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

Technical Report QA-RFoliar22

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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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 in a reliable way 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 regularly 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 months. 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 it 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

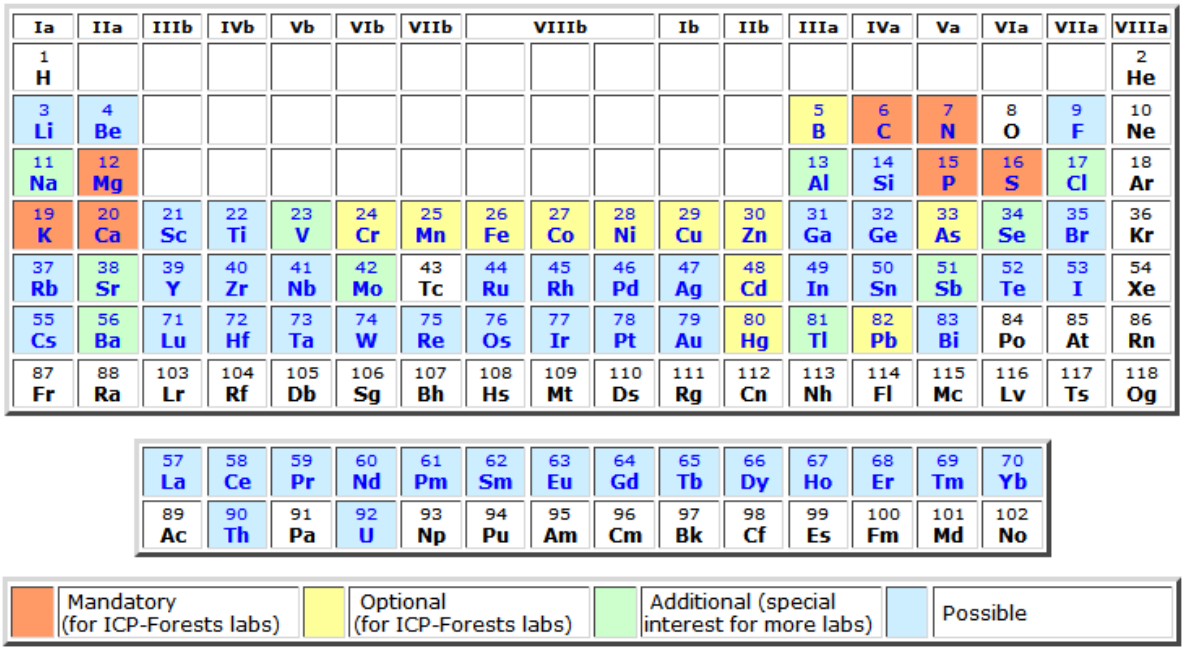
The Forest Foliar Co-ordinating Centre established the following timetable:

- Information of the participating labs (March 2021)
- Registration of the participants via internet (1st July 2021)
- Submission of the ring test samples (July 2021)
- Submission of the results from the labs (October-December 2021)
- Deadline of data input (3rd January 2022)
- Evaluation according to DIN 38402-42:2005-09 (January 2022)
- Submission of the final report and the online qualification reports (February 2022)
- Re-qualification process finished (1st September 2022)

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. The 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 or 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 they plan to analyse and submit monitoring results to ICP-FORESTS PCC from the growing season 2021.

2.2 Material

In July 2021 the Austrian Federal Research Centre for Forests, Natural Hazards and Landscape (BFW) sent out four dried and powdered plant samples to 47 laboratories in 25 countries.

The samples consisted of:

1. Spruce twigs (Austria) – same sample as for the 21st test (Sample 3 there)
2. Pine needles (Austria)
3. Beech leaves (Austria)
4. Spruce needles (Austria)

Sample 1 was collected in Carinthia/Austria and was already used in the 21st test (Sample 3). **Sample 2** was collected and prepared from BFW/Austria. **Sample 3** was collected in Lower Austria from Ramona Hofer. **Sample 4** was collected in Carinthia/Austria (special thanks to DI Walter Wuggenig and Ing. Hubert Kügler/LFD Kärnten, DI Dr. Hubert Untersteiner/TIAG Treibach and Ing. Manfred Jamnig/FAST Strassburg/BFI St. Veit).

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
24th	2021/22	25	47

Three participating laboratories didn't send any results till the end of the deadline (A49, A90 and S22). With a few exceptions, all other laboratories analysed the complete list of mandatory elements in the 24th 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 2021 and these results will be sent to PCC in 2022 ("*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								
A47																			
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												
A62	X	X	X	X	X	X	X												
A65																			
A71																			
A79																			
A80																			
A82																			
A85	X	X	X	X	X	X	X												
A86																			
A88																			
A90																			
F01	X		X	X	X	X													
F02	X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
F03	X	X	X	X	X	X	X	X	X	X	X					X			X
F05	X	X	X	X	X	X	X	X	X	X									
F06	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			X	
F12	X	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			X	X		X
F14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
F15	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	X	X		X			X					X
F21	X	X	X	X	X	X	X		X	X									
F22	X	X	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	X	X	X	X			X			X
F26	X		X	X	X	X	X												
F27	X	X	X	X	X	X	X												
F28	X	X	X	X	X	X	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	X	X						X
S22																			

2.4 Data Evaluation

Only in the case that four replicates above the quantification limits are entered for a sample its results 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 are first checked for outliers (type 1 outlier). The second 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 (type 2 outlier). Now the outlier free total mean value and the outlier free maximum and minimum mean values of all labs can be calculated. Marked type 1 outliers between the outlier free maximum and minimum mean values are not longer outliers; hence they are not excluded anymore and will be included again for the further evaluation of the interlaboratory comparison test. Third, 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 type 3 outliers, a re-check for type 2 outliers 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 Tables 3 and 4. Laboratory results inside these tolerable limits are marked green (passed the test); outside they are marked orange (failed 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 %	Applied to 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 entered by a laboratory instead of a measured value, 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 against the outlier free mean. Is a submitted LOQ within the tolerable limits associated with the mean of all labs, the lab will pass for this sample of the according parameter (marked in green colour). When the submitted LOQ exceeds these tolerable limits, the lab will fail for this sample (marked in orange colour). This evaluation approach for 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 for the elements which are concerned (see Table 5). This procedure is necessary to avoid wrong qualification results caused by calculations which are then too unreliable. Furthermore, there is seldom a practical need to detect these low concentrations in natural samples, because it gives no additional information about the nutrient status (e.g. < 1 µg Cu/g is always deficiency) or about 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 (LOQ) 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	-

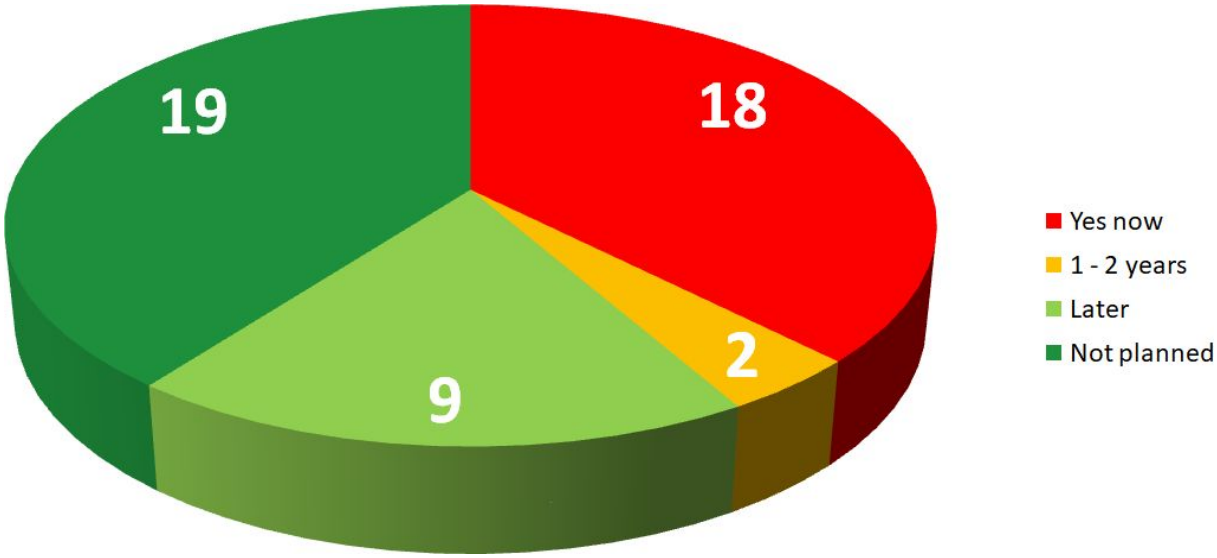
3 RESULTS

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.

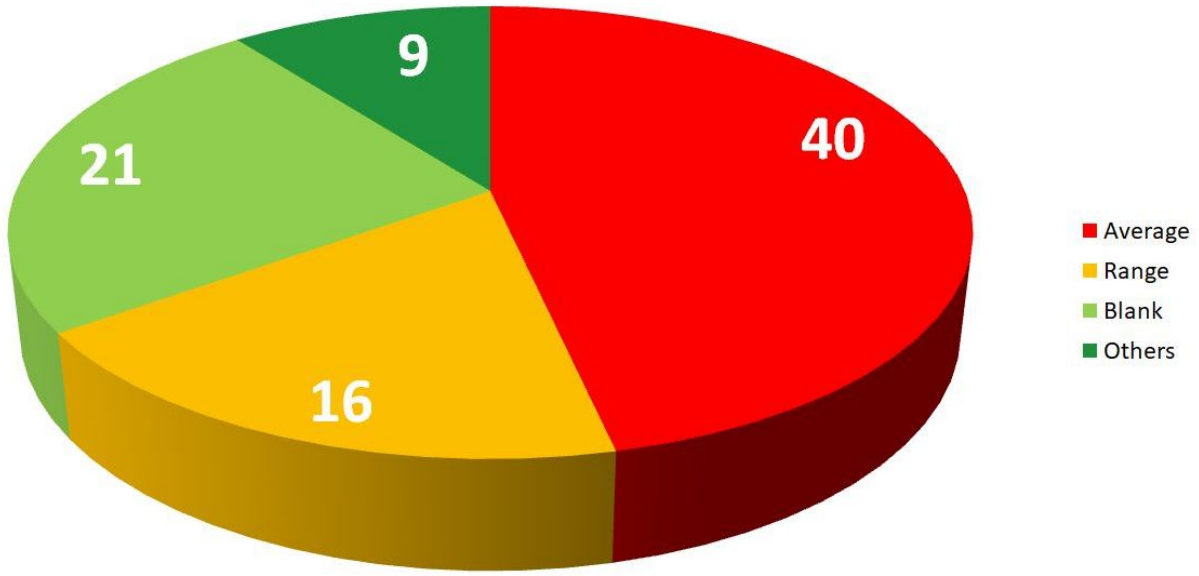
Figure 2: Accreditation status according EN 17025 (n=47)



42.6% of the laboratories are accredited now (18 labs) or plan an accreditation within 1-2 years (2 labs) - 18 laboratories (38.3%) 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). 91.5% of these 47 laboratories (say that they) are using control charts, and most of them are using average control charts – 4 of these 47 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 (multiple answers were possible)



3.2 Results of the 24th Interlaboratory Comparison Test

Table 6 gives an overview about the test samples analysed by the different laboratories and about correct or failed results of these determinations. 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 2022. The red marked "<" or ">" characters mean that results were lower or higher than the tolerable limits.

As explained in the description of Table 5, LOQ's are checked against the maximum acceptable LOQ and following they are checked against the lower tolerable limit associated with the mean of all laboratories. In case that it is lower than the maximum acceptable LOQ it is labelled with an "L" (see Table 6).

A further important parameter is the total percentage of correct results per lab, which is calculated from all determinations and if they were correct or not. The following participants have a percentage of correct results being lower than 80%, hence QC/QA-problems in their laboratory should be considered as well:

F07 (71.01%), **F27** (75.81%), **F22** (78.57%) and **A85** (78.57%)

Some accepted results are within the tolerable limits, but the statistical evaluation shows an excessive standard deviation (type 1 or 3 outliers, marked with "a" or "c", respectively) or a high Vi (> 10%, marked with red colour). This means these labs have e.g. contamination influences or other methodological problems. Please keep in mind that such errors have a random character and increase the probability of failed determinations in the future. Hence they should be seen as alarm signs when they occur!

Table 6: Results of the 24th Needle/Leaf Interlaboratory Comparison Test – results marked with the limits from Tables 3 and 4 (green = all samples were analysed well; "<" means too low; ">" means too high; white = no results were submitted) and with the maximum acceptable LOQ from Table 5 (L means an LOQ being higher than the maximum acceptable 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																			
A56	>	<<<									>>>>								
A57				<	<<														
A58								>											
A59	<<<<						<<<<												
A60	>														<				
A61																			
A62			>	<	>>>														
A65			>>>																
A71		<<												>>>		>>>	<>	>>	
A79																			
A80																			
A82				<		<<<<													
A85	<	>	>	>	>>														
A86		>>																	
A88				>>>			>>>>	<										<<	
A90																			
F01																			
F02																			
F03																			
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F06	<																		
F07		<<<<	<<		<<	<						>		<<<	>LL	<<<<			
F08						<		<	<		<>>								
F12																			
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F14																			
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F16																			
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F19																			
F21		>	<<		<					<									
F22				>>>>	<<														
F24	>							>	>		>>			>>					<<>
F25												>							
F26																			
F27		>		>>	<	<<<<		<<<<		<							<>		
F28		>>						>	<										
F32										>									
F33	>>>		>	>>															
S22																			

The calculated outlier-free mean element concentrations for each test sample and the percentage of the non-tolerable laboratory results based on the tolerable limits are provided in Table 7.

Sample 1 had a too low concentration for Pb and sample 4 for Pb, As and Hg. Consequently, their results were excluded from the evaluation.

Three samples in this test were foliage samples (samples 2-4), one sample consisted of twigs (sample 1). 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 percentages of non-tolerable results (results evaluated with the tolerable limits for low concentrations are marked in blue colour; not evaluated samples with very low concentrations are marked in grey colour)

Element	Unit	Sample 1 *Pine twigs*	Sample 2 *Pine needles*	Sample 3 *Beech leaves*	Sample 4 *Spruce needles*
N	**mg/g**	9.11	11.04	23.58	13.33
	%	21.43	7.14	4.76	2.38
S	**mg/g**	0.63	0.94	1.49	0.93
	%	10.26	7.69	10.26	12.82
P	**mg/g**	1.55	1.83	1.28	2.29
	%	7.32	7.32	12.20	2.44
Ca	**mg/g**	4.73	3.48	5.13	5.49
	%	9.52	16.67	4.76	9.52
Mg	**mg/g**	1.08	1.22	0.78	1.34
	%	11.90	4.76	9.52	7.14
K	**mg/g**	6.92	6.04	8.77	8.17
	%	11.90	11.90	11.90	11.90
C	**g/100g**	53.33	52.18	51.80	51.73
	%	7.69	7.69	7.69	7.69
Zn	**µg/g**	55.52	23.05	21.81	31.39
	%	2.94	8.82	8.82	5.88
Mn	**µg/g**	145.20	38.41	785.12	993.61
	%	0.00	8.33	2.78	0.00
Fe	**µg/g**	68.40	85.13	108.85	65.58
	%	11.76	0.00	0.00	0.00
Cu	**µg/g**	6.05	3.29	5.97	3.10
	%	3.03	9.09	6.06	9.09
Pb	**µg/g**	*0.17*	0.31	0.24	*0.067*
	%	-	0.00	9.52	-
Cd	**ng/g**	55.40	192.78	102.18	70.50
	%	0.00	0.00	0.00	0.00
B	**µg/g**	10.33	16.11	13.20	2.43
	%	18.18	9.09	9.09	16.64
As	**ng/g**	28.11	35.32	26.97	*12.96*
	%	16.67	8.33	8.33	-
Cr	**µg/g**	0.67	1.71	0.72	2.68
	%	9.52	9.52	9.52	9.52
Co	**µg/g**	0.44	0.077	0.061	0.50
	%	5.88	0.00	17.65	5.88
Hg	**ng/g**	19.85	17.51	30.78	*7.81*
	%	11.76	11.76	5.88	-
Ni	**µg/g**	2.35	0.88	0.83	7.97
	%	4.00	4.00	4.00	0.00

3.3 Comparison of the 24th Interlaboratory Comparison Test with former tests

Sample 3 of the 21st Interlaboratory Comparison Test and sample 1 of the 24th Interlaboratory Comparison Test are identical (*Spruce twigs - Austria*). For most of the elements the mean values are identical (see Table 8). The well comparable results show that the determined contents of this sample are stable.

The ringtest is evaluated on the basis of fixed limits (Tables 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. The 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). These maximum acceptable limits were applied from the 14th to the 24th test. The changes of the percentages of non-tolerable results from the 11th to the 24th test are accessible in Tables 9a and 9b.

Table 8: Comparison between Sample 3 of the 21st and Sample 1 of the 24th Interlaboratory Comparison Test

Element (Unit)	21st Interlaboratory Comparison Test 2018/19 (Sample 3) Mean	Number of Labs	24th Interlaboratory Comparison Test 2021/22 (Sample 1) Mean	Number of Labs
N mg/g	9.18	*45*	9.11	*42*
S mg/g	0.64	*43*	0.63	*39*
P mg/g	1.54	*46*	1.55	*41*
Ca mg/g	4.69	*46*	4.73	*42*
Mg mg/g	1.07	*47*	1.08	*42*
K mg/g	6.93	*47*	6.92	*42*
C g/100g	53.01	*42*	53.33	*39*
Zn µg/g	53.18	*38*	55.52	*34*
Mn µg/g	144.50	*39*	145.20	*36*
Fe µg/g	67.07	*35*	68.40	*34*
Cu µg/g	6.01	*37*	6.05	*33*
Pb µg/g	*0.18*	*28*	*0.17*	*23*
Cd ng/g	55.57	*29*	55.40	*23*
B µg/g	10.32	*23*	10.33	*22*
As ng/g	26.82	*14*	28.11	*12*
Cr µg/g	0.66	*23*	0.67	*21*
Co µg/g	0.42	*21*	0.44	*17*
Hg ng/g	19.80	*16*	19.85	*17*
Ni µg/g	2.36	*25*	2.35	*25*

Table 9a: Percentage of non tolerable results from 11th to 17th test

Element	Tolerable limits [1]	11th Labtest 2008/2009		12th Labtest 2009/2010		13th Labtest 2010/2011		14th Labtest 2011/2012		15th Labtest 2012/2013		16th Labtest 2013/2014		17th Labtest 2014/2015	
	normal (low) (± %)	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	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values
N	10 (15)	**10,9**	*192*	**7,6**	*212*	**4,9**	*224*	**8,9**	*224*	**6,0**	*216*	**3,1**	*196*	**2,1**	*192*
S	15 (20)	**14,4**	*188*	**16,5**	*200*	**13,9**	*208*	**12,7**	*220*	**13,9**	*208*	**14,8**	*196*	**9,9**	*192*
P	10 (15)	**14,2**	*204*	**13,7**	*212*	**7,4**	*216*	**15,9**	*220*	**9,4**	*224*	**18,8**	*208*	**14,7**	*204*
Ca	10 (15)	**19,1**	*204*	**9,7**	*216*	**8,0**	*212*	**14,7**	*224*	**12,1**	*224*	**16,3**	*208*	**17,7**	*212*
Mg	10 (15)	**18,6**	*204*	**14,4**	*216*	**5,7**	*212*	**19,3**	*228*	**5,9**	*220*	**8,8**	*204*	**12,3**	*212*
K	10 (15)	**17,5**	*200*	**6,0**	*216*	**8,5**	*212*	**21,0**	*228*	**18,0**	*228*	**9,1**	*208*	**11,5**	*208*
C	5	**16,9**	*148*	**8,5**	*188*	**6,3**	*192*	**15,4**	*208*	**7,7**	*196*	**10,0**	*180*	**7,8**	*180*
Zn	15 (20)	**6,7**	*164*	**6,4**	*172*	**9,7**	*176*	**4,4**	*184*	**5,4**	*184*	**5,6**	*180*	**8,1**	*172*
Mn	15 (20)	**6,5**	*168*	**2,7**	*176*	**4,8**	*188*	**6,8**	*192*	**0,5**	*188*	**8,7**	*184*	**3,9**	*180*
Fe	20 (30)	**13,1**	*160*	**4,8**	*168*	**0,0**	*180*	**14,1**	*184*	**3,7**	*188*	**9,4**	*180*	**6,5**	*168*
Cu	20	**17,1**	*164*	**21,3**	*160*	**9,1**	*176*	**10,3**	*184*	**9,1**	*176*	**14,5**	*172*	**15,7**	*172*
Pb	30 (40)	**9,8**	*92*	**13,3**	*120*	**12,5**	*112*	**15,6**	*128*	**8,6**	*105* [2]	**10,7**	*56* [2]	**7,8**	*87* [2]
Cd	30	**7,7**	*104*	**10,7**	*112*	**9,5**	*116*	**10,0**	*140*	**7,1**	*140*	**4,8**	*62* [2]	**14,3**	*112*
B	20 (30)	**12,5**	*88*	**5,4**	*92*	**3,3**	*92*	**12,0**	*100*	**5,0**	*100*	**6,3**	*96*	**5,0**	*100*

[1] special tolerable limits for low concentrations

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

Table 9b: Percentage of non tolerable results from the 18th to the 24th test

Element	Tolerable limits [1] normal (low) (± %)	18th Labtest 2015/2016		19th Labtest 2016/2017		20th Labtest 2017/2018		21st Labtest 2018/2019		22nd Labtest 2019/2020		23rd Labtest 2020/2021		24th Labtest 2021/2022	
		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	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values
N	10 (15)	**7,9**	*164*	**4,6**	*152*	**3,7**	*164*	**16,1**	*180*	**5,1**	*156*	**4,7**	*172*	**8,9**	*168*
S	15 (20)	**6,4**	*156*	**7,4**	*148*	**16,7**	*156*	**16,9**	*172*	**11,4**	*140*	**11,9**	*160*	**10,3**	*156*
P	10 (15)	**15,5**	*168*	**15,4**	*164*	**18,3**	*180*	**16,3**	*184*	**9,0**	*156*	**16,7**	*168*	**7,3**	*164*
Ca	10 (15)	**9,1**	*176*	**11,3**	*168*	**12,0**	*184*	**15,8**	*184*	**12,5**	*160*	**15,3**	*176*	**10,1**	*168*
Mg	10 (15)	**14,2**	*176*	**13,1**	*168*	**10,9**	*184*	**10,1**	*188*	**10,6**	*160*	**7,4**	*176*	**8,3**	*168*
K	10 (15)	**15,6**	*180*	**16,7**	*168*	**14,7**	*184*	**16,5**	*188*	**12,5**	*160*	**11,4**	*176*	**10,1**	*168*
C	5	**9,5**	*148*	**8,1**	*136*	**7,9**	*152*	**14,3**	*168*	**2,9**	*140*	**3,8**	*156*	**7,7**	*156*
Zn	15 (20)	**13,5**	*148*	**12,1**	*132*	**6,3**	*144*	**5,3**	*152*	**10,0**	*140*	**9,0**	*144*	**6,6**	*136*
Mn	15 (20)	**6,1**	*148*	**8,8**	*136*	**10,5**	*152*	**3,2**	*156*	**11,5**	*148*	**9,2**	*152*	**2,8**	*144*
Fe	20 (30)	**12,2**	*148*	**13,3**	*128*	**4,2**	*144*	**5,0**	*140*	**6,9**	*144*	**8,1**	*136*	**2,9**	*136*
Cu	20	**4,2**	*144*	**15,2**	*132*	**8,8**	*136*	**6,8**	*148*	**12,5**	*136*	**7,9**	*140*	**6,8**	*132*
Pb	30 (40)	**16,0**	*75* [2]	**7,7**	*24* [2]	**8,3**	*24* [2]	**7,1**	*84* [2]	**22,7**	*75* [2]	**16,7**	*78* [2]	**4,3**	*46* [2]
Cd	30	**8,0**	*112*	**2,1**	*96*	**2,7**	*75* [2]	**10,3**	*116*	**14,6**	*48* [2]	**8,0**	*50* [2]	**0,0**	*92*
B	20 (30)	**11,9**	*84*	**13,9**	*72*	**6,8**	*88*	**4,3**	*92*	**13,1**	*84*	**10,9**	*92*	**11,4**	*88*
As	20 (30)	**19,2**	*52*	**25,6**	*39* [2]	**48,7**	*39* [2]	**19,6**	*56*	**37,5**	*48*	**27,1**	*48*	**11,1**	*36* [2]
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]	**7,4**	*68*
Cr	25 (35)	**10,9**	*46* [2]	**16,3**	*92*	**15,2**	*92*	**21,7**	*92*	**6,3**	*32* [2]	**7,2**	*69* [2]	**9,5**	*84*
Hg	20 (30)	**4,5**	*44*	**19,6**	*56*	**0,0**	*36* [2]	**6,3**	*48* [2]	**9,5**	*42* [2]	**8,3**	*60*	**9,8**	*51* [2]
Ni	20 (30)	**8,3**	*96*	**7,6**	*92*	**16,3**	*92*	**9,0**	*100*	**18,0**	*100*	**13,0**	*100*	**3,0**	*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 increased slightly (4.7 → 8.9%).
One laboratory (A59) failed in analyzing all four samples correctly. All four sample results were too low. This laboratory failed in the last test, too, which means that its methodical problems are still not solved!
Laboratory F33 failed with three out of four determined samples – a requalification is obligatory for this *ICP-Forests laboratory.*
Both laboratories are using *micro elemental-analyzer* as determination method; a calibration error could be the reason for this failure.

3.4.2 Sulphur

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results of all laboratories is similar (11.9 → 10.3%). Two laboratories failed in analyzing all four (F07) or three out of four (A56) samples correctly, whereas all of these non-tolerable results were too low. Laboratory A56 failed in the last test, too. This means that its methodical problems are still not solved! A requalification is obligatory for the *ICP-Forests laboratory F07.*
Both laboratories are using *ICP-AES without Ultrasonic nebulisation* as determination method; all sulphur emission lines are in the lower UV range. A possible reason for the wrong results could be that oxygen from air might be not removed completely from the monochromator for accurate results when determining sulphur.

3.4.3 Phosphorus

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is lower again (22nd Labtest: 9.0% → 23rd Labtest: 16.7% → 24th Labtest: 7.3%). One laboratory (A65) failed in analyzing three out of four samples correctly.

3.4.4 Calcium

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results remains on a comparably high level with a slight recent decrease compared to the last two tests (22nd Labtest: 12.5 → 23rd Labtest: 15.3 → 24th Labtest: 10.1%). The laboratories A88 and F22 failed in analyzing three or four samples correctly.
Laboratory A88 failed in the last test, too. This means that its methodical problems are still not solved!
A re-qualification is obligatory for the *ICP-Forests laboratory F22.*

3.4.5 Magnesium

In comparison with the last test the percentage of non-tolerable results is quite constant (7.4 → 8.3%). Laboratory A62 failed with three out of four samples.
A requalification is obligatory for the *ICP-Forests laboratory A62.*

3.4.6 Potassium

In comparison with the last test the percentage of non-tolerable results is similar (11.4 → 10.1%). The laboratories A45, A82 and F27 failed in analyzing all four samples correctly. Laboratory A47 failed in analyzing three out of four samples correctly.
A re-qualification is obligatory for the ICP-Forests *laboratories A45 and F27*.

3.4.7 Carbon

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is slightly increased (3.8 → 7.7%). Laboratories A59, A88 and F13 failed in analyzing all four samples correctly. All three labs are using elemental-analyzers. The very constant percentages of recovery of all four samples per lab indicate a calibration error.
Laboratory A59 failed with this in the last test, too. This means that its methodical problems are still not solved!
A requalification is obligatory for the *ICP-Forests laboratory F13.*

3.4.8 Zinc

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is slightly decreased (9.0 → 6.6%). Laboratory F27 failed in analyzing all four samples correctly.

3.4.9 Manganese

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is lower again (9.2 → 2.8%).
No laboratory failed with three or four samples; hence no requalification will be necessary for this element.

3.4.10 Iron

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is lower (8.1 → 2.9%).
No laboratory failed with three or four samples; hence no requalification will be necessary for this element.

3.4.11 Copper

In comparison with the last test the percentage of non-tolerable results is quite constant (7.9 → 6.8%). Laboratories A56 and F08 failed with three or four samples.
A requalification is obligatory for the *ICP-Forests laboratory F08.*

3.4.12 Lead

Samples 1 and 4 had to be excluded from the ringtest evaluation, because of their too low lead concentrations. In comparison with the last test the percentage of non-tolerable results is lower again (16.7 → 4.3%). The two remaining samples have a lower lead concentration than the limit of the lower concentration range (< 0.5 µg/g). No laboratory failed with three or four samples; hence no requalification will be necessary for this element.
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 too close to their determination limit.

3.4.13 Cadmium

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results decreased again (8.0 → 0.0%).
No laboratory failed with three or four samples; hence no requalification will be necessary for this element.

3.4.14 Boron

In comparison with the last test the percentage of non-tolerable results is quite constant (10.9 → 11.4%). The laboratories A71 and F07 failed in analyzing three out of four samples. Laboratory F18 reported a too high LOQ for sample 4.
A requalification is obligatory for the *ICP-Forests laboratory F07.*

3.4.15 Arsenic

Sample 4 was excluded from the ringtest evaluation, because of too low content. In comparison with the last test the percentage of non-tolerable results is lower again (27.1 → 11.1%). Laboratory F07 failed in analyzing one out of three remaining samples correctly and because of a too high LOQ for the other two remaining samples. Laboratory F07 is using an ICP-AES. ICP-AES is not sensitive enough to detect arsenic in these low concentrations.
Laboratory F07 failed in the last tests for arsenic, too. This means the methodical problem (e.g. a change of the method) is still not solved! Laboratory F07 withdrew the re-qualification for arsenic in the last test for the ICP-Forests programme, but marked it again with the same method in the 24th test. Hence the results had to be evaluated and a requalification is obligatory for the *ICP-Forests laboratory F07.*

3.4.16 Cobalt

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is lower (19.0 → 7.4%).
No laboratory failed with three or four samples; hence no requalification will be necessary for this element.

3.4.17 Chromium

In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results is slightly higher (7.2 → 9.5%). Laboratories A71 and F07 failed in analyzing three or four samples.
A requalification is obligatory for the *ICP-Forests laboratory* F07.

3.4.18 Mercury

Sample 4 was excluded from the ringtest evaluation for mercury, because of its too low content. In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is similar (8.3 → 9.8%).
The laboratories A71 and A88 failed with two of the three remaining samples.

3.4.19 Nickel

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is lower (13.0 → 3.0%). Laboratory F24 failed with this parameter.

4 CONCLUSIONS

47 laboratories in 25 countries participated in the 24th Needle/Leaf Interlaboratory Test, but only 44 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 Fürst et al. 2020, König et al. 2013, Rautio et al. 2013 and 2020, Ukonmaanaho et al. 2020). 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. A qualification is mandatory for all ICP-Forests laboratories, if monitoring results (foliage, litterfall, ground vegetation) from the vegetation period 2021 is intended to be submitted to PCC.

In case of an unsuccessful participation, a re-qualification is foreseen (see: http://bfw.ac.at/rz/bfwcms2.web?dok=3002). Only a successful participation in the following ringtest for the element(s) which had to be requalified can successfully complete the re-qualification.

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 two laboratories submitted LOQs higher than the maximum acceptable LOQs (**F18** for B and **F07** for As).

In case of very low concentrations in the test samples, results of these samples were excluded from the evaluation (this was the case for **sample 1:** Pb and **sample 4**: Pb, As and Hg). This procedure is necessary to avoid wrong qualification results caused by calculations which are then too unreliable. Furthermore, there is seldom a practical need to detect these low concentrations in natural 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:

F07 (71.01%), **F27** (75.81%), **F22** (78.57%) and **A85** (78.57%)

Some of the *ICP-Forests laboratories* failed and a re-qualification **is obligatory** for certain parameters (**A45**: K; **A62**: Mg; **F07**: S, B, As and Cr; **F08**: Cu; **F13**: C, **F22:** Ca, **F27**: K and **F33:** N). 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 **A59** (N), **A56** (S), **A88** (Ca), **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 September 2022 (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

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A85x	PZ98	DA01	7,30	7,31	7,32	7,30	4	7,31	*	0,01	0,13	80,15
2	A59	PZ98	DA02	7,40	7,40	7,29	7,59	4	7,42	*	0,12	1,68	81,41
3	A47	PZ98	DA02	8,39	8,28	6,77	7,63	4	7,77	*	0,74	9,59	85,22
4	F06x	PZ98	DA02	8,03	7,86	7,78	7,65	4	7,83	*	0,16	2,03	85,92
5	F02x	PZ98	DA01	8,55	8,16	8,38	8,82	4	8,48		0,28	3,29	93,01
6	A45x	PZ98	DA02	8,37	8,74	8,66	8,24	4	8,50		0,24	2,78	93,28
7	A62x	PZ98	DA01	8,62	8,32	8,54	8,81	4	8,57		0,20	2,37	94,05
8	A65	PZ98	DA02	8,62	8,41	8,67	8,61	4	8,58		0,11	1,34	94,11
9	F12x	PZ98	DA02	8,62	8,77	8,36	8,58	4	8,58		0,17	2,00	94,18
10	A61x	PZ98	DA02	8,68	8,46	8,47	8,80	4	8,60		0,17	1,93	94,38
11	A82	PZ98	DA02	8,50	8,80	8,50	8,80	4	8,65		0,17	2,00	94,90
12	F16x	PZ98	DA02	8,53	8,51	8,67	8,99	4	8,68		0,22	2,56	95,18
13	F03x	PZ98	DA01	8,98	8,82	8,45	8,46	4	8,68		0,27	3,06	95,20
14	F32x	PZ98	DA01	8,19	9,10	8,84	8,62	4	8,69		0,39	4,44	95,31
15	F25x	PZ98	DA01	9,22	8,53	8,96	8,20	4	8,73		0,45	5,18	95,75
16	F14x	PZ98	DA01	8,80	8,50	9,30	8,70	4	8,83		0,34	3,86	96,82
17	A57	PZ98	DA01	9,06	8,83	9,03	8,75	4	8,92		0,15	1,70	97,84
18	F15x	PZ98	DA01	9,07	9,04	8,74	8,98	4	8,96		0,15	1,67	98,28
19	F18x	PB07	DZ02	8,86	9,09	8,97	8,96	4	8,97		0,09	1,05	98,41
20	A58x	PZ98	DA99	9,10	9,00	9,00	8,90	4	9,00		0,08	0,91	98,74
21	F21x	PZ98	DA01	8,95	9,21	8,86	9,17	4	9,05		0,17	1,87	99,26
22	F07x	PZ98	DA01	9,20	9,05	9,24	8,83	4	9,08		0,19	2,04	99,62
23	F05x	PZ98	DA01	9,17	9,20	9,02	9,33	4	9,18		0,13	1,39	100,72
24	F28x	PZ98	DA01	9,25	9,22	9,11	9,16	4	9,19		0,06	0,68	100,77
25	A88	PB07	DZ02	9,00	9,32	9,42	9,32	4	9,27		0,18	1,97	101,65
26	F08x	PZ98	DA01	9,37	9,63	10,03	8,33	4	9,34		0,73	7,78	102,47
27	A39	PZ98	DA02	9,67	9,75	9,19	8,95	4	9,39		0,38	4,09	103,02
28	F19x	PZ98	DA99	9,90	9,70	9,00	9,30	4	9,48		0,40	4,25	103,95
29	A36	PB07	DZ02	9,59	9,91	9,81	9,27	4	9,65		0,28	2,94	105,82
30	F22x	PZ98	DA01	9,58	9,37	9,47	10,22	4	9,66		0,38	3,96	106,00
31	F13x	PZ98	DA01	9,49	9,03	10,23	10,05	4	9,70		0,55	5,64	106,42
32	A71	PB07	DZ02	10,52	9,42	9,59	9,41	4	9,74		0,53	5,47	106,81
33	F26x	PB08	DZ02	9,79	9,79	9,78	9,79	4	9,79		0,00	0,05	107,38
34	A43	PB08	DZ02	9,98	9,98	9,68	9,83	4	9,87		0,14	1,46	108,26
35	F01x	PB08	DZ02	9,76	10,17	9,75	9,97	4	9,91		0,20	2,03	108,77
36	A86	PZ98	DA01	9,91	9,87	10,22	9,95	4	9,99		0,16	1,59	109,58
37	F27x	PZ98	DA01	9,95	9,62	10,22	10,24	4	10,01		0,29	2,90	109,80
38	A42	PZ98	DA01	11,05	9,70	9,11	10,26	0	10,03	*c* *	0,83	8,24	110,04
39	F24x	PZ98	DA02	9,98	10,00	10,24	10,08	4	10,08	*	0,12	1,17	110,54
40	A56	PZ98	DA02	10,40	10,00	9,90	10,20	4	10,13	*	0,22	2,19	111,08
41	A60x	PZ98	DA02	10,41	10,34	10,06	10,30	4	10,28	*	0,15	1,48	112,76
42	F33x	PZ98	DA02	11,39	11,51	10,81	11,20	4	11,23	*	0,31	2,73	123,18
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**164**	**9,11**	**0,246**	**2,704**
10	% from the mean			

l	s_R	CV_R
41	**0,794**	**8,709**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: N **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	A59	PZ98	DA02	9,09	9,09	9,12	*8,94a*	0	9,10	*b*	*	0,02	0,19	82,44
2	A62x	PZ98	DA01	10,22	10,10	10,20	10,00	4	10,13			0,10	1,00	91,77
3	A65	PZ98	DA02	10,82	10,19	10,03	10,54	4	10,40			0,35	3,41	94,17
4	A58x	PZ98	DA99	10,40	10,41	10,40	10,40	4	10,40			0,00	0,05	94,24
5	F06x	PZ98	DA02	10,48	10,56	10,30	10,50	4	10,46			0,11	1,07	94,76
6	F12x	PZ98	DA02	10,26	10,22	10,96	10,48	4	10,48			0,34	3,23	94,94
7	F26x	PB08	DZ02	10,49	10,49	10,47	10,47	4	10,48			0,01	0,11	94,94
8	A71	PB07	DZ02	10,72	10,58	10,51	10,45	4	10,57			0,12	1,09	95,72
9	F25x	PZ98	DA01	10,77	10,70	10,41	10,62	4	10,63			0,16	1,47	96,26
10	F21x	PZ98	DA01	10,80	10,75	10,47	10,61	4	10,66			0,15	1,39	96,55
11	A85x	PZ98	DA01	10,72	10,70	10,69	10,72	4	10,71			0,02	0,16	97,03
12	A42	PZ98	DA01	11,56	10,56	10,48	10,36	4	10,74			0,55	5,15	97,30
13	A45x	PZ98	DA02	10,80	10,70	10,80	10,80	4	10,78			0,05	0,46	97,62
14	A47	PZ98	DA02	11,56	10,91	10,17	10,81	4	10,86			0,57	5,24	98,41
15	F14x	PZ98	DA01	10,70	11,00	10,90	10,90	4	10,88			0,13	1,16	98,52
16	A86	PZ98	DA01	11,06	10,87	10,75	11,01	4	10,92			0,14	1,28	98,95
17	A82	PZ98	DA02	11,30	10,70	11,10	10,70	4	10,95			0,30	2,74	99,20
18	F03x	PZ98	DA01	11,00	11,01	10,97	10,93	4	10,98			0,04	0,33	99,45
19	F32x	PZ98	DA01	11,00	11,00	11,00	11,00	4	11,00			0,00	0,00	99,66
20	F22x	PZ98	DA01	10,78	10,98	11,09	11,21	4	11,02			0,19	1,68	99,80
21	F19x	PZ98	DA99	10,70	11,00	11,00	11,40	4	11,03			0,29	2,61	99,88
22	F02x	PZ98	DA01	11,11	10,94	11,11	11,09	4	11,06			0,08	0,74	100,22
23	A61x	PZ98	DA02	10,55	11,53	11,00	11,19	4	11,07			0,41	3,69	100,27
24	F15x	PZ98	DA01	11,07	11,09	11,22	10,94	4	11,08			0,11	1,03	100,38
25	F16x	PZ98	DA02	10,74	11,03	11,29	11,30	4	11,09			0,26	2,39	100,47
26	F28x	PZ98	DA01	11,00	10,70	11,50	11,20	4	11,10			0,34	3,03	100,56
27	F07x	PZ98	DA01	11,12	11,05	11,18	11,05	4	11,10			0,06	0,57	100,56
28	F24x	PZ98	DA02	11,07	11,15	11,16	11,20	4	11,15			0,05	0,49	100,97
29	A57	PZ98	DA01	11,64	11,14	11,19	11,32	4	11,32			0,22	1,99	102,58
30	A39	PZ98	DA02	10,53	11,55	11,50	11,89	4	11,37			0,58	5,14	102,99
31	F05x	PZ98	DA01	11,40	11,50	11,40	11,20	4	11,38			0,13	1,11	103,05
32	A36	PB07	DZ02	11,44	11,23	11,44	11,44	4	11,39			0,11	0,92	103,17
33	F27x	PZ98	DA01	11,34	11,30	11,55	11,45	4	11,41			0,11	0,99	103,37
34	F18x	PB07	DZ02	11,45	11,46	11,47	11,53	4	11,48			0,04	0,31	103,98
35	A60x	PZ98	DA02	11,70	11,35	11,37	11,67	4	11,52			0,19	1,63	104,39
36	F01x	PB08	DZ02	11,56	11,61	11,82	11,62	4	11,65			0,12	1,01	105,56
37	F08x	PZ98	DA01	11,86	11,72	11,48	11,65	4	11,68			0,16	1,35	105,79
38	A88	PB07	DZ02	11,90	11,69	11,90	11,69	4	11,80			0,12	1,03	106,86
39	A43	PB08	DZ02	11,59	11,59	12,34	11,89	4	11,85			0,35	2,99	107,38
40	A56	PZ98	DA02	11,70	12,40	11,70	12,00	4	11,95			0,33	2,78	108,26
41	F13x	PZ98	DA01	12,02	11,34	13,30	12,20	0	12,22	*c*	*	0,81	6,65	110,66
42	F33x	PZ98	DA02	13,25	13,02	13,25	13,49	0	13,25	*b*	*	0,19	1,45	120,06
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	n	Mean	s_r	CV_r
all labs	**156**	**11,04**	**0,190**	**1,717**
10 % from the mean				

* = non tolerable mean because more than +/-

l	s_R	CV_R
39	**0,440**	**3,987**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: N **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	A59	PZ98	DA02	20,68	20,63	20,49	20,94	0	20,69	*b*	*	0,19	0,91	87,72
2	A58x	PZ98	DA99	21,60	21,80	21,60	21,80	0	21,70	*b*		0,12	0,53	92,02
3	A42	PZ98	DA01	22,59	22,90	22,29	21,22	4	22,25			0,73	3,28	94,35
4	F28x	PZ98	DA01	22,70	22,50	22,10	23,30	4	22,65			0,50	2,21	96,05
5	F12x	PZ98	DA02	22,52	22,63	22,92	22,69	4	22,69			0,17	0,74	96,22
6	A62x	PZ98	DA01	23,00	22,80	22,40	23,00	4	22,80			0,28	1,24	96,69
7	F22x	PZ98	DA01	23,33	22,79	23,33	22,50	4	22,99			0,41	1,80	97,48
8	F25x	PZ98	DA01	22,97	22,98	23,10	22,98	4	23,01			0,06	0,27	97,57
9	A71	PB07	DZ02	23,12	22,94	23,25	23,11	4	23,11			0,13	0,55	97,99
10	A57	PZ98	DA01	22,98	22,89	23,85	22,72	4	23,11			0,50	2,19	98,00
11	A45x	PZ98	DA02	23,00	23,40	23,10	23,20	4	23,18			0,17	0,74	98,28
12	F06x	PZ98	DA02	23,15	23,29	23,06	23,29	4	23,20			0,11	0,49	98,37
13	A65	PZ98	DA02	23,47	23,42	23,03	23,14	4	23,27			0,21	0,92	98,66
14	F26x	PB08	DZ02	23,42	23,40	23,43	23,43	4	23,42			0,01	0,06	99,32
15	A36	PB07	DZ02	23,57	23,57	23,36	23,25	4	23,44			0,16	0,68	99,39
16	F05x	PZ98	DA01	23,40	23,40	23,50	23,50	4	23,45			0,06	0,25	99,44
17	A43	PB08	DZ02	23,39	24,13	22,64	23,68	4	23,46			0,63	2,67	99,49
18	A82	PZ98	DA02	24,00	23,20	22,60	24,10	4	23,48			0,71	3,02	99,55
19	F02x	PZ98	DA01	23,33	23,73	23,56	23,42	4	23,51			0,17	0,74	99,70
20	F18x	PB07	DZ02	23,58	23,48	23,47	23,55	4	23,52			0,05	0,23	99,74
21	F14x	PZ98	DA01	23,70	23,40	23,60	23,60	4	23,58			0,13	0,53	99,97
22	F32x	PZ98	DA01	23,80	23,80	23,70	23,50	4	23,70			0,14	0,60	100,50
23	A61x	PZ98	DA02	23,64	23,29	23,71	24,27	4	23,73			0,41	1,71	100,62
24	F07x	PZ98	DA01	23,78	23,80	23,67	23,68	4	23,73			0,07	0,28	100,64
25	F15x	PZ98	DA01	23,70	23,83	23,84	23,74	4	23,78			0,07	0,29	100,83
26	A86	PZ98	DA01	23,71	23,87	23,92	23,76	4	23,82			0,10	0,41	100,99
27	F19x	PZ98	DA99	23,80	23,50	23,90	24,10	4	23,83			0,25	1,05	101,03
28	A60x	PZ98	DA02	23,93	23,85	23,61	23,91	4	23,83			0,15	0,62	101,03
29	F27x	PZ98	DA01	23,87	23,80	23,81	24,03	4	23,88			0,11	0,45	101,26
30	A85x	PZ98	DA01	23,88	23,91	23,88	23,91	4	23,89			0,02	0,09	101,33
31	F01x	PB08	DZ02	24,15	23,85	23,73	23,91	4	23,91			0,18	0,74	101,38
32	F24x	PZ98	DA02	23,88	23,93	24,00	24,02	4	23,96			0,06	0,27	101,60
33	F03x	PZ98	DA01	23,86	24,03	24,10	23,92	4	23,98			0,11	0,45	101,68
34	F08x	PZ98	DA01	24,41	24,73	23,45	23,35	4	23,99			0,69	2,87	101,71
35	A39	PZ98	DA02	24,23	24,38	24,42	23,58	4	24,15			0,39	1,62	102,42
36	F16x	PZ98	DA02	24,21	24,44	23,80	24,67	4	24,28			0,37	1,53	102,96
37	F21x	PZ98	DA01	24,48	24,36	24,05	24,27	4	24,29			0,18	0,75	103,01
38	A88	PB07	DZ02	24,11	24,48	24,27	24,32	4	24,30			0,15	0,63	103,03
39	F13x	PZ98	DA01	23,97	23,96	24,96	24,54	4	24,36			0,48	1,99	103,29
40	A56	PZ98	DA02	25,10	24,90	24,30	24,20	4	24,63			0,44	1,80	104,43
41	A47	PZ98	DA02	25,25	25,79	24,49	23,63	0	24,79	*c*		0,94	3,79	105,13
42	F33x	PZ98	DA02	28,28	28,64	28,52	28,76	0	28,55	*b*	*	0,20	0,72	121,07
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	n	Mean	s_r	CV_r
all labs	**152**	**23,58**	**0,252**	**1,068**
10	% from the mean			
	l		s_R	CV_R
	38		**0,526**	**2,229**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: N **Sample: 4** 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	11,41	11,48	11,30	11,56	0	11,44	*b* *	0,11	0,96	85,82
2	A43	PB08	DZ02	12,38	12,38	*12,24a*	12,38	3	12,38		0,00	0,00	92,89
3	F12x	PZ98	DA02	12,67	12,41	12,20	12,43	4	12,43		0,19	1,55	93,24
4	A62x	PZ98	DA01	12,70	12,50	12,40	12,90	4	12,63		0,22	1,76	94,73
5	A65	PZ98	DA02	12,61	12,65	13,01	12,54	4	12,70		0,21	1,65	95,31
6	F28x	PZ98	DA01	12,80	12,50	13,10	12,50	4	12,73		0,29	2,26	95,48
7	F25x	PZ98	DA01	12,89	12,82	12,87	12,93	4	12,88		0,05	0,36	96,62
8	A85x	PZ98	DA01	13,00	12,92	12,96	12,98	4	12,96		0,03	0,25	97,27
9	A45x	PZ98	DA02	13,00	13,20	12,90	12,90	4	13,00		0,14	1,09	97,54
10	A71	PB07	DZ02	13,01	12,94	12,97	13,13	4	13,01		0,08	0,63	97,62
11	A42	PZ98	DA01	13,63	12,94	12,69	12,82	4	13,02		0,42	3,22	97,69
12	F19x	PZ98	DA99	12,90	12,90	13,10	13,60	4	13,13		0,33	2,52	98,48
13	F22x	PZ98	DA01	13,17	13,38	13,10	12,88	4	13,13		0,21	1,58	98,54
14	F21x	PZ98	DA01	13,10	13,18	13,20	13,16	4	13,16		0,04	0,33	98,74
15	A86	PZ98	DA01	13,33	13,20	13,15	13,10	4	13,20		0,10	0,75	99,00
16	F14x	PZ98	DA01	13,10	13,20	13,20	13,40	4	13,23		0,13	0,95	99,23
17	F06x	PZ98	DA02	13,32	13,23	13,28	13,11	4	13,24		0,09	0,69	99,30
18	A61x	PZ98	DA02	13,29	13,20	13,27	13,25	4	13,25		0,04	0,29	99,43
19	F26x	PB08	DZ02	13,26	13,28	13,27	13,26	4	13,27		0,01	0,07	99,55
20	F02x	PZ98	DA01	13,41	13,40	13,10	13,18	4	13,27		0,16	1,18	99,58
21	F32x	PZ98	DA01	13,40	13,40	13,30	13,00	4	13,28		0,19	1,43	99,60
22	F15x	PZ98	DA01	13,38	13,30	13,30	13,24	4	13,31		0,06	0,43	99,83
23	F18x	PB07	DZ02	13,30	13,40	13,30	13,30	4	13,33		0,05	0,38	99,98
24	F03x	PZ98	DA01	13,29	13,36	13,29	13,37	4	13,33		0,04	0,33	100,00
25	A58x	PZ98	DA99	13,30	13,50	13,40	13,20	4	13,35		0,13	0,97	100,17
26	F07x	PZ98	DA01	13,34	13,33	13,56	13,21	4	13,36		0,15	1,09	100,24
27	F05x	PZ98	DA01	13,30	13,50	13,50	13,40	4	13,43		0,10	0,71	100,73
28	F16x	PZ98	DA02	13,59	13,63	13,22	13,32	4	13,44		0,20	1,50	100,84
29	F24x	PZ98	DA02	13,37	13,50	13,55	13,47	4	13,47		0,08	0,56	101,09
30	A57	PZ98	DA01	13,70	13,25	13,58	13,62	4	13,54		0,20	1,46	101,57
31	A36	PB07	DZ02	13,59	13,59	13,70	13,48	4	13,59		0,09	0,66	101,97
32	A82	PZ98	DA02	13,50	13,30	14,00	13,60	4	13,60		0,29	2,16	102,04
33	A60x	PZ98	DA02	13,76	13,48	13,57	13,62	4	13,61		0,12	0,86	102,10
34	F33x	PZ98	DA02	13,46	13,81	13,57	13,69	4	13,63		0,15	1,11	102,29
35	A39	PZ98	DA02	13,69	13,65	13,56	13,67	4	13,64		0,06	0,42	102,36
36	A47	PZ98	DA02	14,81	14,59	12,55	12,88	0	13,71	*c*	1,16	8,44	102,85
37	F01x	PB08	DZ02	14,02	13,96	13,61	13,67	4	13,81		0,21	1,50	103,63
38	F08x	PZ98	DA01	13,93	13,89	14,28	13,78	4	13,97		0,22	1,55	104,82
39	F13x	PZ98	DA01	13,68	13,88	14,44	14,05	4	14,01		0,32	2,30	105,14
40	F27x	PZ98	DA01	13,67	14,11	14,47	14,10	4	14,09		0,33	2,32	105,70
41	A88	PB07	DZ02	14,19	14,09	14,30	14,25	4	14,21		0,09	0,64	106,60
42	A56	PZ98	DA02	14,30	14,30	14,70	13,90	4	14,30		0,33	2,28	107,29
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	n	Mean	s_r	CV_r
all labs	**159**	**13,33**	**0,153**	**1,148**
10	% from the mean			

l	s_R	CV_R
40	**0,443**	**3,328**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: S **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	F07x	PD99	DB08	0,57	0,52	0,53	0,52	4	0,54	*	0,02	4,14	84,63
2	A56	PC01	DB08	0,55	0,56	0,54	0,54	4	0,55		0,01	1,67	87,04
3	F18x	PD99	DB08	0,57	0,57	0,56	0,57	4	0,57		0,00	0,42	89,42
4	A36	PD02	DB08	0,54	0,59	0,57	0,58	4	0,57		0,02	3,79	90,17
5	A57	PZ02	DD02	0,57	0,55	0,60	0,59	4	0,58		0,02	3,84	91,35
6	A59	PC01	DB08	0,57	0,58	0,58	0,59	4	0,58		0,01	1,55	91,94
7	A82	PD01	DB08	0,58	0,59	0,60	0,61	4	0,59		0,01	2,03	93,98
8	A58x	PZ98	DA99	0,60	0,60	0,60	0,60	4	0,60		0,00	0,00	94,91
9	F15x	PC01	DB08	0,59	0,57	0,62	0,63	4	0,60		0,03	4,57	95,31
10	F14x	PC01	DB08	0,63	0,60	0,60	0,59	4	0,61		0,02	2,86	95,70
11	F12x	PC01	DB08	0,61	0,62	0,62	0,62	4	0,62		0,00	0,72	97,40
12	F16x	PC01	DB08	0,62	0,61	0,63	0,62	4	0,62		0,01	1,15	97,74
13	F19x	PD02	DB08	0,65	0,59	0,59	0,64	4	0,62		0,03	4,92	97,80
14	F02x	PZ98	DA01	0,60	0,58	0,65	0,67	4	0,62		0,04	6,87	98,39
15	A71	PB03	DZ99	0,62	0,64	0,64	0,61	4	0,63		0,02	2,46	99,11
16	F32x	PD01	DB08	0,64	0,62	0,65	0,61	4	0,63		0,02	2,75	99,58
17	F13x	PD01	DB08	0,68	0,64	0,60	0,60	4	0,63		0,04	6,33	99,71
18	A79	PD03	DB99	0,64	0,65	0,63	0,64	4	0,64		0,01	1,25	101,28
19	A61x	PD01	DB08	0,66	0,66	0,62	0,66	4	0,65		0,02	2,63	102,74
20	F24x	PD01	DB99	0,64	0,65	0,65	0,66	4	0,65		0,01	1,26	102,82
21	F05x	PZ98	DA01	0,65	0,65	0,66	0,65	4	0,65		0,00	0,63	102,90
22	F06x	PD02	DB08	0,67	0,67	0,63	0,64	4	0,65		0,02	2,72	103,10
23	F28x	PZ98	DA01	0,62	0,64	0,69	0,66	4	0,65		0,03	4,34	103,14
24	A39	PC02	DB08	0,64	0,66	0,67	0,66	4	0,66		0,01	2,00	103,76
25	A88	PZ98	DA01	0,66	0,66	0,64	0,67	4	0,66		0,01	1,91	104,01
26	F03x	PD02	DB08	0,68	0,67	0,66	0,63	4	0,66		0,02	3,23	104,36
27	A62x	PZ98	DA01	0,70	0,69	0,68	0,58	4	0,66		0,06	8,69	104,68
28	A45x	PB99	DB08	0,66	0,67	0,68	0,64	4	0,66		0,02	2,51	104,96
29	F22x	PC02	DB08	0,67	0,64	0,66	0,69	4	0,67		0,02	3,08	105,21
30	F33x	PD01	DB10	0,64	0,67	0,68	0,70	4	0,67		0,02	3,70	105,87
31	A85x	PZ98	DA01	0,66	0,66	0,69	0,67	4	0,67		0,01	1,55	106,10
32	A47	PC01	DB08	0,69	0,68	0,66	0,69	4	0,68		0,01	2,14	107,37
33	A60x	PD01	DB10	0,68	0,68	0,69	0,68	4	0,68		0,01	0,80	107,40
34	A65	PD01	DB08	0,63	0,71	0,65	0,74	4	0,68		0,05	7,51	107,96
35	F08x	PZ99	DB08	0,64	0,66	0,71	0,72	4	0,68		0,04	6,01	108,21
36	F25x	PB06	DB08	0,70	0,70	0,68	0,70	4	0,70		0,01	1,44	109,94
37	A86	PZ98	DA01	0,82	0,81	0,81	0,80	0	0,81	*b* *	0,01	1,04	127,93
38	F21x	PZ98	DA01	0,93	0,82	0,88	0,87	0	0,88	*b* *	0,05	5,15	138,41
39	F27x	PZ98	DA01	1,21	0,79	0,85	0,95	0	0,95	*b* *	0,19	**19,77**	150,48
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	n	Mean	s_r	CV_r
all labs	**144**	**0,63**	**0,019**	**3,002**
15	% from the mean			

l	s_R	CV_R
36	**0,041**	**6,445**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: S **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	F07x	PD99	DB08	0,74	0,74	0,73	0,71	0	0,73	*b*	*	0,01	1,76	77,45
2	A56	PC01	DB08	0,75	0,76	0,76	0,76	0	0,75	*b*	*	0,01	0,85	80,07
3	A71	PB03	DZ99	0,85	0,86	0,84	0,84	4	0,85			0,01	1,15	89,98
4	A36	PD02	DB08	0,83	0,86	0,89	0,85	4	0,86			0,03	2,92	91,06
5	F32x	PD01	DB08	0,88	0,89	0,89	0,85	4	0,88			0,02	1,93	92,97
6	F16x	PC01	DB08	0,89	0,86	0,89	0,86	4	0,88			0,02	2,03	93,01
7	F12x	PC01	DB08	0,86	0,93	0,87	0,89	4	0,89			0,03	3,22	94,08
8	A59	PC01	DB08	0,89	0,90	0,88	0,87	4	0,89			0,01	1,35	94,18
9	F14x	PC01	DB08	0,88	0,89	0,89	0,89	4	0,89			0,01	0,56	94,25
10	A58x	PZ98	DA99	0,90	0,90	0,90	0,90	4	0,90			0,00	0,00	95,58
11	F27x	PZ98	DA01	0,88	*1,187a*	0,91	0,95	3	0,91			0,04	3,85	96,74
12	F33x	PD01	DB10	0,93	0,92	0,90	0,90	4	0,91			0,01	1,41	96,77
13	A82	PD01	DB08	0,90	0,92	0,88	0,94	4	0,91			0,03	2,94	96,88
14	A79	PD03	DB99	0,91	0,92	0,92	0,91	4	0,91			0,01	0,66	97,15
15	A62x	PZ98	DA01	0,90	0,90	0,91	0,99	4	0,92			0,04	4,73	98,10
16	F03x	PD02	DB08	0,92	0,93	0,93	0,93	4	0,93			0,00	0,37	98,52
17	F22x	PC02	DB08	0,92	0,93	0,93	0,93	4	0,93			0,00	0,44	98,53
18	A61x	PD01	DB08	0,93	0,94	0,93	0,92	4	0,93			0,01	0,70	98,55
19	F06x	PD02	DB08	0,93	0,93	0,92	0,93	4	0,93			0,01	0,55	98,58
20	A45x	PB99	DB08	0,93	0,93	0,93	0,92	4	0,93			0,01	0,77	98,60
21	A39	PC02	DB08	0,93	0,93	0,94	0,93	4	0,93			0,01	0,56	99,10
22	F13x	PD01	DB08	0,94	0,93	0,93	0,94	4	0,94			0,00	0,08	99,29
23	F08x	PZ99	DB08	0,91	0,93	0,97	0,97	4	0,94			0,03	3,39	100,07
24	A85x	PZ98	DA01	0,95	0,95	0,95	0,94	4	0,95			0,01	0,55	100,41
25	A88	PZ98	DA01	0,94	0,96	0,94	0,97	4	0,95			0,02	1,57	101,15
26	F21x	PZ98	DA01	1,00	0,89	0,95	0,98	4	0,96			0,05	5,02	101,42
27	F02x	PZ98	DA01	0,95	0,98	0,94	0,96	4	0,96			0,01	1,54	101,74
28	F19x	PD02	DB08	0,97	0,96	0,95	0,96	4	0,96			0,01	0,83	101,87
29	F05x	PZ98	DA01	1,06	0,90	1,03	0,90	0	0,97	*c*		0,08	8,67	103,30
30	A65	PD01	DB08	0,98	0,98	0,99	0,98	4	0,98			0,01	0,51	104,34
31	A47	PC01	DB08	0,97	0,99	0,99	1,01	4	0,99			0,02	1,86	105,08
32	F25x	PB06	DB08	1,00	1,00	0,99	0,99	4	1,00			0,01	0,58	105,67
33	F18x	PD99	DB08	1,00	0,99	1,02	0,99	4	1,00			0,01	1,45	106,06
34	A57	PZ02	DD02	0,99	1,02	1,01	1,02	4	1,01			0,01	1,40	107,26
35	F15x	PC01	DB08	1,04	1,01	1,01	1,01	4	1,02			0,02	1,47	108,05
36	A60x	PD01	DB10	1,03	1,02	1,02	1,01	4	1,02			0,01	0,70	108,21
37	A86	PZ98	DA01	1,06	1,07	1,04	1,05	4	1,06			0,01	1,22	112,04
38	F24x	PD01	DB99	1,05	1,06	1,09	1,09	4	1,07			0,02	1,92	113,90
39	F28x	PZ98	DA01	1,17	1,20	1,13	1,24	0	1,19	*b*	*	0,05	3,93	125,84
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	n	Mean	s_r	CV_r
all labs	**139**	**0,94**	**0,015**	**1,541**
15	% from the mean			

l	s_R	CV_R
35	**0,054**	**5,691**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: S **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	F07x	PD99	DB08	1,17	1,21	1,16	1,15	4	1,17	*	0,02	2,01	78,57
2	A71	PB03	DZ99	1,20	*1,152a*	1,19	1,19	3	1,20	*	0,00	0,26	80,12
3	A56	PC01	DB08	1,19	1,21	1,24	1,20	4	1,21	*	0,02	1,89	80,99
4	F21x	PZ98	DA01	1,24	1,31	1,35	1,28	4	1,30		0,05	3,59	86,76
5	F16x	PC01	DB08	1,30	1,34	1,31	1,32	4	1,32		0,02	1,34	88,29
6	F32x	PD01	DB08	1,38	1,39	1,39	1,38	4	1,39		0,01	0,42	92,79
7	A36	PD02	DB08	1,38	1,40	1,47	1,38	4	1,41		0,04	3,04	94,30
8	A45x	PB99	DB08	1,44	1,42	1,41	1,44	4	1,43		0,02	1,05	95,64
9	F12x	PC01	DB08	1,44	1,46	1,41	1,44	4	1,44		0,02	1,39	96,22
10	A57	PZ02	DD02	1,43	1,46	1,44	1,42	4	1,44		0,02	1,19	96,31
11	A62x	PZ98	DA01	1,43	1,44	1,46	1,44	4	1,44		0,01	0,87	96,65
12	A61x	PD01	DB08	1,49	1,45	1,40	1,46	4	1,45		0,04	2,60	97,22
13	F27x	PZ98	DA01	1,40	1,55	1,36	1,51	0	1,45	*c*	0,09	6,14	97,28
14	A82	PD01	DB08	1,45	1,49	1,42	1,46	4	1,45		0,03	2,08	97,42
15	F14x	PC01	DB08	1,47	1,47	1,45	1,45	4	1,46		0,01	0,79	97,82
16	A59	PC01	DB08	1,49	1,46	1,47	1,48	4	1,47		0,01	0,89	98,79
17	F06x	PD02	DB08	1,56	1,46	1,43	1,46	4	1,48		0,05	3,66	98,94
18	F08x	PZ99	DB08	1,42	1,47	1,55	1,50	4	1,49		0,06	3,89	99,49
19	F22x	PC02	DB08	1,48	1,49	1,48	1,50	4	1,49		0,01	0,65	99,59
20	A79	PD03	DB99	1,46	1,49	1,49	1,51	4	1,49		0,02	1,22	99,68
21	A58x	PZ98	DA99	1,50	1,50	1,50	1,50	4	1,50		0,00	0,00	100,50
22	F13x	PD01	DB08	1,50	1,51	1,51	1,51	4	1,51		0,00	0,25	100,98
23	A39	PC02	DB08	1,51	1,49	1,53	1,52	4	1,51		0,02	1,06	101,37
24	F03x	PD02	DB08	1,54	1,52	1,52	1,51	4	1,52		0,01	0,75	101,97
25	A88	PZ98	DA01	1,52	1,52	1,53	1,54	4	1,53		0,01	0,63	102,34
26	F19x	PD02	DB08	1,52	1,54	1,53	1,53	4	1,53		0,01	0,53	102,51
27	F02x	PZ98	DA01	1,54	1,56	1,56	1,54	4	1,55		0,01	0,74	103,85
28	F24x	PD01	DB99	1,52	1,53	1,64	1,64	4	1,58		0,07	4,20	106,03
29	A65	PD01	DB08	1,57	1,61	1,58	1,57	4	1,58		0,02	1,20	106,03
30	F05x	PZ98	DA01	*1,8a*	1,60	1,60	1,56	3	1,59		0,02	1,46	106,31
31	F25x	PB06	DB08	1,59	1,70	1,59	1,60	4	1,62		0,05	3,31	108,54
32	F28x	PZ98	DA01	1,66	1,70	1,55	1,58	4	1,62		0,07	4,28	108,71
33	A47	PC01	DB08	1,64	1,64	1,66	1,55	4	1,62		0,05	3,09	108,86
34	A60x	PD01	DB10	1,65	1,60	1,61	1,65	4	1,63		0,03	1,62	108,91
35	F33x	PD01	DB10	1,63	1,59	1,67	1,62	4	1,63		0,03	1,95	109,18
36	F18x	PD99	DB08	1,61	1,64	1,64	1,63	4	1,63		0,01	0,87	109,21
37	F15x	PC01	DB08	1,62	1,67	1,66	1,62	4	1,64		0,03	1,60	110,05
38	A85x	PZ98	DA01	1,65	1,64	1,64	1,65	4	1,64		0,01	0,47	110,11
39	A86	PZ98	DA01	1,71	1,74	1,72	1,73	4	1,73	*	0,01	0,75	115,57
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	n	Mean	s_r	CV_r
all labs	**150**	**1,49**	**0,024**	**1,623**
15	% from the mean			

l	s_R	CV_R
38	**0,129**	**8,644**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: S **Sample: 4** 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	A71	PB03	DZ99	0,74	0,74	0,75	0,75	4	0,74	*	0,00	0,64	80,40
2	A56	PC01	DB08	0,75	0,74	0,77	0,74	4	0,75	*	0,01	1,52	80,85
3	F07x	PD99	DB08	0,78	0,79	0,78	0,78	4	0,78	*	0,01	0,71	84,29
4	F32x	PD01	DB08	0,86	0,85	0,85	0,85	4	0,85		0,01	0,75	92,25
5	A36	PD02	DB08	0,85	0,84	0,89	0,85	4	0,86		0,02	2,59	92,63
6	A61x	PD01	DB08	0,87	0,87	0,88	0,86	4	0,87		0,01	1,28	93,95
7	F14x	PC01	DB08	0,88	0,88	0,88	0,87	4	0,88		0,01	0,57	94,79
8	F12x	PC01	DB08	0,90	0,86	0,88	0,88	4	0,88		0,01	1,50	94,87
9	F21x	PZ98	DA01	0,94	0,88	0,86	0,89	4	0,89		0,03	3,81	96,41
10	A58x	PZ98	DA99	0,90	0,90	0,90	0,90	4	0,90		0,00	0,00	97,22
11	A59	PC01	DB08	0,89	0,89	0,92	0,90	4	0,90		0,02	1,88	97,23
12	F16x	PC01	DB08	0,90	0,91	0,92	0,90	4	0,91		0,01	0,96	97,89
13	A82	PD01	DB08	0,87	0,94	0,89	0,93	4	0,91		0,03	3,22	98,08
14	F13x	PD01	DB08	0,89	0,91	0,92	0,91	4	0,91		0,01	1,41	98,17
15	A79	PD03	DB99	0,90	0,91	0,92	0,92	4	0,91		0,01	0,89	98,43
16	F05x	PZ98	DA01	0,91	0,90	0,92	0,92	4	0,91		0,01	1,01	98,65
17	A45x	PB99	DB08	0,92	0,92	0,92	0,91	4	0,92		0,01	0,81	99,06
18	F06x	PD02	DB08	0,94	0,92	0,92	0,91	4	0,92		0,01	1,34	99,46
19	A62x	PZ98	DA01	0,92	0,94	0,88	0,94	4	0,92		0,03	3,17	99,54
20	F22x	PC02	DB08	0,92	0,92	0,93	0,93	4	0,92		0,00	0,31	99,86
21	F02x	PZ98	DA01	0,96	0,93	0,92	0,93	4	0,94		0,02	2,08	101,16
22	A57	PZ02	DD02	0,91	0,93	0,96	0,96	4	0,94		0,02	2,61	101,54
23	A88	PZ98	DA01	0,92	0,94	0,95	0,96	4	0,94		0,02	1,81	101,81
24	F27x	PZ98	DA01	0,85	1,05	0,90	0,98	0	0,94	*c*	0,09	9,45	102,03
25	F03x	PD02	DB08	0,95	0,95	0,94	0,94	4	0,95		0,00	0,43	102,27
26	F19x	PD02	DB08	0,95	0,95	0,95	0,95	4	0,95		0,00	0,27	102,62
27	F08x	PZ99	DB08	0,96	0,95	0,98	0,98	4	0,97		0,02	1,65	104,37
28	F25x	PB06	DB08	0,97	0,97	0,96	0,97	4	0,97		0,01	0,52	104,51
29	A47	PC01	DB08	0,97	0,97	0,98	0,96	4	0,97		0,01	0,80	104,70
30	F18x	PD99	DB08	0,98	0,96	0,97	0,98	4	0,97		0,01	1,12	105,13
31	A39	PC02	DB08	0,94	1,03	0,94	1,02	4	0,98		0,05	5,21	106,20
32	A65	PD01	DB08	0,98	0,99	1,00	0,98	4	0,99		0,01	0,97	106,67
33	A60x	PD01	DB10	1,02	0,98	0,98	0,99	4	0,99		0,02	1,90	106,96
34	F24x	PD01	DB99	0,99	0,99	1,03	0,96	4	0,99		0,03	2,89	107,21
35	F33x	PD01	DB10	1,06	0,97	1,02	0,97	4	1,00		0,04	4,32	108,48
36	F15x	PC01	DB08	1,01	1,00	1,01	1,02	4	1,01		0,01	0,81	109,10
37	A86	PZ98	DA01	1,07	1,04	1,01	1,04	4	1,04		0,02	2,36	112,34
38	A85x	PZ98	DA01	1,12	1,12	1,11	1,12	4	1,12	*	0,01	0,54	120,88
39	F28x	PZ98	DA01	1,22	1,19	1,24	1,23	0	1,22	*b* *	0,02	1,77	131,79
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	n	Mean	s_r	CV_r
all labs	**148**	**0,93**	**0,015**	**1,600**
15	% from the mean			

l	s_R	CV_R
37	**0,074**	**7,960**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: P **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	F21x	PD02	DE01	1,23	1,29	1,13	1,25	0	1,23	*b*	*	0,07	5,56	79,06
2	A59	PC01	DB08	1,36	1,38	1,38	1,46	4	1,40			0,05	3,22	90,13
3	A57	PZ02	DD02	1,37	1,34	1,46	1,45	4	1,41			0,06	4,21	90,68
4	F07x	PD99	DB08	1,51	1,36	1,42	1,39	4	1,42			0,07	4,72	91,67
5	A43	PB06	DE01	1,44	1,42	1,42	1,43	4	1,43			0,01	0,84	92,10
6	F15x	PC01	DB08	1,40	1,37	1,45	1,49	4	1,43			0,05	3,72	92,13
7	F16x	PC01	DB08	1,45	1,41	1,45	1,43	4	1,43			0,02	1,20	92,54
8	F18x	PD99	DB08	1,49	1,49	1,43	1,40	4	1,45			0,04	3,10	93,75
9	A36	PD02	DB08	*1,33a*	1,47	1,44	1,46	3	1,46			0,02	1,05	94,02
10	F24x	PD01	DB99	1,45	1,48	1,50	1,51	4	1,49			0,03	1,78	95,85
11	A71	PB03	DE01	1,51	1,51	1,50	1,51	4	1,51			0,01	0,50	97,23
12	F13x	PD01	DB08	1,62	1,54	1,43	1,46	4	1,51			0,08	5,61	97,52
13	F19x	PD02	DB08	1,59	1,43	1,47	1,56	4	1,51			0,07	4,96	97,62
14	F01x	PD02	DE01	1,54	1,52	1,50	1,51	4	1,52			0,02	1,13	97,94
15	A61x	PB02	DB08	1,56	1,52	1,49	1,52	4	1,52			0,03	1,73	98,20
16	F12x	PC01	DB08	1,47	1,54	1,56	1,52	4	1,52			0,04	2,46	98,36
17	A56	PC01	DB08	1,54	1,54	1,50	1,51	4	1,52			0,02	1,41	98,39
18	F03x	PD02	DB08	1,59	1,59	1,52	1,42	4	1,53			0,08	5,26	98,75
19	A60x	PD01	DB10	1,56	1,52	1,55	1,50	4	1,53			0,03	1,73	98,94
20	F22x	PC02	DB08	1,53	1,49	1,51	1,61	4	1,53			0,06	3,64	98,97
21	F27x	PD01	DE01	1,53	1,55	1,55	1,53	4	1,54			0,02	1,05	99,39
22	A88	PD01	DB08	1,52	1,56	1,52	1,58	4	1,55			0,03	1,94	99,72
23	F28x	PD02	DB08	1,56	1,61	1,51	1,54	4	1,56			0,04	2,61	100,44
24	A82	PD01	DB08	1,56	1,68	1,53	1,55	4	1,58			0,07	4,18	101,91
25	A39	PC02	DB08	1,59	1,64	1,55	1,53	4	1,58			0,05	3,07	101,91
26	F26x	PD02	DB09	1,57	1,59	1,58	1,58	4	1,58			0,01	0,52	101,98
27	F02x	PD02	DB08	1,51	1,57	1,60	1,66	4	1,59			0,06	3,95	102,32
28	F05x	PD02	DB08	1,58	1,61	1,59	1,57	4	1,59			0,02	1,08	102,46
29	A45x	PE99	DB08	1,57	1,61	1,64	1,55	4	1,59			0,04	2,53	102,78
30	F25x	PB06	DB08	1,62	1,58	1,57	1,60	4	1,59			0,02	1,39	102,78
31	F14x	PC01	DB08	1,67	1,58	1,57	1,56	4	1,60			0,05	3,18	102,94
32	F06x	PD02	DB08	1,62	1,64	1,55	1,59	4	1,60			0,04	2,44	103,17
33	A79	PD03	DB99	1,61	1,61	1,59	1,61	4	1,61			0,01	0,82	103,62
34	A58x	PD02	DE99	1,61	1,62	1,63	1,59	4	1,61			0,02	1,06	104,07
35	A62x	PC02	DE01	1,65	1,56	1,66	1,76	4	1,66			0,08	4,94	106,98
36	A47	PC01	DB08	1,65	1,66	1,67	1,69	4	1,67			0,02	1,00	107,54
37	F32x	PD01	DB08	1,66	1,73	1,71	1,59	4	1,67			0,06	3,73	107,95
38	F33x	PD01	DB10	1,63	1,66	1,71	1,72	4	1,68			0,04	2,53	108,43
39	F08x	PE99	DB08	1,69	1,68	1,70	1,73	4	1,70			0,02	1,08	109,77
40	A65	PD01	DB08	1,58	1,79	1,62	1,86	0	1,71	*c*	*	0,13	7,83	110,53
41	A85x	PD02	DB08	1,78	1,74	1,76	1,75	4	1,76		*	0,02	1,00	113,53
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	n	Mean	s_r	CV_r
all labs	**155**	**1,55**	**0,038**	**2,455**
10	% from the mean			

l	s_R	CV_R
39	**0,086**	**5,544**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A43	PB06	DE01	1,59	1,53	1,58	1,58	4	1,57	*	0,03	1,69	85,64
2	F07x	PD99	DB08	1,60	1,57	1,62	1,60	4	1,60	*	0,02	1,32	87,20
3	A56	PC01	DB08	1,70	1,71	1,70	1,71	4	1,70		0,01	0,38	92,93
4	F16x	PC01	DB08	1,69	1,75	1,70	1,73	4	1,72		0,03	1,50	93,78
5	A57	PZ02	DD02	1,70	1,72	1,73	1,76	4	1,73		0,03	1,45	94,24
6	A59	PC01	DB08	1,74	1,74	1,76	1,73	4	1,74		0,01	0,71	94,90
7	A71	PB03	DE01	1,75	1,73	1,76	1,74	4	1,75		0,01	0,58	95,29
8	F03x	PD02	DB08	1,79	1,78	1,73	1,70	4	1,75		0,04	2,42	95,47
9	F28x	PD02	DB08	1,70	1,74	1,83	1,75	4	1,75		0,05	3,06	95,67
10	A36	PD02	DB08	1,68	1,78	1,83	1,75	4	1,76		0,06	3,56	96,01
11	F13x	PD01	DB08	1,79	1,79	1,78	1,80	4	1,79		0,00	0,28	97,64
12	A88	PD01	DB08	1,76	1,79	1,80	1,83	4	1,80		0,03	1,61	97,92
13	F01x	PD02	DE01	1,79	1,80	1,81	1,81	4	1,80		0,01	0,53	98,33
14	A61x	PB02	DB08	1,79	1,79	1,83	1,80	4	1,80		0,02	1,01	98,37
15	F22x	PC02	DB08	1,81	1,77	1,82	1,83	4	1,81		0,03	1,47	98,54
16	F27x	PD01	DE01	1,84	1,84	1,78	1,77	4	1,81		0,04	2,11	98,59
17	F05x	PD02	DB08	1,83	1,81	1,83	1,84	4	1,83		0,01	0,69	99,70
18	F12x	PC01	DB08	1,79	1,87	1,83	1,83	4	1,83		0,03	1,68	99,82
19	F26x	PD02	DB09	1,83	1,83	1,82	1,84	4	1,83		0,01	0,45	99,83
20	A45x	PE99	DB08	1,84	1,83	1,84	1,82	4	1,83		0,01	0,52	99,97
21	A58x	PD02	DE99	1,83	1,84	1,84	1,84	4	1,84		0,01	0,27	100,24
22	F18x	PD99	DB08	1,84	1,85	1,87	1,85	4	1,85		0,01	0,68	101,06
23	A60x	PD01	DB10	1,88	1,86	1,86	1,86	4	1,86		0,01	0,52	101,71
24	A82	PD01	DB08	1,88	1,89	1,82	1,90	4	1,87		0,04	1,99	101,97
25	A79	PD03	DB99	1,88	1,86	1,88	1,85	4	1,87		0,01	0,77	101,99
26	F24x	PD01	DB99	1,86	1,86	1,89	1,89	4	1,88		0,02	0,92	102,29
27	F06x	PD02	DB08	1,89	1,86	1,88	1,89	4	1,88		0,02	0,81	102,53
28	A39	PC02	DB08	1,85	1,89	1,90	1,92	4	1,89		0,03	1,54	103,16
29	F14x	PC01	DB08	1,87	1,89	1,91	1,90	4	1,89		0,02	0,90	103,24
30	F21x	PD02	DE01	1,92	1,88	1,89	1,90	4	1,90		0,02	0,90	103,52
31	F32x	PD01	DB08	1,90	1,91	1,93	1,90	4	1,91		0,01	0,74	104,20
32	F19x	PD02	DB08	1,91	1,91	1,89	1,93	4	1,91		0,02	0,85	104,20
33	F33x	PD01	DB10	1,89	1,90	1,94	1,92	4	1,91		0,02	1,16	104,33
34	F25x	PB06	DB08	1,91	1,91	1,90	1,93	4	1,91		0,01	0,66	104,33
35	F15x	PC01	DB08	1,97	1,93	1,90	1,91	4	1,93		0,03	1,61	105,15
36	A47	PC01	DB08	1,92	1,93	1,96	1,93	4	1,93		0,02	0,87	105,41
37	F02x	PD02	DB08	1,87	1,90	1,95	2,03	0	1,93	*c*	0,07	3,62	105,53
38	A62x	PC02	DE01	1,97	1,94	2,01	1,87	4	1,95		0,06	3,03	106,24
39	A85x	PD02	DB08	1,97	1,97	1,95	1,93	4	1,95		0,02	0,96	106,45
40	F08x	PE99	DB08	1,96	1,98	1,97	2,01	4	1,98		0,02	1,16	108,07
41	A65	PD01	DB08	1,98	2,03	2,04	2,02	4	2,02	*	0,03	1,30	110,06
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	n	Mean	s_r	CV_r
all labs	**160**	**1,83**	**0,022**	**1,212**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
40	**0,095**	**5,181**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: P **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	A43	PB06	DE01	1,09	1,09	1,15	1,10	4	1,11	*	0,03	2,37	86,65
2	F07x	PD99	DB08	1,11	1,18	1,11	1,12	4	1,13	*	0,03	2,84	88,41
3	F21x	PD02	DE01	1,12	1,13	1,16	1,11	4	1,13	*	0,02	1,91	88,51
4	A56	PC01	DB08	1,16	1,18	1,20	1,18	4	1,18		0,02	1,54	92,35
5	A57	PZ02	DD02	1,20	1,21	1,19	1,21	4	1,20		0,01	0,80	94,19
6	A45x	PE99	DB08	1,22	1,21	1,22	1,22	4	1,22		0,01	0,41	95,37
7	F16x	PC01	DB08	1,22	1,23	1,25	1,21	4	1,22		0,02	1,33	95,89
8	A58x	PD02	DE99	1,21	1,21	1,24	1,24	4	1,23		0,02	1,41	95,95
9	A36	PD02	DB08	1,20	1,22	1,29	1,21	4	1,23		0,04	3,32	96,34
10	A59	PC01	DB08	1,24	1,24	1,27	1,25	4	1,25		0,01	1,15	97,87
11	F12x	PC01	DB08	1,25	1,27	1,23	1,25	4	1,25		0,02	1,44	97,99
12	F22x	PC02	DB08	1,25	1,25	1,25	1,25	4	1,25		0,00	0,19	98,00
13	A88	PD01	DB08	1,23	1,24	1,22	1,32	4	1,25		0,05	3,65	98,11
14	A71	PB03	DE01	1,25	1,26	1,26	1,26	4	1,25		0,01	0,44	98,27
15	F03x	PD02	DB08	1,29	1,29	1,23	1,21	4	1,26		0,04	3,29	98,30
16	F28x	PD02	DB08	1,29	1,24	1,24	1,26	4	1,26		0,02	1,95	98,54
17	A61x	PB02	DB08	1,28	1,27	1,26	1,25	4	1,26		0,01	1,01	98,91
18	F24x	PD01	DB99	1,24	1,27	1,27	1,28	4	1,27		0,02	1,37	99,09
19	F06x	PD02	DB08	1,33	1,26	1,23	1,26	4	1,27		0,05	3,59	99,34
20	F05x	PD02	DB08	1,26	1,28	1,27	1,27	4	1,27		0,01	0,64	99,48
21	A60x	PD01	DB10	1,29	1,24	1,28	1,27	4	1,27		0,02	1,66	99,56
22	A39	PC02	DB08	1,32	1,27	1,25	1,27	4	1,28		0,03	2,19	99,95
23	A79	PD03	DB99	1,30	1,30	1,28	1,26	4	1,28		0,02	1,28	100,50
24	A82	PD01	DB08	1,29	1,32	1,28	1,28	4	1,29		0,02	1,51	101,10
25	F02x	PD02	DB08	1,26	1,28	1,29	1,34	4	1,29		0,04	2,72	101,30
26	F18x	PD99	DB08	1,29	1,29	1,30	1,30	4	1,30		0,01	0,45	101,44
27	F13x	PD01	DB08	1,30	1,29	1,30	1,31	4	1,30		0,01	0,73	101,55
28	F27x	PD01	DE01	1,31	1,31	1,28	1,29	4	1,30		0,01	1,13	101,57
29	F01x	PD02	DE01	1,30	1,29	1,30	1,30	4	1,30		0,01	0,39	101,63
30	F14x	PC01	DB08	1,32	1,30	1,29	1,30	4	1,30		0,01	0,97	102,02
31	F32x	PD01	DB08	1,31	1,31	1,32	1,32	4	1,32		0,01	0,44	103,00
32	F15x	PC01	DB08	1,31	1,34	1,33	1,31	4	1,32		0,02	1,13	103,59
33	F19x	PD02	DB08	1,33	1,33	1,32	1,33	4	1,33		0,01	0,38	103,98
34	F25x	PB06	DB08	1,33	1,33	1,33	1,33	4	1,33		0,00	0,00	104,18
35	F08x	PE99	DB08	1,32	1,36	1,34	1,34	4	1,34		0,02	1,28	104,65
36	F26x	PD02	DB09	1,34	1,35	1,33	1,34	4	1,34		0,01	0,61	104,96
37	A47	PC01	DB08	1,37	1,38	1,39	1,31	4	1,36		0,03	2,50	106,61
38	F33x	PD01	DB10	1,36	1,37	1,44	1,41	4	1,40		0,04	2,65	109,27
39	A85x	PD02	DB08	1,40	1,40	1,40	1,38	4	1,40		0,01	0,64	109,31
40	A65	PD01	DB08	1,40	1,42	1,42	1,41	4	1,41	*	0,01	0,68	110,64
41	A62x	PC02	DE01	1,45	1,35	1,45	1,45	4	1,43	*	0,05	3,51	111,62
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	n	Mean	s_r	CV_r
all labs	**164**	**1,28**	**0,019**	**1,492**
* = non tolerable mean because more than +/- **10** % from the mean				

l	s_R	CV_R
41	**0,070**	**5,510**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: P **Sample: 4** 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	A43	PB06	DE01	2,08	2,08	2,08	2,10	4	2,08		0,01	0,58	91,04
2	A56	PC01	DB08	2,14	2,15	2,14	2,12	4	2,14		0,01	0,48	93,42
3	A57	PZ02	DD02	2,10	2,11	2,19	2,21	4	2,15		0,06	2,58	94,08
4	F07x	PD99	DB08	2,15	2,19	2,19	2,19	4	2,18		0,02	1,03	95,31
5	F28x	PD02	DB08	2,26	2,13	2,17	2,19	4	2,19		0,06	2,52	95,52
6	A71	PB03	DE01	2,22	2,20	2,19	2,17	4	2,19		0,02	0,87	95,90
7	A36	PD02	DB08	2,17	2,17	2,28	2,16	4	2,20		0,06	2,59	95,94
8	A59	PC01	DB08	2,17	2,16	2,29	2,20	4	2,20		0,06	2,78	96,31
9	F03x	PD02	DB08	2,28	2,29	2,13	2,15	4	2,21		0,08	3,81	96,70
10	F13x	PD01	DB08	2,22	2,20	2,22	2,22	4	2,21		0,01	0,47	96,76
11	F16x	PC01	DB08	2,21	2,23	2,23	2,21	4	2,22		0,01	0,59	97,05
12	F05x	PD02	DB08	2,25	2,23	2,24	2,24	4	2,24		0,01	0,36	97,91
13	F22x	PC02	DB08	2,23	2,23	2,23	2,26	4	2,24		0,02	0,70	97,94
14	A58x	PD02	DE99	2,28	2,27	2,27	2,22	4	2,26		0,03	1,20	98,78
15	F12x	PC01	DB08	2,30	2,26	2,26	2,27	4	2,27		0,02	0,90	99,39
16	F01x	PD02	DE01	2,26	2,26	2,28	2,30	4	2,28		0,02	0,84	99,44
17	A61x	PB02	DB08	2,28	2,30	2,30	2,28	4	2,29		0,01	0,40	100,08
18	A45x	PE99	DB08	2,30	2,31	2,29	2,31	4	2,30		0,01	0,42	100,64
19	A88	PD01	DB08	2,31	2,29	2,33	2,28	4	2,30		0,02	0,96	100,64
20	A79	PD03	DB99	2,32	2,32	2,29	2,29	4	2,30		0,02	0,70	100,69
21	A62x	PC02	DE01	2,35	2,32	2,28	2,28	4	2,31		0,03	1,47	100,86
22	A39	PC02	DB08	2,32	2,32	2,29	2,30	4	2,31		0,02	0,70	100,87
23	A85x	PD02	DB08	2,33	2,32	2,31	2,30	4	2,31		0,01	0,58	101,16
24	F24x	PD01	DB99	2,29	2,31	2,34	2,32	4	2,32		0,02	0,90	101,18
25	F18x	PD99	DB08	2,31	2,33	2,33	2,30	4	2,32		0,02	0,65	101,29
26	A82	PD01	DB08	2,30	2,31	2,29	2,37	4	2,32		0,04	1,56	101,40
27	F02x	PD02	DB08	2,25	2,30	2,36	2,41	4	2,33		0,07	2,90	101,82
28	F32x	PD01	DB08	2,35	2,35	2,32	2,32	4	2,34		0,02	0,74	102,06
29	F25x	PB06	DB08	2,33	2,34	2,33	2,34	4	2,34		0,01	0,25	102,06
30	F14x	PC01	DB08	2,35	2,35	2,34	2,34	4	2,35		0,01	0,25	102,50
31	A60x	PD01	DB10	2,36	2,35	2,39	2,33	4	2,36		0,03	1,14	103,00
32	F06x	PD02	DB08	2,39	2,36	2,34	2,33	4	2,36		0,02	1,04	103,00
33	F27x	PD01	DE01	2,40	2,30	2,34	2,39	4	2,36		0,05	1,94	103,06
34	F15x	PC01	DB08	2,35	2,34	2,38	2,38	4	2,36		0,02	0,87	103,26
35	A47	PC01	DB08	2,35	2,37	2,35	2,38	4	2,36		0,02	0,67	103,33
36	F08x	PE99	DB08	2,41	2,40	2,37	2,35	4	2,38		0,03	1,05	104,05
37	F21x	PD02	DE01	2,28	2,37	2,46	2,44	4	2,39		0,08	3,41	104,35
38	F19x	PD02	DB08	2,39	2,39	2,38	2,39	4	2,39		0,01	0,21	104,35
39	F26x	PD02	DB09	2,41	2,40	2,39	2,40	4	2,40		0,01	0,34	104,90
40	A65	PD01	DB08	2,46	2,47	2,49	2,46	4	2,47		0,01	0,57	107,96
41	F33x	PD01	DB10	2,66	2,46	2,59	2,57	0	2,57	*b* *	0,08	3,22	112,33
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	n	Mean	s_r	CV_r
all labs	**160**	**2,29**	**0,026**	**1,145**
* = non tolerable mean because more than +/- **10** % from the mean				

l	s_R	CV_R
40	**0,082**	**3,603**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Ca **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	F15x	PC01	DB08	4,17	4,09	4,35	4,53	4	4,29		0,20	4,58	90,55
2	F21x	PD02	DB09	4,21	4,34	4,29	4,36	4	4,30		0,07	1,55	90,87
3	A59	PC01	DB08	4,29	4,32	4,39	4,20	4	4,30		0,08	1,82	90,87
4	A82	PD01	DB08	4,26	4,25	4,30	4,42	4	4,31		0,08	1,79	91,01
5	F16x	PC01	DB08	4,38	4,43	4,36	4,40	4	4,39		0,03	0,66	92,75
6	A60x	PD01	DB10	4,40	4,53	4,37	4,33	4	4,41		0,09	1,99	93,15
7	A62x	PD02	DB01	4,40	4,50	4,38	4,42	4	4,43		0,05	1,19	93,51
8	F19x	PD02	DB08	4,65	4,36	4,23	4,57	4	4,45		0,19	4,32	94,09
9	F07x	PD99	DB08	4,50	4,41	4,62	4,50	4	4,51		0,09	1,92	95,23
10	A71	PB03	DZ99	4,61	4,62	4,51	4,52	4	4,57		0,06	1,29	96,47
11	A56	PC01	DB08	4,54	4,68	4,56	4,50	4	4,57		0,08	1,69	96,52
12	F18x	PD99	DB08	4,65	4,65	4,52	4,53	4	4,59		0,07	1,58	96,94
13	A36	PD02	DB08	4,22	4,62	4,80	4,72	4	4,59		0,26	5,61	96,99
14	F12x	PC01	DB08	4,49	4,66	4,66	4,60	4	4,60		0,08	1,75	97,25
15	A58x	PD02	DB02	4,66	4,65	4,60	4,63	4	4,64		0,03	0,57	97,94
16	A43	PB06	DB01	4,79	4,58	4,52	4,68	4	4,64		0,12	2,55	98,10
17	F01x	PD02	DB01	4,53	4,69	4,64	4,72	4	4,65		0,08	1,80	98,16
18	F25x	PB06	DB08	4,68	4,66	4,62	4,63	4	4,65		0,03	0,59	98,21
19	F13x	PD01	DB08	4,67	4,77	4,78	4,56	4	4,69		0,10	2,19	99,12
20	F14x	PC01	DB08	4,81	4,67	4,65	4,64	4	4,69		0,08	1,69	99,16
21	A61x	PB02	DB08	4,73	4,66	4,70	4,73	4	4,70		0,03	0,73	99,40
22	F28x	PD02	DB08	4,76	4,88	4,63	4,61	4	4,72		0,13	2,71	99,72
23	F03x	PD02	DB08	4,87	4,78	4,68	4,60	4	4,73		0,12	2,48	100,00
24	A79	PD03	DB99	4,83	4,71	4,69	4,70	4	4,73		0,06	1,37	100,05
25	F32x	PD01	DB08	4,73	4,70	4,78	4,73	4	4,74		0,03	0,70	100,06
26	F05x	PD02	DB08	4,67	4,86	4,75	4,77	4	4,76		0,08	1,64	100,64
27	F02x	PD02	DB08	4,62	4,72	4,83	4,91	4	4,77		0,13	2,67	100,81
28	F24x	PD01	DB99	4,65	4,78	4,87	4,89	4	4,80		0,11	2,23	101,36
29	F26x	PD02	DB09	4,80	4,81	4,79	4,80	4	4,80		0,01	0,17	101,43
30	A57	PZ02	DD02	4,73	4,71	4,88	4,90	4	4,81		0,10	2,06	101,54
31	A45x	PB99	DB08	4,94	4,96	4,76	4,78	4	4,86		0,10	2,15	102,70
32	F06x	PD02	DB08	5,00	5,03	4,88	4,93	4	4,96		0,07	1,36	104,79
33	A42	PB02	DB01	4,97	5,32	4,76	4,86	4	4,98		0,24	4,90	105,18
34	F08x	PE99	DB08	5,07	4,89	4,98	5,03	4	4,99		0,08	1,55	105,46
35	A39	PC02	DB08	5,04	5,19	5,12	4,87	4	5,06		0,14	2,70	106,87
36	A65	PD01	DB08	4,91	5,26	4,96	5,39	4	5,13		0,23	4,53	108,40
37	A85x	PD02	DB08	5,17	5,11	5,12	5,14	4	5,14		0,03	0,50	108,56
38	A47	PC01	DB08	5,17	5,29	5,14	5,13	4	5,18		0,07	1,42	109,53
39	F33x	PD01	DB10	5,66	5,00	5,20	5,29	4	5,29	*	0,28	5,23	111,73
40	A88	PD01	DB08	5,23	5,29	5,38	5,32	4	5,31	*	0,06	1,18	112,10
41	F27x	PC01	DB01	5,58	5,30	5,40	5,08	4	5,34	*	0,21	3,88	112,78
42	F22x	PC02	DB01	5,53	5,91	5,52	6,14	0	5,78	*b* *	0,31	5,29	122,04
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	n	Mean	s_r	CV_r
all labs	**164**	**4,73**	**0,101**	**2,142**
* = non tolerable mean because more than +/- **10** % from the mean				

l	s_R	CV_R
41	**0,283**	**5,973**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A62x	PD02	DB01	3,07	3,17	2,91	2,87	4	3,01	*	0,14	4,65	86,25
2	A57	PZ02	DD02	3,10	3,15	3,10	3,15	4	3,13	*	0,03	0,92	89,70
3	A82	PD01	DB08	3,13	3,19	2,92	3,28	4	3,13	*	0,15	4,84	89,76
4	F07x	PD99	DB08	3,11	3,06	3,19	3,21	4	3,14		0,07	2,25	90,20
5	A59	PC01	DB08	3,29	3,24	3,35	3,32	4	3,30		0,05	1,37	94,64
6	A56	PC01	DB08	3,38	3,35	3,35	3,29	4	3,34		0,04	1,06	95,95
7	A60x	PD01	DB10	3,35	3,41	3,30	3,32	4	3,34		0,05	1,46	96,00
8	F28x	PD02	DB08	3,26	3,31	3,44	3,38	4	3,35		0,08	2,35	96,09
9	F16x	PC01	DB08	3,44	3,26	3,41	3,32	4	3,36		0,08	2,49	96,39
10	F24x	PD01	DB99	2,61	3,37	3,79	3,89	0	3,42	*c*	0,59	**17,14**	98,02
11	A42	PB02	DB01	3,35	3,50	3,40	3,42	4	3,42		0,06	1,83	98,09
12	A71	PB03	DZ99	3,41	3,44	3,43	3,41	4	3,42		0,01	0,43	98,14
13	A58x	PD02	DB02	3,42	3,45	3,44	3,45	4	3,44		0,01	0,41	98,74
14	F12x	PC01	DB08	3,40	3,53	3,42	3,45	4	3,45		0,06	1,69	98,90
15	F15x	PC01	DB08	3,41	3,42	3,49	3,50	4	3,46		0,05	1,35	99,17
16	A43	PB06	DB01	3,55	3,55	3,28	3,56	4	3,49		0,14	3,92	100,03
17	F14x	PC01	DB08	3,53	3,53	3,48	3,41	4	3,49		0,06	1,63	100,10
18	F25x	PB06	DB08	3,48	3,51	3,49	3,48	4	3,49		0,01	0,41	100,17
19	F33x	PD01	DB10	3,38	3,50	3,56	3,56	4	3,50		0,08	2,42	100,46
20	F32x	PD01	DB08	3,50	3,52	3,53	3,45	4	3,50		0,04	1,02	100,46
21	F26x	PD02	DB09	3,50	3,51	3,52	3,50	4	3,51		0,01	0,27	100,67
22	A79	PD03	DB99	3,52	3,49	3,52	3,53	4	3,51		0,02	0,54	100,88
23	F21x	PD02	DB09	3,55	3,59	3,51	3,47	4	3,53		0,05	1,46	101,32
24	F13x	PD01	DB08	3,54	3,50	3,55	3,55	4	3,53		0,02	0,68	101,35
25	F02x	PD02	DB08	3,42	3,51	3,57	3,63	4	3,53		0,09	2,59	101,39
26	F01x	PD02	DB01	3,56	3,59	3,46	3,56	4	3,54		0,06	1,60	101,68
27	A61x	PB02	DB08	3,48	3,59	3,58	3,53	4	3,55		0,05	1,43	101,79
28	F18x	PD99	DB08	3,62	3,56	3,52	3,50	4	3,55		0,05	1,49	101,89
29	F19x	PD02	DB08	3,57	3,57	3,50	3,56	4	3,55		0,03	0,95	101,89
30	F05x	PD02	DB08	3,55	3,56	3,53	3,57	4	3,55		0,02	0,48	101,97
31	A36	PD02	DB08	3,43	3,55	3,70	3,58	4	3,57		0,11	3,11	102,33
32	F03x	PD02	DB08	3,54	3,60	3,56	3,59	4	3,57		0,03	0,77	102,54
33	A45x	PB99	DB08	3,64	3,58	3,53	3,59	4	3,59		0,05	1,26	102,90
34	A85x	PD02	DB08	3,63	3,56	3,54	3,61	4	3,59		0,04	1,13	102,96
35	F06x	PD02	DB08	3,59	3,64	3,68	3,66	4	3,64		0,04	1,10	104,49
36	F08x	PE99	DB08	3,71	3,68	3,69	3,71	4	3,69		0,02	0,43	106,05
37	A39	PC02	DB08	3,77	3,72	3,76	3,75	4	3,75		0,02	0,47	107,58
38	A65	PD01	DB08	3,83	3,74	3,62	3,85	4	3,76		0,10	2,79	107,92
39	A88	PD01	DB08	3,83	3,87	3,81	3,88	4	3,85	*	0,03	0,86	110,43
40	F27x	PC01	DB01	*4,311a*	3,89	3,85	3,93	3	3,89	*	0,04	0,97	111,62
41	A47	PC01	DB08	4,37	4,06	4,06	3,60	0	4,02	*c* *	0,32	7,86	115,47
42	F22x	PC02	DB01	4,70	4,56	4,65	4,60	0	4,62	*b* *	0,06	1,31	132,71
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	n	Mean	s_r	CV_r
all labs	**155**	**3,48**	**0,053**	**1,536**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
39	**0,185**	**5,303**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Ca **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	A82	PD01	DB08	4,62	4,73	4,68	4,69	4	4,68		0,05	0,98	91,17
2	F07x	PD99	DB08	4,64	4,92	4,59	4,79	4	4,74		0,15	3,13	92,23
3	A56	PC01	DB08	4,72	4,88	4,94	4,80	4	4,83		0,10	1,97	94,17
4	A57	PZ02	DD02	4,90	4,85	4,85	4,85	4	4,86		0,03	0,51	94,71
5	A60x	PD01	DB10	4,83	4,78	4,97	4,98	4	4,89		0,10	2,02	95,26
6	A43	PB06	DB01	4,79	4,95	4,89	4,95	4	4,90		0,08	1,54	95,34
7	A59	PC01	DB08	4,82	4,89	4,93	5,02	4	4,91		0,08	1,69	95,72
8	F16x	PC01	DB08	4,88	5,06	4,90	4,96	4	4,95		0,08	1,65	96,38
9	F08x	PE99	DB08	5,02	4,90	4,86	5,01	4	4,95		0,08	1,65	96,39
10	F25x	PB06	DB08	4,99	4,97	4,99	4,94	4	4,97		0,02	0,48	96,85
11	F12x	PC01	DB08	5,02	5,02	5,00	5,01	4	5,01		0,01	0,15	97,65
12	A71	PB03	DZ99	5,06	5,07	5,01	4,97	4	5,03		0,05	0,95	97,92
13	F13x	PD01	DB08	5,04	5,13	5,07	5,09	4	5,08		0,04	0,76	98,98
14	A79	PD03	DB99	5,08	5,07	5,17	5,04	4	5,09		0,06	1,08	99,12
15	F28x	PD02	DB08	5,17	5,03	5,30	4,89	4	5,10		0,18	3,50	99,31
16	F14x	PC01	DB08	5,07	5,13	5,11	5,14	4	5,11		0,03	0,61	99,58
17	F19x	PD02	DB08	5,10	5,14	5,13	5,09	4	5,12		0,02	0,47	99,63
18	F15x	PC01	DB08	5,07	5,12	5,18	5,09	4	5,12		0,05	0,94	99,63
19	F03x	PD02	DB08	5,21	5,17	5,03	5,10	4	5,13		0,08	1,55	99,87
20	F02x	PD02	DB08	5,05	5,13	5,16	5,17	4	5,13		0,05	1,05	99,88
21	A45x	PB99	DB08	5,15	5,13	5,15	5,11	4	5,14		0,02	0,37	100,02
22	A58x	PD02	DB02	5,13	5,13	5,13	5,16	4	5,14		0,02	0,29	100,07
23	A36	PD02	DB08	5,07	5,13	5,39	5,10	4	5,17		0,15	2,84	100,75
24	F05x	PD02	DB08	5,18	5,15	5,19	5,19	4	5,18		0,02	0,37	100,85
25	F32x	PD01	DB08	5,07	5,21	5,21	5,23	4	5,18		0,07	1,43	100,90
26	F18x	PD99	DB08	5,21	5,18	5,18	5,21	4	5,20		0,02	0,33	101,19
27	F26x	PD02	DB09	5,21	5,19	5,20	5,20	4	5,20		0,01	0,16	101,28
28	F06x	PD02	DB08	5,42	5,15	5,03	5,22	4	5,21		0,16	3,17	101,38
29	F01x	PD02	DB01	5,12	5,29	5,29	5,22	4	5,23		0,08	1,54	101,87
30	F21x	PD02	DB09	5,00	5,46	5,27	5,19	4	5,23		0,19	3,64	101,87
31	A62x	PD02	DB01	5,56	5,55	5,32	4,76	0	5,30	*c*	0,38	7,08	103,18
32	A61x	PB02	DB08	5,29	5,31	5,36	5,36	4	5,33		0,03	0,61	103,79
33	F24x	PD01	DB99	5,20	5,24	5,45	5,46	4	5,34		0,14	2,55	103,94
34	F27x	PC01	DB01	5,61	5,11	5,24	5,77	0	5,43		0,31	5,67	105,81
35	A85x	PD02	DB08	5,48	5,44	5,42	5,47	4	5,45		0,03	0,49	106,18
36	A39	PC02	DB08	5,51	5,32	5,66	5,33	4	5,45		0,16	2,97	106,23
37	A65	PD01	DB08	5,37	5,48	5,53	5,45	4	5,46		0,07	1,23	106,30
38	F33x	PD01	DB10	5,40	5,48	5,71	5,56	4	5,54		0,13	2,39	107,86
39	A42	PB02	DB01	5,79	5,89	5,29	5,40	4	5,59		0,29	5,22	108,93
40	A88	PD01	DB08	5,60	5,56	5,64	*6,06a*	3	5,60		0,04	0,71	109,08
41	A47	PC01	DB08	6,09	6,05	6,14	5,26	0	5,88	*b* *	0,42	7,06	114,59
42	F22x	PC02	DB01	6,33	6,15	6,45	6,13	0	6,27	*b* *	0,15	2,44	122,04
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	n	Mean	s_r	CV_r
all labs	**151**	**5,13**	**0,078**	**1,510**
10	% from the mean			

l	s_R	CV_R
38	**0,223**	**4,334**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Ca **Sample: 4** 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	A82	PD01	DB08	5,02	5,22	5,02	4,95	4	5,05		0,11	2,23	92,09
2	A56	PC01	DB08	5,14	5,03	5,15	5,10	4	5,11		0,05	1,03	93,05
3	A59	PC01	DB08	5,16	5,14	5,12	5,06	4	5,12		0,05	0,89	93,27
4	F25x	PB06	DB08	5,14	5,17	5,14	5,13	4	5,15		0,02	0,34	93,76
5	A62x	PD02	DB01	5,23	5,51	4,85	5,10	4	5,17		0,27	5,31	94,26
6	A71	PB03	DZ99	5,22	5,26	5,16	5,21	4	5,21		0,04	0,79	94,95
7	A60x	PD01	DB10	5,22	5,17	5,33	5,17	4	5,22		0,08	1,47	95,18
8	F28x	PD02	DB08	5,32	5,13	5,23	5,27	4	5,24		0,08	1,49	95,44
9	F07x	PD99	DB08	5,20	5,27	5,30	5,29	4	5,26		0,05	0,88	95,94
10	F13x	PD01	DB08	5,29	5,09	5,34	5,34	4	5,27		0,12	2,24	95,98
11	F12x	PC01	DB08	5,34	5,20	5,29	5,28	4	5,28		0,06	1,09	96,15
12	F16x	PC01	DB08	5,26	5,40	5,22	5,27	4	5,29		0,08	1,43	96,35
13	A79	PD03	DB99	5,36	5,34	5,32	5,30	4	5,33		0,03	0,48	97,12
14	A43	PB06	DB01	5,23	5,27	5,53	5,37	4	5,35		0,13	2,50	97,50
15	F19x	PD02	DB08	5,38	5,37	5,34	5,35	4	5,36		0,02	0,34	97,68
16	F15x	PC01	DB08	5,34	5,37	5,33	5,42	4	5,37		0,04	0,75	97,77
17	F03x	PD02	DB08	5,47	5,42	5,30	5,36	4	5,39		0,07	1,37	98,18
18	F02x	PD02	DB08	5,26	5,39	5,42	5,48	4	5,39		0,09	1,76	98,22
19	A36	PD02	DB08	5,33	5,29	5,60	5,35	4	5,39		0,14	2,61	98,27
20	F14x	PC01	DB08	5,40	5,40	5,40	5,40	4	5,40		0,00	0,00	98,41
21	F18x	PD99	DB08	5,45	5,39	5,39	5,40	4	5,41		0,03	0,53	98,55
22	A58x	PD02	DB02	5,43	5,45	5,43	5,44	4	5,44		0,01	0,18	99,09
23	F05x	PD02	DB08	5,44	5,44	5,45	5,45	4	5,45		0,01	0,11	99,23
24	F21x	PD02	DB09	5,52	5,49	5,46	5,38	4	5,46		0,06	1,10	99,55
25	F08x	PE99	DB08	5,51	5,50	5,32	5,55	4	5,47		0,10	1,88	99,71
26	F24x	PD01	DB99	5,30	5,43	5,44	5,79	4	5,49		0,21	3,86	100,04
27	A45x	PB99	DB08	5,53	5,51	5,53	5,48	4	5,51		0,02	0,43	100,46
28	F27x	PC01	DB01	5,29	5,49	5,37	6,00	0	5,54	*c*	0,32	5,76	100,95
29	F32x	PD01	DB08	5,58	5,56	5,47	5,56	4	5,54		0,05	0,89	101,01
30	F01x	PD02	DB01	5,50	5,67	5,55	5,67	4	5,60		0,09	1,54	102,01
31	A61x	PB02	DB08	5,68	5,58	5,58	5,62	4	5,62		0,05	0,86	102,35
32	F06x	PD02	DB08	5,77	5,61	5,66	5,59	4	5,66		0,08	1,41	103,11
33	A57	PZ02	DD02	5,79	5,75	5,76	5,80	4	5,78		0,02	0,41	105,24
34	A65	PD01	DB08	5,85	5,75	5,82	5,74	4	5,79		0,05	0,92	105,52
35	F26x	PD02	DB09	5,81	5,79	5,80	5,80	4	5,80		0,01	0,14	105,70
36	A39	PC02	DB08	6,03	5,72	5,72	5,76	4	5,81		0,15	2,64	105,82
37	A47	PC01	DB08	6,00	6,08	6,11	5,67	4	5,96		0,21	3,44	108,70
38	A42	PB02	DB01	6,14	6,29	5,86	5,80	4	6,02		0,23	3,85	109,75
39	F33x	PD01	DB10	6,21	5,84	6,16	6,08	4	6,07	*	0,16	2,70	110,66
40	A85x	PD02	DB08	6,09	6,11	6,11	6,08	4	6,10	*	0,01	0,23	111,14
41	A88	PD01	DB08	6,21	6,16	6,19	6,20	4	6,19	*	0,02	0,35	112,81
42	F22x	PC02	DB01	6,98	6,84	7,33	7,32	0	7,12	*b* *	0,25	3,45	129,67
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	n	Mean	s_r	CV_r
all labs	**160**	**5,49**	**0,078**	**1,415**
10	% from the mean			
	l		s_R	CV_R
	40		**0,294**	**5,351**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F22x	PC02	DB01	0,93	0,99	1,00	0,89	4	0,95	*	0,05	5,50	88,01
2	F21x	PC02	DB09	0,97	0,98	0,95	0,96	4	0,97	*	0,01	1,34	89,46
3	F16x	PC01	DB08	0,98	1,01	0,98	0,98	4	0,99		0,01	1,50	91,59
4	F07x	PD99	DB08	1,02	0,95	1,00	0,98	4	0,99		0,03	2,91	91,79
5	A59	PC01	DB08	0,97	1,00	0,99	1,03	4	1,00		0,02	2,32	92,40
6	A60x	PD01	DB10	1,00	1,03	0,99	0,98	4	1,00		0,02	2,26	92,65
7	A36	PD02	DB08	0,97	1,03	1,00	1,03	4	1,01		0,03	2,85	93,40
8	F18x	PD99	DB08	1,02	1,00	1,02	1,00	4	1,01		0,01	1,14	93,63
9	F15x	PC01	DB08	0,98	0,98	1,03	1,07	4	1,02		0,04	4,29	94,10
10	A71	PB03	DZ99	1,03	1,04	1,02	1,03	4	1,03		0,01	0,87	95,51
11	F28x	PD02	DB08	1,05	1,09	1,01	1,02	4	1,04		0,04	3,37	96,37
12	F19x	PD02	DB08	1,11	1,01	0,96	1,09	4	1,04		0,07	6,71	96,65
13	A61x	PB02	DB08	1,05	1,05	1,04	1,06	4	1,05		0,01	1,02	97,32
14	F12x	PC01	DB08	1,03	1,07	1,08	1,06	4	1,06		0,02	1,71	98,25
15	F03x	PD02	DB08	1,10	1,09	1,04	1,04	4	1,06		0,03	2,94	98,66
16	F01x	PD02	DB01	1,09	1,05	1,07	1,06	4	1,07		0,02	1,60	98,96
17	F14x	PC01	DB08	1,09	1,06	1,07	1,05	4	1,07		0,02	1,60	98,96
18	F02x	PD02	DB08	1,04	1,05	1,08	1,11	4	1,07		0,03	2,73	99,24
19	A82	PD01	DB08	1,05	1,07	1,08	1,10	4	1,07		0,02	2,21	99,54
20	A58x	PD02	DB01	1,07	1,06	1,06	1,11	4	1,08		0,02	2,21	99,66
21	F26x	PD02	DB09	1,08	1,09	1,08	1,07	4	1,08		0,01	0,76	100,12
22	F13x	PD01	DB08	1,15	1,11	1,03	1,05	4	1,08		0,05	5,00	100,19
23	A39	PC02	DB08	1,06	1,14	1,08	1,06	4	1,09		0,04	3,29	100,59
24	F05x	PD02	DB08	1,07	1,10	1,10	1,07	4	1,09		0,02	1,60	100,59
25	A45x	PB99	DB08	1,10	1,11	1,05	1,08	4	1,09		0,03	2,44	100,59
26	A57	PZ02	DD02	1,06	1,04	1,14	1,12	4	1,09		0,05	4,37	101,05
27	A42	PB04	DB01	1,09	1,15	1,03	1,09	4	1,09		0,05	4,49	101,05
28	F27x	PD01	DB01	1,12	1,07	1,14	1,06	4	1,10		0,04	3,67	101,63
29	F25x	PB06	DB08	1,10	1,10	1,10	1,10	4	1,10		0,00	0,00	101,98
30	F24x	PD01	DB99	1,08	1,09	1,10	1,14	4	1,10		0,03	2,73	102,21
31	A56	PC01	DB08	1,12	1,13	1,10	1,10	4	1,11		0,01	1,34	102,74
32	F33x	PD01	DB10	1,08	1,08	1,16	1,13	4	1,11		0,04	3,55	103,14
33	F08x	PE99	DB08	1,14	1,13	1,09	1,13	4	1,12		0,02	2,11	103,90
34	A79	PD03	DB99	1,13	1,13	1,18	1,08	4	1,13		0,04	3,29	104,71
35	F06x	PD02	DB08	1,16	1,12	1,11	1,13	4	1,13		0,02	1,94	104,85
36	A88	PD01	DB08	1,14	1,13	1,13	1,15	4	1,14		0,01	0,84	105,45
37	F32x	PD01	DB08	1,15	1,13	1,19	1,11	4	1,15		0,03	2,98	106,15
38	A43	PB06	DB01	1,17	1,12	1,17	1,17	4	1,16		0,03	2,29	107,24
39	A65	PD01	DB08	1,11	1,22	1,10	1,25	4	1,17		0,07	6,29	108,28
40	A85x	PD02	DB08	1,22	1,21	1,20	1,20	4	1,21	*	0,01	0,54	111,85
41	A62x	PD02	DB01	1,21	1,19	1,21	1,22	4	1,21	*	0,01	1,04	111,94
42	A47	PC01	DB08	1,27	1,26	1,24	1,13	4	1,23	*	0,06	5,25	113,57
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	n	Mean	s_r	CV_r
all labs	**168**	**1,08**	**0,028**	**2,641**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
42	**0,064**	**5,910**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A57	PZ02	DD02	1,02	1,03	1,04	1,06	4	1,04	*	0,02	1,65	85,34
2	F07x	PD99	DB08	1,03	1,03	1,06	1,05	4	1,04	*	0,02	1,45	85,90
3	F28x	PD02	DB08	1,08	1,09	1,18	1,11	4	1,11		0,04	4,03	91,56
4	F22x	PC02	DB01	1,14	1,11	1,15	1,13	4	1,13		0,02	1,49	93,10
5	F27x	PD01	DB01	1,26	1,23	1,05	1,02	0	1,14	*c*	0,12	**10,81**	93,63
6	F16x	PC01	DB08	1,14	1,12	1,18	1,14	4	1,15		0,03	2,20	94,21
7	A71	PB03	DZ99	1,13	1,17	1,17	1,15	4	1,15		0,02	1,83	94,78
8	A60x	PD01	DB10	1,19	1,15	1,14	1,16	4	1,16		0,02	1,95	95,38
9	A58x	PD02	DB01	1,17	1,16	1,17	1,20	4	1,18		0,02	1,47	96,66
10	A56	PC01	DB08	1,19	1,18	1,20	1,18	4	1,19		0,01	0,77	97,50
11	F03x	PD02	DB08	1,20	1,17	1,19	1,21	4	1,19		0,01	1,14	98,03
12	A42	PB04	DB01	1,20	1,21	1,15	1,21	4	1,19		0,03	2,41	98,09
13	A39	PC02	DB08	1,20	1,19	1,21	1,19	4	1,20		0,01	0,57	98,32
14	A36	PD02	DB08	1,15	1,20	1,24	1,20	4	1,20		0,04	3,08	98,51
15	F05x	PD02	DB08	1,19	1,20	1,20	1,20	4	1,20		0,01	0,42	98,51
16	A82	PD01	DB08	*1,374a*	1,21	1,19	1,20	3	1,20		0,01	1,13	98,66
17	A59	PC01	DB08	1,22	1,19	1,20	1,19	4	1,20		0,01	1,14	98,69
18	F21x	PC02	DB09	1,18	1,20	1,22	1,21	4	1,20		0,02	1,42	98,92
19	F01x	PD02	DB01	1,19	1,21	1,22	1,22	4	1,21		0,01	1,17	99,53
20	F26x	PD02	DB09	1,21	1,22	1,20	1,21	4	1,21		0,01	0,67	99,53
21	A61x	PB02	DB08	1,21	1,19	1,24	1,23	4	1,22		0,02	2,01	100,19
22	F12x	PC01	DB08	1,21	1,23	1,22	1,22	4	1,22		0,01	0,94	100,27
23	F14x	PC01	DB08	1,22	1,21	1,23	1,22	4	1,22		0,01	0,67	100,36
24	A45x	PB99	DB08	1,24	1,22	1,21	1,22	4	1,22		0,01	1,03	100,56
25	F18x	PD99	DB08	1,24	1,23	1,22	1,21	4	1,23		0,01	1,05	100,77
26	F06x	PD02	DB08	1,20	1,24	1,24	1,28	4	1,24		0,03	2,55	102,02
27	F33x	PD01	DB10	1,27	1,23	1,23	1,25	4	1,25		0,02	1,54	102,41
28	F13x	PD01	DB08	1,24	1,25	1,24	1,25	4	1,25		0,00	0,32	102,47
29	F02x	PD02	DB08	1,20	1,23	1,25	1,31	4	1,25		0,05	3,74	102,66
30	A43	PB06	DB01	1,29	1,24	1,24	1,24	4	1,25		0,03	2,16	102,78
31	F08x	PE99	DB08	1,26	1,25	1,23	1,28	4	1,26		0,02	1,76	103,28
32	A88	PD01	DB08	1,26	1,27	1,26	1,27	4	1,27		0,01	0,46	104,06
33	F19x	PD02	DB08	1,26	1,27	1,25	1,28	4	1,27		0,01	1,02	104,06
34	F24x	PD01	DB99	1,23	1,26	1,28	1,31	4	1,27		0,03	2,45	104,51
35	F25x	PB06	DB08	1,28	1,28	1,28	1,27	4	1,28		0,01	0,39	105,09
36	A85x	PD02	DB08	1,27	1,29	1,27	1,29	4	1,28		0,01	0,89	105,25
37	A79	PD03	DB99	1,27	1,32	1,31	1,22	4	1,28		0,04	3,31	105,27
38	A47	PC01	DB08	1,27	1,30	1,31	1,24	4	1,28		0,03	2,36	105,31
39	F32x	PD01	DB08	1,29	1,30	1,29	1,27	4	1,29		0,01	0,98	105,91
40	A62x	PD02	DB01	1,30	1,32	1,28	1,26	4	1,29		0,03	2,00	106,11
41	F15x	PC01	DB08	1,31	1,31	1,28	1,30	4	1,30		0,01	1,09	106,94
42	A65	PD01	DB08	1,31	1,30	1,31	1,34	4	1,31		0,02	1,26	108,15
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	n	Mean	s_r	CV_r
all labs	**163**	**1,22**	**0,019**	**1,555**
10	% from the mean			

l	s_R	CV_R
41	**0,062**	**5,110**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F22x	PC02	DB01	0,71	0,70	0,69	0,66	4	0,69	*	0,02	3,31	88,81
2	F07x	PD99	DB08	0,69	0,72	0,68	0,70	4	0,70	*	0,02	2,51	89,95
3	F08x	PE99	DB08	0,73	0,73	0,72	0,76	4	0,73		0,02	2,54	94,32
4	A60x	PD01	DB10	0,74	0,73	0,73	0,74	4	0,74		0,01	1,01	94,78
5	A42	PB04	DB01	0,78	0,77	0,68	0,73	4	0,74		0,05	6,14	95,32
6	F28x	PD02	DB08	0,79	0,71	0,76	0,72	4	0,74		0,04	4,87	95,84
7	A39	PC02	DB08	0,75	0,74	0,75	0,75	4	0,75		0,01	0,82	96,45
8	F16x	PC01	DB08	0,75	0,76	0,74	0,76	4	0,75		0,01	1,18	97,18
9	F01x	PD02	DB01	0,77	0,75	0,76	0,75	4	0,76		0,01	1,26	97,58
10	A45x	PB99	DB08	0,76	0,77	0,76	0,76	4	0,76		0,01	0,69	97,90
11	A56	PC01	DB08	0,74	0,77	0,77	0,77	4	0,76		0,01	1,97	98,16
12	F26x	PD02	DB09	0,76	0,76	0,77	0,76	4	0,76		0,01	0,66	98,22
13	A36	PD02	DB08	0,73	0,76	0,80	0,76	4	0,76		0,03	3,77	98,22
14	F25x	PB06	DB08	0,77	0,76	0,76	0,77	4	0,77		0,01	0,75	98,54
15	F32x	PD01	DB08	0,76	0,76	0,77	0,77	4	0,77		0,01	1,00	98,70
16	F14x	PC01	DB08	0,77	0,77	0,76	0,77	4	0,77		0,01	0,65	98,87
17	A71	PB03	DZ99	0,77	0,77	0,77	0,77	4	0,77		0,00	0,35	98,99
18	F12x	PC01	DB08	0,77	0,78	0,76	0,77	4	0,77		0,01	0,95	99,20
19	F06x	PD02	DB08	0,78	0,79	0,76	0,77	4	0,77		0,01	1,59	99,35
20	F05x	PD02	DB08	0,77	0,77	0,77	0,78	4	0,77		0,00	0,37	99,41
21	F18x	PD99	DB08	0,77	0,78	0,77	0,78	4	0,77		0,00	0,46	99,70
22	F27x	PD01	DB01	0,80	0,75	0,78	0,78	4	0,77		0,02	2,64	99,70
23	F02x	PD02	DB08	0,76	0,77	0,79	0,79	4	0,77		0,01	1,83	99,77
24	F03x	PD02	DB08	0,78	0,78	0,77	0,77	4	0,78		0,01	0,70	99,93
25	F21x	PC02	DB09	0,77	0,75	0,81	0,78	4	0,78		0,03	3,22	100,15
26	A59	PC01	DB08	0,77	0,78	0,79	0,79	4	0,78		0,01	1,02	100,64
27	A61x	PB02	DB08	0,77	0,78	0,79	0,79	4	0,78		0,01	1,29	100,96
28	A58x	PD02	DB01	0,79	0,78	0,78	0,79	4	0,79		0,01	0,74	101,12
29	F24x	PD01	DB99	0,79	0,79	0,79	0,79	4	0,79		0,00	0,36	101,80
30	A79	PD03	DB99	0,81	0,81	0,77	0,78	4	0,79		0,02	2,48	101,94
31	F13x	PD01	DB08	0,79	0,79	0,79	0,80	4	0,79		0,00	0,58	102,35
32	A82	PD01	DB08	0,78	0,80	0,78	0,83	4	0,80		0,03	3,23	102,69
33	A43	PB06	DB01	0,80	0,80	0,80	0,81	4	0,80		0,00	0,44	103,02
34	F19x	PD02	DB08	0,80	0,81	0,80	0,80	4	0,80		0,00	0,62	103,54
35	A88	PD01	DB08	0,80	0,80	0,79	0,86	4	0,81		0,03	3,94	104,66
36	F15x	PC01	DB08	0,81	0,82	0,83	0,82	4	0,82		0,01	1,00	105,63
37	A47	PC01	DB08	0,85	0,84	0,85	0,75	0	0,82	*c*	0,05	5,97	105,69
38	F33x	PD01	DB10	0,80	0,80	0,85	0,85	4	0,83		0,03	3,50	106,27
39	A65	PD01	DB08	0,83	0,86	0,85	0,85	4	0,85		0,01	1,02	108,88
40	A57	PZ02	DD02	0,85	0,86	0,85	0,84	4	0,85		0,01	0,96	109,49
41	A85x	PD02	DB08	0,89	0,85	0,86	0,88	4	0,87	*	0,01	1,59	111,97
42	A62x	PD02	DB01	0,90	0,94	0,88	0,81	0	0,88	*c* *	0,05	6,16	113,68
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	n	Mean	s_r	CV_r
all labs	**160**	**0,78**	**0,013**	**1,686**
10	% from the mean			

l	s_R	CV_R
40	**0,036**	**4,592**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Mg **Sample: 4** 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	A57	PZ02	DD02	1,11	1,09	1,15	1,16	0	1,13	*b*	*	0,03	2,93	84,21
2	F27x	PD01	DB01	1,27	1,07	1,18	1,21	0	1,18	*c*	*	0,08	6,97	88,27
3	F07x	PD99	DB08	1,21	1,25	1,25	1,25	4	1,24			0,02	1,53	92,71
4	F28x	PD02	DB08	1,32	1,19	1,22	1,26	4	1,25			0,06	4,49	93,20
5	A39	PC02	DB08	1,28	1,28	1,25	1,26	4	1,27			0,02	1,38	94,60
6	A56	PC01	DB08	1,28	1,28	1,28	1,26	4	1,27			0,01	0,72	95,14
7	A71	PB03	DZ99	1,28	1,28	1,26	1,28	4	1,27			0,01	0,80	95,23
8	A60x	PD01	DB10	1,29	1,28	1,28	1,26	4	1,28			0,01	1,03	95,42
9	F02x	PD02	DB08	1,24	1,26	1,30	1,32	4	1,28			0,04	2,99	95,62
10	A58x	PD02	DB01	1,27	1,28	1,29	1,29	4	1,28			0,01	0,75	95,79
11	F16x	PC01	DB08	1,26	1,28	1,29	1,31	4	1,29			0,02	1,69	96,03
12	F03x	PD02	DB08	1,30	1,31	1,28	1,30	4	1,30			0,01	0,98	96,86
13	A36	PD02	DB08	1,29	1,27	1,35	1,29	4	1,30			0,03	2,66	97,10
14	F05x	PD02	DB08	1,30	1,30	1,30	1,30	4	1,30			0,00	0,00	97,10
15	A59	PC01	DB08	1,27	1,28	1,34	1,32	4	1,30			0,03	2,67	97,30
16	F22x	PC02	DB01	1,29	1,34	1,28	1,31	4	1,30			0,02	1,86	97,42
17	F12x	PC01	DB08	1,32	1,29	1,31	1,31	4	1,30			0,01	1,10	97,46
18	F21x	PC02	DB09	1,29	1,30	1,34	1,31	4	1,31			0,02	1,65	97,85
19	F14x	PC01	DB08	1,32	1,32	1,32	1,31	4	1,32			0,01	0,38	98,41
20	F18x	PD99	DB08	1,32	1,31	1,32	1,32	4	1,32			0,01	0,38	98,41
21	F01x	PD02	DB01	1,34	1,32	1,33	1,32	4	1,33			0,01	0,72	99,15
22	A45x	PB99	DB08	1,34	1,32	1,34	1,32	4	1,33			0,01	0,87	99,34
23	F13x	PD01	DB08	1,34	1,34	1,34	1,33	4	1,34			0,00	0,34	99,84
24	F32x	PD01	DB08	1,35	1,34	1,33	1,33	4	1,34			0,01	0,72	99,90
25	A82	PD01	DB08	1,31	1,32	1,34	1,38	4	1,34			0,03	2,37	99,97
26	F08x	PE99	DB08	1,35	1,34	1,30	1,38	4	1,34			0,04	2,61	100,33
27	F26x	PD02	DB09	1,35	1,34	1,36	1,35	4	1,35			0,01	0,60	100,83
28	A61x	PB02	DB08	1,37	1,36	1,37	1,34	4	1,36			0,01	0,99	101,26
29	A79	PD03	DB99	1,36	1,38	1,36	1,33	4	1,36			0,02	1,66	101,30
30	F25x	PB06	DB08	1,36	1,35	1,36	1,36	4	1,36			0,01	0,37	101,39
31	F06x	PD02	DB08	1,39	1,39	1,34	1,36	4	1,37			0,03	2,01	102,20
32	A43	PB06	DB01	1,32	1,37	1,42	1,37	4	1,37			0,04	3,16	102,25
33	F19x	PD02	DB08	1,38	1,39	1,38	1,37	4	1,38			0,01	0,59	103,07
34	F24x	PD01	DB99	1,37	1,38	1,39	1,42	4	1,39			0,02	1,38	103,76
35	F33x	PD01	DB10	1,41	1,33	1,47	1,38	4	1,40			0,06	4,19	104,38
36	A88	PD01	DB08	1,40	1,39	1,40	1,43	4	1,41			0,02	1,23	104,94
37	F15x	PC01	DB08	1,40	1,40	1,42	1,42	4	1,41			0,01	0,82	105,31
38	A85x	PD02	DB08	1,40	1,43	1,44	1,40	4	1,42			0,02	1,65	105,91
39	A47	PC01	DB08	1,43	1,44	1,43	1,39	4	1,42			0,02	1,69	106,23
40	A65	PD01	DB08	1,44	1,44	1,45	1,42	4	1,44			0,01	1,03	107,20
41	A42	PB04	DB01	1,48	1,47	1,34	1,46	4	1,44			0,07	4,56	107,37
42	A62x	PD02	DB01	1,52	1,44	1,52	1,54	4	1,51		*	0,04	2,95	112,41
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	n	Mean	s_r	CV_r
all labs	**160**	**1,34**	**0,021**	**1,598**
10	% from the mean			
	l		s_R	CV_R
	40		**0,059**	**4,391**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: K **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	A45x	PB99	DB08	1,57	1,61	1,64	1,55	0	1,59	*b*	*	0,04	2,53	23,03
2	A82	PD01	DB08	5,44	5,50	5,42	5,52	0	5,47	*b*	*	0,05	0,86	79,11
3	F27x	PD01	DB06	5,07	5,46	6,08	5,89	0	5,62	*b*	*	0,45	8,01	81,31
4	F08x	PZ99	DB08	5,85	6,43	6,51	5,79	4	6,14		*	0,38	6,13	88,84
5	F21x	PC02	DB09	6,22	6,49	6,55	6,56	4	6,46			0,16	2,47	93,34
6	A59	PC01	DB08	6,50	6,44	6,58	6,35	4	6,46			0,10	1,52	93,47
7	A60x	PD01	DB10	6,56	6,77	6,69	6,55	4	6,64			0,11	1,62	96,02
8	A36	PD02	DB08	6,72	6,75	6,46	6,63	4	6,64			0,13	1,96	96,02
9	F16x	PC01	DB08	6,61	6,81	6,52	6,66	4	6,65			0,12	1,79	96,20
10	F26x	PD02	DB09	6,66	6,65	6,68	6,66	4	6,66			0,01	0,19	96,34
11	F24x	PD01	DB99	6,65	6,65	6,66	6,69	4	6,66			0,02	0,30	96,35
12	F07x	PB99	DB08	6,66	6,47	6,80	6,77	4	6,67			0,15	2,21	96,48
13	A43	PB06	DB01	6,65	6,54	6,81	6,70	4	6,68			0,11	1,68	96,52
14	A62x	PD02	DB01	6,75	6,64	6,69	6,72	4	6,70			0,05	0,70	96,89
15	F32x	PD01	DB08	6,72	6,79	6,72	6,78	4	6,75			0,04	0,56	97,65
16	F28x	PD02	DB08	6,72	7,18	6,93	6,60	4	6,86			0,25	3,70	99,17
17	A58x	PD02	DB01	6,83	6,83	6,96	6,86	4	6,87			0,06	0,90	99,34
18	F15x	PC01	DB08	6,88	6,70	6,81	7,12	4	6,88			0,18	2,59	99,45
19	F19x	PD02	DB08	6,88	6,74	6,84	7,05	4	6,88			0,13	1,88	99,45
20	A71	PB03	DZ99	6,92	6,90	6,86	6,86	4	6,89			0,03	0,46	99,59
21	F18x	PD99	DB08	6,91	6,85	6,94	6,85	4	6,89			0,05	0,65	99,60
22	F22x	PC02	DB01	7,07	6,78	6,75	7,00	4	6,90			0,16	2,28	99,78
23	A56	PC01	DB08	6,93	6,94	6,89	6,88	4	6,91			0,03	0,44	99,94
24	F01x	PD02	DB01	6,82	6,88	6,93	7,02	4	6,91			0,08	1,22	99,96
25	F13x	PD01	DB08	7,07	6,95	6,78	6,88	4	6,92			0,12	1,76	100,03
26	A42	PB04	DB01	6,82	6,98	6,86	7,04	4	6,93			0,10	1,48	100,14
27	F05x	PD02	DB08	6,93	6,96	6,94	6,98	4	6,95			0,02	0,32	100,54
28	F03x	PD02	DB08	6,98	7,23	7,12	6,53	4	6,97			0,31	4,42	100,72
29	A57	PZ02	DD02	6,77	7,02	7,04	7,04	4	6,97			0,13	1,89	100,75
30	A61x	PB02	DB08	6,95	7,03	6,93	6,98	4	6,97			0,04	0,64	100,81
31	F14x	PC01	DB08	7,09	6,90	6,99	6,96	4	6,99			0,08	1,14	101,01
32	F12x	PC01	DB08	6,88	7,13	7,18	7,06	4	7,06			0,13	1,88	102,11
33	F25x	PB06	DB08	7,06	7,03	6,99	7,17	4	7,06			0,08	1,09	102,13
34	F06x	PD02	DB08	7,12	7,02	7,11	7,07	4	7,08			0,05	0,66	102,38
35	A65	PD01	DB08	6,90	7,21	7,00	7,42	4	7,13			0,23	3,24	103,14
36	F02x	PD02	DB08	6,94	7,05	7,20	7,45	4	7,16			0,22	3,05	103,56
37	A79	PD03	DB99	7,33	7,25	6,96	7,12	4	7,17			0,16	2,24	103,61
38	A39	PC02	DB08	7,07	7,25	7,00	7,45	4	7,19			0,20	2,78	104,01
39	A88	PD01	DB08	7,06	7,19	7,33	7,43	4	7,25			0,16	2,23	104,88
40	F33x	PD01	DB10	7,92	7,28	7,53	7,42	4	7,54			0,27	3,65	109,00
41	A85x	PD02	DB08	7,65	7,53	7,54	7,59	4	7,58			0,05	0,70	109,55
42	A47	PC01	DB08	7,69	7,80	7,77	7,51	4	7,69		*	0,13	1,68	111,23
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	n	Mean	s_r	CV_r
all labs	**156**	**6,92**	**0,124**	**1,793**
* = non tolerable mean because more than +/- **10** % from the mean				

l	s_R	CV_R
39	**0,301**	**4,346**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: K **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	A45x	PB99	DB08	1,84	1,83	1,84	1,82	0	1,83	*b*	*	0,01	0,52	30,34
2	A82	PD01	DB08	4,70	4,66	4,45	4,56	0	4,59	*b*	*	0,11	2,38	75,99
3	F27x	PD01	DB06	4,78	4,59	4,69	5,12	0	4,79	*b*	*	0,23	4,79	79,33
4	F07x	PB99	DB08	5,33	5,30	5,53	5,43	4	5,39		*	0,10	1,93	89,29
5	F08x	PZ99	DB08	5,39	5,66	5,78	5,65	4	5,62			0,16	2,92	93,04
6	A57	PZ02	DD02	5,62	5,64	5,63	5,75	4	5,66			0,06	1,07	93,70
7	F21x	PC02	DB09	5,38	5,57	6,02	5,76	4	5,68			0,27	4,81	94,07
8	A59	PC01	DB08	5,75	5,74	5,84	5,67	4	5,75			0,07	1,24	95,20
9	F26x	PD02	DB09	5,75	5,78	5,76	5,75	4	5,76			0,01	0,25	95,36
10	F16x	PC01	DB08	5,67	5,87	5,74	5,78	4	5,76			0,08	1,44	95,42
11	A62x	PD02	DB01	5,98	5,86	5,66	5,73	4	5,81			0,14	2,44	96,14
12	F32x	PD01	DB08	5,84	6,00	5,91	5,54	4	5,82			0,20	3,42	96,39
13	F28x	PD02	DB08	5,94	5,70	6,07	5,82	4	5,88			0,16	2,68	97,36
14	A60x	PD01	DB10	5,98	5,92	5,84	5,85	4	5,90			0,07	1,15	97,60
15	F03x	PD02	DB08	6,09	6,03	5,78	5,86	4	5,94			0,14	2,43	98,34
16	F24x	PD01	DB99	5,83	5,85	5,92	6,16	4	5,94			0,15	2,53	98,35
17	F01x	PD02	DB01	5,97	6,03	5,86	5,92	4	5,95			0,07	1,22	98,42
18	A56	PC01	DB08	5,93	5,90	6,07	5,90	4	5,95			0,08	1,37	98,51
19	A42	PB04	DB01	5,73	6,00	6,01	6,14	4	5,97			0,17	2,89	98,83
20	A58x	PD02	DB01	6,03	6,04	5,95	5,93	4	5,99			0,06	0,93	99,12
21	F05x	PD02	DB08	6,03	6,05	5,94	6,02	4	6,01			0,05	0,80	99,49
22	F19x	PD02	DB08	6,01	6,06	6,01	6,16	4	6,06			0,07	1,17	100,32
23	A36	PD02	DB08	5,76	6,08	6,25	6,17	4	6,07			0,21	3,54	100,40
24	F14x	PC01	DB08	6,02	6,03	6,13	6,08	4	6,07			0,05	0,84	100,40
25	F22x	PC02	DB01	5,86	6,14	6,13	6,16	4	6,07			0,14	2,35	100,49
26	A71	PB03	DZ99	6,14	6,16	6,06	6,07	4	6,11			0,05	0,82	101,10
27	F13x	PD01	DB08	6,17	6,18	6,05	6,07	4	6,12			0,07	1,12	101,27
28	F33x	PD01	DB10	6,08	6,07	6,18	6,15	4	6,12			0,05	0,87	101,32
29	F18x	PD99	DB08	6,16	6,13	6,11	6,14	4	6,14			0,02	0,34	101,56
30	F25x	PB06	DB08	6,18	6,18	6,16	6,11	4	6,16			0,03	0,54	101,94
31	A43	PB06	DB01	6,34	6,07	6,07	6,17	4	6,16			0,13	2,07	102,02
32	F06x	PD02	DB08	6,06	6,14	6,19	6,39	4	6,19			0,14	2,25	102,51
33	A61x	PB02	DB08	5,95	6,14	6,35	6,39	4	6,21			0,20	3,25	102,74
34	F12x	PC01	DB08	6,14	6,30	6,26	6,23	4	6,23			0,07	1,10	103,15
35	A88	PD01	DB08	6,22	6,31	6,23	6,33	4	6,27			0,06	0,89	103,84
36	A79	PD03	DB99	6,22	6,38	6,34	6,22	4	6,29			0,08	1,28	104,10
37	A39	PC02	DB08	6,19	6,33	6,38	6,34	4	6,31			0,08	1,28	104,49
38	A65	PD01	DB08	6,32	6,24	6,33	6,40	4	6,32			0,07	1,04	104,67
39	F15x	PC01	DB08	6,44	6,40	6,27	6,35	4	6,37			0,07	1,15	105,37
40	F02x	PD02	DB08	6,07	6,33	6,44	6,82	4	6,42			0,31	4,83	106,21
41	A85x	PD02	DB08	6,55	6,57	6,56	6,51	4	6,55			0,03	0,44	108,37
42	A47	PC01	DB08	6,56	6,62	6,83	6,35	4	6,59			0,20	2,99	109,09
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	n	Mean	s_r	CV_r
all labs	**156**	**6,04**	**0,108**	**1,781**
10	% from the mean			
	l		s_R	CV_R
	39		**0,257**	**4,260**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: K **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	A45x	PB99	DB08	1,22	*1,21a*	1,22	1,22	0	1,22	*b*	*	0,00	0,00	13,91
2	A82	PD01	DB08	7,14	7,26	7,19	7,20	0	7,20	*b*	*	0,05	0,68	82,05
3	F27x	PD01	DB06	7,49	7,99	7,75	6,68	0	7,48	*b*	*	0,57	7,60	85,27
4	F32x	PD01	DB08	8,01	8,21	8,24	8,03	4	8,12			0,12	1,47	92,62
5	F08x	PZ99	DB08	7,98	8,12	8,25	8,34	4	8,17			0,15	1,89	93,21
6	F07x	PB99	DB08	8,02	8,47	8,04	8,25	4	8,20			0,21	2,56	93,45
7	F21x	PC02	DB09	8,04	7,89	8,51	8,38	4	8,21			0,29	3,52	93,57
8	A43	PB06	DB01	8,41	8,51	8,30	8,30	4	8,38			0,10	1,21	95,56
9	A59	PC01	DB08	8,37	8,34	8,47	8,51	4	8,42			0,08	0,94	96,04
10	A60x	PD01	DB10	8,51	8,23	8,56	8,55	4	8,46			0,16	1,84	96,48
11	A42	PB04	DB01	8,42	8,36	8,56	8,56	4	8,48			0,10	1,19	96,64
12	F26x	PD02	DB09	8,50	8,52	8,49	8,49	4	8,50			0,01	0,17	96,93
13	A56	PC01	DB08	8,45	8,61	8,66	8,43	4	8,54			0,12	1,38	97,33
14	F24x	PD01	DB99	8,43	8,44	8,63	8,69	4	8,55			0,13	1,55	97,45
15	F16x	PC01	DB08	8,47	8,66	8,46	8,65	4	8,56			0,11	1,30	97,63
16	F01x	PD02	DB01	8,61	8,61	8,52	8,57	4	8,58			0,04	0,50	97,81
17	A57	PZ02	DD02	8,62	8,65	8,55	8,52	4	8,59			0,06	0,70	97,90
18	A58x	PD02	DB01	8,73	8,67	8,61	8,52	4	8,63			0,09	1,04	98,44
19	F28x	PD02	DB08	8,87	8,63	9,05	8,32	4	8,72			0,31	3,61	99,40
20	A36	PD02	DB08	8,65	8,84	9,07	8,59	4	8,79			0,22	2,46	100,21
21	F13x	PD01	DB08	8,77	8,74	8,78	8,87	4	8,79			0,06	0,65	100,24
22	F18x	PD99	DB08	8,82	8,80	8,77	8,77	4	8,79			0,02	0,28	100,24
23	A62x	PD02	DB01	8,84	9,36	8,92	8,09	0	8,80	*c*		0,53	5,99	100,38
24	F22x	PC02	DB01	8,93	8,85	8,74	8,72	4	8,81			0,10	1,12	100,45
25	F05x	PD02	DB08	8,79	8,86	8,88	8,83	4	8,84			0,04	0,44	100,81
26	F25x	PB06	DB08	8,93	8,79	8,85	8,81	4	8,85			0,06	0,70	100,86
27	A39	PC02	DB08	9,19	8,85	8,79	8,82	4	8,91			0,18	2,06	101,62
28	F14x	PC01	DB08	8,99	8,99	8,86	8,88	4	8,93			0,07	0,78	101,83
29	F19x	PD02	DB08	8,91	8,99	8,92	8,94	4	8,94			0,04	0,40	101,95
30	A61x	PB02	DB08	8,86	8,98	9,09	8,85	4	8,94			0,11	1,26	102,00
31	A79	PD03	DB99	9,04	8,95	8,89	9,01	4	8,97			0,07	0,76	102,30
32	F03x	PD02	DB08	8,98	8,92	9,02	9,05	4	8,99			0,06	0,62	102,55
33	F12x	PC01	DB08	9,01	9,13	8,95	9,03	4	9,03			0,07	0,81	102,98
34	A65	PD01	DB08	8,94	9,14	9,05	9,10	4	9,06			0,09	0,96	103,29
35	F06x	PD02	DB08	9,40	9,18	8,95	8,89	4	9,11			0,23	2,53	103,85
36	A71	PB03	DZ99	9,05	9,17	9,15	9,06	4	9,11			0,06	0,66	103,87
37	F02x	PD02	DB08	8,94	9,19	9,22	9,28	4	9,16			0,15	1,61	104,43
38	F15x	PC01	DB08	9,15	9,25	9,19	9,13	4	9,18			0,05	0,58	104,68
39	A88	PD01	DB08	9,13	8,98	9,17	9,58	4	9,22			0,26	2,79	105,08
40	A85x	PD02	DB08	9,45	9,50	9,48	9,51	4	9,48			0,03	0,29	108,16
41	F33x	PD01	DB10	9,26	9,48	9,77	9,43	4	9,49			0,21	2,24	108,16
42	A47	PC01	DB08	10,32	10,51	10,60	9,14	0	10,14	*b*	*	0,68	6,68	115,66
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	n	Mean	s_r	CV_r
all labs	**148**	**8,77**	**0,115**	**1,314**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
37	**0,346**	**3,950**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: K **Sample: 4** 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	A45x	PB99	DB08	2,30	2,31	2,29	2,31	0	2,30	*b*	*	0,01	0,42	28,20
2	A82	PD01	DB08	6,54	6,52	6,51	6,51	0	6,52	*b*	*	0,02	0,25	79,84
3	F27x	PD01	DB06	7,47	6,73	7,57	6,69	0	7,11	*c*	*	0,47	6,63	87,13
4	F08x	PZ99	DB08	7,38	7,47	7,55	7,82	4	7,56			0,19	2,53	92,53
5	F32x	PD01	DB08	7,62	7,57	7,66	7,63	4	7,62			0,04	0,49	93,32
6	F22x	PC02	DB01	7,79	7,59	7,61	7,82	4	7,70			0,12	1,52	94,34
7	A57	PZ02	DD02	7,73	7,71	7,81	7,90	4	7,79			0,09	1,11	95,37
8	A59	PC01	DB08	7,77	7,64	8,09	7,81	4	7,83			0,19	2,41	95,83
9	A43	PB06	DB01	7,63	7,79	8,11	7,84	4	7,84			0,20	2,54	96,04
10	F21x	PC02	DB09	7,46	7,95	8,07	7,96	4	7,86			0,27	3,46	96,26
11	F28x	PD02	DB08	8,22	7,55	7,81	7,97	4	7,88			0,28	3,55	96,56
12	A71	PB03	DZ99	7,93	7,93	7,99	7,87	4	7,93			0,05	0,65	97,12
13	F16x	PC01	DB08	7,86	8,06	7,89	7,92	4	7,93			0,09	1,10	97,16
14	A42	PB04	DB01	7,65	7,97	8,09	8,10	4	7,95			0,21	2,64	97,39
15	A60x	PD01	DB10	8,05	7,94	7,92	7,92	4	7,96			0,06	0,78	97,43
16	A56	PC01	DB08	8,00	7,99	8,02	7,93	4	7,99			0,04	0,51	97,79
17	F07x	PB99	DB08	7,82	8,05	8,08	8,03	4	8,00			0,12	1,47	97,91
18	F01x	PD02	DB01	8,01	7,98	8,12	7,90	4	8,00			0,09	1,14	98,00
19	F26x	PD02	DB09	8,03	8,04	8,02	8,03	4	8,03			0,01	0,10	98,34
20	F24x	PD01	DB99	7,89	7,97	8,16	8,25	4	8,07			0,17	2,05	98,80
21	A36	PD02	DB08	8,07	7,85	8,40	7,98	4	8,08			0,23	2,91	98,89
22	F05x	PD02	DB08	8,07	8,10	8,06	8,10	4	8,08			0,02	0,26	98,98
23	A58x	PD02	DB01	8,10	8,19	8,15	8,05	4	8,12			0,06	0,75	99,47
24	F13x	PD01	DB08	8,19	8,14	8,10	8,14	4	8,14			0,04	0,45	99,69
25	F25x	PB06	DB08	8,13	8,19	8,15	8,10	4	8,14			0,04	0,46	99,71
26	F02x	PD02	DB08	7,81	8,03	8,32	8,46	4	8,15			0,29	3,55	99,85
27	F18x	PD99	DB08	8,18	8,18	8,21	8,14	4	8,18			0,03	0,35	100,14
28	F14x	PC01	DB08	8,20	8,20	8,20	8,20	4	8,20			0,00	0,00	100,42
29	A79	PD03	DB99	8,36	8,08	8,37	8,23	4	8,26			0,13	1,63	101,14
30	F19x	PD02	DB08	8,27	8,29	8,28	8,30	4	8,29			0,01	0,16	101,46
31	F12x	PC01	DB08	8,47	8,17	8,34	8,33	4	8,33			0,12	1,46	101,97
32	A65	PD01	DB08	8,33	8,38	8,40	8,30	4	8,35			0,05	0,55	102,29
33	F03x	PD02	DB08	8,26	8,36	8,45	8,44	4	8,38			0,09	1,05	102,59
34	A39	PC02	DB08	8,35	8,67	8,36	8,29	4	8,42			0,17	2,03	103,11
35	F15x	PC01	DB08	8,50	8,41	8,55	8,49	4	8,49			0,06	0,68	103,94
36	A61x	PB02	DB08	8,54	8,42	8,58	8,43	4	8,49			0,08	0,93	104,01
37	A62x	PD02	DB01	8,25	8,35	8,56	8,82	4	8,50			0,25	2,97	104,03
38	F06x	PD02	DB08	8,82	8,72	8,45	8,39	4	8,59			0,21	2,40	105,22
39	A88	PD01	DB08	8,61	8,51	8,57	8,84	4	8,63			0,14	1,67	105,72
40	F33x	PD01	DB10	9,15	8,72	9,02	8,70	4	8,90			0,22	2,51	108,96
41	A85x	PD02	DB08	8,89	8,92	8,92	*9,949a*	3	8,91			0,01	0,16	109,11
42	A47	PC01	DB08	9,18	9,31	9,42	8,48	4	9,10		*	0,42	4,62	111,40
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	n	Mean	s_r	CV_r
all labs	**155**	**8,17**	**0,125**	**1,534**
10	% from the mean			

l	s_R	CV_R
39	**0,349**	**4,268**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: C **Sample: 1** 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	49,94	50,04	49,79	49,77	0	49,89	*b*	*	0,13	0,26	93,54
2	A71	PZ99	DZ99	52,65	53,31	51,96	51,16	4	52,27			0,92	1,77	98,01
3	F02x	PZ98	DA01	52,52	52,37	*51,81a*	52,51	4	52,30			0,34	0,64	98,08
4	A56	PZ98	DA02	53,06	52,43	52,30	51,97	4	52,44			0,46	0,87	98,33
5	F07x	PZ98	DA01	52,72	52,78	52,56	52,65	4	52,68			0,09	0,18	98,78
6	A86	PZ98	DA01	52,80	52,82	52,67	52,75	4	52,76			0,07	0,13	98,93
7	F25x	PZ98	DA01	52,89	52,79	52,67	52,83	4	52,80			0,09	0,18	99,00
8	F15x	PZ98	DA01	52,80	52,90	52,90	52,90	3	52,90			0,00	0,00	99,20
9	A57	PZ98	DA01	53,08	52,95	52,96	52,63	4	52,91			0,19	0,36	99,21
10	F06x	PZ98	DA02	53,13	52,76	52,91	52,92	4	52,93			0,15	0,29	99,25
11	F12x	PZ98	DA02	52,69	53,42	52,75	52,95	4	52,95			0,33	0,62	99,29
12	F22x	PZ98	DA01	53,41	52,88	52,60	53,13	4	53,00			0,35	0,65	99,39
13	F28x	PZ98	DA01	53,60	52,90	52,70	52,90	4	53,03			0,39	0,74	99,43
14	F05x	PZ98	DA01	53,10	53,00	52,90	53,10	4	53,03			0,10	0,18	99,43
15	F32x	PZ98	DA01	53,00	53,10	53,10	52,90	4	53,03			0,10	0,18	99,43
16	F18x	PZ98	DA01	53,30	53,10	52,90	52,80	4	53,03			0,22	0,42	99,43
17	A61x	PZ98	DA02	53,08	52,98	53,05	53,08	4	53,05			0,05	0,09	99,47
18	A39	PZ98	DA02	52,94	53,04	53,12	53,18	4	53,07			0,11	0,20	99,51
19	A82	PZ98	DA02	52,99	53,23	52,99	53,23	4	53,11			0,14	0,26	99,59
20	F08x	PZ98	DA01	53,04	53,20	53,26	53,02	4	53,13			0,12	0,22	99,63
21	A65	PZ98	DA02	53,21	53,13	53,14	53,31	4	53,20			0,08	0,16	99,75
22	F14x	PZ98	DA01	53,30	53,40	53,30	53,30	4	53,33			0,05	0,09	99,99
23	F19x	PZ98	DA99	53,40	53,50	53,40	53,40	4	53,43			0,05	0,09	100,18
24	A45x	PZ98	DA02	53,40	53,30	53,50	53,50	4	53,43			0,10	0,18	100,18
25	F16x	PZ98	DA02	53,29	53,72	53,59	53,33	4	53,48			0,21	0,39	100,29
26	A42	PZ98	DA01	54,90	52,80	53,40	52,90	4	53,50			0,97	1,81	100,32
27	A62x	PZ98	DA01	53,10	53,00	53,30	54,70	4	53,53			0,79	1,48	100,37
28	F26x	PZ98	DA02	53,40	53,60	53,80	53,60	4	53,60			0,16	0,30	100,51
29	F24x	PZ98	DA02	53,65	53,70	53,72	53,76	4	53,71			0,05	0,09	100,71
30	F21x	PZ98	DA01	53,82	53,71	53,76	53,73	4	53,76			0,05	0,09	100,80
31	A47	PZ98	DA02	53,73	54,41	53,99	53,01	4	53,79			0,59	1,09	100,86
32	A85x	PZ98	DA01	53,88	53,88	53,90	53,89	4	53,89			0,01	0,02	101,04
33	F33x	PZ98	DA02	54,07	54,20	53,63	53,90	4	53,95			0,25	0,46	101,16
34	F03x	PZ98	DA01	54,61	54,36	54,59	54,92	4	54,62			0,23	0,42	102,42
35	F27x	PZ98	DA01	54,67	54,71	54,86	54,43	4	54,67			0,18	0,33	102,51
36	A58x	PZ98	DA99	54,54	54,50	54,92	54,89	4	54,71			0,22	0,41	102,59
37	A60x	PZ98	DA02	54,57	54,60	54,82	55,12	4	54,77			0,26	0,47	102,71
38	F13x	PZ98	DA01	56,53	57,54	57,10	56,65	0	56,96	*b*	*	0,46	0,81	106,80
39	A88	PZ98	DA01	67,45	65,47	68,65	65,95	0	66,88	*b*	*	1,45	2,17	125,41
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	n	Mean	s_r	CV_r
all labs	**143**	**53,33**	**0,235**	**0,440**
5	% from the mean			

l	s_R	CV_R
36	**0,638**	**1,197**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: C **Sample: 2** 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	48,98	49,01	48,83	48,95	0	48,94	*b*	*	0,08	0,16	93,79
2	F28x	PZ98	DA01	51,50	50,20	51,30	51,00	4	51,00			0,57	1,12	97,73
3	A56	PZ98	DA02	51,23	51,22	51,36	51,13	4	51,24			0,09	0,18	98,19
4	F22x	PZ98	DA01	51,55	51,23	50,92	51,32	4	51,25			0,26	0,51	98,22
5	F25x	PZ98	DA01	51,37	51,40	51,20	51,38	4	51,34			0,09	0,18	98,38
6	F07x	PZ98	DA01	51,56	51,30	51,35	51,19	4	51,35			0,16	0,30	98,41
7	F02x	PZ98	DA01	51,33	51,23	51,89	51,10	4	51,39			0,35	0,68	98,48
8	A39	PZ98	DA02	51,36	51,54	51,46	51,58	4	51,48			0,10	0,19	98,66
9	A57	PZ98	DA01	51,93	51,52	51,63	51,27	4	51,59			0,27	0,53	98,86
10	A82	PZ98	DA02	51,71	51,47	51,50	51,90	4	51,65			0,20	0,39	98,97
11	F12x	PZ98	DA02	51,66	51,70	51,63	51,66	4	51,66			0,03	0,06	99,00
12	F18x	PZ98	DA01	51,50	51,60	51,70	51,90	4	51,68			0,17	0,33	99,03
13	F15x	PZ98	DA01	51,70	51,80	51,70	51,70	4	51,73			0,05	0,10	99,12
14	F06x	PZ98	DA02	51,75	51,73	51,74	51,81	4	51,76			0,04	0,07	99,19
15	F32x	PZ98	DA01	51,80	51,80	51,80	51,80	4	51,80			0,00	0,00	99,27
16	F08x	PZ98	DA01	52,01	52,01	51,80	51,73	4	51,89			0,14	0,28	99,44
17	A86	PZ98	DA01	51,96	51,87	51,75	52,01	4	51,90			0,11	0,22	99,45
18	F19x	PZ98	DA99	52,00	51,90	51,90	52,10	4	51,98			0,10	0,18	99,60
19	F14x	PZ98	DA01	52,00	52,10	52,00	52,00	4	52,03			0,05	0,10	99,70
20	A61x	PZ98	DA02	52,13	52,05	52,06	52,06	4	52,08			0,04	0,07	99,79
21	F24x	PZ98	DA02	52,10	52,10	52,14	52,15	4	52,12			0,02	0,04	99,88
22	A42	PZ98	DA01	54,00	52,30	50,50	52,00	4	52,20			1,44	2,75	100,03
23	F16x	PZ98	DA02	52,20	52,53	52,28	52,27	4	52,32			0,14	0,28	100,26
24	A65	PZ98	DA02	52,39	52,46	52,08	52,39	4	52,33			0,17	0,33	100,29
25	A45x	PZ98	DA02	52,40	52,70	52,40	52,30	4	52,45			0,17	0,33	100,51
26	F26x	PZ98	DA02	52,50	52,60	52,40	52,50	4	52,50			0,08	0,16	100,61
27	F05x	PZ98	DA01	52,50	52,50	52,50	52,50	4	52,50			0,00	0,00	100,61
28	F33x	PZ98	DA02	52,66	52,46	52,34	52,67	4	52,53			0,16	0,31	100,67
29	F21x	PZ98	DA01	52,58	52,53	52,63	52,57	4	52,58			0,04	0,08	100,76
30	F27x	PZ98	DA01	52,77	52,66	52,76	52,92	4	52,78			0,11	0,20	101,14
31	A47	PZ98	DA02	53,07	53,89	52,87	51,39	4	52,81			1,04	1,97	101,19
32	A62x	PZ98	DA01	53,30	53,00	53,10	52,90	4	53,08			0,17	0,32	101,71
33	A85x	PZ98	DA01	53,09	53,07	53,09	53,07	4	53,08			0,01	0,02	101,72
34	A58x	PZ98	DA99	53,41	53,26	53,77	53,53	4	53,49			0,22	0,40	102,51
35	F03x	PZ98	DA01	53,45	53,50	53,46	53,57	4	53,50			0,05	0,10	102,52
36	A60x	PZ98	DA02	53,79	53,54	53,51	53,47	4	53,58			0,14	0,27	102,68
37	A71	PZ99	DZ99	54,39	54,16	53,98	53,31	4	53,96			0,46	0,86	103,41
38	F13x	PZ98	DA01	54,96	55,09	55,06	*54,3a*	0	55,04	*b*	*	0,07	0,12	105,47
39	A88	PZ98	DA01	70,02	70,87	65,14	64,55	0	67,65	*b*	*	3,26	4,82	129,63
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	n	Mean	s_r	CV_r
all labs	**144**	**52,18**	**0,202**	**0,386**
5	% from the mean			

l	s_R	CV_R
36	**0,739**	**1,417**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	48,43	*48,25a*	48,43	48,40	0	48,42	*b*	*	0,02	0,04	93,48
2	A71	PZ99	DZ99	50,30	48,80	50,56	49,85	4	49,88			0,78	1,56	96,29
3	A56	PZ98	DA02	50,17	50,26	50,02	49,87	4	50,08			0,17	0,34	96,68
4	F22x	PZ98	DA01	51,60	48,96	51,85	50,46	0	50,72	*c*		1,32	2,60	97,91
5	A57	PZ98	DA01	51,02	50,88	50,91	50,60	4	50,85			0,18	0,35	98,17
6	F02x	PZ98	DA01	50,99	51,10	51,23	50,86	4	51,05			0,16	0,31	98,55
7	F28x	PZ98	DA01	50,70	50,90	51,60	51,20	4	51,10			0,39	0,77	98,65
8	F18x	PZ98	DA01	51,20	51,10	51,30	50,90	4	51,13			0,17	0,33	98,70
9	F08x	PZ98	DA01	51,32	51,71	50,94	50,89	4	51,22			0,38	0,75	98,87
10	A86	PZ98	DA01	51,32	51,28	51,11	51,40	4	51,28			0,12	0,24	98,99
11	F07x	PZ98	DA01	51,32	51,16	51,28	51,39	4	51,29			0,10	0,19	99,01
12	A82	PZ98	DA02	51,60	51,21	51,28	51,19	4	51,32			0,19	0,37	99,08
13	F25x	PZ98	DA01	51,38	51,29	51,37	51,28	4	51,33			0,05	0,10	99,10
14	F06x	PZ98	DA02	51,54	51,53	51,54	51,63	4	51,56			0,05	0,09	99,54
15	F15x	PZ98	DA01	51,50	51,70	51,60	51,60	4	51,60			0,08	0,16	99,62
16	F32x	PZ98	DA01	51,60	51,60	51,60	51,60	4	51,60			0,00	0,00	99,62
17	A39	PZ98	DA02	51,79	51,59	51,69	51,59	4	51,66			0,10	0,19	99,74
18	F12x	PZ98	DA02	51,90	51,58	51,52	51,67	4	51,67			0,17	0,32	99,75
19	F14x	PZ98	DA01	51,70	51,70	51,70	51,80	4	51,73			0,05	0,10	99,86
20	A61x	PZ98	DA02	51,90	51,57	51,91	51,69	4	51,77			0,17	0,32	99,94
21	A85x	PZ98	DA01	51,80	51,75	51,80	51,76	4	51,78			0,03	0,05	99,96
22	A42	PZ98	DA01	53,30	52,10	51,80	50,00	0	51,80	*c*		1,36	2,63	100,00
23	A45x	PZ98	DA02	51,90	52,00	51,70	51,90	4	51,88			0,13	0,24	100,15
24	F05x	PZ98	DA01	51,90	52,00	51,90	51,90	4	51,93			0,05	0,10	100,24
25	F19x	PZ98	DA99	52,00	51,90	51,80	52,10	4	51,95			0,13	0,25	100,29
26	F33x	PZ98	DA02	52,19	52,04	52,32	52,00	4	52,14			0,15	0,28	100,66
27	A65	PZ98	DA02	52,08	52,18	52,33	52,00	4	52,15			0,14	0,27	100,67
28	F24x	PZ98	DA02	52,14	52,15	52,17	52,17	4	52,16			0,01	0,03	100,69
29	F16x	PZ98	DA02	52,06	52,21	52,09	52,32	4	52,17			0,12	0,23	100,72
30	F21x	PZ98	DA01	52,67	52,30	52,22	51,95	4	52,29			0,30	0,57	100,94
31	A62x	PZ98	DA01	52,40	52,30	52,10	52,40	4	52,30			0,14	0,27	100,97
32	F26x	PZ98	DA02	52,30	52,50	52,70	52,50	4	52,50			0,16	0,31	101,36
33	F27x	PZ98	DA01	52,70	52,82	52,70	52,94	4	52,79			0,11	0,22	101,91
34	A47	PZ98	DA02	52,99	53,92	53,19	52,25	4	53,09			0,69	1,29	102,49
35	F03x	PZ98	DA01	53,05	53,21	53,24	53,41	4	53,23			0,15	0,28	102,76
36	A60x	PZ98	DA02	53,29	53,36	53,22	53,24	4	53,28			0,06	0,12	102,86
37	A58x	PZ98	DA99	53,10	53,36	53,65	53,64	4	53,44			0,26	0,49	103,16
38	F13x	PZ98	DA01	*53,74a*	54,90	54,67	54,88	0	54,82	*b*	*	0,13	0,23	105,83
39	A88	PZ98	DA01	66,02	66,73	65,01	65,37	0	65,78	*b*	*	0,76	1,15	127,00
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	n	Mean	s_r	CV_r
all labs	**136**	**51,80**	**0,174**	**0,337**
5	% from the mean			

l	s_R	CV_R
34	**0,810**	**1,563**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	48,65	48,77	48,69	48,64	0	48,69	*b*	*	0,06	0,12	94,12
2	A56	PZ98	DA02	50,43	50,60	50,57	50,17	4	50,44			0,20	0,39	97,51
3	F02x	PZ98	DA01	50,10	50,75	50,68	51,02	4	50,64			0,39	0,76	97,89
4	F07x	PZ98	DA01	50,80	50,97	50,65	50,87	4	50,82			0,13	0,26	98,24
5	A85x	PZ98	DA01	50,99	50,98	50,98	51,02	4	50,99			0,02	0,04	98,57
6	F25x	PZ98	DA01	51,01	51,01	51,04	50,97	4	51,01			0,03	0,06	98,60
7	F28x	PZ98	DA01	51,30	51,10	50,80	51,00	4	51,05			0,21	0,41	98,68
8	F08x	PZ98	DA01	51,23	50,89	51,22	51,10	4	51,11			0,16	0,31	98,80
9	F19x	PZ98	DA99	51,10	51,30	51,20	51,50	4	51,28			0,17	0,33	99,12
10	F15x	PZ98	DA01	51,40	51,30	51,30	51,30	4	51,33			0,05	0,10	99,22
11	A86	PZ98	DA01	51,20	51,48	51,32	51,44	4	51,36			0,13	0,25	99,28
12	F18x	PZ98	DA01	51,50	51,50	51,30	51,30	4	51,40			0,12	0,22	99,36
13	A57	PZ98	DA01	51,86	51,37	51,35	51,05	4	51,41			0,34	0,65	99,38
14	F05x	PZ98	DA01	51,40	51,40	51,40	51,50	4	51,43			0,05	0,10	99,41
15	F32x	PZ98	DA01	51,50	51,40	51,50	51,50	4	51,48			0,05	0,10	99,51
16	A82	PZ98	DA02	51,63	51,47	51,37	51,58	4	51,51			0,12	0,23	99,58
17	F12x	PZ98	DA02	51,70	51,69	51,26	51,55	4	51,55			0,21	0,40	99,65
18	A61x	PZ98	DA02	51,49	51,72	51,40	51,59	4	51,55			0,14	0,27	99,65
19	F14x	PZ98	DA01	51,60	51,60	51,60	51,60	4	51,60			0,00	0,00	99,75
20	A39	PZ98	DA02	51,62	51,66	51,43	51,76	4	51,62			0,14	0,26	99,78
21	F06x	PZ98	DA02	51,56	51,70	51,68	51,64	4	51,65			0,06	0,12	99,83
22	F24x	PZ98	DA02	51,68	51,71	51,72	51,81	4	51,73			0,06	0,11	100,00
23	A71	PZ99	DZ99	51,72	50,65	52,05	52,78	0	51,80	*c*		0,89	1,71	100,13
24	F16x	PZ98	DA02	51,89	51,94	51,94	51,62	4	51,85			0,15	0,30	100,23
25	A42	PZ98	DA01	53,70	51,80	51,90	50,20	0	51,90	*c*		1,43	2,76	100,33
26	A65	PZ98	DA02	52,02	51,92	51,95	51,95	4	51,96			0,04	0,08	100,44
27	A45x	PZ98	DA02	51,90	52,10	51,90	52,00	4	51,98			0,10	0,18	100,47
28	F22x	PZ98	DA01	52,31	52,15	51,88	51,74	4	52,02			0,26	0,50	100,56
29	A47	PZ98	DA02	51,57	52,76	51,55	52,56	4	52,11			0,64	1,23	100,73
30	F33x	PZ98	DA02	52,14	52,36	52,26	52,12	4	52,22			0,11	0,21	100,95
31	F21x	PZ98	DA01	52,38	52,42	52,45	52,44	4	52,42			0,03	0,06	101,34
32	F27x	PZ98	DA01	52,25	52,58	52,55	52,45	4	52,46			0,15	0,28	101,41
33	A58x	PZ98	DA99	52,44	52,76	52,38	52,48	4	52,52			0,17	0,32	101,52
34	F26x	PZ98	DA02	52,60	52,60	52,70	52,70	4	52,65			0,06	0,11	101,78
35	A62x	PZ98	DA01	53,20	52,80	52,60	53,90	4	53,13			0,57	1,08	102,70
36	A60x	PZ98	DA02	53,05	53,17	53,30	53,34	4	53,21			0,13	0,24	102,87
37	F03x	PZ98	DA01	53,42	53,39	53,28	53,49	4	53,40			0,09	0,16	103,22
38	F13x	PZ98	DA01	54,56	54,65	54,70	*53,51a*	0	54,64	*b*	*	0,07	0,13	105,62
39	A88	PZ98	DA01	66,01	65,12	65,83	64,61	0	65,39	*b*	*	0,65	0,99	126,41
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	n	Mean	s_r	CV_r
all labs	**136**	**51,73**	**0,154**	**0,298**
5	% from the mean			

l	s_R	CV_R
34	**0,709**	**1,371**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F27	PD01	DB01	46,51	44,32	45,22	47,37	4	45,86	*	1,35	2,95	82,60
2	A88	PD01	DB08	50,19	48,06	48,03	47,73	4	48,50		1,13	2,34	87,36
3	A80	PD03	DB10	47,60	49,10	48,10	49,50	4	48,58		0,88	1,81	87,50
4	F19x	PD02	DB08	52,60	47,70	44,80	51,30	4	49,10		3,54	7,20	88,44
5	A59	PC01	DB08	50,66	51,54	52,35	49,07	4	50,91		1,40	2,76	91,69
6	F16x	PC01	DB08	52,11	52,14	50,83	51,34	4	51,61		0,64	1,23	92,95
7	F18x	PD99	DB10	52,80	55,30	50,20	50,80	4	52,28		2,30	4,41	94,16
8	A36	PD02	DB08	46,90	53,94	55,22	55,32	4	52,85		4,01	7,59	95,19
9	F15x	PC01	DB08	56,00	50,00	55,00	51,00	4	53,00		2,94	5,55	95,47
10	F07x	PD99	DB08	54,51	52,51	53,68	52,49	4	53,30		0,98	1,84	96,00
11	A82	PD01	DB08	52,34	52,60	55,21	55,70	4	53,96		1,74	3,22	97,20
12	F08x	PE99	DB08	55,38	54,58	53,44	53,32	4	54,18		0,98	1,81	97,59
13	F24x	PD01	DB99	49,00	52,00	55,00	61,00	4	54,25		5,12	9,44	97,72
14	A60x	PD01	DB10	56,12	56,11	52,18	52,69	4	54,28		2,13	3,93	97,76
15	A45x	PB99	DB08	53,10	56,70	54,10	55,00	4	54,73		1,53	2,79	98,57
16	F14x	PC01	DB08	55,50	55,60	55,40	54,80	4	55,33		0,36	0,65	99,65
17	A39	PC02	DB08	54,92	54,61	55,35	57,92	4	55,70		1,51	2,71	100,33
18	F12x	PC01	DB10	55,31	57,21	56,03	56,18	4	56,18		0,78	1,39	101,20
19	A71	PD02	DB10	55,88	56,69	56,04	56,26	4	56,22		0,35	0,63	101,26
20	A56	PC01	DB08	56,00	58,00	56,00	55,00	4	56,25		1,26	2,24	101,32
21	F05x	PD02	DB08	56,80	56,50	56,40	56,20	4	56,48		0,25	0,44	101,72
22	F28x	PD02	DB08	53,53	57,15	58,96	56,57	4	56,55		2,26	3,99	101,86
23	F13x	PD01	DB08	56,80	61,70	54,20	53,70	4	56,60		3,66	6,47	101,95
24	F25x	PB06	DB08	58,87	59,00	57,52	57,11	4	58,13		0,95	1,64	104,70
25	A79	PD03	DB10	61,22	61,12	56,57	56,23	4	58,79		2,76	4,69	105,89
26	F06x	PD02	DB08	61,40	59,30	57,50	57,80	4	59,00		1,78	3,02	106,27
27	F02x	PD02	DB08	56,45	58,95	60,37	61,35	4	59,28		2,13	3,59	106,78
28	A65	PD01	DB08	53,40	62,90	56,10	65,10	4	59,38		5,53	9,31	106,95
29	F03x	PD02	DB08	62,60	61,24	60,57	57,83	4	60,56		2,01	3,31	109,08
30	A57	PZ02	DD02	58,50	59,60	60,80	63,70	4	60,65		2,24	3,69	109,25
31	A58x	PD02	DB01	61,61	59,81	61,41	61,01	4	60,96		0,81	1,32	109,80
32	F32x	PD01	DB08	61,40	63,80	59,90	59,60	4	61,18		1,92	3,14	110,19
33	A47	PC01	DB08	59,00	61,00	61,00	64,00	4	61,25		2,06	3,37	110,33
34	F33x	PD01	DB10	64,20	59,20	61,20	62,50	4	61,78		2,11	3,42	111,27
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	n	Mean	s_r	CV_r
all labs	**136**	**55,52**	**1,924**	**3,465**
15	% from the mean			
	l		s_R	CV_R
	34		**4,098**	**7,382**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Zn **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	F27	PD01	DB01	15,48	13,73	15,29	14,23	0	14,68	*b*	*	0,84	5,72	63,71
2	A88	PD01	DB08	20,26	19,24	19,28	19,66	4	19,61			0,47	2,41	85,09
3	F28x	PD02	DB08	19,39	21,41	21,63	20,59	4	20,76			1,01	4,89	90,06
4	F07x	PD99	DB08	20,91	20,71	21,10	20,47	4	20,80			0,27	1,30	90,25
5	A80	PD03	DB10	21,00	21,20	21,00	20,70	4	20,98			0,21	0,98	91,02
6	A71	PD02	DB10	20,67	21,36	21,41	21,43	4	21,22			0,37	1,73	92,07
7	A59	PC01	DB08	20,86	20,65	23,01	20,69	4	21,30			1,14	5,36	92,44
8	F19x	PD02	DB08	22,00	22,10	21,70	22,20	4	22,00			0,22	0,98	95,46
9	F08x	PE99	DB08	22,23	22,02	21,87	21,93	4	22,01			0,16	0,72	95,52
10	F16x	PC01	DB08	21,85	21,86	22,10	22,55	4	22,09			0,33	1,48	95,86
11	F33x	PD01	DB10	21,70	22,00	22,80	22,80	4	22,33			0,56	2,52	96,88
12	A45x	PB99	DB08	22,60	22,40	22,50	22,00	4	22,38			0,26	1,18	97,09
13	A82	PD01	DB08	22,38	22,75	21,90	22,72	4	22,44			0,40	1,76	97,36
14	F14x	PC01	DB08	22,70	22,50	22,80	22,80	4	22,70			0,14	0,62	98,50
15	A36	PD02	DB08	22,25	22,78	23,31	22,46	4	22,70			0,46	2,03	98,50
16	F05x	PD02	DB08	22,90	22,80	23,20	23,10	4	23,00			0,18	0,79	99,80
17	A57	PZ02	DD02	23,00	23,20	22,30	23,60	4	23,03			0,54	2,36	99,91
18	F25x	PB06	DB08	23,25	23,56	23,28	23,48	4	23,39			0,15	0,65	101,51
19	A60x	PD01	DB10	23,60	23,38	23,41	23,20	4	23,40			0,16	0,70	101,53
20	F18x	PD99	DB10	23,30	22,90	23,30	24,10	4	23,40			0,50	2,15	101,54
21	A56	PC01	DB08	23,00	23,00	25,00	23,00	4	23,50			1,00	4,26	101,97
22	F12x	PC01	DB10	23,58	23,81	23,16	23,52	4	23,52			0,27	1,14	102,05
23	F06x	PD02	DB08	23,00	23,40	24,00	23,90	4	23,58			0,46	1,97	102,30
24	A79	PD03	DB10	24,94	24,73	22,78	22,33	4	23,70			1,33	5,62	102,82
25	A39	PC02	DB08	23,93	23,47	24,17	24,19	4	23,94			0,33	1,40	103,88
26	F03x	PD02	DB08	23,82	23,51	24,49	25,78	4	24,40			1,01	4,13	105,88
27	F13x	PD01	DB08	24,60	24,00	24,40	24,70	4	24,43			0,31	1,27	105,99
28	F15x	PC01	DB08	23,00	25,00	27,00	23,00	4	24,50			1,91	7,82	106,31
29	F02x	PD02	DB08	23,82	24,10	24,77	25,40	4	24,52			0,71	2,89	106,41
30	A65	PD01	DB08	24,80	24,60	24,50	24,60	4	24,63			0,13	0,51	106,86
31	A47	PC01	DB08	24,00	25,00	25,00	26,00	4	25,00			0,82	3,27	108,48
32	F32x	PD01	DB08	25,50	26,20	25,50	25,30	4	25,63			0,39	1,54	111,19
33	A58x	PD02	DB01	27,05	25,63	27,91	25,84	4	26,61		*	1,07	4,02	115,46
34	F24x	PD01	DB99	25,00	25,00	30,00	32,00	0	28,00	*c*	*	3,56	**12,71**	121,50
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	n	Mean	s_r	CV_r
all labs	**128**	**23,05**	**0,540**	**2,344**
15	% from the mean			

l	s_R	CV_R
32	**1,539**	**6,678**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F27	PD01	DB01	12,83	14,47	13,04	13,48	0	13,46	*b*	*	0,73	5,42	61,68
2	F08x	PE99	DB08	*18,07a*	16,11	16,12	16,19	0	16,14	*b*	*	0,04	0,27	73,99
3	A88	PD01	DB08	18,85	18,49	18,62	19,18	4	18,79			0,30	1,61	86,12
4	A59	PC01	DB08	20,31	19,30	20,16	19,50	4	19,82			0,49	2,49	90,85
5	A80	PD03	DB10	19,50	19,80	19,70	20,50	4	19,88			0,43	2,19	91,11
6	F24x	PD01	DB99	19,00	20,00	20,00	21,00	4	20,00			0,82	4,08	91,69
7	F07x	PD99	DB08	20,75	22,33	19,61	20,26	4	20,74			1,16	5,59	95,07
8	A71	PD02	DB10	20,91	20,93	20,94	20,45	4	20,81			0,24	1,15	95,39
9	A82	PD01	DB08	21,33	21,05	20,80	20,89	4	21,02			0,23	1,11	96,35
10	F25x	PB06	DB08	20,74	20,96	21,19	21,25	4	21,04			0,23	1,11	96,43
11	A45x	PB99	DB08	21,40	20,80	21,20	20,80	4	21,05			0,30	1,43	96,50
12	F14x	PC01	DB08	20,90	20,80	21,90	21,50	4	21,28			0,52	2,44	97,53
13	F19x	PD02	DB08	21,60	21,30	21,10	21,20	4	21,30			0,22	1,01	97,64
14	A57	PZ02	DD02	21,90	21,20	21,20	21,00	4	21,33			0,39	1,85	97,76
15	F16x	PC01	DB08	21,48	21,62	21,13	21,13	4	21,34			0,25	1,17	97,83
16	F06x	PD02	DB08	21,50	21,80	21,20	21,90	4	21,60			0,32	1,46	99,02
17	A36	PD02	DB08	21,35	21,25	22,72	21,56	4	21,72			0,68	3,13	99,57
18	A56	PC01	DB08	22,00	21,00	22,00	22,00	4	21,75			0,50	2,30	99,71
19	F15x	PC01	DB08	21,00	23,00	22,00	22,00	4	22,00			0,82	3,71	100,85
20	F12x	PC01	DB10	22,04	22,17	22,10	22,10	4	22,10			0,05	0,24	101,32
21	F02x	PD02	DB08	22,12	22,34	22,56	22,95	4	22,49			0,35	1,57	103,11
22	F18x	PD99	DB10	22,80	23,00	22,50	22,20	4	22,63			0,35	1,55	103,72
23	A79	PD03	DB10	23,92	23,85	21,56	21,64	4	22,74			1,32	5,80	104,26
24	A60x	PD01	DB10	22,66	22,30	22,82	23,25	4	22,76			0,39	1,73	104,33
25	F03x	PD02	DB08	22,72	22,28	22,78	23,28	4	22,77			0,41	1,80	104,36
26	F13x	PD01	DB08	22,70	22,80	23,10	23,00	4	22,90			0,18	0,80	104,98
27	A65	PD01	DB08	22,70	22,70	23,80	23,00	4	23,05			0,52	2,25	105,67
28	F05x	PD02	DB08	23,80	23,60	23,20	22,20	4	23,20			0,71	3,07	106,35
29	A58x	PD02	DB01	24,38	23,72	22,81	22,15	4	23,27			0,98	4,23	106,65
30	F33x	PD01	DB10	21,80	22,40	23,70	25,60	0	23,38	*c*		1,68	7,20	107,16
31	A39	PC02	DB08	24,05	23,09	22,98	23,89	4	23,50			0,55	2,32	107,74
32	F32x	PD01	DB08	23,10	23,90	23,60	23,70	4	23,58			0,34	1,44	108,07
33	A47	PC01	DB08	23,00	23,00	25,00	25,00	4	24,00			1,15	4,81	110,02
34	F28x	PD02	DB08	29,87	28,76	31,32	32,14	0	30,52	*b*	*	1,50	4,93	139,92
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	n	Mean	s_r	CV_r
all labs	**120**	**21,81**	**0,507**	**2,326**
15	% from the mean			
	l		s_R	CV_R
	30		**1,268**	**5,814**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Zn **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	DB01	21,86	22,19	22,02	21,74	0	21,95	*b*	*	0,20	0,89	69,93
2	A88	PD01	DB08	26,26	25,92	26,03	26,70	0	26,23	*b*	*	0,35	1,32	83,55
3	A80	PD03	DB10	27,70	28,20	27,90	28,20	4	28,00			0,24	0,87	89,20
4	A59	PC01	DB08	28,54	28,28	29,28	28,34	4	28,61			0,46	1,61	91,14
5	F08x	PE99	DB08	28,51	28,75	29,58	29,13	4	28,99			0,47	1,61	92,36
6	F19x	PD02	DB08	29,60	29,90	29,70	30,00	4	29,80			0,18	0,61	94,93
7	F28x	PD02	DB08	28,73	30,81	29,43	31,45	4	30,11			1,25	4,14	95,90
8	F14x	PC01	DB08	30,50	30,50	30,30	30,10	4	30,35			0,19	0,63	96,68
9	A82	PD01	DB08	30,14	30,45	30,64	30,31	4	30,39			0,21	0,70	96,80
10	A71	PD02	DB10	30,37	30,44	30,33	30,51	4	30,41			0,08	0,26	96,88
11	A36	PD02	DB08	30,18	30,28	31,46	30,28	4	30,55			0,61	1,99	97,32
12	F16x	PC01	DB08	30,29	31,25	30,09	30,67	4	30,58			0,51	1,67	97,40
13	F18x	PD99	DB10	30,90	30,70	30,80	30,20	4	30,65			0,31	1,01	97,64
14	F12x	PC01	DB10	30,92	30,51	30,74	30,73	4	30,73			0,17	0,55	97,88
15	F05x	PD02	DB08	31,00	30,60	30,70	30,80	4	30,78			0,17	0,55	98,04
16	A60x	PD01	DB10	31,19	30,57	32,16	29,74	4	30,92			1,02	3,30	98,48
17	A56	PC01	DB08	30,00	31,00	33,00	31,00	4	31,25			1,26	4,03	99,55
18	A45x	PB99	DB08	30,20	30,80	30,70	33,50	4	31,30			1,49	4,76	99,71
19	F25x	PB06	DB08	30,93	30,79	31,34	32,25	4	31,33			0,66	2,10	99,80
20	F13x	PD01	DB08	31,55	31,70	30,60	32,10	4	31,49			0,64	2,02	100,31
21	A57	PZ02	DD02	30,90	31,30	32,00	32,30	4	31,63			0,64	2,02	100,75
22	A79	PD03	DB10	33,76	33,87	30,09	30,40	4	32,03			2,07	6,45	102,04
23	F06x	PD02	DB08	32,70	32,40	31,60	31,80	4	32,13			0,51	1,59	102,34
24	F07x	PD99	DB08	31,59	32,94	30,30	33,91	4	32,19			1,58	4,90	102,53
25	A39	PC02	DB08	32,84	33,05	31,54	31,52	4	32,24			0,82	2,55	102,70
26	F03x	PD02	DB08	31,82	32,36	32,09	33,00	4	32,32			0,51	1,56	102,95
27	F02x	PD02	DB08	31,31	32,10	32,88	33,52	4	32,45			0,96	2,95	103,38
28	F24x	PD01	DB99	30,00	32,00	33,00	35,00	4	32,50			2,08	6,41	103,53
29	A65	PD01	DB08	32,70	32,80	32,40	32,50	4	32,60			0,18	0,56	103,85
30	A47	PC01	DB08	33,00	33,00	33,00	34,00	4	33,25			0,50	1,50	105,92
31	A58x	PD02	DB01	32,10	34,07	33,36	34,29	4	33,46			0,99	2,95	106,58
32	F33x	PD01	DB10	34,60	32,30	34,30	32,90	4	33,53			1,10	3,29	106,80
33	F32x	PD01	DB08	33,90	33,70	33,60	33,80	4	33,75			0,13	0,38	107,51
34	F15x	PC01	DB08	32,00	35,00	33,00	37,00	4	34,25			2,22	6,47	109,11
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	n	Mean	s_r	CV_r
all labs	**128**	**31,39**	**0,756**	**2,408**
15	% from the mean			
	l		s_R	CV_R
	32		**1,484**	**4,728**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F19x	PD02	DB08	135,00	122,00	113,00	128,00	4	124,50		9,33	7,49	85,74
2	F15x	PB03	DB08	125,00	122,00	131,00	134,00	4	128,00		5,48	4,28	88,15
3	F21x	PC02	DB09	131,96	129,68	128,35	130,00	4	130,00		1,49	1,15	89,53
4	A60x	PD01	DB10	137,40	136,40	129,20	128,70	4	132,93		4,61	3,47	91,55
5	A59	PC01	DB08	131,50	134,30	135,60	136,60	4	134,50		2,21	1,64	92,63
6	F16x	PC01	DB08	137,00	137,20	135,40	135,80	4	136,35		0,89	0,65	93,91
7	F07x	PD99	DB08	137,20	133,60	140,40	138,20	4	137,35		2,83	2,06	94,59
8	F18x	PD99	DB08	139,00	138,00	137,00	140,00	4	138,50		1,29	0,93	95,39
9	A71	PD02	DB10	143,23	143,06	136,09	136,61	4	139,75		3,93	2,81	96,25
10	F14x	PC01	DB08	139,00	141,00	140,00	144,00	4	141,00		2,16	1,53	97,11
11	A39	PC02	DB08	144,10	139,50	143,20	137,80	4	141,15		2,99	2,12	97,21
12	F28x	PD02	DB08	137,60	142,50	141,60	144,80	4	141,63		3,00	2,12	97,54
13	F25x	PB06	DB08	139,50	143,80	142,60	140,90	4	141,70		1,89	1,33	97,59
14	F12x	PC01	DB08	138,80	143,80	143,60	142,10	4	142,08		2,31	1,63	97,85
15	A88	PD01	DB08	140,51	141,82	141,02	146,23	4	142,40		2,61	1,83	98,07
16	A56	PC01	DB08	146,00	145,00	142,00	140,00	4	143,25		2,75	1,92	98,66
17	F03x	PD02	DB08	148,40	148,73	141,97	141,35	4	145,11		4,00	2,75	99,94
18	A82	PD01	DB08	142,70	142,43	148,99	147,73	4	145,46		3,39	2,33	100,18
19	F08x	PE99	DB08	149,40	149,20	143,90	140,70	4	145,80		4,25	2,91	100,41
20	F27	PD01	DB01	147,40	143,50	146,70	147,60	4	146,30		1,91	1,30	100,76
21	A57	PZ02	DD02	143,30	143,10	149,40	150,70	4	146,63		3,99	2,72	100,98
22	F06x	PD02	DB08	145,80	149,00	149,30	144,20	4	147,08		2,49	1,69	101,29
23	A36	PD02	DB08	134,30	148,20	156,70	151,40	4	147,65		9,57	6,48	101,69
24	F13x	PD01	DB08	148,60	155,20	147,00	141,10	4	147,98		5,80	3,92	101,91
25	A45x	PB99	DB08	146,00	150,00	154,00	145,00	4	148,75		4,11	2,77	102,45
26	F05x	PD02	DB08	145,00	152,00	147,00	151,00	4	148,75		3,30	2,22	102,45
27	A80	PD03	DB10	144,00	155,00	149,00	152,00	4	150,00		4,69	3,13	103,31
28	A79	PD03	DB10	152,90	151,20	150,30	148,50	4	150,73		1,83	1,22	103,81
29	F02x	PD02	DB08	146,20	151,60	153,70	157,80	4	152,33		4,83	3,17	104,91
30	A65	PD01	DB08	144,00	160,00	148,00	167,00	4	154,75		10,63	6,87	106,58
31	A47	PC01	DB08	161,00	154,00	156,00	149,00	4	155,00		4,97	3,20	106,75
32	F32x	PD01	DB08	157,00	153,00	159,00	155,00	4	156,00		2,58	1,66	107,44
33	F33x	PD01	DB10	163,10	149,60	156,70	156,90	4	156,58		5,52	3,52	107,83
34	F24x	PD01	DB99	155,00	156,00	162,00	167,00	4	160,00		5,60	3,50	110,19
35	A43	PB06	DB01	170,00	154,00	160,00	160,00	4	161,00		6,63	4,12	110,88
36	A58x	PD02	DB01	165,87	165,28	166,38	167,41	4	166,24		0,90	0,54	114,49
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	n	Mean	s_r	CV_r
all labs	**144**	**145,20**	**3,910**	**2,693**
* = non tolerable mean because more than +/- **15** % from the mean				
	l		s_R	CV_R
	36		**9,274**	**6,387**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Mn **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	A43	PB06	DB01	32,30	*29,6a*	32,30	31,90	3	32,17	*	0,23	0,72	83,75
2	F28x	PD02	DB08	32,34	33,18	30,66	34,24	4	32,61	*	1,51	4,64	84,89
3	F07x	PD99	DB08	34,82	33,48	34,98	35,86	4	34,79		0,98	2,83	90,57
4	F33x	PD01	DB10	36,20	36,70	34,90	33,80	4	35,40		1,31	3,70	92,17
5	F16x	PC01	DB08	34,35	37,04	35,21	37,48	4	36,02		1,49	4,12	93,78
6	F19x	PD02	DB08	36,20	36,50	35,20	36,20	4	36,03		0,57	1,58	93,80
7	A60x	PD01	DB10	37,49	36,55	36,48	35,79	4	36,58		0,70	1,91	95,23
8	A39	PC02	DB08	36,06	36,42	36,25	38,21	4	36,74		0,99	2,71	95,64
9	A71	PD02	DB10	37,10	37,77	37,25	36,63	4	37,19		0,47	1,26	96,82
10	A56	PC01	DB08	38,00	37,00	37,00	37,00	4	37,25		0,50	1,34	96,98
11	A88	PD01	DB08	37,69	37,03	37,18	37,87	4	37,44		0,40	1,07	97,49
12	F06x	PD02	DB08	37,20	38,40	36,60	38,00	4	37,55		0,81	2,15	97,77
13	F21x	PC02	DB09	37,05	39,34	36,11	38,02	4	37,63		1,38	3,67	97,97
14	F08x	PE99	DB08	37,98	39,11	37,22	37,13	4	37,86		0,92	2,42	98,57
15	A57	PZ02	DD02	37,60	38,00	37,80	38,20	4	37,90		0,26	0,68	98,68
16	F14x	PC01	DB08	38,00	38,00	38,00	38,00	4	38,00		0,00	0,00	98,94
17	A59	PC01	DB08	38,25	37,67	38,64	38,08	4	38,16		0,40	1,05	99,35
18	A82	PD01	DB08	37,28	38,99	38,45	39,20	4	38,48		0,86	2,24	100,19
19	A45x	PB99	DB08	38,80	38,00	39,20	38,40	4	38,60		0,52	1,34	100,50
20	F25x	PB06	DB08	37,89	39,59	38,44	38,59	4	38,63		0,71	1,83	100,57
21	F12x	PC01	DB08	38,40	39,50	38,60	38,80	4	38,83		0,48	1,23	101,09
22	A65	PD01	DB08	38,00	39,00	39,00	40,00	4	39,00		0,82	2,09	101,54
23	F05x	PD02	DB08	39,20	39,10	39,00	39,10	4	39,10		0,08	0,21	101,80
24	F03x	PD02	DB08	38,62	40,30	39,26	39,34	4	39,38		0,69	1,76	102,53
25	F15x	PB03	DB08	39,00	39,00	41,00	39,00	4	39,50		1,00	2,53	102,84
26	F18x	PD99	DB08	39,70	38,90	40,60	39,20	4	39,60		0,74	1,88	103,10
27	A79	PD03	DB10	40,78	40,98	38,02	38,66	4	39,61		1,49	3,77	103,13
28	A80	PD03	DB10	40,60	41,40	40,10	39,80	4	40,48		0,70	1,73	105,38
29	A47	PC01	DB08	39,00	40,00	41,00	43,00	4	40,75		1,71	4,19	106,10
30	A36	PD02	DB08	39,00	40,80	42,20	41,20	4	40,80		1,34	3,28	106,23
31	F32x	PD01	DB08	42,00	41,40	41,30	40,40	4	41,28		0,66	1,60	107,46
32	F27	PD01	DB01	41,00	42,30	41,90	41,30	4	41,63		0,59	1,41	108,38
33	F13x	PD01	DB08	41,60	41,30	43,00	41,20	4	41,78		0,83	2,00	108,77
34	F02x	PD02	DB08	41,30	41,70	42,90	44,50	4	42,60		1,44	3,37	110,91
35	A58x	PD02	DB01	43,70	43,48	43,24	43,22	4	43,41		0,23	0,52	113,02
36	F24x	PD01	DB99	44,00	46,00	51,00	53,00	0	48,50	*b* *	4,20	8,67	126,28
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	n	Mean	s_r	CV_r
all labs	**139**	**38,41**	**0,794**	**2,068**
15	% from the mean			

l	s_R	CV_R
35	**2,498**	**6,512**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Mn **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	F08x	PE99	DB08	679,20	621,70	614,00	633,90	0	637,20	*b* *	29,17	4,58	81,16
2	F07x	PD99	DB08	703,90	696,40	693,60	710,30	4	701,05		7,55	1,08	89,29
3	F28x	PD02	DB08	685,00	700,30	691,30	737,30	4	703,48		23,41	3,33	89,60
4	A39	PC02	DB08	729,00	738,70	731,70	730,20	4	732,40		4,34	0,59	93,29
5	F32x	PD01	DB08	741,00	736,00	742,00	730,00	4	737,25		5,50	0,75	93,90
6	F19x	PD02	DB08	742,00	737,00	736,00	741,00	4	739,00		2,94	0,40	94,13
7	A60x	PD01	DB10	764,40	735,70	755,30	757,70	4	753,28		12,33	1,64	95,94
8	A56	PC01	DB08	741,00	745,00	762,00	766,00	4	753,50		12,34	1,64	95,97
9	A59	PC01	DB08	756,90	755,80	757,60	767,60	4	759,48		5,47	0,72	96,73
10	A88	PD01	DB08	750,87	739,65	754,96	795,19	4	760,17		24,23	3,19	96,82
11	F06x	PD02	DB08	809,30	763,70	741,70	757,90	4	768,15		28,97	3,77	97,84
12	F16x	PC01	DB08	777,40	760,70	761,20	778,70	4	769,50		9,89	1,29	98,01
13	A71	PD02	DB10	774,61	779,51	772,70	777,51	4	776,08		3,02	0,39	98,85
14	F25x	PB06	DB08	781,20	773,80	778,70	779,20	4	778,23		3,14	0,40	99,12
15	A57	PZ02	DD02	771,60	778,20	784,20	786,10	4	780,03		6,55	0,84	99,35
16	F14x	PC01	DB08	790,00	780,00	777,00	777,00	4	781,00		6,16	0,79	99,48
17	F27	PD01	DB01	761,10	754,20	849,20	779,70	0	786,05	*c*	43,46	5,53	100,12
18	F15x	PB03	DB08	796,00	804,00	798,00	776,00	4	793,50		12,15	1,53	101,07
19	A79	PD03	DB10	811,30	808,80	780,00	774,80	4	793,73		19,00	2,39	101,10
20	A45x	PB99	DB08	791,00	793,00	796,00	795,00	4	793,75		2,22	0,28	101,10
21	F21x	PC02	DB09	761,80	802,15	829,95	782,04	4	793,99		29,09	3,66	101,13
22	F05x	PD02	DB08	795,00	791,00	794,00	798,00	4	794,50		2,89	0,36	101,20
23	F18x	PD99	DB08	796,00	799,00	792,00	798,00	4	796,25		3,10	0,39	101,42
24	F12x	PC01	DB08	812,10	813,80	799,10	808,30	4	808,33		6,57	0,81	102,96
25	A58x	PD02	DB01	810,64	811,05	813,86	801,77	4	809,33		5,24	0,65	103,08
26	F13x	PD01	DB08	811,20	815,60	821,50	811,30	4	814,90		4,85	0,60	103,79
27	A43	PB06	DB01	825,00	814,00	819,00	814,00	4	818,00		5,23	0,64	104,19
28	F02x	PD02	DB08	801,70	811,50	821,70	841,90	4	819,20		17,20	2,10	104,34
29	F33x	PD01	DB10	818,90	820,60	*874,2a*	822,60	3	820,70		1,85	0,23	104,53
30	A65	PD01	DB08	813,00	839,00	817,00	821,00	4	822,50		11,47	1,40	104,76
31	F03x	PD02	DB08	823,34	830,33	821,91	822,12	4	824,43		3,99	0,48	105,01
32	A36	PD02	DB08	796,96	821,27	870,94	808,58	4	824,44		32,55	3,95	105,01
33	A82	PD01	DB08	820,33	842,61	823,31	834,29	4	830,14		10,26	1,24	105,73
34	A80	PD03	DB10	821,00	845,00	830,00	831,00	4	831,75		9,91	1,19	105,94
35	F24x	PD01	DB99	828,00	833,00	839,00	843,00	4	835,75		6,60	0,79	106,45
36	A47	PC01	DB08	898,00	906,00	912,00	817,00	0	883,25	*b*	44,54	5,04	112,50
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	n	Mean	s_r	CV_r
all labs	**131**	**785,12**	**10,303**	**1,312**
15	% from the mean			

l	s_R	CV_R
33	**36,318**	**4,624**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F28x	PD02	DB08	835,30	925,50	854,40	872,30	4	871,88		38,81	4,45	87,75
2	F25x	PB06	DB08	863,90	907,50	893,40	858,70	4	880,88		23,42	2,66	88,65
3	F19x	PD02	DB08	937,00	929,00	930,00	937,00	4	933,25		4,35	0,47	93,93
4	A39	PC02	DB08	936,80	939,60	938,80	938,40	4	938,40		1,18	0,13	94,44
5	F07x	PD99	DB08	931,10	945,10	954,20	943,50	4	943,48		9,50	1,01	94,95
6	F32x	PD01	DB08	944,00	956,00	951,00	958,00	4	952,25		6,24	0,66	95,84
7	A60x	PD01	DB10	955,00	954,30	977,10	925,60	4	953,00		21,11	2,22	95,91
8	A59	PC01	DB08	947,40	939,60	966,30	967,10	4	955,10		13,77	1,44	96,12
9	A79	PD03	DB10	1037,00	1029,00	879,90	877,20	0	955,78	*c*	89,24	9,34	96,19
10	A71	PD02	DB10	959,26	956,20	964,13	964,91	4	961,13		4,13	0,43	96,73
11	F08x	PE99	DB08	967,30	974,20	965,30	973,40	4	970,05		4,42	0,46	97,63
12	F27	PD01	DB01	965,70	948,30	1024,10	959,20	4	974,33		33,95	3,48	98,06
13	F16x	PC01	DB08	985,10	983,80	966,10	971,00	4	976,50		9,41	0,96	98,28
14	A56	PC01	DB08	967,00	984,00	980,00	983,00	4	978,50		7,85	0,80	98,48
15	F21x	PC02	DB09	959,65	990,41	967,12	1017,00	4	983,55		25,87	2,63	98,99
16	F14x	PC01	DB08	988,00	986,00	987,00	976,00	4	984,25		5,56	0,56	99,06
17	A88	PD01	DB08	985,27	979,16	991,36	1009,29	4	991,27		13,00	1,31	99,76
18	F12x	PC01	DB08	1005,80	978,60	998,40	994,30	4	994,28		11,48	1,15	100,07
19	F05x	PD02	DB08	997,00	994,00	994,00	994,00	4	994,75		1,50	0,15	100,12
20	A57	PZ02	DD02	986,80	996,40	993,50	1007,70	4	996,10		8,72	0,88	100,25
21	F06x	PD02	DB08	1017,00	991,80	993,50	986,20	4	997,13		13,61	1,37	100,35
22	A58x	PD02	DB01	1013,33	1003,40	986,43	997,35	4	1000,13		11,26	1,13	100,66
23	F15x	PB03	DB08	999,00	996,00	1000,00	1008,00	4	1000,75		5,12	0,51	100,72
24	F13x	PD01	DB08	1008,00	1013,00	982,20	1021,00	4	1006,05		16,78	1,67	101,25
25	F18x	PD99	DB08	1010,00	1010,00	1010,00	1010,00	4	1010,00		0,00	0,00	101,65
26	F02x	PD02	DB08	996,60	1013,10	1035,90	1053,00	4	1024,65		24,84	2,42	103,12
27	A36	PD02	DB08	999,46	1015,52	1071,16	1026,22	4	1028,09		30,75	2,99	103,47
28	A43	PB06	DB01	1016,00	1021,00	1042,00	1037,00	4	1029,00		12,46	1,21	103,56
29	A65	PD01	DB08	1029,00	1029,00	1046,00	1031,00	4	1033,75		8,22	0,80	104,04
30	A45x	PB99	DB08	1030,00	1040,00	1040,00	1030,00	4	1035,00		5,77	0,56	104,17
31	A82	PD01	DB08	1025,80	1042,20	1045,00	1065,30	4	1044,58		16,21	1,55	105,13
32	F03x	PD02	DB08	1052,83	1057,77	1049,27	1047,60	4	1051,87		4,50	0,43	105,86
33	F24x	PD01	DB99	1029,00	1059,00	1068,00	1079,00	4	1058,75		21,45	2,03	106,56
34	F33x	PD01	DB10	1084,20	1040,80	1096,40	1068,00	4	1072,35		24,04	2,24	107,92
35	A80	PD03	DB10	1054,00	1080,00	1076,00	1081,00	4	1072,75		12,69	1,18	107,97
36	A47	PC01	DB08	1087,00	1099,00	1085,00	1043,00	4	1078,50		24,46	2,27	108,54
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	n	Mean	s_r	CV_r
all labs	**140**	**993,61**	**13,612**	**1,370**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
35	**48,943**	**4,926**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Fe **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	Lab.standard dev. V_i	Recovery %
1	F15x	PC01	DB08	49,00	37,00	43,00	45,00	0	43,50	*b*	*	5,00	**11,49**	63,60
2	F27	PD01	DB01	49,74	46,74	53,85	47,56	4	49,47		*	3,18	6,43	72,33
3	F21x	PD02	DB09	52,60	51,70	51,67	52,00	4	51,99		*	0,43	0,83	76,02
4	F07x	PD99	DB08	60,85	59,67	56,44	55,44	4	58,10			2,57	4,43	84,95
5	A60x	PD01	DB10	63,80	58,54	56,04	54,76	4	58,29			4,00	6,86	85,22
6	A59	PC01	DB08	62,68	61,02	61,98	61,40	4	61,77			0,72	1,17	90,31
7	F18x	PD99	DB08	63,30	62,60	62,70	62,00	4	62,65			0,53	0,85	91,60
8	F16x	PC01	DB08	63,71	64,19	64,20	66,81	4	64,73			1,41	2,17	94,64
9	F13x	PD01	DB08	68,19	66,45	62,30	64,21	4	65,29			2,57	3,94	95,45
10	A36	PD02	DB08	67,38	63,64	65,45	68,76	4	66,31			2,24	3,37	96,95
11	F28x	PD02	DB08	66,70	64,60	65,80	69,90	4	66,75			2,27	3,40	97,59
12	F12x	PC01	DB08	65,50	68,60	66,80	67,00	4	66,98			1,27	1,90	97,92
13	F05x	PD02	DB08	64,50	67,50	67,70	68,40	4	67,03			1,73	2,58	97,99
14	F03x	PD02	DB08	70,06	65,28	65,79	67,70	4	67,21			2,17	3,23	98,26
15	A71	PB03	DB01	67,84	66,67	66,72	67,75	4	67,25			0,64	0,95	98,32
16	A80	PD03	DB10	66,10	71,80	67,30	68,00	4	68,30			2,46	3,60	99,86
17	A82	PD01	DB08	62,74	76,70	67,63	67,79	4	68,72			5,82	8,46	100,47
18	F25x	PB06	DB08	68,67	68,10	72,04	68,41	4	69,31			1,84	2,65	101,33
19	A88	PD01	DB08	69,39	67,92	69,39	71,00	4	69,43			1,26	1,81	101,50
20	F08x	PE99	DB08	79,14	66,57	65,85	67,25	4	69,70			6,32	9,06	101,91
21	A39	PC02	DB08	70,17	69,02	70,05	70,24	4	69,87			0,57	0,82	102,15
22	F06x	PD02	DB08	73,60	72,10	67,10	67,90	4	70,18			3,17	4,51	102,60
23	A45x	PB99	DB08	69,70	74,50	63,50	74,20	4	70,48			5,14	7,30	103,04
24	A79	PD03	DB10	73,14	68,86	68,64	73,53	4	71,04			2,65	3,74	103,87
25	F14x	PC01	DB08	71,00	72,00	73,00	70,00	4	71,50			1,29	1,81	104,54
26	F02x	PD02	DB08	69,90	71,30	72,60	76,00	4	72,45			2,61	3,60	105,93
27	F33x	PD01	DB10	77,85	72,20	73,32	73,38	4	74,19			2,50	3,37	108,47
28	F24x	PD01	DB99	73,00	74,00	76,00	74,00	4	74,25			1,26	1,69	108,56
29	A47	PC01	DB08	73,00	82,00	81,00	69,00	4	76,25			6,29	8,25	111,48
30	A56	PC01	DB08	78,00	79,00	76,00	81,00	4	78,50			2,08	2,65	114,77
31	A57	PZ02	DD02	77,70	76,60	78,50	82,50	4	78,83			2,57	3,26	115,25
32	A58x	PD02	DB01	79,34	76,70	80,51	79,16	4	78,93			1,60	2,03	115,40
33	A65	PD01	DB08	69,20	85,20	70,40	96,00	0	80,20	*c*		12,80	**15,96**	117,26
34	F32x	PD01	DB08	88,00	87,00	83,00	74,00	4	83,00		*	6,38	7,68	121,35
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	n	Mean	s_r	CV_r
all labs	**128**	**68,40**	**2,548**	**3,725**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
32	**7,318**	**10,699**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F07x	PD99	DB08	68,08	67,31	69,49	69,30	4	68,55		1,03	1,51	80,52
2	F27	PD01	DB01	71,90	*67,91a*	72,67	71,80	3	72,12		0,48	0,66	84,72
3	F15x	PC01	DB08	67,00	71,00	74,00	81,00	4	73,25		5,91	8,07	86,05
4	F28x	PD02	DB08	75,40	72,40	77,00	70,40	4	73,80		2,96	4,01	86,69
5	F08x	PE99	DB08	76,61	78,13	73,60	76,83	4	76,29		1,92	2,51	89,62
6	A60x	PD01	DB10	74,85	81,01	77,15	78,12	4	77,78		2,55	3,28	91,37
7	F14x	PC01	DB08	79,60	78,50	78,30	80,80	4	79,30		1,15	1,45	93,15
8	F12x	PC01	DB08	78,10	81,30	79,50	79,60	4	79,63		1,31	1,65	93,54
9	A88	PD01	DB08	80,56	77,74	81,93	81,18	4	80,35		1,83	2,28	94,39
10	F06x	PD02	DB08	80,50	82,00	81,50	83,50	4	81,88		1,25	1,53	96,18
11	A36	PD02	DB08	78,52	83,29	85,73	84,77	4	83,08		3,20	3,85	97,59
12	A82	PD01	DB08	82,82	84,58	82,32	82,66	4	83,10		1,01	1,22	97,61
13	A45x	PB99	DB08	83,40	82,00	83,40	83,90	4	83,18		0,82	0,98	97,71
14	F16x	PC01	DB08	84,53	84,08	84,33	81,53	4	83,62		1,40	1,68	98,23
15	A79	PD03	DB10	84,04	86,85	85,39	83,91	4	85,05		1,38	1,62	99,91
16	A71	PB03	DB01	85,94	85,04	87,51	87,49	4	86,50		1,22	1,41	101,61
17	F03x	PD02	DB08	86,84	87,55	86,47	85,72	4	86,65		0,76	0,88	101,78
18	A59	PC01	DB08	86,92	86,68	89,43	85,19	4	87,06		1,76	2,02	102,26
19	F18x	PD99	DB08	86,70	88,50	88,80	86,30	4	87,58		1,26	1,44	102,88
20	F13x	PD01	DB08	87,78	87,32	87,56	89,54	4	88,05		1,01	1,15	103,43
21	F33x	PD01	DB10	91,08	88,07	84,86	88,70	4	88,18		2,56	2,91	103,58
22	A39	PC02	DB08	89,71	88,73	89,49	86,10	4	88,51		1,66	1,87	103,97
23	F05x	PD02	DB08	86,50	89,00	91,00	89,80	4	89,08		1,90	2,14	104,64
24	F32x	PD01	DB08	91,90	88,40	91,90	85,80	4	89,50		2,97	3,32	105,14
25	F25x	PB06	DB08	91,22	89,68	90,50	87,34	4	89,69		1,69	1,88	105,35
26	A56	PC01	DB08	93,00	93,00	88,00	87,00	4	90,25		3,20	3,55	106,02
27	A58x	PD02	DB01	89,64	90,30	91,42	90,79	4	90,54		0,75	0,83	106,36
28	A65	PD01	DB08	90,70	90,70	*104,2a*	90,40	3	90,60		0,17	0,19	106,43
29	F21x	PD02	DB09	91,50	91,60	91,10	91,05	4	91,31		0,28	0,30	107,27
30	A47	PC01	DB08	96,00	96,00	89,00	92,00	4	93,25		3,40	3,65	109,54
31	F02x	PD02	DB08	91,60	93,70	95,50	97,90	4	94,68		2,68	2,83	111,22
32	F24x	PD01	DB99	92,00	93,00	98,00	100,00	4	95,75		3,86	4,03	112,48
33	A57	PZ02	DD02	99,00	98,10	99,90	99,90	4	99,23		0,86	0,87	116,56
34	A80	PD03	DB10	120,00	102,00	87,90	89,90	0	99,95	*c*	14,75	**14,75**	117,41
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	n	Mean	s_r	CV_r
all labs	**130**	**85,13**	**1,824**	**2,143**
20	% from the mean			

l	s_R	CV_R
33	**7,177**	**8,437**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Fe **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	F27	PD01	DB01	90,88	97,70	91,49	90,03	4	92,53		3,50	3,78	85,00
2	F07x	PD99	DB08	91,82	93,73	94,55	92,30	4	93,10		1,26	1,36	85,53
3	F08x	PE99	DB08	97,08	96,21	95,70	100,99	4	97,50		2,40	2,46	89,57
4	F28x	PD02	DB08	97,10	93,70	100,30	101,90	4	98,25		3,63	3,70	90,26
5	F12x	PC01	DB08	102,00	100,00	98,00	100,00	4	100,00		1,63	1,63	91,87
6	A60x	PD01	DB10	108,00	98,24	100,80	101,50	4	102,14		4,15	4,07	93,83
7	F06x	PD02	DB08	104,50	105,50	101,20	103,70	4	103,73		1,84	1,77	95,29
8	F15x	PC01	DB08	101,00	110,00	104,00	101,00	4	104,00		4,24	4,08	95,54
9	A45x	PB99	DB08	107,00	102,00	103,00	105,00	4	104,25		2,22	2,13	95,77
10	F16x	PC01	DB08	106,10	103,10	106,80	105,30	4	105,33		1,60	1,52	96,76
11	F13x	PD01	DB08	105,50	106,90	105,00	106,70	4	106,03		0,92	0,87	97,40
12	F14x	PC01	DB08	107,00	105,00	109,00	105,00	4	106,50		1,91	1,80	97,84
13	A82	PD01	DB08	104,68	106,74	108,30	107,21	4	106,73		1,52	1,42	98,05
14	A88	PD01	DB08	119,33	100,16	102,43	106,75	4	107,17		8,56	7,98	98,45
15	A36	PD02	DB08	105,70	106,75	113,10	109,92	4	108,87		3,34	3,07	100,01
16	A71	PB03	DB01	109,90	109,76	110,51	109,32	4	109,87		0,49	0,45	100,94
17	F25x	PB06	DB08	109,90	121,10	105,50	107,40	4	110,98		6,99	6,30	101,95
18	F18x	PD99	DB08	111,00	112,00	110,00	112,00	4	111,25		0,96	0,86	102,20
19	A39	PC02	DB08	111,20	112,00	109,40	113,40	4	111,50		1,67	1,50	102,43
20	A58x	PD02	DB01	112,82	111,56	112,23	112,24	4	112,21		0,52	0,46	103,09
21	F05x	PD02	DB08	112,00	112,00	113,00	112,00	4	112,25		0,50	0,45	103,12
22	A79	PD03	DB10	111,00	114,50	114,70	110,50	4	112,68		2,23	1,98	103,51
23	A59	PC01	DB08	112,00	111,00	113,90	114,20	4	112,78		1,53	1,36	103,60
24	A57	PZ02	DD02	111,10	115,20	115,10	110,70	4	113,03		2,46	2,18	103,83
25	F32x	PD01	DB08	114,00	115,00	113,00	113,00	4	113,75		0,96	0,84	104,50
26	F02x	PD02	DB08	111,70	112,60	114,40	116,60	4	113,83		2,16	1,90	104,57
27	F03x	PD02	DB08	115,06	114,04	113,82	114,54	4	114,37		0,55	0,48	105,06
28	F21x	PD02	DB09	109,30	117,80	117,77	115,82	4	115,17		4,02	3,49	105,81
29	A80	PD03	DB10	114,00	118,00	113,00	116,00	4	115,25		2,22	1,92	105,88
30	F33x	PD01	DB10	113,80	115,03	121,36	119,16	4	117,34		3,53	3,01	107,80
31	A56	PC01	DB08	114,00	120,00	122,00	119,00	4	118,75		3,40	2,87	109,09
32	A47	PC01	DB08	114,00	121,00	120,00	125,00	4	120,00		4,55	3,79	110,24
33	A65	PD01	DB08	121,50	121,70	119,80	121,10	4	121,03		0,85	0,71	111,18
34	F24x	PD01	DB99	109,00	113,00	151,00	127,00	0	125,00	*c*	18,97	**15,18**	114,84
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	n	Mean	s_r	CV_r
all labs	**132**	**108,85**	**2,495**	**2,292**
* = non tolerable mean because more than +/- **20** % from the mean				

l	s_R	CV_R
33	**7,235**	**6,646**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F08x	PE99	DB08	55,96	56,91	54,82	55,39	4	55,77		0,89	1,60	85,03
2	F28x	PD02	DB08	56,70	59,20	55,60	62,10	4	58,40		2,89	4,95	89,04
3	F07x	PD99	DB08	59,56	59,17	58,71	57,43	4	58,72		0,93	1,58	89,53
4	F27	PD01	DB01	55,72	63,58	63,77	56,11	4	59,80		4,48	7,50	91,17
5	F15x	PC01	DB08	51,00	64,00	54,00	71,00	0	60,00	*c*	9,20	**15,34**	91,48
6	A60x	PD01	DB10	59,50	61,23	61,62	57,92	4	60,07		1,70	2,83	91,59
7	A88	PD01	DB08	61,30	60,89	61,15	60,74	4	61,02		0,25	0,41	93,04
8	F14x	PC01	DB08	63,00	62,00	62,00	60,00	4	61,75		1,26	2,04	94,15
9	F12x	PC01	DB08	64,30	62,10	62,80	63,10	4	63,08		0,92	1,46	96,17
10	A71	PB03	DB01	63,57	62,56	63,27	63,48	4	63,22		0,46	0,72	96,39
11	F06x	PD02	DB08	64,70	63,40	62,40	63,50	4	63,50		0,94	1,48	96,82
12	F05x	PD02	DB08	63,40	63,00	65,00	63,20	4	63,65		0,91	1,44	97,05
13	A36	PD02	DB08	64,21	59,82	63,46	68,59	4	64,02		3,60	5,62	97,61
14	F03x	PD02	DB08	64,43	64,65	63,71	64,69	4	64,37		0,45	0,71	98,15
15	F21x	PD02	DB09	64,98	63,40	64,50	64,82	4	64,43		0,71	1,10	98,23
16	F25x	PB06	DB08	65,42	65,53	58,85	68,95	4	64,69		4,22	6,53	98,63
17	F13x	PD01	DB08	64,34	67,53	66,12	63,10	4	65,27		1,95	2,99	99,52
18	F16x	PC01	DB08	64,14	67,26	66,97	66,74	4	66,28		1,44	2,17	101,06
19	A39	PC02	DB08	65,25	70,63	65,64	65,53	4	66,76		2,58	3,87	101,80
20	F18x	PD99	DB08	68,60	65,30	66,90	66,90	4	66,93		1,35	2,01	102,04
21	A59	PC01	DB08	67,49	*76,48a*	66,80	67,25	3	67,18		0,35	0,52	102,43
22	A82	PD01	DB08	66,21	64,24	71,27	67,17	4	67,22		2,96	4,41	102,50
23	A79	PD03	DB10	69,00	66,17	67,90	66,25	4	67,33		1,37	2,03	102,66
24	A47	PC01	DB08	67,00	70,00	64,00	69,00	4	67,50		2,65	3,92	102,92
25	A45x	PB99	DB08	68,20	67,00	66,70	68,50	4	67,60		0,88	1,31	103,07
26	F02x	PD02	DB08	66,60	67,40	68,60	70,00	4	68,15		1,48	2,17	103,91
27	A58x	PD02	DB01	68,06	68,00	70,76	67,98	4	68,70		1,37	2,00	104,75
28	F32x	PD01	DB08	67,10	68,10	71,10	69,30	4	68,90		1,72	2,50	105,05
29	A80	PD03	DB10	67,70	69,20	69,70	70,20	4	69,20		1,08	1,56	105,51
30	F33x	PD01	DB10	67,79	66,13	74,63	70,42	4	69,74		3,71	5,31	106,34
31	A57	PZ02	DD02	68,50	71,00	71,70	71,20	4	70,60		1,43	2,03	107,65
32	A65	PD01	DB08	71,20	76,70	71,20	73,80	4	73,23		2,62	3,58	111,65
33	F24x	PD01	DB99	72,00	75,00	*85a*	73,00	3	73,33		1,53	2,08	111,81
34	A56	PC01	DB08	73,00	74,00	76,00	82,00	4	76,25		4,03	5,29	116,26
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	n	Mean	s_r	CV_r
all labs	**130**	**65,58**	**1,792**	**2,732**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
33	**4,525**	**6,892**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F24x	PD01	DB99	4,77	4,88	5,23	5,28	4	5,04		0,25	5,02	83,25
2	A58x	PD02	DB05	5,18	5,28	5,25	5,28	4	5,25		0,05	0,90	86,68
3	A71	PD02	DB10	5,52	5,52	5,38	5,37	4	5,45		0,09	1,61	89,99
4	A59	PC01	DB08	5,53	5,53	5,43	5,52	4	5,50		0,05	0,88	90,89
5	A36	PD02	DB08	5,44	5,68	5,64	5,61	4	5,59		0,11	1,89	92,38
6	F16x	PC01	DB08	5,63	5,59	5,65	5,60	4	5,62		0,03	0,50	92,80
7	F19x	PD02	DB08	6,04	5,71	5,46	5,86	4	5,77		0,25	4,26	95,27
8	F12x	PC01	DB10	5,81	5,86	5,77	5,81	4	5,81		0,04	0,65	96,04
9	A57	PZ02	DD02	5,80	5,70	5,90	6,10	4	5,88		0,17	2,91	97,04
10	F07x	PD99	DB08	5,75	6,13	5,83	5,92	4	5,91		0,16	2,73	97,58
11	A82	PD01	DB10	5,74	5,88	5,88	6,19	4	5,92		0,19	3,18	97,83
12	A45x	PB99	DB08	5,73	5,89	6,07	6,08	4	5,94		0,17	2,80	98,16
13	A79	PD03	DB10	5,83	5,78	6,13	6,09	4	5,96		0,18	3,00	98,41
14	F14x	PC01	DB10	6,06	5,92	5,85	6,15	4	6,00		0,14	2,26	99,03
15	F05	PD02	DB08	5,97	6,01	6,05	6,02	4	6,01		0,03	0,55	99,32
16	F13x	PD01	DB08	5,99	6,51	5,87	5,72	4	6,02		0,34	5,70	99,48
17	A39	PC02	DB08	6,24	6,08	5,84	6,18	4	6,09		0,18	2,90	100,51
18	F15	PC01	DB09	6,10	6,00	6,40	5,90	4	6,10		0,22	3,54	100,76
19	F18x	PD99	DB10	6,08	6,07	6,13	6,28	4	6,14		0,10	1,58	101,42
20	A80	PD03	DB10	6,10	6,21	6,16	6,32	4	6,20		0,09	1,50	102,37
21	F28x	PD02	DB08	6,48	6,31	6,10	5,92	4	6,20		0,24	3,93	102,48
22	A60x	PD01	DB10	6,24	6,27	6,23	6,14	4	6,22		0,06	0,93	102,75
23	F27	PD01	DB05	6,22	6,02	6,75	5,91	4	6,23		0,37	5,99	102,83
24	F32x	PD01	DB08	6,24	6,38	6,28	6,09	4	6,25		0,12	1,93	103,20
25	A88	PD01	DB08	6,03	6,31	6,26	6,40	4	6,25		0,16	2,52	103,24
26	F02x	PD02	DB08	6,09	6,20	6,34	6,44	4	6,27		0,15	2,46	103,53
27	F25x	PB06	DB08	6,33	6,30	6,22	6,38	4	6,31		0,07	1,06	104,19
28	F03x	PD02	DB08	6,49	6,38	6,30	6,26	4	6,36		0,10	1,60	105,01
29	A65	PD01	DB08	6,00	6,70	6,30	7,00	4	6,50		0,44	6,76	107,37
30	F33x	PD01	DB10	7,03	6,57	6,58	6,71	4	6,72		0,21	3,19	111,04
31	F06x	PD02	DB08	8,10	7,43	6,14	6,54	4	7,05		0,88	**12,51**	116,49
32	F08x	PE99	DB08	6,64	7,83	7,43	6,83	4	7,18		0,55	7,62	118,66
33	A56	PC01	DB08	8,00	9,00	8,00	12,00	0	9,25	*b* *	1,89	**20,46**	152,79
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	n	Mean	s_r	CV_r
all labs	**128**	**6,05**	**0,193**	**3,186**
20	% from the mean			

l	s_R	CV_R
32	**0,451**	**7,446**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Cu **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	A58x	PD02	DB05	2,75	2,72	2,65	2,80	4	2,73		0,06	2,30	83,04
2	A57	PZ02	DD02	2,90	2,70	2,90	2,80	4	2,83		0,10	3,39	85,93
3	F07x	PD99	DB08	2,84	2,67	2,96	2,86	4	2,83		0,12	4,25	86,11
4	A45x	PB99	DB08	2,89	2,90	2,83	2,85	4	2,87		0,03	1,15	87,22
5	A71	PD02	DB10	2,99	3,04	2,95	2,99	4	2,99		0,04	1,23	90,89
6	F16x	PC01	DB08	3,04	3,15	2,97	3,13	4	3,07		0,08	2,72	93,50
7	A36	PD02	DB08	3,18	3,05	3,13	3,04	4	3,10		0,07	2,16	94,29
8	F12x	PC01	DB10	3,09	3,21	3,03	3,11	4	3,11		0,08	2,45	94,53
9	A59	PC01	DB08	3,25	2,95	3,26	3,08	4	3,14		0,15	4,73	95,36
10	A79	PD03	DB10	3,08	3,25	3,21	3,25	4	3,20		0,08	2,47	97,31
11	A82	PD01	DB10	3,23	*3,851a*	3,21	3,20	3	3,21		0,01	0,45	97,66
12	F32x	PD01	DB08	3,35	3,32	3,36	3,26	4	3,32		0,05	1,35	101,06
13	F27	PD01	DB05	3,36	3,48	3,21	3,27	4	3,33		0,12	3,53	101,29
14	F18x	PD99	DB10	3,40	3,34	3,34	3,38	4	3,37		0,03	0,89	102,36
15	F25x	PB06	DB08	3,40	3,33	3,21	3,55	4	3,37		0,14	4,21	102,58
16	F13x	PD01	DB08	3,32	3,41	3,40	3,42	4	3,39		0,05	1,35	103,04
17	F14x	PC01	DB10	3,66	3,41	3,25	3,26	4	3,40		0,19	5,63	103,27
18	A39	PC02	DB08	3,39	3,29	3,55	3,39	4	3,41		0,11	3,14	103,59
19	F28x	PD02	DB08	3,36	3,24	3,62	3,43	4	3,41		0,16	4,68	103,78
20	A60x	PD01	DB10	3,41	3,45	3,41	3,46	4	3,43		0,03	0,80	104,42
21	F19x	PD02	DB08	3,51	3,42	3,38	3,47	4	3,45		0,06	1,65	104,79
22	F05	PD02	DB08	3,41	3,50	3,39	3,49	4	3,45		0,06	1,61	104,86
23	F06x	PD02	DB08	3,45	3,52	3,39	3,47	4	3,46		0,05	1,56	105,17
24	F33x	PD01	DB10	3,32	3,53	3,38	3,63	4	3,47		0,14	4,07	105,40
25	F02x	PD02	DB08	3,38	3,43	3,54	3,60	4	3,49		0,10	2,88	106,08
26	F03x	PD02	DB08	3,57	3,44	3,42	3,63	4	3,52		0,10	2,89	106,92
27	A88	PD01	DB08	3,58	3,53	3,48	3,47	4	3,52		0,05	1,44	106,92
28	A65	PD01	DB08	3,50	3,50	3,60	3,50	4	3,53		0,05	1,42	107,22
29	A80	PD03	DB10	3,57	3,62	3,48	3,57	4	3,56		0,06	1,64	108,29
30	F15	PC01	DB09	3,50	4,00	3,70	3,60	4	3,70		0,22	5,84	112,54
31	F08x	PE99	DB08	4,58	4,42	4,49	*5,1349a*	0	4,50	*b* *	0,08	1,85	136,84
32	F24x	PD01	DB99	3,19	5,08	5,67	6,31	0	5,06	*b* *	1,35	**26,58**	153,99
33	A56	PC01	DB08	5,00	5,00	6,00	6,00	0	5,50	*b* *	0,58	**10,50**	167,30
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	n	Mean	s_r	CV_r
all labs	**119**	**3,29**	**0,086**	**2,602**
20	% from the mean			

l	s_R	CV_R
30	**0,249**	**7,565**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Cu **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	F08x	PE99	DB08	3,39	3,77	3,59	3,41	0	3,54	*b* *	0,18	4,95	59,32
2	F27	PD01	DB05	4,91	4,74	5,62	5,66	4	5,23		0,48	9,10	87,65
3	A45x	PB99	DB08	5,42	5,46	5,43	5,35	4	5,42		0,05	0,86	90,71
4	A58x	PD02	DB05	5,53	5,58	5,33	5,49	4	5,48		0,11	1,97	91,84
5	A71	PD02	DB10	5,45	5,52	5,53	5,48	4	5,50		0,04	0,67	92,05
6	F07x	PD99	DB08	5,51	5,65	5,39	5,55	4	5,53		0,11	1,93	92,60
7	A57	PZ02	DD02	5,40	5,70	5,70	5,40	4	5,55		0,17	3,12	92,97
8	A36	PD02	DB08	5,53	5,55	5,92	5,52	4	5,63		0,19	3,44	94,31
9	F28x	PD02	DB08	5,61	5,77	5,46	5,91	4	5,69		0,20	3,44	95,26
10	F16x	PC01	DB08	5,67	5,69	5,76	5,74	4	5,71		0,04	0,70	95,68
11	F12x	PC01	DB10	5,80	5,78	5,68	5,75	4	5,75		0,05	0,92	96,34
12	A79	PD03	DB10	5,57	5,57	6,01	6,01	4	5,79		0,25	4,39	97,00
13	A82	PD01	DB10	5,79	5,84	5,88	5,83	4	5,84		0,04	0,60	97,77
14	A59	PC01	DB08	5,77	5,91	6,15	5,76	4	5,90		0,18	3,08	98,79
15	F14x	PC01	DB10	6,02	5,88	5,88	5,81	4	5,90		0,09	1,49	98,79
16	F05	PD02	DB08	5,94	5,86	5,97	5,89	4	5,92		0,05	0,83	99,08
17	F19x	PD02	DB08	5,96	5,87	5,95	5,92	4	5,93		0,04	0,68	99,25
18	F06x	PD02	DB08	6,49	6,16	5,80	5,74	4	6,05		0,35	5,76	101,30
19	F32x	PD01	DB08	6,01	6,03	6,07	6,13	4	6,06		0,05	0,87	101,51
20	A80	PD03	DB10	6,08	6,27	6,10	6,17	4	6,16		0,09	1,39	103,10
21	F18x	PD99	DB10	6,18	6,14	6,21	6,25	4	6,20		0,05	0,75	103,77
22	F02x	PD02	DB08	6,09	6,15	6,26	6,30	4	6,20		0,10	1,56	103,86
23	F13x	PD01	DB08	6,12	6,29	6,20	6,32	4	6,23		0,09	1,46	104,40
24	A60x	PD01	DB10	6,37	6,07	6,30	6,24	4	6,24		0,13	2,02	104,60
25	A88	PD01	DB08	6,18	6,18	6,23	6,48	4	6,27		0,14	2,29	104,99
26	F03x	PD02	DB08	6,28	6,30	6,23	6,32	4	6,28		0,04	0,61	105,24
27	A39	PC02	DB08	6,30	6,34	6,34	6,20	4	6,29		0,07	1,05	105,43
28	F25x	PB06	DB08	6,20	6,24	6,51	6,24	4	6,30		0,14	2,27	105,49
29	A65	PD01	DB08	6,30	6,50	6,60	6,40	4	6,45		0,13	2,00	108,05
30	F24x	PD01	DB99	5,48	6,66	6,78	7,53	0	6,61	*c*	0,85	**12,82**	110,77
31	F33x	PD01	DB10	6,40	6,59	6,92	6,87	4	6,70		0,24	3,65	112,15
32	F15	PC01	DB09	6,80	6,70	7,00	7,20	4	6,93		0,22	3,20	116,00
33	A56	PC01	DB08	8,00	8,00	8,00	8,00	0	8,00	*b* *	0,00	0,00	134,01
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	n	Mean	s_r	CV_r
all labs	**120**	**5,97**	**0,130**	**2,185**
20	% from the mean			

l	s_R	CV_R
30	**0,391**	**6,544**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A58x	PD02	DB05	2,87	2,73	2,66	2,64	4	2,73			0,10	3,82	87,79
2	A45x	PB99	DB08	2,65	2,66	2,60	3,23	4	2,79			0,30	**10,69**	89,72
3	A71	PD02	DB10	2,80	2,80	2,83	2,82	4	2,81			0,01	0,49	90,64
4	A57	PZ02	DD02	2,70	2,80	2,90	3,00	4	2,85			0,13	4,53	91,82
5	A36	PD02	DB08	2,88	2,76	3,06	2,81	4	2,88			0,13	4,56	92,70
6	F12x	PC01	DB10	2,94	2,88	2,95	2,92	4	2,92			0,03	1,06	94,22
7	F07x	PD99	DB08	2,87	2,94	2,88	3,08	4	2,94			0,10	3,32	94,68
8	A79	PD03	DB10	2,89	2,80	3,04	3,05	4	2,94			0,12	4,11	94,83
9	A59	PC01	DB08	2,89	3,00	2,93	2,96	4	2,95			0,05	1,58	94,88
10	F28x	PD02	DB08	3,11	3,04	2,85	2,96	4	2,99			0,11	3,77	96,29
11	F16x	PC01	DB08	2,99	3,10	2,95	3,00	4	3,01			0,06	2,08	96,96
12	F14x	PC01	DB10	3,09	2,85	3,05	3,05	4	3,01			0,11	3,60	96,97
13	A60x	PD01	DB10	3,05	3,00	3,08	2,96	4	3,02			0,05	1,70	97,40
14	F25x	PB06	DB08	3,15	3,00	3,02	3,04	4	3,05			0,07	2,20	98,34
15	F05	PD02	DB08	3,04	3,03	3,06	3,17	4	3,08			0,06	2,10	99,06
16	F13x	PD01	DB08	3,07	3,13	3,04	3,14	4	3,10			0,05	1,55	99,71
17	F19x	PD02	DB08	3,12	*4,45a*	3,13	3,06	3	3,10			0,04	1,22	99,98
18	F32x	PD01	DB08	3,15	3,13	3,08	3,09	4	3,11			0,03	1,06	100,27
19	F02x	PD02	DB08	3,05	3,11	3,17	3,21	4	3,14			0,07	2,23	101,00
20	A82	PD01	DB10	3,05	3,02	3,42	3,10	4	3,15			0,18	5,84	101,36
21	F27	PD01	DB05	2,96	2,99	3,68	3,26	4	3,22			0,33	**10,35**	103,82
22	F18x	PD99	DB10	3,33	3,22	3,18	3,16	4	3,22			0,08	2,35	103,82
23	A80	PD03	DB10	3,20	3,27	3,20	3,24	4	3,23			0,03	1,05	103,98
24	A39	PC02	DB08	3,35	3,36	3,16	3,21	4	3,27			0,10	3,05	105,23
25	A65	PD01	DB08	3,30	3,20	3,30	3,30	4	3,28			0,05	1,53	105,51
26	F06x	PD02	DB08	3,47	3,19	3,25	3,35	4	3,32			0,12	3,70	106,80
27	F03x	PD02	DB08	3,32	3,45	3,25	3,36	4	3,35			0,08	2,50	107,76
28	A88	PD01	DB08	3,53	3,63	3,42	3,47	4	3,51			0,09	2,57	113,16
29	F33x	PD01	DB10	3,65	3,29	3,74	3,44	4	3,53			0,20	5,76	113,72
30	F15	PC01	DB09	3,70	3,80	3,40	3,70	4	3,65			0,17	4,75	117,59
31	F24x	PD01	DB99	4,01	4,66	4,66	4,29	0	4,41	*b*	*	0,32	7,17	141,91
32	F08x	PE99	DB08	4,21	4,65	5,03	4,52	0	4,60	*b*	*	0,34	7,32	148,23
33	A56	PC01	DB08	5,00	5,00	5,00	5,00	0	5,00	*b*	*	0,00	0,00	161,08
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	n	Mean	s_r	CV_r
all labs	**119**	**3,10**	**0,103**	**3,305**
20	% from the mean			

l	s_R	CV_R
30	**0,223**	**7,199**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F27	PD01	DB05	0,09	0,09	0,09	*0,102a*	0	0,09	*b*	*	0,00	1,75	51,52
2	F16x	PC01	DB10	0,14	0,15	0,14	0,14	4	0,15			0,00	2,28	85,79
3	A36	PD02	DB10	0,14	0,15	0,15	0,14	4	0,15			0,01	4,11	86,43
4	F05	PD02	DB05	0,13	0,17	0,13	0,16	0	0,15	*c*		0,02	**15,96**	87,31
5	A79	PD03	DB10	0,15	0,15	0,15	0,15	4	0,15			0,00	1,14	88,83
6	F08x	PC01	DB10	0,16	0,14	0,15	0,16	4	0,15			0,01	7,39	90,25
7	A82	PD01	DB10	0,16	0,15	0,16	0,15	4	0,16			0,01	4,13	91,96
8	F32x	PD01	DB10	0,16	0,16	0,16	0,17	4	0,16			0,01	3,24	94,69
9	A71	PD02	DB10	0,16	0,17	0,15	0,16	4	0,16			0,01	5,77	96,01
10	F18x	PD99	DB10	0,18	0,16	0,16	0,19	4	0,17			0,01	8,00	101,32
11	A45	PZ99	DB10	0,19	0,19	0,17	0,19	4	0,19			0,01	5,11	110,32
12	F13x	PD01	DB10	0,18	0,18	0,20	0,19	4	0,19			0,01	3,90	110,35
13	F12x	PC01	DB10	0,18	0,19	0,20	0,19	4	0,19			0,01	5,57	112,37
14	A60x	PD01	DB10	0,19	0,19	0,19	0,19	4	0,19			0,00	1,53	112,50
15	F33x	PD01	DB10	0,20	0,21	0,18	0,22	4	0,20			0,02	8,66	119,17
16	F14x	PC01	DB10	0,27	0,26	0,25	0,27	0	0,26	*b*	*	0,01	3,88	154,27
17														
18														
19	F15	PC01	DB09	<,5	<,5	<,5	<,5							
20	F25x	PB99	DB08	<,5	<,5	<,5	<,5							
21	A39	PC02	DB08	<,5	<,5	<,5	<,5							
22	F06x	PD02	DB08	<,5	<,5	<,5	<,5							
23	F02	PC02	DB05	<,5	<,5	<,5	<,5							
24	F07x	PD99	DB08	<,2	<,2	<,2	<,2							
25	A80	PD03	DB10	<,2	<,2	<,2	<,2							
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	n	Mean	s_r	CV_r
all labs	**52**	**0,17**	**0,008**	**4,766**
40	% from the mean			

l	s_R	CV_R
13	**0,020**	**11,572**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F27	PD01	DB05	0,25	0,23	0,23	0,24	4	0,23		0,01	3,90	75,43
2	F05	PD02	DB05	0,26	0,24	0,24	0,26	4	0,25		0,01	4,63	80,50
3	A80	PD03	DB10	0,29	0,29	0,29	0,29	4	0,29		0,00	1,32	93,38
4	A36	PD02	DB10	0,29	0,29	0,30	0,28	4	0,29		0,01	1,95	93,86
5	A79	PD03	DB10	0,29	0,30	0,30	0,30	4	0,30		0,01	2,60	95,54
6	A82	PD01	DB10	0,30	0,32	0,30	0,28	4	0,30		0,01	4,59	95,92
7	F08x	PC01	DB10	0,31	0,31	0,31	0,31	4	0,31		0,00	0,56	98,99
8	A71	PD02	DB10	0,30	0,31	0,31	0,32	4	0,31		0,01	2,55	99,50
9	A45	PZ99	DB10	0,31	0,32	0,30	0,31	4	0,31		0,01	2,42	99,50
10	F16x	PC01	DB10	0,29	0,31	0,32	0,32	4	0,31		0,01	4,44	99,79
11	F07x	PD99	DB08	0,31	0,32	0,30	0,33	4	0,31		0,01	3,61	100,78
12	F18x	PD99	DB10	0,31	0,30	0,32	0,33	4	0,32		0,01	3,08	101,51
13	F12x	PC01	DB10	0,33	0,32	0,31	0,32	4	0,32		0,01	2,75	103,20
14	F32x	PD01	DB10	0,32	0,32	0,35	0,31	4	0,32		0,02	5,67	103,84
15	F13x	PD01	DB10	0,35	0,33	0,35	0,35	4	0,34		0,01	3,12	110,64
16	A60x	PD01	DB10	0,32	0,35	0,37	0,36	4	0,35		0,02	5,22	112,11
17	F33x	PD01	DB10	0,35	0,36	0,35	0,38	4	0,36		0,01	3,61	116,24
18	F14x	PC01	DB10	0,39	0,39	*0,406a*	0,39	3	0,39		0,00	0,30	125,69
19													
20													
21	A39	PC02	DB08	<,5	<,5	<,5	<,5						
22	F15	PC01	DB09	<,5	<,5	<,5	<,5						
23	F25x	PB99	DB08	<,5	<,5	<,5	<,5						
24	F06x	PD02	DB08	<,5	<,5	<,5	<,5						
25	F02	PC02	DB05	<,5	<,5	<,5	0,50						
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	n	Mean	s_r	CV_r
all labs	**71**	**0,31**	**0,010**	**3,107**
40	% from the mean			

l	s_R	CV_R
18	**0,036**	**11,622**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	V_i	Recovery %
1	F27	PD01	DB05	0,16	0,18	0,17	0,16	4	0,17			0,01	5,65	69,66
2	F05	PD02	DB05	0,19	0,18	0,19	0,18	4	0,19			0,00	1,79	76,80
3	A82	PD01	DB10	0,22	0,19	0,20	0,20	4	0,20			0,01	4,96	84,39
4	A36	PD02	DB10	0,20	0,20	0,21	0,21	4	0,21			0,00	1,54	85,29
5	A79	PD03	DB10	0,20	0,21	0,21	0,20	4	0,21			0,00	1,93	85,42
6	A45	PZ99	DB10	0,20	0,21	0,21	0,21	4	0,21			0,00	0,93	85,49
7	F16x	PC01	DB10	0,24	0,24	0,21	0,19	4	0,22			0,02	**10,26**	91,99
8	A71	PD02	DB10	0,22	0,23	0,22	0,23	4	0,23			0,00	2,13	93,26
9	F12x	PC01	DB10	0,22	0,23	0,23	0,23	4	0,23			0,00	1,35	94,23
10	F18x	PD99	DB10	0,23	0,24	0,24	0,24	4	0,23			0,00	2,03	96,88
11	F13x	PD01	DB10	0,24	0,23	0,24	0,24	4	0,24			0,00	1,25	98,49
12	F32x	PD01	DB10	0,25	0,25	0,26	0,24	4	0,25			0,01	3,50	101,54
13	A60x	PD01	DB10	0,256	0,264	0,254	0,255	4	0,26			0,00	1,86	106,45
14	F33x	PD01	DB10	0,26	0,29	0,30	0,32	4	0,29			0,03	8,83	120,06
15	F08x	PC01	DB10	0,34	0,32	0,28	0,33	4	0,32			0,03	8,14	132,34
16	F14x	PC01	DB10	0,34	0,30	0,34	0,31	4	0,32			0,02	6,39	133,52
17	F07x	PD99	DB08	0,35	0,37	0,33	0,34	4	0,35		*	0,01	4,21	144,20
18	F25x	PB99	DB08	0,64	0,52	0,68	0,61	0	0,61	*b*	*	0,07	**11,60**	253,32
19														
20														
21	F06x	PD02	DB08	<,5	<,5	<,5	<,5							
22	F02	PC02	DB05	<,5	<,5	<,5	<,5							
23	F15	PC01	DB09	<,5	<,5	<,5	<,5							
24	A39	PC02	DB08	<,5	<,5	<,5	<,5							
25	A80	PD03	DB10	<,2	<,2	<,2	<,2							
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	n	Mean	s_r	CV_r
all labs	**68**	**0,24**	**0,010**	**4,155**
40	% from the mean			

l	s_R	CV_R
17	**0,051**	**21,016**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	0,05	0,01	0,00	0,04	4	0,03	*	0,02	**86,35**	39,71
2	A36	PD02	DB10	0,04	0,04	0,05	0,04	4	0,04		0,00	3,51	64,06
3	A79	PD03	DB10	0,04	0,05	0,05	0,05	4	0,05		0,00	3,16	68,82
4	A45	PZ99	DB10	0,05	0,05	0,05	0,05	4	0,05		0,00	5,68	72,45
5	F16x	PC01	DB10	0,04	0,06	0,05	0,05	4	0,05		0,01	**12,03**	73,69
6	F33x	PD01	DB10	0,06	0,06	0,05	0,05	4	0,06		0,01	9,01	83,17
7	F18x	PD99	DB10	0,06	0,05	0,05	0,06	4	0,06		0,01	**10,03**	85,15
8	F32x	PD01	DB10	0,06	0,06	0,05	0,05	4	0,06		0,00	7,44	85,42
9	A60x	PD01	DB10	0,07	0,05	0,07	0,06	4	0,06		0,01	**13,79**	94,67
10	F12x	PC01	DB10	0,06	0,06	0,08	0,07	4	0,07		0,01	**10,84**	99,69
11	A82	PD01	DB10	0,12	0,05	0,05	0,04	0	0,07	*c*	0,04	**52,30**	103,14
12	F13x	PD01	DB10	0,07	0,07	0,07	0,08	4	0,07		0,01	7,48	108,46
13	A71	PD02	DB10	0,11	0,11	0,11	0,11	4	0,11	*	0,00	3,73	164,50
14	F08x	PC01	DB10	0,10	0,12	0,13	0,13	4	0,12	*	0,02	**12,70**	177,87
15	F14x	PC01	DB10	0,14	0,14	0,14	*0,15a*	3	0,14	*	0,00	0,00	209,79
16	F05	PD02	DB05	0,16	0,19	0,17	0,18	0	0,17	*b* *	0,01	8,27	261,12
17	F07x	PD99	DB08	0,22	0,22	0,23	0,26	0	0,23	*b* *	0,02	7,60	350,62

	n	Mean	s_r	CV_r
all labs	**55**	**0,067**	**0,006**	**9,628**
40	% from the mean			

l	s_R	CV_R
14	**0,032**	**47,421**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Cd **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	F07x	PD99	DB08	42,78	40,23	38,37	38,20	0	39,90	*b*	2,13	5,34	72,01
2	F16x	PC01	DB10	48,64	49,88	48,67	47,76	4	48,74		0,87	1,79	87,97
3	F08x	PC01	DB10	54,60	51,00	45,30	44,10	4	48,75		4,93	**10,11**	87,99
4	F12x	PC01	DB10	49,60	51,70	53,40	51,60	4	51,58		1,55	3,01	93,09
5	A36	PC02	DB10	51,70	53,09	50,31	52,23	4	51,83		1,17	2,25	93,56
6	A80	PD03	DB10	51,50	53,30	52,50	53,80	4	52,78		1,00	1,90	95,26
7	F25x	PZ99	DB08	55,30	53,90	52,80	56,80	4	54,70		1,73	3,17	98,73
8	A79	PD03	DB10	53,90	54,10	55,60	55,90	4	54,88		1,02	1,86	99,05
9	A71	PD02	DB10	57,05	55,62	52,95	54,56	4	55,05		1,73	3,14	99,36
10	A39	PC02	DB08	53,10	53,10	56,40	58,80	4	55,35		2,78	5,02	99,91
11	F32x	PD01	DB10	55,30	56,40	56,40	54,30	4	55,60		1,01	1,82	100,36
12	F18x	PD99	DB10	57,90	54,50	50,80	59,60	4	55,70		3,89	6,99	100,54
13	A82	PD01	DB10	51,60	57,10	57,80	56,70	4	55,80		2,84	5,08	100,72
14	F13x	PD01	DB10	56,95	58,15	56,17	55,92	4	56,80		1,00	1,77	102,52
15	F33x	PD01	DB10	58,18	55,19	59,07	55,07	4	56,88		2,05	3,61	102,67
16	F05	PD02	DB05	56,40	57,20	60,00	54,80	4	57,10		2,18	3,81	103,07
17	A88	PD01	DB05	58,61	56,48	55,41	59,68	4	57,55		1,95	3,39	103,87
18	F27	PD01	DB05	66,00	58,90	50,10	55,30	4	57,58		6,68	**11,60**	103,92
19	A60x	PD01	DB10	56,05	61,64	59,00	61,25	4	59,49		2,57	4,32	107,37
20	F02	PC02	DB05	60,00	60,00	60,00	60,00	4	60,00		0,00	0,00	108,30
21	F14x	PC01	DB10	64,00	61,90	58,70	63,00	4	61,90		2,30	3,71	111,73
22	F24x	PD01	DB99	56,00	60,00	74,00	79,00	0	67,25	*b*	11,00	**16,35**	121,39
23													
24													
25	F15	PC01	DB09	<50	<50	<50	<50						
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	n	Mean	s_r	CV_r
all labs	**80**	**55,40**	**2,162**	**3,903**
* = non tolerable mean because more than +/- **30** % from the mean				
	l		s_R	CV_R
	20		**3,407**	**6,149**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F07x	PD99	DB08	144,50	149,00	166,20	169,80	0	157,38	*b*	12,49	7,94	81,63
2	F16x	PC01	DB10	170,10	192,90	172,90	183,50	4	179,85		10,44	5,80	93,29
3	F15	PC01	DB09	181,00	180,00	182,00	177,00	4	180,00		2,16	1,20	93,37
4	A71	PD02	DB10	172,40	186,40	180,40	181,30	4	180,13		5,79	3,21	93,43
5	F12x	PC01	DB10	182,40	184,90	182,80	183,40	4	183,38		1,10	0,60	95,12
6	F05	PD02	DB05	185,00	187,00	183,00	186,00	4	185,25		1,71	0,92	96,09
7	F33x	PD01	DB10	183,99	184,95	191,50	189,46	4	187,48		3,59	1,91	97,25
8	F08x	PC01	DB10	188,40	186,20	185,90	191,10	4	187,90		2,41	1,28	97,47
9	F18x	PD99	DB10	189,00	182,00	195,00	194,00	4	190,00		5,94	3,13	98,56
10	A80	PD03	DB10	192,00	192,00	189,00	188,00	4	190,25		2,06	1,08	98,69
11	A79	PD03	DB10	189,20	191,20	194,20	193,20	4	191,95		2,22	1,16	99,57
12	A36	PC02	DB10	186,61	189,68	194,87	198,69	4	192,46		5,37	2,79	99,83
13	A60x	PD01	DB10	194,80	189,70	190,00	199,20	4	193,43		4,50	2,33	100,33
14	F14x	PC01	DB10	202,00	199,00	192,00	184,00	4	194,25		8,02	4,13	100,76
15	F32x	PD01	DB10	190,30	200,80	190,30	200,80	4	195,55		6,06	3,10	101,43
16	A39	PC02	DB08	191,40	203,70	191,10	201,30	4	196,88		6,57	3,34	102,12
17	F02	PC02	DB05	200,00	200,00	190,00	200,00	4	197,50		5,00	2,53	102,45
18	A88	PD01	DB05	205,40	200,06	200,06	192,06	4	199,40		5,50	2,76	103,43
19	A82	PD01	DB10	199,00	215,30	193,60	194,00	4	200,48		10,18	5,08	103,99
20	F25x	PZ99	DB08	203,30	204,90	203,40	202,20	4	203,45		1,11	0,55	105,53
21	F27	PD01	DB05	211,70	204,50	209,60	201,30	4	206,78		4,74	2,29	107,26
22	F13x	PD01	DB10	213,80	210,00	213,10	211,60	4	212,13		1,69	0,80	110,03
23	F24x	PD01	DB99	219,00	224,00	259,00	276,00	0	244,50	*b*	27,53	**11,26**	126,83
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	n	Mean	s_r	CV_r
all labs	**84**	**192,78**	**4,579**	**2,375**
* = non tolerable mean because more than +/- **30** % from the mean				

l	s_R	CV_R
21	**8,772**	**4,550**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F07x	PD99	DB08	87,51	91,45	87,55	88,75	4	88,82		1,85	2,08	86,92
2	F15	PC01	DB09	99,00	91,00	94,00	89,00	4	93,25		4,35	4,66	91,26
3	F12x	PC01	DB10	95,00	97,90	96,10	96,30	4	96,33		1,20	1,24	94,27
4	F05	PD02	DB05	96,30	96,60	96,70	97,20	4	96,70		0,37	0,39	94,64
5	A71	PD02	DB10	99,72	94,87	94,99	97,27	4	96,71		2,29	2,37	94,65
6	F16x	PC01	DB10	87,44	86,58	109,30	108,00	0	97,83	*c*	12,51	**12,79**	95,75
7	F18x	PD99	DB10	99,00	101,00	98,80	100,00	4	99,70		1,01	1,02	97,58
8	F02	PC02	DB05	110,00	90,00	110,00	90,00	4	100,00		11,55	**11,55**	97,87
9	A39	PC02	DB08	96,00	97,50	101,70	105,00	4	100,05		4,09	4,09	97,92
10	A79	PD03	DB10	97,80	99,80	105,20	102,40	4	101,30		3,21	3,17	99,14
11	A36	PC02	DB10	99,78	103,79	98,40	106,44	4	102,10		3,69	3,61	99,93
12	A80	PD03	DB10	102,00	103,00	102,00	105,00	4	103,00		1,41	1,37	100,81
13	A82	PD01	DB10	103,40	101,00	106,80	101,60	4	103,20		2,61	2,53	101,00
14	F14x	PC01	DB10	104,00	105,00	100,00	106,00	4	103,75		2,63	2,53	101,54
15	A88	PD01	DB05	106,10	106,10	101,28	102,88	4	104,09		2,41	2,32	101,87
16	A60x	PD01	DB10	92,17	113,60	96,94	115,00	4	104,43		11,58	**11,09**	102,20
17	F33x	PD01	DB10	100,01	103,44	109,29	108,19	4	105,23		4,31	4,09	102,99
18	F13x	PD01	DB10	106,40	107,90	108,30	109,90	4	108,13		1,44	1,33	105,82
19	F08x	PC01	DB10	118,80	108,20	102,80	114,10	4	110,98		6,96	6,28	108,61
20	F25x	PZ99	DB08	112,60	109,90	113,30	108,80	4	111,15		2,15	1,93	108,78
21	F32x	PD01	DB10	117,30	114,10	111,90	115,10	4	114,60		2,24	1,96	112,16
22	F27	PD01	DB05	131,50	121,20	127,80	124,50	0	126,25	*b*	4,42	3,50	123,56
23	F24x	PD01	DB99	136,00	126,00	128,00	129,00	0	129,75	*b*	4,35	3,35	126,99
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	n	Mean	s_r	CV_r
all labs	**80**	**102,18**	**3,567**	**3,491**
* = non tolerable mean because more than +/- **30** % from the mean				

l	s_R	CV_R
20	**6,234**	**6,101**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F15	PC01	DB09	54,00	56,00	59,00	51,00	4	55,00		3,37	6,12	78,02
2	F07x	PD99	DB08	60,77	58,99	61,81	58,56	4	60,03		1,52	2,54	85,16
3	F12x	PC01	DB10	66,60	63,60	64,70	65,00	4	64,98		1,24	1,91	92,17
4	F08x	PC01	DB10	68,40	64,90	62,90	65,30	4	65,38		2,27	3,48	92,74
5	A36	PC02	DB10	66,35	69,66	64,63	65,81	4	66,61		2,15	3,23	94,49
6	F18x	PD99	DB10	67,00	70,30	63,00	66,30	4	66,65		2,99	4,49	94,55
7	F02	PC02	DB05	70,00	60,00	60,00	80,00	4	67,50		9,57	**14,18**	95,75
8	F16x	PC01	DB10	63,26	74,06	63,62	73,19	4	68,53		5,89	8,60	97,22
9	A79	PD03	DB10	66,40	67,60	70,10	70,20	4	68,58		1,88	2,75	97,28
10	A71	PD02	DB10	69,68	68,91	69,53	68,38	4	69,13		0,60	0,87	98,06
11	A80	PD03	DB10	72,30	71,30	69,30	70,30	4	70,80		1,29	1,82	100,43
12	A82	PD01	DB10	73,10	72,30	73,90	69,00	4	72,08		2,15	2,99	102,24
13	A39	PC02	DB08	73,50	73,50	72,00	69,60	4	72,15		1,84	2,55	102,35
14	F25x	PZ99	DB08	73,30	69,10	69,10	77,20	4	72,18		3,89	5,39	102,38
15	F14x	PC01	DB10	75,20	72,10	73,10	69,90	4	72,58		2,20	3,03	102,95
16	A88	PD01	DB05	73,03	74,09	73,03	71,97	4	73,03		0,87	1,19	103,60
17	F33x	PD01	DB10	75,36	69,31	73,75	74,40	4	73,21		2,68	3,66	103,84
18	F05	PD02	DB05	75,70	76,10	71,20	74,10	4	74,28		2,22	3,00	105,36
19	F13x	PD01	DB10	75,70	75,66	76,12	75,77	4	75,81		0,21	0,28	107,54
20	F24x	PD01	DB99	52,00	56,00	92,00	111,00	0	77,75	*c*	28,55	**36,72**	110,29
21	A60x	PD01	DB10	84,72	73,05	76,12	80,98	4	78,72		5,16	6,56	111,66
22	F32x	PD01	DB10	81,30	80,20	82,30	81,30	4	81,28		0,86	1,06	115,29
23	F27	PD01	DB05	81,30	80,00	82,10	86,30	4	82,43		2,72	3,31	116,92
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	n	Mean	s_r	CV_r
all labs	**88**	**70,50**	**2,618**	**3,714**
* = non tolerable mean because more than +/- **30** % from the mean				

l	s_R	CV_R
22	**6,360**	**9,022**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F07x	PD99	DB08	8,49	7,74	8,35	7,80	4	8,10	*	0,38	4,69	78,37
2	F16x	PC01	DB10	9,54	9,22	9,20	9,77	4	9,43		0,27	2,89	91,33
3	A59	PC01	DB08	9,44	9,68	9,88	*8,07a*	3	9,67		0,22	2,28	93,58
4	F18x	PD99	DB08	9,93	9,85	9,71	9,64	4	9,78		0,13	1,34	94,70
5	A60x	PD01	DB10	10,13	9,90	9,85	9,41	4	9,82		0,30	3,06	95,09
6	F08x	PZ99	DB09	9,94	10,48	9,61	9,46	4	9,87		0,45	4,59	95,58
7	A39	PC02	DB08	10,13	9,98	10,05	9,40	4	9,89		0,33	3,38	95,73
8	A80	PD03	DB10	10,00	10,40	10,30	10,30	4	10,25		0,17	1,69	99,23
9	F28x	PD02	DB08	10,19	10,44	10,15	10,36	4	10,29		0,14	1,34	99,57
10	F05	PD02	DB08	10,20	10,30	10,50	10,30	4	10,33		0,13	1,22	99,95
11	A88	PD01	DB08	10,38	10,32	10,33	10,31	4	10,34		0,03	0,30	100,05
12	F02x	PD02	DB08	10,18	10,33	10,61	10,71	4	10,46		0,25	2,34	101,24
13	F14x	PC01	DB08	10,90	10,30	10,40	10,40	4	10,50		0,27	2,58	101,65
14	F19x	PD02	DB08	11,10	10,40	9,90	10,70	4	10,53		0,51	4,81	101,89
15	A65	PD01	DB08	9,70	11,00	10,10	11,40	4	10,55		0,79	7,44	102,13
16	F15x	PC01	DB08	10,90	10,20	11,10	11,00	4	10,80		0,41	3,78	104,55
17	F32	PD01	DB08	11,00	10,70	11,10	10,60	4	10,85		0,24	2,19	105,04
18	F33	PD01	DB10	10,46	11,31	11,08	11,35	4	11,05		0,41	3,72	106,97
19	A79	PD03	DB10	11,85	11,76	11,65	10,64	4	11,48		0,56	4,90	111,09
20	A36	PD02	DB08	12,77	12,42	11,90	12,77	4	12,47	*	0,41	3,30	120,67
21	F24x	PD01	DB99	11,50	12,12	14,68	14,70	0	13,25	*c* *	1,68	**12,69**	128,27
22	A71	PD02	DB10	14,51	14,23	13,87	13,74	0	14,09	*b* *	0,35	2,49	136,39
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	n	Mean	s_r	CV_r
all labs	**79**	**10,33**	**0,320**	**3,097**
20	% from the mean			

l	s_R	CV_R
20	**0,865**	**8,379**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	V_i	Recovery %
1	F07x	PD99	DB08	12,63	12,58	12,71	12,81	0	12,68	*b*	*	0,10	0,79	78,72
2	A39	PC02	DB08	14,04	13,93	13,99	14,24	4	14,05			0,13	0,96	87,21
3	F08x	PZ99	DB09	14,70	14,31	15,27	15,33	4	14,90			0,49	3,26	92,50
4	F18x	PD99	DB08	14,90	14,90	15,10	14,80	4	14,93			0,13	0,84	92,64
5	F28x	PD02	DB08	15,03	15,44	15,90	14,92	4	15,32			0,45	2,91	95,11
6	A88	PD01	DB08	14,98	15,40	15,48	15,98	4	15,46			0,41	2,65	95,96
7	F16x	PC01	DB10	15,25	16,30	14,90	15,68	4	15,53			0,60	3,88	96,41
8	A60x	PD01	DB10	16,03	15,82	15,70	16,00	4	15,89			0,16	0,98	98,62
9	A59	PC01	DB08	16,23	16,11	15,63	*13,21a*	3	15,99			0,32	1,99	99,25
10	F14x	PC01	DB08	16,10	16,10	16,10	16,00	4	16,08			0,05	0,31	99,78
11	A65	PD01	DB08	16,30	16,30	16,00	16,30	4	16,23			0,15	0,92	100,71
12	F33	PD01	DB10	15,99	16,08	16,59	16,42	4	16,27			0,28	1,74	100,99
13	A80	PD03	DB10	16,20	16,40	16,40	16,80	4	16,45			0,25	1,53	102,11
14	F19x	PD02	DB08	16,80	16,90	16,30	16,90	4	16,73			0,29	1,72	103,82
15	F32	PD01	DB08	16,90	16,60	17,10	16,40	4	16,75			0,31	1,86	103,97
16	F05	PD02	DB08	16,80	16,80	16,70	16,80	4	16,78			0,05	0,30	104,13
17	A36	PD02	DB08	17,06	16,64	16,64	17,27	4	16,90			0,31	1,86	104,92
18	F02x	PD02	DB08	16,29	16,72	17,12	17,75	4	16,97			0,62	3,66	105,34
19	F15x	PC01	DB08	16,60	17,10	17,50	17,40	4	17,15			0,40	2,36	106,45
20	A79	PD03	DB10	18,22	17,54	17,21	17,83	4	17,70			0,43	2,43	109,87
21	F24x	PD01	DB99	17,63	18,10	20,16	19,20	0	18,77	*c*		1,14	6,05	116,53
22	A71	PD02	DB10	21,79	21,84	21,75	*21,2862a*	0	21,79	*b*	*	0,04	0,20	135,27
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	n	Mean	s_r	CV_r
all labs	**75**	**16,11**	**0,307**	**1,905**
20	% from the mean			

l	s_R	CV_R
19	**0,910**	**5,650**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F07x	PD99	DB08	9,37	11,17	10,21	10,55	4	10,33	*	0,75	7,26	78,23
2	F08x	PZ99	DB09	10,84	11,05	11,24	11,22	4	11,09		0,19	1,68	84,00
3	A39	PC02	DB08	11,79	11,73	12,31	11,63	4	11,87		0,30	2,56	89,89
4	F28x	PD02	DB08	13,00	12,45	12,24	12,07	4	12,44		0,40	3,25	94,25
5	F18x	PD99	DB08	12,50	12,50	12,60	12,60	4	12,55		0,06	0,46	95,08
6	A60x	PD01	DB10	12,50	12,65	12,31	12,82	4	12,57		0,22	1,73	95,23
7	F05	PD02	DB08	13,10	13,20	13,10	13,10	4	13,13		0,05	0,38	99,44
8	A88	PD01	DB08	12,77	13,05	13,33	13,70	4	13,21		0,40	3,01	100,10
9	A65	PD01	DB08	13,30	13,40	13,30	13,20	4	13,30		0,08	0,61	100,76
10	A59	PC01	DB08	13,04	13,22	13,64	13,55	4	13,36		0,28	2,10	101,24
11	F16x	PC01	DB10	12,32	14,58	12,26	14,54	0	13,43	*c*	1,31	9,76	101,71
12	A80	PD03	DB10	13,70	13,50	13,20	13,70	4	13,53		0,24	1,75	102,47
13	F14x	PC01	DB08	13,60	13,50	13,50	13,60	4	13,55		0,06	0,43	102,66
14	F24x	PD01	DB99	13,04	13,11	13,60	14,83	4	13,65		0,83	6,07	103,38
15	F32	PD01	DB08	13,50	13,90	13,80	13,40	4	13,65		0,24	1,74	103,41
16	A79	PD03	DB10	13,54	13,80	14,14	14,15	4	13,91		0,29	2,11	105,37
17	F02x	PD02	DB08	13,61	13,83	14,02	14,28	4	13,94		0,28	2,04	105,57
18	F19x	PD02	DB08	14,10	14,00	13,90	13,80	4	13,95		0,13	0,93	105,69
19	F33	PD01	DB10	13,88	14,35	14,91	14,53	4	14,42		0,43	2,97	109,23
20	A36	PD02	DB08	15,22	14,06	14,16	15,33	4	14,69		0,68	4,60	111,31
21	F15x	PC01	DB08	14,80	14,70	15,00	15,00	4	14,88		0,15	1,01	112,70
22	A71	PD02	DB10	18,33	18,49	16,97	16,80	0	17,65	*b* *	0,88	5,01	133,71
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	n	Mean	s_r	CV_r
all labs	**80**	**13,20**	**0,302**	**2,291**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
20	**1,140**	**8,637**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	F05	PD02	DB08	1,79	1,77	1,79	1,77	4	1,78		0,01	0,65	73,12
2	F07x	PD99	DB08	1,95	1,87	1,92	2,10	4	1,96		0,10	5,10	80,45
3	F32	PD01	DB08	2,20	2,11	2,12	2,06	4	2,12		0,06	2,73	87,19
4	A60x	PD01	DB10	2,31	2,22	2,15	1,86	4	2,13		0,20	9,14	87,60
5	F08x	PZ99	DB09	2,44	2,47	2,04	2,01	4	2,24		0,25	**11,12**	91,97
6	F02x	PD02	DB08	2,12	2,20	2,30	2,34	4	2,24		0,10	4,43	92,01
7	F16x	PC01	DB10	2,48	2,21	2,20	2,44	4	2,33		0,15	6,29	95,82
8	A65	PD01	DB08	2,40	2,40	2,30	2,30	4	2,35		0,06	2,46	96,53
9	F14x	PC01	DB08	2,40	2,40	2,30	2,30	4	2,35		0,06	2,46	96,53
10	F33	PD01	DB10	2,25	2,33	2,47	2,37	4	2,36		0,09	3,88	96,74
11	A59	PC01	DB08	2,51	2,53	2,56	2,11	4	2,43		0,21	8,76	99,72
12	A79	PD03	DB10	2,75	2,49	2,44	2,37	4	2,51		0,17	6,59	103,18
13	A88	PD01	DB08	2,54	2,54	2,64	2,64	4	2,59		0,06	2,23	106,39
14	A80	PD03	DB10	2,78	2,65	2,52	2,50	4	2,61		0,13	4,97	107,32
15	A39	PC02	DB08	2,52	2,70	2,56	2,71	4	2,62		0,09	3,59	107,76
16	A36	PD02	DB08	2,51	2,65	2,55	3,39	4	2,78		0,41	**14,93**	113,99
17	A71	PD02	DB10	2,88	2,82	2,80	2,96	4	2,86		0,07	2,50	117,56
18	F19x	PD02	DB08	3,10	2,89	2,79	2,95	4	2,93		0,13	4,42	120,46
19	F28x	PD02	DB08	3,05	3,23	3,11	2,86	4	3,06		0,15	4,97	125,66
20	F24x	PD01	DB99	3,04	3,21	4,24	3,50	0	3,50	*c* *	0,53	**15,16**	143,67
21	F15x	PC01	DB08	3,80	3,50	3,90	3,60	0	3,70	*b* *	0,18	4,93	151,99
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24	F18x	PD99	DB08	<4	<4	<4	<4			**			
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	n	Mean	s_r	CV_r
all labs	**76**	**2,43**	**0,131**	**5,393**
30	% from the mean			

l	s_R	CV_R
19	**0,332**	**13,640**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A60	PD01	DB10	18,95	18,69	*21,16a*	18,92	0	18,85	*b*	*	0,14	0,75	67,06
2	A79	PD03	DB10	26,20	25,90	26,10	25,30	4	25,88			0,40	1,56	92,04
3	A82	PD01	DB10	29,19	24,89	23,78	26,87	4	26,18			2,38	9,08	93,13
4	F14x	PC01	DB10	26,70	28,80	26,30	25,00	4	26,70			1,58	5,91	94,97
5	F32	PD01	DB10	29,80	25,50	25,50	27,70	4	27,13			2,06	7,61	96,48
6	A36	PD02	DB10	28,36	28,04	26,76	27,29	4	27,61			0,72	2,62	98,22
7	A45	PZ99	DB10	31,90	28,60	26,90	28,00	4	28,85			2,15	7,46	102,62
8	F08x	PC01	DB10	23,45	34,08	37,26	23,53	4	29,58			7,15	**24,18**	105,21
9	F16x	PC01	DB10	29,26	31,56	29,23	32,15	4	30,55			1,53	5,00	108,67
10	A80	PD03	DB10	31,30	29,90	30,70	30,30	4	30,55			0,60	1,95	108,67
11	F07x	PD99	DB08	230,00	223,50	191,00	212,30	0	214,20	*b*	*	17,11	7,99	761,90
12														
13														
14	A39	PC02	DB08	<50	<50	<50	<50							
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	n	Mean	s_r	CV_r
all labs	**36**	**28,11**	**2,063**	**7,339**
30	% from the mean			

l	s_R	CV_R
9	**1,821**	**6,478**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: As **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	A45	PZ99	DB10	30,70	29,30	29,40	28,60	4	29,50		0,88	2,97	83,51
2	F14x	PC01	DB10	33,00	35,00	28,70	30,00	4	31,68		2,86	9,02	89,67
3	A60	PD01	DB10	32,50	33,25	34,63	32,03	4	33,10		1,14	3,43	93,71
4	F32	PD01	DB10	30,70	30,70	41,20	31,70	4	33,58		5,11	**15,21**	95,05
5	F08x	PC01	DB10	35,91	32,75	30,57	36,34	4	33,89		2,73	8,06	95,95
6	A79	PD03	DB10	36,60	34,00	34,00	35,70	4	35,08		1,29	3,69	99,29
7	A36	PD02	DB10	37,83	33,91	38,36	35,39	4	36,37		2,09	5,75	102,97
8	A82	PD01	DB10	36,96	38,25	39,87	36,04	4	37,78		1,66	4,40	106,95
9	F16x	PC01	DB10	40,36	38,63	40,27	36,63	4	38,97		1,75	4,50	110,33
10	A80	PD03	DB10	47,10	43,30	39,00	43,80	4	43,30		3,33	7,68	122,58
11													
12													
13	F07x	PD99	DB08	<200	<200	<200	<200			**			
14	A39	PC02	DB08	<50	<50	<50	<50						
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	n	Mean	s_r	CV_r
all labs	**40**	**35,32**	**2,283**	**6,463**
30	% from the mean			
	l		s_R	CV_R
	10		**3,964**	**11,221**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

** = higher than maximum acceptable limit of quantification

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: As **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	F32	PD01	DB10	25,60	26,70	13,90	23,50	4	22,43		5,84	**26,03**	83,15
2	A79	PD03	DB10	24,80	23,50	22,60	24,90	4	23,95		1,10	4,61	88,80
3	A60	PD01	DB10	26,66	25,86	23,40	21,09	4	24,25		2,52	**10,41**	89,92
4	A36	PD02	DB10	25,90	27,59	26,42	25,90	4	26,45		0,80	3,01	98,08
5	F14x	PC01	DB10	*33,12a*	27,78	27,78	26,70	3	27,42		0,62	2,27	101,67
6	A82	PD01	DB10	29,21	24,97	28,43	33,00	4	28,90		3,30	**11,40**	107,17
7	F08x	PC01	DB10	33,03	30,77	24,89	27,33	4	29,01		3,61	**12,44**	107,55
8	F16x	PC01	DB10	27,65	31,73	28,19	30,36	4	29,48		1,90	6,45	109,32
9	A80	PD03	DB10	28,80	33,20	30,60	31,20	4	30,95		1,81	5,86	114,76
10													
11													
12	F07x	PD99	DB08	<200	<200	<200	<200			**			
13	A39	PC02	DB08	<50	<50	<50	<50						
14	A45	PZ99	DB10	<20	<20	<20	<20						
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	n	Mean	s_r	CV_r
all labs	**35**	**26,97**	**2,389**	**8,859**
30	% from the mean			
	l		s_R	CV_R
	9		**2,908**	**10,778**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

** = higher than maximum acceptable limit of quantification

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A79	PD03	DB10	8,80	8,40	8,90	9,30	4	8,85	*	0,37	4,18	68,28
2	A36	PD02	DB10	11,88	12,09	11,13	11,34	4	11,61		0,45	3,87	89,58
3	F16x	PC01	DB10	10,96	11,43	13,88	14,77	4	12,76		1,85	**14,52**	98,45
4	F14x	PC01	DB10	16,17	12,00	12,00	14,00	4	13,54		1,99	**14,69**	104,49
5	F32	PD01	DB10	14,80	20,10	6,90	14,80	4	14,15		5,44	**38,45**	109,17
6	A82	PD01	DB10	12,65	20,01	15,56	10,84	4	14,77		4,00	**27,10**	113,92
7	A80	PD03	DB10	14,60	18,00	15,40	12,20	4	15,05		2,39	**15,89**	116,12
8	A60	PD01	DB10	83,98	84,62	12,79	14,16	0	48,89	*b* *	40,90	**83,65**	377,19
9													
10													
11	F07x	PD99	DB08	<200	<200	<200	<200			**			
12	A39	PC02	DB08	<50	<50	<50	<50						
13	F08x	PC01	DB10	<20	<20	<20	<20						
14	A45	PZ99	DB10	<20	<20	<20	<20						
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	n	Mean	s_r	CV_r
all labs	**28**	**12,96**	**2,356**	**18,180**
30 % from the mean				
	l		s_R	CV_R
	7		**2,165**	**16,708**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

** = higher than maximum acceptable limit of quantification

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Cr **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	F07x	PD99	DB08	0,40	0,39	0,44	0,41	0	0,41	*b*	*	0,02	5,29	61,10
2	F27	PD01	DB05	0,57	0,54	0,51	0,48	4	0,53			0,04	7,68	78,60
3	A80	PD03	DB10	0,62	0,60	0,59	0,59	4	0,60			0,02	2,53	89,20
4	F05	PD02	DB05	0,63	0,64	0,63	0,65	4	0,64			0,01	1,55	94,79
5	F24	PD01	DB99	0,37	0,65	0,93	0,63	0	0,65	*c*		0,23	**35,48**	96,25
6	A60x	PD01	DB10	0,84	0,61	0,63	0,54	4	0,65			0,13	**20,02**	97,69
7	F14x	PC01	DB10	0,67	0,67	0,64	0,65	4	0,66			0,01	2,25	98,45
8	A36	PD02	DB10	0,70	0,63	0,67	0,66	4	0,66			0,03	4,74	98,78
9	F13x	PD01	DB10	0,67	0,67	0,67	0,66	4	0,67			0,01	0,97	99,27
10	F32x	PD01	DB10	0,68	0,66	0,66	0,67	4	0,67			0,01	1,50	99,64
11	F12x	PC01	DB10	0,72	0,64	0,65	0,67	4	0,67			0,03	5,02	99,73
12	A82	PD01	DB10	0,67	0,68	0,64	0,71	4	0,67			0,03	4,24	100,43
13	A88	PD01	DB08	0,69	0,68	0,73	0,62	4	0,68			0,05	6,69	101,47
14	A79	PD03	DB10	0,67	0,69	0,70	0,73	4	0,70			0,03	3,71	104,11
15	F18x	PD99	DB10	0,71	0,73	0,74	0,71	4	0,72			0,01	1,98	107,59
16	A39	PC02	DB08	0,78	0,76	0,72	0,79	4	0,76			0,03	4,03	113,86
17	F03x	PD02	DB08	0,82	0,72	0,85	0,73	4	0,78			0,06	8,31	116,39
18	F16x	PC01	DB10	0,89	*0,9356a*	0,89	0,89	0	0,89	*b*		0,00	0,24	132,63
19	A71	PD02	DB10	1,28	1,22	1,31	1,31	0	1,28	*b*	*	0,04	3,37	191,00
20														
21														
22	F25x	PZ99	DB08	<1	<1	<1	<1							
23	F02x	PD02	DB08	<1	<1	<1	<1							
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	n	Mean	s_r	CV_r
all labs	**60**	**0,67**	**0,033**	**4,998**
35	% from the mean			

l	s_R	CV_R
15	**0,061**	**9,060**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Cr **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	F07x	PD99	DB08	1,21	1,18	1,22	1,19	4	1,20	*	0,02	1,40	70,29
2	F27	PD01	DB05	1,38	1,18	1,25	1,44	4	1,31		0,12	8,90	76,66
3	F14x	PC01	DB10	1,61	1,57	1,47	1,59	4	1,56		0,06	3,99	91,17
4	A36	PD02	DB10	1,52	1,64	1,48	1,64	4	1,57		0,08	5,21	91,63
5	F16x	PC01	DB10	1,68	1,38	1,63	1,61	4	1,57		0,14	8,61	91,93
6	A88	PD01	DB08	1,70	1,65	1,55	1,60	4	1,63		0,06	3,97	94,97
7	F13x	PD01	DB10	1,66	1,63	1,61	1,74	4	1,66		0,06	3,58	96,92
8	A79	PD03	DB10	1,66	1,64	1,68	1,70	4	1,67		0,03	1,58	97,67
9	F18x	PD99	DB10	1,70	1,60	1,57	1,88	4	1,69		0,14	8,29	98,62
10	F24	PD01	DB99	1,57	1,74	1,76	1,72	4	1,70		0,09	5,10	99,20
11	A80	PD03	DB10	1,79	1,81	1,53	1,76	4	1,72		0,13	7,55	100,66
12	F03x	PD02	DB08	1,78	1,87	1,62	1,68	4	1,74		0,11	6,35	101,54
13	F32x	PD01	DB10	1,96	1,78	1,88	1,65	4	1,82		0,13	7,36	106,22
14	F05	PD02	DB05	1,99	1,71	1,76	1,85	4	1,83		0,12	6,72	106,80
15	F12x	PC01	DB10	1,78	1,74	2,04	1,86	4	1,85		0,13	7,26	108,38
16	A60x	PD01	DB10	1,77	2,27	1,89	1,79	4	1,93		0,23	**12,11**	112,69
17	A39	PC02	DB08	2,07	1,93	2,07	2,00	4	2,02		0,07	3,31	117,93
18	F25x	PZ99	DB08	1,96	2,13	2,10	2,09	4	2,07		0,08	3,64	120,97
19	A82	PD01	DB10	2,01	*2,54a*	2,08	2,12	3	2,07		0,06	2,72	121,01
20	F02x	PD02	DB08	1,80	2,02	2,17	2,51	0	2,13	*c*	0,30	**14,04**	124,19
21	A71	PD02	DB10	2,58	2,52	2,73	2,65	0	2,62	*b* *	0,09	3,44	153,07
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	n	Mean	s_r	CV_r
all labs	**75**	**1,71**	**0,098**	**5,700**
25	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
19	**0,228**	**13,304**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Cr **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	F07x	PD99	DB08	0,44	0,43	0,47	0,46	4	0,45	*	0,02	3,64	62,18
2	F27	PD01	DB05	0,50	0,57	0,54	0,52	4	0,53		0,03	5,19	73,60
3	A80	PD03	DB10	0,63	0,70	0,63	0,76	4	0,68		0,06	9,13	94,16
4	F14x	PC01	DB10	0,71	0,73	0,66	0,64	4	0,69		0,04	6,14	94,81
5	A36	PD02	DB10	0,67	0,66	0,72	0,70	4	0,69		0,03	3,96	94,85
6	A79	PD03	DB10	0,68	0,69	0,68	0,71	4	0,69		0,02	2,22	95,35
7	A39	PC02	DB08	0,73	0,69	0,69	0,71	4	0,71		0,02	2,41	97,65
8	F12x	PC01	DB10	0,72	0,73	0,67	0,71	4	0,71		0,03	4,21	98,00
9	F13x	PD01	DB10	0,73	0,72	0,67	0,73	4	0,71		0,03	3,84	98,73
10	A60x	PD01	DB10	0,80	0,72	0,68	0,68	4	0,72		0,06	7,70	99,56
11	A88	PD01	DB08	0,75	0,69	0,78	0,70	4	0,73		0,04	5,81	101,04
12	F03x	PD02	DB08	0,77	0,85	0,80	0,82	4	0,81		0,03	4,16	112,11
13	F16x	PC01	DB10	0,74	0,93	0,70	0,88	4	0,81		0,11	**13,83**	112,32
14	F05	PD02	DB05	0,82	0,87	0,82	0,81	4	0,83		0,02	2,94	114,85
15	A82	PD01	DB10	0,82	0,83	0,86	0,83	4	0,83		0,02	2,00	115,57
16	F18x	PD99	DB10	0,85	0,89	0,81	0,84	4	0,85		0,03	3,73	117,58
17	F32x	PD01	DB10	0,86	0,83	0,86	0,85	4	0,85		0,01	1,56	117,65
18	F24	PD01	DB99	0,71	0,92	1,15	0,89	0	0,92	*c*	0,18	**19,69**	126,99
19	A71	PD02	DB10	1,01	1,12	1,16	1,11	0	1,10	*b* *	0,07	6,08	152,25
20													
21													
22	F02x	PD02	DB08	<1	<1	<1	<1						
23	F25x	PZ99	DB08	<1	<1	<1	<1						
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	n	Mean	s_r	CV_r
all labs	**68**	**0,72**	**0,035**	**4,840**
35	% from the mean			

l	s_R	CV_R
17	**0,109**	**15,065**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Cr **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	F07x	PD99	DB08	2,02	2,00	2,02	1,94	4	2,00	*	0,04	1,84	74,57
2	F27	PD01	DB05	2,52	2,20	2,00	2,09	4	2,20		0,23	**10,44**	82,23
3	F25x	PZ99	DB08	2,40	2,19	2,30	2,22	4	2,28		0,09	4,12	85,08
4	F14x	PC01	DB10	2,43	2,42	2,39	2,42	4	2,42		0,02	0,72	90,22
5	A88	PD01	DB08	2,49	2,65	2,59	2,49	4	2,56		0,08	3,09	95,45
6	F13x	PD01	DB10	2,56	2,56	2,57	2,58	4	2,56		0,01	0,33	95,79
7	A79	PD03	DB10	2,59	2,50	2,67	2,65	4	2,60		0,08	3,05	97,22
8	F03x	PD02	DB08	2,54	2,78	2,52	2,64	4	2,62		0,12	4,54	97,88
9	A36	PD02	DB10	2,71	2,49	2,64	2,65	4	2,62		0,09	3,49	98,03
10	A60x	PD01	DB10	2,57	2,56	2,96	2,43	4	2,63		0,23	8,59	98,20
11	F18x	PD99	DB10	2,69	2,67	2,55	2,68	4	2,65		0,07	2,47	98,90
12	F12x	PC01	DB10	2,83	2,45	2,81	2,69	4	2,69		0,18	6,54	100,64
13	A39	PC02	DB08	2,80	2,67	2,62	2,83	4	2,73		0,10	3,66	102,04
14	F02x	PD02	DB08	2,66	2,72	2,85	2,90	4	2,78		0,11	4,01	103,95
15	A80	PD03	DB10	2,49	3,08	2,71	2,93	4	2,80		0,26	9,20	104,69
16	F16x	PC01	DB10	2,86	2,63	2,79	2,97	4	2,81		0,14	5,11	105,09
17	A71	PD02	DB10	2,92	2,87	2,84	2,77	4	2,85		0,06	2,25	106,45
18	F24	PD01	DB99	2,58	2,83	2,99	3,17	4	2,89		0,25	8,66	108,06
19	A82	PD01	DB10	3,38	3,10	3,04	2,98	4	3,13		0,18	5,68	116,83
20	F32x	PD01	DB10	3,13	3,17	3,26	3,20	4	3,19		0,05	1,72	119,17
21	F05	PD02	DB05	3,37	3,34	*3,63a*	3,41	3	3,37	*	0,04	1,04	126,02
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	n	Mean	s_r	CV_r
all labs	**83**	**2,68**	**0,115**	**4,301**
* = non tolerable mean because more than +/- **25** % from the mean				

l	s_R	CV_R
21	**0,319**	**11,879**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Co **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	F27	PD01	DB05	0,42	0,32	0,27	0,24	0	0,31	*b* *	0,08	**24,48**	70,56
2	F03	PD02	DB08	0,38	0,41	0,35	0,35	4	0,37		0,03	7,71	84,51
3	F16x	PC01	DB10	0,39	0,40	0,40	0,39	4	0,40		0,01	1,48	89,69
4	F07x	PD99	DB08	0,43	0,39	0,41	0,39	4	0,41		0,02	4,56	92,24
5	F13x	PD01	DB10	0,45	0,44	0,38	0,38	4	0,41		0,04	8,65	93,49
6	A39	PC02	DB08	0,43	0,39	0,43	0,40	4	0,41		0,02	4,43	93,58
7	A80	PD03	DB10	0,41	0,43	0,43	0,43	4	0,42		0,01	2,65	95,91
8	A36	PC02	DB10	0,44	0,44	0,44	0,44	4	0,44		0,00	0,19	99,37
9	F14x	PC01	DB10	0,45	0,44	0,43	0,43	4	0,44		0,01	2,18	99,42
10	F12x	PC01	DB10	0,44	0,45	0,44	0,44	4	0,44		0,00	0,86	100,14
11	A60x	PD01	DB10	0,48	0,47	0,43	0,42	4	0,45		0,03	5,99	101,78
12	A79	PD03	DB10	0,45	0,45	0,46	0,46	4	0,45		0,01	1,97	103,10
13	A88	PD01	DB08	0,51	0,45	0,48	0,47	4	0,48		0,03	5,24	108,33
14	F33	PD01	DB10	0,49	0,45	0,48	0,48	4	0,48		0,02	3,80	108,50
15	F32	PD01	DB10	0,49	0,49	0,48	0,47	4	0,48		0,01	2,08	109,18
16	A82	PD01	DB10	0,46	0,50	0,47	0,51	4	0,49		0,02	4,43	110,32
17	A71	PD02	DB10	0,48	0,48	0,50	0,49	4	0,49		0,01	1,55	110,45
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	n	Mean	s_r	CV_r
all labs	**64**	**0,44**	**0,016**	**3,552**
25	% from the mean			

l	s_R	CV_R
16	**0,035**	**8,009**

* = non tolerable mean because more than +/-

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A39	PC02	DB08	0,06	0,06	0,05	0,06	4	0,06		0,00	1,72	71,94
2	F07x	PD99	DB08	0,07	0,07	0,07	0,07	4	0,07		0,00	2,66	89,65
3	F27	PD01	DB05	0,05	0,05	0,10	0,10	0	0,07	*c*	0,03	**40,22**	93,24
4	F33	PD01	DB10	0,07	0,07	0,08	0,07	4	0,07		0,00	3,05	94,21
5	F13x	PD01	DB10	0,08	0,08	0,07	0,07	4	0,08		0,00	4,66	97,29
6	F16x	PC01	DB10	0,07	0,08	0,08	0,08	4	0,08		0,00	2,93	97,32
7	A80	PD03	DB10	0,08	0,08	0,08	0,08	4	0,08		0,00	2,78	100,17
8	A36	PC02	DB10	0,08	0,08	0,08	0,08	4	0,08		0,00	0,74	100,36
9	F12x	PC01	DB10	0,08	0,08	0,08	0,08	4	0,08		0,00	2,37	100,65
10	A60x	PD01	DB10	0,07	0,09	0,08	0,07	4	0,08		0,01	**12,87**	101,95
11	A79	PD03	DB10	0,08	0,08	0,08	0,08	4	0,08		0,00	2,15	103,66
12	A82	PD01	DB10	0,08	0,09	0,08	0,08	4	0,08		0,00	3,05	107,00
13	F32	PD01	DB10	0,09	0,09	0,09	0,09	4	0,09		0,00	2,82	112,66
14	A71	PD02	DB10	0,09	0,10	0,10	0,10	4	0,10		0,00	1,25	123,15
15													
16													
17	F03	PD02	DB08	<,1	<,1	<,1	<,1						
18	F14x	PC01	DB10	<,1	<,1	<,1	<,1						
19	A88	PD01	DB08	<,09	<,09	<,09	<,09						
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	n	Mean	s_r	CV_r
all labs	**52**	**0,077**	**0,003**	**3,317**
* = non tolerable mean because more than +/-	**35**	% from the mean		
Limit of the lower concentration range	l		s_R	CV_R
	13		**0,009**	**11,924**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A39	PC02	DB08	0,03	0,03	0,03	0,03	0	0,03	*b*	*	0,00	4,71	49,24
2	F12x	PC01	DB10	0,06	0,06	0,06	0,06	4	0,06			0,00	0,73	92,87
3	F13x	PD01	DB10	0,0577	0,06	0,06	0,06	4	0,06			0,00	0,34	95,67
4	A80	PD03	DB10	0,06	0,06	0,06	0,06	4	0,06			0,00	2,61	96,46
5	A36	PC02	DB10	0,06	0,06	0,06	0,06	4	0,06			0,00	0,99	96,50
6	F16x	PC01	DB10	0,06	0,06	0,06	0,05	4	0,06			0,00	6,51	98,64
7	F33	PD01	DB10	0,06	0,06	0,06	0,07	4	0,06			0,01	8,98	100,62
8	A60x	PD01	DB10	0,07	0,06	0,06	0,06	4	0,06			0,00	5,24	103,26
9	A82	PD01	DB10	0,06	0,06	0,07	0,06	4	0,06			0,00	2,31	104,95
10	A79	PD03	DB10	0,06	0,06	0,06	0,07	4	0,06			0,00	4,54	105,45
11	F32	PD01	DB10	0,06	0,07	0,07	0,06	4	0,06			0,00	3,83	105,57
12	A71	PD02	DB10	0,08	0,09	0,08	0,09	0	0,08	*b*	*	0,00	2,28	139,63
13	F27	PD01	DB05	0,01	0,10	0,10	0,20	0	0,10	*c*	*	0,08	**79,61**	160,83
14														
15														
16	F03	PD02	DB08	<,1	<,1	<,1	<,1							
17	F14x	PC01	DB10	<,1	<,1	<,1	<,1							
18	A88	PD01	DB08	<,09	<,09	<,09	<,09							
19	F07x	PD99	DB08	<,05	<,05	<,05	<,05							
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	n	Mean	s_r	CV_r
all labs	**40**	**0,061**	**0,002**	**3,659**
35	% from the mean			

l	s_R	CV_R
10	**0,003**	**4,625**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A71	PD02	DB10	0,24	0,24	0,24	0,24	0	0,24	*b*	*	0,00	0,39	47,64
2	F03	PD02	DB08	0,42	0,41	0,41	0,40	4	0,41			0,01	1,99	82,42
3	F07x	PD99	DB08	0,45	0,45	0,44	0,44	4	0,45			0,00	1,09	89,45
4	F27	PD01	DB05	0,59	0,39	0,45	0,40	0	0,46	*c*		0,09	**19,81**	92,22
5	F14x	PC01	DB10	0,48	0,47	0,47	0,48	4	0,48			0,01	1,17	95,63
6	F16x	PC01	DB10	0,46	0,46	0,51	0,52	4	0,49			0,03	6,26	97,91
7	F12x	PC01	DB10	0,50	0,48	0,49	0,49	4	0,49			0,01	1,15	98,04
8	F13x	PD01	DB10	0,50	0,48	0,49	0,48	4	0,49			0,01	1,80	98,24
9	A80	PD03	DB10	0,49	0,51	0,49	0,50	4	0,50			0,01	1,24	99,80
10	A79	PD03	DB10	0,48	0,49	0,51	0,52	4	0,50			0,02	3,55	100,30
11	A36	PC02	DB10	0,50	0,51	0,49	0,50	4	0,50			0,01	1,08	100,91
12	A39	PC02	DB08	0,52	0,51	0,52	0,50	4	0,51			0,01	1,98	102,74
13	A60x	PD01	DB10	0,52	0,53	0,55	0,50	4	0,52			0,02	3,42	105,47
14	F32	PD01	DB10	0,52	0,53	0,52	0,53	4	0,53			0,00	0,66	105,73
15	A88	PD01	DB08	0,55	0,51	0,46	0,60	4	0,53			0,06	**11,22**	106,54
16	F33	PD01	DB10	0,55	0,52	0,54	0,53	4	0,53			0,01	2,58	107,24
17	A82	PD01	DB10	0,54	0,53	0,56	0,55	4	0,55			0,01	2,15	109,56
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	n	Mean	s_r	CV_r
all labs	**60**	**0,50**	**0,014**	**2,803**
25	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
15	**0,035**	**7,115**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A88	PD01	DA05	13,91	13,22	13,91	13,22	4	13,57	*	0,40	2,94	68,35
2	F08x	PC01	DB03	17,79	16,72	14,70	16,30	4	16,38		1,28	7,83	82,53
3	A36	PD02	DB03	17,27	16,52	15,56	16,52	4	16,47		0,70	4,26	82,98
4	A39	PZ98	DA05	18,02	17,14	16,04	17,35	4	17,14		0,82	4,80	86,36
5	F16x	PC01	DB10	19,45	19,56	14,77	16,15	4	17,48		2,40	**13,74**	88,09
6	F12x	PC01	DB10	17,79	18,26	17,55	17,87	4	17,87		0,29	1,65	90,03
7	F28x	PZ98	DA05	19,32	20,12	18,47	19,90	4	19,45		0,74	3,79	98,02
8	A79	PD03	DB10	21,30	21,30	20,40	19,80	4	20,70		0,73	3,55	104,31
9	F02x	PZ98	DA05	21,60	20,00	21,50	19,80	4	20,73		0,96	4,62	104,43
10	F24	PZ98	DA05	20,62	21,30	21,70	22,51	4	21,53		0,79	3,67	108,50
11	F03	PZ98	DA05	21,01	21,01	23,11	21,01	4	21,54		1,05	4,88	108,52
12	F32	PZ98	DA05	22,60	22,00	21,70	23,20	4	22,38		0,67	2,97	112,75
13	A80	PZ98	DA05	25,30	24,10	22,80	23,80	4	24,00		1,03	4,29	120,94
14	A60	PD01	DB10	25,79	24,96	23,97	21,87	4	24,15		1,69	7,00	121,68
15	A82	PZ98	DA05	24,20	24,43	24,35	24,27	4	24,31		0,10	0,41	122,51
16	A71	PD02	DB10	47,51	44,31	41,40	47,12	0	45,09	*b* *	2,84	6,30	227,18
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19	F18x	PD99	DA05	<20	<20	<20	<20						
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	n	Mean	s_r	CV_r
all labs	**60**	**19,85**	**0,910**	**4,587**
30	% from the mean			

l	s_R	CV_R
15	**3,264**	**16,449**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	A88	PD01	DA05	11,72	10,65	12,30	11,72	4	11,60	*	0,69	5,93	66,25
2	F28x	PZ98	DA05	13,76	14,90	14,36	13,43	4	14,11		0,65	4,61	80,62
3	A39	PZ98	DA05	14,37	14,78	13,18	14,55	4	14,22		0,71	5,02	81,23
4	F12x	PC01	DB10	15,13	14,22	13,99	14,44	4	14,45		0,49	3,41	82,51
5	A36	PD02	DB03	15,37	14,41	15,15	14,31	4	14,81		0,53	3,57	84,60
6	F08x	PC01	DB03	18,33	13,56	13,99	15,90	0	15,45	*c*	2,18	**14,09**	88,23
7	F16x	PC01	DB10	16,52	16,35	17,24	16,38	4	16,62		0,42	2,52	94,95
8	F02x	PZ98	DA05	17,10	17,00	16,60	16,80	4	16,88		0,22	1,31	96,40
9	F03	PZ98	DA05	18,00	18,00	18,00	18,00	4	18,00		0,00	0,00	102,82
10	A79	PD03	DB10	17,90	17,80	18,80	18,50	4	18,25		0,48	2,63	104,25
11	F24	PZ98	DA05	18,41	18,58	19,05	18,98	4	18,76		0,31	1,65	107,13
12	F32	PZ98	DA05	19,34	19,34	19,24	19,45	4	19,34		0,09	0,44	110,49
13	A80	PZ98	DA05	20,30	20,50	19,90	20,10	4	20,20		0,26	1,28	115,39
14	A82	PZ98	DA05	20,18	20,63	20,61	20,18	4	20,40		0,25	1,25	116,53
15	A60	PD01	DB10	21,11	21,43	20,85	20,75	4	21,04		0,30	1,44	120,16
16	A71	PD02	DB10	19,23	23,34	23,64	22,63	0	22,21	*c*	2,03	9,15	126,87
17	F18x	PD99	DA05	22,10	25,20	23,80	24,60	4	23,93	*	1,35	5,62	136,67
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	n	Mean	s_r	CV_r
all labs	**60**	**17,51**	**0,450**	**2,571**
30	% from the mean			

l	s_R	CV_R
15	**3,274**	**18,702**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	Lab.standard dev. V_i	Recovery %
1	F08x	PC01	DB03	17,85	23,73	32,28	26,62	0	25,12	*c*		6,01	**23,92**	81,61
2	F12x	PC01	DB10	26,82	25,82	24,93	25,85	4	25,86			0,77	2,99	83,99
3	A88	PD01	DA05	26,86	25,05	26,86	25,05	4	25,96			1,05	4,03	84,32
4	A39	PZ98	DA05	26,61	26,11	26,46	25,65	4	26,21			0,43	1,63	85,14
5	A36	PD02	DB03	26,42	28,75	25,79	26,95	4	26,98			1,27	4,72	87,64
6	F28x	PZ98	DA05	27,83	26,14	27,38	28,72	4	27,52			1,07	3,90	89,39
7	F16x	PC01	DB10	28,17	24,23	31,86	27,10	4	27,84			3,15	**11,33**	90,44
8	F02x	PZ98	DA05	27,80	28,80	30,10	29,70	4	29,10			1,02	3,52	94,53
9	F03	PZ98	DA05	32,06	30,99	30,99	30,99	4	31,26			0,54	1,71	101,54
10	A79	PD03	DB10	31,60	29,30	31,70	34,50	4	31,78			2,13	6,70	103,22
11	F24	PZ98	DA05	32,43	32,75	33,49	33,28	4	32,99			0,48	1,47	107,16
12	F32	PZ98	DA05	34,80	34,60	34,10	34,80	4	34,58			0,33	0,96	112,32
13	A80	PZ98	DA05	34,30	35,30	34,40	35,00	4	34,75			0,48	1,38	112,89
14	A82	PZ98	DA05	35,09	34,58	34,91	35,12	4	34,93			0,25	0,71	113,46
15	A60	PD01	DB10	*38,04a*	36,04	36,34	35,89	3	36,09			0,23	0,63	117,24
16	F18x	PD99	DA05	39,40	34,90	39,00	35,70	4	37,25			2,28	6,12	121,01
17	A71	PD02	DB10	56,35	56,24	58,70	59,44	0	57,68	*b*	*	1,63	2,83	187,39
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	n	Mean	s_r	CV_r
all labs	**59**	**30,78**	**1,032**	**3,354**
30	% from the mean			
	l		s_R	CV_R
	15		**4,039**	**13,083**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	V_i	Recovery %
1	A88	PD01	DA05	1,91	1,24	1,67	1,55	0	1,59	*b*	*	0,28	**17,50**	20,38
2	F28x	PZ98	DA05	5,03	4,84	5,43	5,24	4	5,13		*	0,26	4,98	65,69
3	A36	PD02	DB03	5,14	5,24	5,46	5,67	4	5,38		*	0,24	4,40	68,82
4	A39	PZ98	DA05	6,55	6,12	6,81	6,58	4	6,51			0,29	4,40	83,34
5	F12x	PC01	DB10	6,61	6,54	6,40	6,52	4	6,52			0,09	1,35	83,38
6	F03	PZ98	DA05	7,44	7,44	7,44	7,44	4	7,44			0,00	0,00	95,22
7	F02x	PZ98	DA05	7,70	8,00	7,90	7,90	4	7,88			0,13	1,60	100,79
8	A79	PD03	DB10	8,30	7,90	8,00	8,10	4	8,08			0,17	2,11	103,34
9	F32	PZ98	DA05	8,24	7,92	8,24	8,24	4	8,16			0,16	1,96	104,43
10	A60	PD01	DB10	8,84	8,71	8,18	7,80	4	8,38			0,48	5,74	107,27
11	A82	PZ98	DA05	9,41	9,09	9,16	9,42	4	9,27			0,17	1,85	118,63
12	F16x	PC01	DB10	9,67	8,77	9,79	9,02	4	9,31			0,50	5,33	119,19
13	A80	PZ98	DA05	9,60	9,50	9,30	9,50	4	9,48			0,13	1,33	121,26
14	F24	PZ98	DA05	9,20	9,72	11,15	10,13	4	10,05			0,83	8,22	128,62
15	A71	PD02	DB10	23,20	21,39	20,11	22,69	0	21,85	*b*	*	1,39	6,35	279,61
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	n	Mean	s_r	CV_r
all labs	**52**	**7,81**	**0,263**	**3,371**
30	% from the mean			
	l		s_R	CV_R
	13		**1,562**	**19,993**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Ni **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	0,92	1,15	2,08	2,23	0	1,60	*b* *	0,66	**41,15**	67,94
2	A56	PC01	DB08	2,00	2,00	2,00	2,00	4	2,00		0,00	0,00	85,20
3	A71	PD02	DB10	2,11	2,18	2,20	2,04	4	2,13		0,07	3,42	90,81
4	F07x	PD99	DB08	2,25	2,07	2,13	2,08	4	2,13		0,08	3,75	90,86
5	F13x	PD01	DB99	2,32	2,27	2,01	2,03	4	2,16		0,16	7,27	91,86
6	F19x	PD02	DB08	2,39	2,13	1,93	2,21	4	2,17		0,19	8,81	92,23
7	A45	PB99	DB10	2,13	2,33	2,38	2,13	4	2,24		0,13	5,86	95,53
8	F27	PD01	DB05	2,20	2,13	2,43	2,24	4	2,25		0,13	5,70	95,85
9	F16x	PC01	DB10	2,18	2,23	2,30	2,30	4	2,25		0,06	2,58	95,92
10	A60x	PD01	DB10	2,48	2,28	2,18	2,14	4	2,27		0,15	6,77	96,72
11	A36	PD02	DB10	2,26	2,33	2,25	2,36	4	2,30		0,05	2,38	97,96
12	F12x	PC01	DB10	2,35	2,33	2,30	2,33	4	2,33		0,02	0,83	99,15
13	F18x	PD99	DB10	2,34	2,34	2,37	2,41	4	2,37		0,03	1,40	100,75
14	A79	PD03	DB10	2,33	2,33	2,44	2,44	4	2,38		0,07	2,80	101,59
15	F14x	PC01	DB10	2,46	2,35	2,37	2,37	4	2,39		0,05	2,06	101,70
16	A88	PD01	DB08	2,43	2,34	2,35	2,44	4	2,39		0,05	2,19	101,81
17	A39	PC02	DB08	2,36	2,31	2,47	2,42	4	2,39		0,07	2,86	101,86
18	A80	PD03	DB10	2,29	2,57	2,33	2,40	4	2,40		0,12	5,16	102,13
19	F05	PD02	DB08	2,44	2,43	2,49	2,34	4	2,43		0,06	2,58	103,30
20	F32x	PD01	DB10	2,48	2,50	2,50	2,32	4	2,45		0,09	3,56	104,37
21	F33x	PD01	DB10	2,45	2,44	2,50	2,60	4	2,50		0,07	2,93	106,39
22	A82	PD01	DB10	2,42	2,48	2,51	2,59	4	2,50		0,07	2,88	106,52
23	F03x	PD02	DB08	2,56	2,61	2,64	2,50	4	2,58		0,06	2,38	109,80
24	F25x	PB06	DB08	2,69	2,62	2,68	2,56	4	2,64		0,06	2,27	112,27
25	F02x	PD02	DB08	2,49	2,63	2,75	2,97	4	2,71		0,20	7,50	115,44
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	n	Mean	s_r	CV_r
all labs	**96**	**2,35**	**0,086**	**3,654**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
24	**0,169**	**7,220**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Ni **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	F07x	PD99	DB08	0,72	0,75	0,75	0,72	4	0,73		0,02	2,21	83,32
2	F27	PD01	DB05	0,77	0,71	0,79	0,70	4	0,74		0,04	5,65	84,45
3	A45	PB99	DB10	0,80	0,75	0,78	0,72	4	0,76		0,04	4,74	86,52
4	A71	PD02	DB10	0,75	0,77	0,78	0,77	4	0,77		0,01	1,81	86,92
5	F13x	PD01	DB99	0,82	0,79	0,76	0,77	4	0,78		0,03	3,29	88,87
6	F05	PD02	DB08	0,86	0,76	0,77	0,86	4	0,81		0,06	6,99	91,92
7	F19x	PD02	DB08	0,85	0,73	0,81	0,90	4	0,82		0,07	9,09	93,28
8	A79	PD03	DB10	0,81	0,84	0,84	0,84	4	0,83		0,02	2,13	94,39
9	F33x	PD01	DB10	0,79	0,77	0,91	0,89	4	0,84		0,07	8,36	95,35
10	F12x	PC01	DB10	0,82	0,79	0,94	0,85	4	0,85		0,07	7,94	96,57
11	A36	PD02	DB10	0,88	0,80	0,83	0,91	4	0,85		0,05	5,81	96,94
12	A39	PC02	DB08	0,82	0,89	0,89	0,82	4	0,86		0,04	4,68	97,11
13	A60x	PD01	DB10	0,83	1,04	0,82	0,79	4	0,87		0,12	**13,25**	98,67
14	F32x	PD01	DB10	0,91	0,86	0,93	0,87	4	0,89		0,03	3,70	101,31
15	A82	PD01	DB10	0,90	*1,456a*	0,93	0,89	3	0,91		0,02	2,06	102,92
16	F14x	PC01	DB10	0,86	0,98	0,89	0,91	4	0,91		0,05	5,60	103,30
17	F03x	PD02	DB08	0,94	0,86	0,88	1,01	4	0,92		0,07	7,32	104,71
18	A80	PD03	DB10	1,11	0,89	0,87	0,86	4	0,93		0,12	**12,74**	105,88
19	F16x	PC01	DB10	0,93	0,98	0,93	0,97	4	0,95		0,03	2,71	107,74
20	A56	PC01	DB08	1,00	1,00	1,00	1,00	4	1,00		0,00	0,00	113,51
21	F25x	PB06	DB08	1,06	1,05	1,04	1,03	4	1,04		0,01	1,23	118,45
22	A88	PD01	DB08	1,21	1,06	1,03	0,95	4	1,06		0,11	**10,23**	120,61
23	F18x	PD99	DB10	1,00	1,11	1,38	1,02	4	1,13		0,18	**15,52**	127,98
24	F24	PD01	DB99	0,72	1,28	1,92	2,18	0	1,53	*b* *	0,66	**43,05**	173,11
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27	F02x	PD02	DB08	<1	1,01	1,12	1,28						
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	n	Mean	s_r	CV_r
all labs	**91**	**0,88**	**0,054**	**6,105**
30	% from the mean			

l	s_R	CV_R
23	**0,104**	**11,789**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Ni **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	0,25	0,32	0,32	0,57	0	0,37	*b* *	0,14	**38,52**	43,99
2	F07x	PD99	DB08	0,60	0,61	0,61	0,60	4	0,61		0,01	1,36	73,01
3	F05	PD02	DB08	0,60	0,63	0,60	0,67	4	0,63		0,03	5,29	75,38
4	A45	PB99	DB10	0,70	0,70	0,71	0,70	4	0,70		0,01	0,85	84,63
5	F27	PD01	DB05	0,76	0,69	0,68	0,69	4	0,70		0,04	5,48	84,75
6	F13x	PD01	DB99	0,73	0,74	0,75	0,76	4	0,74		0,01	1,97	89,68
7	F12x	PC01	DB10	0,74	0,76	0,74	0,75	4	0,75		0,01	1,37	90,06
8	F33x	PD01	DB10	0,76	0,81	0,82	0,67	4	0,77		0,07	8,96	92,19
9	A60x	PD01	DB10	*2,08a*	0,76	0,77	0,79	3	0,77		0,02	1,96	92,83
10	A36	PD02	DB10	0,77	0,77	0,79	0,77	4	0,78		0,01	1,31	93,61
11	A79	PD03	DB10	0,76	0,80	0,82	0,80	4	0,79		0,02	3,13	95,66
12	A39	PC02	DB08	0,80	0,80	0,84	0,79	4	0,81		0,02	2,62	97,29
13	F19x	PD02	DB08	0,81	0,83	0,80	*1,11a*	3	0,81		0,01	1,52	97,90
14	A80	PD03	DB10	0,80	0,83	0,81	0,85	4	0,82		0,02	2,96	98,88
15	F14x	PC01	DB10	0,81	0,89	0,84	0,80	4	0,84		0,04	4,84	100,63
16	A82	PD01	DB10	0,84	0,96	0,85	0,80	4	0,86		0,07	7,81	103,81
17	F16x	PC01	DB10	0,85	0,98	0,81	0,94	4	0,89		0,08	8,72	107,59
18	F03x	PD02	DB08	0,97	0,94	0,80	0,92	4	0,91		0,07	8,22	109,37
19	F32x	PD01	DB10	0,95	0,93	0,92	0,92	4	0,93		0,02	1,63	111,81
20	A71	PD02	DB10	0,96	0,93	0,93	0,93	4	0,94		0,02	1,78	113,06
21	A88	PD01	DB08	0,94	1,03	0,94	1,00	4	0,98		0,04	4,60	117,80
22	F18x	PD99	DB10	1,03	0,95	0,94	1,03	4	0,99		0,05	4,85	119,13
23	A56	PC01	DB08	1,00	1,00	1,00	1,00	4	1,00		0,00	0,00	120,52
24	F25x	PB06	DB08	1,03	1,10	1,07	1,05	4	1,06		0,03	2,83	128,11
25													
26													
27	F02x	PD02	DB08	<1	<1	<1	<1						
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	n	Mean	s_r	CV_r
all labs	**90**	**0,83**	**0,031**	**3,680**
30	% from the mean			

l	s_R	CV_R
23	**0,119**	**14,408**

* = non tolerable mean because more than +/-

Limit of the lower concentration range

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

Element: Ni **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	A71	PD02	DB10	7,19	7,14	7,11	7,09	4	7,13		0,04	0,62	89,48
2	A88	PD01	DB08	7,21	6,98	7,22	7,42	4	7,21		0,18	2,50	90,41
3	A56	PC01	DB08	8,00	7,00	7,00	7,00	4	7,25		0,50	6,90	90,95
4	F07x	PD99	DB08	7,10	7,42	7,37	7,29	4	7,30		0,14	1,91	91,52
5	F14x	PC01	DB10	7,38	7,31	7,41	7,32	4	7,36		0,05	0,65	92,26
6	F19x	PD02	DB08	7,44	7,73	7,56	7,56	4	7,57		0,12	1,58	94,99
7	A39	PC02	DB08	7,66	7,53	7,77	7,90	4	7,71		0,16	2,06	96,76
8	F16x	PC01	DB10	7,39	8,18	7,24	8,08	4	7,72		0,48	6,16	96,86
9	F13x	PD01	DB99	7,67	7,75	7,80	7,71	4	7,73		0,05	0,68	97,01
10	A45	PB99	DB10	7,69	7,76	7,74	7,80	4	7,75		0,05	0,59	97,19
11	A79	PD03	DB10	7,68	7,71	8,18	8,05	4	7,90		0,25	3,15	99,15
12	F12x	PC01	DB10	7,96	7,83	7,98	7,92	4	7,92		0,07	0,86	99,37
13	A60x	PD01	DB10	8,13	7,85	8,08	7,87	4	7,98		0,14	1,77	100,11
14	F27	PD01	DB05	7,82	8,39	8,20	7,54	4	7,99		0,38	4,77	100,20
15	A82	PD01	DB10	8,01	7,94	8,11	7,95	4	8,00		0,08	0,99	100,34
16	A36	PD02	DB10	8,01	7,91	7,95	8,21	4	8,02		0,13	1,65	100,59
17	F05	PD02	DB08	8,20	8,39	8,36	8,30	4	8,31		0,08	1,01	104,27
18	F03x	PD02	DB08	8,16	8,39	8,52	8,37	4	8,36		0,15	1,78	104,87
19	A80	PD03	DB10	8,05	8,88	8,43	8,27	4	8,41		0,35	4,18	105,47
20	F25x	PB06	DB08	8,51	8,39	8,42	8,39	4	8,43		0,06	0,68	105,71
21	F02x	PD02	DB08	8,00	8,24	8,55	8,95	4	8,44		0,41	4,87	105,81
22	F18x	PD99	DB10	8,34	8,29	8,63	8,49	4	8,44		0,15	1,82	105,84
23	F24	PD01	DB99	7,89	8,25	8,81	8,96	4	8,48		0,50	5,86	106,34
24	F33x	PD01	DB10	8,81	8,43	8,77	8,51	4	8,63		0,19	2,18	108,26
25	F32x	PD01	DB10	9,31	9,22	9,22	9,31	4	9,27		0,05	0,56	116,22
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	n	Mean	s_r	CV_r
all labs	**100**	**7,97**	**0,190**	**2,387**
* = non tolerable mean because more than +/-	**20**	% from the mean		

l	s_R	CV_R
25	**0,521**	**6,533**

24th Needle/Leaf Interlaboratory Comparison Test 2021/2022

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	PD03	DB10	<10	<10	<10	<10			
Ag	(ng/g)	2	A80	PD03	DB10	13,7	13,7	13,4	13,1	13,48	0,287	2,132
Ag	(ng/g)	3	A80	PD03	DB10	<10	<10	<10	<10			
Ag	(ng/g)	4	A80	PD03	DB10	<10	<10	<10	<10			
Al	(µg/g)	1	F07x	PD99	DB08	56,15	55,46	53,37	53,9	54,72	1,302	2,380
			F18x	PD99	DB08	61,2	61,2	59,3	60,2	60,48	0,914	1,512
			A36	PD02	DB08	55,96	62,68	59,8	70,14	62,15	5,999	9,653
			A60x	PD01	DB10	70,53	70,07	60,69	57,2	64,62	6,711	10,386
			A80	PD03	DB10	70	74	69,7	69,1	70,70	2,232	3,156
			F25x	PB06	DB08	69,25	69,78	73,26	72,32	71,15	1,941	2,729
			F33	PD01	DB10	77,56	75,28	65,13	67,98	71,49	5,887	8,235
			F24	PD01	DB99	65	74	75	74	72,00	4,690	6,514
			F05	PD02	DB08	80,4	75,6	70,4	72,8	74,80	4,296	5,743
			A71	PD02	DB10	78,03	78,94	77,29	77,56	77,96	0,724	0,929
			F03x	PD02	DB08	79,43	80,29	75,33	76,81	77,97	2,297	2,946
			F28x	PD02	DB08	82,27	84,61	80,89	82,7	82,62	1,536	1,860
			A59	PC01	DB08	84,05	82,14	85,19	83,7	83,77	1,259	1,503
			F15x	PC01	DB08	80	77	83	98	84,50	9,327	11,038
			F16x	PC01	DB08	84,68	84,21	85,15	84,52	84,64	0,392	0,463
			A39	PC02	DB08	85,18	85,01	81,67	87,09	84,74	2,252	2,658
			A65	PD01	DB08	80	94	83	111	92,00	14,024	15,243
			F13x	PD01	DB08	96	102	96	89	95,75	5,315	5,551
			A79	PD03	DB10	98,5	99,49	97,7	88,04	95,93	5,312	5,538
			F32	PD01	DB08	103,4	99,1	106,4	101,4	102,58	3,097	3,019
			F14	PC01	DB08	112,7	110	115	106,2	110,98	3,783	3,409
			A57	PZ02	DD02	117,9	119,1	125,2	126,6	122,20	4,338	3,550
			A56	PC01	DB08	123	132	134	129	129,50	4,796	3,703
Al	(µg/g)	2	F07x	PD99	DB08	28,55	32,02	32,2	32,03	31,20	1,769	5,669
			F33	PD01	DB10	39,31	42,8	40,85	46,82	42,45	3,248	7,651

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	2	A36	PD02	DB08	41,64	44,72	42,49	48	44,21	2,839	6,422
			A60x	PD01	DB10	44,82	45,24	46,8	47,88	46,19	1,415	3,064
			F25x	PB06	DB08	50,84	48,89	50,02	48,97	49,68	0,929	1,870
			A80	PD03	DB10	50,1	52,9	51	51,2	51,30	1,169	2,279
			F18x	PD99	DB08	51,6	50,4	54,1	54,5	52,65	1,974	3,749
			A71	PD02	DB10	55,13	54,34	55,41	54,51	54,85	0,506	0,922
			F28x	PD02	DB08	54,19	58,35	56,91	52,22	55,42	2,742	4,948
			F24	PD01	DB99	40	59	66	60	56,25	11,266	20,028
			F05	PD02	DB08	55,1	57	57,4	56,9	56,60	1,023	1,808
			A65	PD01	DB08	59	57	59	56	57,75	1,500	2,597
			A39	PC02	DB08	54,85	57,29	60,32	59,72	58,05	2,501	4,308
			F03x	PD02	DB08	57,65	55,76	65,66	56,9	58,99	4,512	7,649
			A59	PC01	DB08	66,29	59	61,64	61,64	62,14	3,032	4,879
			F16x	PC01	DB08	65,75	62,1	66,78	63,16	64,45	2,184	3,388
			A79	PD03	DB10	68,55	68,8	63,63	64,65	66,41	2,653	3,995
			F13x	PD01	DB08	66	67	67	67	66,75	0,500	0,749
			F32	PD01	DB08	70,5	68,4	69,3	64,8	68,25	2,456	3,598
			F15x	PC01	DB08	71	68	74	68	70,25	2,872	4,089
			F14	PC01	DB08	72,6	69,9	68,8	73	71,08	2,048	2,882
			A56	PC01	DB08	82	78	82	98	85,00	8,869	10,435
			A57	PZ02	DD02	105,8	99,8	100	100,4	101,50	2,877	2,835
Al	(µg/g)	3	F07x	PD99	DB08	75,61	79,86	74,6	78,2	77,07	2,401	3,115
			A60x	PD01	DB10	100,9	93,31	100,3	93,38	96,97	4,196	4,327
			F33	PD01	DB10	95,35	93,6	102,11	97,94	97,25	3,698	3,803
			A36	PD02	DB08	102,1	103,9	99,46	103,37	102,21	1,981	1,938
			A80	PD03	DB10	100	106	100	104	102,50	3,000	2,927
			F25x	PB06	DB08	108,5	109,1	110,9	109,9	109,60	1,039	0,948
			F28x	PD02	DB08	112,2	106,6	116,1	104,7	109,90	5,217	4,747
			A39	PC02	DB08	117,98	112,15	107,69	108,43	111,56	4,702	4,215

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	3	F24	PD01	DB99	111	111	115	115	113,00	2,309	2,044
			F05	PD02	DB08	113	113	114	114	113,50	0,577	0,509
			A65	PD01	DB08	116	116	112	113	114,25	2,062	1,804
			A71	PD02	DB10	115,81	115,41	117,57	115,27	116,02	1,062	0,915
			F16x	PC01	DB08	115,4	116,5	120,4	116,9	117,30	2,162	1,843
			F03x	PD02	DB08	112,49	119,33	121,26	122	118,77	4,335	3,650
			A59	PC01	DB08	123,5	123,3	123,3	126,1	124,05	1,370	1,104
			F13x	PD01	DB08	126	124	123	124	124,25	1,258	1,013
			A79	PD03	DB10	128,3	129,4	122,2	122,9	125,70	3,676	2,924
			F32	PD01	DB08	125,8	125,8	126,8	125,8	126,05	0,500	0,397
			F15x	PC01	DB08	128	129	127	139	130,75	5,560	4,253
			F14	PC01	DB08	132,5	131,1	132,4	130,5	131,63	0,984	0,748
			F18x	PD99	DB08	132	133	139	135	134,75	3,096	2,297
			A56	PC01	DB08	146	154	148	137	146,25	7,042	4,815
			A57	PZ02	DD02	163,8	163,2	168,8	182,6	169,60	9,023	5,320
Al	(µg/g)	4	F07x	PD99	DB08	41,9	43,98	43,07	44,08	43,26	1,013	2,341
			F33	PD01	DB10	43,5	43,27	44,99	43,83	43,90	0,764	1,740
			F24	PD01	DB99	30	31	53	63	44,25	16,399	37,059
			A36	PD02	DB08	47,51	43,45	45,91	45,69	45,64	1,670	3,659
			A60x	PD01	DB10	46,61	46,19	51,12	46,88	47,70	2,298	4,817
			A80	PD03	DB10	47,7	51,9	50,4	51,8	50,45	1,957	3,879
			F25x	PB06	DB08	52,86	52,96	50,3	50,46	51,65	1,463	2,832
			F18x	PD99	DB08	50,7	52,5	52,4	52,7	52,08	0,925	1,777
			F28x	PD02	DB08	54,34	56,56	51,56	53,21	53,92	2,099	3,893
			A65	PD01	DB08	56	54	54	55	54,75	0,957	1,749
			F05	PD02	DB08	55,9	55	54,2	54,5	54,90	0,744	1,355
			A39	PC02	DB08	55,42	55,63	60,24	56,54	56,96	2,242	3,936
			F03x	PD02	DB08	58,56	60,76	58,08	58,99	59,10	1,169	1,978
			A71	PD02	DB10	59	58,97	59,48	59,12	59,14	0,234	0,396

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	4	F16x	PC01	DB08	62,53	62,63	59,88	61,62	61,67	1,274	2,066
			A79	PD03	DB10	65,28	65,23	59,76	60,26	62,63	3,035	4,846
			F13x	PD01	DB08	63	63	62	65	63,25	1,258	1,989
			F15x	PC01	DB08	65	67	65	66	65,75	0,957	1,456
			F32	PD01	DB08	66,9	66,4	67,3	66,6	66,80	0,392	0,586
			A59	PC01	DB08	65,76	66,68	68,08	72,96	68,37	3,205	4,688
			F14	PC01	DB08	70,3	71,1	72,4	71,3	71,28	0,866	1,214
			A57	PZ02	DD02	79,6	68,1	73,3	72,7	73,43	4,727	6,438
			A56	PC01	DB08	70	77	71	82	75,00	5,598	7,463
Ba	(µg/g)	1	F16x	PC01	DB10	38,37	38	39,17	38,22	38,44	0,510	1,326
			A80	PD03	DB10	38,1	39,7	38,9	39,7	39,10	0,766	1,959
			A39	PC02	DB08	38,9	39,34	39,99	38,97	39,30	0,499	1,269
			A82	PD01	DB08	38,44	38,63	40,06	40,57	39,43	1,051	2,667
			A71	PD02	DB10	38,922	40,686	39,244	39,147	39,50	0,802	2,031
			A60	PD01	DB10	42,67	41,49	38,59	38,75	40,38	2,028	5,023
			A65	PD01	DB08	38,1	44	39,3	44,1	41,38	3,128	7,559
Ba	(µg/g)	2	A65	PD01	DB08	2	2	1,9	2	1,98	0,050	2,532
			A82	PD01	DB08	2,075	1,949	1,916	1,968	1,98	0,069	3,479
			A60	PD01	DB10	1,625	2,975	2,007	1,55	2,04	0,655	32,127
			F16x	PC01	DB10	2,056	2,094	2,005	2,081	2,06	0,039	1,909
			A71	PD02	DB10	2,032	2,047	2,438	2,142	2,16	0,189	8,711
			A80	PD03	DB10	2,43	2,52	2,07	1,98	2,25	0,265	11,776
			A39	PC02	DB08	2,123	2,414	2,271	2,287	2,27	0,119	5,240
Ba	(µg/g)	3	A82	PD01	DB08	22,13	21,42	21,85	21,34	21,69	0,372	1,714
			A65	PD01	DB08	21,4	21,8	22,3	21,7	21,80	0,374	1,716
			A39	PC02	DB08	22,2	21,78	23,05	22,45	22,37	0,531	2,374
			A71	PD02	DB10	23,113	22,368	22,575	22,118	22,54	0,423	1,877
			A80	PD03	DB10	22,2	22,1	22,5	23,5	22,58	0,640	2,833
			A60	PD01	DB10	22,96	23,47	23,37	23,85	23,41	0,366	1,562

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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)	3	F16x	PC01	DB10	24,06	24,94	22,27	22,45	23,43	1,289	5,501
Ba	(µg/g)	4	A71	PD02	DB10	51,49	50,56	50,335	50,979	50,84	0,508	1,000
			A82	PD01	DB08	52,41	51,58	52,94	52	52,23	0,581	1,112
			A65	PD01	DB08	52,8	53,2	53,7	53,4	53,28	0,377	0,709
			A39	PC02	DB08	53,67	53,92	54,08	52,01	53,42	0,955	1,788
			A80	PD03	DB10	52,9	54,4	53,1	54	53,60	0,716	1,337
			F16x	PC01	DB10	52,32	56,19	51,62	55,83	53,99	2,355	4,361
			A60	PD01	DB10	54,14	53,16	56,27	52,62	54,05	1,610	2,978
Be	(ng/g)	1	A80	PD03	DB10	<25	<25	<25	<25			
			F16x	PC01	DB10	3,537	3,701	3,352	3,582	3,54	0,145	4,090
Be	(ng/g)	2	A80	PD03	DB10	<25	<25	<25	<25			
			F16x	PC01	DB10	2,067	1,93	2,087	1,99	2,02	0,072	3,583
Be	(ng/g)	3	A80	PD03	DB10	120	127	123	123	123,25	2,872	2,330
			F16x	PC01	DB10	122,6	153,3	125,5	152,5	138,48	16,702	12,061
Be	(ng/g)	4	A80	PD03	DB10	<25	<25	<25	<25			
			F16x	PC01	DB10	4,295	3,751	4,158	3,795	4,00	0,268	6,709
Bi	(ng/g)	1	F16x	PC01	DB10	2,773	2,361	2,403	2,816	2,59	0,239	9,250
			A80	PD03	DB10	7,06	3,61	2,61	2,93	4,05	2,048	50,534
Bi	(ng/g)	2	F16x	PC01	DB10	15,16	12,67	15,62	15	14,61	1,321	9,043
			A80	PD03	DB10	19,3	18,2	15,7	16,3	17,38	1,668	9,600
Bi	(ng/g)	3	F16x	PC01	DB10	10,34	7,551	10,42	7,833	9,04	1,557	17,226
			A80	PD03	DB10	11,3	9,91	9,23	9,23	9,92	0,976	9,839
Bi	(ng/g)	4	A80	PD03	DB10	<2	<2	2,35	<2			
			F16x	PC01	DB10	2,015	1,97	1,777	1,855	1,90	0,108	5,689
Ce	(ng/g)	1	A80	PD03	DB10	69,1	79,7	72,7	81,4	75,73	5,804	7,664
			A71	PD02	DB10	132,7	134,9	140,9	132,7	135,30	3,875	2,864
Ce	(ng/g)	2	A80	PD03	DB10	66,2	68,3	65,6	62,7	65,70	2,311	3,517
			A71	PD02	DB10	115,7	134,9	128,8	131,5	127,73	8,396	6,574

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Ce	(ng/g)	3	A80	PD03	DB10	112	114	99,3	113	109,58	6,898	6,296
			A71	PD02	DB10	206,8	204,4	192,1	209	203,08	7,554	3,720
Ce	(ng/g)	4	A80	PD03	DB10	74	75	77	74,1	75,03	1,391	1,855
			A71	PD02	DB10	203,7	210,1	215,6	218	211,85	6,361	3,002
Cl	(µg/g)	1	F05	PZ99	DF08	350	370	350	359	357,25	9,500	2,659
			F02	PA06	DF03	390	410	400	320	380,00	40,825	10,743
			A57	PZ02	DD02	490	500	540	500	507,50	22,174	4,369
Cl	(µg/g)	2	F02	PA06	DF03	<100	<100	<100	<100			
			F05	PZ99	DF08	75	64,7	79,4	56,1	68,80	10,471	15,219
			A57	PZ02	DD02	160	150	180	150	160,00	14,142	8,839
Cl	(µg/g)	3	F02	PA06	DF03	<100	<100	<100	<100			
			F05	PZ99	DF08	103	100	101	100	101,00	1,414	1,400
			A57	PZ02	DD02	180	170	170	180	175,00	5,774	3,299
Cl	(µg/g)	4	F05	PZ99	DF08	310	302	313	321	311,50	7,853	2,521
			F02	PA06	DF03	340	330	330	330	332,50	5,000	1,504
			A57	PZ02	DD02	430	430	460	430	437,50	15,000	3,429
Cs	(ng/g)	1	A80	PD03	DB10	15,2	16,3	14,9	15,5	15,48	0,602	3,891
			A71	PD02	DB10	16,79	16,28	15,02	15,85	15,99	0,749	4,688
Cs	(ng/g)	2	A71	PD02	DB10	19,93	19,77	22,11	20,71	20,63	1,069	5,180
			A80	PD03	DB10	20,2	21,2	21,2	20,8	20,85	0,473	2,267
Cs	(ng/g)	3	A80	PD03	DB10	27,9	28,1	26,7	28,2	27,73	0,695	2,505
			A71	PD02	DB10	28,73	28,89	27,67	27,49	28,20	0,717	2,543
Cs	(ng/g)	4	A71	PD02	DB10	820,7	810,3	831,1	834,2	824,08	10,848	1,316
			A80	PD03	DB10	825	829	822	832	827,00	4,397	0,532
Dy	(ng/g)	1	A71	PD02	DB10	5,426	6,285	6,467	5,443	5,91	0,549	9,291
Dy	(ng/g)	2	A71	PD02	DB10	4,572	4,597	4,488	4,216	4,47	0,175	3,906
Dy	(ng/g)	3	A71	PD02	DB10	9,52	10,66	10,36	9,062	9,90	0,738	7,459
Dy	(ng/g)	4	A71	PD02	DB10	6,993	6,99	7,095	6,919	7,00	0,072	1,035

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Er	(ng/g)	1	A71	PD02	DB10	2,652	2,746	2,697	2,669	2,69	0,041	1,527
Er	(ng/g)	2	A71	PD02	DB10	2,392	2,748	2,731	2,746	2,65	0,175	6,593
Er	(ng/g)	3	A71	PD02	DB10	5,159	5,075	5,004	4,984	5,06	0,079	1,568
Er	(ng/g)	4	A71	PD02	DB10	4,005	3,815	3,69	3,957	3,87	0,143	3,693
Eu	(ng/g)	1	A71	PD02	DB10	3,694	3,925	4,079	3,614	3,83	0,213	5,565
Eu	(ng/g)	2	A71	PD02	DB10	1,267	1,157	1,126	1,258	1,20	0,071	5,914
Eu	(ng/g)	3	A71	PD02	DB10	3,229	3,168	3,021	3,055	3,12	0,097	3,109
Eu	(ng/g)	4	A71	PD02	DB10	5,349	4,38	5,012	5,167	4,98	0,421	8,462
F	(µg/g)	1	F32x	PE99	DF03	<5	<5	<5	<5			
			F02	PE01	DF03	<3	<3	<3	<3			
F	(µg/g)	2	F32x	PE99	DF03	<5	<5	<5	<5			
			F02	PE01	DF03	<3	<3	<3	<3			
F	(µg/g)	3	F32x	PE99	DF03	<5	<5	<5	<5			
			F02	PE01	DF03	<3	<3	<3	<3			
F	(µg/g)	4	F32x	PE99	DF03	<5	<5	<5	<5			
			F02	PE01	DF03	<3	<3	<3	<3			
Ga	(µg/g)	1	A71	PD02	DB10	0,061	0,0638	0,0569	0,0536	0,06	0,004	7,633
Ga	(µg/g)	2	A71	PD02	DB10	0,04	0,0439	0,0444	0,0419	0,04	0,002	4,734
Ga	(µg/g)	3	A71	PD02	DB10	0,1451	0,1535	0,1452	0,1439	0,15	0,004	3,010
Ga	(µg/g)	4	A71	PD02	DB10	0,152	0,165	0,1699	0,1691	0,16	0,008	5,051
Gd	(ng/g)	1	A71	PD02	DB10	8,737	9,739	8,916	8,916	9,08	0,449	4,950
Gd	(ng/g)	2	A71	PD02	DB10	8,011	8,127	8,83	7,831	8,20	0,437	5,335
Gd	(ng/g)	3	A71	PD02	DB10	10,63	10,46	9,971	10,33	10,35	0,280	2,702
Gd	(ng/g)	4	A71	PD02	DB10	10,78	9,903	10,18	10,7	10,39	0,420	4,043
Ho	(ng/g)	1	A71	PD02	DB10	1,287	1,345	1,157	1,214	1,25	0,082	6,583
Ho	(ng/g)	2	A71	PD02	DB10	1,229	1,212	1,13	1,247	1,20	0,052	4,291
Ho	(ng/g)	3	A71	PD02	DB10	2,348	2,103	2,249	2,344	2,26	0,115	5,079
Ho	(ng/g)	4	A71	PD02	DB10	1,661	1,569	1,646	1,563	1,61	0,051	3,165

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
La	(ng/g)	1	A80	PD03	DB10	35,7	42,1	38,7	43,4	39,98	3,471	8,683
			A71	PD02	DB10	63,84	60,88	60,88	61,62	61,81	1,401	2,266
La	(ng/g)	2	A80	PD03	DB10	34	35,8	33,2	35,5	34,63	1,234	3,564
			A71	PD02	DB10	58,23	61,54	63,52	64,98	62,07	2,921	4,706
La	(ng/g)	3	A80	PD03	DB10	59,3	61,4	54,5	59,4	58,65	2,931	4,997
			A71	PD02	DB10	100,8	104,1	107	104,7	104,15	2,559	2,457
La	(ng/g)	4	A80	PD03	DB10	51,4	76,7	52,7	50,9	57,93	12,540	21,648
			A71	PD02	DB10	95,03	93,1	99,4	109,8	99,33	7,459	7,510
Li	(µg/g)	1	A80	PD03	DB10	0,104	0,113	0,112	0,111	0,11	0,004	3,711
			A71	PD02	DB10	0,1441	0,1455	0,1369	0,1432	0,14	0,004	2,670
Li	(µg/g)	2	A80	PD03	DB10	0,159	0,155	0,149	0,153	0,15	0,004	2,703
			A71	PD02	DB10	0,178	0,1743	0,1768	0,1702	0,17	0,003	1,972
Li	(µg/g)	3	A80	PD03	DB10	0,106	0,107	0,102	0,106	0,11	0,002	2,107
			A71	PD02	DB10	0,1345	0,1249	0,1238	0,126	0,13	0,005	3,836
Li	(µg/g)	4	A80	PD03	DB10	0,0932	0,0889	0,0891	0,0865	0,09	0,003	3,109
			A71	PD02	DB10	0,0969	0,1004	0,0994	0,0989	0,10	0,001	1,488
Lu	(ng/g)	1	A71	PD02	DB10	0,265	0,248	0,237	0,229	0,24	0,016	6,368
Lu	(ng/g)	2	A71	PD02	DB10	0,316	0,348	0,318	0,362	0,34	0,023	6,752
Lu	(ng/g)	3	A71	PD02	DB10	0,414	0,427	0,43	0,426	0,42	0,007	1,660
Lu	(ng/g)	4	A71	PD02	DB10	0,405	0,397	0,394	0,399	0,40	0,005	1,165
Mo	(ng/g)	1	A60	PD01	DB10	210,9	228,8	234	182,7	214,10	23,154	10,814
			F07x	PD99	DB08	424,2	421,2	435,7	414,6	423,93	8,815	2,079
			A71	PD02	DB10	455,1	461,8	461,5	432,3	452,68	13,930	3,077
			F16x	PC01	DB10	460,4	467,3	450,1	456,6	458,60	7,192	1,568
			F13	PD01	DB10	477,6	526,3	437,9	432,6	468,60	43,393	9,260
			A80	PD03	DB10	456	471	464	512	475,75	24,932	5,240
			A36	PD02	DB10	492,8	474,8	487,5	475,2	482,58	9,012	1,867
			F32	PD01	DB10	489	532	532	436	497,25	45,588	9,168

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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	A60	PD01	DB10	139,6	257,1	199,1	171,8	191,90	49,807	25,955
			A71	PD02	DB10	311,1	320,6	319,1	324,9	318,93	5,767	1,808
			F07x	PD99	DB08	341,9	313,3	333,9	326,5	328,90	12,153	3,695
			F13	PD01	DB10	356,7	359,2	341,7	339,3	349,23	10,174	2,913
			A80	PD03	DB10	403	381	354	355	373,25	23,443	6,281
			A36	PD02	DB10	372,7	376,6	361,8	383,3	373,60	9,003	2,410
			F16x	PC01	DB10	382,4	358,3	397,7	370,8	377,30	16,787	4,449
			F32	PD01	DB10	370	412	370	381	383,25	19,856	5,181
Mo	(ng/g)	3	A60	PD01	DB10	<50	<50	<50	<50			
			F07x	PD99	DB08	48,02	47,45	52,86	51,49	49,96	2,634	5,273
			A71	PD02	DB10	59,85	59,05	52,65	52,95	56,13	3,855	6,869
			F13	PD01	DB10	71,1	68,2	69,8	71,5	70,15	1,489	2,122
			A36	PD02	DB10	74,73	70,92	73,78	73,46	73,22	1,627	2,222
			A80	PD03	DB10	77,1	83,8	75,4	80,6	79,23	3,740	4,721
			F16x	PC01	DB10	94,6	72,5	83,53	74,44	81,27	10,105	12,435
			F32	PD01	DB10	87,4	85,3	80	82,1	83,70	3,291	3,932
Mo	(ng/g)	4	A60	PD01	DB10	313,4	310,7	286,7	309,1	304,98	12,312	4,037
			A71	PD02	DB10	385,5	403,1	404,6	398,4	397,90	8,678	2,181
			A36	PD02	DB10	434,3	421,5	415,1	425,4	424,08	8,031	1,894
			F07x	PD99	DB08	422,8	413,3	433,1	438,7	426,98	11,246	2,634
			F13	PD01	DB10	442,7	423,2	427,1	428,7	430,43	8,503	1,976
			A80	PD03	DB10	443	444	440	450	444,25	4,193	0,944
			F16x	PC01	DB10	494,7	481,2	506,7	487,8	492,60	10,897	2,212
			F32	PD01	DB10	496	496	486	496	493,50	5,000	1,013
Na	(µg/g)	1	A79	PD03	DB99	<25	<25	<25	<25			
			F03x	PD02	DB08	<20	<20	<20	<20			
			F25x	PB06	DB08	14,25	13,31	12,38	13,02	13,24	0,777	5,872
			F07x	PD99	DB08	13,56	12,75	14,16	14,26	13,68	0,694	5,074
			F18x	PD99	DB08	13,7	15,9	14,7	13	14,33	1,261	8,800

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Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Na	(µg/g)	1	F16x	PC01	DB10	14,44	15,74	14,1	14,52	14,70	0,717	4,876
			A60x	PD01	DB10	16,3	15,71	13,15	16,85	15,50	1,636	10,553
			F05	PD02	DB08	19,3	16	17,7	17,4	17,60	1,354	7,693
			F14	PC01	DB08	21,1	18,4	17	17	18,38	1,933	10,519
			F24	PD01	DB99	17	19	20	21	19,25	1,708	8,872
			A36	PD02	DB08	19,51	20,38	21,05	19,88	20,21	0,667	3,299
			A39	PC02	DB08	22,36	20,86	21,95	20,84	21,50	0,772	3,590
			F27	PD01	DB06	19,08	19,6	30,86	18,67	22,05	5,884	26,682
			A65	PD01	DB08	18,9	21,3	23,4	24,8	22,10	2,573	11,642
			F28x	PD02	DB08	22,69	21,05	22,32	23,33	22,35	0,960	4,297
			F32x	PD01	DB08	27,6	29,3	26,4	26,4	27,43	1,372	5,003
			A71	PD02	DB10	43,9	44,29	44,22	43,82	44,06	0,232	0,527
Na	(µg/g)	2	A79	PD03	DB99	<25	<25	<25	<25			
			F03x	PD02	DB08	<20	<20	<20	<20			
			F18x	PD99	DB08	<10	<10	<10	<10			
			F14	PC01	DB08	<5	<5	<5	<5			
			F25x	PB06	DB08	4,11	5,53	4,51	4,46	4,65	0,611	13,143
			F07x	PD99	DB08	6,352	6,273	6,343	6,59	6,39	0,138	2,164
			A60x	PD01	DB10	6,84	7,48	6,78	7,28	7,10	0,340	4,791
			F16x	PC01	DB10	8,556	7,561	8,494	7,402	8,00	0,606	7,578
			A36	PD02	DB08	9,43	9,92	10,3	10,24	9,97	0,398	3,994
			F27	PD01	DB06	16,28	10,68	11,64	10,87	12,37	2,641	21,356
			A65	PD01	DB08	13,7	12,6	11,1	12,5	12,48	1,066	8,543
			F28x	PD02	DB08	12,49	13,6	13,07	12,23	12,85	0,612	4,766
			F05	PD02	DB08	16,5	16,9	15,7	14,4	15,88	1,103	6,946
			A39	PC02	DB08	16,65	15,54	15,98	15,95	16,03	0,459	2,866
			F32x	PD01	DB08	18,2	18,1	18,9	17,5	18,18	0,574	3,157
			F24	PD01	DB99	14	14	20	30	19,50	7,550	38,717
			A71	PD02	DB10	31,5	30,85	32,89	32,48	31,93	0,927	2,902

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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	A79	PD03	DB99	<25	<25	<25	<25			
			F14	PC01	DB08	12,9	12,2	12,2	12,3	12,40	0,337	2,715
			F07x	PD99	DB08	17,32	18,25	16,98	16,93	17,37	0,612	3,522
			F18x	PD99	DB08	17,8	17,2	17,4	19	17,85	0,806	4,517
			F05	PD02	DB08	17,3	18,7	18,6	17	17,90	0,876	4,892
			F16x	PC01	DB10	17,81	20,46	19,99	17,87	19,03	1,391	7,306
			A60x	PD01	DB10	25,16	20,23	19,31	18,74	20,86	2,932	14,054
			F03x	PD02	DB08	21,9	20,66	23,18	23,28	22,26	1,235	5,550
			F24	PD01	DB99	21	24	27	25	24,25	2,500	10,309
			A36	PD02	DB08	24,42	23,49	25,26	24,52	24,42	0,726	2,972
			A39	PC02	DB08	24,85	24,86	25,01	23,49	24,55	0,712	2,900
			A65	PD01	DB08	26,2	26,1	26,2	25,9	26,10	0,141	0,542
			F28x	PD02	DB08	25,55	28,26	27,25	26,04	26,78	1,221	4,560
			F32x	PD01	DB08	27,2	27,7	27	26,8	27,18	0,386	1,421
			F27	PD01	DB06	39,82	28,28	41,09	27,46	34,16	7,292	21,345
			F25x	PB06	DB08	33,27	35,29	35,86	33,16	34,40	1,383	4,021
			A71	PD02	DB10	47,23	49,12	48,76	47,74	48,21	0,878	1,821
Na	(µg/g)	4	A79	PD03	DB99	<25	<25	<25	<25			
			F03x	PD02	DB08	<20	<20	<20	<20			
			F16x	PC01	DB10	14,29	13,81	13,58	13,05	13,68	0,515	3,764
			F18x	PD99	DB08	14,5	13,3	14,3	13,6	13,93	0,568	4,078
			F07x	PD99	DB08	13,88	14,21	14,14	14,09	14,08	0,142	1,009
			F14	PC01	DB08	15,7	15,3	15,4	15,9	15,58	0,275	1,768
			F05	PD02	DB08	17,1	18,3	18,2	17,3	17,73	0,613	3,459
			F25x	PB06	DB08	17,99	20,68	17,85	15,07	17,90	2,291	12,801
			A60x	PD01	DB10	16,98	16,32	25,39	16,75	18,86	4,362	23,128
			A39	PC02	DB08	20,15	20,47	18,76	19,69	19,77	0,744	3,764
			A65	PD01	DB08	19,7	20,1	19,9	20,6	20,08	0,386	1,924
			A36	PD02	DB08	21,83	21,19	21,08	20,97	21,27	0,386	1,813

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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	F28x	PD02	DB08	22,52	20,9	21,03	20,63	21,27	0,850	3,995
			F24	PD01	DB99	19	23	26	23	22,75	2,872	12,625
			F32x	PD01	DB08	23	22,9	22,5	22,6	22,75	0,238	1,046
			F27	PD01	DB06	32,98	18,18	22,73	20,02	23,48	6,605	28,133
			A71	PD02	DB10	40,05	43,69	41,01	43,22	41,99	1,744	4,154
Nb	(ng/g)	1	A80	PD03	DB10	9,28	9,49	8,92	8,32	9,00	0,512	5,690
Nb	(ng/g)	2	A80	PD03	DB10	9,86	10,4	9,39	9,62	9,82	0,433	4,412
Nb	(ng/g)	3	A80	PD03	DB10	9,79	11,2	10,4	10,6	10,50	0,581	5,538
Nb	(ng/g)	4	A80	PD03	DB10	5,68	7,04	6,36	6,58	6,42	0,566	8,823
Nd	(ng/g)	1	A71	PD02	DB10	42,17	43,85	41,13	41,22	42,09	1,263	3,000
Nd	(ng/g)	2	A71	PD02	DB10	27,79	27,61	26	30,67	28,02	1,943	6,934
Nd	(ng/g)	3	A71	PD02	DB10	56,15	50,07	50,72	53,41	52,59	2,780	5,287
Nd	(ng/g)	4	A71	PD02	DB10	44,64	44,16	48,16	44,91	45,47	1,822	4,006
Pr	(ng/g)	1	A71	PD02	DB10	11,5	12,31	9,83	10,69	11,08	1,065	9,611
Pr	(ng/g)	2	A71	PD02	DB10	10,33	11,04	10,63	9,81	10,45	0,518	4,954
Pr	(ng/g)	3	A71	PD02	DB10	16,89	15,08	16,47	16,16	16,15	0,774	4,790
Pr	(ng/g)	4	A71	PD02	DB10	13,23	12,57	12,09	13,45	12,84	0,622	4,844
Rb	(µg/g)	1	F16x	PC01	DB10	6,498	6,261	6,498	6,428	6,42	0,112	1,741
			A71	PD02	DB10	6,644	6,629	6,423	6,302	6,50	0,166	2,552
			A80	PD03	DB10	6,96	7,05	6,87	7,05	6,98	0,086	1,234
Rb	(µg/g)	2	F16x	PC01	DB10	4,829	5,215	4,698	4,972	4,93	0,221	4,491
			A71	PD02	DB10	4,808	5,137	5,155	5,272	5,09	0,199	3,911
			A80	PD03	DB10	5,08	5,2	5,22	5,16	5,17	0,062	1,199
Rb	(µg/g)	3	A71	PD02	DB10	61,18	60,56	60,78	60,97	60,87	0,265	0,435
			F16x	PC01	DB10	55,82	56,46	67,35	64,31	60,99	5,736	9,406
			A80	PD03	DB10	62,5	62,3	61,6	62,4	62,20	0,408	0,656
Rb	(µg/g)	4	A71	PD02	DB10	23,664	23,485	23,633	23,49	23,57	0,094	0,398
			F16x	PC01	DB10	22,28	25,73	22,15	25,17	23,83	1,882	7,899
			A80	PD03	DB10	25,4	25,4	24,9	24,8	25,13	0,320	1,274

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Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Sa	(ng/g)	1	A71	PD02	DB10	8,608	8,948	8,478	8,555	8,65	0,207	2,399
Sa	(ng/g)	2	A71	PD02	DB10	8,13	8,311	8,176	8,569	8,30	0,197	2,377
Sa	(ng/g)	3	A71	PD02	DB10	11,8	11,02	11,62	11,4	11,46	0,336	2,931
Sa	(ng/g)	4	A71	PD02	DB10	12,53	11,13	12,37	10,57	11,65	0,954	8,188
Sb	(ng/g)	1	F16x	PC01	DB10	16,4	16,24	15,7	16,06	16,10	0,301	1,867
			F32	PD01	DB10	19,8	20,6	18,7	17,9	19,25	1,190	6,183
			A79	PD03	DB10	18,7	20	19,9	19,1	19,43	0,629	3,239
			A71	PD02	DB10	28,37	29,71	27,89	26,78	28,19	1,214	4,307
			A80	PD03	DB10	74,3	35,6	44,4	23,4	44,43	21,698	48,843
Sb	(ng/g)	2	A71	PD02	DB10	52,18	48,29	50,97	51,78	50,81	1,751	3,446
			F16x	PC01	DB10	57,53	64,53	53,74	61,29	59,27	4,667	7,875
			A79	PD03	DB10	58,8	60,4	60,6	59,3	59,78	0,866	1,448
			F32	PD01	DB10	62,4	66,6	62,4	63,4	63,70	1,990	3,124
			A80	PD03	DB10	110	105	72,5	70,4	89,48	20,931	23,393
Sb	(ng/g)	3	A79	PD03	DB10	11,3	10,9	12,2	11,2	11,40	0,560	4,910
			F16x	PC01	DB10	13,99	11,36	13,96	12,33	12,91	1,292	10,008
			F32	PD01	DB10	17,1	18,1	19,2	17,1	17,88	1,001	5,601
			A71	PD02	DB10	22,54	23,6	23,08	23,82	23,26	0,572	2,457
			A80	PD03	DB10	27,7	28,6	23,7	25,3	26,33	2,237	8,496
Sb	(ng/g)	4	A79	PD03	DB10	3,7	3,7	4,2	4,1	3,93	0,263	6,701
			F16x	PC01	DB10	3,824	4,733	4,013	4,76	4,33	0,484	11,180
			F32	PD01	DB10	6,55	5,6	5,91	5,91	5,99	0,399	6,664
			A71	PD02	DB10	9,113	7,881	7,799	9,154	8,49	0,748	8,811
			A80	PD03	DB10	14,6	11	7,75	6,19	9,89	3,728	37,710
Se	(ng/g)	1	F32	PD01	DB04	<30	<30	<30	<30			
			A82	PD01	DB10	9,346	12,25	13,67	11,21	11,62	1,820	15,665
			A36	PD02	DB10	12,69	15,99	14,07	13,86	14,15	1,367	9,660
			F16x	PC01	DB10	19,49	20,81	20,85	21,11	20,57	0,729	3,544
			A80	PD03	DB10	31,3	29,9	30,7	30,3	30,55	0,597	1,955

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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)	2	F32	PD01	DB04	<30	<30	<30	<30			
			A82	PD01	DB10	21,61	22,32	25,33	23,27	23,13	1,615	6,982
			A36	PD02	DB10	29,46	27,76	27,87	27,23	28,08	0,961	3,424
			F16x	PC01	DB10	33,16	28,15	35,86	31,74	32,23	3,211	9,963
			A80	PD03	DB10	47,1	43,3	39	43,8	43,30	3,326	7,681
Se	(ng/g)	3	F32	PD01	DB04	<30	<30	<30	<30			
			A82	PD01	DB10	19,26	38,59	15,97	22,16	24,00	10,053	41,897
			A36	PD02	DB10	27,59	28,33	25,58	25,05	26,64	1,572	5,900
			A80	PD03	DB10	28,8	33,2	30,6	31,2	30,95	1,814	5,861
			F16x	PC01	DB10	41,15	55,31	39,58	49,63	46,42	7,391	15,924
Se	(ng/g)	4	F32	PD01	DB04	<30	<30	<30	<30			
			A82	PD01	DB10	<7,68	<7,68	<7,68	<7,68			
			A36	PD02	DB10	6,53	6,1	5,46	5,46	5,89	0,524	8,899
			A80	PD03	DB10	14,6	18	15,4	12,2	15,05	2,391	15,887
			F16x	PC01	DB10	27,9	36,78	34,58	27,59	31,71	4,670	14,727
Sn	(ng/g)	1	F16x	PC01	DB10	45,41	45,49	31,99	33,94	39,21	7,252	18,497
			A80	PD03	DB10	83,6	107	85,7	57,7	83,50	20,189	24,178
			A71	PD02	DB10	122,7	126,4	135,5	135,3	129,98	6,444	4,958
Sn	(ng/g)	2	F16x	PC01	DB10	143	145,4	129,6	144,1	140,53	7,349	5,230
			A71	PD02	DB10	211,6	226,9	229,2	219,7	221,85	7,942	3,580
			A80	PD03	DB10	276	322	191	192	245,25	64,845	26,441
Sn	(ng/g)	3	F16x	PC01	DB10	59,25	51,03	45,35	42,2	49,46	7,481	15,127
			A80	PD03	DB10	86,8	80,1	69,1	69,6	76,40	8,590	11,244
			A71	PD02	DB10	126,9	129,4	114,8	118,9	122,50	6,812	5,561
Sn	(ng/g)	4	F16x	PC01	DB10	11,1	11,14	14,52	14,92	12,92	2,085	16,137
			A80	PD03	DB10	31,5	34,3	29,7	19,3	28,70	6,546	22,809
			A71	PD02	DB10	60,69	61,09	61,16	58,31	60,31	1,351	2,240

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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	15,98	16,2	16,43	16,21	16,21	0,184	1,134
			F16x	PC01	DB10	16,59	16,48	16,39	15,48	16,24	0,510	3,141
			A80	PD03	DB10	17,4	17,8	17,8	18	17,75	0,252	1,418
			A39	PC02	DB08	17,24	18,56	17,83	17,45	17,77	0,581	3,267
			A60	PD01	DB10	18,05	18,52	17,69	17,73	18,00	0,384	2,132
			A65	PD01	DB08	17,5	19,3	18	19,7	18,63	1,044	5,603
Sr	(µg/g)	2	A71	PB03	DB02	2,87	2,88	2,84	2,89	2,87	0,022	0,753
			F16x	PC01	DB10	3,235	3,394	3,279	3,313	3,31	0,067	2,034
			A39	PC02	DB08	3,626	3,45	3,44	3,427	3,49	0,094	2,696
			A80	PD03	DB10	3,54	3,49	3,5	3,45	3,50	0,037	1,058
			A60	PD01	DB10	3,489	3,571	3,456	3,572	3,52	0,059	1,667
			A65	PD01	DB08	3,6	3,6	3,5	3,7	3,60	0,082	2,268
Sr	(µg/g)	3	A39	PC02	DB08	19,27	19,86	19,53	19,63	19,57	0,244	1,249
			A71	PB03	DB02	19,99	19,99	20,3	20,34	20,16	0,191	0,949
			F16x	PC01	DB10	21,2	22,4	19,99	20,06	20,91	1,136	5,433
			A65	PD01	DB08	20,9	21,3	21,9	21	21,28	0,450	2,115
			A60	PD01	DB10	21,82	21,75	22,42	23,22	22,30	0,682	3,056
			A80	PD03	DB10	22,2	22	22,2	22,9	22,33	0,395	1,768
Sr	(µg/g)	4	A71	PB03	DB02	27,92	28,84	28,81	27,17	28,19	0,800	2,838
			F16x	PC01	DB10	30,69	31,52	28,95	29,14	30,08	1,239	4,120
			A39	PC02	DB08	29,7	31,5	29,98	30,07	30,31	0,807	2,663
			A65	PD01	DB08	31,5	31,3	31,4	31	31,30	0,216	0,690
			A80	PD03	DB10	31,8	31,9	31	31,5	31,55	0,404	1,281
			A60	PD01	DB10	32,13	31,77	32,99	31,44	32,08	0,667	2,080
Tb	(ng/g)	1	A71	PD02	DB10	1,043	1,186	1,096	1,088	1,10	0,060	5,429
Tb	(ng/g)	2	A71	PD02	DB10	0,784	0,823	0,908	0,97	0,87	0,084	9,613
Tb	(ng/g)	3	A71	PD02	DB10	1,496	1,582	1,525	1,509	1,53	0,038	2,481
Tb	(ng/g)	4	A71	PD02	DB10	1,156	1,092	1,04	1,094	1,10	0,047	4,332

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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	PD03	DB10	2,79	3,13	2,83	2,51	2,82	0,254	9,013
			A39	PC02	DB08	3,278	3,299	3,283	3,527	3,35	0,120	3,601
			A65	PD01	DB08	8,2	4,4	4,4	5,9	5,73	1,795	31,356
			A71	PD02	DB10	8,972	8,913	8,826	8,731	8,86	0,105	1,186
Ti	(µg/g)	2	A80	PD03	DB10	2,18	2,15	2,08	2,22	2,16	0,059	2,739
			A39	PC02	DB08	3,192	3,254	3,198	3,202	3,21	0,029	0,891
			A65	PD01	DB08	3,8	3,4	3,3	3,3	3,45	0,238	6,900
			A71	PD02	DB10	6,545	6,911	6,973	7,131	6,89	0,248	3,599
Ti	(µg/g)	3	A80	PD03	DB10	2,48	2,6	2,5	2,62	2,55	0,070	2,754
			A39	PC02	DB08	3,585	3,575	3,364	3,384	3,48	0,119	3,431
			A65	PD01	DB08	3,9	3,9	3,5	3,5	3,70	0,231	6,242
			A71	PD02	DB10	9,363	9,603	8,042	9,02	9,01	0,686	7,620
Ti	(µg/g)	4	A80	PD03	DB10	2,28	2,76	2,74	3,21	2,75	0,380	13,822
			A65	PD01	DB08	3,3	3,3	3,5	3,8	3,48	0,236	6,800
			A39	PC02	DB08	3,649	3,795	3,546	3,762	3,69	0,113	3,076
			A71	PD02	DB10	8,655	7,872	8,321	8,312	8,29	0,321	3,874
Tl	(ng/g)	1	A80	PD03	DB10	5,25	4,93	5,16	5,39	5,18	0,193	3,726
			A36	PD02	DB10	5,44	5,76	5,44	5,86	5,63	0,217	3,866
			F16x	PC01	DB10	5,757	5,704	5,808	5,808	5,77	0,050	0,861
			A82	PD01	DB10	5,451	5,904	6,125	5,94	5,86	0,286	4,888
			F32	PD01	DB10	5,96	5,85	6,06	5,85	5,93	0,101	1,703
			A79	PD03	DB10	6,2	6	5,7	5,9	5,95	0,208	3,499
			F13x	PD01	DB10	6,091	6,038	6,164	5,962	6,06	0,085	1,406
			A60	PD01	DB10	5,888	6,1	6,465	6,747	6,30	0,382	6,057
Tl	(ng/g)	2	A80	PD03	DB10	5,37	4,98	5,35	4,86	5,14	0,259	5,036
			A82	PD01	DB10	5,127	5,565	5,324	5,33	5,34	0,179	3,357
			F32	PD01	DB10	5,92	5,6	5,92	5,6	5,76	0,185	3,208
			A36	PD02	DB10	5,93	5,93	6,04	5,62	5,88	0,181	3,077
			A79	PD03	DB10	5,8	5,9	5,9	6	5,90	0,082	1,384

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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)	2	A60	PD01	DB10	5,901	6,681	5,645	5,778	6,00	0,465	7,750
			F16x	PC01	DB10	6,295	5,887	6,31	5,923	6,10	0,230	3,769
			F13x	PD01	DB10	6,393	6,202	6,377	6,412	6,35	0,097	1,529
Tl	(ng/g)	3	A80	PD03	DB10	2,8	2,91	3,03	2,91	2,91	0,094	3,225
			A82	PD01	DB10	3,352	3,285	3,464	3,4	3,38	0,076	2,242
			A36	PD02	DB10	3,7	3,81	3,7	3,59	3,70	0,090	2,427
			A79	PD03	DB10	3,6	3,8	3,7	3,9	3,75	0,129	3,443
			F13x	PD01	DB10	3,778	3,794	3,768	3,71	3,76	0,037	0,973
			A60	PD01	DB10	3,662	3,646	3,911	4,033	3,81	0,190	4,992
			F32	PD01	DB10	4,05	3,94	3,94	3,94	3,97	0,055	1,386
			F16x	PC01	DB10	4,469	3,761	4,596	3,763	4,15	0,448	10,799
Tl	(ng/g)	4	A82	PD01	DB10	28,1	27,8	27,18	28,99	28,02	0,753	2,688
			A36	PD02	DB10	28,46	29,64	28,46	28,04	28,65	0,689	2,405
			F13x	PD01	DB10	29,868	30,87	29,987	29,687	30,10	0,526	1,747
			A79	PD03	DB10	29,5	30,4	29,8	30,8	30,13	0,585	1,943
			A80	PD03	DB10	29,9	30	30,3	30,4	30,15	0,238	0,790
			F16x	PC01	DB10	29,95	35,19	29,9	33,22	32,07	2,599	8,105
			A60	PD01	DB10	33,4	33,34	34,71	29,78	32,81	2,115	6,447
			F32	PD01	DB10	35,9	34,9	35,9	34,9	35,40	0,577	1,631
Tm	(ng/g)	1	A71	PD02	DB10	0,376	0,328	0,333	0,326	0,34	0,024	6,950
Tm	(ng/g)	2	A71	PD02	DB10	0,426	0,38	0,367	0,418	0,40	0,029	7,212
Tm	(ng/g)	3	A71	PD02	DB10	0,582	0,535	0,589	0,595	0,58	0,027	4,755
Tm	(ng/g)	4	A71	PD02	DB10	0,521	0,562	0,553	0,591	0,56	0,029	5,177
U	(ng/g)	1	A80	PD03	DB10	2,01	2,66	1,92	1,95	2,14	0,352	16,487
			F16x	PC01	DB10	1,93	2,124	2,217	2,308	2,14	0,162	7,538
			A71	PD02	DB10	3,873	3,363	3,889	3,669	3,70	0,245	6,626
U	(ng/g)	2	A80	PD03	DB10	3,23	3,28	3,06	3,2	3,19	0,094	2,954
			A71	PD02	DB10	3,535	3,302	3,124	3,747	3,43	0,272	7,929
			F16x	PC01	DB10	4,194	3,35	3,515	3,362	3,61	0,400	11,084

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Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
U	(ng/g)	3	A80	PD03	DB10	3,33	3,28	4,34	3,46	3,60	0,497	13,809
			A71	PD02	DB10	3,85	4,155	4,028	4,255	4,07	0,175	4,291
			F16x	PC01	DB10	3,887	4,735	4,408	3,618	4,16	0,503	12,097
U	(ng/g)	4	A80	PD03	DB10	<1	<1	<1	<1			
			F16x	PC01	DB10	0,8099	0,9345	0,8462	0,8837	0,87	0,053	6,135
			A71	PD02	DB10	1,144	0,956	1,16	0,987	1,06	0,105	9,906
V	(µg/g)	1	A39	PC02	DB08	0,1041	0,1086	0,1125	0,1038	0,11	0,004	3,852
			F33	PC01	DB10	0,108	0,111	0,109	0,12	0,11	0,005	4,890
			A79	PD03	DB10	0,114	0,1101	0,1112	0,1181	0,11	0,004	3,147
			A80	PD03	DB10	0,122	0,131	0,121	0,12	0,12	0,005	4,102
			F16x	PC01	DB10	0,1332	0,129	0,1332	0,1312	0,13	0,002	1,521
			A60x	PD01	DB10	0,1309	0,2059	0,1349	0,094	0,14	0,047	33,063
			F13	PD01	DB10	0,1535	0,1619	0,1353	0,1352	0,15	0,013	9,153
			F32	PD01	DB10	0,17	0,17	0,181	0,16	0,17	0,009	5,039
			A71	PD02	DB10	0,3371	0,3558	0,3505	0,3475	0,35	0,008	2,264
V	(µg/g)	2	F33	PC01	DB10	0,086	0,09	0,088	0,087	0,09	0,002	1,946
			A79	PD03	DB10	0,0788	0,0818	0,0977	0,0977	0,09	0,010	11,371
			A60x	PD01	DB10	0,0973	0,0852	0,1147	0,1009	0,10	0,012	12,201
			A39	PC02	DB08	0,0984	0,1038	0,1002	0,106	0,10	0,003	3,364
			A80	PD03	DB10	0,113	0,112	0,114	0,111	0,11	0,001	1,148
			F16x	PC01	DB10	0,1075	0,1228	0,1179	0,1186	0,12	0,007	5,573
			F13	PD01	DB10	0,1257	0,1255	0,1148	0,1144	0,12	0,006	5,290
			F32	PD01	DB10	0,137	0,137	0,137	0,127	0,13	0,005	3,717
			A71	PD02	DB10	0,3098	0,3013	0,3143	0,3019	0,31	0,006	2,057
V	(µg/g)	3	A79	PD03	DB10	0,0977	0,0995	0,099	0,0945	0,10	0,002	2,302
			A39	PC02	DB08	0,1014	0,0969	0,096	0,1021	0,10	0,003	3,123
			F33	PC01	DB10	0,109	0,104	0,116	0,118	0,11	0,006	5,770
			A60x	PD01	DB10	0,1356	0,0965	0,1139	0,1158	0,12	0,016	13,856
			A80	PD03	DB10	0,118	0,124	0,12	0,126	0,12	0,004	2,993

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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)	3	F16x	PC01	DB10	0,129	0,1542	0,127	0,1514	0,14	0,014	10,247
			F13	PD01	DB10	0,1411	0,1404	0,1405	0,1425	0,14	0,001	0,685
			F32	PD01	DB10	0,145	0,146	0,146	0,148	0,15	0,001	0,860
			A71	PD02	DB10	0,2613	0,2655	0,2725	0,2663	0,27	0,005	1,734
V	(µg/g)	4	F33	PC01	DB10	1,07	0,996	1,056	1,051	1,04	0,033	3,116
			A60x	PD01	DB10	1,183	1,12	1,049	1,083	1,11	0,057	5,174
			A80	PD03	DB10	1,06	1,12	1,12	1,17	1,12	0,045	4,027
			A79	PD03	DB10	1,135	1,15	1,156	1,133	1,14	0,011	0,986
			F16x	PC01	DB10	1,124	1,231	1,139	1,215	1,18	0,054	4,551
			F13	PD01	DB10	1,168	1,181	1,231	1,17	1,19	0,030	2,489
			F32	PD01	DB10	1,24	1,22	1,19	1,2	1,21	0,022	1,829
			A39	PC02	DB08	1,167	1,254	1,209	1,249	1,22	0,041	3,322
			A71	PD02	DB10	1,282	1,341	1,306	1,292	1,31	0,026	1,976
W	(ng/g)	1	A80	PD03	DB10	7,41	9,97	7,5	9,24	8,53	1,277	14,972
W	(ng/g)	2	A80	PD03	DB10	22	22,3	19,5	19,7	20,88	1,480	7,088
W	(ng/g)	3	A80	PD03	DB10	9,37	11,4	8,28	7,53	9,15	1,682	18,398
W	(ng/g)	4	A80	PD03	DB10	10,9	11,2	9,52	9,15	10,19	1,009	9,900
Y	(ng/g)	1	A80	PD03	DB10	19,3	21,3	19,9	19,1	19,90	0,993	4,992
			A71	PD02	DB10	28,82	28,09	28,33	26,38	27,91	1,061	3,802
Y	(ng/g)	2	A80	PD03	DB10	20,4	19,3	18,4	19,1	19,30	0,829	4,294
			A71	PD02	DB10	24,86	26,83	25,21	28,49	26,35	1,666	6,324
Y	(ng/g)	3	A80	PD03	DB10	46,2	47	44,5	46,1	45,95	1,047	2,279
			A71	PD02	DB10	58,95	62,05	62,26	59,42	60,67	1,728	2,847
Y	(ng/g)	4	A71	PD02	DB10	59,1	60,63	59,38	60,46	59,89	0,765	1,278
			A80	PD03	DB10	83	56	51,5	52,8	60,83	14,904	24,503
Yb	(ng/g)	1	A71	PD02	DB10	2,058	2,033	2,037	1,911	2,01	0,067	3,321
Yb	(ng/g)	2	A71	PD02	DB10	2,805	3,029	2,962	2,957	2,94	0,095	3,223
Yb	(ng/g)	3	A71	PD02	DB10	3,95	3,848	3,473	3,753	3,76	0,205	5,461
Yb	(ng/g)	4	A71	PD02	DB10	2,917	3,006	2,971	3,226	3,03	0,136	4,478

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