08	41,68	41,32	40,32	41,45	4	41,19			0,60	1,46	96,73
13	F06x	PD02	DB08	41,30	40,50	42,30	40,80	4	41,23			0,79	1,91	96,80
14	A61x	PD01	DB08	41,85	41,13	41,20	41,67	4	41,46			0,35	0,85	97,36
15	F02x	PD02	DB08	41,30	41,10	42,70	42,30	4	41,85			0,77	1,85	98,27
16	A58x	PD02	DB01	41,68	41,82	42,60	41,58	4	41,92			0,46	1,11	98,44
17	F19	PD02	DB08	43,60	41,70	41,70	41,90	4	42,23			0,92	2,18	99,15
18	A45x	PE99	DB08	42,50	42,30	42,40	42,70	4	42,48			0,17	0,40	99,74
19	F14x	PC01	DB08	42,40	42,40	42,70	42,70	4	42,55			0,17	0,41	99,91
20	A82	PD01	DB08	42,10	43,20	42,40	43,10	4	42,70			0,54	1,25	100,27
21	F05x	PD02	DB08	43,10	43,70	42,30	42,80	4	42,98			0,59	1,36	100,91
22	A49	PD05	DB08	43,37	42,85	43,38	42,91	4	43,13			0,29	0,67	101,27
23	A57	PZ02	DD02	43,30	43,10	43,10	43,50	4	43,25			0,19	0,44	101,56
24	F18x	PD99	DB10	44,40	43,80	42,40	42,50	4	43,28			0,98	2,27	101,62
25	F03	PD02	DB08	43,15	44,14	42,79	43,19	4	43,32			0,58	1,34	101,71
26	A59	PC01	DB08	43,02	42,74	43,42	44,21	4	43,35			0,64	1,47	101,79
27	F32x	PC01	DB08	44,40	43,70	43,40	43,30	4	43,70			0,50	1,14	102,61
28	F33x	PD01	DB10	43,60	44,97	43,49	45,01	4	44,27			0,84	1,89	103,95
29	F15x	PC01	DB08	44,00	45,00	46,00	43,00	4	44,50			1,29	2,90	104,49
30	F16x	PC01	DB08	44,19	44,20	45,16	45,13	4	44,67			0,55	1,23	104,89
31	A36	PD02	DB08	44,19	43,83	46,47	44,30	4	44,70			1,20	2,68	104,96
32	F27	PD01	DB01	44,04	45,54	47,22	46,89	4	45,92			1,45	3,16	107,83
33	A80	PD01	DB10	46,90	47,30	48,10	47,10	4	47,35			0,53	1,11	111,19
34	A60x	PD01	DB10	46,53	47,49	47,11	50,34	4	47,87			1,69	3,54	112,40
35	F07x	PD99	DB08	49,05	49,87	48,29	48,72	4	48,98		*	0,67	1,36	115,02
36	A56	PC01	DB08	49,00	52,00	51,00	55,00	0	51,75	*b*	*	2,50	4,83	121,52
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	n	Mean	s_r	CV_r
all labs	**132**	**42,59**	**0,745**	**1,749**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
33	**2,697**	**6,332**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Zn **Sample: 2** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A88	PD01	DB08	17,40	19,10	17,40	18,10	0	18,00	*b*	*	0,80	4,47	76,72
2	S22x	PD02	DB08	17,88	19,08	19,15	18,70	0	18,70	*b*	*	0,58	3,12	79,71
3	F24x	PD01	DB99	17,00	23,00	20,00	16,00	0	19,00	*b*	*	3,16	**16,64**	80,98
4	F09	PZ02	DD02	20,87	21,11	21,30	20,93	4	21,05			0,19	0,92	89,73
5	F13x	PD01	DB08	21,50	21,36	21,40	21,32	4	21,40			0,08	0,36	91,19
6	F12x	PC01	DB10	22,10	21,80	21,87	21,92	4	21,92			0,12	0,57	93,43
7	F06x	PD02	DB08	22,00	22,20	22,50	21,70	4	22,10			0,34	1,52	94,19
8	F14x	PC01	DB08	21,90	22,10	23,10	22,00	4	22,28			0,56	2,50	94,94
9	A49	PD05	DB08	22,83	22,82	22,77	22,50	4	22,73			0,16	0,68	96,88
10	A47x	PD01	DB08	23,06	22,92	22,50	22,62	4	22,78			0,26	1,14	97,07
11	F19	PD02	DB08	22,80	22,70	22,80	23,00	4	22,83			0,13	0,55	97,28
12	A65	PD01	DB08	21,80	23,80	23,10	23,00	4	22,93			0,83	3,62	97,71
13	A79	PD03	DB10	23,86	23,91	22,05	21,89	4	22,93			1,11	4,84	97,72
14	A61x	PD01	DB08	23,25	22,75	23,42	22,72	4	23,04			0,35	1,53	98,18
15	A80	PD01	DB10	23,50	22,80	23,20	22,80	4	23,08			0,34	1,47	98,35
16	A39	PC02	DB08	22,92	23,20	23,48	22,79	4	23,10			0,31	1,33	98,44
17	F33x	PD01	DB10	24,07	23,24	23,03	22,16	4	23,13			0,78	3,39	98,56
18	A58x	PD02	DB01	23,07	24,18	23,61	22,81	4	23,42			0,61	2,60	99,81
19	F16x	PC01	DB08	23,60	23,82	23,24	23,54	4	23,55			0,24	1,02	100,37
20	F27	PD01	DB01	23,80	21,97	23,91	24,96	4	23,66			1,24	5,25	100,84
21	F18x	PD99	DB10	23,20	24,20	23,20	24,10	4	23,68			0,55	2,32	100,90
22	F03	PD02	DB08	23,47	24,50	23,40	23,48	4	23,71			0,52	2,21	101,06
23	F32x	PC01	DB08	24,30	23,90	24,40	23,10	4	23,93			0,59	2,47	101,97
24	F05x	PD02	DB08	24,20	24,40	24,10	23,20	4	23,98			0,53	2,22	102,18
25	A71	PB03	DB01	23,79	24,01	23,88	24,29	4	23,99			0,22	0,91	102,26
26	F15x	PC01	DB08	24,00	24,00	24,00	24,00	4	24,00			0,00	0,00	102,29
27	A36	PD02	DB08	23,57	24,22	24,98	23,25	4	24,01			0,77	3,19	102,31
28	A59	PC01	DB08	25,09	24,15	23,50	23,64	4	24,10			0,72	2,99	102,69
29	F02x	PD02	DB08	23,60	24,20	25,60	23,00	4	24,10			1,11	4,62	102,71
30	F08x	PE99	DB08	23,23	25,12	23,41	24,85	4	24,15			0,97	4,02	102,94
31	A57	PZ02	DD02	24,60	23,90	24,60	24,50	4	24,40			0,34	1,38	103,99
32	A82	PD01	DB08	23,60	25,10	24,70	24,30	4	24,43			0,64	2,62	104,10
33	A60x	PD01	DB10	24,41	25,20	25,90	25,15	4	25,17			0,61	2,42	107,25
34	A45x	PE99	DB08	25,90	*26,2a*	25,90	25,90	3	25,90			0,00	0,00	110,39
35	F07x	PD99	DB08	25,61	25,93	26,31	26,23	4	26,02			0,32	1,22	110,90
36	A56	PC01	DB08	51,00	54,00	53,00	54,00	0	53,00	*b*	*	1,41	2,67	225,89
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	n	Mean	s_r	CV_r
all labs	**127**	**23,46**	**0,485**	**2,069**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
32	**1,111**	**4,730**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Zn **Sample: 3** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	A88	PD01	DB08	17,80	17,70	18,30	17,90	0	17,93	*b* *	0,26	1,47	78,17
2	F24x	PD01	DB99	23,00	16,00	20,00	20,00	0	19,75	*c*	2,87	**14,54**	86,13
3	S22x	PD02	DB08	18,22	22,29	20,13	20,21	4	20,21		1,66	8,23	88,15
4	F09	PZ02	DD02	20,66	20,34	20,75	20,49	4	20,56		0,18	0,89	89,66
5	F14x	PC01	DB08	21,60	21,30	21,70	21,70	4	21,58		0,19	0,88	94,09
6	F12x	PC01	DB10	21,76	21,71	21,56	21,68	4	21,68		0,08	0,38	94,53
7	A47x	PD01	DB08	21,80	21,88	21,82	21,35	4	21,71		0,24	1,12	94,69
8	F13x	PD01	DB08	21,69	21,64	21,90	21,85	4	21,77		0,12	0,57	94,94
9	A65	PD01	DB08	21,90	21,80	21,90	21,70	4	21,83		0,10	0,44	95,18
10	F02x	PD02	DB08	22,40	22,90	21,10	22,20	4	22,15		0,76	3,43	96,60
11	F19	PD02	DB08	22,00	22,50	22,10	22,10	4	22,18		0,22	1,00	96,71
12	A79	PD03	DB10	22,86	23,08	21,55	21,40	4	22,22		0,87	3,92	96,91
13	F06x	PD02	DB08	22,50	22,40	22,20	22,10	4	22,30		0,18	0,82	97,25
14	F08x	PE99	DB08	22,48	22,58	22,74	21,40	4	22,30		0,61	2,73	97,25
15	A49	PD05	DB08	22,47	22,72	22,27	22,28	4	22,44		0,21	0,94	97,84
16	A61x	PD01	DB08	22,55	22,40	22,09	23,08	4	22,53		0,41	1,84	98,25
17	A58x	PD02	DB01	21,49	23,31	23,48	22,71	4	22,75		0,90	3,96	99,20
18	F16x	PC01	DB08	22,72	22,85	22,80	22,80	4	22,79		0,05	0,24	99,40
19	F32x	PC01	DB08	22,30	23,10	22,50	23,40	4	22,83		0,51	2,24	99,54
20	A39	PC02	DB08	22,63	22,85	23,15	22,91	4	22,89		0,21	0,93	99,80
21	F15x	PC01	DB08	23,00	23,00	23,00	23,00	4	23,00		0,00	0,00	100,30
22	A36	PD02	DB08	22,67	23,16	24,34	22,20	4	23,09		0,92	3,98	100,71
23	F03	PD02	DB08	24,29	23,73	22,58	23,20	4	23,45		0,73	3,12	102,26
24	F18x	PD99	DB10	23,20	22,80	23,40	24,40	4	23,45		0,68	2,90	102,27
25	F33x	PD01	DB10	23,34	23,01	23,48	24,22	4	23,51		0,51	2,17	102,54
26	A71	PB03	DB01	24,16	23,48	24,16	22,53	4	23,58		0,77	3,27	102,84
27	F05x	PD02	DB08	23,60	23,60	23,60	23,90	4	23,68		0,15	0,63	103,25
28	A57	PZ02	DD02	24,10	23,80	23,60	23,90	4	23,85		0,21	0,87	104,01
29	F27	PD01	DB01	23,12	23,45	24,50	25,30	4	24,09		1,00	4,14	105,07
30	A80	PD01	DB10	23,40	24,30	24,50	24,20	4	24,10		0,48	2,00	105,10
31	A82	PD01	DB08	23,50	24,00	24,30	25,30	4	24,28		0,76	3,13	105,86
32	A59	PC01	DB08	24,79	24,97	24,11	24,08	4	24,49		0,46	1,88	106,79
33	A60x	PD01	DB10	24,79	25,03	25,48	*27,7a*	3	25,10		0,35	1,40	109,46
34	A45x	PE99	DB08	25,40	25,40	25,30	25,40	3	25,38		0,05	0,20	110,66
35	F07x	PD99	DB08	26,46	25,80	24,61	25,18	4	25,51		0,80	3,12	111,26
36	A56	PC01	DB08	43,00	48,00	48,00	54,00	0	48,25	*b* *	4,50	9,33	210,42
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	n	Mean	s_r	CV_r
all labs	**130**	**22,93**	**0,467**	**2,035**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
33	**1,256**	**5,471**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Zn **Sample: 4** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	F24x	PD01	DB99	11,00	15,00	12,00	13,00	0	12,75	*b*	*	1,71	**13,39**	63,80
2	A88	PD01	DB08	14,40	16,40	17,70	15,50	4	16,00			1,40	8,74	80,07
3	S22x	PD02	DB08	15,95	16,55	19,21	17,24	4	17,24			1,42	8,22	86,26
4	F13x	PD01	DB08	18,02	17,82	18,46	17,92	4	18,06			0,28	1,56	90,35
5	F09	PZ02	DD02	18,06	18,03	18,26	18,20	4	18,14			0,11	0,61	90,76
6	F12x	PC01	DB10	18,06	18,12	18,48	18,22	4	18,22			0,19	1,02	91,19
7	F08x	PE99	DB08	19,17	19,07	17,82	17,70	4	18,44			0,79	4,27	92,28
8	A47x	PD01	DB08	19,29	18,93	18,52	18,12	4	18,72			0,51	2,71	93,65
9	A65	PD01	DB08	18,70	18,70	18,30	19,50	4	18,80			0,50	2,68	94,08
10	A79	PD03	DB10	19,74	18,20	19,15	19,15	4	19,06			0,64	3,35	95,38
11	F06x	PD02	DB08	19,00	19,00	19,30	19,20	4	19,13			0,15	0,78	95,70
12	F02x	PD02	DB08	20,40	18,50	19,00	20,10	4	19,50			0,90	4,61	97,58
13	F15x	PC01	DB08	19,00	20,00	20,00	19,00	4	19,50			0,58	2,96	97,58
14	A57	PZ02	DD02	19,60	19,20	20,40	19,30	4	19,63			0,54	2,77	98,21
15	A49	PD05	DB08	19,93	19,70	19,69	19,56	4	19,72			0,15	0,78	98,68
16	F19	PD02	DB08	19,80	19,30	19,70	20,20	4	19,75			0,37	1,87	98,83
17	F32x	PC01	DB08	20,10	19,70	20,00	19,80	4	19,90			0,18	0,92	99,58
18	A61x	PD01	DB08	20,13	20,29	20,07	19,69	4	20,05			0,25	1,27	100,31
19	F14x	PC01	DB08	19,40	20,00	20,70	20,40	4	20,13			0,56	2,79	100,71
20	A39	PC02	DB08	20,63	20,46	20,48	19,29	4	20,22			0,62	3,07	101,16
21	A59	PC01	DB08	20,56	20,54	20,20	20,38	4	20,42			0,17	0,82	102,18
22	A58x	PD02	DB01	20,68	19,83	20,48	20,84	4	20,46			0,44	2,17	102,37
23	F18x	PD99	DB10	20,60	20,90	19,80	20,80	4	20,53			0,50	2,43	102,71
24	F33x	PD01	DB10	21,25	20,33	21,25	20,38	4	20,80			0,52	2,49	104,10
25	F05x	PD02	DB08	20,80	20,20	21,10	21,60	4	20,93			0,59	2,80	104,71
26	A80	PD01	DB10	20,60	21,10	20,80	21,20	4	20,93			0,28	1,32	104,71
27	A36	PD02	DB08	20,81	21,21	21,41	20,31	4	20,94			0,49	2,32	104,76
28	F03	PD02	DB08	21,35	21,31	20,25	20,98	4	20,97			0,51	2,42	104,95
29	F27	PD01	DB01	20,51	21,73	20,56	21,59	4	21,10			0,65	3,09	105,57
30	F16x	PC01	DB08	21,28	21,58	20,88	21,52	4	21,32			0,32	1,49	106,66
31	A71	PB03	DB01	22,48	22,68	21,13	21,17	4	21,87			0,83	3,80	109,42
32	A45x	PE99	DB08	21,60	21,90	21,90	22,10	4	21,88			0,21	0,94	109,47
33	A82	PD01	DB08	21,80	22,50	23,30	20,50	4	22,03			1,19	5,39	110,22
34	A60x	PD01	DB10	22,73	22,04	22,43	22,40	4	22,40			0,28	1,26	112,09
35	F07x	PD99	DB08	22,18	22,63	23,72	22,38	4	22,73			0,69	3,02	113,73
36	A56	PC01	DB08	44,00	49,00	45,00	46,00	0	46,00	*b*	*	2,16	4,70	230,19
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	n	Mean	s_r	CV_r
all labs	**136**	**19,98**	**0,523**	**2,618**
20	% from the mean			
	l		s_R	CV_R
	34		**1,499**	**7,500**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Mn **Sample: 1** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	688,52	665,57	727,08	693,72	0	693,72	*b*	*	25,38	3,66	69,14
2	A88	PD01	DB08	906,90	893,00	880,40	900,10	4	895,10			11,32	1,27	89,21
3	A56	PC01	DB08	902,00	905,00	*879a*	908,00	3	905,00			3,00	0,33	90,19
4	F06x	PD02	DB08	948,50	944,00	959,10	940,30	4	947,98			8,14	0,86	94,48
5	A47x	PD01	DB08	949,00	939,00	964,00	948,00	4	950,00			10,36	1,09	94,68
6	A61x	PD01	DB08	962,40	941,30	948,90	953,50	4	951,53			8,82	0,93	94,83
7	A59	PC01	DB08	975,81	954,05	978,45	937,52	4	961,46			19,34	2,01	95,82
8	A65	PD01	DB08	966,00	949,00	991,00	950,00	4	964,00			19,61	2,03	96,07
9	A79	PD03	DB10	973,11	985,06	930,54	971,80	4	965,13			23,82	2,47	96,19
10	F15x	PC01	DB08	965,00	976,00	981,00	956,00	4	969,50			11,21	1,16	96,62
11	A60x	PD01	DB10	934,30	955,30	971,70	1017,00	0	969,58	*c*		35,13	3,62	96,63
12	A57	PZ02	DD02	981,60	976,70	979,10	985,10	4	980,63			3,59	0,37	97,73
13	F02x	PD02	DB08	974,00	957,00	999,00	996,00	4	981,50			19,77	2,01	97,82
14	F19	PD02	DB08	984,00	978,00	992,00	977,00	4	982,75			6,90	0,70	97,94
15	F03	PD02	DB08	981,62	981,05	971,10	1003,45	4	984,31			13,65	1,39	98,10
16	F08x	PE99	DB08	995,00	992,00	989,00	988,00	4	991,00			3,16	0,32	98,76
17	F13x	PD01	DB08	996,30	992,80	987,90	990,10	4	991,78			3,62	0,37	98,84
18	F14x	PC01	DB08	1008,00	1004,00	1001,00	995,00	4	1002,00			5,48	0,55	99,86
19	A58x	PD02	DB01	1005,92	1007,99	996,90	999,42	4	1002,56			5,25	0,52	99,92
20	A45x	PE99	DB08	1000,00	1010,00	1000,00	1010,00	4	1005,00			5,77	0,57	100,16
21	F16x	PC01	DB08	1001,00	1017,00	993,70	1014,00	4	1006,43			10,96	1,09	100,30
22	F25x	PB06	DB08	1008,00	1012,00	1015,00	1002,00	4	1009,25			5,62	0,56	100,58
23	F05x	PD02	DB08	1010,00	1020,00	1000,00	1010,00	4	1010,00			8,16	0,81	100,66
24	A71	PD02	DB10	1010,30	1006,70	1001,70	1021,90	4	1010,15			8,59	0,85	100,67
25	A82	PD01	DB08	1004,00	1008,00	1014,00	1023,00	4	1012,25			8,26	0,82	100,88
26	F12x	PC01	DB08	1001,00	1037,00	1013,00	1017,00	4	1017,00			14,97	1,47	101,36
27	A43	PB06	DB01	1037,00	1032,00	1000,00	1002,00	4	1017,75			19,47	1,91	101,43
28	A49	PD05	DB08	1025,70	1028,81	1023,09	1037,93	4	1028,88			6,47	0,63	102,54
29	F33x	PD01	DB10	1006,00	1041,00	1035,00	1046,00	4	1032,00			17,91	1,74	102,85
30	F18x	PD99	DB08	1030,00	1040,00	1030,00	1030,00	4	1032,50			5,00	0,48	102,90
31	F24x	PD01	DB99	1026,00	1033,00	1040,00	1037,00	4	1034,00			6,06	0,59	103,05
32	A36	PD02	DB08	1067,90	1053,70	1100,30	1068,40	4	1072,58			19,70	1,84	106,89
33	A39	PC02	DB08	1056,00	1087,00	1076,00	1078,00	4	1074,25			13,07	1,22	107,06
34	F27	PD01	DB01	1069,00	1079,00	1100,00	1102,00	4	1087,50			16,13	1,48	108,38
35	F09	PZ02	DD02	1089,00	1096,00	1103,00	1093,00	4	1095,25			5,91	0,54	109,15
36	F32x	PC01	DB08	1115,00	1125,00	1125,00	1115,00	4	1120,00			5,77	0,52	111,62
37	A80	PD01	DB10	1173,00	1195,00	1196,00	1171,00	0	1183,75	*b*	*	13,60	1,15	117,97
38	F07x	PD99	DB08	*1122a*	1232,00	1214,00	1220,00	0	1222,00	*b*	*	9,17	0,75	121,79
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	n	Mean	s_r	CV_r
all labs	**135**	**1003,40**	**10,438**	**1,040**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
34	**49,476**	**4,934**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Mn **Sample: 2** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	959,60	1048,37	1024,64	1010,87	0	1010,87	*b*	*	37,53	3,71	68,51
2	A56	PC01	DB08	1289,00	1287,00	1274,00	1265,00	4	1278,75			11,32	0,89	86,67
3	A88	PD01	DB08	1363,40	1354,90	1277,50	1293,70	4	1322,38			43,12	3,26	89,63
4	F06x	PD02	DB08	1356,00	1364,00	1385,00	1342,00	4	1361,75			17,97	1,32	92,30
5	A60x	PD01	DB10	1333,00	1386,00	1448,00	1409,00	4	1394,00			48,05	3,45	94,48
6	A47x	PD01	DB08	1382,00	1391,00	1414,00	1410,00	4	1399,25			15,26	1,09	94,84
7	A65	PD01	DB08	1357,00	1361,00	1475,00	1469,00	0	1415,50	*c*		65,31	4,61	95,94
8	A79	PD03	DB10	1444,20	1449,50	1387,50	1385,70	4	1416,73			34,86	2,46	96,02
9	A59	PC01	DB08	1445,39	1407,43	1415,09	1405,33	4	1418,31			18,53	1,31	96,13
10	F13x	PD01	DB08	1431,00	1433,00	1418,00	1421,00	4	1425,75			7,37	0,52	96,63
11	A61x	PD01	DB08	1421,50	1442,20	1425,60	1416,00	4	1426,33			11,29	0,79	96,67
12	A49	PD05	DB08	1438,30	1417,80	1444,14	1427,87	4	1432,03			11,63	0,81	97,06
13	F16x	PC01	DB08	1432,00	1421,00	1450,00	1442,00	4	1436,25			12,55	0,87	97,35
14	F15x	PC01	DB08	1439,00	1427,00	1445,00	1442,00	4	1438,25			7,89	0,55	97,48
15	F19	PD02	DB08	1430,00	1440,00	1450,00	1460,00	4	1445,00			12,91	0,89	97,94
16	F08x	PE99	DB08	1468,00	1431,00	1495,00	1417,00	4	1452,75			35,44	2,44	98,46
17	A58x	PD02	DB01	1458,39	1466,53	1464,18	1458,37	4	1461,87			4,14	0,28	99,08
18	F03	PD02	DB08	1435,92	1466,81	1478,26	1479,50	4	1465,12			20,29	1,38	99,30
19	F05x	PD02	DB08	1465,00	1465,00	1470,00	1470,00	4	1467,50			2,89	0,20	99,46
20	F25x	PB06	DB08	1484,00	1483,00	1481,00	1439,00	4	1471,75			21,87	1,49	99,75
21	F14x	PC01	DB08	1463,00	1476,00	1473,00	1481,00	4	1473,25			7,59	0,52	99,85
22	A39	PC02	DB08	1482,00	1490,00	1477,00	1470,00	4	1479,75			8,42	0,57	100,29
23	A43	PB06	DB01	1490,00	1495,00	1484,00	1485,00	4	1488,50			5,07	0,34	100,89
24	F02x	PD02	DB08	1505,00	1492,00	1476,00	1516,00	4	1497,25			17,23	1,15	101,48
25	F18x	PD99	DB08	1510,00	1500,00	1500,00	1500,00	4	1502,50			5,00	0,33	101,84
26	F24x	PD01	DB99	1512,00	1500,00	1522,00	1522,00	4	1514,00			10,46	0,69	102,61
27	A82	PD01	DB08	1495,00	1530,00	1519,00	1514,00	4	1514,50			14,62	0,97	102,65
28	F12x	PC01	DB08	1524,00	1524,00	1523,00	1524,00	4	1523,75			0,50	0,03	103,28
29	A57	PZ02	DD02	1554,30	1514,50	1524,10	1535,10	4	1532,00			17,08	1,12	103,83
30	F27	PD01	DB01	1534,00	1516,00	1538,00	1550,00	4	1534,50			14,08	0,92	104,00
31	A71	PD02	DB10	1555,40	1561,60	1543,50	1501,20	4	1540,43			27,21	1,77	104,41
32	A36	PD02	DB08	1532,60	1540,20	1585,90	1532,70	4	1547,85			25,62	1,65	104,91
33	A45x	PE99	DB08	1560,00	1540,00	1550,00	1550,00	4	1550,00			8,16	0,53	105,05
34	F33x	PD01	DB10	1568,00	1593,00	1595,00	1483,00	4	1559,75			52,62	3,37	105,72
35	F09	PZ02	DD02	1577,00	1589,00	1599,00	1595,00	4	1590,00			9,59	0,60	107,77
36	F32x	PC01	DB08	1649,00	1660,00	1649,00	1649,00	4	1651,75			5,50	0,33	111,95
37	A80	PD01	DB10	*1710a*	1677,00	1677,00	1675,00	3	1676,33			1,15	0,07	113,62
38	F07x	PD99	DB08	1720,00	1786,00	1822,00	1796,00	0	1781,00	*b*	*	43,41	2,44	120,71
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	n	Mean	s_r	CV_r
all labs	**139**	**1475,42**	**16,208**	**1,099**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
35	**81,484**	**5,517**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Mn **Sample: 3** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	25,69	33,82	31,24	30,25	0	30,25	*b*	*	3,39	**11,21**	63,32
2	A56	PC01	DB08	40,00	40,00	40,00	*39a*	3	40,00		*	0,00	0,00	83,72
3	F19	PD02	DB08	41,30	41,60	40,70	40,40	4	41,00			0,55	1,34	85,82
4	A88	PD01	DB08	43,00	41,70	41,90	41,40	4	42,00			0,70	1,66	87,91
5	F16x	PC01	DB08	42,79	43,16	42,67	43,58	4	43,05			0,41	0,95	90,11
6	A47x	PD01	DB08	43,46	43,57	43,12	43,16	4	43,33			0,22	0,51	90,69
7	A61x	PD01	DB08	44,91	44,34	44,28	44,16	4	44,42			0,33	0,75	92,98
8	A49	PD05	DB08	44,78	44,87	44,54	44,70	4	44,72			0,14	0,31	93,61
9	A60x	PD01	DB10	43,37	44,50	44,99	50,01	0	45,72	*c*		2,94	6,43	95,69
10	A58x	PD02	DB01	45,97	45,59	45,90	45,87	4	45,83			0,17	0,36	95,93
11	F14x	PC01	DB08	45,90	45,90	45,90	45,90	4	45,90			0,00	0,00	96,07
12	F15x	PC01	DB08	46,00	46,00	46,00	46,00	4	46,00			0,00	0,00	96,28
13	F03	PD02	DB08	46,82	47,15	45,58	45,96	4	46,38			0,73	1,58	97,07
14	F06x	PD02	DB08	46,62	46,57	46,88	45,89	4	46,49			0,42	0,91	97,31
15	F02x	PD02	DB08	47,60	46,10	47,10	45,30	4	46,53			1,03	2,21	97,38
16	A45x	PE99	DB08	46,80	46,70	46,40	46,90	4	46,70			0,22	0,46	97,75
17	F05x	PD02	DB08	47,30	47,30	47,00	46,40	4	47,00			0,42	0,90	98,38
18	A82	PD01	DB08	46,80	47,00	47,70	47,30	4	47,20			0,39	0,83	98,80
19	F08x	PE99	DB08	46,60	46,74	47,57	48,18	4	47,27			0,74	1,57	98,95
20	A79	PD03	DB10	49,04	48,25	46,25	45,83	4	47,34			1,55	3,26	99,09
21	F18x	PD99	DB08	47,10	47,80	47,20	47,70	4	47,45			0,35	0,74	99,32
22	F33x	PD01	DB10	47,61	46,52	49,32	47,38	4	47,71			1,17	2,46	99,86
23	A57	PZ02	DD02	48,20	49,30	47,00	47,00	4	47,88			1,11	2,31	100,21
24	A59	PC01	DB08	48,52	48,30	48,21	46,59	4	47,91			0,89	1,85	100,27
25	F12x	PC01	DB08	48,00	49,00	47,00	48,00	4	48,00			0,82	1,70	100,47
26	A65	PD01	DB08	50,00	47,00	48,00	48,00	4	48,25			1,26	2,61	100,99
27	F13x	PD01	DB08	48,56	49,24	48,25	48,72	4	48,69			0,41	0,85	101,92
28	F32x	PC01	DB08	49,40	50,20	49,40	49,60	4	49,65			0,38	0,76	103,92
29	F09	PZ02	DD02	49,47	50,23	49,15	49,94	4	49,70			0,48	0,97	104,02
30	A36	PD02	DB08	49,52	49,74	51,58	48,14	4	49,75			1,41	2,84	104,12
31	A39	PC02	DB08	49,54	49,80	49,64	50,26	4	49,81			0,32	0,64	104,26
32	F25x	PB06	DB08	50,59	49,78	49,89	49,56	4	49,96			0,45	0,89	104,56
33	F27	PD01	DB01	50,63	50,98	49,44	51,05	4	50,53			0,75	1,48	105,75
34	F07x	PD99	DB08	51,66	53,93	51,82	52,83	4	52,56			1,05	2,00	110,01
35	A71	PD02	DB10	50,49	55,03	54,12	52,33	4	52,99			2,01	3,79	110,92
36	A43	PB06	DB01	55,30	52,70	53,70	52,90	4	53,65			1,18	2,20	112,30
37	A80	PD01	DB10	52,70	54,80	55,40	54,50	4	54,35			1,16	2,14	113,76
38	F24x	PD01	DB99	57,00	58,00	58,00	59,00	4	58,00		*	0,82	1,41	121,40
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	n	Mean	s_r	CV_r
all labs	**143**	**47,78**	**0,667**	**1,397**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
36	**3,710**	**7,773**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Mn **Sample: 4** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	S22x	PD02	DB08	7,40	6,55	6,35	6,77	0	6,77	*b*	*	0,46	6,73	59,33
2	F16x	PC01	DB08	8,24	7,70	8,00	7,77	0	7,93	*b*	*	0,24	3,09	69,49
3	A88	PD01	DB08	8,37	8,19	9,11	8,57	0	8,56	*b*	*	0,40	4,65	75,04
4	F19	PD02	DB08	9,15	9,32	9,19	10,10	0	9,44	*b*		0,45	4,72	82,76
5	F12x	PC01	DB08	10,00	11,00	10,00	10,00	4	10,25			0,50	4,88	89,86
6	A47x	PD01	DB08	10,19	10,46	10,13	10,53	4	10,33			0,20	1,91	90,54
7	A58x	PD02	DB01	10,65	10,66	10,64	10,48	4	10,61			0,09	0,81	92,99
8	F15x	PC01	DB08	11,00	11,00	11,00	10,00	4	10,75			0,50	4,65	94,24
9	F08x	PE99	DB08	11,14	10,72	10,62	10,58	4	10,77			0,26	2,39	94,37
10	F06x	PD02	DB08	10,87	10,82	10,75	10,86	4	10,83			0,05	0,50	94,90
11	A61x	PD01	DB08	10,64	10,82	10,74	11,17	4	10,84			0,23	2,13	95,05
12	A57	PZ02	DD02	10,80	10,60	10,90	11,30	4	10,90			0,29	2,70	95,55
13	A45x	PE99	DB08	11,00	10,90	11,10	10,90	4	10,98			0,10	0,87	96,21
14	F03	PD02	DB08	10,69	11,26	11,13	11,33	4	11,10			0,29	2,59	97,33
15	A59	PC01	DB08	11,25	11,03	11,02	11,21	4	11,13			0,12	1,07	97,55
16	F02x	PD02	DB08	11,40	10,80	11,30	11,20	4	11,18			0,26	2,35	97,96
17	F13x	PD01	DB08	11,38	11,44	11,30	11,31	4	11,36			0,07	0,58	99,56
18	F05x	PD02	DB08	11,30	11,50	11,40	11,40	4	11,40			0,08	0,72	99,94
19	A39	PC02	DB08	11,79	11,34	11,46	11,35	4	11,49			0,21	1,83	100,68
20	A65	PD01	DB08	11,00	11,00	12,00	12,00	4	11,50			0,58	5,02	100,81
21	F32x	PC01	DB08	11,70	11,30	11,70	11,30	4	11,50			0,23	2,01	100,81
22	A49	PD05	DB08	11,52	11,71	11,16	11,70	4	11,52			0,26	2,23	101,01
23	A82	PD01	DB08	11,50	11,80	11,30	11,50	4	11,53			0,21	1,79	101,03
24	A60x	PD01	DB10	11,39	11,37	11,76	11,59	4	11,53			0,18	1,60	101,06
25	A79	PD03	DB10	12,03	11,98	10,87	11,56	4	11,61			0,53	4,60	101,78
26	F18x	PD99	DB08	11,50	11,70	11,70	11,60	4	11,63			0,10	0,82	101,91
27	F09	PZ02	DD02	11,02	11,76	11,46	12,44	4	11,67			0,60	5,11	102,30
28	F27	PD01	DB01	11,12	11,67	12,09	12,01	4	11,72			0,44	3,76	102,76
29	F25x	PB06	DB08	11,83	11,72	11,87	12,47	4	11,97			0,34	2,82	104,96
30	F24x	PD01	DB99	12,00	*13a*	12,00	12,00	3	12,00			0,00	0,00	105,20
31	F33x	PD01	DB10	11,91	11,67	11,95	12,55	4	12,02			0,37	3,11	105,37
32	F14x	PC01	DB08	12,20	11,90	12,10	12,30	4	12,13			0,17	1,41	106,29
33	A36	PD02	DB08	11,95	12,44	12,62	11,97	4	12,25			0,34	2,75	107,34
34	A80	PD01	DB10	12,60	12,50	12,70	12,60	4	12,60			0,08	0,65	110,46
35	F07x	PD99	DB08	12,25	12,77	12,89	12,95	4	12,72			0,32	2,51	111,47
36	A43	PB06	DB01	14,40	13,80	14,90	14,00	0	14,28	*b*	*	0,49	3,40	125,14
37	A71	PD02	DB10	15,19	15,58	15,15	14,91	0	15,21	*b*	*	0,28	1,82	133,32
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40	A56	PC01	DB08	<2	<2	<2	<2				*			
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	n	Mean	s_r	CV_r
all labs	**123**	**11,41**	**0,258**	**2,258**
20	% from the mean			
	l		s_R	CV_R
	31		**0,607**	**5,315**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Fe **Sample: 1** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	72,61	70,46	78,41	73,83	0	73,83	*b*	*	3,36	4,55	71,70
2	A56	PC01	DB08	78,00	81,00	76,00	80,00	0	78,75	*b*	*	2,22	2,82	76,49
3	F08x	PE99	DB08	91,66	93,96	87,59	89,24	4	90,61			2,79	3,08	88,01
4	F24x	PC01	DB99	107,00	88,00	79,00	95,00	0	92,25	*c*		11,81	**12,81**	89,60
5	A88	PD01	DB08	92,20	92,10	88,10	101,40	4	93,45			5,63	6,03	90,76
6	F06x	PD02	DB08	95,40	93,62	95,65	92,88	4	94,39			1,35	1,43	91,67
7	F13x	PD01	DB08	95,88	96,30	96,54	95,68	4	96,10			0,39	0,41	93,34
8	A45x	PE99	DB08	96,20	98,80	95,10	95,70	4	96,45			1,63	1,69	93,68
9	A60x	PD01	DB10	93,24	96,65	97,99	101,50	4	97,35			3,42	3,51	94,55
10	F02x	PD02	DB08	97,80	99,70	101,00	93,40	4	97,98			3,32	3,39	95,16
11	F14x	PC01	DB08	99,60	98,20	97,90	98,20	4	98,48			0,76	0,78	95,64
12	A79	PD03	DB10	100,37	101,62	94,84	98,77	4	98,90			2,95	2,98	96,06
13	F12x	PC01	DB08	94,00	99,00	104,00	99,00	4	99,00			4,08	4,12	96,15
14	A47x	PD01	DB08	99,11	99,02	99,39	99,71	4	99,31			0,31	0,31	96,45
15	A71	PB03	DB01	98,63	98,98	103,40	98,72	4	99,93			2,32	2,32	97,06
16	A49	PD05	DB08	98,49	103,51	99,48	98,97	4	100,11			2,30	2,30	97,23
17	A58x	PD02	DB01	98,88	99,34	106,86	100,74	4	101,46			3,69	3,64	98,54
18	F18x	PD99	DB08	101,00	102,00	102,00	101,00	4	101,50			0,58	0,57	98,58
19	A65	PD01	DB08	104,30	101,20	103,30	97,90	4	101,68			2,83	2,78	98,75
20	A82	PD01	DB08	99,80	101,00	105,00	104,00	4	102,45			2,45	2,39	99,50
21	F16x	PC01	DB08	104,10	98,90	105,10	103,20	4	102,83			2,73	2,65	99,87
22	A36	PD02	DB08	104,68	101,12	106,62	101,74	4	103,54			2,57	2,49	100,56
23	F03	PD02	DB08	104,46	105,86	102,47	102,43	4	103,81			1,67	1,60	100,82
24	F05x	PD02	DB08	104,00	105,00	103,00	104,00	4	104,00			0,82	0,79	101,01
25	A57	PZ02	DD02	104,30	102,70	104,20	104,80	4	104,00			0,91	0,87	101,01
26	F27	PD01	DB01	104,60	105,10	102,30	104,90	4	104,23			1,30	1,25	101,23
27	A59	PC01	DB08	103,95	106,42	105,44	105,76	4	105,39			1,04	0,99	102,36
28	F32x	PC01	DB08	106,00	106,00	106,00	106,00	4	106,00			0,00	0,00	102,95
29	F33x	PD01	DB10	102,10	110,10	111,80	114,80	4	109,70			5,43	4,95	106,55
30	F09	PZ02	DD02	110,00	114,00	114,00	113,00	4	112,75			1,89	1,68	109,51
31	A80	PD01	DB10	114,00	114,00	115,00	112,00	4	113,75			1,26	1,11	110,48
32	A39	PC02	DB08	114,60	113,70	116,60	115,70	4	115,15			1,27	1,10	111,84
33	F07x	PD99	DB08	108,80	117,70	116,80	117,80	4	115,28			4,34	3,76	111,96
34	F15x	PC01	DB08	122,00	117,00	133,00	117,00	4	122,25			7,54	6,17	118,73
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	n	Mean	s_r	CV_r
all labs	**124**	**102,96**	**2,373**	**2,305**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
31	**7,075**	**6,871**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Fe **Sample: 2** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	A56	PC01	DB08	54,00	51,00	58,00	56,00	0	54,75	*b*	*	2,99	5,45	68,40
2	S22x	PD02	DB08	60,39	60,94	59,87	60,25	0	60,36	*b*	*	0,44	0,73	75,42
3	F13x	PD01	DB08	66,32	65,96	65,91	67,67	4	66,47			0,82	1,24	83,04
4	F08x	PE99	DB08	74,60	68,63	72,30	72,41	4	71,99			2,47	3,44	89,94
5	A60x	PD01	DB10	73,14	74,07	77,68	75,81	4	75,18			2,00	2,66	93,92
6	F14x	PC01	DB08	74,20	75,60	74,50	77,70	4	75,50			1,59	2,10	94,33
7	A88	PD01	DB08	77,10	75,30	75,00	74,80	4	75,55			1,05	1,39	94,39
8	F12x	PC01	DB08	75,00	75,00	77,00	76,00	4	75,75			0,96	1,26	94,64
9	A47x	PD01	DB08	75,32	76,52	77,07	76,45	4	76,34			0,73	0,96	95,38
10	A49	PD05	DB08	79,92	75,17	76,09	74,57	4	76,44			2,40	3,15	95,50
11	F16x	PC01	DB08	75,71	76,09	76,77	77,43	4	76,50			0,76	0,99	95,58
12	A45x	PE99	DB08	79,10	76,30	75,60	77,60	4	77,15			1,54	2,00	96,39
13	A79	PD03	DB10	82,07	80,10	75,68	75,88	4	78,44			3,17	4,04	98,00
14	A57	PZ02	DD02	79,80	78,70	78,50	78,20	4	78,80			0,70	0,89	98,45
15	A71	PB03	DB01	79,88	77,65	80,47	77,30	4	78,83			1,58	2,01	98,48
16	A39	PC02	DB08	81,20	76,03	79,70	78,81	4	78,94			2,17	2,75	98,62
17	F33x	PD01	DB10	78,59	77,22	83,42	78,06	4	79,32			2,79	3,52	99,10
18	F06x	PD02	DB08	86,19	73,90	78,36	78,93	4	79,35			5,09	6,41	99,13
19	F18x	PD99	DB08	81,00	79,80	79,20	79,90	4	79,98			0,75	0,94	99,92
20	A65	PD01	DB08	75,70	79,90	85,50	79,70	4	80,20			4,03	5,02	100,20
21	A36	PD02	DB08	79,69	80,92	82,55	80,60	4	80,94			1,19	1,47	101,12
22	F09	PZ02	DD02	83,20	80,15	83,36	82,27	4	82,25			1,48	1,80	102,76
23	A82	PD01	DB08	81,30	81,70	84,20	83,20	4	82,60			1,34	1,63	103,20
24	F02x	PD02	DB08	79,10	89,90	79,60	82,80	4	82,85			4,98	6,01	103,51
25	F05x	PD02	DB08	83,80	85,60	82,10	80,50	4	83,00			2,20	2,65	103,70
26	F03	PD02	DB08	82,32	84,77	84,05	84,29	4	83,86			1,07	1,27	104,77
27	F24x	PC01	DB99	86,00	80,00	86,00	84,00	4	84,00			2,83	3,37	104,95
28	F27	PD01	DB01	84,24	87,44	82,99	83,64	4	84,58			1,98	2,34	105,67
29	A59	PC01	DB08	85,29	86,14	90,28	81,82	4	85,88			3,48	4,05	107,30
30	F32x	PC01	DB08	85,20	86,70	86,50	86,00	4	86,10			0,67	0,78	107,57
31	A58x	PD02	DB01	83,76	88,18	87,16	87,21	4	86,58			1,94	2,24	108,17
32	A80	PD01	DB10	88,90	88,80	87,70	86,40	4	87,95			1,17	1,33	109,88
33	F07x	PD99	DB08	89,42	89,02	89,87	91,53	4	89,96			1,10	1,23	112,39
34	F15x	PC01	DB08	103,00	103,00	90,00	90,00	0	96,50	*c*	*	7,51	7,78	120,57
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	n	Mean	s_r	CV_r
all labs	**124**	**80,04**	**1,936**	**2,419**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
31	**4,972**	**6,212**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Fe **Sample: 3** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	A56	PC01	DB08	52,00	52,00	51,00	51,00	0	51,50	*b*	*	0,58	1,12	66,47
2	S22x	PD02	DB08	54,25	52,19	58,92	61,79	0	56,79	*b*	*	4,36	7,69	73,30
3	A58x	PD02	DB01	72,79	68,82	72,67	69,62	4	70,98			2,05	2,89	91,61
4	A88	PD01	DB08	68,90	73,80	76,00	70,60	4	72,33			3,18	4,40	93,35
5	F08x	PE99	DB08	70,55	74,01	73,83	71,40	4	72,45			1,74	2,40	93,51
6	A47x	PD01	DB08	70,89	76,11	73,40	72,21	4	73,15			2,22	3,04	94,42
7	A49	PD05	DB08	73,93	73,88	73,12	74,60	4	73,88			0,61	0,82	95,36
8	F14x	PC01	DB08	74,20	73,60	74,80	73,20	4	73,95			0,70	0,95	95,45
9	F12x	PC01	DB08	73,00	74,00	75,00	74,00	4	74,00			0,82	1,10	95,51
10	F13x	PD01	DB08	74,88	76,18	74,35	74,33	4	74,94			0,87	1,16	96,72
11	A45x	PE99	DB08	74,90	75,60	73,70	76,10	4	75,08			1,04	1,39	96,90
12	F06x	PD02	DB08	75,40	77,02	75,06	73,04	4	75,13			1,63	2,18	96,97
13	A79	PD03	DB10	76,76	76,32	74,07	74,15	4	75,33			1,41	1,88	97,22
14	A36	PD02	DB08	74,54	76,39	76,35	75,49	4	75,69			0,87	1,15	97,70
15	F05x	PD02	DB08	76,90	74,70	75,20	76,00	4	75,70			0,96	1,27	97,71
16	F27	PD01	DB01	79,52	75,86	74,55	73,32	4	75,81			2,68	3,54	97,85
17	A39	PC02	DB08	73,83	77,75	77,40	76,28	4	76,32			1,77	2,32	98,50
18	F03	PD02	DB08	77,03	78,55	74,96	75,75	4	76,57			1,57	2,05	98,83
19	F16x	PC01	DB08	78,15	77,56	76,80	76,82	4	77,33			0,65	0,84	99,81
20	F02x	PD02	DB08	77,00	75,50	78,10	79,60	4	77,55			1,73	2,23	100,09
21	F18x	PD99	DB08	76,60	79,40	78,70	77,70	4	78,10			1,22	1,56	100,80
22	A65	PD01	DB08	77,80	78,90	78,90	78,80	4	78,60			0,54	0,68	101,45
23	F33x	PD01	DB10	79,47	78,38	80,32	79,62	4	79,45			0,80	1,01	102,54
24	A71	PB03	DB01	78,75	79,53	76,42	83,68	4	79,60			3,03	3,80	102,73
25	A82	PD01	DB08	79,50	79,00	81,30	79,70	4	79,88			0,99	1,25	103,10
26	F32x	PC01	DB08	80,90	82,40	81,50	80,70	4	81,38			0,76	0,94	105,03
27	F09	PZ02	DD02	82,25	81,26	80,43	82,69	4	81,66			1,01	1,24	105,40
28	A60x	PD01	DB10	77,17	80,99	81,93	90,79	4	82,72			5,76	6,96	106,77
29	F07x	PD99	DB08	85,17	84,01	82,81	83,71	4	83,93			0,97	1,16	108,32
30	F15x	PC01	DB08	90,00	79,00	89,00	78,00	4	84,00			6,38	7,59	108,42
31	A80	PD01	DB10	82,80	85,90	84,70	84,10	4	84,38			1,29	1,53	108,90
32	A59	PC01	DB08	85,50	83,53	82,98	85,83	4	84,46			1,42	1,68	109,01
33	F24x	PC01	DB99	105,00	90,00	91,00	75,00	0	90,25	*c*		12,26	**13,58**	116,49
34	A57	PZ02	DD02	90,50	89,90	92,30	90,80	0	90,88	*b*		1,02	1,12	117,29
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	n	Mean	s_r	CV_r
all labs	**120**	**77,48**	**1,690**	**2,181**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
30	**3,897**	**5,030**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Fe **Sample: 4** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	S22x	PD02	DB08	78,52	72,82	80,86	84,06	4	79,07	*	4,74	6,00	77,92
2	A56	PC01	DB08	81,00	84,00	79,00	81,00	4	81,25		2,06	2,54	80,07
3	F24x	PC01	DB99	91,00	87,00	77,00	75,00	4	82,50		7,72	9,36	81,31
4	A47x	PD01	DB08	88,85	90,38	88,66	89,73	4	89,41		0,80	0,89	88,11
5	A58x	PD02	DB01	89,85	90,52	92,91	91,60	4	91,22		1,34	1,47	89,90
6	F05x	PD02	DB08	92,90	92,90	91,90	91,00	4	92,18		0,91	0,99	90,84
7	F06x	PD02	DB08	93,33	92,87	92,71	92,88	4	92,95		0,27	0,29	91,60
8	F08x	PE99	DB08	96,01	90,27	96,26	89,53	4	93,02		3,61	3,89	91,67
9	A71	PB03	DB01	91,43	108,54	88,82	89,22	4	94,50		9,43	9,98	93,13
10	F13x	PD01	DB08	101,40	100,10	98,87	101,00	4	100,34		1,12	1,12	98,89
11	A39	PC02	DB08	103,30	97,70	99,00	101,50	4	100,38		2,51	2,50	98,92
12	F02x	PD02	DB08	102,00	99,20	95,90	106,00	4	100,78		4,28	4,25	99,32
13	A36	PD02	DB08	99,01	98,64	107,81	98,14	4	100,90		4,62	4,58	99,44
14	A88	PD01	DB08	97,80	95,60	108,90	101,60	4	100,98		5,84	5,78	99,51
15	F27	PD01	DB01	116,14	96,09	95,78	95,96	4	100,99		10,10	10,00	99,53
16	F12x	PC01	DB08	98,00	99,00	108,00	102,00	4	101,75		4,50	4,42	100,28
17	A79	PD03	DB10	103,17	98,59	99,02	107,14	4	101,98		4,01	3,93	100,50
18	F15x	PC01	DB08	101,00	110,00	107,00	95,00	4	103,25		6,65	6,44	101,76
19	F16x	PC01	DB08	103,60	104,60	102,00	103,90	4	103,53		1,10	1,06	102,03
20	A59	PC01	DB08	104,51	105,19	105,11	105,15	4	104,99		0,32	0,31	103,47
21	F03	PD02	DB08	97,74	106,18	109,22	109,34	4	105,62		5,45	5,16	104,09
22	A45x	PE99	DB08	106,00	110,00	107,00	101,00	4	106,00		3,74	3,53	104,47
23	A80	PD01	DB10	112,00	104,00	109,00	105,00	4	107,50		3,70	3,44	105,94
24	A49	PD05	DB08	103,39	114,52	104,50	114,17	4	109,15		6,02	5,52	107,57
25	F32x	PC01	DB08	113,00	105,00	109,00	110,00	4	109,25		3,30	3,02	107,67
26	F18x	PD99	DB08	109,00	109,00	109,00	113,00	4	110,00		2,00	1,82	108,41
27	A82	PD01	DB08	113,00	116,00	105,00	108,00	4	110,50		4,93	4,46	108,90
28	A65	PD01	DB08	103,40	109,70	113,90	115,20	4	110,55		5,31	4,81	108,95
29	F14x	PC01	DB08	115,00	108,00	113,00	107,00	4	110,75		3,86	3,49	109,15
30	F09	PZ02	DD02	105,00	108,00	114,00	118,00	4	111,25		5,85	5,26	109,64
31	A57	PZ02	DD02	118,50	119,80	113,90	113,60	4	116,45		3,16	2,72	114,76
32	F07x	PD99	DB08	118,10	122,60	127,90	127,60	4	124,05	*	4,65	3,75	122,25
33	A60x	PD01	DB10	101,80	153,00	151,30	110,80	0	129,23	*c* *	26,73	**20,69**	127,35
34	F33x	PD01	DB10	*133,5a*	139,60	139,70	141,00	0	140,10	*b* *	0,78	0,56	138,07
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	n	Mean	s_r	CV_r
all labs	**128**	**101,47**	**3,998**	**3,940**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
32	**10,113**	**9,967**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cu **Sample: 1** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	3,68	3,73	3,83	3,75	0	3,75	*b*	*	0,06	1,66	60,76
2	A47x	PD02	DB08	5,33	5,21	4,98	5,20	4	5,18			0,15	2,82	83,98
3	A49	PD05	DB08	5,65	5,72	5,61	5,69	4	5,67			0,05	0,84	91,89
4	F08x	PE99	DB08	5,79	5,89	5,62	5,48	4	5,69			0,18	3,22	92,33
5	F24	PD01	DB99	5,63	5,68	5,76	5,78	4	5,71			0,07	1,26	92,60
6	F12x	PC01	DB10	5,71	5,70	5,86	5,76	4	5,76			0,08	1,31	93,32
7	A57	PZ02	DD02	5,90	6,00	5,70	5,80	4	5,85			0,13	2,21	94,85
8	A79	PD03	DB10	6,03	6,13	5,48	5,78	4	5,86			0,29	4,97	94,93
9	F06x	PD02	DB08	6,01	5,90	5,87	5,83	4	5,90			0,08	1,31	95,70
10	A45x	PE99	DB08	5,85	6,05	6,00	5,82	4	5,93			0,11	1,89	96,14
11	A65	PD01	DB08	5,80	5,90	6,40	5,70	4	5,95			0,31	5,23	96,47
12	F02x	PD02	DB08	5,90	6,20	6,00	6,10	4	6,05			0,13	2,13	98,09
13	F13x	PD01	DB08	5,95	5,99	6,26	6,01	4	6,05			0,14	2,29	98,12
14	A71	PB03	DB01	6,09	6,15	6,16	6,07	4	6,12			0,04	0,73	99,17
15	F19	PD02	DB08	6,03	5,93	6,56	5,98	4	6,13			0,29	4,78	99,30
16	A36	PD02	DB08	6,33	6,19	6,12	6,06	4	6,18			0,12	1,88	100,12
17	A58x	PD02	DB05	6,06	6,16	6,35	6,25	4	6,21			0,12	2,00	100,60
18	A61x	PD01	DB08	6,40	6,23	6,19	6,07	4	6,22			0,14	2,19	100,89
19	F27	PD01	DB01	6,37	6,00	6,14	6,57	4	6,27			0,25	4,01	101,66
20	F18x	PD99	DB10	6,31	6,39	6,22	6,18	4	6,28			0,09	1,50	101,74
21	F25x	PB06	DB08	6,29	6,31	6,31	6,36	4	6,32			0,03	0,47	102,43
22	F03	PD02	DB08	6,31	6,33	6,38	6,27	4	6,32			0,04	0,71	102,51
23	A82	PC01	DB10	6,44	6,54	6,27	6,25	4	6,38			0,14	2,18	103,36
24	F05	PD02	DB08	6,35	6,30	6,48	6,38	4	6,38			0,08	1,19	103,40
25	A59	PC01	DB08	6,28	6,54	6,42	6,28	4	6,38			0,13	1,97	103,44
26	F14x	PC01	DB10	6,40	6,36	6,37	6,41	4	6,39			0,02	0,37	103,52
27	F32x	PC01	DB08	6,44	6,42	6,40	6,39	4	6,41			0,02	0,35	103,97
28	A39	PC02	DB08	6,44	6,42	6,45	6,86	4	6,54			0,21	3,28	106,07
29	F09	PZ02	DD02	6,63	6,81	6,43	6,42	4	6,57			0,18	2,80	106,55
30	F16x	PC01	DB08	6,73	6,78	6,59	6,73	4	6,71			0,08	1,18	108,75
31	A80	PD01	DB10	6,64	6,75	6,81	6,67	4	6,72			0,08	1,15	108,91
32	A60x	PD01	DB10	6,48	6,77	7,91	6,98	0	7,04	*c*		0,62	8,81	114,06
33	F33x	PD01	DB10	7,13	6,96	7,08	7,26	4	7,11			0,12	1,75	115,23
34	F15x	PC01	DB09	7,70	7,60	7,80	6,90	0	7,50	*b*	*	0,41	5,44	121,60
35	F07x	PD99	DB08	7,85	9,04	8,07	8,51	0	8,37	*b*	*	0,52	6,26	135,67
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	n	Mean	s_r	CV_r
all labs	**124**	**6,17**	**0,126**	**2,046**
20	% from the mean			

l	s_R	CV_R
31	**0,380**	**6,156**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cu **Sample: 2** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	1,58	1,86	1,61	1,85	0	1,73	*b*	*	0,15	8,73	54,44
2	F13x	PD01	DB08	2,61	2,63	2,60	2,59	4	2,61			0,02	0,63	82,28
3	A47x	PD02	DB08	2,68	2,70	2,61	2,69	4	2,67			0,04	1,53	84,26
4	A49	PD05	DB08	2,80	2,76	2,81	2,79	4	2,79			0,02	0,77	88,04
5	F24	PD01	DB99	2,75	2,78	2,86	2,80	4	2,80			0,05	1,76	88,23
6	A45x	PE99	DB08	2,98	2,95	2,99	2,93	4	2,96			0,03	0,93	93,49
7	F06x	PD02	DB08	2,96	3,14	2,93	2,96	4	3,00			0,10	3,20	94,59
8	F33x	PD01	DB10	3,03	3,13	3,15	2,77	4	3,02			0,17	5,79	95,30
9	A36	PD02	DB08	3,13	3,16	2,98	2,87	4	3,04			0,14	4,46	95,78
10	F12x	PC01	DB10	3,09	3,05	3,01	3,05	4	3,05			0,03	1,03	96,23
11	F02x	PD02	DB08	3,00	3,10	3,00	3,10	4	3,05			0,06	1,89	96,25
12	A65	PD01	DB08	2,90	2,90	3,20	3,20	4	3,05			0,17	5,68	96,25
13	A79	PD03	DB10	3,15	3,20	2,93	2,92	4	3,05			0,15	4,76	96,27
14	A57	PZ02	DD02	3,10	3,00	3,00	3,20	4	3,08			0,10	3,11	97,04
15	A82	PC01	DB10	3,13	3,05	3,05	3,09	4	3,08			0,04	1,24	97,20
16	F19	PD02	DB08	3,12	3,07	3,09	3,09	4	3,09			0,02	0,67	97,59
17	F25x	PB06	DB08	3,19	3,21	3,15	3,01	4	3,14			0,09	2,87	99,09
18	F16x	PC01	DB08	3,13	3,18	3,13	3,15	4	3,15			0,03	0,82	99,31
19	A71	PB03	DB01	3,22	3,21	3,18	3,20	4	3,20			0,02	0,60	101,10
20	F03	PD02	DB08	3,08	3,43	3,15	3,17	4	3,21			0,15	4,75	101,18
21	A58x	PD02	DB05	3,05	3,62	3,21	3,00	4	3,22			0,28	8,74	101,61
22	F27	PD01	DB01	3,70	2,85	3,02	3,31	0	3,22	*c*		0,37	**11,56**	101,61
23	A61x	PD01	DB08	3,26	3,24	3,21	3,18	4	3,22			0,03	1,09	101,69
24	F18x	PD99	DB10	3,19	3,24	3,21	3,41	4	3,26			0,10	3,08	102,96
25	F14x	PC01	DB10	3,29	3,37	3,31	3,25	4	3,31			0,05	1,51	104,30
26	A39	PC02	DB08	3,27	3,27	3,35	3,37	4	3,32			0,05	1,49	104,61
27	A80	PD01	DB10	3,41	3,37	3,39	3,32	4	3,37			0,04	1,15	106,43
28	F05	PD02	DB08	3,33	3,28	3,49	3,40	4	3,38			0,09	2,70	106,51
29	A59	PC01	DB08	3,58	3,48	3,22	3,48	4	3,44			0,15	4,48	108,56
30	F32x	PC01	DB08	3,41	3,44	3,47	3,47	4	3,45			0,03	0,83	108,79
31	F09	PZ02	DD02	3,21	3,69	3,34	3,56	4	3,45			0,21	6,19	108,92
32	F15x	PC01	DB09	3,60	3,60	3,80	3,30	4	3,58			0,21	5,77	112,82
33	F08x	PE99	DB08	3,51	3,59	3,65	3,64	4	3,60			0,06	1,75	113,50
34	A60x	PD01	DB10	3,59	3,89	3,86	3,85	4	3,80			0,14	3,62	119,82
35	F07x	PD99	DB08	4,88	4,59	5,04	5,00	0	4,88	*b*	*	0,20	4,11	153,89
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	n	Mean	s_r	CV_r
all labs	**128**	**3,17**	**0,089**	**2,821**
20	% from the mean			
	l		s_R	CV_R
	32		**0,264**	**8,318**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cu **Sample: 3** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	F24	PD01	DB99	2,02	2,40	2,16	2,39	4	2,24	*	0,19	8,32	74,64
2	A47x	PD02	DB08	2,39	2,43	2,34	2,33	4	2,37	*	0,05	1,96	79,06
3	A45x	PE99	DB08	2,66	2,77	2,68	2,75	4	2,72		0,05	1,96	90,47
4	A57	PZ02	DD02	2,80	2,80	2,70	2,80	4	2,78		0,05	1,80	92,47
5	A49	PD05	DB08	2,75	2,74	2,79	2,82	4	2,78		0,04	1,33	92,47
6	A36	PD02	DB08	2,88	3,00	2,85	2,55	4	2,82		0,19	6,78	93,97
7	F13x	PD01	DB08	2,80	2,78	2,85	2,86	4	2,82		0,04	1,43	93,99
8	A79	PD03	DB10	2,92	2,94	2,79	2,77	4	2,85		0,09	3,13	95,09
9	F33x	PD01	DB10	2,90	2,65	3,03	2,84	4	2,86		0,16	5,53	95,14
10	F05	PD02	DB08	2,67	2,85	3,04	3,00	4	2,89		0,17	5,81	96,31
11	F19	PD02	DB08	2,91	2,96	2,95	2,90	4	2,93		0,03	1,00	97,64
12	A82	PC01	DB10	2,93	2,96	3,01	2,88	4	2,95		0,05	1,85	98,14
13	F12x	PC01	DB10	2,91	3,07	2,87	2,95	4	2,95		0,09	2,97	98,24
14	F02x	PD02	DB08	3,00	2,90	2,90	3,00	4	2,95		0,06	1,96	98,31
15	F06x	PD02	DB08	2,91	3,02	3,03	2,89	4	2,96		0,07	2,46	98,72
16	S22x	PD02	DB08	3,06	2,93	3,05	2,85	4	2,97		0,10	3,39	99,05
17	A65	PD01	DB08	2,90	3,00	3,10	2,90	4	2,98		0,10	3,22	99,14
18	F25x	PB06	DB08	3,04	3,01	3,01	3,06	4	3,03		0,02	0,81	100,97
19	A61x	PD01	DB08	3,07	2,98	2,98	3,11	4	3,04		0,07	2,16	101,14
20	F16x	PC01	DB08	3,08	3,07	3,06	3,03	4	3,06		0,02	0,64	101,95
21	F18x	PD99	DB10	2,98	3,00	3,18	3,14	4	3,08		0,10	3,25	102,47
22	A58x	PD02	DB05	3,04	3,03	3,06	3,28	4	3,10		0,12	3,84	103,39
23	A71	PB03	DB01	3,12	3,10	3,19	3,11	4	3,13		0,04	1,22	104,28
24	A39	PC02	DB08	3,12	3,17	3,19	3,20	4	3,17		0,03	1,05	105,64
25	F03	PD02	DB08	3,44	3,18	3,06	3,13	4	3,20		0,17	5,18	106,68
26	A80	PD01	DB10	3,16	3,25	3,30	3,25	4	3,24		0,06	1,80	107,97
27	A59	PC01	DB08	3,63	3,27	3,01	3,12	4	3,26		0,27	8,30	108,55
28	F09	PZ02	DD02	3,46	3,12	3,17	3,34	4	3,27		0,15	4,74	108,93
29	F14x	PC01	DB10	3,27	3,38	3,21	3,34	4	3,30		0,08	2,28	109,97
30	F32x	PC01	DB08	3,34	3,35	3,35	3,31	4	3,34		0,02	0,57	111,22
31	F15x	PC01	DB09	2,80	3,20	4,30	3,60	0	3,48	*c*	0,64	**18,41**	115,80
32	F08x	PE99	DB08	3,20	3,29	3,60	3,85	4	3,48		0,30	8,59	116,09
33	F27	PD01	DB01	3,65	4,49	2,92	2,97	0	3,51	*c*	0,73	**20,95**	116,88
34	A60x	PD01	DB10	3,36	3,44	3,51	3,85	4	3,54		0,22	6,10	117,90
35	F07x	PD99	DB08	4,82	4,65	4,74	4,73	0	4,73	*b* *	0,07	1,44	157,75
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	n	Mean	s_r	CV_r
all labs	**128**	**3,00**	**0,099**	**3,308**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
32	**0,274**	**9,118**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cu **Sample: 4** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	5,79	6,52	6,02	6,11	0	6,11	*b*	*	0,30	4,99	66,68
2	A47x	PD02	DB08	7,30	7,24	7,07	7,17	0	7,20	*b*	*	0,10	1,37	78,52
3	F24	PD01	DB99	7,74	8,27	7,75	7,76	4	7,88			0,26	3,30	86,01
4	A45x	PE99	DB08	8,30	8,50	8,47	8,62	4	8,47			0,13	1,56	92,46
5	F06x	PD02	DB08	8,35	8,61	8,44	8,58	4	8,50			0,12	1,43	92,71
6	F12x	PC01	DB10	8,57	8,48	8,53	8,53	4	8,53			0,04	0,45	93,05
7	A79	PD03	DB10	8,82	8,62	8,19	8,64	4	8,57			0,27	3,14	93,50
8	F13x	PD01	DB08	8,65	8,67	8,68	8,65	4	8,66			0,01	0,16	94,52
9	F05	PD02	DB08	8,79	8,66	8,67	8,60	4	8,68			0,08	0,92	94,73
10	F19	PD02	DB08	8,59	8,80	8,71	8,83	4	8,73			0,11	1,23	95,30
11	A49	PD05	DB08	8,67	8,86	8,81	8,74	4	8,77			0,08	0,94	95,71
12	A65	PD01	DB08	8,80	9,00	8,80	9,00	4	8,90			0,12	1,30	97,13
13	F08x	PE99	DB08	8,70	8,97	8,67	9,54	4	8,97			0,40	4,48	97,91
14	F02x	PD02	DB08	9,00	9,10	8,70	9,30	4	9,03			0,25	2,77	98,49
15	A59	PC01	DB08	9,09	8,75	9,18	9,17	4	9,05			0,20	2,24	98,74
16	F25x	PB06	DB08	9,15	9,15	9,00	9,13	4	9,11			0,07	0,79	99,39
17	A36	PD02	DB08	9,05	9,46	9,16	8,89	4	9,14			0,24	2,63	99,75
18	F18x	PD99	DB10	9,22	9,17	9,13	9,24	4	9,19			0,05	0,54	100,29
19	F03	PD02	DB08	9,21	9,31	9,15	9,34	4	9,25			0,09	0,97	100,96
20	A57	PZ02	DD02	9,30	9,40	9,40	9,10	4	9,30			0,14	1,52	101,49
21	A61x	PD01	DB08	9,25	9,34	9,44	9,20	4	9,31			0,11	1,13	101,57
22	F32x	PC01	DB08	9,41	9,44	9,42	9,45	4	9,43			0,02	0,19	102,91
23	F09	PZ02	DD02	9,27	9,44	9,50	9,52	4	9,43			0,11	1,18	102,92
24	F14x	PC01	DB10	9,70	9,50	9,43	9,19	4	9,46			0,21	2,23	103,18
25	A58x	PD02	DB05	9,51	9,17	9,72	9,55	4	9,49			0,23	2,43	103,54
26	A71	PB03	DB01	9,61	9,71	9,63	9,31	4	9,57			0,18	1,84	104,40
27	A80	PD01	DB10	9,56	9,48	9,64	9,68	4	9,59			0,09	0,92	104,66
28	A60x	PD01	DB10	9,60	9,62	9,74	9,58	4	9,63			0,07	0,73	105,12
29	F27	PD01	DB01	9,70	10,45	9,23	9,35	0	9,68	*c*		0,55	5,67	105,67
30	A39	PC02	DB08	9,97	9,79	9,94	9,68	4	9,84			0,14	1,41	107,44
31	F16x	PC01	DB08	9,62	9,98	9,81	10,07	4	9,87			0,20	2,03	107,71
32	A82	PC01	DB10	10,06	10,63	9,50	9,35	0	9,89	*c*		0,58	5,90	107,88
33	F15x	PC01	DB09	10,20	10,10	10,40	9,80	4	10,13			0,25	2,47	110,50
34	F33x	PD01	DB10	10,33	10,39	10,53	10,51	4	10,44			0,10	0,92	113,93
35	F07x	PD99	DB08	13,07	13,33	13,08	13,26	0	13,19	*b*	*	0,13	0,99	143,89
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	n	Mean	s_r	CV_r
all labs	**120**	**9,16**	**0,145**	**1,587**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
30	**0,550**	**5,998**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Pb **Sample: 1** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	A45x	PE99	DB10	0,19	0,19	0,18	0,19	4	0,19			0,00	2,28	73,35
2	A82	PC01	DB10	0,19	0,18	0,19	0,19	4	0,19			0,00	2,00	73,75
3	A36	PD02	DB10	0,20	0,18	0,19	0,19	4	0,19			0,01	2,99	74,04
4	A79	PD03	DB10	0,19	0,18	0,20	0,19	4	0,19			0,01	4,39	75,77
5	F16x	PC01	DB10	0,19	0,18	0,21	0,19	4	0,19			0,01	6,90	76,79
6	F27	PD01	DB05	0,20	0,23	0,14	0,24	4	0,20			0,04	**21,09**	78,68
7	F12x	PC01	DB10	0,19	0,20	0,21	0,20	4	0,20			0,01	5,53	79,56
8	F32x	PC01	DB10	0,21	0,20	0,21	0,20	4	0,21			0,00	2,07	80,85
9	F18x	PD99	DB10	0,23	0,21	0,21	0,20	4	0,21			0,01	5,36	83,80
10	F08x	PD01	DB10	0,20	0,24	0,22	0,21	4	0,22			0,02	8,55	86,27
11	F33	PD01	DB10	0,23	0,20	0,21	0,24	4	0,22			0,02	8,33	86,96
12	A71	PD02	DB10	0,22	0,26	0,21	0,22	4	0,23			0,02	9,85	89,06
13	A60x	PD01	DB10	0,23	0,24	0,22	0,23	4	0,23			0,01	2,95	90,47
14	F14	PC01	DB10	0,23	0,23	0,25	0,24	4	0,24			0,01	4,55	93,37
15	F13x	PD01	DB05	0,25	0,23	0,26	0,25	4	0,25			0,01	5,18	97,34
16	F02	PD02	DB05	0,29	0,32	0,31	0,28	4	0,30			0,02	6,09	118,31
17	F05	PD02	DB05	0,41	0,40	0,44	0,40	4	0,42		*	0,02	4,73	163,66
18	F07x	PD99	DB08	0,49	0,42	0,47	0,49	4	0,47		*	0,03	6,82	185,23
19	F03	PD02	DB08	0,48	0,52	0,49	0,47	4	0,49		*	0,02	4,76	192,75
20	A65	PD01	DB08	0,60	0,60	*0,8a*	0,60	0	0,60	*b*	*	0,00	0,00	236,62
21	F24	PC01	DB99	1,05	1,54	0,97	1,19	0	1,19	*b*	*	0,25	**20,96**	468,21
22														
23														
24	A39	PC02	DB08	<,5	<,5	<,5	<,5							
25	F06x	PD02	DB08	<,5	<,5	<,5	<,5							
26	F15x	PC01	DB09	<,5	<,5	<,5	<,5							
27	S22x	PD02	DB08	<,4	<,4	<,4	<,4							
28	A80	PD01	DB10	0,22	<,2	<,2	<,2							
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	n	Mean	s_r	CV_r
all labs	**76**	**0,25**	**0,015**	**5,960**
40	% from the mean			

* = non tolerable mean because more than +/-

Limit for the lower concentartion range

l	s_R	CV_R
19	**0,096**	**37,693**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Pb **Sample: 2** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F13x	PD01	DB05	0,11	0,12	0,14	0,13	4	0,13		0,01	8,02	77,73
2	F16x	PC01	DB10	0,14	0,15	0,14	0,14	4	0,14		0,01	5,24	86,38
3	A79	PD03	DB10	0,14	0,14	0,14	0,14	4	0,14		0,00	1,01	87,79
4	A82	PC01	DB10	0,15	0,14	0,14	0,14	4	0,14		0,00	1,94	88,08
5	A36	PD02	DB10	0,14	0,14	0,15	0,15	4	0,14		0,00	3,47	88,55
6	F32x	PC01	DB10	0,15	0,15	0,14	0,15	4	0,15		0,00	2,99	91,80
7	F12x	PC01	DB10	0,15	0,15	0,15	0,15	4	0,15		0,00	0,94	92,88
8	A45x	PE99	DB10	0,14	0,14	0,17	0,15	4	0,15		0,01	7,68	93,19
9	A71	PD02	DB10	0,18	0,18	0,17	0,17	4	0,17		0,01	3,73	108,30
10	F18x	PD99	DB10	0,17	0,18	0,19	0,18	4	0,18		0,01	2,87	110,68
11	F08x	PD01	DB10	0,16	0,17	0,21	0,19	4	0,18		0,02	**12,63**	112,23
12	A60x	PD01	DB10	0,19	0,20	0,18	0,17	4	0,18		0,01	6,05	113,61
13	F33	PD01	DB10	0,19	0,20	0,20	0,19	4	0,19		0,01	3,57	120,13
14	F27	PD01	DB05	0,27	0,12	0,17	0,27	0	0,21	*c*	0,08	**36,95**	127,25
15	F14	PC01	DB10	0,20	0,19	0,23	0,21	4	0,21		0,02	7,62	128,64
16	F05	PD02	DB05	0,31	0,31	0,26	0,29	0	0,29	*b* *	0,02	7,73	181,58
17	F07x	PD99	DB08	0,40	0,40	0,44	0,46	0	0,42	*b* *	0,03	6,79	262,76
18	A65	PD01	DB08	0,60	0,60	0,60	*0,8a*	0	0,60	*b* *	0,00	0,00	371,53
19	F24	PC01	DB99	0,94	0,76	0,76	0,94	0	0,85	*b* *	0,10	**11,68**	526,33
20													
21													
22	A39	PC02	DB08	<,5	<,5	<,5	<,5						
23	F15x	PC01	DB09	<,5	<,5	<,5	<,5						
24	F03	PD02	DB08	<,5	<,5	<,5	<,5						
25	F06x	PD02	DB08	<,5	<,5	<,5	<,5						
26	S22x	PD02	DB08	<,4	<,4	<,4	<,4						
27	A80	PD01	DB10	<,2	<,2	<,2	<,2						
28	F02	PD02	DB05	0,21	0,24	0,20	<,2						
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	n	Mean	s_r	CV_r
all labs	**56**	**0,16**	**0,008**	**4,970**
40	% from the mean			
	l		s_R	CV_R
	14		**0,025**	**15,220**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Pb **Sample: 3** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A36	PD02	DB10	0,17	0,17	0,17	0,18	4	0,17			0,00	1,67	78,06
2	A79	PD03	DB10	0,18	0,18	0,18	0,17	4	0,18			0,00	1,98	80,25
3	A45x	PE99	DB10	0,18	0,18	0,18	0,18	4	0,18			0,00	1,03	80,54
4	F16x	PC01	DB10	0,18	0,18	0,18	0,18	4	0,18			0,00	0,80	81,94
5	F18x	PD99	DB10	0,19	0,20	0,19	0,20	4	0,19			0,01	3,78	86,65
6	F12x	PC01	DB10	0,19	0,20	0,19	0,19	4	0,19			0,00	0,89	87,22
7	F32x	PC01	DB10	0,19	0,19	0,20	0,19	4	0,19			0,00	1,40	87,78
8	F13x	PD01	DB05	0,18	0,20	0,20	0,20	4	0,20			0,01	6,38	88,30
9	F33	PD01	DB10	0,19	0,19	0,20	0,21	4	0,20			0,01	5,16	88,92
10	A82	PC01	DB10	0,19	0,21	0,20	0,23	4	0,20			0,02	8,18	92,65
11	F08x	PD01	DB10	0,22	0,22	0,19	0,19	4	0,21			0,02	8,48	94,01
12	A60x	PD01	DB10	0,21	0,21	0,20	0,23	4	0,21			0,01	6,12	96,64
13	A71	PD02	DB10	0,21	0,22	0,20	0,22	4	0,21			0,01	3,71	96,95
14	F14	PC01	DB10	0,25	0,24	0,27	0,24	4	0,25			0,01	5,66	113,12
15	F02	PD02	DB05	0,30	0,29	0,26	0,24	4	0,27			0,03	**10,11**	123,31
16	F07x	PD99	DB08	0,36	0,24	0,27	0,27	4	0,29			0,05	**18,99**	128,97
17	F27	PD01	DB05	0,28	0,25	0,37	0,32	4	0,30			0,05	**17,51**	137,56
18	F05	PD02	DB05	0,37	0,31	0,40	0,32	4	0,35		*	0,04	**12,18**	157,13
19	A65	PD01	DB08	0,60	0,60	0,50	0,50	0	0,55	*b*	*	0,06	**10,50**	248,87
20	F24	PC01	DB99	0,96	0,69	0,69	0,96	0	0,82	*b*	*	0,15	**18,85**	371,50
21														
22														
23	F03	PD02	DB08	<,5	<,5	<,5	<,5							
24	A39	PC02	DB08	<,5	<,5	<,5	<,5							
25	F15x	PC01	DB09	<,5	<,5	<,5	<,5							
26	F06x	PD02	DB08	<,5	<,5	<,5	<,5							
27	S22x	PD02	DB08	<,4	<,4	<,4	<,4							
28	A80	PD01	DB10	<,2	<,2	<,2	<,2							
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	n	Mean	s_r	CV_r
all labs	**72**	**0,22**	**0,016**	**7,306**
40	% from the mean			

l	s_R	CV_R
18	**0,050**	**22,579**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Pb **Sample: 4** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F27	PD01	DB05	0,17	0,09	0,09	0,15	4	0,12	*	0,04	**31,47**	34,04
2	F16x	PC01	DB10	0,28	0,28	0,28	0,28	4	0,28		0,00	0,98	77,32
3	F33	PD01	DB10	0,30	0,28	0,28	0,27	4	0,28		0,01	4,73	77,49
4	A36	PD02	DB10	0,29	0,29	0,29	0,29	4	0,29		0,00	1,10	79,21
5	A79	PD03	DB10	0,30	0,29	0,29	0,31	4	0,30		0,01	3,23	81,28
6	A80	PD01	DB10	0,31	0,32	0,31	0,31	4	0,31		0,00	1,26	85,81
7	A82	PC01	DB10	0,31	0,32	0,34	0,34	4	0,33		0,01	4,55	89,53
8	F12x	PC01	DB10	0,33	0,33	0,32	0,33	4	0,33		0,00	1,44	90,15
9	F08x	PD01	DB10	0,33	0,37	0,28	0,35	4	0,33		0,04	**12,14**	90,90
10	A45x	PE99	DB10	0,35	0,33	0,33	0,35	4	0,34		0,01	3,37	92,97
11	A60x	PD01	DB10	0,36	0,35	0,33	0,33	4	0,34		0,02	4,61	94,51
12	F32x	PC01	DB10	0,35	0,35	0,35	0,35	4	0,35		0,00	0,85	96,20
13	F18x	PD99	DB10	0,38	0,36	0,36	0,39	4	0,37		0,01	3,92	101,84
14	A71	PD02	DB10	0,40	0,38	0,37	0,38	4	0,38		0,01	3,19	105,06
15	F13x	PD01	DB05	0,42	0,41	0,40	0,40	4	0,41		0,01	1,96	112,17
16	F14	PC01	DB10	0,41	0,39	0,44	0,43	4	0,42		0,02	5,31	114,83
17	F07x	PD99	DB08	0,42	0,48	0,41	0,41	4	0,43		0,03	7,20	118,22
18	F05	PD02	DB05	0,48	0,44	0,44	0,45	4	0,45		0,02	4,13	124,60
19	F24	PC01	DB99	0,50	0,59	0,53	0,44	4	0,51	*	0,06	**11,93**	140,89
20	F02	PD02	DB05	0,54	0,56	0,50	0,48	4	0,52	*	0,04	7,02	143,02
21	F03	PD02	DB08	0,55	0,55	0,52	0,56	4	0,55	*	0,02	2,76	149,97
22	A65	PD01	DB08	1,00	0,90	0,80	0,90	0	0,90	*b* *	0,08	9,07	247,54
23													
24													
25	A39	PC02	DB08	<,5	<,5	<,5	<,5						
26	F15x	PC01	DB09	<,5	<,5	<,5	<,5						
27	F06x	PD02	DB08	<,5	<,5	<,5	<,5						
28	S22x	PD02	DB08	<,4	<,4	<,4	<,4						
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	n	Mean	s_r	CV_r
all labs	**84**	**0,36**	**0,018**	**4,986**
40	% from the mean			
	l		s_R	CV_R
	21		**0,097**	**26,546**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cd **Sample: 1** Unit: ng/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	F08x	PD01	DB10	57,96	61,18	59,26	61,78	4	60,05			1,76	2,93	82,21
2	F02	PD02	DB05	60,00	60,00	70,00	60,00	4	62,50			5,00	8,00	85,57
3	F03	PD02	DB08	57,54	62,75	63,28	66,68	4	62,56			3,77	6,03	85,65
4	F16x	PC01	DB10	65,78	65,72	67,05	66,18	4	66,18			0,61	0,93	90,61
5	F06x	PD02	DB08	67,00	68,00	64,00	70,00	4	67,25			2,50	3,72	92,07
6	A79	PD03	DB10	71,20	72,20	65,40	68,50	4	69,33			3,05	4,40	94,91
7	F12x	PC01	DB10	69,00	67,00	74,00	70,00	4	70,00			2,94	4,21	95,84
8	F13x	PD01	DB05	70,12	72,26	68,86	68,95	4	70,05			1,58	2,26	95,90
9	F24x	PC01	DB99	72,00	70,00	73,00	70,00	4	71,25			1,50	2,11	97,55
10	A36	PD02	DB10	70,79	72,10	72,31	69,82	4	71,26			1,17	1,64	97,55
11	F32x	PC01	DB10	74,80	73,90	72,20	72,30	4	73,30			1,27	1,73	100,35
12	A45x	PE99	DB10	73,50	73,60	73,50	73,20	4	73,45			0,17	0,24	100,56
13	F18x	PD99	DB10	76,20	73,50	71,70	73,20	4	73,65			1,87	2,54	100,83
14	A60x	PD01	DB10	75,29	78,86	70,93	70,94	4	74,01			3,83	5,18	101,32
15	A88	PD01	DB01	69,50	74,00	74,00	81,50	4	74,75			4,97	6,66	102,34
16	F14	PC01	DB10	74,60	75,70	73,50	77,00	4	75,20			1,50	1,99	102,96
17	A39	PC02	DB08	72,00	77,10	75,00	78,90	4	75,75			2,96	3,91	103,71
18	A82	PC01	DB10	73,00	79,00	79,00	77,00	4	77,00			2,83	3,67	105,42
19	F33	PD01	DB10	77,32	86,18	76,69	76,97	4	79,29			4,60	5,80	108,55
20	A80	PD01	DB10	76,90	79,10	80,80	80,90	4	79,43			1,88	2,36	108,74
21	F07x	PD99	DB08	82,56	78,01	82,04	83,57	4	81,55			2,44	2,99	111,64
22	F05	PD02	DB05	88,70	90,30	78,70	79,00	4	84,18			6,18	7,35	115,24
23	F15x	PC01	DB09	88,00	92,00	88,00	84,00	4	88,00			3,27	3,71	120,48
24	F27	PD01	DB05	106,20	105,80	106,40	104,70	0	105,78	*b*	*	0,76	0,72	144,81
25														
26														
27	A49	PD05	DB09	<120	<120	<120	<120				**			
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	n	Mean	s_r	CV_r
all labs	**92**	**73,04**	**2,681**	**3,671**
30	% from the mean			

l	s_R	CV_R
23	**6,878**	**9,417**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cd **Sample: 2** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F06x	PD02	DB08	59,00	59,00	58,00	60,00	4	59,00		0,82	1,38	79,31
2	F02	PD02	DB05	60,00	60,00	60,00	70,00	4	62,50		5,00	8,00	84,02
3	F24x	PC01	DB99	67,00	62,00	60,00	63,00	4	63,00		2,94	4,67	84,69
4	F08x	PD01	DB10	65,98	71,12	67,83	63,55	4	67,12		3,19	4,75	90,23
5	F03	PD02	DB08	67,69	63,74	65,87	71,49	4	67,20		3,29	4,89	90,33
6	F13x	PD01	DB05	67,96	71,73	66,89	66,34	4	68,23		2,43	3,56	91,72
7	F16x	PC01	DB10	70,13	69,85	68,02	69,83	4	69,46		0,97	1,39	93,37
8	A79	PD03	DB10	76,20	76,20	70,20	69,60	4	73,05		3,65	4,99	98,20
9	F33	PD01	DB10	70,91	80,52	74,07	67,13	4	73,16		5,67	7,75	98,35
10	F18x	PD99	DB10	74,80	74,60	69,70	74,70	4	73,45		2,50	3,41	98,74
11	A36	PD02	DB10	74,30	72,56	74,95	73,00	4	73,70		1,11	1,51	99,08
12	F12x	PC01	DB10	73,00	77,00	72,00	74,00	4	74,00		2,16	2,92	99,48
13	A82	PC01	DB10	76,00	75,00	74,00	78,00	4	75,75		1,71	2,25	101,83
14	F32x	PC01	DB10	76,28	76,28	76,17	75,74	4	76,12		0,26	0,34	102,33
15	F05	PD02	DB05	76,70	74,90	78,60	79,90	4	77,53		2,19	2,82	104,22
16	A39	PC02	DB08	75,30	80,10	76,20	80,40	4	78,00		2,63	3,37	104,86
17	A60x	PD01	DB10	81,95	85,98	75,01	71,62	4	78,64		6,51	8,28	105,72
18	A45x	PE99	DB10	78,10	81,10	79,40	79,10	4	79,43		1,25	1,57	106,77
19	A80	PD01	DB10	82,90	81,30	79,10	79,80	4	80,78		1,69	2,09	108,59
20	F14	PC01	DB10	77,50	84,00	79,70	84,00	4	81,30		3,24	3,99	109,29
21	A88	PD01	DB01	81,50	84,50	78,50	83,00	4	81,88		2,56	3,13	110,07
22	F07x	PD99	DB08	87,88	88,45	88,68	89,58	4	88,65		0,71	0,80	119,17
23	F15x	PC01	DB09	92,00	92,00	85,00	87,00	4	89,00		3,56	4,00	119,64
24	F27	PD01	DB05	99,60	96,80	105,00	102,70	0	101,03	*b* *	3,58	3,55	135,81
25													
26													
27	A49	PD05	DB09	<120	<120	<120	<120			**			
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	n	Mean	s_r	CV_r
all labs	**92**	**74,39**	**#DIV/0!**	**#DIV/0!**
30	% from the mean			

l	s_R	CV_R
23	**7,723**	**10,381**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cd **Sample: 3** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	A82	PC01	DB10	6,00	5,00	8,00	9,00	4	7,00		1,83	**26,08**	78,04
2	A36	PD02	DB10	6,86	7,29	7,08	6,97	4	7,05		0,18	2,60	78,60
3	F32x	PC01	DB10	7,26	6,73	7,26	7,57	4	7,21		0,35	4,84	80,32
4	F16x	PC01	DB10	7,03	7,36	7,48	7,46	4	7,33		0,21	2,82	81,75
5	A88	PD01	DB01	7,67	7,00	7,50	8,50	4	7,67		0,62	8,13	85,48
6	A60x	PD01	DB10	8,11	7,80	7,78	7,40	4	7,77		0,29	3,74	86,65
7	F12x	PC01	DB10	10,00	7,00	8,00	8,00	4	8,25		1,26	**15,25**	91,98
8	F13x	PD01	DB05	8,85	8,92	8,39	9,39	4	8,88		0,41	4,63	99,05
9	F18x	PD99	DB10	9,40	9,50	9,70	9,50	4	9,53		0,13	1,32	106,19
10	F14	PC01	DB10	10,70	10,70	11,00	11,00	4	10,85		0,17	1,60	120,96
11	F27	PD01	DB05	18,00	10,30	14,70	8,40	4	12,85	*	4,33	**33,70**	143,26
12	A39	PC02	DB08	13,20	14,10	12,90	12,80	4	13,25	*	0,59	4,46	147,72
13	F33	PD01	DB10	40,41	43,62	35,51	40,02	0	39,89	*b* *	3,34	8,36	444,71
14	F24x	PC01	DB99	109,00	92,00	72,00	91,00	0	91,00	*b* *	15,12	**16,62**	1014,51
15													
16													
17	A49	PD05	DB09	<120	<120	<120	<120			**			
18	F03	PD02	DB08	<50	<50	<50	<50						
19	F06x	PD02	DB08	<50	<50	<50	<50						
20	F15x	PC01	DB09	<50	<50	<50	<50						
21	F05	PD02	DB05	<25	<25	<25	<25						
22	F02	PD02	DB05	<20	<20	<20	<20						
23	F08x	PD01	DB10	<20	<20	<20	<20						
24	A79	PD03	DB10	<10	<10	<10	<10						
25	A80	PD01	DB10	<10	<10	<10	<10						
26	A45x	PE99	DB10	<10	<10	<10	<10						
27	F07x	PD99	DB08	13,67	10,54	11,41	<10						
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	n	Mean	s_r	CV_r
all labs	**48**	**8,97**	**0,864**	**9,634**
30	% from the mean			

l	s_R	CV_R
12	**2,220**	**24,755**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cd **Sample: 4** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F16x	PC01	DB10	9,73	9,32	9,39	9,40	4	9,46		0,18	1,92	76,14
2	F12x	PC01	DB10	11,00	10,00	9,00	10,00	4	10,00		0,82	8,16	80,50
3	A36	PD02	DB10	9,88	9,99	10,87	9,88	4	10,16		0,48	4,72	81,75
4	F13x	PD01	DB05	10,30	10,21	9,95	10,49	4	10,24		0,23	2,21	82,40
5	A79	PD03	DB10	10,60	9,70	10,10	10,70	4	10,28		0,46	4,52	82,71
6	A60x	PD01	DB10	12,20	8,14	9,12	13,58	4	10,76		2,55	**23,74**	86,62
7	F32x	PC01	DB10	9,95	10,91	11,87	11,34	4	11,02		0,81	7,38	88,69
8	A82	PC01	DB10	11,00	13,00	12,00	12,00	4	12,00		0,82	6,80	96,60
9	F07x	PD99	DB08	12,11	11,14	14,74	13,15	4	12,79		1,54	**12,05**	102,92
10	F18x	PD99	DB10	14,00	13,50	13,60	13,00	4	13,53		0,41	3,04	108,88
11	F14	PC01	DB10	14,10	14,10	13,00	14,10	4	13,83		0,55	3,98	111,29
12	A45x	PE99	DB10	13,20	14,10	14,20	13,80	4	13,83		0,45	3,25	111,29
13	A88	PD01	DB01	12,00	16,50	15,00	14,50	4	14,50		1,87	**12,90**	116,72
14	A39	PC02	DB08	16,50	17,00	16,80	16,80	4	16,78	*	0,21	1,23	135,04
15	F27	PD01	DB05	14,20	18,00	19,80	16,80	4	17,20	*	2,35	**13,66**	138,46
16	F33	PD01	DB10	24,34	24,20	23,43	26,81	0	24,70	*b* *	1,47	5,94	198,79
17	F24x	PC01	DB99	*44a*	36,00	36,00	35,00	0	35,67	*b* *	0,58	1,62	287,11
18													
19													
20	A49	PD05	DB09	<120	<120	<120	<120			**			
21	F03	PD02	DB08	<50	<50	<50	<50						
22	F15x	PC01	DB09	<50	<50	<50	<50						
23	F06x	PD02	DB08	<50	<50	<50	<50						
24	F05	PD02	DB05	<25	<25	<25	<25						
25	F02	PD02	DB05	<20	<20	<20	<20						
26	F08x	PD01	DB10	<20	<20	<20	<20						
27	A80	PD01	DB10	11,10	11,40	<10	<10						
28													
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	n	Mean	s_r	CV_r
all labs	**60**	**12,42**	**0,915**	**7,369**
30	% from the mean			

	l	s_R	CV_R
	15	**2,471**	**19,890**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: B **Sample: 1** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F24	PD01	DB99	29,33	30,40	31,83	29,97	4	30,38	*	1,06	3,49	74,81
2	A88	PD01	DB08	34,60	34,60	34,40	34,80	4	34,60		0,16	0,47	85,19
3	F08x	PE99	DB08	39,24	38,51	35,76	35,86	4	37,34		1,79	4,81	91,94
4	F07x	PD99	DB08	37,55	37,76	36,68	37,98	4	37,49		0,57	1,52	92,31
5	F18x	PD99	DB08	37,20	37,70	37,60	37,80	4	37,58		0,26	0,70	92,52
6	A65	PD01	DB08	37,90	37,70	39,40	37,40	4	38,10		0,89	2,34	93,81
7	F16x	PC01	DB10	38,24	38,88	38,07	38,81	4	38,50		0,41	1,05	94,79
8	A39	PC02	DB08	37,96	37,82	39,06	39,67	4	38,63		0,89	2,30	95,11
9	F02x	PD02	DB08	39,30	40,10	41,20	38,90	4	39,88		1,01	2,54	98,18
10	A71	PD02	DB10	40,78	39,89	40,75	40,08	4	40,38		0,46	1,13	99,41
11	A61x	PD01	DB08	41,19	40,60	40,64	41,06	4	40,87		0,30	0,73	100,64
12	A49	PD05	DB08	41,01	41,08	41,11	41,47	4	41,17		0,21	0,50	101,36
13	F14	PC01	DB08	41,40	41,40	41,00	41,10	4	41,23		0,21	0,50	101,50
14	F32	PC01	DB08	41,80	41,60	41,50	41,60	4	41,63		0,13	0,30	102,49
15	F19	PD02	DB08	41,90	41,50	42,20	41,70	4	41,83		0,30	0,71	102,98
16	A60x	PD01	DB10	40,20	41,10	42,10	45,40	0	42,20	*c*	2,27	5,38	103,90
17	F15x	PC01	DB08	42,00	42,00	44,00	42,00	4	42,50		1,00	2,35	104,64
18	F33	PD01	DB10	44,06	42,66	43,16	44,43	4	43,58		0,81	1,86	107,30
19	F05	PD02	DB08	44,70	44,70	44,60	44,60	4	44,65		0,06	0,13	109,94
20	A36	PD02	DB08	45,84	46,42	46,80	45,17	4	46,06		0,71	1,54	113,40
21	A59	PC01	DB08	48,14	47,54	48,07	46,81	4	47,64		0,61	1,29	117,30
22	A47x	PD01	DB08	48,79	51,24	48,80	46,75	4	48,90	*	1,84	3,76	120,39
23													
24													
25	S22x	PD02	DB08	<,4	<,4	<,4	<,4			*			
26													
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	n	Mean	s_r	CV_r
all labs	**84**	**40,61**	**0,651**	**1,603**
* = non tolerable mean because more than +/- **20** % from the mean				

l	s_R	CV_R
21	**4,274**	**10,523**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: B **Sample: 2** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	F24	PD01	DB99	15,65	14,40	14,15	15,13	0	14,83	*b*	*	0,68	4,61	67,81
2	A88	PD01	DB08	19,20	19,40	18,10	18,50	4	18,80			0,61	3,22	85,95
3	F18x	PD99	DB08	19,30	19,30	19,20	19,20	4	19,25			0,06	0,30	88,01
4	A39	PC02	DB08	20,67	19,77	20,57	20,02	4	20,26			0,43	2,14	92,61
5	F07x	PD99	DB08	19,51	20,94	19,99	20,63	4	20,27			0,64	3,17	92,66
6	A71	PD02	DB10	20,28	20,67	20,27	20,84	4	20,52			0,29	1,39	93,79
7	F16x	PC01	DB10	20,27	20,53	20,77	20,64	4	20,55			0,21	1,03	93,96
8	A65	PD01	DB08	20,00	19,90	20,90	21,60	4	20,60			0,80	3,90	94,18
9	F05	PD02	DB08	21,20	21,00	21,30	21,10	4	21,15			0,13	0,61	96,70
10	F08x	PE99	DB08	21,39	21,85	21,04	21,14	4	21,36			0,36	1,69	97,63
11	A49	PD05	DB08	21,60	21,36	21,45	21,39	4	21,45			0,11	0,50	98,07
12	F14	PC01	DB08	21,50	21,50	21,40	21,50	4	21,48			0,05	0,23	98,18
13	A59	PC01	DB08	22,22	18,81	20,78	26,89	0	22,18	*c*		3,44	**15,51**	101,38
14	A61x	PD01	DB08	22,89	22,68	23,12	22,61	4	22,83			0,23	1,01	104,35
15	F19	PD02	DB08	22,70	22,60	23,00	23,10	4	22,85			0,24	1,04	104,47
16	F32	PC01	DB08	22,90	22,70	22,80	23,20	4	22,90			0,22	0,94	104,70
17	F02x	PD02	DB08	25,80	21,70	23,10	22,00	4	23,15			1,87	8,06	105,84
18	F33	PD01	DB10	23,38	23,52	23,94	22,95	4	23,45			0,41	1,74	107,20
19	F15x	PC01	DB08	24,00	22,00	25,00	23,00	4	23,50			1,29	5,49	107,44
20	A60x	PD01	DB10	22,40	24,60	24,70	24,40	4	24,03			1,09	4,54	109,84
21	A36	PD02	DB08	24,10	24,08	24,55	23,90	4	24,16			0,28	1,15	110,45
22	A47x	PD01	DB08	25,35	25,32	24,83	24,22	4	24,93			0,53	2,13	113,98
23														
24														
25	S22x	PD02	DB08	<,4	<,4	<,4	<,4				*			
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	n	Mean	s_r	CV_r
all labs	**80**	**21,87**	**0,492**	**2,248**
* = non tolerable mean because more than +/- **20** % from the mean				

l	s_R	CV_R
20	**1,728**	**7,899**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: B **Sample: 3** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	F24	PD01	DB99	9,50	8,44	8,21	9,42	0	8,89	*b*	*	0,66	7,43	57,26
2	A88	PD01	DB08	13,40	13,90	13,70	13,30	4	13,58			0,28	2,03	87,41
3	F18x	PD99	DB08	13,60	13,50	13,70	13,70	4	13,63			0,10	0,70	87,73
4	A39	PC02	DB08	14,38	13,98	14,34	14,76	4	14,37			0,32	2,22	92,49
5	F14	PC01	DB08	14,60	14,50	14,60	14,60	4	14,58			0,05	0,34	93,85
6	A59	PC01	DB08	15,82	13,53	13,68	15,38	4	14,60			1,17	7,99	94,02
7	F16x	PC01	DB10	14,54	14,83	14,54	14,71	4	14,66			0,14	0,97	94,36
8	F08x	PE99	DB08	14,68	14,73	14,53	14,69	4	14,66			0,09	0,60	94,38
9	F02x	PD02	DB08	15,10	14,80	*18,8a*	15,10	3	15,00			0,17	1,15	96,58
10	F07x	PD99	DB08	15,19	15,13	15,33	15,29	4	15,24			0,09	0,60	98,10
11	A65	PD01	DB08	15,40	15,30	15,50	15,40	4	15,40			0,08	0,53	99,16
12	A49	PD05	DB08	14,98	14,93	15,76	16,23	4	15,48			0,63	4,08	99,64
13	A71	PD02	DB10	15,78	15,55	15,71	15,69	4	15,68			0,10	0,61	100,98
14	A61x	PD01	DB08	15,85	15,70	16,19	15,53	4	15,82			0,28	1,77	101,85
15	F32	PC01	DB08	16,00	16,00	16,10	16,10	4	16,05			0,06	0,36	103,34
16	F05	PD02	DB08	16,10	16,20	16,10	15,90	4	16,08			0,13	0,78	103,51
17	F19	PD02	DB08	16,20	16,20	16,20	16,00	4	16,15			0,10	0,62	103,99
18	A36	PD02	DB08	16,59	16,86	17,16	16,19	4	16,70			0,41	2,47	107,53
19	F33	PD01	DB10	16,75	16,70	17,19	16,82	4	16,87			0,22	1,32	108,59
20	F15x	PC01	DB08	19,00	18,00	17,00	17,00	4	17,75			0,96	5,39	114,29
21	A60x	PD01	DB10	17,20	18,30	17,80	19,60	4	18,23			1,02	5,60	117,35
22	A47x	PD01	DB08	19,96	20,59	18,44	19,85	0	19,71	*b*	*	0,91	4,60	126,91
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25	S22x	PD02	DB08	<,4	<,4	<,4	<,4				*			
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	n	Mean	s_r	CV_r
all labs	**79**	**15,53**	**0,319**	**2,056**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
20	**1,233**	**7,944**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: B **Sample: 4** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	F24	PD01	DB99	19,51	20,83	19,64	20,89	0	20,22	*b*	*	0,74	3,68	73,61
2	A88	PD01	DB08	23,10	23,30	24,60	23,60	4	23,65			0,67	2,82	86,10
3	F08x	PE99	DB08	24,52	23,90	24,17	24,24	4	24,21			0,25	1,05	88,13
4	F18x	PD99	DB08	25,00	24,70	24,50	24,90	4	24,78			0,22	0,89	90,19
5	F07x	PD99	DB08	25,68	25,29	25,02	25,37	4	25,34			0,27	1,07	92,25
6	F16x	PC01	DB10	25,28	25,24	25,64	25,50	4	25,42			0,19	0,74	92,52
7	A71	PD02	DB10	26,00	26,50	25,64	26,33	4	26,12			0,38	1,46	95,08
8	A65	PD01	DB08	26,60	26,50	26,80	27,10	4	26,75			0,26	0,99	97,38
9	A39	PC02	DB08	26,96	26,49	27,18	26,42	4	26,76			0,37	1,37	97,43
10	F05	PD02	DB08	27,20	27,10	27,10	27,20	4	27,15			0,06	0,21	98,84
11	F14	PC01	DB08	27,30	27,40	27,20	27,60	4	27,38			0,17	0,62	99,66
12	A61x	PD01	DB08	27,37	27,95	27,61	27,16	4	27,52			0,34	1,23	100,19
13	F32	PC01	DB08	27,80	27,80	27,90	27,80	4	27,83			0,05	0,18	101,29
14	F02x	PD02	DB08	27,80	29,00	26,90	28,40	4	28,03			0,90	3,20	102,02
15	F19	PD02	DB08	28,40	28,40	28,20	28,40	4	28,35			0,10	0,35	103,21
16	A59	PC01	DB08	23,15	25,68	32,36	33,01	0	28,55	*c*		4,89	**17,14**	103,93
17	F15x	PC01	DB08	30,00	29,00	29,00	27,00	4	28,75			1,26	4,38	104,66
18	A49	PD05	DB08	29,12	28,85	28,93	28,94	4	28,96			0,11	0,39	105,43
19	F33	PD01	DB10	29,66	29,50	30,25	30,44	4	29,96			0,45	1,51	109,08
20	A47x	PD01	DB08	30,82	30,28	30,63	30,30	4	30,51			0,26	0,86	111,06
21	A60x	PD01	DB10	30,70	30,60	30,60	30,70	4	30,65			0,06	0,19	111,58
22	A36	PD02	DB08	30,99	31,28	31,73	31,18	4	31,30			0,31	1,00	113,93
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24														
25	S22x	PD02	DB08	<,4	<,4	<,4	<,4				*			
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	n	Mean	s_r	CV_r
all labs	**80**	**27,47**	**0,334**	**1,217**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
20	**2,170**	**7,900**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: As **Sample: 1** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F32	PC01	DB10	25,50	23,40	22,30	25,50	4	24,18		1,59	6,60	80,78
2	F14	PC01	DB10	27,00	27,00	27,00	26,00	4	26,75		0,50	1,87	89,39
3	A82	PC01	DB10	29,30	26,40	33,70	25,80	4	28,80		3,61	**12,52**	96,24
4	A36	PD02	DB10	28,88	29,10	28,88	31,05	4	29,48		1,05	3,57	98,50
5	A79	PD03	DB10	31,70	31,00	29,40	32,10	4	31,05		1,19	3,83	103,76
6	F16x	PC01	DB10	33,01	36,96	31,12	36,22	4	34,33		2,74	7,98	114,71
7	A60	PD01	DB10	36,50	33,40	35,10	34,60	4	34,90		1,28	3,68	116,62
8	F07x	PD99	DB08	256,80	226,40	266,60	263,70	0	253,38	*b* *	18,45	7,28	846,68
9													
10													
11	A80	PD01	DB10	<100	<100	<100	<100			**			
12	A39	PC02	DB08	<50	<50	<50	<50						
13	A45x	PE99	DB08	<20	<20	<20	<20			*			
14	S22x	PD02	DB08	<,4	<,4	<,4	<,4			*			
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	n	Mean	s_r	CV_r
all labs	**28**	**29,93**	**1,710**	**5,714**
30	% from the mean			

	l	s_R	CV_R
	7	**3,873**	**12,943**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: As **Sample: 2** Unit: ng/g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	F14	PC01	DB10	26,00	26,00	28,00	28,00	4	27,00		1,15	4,28	94,59
2	F32	PC01	DB10	26,60	26,60	30,90	24,50	4	27,15		2,69	9,90	95,12
3	A36	PD02	DB10	26,94	26,72	27,16	28,13	4	27,24		0,62	2,28	95,43
4	A82	PC01	DB10	27,20	25,30	27,80	29,00	4	27,33		1,54	5,65	95,73
5	A79	PD03	DB10	29,10	30,30	29,00	27,50	4	28,98		1,15	3,96	101,51
6	F16x	PC01	DB10	29,65	31,28	29,19	30,54	4	30,17		0,93	3,09	105,68
7	A60	PD01	DB10	32,20	29,90	34,20	31,50	4	31,95		1,78	5,58	111,94
8													
9													
10	F07x	PD99	DB08	<200	<200	<200	<200			**			
11	A80	PD01	DB10	<100	<100	<100	<100			**			
12	A39	PC02	DB08	<50	<50	<50	<50						
13	A45x	PE99	DB08	<20	<20	<20	<20						
14	S22x	PD02	DB08	<,4	<,4	<,4	<,4			*			
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	n	Mean	s_r	CV_r
all labs	**28**	**28,54**	**1,410**	**4,939**
30	% from the mean			
	l		s_R	CV_R
	7		**1,912**	**6,699**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: As **Sample: 3** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A45x	PE99	DB08	33,70	33,50	36,20	36,40	4	34,95			1,56	4,47	89,43
2	A36	PD02	DB10	35,06	36,14	34,74	36,03	4	35,49			0,70	1,97	90,82
3	F14	PC01	DB10	37,00	36,00	36,00	38,00	4	36,75			0,96	2,61	94,04
4	F32	PC01	DB10	37,90	36,80	34,70	38,90	4	37,08			1,80	4,86	94,87
5	A79	PD03	DB10	40,90	41,70	37,90	36,00	4	39,13			2,65	6,77	100,12
6	F16x	PC01	DB10	40,83	40,63	38,87	40,13	4	40,12			0,88	2,20	102,65
7	A82	PC01	DB10	44,30	47,20	41,90	37,30	4	42,68			4,19	9,81	109,20
8	A60	PD01	DB10	44,80	46,00	45,30	49,70	4	46,45			2,22	4,78	118,86
9	F07x	PD99	DB08	213,10	245,40	235,70	216,60	0	227,70	*b*	*	15,42	6,77	582,66
10														
11														
12	A80	PD01	DB10	<100	<100	<100	<100				**			
13	A39	PC02	DB08	<50	<50	<50	<50							
14	S22x	PD02	DB08	<,4	<,4	<,4	<,4				*			
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	n	Mean	s_r	CV_r
all labs	**32**	**39,08**	**1,870**	**4,785**
30	% from the mean			

* = non tolerable mean because more than +/-

Limit for the lower concentration range

l	s_R	CV_R
8	**3,922**	**10,037**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: As **Sample: 4** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	A39	PC02	DB08	65,40	60,00	64,80	66,90	0	64,28	*b*		2,98	4,64	82,08
2	F32	PC01	DB10	72,70	72,70	72,70	78,10	4	74,05			2,70	3,65	94,56
3	F14	PC01	DB10	78,00	74,00	71,00	77,00	4	75,00			3,16	4,22	95,77
4	A36	PD02	DB10	76,96	73,44	73,66	75,97	4	75,01			1,73	2,31	95,78
5	A45x	PE99	DB08	79,40	78,10	75,90	80,90	4	78,58			2,12	2,70	100,34
6	A82	PC01	DB10	78,70	85,80	74,20	79,60	4	79,58			4,78	6,00	101,62
7	A79	PD03	DB10	85,80	82,10	76,70	80,20	4	81,20			3,80	4,67	103,69
8	F16x	PC01	DB10	78,74	85,00	80,09	81,85	4	81,42			2,71	3,32	103,97
9	A60	PD01	DB10	82,60	79,70	83,90	80,40	4	81,65			1,94	2,38	104,27
10	F07x	PD99	DB08	331,80	314,90	268,60	256,30	0	292,90	*b*	*	36,18	**12,35**	374,03
11														
12														
13	A80	PD01	DB10	<100	<100	<100	<100				**			
14	S22x	PD02	DB08	<,4	<,4	<,4	<,4				*			
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	n	Mean	s_r	CV_r
all labs	**32**	**78,31**	**2,867**	**3,661**
20	% from the mean			

l	s_R	CV_R
8	**3,182**	**4,063**

* = non tolerable mean because more than +/-

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cr **Sample: 1** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	A49	PD05	DB08	0,85	0,84	0,92	0,97	4	0,90			0,06	6,86	78,62
2	A56	PC01	DB08	1,00	1,00	1,00	1,00	4	1,00			0,00	0,00	87,84
3	A36	PD02	DB10	1,07	1,06	0,94	0,99	4	1,02			0,06	5,85	89,22
4	F07x	PD99	DB08	1,01	1,01	1,11	0,97	4	1,02			0,06	5,80	90,01
5	A39	PC02	DB08	1,03	1,02	1,06	1,02	4	1,03			0,02	1,81	90,52
6	F16x	PC01	DB10	1,08	1,04	1,06	1,11	4	1,07			0,03	2,92	94,16
7	F14	PC01	DB10	1,08	1,07	1,10	1,06	4	1,08			0,02	1,66	94,80
8	A80	PD01	DB10	1,01	1,17	1,09	1,05	4	1,08			0,07	6,33	94,87
9	A79	PD03	DB10	1,16	1,10	1,00	1,10	4	1,09			0,07	6,19	95,89
10	A71	PD02	DB10	1,05	1,10	1,17	1,10	4	1,11			0,05	4,51	97,28
11	F12x	PC01	DB10	1,06	1,11	1,23	1,13	4	1,13			0,07	6,17	99,41
12	A60x	PD01	DB10	1,13	1,16	1,10	1,26	4	1,16			0,07	6,18	102,11
13	F19	PD02	DB08	1,33	1,06	1,32	1,02	4	1,18			0,17	**13,99**	103,87
14	F33	PD01	DB10	1,06	1,21	1,19	1,30	4	1,19			0,10	8,32	104,53
15	F32x	PC01	DB10	1,22	1,15	1,13	1,26	4	1,19			0,06	5,09	104,53
16	F18x	PD99	DB10	1,11	1,44	1,16	1,15	4	1,22			0,15	**12,47**	106,73
17	F02x	PD02	DB08	1,20	1,50	1,10	1,20	4	1,25			0,17	**13,86**	109,80
18	F03	PD02	DB08	1,27	1,25	1,29	1,30	4	1,28			0,02	1,67	112,41
19	F24x	PD01	DB99	1,20	1,46	1,26	1,39	4	1,33			0,12	8,94	116,61
20	A65	PD01	DB08	1,30	1,70	1,10	1,30	0	1,35	*c*		0,25	**18,64**	118,58
21	F27	PD01	DB05	1,53	1,34	1,34	1,56	4	1,44		*	0,12	8,34	126,78
22	F05	PD02	DB05	1,68	1,70	1,51	1,76	0	1,66	*b*	*	0,11	6,45	146,03
23														
24														
25	S22x	PD02	DB08	<,4	<,4	<,4	<,4				*			
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	n	Mean	s_r	CV_r
all labs	**80**	**1,14**	**0,074**	**6,525**
* = non tolerable mean because more than +/- **25** % from the mean				

l	s_R	CV_R
20	**0,127**	**11,172**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cr **Sample: 2** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	S22x	PD02	DB08	1,86	1,88	2,08	2,18	0	2,00	*b*	*	0,16	7,79	55,54
2	F18x	PD99	DB10	2,94	2,92	3,17	3,07	4	3,03			0,12	3,88	84,01
3	F07x	PD99	DB08	2,93	3,09	3,12	3,08	4	3,06			0,08	2,75	84,86
4	A36	PD02	DB10	2,88	3,19	3,05	3,16	4	3,07			0,14	4,56	85,27
5	A79	PD03	DB10	3,43	3,16	3,03	3,06	4	3,17			0,18	5,65	88,08
6	F03	PD02	DB08	3,07	2,92	3,42	3,28	4	3,17			0,22	6,97	88,11
7	F14	PC01	DB10	3,12	3,21	3,21	3,26	4	3,20			0,06	1,82	88,87
8	F19	PD02	DB08	3,47	3,41	3,26	3,00	4	3,29			0,21	6,38	91,23
9	F16x	PC01	DB10	3,13	3,27	3,31	3,50	4	3,30			0,16	4,70	91,71
10	A80	PD01	DB10	3,40	3,45	3,41	3,28	4	3,39			0,07	2,16	94,01
11	A60x	PD01	DB10	3,38	3,22	3,47	3,57	4	3,41			0,15	4,37	94,65
12	A56	PC01	DB08	4,00	3,00	3,00	4,00	4	3,50			0,58	**16,50**	97,20
13	F33	PD01	DB10	3,79	3,73	3,58	3,25	4	3,59			0,24	6,74	99,63
14	F24x	PD01	DB99	4,25	3,47	3,42	3,63	4	3,69			0,38	**10,40**	102,55
15	F32x	PC01	DB10	3,66	3,99	3,66	3,69	4	3,75			0,16	4,28	104,14
16	F05	PD02	DB05	3,65	3,83	3,94	3,77	4	3,80			0,12	3,18	105,46
17	F27	PD01	DB05	3,75	3,54	4,47	3,97	4	3,93			0,40	**10,15**	109,19
18	A39	PC02	DB08	3,87	3,81	4,17	4,08	4	3,98			0,17	4,30	110,61
19	F12x	PC01	DB10	3,87	4,07	4,02	3,99	4	3,99			0,09	2,21	110,71
20	F02x	PD02	DB08	5,00	3,90	4,00	3,50	4	4,10			0,64	**15,55**	113,87
21	A71	PD02	DB10	4,30	4,04	4,15	4,05	4	4,14			0,12	2,83	114,84
22	A49	PD05	DB08	4,69	3,80	4,18	3,94	4	4,15			0,39	9,42	115,32
23	A65	PD01	DB08	4,20	4,80	5,10	4,00	4	4,53		*	0,51	**11,32**	125,67
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	n	Mean	s_r	CV_r
all labs	**88**	**3,60**	**0,236**	**6,550**
25	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
22	**0,430**	**11,949**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cr **Sample: 3** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	F07x	PD99	DB08	1,58	*1,503a*	1,57	1,58	3	1,58		0,01	0,49	88,70
2	F19	PD02	DB08	1,52	1,80	1,59	1,45	4	1,59		0,15	9,51	89,38
3	A79	PD03	DB10	1,67	1,60	1,64	1,64	4	1,63		0,03	1,83	91,88
4	A36	PD02	DB10	1,64	1,68	1,71	1,64	4	1,67		0,04	2,14	93,72
5	F24x	PD01	DB99	1,82	1,56	1,89	1,42	4	1,67		0,22	**13,17**	93,97
6	A39	PC02	DB08	1,73	1,65	1,61	1,69	4	1,67		0,05	3,21	93,99
7	F18x	PD99	DB10	1,76	1,72	1,69	1,75	4	1,73		0,03	1,83	97,25
8	F14	PC01	DB10	1,86	1,63	1,75	1,72	4	1,74		0,09	5,45	97,81
9	F32x	PC01	DB10	1,75	1,68	1,77	1,78	4	1,75		0,05	2,58	98,09
10	F16x	PC01	DB10	1,79	1,76	1,70	1,80	4	1,76		0,04	2,46	99,04
11	A71	PD02	DB10	1,74	1,79	1,89	1,68	4	1,77		0,09	4,94	99,76
12	F02x	PD02	DB08	1,80	1,70	1,60	2,00	4	1,78		0,17	9,62	99,77
13	A80	PD01	DB10	1,94	1,75	1,77	1,69	4	1,79		0,11	6,00	100,48
14	F03	PD02	DB08	1,82	1,83	1,83	1,82	4	1,82		0,01	0,46	102,49
15	F12x	PC01	DB10	1,82	1,69	1,99	1,83	4	1,83		0,12	6,75	102,94
16	F33	PD01	DB10	1,79	1,89	1,94	1,86	4	1,87		0,06	3,35	105,11
17	S22x	PD02	DB08	2,08	1,84	1,76	1,86	4	1,89		0,14	7,27	105,96
18	A65	PD01	DB08	2,00	1,80	1,90	1,90	4	1,90		0,08	4,30	106,80
19	F05	PD02	DB05	1,99	1,92	2,05	1,84	4	1,95		0,09	4,64	109,61
20	A60x	PD01	DB10	1,92	2,01	1,98	*2,371a*	3	1,97		0,04	2,28	110,68
21	A56	PC01	DB08	2,00	2,00	2,00	2,00	4	2,00		0,00	0,00	112,42
22	F27	PD01	DB05	2,07	2,09	2,38	2,31	0	2,21	*b*	0,16	7,01	124,38
23													
24													
25	A49	PD05	DB08	1,54	<,6	1,53	1,68						
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	n	Mean	s_r	CV_r
all labs	**82**	**1,78**	**0,078**	**4,357**
* = non tolerable mean because more than +/- **25** % from the mean				

l	s_R	CV_R
21	**0,121**	**6,780**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Cr **Sample: 4** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean		Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	F07x	PD99	DB08	0,26	0,25	0,26	0,25	4	0,26	*	0,01	2,16	53,32
2	A36	PD02	DB10	0,26	0,27	*0,238a*	0,27	3	0,26	*	0,00	1,21	55,30
3	A80	PD01	DB10	0,29	0,26	0,28	0,25	4	0,27	*	0,02	6,65	55,74
4	F24x	PD01	DB99	0,31	0,28	0,25	0,30	4	0,29	*	0,02	8,66	59,71
5	F18x	PD99	DB10	0,36	0,30	0,31	0,37	4	0,33		0,03	9,67	69,95
6	A79	PD03	DB10	0,34	0,35	0,32	0,34	4	0,34		0,01	3,00	70,69
7	F32x	PC01	DB10	0,33	0,39	0,35	0,33	4	0,35		0,03	8,73	73,29
8	F19	PD02	DB08	0,35	0,34	0,38	0,34	4	0,35		0,02	5,38	73,50
9	F05	PD02	DB05	0,33	0,37	0,38	0,37	4	0,36		0,02	5,86	76,11
10	A39	PC02	DB08	0,38	0,38	0,40	0,36	4	0,38		0,02	4,12	79,58
11	F14	PC01	DB10	0,43	0,39	0,36	0,43	4	0,40		0,03	8,46	84,11
12	F12x	PC01	DB10	0,46	0,46	0,45	0,46	4	0,46		0,00	0,54	95,08
13	F33	PD01	DB10	0,60	0,51	0,58	0,53	4	0,55		0,04	7,40	115,55
14	F27	PD01	DB05	0,36	1,01	0,55	0,34	4	0,56		0,31	**55,30**	117,64
15	A71	PD02	DB10	0,87	0,88	0,89	0,87	4	0,88	*	0,01	1,23	183,10
16	A65	PD01	DB08	1,10	1,10	1,10	1,10	4	1,10	*	0,00	0,00	229,85
17	F16x	PC01	DB10	1,10	1,09	*1,18a*	1,09	3	1,09	*	0,00	0,24	228,39
18	A60x	PD01	DB10	2,34	8,93	8,23	1,80	0	5,33	*b* *	3,78	**70,90**	1113,22
19													
20													
21	F03	PD02	DB08	<1	<1	<1	<1						
22	F02x	PD02	DB08	<1	<1	<1	<1						
23	A56	PC01	DB08	<,62	<,62	<,62	<,62						
24	A49	PD05	DB08	<,6	<,6	<,6	<,6						
25	S22x	PD02	DB08	<,4	<,4	<,4	<,4						
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	n	Mean	s_r	CV_r
all labs	**66**	**0,48**	**0,034**	**7,160**
35	% from the mean			

	l	s_R	CV_R
	17	**0,275**	**56,844**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Co **Sample: 1** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	F12x	PC01	DB10	0,02	0,01	0,02	0,01	4	0,014	*	0,00	**26,49**	36,55
2	F16x	PC01	DB10	0,04	0,03	0,04	0,03	4	0,034		0,00	2,47	88,17
3	A36	PD02	DB10	0,03	0,04	0,03	0,04	4	0,035		0,00	3,74	88,49
4	F32	PC01	DB10	0,04	0,04	0,04	0,04	4	0,036		0,00	3,47	92,98
5	A60	PD01	DB10	0,04	0,03	0,04	0,04	4	0,037		0,00	8,70	95,22
6	A80	PD01	DB10	0,03	0,04	0,04	0,04	4	0,037		0,00	5,04	95,41
7	A45x	PE99	DB10	0,04	0,04	0,04	0,04	4	0,038		0,00	9,26	97,53
8	A79	PD03	DB10	0,04	0,04	0,04	0,04	4	0,039		0,00	4,42	99,84
9	A39	PC02	DB08	0,05	0,04	0,04	0,04	4	0,044		0,00	4,24	112,66
10	F07x	PD99	DB08	0,05	0,05	0,05	0,05	4	0,052		0,00	1,97	133,50
11	F14	PC01	DB10	0,06	0,06	0,06	0,06	4	0,062	*	0,00	1,54	159,66
12	F24	PD01	DB99	0,06	0,22	0,22	0,17	0	0,165	*b* *	0,08	**47,22**	423,84
13													
14													
15	A49	PD05	DB09	<,12	<,12	<,12	<,12			**			
16	F03	PD02	DB08	<,1	<,1	<,1	<,1						
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	n	Mean	s_r	CV_r
all labs	**44**	**0,039**	**0,002**	**4,981**
35	% from the mean			

	l	s_R	CV_R
	11	**0,012**	**30,397**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Co **Sample: 2** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F12x	PC01	DB10	0,44	0,45	0,44	0,44	4	0,44		0,00	0,98	92,03
2	F03	PD02	DB08	0,46	0,44	0,47	0,43	4	0,45		0,02	3,54	93,12
3	F16x	PC01	DB10	0,45	0,46	0,46	0,46	4	0,46		0,00	0,54	95,20
4	F24	PD01	DB99	0,43	0,46	0,46	0,49	4	0,46		0,02	5,11	95,62
5	A60	PD01	DB10	0,46	0,48	0,48	0,47	4	0,47		0,01	1,78	98,68
6	A79	PD03	DB10	0,49	0,49	0,46	0,46	4	0,48		0,02	3,95	99,58
7	A36	PD02	DB10	0,48	0,49	0,49	0,49	4	0,49		0,01	1,40	101,09
8	A39	PC02	DB08	0,47	0,48	0,50	0,49	4	0,49		0,01	2,65	101,19
9	A45x	PE99	DB10	0,49	0,51	0,51	0,49	4	0,50		0,01	1,98	103,59
10	F14	PC01	DB10	0,49	0,50	0,50	0,50	4	0,50		0,01	1,01	103,59
11	F32	PC01	DB10	0,50	0,50	0,50	0,50	4	0,50		0,00	0,60	104,21
12	A80	PD01	DB10	0,51	0,50	0,50	0,50	4	0,50		0,00	0,96	104,21
13	F07x	PD99	DB08	0,51	0,52	0,53	0,52	4	0,52		0,01	1,53	107,89
14	A49	PD05	DB09	0,56	0,62	0,58	0,57	0	0,58	*b*	0,03	4,51	121,29
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	n	Mean	s_r	CV_r
all labs	**52**	**0,48**	**0,010**	**1,981**

* = non tolerable mean because more than +/- **25** % from the mean

l	s_R	CV_R
13	**0,023**	**4,839**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Co **Sample: 3** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F12x	PC01	DB10	0,03	0,03	0,03	0,03	4	0,027	*	0,00	3,51	50,50
2	F24	PD01	DB99	0,04	0,01	0,02	0,07	0	0,034	*c* *	0,02	**70,55**	62,55
3	A36	PD02	DB10	0,05	0,05	0,05	0,05	4	0,048		0,00	2,01	88,49
4	F16x	PC01	DB10	0,05	0,05	0,05	0,05	4	0,048		0,00	0,78	89,37
5	A80	PD01	DB10	0,05	0,05	0,05	0,05	4	0,051		0,00	2,70	94,79
6	A79	PD03	DB10	0,05	0,05	0,05	0,05	4	0,051		0,00	4,01	95,21
7	F32	PC01	DB10	0,05	0,05	0,05	0,05	4	0,052		0,00	3,36	95,44
8	A60	PD01	DB10	0,05	0,06	0,05	0,06	4	0,057		0,00	8,69	105,82
9	F07x	PD99	DB08	0,06	0,06	0,06	0,06	4	0,060		0,00	5,19	111,15
10	A39	PC02	DB08	0,06	0,06	0,06	0,06	4	0,061		0,00	5,34	113,56
11	F14	PC01	DB10	0,06	0,06	0,06	0,06	4	0,062		0,00	2,41	115,37
12	A45x	PE99	DB10	0,08	0,06	0,09	0,08	4	0,076	*	0,01	**17,09**	140,29
13													
14													
15	A49	PD05	DB09	<,12	<,12	<,12	<,12			**			
16	F03	PD02	DB08	<,1	<,1	<,1	<,1						
17													
18													
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	n	Mean	s_r	CV_r
all labs	**44**	**0,054**	**0,003**	**5,601**
35	% from the mean			

	l	s_R	CV_R
	11	**0,012**	**22,289**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Co **Sample: 4** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	F12x	PC01	DB10	0,03	0,02	0,03	0,03	0	0,029	*b*	*	0,00	**16,41**	49,41
2	A36	PD02	DB10	0,05	0,05	0,05	0,05	4	0,050			0,00	5,34	85,06
3	A80	PD01	DB10	0,05	0,05	0,05	0,05	4	0,050			0,00	5,08	85,45
4	F16x	PC01	DB10	0,05	0,05	0,06	0,05	4	0,053			0,00	6,67	91,25
5	A79	PD03	DB10	0,06	0,05	0,05	0,05	4	0,055			0,00	5,56	94,39
6	A39	PC02	DB08	0,06	0,06	0,06	0,06	4	0,060			0,00	4,04	103,54
7	F32	PC01	DB10	0,07	0,06	0,06	0,06	4	0,061			0,00	6,28	104,83
8	A45x	PE99	DB10	0,06	0,06	0,06	0,07	4	0,064			0,01	8,61	109,47
9	F07x	PD99	DB08	0,07	0,06	0,07	0,06	4	0,065			0,00	4,68	112,34
10	A60	PD01	DB10	0,06	0,06	0,07	0,07	4	0,066			0,01	9,84	113,68
11	F14	PC01	DB10	0,10	0,10	0,10	0,10	0	0,100	*b*	*	0,00	1,30	170,99
12	F24	PD01	DB99	0,14	0,11	0,12	0,12	0	0,123	*b*	*	0,01	**10,01**	210,94
13														
14														
15	A49	PD05	DB09	0,17	0,14	0,14	<,12				**			
16	F03	PD02	DB08	<,1	<,1	<,1	<,1							
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	n	Mean	s_r	CV_r
all labs	**36**	**0,058**	**0,004**	**6,316**
35	% from the mean			

* = non tolerable mean because more than +/-

Limit for the lower concentration range

l	s_R	CV_R
9	**0,007**	**11,223**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Hg **Sample: 1** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	A36	PD02	DB03	13,03	15,20	13,03	12,81	4	13,52			1,13	8,33	82,02
2	F16x	PC01	DB10	13,92	14,64	13,03	13,58	4	13,79			0,67	4,88	83,69
3	A39	PZ98	DA05	15,31	16,30	15,28	15,71	4	15,65			0,48	3,04	94,96
4	A71	PD02	DB10	17,27	15,42	14,15	16,05	4	15,72			1,30	8,27	95,40
5	F02x	PZ98	DA05	16,10	15,70	15,70	15,90	4	15,85			0,19	1,21	96,17
6	F03	PZ98	DA05	16,34	16,34	15,32	16,34	4	16,09			0,51	3,17	97,60
7	A45x	PZ98	DA05	16,90	16,50	16,40	16,70	4	16,63			0,22	1,33	100,87
8	A93	PZ98	DA05	16,74	16,82	16,58	16,49	4	16,66			0,15	0,90	101,07
9	A60x	PD01	DB10	19,56	17,78	17,77	16,72	4	17,96			1,18	6,56	108,96
10	A79	PD03	DB10	19,00	18,40	17,50	17,60	4	18,13			0,71	3,91	109,97
11	F32	PZ98	DA05	18,20	18,90	19,20	17,90	4	18,55			0,60	3,25	112,55
12	A82	PZ98	DA05	19,54	19,15	19,08	19,20	4	19,24			0,20	1,06	116,75
13	F08x	PB03	DB03	20,31	23,20	21,59	24,69	0	22,45	*c*	*	1,91	8,49	136,20
14	A80	PZ98	DA05	23,10	23,20	22,90	22,40	0	22,90	*b*	*	0,36	1,55	138,95
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17	F18x	PD99	DA05	<20	<20	<20	<20							
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	n	Mean	s_r	CV_r
all labs	**48**	**16,48**	**0,612**	**3,713**
30	% from the mean			

l	s_R	CV_R
12	**1,775**	**10,772**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Hg **Sample: 2** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	A39	PZ98	DA05	19,78	19,95	19,02	17,14	4	18,97		1,29	6,78	82,25
2	A36	PD02	DB03	18,90	21,07	18,47	17,81	4	19,06		1,41	7,40	82,64
3	F16x	PC01	DB10	19,56	19,80	21,17	21,05	4	20,40		0,83	4,08	88,42
4	A93	PZ98	DA05	20,18	21,84	21,22	21,59	4	21,21		0,73	3,45	91,94
5	A45x	PZ98	DA05	21,60	21,40	21,90	21,30	4	21,55		0,26	1,23	93,43
6	F02x	PZ98	DA05	21,10	21,30	21,80	22,00	4	21,55		0,42	1,95	93,43
7	F03	PZ98	DA05	24,44	23,42	24,44	23,42	4	23,93		0,59	2,46	103,75
8	A60x	PD01	DB10	24,92	22,93	23,76	24,35	4	23,99		0,85	3,55	104,01
9	F32	PZ98	DA05	24,04	24,26	24,68	23,72	4	24,18		0,40	1,67	104,81
10	A79	PD03	DB10	25,60	25,70	23,40	23,20	4	24,48		1,36	5,56	106,11
11	F08x	PB03	DB03	27,49	25,68	28,89	23,86	4	26,48		2,19	8,25	114,80
12	A82	PZ98	DA05	26,76	26,39	26,76	26,96	4	26,72		0,24	0,89	115,83
13	A80	PZ98	DA05	27,40	27,60	27,60	26,80	4	27,35		0,38	1,38	118,57
14	A71	PD02	DB10	41,06	41,51	44,49	38,86	0	41,48	*b* *	2,32	5,59	179,83
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17	F18x	PD99	DA05	<20	<20	<20	<20						
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	n	Mean	s_r	CV_r
all labs	**52**	**23,07**	**0,842**	**3,652**
30	% from the mean			

* = non tolerable mean because more than +/-

Limit for the lower concentration range

l	s_R	CV_R
13	**2,830**	**12,271**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Hg **Sample: 3** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	A36	PD02	DB03	8,79	8,79	9,54	8,47	4	8,90	*	0,45	5,10	68,81
2	A39	PZ98	DA05	12,19	11,79	11,57	10,70	4	11,56		0,63	5,45	89,43
3	A45x	PZ98	DA05	11,40	11,80	11,70	11,60	4	11,63		0,17	1,47	89,91
4	F02x	PZ98	DA05	11,90	11,30	12,00	11,60	4	11,70		0,32	2,70	90,49
5	F03	PZ98	DA05	12,09	12,09	12,09	12,09	4	12,09		0,00	0,00	93,51
6	F16x	PC01	DB10	12,79	11,71	12,57	11,71	4	12,20		0,57	4,65	94,32
7	A93	PZ98	DA05	12,19	12,05	12,25	12,67	4	12,29		0,27	2,17	95,05
8	F32	PZ98	DA05	13,80	13,00	13,20	14,00	4	13,50		0,48	3,53	104,41
9	A79	PD03	DB10	14,00	14,70	13,50	12,70	4	13,73		0,84	6,14	106,15
10	A60x	PD01	DB10	14,35	13,33	12,76	14,57	4	13,75		0,85	6,21	106,36
11	A82	PZ98	DA05	14,51	14,61	14,40	14,39	4	14,48		0,10	0,72	111,97
12	A80	PZ98	DA05	15,90	15,70	15,50	15,60	4	15,68		0,17	1,09	121,23
13	F08x	PB03	DB03	16,39	16,92	17,77	15,30	4	16,60		1,03	6,23	128,35
14	A71	PD02	DB10	21,80	18,48	20,40	20,68	0	20,34	*b* *	1,38	6,78	157,31
15													
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17	F18x	PD99	DA05	<20	<20	<20	<20						
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	n	Mean	s_r	CV_r
all labs	**52**	**12,93**	**0,453**	**3,501**
30	% from the mean			

* = non tolerable mean because more than +/-

Limit for the lower concentration range

l	s_R	CV_R
13	**2,000**	**15,468**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Hg **Sample: 4** Unit: ng/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean	Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	A39	PZ98	DA05	21,12	21,31	20,45	22,26	4	21,29	0,75	3,51	71,33
2	A36	PD02	DB03	23,38	26,46	24,15	23,82	4	24,45	1,38	5,62	81,95
3	F16x	PC01	DB10	27,17	27,42	26,29	25,93	4	26,70	0,71	2,65	89,49
4	F08x	PB03	DB03	27,62	28,16	26,54	30,53	4	28,21	1,69	5,97	94,55
5	A45x	PZ98	DA05	27,90	27,60	28,70	28,80	4	28,25	0,59	2,09	94,67
6	F02x	PZ98	DA05	30,70	29,40	27,20	28,40	4	28,93	1,49	5,14	96,94
7	A71	PD02	DB10	30,96	30,59	27,66	28,46	4	29,42	1,61	5,47	98,59
8	F03	PZ98	DA05	29,77	29,77	28,74	30,79	4	29,77	0,84	2,81	99,76
9	A79	PD03	DB10	32,00	31,70	29,00	29,80	4	30,63	1,46	4,76	102,63
10	F32	PZ98	DA05	33,00	33,00	30,80	31,00	4	31,95	1,22	3,80	107,07
11	A60x	PD01	DB10	34,52	30,69	32,18	31,83	4	32,31	1,61	4,98	108,26
12	A93	PZ98	DA05	33,25	31,36	33,26	33,36	4	32,81	0,97	2,95	109,95
13	F18x	PD99	DA05	33,40	32,60	34,80	33,80	4	33,65	0,91	2,72	112,77
14	A80	PZ98	DA05	35,50	35,60	32,70	33,50	4	34,33	1,45	4,23	115,03
15	A82	PZ98	DA05	35,35	35,29	34,14	34,87	4	34,91	0,56	1,60	117,00
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	n	Mean	s_r	CV_r
all labs	**60**	**29,84**	**1,147**	**3,845**

* = non tolerable mean because more than +/- **30** % from the mean

Limit for the lower concentration range

l	s_R	CV_R
15	**3,766**	**12,621**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Ni **Sample: 1** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean			Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	S22x	PD02	DB08	3,70	3,43	3,73	3,96	0	3,71	*b*	*	0,22	5,86	48,04
2	A88	PD01	DB08	6,46	6,48	6,45	7,64	0	6,76	*c*		0,59	8,71	87,62
3	F12x	PC01	DB10	6,95	6,95	7,23	7,04	4	7,04			0,13	1,86	91,28
4	F19	PD02	DB08	7,70	6,90	7,11	7,00	4	7,18			0,36	5,00	93,06
5	F03	PD02	DB08	7,14	7,27	7,22	7,16	4	7,20			0,06	0,83	93,33
6	A39	PC02	DB08	7,18	7,15	7,24	7,25	4	7,20			0,05	0,64	93,39
7	F24x	PD01	DB99	7,28	7,39	7,12	7,25	4	7,26			0,11	1,53	94,13
8	A79	PD03	DB10	7,61	7,61	6,95	6,95	4	7,28			0,38	5,27	94,37
9	F16x	PC01	DB10	7,38	7,30	7,57	7,34	4	7,40			0,12	1,60	95,91
10	A45x	PE99	DB10	7,71	7,40	7,77	7,46	4	7,59			0,18	2,40	98,35
11	A49	PD05	DB09	7,58	7,57	7,61	7,74	4	7,63			0,08	1,03	98,87
12	A60x	PD01	DB10	7,42	7,52	7,49	8,07	4	7,63			0,30	3,94	98,87
13	A65	PD01	DB08	7,40	7,70	7,90	7,60	4	7,65			0,21	2,72	99,19
14	F05	PD02	DB08	7,85	7,77	7,75	7,90	4	7,82			0,07	0,89	101,36
15	F18x	PD99	DB10	7,87	7,77	7,84	7,86	4	7,84			0,05	0,58	101,59
16	A36	PD02	DB10	7,83	7,91	7,80	7,80	4	7,84			0,05	0,68	101,62
17	F02x	PD02	DB08	7,50	8,20	8,10	7,60	4	7,85			0,35	4,47	101,78
18	F14	PC01	DB10	8,03	7,84	7,86	7,95	4	7,92			0,09	1,11	102,69
19	F33	PD01	DB10	7,76	8,16	7,93	8,06	4	7,98			0,17	2,17	103,44
20	F27	PD01	DB05	8,40	8,23	7,69	8,03	4	8,09			0,30	3,76	104,85
21	F32x	PC01	DB10	8,20	8,23	7,95	7,97	4	8,09			0,15	1,83	104,86
22	A71	PB03	DB01	8,19	8,17	8,34	8,44	4	8,28			0,13	1,54	107,40
23	F07x	PD99	DB08	8,39	8,43	8,47	8,38	4	8,42			0,04	0,53	109,15
24	A80	PD01	DB10	8,43	8,58	8,68	8,40	4	8,52			0,13	1,54	110,50
25	A56	PC01	DB08	10,00	10,00	10,00	10,00	0	10,00	*b*	*	0,00	0,00	129,66
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	n	Mean	s_r	CV_r
all labs	**88**	**7,71**	**0,160**	**2,071**
* = non tolerable mean because more than +/- **20** % from the mean				

l	s_R	CV_R
22	**0,421**	**5,461**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Ni **Sample: 2** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	F19	PD02	DB08	1,77	1,74	1,70	1,71	4	1,73		0,03	1,83	89,15
2	F12x	PC01	DB10	1,73	1,73	1,78	1,75	4	1,75		0,02	1,23	90,07
3	F24x	PD01	DB99	1,86	1,77	1,75	1,75	4	1,78		0,06	3,09	91,79
4	A79	PD03	DB10	1,96	1,89	1,65	1,70	4	1,80		0,15	8,24	92,62
5	F05	PD02	DB08	1,86	1,87	1,88	1,81	4	1,86		0,03	1,68	95,60
6	A45x	PE99	DB10	1,88	1,90	1,86	1,91	4	1,89		0,02	1,17	97,27
7	A36	PD02	DB10	1,85	1,88	1,91	1,93	4	1,89		0,03	1,85	97,45
8	A60x	PD01	DB10	1,83	1,99	1,92	1,90	4	1,91		0,06	3,38	98,39
9	F03	PD02	DB08	1,88	1,89	1,98	1,93	4	1,92		0,05	2,46	98,84
10	A71	PB03	DB01	1,94	2,00	1,93	1,85	4	1,93		0,06	3,29	99,34
11	A39	PC02	DB08	1,94	2,00	1,94	1,95	4	1,96		0,03	1,47	100,85
12	A49	PD05	DB09	1,95	1,90	1,98	2,02	4	1,96		0,05	2,58	101,14
13	F33	PD01	DB10	2,00	2,04	1,92	1,89	4	1,96		0,07	3,54	101,14
14	F18x	PD99	DB10	1,98	1,98	2,04	1,91	4	1,98		0,05	2,69	101,91
15	A65	PD01	DB08	1,80	2,00	2,20	2,00	4	2,00		0,16	8,16	103,07
16	F02x	PD02	DB08	2,20	2,10	1,90	1,80	4	2,00		0,18	9,13	103,07
17	F14	PC01	DB10	2,03	2,09	1,99	1,95	4	2,02		0,06	2,96	103,84
18	F32x	PC01	DB10	2,07	2,01	1,99	1,99	4	2,02		0,04	1,88	103,84
19	F27	PD01	DB05	2,21	2,07	1,96	1,86	4	2,02		0,15	7,39	104,27
20	A88	PD01	DB08	*2,25a*	2,05	2,08	2,04	3	2,06		0,02	1,01	105,99
21	F07x	PD99	DB08	2,00	2,05	2,09	2,13	4	2,07		0,06	2,76	106,46
22	F16x	PC01	DB10	2,07	2,05	2,09	2,10	4	2,07		0,02	1,10	106,92
23	A80	PD01	DB10	2,10	2,11	2,17	2,04	4	2,11		0,05	2,53	108,48
24	A56	PC01	DB08	5,00	5,00	5,00	*4a*	0	5,00	*b* *	0,00	0,00	257,67
25													
26													
27	S22x	PD02	DB08	<,4	<,4	<,4	<,4			*			
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		n	Mean	s_r	CV_r
	all labs	**91**	**1,94**	**0,064**	**3,290**
* = non tolerable mean because more than +/-	**20**	% from the mean			
		l		s_R	CV_R
		23		**0,105**	**5,417**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Ni **Sample: 3** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	F12x	PC01	DB10	0,41	0,46	0,45	0,44	4	0,44			0,02	4,66	79,57
2	A79	PD03	DB10	0,53	0,43	0,45	0,45	4	0,46			0,05	9,74	83,70
3	F18x	PD99	DB10	0,47	0,50	0,50	0,53	4	0,50			0,02	4,94	89,77
4	F05	PD02	DB08	0,53	0,54	0,50	0,48	4	0,51			0,03	5,38	92,38
5	F19	PD02	DB08	0,54	0,55	0,48	0,50	4	0,52			0,03	6,18	93,47
6	A36	PD02	DB10	0,50	0,54	0,50	0,54	4	0,52			0,02	4,53	94,41
7	A45x	PE99	DB10	0,53	0,53	0,53	0,53	4	0,53			0,00	0,57	95,41
8	F24x	PD01	DB99	0,53	0,53	0,54	0,53	4	0,53			0,01	1,32	96,31
9	A39	PC02	DB08	0,55	0,56	0,56	0,59	4	0,56			0,01	2,62	101,86
10	F32x	PC01	DB10	0,56	0,60	0,56	0,57	4	0,57			0,02	3,15	102,90
11	F07x	PD99	DB08	0,59	0,59	0,57	0,58	4	0,58			0,01	1,48	105,47
12	A80	PD01	DB10	0,59	0,60	0,58	0,57	4	0,59			0,01	2,25	105,61
13	A71	PB03	DB01	0,57	0,52	0,64	0,61	4	0,59			0,05	8,85	105,79
14	F14	PC01	DB10	0,63	0,57	0,67	0,59	4	0,62			0,04	7,21	111,02
15	F27	PD01	DB05	0,74	0,61	0,53	0,60	4	0,62			0,09	**14,08**	112,06
16	F33	PD01	DB10	0,63	0,62	0,62	0,63	4	0,63			0,01	0,92	112,83
17	A60x	PD01	DB10	0,62	0,66	0,63	0,69	4	0,65			0,03	4,50	117,46
18	F16x	PC01	DB10	0,83	0,82	0,82	0,81	0	0,82	*b*	*	0,01	0,92	147,61
19	A56	PC01	DB08	3,00	3,00	5,00	5,00	0	4,00	*b*	*	1,15	**28,87**	722,10
20														
21														
22	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1				**			
23	F03	PD02	DB08	<1	<1	<1	<1							
24	A88	PD01	DB08	<1	<1	<1	<1							
25	F02x	PD02	DB08	<1	<1	<1	<1							
26	A49	PD05	DB09	<,9	<,9	<,9	<,9							
27	S22x	PD02	DB08	<,4	<,4	<,4	<,4							
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	n	Mean	s_r	CV_r
all labs	**68**	**0,55**	**0,027**	**4,851**
30	% from the mean			

l	s_R	CV_R
17	**0,059**	**10,600**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Element: Ni **Sample: 4** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	Replications 2	Replications 3	Replications 4	n	Lab.mean		Lab.standard dev. s_i	Lab.standard dev. V_i	Recovery %
1	F24x	PD01	DB99	0,86	0,84	0,87	0,86	4	0,86	*	0,01	1,61	75,23
2	F12x	PC01	DB10	0,96	0,94	1,13	1,01	4	1,01		0,08	8,37	88,70
3	F18x	PD99	DB10	0,99	1,02	1,01	1,02	4	1,01		0,01	1,45	88,77
4	A79	PD03	DB10	1,02	1,00	0,95	1,21	4	1,04		0,11	**10,81**	91,84
5	A36	PD02	DB10	1,02	1,07	1,06	1,03	4	1,05		0,02	2,32	92,00
6	A45x	PE99	DB10	1,02	1,12	1,06	1,07	4	1,07		0,04	3,85	93,85
7	F19	PD02	DB08	0,99	1,03	1,00	1,26	4	1,07		0,13	**11,94**	94,07
8	A80	PD01	DB10	1,12	1,08	1,12	1,12	4	1,11		0,02	1,80	97,58
9	A39	PC02	DB08	1,08	1,14	1,15	1,09	4	1,11		0,03	3,01	97,87
10	F07x	PD99	DB08	1,12	1,11	1,12	1,15	4	1,12		0,02	1,36	98,86
11	F32x	PC01	DB10	1,07	1,16	1,13	1,14	4	1,13		0,04	3,44	98,90
12	F27	PD01	DB05	1,11	1,03	1,31	1,07	4	1,13		0,12	**10,83**	99,32
13	A49	PD05	DB09	1,07	1,23	1,08	1,17	4	1,14		0,08	6,71	100,00
14	F02x	PD02	DB08	1,20	1,10	1,20	1,10	4	1,15		0,06	5,02	101,10
15	F03	PD02	DB08	1,15	1,23	1,12	1,14	4	1,16		0,05	4,05	101,98
16	F05	PD02	DB08	1,23	1,14	1,10	1,18	4	1,16		0,06	4,78	102,20
17	F14	PC01	DB10	1,15	1,16	1,18	1,17	4	1,17		0,01	1,11	102,42
18	A88	PD01	DB08	1,17	1,20	1,25	1,32	4	1,24		0,07	5,31	108,57
19	F33	PD01	DB10	1,39	1,25	1,33	1,44	4	1,35		0,08	6,05	118,90
20	A60x	PD01	DB10	1,33	1,36	1,37	1,37	4	1,36		0,02	1,54	119,21
21	F16x	PC01	DB10	1,45	1,47	1,46	1,47	4	1,46	*	0,01	0,59	128,64
22	A71	PB03	DB01	2,10	2,16	2,04	2,15	0	2,11	*b* *	0,05	2,50	185,58
23	A56	PC01	DB08	4,00	4,00	4,00	*5a*	0	4,00	*b* *	0,00	0,00	351,65
24													
25													
26	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1			**			
27	S22x	PD02	DB08	<,4	<,4	<,4	0,72			*			
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	n	Mean	s_r	CV_r
all labs	**84**	**1,14**	**0,051**	**4,502**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
21	**0,133**	**11,662**

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Ag	(ng/g)	1	A80	PD01	DB10	<10	<10	<10	<10			
Ag	(ng/g)	2	A80	PD01	DB10	<10	<10	<10	<10			
Ag	(ng/g)	3	A80	PD01	DB10	<10	<10	<10	<10			
Ag	(ng/g)	4	A80	PD01	DB10	<10	<10	<10	<10			
Al	(µg/g)	1	S22x	PD02	DB08	16,21	16,9	18,74	15,95	16,95	1,259	7,427
			F19	PD02	DB08	51,6	44,4	46,1	46,2	47,08	3,128	6,644
			F27	PD01	DB02	79,16	48,94	46,62	38,89	53,40	17,701	33,146
			F33	PD01	DB10	58,03	52,48	49,55	56,08	54,04	3,772	6,980
			A71	PB03	DB02	57,87	58,28	56,69	57,84	57,67	0,683	1,185
			F18x	PD99	DB08	59	57	58,1	58,6	58,18	0,866	1,488
			F07x	PD99	DB08	58,41	61,48	60,21	56,33	59,11	2,239	3,789
			A36	PD02	DB08	64,55	60,89	59,39	55,81	60,16	3,620	6,018
			A56	PC01	DB08	64	65	59	60	62,00	2,944	4,748
			F05	PD02	DB08	65,1	64,9	62,2	64,4	64,15	1,333	2,078
			A60	PC01	DB10	61,9	65	68,2	65	65,03	2,572	3,956
			A80	PD01	DB10	66,3	68,2	68,3	63,4	66,55	2,293	3,445
			A65	PD01	DB08	68	67	74	61	67,50	5,323	7,886
			A39	PC02	DB08	69,96	70,5	68,71	73,53	70,68	2,046	2,894
			F12	PC01	DB08	67	73	78	73	72,75	4,500	6,186
			F24x	PD01	DB99	80	70	79	66	73,75	6,850	9,288
			A79	PD03	DB10	80,905	81,952	68,407	71,626	75,72	6,732	8,890
			F15x	PC01	DB08	76	77	77	75	76,25	0,957	1,256
			F32x	PC01	DB08	77,2	77,1	77,9	76,9	77,28	0,435	0,563
			F16x	PC01	DB08	78,8	77,39	79,89	79,57	78,91	1,113	1,411
			F03	PD02	DB08	79,223	79,232	85,789	78,362	80,65	3,449	4,277
			A49	PD05	DB08	83	81,61	80,63	82,28	81,88	1,008	1,231
			A45x	PC99	DB08	83,6	83,6	82,2	83,6	83,25	0,700	0,841
			A57	PZ02	DD02	134,8	115,8	114,4	115,8	120,20	9,756	8,116

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	2	S22x	PD02	DB08	30,05	36,13	33,6	33,26	33,26	2,494	7,498
			F19	PD02	DB08	79	78,2	79,5	79,5	79,05	0,614	0,776
			F18x	PD99	DB08	82,1	82,3	81,8	82,8	82,25	0,420	0,511
			F27	PD01	DB02	102,13	72,53	88,15	73,35	84,04	14,034	16,700
			A56	PC01	DB08	90	87	81	84	85,50	3,873	4,530
			A71	PB03	DB02	85,29	86,26	87,73	85,78	86,27	1,054	1,222
			A60	PC01	DB10	83,9	88,3	93	92	89,30	4,129	4,623
			A65	PD01	DB08	84	86	94	94	89,50	5,260	5,877
			A36	PD02	DB08	93,14	94,14	86,25	85,49	89,76	4,515	5,031
			F33	PD01	DB10	94,16	94,37	89,3	88,48	91,58	3,122	3,410
			F16x	PC01	DB08	90,97	96,86	92,28	95,53	93,91	2,746	2,924
			F12	PC01	DB08	95	96	96	96	95,75	0,500	0,522
			A49	PD05	DB08	95,05	97,11	95,99	95,01	95,79	0,990	1,033
			A39	PC02	DB08	93,78	98,56	95,86	99,59	96,95	2,633	2,716
			F15x	PC01	DB08	100	99	98	97	98,50	1,291	1,311
			F24x	PD01	DB99	101	102	99	94	99,00	3,559	3,595
			A79	PD03	DB10	106,78	107,06	91,765	91,309	99,23	8,884	8,953
			A80	PD01	DB10	101	98,3	101	97,3	99,40	1,892	1,904
			F07x	PD99	DB08	100,5	101	102,7	101,4	101,40	0,942	0,929
			F05	PD02	DB08	102	101	102	102	101,75	0,500	0,491
			F32x	PC01	DB08	104,3	104,7	104,7	104,7	104,60	0,200	0,191
			A45x	PC99	DB08	107	108	107	107	107,25	0,500	0,466
			F03	PD02	DB08	111,005	104,711	111,677	103,884	107,82	4,090	3,793
			A57	PZ02	DD02	119,1	125,1	120,3	122,4	121,73	2,631	2,161
Al	(µg/g)	3	S22x	PD02	DB08	9,75	9,17	8,35	8,76	9,01	0,598	6,634
			F19	PD02	DB08	36,6	36,4	35,6	35,5	36,03	0,556	1,543
			A36	PD02	DB08	41,57	43,52	37,53	36,89	39,88	3,192	8,005
			F33	PD01	DB10	41,84	40,86	41,76	40,06	41,13	0,840	2,043
			F24x	PD01	DB99	42	38	45	44	42,25	3,096	7,327

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	3	A71	PB03	DB02	42,93	41,9	41,8	43,46	42,52	0,807	1,898
			A56	PC01	DB08	42	42	45	47	44,00	2,449	5,567
			F18x	PD99	DB08	41,1	41,9	46,6	46,6	44,05	2,963	6,725
			F05	PD02	DB08	45,2	43,1	47,6	46,3	45,55	1,905	4,183
			A80	PD01	DB10	40,9	50	46,6	46,5	46,00	3,769	8,194
			F07x	PD99	DB08	46,7	45,74	47,58	44,5	46,13	1,321	2,864
			F27	PD01	DB02	106,17	24,26	14,37	41,45	46,56	41,283	88,662
			A65	PD01	DB08	46	46	49	47	47,00	1,414	3,009
			F12	PC01	DB08	50	52	52	51	51,25	0,957	1,868
			A79	PD03	DB10	56,8	57,722	50,241	50,285	53,76	4,058	7,548
			F15x	PC01	DB08	54	55	53	55	54,25	0,957	1,765
			A39	PC02	DB08	56,52	55,77	52,31	52,55	54,29	2,169	3,995
			F16x	PC01	DB08	54,77	53,9	56,08	54,95	54,93	0,896	1,632
			A60	PC01	DB10	54,6	55,8	56,9	63,5	57,70	3,979	6,896
			F32x	PC01	DB08	58,9	59,8	57,3	59,1	58,78	1,056	1,797
			F03	PD02	DB08	59,356	60,445	60,963	62,952	60,93	1,506	2,471
			A49	PD05	DB08	60,11	59,41	63,68	64,96	62,04	2,699	4,351
			A45x	PC99	DB08	64,4	63,7	65,8	63,8	64,43	0,967	1,502
			A57	PZ02	DD02	84	80,5	77,5	78,8	80,20	2,815	3,511
Al	(µg/g)	4	S22x	PD02	DB08	<,4	<,4	<,4	<,4			
			F19	PD02	DB08	24,5	27,4	27,2	30	27,28	2,247	8,238
			F24x	PD01	DB99	31	26	32	35	31,00	3,742	12,070
			A71	PB03	DB02	35,32	36,73	36,36	36,17	36,15	0,597	1,652
			A36	PD02	DB08	39,52	38,48	41,61	37,44	39,26	1,781	4,535
			F33	PD01	DB10	37,53	46,18	41,76	37,75	40,81	4,077	9,991
			A80	PD01	DB10	43,1	39	41,3	40,1	40,88	1,756	4,295
			A56	PC01	DB08	41	45	40	42	42,00	2,160	5,143
			A65	PD01	DB08	42	44	44	45	43,75	1,258	2,876
			F07x	PD99	DB08	45,52	41,97	43,63	44,46	43,90	1,498	3,414

23rd Needle/Leaf Interlaboratory Comparison Test 2020/2021

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	4	F18x	PD99	DB08	44,3	41,7	47,6	47,5	45,28	2,834	6,259
			A60	PC01	DB10	43,6	45,4	50,7	45,9	46,40	3,032	6,535
			F12	PC01	DB08	47	47	48	47	47,25	0,500	1,058
			F15x	PC01	DB08	51	50	52	49	50,50	1,291	2,556
			A79	PD03	DB10	55,383	52,704	46,693	50,747	51,38	3,658	7,120
			F05	PD02	DB08	50	49,6	53,2	54,3	51,78	2,330	4,500
			A39	PC02	DB08	54,21	53,94	55,31	51,9	53,84	1,423	2,642
			F16x	PC01	DB08	53,42	53,55	56,48	54,07	54,38	1,428	2,626
			F27	PD01	DB02	143,33	22,62	40,41	32,45	59,70	56,224	94,174
			F32x	PC01	DB08	64,2	59,1	58,4	58,2	59,98	2,843	4,740
			F03	PD02	DB08	57,659	59,182	63,633	62,204	60,67	2,733	4,505
			A49	PD05	DB08	68,38	84,67	69,37	80,06	75,62	8,023	10,609
			A45x	PC99	DB08	80,7	75,7	74,5	79	77,48	2,871	3,706
			A57	PZ02	DD02	132,8	157,3	159,3	136,4	146,45	13,786	9,414
Ba	(µg/g)	1	S22x	PD02	DB08	66,24	63,33	70,99	66,85	66,85	3,157	4,723
			A39	PC02	DB08	78,34	80,38	79,36	80,16	79,56	0,924	1,161
			A49	PD05	DB08	86,82	87,08	87,27	87,21	87,10	0,200	0,229
			A65	PD01	DB08	87,7	86,2	91,3	87,5	88,18	2,187	2,480
			A60	PD01	DB10	87,78	89,19	88,71	93,92	89,90	2,743	3,051
			A82	PD01	DB08	89,7	90,4	90	90	90,03	0,287	0,319
			A61x	PD01	DB08	90,83	89,89	89,86	90,5	90,27	0,476	0,527
			A71	PD02	DB10	93,86	91,88	94,23	91,31	92,82	1,441	1,553
			F16x	PC01	DB10	97,14	94,79	95,36	95,14	95,61	1,048	1,096
			A80	PD01	DB10	100	102	102	102	101,50	1,000	0,985
Ba	(µg/g)	2	S22x	PD02	DB08	4,13	4,48	4,43	4,35	4,35	0,155	3,555
			A61x	PD01	DB08	5,91	5,84	5,93	5,72	5,85	0,095	1,622
			A65	PD01	DB08	7	7,1	7,2	7,3	7,15	0,129	1,806
			A49	PD05	DB08	7,32	7,17	7,15	7,22	7,22	0,076	1,053
			A60	PD01	DB10	7,302	7,213	7,511	7,112	7,28	0,170	2,331

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Ba	(µg/g)	2	F16x	PC01	DB10	7,218	7,528	7,568	7,091	7,35	0,234	3,178
			A82	PD01	DB08	7,37	7,48	7,47	7,5	7,46	0,058	0,778
			A71	PD02	DB10	7,682	7,409	7,669	7,408	7,54	0,154	2,045
			A39	PC02	DB08	7,656	7,367	7,714	7,556	7,57	0,152	2,010
			A80	PD01	DB10	8,05	7,91	7,88	7,9	7,94	0,078	0,979
Ba	(µg/g)	3	S22x	PD02	DB08	25,93	24,42	29,28	29,88	27,38	2,628	9,600
			A49	PD05	DB08	36,56	36,78	36,29	36,32	36,49	0,229	0,629
			A61x	PD01	DB08	37,43	37,06	36,9	36,81	37,05	0,274	0,739
			A65	PD01	DB08	38	37,9	38,1	37,6	37,90	0,216	0,570
			F16x	PC01	DB10	37,06	37,18	38,95	38,98	38,04	1,066	2,803
			A60	PD01	DB10	37,16	37,38	37,27	41,14	38,24	1,937	5,066
			A82	PD01	DB08	38,5	38,4	38,9	38,9	38,68	0,263	0,680
			A39	PC02	DB08	39,71	39,21	39,5	40,14	39,64	0,391	0,987
			A71	PD02	DB10	39,96	40,84	39,03	39,13	39,74	0,844	2,123
			A80	PD01	DB10	41,9	43,2	43,1	42,6	42,70	0,594	1,392
Ba	(µg/g)	4	S22x	PD02	DB08	7,67	7,9	8,97	8,18	8,18	0,566	6,925
			A61x	PD01	DB08	9,86	10,13	10,19	9,79	9,99	0,197	1,972
			A60	PD01	DB10	11,23	11,36	11,31	11,27	11,29	0,056	0,492
			A65	PD01	DB08	11,4	10,8	11,3	11,7	11,30	0,374	3,311
			A49	PD05	DB08	12,05	11,26	11,52	11,19	11,51	0,390	3,391
			F16x	PC01	DB10	11,95	11,95	11,93	11,71	11,89	0,117	0,985
			A82	PD01	DB08	11,2	12,1	12,8	12,1	12,05	0,656	5,442
			A39	PC02	DB08	12,2	12,08	11,9	12,11	12,07	0,126	1,042
			A80	PD01	DB10	12,6	13,4	13	13,1	13,03	0,330	2,537
			A71	PD02	DB10	13,75	13,89	13,84	14,23	13,93	0,210	1,507
Be	(ng/g)	1	A80	PD01	DB10	<25	<25	<25	<25			
			F16x	PC01	DB10	12,74	12,5	12,75	12,59	12,65	0,121	0,959
			F32	PC01	DB10	13,9	15	14,4	14,1	14,35	0,480	3,342

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Be	(ng/g)	2	A80	PD01	DB10	<25	<25	<25	<25			
			F16x	PC01	DB10	6,136	6,015	5,871	5,966	6,00	0,110	1,839
			F32	PC01	DB10	6,49	6,6	6,91	6,81	6,70	0,192	2,860
Be	(ng/g)	3	A80	PD01	DB10	<25	<25	<25	<25			
			F16x	PC01	DB10	1,61	1,82	1,751	1,781	1,74	0,091	5,255
			F32	PC01	DB10	2,73	2,1	2,42	2,42	2,42	0,257	10,640
Be	(ng/g)	4	A80	PD01	DB10	<25	<25	<25	<25			
			F16x	PC01	DB10	2,001	1,979	1,966	1,977	1,98	0,015	0,740
			F32	PC01	DB10	3,21	3,21	2,89	3,21	3,13	0,160	5,112
Bi	(ng/g)	1	A80	PD01	DB10	6,4	6,68	7,37	7,35	6,95	0,487	7,009
			F16x	PC01	DB10	7,78	7,464	8,159	7,639	7,76	0,295	3,807
Bi	(ng/g)	2	F16x	PC01	DB10	5,897	6,046	6,016	6,017	5,99	0,066	1,104
			A80	PD01	DB10	6,39	6,8	6,2	6,44	6,46	0,251	3,882
Bi	(ng/g)	3	F16x	PC01	DB10	10,74	12,01	10,78	10,92	11,11	0,603	5,429
			A80	PD01	DB10	14,5	11,6	11,5	12,9	12,63	1,403	11,115
Bi	(ng/g)	4	F16x	PC01	DB10	4,867	5,403	5,041	5,218	5,13	0,230	4,491
			A80	PD01	DB10	5,61	5,27	6,59	4,53	5,50	0,855	15,549
Ce	(ng/g)	1	A80	PD01	DB10	333	344	333	340	337,50	5,447	1,614
Ce	(ng/g)	2	A80	PD01	DB10	45,4	44,2	45,2	44,4	44,80	0,589	1,314
Ce	(ng/g)	3	A80	PD01	DB10	58,5	62,4	63,4	52,7	59,25	4,851	8,188
Ce	(ng/g)	4	A80	PD01	DB10	105	98,7	89,6	93,4	96,68	6,688	6,918
Cl	(µg/g)	1	F02	PA06	DF08	<100	<100	<100	<100			
			F09	PZ02	DD02	<90	<90	<90	<90			
			F05	PZ99	DF08	54,3	54,6	55,6	63,4	56,98	4,319	7,581
			A57	PZ02	DD02	120	130	130	110	122,50	9,574	7,816
Cl	(µg/g)	2	F05	PZ99	DF08	529	537	508	508	520,50	14,799	2,843
			F02	PA06	DF08	600	600	600	580	595,00	10,000	1,681
			F09	PZ02	DD02	664	664	664	664	664,00	0,000	0,000
			A57	PZ02	DD02	700	670	680	680	682,50	12,583	1,844

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Cl	(µg/g)	3	F05	PZ99	DF08	572	639	652	642	626,25	36,591	5,843
			F02	PA06	DF08	730	730	720	710	722,50	9,574	1,325
			F09	PZ02	DD02	794	794	794	783	791,25	5,500	0,695
			A57	PZ02	DD02	800	810	800	790	800,00	8,165	1,021
Cl	(µg/g)	4	F05	PZ99	DF08	2720	2865	2722	2807	2778,50	70,496	2,537
			A57	PZ02	DD02	2770	2780	2820	2770	2785,00	23,805	0,855
			F02	PA06	DF08	2990	2990	3020	3070	3017,50	37,749	1,251
			F09	PZ02	DD02	3141	3173	3270	3151	3183,75	59,033	1,854
Cs	(ng/g)	1	A80	PD01	DB10	6,77	7,07	7,22	6,74	6,95	0,234	3,362
Cs	(ng/g)	2	A80	PD01	DB10	113	110	110	111	111,00	1,414	1,274
Cs	(ng/g)	3	A80	PD01	DB10	12,4	13,1	12,9	12,7	12,78	0,299	2,337
Cs	(ng/g)	4	A80	PD01	DB10	8,11	8,09	8,16	8,16	8,13	0,036	0,438
Dy	(ng/g)	1	A71	PD02	DB10	48,03	47,87	52,13	47,59	48,91	2,158	4,412
Dy	(ng/g)	2	A71	PD02	DB10	4,201	4,229	5,115	4,796	4,59	0,447	9,750
Dy	(ng/g)	3	A71	PD02	DB10	4,531	4,494	5,176	4,97	4,79	0,335	6,983
Dy	(ng/g)	4	A71	PD02	DB10	9,559	8,916	9,037	9,125	9,16	0,280	3,056
Er	(ng/g)	1	A71	PD02	DB10	18,14	18,07	18,74	18,01	18,24	0,338	1,851
Er	(ng/g)	2	A71	PD02	DB10	1,447	1,468	1,63	1,546	1,52	0,083	5,465
Er	(ng/g)	3	A71	PD02	DB10	1,793	1,785	1,865	1,905	1,84	0,058	3,150
Er	(ng/g)	4	A71	PD02	DB10	5,409	5,121	4,704	5,338	5,14	0,317	6,169
Eu	(ng/g)	1	A71	PD02	DB10	31,23	28,89	31,93	30,63	30,67	1,300	4,239
Eu	(ng/g)	2	A71	PD02	DB10	7,482	7,066	7,085	6,796	7,11	0,283	3,976
Eu	(ng/g)	3	A71	PD02	DB10	8,057	6,557	7,382	7,699	7,42	0,640	8,624
Eu	(ng/g)	4	A71	PD02	DB10	4,949	4,18	4,206	4,768	4,53	0,391	8,649
F	(µg/g)	1	F32x	PE99	DF08	<5	<5	<5	<5			
			F02	PE01	DF03	3,3	1,9	2,1	1,7	2,25	0,719	31,946
F	(µg/g)	2	F32x	PE99	DF08	<5	<5	<5	<5			
			F02	PE01	DF03	2,2	1,5	1,3	1,6	1,65	0,387	23,473

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
F	(µg/g)	3	F32x	PE99	DF08	1,29	1,28	1,18	1,25	1,25	0,050	3,973
			F02	PE01	DF03	1,4	1,6	2	2,1	1,78	0,330	18,614
F	(µg/g)	4	F02	PE01	DF03	1,1	1,2	1,9	1,7	1,48	0,386	26,184
			F32x	PE99	DF08	1,61	1,97	1,95	1,81	1,84	0,166	9,048
Gd	(ng/g)	1	A71	PD02	DB10	79,88	78,48	80,62	79,09	79,52	0,932	1,172
Gd	(ng/g)	2	A71	PD02	DB10	9,57	9,74	10,23	10,72	10,07	0,519	5,153
Gd	(ng/g)	3	A71	PD02	DB10	11,99	10,56	10,19	11,46	11,05	0,823	7,447
Gd	(ng/g)	4	A71	PD02	DB10	17,65	16,87	15,27	15,67	16,37	1,094	6,683
Ho	(ng/g)	1	A71	PD02	DB10	7,863	7,882	7,794	7,895	7,86	0,045	0,572
Ho	(ng/g)	2	A71	PD02	DB10	0,722	0,696	0,682	0,706	0,70	0,017	2,401
Ho	(ng/g)	3	A71	PD02	DB10	0,707	0,745	0,754	0,772	0,74	0,027	3,681
Ho	(ng/g)	4	A71	PD02	DB10	1,8	1,81	1,84	1,83	1,82	0,018	1,003
La	(ng/g)	1	A80	PD01	DB10	238	244	238	240	240,00	2,828	1,179
La	(ng/g)	2	A80	PD01	DB10	23,4	22,9	23,1	22,8	23,05	0,265	1,148
La	(ng/g)	3	A80	PD01	DB10	30,8	31,6	32,8	27,3	30,63	2,364	7,720
La	(ng/g)	4	A80	PD01	DB10	78,2	73,6	69,8	69,7	72,83	4,017	5,516
Lu	(ng/g)	1	A71	PD02	DB10	1,508	1,465	1,326	1,453	1,44	0,078	5,446
Lu	(ng/g)	2	A71	PD02	DB10	0,0715	0,072	0,0719	0,0837	0,07	0,006	7,962
Lu	(ng/g)	3	A71	PD02	DB10	0,0887	0,0967	0,0845	0,0945	0,09	0,006	6,087
Lu	(ng/g)	4	A71	PD02	DB10	0,546	0,495	0,507	0,503	0,51	0,023	4,431
Mo	(ng/g)	1	A49	PD05	DB09	<120	<120	<120	<120			
			A45x	PE99	DB10	0,132	0,156	0,125	0,126	0,13	0,015	10,761
			A60	PD01	DB10	134,4	136,2	128	129,9	132,13	3,819	2,890
			A36	PD02	DB10	130,6	137,4	133,7	130,7	133,10	3,207	2,410
			F16x	PC01	DB10	140,7	134,8	139,3	137	137,95	2,596	1,881
			F32	PC01	DB10	144	138	145	138	141,25	3,775	2,673
			A80	PD01	DB10	146	156	147	148	149,25	4,573	3,064
			F07x	PD99	DB08	183,8	160,2	167,6	180,9	173,13	11,135	6,432

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Mo	(ng/g)	2	A49	PD05	DB09	<120	<120	<120	<120			
			A45x	PE99	DB10	0,136	0,137	0,122	0,116	0,13	0,010	8,144
			A60	PD01	DB10	126,9	132,6	128,5	133,3	130,33	3,114	2,389
			F32	PC01	DB10	136	129	131	131	131,75	2,986	2,266
			A36	PD02	DB10	133,5	133,1	133,1	136,5	134,05	1,644	1,227
			F16x	PC01	DB10	138	139,1	136,6	139	138,18	1,162	0,841
			A80	PD01	DB10	152	156	175	148	157,75	11,955	7,578
			F07x	PD99	DB08	158	170,8	169	162,6	165,10	5,898	3,572
Mo	(ng/g)	3	A45x	PE99	DB10	0,132	0,156	0,156	0,133	0,14	0,014	9,410
			A36	PD02	DB10	124	119,6	120,3	126,6	122,63	3,279	2,674
			F32	PC01	DB10	130	125	124	124	125,75	2,872	2,284
			A60	PD01	DB10	118,4	134,7	128,5	142	130,90	9,994	7,635
			A80	PD01	DB10	132	132	134	129	131,75	2,062	1,565
			F16x	PC01	DB10	137,9	133	130	129,8	132,68	3,778	2,848
			A49	PD05	DB09	125	144	144	129	135,50	9,950	7,343
			F07x	PD99	DB08	146,4	143,5	135,3	136,8	140,50	5,308	3,778
Mo	(ng/g)	4	A45x	PE99	DB10	0,339	0,343	0,333	0,352	0,34	0,008	2,333
			A49	PD05	DB09	264	283	262	260	267,25	10,626	3,976
			A36	PD02	DB10	344,5	332	314,9	324,7	329,03	12,471	3,790
			A80	PD01	DB10	344	328	338	333	335,75	6,850	2,040
			F32	PC01	DB10	350	345	343	351	347,25	3,862	1,112
			F07x	PD99	DB08	389,1	384,7	398,2	382,4	388,60	6,978	1,796
			A60	PD01	DB10	359,6	441,5	451,6	352,2	401,23	52,586	13,106
			F16x	PC01	DB10	412,8	420,7	421,7	416,4	417,90	4,104	0,982
Na	(µg/g)	1	F15x	PB03	DB08	<40	<40	<40	<40			
			F03	PD02	DB08	<25	<25	<25	<25			
			F18x	PD99	DB08	<10	<10	10,4	<10			
			A65	PD01	DB08	13,2	<11,1	15	<11,1	14,10	1,273	9,027
			F12	PC01	DB08	8	9	10	9	9,00	0,816	9,072

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Na	(µg/g)	1	A71	PB03	DB06	10,07	10,9	9,23	10,73	10,23	0,758	7,409
			F16x	PC01	DB10	10,52	10,3	10,65	10,39	10,47	0,153	1,461
			F32x	PC01	DB08	11,5	11,5	11,7	11,5	11,55	0,100	0,866
			A49	PD05	DB08	13,08	13,11	12,34	13,33	12,97	0,431	3,327
			F33x	PD01	DB10	12,93	13,31	12,89	13,61	13,19	0,341	2,584
			A60	PD01	DB10	9,91	10,6	23,1	10,8	13,60	6,343	46,632
			F27	PD01	DB06	13,47	12,75	16,97	25,67	17,22	5,930	34,449
			A88	PD01	DB08	19	16,6	17,1	18	17,68	1,056	5,976
			A36	PD02	DB08	19,44	20,06	21,06	20,85	20,35	0,745	3,662
			F07x	PD99	DB08	18,68	24,06	24,14	22,03	22,23	2,559	11,511
			F05	PD02	DB08	28	26,2	27	25,6	26,70	1,039	3,892
Na	(µg/g)	2	F15x	PB03	DB08	<40	<40	<40	<40			
			F03	PD02	DB08	<25	<25	<25	<25			
			F12	PC01	DB08	16	15	16	16	15,75	0,500	3,175
			F18x	PD99	DB08	16,2	16,1	16,1	15,9	16,08	0,126	0,783
			A65	PD01	DB08	15	16,2	18,5	15,3	16,25	1,584	9,750
			A71	PB03	DB06	17,57	15,85	15,85	15,85	16,28	0,860	5,283
			F16x	PC01	DB10	16,2	16,32	16,6	16,46	16,40	0,173	1,056
			A49	PD05	DB08	16,75	16,91	16,53	15,99	16,55	0,401	2,426
			A60	PD01	DB10	14,6	16,3	17,8	17,9	16,65	1,550	9,311
			A36	PD02	DB08	17,79	18,03	16,62	17,49	17,48	0,616	3,523
			F32x	PC01	DB08	21,28	21,06	21,6	20,74	21,17	0,362	1,712
			F33x	PD01	DB10	20,7	22,27	21,58	25,4	22,49	2,045	9,095
			A88	PD01	DB08	23,5	22,2	22,1	23,1	22,73	0,685	3,014
			F05	PD02	DB08	23,9	26,8	23,2	26,2	25,03	1,744	6,970
			F27	PD01	DB06	16,82	17,66	20,52	48,09	25,77	14,962	58,056
			F07x	PD99	DB08	25,02	28,04	28,09	26,64	26,95	1,450	5,381

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Na	(µg/g)	3	F15x	PB03	DB08	<40	<40	<40	<40			
			F03	PD02	DB08	<25	<25	<25	<25			
			A65	PD01	DB08	<11,1	<11,1	<11,1	<11,1			
			F18x	PD99	DB08	<10	<10	<10	<10			
			F12	PC01	DB08	<5	<5	<5	<5			
			A71	PB03	DB06	5,56	4,83	5,01	5,79	5,30	0,452	8,531
			F16x	PC01	DB10	5,675	5,484	5,904	5,543	5,65	0,186	3,297
			F32x	PC01	DB08	7,02	7,57	7,94	7,53	7,52	0,378	5,031
			A36	PD02	DB08	7,7	8,03	8,57	8,82	8,28	0,508	6,137
			A49	PD05	DB08	8,05	8,3	9,42	10,4	9,04	1,083	11,982
			F33x	PD01	DB10	8,34	9,98	8,81	9,91	9,26	0,814	8,795
			A60	PD01	DB10	12	6,55	9,21	10	9,44	2,256	23,901
			F27	PD01	DB06	5,23	9,48	5,32	23,92	10,99	8,847	80,516
			F05	PD02	DB08	12,1	12,4	12,4	12,6	12,38	0,206	1,666
			A88	PD01	DB08	18,8	12,9	12,2	10,5	13,60	3,610	26,545
			F07x	PD99	DB08	15,93	16,25	15,62	14,74	15,64	0,650	4,156
Na	(µg/g)	4	F15x	PB03	DB08	<40	<40	<40	<40			
			F05	PD02	DB08	38,6	38	36,5	37	37,53	0,950	2,532
			F18x	PD99	DB08	42,3	43	42,9	42	42,55	0,480	1,127
			A60	PD01	DB10	40,4	40,1	42,4	47,5	42,60	3,422	8,034
			A71	PB03	DB06	44,59	42,77	42,77	40,94	42,77	1,490	3,484
			F12	PC01	DB08	43	43	43	43	43,00	0,000	0,000
			A65	PD01	DB08	43,5	43,1	43,7	49,9	45,05	3,243	7,199
			F16x	PC01	DB10	45,42	45,48	45,95	45,54	45,60	0,240	0,526
			A36	PD02	DB08	48,23	50,25	47,32	48,63	48,61	1,225	2,519
			F33x	PD01	DB10	48,72	49,56	50,68	47,75	49,18	1,245	2,532
			A49	PD05	DB08	49,12	52,68	46,27	51,08	49,79	2,760	5,544
			A88	PD01	DB08	50,4	48	51,3	52,1	50,45	1,775	3,518
			F03	PD02	DB08	49,62	55,61	47,53	56,57	52,33	4,439	8,483

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Na	(µg/g)	4	F32x	PC01	DB08	56,8	56,8	56,6	56,8	56,75	0,100	0,176
			F07x	PD99	DB08	62,09	62,97	64,02	62,83	62,98	0,795	1,262
			F27	PD01	DB06	67,21	50,99	49,8	92,43	65,11	19,871	30,520
Nb	(ng/g)	1	A80	PD01	DB10	7,75	8,11	8,44	7,36	7,92	0,465	5,876
Nb	(ng/g)	2	A80	PD01	DB10	5,64	4,74	5,16	5,17	5,18	0,368	7,102
Nb	(ng/g)	3	A80	PD01	DB10	7,47	9,01	8,26	8,32	8,27	0,630	7,621
Nb	(ng/g)	4	A80	PD01	DB10	7,19	6,7	7,21	6,78	6,97	0,268	3,841
Rb	(µg/g)	1	A71	PD02	DB10	1,126	1,064	1,053	1,061	1,08	0,034	3,128
			F16x	PC01	DB10	1,164	1,2	1,055	1,064	1,12	0,072	6,454
			A80	PD01	DB10	1,26	1,28	1,29	1,25	1,27	0,018	1,438
Rb	(µg/g)	2	F16x	PC01	DB10	25,98	26,87	27,2	25,99	26,51	0,621	2,343
			A71	PD02	DB10	28,15	27,48	27,67	27,63	27,73	0,290	1,046
			A80	PD01	DB10	31,4	30,6	30,2	30,4	30,65	0,526	1,716
Rb	(µg/g)	3	F16x	PC01	DB10	1,737	1,661	1,773	1,751	1,73	0,049	2,811
			A71	PD02	DB10	1,911	1,958	1,93	1,947	1,94	0,021	1,060
			A80	PD01	DB10	1,97	2,02	2,03	1,99	2,00	0,028	1,375
Rb	(µg/g)	4	F16x	PC01	DB10	6,466	6,627	6,064	6,768	6,48	0,304	4,695
			A71	PD02	DB10	7,502	7,447	7,476	7,465	7,47	0,023	0,308
			A80	PD01	DB10	7,72	7,95	7,94	7,89	7,88	0,107	1,354
Sb	(ng/g)	1	A80	PD01	DB10	<50	<50	<50	<50			
			A79	PD03	DB10	<25	<25	<25	<25			
			F16x	PC01	DB10	12,51	11,76	12,58	11,87	12,18	0,425	3,488
			F32	PC01	DB10	13,8	17	13,8	12,7	14,33	1,857	12,965
			A71	PD02	DB10	29,2	27	28	27,7	27,98	0,918	3,281
Sb	(ng/g)	2	A80	PD01	DB10	<50	<50	<50	<50			
			A79	PD03	DB10	28	28,7	24,6	24,9	26,55	2,102	7,916
			F16x	PC01	DB10	29,12	28,98	28,91	28,17	28,80	0,426	1,478
			F32	PC01	DB10	35,1	36,2	35,1	34	35,10	0,898	2,559
			A71	PD02	DB10	37,6	39,8	39,2	37,3	38,48	1,215	3,157

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Sb	(ng/g)	3	A79	PD03	DB10	49,3	48,9	43,5	43,4	46,28	3,266	7,059
			F16x	PC01	DB10	48,56	49,01	50,22	49,19	49,25	0,702	1,425
			F32	PC01	DB10	51,5	53,6	54,7	52,6	53,10	1,369	2,578
			A71	PD02	DB10	56,9	56,3	54,6	54,8	55,65	1,127	2,025
			A80	PD01	DB10	56,5	56,9	57,6	58,1	57,28	0,714	1,246
Sb	(ng/g)	4	A80	PD01	DB10	<50	<50	<50	<50			
			F16x	PC01	DB10	24,84	24,52	25,14	25,96	25,12	0,618	2,459
			A79	PD03	DB10	26,6	27,4	25,6	30,1	27,43	1,929	7,035
			F32	PC01	DB10	33,2	33,2	34,2	33,2	33,45	0,500	1,495
			A71	PD02	DB10	35,2	35,7	34,4	34,4	34,93	0,640	1,832
Se	(ng/g)	1	S22x	PD02	DB08	<400	<400	<400	<400			
			A80	PD01	DB10	<100	<100	<100	<100			
			A39	PC02	DB08	<50	<50	<50	<50			
			A82	PD01	DZ99	12,6	11,9	13,3	13,3	12,78	0,670	5,246
			A36	PD02	DB10	19,22	19,22	18,57	19	19,00	0,306	1,613
			A60	PD01	DB10	30,5	33	24,6	26,6	28,68	3,784	13,195
			F32	PC01	DB10	32,9	29,7	31,8	32,9	31,83	1,509	4,740
			F16x	PC01	DB10	63,69	63,81	68,76	69,75	66,50	3,204	4,818
Se	(ng/g)	2	S22x	PD02	DB08	<400	<400	<400	<400			
			A80	PD01	DB10	<100	<100	<100	<100			
			A39	PC02	DB08	<50	<50	<50	<50			
			A82	PD01	DZ99	8,89	7,66	8,68	7,53	8,19	0,694	8,479
			A36	PD02	DB10	10,21	10,1	10,65	10,1	10,27	0,262	2,551
			F32	PC01	DB10	16	10,6	11,7	16	13,58	2,836	20,891
			A60	PD01	DB10	13	15,6	5,91	20,7	13,80	6,157	44,611
			F16x	PC01	DB10	52,14	40,28	50,05	46,19	47,17	5,210	11,046
Se	(ng/g)	3	S22x	PD02	DB08	<400	<400	<400	<400			
			A80	PD01	DB10	<100	<100	<100	<100			
			A39	PC02	DB08	<50	<50	<50	<50			

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Se	(ng/g)	3	A82	PD01	DZ99	8,79	8,43	8,59	8,98	8,70	0,239	2,749
			A60	PD01	DB10	5,4	5,08	23,7	3,02	9,30	9,658	103,847
			A36	PD02	DB10	11,15	10,72	11,58	11,69	11,29	0,443	3,925
			F32	PC01	DB10	12,6	13,7	12,6	14,7	13,40	1,010	7,537
			F16x	PC01	DB10	35,79	41,55	35,23	41,28	38,46	3,419	8,888
Se	(ng/g)	4	S22x	PD02	DB08	<400	<400	<400	<400			
			A39	PC02	DB08	94,8	89,4	76,2	76,8	84,30	9,276	11,003
			A82	PD01	DZ99	107	104	100	99	102,50	3,697	3,607
			F32	PC01	DB10	115,5	121,9	125,1	113,4	118,98	5,454	4,584
			A60	PD01	DB10	132,4	130,2	117	136,7	129,08	8,491	6,578
			A36	PD02	DB10	142,06	136,79	138,76	134,92	138,13	3,052	2,209
			A80	PD01	DB10	163	155	157	153	157,00	4,320	2,752
			F16x	PC01	DB10	209,5	238,5	229,5	209,2	221,68	14,699	6,631
Si	(µg/g)	1	F09	PZ02	DD02	1016	1006	1004	998	1006,00	7,483	0,744
Si	(µg/g)	2	F09	PZ02	DD02	1702	1723	1766	1745	1734,00	27,628	1,593
Si	(µg/g)	3	F09	PZ02	DD02	1101	1048	1069	1037	1063,75	28,159	2,647
Si	(µg/g)	4	F09	PZ02	DD02	2256	2299	2428	2461	2361,00	98,924	4,190
Sn	(ng/g)	1	F16x	PC01	DB10	43,75	44,35	48,58	48,33	46,25	2,557	5,528
			A80	PD01	DB10	49,5	54,1	67,7	49,7	55,25	8,567	15,506
Sn	(ng/g)	2	F16x	PC01	DB10	69,78	71,45	68,5	70,82	70,14	1,291	1,840
			A80	PD01	DB10	79	84,8	76,5	76,9	79,30	3,827	4,826
Sn	(ng/g)	3	F16x	PC01	DB10	121,1	121,9	120,9	121,1	121,25	0,443	0,366
			A80	PD01	DB10	123	127	132	125	126,75	3,862	3,047
Sn	(ng/g)	4	F16x	PC01	DB10	51,96	54,85	52,99	53,99	53,45	1,249	2,338
			A80	PD01	DB10	70,4	65,2	62,8	73,8	68,05	4,976	7,312
Sr	(µg/g)	1	S22x	PD02	DB08	7,07	6,5	7,71	7,09	7,09	0,494	6,969
			A39	PC02	DB08	10,19	10,41	10,29	10,34	10,31	0,093	0,898
			A65	PD01	DB08	10,4	10,4	10,9	10,4	10,53	0,250	2,375
			F16x	PC01	DB10	11,09	10,06	11,17	10,24	10,64	0,571	5,371

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Sr	(µg/g)	1	A71	PB03	DB02	10,78	10,69	11,12	11,16	10,94	0,237	2,169
			A80	PD01	DB10	11,2	11,4	11,5	11,3	11,35	0,129	1,137
			A60	PD01	DB10	11,46	11,61	11,62	12,05	11,69	0,254	2,175
Sr	(µg/g)	2	S22x	PD02	DB08	1,85	1,8	2,01	1,6	1,82	0,169	9,312
			A65	PD01	DB08	3,3	3,3	3,5	3,5	3,40	0,115	3,396
			A39	PC02	DB08	3,472	3,506	3,503	3,478	3,49	0,017	0,494
			A80	PD01	DB10	3,64	3,54	3,51	3,55	3,56	0,056	1,572
			F16x	PC01	DB10	4,025	3,56	4,064	3,687	3,83	0,249	6,496
			A60	PD01	DB10	3,732	3,922	3,922	3,836	3,85	0,090	2,343
			A71	PB03	DB02	4,091	4,112	4,005	3,845	4,01	0,121	3,024
Sr	(µg/g)	3	S22x	PD02	DB08	16,31	20,05	18,77	19,38	18,63	1,631	8,756
			A71	PB03	DB02	24	24,1	23,07	24,36	23,88	0,563	2,355
			A39	PC02	DB08	23,83	24,03	24,19	24,26	24,08	0,191	0,793
			A65	PD01	DB08	24,3	24,3	24,4	24,2	24,30	0,082	0,336
			A80	PD01	DB10	24,1	24,6	24,8	24,4	24,48	0,299	1,220
			A60	PD01	DB10	24,278	24,833	24,628	27,101	25,21	1,281	5,083
			F16x	PC01	DB10	24,22	24,24	27,54	28,29	26,07	2,149	8,244
Sr	(µg/g)	4	S22x	PD02	DB08	23,16	26,09	29,15	26,13	26,13	2,446	9,358
			A65	PD01	DB08	32,6	31,8	33,1	33,3	32,70	0,668	2,044
			F16x	PC01	DB10	34,52	30,32	35,71	31,28	32,96	2,568	7,793
			A39	PC02	DB08	34,01	33,83	33,66	32,16	33,42	0,849	2,540
			A60	PD01	DB10	35,53	34,513	35,127	35,103	35,07	0,419	1,194
			A80	PD01	DB10	34,4	35,4	35,2	35,6	35,15	0,526	1,496
			A71	PB03	DB02	38,05	37,96	37,08	37,45	37,64	0,455	1,208
Tb	(ng/g)	1	A71	PD02	DB10	10,73	10,56	11,49	10,96	10,94	0,405	3,701
Tb	(ng/g)	2	A71	PD02	DB10	1,078	1,173	1,264	1,346	1,22	0,116	9,513
Tb	(ng/g)	3	A71	PD02	DB10	1,481	1,357	1,279	1,441	1,39	0,090	6,476
Tb	(ng/g)	4	A71	PD02	DB10	2,275	1,869	1,863	2,106	2,03	0,200	9,844

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Ti	(µg/g)	1	A80	PD01	DB10	2,16	2,2	2,24	1,97	2,14	0,120	5,580
			A39	PC02	DB08	2,963	3,125	3,002	2,879	2,99	0,102	3,419
			A65	PD01	DB08	3,3	3,3	3,3	2,7	3,15	0,300	9,524
Ti	(µg/g)	2	A80	PD01	DB10	0,982	1,01	1,11	1,27	1,09	0,130	11,909
			A39	PC02	DB08	1,47	1,444	1,368	1,462	1,44	0,047	3,246
			A65	PD01	DB08	1,5	2,8	1,7	2	2,00	0,572	28,577
Ti	(µg/g)	3	A80	PD01	DB10	1,31	1,83	1,65	1,62	1,60	0,216	13,474
			A65	PD01	DB08	2,5	2,2	2,3	2,3	2,33	0,126	5,412
			A39	PC02	DB08	2,475	2,258	2,325	2,345	2,35	0,091	3,863
Ti	(µg/g)	4	A80	PD01	DB10	1,83	1,9	1,78	1,82	1,83	0,050	2,724
			A65	PD01	DB08	2,8	2,5	2,5	2,5	2,58	0,150	5,825
			A39	PC02	DB08	3,084	2,864	2,948	2,977	2,97	0,091	3,060
Tl	(ng/g)	1	A79	PD03	DB10	<25	<25	<25	<25			
			A80	PD01	DB10	<5	<5	<5	<5			
			A36	PD02	DB10	1,086	1,303	1,086	1,086	1,14	0,108	9,515
			F32	PC01	DB10	1,27	1,38	1,27	1,27	1,30	0,055	4,239
			A60	PD01	DB10	1,869	1,029	1,538	1,65	1,52	0,356	23,395
			F16x	PC01	DB10	1,525	1,534	1,706	1,575	1,59	0,084	5,271
Tl	(ng/g)	2	A79	PD03	DB10	48,8	49	45,8	45	47,15	2,049	4,345
			A36	PD02	DB10	47,58	47,14	47,79	46,82	47,33	0,436	0,921
			A60	PD01	DB10	47,35	47,32	49,32	47,85	47,96	0,939	1,957
			A80	PD01	DB10	50,4	49,9	49,3	49,5	49,78	0,486	0,976
			F32	PC01	DB10	50,3	50,4	49,7	50,1	50,13	0,310	0,618
			F16x	PC01	DB10	51,04	51,59	50,75	51,25	51,16	0,354	0,692
Tl	(ng/g)	3	A79	PD03	DB10	<25	<25	<25	<25			
			A80	PD01	DB10	<5	5,4	<5	5,36	5,38	0,028	0,526
			A36	PD02	DB10	4,932	5,04	5,147	5,361	5,12	0,183	3,576
			A60	PD01	DB10	5,5757	4,732	5,395	6,695	5,60	0,815	14,564
			F32	PC01	DB10	5,68	5,78	5,78	5,78	5,76	0,050	0,869

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Tl	(ng/g)	3	F16x	PC01	DB10	6,1	6,026	6,015	5,993	6,03	0,046	0,769
Tl	(ng/g)	4	A79	PD03	DB10	<25	<25	<25	<25			
			A80	PD01	DB10	<5	<5	<5	<5			
			A36	PD02	DB10	2,525	2,635	2,525	2,525	2,55	0,055	2,155
			A60	PD01	DB10	2,807	2,498	2,676	2,851	2,71	0,159	5,853
			F16x	PC01	DB10	2,766	2,796	2,826	2,859	2,81	0,040	1,419
			F32	PC01	DB10	2,78	2,89	2,89	2,78	2,84	0,064	2,240
Tm	(ng/g)	1	A71	PD02	DB10	1,916	1,771	1,831	1,916	1,86	0,071	3,808
Tm	(ng/g)	2	A71	PD02	DB10	0,155	0,162	0,144	0,146	0,15	0,008	5,497
Tm	(ng/g)	3	A71	PD02	DB10	0,172	0,169	0,177	0,182	0,18	0,006	3,266
Tm	(ng/g)	4	A71	PD02	DB10	0,616	0,594	0,581	0,619	0,60	0,018	3,014
U	(ng/g)	1	F16x	PC01	DB10	2,985	2,974	3,163	3,079	3,05	0,089	2,908
			A80	PD01	DB10	3,17	3,12	2,91	3,32	3,13	0,170	5,416
U	(ng/g)	2	F16x	PC01	DB10	2,671	2,699	2,629	2,687	2,67	0,031	1,144
			A80	PD01	DB10	2,68	2,65	2,63	2,75	2,68	0,053	1,962
U	(ng/g)	3	A80	PD01	DB10	2,67	3,19	3,22	2,86	2,99	0,266	8,908
			F16x	PC01	DB10	3,034	3,141	3,036	3,045	3,06	0,052	1,683
U	(ng/g)	4	A80	PD01	DB10	3,42	2,7	3,17	2,67	2,99	0,367	12,270
			F16x	PC01	DB10	3,166	3,317	3,174	3,352	3,25	0,096	2,955
V	(µg/g)	1	A39	PC02	DB08	0,1092	0,099	0,1043	0,1063	0,10	0,004	4,107
			A80	PD01	DB10	0,108	0,112	0,11	0,105	0,11	0,003	2,746
			A60	PD01	DB10	0,103	0,1277	0,1156	0,1255	0,12	0,011	9,556
			F16x	PC01	DB10	0,1242	0,121	0,1245	0,1234	0,12	0,002	1,287
			F14	PC01	DB10	0,123	0,131	0,126	0,123	0,13	0,004	3,002
			A79	PD03	DB10	0,1299	0,1338	0,1218	0,1293	0,13	0,005	3,896
V	(µg/g)	2	A80	PD01	DB10	0,0733	0,0725	0,0747	0,0708	0,07	0,002	2,235
			A39	PC02	DB08	0,0753	0,0723	0,0747	0,0729	0,07	0,001	1,935
			F14	PC01	DB10	0,075	0,078	0,075	0,078	0,08	0,002	2,264
			F16x	PC01	DB10	0,0769	0,0778	0,0772	0,0799	0,08	0,001	1,735

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
V	(µg/g)	2	A79	PD03	DB10	0,0863	0,0883	0,081	0,0812	0,08	0,004	4,362
			A60	PD01	DB10	0,0751	0,0924	0,0851	0,0879	0,09	0,007	8,609
V	(µg/g)	3	A80	PD01	DB10	0,0844	0,0925	0,0877	0,088	0,09	0,003	3,774
			F14	PC01	DB10	0,094	0,098	0,098	0,096	0,10	0,002	1,984
			F16x	PC01	DB10	0,1007	0,0954	0,0986	0,0988	0,10	0,002	2,234
			A79	PD03	DB10	0,1068	0,1062	0,1038	0,1023	0,10	0,002	2,003
			A39	PC02	DB08	0,1142	0,1116	0,1115	0,1042	0,11	0,004	3,898
			A60	PD01	DB10	0,1146	0,1121	0,114	0,1266	0,12	0,007	5,652
V	(µg/g)	4	A80	PD01	DB10	0,116	0,105	0,112	0,104	0,11	0,006	5,252
			F16x	PC01	DB10	0,1274	0,1256	0,1275	0,1261	0,13	0,001	0,748
			A79	PD03	DB10	0,1386	0,1318	0,1283	0,1442	0,14	0,007	5,221
			F14	PC01	DB10	0,16	0,14	0,13	0,14	0,14	0,013	8,830
			A39	PC02	DB08	0,1386	0,1514	0,1516	0,1449	0,15	0,006	4,221
			A60	PD01	DB10	0,1389	0,1801	0,1781	0,1318	0,16	0,025	16,179
Y	(ng/g)	1	A71	PD02	DB10	381,8	366,7	376,6	382,8	376,98	7,369	1,955
Y	(ng/g)	2	A71	PD02	DB10	23,12	24,16	27,32	27,44	25,51	2,201	8,629
Y	(ng/g)	3	A71	PD02	DB10	24,34	25,84	29,27	27,81	26,82	2,167	8,083
Y	(ng/g)	4	A71	PD02	DB10	65,58	61,19	62,2	63,74	63,18	1,914	3,030
Yb	(ng/g)	1	A71	PD02	DB10	10,56	10,16	10,11	10,43	10,32	0,215	2,089
Yb	(ng/g)	2	A71	PD02	DB10	0,789	0,81	0,806	0,823	0,81	0,014	1,738
Yb	(ng/g)	3	A71	PD02	DB10	0,869	0,918	0,934	0,953	0,92	0,036	3,916
Yb	(ng/g)	4	A71	PD02	DB10	3,946	3,526	3,668	3,582	3,68	0,186	5,064