ISBN 978-3-903258-20-4

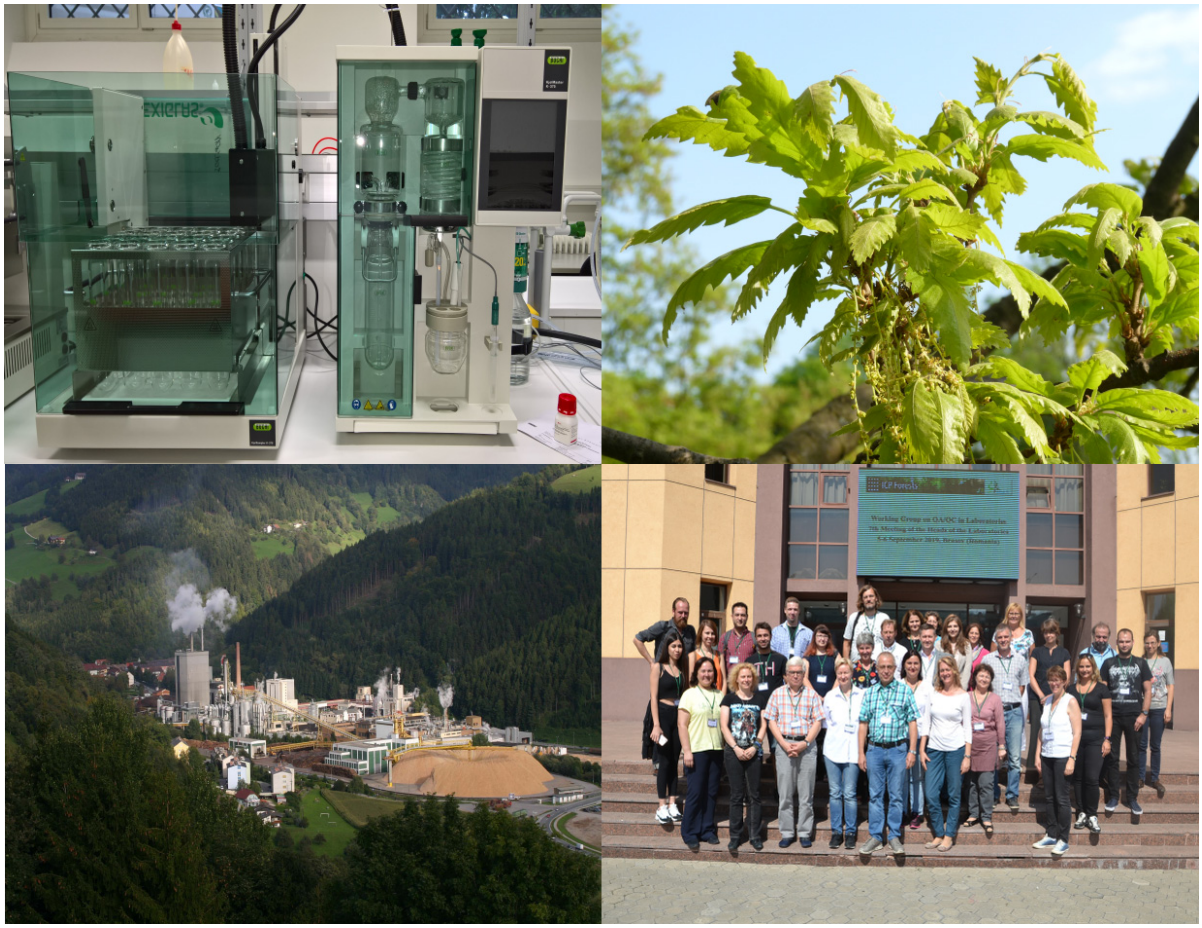
ICP Forests

International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP-Forests)

Technical Report QA-RFoliar20

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Alfred Fürst



Federal Research and Training Centre for Forests, Natural Hazards and Landscape
Forest Foliar Co-ordinating Centre
Seckendorff-Gudent-Weg 8
A-1131 Vienna/Austria

ISBN: 978-3-903258-20-4

Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape
Forest Foliar Co-ordinating Centre
Seckendorff-Gudent Weg 8
A-1131 Wien

Phone: +431-87838-1114
Fax: +431-87838-1250

URL: http://www.ffcc.at
e-Mail: alfred.fuerst@bfw.gv.at

Cover photos by Alfred Fürst

TABLE OF CONTENTS

1 INTRODUCTION

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

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

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

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

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

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

2 TASK, MATERIAL, PARTICIPANTS AND EVALUATION

2.1 Task

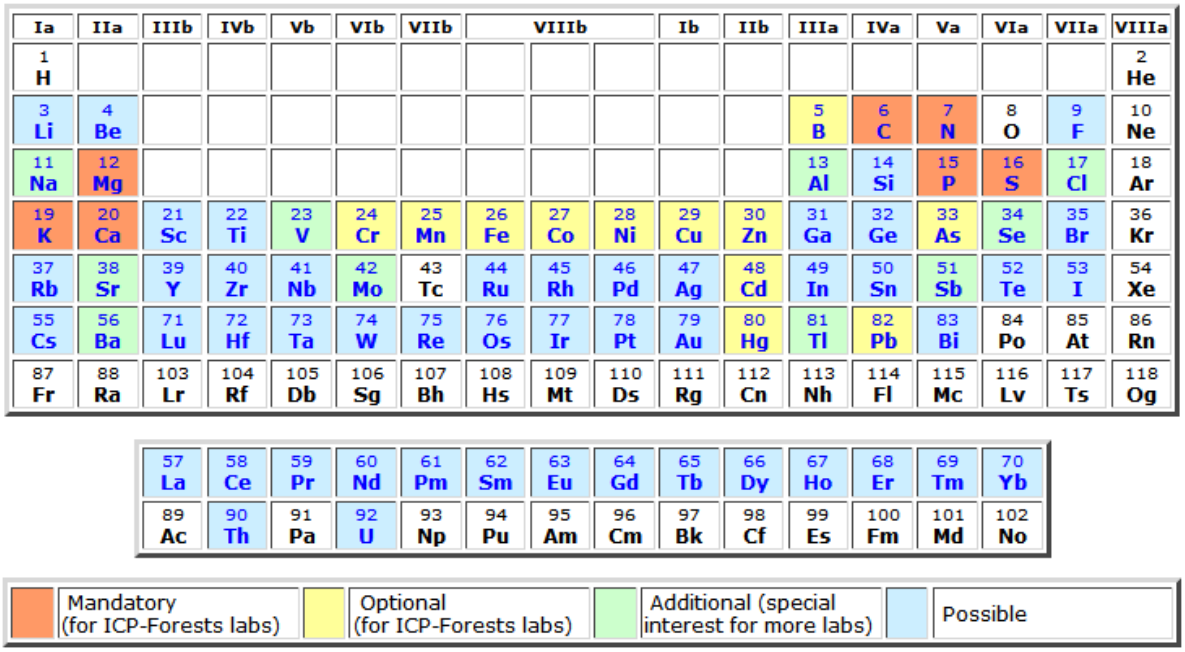
The Forest Foliar Co-ordinating Centre established the following timetable:

- Information of the participating labs (March 2019)
- Registration of the participants via internet (1st July 2019)
- Submission of the ring test samples (July 2019)
- Submission of the results from the labs (October-December 2019)
- Deadline of data input (1st January 2020)
- Evaluation according to DIN 38402-42:2005-09 (January 2020)
- Submission of the final report and the online qualification reports (February 2020)
- Re-qualification process finished (1st September 2020)

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

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

Figure 1: Possible elements



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

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

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

For a deeper evaluation - all participant laboratories had to answer a questionnaire to get more information about the status of their quality control systems, about their instrumentation, about their sample number/year and about their methodical knowledge. *ICP-Forests laboratories* had to mark all parameters, if the plan to analyse and submit monitoring results to ICP-FORESTS PCC from the growing season 2018.

2.2 Material

In July 2019 the Austrian Federal Research Centre for Forests, Natural Hazards and Landscape (BFW) sent out four dried and powdered plant samples to 48 laboratories in 24 countries.

The samples consisted of:

1. Spruce needles (France) - same sample like in the 18th Test (Sample 4)
2. Ash leaves (Austria)
3. Quercus robur leaves (Austria)
4. Spruce needles (Germany)

Sample 1 was collected and prepared from INRA in France. **Sample 2** and **Sample 3** were collected from BFW in Austria. **Sample 4** was collected from Saxon Public Enterprise-Sachsenforst in Germany.

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

2.3 Participants

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

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

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

Four of the participating laboratories didn't send any results till the end of the deadline (A49, A61, A83 and A87). With a few exceptions, all other laboratories analysed the complete list of mandatory elements in the 22nd 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 2019 and these results will be sent to PCC in 2020 ("*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	X			X	X	X	X		X										
A43																			
A45	X	X	X	X	X	X	X	X	X	X	X						X		
A47	X	X	X	X	X	X	X	X	X	X	X			X					
A51																			
A56																			
A57																			
A58	X	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		X
A62			X	X	X														
A65																			
A79																			
A80																			
A82																			
A85	X	X	X	X	X	X	X												
A86																			
A88																			
A93																			
F01	X		X	X	X	X													
F02	X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
F03																			
F05	X	X	X	X	X	X	X	X	X	X									
F06	X	X	X	X	X	X	X	X	X	X	X	X	X						
F07	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
F08	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
F12	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X		X
F13	X	X	X	X	X	X	X	X	X	X	X	X	X						
F14																			
F15	X	X	X	X	X	X	X	X	X	X	X	X	X						
F16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
F18	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	
F19	X	X	X	X	X	X	X	X	X	X	X								
F21	X	X	X	X	X	X	X	X	X		X								
F24	X		X	X	X	X	X												
F25	X	X	X	X	X	X	X			X	X								
F26	X		X	X	X	X		X	X	X	X								
F27	X	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	X		X	X
F33	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			X

2.4 Data Evaluation

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

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

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

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

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

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

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

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

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

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

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

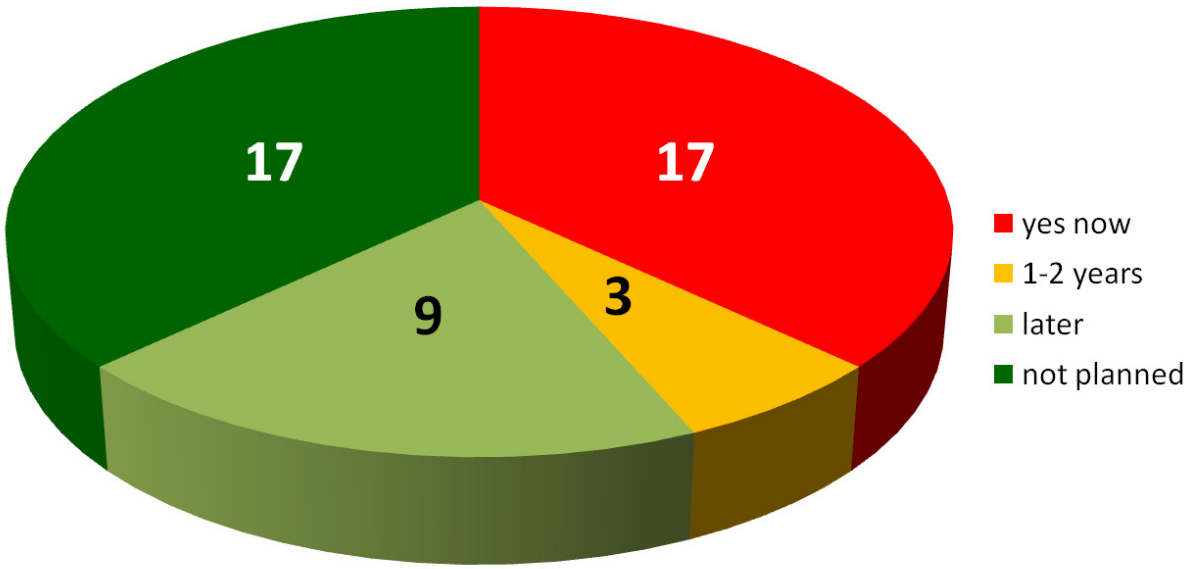
3 RESULTS

3.1 Main results of the questionnaire

All participating laboratories should answer a questionnaire in order to obtain information about the status and changes of their quality control systems and their instrumentation. 46 of the 47 laboratories submitted this questionnaire.

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

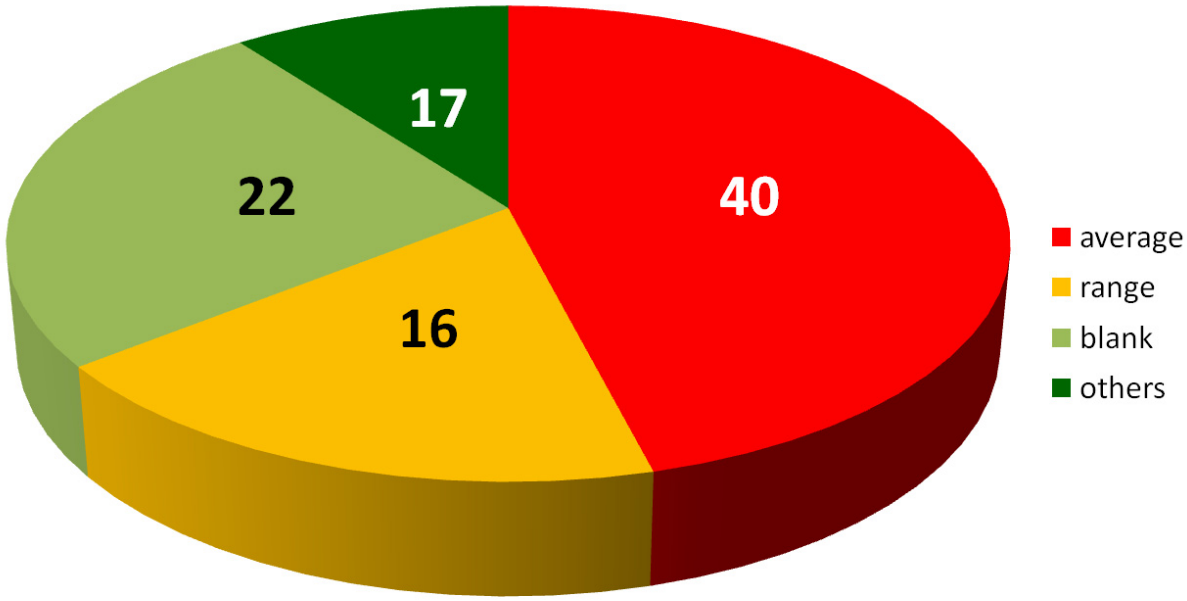
Figure 2: Accreditation status according EN 17025 (n=46)



43.5% of the laboratories are accredited now (17 labs) or plan an accreditation within 1-2 years (3 labs) - 17 laboratories 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). 93.5% of these 46 laboratories (say that they) are using control charts, and most of them are using average control chart – 3 of this 46 laboratories are still using no control chart. Some of the laboratories are using more than one type of control charts (see Figure 3).

Figure 3: Types of control charts used in foliar laboratories



3.2 Results of the 22nd Interlaboratory Comparison Test

Table 6 gives an overview which laboratories analysed the test samples well and which laboratory encountered quality problems. This evaluation is based on the tolerable limits from table 3 and table 4 and on the maximum acceptable limit of quantification (LOQ) from table 5. A green marked field means all samples are analysed well, a grey marked field means no results were sent from this laboratory till 1st of January 2020. The red marked "<" or ">" mean number of results lower or higher the tolerable limits.

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

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

A85 (75.0%), **A62** (62.5%), **A88** (33.8%), **A60** (18.6%) and **A43** (8.3%).

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

Table 6: Results of the 22nd Needle/Leaf Interlaboratory Comparison Test – results marked with the limits from tables 3 and 4 (green = all samples were analysed well; < = too low; > = too high; grey = no results were submitted) and with the maximum acceptable LOQ from table 5 (L = too high LOQ)

Labcode	N	S	P	Ca	Mg	K	C	Zn	Mn	Fe	Cu	Pb	Cd	B	As	Cr	Co	Hg	Ni
A36	>																		
A39			>	>		>									<				
A42																			
A43	<<		>>>>	>>>>	>>>>	>>>>			>>>>										
A45																			
A47												>>		>>>					
A51		>>																	<
A56		<						>											
A57										>									
A58		<<		>>				>											
A59	<						<<<<	>											
A60		>>>>	>>>>	>>>>	>>>>	>>>>		>>>>	>>>>	>>>>	>>>>	>	>>	>>>>	>>>>	>	>>		>>>
A62			<	<	<<<	>													
A65												>>>				L			LLL
A79		>>																	
A80									>										
A82						<<<									>>>>				
A85	>	<>		>>		<<													
A86	<<																		
A88			<<<<	<<<<	<<<<	<<<<		<<<<	<<<<	<	<<<<	LLL			>>>>	<	LL	LL	LLLL
A93																			
F01				<															
F02												>>							>>
F03																			
F05												>	>						
F06												>	>>						
F07		<									>	>		<<<<	>>>>		<		
F08						<		<	<	<	>L				<			<<	>
F12	<																		
F13																			
F14																			
F15												>LL	LL						
F16											>								>
F18																			
F19																			
F21		>																	
F24									>>>		>>								>>>
F25											>								
F26				>	>			<>											
F27		<			<					>>							>>		
F28											>>								
F32																			
F33										>									

The following mean element concentrations were found in the test samples and the percentage of the laboratory results out of the tolerable limits are provided in table 7.
Sample 1 had a too low concentration for Cr, sample 2 for Pb, Cd, Cr, Co and Hg and sample 3 for Cd and Co. Consequently, their results were excluded from the evaluation.

In general was the concentration of the used samples for Pb, Cd, As, Co and Ni lower than in the last test. This explains the higher amount of non-tolerable results for these parameters.

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

Element	Unit	Sample 1 *Spruce needles*	Sample 2 *Ash leaves*	Sample 3 *Quercus robur*	Sample 4 *Spruce needles*
N	**mg/g**	13.41	23.32	18.74	11.53
	%	7.69	5.13	0.00	7.69
S	**mg/g**	0.92	2.98	1.25	0.96
	%	8.57	14.29	11.43	11.43
P	**mg/g**	1.46	2.87	2.49	1.01
	%	7.69	10.26	7.69	10.26
Ca	**mg/g**	4.15	13.82	16.18	6.73
	%	12.50	12.50	15.00	10.00
Mg	**mg/g**	0.84	2.94	1.51	1.27
	%	10.00	10.00	10.00	12.50
K	**mg/g**	5.89	16.53	7.34	3.58
	%	12.50	10.00	12.50	15.00
C	**g/100g**	52.14	47.72	50.94	51.30
	%	2.86	2.86	2.86	2.86
Zn	**µg/g**	30.62	26.98	19.49	40.17
	%	8.57	8.57	11.43	11.43
Mn	**µg/g**	860.51	26.53	42.05	169.30
	%	8.11	13.51	8.11	13.51
Fe	**µg/g**	98.72	38.88	103.79	117.00
	%	8.33	13.89	2.78	2.78
Cu	**µg/g**	2.60	7.37	6.81	2.83
	%	17.65	5.88	5.88	20.59
Pb	**µg/g**	*0.21*	*0.101*	*0.39*	0.80
	%	28.00	---	20.00	20.00
Cd	**ng/g**	26.40	*3.57*	*16.45*	23.39
	%	16.67	---	---	12.50
B	**µg/g**	9.36	12.74	38.54	21.25
	%	14.29	14.29	9.52	14.29
As	**ng/g**	*44.14*	*40.01*	*35.41*	161.14
	%	33.33	33.33	33.33	41.67
Cr	**µg/g**	*0.22*	*0.18*	*0.88*	3.20
	%	---	---	4.17	8.33
Co	**µg/g**	0.12	*0.034*	*0.039*	*0.062*
	%	25.00	---	---	18.75
Hg	**ng/g**	*44.00*	*4.65*	*23.53*	*45.67*
	%	14.29	---	14.29	0.00
Ni	**µg/g**	*0.79*	*0.94*	*0.70*	1.85
	%	24.00	16.00	12.00	20.00

3.3 Comparison between of the 22nd Interlaboratory Comparison Test with former tests

Sample 4 of the 18th Interlaboratory Comparison Test and sample 1 of the 22nd Interlaboratory Comparison Test are identical (*Spruce needles - France*). For most of the elements the mean values are identical (see Table 8). The results are well comparable and the composition of the sample is stable.

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

Table 8: Comparison between the 18th and 22snd Interlaboratory Comparison Test

Element (Unit)	18th Interlaboratory Comparison Test 2015/16 (Sample 4) Mean	Number of Labs	22nd Interlaboratory Comparison Test 2019/20 (Sample 1) Mean	Number of Labs
N mg/g	13.37	*41*	13.41	*39*
S mg/g	0.93	*39*	0.92	*35*
P mg/g	1.47	*42*	1.46	*39*
Ca mg/g	4.19	*44*	4.15	*40*
Mg mg/g	0.83	*44*	0.84	*40*
K mg/g	5.81	*45*	5.89	*40*
C g/100g	51.88	*37*	52.14	*35*
Zn µg/g	30.95	*37*	30.62	*35*
Mn µg/g	875.0	*37*	860.5	*37*
Fe µg/g	100.8	*37*	98.72	*36*
Cu µg/g	2.68	*36*	2.60	*34*
Pb µg/g	0.18	*25*	0.21	*25*
Cd ng/g	27.32	*28*	26.40	*24*
B µg/g	9.79	*21*	9.36	*21*
As ng/g	41,34	*13*	44.14	*12*
Cr µg/g	0,213	*23*	0.22	*24*
Co µg/g	0,126	*17*	0.12	*16*
Hg ng/g	41,54	*11*	44.00	*14*
Ni µg/g	0,831	*24*	0.79	*25*

Table 9a: Percentage of non tolerable results from 7th to 15th test

Element	Tolerable limits [1]	9th Labtest 2006/2007		10th Labtest 2007/2008		11th Labtest 2008/2009		12th Labtest 2009/2010		13th Labtest 2010/2011		14th Labtest 2011/2012		15th Labtest 2012/2013	
	normal (low) (± %)	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number
N	10 (15)	**6,1**	*196*	**2,6**	*196*	**10,9**	*192*	**7,6**	*212*	**4,9**	*224*	**8,9**	*224*	**6,0**	*216*
S	15 (20)	**8,3**	*196*	**15,4**	*188*	**14,4**	*188*	**16,5**	*200*	**13,9**	*208*	**12,7**	*220*	**13,9**	*208*
P	10 (15)	**4,3**	*208*	**13,2**	*204*	**14,2**	*204*	**13,7**	*212*	**7,4**	*216*	**15,9**	*220*	**9,4**	*224*
Ca	10 (15)	**4,3**	*208*	**17,2**	*204*	**19,1**	*204*	**9,7**	*216*	**8,0**	*212*	**14,7**	*224*	**12,1**	*224*
Mg	10 (15)	**4,3**	*208*	**10,8**	*204*	**18,6**	*204*	**14,4**	*216*	**5,7**	*212*	**19,3**	*228*	**5,9**	*220*
K	10 (15)	**3,3**	*212*	**16,8**	*208*	**17,5**	*200*	**6,0**	*216*	**8,5**	*212*	**21,0**	*228*	**18,0**	*228*
C	5	**11,1**	*144*	**3,2**	*156*	**16,9**	*148*	**8,5**	*188*	**6,3**	*192*	**15,4**	*208*	**7,7**	*196*
Zn	15 (20)	**8,9**	*168*	**10,2**	*176*	**6,7**	*164*	**6,4**	*172*	**9,7**	*176*	**4,4**	*184*	**5,4**	*184*
Mn	15 (20)	**0,0**	*176*	**2,8**	*180*	**6,5**	*168*	**2,7**	*176*	**4,8**	*188*	**6,8**	*192*	**0,5**	*188*
Fe	20 (30)	**9,9**	*172*	**5,7**	*176*	**13,1**	*160*	**4,8**	*168*	**0,0**	*180*	**14,1**	*184*	**3,7**	*188*
Cu	20	**10,8**	*148*	**4,9**	*164*	**17,1**	*164*	**21,3**	*160*	**9,1**	*176*	**10,3**	*184*	**9,1**	*176*
Pb	30 (40)	**24,0**	*104*	**13,0**	*100*	**9,8**	*92*	**13,3**	*120*	**12,5**	*112*	**15,6**	*128*	**8,6**	*105* [2]
Cd	30	**7,1**	*112*	**17,0**	*100*	**7,7**	*104*	**10,7**	*112*	**9,5**	*116*	**10,0**	*140*	**7,1**	*140*
B	20 (30)	**8,3**	*84*	**13,5**	*96*	**12,5**	*88*	**5,4**	*92*	**3,3**	*92*	**12,0**	*100*	**5,0**	*100*

[1] special tolerable limits for low concentrations from the 11th till 15th test

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

Table 9b: Percentage of non tolerable results from the 16th to the 22nd test

Element	Tolerable limits [1]	16th Labtest 2013/2014		17th Labtest 2014/2015		18th Labtest 2015/2016		19th Labtest 2016/2017		20th Labtest 2017/2018		21st Labtest 2018/2019		22nd Labtest 2019/2020	
	normal (low) (± %)	Non tolerable (%)	Number	Non tolerable (%)	Number	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values	Non tolerable (%)	Number of mean values
N	10 (15)	**3,1**	*196*	**2,1**	*192*	**7,9**	*164*	**4,6**	*152*	**3,7**	*164*	**16,1**	*180*	**5,1**	*156*
S	15 (20)	**14,8**	*196*	**9,9**	*192*	**6,4**	*156*	**7,4**	*148*	**16,7**	*156*	**16,9**	*172*	**11,4**	*140*
P	10 (15)	**18,8**	*208*	**14,7**	*204*	**15,5**	*168*	**15,4**	*164*	**18,3**	*180*	**16,3**	*184*	**9,0**	*156*
Ca	10 (15)	**16,3**	*208*	**17,7**	*212*	**9,1**	*176*	**11,3**	*168*	**12,0**	*184*	**15,8**	*184*	**12,5**	*160*
Mg	10 (15)	**8,8**	*204*	**12,3**	*212*	**14,2**	*176*	**13,1**	*168*	**10,9**	*184*	**10,1**	*188*	**10,6**	*160*
K	10 (15)	**9,1**	*208*	**11,5**	*208*	**15,6**	*180*	**16,7**	*168*	**14,7**	*184*	**16,5**	*188*	**12,5**	*160*
C	5	**10,0**	*180*	**7,8**	*180*	**9,5**	*148*	**8,1**	*136*	**7,9**	*152*	**14,3**	*168*	**2,9**	*140*
Zn	15 (20)	**5,6**	*180*	**8,1**	*172*	**13,5**	*148*	**12,1**	*132*	**6,3**	*144*	**5,3**	*152*	**10,0**	*140*
Mn	15 (20)	**8,7**	*184*	**3,9**	*180*	**6,1**	*148*	**8,8**	*136*	**10,5**	*152*	**3,2**	*156*	**11,5**	*148*
Fe	20 (30)	**9,4**	*180*	**6,5**	*168*	**12,2**	*148*	**13,3**	*128*	**4,2**	*144*	**5,0**	*140*	**6,9**	*144*
Cu	20	**14,5**	*172*	**15,7**	*172*	**4,2**	*144*	**15,2**	*132*	**8,8**	*136*	**6,8**	*148*	**12,5**	*136*
Pb	30 (40)	**10,7**	*56* [2]	**7,8**	*87* [2]	**16,0**	*75* [2]	**7,7**	*24* [2]	**8,3**	*24* [2]	**7,1**	*84* [2]	**22,7**	*75* [2]
Cd	30	**4,8**	*62* [2]	**14,3**	*112*	**8,0**	*112*	**2,1**	*96*	**2,7**	*75* [2]	**10,3**	*116*	**14,6**	*48* [2]
B	20 (30)	**6,3**	*96*	**5,0**	*100*	**11,9**	*84*	**13,9**	*72*	**6,8**	*88*	**4,3**	*92*	**13,1**	*84*
As	20 (30)					**19,2**	*52*	**25,6**	*39* [2]	**48,7**	*39* [2]	**19,6**	*56*	**37,5**	*48*
Co	25 (35)					**13,2**	*68*	**4,4**	*68*	**11,8**	*51* [2]	**20,6**	*63* [2]	**21,9**	*48* [2]
Cr	25 (35)					**10,9**	*46* [2]	**16,3**	*92*	**15,2**	*92*	**21,7**	*92*	**6,3**	*32* [2]
Hg	20 (30)					**4,5**	*44*	**19,6**	*56*	**0,0**	*36* [2]	**6,3**	*48* [2]	**9,5**	*42* [2]
Ni	20 (30)					**8,3**	*96*	**7,6**	*92*	**16,3**	*92*	**9,0**	*100*	**18,0**	*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

No laboratory failed in analyzing three or four samples. In comparison with the last Interlaboratory Comparison Test the percentage of non-tolerable results decreased (3.7 → 16.1 → 5.1%) and reached a usual value.

3.4.2 Sulphur

Laboratory A60 failed in analyzing all four samples. In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is lower (16.7 → 16.9 → 11.4%). Laboratory A60 is using ICP-MS; especially sulphur is a problematic element with low sensitivity or with a lot of mass interferences in ICP-MS. A requalification is needed from the *ICP-Forests laboratories* A60, which failed in the last tests too.

3.4.3 Phosphorus

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is lower (18.3 → 16.3 → 9.0%). Three laboratories A43, A60 and A88 failed in analyzing all four samples. The reasons could be a miscalculation, a calibration error or too less experience with the method. A re-qualification is needed for the *ICP-Forests laboratory* A60.

3.4.4 Calcium

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results are slightly lower (12.0 → 15.8 → 12.5%). The laboratories A43, A60 and A88 failed in analyzing all four samples. A requalification is needed from the *ICP-Forests laboratory* A60. This laboratory failed in the last test, too – their methodical problems are still not solved!

3.4.5 Magnesium

In comparison with the last tests the percentage of non-tolerable results are similar (10.9 → 10.1 → 10.6%). The laboratories A43, A60, A62 and A88 failed with three or four samples. A requalification is needed for the *ICP-Forests laboratories* A60 and A62.

3.4.6 Potassium

In comparison with the last tests the percentage of non-tolerable results is lower (14.7 → 16.5 → 12.5%). The laboratories A43, A60, A82 and A88 failed in analyzing three or all four samples.
A re-qualification is needed for the *ICP-Forests laboratory* A60. Laboratory A82 failed in the last test for potassium too – the methodical problem is still not solved!

3.4.7 Carbon

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is lower (7.9 → 14.3 → 2.9 %). Only laboratory A59 failed in analyzing all four samples. It seems that this laboratory has a calibration problem with the element-analyzer.

3.4.8 Zinc

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is higher (6.3 → 5.3 → 10.0%). The laboratories A60 and A88 failed in analyzing all four samples. A requalification is needed from the *ICP-Forests laboratory* A60. This laboratory failed in the last test, too – their methodical problems are still not solved!

3.4.9 Manganese

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is higher (10.5 → 3.2 → 11.5%). The laboratories A43, A60, A88 and F24 failed with three or four samples. A requalification is needed from the *ICP-Forests laboratory* A60.

3.4.10 Iron

6.9% of non-tolerable results; only laboratory A60 failed in analyzing all four samples. A requalification is needed from this *ICP-Forests laboratory*.

3.4.11 Copper

In comparison with the last tests the percentage of non-tolerable results is increasing (8.8 → 6.8 → 12.5%). The laboratories A60 and A88 failed with all four samples. A requalification is needed from the *ICP-Forests laboratory* A60.

3.4.12 Lead

Sample 2 was excluded from the ringtest evaluation, because of the too low lead content. In comparison with the last tests the percentage of non-tolerable results is much higher (8.3 → 7.1 → 22.7%). On the other hand the lead concentrations of the test samples in the last test were much higher. The laboratories A47, A65, A88, F02, and F15 failed with this parameter. The laboratories A65 and A88 failed in the last test for lead, too. The laboratories A88 and F15 failed because of a too high LOQ. A requalification is needed from the *ICP-Forests laboratory* F15.

3.4.13 Cadmium

The samples 2 and 3 were excluded from the ringtest evaluation, because of the too low cadmium content. In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results are increasing (2.7 →10.3 → 14.6%). Apart from that the cadmium concentrations of the test samples in the last test were much higher. The laboratories A60, F06 and F15 failed; laboratory F15 failed because of a too high LOQ. A requalification is needed from the *ICP-Forests laboratories* A60, F06 and F15.

3.4.14 Boron

In comparison with the last tests the percentage of non-tolerable results is higher (6.8 → 4.3 → 13.1%). The laboratories A47, A60 and F07 failed in analyzing three or all four samples. A re-qualification is needed for the *ICP-Forests laboratories* A47, A60 and F07.

3.4.15 Arsenic

In comparison with the last tests the percentage of non-tolerable results is high again (48.7 → 19.6 → 37.5%). The laboratories A60, A82, A88 and F07 failed in analyzing all four samples. A re-qualification is needed for the *ICP-Forests laboratories A60 and F07*. The laboratory F07 failed in the last tests for arsenic too – the methodical problem is still not solved!

3.4.16 Cobalt

Samples 2 and 3 were excluded from the ringtest evaluation, because of too low cobalt content. In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results in the last Interlaboratory Comparison Test is similar (11.8 →20.6 → 21.9%), but the sample concentration were lower. The laboratories A60, A88 and F27 failed with this parameter. Laboratory A88 failed because of a too high LOQ, a LOQ from equal or lower than 0.1 can be usually reached (only) with ICP-MS. A re-qualification is needed for the *ICP-Forests laboratory* A60.

3.4.17 Chromium

Samples 1 and 2 were excluded from the ringtest evaluation, because of too low chromium contents. In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is lower (15.2 →21.7 → 6.3%). No laboratory failed with two samples. The LOQ from laboratory A65 is too high.

3.4.18 Mercury

Sample 2 was excluded from the ringtest evaluation, because of too low content. In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is increasing (0.0 → 6.3 → 9.5%). The laboratories A88 and F08 failed with this parameter. Laboratory A88 failed because of a too high LOQ.

3.4.19 Nickel

In comparison with the last Interlaboratory Comparison Tests the percentage of non-tolerable results is increasing (16.3 → 9.0 → 18.0%). The laboratories A60, A65, A88 and F24 failed with this parameter. Laboratories A65 and A88 failed because of a too high LOQ. A re-qualification is needed for the *ICP-Forests laboratory* A60.

4 CONCLUSIONS

47 laboratories in 23 countries participated in the 22nd Needle/Leaf Interlaboratory Test, but only 43 laboratories submitted their results in time.

A new system for qualification and re-qualification started with the 11th test in 2009. This system was enlarged after the manual update in 2010 to all ICP-Forests partners (see König et al. 2010 and 2013, Rautio et al. 2010 and 2013 Pitman et al. 2010). With the ring test report, each participant received a qualification report which can be downloaded from the webpage (https://bfw.ac.at/ws/ring_nadel.login). It has been decided to qualify the results of each parameter separately. A laboratory is qualified when 50% or more (generally two, three or all four samples) of the results for this parameter for all the samples of the ring test are within the tolerable limits. Re-qualification is mandatory for all ICP-Forests laboratories, if monitoring results (foliage, litterfall, ground vegetation) from the vegetation period 2019 will be submitted to PCC.

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 five laboratories submited LOQs higher than the maximum acceptable LOQs (**A85** for Cr and Ni; **A88** for Pb, Co, Hg and Ni; **F08** for Cu and **F15** for Pb and Cd).

In case of very low concentrations in the test samples, results of these samples will be excluded from the evaluation (this was the case for **sample 1:** Cr; **sample 2:** Pb, Cd, Cr, Co, Hg; **sample 3:** Cd, Co). This procedure is needed to avoid wrong qualification results influenced by inaccurate measurements. And on the other hand there is no real need to detect these very low concentrations in real monitoring samples, because it gives no additional information of the nutrient status or of the pollution impact situation. In general was the concentration of the test samples for Pb, Cd, As, Co and Ni lower than in the last test. This explains the higher amount of non-tolerable results for these parameters.

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

A85 (75.0%), **A62** (62.5%), **A88** (33.8%), **A60** (18.6%) and **A43** (8.3%).

Some of the *ICP-Forests laboratories* fail and have to do a re-qualification for certain parameters (**A47**: B; **A60:** S, P, Ca, Mg, K, Zn, Mn, Fe, Cu, Cd, B, As, Co, Ni; **A62:** Mg; **F06:** Cd; **F07:** B, As; **F15:** Cd, Pb). These (*ICP-Forests*) laboratories have to check and re-validate their method or employ a better method. 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 **A60** (S, Ca, Zn) 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 2020 (see details: 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.

5 LITERATURE

BARTELS, U., 1996: ICP-Forests 2nd needle/leaf Interlaboratory Test 1995/1996, North Rhine - Westphalia State Environment Agency, Essen/Germany.

BARTELS, U., 1998: ICP-Forests 3rd needle/leaf Interlaboratory Test 1997/1998, North Rhine - Westphalia State Environment Agency, Essen/Germany.

BARTELS, U., 2000: ICP-Forests 4th needle/leaf Interlaboratory Test 1999/2000, North Rhine - Westphalia State Environment Agency, Essen/Germany.

BARTELS, U., 2002: ICP-Forests 5th needle/leaf Interlaboratory Test 2001/2002, North Rhine - Westphalia State Environment Agency, Essen/Germany.

DIN 38402-42:2005-09: Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlammuntersuchung – Allgemeine Angaben (Gruppe A) Ringversuche, Auswertung (A42).

EC-UN/ECE 1994: Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of the effects of air pollution on forests, Hamburg/Prague, EC-UN/ECE 1994.

FÜRST, A., 2004: 6th Needle/Leaf Interlaboratory Comparison Test 2003/2004, Austrian Federal Office and Research Centre for Forests (ISBN 3-901347-46-1), Vienna/Austria.

FÜRST, A., 2005: 7th Needle/Leaf Interlaboratory Comparison Test 2004/2005, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 3-901347-52-1), Vienna/Austria.

FÜRST, A., 2006: 8th Needle/Leaf Interlaboratory Comparison Test 2005/2006, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 3-901347-60-7), Vienna/Austria.

FÜRST, A., 2007: 9th Needle/Leaf Interlaboratory Comparison Test 2006/2007, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-901347-66-5), Vienna/Austria.

FÜRST, A., 2008: 10th Needle/Leaf Interlaboratory Comparison Test 2007/2008, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-901347-73-3), Vienna/Austria.

FÜRST, A., 2009: 11th Needle/Leaf Interlaboratory Comparison Test 2008/2009, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-901347-79-5), Vienna/Austria.

FÜRST, A., 2010: 12th Needle/Leaf Interlaboratory Comparison Test 2009/2010, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-901347-89-4), Vienna/Austria.

FÜRST, A., 2011: 13th Needle/Leaf Interlaboratory Comparison Test 2010/2011, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-902762-03-0), Vienna/Austria.

FÜRST, A., 2012: 14th Needle/Leaf Interlaboratory Comparison Test 2011/2012, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-902762-13-9), Vienna/Austria.

FÜRST, A., 2013: 15th Needle/Leaf Interlaboratory Comparison Test 2012/2013, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-902762-20-7), Vienna/Austria.

FÜRST, A., 2014: 16th Needle/Leaf Interlaboratory Comparison Test 2013/2014, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-902762-28-3), Vienna/Austria.

FÜRST, A., 2015: 17th Needle/Leaf Interlaboratory Comparison Test 2014/2015, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-902762-37-5), Vienna/Austria.

FÜRST, A., 2016: 18th Needle/Leaf Interlaboratory Comparison Test 2015/2016, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-902762-52-8), Vienna/Austria.

FÜRST, A., 2017: 19th Needle/Leaf Interlaboratory Comparison Test 2016/2017, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-902762-72-6), Vienna/Austria.

FÜRST, A., 2018: 20th Needle/Leaf Interlaboratory Comparison Test 2017/2018, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-902762-90-0), Vienna/Austria.

FÜRST, A., 2019: 21st Needle/Leaf Interlaboratory Comparison Test 2018/2019, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (ISBN 978-3-903258-12-9), Vienna/Austria.

HOVIND, H., MAGNUSSON, B., KRYSELL, M., LUND, U., MÄKINEN, I., 2007: Internal Quality Control – Handbook for Chemical Laboratories. NORDTEST REPORT 569, Ed.3. 46p.

KÖNIG N, KOWALSKA A, BRUNIALTI G, FERRETTI M, CLARKE N, COOLS N, DEROME J, DEROME K, DE VOS B, FÜRST A, JAKOVLJEVIČ T, MARCHETTO A, MOSELLO R, O'DEA P, TARTARI GA, ULRICH E, 2016: Part XVI: Quality Assurance and Control in Laboratories, In: UNECE, ICP Forests Programme Co-ordinating Centre (ed.): Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of the effects of air pollution on forests. Thunen Institute of Forest Ecosystems, Eberswalde, Germany, 46 p.+Annex ISBN: 978-3-86576-162-0

KÖNIG, N., COOLS, N., DEROME, K., KOWALSKA, A., DE VOS, B., FÜRST, A., MARCHETTO, A., O'DEA, P., AND TARTARI, G.A., 2013: Data Quality in Laboratories: Methods and Results for Soil, Foliar, and

Water Chemical Analyses. In: Forest Monitoring : Methods for Terrestrial Investigations in Europe with an Overview of North America and Asia.; Developments in Environmental Science, Amsterdam, (12): 415-453.

RAUTIO P, FÜRST A, STEFAN K, RAITIO H, BARTELS U, 2016: Part XII: Sampling and Analysis of Needles and Leaves. In: UNECE ICP Forests Programme Co-ordinating Centre (ed.): Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of the effects of air pollution on forests. Thunen Institute of Forest Ecosystems, Eberswalde, Germany, 19 p. + Annex. ISBN: 978-3-86576-162-0

RAUTIO P., FÜRST A., 2013: Tree Foliage: Sampling and Chemical Analyses. In: Forest Monitoring : Methods for Terrestrial Investigations in Europe with an Overview of North America and Asia.; Developments in Environmental Science, Amsterdam, (12): 223-236.

UKONMAANAHO L., PITMAN R, BASTRUP-BIRK A, BREDA N, RAUTIO P, 2016: Part XIII: Sampling and Analysis of Litterfall. In: UNECE ICP Forests Programme Co-ordinating Centre (ed.): Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of the effects of air pollution on forests. Thunen Institute for Forests Ecosystems, Eberswalde, Germany, 14 p. + Annex. ISBN: 978-3-86576-162-0

STEFAN, K., FÜRST, A., HACKER, R., BARTELS, U., 1997: Forest Foliar Condition in Europe - Results of large-scale foliar chemistry surveys, ISBN 3-901347-05-4, EC-UN/ECE -FBVA 1997.

List of participating laboratories

Austria

A 10 Land Steiermark
Referat Boden- und Pflanzenanalytik
Ragnitzstraße 193
8047 - Graz

BOKU University Vienna
Forest Ecology
Peter Jordan Straße 82
1190 - Vienna

Austrian Federal Research Centre for Forests
Pflanzenanalyse
Seckendorff-Gudent-Weg 8
A-1131 - Vienna

Belgium / Flanders

Research Institute for Nature and Forest
INBO laboratory
Gaverstraat 35
B-9500 - Geraardsbergen

Belgium/Wallonia

Earth and Life Institute (ELIE)
Recherche en Sciences Forestières
Croix du Sud 2- L7.05.09
B-1348 - Louvain-La-Neuve

Croatia

HRVATSKI SUMARSKI INSTITUT
Division for forest ecology
Cvjetno naselje 41
HR-10450 - Jastrebarsko

Czech Republic

Forestry and Game Management Res. Inst.
Testing Laboratories (25)
Strnady 136
CZ-15604 - Praha 5- Zbraslav

Denmark

Geosciences & Natural Resources Manageme
BioGeoLab
Rolighedsvej 23
DK-1958 - Frederiksberg C

Estonia

Estonian Environmental Research Centre
Tartu Department
Vaksali 17a
EST-50410 - Tartu

Finland

Natural Resources Institute Finland
Viikki B2
Latokartanonkaari 9
FIN-00790 - Helsinki

France

INRA
USRAVE
71, ave E. Bourlaux CS20032
33 882 - Villenave d'Ornon Cedex

Germany

Bay. LA f. Wald u. Forstwirtschaft
Abteilung 2 - Labor
Hans-Carl-von-Carlowitz-Platz 1
D-85354 - Freising

Bayerisches Landesamt für Umwelt
Referat 72 - Schwermetallanalytik
Bürgermeister-Ulrich-Straße 160
86179 - Augsburg

Berghof Analytik + Umweltengineering
GmbH
Ob dem Himmelreich 9
72074 - Tübingen

Germany

FI. für Bergbaufolgelandschaften e.V.
Analytisches Labor
Brauhausweg 2
D-03238 - Finsterwalde

Fraunhofer IME
ESB and Elemental Analysis
Auf dem Aberg 1
57392 - Schmallenberg

FVA-Baden-Württemberg
Abt. Boden und Umwelt
Wonnhaldestraße 4
D-79100 - Freiburg

HNE Eberswalde
Zentrales ökologisches Labor
Schicklerstraße 5
D-16225 - Eberswalde

LANUV Nordrhein-Westfalen
LANUV; FB 46
Wallneyer Str. 6
D-45133 - Essen

LECO Instrumente GmbH
LECO EATC Berlin
Max-Dohrn-Str. 8-10
10589 - Berlin

LMS Agrarberatung GmbH, LUFA Rostock
LUFA Rostock - nasschemische Daten
Graf-Lippe-Str. 1
D-18059 - Rostock

LUFA NRW
Spezielle Analytik
Nevinghoff 40
D-48147 - Münster

LUFA NRW
Zentrale anorganische Analytik
Nevinghoff 40
48147 - Münster

Germany

LUFA Speyer
Abt. 3 Referat 2
Obere Langgasse 40
D-67346 - Speyer

Nordwestdeutsche Forstl.Versuchsanstalt
Abt. D, Umweltanalytik
Grätzelstr. 2
D-37079 - Göttingen

Ökopedologie der gemäßigten Zonen (PGZ)
Zentrallabor
Büsgenweg 2
D-37077 - Göttingen

Saxon Public Enterprise-Sachsenforst
Dept. IV. Ref. 43
Bonnewitzer Str. 34
D-01796 - Pirna OT Graupa

Thuer. Landesanstalt. f. Landwirtschaft
Untersuchungswesen
Naumburger Str. 98
07743 - Jena

TU - München
Lehrgebiet Waldernährung+ Wasserhaushalt
H.C.v.Carlowitz-Platz 2
D-85354 - Freising

Universität Trier, FB VI, Geobotanik
Geobotanisches Labor
Behringstraße 21
D-54286 - Trier

Greece

Forest Research Institute of Athens
Forest Soils
Terma Alkmanos
115 28 - Athens

Hungary

NARIC Forest Research Institute
Ecological Laboratory
Várkerület 30/A
H-9600 - Sárvár

Latvia

LSFRI Silava
Forest environment laboratory
Riga street 111
LV-2169 - Salaspils

Norway

Norwegian Institute of Bioeconomy Research
Chemical Laboratories
Pb 115
NO-1431 - As

Poland

Forest Research Institute
Lab. of Natural Environment Chemistry
3, Braci Lesnej
PL-05-090 - Sekocin Stary

Romania

INCDS "Marin Dracea"
Forestry-Ecology Laboratory
B-dul Eroilor, nr.128
RO-077190 - Voluntari-Jud. Ilfov

INCDS "Marin Dracea"
Chemistry laboratory
Calea Bucovinei, 73 bis
725100 - Campulung Moldovenesc

INCDS "Marin Dracea" - Statiunea Brasov
Lab. de analize pedologice si foliare
Strada Closca 13
500040 - Brasov

Russia

Institute of Biology Komi SC UB RAS
Ecoanalytical laboratory
Kommunisticheskaya, 28
167982 - Syktyvkar

Joint Institute for Nuclear Research

Joliot-Curie 6
141980 - Dubna

Slovakia

National Forest Centre
Central Forest Laboratory
T.G.Masaryka 22
SK-96092 - Zvolen

Slovenia

Slovenian Forestry Institute
Laboratory for Forest Ecology
Vecna pot 2
SI-1000 - Ljubljana

Spain

Universidad de Navarra
Departamento de Química
Irunlarrea, 1
31008 - Pamplona (Navarra)

Switzerland

Eidg. Forschungsanstalt WSL
Zentrallabor
Zürcherstrasse 111
CH-8903 - Birmensdorf

University of Basel
Mercury Laboratory
Bernoullistrasse 30
4056 - Basel

Turkey

Ege Forestry Research Institute
Soil and Ecology Laboratory
Mustafa Kemal Blv. No: 75 Zeytinalani
35430 - Izmir

United Kingdom

Forest Research
Environmental Research Laboratory
Alice Holt Lodge
GU10 4LH - Farnham, Surrey

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 $\leq$ 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 abbreviation

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

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A43	PB07	DZ02	6,14	6,28	6,50	6,29	0	6,30	*b*	*	0,15	2,35	47,00
2	F12x	PZ98	DA02	11,40	11,20	11,90	11,50	0	11,50	*b*	*	0,29	2,56	85,76
3	A86	PZ98	DA01	11,94	11,96	12,02	12,01	0	11,98	*b*	*	0,04	0,32	89,36
4	A59	PZ98	DA02	13,10	12,70	12,00	11,90	0	12,43	*c*		0,57	4,62	92,66
5	F13x	PZ98	DA01	12,60	12,42	12,37	12,36	4	12,44			0,11	0,90	92,76
6	A65	PZ98	DA02	12,28	12,81	12,69	12,52	4	12,58			0,23	1,83	93,78
7	A82	PZ98	DA02	13,00	12,60	12,90	12,60	4	12,78			0,21	1,61	95,27
8	A88	PB07	DZ02	12,90	12,60	12,80	12,80	4	12,78			0,13	0,98	95,27
9	A47x	PZ98	DA02	13,62	12,60	12,43	12,96	0	12,90	*c*		0,53	4,08	96,22
10	F25x	PZ98	DA01	13,06	13,20	13,07	13,13	4	13,12			0,06	0,49	97,81
11	F33x	PZ98	DA02	13,20	13,00	13,00	13,40	4	13,15			0,19	1,46	98,07
12	A36	PB07	DZ02	13,24	13,24	13,13	13,24	4	13,21			0,05	0,42	98,54
13	F19x	PZ98	DA99	13,20	13,20	13,40	13,20	4	13,25			0,10	0,75	98,82
14	F26x	PB08	DZ02	13,28	13,28	13,28	13,28	4	13,28			0,00	0,00	99,04
15	F01x	PB08	DZ02	13,44	13,32	13,26	13,14	4	13,29			0,12	0,93	99,08
16	F16x	PZ98	DA02	13,35	13,21	13,43	13,26	4	13,31			0,10	0,73	99,28
17	F03	PZ98	DA01	13,36	13,32	13,29	13,31	4	13,32			0,03	0,22	99,34
18	A42x	PZ98	DA01	13,46	13,57	13,16	13,11	4	13,32			0,23	1,69	99,36
19	F07x	PZ98	DA01	13,24	13,23	13,40	13,43	4	13,33			0,10	0,79	99,38
20	F06x	PZ98	DA02	13,31	13,26	13,39	13,43	4	13,35			0,08	0,57	99,55
21	A56	PZ98	DA02	13,60	13,40	13,20	13,30	4	13,38			0,17	1,28	99,75
22	F27x	PZ98	DA01	13,38	13,48	13,34	13,30	4	13,38			0,08	0,58	99,75
23	A45x	PZ98	DA01	13,40	13,40	13,40	13,40	4	13,40			0,00	0,00	99,93
24	F14	PZ98	DA01	13,70	13,43	13,28	13,37	4	13,45			0,18	1,34	100,27
25	F18x	PB07	DZ02	13,80	13,52	13,29	13,25	4	13,46			0,25	1,88	100,40
26	F32x	PZ98	DA01	13,50	13,50	13,40	13,50	4	13,48			0,05	0,37	100,49
27	A60x	PZ98	DA02	13,63	13,40	13,46	13,42	4	13,48			0,10	0,78	100,51
28	A57	PZ98	DA01	13,26	13,30	13,76	13,61	4	13,48			0,24	1,80	100,55
29	A85x	PZ98	DA01	13,65	13,48	13,42	13,51	4	13,52			0,10	0,72	100,80
30	F05x	PZ98	DA01	13,60	13,60	13,50	13,50	4	13,55			0,06	0,43	101,05
31	A51	PZ98	DA02	13,57	13,65	13,48	13,52	4	13,56			0,07	0,54	101,09
32	A58x	PZ98	DA02	13,82	13,79	13,70	13,37	4	13,67			0,21	1,53	101,96
33	A39	PZ98	DA02	14,02	13,83	13,71	13,49	4	13,76			0,22	1,61	102,64
34	F15x	PZ98	DA01	13,77	13,88	13,75	13,72	4	13,78			0,07	0,51	102,77
35	F21x	PZ98	DA01	13,87	13,97	13,90	13,89	4	13,91			0,04	0,31	103,72
36	F24x	PZ98	DA02	13,46	13,74	14,05	14,39	4	13,91			0,40	2,88	103,74
37	F28x	PZ98	DA02	13,90	13,80	14,00	14,10	4	13,95			0,13	0,93	104,04
38	F08x	PZ98	DA01	13,80	13,90	13,90	14,20	4	13,95			0,17	1,24	104,04
39	F02x	PZ98	DA01	14,09	15,06	14,31	14,02	4	14,37			0,48	3,31	107,17
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**136**	**13,41**	**0,140**	**1,047**
10	% from the mean			

l	s_R	CV_R
34	**0,395**	**2,944**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A43	PB07	DZ02	20,60	20,60	21,00	21,00	0	20,80	*b*	*	0,23	1,11	89,18
2	A59	PZ98	DA02	21,10	21,20	21,00	21,30	0	21,15	*b*		0,13	0,61	90,68
3	A88	PB07	DZ02	21,50	21,30	21,40	21,40	0	21,40	*b*		0,08	0,38	91,75
4	F13x	PZ98	DA01	21,95	22,17	22,21	22,00	4	22,08			0,13	0,57	94,67
5	A86	PZ98	DA01	22,62	22,38	22,17	22,12	4	22,32			0,23	1,02	95,70
6	A36	PB07	DZ02	22,86	23,29	22,65	22,65	4	22,86			0,30	1,32	98,02
7	F03	PZ98	DA01	22,78	22,89	22,95	22,93	4	22,89			0,08	0,33	98,13
8	A82	PZ98	DA02	23,00	23,00	22,90	22,90	4	22,95			0,06	0,25	98,39
9	A42x	PZ98	DA01	22,99	22,90	23,00	22,97	4	22,96			0,04	0,20	98,45
10	F25x	PZ98	DA01	23,11	23,06	22,80	22,98	4	22,99			0,14	0,59	98,55
11	F12x	PZ98	DA02	23,00	22,80	23,30	23,00	4	23,03			0,21	0,90	98,71
12	A39	PZ98	DA02	23,23	23,22	22,97	22,77	4	23,05			0,22	0,96	98,81
13	F33x	PZ98	DA02	23,10	22,60	23,10	23,40	4	23,05			0,33	1,44	98,82
14	F06x	PZ98	DA02	23,10	23,06	23,26	23,06	4	23,12			0,09	0,40	99,12
15	F28x	PZ98	DA02	23,87	23,01	22,80	22,90	4	23,15			0,49	2,12	99,23
16	F27x	PZ98	DA01	23,30	22,99	23,27	23,16	4	23,18			0,14	0,60	99,38
17	A60x	PZ98	DA02	23,38	23,24	23,26	23,11	4	23,25			0,11	0,48	99,67
18	F07x	PZ98	DA01	23,07	23,26	23,43	23,44	4	23,30			0,17	0,75	99,89
19	F02x	PZ98	DA01	23,22	23,06	23,04	23,91	4	23,31			0,41	1,76	99,93
20	F16x	PZ98	DA02	23,35	23,29	23,48	23,31	4	23,36			0,09	0,37	100,14
21	A56	PZ98	DA02	23,50	23,60	23,20	23,20	4	23,38			0,21	0,88	100,22
22	F05x	PZ98	DA01	23,40	23,40	23,40	23,30	4	23,38			0,05	0,21	100,22
23	A47x	PZ98	DA02	23,65	23,69	23,38	22,96	4	23,42			0,34	1,44	100,41
24	F19x	PZ98	DA99	23,40	23,30	23,50	23,50	4	23,43			0,10	0,41	100,43
25	F14	PZ98	DA01	23,80	23,45	23,21	23,38	4	23,46			0,25	1,06	100,58
26	A51	PZ98	DA02	23,31	23,58	23,58	23,53	4	23,50			0,13	0,55	100,75
27	A45x	PZ98	DA01	23,40	23,50	23,60	23,50	4	23,50			0,08	0,35	100,75
28	F24x	PZ98	DA02	23,33	23,35	23,63	23,70	4	23,50			0,19	0,81	100,76
29	F32x	PZ98	DA01	23,60	23,60	23,60	23,50	4	23,58			0,05	0,21	101,07
30	F01x	PB08	DZ02	23,48	23,71	23,77	23,58	4	23,63			0,13	0,54	101,32
31	F18x	PB07	DZ02	23,65	23,48	23,61	23,87	4	23,65			0,16	0,69	101,40
32	A65	PZ98	DA02	23,61	23,68	23,71	23,78	4	23,70			0,07	0,30	101,59
33	F26x	PB08	DZ02	23,76	23,78	23,75	23,78	4	23,77			0,02	0,06	101,90
34	A57	PZ98	DA01	23,73	23,77	24,68	22,91	0	23,77	*c*		0,72	3,04	101,92
35	F21x	PZ98	DA01	23,86	23,68	23,76	23,85	4	23,79			0,08	0,36	101,98
36	A58x	PZ98	DA02	23,98	23,83	23,68	23,99	4	23,87			0,15	0,63	102,33
37	F15x	PZ98	DA01	24,37	24,26	24,15	24,12	4	24,23			0,11	0,47	103,86
38	F08x	PZ98	DA01	24,60	24,20	24,60	24,40	4	24,45			0,19	0,78	104,82
39	A85x	PZ98	DA01	*26,127a*	26,40	26,38	26,39	0	26,39	*b*	*	0,01	0,04	113,13
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**136**	**23,32**	**0,163**	**0,698**
10	% from the mean			
	l		s_R	CV_R
	34		**0,461**	**1,975**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PB07	DZ02	*17,2a*	17,30	17,30	17,30	3	17,30		0,00	0,00	92,31
2	F12x	PZ98	DA02	16,80	17,30	18,30	17,50	4	17,48		0,62	3,57	93,24
3	A85x	PZ98	DA01	17,69	17,49	17,53	17,23	4	17,48		0,19	1,07	93,29
4	A86	PZ98	DA01	17,64	17,66	*16,2a*	17,63	3	17,64		0,02	0,09	94,14
5	F13x	PZ98	DA01	17,77	17,60	17,61	17,75	4	17,68		0,09	0,51	94,35
6	A59	PZ98	DA02	17,80	17,60	18,10	17,70	4	17,80		0,22	1,21	94,98
7	A43	PB07	DZ02	17,90	17,60	17,90	17,80	4	17,80		0,14	0,79	94,98
8	A56	PZ98	DA02	18,00	17,90	18,50	18,60	4	18,25		0,35	1,92	97,38
9	F28x	PZ98	DA02	18,20	18,10	18,00	18,80	4	18,28		0,36	1,97	97,51
10	A65	PZ98	DA02	18,73	18,05	18,80	17,77	4	18,34		0,51	2,77	97,84
11	F25x	PZ98	DA01	18,48	18,30	18,33	18,34	4	18,36		0,08	0,44	97,98
12	A60x	PZ98	DA02	18,72	18,58	18,26	18,50	4	18,52		0,19	1,04	98,79
13	F03	PZ98	DA01	18,52	18,45	18,59	18,57	4	18,53		0,06	0,34	98,88
14	F06x	PZ98	DA02	18,31	18,59	18,99	18,67	4	18,64		0,28	1,49	99,46
15	F19x	PZ98	DA99	18,90	18,60	18,70	18,70	4	18,73		0,13	0,67	99,91
16	A82	PZ98	DA02	18,80	18,60	18,90	18,70	4	18,75		0,13	0,69	100,04
17	F07x	PZ98	DA01	18,66	19,01	18,70	18,77	4	18,79		0,16	0,83	100,23
18	F02x	PZ98	DA01	18,61	18,18	19,82	18,74	0	18,84	*c*	0,70	3,70	100,51
19	F05x	PZ98	DA01	18,80	18,90	18,90	18,80	4	18,85		0,06	0,31	100,58
20	A36	PB07	DZ02	18,74	18,85	18,96	18,85	4	18,85		0,09	0,48	100,58
21	A58x	PZ98	DA02	19,02	18,97	18,49	18,93	4	18,85		0,24	1,28	100,59
22	F27x	PZ98	DA01	18,88	18,72	18,92	19,02	4	18,89		0,12	0,66	100,77
23	F32x	PZ98	DA01	18,90	18,90	19,00	19,00	4	18,95		0,06	0,30	101,11
24	F01x	PB08	DZ02	19,17	18,84	18,78	19,03	4	18,96		0,18	0,94	101,14
25	A57	PZ98	DA01	18,52	18,76	19,62	19,03	4	18,98		0,47	2,49	101,29
26	A45x	PZ98	DA01	19,00	18,80	19,20	19,00	4	19,00		0,16	0,86	101,38
27	A39	PZ98	DA02	19,26	19,14	18,59	19,07	4	19,02		0,29	1,55	101,46
28	F14	PZ98	DA01	19,29	19,23	18,93	18,62	4	19,02		0,31	1,62	101,47
29	F16x	PZ98	DA02	18,85	19,13	19,05	19,09	4	19,03		0,12	0,65	101,54
30	F24x	PZ98	DA02	18,80	19,03	19,08	19,43	4	19,09		0,26	1,36	101,83
31	F33x	PZ98	DA02	19,40	18,90	19,30	18,80	4	19,10		0,29	1,54	101,91
32	A51	PZ98	DA02	19,49	18,95	18,98	19,21	4	19,16		0,25	1,31	102,22
33	A42x	PZ98	DA01	19,26	19,35	19,21	19,34	4	19,29		0,07	0,35	102,92
34	F18x	PB07	DZ02	19,30	19,45	19,32	19,43	4	19,37		0,07	0,38	103,37
35	F15x	PZ98	DA01	19,46	19,64	19,46	19,53	4	19,52		0,08	0,44	104,17
36	F26x	PB08	DZ02	19,56	19,55	19,58	19,58	4	19,57		0,01	0,08	104,41
37	F21x	PZ98	DA01	19,79	19,56	19,62	19,78	4	19,69		0,12	0,59	105,05
38	A47x	PZ98	DA02	20,51	19,34	19,36	20,45	4	19,92		0,65	3,28	106,26
39	F08x	PZ98	DA01	20,10	19,90	20,40	20,02	4	20,10		0,21	1,06	107,27
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**150**	**18,74**	**0,202**	**1,075**
10	% from the mean			

l	s_R	CV_R
38	**0,683**	**3,649**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A86	PZ98	DA01	10,01	9,95	10,07	10,13	0	10,04	*b*	*	0,08	0,78	87,08
2	A59	PZ98	DA02	10,20	10,40	10,30	10,50	4	10,35		*	0,13	1,25	89,77
3	F12x	PZ98	DA02	10,60	10,70	10,40	10,60	4	10,58			0,13	1,19	91,72
4	A82	PZ98	DA02	10,50	11,20	10,50	10,40	4	10,65			0,37	3,47	92,37
5	A65	PZ98	DA02	11,15	10,47	10,50	10,86	4	10,75			0,32	3,01	93,20
6	F13x	PZ98	DA01	11,03	10,98	10,93	10,86	4	10,95			0,07	0,66	94,98
7	A88	PB07	DZ02	11,00	11,20	11,10	11,10	4	11,10			0,08	0,74	96,28
8	A47x	PZ98	DA02	11,00	11,15	11,71	11,32	4	11,30			0,31	2,71	97,97
9	F25x	PZ98	DA01	11,36	11,36	11,26	11,34	4	11,33			0,05	0,42	98,27
10	F19x	PZ98	DA99	11,40	11,30	11,40	11,30	4	11,35			0,06	0,51	98,45
11	F06x	PZ98	DA02	11,37	11,44	11,51	11,27	4	11,40			0,10	0,88	98,84
12	A60x	PZ98	DA02	11,44	11,35	11,48	11,40	4	11,42			0,06	0,49	99,03
13	A56	PZ98	DA02	11,50	11,30	11,40	11,50	4	11,43			0,10	0,84	99,10
14	F01x	PB08	DZ02	11,64	11,40	11,46	11,40	4	11,48			0,11	1,00	99,54
15	F14	PZ98	DA01	11,80	11,40	11,20	11,55	4	11,49			0,25	2,20	99,64
16	F03	PZ98	DA01	11,62	11,52	11,50	11,46	4	11,53			0,07	0,59	99,96
17	F28x	PZ98	DA02	11,60	11,60	11,40	11,50	4	11,53			0,10	0,83	99,96
18	A85x	PZ98	DA01	11,66	11,62	11,32	11,53	4	11,53			0,15	1,31	100,02
19	A42x	PZ98	DA01	11,49	11,48	11,77	11,49	4	11,56			0,14	1,20	100,24
20	F16x	PZ98	DA02	11,72	11,36	11,77	11,41	4	11,57			0,21	1,81	100,31
21	F27x	PZ98	DA01	11,47	11,58	11,56	11,68	4	11,57			0,09	0,74	100,38
22	A58x	PZ98	DA02	11,52	11,54	11,70	11,54	4	11,57			0,08	0,71	100,38
23	F32x	PZ98	DA01	11,60	11,70	11,60	11,60	4	11,63			0,05	0,43	100,83
24	F07x	PZ98	DA01	11,67	11,68	11,61	11,59	4	11,64			0,04	0,38	100,94
25	F18x	PB07	DZ02	11,60	11,79	11,54	11,62	4	11,64			0,11	0,91	100,95
26	A45x	PZ98	DA01	11,60	11,60	11,70	11,70	4	11,65			0,06	0,50	101,05
27	F05x	PZ98	DA01	11,70	11,80	11,80	11,70	4	11,75			0,06	0,49	101,91
28	A51	PZ98	DA02	11,69	11,88	11,82	11,71	4	11,78			0,09	0,77	102,13
29	A39	PZ98	DA02	11,76	11,88	11,84	11,92	4	11,85			0,07	0,58	102,78
30	F26x	PB08	DZ02	11,89	11,87	11,87	11,87	4	11,88			0,01	0,08	103,00
31	F33x	PZ98	DA02	12,10	11,90	11,80	11,70	4	11,88			0,17	1,44	103,00
32	A57	PZ98	DA01	11,98	12,08	12,41	11,05	4	11,88			0,58	4,91	103,04
33	F15x	PZ98	DA01	11,96	11,99	11,91	11,78	4	11,91			0,09	0,78	103,30
34	F24x	PZ98	DA02	11,45	11,86	12,38	11,95	4	11,91			0,38	3,20	103,30
35	F21x	PZ98	DA01	12,14	12,09	12,05	12,00	4	12,07			0,06	0,49	104,69
36	A43	PB07	DZ02	12,30	12,00	12,00	12,10	4	12,10			0,14	1,17	104,95
37	F02x	PZ98	DA01	12,79	12,00	12,49	11,78	4	12,27			0,46	3,74	106,38
38	F08x	PZ98	DA01	12,50	12,20	12,30	12,50	4	12,38			0,15	1,21	107,34
39	A36	PB07	DZ02	11,45	11,45	16,22	13,99	0	13,28	*b*	*	2,30	**17,31**	115,16
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**148**	**11,53**	**0,148**	**1,286**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
37	**0,446**	**3,872**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	PD03	DB08	0,78	0,77	0,77	0,81	4	0,79			0,02	2,53	85,75
2	A56	PC01	DB08	0,79	0,79	0,79	0,79	4	0,79			0,00	0,00	86,27
3	F12x	PC01	DB08	0,79	0,79	0,79	0,79	4	0,79			0,00	0,00	86,70
4	A58x	PZ98	DA02	0,82	0,82	0,82	0,84	4	0,83			0,01	1,21	90,09
5	A88	PZ98	DA01	0,82	0,83	0,84	0,83	4	0,83			0,01	0,98	90,64
6	F06x	PD02	DB08	0,88	0,86	0,86	0,85	4	0,86			0,01	1,22	93,93
7	A36	PB02	DB08	0,86	0,89	0,86	0,84	4	0,86			0,02	2,39	94,18
8	F19x	PD02	DB08	0,88	0,88	0,87	0,87	4	0,88			0,00	0,47	95,63
9	A86	PZ98	DA01	0,88	0,88	0,88	0,88	4	0,88			0,00	0,41	96,02
10	A59	PC01	DB08	0,88	0,87	0,89	0,89	4	0,88			0,01	1,00	96,20
11	F16x	PC01	DB08	0,89	0,89	0,88	0,87	4	0,88			0,01	1,13	96,51
12	F08x	PZ99	DB08	0,97	0,93	0,86	0,81	0	0,89	*c*		0,07	7,51	97,38
13	F14	PC01	DB08	0,90	0,90	0,90	0,89	4	0,90			0,00	0,30	97,95
14	A39	PC02	DB08	0,90	0,89	0,92	0,92	4	0,91			0,01	1,55	99,48
15	F03	PD02	DB08	0,88	0,87	0,94	0,95	4	0,91			0,04	4,45	99,56
16	A45x	PE99	DB08	0,98	0,89	0,89	0,89	4	0,91			0,05	5,13	99,78
17	F13x	PD01	DB08	0,92	0,92	0,91	0,91	4	0,91			0,00	0,39	99,81
18	F02x	PZ98	DA01	0,92	0,93	0,90	0,91	4	0,92			0,01	1,40	100,11
19	F32x	PD01	DB08	0,92	0,92	0,92	0,92	4	0,92			0,00	0,14	100,41
20	F15x	PC01	DB08	0,92	0,92	0,94	0,92	4	0,93			0,01	1,08	101,01
21	F05x	PZ98	DA01	0,94	0,93	0,94	0,94	4	0,94			0,00	0,43	102,29
22	F27x	PZ98	DA01	0,90	0,91	0,93	1,01	4	0,94			0,05	5,23	102,35
23	A57	PZ02	DD02	0,95	0,94	0,92	0,94	4	0,94			0,01	1,34	102,37
24	A82	PD01	DB08	*1,18a*	0,93	0,96	0,96	3	0,95			0,02	1,82	103,74
25	A65	PD01	DB08	0,95	0,95	0,95	0,96	4	0,95			0,01	0,52	104,01
26	A47x	PD01	DB08	0,95	0,97	0,97	0,95	4	0,96			0,01	1,20	104,83
27	F28x	PZ98	DA02	0,97	0,96	0,98	0,96	4	0,96			0,01	1,07	105,30
28	F33x	PD01	DB10	0,99	0,98	0,94	0,96	4	0,97			0,02	2,18	105,79
29	A79	PD03	DB99	0,99	0,99	0,95	1,00	4	0,98			0,02	2,46	107,50
30	F18x	PD99	DB08	0,99	0,99	0,98	0,99	4	0,99			0,00	0,30	107,89
31	F25x	PB06	DB08	0,99	1,00	1,01	1,01	4	1,00			0,01	0,96	109,47
32	A85x	PZ98	DA01	1,07	1,07	1,05	1,02	4	1,05			0,02	2,33	114,96
33	F21x	PZ98	DA01	1,10	1,10	1,09	1,12	4	1,10		*	0,01	1,14	120,39
34	A51	PZ98	DA02	1,22	1,14	1,19	1,05	0	1,15	*b*	*	0,07	6,47	125,58
35	A60x	PD01	DB10	1,36	1,44	1,29	1,28	0	1,34	*b*	*	0,07	5,52	146,60
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**127**	**0,92**	**0,014**	**1,475**
15	% from the mean			

l	s_R	CV_R
32	**0,071**	**7,768**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A58x	PZ98	DA02	1,55	1,56	1,58	1,58	0	1,57	*b*	*	0,02	0,96	52,65
2	A85x	PZ98	DA01	1,72	1,75	1,75	1,73	0	1,74	*b*	*	0,02	0,92	58,30
3	F27x	PZ98	DA01	1,78	2,04	1,81	2,12	0	1,94	*b*	*	0,17	8,63	65,06
4	A56	PC01	DB08	2,45	2,41	2,41	2,53	0	2,45	*b*	*	0,06	2,31	82,28
5	F07x	PD03	DB08	2,64	2,58	2,58	2,77	4	2,64			0,09	3,51	88,71
6	A57	PZ02	DD02	2,69	2,76	2,76	2,71	4	2,73			0,04	1,30	91,69
7	A88	PZ98	DA01	2,86	2,87	2,86	2,76	4	2,84			0,05	1,83	95,30
8	F06x	PD02	DB08	2,83	2,81	2,87	2,89	4	2,85			0,04	1,28	95,78
9	F33x	PD01	DB10	2,73	2,88	2,83	3,00	4	2,86			0,11	3,89	96,05
10	A36	PB02	DB08	2,82	2,93	2,89	2,81	4	2,86			0,06	2,00	96,14
11	F12x	PC01	DB08	2,89	2,86	2,87	2,87	4	2,87			0,01	0,44	96,47
12	F19x	PD02	DB08	2,87	2,90	2,87	2,90	4	2,89			0,02	0,60	96,89
13	F05x	PZ98	DA01	2,89	2,90	2,89	2,87	4	2,89			0,01	0,44	96,98
14	F02x	PZ98	DA01	2,82	2,92	3,06	2,85	4	2,91			0,11	3,67	97,82
15	A59	PC01	DB08	2,92	2,92	2,94	2,97	4	2,94			0,02	0,81	98,59
16	F03	PD02	DB08	2,97	2,90	2,94	2,95	4	2,94			0,03	1,10	98,74
17	F15x	PC01	DB08	2,98	2,95	2,95	2,91	4	2,95			0,03	0,97	98,99
18	A86	PZ98	DA01	2,96	2,95	3,00	2,97	4	2,97			0,02	0,74	99,77
19	F16x	PC01	DB08	3,00	2,96	3,01	2,95	4	2,98			0,03	0,99	99,97
20	F08x	PZ99	DB08	3,03	3,02	2,99	2,94	4	2,99			0,04	1,32	100,56
21	F14	PC01	DB08	2,99	3,00	2,99	3,00	4	3,00			0,01	0,21	100,64
22	A82	PD01	DB08	2,95	3,00	3,07	3,06	4	3,02			0,06	1,85	101,43
23	F25x	PB06	DB08	3,03	2,89	3,12	3,06	4	3,03			0,10	3,22	101,60
24	A45x	PE99	DB08	3,03	3,01	3,03	3,05	4	3,03			0,02	0,54	101,76
25	F18x	PD99	DB08	3,06	3,04	2,98	3,06	4	3,04			0,04	1,25	101,93
26	F32x	PD01	DB08	3,05	3,04	3,04	3,05	4	3,05			0,01	0,19	102,27
27	F13x	PD01	DB08	3,06	3,06	3,05	3,04	4	3,05			0,01	0,27	102,59
28	A47x	PD01	DB08	3,04	3,06	3,06	3,06	4	3,06			0,01	0,33	102,60
29	F28x	PZ98	DA02	2,97	3,12	3,19	3,01	4	3,07			0,10	3,28	103,19
30	A65	PD01	DB08	3,13	3,10	3,07	2,99	4	3,07			0,06	1,96	103,19
31	A51	PZ98	DA02	3,21	3,38	2,93	2,87	0	3,10	*c*		0,24	7,74	104,03
32	A39	PC02	DB08	3,17	3,26	3,25	3,20	4	3,22			0,04	1,30	108,20
33	A79	PD03	DB99	3,28	3,29	3,31	3,32	4	3,30			0,02	0,58	110,82
34	F21x	PZ98	DA01	3,26	3,34	3,34	3,32	4	3,32			0,04	1,14	111,34
35	A60x	PD01	DB10	4,79	4,55	4,42	4,14	0	4,48	*b*	*	0,27	6,05	150,30
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**116**	**2,98**	**0,042**	**1,399**
15	% from the mean			

l	s_R	CV_R
29	**0,146**	**4,897**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A58x	PZ98	DA02	1,05	1,02	1,08	1,09	4	1,06	*	0,03	2,98	84,75
2	F07x	PD03	DB08	1,06	1,09	1,09	1,03	4	1,07		0,03	2,89	85,33
3	A56	PC01	DB08	1,08	1,04	1,12	1,04	4	1,07		0,04	3,58	85,55
4	F12x	PC01	DB08	1,11	1,13	1,12	1,12	4	1,12		0,01	0,73	89,55
5	F03	PD02	DB08	1,20	1,17	1,19	1,21	4	1,19		0,02	1,35	95,44
6	A86	PZ98	DA01	1,21	1,18	1,21	1,18	4	1,19		0,02	1,28	95,52
7	A82	PD01	DB08	1,22	1,23	1,23	1,15	4	1,21		0,04	3,20	96,54
8	F19x	PD02	DB08	1,23	1,21	1,19	1,21	4	1,21		0,02	1,35	96,74
9	F08x	PZ99	DB08	1,24	1,24	1,23	1,15	4	1,22		0,04	3,59	97,14
10	A36	PB02	DB08	1,19	1,30	1,23	1,14	4	1,22		0,07	5,56	97,14
11	F02x	PZ98	DA01	1,30	1,31	1,14	1,15	0	1,23	*c*	0,09	7,56	97,94
12	A88	PZ98	DA01	1,27	1,22	1,23	1,20	4	1,23		0,03	2,39	98,34
13	F14	PC01	DB08	1,24	1,23	1,24	1,23	4	1,23		0,00	0,33	98,58
14	F05x	PZ98	DA01	1,24	1,24	1,24	1,24	4	1,24		0,00	0,00	99,14
15	F33x	PD01	DB10	1,18	1,26	1,25	1,27	4	1,24		0,04	3,23	99,22
16	A45x	PE99	DB08	1,24	1,25	1,24	1,25	4	1,25		0,01	0,46	99,54
17	A59	PC01	DB08	1,25	1,25	1,27	1,21	4	1,25		0,03	2,01	99,56
18	A57	PZ02	DD02	1,28	1,26	1,22	1,26	4	1,26		0,03	2,01	100,34
19	F06x	PD02	DB08	1,25	1,27	1,26	1,24	4	1,26		0,01	0,92	100,44
20	F15x	PC01	DB08	1,25	1,27	1,25	1,26	4	1,26		0,01	0,76	100,54
21	F32x	PD01	DB08	1,27	1,27	1,26	1,26	4	1,27		0,01	0,46	101,14
22	F16x	PC01	DB08	1,25	1,27	1,27	1,28	4	1,27		0,01	1,16	101,38
23	A65	PD01	DB08	1,26	1,27	1,28	1,30	4	1,28		0,02	1,34	102,14
24	A47x	PD01	DB08	1,35	1,27	1,27	1,26	4	1,29		0,04	3,26	102,94
25	F18x	PD99	DB08	1,29	1,29	1,30	1,29	4	1,29		0,01	0,39	103,34
26	A39	PC02	DB08	1,27	1,28	1,31	1,34	4	1,30		0,03	2,45	103,72
27	F27x	PZ98	DA01	1,26	1,34	1,30	1,33	4	1,31		0,04	2,68	104,54
28	F28x	PZ98	DA02	1,29	1,38	1,32	1,29	4	1,32		0,04	3,21	105,54
29	F21x	PZ98	DA01	1,36	1,33	1,31	1,31	4	1,33		0,02	1,78	106,14
30	F13x	PD01	DB08	1,37	1,38	1,38	1,38	4	1,38		0,00	0,29	110,20
31	F25x	PB06	DB08	1,37	1,38	1,38	1,39	4	1,38		0,01	0,59	110,34
32	A51	PZ98	DA02	1,44	1,50	1,42	1,35	4	1,43		0,06	4,33	114,13
33	A85x	PZ98	DA01	1,42	1,46	1,45	1,42	4	1,44	*	0,02	1,22	115,03
34	A60x	PD01	DB10	1,53	1,74	1,58	1,47	0	1,58	*b* *	0,12	7,33	126,33
35	A79	PD03	DB99	1,62	1,57	1,62	1,60	0	1,60	*b* *	0,03	1,56	128,02
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**128**	**1,25**	**0,024**	**1,914**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
32	**0,090**	**7,228**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	F07x	PD03	DB08	0,81	0,83	0,83	0,78	4	0,81	*	0,02	2,63	84,49
2	A56	PC01	DB08	0,83	0,85	0,82	0,86	4	0,84		0,02	2,17	87,34
3	A58x	PZ98	DA02	0,84	0,85	0,85	0,84	4	0,85		0,01	0,68	87,86
4	F33x	PD01	DB10	0,81	0,87	0,84	0,90	4	0,86		0,04	4,49	88,93
5	F12x	PC01	DB08	0,87	0,89	0,87	0,87	4	0,87		0,01	1,04	90,91
6	A86	PZ98	DA01	0,91	0,87	0,90	0,87	4	0,89		0,02	2,58	92,27
7	A82	PD01	DB08	0,94	0,90	0,90	0,90	4	0,91		0,02	2,09	94,28
8	A36	PB02	DB08	0,92	0,97	0,93	0,89	4	0,93		0,03	3,56	96,44
9	F19x	PD02	DB08	0,93	0,93	0,94	0,93	4	0,93		0,01	0,60	96,81
10	F06x	PD02	DB08	0,94	0,94	0,94	0,93	4	0,94		0,01	0,65	97,30
11	F27x	PZ98	DA01	0,93	0,95	0,94	0,97	4	0,95		0,02	1,61	98,44
12	A88	PZ98	DA01	0,95	0,95	0,96	0,96	4	0,96		0,01	0,60	99,30
13	A45x	PE99	DB08	0,95	0,96	0,96	0,96	4	0,96		0,01	0,55	99,51
14	A57	PZ02	DD02	0,97	0,95	0,95	0,96	4	0,96		0,01	1,00	99,56
15	A59	PC01	DB08	0,93	0,97	0,95	0,99	4	0,96		0,03	2,75	99,61
16	F14	PC01	DB08	0,96	0,96	0,96	0,96	4	0,96		0,00	0,20	99,64
17	F08x	PZ99	DB08	1,00	0,98	0,96	0,90	4	0,96		0,04	4,20	99,80
18	F03	PD02	DB08	0,95	0,96	0,98	0,99	4	0,97		0,02	1,87	100,76
19	F02x	PZ98	DA01	0,96	0,99	0,95	0,97	4	0,97		0,01	1,52	100,76
20	A39	PC02	DB08	0,99	0,97	0,98	0,97	4	0,98		0,01	1,19	101,86
21	F16x	PC01	DB08	0,99	0,97	0,99	0,96	4	0,98		0,01	1,34	101,88
22	F18x	PD99	DB08	1,00	0,97	0,98	0,99	4	0,98		0,01	1,24	102,16
23	F32x	PD01	DB08	0,98	0,98	0,98	0,99	4	0,98		0,00	0,34	102,32
24	F15x	PC01	DB08	0,98	0,99	1,01	0,96	4	0,99		0,02	2,11	102,42
25	A47x	PD01	DB08	1,00	1,01	0,99	0,97	4	0,99		0,02	1,72	103,20
26	A65	PD01	DB08	0,99	1,00	1,00	0,98	4	0,99		0,01	0,96	103,20
27	F05x	PZ98	DA01	0,99	0,99	1,01	1,01	4	1,00		0,01	1,12	104,03
28	F28x	PZ98	DA02	1,04	1,00	1,02	1,00	4	1,01		0,02	2,05	105,38
29	F13x	PD01	DB08	1,02	1,02	1,02	1,02	4	1,02		0,00	0,09	106,14
30	A85x	PZ98	DA01	1,01	1,03	1,05	1,03	4	1,03		0,02	1,67	107,00
31	F21x	PZ98	DA01	1,04	1,02	1,05	1,08	4	1,05		0,03	2,39	108,92
32	F25x	PB06	DB08	1,04	1,00	1,10	1,09	4	1,06		0,05	4,39	109,96
33	A60x	PD01	DB10	1,10	*1,3a*	1,11	1,12	3	1,11	*	0,01	0,90	115,42
34	A79	PD03	DB99	1,11	1,12	1,11	1,12	4	1,11	*	0,01	0,63	115,94
35	A51	PZ98	DA02	1,29	1,29	1,09	1,10	0	1,19	*b* *	0,11	9,45	124,00
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**135**	**0,96**	**0,016**	**1,661**
15	% from the mean			

l	s_R	CV_R
34	**0,070**	**7,223**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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

No.	Lab.	Method code		Replications				n	Lab.mean			Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4					s_i	V_i	%
1	A88	PD01	DB08	1,10	1,12	1,13	1,12	0	1,12	*b*	*	0,01	1,12	76,61
2	A62x	PD02	DE01	1,36	1,41	1,26	1,30	4	1,33			0,07	4,95	91,40
3	F07x	PD03	DB08	1,33	1,30	1,34	1,38	4	1,34			0,03	2,55	91,70
4	F12x	PC01	DB08	1,36	1,36	1,36	1,36	4	1,36			0,00	0,00	93,28
5	F06x	PD02	DB08	1,38	1,36	1,35	1,35	4	1,36			0,01	0,85	93,30
6	F13x	PD01	DB08	1,40	1,39	1,39	1,41	4	1,40			0,01	0,48	95,89
7	F02x	PD02	DB08	1,44	1,38	1,40	1,44	4	1,42			0,03	2,12	97,05
8	F01x	PB04	DE01	1,41	1,44	1,41	1,43	4	1,42			0,02	1,05	97,57
9	A82	PD01	DB08	1,44	1,44	1,41	1,42	4	1,43			0,02	1,05	97,91
10	F08x	PE99	DB08	1,41	1,41	1,43	1,46	4	1,43			0,02	1,66	97,91
11	F26x	PD02	DB09	1,44	1,39	1,48	1,41	4	1,43			0,04	2,74	98,08
12	A56	PC01	DB08	1,43	1,43	1,43	1,43	4	1,43			0,00	0,00	98,08
13	F19x	PD02	DB08	1,43	1,43	1,43	1,43	4	1,43			0,00	0,00	98,08
14	A36	PD02	DB08	1,41	1,48	1,45	1,39	4	1,43			0,04	2,81	98,25
15	F05x	PC02	DB08	1,45	1,44	1,45	1,45	4	1,45			0,01	0,35	99,28
16	A45x	PE99	DB08	1,46	1,45	1,44	1,45	4	1,45			0,01	0,56	99,46
17	F03	PD02	DB08	1,44	1,46	1,45	1,47	4	1,46			0,01	0,77	99,83
18	F21x	PD02	DE01	1,45	1,44	1,49	1,45	4	1,46			0,02	1,52	99,97
19	A85x	PD02	DB08	1,45	1,44	1,52	1,43	4	1,46			0,04	2,77	100,07
20	F16x	PC01	DB08	1,46	1,48	1,46	1,44	4	1,46			0,01	0,93	100,09
21	A58x	PD02	DE01	1,45	1,48	1,44	1,48	4	1,46			0,02	1,41	100,31
22	A59	PC01	DB08	1,46	1,45	1,47	1,48	4	1,47			0,01	0,72	100,57
23	A79	PD03	DB99	1,48	1,49	1,43	1,47	4	1,47			0,03	1,88	100,78
24	A39	PC02	DB08	1,45	1,49	1,49	1,46	4	1,48			0,02	1,34	101,22
25	F28x	PD02	DB08	1,46	1,50	1,50	1,47	4	1,48			0,02	1,31	101,56
26	F27x	PD01	DE01	1,49	1,48	1,50	1,46	4	1,48			0,02	1,27	101,72
27	F15x	PC01	DB08	1,49	1,48	1,49	1,49	4	1,49			0,01	0,34	102,03
28	F33x	PD01	DB10	1,55	1,46	1,43	1,54	4	1,49			0,06	4,05	102,51
29	F25x	PB06	DB08	1,49	1,52	1,52	1,50	4	1,51			0,02	1,00	103,40
30	F14	PC01	DB08	1,51	1,50	1,51	1,52	4	1,51			0,01	0,54	103,45
31	A57	PZ02	DD02	1,52	1,52	1,48	1,52	4	1,51			0,02	1,32	103,57
32	F24x	PD01	DB99	1,44	1,41	1,63	1,61	0	1,52	*c*		0,11	7,48	104,20
33	F32x	PD01	DB08	1,54	1,53	1,53	1,53	4	1,53			0,01	0,33	105,11
34	A65	PD01	DB08	1,54	1,54	1,53	1,55	4	1,54			0,01	0,53	105,63
35	A47x	PD01	DB08	1,56	1,50	1,58	1,54	4	1,55			0,03	2,21	105,97
36	F18x	PD99	DB08	1,55	1,59	1,55	1,57	4	1,57			0,02	1,22	107,34
37	A51	PD02	DB08	1,58	1,54	1,56	1,59	4	1,57			0,02	1,43	107,60
38	A60x	PD01	DB10	2,36	2,34	2,31	2,20	0	2,30	*b*	*	0,07	3,10	157,93
39	A43	PB06	DE01	2,49	2,56	2,38	2,47	0	2,47	*b*	*	0,07	2,90	169,73
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**140**	**1,46**	**0,020**	**1,365**
10	% from the mean			

l	s_R	CV_R
35	**0,059**	**4,014**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: P **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	A88	PD01	DB08	2,15	2,19	2,17	2,14	0	2,16	*b*	*	0,02	0,97	75,38
2	F06x	PD02	DB08	2,63	2,60	2,64	2,64	4	2,63			0,02	0,78	91,57
3	F07x	PD03	DB08	2,62	2,56	2,64	2,78	4	2,65			0,09	3,50	92,41
4	F24x	PD01	DB99	2,68	2,74	2,61	2,68	4	2,68			0,05	2,03	93,38
5	F21x	PD02	DE01	2,67	2,76	2,73	2,71	4	2,72			0,04	1,39	94,76
6	A57	PZ02	DD02	2,69	2,75	2,74	2,70	4	2,72			0,03	1,08	94,84
7	F13x	PD01	DB08	2,76	2,76	2,74	2,73	4	2,75			0,01	0,50	95,71
8	A56	PC01	DB08	2,81	2,68	2,83	2,78	4	2,78			0,07	2,40	96,76
9	F02x	PD02	DB08	2,66	2,89	2,76	2,90	4	2,80			0,11	4,08	97,72
10	F12x	PC01	DB08	2,83	2,82	2,81	2,82	4	2,82			0,01	0,29	98,33
11	F01x	PB04	DE01	2,80	2,85	2,80	2,87	4	2,83			0,04	1,26	98,68
12	A51	PD02	DB08	2,86	2,87	2,81	2,83	4	2,84			0,03	0,98	99,00
13	A62x	PD02	DE01	2,97	3,08	2,64	2,67	4	2,84			0,22	7,70	99,03
14	A82	PD01	DB08	2,83	2,83	2,85	2,86	4	2,84			0,01	0,53	99,11
15	F19x	PD02	DB08	2,84	2,86	2,84	2,85	4	2,85			0,01	0,34	99,29
16	F05x	PC02	DB08	2,85	2,85	2,86	2,84	4	2,85			0,01	0,29	99,38
17	F08x	PE99	DB08	2,81	2,83	2,90	2,91	4	2,86			0,05	1,75	99,82
18	F15x	PC01	DB08	2,89	2,88	2,89	2,84	4	2,88			0,02	0,83	100,25
19	F27x	PD01	DE01	2,87	2,88	2,89	2,88	4	2,88			0,01	0,31	100,47
20	A58x	PD02	DE01	2,83	2,79	3,00	2,93	4	2,89			0,10	3,30	100,68
21	A59	PC01	DB08	2,89	2,87	2,89	2,91	4	2,89			0,02	0,67	100,74
22	F03	PD02	DB08	2,91	2,83	2,89	2,95	4	2,89			0,05	1,81	100,87
23	A36	PD02	DB08	2,88	3,02	2,92	2,77	4	2,90			0,10	3,57	101,03
24	A79	PD03	DB99	2,83	2,96	3,02	2,91	4	2,93			0,08	2,85	102,17
25	F14	PC01	DB08	2,94	2,94	2,94	2,95	4	2,94			0,01	0,25	102,52
26	F16x	PC01	DB08	2,91	2,97	2,93	2,95	4	2,94			0,02	0,83	102,55
27	A45x	PE99	DB08	2,95	2,93	2,95	2,95	4	2,95			0,01	0,34	102,69
28	A47x	PD01	DB08	2,93	2,97	2,99	2,97	4	2,97			0,03	0,85	103,39
29	F26x	PD02	DB09	2,95	2,96	2,99	2,98	4	2,97			0,02	0,61	103,56
30	A65	PD01	DB08	3,00	2,97	2,97	2,96	4	2,98			0,02	0,58	103,73
31	F32x	PD01	DB08	3,01	2,97	2,99	2,97	4	2,99			0,02	0,64	104,08
32	F25x	PB06	DB08	2,95	2,98	3,01	3,00	4	2,99			0,03	0,89	104,08
33	F28x	PD02	DB08	2,90	2,90	3,05	3,12	4	2,99			0,11	3,72	104,35
34	F18x	PD99	DB08	3,01	3,02	2,97	3,01	4	3,00			0,02	0,74	104,69
35	A85x	PD02	DB08	2,60	3,03	3,27	3,14	0	3,01	*c*		0,29	9,71	104,95
36	F33x	PD01	DB10	2,96	3,14	3,08	3,25	4	3,11			0,12	3,89	108,35
37	A39	PC02	DB08	3,21	3,32	3,36	3,26	0	3,29	*b*	*	0,07	2,03	114,60
38	A60x	PD01	DB10	4,98	4,59	4,63	4,35	0	4,64	*b*	*	0,26	5,60	161,70
39	A43	PB06	DE01	5,38	5,49	5,94	5,60	0	5,60	*b*	*	0,24	4,34	195,36
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**136**	**2,87**	**0,047**	**1,633**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
34	**0,109**	**3,810**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	1,85	1,88	1,95	1,88	0	1,89	*b*	*	0,04	2,13	75,95
2	A57	PZ02	DD02	2,33	2,34	2,24	2,31	4	2,31			0,05	1,96	92,68
3	F07x	PD03	DB08	2,22	2,32	2,55	2,29	4	2,35			0,14	6,12	94,29
4	F13x	PD01	DB08	2,37	2,36	2,36	2,35	4	2,36			0,01	0,23	94,90
5	F06x	PD02	DB08	2,37	2,38	2,38	2,39	4	2,38			0,01	0,39	95,73
6	A62x	PD02	DE01	2,60	2,30	2,30	2,37	4	2,39			0,14	5,94	96,20
7	F12x	PC01	DB08	2,39	2,41	2,39	2,40	4	2,40			0,01	0,40	96,40
8	A82	PD01	DB08	2,51	2,47	2,31	2,35	4	2,41			0,10	3,95	96,91
9	F03	PD02	DB08	2,43	2,45	2,39	2,45	4	2,43			0,03	1,12	97,65
10	F01x	PB04	DE01	2,45	2,42	2,42	2,43	4	2,43			0,01	0,58	97,71
11	F21x	PD02	DE01	2,45	2,40	2,41	2,46	4	2,43			0,03	1,21	97,71
12	F27x	PD01	DE01	2,43	2,47	2,46	2,44	4	2,45			0,02	0,70	98,45
13	F24x	PD01	DB99	2,47	2,44	2,50	2,38	4	2,45			0,05	2,14	98,51
14	F33x	PD01	DB10	2,34	2,50	2,44	2,53	4	2,45			0,08	3,32	98,61
15	A58x	PD02	DE01	2,43	2,47	2,48	2,44	4	2,46			0,02	0,97	98,72
16	A56	PC01	DB08	2,46	2,53	2,31	2,52	4	2,46			0,10	4,13	98,72
17	F08x	PE99	DB08	2,41	2,41	2,52	2,51	4	2,46			0,06	2,47	99,02
18	F05x	PC02	DB08	2,47	2,47	2,47	2,47	4	2,47			0,00	0,00	99,32
19	F19x	PD02	DB08	2,48	2,47	2,46	2,48	4	2,47			0,01	0,39	99,42
20	A79	PD03	DB99	2,49	2,49	2,47	2,46	4	2,48			0,02	0,64	99,63
21	A45x	PE99	DB08	2,47	2,49	2,48	2,49	4	2,48			0,01	0,39	99,82
22	A51	PD02	DB08	2,46	2,50	2,50	2,51	4	2,49			0,02	0,96	100,16
23	F02x	PD02	DB08	2,41	2,55	2,41	2,61	4	2,50			0,10	4,05	100,32
24	A36	PD02	DB08	2,46	2,64	2,50	2,38	4	2,50			0,11	4,36	100,32
25	F15x	PC01	DB08	2,48	2,50	2,48	2,53	4	2,50			0,02	0,95	100,43
26	F16x	PC01	DB08	2,51	2,53	2,53	2,48	4	2,51			0,02	0,95	101,06
27	F28x	PD02	DB08	2,56	2,50	2,58	2,41	4	2,51			0,08	3,03	101,06
28	A59	PC01	DB08	2,51	2,53	2,62	2,53	4	2,55			0,05	1,91	102,46
29	F14	PC01	DB08	2,55	2,54	2,56	2,54	4	2,55			0,01	0,33	102,46
30	F32x	PD01	DB08	2,57	2,58	2,58	2,52	4	2,56			0,03	1,12	103,04
31	F26x	PD02	DB09	2,53	2,55	2,59	2,58	4	2,56			0,03	1,07	103,04
32	A47x	PD01	DB08	2,70	2,52	2,54	2,53	4	2,57			0,09	3,32	103,44
33	A65	PD01	DB08	2,58	2,60	2,57	2,62	4	2,59			0,02	0,86	104,25
34	F25x	PB06	DB08	2,61	2,61	2,61	2,61	4	2,61			0,00	0,00	104,95
35	A85x	PD02	DB08	2,70	2,81	2,56	2,55	4	2,65			0,12	4,63	106,69
36	F18x	PD99	DB08	2,65	2,67	2,68	2,64	4	2,66			0,02	0,69	106,96
37	A39	PC02	DB08	2,73	2,73	2,71	2,67	4	2,71			0,03	1,15	108,97
38	A60x	PD01	DB10	3,69	3,65	3,66	3,53	0	3,63	*b*	*	0,07	1,94	146,06
39	A43	PB06	DE01	4,85	4,81	4,43	4,69	0	4,69	*b*	*	0,19	4,03	188,72
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**144**	**2,49**	**0,046**	**1,836**
10	% from the mean			
	l		s_R	CV_R
	36		**0,090**	**3,610**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	*0,744a*	0,75	0,76	0,75	0	0,75	*b*	*	0,00	0,13	75,00
2	A62x	PD02	DE01	0,96	0,88	0,80	0,89	0	0,88	*c*	*	0,07	7,42	87,78
3	F33x	PD01	DB10	0,87	0,96	0,93	0,95	4	0,92			0,04	4,40	91,89
4	F07x	PD03	DB08	0,90	0,91	0,95	0,95	4	0,92			0,03	2,77	91,98
5	A82	PD01	DB08	0,96	0,93	0,92	0,92	4	0,93			0,02	1,84	92,68
6	F12x	PC01	DB08	0,94	0,95	0,94	0,95	4	0,95			0,00	0,25	94,07
7	F06x	PD02	DB08	0,97	0,95	0,97	0,96	4	0,96			0,01	0,66	95,52
8	F08x	PE99	DB08	0,93	0,93	0,99	1,00	4	0,96			0,03	3,60	95,76
9	F13x	PD01	DB08	0,97	0,97	0,97	0,97	4	0,97			0,00	0,22	96,18
10	A45x	PE99	DB08	0,99	0,98	0,98	0,98	4	0,98			0,01	0,65	97,65
11	A36	PD02	DB08	0,96	1,03	1,00	0,94	4	0,98			0,04	4,10	97,73
12	A56	PC01	DB08	0,98	1,00	0,96	1,00	4	0,99			0,02	1,94	97,98
13	F19x	PD02	DB08	0,98	0,98	0,99	0,99	4	0,99			0,00	0,35	98,03
14	F03	PD02	DB08	0,99	1,01	1,00	0,99	4	1,00			0,01	0,92	99,07
15	F05x	PC02	DB08	1,00	1,00	0,99	0,99	4	1,00			0,00	0,44	99,10
16	F21x	PD02	DE01	0,98	0,98	1,01	1,02	4	1,00			0,02	2,07	99,22
17	F01x	PB04	DE01	0,98	0,97	0,99	1,05	4	1,00			0,04	3,60	99,22
18	F16x	PC01	DB08	0,98	0,99	1,01	1,02	4	1,00			0,02	1,62	99,38
19	A85x	PD02	DB08	1,03	0,95	0,98	1,04	4	1,00			0,04	4,16	99,52
20	F02x	PD02	DB08	0,98	1,04	1,01	0,98	4	1,00			0,03	2,79	99,59
21	A58x	PD02	DE01	0,98	1,01	0,99	1,04	4	1,01			0,03	2,63	99,97
22	A79	PD03	DB99	1,02	1,02	1,00	0,99	4	1,01			0,02	1,57	100,45
23	F24x	PD01	DB99	0,99	1,04	0,93	1,08	0	1,01	*c*		0,06	6,14	100,59
24	F15x	PC01	DB08	1,02	1,01	1,02	1,01	4	1,02			0,01	0,57	100,96
25	A57	PZ02	DD02	1,04	1,01	1,01	1,03	4	1,02			0,02	1,47	101,71
26	A47x	PD01	DB08	1,03	1,04	1,03	1,03	4	1,03			0,01	0,48	102,70
27	A59	PC01	DB08	1,00	1,04	1,03	1,06	4	1,03			0,03	2,54	102,75
28	F14	PC01	DB08	1,02	1,04	1,03	1,05	4	1,03			0,01	0,92	102,88
29	F27x	PD01	DE01	1,03	1,05	1,03	1,04	4	1,04			0,01	1,00	103,00
30	F28x	PD02	DB08	1,02	1,07	1,06	1,00	4	1,04			0,03	3,17	103,32
31	F32x	PD01	DB08	1,04	1,05	1,04	1,04	4	1,04			0,01	0,48	103,70
32	F25x	PB06	DB08	1,00	1,06	1,06	1,05	4	1,04			0,03	2,76	103,70
33	F18x	PD99	DB08	1,05	1,05	1,05	1,05	4	1,05			0,00	0,00	104,44
34	A65	PD01	DB08	1,07	1,05	1,06	1,05	4	1,06			0,01	0,91	105,19
35	A39	PC02	DB08	1,08	1,04	1,09	1,04	4	1,06			0,02	2,24	105,51
36	F26x	PD02	DB09	1,05	1,07	1,06	1,07	4	1,06			0,01	0,90	105,69
37	A51	PD02	DB08	1,09	1,09	1,12	1,10	4	1,10			0,01	1,30	109,44
38	A60x	PD01	DB10	1,50	1,51	1,52	1,50	0	1,51	*b*	*	0,01	0,64	149,95
39	A43	PB06	DE01	1,95	1,99	1,95	1,98	0	1,97	*b*	*	0,02	1,16	195,76
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**136**	**1,01**	**0,017**	**1,732**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
34	**0,042**	**4,144**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	A88	PD01	DB08	3,33	3,40	3,35	3,35	0	3,36	*b*	*	0,03	0,93	80,88
2	A62x	PD02	DB01	3,68	3,82	3,58	3,59	4	3,67		*	0,11	3,03	88,34
3	F12x	PC01	DB08	3,84	3,84	3,84	3,84	4	3,84			0,00	0,00	92,49
4	F27x	PD01	DB01	3,97	3,89	3,93	3,86	4	3,91			0,05	1,21	94,28
5	A79	PD03	DB99	3,96	4,00	3,85	3,97	4	3,95			0,06	1,63	95,07
6	A59	PC01	DB08	3,99	3,92	4,03	4,01	4	3,99			0,05	1,23	96,04
7	F02x	PD02	DB08	3,92	4,05	3,88	4,11	4	3,99			0,11	2,71	96,10
8	F06x	PD02	DB08	4,05	4,01	3,99	3,97	4	4,00			0,03	0,85	96,42
9	A56	PC01	DB08	4,02	3,97	4,01	4,06	4	4,02			0,04	0,92	96,71
10	F13x	PC01	DB08	4,01	4,01	4,08	4,04	4	4,04			0,03	0,75	97,20
11	F07x	PD03	DB08	4,19	4,00	4,08	3,99	4	4,06			0,09	2,25	97,90
12	F19x	PD02	DB08	4,09	4,07	4,04	4,06	4	4,07			0,02	0,51	97,91
13	A51	PD02	DB08	4,09	4,00	4,13	4,11	4	4,08			0,05	1,35	98,28
14	F03	PD02	DB08	4,05	4,10	4,06	4,17	4	4,10			0,06	1,36	98,63
15	F15x	PC01	DB08	4,06	*4,96a*	4,17	4,06	3	4,10			0,06	1,55	98,67
16	A42x	PB04	DB01	4,28	4,20	3,93	4,00	4	4,10			0,16	3,95	98,77
17	F33x	PD01	DB10	4,30	4,14	3,95	4,12	4	4,13			0,14	3,48	99,41
18	F18x	PD99	DB08	4,11	4,13	4,13	4,14	4	4,13			0,01	0,30	99,42
19	A82	PD01	DB08	4,22	4,12	4,12	4,05	4	4,13			0,07	1,69	99,42
20	F05x	PC02	DB08	4,13	4,12	4,14	4,13	4	4,13			0,01	0,20	99,48
21	A58x	PD02	DB02	4,15	4,12	4,19	4,11	4	4,14			0,04	0,87	99,78
22	F16x	PC01	DB08	4,17	4,10	4,19	4,13	4	4,15			0,04	1,06	99,91
23	F21x	PD02	DB09	4,18	4,20	4,18	4,14	4	4,18			0,03	0,60	100,56
24	F14	PC01	DB08	4,20	4,14	4,18	4,20	4	4,18			0,03	0,74	100,67
25	F25x	PB06	DB08	4,14	4,14	4,25	4,19	4	4,18			0,05	1,25	100,68
26	A45x	PE99	DB08	4,25	4,22	4,24	4,25	4	4,24			0,01	0,33	102,13
27	F24x	PD01	DB99	4,70	4,20	3,95	4,29	0	4,28	*c*		0,31	7,30	103,17
28	A36	PD02	DB08	4,21	4,46	4,34	4,16	4	4,29			0,13	3,15	103,39
29	A57	PZ02	DD02	4,28	4,35	4,31	4,25	4	4,30			0,04	0,99	103,51
30	F08x	PE99	DB08	4,29	4,29	4,25	4,37	4	4,30			0,05	1,17	103,57
31	A65	PD01	DB08	4,44	4,38	4,33	4,34	4	4,37			0,05	1,14	105,32
32	F32x	PD01	DB08	4,38	4,38	4,40	4,37	4	4,38			0,01	0,29	105,56
33	F28x	PD02	DB08	4,38	4,36	4,43	4,38	4	4,39			0,03	0,68	105,73
34	A47x	PD01	DB08	4,42	4,34	4,44	4,36	4	4,39			0,05	1,08	105,74
35	F26x	PD02	DB09	4,46	4,39	4,41	4,50	4	4,44			0,05	1,12	106,94
36	A85x	PD02	DB08	4,22	4,22	4,58	4,77	4	4,45			0,28	6,19	107,12
37	F01x	PB04	DB01	4,51	4,60	4,53	4,38	4	4,51			0,09	2,04	108,51
38	A39	PC02	DB08	4,94	5,00	4,97	4,99	0	4,97	*b*	*	0,03	0,51	119,82
39	A60x	PD01	DB10	6,06	5,87	5,77	5,59	0	5,82	*b*	*	0,20	3,37	140,24
40	A43	PB06	DB01	7,81	9,08	8,34	8,42	0	8,41	*b*	*	0,52	6,19	202,63
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**139**	**4,15**	**0,061**	**1,480**
10	% from the mean			
	l		s_R	CV_R
	35		**0,184**	**4,435**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: Ca **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	A88	PD01	DB08	11,18	11,27	10,96	11,09	0	11,13	*b*	*	0,13	1,20	80,51
2	A42x	PB04	DB01	12,85	12,56	12,99	12,97	4	12,84			0,20	1,53	92,93
3	A56	PC01	DB08	13,04	12,44	13,19	12,97	4	12,91			0,33	2,53	93,42
4	F02x	PD02	DB08	12,78	13,11	13,77	13,14	4	13,20			0,41	3,13	95,52
5	F06x	PD02	DB08	13,26	13,01	13,31	13,31	4	13,22			0,14	1,09	95,68
6	F13x	PC01	DB08	13,36	13,38	13,39	13,54	4	13,41			0,08	0,62	97,07
7	F01x	PB04	DB01	13,27	13,41	13,50	13,49	4	13,42			0,11	0,79	97,09
8	F07x	PD03	DB08	13,71	13,03	13,58	13,39	4	13,43			0,30	2,20	97,17
9	A59	PC01	DB08	13,27	13,30	13,56	13,69	4	13,45			0,20	1,51	97,36
10	F21x	PD02	DB09	13,51	13,50	13,42	13,41	4	13,46			0,05	0,39	97,40
11	F26x	PD02	DB09	13,41	13,49	13,84	13,23	4	13,49			0,26	1,90	97,64
12	A39	PC02	DB08	13,46	13,27	14,04	13,59	4	13,59			0,33	2,41	98,34
13	A51	PD02	DB08	13,60	13,76	13,43	13,61	4	13,60			0,14	1,00	98,42
14	A79	PD03	DB99	13,55	13,55	13,63	13,71	4	13,61			0,08	0,57	98,49
15	F19x	PD02	DB08	13,60	13,80	13,60	13,60	4	13,65			0,10	0,73	98,78
16	F15x	PC01	DB08	13,72	13,61	13,77	13,62	4	13,68			0,08	0,57	98,99
17	F12x	PC01	DB08	13,76	13,66	13,75	13,72	4	13,72			0,04	0,33	99,30
18	A57	PZ02	DD02	13,52	13,93	13,88	13,66	4	13,75			0,19	1,39	99,48
19	F27x	PD01	DB01	13,72	13,95	13,91	13,48	4	13,77			0,21	1,55	99,62
20	A62x	PD02	DB01	13,65	14,22	13,43	13,96	4	13,82			0,35	2,51	99,97
21	F18x	PD99	DB08	13,90	13,90	13,90	13,80	4	13,88			0,05	0,36	100,40
22	F24x	PD01	DB99	*15,665a*	13,85	13,87	13,93	3	13,88			0,04	0,29	100,45
23	F05x	PC02	DB08	13,90	13,90	13,90	13,90	4	13,90			0,00	0,00	100,58
24	F25x	PB06	DB08	13,89	13,69	14,20	14,12	4	13,98			0,23	1,65	101,13
25	F32x	PD01	DB08	14,07	13,97	13,97	14,07	4	14,02			0,06	0,41	101,45
26	F16x	PC01	DB08	13,96	14,23	14,04	14,06	4	14,07			0,11	0,81	101,83
27	A82	PD01	DB08	14,10	14,20	14,20	14,00	4	14,13			0,10	0,68	102,21
28	F14	PC01	DB08	14,16	14,22	14,20	14,19	4	14,19			0,03	0,19	102,71
29	A47x	PD01	DB08	13,95	14,27	14,39	14,27	4	14,22			0,19	1,33	102,90
30	A65	PD01	DB08	14,42	14,36	14,27	14,15	4	14,30			0,12	0,82	103,48
31	F08x	PE99	DB08	14,20	14,50	14,30	14,20	4	14,30			0,14	0,99	103,48
32	F03	PD02	DB08	14,21	14,26	14,39	14,35	4	14,30			0,08	0,57	103,49
33	F33x	PD01	DB10	13,93	14,74	14,07	14,89	4	14,41			0,48	3,30	104,25
34	A36	PD02	DB08	14,28	14,98	14,77	14,03	4	14,52			0,44	3,01	105,04
35	F28x	PD02	DB08	14,64	14,85	14,68	14,94	4	14,78			0,14	0,96	106,93
36	A45x	PE99	DB08	14,90	14,80	14,70	14,80	4	14,80			0,08	0,55	107,10
37	A85x	PD02	DB08	14,80	15,55	16,75	16,08	0	15,79	*b*	*	0,82	5,22	114,30
38	A58x	PD02	DB02	15,65	15,90	16,79	16,74	0	16,27	*b*	*	0,58	3,57	117,73
39	A60x	PD01	DB10	21,70	19,70	19,90	18,80	0	20,03	*b*	*	1,21	6,07	144,91
40	A43	PB06	DB01	29,40	28,20	30,40	29,30	0	29,33	*b*	*	0,90	3,07	212,20
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**139**	**13,82**	**0,168**	**1,214**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
35	**0,470**	**3,403**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	12,95	12,66	13,05	13,18	0	12,96	*b*	*	0,22	1,73	80,07
2	F01x	PB04	DB01	14,00	13,85	13,99	13,91	4	13,94		*	0,07	0,51	86,12
3	A42x	PB04	DB01	14,80	14,51	14,68	14,69	4	14,67			0,12	0,81	90,62
4	A57	PZ02	DD02	14,67	15,04	14,39	14,76	4	14,72			0,27	1,82	90,93
5	F28x	PD02	DB08	15,67	15,12	14,69	14,79	4	15,07			0,44	2,93	93,10
6	F21x	PD02	DB09	15,13	15,12	15,14	14,97	4	15,09			0,08	0,53	93,24
7	F12x	PC01	DB08	15,06	15,29	15,06	15,14	4	15,14			0,11	0,72	93,54
8	A56	PC01	DB08	15,37	14,72	15,87	15,85	4	15,45			0,54	3,50	95,48
9	F26x	PD02	DB09	15,43	15,82	15,09	15,95	4	15,57			0,39	2,51	96,23
10	F33x	PD01	DB10	15,01	15,84	15,73	15,87	4	15,61			0,40	2,59	96,48
11	F07x	PD03	DB08	15,58	15,42	15,61	15,88	4	15,62			0,19	1,22	96,53
12	F13x	PC01	DB08	15,61	15,68	15,72	15,81	4	15,70			0,09	0,54	97,04
13	A51	PD02	DB08	15,85	15,99	15,81	16,01	4	15,92			0,10	0,62	98,35
14	A59	PC01	DB08	15,81	15,85	16,16	15,93	4	15,94			0,15	0,96	98,48
15	A79	PD03	DB99	16,06	15,93	15,89	16,02	4	15,98			0,08	0,48	98,72
16	A39	PC02	DB08	16,21	15,97	16,20	15,87	4	16,06			0,17	1,06	99,25
17	F05x	PC02	DB08	16,20	16,20	16,20	16,20	4	16,20			0,00	0,00	100,10
18	F18x	PD99	DB08	16,20	16,20	16,20	16,20	4	16,20			0,00	0,00	100,10
19	F06x	PD02	DB08	15,93	16,55	16,26	16,06	4	16,20			0,27	1,67	100,10
20	A82	PD01	DB08	16,60	16,50	16,20	16,10	4	16,35			0,24	1,46	101,03
21	F15x	PC01	DB08	16,52	16,53	16,46	16,02	4	16,38			0,24	1,49	101,23
22	F02x	PD02	DB08	15,51	16,42	16,60	17,22	4	16,44			0,71	4,30	101,57
23	F19x	PD02	DB08	16,70	16,40	16,40	16,40	4	16,48			0,15	0,91	101,80
24	A65	PD01	DB08	16,47	16,45	16,45	16,53	4	16,48			0,04	0,23	101,80
25	F32x	PD01	DB08	16,54	16,54	16,44	16,54	4	16,52			0,05	0,30	102,05
26	F16x	PC01	DB08	16,32	16,69	16,58	16,73	4	16,58			0,18	1,11	102,45
27	F03	PD02	DB08	16,64	16,65	16,54	16,55	4	16,60			0,06	0,35	102,56
28	F08x	PE99	DB08	16,60	16,60	16,90	16,70	4	16,70			0,14	0,85	103,19
29	F14	PC01	DB08	16,68	16,66	16,82	16,78	4	16,73			0,08	0,46	103,41
30	F27x	PD01	DB01	16,66	17,01	16,94	16,68	4	16,82			0,18	1,05	103,95
31	F25x	PB06	DB08	16,78	17,00	16,89	16,72	4	16,85			0,12	0,73	104,10
32	F24x	PD01	DB99	18,51	16,97	16,12	15,90	0	16,88	*c*		1,18	7,02	104,27
33	A36	PD02	DB08	16,64	17,64	16,98	16,50	4	16,94			0,51	3,00	104,68
34	A45x	PE99	DB08	16,90	17,00	17,00	16,90	4	16,95			0,06	0,34	104,74
35	A62x	PD02	DB01	16,96	17,24	17,27	16,89	4	17,09			0,19	1,13	105,60
36	A47x	PD01	DB08	17,84	17,33	17,25	17,44	4	17,47			0,26	1,50	107,92
37	A58x	PD02	DB02	17,93	17,97	17,93	17,94	4	17,94		*	0,02	0,11	110,87
38	A85x	PD02	DB08	18,54	19,25	17,67	17,44	4	18,23		*	0,83	4,55	112,62
39	A60x	PD01	DB10	21,10	21,00	21,00	*20,6a*	0	21,03	*b*	*	0,06	0,27	129,97
40	A43	PB06	DB01	30,20	33,20	32,80	32,10	0	32,08	*b*	*	1,33	4,15	198,20
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**144**	**16,18**	**0,209**	**1,292**
10	% from the mean			

l	s_R	CV_R
36	**0,895**	**5,532**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	5,39	5,50	5,62	5,39	0	5,48	*b*	*	0,11	2,05	81,42
2	F28x	PD02	DB08	6,12	6,13	6,04	5,97	4	6,06			0,07	1,22	90,17
3	F33x	PD01	DB10	5,94	6,41	6,24	6,15	4	6,19			0,20	3,18	91,98
4	F12x	PC01	DB08	6,25	*2,28a*	6,20	6,24	3	6,23			0,03	0,42	92,64
5	F27x	PD01	DB01	6,24	6,39	6,18	6,21	4	6,26			0,09	1,50	93,03
6	F21x	PD02	DB09	6,30	6,34	6,31	6,28	4	6,31			0,02	0,40	93,79
7	A62x	PD02	DB01	6,39	6,49	6,26	6,76	4	6,48			0,21	3,27	96,28
8	F06x	PD02	DB08	6,50	6,50	6,52	6,48	4	6,50			0,02	0,27	96,63
9	A58x	PD02	DB02	6,47	6,52	6,55	6,50	4	6,51			0,03	0,52	96,80
10	A79	PD03	DB99	6,55	6,53	6,52	6,44	4	6,51			0,05	0,73	96,81
11	F07x	PD03	DB08	6,56	6,44	6,46	6,89	4	6,59			0,21	3,13	97,95
12	F13x	PC01	DB08	6,65	6,63	6,59	6,61	4	6,62			0,03	0,40	98,42
13	A51	PD02	DB08	6,64	6,62	6,67	6,60	4	6,63			0,03	0,45	98,63
14	F15x	PC01	DB08	6,65	6,61	6,68	6,64	4	6,65			0,03	0,43	98,81
15	A59	PC01	DB08	6,50	6,66	6,61	6,84	4	6,65			0,14	2,13	98,87
16	A56	PC01	DB08	6,57	6,41	6,91	6,78	4	6,67			0,22	3,32	99,14
17	F19x	PD02	DB08	6,71	6,68	6,75	6,75	4	6,72			0,03	0,51	99,96
18	F16x	PC01	DB08	6,74	6,73	6,73	6,73	4	6,73			0,01	0,08	100,08
19	A57	PZ02	DD02	6,82	6,73	6,71	6,68	4	6,74			0,06	0,89	100,14
20	F05x	PC02	DB08	6,75	6,74	6,75	6,75	4	6,75			0,00	0,07	100,33
21	A82	PD01	DB08	6,93	6,69	6,89	6,53	4	6,76			0,19	2,75	100,52
22	F03	PD02	DB08	6,97	6,71	6,77	6,78	4	6,81			0,11	1,64	101,23
23	F14	PC01	DB08	6,85	6,81	6,80	6,86	4	6,83			0,03	0,42	101,53
24	F08x	PE99	DB08	6,75	6,82	6,95	6,85	4	6,84			0,08	1,21	101,74
25	F02x	PD02	DB08	6,67	6,97	6,85	7,00	4	6,87			0,15	2,18	102,19
26	A65	PD01	DB08	6,90	6,94	6,88	6,79	4	6,88			0,06	0,92	102,26
27	F18x	PD99	DB08	6,88	6,89	6,88	6,91	4	6,89			0,01	0,21	102,45
28	F32x	PD01	DB08	6,88	6,91	6,88	6,93	4	6,90			0,02	0,35	102,60
29	A42x	PB04	DB01	6,92	6,97	6,88	6,84	4	6,90			0,06	0,84	102,61
30	A39	PC02	DB08	7,03	6,96	6,94	6,72	4	6,91			0,14	1,96	102,74
31	A36	PD02	DB08	6,82	7,23	6,90	6,78	4	6,93			0,20	2,95	103,08
32	A45x	PE99	DB08	7,02	7,01	6,96	7,03	4	7,01			0,03	0,44	104,16
33	A47x	PD01	DB08	7,06	7,06	7,01	6,97	4	7,03			0,04	0,62	104,46
34	F01x	PB04	DB01	6,91	7,05	7,09	7,11	4	7,04			0,09	1,28	104,68
35	F25x	PB06	DB08	7,15	6,94	7,12	7,09	4	7,08			0,09	1,32	105,20
36	A85x	PD02	DB08	7,27	6,92	6,87	7,30	4	7,09			0,23	3,19	105,46
37	F24x	PD01	DB99	7,57	7,13	6,55	7,46	0	7,18	*c*		0,46	6,40	106,73
38	F26x	PD02	DB09	7,42	7,44	7,47	7,48	4	7,45		*	0,03	0,37	110,81
39	A60x	PD01	DB10	8,96	9,08	9,10	8,97	0	9,03	*b*	*	0,07	0,81	134,23
40	A43	PB06	DB01	13,40	13,40	*13,6a*	13,40	0	13,40	*b*	*	0,00	0,00	199,25
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**143**	**6,73**	**0,085**	**1,263**
10	% from the mean			

l	s_R	CV_R
36	**0,289**	**4,300**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	0,67	0,67	0,66	0,66	0	0,67	*b*	*	0,01	0,86	79,33
2	A62x	PD02	DB01	0,73	0,74	0,72	0,75	0	0,74	*b*	*	0,01	1,76	87,29
3	F27x	PD01	DB01	0,76	0,77	0,76	0,75	4	0,76			0,01	0,90	90,48
4	F19x	PD02	DB08	0,80	0,79	0,79	0,80	4	0,79			0,00	0,51	94,24
5	F06x	PD02	DB08	0,81	0,80	0,79	0,79	4	0,80			0,01	1,16	94,59
6	A42x	PB04	DB01	0,79	0,80	0,79	0,81	4	0,80			0,01	1,24	94,72
7	F03	PD02	DB08	0,81	0,82	0,80	0,81	4	0,81			0,01	1,12	95,82
8	F18x	PD99	DB08	0,81	0,81	0,81	0,81	4	0,81			0,00	0,24	96,02
9	A57	PZ02	DD02	0,82	0,82	0,81	0,82	4	0,82			0,00	0,61	97,09
10	A82	PD01	DB08	0,83	0,82	0,82	0,81	4	0,82			0,01	1,17	97,51
11	A79	PD03	DB99	0,83	0,83	0,80	0,82	4	0,82			0,01	1,66	97,54
12	A85x	PD02	DB08	0,81	0,81	0,81	0,86	4	0,82			0,03	3,04	97,72
13	F24x	PD01	DB99	0,83	0,85	0,78	0,84	0	0,83	*c*		0,03	3,95	97,98
14	F07x	PD03	DB08	0,82	0,80	0,82	0,87	4	0,83			0,03	3,45	98,36
15	F01x	PB04	DB01	0,83	0,84	0,83	0,82	4	0,83			0,01	0,67	98,76
16	F02x	PD02	DB08	0,84	0,87	0,83	0,80	4	0,84			0,03	3,53	99,23
17	F33x	PD01	DB10	0,85	0,84	0,82	0,85	4	0,84			0,01	1,62	99,68
18	A58x	PD02	DB01	0,84	0,85	0,83	0,84	4	0,84			0,01	0,97	99,77
19	A56	PC01	DB08	0,84	0,84	0,83	0,85	4	0,84			0,01	0,97	99,77
20	F05x	PC02	DB08	0,85	0,84	0,85	0,85	4	0,85			0,00	0,17	100,36
21	F08x	PE99	DB08	0,85	0,85	0,84	0,85	4	0,85			0,01	0,59	100,42
22	F16x	PC01	DB08	0,84	0,86	0,84	0,85	4	0,85			0,01	1,02	100,63
23	A36	PD02	DB08	0,84	0,87	0,87	0,81	4	0,85			0,03	3,39	100,66
24	A59	PC01	DB08	0,84	0,84	0,85	0,86	4	0,85			0,01	1,01	100,80
25	F12x	PC01	DB08	0,86	0,86	0,86	0,86	4	0,86			0,00	0,00	101,55
26	A39	PC02	DB08	0,85	0,86	0,87	0,85	4	0,86			0,01	1,10	101,68
27	A45x	PE99	DB08	0,86	0,86	0,86	0,85	4	0,86			0,00	0,43	101,84
28	A47x	PD01	DB08	0,86	0,85	0,87	0,85	4	0,86			0,01	1,12	101,84
29	F13x	PD01	DB08	0,86	0,86	0,85	0,87	4	0,86			0,01	0,86	102,12
30	F15x	PC01	DB08	0,86	0,86	0,86	0,86	4	0,86			0,00	0,00	102,14
31	F14	PC01	DB08	0,86	0,86	0,87	0,86	4	0,86			0,00	0,55	102,53
32	F25x	PB06	DB08	0,87	0,86	0,87	0,87	4	0,87			0,01	0,58	103,03
33	F26x	PD02	DB09	0,87	0,86	0,88	0,89	4	0,88			0,01	1,48	103,92
34	A51	PD02	DB08	0,88	0,86	0,87	0,88	4	0,88			0,01	1,08	103,94
35	F21x	PD02	DB09	0,87	0,88	0,88	0,88	4	0,88			0,01	0,57	104,22
36	F28x	PD02	DB08	0,87	0,88	0,88	0,88	4	0,88			0,00	0,57	104,28
37	F32x	PD01	DB08	0,90	0,90	0,90	0,90	4	0,90			0,00	0,09	106,77
38	A65	PD01	DB08	*0,935a*	0,91	0,91	0,91	3	0,91			0,00	0,11	107,96
39	A60x	PD01	DB10	1,29	1,27	1,26	1,25	0	1,27	*b*	*	0,02	1,35	150,54
40	A43	PB06	DB01	1,58	1,58	1,58	*1,57a*	0	1,58	*b*	*	0,00	0,00	187,65
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**139**	**0,84**	**0,009**	**1,066**
10	% from the mean			

l	s_R	CV_R
35	**0,031**	**3,675**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	2,28	2,38	2,34	2,33	0	2,33	*b*	*	0,04	1,75	79,50
2	A62x	PD02	DB01	2,55	2,58	2,65	2,65	4	2,61		*	0,05	1,94	88,82
3	A57	PZ02	DD02	2,62	2,72	2,70	2,62	4	2,67			0,05	1,97	90,78
4	F27x	PD01	DB01	2,66	2,72	2,73	2,70	4	2,70			0,03	1,05	92,08
5	F06x	PD02	DB08	2,73	2,66	2,77	2,79	4	2,74			0,06	2,05	93,36
6	F01x	PB04	DB01	2,78	2,78	2,81	2,83	4	2,80			0,02	0,87	95,38
7	A56	PC01	DB08	2,84	2,72	2,86	2,80	4	2,81			0,06	2,21	95,55
8	F21x	PD02	DB09	2,87	2,85	2,85	2,84	4	2,85			0,01	0,44	97,17
9	F13x	PD01	DB08	2,86	2,84	2,86	2,90	4	2,86			0,03	0,91	97,57
10	F19x	PD02	DB08	2,88	2,90	2,88	2,90	4	2,89			0,01	0,40	98,45
11	A85x	PD02	DB08	2,82	2,87	2,95	2,93	4	2,89			0,06	1,99	98,52
12	F07x	PD03	DB08	2,87	2,77	2,87	3,08	4	2,90			0,13	4,44	98,69
13	A51	PD02	DB08	2,97	2,92	2,88	2,86	4	2,91			0,05	1,57	99,03
14	F08x	PE99	DB08	2,90	2,91	2,94	2,96	4	2,93			0,03	0,92	99,74
15	A79	PD03	DB99	2,94	2,91	2,96	2,96	4	2,94			0,02	0,75	100,11
16	F05x	PC02	DB08	2,94	2,94	2,94	2,94	4	2,94			0,00	0,00	100,15
17	F03	PD02	DB08	2,96	2,95	2,94	2,91	4	2,94			0,02	0,66	100,19
18	F15x	PC01	DB08	2,96	2,94	2,96	2,93	4	2,95			0,01	0,51	100,41
19	F18x	PD99	DB08	2,97	2,95	2,95	2,96	4	2,96			0,01	0,32	100,75
20	F24x	PD01	DB99	*3,331a*	2,86	2,86	2,80	3	2,84			0,03	1,11	96,76
21	F16x	PC01	DB08	2,93	3,00	2,97	2,96	4	2,96			0,03	0,96	100,99
22	F12x	PC01	DB08	2,98	2,96	2,97	2,97	4	2,97			0,01	0,27	101,17
23	F02x	PD02	DB08	2,90	2,95	3,08	3,00	4	2,98			0,08	2,58	101,51
24	A47x	PD01	DB08	2,97	2,99	3,01	2,99	4	2,99			0,02	0,55	101,85
25	F14	PC01	DB08	3,00	3,00	3,00	3,00	4	3,00			0,00	0,09	102,14
26	A39	PC02	DB08	2,81	2,80	3,20	3,18	0	3,00	*c*		0,22	7,34	102,15
27	A59	PC01	DB08	2,98	2,99	3,00	3,04	4	3,00			0,02	0,80	102,30
28	A65	PD01	DB08	3,06	3,02	3,00	2,96	4	3,01			0,04	1,38	102,37
29	F33x	PD01	DB10	2,92	3,04	2,96	3,11	4	3,01			0,08	2,81	102,45
30	A82	PD01	DB08	2,99	3,01	3,02	3,02	4	3,01			0,01	0,47	102,54
31	A45x	PE99	DB08	3,03	3,00	3,01	3,02	4	3,02			0,01	0,43	102,71
32	A36	PD02	DB08	3,02	3,14	3,13	2,78	4	3,02			0,17	5,55	102,79
33	F25x	PB06	DB08	2,99	2,97	3,09	3,04	4	3,02			0,05	1,78	102,96
34	A42x	PB04	DB01	3,04	3,07	3,12	2,98	4	3,05			0,06	1,91	103,96
35	A58x	PD02	DB01	3,09	3,10	3,12	3,09	4	3,10			0,01	0,46	105,60
36	F32x	PD01	DB08	3,12	3,12	3,11	3,11	4	3,12			0,01	0,20	106,23
37	F28x	PD02	DB08	3,12	3,17	3,12	3,10	4	3,13			0,03	1,02	106,56
38	F26x	PD02	DB09	3,15	3,15	3,17	3,16	4	3,16			0,01	0,30	107,56
39	A60x	PD01	DB10	4,79	4,40	4,44	4,31	0	4,49	*b*	*	0,21	4,69	152,78
40	A43	PB06	DB01	5,64	5,64	5,43	5,34	0	5,51	*b*	*	0,15	2,75	187,78
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**143**	**2,94**	**0,037**	**1,260**
10	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
36	**0,125**	**4,265**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	1,23	1,24	*1,2893a*	1,23	0	1,23	*b*	*	0,01	0,58	81,79
2	F27x	PD01	DB01	1,35	1,34	1,40	1,37	4	1,37			0,03	1,89	90,41
3	A62x	PD02	DB01	1,39	1,34	1,35	1,39	4	1,37			0,03	1,92	90,57
4	A57	PZ02	DD02	1,40	1,41	1,35	1,39	4	1,39			0,03	1,90	91,90
5	F03	PD02	DB08	1,42	1,41	1,41	1,42	4	1,41			0,00	0,20	93,69
6	F07x	PD03	DB08	1,44	1,44	1,47	1,39	4	1,43			0,03	2,18	94,99
7	A79	PD03	DB99	1,46	1,46	1,45	1,44	4	1,45			0,01	0,85	96,30
8	F33x	PD01	DB10	1,41	1,48	1,45	1,50	4	1,46			0,04	2,68	96,70
9	A56	PC01	DB08	1,49	1,39	1,43	1,54	4	1,46			0,07	4,51	96,87
10	F18x	PD99	DB08	1,46	1,46	1,47	1,47	4	1,47			0,01	0,39	97,03
11	A42x	PB04	DB01	1,47	1,48	1,46	1,48	4	1,47			0,01	0,72	97,49
12	F01x	PB04	DB01	1,48	1,49	1,46	1,46	4	1,47			0,02	1,02	97,53
13	F28x	PD02	DB08	1,53	1,50	1,47	1,46	4	1,49			0,03	2,02	98,62
14	F19x	PD02	DB08	1,50	1,50	1,49	1,49	4	1,50			0,01	0,39	99,02
15	F06x	PD02	DB08	1,50	1,51	1,50	1,50	4	1,51			0,01	0,35	99,70
16	A82	PD01	DB08	*1,82a*	1,53	1,51	1,48	3	1,51			0,03	1,67	99,79
17	A51	PD02	DB08	1,48	1,51	1,53	1,53	4	1,51			0,03	1,69	100,11
18	A85x	PD02	DB08	1,56	1,51	1,48	1,50	4	1,51			0,03	2,12	100,13
19	F13x	PD01	DB08	1,52	1,52	1,52	1,51	4	1,52			0,01	0,39	100,48
20	F21x	PD02	DB09	1,54	1,52	1,52	1,49	4	1,52			0,02	1,36	100,51
21	F24x	PD01	DB99	1,57	1,50	1,41	1,59	4	1,52			0,08	5,15	100,54
22	F02x	PD02	DB08	1,47	1,53	1,49	1,59	4	1,52			0,05	3,36	100,67
23	F05x	PC02	DB08	1,52	1,52	1,53	1,51	4	1,52			0,01	0,54	100,67
24	F14	PC01	DB08	1,53	1,52	1,53	1,52	4	1,52			0,01	0,54	100,97
25	A58x	PD02	DB01	1,53	1,53	1,51	1,53	4	1,53			0,01	0,66	101,01
26	F16x	PC01	DB08	1,50	1,54	1,53	1,53	4	1,53			0,02	1,11	101,05
27	F15x	PC01	DB08	1,54	1,54	1,53	1,52	4	1,53			0,01	0,62	101,50
28	A65	PD01	DB08	1,54	1,54	1,51	1,55	4	1,54			0,02	1,09	101,77
29	A45x	PE99	DB08	1,56	1,54	1,55	1,53	4	1,55			0,01	0,84	102,33
30	F12x	PC01	DB08	1,54	1,56	1,54	1,55	4	1,55			0,01	0,62	102,50
31	A36	PD02	DB08	1,53	1,61	1,58	1,47	4	1,55			0,06	3,96	102,50
32	F08x	PE99	DB08	1,56	1,57	1,56	1,55	4	1,56			0,01	0,52	103,32
33	A47x	PD01	DB08	1,66	1,54	1,56	1,54	4	1,58			0,06	3,65	104,32
34	A59	PC01	DB08	1,56	1,58	1,61	1,58	4	1,58			0,02	1,37	104,88
35	A39	PC02	DB08	1,62	1,60	1,58	1,55	4	1,59			0,03	1,99	105,21
36	F32x	PD01	DB08	1,60	1,59	1,58	1,60	4	1,59			0,01	0,60	105,48
37	F25x	PB06	DB08	1,62	1,64	1,63	1,61	4	1,63			0,01	0,79	107,63
38	F26x	PD02	DB09	1,69	1,69	1,68	1,69	4	1,69		*	0,01	0,30	111,77
39	A60x	PD01	DB10	2,13	2,11	2,08	2,07	0	2,10	*b*	*	0,03	1,31	138,92
40	A43	PB06	DB01	3,01	3,01	3,22	3,08	0	3,08	*b*	*	0,10	3,21	204,00
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**147**	**1,51**	**0,023**	**1,506**
10	% from the mean			

l	s_R	CV_R
37	**0,067**	**4,426**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	1,02	1,04	1,06	1,03	0	1,04	*b*	*	0,02	1,59	81,59
2	A62x	PD02	DB01	1,14	1,17	1,10	1,13	4	1,14		*	0,03	2,54	89,33
3	F27x	PD01	DB01	1,12	1,16	1,13	1,14	4	1,14		*	0,02	1,42	89,49
4	F33x	PD01	DB10	1,11	1,19	1,16	1,16	4	1,16			0,03	2,87	90,91
5	F28x	PD02	DB08	1,16	1,16	1,18	1,13	4	1,16			0,02	1,55	91,18
6	F07x	PD03	DB08	1,23	1,21	1,22	*1,115a*	3	1,22			0,01	0,60	96,05
7	A85x	PD02	DB08	1,22	1,23	1,16	1,22	4	1,21			0,03	2,89	95,00
8	A57	PZ02	DD02	1,21	1,21	1,20	1,21	4	1,21			0,01	0,41	95,04
9	A58x	PD02	DB01	1,21	1,21	1,22	1,23	4	1,22			0,01	0,79	95,82
10	F06x	PD02	DB08	1,23	1,23	1,23	1,21	4	1,22			0,01	1,02	96,24
11	F19x	PD02	DB08	1,24	1,24	1,25	1,23	4	1,24			0,01	0,66	97,60
12	F08x	PE99	DB08	1,26	1,22	1,26	1,23	4	1,24			0,02	1,66	97,79
13	A82	PD01	DB08	1,26	1,25	1,24	1,23	4	1,25			0,01	1,04	97,99
14	F03	PD02	DB08	1,25	1,24	1,26	1,25	4	1,25			0,01	0,62	98,46
15	F01x	PB04	DB01	1,23	1,26	1,26	1,26	4	1,25			0,02	1,20	98,58
16	F18x	PD99	DB08	1,26	1,26	1,26	1,26	4	1,26			0,00	0,00	99,17
17	A42x	PB04	DB01	1,27	1,25	1,26	1,26	4	1,26			0,01	0,69	99,41
18	A79	PD03	DB99	1,28	1,26	1,28	1,27	4	1,27			0,01	0,66	100,25
19	A56	PC01	DB08	1,27	1,28	1,26	1,31	4	1,28			0,02	1,69	100,74
20	A36	PD02	DB08	1,25	1,33	1,32	1,23	4	1,28			0,05	3,89	100,94
21	F15x	PC01	DB08	1,29	1,28	1,29	1,28	4	1,29			0,01	0,45	101,14
22	F21x	PD02	DB09	1,30	1,28	1,30	1,28	4	1,29			0,01	0,90	101,53
23	F02x	PD02	DB08	1,29	1,31	1,26	1,31	4	1,29			0,02	1,84	101,67
24	F05x	PC02	DB08	1,29	1,30	1,29	1,30	4	1,30			0,01	0,45	101,92
25	F12x	PC01	DB08	1,29	1,30	1,31	1,30	4	1,30			0,01	0,63	102,32
26	F16x	PC01	DB08	1,29	1,29	1,33	1,31	4	1,31			0,02	1,42	102,79
27	F14	PC01	DB08	1,32	1,31	1,31	1,31	4	1,31			0,01	0,41	103,20
28	A45x	PE99	DB08	1,32	1,31	1,32	1,30	4	1,31			0,01	0,73	103,30
29	A65	PD01	DB08	1,32	1,31	1,33	1,32	4	1,32			0,01	0,77	103,95
30	F26x	PD02	DB09	1,35	1,32	1,31	1,31	4	1,32			0,02	1,43	104,09
31	F13x	PD01	DB08	1,32	1,32	1,34	1,31	4	1,32			0,01	1,08	104,17
32	F24x	PD01	DB99	1,47	1,33	1,16	1,37	0	1,33	*c*		0,13	9,61	104,88
33	A51	PD02	DB08	1,34	1,32	1,35	1,33	4	1,33			0,01	0,75	105,03
34	A59	PC01	DB08	1,30	1,33	1,33	1,38	4	1,34			0,03	2,34	105,07
35	A47x	PD01	DB08	1,34	1,34	1,34	1,32	4	1,34			0,01	0,75	105,07
36	F32x	PD01	DB08	1,34	1,34	1,35	1,35	4	1,35			0,01	0,43	105,86
37	F25x	PB06	DB08	1,39	1,36	1,38	1,38	4	1,38			0,01	0,91	108,42
38	A39	PC02	DB08	1,36	1,40	1,39	1,41	4	1,39			0,02	1,42	109,50
39	A60x	PD01	DB10	1,79	1,83	1,88	1,87	0	1,84	*b*	*	0,04	2,23	145,02
40	A43	PB06	DB01	2,65	2,65	2,44	2,58	0	2,58	*b*	*	0,10	3,84	203,06
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**143**	**1,27**	**0,015**	**1,179**
10	% from the mean			

l	s_R	CV_R
36	**0,063**	**4,986**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	4,82	4,79	4,73	4,73	0	4,77	*b*	*	0,05	1,02	80,88
2	A82	PD01	DB08	5,13	5,10	5,08	5,03	4	5,09		*	0,04	0,83	86,28
3	A85x	PD02	DB08	5,29	5,30	5,23	5,26	4	5,27		*	0,03	0,61	89,39
4	F21x	PD02	DB09	5,56	5,57	5,56	5,55	4	5,56			0,01	0,15	94,33
5	A59	PC01	DB08	5,58	5,53	5,65	5,65	4	5,60			0,06	1,04	95,02
6	A42x	PB04	DB01	5,64	5,70	5,64	5,64	4	5,65			0,03	0,51	95,92
7	F08x	PE99	DB08	5,92	6,07	5,27	5,40	0	5,67	*c*		0,39	6,86	96,12
8	F01x	PB04	DB01	5,62	5,67	5,70	5,68	4	5,67			0,03	0,60	96,16
9	A56	PC01	DB08	5,66	5,70	5,71	5,71	4	5,70			0,02	0,42	96,63
10	F02x	PD02	DB08	5,78	5,68	5,79	5,53	4	5,70			0,12	2,12	96,63
11	F26x	PD02	DB09	5,89	5,55	5,76	5,69	4	5,72			0,14	2,48	97,09
12	F18x	PD99	DB08	5,76	5,76	5,76	5,77	4	5,76			0,00	0,09	97,77
13	F24x	PD01	DB99	5,71	5,79	*4,605a*	5,79	3	5,76			0,05	0,84	97,78
14	F06x	PD02	DB08	5,88	5,78	5,74	5,72	4	5,78			0,07	1,23	98,06
15	A58x	PD02	DB01	5,73	5,83	5,88	5,79	4	5,81			0,06	1,09	98,53
16	A57	PZ02	DD02	5,81	5,86	5,80	5,82	4	5,82			0,03	0,45	98,79
17	F05x	PC02	DB08	5,82	5,82	5,84	5,85	4	5,83			0,01	0,26	98,96
18	A79	PD03	DB99	5,85	5,95	5,74	5,86	4	5,85			0,09	1,48	99,21
19	F27x	PD01	DB06	5,87	5,80	5,88	5,86	4	5,85			0,04	0,60	99,32
20	F33x	PD01	DB10	6,00	5,83	5,61	5,99	4	5,86			0,19	3,17	99,40
21	F03	PD02	DB08	5,93	5,94	5,83	5,85	4	5,89			0,05	0,92	99,88
22	F15x	PC01	DB08	5,88	5,90	5,91	5,92	4	5,90			0,02	0,29	100,15
23	F16x	PC01	DB08	5,98	5,93	5,91	5,87	4	5,92			0,04	0,74	100,50
24	A36	PD02	DB08	5,84	6,16	6,12	5,60	4	5,93			0,26	4,42	100,61
25	F12x	PC01	DB08	5,96	5,96	5,96	5,96	4	5,96			0,00	0,00	101,12
26	A65	PD01	DB08	6,02	6,00	6,00	6,00	4	6,01			0,01	0,17	101,88
27	F19x	PD02	DB08	6,04	6,01	5,99	6,05	4	6,02			0,03	0,46	102,18
28	F14	PC01	DB08	6,03	6,00	6,03	6,04	4	6,03			0,02	0,30	102,23
29	A51	PD02	DB08	6,00	5,99	6,07	6,09	4	6,04			0,05	0,81	102,40
30	F25x	PB06	DB08	6,03	6,01	6,05	6,06	4	6,04			0,02	0,37	102,44
31	A45x	PE99	DB08	6,11	6,08	6,06	6,11	4	6,09			0,02	0,40	103,33
32	F07x	PD03	DB08	6,39	5,97	6,06	6,04	4	6,11			0,19	3,06	103,70
33	F32x	PD01	DB08	6,06	5,97	6,05	6,38	4	6,12			0,18	2,96	103,75
34	A39	PC02	DB08	6,26	6,31	6,20	6,45	4	6,31			0,11	1,72	106,98
35	F13x	PZ02	DD01	6,24	6,34	6,37	6,37	4	6,33			0,06	0,97	107,37
36	A62x	PD02	DB01	6,39	6,48	6,18	6,39	4	6,36			0,13	2,00	107,91
37	F28x	PD02	DB08	6,32	6,39	6,39	6,37	4	6,37			0,03	0,49	108,03
38	A47x	PD01	DB08	6,52	6,37	6,52	6,46	4	6,47			0,07	1,10	109,73
39	A60x	PD01	DB10	10,10	9,99	9,93	9,39	0	9,85	*b*	*	0,32	3,21	167,16
40	A43	PB06	DB01	11,70	11,90	11,80	11,80	0	11,80	*b*	*	0,08	0,69	200,21
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**143**	**5,89**	**0,064**	**1,094**
10	% from the mean			

l	s_R	CV_R
36	**0,287**	**4,873**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	13,19	13,38	13,40	13,16	0	13,28	*b*	*	0,13	0,94	80,35
2	A85x	PD02	DB08	15,04	15,26	14,79	14,61	4	14,92			0,29	1,93	90,29
3	A56	PC01	DB08	15,62	14,95	15,83	15,67	4	15,52			0,39	2,51	93,87
4	F06x	PD02	DB08	15,49	15,20	15,72	15,69	4	15,53			0,24	1,54	93,92
5	F24x	PD01	DB99	15,60	15,61	15,45	15,87	4	15,63			0,18	1,12	94,58
6	A59	PC01	DB08	15,61	15,67	15,76	15,87	4	15,73			0,11	0,73	95,13
7	A82	PD01	DB08	15,80	16,00	15,80	15,70	4	15,83			0,13	0,80	95,73
8	A42x	PB04	DB01	16,00	15,91	15,83	15,98	4	15,93			0,08	0,49	96,36
9	A79	PD03	DB99	16,15	15,91	15,84	15,89	4	15,95			0,14	0,86	96,49
10	A57	PZ02	DD02	15,70	16,16	16,09	15,87	4	15,96			0,21	1,32	96,52
11	F01x	PB04	DB01	16,04	16,04	15,95	16,17	4	16,05			0,09	0,56	97,10
12	F18x	PD99	DB08	16,10	16,20	16,10	16,20	4	16,15			0,06	0,36	97,70
13	F13x	PZ02	DD01	16,07	16,33	16,25	16,28	4	16,23			0,11	0,70	98,20
14	F26x	PD02	DB09	16,23	16,42	16,33	16,21	4	16,30			0,10	0,60	98,59
15	A65	PD01	DB08	16,46	16,29	16,16	16,37	4	16,32			0,13	0,78	98,73
16	A58x	PD02	DB01	16,62	16,34	16,40	16,15	4	16,38			0,19	1,18	99,08
17	F15x	PC01	DB08	16,37	16,38	16,59	16,34	4	16,42			0,11	0,70	99,33
18	F08x	PE99	DB08	16,40	16,60	16,40	16,30	4	16,43			0,13	0,77	99,36
19	F21x	PD02	DB09	16,59	16,55	16,64	16,47	4	16,56			0,07	0,43	100,20
20	F12x	PC01	DB08	16,70	16,50	16,50	16,60	4	16,58			0,10	0,58	100,27
21	F27x	PD01	DB06	16,69	16,66	16,59	16,43	4	16,59			0,12	0,71	100,37
22	F07x	PD03	DB08	17,46	16,12	16,47	16,32	4	16,59			0,60	3,59	100,38
23	A51	PD02	DB08	16,55	16,79	16,59	16,46	4	16,60			0,14	0,84	100,42
24	F05x	PC02	DB08	16,60	16,60	16,60	16,60	4	16,60			0,00	0,00	100,42
25	A36	PD02	DB08	16,25	17,65	17,53	15,53	0	16,74	*c*		1,03	6,13	101,27
26	A62x	PD02	DB01	15,67	17,45	16,37	17,72	0	16,80	*c*		0,95	5,68	101,65
27	F16x	PC01	DB08	16,73	16,92	16,91	16,70	4	16,82			0,12	0,69	101,72
28	F33x	PD01	DB10	16,44	17,22	16,57	17,55	4	16,95			0,53	3,10	102,51
29	F25x	PB06	DB08	16,87	17,21	17,19	16,87	4	17,04			0,19	1,12	103,05
30	F03	PD02	DB08	16,89	17,01	17,01	17,26	4	17,04			0,15	0,91	103,10
31	A45x	PE99	DB08	17,10	17,00	17,10	17,00	4	17,05			0,06	0,34	103,14
32	F02x	PD02	DB08	16,07	17,78	17,02	17,73	4	17,15			0,80	4,66	103,75
33	F19x	PD02	DB08	17,10	17,20	17,20	17,30	4	17,20			0,08	0,47	104,05
34	A47x	PD01	DB08	17,33	17,35	17,51	17,20	4	17,35			0,13	0,73	104,94
35	F14	PC01	DB08	17,54	17,39	17,38	17,27	4	17,39			0,11	0,65	105,22
36	F32x	PD01	DB08	17,60	17,60	17,80	17,30	4	17,58			0,21	1,17	106,32
37	F28x	PD02	DB08	17,59	18,03	17,69	17,97	4	17,82			0,21	1,20	107,80
38	A39	PC02	DB08	18,15	18,61	18,27	18,59	4	18,41		*	0,23	1,25	111,34
39	A60x	PD01	DB10	25,80	23,90	23,90	22,80	0	24,10	*b*	*	1,25	5,17	145,79
40	A43	PB06	DB01	29,70	29,70	29,80	29,80	0	29,75	*b*	*	0,06	0,19	179,97
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**140**	**16,53**	**0,186**	**1,126**
10	% from the mean			

l	s_R	CV_R
35	**0,723**	**4,374**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	5,97	6,03	*6,333a*	5,93	0	5,97	*b*	*	0,05	0,81	81,41
2	A82	PD01	DB08	6,53	*6,47a*	6,52	6,53	3	6,53		*	0,01	0,09	88,94
3	A85x	PD02	DB08	6,71	6,41	6,74	6,53	4	6,60		*	0,16	2,38	89,87
4	F28x	PD02	DB08	6,76	6,67	6,83	6,65	4	6,73			0,08	1,25	91,65
5	A56	PC01	DB08	7,00	6,70	6,64	7,24	4	6,90			0,28	4,04	93,96
6	A79	PD03	DB99	6,91	6,88	6,93	6,89	4	6,90			0,02	0,30	94,07
7	F33x	PD01	DB10	6,72	7,15	7,00	7,10	4	6,99			0,19	2,77	95,27
8	F18x	PD99	DB08	7,10	7,10	7,11	7,13	4	7,11			0,01	0,20	96,89
9	F01x	PB04	DB01	6,93	7,15	7,28	7,22	4	7,15			0,15	2,14	97,37
10	F27x	PD01	DB06	7,16	7,23	7,23	7,12	4	7,18			0,05	0,76	97,88
11	A42x	PB04	DB01	7,19	7,25	7,20	7,14	4	7,19			0,04	0,61	98,04
12	F08x	PE99	DB08	7,43	7,18	7,34	7,01	4	7,24			0,19	2,57	98,65
13	F02x	PD02	DB08	7,04	7,17	7,33	7,57	4	7,28			0,23	3,14	99,17
14	A58x	PD02	DB01	7,28	7,37	7,34	7,18	4	7,29			0,08	1,15	99,38
15	F21x	PD02	DB09	7,20	7,38	7,28	7,32	4	7,30			0,08	1,03	99,41
16	A59	PC01	DB08	7,36	7,27	7,37	7,19	4	7,30			0,08	1,16	99,48
17	F05x	PC02	DB08	7,29	7,34	7,34	7,29	4	7,32			0,03	0,39	99,68
18	F03	PD02	DB08	7,42	7,28	7,26	7,35	4	7,33			0,07	0,98	99,83
19	A57	PZ02	DD02	7,44	7,43	7,16	7,36	4	7,35			0,13	1,77	100,13
20	F12x	PC01	DB08	7,34	7,38	7,35	7,36	4	7,36			0,02	0,23	100,26
21	F19x	PD02	DB08	7,46	7,36	7,35	7,26	4	7,36			0,08	1,11	100,26
22	A51	PD02	DB08	7,37	7,48	7,37	7,45	4	7,41			0,06	0,76	101,02
23	A62x	PD02	DB01	7,22	7,37	7,69	7,42	4	7,43			0,20	2,64	101,18
24	F24x	PD01	DB99	8,26	7,43	7,18	6,86	0	7,43	*c*		0,60	8,08	101,29
25	A65	PD01	DB08	7,43	7,55	7,38	7,39	4	7,44			0,08	1,05	101,35
26	F13x	PZ02	DD01	7,57	7,62	7,30	7,30	4	7,45			0,17	2,32	101,46
27	F15x	PC01	DB08	7,50	7,43	7,41	7,60	4	7,49			0,09	1,15	102,00
28	F16x	PC01	DB08	7,41	7,44	7,57	7,55	4	7,49			0,08	1,06	102,10
29	A45x	PE99	DB08	7,49	7,52	7,48	7,49	4	7,50			0,02	0,23	102,14
30	A36	PD02	DB08	7,48	7,92	7,73	7,05	4	7,55			0,38	4,98	102,82
31	F14	PC01	DB08	7,60	7,56	7,61	7,51	4	7,57			0,05	0,61	103,14
32	F06x	PD02	DB08	7,66	7,71	7,70	7,58	4	7,66			0,06	0,77	104,42
33	F26x	PD02	DB09	7,69	7,72	7,62	7,67	4	7,68			0,04	0,55	104,59
34	F32x	PD01	DB08	7,74	7,72	7,69	7,69	4	7,71			0,02	0,32	105,07
35	F07x	PD03	DB08	7,89	7,59	7,69	7,85	4	7,75			0,14	1,81	105,66
36	F25x	PB06	DB08	7,84	7,89	7,86	7,73	4	7,83			0,07	0,89	106,70
37	A47x	PD01	DB08	*8,46a*	7,94	7,84	7,81	3	7,86			0,07	0,87	107,15
38	A39	PC02	DB08	7,98	8,00	7,97	7,76	4	7,93			0,11	1,45	108,05
39	A60x	PD01	DB10	9,97	11,40	10,30	9,42	0	10,27	*b*	*	0,83	8,13	139,98
40	A43	PB06	DB01	15,80	15,70	15,90	15,80	0	15,80	*b*	*	0,08	0,52	215,31
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**142**	**7,34**	**0,101**	**1,370**
10	% from the mean			

l	s_R	CV_R
36	**0,331**	**4,517**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A82	PD01	DB08	2,98	*2,88a*	2,99	2,97	3	2,98	*	0,01	0,34	83,35
2	A88	PD01	DB08	2,93	2,98	3,04	2,92	4	2,97	*	0,05	1,75	82,98
3	F08x	PE99	DB08	3,14	3,20	3,22	3,16	4	3,18	*	0,04	1,13	88,92
4	A85x	PD02	DB08	3,11	3,20	3,34	3,24	4	3,22		0,09	2,88	90,09
5	F28x	PD02	DB08	3,19	3,24	3,30	3,31	4	3,26		0,06	1,80	91,16
6	F33x	PD01	DB10	3,15	3,39	3,32	3,29	4	3,29		0,10	3,03	91,96
7	F21x	PD02	DB09	3,48	3,28	3,35	3,25	4	3,34		0,10	3,06	93,42
8	A79	PD03	DB99	3,40	3,40	3,41	3,37	4	3,39		0,01	0,43	94,92
9	F01x	PB04	DB01	3,48	3,37	3,39	3,49	4	3,43		0,06	1,79	96,01
10	A57	PZ02	DD02	3,47	3,45	3,43	3,43	4	3,45		0,02	0,56	96,36
11	A56	PC01	DB08	3,40	3,48	3,44	3,60	4	3,48		0,09	2,48	97,34
12	A42x	PB04	DB01	3,50	3,47	3,50	3,48	4	3,49		0,01	0,39	97,49
13	F27x	PD01	DB06	3,51	3,51	3,54	3,58	4	3,53		0,03	0,91	98,78
14	A58x	PD02	DB01	3,60	3,56	3,56	3,50	4	3,56		0,04	1,16	99,43
15	F18x	PD99	DB08	3,57	3,57	3,57	3,56	4	3,57		0,00	0,14	99,78
16	F03	PD02	DB08	3,46	3,50	3,64	3,68	4	3,57		0,11	3,01	99,80
17	F26x	PD02	DB09	3,59	3,58	3,59	3,52	4	3,57		0,03	0,94	99,85
18	A59	PC01	DB08	3,48	3,59	3,53	3,68	4	3,57		0,09	2,40	99,90
19	F19x	PD02	DB08	3,62	3,58	3,59	3,54	4	3,58		0,03	0,92	100,20
20	F02x	PD02	DB08	3,56	3,75	3,60	3,43	4	3,59		0,13	3,68	100,27
21	F15x	PC01	DB08	3,67	3,62	3,61	3,59	4	3,62		0,03	0,94	101,32
22	F05x	PC02	DB08	3,63	3,63	3,63	3,63	4	3,63		0,00	0,00	101,53
23	F12x	PC01	DB08	3,64	3,67	3,71	3,67	4	3,67		0,03	0,78	102,72
24	A36	PD02	DB08	3,63	3,85	3,81	3,44	4	3,68		0,19	5,10	103,00
25	A45x	PE99	DB08	3,70	3,68	3,67	3,70	4	3,69		0,02	0,41	103,14
26	F16x	PC01	DB08	3,76	3,64	3,65	3,70	4	3,69		0,05	1,40	103,16
27	F24x	PD01	DB99	4,07	3,68	3,38	3,66	0	3,70	*c*	0,28	7,65	103,40
28	A51	PD02	DB08	3,73	3,71	3,72	3,68	4	3,71		0,02	0,55	103,72
29	A65	PD01	DB08	3,74	3,70	3,69	3,72	4	3,71		0,02	0,60	103,84
30	F06x	PD02	DB08	3,72	3,74	3,73	3,71	4	3,73		0,01	0,35	104,19
31	F07x	PD03	DB08	3,81	3,69	3,69	3,76	4	3,74		0,06	1,56	104,48
32	F14	PC01	DB08	3,79	3,74	3,72	3,76	4	3,75		0,03	0,85	104,91
33	A39	PC02	DB08	3,87	3,74	3,82	3,96	4	3,85		0,09	2,40	107,59
34	F32x	PD01	DB08	3,93	3,87	3,90	3,92	4	3,91		0,03	0,68	109,22
35	A47x	PD01	DB08	3,95	3,91	3,90	3,88	4	3,91		0,03	0,75	109,36
36	F25x	PB06	DB08	3,95	3,90	3,91	3,89	4	3,91		0,03	0,67	109,43
37	F13x	PZ02	DD01	3,90	3,93	3,93	3,93	4	3,92		0,01	0,34	109,73
38	A62x	PD02	DB01	4,06	4,00	4,00	4,02	4	4,02	*	0,03	0,70	112,44
39	A60x	PD01	DB10	5,67	5,62	*5,89a*	5,64	0	5,64	*b* *	0,03	0,45	157,85
40	A43	PB06	DB01	7,89	8,22	8,00	8,05	0	8,04	*b* *	0,14	1,71	224,88
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**147**	**3,58**	**0,049**	**1,357**
10	% from the mean			

l	s_R	CV_R
37	**0,249**	**6,967**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	48,79	48,71	48,66	48,73	0	48,72	*b* *	0,05	0,11	93,45
2	A51	PZ98	DA02	50,49	50,47	50,11	50,22	4	50,32		0,19	0,37	96,52
3	A85x	PZ98	DA01	50,57	50,60	50,79	50,61	4	50,64		0,10	0,20	97,13
4	F18x	PZ98	DA99	51,25	50,40	51,07	51,28	4	51,00		0,41	0,81	97,82
5	F25x	PZ98	DA01	51,08	51,06	50,97	51,02	4	51,03		0,05	0,10	97,88
6	F13x	PZ98	DA01	51,19	51,12	51,17	51,10	4	51,15		0,04	0,08	98,10
7	A86	PZ98	DA01	51,34	51,39	51,30	51,34	4	51,34		0,04	0,07	98,48
8	F07x	PZ98	DA01	50,88	51,12	51,58	51,92	4	51,38		0,47	0,91	98,54
9	F12x	PZ98	DA02	51,80	51,50	51,60	51,60	4	51,63		0,13	0,24	99,02
10	F06x	PZ98	DA02	51,61	51,68	51,82	51,68	4	51,70		0,09	0,17	99,16
11	F33x	PZ98	DA02	51,84	51,90	51,76	51,62	4	51,78		0,12	0,23	99,32
12	A42x	PZ98	DA01	52,11	52,08	51,21	51,75	4	51,79		0,42	0,81	99,34
13	A39	PZ98	DA02	51,84	51,86	51,96	51,68	4	51,84		0,12	0,22	99,42
14	F02x	PZ98	DA01	52,02	51,96	51,67	51,88	4	51,88		0,15	0,29	99,51
15	F24x	PZ98	DA02	52,09	52,52	51,33	51,72	4	51,91		0,51	0,97	99,57
16	A57	PZ98	DA01	52,11	52,13	52,12	51,59	4	51,99		0,27	0,51	99,72
17	F32x	PZ98	DA01	52,00	52,00	52,00	52,00	4	52,00		0,00	0,00	99,74
18	F28x	PZ98	DA02	51,90	51,80	52,10	52,30	4	52,03		0,22	0,43	99,79
19	F05x	PZ98	DA01	52,10	52,10	52,10	52,10	4	52,10		0,00	0,00	99,93
20	A82	PZ98	DA02	52,10	52,10	52,20	52,10	4	52,13		0,05	0,10	99,98
21	A56	PZ98	DA02	52,15	52,15	52,20	52,03	4	52,13		0,07	0,14	99,99
22	F16x	PZ98	DA02	52,06	52,28	52,07	52,50	4	52,23		0,21	0,40	100,18
23	F14	PZ98	DA01	52,10	52,40	52,30	52,20	4	52,25		0,13	0,25	100,22
24	F27x	PZ98	DA01	52,34	52,42	51,99	52,27	4	52,26		0,19	0,36	100,23
25	F03	PZ98	DA01	52,34	52,33	52,36	52,23	4	52,32		0,06	0,11	100,35
26	A45x	PZ98	DA01	52,50	52,50	52,30	52,30	4	52,40		0,12	0,22	100,51
27	A60x	PZ98	DA02	52,19	52,55	52,74	52,49	4	52,49		0,23	0,43	100,68
28	F19x	PC02	DB08	52,30	52,20	52,80	52,70	4	52,50		0,29	0,56	100,70
29	A65	PZ98	DA02	52,50	53,05	52,47	53,05	4	52,77		0,33	0,62	101,21
30	F08x	PZ98	DA01	52,70	52,80	53,00	53,00	4	52,88		0,15	0,28	101,42
31	A58x	PZ98	DA02	53,04	53,29	53,38	53,00	4	53,17		0,19	0,35	101,99
32	F21x	PZ98	DA01	53,34	53,39	53,59	53,16	4	53,37		0,18	0,33	102,37
33	A88	PZ98	DA01	53,70	53,70	53,60	52,90	4	53,48		0,39	0,72	102,57
34	F15x	PZ98	DA01	54,20	54,30	54,40	54,30	4	54,30		0,08	0,15	104,15
35	A47x	PZ98	DA02	54,60	54,84	54,45	54,00	4	54,47		0,35	0,65	104,48
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**136**	**52,14**	**0,185**	**0,356**
5	% from the mean			
	l		s_R	CV_R
	34		**0,906**	**1,737**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	44,33	44,42	44,40	44,54	0	44,42	*b* *	0,09	0,20	93,09
2	A85x	PZ98	DA01	46,26	46,35	46,32	46,27	4	46,30		0,05	0,10	97,03
3	F13x	PZ98	DA01	46,35	46,33	46,40	46,34	4	46,36		0,03	0,07	97,15
4	F18x	PZ98	DA99	46,96	46,63	46,90	46,38	4	46,72		0,27	0,57	97,90
5	A51	PZ98	DA02	46,89	46,96	46,61	46,63	4	46,77		0,18	0,38	98,02
6	F25x	PZ98	DA01	46,91	46,87	46,78	46,79	4	46,84		0,06	0,13	98,15
7	A86	PZ98	DA01	47,20	46,95	46,92	46,98	4	47,01		0,13	0,27	98,52
8	F28x	PZ98	DA02	46,90	46,80	47,20	47,60	4	47,13		0,36	0,76	98,75
9	F07x	PZ98	DA01	46,79	46,98	47,37	47,61	4	47,19		0,37	0,79	98,89
10	F06x	PZ98	DA02	47,23	47,21	47,23	47,24	4	47,23		0,01	0,03	98,97
11	F27x	PZ98	DA01	47,56	47,59	47,09	47,42	4	47,42		0,23	0,48	99,36
12	F12x	PZ98	DA02	47,30	47,50	47,50	47,40	4	47,43		0,10	0,20	99,38
13	A39	PZ98	DA02	47,45	47,54	47,47	47,27	4	47,43		0,11	0,24	99,40
14	F24x	PZ98	DA02	47,25	47,52	47,56	47,85	4	47,55		0,24	0,51	99,64
15	F33x	PZ98	DA02	47,27	47,88	47,48	47,69	4	47,58		0,26	0,55	99,71
16	F05x	PZ98	DA01	47,60	47,60	47,60	47,60	4	47,60		0,00	0,00	99,75
17	A82	PZ98	DA02	47,60	47,60	47,70	47,70	4	47,65		0,06	0,12	99,85
18	F32x	PZ98	DA01	47,70	47,80	47,70	47,60	4	47,70		0,08	0,17	99,96
19	F14	PZ98	DA01	47,70	47,90	47,70	47,60	4	47,73		0,13	0,26	100,01
20	F16x	PZ98	DA02	47,76	47,79	47,76	47,92	4	47,81		0,08	0,16	100,18
21	A47x	PZ98	DA02	48,07	47,35	48,14	47,75	4	47,83		0,36	0,75	100,23
22	A56	PZ98	DA02	47,80	47,89	47,82	47,86	4	47,84		0,04	0,08	100,26
23	A60x	PZ98	DA02	47,97	47,87	47,84	47,81	4	47,87		0,07	0,14	100,32
24	A45x	PZ98	DA01	47,90	48,00	47,80	47,90	4	47,90		0,08	0,17	100,38
25	A57	PZ98	DA01	48,14	48,26	48,24	47,73	4	48,09		0,25	0,51	100,78
26	F02x	PZ98	DA01	47,62	48,01	47,34	49,68	0	48,16	*c*	1,05	2,18	100,93
27	F19x	PC02	DB08	48,00	48,00	48,40	48,30	4	48,18		0,21	0,43	100,95
28	A65	PZ98	DA02	48,30	48,28	48,04	48,23	4	48,21		0,12	0,25	101,03
29	F03	PZ98	DA01	48,20	48,20	48,15	48,37	4	48,23		0,10	0,20	101,07
30	F08x	PZ98	DA01	48,30	48,10	48,70	48,60	4	48,43		0,28	0,57	101,48
31	F21x	PZ98	DA01	48,84	48,78	48,32	48,81	4	48,69		0,25	0,51	102,03
32	A58x	PZ98	DA02	48,93	49,08	49,17	48,99	4	49,04		0,11	0,21	102,77
33	A88	PZ98	DA01	49,60	49,40	49,40	49,50	4	49,48		0,10	0,19	103,68
34	A42x	PZ98	DA01	48,13	48,06	51,23	51,40	0	49,70	*c*	1,86	3,74	104,16
35	F15x	PZ98	DA01	50,10	49,70	49,80	49,70	4	49,83		0,19	0,38	104,41
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**128**	**47,72**	**0,152**	**0,319**
5	% from the mean			

l	s_R	CV_R
32	**0,801**	**1,679**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	47,96	48,07	48,17	48,17	4	48,09	*	0,10	0,21	94,41
2	A51	PZ98	DA02	49,57	49,51	49,20	49,14	4	49,36		0,22	0,44	96,89
3	F18x	PZ98	DA99	49,36	49,71	49,36	49,67	4	49,53		0,19	0,39	97,23
4	A85x	PZ98	DA01	49,81	49,71	49,72	49,60	4	49,71		0,09	0,17	97,59
5	F25x	PZ98	DA01	50,05	49,84	49,99	50,04	4	49,98		0,09	0,19	98,12
6	F13x	PZ98	DA01	50,05	50,00	50,01	49,98	4	50,01		0,03	0,06	98,18
7	A86	PZ98	DA01	50,08	50,15	50,18	50,10	4	50,13		0,05	0,09	98,41
8	F07x	PZ98	DA01	49,84	50,37	49,97	50,75	4	50,23		0,41	0,82	98,61
9	A56	PZ98	DA02	50,20	50,56	50,48	50,54	4	50,45		0,17	0,33	99,03
10	F06x	PZ98	DA02	50,50	50,40	50,54	50,47	4	50,48		0,06	0,12	99,10
11	A60x	PZ98	DA02	50,79	50,46	50,26	50,45	4	50,49		0,22	0,44	99,12
12	F28x	PZ98	DA02	50,50	50,10	50,80	50,60	4	50,50		0,29	0,58	99,14
13	F24x	PZ98	DA02	50,64	50,64	50,74	50,00	4	50,51		0,34	0,67	99,15
14	F32x	PZ98	DA01	50,60	50,50	50,60	50,60	4	50,58		0,05	0,10	99,29
15	A42x	PZ98	DA01	50,36	50,77	50,75	50,73	4	50,65		0,20	0,39	99,44
16	A39	PZ98	DA02	50,81	50,97	50,54	50,45	4	50,69		0,24	0,47	99,52
17	F12x	PZ98	DA02	50,80	50,90	50,60	50,80	4	50,78		0,13	0,25	99,68
18	F05x	PZ98	DA01	50,80	50,80	50,80	50,70	4	50,78		0,05	0,10	99,68
19	A82	PZ98	DA02	50,80	50,80	50,90	51,10	4	50,90		0,14	0,28	99,92
20	F14	PZ98	DA01	50,80	51,10	51,00	50,80	4	50,93		0,15	0,29	99,97
21	A45x	PZ98	DA01	51,10	51,00	51,20	51,00	4	51,08		0,10	0,19	100,27
22	F16x	PZ98	DA02	51,08	51,42	51,03	50,98	4	51,13		0,20	0,39	100,37
23	A57	PZ98	DA01	51,07	51,32	51,46	50,73	4	51,15		0,32	0,63	100,41
24	F19x	PC02	DB08	51,00	51,00	51,50	51,40	4	51,23		0,26	0,51	100,56
25	F33x	PZ98	DA02	51,41	51,57	51,31	51,43	4	51,43		0,11	0,21	100,97
26	F03	PZ98	DA01	51,41	51,29	51,83	51,45	4	51,50		0,23	0,45	101,09
27	F27x	PZ98	DA01	51,60	51,38	51,84	51,21	4	51,51		0,27	0,53	101,12
28	A65	PZ98	DA02	51,61	51,64	51,74	51,50	4	51,62		0,10	0,19	101,34
29	F08x	PZ98	DA01	51,70	51,50	51,80	51,70	4	51,68		0,13	0,24	101,45
30	A58x	PZ98	DA02	51,93	51,90	51,87	52,02	4	51,93		0,06	0,12	101,95
31	A47x	PZ98	DA02	52,12	52,09	52,66	52,13	4	52,25		0,27	0,52	102,58
32	F02x	PZ98	DA01	51,87	53,16	52,39	52,66	4	52,52		0,54	1,02	103,11
33	F21x	PZ98	DA01	52,28	52,72	52,53	52,62	4	52,54		0,19	0,36	103,14
34	F15x	PZ98	DA01	53,00	53,40	53,00	53,00	4	53,10		0,20	0,38	104,24
35	A88	PZ98	DA01	53,60	53,10	53,00	54,10	4	53,45		0,51	0,95	104,93
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**140**	**50,94**	**0,191**	**0,376**
5	% from the mean			

l	s_R	CV_R
35	**1,074**	**2,109**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	48,13	47,99	47,95	47,88	0	47,99	*b* *	0,11	0,22	93,55
2	A51	PZ98	DA02	49,53	49,54	49,42	49,38	4	49,47		0,08	0,16	96,44
3	A85x	PZ98	DA01	49,75	49,72	49,68	49,89	4	49,76		0,09	0,18	97,00
4	F18x	PZ98	DA99	50,36	50,20	50,39	50,31	4	50,32		0,08	0,17	98,09
5	A86	PZ98	DA01	50,34	50,43	50,36	50,51	4	50,41		0,08	0,15	98,27
6	F25x	PZ98	DA01	50,41	50,41	50,57	50,51	4	50,47		0,08	0,16	98,40
7	F13x	PZ98	DA01	50,52	50,48	50,54	50,48	4	50,50		0,03	0,06	98,46
8	F24x	PZ98	DA02	49,10	51,05	51,90	51,31	0	50,84	*c*	1,21	2,38	99,11
9	F06x	PZ98	DA02	50,94	50,86	50,78	50,81	4	50,85		0,07	0,14	99,13
10	F07x	PZ98	DA01	50,91	50,89	50,48	51,18	4	50,87		0,29	0,57	99,16
11	F32x	PZ98	DA01	50,90	51,00	50,80	50,80	4	50,88		0,10	0,19	99,18
12	F12x	PZ98	DA02	50,90	50,90	50,80	50,90	4	50,88		0,05	0,10	99,18
13	F28x	PZ98	DA02	50,20	51,20	51,90	50,60	4	50,98		0,74	1,45	99,37
14	A60x	PZ98	DA02	50,88	51,26	50,89	50,96	4	51,00		0,18	0,36	99,42
15	A56	PZ98	DA02	51,00	50,91	50,99	51,15	4	51,01		0,10	0,20	99,45
16	A39	PZ98	DA02	50,93	50,95	51,16	51,03	4	51,02		0,10	0,20	99,46
17	A42x	PZ98	DA01	51,35	51,54	51,18	50,66	4	51,18		0,38	0,73	99,78
18	F05x	PZ98	DA01	51,20	51,20	51,20	51,20	4	51,20		0,00	0,00	99,81
19	F14	PZ98	DA01	51,20	51,50	50,80	51,40	4	51,23		0,31	0,60	99,86
20	A82	PZ98	DA02	51,10	51,40	51,40	51,20	4	51,28		0,15	0,29	99,96
21	A57	PZ98	DA01	51,39	51,48	51,52	50,85	4	51,31		0,31	0,61	100,03
22	F02x	PZ98	DA01	50,78	52,11	50,88	51,55	4	51,33		0,62	1,21	100,07
23	F33x	PZ98	DA02	51,50	51,62	51,46	51,20	4	51,45		0,18	0,34	100,29
24	F16x	PZ98	DA02	51,54	51,49	51,59	51,68	4	51,58		0,08	0,16	100,54
25	A45x	PZ98	DA01	51,50	51,70	51,60	51,70	4	51,63		0,10	0,19	100,64
26	F19x	PC02	DB08	51,60	51,50	51,90	51,80	4	51,70		0,18	0,35	100,79
27	F03	PZ98	DA01	51,50	52,16	51,40	51,79	4	51,71		0,34	0,66	100,81
28	A65	PZ98	DA02	52,04	50,68	51,56	53,11	0	51,85	*c*	1,01	1,95	101,08
29	F27x	PZ98	DA01	51,79	51,78	52,17	51,83	4	51,89		0,19	0,36	101,16
30	F08x	PZ98	DA01	51,90	51,90	52,20	52,20	4	52,05		0,17	0,33	101,47
31	A58x	PZ98	DA02	52,15	52,18	52,25	52,20	4	52,19		0,04	0,08	101,75
32	A47x	PZ98	DA02	51,92	52,33	52,81	52,15	4	52,30		0,38	0,72	101,96
33	F21x	PZ98	DA01	52,62	52,77	52,68	52,56	4	52,66		0,09	0,17	102,65
34	A88	PZ98	DA01	53,00	53,30	53,10	52,80	4	53,05		0,21	0,39	103,42
35	F15x	PZ98	DA01	53,40	53,40	53,30	53,30	4	53,35		0,06	0,11	104,00
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**128**	**51,30**	**0,183**	**0,356**
* = non tolerable mean because more than +/- **5** % from the mean				

l	s_R	CV_R
32	**0,848**	**1,654**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: Zn **Sample: 1** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	A88	PD01	DB08	23,60	24,10	24,10	23,80	0	23,90	*b*	*	0,24	1,02	78,05
2	F24	PD01	DB99	30,36	24,41	23,71	28,15	0	26,66	*c*		3,15	**11,80**	87,05
3	F08x	PE99	DB08	27,03	26,90	27,40	27,50	4	27,21			0,29	1,06	88,85
4	A80	PD03	DB10	27,80	27,80	27,50	27,70	4	27,70			0,14	0,51	90,46
5	F12x	PC01	DB10	28,30	27,40	28,20	27,90	4	27,95			0,40	1,45	91,27
6	A79	PD03	DB10	28,44	28,80	27,08	28,30	4	28,16			0,75	2,65	91,95
7	A47x	PD01	DB08	29,34	28,71	29,42	28,71	4	29,05			0,39	1,34	94,85
8	F07x	PD03	DB08	28,59	28,87	29,97	29,57	4	29,25			0,63	2,16	95,52
9	A82	PD01	DB08	29,20	29,20	29,50	29,20	4	29,28			0,15	0,51	95,60
10	A39	PC02	DB08	29,54	29,43	29,52	29,11	4	29,40			0,20	0,68	96,01
11	F19x	PD02	DB08	29,70	29,80	29,80	30,10	4	29,85			0,17	0,58	97,48
12	F15x	PC01	DB08	30,00	29,00	30,00	31,00	4	30,00			0,82	2,72	97,97
13	F02x	PD02	DB08	29,80	31,10	30,20	29,20	4	30,08			0,80	2,65	98,21
14	A45x	PE99	DB08	30,50	30,80	30,40	30,30	4	30,50			0,22	0,71	99,60
15	F18x	PD99	DB10	30,40	31,00	30,50	30,40	4	30,58			0,29	0,94	99,85
16	F06x	PD02	DB08	31,00	30,60	30,60	30,20	4	30,60			0,33	1,07	99,93
17	F28x	PD02	DB08	30,16	30,05	31,92	30,52	4	30,66			0,86	2,81	100,13
18	A58x	PD02	DB01	31,92	30,96	31,22	28,68	4	30,70			1,40	4,57	100,24
19	F21x	PD02	DB09	30,16	31,40	32,79	28,67	4	30,76			1,76	5,71	100,43
20	F03	PD02	DB08	30,88	30,85	31,21	30,77	4	30,93			0,19	0,63	101,00
21	F14	PC01	DB08	31,14	31,25	31,04	31,04	4	31,12			0,10	0,32	101,62
22	A36	PD02	DB08	31,00	32,30	31,60	30,30	4	31,30			0,85	2,72	102,21
23	F13x	PD01	DB08	31,85	31,87	*33,03a*	31,65	3	31,79			0,12	0,38	103,81
24	A57	PZ02	DD02	31,60	32,30	31,30	32,10	4	31,83			0,46	1,44	103,93
25	A65	PD01	DB08	31,80	31,60	31,90	32,20	4	31,88			0,25	0,78	104,09
26	F33x	PD01	DB10	33,72	30,65	30,51	33,11	4	32,00			1,66	5,18	104,49
27	F26x	PD02	DB09	32,10	32,29	32,00	32,06	4	32,11			0,13	0,39	104,87
28	F16x	PC01	DB08	32,26	32,07	32,27	32,10	4	32,18			0,10	0,33	105,07
29	F27	PD01	DB01	32,01	32,09	32,60	32,25	4	32,24			0,26	0,81	105,28
30	F05x	PC02	DB08	32,14	32,34	32,24	32,74	4	32,37			0,26	0,81	105,69
31	F32x	PD01	DB08	32,30	32,50	32,90	32,70	4	32,60			0,26	0,79	106,46
32	A51	PD02	DB08	32,28	32,68	32,66	32,91	4	32,63			0,26	0,80	106,57
33	A59	PC01	DB08	31,70	31,90	33,50	34,60	4	32,93			1,38	4,18	107,52
34	A56	PC01	DB08	39,01	39,30	39,70	*36,49a*	0	39,34	*b*	*	0,35	0,88	128,46
35	A60x	PD01	DB10	52,20	51,90	50,70	49,60	0	51,10	*b*	*	1,19	2,33	166,87
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**123**	**30,62**	**0,512**	**1,672**
15	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
31	**1,560**	**5,094**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	19,80	20,00	19,50	20,00	0	19,83	*b*	*	0,24	1,19	73,47
2	A47x	PD01	DB08	23,96	23,86	23,85	23,66	4	23,83			0,13	0,53	88,32
3	A79	PD03	DB10	24,47	24,06	24,71	23,95	4	24,30			0,36	1,46	90,04
4	A39	PC02	DB08	23,86	24,20	25,03	24,68	4	24,44			0,52	2,11	90,58
5	F12x	PC01	DB10	24,50	24,30	24,70	24,50	4	24,50			0,16	0,67	90,80
6	A56	PC01	DB08	25,71	24,05	25,12	23,80	4	24,67			0,90	3,64	91,43
7	F15x	PC01	DB08	25,00	24,00	26,00	24,00	4	24,75			0,96	3,87	91,72
8	A82	PD01	DB08	24,60	25,00	25,00	25,50	4	25,03			0,37	1,47	92,74
9	A80	PD03	DB10	25,40	25,30	25,50	25,30	4	25,38			0,10	0,38	94,04
10	F08x	PE99	DB08	25,20	25,20	25,40	26,10	4	25,48			0,43	1,68	94,41
11	F02x	PD02	DB08	24,90	26,10	26,40	25,60	4	25,75			0,66	2,55	95,43
12	F19x	PD02	DB08	25,70	26,00	25,90	26,00	4	25,90			0,14	0,55	95,98
13	F07x	PD03	DB08	25,81	26,12	25,89	26,63	4	26,11			0,37	1,41	96,77
14	F06x	PD02	DB08	26,40	26,30	26,50	26,60	4	26,45			0,13	0,49	98,02
15	A45x	PE99	DB08	26,50	26,70	26,80	26,50	4	26,63			0,15	0,56	98,67
16	F18x	PD99	DB10	27,10	26,60	26,80	27,40	4	26,98			0,35	1,30	99,97
17	A65	PD01	DB08	27,50	27,20	26,70	26,60	4	27,00			0,42	1,57	100,06
18	F13x	PD01	DB08	26,92	27,10	27,17	27,11	4	27,08			0,11	0,40	100,34
19	F21x	PD02	DB09	27,24	27,35	28,11	25,65	4	27,09			1,03	3,82	100,38
20	F32x	PD01	DB08	27,00	27,30	27,20	27,40	4	27,23			0,17	0,63	100,89
21	F14	PC01	DB08	27,19	27,29	27,40	27,19	4	27,27			0,10	0,37	101,05
22	F03	PD02	DB08	27,32	27,24	27,53	27,94	4	27,51			0,31	1,14	101,94
23	A36	PD02	DB08	27,10	29,00	27,90	26,70	4	27,68			1,01	3,67	102,56
24	F05x	PC02	DB08	27,59	28,11	27,48	27,78	4	27,74			0,28	1,00	102,80
25	F27	PD01	DB01	27,49	28,19	27,85	27,77	4	27,83			0,29	1,04	103,12
26	A57	PZ02	DD02	28,10	28,00	28,20	27,80	4	28,03			0,17	0,61	103,86
27	F28x	PD02	DB08	27,63	28,68	28,10	28,80	4	28,30			0,54	1,92	104,89
28	F16x	PC01	DB08	28,30	28,32	29,00	28,72	4	28,59			0,34	1,18	105,93
29	F33x	PD01	DB10	27,95	29,85	28,93	29,65	4	29,10			0,86	2,95	107,82
30	F24	PD01	DB99	29,32	23,19	27,47	37,30	0	29,32	*c*		5,91	**20,15**	108,66
31	A51	PD02	DB08	26,84	30,03	27,89	32,53	4	29,32			2,52	8,58	108,67
32	A59	PC01	DB08	33,20	30,90	28,50	30,10	4	30,68			1,96	6,38	113,68
33	F26x	PD02	DB09	30,81	30,50	31,26	31,03	4	30,90			0,32	1,05	114,51
34	A58x	PD02	DB01	31,77	32,95	33,56	29,70	4	32,00		*	1,70	5,32	118,57
35	A60x	PD01	DB10	49,40	44,70	45,20	43,10	0	45,60	*b*	*	2,69	5,89	168,99
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**128**	**26,98**	**0,558**	**2,066**
15	% from the mean			

l	s_R	CV_R
32	**2,002**	**7,420**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	F26x	PD02	DB09	13,30	13,34	13,36	*12,9a*	0	13,33	*b*	*	0,03	0,23	68,39
2	A88	PD01	DB08	14,30	14,20	15,10	14,90	0	14,63	*b*	*	0,44	3,03	75,02
3	F24	PD01	DB99	17,97	17,28	15,83	15,63	4	16,68			1,13	6,79	85,55
4	A80	PD03	DB10	17,80	17,50	17,50	17,40	4	17,55			0,17	0,99	90,02
5	F15x	PC01	DB08	18,00	18,00	18,00	18,00	4	18,00			0,00	0,00	92,33
6	F12x	PC01	DB10	18,40	17,80	18,10	18,10	4	18,10			0,24	1,35	92,84
7	A39	PC02	DB08	18,60	18,28	18,25	18,24	4	18,34			0,17	0,94	94,09
8	A79	PD03	DB10	18,61	18,37	18,38	18,24	4	18,40			0,15	0,84	94,39
9	A47x	PD01	DB08	18,55	18,48	18,55	18,52	4	18,53			0,03	0,18	95,02
10	A82	PD01	DB08	19,20	18,60	18,70	18,40	4	18,73			0,34	1,82	96,05
11	F32x	PD01	DB08	18,70	18,70	18,70	18,80	4	18,73			0,05	0,27	96,05
12	F07x	PD03	DB08	18,37	19,19	19,64	19,23	4	19,11			0,53	2,78	98,01
13	A58x	PD02	DB01	19,40	18,91	19,24	19,75	4	19,33			0,35	1,81	99,13
14	F19x	PD02	DB08	19,30	19,40	19,50	19,20	4	19,35			0,13	0,67	99,26
15	F08x	PE99	DB08	18,30	19,70	20,03	19,40	4	19,36			0,75	3,88	99,30
16	F02x	PD02	DB08	18,90	19,10	19,40	20,20	4	19,40			0,57	2,95	99,51
17	A45x	PE99	DB08	19,40	19,20	19,90	19,70	4	19,55			0,31	1,59	100,28
18	F13x	PD01	DB08	19,90	20,09	20,13	19,83	4	19,99			0,15	0,73	102,53
19	F27	PD01	DB01	19,97	19,94	20,13	19,95	4	20,00			0,09	0,45	102,58
20	F14	PC01	DB08	19,98	19,96	20,01	20,09	4	20,01			0,06	0,29	102,64
21	F05x	PC02	DB08	20,17	19,96	19,86	20,17	4	20,04			0,16	0,78	102,80
22	F21x	PD02	DB09	19,04	19,26	21,65	20,22	4	20,04			1,19	5,93	102,81
23	A65	PD01	DB08	20,00	20,00	20,10	20,50	4	20,15			0,24	1,18	103,36
24	A36	PD02	DB08	20,00	21,10	20,20	19,40	4	20,18			0,70	3,49	103,49
25	F18x	PD99	DB10	20,60	20,60	20,20	19,50	4	20,23			0,52	2,57	103,75
26	F06x	PD02	DB08	20,30	20,50	20,30	20,30	4	20,35			0,10	0,49	104,39
27	A57	PZ02	DD02	20,70	20,90	19,50	20,50	4	20,40			0,62	3,05	104,64
28	F33x	PD01	DB10	20,10	20,55	19,94	21,51	4	20,53			0,71	3,44	105,28
29	F28x	PD02	DB08	21,03	19,40	21,36	20,57	4	20,59			0,86	4,16	105,62
30	F03	PD02	DB08	20,71	20,74	20,87	20,84	4	20,79			0,08	0,37	106,64
31	A51	PD02	DB08	21,95	22,19	20,74	19,45	4	21,08			1,26	5,98	108,14
32	F16x	PC01	DB08	21,36	21,24	21,42	21,36	4	21,35			0,08	0,35	109,49
33	A56	PC01	DB08	18,95	21,83	24,47	21,11	0	21,59	*c*		2,28	**10,55**	110,75
34	A59	PC01	DB08	23,30	26,10	24,00	24,30	0	24,43	*b*	*	1,19	4,88	125,29
35	A60x	PD01	DB10	30,30	30,40	30,30	*29,8a*	0	30,33	*b*	*	0,06	0,19	155,60
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**120**	**19,49**	**0,391**	**2,007**
20	% from the mean			

l	s_R	CV_R
30	**1,099**	**5,635**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	F08x	PE99	DB08	27,90	27,60	31,20	32,40	0	29,78	*b*	*	2,39	8,03	74,12
2	A88	PD01	DB08	*29,6a*	30,20	30,20	30,20	0	30,20	*b*	*	0,00	0,00	75,18
3	A80	PD03	DB10	35,60	35,40	35,00	35,80	4	35,45			0,34	0,96	88,25
4	F12x	PC01	DB10	36,60	36,70	36,60	36,60	4	36,63			0,05	0,14	91,17
5	A82	PD01	DB08	38,10	37,20	37,90	37,20	4	37,60			0,47	1,25	93,60
6	F07x	PD03	DB08	36,34	38,32	37,99	37,91	4	37,64			0,88	2,35	93,70
7	A79	PD03	DB10	37,14	38,63	37,57	37,38	4	37,68			0,66	1,74	93,79
8	A39	PC02	DB08	37,56	38,72	38,45	37,04	4	37,94			0,78	2,05	94,45
9	F33x	PD01	DB10	35,51	39,92	37,77	38,73	4	37,98			1,87	4,92	94,55
10	A47x	PD01	DB08	38,52	38,88	38,65	38,20	4	38,56			0,28	0,74	95,99
11	F21x	PD02	DB09	36,56	42,13	39,76	38,47	4	39,23			2,34	5,96	97,65
12	F19x	PD02	DB08	39,30	39,30	39,70	39,20	4	39,38			0,22	0,56	98,02
13	F28x	PD02	DB08	38,08	39,25	39,72	40,78	4	39,46			1,12	2,84	98,22
14	F15x	PC01	DB08	40,00	39,00	40,00	39,00	4	39,50			0,58	1,46	98,33
15	F18x	PD99	DB10	39,40	39,70	39,50	39,60	4	39,55			0,13	0,33	98,45
16	A45x	PE99	DB08	40,10	40,30	40,40	40,00	4	40,20			0,18	0,45	100,07
17	A58x	PD02	DB01	40,98	40,42	40,28	39,64	4	40,33			0,55	1,37	100,39
18	F06x	PD02	DB08	40,80	40,30	40,30	40,10	4	40,38			0,30	0,74	100,51
19	A36	PD02	DB08	40,00	42,50	41,10	39,10	4	40,68			1,47	3,60	101,25
20	F03	PD02	DB08	40,69	40,75	40,54	41,04	4	40,76			0,21	0,51	101,45
21	A65	PD01	DB08	40,90	40,60	41,30	40,40	4	40,80			0,39	0,96	101,56
22	A57	PZ02	DD02	41,50	40,90	40,70	40,70	4	40,95			0,38	0,92	101,94
23	F27	PD01	DB01	41,07	40,63	40,71	41,58	4	41,00			0,43	1,06	102,05
24	F02x	PD02	DB08	40,40	41,30	40,70	42,20	4	41,15			0,79	1,93	102,43
25	F14	PC01	DB08	41,11	41,86	41,54	41,00	4	41,38			0,40	0,96	103,00
26	F05x	PC02	DB08	42,64	41,70	40,44	40,96	4	41,44			0,96	2,31	103,14
27	F13x	PD01	DB08	41,86	42,03	42,24	41,80	4	41,98			0,20	0,47	104,51
28	F16x	PC01	DB08	41,11	42,76	41,88	42,50	4	42,06			0,73	1,75	104,71
29	F32x	PD01	DB08	41,90	42,80	42,10	42,80	4	42,40			0,47	1,11	105,55
30	A56	PC01	DB08	38,52	42,78	43,39	47,18	4	42,97			3,55	8,25	106,96
31	F24	PD01	DB99	43,60	44,55	36,44	49,81	0	43,60	*c*		5,50	**12,61**	108,53
32	A51	PD02	DB08	43,47	43,05	43,83	44,59	4	43,74			0,65	1,49	108,87
33	A59	PC01	DB08	41,30	44,80	42,80	51,40	0	45,08	*c*		4,45	9,88	112,20
34	F26x	PD02	DB09	45,84	46,57	46,45	46,65	4	46,38		*	0,37	0,79	115,45
35	A60x	PD01	DB10	64,50	62,60	66,20	64,50	0	64,45	*b*	*	1,47	2,28	160,43
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**120**	**40,17**	**0,725**	**1,804**
15	% from the mean			

l	s_R	CV_R
30	**2,248**	**5,596**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: Mn **Sample: 1** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	A88	PD01	DB08	717,20	729,80	719,80	715,10	4	720,48	*	6,51	0,90	83,73
2	F08x	PE99	DB08	761,00	784,00	742,00	740,00	4	756,75		20,48	2,71	87,94
3	F27x	PD01	DB01	772,10	770,20	775,20	783,60	4	775,28		5,92	0,76	90,09
4	A79	PD03	DB10	803,92	809,27	760,34	814,53	4	797,01		24,83	3,12	92,62
5	F06x	PD02	DB08	813,10	810,30	801,60	799,80	4	806,20		6,49	0,81	93,69
6	F13x	PZ02	DD01	803,50	816,60	822,90	821,30	4	816,08		8,80	1,08	94,84
7	A59	PC01	DB08	815,00	810,00	827,00	826,00	4	819,50		8,35	1,02	95,23
8	A56	PC01	DB08	822,00	820,00	820,00	820,00	4	820,50		1,00	0,12	95,35
9	F07x	PD03	DB08	830,50	811,20	820,30	867,20	4	832,30		24,57	2,95	96,72
10	F19x	PC02	DB08	835,00	828,00	835,00	836,00	4	833,50		3,70	0,44	96,86
11	F18x	PD99	DB08	842,00	840,00	844,00	844,00	4	842,50		1,91	0,23	97,91
12	F15x	PC01	DB08	849,00	854,00	851,00	854,00	4	852,00		2,45	0,29	99,01
13	F12x	PC01	DB08	853,00	853,00	853,00	853,00	4	853,00		0,00	0,00	99,13
14	A82	PD01	DB08	871,00	861,00	870,00	852,00	4	863,50		8,89	1,03	100,35
15	F02x	PC02	DB08	872,00	862,00	855,00	870,00	4	864,75		7,80	0,90	100,49
16	A58x	PD02	DB01	870,56	870,99	854,58	868,23	4	866,09		7,77	0,90	100,65
17	F03	PD02	DB08	879,87	861,09	877,38	861,61	4	869,99		10,03	1,15	101,10
18	F16x	PC01	DB08	872,80	862,20	874,10	871,00	4	870,03		5,37	0,62	101,11
19	F33x	PD01	DB10	897,23	877,39	869,57	850,57	4	873,69		19,32	2,21	101,53
20	F14	PC01	DB08	874,15	875,22	877,37	875,22	4	875,49		1,35	0,15	101,74
21	A39	PC02	DB08	882,70	870,50	876,70	876,50	4	876,60		4,98	0,57	101,87
22	A57	PZ02	DD02	874,20	885,90	875,60	871,30	4	876,75		6,36	0,73	101,89
23	F05x	PC02	DB08	885,00	885,00	884,00	884,00	4	884,50		0,58	0,07	102,79
24	F21x	PD02	DB09	856,70	891,13	901,54	889,21	4	884,65		19,40	2,19	102,80
25	A42x	PB04	DB01	888,63	884,90	888,95	892,55	4	888,76		3,13	0,35	103,28
26	F26x	PD02	DB09	890,90	889,50	890,70	887,50	4	889,65		1,56	0,18	103,39
27	A51	PD02	DB08	885,40	884,60	893,00	900,30	4	890,83		7,36	0,83	103,52
28	F28x	PD02	DB08	890,60	900,90	896,20	896,50	4	896,05		4,22	0,47	104,13
29	A45x	PE99	DB08	906,00	903,00	905,00	900,00	4	903,50		2,65	0,29	105,00
30	A36	PB02	DB08	900,80	951,00	915,80	872,00	4	909,90		32,88	3,61	105,74
31	F24	PD01	DB99	982,00	771,00	992,00	915,00	0	915,00	*c*	101,91	**11,14**	106,33
32	A80	PD03	DB10	928,00	922,00	913,00	922,00	4	921,25		6,18	0,67	107,06
33	A65	PD01	DB08	944,00	920,00	919,00	910,00	4	923,25		14,55	1,58	107,29
34	A47x	PD01	DB08	943,00	916,00	943,00	923,00	4	931,25		13,87	1,49	108,22
35	F32x	PD01	DB08	972,00	972,00	970,00	973,00	4	971,75		1,26	0,13	112,93
36	A60x	PD01	DB10	1340,00	1340,00	1310,00	1270,00	0	1315,00	*b* *	33,17	2,52	152,82
37	A43	PB06	DB01	*1774a*	1763,00	1760,00	1762,00	0	1761,67	*b* *	1,53	0,09	204,72
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**136**	**860,51**	**8,662**	**1,007**
15	% from the mean			

l	s_R	CV_R
34	**51,433**	**5,977**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	22,70	22,50	22,00	21,70	4	22,23	*	0,46	2,06	83,76
2	F19x	PC02	DB08	23,20	23,30	23,10	23,30	4	23,23		0,10	0,41	87,53
3	A59	PC01	DB08	24,30	23,50	23,50	23,70	4	23,75		0,38	1,59	89,51
4	F27x	PD01	DB01	24,23	23,63	24,23	24,25	4	24,09		0,30	1,26	90,77
5	F07x	PD03	DB08	25,19	22,95	25,20	24,42	4	24,44		1,06	4,33	92,11
6	A47x	PD01	DB08	24,00	25,00	25,00	24,00	4	24,50		0,58	2,36	92,33
7	A56	PC01	DB08	25,00	24,00	25,00	25,00	4	24,75		0,50	2,02	93,28
8	F13x	PZ02	DD01	24,50	24,90	24,90	25,00	4	24,83		0,22	0,89	93,56
9	A82	PD01	DB08	24,80	24,80	24,80	24,90	4	24,83		0,05	0,20	93,56
10	F06x	PD02	DB08	25,27	24,79	25,52	25,69	4	25,32		0,39	1,55	95,42
11	F16x	PC01	DB08	25,45	27,16	25,28	25,95	4	25,96		0,85	3,27	97,84
12	F03	PD02	DB08	26,05	26,03	25,92	25,90	4	25,98		0,08	0,29	97,89
13	F15x	PC01	DB08	26,00	26,00	26,00	26,00	4	26,00		0,00	0,00	97,99
14	F12x	PC01	DB08	26,00	26,00	26,00	26,00	4	26,00		0,00	0,00	97,99
15	F18x	PD99	DB08	26,10	26,00	26,30	26,00	4	26,10		0,14	0,54	98,36
16	A42x	PB04	DB01	26,45	26,48	25,99	25,62	4	26,13		0,41	1,58	98,49
17	A79	PD03	DB10	26,59	26,28	27,29	26,43	4	26,65		0,45	1,68	100,43
18	F32x	PD01	DB08	27,00	26,70	26,70	26,50	4	26,73		0,21	0,77	100,72
19	F02x	PC02	DB08	26,10	25,90	27,40	28,10	4	26,88		1,05	3,92	101,29
20	F05x	PC02	DB08	26,90	26,80	26,90	27,00	4	26,90		0,08	0,30	101,38
21	A45x	PE99	DB08	27,10	27,00	27,20	27,40	4	27,18		0,17	0,63	102,42
22	F08x	PE99	DB08	26,50	26,20	29,40	27,30	4	27,35		1,44	5,28	103,08
23	A57	PZ02	DD02	27,10	27,60	27,30	28,10	4	27,53		0,43	1,58	103,74
24	F21x	PD02	DB09	28,04	27,76	27,47	27,80	4	27,77		0,23	0,84	104,65
25	A51	PD02	DB08	27,86	28,11	27,51	27,77	4	27,81		0,25	0,89	104,82
26	A65	PD01	DB08	*31a*	28,00	28,00	28,00	3	28,00		0,00	0,00	105,53
27	F33x	PD01	DB10	27,61	27,98	28,07	29,48	4	28,29		0,82	2,90	106,60
28	A58x	PD02	DB01	28,18	28,24	28,30	28,94	4	28,42		0,35	1,24	107,09
29	F14	PC01	DB08	28,50	28,60	28,20	28,70	4	28,50		0,22	0,76	107,41
30	F28x	PD02	DB08	29,39	29,39	27,87	27,51	4	28,54		0,99	3,48	107,56
31	A36	PB02	DB08	28,95	30,45	29,06	27,78	4	29,06		1,09	3,76	109,52
32	A39	PC02	DB08	29,83	29,70	29,01	29,28	4	29,46		0,38	1,28	111,01
33	F26x	PD02	DB09	30,03	28,91	30,17	30,05	4	29,79		0,59	1,98	112,27
34	A80	PD03	DB10	30,60	30,60	*31a*	30,60	3	30,60	*	0,00	0,00	115,32
35	F24	PD01	DB99	34,00	32,00	33,00	34,00	0	33,25	*b* *	0,96	2,88	125,31
36	A60x	PD01	DB10	47,00	44,30	44,10	41,60	0	44,25	*b* *	2,21	4,99	166,77
37	A43	PB06	DB01	50,10	*54,6a*	50,10	51,00	0	50,40	*b* *	0,52	1,03	189,95
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**134**	**26,53**	**0,420**	**1,582**
15	% from the mean			

l	s_R	CV_R
34	**1,969**	**7,411**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	34,10	34,50	35,70	34,10	4	34,60	*	0,76	2,19	82,28
2	F19x	PC02	DB08	37,10	37,10	36,90	37,00	4	37,03		0,10	0,26	88,05
3	F07x	PD03	DB08	38,35	36,51	38,73	39,20	4	38,20		1,18	3,08	90,84
4	F27x	PD01	DB01	37,75	40,31	39,69	37,47	4	38,81		1,41	3,63	92,28
5	A79	PD03	DB10	39,39	38,75	38,91	38,89	4	38,99		0,28	0,71	92,71
6	A82	PD01	DB08	39,60	39,50	39,20	38,60	4	39,23		0,45	1,15	93,28
7	A56	PC01	DB08	37,00	41,00	38,00	41,00	4	39,25		2,06	5,25	93,34
8	A59	PC01	DB08	39,60	39,90	40,80	39,40	4	39,93		0,62	1,55	94,95
9	F13x	PZ02	DD01	41,80	40,50	39,00	38,90	4	40,05		1,38	3,44	95,25
10	F08x	PE99	DB08	41,80	41,70	39,70	38,80	4	40,50		1,49	3,68	96,32
11	A47x	PD01	DB08	43,00	40,00	40,00	40,00	4	40,75		1,50	3,68	96,91
12	F03	PD02	DB08	40,85	41,28	40,49	40,38	4	40,75		0,41	1,00	96,91
13	F18x	PD99	DB08	40,80	41,00	40,90	40,80	4	40,88		0,10	0,23	97,21
14	F12x	PC01	DB08	41,00	42,00	41,00	41,00	4	41,25		0,50	1,21	98,10
15	F16x	PC01	DB08	39,83	42,66	41,44	42,50	4	41,61		1,30	3,13	98,95
16	F15x	PC01	DB08	42,00	42,00	42,00	41,00	4	41,75		0,50	1,20	99,29
17	F28x	PD02	DB08	42,29	41,94	42,64	42,53	4	42,35		0,31	0,73	100,72
18	F06x	PD02	DB08	42,28	43,65	42,41	42,41	4	42,69		0,64	1,51	101,52
19	A45x	PE99	DB08	42,60	42,70	42,90	42,80	4	42,75		0,13	0,30	101,67
20	F33x	PD01	DB10	40,44	41,51	44,10	45,05	4	42,78		2,16	5,05	101,73
21	F02x	PC02	DB08	43,20	42,00	44,00	42,00	4	42,80		0,98	2,29	101,79
22	F05x	PC02	DB08	42,80	43,30	42,90	42,80	4	42,95		0,24	0,55	102,14
23	A51	PD02	DB08	43,00	44,19	43,12	42,39	4	43,18		0,75	1,73	102,68
24	A57	PZ02	DD02	43,40	44,00	42,50	43,40	4	43,33		0,62	1,43	103,03
25	A58x	PD02	DB01	44,11	43,16	43,82	43,08	4	43,54		0,50	1,16	103,55
26	F21x	PD02	DB09	42,76	43,92	43,84	43,82	4	43,59		0,55	1,27	103,65
27	A65	PD01	DB08	45,00	44,00	43,00	43,00	4	43,75		0,96	2,19	104,04
28	F14	PC01	DB08	44,40	44,00	44,10	43,90	4	44,10		0,22	0,49	104,88
29	F32x	PD01	DB08	44,90	44,10	44,10	44,30	4	44,35		0,38	0,85	105,47
30	A80	PD03	DB10	45,40	44,80	44,90	43,80	4	44,73		0,67	1,50	106,36
31	A42x	PB04	DB01	45,63	44,94	45,04	44,33	4	44,99		0,53	1,18	106,98
32	A39	PC02	DB08	46,03	45,49	45,02	44,99	4	45,38		0,49	1,08	107,93
33	A36	PB02	DB08	44,80	48,61	45,32	43,42	4	45,54		2,20	4,83	108,30
34	F26x	PD02	DB09	46,17	46,38	46,27	46,80	4	46,41		0,28	0,60	110,36
35	F24	PD01	DB99	50,00	50,00	48,00	48,00	4	49,00	*	1,15	2,36	116,53
36	A60x	PD01	DB10	64,50	62,70	64,00	60,90	0	63,03	*b* *	1,61	2,55	149,88
37	A43	PB06	DB01	86,30	84,00	92,00	87,20	0	87,38	*b* *	3,36	3,85	207,79
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**140**	**42,05**	**0,793**	**1,887**
15	% from the mean			

l	s_R	CV_R
35	**2,854**	**6,788**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	140,20	142,70	145,90	139,50	4	142,08	*	2,90	2,04	83,92
2	F08x	PE99	DB08	149,00	145,00	139,00	140,00	4	143,25	*	4,65	3,24	84,61
3	F27x	PD01	DB01	150,70	152,60	153,80	154,50	4	152,90		1,66	1,09	90,31
4	F07x	PD03	DB08	155,30	146,50	157,50	155,20	4	153,63		4,87	3,17	90,74
5	A79	PD03	DB10	150,48	155,53	156,37	155,49	4	154,47		2,69	1,74	91,24
6	F19x	PC02	DB08	156,00	156,00	157,00	156,00	4	156,25		0,50	0,32	92,29
7	A56	PC01	DB08	161,00	167,00	162,00	167,00	4	164,25		3,20	1,95	97,02
8	A82	PD01	DB08	169,00	165,00	164,00	164,00	4	165,50		2,38	1,44	97,75
9	F12x	PC01	DB08	166,00	167,00	167,00	167,00	4	166,75		0,50	0,30	98,49
10	F06x	PD02	DB08	167,90	168,30	167,70	165,10	4	167,25		1,45	0,87	98,79
11	F18x	PD99	DB08	168,00	168,00	169,00	168,00	4	168,25		0,50	0,30	99,38
12	F15x	PC01	DB08	171,00	168,00	168,00	167,00	4	168,50		1,73	1,03	99,53
13	A59	PC01	DB08	163,00	169,00	169,00	174,00	4	168,75		4,50	2,67	99,67
14	F03	PD02	DB08	168,94	170,57	168,40	168,39	4	169,08		1,03	0,61	99,87
15	A57	PZ02	DD02	171,30	170,80	170,50	169,00	4	170,40		0,99	0,58	100,65
16	F13x	PZ02	DD01	169,70	171,80	171,40	171,40	4	171,08		0,94	0,55	101,05
17	A42x	PB04	DB01	172,36	172,86	171,72	171,09	4	172,01		0,77	0,45	101,60
18	A58x	PD02	DB01	172,23	171,08	173,32	174,83	4	172,87		1,60	0,92	102,10
19	A47x	PD01	DB08	174,00	175,00	174,00	171,00	4	173,50		1,73	1,00	102,48
20	A45x	PE99	DB08	175,00	174,00	172,00	174,00	4	173,75		1,26	0,72	102,63
21	F14	PC01	DB08	173,50	174,50	174,20	174,70	4	174,23		0,53	0,30	102,91
22	A39	PC02	DB08	171,60	173,80	177,60	176,00	4	174,75		2,61	1,50	103,22
23	F21x	PD02	DB09	175,89	174,48	174,95	174,55	4	174,97		0,65	0,37	103,35
24	F33x	PD01	DB10	171,60	181,26	175,97	172,67	4	175,38		4,34	2,48	103,59
25	F26x	PD02	DB09	175,50	177,50	175,50	174,50	4	175,75		1,26	0,72	103,81
26	F16x	PC01	DB08	178,90	180,30	171,40	172,80	4	175,85		4,40	2,50	103,87
27	F28x	PD02	DB08	171,70	178,20	178,70	177,40	4	176,50		3,24	1,84	104,25
28	F02x	PC02	DB08	177,60	170,50	183,60	175,10	4	176,70		5,46	3,09	104,37
29	A51	PD02	DB08	178,60	175,90	176,10	176,90	4	176,88		1,23	0,69	104,47
30	F05x	PC02	DB08	177,00	178,00	176,00	177,00	4	177,00		0,82	0,46	104,55
31	A65	PD01	DB08	179,00	178,00	180,00	177,00	4	178,50		1,29	0,72	105,43
32	F32x	PD01	DB08	185,00	181,00	180,00	179,00	4	181,25		2,63	1,45	107,06
33	A36	PB02	DB08	179,20	189,80	183,40	173,90	4	181,58		6,72	3,70	107,25
34	A80	PD03	DB10	183,00	183,00	180,00	184,00	4	182,50		1,73	0,95	107,79
35	F24	PD01	DB99	200,00	202,00	200,00	184,00	0	196,50	*c* *	8,39	4,27	116,06
36	A60x	PD01	DB10	266,00	268,00	270,00	267,00	0	267,75	*b* *	1,71	0,64	158,15
37	A43	PB06	DB01	316,00	322,00	320,00	321,00	0	319,75	*b* *	2,63	0,82	188,86
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**136**	**169,30**	**2,258**	**1,334**
15	% from the mean			

l	s_R	CV_R
34	**10,184**	**6,015**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	V_i	Recovery %
1	F08x	PE99	DB08	78,60	80,60	76,90	*64,2a*	3	78,70	*	1,85	2,35	79,72
2	A88	PD01	DB08	77,60	78,60	80,10	79,80	4	79,03		1,15	1,46	80,05
3	F12x	PC01	DB08	89,00	89,00	89,00	89,00	4	89,00		0,00	0,00	90,15
4	F33x	PD01	DB10	90,74	91,47	88,43	86,67	4	89,33		2,19	2,46	90,48
5	F19x	PD02	DB08	94,20	87,60	87,80	88,40	4	89,50		3,15	3,52	90,66
6	F06x	PD02	DB08	93,27	91,90	89,99	90,28	4	91,36		1,53	1,67	92,54
7	A79	PD03	DB10	94,49	94,59	90,42	94,82	4	93,58		2,11	2,26	94,79
8	F18x	PD99	DB08	95,20	93,80	94,10	93,80	4	94,23		0,67	0,71	95,44
9	A45x	PE99	DB08	93,80	96,10	95,60	95,50	4	95,25		1,00	1,05	96,48
10	F02x	PD02	DB08	95,40	101,80	94,80	92,50	4	96,13		3,98	4,15	97,37
11	A82	PD01	DB08	96,00	102,00	97,00	90,60	4	96,40		4,67	4,85	97,65
12	F07x	PD03	DB08	89,88	99,92	109,40	88,60	0	96,95	*c*	9,72	**10,03**	98,21
13	F15x	PC01	DB08	96,00	94,00	102,00	100,00	4	98,00		3,65	3,73	99,27
14	F13x	PD01	DB08	98,74	97,66	98,88	100,20	4	98,87		1,04	1,05	100,15
15	F24	PD01	DB99	96,00	100,00	102,00	100,00	4	99,50		2,52	2,53	100,79
16	A58x	PD02	DB01	99,86	98,90	99,27	100,38	4	99,60		0,65	0,65	100,89
17	F05x	PC02	DB08	99,80	100,00	100,00	100,00	4	99,95		0,10	0,10	101,24
18	F03	PD02	DB08	98,98	99,81	100,49	101,57	4	100,21		1,10	1,09	101,51
19	A36	PB02	DB08	98,20	107,70	100,70	95,20	4	100,45		5,33	5,31	101,75
20	F16x	PC01	DB08	99,25	102,60	96,89	103,30	4	100,51		2,99	2,98	101,81
21	A59	PC01	DB08	99,90	106,00	97,60	98,60	4	100,53		3,77	3,75	101,83
22	F26x	PD02	DB09	99,30	100,60	103,20	103,50	4	101,65		2,04	2,00	102,97
23	F25x	PB06	DB08	99,40	102,40	106,30	99,20	4	101,83		3,32	3,26	103,14
24	A47x	PD01	DB08	104,00	100,00	104,00	102,00	4	102,50		1,91	1,87	103,83
25	A51	PD02	DB08	104,70	104,00	100,00	102,40	4	102,78		2,09	2,03	104,11
26	A39	PC02	DB08	103,40	103,60	105,60	102,10	4	103,68		1,45	1,39	105,02
27	F28x	PD02	DB08	105,80	101,40	107,50	101,80	4	104,13		3,00	2,88	105,47
28	A80	PD03	DB10	103,00	104,00	108,00	105,00	4	105,00		2,16	2,06	106,36
29	F32x	PD01	DB08	105,00	106,00	104,00	106,00	4	105,25		0,96	0,91	106,61
30	F21x	PD02	DB09	104,90	98,75	107,67	109,87	4	105,30		4,82	4,57	106,66
31	A56	PC01	DB08	106,00	100,00	112,00	104,00	4	105,50		5,00	4,74	106,87
32	F14	PC01	DB08	104,49	105,45	107,82	107,07	4	106,21		1,51	1,42	107,58
33	A57	PZ02	DD02	109,90	109,80	104,90	104,70	4	107,33		2,92	2,72	108,71
34	A65	PD01	DB08	112,30	105,30	113,30	115,40	4	111,58		4,38	3,92	113,02
35	F27	PD01	DB02	106,10	128,50	118,90	138,10	0	122,90	*b* *	13,67	**11,12**	124,49
36	A60x	PD01	DB10	158,00	159,00	152,00	148,00	0	154,25	*b* *	5,19	3,36	156,25
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**131**	**98,72**	**2,394**	**2,425**
20	% from the mean			

l	s_R	CV_R
33	**7,427**	**7,535**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	28,80	30,20	29,90	30,40	4	29,83		*	0,71	2,39	76,71
2	F15x	PC01	DB08	34,00	29,00	30,00	34,00	4	31,75			2,63	8,28	81,67
3	A39	PC02	DB08	33,90	32,87	34,72	33,37	4	33,72			0,79	2,35	86,72
4	F19x	PD02	DB08	33,80	34,70	33,70	34,10	4	34,08			0,45	1,32	87,65
5	F32x	PD01	DB08	33,90	32,70	35,20	35,10	4	34,23			1,18	3,44	88,03
6	F24	PD01	DB99	35,00	33,00	29,00	46,00	0	35,75	*c*		7,27	**20,35**	91,95
7	F12x	PC01	DB08	37,00	36,00	36,00	36,00	4	36,25			0,50	1,38	93,24
8	F06x	PD02	DB08	36,49	35,85	36,99	36,84	4	36,54			0,51	1,39	93,99
9	F13x	PD01	DB08	36,98	37,26	37,23	37,69	4	37,29			0,29	0,79	95,92
10	A79	PD03	DB10	37,41	36,92	38,21	36,70	4	37,31			0,67	1,80	95,96
11	A82	PD01	DB08	36,60	38,20	37,50	37,70	4	37,50			0,67	1,78	96,46
12	A58x	PD02	DB01	37,17	39,45	37,39	37,34	4	37,84			1,08	2,85	97,32
13	F05x	PC02	DB08	38,30	38,10	38,10	38,40	4	38,23			0,15	0,39	98,32
14	F14	PC01	DB08	38,95	38,41	38,51	38,19	4	38,52			0,32	0,83	99,07
15	F18x	PD99	DB08	39,30	39,40	38,60	38,40	4	38,93			0,50	1,28	100,12
16	A47x	PD01	DB08	37,50	43,00	37,80	37,70	4	39,00			2,67	6,85	100,31
17	F28x	PD02	DB08	39,80	38,80	38,10	40,80	4	39,38			1,18	2,99	101,28
18	F02x	PD02	DB08	40,00	41,10	38,90	40,30	4	40,08			0,91	2,27	103,08
19	A36	PB02	DB08	40,50	42,10	40,20	37,90	4	40,18			1,73	4,31	103,34
20	F16x	PC01	DB08	40,27	40,52	40,89	39,16	4	40,21			0,74	1,85	103,43
21	A45x	PE99	DB08	40,90	39,80	39,70	41,00	4	40,35			0,70	1,72	103,79
22	A59	PC01	DB08	40,60	39,90	39,80	41,30	4	40,40			0,70	1,73	103,91
23	A51	PD02	DB08	41,03	40,73	40,70	40,05	4	40,63			0,41	1,02	104,50
24	A56	PC01	DB08	40,00	43,00	43,00	38,00	4	41,00			2,45	5,97	105,46
25	F07x	PD03	DB08	41,10	39,73	41,84	42,34	4	41,25			1,14	2,75	106,11
26	F08x	PE99	DB08	40,48	39,40	42,60	42,70	4	41,30			1,63	3,94	106,22
27	A65	PD01	DB08	42,00	41,20	41,20	41,30	4	41,43			0,39	0,93	106,55
28	F03	PD02	DB08	42,45	42,58	42,36	43,14	4	42,63			0,35	0,82	109,66
29	F21x	PD02	DB09	42,30	44,59	43,64	42,25	4	43,20			1,13	2,62	111,10
30	F26x	PD02	DB09	43,68	43,05	43,15	42,93	4	43,20			0,33	0,77	111,12
31	F25x	PB06	DB08	44,00	44,20	44,20	44,20	4	44,15			0,10	0,23	113,56
32	A80	PD03	DB10	44,70	44,20	45,80	44,80	4	44,88			0,67	1,49	115,42
33	F27	PD01	DB02	58,10	54,99	48,70	43,85	0	51,41	*b*	*	6,38	**12,41**	132,23
34	A57	PZ02	DD02	57,20	58,60	57,80	56,40	0	57,50	*b*	*	0,93	1,62	147,90
35	F33x	PD01	DB10	58,09	61,25	58,26	62,71	0	60,08	*b*	*	2,28	3,79	154,53
36	A60x	PD01	DB10	67,40	60,20	62,10	57,50	0	61,80	*b*	*	4,18	6,77	158,96
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**124**	**38,88**	**0,893**	**2,296**
20	% from the mean			

l	s_R	CV_R
31	**3,537**	**9,099**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	Lab.standard dev. V_i	Recovery %
1	A88	PD01	DB08	81,70	81,40	91,50	83,80	4	84,60			4,72	5,58	81,51
2	A79	PD03	DB10	96,00	92,50	91,88	92,63	4	93,25			1,86	1,99	89,85
3	F28x	PD02	DB08	94,90	95,60	92,50	90,70	4	93,43			2,25	2,41	90,02
4	F08x	PE99	DB08	90,10	96,60	95,80	93,80	4	94,07			2,90	3,08	90,64
5	F19x	PD02	DB08	92,00	108,00	89,80	90,20	0	95,00	*c*		8,72	9,18	91,53
6	F12x	PC01	DB08	95,00	99,00	97,00	97,00	4	97,00			1,63	1,68	93,46
7	F18x	PD99	DB08	98,30	98,50	98,20	98,40	4	98,35			0,13	0,13	94,76
8	F32x	PD01	DB08	99,20	99,70	97,70	97,30	4	98,48			1,16	1,17	94,88
9	F15x	PC01	DB08	103,00	96,00	98,00	104,00	4	100,25			3,86	3,85	96,59
10	F24	PD01	DB99	102,00	98,00	98,00	105,00	4	100,75			3,40	3,38	97,07
11	F14	PC01	DB08	101,20	101,20	101,84	100,03	4	101,07			0,75	0,75	97,38
12	F02x	PD02	DB08	98,80	101,50	104,40	99,90	4	101,15			2,43	2,41	97,46
13	F05x	PC02	DB08	101,00	101,00	101,00	102,00	4	101,25			0,50	0,49	97,56
14	F03	PD02	DB08	100,69	102,17	102,58	99,99	4	101,36			1,22	1,20	97,66
15	A47x	PD01	DB08	109,00	101,00	100,00	97,00	4	101,75			5,12	5,04	98,04
16	A45x	PE99	DB08	105,00	100,00	102,00	100,00	4	101,75			2,36	2,32	98,04
17	F07x	PD03	DB08	96,00	107,20	108,80	96,33	4	102,08			6,87	6,73	98,36
18	F13x	PD01	DB08	102,90	102,90	103,40	103,80	4	103,25			0,44	0,42	99,48
19	A82	PD01	DB08	106,00	104,00	103,00	101,00	4	103,50			2,08	2,01	99,72
20	F06x	PD02	DB08	103,00	104,70	103,90	104,20	4	103,95			0,71	0,69	100,16
21	A56	PC01	DB08	107,00	104,00	101,00	107,00	4	104,75			2,87	2,74	100,93
22	F21x	PD02	DB09	110,53	102,01	102,88	104,22	4	104,91			3,86	3,67	101,08
23	A58x	PD02	DB01	106,48	103,25	104,86	105,41	4	105,00			1,35	1,28	101,17
24	A36	PB02	DB08	103,90	111,70	104,00	100,70	4	105,08			4,68	4,45	101,24
25	A51	PD02	DB08	104,50	105,90	107,50	103,90	4	105,45			1,60	1,52	101,60
26	F16x	PC01	DB08	104,50	109,60	105,10	109,60	4	107,20			2,78	2,60	103,29
27	A65	PD01	DB08	107,10	109,40	107,40	105,40	4	107,33			1,64	1,53	103,41
28	A80	PD03	DB10	112,00	110,00	107,00	102,00	4	107,75			4,35	4,04	103,82
29	A39	PC02	DB08	110,50	107,20	110,80	104,70	4	108,30			2,90	2,68	104,35
30	A59	PC01	DB08	108,00	109,00	117,00	110,00	4	111,00			4,08	3,68	106,95
31	F25x	PB06	DB08	115,20	111,20	115,40	111,10	4	113,23			2,40	2,12	109,09
32	F26x	PD02	DB09	114,20	115,20	115,10	114,90	4	114,85			0,45	0,39	110,66
33	F27	PD01	DB02	111,50	118,00	117,10	114,60	4	115,30			2,91	2,53	111,09
34	F33x	PD01	DB10	110,39	120,66	117,30	121,24	4	117,40			4,98	4,25	113,11
35	A57	PZ02	DD02	120,80	120,90	117,70	120,40	4	119,95			1,52	1,26	115,57
36	A60x	PD01	DB10	148,00	150,00	147,00	141,00	0	146,50	*b*	*	3,87	2,64	141,15
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**136**	**103,79**	**2,552**	**2,459**
* = non tolerable mean because more than +/- **20** % from the mean				

l	s_R	CV_R
34	**7,294**	**7,028**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: Fe **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	Lab.standard dev. V_i	Recovery %
1	F08x	PE99	DB08	93,50	89,10	97,90	102,00	4	95,63			5,56	5,82	81,73
2	A88	PD01	DB08	94,40	96,90	99,40	94,40	4	96,28			2,39	2,49	82,28
3	F12x	PC01	DB08	103,00	103,00	102,00	103,00	4	102,75			0,50	0,49	87,82
4	F19x	PD02	DB08	104,00	103,00	106,00	107,00	4	105,00			1,83	1,74	89,74
5	F28x	PD02	DB08	107,60	108,40	110,50	110,20	4	109,18			1,40	1,28	93,31
6	A58x	PD02	DB01	107,40	111,06	110,17	111,72	4	110,09			1,90	1,73	94,09
7	F33x	PD01	DB10	110,83	115,59	111,78	109,80	4	112,00			2,53	2,26	95,72
8	A45x	PE99	DB08	115,00	111,00	114,00	116,00	4	114,00			2,16	1,89	97,43
9	A79	PD03	DB10	108,27	115,57	123,05	109,92	4	114,20			6,68	5,85	97,61
10	F06x	PD02	DB08	117,90	118,50	114,00	113,40	4	115,95			2,62	2,26	99,10
11	F05x	PC02	DB08	110,00	117,00	122,00	115,00	4	116,00			4,97	4,28	99,14
12	A82	PD01	DB08	120,00	117,00	113,00	114,00	4	116,00			3,16	2,73	99,14
13	A36	PB02	DB08	115,60	119,80	117,70	112,40	4	116,38			3,16	2,71	99,46
14	F24	PD01	DB99	114,00	115,00	117,00	120,00	4	116,50			2,65	2,27	99,57
15	F21x	PD02	DB09	115,60	115,65	117,12	118,32	4	116,67			1,31	1,12	99,72
16	F18x	PD99	DB08	116,00	118,00	118,00	116,00	4	117,00			1,15	0,99	100,00
17	A47x	PD01	DB08	120,00	117,00	118,00	116,00	4	117,75			1,71	1,45	100,64
18	F03	PD02	DB08	120,00	119,53	119,45	119,03	4	119,50			0,40	0,33	102,14
19	F02x	PD02	DB08	122,90	115,50	117,30	122,60	4	119,58			3,74	3,13	102,20
20	F14	PC01	DB08	118,81	122,14	119,13	119,67	4	119,94			1,51	1,26	102,51
21	A51	PD02	DB08	122,60	118,10	121,70	119,40	4	120,45			2,07	1,72	102,95
22	A65	PD01	DB08	121,30	122,10	123,80	116,20	4	120,85			3,27	2,71	103,29
23	F13x	PD01	DB08	121,80	121,90	121,40	119,80	4	121,23			0,97	0,80	103,61
24	F15x	PC01	DB08	117,00	123,00	119,00	129,00	4	122,00			5,29	4,34	104,27
25	A39	PC02	DB08	118,20	122,10	124,40	123,80	4	122,13			2,79	2,29	104,38
26	F16x	PC01	DB08	119,70	119,50	122,80	127,10	4	122,28			3,55	2,91	104,51
27	A59	PC01	DB08	116,00	126,00	121,00	127,00	4	122,50			5,07	4,14	104,70
28	F07x	PD03	DB08	136,80	107,30	117,50	130,20	0	122,95	*c*		13,15	**10,70**	105,08
29	A80	PD03	DB10	122,00	122,00	126,00	123,00	4	123,25			1,89	1,54	105,34
30	A57	PZ02	DD02	126,00	125,70	126,00	123,40	4	125,28			1,26	1,00	107,07
31	F32x	PD01	DB08	128,00	126,00	127,00	127,00	4	127,00			0,82	0,64	108,54
32	F25x	PB06	DB08	129,30	125,10	125,10	129,60	4	127,28			2,51	1,98	108,78
33	F26x	PD02	DB09	129,40	123,30	128,90	129,60	4	127,80			3,01	2,36	109,23
34	F27	PD01	DB02	127,80	129,70	130,20	127,20	4	128,73			1,45	1,13	110,02
35	A56	PC01	DB08	122,00	123,00	140,00	142,00	0	131,75	*c*		10,72	8,14	112,60
36	A60x	PD01	DB10	173,00	175,00	178,00	177,00	0	175,75	*b*	*	2,22	1,26	150,21
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**132**	**117,00**	**2,584**	**2,209**
20	% from the mean			

l	s_R	CV_R
33	**8,161**	**6,975**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	1,87	1,69	1,66	1,74	4	1,74		*	0,09	5,33	66,83
2	F06x	PD02	DB08	2,16	2,09	2,11	2,08	4	2,11			0,04	1,69	81,04
3	A79	PD03	DB10	2,25	2,26	2,13	2,25	4	2,22			0,06	2,73	85,29
4	F12x	PC01	DB10	2,28	2,31	2,29	2,29	4	2,29			0,01	0,55	88,05
5	A45x	PE99	DB08	2,47	2,12	2,22	2,54	4	2,34			0,20	8,54	89,78
6	A57	PZ02	DD02	2,40	2,50	2,30	2,20	4	2,35			0,13	5,49	90,26
7	F15x	PC01	DB08	2,40	2,20	2,30	2,60	4	2,38			0,17	7,19	91,22
8	A80	PD03	DB10	2,40	2,38	2,36	2,39	4	2,38			0,02	0,72	91,51
9	F27	PD01	DB05	2,28	2,50	2,44	2,33	4	2,39			0,10	4,23	91,72
10	A36	PD02	DB08	2,45	2,56	2,38	2,34	4	2,43			0,10	3,96	93,43
11	F13x	PC01	DB08	2,47	2,42	2,46	2,45	4	2,45			0,02	0,91	94,15
12	F21x	PD02	DB09	2,41	2,24	2,75	2,47	4	2,47			0,21	8,59	94,77
13	A82	PD01	DB10	2,54	2,56	2,54	2,57	4	2,55			0,01	0,59	98,04
14	F19x	PD02	DB08	2,57	2,58	2,53	2,55	4	2,56			0,02	0,87	98,23
15	F14	PC01	DB10	2,72	2,58	2,50	2,46	4	2,56			0,11	4,43	98,44
16	A39	PC02	DB08	2,59	2,60	2,61	2,57	4	2,59			0,02	0,66	99,58
17	A47x	PD01	DB08	2,56	2,64	2,66	2,58	4	2,61			0,05	1,82	100,25
18	F33x	PD01	DB10	2,62	2,72	2,69	2,65	4	2,67			0,04	1,55	102,54
19	F02x	PD02	DB08	2,60	3,00	2,70	2,60	4	2,73			0,19	6,95	104,66
20	A59	PC01	DB08	2,72	2,66	2,84	2,77	4	2,75			0,08	2,78	105,53
21	F32x	PD01	DB08	2,74	2,74	2,77	2,78	4	2,76			0,02	0,75	105,91
22	A58x	PD02	DB05	2,74	2,67	2,98	2,80	4	2,80			0,13	4,75	107,45
23	F18x	PD99	DB10	2,81	2,85	2,69	2,86	4	2,80			0,08	2,78	107,64
24	A65	PD01	DB08	3,00	2,90	2,80	2,90	4	2,90			0,08	2,82	111,38
25	F25x	PB06	DB08	2,89	3,00	3,00	2,73	4	2,91			0,13	4,39	111,58
26	F26x	PD02	DB09	2,97	2,99	2,85	2,88	4	2,92			0,07	2,33	112,25
27	F03	PD02	DB08	2,93	2,93	2,91	2,95	4	2,93			0,01	0,50	112,41
28	F07x	PD03	DB08	2,66	2,61	3,63	3,04	4	2,99			0,47	**15,87**	114,68
29	F05	PC02	DB08	2,92	2,92	3,27	3,10	4	3,05			0,17	5,50	117,24
30	F08x	PE99	DB08	3,34	3,80	3,21	3,62	4	3,49		*	0,27	7,67	134,16
31	A60x	PD01	DB10	4,05	4,03	3,91	3,90	0	3,97	*b*	*	0,08	1,98	152,58
32	F28x	PD02	DB08	4,61	4,15	4,35	4,45	0	4,39	*b*	*	0,20	4,45	168,52
33	F24	PD01	DB99	3,41	6,74	4,50	6,28	0	5,23	*b*	*	1,55	**29,66**	200,97
34	F16x	PC01	DB08	9,69	9,93	9,17	9,93	0	9,68	*b*	*	0,36	3,72	371,69
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**120**	**2,60**	**0,104**	**3,976**
20	% from the mean			

l	s_R	CV_R
30	**0,335**	**12,872**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	5,46	5,36	5,48	5,36	0	5,42	*b*	*	0,06	1,18	73,44
2	F06x	PD02	DB08	5,97	5,85	5,92	6,06	4	5,95			0,09	1,48	80,70
3	A79	PD03	DB10	6,46	6,37	6,48	6,28	4	6,40			0,09	1,42	86,75
4	A47x	PD01	DB08	6,69	6,82	6,66	6,73	4	6,73			0,07	1,03	91,21
5	F12x	PC01	DB10	6,89	6,68	6,82	6,80	4	6,80			0,09	1,28	92,19
6	F27	PD01	DB05	7,04	6,89	6,78	6,82	4	6,88			0,11	1,66	93,33
7	A80	PD03	DB10	7,00	6,98	7,03	6,95	4	6,99			0,03	0,48	94,80
8	F14	PC01	DB10	7,06	6,94	6,93	7,23	4	7,04			0,14	1,99	95,48
9	F21x	PD02	DB09	6,92	7,04	7,65	6,77	4	7,10			0,39	5,44	96,23
10	F13x	PC01	DB08	7,15	7,17	7,08	7,07	4	7,12			0,05	0,67	96,55
11	F19x	PD02	DB08	7,04	7,11	7,32	7,09	4	7,14			0,12	1,73	96,84
12	F02x	PD02	DB08	7,10	6,80	7,30	7,40	4	7,15			0,26	3,70	96,97
13	A39	PC02	DB08	7,17	7,26	7,21	7,22	4	7,21			0,04	0,50	97,85
14	A59	PC01	DB08	7,27	7,35	7,31	7,51	4	7,36			0,11	1,43	99,82
15	A36	PD02	DB08	7,26	7,82	7,52	6,91	4	7,38			0,39	5,24	100,06
16	A45x	PE99	DB08	7,43	7,38	7,41	7,40	4	7,41			0,02	0,28	100,43
17	F03	PD02	DB08	7,39	7,42	7,40	7,43	4	7,41			0,02	0,26	100,49
18	F15x	PC01	DB08	7,40	7,50	7,10	7,80	4	7,45			0,29	3,87	101,04
19	F05	PC02	DB08	7,54	7,44	7,40	7,52	4	7,48			0,07	0,88	101,38
20	A82	PD01	DB10	7,36	7,62	7,48	7,44	4	7,48			0,11	1,46	101,38
21	F18x	PD99	DB10	7,51	7,65	7,70	7,63	4	7,62			0,08	1,06	103,38
22	A57	PZ02	DD02	7,40	7,70	7,80	7,60	4	7,63			0,17	2,24	103,42
23	F26x	PD02	DB09	7,62	7,62	7,73	7,55	4	7,63			0,07	0,97	103,48
24	A65	PD01	DB08	7,70	7,70	7,70	7,70	4	7,70			0,00	0,00	104,43
25	F32x	PD01	DB08	7,76	7,77	7,75	7,75	4	7,76			0,01	0,12	105,21
26	F08x	PE99	DB08	8,00	8,26	7,24	7,70	4	7,80			0,44	5,62	105,78
27	F07x	PD03	DB08	6,43	6,75	9,73	8,47	0	7,85	*c*		1,54	**19,67**	106,40
28	F25x	PB06	DB08	7,64	8,00	7,82	8,03	4	7,87			0,18	2,29	106,77
29	F16x	PC01	DB08	7,96	8,16	7,98	8,06	4	8,04			0,09	1,14	109,03
30	F33x	PD01	DB10	7,91	7,98	8,18	8,21	4	8,07			0,15	1,81	109,42
31	F24	PD01	DB99	10,49	7,01	8,05	6,99	0	8,14	*c*		1,65	**20,24**	110,33
32	F28x	PD02	DB08	8,52	8,06	8,55	8,13	4	8,31			0,25	3,07	112,74
33	A58x	PD02	DB05	8,30	8,29	8,56	8,13	4	8,32			0,18	2,14	112,84
34	A60x	PD01	DB10	*12,8a*	11,10	11,00	10,90	0	11,00	*b*	*	0,10	0,91	149,19
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**120**	**7,37**	**0,137**	**1,854**
20	% from the mean			

l	s_R	CV_R
30	**0,529**	**7,174**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	5,24	4,82	5,33	5,14	4	5,13	*	0,22	4,33	75,41
2	A79	PD03	DB10	5,69	5,59	5,51	5,53	4	5,58		0,08	1,45	81,92
3	F06x	PD02	DB08	5,81	5,93	5,81	5,80	4	5,84		0,06	1,06	85,77
4	A80	PD03	DB10	6,24	6,25	6,11	6,02	4	6,16		0,11	1,79	90,43
5	F12x	PC01	DB10	6,18	6,17	6,15	6,17	4	6,17		0,01	0,20	90,62
6	F05	PC02	DB08	6,25	6,56	6,15	6,30	4	6,32		0,17	2,77	92,78
7	F27	PD01	DB05	6,69	6,56	6,24	6,15	4	6,41		0,26	4,00	94,20
8	F14	PC01	DB10	6,47	6,69	6,34	6,40	4	6,47		0,16	2,39	95,11
9	F13x	PC01	DB08	6,53	6,59	6,53	6,54	4	6,55		0,03	0,43	96,20
10	F19x	PD02	DB08	6,60	6,60	6,49	6,54	4	6,56		0,05	0,81	96,35
11	F21x	PD02	DB09	6,33	7,25	6,46	6,43	4	6,62		0,43	6,43	97,23
12	A47x	PD01	DB08	6,97	6,59	6,53	6,38	4	6,62		0,25	3,79	97,23
13	A45x	PE99	DB08	6,32	6,36	6,72	7,16	4	6,64		0,39	5,88	97,56
14	A82	PD01	DB10	6,82	6,69	6,65	6,60	4	6,69		0,09	1,41	98,29
15	F03	PD02	DB08	6,72	6,76	6,75	6,70	4	6,73		0,03	0,40	98,94
16	A39	PC02	DB08	6,93	6,79	6,99	6,84	4	6,89		0,09	1,30	101,19
17	A36	PD02	DB08	6,75	7,50	7,16	6,26	4	6,92		0,53	7,73	101,64
18	F32x	PD01	DB08	6,98	6,86	6,95	6,96	4	6,94		0,05	0,77	101,93
19	A57	PZ02	DD02	7,20	7,00	6,70	6,90	4	6,95		0,21	3,00	102,11
20	F02x	PD02	DB08	6,90	7,00	6,90	7,10	4	6,98		0,10	1,37	102,48
21	F08x	PE99	DB08	7,04	7,47	6,85	6,68	4	7,01		0,34	4,85	102,99
22	A59	PC01	DB08	6,89	6,92	7,19	7,16	4	7,04		0,16	2,23	103,44
23	F33x	PD01	DB10	6,91	7,33	6,99	7,09	4	7,08		0,18	2,53	104,02
24	F07x	PD03	DB08	5,72	6,00	9,49	7,23	0	7,11	*c*	1,72	**24,17**	104,46
25	F18x	PD99	DB10	7,11	7,08	7,23	7,02	4	7,11		0,09	1,24	104,46
26	A65	PD01	DB08	7,20	7,30	7,20	7,30	4	7,25		0,06	0,80	106,52
27	F15x	PC01	DB08	7,20	7,40	7,40	7,50	4	7,38		0,13	1,71	108,36
28	A58x	PD02	DB05	7,71	7,58	7,06	7,24	4	7,40		0,30	4,05	108,69
29	F26x	PD02	DB09	7,45	7,37	7,48	7,39	4	7,42		0,05	0,69	109,06
30	F25x	PB06	DB08	7,41	7,31	7,52	7,70	4	7,49		0,17	2,23	109,97
31	F16x	PC01	DB08	7,69	7,50	7,48	7,44	4	7,53		0,11	1,52	110,59
32	F24	PD01	DB99	8,44	8,12	8,29	6,99	4	7,96		0,66	8,29	116,95
33	F28x	PD02	DB08	8,27	7,79	8,20	7,75	4	8,00		0,27	3,38	117,57
34	A60x	PD01	DB10	9,42	9,55	9,49	9,28	0	9,44	*b* *	0,12	1,23	138,62
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**128**	**6,81**	**0,182**	**2,679**
20	% from the mean			

l	s_R	CV_R
32	**0,627**	**9,210**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A88	PD01	DB08	2,05	1,82	1,82	1,83	4	1,88	*	0,11	6,03	66,48
2	F06x	PD02	DB08	2,28	2,26	2,25	2,27	4	2,27		0,01	0,57	80,09
3	A79	PD03	DB10	2,34	2,34	2,38	2,35	4	2,35		0,02	0,66	83,20
4	A57	PZ02	DD02	2,50	2,40	2,30	2,40	4	2,40		0,08	3,40	84,86
5	A45x	PE99	DB08	2,51	2,42	2,37	2,40	4	2,43		0,06	2,49	85,75
6	F26x	PD02	DB09	2,45	2,44	2,40	2,50	4	2,45		0,04	1,68	86,54
7	F12x	PC01	DB10	2,46	2,52	2,47	2,48	4	2,48		0,03	1,06	87,78
8	A80	PD03	DB10	2,54	2,49	2,48	2,53	4	2,51		0,03	1,17	88,75
9	F15x	PC01	DB08	1,80	2,30	2,20	3,90	0	2,55	*c*	0,93	**36,30**	90,17
10	F13x	PC01	DB08	2,55	2,55	2,63	2,58	4	2,57		0,04	1,47	91,03
11	F27	PD01	DB05	2,64	2,53	2,71	2,42	4	2,58		0,12	4,84	91,07
12	A47x	PD01	DB08	2,64	2,69	2,67	2,51	4	2,63		0,08	3,08	92,91
13	F21x	PD02	DB09	2,66	2,60	2,52	2,82	4	2,65		0,13	4,79	93,70
14	F19x	PD02	DB08	2,67	2,68	2,68	2,69	4	2,68		0,01	0,30	94,76
15	A82	PD01	DB10	2,74	2,69	2,68	2,69	4	2,70		0,03	1,00	95,47
16	F14	PC01	DB10	2,66	2,79	2,74	2,84	4	2,76		0,08	2,81	97,53
17	A36	PD02	DB08	2,67	2,99	2,92	2,47	4	2,76		0,24	8,63	97,68
18	A58x	PD02	DB05	2,81	2,78	2,70	2,84	4	2,78		0,06	2,16	98,39
19	A39	PC02	DB08	2,76	2,79	2,78	2,87	4	2,80		0,05	1,64	98,95
20	F33x	PD01	DB10	3,04	2,77	2,77	3,01	4	2,90		0,15	5,04	102,46
21	F02x	PD02	DB08	2,90	2,90	2,80	3,00	4	2,90		0,08	2,82	102,54
22	F32x	PD01	DB08	2,92	2,94	2,99	2,91	4	2,94		0,04	1,21	103,96
23	F03	PD02	DB08	2,96	3,01	2,94	2,93	4	2,96		0,04	1,30	104,60
24	F18x	PD99	DB10	2,96	3,02	2,97	2,91	4	2,97		0,05	1,52	104,84
25	F16x	PC01	DB08	2,94	2,96	3,08	2,99	4	2,99		0,06	2,05	105,66
26	A65	PD01	DB08	3,00	3,10	3,10	3,00	4	3,05		0,06	1,89	107,85
27	A59	PC01	DB08	2,86	3,43	2,89	*5,63a*	3	3,06		0,32	**10,48**	108,20
28	F05	PC02	DB08	3,02	3,06	3,28	3,14	4	3,13		0,11	3,67	110,50
29	F07x	PD03	DB08	2,45	3,69	4,89	3,14	0	3,54	*c* *	1,03	**29,10**	125,33
30	F28x	PD02	DB08	3,78	3,55	3,69	3,42	4	3,61	*	0,16	4,31	127,64
31	F25x	PB06	DB08	3,65	3,67	3,61	3,60	4	3,63	*	0,03	0,91	128,44
32	F24	PD01	DB99	4,86	3,41	4,03	3,41	4	3,93	*	0,69	**17,49**	138,87
33	A60x	PD01	DB10	4,05	3,93	3,98	4,05	4	4,00	*	0,06	1,46	141,53
34													
35													
36	F08x	PE99	DB08	<2,5	<2,5	<2,5	<2,5			**			
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**123**	**2,83**	**0,098**	**3,472**
20	% from the mean			

l	s_R	CV_R
31	**0,466**	**16,479**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	0,16	0,16	0,15	0,15	4	0,15			0,01	4,50	72,21
2	A80	PD03	DB10	0,17	0,16	0,17	0,16	4	0,16			0,00	2,55	76,09
3	A36	PD02	DB10	0,17	0,17	0,18	0,17	4	0,17			0,00	2,75	80,92
4	F12x	PC01	DB10	0,17	0,18	0,18	0,18	4	0,18			0,00	0,72	82,57
5	A45	PE99	DB10	0,19	0,17	0,18	0,18	4	0,18			0,01	4,10	85,16
6	F33x	PD01	DB10	0,19	0,19	0,18	0,17	4	0,18			0,01	7,28	85,75
7	F16x	PC01	DB10	0,19	0,18	0,18	0,18	4	0,18			0,00	1,60	86,04
8	A82	PD01	DB10	0,17	0,17	0,20	0,20	4	0,18			0,01	7,62	86,22
9	F32x	PD01	DB10	0,18	0,18	0,20	0,19	4	0,19			0,01	4,32	87,64
10	F14	PC01	DB10	0,22	0,22	0,20	0,19	4	0,21			0,02	7,93	98,24
11	F18x	PD99	DB10	0,21	0,22	0,21	0,21	4	0,21			0,00	1,18	100,01
12	F13x	PD01	DB05	0,27	0,23	0,19	0,21	4	0,22			0,03	**14,37**	105,39
13	F27	PD01	DB05	0,22	0,20	0,23	0,27	4	0,23			0,03	**12,12**	107,90
14	F08x	PD01	DB10	0,27	0,29	0,19	0,19	4	0,23			0,05	**22,38**	110,14
15	A60x	PD01	DB10	0,30	0,26	0,26	0,26	4	0,27			0,02	6,92	126,86
16	F05	PC02	DB05	0,34	0,33	0,27	0,34	4	0,32		*	0,03	**10,11**	151,36
17	F07x	PD03	DB08	0,33	0,35	0,30	0,35	4	0,33		*	0,02	6,49	157,49
18	A47	PD01	DB10	0,51	0,55	0,47	0,38	0	0,48	*b*	*	0,07	**14,83**	225,22
19	A65	PD01	DB08	0,60	0,70	0,50	0,60	0	0,60	*b*	*	0,08	**13,61**	282,70
20														
21														
22	A88	PD01	DB08	<2	<2	<2	<2				**			
23	F15x	PC01	DB08	<1	<1	<1	<1				**			
24	A39	PC02	DB08	<,5	<,5	<,5	<,5							
25	F03	PD02	DB08	<,5	<,5	<,5	<,5							
26	F02	PD02	DB05	<,5	<,5	<,5	<,5							
27	F06x	PC02	DB08	0,53	<,5	<,5	0,50				*			
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**68**	**0,21**	**0,016**	**7,390**
40	% from the mean			

l	s_R	CV_R
17	**0,053**	**24,792**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	0,073	0,072	0,072	0,071	4	0,072		0,00	1,13	71,23
2	F16x	PC01	DB10	0,076	0,080	0,077	0,077	4	0,077		0,00	2,12	76,59
3	A45	PE99	DB10	0,085	0,075	0,083	0,085	4	0,082		0,00	5,56	81,07
4	A82	PD01	DB10	0,082	0,085	0,080	0,083	4	0,082		0,00	2,72	81,54
5	F32x	PD01	DB10	0,084	0,085	0,081	0,085	4	0,084		0,00	2,26	82,85
6	F12x	PC01	DB10	0,085	0,088	0,079	0,084	4	0,084		0,00	4,45	83,10
7	A36	PD02	DB10	0,086	0,085	0,086	0,080	4	0,084		0,00	3,41	83,35
8	F08x	PD01	DB10	0,086	0,084	0,089	0,086	4	0,086		0,00	2,22	85,27
9	F18x	PD99	DB10	0,128	0,122	0,126	0,130	4	0,127		0,00	2,70	125,14
10	A60x	PD01	DB10	*0,238a*	0,122	0,123	0,118	3	0,121		0,00	2,19	119,70
11	F14	PC01	DB10	0,155	0,146	0,155	0,170	4	0,157	*	0,01	6,36	154,82
12	F33x	PD01	DB10	0,151	0,166	0,182	0,149	4	0,162	*	0,02	9,47	160,26
13	A47	PD01	DB10	0,160	0,260	0,140	0,170	0	0,183	*c* *	0,05	**29,12**	180,54
14													
15													
16	A88	PD01	DB08	<2	<2	<2	<2			**			
17	F15x	PC01	DB08	<1	<1	<1	<1			**			
18	F06x	PC02	DB08	<,5	<,5	<,5	<,5						
19	F03	PD02	DB08	<,5	<,5	<,5	<,5						
20	A39	PC02	DB08	<,5	<,5	<,5	<,5						
21	F02	PD02	DB05	<,5	<,5	<,5	<,5						
22	A65	PD01	DB08	<,4	<,4	<,4	<,4						
23	F07x	PD03	DB08	<,2	<,2	<,2	<,2						
24	F05	PC02	DB05	<,125	<,125	<,125	<,125						
25	A80	PD03	DB10	<,1	<,1	<,1	<,1						
26	F27	PD01	DB05	<,05	<,05	<,05	<,05			*			
27	F13x	PD01	DB05	0,122	<,096	<,096	<,096						
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**47**	**0,101**	**0,004**	**4,207**
40	% from the mean			

l	s_R	CV_R
12	**0,032**	**31,211**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	0,30	0,29	0,29	0,29	4	0,29			0,00	1,72	74,99
2	F27	PD01	DB05	0,29	0,31	0,32	0,28	4	0,30			0,02	6,23	77,19
3	F16x	PC01	DB10	0,30	0,32	0,31	0,32	4	0,31			0,01	2,93	81,04
4	A80	PD03	DB10	0,33	0,31	0,32	0,32	4	0,32			0,01	2,36	82,04
5	A36	PD02	DB10	0,36	0,33	0,32	0,33	4	0,34			0,02	4,75	86,89
6	A82	PD01	DB10	0,36	0,33	0,33	0,32	4	0,34			0,02	4,95	86,89
7	F05	PC02	DB05	0,33	0,35	0,38	0,34	4	0,35			0,02	6,00	89,93
8	A45	PE99	DB10	0,35	0,35	0,35	0,35	4	0,35			0,00	0,59	90,13
9	F12x	PC01	DB10	0,34	0,35	0,36	0,35	4	0,35			0,01	2,07	90,58
10	F07x	PD03	DB08	0,36	0,33	0,37	0,36	4	0,36			0,02	4,43	91,95
11	F32x	PD01	DB10	0,36	0,38	0,37	0,36	4	0,37			0,01	2,13	95,63
12	F18x	PD99	DB10	0,39	0,38	0,38	0,37	4	0,38			0,01	1,85	98,41
13	F33x	PD01	DB10	0,35	0,42	0,43	0,39	4	0,40			0,04	9,05	103,07
14	F08x	PD01	DB10	0,48	0,48	0,35	0,34	0	0,41	*c*		0,08	**19,01**	106,59
15	F13x	PD01	DB05	0,45	0,42	0,42	0,40	4	0,42			0,02	4,57	109,32
16	F14	PC01	DB10	0,45	0,51	0,51	0,42	4	0,47			0,05	9,68	121,90
17	A60x	PD01	DB10	0,47	0,49	0,49	0,45	4	0,47			0,02	3,62	122,41
18	F02	PD02	DB05	0,61	0,51	0,59	0,56	4	0,57		*	0,04	7,66	146,87
19	A47	PD01	DB10	0,65	0,52	0,54	0,62	4	0,58		*	0,06	**10,71**	150,75
20	A65	PD01	DB08	0,80	0,90	0,80	0,90	0	0,85	*b*	*	0,06	6,79	219,98
21														
22														
23	A88	PD01	DB08	<2	<2	<2	<2				**			
24	A39	PC02	DB08	<,5	<,5	<,5	<,5							
25	F03	PD02	DB08	<,5	<,5	<,5	<,5							
26	F06x	PC02	DB08	<,5	0,50	<,5	<,5							
27	F15x	PC01	DB08	1,30	<1	1,40	1,40				*			
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**72**	**0,39**	**0,020**	**5,141**
40	% from the mean			

l	s_R	CV_R
18	**0,086**	**22,224**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	0,65	0,70	0,64	0,62	4	0,65		0,03	5,21	81,14
2	F03	PD02	DB08	0,73	0,65	0,69	0,75	4	0,70		0,05	6,65	88,01
3	F16x	PC01	DB10	0,68	0,70	0,71	0,73	4	0,71		0,02	3,00	88,08
4	F12x	PC01	DB10	0,71	0,72	0,71	0,71	4	0,71		0,00	0,40	89,04
5	F07x	PD03	DB08	0,71	0,73	0,76	0,66	4	0,71		0,04	6,06	89,26
6	A80	PD03	DB10	0,74	0,71	0,69	0,73	4	0,72		0,02	2,91	89,60
7	A82	PD01	DB10	0,73	0,72	0,74	0,71	4	0,72		0,02	2,11	90,32
8	A45	PE99	DB10	0,74	0,73	0,75	0,75	4	0,74		0,01	1,27	92,85
9	A36	PD02	DB10	0,75	0,75	0,75	0,73	4	0,74		0,01	1,56	92,94
10	A39	PC02	DB08	0,75	0,76	0,73	0,75	4	0,75		0,01	1,55	93,17
11	F27	PD01	DB05	0,76	0,76	0,74	0,74	4	0,75		0,01	1,31	93,63
12	F05	PC02	DB05	0,79	0,79	0,77	0,79	4	0,78		0,01	1,11	97,69
13	F06x	PC02	DB08	0,55	0,72	1,18	0,71	0	0,79	*c*	0,27	**34,07**	98,78
14	F18x	PD99	DB10	0,80	0,80	0,81	0,81	4	0,80		0,01	1,23	100,44
15	F32x	PD01	DB10	0,80	0,81	0,82	0,82	4	0,81		0,01	1,18	101,60
16	F33x	PD01	DB10	0,87	0,78	0,79	0,85	4	0,82		0,04	5,25	102,38
17	F14	PC01	DB10	0,79	0,83	0,82	0,87	4	0,83		0,04	4,28	103,25
18	F13x	PD01	DB05	0,88	0,82	0,79	0,84	4	0,83		0,04	4,67	104,00
19	F08x	PD01	DB10	0,92	0,91	0,78	0,79	4	0,85		0,07	8,55	105,97
20	A47	PD01	DB10	0,92	1,02	1,07	0,96	4	0,99		0,07	6,65	123,99
21	A60x	PD01	DB10	1,08	1,07	1,11	1,05	4	1,08	*	0,03	2,32	134,61
22	F02	PD02	DB05	1,10	1,02	1,18	1,12	4	1,11	*	0,07	5,98	138,04
23	A65	PD01	DB08	1,10	1,20	1,20	1,20	0	1,18	*b* *	0,05	4,26	146,79
24													
25													
26	A88	PD01	DB08	<2	<2	<2	<2			**			
27	F15x	PC01	DB08	<1	<1	<1	<1			**			
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**84**	**0,80**	**0,029**	**3,580**
30	% from the mean			

l	s_R	CV_R
21	**0,121**	**15,105**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	23,00	23,00	*22a*	23,00	3	23,00		0,00	0,00	87,11
2	F16x	PC01	DB10	23,87	23,04	22,49	24,26	4	23,42		0,80	3,41	88,68
3	F13x	PD01	DB05	22,30	22,39	26,61	26,37	4	24,42		2,40	9,81	92,48
4	F12x	PC01	DB10	25,00	24,00	25,00	25,00	4	24,75		0,50	2,02	93,74
5	A36	PD02	DB10	25,19	24,02	26,04	24,12	4	24,84		0,96	3,86	94,09
6	A80	PD03	DB10	25,40	24,80	24,50	24,90	4	24,90		0,37	1,50	94,31
7	A47	PD01	DB10	25,30	25,84	24,27	24,25	4	24,92		0,79	3,16	94,36
8	A82	PD01	DB10	26,50	25,60	24,40	24,80	4	25,33		0,93	3,67	95,92
9	A58x	PD02	DB05	26,65	26,83	25,92	26,01	4	26,35		0,45	1,73	99,81
10	F08x	PD01	DB10	27,90	23,20	26,97	27,60	4	26,42		2,18	8,25	100,05
11	F07x	PD03	DB08	26,55	29,80	30,98	20,81	4	27,04		4,55	**16,84**	102,39
12	F32x	PD01	DB10	27,70	27,10	27,30	27,20	4	27,33		0,26	0,96	103,49
13	A88	PD01	DB05	25,50	25,00	29,50	30,50	4	27,63		2,78	**10,06**	104,63
14	F18x	PD99	DB10	28,70	26,40	27,00	28,50	4	27,65		1,13	4,08	104,72
15	F14	PC01	DB10	32,20	25,77	27,90	29,00	4	28,72		2,68	9,33	108,77
16	F33x	PD01	DB10	29,64	32,71	29,49	26,10	4	29,49		2,70	9,16	111,67
17	F27	PD01	DB05	37,78	27,63	34,14	27,76	4	31,83		5,00	**15,70**	120,54
18	F05	PC02	DB05	37,20	36,40	39,80	34,60	0	37,00	*b* *	2,16	5,84	140,14
19	A60x	PD01	DB10	41,40	45,80	35,40	33,80	0	39,10	*b* *	5,54	**14,16**	148,09
20													
21													
22	F15x	PC01	DB08	<200	<200	<200	<200			**			
23	A39	PC02	DB08	<50	<50	<50	<50						
24	F03	PD02	DB08	<50	<50	<50	<50						
25	F02	PD02	DB05	<50	<50	<50	<50						
26	F06x	PD02	DB08	69,00	53,00	47,00	<40			*			
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**67**	**26,40**	**1,675**	**6,345**
30	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
17	**2,289**	**8,684**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	F27	PD01	DB05	3,87	1,17	5,85	1,08	0	2,99	*c*		2,30	**76,97**	83,89
2	A88	PD01	DB05	2,00	3,00	3,00	4,00	4	3,00			0,82	**27,22**	84,10
3	A36	PD02	DB10	3,10	3,42	3,53	3,21	4	3,32			0,20	5,89	92,93
4	F32x	PD01	DB10	3,41	3,52	3,30	3,20	4	3,36			0,14	4,12	94,12
5	F16x	PC01	DB10	3,50	3,58	3,37	3,51	4	3,49			0,09	2,53	97,75
6	F14	PC01	DB10	4,32	3,24	3,24	3,24	4	3,51			0,54	**15,38**	98,31
7	F12x	PC01	DB10	3,00	4,00	4,00	4,00	4	3,75			0,50	**13,33**	105,12
8	A82	PD01	DB10	4,07	3,74	3,64	3,75	4	3,80			0,19	4,91	106,52
9	A60x	PD01	DB10	4,54	*7,27a*	4,72	4,46	3	4,57			0,13	2,91	128,20
10	A58x	PD02	DB05	12,16	13,23	12,76	11,02	0	12,29	*b*	*	0,95	7,77	344,59
11	F33x	PD01	DB10	28,52	30,31	33,21	28,38	0	30,11	*b*	*	2,25	7,47	843,92
12														
13														
14	F15x	PC01	DB08	<200	<200	<200	<200				**			
15	F02	PD02	DB05	<50	<50	<50	<50							
16	A39	PC02	DB08	<50	<50	<50	<50							
17	F03	PD02	DB08	<50	<50	<50	<50							
18	F05	PC02	DB05	<25	<25	<25	<25							
19	A47	PD01	DB10	<20	<20	<20	<20							
20	F06x	PD02	DB08	<40	<40	47,00	<40				*			
21	F07x	PD03	DB08	<10	<10	<10	<10							
22	F13x	PD01	DB05	<8	<8	<8	<8							
23	A80	PD03	DB10	<5	<5	<5	<5							
24	A79	PD03	DB10	<5	<5	<5	<5							
25	F18x	PD99	DB10	<4	<4	<4	<4							
26	F08x	PD01	DB10	<3	<3	<3	<3							
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**31**	**3,57**	**0,325**	**9,102**
30	% from the mean			

l	s_R	CV_R
8	**0,468**	**12,997**

* = non tolerable mean because more than +/-

Lower than the lower evaluated result

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	F33x	PD01	DB10	12,29	11,64	12,93	12,94	4	12,45		0,62	4,98	75,69
2	A79	PD03	DB10	14,00	13,00	13,00	13,00	4	13,25		0,50	3,77	80,56
3	F13x	PD01	DB05	11,57	11,57	15,58	16,67	4	13,85		2,67	**19,26**	84,19
4	F16x	PC01	DB10	13,95	14,07	14,13	14,30	4	14,11		0,15	1,03	85,80
5	F08x	PD01	DB10	15,20	14,40	15,80	14,40	4	14,95		0,68	4,55	90,89
6	F12x	PC01	DB10	16,00	15,00	14,00	15,00	4	15,00		0,82	5,44	91,20
7	A80	PD03	DB10	15,90	14,70	14,80	14,60	4	15,00		0,61	4,04	91,20
8	A88	PD01	DB05	13,50	14,00	17,00	17,00	4	15,38		1,89	**12,28**	93,47
9	A36	PD02	DB10	15,99	15,57	15,25	14,83	4	15,41		0,49	3,19	93,69
10	F14	PC01	DB10	14,95	14,95	13,90	18,15	4	15,49		1,84	**11,90**	94,15
11	A82	PD01	DB10	18,60	16,10	15,40	15,30	4	16,35		1,54	9,43	99,40
12	F32x	PD01	DB10	16,50	17,10	17,10	16,50	4	16,80		0,35	2,06	102,14
13	F18x	PD99	DB10	16,80	17,30	17,30	19,30	4	17,68		1,11	6,27	107,46
14	F07x	PD03	DB08	20,41	20,71	18,02	15,15	4	18,57		2,58	**13,89**	112,91
15	F27	PD01	DB05	19,47	24,34	21,05	17,31	4	20,54		2,96	**14,41**	124,89
16	A47	PD01	DB10	21,30	20,80	21,82	21,78	4	21,43	*	0,48	2,24	130,26
17	A60x	PD01	DB10	24,40	26,50	20,20	22,40	4	23,38	*	2,70	**11,54**	142,11
18	A58x	PD02	DB05	28,72	31,84	30,62	35,97	0	31,79	*b* *	3,07	9,66	193,26
19													
20													
21	F15x	PC01	DB08	<200	<200	<200	<200			**			
22	A39	PC02	DB08	<50	<50	<50	<50						
23	F02	PD02	DB05	<50	<50	<50	<50						
24	F03	PD02	DB08	<50	<50	<50	<50						
25	F05	PC02	DB05	<25	<25	<25	<25						
26	F06x	PD02	DB08	<40	62,00	55,00	<40			*			
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**68**	**16,45**	**1,292**	**7,857**
30	% from the mean			

l	s_R	CV_R
17	**2,997**	**18,220**

* = non tolerable mean because more than +/-

Lower than the lower evaluated result

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	A79	PD03	DB10	*18a*	19,00	19,00	19,00	3	19,00		0,00	0,00	81,24
2	F12x	PC01	DB10	19,00	22,00	20,00	20,00	4	20,25		1,26	6,21	86,58
3	F16x	PC01	DB10	21,25	20,01	19,83	21,25	4	20,59		0,77	3,75	88,01
4	F33x	PD01	DB10	19,03	21,86	20,47	22,43	4	20,95		1,52	7,26	89,56
5	A82	PD01	DB10	21,80	21,60	21,40	21,00	4	21,45		0,34	1,59	91,71
6	A36	PD02	DB10	21,20	21,95	21,10	21,63	4	21,47		0,39	1,84	91,80
7	A80	PD03	DB10	21,40	21,60	22,20	21,80	4	21,75		0,34	1,57	92,99
8	F18x	PD99	DB10	23,20	22,10	23,20	21,70	4	22,55		0,77	3,41	96,41
9	F13x	PD01	DB05	21,78	20,87	22,94	25,59	4	22,80		2,05	8,98	97,46
10	F14	PC01	DB10	21,47	21,54	23,61	25,76	4	23,09		2,04	8,82	98,74
11	F32x	PD01	DB10	23,80	23,40	24,90	23,90	4	24,00		0,64	2,66	102,61
12	A58x	PD02	DB05	26,17	23,28	24,41	25,13	4	24,75		1,22	4,91	105,81
13	A47	PD01	DB10	23,08	21,25	29,32	26,27	4	24,98		3,56	**14,25**	106,80
14	A88	PD01	DB05	21,50	31,50	23,00	25,00	4	25,25		4,41	**17,45**	107,96
15	F27	PD01	DB05	26,36	24,08	27,00	23,59	4	25,26		1,68	6,63	107,99
16	F08x	PD01	DB10	25,50	26,20	27,70	24,40	4	25,95		1,38	5,33	110,95
17	F07x	PD03	DB08	24,15	29,44	30,71	20,30	4	26,15		4,82	**18,45**	111,81
18	F05	PC02	DB05	27,70	29,00	33,00	29,00	4	29,68		2,30	7,75	126,88
19	A60x	PD01	DB10	33,80	33,30	30,00	40,80	0	34,48	*b* *	4,54	**13,17**	147,40
20													
21													
22	F15x	PC01	DB08	<200	<200	<200	<200			**			
23	F03	PD02	DB08	<50	<50	<50	<50						
24	F02	PD02	DB05	<50	<50	<50	<50						
25	A39	PC02	DB08	<50	<50	<50	<50						
26	F06x	PD02	DB08	<40	<40	43,00	50,00			*			
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**71**	**23,39**	**1,638**	**7,003**
* = non tolerable mean because more than +/- **30** % from the mean				

l	s_R	CV_R
18	**2,652**	**11,368**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	PD03	DB08	6,73	6,59	7,16	7,98	4	7,11	*	0,63	8,80	76,04
2	F28x	PD02	DB08	8,04	7,77	7,55	7,32	4	7,67		0,31	4,02	81,98
3	A88	PD01	DB08	8,08	7,88	7,91	7,74	4	7,90		0,14	1,77	84,46
4	F18x	PD99	DB08	8,53	8,48	8,74	8,47	4	8,56		0,13	1,47	91,43
5	F33x	PD01	DB10	9,12	8,52	8,24	8,61	4	8,62		0,37	4,26	92,15
6	F08x	PE99	DB08	8,44	8,63	8,98	9,44	4	8,87		0,44	4,95	94,83
7	F16x	PC01	DB10	9,12	8,56	9,57	8,90	4	9,04		0,42	4,65	96,59
8	A59	PC01	DB08	9,17	9,14	9,32	9,30	4	9,23		0,09	0,98	98,67
9	A80	PD03	DB10	9,56	9,32	9,22	9,18	4	9,32		0,17	1,83	99,61
10	A51	PD02	DB08	10,32	8,90	9,70	8,63	4	9,39		0,77	8,20	100,33
11	A79	PD03	DB10	9,28	9,49	9,22	9,73	4	9,43		0,23	2,46	100,79
12	F02x	PD02	DB08	9,40	9,60	9,10	9,70	4	9,45		0,26	2,80	101,00
13	F05	PC02	DB08	9,66	9,61	9,60	9,62	4	9,62		0,03	0,27	102,84
14	F19	PD02	DB08	9,79	9,66	9,63	9,66	4	9,69		0,07	0,74	103,51
15	F14	PC01	DB08	9,97	9,89	9,78	9,93	4	9,89		0,08	0,83	105,73
16	A39	PC02	DB08	9,62	9,83	10,22	10,28	4	9,99		0,32	3,17	106,73
17	F32x	PD01	DB08	10,20	10,20	10,10	10,10	4	10,15		0,06	0,57	108,48
18	A65	PD01	DB08	10,80	10,60	10,20	10,30	4	10,48		0,28	2,63	111,95
19	A36	PD02	DB08	10,18	10,52	10,34	11,85	4	10,72		0,76	7,13	114,60
20	A47x	PD01	DB08	12,32	12,10	11,82	11,77	4	12,00	*	0,26	2,14	128,28
21	A60x	PD01	DB10	*28,6a*	21,60	21,10	21,40	0	21,37	*b* *	0,25	1,18	228,36
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**80**	**9,36**	**0,290**	**3,102**
20	% from the mean			

l	s_R	CV_R
20	**1,104**	**11,795**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	PD03	DB08	8,75	8,47	8,95	9,89	4	9,02	*	0,61	6,82	70,77
2	F28x	PD02	DB08	10,20	10,56	10,24	9,88	4	10,22		0,28	2,72	80,21
3	A88	PD01	DB08	10,40	10,80	11,10	10,80	4	10,78		0,29	2,67	84,57
4	F18x	PD99	DB08	11,70	11,60	11,40	11,30	4	11,50		0,18	1,59	90,26
5	A39	PC02	DB08	11,64	11,93	11,82	11,74	4	11,78		0,12	1,04	92,47
6	F08x	PE99	DB08	11,60	12,70	12,60	11,40	4	12,08		0,67	5,55	94,77
7	F16x	PC01	DB10	11,79	12,30	12,15	12,08	4	12,08		0,21	1,77	94,81
8	A51	PD02	DB08	12,77	12,58	11,83	12,51	4	12,42		0,41	3,30	97,50
9	F02x	PD02	DB08	12,90	12,30	13,20	13,10	4	12,88		0,40	3,13	101,05
10	A59	PC01	DB08	12,90	13,00	13,00	13,20	4	13,03		0,13	0,97	102,23
11	F05	PC02	DB08	13,20	13,20	13,20	13,20	4	13,20		0,00	0,00	103,60
12	F19	PD02	DB08	13,30	13,30	13,30	13,30	4	13,30		0,00	0,00	104,38
13	F32x	PD01	DB08	13,40	13,40	13,50	13,40	4	13,43		0,05	0,37	105,37
14	A79	PD03	DB10	13,09	13,44	13,71	13,61	4	13,46		0,27	2,02	105,67
15	F33x	PD01	DB10	13,99	13,15	13,68	13,39	4	13,55		0,36	2,68	106,37
16	F14	PC01	DB08	13,59	13,70	13,59	13,81	4	13,67		0,11	0,77	107,31
17	A65	PD01	DB08	14,30	13,90	13,90	13,90	4	14,00		0,20	1,43	109,88
18	A80	PD03	DB10	13,60	14,20	14,40	14,00	4	14,05		0,34	2,43	110,27
19	A36	PD02	DB08	14,64	15,28	14,85	15,60	4	15,09		0,43	2,85	118,45
20	A47x	PD01	DB08	15,30	15,84	15,42	14,64	4	15,30	*	0,50	3,25	120,08
21	A60x	PD01	DB10	*45,4a*	26,80	26,80	26,90	0	26,83	*b* *	0,06	0,22	210,60
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**80**	**12,74**	**0,278**	**2,185**
20	% from the mean			

* = non tolerable mean because more than +/-

l	s_R	CV_R
20	**1,557**	**12,218**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	PD03	DB08	27,10	27,72	28,06	28,54	0	27,86	*b*	*	0,61	2,17	72,28
2	F28x	PD02	DB08	30,12	31,67	33,42	33,04	4	32,06			1,50	4,67	83,20
3	A88	PD01	DB08	32,40	32,20	33,30	32,40	4	32,58			0,49	1,51	84,53
4	F08x	PE99	DB08	35,50	32,80	39,70	32,00	0	35,00	*c*		3,47	9,92	90,83
5	F16x	PC01	DB10	36,00	37,55	36,97	39,30	4	37,46			1,39	3,70	97,20
6	A79	PD03	DB10	36,92	37,75	37,65	37,64	4	37,49			0,38	1,02	97,28
7	F05	PC02	DB08	38,40	37,80	38,30	37,40	4	37,98			0,46	1,22	98,55
8	A80	PD03	DB10	38,70	37,90	38,20	37,20	4	38,00			0,63	1,65	98,61
9	A39	PC02	DB08	39,29	38,62	38,92	37,06	4	38,47			0,98	2,55	99,84
10	A59	PC01	DB08	39,20	37,90	39,90	37,50	4	38,63			1,12	2,89	100,23
11	F18x	PD99	DB08	38,70	38,30	38,90	39,00	4	38,73			0,31	0,80	100,49
12	F19	PD02	DB08	39,40	39,00	38,40	38,90	4	38,93			0,41	1,06	101,01
13	A65	PD01	DB08	40,00	39,40	38,50	39,10	4	39,25			0,62	1,59	101,85
14	F02x	PD02	DB08	37,90	40,00	39,80	39,80	4	39,38			0,99	2,51	102,18
15	F32x	PD01	DB08	39,50	39,40	39,60	39,70	4	39,55			0,13	0,33	102,63
16	A51	PD02	DB08	39,23	40,68	40,09	40,12	4	40,03			0,60	1,49	103,88
17	F33x	PD01	DB10	38,57	40,76	39,70	41,43	4	40,12			1,25	3,12	104,10
18	F14	PC01	DB08	40,57	40,57	40,99	40,14	4	40,57			0,35	0,86	105,27
19	A36	PD02	DB08	42,78	*45,75a*	42,89	43,10	3	42,92			0,16	0,38	111,39
20	A47x	PD01	DB08	*46,79a*	44,39	43,85	43,70	3	43,98			0,36	0,83	114,13
21	A60x	PD01	DB10	61,90	61,20	60,00	61,30	0	61,10	*b*	*	0,80	1,30	158,56
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**70**	**38,54**	**0,674**	**1,749**
20	% from the mean			
	l		s_R	CV_R
	18		**2,871**	**7,425**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	F07x	PD03	DB08	15,52	15,87	15,85	18,31	4	16,39	*	1,29	7,88	77,13
2	F28x	PD02	DB08	18,09	17,72	18,45	17,52	4	17,95		0,41	2,29	84,46
3	A88	PD01	DB08	18,40	18,30	18,50	18,20	4	18,35		0,13	0,70	86,37
4	F18x	PD99	DB08	18,70	18,80	19,00	18,80	4	18,83		0,13	0,67	88,61
5	F08x	PE99	DB08	18,70	20,40	20,40	21,40	4	20,23		1,12	5,54	95,20
6	A80	PD03	DB10	20,60	20,50	20,10	20,50	4	20,43		0,22	1,09	96,14
7	F33x	PD01	DB10	21,30	19,48	20,53	20,91	4	20,56		0,78	3,81	96,75
8	F16x	PC01	DB10	20,97	19,86	21,14	21,17	4	20,79		0,62	3,00	97,83
9	F05	PC02	DB08	21,60	21,60	21,50	21,50	4	21,55		0,06	0,27	101,43
10	A59	PC01	DB08	21,00	21,90	21,30	22,20	4	21,60		0,55	2,54	101,67
11	A39	PC02	DB08	21,14	21,96	22,36	21,21	4	21,67		0,59	2,73	101,98
12	A79	PD03	DB10	21,68	22,14	21,56	21,47	4	21,71		0,30	1,37	102,20
13	F19	PD02	DB08	21,70	21,90	22,10	21,90	4	21,90		0,16	0,75	103,08
14	A51	PD02	DB08	22,53	21,84	22,81	21,89	4	22,27		0,48	2,15	104,81
15	A65	PD01	DB08	22,30	22,50	22,10	22,30	4	22,30		0,16	0,73	104,96
16	F32x	PD01	DB08	22,70	22,60	22,70	22,70	4	22,68		0,05	0,22	106,73
17	F02x	PD02	DB08	23,10	22,60	23,30	22,00	4	22,75		0,58	2,55	107,08
18	F14	PC01	DB08	23,29	23,18	23,29	23,40	4	23,29		0,09	0,39	109,62
19	A36	PD02	DB08	23,32	24,60	24,28	24,49	4	24,17		0,58	2,41	113,78
20	A47x	PD01	DB08	26,44	25,17	25,95	24,57	4	25,53	*	0,83	3,24	120,18
21	A60x	PD01	DB10	38,60	37,90	39,40	39,50	0	38,85	*b* *	0,75	1,93	182,86
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**80**	**21,25**	**0,457**	**2,150**
20	% from the mean			

l	s_R	CV_R
20	**2,174**	**10,231**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	41,00	39,00	38,00	40,00	4	39,50			1,29	3,27	89,49
2	F08	PD01	DB10	42,30	44,50	35,60	43,60	4	41,50			4,04	9,72	94,02
3	F14	PC01	DB10	43,00	43,00	*49a*	44,00	3	43,33			0,58	1,33	98,17
4	A36	PD02	DB10	44,83	44,83	46,43	45,68	4	45,44			0,77	1,70	102,95
5	F32x	PD01	DB10	45,80	47,90	47,90	45,80	4	46,85			1,21	2,59	106,14
6	F16x	PC01	DB10	48,70	46,44	48,74	48,15	4	48,01			1,08	2,25	108,76
7	A60x	PD01	DB10	74,70	74,80	71,80	62,60	0	70,98	*b*	*	5,75	8,11	160,80
8	A82	PD01	DB10	97,40	103,00	114,00	97,40	0	102,95	*b*	*	7,83	7,60	233,24
9	F07x	PD03	DB08	348,90	460,20	354,90	286,00	0	362,50	*b*	*	72,20	**19,92**	821,27
10														
11														
12	A39	PC02	DB08	<50	<50	<50	<50							
13	A80	PD03	DB10	<50	<50	<50	<50							
14	A88	PD01	DB05	<,8	<,8	<,8	<,8				*			
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**23**	**44,14**	**1,494**	**3,386**
* = non tolerable mean because more than +/- **30** % from the mean				

l	s_R	CV_R
6	**3,260**	**7,392**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	33,00	31,00	34,00	32,00	4	32,50			1,29	3,97	81,24
2	F14	PC01	DB10	35,00	37,00	35,00	33,00	4	35,00			1,63	4,67	87,49
3	A36	PD02	DB10	35,47	34,40	36,32	35,26	4	35,36			0,79	2,23	88,40
4	F08	PD01	DB10	36,03	43,30	31,60	37,50	4	37,11			4,83	**13,02**	92,76
5	F32x	PD01	DB10	41,60	37,30	39,40	37,30	4	38,90			2,05	5,28	97,24
6	F16x	PC01	DB10	42,39	42,72	46,88	41,37	4	43,34			2,43	5,60	108,34
7	A60x	PD01	DB10	61,80	56,80	51,50	61,20	4	57,83		*	4,77	8,25	144,54
8	A82	PD01	DB10	81,10	76,40	73,20	76,80	0	76,88	*b*	*	3,24	4,22	192,16
9	F07x	PD03	DB08	363,40	646,90	484,90	262,20	0	439,35	*b*	*	165,63	**37,70**	1098,24
10														
11														
12	A39	PC02	DB08	<50	<50	<50	<50							
13	A80	PD03	DB10	<50	<50	<50	<50							
14	A88	PD01	DB05	<,8	<,8	<,8	<,8				*			
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**28**	**40,01**	**2,542**	**6,355**
30	% from the mean			

l	s_R	CV_R
7	**8,575**	**21,436**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	Lab.standard dev. V_i	Recovery %
1	F08	PD01	DB10	29,50	26,80	20,50	22,60	4	24,85			4,06	**16,33**	70,18
2	A79	PD03	DB10	31,00	29,00	31,00	30,00	4	30,25			0,96	3,17	85,43
3	F14	PC01	DB10	31,00	30,00	31,00	32,00	4	31,00			0,82	2,63	87,55
4	A36	PD02	DB10	35,26	35,16	35,16	36,11	4	35,42			0,46	1,30	100,04
5	F32x	PD01	DB10	35,60	36,60	33,50	37,70	4	35,85			1,79	4,98	101,24
6	F16x	PC01	DB10	41,46	40,73	38,43	38,95	4	39,89			1,44	3,60	112,66
7	A60x	PD01	DB10	55,70	50,90	45,40	50,40	4	50,60		*	4,21	8,32	142,90
8	A82	PD01	DB10	88,10	82,00	84,70	85,00	0	84,95	*b*	*	2,50	2,94	239,91
9	F07x	PD03	DB08	309,80	558,50	417,10	374,70	0	415,03	*b*	*	105,34	**25,38**	1172,08
10														
11														
12	A80	PD03	DB10	<50	<50	<50	<50							
13	A39	PC02	DB08	<50	<50	<50	<50							
14	A88	PD01	DB05	<,8	<,8	<,8	<,8				*			
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**28**	**35,41**	**1,961**	**5,537**
30	% from the mean			

l	s_R	CV_R
7	**8,252**	**23,306**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	A39	PC02	DB08	123,20	120,70	122,10	121,80	0	121,95	*b*	*	1,03	0,84	75,68
2	A79	PD03	DB10	145,00	150,00	150,00	148,00	4	148,25			2,36	1,59	92,00
3	F14	PC01	DB10	159,00	156,00	152,00	169,00	4	159,00			7,26	4,56	98,67
4	A80	PD03	DB10	158,00	152,00	177,00	158,00	4	161,25			10,87	6,74	100,07
5	F32x	PD01	DB10	154,00	155,00	171,00	167,00	4	161,75			8,54	5,28	100,38
6	A36	PD02	DB10	163,00	158,40	164,10	163,60	4	162,28			2,62	1,62	100,70
7	F08	PD01	DB10	161,00	171,00	176,00	150,00	4	164,50			11,50	6,99	102,09
8	F16x	PC01	DB10	177,90	159,40	180,30	166,20	4	170,95			9,86	5,77	106,09
9	A60x	PD01	DB10	238,00	221,00	234,00	227,00	0	230,00	*b*	*	7,53	3,27	142,73
10	A82	PD01	DB10	393,00	376,00	354,00	380,00	0	375,75	*b*	*	16,21	4,32	233,18
11	F07x	PD03	DB08	500,00	605,80	592,20	340,80	0	509,70	*b*	*	122,01	**23,94**	316,31
12														
13														
14	A88	PD01	DB05	<,8	<,8	<,8	<,8				*			
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**28**	**161,14**	**7,574**	**4,700**
20	% from the mean			
	l		s_R	CV_R
	7		**6,830**	**4,239**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: Cr **Sample: 1** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	A80	PD03	DB10	0,13	0,16	0,15	0,14	4	0,15		0,01	8,14	66,45
2	A79	PD03	DB10	0,14	0,15	0,16	0,15	4	0,15		0,01	4,04	68,50
3	A36	PC02	DB10	0,18	0,13	0,16	0,15	4	0,16		0,02	**13,31**	71,24
4	A56	PC01	DB08	0,20	0,14	0,11	0,17	4	0,16		0,04	**24,40**	71,70
5	F32x	PD01	DB10	0,17	0,17	0,15	0,14	4	0,16		0,02	9,85	72,15
6	F07x	PD03	DB08	0,15	0,15	0,16	0,17	4	0,16		0,01	6,63	72,55
7	A82	PD01	DB10	0,19	0,18	0,18	0,17	4	0,18		0,01	2,86	81,29
8	F08	PD01	DB10	0,20	0,17	0,20	0,17	4	0,18		0,02	9,44	82,54
9	F14	PC01	DB10	0,20	0,19	0,19	0,21	4	0,20		0,01	4,94	89,05
10	F18	PD99	DB10	0,26	0,19	0,17	0,17	4	0,20		0,04	**20,74**	89,96
11	F24	PD01	DB99	0,21	0,34	0,12	0,21	0	0,22	*c*	0,09	**40,80**	100,12
12	F27	PD01	DB05	0,23	0,25	0,25	0,20	4	0,23		0,03	**11,46**	106,40
13	A60x	PD01	DB10	0,26	0,23	0,22	0,24	4	0,24		0,02	8,69	107,77
14	F05	PC02	DB05	0,29	0,24	0,25	0,24	4	0,25		0,02	8,92	116,11
15	F12x	PC01	DB10	0,27	0,28	0,27	0,27	4	0,27		0,00	1,65	124,56
16	F19	PC02	DB08	0,32	0,27	0,25	0,27	4	0,28		0,03	**11,58**	126,27
17	F33x	PD01	DB10	0,40	0,35	0,42	0,35	4	0,38	*	0,03	9,13	172,85
18	F16x	PC01	DB10	0,39	0,37	0,44	0,38	4	0,40	*	0,03	8,07	180,61
19													
20													
21	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1			**			
22	A88	PD01	DB08	<1	<1	<1	<1						
23	F02x	PD02	DB08	<1	<1	<1	<1						
24	F03	PD02	DB08	<1	<1	<1	<1						
25	A39	PC02	DB08	<,5	<,5	<,5	<,5						
26	A51	PD02	DB08	<,5	<,5	<,5	<,5						
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**68**	**0,22**	**0,021**	**9,364**
35	% from the mean			

l	s_R	CV_R
17	**0,077**	**35,009**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	0,13	0,13	0,12	0,13	4	0,13		0,01	4,50	70,38
2	A36	PC02	DB10	0,13	0,14	0,14	0,13	4	0,13		0,00	2,91	73,57
3	F12x	PC01	DB10	0,16	0,13	0,12	0,14	4	0,14		0,02	**11,29**	75,79
4	F08	PD01	DB10	0,14	0,15	0,12	0,15	4	0,14		0,01	7,98	77,59
5	F32x	PD01	DB10	0,14	0,16	0,15	0,14	4	0,15		0,01	6,04	80,50
6	A80	PD03	DB10	0,14	0,13	0,20	0,12	4	0,15		0,04	**26,32**	81,61
7	F07x	PD03	DB08	0,14	0,16	0,16	0,16	4	0,15		0,01	5,33	85,51
8	A82	PD01	DB10	0,17	0,19	0,15	0,17	4	0,17		0,02	**11,17**	93,94
9	F05	PC02	DB05	0,18	0,18	0,20	0,18	4	0,18		0,01	6,43	102,39
10	F14	PC01	DB10	0,17	0,19	0,19	0,19	4	0,19		0,01	4,90	102,94
11	A56	PC01	DB08	0,19	0,17	0,21	0,20	4	0,19		0,02	8,27	106,68
12	F18	PD99	DB10	0,20	0,22	0,24	0,21	4	0,22		0,02	7,96	120,12
13	F27	PD01	DB05	0,26	0,30	0,23	0,20	4	0,25	*	0,04	**16,83**	137,30
14	F24	PD01	DB99	0,37	0,24	0,16	0,26	4	0,26	*	0,09	**33,45**	142,29
15	F16x	PC01	DB10	0,23	0,31	0,24	0,30	4	0,27	*	0,04	**15,40**	149,38
16	A60x	PD01	DB10	0,38	0,53	0,19	0,15	0	0,31	*c* *	0,18	**57,47**	172,91
17	F33x	PD01	DB10	0,48	0,44	0,43	0,47	0	0,45	*b* *	0,03	5,58	251,75
18													
19													
20	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1			**			
21	A88	PD01	DB08	<1	<1	<1	<1						
22	F03	PD02	DB08	<1	<1	<1	<1						
23	F02x	PD02	DB08	<1	<1	<1	<1						
24	A51	PD02	DB08	<,5	<,5	<,5	<,5						
25	A39	PC02	DB08	<,5	<,5	<,5	<,5						
26	F19	PC02	DB08	<,214	<,214	<,214	<,214						
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**60**	**0,18**	**0,022**	**12,344**
35	% from the mean			

l	s_R	CV_R
15	**0,048**	**26,339**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	PD03	DB08	0,62	0,69	0,65	0,84	4	0,70		0,10	**14,10**	78,99
2	A39	PC02	DB08	0,73	0,73	0,73	*0,6798a*	3	0,73		0,00	0,22	82,38
3	A80	PD03	DB10	0,92	0,75	0,70	0,64	4	0,75		0,12	**15,89**	85,12
4	A79	PD03	DB10	0,78	0,75	0,73	0,76	4	0,75		0,02	2,87	85,18
5	F18	PD99	DB10	0,78	0,79	0,78	0,79	4	0,79		0,00	0,38	88,82
6	F08	PD01	DB10	0,79	0,83	0,81	0,79	4	0,80		0,02	2,16	90,83
7	F12x	PC01	DB10	0,81	0,76	0,87	0,81	4	0,81		0,04	5,33	92,02
8	F27	PD01	DB05	0,81	0,93	0,82	0,84	4	0,85		0,05	6,27	95,93
9	F14	PC01	DB10	0,88	0,83	0,81	0,91	4	0,86		0,05	5,38	97,03
10	A36	PC02	DB10	0,92	0,84	0,83	0,88	4	0,87		0,04	5,14	98,16
11	F24	PD01	DB99	0,89	0,85	0,98	0,85	4	0,89		0,06	6,66	101,05
12	F32x	PD01	DB10	0,95	0,92	0,93	0,91	4	0,93		0,01	1,40	105,03
13	F19	PC02	DB08	0,85	1,01	1,06	0,82	4	0,94		0,12	**12,49**	105,91
14	F05	PC02	DB05	0,97	0,93	0,95	0,94	4	0,95		0,02	2,02	107,04
15	A82	PD01	DB10	0,95	0,91	0,99	0,97	4	0,95		0,03	3,57	107,92
16	F16x	PC01	DB10	0,96	1,00	0,93	0,97	4	0,96		0,03	2,94	109,18
17	A56	PC01	DB08	1,16	1,08	0,97	0,93	4	1,03		0,10	9,87	117,00
18	F33x	PD01	DB10	1,08	1,03	1,16	1,07	4	1,09		0,06	5,08	122,97
19	A60x	PD01	DB10	1,13	1,06	1,06	1,17	4	1,11		0,05	4,93	125,03
20													
21													
22	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1			**			
23	F03	PD02	DB08	<1	<1	<1	<1						
24	A88	PD01	DB08	<1	<1	<1	<1						
25	F02x	PD02	DB08	1,00	<1	<1	1,00						
26	A51	PD02	DB08	0,90	1,11	1,01	<,9						
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**75**	**0,88**	**0,049**	**5,547**
35	% from the mean			

l	s_R	CV_R
19	**0,118**	**13,353**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	Lab.standard dev. V_i	Recovery %
1	A88	PD01	DB08	1,90	2,00	2,10	1,90	0	1,98	*b*	*	0,10	4,85	61,80
2	F19	PC02	DB08	2,74	2,51	2,81	2,81	4	2,72			0,14	5,23	85,04
3	F07x	PD03	DB08	2,64	2,69	2,88	2,75	4	2,74			0,10	3,72	85,70
4	F08	PD01	DB10	2,83	2,80	2,62	3,12	4	2,84			0,21	7,28	88,95
5	A51	PD02	DB08	2,98	2,78	2,90	2,71	4	2,84			0,12	4,28	88,97
6	F27	PD01	DB05	3,06	2,75	3,06	2,88	4	2,94			0,15	5,14	91,86
7	A36	PC02	DB10	2,85	2,91	2,95	3,08	4	2,95			0,10	3,31	92,24
8	F05	PC02	DB05	3,24	2,73	2,83	3,00	4	2,95			0,22	7,56	92,31
9	A80	PD03	DB10	2,96	3,08	*3,89a*	2,96	3	3,00			0,07	2,31	93,88
10	F24	PD01	DB99	3,14	3,04	3,01	2,81	4	3,00			0,14	4,58	93,96
11	F16x	PC01	DB10	3,08	3,27	2,88	3,20	4	3,11			0,17	5,44	97,20
12	F12x	PC01	DB10	3,28	3,08	3,03	3,13	4	3,13			0,11	3,45	97,95
13	F03	PD02	DB08	3,16	3,20	3,16	3,15	4	3,17			0,02	0,64	99,10
14	F33x	PD01	DB10	3,33	3,14	3,04	3,16	4	3,17			0,12	3,76	99,15
15	A79	PD03	DB10	2,86	3,08	3,18	3,56	4	3,17			0,29	9,21	99,18
16	A39	PC02	DB08	3,29	3,24	3,06	3,36	4	3,24			0,13	3,93	101,30
17	F14	PC01	DB10	3,31	3,37	3,29	3,41	4	3,35			0,05	1,59	104,69
18	F18	PD99	DB10	3,35	3,47	3,44	3,24	4	3,38			0,10	3,06	105,61
19	F02x	PD02	DB08	4,00	3,50	3,10	3,40	4	3,50			0,37	**10,69**	109,53
20	F32x	PD01	DB10	3,83	3,60	3,73	3,76	4	3,73			0,10	2,58	116,72
21	A56	PC01	DB08	3,94	3,59	3,57	3,85	4	3,74			0,18	4,91	116,92
22	A65	PD01	DB08	3,80	3,80	3,80	3,80	4	3,80			0,00	0,00	118,91
23	A82	PD01	DB10	4,00	3,94	3,63	3,68	4	3,81			0,18	4,84	119,30
24	A60x	PD01	DB10	4,84	4,35	4,67	4,78	0	4,66	*b*	*	0,22	4,69	145,83
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**87**	**3,20**	**0,140**	**4,383**
25	% from the mean			

l	s_R	CV_R
22	**0,341**	**10,671**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	F07x	PD03	DB08	0,09	0,08	0,08	0,08	0	0,08	*b*	*	0,00	5,93	65,95
2	A45x	PE99	DB10	0,11	0,11	0,12	0,11	4	0,11			0,00	2,54	93,39
3	F03	PD02	DB08	0,11	0,11	0,11	0,12	4	0,11			0,00	2,38	94,01
4	A79	PD03	DB10	0,12	0,12	0,11	0,12	4	0,11			0,00	3,38	94,42
5	F16x	PC01	DB10	0,12	0,11	0,12	0,12	4	0,12			0,00	2,41	95,25
6	F12x	PC01	DB10	0,12	0,11	0,11	0,12	4	0,12			0,00	3,26	95,45
7	A80	PD03	DB10	0,12	0,12	0,12	0,12	4	0,12			0,00	2,40	97,31
8	A39	PC02	DB08	0,12	0,12	0,11	0,12	4	0,12			0,00	3,18	97,85
9	F08	PD01	DB10	0,12	0,12	0,12	0,12	4	0,12			0,00	3,21	99,17
10	A36	PD02	DB10	0,12	0,12	0,13	0,12	4	0,12			0,00	2,12	102,46
11	F14	PC01	DB10	0,13	0,12	0,13	0,13	4	0,13			0,00	2,43	104,94
12	F32	PD01	DB10	0,13	0,14	0,13	0,14	4	0,14			0,00	1,35	111,33
13	A82	PD01	DB10	0,14	0,14	0,14	0,14	4	0,14			0,00	2,78	114,42
14	F27	PD01	DB05	0,15	0,15	0,15	0,17	0	0,16	*b*	*	0,01	7,52	128,03
15	A60x	PD01	DB10	0,19	0,19	0,17	0,17	0	0,18	*b*	*	0,01	5,47	149,26
16														
17														
18	A88	PD01	DB08	<1	<1	<1	<1				**			
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**48**	**0,12**	**0,003**	**2,604**
25	% from the mean			
	l		s_R	CV_R
	12		**0,008**	**6,962**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: Co **Sample: 2** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean		Lab.standard dev. s_i	V_i	Recovery %
1	F12x	PC01	DB10	*0,027a*	0,028	0,028	0,028	3	0,028		0,00	0,00	83,22
2	F16x	PC01	DB10	0,029	0,032	0,030	0,030	4	0,030		0,00	4,33	90,06
3	A80	PD03	DB10	0,029	0,032	0,031	0,030	4	0,030		0,00	3,43	90,35
4	A36	PD02	DB10	0,031	0,031	0,031	0,030	4	0,031		0,00	1,63	91,39
5	A79	PD03	DB10	0,031	0,031	0,031	0,031	4	0,031		0,00	0,00	92,14
6	F08	PD01	DB10	0,032	0,035	0,032	0,031	4	0,032		0,00	5,20	96,00
7	F32	PD01	DB10	0,033	0,033	0,032	0,033	4	0,033		0,00	1,53	97,34
8	A45x	PE99	DB10	0,039	0,034	0,036	0,033	4	0,036		0,00	7,75	105,66
9	A82	PD01	DB10	0,035	0,036	0,038	0,035	4	0,036		0,00	3,66	106,92
10	F14	PC01	DB10	0,042	0,041	*0,047a*	0,042	3	0,042		0,00	1,39	123,84
11	A60x	PD01	DB10	0,049	0,040	0,037	0,042	4	0,042		0,01	**12,50**	124,83
12	F27	PD01	DB05	0,029	0,086	0,062	0,061	0	0,060	*b* *	0,02	**39,31**	176,85
13	A39	PC02	DB08	0,113	0,124	0,125	0,113	0	0,119	*b* *	0,01	5,81	352,50
14													
15													
16	A88	PD01	DB08	<1	<1	<1	<1			**			
17	F03	PD02	DB08	<,1	<,1	<,1	<,1						
18	F07x	PD03	DB08	<,05	<,05	<,05	<,05						
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**42**	**0,034**	**0,001**	**4,034**
35	% from the mean			

l	s_R	CV_R
11	**0,005**	**13,751**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A45x	PE99	DB10	0,025	0,027	0,023	0,027	4	0,025		0,00	6,84	65,38
2	A79	PD03	DB10	0,034	0,036	0,034	0,033	4	0,034		0,00	3,67	88,34
3	A80	PD03	DB10	0,037	0,042	0,034	0,034	4	0,037		0,00	9,83	94,27
4	F16x	PC01	DB10	0,037	0,038	0,035	0,038	4	0,037		0,00	4,10	95,11
5	F08	PD01	DB10	0,035	0,037	0,040	0,038	4	0,037		0,00	4,65	96,52
6	F12x	PC01	DB10	0,039	0,036	0,039	0,038	4	0,038		0,00	3,72	98,01
7	A36	PD02	DB10	0,040	0,039	0,038	0,039	4	0,039		0,00	2,09	100,59
8	F32	PD01	DB10	0,041	0,040	0,039	0,041	4	0,040		0,00	2,38	103,81
9	A82	PD01	DB10	0,042	0,039	0,039	0,043	4	0,041		0,00	4,27	104,58
10	A60x	PD01	DB10	0,044	0,053	0,048	0,050	4	0,049		0,00	8,18	125,09
11	F14	PC01	DB10	0,051	0,049	0,049	0,050	4	0,050		0,00	1,92	128,31
12	F27	PD01	DB05	0,104	0,051	0,006	0,120	0	0,070	*b* *	0,05	**74,02**	181,18
13													
14													
15	A88	PD01	DB08	<1	<1	<1	<1			**			
16	A39	PC02	DB08	<,1	<,1	<,1	<,1						
17	F03	PD02	DB08	<,1	<,1	<,1	<,1						
18	F07x	PD03	DB08	<,05	<,05	<,05	<,05						
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**44**	**0,039**	**0,002**	**4,614**
35	% from the mean			

l	s_R	CV_R
11	**0,007**	**16,954**

* = non tolerable mean because more than +/-

Lower than the lowest evaluated result

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: Co **Sample: 4** Unit: µg/g

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	F12x	PC01	DB10	0,056	0,057	0,056	0,056	4	0,056			0,00	0,89	90,83
2	A80	PD03	DB10	0,059	0,058	0,058	0,058	4	0,058			0,00	1,39	93,66
3	A36	PD02	DB10	0,058	0,060	0,058	0,061	4	0,059			0,00	2,53	95,68
4	A79	PD03	DB10	0,057	0,066	0,060	0,058	4	0,060			0,00	6,69	97,29
5	A45x	PE99	DB10	0,056	0,062	0,059	0,065	4	0,060			0,00	5,97	97,57
6	F08	PD01	DB10	0,066	0,061	0,062	0,056	4	0,061			0,00	6,41	98,54
7	F16x	PC01	DB10	0,059	0,060	0,064	0,062	4	0,061			0,00	3,35	98,74
8	F32	PD01	DB10	0,068	0,066	0,066	0,066	4	0,067			0,00	1,50	107,38
9	F14	PC01	DB10	0,069	0,069	0,069	0,065	4	0,068			0,00	2,94	109,81
10	A82	PD01	DB10	0,068	0,069	0,070	0,066	4	0,068			0,00	2,66	110,49
11	A60x	PD01	DB10	0,084	0,087	0,093	0,090	0	0,088	*b*	*	0,00	4,54	142,63
12	F27	PD01	DB05	0,121	0,116	0,087	0,082	0	0,102	*b*	*	0,02	**19,55**	163,90
13														
14														
15	A88	PD01	DB08	<1	<1	<1	<1				**			
16	A39	PC02	DB08	<,1	<,1	<,1	<,1							
17	F03	PD02	DB08	<,1	<,1	<,1	<,1							
18	F07x	PD03	DB08	<,05	<,05	<,05	<,05							
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**40**	**0,062**	**0,002**	**3,427**
35	% from the mean			

l	s_R	CV_R
10	**0,004**	**6,837**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	F08	PD01	DB03	21,90	22,40	37,60	35,40	0	29,33	*c*	*	8,34	**28,43**	66,65
2	A39	PZ98	DA05	34,40	33,70	36,00	36,30	4	35,10			1,25	3,57	79,78
3	A36	PD02	DB10	34,16	37,36	33,30	36,29	4	35,28			1,87	5,31	80,18
4	F03	PZ98	DA05	39,44	40,31	39,83	40,60	4	40,05			0,51	1,28	91,02
5	F32x	PZ98	DA05	41,50	42,00	41,70	41,20	4	41,60			0,34	0,81	94,56
6	F02x	PZ98	DA05	42,50	40,60	41,60	42,90	4	41,90			1,02	2,44	95,24
7	A79	PD03	DB10	44,00	43,00	43,00	41,00	4	42,75			1,26	2,94	97,17
8	F28x	PZ98	DA05	43,29	43,09	43,18	43,14	4	43,18			0,09	0,20	98,14
9	A93	PZ98	DA05	43,81	43,91	43,97	44,18	4	43,97			0,16	0,36	99,94
10	A80	PZ98	DA05	45,70	44,90	45,40	44,40	4	45,10			0,57	1,27	102,51
11	A82	PZ98	DA05	51,53	51,61	51,33	51,83	4	51,58			0,21	0,40	117,23
12	F16x	PC01	DB10	53,02	53,15	51,24	51,61	4	52,26			0,97	1,86	118,77
13	F18x	PD03	DA05	54,90	54,30	55,70	55,90	4	55,20			0,74	1,34	125,47
14														
15														
16	A88	PD01	DB04	<30	<30	<30	<30				**			
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**48**	**44,00**	**0,749**	**1,702**
30	% from the mean			
	l		s_R	CV_R
	12		**6,292**	**14,302**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A80	PZ98	DA05	3,20	3,00	3,30	3,20	4	3,18	*	0,13	3,96	68,29
2	F32x	PZ98	DA05	3,25	2,93	3,36	3,36	4	3,23	*	0,20	6,31	69,36
3	A39	PZ98	DA05	3,80	3,60	3,70	3,40	4	3,63		0,17	4,71	77,97
4	A82	PZ98	DA05	4,04	4,04	4,04	4,06	4	4,05		0,01	0,25	87,00
5	F28x	PZ98	DA05	4,28	4,11	4,13	4,05	4	4,14		0,10	2,36	89,10
6	F02x	PZ98	DA05	4,70	5,30	4,20	4,50	4	4,68		0,46	9,94	100,55
7	A93	PZ98	DA05	5,16	6,06	5,10	4,96	4	5,32		0,50	9,41	114,42
8	F08	PD01	DB03	6,40	6,60	*8,5a*	6,90	3	6,63	*	0,25	3,79	142,67
9	A79	PD03	DB10	8,00	7,00	8,00	7,00	4	7,50	*	0,58	7,70	161,31
10	F16x	PC01	DB10	6,00	6,19	8,87	9,18	0	7,56	*c* *	1,70	**22,49**	162,58
11													
12													
13	A88	PD01	DB04	<30	<30	<30	<30			**			
14	F03	PZ98	DA05	<20	<20	<20	<20						
15	F18x	PD03	DA05	<20	<20	<20	<20						
16	A36	PD02	DB10	<10	<10	<10	<10						
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**35**	**4,65**	**0,267**	**5,740**
* = non tolerable mean because more than +/- **30** % from the mean				
Lower than the lowest evaluated result				

l	s_R	CV_R
9	**1,515**	**32,201**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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

No.	Lab. Code	Method code P	Method code D	Replications 1	2	3	4	n	Lab.mean			Lab.standard dev. s_i	V_i	Recovery %
1	F08	PD01	DB03	10,98	11,20	15,80	15,70	0	13,42	*c*	*	2,69	**20,06**	57,04
2	A36	PD02	DB10	17,69	18,21	18,00	18,00	4	17,98			0,21	1,19	76,39
3	A39	PZ98	DA05	21,20	19,90	20,10	19,00	4	20,05			0,90	4,51	85,21
4	F32x	PZ98	DA05	21,70	20,70	20,00	20,90	4	20,83			0,70	3,36	88,51
5	A79	PD03	DB10	22,00	23,00	21,00	22,00	4	22,00			0,82	3,71	93,50
6	F02x	PZ98	DA05	22,20	21,90	22,30	22,40	4	22,20			0,22	0,97	94,35
7	F28x	PZ98	DA05	21,25	22,95	22,26	23,53	4	22,50			0,98	4,36	95,62
8	F03	PZ98	DA05	23,65	23,84	22,89	24,41	4	23,70			0,63	2,65	100,72
9	A80	PZ98	DA05	24,30	24,30	23,90	23,40	4	23,98			0,43	1,78	101,89
10	A93	PZ98	DA05	23,89	23,97	24,53	24,27	4	24,17			0,29	1,21	102,70
11	F18x	PD03	DA05	27,20	*30,4a*	26,90	27,40	3	27,17			0,25	0,93	115,46
12	A82	PZ98	DA05	29,20	28,60	29,90	28,80	4	29,13			0,57	1,97	123,78
13	F16x	PC01	DB10	30,28	28,23	31,57	28,25	4	29,58			1,64	5,53	125,73
14														
15														
16	A88	PD01	DB04	<30	<30	<30	<30				**			
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**47**	**23,53**	**0,637**	**2,706**
30	% from the mean			

l	s_R	CV_R
12	**3,531**	**14,961**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A39	PZ98	DA05	35,60	34,60	37,80	36,60	4	36,15		1,37	3,79	79,15
2	A36	PD02	DB10	40,08	39,33	36,79	38,17	4	38,59		1,44	3,72	84,50
3	F08	PD01	DB03	31,90	39,70	41,10	47,10	0	39,95	*c*	6,25	**15,65**	87,47
4	A79	PD03	DB10	41,00	43,00	40,00	44,00	4	42,00		1,83	4,35	91,96
5	F32x	PZ98	DA05	42,60	43,60	42,30	44,80	4	43,33		1,13	2,61	94,86
6	F03	PZ98	DA05	43,54	42,97	43,93	42,87	4	43,33		0,50	1,15	94,86
7	F02x	PZ98	DA05	46,20	47,40	43,00	44,10	4	45,18		1,99	4,41	98,91
8	F18x	PD03	DA05	43,20	48,40	44,50	46,70	4	45,70		2,31	5,05	100,06
9	A88	PD01	DB04	48,00	45,00	44,00	47,00	4	46,00		1,83	3,97	100,71
10	F28x	PZ98	DA05	46,04	48,42	46,25	45,42	4	46,53		1,31	2,81	101,88
11	A80	PZ98	DA05	48,40	47,40	46,60	46,60	4	47,25		0,85	1,81	103,45
12	A93	PZ98	DA05	47,51	47,53	47,76	47,73	4	47,63		0,13	0,27	104,29
13	F16x	PC01	DB10	52,26	56,94	55,82	53,01	4	54,51		2,23	4,09	119,34
14	A82	PZ98	DA05	58,06	57,53	57,24	57,46	4	57,57		0,35	0,60	126,05
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**52**	**45,67**	**1,327**	**2,906**
30	% from the mean			

* = non tolerable mean because more than +/-

Limit for the lower concentration range

l	s_R	CV_R
13	**5,718**	**12,520**

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	F07x	PD03	DB08	0,67	*0,6406a*	0,67	0,67	3	0,67			0,00	0,32	84,83
2	A79	PD03	DB10	0,74	0,73	0,68	0,74	4	0,72			0,03	3,75	91,01
3	A45	PE99	DB10	0,74	0,72	0,74	0,72	4	0,73			0,01	1,82	92,19
4	F19	PC02	DB08	0,76	0,74	0,75	0,73	4	0,74			0,01	1,87	93,99
5	F12x	PC01	DB10	0,73	0,76	0,74	0,74	4	0,74			0,01	1,72	93,99
6	A51	PD02	DB08	0,76	0,72	0,77	0,74	4	0,75			0,02	2,77	94,34
7	F05	PC02	DB08	0,78	0,74	0,71	0,82	4	0,76			0,05	6,30	96,84
8	F08	PD01	DB10	0,67	0,83	0,80	0,79	4	0,77			0,07	9,52	97,76
9	F18	PD99	DB10	0,75	0,79	0,78	0,78	4	0,77			0,02	2,18	98,11
10	F33x	PD01	DB10	0,78	0,77	0,78	0,78	4	0,78			0,00	0,40	98,45
11	A56	PC02	DB08	0,81	0,72	0,90	0,69	4	0,78			0,09	**11,82**	98,49
12	A36	PD02	DB10	0,81	0,76	0,77	0,79	4	0,78			0,02	3,08	99,28
13	A80	PD03	DB10	0,79	0,79	0,78	0,78	4	0,78			0,01	0,87	99,34
14	F27	PD01	DB05	1,00	0,79	0,83	0,77	4	0,85			0,11	**12,59**	107,10
15	A82	PD01	DB10	0,83	0,86	0,86	0,86	4	0,85			0,02	1,78	107,57
16	F32x	PD01	DB10	0,87	0,87	0,89	0,89	4	0,88			0,01	0,89	111,21
17	F14	PC01	DB10	0,91	0,91	0,92	0,92	4	0,91			0,01	0,69	115,77
18	A39	PC02	DB08	0,89	0,88	0,94	0,96	4	0,92			0,04	4,21	115,96
19	F16x	PC01	DB10	1,09	1,01	1,04	1,04	0	1,05	*b*	*	0,03	3,05	132,45
20	A60x	PD01	DB10	1,33	1,23	1,14	1,15	0	1,21	*b*	*	0,09	7,26	153,54
21	F24	PD01	DB99	1,03	2,03	1,41	1,04	0	1,38	*b*	*	0,47	**33,89**	174,43
22	F02x	PD02	DB08	1,70	1,60	1,50	1,70	0	1,63	*b*	*	0,10	5,89	205,77
23														
24														
25	A88	PD01	DB08	<2	<2	<2	<2				**			
26	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1				**			
27	F03	PD02	DB08	<1	<1	<1	<1							
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**71**	**0,79**	**0,029**	**3,718**
30	% from the mean			

l	s_R	CV_R
18	**0,067**	**8,546**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Element: Ni **Sample: 2** Unit: µg/g

No.	Lab.	Method code		Replications				n	Lab.mean		Lab.standard dev.		Recovery
	Code	P	D	1	2	3	4				s_i	V_i	%
1	A56	PC02	DB08	0,77	0,73	0,73	0,85	4	0,77		0,06	7,48	81,63
2	F08	PD01	DB10	0,78	0,93	0,83	0,73	4	0,82		0,09	**10,68**	86,62
3	F12x	PC01	DB10	0,82	0,80	0,87	0,83	4	0,83		0,03	3,36	88,18
4	F19	PC02	DB08	0,86	0,83	0,90	0,87	4	0,87		0,03	2,99	91,79
5	A79	PD03	DB10	0,90	0,99	0,80	0,83	4	0,88		0,09	9,87	92,98
6	A45	PE99	DB10	0,88	0,88	0,90	0,93	4	0,90		0,03	2,82	94,97
7	F07x	PD03	DB08	0,87	0,75	1,04	0,99	4	0,91		0,13	**14,28**	96,95
8	F27	PD01	DB05	0,92	0,96	0,89	0,96	4	0,93		0,03	3,56	98,89
9	A39	PC02	DB08	0,94	0,97	0,94	0,96	4	0,95		0,02	1,69	101,06
10	F18	PD99	DB10	0,99	0,94	0,95	0,96	4	0,96		0,02	2,49	101,78
11	A80	PD03	DB10	0,98	1,00	0,95	0,93	4	0,96		0,03	2,84	102,18
12	A36	PD02	DB10	1,02	0,96	0,99	0,94	4	0,98		0,04	3,71	103,92
13	F33x	PD01	DB10	1,01	1,03	0,98	1,02	4	1,01		0,02	2,03	106,95
14	F14	PC01	DB10	0,99	1,13	0,93	1,03	4	1,02		0,08	8,20	108,17
15	F32x	PD01	DB10	1,02	1,09	1,00	1,02	4	1,03		0,04	3,82	109,46
16	F05	PC02	DB08	1,01	1,24	0,92	0,96	4	1,03		0,14	**13,85**	109,52
17	A82	PD01	DB10	*1,47a*	1,10	1,03	1,06	3	1,06		0,04	3,30	112,73
18	F16x	PC01	DB10	1,07	1,12	1,06	1,11	4	1,09		0,03	2,66	115,43
19	A60x	PD01	DB10	1,76	1,29	1,41	1,26	0	1,43	*b* *	0,23	**16,04**	151,61
20	F24	PD01	DB99	1,35	1,62	1,79	1,64	0	1,60	*b* *	0,18	**11,40**	169,47
21													
22													
23	A88	PD01	DB08	<2	<2	<2	<2			**			
24	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1			**			
25	F03	PD02	DB08	<1	<1	<1	<1						
26	F02x	PD02	DB08	1,00	<1	1,00	<1						
27	A51	PD02	DB08	0,86	1,04	0,84	<,8						
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**71**	**0,94**	**0,052**	**5,470**
30	% from the mean			
	l		s_R	CV_R
	18		**0,089**	**9,463**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A79	PD03	DB10	0,58	0,59	0,58	0,56	4	0,58		0,01	2,42	82,18
2	F07x	PD03	DB08	0,62	0,58	0,61	0,63	4	0,61		0,02	3,65	86,32
3	A56	PC02	DB08	0,64	0,59	0,65	0,58	4	0,61		0,04	5,91	87,05
4	F12x	PC01	DB10	0,62	0,63	0,63	0,62	4	0,62		0,00	0,62	88,50
5	F18	PD99	DB10	0,64	0,64	0,68	0,68	4	0,66		0,02	3,33	93,33
6	F19	PC02	DB08	0,67	0,68	0,71	0,66	4	0,68		0,02	2,89	96,56
7	A80	PD03	DB10	0,78	0,68	0,66	0,60	4	0,68		0,07	**10,65**	96,56
8	A36	PD02	DB10	0,68	0,70	0,66	0,68	4	0,68		0,02	2,60	96,63
9	F33x	PD01	DB10	0,69	0,64	0,68	0,72	4	0,68		0,03	4,75	96,67
10	F14	PC01	DB10	0,72	0,69	0,68	0,68	4	0,69		0,02	2,57	98,23
11	F05	PC02	DB08	0,69	0,69	0,70	0,70	4	0,69		0,01	1,13	98,62
12	F08	PD01	DB10	0,86	0,72	0,64	0,57	4	0,70		0,12	**17,88**	98,98
13	A45	PE99	DB10	0,71	0,63	0,73	0,73	4	0,70		0,05	6,67	99,37
14	F32x	PD01	DB10	0,74	0,72	0,71	0,73	4	0,72		0,01	1,68	102,81
15	A82	PD01	DB10	0,72	0,73	0,73	0,74	4	0,73		0,01	1,14	103,34
16	F27	PD01	DB05	0,80	0,72	0,85	0,74	4	0,78		0,06	7,54	110,48
17	A39	PC02	DB08	0,82	0,75	0,78	0,79	4	0,78		0,03	3,69	111,44
18	F16x	PC01	DB10	0,82	0,90	0,88	0,89	4	0,87		0,04	4,31	124,10
19	A60x	PD01	DB10	0,92	0,93	0,89	0,89	4	0,91		0,02	2,16	128,83
20	F24	PD01	DB99	0,82	0,90	1,74	1,15	0	1,15	*b* *	0,42	**36,27**	163,20
21													
22													
23	A88	PD01	DB08	<2	<2	<2	<2			**			
24	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1			**			
25	F03	PD02	DB08	<1	<1	<1	<1						
26	F02x	PD02	DB08	<1	1,00	<1	1,00						
27	A51	PD02	DB08	0,80	0,98	0,81	<,8						
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													

	n	Mean	s_r	CV_r
all labs	**76**	**0,70**	**0,032**	**4,505**
30	% from the mean			
	l		s_R	CV_R
	19		**0,084**	**11,957**

* = non tolerable mean because more than +/-

Limit for the lower concentration range

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

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	A51	PD02	DB08	1,38	1,44	1,35	1,49	4	1,41		*	0,06	4,49	76,59
2	F19	PC02	DB08	1,46	1,52	1,61	1,66	4	1,56			0,09	5,73	84,62
3	F07x	PD03	DB08	1,60	1,72	1,67	1,57	4	1,64			0,07	4,36	88,72
4	F05	PC02	DB08	1,80	1,65	1,59	1,69	4	1,68			0,09	5,26	91,12
5	A79	PD03	DB10	1,67	1,70	1,75	1,71	4	1,71			0,03	1,92	92,43
6	F12x	PC01	DB10	1,69	1,74	1,70	1,71	4	1,71			0,02	1,26	92,61
7	F27	PD01	DB05	1,71	1,75	1,81	1,66	4	1,73			0,06	3,63	93,77
8	A36	PD02	DB10	1,75	1,83	1,71	1,82	4	1,78			0,06	3,23	96,27
9	A39	PC02	DB08	1,79	1,78	1,88	1,78	4	1,81			0,05	2,55	97,82
10	F33x	PD01	DB10	1,86	1,76	1,79	1,88	4	1,82			0,06	3,07	98,65
11	A45	PE99	DB10	1,86	1,93	1,76	1,80	4	1,84			0,07	4,03	99,52
12	A80	PD03	DB10	1,92	1,88	1,80	1,87	4	1,87			0,05	2,67	101,14
13	F03	PD02	DB08	1,91	1,91	1,86	1,87	4	1,88			0,02	1,31	102,07
14	A56	PC02	DB08	1,88	1,93	1,77	2,01	4	1,90			0,10	5,42	102,70
15	F14	PC01	DB10	1,93	2,01	1,99	2,01	4	1,98			0,04	1,79	107,40
16	F16x	PC01	DB10	2,06	1,93	2,10	1,96	4	2,01			0,08	4,09	108,94
17	F18	PD99	DB10	2,04	2,06	2,03	1,98	4	2,03			0,03	1,68	109,81
18	A82	PD01	DB10	2,08	2,07	2,03	1,99	4	2,04			0,04	2,01	110,62
19	F32x	PD01	DB10	2,07	2,08	2,04	2,07	4	2,07			0,02	0,84	111,84
20	A65	PD01	DB08	2,00	2,10	2,20	2,10	4	2,10			0,08	3,89	113,73
21	F24	PD01	DB99	2,50	2,16	2,15	2,03	4	2,21			0,20	9,21	119,63
22	F08	PD01	DB10	2,36	2,44	1,68	2,61	0	2,27	*c*	*	0,41	**17,98**	123,07
23	A60x	PD01	DB10	2,80	2,74	2,83	2,89	0	2,82	*b*	*	0,06	2,22	152,45
24	F02x	PD02	DB08	3,10	2,90	2,90	3,20	0	3,03	*b*	*	0,15	4,96	163,83
25														
26														
27	A88	PD01	DB08	<2	<2	<2	<2				**			
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														

	n	Mean	s_r	CV_r
all labs	**84**	**1,85**	**0,064**	**3,446**
20	% from the mean			

l	s_R	CV_R
21	**0,195**	**10,565**

* = non tolerable mean because more than +/-

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	1	F27	PD01	DB02	197,3	232,1	199,7	219,6	212,18	16,624	7,835
Al	(µg/g)	1	F28x	PD02	DB08	225,8	226,8	230	223,1	226,43	2,850	1,259
Al	(µg/g)	1	A36	PB02	DB08	233,7	233,7	231,6	214,5	228,38	9,303	4,073
Al	(µg/g)	1	F07x	PD03	DB08	252,5	213,3	215	233,1	228,48	18,353	8,033
Al	(µg/g)	1	F19	PD02	DB08	238	229	225	230	230,50	5,447	2,363
Al	(µg/g)	1	F18x	PD99	DB08	238	235	235	236	236,00	1,414	0,599
Al	(µg/g)	1	F12x	PC01	DB08	243	243	243	243	243,00	0,000	0,000
Al	(µg/g)	1	F06x	PD02	DB08	246,8	244,4	242,8	240,8	243,70	2,538	1,041
Al	(µg/g)	1	F03	PD02	DB08	245,68	245,16	242,69	243,17	244,18	1,466	0,601
Al	(µg/g)	1	F05x	PC02	DB08	248	242	243	245	244,50	2,646	1,082
Al	(µg/g)	1	A51	PD02	DB08	245,8	243,5	245,1	244,3	244,68	0,995	0,406
Al	(µg/g)	1	A80	PD03	DB10	248	251	243	252	248,50	4,041	1,626
Al	(µg/g)	1	A79	PD03	DB10	256,326	258,413	254,502	267,34	259,15	5,692	2,196
Al	(µg/g)	1	A39	PC02	DB08	256,3	261,5	265,1	257,7	260,15	3,964	1,524
Al	(µg/g)	1	F16x	PC01	DB08	267,4	261,8	270,4	263,6	265,80	3,854	1,450
Al	(µg/g)	1	F15x	PC01	DB08	267	265	277	274	270,75	5,679	2,097
Al	(µg/g)	1	F14	PC01	DB08	283,51	272,77	285,66	271,7	278,41	7,197	2,585
Al	(µg/g)	1	A65	PD01	DB08	283	270	290	285	282,00	8,524	3,023
Al	(µg/g)	1	F08	PD01	DB10	296	297	291	285	292,25	5,500	1,882
Al	(µg/g)	1	A56	PC01	DB08	300	293	298	294	296,25	3,304	1,115
Al	(µg/g)	1	A57	PZ02	DD02	320,2	306,4	298,2	306,1	307,73	9,142	2,971
Al	(µg/g)	1	A45x	PE99	DB08	310	312	302	315	309,75	5,560	1,795
Al	(µg/g)	1	A60x	PD01	DB10	410	368	364	368	377,50	21,749	5,761
Al	(µg/g)	2	F03	PD02	DB08	<50	<50	<50	<50			
Al	(µg/g)	2	F28x	PD02	DB08	8,63	8,47	7,98	7,88	8,24	0,366	4,444
Al	(µg/g)	2	A36	PB02	DB08	9,57	8,99	7,43	8,23	8,56	0,929	10,862
Al	(µg/g)	2	F19	PD02	DB08	10,3	11,3	10,6	11,1	10,83	0,457	4,225
Al	(µg/g)	2	F27	PD01	DB02	12,39	13,15	10,24	10,86	11,66	1,343	11,516
Al	(µg/g)	2	F08	PD01	DB10	12,1	11,04	13,3	11,03	11,87	1,079	9,091

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	2	F07x	PD03	DB08	13,1	12,71	11,79	14,85	13,11	1,282	9,776
Al	(µg/g)	2	A80	PD03	DB10	14,9	14,4	14,6	15,1	14,75	0,311	2,108
Al	(µg/g)	2	F06x	PD02	DB08	14,74	14,94	15,22	15,34	15,06	0,271	1,801
Al	(µg/g)	2	F12x	PC01	DB08	17	17	16	17	16,75	0,500	2,985
Al	(µg/g)	2	F05x	PC02	DB08	18,1	17,7	18	17,8	17,90	0,183	1,020
Al	(µg/g)	2	A65	PD01	DB08	19	18	19	17	18,25	0,957	5,246
Al	(µg/g)	2	A79	PD03	DB10	18,958	18,326	19,317	18,501	18,78	0,449	2,390
Al	(µg/g)	2	F18x	PD99	DB08	19,1	19,9	18,7	18	18,93	0,793	4,191
Al	(µg/g)	2	A39	PC02	DB08	20,88	20,3	20,86	19,54	20,40	0,630	3,090
Al	(µg/g)	2	A56	PC01	DB08	23	22	21	21	21,75	0,957	4,402
Al	(µg/g)	2	A45x	PE99	DB08	22,4	22,7	22,8	22,5	22,60	0,183	0,808
Al	(µg/g)	2	A51	PD02	DB08	22,31	22,99	21,97	23,47	22,69	0,674	2,969
Al	(µg/g)	2	F15x	PC01	DB08	22	23	23	25	23,25	1,258	5,412
Al	(µg/g)	2	F16x	PC01	DB08	23,85	23,1	23,96	23,27	23,55	0,424	1,800
Al	(µg/g)	2	F14	PC01	DB08	27,4	29,56	24,81	29,02	27,70	2,133	7,700
Al	(µg/g)	2	A60x	PD01	DB10	101	20,3	20,8	15,6	39,43	41,117	104,291
Al	(µg/g)	2	A57	PZ02	DD02	41,1	38,3	39,8	44,4	40,90	2,599	6,354
Al	(µg/g)	3	F27	PD01	DB02	50,62	58,91	53,21	24,06	46,70	15,485	33,159
Al	(µg/g)	3	F28x	PD02	DB08	63,32	61,12	63,21	64,37	63,01	1,361	2,160
Al	(µg/g)	3	A36	PB02	DB08	72,65	70,74	66,29	63,75	68,36	4,066	5,949
Al	(µg/g)	3	F07x	PD03	DB08	74,74	65,73	66,49	67,9	68,72	4,116	5,990
Al	(µg/g)	3	F19	PD02	DB08	69,2	75,2	67,3	67,7	69,85	3,659	5,239
Al	(µg/g)	3	A80	PD03	DB10	76,4	71,5	69,8	65,5	70,80	4,507	6,366
Al	(µg/g)	3	F08	PD01	DB10	83,005	76,03	78,1	73,6	77,68	3,996	5,144
Al	(µg/g)	3	F18x	PD99	DB08	83,5	80	79,4	79,8	80,68	1,900	2,355
Al	(µg/g)	3	F05x	PC02	DB08	84,1	79,6	83,1	82,5	82,33	1,933	2,348
Al	(µg/g)	3	A51	PD02	DB08	84,8	85,24	85,1	85,31	85,11	0,226	0,265
Al	(µg/g)	3	F03	PD02	DB08	88,82	87,43	88,73	87,53	88,13	0,750	0,851
Al	(µg/g)	3	F06x	PD02	DB08	88,31	86,29	90,22	88,09	88,23	1,607	1,822

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	3	A79	PD03	DB10	90,341	85,849	88,031	88,763	88,25	1,866	2,115
Al	(µg/g)	3	F12x	PC01	DB08	90	91	92	91	91,00	0,816	0,897
Al	(µg/g)	3	A39	PC02	DB08	93,79	90,19	96,05	89,35	92,35	3,132	3,392
Al	(µg/g)	3	A65	PD01	DB08	91	93	95	93	93,00	1,633	1,756
Al	(µg/g)	3	F15x	PC01	DB08	94	97	96	97	96,00	1,414	1,473
Al	(µg/g)	3	F16x	PC01	DB08	98,23	103,5	100,6	104,1	101,61	2,721	2,678
Al	(µg/g)	3	A56	PC01	DB08	102	109	108	106	106,25	3,096	2,914
Al	(µg/g)	3	A60x	PD01	DB10	106	100	109	114	107,25	5,852	5,457
Al	(µg/g)	3	A45x	PE99	DB08	108	110	107	108	108,25	1,258	1,162
Al	(µg/g)	3	F14	PC01	DB08	110,39	112,31	108,04	105,69	109,11	2,871	2,631
Al	(µg/g)	3	A57	PZ02	DD02	158	161,3	155,2	159,4	158,48	2,568	1,621
Al	(µg/g)	4	F27	PD01	DB02	86,52	87,3	91,39	63,56	82,19	12,604	15,335
Al	(µg/g)	4	F28x	PD02	DB08	118,1	130,3	124	126,5	124,73	5,120	4,105
Al	(µg/g)	4	F07x	PD03	DB08	124,9	124,4	143	130,1	130,60	8,659	6,630
Al	(µg/g)	4	A36	PB02	DB08	136,8	135,7	133,6	121,9	132,00	6,863	5,199
Al	(µg/g)	4	F19	PD02	DB08	142	141	144	147	143,50	2,646	1,844
Al	(µg/g)	4	A80	PD03	DB10	146	147	134	153	145,00	7,958	5,488
Al	(µg/g)	4	F05x	PC02	DB08	151	148	144	146	147,25	2,986	2,028
Al	(µg/g)	4	A51	PD02	DB08	148,7	149,6	148,2	151,1	149,40	1,273	0,852
Al	(µg/g)	4	F12x	PC01	DB08	156	155	153	155	154,75	1,258	0,813
Al	(µg/g)	4	F03	PD02	DB08	158,03	159,16	159,49	159,67	159,09	0,736	0,463
Al	(µg/g)	4	F08	PD01	DB10	169	165	155	163	163,00	5,888	3,612
Al	(µg/g)	4	F06x	PD02	DB08	164	163,6	162,4	164,7	163,68	0,964	0,589
Al	(µg/g)	4	A79	PD03	DB10	166,188	173,818	163,558	166,667	167,56	4,392	2,621
Al	(µg/g)	4	A65	PD01	DB08	173	167	170	167	169,25	2,872	1,697
Al	(µg/g)	4	F15x	PC01	DB08	171	167	171	171	170,00	2,000	1,176
Al	(µg/g)	4	A39	PC02	DB08	167	173,9	175,1	173,2	172,30	3,619	2,101
Al	(µg/g)	4	F18x	PD99	DB08	166	183	176	184	177,25	8,302	4,684
Al	(µg/g)	4	F16x	PC01	DB08	185,4	180,6	178,2	176,2	180,10	3,965	2,201

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Al	(µg/g)	4	F14	PC01	DB08	182,78	182,88	182,45	186,85	183,74	2,081	1,133
Al	(µg/g)	4	A45x	PE99	DB08	206	208	209	205	207,00	1,826	0,882
Al	(µg/g)	4	A56	PC01	DB08	199	203	221	207	207,50	9,574	4,614
Al	(µg/g)	4	A57	PZ02	DD02	216,8	217,2	213,1	207,1	213,55	4,679	2,191
Al	(µg/g)	4	A60x	PD01	DB10	208	211	212	229	215,00	9,487	4,412
Ba	(µg/g)	1	F16x	PC01	DB10	12,05	11,28	12,12	11,96	11,85	0,387	3,267
Ba	(µg/g)	1	A82	PD01	DB08	12,6	12,5	12,4	12,5	12,50	0,082	0,653
Ba	(µg/g)	1	A80	PD03	DB10	13,7	13,5	13,4	13,5	13,53	0,126	0,930
Ba	(µg/g)	1	A39	PC02	DB08	13,72	13,64	13,6	14,05	13,75	0,205	1,487
Ba	(µg/g)	1	A65	PD01	DB08	14,5	13,6	14	13,9	14,00	0,374	2,673
Ba	(µg/g)	1	F08	PD01	DB10	15,5	14,9	14,8	14,4	14,90	0,455	3,051
Ba	(µg/g)	2	A39	PC02	DB08	9,729	9,921	9,759	9,604	9,75	0,130	1,337
Ba	(µg/g)	2	F16x	PC01	DB10	10,22	10,18	10,19	10,22	10,20	0,021	0,202
Ba	(µg/g)	2	A82	PD01	DB08	10,4	10,5	10,5	10,5	10,48	0,050	0,477
Ba	(µg/g)	2	A65	PD01	DB08	11,7	11,4	11,5	11,5	11,53	0,126	1,092
Ba	(µg/g)	2	A80	PD03	DB10	11,7	11,7	11,8	11,6	11,70	0,082	0,698
Ba	(µg/g)	2	F08	PD01	DB10	12,8	13,1	13,4	13,3	13,15	0,265	2,012
Ba	(µg/g)	3	F16x	PC01	DB10	18,69	19,27	18,74	19,21	18,98	0,305	1,606
Ba	(µg/g)	3	A82	PD01	DB08	19,7	19,5	19,2	19,2	19,40	0,245	1,263
Ba	(µg/g)	3	A80	PD03	DB10	21,2	20,7	21	20,3	20,80	0,392	1,883
Ba	(µg/g)	3	A65	PD01	DB08	21,3	21,1	21	21	21,10	0,141	0,670
Ba	(µg/g)	3	A39	PC02	DB08	22,13	22,05	21,29	21,69	21,79	0,384	1,764
Ba	(µg/g)	3	F08	PD01	DB10	23,04	24,03	22,6	23,5	23,29	0,614	2,635
Ba	(µg/g)	4	F16x	PC01	DB10	13,01	12,19	13,15	12,81	12,79	0,424	3,312
Ba	(µg/g)	4	A82	PD01	DB08	13,4	13	12,9	13,1	13,10	0,216	1,649
Ba	(µg/g)	4	A80	PD03	DB10	14,2	14,2	13,8	14,2	14,10	0,200	1,418
Ba	(µg/g)	4	A65	PD01	DB08	14,7	14,3	14,6	14,2	14,45	0,238	1,647
Ba	(µg/g)	4	A39	PC02	DB08	14,35	14,88	14,89	14,55	14,67	0,264	1,801
Ba	(µg/g)	4	F08	PD01	DB10	16,3	15,97	15,3	15,5	15,77	0,453	2,871

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Be	(ng/g)	1	A80	PD03	DB10	45,7	45,7	44	45,6	45,25	0,835	1,845
Be	(ng/g)	1	F16x	PC01	DB10	53,98	54,76	51,11	54,58	53,61	1,698	3,168
Be	(ng/g)	1	F32	PD01	DB10	58,8	57	57,8	62,6	59,05	2,479	4,197
Be	(ng/g)	2	A80	PD03	DB10	<12,5	<12,5	<12,5	<12,5			
Be	(ng/g)	2	F16x	PC01	DB10	0,4754	0,5308	0,4934	0,504	0,50	0,023	4,625
Be	(ng/g)	2	F32	PD01	DB10	0,75	0,64	0,85	0,53	0,69	0,138	19,953
Be	(ng/g)	3	A80	PD03	DB10	<12,5	<12,5	<12,5	<12,5			
Be	(ng/g)	3	F16x	PC01	DB10	3,128	3,388	3,052	3,366	3,23	0,169	5,221
Be	(ng/g)	3	F32	PD01	DB10	3,87	4,29	4,5	3,56	4,06	0,421	10,390
Be	(ng/g)	4	A80	PD03	DB10	<12,5	<12,5	<12,5	<12,5			
Be	(ng/g)	4	F16x	PC01	DB10	7,861	8,448	8,66	8,892	8,47	0,442	5,219
Be	(ng/g)	4	F32	PD01	DB10	10,1	9,18	9,92	9,7	9,73	0,398	4,097
Bi	(ng/g)	1	A80	PD03	DB10	4,4	4,41	4,61	4,44	4,47	0,098	2,198
Bi	(ng/g)	1	F16x	PC01	DB10	4,901	4,538	5,291	4,875	4,90	0,308	6,284
Bi	(ng/g)	2	F16x	PC01	DB10	3,034	3,238	3,106	3,575	3,24	0,240	7,407
Bi	(ng/g)	2	A80	PD03	DB10	3,41	3,74	4,51	3,07	3,68	0,616	16,721
Bi	(ng/g)	3	F16x	PC01	DB10	9,592	12,75	11,5	12,73	11,64	1,487	12,772
Bi	(ng/g)	3	A80	PD03	DB10	11,9	11,2	13,2	12,6	12,23	0,866	7,080
Bi	(ng/g)	4	F16x	PC01	DB10	9,275	10,03	9,035	9,635	9,49	0,434	4,574
Bi	(ng/g)	4	A80	PD03	DB10	10,5	11	10,2	10,5	10,55	0,332	3,144
Ce	(ng/g)	1	A80	PD03	DB10	118	109	173	109	127,25	30,794	24,199
Ce	(ng/g)	2	A80	PD03	DB10	19,7	21	19,6	24,9	21,30	2,483	11,659
Ce	(ng/g)	3	A80	PD03	DB10	120	108	96,8	94,7	104,88	11,651	11,110
Ce	(ng/g)	4	A80	PD03	DB10	125	137	114	129	126,25	9,570	7,580
Cl	(µg/g)	1	F05	PZ99	DF08	524	529	515	548	529,00	13,928	2,633
Cl	(µg/g)	1	F02	PA06	DF08	540	520	560	540	540,00	16,330	3,024
Cl	(µg/g)	1	A57	PZ02	DD02	690	680	670	660	675,00	12,910	1,913

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Cl	(µg/g)	2	F02	PA06	DF08	490	490	450	460	472,50	20,616	4,363
Cl	(µg/g)	2	F05	PZ99	DF08	486	489	494	486	488,75	3,775	0,772
Cl	(µg/g)	2	A57	PZ02	DD02	630	640	640	630	635,00	5,774	0,909
Cl	(µg/g)	3	F05	PZ99	DF08	<24,7	<24,7	<24,7	<24,7			
Cl	(µg/g)	3	A57	PZ02	DD02	120	120	120	120	120,00	0,000	0,000
Cl	(µg/g)	3	F02	PA06	DF08	430	430	350	370	395,00	41,231	10,438
Cl	(µg/g)	4	F05	PZ99	DF08	435	450	449	447	445,25	6,946	1,560
Cl	(µg/g)	4	F02	PA06	DF08	550	620	500	480	537,50	62,383	11,606
Cl	(µg/g)	4	A57	PZ02	DD02	600	590	590	590	592,50	5,000	0,844
Cs	(ng/g)	1	A80	PD03	DB10	63,3	62,6	61,8	63,4	62,78	0,741	1,180
Cs	(ng/g)	2	A80	PD03	DB10	4,8	4,99	5,03	4,79	4,90	0,125	2,555
Cs	(ng/g)	3	A80	PD03	DB10	17,5	16,9	16,8	16,4	16,90	0,455	2,690
Cs	(ng/g)	4	A80	PD03	DB10	262	261	255	264	260,50	3,873	1,487
F	(µg/g)	1	F32x	PE99	DF08	2,5	<2,5	<2,5	<2,5			
F	(µg/g)	1	F02	PE01	DF03	3,9	3,3	2,5	2	2,93	0,842	28,790
F	(µg/g)	2	F32x	PE99	DF08	<2,5	<2,5	<2,5	<2,5			
F	(µg/g)	2	F02	PE01	DF03	1,2	0,8	0,5	0,7	0,80	0,294	36,799
F	(µg/g)	3	F32x	PE99	DF08	<2,5	<2,5	<2,5	<2,5			
F	(µg/g)	3	F02	PE01	DF03	1,9	1,7	1,3	0,8	1,43	0,486	34,079
F	(µg/g)	4	F02	PE01	DF03	3,4	3,4	3,6	3,9	3,58	0,236	6,610
F	(µg/g)	4	F32x	PE99	DF08	3,96	4,03	4,49	4,58	4,27	0,315	7,391
La	(ng/g)	1	A80	PD03	DB10	66,7	61,9	92	63,4	71,00	14,143	19,919
La	(ng/g)	2	A80	PD03	DB10	11,2	11,9	11,1	13,8	12,00	1,252	10,431
La	(ng/g)	3	A80	PD03	DB10	64,4	56,8	50,1	49,5	55,20	6,969	12,625
La	(ng/g)	4	A80	PD03	DB10	64,2	68,6	60,3	67,4	65,13	3,714	5,703
Li	(µg/g)	1	A80	PD03	DB10	0,247	0,248	0,248	0,25	0,25	0,001	0,507
Li	(µg/g)	2	A80	PD03	DB10	0,0405	0,0427	0,043	0,0411	0,04	0,001	2,905
Li	(µg/g)	3	A80	PD03	DB10	0,0851	0,0813	0,0798	0,0764	0,08	0,004	4,471

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Li	(µg/g)	4	A80	PD03	DB10	0,19	0,191	0,18	0,195	0,19	0,006	3,374
Mo	(ng/g)	1	F32	PD01	DB10	<6	<6	<6	<6			
Mo	(ng/g)	1	A88	PD01	DB05	<,4	<,4	<,4	<,4			
Mo	(ng/g)	1	F16x	PC01	DB10	19,89	17,16	20,94	17,41	18,85	1,860	9,868
Mo	(ng/g)	1	A60x	PD01	DB10	25,6	24,9	18,7	23,9	23,28	3,129	13,443
Mo	(ng/g)	1	A80	PD03	DB10	25,8	25,6	25,2	26,3	25,73	0,457	1,778
Mo	(ng/g)	1	F14	PC01	DB10	27	27	32	25	27,75	2,986	10,761
Mo	(ng/g)	1	F08	PD01	DB10	64,3	65,4	55,7	51,2	59,15	6,848	11,578
Mo	(ng/g)	1	F07x	PD03	DB08	<40	123,4	59,88	151	111,43	46,725	41,933
Mo	(ng/g)	1	A39	PC02	DB08	152,8	157,6	158,2	154,2	155,70	2,615	1,680
Mo	(ng/g)	2	F07x	PD03	DB08	514,7	617,3	510,8	632,4	568,80	65,033	11,433
Mo	(ng/g)	2	A88	PD01	DB05	565	565	595	580	576,25	14,361	2,492
Mo	(ng/g)	2	F14	PC01	DB10	581	588	571	586	581,50	7,594	1,306
Mo	(ng/g)	2	A80	PD03	DB10	592	584	590	586	588,00	3,651	0,621
Mo	(ng/g)	2	A36	PD02	DB10	581,7	598,5	576,2	610,3	591,68	15,625	2,641
Mo	(ng/g)	2	F16x	PC01	DB10	616,6	658,5	613,4	639,8	632,08	21,183	3,351
Mo	(ng/g)	2	F08	PD01	DB10	656	633	624	620	633,25	16,112	2,544
Mo	(ng/g)	2	F32	PD01	DB10	639	638	630	628	633,75	5,560	0,877
Mo	(ng/g)	2	A39	PC02	DB08	648,7	640	649,7	622,7	640,28	12,500	1,952
Mo	(ng/g)	2	A60x	PD01	DB10	992	923	907	849	917,75	58,830	6,410
Mo	(ng/g)	3	A88	PD01	DB05	<,4	<,4	<,4	<,4			
Mo	(ng/g)	3	A80	PD03	DB10	101,5	94	90,4	89,4	93,83	5,485	5,846
Mo	(ng/g)	3	A36	PD02	DB10	96	94,9	94,1	95,4	95,10	0,804	0,846
Mo	(ng/g)	3	F32	PD01	DB10	99,5	95,3	91,8	95,3	95,48	3,150	3,299
Mo	(ng/g)	3	F16x	PC01	DB10	97,59	104,9	97,45	100,4	100,09	3,486	3,483
Mo	(ng/g)	3	F14	PC01	DB10	105	104	106	96	102,75	4,573	4,451
Mo	(ng/g)	3	A60x	PD01	DB10	135	121	126	126	127,00	5,831	4,591
Mo	(ng/g)	3	F08	PD01	DB10	140	162	170	144	154,00	14,329	9,305
Mo	(ng/g)	3	F07x	PD03	DB08	193,2	103,8	174,1	213,6	171,18	47,725	27,881

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Mo	(ng/g)	3	A39	PC02	DB08	218,9	215,2	211,1	200,7	211,48	7,858	3,716
Mo	(ng/g)	4	A88	PD01	DB05	<,4	<,4	<,4	<,4			
Mo	(ng/g)	4	A36	PD02	DB10	225,5	206,2	200,3	232	216,00	15,152	7,015
Mo	(ng/g)	4	A80	PD03	DB10	249	241	237	237	241,00	5,657	2,347
Mo	(ng/g)	4	F16x	PC01	DB10	240,1	261,1	248,7	249,8	249,93	8,620	3,449
Mo	(ng/g)	4	F32	PD01	DB10	252	249	252	249	250,50	1,732	0,691
Mo	(ng/g)	4	F14	PC01	DB10	237	253	250	262	250,50	10,344	4,129
Mo	(ng/g)	4	F08	PD01	DB10	276	259	259	313	276,75	25,461	9,200
Mo	(ng/g)	4	F07x	PD03	DB08	321,7	248,9	299,1	360,8	307,63	46,715	15,186
Mo	(ng/g)	4	A39	PC02	DB08	331,6	336,9	325,2	335,4	332,28	5,218	1,570
Mo	(ng/g)	4	A60x	PD01	DB10	364	354	355	353	356,50	5,066	1,421
Na	(µg/g)	1	F12x	PC01	DB08	64	64	64	64	64,00	0,000	0,000
Na	(µg/g)	1	F07x	PD03	DB08	69,71	65,91	67,19	65,19	67,00	1,987	2,966
Na	(µg/g)	1	F05	PC02	DB02	69,9	68,8	69,2	70,7	69,65	0,835	1,198
Na	(µg/g)	1	F03	PC02	DB08	72,06	71,2	73,09	73,38	72,43	0,998	1,378
Na	(µg/g)	1	F18x	PD99	DB08	72,8	72,2	72,9	72	72,48	0,443	0,611
Na	(µg/g)	1	F16x	PC01	DB10	75,08	71,85	73,72	72,37	73,26	1,450	1,979
Na	(µg/g)	1	F14	PC01	DB08	75,82	73,45	75,28	74,53	74,77	1,027	1,373
Na	(µg/g)	1	A36	PD02	DB08	73,75	76,85	78,45	72,26	75,33	2,826	3,752
Na	(µg/g)	1	A79	PD03	DB99	75,743	75,621	73,56	76,691	75,40	1,319	1,749
Na	(µg/g)	1	A65	PD01	DB08	81,5	76,4	79,9	80,6	79,60	2,232	2,804
Na	(µg/g)	1	A39	PC02	DB08	83,33	82,97	85,92	87,6	84,96	2,199	2,589
Na	(µg/g)	1	F32x	PD01	DB08	90,7	88,7	87,3	87,5	88,55	1,561	1,763
Na	(µg/g)	1	F06x	PD02	DB08	93,15	90,74	91,51	89,88	91,32	1,390	1,522
Na	(µg/g)	1	A51	PD02	DB08	95,65	94,78	90,92	93,11	93,62	2,083	2,225
Na	(µg/g)	1	F27	PD01	DB06	102,4	107,8	104,7	107,7	105,65	2,601	2,462
Na	(µg/g)	1	A60x	PD01	DB10	124	116	115	109	116,00	6,164	5,314
Na	(µg/g)	2	A51	PD02	DB08	<40	<40	<40	<40			
Na	(µg/g)	2	F03	PC02	DB08	<25	<25	<25	<25			

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Na	(µg/g)	2	A65	PD01	DB08	<11,1	<11,1	<11,1	<11,1			
Na	(µg/g)	2	F18x	PD99	DB08	<10	<10	<10	<10			
Na	(µg/g)	2	A39	PC02	DB08	1,685	1,624	1,616	1,764	1,67	0,068	4,096
Na	(µg/g)	2	F12x	PC01	DB08	5	5	5	5	5,00	0,000	0,000
Na	(µg/g)	2	A79	PD03	DB99	5,636	5,81	5,79	6,083	5,83	0,186	3,188
Na	(µg/g)	2	F32x	PD01	DB08	5,68	5,92	5,52	6,2	5,83	0,296	5,084
Na	(µg/g)	2	F16x	PC01	DB10	5,87	6,346	5,286	6,125	5,91	0,457	7,741
Na	(µg/g)	2	A36	PD02	DB08	6,7	6,74	6,82	8,12	7,10	0,685	9,657
Na	(µg/g)	2	F07x	PD03	DB08	8,72	7,776	8,123	8,51	8,28	0,418	5,052
Na	(µg/g)	2	F14	PC01	DB08	9,23	9,54	9,61	9,59	9,49	0,177	1,869
Na	(µg/g)	2	F05	PC02	DB02	12,8	12,1	9,4	11,1	11,35	1,475	12,999
Na	(µg/g)	2	F06x	PD02	DB08	24,92	24,41	24,91	24,88	24,78	0,247	0,998
Na	(µg/g)	2	A60x	PD01	DB10	88,2	4,93	5,97	5,15	26,06	41,427	158,954
Na	(µg/g)	2	F27	PD01	DB06	36,81	29,76	36,85	36,77	35,05	3,525	10,058
Na	(µg/g)	3	F03	PC02	DB08	<25	<25	<25	<25			
Na	(µg/g)	3	A51	PD02	DB08	<40	<40	<40	41,48			
Na	(µg/g)	3	F12x	PC01	DB08	14	14	11	13	13,00	1,414	10,879
Na	(µg/g)	3	F16x	PC01	DB10	14,06	14,52	13,86	14,27	14,18	0,283	1,997
Na	(µg/g)	3	F05	PC02	DB02	14,7	18	14,7	16,3	15,93	1,576	9,894
Na	(µg/g)	3	A79	PD03	DB99	16,454	16,367	16,322	16,205	16,34	0,104	0,635
Na	(µg/g)	3	F07x	PD03	DB08	17,13	16,09	16,7	17,78	16,93	0,712	4,207
Na	(µg/g)	3	A65	PD01	DB08	18,2	17,7	17,9	16,6	17,60	0,698	3,964
Na	(µg/g)	3	F18x	PD99	DB08	18,6	17,6	18	18,1	18,08	0,411	2,276
Na	(µg/g)	3	A60x	PD01	DB10	21,3	17,2	17,4	16,5	18,10	2,168	11,978
Na	(µg/g)	3	A36	PD02	DB08	16,2	18	17,47	20,76	18,11	1,923	10,619
Na	(µg/g)	3	A39	PC02	DB08	22,35	20,78	19,91	20,06	20,78	1,117	5,375
Na	(µg/g)	3	F32x	PD01	DB08	22,5	21,8	22,4	23	22,43	0,492	2,196
Na	(µg/g)	3	F14	PC01	DB08	23,37	21,78	23,48	23,14	22,94	0,788	3,434
Na	(µg/g)	3	F27	PD01	DB06	35,65	36,62	50,22	50,94	43,36	8,354	19,269

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Na	(µg/g)	3	F06x	PD02	DB08	51,55	53,75	52,69	51,89	52,47	0,978	1,864
Na	(µg/g)	4	F12x	PC01	DB08	21	21	21	21	21,00	0,000	0,000
Na	(µg/g)	4	A51	PD02	DB08	44,49	<40	42,89	47,58	44,99	2,384	5,300
Na	(µg/g)	4	F16x	PC01	DB10	23,14	28,41	22,68	25,4	24,91	2,620	10,520
Na	(µg/g)	4	F07x	PD03	DB08	25,98	24,76	24,53	24,66	24,98	0,672	2,688
Na	(µg/g)	4	F03	PC02	DB08	25,66	25,06	26,06	26,31	25,77	0,545	2,116
Na	(µg/g)	4	F05	PC02	DB02	27,3	24,1	27,3	25,7	26,10	1,532	5,869
Na	(µg/g)	4	F18x	PD99	DB08	26,7	26,7	26,4	26,7	26,63	0,150	0,563
Na	(µg/g)	4	A79	PD03	DB99	27,104	27,223	26,679	27,297	27,08	0,276	1,020
Na	(µg/g)	4	A36	PD02	DB08	26,51	28,31	27,99	27,35	27,54	0,794	2,884
Na	(µg/g)	4	F14	PC01	DB08	28,12	27,69	27,9	28,66	28,09	0,417	1,485
Na	(µg/g)	4	A65	PD01	DB08	27,3	29,7	29,4	27,3	28,43	1,305	4,590
Na	(µg/g)	4	A39	PC02	DB08	28,48	28,25	30,59	30,41	29,43	1,238	4,208
Na	(µg/g)	4	F32x	PD01	DB08	34,6	34,4	32,8	33,4	33,80	0,849	2,510
Na	(µg/g)	4	A60x	PD01	DB10	34,5	34	35,6	35,8	34,98	0,866	2,475
Na	(µg/g)	4	F27	PD01	DB06	47,32	49,82	43,13	47,82	47,02	2,811	5,978
Na	(µg/g)	4	F06x	PD02	DB08	50,59	50,32	49,19	49,15	49,81	0,750	1,506
Nb	(ng/g)	1	A80	PD03	DB10	12	13,1	11,7	14,1	12,73	1,097	8,618
Nb	(ng/g)	2	A80	PD03	DB10	2,16	2,19	1,91	2,03	2,07	0,129	6,209
Nb	(ng/g)	3	A80	PD03	DB10	11,9	11,7	9,89	9,95	10,86	1,089	10,025
Nb	(ng/g)	4	A80	PD03	DB10	18,3	17,6	14,7	19,5	17,53	2,040	11,642
Rb	(µg/g)	1	A80	PD03	DB10	22,8	22,6	22,8	22,6	22,70	0,115	0,509
Rb	(µg/g)	1	F16x	PC01	DB10	23,29	26,56	21,9	24,22	23,99	1,959	8,166
Rb	(µg/g)	2	A80	PD03	DB10	6,63	6,6	6,64	6,6	6,62	0,021	0,312
Rb	(µg/g)	2	F16x	PC01	DB10	6,746	7,333	6,824	7,12	7,01	0,271	3,871
Rb	(µg/g)	3	A80	PD03	DB10	3,25	3,2	3,18	3,16	3,20	0,039	1,208
Rb	(µg/g)	3	F16x	PC01	DB10	3,447	3,305	3,459	3,327	3,38	0,080	2,357

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Rb	(µg/g)	4	A80	PD03	DB10	25,8	25,7	25,5	26	25,75	0,208	0,808
Rb	(µg/g)	4	F16x	PC01	DB10	27,61	29,24	27,72	29,02	28,40	0,852	2,999
Sb	(ng/g)	1	A80	PD03	DB10	<25	<25	<25	<25			
Sb	(ng/g)	1	A79	PD03	DB10	<25	<25	<25	<25			
Sb	(ng/g)	1	F32	PD01	DB10	7,45	6,39	7,45	8,52	7,45	0,870	11,668
Sb	(ng/g)	1	A82	PD01	DB10	7,97	7,71	8,79	8,08	8,14	0,462	5,675
Sb	(ng/g)	1	F16x	PC01	DB10	9,003	7,294	8,703	8,423	8,36	0,746	8,933
Sb	(ng/g)	2	A79	PD03	DB10	<25	<25	<25	<25			
Sb	(ng/g)	2	A80	PD03	DB10	<25	<25	<25	<25			
Sb	(ng/g)	2	F32	PD01	DB10	11,73	9,59	8,53	8,53	9,60	1,508	15,722
Sb	(ng/g)	2	F16x	PC01	DB10	11,45	11,64	10,6	11,49	11,30	0,470	4,166
Sb	(ng/g)	2	A82	PD01	DB10	12,7	12,3	13,4	11,8	12,55	0,676	5,385
Sb	(ng/g)	3	F16x	PC01	DB10	46,85	49,27	49,59	49,81	48,88	1,371	2,806
Sb	(ng/g)	3	A82	PD01	DB10	56	48,9	50,5	49,3	51,18	3,288	6,424
Sb	(ng/g)	3	A79	PD03	DB10	52	50	51	54	51,75	1,708	3,300
Sb	(ng/g)	3	A80	PD03	DB10	57,5	55,1	57	57	56,65	1,060	1,871
Sb	(ng/g)	3	F32	PD01	DB10	62,8	61,8	59,7	58,6	60,73	1,917	3,157
Sb	(ng/g)	4	F16x	PC01	DB10	32,13	29,1	29,42	31,36	30,50	1,475	4,834
Sb	(ng/g)	4	A82	PD01	DB10	30,6	33,8	31,3	32,4	32,03	1,396	4,359
Sb	(ng/g)	4	F32	PD01	DB10	33,8	33,8	35,9	34,8	34,58	1,001	2,896
Sb	(ng/g)	4	A79	PD03	DB10	43	47	46	44	45,00	1,826	4,057
Sb	(ng/g)	4	A80	PD03	DB10	52,2	52,6	52	51,8	52,15	0,342	0,655
Se	(ng/g)	1	A80	PD03	DB10	<50	<50	<50	<50			
Se	(ng/g)	1	A82	PD01	DB10	15,5	14,6	15,5	15,2	15,20	0,424	2,791
Se	(ng/g)	1	F08	PD01	DB10	20,7	18,8	18,4	19,2	19,28	1,005	5,212
Se	(ng/g)	1	F14	PC01	DB10	20	20	23	18	20,25	2,062	10,181
Se	(ng/g)	1	A36	PD02	DB10	23,7	21,35	21,99	22,41	22,36	0,992	4,438
Se	(ng/g)	1	A39	PC02	DB08	23,52	22,18	21,87	23,11	22,67	0,774	3,413
Se	(ng/g)	1	F32	PD01	DB10	27,7	29,8	31,9	30,9	30,08	1,801	5,987

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Se	(ng/g)	1	F16x	PC01	DB10	82,07	59,35	67,13	59,98	67,13	10,565	15,737
Se	(ng/g)	2	A80	PD03	DB10	<50	<50	<50	<50			
Se	(ng/g)	2	A82	PD01	DB10	7,82	7,99	7,12	9,1	8,01	0,820	10,239
Se	(ng/g)	2	F08	PD01	DB10	12,6	13,2	15,3	12,2	13,33	1,379	10,351
Se	(ng/g)	2	A36	PD02	DB10	14	14,74	13,14	14,42	14,08	0,693	4,924
Se	(ng/g)	2	F14	PC01	DB10	18	16	15	17	16,50	1,291	7,824
Se	(ng/g)	2	A39	PC02	DB08	16,24	17,36	17,48	16,69	16,94	0,583	3,442
Se	(ng/g)	2	F32	PD01	DB10	25,6	29,9	25,6	25,6	26,68	2,150	8,060
Se	(ng/g)	2	F16x	PC01	DB10	103,3	114,1	108,4	130,6	114,10	11,852	10,387
Se	(ng/g)	3	A39	PC02	DB08	47,04	49,28	47,04	45,92	47,32	1,409	2,978
Se	(ng/g)	3	F14	PC01	DB10	62	53	48	47	52,50	6,856	13,058
Se	(ng/g)	3	A82	PD01	DB10	55,9	54,3	55,9	50,5	54,15	2,548	4,705
Se	(ng/g)	3	F08	PD01	DB10	59,1	66,8	69,5	61,7	64,28	4,729	7,357
Se	(ng/g)	3	F32	PD01	DB10	64,9	71,2	60,7	66	65,70	4,320	6,575
Se	(ng/g)	3	A36	PD02	DB10	81,75	77,62	78,58	77,73	78,92	1,935	2,452
Se	(ng/g)	3	A80	PD03	DB10	82,9	85	77,7	79,1	81,18	3,366	4,146
Se	(ng/g)	3	F16x	PC01	DB10	80	75,89	82,05	90,25	82,05	6,038	7,360
Se	(ng/g)	4	A80	PD03	DB10	<50	<50	<50	<50			
Se	(ng/g)	4	A82	PD01	DB10	37,3	38	37,2	37,2	37,43	0,386	1,032
Se	(ng/g)	4	A39	PC02	DB08	36,96	38,64	37,92	36,96	37,62	0,817	2,171
Se	(ng/g)	4	F08	PD01	DB10	47,5	49,1	39,8	38,7	43,78	5,285	12,073
Se	(ng/g)	4	A36	PD02	DB10	55,13	53,86	51,31	53,22	53,38	1,592	2,982
Se	(ng/g)	4	F14	PC01	DB10	57	56	55	56	56,00	0,816	1,458
Se	(ng/g)	4	F16x	PC01	DB10	54,26	56,91	57,99	58,47	56,91	1,882	3,307
Se	(ng/g)	4	F32	PD01	DB10	54,9	57	61,2	63,3	59,10	3,834	6,487
Sn	(ng/g)	1	F16x	PC01	DB10	32,06	31,47	38,9	33,7	34,03	3,379	9,930
Sn	(ng/g)	1	A80	PD03	DB10	34,9	35,6	36,3	38,8	36,40	1,699	4,668
Sn	(ng/g)	2	F16x	PC01	DB10	12,95	12,84	13,17	13,11	13,02	0,150	1,155
Sn	(ng/g)	2	A80	PD03	DB10	15,7	14	14,4	15,2	14,83	0,768	5,178

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Sn	(ng/g)	3	F16x	PC01	DB10	116,8	121,1	121,5	126,5	121,48	3,969	3,267
Sn	(ng/g)	3	A80	PD03	DB10	146	139	138	138	140,25	3,862	2,754
Sn	(ng/g)	4	F16x	PC01	DB10	94,96	89,83	83,85	79,99	87,16	6,591	7,562
Sn	(ng/g)	4	A80	PD03	DB10	118	126	112	115	117,75	6,021	5,113
Sr	(µg/g)	1	F08	PD01	DB10	14,1	14,1	13,6	13,4	13,80	0,356	2,579
Sr	(µg/g)	1	A65	PD01	DB08	14,2	13,9	14	14	14,03	0,126	0,897
Sr	(µg/g)	1	F16x	PC01	DB10	13,88	14,5	13,85	14,08	14,08	0,300	2,128
Sr	(µg/g)	1	A80	PD03	DB10	14,2	14,1	14,2	14,2	14,18	0,050	0,353
Sr	(µg/g)	1	A39	PC02	DB08	14,66	14,63	15,54	14,32	14,79	0,525	3,548
Sr	(µg/g)	2	A39	PC02	DB08	6,548	6,489	6,377	6,392	6,45	0,081	1,260
Sr	(µg/g)	2	A65	PD01	DB08	7	6,9	7	7	6,98	0,050	0,717
Sr	(µg/g)	2	F08	PD01	DB10	7,36	7,71	7,58	7,68	7,58	0,158	2,089
Sr	(µg/g)	2	A80	PD03	DB10	7,74	7,63	7,61	7,61	7,65	0,062	0,816
Sr	(µg/g)	2	F16x	PC01	DB10	8,564	8,052	7,695	8,7	8,25	0,465	5,633
Sr	(µg/g)	3	A80	PD03	DB10	17,4	17,5	17,2	17,3	17,35	0,129	0,744
Sr	(µg/g)	3	A65	PD01	DB08	17,3	17,3	17,4	17,4	17,35	0,058	0,333
Sr	(µg/g)	3	F08	PD01	DB10	17,4	17,99	17,4	17,7	17,62	0,283	1,605
Sr	(µg/g)	3	F16x	PC01	DB10	18,42	18,13	18,78	18,16	18,37	0,301	1,640
Sr	(µg/g)	3	A39	PC02	DB08	19,21	19,39	18,83	18,45	18,97	0,418	2,203
Sr	(µg/g)	4	F08	PD01	DB10	10,52	9,99	9,62	9,597	9,93	0,432	4,345
Sr	(µg/g)	4	F16x	PC01	DB10	9,793	10,12	9,852	10,03	9,95	0,152	1,530
Sr	(µg/g)	4	A65	PD01	DB08	10,2	10,2	10,2	10	10,15	0,100	0,985
Sr	(µg/g)	4	A80	PD03	DB10	10,2	10,2	10	10,2	10,15	0,100	0,985
Sr	(µg/g)	4	A39	PC02	DB08	10,66	10,82	10,89	11,47	10,96	0,353	3,224
Ti	(µg/g)	1	A80	PD03	DB10	2,42	2,63	2,25	2,8	2,53	0,240	9,519
Ti	(µg/g)	1	A39	PC02	DB08	3,638	3,58	3,737	4,012	3,74	0,191	5,117
Ti	(µg/g)	1	A65	PD01	DB08	4,4	4	4,3	5,1	4,45	0,465	10,460

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Ti	(µg/g)	2	A65	PD01	DB08	<1,1	<1,1	<1,1	<1,1			
Ti	(µg/g)	2	A39	PC02	DB08	0,4958	0,4867	0,5187	0,5094	0,50	0,014	2,824
Ti	(µg/g)	2	A80	PD03	DB10	0,661	0,753	0,626	0,662	0,68	0,054	8,040
Ti	(µg/g)	3	A80	PD03	DB10	2,61	2,33	2,07	1,93	2,24	0,300	13,420
Ti	(µg/g)	3	A39	PC02	DB08	4,989	5,017	4,968	4,964	4,98	0,024	0,487
Ti	(µg/g)	3	A65	PD01	DB08	5	5,5	4,8	4,9	5,05	0,311	6,157
Ti	(µg/g)	4	A80	PD03	DB10	4,16	4,01	3,25	4,58	4,00	0,555	13,879
Ti	(µg/g)	4	A39	PC02	DB08	5,518	5,259	5,389	5,63	5,45	0,160	2,944
Ti	(µg/g)	4	A65	PD01	DB08	6,3	5,8	5,6	5,7	5,85	0,311	5,315
Tl	(ng/g)	1	A79	PD03	DB10	45	43	42	43	43,25	1,258	2,909
Tl	(ng/g)	1	F14	PC01	DB10	44	48	46,2	46,2	46,10	1,637	3,551
Tl	(ng/g)	1	A36	PD02	DB10	47,18	46,75	47,71	46,32	46,99	0,595	1,266
Tl	(ng/g)	1	A82	PD01	DB10	47,6	47,3	47,3	47,1	47,33	0,206	0,436
Tl	(ng/g)	1	F16x	PC01	DB10	45,7	48,23	49,14	49,01	48,02	1,598	3,328
Tl	(ng/g)	1	A80	PD03	DB10	49,7	48,4	49,1	49,2	49,10	0,535	1,090
Tl	(ng/g)	1	F08	PD01	DB10	51,5	49,4	49,9	51,98	50,70	1,239	2,445
Tl	(ng/g)	1	F32	PD01	DB10	53,7	53,6	53,1	54,2	53,65	0,451	0,840
Tl	(ng/g)	1	A60x	PD01	DB10	73,2	73,3	71,6	69,9	72,00	1,602	2,225
Tl	(ng/g)	2	A79	PD03	DB10	<25	<25	<25	<25			
Tl	(ng/g)	2	F14	PC01	DB10	<10	<10	<10	<10			
Tl	(ng/g)	2	F08	PD01	DB10	<4	<4	<4	<4			
Tl	(ng/g)	2	A80	PD03	DB10	<2,5	<2,5	<2,5	<2,5			
Tl	(ng/g)	2	A36	PD02	DB10	<2,5	<2,5	<2,5	<2,5			
Tl	(ng/g)	2	A82	PD01	DB10	<,14	<,14	<,14	<,14			
Tl	(ng/g)	2	F32	PD01	DB10	0,64	0,64	0,64	0,64	0,64	0,000	0,000
Tl	(ng/g)	2	F16x	PC01	DB10	0,624	0,667	0,6441	0,6483	0,65	0,018	2,732
Tl	(ng/g)	2	A60x	PD01	DB10	0,984	1,22	0,875	0,958	1,01	0,148	14,663

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
Tl	(ng/g)	3	A79	PD03	DB10	<25	<25	<25	<25			
Tl	(ng/g)	3	F14	PC01	DB10	<10	<10	<10	<10			
Tl	(ng/g)	3	F08	PD01	DB10	<4	<4	<4	<4			
Tl	(ng/g)	3	A36	PD02	DB10	<2,5	<2,5	<2,5	<2,5			
Tl	(ng/g)	3	A80	PD03	DB10	<2,5	<2,5	<2,5	<2,5			
Tl	(ng/g)	3	A82	PD01	DB10	<,14	<,14	<,14	<,14			
Tl	(ng/g)	3	F16x	PC01	DB10	2,157	2,147	2,13	2,067	2,13	0,040	1,901
Tl	(ng/g)	3	F32	PD01	DB10	2,51	2,51	2,51	2,51	2,51	0,000	0,000
Tl	(ng/g)	3	A60x	PD01	DB10	3,14	2,8	3,14	2,56	2,91	0,283	9,728
Tl	(ng/g)	4	A79	PD03	DB10	223	229	219	218	222,25	4,992	2,246
Tl	(ng/g)	4	F16x	PC01	DB10	246,8	260	263,1	263,5	258,35	7,857	3,041
Tl	(ng/g)	4	A82	PD01	DB10	269	258	259	257	260,75	5,560	2,132
Tl	(ng/g)	4	A36	PD02	DB10	263,68	259,01	260,71	259,75	260,79	2,050	0,786
Tl	(ng/g)	4	F14	PC01	DB10	266	262	264	265	264,25	1,708	0,646
Tl	(ng/g)	4	F08	PD01	DB10	270,05	262	266	267	266,26	3,323	1,248
Tl	(ng/g)	4	A80	PD03	DB10	269	268	265	268	267,50	1,732	0,647
Tl	(ng/g)	4	F32	PD01	DB10	308	304	304	303	304,75	2,217	0,728
Tl	(ng/g)	4	A60x	PD01	DB10	375	375	394	384	382,00	9,055	2,371
U	(ng/g)	1	F16x	PC01	DB10	24,98	21,41	24,79	23,96	23,79	1,644	6,912
U	(ng/g)	1	F14	PC01	DB10	23,6	24,7	25	23	24,08	0,936	3,887
U	(ng/g)	1	A80	PD03	DB10	24,9	27,6	26,1	24,7	25,83	1,335	5,170
U	(ng/g)	2	A80	PD03	DB10	0,582	0,573	0,576	0,554	0,57	0,012	2,117
U	(ng/g)	2	F16x	PC01	DB10	0,6879	0,7425	0,6898	0,7208	0,71	0,026	3,698
U	(ng/g)	2	F14	PC01	DB10	1	1	1	1	1,00	0,000	0,000
U	(ng/g)	3	A80	PD03	DB10	4,21	4,13	4,08	4,22	4,16	0,067	1,607
U	(ng/g)	3	F14	PC01	DB10	5	5	4	4	4,50	0,577	12,830
U	(ng/g)	3	F16x	PC01	DB10	4,37	4,531	4,657	4,6	4,54	0,124	2,736

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
U	(ng/g)	4	F14	PC01	DB10	5	5	5	5	5,00	0,000	0,000
U	(ng/g)	4	A80	PD03	DB10	5,24	5,39	4,84	5,49	5,24	0,286	5,454
U	(ng/g)	4	F16x	PC01	DB10	5,372	6,382	4,943	5,468	5,54	0,605	10,922
V	(µg/g)	1	A80	PD03	DB10	0,11	0,111	0,111	0,114	0,11	0,002	1,553
V	(µg/g)	1	A79	PD03	DB10	0,121	0,117	0,117	0,122	0,12	0,003	2,205
V	(µg/g)	1	F16x	PC01	DB10	0,1211	0,1286	0,1226	0,1133	0,12	0,006	5,187
V	(µg/g)	1	F08	PD01	DB10	0,115	0,143	0,118	0,142	0,13	0,015	11,634
V	(µg/g)	1	F14	PC01	DB10	0,137	0,134	0,141	0,132	0,14	0,004	2,879
V	(µg/g)	1	A60x	PD01	DB10	0,183	0,169	0,174	0,168	0,17	0,007	3,951
V	(µg/g)	1	A39	PC02	DB08	0,3215	0,3156	0,3364	0,3378	0,33	0,011	3,353
V	(µg/g)	2	A79	PD03	DB10	0,021	0,023	0,024	0,024	0,02	0,001	6,149
V	(µg/g)	2	A80	PD03	DB10	0,0215	0,0232	0,0246	0,0238	0,02	0,001	5,650
V	(µg/g)	2	F08	PD01	DB10	0,0277	0,0288	0,0255	0,0208	0,03	0,004	13,786
V	(µg/g)	2	F16x	PC01	DB10	0,0287	0,0323	0,0304	0,0317	0,03	0,002	5,181
V	(µg/g)	2	F14	PC01	DB10	0,033	0,035	0,032	0,035	0,03	0,002	4,444
V	(µg/g)	2	A60x	PD01	DB10	0,0514	0,0429	0,0379	0,0266	0,04	0,010	26,095
V	(µg/g)	2	A39	PC02	DB08	0,061	0,0582	0,0608	0,061	0,06	0,001	2,274
V	(µg/g)	3	A80	PD03	DB10	0,137	0,13	0,124	0,115	0,13	0,009	7,373
V	(µg/g)	3	A39	PC02	DB08	0,1364	0,1383	0,1322	0,1296	0,13	0,004	2,944
V	(µg/g)	3	A79	PD03	DB10	0,141	0,132	0,136	0,138	0,14	0,004	2,760
V	(µg/g)	3	F08	PD01	DB10	0,145	0,137	0,157	0,131	0,14	0,011	7,888
V	(µg/g)	3	F16x	PC01	DB10	0,1476	0,1505	0,1482	0,1491	0,15	0,001	0,847
V	(µg/g)	3	F14	PC01	DB10	0,167	0,162	0,162	0,158	0,16	0,004	2,272
V	(µg/g)	3	A60x	PD01	DB10	0,203	0,2	0,193	0,208	0,20	0,006	3,120
V	(µg/g)	4	A80	PD03	DB10	0,199	0,192	0,18	0,197	0,19	0,009	4,440
V	(µg/g)	4	F08	PD01	DB10	0,198	0,195	0,188	0,198	0,19	0,005	2,422
V	(µg/g)	4	F16x	PC01	DB10	0,2116	0,211	0,2156	0,2149	0,21	0,002	1,084
V	(µg/g)	4	A79	PD03	DB10	0,211	0,227	0,211	0,206	0,21	0,009	4,277
V	(µg/g)	4	F14	PC01	DB10	0,229	0,236	0,234	0,225	0,23	0,005	2,150

22nd Needle/Leaf Interlaboratory Comparison Test 2019/2020

Additional parameters

Element	Unit	Sample no.	Lab no.	Method code		Replicates				Mean	Si	Vi
				P	D	1	2	3	4			
V	(µg/g)	4	A60x	PD01	DB10	0,31	0,295	0,295	0,321	0,31	0,013	4,147
V	(µg/g)	4	A39	PC02	DB08	0,3125	0,3044	0,2955	0,3126	0,31	0,008	2,655
W	(ng/g)	1	A80	PD03	DB10	21,9	21	21,6	24,1	22,15	1,353	6,107
W	(ng/g)	2	A80	PD03	DB10	7,76	7,73	6,01	5,98	6,87	1,011	14,709
W	(ng/g)	3	A80	PD03	DB10	34	27,5	31,5	30	30,75	2,723	8,856
W	(ng/g)	4	A80	PD03	DB10	21	22,2	20,3	18,7	20,55	1,462	7,113
Y	(ng/g)	1	A80	PD03	DB10	62,8	64,8	63	63,5	63,53	0,900	1,416
Y	(ng/g)	2	A80	PD03	DB10	4,41	4,64	4,33	4,69	4,52	0,175	3,865
Y	(ng/g)	3	A80	PD03	DB10	29,3	29,1	27	26,7	28,03	1,365	4,870
Y	(ng/g)	4	A80	PD03	DB10	32,9	34,4	28,8	35,2	32,83	2,848	8,675