Convention on Long-Range Transboundary Air Pollution
International co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests
and
European Union Scheme
On the Protection of Forests against Atmospheric Pollution

ICP-Forests

4th Needle/Leaf Interlaboratory Test 1999/2000

Results

Prepared by: **North Rhine-Westphalia**
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assisted by
Ursula Busch, Hans Joachim Fermer (LUA).

In co-operation with: **Austrian Federal Forest Research Centre, Vienna**
The Finnish Forest Research Institute, Parkano
Bundesministerium f. Ernährung, Landwirtschaft und Forsten, Bonn

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Results

(December 1st, 2000)

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O. Summary

52 Laboratories from 29 European countries took part in the 4th ICP Needle/Leaf Interlaboratory Test 1999/2000.
In comparison to the 3rd test, the results show a distinct improvement of analysis quality at European laboratories working on the issue of forestry analysis. This improvement results, apart from a growing awareness of the problems of quality management, especially from the increased use of elemental analyzers and multi-element spectroscopes. These more and more replace classic analytical methods.

Still the elements sodium and lead are as problematic as before.

The evaluation of the applied methods indicates for some elements tendencies that should be taken into consideration in the revised manual:

Nitrogen:
Analysis by Kjeldal methods results in distinctly lower values than analysis by elemental analyzers. This was to be expected in theory but had not shown so clearly in former ring tests. In future, elemental analyzers are to be used with preference.

Sulphur:
The combination of HNO_3 pressure digestion with ICP results in very homogenous results close to the overall lab mean and therefore has advantages over classic $BaCl_2$ - methods.

Metals (in general)**:**
The 4th ringtest basically confirms the formerly detected tendency that closed digestion systems (HNO_3 pressure digestion prior to HNO_3 microwave digestion) produce greater comparability of the results than digestion in open systems. The combination with ICP is the most favourable method.

Aluminium:
Only a minority of laboratories have kept to the instructions given in the manual and used HF for digestion. Whereas the results from the few laboratories that used both variants (with and without HF) were clearly higher when using HF, the differences disappeared when looking at the overall results. Seemingly digestion and/or determination are so faulty that the differences between the methods applied within one laboratory disappear among all participants.

Because of that methodology has to be discussed again. But if the majority of the laboratories are not prepared to keep to the manual, aluminium should be cancelled from the list of "optional elements".

It is suggested to reduce the selection of recommended methods in favour of automatic methods.

Sensible would be:

1. **C-N-S - elemental analyzers (for C, N, S)**

2. **HNO3 - digestion in closed systems (pressure bomb or microwave digestion) combined with ICP-OES-MS (for S, P, Ca, etc)**

3. **X-ray - spectroscopy: This has not proved to be as successful as the before mentioned methods because of higher determination limits but should be maintained and developed for a quick, automatic and non-destructive multi element method of analysis. (for S, etc.)**

It is suggested to carry out a ringtest with these methods exclusively.

1.1 Introduction

ICP-Forests of UN-ECE in collaboration with EU initialised a programme for intensive and continuous monitoring of forest ecosystems for Europe in order to realise a better understanding of air pollution processes. An important task in this field is the needle/leaf-analysis of trees, because they serve as bioindicators for nutrition state and damages.

Necessary is the harmonising and the improvement of analytical techniques. A high and comparable laboratory standard in all countries is indispensable for a European-wide survey of forest state. Important steps on this way have been the edition of the „Manual on methods and criteria for harmonised sampling, assessment, monitoring and analysis of the effects of air pollution on forests“ (UN-ECE, Hamburg and Prague 1994) and the performance of the first European needle/leaf interlaboratory test on two certified standards (BCR 100-beech leaves and BCR 101 - spruce needles) with 24 laboratories from 21 countries, organised by France in 1993.
The intensive discussion of ICP-expert panel in As 1994 ended with the recommendation of a second test with 4 unknown samples (spruce, pine, oak) during the running level-II monitoring programme. It was organised by Germany in 1995/96 and subsequently discussed on expert panels in Vienna 1997 (BARTELS 1996, STEFAN et al. 1997). The expert panel in Vienna therefore decided on a complete repetition and authorised the Landesumweltamt North-Rhine-Westfalia (LUA) to organise another interlaboratory test on foliage every two years. The 3rd interlaboratory study with 5 unknown samples (spruce, pine, oak, beech) and its consequences for the analytical quality manegement (BARTELS 1998) were intensively discussed in Bonn 1999 and ended with a revision of Part IV “Sampling and analysis of needles and leaves” of the above mentioned manual.

These results of the 4th test will be commented on in the following text.

1.2 Material

In October 1999 the LUA sent dried plant powder of the following five samples to more than 50 European laboratories:

1. Spruce needles (Austria)
2. Spruce needles (Norway)
3. Pine needles (Germany)
4. Beech leaves (Slovakia)*

All materials were foremost ground with a Retsch-centrifugal-mill (sieve 0.25 mm, Cr-Ni steel) and homogenised by the LUA-laboratory by shaking over head for 24 hours before dispatch.
I have to thank **Alfred Fürst** (Vienna, A), **Svein Solberg** (As, N), **Lutz Genßler** (Recklinghausen, D) and their co-workers for sampling and my co-workers **Hans-Joachim Fermer** for preparing the samples and **Ursula Busch** for various help in preparing the data processing and text translation.

[*] **Sample 4 was – unknwon to the participants – identical with sample 5 ('beech Slovenia') of the 3rd interlaboratory test.** The real sample 'beech leaves Slovakia' prepared by **Branka Mankowska** (Zvolen) will be used in the 5th test 2001/2002.

1.3 Participant countries

52 laboratories from 29 countries joined in this test (1st test: 24/21; 2nd test: 39/25; 3rd test 51/29).
Figure 1 gives an overview of the participant countries. Because of diverse problems we got no results from Belarus. From Sweden we got no response.

The code numbers of the laboratories are mostly the same as in the last interlaboratory test to make it easy to compare the two runs. An 'a' or a 'b' after the number means the same laboratory or country, but another data set using other methods.

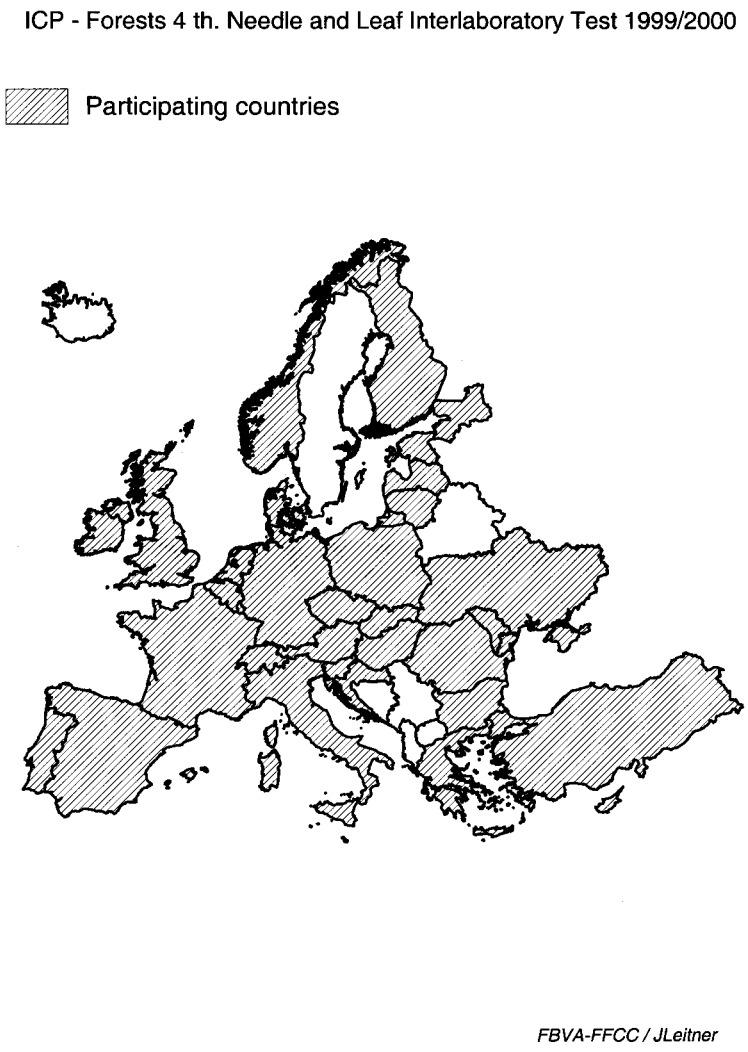


Figure 1: Europe map of participant countries

1.4 Task

The laboratories were asked to analyse the following elements with three replicates before February 15, 2000 :

a) mandatory elements	*b) optional elements*	*c) additional elements*
Nitrogen	*Sodium*	
Sulphur	*Zinc*	
Phosphorus	*Manganese*	
Magnesium	*Iron*	*no limitation*
Calcium	*Copper*	
Potassium	*Lead*	
	Aluminium	
	Boron	
	Cadmium	
	Carbon	

The samples - moisture content was about 5% - were to be dried at 80 ^{o}Celsius prior to analysis. Anyhow all results had to be reported as by dry matter (105 ^{o}C). With a few exceptions all laboratories analysed the complete list of mandatory elements and most of the optional elements. An overview is given in **Table 1**.

All laboratories were given the opportunity to recheck their data.

2. Data Evaluation

2.1 Method of data calculation

A computer programme (RING 4.0, author: Dr. Steffen Uhlig, Berlin) was used to calculate the ring test data. The evaluation was carried out for all mandatory elements and all optional elements. All other elements with only a few data bases are given in **pp 4-1** without further comments. These data are very useful to characterise the samples.

The evaluation is presented in the same way as in the past for the 2nd ring test and calculated on the basis of modern „robust statistics“. The procedure is given by LISCHER in the ‘Schweizer Lebensmittelbuch’ (‘Swiss food handbook’, chapter 60A). Its advantage is that it works without elimination of outliers and its complete absence of any manipulations by the ring-test leader. It is based on a monofactoral variance analysis but requires no assumptions on the distribution of the measurement deviations. The disadvantage is the black box character of the used iterative calculations. They are normally not understandable for most chemists without deeper knowledge of statistic methods. Some foundations are cited and translated from chapter 60 A, Schweizer Lebensmittelbuch:

Table 1.: Participant laboratories and elements they analysed

Nr.	N	S	P	Ca	Mg	K		Na	Zn	Mn	Fe	Cu	Pb	Al	B	Cd	C
1	X	X	X	X	X	X			X	X	X						
2	X	X	X	X	X	X		X	X	X	X	X	X	X	X		
3	X	X	X	X	X	X			X	X	X						
3a	X																
4		X	X	X	X	X		X	X	X	X	X	X	X		X	
4a	X	X	X	X	X	X		X	X	X	X	X	X	X	X		
4b	X	X		X	X	X		X	X	X	X	X	X		X	X	X
5	X	X	X	X	X	X		X	X	X	X	X					
6	X	X	X	X	X	X			X	X	X	X		X	X		X
7	X	X	X	X	X	X		X	X	X	X	X			X		
8	X	X	X	X	X	X		X	X	X	X	X	X	X	X		
8a	X																
9	X	X	X	X	X	X		X	X	X	X	X	X	X		X	
10	X	X	X	X	X	X			X	X	X	X			X		
11	X	X	X	X	X	X			X	X	X	X		X			
12	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X
13	X	X															
14	X	X	X	X	X	X		X	X	X	X	X		X	X		
15	X	X	X	X	X	X											X
16	X	X	X	X	X	X		X	X	X	X	X		X			
17	X	X	X	X	X	X			X	X	X	X	X	X	X		
18	X	X	X	X	X	X		X	X	X	X	X	X	X	X		
19	X	X	X	X	X	X											
20	X	X	X	X	X	X					X						
21	X	X	X	X	X	X		X	X	X	X	X		X	X		
22																	
23	X	X	X	X	X	X		X	X	X	X	X		X	X		
24	X	X	X	X	X	X		X	X	X	X	X	X		X	X	
25	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	
26	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
27			X	X	X	X		X	X	X	X	X					
28	X	X	X	X	X	X		X	X	X	X	X			X		
29	X	X	X	X	X	X			X	X	X	X			X		
30	X	X	X	X	X	X			X	X	X						
31																	
32																	
33																	
33a									X			X	X			X	
34																	
35	X		X	X	X	X		X	X	X	X	X	X			X	
36	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X
37	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	
38	X	X	X	X	X	X		X	X	X	X	X	X	X	X		
38a		X	X	X	X	X		X	X	X	X	X					
39	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
40	X		X	X	X	X		X		X	X	X					
41	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X
42	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
43	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	
44	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X
44a		X	X	X	X	X		X	X	X	X	X	X	X		X	
45	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
46	X	X	X	X	X	X		X	X	X	X		X	X			X
47	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X
48	X	X	X	X	X	X			X	X	X	X		X			X
49	X		X	X	X	X			X	X	X	X		X			X
50	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	
51		X	X	X	X	X				X	X						
52	X	X	X	X	X	X			X	X	X	X		X			X
53	X	X	X	X	X	X		X		X	X			X			X

„In order to find out whether or not chemical-analytical or physical methods of determination provide comparable results not only when repeated in the same laboratory but also in different laboratories, it is necessary to carry out joint studies (interlaboratory experiments). In ISO 5725, very detailed information is given on how such interlaboratory experiments are to be carried out and evaluated. A central factor in judging such a measuring method are the quantities of repeatability and reproducibility, or more precisely, repeatability standard deviation and reproducibility standard deviation. In order to prevent these quantities being distorted by the results of isolated non-representative laboratories, the ISO norm 5725 suggests conducting outlier tests before the final evaluation. Robust statistical methods allow us to circumvent outlier tests.
The important thing about these robust methods is that a different measure is used for variability then empirical variance. There are different reasons that suggest such a method. On the one hand, no systematic error should be committed with data that have exactly normal distribution. Yet this is not the case for the ISO norm (and with other methods using outlier tests). If such a test operates with a probability for error of 5%, then in one case out of twenty on average one laboratory will be eliminated, even if its results are completely correct. Since several such tests are carried out in an interlaboratory experiment, these probabilities for error accumulate. Rejection measurement values with large residues (difference between estimated and measured quantities) results in the variance components systematically coming out too small and in methods being considered more precise then they actually are.
On the other hand, results deviating too strongly from the great majority should not be weighted or should only be weighted with a very little weight so that final result is not distortet.
...
In general, the characteristic quantities calculated according to different methods do not deviate strongly from one another. Still, the robust method is preferable to the ISO norm. The absence of systematic error is important, as well as the fact that subjective decisions by the interlaboratory experiment leaders become superfluous. The problematic outlier tests can also be dispensed with. By contrast, the robust method permits a constant transition between accepting and completely rejecting doubtful measurement values.“

For further information please see the ‘Schweizer Lebensmittelbuch’ or the more specialised literature listed in chapter 2.5 (HAMPEL 1980, HAMPEL 1987, LISCHER 1987, ROCKE 1983).

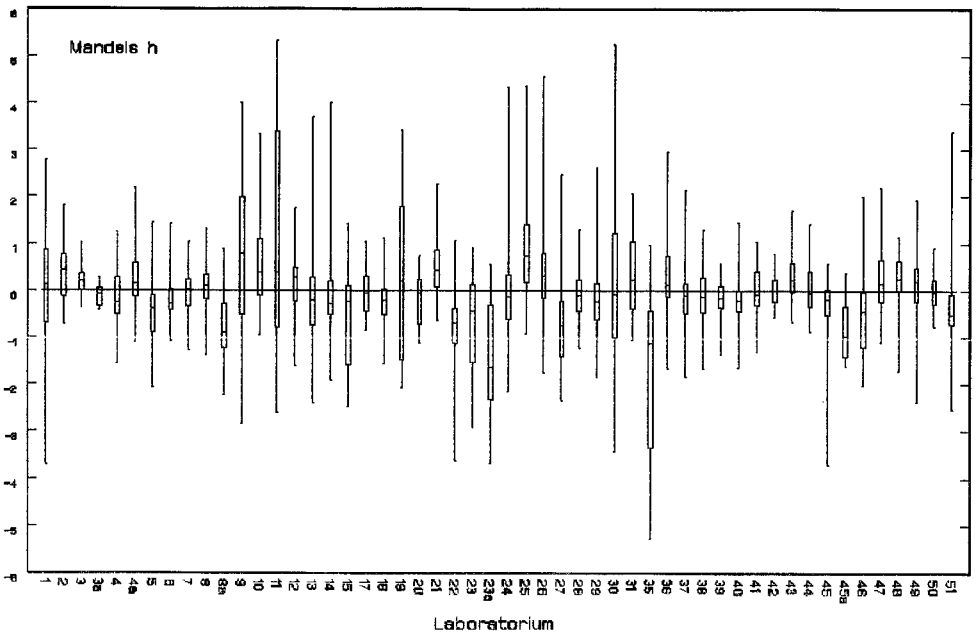
The complete data are presented on **pages 2-1** and following. If single values have an enclosed ‘a’, ‘b’, or ‘ab’ their data are automatically ‘trimmed’(the original German term is ‘gestutzt’) by the iteration process, but, as explained in the above citation, not eliminated.
Only the data with values lower than the determination limits were not included in evaluation.

2.2 Comparability with the 3rd interlaboratory test 1997/98

Figure 2 compares the 3rd to the 4th ring test the so-called Mandels h plot over all samples and elements. It demonstrates whether the laboratory trends towards higher or lower values than the mean of all laboratories and likewise extremes. 50% of all values are to be found within the rectangular box. One can see, that in the 4th ringtest there are not so many extremes as in the 3rd one.

Figure 3 compares the interlab variances of 3rd and 4th ringtest according to all elements.
The variances (%) are in the same range for most elements, but much higher for sodium and lower for lead and noteworthy better for cadmium. This will be discussed in chapter 3.

ICP-Forests 3rd Needle/Leaf Test 1997/98



ICP Forest 4th ringtest 1999/2000

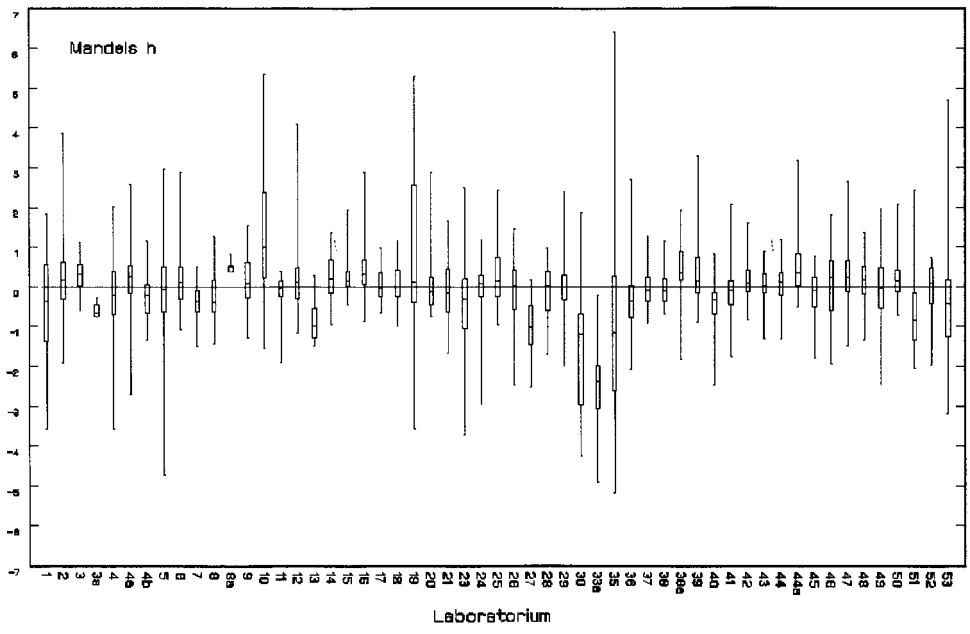
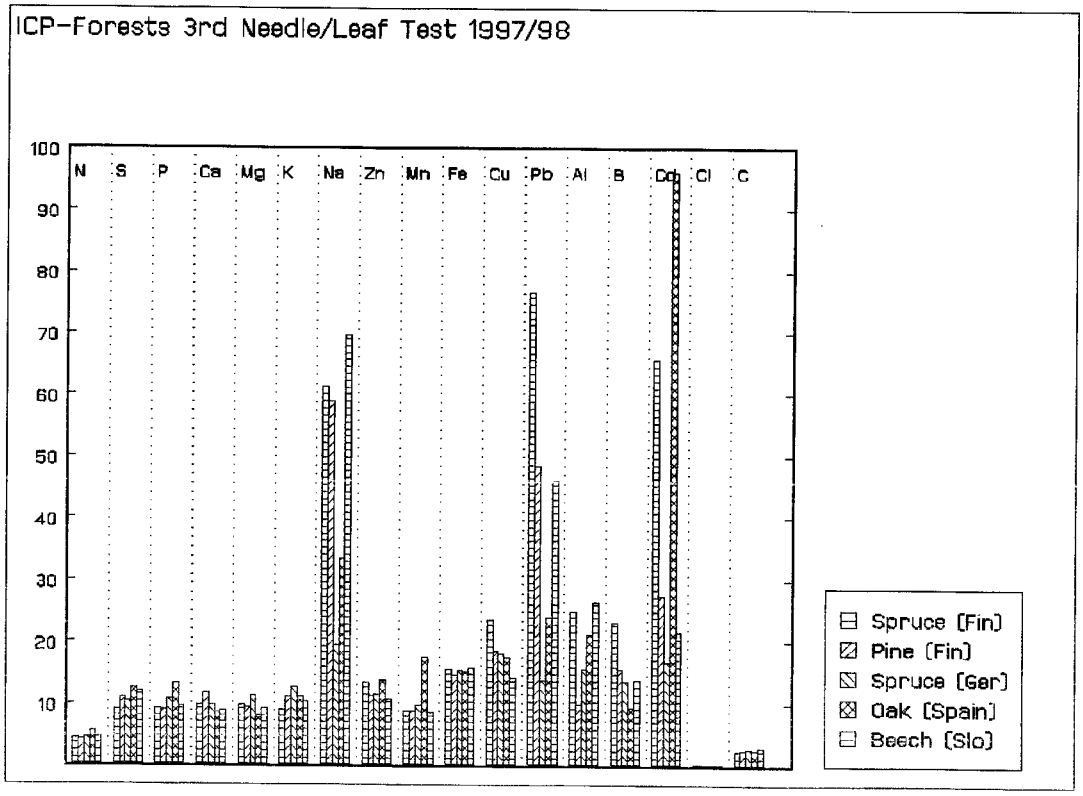


Figure 2: Comprehensive comparison of Mandels h plot (3rd and 4th ring test)



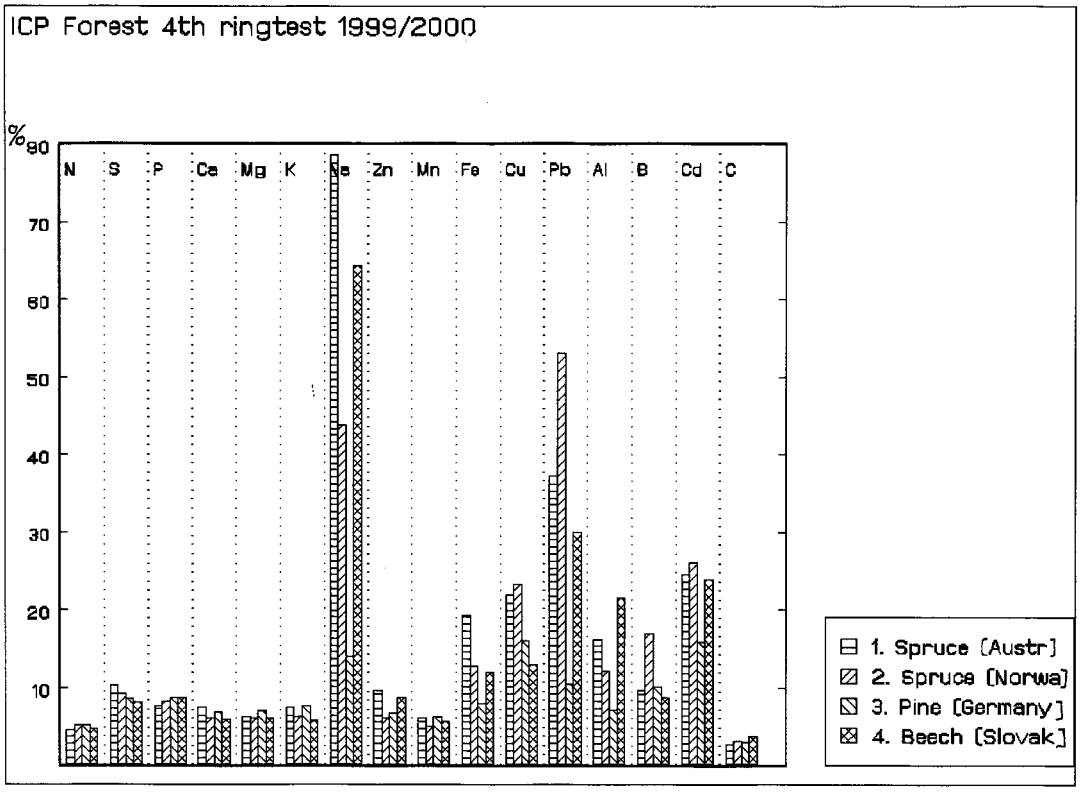


Figure 3: Comprehensive comparison of interlab variances (3rd and 4th ringtest)

As mentioned before, sample 5 (beech, Slovenia) of the 3rd test and sample 4 ("beech Slovakia") have been identical. The following **Table 2** gives a comparison of element means of 3rd and 4th interlaboratory study.
For almost all elements we find a surprisingly high harmony among the means. It proves a very good comparability between 3rd and 4th ringtest.
It is an important conclusion that on principle the 4th interlaboratory needle/leaf test 1999/2000 is fully comparable with the study of 1997/98.

Table 2: Mean comparison of sample 5 (3rd ring test) and sample 4 (4th ring test) (*n* = number of data sets)

	3rd test 97/98 sample 5		**4th test 99/00 sample 4**	
Element	**Robust Stat.**	***N***	**Robust Stat.**	***N***
Nitrogen (mg/g)	**20.02**	*45*	**20.14**	*49*
Sulphur (mg/g)	**1.87**	*46*	**1.82**	*46*
Phosphorus (mg/g)	**1.16**	*50*	**1.21**	*49*
Calcium (mg/g)	**7.25**	*49*	**7.10**	*49*
Magnesium (mg/g)	**1.02**	*49*	**1.00**	*49*
Potassium (mg/g)	**6.80**	*50*	**6.87**	*49*
Sodium (µg/g)	**30.55**	*37*	**32.47**	*33*
Zinc (µg/g)	**27.54**	*45*	**27.95**	*45*
Manganese (µg/g)	**1328.00**	*45*	**1313.00**	*48*
Iron (µg/g)	**70.29**	*45*	**71.03**	*49*
Copper (µg/g)	**5.88**	*38*	**5.82**	*42*
Lead (µg/g)	**0.96**	*21*	**0.69**	*19*
Aluminium (µg/g)	**60.04**	*33*	**65.13**	*30*
Boron (µg/g)	**17.52**	*23*	**16.58**	*26*
Cadmium (ng/g)	**200.7**	*13*	**177.4**	*16*
Carbon (%)	**48.99**	*17*	**49.03**	*15*

2.3 Data Evaluation

The agreements of As (1994) and Vienna (1997) say that the ring tests should be evaluated on the basis of fixed limits. **Table 3** presents an overview of the percentage of non-tolerable values, based on the original data given on pp 2-1.

Table 3: Percentage of non tolerable values; comparison of 2nd, 3rd and 4th ring test

		2nd Labtest 1995/96		**3rd Labtest 1997/98**		**4th Labtest 1999/00**	
Element	**Tolerable deviation from mean (±%)**	**Non tolerable (%)**	***n***	**non tolerable (%)**	***n***	**non tolerable (%)**	***n***
Nitrogen	15* / 10**	**2.7**	*148*	**4.4**	*225*	**6.6**	*196*
Sulphur	20	**25.8**	*132*	**14.3**	*230*	**9.8**	*184*
Phosphorus	15	**6.8**	*148*	**19.6**	*250*	**7.1**	*196*
Calcium	15	**9.6**	*156*	**16.3**	*245*	**6.6**	*196*
Magnesium	15	**12.2**	*156*	**16.7**	*245*	**5.1**	*196*
Potassium	15	**7.7**	*156*	**20.4**	*250*	**6.6**	*196*
Sodium	30	**61.0**	*84*	**46.6**	*178*	**43.4**	*136*
Zinc	20	**18.9**	*132*	**16.9**	*225*	**12.0**	*183*
Manganese	20	**3.6**	*139*	**10.9**	*229*	**4.2**	*192*
Iron	20	**20.6**	*136*	**23.7**	*224*	**17.9**	*196*
Copper	30	**20.7**	*116*	**16.2**	*191*	**20**	*165*
Lead	30	**53.0**	*66*	**42.4**	*99*	**32.1**	*78*
Aluminium	20	**32.3**	*99*	**31.1**	*164*	**16.1**	*124*
Boron	20	**33.9**	*56*	**18.2**	*115*	**18.4**	*103*
Cadmium	30	**48**	*25*	**39.0**	*77*	**16.9**	*65*
Carbon	10* / 5**	**0**	*24*	**0**	*85*	**3.3**	*60*

*** 2nd and 3rd Labtest, ** 4th Labtest**

The percentage of results out of the given tolerable limits decreases for all elements, especially for all mandatory elements. Even for Nitrogen and Carbon, where the limits became much stronger, we do not notice any significant deterioration.

Table 4 gives a short survey about the laboratories with 'values out of tolerance'. But this is not the place to censure single laboratories. Each laboratory is appealed to criticise itself and to improve its own methods, equipment and the training of staff.

Table 4: Values out of tolerance (< = too low; > = to high)

Nr.	N	S	P	Ca	Mg	K		Na	Zn	Mn	Fe	Cu	Pb	Al	B	Cd	C
1	<<<<	><	.	<<<	.	.			<<	.	<<<						
2	.	.	.	.	.	.		<<	.	.	.	>><	.	<<	.		
3	.	.	.	.	.	.			.	.	.						
3a	.																
4		.	.	.	.	.		.	.	.	>>	>>>>	>	<<		.	
4a	.	.	.	.	>	.		<	.	.	>	.	>>	<	.		
4b	.	.		<	.	.		<<	.	.	.	.	<		.	.	.
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8	.	.	.	.	.	.		>>>	.	.	.	.	.	.	>		
8a	.																
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27			.	<	<	<<<		<<	.	.	<<<	.					
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31																	
32																	
33																	
33a									<<<<			<<<	<<<<			<<	
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Table 5 demonstrates that numerous values out of tolerance depend on element contents in the foliar samples. In most cases lower element contents cause higher numbers of intolerable values.

Element contents (mean) and percentage of values out of tolerance (%)

Elem./Sample		1 Spruce (A)	2 Spruce (N)	3 Pine (D)	4 Beech (SK)
N	mg/g	13,26	11,3	21,84	20,14
	%	6,1	8,2	6,1	6,1
S	mg/g	0,99	1,27	1,52	1,82
	%	10,9	8,7	6,5	13
P	mg/g	1,95	2,19	1,32	1,21
	%	8,2	10,2	6,1	4,1
Ca	mg/g	4,11	11,32	3,28	7,1
	%	6,1	2	12,2	6,1
Mg	mg/g	1,3	0,86	0,53	1
	%	4,1	2	12,2	2
K	mg/g	3,7	7,65	4,78	6,87
	%	8,2	4,1	8,2	6,1
Na	µg/g	24,16	50,75	411,6	32,47
	%	71	40	5,4	63,6
Zn	µg/g	21,9	100,4	60,45	27,95
	%	17,4	8,7	6,5	15,6
Mn	µg/g	1519	1007	826	1313
	%	4,2	4,2	4,2	4,2
Fe	µg/g	136	57,88	195,9	71,03
	%	26,5	24,5	6,1	14,3
Cu	µg/g	3,44	3,03	4,34	5,82
	%	24,4	24,4	17,1	14,3
Pb	µg/g	0,53	0,43	5,23	0,69
	%	41,2	61,1	8,3	26,3
Al	µg/g	83,82	135,5	263,4	65,13
	%	13,3	9,4	6,3	36,7
B	µg/g	21,5	11,44	20,07	16,58
	%	16	26,9	15,4	15,4
Cd	ng/g	120,5	93,73	537,7	177,4
	%	25	13,3	5,6	25
C	%	51,27	49,51	51,77	49,03
	%	0	6,7	0	6,7

3. Evaluation by analysis methods

This part will discuss in detail the problems of used pretreatment and measurement methods. The evaluation by methods is based on the following informations for each element:

a) Elementspecific code index according to the used methods on pp1-21.

As against the 3rd ringtest the code has been supplemented in a way that it is extendable and more generally applicable. Furthermore that renders it possible to integrate any future development.

b) Original laboratory data with graphic presentation on pp 2-1

The graph shows the plus/minus deviations of methods for each element from mean based on the robust evaluated data (annex) and arranged by ascending pretreatment methods. Each column represents one of the 4 samples. The broken lines define the tolerable limits (see table 3).

„PN“ means pretreatment method, „DN“ means determination method

c) Presentations of data arranged acc. method codes on pp 3-1

For these graphs the same explanations are valid as for the graphs of the original data pp 2-1.

It will be tried to gain important results from this ringtest for each element by comparing graphs for each digestion and determination method. Methods that lead to the best comparable results and help to further optimise and, if possible, concentrate/condense the manual will be highlighted.

3.1 Nitrogen (pp 2-1, 3-1)

The result of the ringtest can be stated as remarkably positive. This applies even more as the determination tolerance had been reduced from ± 15% in the 3rd ringtest to +-10% .
Only two laboratories (19, 35) clearly overstep the limits, not so much because of reasons concerning the apparatus but more so due to mishandling or wrong calibration of the elemental analyzers.
It is remarkable that classic wet chemical analysing methods result in means below the average mean, and those from elemental analyzers lie above it. It was to be expected in theory that Kjeldal digestion is not able to digest the sample matrix completely, but was not so clear from the 3rd ringtest.
In the medium term it should be aspired to give up Kjeldal digestion whenever possible to optimise the comparability of nitrogen determination.
As concerning elemental analyzers, measurement by LECO-CNS analyser (P1-D17.1) achieve the best results.

3.2 Sulphur (pp 2-6, 3-3)

As against earlier ringtests the determination of sulphur has improved considerately. Almost each laboratory stayed inside the tolerance limit of ± 20%. Only the means from three laboratories (10, 19, 30) show big deviations, using various methods.
In tendency, those laboratories that use a combination of HNO_3-digestion followed by ICP-determination are the closest to the overall mean.
Classic $BaCl_2$ - methods seems to be rather risky. They demand a more thorough handling and sufficient experience.
It is recommended that in the medium term all laboratories should focus on using elemental analyzers or the combination of HNO_3 digestion/ICP.
Furthermore, X-ray methods have proved feasible.

3.3 Phosphorus (pp 2-11, 3-5, 3-6)

A few laboratories (5, 10, 19, 53) apparently have great difficulty in determining phosphorus. This may be due to internal problems because the participants applied different methods.
Generally all wet digestions using HNO_3 followed by determination by ICP lead to very good results.
Results achieved by X-ray-spectroscopy are acceptable.
Classic methods using dry ashing and colometric determination with (Vanadium)-Molybdenum blue lead to results within the allowed limits of ± 15%, yet faults occur more frequently.

3.4 Calcium (pp 2-16, 3-7, 3-8)

Two laboratories (10, 35) found extremely deviating results for calcium. Single outliers were found among data from a few other laboratories.
The best results can be obtained from the combination of HNO_3 digestion with ICP determination. This will be the chosen method in the future. Pressure digestion should be preferred to digestion in open systems and microwave digestion.
The use of flame AAS often leads to lower or higher results.
Results from X-ray spectroscopy are good.

3.5 Magnesium (pp 2-21, 3-9, 3-10)

Results for magnesium are altogether very good. Only one laboratory (30) found extremely low values in all four samples. Few laboratories have come up with one single outlier.
As with calcium, the best results are obtained from combined HNO_3 digestion with ICP. This will be the chosen method for magnesium as well.
Application of flame AAS more often leads to lower results.
Results from energy disperse X-ray-spectroscopy are good, those from wavelength disperse are faulty in some cases.

3.6 Potassium (pp 2-26, 3-11, 3-12)

Results for potassium are rather good. One laboratory (30) finds definitely too little in all 4 samples.
Eight laboratories show single outliers or range close to the tolerated limit of ± 15%.
Pressure digestion in combination with ICP leads to the best results and should be preferred in future. Yet results obtained by flame AAS or classic flame photometry are fairly acceptable.
Results from X-ray spectroscopy are good.

3.7 Sodium (pp 2-31, 3-13, 3-14)

Sodium is the element with the highest percentage of outliers by far that has not improved significantly since the 3rd ringtest.
Especially samples containing low amounts of sodium < 100 µg/g (samples 1, 2, 4) are problematic and show 40 – 70% of values lying outside the generously limited range of ± 30%.
On the contrary, sample 3 with > 400µg/g shows only 5.4% outliers. The reason for this is not the poor sensitivity of spectroscopes but the ubiquity of the element in laboratories and measurement equipment which causes a high risk of blind values. On the basis of the data given it seems to be an urgent demand to work exclusively with closed systems, either with pressure digestion or microwave ovens. Moreover, measurement by ICP is favourable against flame AAS.
To limit the risk of blind values only glass-free instruments are to be used.

3.8 Zinc (pp 2-36, 3-15, 3-16)

Zinc is one of the heavy metals which analysis causes the least problems. The number of values below the tolerance limit of ± 20% is with 12% even lower than in the 3rd ringtest.
Very few laboratories (23, 33a, 35) delivered values well below the lower limit.
Open acidic digestion should be avoided. Digestion with HNO3 in closed pressure or microwave systems is recommended.
ICP-OES and X-ray fluorescence spectrometry have proved advantageous against flame AAS.

3.9 Manganese (pp 2-41, 3-17, 3-18)

Of all metals, manganese shows the lowest number of values outside the limits of ± 20%.
Only two laboratories (30, 35) find too little in all 4 samples, applying open acid digestion followed by flame AAS.
For the future, pressure or microwave digestion in combination with ICP, as well as X-ray fluorescence spectroscopy, are recommendable.

3.10 Iron (pp 2-46, 3-19, 3-20)

Iron analysis has improved slightly against the 3rd ringtest. Nevertheless, the number of values beyond the limits of ± 20% is still too high. The number of outliers decreases with higher values of iron (> 100 µg/g). Similar to sodium the ubiquity of iron in all laboratory equipment plays an important role. Another possible source of faulty results could lie in the inhomogeneity of the samples caused by metal abrasion from grinding.
Graphic evaluation according to digestion methods indicates risks with open acid digestion. Simple pressure digestion with HNO_3 followed by ICP is recommended, microwave digestion would be the second choice.
X-ray fluorescence analysis proved to be not so feasible.

3.11 Copper (pp 2-51, 3-21, 3-22)

The quantity of 20% non-tolerable results is slightly higher than in the 3rd ringtest. A number of laboratories show clearly deviating results (2, 4, 10, 33a, 35, 38a, 52). A look at the graphic evaluation reveals that microwave digestion seems to have advantages over pressure digestion and open acid digestion. Self-made purest water can contain copper from copper pipes and cause false results. Contamination can stem from contact of digestion acids with metal parts in the pressure system as well.
Good results can be obtained from ICP and graphite tube AAS.
For such low concentrations X-ray fluorescence is less recommendable because it reaches its determination limits.

3.12 Lead (pp 2-56, 3-23, 3-24)

Apart from sodium, lead is the element with the highest percentage of values outside the tolerance limits of ± 30%. However, there is an obvious correlation to the concentration, as shown in chart 5. There are relatively few outliers for sample 3 with a high concentration of more than 5µg/g lead. At the same time, lead is an element that has been analysed by less than half of the laboratories altogether. The decrease of the sensitive but slow graphite tube AAS in laboratory routine is to be taken seriously, as well as the insufficient use of methods with a comparable sensitivity, like ICP-MS.
Because of the incomplete participation the present data do not state a clear hint to recommendable methods, neither to digestion nor determination techniques.
For the future, digestion in closed systems (pressure or microwave digestion) followed by ICP- OES with USN or ICP-Ms seem to be more recommendable.
X-ray fluorescent spectroscopy is not suitable for concentrations of <1 µg/g pb.

3.13 Aluminium (pp 2-61, 3-25, 3-26)

The ring test for aluminium cannot be evaluated because only 4 out of 31 laboratories have kept to the manual which requires digestion using HF. Two laboratories have analysed the samples by x-ray spectroscopy. All the other data sets are contradictory to the instructions given in the ringtest.
It is well-known that without the use of HF, aluminium which is combined with silica in plants cannot be dissoluted completely which causes a considerable risk of low findings. That

has clearly been proved by laboratory 44. Data set 44 shows the results obtained without the use of HF against data set 44a with HF. The latter is 10 –50 % higher for all samples!
It is recommended to delete aluminium from the list of "optional elements", because even after the 4th ringtest only a small number of laboratories keep to the ICP-manual.

3.14 Boron (pp 2-66, 3-27, 3-28)

Boron has been determined by about half of the laboratories, of which three delivered strongly deviating results.
According to the evaluation of the methods, in particular pressure digestion with HNO_3 followed by ICP-OES seems to be the future method.
The use of borosilica glass has to be avoided by all means.

3.15 Cadmium (pp 2-71, 3-29, 3-30)

The toxic heavy metal cadmium has been added later to the list of "optional elements" and determined by only a third of the laboratories. Compared to the results for sodium, lead and copper, the overall result has to be considered very positive. Only nearly 17% of the results lie outside the tolerance range of ± 30%.Like with lead, the error (fault) rate decreases drastically with the increase of the concentration (sample 3). Only one laboratory (47) delivered too high values for all samples. Apart from that single outliers dominate.
No particular digestion method is to be stated as being clearly of advantage. It is remarkable that results from graphite tube AAS tend to be rather lower than the overall mean, results form ICP rather higher.

3.16 Carbon (pp 2-76, 3-31, 3-32)

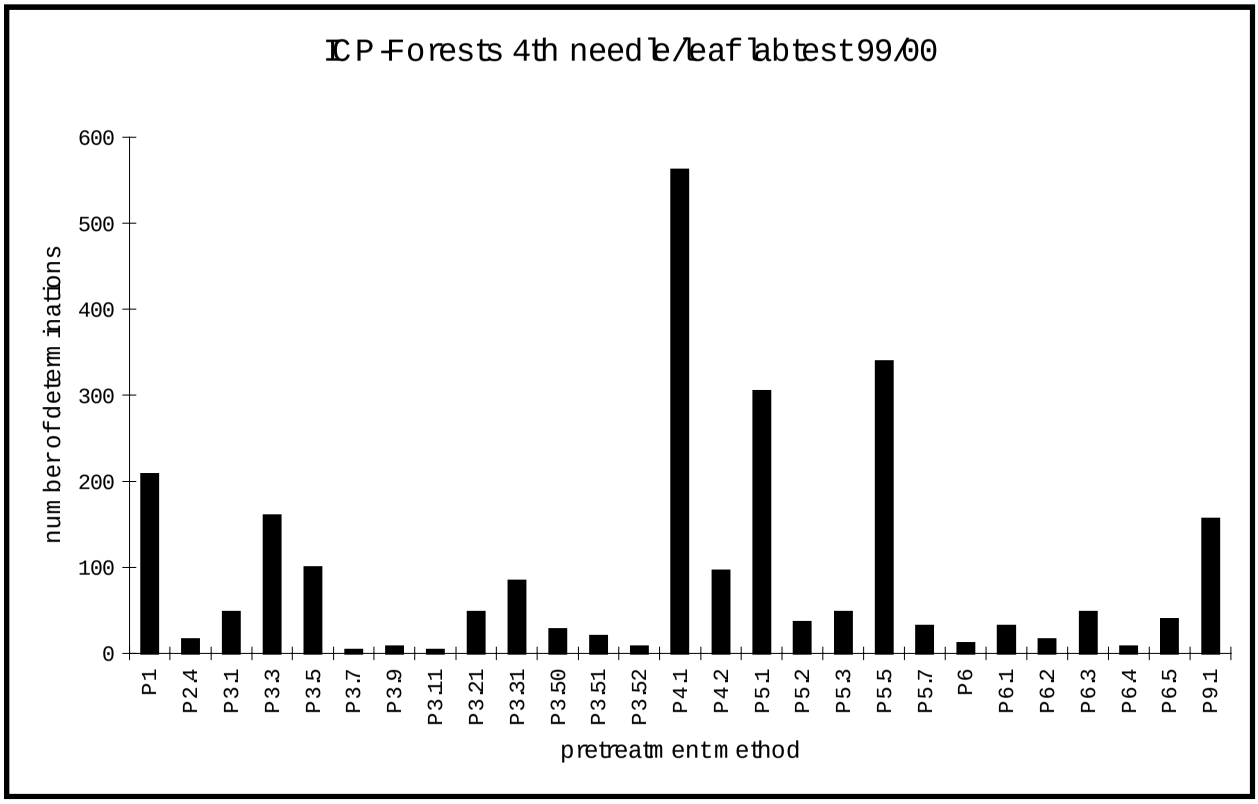
Only one results lies outside the recommended limits of ± 5%. Within these limits the analysis of carbon does not cause any problems and has not to be commented on further.

4. Conclusions

The 4th ICP Forest Interlaboratory Test shows significant improvement in analytical quality despite a few unsatisfactory aspects. Nevertheless bigger efforts are necessary to improve especially the comparability of the analysis of trace elements. This can only be achieved by further periodical ringtests and by restricting the number of methods at the same time to as few as possible.

Fig. 4 and **Table 6** show the frequency of methods applied. They show impressingly that the trend leads away from classic to more automatic methods (such as elemental analyzers, ICP, etc.) and to the restriction to simple HNO_3 digestions in closed systems.

Figure 4:


ICP-Forests 4th needle/leaf labtest 99/00
number of determinations
0
100
200
300
400
500
600
P1
P2.4
P3.1
P3.3
P3.5
P3.7
P3.9
P3.11
P3.21
P3.31
P3.50
P3.51
P3.52
P4.1
P4.2
P5.1
P5.2
P5.3
P5.5
P5.7
P6
P6.1
P6.2
P6.3
P6.4
P6.5
P9.1
pretreatment method

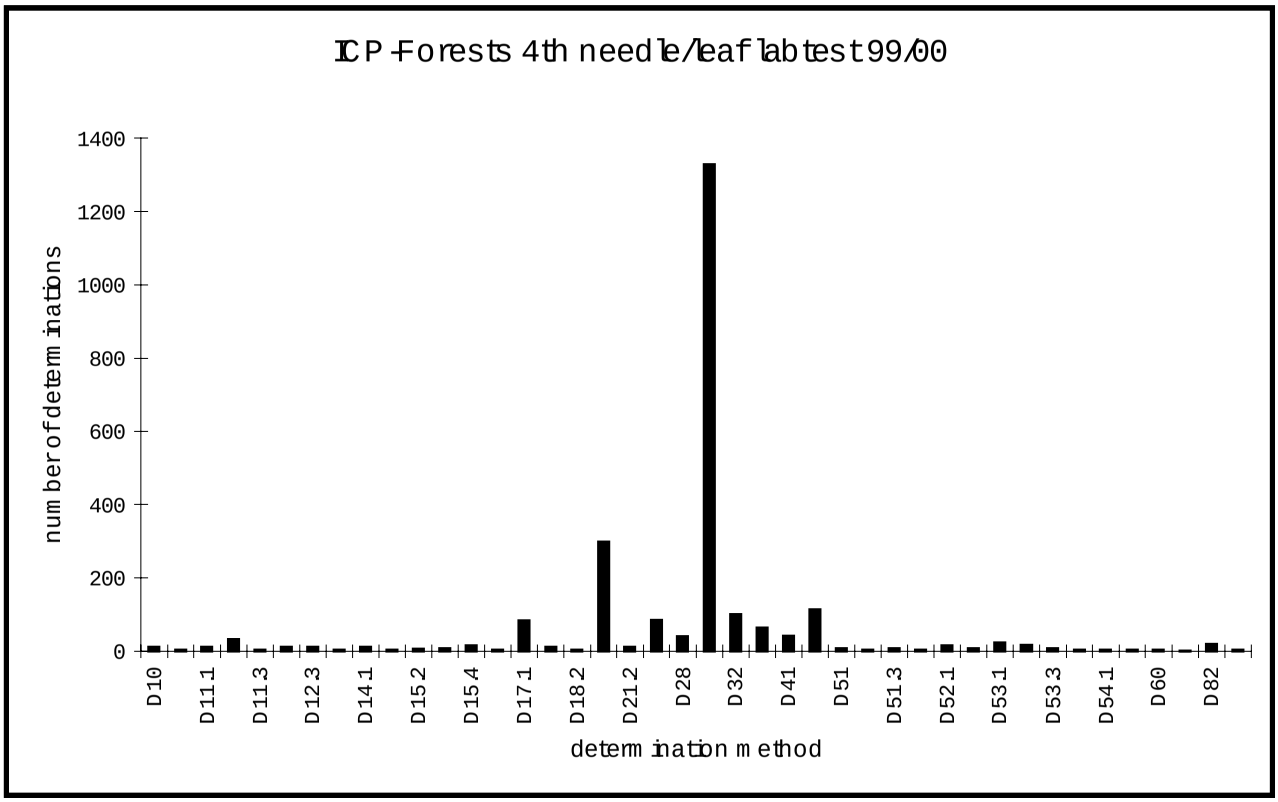

ICP-Forests 4th needle/leaf labtest 99/00
number of determinations
0
200
400
600
800
1000
1200
1400
D10
D11.1
D11.3
D12.3
D14.1
D15.2
D15.4
D17.1
D18.2
D21.2
D28
D32
D41
D51
D51.3
D52.1
D53.1
D53.3
D54.1
D60
D82
determination method

Table 6:

Number of applied methods				
method	**number**		**method**	**number**
P1-D10	12		P3.50-D11.2	8
P1-D11.1	4		P3.50-D11.3	4
P1-D11.2	12		P3.50-D51	4
P1-D12.2	12		P3.50-D51.2	4
P1-D12.3	12		P3.50-D82	8
P1-D13.1	4		P3.51-D11.1	4
P1-D14.1	12		P3.51-D11.2	8
P1-D15.1	4		P3.51-D82	8
P1-D15.2	7		P3.52-D11.2	4
P1-D15.3	8		P3.52-D82	4
P1-D15.4	16		P4.1-D21.1	40
P1-D16.1	4		P4.1-D22	37
P1-D17.1	84		P4.1-D31	413
P1-D18.1	12		P4.1-D32	68
P1-D18.2	4		P4.1-D53.1	4
P1-D71.1	1		P4.2-D31	80
P2.4-D21.1	4		P4.2-D32	16
P2.4-D28	8		P5.1-D21.1	64
P2.4-D53.2	4		P5.1-D22	20
P3.1-D21.1	4		P5.1-D28	8
P3.1-D28	4		P5.1-D31	209
P3.1-D31	12		P5.1-D53.1	4
P3.3-D21.1	48		P5.2-D31	36
P3.3-D22	4		P5.3-D31	48
P3.3-D28	13		P5.5-D21.1	11
P3.3-D31	83		P5.5-D31	263
P3.3-D52	4		P5.5-D32	13
P3.3-D53.2	4		P5.5-D35	52
P3.3-D82.3	4		P5.7-D31	28
P3.5-D21.1	28		P5.7-D53.1	4
P3.5-D22	8		P6.1-D21.1	20
P3.5-D31	44		P6.1-D28	8
P3.5-D35	12		P6.1-D53.2	4
P3.5-D52.1	8		P6.2-D52.1	8
P3.7-D53	4		P6.2-D53.1	4
P3.9-D52.1	4		P6.2-D54.2	4
P3.9-D53	4		P6.3-D31	44
P3.10-D31	28		P6.3-D32	4
P3.11-D51	4		P6.4-D53.2	4
P3.21-D21.1	44		P6.4-D54.1	4
P3.21-D53.1	4		P6.5-D21.1	35
P3.31-D11	4		P6.5-D53.2	1
P3.31-D11.1	4		P6.5-D54	4
P3.31-D21.1	12		P6-D31	8
P3.31-D22	16		P6-D60	4
P3.31-D31	32		P9.1-D41	42
P3.31-D51.3	8		P9.1-D42	114
P3.31-D53.3	8			

The variants that are described in detail in the method code are not needed any longer in such a comprehensive form. It is suggested to reduce the choice of proposed methods in favour of more automatic methods in the revised manual.

According to the author it would be reasonable to radically restrict methods to:

1. C-N-S elemental analyzers (for C, N, and S)

2. HNO3 digestions in closed systems (pressure bomb or microwave) in combination with ICP-OES or ICP-MS (for S, P, Ca, etc.) or HGA-AAS (for Cu, Pb, Cd)

3. X-ray fluorescence analysis. This has not proved in each case to be as good as the before mentioned methods due to poorer sensitivity but should be kept and further developed as a quick automatic and non-destructive multi element analysis method (for S, P, Ca, Mg, K, (Na), Zn, Mn, (Fe, Cu, Pb, Cd) .

It is suggested to carry out a separate ringtest exclusively with these methods.

5. Literature

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7. ICP Forests Foliar Analysis Methods Code (1999/2000)

7. 1 Code Numbers of Abbreviations of Pretreatments

P0 No information

P1 No pretreatment

P2 Extractions
P2.1 Extraction, H_2O
P2.2 Extraction. HNO_3
P2.2 Extracton, aqua regia

P3 Wet ashings at room pressure (open system)
P3.1 Wet ashing, HNO_3
P3.2 Wet ashing, HNO_3/HF
P3.3 Wet ashing, $HNO_3/HClO_4$
P3.4 Wet ashing, HNO3/$HClO_4$/HF
P3.5 Wet ashing HNO_3/H_2O_2
P3.6 Wet ashing $HNO_3/HClO_4$ /H_2SO_4
P3.7 Wet ashing, $HNO_3/HClO_4/CaCl_2$
P3.8 Wet ashing, $HNO_3/HClO_4/H_2O_2$
P3.9 wet ashing, HNO_3,/$HClO_4$/HCl
P3.10 Wet ashing, HNO_3 /H_2SO_4
P3.20 Wet ashing, $HClO_4/H_2O_2$
P3.21 Wet ashing, $HClO_4/H_2SO_4$
P3.31 Wet ashing, H_2SO_4/H_2O_2
P3.32 Wet ashing, H_2SO_4/K_2CrO_7
P3.50 Kjeldahl, H_2SO_4/ Se-catalyst
P3.51 Kjeldahl, H_2SO_4/Cu-catalyst
P3.52 Kjeldahl, H_2SO_4/Ti-Cu-catalyst
P3.53 Kjeldahl, H_2SO_4/Hg-catalyst

P4 Pressure digestions (closed system)
P4.1 Pressure digestion, HNO_3,
P4.2 Pressure digestion, HNO_3/HF
P4.3 Pressure digestion, $HNO_3/HClO_4$,
P4.4 Pressure digestion, $HNO_3/HClO_4$/HF,
P4.5 Pressure digestion, HNO_3/H_2O_2,

P5 Microwave pressure digestions (closed system)
P5.1 Microwave digestion, HNO_3,
P5.2 Microwave digestion, HNO_3/HF
P5.3 Microwave digestion, $HNO_3/HClO_4$
P5.4 Microwave digestion, $HNO_3/HClO_4$/HF
P5.5 Microwave digestion, HNO_3/H_2O_2,
P5.6 Microwave digestion, HNO_3/H_2O_2/HF

P5.7 Microwave digestion, $HNO_3/H_2O_2/HCl$

P6 Dry ashings

P6.1 Dry ashing, dissolution with HNO_3
P6.2 Dry ashing, dissolution with $HNO_3/MgNO_3$
P6.3 Dry ashing, dissolution with HNO_3/HF
P6.4 Dry ashing, dissolution with HNO_3/HCl
P6.5 Dry ashing, dissolution with HCl
P6.6 Dry ashing, dissolution with HCl/HF
P6.7 Dry ashing, dissolution with H_2SO_4

P7 Oxygen ashings

P7.1 Oxygen ashing, Schöniger
P7.2 Oxygen ashing, Wickbold
P7.3 Oxygen ashing, calorimetric bomb

P9 X-ray-pretreatments and other pretreatments

P9.1 Material pressed (Pellet)
P9.2 Material melted and formed (tablet)
P9.5 Melting (NaOH)6. 2 Code Numbers of Abbreviations of Detections

7.2 Code Numbers of Abbreviations of Detectrions

D0 No information
D1 No detection

D10 Elemental-analyzers

D11 Kjeldahl-apparatus
D11.1 Kjeldahl-apparatus (Tecator)
D11.2 Kjeldahl-apparatus (Gerhardt)
D11.3 Kjeldahl-apparatus (Büchi)

D12 N-Analyzer
D12.1 N-Analyzer (Heraeus/Elementar)
D12.2 N-Analyzer (Vario)
D12.3 N-Analyzer(,Leco)

D13 C-Analyzer
D13.1 C-Analyzer (Leco)

D14 S-Analyzer
D14.1 S-Analyzer (Leco)

D15 C/N-Analyzer
D15.1 C/N-Analyzer (Carlo-Erba)
D15.2 C/N-Analyzer (Leco)
D15.3 C/N-Analyzer (Heraeus)
D15.4 C/N-Analyzer (Vario)

D16 C/S-Analyzer
D16.1 C/S-Analyzer (Leco)

D17 C/N/S-Analyzer
D17.1 C/N/S-Analyzer (Leco)
D17.2

D18 C/N/H-Analyzer
D18.1 C/N/H-Analyzer (Leco)
D18.2 C/H/N-Analyzer (Heraeus)

D20 Mono-Atom-Spectrometry-Techniques
D21 AAS-flame technique
D21.1 AAS-flame technique (C_2H_2/Air)
D21.2 AAS-flame technique (C_2H_2/N_2O)
D22 AAS-flameless technique
D24 AAS-hydride technique
D25 AAS-cold vapor technique

D26 AFS-hydride-technique

D28 AES-Flame photometer

D30 Multi-Atom-Spectrometry-techniques
D31 ICP-AES without Ultrasonic nebulisation
D32 ICP-AES with Ultrasonic nebulisation

D35 ICP-MS

D40 Physical techniques
D41 X-ray-energy dispersive
D42 X-ray-wavelength dispersive

D45 Neutron activation analysis (NAA)
D47 γ-spectroscopy

D50 UV-VIS-spectrophotometric techniques

D51 Colorimetric N-Determination
D51.1 Indophenol-blue-method
D51.2 Flow Injection (FIAS) - NH_3-Membrane-diffusion, 566 nm
D51.3 Continuous flow method, Indophenol blue

D52 Colorimetric S-Determination
D52.1 $BaCl_2$-methods (Nephelometry)

D53 Colorimetric P-Determination
D53.1 Molybdene-blue-method
D53.2 Vanadium-Mo-blue-method
D53.3 Continuous flow method, Molybdene-blue

D54 Colorimetric B-Determination
D54.1 Azomethin - H
D54.2 Carmine

D60 Ion-chromatographic techniques

D61.1 Anion-Chromatography w. chemical suppression
D61.2 Anion-Chromatography w. electr. suppression
D62.1 Kation-Chromatography w. chemical suppression
D62.2 Kation-Chromatography w. electr. suppression

D70 Electrochemical methods

D71 Conductimetry
D71.1 Conductometric titration
D72 Potentiometry
D72.1 pH
D72.2 other ion selective elektrodes
D73 Potentiometric titrations
D74 Stripping potentiometry
D75 Voltammetry
D76 Polarography
D77 Amperometry
D78 Electrophoresis
D79 Redox potential

D80 Classical analytical techniques

D81 Gravimetry
D82 Titration
D82.1 NH_4-back titration
D82.2 Thiocyanate-titration
D82.3 $FeNH_4SO_4$-Titration
D82.4 Barimetric titration

D90 other detections

ICP-Forests 4th needle/leaf labtest 99/00

Element: **N**
Dimension: **mg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**1**	P3.50	D82	11.59	a	11.59	a	11.69	a	**11.62**	*	0.06	0.52
2	**41**	P1	D15.3	12.64	ab	12.13	a	12.17	a	**12.18**		0.28	2.30
3	**28**	P3.31	P51.3	12.34		12.50		12.37		**12.39**		0.09	0.73
4	**10**	P3.51	D82	12.59		12.59		12.57		**12.58**		0.01	0.08
5	**26**	P3.11	D51	12.38	b	12.64		12.58		**12.58**		0.14	1.11
6	**44**	P1	D17.1	12.60		12.80	b	12.40	b	**12.60**		0.20	1.59
7	**13**	P1	D11.2	12.65		12.63		12.55		**12.61**		0.05	0.40
8	**18**	P3.31	D51.3	12.18	b	12.71		12.71		**12.68**		0.31	2.44
9	**3a**	P3.50	D11.2	12.80		12.60		12.70		**12.70**		0.10	0.79
10	**48**	P1	D17.1	12.78		12.71		12.72		**12.74**		0.04	0.31
11	**21**	P1	D12.3	12.69		12.75		12.90	b	**12.75**		0.11	0.86
12	**4a**	P3.52	D82	12.90		12.60	b	13.10	b	**12.90**		0.25	1.94
13	**29**	P3.31	D11.1	12.94		12.86		12.90		**12.90**		0.04	0.31
14	**42**	P1	D17.1	13.12	b	12.92		12.82		**12.92**		0.15	1.16
15	**9**	P3.51	D11.2	12.97		12.96		12.96		**12.96**		0.01	0.08
16	**11**	P3.51	D11.1	12.91		13.21	b	12.98		**12.98**		0.16	1.23
17	**17**	P3.50	D51	12.90		13.11		12.99		**12.99**		0.11	0.85
18	**43**	P1	D15.2	13.00		13.00		13.00		**13.00**		0.00	0.00
19	**20**	P1	D18.1	13.00		13.70	b	13.00		**13.03**		0.40	3.07
20	**35**	P3.31	D11	13.62	b	12.60	b	13.05		**13.05**		0.51	3.91
21	**36**	P3.51	D82	13.06		14.01	b	12.88	b	**13.06**		0.61	4.67
22	**2**	P3.50	D51.2	13.10		13.00		13.20		**13.10**		0.10	0.76
23	**49**	P1	D12.2	13.11		13.23		12.97	b	**13.11**		0.13	0.99
24	**23**	P3.50	D82	13.10		13.20		13.20		**13.17**		0.06	0.46
25	**40**	P1	D18.1	13.30		13.10		13.20		**13.20**		0.10	0.76
26	**5**	P3.50	D11.2	13.30		13.23		13.30		**13.28**		0.04	0.30
27	**37**	P1	D11.1	13.28		13.25		13.32		**13.28**		0.04	0.30
28	**4b**	P1	D17.1	13.40		13.30		13.20		**13.30**		0.10	0.75
29	**24**	P3.51	D11.2	13.38		13.34		13.36		**13.36**		0.02	0.15
30	**45**	P1	D17.1	13.39		13.42		13.33		**13.38**		0.05	0.37
31	**16**	P1	D15.2	13.50		13.40		13.20	b	**13.40**		0.15	1.12
32	**50**	P3.52	D11.2	13.40		13.60	b	12.70	b	**13.40**		0.47	3.51
33	**7**	P1	D18.1	13.80	b	13.20	b	13.50		**13.50**		0.30	2.22
34	**15**	P1	D17.1	12.91	b	13.50		13.89	b	**13.50**		0.49	3.63
35	**12**	P1	D17.1	13.63		13.52		13.58		**13.58**		0.06	0.44
36	**8a**	P1	D11.2	13.60		13.30	b	14.00	b	**13.60**		0.35	2.57
37	**38**	P1	D12.2	13.60		13.40	b	13.80	b	**13.60**		0.20	1.47
38	**25**	P1	D12.3	13.63		13.61		13.65		**13.63**		0.02	0.15
39	**3**	P1	D17.1	13.64		13.73		13.73		**13.70**		0.05	0.36
40	**19**	P1	D10	13.90	b	13.70		13.70		**13.73**		0.12	0.87
41	**47**	P1	D15.4	13.98	b	13.74		13.71		**13.76**		0.15	1.09
42	**52**	P1	D17.1	13.90		13.90		14.00		**13.93**		0.06	0.43
43	**46**	P1	D15.4	14.13		13.93		14.01		**14.01**		0.10	0.71
44	**39**	P1	D12.3	14.10		14.11		14.10		**14.10**		0.01	0.07
45	**14**	P1	D11.2	14.00	ab	14.20	a	14.50	ab	**14.20**		0.25	1.76
46	**8**	P1	D15.1	14.20	a	14.20	a	14.30	a	**14.23**		0.06	0.42
47	**6**	P1	D10	15.08	ab	14.34	ab	14.53	a	**14.53**		0.38	2.62
48	**30**	P3.50	D11.3	14.75	ab	14.89	a	14.96	a	**14.89**	*	0.11	0.74
49	**53**	P1	D18.2	16.63	ab	17.77	ab			**17.20**	*	0.81	4.71
										Mean		Interlab.std. deviation	
												abs.	rel.%
										13.26		**0.17**	**1.27**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 10 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **N**
Dimension: **mg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**11**	P3.51	D11.1	9.90	a	10.19	ab	9.61	ab	**9.90 ***	0.29	2.93
2	**21**	P1	D12.3	10.54	ab	10.21	a	9.45	ab	**10.21**	0.56	5.48
3	**10**	P3.51	D82	10.27	a	9.97	ab	10.27	a	**10.25**	0.17	1.66
4	**41**	P1	D15.3	10.50		10.53		10.54		**10.52**	0.02	0.19
5	**13**	P1	D11.2	10.69		10.48	b	10.62		**10.62**	0.11	1.04
6	**28**	P3.31	P51.3	10.61		10.63		10.74		**10.64**	0.07	0.66
7	**42**	P1	D17.1	10.82		10.61		10.71		**10.71**	0.11	1.03
8	**3a**	P3.50	D11.2	11.00	b	10.70		10.80		**10.80**	0.15	1.39
9	**9**	P3.51	D11.2	10.75		10.83		10.84		**10.81**	0.05	0.46
10	**48**	P1	D17.1	10.89		10.82		10.84		**10.85**	0.04	0.37
11	**44**	P1	D17.1	10.99		10.89		10.89		**10.91**	0.06	0.55
12	**23**	P3.50	D82	10.90		11.00		10.90		**10.92**	0.06	0.55
13	**1**	P3.50	D82	10.97		10.97		10.87		**10.95**	0.06	0.55
14	**4a**	P3.52	D82	11.00		10.90		11.00		**10.98**	0.06	0.55
15	**17**	P3.50	D51	10.89		10.98		11.03		**10.98**	0.07	0.64
16	**7**	P1	D18.1	11.00		10.80	b	11.30	b	**11.00**	0.25	2.27
17	**35**	P3.31	D11	11.00		10.35	b	11.50	b	**11.00**	0.58	5.27
18	**18**	P3.31	D51.3	11.02		11.13		11.02		**11.04**	0.06	0.54
19	**40**	P1	D18.1	11.20		11.10		11.10		**11.12**	0.06	0.54
20	**20**	P1	D18.1	11.40	b	11.20		11.10		**11.20**	0.15	1.34
21	**36**	P3.51	D82	11.34	b	10.96	b	11.20		**11.20**	0.19	1.70
22	**37**	P1	D11.1	11.24		11.19		11.20		**11.21**	0.03	0.27
23	**29**	P3.31	D11.1	11.18		11.32		11.24		**11.24**	0.07	0.62
24	**43**	P1	D15.2	11.20		11.30		11.30		**11.28**	0.06	0.53
25	**45**	P1	D17.1	11.20		11.32		11.29		**11.28**	0.06	0.53
26	**2**	P3.50	D51.2	11.50	b	10.90	b	11.30		**11.30**	0.31	2.74
27	**4b**	P1	D17.1	11.30		11.30		11.30		**11.30**	0.00	0.00
28	**5**	P3.50	D11.2	11.34		11.34		11.20	b	**11.32**	0.08	0.71
29	**39**	P1	D12.3	11.38		11.32		11.35		**11.35**	0.03	0.26
30	**26**	P3.11	D51	11.37		11.25	b	11.66	b	**11.37**	0.21	1.85
31	**16**	P1	D71.1	11.50		11.30		11.40		**11.40**	0.10	0.88
32	**12**	P1	D17.1	11.47		11.30	b	11.54		**11.47**	0.12	1.05
33	**50**	P3.52	D11.2	11.50		11.60		11.40		**11.50**	0.10	0.87
34	**15**	P1	D17.1	11.52		11.10	b	11.72	b	**11.52**	0.32	2.78
35	**3**	P1	D17.1	11.61		11.64		11.52		**11.60**	0.06	0.52
36	**25**	P1	D12.3	11.60		11.63		11.66		**11.63**	0.03	0.26
37	**24**	P3.51	D11.2	11.70		11.44	b	11.65		**11.65**	0.14	1.20
38	**30**	P3.50	D11.3	11.50	b	11.68		11.70		**11.67**	0.11	0.94
39	**49**	P1	D12.2	11.70		11.77		11.48	b	**11.70**	0.15	1.28
40	**47**	P1	D15.4	11.87		12.05	b	11.81		**11.87**	0.12	1.01
41	**8a**	P1	D11.2	11.80		11.90		12.20	b	**11.90**	0.21	1.76
42	**52**	P1	D17.1	11.90		11.90		11.90		**11.90**	0.00	0.00
43	**38**	P1	D12.2	11.70	b	12.00		12.00		**11.98**	0.17	1.42
44	**14**	P1	D11.2	12.30	b	12.00		12.10		**12.10**	0.15	1.24
45	**8**	P1	D15.1	12.30	a	12.30	a	12.30	a	**12.30**	0.00	0.00
46	**6**	P1	D10	12.00	ab	12.34	a	12.33	a	**12.31**	0.19	1.54
47	**46**	P1	D15.4	12.58	a	12.57	a	12.59	a	**12.58 ***	0.01	0.08
48	**19**	P1	D10	13.28	a	13.28	a	13.20	a	**13.26 ***	0.05	0.38
49	**53**	P1	D18.2	13.95	ab	14.63	ab			**14.29 ***	0.48	3.36
										Mean	Interlab.std. deviation	
											abs.	rel.%
										11.30	**0.13**	**1.18**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/-** **10 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **8.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **N**
Dimension: **mg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**35**	P3.31	D11	20.06	ab	19.32	a	18.75	ab	**19.32 ***	0.66	3.42
2	**4a**	P3.52	D82	19.70	a	19.60	a	19.70	a	**19.67**	0.06	0.31
3	**30**	P3.50	D11.3	19.65	a	19.64	a	19.76	a	**19.68**	0.07	0.36
4	**13**	P1	D11.2	20.82	b	20.02	b	20.25		**20.25**	0.41	2.02
5	**26**	P3.11	D51	18.27	b	20.25		20.86	b	**20.25**	1.35	6.67
6	**41**	P1	D15.3	20.12	b	20.45		20.59		**20.45**	0.24	1.17
7	**9**	P3.51	D11.2	20.66		20.79		20.46	b	**20.66**	0.17	0.82
8	**11**	P3.51	D11.1	20.73		20.52		20.72		**20.68**	0.12	0.58
9	**1**	P3.50	D82	20.60		20.75		20.75		**20.71**	0.09	0.43
10	**21**	P1	D12.3	20.95		20.82		20.77		**20.84**	0.09	0.43
11	**10**	P3.51	D82	21.02		20.97		20.97		**20.99**	0.03	0.14
12	**48**	P1	D17.1	21.17		21.21		21.29		**21.22**	0.06	0.28
13	**3a**	P3.50	D11.2	21.20		21.20		21.40		**21.24**	0.12	0.56
14	**40**	P1	D18.1	21.60	b	21.20		21.30		**21.30**	0.21	0.99
15	**36**	P3.51	D82	21.08	b	21.34		21.56	b	**21.34**	0.24	1.12
16	**18**	P3.31	D51.3	21.35		21.89	b	21.03	b	**21.35**	0.43	2.01
17	**37**	P1	D11.1	21.54		21.40		21.44		**21.46**	0.07	0.33
18	**29**	P3.31	D11.1	21.46		21.53		21.57		**21.52**	0.06	0.28
19	**44**	P1	D17.1	21.27	b	21.67		21.57		**21.57**	0.21	0.97
20	**2**	P3.50	D51.2	22.30	b	21.10	b	21.60		**21.60**	0.60	2.78
21	**20**	P1	D18.1	21.30	b	21.70		21.60		**21.60**	0.21	0.97
22	**38**	P1	D12.2	21.80	b	21.60		21.10	b	**21.60**	0.36	1.67
23	**5**	P3.50	D11.2	21.70		21.70		21.60		**21.67**	0.06	0.28
24	**28**	P3.31	P51.3	21.68		22.02	b	21.16	b	**21.68**	0.43	1.98
25	**45**	P1	D17.1	21.67		21.68		21.94	b	**21.72**	0.15	0.69
26	**17**	P3.50	D51	21.74		21.60		21.90		**21.74**	0.15	0.69
27	**23**	P3.50	D82	21.90		21.80		21.70		**21.80**	0.10	0.46
28	**43**	P1	D15.2	21.90		21.90		21.80		**21.87**	0.06	0.27
29	**42**	P1	D17.1	21.89		21.89		21.89		**21.89**	0.00	0.00
30	**50**	P3.52	D11.2	22.20		22.10		21.50	b	**22.10**	0.38	1.72
31	**24**	P3.51	D11.2	22.29		21.99	b	22.20		**22.20**	0.15	0.68
32	**4b**	P1	D17.1	22.40		22.30		22.30		**22.33**	0.06	0.27
33	**12**	P1	D17.1	22.57		22.43		22.54		**22.51**	0.07	0.31
34	**3**	P1	D17.1	22.58		22.58		22.60		**22.59**	0.01	0.04
35	**7**	P1	D18.1	22.10	b	22.80	b	22.60		**22.60**	0.36	1.59
36	**16**	P1	D15.2	22.60		22.60		22.60		**22.60**	0.00	0.00
37	**49**	P1	D12.2	22.65		22.72		22.41	b	**22.64**	0.16	0.71
38	**52**	P1	D17.1	22.70		22.70		22.60		**22.67**	0.06	0.26
39	**8a**	P1	D11.2	22.70		22.10	b	22.80		**22.70**	0.38	1.67
40	**6**	P1	D10	23.42	b	22.77		22.72		**22.79**	0.39	1.71
41	**15**	P1	D17.1	22.86		22.80		22.40	b	**22.79**	0.25	1.10
42	**39**	P1	D12.3	22.83		22.85		22.54	b	**22.80**	0.17	0.75
43	**14**	P1	D11.2	22.80	b	23.00		23.30	b	**23.00**	0.25	1.09
44	**47**	P1	D15.4	23.12		23.14		22.82	b	**23.09**	0.18	0.78
45	**46**	P1	D15.4	23.25		23.42		23.59		**23.42**	0.17	0.73
46	**8**	P1	D15.1	23.40		23.70	b	23.40		**23.44**	0.17	0.73
47	**25**	P1	D12.3	23.64		23.60		23.67		**23.64**	0.04	0.17
48	**19**	P1	D10	25.26	a	25.20	a	25.26	a	**25.24 ***	0.03	0.12
49	**53**	P1	D18.2	27.92	ab	24.19	ab			**26.05 ***	2.64	10.13
										Mean	Interlab.std. deviation	
											abs.	rel.%
										21.84	**0.26**	**1.17**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 10 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **N**
Dimension: **mg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**35**	P3.31	D11	17.44	ab	17.71	a	18.32	ab	**17.71 ***	0.45	2.54
2	**41**	P1	D15.3	18.30	a	18.36	a	18.52	ab	**18.36**	0.11	0.60
3	**13**	P1	D11.2	18.51	a	18.52	a	18.50	a	**18.51**	0.01	0.05
4	**9**	P3.51	D11.2	18.89		18.87		18.53	b	**18.86**	0.20	1.06
5	**1**	P3.50	D82	19.00		18.60	b	19.21	b	**19.00**	0.31	1.63
6	**21**	P1	D12.3	19.06		19.10		19.04		**19.07**	0.03	0.16
7	**4a**	P3.52	D82	19.10		19.20		19.20		**19.18**	0.06	0.31
8	**10**	P3.51	D82	19.16		19.16		19.74	b	**19.18**	0.33	1.72
9	**36**	P3.51	D82	19.24		20.01	b	19.24		**19.26**	0.44	2.28
10	**11**	P3.51	D11.1	19.35		19.36		18.98	b	**19.33**	0.22	1.14
11	**48**	P1	D17.1	19.34		19.35		19.30		**19.33**	0.03	0.16
12	**30**	P3.50	D11.3	19.44		19.56		19.35		**19.44**	0.11	0.57
13	**40**	P1	D18.1	19.50		19.40		19.60		**19.50**	0.10	0.51
14	**44**	P1	D17.1	19.49		19.59		19.49		**19.51**	0.06	0.31
15	**18**	P3.31	D51.3	19.34	b	19.55		19.66		**19.55**	0.16	0.82
16	**45**	P1	D17.1	19.72		19.63		19.78		**19.72**	0.08	0.41
17	**17**	P3.50	D51	19.73		19.63		19.81		**19.73**	0.09	0.46
18	**3a**	P3.50	D11.2	20.00	b	19.80		19.80		**19.82**	0.12	0.61
19	**29**	P3.31	D11.1	19.85		19.78		19.82		**19.82**	0.04	0.20
20	**5**	P3.50	D11.2	20.02		19.88		19.95		**19.95**	0.07	0.35
21	**37**	P1	D11.1	20.03		19.95		19.92		**19.96**	0.06	0.30
22	**20**	P1	D18.1	20.00		20.00		19.90		**19.98**	0.06	0.30
23	**43**	P1	D15.2	20.10		19.90		20.00		**20.00**	0.10	0.50
24	**23**	P3.50	D82	20.00		20.00		20.20	b	**20.02**	0.12	0.60
25	**42**	P1	D17.1	20.10		20.00		20.00		**20.02**	0.06	0.30
26	**26**	P3.11	D51	19.19	b	20.74	b	20.17		**20.17**	0.78	3.87
27	**28**	P3.31	P51.3	20.33	b	19.93	b	20.19		**20.19**	0.20	0.99
28	**24**	P3.51	D11.2	20.27		20.35		20.10	b	**20.27**	0.13	0.64
29	**2**	P3.50	D51.2	20.40		19.60	b	20.30		**20.30**	0.44	2.17
30	**6**	P1	D10	20.52	b	20.13	b	20.38		**20.38**	0.20	0.98
31	**7**	P1	D18.1	20.40		20.50		20.40		**20.42**	0.06	0.29
32	**4b**	P1	D17.1	20.50		20.50		20.50		**20.50**	0.00	0.00
33	**38**	P1	D12.2	20.40	b	20.80	b	20.60		**20.60**	0.20	0.97
34	**49**	P1	D12.2	20.73		20.50	b	20.86	b	**20.73**	0.18	0.87
35	**8a**	P1	D11.2	20.80		20.60	b	20.80		**20.78**	0.12	0.58
36	**16**	P1	D15.2	20.80		20.70		20.80		**20.78**	0.06	0.29
37	**39**	P1	D12.3	20.76		20.86		20.80		**20.80**	0.05	0.24
38	**50**	P3.52	D11.2	20.40	b	20.90		20.80		**20.80**	0.26	1.25
39	**3**	P1	D17.1	20.73	b	20.90		21.40	b	**20.90**	0.35	1.67
40	**52**	P1	D17.1	20.90		20.90		20.90		**20.90**	0.00	0.00
41	**12**	P1	D17.1	21.05		21.78	b	20.72	b	**21.05**	0.54	2.57
42	**46**	P1	D15.4	21.13		21.26		21.10		**21.14**	0.09	0.43
43	**15**	P1	D17.1	21.20		20.78	b	21.53	b	**21.20**	0.38	1.79
44	**14**	P1	D11.2	21.50	b	21.30		21.20		**21.30**	0.15	0.70
45	**47**	P1	D15.4	21.33		21.33		21.31		**21.32**	0.01	0.05
46	**8**	P1	D15.1	21.60		21.50		21.60		**21.58**	0.06	0.28
47	**25**	P1	D12.3	21.58		21.57		21.63		**21.59**	0.03	0.14
48	**19**	P1	D10	23.50	a	23.40	a	23.40	a	**23.42 ***	0.06	0.26
49	**53**	P1	D18.2	23.52	ab	23.79	ab			**23.66 ***	0.19	0.80
										Mean	Interlab.std. deviation	
											abs.	rel.%
										20.14	**0.16**	**0.81**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 10 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.1**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **20.02**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **S**
Dimension: **mg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
44	**1**	P1	D14.1	1.26	a	1.26	a	1.30	ab	**1.27 ***	0.02	1.57
29	**2**	P5.3	D31	1.01		1.04		1.02		**1.02**	0.02	1.96
32	**3**	P1	D17.1	1.02		1.03		1.03		**1.03**	0.01	0.97
2	**4**	P9.1	D41	0.83		0.86		0.85		**0.85**	0.02	2.35
7	**5**	P6.2	D52.1	0.63	b	0.92		0.90		**0.90**	0.16	17.78
33	**6**	P4.2	D31	1.03		1.02		1.04		**1.03**	0.01	0.97
8	**7**	P5.5	D31	0.90		0.90		0.92		**0.91**	0.01	1.10
9	**8**	P3.3	D31	0.91		0.90		0.91		**0.91**	0.01	1.10
19	**9**	P5.5	D31	0.98		0.98		0.97		**0.98**	0.01	1.02
45	**10**	P1	D14.1	1.57	ab	1.47	ab	1.53	a	**1.53 ***	0.05	3.27
20	**11**	P5.1	D31	0.98		0.97		0.99		**0.98**	0.01	1.02
24	**12**	P5.1	D31	1.10	b	0.98		0.98		**0.99**	0.07	7.07
21	**14**	P4.1	D31	0.96		0.98		0.99		**0.98**	0.02	2.04
36	**15**	P1	D17.1	1.07		1.08		1.10		**1.08**	0.02	1.85
28	**16**	P5.5	D31	1.12	b	0.99		1.01		**1.01**	0.07	6.93
25	**17**	P5.5	D32	0.99		0.98		0.99		**0.99**	0.01	1.01
5	**18**	P5.1	D31	0.89		0.81	b	0.92	b	**0.89**	0.06	6.74
46	**19**	P5.5	D31	2.13	a	2.09	a	2.11	a	**2.11 ***	0.02	0.95
12	**20**	P1	D16.1	0.92		0.94		0.93		**0.93**	0.01	1.08
13	**21**	P5.1	D31	0.91		0.92		0.96	b	**0.93**	0.03	3.23
43	**23**	P3.3	D52	1.18	ab	1.22	a	1.26	ab	**1.22 ***	0.04	3.28
39	**24**	P3.5	D52.1	1.07	b	1.18	b	1.10		**1.10**	0.06	5.45
22	**25**	P1	D14.1	0.98		0.98		0.99		**0.98**	0.01	1.02
41	**26**	P3.5	D35	1.13		1.11		1.15		**1.13**	0.02	1.77
4	**28**	P6	D60	0.88		0.85		0.85		**0.86**	0.02	2.33
14	**29**	P3.3	D31	0.87	b	0.94		1.02	b	**0.94**	0.08	8.51
1	**30**	P3.9	D52.1	0.68	a	0.66	a	0.65	a	**0.66 ***	0.02	3.03
6	**36**	P6.2	D52.1	0.82	b	0.90		0.91		**0.89**	0.05	5.62
30	**37**	P5.5	D31	0.99	b	1.04		1.02		**1.02**	0.03	2.94
15	**38**	P4.1	D31	0.94		0.93		0.95		**0.94**	0.01	1.06
38	**39**	P5.5	D31	1.09		1.09		1.10		**1.09**	0.01	0.92
26	**41**	P4.1	D31	0.99		0.99		0.98		**0.99**	0.01	1.01
31	**42**	P4.1	D31	1.02		1.01		1.02		**1.02**	0.01	0.98
18	**43**	P4.1	D31	0.97		0.96		0.95		**0.96**	0.01	1.04
16	**44**	P4.1	D31	0.95		0.96		0.94		**0.95**	0.01	1.05
11	**45**	P5.5	D31	0.93		0.91		0.92		**0.92**	0.01	1.09
40	**46**	P5.2	D31	1.12		1.10		1.09		**1.10**	0.02	1.82
10	**47**	P4.1	D32	0.90		0.92		0.90		**0.91**	0.01	1.10
27	**48**	P4.1	D31	0.99		0.99		0.99		**0.99**	0.00	0.00
17	**50**	P4.1	D31	0.95		0.94		0.96		**0.95**	0.01	1.05
3	**51**	P9.1	D42	0.78	b	0.85		0.89	b	**0.85**	0.06	7.06
37	**52**	P1	D17.1	0.99	b	1.08		1.12	b	**1.08**	0.07	6.48
34	**38a**	P9.1	D42	1.06		1.05		1.07		**1.06**	0.01	0.94
23	**44a**	P4.2	D31	0.98		1.00		0.97		**0.98**	0.02	2.04
42	**4a**	P9.1	D42	1.15		1.13		1.13		**1.14**	0.01	0.88
35	**4b**	P1	D17.1	1.07		1.08		1.08		**1.08**	0.01	0.93

Mean	Interlab.std. deviation	
	abs.	rel.%
0.99	**0.03**	**2.77**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **10.9**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **S**
Dimension: **mg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**30**	P3.9	D52.1	0.90	a	1.03	ab	0.91	a	**0.92 ***	0.07	7.61
2	**51**	P9.1	D42	0.96	a	0.97	a	1.03	ab	**0.98 ***	0.04	4.08
3	**28**	P6	D60	1.11		1.13		1.13		**1.12**	0.01	0.89
4	**36**	P6.2	D52.1	1.15	b	1.12		1.00	b	**1.12**	0.08	7.14
5	**45**	P5.5	D31	1.14		1.13		1.13		**1.13**	0.01	0.88
6	**4**	P9.1	D41	1.15		1.15		1.16		**1.15**	0.01	0.87
7	**5**	P6.2	D52.1	1.08	b	1.16		1.16		**1.15**	0.05	4.35
8	**7**	P5.5	D31	1.15		1.15		1.15		**1.15**	0.00	0.00
9	**21**	P5.1	D31	1.17		1.16		1.11	b	**1.15**	0.03	2.61
10	**8**	P3.3	D31	1.16		1.17		1.14		**1.16**	0.02	1.72
11	**20**	P1	D16.1	1.15		1.18		1.19		**1.17**	0.02	1.71
12	**38**	P4.1	D31	1.17		1.16		1.19		**1.17**	0.02	1.71
13	**25**	P1	D14.1	1.16		1.18		1.19		**1.18**	0.02	1.69
14	**9**	P5.5	D31	1.19		1.21		1.23		**1.21**	0.02	1.65
15	**50**	P4.1	D31	1.22		1.19		1.21		**1.21**	0.02	1.65
16	**47**	P4.1	D32	1.21		1.22		1.22		**1.22**	0.01	0.82
17	**3**	P1	D17.1	1.23		1.22		1.24		**1.23**	0.01	0.81
18	**44**	P4.1	D31	1.23		1.22		1.23		**1.23**	0.01	0.81
19	**11**	P5.1	D31	1.23		1.23		1.26		**1.24**	0.02	1.61
20	**18**	P5.1	D31	1.23		1.25		1.24		**1.24**	0.01	0.81
21	**39**	P5.5	D31	1.26		1.26		1.23		**1.25**	0.02	1.60
22	**43**	P4.1	D31	1.27		1.26		1.26		**1.26**	0.01	0.79
23	**4b**	P1	D17.1	1.32	b	1.28		1.24	b	**1.28**	0.04	3.13
24	**14**	P4.1	D31	1.27		1.29		1.27		**1.28**	0.01	0.78
25	**42**	P4.1	D31	1.29		1.28		1.27		**1.28**	0.01	0.78
26	**38a**	P9.1	D42	1.30		1.29		1.29		**1.29**	0.01	0.78
27	**41**	P4.1	D31	1.30		1.29		1.28		**1.29**	0.01	0.78
28	**44a**	P4.2	D31	1.26	b	1.31		1.29		**1.29**	0.03	2.33
29	**2**	P5.3	D31	1.27	b	1.33	b	1.30		**1.30**	0.03	2.31
30	**17**	P5.5	D32	1.32		1.32		1.29		**1.31**	0.02	1.53
31	**16**	P5.5	D31	1.32		1.25	b	1.40	b	**1.32**	0.08	6.06
32	**6**	P4.2	D31	1.33		1.31		1.35		**1.33**	0.02	1.50
33	**48**	P4.1	D31	1.33		1.33		1.33		**1.33**	0.00	0.00
34	**23**	P3.3	D52	1.49	b	1.34		1.30	b	**1.34**	0.10	7.46
35	**37**	P5.5	D31	1.34		1.36		1.33		**1.34**	0.02	1.49
36	**1**	P1	D14.1	1.30	b	1.37		1.35		**1.35**	0.04	2.96
37	**52**	P1	D17.1	1.37		1.35		1.32	b	**1.35**	0.03	2.22
38	**4a**	P9.1	D42	1.35		1.38		1.36		**1.36**	0.02	1.47
39	**24**	P3.5	D52.1	1.30	b	1.36		1.40	b	**1.36**	0.05	3.68
40	**15**	P1	D17.1	1.38		1.46	b	1.27	b	**1.38**	0.10	7.25
41	**12**	P5.1	D31	1.47	b	1.29	b	1.42		**1.42**	0.09	6.34
42	**46**	P5.2	D31	1.42		1.42		1.42		**1.42**	0.00	0.00
43	**29**	P3.3	D31	1.39	ab	1.46	a	1.44	a	**1.44**	0.04	2.78
44	**26**	P3.5	D35	1.47	a	1.70	ab	1.49	a	**1.49**	0.13	8.72
45	**10**	P1	D14.1	1.84	a	2.05	ab	1.51	ab	**1.84 ***	0.27	14.67
46	**19**	P5.5	D31	2.35	a	2.38	a	2.37	a	**2.37 ***	0.02	0.84

Mean	Interlab.std. deviation	
	abs.	rel.%
1.27	**0.04**	**2.73**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **8.7**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **S**
Dimension: **mg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**30**	P3.9	D52.1	0.96	ab	1.00	a	1.05	ab	**1.00 ***	0.05	5.00
2	**36**	P6.2	D52.1	1.30	a	1.31	a	1.34	a	**1.32**	0.02	1.52
3	**28**	P6	D60	1.34		1.34		1.38	b	**1.35**	0.02	1.48
4	**47**	P4.1	D32	1.36		1.35		1.34		**1.35**	0.01	0.74
5	**4**	P9.1	D41	1.39		1.39		1.41		**1.40**	0.01	0.71
6	**7**	P5.5	D31	1.40		1.40		1.39		**1.40**	0.01	0.71
7	**18**	P5.1	D31	1.42		1.37	b	1.40		**1.40**	0.03	2.14
8	**17**	P5.5	D32	1.48	b	1.36	b	1.41		**1.41**	0.06	4.26
9	**19**	P5.5	D31	1.42		1.40		1.42		**1.41**	0.01	0.71
10	**45**	P5.5	D31	1.41		1.41		1.40		**1.41**	0.01	0.71
11	**8**	P3.3	D31	1.47	b	1.42		1.39	b	**1.42**	0.04	2.82
12	**21**	P5.1	D31	1.43		1.41		1.41		**1.42**	0.01	0.70
13	**25**	P1	D14.1	1.44		1.41		1.41		**1.42**	0.02	1.41
14	**51**	P9.1	D42	1.34	b	1.45		1.48	b	**1.45**	0.07	4.83
15	**14**	P4.1	D31	1.41	b	1.47		1.50	b	**1.47**	0.05	3.40
16	**44**	P4.1	D31	1.46		1.47		1.47		**1.47**	0.01	0.68
17	**43**	P4.1	D31	1.50		1.48		1.47		**1.48**	0.02	1.35
18	**48**	P4.1	D31	1.47		1.49		1.49		**1.48**	0.01	0.68
19	**9**	P5.5	D31	1.48		1.50		1.49		**1.49**	0.01	0.67
20	**38**	P4.1	D31	1.49		1.49		1.50		**1.49**	0.01	0.67
21	**11**	P5.1	D31	1.48		1.49		1.54	b	**1.50**	0.03	2.00
22	**50**	P4.1	D31	1.49		1.48		1.52		**1.50**	0.02	1.33
23	**37**	P5.5	D31	1.50		1.50		1.52		**1.51**	0.01	0.66
24	**41**	P4.1	D31	1.56	b	1.49	b	1.53		**1.53**	0.04	2.61
25	**12**	P5.1	D31	1.43	b	1.56		1.55		**1.54**	0.07	4.55
26	**5**	P6.2	D52.1	1.42	b	1.56		1.56		**1.55**	0.08	5.16
27	**6**	P4.2	D31	1.54		1.60	b	1.54		**1.55**	0.03	1.94
28	**1**	P1	D14.1	1.54		1.57		1.58		**1.56**	0.02	1.28
29	**20**	P1	D16.1	1.56		1.55		1.56		**1.56**	0.01	0.64
30	**42**	P4.1	D31	1.56		1.56		1.57		**1.56**	0.01	0.64
31	**16**	P5.5	D31	1.42	b	1.57		1.64	b	**1.57**	0.11	7.01
32	**39**	P5.5	D31	1.57		1.58		1.55		**1.57**	0.02	1.27
33	**3**	P1	D17.1	1.59		1.56		1.58		**1.58**	0.02	1.27
34	**24**	P3.5	D52.1	1.60		1.58		1.52	b	**1.58**	0.04	2.53
35	**2**	P5.3	D31	1.54	b	1.59		1.61		**1.59**	0.04	2.52
36	**44a**	P4.2	D31	1.53	b	1.66	b	1.59		**1.59**	0.07	4.40
37	**29**	P3.3	D31	1.56	b	1.65	b	1.62		**1.62**	0.05	3.09
38	**38a**	P9.1	D42	1.66		1.66		1.67		**1.66**	0.01	0.60
39	**52**	P1	D17.1	1.66		1.66		1.65		**1.66**	0.01	0.60
40	**4a**	P9.1	D42	1.67		1.76	b	1.68		**1.69**	0.05	2.96
41	**26**	P3.5	D35	1.58	b	1.70		1.81	b	**1.70**	0.12	7.06
42	**23**	P3.3	D52	1.75	ab	1.72	a	1.57	ab	**1.72**	0.10	5.81
43	**46**	P5.2	D31	1.79	a	1.77	a	1.76	a	**1.77**	0.02	1.13
44	**4b**	P1	D17.1	1.78	a	1.61	ab	1.87	ab	**1.78**	0.13	7.30
45	**15**	P1	D17.1	1.91	a	1.90	a	1.88	a	**1.90 ***	0.02	1.05
46	**10**	P1	D14.1	2.36	a	2.36	a	2.36	a	**2.36 ***	0.00	0.00

	Mean	Interlab.std. deviation	
		abs.	rel.%
	1.52	**0.04**	**2.27**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.5**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **S**
Dimension: **mg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**5**	P6.2	D52.1	1.36	ab	1.11	a	1.00	ab	**1.11 ***	0.18	16.22
2	**19**	P5.5	D31	1.32	a	1.29	a	1.30	a	**1.30 ***	0.02	1.54
3	**30**	P3.9	D52.1	1.37	ab	1.30	ab	1.34	a	**1.34 ***	0.04	2.99
4	**1**	P1	D14.1	1.39	a	1.42	a	1.43	a	**1.41 ***	0.02	1.42
5	**51**	P9.1	D42	1.59	a	1.61	a	1.58	a	**1.59**	0.02	1.26
6	**28**	P6	D60	1.61		1.62		1.60		**1.61**	0.01	0.62
7	**25**	P1	D14.1	1.65		1.64		1.67		**1.65**	0.02	1.21
8	**36**	P6.2	D52.1	1.66		1.61	b	1.76	b	**1.66**	0.08	4.82
9	**21**	P5.1	D31	1.68	b	1.76	b	1.71		**1.71**	0.04	2.34
10	**45**	P5.5	D31	1.71		1.71		1.71		**1.71**	0.00	0.00
11	**4**	P9.1	D41	1.72		1.73		1.75		**1.73**	0.02	1.16
12	**17**	P5.5	D32	1.83	b	1.73		1.69	b	**1.73**	0.07	4.05
13	**8**	P3.3	D31	1.73		1.72		1.78	b	**1.74**	0.03	1.72
14	**26**	P3.5	D35	1.65	b	1.77		1.77		**1.76**	0.07	3.98
15	**12**	P5.1	D31	1.75		1.79		1.78		**1.77**	0.02	1.13
16	**7**	P5.5	D31	1.77		1.80		1.78		**1.78**	0.02	1.12
17	**9**	P5.5	D31	1.76		1.78		1.82	b	**1.78**	0.03	1.69
18	**38**	P4.1	D31	1.83	b	1.78		1.76		**1.78**	0.04	2.25
19	**18**	P5.1	D31	1.77		1.79		1.80		**1.79**	0.02	1.12
20	**14**	P4.1	D31	1.82		1.78		1.79		**1.80**	0.02	1.11
21	**44**	P4.1	D31	1.83		1.82		1.82		**1.82**	0.01	0.55
22	**47**	P4.1	D32	1.83		1.81		1.81		**1.82**	0.01	0.55
23	**50**	P4.1	D31	1.82		1.81		1.82		**1.82**	0.01	0.55
24	**11**	P5.1	D31	1.82		1.84		1.87		**1.84**	0.03	1.63
25	**43**	P4.1	D31	1.83		1.84		1.84		**1.84**	0.01	0.54
26	**44a**	P4.2	D31	1.90	b	1.85		1.82	b	**1.85**	0.04	2.16
27	**38a**	P9.1	D42	1.86		1.86		1.85		**1.86**	0.01	0.54
28	**20**	P1	D16.1	1.87		1.87		1.86		**1.87**	0.01	0.53
29	**37**	P5.5	D31	1.88		1.86		1.87		**1.87**	0.01	0.53
30	**3**	P1	D17.1	1.87		1.86		1.90		**1.88**	0.02	1.06
31	**4a**	P9.1	D42	1.91		1.90		1.89		**1.90**	0.01	0.53
32	**6**	P4.2	D31	1.90		1.93		1.91		**1.91**	0.02	1.05
33	**41**	P4.1	D31	1.92		1.92		1.89		**1.91**	0.02	1.05
34	**42**	P4.1	D31	1.90		1.90		1.92		**1.91**	0.01	0.52
35	**4b**	P1	D17.1	1.92		1.93		1.92		**1.92**	0.01	0.52
36	**48**	P4.1	D31	1.91		1.94		1.92		**1.92**	0.02	1.04
37	**29**	P3.3	D31	1.95		1.91	b	1.98	b	**1.95**	0.04	2.05
38	**52**	P1	D17.1	1.85	b	1.96		2.00	b	**1.96**	0.08	4.08
39	**15**	P1	D17.1	1.94	b	1.97		2.01	b	**1.97**	0.04	2.03
40	**16**	P5.5	D31	1.97		1.88	b	1.99		**1.97**	0.06	3.05
41	**23**	P3.3	D52	2.09	b	1.87	b	1.98		**1.98**	0.11	5.56
42	**24**	P3.5	D52.1	1.98		1.89	b	2.05	b	**1.98**	0.08	4.04
43	**39**	P5.5	D31	2.02	b	1.96	b	1.99		**1.99**	0.03	1.51
44	**2**	P5.3	D31	1.94	b	2.03		2.04		**2.02**	0.06	2.97
45	**46**	P5.2	D31	2.28	ab	2.21	a	2.20	a	**2.22 ***	0.04	1.80
46	**10**	P1	D14.1	2.83	ab	2.50	ab	2.61	a	**2.61 ***	0.17	6.51

Mean	Interlab.std. deviation	
	abs.	rel.%
1.82	**0.04**	**2.15**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **13.0**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **1.87**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **P**
Dimension: **mg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**19**	P5.5	D31	1.17	ab	1.13	a	1.12	a	**1.14 ***	0.03	2.63
2	**53**	P4.1	D53.1	1.45	ab	1.26	a	1.01	ab	**1.26 ***	0.22	17.46
3	**40**	P5.7	D53.1	1.53	ab	1.48	a	1.43	ab	**1.48 ***	0.05	3.38
4	**51**	P9.1	D42	1.50	ab	1.60	a	1.75	ab	**1.60 ***	0.13	8.13
5	**46**	P5.2	D31	1.78	ab	1.73	a	1.70	a	**1.73**	0.04	2.31
6	**8**	P6.3	D31	1.75		1.76		1.75		**1.75**	0.01	0.57
7	**29**	P3.3	D31	1.75		1.71	b	1.82	b	**1.75**	0.06	3.43
8	**14**	P4.1	D31	1.78		1.74	b	1.80		**1.78**	0.03	1.69
9	**30**	P3.9	D53	1.79		1.80		1.74	b	**1.78**	0.03	1.69
10	**13**	P3.5	D53.1	1.81		1.79		1.83		**1.81**	0.02	1.10
11	**20**	P3.1	D31	1.84		1.83		1.82		**1.83**	0.01	0.55
12	**27**	P6.1	D53.2	1.84		1.84		1.86		**1.85**	0.01	0.54
13	**36**	P3.3	D53.2	1.87		1.84		1.84		**1.85**	0.02	1.08
14	**4**	P9.1	D41	1.84	b	1.88		1.92	b	**1.88**	0.04	2.13
15	**12**	P5.1	D31	1.89		1.88		1.87		**1.88**	0.01	0.53
16	**17**	P5.5	D32	1.83	b	1.89		1.89		**1.88**	0.03	1.60
17	**26**	P3.5	D35	1.89		1.88		1.88		**1.88**	0.01	0.53
18	**7**	P5.5	D31	1.89		1.88		1.94	b	**1.90**	0.03	1.58
19	**15**	P5.1	D53.1	2.02	b	1.86	b	1.91		**1.91**	0.08	4.19
20	**50**	P4.1	D31	1.94		1.90		1.93		**1.92**	0.02	1.04
21	**24**	P6.4	D53.2	1.91		1.94		1.93		**1.93**	0.02	1.04
22	**42**	P4.1	D31	1.93		1.92		1.93		**1.93**	0.01	0.52
23	**41**	P4.1	D31	1.93		1.93		1.95		**1.94**	0.01	0.52
24	**43**	P4.1	D31	1.94		1.95		1.92		**1.94**	0.02	1.03
25	**28**	P3.31	D53.3	1.95		1.95		1.95		**1.95**	0.00	0.00
26	**25**	P5.1	D31	1.96		1.94		1.98		**1.96**	0.02	1.02
27	**35**	P3.7	D53	1.96		1.96		1.96		**1.96**	0.00	0.00
28	**3**	P3.10	D31	2.08	b	1.93	b	1.97		**1.97**	0.08	4.06
29	**6**	P4.2	D31	1.97		1.95		1.99		**1.97**	0.02	1.02
30	**11**	P5.1	D31	2.01	b	1.95		1.97		**1.97**	0.03	1.52
31	**5**	P6.2	D53.1	1.90	b	1.99		1.99		**1.98**	0.05	2.53
32	**44**	P4.1	D31	1.99		2.02		2.00		**2.00**	0.02	1.00
33	**44a**	P4.2	D31	2.00		2.02		1.97		**2.00**	0.03	1.50
34	**16**	P5.5	D31	2.30	b	2.00		2.00		**2.01**	0.17	8.46
35	**38a**	P9.1	D42	2.02		2.04		2.01		**2.02**	0.02	0.99
36	**45**	P5.5	D31	2.04		2.03		2.01		**2.03**	0.02	0.99
37	**2**	P5.3	D31	2.02		2.08	b	2.04		**2.04**	0.03	1.47
38	**49**	P4.1	D31	2.08	b	2.00	b	2.04		**2.04**	0.04	1.96
39	**38**	P4.1	D31	2.03		2.10	b	2.04		**2.05**	0.04	1.95
40	**47**	P4.1	D32	2.06		2.06		2.01	b	**2.05**	0.03	1.46
41	**52**	P4.1	D31	2.09	b	1.95	b	2.05		**2.05**	0.07	3.41
42	**1**	P3.21	D53.1	2.03	b	2.14	b	2.07		**2.07**	0.06	2.90
43	**39**	P5.5	D31	2.07		2.09		2.07		**2.08**	0.01	0.48
44	**37**	P2.4	D53.2	2.08		2.09		2.09		**2.09**	0.01	0.48
45	**9**	P5.5	D31	2.09		2.11		2.09		**2.10**	0.01	0.48
46	**18**	P3.31	D53.3	2.10		2.07		2.13		**2.10**	0.03	1.43
47	**21**	P5.1	D31	2.08	b	2.12		2.14		**2.12**	0.03	1.42
48	**48**	P4.1	D31	2.22	a	2.17	a	2.20	a	**2.20**	0.03	1.36
49	**4a**	P9.1	D42	2.25	a	2.21	a	2.22	a	**2.23**	0.02	0.90
										Mean	Interlab.std. deviation	
											abs.	rel.%
										1.95	**0.04**	**2.08**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **8.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **P**
Dimension: **mg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
44	**1**	P3.21	D53.1	2.45	b	2.38		2.34	b	**2.38**	0.06	2.52
30	**2**	P5.3	D31	2.17	b	2.28	b	2.22		**2.22**	0.06	2.70
19	**3**	P3.10	D31	2.10	b	2.14		2.16		**2.14**	0.03	1.40
21	**4**	P9.1	D41	2.14		2.16		2.20	b	**2.16**	0.03	1.39
4	**5**	P6.2	D53.1	1.62	ab	1.71	a	1.83	ab	**1.71 ***	0.11	6.43
27	**6**	P4.2	D31	2.20		2.15	b	2.26	b	**2.20**	0.06	2.73
28	**7**	P5.5	D31	2.20		2.21		2.19		**2.20**	0.01	0.45
8	**8**	P6.3	D31	1.97		1.96		1.97		**1.97**	0.01	0.51
39	**9**	P5.5	D31	2.32		2.31		2.29		**2.31**	0.02	0.87
32	**11**	P5.1	D31	2.25		2.19	b	2.24		**2.23**	0.03	1.35
20	**12**	P5.1	D31	2.15		2.07	b	2.20	b	**2.15**	0.07	3.26
11	**13**	P3.5	D53.1	2.09		2.07		2.08		**2.08**	0.01	0.48
16	**14**	P4.1	D31	2.12		2.08	b	2.15		**2.12**	0.04	1.89
40	**15**	P5.1	D53.1	2.31		2.31		2.32		**2.31**	0.01	0.43
46	**16**	P5.5	D31	2.40		2.20	b	2.50	b	**2.40**	0.15	6.25
14	**17**	P5.5	D32	2.12		2.12		2.07	b	**2.11**	0.03	1.42
47	**18**	P3.31	D53.3	2.43		2.49	b	2.35	b	**2.43**	0.07	2.88
2	**19**	P5.5	D31	1.58	a	1.54	a	1.54	a	**1.55 ***	0.02	1.29
15	**20**	P3.1	D31	2.08		2.11		2.15	b	**2.11**	0.04	1.90
38	**21**	P5.1	D31	2.26	b	2.31		2.31		**2.30**	0.03	1.30
49	**23**	P3.3	D31	2.46	a	2.47	a	2.42	a	**2.45**	0.03	1.22
23	**24**	P6.4	D53.2	2.16		2.19		2.20		**2.18**	0.02	0.92
13	**25**	P5.1	D31	2.09		2.10		2.10		**2.10**	0.01	0.48
45	**26**	P3.5	D35	2.30	b	2.39		2.44	b	**2.39**	0.07	2.93
10	**27**	P6.1	D53.2	2.07		2.07		2.01	b	**2.06**	0.03	1.46
33	**28**	P3.31	D53.3	2.22		2.22		2.25		**2.23**	0.02	0.90
17	**29**	P3.3	D31	2.09	b	2.16		2.13		**2.13**	0.04	1.88
5	**30**	P3.9	D53	1.88	a	1.80	ab	1.85	a	**1.85 ***	0.04	2.16
9	**35**	P3.7	D53	1.96	b	2.00		2.09	b	**2.00**	0.07	3.50
12	**36**	P3.3	D53.2	2.06		2.08		2.20	b	**2.08**	0.08	3.85
48	**37**	P2.4	D53.2	2.45		2.43		2.42		**2.43**	0.02	0.82
25	**38**	P4.1	D31	2.19		2.15	b	2.21		**2.19**	0.03	1.37
26	**39**	P5.5	D31	2.17		2.20		2.19		**2.19**	0.02	0.91
3	**40**	P5.7	D53.1	1.63	ab	1.52	ab	1.59	a	**1.59 ***	0.06	3.77
22	**41**	P4.1	D31	2.18		2.17		2.17		**2.17**	0.01	0.46
24	**42**	P4.1	D31	2.17		2.19		2.17		**2.18**	0.01	0.46
29	**43**	P4.1	D31	2.20		2.19		2.20		**2.20**	0.01	0.45
37	**44**	P4.1	D31	2.29		2.26		2.26		**2.27**	0.02	0.88
42	**45**	P5.5	D31	2.32		2.34		2.33		**2.33**	0.01	0.43
7	**46**	P5.2	D31	1.90	a	1.87	a	1.82	ab	**1.87**	0.04	2.14
31	**47**	P4.1	D32	2.22		2.23		2.21		**2.22**	0.01	0.45
35	**49**	P4.1	D31	2.23		2.26		2.24		**2.24**	0.02	0.89
18	**50**	P4.1	D31	2.15		2.11		2.14		**2.13**	0.02	0.94
6	**51**	P9.1	D42	1.79	ab	1.86	a	1.89	a	**1.86**	0.05	2.69
36	**52**	P4.1	D31	2.24		2.17	b	2.29	b	**2.24**	0.06	2.68
1	**53**	P4.1	D53.1	1.40	a	1.40	a	1.45	ab	**1.41 ***	0.03	2.13
34	**38a**	P9.1	D42	2.23		2.23		2.22		**2.23**	0.01	0.45
43	**44a**	P4.2	D31	2.28	b	2.37		2.36		**2.35**	0.05	2.13
41	**4a**	P9.1	D42	2.36	b	2.30		2.31		**2.32**	0.03	1.29
										Mean	Interlab.std. deviation	
											abs.	rel.%
										2.19	**0.04**	**1.76**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **10.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **P**
Dimension: **mg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**30**	P3.9	D53	1.09	ab	1.01	ab	1.04	a	**1.04 ***	0.04	3.85
2	**46**	P5.2	D31	1.10	a	1.06	a	1.08	a	**1.08 ***	0.02	1.85
3	**8**	P6.3	D31	1.16	a	1.15	a	1.12	a	**1.14**	0.02	1.75
4	**53**	P4.1	D53.1	1.16		1.17		1.10	b	**1.15**	0.04	3.48
5	**13**	P3.5	D53.1	1.16		1.17		1.16		**1.16**	0.01	0.86
6	**40**	P5.7	D53.1	1.16		1.21	b	1.12	b	**1.16**	0.05	4.31
7	**51**	P9.1	D42	1.13	b	1.20		1.24	b	**1.20**	0.06	5.00
8	**14**	P4.1	D31	1.21		1.17	b	1.23		**1.21**	0.03	2.48
9	**27**	P6.1	D53.2	1.25		1.21		1.22		**1.23**	0.02	1.63
10	**17**	P5.5	D32	1.24		1.24		1.24		**1.24**	0.00	0.00
11	**29**	P3.3	D31	1.24		1.21		1.26		**1.24**	0.03	2.42
12	**3**	P3.10	D31	1.23		1.24		1.27		**1.25**	0.02	1.60
13	**12**	P5.1	D31	1.21	b	1.26		1.31	b	**1.26**	0.05	3.97
14	**15**	P5.1	D53.1	1.30	b	1.26		1.24		**1.26**	0.03	2.38
15	**35**	P3.7	D53	1.22	b	1.26		1.36	b	**1.26**	0.07	5.56
16	**43**	P4.1	D31	1.27		1.25		1.25		**1.26**	0.01	0.79
17	**6**	P4.2	D31	1.26		1.31	b	1.25		**1.27**	0.03	2.36
18	**25**	P5.1	D31	1.27		1.29		1.26		**1.27**	0.02	1.57
19	**7**	P5.5	D31	1.29		1.28		1.26		**1.28**	0.02	1.56
20	**42**	P4.1	D31	1.28		1.28		1.28		**1.28**	0.00	0.00
21	**50**	P4.1	D31	1.28		1.27		1.29		**1.28**	0.01	0.78
22	**4**	P9.1	D41	1.28		1.30		1.30		**1.29**	0.01	0.78
23	**11**	P5.1	D31	1.32		1.28		1.30		**1.30**	0.02	1.54
24	**36**	P3.3	D53.2	1.34	b	1.30		1.23	b	**1.30**	0.06	4.62
25	**41**	P4.1	D31	1.33	b	1.28		1.29		**1.30**	0.03	2.31
26	**49**	P4.1	D31	1.29		1.32		1.30		**1.30**	0.02	1.54
27	**20**	P3.1	D31	1.34		1.30		1.31		**1.32**	0.02	1.52
28	**23**	P3.3	D31	1.32		1.30		1.34		**1.32**	0.02	1.52
29	**28**	P3.31	D53.3	1.33		1.34		1.30		**1.32**	0.02	1.52
30	**39**	P5.5	D31	1.32		1.32		1.31		**1.32**	0.01	0.76
31	**44**	P4.1	D31	1.32		1.32		1.31		**1.32**	0.01	0.76
32	**24**	P6.4	D53.2	1.35		1.33		1.31		**1.33**	0.02	1.50
33	**45**	P5.5	D31	1.35		1.35		1.32		**1.34**	0.02	1.49
34	**47**	P4.1	D32	1.34		1.34		1.34		**1.34**	0.00	0.00
35	**52**	P4.1	D31	1.35		1.33		1.36		**1.35**	0.02	1.48
36	**38**	P4.1	D31	1.34		1.37		1.37		**1.36**	0.02	1.47
37	**44a**	P4.2	D31	1.33	b	1.42	b	1.36		**1.36**	0.05	3.68
38	**9**	P5.5	D31	1.39		1.39		1.41		**1.40**	0.01	0.71
39	**16**	P5.5	D31	1.50	b	1.30	b	1.40		**1.40**	0.10	7.14
40	**2**	P5.3	D31	1.36	b	1.44		1.42		**1.42**	0.04	2.82
41	**1**	P3.21	D53.1	1.40		1.44		1.44		**1.43**	0.02	1.40
42	**18**	P3.31	D53.3	1.42		1.49	b	1.42		**1.43**	0.04	2.80
43	**21**	P5.1	D31	1.39	b	1.43		1.46	b	**1.43**	0.04	2.80
44	**48**	P4.1	D31	1.43		1.41		1.45		**1.43**	0.02	1.40
45	**26**	P3.5	D35	1.35	b	1.45		1.49	b	**1.45**	0.07	4.83
46	**37**	P2.4	D53.2	1.47		1.48		1.48		**1.48**	0.01	0.68
47	**38a**	P9.1	D42	1.47		1.48		1.48		**1.48**	0.01	0.68
48	**5**	P6.2	D53.1	1.50	a	1.40	ab	1.52	a	**1.50**	0.06	4.00
49	**10**	P6.5	D53.2	1.68	ab	1.58	a	1.49	ab	**1.58 ***	0.10	6.33
										Mean	Interlab.std. deviation	
											abs.	rel.%
										1.32	**0.03**	**2.25**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/-** **15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **P**
Dimension: **mg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
40	**1**	P3.21	D53.1	1.39	b	1.28		1.28		**1.29**		0.06	4.65
44	**2**	P5.3	D31	1.29	b	1.35	b	1.32		**1.32**		0.03	2.27
11	**3**	P3.10	D31	1.12		1.14		1.16		**1.14**		0.02	1.75
17	**4**	P9.1	D41	1.17		1.17		1.17		**1.17**		0.00	0.00
49	**5**	P6.2	D53.1	1.49	a	1.15	ab	1.52	ab	**1.49**	*	0.21	14.09
18	**6**	P4.2	D31	1.17		1.17		1.16		**1.17**		0.01	0.85
26	**7**	P5.5	D31	1.22		1.23		1.21		**1.22**		0.01	0.82
3	**8**	P6.3	D31	1.06	a	1.06	a	1.05	a	**1.06**		0.01	0.94
34	**9**	P5.5	D31	1.26		1.24		1.25		**1.25**		0.01	0.80
22	**11**	P5.1	D31	1.22		1.18		1.20		**1.20**		0.02	1.67
5	**12**	P5.1	D31	1.08		1.09		1.08		**1.08**		0.01	0.93
38	**13**	P3.5	D53.1	1.29		1.29		1.25	b	**1.28**		0.02	1.56
12	**14**	P4.1	D31	1.17		1.14		1.15		**1.15**		0.02	1.74
31	**15**	P5.1	D53.1	1.26		1.23		1.22		**1.24**		0.02	1.61
41	**16**	P5.5	D31	1.30		1.20	b	1.30		**1.29**		0.06	4.65
13	**17**	P5.5	D32	1.15		1.10	b	1.17		**1.15**		0.04	3.48
45	**18**	P3.31	D53.3	1.29	b	1.37		1.35		**1.35**		0.04	2.96
10	**20**	P3.1	D31	1.15		1.13		1.08	b	**1.13**		0.04	3.54
32	**21**	P5.1	D31	1.22		1.24		1.28	b	**1.24**		0.03	2.42
35	**23**	P3.3	D31	1.26		1.20	b	1.35	b	**1.26**		0.08	6.35
19	**24**	P6.4	D53.2	1.19		1.20		1.15	b	**1.18**		0.03	2.54
8	**25**	P5.1	D31	1.10		1.09		1.11		**1.10**		0.01	0.91
14	**26**	P3.5	D35	1.11	b	1.15		1.17		**1.15**		0.03	2.61
15	**27**	P6.1	D53.2	1.13	b	1.17		1.17		**1.16**		0.02	1.72
27	**28**	P3.31	D53.3	1.23		1.21		1.23		**1.22**		0.01	0.82
9	**29**	P3.3	D31	1.07	b	1.10		1.13	b	**1.10**		0.03	2.73
4	**30**	P3.9	D53	1.09		1.07		1.02	b	**1.07**		0.04	3.74
42	**35**	P3.7	D53	1.22	b	1.29		1.31		**1.29**		0.05	3.88
46	**36**	P3.3	D53.2	1.36		1.29	b	1.36		**1.35**		0.04	2.96
48	**37**	P2.4	D53.2	1.41	a	1.39	a	1.39	a	**1.40**	*	0.01	0.71
16	**38**	P4.1	D31	1.18		1.15		1.15		**1.16**		0.02	1.72
25	**39**	P5.5	D31	1.22		1.22		1.20		**1.21**		0.01	0.83
7	**40**	P5.7	D53.1	1.11		1.08		1.09		**1.09**		0.02	1.83
28	**41**	P4.1	D31	1.23		1.23		1.21		**1.22**		0.01	0.82
20	**42**	P4.1	D31	1.18		1.18		1.17		**1.18**		0.01	0.85
23	**43**	P4.1	D31	1.20		1.20		1.21		**1.20**		0.01	0.83
29	**44**	P4.1	D31	1.22		1.23		1.21		**1.22**		0.01	0.82
43	**45**	P5.5	D31	1.30		1.30		1.31		**1.30**		0.01	0.77
6	**46**	P5.2	D31	1.08		1.10		1.06		**1.08**		0.02	1.85
39	**47**	P4.1	D32	1.28		1.28		1.28		**1.28**		0.00	0.00
47	**48**	P4.1	D31	1.36	a	1.40	ab	1.36	a	**1.37**		0.02	1.46
30	**49**	P4.1	D31	1.20		1.25	b	1.22		**1.22**		0.03	2.46
21	**50**	P4.1	D31	1.18		1.17		1.18		**1.18**		0.01	0.85
1	**51**	P9.1	D42	1.03	a	1.05	a	1.03	a	**1.04**		0.01	0.96
33	**52**	P4.1	D31	1.26		1.22		1.25		**1.24**		0.02	1.61
2	**53**	P4.1	D53.1	1.03	a	1.05	a	1.06	a	**1.05**		0.02	1.90
36	**38a**	P9.1	D42	1.26		1.26		1.26		**1.26**		0.00	0.00
24	**44a**	P4.2	D31	1.24	b	1.20		1.18		**1.20**		0.03	2.50
37	**4a**	P9.1	D42	1.29		1.28		1.26		**1.28**		0.02	1.56
										Mean		Interlab.std. deviation	
												abs.	rel.%
										1.21		**0.03**	**2.11**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/-** **15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **4.1**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **1.16**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Ca**
Dimension: **mg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
3	**1**	P3.21	D21.1	3.43	a	3.59	ab	3.35	ab	**3.43**	*	0.12	3.50
32	**2**	P5.3	D31	4.17		4.30	b	4.21		**4.21**		0.07	1.66
27	**3**	P3.10	D31	4.19		4.17		3.95	b	**4.16**		0.13	3.13
44	**4**	P9.1	D41	4.25	b	4.39		4.40		**4.37**		0.08	1.83
4	**5**	P3.3	D21.1	3.50	a	3.55	a	3.55	a	**3.53**		0.03	0.85
13	**6**	P4.2	D31	3.95		3.89	b	4.00		**3.95**		0.06	1.52
7	**7**	P5.5	D31	3.67		3.65		3.72		**3.68**		0.04	1.09
11	**8**	P6.3	D31	3.92		3.89		3.86		**3.89**		0.03	0.77
37	**9**	P5.5	D31	4.25		4.24		4.27		**4.25**		0.02	0.47
39	**11**	P5.1	D31	4.31		4.23		4.26		**4.27**		0.04	0.94
19	**12**	P5.1	D31	4.02		3.95	b	4.10	b	**4.02**		0.08	1.99
47	**14**	P4.1	D31	4.57	a	4.54	a	4.61	a	**4.57**		0.04	0.88
38	**15**	P5.1	D21.1	4.28		4.23		4.25		**4.25**		0.03	0.71
42	**16**	P5.5	D31	4.40	b	4.10	b	4.30		**4.30**		0.15	3.49
16	**17**	P5.5	D31	4.02		4.00		3.98		**4.00**		0.02	0.50
24	**18**	P3.31	D31	4.09		4.17		4.10		**4.12**		0.04	0.97
49	**19**	P5.5	D21.1	4.62	a	4.60	a	4.62	a	**4.61**		0.01	0.22
9	**20**	P3.1	D31	3.79		3.95	b	3.68	b	**3.79**		0.14	3.69
40	**21**	P5.1	D31	4.22		4.31		4.27		**4.27**		0.05	1.17
30	**23**	P3.3	D31	4.19		4.27	b	4.16		**4.20**		0.06	1.43
31	**24**	P5.1	D21.1	4.20		4.03	b	4.25		**4.20**		0.12	2.86
43	**25**	P5.1	D31	4.29		4.34		4.33		**4.32**		0.03	0.69
33	**26**	P3.5	D31	4.22		4.42	b	4.22		**4.24**		0.12	2.83
6	**27**	P6.1	D21.1	3.26	ab	3.67	a	3.62	a	**3.62**		0.22	6.08
34	**28**	P3.31	D21.1	4.24		4.26		4.21		**4.24**		0.03	0.71
35	**29**	P3.3	D31	4.28		4.21		4.24		**4.24**		0.04	0.94
1	**30**	P3.21	D21.2	2.85	ab	2.91	a	3.03	ab	**2.91**	*	0.09	3.09
14	**36**	P3.3	D21.1	3.92		3.98		3.99		**3.96**		0.04	1.01
8	**37**	P2.4	D28	3.78		3.70	b	3.83		**3.78**		0.07	1.85
36	**38**	P4.1	D31	4.20		4.29		4.24		**4.24**		0.05	1.18
46	**39**	P5.5	D31	4.55		4.51		4.55		**4.54**		0.02	0.44
20	**40**	P5.7	D31	4.09	b	3.98		4.03		**4.03**		0.06	1.49
12	**41**	P4.1	D31	3.92		3.93		3.92		**3.92**		0.01	0.26
22	**42**	P4.1	D31	4.05		4.08		4.11		**4.08**		0.03	0.74
25	**43**	P4.1	D31	4.15		4.14		4.14		**4.14**		0.01	0.24
15	**44**	P4.1	D31	3.98		3.98		3.95		**3.97**		0.02	0.50
17	**45**	P5.5	D31	4.01		4.01		3.98		**4.00**		0.02	0.50
2	**46**	P5.2	D31	3.37	ab	3.16	ab	3.25	a	**3.25**	*	0.11	3.38
26	**47**	P4.1	D32	4.15		4.15		4.14		**4.15**		0.01	0.24
41	**48**	P4.1	D31	4.27		4.27		4.28		**4.27**		0.01	0.23
29	**49**	P4.1	D31	4.23		4.15		4.19		**4.19**		0.04	0.95
28	**50**	P4.1	D31	4.17		4.16		4.18		**4.17**		0.01	0.24
10	**51**	P9.1	D42	3.75	b	3.91		3.86		**3.86**		0.08	2.07
21	**52**	P4.1	D31	4.08		4.00	b	4.11		**4.07**		0.06	1.47
18	**53**	P4.1	D21.2	4.00		4.12	b	3.96		**4.00**		0.08	2.00
45	**38a**	P9.1	D42	4.52		4.50		4.49		**4.50**		0.02	0.44
23	**44a**	P4.2	D31	4.07		4.12		4.04		**4.08**		0.04	0.98
48	**4a**	P9.1	D42	4.59	a	4.62	a	4.48	ab	**4.58**		0.07	1.53
5	**4b**	P5.1	D31	3.62	a	3.44	ab	3.94	ab	**3.62**		0.25	6.91
										Mean		Interlab.std. deviation	
												abs.	rel.%
										4.11		**0.06**	**1.56**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Ca**
Dimension: **mg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
2	**1**	P3.21	D21.1	10.02	a	10.02	a	9.94	a	**9.99**		0.05	0.50
47	**2**	P5.3	D31	11.91	b	12.36	b	12.18		**12.18**		0.23	1.89
31	**3**	P3.10	D31	11.30	b	11.60		11.50		**11.49**		0.15	1.31
46	**4**	P9.1	D41	11.83	b	12.23		12.17		**12.14**		0.22	1.81
28	**5**	P3.3	D21.1	11.65	b	11.45		11.25	b	**11.45**		0.20	1.75
16	**6**	P4.2	D31	11.00		10.90		11.20	b	**11.01**		0.15	1.36
6	**7**	P5.5	D31	10.20	a	10.30	a	10.30	a	**10.27**		0.06	0.58
11	**8**	P6.3	D31	10.80		10.70		10.80		**10.77**		0.06	0.56
9	**9**	P5.5	D31	10.48		10.67		10.64		**10.60**		0.10	0.94
41	**11**	P5.1	D31	11.93		11.71		11.82		**11.82**		0.11	0.93
21	**12**	P5.1	D31	11.18		11.17		11.45	b	**11.23**		0.16	1.42
24	**14**	P4.1	D31	11.26		11.23		11.39		**11.29**		0.09	0.80
39	**15**	P5.1	D21.1	11.77		11.80		11.71		**11.76**		0.05	0.43
35	**16**	P5.5	D31	11.70		11.60		13.60	b	**11.71**		1.13	9.65
19	**17**	P5.5	D31	11.28		11.00	b	11.18		**11.17**		0.14	1.25
29	**18**	P3.31	D31	11.43		11.38		11.92	b	**11.46**		0.30	2.62
14	**19**	P5.5	D21.1	10.85		10.90		10.86		**10.87**		0.03	0.28
30	**20**	P3.1	D31	11.33		11.51		11.52		**11.46**		0.11	0.96
25	**21**	P5.1	D31	11.28		11.26		11.35		**11.30**		0.05	0.44
33	**23**	P3.3	D31	11.60		11.80	b	11.50		**11.61**		0.15	1.29
49	**24**	P5.1	D21.1	12.51	a	12.65	a	12.82	ab	**12.65**		0.16	1.26
12	**25**	P5.1	D31	10.80		10.85		10.74		**10.80**		0.06	0.56
40	**26**	P3.5	D31	11.38	b	11.79		12.28	b	**11.79**		0.45	3.82
3	**27**	P6.1	D21.1	11.08	ab	10.12	a	9.91	ab	**10.12**		0.62	6.13
32	**28**	P3.31	D21.1	11.54		11.49		11.52		**11.52**		0.03	0.26
42	**29**	P3.3	D31	11.87		11.88		11.76		**11.84**		0.07	0.59
1	**30**	P3.21	D21.2	9.52	a	9.57	a	9.60	a	**9.56**	*	0.04	0.42
7	**36**	P3.3	D21.1	10.23	b	10.80	b	10.51		**10.51**		0.29	2.76
8	**37**	P2.4	D28	10.61		10.48		10.53		**10.54**		0.07	0.66
20	**38**	P4.1	D31	11.20		11.00	b	11.30		**11.19**		0.15	1.34
38	**39**	P5.5	D31	11.66		11.78		11.77		**11.74**		0.07	0.60
13	**40**	P5.7	D31	10.70		10.90		10.80		**10.80**		0.10	0.93
17	**41**	P4.1	D31	11.15		11.07		11.00		**11.07**		0.08	0.72
34	**42**	P4.1	D31	11.68		11.69		11.57		**11.65**		0.07	0.60
36	**43**	P4.1	D31	11.71		11.55	b	11.88	b	**11.71**		0.17	1.45
27	**44**	P4.1	D31	11.46		11.36		11.41		**11.41**		0.05	0.44
18	**45**	P5.5	D31	11.16		11.16		11.08		**11.13**		0.05	0.45
4	**46**	P5.2	D31	10.15	a	10.20	a	9.85	ab	**10.12**		0.19	1.88
37	**47**	P4.1	D32	11.67		11.69		11.76		**11.71**		0.05	0.43
44	**48**	P4.1	D31	11.85		11.78		11.90		**11.84**		0.06	0.51
23	**49**	P4.1	D31	11.27		11.25		11.26		**11.26**		0.01	0.09
26	**50**	P4.1	D31	11.46		11.15	b	11.41		**11.38**		0.17	1.49
5	**51**	P9.1	D42	10.15	a	9.63	ab	10.24	a	**10.14**		0.33	3.25
22	**52**	P4.1	D31	11.45	b	10.96	b	11.23		**11.23**		0.25	2.23
15	**53**	P4.1	D21.2	11.02		10.94		10.87		**10.94**		0.08	0.73
48	**38a**	P9.1	D42	12.30		12.30		12.30		**12.30**		0.00	0.00
43	**44a**	P4.2	D31	11.61	b	11.97		11.84		**11.84**		0.18	1.52
45	**4a**	P9.1	D42	11.93		11.95		11.85		**11.91**		0.05	0.42
10	**4b**	P5.1	D31	10.26	b	10.76		11.06	b	**10.76**		0.40	3.72
										Mean		Interlab.std. deviation	
												abs.	rel.%
										11.32		**0.16**	**1.43**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **2.0**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Ca**
Dimension: **mg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications			**Lab.mean**	Lab.standard deviation	
								abs.	rel.%
1	**1**	P3.21	D21.1	2.88 ab	2.59 ab	2.67 a	**2.67 ***	0.15	5.62
25	**2**	P5.3	D31	3.22 b	3.39 b	3.31	**3.31**	0.09	2.72
18	**3**	P3.10	D31	3.15	3.31 b	3.20	**3.20**	0.08	2.50
39	**4**	P9.1	D41	3.34 b	3.45	3.43	**3.42**	0.06	1.75
2	**5**	P3.3	D21.1	2.64 ab	2.72 a	2.74 a	**2.71 ***	0.05	1.85
8	**6**	P4.2	D31	3.05	3.09	3.01	**3.05**	0.04	1.31
7	**7**	P5.5	D31	3.01	3.01	2.94	**2.99**	0.04	1.34
10	**8**	P6.3	D31	3.12	3.14	3.06	**3.11**	0.04	1.29
32	**9**	P5.5	D31	3.38	3.36	3.36	**3.37**	0.01	0.30
30	**11**	P5.1	D31	3.39	3.33	3.36	**3.36**	0.03	0.89
17	**12**	P5.1	D31	3.11 b	3.18	3.25 b	**3.18**	0.07	2.20
48	**14**	P4.1	D31	3.79 ab	3.65 ab	3.71 a	**3.71**	0.07	1.89
45	**15**	P5.1	D21.1	3.54	3.49	3.50	**3.51**	0.03	0.85
47	**16**	P5.5	D31	3.40 ab	3.70 a	3.80 ab	**3.70**	0.21	5.68
15	**17**	P5.5	D31	3.22	3.13	3.17	**3.17**	0.05	1.58
35	**18**	P3.31	D31	3.41	3.37	3.40	**3.39**	0.02	0.59
49	**19**	P5.5	D21.1	3.86 a	3.83 a	3.82 a	**3.84 ***	0.02	0.52
9	**20**	P3.1	D31	3.01	3.15 b	3.04	**3.05**	0.07	2.30
36	**21**	P5.1	D31	3.43	3.27 b	3.40	**3.39**	0.09	2.65
26	**23**	P3.3	D31	3.30	3.34	3.32	**3.32**	0.02	0.60
41	**24**	P5.1	D21.1	3.43	3.30 b	3.52 b	**3.43**	0.11	3.21
43	**25**	P5.1	D31	3.47	3.49	3.44	**3.47**	0.03	0.86
40	**26**	P3.5	D31	3.42	3.53 b	3.27 b	**3.42**	0.13	3.80
3	**27**	P6.1	D21.1	2.81 a	2.65 ab	2.76 a	**2.76 ***	0.08	2.90
34	**28**	P3.31	D21.1	3.42	3.37	3.35	**3.38**	0.04	1.18
38	**29**	P3.3	D31	3.37	3.44	3.39	**3.40**	0.04	1.18
5	**30**	P3.21	D21.2	2.81 a	2.73 ab	2.81 a	**2.79 ***	0.05	1.79
37	**36**	P3.3	D21.1	3.39	3.48 b	3.28 b	**3.39**	0.10	2.95
11	**37**	P2.4	D28	3.14	3.10	3.16	**3.13**	0.03	0.96
27	**38**	P4.1	D31	3.36	3.21 b	3.32	**3.32**	0.08	2.41
44	**39**	P5.5	D31	3.50	3.46	3.49	**3.48**	0.02	0.57
14	**40**	P5.7	D31	3.13	3.24 b	3.15	**3.16**	0.06	1.90
12	**41**	P4.1	D31	3.17	3.10	3.11	**3.13**	0.04	1.28
24	**42**	P4.1	D31	3.27	3.28	3.28	**3.28**	0.01	0.30
22	**43**	P4.1	D31	3.26	3.26	3.26	**3.26**	0.00	0.00
21	**44**	P4.1	D31	3.22	3.23	3.25	**3.23**	0.02	0.62
20	**45**	P5.5	D31	3.21	3.22	3.24	**3.22**	0.02	0.62
4	**46**	P5.2	D31	2.73 a	2.76 a	2.78 a	**2.76 ***	0.03	1.09
29	**47**	P4.1	D32	3.35	3.34	3.31	**3.33**	0.02	0.60
33	**48**	P4.1	D31	3.39	3.39	3.31 b	**3.37**	0.05	1.48
23	**49**	P4.1	D31	3.21	3.31	3.26	**3.26**	0.05	1.53
28	**50**	P4.1	D31	3.29	3.30	3.36	**3.32**	0.04	1.20
19	**51**	P9.1	D42	3.18	3.20	3.28 b	**3.21**	0.05	1.56
13	**52**	P4.1	D31	3.17	3.12	3.13	**3.14**	0.03	0.96
16	**53**	P4.1	D21.2	3.21	3.14	3.16	**3.17**	0.04	1.26
42	**38a**	P9.1	D42	3.48	3.47	3.43	**3.46**	0.03	0.87
31	**44a**	P4.2	D31	3.31	3.46 b	3.36	**3.36**	0.08	2.38
46	**4a**	P9.1	D42	3.55	3.54	3.54	**3.54**	0.01	0.28
6	**4b**	P5.1	D31	2.83 a	2.82 a	2.80 a	**2.82**	0.02	0.71
							Mean	Interlab.std. deviation	
								abs.	rel.%
							3.28	**0.05**	**1.61**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **12.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Ca**
Dimension: **mg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
2	**1**	P3.21	D21.1	6.12	ab	5.93	a	5.93	a	**5.95**	*	0.11	1.85
45	**2**	P5.3	D31	7.15	b	7.53		7.58		**7.53**		0.24	3.19
25	**3**	P3.10	D31	7.14		6.96	b	7.51	b	**7.14**		0.28	3.92
18	**4**	P9.1	D41	6.97		6.92		7.00		**6.96**		0.04	0.57
31	**5**	P3.3	D21.1	7.45	b	7.25		7.20		**7.25**		0.13	1.79
11	**6**	P4.2	D31	6.69		6.70		6.70		**6.70**		0.01	0.15
10	**7**	P5.5	D31	6.63		6.79	b	6.68		**6.68**		0.08	1.20
16	**8**	P6.3	D31	6.79		6.77		6.85		**6.80**		0.04	0.59
20	**9**	P5.5	D31	7.03		7.09		7.01		**7.04**		0.04	0.57
37	**11**	P5.1	D31	7.44		7.31		7.34		**7.35**		0.07	0.95
17	**12**	P5.1	D31	6.67	b	7.05	b	6.94		**6.94**		0.20	2.88
49	**14**	P4.1	D31	7.76	a	7.77	a	7.78	a	**7.77**		0.01	0.13
34	**15**	P5.1	D21.1	7.28		7.26		7.33		**7.29**		0.04	0.55
41	**16**	P5.5	D31	7.20	b	7.40		8.00	b	**7.40**		0.42	5.68
24	**17**	P5.5	D31	7.14		7.01		7.10		**7.10**		0.07	0.99
29	**18**	P3.31	D31	7.12		7.21		7.30		**7.21**		0.09	1.25
7	**20**	P3.1	D31	6.60		6.43	b	6.80	b	**6.60**		0.19	2.88
33	**21**	P5.1	D31	7.41	b	7.14	b	7.26		**7.26**		0.14	1.93
38	**23**	P3.3	D31	7.28		7.35		7.43		**7.35**		0.08	1.09
27	**24**	P5.1	D21.1	7.35	b	7.20		7.04	b	**7.20**		0.16	2.22
13	**25**	P5.1	D31	6.77		6.80		6.76		**6.78**		0.02	0.29
48	**26**	P3.5	D31	7.46	b	7.63		7.89	b	**7.63**		0.22	2.88
5	**27**	P6.1	D21.1	6.98	b	6.56		6.45	b	**6.56**		0.28	4.27
42	**28**	P3.31	D21.1	7.43		7.34		7.46		**7.42**		0.06	0.81
40	**29**	P3.3	D31	7.31		7.38		7.41		**7.37**		0.05	0.68
4	**30**	P3.21	D21.2	6.21	a	6.24	a	5.96	ab	**6.20**		0.15	2.42
1	**35**	P3.5	D21.1	4.36	ab	5.25	ab	4.88	a	**4.88**	*	0.45	9.22
9	**36**	P3.3	D21.1	6.56		6.73		6.65		**6.65**		0.09	1.35
12	**37**	P2.4	D28	6.70		6.78		6.73		**6.74**		0.04	0.59
19	**38**	P4.1	D31	6.97		6.75	b	6.99		**6.96**		0.13	1.87
47	**39**	P5.5	D31	7.63		7.65		7.46	b	**7.62**		0.10	1.31
14	**40**	P5.7	D31	6.83		6.75		6.77		**6.78**		0.04	0.59
39	**41**	P4.1	D31	7.35		7.40		7.28		**7.35**		0.06	0.82
35	**42**	P4.1	D31	7.31		7.33		7.23		**7.30**		0.05	0.68
44	**43**	P4.1	D31	7.37		7.46		7.52		**7.46**		0.08	1.07
26	**44**	P4.1	D31	7.16		7.17		7.17		**7.17**		0.01	0.14
22	**45**	P5.5	D31	7.06		7.06		7.07		**7.06**		0.01	0.14
6	**46**	P5.2	D31	6.58		6.57		6.55		**6.57**		0.02	0.30
36	**47**	P4.1	D32	7.33		7.37		7.30		**7.33**		0.04	0.55
46	**48**	P4.1	D31	7.55		7.56		7.56		**7.56**		0.01	0.13
30	**49**	P4.1	D31	7.09	b	7.33	b	7.21		**7.21**		0.12	1.66
28	**50**	P4.1	D31	7.19		7.18		7.24		**7.20**		0.03	0.42
8	**51**	P9.1	D42	6.55		6.82	b	6.62		**6.62**		0.14	2.11
23	**52**	P4.1	D31	7.38	b	7.05		7.09		**7.09**		0.18	2.54
15	**53**	P4.1	D21.2	6.88	b	6.74		6.78		**6.78**		0.07	1.03
43	**38a**	P9.1	D42	7.45		7.46		7.46		**7.46**		0.01	0.13
21	**44a**	P4.2	D31	7.31	b	7.04		6.94	b	**7.04**		0.19	2.70
32	**4a**	P9.1	D42	7.28		7.29		7.22		**7.26**		0.04	0.55
3	**4b**	P5.1	D31	5.96	a	6.24	ab	5.84	ab	**5.96**	*	0.21	3.52
										Mean		Interlab.std. deviation	
												abs.	rel.%
										7.10		**0.11**	**1.62**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.1**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **7.25**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Mg**
Dimension: **mg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
48	**1**	P3.21	D21.1	1.43	a	1.47	ab	1.40	ab	**1.43**		0.04	2.80
23	**2**	P5.3	D31	1.28	b	1.32		1.31		**1.30**		0.02	1.54
42	**3**	P3.10	D31	1.43	b	1.33	b	1.36		**1.36**		0.05	3.68
10	**4**	P9.1	D41	1.25		1.19	b	1.23		**1.23**		0.03	2.44
5	**5**	P3.3	D21.1	1.15	a	1.20	ab	1.15	a	**1.16**		0.03	2.59
35	**6**	P4.2	D31	1.34		1.32		1.34		**1.33**		0.01	0.75
8	**7**	P5.5	D31	1.20		1.19		1.21		**1.20**		0.01	0.83
9	**8**	P6.3	D31	1.21		1.21		1.22		**1.21**		0.01	0.83
49	**9**	P5.5	D31	1.46	a	1.48	a	1.46	a	**1.47**		0.01	0.68
46	**10**	P6.5	D21.1	1.49	b	1.32	b	1.40		**1.40**		0.09	6.43
29	**11**	P5.1	D31	1.31		1.30		1.31		**1.31**		0.01	0.76
36	**12**	P5.1	D31	1.33		1.34		1.33		**1.33**		0.01	0.75
47	**14**	P4.1	D31	1.38		1.40		1.42		**1.40**		0.02	1.43
30	**15**	P5.1	D21.1	1.31		1.32		1.31		**1.31**		0.01	0.76
31	**16**	P5.5	D31	1.40	b	1.30		1.30		**1.31**		0.06	4.58
20	**17**	P5.5	D31	1.30		1.29		1.29		**1.29**		0.01	0.78
33	**18**	P3.31	D31	1.31		1.33		1.32		**1.32**		0.01	0.76
26	**19**	P5.5	D21.1	1.31		1.30		1.30		**1.30**		0.01	0.77
32	**20**	P3.1	D31	1.29		1.33	b	1.30		**1.31**		0.02	1.53
45	**21**	P5.1	D31	1.36	b	1.39		1.41		**1.39**		0.03	2.16
18	**23**	P3.3	D31	1.28		1.29		1.27		**1.28**		0.01	0.78
34	**24**	P5.1	D21.1	1.32		1.39	b	1.28	b	**1.32**		0.06	4.55
11	**26**	P3.5	D31	1.24		1.22		1.22		**1.23**		0.01	0.81
4	**27**	P6.1	D21.1	1.10	ab	1.15	a	1.15	a	**1.14**		0.03	2.63
21	**28**	P3.31	D21.1	1.29		1.27		1.42	b	**1.29**		0.08	6.20
13	**29**	P3.3	D31	1.26		1.28		1.25		**1.26**		0.02	1.59
1	**30**	P3.21	D21.1	0.90	a	0.92	a	0.86	ab	**0.90**	*	0.03	3.33
2	**35**	P3.5	D21.1	0.90	a	0.91	a	0.91	a	**0.91**	*	0.01	1.10
14	**36**	P3.3	D21.1	1.25		1.26		1.26		**1.26**		0.01	0.79
6	**37**	P2.4	D21.1	1.17		1.19		1.19		**1.18**		0.01	0.85
43	**38**	P4.1	D31	1.35		1.38		1.37		**1.37**		0.02	1.46
39	**40**	P5.7	D31	1.35		1.37		1.34		**1.35**		0.02	1.48
15	**41**	P4.1	D31	1.27		1.27		1.28		**1.27**		0.01	0.79
38	**42**	P4.1	D31	1.34		1.34		1.35		**1.34**		0.01	0.75
27	**43**	P4.1	D31	1.31		1.30		1.28		**1.30**		0.02	1.54
19	**44**	P4.1	D31	1.28		1.28		1.29		**1.28**		0.01	0.78
16	**45**	P5.5	D31	1.28		1.26		1.26		**1.27**		0.01	0.79
17	**46**	P5.2	D31	1.29		1.27		1.24	b	**1.27**		0.03	2.36
40	**47**	P4.1	D32	1.35		1.35		1.34		**1.35**		0.01	0.74
37	**48**	P4.1	D31	1.32		1.32		1.35		**1.33**		0.02	1.50
28	**49**	P4.1	D31	1.34	b	1.25	b	1.30		**1.30**		0.05	3.85
41	**50**	P4.1	D31	1.36		1.34		1.35		**1.35**		0.01	0.74
3	**51**	P9.1	D42	1.10	a	1.09	a	1.19	ab	**1.11**		0.06	5.41
44	**52**	P4.1	D31	1.38		1.36		1.36		**1.37**		0.01	0.73
7	**53**	P4.1	D21.1	1.19		1.20		1.18		**1.19**		0.01	0.84
12	**38a**	P9.1	D42	1.24		1.22		1.24		**1.23**		0.01	0.81
22	**44a**	P4.2	D31	1.29		1.30		1.28		**1.29**		0.01	0.78
24	**4a**	P9.1	D42	1.32		1.31		1.25	b	**1.30**		0.04	3.08
25	**4b**	P5.1	D31	1.22	b	1.36	b	1.30		**1.30**		0.07	5.38
										Mean		Interlab.std. deviation	
												abs.	rel.%
										1.30		**0.02**	**1.90**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **4.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Mg**
Dimension: **mg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications			**Lab.mean**	Lab.standard deviation	
								abs.	rel.%
49	**1**	P3.21	D21.1	1.01 ab	0.98 a	0.97 ab	**0.98**	0.02	2.04
15	**2**	P5.3	D31	0.81 b	0.86 b	0.84	**0.84**	0.03	3.57
41	**3**	P3.10	D31	0.88 b	0.91 b	0.90	**0.90**	0.02	2.22
3	**4**	P9.1	D41	0.77 ab	0.76 a	0.74 ab	**0.76**	0.02	2.63
7	**5**	P3.3	D21.1	1.00 b	0.80	0.80	**0.80**	0.12	15.00
19	**6**	P4.2	D31	0.85	0.84 b	0.87 b	**0.85**	0.02	2.35
16	**7**	P5.5	D31	0.83 b	0.84	0.85 b	**0.84**	0.01	1.19
8	**8**	P6.3	D31	0.81	0.82 b	0.81	**0.81**	0.01	1.23
36	**9**	P5.5	D31	0.89	0.89	0.89	**0.89**	0.00	0.00
29	**11**	P5.1	D31	0.87	0.86 b	0.87	**0.87**	0.01	1.15
33	**12**	P5.1	D31	0.88	0.88	0.88	**0.88**	0.00	0.00
47	**14**	P4.1	D31	0.94 ab	0.95 a	0.97 ab	**0.95**	0.02	2.11
24	**15**	P5.1	D21.1	0.86	0.90 b	0.85 b	**0.86**	0.03	3.49
42	**16**	P5.5	D31	0.90	0.90	1.00 b	**0.90**	0.06	6.67
45	**17**	P5.5	D31	0.93	0.93	0.92 b	**0.93**	0.01	1.08
34	**18**	P3.31	D31	0.88	0.88	0.92 b	**0.88**	0.02	2.27
25	**19**	P5.5	D21.1	0.86	0.86	0.85 b	**0.86**	0.01	1.16
35	**20**	P3.1	D31	0.87 b	0.88	0.88	**0.88**	0.01	1.14
37	**21**	P5.1	D31	0.86 b	0.89	0.90 b	**0.89**	0.02	2.25
12	**23**	P3.3	D31	0.83	0.83	0.86 b	**0.83**	0.02	2.41
43	**24**	P5.1	D21.1	0.90	0.94 b	0.88 b	**0.90**	0.03	3.33
13	**26**	P3.5	D31	0.82 b	0.83	0.85 b	**0.83**	0.02	2.41
2	**27**	P6.1	21.1	0.79 ab	0.74 a	0.74 a	**0.74**	0.03	4.05
4	**28**	P3.31	D21.1	0.76 a	0.78 ab	0.74 ab	**0.76**	0.02	2.63
38	**29**	P3.3	D31	0.88 b	0.90 b	0.89	**0.89**	0.01	1.12
1	**30**	P3.21	D21.1	0.59 ab	0.56 ab	0.57 a	**0.57 ***	0.02	3.51
9	**35**	P3.5	D21.1	0.82 b	0.70 b	0.81	**0.81**	0.07	8.64
6	**36**	P3.3	D21.1	0.79	0.83 b	0.79	**0.79**	0.02	2.53
10	**37**	P2.4	D21.1	0.82 b	0.81	0.80 b	**0.81**	0.01	1.23
17	**38**	P4.1	D31	0.84	0.83 b	0.85 b	**0.84**	0.01	1.19
48	**39**	P5.5	D31	0.94 ab	0.95 a	0.95 a	**0.95**	0.01	1.05
27	**40**	P5.7	D31	0.87 b	0.86	0.86	**0.86**	0.01	1.16
14	**41**	P4.1	D31	0.83	0.83	0.83	**0.83**	0.00	0.00
30	**42**	P4.1	D31	0.87	0.87	0.86 b	**0.87**	0.01	1.15
20	**43**	P4.1	D31	0.85	0.85	0.85	**0.85**	0.00	0.00
46	**44**	P4.1	D31	0.94 a	0.94 a	0.94 a	**0.94**	0.00	0.00
21	**45**	P5.5	D31	0.85	0.85	0.85	**0.85**	0.00	0.00
18	**46**	P5.2	D31	0.88 b	0.84	0.84	**0.84**	0.02	2.38
40	**47**	P4.1	D32	0.90 b	0.89	0.89	**0.89**	0.01	1.12
28	**48**	P4.1	D31	0.86	0.86	0.87 b	**0.86**	0.01	1.16
22	**49**	P4.1	D31	0.85	0.84 b	0.85	**0.85**	0.01	1.18
23	**50**	P4.1	D31	0.84 b	0.85	0.87 b	**0.85**	0.02	2.35
31	**51**	P9.1	D42	0.83 b	0.87	0.88 b	**0.87**	0.03	3.45
44	**52**	P4.1	D31	0.91 b	0.90	0.88 b	**0.90**	0.02	2.22
5	**53**	P4.1	D21.1	0.77 a	0.78 ab	0.77 a	**0.77**	0.01	1.30
26	**38a**	P9.1	D42	0.87 b	0.86	0.86	**0.86**	0.01	1.16
39	**44a**	P4.2	D31	0.86 b	0.89	0.90 b	**0.89**	0.02	2.25
11	**4a**	P9.1	D42	0.85 b	0.83	0.80 b	**0.83**	0.03	3.61
32	**4b**	P5.1	D31	0.84 b	0.88	0.89 b	**0.88**	0.03	3.41
							Mean	Interlab.std. deviation	
								abs.	rel.%
							0.86	**0.02**	**2.32**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **2.0**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Mg**
Dimension: **mg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
45	**1**	P3.21	D21.1	0.58		0.60	b	0.53	b	**0.58**		0.04	6.90
11	**2**	P5.3	D31	0.49	b	0.51		0.51		**0.51**		0.01	1.96
40	**3**	P3.10	D31	0.55	b	0.57	b	0.56		**0.56**		0.01	1.79
6	**4**	P9.1	D41	0.48		0.49	b	0.47	b	**0.48**		0.01	2.08
7	**5**	P3.3	D21.1	0.48	b	0.49		0.49		**0.49**		0.01	2.04
13	**6**	P4.2	D31	0.51		0.54	b	0.51		**0.51**		0.02	3.92
8	**7**	P5.5	D31	0.51	b	0.50		0.50		**0.50**		0.01	2.00
9	**8**	P6.3	D31	0.50		0.51	b	0.49	b	**0.50**		0.01	2.00
33	**9**	P5.5	D31	0.55		0.56	b	0.54	b	**0.55**		0.01	1.82
16	**10**	P6.5	D21.1	0.55	b	0.52		0.52		**0.52**		0.02	3.85
21	**11**	P5.1	D31	0.53		0.53		0.53		**0.53**		0.00	0.00
41	**12**	P5.1	D31	0.55	b	0.56		0.57	b	**0.56**		0.01	1.79
27	**14**	P4.1	D31	0.53	b	0.55	b	0.54		**0.54**		0.01	1.85
28	**15**	P5.1	D21.1	0.55	b	0.52	b	0.54		**0.54**		0.02	3.70
46	**16**	P5.5	D31	0.60	a	0.60	a	0.60	a	**0.60**		0.00	0.00
29	**17**	P5.5	D31	0.54		0.54		0.54		**0.54**		0.00	0.00
34	**18**	P3.31	D31	0.55		0.55		0.55		**0.55**		0.00	0.00
17	**19**	P5.5	D21.1	0.52		0.52		0.52		**0.52**		0.00	0.00
30	**20**	P3.1	D31	0.56	b	0.53	b	0.54		**0.54**		0.02	3.70
35	**21**	P5.1	D31	0.51	b	0.55		0.56	b	**0.55**		0.03	5.45
18	**23**	P3.3	D31	0.52		0.51	b	0.52		**0.52**		0.01	1.92
36	**24**	P5.1	D21.1	0.55		0.57	b	0.53	b	**0.55**		0.02	3.64
22	**26**	P3.5	D31	0.53		0.53		0.53		**0.53**		0.00	0.00
3	**27**	P6.1	D21.1	0.42	a	0.42	a	0.42	a	**0.42**	*	0.00	0.00
4	**28**	P3.31	D21.1	0.42	a	0.45	ab	0.42	a	**0.42**	*	0.02	4.76
14	**29**	P3.3	D31	0.55	b	0.50	b	0.51		**0.51**		0.03	5.88
1	**30**	P3.21	D21.1	0.34	a	0.34	a	0.34	a	**0.34**	*	0.00	0.00
2	**35**	P3.5	D21.1	0.40	a	0.37	ab	0.44	ab	**0.40**	*	0.04	10.00
19	**36**	P3.3	D21.1	0.55	b	0.51	b	0.52		**0.52**		0.02	3.85
23	**37**	P2.4	D21.1	0.54	b	0.53		0.53		**0.53**		0.01	1.89
37	**38**	P4.1	D31	0.55		0.53	b	0.55		**0.55**		0.01	1.82
47	**39**	P5.5	D31	0.61	a	0.61	a	0.61	a	**0.61**		0.00	0.00
42	**40**	P5.7	D31	0.56		0.55	b	0.57	b	**0.56**		0.01	1.79
20	**41**	P4.1	D31	0.54	b	0.51	b	0.52		**0.52**		0.02	3.85
31	**42**	P4.1	D31	0.54		0.54		0.55	b	**0.54**		0.01	1.85
24	**43**	P4.1	D31	0.53		0.53		0.53		**0.53**		0.00	0.00
44	**44**	P4.1	D31	0.57		0.57		0.57		**0.57**		0.00	0.00
25	**45**	P5.5	D31	0.53		0.53		0.53		**0.53**		0.00	0.00
15	**46**	P5.2	D31	0.51		0.51		0.53	b	**0.51**		0.01	1.96
43	**47**	P4.1	D32	0.56		0.56		0.56		**0.56**		0.00	0.00
26	**48**	P4.1	D31	0.54	b	0.53		0.53		**0.53**		0.01	1.89
10	**49**	P4.1	D31	0.50		0.50		0.50		**0.50**		0.00	0.00
38	**50**	P4.1	D31	0.55		0.54	b	0.56	b	**0.55**		0.01	1.82
39	**52**	P4.1	D31	0.55		0.56	b	0.55		**0.55**		0.01	1.82
5	**53**	P4.1	D21.1	0.48	ab	0.47	a	0.47	a	**0.47**		0.01	2.13
48	**38a**	P9.1	D42	0.65	ab	0.64	a	0.64	a	**0.64**	*	0.01	1.56
32	**44a**	P4.2	D31	0.53	b	0.56	b	0.54		**0.54**		0.02	3.70
49	**4a**	P9.1	D42	0.68	a	0.67	ab	0.68	a	**0.68**	*	0.01	1.47
12	**4b**	P5.1	D31	0.51		0.51		0.51		**0.51**		0.00	0.00
										Mean		Interlab.std. deviation	
												abs.	rel.%
										0.53		**0.01**	**2.09**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **12.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Mg**
Dimension: **mg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
34	**1**	P3.21	D21.1	1.09	b	1.04		1.01	b	**1.04**		0.04	3.85
31	**2**	P5.3	D31	0.98	b	1.03		1.04	b	**1.03**		0.03	2.91
39	**3**	P3.10	D31	1.07	b	1.04	b	1.05		**1.05**		0.02	1.90
8	**4**	P9.1	D41	0.94		0.93	b	0.95	b	**0.94**		0.01	1.06
2	**5**	P3.3	D21.1	0.95	ab	0.90	a	0.90	a	**0.90**		0.03	3.33
21	**6**	P4.2	D31	0.99	b	1.00		1.00		**1.00**		0.01	1.00
19	**7**	P5.5	D31	0.99		1.01	b	0.99		**0.99**		0.01	1.01
11	**8**	P6.3	D31	0.94	b	0.96	b	0.95		**0.95**		0.01	1.05
43	**9**	P5.5	D31	1.06		1.06		1.06		**1.06**		0.00	0.00
44	**10**	P6.5	D21.1	1.07	b	1.03	b	1.06		**1.06**		0.02	1.89
27	**11**	P5.1	D31	1.02		1.01	b	1.02		**1.02**		0.01	0.98
14	**12**	P5.1	D31	0.99	b	0.97		0.95	b	**0.97**		0.02	2.06
40	**14**	P4.1	D31	1.03	b	1.06	b	1.05		**1.05**		0.02	1.90
28	**15**	P5.1	D21.1	1.02		1.01	b	1.03	b	**1.02**		0.01	0.98
22	**16**	P5.5	D31	1.00		1.00		1.20	b	**1.00**		0.12	12.00
45	**17**	P5.5	D31	1.06		1.06		1.07	b	**1.06**		0.01	0.94
36	**18**	P3.31	D31	1.03	b	1.04		1.05	b	**1.04**		0.01	0.96
16	**19**	P5.5	D21.1	0.99	b	0.98		0.98		**0.98**		0.01	1.02
12	**20**	P3.1	D31	0.95		0.95		0.97	b	**0.95**		0.01	1.05
32	**21**	P5.1	D31	1.05	b	0.99	b	1.03		**1.03**		0.03	2.91
17	**23**	P3.3	D31	0.98		0.94	b	1.01	b	**0.98**		0.04	4.08
29	**24**	P5.1	D21.1	1.02		0.98	b	1.05	b	**1.02**		0.04	3.92
49	**26**	P3.5	D31	1.07	ab	1.10	a	1.14	ab	**1.10**		0.04	3.64
3	**27**	P6.1	D21.1	0.91	a	0.86	ab	0.91	a	**0.91**		0.03	3.30
7	**28**	P3.31	D21.1	0.86	b	0.95	b	0.93		**0.93**		0.05	5.38
23	**29**	P3.3	D31	1.02	b	1.00		0.99	b	**1.00**		0.02	2.00
1	**30**	P3.21	D21.1	0.70	a	0.65	ab	0.71	ab	**0.70**	*	0.03	4.29
4	**35**	P3.5	D21.1	0.92	ab	0.89	ab	0.91	a	**0.91**		0.02	2.20
9	**36**	P3.3	D21.1	0.94		0.95	b	0.92	b	**0.94**		0.02	2.13
10	**37**	P2.4	D21.1	0.93	b	0.94		0.94		**0.94**		0.01	1.06
20	**38**	P4.1	D31	0.99		0.95	b	0.99		**0.99**		0.02	2.02
46	**40**	P5.7	D31	1.02	b	1.11	b	1.06		**1.06**		0.05	4.72
24	**41**	P4.1	D31	1.00		1.00		1.00		**1.00**		0.00	0.00
33	**42**	P4.1	D31	1.03		1.04	b	1.03		**1.03**		0.01	0.97
30	**43**	P4.1	D31	1.00	b	1.02		1.02		**1.02**		0.01	0.98
48	**44**	P4.1	D31	1.10	b	1.09		1.08	b	**1.09**		0.01	0.92
25	**45**	P5.5	D31	1.00		1.00		1.00		**1.00**		0.00	0.00
18	**46**	P5.2	D31	0.99	b	0.98		0.97	b	**0.98**		0.01	1.02
37	**47**	P4.1	D32	1.02	b	1.04		1.04		**1.04**		0.01	0.96
41	**48**	P4.1	D31	1.04	b	1.05		1.05		**1.05**		0.01	0.95
13	**49**	P4.1	D31	0.94	b	0.99	b	0.96		**0.96**		0.03	3.13
26	**50**	P4.1	D31	1.01		1.01		1.05	b	**1.01**		0.02	1.98
38	**51**	P9.1	D42	1.04		1.05	b	1.04		**1.04**		0.01	0.96
42	**52**	P4.1	D31	1.04	b	1.08	b	1.05		**1.05**		0.02	1.90
5	**53**	P4.1	D21.1	0.91	a	0.91	a	0.90	ab	**0.91**		0.01	1.10
47	**38a**	P9.1	D42	1.08	b	1.07		1.07		**1.07**		0.01	0.93
15	**44a**	P4.2	D31	1.01	b	0.97		0.96	b	**0.97**		0.03	3.09
35	**4a**	P9.1	D42	1.05	b	1.03	b	1.04		**1.04**		0.01	0.96
6	**4b**	P5.1	D31	0.92		0.96	b	0.90	b	**0.92**		0.03	3.26
										Mean		Interlab.std. deviation	
												abs.	rel.%
										1.00		**0.02**	**2.14**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **2.0**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **1.02**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **K**
Dimension: **mg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**30**	P3.21	D21.1	2.29	a	2.22	ab	2.33	a	**2.29 ***	0.06	2.62
2	**51**	P9.1	D42	3.02	ab	3.12	a	3.36	ab	**3.12 ***	0.17	5.45
3	**26**	P3.5	D31	3.06	ab	3.13	a	3.16	a	**3.13 ***	0.05	1.60
4	**27**	P6.1	D28	3.25	ab	3.15	a	3.15	a	**3.16**	0.06	1.90
5	**10**	P6.5	D21.1	3.77	ab	3.07	ab	3.26	a	**3.26**	0.36	11.04
6	**36**	P3.3	D28	3.32		3.36		3.28		**3.32**	0.04	1.20
7	**20**	P3.1	D28	3.22	b	3.36		3.39		**3.36**	0.09	2.68
8	**7**	P5.5	D31	3.37		3.37		3.45	b	**3.38**	0.05	1.48
9	**12**	P5.1	D31	3.52	b	3.43		3.32	b	**3.43**	0.10	2.92
10	**19**	P5.5	D21.1	3.50		3.48		3.47		**3.48**	0.02	0.57
11	**40**	P5.7	D31	3.52		3.49		3.56		**3.52**	0.04	1.14
12	**8**	P6.3	D31	3.51		3.54		3.53		**3.53**	0.02	0.57
13	**37**	P2.4	D28	3.50		3.55		3.55		**3.54**	0.03	0.85
14	**11**	P5.1	D31	3.60		3.54		3.54		**3.55**	0.03	0.85
15	**52**	P4.1	D31	3.58		3.55		3.57		**3.57**	0.02	0.56
16	**28**	P3.31	D21.1	3.63		3.60		3.61		**3.61**	0.02	0.55
17	**49**	P4.1	D31	3.67		3.56		3.61		**3.61**	0.06	1.66
18	**5**	P3.3	D28	3.60		3.61		3.65		**3.62**	0.03	0.83
19	**4b**	P5.1	D21.1	3.54	b	3.76	b	3.64		**3.64**	0.11	3.02
20	**43**	P4.1	D31	3.66		3.66		3.59		**3.65**	0.04	1.10
21	**6**	P4.2	D31	3.66		3.61		3.68		**3.66**	0.04	1.09
22	**47**	P4.1	D32	3.66		3.65		3.66		**3.66**	0.01	0.27
23	**14**	P4.1	D21.1	3.70		3.36	b	3.76		**3.70**	0.22	5.95
24	**41**	P4.1	D31	3.68		3.69		3.74		**3.70**	0.03	0.81
25	**4**	P9.1	D41	3.59	b	3.73		3.73		**3.72**	0.08	2.15
26	**45**	P5.5	D31	3.76		3.73		3.71		**3.73**	0.03	0.80
27	**46**	P5.2	D31	3.75		3.73		3.61	b	**3.73**	0.08	2.14
28	**24**	P5.1	D28	3.74		3.56	b	3.80		**3.74**	0.12	3.21
29	**42**	P4.1	D31	3.73		3.73		3.79		**3.74**	0.03	0.80
30	**1**	P3.21	D21.1	3.75		3.78		3.73		**3.75**	0.03	0.80
31	**17**	P5.5	D31	3.76		3.77		3.71		**3.75**	0.03	0.80
32	**15**	P5.1	D28	3.76		3.68	b	3.82		**3.76**	0.07	1.86
33	**44a**	P4.2	D31	3.77		3.77		3.74		**3.76**	0.02	0.53
34	**53**	P4.1	D21.1	3.76		3.82		3.43	b	**3.76**	0.21	5.59
35	**4a**	P9.1	D42	3.87	b	3.80		3.79		**3.81**	0.04	1.05
36	**44**	P4.1	D31	3.81		3.86		3.71	b	**3.81**	0.08	2.10
37	**18**	P3.31	D31	3.81		3.91	b	3.82		**3.83**	0.06	1.57
38	**39**	P5.5	D31	3.83		3.82		3.84		**3.83**	0.01	0.26
39	**48**	P4.1	D31	3.78		3.90		3.84		**3.84**	0.06	1.56
40	**29**	P3.3	D31	3.83	b	3.90		3.91		**3.89**	0.04	1.03
41	**3**	P3.10	D31	3.95		3.74	b	3.90		**3.90**	0.11	2.82
42	**38a**	P9.1	D42	3.90		3.92		3.93		**3.92**	0.02	0.51
43	**2**	P5.3	D31	3.84	b	3.99		3.99		**3.98**	0.09	2.26
44	**50**	P4.1	D31	3.99		3.96		3.99		**3.98**	0.02	0.50
45	**21**	P5.1	D31	4.09	b	4.02		3.95	b	**4.02**	0.07	1.74
46	**9**	P5.5	D31	4.14	b	4.00		4.03		**4.03**	0.07	1.74
47	**38**	P4.1	D31	4.12	a	4.22	ab	4.10	a	**4.12**	0.06	1.46
48	**25**	P5.1	D31	4.13	a	4.12	a	4.16	a	**4.14**	0.02	0.48
49	**16**	P5.5	D31	4.50	ab	3.80	ab	4.30	a	**4.30 ***	0.36	8.37
										Mean	Interlab.std. deviation	
											abs.	rel.%
										3.70	**0.07**	**1.98**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **8.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **K**
Dimension: **mg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**30**	P3.21	D21.1	4.99	ab	5.22	a	5.26	a	**5.21 ***	0.15	2.88
2	**27**	P6.1	D28	6.84	ab	6.25	a	6.04	ab	**6.25 ***	0.41	6.56
3	**7**	P5.5	D31	6.57	a	6.69	a	6.62	a	**6.63**	0.06	0.90
4	**51**	P9.1	D42	6.60	ab	6.75	a	6.72	a	**6.70**	0.08	1.19
5	**36**	P3.3	D28	6.80	a	6.76	a	6.72	a	**6.76**	0.04	0.59
6	**40**	P5.7	D31	6.82	a	6.75	a	6.78	a	**6.78**	0.04	0.59
7	**26**	P3.5	D31	6.68	ab	6.85	a	6.83	a	**6.81**	0.09	1.32
8	**12**	P5.1	D31	7.08		6.95	b	7.22	b	**7.08**	0.14	1.98
9	**35**	P3.5	D21.1	7.27	b	6.84	b	7.10		**7.10**	0.22	3.10
10	**49**	P4.1	D31	7.25	b	7.04	b	7.15		**7.15**	0.11	1.54
11	**4b**	P5.1	D21.1	7.44	b	7.19		7.23		**7.24**	0.13	1.80
12	**37**	P2.4	D28	7.42		7.30		7.34		**7.35**	0.06	0.82
13	**8**	P6.3	D31	7.32		7.39		7.36		**7.36**	0.04	0.54
14	**52**	P4.1	D31	7.20	b	7.36		7.42		**7.36**	0.11	1.49
15	**39**	P5.5	D31	7.40		7.46		7.45		**7.44**	0.03	0.40
16	**14**	P4.1	D21.1	7.37	b	7.51		7.48		**7.46**	0.07	0.94
17	**6**	P4.2	D31	7.53		7.44		7.50		**7.49**	0.05	0.67
18	**41**	P4.1	D31	7.56		7.50		7.49		**7.52**	0.04	0.53
19	**47**	P4.1	D32	7.52		7.54		7.52		**7.53**	0.01	0.13
20	**43**	P4.1	D31	7.62		7.57		7.59		**7.59**	0.03	0.40
21	**42**	P4.1	D31	7.67		7.68		7.58		**7.64**	0.06	0.79
22	**45**	P5.5	D31	7.66		7.59		7.67		**7.64**	0.04	0.52
23	**10**	P6.5	D21.1	7.65		7.62		7.73		**7.67**	0.06	0.78
24	**17**	P5.5	D31	7.71		7.69		7.62		**7.67**	0.05	0.65
25	**3**	P3.10	D31	7.66		7.65		7.73		**7.68**	0.04	0.52
26	**19**	P5.5	D21.1	7.70		7.68		7.67		**7.68**	0.02	0.26
27	**11**	P5.1	D31	7.69		7.68		7.69		**7.69**	0.01	0.13
28	**50**	P4.1	D31	7.75		7.60	b	7.74		**7.71**	0.08	1.04
29	**53**	P4.1	D21.1	7.64	b	7.74		7.80		**7.74**	0.08	1.03
30	**38a**	P9.1	D42	7.82		7.79		7.73		**7.78**	0.05	0.64
31	**15**	P5.1	D28	7.72		7.80		7.85		**7.79**	0.07	0.90
32	**28**	P3.31	D21.1	7.85		7.71		7.79		**7.79**	0.07	0.90
33	**29**	P3.3	D31	7.73		7.86		7.84		**7.82**	0.07	0.90
34	**46**	P5.2	D31	8.01	b	7.81		7.76		**7.82**	0.13	1.66
35	**44**	P4.1	D31	7.85		7.79		7.84		**7.83**	0.03	0.38
36	**21**	P5.1	D31	7.81		7.83		7.93		**7.85**	0.06	0.76
37	**9**	P5.5	D31	8.12	b	7.82		7.89		**7.89**	0.16	2.03
38	**38**	P4.1	D31	7.95		7.80	b	7.96		**7.92**	0.09	1.14
39	**48**	P4.1	D31	7.90		7.91		8.02		**7.94**	0.07	0.88
40	**4**	P9.1	D41	7.79	b	7.98		7.99		**7.95**	0.11	1.38
41	**4a**	P9.1	D42	8.07		8.03		8.00		**8.03**	0.04	0.50
42	**18**	P3.31	D31	7.86	b	8.03		8.25	b	**8.03**	0.20	2.49
43	**20**	P3.1	D28	8.06		8.02		8.26	b	**8.07**	0.13	1.61
44	**1**	P3.21	D21.1	8.19	b	8.09		7.92	b	**8.09**	0.14	1.73
45	**25**	P5.1	D31	8.10		8.09		8.12		**8.10**	0.02	0.25
46	**44a**	P4.2	D31	7.85	b	8.11		8.16		**8.10**	0.17	2.10
47	**24**	P5.1	D28	8.25		8.36	b	8.14	b	**8.25**	0.11	1.33
48	**2**	P5.3	D31	8.08	b	8.37	b	8.28		**8.28**	0.15	1.81
49	**16**	P5.5	D31	8.40	a	8.00	ab	8.50	ab	**8.40**	0.26	3.10
										Mean	Interlab.std. deviation	
											abs.	rel.%
										7.65	**0.09**	**1.24**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **4.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **K**
Dimension: **mg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**30**	P3.21	D21.1	3.12	a	3.20	a	3.17	a	**3.17 ***	0.04	1.26
2	**27**	P6.1	D28	3.82	a	3.82	a	3.92	ab	**3.83 ***	0.06	1.57
3	**26**	P3.5	D31	3.99	a	3.99	a	3.98	a	**3.99 ***	0.01	0.25
4	**35**	P3.5	D21.1	4.39	ab	3.98	ab	4.10	a	**4.10**	0.21	5.12
5	**10**	P6.5	D21.1	4.16	a	4.51	ab	4.14	a	**4.16**	0.21	5.05
6	**12**	P5.1	D31	4.22	b	4.30		4.34		**4.30**	0.06	1.40
7	**36**	P3.3	D28	4.36		4.36		4.36		**4.36**	0.00	0.00
8	**7**	P5.5	D31	4.27	b	4.44		4.39		**4.39**	0.09	2.05
9	**40**	P5.7	D31	4.42		4.35		4.39		**4.39**	0.04	0.91
10	**53**	P4.1	D21.1	4.34	b	4.50		4.52		**4.50**	0.10	2.22
11	**37**	P2.4	D28	4.48		4.52		4.54		**4.52**	0.03	0.66
12	**46**	P5.2	D31	4.55		4.52		4.60		**4.55**	0.04	0.88
13	**4**	P9.1	D41	4.51	b	4.62		4.64		**4.62**	0.07	1.52
14	**8**	P6.3	D31	4.63		4.64		4.50	b	**4.62**	0.08	1.73
15	**52**	P4.1	D31	4.58		4.65		4.63		**4.63**	0.04	0.86
16	**4b**	P5.1	D21.1	4.66		4.68		4.70		**4.68**	0.02	0.43
17	**28**	P3.31	D21.1	4.69		4.67		4.76	b	**4.69**	0.05	1.07
18	**47**	P4.1	D32	4.69		4.73		4.65		**4.69**	0.04	0.85
19	**19**	P5.5	D21.1	4.72		4.70		4.69		**4.70**	0.02	0.43
20	**51**	P9.1	D42	4.65		4.70		4.80	b	**4.70**	0.08	1.70
21	**6**	P4.2	D31	4.70		4.72		4.71		**4.71**	0.01	0.21
22	**39**	P5.5	D31	4.73		4.73		4.68		**4.72**	0.03	0.64
23	**41**	P4.1	D31	4.93	b	4.71		4.72		**4.73**	0.12	2.54
24	**43**	P4.1	D31	4.77		4.72		4.72		**4.73**	0.03	0.63
25	**14**	P4.1	D21.1	4.79		4.52	b	4.74		**4.74**	0.14	2.95
26	**17**	P5.5	D31	4.75		4.74		4.83	b	**4.76**	0.05	1.05
27	**45**	P5.5	D31	4.78		4.78		4.79		**4.78**	0.01	0.21
28	**15**	P5.1	D28	4.79		4.80		4.77		**4.79**	0.02	0.42
29	**11**	P5.1	D31	4.82		4.80		4.77		**4.80**	0.03	0.63
30	**42**	P4.1	D31	4.81		4.78		4.83		**4.81**	0.03	0.62
31	**1**	P3.21	D21.1	4.82		4.90	b	4.81		**4.83**	0.05	1.04
32	**49**	P4.1	D31	4.93	b	4.72	b	4.83		**4.83**	0.11	2.28
33	**24**	P5.1	D28	4.85		4.50	b	4.92	b	**4.85**	0.23	4.74
34	**3**	P3.10	D31	4.88		4.79	b	5.06	b	**4.88**	0.14	2.87
35	**29**	P3.3	D31	4.88		4.89		4.96	b	**4.90**	0.04	0.82
36	**44**	P4.1	D31	4.93		4.91		4.89		**4.91**	0.02	0.41
37	**18**	P3.31	D31	5.04	b	4.97		4.97		**4.98**	0.04	0.80
38	**48**	P4.1	D31	4.99		4.93	b	5.03		**4.99**	0.05	1.00
39	**50**	P4.1	D31	5.04		5.05		5.12	b	**5.06**	0.04	0.79
40	**44a**	P4.2	D31	4.90	b	5.14	b	5.08		**5.08**	0.12	2.36
41	**2**	P5.3	D31	4.90	b	5.10		5.18	b	**5.10**	0.14	2.75
42	**9**	P5.5	D31	5.12		5.10		4.99	b	**5.10**	0.07	1.37
43	**20**	P3.1	D28	5.05	b	5.15		5.12		**5.12**	0.05	0.98
44	**4a**	P9.1	D42	5.13		5.14		5.12		**5.13**	0.01	0.19
45	**21**	P5.1	D31	5.08	b	5.16		5.17		**5.15**	0.05	0.97
46	**38**	P4.1	D31	5.22	b	5.32		5.37		**5.32**	0.08	1.50
47	**38a**	P9.1	D42	5.38	a	5.38	a	5.37	a	**5.38**	0.01	0.19
48	**16**	P5.5	D31	5.50	a	5.20	ab	5.60	ab	**5.50**	0.21	3.82
49	**25**	P5.1	D31	5.53	a	5.50	a	5.49	a	**5.51 ***	0.02	0.36
										Mean	Interlab.std. deviation	
											abs.	rel.%
										4.78	**0.07**	**1.41**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **8.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **K**
Dimension: **mg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**35**	P3.5	D21.1	3.51	a	3.57	a	3.45	a	**3.51 ***	0.06	1.71
2	**30**	P3.21	D21.1	4.72	a	4.64	a	4.64	a	**4.66 ***	0.05	1.07
3	**27**	P6.1	D28	6.02	ab	5.81	a	5.75	a	**5.81 ***	0.14	2.41
4	**12**	P5.1	D31	5.91	a	5.99	a	5.92	a	**5.94**	0.04	0.67
5	**26**	P3.5	D31	6.06	a	5.95	ab	6.04	a	**6.03**	0.06	1.00
6	**36**	P3.3	D28	6.20	a	6.12	a	6.12	a	**6.14**	0.05	0.81
7	**40**	P5.7	D31	6.26		6.35		6.29		**6.30**	0.05	0.79
8	**7**	P5.5	D31	6.41		6.45		6.24	b	**6.41**	0.11	1.72
9	**4**	P9.1	D41	6.51		6.45		6.53		**6.50**	0.04	0.62
10	**51**	P9.1	D42	6.51		6.62	b	6.50		**6.53**	0.07	1.07
11	**37**	P2.4	D28	6.55		6.57		6.52		**6.55**	0.03	0.46
12	**14**	P4.1	D21.1	6.57		6.67	b	6.41	b	**6.57**	0.13	1.98
13	**53**	P4.1	D21.1	6.87	b	6.55		6.58		**6.59**	0.18	2.73
14	**4b**	P5.1	D21.1	6.52	b	6.64		6.97	b	**6.64**	0.23	3.46
15	**52**	P4.1	D31	6.60		6.73	b	6.65		**6.65**	0.07	1.05
16	**49**	P4.1	D31	6.71		6.71		6.71		**6.71**	0.00	0.00
17	**6**	P4.2	D31	6.77		6.75		6.72		**6.75**	0.03	0.44
18	**10**	P6.5	D21.1	6.90	b	6.80		6.52	b	**6.80**	0.20	2.94
19	**43**	P4.1	D31	6.80		6.83		6.80		**6.81**	0.02	0.29
20	**44a**	P4.2	D31	7.09	b	6.77		6.81		**6.81**	0.17	2.50
21	**8**	P6.3	D31	6.62	b	6.85		6.84		**6.82**	0.13	1.91
22	**42**	P4.1	D31	6.84		6.90		6.77		**6.84**	0.07	1.02
23	**39**	P5.5	D31	6.96	b	6.84		6.84		**6.86**	0.07	1.02
24	**19**	P5.5	D21.1	6.91		6.89		6.88		**6.89**	0.02	0.29
25	**41**	P4.1	D31	6.93		6.91		6.83		**6.90**	0.05	0.72
26	**4a**	P9.1	D42	6.92		6.96		6.91		**6.93**	0.03	0.43
27	**45**	P5.5	D31	6.93		6.93		6.94		**6.93**	0.01	0.14
28	**15**	P5.1	D28	6.94		6.83	b	7.02	b	**6.94**	0.10	1.44
29	**29**	P3.3	D31	6.88		6.97		6.95		**6.94**	0.05	0.72
30	**11**	P5.1	D31	6.97		6.97		6.95		**6.96**	0.01	0.14
31	**17**	P5.5	D31	6.96		6.96		6.98		**6.97**	0.01	0.14
32	**47**	P4.1	D32	6.86	b	7.00		7.00		**6.98**	0.08	1.15
33	**3**	P3.10	D31	7.02		7.17	b	6.90	b	**7.02**	0.14	1.99
34	**50**	P4.1	D31	7.00		7.01		7.04		**7.02**	0.02	0.28
35	**20**	P3.1	D28	7.05		7.08		6.95	b	**7.04**	0.07	0.99
36	**28**	P3.31	D21.1	7.04		6.97		7.11		**7.04**	0.07	0.99
37	**21**	P5.1	D31	6.91	b	7.09		7.05		**7.05**	0.09	1.28
38	**24**	P5.1	D28	7.05		6.97	b	7.18	b	**7.05**	0.11	1.56
39	**38**	P4.1	D31	7.20	b	7.03		7.06		**7.07**	0.09	1.27
40	**18**	P3.31	D31	7.05		7.06		7.18	b	**7.08**	0.07	0.99
41	**44**	P4.1	D31	7.08		7.09		7.10		**7.09**	0.01	0.14
42	**1**	P3.21	D21.1	7.19		7.19		6.91	b	**7.17**	0.16	2.23
43	**9**	P5.5	D31	7.23		7.16		7.25		**7.22**	0.05	0.69
44	**38a**	P9.1	D42	7.23		7.21		7.23		**7.22**	0.01	0.14
45	**46**	P5.2	D31	7.27		7.12	b	7.39	b	**7.27**	0.14	1.93
46	**48**	P4.1	D31	7.34		7.26		7.32		**7.31**	0.04	0.55
47	**2**	P5.3	D31	7.21	ab	7.53	a	7.51	a	**7.50**	0.18	2.40
48	**16**	P5.5	D31	7.50	a	7.20	ab	7.70	ab	**7.50**	0.25	3.33
49	**25**	P5.1	D31	7.66	a	7.65	a	7.61	a	**7.64**	0.03	0.39
										Mean	Interlab.std. deviation	
											abs.	rel.%
										6.87	**0.08**	**1.18**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 15 % from mean (Agreement from Bonn 1999)**

Annotation:	Percentage of non-tolerable lab means:	**6.1**
	Mean of 3rd Needle/Leaf Test 97/98 sample 5:	**6.8**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Na**
Dimension: **µg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**53**	P4.1	D21.1	7.70		5.20				**6.45**	*	1.77	27.44
2	**47**	P4.1	D32	8.00		8.00		8.00		**8.00**	*	0.00	0.00
3	**4b**	P5.1	D21.1	8.24		7.77		8.44		**8.15**	*	0.34	4.17
4	**38**	P4.1	D31	11.00		9.00		10.00		**10.00**	*	1.00	10.00
5	**37**	P5.5	D35	10.40		10.40		10.40		**10.40**	*	0.00	0.00
6	**5**	P3.3	D28	15.50	b	10.50		10.00		**10.73**	*	3.04	28.33
7	**50**	P4.1	D31	10.90		12.10		11.20		**11.40**	*	0.62	5.44
8	**2**	P5.3	D31	12.50		11.10		11.10		**11.57**	*	0.81	7.00
9	**28**	D5.1	D21.1	11.11		12.33		12.30		**11.91**	*	0.70	5.88
10	**30**	P6.5	D21.1	11.60		11.60		12.90		**12.03**	*	0.75	6.23
11	**42**	P4.1	D21.1	12.20		11.20		13.20		**12.20**	*	1.00	8.20
12	**18**	P5.1	D31	15.50	b	12.40		8.70	b	**12.40**	*	3.40	27.42
13	**45**	P5.5	D31	15.00		13.00		13.00		**13.48**	*	1.15	8.53
14	**27**	P6.1	D28	17.80		18.30		15.70	b	**17.57**		1.38	7.85
15	**23**	P3.3	D31	15.70	b	22.00	b	17.70		**17.70**		3.22	18.19
16	**40**	P5.7	D31	20.70		21.30		20.50		**20.83**		0.42	2.02
17	**21**	P5.1	D31	22.50		22.80		21.70		**22.33**		0.57	2.55
18	**24**	P5.1	D21.1	22.80		21.40		23.50		**22.67**		1.07	4.72
19	**9**	P5.1	D31	25.60		22.80	b	32.30	b	**25.60**		4.88	19.06
20	**41**	P4.1	D31	18.10	b	26.60		35.00	b	**26.60**		8.45	31.77
21	**43**	P4.1	D31	35.20	b	29.00		25.50	b	**29.00**		4.91	16.93
22	**4a**	P9.1	D42	30.00		30.00		30.00		**30.00**		0.00	0.00
23	**8**	P6.3	D31	30.80	b	39.10		40.40		**39.10**	*	5.21	13.32
24	**14**	P4.1	D21.1	41.50		42.70		44.60	b	**42.70**	*	1.56	3.65
25	**25**	P5.1	D31	48.60		47.50		47.90		**48.00**	*	0.56	1.17
26	**26**	P3.5	D35	67.30	b	51.90		50.90		**51.90**	*	9.19	17.71
27	**36**	P3.3	D28	60.00	a	62.00	ab	59.00	a	**60.00**	*	1.53	2.55
28	**38a**	P9.1	D42	65.00	ab	63.00	a	56.00	ab	**63.00**	*	4.73	7.51
29	**44a**	P4.2	D31	70.00	ab	80.00	a	90.00	ab	**80.00**	*	10.00	12.50
30	**39**	P5.5	D31	98.60	a	97.60	a	98.60	a	**98.27**	*	0.58	0.59
31	**35**	P3.5	D21.1	164.70	ab	162.80	a	143.30	ab	**162.80**	*	11.84	7.27

Mean	Interlab.std. deviation	
	abs.	rel.%
24.16	**2.73**	**9.94**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **71.0**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Na**
Dimension: **µg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
14	**2**	P5.3	D31	41.30		42.40		42.80		**42.17**		0.78	1.85
20	**5**	P3.3	D28	45.00	b	50.00		50.00		**49.56**		2.89	5.83
11	**6**	P4.2	D31	40.00		40.00		40.00		**40.00**		0.00	0.00
29	**8**	P6.3	D31	87.60	a	81.20	ab	94.40	ab	**87.60**	*	6.60	7.53
21	**9**	P5.1	D31	51.00		50.70		45.90	b	**50.41**		2.86	5.67
23	**12**	P5.1	D31	57.00	b	47.60	b	53.90		**53.90**		4.79	8.89
26	**14**	P4.1	D21.1	64.80		66.90		69.10	b	**66.90**	*	2.15	3.21
9	**18**	P5.1	D31	39.40		35.10	b	46.90	b	**39.40**		5.97	15.15
18	**21**	P5.1	D31	45.80		46.70		45.00		**45.83**		0.85	1.85
17	**23**	P3.3	D31	44.80		40.90	b	47.40	b	**44.80**		3.27	7.30
1	**24**	P5.1	D21.1	21.60		22.80		21.10		**21.79**	*	0.87	3.99
28	**25**	P5.1	D31	85.50	a	83.70	a	83.10	a	**83.84**	*	1.25	1.49
30	**26**	P3.5	D35	92.50	a	92.30	a	83.50	ab	**91.96**	*	5.14	5.59
27	**27**	P6.1	D28	68.40		65.70	b	70.50		**68.40**	*	2.41	3.52
13	**28**	D5.1	D21.1	41.63		41.20		41.96		**41.60**		0.38	0.91
22	**30**	P6.5	D21.1	53.60		52.80		53.60		**53.33**		0.46	0.86
35	**35**	P3.5	D21.1	178.20	a	193.10	ab	134.40	ab	**178.20**	*	30.51	17.12
33	**36**	P3.3	D28	125.00	a	123.00	a	135.00	ab	**125.00**	*	6.43	5.14
6	**37**	P5.5	D35	37.10		36.50		36.70		**36.77**		0.31	0.84
5	**38**	P4.1	D31	35.00		37.00		37.00		**36.56**		1.15	3.15
34	**39**	P5.5	D31	174.70	ab	185.10	ab	177.80	a	**177.80**	*	5.34	3.00
19	**40**	P5.7	D31	49.10		46.30		48.50		**48.36**		1.47	3.04
16	**41**	P4.1	D31	49.10	b	43.00		38.00	b	**43.00**		5.56	12.93
8	**42**	P4.1	D21.1	38.80		39.80		38.80		**39.13**		0.58	1.48
24	**43**	P4.1	D31	55.00	b	75.80	b	59.80		**59.80**		10.89	18.21
25	**44**	P4.1	D31	60.00						**60.00**			0.00
15	**45**	P5.5	D31	42.00		43.00		42.00		**42.33**		0.58	1.37
10	**46**	P5.2	D31	39.90		39.90		36.80	b	**39.46**		1.79	4.54
4	**47**	P4.1	D32	34.00		34.00		34.00		**34.00**	*	0.00	0.00
7	**50**	P4.1	D31	37.70		39.50		37.30		**37.94**		1.17	3.08
2	**53**	P4.1	D21.1	22.70		22.70		55.20	b	**23.14**	*	18.76	81.07
31	**38a**	P9.1	D42	104.00	a	101.00	a	103.00	a	**103.00**	*	1.53	1.49
32	**44a**	P4.2	D31	110.00	a	110.00	a	120.00	ab	**110.44**	*	5.77	5.22
3	**4a**	P9.1	D42	34.00		35.00		32.00		**34.00**	*	1.53	4.50
12	**4b**	P5.1	D21.1	34.67	b	41.52		40.13		**40.13**		3.62	9.02

Mean	Interlab.std. deviation	
	abs.	rel.%
50.75	**4.05**	**7.11**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **40.0**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Na**
Dimension: **µg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
30	**2**	P5.3	D31	459.80		455.30		458.30		**457.80**	2.29	0.50
37	**4**	P9.1	D41	509.00	a	661.00	ab	410.00	ab	**509.00**	126.43	24.84
21	**5**	P3.3	D28	425.00		430.00		415.00	b	**425.00**	7.64	1.80
17	**6**	P4.2	D31	420.00		420.00		410.00		**417.66**	5.77	1.38
34	**8**	P6.3	D31	447.00	b	485.00	b	468.00		**468.00**	19.04	4.07
32	**9**	P5.1	D31	464.40		464.90		464.90		**464.73**	0.29	0.06
28	**12**	P5.1	D31	433.00		441.00		437.00		**437.00**	4.00	0.92
33	**14**	P4.1	D21.1	466.70		467.60		468.50		**467.60**	0.90	0.19
13	**16**	P5.5	D31	400.00		400.00		500.00	b	**402.34**	57.74	14.35
14	**18**	P5.1	D31	403.90		402.30		408.90		**405.03**	3.44	0.85
10	**21**	P5.1	D31	373.70		381.30		378.00		**377.67**	3.81	1.01
12	**23**	P3.3	D31	401.00		377.00	b	394.00		**394.00**	12.34	3.13
1	**24**	P5.1	D21.1	196.20	ab	213.50	a	208.70	a	**208.70 ***	8.93	4.28
36	**25**	P5.1	D31	505.00	a	502.50	a	501.00	a	**502.83**	2.02	0.40
18	**26**	P3.5	D35	399.50	b	417.90		422.30		**417.76**	12.10	2.90
2	**27**	P6.1	D28	235.80	a	239.50	a	230.00	a	**235.31 ***	4.79	2.04
29	**28**	D5.1	D21.1	456.11		440.33	b	459.89		**455.66**	10.38	2.28
6	**30**	P6.5	D21.1	345.00	ab	324.60	a	314.40	ab	**324.60**	15.58	4.80
3	**35**	P3.5	D21.1	387.20	ab	296.30	a	274.80	ab	**296.30**	59.66	20.13
5	**36**	P3.3	D28	315.00	a	300.00	ab	340.00	ab	**315.00**	20.21	6.42
16	**37**	P5.5	D35	415.10		416.90		410.50		**414.17**	3.30	0.80
25	**38**	P4.1	D31	433.00		417.00	b	432.00		**430.16**	8.96	2.08
24	**39**	P5.5	D31	430.50		427.30		425.20		**427.67**	2.67	0.62
9	**40**	P5.7	D31	380.00		375.00		372.00		**375.67**	4.04	1.08
26	**41**	P4.1	D31	448.00	b	431.60		412.90	b	**431.60**	17.56	4.07
22	**42**	P4.1	D21.1	417.50		427.70		427.70		**425.36**	5.89	1.38
15	**43**	P4.1	D31	419.30		413.10		407.20		**413.10**	6.05	1.46
19	**44**	P4.1	D31	420.00		420.00		430.00		**422.34**	5.77	1.37
20	**45**	P5.5	D31	422.00		423.00		425.00		**423.33**	1.53	0.36
8	**46**	P5.2	D31	365.80		366.10		368.20		**366.70**	1.31	0.36
4	**47**	P4.1	D32	312.00	a	302.00	a	302.00	a	**304.34**	5.77	1.90
23	**50**	P4.1	D31	421.20		425.20		439.90	b	**425.54**	9.85	2.31
7	**53**	P4.1	D21.1	345.70		340.20		360.20	b	**345.70**	10.33	2.99
31	**38a**	P9.1	D42	460.00		454.00		460.00		**458.00**	3.46	0.76
35	**44a**	P4.2	D31	470.00	b	490.00		500.00	b	**490.00**	15.28	3.12
11	**4a**	P9.1	D42	380.00		360.00	b	390.00	b	**380.00**	15.28	4.02
27	**4b**	P5.1	D21.1	495.77	b	419.80	b	433.42		**433.42**	40.51	9.35

Mean	Interlab.std. deviation	
	abs.	rel.%
411.60	**14.46**	**3.63**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **5.4**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Na**
Dimension: **µg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
12	**2**	P5.3	D31	23.60	b	19.80	b	21.70		**21.70**	*	1.90	8.76
9	**5**	P3.3	D28	20.00		25.00	b	20.00		**20.11**	*	2.89	14.37
8	**6**	P4.2	D31	20.00		20.00		20.00		**20.00**	*	0.00	0.00
27	**8**	P6.3	D31	61.90		74.30	b	46.90	b	**61.90**	*	13.72	22.16
24	**9**	P5.1	D31	45.30	b	36.10		34.50	b	**36.10**		5.83	16.15
15	**12**	P5.1	D31	28.40		28.40		29.90	b	**28.51**		0.87	3.05
20	**14**	P4.1	D21.1	30.60		31.10		33.50	b	**31.10**		1.55	4.98
6	**18**	P5.1	D31	17.90		22.30	b	17.40		**17.90**	*	2.70	15.08
21	**21**	P5.1	D31	30.60		31.20		31.50		**31.20**		0.46	1.47
23	**23**	P3.3	D31	44.50	b	22.70	b	36.00		**36.00**		10.99	30.53
18	**24**	P5.1	D21.1	28.60	b	30.20		30.70		**30.20**		1.10	3.64
26	**25**	P5.1	D31	60.90		61.40		62.10		**61.40**	*	0.60	0.98
30	**26**	P3.5	D35	65.50	ab	70.30	a	70.40	a	**70.24**	*	2.80	3.99
17	**27**	P6.1	D28	34.40	b	30.10		28.50	b	**30.10**		3.05	10.13
11	**28**	D5.1	D21.1	21.62		20.82		21.65		**21.52**	*	0.47	2.18
14	**30**	P6.5	D21.1	24.30		23.90		24.80		**24.30**		0.45	1.85
32	**35**	P3.5	D21.1	91.70	a	91.70	a			**91.70**	*	0.00	0.00
31	**36**	P3.3	D28	85.00	a	90.00	ab	83.00	ab	**85.00**	*	3.61	4.25
3	**37**	P5.5	D35	17.10		16.80		17.80		**17.10**	*	0.51	2.98
4	**38**	P4.1	D31	17.00		23.00	b	17.00		**17.11**	*	3.46	20.22
33	**39**	P5.5	D31	121.30	a	121.30	a	122.40	a	**121.41**	*	0.64	0.53
22	**40**	P5.7	D31	31.20		35.60	b	29.80	b	**31.20**		3.03	9.71
25	**41**	P4.1	D31	68.50	b	50.30		31.50	b	**50.30**	*	18.50	36.78
10	**42**	P4.1	D21.1	20.30		19.30		21.30		**20.30**	*	1.00	4.93
19	**43**	P4.1	D31	30.20		37.60	b	30.90		**30.90**		4.09	13.24
13	**45**	P5.5	D31	24.00		24.00		24.00		**24.00**		0.00	0.00
2	**47**	P4.1	D32	16.00		16.00		16.00		**16.00**	*	0.00	0.00
7	**50**	P4.1	D31	19.00		18.40		19.10		**18.94**	*	0.38	2.01
1	**53**	P4.1	D21.1	2.70		12.70	b	0.20	b	**2.70**	*	6.61	244.81
28	**38a**	P9.1	D42	66.00	a	64.00	ab	67.00	a	**66.00**	*	1.53	2.32
29	**44a**	P4.2	D31	70.00	a	0.00	ab	70.00	a	**69.89**	*	40.41	57.82
16	**4a**	P9.1	D42	30.00		30.00		30.00		**30.00**		0.00	0.00
5	**4b**	P5.1	D21.1	16.99		17.53		18.49		**17.53**	*	0.76	4.34

Mean	Interlab.std. deviation	
	abs.	rel.%
32.47	**4.06**	**16.46**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **63.6**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **30.55**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Zn**
Dimension: **µg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**33a**	P3.31	D22	10.70	a	10.40	a	10.50	a	**10.53 ***	0.15	1.42
2	**49**	P4.1	D31	13.10	a	13.10	a	13.10	a	**13.10 ***	0.00	0.00
3	**23**	P3.3	D31	15.50	ab	13.00	a	13.00	a	**13.22 ***	1.44	10.89
4	**52**	P4.1	D31	16.50	ab	12.80	ab	14.90	a	**14.90 ***	1.86	12.48
5	**1**	P3.21	D21.1	14.50	ab	16.30	a	17.10	ab	**16.30 ***	1.33	8.16
6	**41**	P4.1	D31	17.40	ab	20.30	ab	18.20	a	**18.20**	1.50	8.24
7	**27**	P3.5	D21.1	19.20		18.40		18.70		**18.77**	0.40	2.13
8	**8**	P6.3	D31	19.00		18.90		19.10		**19.00**	0.10	0.53
9	**36**	P3.3	D21.1	18.60		19.60		19.30		**19.23**	0.51	2.65
10	**12**	P5.1	D31	18.50	b	19.60		25.90	b	**19.60**	3.99	20.36
11	**26**	P3.5	D31	19.80		20.00		19.30		**19.70**	0.36	1.83
12	**6**	P4.2	D31	20.00		20.00		20.00		**20.00**	0.00	0.00
13	**4**	P9.1	D41	20.00		21.00	b	20.00		**20.22**	0.58	2.87
14	**7**	P5.5	D31	21.10	b	20.00		20.00		**20.22**	0.64	3.17
15	**18**	P3.31	D31	20.70		20.30		20.80		**20.60**	0.26	1.26
16	**35**	P3.5	D21.1	26.80	b	20.50		20.40		**20.67**	3.67	17.76
17	**14**	P4.1	D31	20.70		19.20	b	22.20	b	**20.70**	1.50	7.25
18	**39**	P5.5	D35	21.30		20.60		20.70		**20.87**	0.38	1.82
19	**4a**	P9.1	D42	20.90		21.80	b	20.10	b	**20.90**	0.85	4.07
20	**24**	P5.1	D21.1	21.20		22.10	b	20.60		**21.20**	0.75	3.54
21	**4b**	P5.1	D31	20.97		21.00		22.63	b	**21.21**	0.95	4.48
22	**29**	P3.3	D31	21.00		21.50		21.30		**21.27**	0.25	1.18
23	**16**	P5.5	D31	22.00		21.10		21.40		**21.47**	0.46	2.14
24	**9**	P5.5	D31	21.30		21.90		21.40		**21.53**	0.32	1.49
25	**47**	P4.1	D32	21.60		21.70		21.50		**21.60**	0.10	0.46
26	**42**	P4.1	D31	22.20		21.30		21.50		**21.62**	0.47	2.17
27	**38**	P4.1	D31	21.60		21.80		21.80		**21.73**	0.12	0.55
28	**11**	P5.1	D31	21.80		21.60		22.10		**21.83**	0.25	1.15
29	**37**	P5.5	D35	21.80		22.10		21.60		**21.83**	0.25	1.15
30	**50**	P4.1	D31	22.00		21.60		22.10		**21.90**	0.26	1.19
31	**3**	P3.10	D31	20.00	b	22.00		24.00	b	**22.00**	2.00	9.09
32	**43**	P4.1	D31	22.50		22.00		21.40		**22.00**	0.55	2.50
33	**46**	P5.2	D31	22.10		22.80	b	21.30	b	**22.10**	0.75	3.39
34	**48**	P4.1	D31	21.40	b	22.10		25.30	b	**22.10**	2.08	9.41
35	**38a**	P9.1	D42	21.80		22.00		22.60		**22.12**	0.42	1.90
36	**44**	P4.1	D32	22.40		22.10		22.00		**22.17**	0.21	0.95
37	**5**	P3.3	D21.1	22.50		23.50	b	22.00		**22.50**	0.76	3.38
38	**17**	P5.5	D31	23.20		22.60		22.30		**22.67**	0.46	2.03
39	**28**	P5.1	D21.1	22.18	b	22.91		25.40	b	**22.91**	1.69	7.38
40	**44a**	P4.2	D32	22.50		22.90		23.40		**22.92**	0.45	1.96
41	**45**	P5.5	D31	24.00	b	22.00	b	23.00		**23.00**	1.00	4.35
42	**25**	P5.1	D31	24.40	a	24.00	a	24.60	a	**24.33**	0.31	1.27
43	**2**	P5.3	D31	24.50	a	25.70	ab	24.60	a	**24.77**	0.67	2.70
44	**10**	P6.5	D21.1	26.40	a	27.00	a	25.90	a	**26.40 ***	0.55	2.08
45	**30**	P6.5	D21.1	26.80	a	26.10	a	26.50	a	**26.47 ***	0.35	1.32
46	**21**	P5.1	D31	26.90	a	25.30	ab	26.80	a	**26.63 ***	0.90	3.38

Mean	Interlab.std. deviation	
	abs.	rel.%
21.19	**0.80**	**3.99**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **17.4**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Zn**
Dimension: **µg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**5**	P3.3	D21.1	10.50	a	10.50	a	10.50	a	**10.50**	*	0.00	0.00
2	**33a**	P3.31	D22	34.90	a	34.70	a	38.70	ab	**35.24**	*	2.25	6.38
3	**36**	P3.3	D21.1	57.00	ab	59.00	a	59.00	a	**58.56**	*	1.15	1.96
4	**35**	P3.5	D21.1	70.90	ab	75.40	a	78.60	ab	**75.40**	*	3.87	5.13
5	**23**	P3.3	D31	89.00	a	87.00	ab	94.00	ab	**89.00**		3.61	4.06
6	**1**	P3.21	D21.1	91.50	a	91.10	a	90.00	a	**90.87**		0.78	0.86
7	**8**	P6.3	D31	94.00		94.00		94.70		**94.23**		0.40	0.42
8	**27**	P3.5	D21.1	94.60		94.60		95.40		**94.87**		0.46	0.48
9	**41**	P4.1	D31	96.50		90.30	b	95.20		**95.20**		3.27	3.43
10	**9**	P5.5	D31	94.80		95.30		96.90		**95.49**		1.10	1.15
11	**25**	P5.1	D31	95.90		96.30		96.50		**96.23**		0.31	0.32
12	**52**	P4.1	D31	96.50		94.90	b	101.20	b	**96.50**		3.27	3.39
13	**12**	P5.1	D31	96.80		95.90		99.10	b	**96.80**		1.65	1.70
14	**49**	P4.1	D31	96.40		98.40		97.40		**97.40**		1.00	1.03
15	**39**	P5.5	D35	96.50		97.50		98.20		**97.41**		0.85	0.87
16	**26**	P3.5	D31	98.20		95.40	b	97.60		**97.46**		1.47	1.51
17	**7**	P5.5	D31	97.50		98.50		98.60		**98.20**		0.61	0.62
18	**24**	P5.1	D21.1	98.50		100.50	b	95.80	b	**98.50**		2.36	2.40
19	**11**	P5.1	D31	99.10		98.70		98.50		**98.77**		0.31	0.31
20	**4**	P9.1	D41	96.00	b	100.00		100.00		**99.56**		2.31	2.32
21	**38**	P4.1	D31	98.70		100.00		101.00		**100.00**		1.15	1.15
22	**37**	P5.5	D35	100.40		98.70	b	102.30	b	**100.40**		1.80	1.79
23	**10**	P6.5	D21.1	100.80		99.80		101.20		**100.60**		0.72	0.72
24	**4a**	P9.1	D42	102.50		101.50		100.10		**101.50**		1.21	1.19
25	**50**	P4.1	D31	102.00		101.20		102.20		**101.80**		0.53	0.52
26	**16**	P5.5	D31	102.00		98.40	b	102.60		**101.86**		2.27	2.23
27	**45**	P5.5	D31	102.00		101.00		103.00		**102.00**		1.00	0.98
28	**30**	P6.5	D21.1	102.20		105.30	b	101.10		**102.20**		2.18	2.13
29	**4b**	P5.1	D31	97.95	b	102.51		103.63		**102.51**		3.01	2.94
30	**48**	P4.1	D31	103.60		102.90		103.00		**103.17**		0.38	0.37
31	**21**	P5.1	D31	102.20	b	106.40	b	103.70		**103.70**		2.13	2.05
32	**18**	P3.31	D31	103.90		101.90	b	106.90	b	**103.90**		2.52	2.43
33	**42**	P4.1	D31	104.60		104.00		104.50		**104.37**		0.32	0.31
34	**2**	P5.3	D31	104.00		108.40	b	104.80		**104.84**		2.34	2.23
35	**3**	P3.10	D31	103.00	b	107.00	b	105.00		**105.00**		2.00	1.90
36	**44**	P4.1	D32	105.60		104.50		104.90		**105.00**		0.56	0.53
37	**46**	P5.2	D31	105.00		109.00	b	101.50	b	**105.00**		3.75	3.57
38	**43**	P4.1	D31	105.10		103.10	b	106.00		**105.10**		1.48	1.41
39	**14**	P4.1	D31	105.50		104.00	b	106.50		**105.50**		1.26	1.19
40	**38a**	P9.1	D42	106.30		105.50		105.60		**105.80**		0.44	0.42
41	**29**	P3.3	D31	106.90		105.40		105.50		**105.89**		0.84	0.79
42	**47**	P4.1	D32	107.10		107.50		107.50		**107.37**		0.23	0.21
43	**17**	P5.5	D31	108.30		109.20		105.90	b	**108.30**		1.71	1.58
44	**44a**	P4.2	D32	108.50		108.70		108.30		**108.50**		0.20	0.18
45	**28**	P5.1	D21.1	109.94		108.18		108.01		**108.54**		1.07	0.99
46	**6**	P4.2	D31	110.00	a	100.00	ab	110.00	a	**109.56**		5.77	5.27
										Mean		Interlab.std. deviation	
												abs.	rel.%
										100.40		**1.56**	**1.68**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/-** **20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **8.7**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Zn**
Dimension: **µg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**33a**	P3.31	D22	23.30	a	24.20	a	25.90	ab	**24.20 ***	1.32	5.45
2	**35**	P3.5	D21.1	47.20	a	44.40	ab	51.00	ab	**47.20 ***	3.31	7.01
3	**23**	P3.3	D31	48.40	a	48.50	a	45.40	ab	**48.23 ***	1.76	3.65
4	**1**	P3.21	D21.1	50.10	a	47.40	ab	49.10	a	**49.10**	1.37	2.79
5	**36**	P3.3	D21.1	51.30	a	51.30	a	48.60	ab	**51.08**	1.56	3.05
6	**5**	P3.3	D21.1	52.50	a	53.00	a	53.00	a	**52.83**	0.29	0.55
7	**27**	P3.5	D21.1	54.10	a	53.50	a	54.60	a	**54.10**	0.55	1.02
8	**8**	P6.3	D31	55.00	a	54.40	a	54.10	a	**54.47**	0.46	0.84
9	**11**	P5.1	D31	56.20		56.20		56.00		**56.13**	0.12	0.21
10	**7**	P5.5	D31	56.80		57.10		56.90		**56.93**	0.15	0.26
11	**4b**	P5.1	D31	61.08	b	57.42		57.12		**57.49**	2.20	3.83
12	**4**	P9.1	D41	57.00		58.00		59.00		**58.00**	1.00	1.72
13	**39**	P5.5	D35	58.20		59.00		58.50		**58.57**	0.40	0.68
14	**24**	P5.1	D21.1	58.90		61.80	b	57.70	b	**58.90**	2.11	3.58
15	**52**	P4.1	D31	58.90		50.30	b	64.20	b	**58.90**	7.01	11.90
16	**26**	P3.5	D31	60.00		59.10		59.50		**59.52**	0.45	0.76
17	**9**	P5.5	D31	59.80		60.00		59.10		**59.68**	0.47	0.79
18	**41**	P4.1	D31	62.40	b	59.70		59.40		**59.77**	1.65	2.76
19	**6**	P4.2	D31	60.00		60.00		60.00		**60.00**	0.00	0.00
20	**50**	P4.1	D31	59.80		60.50		61.40		**60.50**	0.80	1.32
21	**25**	P5.1	D31	60.40		60.50		60.70		**60.53**	0.15	0.25
22	**14**	P4.1	D31	60.70		57.60	b	63.40	b	**60.70**	2.90	4.78
23	**29**	P3.3	D31	61.00		60.80		60.60		**60.80**	0.20	0.33
24	**47**	P4.1	D32	61.80		60.20		60.80		**60.80**	0.81	1.33
25	**3**	P3.10	D31	63.00	b	61.00		60.00		**61.00**	1.53	2.51
26	**38**	P4.1	D31	61.70		59.20	b	61.00		**61.00**	1.29	2.11
27	**16**	P5.5	D31	61.40		58.30	b	63.60	b	**61.40**	2.66	4.33
28	**44**	P4.1	D32	61.70		62.00		61.80		**61.83**	0.15	0.24
29	**18**	P3.31	D31	62.30		61.80		61.60		**61.90**	0.36	0.58
30	**28**	P5.1	D21.1	62.65		60.92	b	62.06		**62.06**	0.88	1.42
31	**37**	P5.5	D35	61.60		62.40		62.20		**62.08**	0.42	0.68
32	**49**	P4.1	D31	73.20	b	50.10	b	62.10		**62.10**	11.55	18.60
33	**42**	P4.1	D31	62.40		62.10		63.60	b	**62.47**	0.79	1.26
34	**43**	P4.1	D31	63.00		62.30		62.80		**62.70**	0.36	0.57
35	**4a**	P9.1	D42	62.50		63.70		62.80		**62.87**	0.62	0.99
36	**12**	P5.1	D31	55.10	b	62.90		69.00	b	**62.90**	6.97	11.08
37	**45**	P5.5	D31	62.00		63.00		64.00		**63.00**	1.00	1.59
38	**46**	P5.2	D31	63.10		63.00		64.40	b	**63.27**	0.78	1.23
39	**48**	P4.1	D31	63.60		59.40	b	64.00		**63.58**	2.55	4.01
40	**44a**	P4.2	D32	62.80	b	67.60	b	64.10		**64.10**	2.48	3.87
41	**17**	P5.5	D31	64.60		64.40		61.20	b	**64.28**	1.91	2.97
42	**10**	P6.5	D21.1	65.00		63.30	b	65.10		**64.83**	1.01	1.56
43	**21**	P5.1	D31	66.40	b	64.90		63.30	b	**64.90**	1.55	2.39
44	**38a**	P9.1	D42	65.40		65.30		65.70		**65.47**	0.21	0.32
45	**2**	P5.3	D31	64.20	ab	66.70	a	66.80	a	**66.53**	1.47	2.21
46	**30**	P6.5	D21.1	69.70	a	69.40	a	70.00	a	**69.70**	0.30	0.43

Mean	Interlab.std. deviation	
	abs.	rel.%
60.45	**1.56**	**2.69**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.5**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Zn**
Dimension: **µg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**33a**	P3.31	D22	16.40	ab	12.40	ab	15.30	a	**15.30 ***	2.07	13.53
2	**35**	P3.5	D21.1	15.80	a	17.60	ab	16.10	a	**16.10 ***	0.96	5.96
3	**49**	P4.1	D31	18.20	ab	20.20	ab	19.20	a	**19.20 ***	1.00	5.21
4	**1**	P3.21	D21.1	22.90	ab	20.00	a	20.40	a	**20.40 ***	1.57	7.70
5	**52**	P4.1	D31	18.60	ab	21.40	a	23.30	ab	**21.40 ***	2.36	11.03
6	**23**	P3.3	D31	21.80	a	17.50	ab	23.70	ab	**21.80 ***	3.18	14.59
7	**27**	P3.5	D21.1	23.90	a	23.90	a	24.20	a	**24.00**	0.17	0.71
8	**8**	P6.3	D31	24.70		24.80		25.50	b	**24.86**	0.44	1.77
9	**29**	P3.3	D31	26.00		26.50		26.20		**26.21**	0.25	0.95
10	**4a**	P9.1	D42	26.80		26.80		26.70		**26.77**	0.06	0.22
11	**4**	P9.1	D41	26.00	b	27.00		27.00		**26.89**	0.58	2.16
12	**5**	P3.3	D21.1	27.00		26.50		27.00		**26.89**	0.29	1.08
13	**36**	P3.3	D21.1	25.90	b	26.90		28.20	b	**26.90**	1.15	4.28
14	**7**	P5.5	D31	26.90		27.40		27.00		**27.06**	0.26	0.96
15	**11**	P5.1	D31	27.30		27.10		27.20		**27.20**	0.10	0.37
16	**16**	P5.5	D31	27.30		26.60	b	29.60	b	**27.30**	1.57	5.75
17	**39**	P5.5	D35	27.40		27.10		27.40		**27.30**	0.17	0.62
18	**12**	P5.1	D31	27.50		27.30		27.40		**27.40**	0.10	0.36
19	**38**	P4.1	D31	27.50		27.40		27.30		**27.40**	0.10	0.36
20	**4b**	P5.1	D31	27.87		27.54		25.09	b	**27.54**	1.52	5.52
21	**24**	P5.1	D21.1	27.60		26.30	b	28.50	b	**27.60**	1.11	4.02
22	**9**	P5.5	D31	27.90		27.40		27.60		**27.61**	0.25	0.91
23	**26**	P3.5	D31	27.80		28.60	b	27.60		**27.81**	0.53	1.91
24	**47**	P4.1	D32	28.30		27.50		27.90		**27.90**	0.40	1.43
25	**25**	P5.1	D31	27.80		27.90		28.10		**27.93**	0.15	0.54
26	**18**	P3.31	D31	28.00		27.40	b	28.80	b	**28.00**	0.70	2.50
27	**44a**	P4.2	D32	29.20	b	28.10		28.00		**28.16**	0.67	2.38
28	**37**	P5.5	D35	28.20		28.00		28.50		**28.21**	0.25	0.89
29	**44**	P4.1	D32	28.80		28.80		28.80		**28.80**	0.00	0.00
30	**50**	P4.1	D31	28.70		28.70		29.30		**28.81**	0.35	1.21
31	**3**	P3.10	D31	28.00	b	29.00		39.00	b	**29.00**	6.08	20.97
32	**38a**	P9.1	D42	28.90		29.40		29.00		**29.06**	0.26	0.89
33	**28**	P5.1	D21.1	29.52		25.91	b	29.88		**29.52**	2.20	7.45
34	**14**	P4.1	D31	29.30		29.70		29.80		**29.64**	0.26	0.88
35	**45**	P5.5	D31	29.00	b	30.00		30.00		**29.89**	0.58	1.94
36	**41**	P4.1	D31	26.80	b	29.90		30.40		**29.90**	1.95	6.52
37	**42**	P4.1	D31	30.00		29.90		29.80		**29.90**	0.10	0.33
38	**43**	P4.1	D31	28.70	b	31.10	b	29.90		**29.90**	1.20	4.01
39	**6**	P4.2	D31	30.00		30.00		30.00		**30.00**	0.00	0.00
40	**17**	P5.5	D31	31.50	b	29.90		30.40		**30.40**	0.82	2.70
41	**48**	P4.1	D31	30.30		30.30		33.40	b	**30.41**	1.79	5.89
42	**21**	P5.1	D31	31.10		30.40	b	32.00	b	**31.10**	0.80	2.57
43	**2**	P5.3	D31	30.40	b	31.30		32.20	b	**31.30**	0.90	2.88
44	**30**	P6.5	D21.1	33.20	a	32.90	a	32.20	ab	**32.90**	0.51	1.55
45	**10**	P6.5	D21.1	37.80	a	37.40	a	38.10	a	**37.80 ***	0.35	0.93

Mean	Interlab.std. deviation	
	abs.	rel.%
27.95	**0.89**	**3.52**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **15.6**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **27.54**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Mn**
Dimension: **µg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**35**	P3.5	D21.1	997.00	a	856.00	ab	1113.00	ab	**997.00**	*	128.70	12.91
2	**30**	P3.21	D21.1	1067.00	a	1072.00	a	1053.00	a	**1065.05**	*	9.85	0.92
3	**27**	P6.1	D21.1	1312.00	a	1312.00	a	1312.00	a	**1312.00**		0.00	0.00
4	**4**	P9.1	D41	1333.00	ab	1371.00	a	1385.00	a	**1371.00**		26.91	1.96
5	**29**	P3.3	D31	1392.00		1415.00	b	1385.00		**1392.95**		15.70	1.13
6	**7**	P5.5	D31	1400.00		1390.00		1400.00		**1396.67**		5.77	0.41
7	**8**	P6.3	D31	1390.00	b	1410.00		1420.00		**1410.00**		15.28	1.08
8	**38**	P4.1	D31	1452.00	b	1413.00		1409.00		**1415.45**		23.76	1.68
9	**24**	P5.1	D21.1	1420.00		1535.00	b	1392.00	b	**1420.00**		75.78	5.34
10	**23**	P3.3	D31	1429.00		1454.00	b	1214.00	b	**1429.00**		131.94	9.23
11	**51**	P9.1	D42	1389.00	b	1437.00		1456.00		**1437.00**		34.53	2.40
12	**45**	P5.5	D31	1461.00		1441.00		1440.00		**1444.95**		11.85	0.82
13	**12**	P5.1	D31	1454.00		1462.00		1440.00		**1453.55**		11.14	0.77
14	**38a**	P9.1	D42	1468.00		1463.00		1475.00		**1468.67**		6.03	0.41
15	**36**	P3.3	D21.1	1427.00	b	1472.00		1521.00	b	**1472.00**		47.01	3.19
16	**1**	P3.21	D21.1	1490.00		1492.00		1492.00		**1491.33**		1.15	0.08
17	**18**	P3.31	D31	1496.00		1523.00	b	1480.00		**1496.00**		21.73	1.45
18	**37**	P5.5	D35	1508.00		1520.00		1491.00		**1508.00**		14.57	0.97
19	**41**	P4.1	D31	1509.00		1512.00		1510.00		**1510.33**		1.53	0.10
20	**4b**	P5.1	D31	1513.51		1454.97	b	1624.10	b	**1513.51**		85.89	5.67
21	**52**	P4.1	D31	1517.00		1571.00	b	1516.00		**1520.95**		31.47	2.07
22	**43**	P4.1	D31	1538.00		1528.00		1509.00		**1528.00**		14.73	0.96
23	**47**	P4.1	D32	1526.00		1557.00	b	1525.00		**1529.95**		18.19	1.19
24	**40**	P5.7	D31	1560.00	b	1530.00		1510.00	b	**1530.00**		25.17	1.65
25	**17**	P5.5	D31	1533.00		1536.00		1523.00		**1530.67**		6.81	0.44
26	**5**	P3.3	D21.1	1535.00		1540.00		1525.00		**1533.33**		7.64	0.50
27	**53**	P4.1	D21.1	1510.00	b	1554.00		1535.00		**1535.00**		22.07	1.44
28	**11**	P5.1	D31	1537.00		1538.00		1536.00		**1537.00**		1.00	0.07
29	**25**	P5.1	D31	1540.00		1550.00		1530.00		**1540.00**		10.00	0.65
30	**44**	P4.1	D31	1540.00		1550.00		1550.00		**1546.67**		5.77	0.37
31	**16**	P5.5	D31	1522.00	b	1550.00		1642.00	b	**1550.00**		62.78	4.05
32	**14**	P4.1	D31	1574.00	b	1539.00		1554.00		**1554.00**		17.56	1.13
33	**10**	P6.5	D21.1	1622.00	b	1564.00		1559.00		**1565.95**		35.02	2.24
34	**4a**	P9.1	D42	1568.00		1584.00		1550.00		**1568.00**		17.01	1.08
35	**49**	P4.1	D31	1574.00		1574.00		1574.00		**1574.00**		0.00	0.00
36	**42**	P4.1	D31	1573.00		1585.00		1578.00		**1578.67**		6.03	0.38
37	**44a**	P4.2	D31	1590.00		1590.00		1560.00	b	**1585.55**		17.32	1.09
38	**50**	P4.1	D31	1586.00		1582.00		1610.00	b	**1588.45**		15.14	0.95
39	**2**	P5.3	D31	1582.00		1649.00	b	1591.00		**1591.00**		36.36	2.29
40	**26**	P3.5	D31	1591.00		1625.00	b	1539.00	b	**1591.00**		43.31	2.72
41	**6**	P4.2	D31	1610.00		1590.00	b	1640.00	b	**1610.00**		25.17	1.56
42	**3**	P3.10	D31	1577.00	b	1616.00		1616.00		**1611.55**		22.52	1.40
43	**28**	P5.1	D21.1	1625.61		1620.71		1601.93		**1618.71**		12.50	0.77
44	**21**	P5.1	D31	1607.00		1622.00		1665.00	b	**1622.00**		30.11	1.86
45	**48**	P4.1	D31	1626.00		1630.00		1597.00	b	**1623.55**		18.01	1.11
46	**46**	P5.2	D31	1640.00		1640.00		1584.00	b	**1635.55**		32.33	1.98
47	**9**	P5.5	D31	1657.00	a	1662.00	a	1658.00	a	**1659.00**		2.65	0.16
48	**39**	P5.5	D31	1773.00	a	1756.00	a	1770.00	a	**1767.05**		9.07	0.51
										Mean		Interlab.std. deviation	
												abs.	rel.%
										1519.00		**25.31**	**1.77**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **4.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Mn**
Dimension: **µg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**35**	P3.5	D21.1	477.00	ab	418.00	ab	450.00	a	**450.00 ***	29.54	6.56
2	**30**	P3.21	D21.1	689.00	a	676.00	a	663.00	a	**676.00 ***	13.00	1.92
3	**27**	P6.1	D21.1	901.00	ab	848.00	a	795.00	ab	**848.00**	53.00	6.25
4	**23**	P3.3	D31	908.00	ab	894.00	a	832.00	ab	**894.00**	40.45	4.52
5	**38**	P4.1	D31	910.00	a	911.00	a	949.00	ab	**914.95**	22.23	2.43
6	**53**	P4.1	D21.1	940.00		942.00		939.00		**940.33**	1.53	0.16
7	**45**	P5.5	D31	943.00		939.00		945.00		**942.33**	3.06	0.32
8	**4**	P9.1	D41	918.00	b	943.00		958.00	b	**943.00**	20.21	2.14
9	**29**	P3.3	D31	967.00		965.00		958.00		**963.33**	4.73	0.49
10	**40**	P5.7	D31	979.00		966.00		958.00		**966.45**	10.60	1.10
11	**8**	P6.3	D31	977.00		971.00		971.00		**973.00**	3.46	0.36
12	**12**	P5.1	D31	972.00		971.00		1000.00	b	**975.95**	16.46	1.69
13	**37**	P5.5	D35	990.00		970.00		974.00		**976.45**	10.58	1.08
14	**7**	P5.5	D31	967.00		977.00		987.00		**977.00**	10.00	1.02
15	**1**	P3.21	D21.1	996.00		979.00		984.00		**985.95**	8.74	0.89
16	**25**	P5.1	D31	980.00		990.00		990.00		**986.67**	5.77	0.58
17	**41**	P4.1	D31	993.00		988.00		984.00		**988.33**	4.51	0.46
18	**47**	P4.1	D32	989.00		977.00		997.00		**988.55**	10.07	1.02
19	**51**	P9.1	D42	978.00		991.00		996.00		**989.05**	9.29	0.94
20	**49**	P4.1	D31	990.00		1000.00		995.00		**995.00**	5.00	0.50
21	**52**	P4.1	D31	975.00	b	1043.00	b	1001.00		**1001.00**	34.31	3.43
22	**46**	P5.2	D31	1017.00		1004.00		1013.00		**1011.33**	6.66	0.66
23	**36**	P3.3	D21.1	1013.00		1048.00	b	997.00	b	**1013.00**	26.08	2.57
24	**38a**	P9.1	D42	1016.00		1016.00		1008.00		**1013.33**	4.62	0.46
25	**43**	P4.1	D31	1010.00		1015.00		1023.00		**1016.00**	6.56	0.65
26	**44**	P4.1	D31	1020.00		1010.00		1020.00		**1016.67**	5.77	0.57
27	**4a**	P9.1	D42	1026.00		1022.00		1012.00		**1020.00**	7.21	0.71
28	**50**	P4.1	D31	1027.00		1009.00		1026.00		**1022.05**	10.12	0.99
29	**11**	P5.1	D31	1029.00		1023.00		1026.00		**1026.00**	3.00	0.29
30	**17**	P5.5	D31	1033.00		1030.00		1023.00		**1028.67**	5.13	0.50
31	**18**	P3.31	D31	1020.00		1029.00		1047.00	b	**1029.00**	13.75	1.34
32	**42**	P4.1	D31	1026.00		1036.00		1028.00		**1030.00**	5.29	0.51
33	**21**	P5.1	D31	1028.00		1026.00		1082.00	b	**1031.45**	31.77	3.08
34	**2**	P5.3	D31	1011.00	b	1072.00	b	1032.00		**1032.00**	30.99	3.00
35	**24**	P5.1	D21.1	1002.00	b	1080.00	b	1035.00		**1035.00**	39.15	3.78
36	**26**	P3.5	D31	956.00	b	1036.00		1078.00	b	**1036.00**	61.98	5.98
37	**48**	P4.1	D31	1035.00		1042.00		1048.00		**1041.67**	6.51	0.62
38	**5**	P3.3	D21.1	1040.00		1055.00		1035.00		**1041.95**	10.41	1.00
39	**4b**	P5.1	D31	1004.48	b	1046.88		1057.26		**1046.88**	27.96	2.67
40	**6**	P4.2	D31	1050.00		1030.00	b	1060.00		**1050.00**	15.28	1.46
41	**3**	P3.10	D31	1049.00		1071.00	b	1043.00		**1050.45**	14.74	1.40
42	**9**	P5.5	D31	1052.00		1048.00		1058.00		**1052.67**	5.03	0.48
43	**10**	P6.5	D21.1	1016.00	b	1061.00		1056.00		**1054.05**	24.66	2.34
44	**16**	P5.5	D31	1055.00		1116.00	b	864.00	b	**1055.00**	131.47	12.46
45	**28**	P5.1	D21.1	1076.04		1021.06	b	1075.78		**1071.46**	31.67	2.96
46	**39**	P5.5	D31	1071.00		1085.00		1082.00		**1079.33**	7.37	0.68
47	**44a**	P4.2	D31	1050.00	ab	1090.00	a	1090.00	a	**1085.55**	23.09	2.13
48	**14**	P4.1	D31	1097.00	a	1060.00	ab	1103.00	a	**1095.55**	23.29	2.13
										Mean	Interlab.std. deviation	
											abs.	rel.%
										1007.00	**18.67**	**1.94**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **4.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Mn**
Dimension: **µg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
8	**1**	P3.21	D21.1	760.00		762.00		762.00		**761.33**		1.15	0.15
41	**2**	P5.3	D31	850.00	b	873.00		871.00		**868.66**		12.74	1.47
36	**3**	P3.10	D31	859.00		855.00		887.00	b	**860.34**		17.44	2.03
5	**4**	P9.1	D41	740.00	b	751.00		761.00		**751.00**		10.50	1.40
39	**5**	P3.3	D21.1	865.00		840.00	b	865.00		**861.66**		14.43	1.67
33	**6**	P4.2	D31	850.00		880.00	b	840.00		**850.00**		20.82	2.45
11	**7**	P5.5	D31	792.00		788.00		782.00		**787.33**		5.03	0.64
6	**8**	P6.3	D31	769.00	b	752.00		723.00	b	**752.00**		23.26	3.09
43	**9**	P5.5	D31	882.00		877.00		879.00		**879.33**		2.52	0.29
38	**10**	P6.5	D21.1	861.00		837.00	b	881.00	b	**861.00**		22.03	2.56
24	**11**	P5.1	D31	829.00		832.00		829.00		**830.00**		1.73	0.21
28	**12**	P5.1	D31	795.00	b	845.00		850.00		**844.16**		30.41	3.60
42	**14**	P4.1	D31	875.00		870.00		886.00		**875.84**		8.19	0.94
48	**16**	P5.5	D31	825.00	ab	915.00	a	1361.00	ab	**915.00**		287.03	31.37
32	**17**	P5.5	D31	854.00		852.00		842.00		**849.66**		6.43	0.76
25	**18**	P3.31	D31	835.00		830.00		825.00		**830.00**		5.00	0.60
46	**21**	P5.1	D31	899.00		852.00	b	909.00		**899.00**		30.44	3.39
4	**23**	P3.3	D31	711.00	ab	699.00	a	674.00	ab	**699.00**		18.88	2.70
29	**24**	P5.1	D21.1	845.00		874.00	b	837.00		**845.00**		19.47	2.30
30	**25**	P5.1	D31	850.00		850.00		830.00	b	**846.66**		11.55	1.36
27	**26**	P3.5	D31	870.00	b	816.00	b			**843.00**		38.18	4.53
3	**27**	P6.1	D21.1	742.00	ab	689.00	a	689.00	a	**692.34**		30.60	4.42
45	**28**	P5.1	D21.1	892.80		856.82	b	891.23		**888.68**		20.34	2.29
14	**29**	P3.3	D31	805.00		801.00		795.00		**800.33**		5.03	0.63
1	**30**	P3.21	D21.1	538.00	ab	559.00	a	552.00	a	**552.00**	*	10.69	1.94
2	**35**	P3.5	D21.1	503.00	ab	736.00	ab	609.00	a	**609.00**	*	116.66	19.16
7	**36**	P3.3	D21.1	758.00		787.00	b	743.00	b	**758.00**		22.37	2.95
26	**37**	P5.5	D35	835.00		840.00		838.00		**837.67**		2.52	0.30
9	**38**	P4.1	D31	775.00		769.00		829.00	b	**775.34**		33.05	4.26
47	**39**	P5.5	D31	915.00	a	914.00	a	914.00	a	**914.33**		0.58	0.06
13	**40**	P5.7	D31	818.00	b	791.00		784.00		**791.00**		17.95	2.27
23	**41**	P4.1	D31	836.00		824.00		829.00		**829.67**		6.03	0.73
35	**42**	P4.1	D31	851.00		852.00		858.00		**853.67**		3.79	0.44
20	**43**	P4.1	D31	823.00		819.00		825.00		**822.33**		3.06	0.37
22	**44**	P4.1	D31	830.00		820.00		830.00		**826.67**		5.77	0.70
10	**45**	P5.5	D31	781.00		784.00		783.00		**782.67**		1.53	0.20
21	**46**	P5.2	D31	838.00	b	823.00		823.00		**826.34**		8.66	1.05
18	**47**	P4.1	D32	806.00		805.00		809.00		**806.67**		2.08	0.26
31	**48**	P4.1	D31	842.90		875.60	b	847.90		**848.74**		17.61	2.07
16	**49**	P4.1	D31	810.00		799.00		804.00		**804.33**		5.51	0.69
34	**50**	P4.1	D31	853.00		847.00		862.00		**853.34**		7.55	0.88
17	**51**	P9.1	D42	799.00		806.00		819.00	b	**806.00**		10.15	1.26
19	**52**	P4.1	D31	811.00		857.00	b	816.00		**816.84**		25.24	3.09
12	**53**	P4.1	D21.1	780.00		790.00		794.00		**788.66**		7.21	0.91
40	**38a**	P9.1	D42	869.00		868.00		865.00		**867.33**		2.08	0.24
44	**44a**	P4.2	D31	850.00	b	910.00	b	880.00		**880.00**		30.00	3.41
37	**4a**	P9.1	D42	869.00		853.00		861.00		**861.00**		8.00	0.93
15	**4b**	P5.1	D31	803.81		803.81		800.41		**802.68**		1.96	0.24
										Mean		Interlab.std. deviation	
												abs.	rel.%
										826.00		**20.69**	**2.57**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **4.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Mn**
Dimension: **µg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**30**	P3.21	D21.1	863.00	a	875.00	a	874.00	a	**870.67**	*	6.66	0.76
2	**35**	P3.5	D21.1	869.00	a	1068.00	ab	865.00	a	**874.79**	*	116.06	13.27
3	**23**	P3.3	D31	1125.00	a	1045.00	ab	1122.00	a	**1115.71**		45.35	4.06
4	**27**	P6.1	D21.1	1182.00	ab	1128.00	a	1128.00	a	**1135.79**		31.18	2.75
5	**1**	P3.21	D21.1	1223.00		1202.00		1194.00		**1205.79**		14.98	1.24
6	**4b**	P5.1	D31	1211.25		1275.91	b	1192.97		**1211.25**		43.58	3.60
7	**4**	P9.1	D41	1214.00		1222.00		1250.00	b	**1225.79**		18.90	1.54
8	**8**	P6.3	D31	1220.00		1230.00		1230.00		**1226.67**		5.77	0.47
9	**45**	P5.5	D31	1236.00		1231.00		1236.00		**1234.33**		2.89	0.23
10	**36**	P3.3	D21.1	1252.00		1191.00	b	1237.00		**1236.71**		31.79	2.57
11	**12**	P5.1	D31	1216.00	b	1282.00	b	1254.00		**1254.00**		33.13	2.64
12	**53**	P4.1	D21.1	1247.00		1256.00		1282.00	b	**1259.29**		18.18	1.44
13	**40**	P5.7	D31	1251.00		1270.00		1283.00		**1268.71**		16.09	1.27
14	**47**	P4.1	D32	1283.00		1264.00		1275.00		**1274.00**		9.54	0.75
15	**7**	P5.5	D31	1270.00		1290.00		1280.00		**1280.00**		10.00	0.78
16	**51**	P9.1	D42	1273.00		1299.00		1276.00		**1282.29**		14.22	1.11
17	**25**	P5.1	D31	1290.00		1300.00		1300.00		**1296.67**		5.77	0.44
18	**4a**	P9.1	D42	1296.00		1307.00		1294.00		**1299.00**		7.00	0.54
19	**29**	P3.3	D31	1290.00		1295.00		1314.00		**1299.67**		12.66	0.97
20	**38**	P4.1	D31	1229.00	b	1384.00	b	1311.00		**1311.00**		77.54	5.91
21	**38a**	P9.1	D42	1312.00		1312.00		1312.00		**1312.00**		0.00	0.00
22	**46**	P5.2	D31	1329.00		1304.00		1317.00		**1316.67**		12.50	0.95
23	**52**	P4.1	D31	1303.00		1377.00	b	1315.00		**1316.79**		39.72	3.02
24	**10**	P6.5	D21.1	1294.00	b	1335.00		1318.00		**1318.00**		20.60	1.56
25	**11**	P5.1	D31	1325.00		1325.00		1314.00		**1321.33**		6.35	0.48
26	**5**	P3.3	D21.1	1350.00	b	1320.00		1315.00		**1325.29**		18.93	1.43
27	**49**	P4.1	D31	1308.00		1348.00		1328.00		**1328.00**		20.00	1.51
28	**18**	P3.31	D31	1317.00		1326.00		1349.00		**1329.29**		16.50	1.24
29	**44**	P4.1	D31	1350.00		1330.00		1340.00		**1340.00**		10.00	0.75
30	**44a**	P4.2	D31	1390.00	b	1340.00		1320.00		**1340.00**		36.06	2.69
31	**24**	P5.1	D21.1	1274.00	b	1350.00		1365.00		**1349.71**		48.79	3.61
32	**43**	P4.1	D31	1339.00		1355.00		1358.00		**1350.67**		10.21	0.76
33	**6**	P4.2	D31	1350.00		1360.00		1350.00		**1353.33**		5.77	0.43
34	**42**	P4.1	D31	1356.00		1364.00		1344.00		**1354.67**		10.07	0.74
35	**50**	P4.1	D31	1345.00		1400.00	b	1350.00		**1355.29**		30.41	2.24
36	**17**	P5.5	D31	1354.00		1375.00		1357.00		**1362.00**		11.36	0.83
37	**41**	P4.1	D31	1363.00		1375.00		1356.00		**1364.67**		9.61	0.70
38	**9**	P5.5	D31	1358.00		1379.00		1359.00		**1365.33**		11.85	0.87
39	**37**	P5.5	D35	1365.00		1370.00		1380.00		**1371.67**		7.64	0.56
40	**28**	P5.1	D21.1	1355.47		1376.93		1382.00		**1371.68**		14.08	1.03
41	**21**	P5.1	D31	1343.00	b	1377.00		1393.00		**1377.00**		25.53	1.85
42	**3**	P3.10	D31	1374.00		1367.00		1422.00	b	**1378.29**		29.94	2.17
43	**48**	P4.1	D31	1384.00		1370.00		1391.00		**1381.67**		10.69	0.77
44	**26**	P3.5	D31	1371.00	b	1412.00	b			**1391.50**		28.99	2.08
45	**2**	P5.3	D31	1345.00	b	1437.00	b	1401.00		**1401.00**		46.36	3.31
46	**14**	P4.1	D31	1448.00	a	1445.00	a	1436.00	a	**1443.00**		6.24	0.43
47	**16**	P5.5	D31	1357.00	ab	1447.00	a	1541.00	ab	**1447.00**		92.01	6.36
48	**39**	P5.5	D31	1458.00	a	1462.00	a	1432.00	ab	**1452.21**		16.29	1.12
										Mean		Interlab.std. deviation	
												abs.	rel.%
										1313.00		**23.29**	**1.87**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **4.2**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **1328**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Fe**
Dimension: **µg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**35**	P3.5	D21.1	42.20	a	37.10	a			**39.65**	*	3.61	9.10
2	**27**	P6.1	D21.1	78.20	a	78.20	a	85.50	ab	**79.31**	*	4.21	5.31
3	**51**	P9.1	D42	81.50	ab	87.90	a	87.30	a	**86.49**	*	3.53	4.08
4	**28**	P5.1	D21.1	82.70	ab	90.15	a	90.19	a	**89.06**	*	4.31	4.84
5	**26**	P3.5	D31	98.10	ab	92.20	a	80.00	ab	**92.20**	*	9.23	10.01
6	**21**	P5.1	D31	92.80	a	99.70	ab	94.20	a	**94.61**	*	3.65	3.86
7	**2**	P5.3	D31	98.90		109.30	b	102.10		**102.10**	*	5.33	5.22
8	**30**	P3.21	D21.1	105.30		104.10		102.90		**104.10**	*	1.20	1.15
9	**40**	P5.7	D31	104.00		107.00		106.00		**105.67**	*	1.53	1.45
10	**9**	P5.5	D31	105.40		106.00		112.60	b	**106.81**	*	3.99	3.74
11	**25**	P5.1	D31	108.00		110.00		111.00		**109.67**		1.53	1.40
12	**4b**	P5.1	D31	112.69		102.51	b	127.69	b	**112.69**		12.67	11.24
13	**36**	P3.3	D21.1	105.20	b	114.40		117.00		**114.40**		6.20	5.42
14	**11**	P5.1	D31	125.00		122.40		120.60		**122.61**		2.21	1.80
15	**38a**	P9.1	D42	124.90		124.80		123.00		**124.23**		1.07	0.86
16	**7**	P5.5	D31	129.00	b	125.00		113.00	b	**125.00**		8.33	6.66
17	**12**	P5.1	D31	108.80	b	139.50	b	127.10		**127.10**		15.44	12.15
18	**20**	P3.1	D21.1	125.00		130.00		128.00		**127.89**		2.52	1.97
19	**1**	P3.21	D21.1	136.00	b	104.80	b	131.00		**131.00**		16.76	12.79
20	**8**	P6.3	D31	130.00		133.00		139.00	b	**133.00**		4.58	3.44
21	**5**	P3.3	D21.1	137.00		135.50		132.50		**135.14**		2.29	1.69
22	**24**	P5.1	D21.1	136.20		130.50	b	142.30	b	**136.20**		5.90	4.33
23	**14**	P4.1	D31	136.70		134.80		140.10		**136.86**		2.69	1.97
24	**29**	P3.3	D31	135.50	b	141.00		144.00		**141.00**		4.31	3.06
25	**16**	P5.5	D31	143.00		140.00		147.00	b	**143.00**		3.51	2.45
26	**48**	P4.1	D31	142.50		152.60	b	142.20		**143.46**		5.92	4.13
27	**53**	P4.1	D21.1	150.10	b	143.60		131.10	b	**143.60**		9.66	6.73
28	**18**	P3.31	D31	140.10	b	145.00		145.90		**144.34**		3.12	2.16
29	**41**	P4.1	D31	142.40	b	161.30	b	147.00		**147.00**		9.86	6.71
30	**17**	P5.5	D31	149.80		152.20		144.00	b	**149.80**		4.22	2.82
31	**44**	P4.1	D31	150.00		150.00		150.00		**150.00**		0.00	0.00
32	**52**	P4.1	D31	148.20		151.50		151.70		**150.49**		1.97	1.31
33	**45**	P5.5	D31	150.00		153.00		149.00		**150.61**		2.08	1.38
34	**3**	P3.10	D31	151.00		153.00		144.00	b	**150.89**		4.73	3.13
35	**6**	P4.2	D31	150.00		150.00		160.00	b	**151.11**		5.77	3.82
36	**47**	P4.1	D32	150.00		151.00		153.00		**151.33**		1.53	1.01
37	**4a**	P9.1	D42	152.20		153.10		150.00		**151.77**		1.59	1.05
38	**23**	P3.3	D31	153.00		147.00	b	154.00		**152.39**		3.79	2.49
39	**49**	P4.1	D31	159.70	b	149.70	b	154.70		**154.70**		5.00	3.23
40	**50**	P4.1	D31	154.70		154.40		155.70		**154.93**		0.68	0.44
41	**37**	P5.5	D35	157.20		158.60		158.30		**158.03**		0.74	0.47
42	**42**	P4.1	D31	156.80		158.70		158.70		**158.07**		1.10	0.70
43	**43**	P4.1	D31	160.80		160.60		155.50	b	**159.59**		3.00	1.88
44	**44a**	P4.2	D31	160.00		160.00		160.00		**160.00**		0.00	0.00
45	**38**	P4.1	D31	159.00		162.00		162.00		**161.00**		1.73	1.07
46	**46**	P5.2	D31	176.30	b	162.60		161.30		**163.06**		8.31	5.10
47	**39**	P5.5	D31	165.30		164.20		167.40		**165.63**	*	1.63	0.98
48	**10**	P6.5	D21.1	171.70		171.00		172.50		**171.73**	*	0.75	0.44
49	**4**	P9.1	D41	171.90	ab	181.20	a	181.50	a	**180.24**	*	5.46	3.03
										Mean		Interlab.std. deviation	
												abs.	rel.%
										136.00		**4.35**	**3.55**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **26.5**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Fe**
Dimension: **µg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**35**	P3.5	D21.1	27.80	a	30.90	a			**29.35**	*	2.19	7.46
2	**51**	P9.1	D42	37.20	a	36.70	a	41.70	ab	**37.51**	*	2.75	7.33
3	**1**	P3.21	D21.1	43.50	a	43.50	a	44.00	a	**43.67**	*	0.29	0.66
4	**38a**	P9.1	D42	43.50	a	44.50	a	43.50	a	**43.83**	*	0.58	1.32
5	**27**	P6.1	D21.1	42.40	ab	48.70	ab	45.50	a	**45.50**	*	3.15	6.92
6	**23**	P3.3	D31	48.40	ab	46.10	a	42.20	ab	**46.10**	*	3.13	6.79
7	**4b**	P5.1	D31	49.19		54.01	b	51.08		**51.08**		2.43	4.76
8	**52**	P4.1	D31	56.80	b	51.10		49.50		**51.10**		3.84	7.51
9	**30**	P3.21	D21.1	52.60		51.40		50.15		**51.40**		1.23	2.39
10	**2**	P5.3	D31	51.70		57.30	b	51.50		**52.16**		3.29	6.31
11	**49**	P4.1	D31	50.90	b	54.90		53.00		**53.00**		2.00	3.77
12	**9**	P5.5	D31	54.40		53.70		49.70	b	**53.49**		2.54	4.75
13	**12**	P5.1	D31	53.70		51.70	b	58.60	b	**53.70**		3.55	6.61
14	**26**	P3.5	D31	48.20	b	54.00		56.40	b	**54.00**		4.22	7.81
15	**7**	P5.5	D31	54.20		54.30		54.40		**54.30**		0.10	0.18
16	**41**	P4.1	D31	54.40		57.50	b	53.20		**54.40**		2.22	4.08
17	**8**	P6.3	D31	55.10		53.50		56.70		**55.10**		1.60	2.90
18	**29**	P3.3	D31	55.80		55.00		54.90		**55.23**		0.49	0.89
19	**16**	P5.5	D31	55.00		55.00		60.00	b	**55.56**		2.89	5.20
20	**21**	P5.1	D31	56.20		59.70	b	54.50		**56.20**		2.65	4.72
21	**38**	P4.1	D31	56.20		56.90		56.00		**56.37**		0.47	0.83
22	**47**	P4.1	D32	56.00		58.00		57.00		**57.00**		1.00	1.75
23	**28**	P5.1	D21.1	58.61		57.61		51.43	b	**57.55**		3.89	6.76
24	**40**	P5.7	D31	63.40	b	49.90	b	57.60		**57.60**		6.77	11.75
25	**3**	P3.10	D31	58.00		59.00		56.00	b	**57.94**		1.53	2.64
26	**11**	P5.1	D31	58.70		58.90		58.30		**58.63**		0.31	0.53
27	**18**	P3.31	D31	58.40		58.70		62.60	b	**59.11**		2.34	3.96
28	**45**	P5.5	D31	59.00		59.00		60.00		**59.33**		0.58	0.98
29	**50**	P4.1	D31	60.40		59.60		59.50		**59.83**		0.49	0.82
30	**6**	P4.2	D31	60.00		60.00		60.00		**60.00**		0.00	0.00
31	**44a**	P4.2	D31	60.00		60.00		60.00		**60.00**		0.00	0.00
32	**24**	P5.1	D21.1	60.10		56.50	b	62.60	b	**60.10**		3.07	5.11
33	**48**	P4.1	D31	59.70		60.60		60.20		**60.17**		0.45	0.75
34	**42**	P4.1	D31	60.10		59.80		63.50	b	**60.51**		2.06	3.40
35	**44**	P4.1	D31	70.00	b	60.00		60.00		**60.56**		5.77	9.53
36	**37**	P5.5	D35	62.30		61.70		60.80		**61.60**		0.75	1.22
37	**14**	P4.1	D31	62.70		63.20		61.40		**62.43**		0.93	1.49
38	**5**	P3.3	D21.1	58.00	b	63.50		63.00		**62.69**		3.04	4.85
39	**17**	P5.5	D31	65.60	b	62.80		61.50		**62.80**		2.10	3.34
40	**39**	P5.5	D31	62.20		63.10		63.70		**63.00**		0.75	1.19
41	**43**	P4.1	D31	65.70	b	58.80	b	63.20		**63.20**		3.49	5.52
42	**46**	P5.2	D31	65.90		61.80	b	64.60		**64.60**		2.10	3.25
43	**10**	P6.5	D21.1	64.70		65.80		67.60		**65.81**		1.46	2.22
44	**36**	P3.3	D21.1	69.80	a	71.10	a	80.00	ab	**71.10**	*	5.55	7.81
45	**25**	P5.1	D31	71.80	a	72.20	a	72.80	a	**72.27**	*	0.50	0.69
46	**53**	P4.1	D21.1	74.60	a	71.10	ab	73.10	a	**73.10**	*	1.76	2.41
47	**4**	P9.1	D41	76.20	a	81.40	ab	75.90	a	**76.61**	*	3.09	4.03
48	**4a**	P9.1	D42	77.00	a	78.90	a	78.40	a	**78.10**	*	0.98	1.25
49	**20**	P3.1	D21.1	82.00	a	82.00	a	80.00	a	**81.44**	*	1.15	1.41
										Mean		Interlab.std. deviation	
												abs.	rel.%
										57.88		**2.07**	**3.71**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **24.5**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Fe**
Dimension: **µg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**1**	P3.21	D21.1	141.70	ab	131.50	a	106.80	ab	**131.50 ***	17.95	13.65
2	**26**	P3.5	D31	154.50	ab	146.90	a	140.40	ab	**146.90 ***	7.06	4.81
3	**27**	P6.1	D21.1	172.80	ab	155.80	a	152.60	a	**155.80 ***	10.86	6.97
4	**35**	P3.5	D21.1	157.90	a	183.40	ab	150.70	ab	**157.90**	17.18	10.88
5	**4b**	P5.1	D31	178.17	ab	165.95	a	160.83	ab	**165.95**	8.91	5.37
6	**30**	P3.21	D21.1	173.90		174.60		175.50		**174.67**	0.80	0.46
7	**36**	P3.3	D21.1	176.10		185.00	b	176.60		**177.46**	5.00	2.82
8	**40**	P5.7	D31	164.00	b	179.00		184.00	b	**179.00**	10.41	5.82
9	**21**	P5.1	D31	179.20		174.70	b	184.30	b	**179.20**	4.80	2.68
10	**51**	P9.1	D42	164.00	b	181.00		184.00		**181.00**	10.79	5.96
11	**2**	P5.3	D31	186.20		183.60		184.60		**184.80**	1.31	0.71
12	**25**	P5.1	D31	184.00		185.00		187.00		**185.33**	1.53	0.83
13	**8**	P6.3	D31	186.00		190.00	b	179.00	b	**186.00**	5.57	2.99
14	**7**	P5.5	D31	189.00		187.00		185.00		**187.00**	2.00	1.07
15	**9**	P5.5	D31	189.20		187.30		187.00		**187.83**	1.19	0.63
16	**52**	P4.1	D31	195.10	b	187.20		188.90		**189.16**	4.16	2.20
17	**29**	P3.3	D31	190.00		188.60		189.00		**189.20**	0.72	0.38
18	**5**	P3.3	D21.1	190.50		186.00	b	198.00	b	**190.50**	6.06	3.18
19	**49**	P4.1	D31	189.10		193.20		191.10		**191.13**	2.05	1.07
20	**24**	P5.1	D21.1	192.50		181.30	b	200.80	b	**192.50**	9.79	5.09
21	**18**	P3.31	D31	185.40	b	196.80		194.20		**194.20**	5.97	3.07
22	**23**	P3.3	D31	195.00		189.00	b	210.00	b	**195.00**	10.82	5.55
23	**41**	P4.1	D31	194.20		197.60		193.80		**195.11**	2.09	1.07
24	**11**	P5.1	D31	197.00		195.80		194.60		**195.80**	1.20	0.61
25	**47**	P4.1	D32	197.00		196.00		198.00		**197.00**	1.00	0.51
26	**6**	P4.2	D31	200.00		200.00		200.00		**200.00**	0.00	0.00
27	**38a**	P9.1	D42	199.80		201.40		200.00		**200.40**	0.87	0.43
28	**16**	P5.5	D31	199.00		201.00		218.00	b	**201.11**	10.44	5.19
29	**14**	P4.1	D31	201.90		197.50	b	206.20	b	**201.90**	4.35	2.15
30	**28**	P5.1	D21.1	201.95		212.00	b	186.12	b	**201.95**	13.05	6.46
31	**45**	P5.5	D31	202.00		202.00		203.00		**202.33**	0.58	0.29
32	**43**	P4.1	D31	206.50		202.80		202.60		**203.81**	2.20	1.08
33	**50**	P4.1	D31	204.50		204.20		204.40		**204.37**	0.15	0.07
34	**46**	P5.2	D31	203.60		203.20		206.80		**204.51**	1.97	0.96
35	**4a**	P9.1	D42	204.00		206.50		204.20		**204.90**	1.39	0.68
36	**48**	P4.1	D31	205.20		208.30		205.30		**206.27**	1.76	0.85
37	**12**	P5.1	D31	194.60	b	206.40		210.30	b	**206.40**	8.17	3.96
38	**3**	P3.10	D31	210.00		200.00	b	208.00		**207.89**	5.29	2.54
39	**42**	P4.1	D31	207.60		208.00		208.80		**208.13**	0.61	0.29
40	**38**	P4.1	D31	210.00		203.00	b	210.00		**208.89**	4.04	1.93
41	**39**	P5.5	D31	208.90		208.70		210.00		**209.20**	0.70	0.33
42	**44**	P4.1	D31	210.00		210.00		210.00		**210.00**	0.00	0.00
43	**44a**	P4.2	D31	200.00	b	230.00	b	210.00		**210.00**	15.28	7.28
44	**37**	P5.5	D35	210.00		208.70		211.50		**210.07**	1.40	0.67
45	**17**	P5.5	D31	215.10		210.30		212.00		**212.26**	2.43	1.14
46	**20**	P3.1	D21.1	214.00		200.00	b	214.00		**212.89**	8.08	3.80
47	**53**	P4.1	D21.1	221.10	a	224.60	a	220.10	a	**221.71**	2.36	1.06
48	**4**	P9.1	D41	214.60	ab	224.30	a	230.70	ab	**224.30**	8.11	3.62
49	**10**	P6.5	D21.1	224.20	a	224.80	a	227.20	a	**225.40**	1.59	0.71
										Mean	Interlab.std. deviation	
											abs.	rel.%
										195.90	**4.98**	**2.73**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Fe**
Dimension: **µg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**1**	P3.21	D21.1	51.10	a	45.00	ab	51.10	a	**50.66 ***	3.52	6.95
2	**29**	P3.3	D31	51.50	a	51.00	a	52.30	a	**51.60 ***	0.66	1.28
3	**38a**	P9.1	D42	52.70	a	53.80	a	53.70	a	**53.40 ***	0.61	1.14
4	**21**	P5.1	D31	55.90	a	59.70	ab	54.90	a	**55.90 ***	2.53	4.53
5	**23**	P3.3	D31	61.80	b	60.20		51.30	b	**60.20**	5.66	9.40
6	**52**	P4.1	D31	59.50		70.10	b	60.10		**60.24**	5.95	9.88
7	**27**	P6.1	D21.1	54.30	b	60.70		63.10	b	**60.70**	4.55	7.50
8	**4b**	P5.1	D31	61.30		62.67	b	58.84	b	**61.30**	1.94	3.16
9	**30**	P3.21	D21.1	63.80		64.10		63.60		**63.83**	0.25	0.39
10	**8**	P6.3	D31	64.10		71.20	b	65.00		**65.00**	3.87	5.95
11	**49**	P4.1	D31	69.70	b	60.70	b	65.20		**65.20**	4.50	6.90
12	**9**	P5.5	D31	64.40		65.60		67.20	b	**65.60**	1.40	2.13
13	**38**	P4.1	D31	65.70		66.30		66.70		**66.23**	0.50	0.75
14	**40**	P5.7	D31	66.80		71.30	b	67.40		**67.54**	2.44	3.61
15	**12**	P5.1	D31	67.20		68.70		68.20		**68.03**	0.76	1.12
16	**2**	P5.3	D31	67.80		70.00	b	67.40		**68.04**	1.40	2.06
17	**41**	P4.1	D31	67.30		67.90		71.90	b	**68.04**	2.50	3.67
18	**7**	P5.5	D31	67.90		68.40		68.30		**68.20**	0.26	0.38
19	**47**	P4.1	D32	69.00		69.00		68.00		**68.67**	0.58	0.84
20	**5**	P3.3	D21.1	76.00	b	68.00		68.50		**68.69**	4.48	6.52
21	**6**	P4.2	D31	70.00		70.00		70.00		**70.00**	0.00	0.00
22	**44**	P4.1	D31	70.00		70.00		70.00		**70.00**	0.00	0.00
23	**44a**	P4.2	D31	80.00	b	70.00		70.00		**70.44**	5.77	8.19
24	**24**	P5.1	D21.1	70.50		73.50	b	69.30		**70.50**	2.16	3.06
25	**11**	P5.1	D31	70.60		71.80		70.20		**70.84**	0.83	1.17
26	**42**	P4.1	D31	71.30		70.40		74.60	b	**71.30**	2.21	3.10
27	**37**	P5.5	D35	72.40		70.80		71.60		**71.60**	0.80	1.12
28	**18**	P3.31	D31	72.80		71.40		71.10		**71.69**	0.91	1.27
29	**3**	P3.10	D31	72.00		72.00		73.00		**72.33**	0.58	0.80
30	**16**	P5.5	D31	73.00		68.00	b	73.00		**72.56**	2.89	3.98
31	**48**	P4.1	D31	72.90		72.30		72.90		**72.70**	0.35	0.48
32	**50**	P4.1	D31	73.50		73.40		73.40		**73.43**	0.06	0.08
33	**45**	P5.5	D31	75.00		74.00		74.00		**74.33**	0.58	0.78
34	**26**	P3.5	D31	74.60		73.40		76.90	b	**74.60**	1.78	2.39
35	**43**	P4.1	D31	75.40		75.60		74.80		**75.27**	0.42	0.56
36	**28**	P5.1	D21.1	75.79		73.02	b	76.74		**75.79**	1.93	2.55
37	**25**	P5.1	D31	76.60		75.80		75.20		**75.87**	0.70	0.92
38	**17**	P5.5	D31	75.80		81.80	b	76.20		**76.44**	3.35	4.38
39	**14**	P4.1	D31	76.80		76.60		76.40		**76.60**	0.20	0.26
40	**10**	P6.5	D21.1	82.20	b	77.20		75.80	b	**77.20**	3.36	4.35
41	**46**	P5.2	D31	77.70		80.50	b	75.40	b	**77.70**	2.55	3.28
42	**39**	P5.5	D31	79.00		79.60		78.10		**78.90**	0.75	0.95
43	**4**	P9.1	D41	82.10		84.70	b	82.00		**82.49**	1.53	1.85
44	**36**	P3.3	D21.1	78.40	ab	86.00	ab	84.10	a	**84.10**	3.96	4.71
45	**53**	P4.1	D21.1	76.10	ab	84.60	a	88.60	ab	**84.60**	6.38	7.54
46	**4a**	P9.1	D42	85.50	a	84.80	a	84.40	a	**84.90**	0.56	0.66
47	**35**	P3.5	D21.1	90.00	a	103.00	ab	86.20	ab	**90.00 ***	8.81	9.79
48	**51**	P9.1	D42	92.20	ab	90.40	a	88.40	ab	**90.40 ***	1.90	2.10
49	**20**	P3.1	D21.1	100.00	a	100.00	a	100.00	a	**100.00 ***	0.00	0.00
										Mean	Interlab.std. deviation	
											abs.	rel.%
										71.03	**2.12**	**3.03**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **14.3**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **70.29**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Cu**
Dimension: **µg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**33a**	P3.31	D22	0.77	a	0.75	a	0.75	a	**0.76 ***	0.01	1.32
2	**52**	P4.1	D31	2.50	ab	2.20	a	2.00	ab	**2.20 ***	0.25	11.36
3	**43**	P4.1	D22	3.14	b	2.56		2.64		**2.64**	0.31	11.74
4	**4b**	P5.1	D22	2.69		2.69		2.54		**2.65**	0.09	3.40
5	**7**	P5.5	D31	2.60		2.70		2.74		**2.68**	0.07	2.61
6	**8**	P6.3	D31	2.72		2.75		2.58		**2.69**	0.09	3.35
7	**18**	P3.31	D31	2.68	b	2.99		2.86		**2.86**	0.16	5.59
8	**23**	P3.3	D31	2.86		2.90		3.11	b	**2.92**	0.13	4.45
9	**42**	P4.1	D22	2.97		2.91		2.95		**2.94**	0.03	1.02
10	**26**	P3.5	D31	3.11		2.97		3.06		**3.05**	0.07	2.30
11	**48**	P4.1	D31	3.11		3.06		3.07		**3.08**	0.03	0.97
12	**27**	P6.1	D21.1	3.15		3.15		3.05		**3.12**	0.06	1.92
13	**11**	P5.1	D31	3.17		3.13		3.13		**3.14**	0.02	0.64
14	**39**	P5.5	D35	3.19		3.09		3.18		**3.15**	0.06	1.90
15	**50**	P4.1	D31	3.20		3.13		3.28		**3.20**	0.08	2.50
16	**9**	P5.5	D31	3.21		3.21		3.23		**3.22**	0.01	0.31
17	**37**	P5.5	D35	3.27		3.20		3.22		**3.23**	0.04	1.24
18	**29**	P3.3	D31	3.20		3.28		3.24		**3.24**	0.04	1.23
19	**38**	P4.1	D31	3.22		3.26		3.28		**3.25**	0.03	0.92
20	**21**	P5.1	D31	3.42		2.99	b	3.29		**3.29**	0.22	6.69
21	**16**	P5.5	D31	3.70	b	3.30		3.10	b	**3.30**	0.31	9.39
22	**44**	P4.1	D32	3.44		3.30		3.32		**3.35**	0.08	2.39
23	**17**	P5.5	D32	3.49		3.40		3.32		**3.40**	0.09	2.65
24	**40**	P5.7	D31	3.32		3.42		4.11	b	**3.42**	0.43	12.57
25	**45**	P5.5	D31	3.50		3.40		3.40		**3.43**	0.06	1.75
26	**41**	P4.1	D22	3.25	b	3.48		3.85	b	**3.48**	0.30	8.62
27	**44a**	P4.2	D32	3.53		3.48		3.45		**3.49**	0.04	1.15
28	**14**	P4.1	D31	3.71		4.09	b	3.54	b	**3.71**	0.28	7.55
29	**49**	P4.1	D31	3.11	b	4.52	b	3.81		**3.81**	0.71	18.64
30	**25**	P5.1	D31	3.80		3.85		3.88		**3.84**	0.04	1.04
31	**24**	P5.1	D21.1	3.85		4.03	b	3.75		**3.85**	0.14	3.64
32	**28**	P5.1	D21.1	3.86		4.13	b	3.70	b	**3.86**	0.22	5.70
33	**4a**	P9.1	D42	4.20	b	3.99		3.74	b	**3.99**	0.23	5.76
34	**5**	P3.3	D21.1	4.50		4.50		5.00	b	**4.54 ***	0.29	6.39
35	**38a**	P9.1	D42	4.70	a	4.90	a			**4.80 ***	0.14	2.92
36	**47**	P4.1	D32	5.63	ab	4.89	a	4.74	ab	**4.89 ***	0.48	9.82
37	**35**	P3.5	D22	5.50	ab	5.05	a	5.02	a	**5.08 ***	0.27	5.31
38	**4**	P9.1	D41	5.40	a	5.60	a	5.50	a	**5.50 ***	0.10	1.82
39	**36**	P3.3	D21.1	5.55	ab	5.74	a	6.28	ab	**5.74 ***	0.38	6.62
40	**10**	P6.5	D21.1	8.81	ab	7.13	a	6.43	ab	**7.13 ***	1.22	17.11
41	**2**	P5.3	D31	8.30	ab	9.50	a	9.50	a	**9.46 ***	0.69	7.29

Mean	Interlab.std. deviation	
	abs.	rel.%
3.44	**0.20**	**4.97**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **24.4**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Cu**
Dimension: **µg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**33a**	P3.31	D22	0.82	a	0.93	a	0.88	a	**0.88 ***	0.06	6.82
2	**52**	P4.1	D31	1.80	a	1.70	a	2.10	ab	**1.80 ***	0.21	11.67
3	**2**	P5.3	D31	1.90	a	1.70	ab	2.10	ab	**1.90 ***	0.20	10.53
4	**26**	P3.5	D31	2.19		2.18		2.21		**2.19**	0.02	0.91
5	**21**	P5.1	D31	2.39		2.18	b	2.59	b	**2.39**	0.21	8.79
6	**42**	P4.1	D22	2.43		2.47		2.44		**2.45**	0.02	0.82
7	**9**	P5.5	D31	2.48		2.51		2.40		**2.47**	0.06	2.43
8	**7**	P5.5	D31	2.76	b	2.49		2.51		**2.52**	0.15	5.95
9	**4b**	P5.1	D22	2.55		2.56		2.42		**2.53**	0.08	3.16
10	**36**	P3.3	D21.1	2.84	b	2.44		2.56		**2.56**	0.21	8.20
11	**43**	P4.1	D22	2.51		2.64		2.76		**2.64**	0.13	4.92
12	**50**	P4.1	D31	2.69		2.62		2.62		**2.64**	0.04	1.52
13	**40**	P5.7	D31	2.45	b	2.73		3.51	b	**2.73**	0.55	20.15
14	**37**	P5.5	D35	2.86		2.65		2.77		**2.77**	0.11	3.97
15	**48**	P4.1	D31	2.77		2.76		2.78		**2.77**	0.01	0.36
16	**8**	P6.3	D31	2.79		2.54	b	2.98	b	**2.79**	0.22	7.89
17	**38**	P4.1	D31	2.80		2.70		2.82		**2.79**	0.06	2.15
18	**11**	P5.1	D31	2.87		2.83		2.81		**2.84**	0.03	1.06
19	**16**	P5.5	D31	2.90		2.80		3.00		**2.90**	0.10	3.45
20	**27**	P6.1	D21.1	2.91		2.92		2.86		**2.90**	0.03	1.03
21	**35**	P3.5	D22	2.92		2.36	b	3.27	b	**2.92**	0.46	15.75
22	**39**	P5.5	D35	2.91		2.98		2.96		**2.95**	0.04	1.36
23	**17**	P5.5	D32	3.01		3.10		2.79	b	**3.01**	0.16	5.32
24	**24**	P5.1	D21.1	3.03		2.88	b	3.27	b	**3.03**	0.20	6.60
25	**18**	P3.31	D31	2.86	b	3.31	b	3.08		**3.08**	0.23	7.47
26	**41**	P4.1	D22	2.96	b	3.36	b	3.14		**3.14**	0.20	6.37
27	**23**	P3.3	D31	3.23		3.01	b	3.53	b	**3.23**	0.26	8.05
28	**28**	P5.1	D21.1	3.31		3.26		2.66	b	**3.26**	0.36	11.04
29	**25**	P5.1	D31	3.29		3.30		3.25		**3.28**	0.03	0.91
30	**44**	P4.1	D32	3.44		3.42		3.43		**3.43**	0.01	0.29
31	**29**	P3.3	D31	3.41		3.50		3.43		**3.44**	0.05	1.45
32	**4a**	P9.1	D42	3.53		3.80	b	3.27	b	**3.53**	0.27	7.65
33	**44a**	P4.2	D32	3.46		4.18	b	3.56		**3.56**	0.39	10.96
34	**45**	P5.5	D31	3.50		3.60		3.60		**3.58**	0.06	1.68
35	**14**	P4.1	D31	4.25	a	4.41	ab	4.23	a	**4.26 ***	0.10	2.35
36	**38a**	P9.1	D42	4.30	a	4.30	a	4.30	a	**4.30 ***	0.00	0.00
37	**5**	P3.3	D21.1	4.50	a	4.50	a	4.00	ab	**4.48 ***	0.29	6.47
38	**49**	P4.1	D31	3.80	ab	5.32	ab	4.55	a	**4.55 ***	0.76	16.70
39	**47**	P4.1	D32	4.33	ab	5.39	ab	4.60	a	**4.60 ***	0.55	11.96
40	**4**	P9.1	D41	4.70	a	5.00	ab	4.80	a	**4.80 ***	0.15	3.13
41	**10**	P6.5	D21.1	6.05	ab	6.94	a	6.85	a	**6.85 ***	0.49	7.15

Mean	Interlab.std. deviation	
	abs.	rel.%
3.03	**0.18**	**5.82**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **24.4**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Cu**
Dimension: **µg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**33a**	P3.31	D22	1.64	a	1.65	a	1.59	a	**1.63 ***	0.03	1.84
2	**2**	P5.3	D31	2.50	a	2.40	a	2.80	ab	**2.50 ***	0.21	8.40
3	**52**	P4.1	D31	2.90	a	2.70	ab	3.10	ab	**2.90 ***	0.20	6.90
4	**4b**	P5.1	D22	3.72	b	3.45		3.51		**3.51**	0.14	3.99
5	**35**	P3.5	D22	3.80	b	3.61		3.39	b	**3.61**	0.21	5.82
6	**23**	P3.3	D31	3.66		3.42	b	4.04	b	**3.66**	0.31	8.47
7	**7**	P5.5	D31	3.66		3.72		3.62		**3.67**	0.05	1.36
8	**24**	P5.1	D21.1	3.84		4.02	b	3.76		**3.84**	0.13	3.39
9	**43**	P4.1	D22	3.84		3.79		4.06	b	**3.85**	0.14	3.64
10	**8**	P6.3	D31	3.90		3.82		4.22	b	**3.90**	0.21	5.38
11	**27**	P6.1	D21.1	4.24	b	3.98		3.92		**3.98**	0.17	4.27
12	**42**	P4.1	D22	3.96		4.00		4.00		**3.99**	0.02	0.50
13	**26**	P3.5	D31	4.08		4.09		4.03		**4.07**	0.03	0.74
14	**14**	P4.1	D31	4.05		4.34	b	4.11		**4.11**	0.15	3.65
15	**11**	P5.1	D31	4.18		4.15		4.15		**4.16**	0.02	0.48
16	**39**	P5.5	D35	4.19		4.16		4.18		**4.18**	0.02	0.48
17	**50**	P4.1	D31	4.15		4.14		4.27		**4.18**	0.07	1.67
18	**48**	P4.1	D31	4.22		4.18		4.20		**4.20**	0.02	0.48
19	**18**	P3.31	D31	4.21		4.67	b	4.02	b	**4.21**	0.33	7.84
20	**36**	P3.3	D21.1	4.57	b	4.22		4.15		**4.22**	0.23	5.45
21	**9**	P5.5	D31	4.22		4.26		4.22		**4.23**	0.02	0.47
22	**16**	P5.5	D31	4.70	b	4.00	b	4.30		**4.30**	0.35	8.14
23	**38**	P4.1	D31	4.38		4.21		4.30		**4.30**	0.09	2.09
24	**17**	P5.5	D32	4.34		4.31		4.32		**4.32**	0.02	0.46
25	**28**	P5.1	D21.1	3.99	b	4.41		4.34		**4.34**	0.23	5.30
26	**37**	P5.5	D35	4.33		4.30		4.38		**4.34**	0.04	0.92
27	**44**	P4.1	D32	4.37		4.54	b	4.39		**4.41**	0.09	2.04
28	**45**	P5.5	D31	4.60		4.60		4.60		**4.60**	0.00	0.00
29	**40**	P5.7	D31	4.46	b	4.62		5.01	b	**4.62**	0.28	6.06
30	**25**	P5.1	D31	4.78		4.75		4.80		**4.78**	0.03	0.63
31	**4a**	P9.1	D42	4.93		4.84		4.72		**4.84**	0.11	2.27
32	**21**	P5.1	D31	4.89		4.99		4.13	b	**4.89**	0.47	9.61
33	**44a**	P4.2	D32	4.95		4.89		4.59	b	**4.89**	0.19	3.89
34	**47**	P4.1	D32	5.34	b	4.92		5.00		**5.00**	0.22	4.40
35	**41**	P4.1	D22	5.06		5.08		4.20	b	**5.04**	0.50	9.92
36	**5**	P3.3	D21.1	5.50	a	5.50	a	5.00	ab	**5.47**	0.29	5.30
37	**49**	P4.1	D31	5.34	ab	5.64	ab	5.49	a	**5.49**	0.15	2.73
38	**38a**	P9.1	D42	6.20	a	6.30	a	6.20	a	**6.23 ***	0.06	0.96
39	**4**	P9.1	D41	5.90	ab	6.30	a	6.40	a	**6.30 ***	0.26	4.13
40	**10**	P6.5	D21.1	6.66	a	6.56	a	6.08	ab	**6.56 ***	0.31	4.73
41	**29**	P3.3	D31	6.76	a	6.68	a	6.64	a	**6.69 ***	0.06	0.90

Mean	Interlab.std. deviation	
	abs.	rel.%
4.34	**0.16**	**3.65**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **17.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Cu**
Dimension: **µg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**35**	P3.5	D22	2.06	a	2.47	ab	1.74	ab	**2.06 ***	0.37	17.96
2	**33a**	P3.31	D22	2.47	a	2.25	a	2.38	a	**2.38 ***	0.11	4.62
3	**52**	P4.1	D31	4.50	a	4.30	a	4.40	a	**4.40**	0.10	2.27
4	**4b**	P5.1	D22	4.53	a	4.63	a	4.76	a	**4.63**	0.12	2.59
5	**8**	P6.3	D31	4.92	b	5.10		5.19		**5.10**	0.14	2.75
6	**42**	P4.1	D22	5.15		5.12		5.18		**5.15**	0.03	0.58
7	**4a**	P9.1	D42	5.12		5.11		5.32		**5.16**	0.12	2.33
8	**43**	P4.1	D22	4.86	b	5.26		5.29		**5.23**	0.24	4.59
9	**23**	P3.3	D31	5.34		3.45	b	5.97	b	**5.34**	1.31	24.53
10	**24**	P5.1	D21.1	5.41		5.56		5.32		**5.41**	0.12	2.22
11	**7**	P5.5	D31	5.43		5.67	b	5.43		**5.47**	0.14	2.56
12	**9**	P5.5	D31	5.63		5.48		5.44		**5.50**	0.10	1.82
13	**38**	P4.1	D31	5.57		5.57		5.38		**5.53**	0.11	1.99
14	**26**	P3.5	D31	5.64		5.50		5.51		**5.55**	0.08	1.44
15	**27**	P6.1	D21.1	5.64		5.37	b	5.59		**5.57**	0.14	2.51
16	**50**	P4.1	D31	5.61		5.48		5.65		**5.59**	0.09	1.61
17	**11**	P5.1	D31	5.62		5.58		5.59		**5.60**	0.02	0.36
18	**16**	P5.5	D31	5.90	b	5.30	b	5.60		**5.60**	0.30	5.36
19	**39**	P5.5	D35	5.59		5.57		5.66		**5.61**	0.05	0.89
20	**41**	P4.1	D22	5.63		5.60		5.77		**5.66**	0.09	1.59
21	**18**	P3.31	D31	5.54	b	5.71		6.14	b	**5.71**	0.31	5.43
22	**37**	P5.5	D35	5.77		5.71		5.67		**5.72**	0.05	0.87
23	**48**	P4.1	D31	5.81		5.76		5.85		**5.81**	0.05	0.86
24	**44a**	P4.2	D32	5.97		5.82		5.69		**5.82**	0.14	2.41
25	**21**	P5.1	D31	5.84		5.99		5.57	b	**5.84**	0.21	3.60
26	**14**	P4.1	D31	5.86		5.83		6.31	b	**5.89**	0.27	4.58
27	**40**	P5.7	D31	5.93		5.82		5.96		**5.90**	0.07	1.19
28	**12**	P5.1	D31	6.90	b	5.30	b			**6.10**	1.13	18.52
29	**44**	P4.1	D32	6.20		6.10		6.04		**6.11**	0.08	1.31
30	**45**	P5.5	D31	6.10		6.10		6.50	b	**6.14**	0.23	3.75
31	**17**	P5.5	D32	6.23		5.78	b	6.18		**6.16**	0.25	4.06
32	**36**	P3.3	D21.1	5.60	b	6.30		6.28		**6.25**	0.40	6.40
33	**28**	P5.1	D21.1	6.33		6.04	b	6.39		**6.32**	0.19	3.01
34	**29**	P3.3	D31	6.24		6.38		6.40		**6.35**	0.09	1.42
35	**25**	P5.1	D31	6.42		6.44		6.55		**6.47**	0.07	1.08
36	**5**	P3.3	D21.1	6.50	ab	7.00	a	7.00	a	**6.96**	0.29	4.17
37	**38a**	P9.1	D42	7.00	a	7.10	a	7.40	ab	**7.10**	0.21	2.96
38	**47**	P4.1	D32	7.12	a	7.23	a	9.60	ab	**7.23**	1.40	19.36
39	**49**	P4.1	D31	10.20	ab	5.16	ab	7.68	a	**7.68 ***	2.52	32.81
40	**4**	P9.1	D41	9.00	ab	8.50	a	8.50	a	**8.54 ***	0.29	3.40
41	**10**	P6.5	D21.1	9.71	ab	8.95	ab	9.43	a	**9.43 ***	0.38	4.03
42	**6**	P4.2	D31	10.00	a	10.00	a	10.00	a	**10.00 ***	0.00	0.00

Mean	Interlab.std. deviation	
	abs.	rel.%
5.82	**0.30**	**4.99**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation:	Percentage of non-tolerable lab means:	**14.3**
	Mean of 3rd Needle/Leaf Test 97/98 sample 5:	**5.88**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Pb**
Dimension: **µg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**33a**	P3.31	D22	0.19	ab	0.16	ab	0.17	a	**0.17 ***	0.02	11.76
2	**43**	P4.1	D22	0.30		0.20	b	0.30		**0.30 ***	0.06	20.00
3	**4b**	P5.1	D22	0.35	b	0.40	b	0.37		**0.37**	0.03	8.11
4	**18**	P6	D31	0.10	b	0.40		0.50	b	**0.40**	0.21	52.50
5	**39**	P5.5	D35	0.40		0.40		0.40		**0.40**	0.00	0.00
6	**42**	P4.1	D22	0.40		0.41	b	0.38	b	**0.40**	0.02	5.00
7	**24**	P5.1	D22	0.46		0.43	b	0.48	b	**0.46**	0.03	6.52
8	**38**	P4.1	D22	0.50	b	0.46	b			**0.48**	0.03	6.25
9	**8**	P6.3	D32	0.50		0.60	b	0.50		**0.50**	0.06	12.00
10	**37**	P5.5	D35	0.50		0.50		0.51	b	**0.50**	0.01	2.00
11	**44**	P4.1	D32	0.60		0.60		0.50	b	**0.60**	0.06	10.00
12	**44a**	P4.2	D32	0.60		0.70	b	0.60		**0.60**	0.06	10.00
13	**9**	P5.5	D31	0.70		0.70		0.70		**0.70 ***	0.00	0.00
14	**47**	P4.1	D32	0.70		0.70		0.60	b	**0.70 ***	0.06	8.57
15	**26**	P3.5	D31	0.67	b	0.76	b	0.72		**0.72 ***	0.05	6.94
16	**4a**	P9.1	D42	0.60	b	0.80		0.90	b	**0.80 ***	0.15	18.75
17	**50**	P4.1	D31	0.90	a	1.00	ab	0.90	a	**0.90 ***	0.06	6.67

Mean	Interlab.std. deviation	
	abs.	rel.%
0.53	**0.05**	**10.89**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **41.2**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Pb**
Dimension: **µg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**43**	P4.1	D22	0.10		0.10		0.30	b	**0.10 ***	0.12	120.00
2	**33a**	P3.31	D22	0.15		0.14	b	0.18	b	**0.15 ***	0.02	13.33
3	**4b**	P5.1	D22	0.25		0.25		0.24	b	**0.25 ***	0.01	4.00
4	**37**	P5.5	D35	0.27	b	0.29		0.29		**0.29 ***	0.01	3.45
5	**39**	P5.5	D35	0.30		0.20	b	0.30		**0.30 ***	0.06	20.00
6	**42**	P4.1	D22	0.28	b	0.31	b	0.30		**0.30 ***	0.02	6.67
7	**38**	P4.1	D22	0.33	b	0.37	b			**0.35**	0.03	8.57
8	**8**	P6.3	D32	0.40		0.40		0.40		**0.40**	0.00	0.00
9	**9**	P5.5	D31	0.40		0.40		0.40		**0.40**	0.00	0.00
10	**18**	P6	D31	0.40		0.30	b	0.40		**0.40**	0.06	15.00
11	**44**	P4.1	D32	0.40		0.40		0.40		**0.40**	0.00	0.00
12	**44a**	P4.2	D32	0.50		0.50		0.40	b	**0.50**	0.06	12.00
13	**47**	P4.1	D32	0.50		0.50		0.50		**0.50**	0.00	0.00
14	**4a**	P9.1	D42	0.60		0.50	b	0.80	b	**0.60 ***	0.15	25.00
15	**26**	P3.5	D31	0.70		0.69	b	0.74	b	**0.70 ***	0.03	4.29
16	**50**	P4.1	D31	0.70		0.80	b	0.70		**0.70 ***	0.06	8.57
17	**24**	P5.1	D22	0.83	a	0.86	ab	0.81	ab	**0.83 ***	0.03	3.61
18	**12**	P5.1	D31	9.00	a					**9.00 ***		0.00

Mean	Interlab.std. deviation	
	abs.	rel.%
0.43	**0.04**	**13.58**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **61.1**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Pb**
Dimension: **µg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**33a**	P3.31	D22	1.92	ab	1.73	ab	1.89	a	**1.89**	*	0.10	5.29
2	**47**	P4.1	D32	4.00	a	4.10	ab	4.00	a	**4.00**		0.06	1.50
3	**18**	P6	D31	4.40	a	4.10	ab	5.00	ab	**4.40**		0.46	10.45
4	**8**	P6.3	D32	4.70		4.70		4.70		**4.70**		0.00	0.00
5	**4b**	P5.1	D22	4.73		4.73		4.80	b	**4.73**		0.04	0.85
6	**2**	P5.3	D31	4.90		5.30	b	4.80	b	**4.90**		0.26	5.31
7	**9**	P5.5	D31	5.00		4.90	b	5.10	b	**5.00**		0.10	2.00
8	**43**	P4.1	D22	5.30	b	4.80	b	5.00		**5.00**		0.25	5.00
9	**46**	P5.2	D31	4.70	b	5.00		5.00		**5.00**		0.17	3.40
10	**26**	P3.5	D31	5.14	b	5.09	b	5.10		**5.10**		0.03	0.59
11	**42**	P4.1	D22	5.08	b	5.17	b	5.12		**5.12**		0.05	0.98
12	**38**	P4.1	D22	5.37	b	5.19	b			**5.28**		0.13	2.46
13	**39**	P5.5	D35	5.30		5.40	b	5.30		**5.30**		0.06	1.13
14	**37**	P5.5	D35	5.32		5.28	b	5.33	b	**5.32**		0.03	0.56
15	**17**	P5.5	D32	5.40		5.40		5.20	b	**5.40**		0.12	2.22
16	**4a**	P9.1	D42	5.20	b	6.00	b	5.50		**5.50**		0.40	7.27
17	**41**	P4.1	D22	5.50		4.90	b	5.60	b	**5.50**		0.38	6.91
18	**50**	P4.1	D31	5.30	b	5.50		5.50		**5.50**		0.12	2.18
19	**4**	P9.1	D41	4.90	b	5.60		6.30	b	**5.60**		0.70	12.50
20	**44**	P4.1	D32	5.50	b	5.60		5.60		**5.60**		0.06	1.07
21	**44a**	P4.2	D32	5.60		5.80	b	5.60		**5.60**		0.12	2.14
22	**45**	P5.5	D31	6.00		6.00		6.00		**6.00**		0.00	0.00
23	**24**	P5.1	D22	6.31	a	5.96	ab	6.66	ab	**6.31**		0.35	5.55
24	**12**	P5.1	D31	11.00	a					**11.00**	*		0.00

Mean	Interlab.std. deviation	
	abs.	rel.%
5.23	**0.17**	**3.31**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **8.3**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Pb**
Dimension: **µg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**33a**	P3.31	D22	0.19	a	0.18	ab	0.21	ab	**0.19**	*	0.02	10.53
2	**43**	P4.1	D22	0.40		0.60	b	0.40		**0.40**	*	0.12	30.00
3	**41**	P4.1	D22	0.50		0.50		0.60	b	**0.50**		0.06	12.00
4	**4b**	P5.1	D22	0.54	b	0.56		0.56		**0.56**		0.01	1.79
5	**42**	P4.1	D22	0.57		0.56	b	0.59	b	**0.57**		0.02	3.51
6	**18**	P6	D31	0.60		0.60		0.60		**0.60**		0.00	0.00
7	**39**	P5.5	D35	0.60		0.60		0.60		**0.60**		0.00	0.00
8	**47**	P4.1	D32	0.60		0.60		0.70	b	**0.60**		0.06	10.00
9	**37**	P5.5	D35	0.67		0.65	b	0.68	b	**0.67**		0.02	2.99
10	**38**	P4.1	D22	0.66	b	0.70	b			**0.68**		0.03	4.41
11	**8**	P6.3	D32	0.70		0.80	b	0.70		**0.70**		0.06	8.57
12	**9**	P5.5	D31	0.70		0.70		0.80	b	**0.70**		0.06	8.57
13	**24**	P5.1	D22	0.76		0.80	b	0.72	b	**0.76**		0.04	5.26
14	**4a**	P9.1	D42	0.60	b	0.90	b	0.80		**0.80**		0.15	18.75
15	**44**	P4.1	D32	0.90	b	0.80		0.80		**0.80**		0.06	7.50
16	**44a**	P4.2	D32	0.90		0.80	b	0.90		**0.90**		0.06	6.67
17	**26**	P3.5	D31	0.94	b	0.97		1.05	b	**0.97**	*	0.06	6.19
18	**4**	P9.1	D41	1.00	a					**1.00**	*		0.00
19	**50**	P4.1	D31	1.10	a	1.10	a	1.00	ab	**1.10**	*	0.06	5.45

Mean	Interlab.std. deviation	
	abs.	rel.%
0.69	**0.05**	**7.48**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **26.3**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **0.96**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Al**
Dimension: **µg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**53**	P4.1	D21.2	43.90	ab	18.90	ab	37.40	a	**37.40**	*	12.97	34.68
2	**2**	P5.3	D31	62.00		68.00	b	64.00		**64.00**	*	3.06	4.78
3	**23**	P3.3	D31	68.80		65.20	b	71.80		**68.80**		3.30	4.80
4	**26**	P3.5	D31	72.20	b	68.80		65.10	b	**68.80**		3.55	5.16
5	**25**	P5.1	D31	68.10		68.90		70.20		**69.06**		1.06	1.53
6	**21**	P5.1	D31	64.00	b	72.90		69.80		**69.80**		4.52	6.48
7	**49**	P4.1	D31	71.60		70.60		71.10		**71.10**		0.50	0.70
8	**11**	P5.1	D31	77.20	b	71.30		71.00		**71.71**		3.50	4.88
9	**52**	P4.1	D31	74.60		74.60		74.50		**74.57**		0.06	0.08
10	**17**	P5.5	D31	79.90		77.40		73.50	b	**77.40**		3.23	4.17
11	**16**	P5.5	D31	86.60	b	79.60		79.40		**80.06**		4.10	5.12
12	**37**	P5.5	D35	80.70		79.60		81.20		**80.50**		0.82	1.02
13	**38**	P4.1	D31	81.20		82.50		81.60		**81.77**		0.67	0.82
14	**4a**	P9.1	D42	79.00		82.00		90.00	b	**82.00**		5.69	6.94
15	**45**	P5.5	D31	81.00		84.00		82.00		**82.06**		1.53	1.86
16	**48**	P4.1	D31	86.10		88.80		85.80		**86.51**		1.65	1.91
17	**47**	P4.1	D32	89.00		87.00		89.00		**88.44**		1.15	1.30
18	**44**	P4.1	D31	90.00		90.00		90.00		**90.00**		0.00	0.00
19	**39**	P5.5	D31	90.00		89.60		93.40		**90.36**		2.09	2.31
20	**42**	P4.1	D31	91.40		87.40	b	91.00		**90.64**		2.20	2.43
21	**9**	P5.5	D31	90.80		91.60		90.20		**90.87**		0.70	0.77
22	**14**	P4.1	D31	103.30	b	91.30		90.90		**91.66**		7.05	7.69
23	**50**	P4.1	D31	92.80		87.60	b	92.20		**91.94**		2.84	3.09
24	**8**	P6.3	D31	96.00	b	92.40		89.40		**92.40**		3.30	3.57
25	**41**	P4.1	D31	94.70		101.80	b	94.20		**95.01**		4.25	4.47
26	**43**	P4.1	D31	95.80		97.70		95.00		**95.96**		1.39	1.45
27	**18**	P3.31	D31	94.00	b	98.00		106.00	b	**98.00**		6.11	6.23
28	**6**	P4.2	D31	110.00	b	90.00	b	100.00		**100.00**		10.00	10.00
29	**12**	P5.1	D31	110.20	ab	115.40	a	123.20	ab	**115.40**	*	6.54	5.67
30	**44a**	P4.2	D31	130.00	ab	120.00	a	100.00	ab	**120.00**	*	15.28	12.73

Mean	Interlab.std. deviation	
	abs.	rel.%
83.82	**3.77**	**4.89**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **13.3**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Al**
Dimension: **µg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**4**	P9.1	D41	69.00	ab	56.00	ab			**62.50**	*	9.19	14.70
2	**53**	P4.1	D21.2	143.90	ab	74.90	ab	81.40	a	**81.40**	*	38.10	46.81
3	**23**	P3.3	D31	110.00	a	109.00	a	113.00	a	**110.61**		2.08	1.88
4	**25**	P5.1	D31	116.00		112.00		114.00		**114.00**		2.00	1.75
5	**49**	P4.1	D31	118.10		121.10		119.60		**119.60**		1.50	1.25
6	**16**	P5.5	D31	142.80	b	119.90		119.60		**120.86**		13.31	11.01
7	**46**	P5.2	D31	127.10	b	121.10		120.00		**121.66**		3.82	3.14
8	**38**	P4.1	D31	126.00		124.00		124.00		**124.67**		1.15	0.92
9	**26**	P3.5	D31	122.30	b	127.20		133.10	b	**127.20**		5.41	4.25
10	**21**	P5.1	D31	126.20		126.50		131.20	b	**127.46**		2.80	2.20
11	**52**	P4.1	D31	130.50		124.40	b	128.10		**128.10**		3.07	2.40
12	**37**	P5.5	D35	128.30		130.60		131.20		**130.03**		1.53	1.18
13	**39**	P5.5	D31	130.40		132.30		130.70		**131.13**		1.02	0.78
14	**4a**	P9.1	D42	135.00		132.00		132.00		**133.00**		1.73	1.30
15	**45**	P5.5	D31	134.00		134.00		135.00		**134.33**		0.58	0.43
16	**17**	P5.5	D31	135.40		134.50		133.30		**134.40**		1.05	0.78
17	**2**	P5.3	D31	134.00		144.00	b	136.00		**136.11**		5.29	3.89
18	**50**	P4.1	D31	138.30		138.60		137.60		**138.17**		0.51	0.37
19	**11**	P5.1	D31	143.60	b	139.60		138.20		**140.01**		2.80	2.00
20	**9**	P5.5	D31	143.70		139.90		139.20		**140.66**		2.42	1.72
21	**44**	P4.1	D31	150.00	b	140.00		140.00		**141.11**		5.77	4.09
22	**48**	P4.1	D31	142.60		142.00		138.80		**141.19**		2.04	1.44
23	**41**	P4.1	D31	145.20	b	141.70		139.70		**141.81**		2.78	1.96
24	**42**	P4.1	D31	142.00		144.80		147.10		**144.80**		2.55	1.76
25	**47**	P4.1	D32	144.00		146.00		145.00		**145.00**		1.00	0.69
26	**18**	P3.31	D31	145.60		147.00		195.80	b	**147.41**		28.59	19.39
27	**43**	P4.1	D31	154.00	b	148.40		150.50		**150.56**		2.83	1.88
28	**14**	P4.1	D31	150.30		153.60		154.80		**153.09**		2.33	1.52
29	**8**	P6.3	D31	154.00		157.00		160.00		**157.00**		3.00	1.91
30	**6**	P4.2	D31	160.00	a	160.00	a	160.00	a	**160.00**		0.00	0.00
31	**12**	P5.1	D31	162.20	a	163.30	a	161.70	a	**162.40**		0.82	0.50
32	**44a**	P4.2	D31	180.00	ab	210.00	a	250.00	ab	**210.00**	*	35.12	16.72

Mean	Interlab.std. deviation	
	abs.	rel.%
135.50	**5.82**	**4.83**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **9.4**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Al**
Dimension: **µg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**4**	P9.1	D41	161.00	a	174.00	ab	160.00	a	**161.61 ***	7.81	4.83
2	**53**	P4.1	D21.2	212.40	a	212.40	a	243.40	ab	**213.51**	17.90	8.38
3	**46**	P5.2	D31	224.10	a	221.10	a	218.90	a	**221.11**	2.61	1.18
4	**49**	P4.1	D31	226.90	ab	240.10	ab	233.50	a	**233.50**	6.60	2.83
5	**23**	P3.3	D31	241.00	ab	230.00	ab	235.00	a	**235.00**	5.51	2.34
6	**52**	P4.1	D31	250.20		248.70		249.10		**249.33**	0.78	0.31
7	**26**	P3.5	D31	249.40		251.50		233.20	b	**249.34**	10.01	4.01
8	**25**	P5.1	D31	258.00		255.00		257.00		**256.67**	1.53	0.60
9	**47**	P4.1	D32	256.00		258.00		257.00		**257.00**	1.00	0.39
10	**11**	P5.1	D31	264.50	b	257.00		255.60		**257.41**	4.79	1.86
11	**37**	P5.5	D35	256.80		258.30		258.60		**257.90**	0.96	0.37
12	**2**	P5.3	D31	252.00	b	258.00		263.00	b	**258.00**	5.51	2.14
13	**14**	P4.1	D31	258.00		257.30		261.30		**258.76**	2.14	0.83
14	**21**	P5.1	D31	257.10		259.00		266.90	b	**259.16**	5.20	2.01
15	**8**	P6.3	D31	261.00		284.00	b	252.00	b	**261.00**	16.50	6.32
16	**45**	P5.5	D31	261.00		261.00		262.00		**261.33**	0.58	0.22
17	**38**	P4.1	D31	263.00		264.00		262.00		**263.00**	1.00	0.38
18	**17**	P5.5	D31	270.20	b	264.30		262.90		**264.71**	3.87	1.46
19	**39**	P5.5	D31	264.00		265.60		264.70		**264.77**	0.80	0.30
20	**16**	P5.5	D31	265.60		248.70	b	278.00	b	**265.60**	14.71	5.54
21	**48**	P4.1	D31	264.70		267.20		265.60		**265.83**	1.27	0.48
22	**44**	P4.1	D31	270.00		270.00		270.00		**270.00**	0.00	0.00
23	**4a**	P9.1	D42	280.00	b	258.00	b	271.00		**271.00**	11.06	4.08
24	**50**	P4.1	D31	271.80		270.20		274.50		**272.11**	2.17	0.80
25	**43**	P4.1	D31	276.10		277.30		268.80	b	**275.59**	4.60	1.67
26	**41**	P4.1	D31	274.30		277.10		280.40		**277.10**	3.05	1.10
27	**6**	P4.2	D31	280.00		280.00		270.00	b	**278.89**	5.77	2.07
28	**42**	P4.1	D31	285.40		286.90		277.30	b	**285.04**	5.16	1.81
29	**18**	P3.31	D31	282.70		299.40	b	286.30		**286.30**	8.79	3.07
30	**9**	P5.5	D31	288.00	ab	298.00	a	295.00	a	**295.00**	5.13	1.74
31	**44a**	P4.2	D31	280.00	ab	310.00	ab	300.00	a	**300.00**	15.28	5.09
32	**12**	P5.1	D31	344.00	ab	290.00	ab	325.00	a	**325.00 ***	27.39	8.43

Mean	Interlab.std. deviation	
	abs.	rel.%
263.40	**6.23**	**2.40**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.3**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Al**
Dimension: **µg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**4a**	P9.1	D42	20.00	a	23.00	ab	20.00	a	**20.67**	*	1.73	8.37
2	**16**	P5.5	D31	46.60		63.50	b	44.60		**46.60**	*	10.38	22.27
3	**2**	P5.3	D31	46.00		50.00	b	47.00		**47.17**	*	2.08	4.41
4	**26**	P3.5	D31	47.30		46.60		57.50	b	**47.62**	*	6.10	12.81
5	**49**	P4.1	D31	49.80		47.80		48.80		**48.80**	*	1.00	2.05
6	**23**	P3.3	D31	50.10		48.60		60.60	b	**50.10**	*	6.54	13.05
7	**21**	P5.1	D31	48.80	b	53.70		56.80	b	**53.70**		4.03	7.50
8	**52**	P4.1	D31	59.90	b	56.20		57.10		**57.32**		1.93	3.37
9	**38**	P4.1	D31	59.90		57.50		58.80		**58.73**		1.20	2.04
10	**39**	P5.5	D31	59.20		58.60		60.10		**59.30**		0.75	1.26
11	**11**	P5.1	D31	66.10	b	60.50		57.80	b	**60.50**		4.23	6.99
12	**17**	P5.5	D31	61.60		59.30		62.20		**61.23**		1.53	2.50
13	**37**	P5.5	D35	64.60		63.20		63.80		**63.87**		0.70	1.10
14	**45**	P5.5	D31	65.00		66.00		65.00		**65.33**		0.58	0.89
15	**48**	P4.1	D31	65.50		66.70		65.70		**65.97**		0.64	0.97
16	**25**	P5.1	D31	67.10		67.60		66.60		**67.10**		0.50	0.75
17	**9**	P5.5	D31	67.20		69.20		59.60	b	**67.20**		5.06	7.53
18	**42**	P4.1	D31	68.00		66.50		73.60	b	**68.00**		3.74	5.50
19	**50**	P4.1	D31	69.20		69.80		68.30		**69.10**		0.75	1.09
20	**6**	P4.2	D31	70.00		70.00		70.00		**70.00**		0.00	0.00
21	**44**	P4.1	D31	70.00		70.00		70.00		**70.00**		0.00	0.00
22	**8**	P6.3	D31	71.50		72.00		70.30		**71.27**		0.87	1.22
23	**14**	P4.1	D31	73.70		76.20	b	70.50	b	**73.70**		2.86	3.88
24	**18**	P3.31	D31	73.60		73.60		74.60		**73.93**		0.58	0.78
25	**47**	P4.1	D32	77.00		75.00		77.00		**76.33**		1.15	1.51
26	**53**	P4.1	D21.2	6.40	b	81.40		99.90	b	**81.40**	*	49.51	60.82
27	**43**	P4.1	D31	83.10		83.40		73.90	b	**82.58**	*	5.40	6.54
28	**12**	P5.1	D31	95.90	a	92.60	ab	99.30	ab	**95.90**	*	3.35	3.49
29	**41**	P4.1	D31	99.40	a	103.80	ab	97.40	a	**99.40**	*	3.27	3.29
30	**44a**	P4.2	D31	120.00	a	120.00	a	80.00	ab	**119.33**	*	23.09	19.35

Mean	Interlab.std. deviation	
	abs.	rel.%
65.13	**4.79**	**6.84**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **36.7**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **60.04**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **B**
Dimension: **µg/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**23**	P3.3	D31	4.49	a	4.56	a	5.41	ab	**4.69**	*	0.51	10.87
2	**45**	P5.5	D31	16.30	ab	15.10	ab	15.70	a	**15.70**	*	0.60	3.82
3	**24**	P6.4	D54.1	17.10	a	16.80	a	17.47	a	**17.12**	*	0.34	1.99
4	**29**	P3.3	D31	18.45		19.21		19.17		**19.02**		0.43	2.26
5	**21**	P5.1	D31	19.54		19.05		19.74		**19.47**		0.36	1.85
6	**6**	P4.2	D31	20.00		20.00		20.00		**20.00**		0.00	0.00
7	**18**	P6	D31	19.52	b	20.32		22.59	b	**20.32**		1.59	7.82
8	**25**	P5.1	D31	20.80		21.10		20.90		**20.93**		0.15	0.72
9	**50**	P4.1	D31	21.01		21.47		20.66		**21.01**		0.41	1.95
10	**7**	P5.5	D31	21.90	b	21.20		20.30	b	**21.20**		0.80	3.77
11	**17**	P5.5	D31	21.60		20.84		21.36		**21.31**		0.39	1.83
12	**4a**	P5.5	D31	21.50		21.30		21.70		**21.50**		0.20	0.93
13	**26**	P3.5	D31	22.81	b	21.10		21.53		**21.53**		0.89	4.13
14	**38**	P4.1	D31	21.70		21.60		21.40		**21.57**		0.15	0.70
15	**37**	P5.5	D35	21.80		22.00		21.80		**21.87**		0.12	0.55
16	**36**	P6.2	D54.2	21.36	b	22.12		22.41		**22.10**		0.54	2.44
17	**14**	P4.1	D31	22.70	b	21.90		22.00		**22.12**		0.44	1.99
18	**42**	P4.1	D31	22.48		22.29		22.44		**22.40**		0.10	0.45
19	**43**	P4.1	D31	22.62		22.74		21.73	b	**22.51**		0.55	2.44
20	**39**	P5.5	D31	23.11		22.79		22.64		**22.85**		0.24	1.05
21	**10**	P6.5	D54	27.21	b	20.93	b	23.02		**23.02**		3.20	13.90
22	**8**	P6.3	D31	26.30	b	20.00	b	23.80		**23.80**		3.17	13.32
23	**2**	P5.3	D31	22.50	b	24.10		24.70	b	**24.10**		1.14	4.73
24	**28**	P6.5	D21.1	23.13	b	24.46		24.52		**24.32**		0.79	3.25
25	**12**	P5.1	D31	26.70	ab	33.40	a	33.40	a	**33.23**	*	3.87	11.65

Mean	Interlab.std. deviation	
	abs.	rel.%
21.50	**0.84**	**3.94**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **16.0**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **B**
Dimension: **µg/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**23**	P3.3	D31	6.67	ab	3.66	ab	4.51	a	**4.51**	*	1.55	34.37
2	**45**	P5.5	D31	8.10	a	7.90	a	7.80	a	**7.93**	*	0.15	1.89
3	**21**	P5.1	D31	8.10	a	7.89	a	8.15	a	**8.05**	*	0.14	1.74
4	**29**	P3.3	D31	9.35		9.84		9.68		**9.65**		0.25	2.59
5	**6**	P4.2	D31	10.00		10.00		10.00		**10.00**		0.00	0.00
6	**26**	P3.5	D31	10.44		11.00		10.50		**10.58**		0.31	2.93
7	**4b**	P5.1	D31	10.90		10.30				**10.60**		0.42	3.96
8	**25**	P5.1	D31	10.70		10.80		11.00		**10.83**		0.15	1.39
9	**36**	P6.2	D54.2	10.51		11.04		11.00		**10.91**		0.30	2.75
10	**4a**	P5.5	D31	10.90		11.00		11.20		**11.03**		0.15	1.36
11	**17**	P5.5	D31	11.00		10.86		11.62	b	**11.04**		0.40	3.62
12	**50**	P4.1	D31	11.03		11.27		11.42		**11.24**		0.20	1.78
13	**7**	P5.5	D31	12.00	b	11.20		11.20		**11.31**		0.46	4.07
14	**38**	P4.1	D31	11.50		11.30		11.30		**11.37**		0.12	1.06
15	**39**	P5.5	D31	11.58		11.63		11.19		**11.49**		0.24	2.09
16	**18**	P6	D31	11.58		11.14		11.69		**11.52**		0.29	2.52
17	**14**	P4.1	D31	11.60		11.20		12.20	b	**11.60**		0.50	4.31
18	**37**	P5.5	D35	11.90		11.80		11.80		**11.83**		0.06	0.51
19	**42**	P4.1	D31	12.02		11.77		11.77		**11.85**		0.14	1.18
20	**2**	P5.3	D31	11.20	b	12.60		13.20	b	**12.60**		1.03	8.17
21	**43**	P4.1	D31	13.07		13.42		12.53	b	**13.07**		0.45	3.44
22	**28**	P6.5	D21.1	14.08	b	13.24		13.57		**13.57**		0.42	3.10
23	**24**	P6.4	D54.1	14.87	a	15.35	ab	14.22	ab	**14.87**	*	0.57	3.83
24	**10**	P6.5	D54	17.29	ab	12.97	ab	15.70	a	**15.70**	*	2.18	13.89
25	**8**	P6.3	D31	11.30	ab	16.80	ab	16.30	a	**16.30**	*	3.04	18.65
26	**12**	P5.1	D31	16.90	ab	22.70	ab	18.10	a	**18.10**	*	3.06	16.91

Mean	Interlab.std. deviation	
	abs.	rel.%
11.44	**0.64**	**5.47**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **26.9**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **B**
Dimension: **µg/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**23**	P3.3	D31	6.24	a	4.06	ab	5.96	a	**5.96 ***	1.19	19.97
2	**45**	P5.5	D31	14.30	a	14.30	a	14.10	a	**14.23 ***	0.12	0.84
3	**21**	P5.1	D31	17.67		17.14	b	17.87		**17.64**	0.38	2.15
4	**36**	P6.2	D54.2	18.36		18.08		17.78		**18.08**	0.29	1.60
5	**4a**	P5.5	D31	19.10		19.00		19.20		**19.10**	0.10	0.52
6	**24**	P6.4	D54.1	19.12		18.60	b	19.65	b	**19.12**	0.53	2.77
7	**39**	P5.5	D31	18.99		20.43	b	18.99		**19.12**	0.83	4.34
8	**50**	P4.1	D31	19.40		19.59		19.13		**19.37**	0.23	1.19
9	**14**	P4.1	D31	19.30		19.50		19.40		**19.40**	0.10	0.52
10	**38**	P4.1	D31	19.30		19.60		19.50		**19.47**	0.15	0.77
11	**8**	P6.3	D31	19.60		23.40	b	18.20	b	**19.60**	2.69	13.72
12	**18**	P6	D31	19.87		19.24	b	19.78		**19.70**	0.34	1.73
13	**4b**	P5.1	D31	18.80	b	20.40	b	19.80		**19.80**	0.81	4.09
14	**17**	P5.5	D31	20.02		18.94	b	19.85		**19.81**	0.58	2.93
15	**42**	P4.1	D31	19.73		19.91		20.21		**19.95**	0.24	1.20
16	**6**	P4.2	D31	20.00		20.00		20.00		**20.00**	0.00	0.00
17	**7**	P5.5	D31	20.60		19.10	b	20.50		**20.42**	0.84	4.11
18	**43**	P4.1	D31	20.79		19.30	b	20.60		**20.57**	0.81	3.94
19	**37**	P5.5	D35	21.10		20.90		20.90		**20.97**	0.12	0.57
20	**2**	P5.3	D31	19.50	b	21.40		22.30	b	**21.40**	1.43	6.68
21	**25**	P5.1	D31	21.90		21.90		21.60		**21.80**	0.17	0.78
22	**10**	P6.5	D54	26.81	b	19.30	b	22.52		**22.52**	3.77	16.74
23	**28**	P6.5	D21.1	22.75		22.96		23.09		**22.93**	0.17	0.74
24	**29**	P3.3	D31	24.19	a	23.76	a	23.89	a	**23.95**	0.22	0.92
25	**26**	P3.5	D31	26.10	a	27.50	ab	25.50	ab	**26.10 ***	1.03	3.95
26	**12**	P5.1	D31	33.60	a	36.70	ab	33.80	a	**33.83 ***	1.73	5.11

Mean	Interlab.std. deviation	
	abs.	rel.%
20.07	**0.73**	**3.92**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **15.4**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **B**
Dimension: **µg/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**23**	P3.3	D31	4.10	ab	5.39	a	8.59	ab	**5.39 ***	2.31	42.86
2	**45**	P5.5	D31	11.10	a	11.50	a	11.20	a	**11.26 ***	0.21	1.87
3	**21**	P5.1	D31	12.88	a	13.04	a	13.21	a	**13.04 ***	0.17	1.30
4	**36**	P6.2	D54.2	14.25	b	14.88		15.12		**14.88**	0.45	3.02
5	**18**	P6	D31	15.61		15.88		15.52		**15.67**	0.19	1.21
6	**39**	P5.5	D31	15.84		15.50		16.68	b	**15.84**	0.61	3.85
7	**17**	P5.5	D31	15.94		15.66		15.97		**15.86**	0.17	1.07
8	**38**	P4.1	D31	16.10		15.90		15.90		**15.97**	0.12	0.75
9	**50**	P4.1	D31	16.01		16.19		15.68		**15.99**	0.26	1.63
10	**26**	P3.5	D31	17.05	b	15.56	b	16.04		**16.04**	0.76	4.74
11	**4a**	P5.5	D31	16.10		16.10		16.00		**16.07**	0.06	0.37
12	**12**	P5.1	D31	17.60	b	16.10		16.40		**16.40**	0.79	4.82
13	**14**	P4.1	D31	16.70		16.40		16.50		**16.53**	0.15	0.91
14	**25**	P5.1	D31	16.60		16.40		16.80		**16.60**	0.20	1.20
15	**4b**	P5.1	D31	16.80						**16.80**		0.00
16	**42**	P4.1	D31	17.03		16.86		16.58		**16.83**	0.23	1.37
17	**7**	P5.5	D31	17.00		16.00	b	18.10	b	**17.00**	1.05	6.18
18	**8**	P6.3	D31	20.50	b	17.00		15.90	b	**17.00**	2.40	14.12
19	**37**	P5.5	D35	17.00		17.10		17.00		**17.03**	0.06	0.35
20	**29**	P3.3	D31	17.12		17.00		17.26		**17.13**	0.13	0.76
21	**43**	P4.1	D31	17.58		17.87		17.58		**17.68**	0.17	0.96
22	**24**	P6.4	D54.1	18.22		19.16	b	17.65	b	**18.22**	0.76	4.17
23	**2**	P5.3	D31	16.70	b	18.30		19.10	b	**18.30**	1.22	6.67
24	**10**	P6.5	D54	21.75	b	16.31	b	18.48		**18.48**	2.74	14.83
25	**28**	P6.5	D21.1	18.94	a	18.62	a	19.02	a	**18.87**	0.21	1.11
26	**6**	P4.2	D31	20.00	a	20.00	a	20.00	a	**20.00 ***	0.00	0.00

Mean	Interlab.std. deviation	
	abs.	rel.%
16.58	**0.62**	**4.62**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 20 % from mean (Agreement from Bonn 1999)**

Annotation:	Percentage of non-tolerable lab means:	**15.4**
	Mean of 3rd Needle/Leaf Test 97/98 sample 5:	**17.52**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Cd**
Dimension: **ng/g**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**41**	P4.1	D22	50.00	a	60.00	ab	50.00	a	**51.11 ***	5.77	11.29
2	**24**	P5.1	D22	72.00	a	65.00	a	70.00	a	**69.89 ***	3.61	5.17
3	**33a**	P3.31	D22	95.00		90.00		100.00		**95.00**	5.00	5.26
4	**4b**	P5.1	D22	103.00		102.00		100.00		**101.67**	1.53	1.50
5	**37**	P5.5	D35	104.00		104.00		104.00		**104.00**	0.00	0.00
6	**36**	P3.3	D22	107.00		112.50		110.00		**110.00**	2.75	2.50
7	**39**	P5.5	D35	110.00		120.00	b	110.00		**111.11**	5.77	5.19
8	**44**	P4.1	D32	110.00	b	120.00		150.00	b	**120.00**	20.82	17.35
9	**44a**	P4.2	D32	140.00	b	110.00	b	120.00		**120.00**	15.28	12.73
10	**26**	P3.5	D31	130.00		135.00		123.00		**130.00**	6.03	4.64
11	**43**	P4.1	D22	130.00		140.00	b	100.00	b	**130.00**	20.82	16.02
12	**42**	P4.1	D22	137.00		128.00	b	137.00		**135.89**	5.20	3.83
13	**9**	P5.5	D31	140.00		140.00		130.00	b	**138.89**	5.77	4.15
14	**50**	P4.1	D31	130.00	b	150.00		160.00	b	**150.00**	15.28	10.19
15	**35**	P3.5	D22	157.00		158.00		190.00	b	**158.61 ***	18.77	11.83
16	**47**	P4.1	D32	230.00	a	230.00	a	220.00	ab	**228.89 ***	5.77	2.52

Mean	Interlab.std. deviation	
	abs.	rel.%
120.50	**8.64**	**7.14**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **25.0**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Cd**
Dimension: **ng/g**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**33a**	P3.31	D22	25.00	ab	30.00	ab	28.00	a	**28.00**	*	2.52	9.00
2	**44**	P4.1	D32	70.00						**70.00**			0.00
3	**35**	P3.5	D22	76.00	b	73.00	b	74.00		**74.00**		1.53	2.07
4	**4b**	P5.1	D22	84.00	b	78.00		78.00		**78.00**		3.46	4.44
5	**24**	P5.1	D22	80.00		96.00	b	76.00	b	**80.00**		10.58	13.23
6	**44a**	P4.2	D32	80.00						**80.00**			0.00
7	**37**	P5.5	D35	89.00		86.00	b	89.00		**89.00**		1.73	1.94
8	**39**	P5.5	D35	90.00		80.00	b	90.00		**90.00**		5.77	6.41
9	**36**	P3.3	D22	92.50		92.50		90.00	b	**92.50**		1.44	1.56
10	**42**	P4.1	D22	94.00	b	93.00		93.00		**93.00**		0.58	0.62
11	**26**	P3.5	D31	112.00		112.00		111.00	b	**112.00**		0.58	0.52
12	**9**	P5.5	D31	120.00		120.00		120.00		**120.00**		0.00	0.00
13	**43**	P4.1	D22	130.00	b	110.00	b	120.00		**120.00**		10.00	8.33
14	**50**	P4.1	D31	110.00	b	120.00		130.00	b	**120.00**		10.00	8.33
15	**47**	P4.1	D32	190.00	a	180.00	ab	190.00	a	**190.00**	*	5.77	3.04

Mean	Interlab.std. deviation	
	abs.	rel.%
93.73	**4.15**	**3.97**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **13.3**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Cd**
Dimension: **ng/g**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**33a**	P3.31	D22	238.00	a	269.00	ab	191.00	ab	**238.00**	*	39.27	16.50
2	**24**	P5.1	D22	396.00	ab	392.00	a	366.00	ab	**392.00**		16.29	4.16
3	**4**	P9.1	D41	400.00	a	400.00	a	400.00	a	**400.00**		0.00	0.00
4	**35**	P3.5	D22	423.00	b	430.00		475.00	b	**430.00**		28.22	6.56
5	**41**	P4.1	D22	550.00	b	500.00		490.00	b	**500.00**		32.15	6.43
6	**4b**	P5.1	D22	491.00	b	511.00		513.00	b	**511.00**		12.17	2.38
7	**36**	P3.3	D22	535.00	b	500.00	b	512.50		**512.50**		17.74	3.46
8	**39**	P5.5	D35	550.00		550.00		570.00	b	**550.00**		11.55	2.10
9	**43**	P4.1	D22	550.00		580.00	b	510.00	b	**550.00**		35.12	6.39
10	**26**	P3.5	D31	570.00	b	540.00	b	554.00		**554.00**		15.01	2.71
11	**37**	P5.5	D35	560.00		560.00		560.00		**560.00**		0.00	0.00
12	**42**	P4.1	D22	560.00		560.00		601.00	b	**560.00**		23.67	4.23
13	**44**	P4.1	D32	550.00	b	560.00		570.00	b	**560.00**		10.00	1.79
14	**9**	P5.5	D31	560.00	b	590.00		590.00		**590.00**		17.32	2.94
15	**45**	P5.5	D31	600.00		600.00		600.00		**600.00**		0.00	0.00
16	**50**	P4.1	D31	600.00	b	610.00		610.00		**610.00**		5.77	0.95
17	**44a**	P4.2	D32	570.00	b	630.00		640.00	b	**630.00**		37.86	6.01
18	**47**	P4.1	D32	650.00		630.00	b	650.00		**650.00**		11.55	1.78

Mean	Interlab.std. deviation	
	abs.	rel.%
537.70	**17.43**	**3.80**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **5.6**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **Cd**
Dimension: **ng/g**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean		Lab.standard deviation	
												abs.	rel.%
1	**35**	P3.5	D22	111.00	ab	99.00	a	96.00	ab	**99.00**	*	7.94	8.02
2	**41**	P4.1	D22	120.00		110.00	b	120.00		**120.00**	*	5.77	4.81
3	**33a**	P3.31	D22	140.00		135.00	b	150.00	b	**140.00**		7.64	5.46
4	**43**	P4.1	D22	140.00		110.00	b	180.00	b	**140.00**		35.12	25.09
5	**44a**	P4.2	D32	160.00		150.00	b	160.00		**160.00**		5.77	3.61
6	**4b**	P5.1	D22	160.00	b	173.00	b	164.00		**164.00**		6.66	4.06
7	**37**	P5.5	D35	170.00		170.00		170.00		**170.00**		0.00	0.00
8	**39**	P5.5	D35	180.00		180.00		180.00		**180.00**		0.00	0.00
9	**26**	P3.5	D31	183.00		179.00	b	196.00	b	**183.00**		8.89	4.86
10	**24**	P5.1	D22	180.00	b	185.00		192.00	b	**185.00**		6.03	3.26
11	**42**	P4.1	D22	192.00	b	187.00		186.00	b	**187.00**		3.21	1.72
12	**9**	P5.5	D31	200.00		210.00	b	200.00		**200.00**		5.77	2.89
13	**44**	P4.1	D32	160.00	b	200.00		200.00		**200.00**		23.09	11.55
14	**50**	P4.1	D31	190.00	b	220.00		220.00		**220.00**		17.32	7.87
15	**47**	P4.1	D32	300.00	ab	290.00	a	290.00	a	**290.00**	*	5.77	1.99
16	**36**	P3.3	D22	360.00	ab	350.00	a	350.00	a	**350.00**	*	5.77	1.65

Mean	Interlab.std. deviation	
	abs.	rel.%
177.40	**9.05**	**5.43**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 30 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **25.0**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **200.7**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **C**
Dimension: **%**
Sample: **1** **SPRUCE NEEDLES (Austria)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**44**	P1	D17.1	49.70		49.90	b	49.20	b	**49.70**	0.36	0.72
2	**48**	P1	D17.1	49.89		49.85		49.88		**49.87**	0.02	0.04
3	**45**	P1	D17.1	50.03		49.90		49.95		**49.95**	0.07	0.14
4	**6**	P1	D10	50.29	b	49.72	b	49.97		**49.97**	0.29	0.58
5	**41**	P1	D15.3	50.00		50.00		49.50	b	**49.99**	0.29	0.58
6	**36**	P3.3	D82.3	50.83		50.20	b	51.02	b	**50.83**	0.43	0.85
7	**4b**	P1	D17.1	51.22		51.23		51.24		**51.23**	0.01	0.02
8	**15**	P1	D17.1	51.32		51.50	b	51.11	b	**51.32**	0.20	0.39
9	**52**	P1	D17.1	51.03	b	51.53		51.53		**51.52**	0.29	0.56
10	**12**	P1	D17.1	51.65		51.86	b	51.68		**51.68**	0.11	0.21
11	**47**	P1	D15.4	51.44	b	51.73		51.72		**51.71**	0.16	0.31
12	**46**	P1	D15.4	51.75		51.89		51.82		**51.82**	0.07	0.14
13	**39**	P1	D13.1	53.06		51.78	b	53.28	b	**53.06**	0.81	1.53
14	**42**	P1	D17.1	53.30	b	53.10		53.10		**53.11**	0.12	0.23
15	**49**	P1	D12.2	53.27		53.26		53.28		**53.27**	0.01	0.02

Mean	Interlab.std. deviation	
	abs.	rel.%
51.27	**0.22**	**0.42**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/-** **5 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **0.0**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **C**
Dimension: **%**
Sample: **2** **SPRUCE NEEDLES (Norway)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**48**	P1	D17.1	47.83		47.81		47.90		**47.85**	0.05	0.10
2	**45**	P1	D17.1	47.90		48.08	b	47.87		**47.92**	0.11	0.23
3	**44**	P1	D17.1	47.98		47.98		47.98		**47.98**	0.00	0.00
4	**6**	P1	D10	47.86		48.00		48.08		**48.00**	0.11	0.23
5	**41**	P1	D15.3	48.00		48.20	b	47.80	b	**48.00**	0.20	0.42
6	**39**	P1	D13.1	48.53		48.53		47.59	b	**48.50**	0.54	1.11
7	**4b**	P1	D17.1	49.68		49.63		49.65		**49.65**	0.03	0.06
8	**15**	P1	D17.1	49.63	b	49.94		49.85		**49.85**	0.16	0.32
9	**36**	P3.3	D82.3	49.98		50.31	b	49.07	b	**49.98**	0.64	1.28
10	**46**	P1	D15.4	49.96		50.09		49.96		**49.99**	0.08	0.16
11	**12**	P1	D17.1	50.12		50.33	b	50.13		**50.16**	0.12	0.24
12	**52**	P1	D17.1	50.57	b	50.39		50.10	b	**50.39**	0.24	0.48
13	**47**	P1	D15.4	50.54	b	50.87		50.84		**50.82**	0.18	0.35
14	**42**	P1	D17.1	51.10	b	51.50		51.40		**51.40**	0.21	0.41
15	**49**	P1	D12.2	52.30		52.12		52.16		**52.17 ***	0.09	0.17

Mean	Interlab.std. deviation	
	abs.	rel.%
49.51	**0.18**	**0.37**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 5 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.7**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **C**
Dimension: **%**
Sample: **3** **PINE NEEDLES (Germany)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**48**	P1	D17.1	49.96		49.96		49.96		**49.96**	0.00	0.00
2	**44**	P1	D17.1	50.10		50.10		49.90	b	**50.09**	0.12	0.24
3	**45**	P1	D17.1	50.21		50.15		50.20		**50.19**	0.03	0.06
4	**41**	P1	D15.3	50.90	b	50.40		50.40		**50.41**	0.29	0.58
5	**6**	P1	D10	50.51		50.55		50.47		**50.51**	0.04	0.08
6	**39**	P1	D13.1	51.13		50.49	b	51.24	b	**51.13**	0.41	0.80
7	**15**	P1	D17.1	51.56		51.60		51.84	b	**51.60**	0.15	0.29
8	**4b**	P1	D17.1	51.72		51.68		51.63		**51.68**	0.05	0.10
9	**12**	P1	D17.1	52.26		52.54	b	52.30		**52.30**	0.15	0.29
10	**52**	P1	D17.1	52.32		52.10	b	52.35		**52.32**	0.14	0.27
11	**46**	P1	D15.4	52.62		52.63		52.77	b	**52.64**	0.08	0.15
12	**47**	P1	D15.4	52.85	b	52.77		52.72		**52.77**	0.07	0.13
13	**36**	P3.3	D82.3	53.00	b	52.30	b	52.92		**52.92**	0.38	0.72
14	**42**	P1	D17.1	53.60	b	53.70		53.70		**53.69**	0.06	0.11
15	**49**	P1	D12.2	54.31		54.32		54.34		**54.32**	0.02	0.04

Mean	Interlab.std. deviation	
	abs.	rel.%
51.77	**0.13**	**0.26**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/-** **5 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **0.0**

ICP-Forests 4th needle/leaf labtest 99/00

Element: **C**
Dimension: **%**
Sample: **4** **BEECH LEAVES (Slovakia)**

No.	Lab.code	Method codes		Replications						Lab.mean	Lab.standard deviation	
											abs.	rel.%
1	**48**	P1	D17.1	46.90		46.91		46.89		**46.90**	0.01	0.02
2	**45**	P1	D17.1	47.20	b	46.92		46.82		**46.92**	0.20	0.43
3	**44**	P1	D17.1	46.97		47.07		47.07		**47.05**	0.06	0.13
4	**6**	P1	D10	47.49		47.28		47.37		**47.37**	0.11	0.23
5	**41**	P1	D15.3	47.20	b	47.60		47.60		**47.58**	0.23	0.48
6	**36**	P3.3	D82.3	49.13	b	48.21		48.00	b	**48.21**	0.60	1.24
7	**12**	P1	D17.1	49.21		50.24	b	49.16		**49.21**	0.61	1.24
8	**4b**	P1	D17.1	49.18		49.25		49.27		**49.24**	0.05	0.10
9	**39**	P1	D13.1	50.68	b	49.28	b	49.49		**49.49**	0.76	1.54
10	**15**	P1	D17.1	49.82		49.50	b	50.12	b	**49.82**	0.31	0.62
11	**52**	P1	D17.1	50.04		50.01		50.08		**50.04**	0.04	0.08
12	**46**	P1	D15.4	50.28		50.19		50.28		**50.26**	0.05	0.10
13	**47**	P1	D15.4	50.28		50.49		50.37		**50.37**	0.11	0.22
14	**49**	P1	D12.2	51.35		51.43		51.45		**51.42**	0.05	0.10
15	**42**	P1	D17.1	51.20	ab	51.70	a	51.70	a	**51.68 ***	0.29	0.56

Mean	Interlab.std. deviation	
	abs.	rel.%
49.03	**0.23**	**0.47**

a = lab.mean is trimmed
b = trimmed single value

*** =not tolerable mean because more than +/- 5 % from mean (Agreement from Bonn 1999)**

Annotation: Percentage of non-tolerable lab means: **6.7**
Mean of 3rd Needle/Leaf Test 97/98 sample 5: **48.99**

ICP-FOREST 4th needle/leaf interlaboratory test 1999/2000

Additional parameters

Element	Lab	Methods	Sample 1	Sample 2	Sample 3	Sample 4
As (µg/g)	4	P9.1-D41	< 0.4	< 0.4	< 0.4	< 0.4
			< 0.4	< 0.4	< 0.4	< 0.4
			< 0.4	< 0.4	< 0.4	< 0.4
			< 0.4	**< 0.4**	**< 0.4**	**< 0.4**
	4b	P4.1-D22	< 0.2	< 0.2	0,31	< 0.2
			<0.2	< 0.2	0,29	< 0.2
			< 0.2	< 0.2	0,30	< 0.2
			<0 .2	**< 0.2**	**0,30**	**< 0.2**
Ba (µg/g)	2	P5.3-D31	22,70	116,50	2,70	32,40
			23,50	122,70	2,90	33,80
			23,30	121,30	2,90	33,90
			23,17	**120,17**	**2,83**	**33,37**
	4	P9.1-D41	21,00	98,00	6,00	34,00
			22,00	100,00	4,00	38,00
			21,00	102,00	4,40	36,00
			21,33	**100,00**	**4,80**	**36,00**
	26	P4-D32	21,03	110,00	3,44	31,13
			21,60	111,00	3,42	30,58
			21,60	112,00	3,37	30,46
			21,41	**111,00**	**3,41**	**30,72**
	42	P4.1-D31	19,10	96,20	3,12	27,50
			19,00	97,00	3,12	27,90
			19,20	99,30	3,00	28,30
			19,10	**97,50**	**3,08**	**27,90**
	45	P5.3-D31	25,00	123,00	4,00	34,00
			25,00	123,00	4,00	36,00
			25,00	123,00	4,00	36,00
			25,00	**123,00**	**4,00**	**35,33**
	50	P4.1-D31	22,10	108,90	3,50	30,70
			22,40	108,30	3,70	30,50
			22,80	107,40	3,70	30,80
			22,43	**108,20**	**3,63**	**30,67**
	Median		**21,92**	**109,60**	**3,52**	**32,05**
Br (µg/g)	4	P9.1-D41	0,30	1,70	6,00	0,50
			0,40	1,90	6,10	0,60
				1,80	6,20	0,40
			0,35	**1,80**	**6,10**	**0,50**
	26	P4-D32	50,40	27,10	33,70	22,90
			48,60	42,10	42,50	22,80
			44,00	34,10	47,70	20,00
			47,67	**34,43**	**41,30**	**21,90**
	38a	P9.1-D42			7,20	
					7,20	
					7,10	
					7,17	

ICP-FOREST 4th needle/leaf interlaboratory test 1999/2000

Additional parameters

Element	Lab	Methods	Sample 1	Sample 2	Sample 3	Sample 4
Cl (µg/g)	4	P9.1-D41	595,00	249,00	667,00	< 300
			604,00	260,00	702,00	< 300
			609,00	247,00	702,00	< 300
			602,67	**252,00**	**690,33**	**< 300**
	4a	P91-D42	730,00	400,00	770,00	120,00
			740,00	410,00	780,00	120,00
			710,00	410,00	790,00	130,00
			726,67	**406,67**	**780,00**	**123,33**
	12	P2.1-D60	663,80	333,40	648,90	60,20
			657,10	320,90	681,30	64,50
			644,20	345,80	630,30	53,70
			655,03	**333,37**	**653,50**	**59,47**
	26	P4-D32	1240,00	879,00	1066,00	530,00
			1305,00	771,00	1226,00	535,00
			1327,00	653,00	1068,00	552,00
			1290,67	**767,67**	**1120,00**	**539,00**
	38a	P9.1-D42	770,00	430,00	850,00	110,00
			770,00	430,00	850,00	110,00
			780,00	420,00	850,00	110,00
			773,33	**426,67**	**850,00**	**110,00**
	42	P1-D17.1	707,00	363,00	686,00	164,00
			714,00	356,00	704,00	154,00
			709,00	342,00	697,00	147,00
			710,00	**353,67**	**695,67**	**155,00**
	Median		**718,33**	**380,17**	**737,83**	**123,33**
Co (µg/g)	2	P5.3-D31	0,70	< 0.2	< 0.2	< 0.2
			0,70	< 0.2	< 0.2	< 0.2
			0,70	< 0.2	< 0.2	< 0.2
			0,70	**< 0.2**	**< 0.2**	**< 0.2**
	18	P6.4-D31	0,71	0,02	0,65	0,18
			0,63	0,25	0,36	0,23
			0,92	0,18	0,41	0,18
			0,75	**0,15**	**0,47**	**0,20**
	26	P4-D32	0,60	< 0.1	0,42	< 0.1
			0,59	< 0.1	0,43	< 0.1
			0,57	< 0.1	0,41	< 0.1
			0,59	**< 0.1**	**0,42**	**< 0.1**
	44	P4.1-D32	0,76	0,29	2,66	0,59
			0,77	0,30	2,71	0,61
			0,75	0,29	2,69	0,55
			0,76	**0,29**	**2,69**	**0,58**
	44a	P4.2-D32	0,78	0,24	0,64	0,00
			0,76	0,27	0,70	0,00
			0,78	0,28	0,81	0,00
			0,77	**0,26**	**0,72**	**0,00**
	45	P5.3-D31	1,30	1,00	0,90	0,80
			1,30	1,00	1,00	0,90
			1,30	1,00	1,00	0,90
			1,30	**1,00**	**0,97**	**0,87**
	47	D4.1-D32	0,80	0,20	0,60	0,50
			0,80	0,20	0,60	0,60
			0,90	0,20	0,60	0,50
			0,83	**0,20**	**0,60**	**0,53**
	50	P4.1-D31	0,94	0,33	0,65	0,24
			0,90	0,34	0,72	0,23
			0,89	0,35	0,71	0,23
			0,91	**0,34**	**0,69**	**0,23**
	Median		**0,77**	**0,28**	**0,69**	**0,38**

ICP-FOREST 4th needle/leaf interlaboratory test 1999/2000

Additional parameters

Element	Lab	Methods	Sample 1	Sample 2	Sample 3	Sample 4
Cr (µg/g)	2	P5.3-D31	8,30	1,90	2,50	< 1.1
			9,50	1,70	2,40	< 1.1
			9,50	2,10	2,80	< 1.1
			9,10	**1,90**	**2,57**	**< 1.1**
	4	P9.1-D41	10,60	1,90	3,00	0,70
			11,10	2,30	2,90	
			11,10	2,70	2,20	
			10,93	**2,30**	**2,70**	**0,70**
	4b	P5.1-D31	8,57	1,03	1,74	0,15
			6,92	0,84	2,40	0,68
			8,85	0,16	1,73	0,35
			8,11	**0,68**	**1,96**	**0,39**
	9	P5.5-D31	9,40	1,18	2,29	1,18
			8,60	1,15	2,15	1,14
			9,10	1,21	2,46	1,16
			9,03	**1,18**	**2,30**	**1,16**
	18	P6.4-D31	6,37	2,31	2,68	1,13
			6,49	2,27	2,23	0,60
			7,40	2,31	2,55	0,74
			6,75	**2,30**	**2,49**	**0,82**
	26	P4-D32	6,60	1,84	2,54	1,89
			6,75	1,74	2,43	1,42
			6,68	1,92	2,49	1,72
			6,68	**1,83**	**2,49**	**1,68**
	42	P4.1-D22	15,15	0,92	2,52	0,58
			15,18	0,90	2,77	0,56
			15,26	0,91	2,61	0,84
			15,20	**0,91**	**2,63**	**0,66**
	44	P4.1-D32	12,45	2,45	2,66	0,59
			12,02	2,02	2,71	0,61
			11,74	2,10	2,69	0,55
			12,07	**2,19**	**2,69**	**0,58**
	44a	P4.2-D32	13,82	3,25	3,56	1,34
			14,38	3,16	3,89	0,74
			14,88	3,00	3,71	0,80
			14,36	**3,14**	**3,72**	**0,96**
	45	P5.3-D31	13,00	3,00	3,00	1,00
			14,00	3,00	3,00	1,00
			14,00	3,00	3,00	1,00
			13,67	**3,00**	**3,00**	**1,00**
	46	P5.2-D31	12,66			
			12,77			
			12,14			
			12,52			
	47	D4.1-D32	13,00	2,40	2,70	0,70
			13,00	2,40	2,80	0,60
			13,30	2,30	2,80	0,70
			13,10	**2,37**	**2,77**	**0,67**
	50	P4.1-D31	12,52	1,05	2,55	0,63
			12,46	1,23	2,55	0,64
			12,82	1,25	2,57	0,67
			12,60	**1,18**	**2,56**	**0,65**
	Median		**12,07**	**2,05**	**2,60**	**0,70**

ICP-FOREST 4th needle/leaf interlaboratory test 1999/2000

Additional parameters

Element	Lab	Methods	Sample 1	Sample 2	Sample 3	Sample 4
Cs (µg/g)	26	P4-D32	1,30	0,52	0,36	0,40
			1,18	0,48	0,43	0,35
			1,46	0,38	0,48	0,36
			1,31	**0,46**	**0,42**	**0,37**
Li (µg/g)	26	P4-D32	2,62	2,51	2,63	2,15
			2,81	2,99	2,92	1,67
			3,06	2,88	3,13	1,77
			2,83	**2,79**	**2,89**	**1,86**
Mo (µg/g)	2	P5.3-D31	1,80	< 0.4	< 0.4	< 0.4
			2,10	< 0.4	< 0.4	< 0.4
			1,80	< 0.4	< 0.4	< 0.4
			1,90	**< 0.4**	**< 0.4**	**< 0.4**
	26	P4-D32	1,46	< 0.1	< 0.1	< 0.1
			1,58	< 0.1	< 0.1	< 0.1
			1,48	< 0.1	< 0.1	< 0.1
			1,51	**< 0.1**	**< 0.1**	**< 0.1**
	38a	P9.1-D42	1,30			
			1,50			
			1,20			
			1,33			
	50	P4.1-D31	1,32	< .25	< .25	< .25
			1,50	< .25	< .25	< .25
			1,44	< .25	< .25	< .25
			1,42	**< .25**	**< .25**	**< .25**
	Median		**1,46**			

ICP-FOREST 4th needle/leaf interlaboratory test 1999/2000

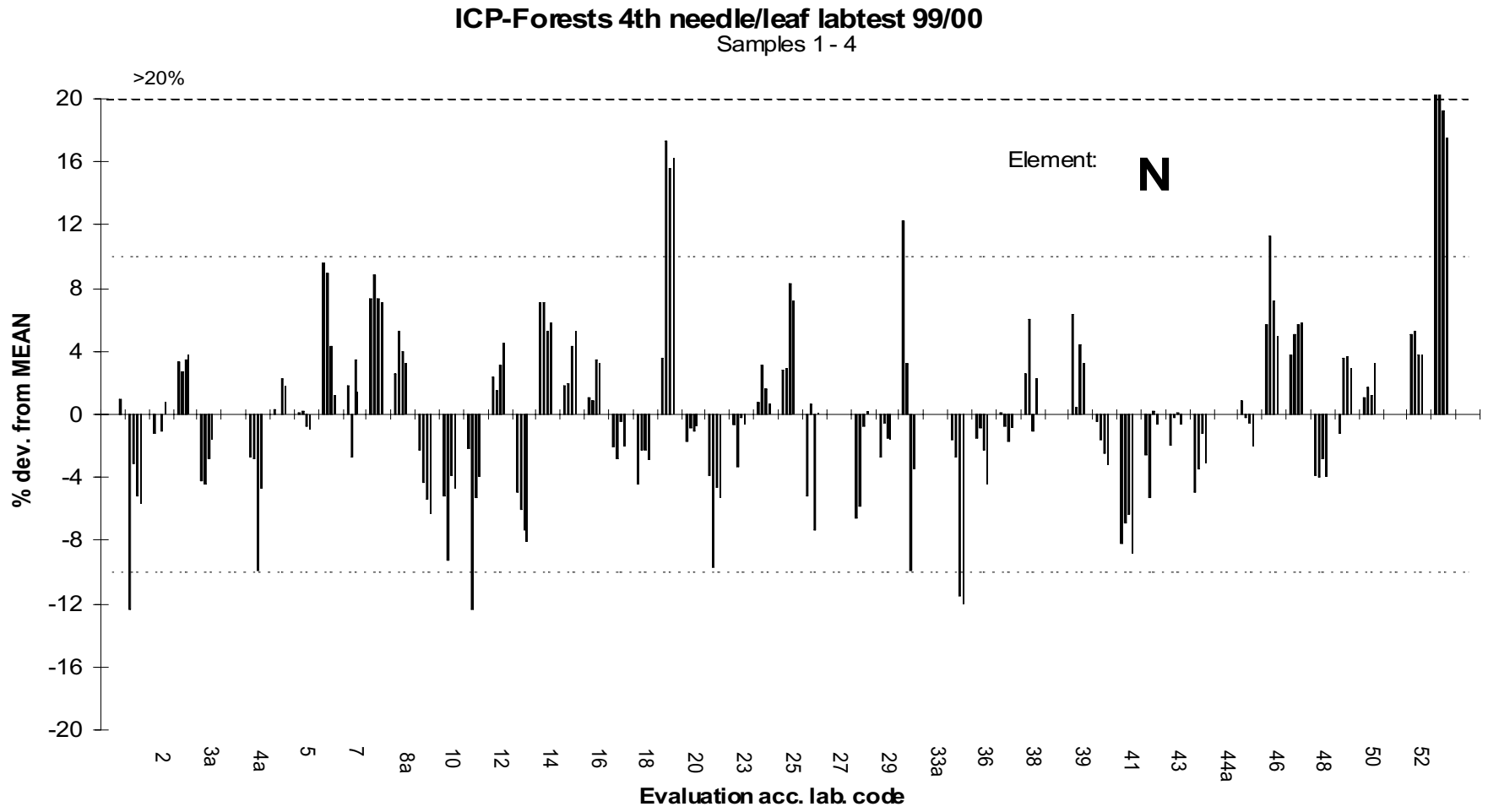
Additional parameters

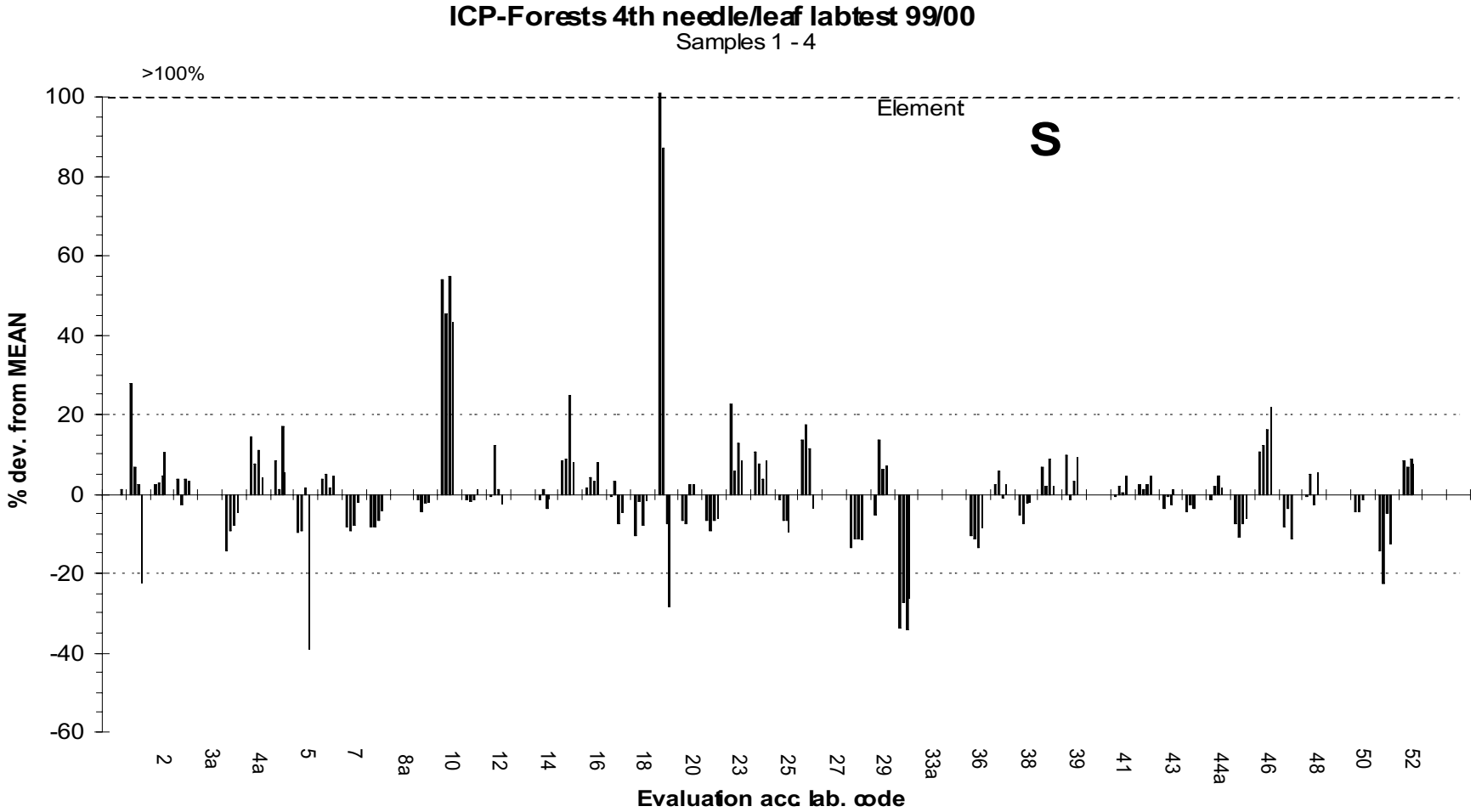
Element	Lab	Methods	Sample 1	Sample 2	Sample 3	Sample 4
Ni (µg/g)	2	P5.3-D31	11,70	1,70	2,70	< 1.1
			12,10	1,90	3,00	< 1.1
			11,70	1,80	3,20	< 1.1
			11,83	**1,80**	**2,97**	**< 1.1**
	4	P9.1-D41	12,90	2,00	2,90	< 1
			14,30	3,10	4,10	< 1
			13,80	2,10	3,50	< 1
			13,67	**2,40**	**3,50**	**< 1**
	4b	P5.1-D31	9,93	2,24	2,89	0,51
			10,27	2,15	2,90	0,52
			9,95	2,28	3,06	0,55
			10,05	**2,22**	**2,95**	**0,53**
	9	P5.5-D31	10,38	1,91	2,88	< 1
			10,23	1,97	2,73	< 1
			10,34	2,26	3,14	< 1
			10,32	**2,05**	**2,92**	**< 1**
	18	P6.4-D31	9,83	2,15	3,12	0,51
			10,30	2,07	3,07	0,24
			11,42	2,37	3,24	0,57
			10,52	**2,20**	**3,14**	**0,44**
	26	P4-D32	10,33	2,15	2,77	0,83
			10,07	2,25	2,78	0,66
			9,78	2,26	2,82	0,56
			10,06	**2,22**	**2,79**	**0,68**
	42	P4.1-D22	9,20	1,53	3,57	0,36
			9,27	1,64	3,78	0,34
			10,21	1,92	3,68	0,35
			9,56	**1,70**	**3,68**	**0,35**
	44	P4.1-D32	11,44	2,60	3,70	0,84
			11,62	2,59	3,62	0,88
			11,90	2,60	3,64	0,87
			11,65	**2,60**	**3,65**	**0,86**
	44a	P4.2-D32	12,92	3,80	4,87	2,02
			12,86	3,76	5,11	1,72
			12,60	3,78	5,25	1,80
			12,79	**3,78**	**5,08**	**1,85**
	45	P5.3-D31	14,00	3,00	4,00	2,00
			14,00	3,00	4,00	2,00
			14,00	3,00	4,00	2,00
			14,00	**3,00**	**4,00**	**2,00**
	46	P5.2-D31	11,64			
			11,90			
			11,45			
			11,66			
	47	P4.1-D32	12,60	2,90	4,00	0,80
			12,40	2,80	4,10	0,70
			12,30	2,90	4,00	0,80
			12,43	**2,87**	**4,03**	**0,77**
	50	P4.1-D31	10,87	2,28	3,29	0,68
			10,60	2,26	3,30	0,70
			10,85	2,26	3,38	0,71
			10,77	**2,27**	**3,32**	**0,70**
	Median		**11,22**	**2,22**	**3,32**	**0,69**

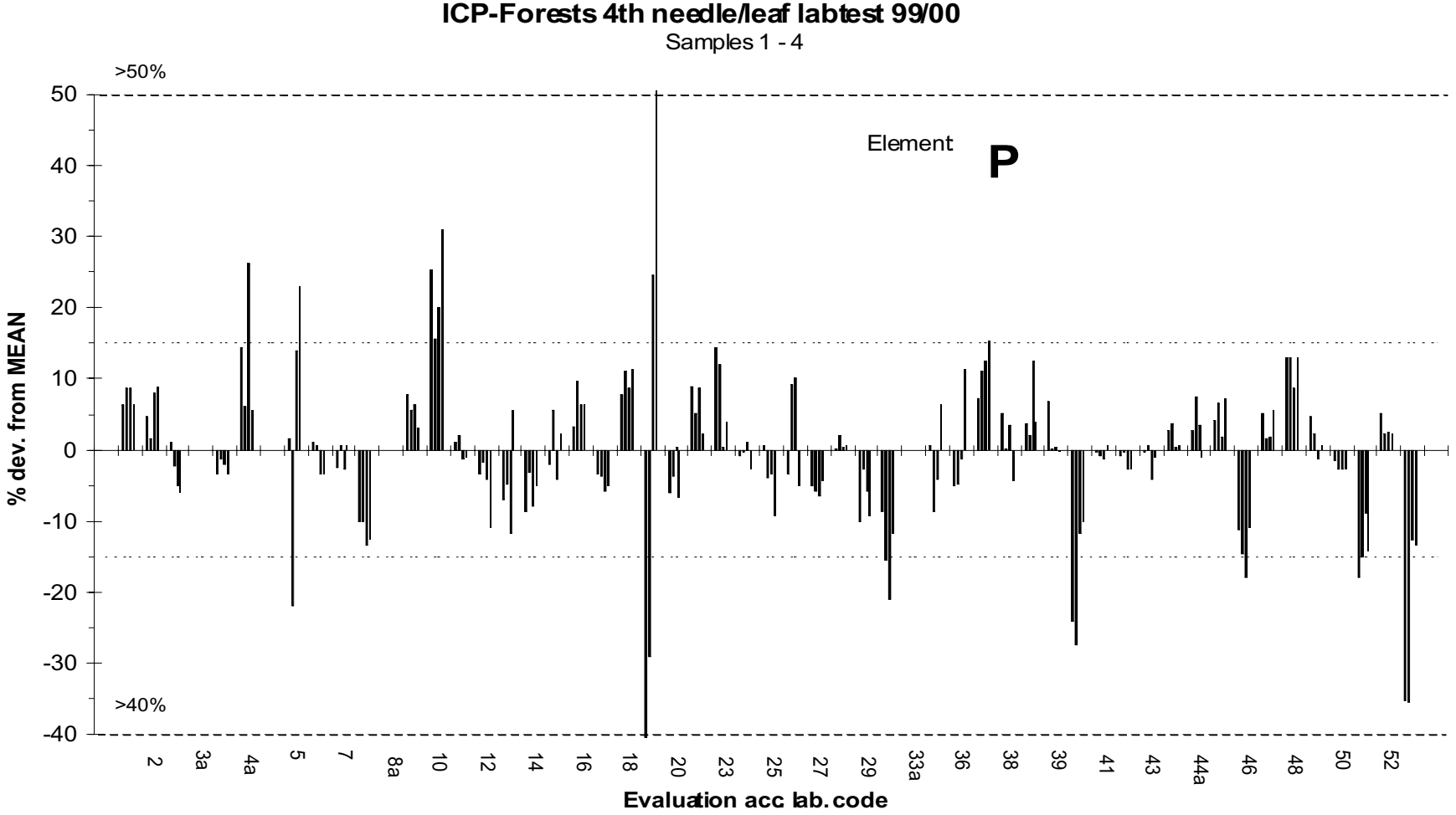
ICP-FOREST 4th needle/leaf interlaboratory test 1999/2000

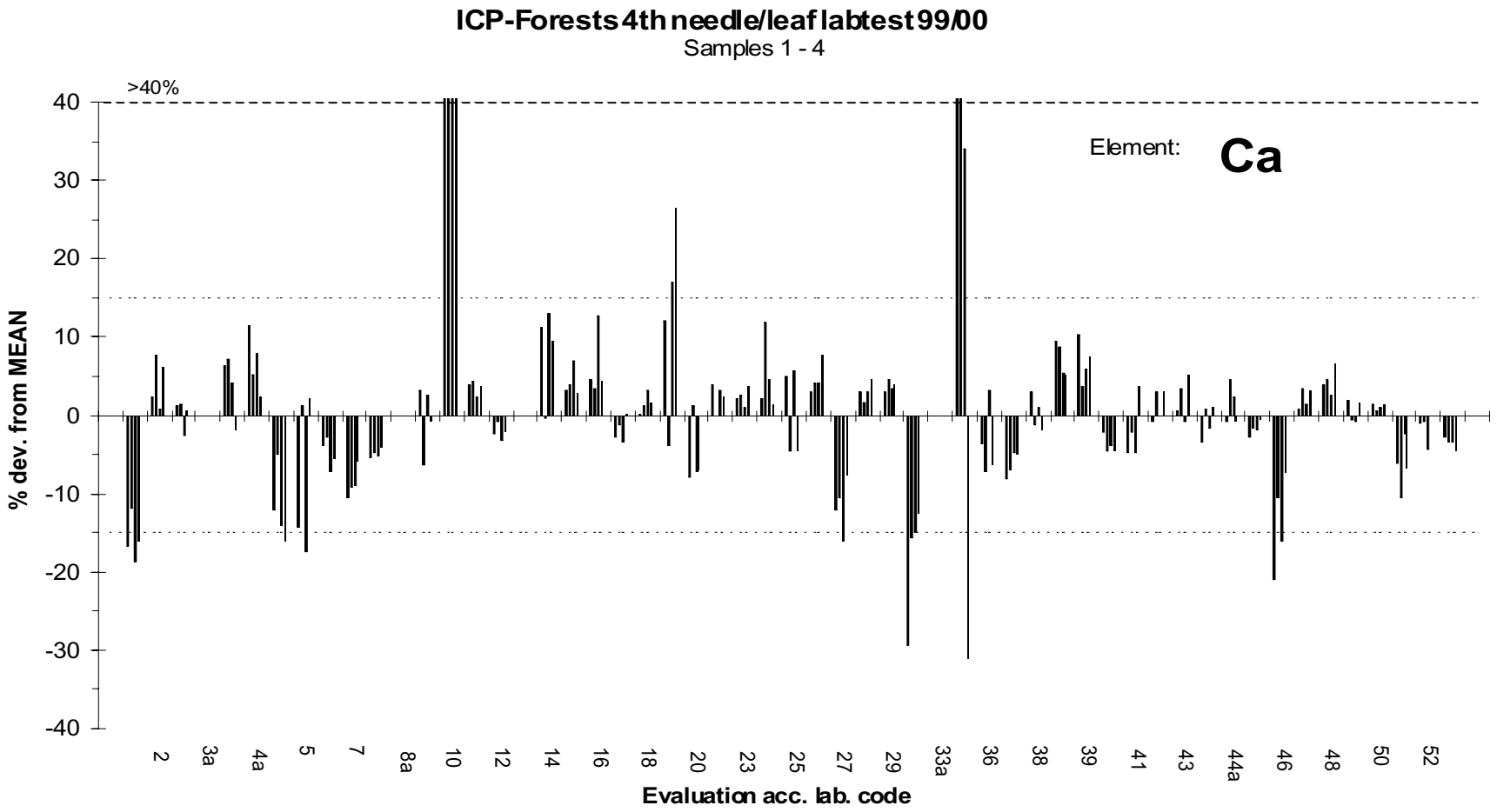
Additional parameters

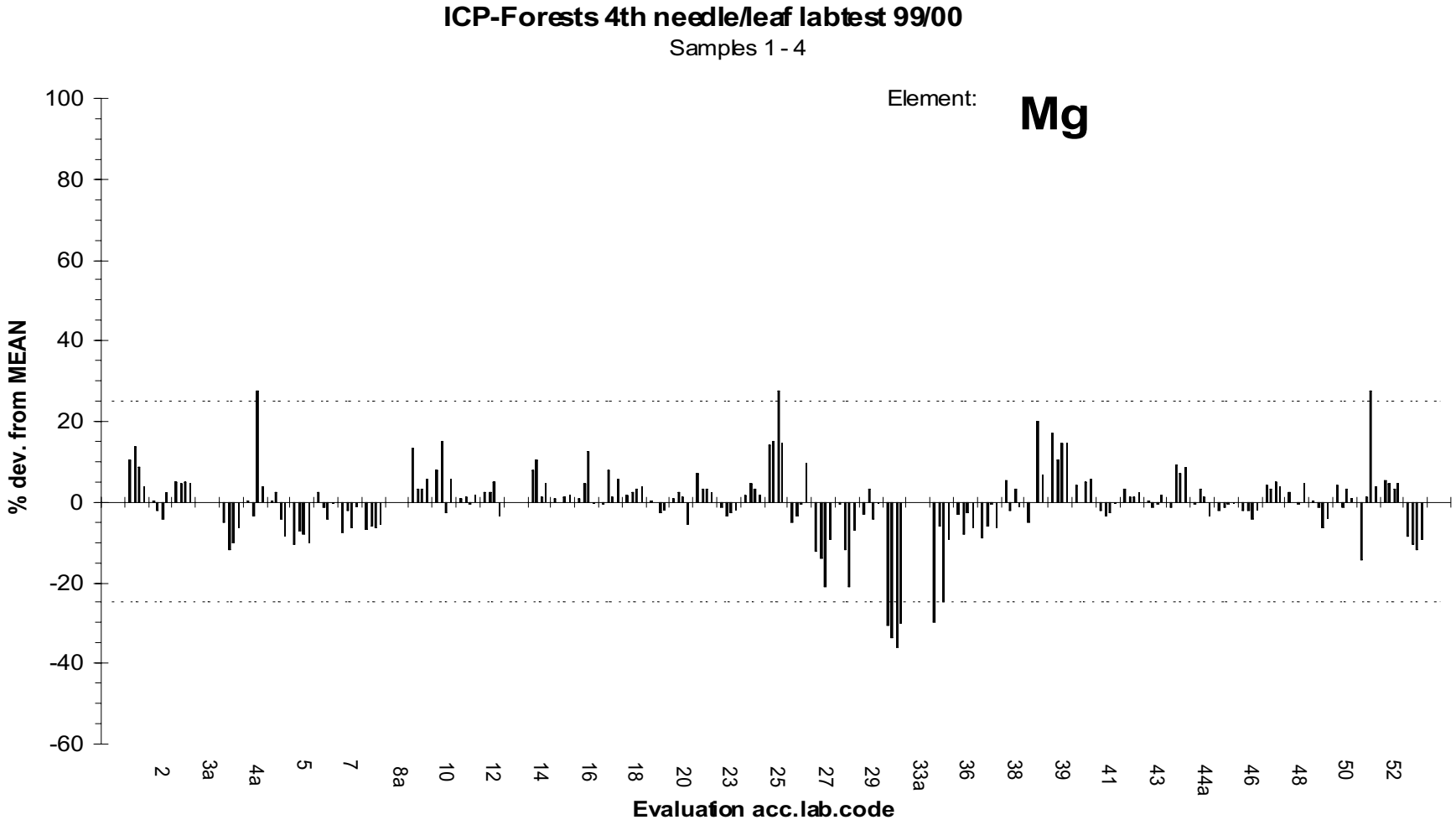
Element	Lab	Methods	Sample 1	Sample 2	Sample 3	Sample 4
Rb (µg/g)	4	P9.1-D41	30,00	0,70	10,60	17,40
			31,00	0,90	10,80	18,10
			31,00	0,90	11,00	17,60
			30,67	**0,83**	**10,80**	**17,70**
	26	P4-D32	8,18	0,61	3,13	4,90
			8,19	0,59	3,22	5,07
			8,00	0,48	3,13	5,04
			8,12	**0,56**	**3,16**	**5,00**
Si (µg/g)	4	P9.1-D41	2307,00	6193,00	1057,00	7058,00
			2373,00	6236,00	1072,00	7066,00
			2336,00	6302,00	1079,00	7182,00
			2338,67	**6243,67**	**1069,33**	**7102,00**
	4a	P9.1-D42	1520,00	4860,00	1200,00	7150,00
			1400,00	4860,00	1090,00	7140,00
			1420,00	4680,00	1050,00	7100,00
			1446,67	**4800,00**	**1113,33**	**7130,00**
Sr (µg/g)	2	P5.3-D31	13,10	97,70	5,10	32,20
			13,40	101,10	5,30	33,20
			13,30	100,30	5,10	33,00
			13,27		**5,17**	**32,80**
	4	P9.1-D41	12,00	86,00	5,20	31,00
			12,00	69,00	5,30	32,00
			12,00	90,00	5,40	32,00
			12,00	**81,67**	**5,30**	**31,67**
	26	P4-D32	12,90	90,57	5,24	30,83
			12,67	91,55	5,22	29,96
			12,69	92,77	5,17	29,82
			12,75	**91,63**	**5,21**	**30,20**
	38a	P9.1-D42	10,90	75,60		25,20
			10,80	75,00		24,70
			10,60	75,00		24,60
			10,77	**75,20**		**24,83**
	42	P4.1-D31	13,30	86,70	5,43	30,70
			13,30	87,20	5,34	30,80
			13,30	87,30	5,38	30,90
			13,30	**87,07**	**5,38**	**30,80**
	45	P5.3-D31	14,00	94,00	5,00	31,00
			14,00	94,00	5,00	31,00
			14,00	94,00	5,00	31,00
			14,00	**94,00**	**5,00**	**31,00**
	Median		**13,01**	**87,07**	**5,21**	**30,90**
Ti (µg/g)	45	P5.3-D31	14,00	3,00	4,00	31,00
			14,00	3,00	4,00	31,00
			14,00	3,00	4,00	31,00
			14,00	**3,00**	**4,00**	**31,00**
V (µg/g)	2	P5.3-D31	3,60	< 0.2	< 0.2	< 0.2
			4,00	< 0.2	< 0.2	< 0.2
			4,10	< 0.2	< 0.2	< 0.2
			3,90	**< 0.2**	**< 0.2**	**< 0.2**
	26	P4-D32	0,42	0,50	0,50	0,40
			0,49	0,45	0,59	0,38
			0,50	0,53	0,54	0,31
			0,47	**0,49**	**0,54**	**0,36**
Dry mass 105 degree (%)	39	D81	93,39	95,64	94,08	92,31
			93,27	95,65	94,05	92,36
			93,33	**95,65**	**94,07**	**92,34**
	45	D81	**95,92**	**94,06**	**94,28**	**93,01**

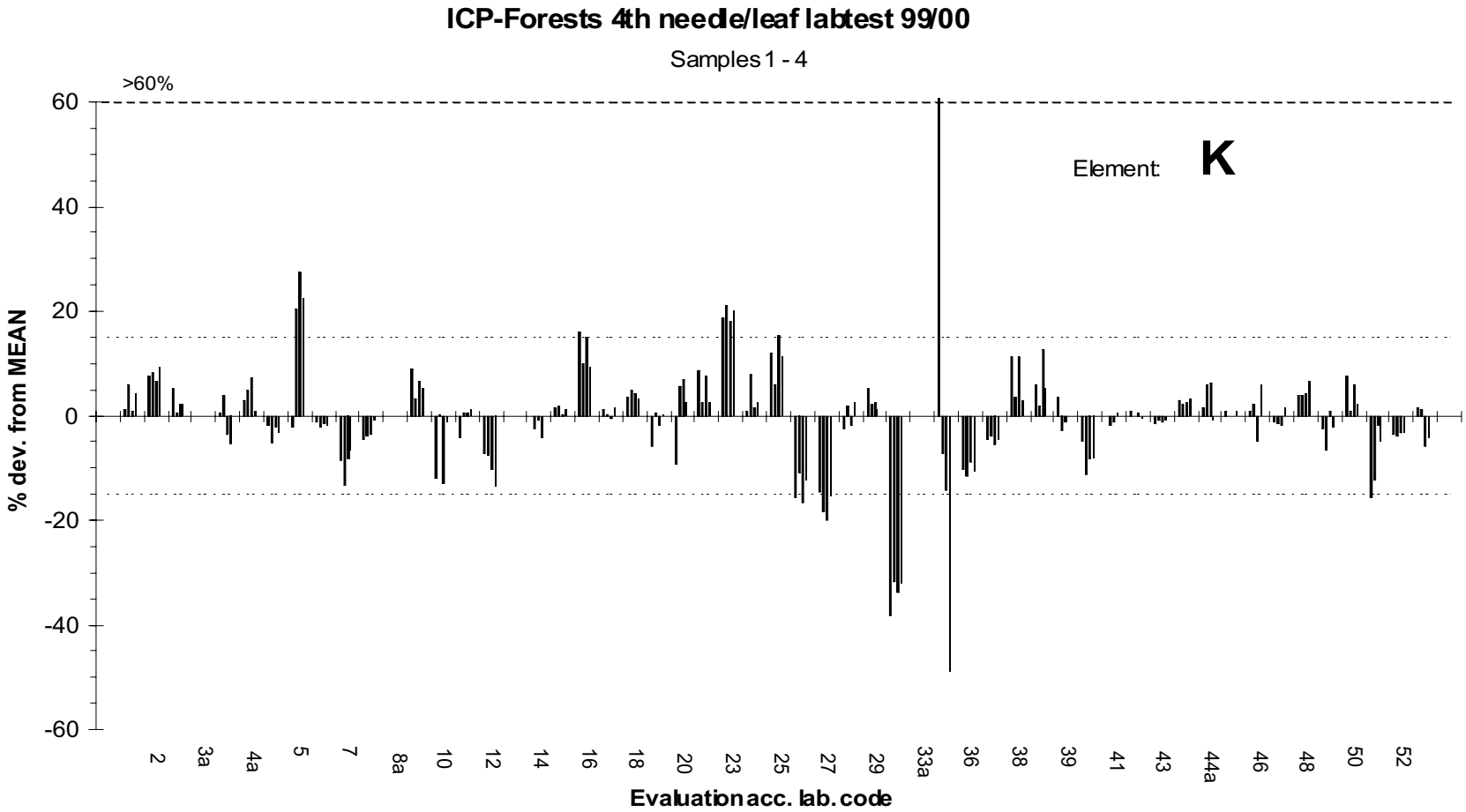

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>20%
Element:
N
% dev. from MEAN
20
16
12
8
4
0
-4
-8
-12
-16
-20
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

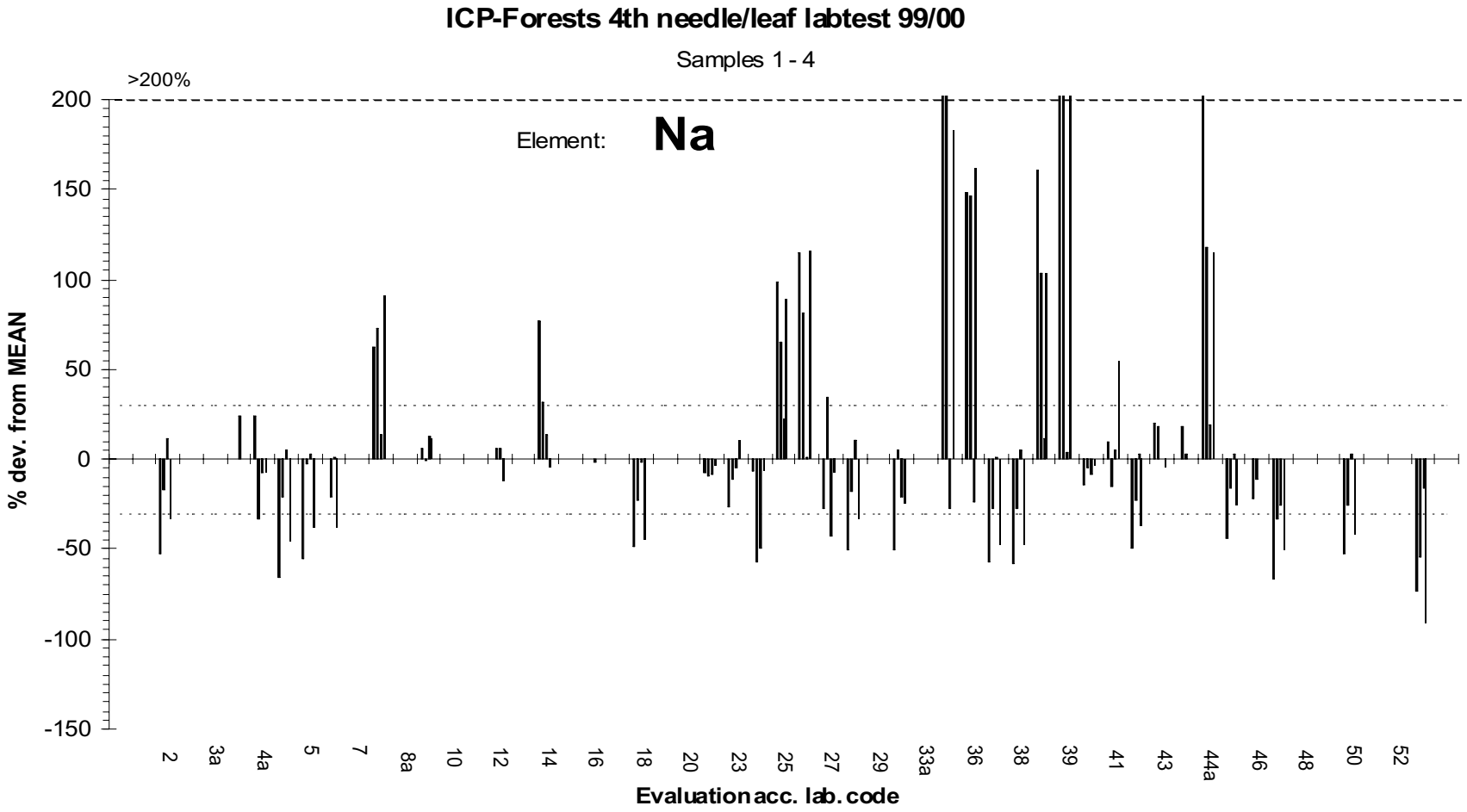

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>100%
Element
S
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

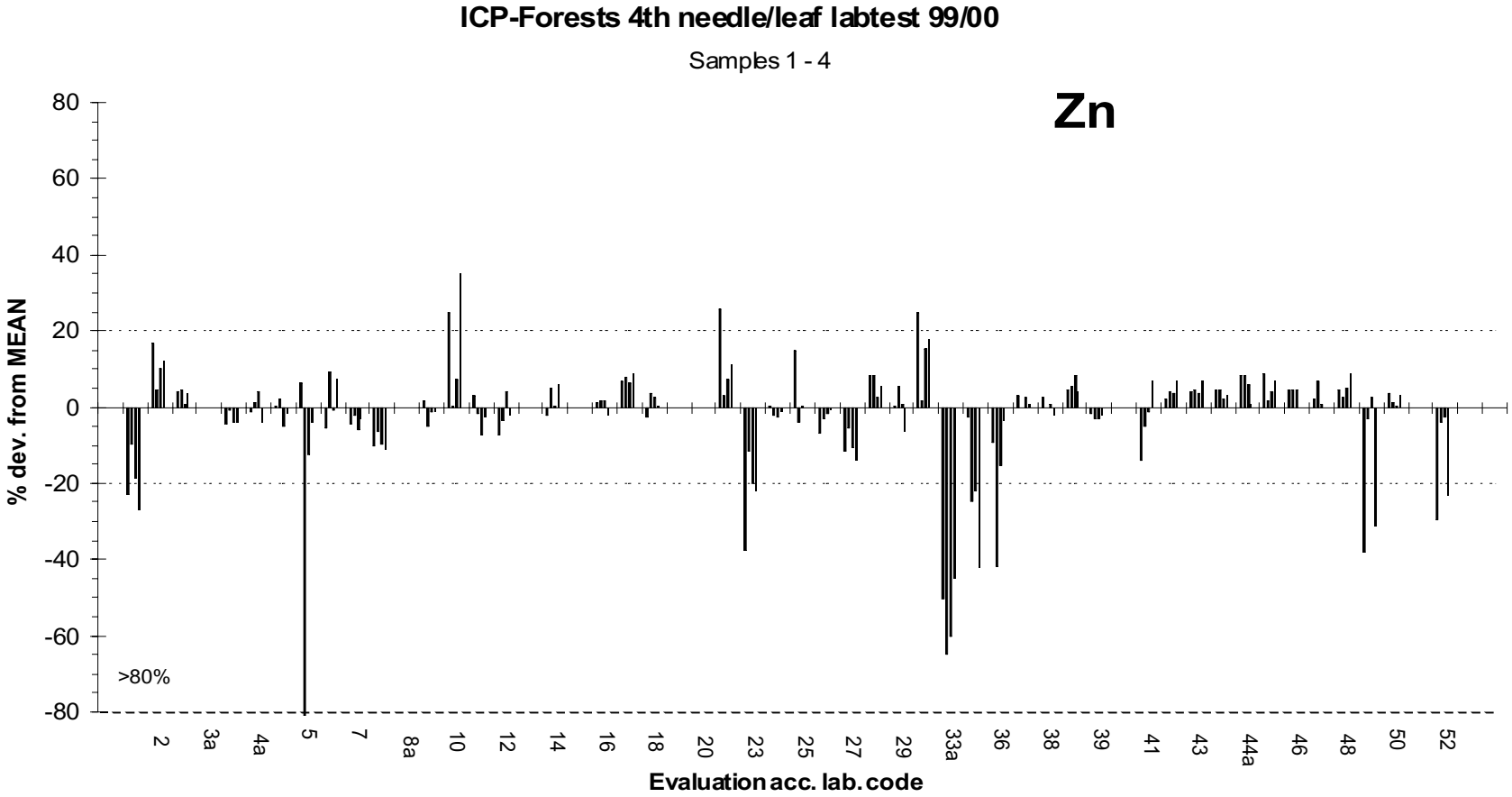

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>50%
>40%
Element
P
% dev. from MEAN
50
40
30
20
10
0
-10
-20
-30
-40
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc lab. code

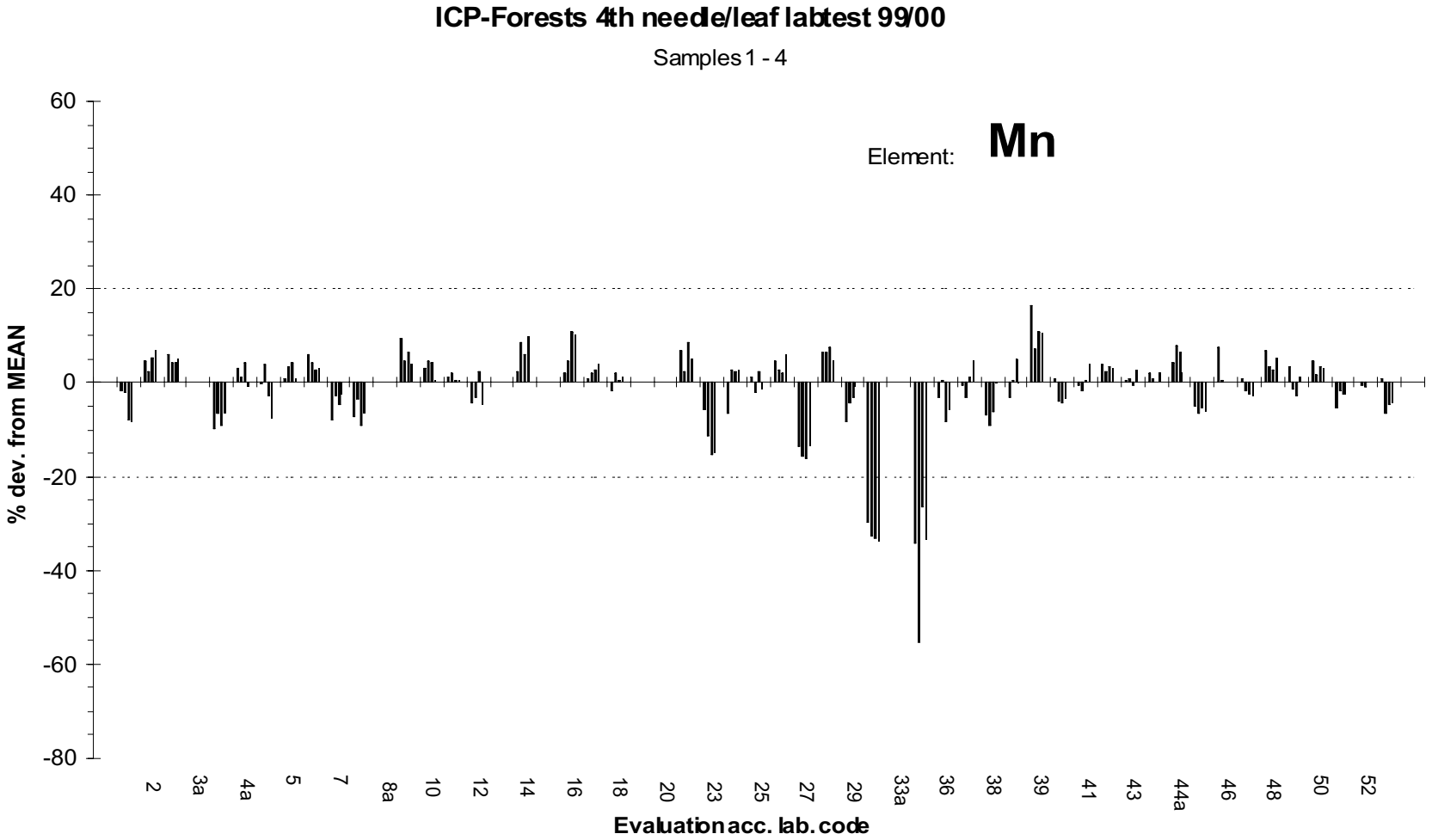

ICP-Forests 4th needle/leaf lab test 99/00
Samples 1 - 4
>40%
Element:
Ca
% dev. from MEAN
40
30
20
10
0
-10
-20
-30
-40
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

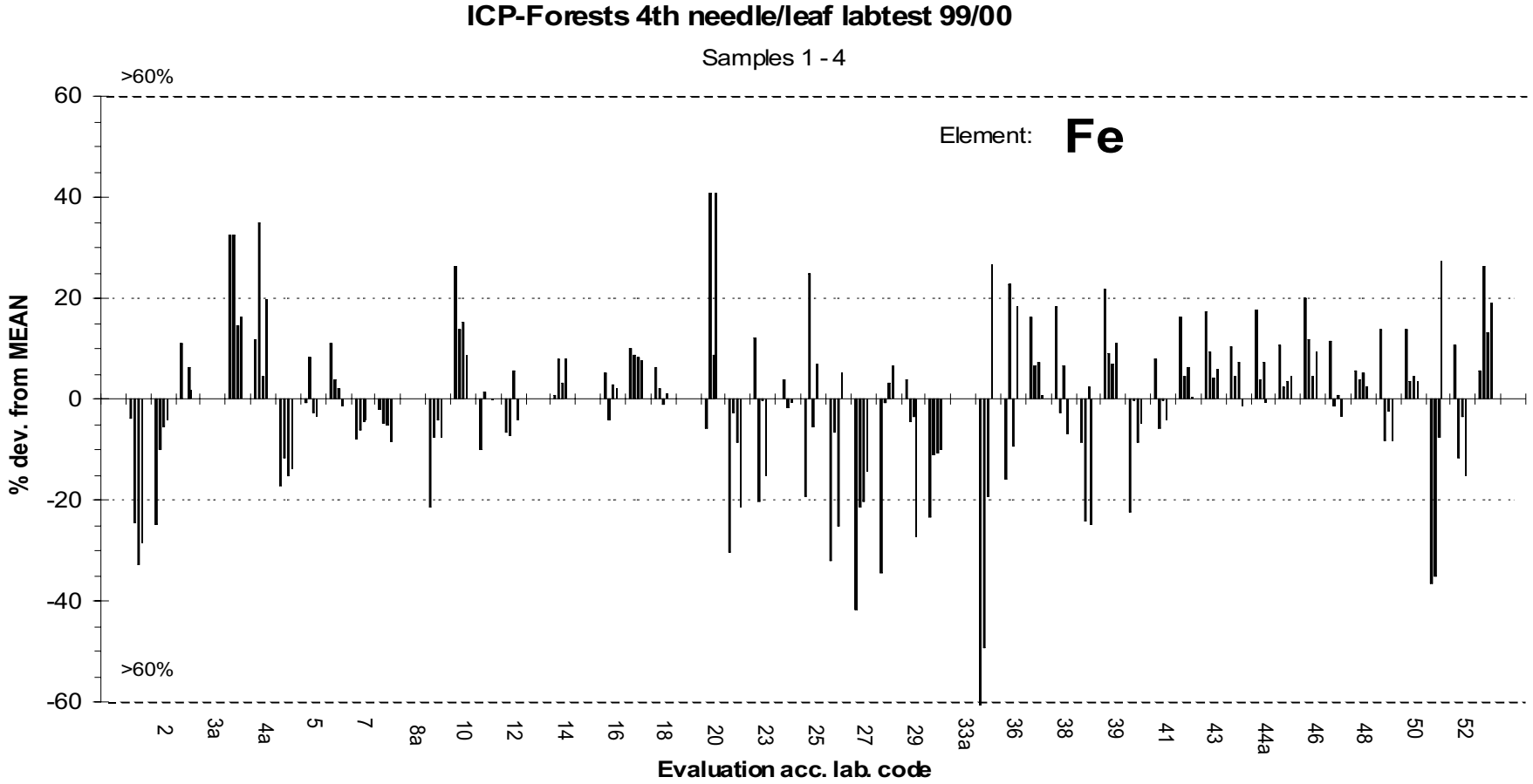

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element:
Mg
100
80
60
40
20
0
-20
-40
-60
% dev. from MEAN
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc.lab.code

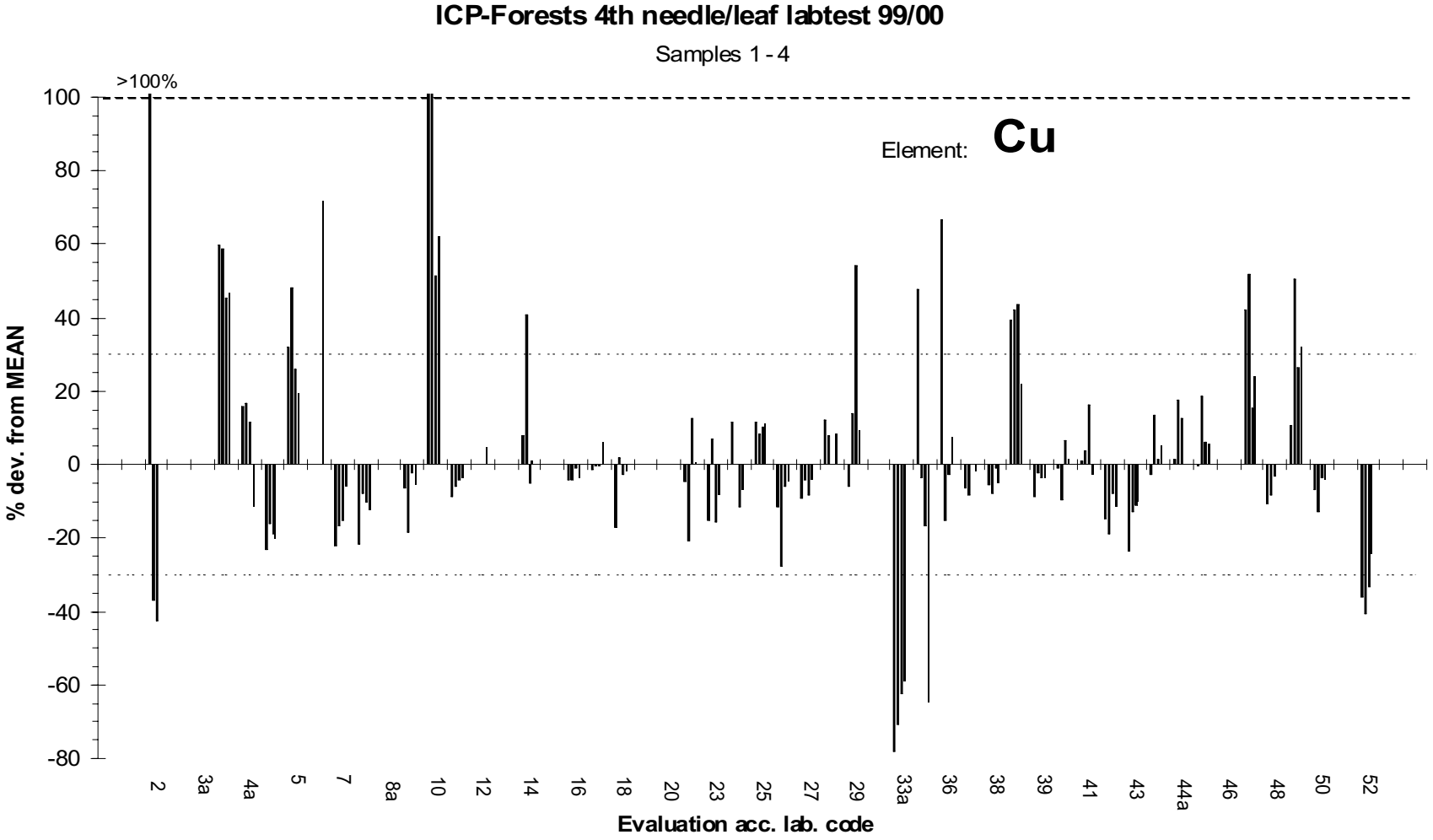

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>60%
Element: K
% dev. from MEAN
60
40
20
0
-20
-40
-60
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

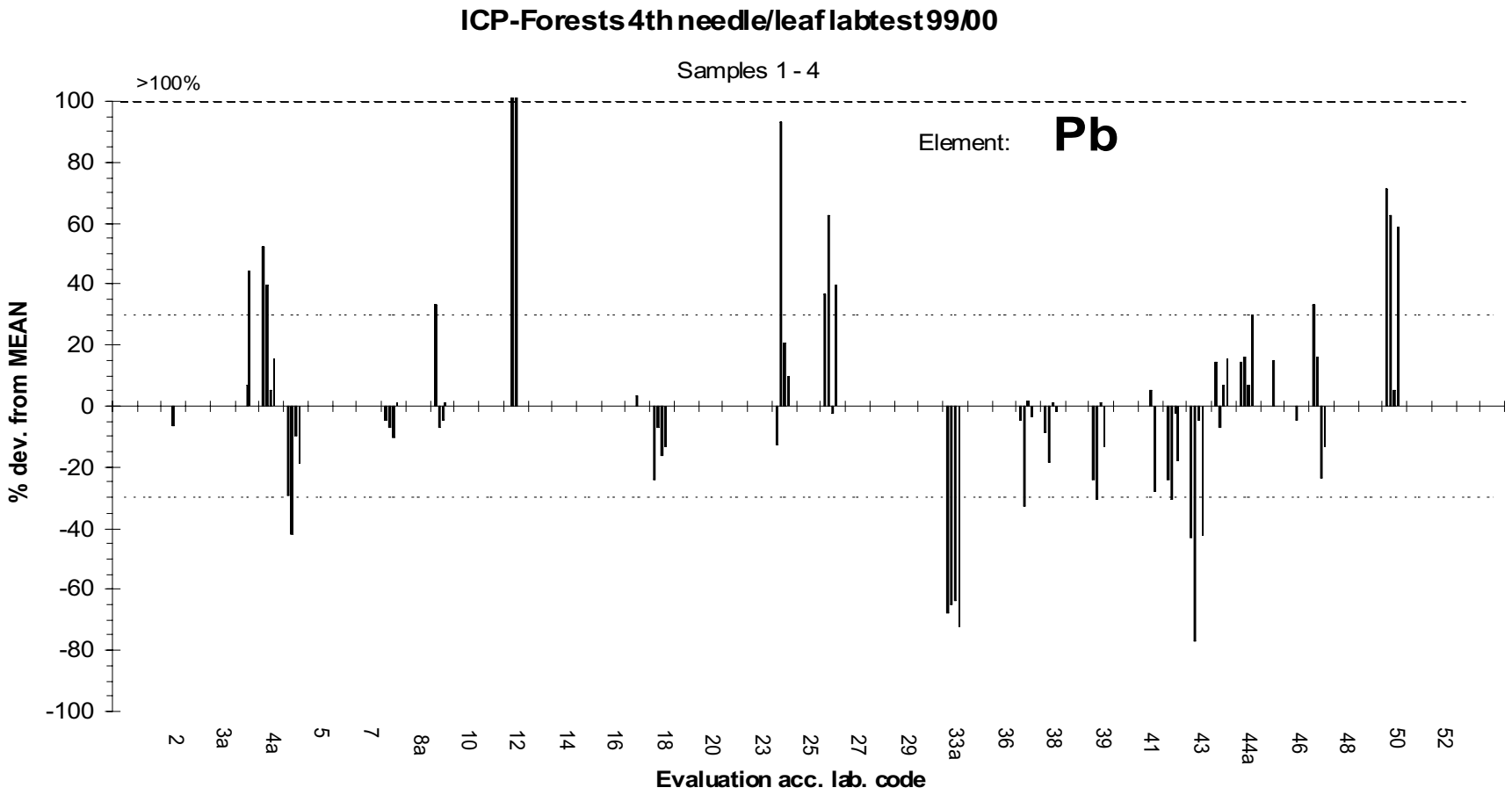

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>200%
Element: Na
% dev. from MEAN
200
150
100
50
0
-50
-100
-150
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

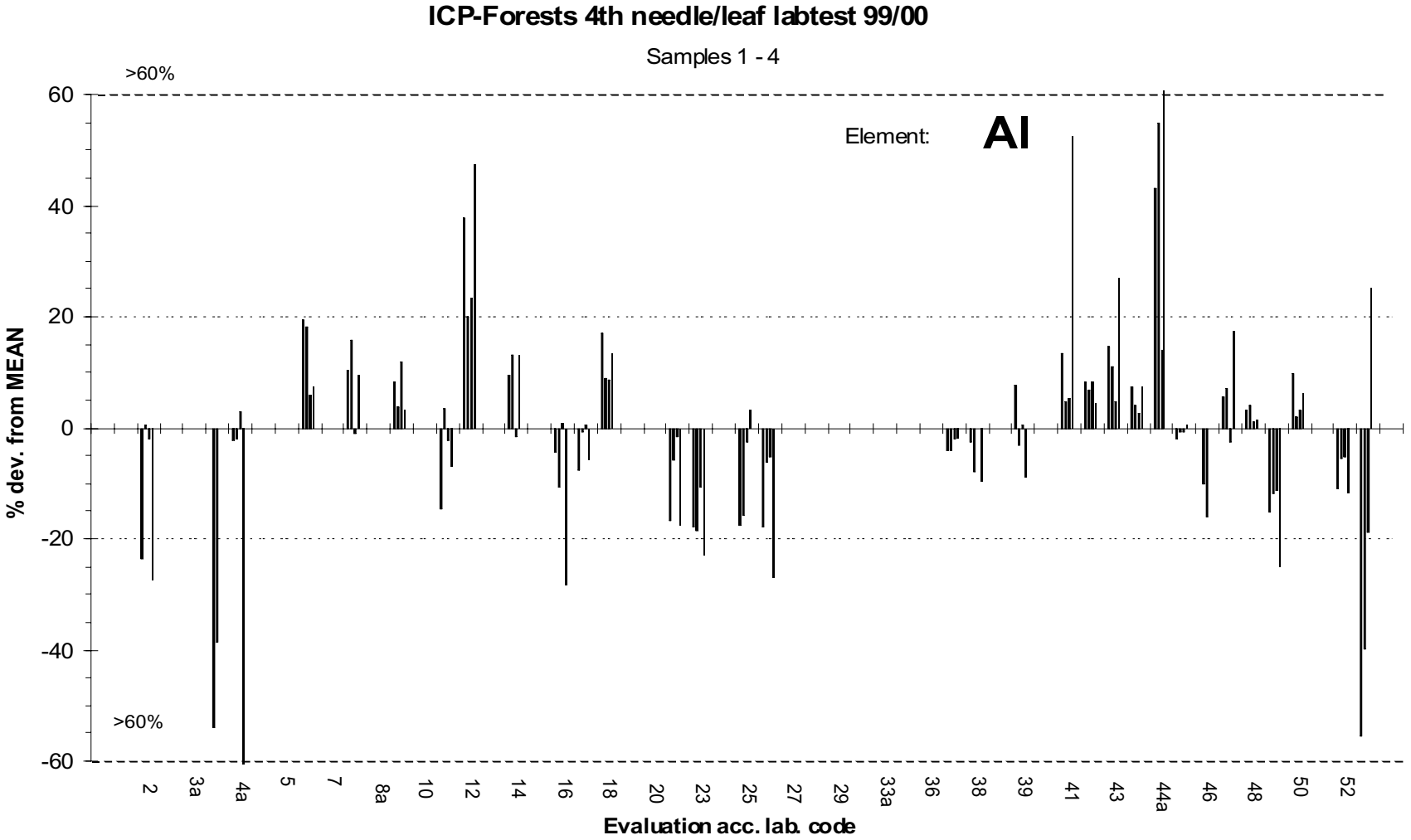

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Zn
% dev. from MEAN
80
60
40
20
0
-20
-40
-60
-80
>80%
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

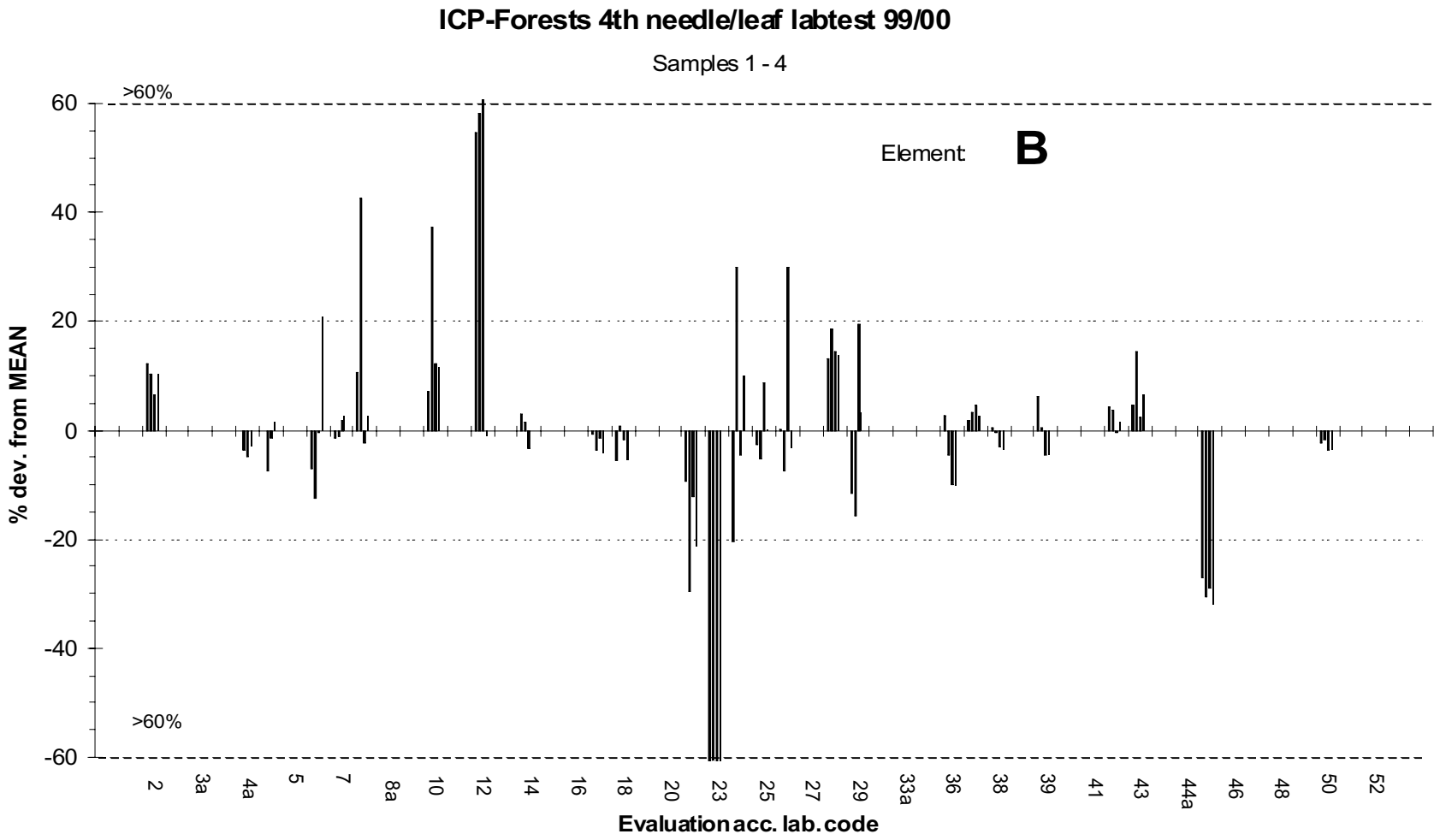

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element: Mn
% dev. from MEAN
60
40
20
0
-20
-40
-60
-80
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

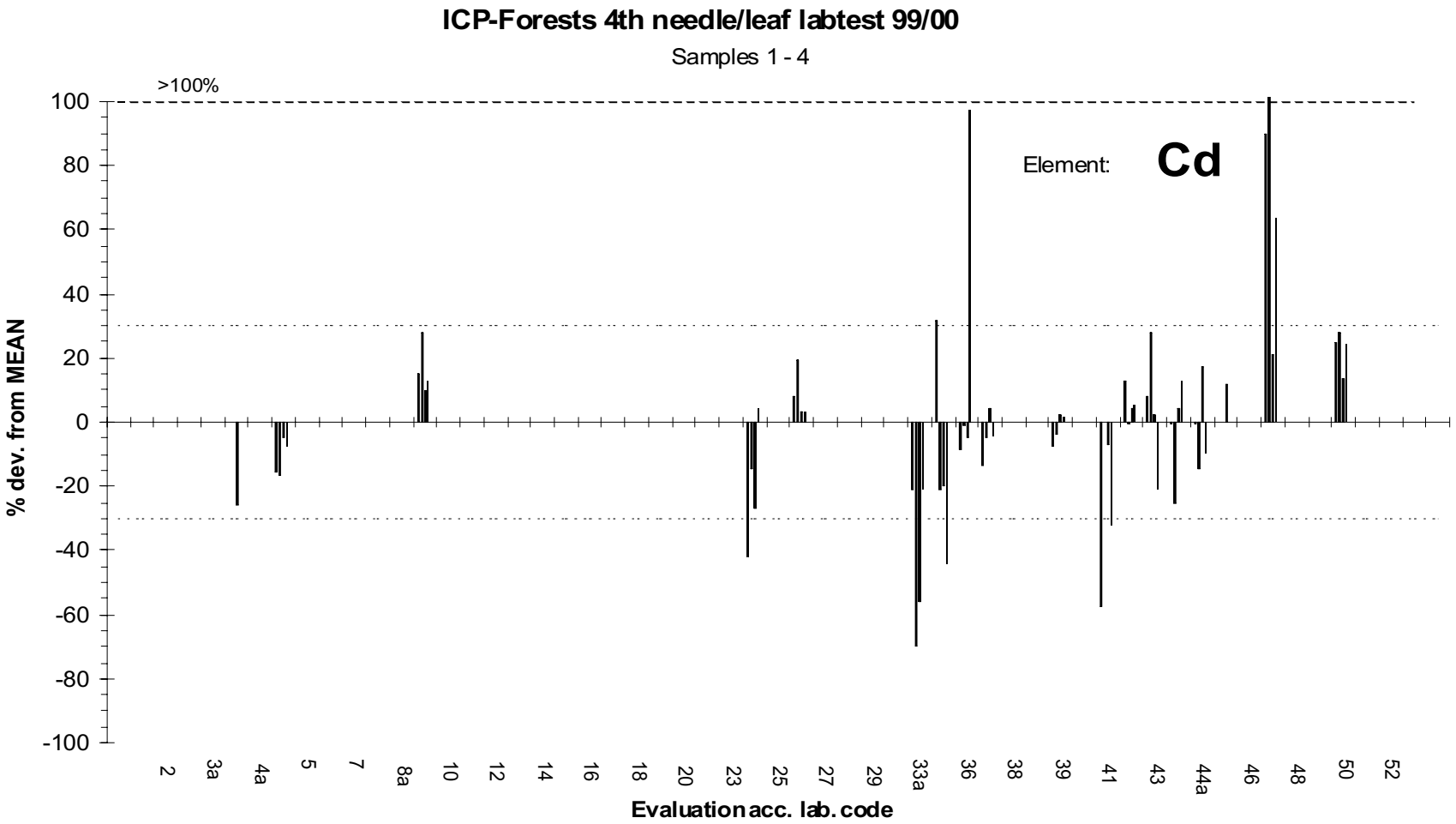

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element: Fe
>60%
60
40
20
0
-20
-40
-60
>60%
% dev. from MEAN
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

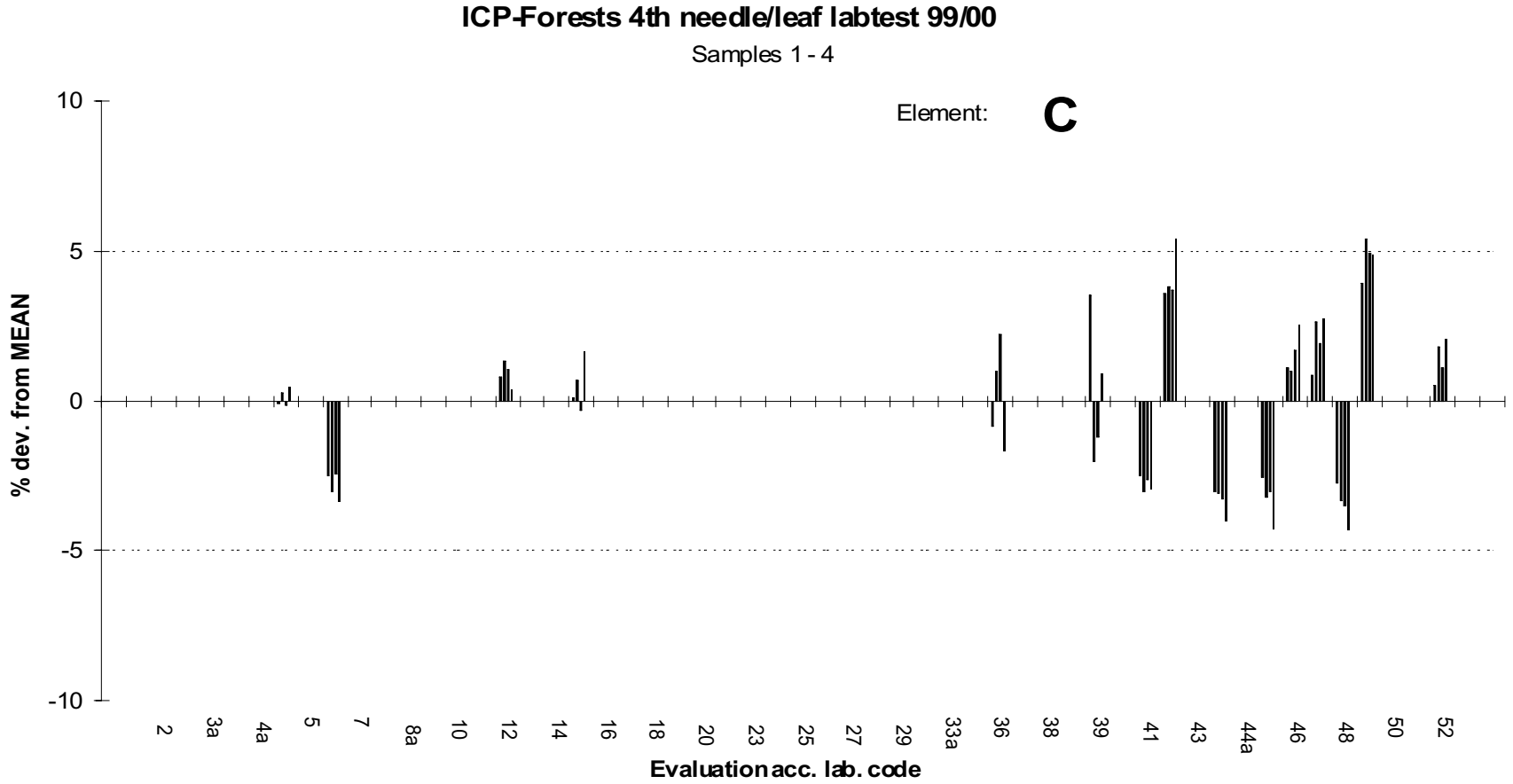

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>100%
Element: Cu
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

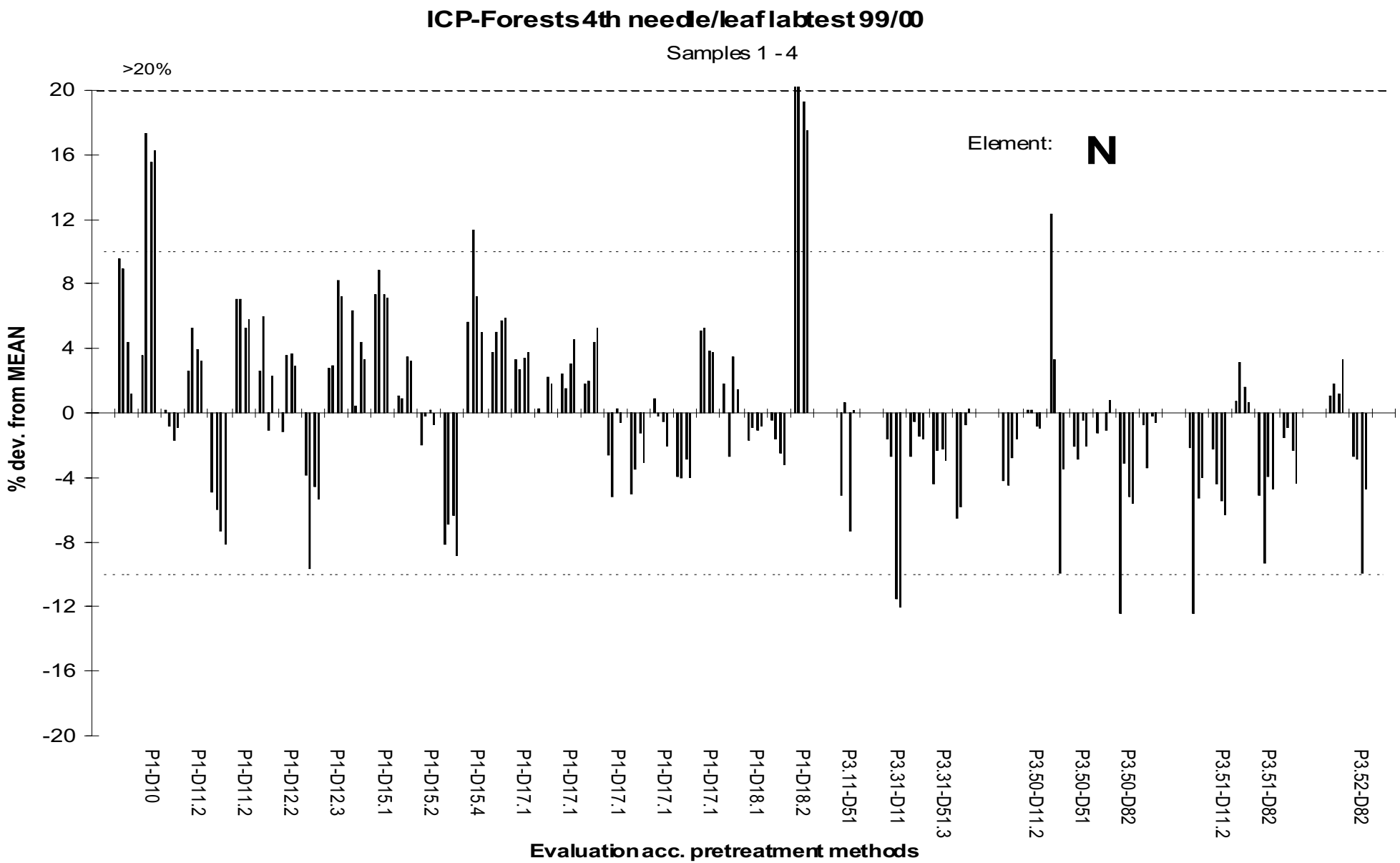

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>100%
Element: Pb
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
-100
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

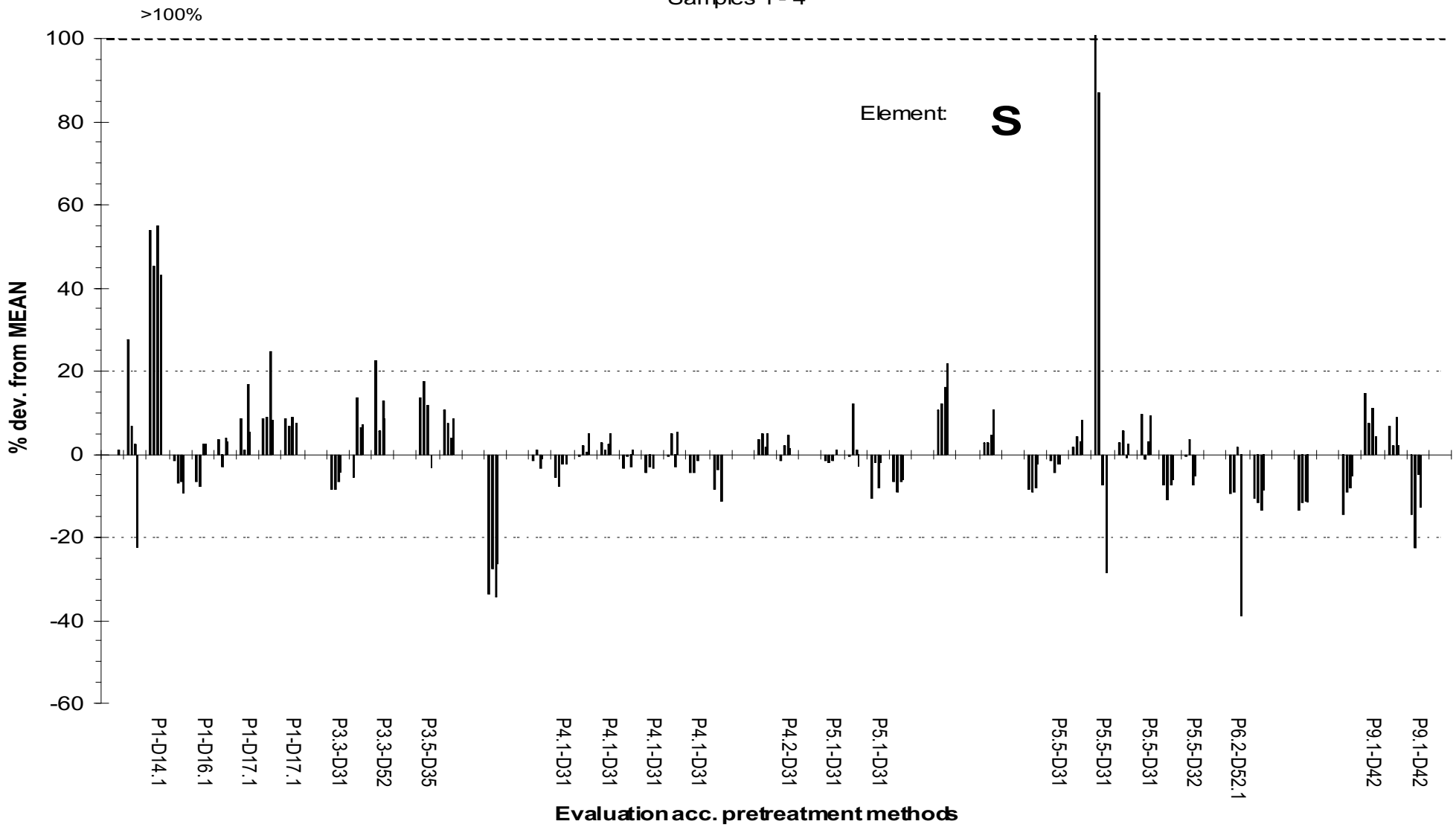

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element: Al
>60%
>60%
60
40
20
0
-20
-40
-60
% dev. from MEAN
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

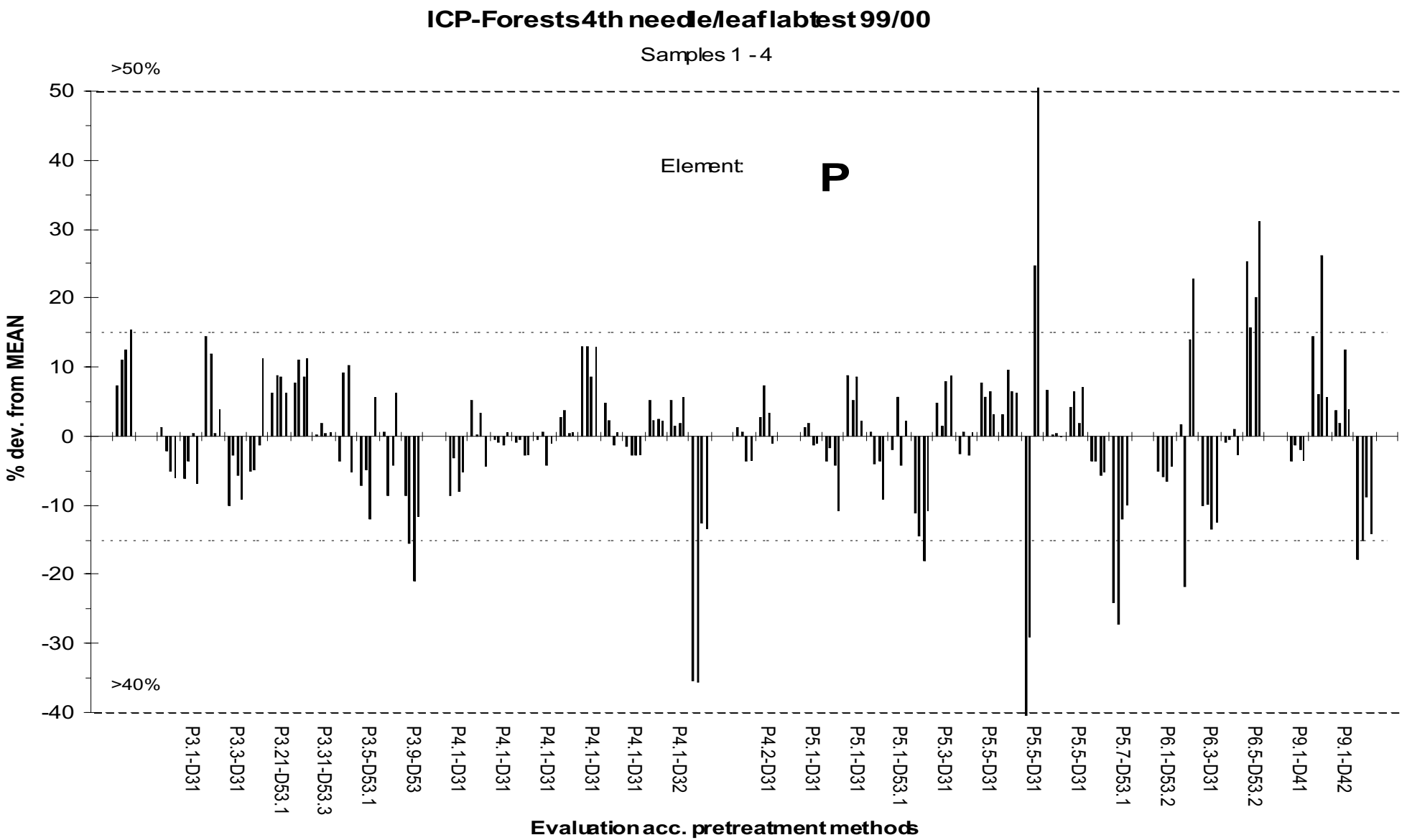

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element: B
>60%
>60%
60
40
20
0
-20
-40
-60
% dev. from MEAN
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code

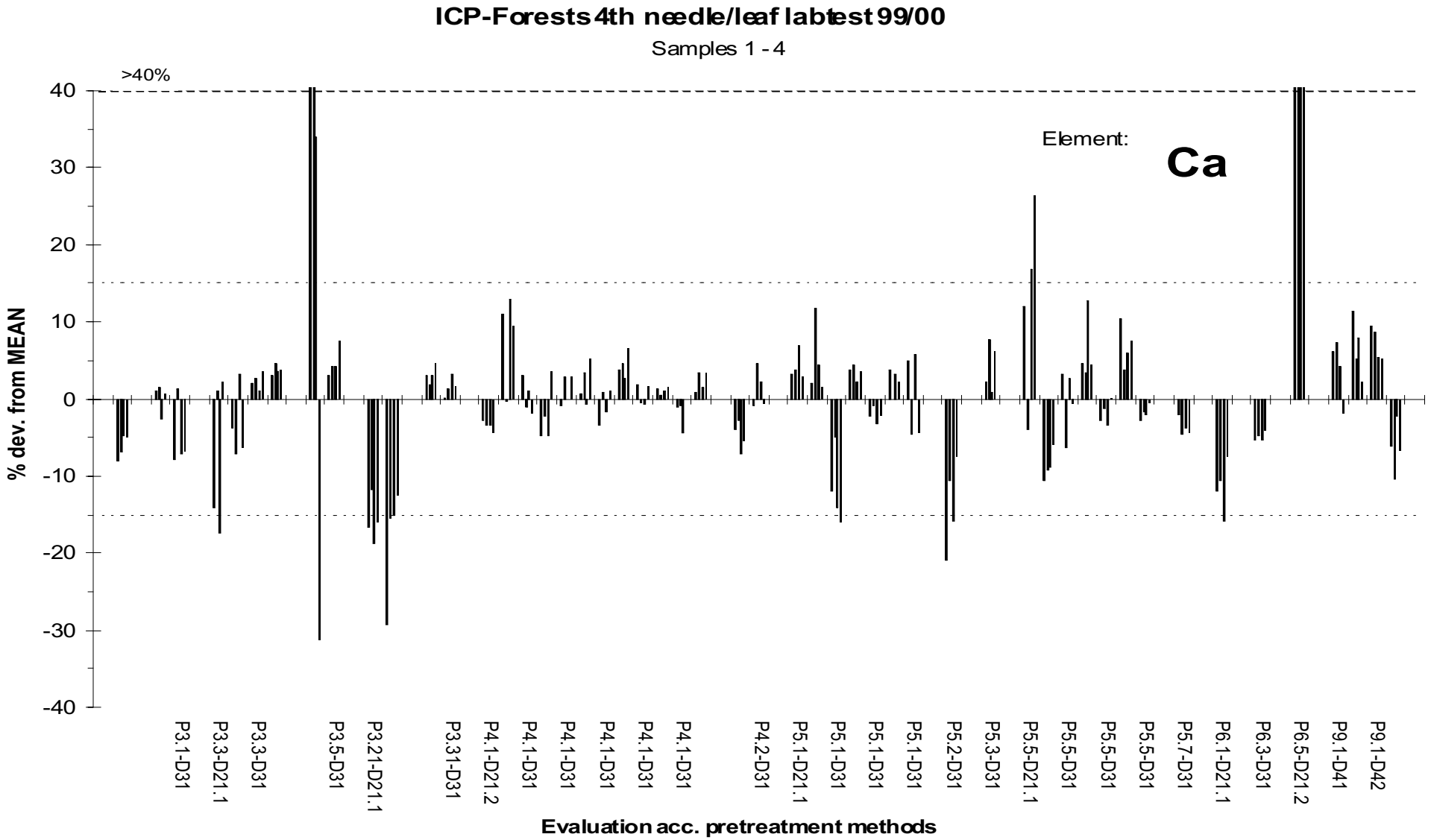

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>100%
Element: Cd
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
-100
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code


ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element:
C
10
5
0
-5
-10
% dev. from MEAN
2
3a
4a
5
7
8a
10
12
14
16
18
20
23
25
27
29
33a
36
38
39
41
43
44a
46
48
50
52
Evaluation acc. lab. code


ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>20%
Element: N
% dev. from MEAN
20
16
12
8
4
0
-4
-8
-12
-16
-20
P1-D10
P1-D11.2
P1-D11.2
P1-D12.2
P1-D12.3
P1-D15.1
P1-D15.2
P1-D15.4
P1-D17.1
P1-D17.1
P1-D17.1
P1-D17.1
P1-D17.1
P1-D18.1
P1-D18.2
P3.11-D51
P3.31-D11
P3.31-D51.3
P3.50-D11.2
P3.50-D51
P3.50-D82
P3.51-D11.2
P3.51-D82
P3.52-D82
Evaluation acc. pretreatment methods

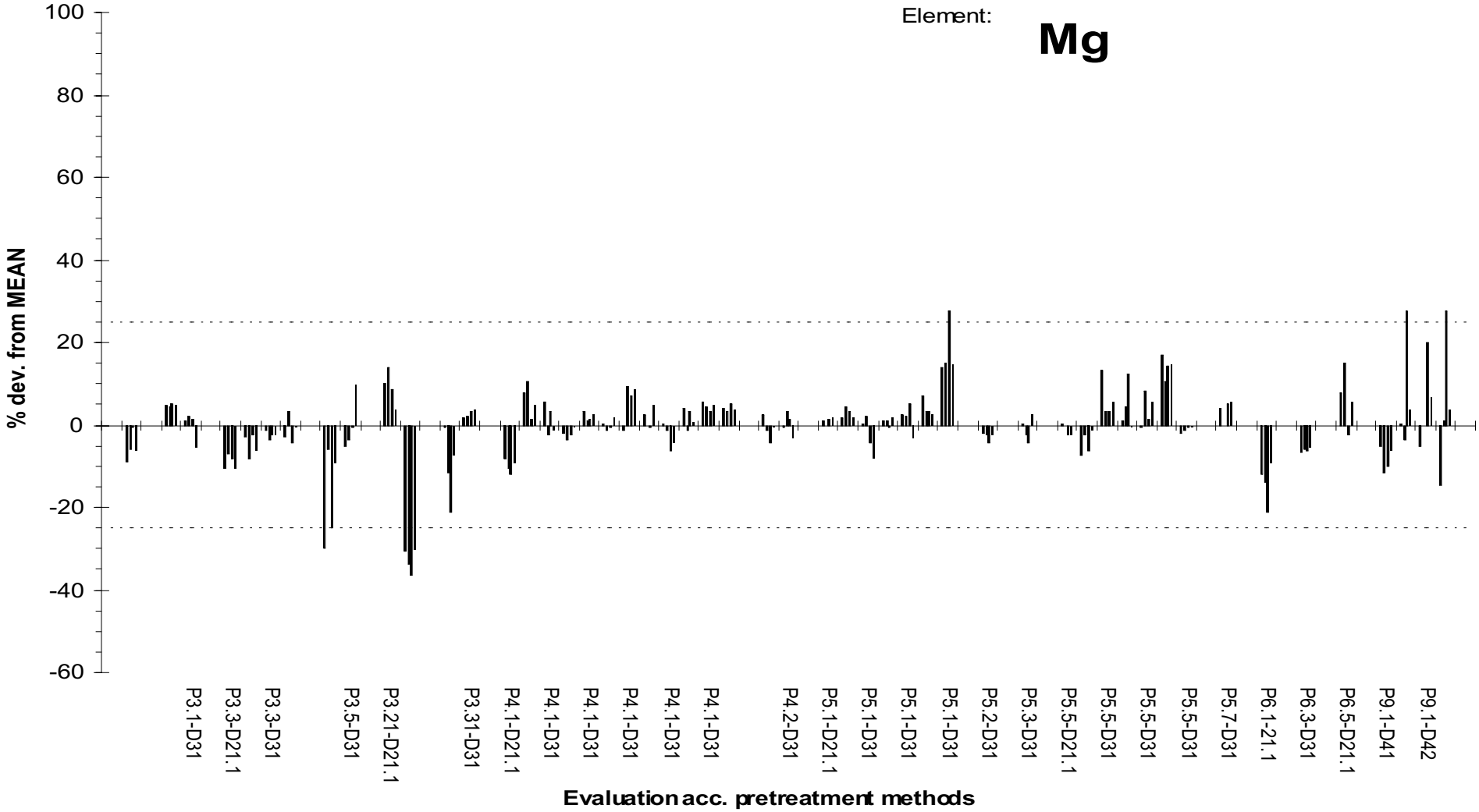

ICP-Forests 4th needle/leaf lab test 99/00
Samples 1 - 4
>100%
Element:
S
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
P1-D14.1
P1-D16.1
P1-D17.1
P1-D17.1
P3.3-D31
P3.3-D52
P3.5-D35
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.2-D31
P5.1-D31
P5.1-D31
P5.5-D31
P5.5-D31
P5.5-D31
P5.5-D32
P6.2-D52.1
P9.1-D42
P9.1-D42
Evaluation acc. pretreatment methods

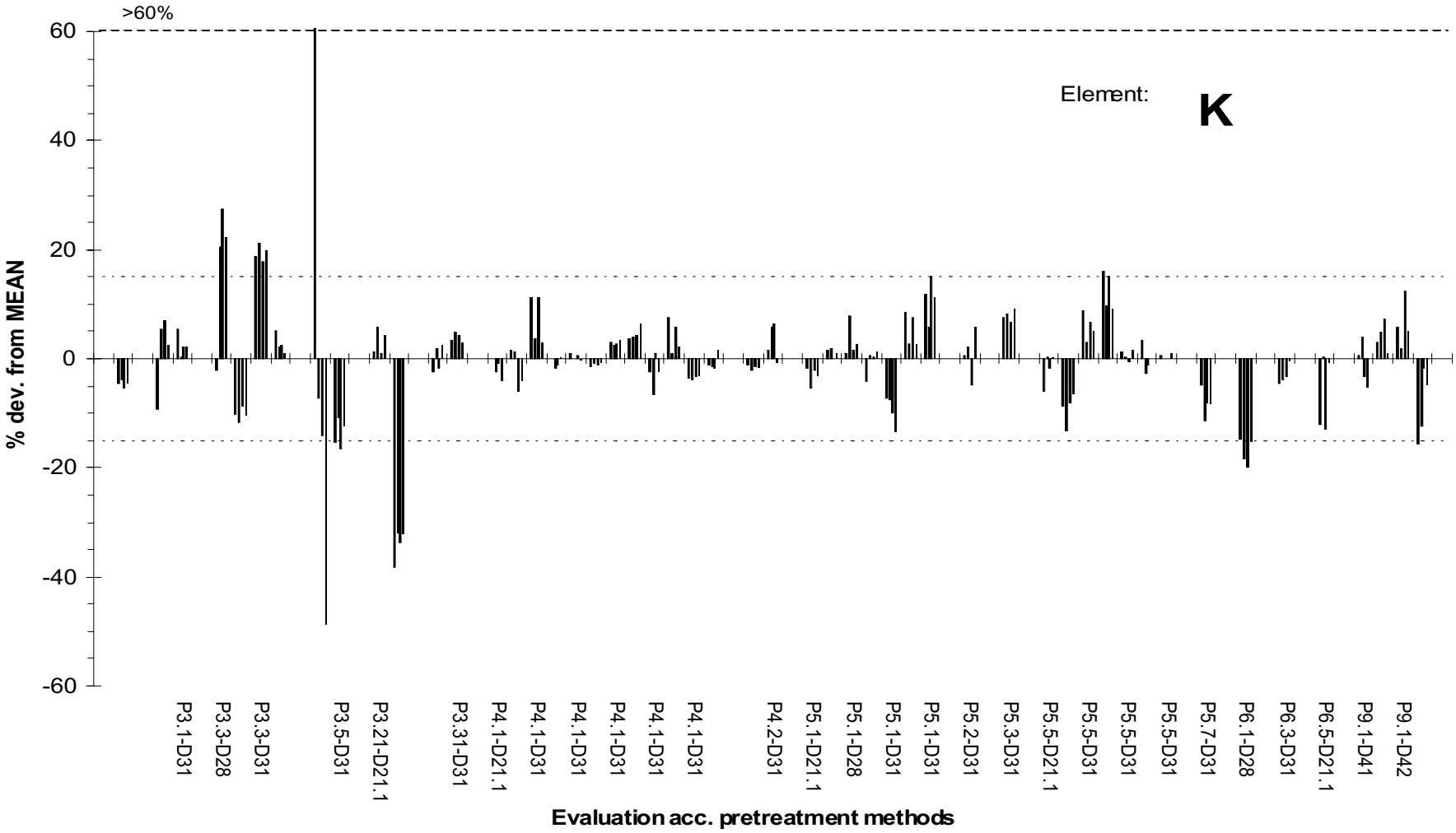

ICP-Forests 4th needle/leaf lab test 99/00
Samples 1 - 4
>50%
Element:
P
>40%
% dev. from MEAN
50
40
30
20
10
0
-10
-20
-30
-40
P3.1-D31
P3.3-D31
P3.21-D53.1
P3.31-D53.3
P3.5-D53.1
P3.9-D53
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D32
P4.2-D31
P5.1-D31
P5.1-D31
P5.1-D53.1
P5.3-D31
P5.5-D31
P5.5-D31
P5.5-D31
P5.7-D53.1
P6.1-D53.2
P6.3-D31
P6.5-D53.2
P9.1-D41
P9.1-D42
Evaluation acc. pretreatment methods

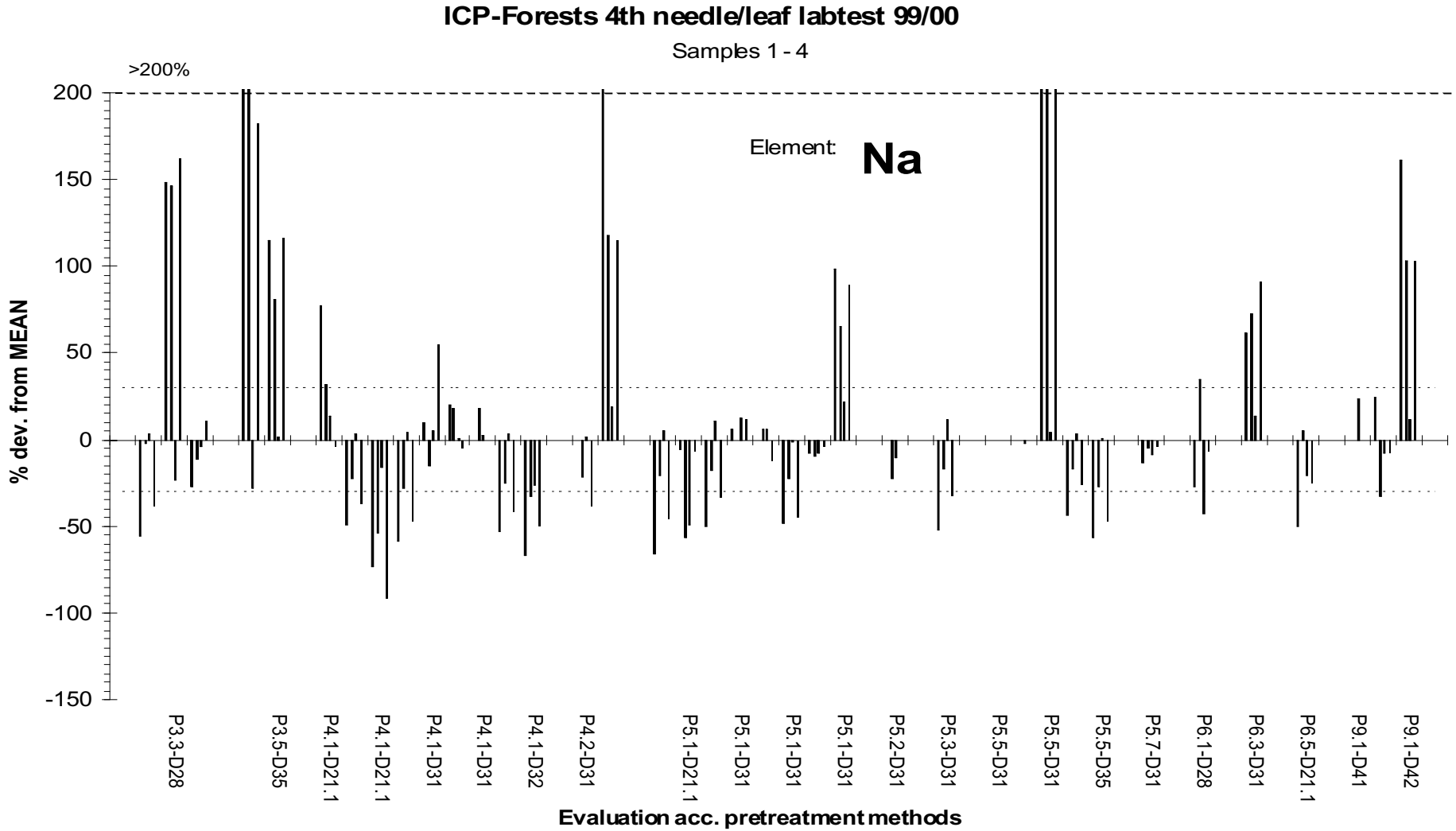

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>40%
Element:
Ca
% dev. from MEAN
40
30
20
10
0
-10
-20
-30
-40
P3.1-D31
P3.3-D21.1
P3.3-D31
P3.5-D31
P3.21-D21.1
P3.31-D31
P4.1-D21.2
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.2-D31
P5.1-D21.1
P5.1-D31
P5.1-D31
P5.1-D31
P5.2-D31
P5.3-D31
P5.5-D21.1
P5.5-D31
P5.5-D31
P5.5-D31
P5.7-D31
P6.1-D21.1
P6.3-D31
P6.5-D21.2
P9.1-D41
P9.1-D42
Evaluation acc. pretreatment methods

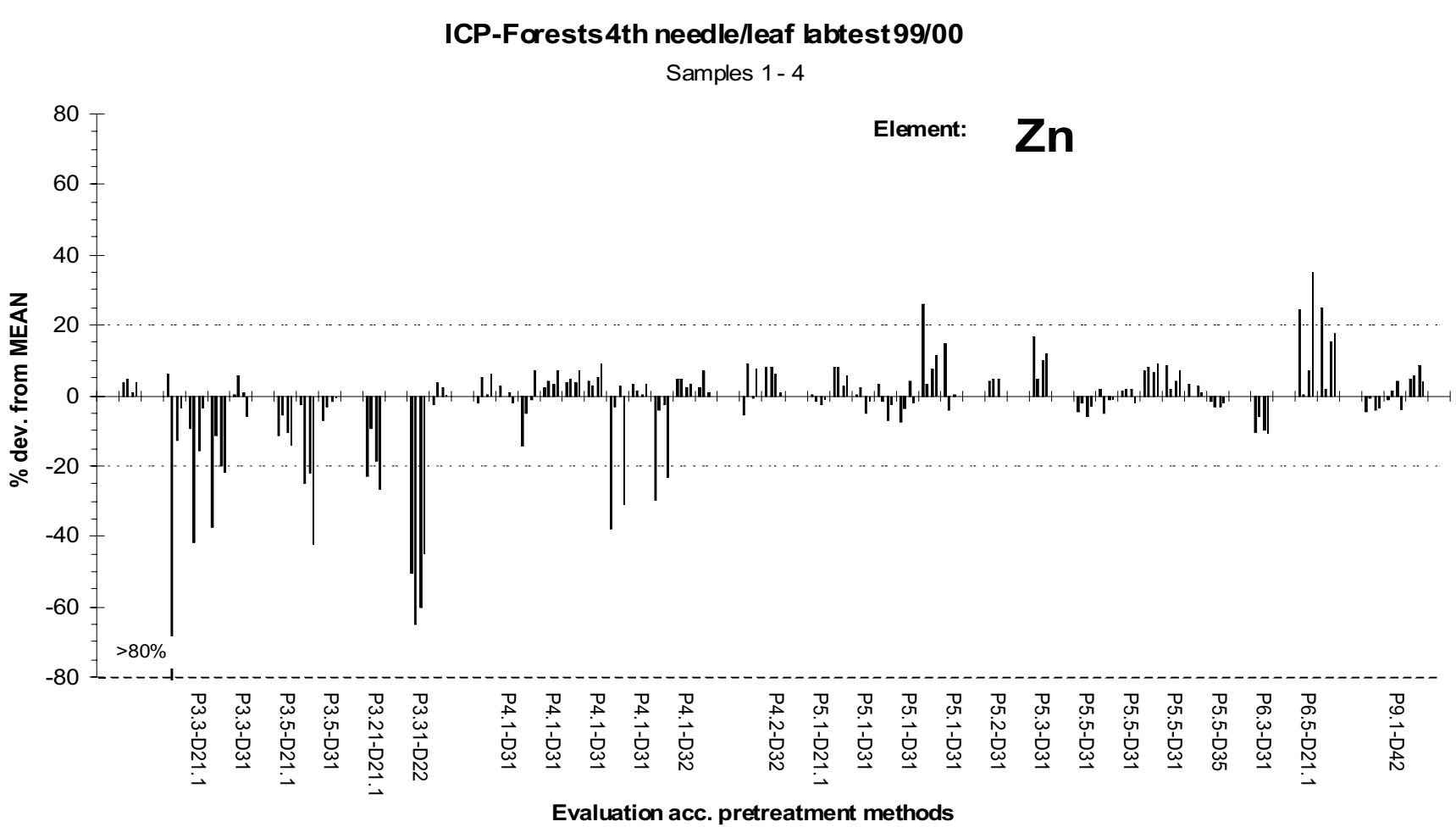
ICP-Forests 4th needle/leaf labtest 99/00

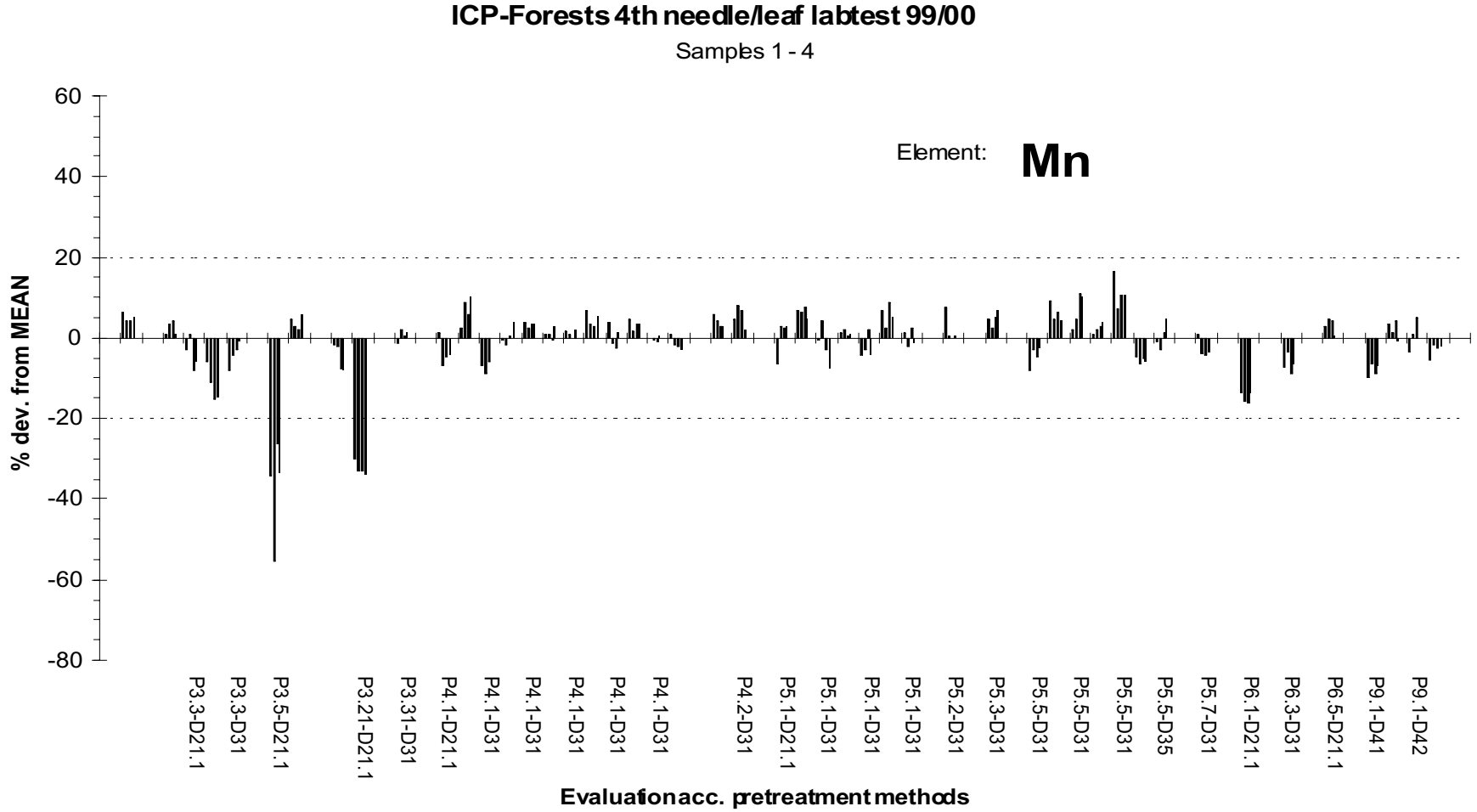
Samples 1 - 4



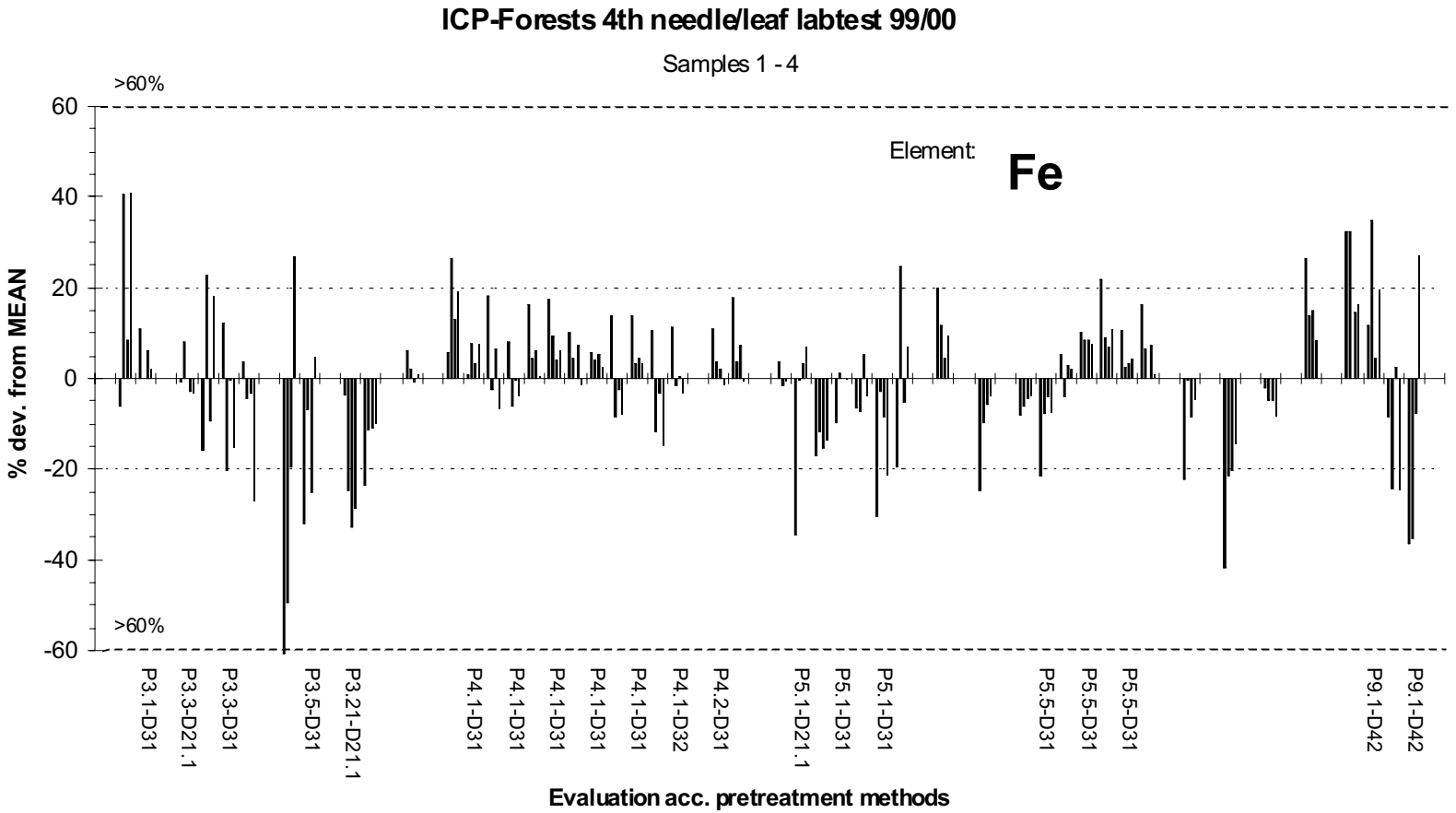

ICP-Forests 4th needle/leaflab test 99/00
Samples 1 - 4
>60%
Element:
K
% dev. from MEAN
60
40
20
0
-20
-40
-60
P3.1-D31
P3.3-D28
P3.3-D31
P3.5-D31
P3.21-D21.1
P3.31-D31
P4.1-D21.1
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.2-D31
P5.1-D21.1
P5.1-D28
P5.1-D31
P5.1-D31
P5.2-D31
P5.3-D31
P5.5-D21.1
P5.5-D31
P5.5-D31
P5.5-D31
P5.7-D31
P6.1-D28
P6.3-D31
P6.5-D21.1
P9.1-D41
P9.1-D42
Evaluation acc. pretreatment methods

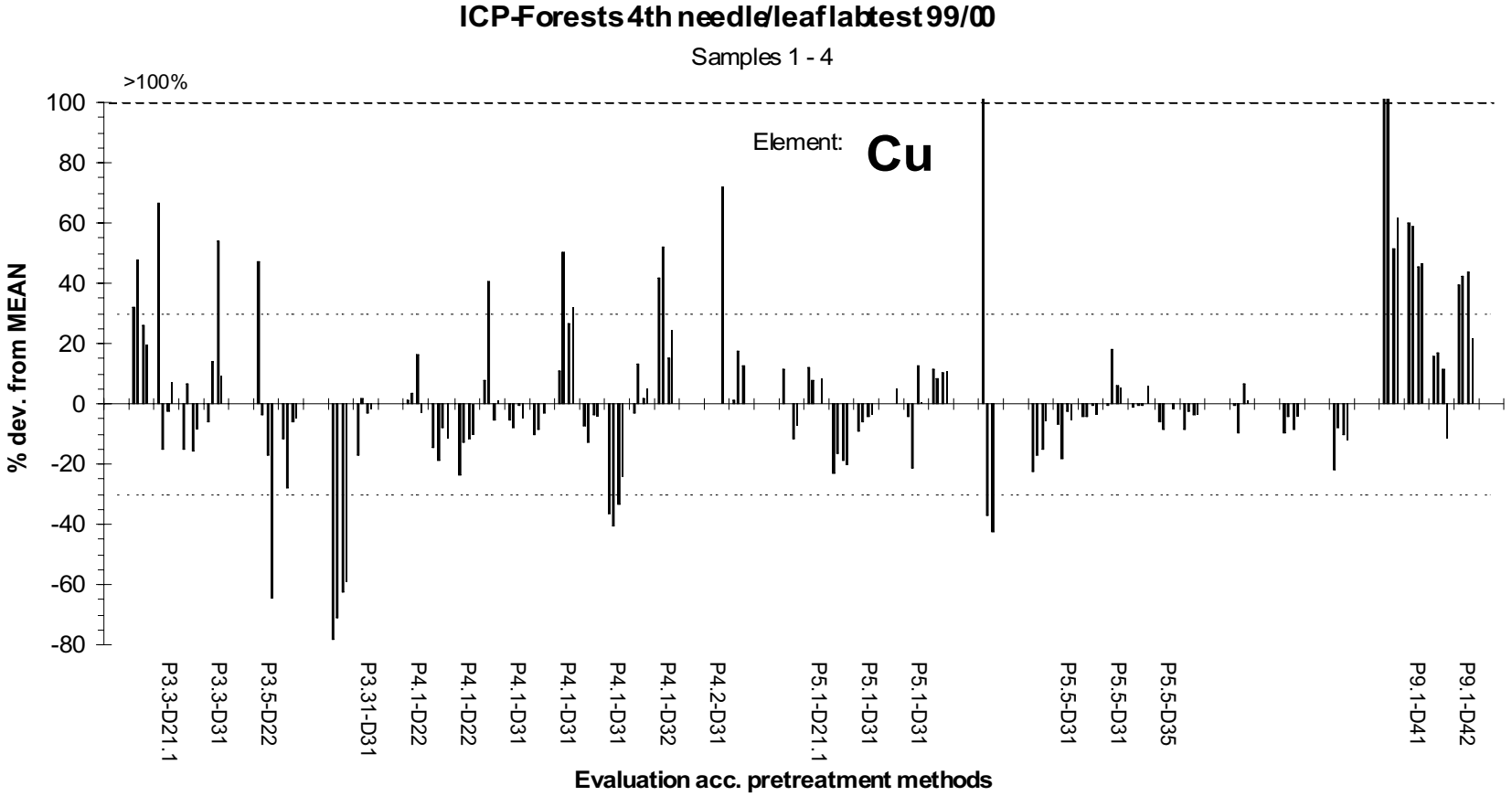

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>200%
Element: Na
% dev. from MEAN
200
150
100
50
0
-50
-100
-150
P3.3-D28
P3.5-D35
P4.1-D21.1
P4.1-D21.1
P4.1-D31
P4.1-D31
P4.1-D32
P4.2-D31
P5.1-D21.1
P5.1-D31
P5.1-D31
P5.1-D31
P5.2-D31
P5.3-D31
P5.5-D31
P5.5-D31
P5.5-D35
P5.7-D31
P6.1-D28
P6.3-D31
P6.5-D21.1
P9.1-D41
P9.1-D42
Evaluation acc. pretreatment methods

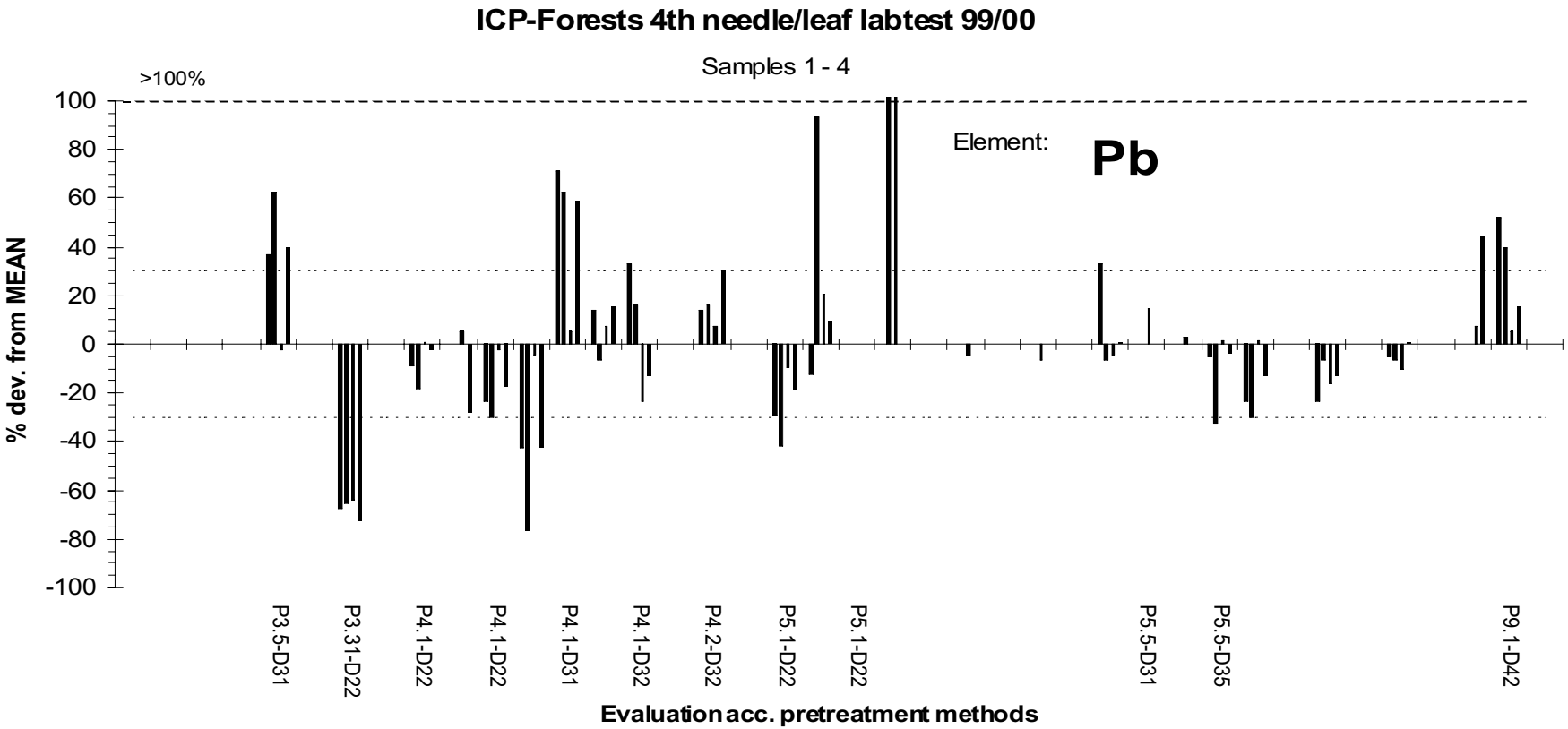

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element:
Zn
% dev. from MEAN
80
60
40
20
0
-20
-40
-60
-80
>80%
P3.3-D21.1
P3.3-D31
P3.5-D21.1
P3.5-D31
P3.21-D21.1
P3.31-D22
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D32
P4.2-D32
P5.1-D21.1
P5.1-D31
P5.1-D31
P5.1-D31
P5.2-D31
P5.3-D31
P5.5-D31
P5.5-D31
P5.5-D31
P5.5-D35
P6.3-D31
P6.5-D21.1
P9.1-D42
Evaluation acc. pretreatment methods

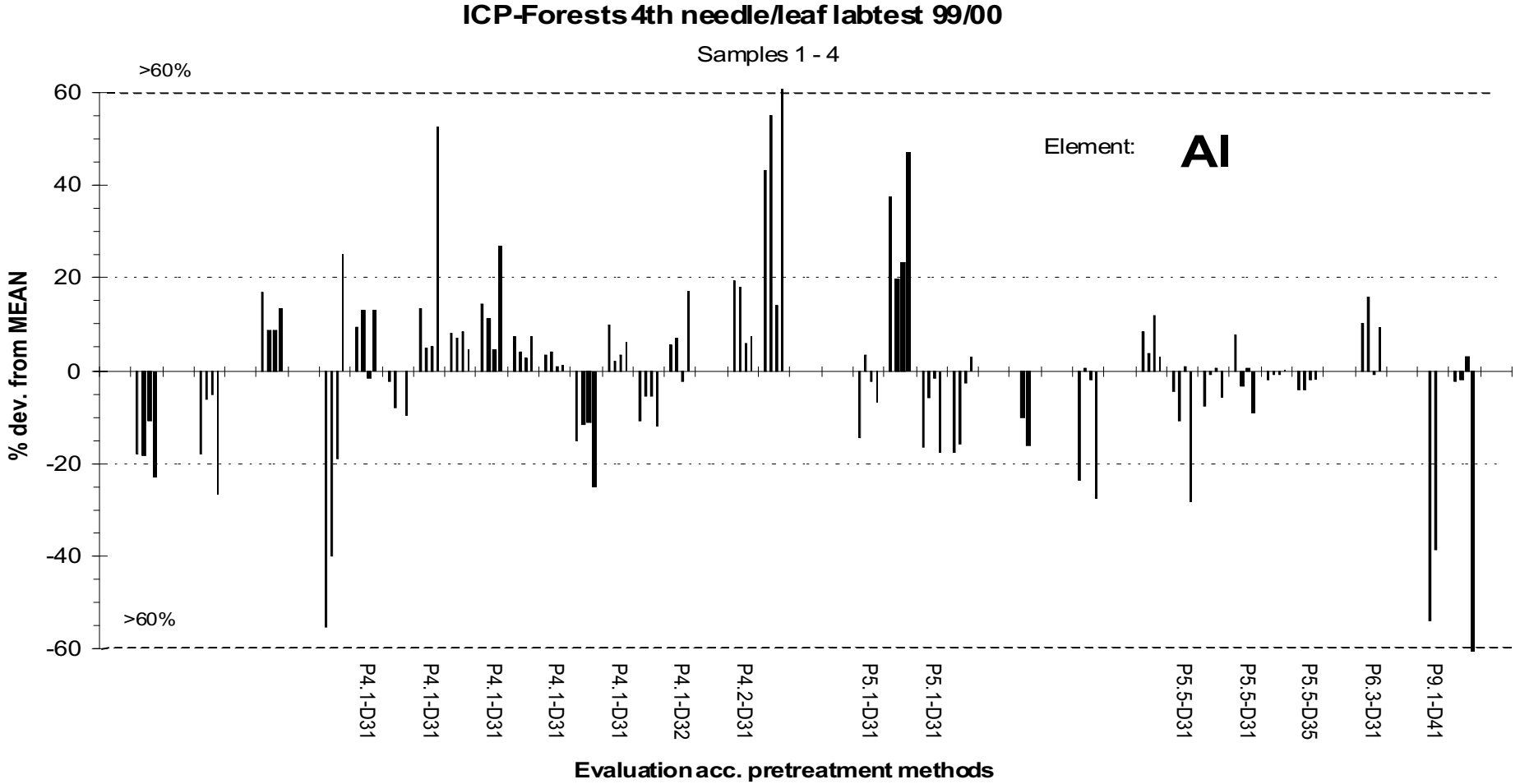

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element: Mn
% dev. from MEAN
60
40
20
0
-20
-40
-60
-80
P3.3-D21.1
P3.3-D31
P3.5-D21.1
P3.21-D21.1
P3.31-D31
P4.1-D21.1
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.2-D31
P5.1-D21.1
P5.1-D31
P5.1-D31
P5.2-D31
P5.3-D31
P5.5-D31
P5.5-D31
P5.5-D31
P5.5-D35
P5.7-D31
P6.1-D21.1
P6.3-D31
P6.5-D21.1
P9.1-D41
P9.1-D42
Evaluation acc. pretreatment methods

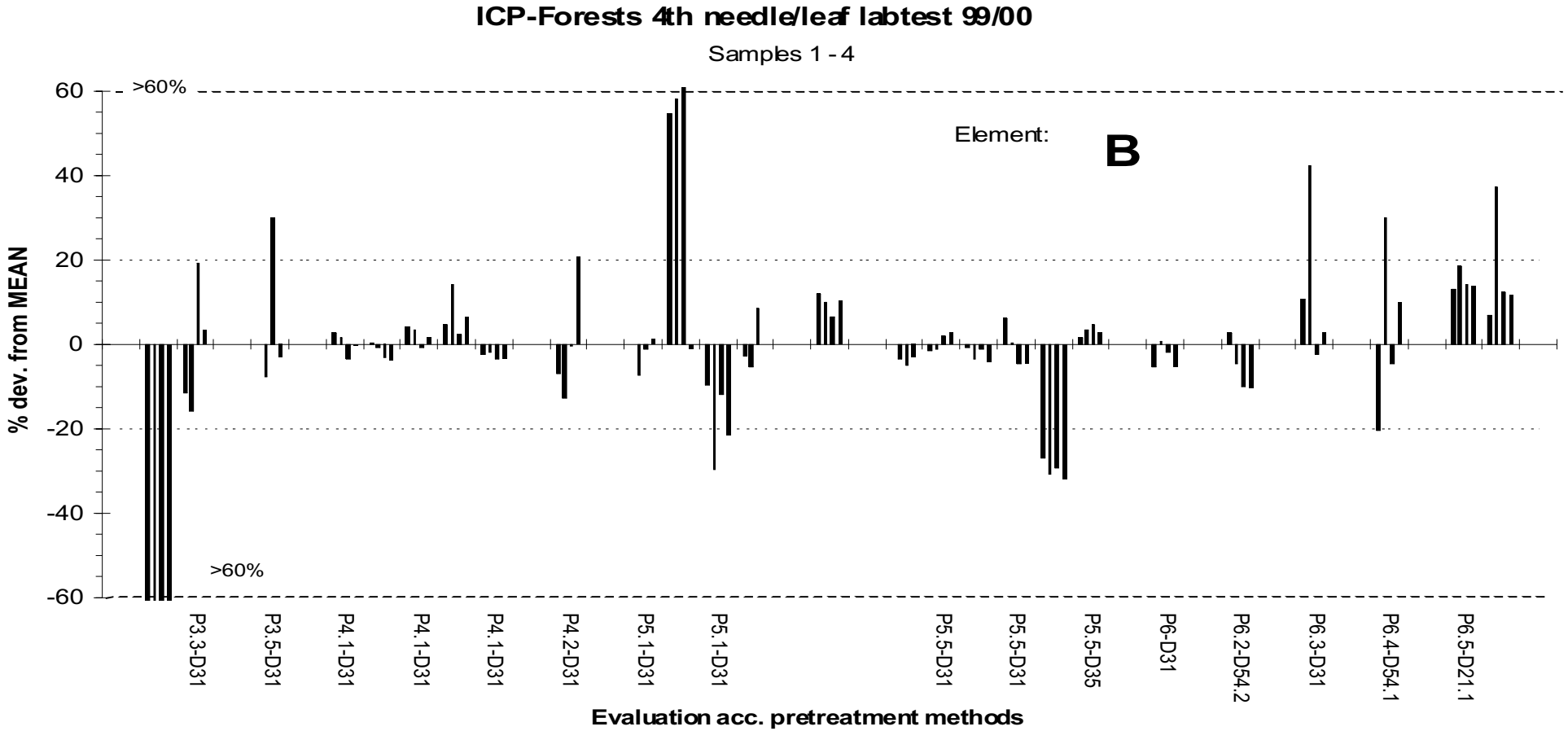
s

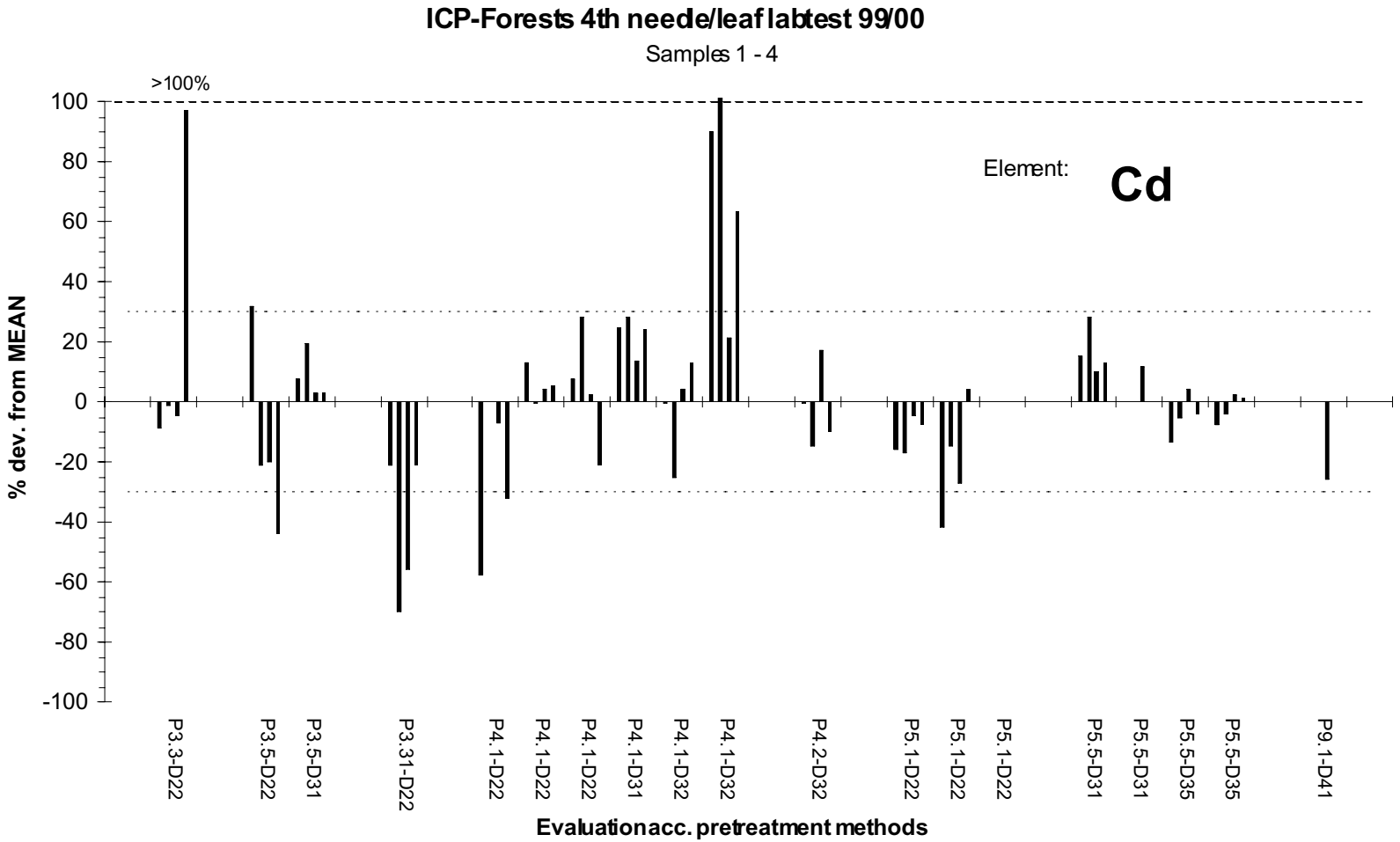

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element:
Fe
>60%
60
40
20
0
-20
-40
>60%
-60
% dev. from MEAN
P3.1-D31
P3.3-D21.1
P3.3-D31
P3.5-D31
P3.21-D21.1
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D32
P4.2-D31
P5.1-D21.1
P5.1-D31
P5.1-D31
P5.5-D31
P5.5-D31
P5.5-D31
P9.1-D42
P9.1-D42
Evaluation acc. pretreatment methods

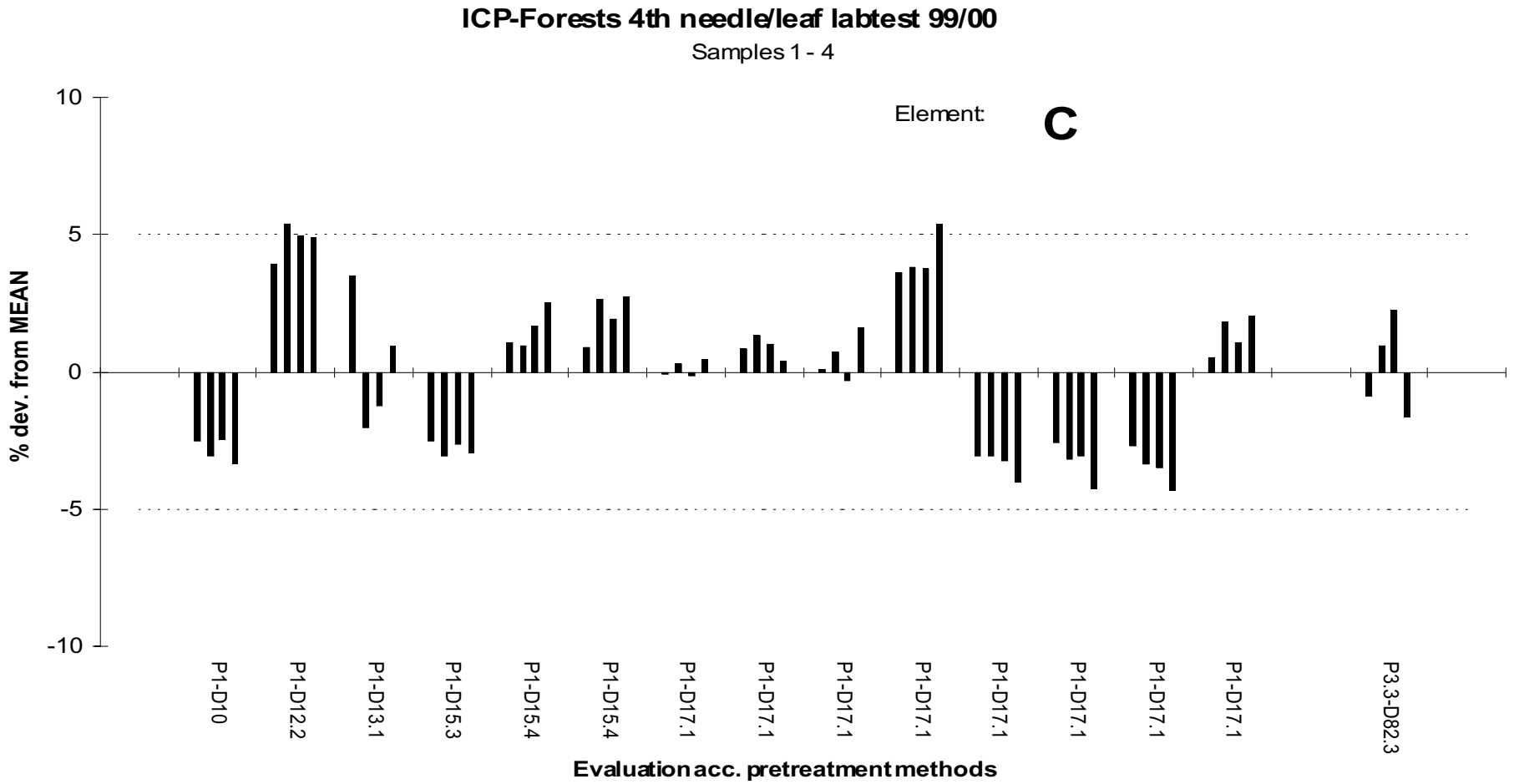

ICP-Forests 4th needle/leaf lab test 99/00
Samples 1 - 4
>100%
Element: Cu
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
P3.3-D21.1
P3.3-D31
P3.5-D22
P3.31-D31
P4.1-D22
P4.1-D22
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D32
P4.2-D31
P5.1-D21.1
P5.1-D31
P5.1-D31
P5.5-D31
P5.5-D31
P5.5-D35
P9.1-D41
P9.1-D42
Evaluation acc. pretreatment methods

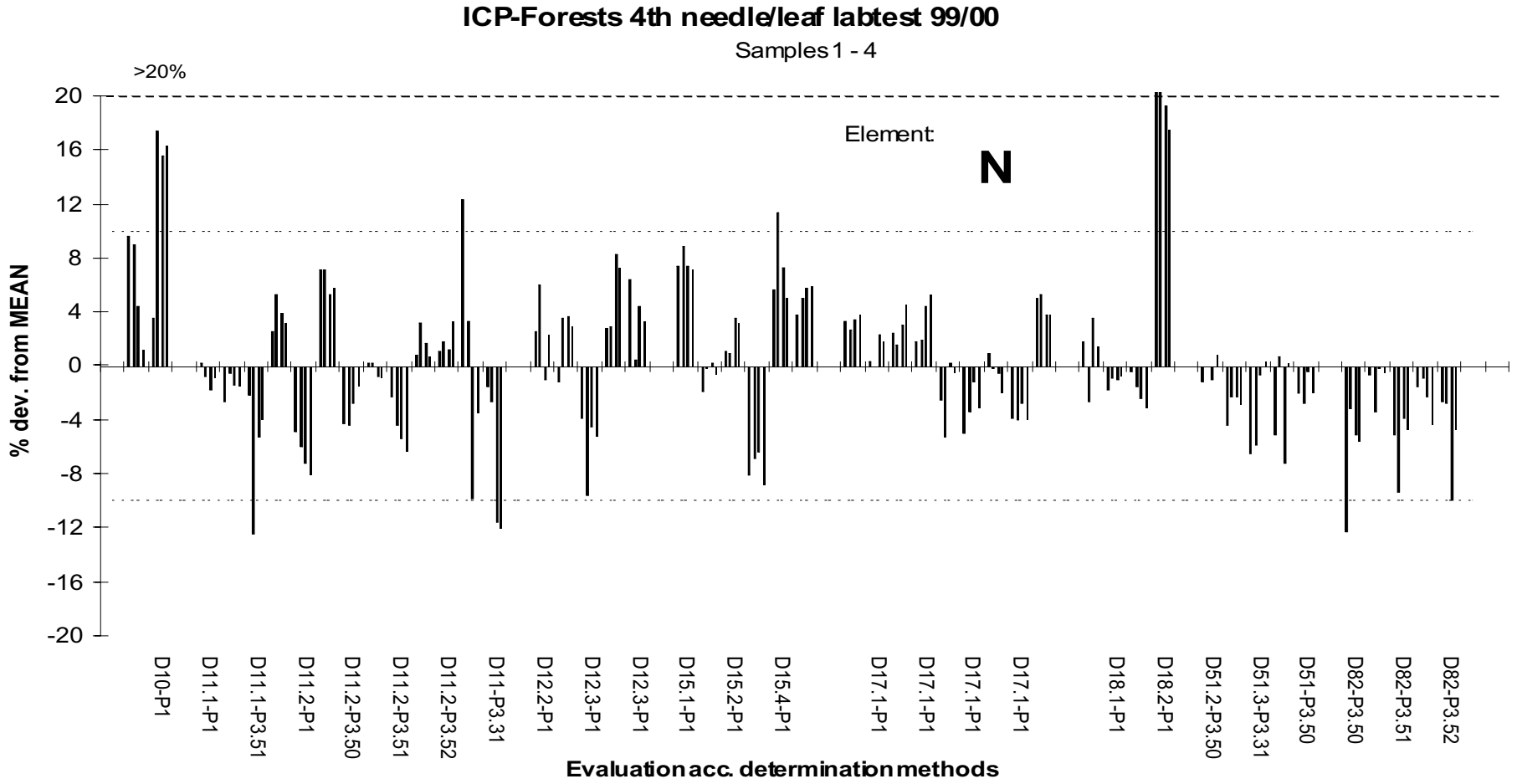

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>100%
Element:
Pb
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
-100
P3.5-D31
P3.31-D22
P4.1-D22
P4.1-D22
P4.1-D31
P4.1-D32
P4.2-D32
P5.1-D22
P5.1-D22
P5.5-D31
P5.5-D35
P9.1-D42
Evaluation acc. pretreatment methods

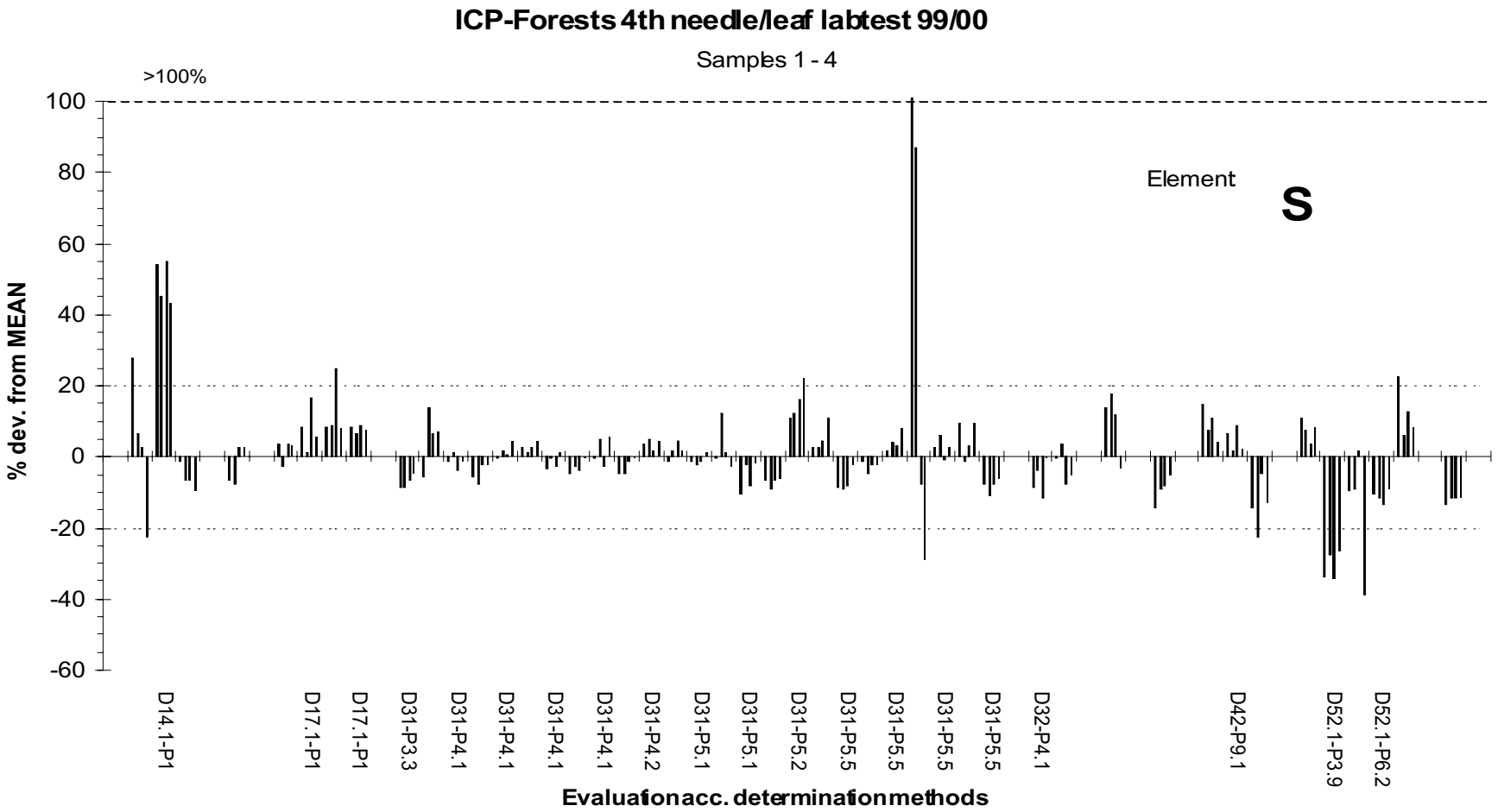

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element: Al
>60%
>60%
60
40
20
0
-20
-40
-60
% dev. from MEAN
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.1-D32
P4.2-D31
P5.1-D31
P5.1-D31
P5.5-D31
P5.5-D31
P5.5-D35
P6.3-D31
P9.1-D41
Evaluation acc. pretreatment methods

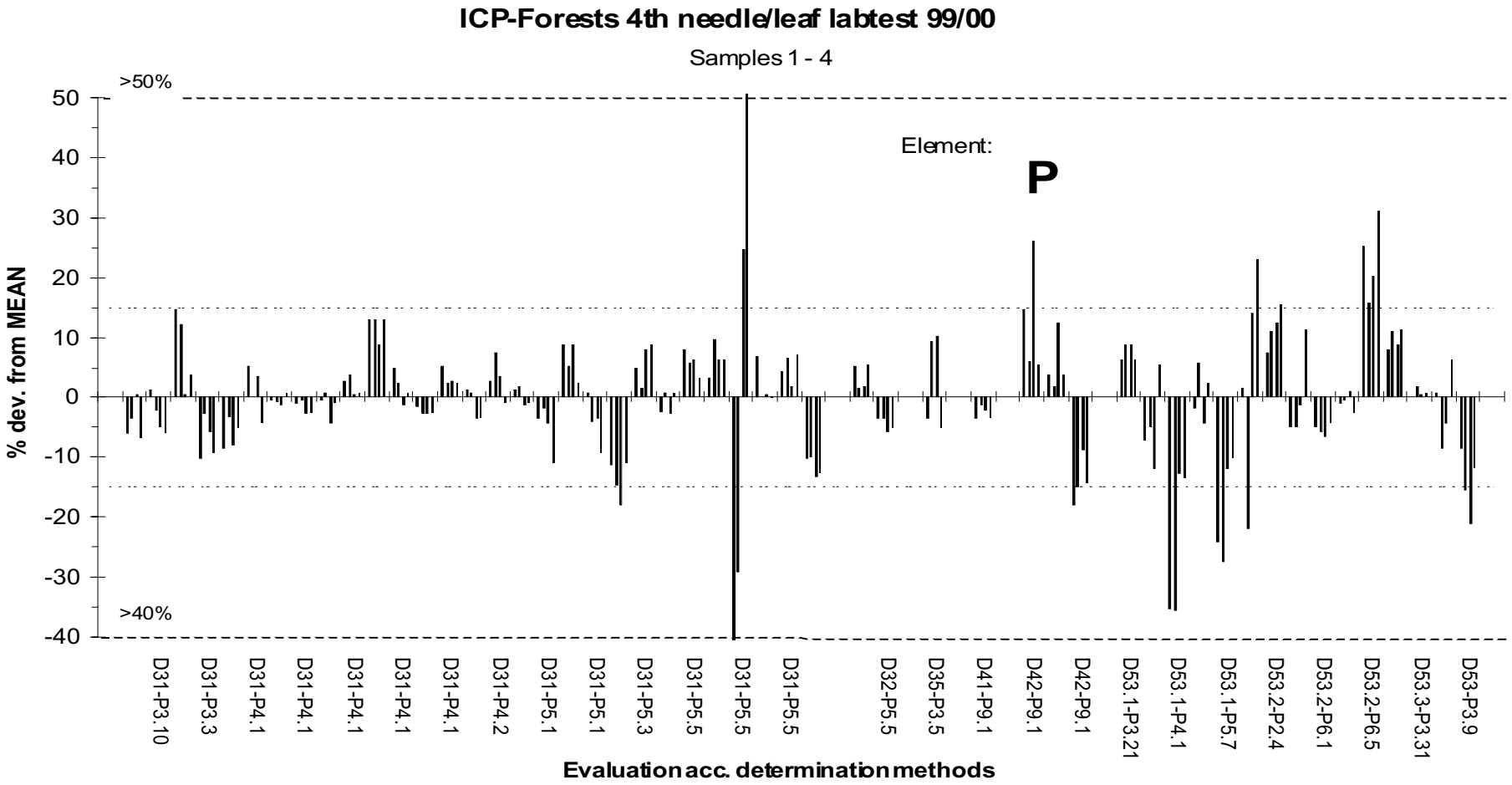

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element:
B
>60%
>60%
60
40
20
0
-20
-40
-60
% dev. from MEAN
P3.3-D31
P3.5-D31
P4.1-D31
P4.1-D31
P4.1-D31
P4.2-D31
P5.1-D31
P5.1-D31
P5.5-D31
P5.5-D31
P5.5-D35
P6-D31
P6.2-D54.2
P6.3-D31
P6.4-D54.1
P6.5-D21.1
Evaluation acc. pretreatment methods

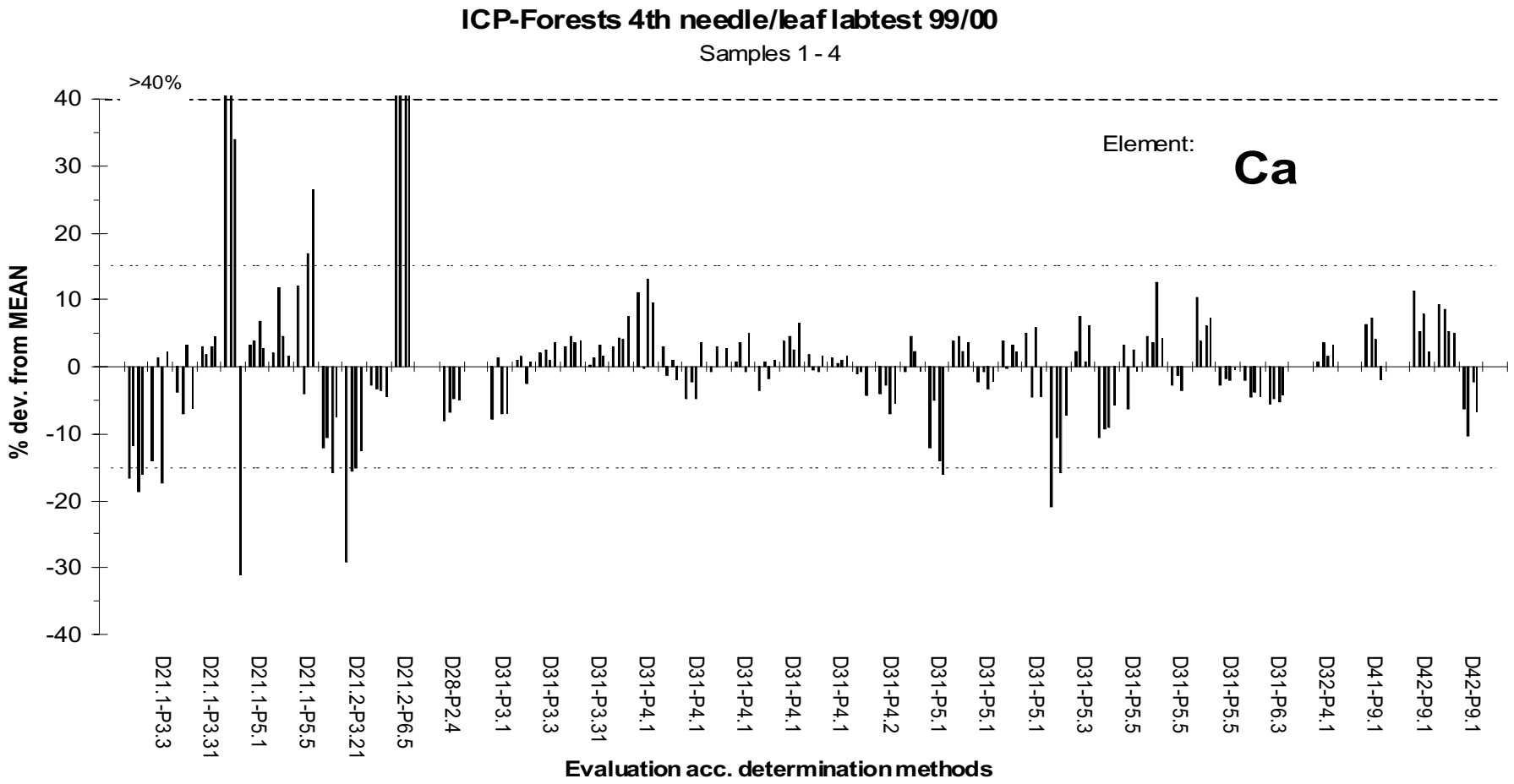

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>100%
Element:
Cd
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
-100
P3.3-D22
P3.5-D22
P3.5-D31
P3.31-D22
P4.1-D22
P4.1-D22
P4.1-D22
P4.1-D31
P4.1-D32
P4.1-D32
P4.2-D32
P5.1-D22
P5.1-D22
P5.1-D22
P5.5-D31
P5.5-D31
P5.5-D35
P5.5-D35
P9.1-D41
Evaluation acc. pretreatment methods

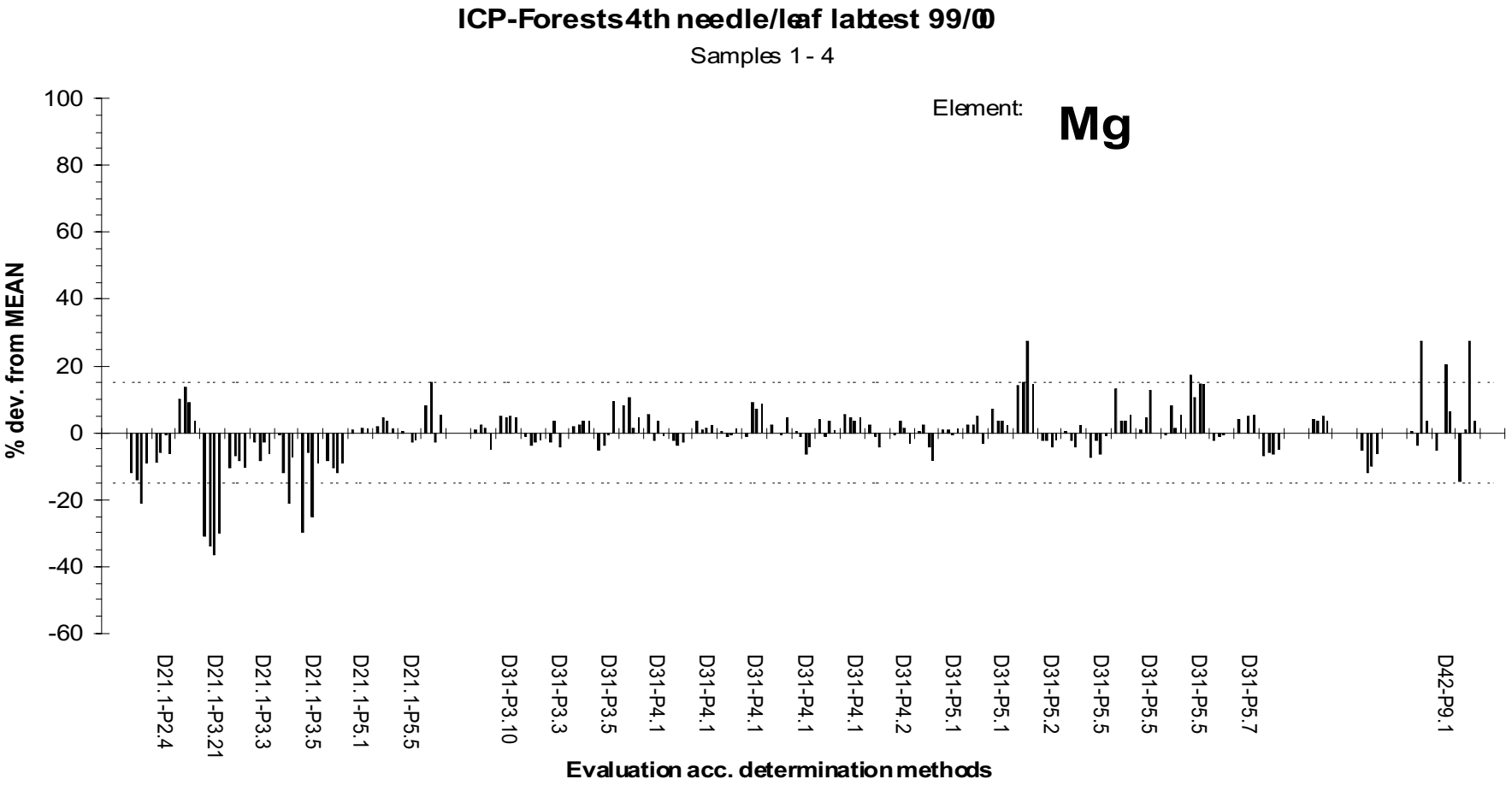

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element:
C
10
5
0
-5
-10
% dev. from MEAN
P1-D10
P1-D12.2
P1-D13.1
P1-D15.3
P1-D15.4
P1-D15.4
P1-D17.1
P1-D17.1
P1-D17.1
P1-D17.1
P1-D17.1
P1-D17.1
P1-D17.1
P1-D17.1
P3.3-D82.3
Evaluation acc. pretreatment methods

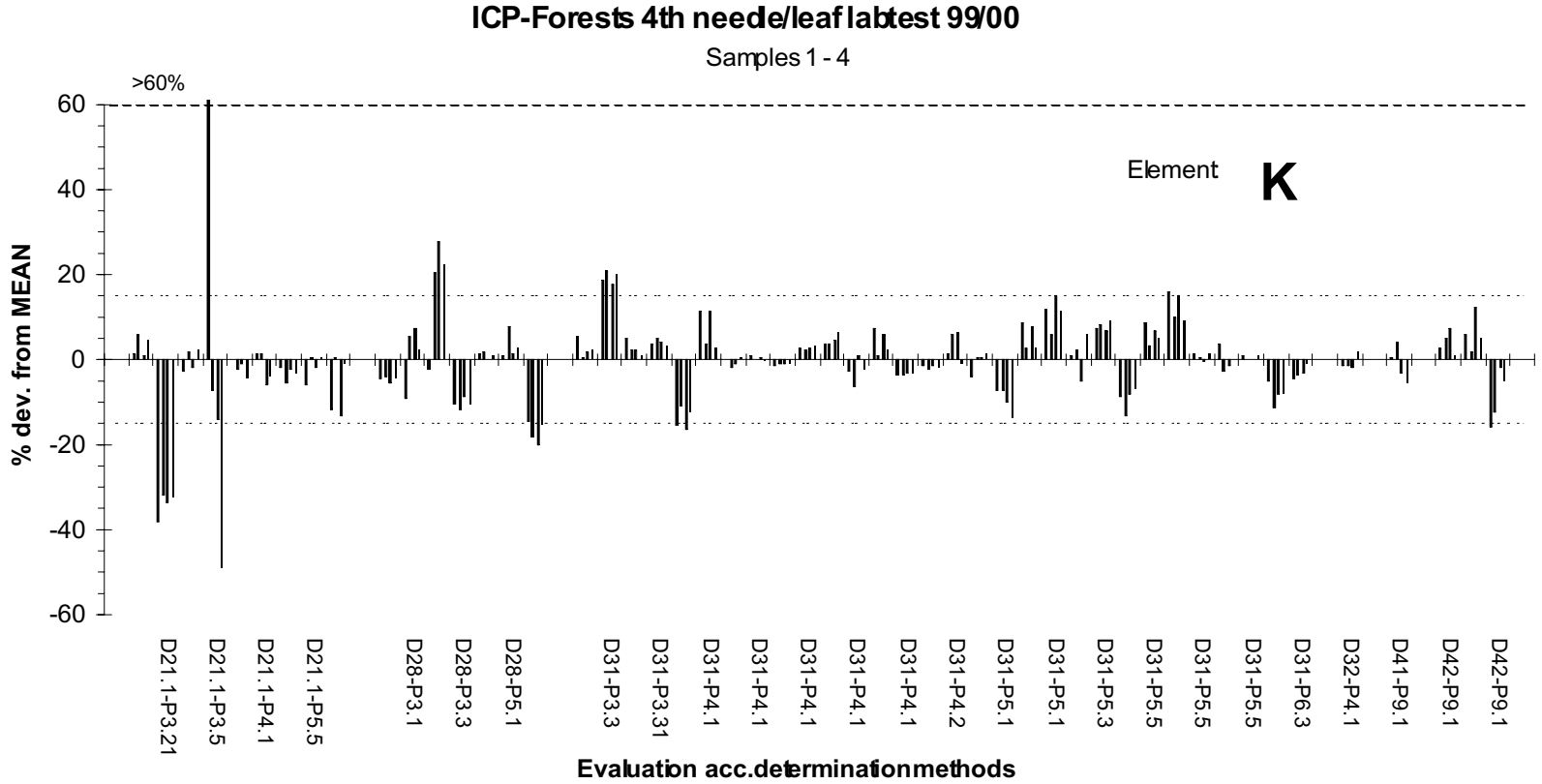

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>20%
Element:
N
% dev. from MEAN
20
16
12
8
4
0
-4
-8
-12
-16
-20
D10-P1
D11.1-P1
D11.1-P3.51
D11.2-P1
D11.2-P3.50
D11.2-P3.51
D11.2-P3.52
D11-P3.31
D12.2-P1
D12.3-P1
D12.3-P1
D15.1-P1
D15.2-P1
D15.4-P1
D17.1-P1
D17.1-P1
D17.1-P1
D17.1-P1
D18.1-P1
D18.2-P1
D51.2-P3.50
D51.3-P3.31
D51-P3.50
D82-P3.50
D82-P3.51
D82-P3.52
Evaluation acc. determination methods

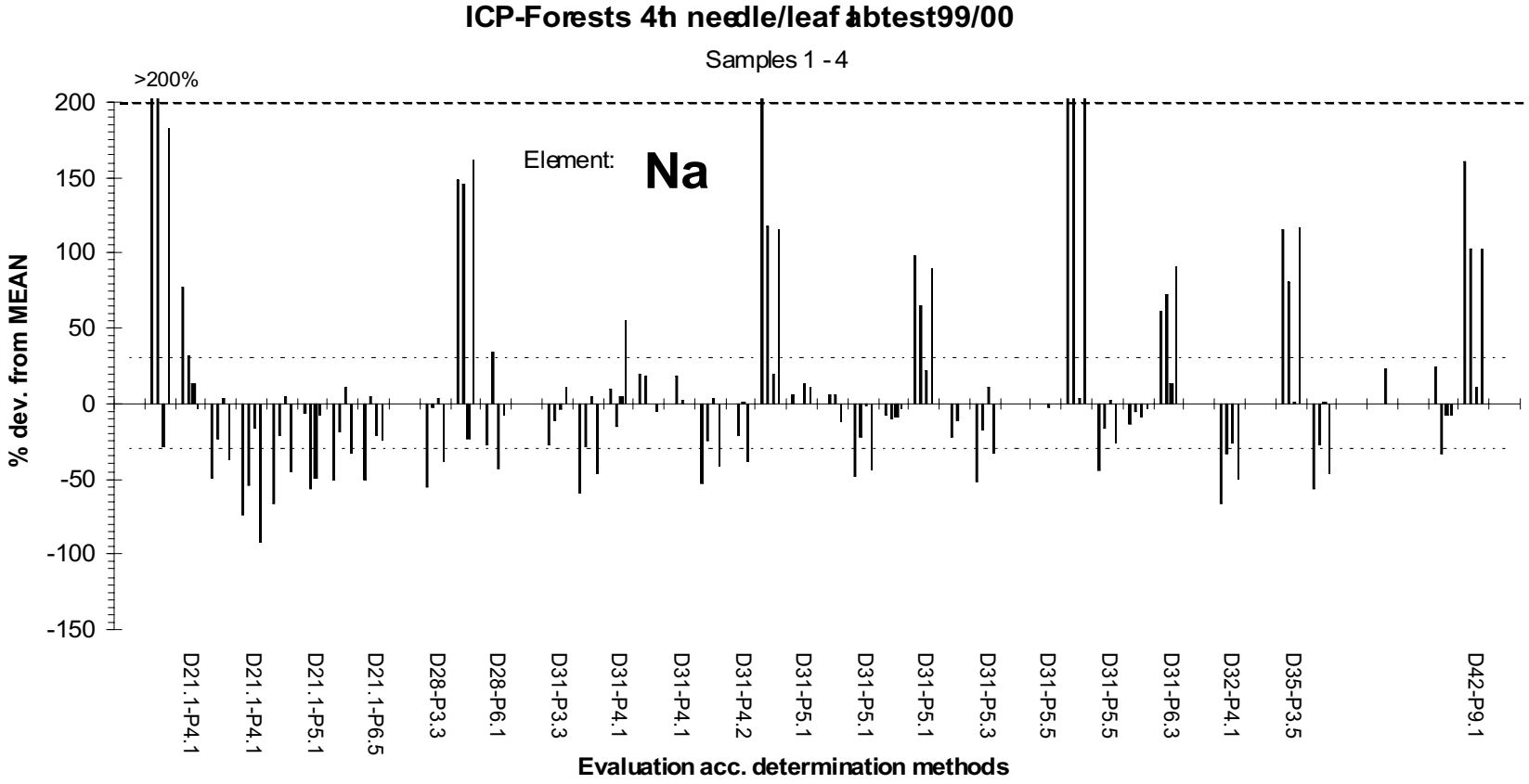

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>100%
100
80
60
40
20
0
-20
-40
-60
% dev. from MEAN
Element
S
D14.1-P1
D17.1-P1
D17.1-P1
D31-P3.3
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.2
D31-P5.1
D31-P5.1
D31-P5.2
D31-P5.5
D31-P5.5
D31-P5.5
D31-P5.5
D32-P4.1
D42-P9.1
D52.1-P3.9
D52.1-P6.2
Evaluation acc. determination methods

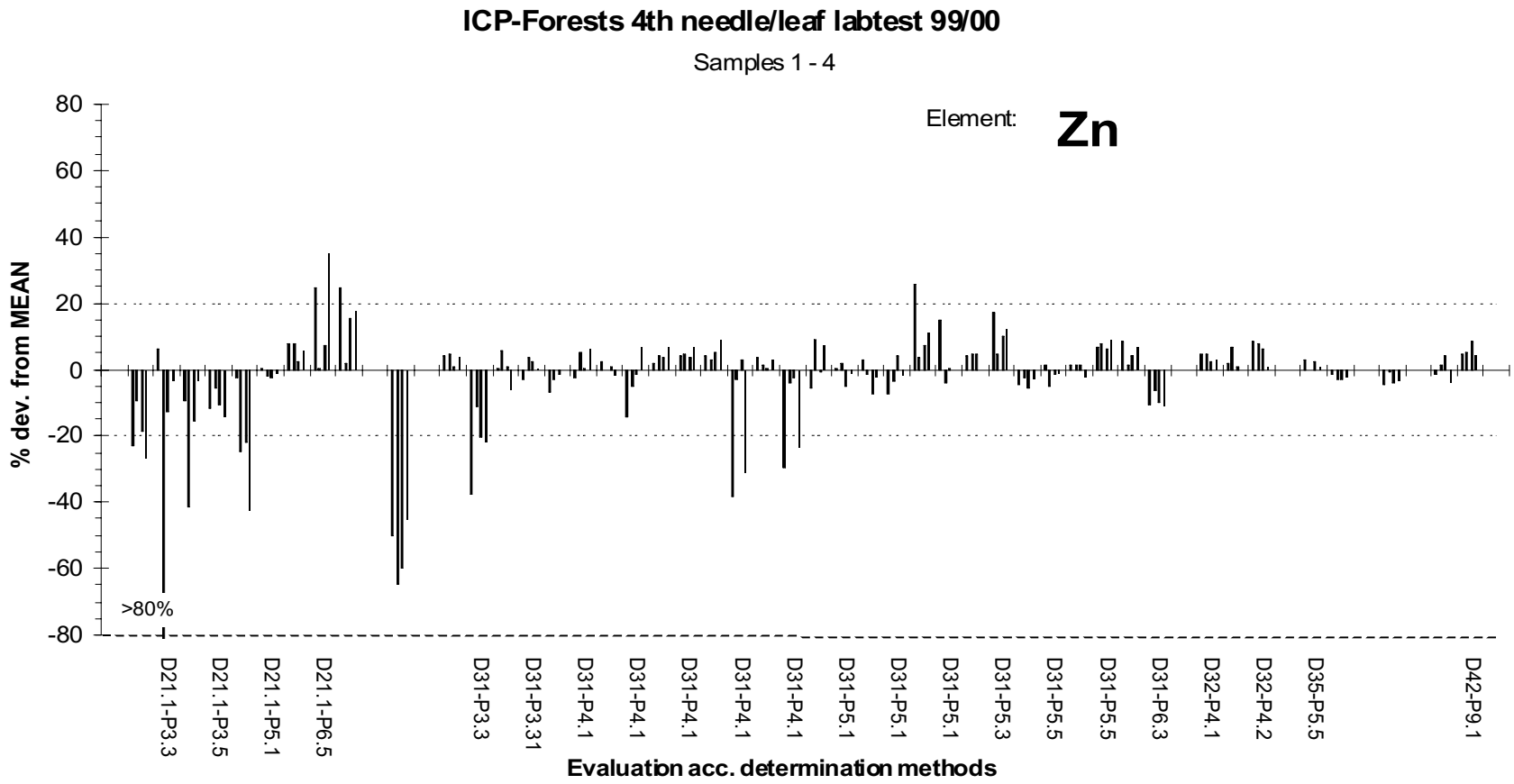

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>50%
>40%
Element:
P
% dev. from MEAN
50
40
30
20
10
0
-10
-20
-30
-40
D31-P3.10
D31-P3.3
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.2
D31-P5.1
D31-P5.1
D31-P5.3
D31-P5.5
D31-P5.5
D31-P5.5
D32-P5.5
D35-P3.5
D41-P9.1
D42-P9.1
D42-P9.1
D53.1-P3.21
D53.1-P4.1
D53.1-P5.7
D53.2-P2.4
D53.2-P6.1
D53.2-P6.5
D53.3-P3.31
D53-P3.9
Evaluation acc. determination methods

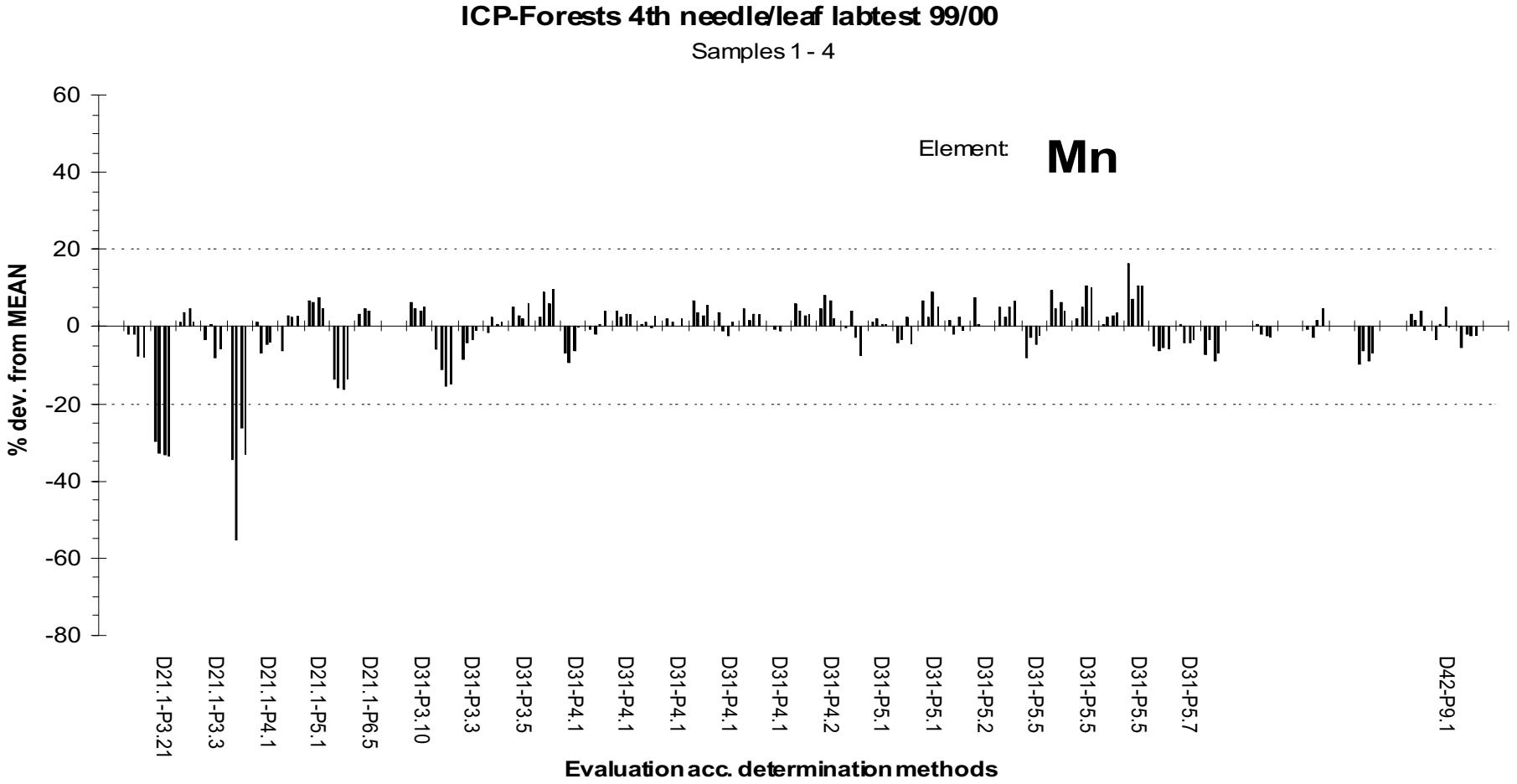

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>40%
Element:
Ca
% dev. from MEAN
40
30
20
10
0
-10
-20
-30
-40
D21.1-P3.3
D21.1-P3.31
D21.1-P5.1
D21.1-P5.5
D21.2-P3.21
D21.2-P6.5
D28-P2.4
D31-P3.1
D31-P3.3
D31-P3.31
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.2
D31-P5.1
D31-P5.1
D31-P5.1
D31-P5.3
D31-P5.5
D31-P5.5
D31-P5.5
D31-P6.3
D32-P4.1
D41-P9.1
D42-P9.1
D42-P9.1
Evaluation acc. determination methods

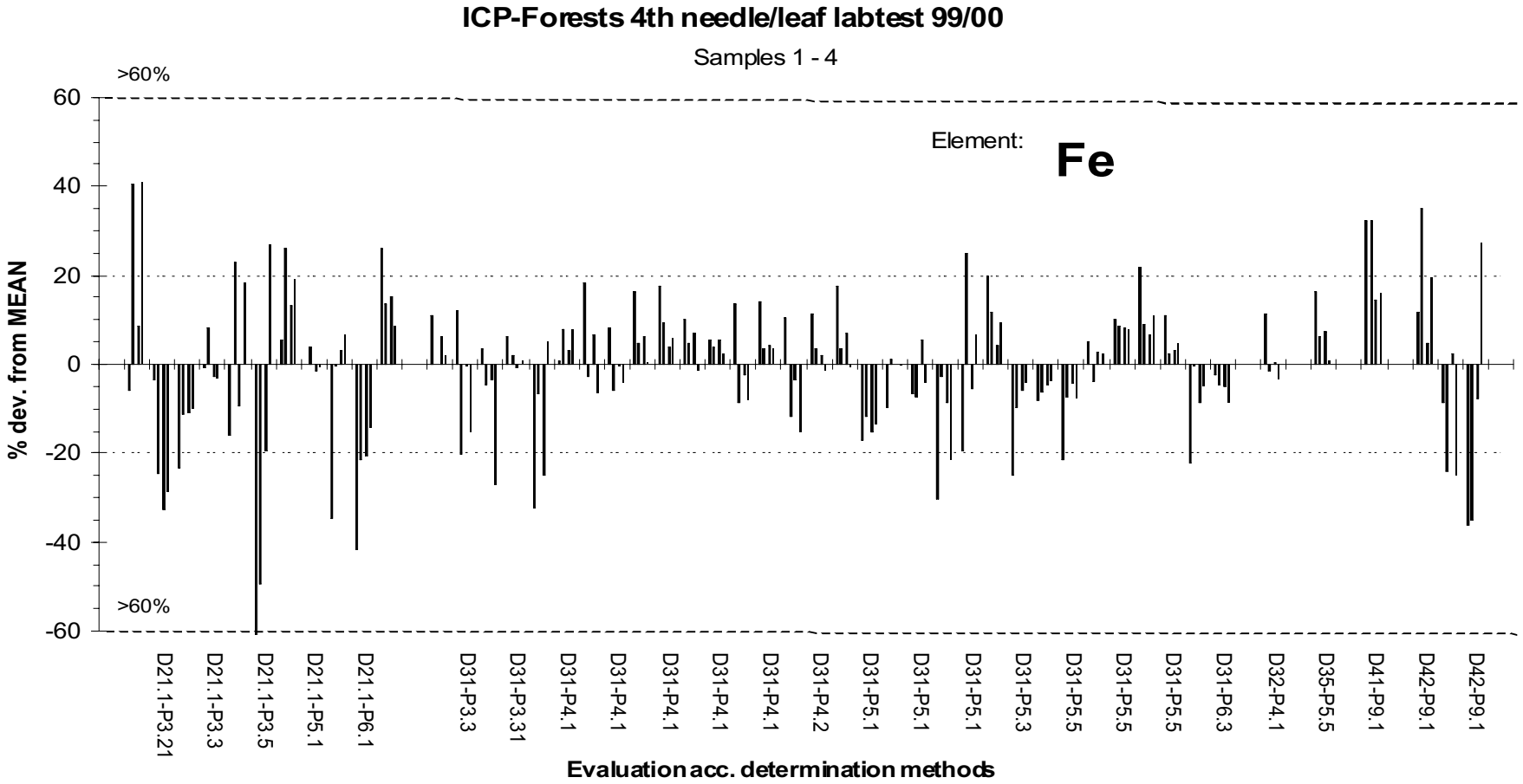

ICP-Forests 4th needle/leaf lab test 99/00
Samples 1 - 4
Element:
Mg
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
D21.1-P2.4
D21.1-P3.21
D21.1-P3.3
D21.1-P3.5
D21.1-P5.1
D21.1-P5.5
D31-P3.10
D31-P3.3
D31-P3.5
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.2
D31-P5.1
D31-P5.1
D31-P5.2
D31-P5.5
D31-P5.5
D31-P5.5
D31-P5.7
D42-P9.1
Evaluation acc. determination methods

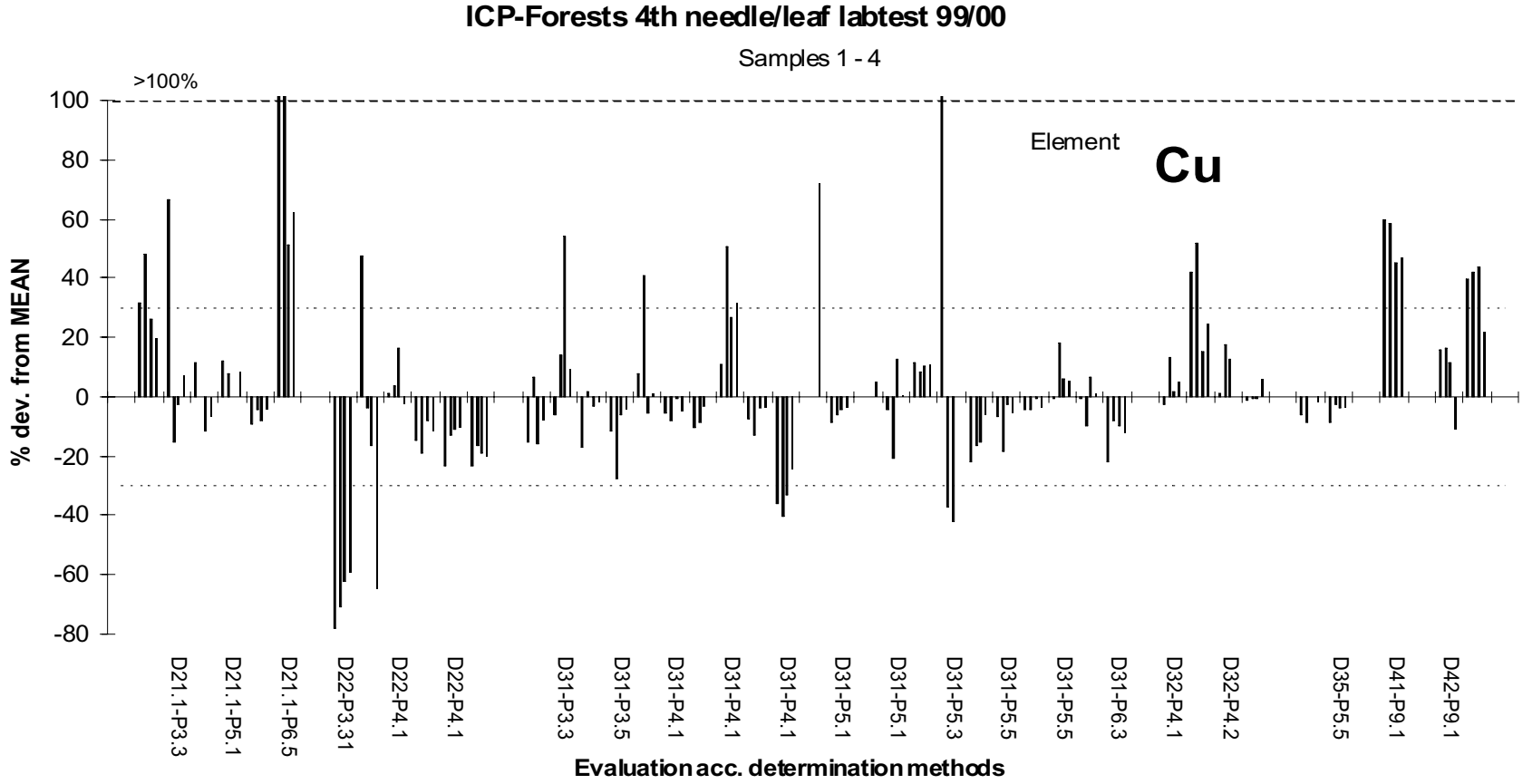

ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>60%
Element
K
% dev. from MEAN
60
40
20
0
-20
-40
-60
D21.1-P3.21
D21.1-P3.5
D21.1-P4.1
D21.1-P5.5
D28-P3.1
D28-P3.3
D28-P5.1
D31-P3.3
D31-P3.31
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.2
D31-P5.1
D31-P5.1
D31-P5.3
D31-P5.5
D31-P5.5
D31-P5.5
D31-P6.3
D32-P4.1
D41-P9.1
D42-P9.1
D42-P9.1
Evaluation acc.determinationmethods

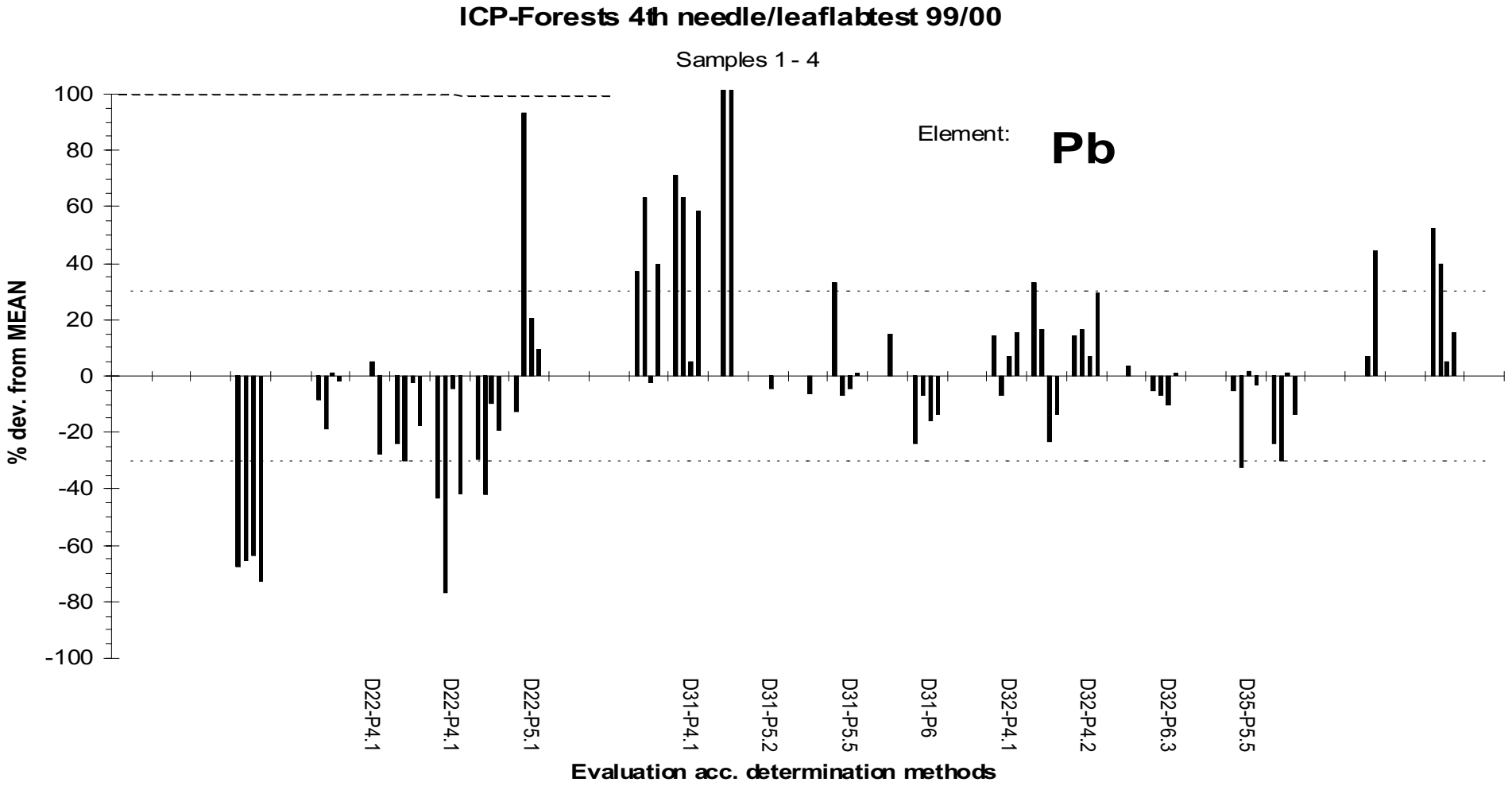

ICP-Forests 4th needle/leaf labtest99/00
Samples 1 - 4
>200%
Element: Na
% dev. from MEAN
200
150
100
50
0
-50
-100
-150
D21.1-P4.1
D21.1-P4.1
D21.1-P5.1
D21.1-P6.5
D28-P3.3
D28-P6.1
D31-P3.3
D31-P4.1
D31-P4.1
D31-P4.2
D31-P5.1
D31-P5.1
D31-P5.1
D31-P5.3
D31-P5.5
D31-P5.5
D31-P6.3
D32-P4.1
D35-P3.5
D42-P9.1
Evaluation acc. determination methods


ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element:
Zn
% dev. from MEAN
80
60
40
20
0
-20
-40
-60
-80
>80%
D21.1-P3.3
D21.1-P3.5
D21.1-P5.1
D21.1-P6.5
D31-P3.3
D31-P3.31
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P5.1
D31-P5.1
D31-P5.1
D31-P5.3
D31-P5.5
D31-P5.5
D31-P6.3
D32-P4.1
D32-P4.2
D35-P5.5
D42-P9.1
Evaluation acc. determination methods


ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element: Mn
% dev. from MEAN
60
40
20
0
-20
-40
-60
-80
D21.1-P3.21
D21.1-P3.3
D21.1-P4.1
D21.1-P5.1
D21.1-P6.5
D31-P3.10
D31-P3.3
D31-P3.5
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.2
D31-P5.1
D31-P5.1
D31-P5.2
D31-P5.5
D31-P5.5
D31-P5.5
D31-P5.7
D42-P9.1
Evaluation acc. determination methods


ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
Element:
Fe
>60%
60
40
20
0
-20
-40
-60
>60%
% dev. from MEAN
D21.1-P3.21
D21.1-P3.3
D21.1-P3.5
D21.1-P5.1
D21.1-P6.1
D31-P3.3
D31-P3.31
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.1
D31-P4.2
D31-P5.1
D31-P5.1
D31-P5.1
D31-P5.3
D31-P5.5
D31-P5.5
D31-P5.5
D31-P6.3
D32-P4.1
D35-P5.5
D41-P9.1
D42-P9.1
D42-P9.1
Evaluation acc. determination methods


ICP-Forests 4th needle/leaf labtest 99/00
Samples 1 - 4
>100%
Element
Cu
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
D21.1-P3.3
D21.1-P5.1
D21.1-P6.5
D22-P3.31
D22-P4.1
D22-P4.1
D31-P3.3
D31-P3.5
D31-P4.1
D31-P4.1
D31-P4.1
D31-P5.1
D31-P5.1
D31-P5.3
D31-P5.5
D31-P5.5
D31-P6.3
D32-P4.1
D32-P4.2
D35-P5.5
D41-P9.1
D42-P9.1
Evaluation acc. determination methods


ICP-Forests 4th needle/leaflabtest 99/00
Samples 1 - 4
Element:
Pb
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
-100
D22-P4.1
D22-P4.1
D22-P5.1
D31-P4.1
D31-P5.2
D31-P5.5
D31-P6
D32-P4.1
D32-P4.2
D32-P6.3
D35-P5.5
Evaluation acc. determination methods