ICP-FORESTS

2nd Needle/Leaf Interlaboratory Test 95/96

Results

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Results

Final Report

by

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1. Background

ICP-Forests of UN-ECE initialized in collaboration with EU a programme for intensive and continuous monitoring of forest ecosystems for Europe in order to realize a better understanding of air pollution processes. An important task in the running Level-I and Level-II monitoring programme is the needle/leaf-analysis of trees, because they serve as bioindicators for nutritrion state and damages.

Necessary is the harmonizing and the improvement of analytical techniques. A high laboratory standard in all countries is indispensable for the intended elaboration of a European-wide survey of forest state. Important steps in the past were the edition of the „Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of the effects of air pollution on forests" (UN-ECE, Hamburg and Prague 1994) and a first european needle/leaf interlaboratory test, organized by France. The intensive discussion of ICP-expert panel in As, Norway, 8-9 March 1994 finished with the recommendation of a repetition during running level-II monitoring programme.

2. Material

In July 1995 the LUA sent the following four samples to 42 european laboratories:

1. Pine needles (Slovakia)
2. Spruce needles (Slovakia)
3. Quercus ilex leaves (Spain)
4. Spruce needles (Germany)

All materials were foremost ground in the LUA- laboratory with a Retsch-centrifugal-mill (sieve 0.25 mm, Cr-Ni-steel) and then homogenized by shaking over head for 24 hours.

3. Participants

24 laboratories from 21 countries participated in the first interlaboratory test. This number increased at the 2nd interlaboratory test with to laboratories from the following 25 countries (sorted alphabetically) :

Austria
Belgium (2x)
Bulgaria
Croatia
Czech Republic (2x)
Denmark
Estonia
Finland
France
Germany (10x)
Greece
Hungary
Ireland
Italy (3x)
Lithuania
Netherlands
Norway
Poland
Portugal
Russia
Slovakia (2x)
Slovenia
Spain
Switzerland
United Kingdom

We received no values from Sweden, Roumania and one of the German.
The code numbers of the laboratories are the same as in the first interlaboratory test (4a and 4b represent the left resp. right stick of No 4 pictures in As-minutes, 17a and 17b are two data sets with different methods of the same laboratory). As a consequence it is possible to compare the results of the first interlaboratory test to those of the second run and to follow the progress in analytical laboratory quality. (Code-numbers 32-40 were not used.)

4. Task

The participating laboratories were asked to analyze with the following elements with three replicates before December 31, 1995:

a) *mandatory elements*	b) *optional elements*	f) *additional elements*
Nitrogen	Sodium	
Sulphur	Zinc	
Phoshporus	Manganese	
Mangnesium	Iron	no limitation
Calcium	Copper	
Potassium	Lead	
	Aluminium	
	Boron	

The samples - moisture content was lower than 5 % - should be dried at 80 °Celsius prior to analysis. Anyhow all results have to be reported as dry matter (105 °C).
With a few exceptions all laboratories analyzed the complete list of the mandatory elements and most of the optional elements. In addition we received further values for Lithium, Carbon, Fluorine, Silicon, Chlorine, Titanium, Chromium, Cobalt, Nickel, Rubidium, Strontium, Cadmium, Barium and Mercury.

As the last values arrived in March 3, 1996, a delay of this final report was unevoidable.

In April 1996 all participating laboratories received a first internal report with all data and an evaluation according to ISO 5725. In August 1996 the second internal report followed with an alternative evaluation based on so-called robust statistics and came similar results .
These two reports were elaborated to inform the ICP-Forest Task Force about the trends, to give the participants the chance to discuss the data and the conclusions and proposals of the ring test leader and last not least to check their own laboratory methods during the Level II campaign.

5. Methods

The used methods, given in coded in chapter 4, are composed of the„code numbers of abbreviations of pretreatments"(p.3 -1) and „code numbers of abbreviations of methods (p. 3.- 2).
E. g.: Method 7-71 means an oxygen combustion combined with turbidimetric titration.

In comparision to the methods of the interlaboratory test it can be stated, that with the exception of labs 4a and 4b using allowed energydispersive resp. wavelengthdispersive X-ray spectroscopy for metal analysis, most labs used in principle ICP or AAS techniques, and as well evoided „exotic" or by the above mentioned manual excluded methods for the other elements. The recommendations from the „As-meeting" have been fulfilled in the main.

6. 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 and optional elements and three elements with at least 5 data sets (Carbon, Chlorine, Cadmium) and documented in pp. 4 - 1 following. All other values will only be reported without comments (p. 5 - 1).

The first report (April 1996) was based on ISO 5727. The problem of this method is the definition and elimination of outlayers which is problematic from a statistical view and should not be used without decisions of the test leader.

The second report (August 1996) therefore presented an evaluation on the basis of modern „robust statistics". The procedure is given in 'Schweizer Lebensmittelbuch' (Swiss food handbook, chapter 60 A). It works without outlayer elimination and is free of manipulations of the leader. But the disadvantage is that these iterative calculations have black-box-character and are difficult to follow for most chemists and persons without deeper statistic knowledges. Nevertheless this final report will present the evaluation based on robust statistics. More information can be found in the following literature:

Schweizer Lebensmittelbuch,	chapter 60 A, pp 37-44 , especially 40-42. Here is the iterative process explained on which the computer programm bases.
Rocke, D.M.	Robust statistical analysis of interlaboratory studies Biometrica 70.2 pp 421-431 (1983)
Hampel, F	Robuste Schätzungen: Ein anwendungsorientierter Überblick Biometrical Journal 22,1 pp 3-21 (1980)
Hampel, F	Einige Aspekte der statistischen Datenanalyse Teil 1: Lebensmittel-Technologie 20.5 pp 99-103 Teil 2: Lebensmittel-Technologie 20.6 pp 130-133
Lischer, P.	Robuste Ringversuchsauswertung Lebensmittel-Technologie 20.7 pp 167-172

The total means of conventinal ISO 5725 calculation are given in the annotations of pp 4 -1. The results of both methods are very similar.

7. Data Evaluation

All data are presented on pp 4 - 1 and following. For each element a graph and 4 tables can be found. The graph shows the plus/minus deviations of laboratory means from the total mean in percent. Each stick represents one of the 4 samples. The broken lines define the tolerable limits. The tables contain all single values, laboratory means, total mean and further annotations (ISO 5725 mean, new values, values after dead line) for the individual samples. They are listed by ascending laboratory means.
If the single values have an enclosed 'a', 'b' or 'ab'the data are 'trimmed' (the orignal german term is 'gestutzt') as result of the above described iterative statistic process.

The aim of this second ring-test was to check the laboratory quality during the running Level-I works of the programme. Only comparable analysis guarantee the possibility of an European-wide survey of forest nutrition and charge. It is obvious that the measure for such a comparability judgment must be more liberal than for a national study

.

The minutes of the „As-meeting" stated for the mandatory elements: „As a guideline for the quality of laboratory results, values should not deviate more than 10% for N, P, Ca, Mg and K, and not more than 15% for S" (minutes of As-Expert Panel , 8-9 March 1994, recommendation 1). The first report acc. ISO 5725 shows, that these limits were irrealistic. The author therefore proposed to enlarge them by 5% and he defined limits for the other elements. The following discussion came to the result that this proposal was accepted by all participants, with one exception (Norway).

Therefore the conclusions of the ring-test results now base on the following tolerable limits:

Element		*tolerable deviation*
N	Nitrogen	15 %
S	Sulphur	20 %
P	Phosphorus	15 %
Ca	Calcium	15 %
Mg	Magnesium	15 %
K	Potassium	15 %
Na	Sodium	30 %
Zn	Zinc	20 %
Mn	Manganese	20 %
Fe	Iron	20 %
Cu	Copper	30 %
Pb	Lead	30 %
Al	Aluminum	20 %
B	Boron	20 %
Cd	Cadmium	30 %
Cl	Chlorine	20 %
C	Carbon	10 %

Nitrogen

37 laboratories participated at the test. We find for each sample only one laboratory out of tolerable limits. This is a **very good** result.

Sulphur

The results of sulphur are **problematic**, because about a quater of all 33 participants are out of the new defined tolerable region. of +/- 20 % from total mean. This is no improvement compared with the first interlaboratory test. But it obvious that the means of the samples 1-3 are relative low and that sample 4 with the highest content has fewer deviations. It is to be checked in the Level II evaluation, if the sulphur contents of this test samples are untypically low. This has to be discussed at the next expert panel meeting.

Phosphorus
Max. 4 from 37 laboratories are out of the given limits. This is a **good** result.

Calcium
Max 4 laboratories from 39 participants lay out of the tolerance limit. This is a **good** result.

Magnesium
Between 3 and 6 laboratories have results out of the tolerable limit. This is **acceptable**.

Potassium
Max 4 laboratories from 39 are out of tolerance. This is a **good** result.

Sodium
More than 50 % of results are out of the 30% limit. This is typically for Na, but **unacceptable**.

Zinc
5 - 7 laboratories of 33 participants are out of the given limit. This is **acceptable**.

Manganese
Max. 2 laboratories from 35 are out of tolerance. This is **very good**.

Iron
The results of the samples with an content under 100 µg/g (sample 1) are problematic, but for higher contents with max 6 not tolerable values from 34 the results are **acceptable**

Copper
About 20% of all values are out of the wide tolerance limit. For a trace element like copper this result is **acceptable**.

Lead
About 50 % of all values are not tolerable. This is **not acceptable**.

Aluminium
More than 30 % of all values are not tolerable. This is **not acceptable**.

Boron, Cadmium, Chlorine, Carbon
The number of laboratories which presented their results for these elements is to low for a final evaluation.

8. Conclusions

The results of Nitrogen, Phosphorus, Calcium, Magnesum, Potassium, Zinc, Manganese, Iron and copper are very good, good or acceptable. They allow the elaboration of an European-wide forest charge and nutrition survey.

The results of sulphur are more problematic because of the wide range of the values under 1000mg/kg S-content. The comparability of the results should be discussed after finishing the analytical work completely.

All other elements are not recommended for an European-wide presentation.

It could be commendable to repeat this interlaboratory study. Especially the methods for sulphur, but also for lead should be improved. The author is ready to organize a third needle/leaf interlaboratory test in 1997/98.

Recklinghausen, October 1st 1996

List of participant laboratories and responsible persons

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Method Code

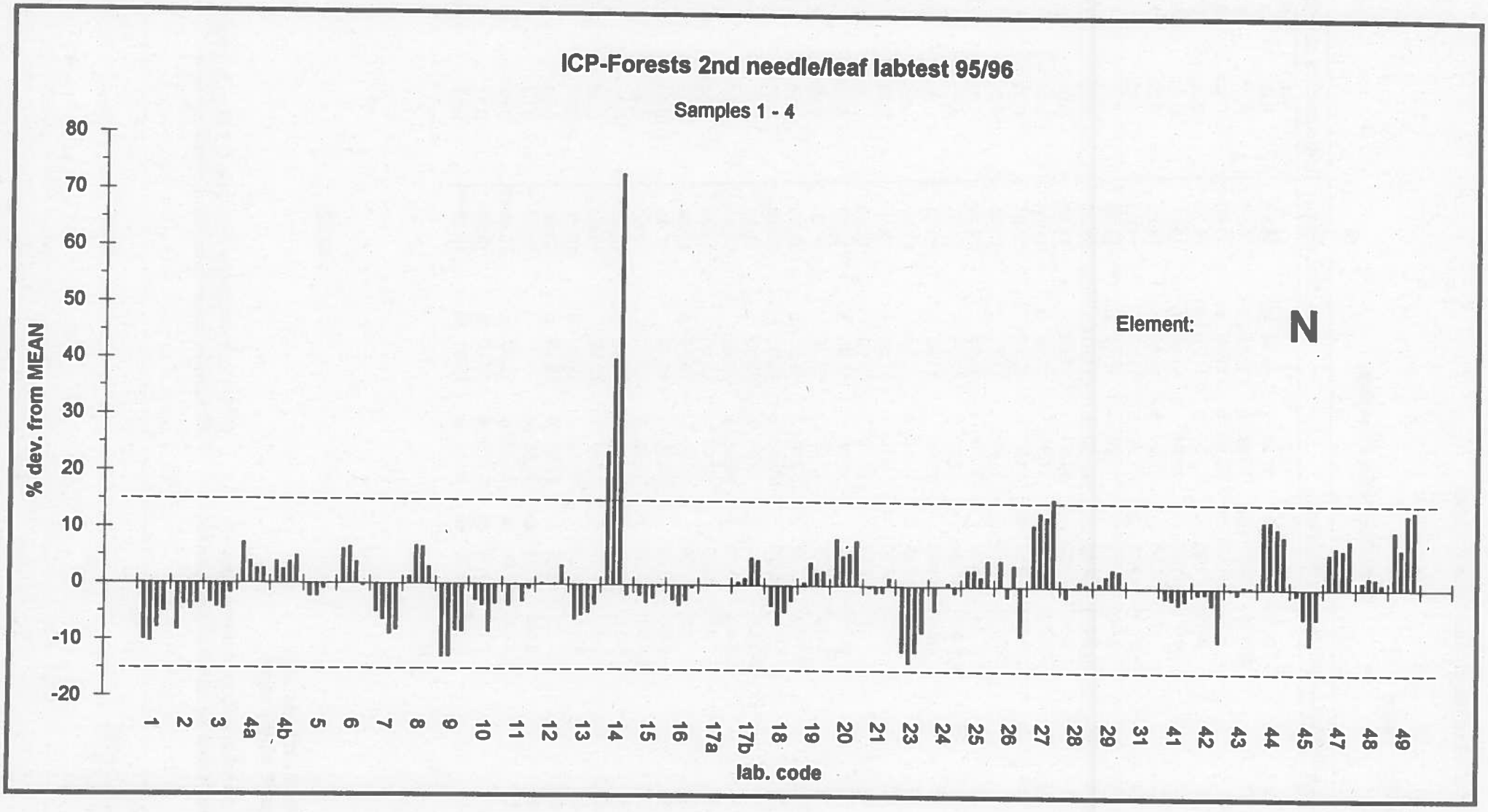
Code Numbers of Abbreviations of Pretreatments

0	No information
1	No pretreatment
2	Pellet
3	Wet ashing, digestion, no more information
3.1	Wet ashing, HNO_3
3.2	Wet ashing, HNO_3/H_2O_2
3.3	Wet ashing, $HNO_3/HClO_4$
3.4	Wet ashing, $HNO_3/HClO_4/CaCl_2$
3.5	Wet ashing, $HNO_3/HClO_4/H_2O_2$
3.6	Wet ashing, $H_2SO_4/HClO_4$
3.7	Wet ashing, H_2SO_4/HNO_3
3.8	Wet ashing, H_2SO_4/H_2O_2
3.9	Wet ashing, $H_2SO_4/HNO_3/HClO_4$
4	Pressure bomb
4.1	Pressure bomb, HNO_3,
4.2	Pressure bomb, $HNO_3/HClO_4$,
4.3	Pressure bomb, $HNO_3/HClO_4/HF$,
4.4	Pressure bomb, HNO_3/H_2O_2,
5	Microwave
5.1	Microwave, HNO_3,
5.2	Microwave, $HCLO_4/HNO_3$,
5.3	Microwave, HF/ HNO_3/H_2O_2,
5.4	Microwave, HNO_3/H_2O_2,
6	Dry ashing
6.1	Dry ashing, dissolution with HCl
6.2	Dry ashing, dissolution with HNO_3
6.3	Dry ashing, dissolution with H_2SO_4
6.4	Dry ashing, dissolution with HF/HCl
7	Oxygen ashing
7.1	Oxygen ashing, Schöniger
7.2	Oxygen ashing, Wickbold
7.3	Elementar-analyzer
8	Kjeldahl
8.1	Kjeldahl, H_2SO_4/ Se-catalyst
8.2	Kjeldahl, $H_2SO_4/K_2SO_4/CuSO_4$
8.3	Kjeldahl, H_2SO_4/ H_2O_2
8.4	Kjeldahl, $H_2SO_4/HClO_4$

Method Code

Code Numbers of Abbreviations of Methods

10	Elementar-analyzer
11	Dumas
12	IR
13	Leco
14	Kjeldahl-apparatus, Kjeltec/Tecator
15	N-Analysator (Heraeus)
15.1	N-Analysator (Vario EL)
20	AAS-flame technique
21	AAS-flameless technique
30	AES-flame technique
31	AES-ICP
32	AES-ICP+MS
40	RFA-energy dispersive
41	RFA-wavelength dispersive
50	UV-VIS spectrophotometry
51	FIAS
52	Indophenol-blue-method
53	Nessler-method
54	Molybdene-blue-method
55	Vanadium-Mo-blue-method
56	$BaCl_2$-method
57	Azomethin - H
58	Carmine
60	Ion-chromatography
61	Gas-chromatography
70	Titration
71	Turbidimetric titration
72	Conductivity titration
73	NH_4-back titration
74	Thiocyanate-titration
80	Polarography
90	K^{40}-Υ-spectroskopy


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
Element: N
% dev. from MEAN
80
70
60
50
40
30
20
10
0
-10
-20
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
23
24
25
26
27
28
29
31
41
42
43
44
45
47
48
49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: N
Dimension: mg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	9	8-70	10.64	a	10.81	a	9.94	ab	10.64	*	0.46	4.32
2	23	8.1-70	10.56	ab	10.97	a	10.80	a	10.80	*	0.21	1.94
3	1	8-	11.00	a	10.90	a	11.10	a	11.00	*	0.10	0.91
4	2	8-51	11.20		11.00	b	11.70	b	11.20		0.36	3.21
5	13	8-70	11.45		11.44		11.68	b	11.47		0.14	1.22
6	7	-13	11.60		12.00	b	11.60		11.62		0.23	1.98
7	24	8.2-14	12.00	b	11.40	b	11.70		11.70		0.30	2.56
8	11	8-70	11.74		11.74		11.97	b	11.76		0.13	1.11
9	18	8.3-51	11.80		11.60	b	11.80		11.78		0.12	1.02
10	3	7-10	11.80		11.81		11.80		11.80		0.01	0.08
11	10	8-70	11.89		11.91		11.64	b	11.88		0.15	1.26
12	16	8-70	10.86	b	11.91		12.00		11.91		0.63	5.29
13	5	8.1-73	11.90		11.97		11.97		11.95		0.04	0.33
14	15	8-14	11.99		11.99		12.05		12.00		0.04	0.33
15	28	8.3-5.2	11.84		12.02		12.05		12.01		0.11	0.92
16	41	-15.1	11.99		12.09		11.99		12.01		0.06	0.50
17	42	-11	11.40	b	12.40	b	12.10		12.10		0.51	4.21
18	45	-12	12.30	b	12.10		11.60	b	12.10		0.36	2.98
19	21	0	12.22		12.10		12.20		12.19		0.06	0.49
20	43	8-73	12.10		12.20		12.40	b	12.20		0.15	1.23
21	12	8-10	12.26		12.28		12.25		12.26		0.02	0.16
22	17b	8.1-50	12.30		12.41		11.36	b	12.30		0.58	4.72
23	19	-13	12.20		12.60	b	12.30		12.30		0.21	1.71
24	29	8-14.1	12.30		12.51	b	12.30		12.32		0.12	0.97
25	8	8-52	13.80	b	12.20	b	12.40		12.40		0.87	7.02
26	48	-15	12.40		12.40		12.40		12.40		0.00	0.00
27	25	-13	12.59		12.48		12.90	b	12.59		0.22	1.75
28	4b	8-52	12.70		12.70		12.70		12.70		0.00	0.00
29	26	8.4-53	12.30	b	13.20	b	12.80		12.80		0.45	3.52
30	6	6-61	13.00		13.00		12.60	b	12.98		0.23	1.77
31	47	-10	13.12		12.97		12.98		13.00		0.08	0.62
32	4a	7-15	13.23		13.11		12.90	b	13.11		0.17	1.30
33	20	0	13.25		13.56	b	12.95	b	13.25		0.31	2.34
34	49	8-50	13.10	ab	13.90	ab			13.50	*	0.57	4.22
35	27	8.2-14	13.60	a	13.57	a	13.57	a	13.58	*	0.02	0.15
36	44	-10	13.40	ab	13.70	a	13.70	a	13.68	*	0.17	1.24
37	14	8-70	12.00	ab	15.12	a	17.31	ab	15.12	**	2.67	17.66

Mean 12.23

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 12.25
New mean Lab 23: 11.54

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	23	8.1-70	9.88 a	10.18 ab	10.02 a	10.02 *	0.15	1.50
2	9	8-70	9.87 ab	10.14 a	10.14 a	10.11 *	0.16	1.58
3	1	8-	10.60 ab	10.40 a	10.30 a	10.40 *	0.15	1.44
4	18	8.3-51	10.80	11.10 b	10.70	10.80	0.21	1.94
5	7	-13	10.70 b	10.90	10.90	10.87	0.12	1.10
6	13	8-70	10.96	10.92	11.07	10.97	0.08	0.73
7	45	-12	10.60 b	11.10	11.00	11.00	0.26	2.36
8	3	7-10	11.08	11.09	11.19	11.12	0.06	0.54
9	2	8-51	11.20	11.10	11.20	11.17	0.06	0.54
10	10	8-70	11.11	11.17	11.23	11.17	0.06	0.54
11	16	8-70	11.27	11.19	10.94 b	11.19	0.17	1.52
12	15	8-14	11.26	11.13	11.28	11.24	0.08	0.71
13	5	8.1-73	11.34	11.34	11.34	11.34	0.00	0.00
14	41	-15.1	11.16 b	11.48	11.36	11.36	0.16	1.41
15	26	8.4-53	11.60 b	11.20 b	11.40	11.40	0.20	1.75
16	21	0	11.50	11.50	11.40	11.47	0.06	0.52
17	42	-11	12.40 b	11.40	11.50	11.50	0.55	4.78
18	43	8-73	11.30 b	11.60	11.50	11.50	0.15	1.30
19	24	8.2-14	11.80 b	11.40 b	11.60	11.60	0.20	1.72
20	12	8-10	11.68	11.61	11.54	11.61	0.07	0.60
21	11	8-70	11.64	11.50	11.66	11.62	0.09	0.77
22	28	8.3-5.2	11.66	11.61	11.58	11.62	0.04	0.34
23	17b	8.1-50	11.24 b	11.76	12.07 b	11.76	0.42	3.57
24	29	8-14.1	11.87	11.84	11.81	11.84	0.03	0.25
25	48	-15	11.80	11.90	11.90	11.87	0.06	0.51
26	4b	8-52	11.90	11.90	11.90	11.90	0.00	0.00
27	25	-13	11.95	11.63 b	12.16 b	11.95	0.27	2.26
28	4a	7-15	12.10	12.10	12.00	12.07	0.06	0.50
29	19	-13	11.70 b	12.10	12.20	12.10	0.26	2.15
30	20	0	12.54 b	12.23	12.13	12.23	0.21	1.72
31	6	6-61	12.40	12.40	12.10 b	12.37	0.17	1.37
32	8	8-52	12.50	11.50 b	12.40	12.40	0.55	4.44
33	49	8-50	11.60 b	13.30 b		12.45	1.20	9.64
34	47	-10	12.48	12.51	12.45	12.48	0.03	0.24
35	44	-10	13.00 a	12.90 a	13.10 a	13.00 *	0.10	0.77
36	27	8.2-14	13.14 a	13.14 a	13.13 a	13.14 *	0.01	0.08
37	14	8-70	11.10 ab	16.28 a	18.00 ab	16.28 **	3.59	22.05

Mean 11.61

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

*** =not tolerable because more than +/-** **10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/-** **15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 11.55
New mean Lab 23: 11.39

ICP-Forests 2nd needle/leaf labtest 95/96

Element: N
Dimension: mg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	23	8.1-70	10.28 a	10.37 a	10.18 a	10.28 *	0.10	0.97
2	45	-12	9.70 ab	10.60 a	10.50 a	10.50	0.49	4.67
3	7	-13	10.80 b	10.60	10.50	10.60	0.15	1.42
4	10	8-70	10.66	10.61	10.80 b	10.66	0.10	0.94
5	9	8-70	10.68	10.22 b	10.84 b	10.68	0.32	3.00
6	1	8-	10.80	10.70	10.70	10.72	0.06	0.56
7	13	8-70	10.96	11.12	11.07	11.07	0.08	0.72
8	2	8-51	11.10	11.30 b	11.00	11.10	0.15	1.35
9	18	8.3-51	10.70 b	11.10	11.20	11.10	0.26	2.34
10	3	7-10	11.14	11.13	11.04	11.11	0.06	0.54
11	11	8-70	11.33	11.29	11.19	11.29	0.07	0.62
12	42	-11	11.30	11.60 b	11.00 b	11.30	0.30	2.65
13	41	-15.1	11.31	11.41	10.91 b	11.31	0.26	2.30
14	16	8-70	11.35	11.29	11.35	11.33	0.03	0.26
15	15	8-14	11.37	11.35	11.39	11.37	0.02	0.18
16	21	0	11.50	11.50	11.60	11.52	0.06	0.52
17	5	8.1-73	11.55	11.55	11.48	11.53	0.04	0.35
18	12	8-10	11.73	11.67	11.47 b	11.67	0.14	1.20
19	43	8-73	11.70	11.30 b	11.80	11.70	0.26	2.22
20	24	8.2-14	11.80	11.70	11.70	11.72	0.06	0.51
21	28	8.3-5.2	11.52 b	11.77	11.83	11.77	0.16	1.36
22	25	-13	11.86	11.86	11.86	11.86	0.00	0.00
23	48	-15	11.90	11.80	11.90	11.88	0.06	0.51
24	19	-13	11.90	12.00	11.90	11.92	0.06	0.50
25	4a	7-15	12.01	11.93	11.92	11.95	0.05	0.42
26	29	8-14.1	12.01	12.05	12.04	12.03	0.02	0.17
27	4b	8-52	12.10	12.10	12.10	12.10	0.00	0.00
28	6	6-61	12.20	12.10	11.70 b	12.10	0.26	2.15
29	26	8.4-53	11.80 b	12.10	12.40 b	12.10	0.30	2.48
30	17b	8.1-50	12.21	12.21	12.52 b	12.23	0.18	1.47
31	20	0	12.34	12.34	12.13 b	12.32	0.12	0.97
32	8	8-52	12.90 b	12.40	12.40	12.42	0.29	2.33
33	47	-10	12.55	12.43	12.47	12.47	0.06	0.48
34	44	-10	12.70 ab	12.90 a	13.10 ab	12.90 *	0.20	1.55
35	27	8.2-14	13.08 a	13.15 a	13.10 a	13.11 *	0.04	0.31
36	49	8-50	12.80 ab	13.60 ab		13.20 *	0.57	4.32
37	14	8-70	20.18 a	22.34 ab	19.48 ab	20.18 **	1.49	7.38

Mean 11.65

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

*** =not tolerable because more than +/-** **10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/-** **15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 11.61
New mean Lab 23: 11.43

ICP-Forests 2nd needle/leaf labtest 95/96

Element: N
Dimension: mg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

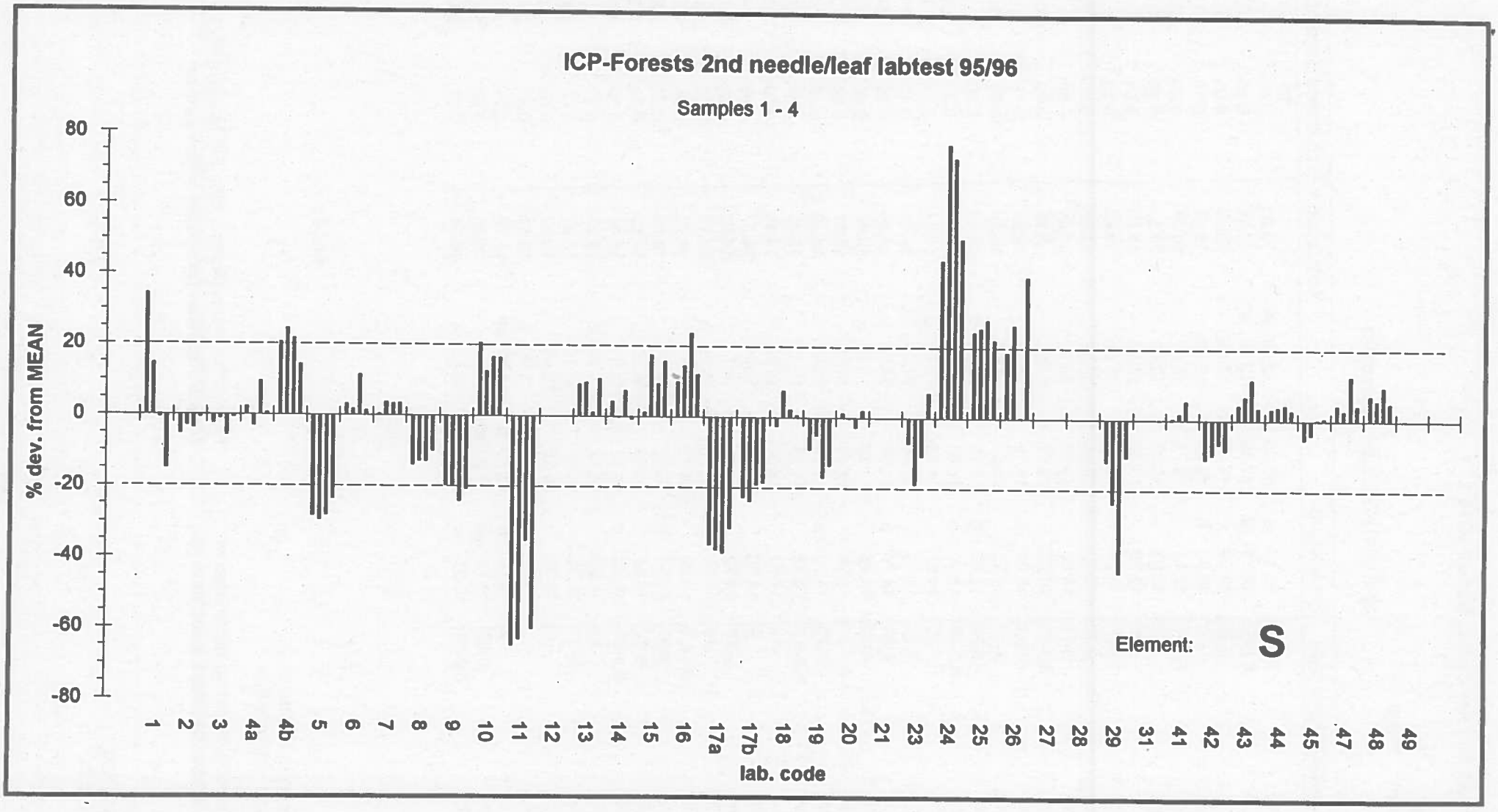
No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	42	-11	13.10 a	13.00 a	12.40 ab	13.00	0.38	2.92
2	26	8.4-53	13.60 ab	12.30 ab	13.10 a	13.10	0.66	5.04
3	9	8-70	13.09	13.13	13.19	13.14	0.05	0.38
4	7	-13	13.00 b	13.20	13.20	13.17	0.12	0.91
5	23	8.1-70	13.25	12.71 b	13.17	13.17	0.29	2.20
6	45	-12	13.00 b	13.90 b	13.60	13.60	0.46	3.38
7	1	8-	13.70	13.60	13.60	13.63	0.06	0.44
8	2	8-51	14.00 b	13.80	13.80	13.83	0.12	0.87
9	10	8-70	13.72	14.01 b	13.86	13.86	0.15	1.08
10	13	8-70	13.88	13.76	13.90	13.86	0.08	0.58
11	18	8.3-51	14.00	13.60 b	14.00	13.97	0.23	1.65
12	41	-15.1	13.84 b	14.15	14.04	14.04	0.16	1.14
13	3	7-10	14.15	14.09	14.06	14.10	0.05	0.35
14	14	8-70	13.80 b	14.10	14.50 b	14.10	0.35	2.48
15	24	8.2-14	14.40 b	14.00 b	14.20	14.20	0.20	1.41
16	11	8-70	14.27	14.26	13.88 b	14.24	0.22	1.54
17	16	8-70	14.29	14.16	14.38	14.29	0.11	0.77
18	6	6-61	14.70 b	14.30	14.00 b	14.30	0.35	2.45
19	15	8-14	14.26	14.36	14.28	14.30	0.05	0.35
20	5	8.1-73	14.35	14.42	14.35	14.37	0.04	0.28
21	43	8-73	14.70 b	14.20 b	14.40	14.40	0.25	1.74
22	28	8.3-5.2	14.56	14.38	14.42	14.43	0.09	0.62
23	48	-15	14.50	14.50	14.50	14.50	0.00	0.00
24	21	0	14.60	14.60	14.50	14.57	0.06	0.41
25	4a	7-15	14.72	14.72	14.74	14.73	0.01	0.07
26	19	-13	14.70	14.70	14.90 b	14.73	0.12	0.81
27	29	8-14.1	14.84	14.72	14.80	14.79	0.06	0.41
28	8	8-52	14.50 b	14.90	14.80	14.80	0.21	1.42
29	12	8-10	14.84	14.89	14.85	14.86	0.03	0.20
30	17b	8.1-50	15.43 b	14.80 b	15.01	15.01	0.32	2.13
31	25	-13	15.03	14.72 b	15.24 b	15.03	0.26	1.73
32	4b	8-52	15.00	15.10	15.10	15.07	0.06	0.40
33	20	0	15.55	15.55	15.45	15.52	0.06	0.39
34	47	-10	15.57 a	15.70 a	15.60 a	15.61	0.07	0.45
35	44	-10	15.80 a	15.70 a	15.40 ab	15.70	0.21	1.34
36	49	8-50	15.70 ab	17.00 ab		16.35 *	0.92	5.63
37	27	8.2-14	16.61 a	16.61 a	16.60 a	16.61 **	0.01	0.06

Mean 14.36

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 14.37
New mean Lab 23: 11.54


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
80
60
40
20
0
-20
-40
-60
-80
Element: S
1
2
3
4a
4b
5
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17a
17b
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lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: S
Dimension: mg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	11	6.1-50	0.32 ab	0.36 a	0.38 a	0.36 **	0.03	8.33
2	17a	7.1-50	0.75 ab	0.64 a	0.65 a	0.66 **	0.06	9.09
3	5	6-71	0.70 ab	0.75 a	0.75 a	0.74 **	0.03	4.05
4	17b	5.4-31	0.82	0.79	0.79	0.80 **	0.02	2.50
5	9	6-60	0.84	0.82	0.82	0.83 *	0.01	1.20
6	8	3.3-31	0.88	0.90	0.89	0.89	0.01	1.12
7	29	-13	0.89	0.91	0.96 b	0.91	0.04	4.40
8	42	7.2-60	0.93	0.91	0.92	0.92	0.01	1.09
9	19	10	0.98 b	0.93	0.92	0.94	0.03	3.19
10	23	3.3-50	1.04 b	0.96	0.93 b	0.96	0.06	6.25
11	2	5.2-31	0.98	1.03 b	0.96	0.98	0.04	4.08
12	45	4.3-31	0.98	0.98	0.98	0.98	0.00	0.00
13	3	7-12	1.03	1.01	0.99	1.01	0.02	1.98
14	18	3-31	1.00	1.00	1.10 b	1.01	0.06	5.94
15	7	3.2-31	1.05	1.04	1.03	1.04	0.01	0.96
16	41	4.1-31	1.05	1.04	1.04	1.04	0.01	0.96
17	15	6-13	1.07	1.05	1.04	1.05	0.02	1.90
18	20	0	1.05	1.03	1.08 b	1.05	0.03	2.86
19	4a	2-40	1.08	1.05	1.06	1.06	0.02	1.89
20	6	5.3-31	1.07	1.07	1.08	1.07	0.01	0.93
21	44	4.1-31	1.08	1.06	1.07	1.07	0.01	0.93
22	14	3-31	1.07	1.08	1.10	1.08	0.02	1.85
23	43	4.1-31	1.06	1.08	1.11 b	1.08	0.03	2.78
24	47	4.1-31	1.09	1.08	1.06	1.08	0.02	1.85
25	48	4.1-31	1.42 b	1.10	1.10	1.11	0.18	16.22
26	13	6-72	1.13	1.15	1.11	1.13	0.02	1.77
27	16	3.4-50	1.21 b	1.06 b		1.14	0.11	9.65
28	26	3.1-32	1.23	1.20 b	1.30 b	1.23 *	0.05	4.07
29	4b	2-41	1.25	1.25	1.26	1.25 **	0.01	0.80
30	10	3.3-71	1.25	1.24	1.25	1.25 **	0.01	0.80
31	25	-13	1.28 a	1.27 a	1.32 ab	1.29 **	0.03	2.33
32	1	-13	1.49 ab	1.39 a	1.31 ab	1.39 **	0.09	6.47
33	24	3.2-71	1.49 a	1.51 a	1.50 a	1.50 **	0.01	0.67

Mean **1.036**

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

*** =not tolerable because more than +/- 15 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **1.03**
New mean Lab 24: 1.24

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	11	6.1-50	0.37 a	0.36 a	0.41 ab	0.37 **	0.03	8.11
2	17a	7.1-50	0.63 a	0.73 ab	0.62 a	0.63 **	0.06	9.52
3	5	6-71	0.75 ab	0.70 a	0.70 a	0.71 **	0.03	4.23
4	17b	5.4-31	0.79 b	0.76	0.77	0.77 **	0.02	2.60
5	29	-13	0.76	0.78	0.78	0.77 **	0.01	1.30
6	9	6-60	0.80	0.81	0.81	0.81 *	0.01	1.23
7	23	3.3-50	0.79 b	0.82	0.83	0.82 *	0.02	2.44
8	8	3.3-31	0.89	0.88	0.80 b	0.88	0.05	5.68
9	42	7.2-60	0.92	0.90	0.90	0.91	0.01	1.10
10	19	10	0.99 b	0.94 b	0.96	0.96	0.03	3.13
11	45	4.3-31	0.96	0.97	0.98	0.97	0.01	1.03
12	2	5.2-31	0.99	0.98	0.96 b	0.98	0.02	2.04
13	4a	2-40	0.97	0.97	1.00 b	0.98	0.02	2.04
14	3	7-12	1.01	0.98 b	1.01	1.00	0.02	2.00
15	14	3-31	0.98 b	1.01	1.03 b	1.01	0.03	2.97
16	20	0	1.01	1.00	1.01	1.01	0.01	0.99
17	6	5.3-31	1.01 b	1.03	1.09 b	1.03	0.04	3.88
18	41	4.1-31	1.03	1.03	1.03	1.03	0.00	0.00
19	47	4.1-31	1.04	1.04	1.05	1.04	0.01	0.96
20	7	3.2-31	1.05	1.05	1.04	1.05	0.01	0.95
21	44	4.1-31	1.04	1.04	1.06	1.05	0.01	0.95
22	48	4.1-31	1.06	1.08	1.08	1.07	0.01	0.93
23	43	4.1-31	1.07	1.08	1.08	1.08	0.01	0.93
24	18	3-31	1.10	1.10	1.00 b	1.09	0.06	5.50
25	13	6-72	1.11	1.10	1.12	1.11	0.01	0.90
26	10	3.3-71	1.14	1.14	1.14	1.14	0.00	0.00
27	1	-13	1.24 b	1.14 b	1.16	1.16	0.05	4.31
28	16	3.4-50	1.30 b	1.01 b		1.16	0.21	18.10
29	15	6-13	1.23 b	1.19	1.14 b	1.19 *	0.05	4.20
30	4b	2-41	1.25	1.27	1.26	1.26 **	0.01	0.79
31	25	-13	1.26	1.27	1.28	1.27 **	0.01	0.79
32	26	3.1-32	1.28	1.25 b	1.30 b	1.28 **	0.03	2.34
33	24	3.2-71	1.92 ab	1.79 a	1.80 a	1.80 **	0.07	3.89

Mean 1.012

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

*** =not tolerable because more than +/- 15 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 0.99
New mean Lab 24: 1.58

ICP-Forests 2nd needle/leaf labtest 95/96

Element: S
Dimension: mg/g
Sample: 3 QUERCUS ILEX (Spain)

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	29	-13	0.58 ab	0.53 a	0.54 a	0.55 **	0.03	5.45
2	17a	7.1-50	0.64 ab	0.56 ab	0.60 a	0.60 **	0.04	6.67
3	11	6.1-50	0.56 ab	0.67 ab	0.63 a	0.63 **	0.06	9.52
4	5	6-71	0.70 a	0.70 a	0.70 a	0.70 **	0.00	0.00
5	9	6-60	0.75	0.73	0.74	0.74 **	0.01	1.35
6	17b	5.4-31	0.79	0.76 b	0.84 b	0.79 *	0.04	5.06
7	19	10	0.81	0.86 b	0.74 b	0.81 *	0.06	7.41
8	8	3.3-31	0.83	0.85	0.88 b	0.85	0.03	3.53
9	23	3.3-50	0.86	0.85	0.92 b	0.87	0.04	4.60
10	42	7.2-60	0.92	0.92	0.90	0.91	0.01	1.10
11	3	7-12	0.93	0.89 b	0.94	0.92	0.03	3.26
12	2	5.2-31	0.94	0.98 b	0.92	0.94	0.03	3.19
13	20	0	0.96	0.95	0.95	0.95	0.01	1.05
14	1	-13	0.92 b	1.03 b	0.97	0.97	0.06	6.19
15	26	3.1-32	0.98	1.00	0.95 b	0.98	0.03	3.06
16	45	4.3-31	0.98	0.98	0.98	0.98	0.00	0.00
17	13	6-72	0.99	1.00	0.97	0.99	0.02	2.02
18	18	3-31	1.00	1.00	1.00	1.00	0.00	0.00
19	7	3.2-31	0.99	1.03	1.01	1.01	0.02	1.98
20	44	4.1-31	1.03	1.02	1.01	1.02	0.01	0.98
21	41	4.1-31	1.02	1.03	1.03	1.03	0.01	0.97
22	14	3-31	1.00 b	1.06	1.07	1.05	0.04	3.81
23	4a	2-40	1.08	1.06	1.06	1.07	0.01	0.93
24	15	6-13	1.17 b	1.07	1.01 b	1.07	0.08	7.48
25	48	4.1-31	1.07	1.07	1.08	1.07	0.01	0.93
26	6	5.3-31	1.07	1.08	1.16 b	1.09	0.05	4.59
27	43	4.1-31	1.09	1.08	1.09	1.09	0.01	0.92
28	47	4.1-31	1.09	1.11	1.10	1.10	0.01	0.91
29	10	3.3-71	1.13	1.14	1.14	1.14 *	0.01	0.88
30	4b	2-41	1.18	1.19	1.19	1.19 **	0.01	0.84
31	16	3.4-50	1.38 b	1.04 b		1.21 **	0.24	19.83
32	25	-13	1.22 ab	1.26 a	1.27 a	1.25 **	0.03	2.40
33	24	3.2-71	1.55 ab	1.80 ab	1.70 a	1.70 **	0.13	7.65

Mean 0.9775

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

*** =not tolerable because more than +/-** 15 % from mean (As-minutes 8-9 March 1994)
**** =not tolerable because more than +/-** 20 % from mean (proposal of the author)

Annotation:
Mean acc. ISO 5725 0.95
New mean Lab 24: 1.11

ICP-Forests 2nd needle/leaf labtest 95/96

Element: S
Dimension: mg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

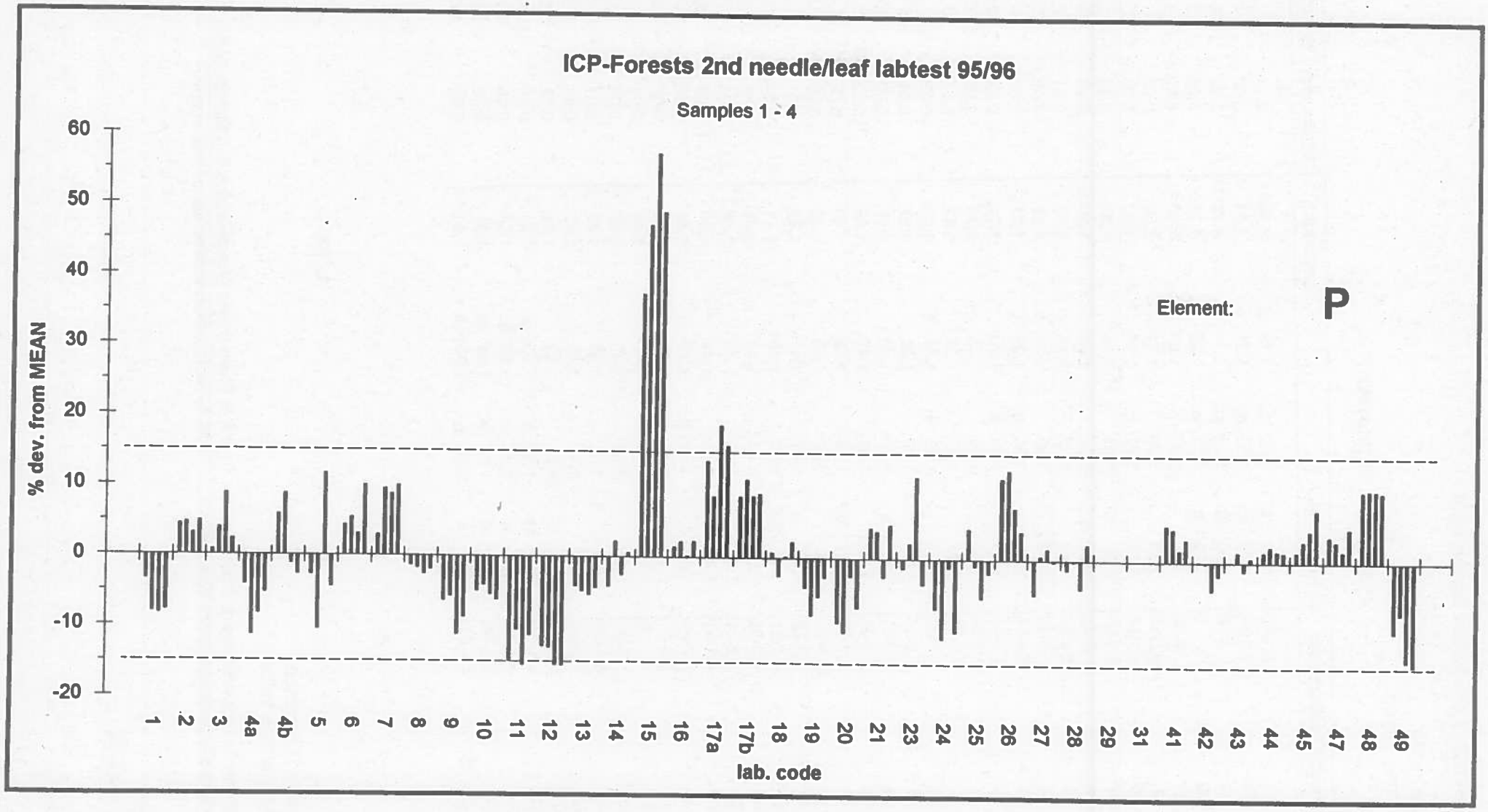
No.	Lab.code	Method code	Replications				Lab.mean	Lab.standard deviation	
								abs.	rel.%
1	11	6.1-50	0.49 ab	0.57 a	0.55 a		0.55 **	0.04	7.27
2	17a	7.1-50	0.92 a	0.95 a	1.02 ab		0.95 **	0.05	5.26
3	5	6-71	1.05 a	1.05 a	1.13 ab		1.06 **	0.05	4.72
4	9	6-60	1.10	1.08	1.13		1.10 **	0.03	2.73
5	17b	5.4-31	1.13	1.11	1.14		1.13 *	0.02	1.77
6	1	-13	1.16	1.17	1.22 b		1.18 *	0.03	2.54
7	19	10	1.25 b	1.20	1.11 b		1.20	0.07	5.83
8	29	-13	1.24	1.28 b	1.21		1.24	0.04	3.23
9	8	3.3-31	1.24	1.28 b	1.23		1.25	0.03	2.40
10	42	7.2-60	1.27	1.27	1.28		1.27	0.01	0.79
11	2	5.2-31	1.39	1.38	1.38		1.38	0.01	0.72
12	3	7-12	1.42 b	1.36	1.38		1.38	0.03	2.17
13	14	3-31	1.33 b	1.38	1.42 b		1.38	0.05	3.62
14	41	4.1-31	1.38	1.38	1.40		1.39	0.01	0.72
15	4a	2-40	1.39	1.39	1.42		1.40	0.02	1.43
16	18	3-31	1.40	1.40	1.40		1.40	0.00	0.00
17	45	4.3-31	1.40	1.38	1.41		1.40	0.02	1.43
18	6	5.3-31	1.40	1.40	1.49 b		1.41	0.05	3.55
19	20	0	1.39	1.45	1.42		1.42	0.03	2.11
20	44	4.1-31	1.44	1.44	1.42		1.43	0.01	0.70
21	7	3.2-31	1.43	1.45	1.44		1.44	0.01	0.69
22	43	4.1-31	1.44	1.46	1.43		1.44	0.02	1.39
23	47	4.1-31	1.45	1.44	1.45		1.45	0.01	0.69
24	48	4.1-31	1.46	1.46	1.46		1.46	0.00	0.00
25	23	3.3-50	1.50	1.50	1.46		1.49	0.02	1.34
26	13	6-72	1.51	1.54	1.56		1.54	0.03	1.95
27	16	3.4-50	1.60 b	1.52 b			1.56	0.06	3.85
28	4b	2-41	1.58	1.59	1.59		1.59	0.01	0.63
29	15	6-13	1.56 b	1.61	1.67 b		1.61 *	0.06	3.73
30	10	3.3-71	1.67 b	1.56 b	1.62		1.62 *	0.06	3.70
31	25	-13	1.72 a	1.71 a	1.68 a		1.70 **	0.02	1.18
32	26	3.1-32	1.90 ab	2.02 ab	1.95 a		1.95 **	0.06	3.08
33	24	3.2-71	2.07 a	2.10 a	2.20 ab		2.10 **	0.07	3.33

Mean 1.391

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

*** =not tolerable because more than +/- 15 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 1.39
New mean Lab 24: 2.1


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
Element: P
% dev. from MEAN
60
50
40
30
20
10
0
-10
-20
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
23
24
25
26
27
28
29
31
41
42
43
44
45
47
48
49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: P
Dimension: mg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	11	6.1-50	1.18 a	1.17 a	1.18 a	1.18 **	0.01	0.85
2	12	5.1-54	1.28 ab	1.17 ab	1.21 a	1.21 *	0.06	4.96
3	49	6-50	1.30 ab	1.20 ab		1.25 *	0.07	5.60
4	20	0	1.23 b	1.31 b	1.26	1.26	0.04	3.17
5	24	6-50	1.30	1.27 b	1.30	1.29	0.02	1.55
6	9	6.2-50	1.30	1.28	1.31	1.30	0.02	1.54
7	10	6.1-55	1.33	1.27 b	1.33	1.32	0.03	2.27
8	27	6.1-55	1.36 b	1.31	1.32	1.32	0.03	2.27
9	4a	2-40	1.32	1.34	1.34	1.33	0.01	0.75
10	13	3.3-54	1.32	1.32	1.34	1.33	0.01	0.75
11	14	3-31	1.32	1.33	1.37 b	1.33	0.03	2.26
12	19	5.4-54	1.33	1.36 b	1.29 b	1.33	0.04	3.01
13	1	3.6-50	1.35	1.29 b	1.35	1.34	0.03	2.24
14	5	6-54	1.34	1.34	1.46 b	1.35	0.07	5.19
15	8	3.2-31	1.36	1.37	1.38	1.37	0.01	0.73
16	23	6.1-31	1.37	1.43 b	1.32 b	1.37	0.06	4.38
17	28	8.3-54	1.37	1.37	1.38	1.37	0.01	0.73
18	42	6.1-31	1.37 b	1.40	1.40	1.39	0.02	1.44
19	43	4.1-31	1.37	1.39	1.40	1.39	0.02	1.44
20	3	3.7-31	1.43 b	1.39	1.39	1.40	0.02	1.43
21	18	3.8-51	1.40	1.40	1.40	1.40	0.00	0.00
22	16	3.8-50	1.40	1.41	1.41	1.41	0.01	0.71
23	44	4.1-31	1.47 b	1.40	1.40	1.41	0.04	2.84
24	45	4.3-31	1.55 b	1.41	1.40	1.41	0.08	5.67
25	7	3.2-31	1.44	1.43	1.42	1.43	0.01	0.70
26	47	4.1-31	1.45	1.44	1.44	1.44	0.01	0.69
27	2	5.2-31	1.45	1.50 b	1.40 b	1.45	0.05	3.45
28	6	5.3-31	1.45	1.43	1.54 b	1.45	0.06	4.14
29	21	0	1.46	1.45	1.45	1.45	0.01	0.69
30	25	5-31	1.44	1.45	1.45	1.45	0.01	0.69
31	41	4.1-31	1.47	1.45	1.45	1.46	0.01	0.68
32	4b	2-41	1.46	1.47	1.48	1.47	0.01	0.68
33	17b	5.4-31	1.48 b	1.51	1.52	1.51	0.02	1.32
34	48	4.1-31	1.97 ab	1.52 a	1.53 a	1.53 *	0.26	16.99
35	26	3.1-32	1.55 a	1.60 ab	1.50 ab	1.55 *	0.05	3.23
36	17a	6.1-54	1.47 ab	1.58 a	1.62 ab	1.58 *	0.08	5.06
37	15	4.4-50	1.90 a	1.90 a	1.93 ab	1.91 **	0.02	1.05

Mean 1.389

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

*** =not tolerable because more than +/-** 10 % from mean (As-minutes 8-9 March 1994)
**** =not tolerable because more than +/-** 15 % from mean (proposal of the author)

Annotation:
Mean acc. ISO 5725 1.39

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	12	5.1-54	1.03 ab	1.08 a	1.17 ab	1.08 *	0.07	6.48
2	4a	2-40	1.12	1.10	1.09	1.10 *	0.02	1.82
3	24	6-50	1.10	1.09	1.10	1.10 *	0.01	0.91
4	5	6-54	1.01 b	1.12	1.12	1.11 *	0.06	5.41
5	11	6.1-50	1.11	1.07 b	1.12	1.11 *	0.03	2.70
6	20	0	1.11	1.10	1.11	1.11 *	0.01	0.90
7	1	3.6-50	1.14	1.08 b	1.15	1.14	0.04	3.51
8	19	5.4-54	1.14	1.13	1.16	1.14	0.02	1.75
9	49	6-50	1.10 b	1.20 b		1.15	0.07	6.09
10	9	6.2-50	1.13 b	1.17	1.18	1.17	0.03	2.56
11	13	3.3-54	1.19	1.19	1.17	1.18	0.01	0.85
12	10	6.1-55	1.20	1.20	1.18	1.19	0.01	0.84
13	18	3.8-51	1.20	1.30 b	1.20	1.21	0.06	4.96
14	8	3.2-31	1.22	1.22	1.23	1.22	0.01	0.82
15	25	5-31	1.25	1.23	1.22	1.23	0.02	1.63
16	28	8.3-54	1.23	1.24	1.24	1.24	0.01	0.81
17	42	6.1-31	1.24	1.24	1.24	1.24	0.00	0.00
18	27	6.1-55	1.26	1.26	1.06 b	1.25	0.12	9.60
19	43	4.1-31	1.25	1.26	1.27	1.26	0.01	0.79
20	14	3-31	1.24 b	1.27	1.29	1.27	0.03	2.36
21	16	3.8-50	1.26	1.28	1.27	1.27	0.01	0.79
22	23	6.1-31	1.26	1.26	1.31 b	1.27	0.03	2.36
23	44	4.1-31	1.26	1.26	1.28	1.27	0.01	0.79
24	45	4.3-31	1.27	1.28	1.28	1.28	0.01	0.78
25	47	4.1-31	1.28	1.30	1.25 b	1.28	0.03	2.34
26	3	3.7-31	1.31	1.29	1.25 b	1.29	0.03	2.33
27	21	0	1.29	1.33 b	1.27	1.29	0.03	2.33
28	2	5.2-31	1.29	1.32 b	1.29	1.30	0.02	1.54
29	41	4.1-31	1.30	1.30	1.31	1.30	0.01	0.77
30	6	5.3-31	1.30	1.30	1.36 b	1.31	0.03	2.29
31	4b	2-41	1.33	1.37	1.35	1.35	0.02	1.48
32	17a	6.1-54	1.34	1.34	1.44 b	1.35	0.06	4.44
33	7	3.2-31	1.33 b	1.36	1.40 b	1.36	0.04	2.94
34	48	4.1-31	1.36	1.37	1.37	1.37 *	0.01	0.73
35	17b	5.4-31	1.35 b	1.38	1.44 b	1.38 *	0.05	3.62
36	26	3.1-32	1.40 a	1.37 ab	1.42 a	1.40 *	0.03	2.14
37	15	4.4-50	1.83 a	1.84 a	1.82 a	1.83 **	0.01	0.55

Mean 1.242

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 1.24

ICP-Forests 2nd needle/leaf labtest 95/96

Element: P
Dimension: mg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	11	6.1-50	0.59 a	0.59 a	0.52 ab	0.59 **	0.04	6.78
2	12	5.1-54	0.58 ab	0.61 ab		0.59 **	0.02	3.39
3	49	6-50	0.60 a	0.60 a		0.60 *	0.00	0.00
4	9	6.2-50	0.62	0.62	0.64 b	0.62 *	0.01	1.61
5	1	3.6-50	0.64	0.63 b	0.64	0.64	0.01	1.56
6	4a	2-40	0.63 b	0.65 b	0.64	0.64	0.01	1.56
7	10	6.1-55	0.69 b	0.66	0.64 b	0.66	0.03	4.55
8	13	3.3-54	0.76 b	0.66	0.66	0.66	0.06	9.09
9	19	5.4-54	0.66	0.65 b	0.68 b	0.66	0.02	3.03
10	25	5-31	0.67 b	0.66	0.66	0.66	0.01	1.52
11	28	8.3-54	0.69 b	0.66 b	0.67	0.67	0.02	2.99
12	42	6.1-31	0.67	0.67	0.68 b	0.67	0.01	1.49
13	8	3.2-31	0.68	0.69 b	0.68	0.68	0.01	1.47
14	14	3-31	0.68	0.67 b	0.69 b	0.68	0.01	1.47
15	20	0	0.68	0.67 b	0.68	0.68	0.01	1.47
16	21	0	0.66 b	0.68	0.71 b	0.68	0.03	4.41
17	4b	2-41	0.69	0.70 b	0.69	0.69	0.01	1.45
18	24	6-50	0.68 b	0.70 b	0.69	0.69	0.01	1.45
19	43	4.1-31	0.70 b	0.69	0.69	0.69	0.01	1.45
20	16	3.8-50	0.72 b	0.70	0.70	0.70	0.01	1.43
21	18	3.8-51	0.70	0.70	0.70	0.70	0.00	0.00
22	27	6.1-55	0.72 b	0.70 b	0.71	0.71	0.01	1.41
23	41	4.1-31	0.71	0.71	0.72 b	0.71	0.01	1.41
24	44	4.1-31	0.72 b	0.71	0.69 b	0.71	0.02	2.82
25	47	4.1-31	0.70 b	0.71	0.71	0.71	0.01	1.41
26	2	5.2-31	0.72	0.72	0.75 b	0.72	0.02	2.78
27	6	5.3-31	0.72	0.72	0.69 b	0.72	0.02	2.78
28	45	4.3-31	0.73	0.73	0.73	0.73	0.00	0.00
29	26	3.1-32	0.71 b	0.75	0.80 b	0.75	0.05	6.67
30	3	3.7-31	0.76	0.76	0.71 b	0.76	0.03	3.95
31	7	3.2-31	0.73 b	0.76	0.76	0.76	0.02	2.63
32	17b	5.4-31	0.76	0.87 b	0.73 b	0.76	0.07	9.21
33	48	4.1-31	0.77	0.77	0.78 b	0.77 *	0.01	1.30
34	5	6-54	0.78	0.82 b	0.78	0.78 *	0.02	2.56
35	23	6.1-31	0.78	0.78	0.88 b	0.78 *	0.06	7.69
36	17a	6.1-54	0.83 a	0.83 a	0.73 ab	0.83 **	0.06	7.23
37	15	4.4-50	1.10 a	1.07 ab	1.10 a	1.10 **	0.02	1.82

Mean 0.6985

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

*** =not tolerable because more than +/-** 10 % from mean (As-minutes 8-9 March 1994)
**** =not tolerable because more than +/-** 15 % from mean (proposal of the author)

Annotation:
Mean acc. ISO 5725 0.7

ICP-Forests 2nd needle/leaf labtest 95/96

Element: P
Dimension: mg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

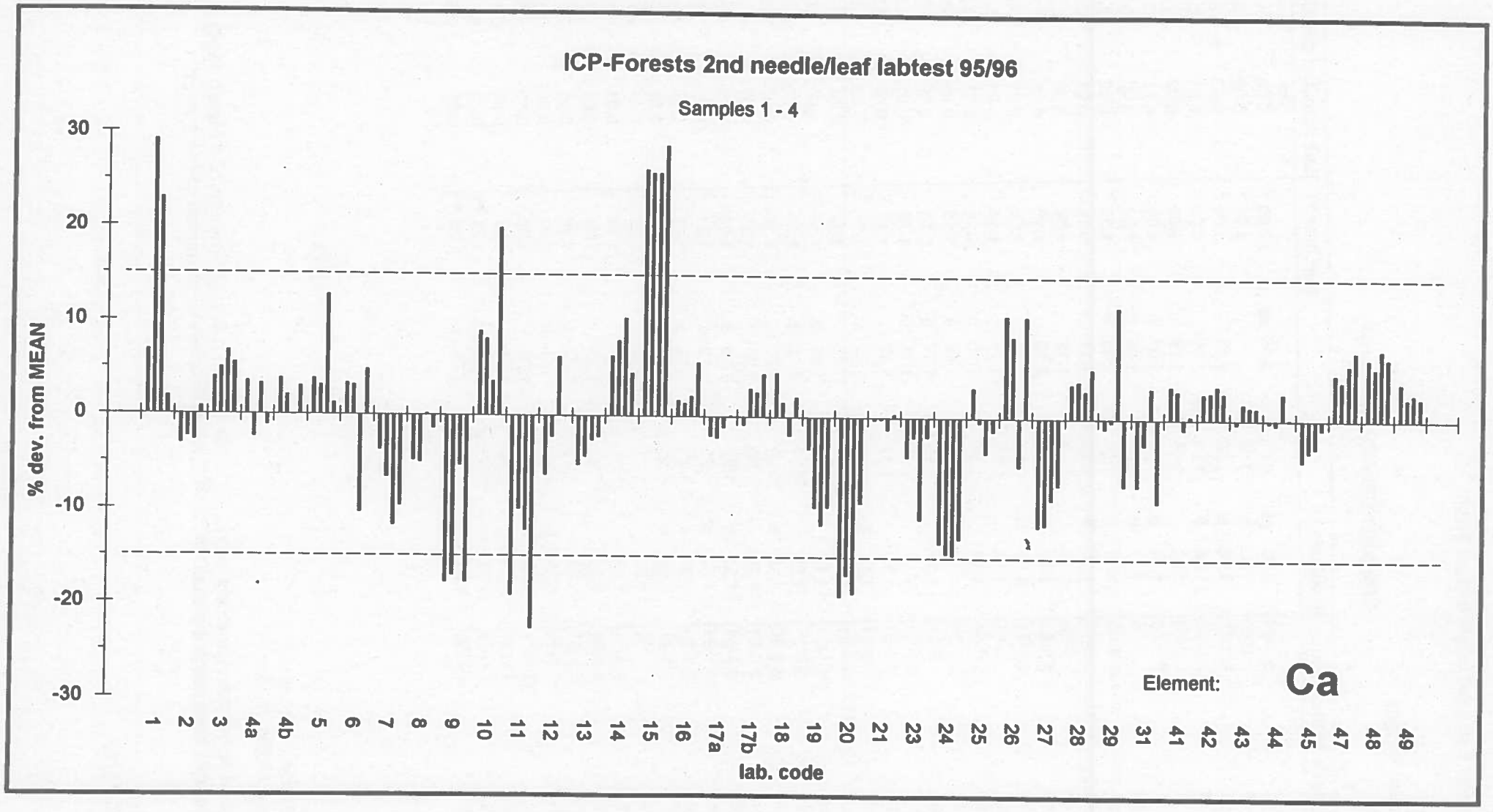
No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	12	5.1-54	1.03 ab	0.99 a	0.95 ab	0.99 **	0.04	4.04
2	49	6-50	1.00 a	1.00 a		1.00 *	0.00	0.00
3	11	6.1-50	1.08 b	1.02 b	1.04	1.04 *	0.03	2.88
4	24	6-50	1.06 b	1.05	1.05	1.05 *	0.01	0.95
5	9	6.2-50	1.07	1.06 b	1.09 b	1.07	0.02	1.87
6	1	3.6-50	1.12 b	1.08	1.07 b	1.08	0.03	2.78
7	20	0	1.11 b	1.09	1.05 b	1.09	0.03	2.75
8	10	6.1-55	1.12 b	1.10	1.08 b	1.10	0.02	1.82
9	4a	2-40	1.10 b	1.12 b	1.11	1.11	0.01	0.90
10	5	6-54	1.12	1.12	1.12	1.12	0.00	0.00
11	13	3.3-54	1.12	1.13 b	1.12	1.12	0.01	0.89
12	23	6.1-31	1.14 b	1.13	1.13	1.13	0.01	0.88
13	4b	2-41	1.14	1.16 b	1.14	1.14	0.01	0.88
14	19	5.4-54	1.14	1.14	1.15 b	1.14	0.01	0.88
15	8	3.2-31	1.15	1.15	1.16 b	1.15	0.01	0.87
16	25	5-31	1.15	1.15	1.12 b	1.15	0.02	1.74
17	42	6.1-31	1.15	1.15	1.14 b	1.15	0.01	0.87
18	27	6.1-55	1.17	1.17	1.17	1.17	0.00	0.00
19	14	3-31	1.16 b	1.18	1.19 b	1.18	0.02	1.69
20	43	4.1-31	1.18	1.19 b	1.18	1.18	0.01	0.85
21	44	4.1-31	1.19	1.20 b	1.18 b	1.19	0.01	0.84
22	3	3.7-31	1.20	1.20	1.19 b	1.20	0.01	0.83
23	16	3.8-50	1.18 b	1.20	1.20	1.20	0.01	0.83
24	18	3.8-51	1.20	1.20	1.20	1.20	0.00	0.00
25	28	8.3-54	1.21 b	1.20	1.19 b	1.20	0.01	0.83
26	41	4.1-31	1.20 b	1.21	1.22 b	1.21	0.01	0.83
27	26	3.1-32	1.28 b	1.22	1.19 b	1.22	0.05	4.10
28	2	5.2-31	1.26 b	1.22 b	1.23	1.23	0.02	1.63
29	21	0	1.23	1.25 b	1.23	1.23	0.01	0.81
30	47	4.1-31	1.23	1.21 b	1.23	1.23	0.01	0.81
31	45	4.3-31	1.26	1.26	1.26	1.26	0.00	0.00
32	17b	5.4-31	1.28	1.31 b	1.22 b	1.28	0.05	3.91
33	6	5.3-31	1.24 b	1.29	1.31 b	1.29	0.04	3.10
34	7	3.2-31	1.26 b	1.29	1.29	1.29	0.02	1.55
35	48	4.1-31	1.29	1.29	1.29	1.29	0.00	0.00
36	17a	6.1-54	1.36 a	1.36 a	1.22 ab	1.36 **	0.08	5.88
37	15	4.4-50	1.74 ab	1.75 a	1.75 a	1.75 **	0.01	0.57

Mean 1.173

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

*** =not tolerable because more than +/-** 10 % from mean (As-minutes 8-9 March 1994)
**** =not tolerable because more than +/-** 15 % from mean (proposal of the author)

Annotation:
Mean acc. ISO 5725 1.17


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
30
20
10
0
-10
-20
-30
Element:
Ca
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
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49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Ca
Dimension: mg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	11	6.1-70	5.19 ab	5.32 a	5.44 ab	5.32 **	0.13	2.44
2	20	0	5.34 a	5.31 a	5.30 a	5.32 **	0.02	0.38
3	9	6.2-30	5.42 a	5.45 a	5.37 a	5.41 **	0.04	0.74
4	24	6-20	5.70 a	5.80 ab	5.50 ab	5.70 *	0.15	2.63
5	27	6.1-20	5.93 ab	5.82 a	5.72 ab	5.82 *	0.11	1.89
6	31	3.5-20	5.89 b	6.11	6.18	6.11	0.15	2.45
7	12	5.1-31	6.17	6.07 b	6.27 b	6.17	0.10	1.62
8	13	3.3-20	6.23	6.28	6.20	6.24	0.04	0.64
9	8	3.2-31	6.25	6.29	6.28	6.27	0.02	0.32
10	45	4.3-31	6.23	6.34	6.33	6.30	0.06	0.95
11	23	6.1-31	6.26	6.34	6.33	6.31	0.04	0.63
12	7	3.2-31	6.40	6.35	6.23 b	6.34	0.09	1.42
13	19	5.4-20	6.37	6.11 b	6.41	6.36	0.16	2.52
14	2	5.2-31	6.38	6.64 b	6.24 b	6.38	0.20	3.13
15	17a	6.1-31	6.48	6.49	6.15 b	6.45	0.19	2.95
16	29	5.1-31	6.51	6.46	6.60	6.52	0.07	1.07
17	17b	5.4-31	6.61	6.47	6.52	6.53	0.07	1.07
18	43	4.1-31	6.48	6.56	6.66 b	6.56	0.09	1.37
19	21	0	6.59	6.55	6.58	6.57	0.02	0.30
20	44	4.1-31	6.64	6.50	6.57	6.57	0.07	1.07
21	16	3.8-30	6.63	6.73	6.73	6.70	0.06	0.90
22	42	6.1-31	6.72	6.77	6.81	6.77	0.05	0.74
23	25	5-31	6.80	6.89	6.74	6.80	0.08	1.18
24	6	5.3-31	6.72	6.82	6.86	6.81	0.07	1.03
25	4a	2-40	6.74	6.87	6.84	6.82	0.07	1.03
26	41	4.1-31	6.87	6.80	6.80	6.82	0.04	0.59
27	28	8.3-20	6.82	6.83	6.85	6.83	0.02	0.29
28	4b	2-41	6.85	6.80	6.87	6.84	0.04	0.58
29	5	3.7-20	6.85	6.90	6.55 b	6.84	0.19	2.78
30	3	3.7-31	6.87	6.90	6.78	6.85	0.06	0.88
31	49	6-20	6.80	6.90		6.85	0.07	1.02
32	18	3.8-31	6.60 b	6.90	7.20 b	6.90	0.30	4.35
33	47	4.1-31	6.96	6.90	6.87	6.91	0.05	0.72
34	14	3-20	6.81 b	7.01	7.30 b	7.01	0.25	3.57
35	48	4.1-31	8.97 b	6.99	6.98	7.02	1.15	16.38
36	1	3.6-30	7.01	7.81 b	7.01	7.04	0.46	6.53
37	10	6.1-20	7.06 b	7.21	7.21	7.18	0.09	1.25
38	26	3.1-32	7.34 a	7.30 a	7.28 a	7.31 *	0.03	0.41
39	15	4.4-20	8.62 ab	8.32 a	8.05 ab	8.32 **	0.29	3.49

Mean 6.589

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

*** =not tolerable because more than +/-** **10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/-** **15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 6.57

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	9	6.2-30	5.17 a	5.13 a	5.13 a	5.14 **	0.02	0.39
2	20	0	5.15 a	5.05 ab	5.19 a	5.15 **	0.07	1.36
3	24	6-20	5.30 a	5.70 ab	5.00 ab	5.30 *	0.35	6.60
4	27	6.1-20	5.47 a	5.47 a	5.63 ab	5.49 *	0.09	1.64
5	11	6.1-70	5.58 a	6.06 ab	5.46 ab	5.58 *	0.32	5.73
6	19	5.4-20	5.84 ab	5.57 a	5.58 a	5.60	0.15	2.68
7	7	3.2-31	5.92 b	5.79	5.57 b	5.79	0.18	3.11
8	8	3.2-31	5.81	5.89	5.96	5.89	0.08	1.36
9	13	3.3-20	5.95	5.93	5.91	5.93	0.02	0.34
10	45	4.3-31	5.98	6.00	5.99	5.99	0.01	0.17
11	31	3.5-20	5.61 b	6.03	6.62 b	6.03	0.51	8.46
12	2	5.2-31	6.06	6.08	5.97	6.05	0.06	0.99
13	4a	2-40	6.04	6.02	6.15 b	6.05	0.07	1.16
14	12	5.1-31	6.12	6.02	6.06	6.06	0.05	0.83
15	17a	6.1-31	6.06	6.21 b	6.00	6.06	0.11	1.82
16	23	6.1-31	6.05	6.05	6.11	6.07	0.03	0.49
17	25	5-31	6.00 b	6.29 b	6.17	6.17	0.15	2.43
18	44	4.1-31	6.15	6.17	6.20	6.17	0.03	0.49
19	29	5.1-31	6.31 b	6.18	6.10	6.18	0.11	1.78
20	21	0	6.19	6.28	6.01 b	6.19	0.14	2.26
21	16	3.8-30	6.31	6.20	6.31	6.29	0.06	0.95
22	18	3.8-31	6.40 b	6.00 b	6.30	6.30	0.21	3.33
23	43	4.1-31	6.25	6.31	6.36	6.31	0.06	0.95
24	4b	2-41	6.28	6.35	6.35	6.33	0.04	0.63
25	49	6-20	6.20 b	6.50 b		6.35	0.21	3.31
26	42	6.1-31	6.40	6.35	6.38	6.38	0.03	0.47
27	17b	5.4-31	6.49 b	6.34	6.39	6.39	0.08	1.25
28	41	4.1-31	6.36	6.39	6.41	6.39	0.03	0.47
29	5	3.7-20	6.10 b	6.40	6.85 b	6.40	0.38	5.94
30	6	5.3-31	6.38	6.37	6.44	6.40	0.04	0.63
31	28	8.3-20	6.44	6.46	6.46	6.45	0.01	0.16
32	47	4.1-31	6.48	6.46	6.45	6.46	0.02	0.31
33	3	3.7-31	6.56	6.51	6.36 b	6.51	0.10	1.54
34	48	4.1-31	6.52	6.56	6.56	6.55	0.02	0.31
35	14	3-20	6.61	6.70	6.93 b	6.70	0.17	2.54
36	10	6.1-20	6.63	6.88 b	6.71	6.71	0.13	1.94
37	26	3.1-32	6.77	6.75	6.70	6.74	0.04	0.59
38	15	4.4-20	7.82 a	7.83 a	7.77 a	7.81 **	0.03	0.38
39	1	3.6-30	8.01 a	8.29 ab	7.36 ab	8.01 **	0.48	5.99

Mean 6.203

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 6.13

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Ca
Dimension: mg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	20	0	10.27	a	10.12	a	10.16	a	10.18 **	0.08	0.79
2	24	6-20	10.60	a	11.80	ab	10.70	a	10.70 *	0.67	6.26
3	11	6.1-70	11.40	b	10.68	b	11.01		11.01 *	0.36	3.27
4	7	3.2-31	10.89		11.36	b	11.07		11.07 *	0.24	2.17
5	19	5.4-20	11.56	b	11.06		11.06		11.10 *	0.29	2.61
6	23	6.1-31	11.16		11.11		11.30		11.18 *	0.10	0.89
7	6	5.3-31	11.20		11.40		11.20		11.24 *	0.12	1.07
8	27	6.1-20	11.44		11.38		11.54		11.45	0.08	0.70
9	9	6.2-30	12.04		11.87		11.52	b	11.87	0.27	2.27
10	26	3.1-32	11.90		10.00	b	12.00		11.90	1.13	9.50
11	25	5-31	11.93		12.07		12.23		12.07	0.15	1.24
12	45	4.3-31	12.18		12.18		12.16		12.17	0.01	0.08
13	2	5.2-31	12.18		12.51	b	12.13		12.20	0.21	1.72
14	13	3.3-20	12.24		12.20		12.23		12.22	0.02	0.16
15	18	3.8-31	12.80	b	12.30		12.00	b	12.30	0.40	3.25
16	21	0	12.09	b	12.39		12.51		12.39	0.22	1.78
17	17a	6.1-31	12.73	b	12.40		12.28		12.40	0.23	1.85
18	41	4.1-31	12.24		12.45		12.45		12.41	0.12	0.97
19	4b	2-41	12.49		12.57		12.57		12.54	0.05	0.40
20	8	3.2-31	12.60		12.50		12.60		12.57	0.06	0.48
21	43	4.1-31	12.75		12.67		12.75		12.72	0.05	0.39
22	16	3.8-30	12.82		12.61	b	13.03	b	12.82	0.21	1.64
23	17b	5.4-31	12.88		12.56	b	13.90	b	12.88	0.70	5.43
24	44	4.1-31	13.10	b	12.90		12.70	b	12.90	0.20	1.55
25	49	6-20	12.70	b	13.10	b			12.90	0.28	2.17
26	28	8.3-20	12.98		12.88		12.90		12.92	0.05	0.39
27	4a	2-40	12.83		13.03		12.97		12.96	0.10	0.77
28	31	3.5-20	12.10	b	12.96		13.35	b	12.96	0.64	4.94
29	42	6.1-31	12.97		13.00		13.03		13.00	0.03	0.23
30	10	6.1-20	13.42	b	13.01		12.62	b	13.01	0.40	3.07
31	47	4.1-31	13.32		13.27		13.29		13.29	0.03	0.23
32	12	5.1-31	13.64	b	13.28		13.32		13.34	0.20	1.50
33	3	3.7-31	13.40		13.52		13.26		13.40	0.13	0.97
34	48	4.1-31	13.45		13.54		13.49		13.49	0.05	0.37
35	14	3-20	13.35	b	13.86		14.30	b	13.86 *	0.48	3.46
36	29	5.1-31	13.76	b	14.18		14.04		14.04 *	0.21	1.50
37	5	3.7-20	14.00	a	14.15	a	14.40	ab	14.15 *	0.20	1.41
38	1	3.6-30	15.44	a	15.44	a	15.44	a	15.44 **	0.00	0.00
39	15	4.4-20	15.85	a	15.83	a	15.71	a	15.80 **	0.08	0.51

Mean 12.55

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 12.59

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Ca
Dimension: mg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

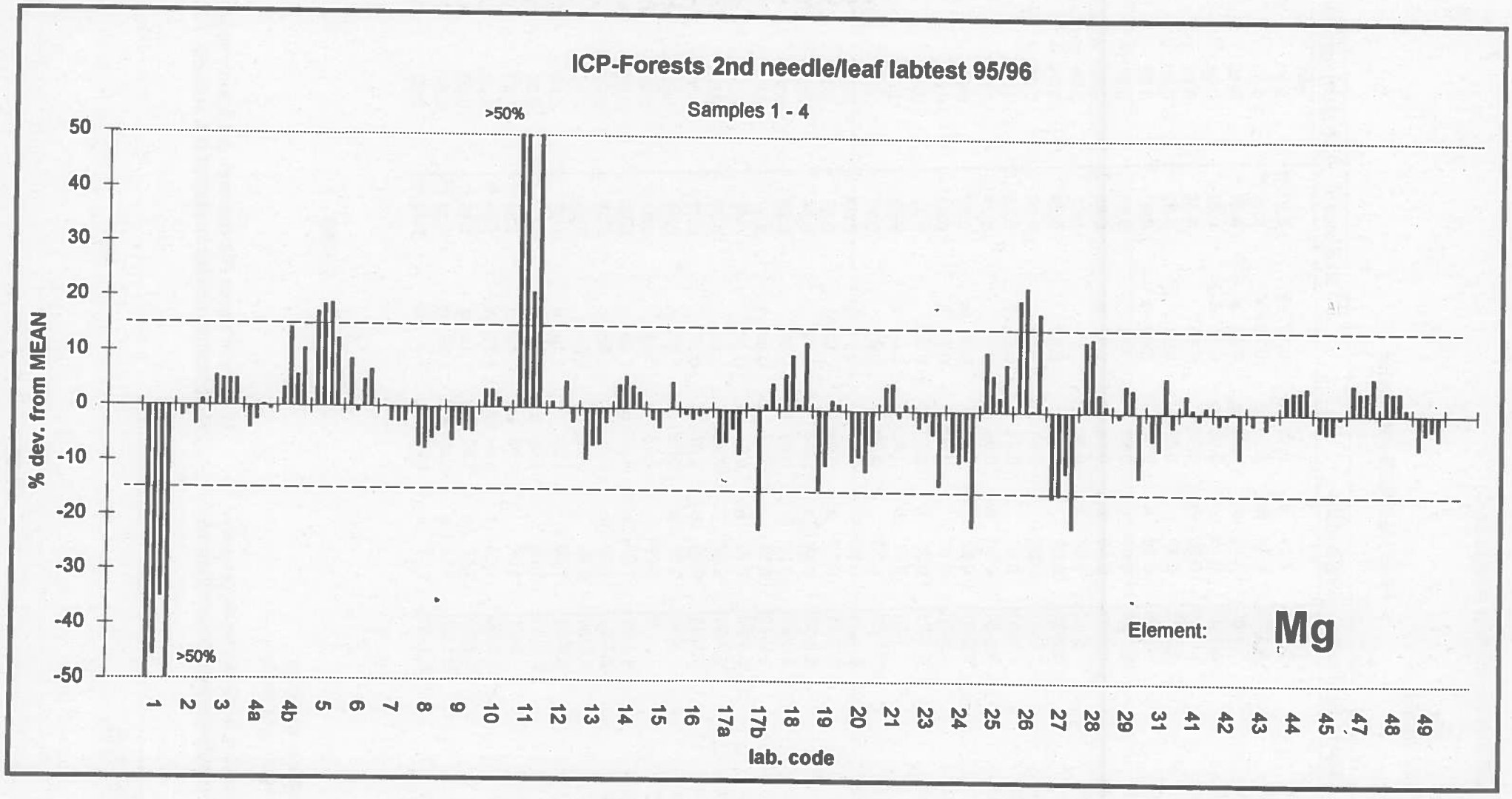
No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	11	6.1-70	3.41 ab	3.55 ab	3.47 a	3.47 **	0.07	2.02
2	9	6.2-30	3.64 ab	3.75 ab	3.69 a	3.69 **	0.06	1.63
3	24	6-20	3.90 a	4.10 ab	3.90 a	3.91 *	0.12	3.07
4	7	3.2-31	4.04	4.05	4.08	4.06	0.02	0.49
5	19	5.4-20	4.04	4.05	4.32 b	4.06	0.16	3.94
6	20	0	4.11	4.00 b	4.08	4.08	0.06	1.47
7	31	3.5-20	4.07	4.26 b	4.09	4.09	0.10	2.44
8	27	6.1-20	4.17	4.17	4.17	4.17	0.00	0.00
9	29	5.1-31	4.15	4.17	4.38 b	4.17	0.13	3.12
10	13	3.3-20	4.40	4.41	4.36	4.39	0.03	0.68
11	23	6.1-31	4.39	4.39	4.41	4.40	0.01	0.23
12	8	3.2-31	4.47	4.43	4.41	4.43	0.03	0.68
13	25	5-31	4.33 b	4.54 b	4.43	4.43	0.11	2.48
14	4a	2-40	4.41	4.44	4.50 b	4.44	0.05	1.13
15	45	4.3-31	4.46	4.45	4.44	4.45	0.01	0.22
16	12	5.1-31	4.44 b	4.49	4.52	4.49	0.04	0.89
17	17a	6.1-31	4.50	4.53	4.46	4.50	0.04	0.89
18	44	4.1-31	4.54	4.50	4.42 b	4.50	0.06	1.33
19	21	0	4.51	4.43 b	4.53	4.51	0.05	1.11
20	41	4.1-31	4.47	4.51	4.54	4.51	0.04	0.89
21	2	5.2-31	4.58 b	4.51	4.53	4.53	0.04	0.88
22	5	3.7-20	4.75 b	4.40 b	4.55	4.55	0.18	3.96
23	43	4.1-31	4.55	4.61 b	4.51	4.55	0.05	1.10
24	1	3.6-30	6.01 b	4.43 b	4.58	4.58	0.87	19.00
25	18	3.8-31	4.60	4.40 b	4.60	4.59	0.12	2.61
26	49	6-20	4.60	4.60		4.60	0.00	0.00
27	42	6.1-31	4.64	4.61	4.60	4.62	0.02	0.43
28	4b	2-41	4.60	4.65	4.64	4.63	0.03	0.65
29	14	3-20	4.63 b	4.70	5.15 b	4.70	0.28	5.96
30	17b	5.4-31	4.72	4.62 b	4.71	4.70	0.06	1.28
31	6	5.3-31	4.71	4.56 b	4.75	4.71	0.10	2.12
32	28	8.3-20	4.74	4.73	4.72	4.73	0.01	0.21
33	3	3.7-31	4.72	4.74	4.75	4.74	0.02	0.42
34	16	3.8-30	4.75	4.75	4.75	4.75	0.00	0.00
35	48	4.1-31	4.77	4.80	4.80	4.79	0.02	0.42
36	47	4.1-31	4.81	4.81	4.84	4.82	0.02	0.41
37	26	3.1-32	4.97 a	4.97 a	5.00 a	4.98 *	0.02	0.40
38	10	6.1-20	5.41 a	5.40 a	5.33 ab	5.39 **	0.04	0.74
39	15	4.4-20	5.76 a	5.79 a	5.85 ab	5.79 **	0.05	0.86

Mean 4.494

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 4.52


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
>50%
>50%
% dev. from MEAN
50
40
30
20
10
0
-10
-20
-30
-40
-50
Element:
Mg
1
2
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4a
4b
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17a
17b
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lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Mg
Dimension: mg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	1	3.6-20	0.21 a	0.42 ab	0.17 ab	0.21 **	0.13	61.90
2	27	6.1-20	0.84 ab	0.79 a	0.79 a	0.79 **	0.03	3.80
3	19	5.4-20	1.06 ab	0.80 a	0.80 a	0.80 *	0.15	18.75
4	13	3.3-20	0.85	0.86 b	0.84 b	0.85	0.01	1.18
5	20	0	0.86 b	0.85	0.85	0.85	0.01	1.18
6	8	3.2-31	0.87	0.87	0.87	0.87	0.00	0.00
7	24	6-20	0.86 b	0.87	0.90 b	0.87	0.02	2.30
8	9	6.2-20	0.87 b	0.88	0.88	0.88	0.01	1.14
9	17a	6.1-31	0.89 b	0.88	0.86 b	0.88	0.02	2.27
10	49	6-20	0.87 b	0.89 b		0.88	0.01	1.14
11	31	3.5-20	0.89	0.90 b	0.89	0.89	0.01	1.12
12	4a	2-40	0.90	0.91 b	0.90	0.90	0.01	1.11
13	23	6.1-31	0.91	0.91	0.92 b	0.91	0.01	1.10
14	45	4.3-31	0.90 b	0.91	0.91	0.91	0.01	1.10
15	2	5.2-31	0.92	0.95 b	0.90 b	0.92	0.03	3.26
16	15	4.4-20	0.92	0.92	0.91 b	0.92	0.01	1.09
17	42	6.1-31	0.91 b	0.92	0.92	0.92	0.01	1.09
18	43	4.1-31	0.91 b	0.92	0.94 b	0.92	0.02	2.17
19	16	3.9-20	0.93	0.93	0.93	0.93	0.00	0.00
20	29	5.1-31	0.93	0.90 b	0.94 b	0.93	0.02	2.15
21	7	3.2-31	0.95 b	0.94	0.92 b	0.94	0.02	2.13
22	17b	5.4-31	0.96 b	0.94	0.94	0.94	0.01	1.06
23	12	5.1-31	0.94 b	0.96 b	0.95	0.95	0.01	1.05
24	4b	2-41	0.97	0.97	0.98 b	0.97	0.01	1.03
25	10	6.1-20	0.95 b	0.97	0.97	0.97	0.01	1.03
26	41	4.1-31	0.97	0.96 b	0.97	0.97	0.01	1.03
27	44	4.1-31	0.99 b	0.97	0.97	0.97	0.01	1.03
28	14	3-20	0.97 b	0.98	1.00 b	0.98	0.02	2.04
29	21	0	0.99 b	0.98	0.98	0.98	0.01	1.02
30	48	4.1-31	1.26 b	0.97 b	0.98	0.98	0.16	16.33
31	3	3.7-31	1.00 b	0.99	0.96 b	0.99	0.02	2.02
32	47	4.1-31	0.99	0.99	0.99	0.99	0.00	0.00
33	18	3.8-31	1.00	1.00	1.10 b	1.00	0.06	6.00
34	6	5.3-31	1.02	1.03 b	0.96 b	1.02	0.04	3.92
35	25	5-31	1.04	1.08 b	1.03 b	1.04 *	0.03	2.88
36	28	8.3-20	1.06 a	0.96 ab	1.13 ab	1.06 *	0.09	8.49
37	5	3.7-20	1.10 a	1.10 a	1.10 a	1.10 **	0.00	0.00
38	26	3.1-32	1.13 a	1.00 ab	1.18 ab	1.13 **	0.09	7.96
39	11	6.1-70	1.43 a	1.44 ab	1.40 ab	1.43 **	0.02	1.40

Mean 0.9385

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 0.95

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	1	3.6-20	0.64 a	0.74 ab	0.63 ab	0.64 **	0.06	9.38
2	17b	5.4-31	0.93 ab	0.92 a	0.92 a	0.92 **	0.01	1.09
3	27	6.1-20	1.00 a	1.00 a	1.00 a	1.00 **	0.00	0.00
4	19	5.4-20	1.06	1.06	1.06	1.06 *	0.00	0.00
5	24	6-20	1.06 b	1.12 b	1.07	1.07	0.03	2.80
6	20	0	1.08	1.08	1.05 b	1.08	0.02	1.85
7	8	3.2-31	1.08 b	1.09	1.10 b	1.09	0.01	0.92
8	13	3.3-20	1.11 b	1.10	1.09 b	1.10	0.01	0.91
9	31	3.5-20	1.12 b	0.92 b	1.10	1.10	0.11	10.00
10	17a	6.1-31	1.09 b	1.13 b	1.11	1.11	0.02	1.80
11	9	6.2-20	1.14	1.17 b	1.11 b	1.14	0.03	2.63
12	15	4.4-20	1.14	1.15 b	1.14	1.14	0.01	0.88
13	45	4.3-31	1.14	1.15 b	1.14	1.14	0.01	0.88
14	49	6-20	1.12 b	1.16 b		1.14	0.03	2.63
15	4a	2-40	1.15	1.11 b	1.19 b	1.15	0.04	3.48
16	7	3.2-31	1.17 b	1.15	1.12 b	1.15	0.03	2.61
17	16	3.9-20	1.16	1.16	1.16	1.16	0.00	0.00
18	23	6.1-31	1.16	1.16	1.16	1.16	0.00	0.00
19	2	5.2-31	1.17	1.17	1.15 b	1.17	0.01	0.85
20	6	5.3-31	1.17	1.17	1.25 b	1.17	0.05	4.27
21	42	6.1-31	1.17	1.16 b	1.17	1.17	0.01	0.85
22	12	5.1-31	1.26 b	1.15 b	1.18	1.18	0.06	5.08
23	43	4.1-31	1.18	1.18	1.19 b	1.18	0.01	0.85
24	41	4.1-31	1.19	1.19	1.20 b	1.19	0.01	0.84
25	10	6.1-20	1.21 b	1.22	1.22	1.22	0.01	0.82
26	44	4.1-31	1.23	1.23	1.25 b	1.23	0.01	0.81
27	47	4.1-31	1.24 b	1.23	1.23	1.23	0.01	0.81
28	48	4.1-31	1.22 b	1.24 b	1.23	1.23	0.01	0.81
29	3	3.7-31	1.24	1.21 b	1.24	1.24	0.02	1.61
30	21	0	1.24	1.26 b	1.21 b	1.24	0.03	2.42
31	29	5.1-31	1.26 b	1.24	1.22 b	1.24	0.02	1.61
32	14	3-20	1.24 b	1.25	1.25	1.25	0.01	0.80
33	25	5-31	1.26	1.28 b	1.24 b	1.26	0.02	1.59
34	18	3.8-31	1.30	1.30	1.20 b	1.30 *	0.06	4.62
35	28	8.3-20	1.36 ab	1.34 a	1.31 ab	1.34 *	0.03	2.24
36	4b	2-41	1.35 a	1.36 ab	1.35 a	1.35 *	0.01	0.74
37	5	3.7-20	1.35 ab	1.45 ab	1.40 a	1.40 **	0.05	3.57
38	26	3.1-32	1.46 ab	1.45 a	1.38 ab	1.45 **	0.04	2.76
39	11	6.1-70	1.83 a	1.64 ab	1.83 a	1.83 **	0.11	6.01

Mean 1.181

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 1.18

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Mg
Dimension: mg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	1	3.6-20	0.83 a	0.84 a	0.86 a	0.84 **	0.02	2.38
2	20	0	1.15 a	1.14 a	1.16 a	1.15 *	0.01	0.87
3	27	6.1-20	1.15 a	1.15 a	1.15 a	1.15 *	0.00	0.00
4	24	6-20	1.18	1.25 b	1.16	1.18	0.05	4.24
5	13	3.3-20	1.19	1.22	1.21	1.21	0.02	1.65
6	8	3.2-31	1.23	1.21	1.23	1.22	0.01	0.82
7	9	6.2-20	1.23	1.25	1.24	1.24	0.01	0.81
8	23	6.1-31	1.24	1.23	1.26	1.24	0.02	1.61
9	2	5.2-31	1.24	1.26	1.24	1.25	0.01	0.80
10	17a	6.1-31	1.25	1.23	1.26	1.25	0.02	1.60
11	45	4.3-31	1.25	1.25	1.25	1.25	0.00	0.00
12	7	3.2-31	1.23 b	1.29 b	1.26	1.26	0.03	2.38
13	43	4.1-31	1.27	1.26	1.26	1.26	0.01	0.79
14	49	6-20	1.24	1.28		1.26	0.03	2.38
15	16	3.9-20	1.27	1.29	1.29	1.28	0.01	0.78
16	21	0	1.26 b	1.29	1.30	1.28	0.02	1.56
17	41	4.1-31	1.27	1.29	1.28	1.28	0.01	0.78
18	15	4.4-20	1.31	1.28	1.29	1.29	0.02	1.55
19	4a	2-40	1.30	1.30	1.29	1.30	0.01	0.77
20	26	3.1-32	1.30	1.20 b	1.35 b	1.30	0.08	6.15
21	42	6.1-31	1.30	1.29	1.30	1.30	0.01	0.77
22	17b	5.4-31	1.31	1.27 b	1.44 b	1.31	0.09	6.87
23	18	3.8-31	1.40 b	1.30	1.30	1.31	0.06	4.58
24	10	6.1-20	1.38 b	1.32	1.29 b	1.32	0.05	3.79
25	19	5.4-20	1.32	1.32	1.32	1.32	0.00	0.00
26	25	5-31	1.35	1.33	1.32	1.33	0.02	1.50
27	28	8.3-20	1.34	1.31 b	1.36	1.34	0.03	2.24
28	14	3-20	1.33	1.35	1.38 b	1.35	0.03	2.22
29	29	5.1-31	1.35	1.39 b	1.31 b	1.35	0.04	2.96
30	44	4.1-31	1.37	1.35	1.32 b	1.35	0.03	2.22
31	47	4.1-31	1.36	1.35	1.35	1.35	0.01	0.74
32	48	4.1-31	1.35	1.35	1.35	1.35	0.00	0.00
33	3	3.7-31	1.37	1.38	1.33 b	1.36	0.03	2.21
34	6	5.3-31	1.37	1.33 b	1.37	1.36	0.02	1.47
35	12	5.1-31	1.38	1.35	1.36	1.36	0.02	1.47
36	4b	2-41	1.37	1.38	1.37	1.37	0.01	0.73
37	31	3.5-20	1.37	1.39	1.38	1.38	0.01	0.72
38	5	3.7-20	1.50 ab	1.55 a	1.55 a	1.54 **	0.03	1.95
39	11	6.1-70	1.53 ab	1.65 ab	1.57 a	1.57 **	0.06	3.82

Mean 1.296

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

*** =not tolerable because more than +/-** 10 % from mean (As-minutes 8-9 March 1994)
**** =not tolerable because more than +/-** 15 % from mean (proposal of the author)

Annotation:
Mean acc. ISO 5725 1.31

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Mg
Dimension: mg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

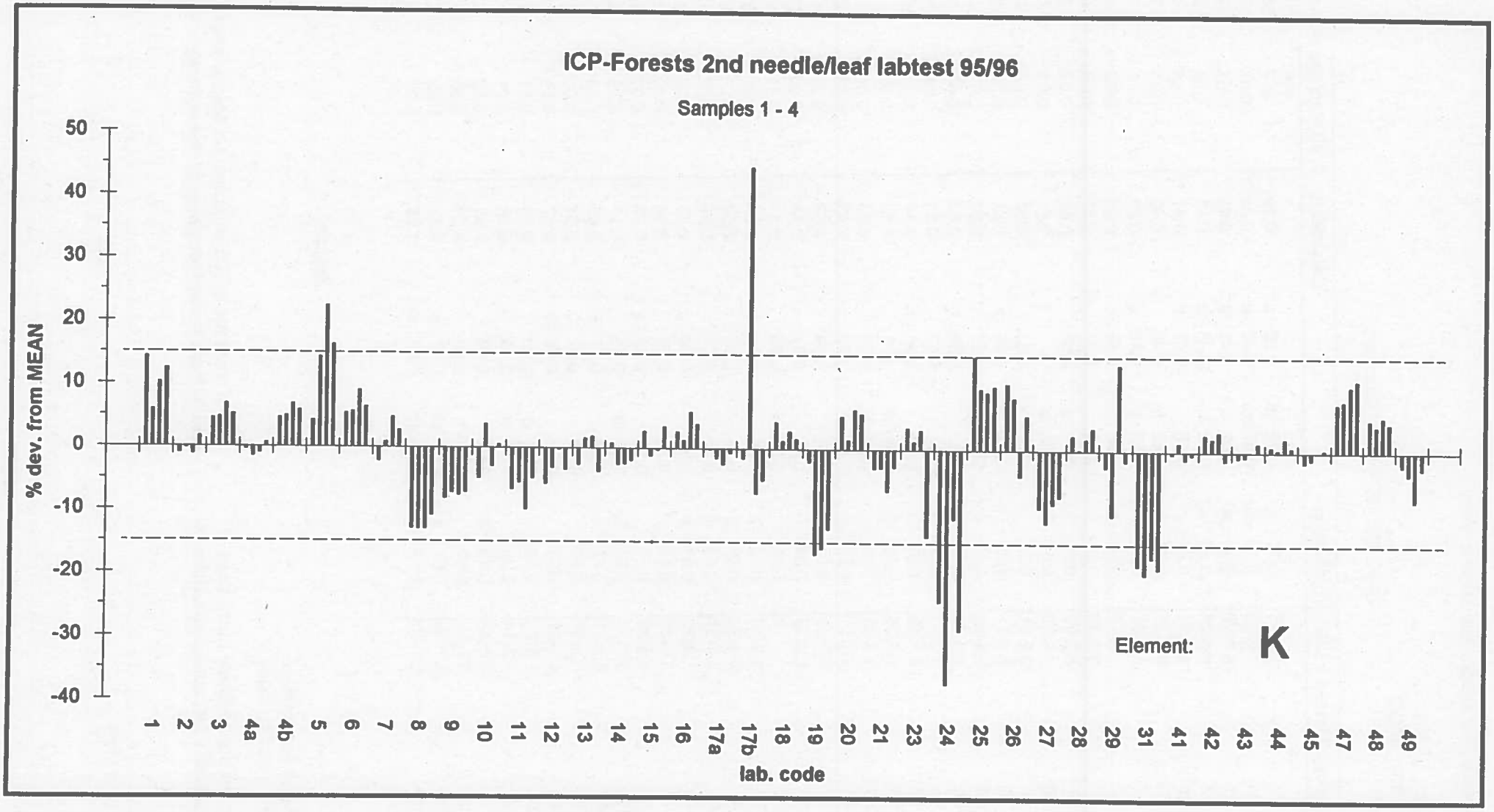
No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	1	3.6-20	0.20 a	0.32 ab	0.20 a	0.20 **	0.07	35.00
2	24	6-20	0.42 a	0.47 ab	0.42 a	0.42 **	0.03	7.14
3	27	6.1-20	0.47 ab	0.42 a	0.42 a	0.42 **	0.03	7.14
4	23	6.1-31	0.46 a	0.47 ab	0.46 a	0.46 *	0.01	2.17
5	29	5.1-31	0.47	0.47	0.52 b	0.47 *	0.03	6.38
6	17a	6.1-31	0.49	0.48 b	0.49	0.49	0.01	2.04
7	42	6.1-31	0.49	0.50 b	0.48 b	0.49	0.01	2.04
8	20	0	0.51 b	0.50	0.48 b	0.50	0.02	4.00
9	8	3.2-31	0.51	0.51	0.51	0.51	0.00	0.00
10	9	6.2-20	0.50 b	0.53 b	0.51	0.51	0.02	3.92
11	49	6-20	0.50 b	0.52 b		0.51	0.01	1.96
12	7	3.2-31	0.52	0.52	0.52	0.52	0.00	0.00
13	12	5.1-31	0.52	0.52	0.55 b	0.52	0.02	3.85
14	13	3.3-20	0.52	0.51 b	0.52	0.52	0.01	1.92
15	31	3.5-20	0.51 b	0.52	0.53 b	0.52	0.01	1.92
16	4a	2-40	0.54 b	0.53	0.53	0.53	0.01	1.89
17	10	6.1-20	0.53	0.53	0.51 b	0.53	0.01	1.89
18	16	3.9-20	0.52 b	0.54 b	0.53	0.53	0.01	1.89
19	43	4.1-31	0.53	0.54 b	0.53	0.53	0.01	1.89
20	45	4.3-31	0.53	0.53	0.53	0.53	0.00	0.00
21	2	5.2-31	0.55 b	0.54	0.54	0.54	0.01	1.85
22	19	5.4-20	0.54	0.54	0.54	0.54	0.00	0.00
23	21	0	0.54	0.52 b	0.54	0.54	0.01	1.85
24	28	8.3-20	0.62 b	0.54	0.53 b	0.54	0.05	9.26
25	41	4.1-31	0.54	0.54	0.54	0.54	0.00	0.00
26	48	4.1-31	0.53 b	0.54	0.54	0.54	0.01	1.85
27	14	3-20	0.54 b	0.55	0.58 b	0.55	0.02	3.64
28	3	3.7-31	0.56	0.56	0.56	0.56	0.00	0.00
29	15	4.4-20	0.56	0.56	0.60 b	0.56	0.02	3.57
30	17b	5.4-31	0.57 b	0.55 b	0.56	0.56	0.01	1.79
31	44	4.1-31	0.57 b	0.56	0.55 b	0.56	0.01	1.79
32	6	5.3-31	0.57	0.57	0.57	0.57	0.00	0.00
33	47	4.1-31	0.57	0.57	0.56 b	0.57	0.01	1.75
34	25	5-31	0.58	0.56 b	0.58	0.58	0.01	1.72
35	4b	2-41	0.59	0.58 b	0.59	0.59 *	0.01	1.69
36	5	3.7-20	0.65 b	0.60	0.60	0.60 *	0.03	5.00
37	18	3.8-31	0.60	0.50 b	0.60	0.60 *	0.06	10.00
38	26	3.1-32	0.63 a	0.60 ab	0.63 a	0.63 **	0.02	3.17
39	11	6.1-70	1.47 ab	1.59 ab	1.56 a	1.56 **	0.06	3.85

Mean 0.5338

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 0.53


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
50
40
30
20
10
0
-10
-20
-30
-40
Element: K
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
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24
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26
27
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29
31
41
42
43
44
45
47
48
49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: K
Dimension: mg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	24	6-30	4.66 a	4.82 ab	4.72 a	4.72 **	0.08	1.69
2	31	3.5-20	4.76 ab	5.09 a	5.47 ab	5.09 **	0.36	7.07
3	8	3.2-31	5.42 a	5.45 a	5.42 a	5.43 *	0.02	0.37
4	27	6.1-20	5.66 a	5.64 a	5.80 ab	5.66	0.09	1.59
5	9	6.2-30	5.75	5.72	5.71	5.73	0.02	0.35
6	11	6.1-30	5.99 b	5.82	5.71 b	5.82	0.14	2.41
7	12	5.1-31	6.10 b	5.83	5.88	5.88	0.14	2.38
8	10	6.1-20	5.84 b	6.15 b	5.93	5.93	0.16	2.70
9	21	0	6.06	6.04	6.05	6.05	0.01	0.17
10	13	3.3-30	6.08	6.08	6.06	6.07	0.01	0.16
11	29	5.1-31	6.08	6.07	6.07	6.07	0.01	0.16
12	7	3.2-31	6.10	6.18 b	5.99 b	6.10	0.10	1.64
13	49	6-20	6.10	6.10		6.10	0.00	0.00
14	19	5.4-20	6.11	5.58 b	6.14	6.11	0.32	5.24
15	45	4.3-31	6.03 b	6.14	6.14	6.13	0.06	0.98
16	17b	5.4-31	6.39 b	5.90 b	6.14	6.14	0.25	4.07
17	2	5.2-31	6.17	6.34 b	6.02 b	6.17	0.16	2.59
18	43	4.1-31	6.13	6.18	6.27 b	6.18	0.07	1.13
19	4a	2-40	6.12 b	6.25	6.21	6.21	0.07	1.13
20	41	4.1-31	6.21	6.20	6.22	6.21	0.01	0.16
21	17a	6.1-31	6.23	6.17	6.26	6.23	0.05	0.80
22	14	3-20	6.25	6.29	6.34	6.29	0.05	0.79
23	44	4.1-31	6.40 b	6.20 b	6.29	6.29	0.10	1.59
24	28	8.3-20	6.39	6.41	6.25 b	6.39	0.09	1.41
25	15	4.4-30	6.40	6.40	6.44	6.41	0.02	0.31
26	16	3.8-30	6.31 b	6.42	6.42	6.41	0.06	0.94
27	42	6.1-31	6.37	6.42	6.42	6.41	0.03	0.47
28	23	6.1-31	6.42	6.49	6.46	6.46	0.04	0.62
29	5	3.7-30	6.75 b	6.50	6.50	6.51	0.14	2.15
30	18	3.8-31	6.50	6.50	6.70 b	6.51	0.12	1.84
31	3	3.7-31	6.66 b	6.48	6.52	6.52	0.09	1.38
32	4b	2-41	6.54	6.51	6.55	6.53	0.02	0.31
33	48	4.1-31	8.43 b	6.56	6.49 b	6.56	1.10	16.77
34	20	0	6.59	6.55	6.56	6.57	0.02	0.30
35	6	5.3-31	6.44 b	6.58	6.66 b	6.58	0.11	1.67
36	47	4.1-31	6.70	6.73	6.73	6.72	0.02	0.30
37	26	3.1-32	6.90 a	7.00 ab	6.50 ab	6.90 *	0.26	3.77
38	1	3.6-30	7.14 a	7.00 ab	7.14 a	7.13 *	0.08	1.12
39	25	5-31	7.17 a	7.21 a	6.99 ab	7.17 *	0.12	1.67

Mean 6.242

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 6.23
Lab 4a Method 90: 6.23

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	24	6-30	2.56 a	2.68 ab	2.60 a	2.60 **	0.06	2.31
2	31	3.5-20	3.27 ab	3.33 a	3.42 ab	3.33 **	0.08	2.40
3	19	5.4-20	3.44 a	3.45 a	3.45 a	3.45 **	0.01	0.29
4	8	3.2-31	3.53 ab	3.61 a	3.63 a	3.61 *	0.05	1.39
5	27	6.1-20	3.76 ab	3.67 a	3.24 ab	3.67 *	0.28	7.63
6	29	5.1-31	3.74 a	3.73 a	3.69 a	3.72 *	0.03	0.81
7	9	6.2-30	3.81	3.85	3.88	3.85	0.04	1.04
8	11	6.1-30	3.90	3.95	3.91	3.92	0.03	0.77
9	49	6-20	4.00	4.00		4.00	0.00	0.00
10	12	5.1-31	4.08 b	3.94 b	4.02	4.02	0.07	1.74
11	21	0	4.03	4.10 b	3.88 b	4.03	0.11	2.73
12	14	3-20	3.86 b	4.04	4.08	4.04	0.12	2.97
13	4a	2-40	4.08	4.11	4.09	4.09	0.02	0.49
14	17a	6.1-31	4.08	4.19 b	4.07	4.09	0.07	1.71
15	15	4.4-30	4.09	4.11	4.09	4.10	0.01	0.24
16	45	4.3-31	4.09	4.10	4.10	4.10	0.01	0.24
17	43	4.1-31	4.10	4.11	4.15	4.12	0.03	0.73
18	2	5.2-31	4.16	4.15	4.09 b	4.14	0.04	0.97
19	28	8.3-20	4.14	4.16	4.19	4.16	0.03	0.72
20	44	4.1-31	4.17	4.14	4.20	4.17	0.03	0.72
21	7	3.2-31	4.21	4.20	4.06 b	4.19	0.08	1.91
22	16	3.8-30	4.21	4.10 b	4.42 b	4.21	0.16	3.80
23	18	3.8-31	4.20	4.40 b	4.20	4.21	0.12	2.85
24	23	6.1-31	4.27 b	4.20	4.19	4.21	0.04	0.95
25	41	4.1-31	4.21	4.17	4.23	4.21	0.03	0.71
26	13	3.3-30	4.24	4.23	4.19	4.22	0.03	0.71
27	20	0	4.19	4.23	4.23	4.22	0.02	0.47
28	42	6.1-31	4.24	4.23	4.24	4.24	0.01	0.24
29	10	6.1-20	4.30	4.33	4.29	4.31	0.02	0.46
30	48	4.1-31	4.30	4.33	4.37	4.33	0.04	0.92
31	3	3.7-31	4.35	4.33	4.36	4.35	0.02	0.46
32	4b	2-41	4.36	4.34	4.38	4.36	0.02	0.46
33	6	5.3-31	4.39	4.37	4.43	4.39	0.03	0.68
34	1	3.6-30	4.32 b	4.40	4.48 b	4.40	0.08	1.82
35	47	4.1-31	4.49	4.50	4.47	4.49	0.02	0.45
36	26	3.1-32	4.57 b	4.50	4.00 b	4.50	0.31	6.89
37	25	5-31	4.34 b	4.65 b	4.56	4.56	0.16	3.51
38	5	3.7-30	4.75 a	4.75 a	4.75 a	4.75 *	0.00	0.00
39	17b	5.4-31	6.27 ab	5.79 ab	6.02 a	6.02 **	0.24	3.99

Mean 4.155

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

*** =not tolerable because more than +/-** **10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/-** **15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 4.12
Lab 4a Method 90: 4.07

ICP-Forests 2nd needle/leaf labtest 95/96

Element: K
Dimension: mg/g
Sample: 3 QUERCUS ILEX (Spain)

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	31	3.5-20	3.71	ab	3.37	a	3.22	ab	3.37 **	0.25	7.42
2	19	5.4-20	3.41	a	3.42	a	3.42	a	3.42 **	0.01	0.29
3	8	3.2-31	3.56		3.52		3.54		3.54 *	0.02	0.56
4	24	6-30	3.63		3.62		3.62		3.62 *	0.01	0.28
5	11	6.1-30	3.69		3.68		3.60	b	3.67	0.05	1.36
6	27	6.1-20	3.72		3.67		3.78	b	3.72	0.06	1.61
7	49	6-20	3.70		3.80				3.75	0.07	1.87
8	9	6.2-30	3.69	b	3.77		3.77		3.76	0.05	1.33
9	17b	5.4-31	3.43	b	3.91	b	3.78		3.78	0.25	6.61
10	21	0	3.73	b	3.80		3.86	b	3.80	0.07	1.84
11	26	3.1-32	3.95		3.80	b	3.90		3.90	0.08	2.05
12	10	6.1-20	4.07	b	3.95		3.84	b	3.95	0.12	3.04
13	14	3-20	3.87	b	3.97		4.10	b	3.97	0.12	3.02
14	17a	6.1-31	3.98		3.96		3.96		3.97	0.01	0.25
15	2	5.2-31	4.02		4.10	b	3.93	b	4.02	0.09	2.24
16	41	4.1-31	4.01		4.02		4.02		4.02	0.01	0.25
17	4a	2-40	3.99		4.04		4.04		4.03	0.03	0.74
18	12	5.1-31	4.03		4.06		4.08		4.06	0.03	0.74
19	15	4.4-30	4.04		4.06		4.07		4.06	0.02	0.49
20	43	4.1-31	4.09		4.05		4.06		4.07	0.02	0.49
21	45	4.3-31	4.07		4.06		4.09		4.07	0.02	0.49
22	13	3.3-30	4.16		4.15		4.15		4.15	0.01	0.24
23	28	8.3-20	4.15		4.14		4.17		4.15	0.02	0.48
24	44	4.1-31	4.16		4.20		4.00	b	4.16	0.11	2.64
25	18	3.8-31	4.20		4.20		4.10	b	4.19	0.06	1.43
26	23	6.1-31	4.20		4.12	b	4.30	b	4.20	0.09	2.14
27	42	6.1-31	4.21		4.19		4.20		4.20	0.01	0.24
28	7	3.2-31	4.09	b	4.36	b	4.27		4.27	0.14	3.28
29	48	4.1-31	4.29		4.33		4.28		4.30	0.03	0.70
30	16	3.8-30	4.31		4.20	b	4.41	b	4.31	0.11	2.55
31	20	0	4.44	b	4.32		4.32		4.33	0.07	1.62
32	3	3.7-31	4.37		4.35		4.32		4.35	0.03	0.69
33	4b	2-41	4.33		4.38		4.35		4.35	0.03	0.69
34	6	5.3-31	4.32	b	4.44		4.60	b	4.44	0.14	3.15
35	25	5-31	4.16	b	4.55	b	4.45		4.45	0.20	4.49
36	1	3.6-30	4.48		4.65	b	4.48		4.49 *	0.10	2.23
37	47	4.1-31	4.53		4.50		4.47		4.50 *	0.03	0.67
38	29	5.1-31	4.63	a	4.61	a	4.67	a	4.63 *	0.03	0.65
39	5	3.7-30	4.75	ab	5.00	a	5.00	a	4.99 **	0.14	2.81

Mean 4.074

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

*** =not tolerable because more than +/- 10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/- 15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 4.08
Lab 4a Method 90: 4.16

ICP-Forests 2nd needle/leaf labtest 95/96

Element: K
Dimension: mg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

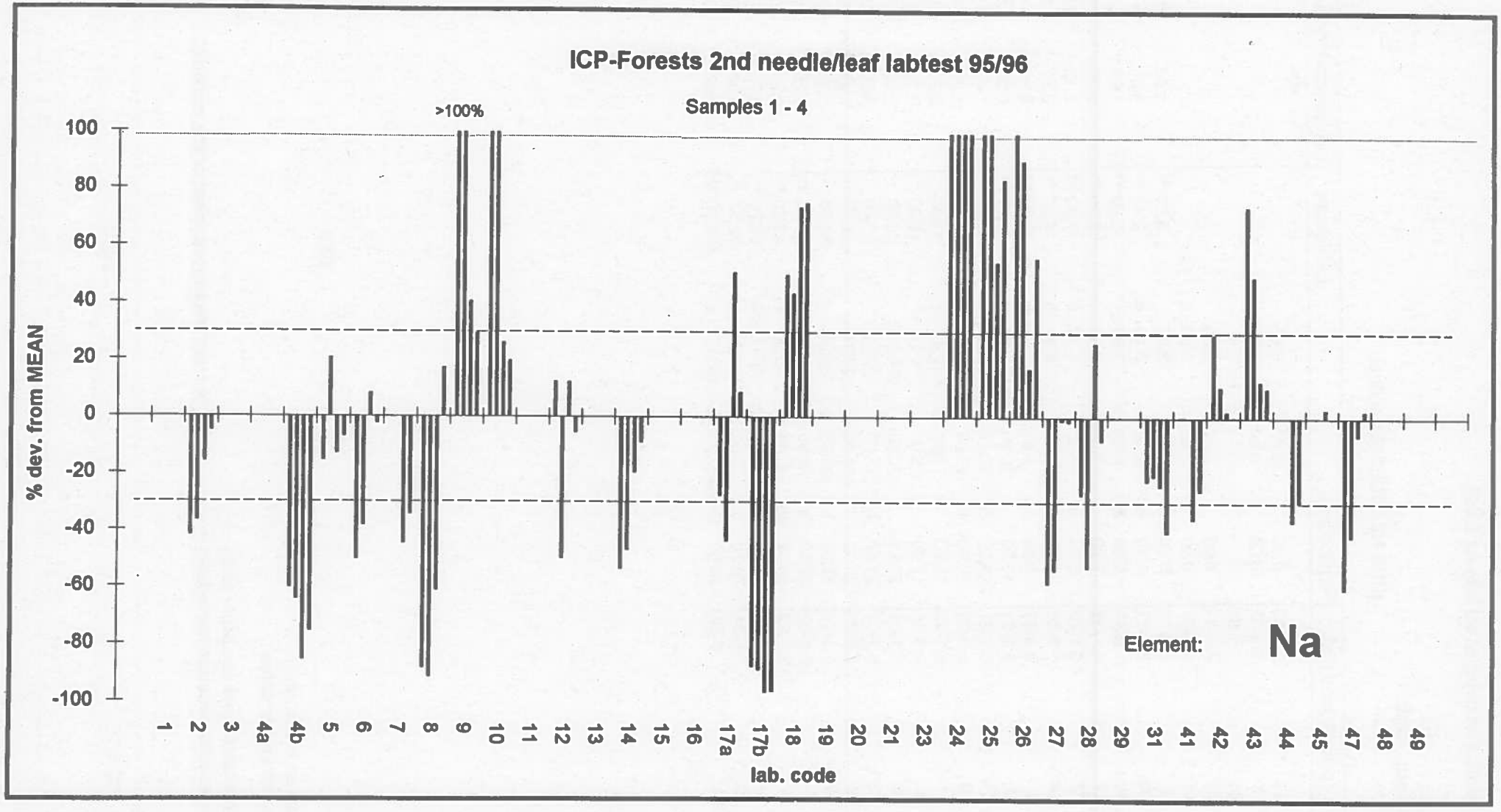
No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	24	6-30	4.40 a	4.58 ab	4.40 a	4.42 **	0.10	2.26
2	31	3.5-20	5.04 a	5.11 a	4.93 ab	5.04 **	0.09	1.79
3	23	6.1-31	5.21 ab	5.58 ab	5.35 a	5.35 *	0.19	3.55
4	19	5.4-20	5.39 a	5.40 a	5.67 ab	5.42 *	0.16	2.95
5	8	3.2-31	5.52 a	5.61 a	5.52 a	5.54 *	0.05	0.90
6	27	6.1-20	5.80	5.75	5.64 b	5.75	0.08	1.39
7	9	6.2-30	5.73	5.77	5.80	5.77	0.04	0.69
8	17b	5.4-31	5.89	6.18 b	5.86	5.90	0.18	3.05
9	11	6.1-30	5.98	5.91	5.86	5.91	0.06	1.02
10	13	3.3-30	6.07 b	5.97	5.95	5.98	0.06	1.00
11	12	5.1-31	5.97	5.99	6.27 b	6.00	0.17	2.83
12	21	0	5.99	6.05	6.08	6.04	0.05	0.83
13	49	6-20	6.10	6.00		6.05	0.07	1.16
14	14	3-20	5.86 b	6.09	6.20 b	6.09	0.17	2.79
15	29	5.1-31	6.30 b	5.99 b	6.11	6.11	0.16	2.62
16	42	6.1-31	6.11	6.16	6.12	6.13	0.03	0.49
17	17a	6.1-31	6.18	6.16	6.16	6.17	0.01	0.16
18	41	4.1-31	6.13	6.19	6.22	6.18	0.05	0.81
19	45	4.3-31	6.24	6.24	6.23	6.24	0.01	0.16
20	10	6.1-20	6.35 b	6.11 b	6.25	6.25	0.12	1.92
21	4a	2-40	6.18 b	6.26	6.33	6.26	0.08	1.28
22	44	4.1-31	6.30	6.26	6.23	6.26	0.04	0.64
23	43	4.1-31	6.21 b	6.39 b	6.30	6.30	0.09	1.43
24	2	5.2-31	6.36	6.26	6.33	6.32	0.05	0.79
25	18	3.8-31	6.30	6.30	6.40 b	6.32	0.06	0.95
26	7	3.2-31	6.13 b	6.61 b	6.39	6.39	0.24	3.76
27	15	4.4-30	6.46	6.41	6.42	6.43	0.03	0.47
28	28	8.3-20	6.40	6.45	6.46	6.44	0.03	0.47
29	16	3.8-30	6.44	6.54 b	6.44	6.46	0.06	0.93
30	48	4.1-31	6.46	6.51	6.52	6.50	0.03	0.46
31	3	3.7-31	6.76 b	6.53	6.51	6.54	0.14	2.14
32	26	3.1-32	6.56	6.50	6.60	6.56	0.05	0.76
33	20	0	6.59	6.56	6.57	6.57	0.02	0.30
34	4b	2-41	6.55	6.58	6.60	6.58	0.03	0.46
35	6	5.3-31	6.67	6.59	6.60	6.62	0.04	0.60
36	25	5-31	6.58 ab	6.87 a	6.87 a	6.85 *	0.17	2.48
37	47	4.1-31	6.91 a	6.92 a	6.95 a	6.93 *	0.02	0.29
38	1	3.6-30	6.97 a	7.30 ab	6.97 a	6.99 *	0.19	2.72
39	5	3.7-30	7.25 a	7.00 ab	7.25 a	7.23 **	0.14	1.94

Mean 6.219

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

*** =not tolerable because more than +/-** **10 % from mean (As-minutes 8-9 March 1994)**
**** =not tolerable because more than +/-** **15 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 6.26
Lab 4a Method 90: 6.69


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
>100%
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
-100
1
2
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4a
4b
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17a
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lab. code
Element:
Na

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Na
Dimension: µg/g
Sample: 1 PINE NEEDLES (Slovakia)

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	4a	2-40	0.00		0.00		0.00					
2	7	3.2-31	0.00		0.00		0.00					
3	41	4.1-31	0.00		0.00		0.00					
4	44	4.1-31	0.00		0.00		0.00					
5	45	4.3-31	0.00		0.00		0.00					
6	8	3.2-31	5.40	b	2.00		2.00		2.00	**	1.96	98.00
7	17b	5.4-31	1.10	b	2.10		3.10	b	2.10	**	1.00	47.62
8	4b	2-41	9.00	b	6.00	b	7.00		7.00	**	1.53	21.86
9	47	4.1-31	7.00		7.00		7.00		7.00	**	0.00	0.00
10	27	6.1-20	8.90	b	7.30		4.70	b	7.30	**	2.12	29.04
11	14	3-20	7.60	b	8.20		8.60	b	8.20	**	0.50	6.10
12	6	5.3-31	8.80		9.00	b	8.30	b	8.80	**	0.36	4.09
13	2	5.2-31	10.30		10.30		10.30		10.30	**	0.00	0.00
14	17a	6.1-31	12.20	b	12.80		14.90	b	12.80		1.42	11.09
15	28	8.3-20	6.80	b	12.90		14.40	b	12.90		4.03	31.24
16	31	6.2-20	13.80		17.90	b	12.40	b	13.80		2.86	20.72
17	5	3.7-30	15.00		15.00		15.00		15.00		0.00	0.00
18	12	5.1-31	20.00		20.00		20.00		20.00		0.00	0.00
19	42	6.1-31	24.00	b	23.00		23.00		23.00		0.58	2.52
20	18	3.8-31	26.70		31.00	b	26.70		26.70	**	2.48	9.29
21	43	4.1-31	33.00	b	29.00	b	31.00		31.00	**	2.00	6.45
22	9	6.2-30	37.50	b	35.00	b	36.00		36.00	**	1.26	3.50
23	26	3-1-32	46.00	ab	45.60	ab	45.80	a	45.80	**	0.20	0.44
24	10	6.1-20	52.70	a	59.50	ab	40.30	ab	52.70	**	9.74	18.48
25	25	5-31	78.70	a	72.30	ab	81.80	ab	78.70	**	4.84	6.15
26	24	6-30	490.00	ab	520.00	ab	495.00	a	495.00	**	16.07	3.25

Mean 17.8

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** 30 % from mean (proposal of the author)

Annotation:
Mean acc. ISO 5725 21.04

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	4a	2-40	0.00		0.00		0.00				
2	7	3.2-31	0.00		0.00		0.00				
3	41	4.1-31	0.00		0.00		0.00				
4	44	4.1-31	0.00		0.00		0.00				
5	45	4.3-31	0.00		0.00		0.00				
6	8	3.2-31	1.00		2.00		2.00		1.67 **	0.58	34.73
7	17b	5.4-31	1.10		2.20		3.30		2.20 **	1.10	50.00
8	4b	2-41	8.00		7.00		7.00		7.33 **	0.58	7.91
9	27	6.1-20	10.00		8.90		9.50		9.47 **	0.55	5.81
10	28	8.3-20	9.70		8.20	b	12.30	b	9.70 **	2.07	21.34
11	12	5.1-31	30.00	b	10.00		10.00		10.33 **	11.55	111.81
12	14	3-20	10.70		11.00		11.10		10.93 **	0.21	1.92
13	17a	6.1-31	10.90		11.60		14.30	b	11.60 **	1.80	15.52
14	47	4.1-31	12.00		12.00		12.00		12.00 **	0.00	0.00
15	6	5.3-31	12.90		12.50		12.80		12.73 **	0.21	1.65
16	2	5.2-31	14.00		13.10		12.40		13.10 **	0.80	6.11
17	31	6.2-20	16.00		16.20		24.00	b	16.43	4.56	27.75
18	42	6.1-31	25.00	b	23.00		21.00	b	23.00	2.00	8.70
19	5	3.7-30	25.00		25.00		25.00		25.00	0.00	0.00
20	18	3.8-31	29.80		69.50	b	22.60	b	29.80 **	25.26	84.77
21	43	4.1-31	31.00		44.00	b	14.00	b	31.00 **	15.04	48.52
22	26	3-1-32	39.60		39.00		40.00		39.53 **	0.50	1.26
23	9	6.2-30	42.80		41.50		40.00	b	41.50 **	1.40	3.37
24	10	6.1-20	38.90	b	66.20	b	42.60		42.60 **	14.81	34.77
25	25	5-31	68.80	ab	61.00	a	61.40	a	61.53 **	4.39	7.13
26	24	6-30	520.00	ab	540.00	ab	522.00	a	522.00 **	11.02	2.11

Mean **20.74**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **21.97**

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Na
Dimension: µg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	4a	2-40	0.00		0.00		0.00					
2	17b	5.4-31	3.40	a	1.10	a	2.20	a	2.21	**	1.15	52.04
3	4b	2-41	12.00	a	9.00	a	12.00	a	11.44	**	1.73	15.12
4	8	3.2-31	16.00	b	34.00	b	31.00		31.00	**	9.64	31.10
5	7	3.2-31	44.20		53.10	b	43.60		44.46	**	5.32	11.97
6	44	4.1-31	51.00		46.00	b	57.00	b	51.00	**	5.51	10.80
7	41	4.1-31	54.40		50.80		51.60		51.76	**	1.89	3.65
8	31	6.2-20	58.50		64.60	b	61.00		61.00		3.07	5.03
9	14	3-20	64.30		64.70		65.00		64.67		0.35	0.54
10	2	5.2-31	68.00		68.50		66.70		67.73		0.93	1.37
11	5	3.7-30	70.00		70.00		70.00		70.00		0.00	0.00
12	47	4.1-31	73.00		76.00		76.00		75.44		1.73	2.29
13	27	6.1-20	79.60		81.70		76.60	b	79.60		2.56	3.22
14	42	6.1-31	83.00		83.00		81.00		82.44		1.15	1.39
15	45	4.3-31	82.00		84.00		83.00		83.00		1.00	1.20
16	6	5.3-31	87.60		88.00		85.60		87.24		1.29	1.48
17	12	5.1-31	100.00	b	90.00		90.00		90.56		5.77	6.37
18	43	4.1-31	114.00	b	91.00		81.00	b	91.00		16.92	18.59
19	26	3-1-32	94.90		95.00		94.00		94.63		0.55	0.58
20	28	8.3-20	101.70		90.20	b	105.40	b	101.70		7.93	7.80
21	10	6.1-20	100.90		113.50	b	101.40		101.71		7.13	7.01
22	9	6.2-30	107.00	b	114.00		114.00		113.44	**	4.04	3.56
23	17a	6.1-31	122.00		122.50		120.10		121.69	**	1.27	1.04
24	25	5-31	119.80	b	128.10	b	124.80		124.80	**	4.18	3.35
25	18	3.8-31	106.30	ab	140.30	a	147.30	ab	140.30	**	21.93	15.63
26	24	6-30	400.00	ab	390.00	ab	397.00	a	397.00	**	5.13	1.29

Mean 80.69

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 76.57

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Na
Dimension: µg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

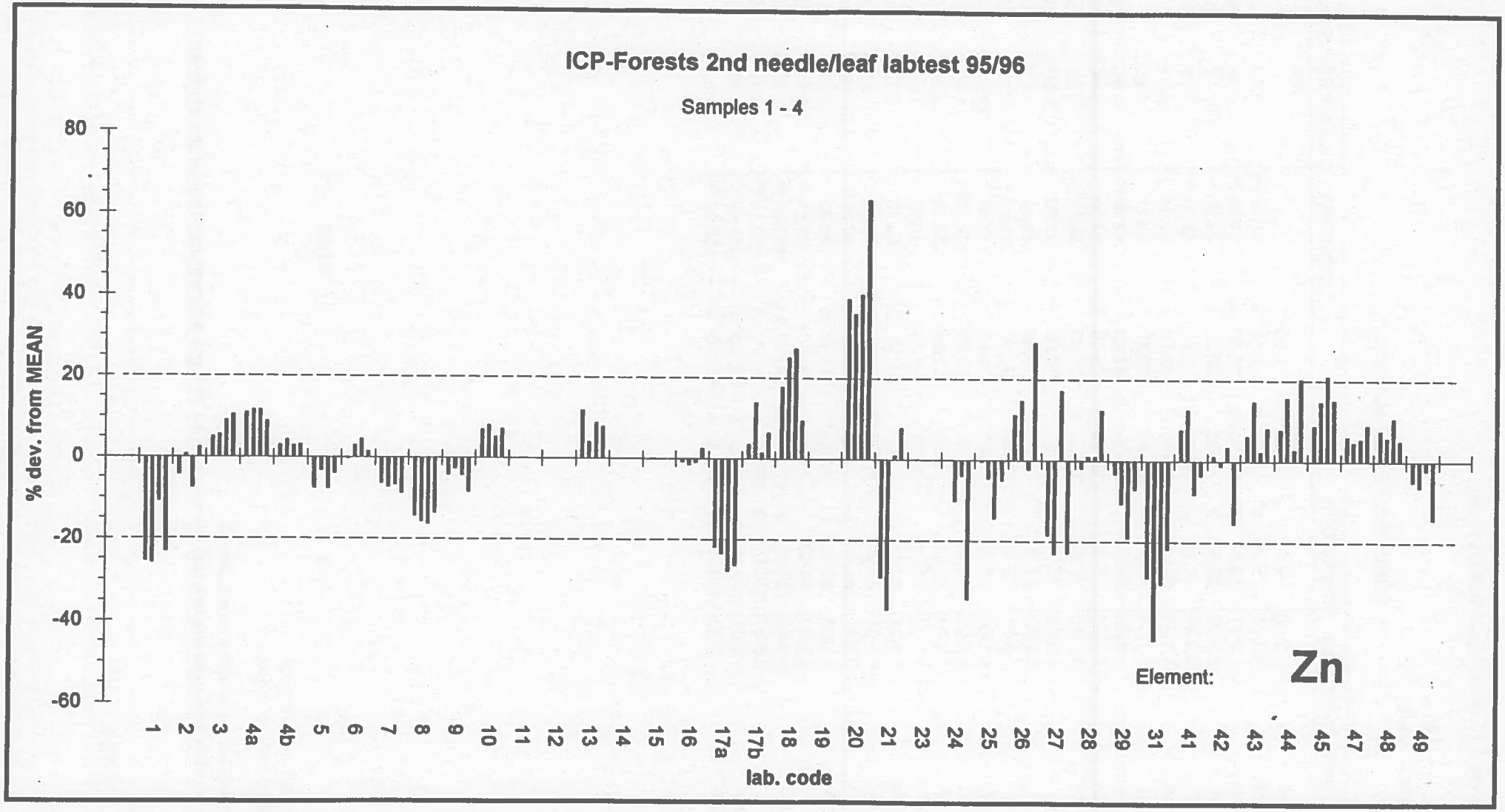
No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	4a	2-40	0.00		0.00		0.00				
2	17b	5.4-31	1.20	a	2.40	a	3.50	a	2.37 **	1.15	48.52
3	4b	2-41	18.00	a	20.00	a	14.00	ab	17.89 **	3.06	17.10
4	31	6.2-20	39.50	b	44.00		60.00	b	44.00 **	10.77	24.48
5	7	3.2-31	48.10		59.40	b	46.50		48.41 **	7.03	14.52
6	44	4.1-31	51.00		51.00		59.00	b	52.11	4.62	8.87
7	41	4.1-31	54.90		53.80		55.90		54.87	1.05	1.91
8	14	3-20	65.50		68.30		68.40		67.40	1.65	2.45
9	28	8.3-20	65.30		68.10		76.70	b	68.10	5.94	8.72
10	5	3.7-30	70.00		65.00	b	70.00		68.89	2.89	4.20
11	12	5.1-31	70.00		70.00		70.00		70.00	0.00	0.00
12	2	5.2-31	71.30		69.20		70.60		70.37	1.07	1.52
13	6	5.3-31	72.30		72.30		72.60		72.40	0.17	0.23
14	27	6.1-20	71.70		72.20		75.90		73.06	2.29	3.13
15	45	4.3-31	74.00		75.00		73.00		74.00	1.00	1.35
16	42	6.1-31	75.00		76.00		72.00		74.39	2.08	2.80
17	47	4.1-31	77.00		76.00		75.00		76.00	1.00	1.32
18	17a	6.1-31	80.70		83.50		72.90	b	80.70	5.49	6.80
19	43	4.1-31	82.00		78.00	b	85.00		82.00	3.51	4.28
20	8	3.2-31	45.00	b	96.00	b	87.00		87.00	27.22	31.29
21	10	6.1-20	82.90	b	88.90		101.10	b	88.90	9.27	10.43
22	9	6.2-30	94.00		99.50		96.00		96.11	2.78	2.89
23	26	3-1-32	116.00	a	110.00	ab	120.00	ab	116.00 **	5.03	4.34
24	18	3.8-31	135.90	ab	128.40	a	129.70	a	130.16 **	4.01	3.08
25	25	5-31	129.60	ab	140.10	a	136.60	a	136.60 **	5.35	3.92
26	24	6-30	480.00	ab	490.00	a	487.00	a	487.00 **	5.13	1.05

Mean 74.25

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** 30 % from mean (proposal of the author)

Annotation:
Mean acc. ISO 5725 72.91


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
80
60
40
20
0
-20
-40
-60
Element:
Zn
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
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24
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42
43
44
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47
48
49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Zn
Dimension: µg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	21	0	27.99	a	30.48	ab	27.53	a	27.99 **	1.59	5.68
2	31	3.5-20	28.10	a	29.00	ab	26.90	ab	28.10 **	1.05	3.74
3	1	3.6-20	28.60	a	31.60	ab	29.40	a	29.40 **	1.55	5.27
4	17a	6.1-31	31.10	a	30.80	a	30.60	a	30.83 **	0.25	0.81
5	27	6.1-20	32.50	a	32.00	a	32.00	a	32.17	0.29	0.90
6	8	3.2-31	33.90		33.80		33.70		33.80	0.10	0.30
7	5	3.7-20	36.50		37.00		36.00		36.50	0.50	1.37
8	7	3.2-31	37.50		36.80		36.70		36.97	0.44	1.19
9	49	6-20	37.00		38.00				37.50	0.71	1.89
10	2	5.2-31	37.80		41.40	b	37.30		37.80	2.24	5.93
11	9	6.2-20	38.10		37.80		37.60		37.83	0.25	0.66
12	29	5.1-31	38.20		41.10	b	37.10	b	38.20	2.07	5.42
13	28	5.1-20	38.30		39.00		39.00		38.78	0.40	1.03
14	16	3.9-20	39.20		39.60		38.50		39.18	0.56	1.43
15	25	5-31	39.20		39.80		39.10		39.37	0.38	0.97
16	6	5.3-31	39.20		39.20		40.70	b	39.42	0.87	2.21
17	24	6-20	36.30	b	42.00	b	39.50		39.50	2.86	7.24
18	42	6.1-31	41.00	b	38.00	b	40.00		40.00	1.53	3.83
19	4b	2-41	40.80		40.30		41.10		40.73	0.40	0.98
20	17b	5.4-31	43.60	b	41.00		39.60	b	41.00	2.03	4.95
21	3	3.7-31	41.10		41.70		41.80		41.53	0.38	0.92
22	47	4.1-31	41.80		42.20		41.90		41.97	0.21	0.50
23	43	4.1-31	40.00	b	42.00		43.00	b	42.00	1.53	3.64
24	10	6.1-20	42.50		42.50		41.90		42.30	0.35	0.83
25	48	4.1-31	56.50	b	41.30	b	42.50		42.50	8.45	19.88
26	41	4.1-21	46.50	b	40.50	b	42.60		42.60	3.04	7.14
27	44	4.1-31	42.50		43.00		42.40		42.63	0.32	0.75
28	45	4.3-31	43.00		43.00		43.00		43.00	0.00	0.00
29	4a	2-40	42.80	b	44.00		44.20		43.88	0.76	1.73
30	26	3.1-32	44.00		40.00	b	49.00	b	44.00	4.51	10.25
31	13	3.3-20	44.20		44.90		43.80		44.22	0.56	1.27
32	18	3.8-31	46.70	a	44.80	ab	46.90	a	46.58	1.16	2.49
33	20	0	55.00	a	55.00	a	58.00	ab	55.22 **	1.73	3.13

Mean 39.56

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/- 20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 39.58

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	31	3.5-20	12.70	a	18.10	ab	13.10	a	13.12 **	3.01	22.94
2	21	0	12.80	ab	14.79	a	19.09	ab	14.79 **	3.21	21.70
3	1	3.6-20	17.20	a	17.20	a	17.80	a	17.40 **	0.35	2.01
4	17a	6.1-31	17.70		17.90		18.30		17.97 **	0.31	1.73
5	27	6.1-20	18.40		17.90		17.90		18.07 **	0.29	1.60
6	8	3.2-31	19.30		20.00		20.00		19.78	0.40	2.02
7	29	5.1-31	21.10		19.00	b	21.30		20.98	1.27	6.05
8	24	6-20	20.80		21.50		21.00		21.10	0.36	1.71
9	7	3.2-31	21.70		22.20		21.50		21.80	0.36	1.65
10	49	6-20	22.00		22.00				22.00	0.00	0.00
11	25	5-31	22.20		22.20		23.20	b	22.42	0.58	2.59
12	5	3.7-20	22.50		23.50	b	22.50		22.72	0.58	2.55
13	9	6.2-20	22.90		23.10		22.60		22.87	0.25	1.09
14	16	3.9-20	22.80		23.20		23.40		23.13	0.31	1.34
15	42	6.1-31	23.00		23.00		24.00	b	23.22	0.58	2.50
16	2	5.2-31	23.70		24.10		22.40	b	23.68	0.89	3.76
17	28	5.1-20	23.70		24.80	b	23.40		23.77	0.74	3.11
18	6	5.3-31	24.00		24.10		24.60		24.23	0.32	1.32
19	13	3.3-20	24.60		24.80		23.90		24.48	0.47	1.92
20	4b	2-41	24.50		24.60		24.50		24.53	0.06	0.24
21	47	4.1-31	24.70		24.60		24.60		24.63	0.06	0.24
22	3	3.7-31	25.10		25.00		24.40		24.83	0.38	1.53
23	48	4.1-31	24.30		28.90	b	24.90		24.90	2.50	10.04
24	10	6.1-20	25.50		25.70		25.10		25.43	0.31	1.22
25	4a	2-40	25.50	b	26.30		26.70		26.28	0.61	2.32
26	41	4.1-21	22.00	b	27.00		26.50		26.50	2.75	10.38
27	17b	5.4-31	25.50	b	29.70	b	26.80		26.80	2.15	8.02
28	26	3.1-32	27.00		25.00	b	30.00	b	27.00	2.52	9.33
29	43	4.1-31	27.00		23.00	b	31.00	b	27.00	4.00	14.81
30	45	4.3-31	27.00		27.00		27.00		27.00	0.00	0.00
31	44	4.1-31	26.70		27.20		28.00	b	27.20	0.66	2.43
32	18	3.8-31	30.00	a	29.40	a	28.30	ab	29.40 **	0.86	2.93
33	20	0	34.00	ab	30.00	ab	32.00	a	32.00 **	2.00	6.25

Mean 23.53

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 23.45

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Zn
Dimension: µg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	31	3.5-20	19.60	a	22.20	ab	19.60	a	19.93 **		1.50	7.53
2	17a	6.1-31	20.70	a	21.50	a	19.70	a	20.70 **		0.90	4.35
3	29	5.1-31	23.10	a	22.70	a	23.70	a	23.17		0.50	2.16
4	8	3.2-31	23.40		24.80		23.80		23.93		0.72	3.01
5	25	5-31	24.50		25.50		23.60		24.50		0.95	3.88
6	1	3.6-20	25.20		25.40		26.00		25.53		0.42	1.65
7	41	4.1-21	25.60		26.30		30.50	b	26.30		2.65	10.08
8	5	3.7-20	26.50		27.00		25.50		26.42		0.76	2.88
9	2	5.2-31	27.90	b	25.40		26.50		26.50		1.25	4.72
10	7	3.2-31	26.70		28.20	b	25.10	b	26.70		1.55	5.81
11	9	6.2-20	27.30		27.10		27.80		27.40		0.36	1.31
12	24	6-20	28.50		27.50		26.50		27.50		1.00	3.64
13	26	3.1-32	27.00		28.00		31.00	b	28.00		2.08	7.43
14	49	6-20	28.00		28.00				28.00		0.00	0.00
15	16	3.9-20	28.40		29.00		27.00	b	28.37		1.03	3.63
16	21	0	28.89		28.39		31.93	b	28.97		1.92	6.63
17	28	5.1-20	29.70		28.90		28.40		28.98		0.66	2.28
18	17b	5.4-31	30.90	b	26.80	b	29.10		29.10		2.06	7.08
19	43	4.1-31	31.00	b	29.00		29.00		29.33		1.15	3.92
20	4b	2-41	29.80		28.50		29.90		29.52		0.78	2.64
21	44	4.1-31	29.70		30.00		28.40	b	29.52		0.85	2.88
22	42	6.1-31	30.00		29.00		30.00		29.67		0.58	1.95
23	6	5.3-31	30.40		30.20		29.00		29.97		0.76	2.54
24	10	6.1-20	31.40	b	29.90		29.80		30.18		0.90	2.98
25	47	4.1-31	30.50		29.80		30.40		30.23		0.38	1.26
26	13	3.3-20	30.60		31.10		32.70	b	31.18		1.10	3.53
27	3	3.7-31	31.20		31.30		31.40		31.30		0.10	0.32
28	48	4.1-31	31.30		31.40		32.50		31.68		0.67	2.11
29	4a	2-40	32.20		32.50		30.70	b	32.02		0.96	3.00
30	27	6.1-20	33.60		38.80	b	26.70	b	33.60		6.07	18.07
31	45	4.3-31	35.00	a	35.00	a	34.00	a	34.67 **		0.58	1.67
32	18	3.8-31	36.90	a	36.50	a	36.10	a	36.50 **		0.40	1.10
33	20	0	41.00	a	40.00	a	40.00	a	40.33 **		0.58	1.44

Mean **28.68**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **28.86**

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Zn
Dimension: µg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

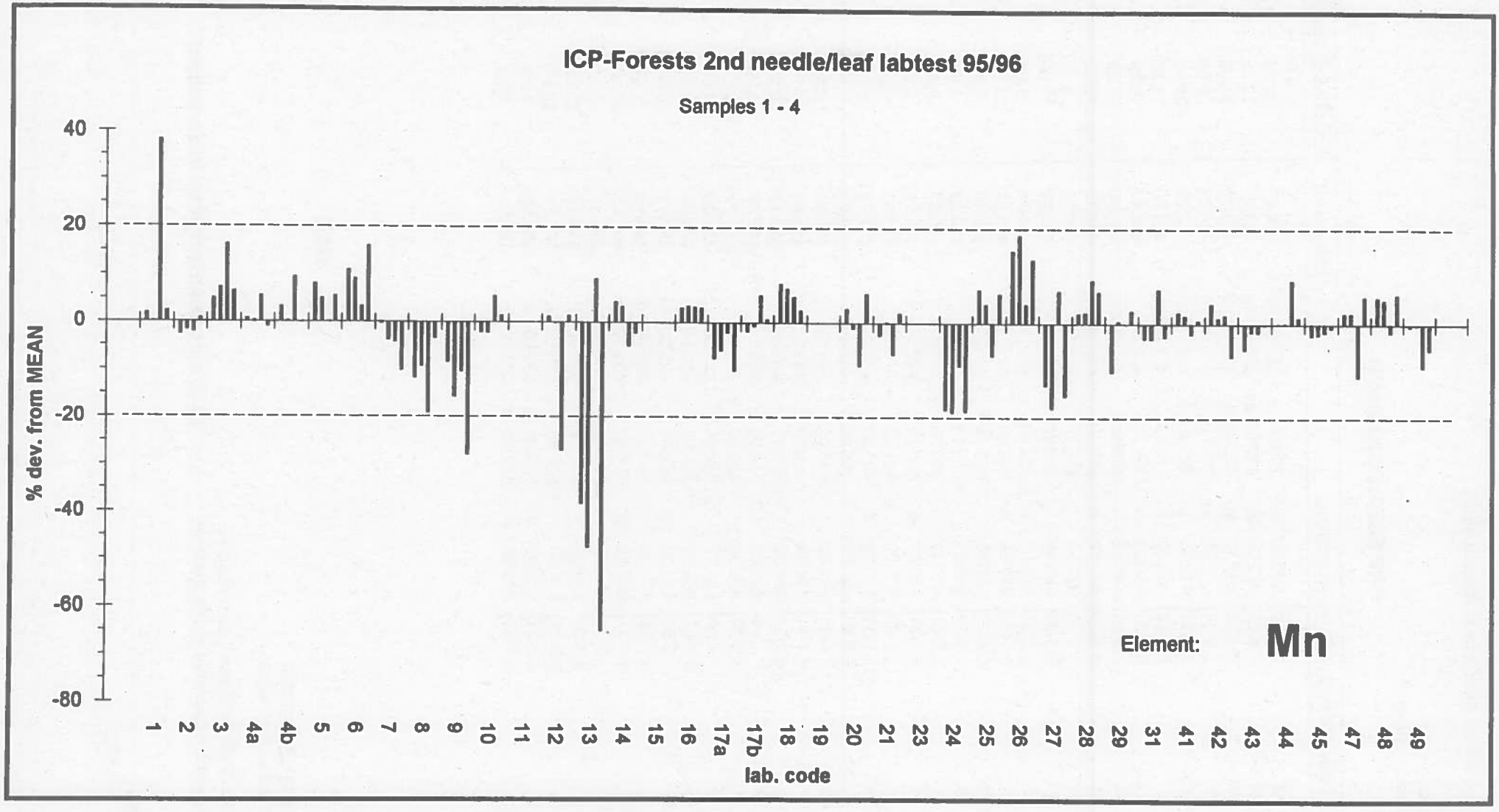
No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	24	6-20	18.80	a	19.30	a	18.00	ab	18.80	**	0.66	3.51
2	17a	6.1-31	21.30	a	21.20	a	20.80	a	21.10	**	0.26	1.23
3	1	3.6-20	20.40	ab	22.00	a	23.80	ab	22.00	**	1.70	7.73
4	27	6.1-20	23.70	b	22.10		20.60	b	22.10	**	1.55	7.01
5	31	3.5-20	21.70		22.80		22.40		22.38	**	0.56	2.50
6	42	6.1-31	24.00		26.00	b	24.00		24.22		1.15	4.75
7	49	6-20	24.00		25.00				24.50		0.71	2.90
8	8	3.2-31	24.70		24.70		24.70		24.70		0.00	0.00
9	7	3.2-31	26.00		26.40		26.00		26.13		0.23	0.88
10	9	6.2-20	26.60		25.90		26.20		26.23		0.35	1.33
11	29	5.1-31	26.60		26.00		29.30	b	26.60		1.76	6.62
12	25	5-31	26.30	b	27.20		28.50	b	27.20		1.11	4.08
13	5	3.7-20	27.50		27.50		27.50		27.50		0.00	0.00
14	41	4.1-21	28.70	b	24.20	b	27.60		27.60		2.35	8.51
15	6	5.3-31	29.10		28.60		31.00	b	29.10		1.27	4.36
16	2	5.2-31	29.00		29.50		29.60		29.37		0.32	1.09
17	16	3.9-20	29.40		29.30		29.50		29.40		0.10	0.34
18	4b	2-41	29.90		29.70		28.40	b	29.58		0.81	2.74
19	48	4.1-31	30.00		30.40		29.90		30.10		0.26	0.86
20	17b	5.4-31	32.40	b	29.90		30.50		30.50		1.31	4.30
21	10	6.1-20	30.90		30.90		30.40		30.73		0.29	0.94
22	21	0	27.43	b	30.91		33.27	b	30.91		2.94	9.51
23	13	3.3-20	31.20		30.90		30.70		30.93		0.25	0.81
24	43	4.1-31	32.00	b	30.00	b	31.00		31.00		1.00	3.23
25	4a	2-40	30.30	b	31.20		31.80		31.20		0.75	2.40
26	47	4.1-31	31.10		31.00		31.50		31.20		0.26	0.83
27	18	3.8-31	31.40		30.80		31.90		31.40		0.55	1.75
28	3	3.7-31	32.20		31.60		31.30		31.67		0.46	1.45
29	28	5.1-20	32.40		32.40		31.90		32.23		0.29	0.90
30	45	4.3-31	33.00		33.00		33.00		33.00		0.00	0.00
31	44	4.1-31	35.20		34.10		34.40		34.47	**	0.57	1.65
32	26	3.1-32	37.00	a	33.00	ab	38.00	ab	37.00	**	2.65	7.16
33	20	0	44.00	ab	48.00	ab	47.00	a	47.00	**	2.08	4.43

Mean **28.68**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **28.31**


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
40
20
0
-20
-40
-60
-80
Element:
Mn
1
2
3
4a
4b
5
6
7
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11
12
13
14
15
16
17a
17b
18
19
20
21
23
24
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49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Mn
Dimension: µg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	13	3.3-20	300.00	ab	290.00	a	280.00	ab	290.00	**	10.00	3.45
2	24	6-20	372.00	ab	410.00	ab	385.00	a	385.00		19.31	5.02
3	27	6.1-20	461.10	ab	402.40	ab	409.70	a	409.70		31.99	7.81
4	8	3.2-31	416.00	a	419.00	a	415.00	a	416.67		2.08	0.50
5	29	5.1-31	418.50	a	423.30	a	458.70	ab	423.30		21.96	5.19
6	9	6.2-20	444.00	b	432.00		421.00	b	432.00		11.50	2.66
7	17a	6.1-31	453.20	b	433.20		435.30		436.47		10.99	2.52
8	43	4.1-31	446.00		453.00		439.00		446.00		7.00	1.57
9	31	3.5-20	442.50	b	457.10		462.20		457.10		10.22	2.24
10	21	0	460.80		459.20		458.50		459.50		1.18	0.26
11	2	5.2-31	459.80		470.30	b	448.30	b	459.80		11.00	2.39
12	45	4.3-31	452.00	b	462.00		463.00		460.28		6.08	1.32
13	10	6.1-20	495.60	b	458.50		461.00		461.97		20.74	4.49
14	17b	5.4-31	467.40		461.70		460.20		463.10		3.80	0.82
15	49	6-20	465.00		475.00				470.00		7.07	1.50
16	7	3.2-31	474.80		470.30		463.30		470.30		5.80	1.23
17	44	4.1-31	480.00	b	470.00		470.00		472.22		5.77	1.22
18	4a	2-40	470.00		481.00		475.50		475.50		5.50	1.16
19	12	5.1-31	470.00	b	480.00		480.00		477.78		5.77	1.21
20	1	3.6-20	480.00		482.00		480.00		480.67		1.15	0.24
21	28	5.1-20	481.00		480.00		486.00		482.33		3.21	0.67
22	47	4.1-31	484.30		480.90		482.30		482.50		1.71	0.35
23	41	4.1-31	486.30		481.10		483.90		483.77		2.60	0.54
24	20	0	491.00		484.00		485.00		486.67		3.79	0.78
25	16	3.9-20	485.20		489.40		485.70		486.77		2.29	0.47
26	4b	2-41	490.00		482.00		489.00		487.28		4.36	0.89
27	42	6.1-31	495.00		491.00		490.00		492.00		2.65	0.54
28	14	3-20	461.00	b	494.00		496.00		492.78		19.66	3.99
29	3	3.7-31	499.00		497.00		485.00	b	495.78		7.57	1.53
30	48	4.1-31	642.30	b	498.50		494.50		498.72		84.20	16.88
31	25	5-31	505.80		504.10		508.20		506.03		2.06	0.41
32	5	3.7-20	510.00		490.00	b	535.00	b	510.00		22.55	4.42
33	18	3.8-31	510.00		508.00		530.00	b	511.22		12.17	2.38
34	6	5.3-31	523.00	a	524.00	a	526.00	a	524.33		1.53	0.29
35	26	3.1-32	545.00	a	550.00	a	540.00	a	545.00		5.00	0.92

Mean 472.5

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 474.2

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	13	3.3-20	400.00	a	400.00	a	410.00	a	402.50 **	5.77	1.43
2	24	6-20	625.00	a	590.00	ab	635.00	ab	625.00	23.63	3.78
3	27	6.1-20	634.60	a	634.10	a	617.20	ab	631.85	9.90	1.57
4	9	6.2-20	655.00	a	609.00	ab	649.00	a	649.00	25.01	3.85
5	8	3.2-31	694.00	a	698.00	a	702.00	a	698.00	4.00	0.57
6	17a	6.1-31	719.90		726.10		727.10		724.37	3.90	0.54
7	7	3.2-31	756.00	b	740.90		716.30	b	740.90	20.04	2.70
8	31	3.5-20	718.80	b	752.00		745.30		745.30	17.56	2.36
9	10	6.1-20	756.00		747.80		755.00		753.00	4.47	0.59
10	45	4.3-31	753.00		754.00		754.00		753.67	0.58	0.08
11	2	5.2-31	758.10		760.90		749.90		757.00	5.72	0.76
12	43	4.1-31	756.00		759.00		758.00		757.67	1.53	0.20
13	20	0	767.00		762.00		757.00		762.00	5.00	0.66
14	17b	5.4-31	765.60		768.60		754.60	b	764.60	7.37	0.96
15	12	5.1-31	780.00	b	770.00		760.00	b	770.00	10.00	1.30
16	49	6-20	750.00	b	790.00	b			770.00	28.28	3.67
17	1	3.6-20	754.00	b	788.00	b	771.00		771.00	17.00	2.20
18	4b	2-41	770.00		770.00		780.00		772.50	5.77	0.75
19	44	4.1-31	770.00		770.00		790.00	b	772.50	11.55	1.50
20	21	0	773.00		786.70	b	763.90		773.00	11.48	1.49
21	4a	2-40	770.00		772.00		779.00		773.50	4.73	0.61
22	29	5.1-31	755.40	b	778.40		776.10		774.75	12.67	1.64
23	42	6.1-31	777.00		781.00		784.00		780.67	3.51	0.45
24	41	4.1-31	782.10		784.90		785.80		784.27	1.93	0.25
25	47	4.1-31	788.40		786.30		788.90		787.87	1.38	0.18
26	28	5.1-20	790.00		793.00		785.00		789.33	4.04	0.51
27	14	3-20	740.00	b	797.00		823.00	b	797.00	42.45	5.33
28	16	3.9-20	799.20		790.20		801.30		797.75	5.90	0.74
29	25	5-31	791.70	b	803.80		805.50		802.15	7.52	0.94
30	5	3.7-20	800.00	b	810.00		840.00	b	810.00	20.82	2.57
31	48	4.1-31	807.90		813.10		810.90		810.63	2.61	0.32
32	3	3.7-31	831.00		827.00		800.00	b	826.50	16.86	2.04
33	18	3.8-31	827.00		843.00	b	813.00	b	827.00	15.01	1.81
34	6	5.3-31	840.00	a	838.00	a	870.00	ab	841.50	17.93	2.13
35	26	3.1-32	915.00	a	910.00	a	920.00	a	915.00	5.00	0.55

Mean 771.4

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/- 20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 766.77

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Mn
Dimension: µg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	29	5.1-31	0.00		0.00		0.00				
2	12	5.1-31	20.00	a	20.00	a	30.00	ab	20.00 **	5.77	28.85
3	8	3.2-31	19.50	ab	22.20	a	35.90	ab	22.20	8.79	39.59
4	47	4.1-31	24.50	b	24.30	b	24.40		24.40	0.10	0.41
5	9	6.2-20	24.70	b	24.60		24.40	b	24.60	0.15	0.61
6	20	0	26.00	b	25.00		22.00	b	25.00	2.08	8.32
7	24	6-20	26.00	b	25.00		25.00		25.00	0.58	2.32
8	49	6-20	25.00		25.00				25.00	0.00	0.00
9	25	5-31	25.60		26.30	b	24.30	b	25.60	1.01	3.95
10	21	0	25.31	b	25.64		26.42	b	25.64	0.57	2.22
11	14	3-20	25.60	b	26.10		26.20	b	26.10	0.32	1.23
12	7	3.2-31	26.30		27.00	b	26.30		26.30	0.40	1.52
13	2	5.2-31	27.50	b	26.90		26.40	b	26.90	0.55	2.04
14	17a	6.1-31	26.80	b	27.50	b	26.90		26.90	0.38	1.41
15	41	4.1-31	27.10	b	26.90		26.70	b	26.90	0.20	0.74
16	43	4.1-31	27.00		26.00	b	27.00		27.00	0.58	2.15
17	45	4.3-31	28.00	b	27.00		27.00		27.00	0.58	2.15
18	48	4.1-31	26.50	b	27.00		27.20	b	27.00	0.36	1.33
19	5	3.7-20	28.00	b	27.50		27.50		27.50	0.29	1.05
20	42	6.1-31	28.00		28.00		28.00		28.00	0.00	0.00
21	6	5.3-31	28.40		28.40		28.40		28.40	0.00	0.00
22	16	3.9-20	28.40		29.40	b	28.40		28.40	0.58	2.04
23	26	3.1-32	28.60		28.50	b	28.70	b	28.60	0.10	0.35
24	4a	2-40	29.00		29.00		27.00	b	29.00	1.15	3.97
25	10	6.1-20	30.00	b	29.00		29.00		29.00	0.58	2.00
26	18	3.8-31	33.20	b	29.00		28.20	b	29.00	2.69	9.28
27	17b	5.4-31	28.90	b	32.40	b	29.10		29.10	1.97	6.77
28	27	6.1-20	29.40		28.90	b	30.90	b	29.40	1.04	3.54
29	31	3.5-20	29.00	b	29.90	b	29.50		29.50	0.45	1.53
30	13	3.3-20	30.00		30.00		30.00		30.00	0.00	0.00
31	28	5.1-20	31.00	b	30.00		30.00		30.00	0.58	1.93
32	44	4.1-31	29.00	b	30.00		30.00		30.00	0.58	1.93
33	4b	2-41	30.10		29.40	b	30.30	b	30.10	0.47	1.56
34	3	3.7-31	33.00	ab	31.00	ab	32.00	a	32.00	1.00	3.13
35	1	3.6-20	38.00	a	36.00	ab	39.00	ab	38.00 **	1.53	4.03

Mean **27.51**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **27.57**

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Mn
Dimension: µg/g
Sample: 4 SPRUCE NEEDLES (Germany)

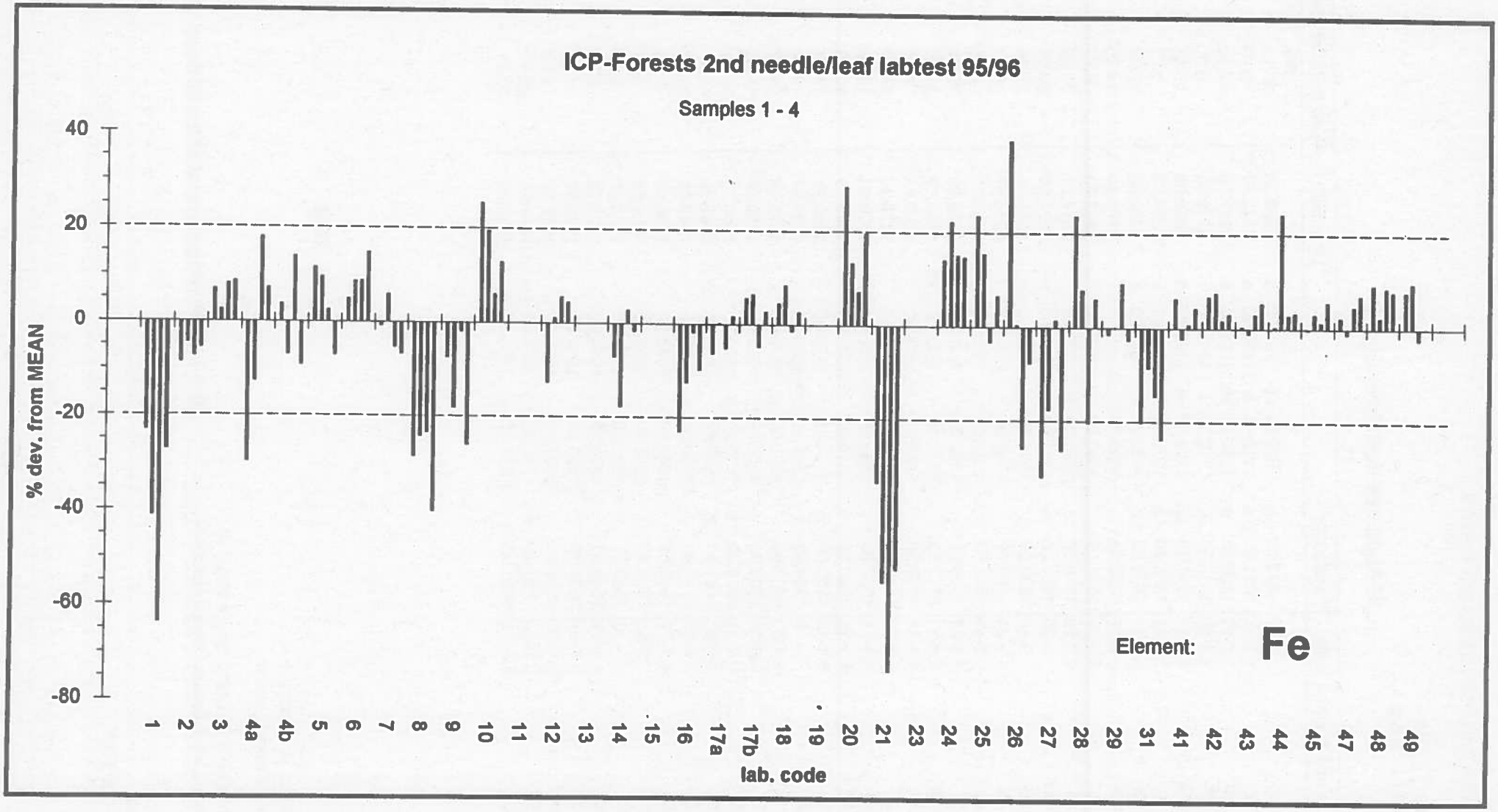
No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	13	3.3-20	540.00	a	520.00	ab	550.00	a	538.94	**	15.28	2.84
2	9	6.2-20	1111.00	a	1118.00	a	1127.00	a	1118.67	**	8.02	0.72
3	24	6-20	1250.00	a	1285.00	ab	1267.00	a	1267.00		17.50	1.38
4	27	6.1-20	1318.50	a	1318.50	a	1318.50	a	1318.50		0.00	0.00
5	17a	6.1-31	1367.40	ab	1398.90	a	1427.20	ab	1398.90		29.91	2.14
6	7	3.2-31	1395.50	a	1402.30	a	1401.30	a	1399.70		3.67	0.26
7	42	6.1-31	1480.00	b	1450.00		1410.00	b	1450.00		35.12	2.42
8	49	6-20	1455.00		1490.00				1472.50		24.75	1.68
9	8	3.2-31	1510.00		1500.00		1500.00		1503.33		5.77	0.38
10	31	3.5-20	1514.30		1576.50	b	1503.00		1514.71		39.58	2.61
11	14	3-20	1464.00	b	1523.00		1590.00	b	1523.00		63.04	4.14
12	4a	2-40	1530.00		1541.00		1588.00	b	1541.56		30.81	2.00
13	45	4.3-31	1550.00		1546.00		1541.00		1545.67		4.51	0.29
14	4b	2-41	1553.00		1560.00		1553.00		1555.33		4.04	0.26
15	43	4.1-31	1556.00		1569.00		1538.00	b	1556.00		15.57	1.00
16	17b	5.4-31	1577.30		1551.10		1572.00		1568.59		13.85	0.88
17	41	4.1-31	1559.10		1567.90		1578.90		1568.63		9.92	0.63
18	2	5.2-31	1583.00		1554.00		1571.00		1570.94		14.57	0.93
19	44	4.1-31	1590.00		1580.00		1560.00	b	1578.94		15.28	0.97
20	12	5.1-31	1580.00		1570.00		1590.00		1580.00		10.00	0.63
21	10	6.1-20	1600.00	b	1574.00		1575.00		1580.56		14.73	0.93
22	21	0	1584.90		1594.30		1590.70		1589.97		4.74	0.30
23	1	3.6-20	1600.00		1550.00	b	1600.00		1593.94		28.87	1.81
24	18	3.8-31	1599.00		1588.00		1622.00	b	1599.56		17.35	1.08
25	29	5.1-31	2589.20	b	1543.20	b	1600.70		1600.70		588.01	36.73
26	16	3.9-20	1541.10	b	1607.60		1625.50	b	1607.60		44.47	2.77
27	5	3.7-20	1645.00		1690.00	b	1630.00		1645.00		31.22	1.90
28	47	4.1-31	1649.80		1642.60		1648.20		1646.87		3.78	0.23
29	25	5-31	1651.00		1652.00		1661.00		1654.67		5.51	0.33
30	20	0	1660.00		1661.00		1646.00		1655.67		8.39	0.51
31	48	4.1-31	1649.30		1656.10		1661.90		1655.77		6.31	0.38
32	3	3.7-31	1659.00		1660.00		1661.00		1660.00		1.00	0.06
33	28	5.1-20	1662.00		1664.00		1663.00		1663.00		1.00	0.06
34	26	3.1-32	1770.00	a	1750.00	ab	1800.00	ab	1770.00		25.17	1.42
35	6	5.3-31	1736.00	ab	1823.00	a	1808.00	a	1808.00		46.51	2.57

Mean 1559

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 1561.65


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
40
20
0
-20
-40
-60
-80
Element:
Fe
1
2
3
4a
4b
5
6
7
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9
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11
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13
14
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17a
17b
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19
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lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Fe
Dimension: µg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	21	0	45.15	a	47.24	a	45.84	a	46.08	**	1.06	2.30
2	27	6.1-20	47.20	a	47.20	a	47.20	a	47.20	**	0.00	0.00
3	4a	2-40	48.00	a	49.50	a	48.70	a	48.73	**	0.75	1.54
4	8	3.2-31	50.40	a	49.20	a	49.20	a	49.60	**	0.69	1.39
5	1	3.6-20	34.00	b	54.00		54.00		53.33	**	11.55	21.66
6	16	3.9-20	52.60		53.70		54.20		53.50	**	0.82	1.53
7	31	3.5-20	58.60	b	55.00		54.60		55.47	**	2.20	3.97
8	12	5.1-31	60.00		80.00	b	60.00		60.67		11.55	19.04
9	2	5.2-31	64.80		63.10		62.50		63.47		1.19	1.87
10	9	6.2-20	63.00		66.50		64.30		64.32		1.77	2.75
11	14	3-20	62.00	b	65.20		65.20		64.53		1.85	2.87
12	17a	6.1-31	64.60		64.30		67.20		65.12		1.59	2.44
13	29	5.1-31	64.70	b	69.90		68.50		68.50		2.69	3.93
14	7	3.2-31	73.40	b	68.90		67.30		68.90		3.16	4.59
15	45	4.3-31	69.00		69.00		70.00		69.33		0.58	0.84
16	43	4.1-31	71.00		70.00		67.00	b	69.83		2.08	2.98
17	44	4.1-31	71.00		67.00	b	70.00		69.83		2.08	2.98
18	47	4.1-31	71.10		71.50		70.80		71.13		0.35	0.49
19	4b	2-41	73.00		71.60		71.90		72.17		0.74	1.03
20	18	3.8-31	72.70		70.90		79.60	b	72.70		4.59	6.31
21	6	5.3-31	72.80		71.80		75.50	b	72.97		1.91	2.62
22	17b	5.4-31	78.20	b	73.40		68.20	b	73.40		5.00	6.81
23	41	4.1-31	74.60		73.00		74.10		73.90		0.82	1.11
24	42	6.1-31	76.00		74.00		73.00		74.17		1.53	2.06
25	3	3.7-31	75.00		73.00		75.00		74.33		1.15	1.55
26	49	6-20	70.00	b	80.00	b			75.00		7.07	9.43
27	48	4.1-31	97.10	b	75.60		74.90		75.92		12.62	16.62
28	5	3.7-20	77.50		76.00		87.50	b	77.50		6.25	8.06
29	24	6-20	80.00		73.00	b	80.00		79.33		4.04	5.09
30	25	5-31	81.70	b	87.10		86.10		85.93	**	2.87	3.34
31	28	5.1-20	90.00	b	86.00		82.00	b	86.00	**	4.00	4.65
32	10	6.1-20	87.80		87.80		85.60		87.13	**	1.27	1.46
33	20	0	97.00	ab	90.00	a	86.00	ab	90.00	**	5.57	6.19
34	26	3.1-32	97.00	a	100.00	ab	95.00	a	97.00	**	2.52	2.60

Mean 69.55

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/- 20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 69.57

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	21	0	49.27 a	51.73 a	47.28 a	49.43 **	2.23	4.51
2	1	3.6-20	81.00 ab	62.00 a	64.00 a	64.22 **	10.44	16.26
3	8	3.2-31	120.00 ab	75.80 ab	82.80 a	82.80 **	23.76	28.70
4	9	6.2-20	92.10	83.70	89.50	89.50	4.30	4.80
5	14	3-20	89.30	90.00	90.50	89.93	0.60	0.67
6	27	6.1-20	84.10	90.90	91.50	89.98	4.11	4.57
7	4a	2-40	95.50	94.65	96.40	95.52	0.88	0.92
8	16	3.9-20	95.70	98.80	92.00	95.70	3.40	3.55
9	31	3.5-20	77.80 b	138.10 b	100.00	100.00	30.50	30.50
10	4b	2-41	101.20	101.90	102.10	101.73	0.47	0.46
11	2	5.2-31	95.50 b	115.60 b	104.40	104.40	10.07	9.65
12	41	4.1-31	107.80	108.60	102.30	106.98	3.43	3.21
13	47	4.1-31	107.70	111.70	106.20	108.17	2.84	2.63
14	43	4.1-31	106.00	108.00	114.00	108.22	4.16	3.84
15	29	5.1-31	121.50 b	107.80	108.90	109.57	7.61	6.95
16	17a	6.1-31	110.40	104.20	111.40	109.68	3.90	3.56
17	26	3.1-32	110.00	100.00 b	115.00	110.00	7.64	6.95
18	12	5.1-31	110.00	110.00	112.00	110.67	1.15	1.04
19	48	4.1-31	122.50 b	112.10	108.60	112.10	7.23	6.45
20	3	3.7-31	114.00	113.00	108.00	112.28	3.21	2.86
21	45	4.3-31	163.00 b	112.00	111.00	112.72	29.74	26.38
22	7	3.2-31	130.20 b	115.90	102.90 b	115.90	13.66	11.79
23	17b	5.4-31	109.20 b	117.40	118.00	116.48	4.92	4.22
24	42	6.1-31	123.00	116.00	117.00	117.72	3.79	3.22
25	28	5.1-20	106.00 b	120.00	119.00	118.28	7.81	6.60
26	18	3.8-31	127.60 b	118.70	103.00 b	118.70	12.46	10.50
27	6	5.3-31	119.00	136.00 b	114.00	119.00	11.53	9.69
28	5	3.7-20	120.00	114.00	133.00 b	120.00	9.71	8.09
29	49	6-20	118.00	122.00		120.00	2.83	2.36
30	20	0	123.00	126.00	123.00	124.00	1.73	1.40
31	25	5-31	119.80 b	126.50	135.80 b	126.50	8.04	6.36
32	10	6.1-20	128.50	130.80	178.80 b	130.87	28.40	21.70
33	24	6-20	135.00 a	135.00 a	120.00 ab	133.78 **	8.66	6.47
34	44	4.1-31	150.00 ab	136.00 a	100.00 ab	136.00 **	25.79	18.96

Mean 109.5

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 111.95

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Fe
Dimension: µg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	21	0	79.36	a	79.86	a	120.80	ab	81.72 **	23.78	29.10
2	1	3.6-20	124.00	ab	108.00	a	112.00	a	112.11 **	8.33	7.43
3	26	3.1-32	230.00	a	225.00	a	235.00	a	230.00 **	5.00	2.17
4	8	3.2-31	240.00	a	234.00	a	238.00	a	237.33 **	3.06	1.29
5	28	5.1-20	213.00	ab	251.00	a	247.00	a	246.89 **	20.88	8.46
6	31	3.5-20	264.00		265.70		265.60		265.10	0.95	0.36
7	2	5.2-31	285.40		288.20		288.70		287.43	1.78	0.62
8	7	3.2-31	291.50		297.60		291.70		293.60	3.47	1.18
9	17a	6.1-31	288.70		294.90		298.00		294.34	4.74	1.61
10	17b	5.4-31	294.50		292.50		336.20	b	295.61	24.67	8.35
11	25	5-31	299.40		304.10		297.50		300.33	3.40	1.13
12	49	6-20	292.00	b	314.00	b			303.00	15.56	5.14
13	9	6.2-20	294.00	b	307.00		306.00		304.39	7.23	2.38
14	16	3.9-20	331.60	b	304.80		289.60	b	304.80	21.27	6.98
15	18	3.8-31	326.60	b	304.80		303.10		306.06	13.10	4.28
16	41	4.1-31	306.90		314.60		315.80		313.09	4.83	1.54
17	45	4.3-31	315.00		316.00		313.00		314.67	1.53	0.49
18	27	6.1-20	315.30		319.50		292.20	b	315.29	14.70	4.66
19	42	6.1-31	305.00	b	316.00		320.00		315.89	7.77	2.46
20	5	3.7-20	316.50		316.50		323.00		318.61	3.75	1.18
21	44	4.1-31	323.00		320.00		310.00	b	319.39	6.81	2.13
22	14	3-20	317.00		318.00		337.00	b	319.61	11.27	3.53
23	43	4.1-31	319.00		317.00		324.00		320.00	3.61	1.13
24	47	4.1-31	325.80		326.10		323.30		325.07	1.54	0.47
25	12	5.1-31	330.00		310.00	b	330.00		327.89	11.55	3.52
26	10	6.1-20	377.00	b	329.30		325.50		329.51	28.70	8.71
27	20	0	345.00	b	332.00		330.00		333.11	8.14	2.44
28	3	3.7-31	339.00		337.00		331.00		335.89	4.16	1.24
29	48	4.1-31	333.20		349.40	b	337.20		337.31	8.44	2.50
30	6	5.3-31	337.00		338.00		339.00		338.00	1.00	0.30
31	29	5.1-31	321.90	b	341.00		343.10		339.94	11.68	3.44
32	4b	2-41	351.60		355.40		354.50		353.83	1.99	0.56
33	24	6-20	350.00	ab	360.00	a	360.00	a	357.89	5.77	1.61
34	4a	2-40	356.00	ab	366.20	a	372.00	a	366.20	8.10	2.21

Mean 310.7

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 305.32

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Fe
Dimension: µg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

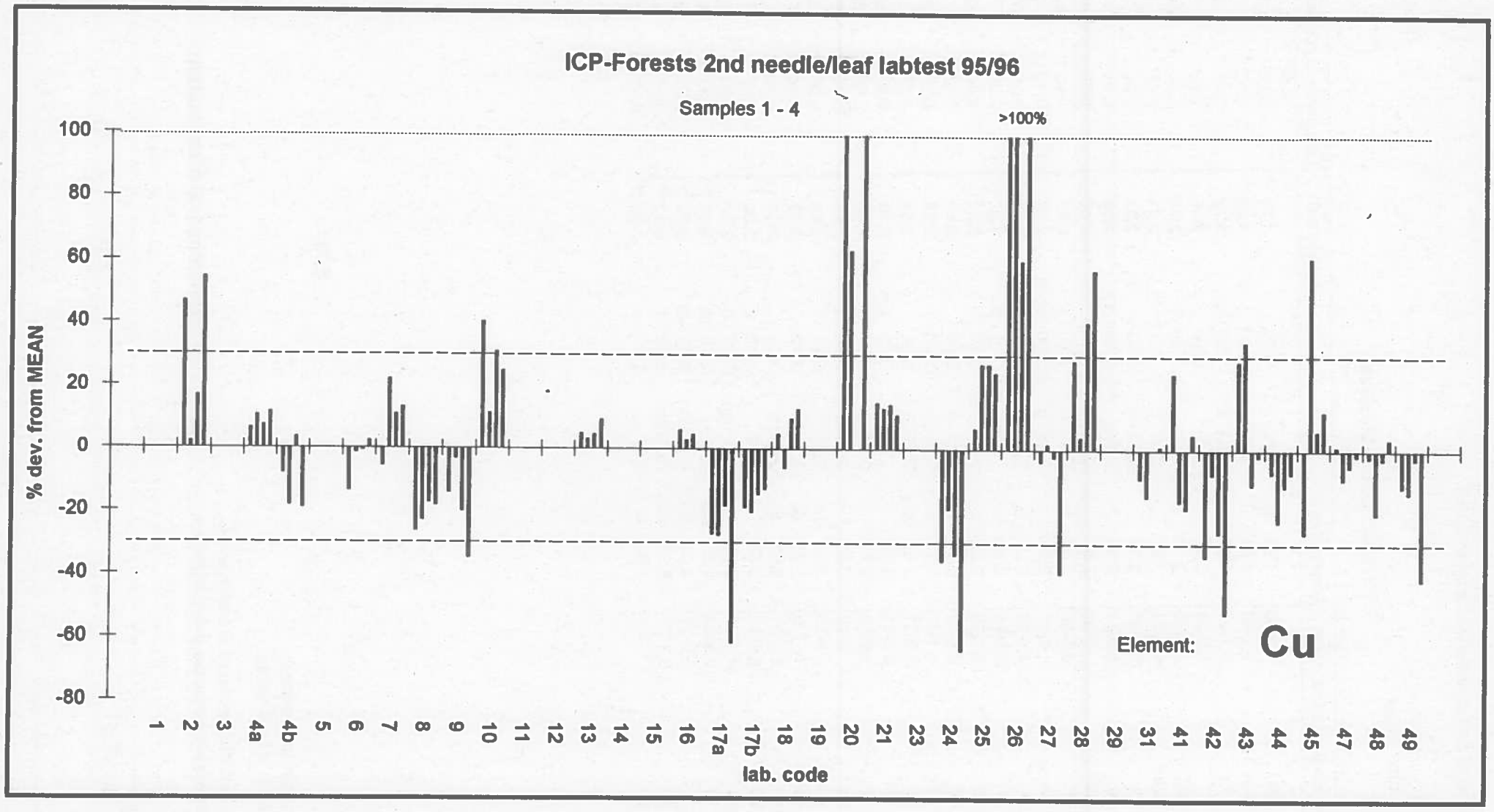
No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	21	0	84.76	a	76.88	ab	83.22	a	82.88	**	4.18	5.04
2	8	3.2-31	104.00	a	101.00	a	105.00	a	103.39	**	2.08	2.01
3	1	3.6-20	147.00	ab	126.00	a	92.00	ab	126.00	**	27.75	22.02
4	27	6.1-20	128.10	a	129.20	a	121.30	ab	127.54	**	4.28	3.36
5	9	6.2-20	126.00	a	130.00	a	128.00	a	128.00	**	2.00	1.56
6	31	3.5-20	121.50	ab	131.90	a	144.70	ab	131.90	**	11.62	8.81
7	16	3.9-20	156.70		156.20		156.20		156.37		0.29	0.19
8	4b	2-41	158.80		156.70		156.80		157.43		1.18	0.75
9	26	3.1-32	160.00		155.00	b	165.00	b	160.00		5.00	3.13
10	5	3.7-20	141.00	b	161.00		185.00	b	161.00		22.03	13.68
11	7	3.2-31	161.20		162.40		160.90		161.50		0.79	0.49
12	2	5.2-31	165.90		162.50		162.50		163.61		1.96	1.20
13	29	5.1-31	167.20		171.40		168.00		168.71		2.23	1.32
14	14	3-20	158.00	b	171.00		172.00		170.39		7.81	4.58
15	49	6-20	167.00	b	180.00	b			173.50		9.19	5.30
16	17a	6.1-31	174.20		179.50		176.30		176.36		2.67	1.51
17	18	3.8-31	178.10		174.10	b	184.50	b	178.10		5.25	2.95
18	17b	5.4-31	181.80		178.30		172.30	b	178.30		4.80	2.69
19	42	6.1-31	190.00	b	178.00		177.00		178.61		7.23	4.05
20	44	4.1-31	180.00		180.00		177.00		179.00		1.73	0.97
21	41	4.1-31	185.00	b	176.80	b	180.90		180.90		4.10	2.27
22	12	5.1-31	180.00		180.00		190.00	b	181.11		5.77	3.19
23	43	4.1-31	183.00		181.00		184.00		182.67		1.53	0.84
24	45	4.3-31	183.00		190.00	b	180.00		183.00		5.13	2.80
25	28	5.1-20	173.00	b	184.00		200.00	b	184.00		13.58	7.38
26	25	5-31	184.80		187.60		182.40		184.80		2.60	1.41
27	47	4.1-31	185.30		184.80		186.20		185.43		0.71	0.38
28	4a	2-40	183.00		186.00		188.00		185.89		2.52	1.36
29	48	4.1-31	185.00		186.70		188.90		186.87		1.96	1.05
30	3	3.7-31	189.00		188.00		188.00		188.33		0.58	0.31
31	10	6.1-20	196.40		195.90		194.40		195.57		1.04	0.53
32	24	6-20	192.00	b	200.00		200.00		198.89		4.62	2.32
33	6	5.3-31	200.00		199.00		198.00		199.00		1.00	0.50
34	20	0	206.00	a	209.00	a	207.00	a	207.33		1.53	0.74

Mean 173.4

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 172.5


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
>100%
100
80
60
40
20
0
-20
-40
-60
-80
% dev. from MEAN
Element:
Cu
1
2
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lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cu
Dimension: µg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	24	6-20	1.85 b	1.75	1.75	1.75 **	0.06	3.43
2	42	6.1-31	1.80	1.60 b	1.80	1.80 **	0.12	6.67
3	17a	6.1-31	1.98	1.84 b	1.99 b	1.98	0.08	4.04
4	8	3.2-31	2.00	2.00	2.00	2.00	0.00	0.00
5	45	4.3-31	2.00	2.00	3.00 b	2.00	0.58	29.00
6	17b	5.4-31	2.21	2.31 b	2.21	2.21	0.06	2.71
7	9	6.2-21	2.33	2.42 b	2.33	2.33	0.05	2.15
8	6	5.3-31	2.35	2.35	2.36 b	2.35	0.01	0.43
9	49	6-20	2.40	2.40		2.40	0.00	0.00
10	31	3.5-20	2.36 b	2.47	2.85 b	2.47	0.26	10.53
11	4b	2-41	2.50	2.40 b	2.60 b	2.50	0.10	4.00
12	44	4.1-21	2.23 b	2.60 b	2.52	2.52	0.19	7.54
13	7	3.2-31	2.90 b	2.57	2.55 b	2.57	0.20	7.78
14	27	6.1-20	2.62	2.62	2.62	2.62	0.00	0.00
15	48	4.1-31	3.36 b	2.46 b	2.66	2.66	0.47	17.67
16	47	4.1-31	3.21 b	2.68 b	2.76	2.76	0.29	10.51
17	13	3.3-21	2.89 b	2.59 b	2.86	2.86	0.17	5.94
18	18	3.8-31	2.86	2.68 b	3.26 b	2.86	0.30	10.49
19	16	3.9-20	2.89	2.83 b	3.17 b	2.89	0.18	6.23
20	4a	2-40	2.90	3.10 b	2.80 b	2.90	0.15	5.17
21	25	5-20	3.02 b	2.91	2.91	2.91	0.06	2.06
22	21	0	3.08 b	3.15 b	3.13	3.13	0.04	1.28
23	41	4.1-21	3.68 b	2.90 b	3.39	3.39	0.39	11.50
24	28	5.1-20	3.50	3.50	3.00 b	3.50	0.29	8.29
25	43	4.1-21	3.50	2.93 b	3.70 b	3.50	0.40	11.43
26	10	6.1-20	4.35 ab	3.83 a	3.79 ab	3.83 **	0.31	8.09
27	2	5.2-31	4.00 a	4.10 ab	3.70 ab	4.00 **	0.21	5.25
28	26	3.1-32	6.90 ab	6.50 ab	6.80 a	6.80 **	0.21	3.09
29	20	0	7.00 a	7.00 a	7.00 a	7.00 **	0.00	0.00

Mean 2.727

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 2.86

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	17a	6.1-31	4.02	3.71	4.33	4.02	0.31	7.71
2	8	3.2-31	4.28	8.46 b	3.81 b	4.28	2.56	59.81
3	44	4.1-21	4.69	3.88		4.29	0.57	13.29
4	17b	5.4-31	11.76 b	3.92 b	4.43	4.43	4.39	99.10
5	48	4.1-31	4.43	3.93 b	5.06 b	4.43	0.57	12.87
6	24	6-20	4.35	4.84	4.40	4.49	0.27	6.01
7	4b	2-41	4.70	4.00 b	4.60	4.54	0.38	8.37
8	41	4.1-21	4.23	5.47 b	4.64	4.64	0.63	13.58
9	31	3.5-20	4.70	4.75	4.74	4.73	0.03	0.63
10	49	6-20	4.80	4.80		4.80	0.00	0.00
11	47	4.1-31	5.04	4.78	6.70 b	5.04	1.04	20.63
12	42	6.1-31	5.20	5.00	5.20	5.13	0.12	2.34
13	18	3.8-31	6.10 b	4.11 b	5.22	5.22	1.00	19.16
14	9	6.2-21	5.40	5.43	5.30	5.38	0.07	1.30
15	6	5.3-31	5.33	5.57	5.55	5.48	0.13	2.37
16	27	6.1-20	5.78	5.26	5.78	5.67	0.30	5.29
17	2	5.2-31	4.70 b	5.80	5.80	5.69	0.64	11.25
18	16	3.9-20	5.73	5.75	5.70	5.73	0.03	0.52
19	13	3.3-21	5.53	5.75	6.13	5.75	0.30	5.22
20	28	5.1-20	5.80	5.90	5.70	5.80	0.10	1.72
21	4a	2-40	6.70 b	6.10	6.00	6.16	0.38	6.17
22	10	6.1-20	7.26 b	6.10	6.09	6.21	0.67	10.79
23	21	0	6.95 b	6.30	5.67 b	6.30	0.64	10.16
24	7	3.2-31	7.14	4.53 b	6.80	6.80	1.42	20.88
25	25	5-20	7.28	7.13	6.76	7.09	0.27	3.81
26	43	4.1-21	7.73 a	7.28 a	7.50 a	7.50 **	0.23	3.07
27	45	4.3-31	5.00 ab	11.00 ab	9.00 a	9.00 **	3.06	34.00
28	20	0	9.00 a	9.00 a	10.00 ab	9.11 **	0.58	6.37
29	26	3.1-32	11.70 a	11.50 a	11.00 ab	11.49 **	0.36	3.13

Mean 5.574

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/- 30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 5.77

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cu
Dimension: µg/g
Sample: 3 QUERCUS ILEX (Spain)

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	24	6-20	2.55 a	2.43 a	2.50 a	2.49 **	0.06	2.41
2	42	6.1-31	2.80	2.80	2.60 b	2.76	0.12	4.35
3	9	6.2-21	3.00	3.03	2.96	3.00	0.04	1.33
4	41	4.1-21	3.11	3.07	2.36 b	3.05	0.42	13.77
5	17a	6.1-31	3.00	3.10	3.10	3.07	0.06	1.95
6	8	3.2-31	3.19	3.10	2.94 b	3.10	0.13	4.19
7	17b	5.4-31	3.31	2.59 b	3.21	3.21	0.39	12.15
8	44	4.1-21	3.67 b	3.30	3.25	3.32	0.23	6.93
9	43	4.1-21	3.65 b	3.30	3.30	3.34	0.20	5.99
10	47	4.1-31	3.68	3.46	3.56	3.56	0.11	3.09
11	48	4.1-31	3.60	3.62	3.83 b	3.65	0.13	3.56
12	49	6-20	3.60	3.70		3.65	0.07	1.92
13	27	6.1-20	3.67	3.67	3.67	3.67	0.00	0.00
14	6	5.3-31	3.60	3.75	3.80	3.73	0.10	2.68
15	31	3.5-20	4.09 b	3.68	3.76	3.76	0.22	5.85
16	4b	2-41	3.80	4.00	3.90	3.90	0.10	2.56
17	13	3.3-21	4.11 b	3.83	3.94	3.94	0.14	3.55
18	16	3.9-20	4.00	3.89	3.94	3.94	0.06	1.52
19	45	4.3-31	4.00	4.00	4.00	4.00	0.00	0.00
20	4a	2-40	4.00	4.50 b	4.00	4.04	0.29	7.18
21	18	3.8-31	4.04	4.14	4.20	4.13	0.08	1.94
22	7	3.2-31	4.12	4.15	4.40 b	4.18	0.15	3.59
23	21	0	3.93 b	4.30	5.30 b	4.30	0.71	16.51
24	2	5.2-31	4.10 b	4.40	5.70 b	4.40	0.85	19.32
25	25	5-20	4.84	4.76	4.78	4.79	0.04	0.84
26	10	6.1-20	4.89 a	4.89 a	5.44 ab	4.93 **	0.32	6.49
27	28	5.1-20	4.20 ab	5.80 ab	5.30 a	5.30 **	0.82	15.47
28	26	3.1-32	6.00 a	6.30 ab	6.00 a	6.04 **	0.17	2.81

Mean 3.766

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 3.85

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cu
Dimension: µg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

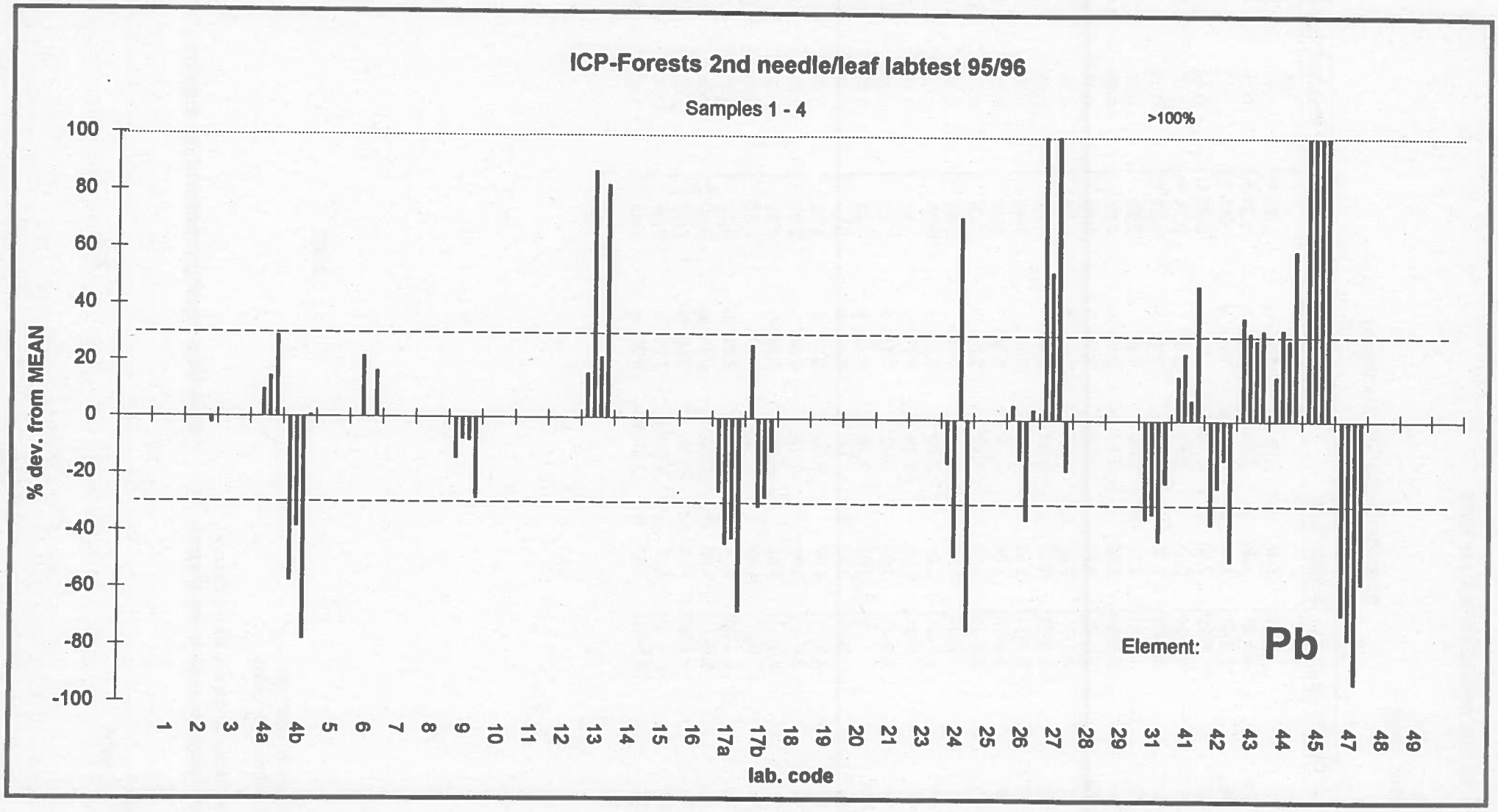
No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	24	6-20	1.15	a	1.36	a	1.25	a	1.25 **		0.11	8.80
2	17a	6.1-31	1.36	a	1.26	a	1.36	a	1.33 **		0.06	4.51
3	42	6.1-31	1.80	a	1.60	a	1.60	a	1.67 **		0.12	7.19
4	49	6-20	2.40	b	1.70	b			2.05 **		0.49	23.90
5	27	6.1-20	2.11		2.11		2.11		2.11 **		0.00	0.00
6	9	6.2-21	2.36		2.25		2.19		2.27 **		0.09	3.96
7	4b	2-41	3.10	b	2.70		2.80		2.82		0.21	7.45
8	8	3.2-31	2.80		3.37	b	2.76		2.85		0.34	11.93
9	17b	5.4-31	2.94		3.04		3.15		3.04		0.11	3.62
10	44	4.1-21	3.57	b	3.23		2.96	b	3.23		0.31	9.60
11	43	4.1-21	3.18	b	3.83	b	3.42		3.42		0.33	9.65
12	47	4.1-31	3.35		3.43		3.51		3.43		0.08	2.33
13	16	3.9-20	3.56		3.49		3.39		3.48		0.09	2.59
14	31	3.5-20	3.52		3.40		3.87	b	3.53		0.24	6.80
15	6	5.3-31	3.54		3.54		3.65		3.58		0.06	1.68
16	48	4.1-31	3.54		3.70		3.63		3.62		0.08	2.21
17	41	4.1-21	3.73		2.90	b	3.75		3.67		0.49	13.35
18	13	3.3-21	3.69		3.80		4.15	b	3.82		0.24	6.28
19	21	0	3.88		3.38	b	4.42	b	3.88		0.52	13.40
20	4a	2-40	3.70	b	3.90		4.60	b	3.90		0.47	12.05
21	45	4.3-31	4.00		4.00		3.00	b	3.93		0.58	14.76
22	18	3.8-31	3.91		3.95		3.96		3.94		0.03	0.76
23	7	3.2-31	3.87		4.00		4.00		3.96		0.08	2.02
24	25	5-20	4.43		4.33		4.28		4.35		0.08	1.84
25	10	6.1-20	4.37		4.94	b	3.74	b	4.37		0.60	13.73
26	2	5.2-31	5.60	ab	5.40	a	4.40	ab	5.40 **		0.64	11.85
27	28	5.1-20	5.10	ab	5.50	a	5.80	ab	5.50 **		0.35	6.36
28	20	0	7.00	a	7.00	a	7.00	a	7.00 **		0.00	0.00
29	26	3.1-32	7.90	a	7.50	ab	8.00	a	7.88 **		0.26	3.30

Mean **3.497**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **3.36**


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
>100%
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
-100
Element:
Pb
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
23
24
25
26
27
28
29
31
41
42
43
44
45
47
48
49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Pb
Dimension: µg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	2	5.2-31	0.00		0.00		0.00				
2	4a	2-40	0.00		0.00		0.00				
3	6	5.3-31	0.00		0.00		0.00				
4	47	4.1-31	0.30		0.30		0.10	b	0.30 **	0.12	40.00
5	4b	2-41	0.00		0.00		0.40		0.40 **		0.00
6	42	6.1-80	0.60		0.60		0.60		0.60 **	0.00	0.00
7	31	3.5-21	0.46	b	0.64	b	0.62		0.62 **	0.10	16.13
8	17a	6.1-31	0.70		0.50	b	0.70		0.70	0.12	17.14
9	24	6-20	0.70	b	0.90	b	0.80		0.80	0.10	12.50
10	9	6.2-21	0.81		0.82	b	0.79	b	0.81	0.02	2.47
11	26	3.1-32	0.90	b	1.00		1.00		1.00	0.06	6.00
12	13	3.3-21	1.10		0.80	b	1.90	b	1.10	0.57	51.82
13	41	4.1-21	1.10		1.60	b	1.00	b	1.10	0.32	29.09
14	44	4.1-21	1.10		1.10		1.30	b	1.10	0.12	10.91
15	17b	5.4-31	1.20		1.20		0.00		1.20	0.00	0.00
16	43	4.1-21	1.40	b	1.30		1.20	b	1.30 **	0.10	7.69
17	45	4.3-31	4.00	ab	3.00	a	3.00	a	3.00 **	0.58	19.33
18	27	6.1-20	4.70	a	4.20	ab	4.70	a	4.70 **	0.29	6.17

Mean **0.9511**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **1.07**

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	2	5.2-31	0.00	0.00	0.00			
2	47	4.1-31	0.10 ab	1.30 ab	0.40 a	0.40 **	0.62	155.00
3	24	6-20	0.80	1.00	0.90	0.90 **	0.10	11.11
4	17a	6.1-31	0.90	1.00	1.00	0.97 **	0.06	6.19
5	4b	2-41	1.00	1.00	1.20	1.07 **	0.12	11.21
6	31	3.5-21	1.28	1.13	1.10	1.17 **	0.10	8.55
7	17b	5.4-31	1.10	1.30	0.00	1.20 **	0.14	11.67
8	42	6.1-80	1.30	1.30	1.40	1.33	0.06	4.51
9	26	3.1-32	1.50	1.60	1.40	1.50	0.10	6.67
10	9	6.2-21	1.49	1.66	1.68	1.61	0.10	6.21
11	4a	2-40	1.90	1.80	2.50 b	1.92	0.38	19.79
12	6	5.3-31	2.20	1.90 b	2.20	2.13	0.17	7.98
13	41	4.1-21	2.10	2.60 b	2.10	2.17	0.29	13.36
14	43	4.1-21	2.30	1.90 b	2.60 b	2.30 **	0.35	15.22
15	44	4.1-21	2.30	3.10 b	2.20	2.32 **	0.49	21.12
16	27	6.1-20	2.60	2.60	3.20 b	2.67 **	0.35	13.11
17	13	3.3-21	3.40 a	3.30 a	2.90 ab	3.28 **	0.26	7.93
18	45	4.3-31	4.00 a	5.00 ab	4.00 a	4.07 **	0.58	14.25

Mean 1.751

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

* =not tolerable because more than +/-
** =not tolerable because more than +/- 30 % from mean (proposal of the author)

Annotation:
Mean acc. ISO 5725 1.89

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Pb
Dimension: µg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	2	5.2-31	0.00	0.00	0.00			
2	6	5.3-31	0.00	0.00	0.00			
3	47	4.1-31	0.10 a	0.40 ab	0.10 a	0.10 **	0.17	170.00
4	4b	2-41	0.40 b	0.20 b	0.30	0.30 **	0.10	33.33
5	17a	6.1-31	0.80	0.90 b	0.80	0.80 **	0.06	7.50
6	31	3.5-21	0.80	0.79 b	0.80	0.80 **	0.01	1.25
7	26	3.1-32	0.90	0.90	0.90	0.90 **	0.00	0.00
8	17b	5.4-31	1.00	0.00	0.00	1.00		0.00
9	42	6.1-80	1.20	1.10 b	1.20	1.20	0.06	5.00
10	9	6.2-21	1.28	1.28	1.31 b	1.28	0.02	1.56
11	41	4.1-21	1.60 b	1.50	1.50	1.50	0.06	4.00
12	4a	2-40	1.60	0.00	0.00	1.60		0.00
13	13	3.3-21	1.80 b	1.50 b	1.70	1.70	0.15	8.82
14	43	4.1-21	1.80	1.80	1.70 b	1.80	0.06	3.33
15	44	4.1-21	1.80	1.70 b	2.00 b	1.80	0.15	8.33
16	24	6-20	2.30 b	2.40	2.40	2.40 **	0.06	2.50
17	45	4.3-31	4.00 ab	5.00 a	6.00 ab	5.00 **	1.00	20.00
18	27	6.1-20	6.80 a	6.80 a	6.80 a	6.80 **	0.00	0.00

Mean 1.398

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 1.5

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Pb
Dimension: µg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

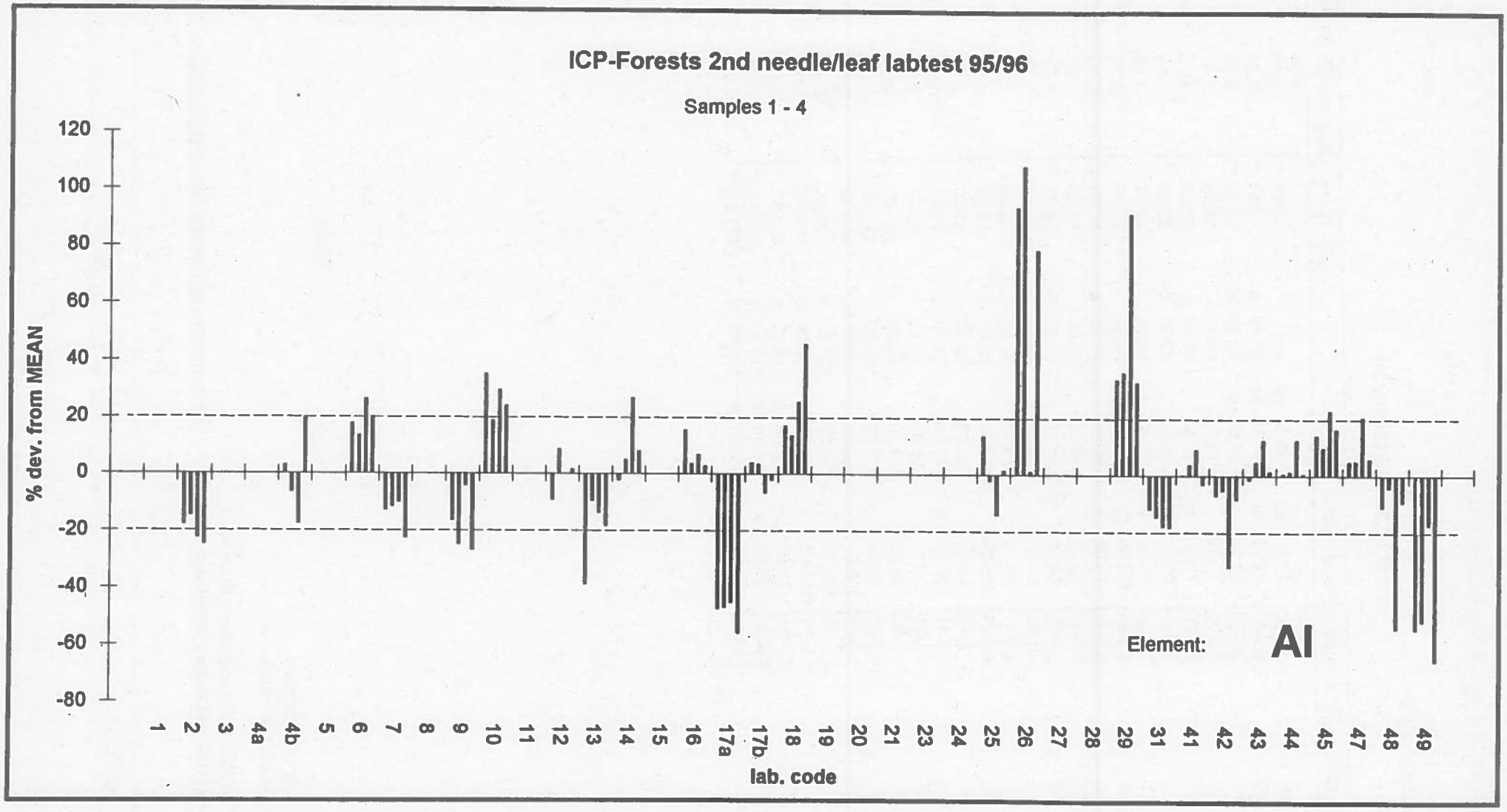
No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	24	6-20	0.80	0.80	0.70 b	0.80 **	0.06	7.50
2	17a	6.1-31	1.00	1.00	1.20 b	1.00 **	0.12	12.00
3	47	4.1-31	0.00	1.20 b	1.50 b	1.35 **	0.21	15.56
4	42	6.1-80	1.60	1.60	1.50 b	1.60 **	0.06	3.75
5	9	6.2-21	2.14 b	2.26	2.28 b	2.26	0.08	3.54
6	31	3.5-21	2.89 b	2.47	2.33 b	2.47	0.29	11.74
7	27	6.1-20	2.60	2.60	2.60	2.60	0.00	0.00
8	17b	5.4-31	2.60 b	2.80	3.30 b	2.80	0.36	12.86
9	2	5.2-31	2.90 b	3.90 b	3.10	3.10	0.53	17.10
10	4b	2-41	3.50 b	2.90 b	3.20	3.20	0.30	9.38
11	26	3.1-32	3.30	3.40 b	3.20 b	3.30	0.10	3.03
12	6	5.3-31	3.40 b	3.90 b	3.70	3.70	0.25	6.76
13	4a	2-40	3.60 b	4.10	4.10	4.10	0.29	7.07
14	43	4.1-21	4.20	4.20	4.20	4.20 **	0.00	0.00
15	41	4.1-21	4.80 b	4.70	4.40 b	4.70 **	0.21	4.47
16	44	4.1-21	5.10	5.10	4.40 b	5.10 **	0.40	7.84
17	13	3.3-21	5.80 a	5.30 ab	5.90 ab	5.80 **	0.32	5.52
18	45	4.3-31	7.00 a	7.00 a	8.00 ab	7.00 **	0.58	8.29

Mean 3.18

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 3.32


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
120
100
80
60
40
20
0
-20
-40
-60
-80
Element:
Al
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
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24
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31
41
42
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44
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49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Al
Dimension: µg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	49	6-20	47.00	ab	34.00	ab			40.50	**	9.19	22.69
2	17a	6.1-31	45.80	a	47.80	a	45.40	a	46.33	**	1.29	2.78
3	13	3.3-21	53.20	a	57.50	a	52.30	a	53.86	**	2.78	5.16
4	2	5.2-31	73.70		72.90		69.10		72.19		2.46	3.41
5	9	6.2-20	78.00	b	73.60		68.60	b	73.60		4.70	6.39
6	7	3.2-31	82.50	b	76.80		72.30	b	76.80		5.11	6.65
7	31	3.5-20	84.40	b	76.10		76.90		77.61		4.58	5.90
8	48	4.1-31	104.60	b	77.20		77.30		78.36		15.79	20.15
9	12	5.1-31	70.00	b	80.00		90.00	b	80.00		10.00	12.50
10	42	6.1-31	82.00		86.00		79.00		82.00		3.51	4.28
11	14	3-31	84.50		85.60		91.40	b	86.16		3.71	4.31
12	43	4.1-31	87.00		88.00		86.00		87.00		1.00	1.15
13	41	4.1-31	89.00		89.30		86.90		88.40		1.31	1.48
14	44	4.1-31	93.00		89.00		80.00	b	89.00		6.66	7.48
15	4b	2-41	89.00		92.00		92.00		91.00		1.73	1.90
16	17b	5.4-31	117.50	b	91.90		87.40	b	91.90		16.24	17.67
17	47	4.1-31	92.80		93.00		92.70		92.83		0.15	0.16
18	25	5-31	98.90		103.20		99.80		100.46		2.27	2.26
19	45	4.3-31	99.00		103.00		101.00		101.00		2.00	1.98
20	16	3.9-20	110.50	b	102.10		100.00		102.16		5.56	5.44
21	18	3.8-31	102.30		102.50		124.80	b	103.51		12.93	12.49
22	6	5.3-31	104.00		99.00	b	112.00	b	104.00		6.56	6.31
23	29	5.1-31	116.60	a	118.30	a	119.60	a	118.17	**	1.50	1.27
24	10	6.4-20	118.80	a	120.40	a	119.20	a	119.47	**	0.83	0.69
25	26	3.1-32	171.00	a	170.00	a	175.00	a	171.61	**	2.65	1.54

Mean 88.32

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 87.42

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	49	6-20	77.00	ab	66.00	ab			71.50 **	7.78	10.88
2	17a	6.1-31	74.10	a	79.20	a	78.70	a	77.84 **	2.81	3.61
3	9	6.2-20	109.00	a	115.00	ab	109.00	a	110.11 **	3.46	3.14
4	2	5.2-31	125.50		123.80		124.70		124.67	0.85	0.68
5	31	3.5-20	127.30		81.00	b	125.30		125.19	26.17	20.90
6	7	3.2-31	130.40		131.30		123.60	b	129.74	4.21	3.24
7	13	3.3-21	132.60		130.00		138.30	b	132.60	4.25	3.21
8	4b	2-41	136.00		139.00		136.00		137.00	1.73	1.26
9	42	6.1-31	139.00		141.00		137.00		139.00	2.00	1.44
10	48	4.1-31	140.50		142.00		138.90		140.47	1.55	1.10
11	25	5-31	138.60	b	143.70		146.50		143.70	4.01	2.79
12	44	4.1-31	150.00		147.00		150.00		149.00	1.73	1.16
13	17b	5.4-31	152.40		146.60	b	158.10	b	152.40	5.75	3.77
14	16	3.9-20	152.50		150.30		161.90	b	152.51	6.16	4.04
15	41	4.1-31	156.60		152.70		149.00		152.70	3.80	2.49
16	43	4.1-31	155.00		155.00		153.00		154.33	1.15	0.75
17	14	3-31	153.60		154.90		155.50		154.67	0.97	0.63
18	47	4.1-31	154.00		155.70		154.60		154.77	0.86	0.56
19	12	5.1-31	140.00	b	160.00		170.00	b	160.00	15.28	9.55
20	45	4.3-31	161.00		163.00		161.00		161.67	1.15	0.71
21	6	5.3-31	166.00		166.00		179.00	b	167.11	7.51	4.49
22	18	3.8-31	191.90	b	167.40		159.80	b	167.40	16.78	10.02
23	10	6.4-20	174.10		180.20	b	173.90		175.11	3.58	2.04
24	29	5.1-31	193.10	ab	209.60	ab	200.60	a	200.60 **	8.26	4.12
25	26	3.1-32	307.00	a	300.00	ab	310.00	a	307.00 **	5.13	1.67

Mean 147.1

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 143.87

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Al
Dimension: µg/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	12	5.1-31	0.00		0.00		0.00				
2	48	4.1-31	197.30	a	196.80	a	199.10	a	197.73 **	1.21	0.61
3	17a	6.1-31	222.80	ab	234.80	a	236.70	a	233.75 **	7.54	3.23
4	42	6.1-31	288.00		291.00		289.00		289.33 **	1.53	0.53
5	2	5.2-31	332.40		327.80		327.80		329.33 **	2.66	0.81
6	31	3.5-20	364.10	b	347.20		350.50		350.85	8.96	2.55
7	4b	2-41	354.00		346.00		353.00		351.50	4.36	1.24
8	49	6-20	384.00	b	322.00	b			353.00	43.84	12.42
9	25	5-31	350.30	b	380.00	b	366.00		366.00	14.86	4.06
10	13	3.3-21	370.20		362.40		370.20		368.20	4.50	1.22
11	7	3.2-31	372.80	b	390.10		383.80		383.80	8.76	2.28
12	17b	5.4-31	397.50		396.30		501.80	b	398.90	60.57	15.18
13	9	6.2-20	407.00		407.00		414.00		409.00	4.04	0.99
14	26	3.1-32	434.00		430.00		435.00		433.00	2.65	0.61
15	16	3.9-20	457.30		462.50		442.60	b	457.30	10.32	2.26
16	41	4.1-31	460.90		472.90		467.60		467.60	6.01	1.29
17	43	4.1-31	483.00		476.00		485.00		482.00	4.73	0.98
18	44	4.1-31	490.00	b	480.00		480.00		482.00	5.77	1.20
19	47	4.1-31	517.30		515.20		515.70		516.07 **	1.10	0.21
20	45	4.3-31	525.00		527.00		527.00		526.33 **	1.15	0.22
21	18	3.8-31	495.20	b	543.00		538.00		538.00 **	26.27	4.88
22	6	5.3-31	539.00		541.00		543.00		541.00 **	2.00	0.37
23	14	3-31	530.00	b	543.00		553.00	b	543.00 **	11.53	2.12
24	10	6.4-20	550.30		557.70		555.20		554.45 **	3.76	0.68
25	29	5.1-31	822.30	a	806.60	ab	830.60	ab	822.30 **	12.19	1.48

Mean 427.9

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 434.73

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Al
Dimension: µg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

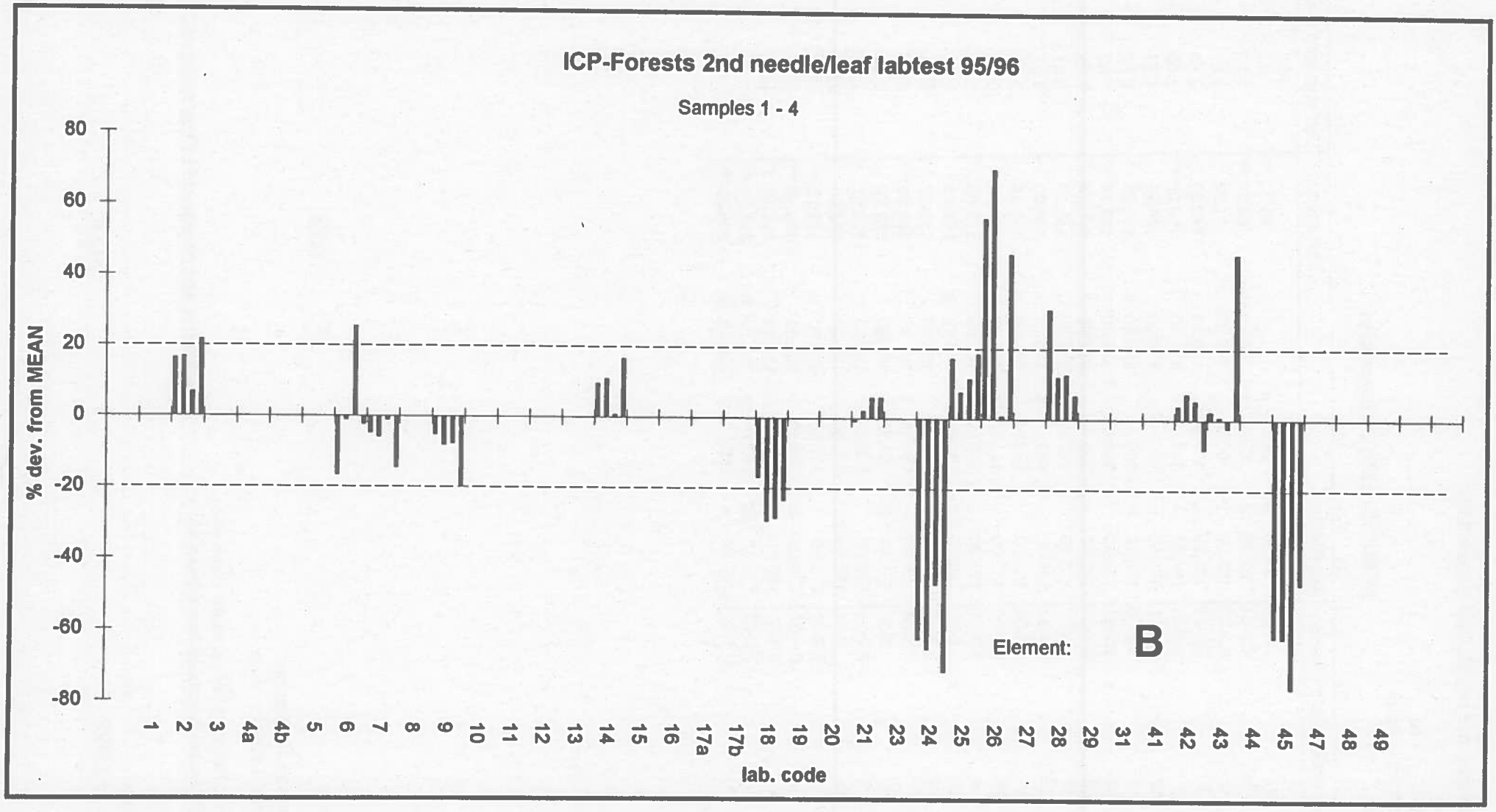
No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	49	6-20	53.00	a	50.00	a			51.50 **	2.12	4.12
2	17a	6.1-31	62.40	a	67.00	a	64.70	a	64.70 **	2.30	3.55
3	9	6.2-20	103.00	b	108.00		110.00		107.78 **	3.61	3.35
4	2	5.2-31	111.20		111.20		109.50		110.63 **	0.98	0.89
5	7	3.2-31	114.10		116.00		111.90		114.00 **	2.05	1.80
6	13	3.3-21	121.40		119.40		119.90		120.23	1.04	0.87
7	31	3.5-20	119.90		118.70		130.90	b	120.52	6.72	5.58
8	48	4.1-31	132.50		132.80		135.80		133.70	1.82	1.36
9	42	6.1-31	137.00		136.00		132.00		135.28	2.65	1.96
10	41	4.1-31	143.10		142.80		143.80		143.23	0.51	0.36
11	17b	5.4-31	144.30		159.70	b	133.70	b	144.30	13.07	9.06
12	44	4.1-31	150.00		150.00		144.00	b	148.78	3.46	2.33
13	12	5.1-31	150.00		140.00	b	160.00	b	150.00	10.00	6.67
14	43	4.1-31	151.00		150.00		149.00		150.00	1.00	0.67
15	25	5-31	152.20		150.60		144.40	b	150.18	4.12	2.74
16	16	3.9-20	167.80	b	150.90		150.90		152.12	9.76	6.42
17	47	4.1-31	157.10		156.10		157.20		156.80	0.61	0.39
18	14	3-31	151.40	b	159.70		162.90		159.70	5.94	3.72
19	45	4.3-31	172.00		175.00		170.00		172.22	2.52	1.46
20	4b	2-41	175.00		179.00		177.00		177.00	2.00	1.13
21	6	5.3-31	176.00		177.00		186.00	b	177.72 **	5.51	3.10
22	10	6.4-20	174.00	b	186.10		183.60		183.60 **	6.39	3.48
23	29	5.1-31	196.10		190.10	b	199.10		196.10 **	4.58	2.34
24	18	3.8-31	161.80	ab	270.70	ab	215.70	a	215.70 **	54.45	25.24
25	26	3.1-32	268.00	a	265.00	a	260.00	ab	265.00 **	4.04	1.52

Mean 147.8

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 149.43


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
80
60
40
20
0
-20
-40
-60
-80
Element: B
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
23
24
25
26
27
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29
31
41
42
43
44
45
47
48
49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: B
Dimension: µg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	24	6.20	4.07	a	3.72	a	4.12	a	4.00 **	0.22	5.50
2	45	4.3-31	5.00	ab	4.00	a	4.00	a	4.09 **	0.58	14.18
3	18	3.8-31	7.78	b	11.78	b	8.84		8.84	2.07	23.42
4	6	5.3-31	9.01		8.92		8.43		8.87	0.31	3.49
5	9	6.3-50	10.57	b	10.06		9.96		10.10	0.33	3.27
6	7	6-57	10.04		10.12		10.29		10.15	0.13	1.28
7	21	0	11.04	b	10.57		10.08	b	10.57	0.48	4.54
8	43	4.1-31	11.00		11.00		10.00	b	10.91	0.58	5.32
9	42	6.1-31	11.90	b	11.00		11.00		11.09	0.52	4.69
10	14	3-31	10.90	b	11.70	-	12.55	b	11.70	0.83	7.09
11	2	5.2-31	12.84		12.42		11.95	b	12.42	0.45	3.62
12	25	5-31	12.41		12.52		12.60		12.51	0.10	0.80
13	28	6-58	14.00						14.00 **		0.00
14	26	3.1-32	16.70	a	16.60	a	17.00	a	16.74 **	0.21	1.25

Mean **10.67**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **10.31**

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	24	6.20	6.00	a	6.05	a	6.59	a	6.20	**	0.33	5.32
2	45	4.3-31	7.00	a	7.00	a	5.00	ab	6.82	**	1.15	16.86
3	18	3.8-31	14.57	ab	12.63	a	10.80	ab	12.63	**	1.89	14.96
4	9	6.3-50	16.09		16.60		16.45		16.38		0.26	1.59
5	7	6-57	16.68		17.01		16.68		16.79		0.19	1.13
6	6	5.3-31	17.30		17.70		17.90		17.63		0.31	1.76
7	43	4.1-31	19.00	b	18.00		17.00	b	18.00		1.00	5.56
8	21	0	18.14		17.99		19.40	b	18.24		0.77	4.22
9	42	6.1-31	19.20		18.60		19.50		19.17		0.46	2.40
10	25	5-31	19.03		19.20		19.40		19.21		0.19	0.99
11	14	3-31	18.71	b	19.84		20.14		19.81		0.75	3.79
12	28	6-58	20.00						20.00			0.00
13	2	5.2-31	20.96		21.11		20.00	b	20.86		0.60	2.88
14	26	3.1-32	32.40	ab	24.20	ab	30.50	a	30.50	**	4.29	14.07

Mean **17.85**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **17.01**

ICP-Forests 2nd needle/leaf labtest 95/96

Element: B
Dimension: µg/g
Sample: 3 QUERCUS ILEX (Spain)

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	45	4.3-31	18.00	ab	13.00	a	14.00	a	14.20 **	2.65	18.66
2	24	6.20	29.10	ab	34.00	ab	31.50	a	31.50 **	2.45	7.78
3	18	3.8-31	51.50	ab	41.19	a	42.52	a	42.55 **	5.61	13.18
4	9	6.3-50	54.40		54.90		54.90		54.73	0.29	0.53
5	43	4.1-31	58.00		59.00		57.00		58.00	1.00	1.72
6	7	6-57	59.55		58.47		58.13		58.72	0.74	1.26
7	14	3-31	59.14		60.19		60.42		59.92	0.68	1.13
8	26	3.1-32	58.00	b	60.00		65.00	b	60.00	3.61	6.02
9	42	6.1-31	62.60		60.60	b	64.00		62.60	1.71	2.73
10	21	0	61.16	b	62.97		64.37		62.97	1.61	2.56
11	2	5.2-31	62.87		64.12		63.53		63.51	0.63	0.99
12	25	5-31	66.16		66.83		65.63		66.21	0.60	0.91
13	28	6-58	67.00						67.00		0.00
14	6	5.3-31	73.60	a	74.40	a	75.80	a	74.60 **	1.11	1.49

Mean 59.41

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 60.82

ICP-Forests 2nd needle/leaf labtest 95/96

Element: B
Dimension: µg/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

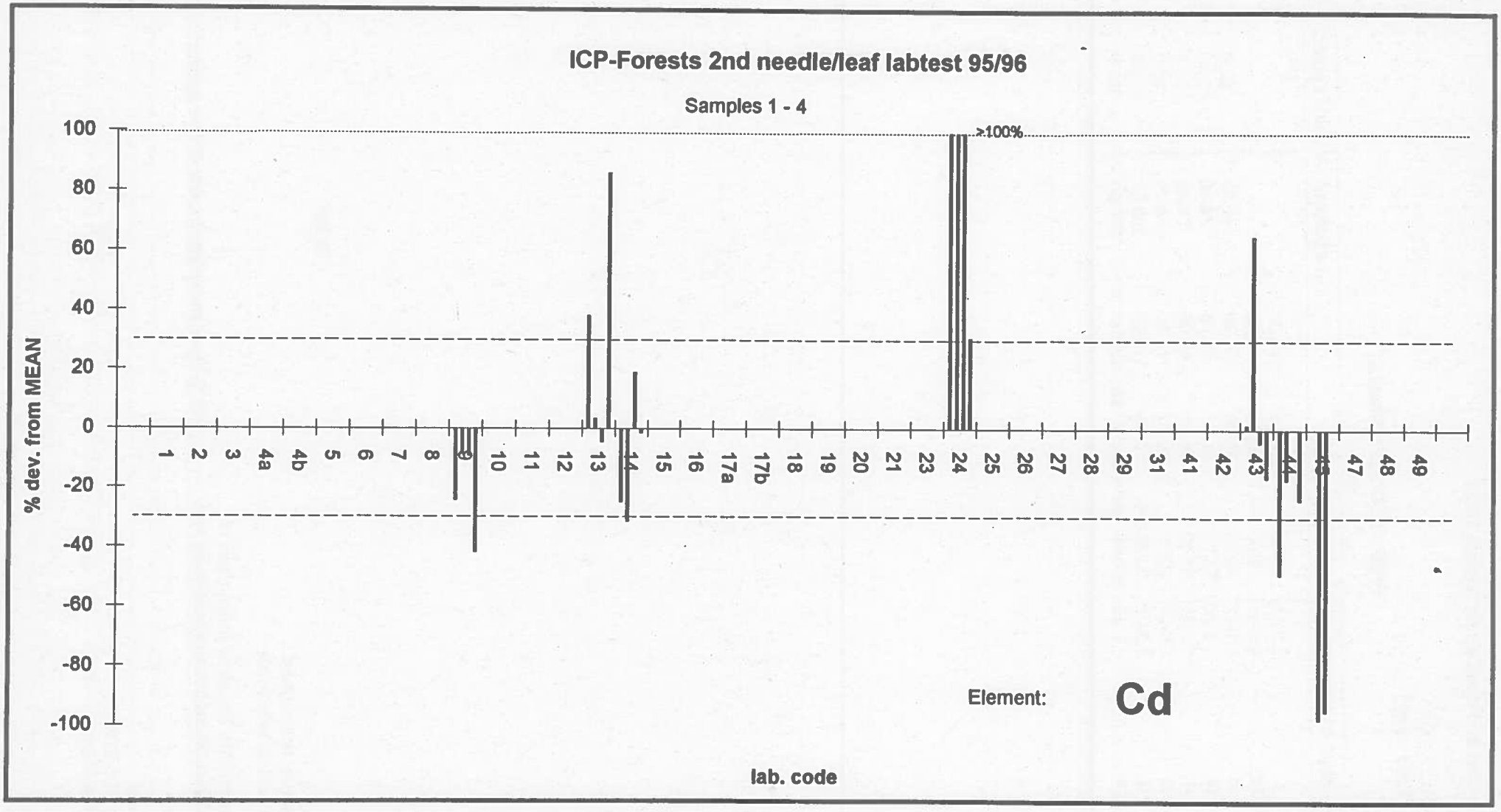
No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	24	6.20	4.27	a	4.10	a	4.35	a	4.24 **	0.13	3.07
2	45	4.3-31	8.00		5.00	b	9.00	b	8.00 **	2.08	26.00
3	18	3.8-31	11.45		7.85	b	12.81	b	11.45 **	2.56	22.36
4	9	6.3-50	12.86	b	11.46		11.96		11.96 **	0.71	5.94
5	7	6-57	12.19		13.02		12.94		12.77	0.46	3.60
6	42	6.1-31	14.30		13.50		13.50		13.71	0.46	3.36
7	6	5.3-31	14.50		14.50		14.80		14.60	0.17	1.16
8	21	0	16.11		15.38		16.08		15.88	0.41	2.58
9	28	6-58	16.00						16.00		0.00
10	14	3-31	16.34	b	17.48		18.00		17.48	0.85	4.86
11	25	5-31	17.50		17.76		18.01		17.76	0.26	1.46
12	2	5.2-31	18.31		17.86		18.52		18.23 **	0.34	1.87
13	26	3.1-32	27.00	b	22.00		20.00	b	22.00 **	3.61	16.41
14	43	4.1-31	16.00	b	23.00	b	22.00		22.00 **	3.79	17.23

Mean 14.98

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/- 20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 14.49


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
100
80
60
40
20
0
-20
-40
-60
-80
-100
>100%
% dev. from MEAN
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
23
24
25
26
27
28
29
31
41
42
43
44
45
47
48
49
Element:
Cd
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cd
Dimension: ng/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	2	5.2-31	0.00		0.00		0.00					
2	45	4.3-31	0.00		0.00		0.00					
3	44	4.1-21	40.00		40.00		40.00		40.00 **		0.00	0.00
4	14	3-21	56.00		59.00		61.00		58.89		2.52	4.28
5	9	6.2-21	61.00		56.00		60.00		59.39		2.65	4.46
6	43	4.1-21	80.00		90.00	b	70.00	b	80.00		10.00	12.50
7	13	3.3-21	90.00	b	110.00		110.00		108.89 **		11.55	10.61
8	24	6-20	300.00	ab	350.00	ab	320.00	a	320.00 **		25.17	7.87

Mean **78.79**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **68.2**
Lab 41 Method 4.1-21: 100

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	2	5.2-31	0.00		0.00		0.00				
2	45	4.3-31	1.00		0.00		0.00		1.00 **		0.00
3	14	3-21	28.00		33.00		50.00	b	33.00 **	11.53	34.94
4	44	4.1-21	0.00		40.00		0.00		40.00		0.00
5	9	6.2-21	43.00		47.00		44.00		44.06	2.08	4.72
6	13	3.3-21	50.00		60.00	b	40.00	b	50.00	10.00	20.00
7	43	4.1-21	100.00	b	80.00		50.00	b	80.00 **	25.17	31.46
8	24	6-20	300.00	a	300.00	a	310.00	ab	300.56 **	5.77	1.92

Mean 48.36

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 47.57
Lab 41 Method 4.1-21: <100

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cd
Dimension: ng/g
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	2	5.2-31	0.00		0.00		0.00				
2	44	4.1-21	0.00		0.00		0.00				
3	45	4.3-31	1.00		1.00		1.00		1.00 **	0.00	0.00
4	9	6.2-21	19.00		17.00	b	20.00	b	19.00	1.53	8.05
5	13	3.3-21	20.00		190.00	b	20.00		20.00	98.15	490.75
6	43	4.1-21	20.00		40.00	b	20.00		20.00	11.55	57.75
7	14	3-21	21.00	b	25.00		31.00	b	25.00	5.03	20.12
8	24	6-20	300.00	a	350.00	ab	300.00	a	300.00 **	28.87	9.62

Mean 21

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 29.73
Lab 41 Method 4.1-21: <100

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cd
Dimension: ng/g
Sample: 4 **SPRUCE NEEDLES (Germany)**

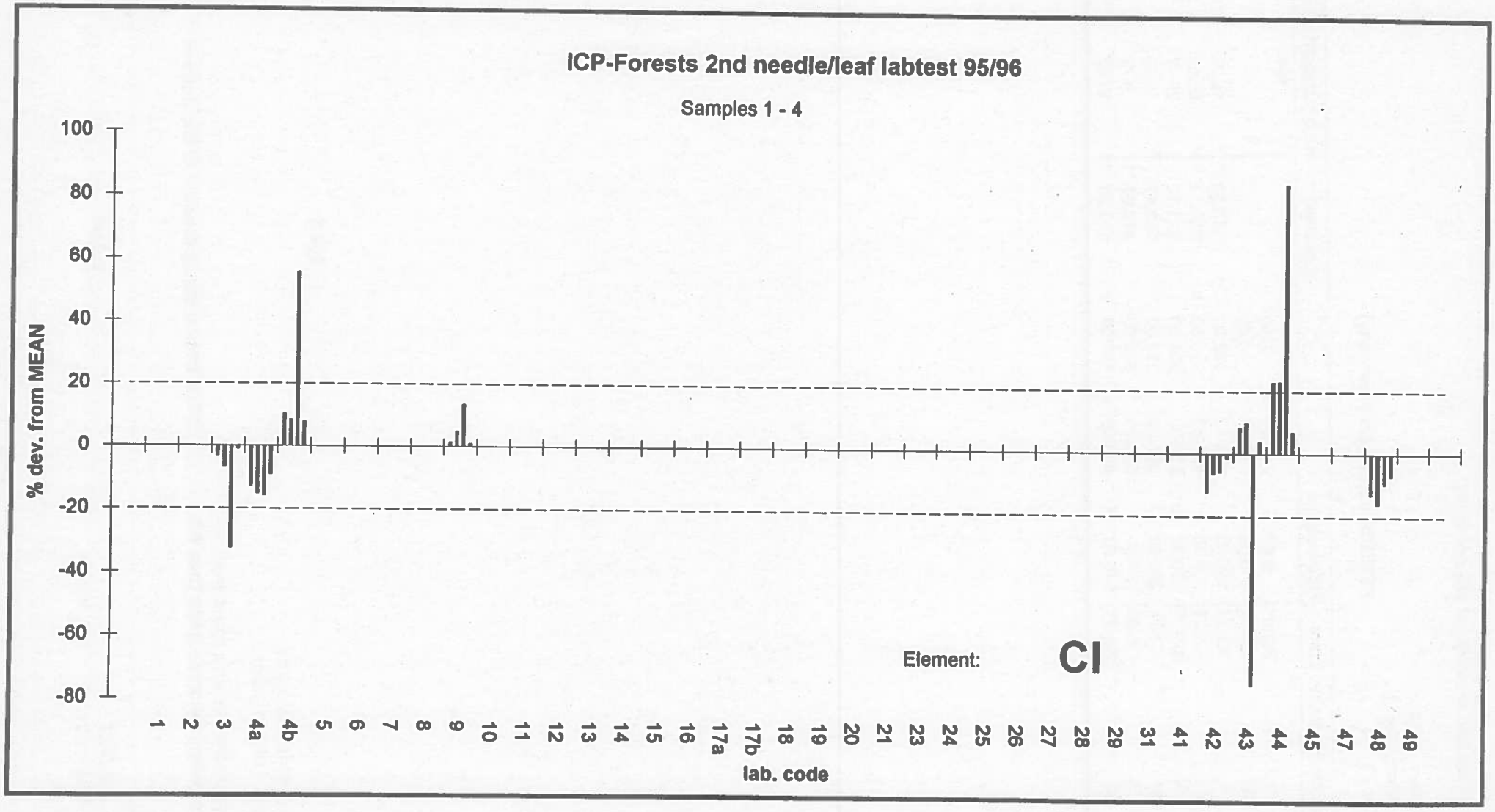
No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	2	5.2-31	0.00		0.00		0.00				
2	45	4.3-31	0.00		0.00		0.00				
3	9	6.2-21	140.00		170.00		150.00		153.33 **	15.28	9.97
4	44	4.1-21	200.00		180.00		290.00	b	201.12	58.59	29.13
5	43	4.1-21	250.00	b	220.00		200.00		221.12	25.17	11.38
6	14	3-21	243.00		267.00		272.00		260.67	15.50	5.95
7	24	6-20	350.00		350.00		340.00		346.67 **	5.77	1.66
8	13	3.3-21	510.00	a	480.00	a	490.00	a	493.33 **	15.28	3.10

Mean 264.9

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **30 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 292.48
Lab 41 Method 4.1-21: 466.67


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
% dev. from MEAN
100
80
60
40
20
0
-20
-40
-60
-80
Element:
Cl
1
2
3
4a
4b
5
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17a
17b
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48
49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cl
Dimension: µg/g
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	4a	2-40	447.00	b	456.90		460.40		456.15	6.95	1.52
2	48	-70	450.00		460.00		458.00		456.50	5.29	1.16
3	42	7.2-60	400.00	b	490.00	b	460.00		460.00	45.83	9.96
4	3	4-70	500.00		510.00		510.00		507.50	5.77	1.14
5	9	0	531.20		534.50		537.00		534.23	2.91	0.54
6	43	6-74	570.00		590.00	b	500.00	b	570.00	47.26	8.29
7	4b	2-41	580.00		580.00		580.00		580.00	0.00	0.00
8	44	7.1-51	651.00		648.00		580.00	b	647.00 **	40.15	6.21

Mean 526.4

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 520.17

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cl
Dimension: µg/g
Sample: 2 **SPRUCE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	48	-70	450.00		452.00		448.00		450.00		2.00	0.44
2	4a	2-40	451.70		454.00		452.10		452.60		1.23	0.27
3	3	4-70	500.00		490.00	b	500.00		498.72		5.77	1.16
4	42	7.2-60	500.00		510.00	b	490.00	b	500.00		10.00	2.00
5	9	0	560.00		566.20		562.70		562.70		3.11	0.55
6	4b	2-41	590.00	b	580.00		580.00		581.28		5.77	0.99
7	43	6-74	590.00		590.00		450.00	b	588.72		80.83	13.73
8	44	7.1-51	630.00	ab	840.00	ab	660.00	a	660.00	**	113.58	17.21

Mean 536.2

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 537.36

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cl
Dimension: µg/g
Sample: 3 QUERCUS ILEX (Spain)

No.	Lab.code	Method code	Replications						Lab.mean		Lab.standard deviation	
											abs.	rel.%
1	43	6-74	30.00	b	50.00		70.00	b	50.00 **		20.00	40.00
2	3	4-70	130.00		160.00	b	110.00	b	130.00 **		25.17	19.36
3	4a	2-40	161.70		159.60		164.80		161.98		2.62	1.62
4	48	-70	174.00		168.00		180.00		174.00		6.00	3.45
5	42	7.2-60	190.00	b	180.00		180.00		181.33		5.77	3.18
6	9	0	218.00		217.70		221.20		218.97		1.94	0.89
7	4b	2-41	300.00		300.00		300.00		300.00 **		0.00	0.00
8	44	7.1-51	359.00	a	362.00	a	342.00	ab	359.00 **		10.79	3.01

Mean 193

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 197

ICP-Forests 2nd needle/leaf labtest 95/96

Element: Cl
Dimension: µg/g
Sample: 4 SPRUCE NEEDLES (Germany)

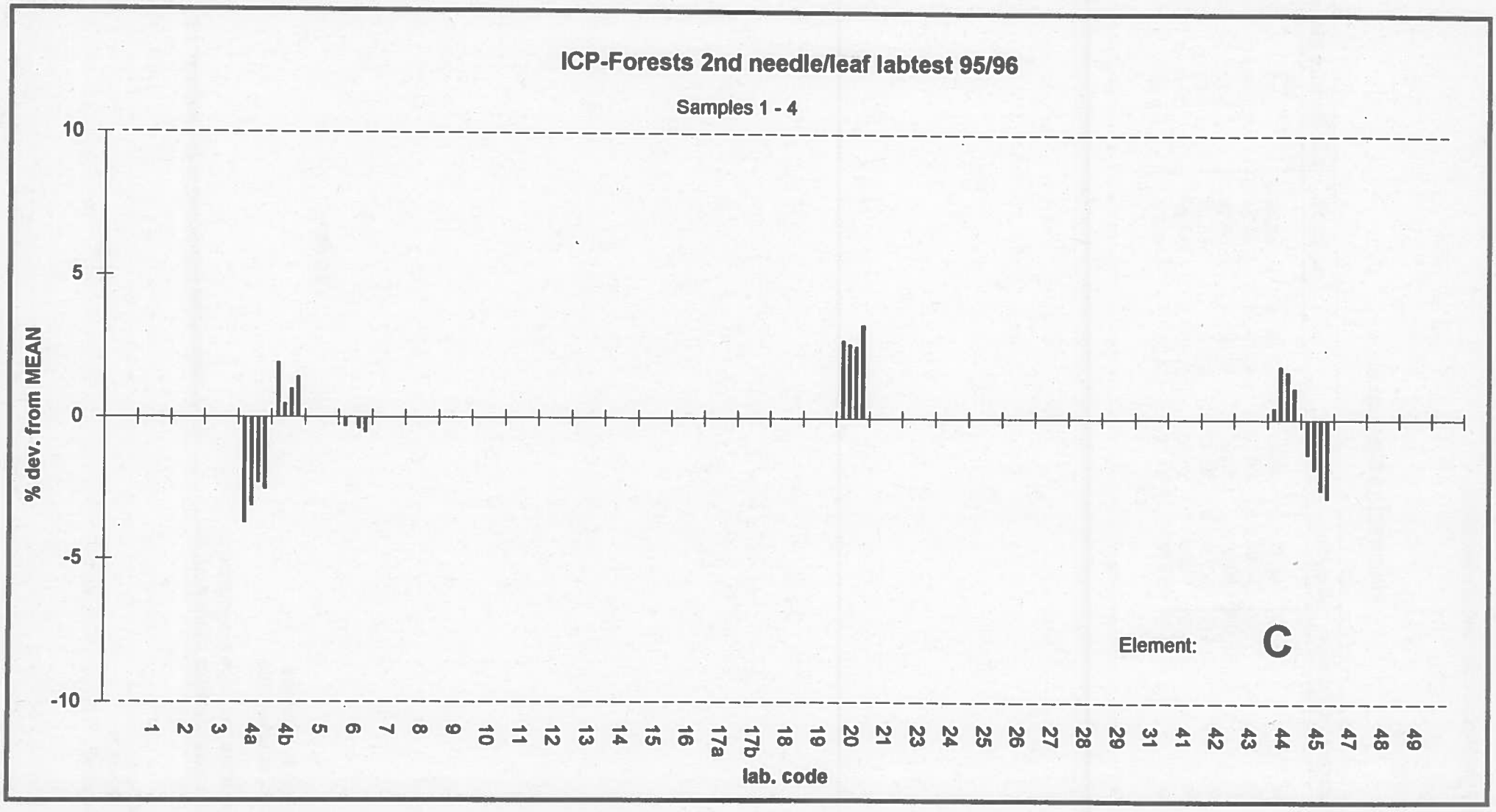
No.	Lab.code	Method code	Replications					Lab.mean	Lab.standard deviation	
									abs.	rel.%
1	4a	2-40	870.60	b	883.40	887.50		883.34	8.82	1.00
2	48	-70	904.00		900.00	910.00		904.11	5.03	0.56
3	42	7.2-60	950.00		960.00	960.00		957.89	5.77	0.60
4	3	4-70	960.00		970.00	960.00		962.11	5.77	0.60
5	9	0	989.00		983.90	980.10		984.11	4.47	0.45
6	43	6-74	1040.00	b	1010.00	1010.00		1012.11	17.32	1.71
7	44	7.1-51	1040.00		1040.00	1090.00	b	1042.11	28.87	2.77
8	4b	2-41	1060.00	b	1050.00	1040.00	b	1050.00	10.00	0.95

Mean 974.5

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **20 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 977.02


ICP-Forests 2nd needle/leaf labtest 95/96
Samples 1 - 4
10
5
0
-5
-10
% dev. from MEAN
Element:
C
1
2
3
4a
4b
5
6
7
8
9
10
11
12
13
14
15
16
17a
17b
18
19
20
21
23
24
25
26
27
28
29
31
41
42
43
44
45
47
48
49
lab. code

ICP-Forests 2nd needle/leaf labtest 95/96

Element: C
Dimension: %
Sample: 1 **PINE NEEDLES (Slovakia)**

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	4a	6-12	48.42	a	48.42	a	48.48	a	**48.44**	0.03	0.06
2	45	-12	50.00	b	49.70		49.10	b	**49.70**	0.46	0.93
3	6	6-61	50.30		50.20		49.00	b	**50.16**	0.72	1.44
4	44	-10	50.90	b	50.40		50.50		**50.54**	0.26	0.51
5	4b	6-72	51.20		51.30		51.40		**51.30**	0.10	0.19
6	20	0	51.77		51.75		51.65		**51.72**	0.06	0.12

Mean **50.33**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **10 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **50.25**
Lab 41 Method 10: 50.7

ICP-Forests 2nd needle/leaf labtest 95/96

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

No.	Lab.code	Method code	Replications						Lab.mean	Lab.standard deviation	
										abs.	rel.%
1	4a	6-12	49.35		49.16		49.39		49.30	0.12	0.24
2	45	-12	49.50	b	50.40	b	50.00		50.00	0.45	0.90
3	6	6-61	51.20		50.90		48.80	b	50.90	1.31	2.57
4	4b	6-72	51.50	b	51.00		51.10		51.16	0.26	0.51
5	44	-10	51.90		52.00		51.70		51.87	0.15	0.29
6	20	0	52.35		52.28		52.12		52.25	0.12	0.23

Mean **50.91**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **10 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **50.81**
Lab 41 Method 10: 51.97

ICP-Forests 2nd needle/leaf labtest 95/96

Element: C
Dimension: %
Sample: 3 **QUERCUS ILEX (Spain)**

No.	Lab.code	Method code	Replications				Lab.mean	Lab.standard deviation	
								abs.	rel.%
1	45	-12	46.40	b	47.80	47.70	**47.64**	0.78	1.64
2	4a	6-12	47.42	b	47.96	47.73	**47.73**	0.27	0.57
3	6	6-61	48.50		48.80	48.70	**48.67**	0.15	0.31
4	4b	6-72	49.20		49.30	50.00 b	**49.36**	0.44	0.89
5	44	-10	49.70		49.60	49.80	**49.70**	0.10	0.20
6	20	0	50.06		50.21	50.05	**50.11**	0.09	0.18

Mean **48.87**

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

*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **10 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **48.83**
Lab 41 Method 10: 48.3

ICP-Forests 2nd needle/leaf labtest 95/96

Element: C
Dimension: %
Sample: 4 **SPRUCE NEEDLES (Germany)**

No.	Lab.code	Method code	Replications			Lab.mean	Lab.standard deviation	
							abs.	rel.%
1	45	-12	47.00 b	48.10 b	47.60	47.60	0.55	1.16
2	4a	6-12	47.68	47.72	47.73	47.71	0.03	0.06
3	6	6-61	48.70	48.90	48.20 b	48.70	0.36	0.74
4	44	-10	49.40	49.90 b	49.50	49.52	0.26	0.53
5	4b	6-72	49.60	49.60	50.10 b	49.67	0.29	0.58
6	20	0	50.71	50.45	50.62	50.59	0.13	0.26

Mean **48.97**

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

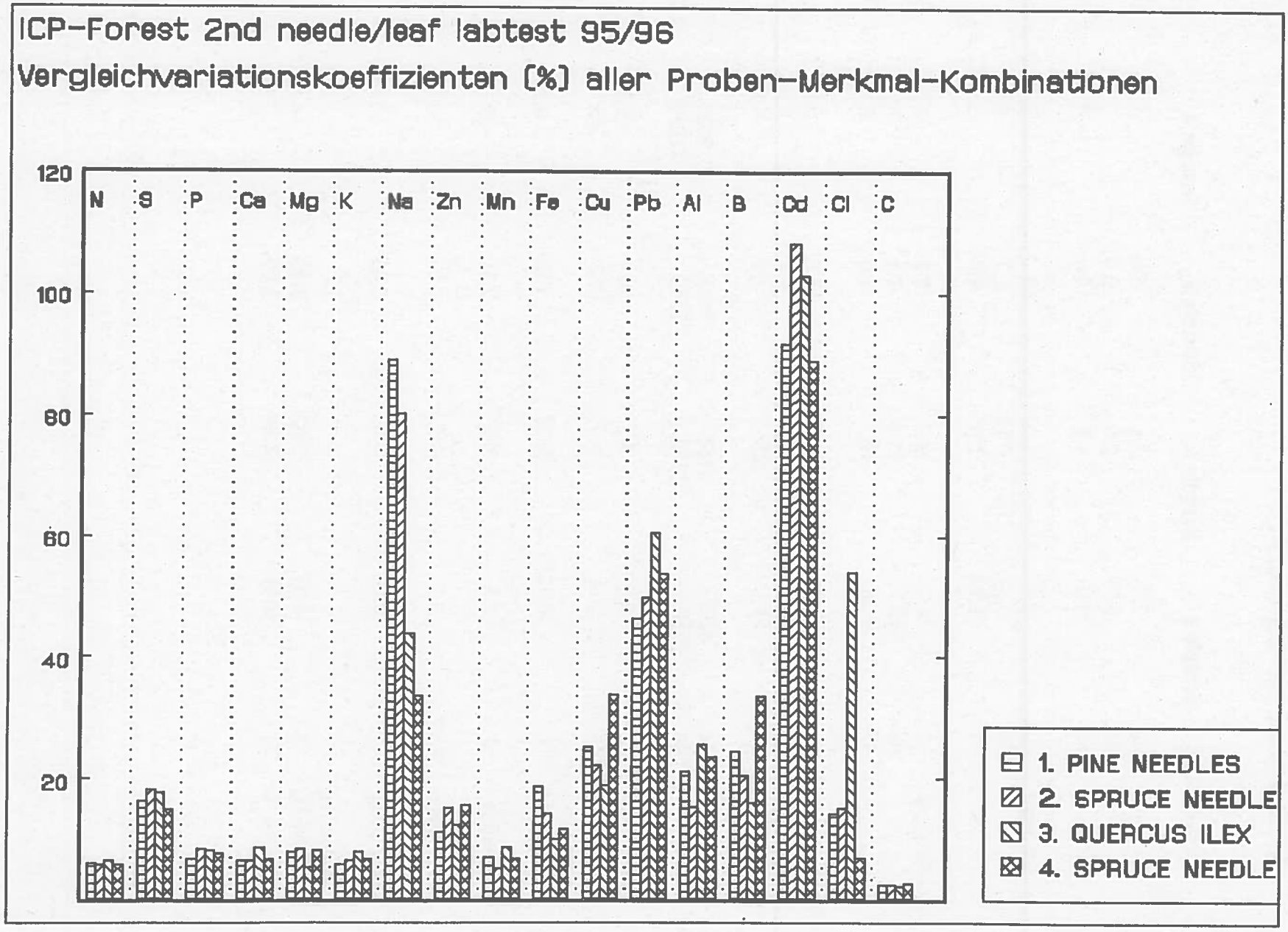
*** =not tolerable because more than +/-**
**** =not tolerable because more than +/-** **10 % from mean (proposal of the author)**

Annotation:
Mean acc. ISO 5725 **48.97**
Lab 41 Method 10: 49

Annex

Additional parameters:

Element	Lab	Sample 1	Sample 2	Sample 3	Sample 4
Ni µg/g	4a	2.7	2.1	5.0	5.9
	26	0.99	2.0	2.0	3.4
	45	4.0	4.9	6.0	7.0
Cr µg/g	4a	4.4	1.2	10	8.4
	26	0.34	0.18	1.3	0.69
	45	1.98	1.0	4.8	5.0
Sr µg/g	2	41.9	14.1	7.0	8.2
	4a	42.7	13.9	7.5	8.0
	45	41.8	14	7.0	8.0
Ba µg/g	2	51.8	31.6	3.3	5.8
	4a	46.9	26.8	4.2	5.4
	45	51	28	3.0	4.0
Si µg/g	4a	4807	4468	1638	9423
	44	5581	5138	2510	11030
Ti µg/g	2	0.89	3.5	4.9	5.3
	4a	11.4	6.7	28.2	<2.3
Li µg/g	31	0.12	0.21	0.33	0.24
F µg/g	3	5.4	6.8	7.3	8.3
Rb µg/g	4a	7.5	8.5	1.7	14.5
Hg µg/g	25	0.04	0.02	0.05	0.07
Moisture					
% 105 °C	8	4.05	3.62	3.90	4.58
% 80 °C	31	3.47	2.84	3.09	3.52


ICP-Forest 2nd needle/leaf labtest 95/96
Vergleichvariationskoeffizienten [%] aller Proben-Merkmal-Kombinationen
120
100
80
60
40
20
N
S
P
Ca
Mg
K
Na
Zn
Mn
Fe
Cu
Pb
Al
B
Cd
Cl
C
1. PINE NEEDLES
2. SPRUCE NEEDLE
3. QUERCUS ILEX
4. SPRUCE NEEDLE