Certification Report

Certified Reference Material

BAM-M110/110a

PbSb3

May 2018

Coordinator: Dr. Sebastian Recknagel
Bundesanstalt für Materialforschung und -prüfung (BAM)
Division 1.6 „Inorganic Reference Materials“
Richard-Willstätter-Str. 11
D-12489 Berlin
Phone: +49 30 8104 1111
Fax: +49 30 8104 71111
E-mail: sebastian.recknagel@bam.de

Summary

This report describes preparation, analysis and certification of the lead alloy reference materials BAM-M110 and BAM-M110a.
The certified reference materials (CRM) are available in the form of discs (ca. 40 mm diameter and 30 mm height). They are intended for establishing and checking the calibration of optical emission spectrometers (excluding micro-analysis) for the analysis of samples of similar matrix composition. They are also suitable for wet chemical analysis.

The following mass fractions and uncertainties have been certified:

BAM-M110

Element	**Mass fraction [1] in %**	**Uncertainty [2] in %**
As	0.107	0.008
Bi	0.0126	0.0004
Sb	3.08	0.08
Se	0.0106	0.0014
Sn	0.131	0.004
	in mg/kg	**in mg/kg**
Ag	22.6	1.7
Cu	6.4	0.4
Te	3.8	0.9

[1] Unweighted mean value of the means of accepted sets of data (consisting of at least 5 but usually 6 single results), each set being obtained by a different laboratory and/or a different method of measurement.

[2] Estimated expanded uncertainty *U* with a coverage factor of $k = 2$, corresponding to a level of confidence of approx. 95 %, as defined in the Guide to the expression of uncertainty in measurement, (GUM, ISO/IEC Guide 98-3:2008).

BAM-M110a

Element	Mass fraction [1] in %	Uncertainty [2] in %
As	0.106	0.008
Bi	0.0126	0.0003
Sb	3.04	0.07
Se	0.0109	0.0013
Sn	0.131	0.005
	in mg/kg	**in mg/kg**
Ag	22.3	1.6
Cu	6.4	0.5
Te	3.6	0.6

[3] Unweighted mean value of the means of accepted sets of data (consisting of at least 5 but usually 6 single results), each set being obtained by a different laboratory and/or a different method of measurement.

[4] Estimated expanded uncertainty *U* with a coverage factor of $k = 2$, corresponding to a level of confidence of approx. 95 %, as defined in the Guide to the expression of uncertainty in measurement, (GUM, ISO/IEC Guide 98-3:2008).

The mass fractions of the elements Cd, Ca and Zn are given for information only.
This report contains detailed information on the preparation of the CRMs as well as on homogeneity investigations and on the analytical methods used for certification analysis.
The certified values are based on the results of eight laboratories which participated in the certification inter-laboratory comparison.

Content

Page

List of abbreviations 6

1. Introduction 7

2. Companies/laboratories involved 7

3. Candidate material 8

4. Homogeneity testing 8

5. Characterisation study 9

5.1 Analytical methods 9
5.2 Analytical results and statistical evaluation 11

6. Instructions for users and stability 41

7. References 41

8. Information on and purchase of the CRM 42

Annex 1: Calculation of uncertainty contribution of potential inhomogeneity (length), SOES 43

Annex 2: Calculation of uncertainty contribution of potential inhomogeneity (area) 59

List of abbreviations
(if not explained elsewhere)

CRM	certified reference material
ETAAS	electrothermal atomic absorption spectrometry
FAAS	flame atomic absorption spectrometry
ICP-OES	inductively coupled plasma optical emission spectrometry
SOES	spark optical emission spectrometry
M	mean value
n	number of accepted data sets
s	standard deviation of an individual data set
s_M	standard deviation of laboratory means
s_{rel}	relative standard deviation
$\bar{s}_i$	square root of mean of variances of data sets under repeatability conditions
M_i	single result
I	ICP-OES (Tables 3 - 24)
I(R)	ICP-OES, revised value (Tables 3 - 24)
A	FAAS (Tables 3 - 24)
EA	ETAAS (Tables 3 - 24)
T	titration (Tables 3 - 24)

1. Introduction

In the metal-producing and metal-working industry mainly spark emission spectrometry (SOES) is used for reception inspection of raw materials, e.g. scrap, for quality control of end products and production control. These time-saving analytical techniques require suitable reference materials for calibration and recalibration. The certified reference materials BAM-M110 and BAM-M110a are based on the lead alloy PbSb3.

The idea to produce a PbSb3 reference material was the outcome of the discussions within the German Gesellschaft der Metallurgen und Bergleute e.V. (GDMB), especially of the working group „Lead" of the Committee of Chemists within GDMB. The needs are defined by this working group, since the members are potential users of the prepared CRMs. Participating laboratories were recruited from this group. Since all of these laboratories are highly experienced with lead analysis and had participated in earlier interlaboratory comparisons, there was no preceding round robin test for qualification.

Certification was carried out on the basis of the relevant ISO-Guides [1-3] and the „Guidelines for the development and production of BAM Reference Materials" [4].

2. Companies/laboratories involved

Manufacturing of the material:

– SUS Nell, Oberhausen, Germany

Test for homogeneity:

– Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin, Germany
– SUS Nell, Oberhausen, Germany

Participants in the certification inter-laboratory comparison:

– Aurubis AG, Hamburg, Germany
– BERZELIUS Stolberg GmbH, Stolberg, Germany
– Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin, Germany
– Hoppecke Batterien GmbH & Co. KG, Brilon-Hoppecke, Germany
– Johnson Controls Sachsen-Batterien GmbH & Co. KG, Zwickau, Germany
– Johnson Controls, VB Autobatterie GmbH & Co. KGaA, Hannover, Germany
– Muldenhütten Recycling und Umwelttechnik GmbH, Freiberg, Germany
– WESER METALL GmbH, Nordenham

Statistical evaluation of the data:

– Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin, Germany

3. Candidate material

Battery alloy PbSb3 was used as basic material for the preparation of the candidate material. This material was milled, melted and doped with the desired impurities by SUS Nell, Oberhausen.
3 batches with in total 71 bolds were casted each giving 9 discs with a diameter of ca. 40 mm and 30 mm height (in total 639 discs). A preliminary homogeneity test showed that the three batches differ slightly. Therefore, Batch B was used as future CRM BAM-M110, Batch C as future CRM BAM-M110a.

In total, 243 discs of BAM-M110 and 180 discs of BAM-M110a with a diameter of ca. 40 mm and 30 mm height were obtained.

4. Homogeneity testing

Possible reasons for an inhomogeneous distribution of elements in the raw material may be a change of the composition of the melt during the casting procedure because some elements may volatise or because of possible segregation during the solidification of the material. Since the raw material was produced by casting of a rod, concentration gradients can occur over the length of the rod (axial) as well as over the area of the rod (radial, see Figure 1):

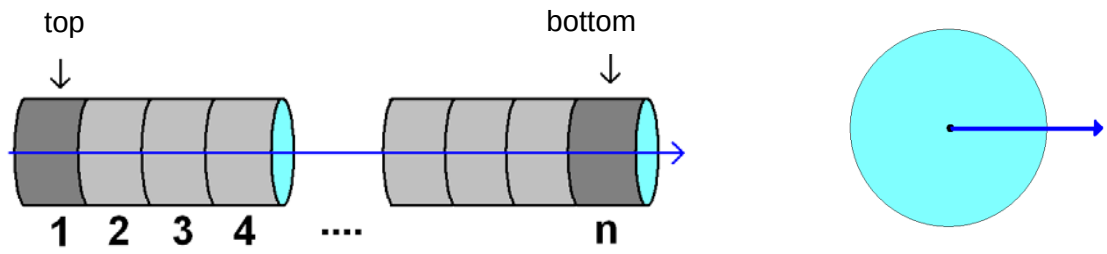


Fig. 1: Axial and radial composition gradient

Therefore, it is necessary to investigate the raw material for both axial and radial inhomogeneities. Radial as well as axial homogeneity testing of the candidate materials using spark emission spectrometry was performed at BAM. In total 27 discs of BAM-M110 (15 for Se which was tested in a separate investigation) and 20 discs of BAM-M110a (10 for Se) were investigated.

Tab. 1a: Discs analysed for homogeneity testing of BAM-M110 (SOES), axial

Y7	AB4	AE2	AH4	AL6	AO1	AR3	AU5	AX7
Z6	AC9	AF6	AJ9	AM8	AP1	AS6	AV8	AY6
AA1	AD1	AG7	AK9	AN9	AQ8	AT2	AW8	AZ9

Tab. 1b: Discs analysed for homogeneity testing of BAM-M110a (SOES), axial

BA8	BC8	BE5	BG7	BI8	BK3	BM8	BO4	BQ7	BS6
BB9	BD6	BF4	BH4	BJ9	BL7	BN5	BP6	BR6	BT4

The estimate of analyte-specific inhomogeneity contribution u_{bb} to be included into the total uncertainty budget was calculated according to ISO Guide 35 [4] using Eq. (1) and Eq. (2):

$$s_{bb} = \sqrt{\frac{MS_{among} - MS_{within}}{n}} \qquad (1)$$

$$u^*_{bb} = \sqrt{\frac{MS_{within}}{n}} \sqrt[4]{\frac{2}{N(n-1)}} \qquad (2)$$

where:

MS_{among}	mean of squared deviations between discs (from 1-way ANOVA, see Annex 1)
MS_{within}	mean of squared deviations within one disc (from 1-way ANOVA)
n	number of replicate measurements per disc
N	number of discs selected for homogeneity study

s_{bb} signifies the between-discs standard deviation whereas u^*_{bb} denotes the maximum heterogeneity that can potentially be hidden by an insufficient repeatability of the applied measurement method (which has to be considered as the minimum uncertainty contribution). In any case the larger of the two values was used as $u_{bb}(1)$. Eq. (1) does not apply if MS_{within} is larger than MS_{among}.

In addition to the tests performed over the length of the rods two discs were tested for homogeneity over the area (possible segregation from the outer part to the centre). To perform this test SOES analysis was carried out in circles (outer circle: 15 sparks, inner circle: 8 sparks; centre: 1 spark).

During this homogeneity test it was found that the composition in the centre of the discs for some elements differ from the outer areas. Therefore, an area of ca. 8 mm in diameter in the centre of the discs should not be used for spark optical emission spectrometry.

The analyte-specific within-disc uncertainty component $u_{bb}(2)$ was calculated in the same way as for the total batch. To calculate the necessary data an unbalanced ANOVA using the data obtained for the inner and outer circle was carried out considering that the number of single measurements is different for the inner and the outer circle. For uncertainty calculation the mean of four runs (two sides of two discs per batch) was used.

The results of the calculations are given in Annex 1 and Annex 2.

5. Characterisation study

5.1 Analytical methods

Eight laboratories participated in the certification inter-laboratory comparison. For some elements part of the laboratories used more than one analytical method reporting more than one data set.

Table 2: Analytical procedures used by the participating laboratories

Lab-No.	Element.	Sample mass	Sample pretreatment	Analytical method
1	As, Sn, Se, Ag, Cd, Cu, Ca, Te, Zn	2 g	Dissolution with tartaric acid/HNO_3 (acc. prEN 13800), Separation of lead as $PbSO_4$	ICP-OES, calibration with commercial solutions (Merck certipur)
	Sb	1 g	Dissolution with tartaric acid/HNO_3 (acc. prEN 13800)	ICP-OES, calibration with commercial solutions (Merck certipur)
	Bi	1 g	Dissolution with tartaric acid/HNO_3 (acc. prEN 13800), Separation of lead as $PbSO_4$	ICP-OES, calibration with commercial solutions (Merck certipur)
2	As	0.5 g	Dissolution with tartaric acid/HNO_3/HF	ICP-OES with matrix matched standards, calibration with commercial solutions (Spex)
	Bi	1 g	Dissolution with tartaric acid/HNO_3 (acc. prEN 13800) and HF	ICP-OES with matrix matched standards, calibration with commercial solutions (Spex)
	Ag, Sn, Ca, Cu, Cd, Se, Te, Zn	1 g	Dissolution with tartaric acid/HNO_3 (acc. prEN 13800) and HFand H_2O_2	ICP-OES with matrix matched standards, calibration with commercial solutions (Spex)
	Sb	1 g	Dissolution with tartaric acid/HNO_3 (acc. prEN 13800) and HF	ICP-OES with matrix matched standards, calibration with commercial solutions (Spex)
3	As, Sn	2 g	Dissolution with HNO_3/HF	FAAS, with matrix matched standards, calibration with commercial solutions
	Sb	1 g	Dissolution with HCl/HF/H_2SO_4	Titration with $KBrO_3$
	Ag, As, Bi, Sn, Se, Sb, Cu, Cd, Ca, Te, Zn	2 g	Dissolution with tartaric acid/HNO_3 (acc. prEN 13800)	ICP-OES with matrix matched standards, calibration with commercial solutions
4	Ag, As, Bi, Sn, Se, Sb, Cd, Ca, Zn	1 g	Dissolution with tartaric acid/HNO_3 (acc. prEN 13800)	ICP-OES with matrix matched standards, calibration with commercial solutions
6	Ag, As, Bi, Sn, Se, Sb, Cu, Cd, Ca, Te, Zn	0.5 g	Dissolution with HNO_3/HF	ICP-OES with matrix matched standards, commercial mono-element solutions (NIST)
7	As, Sn	2 g	Dissolution with tartaric acid/HNO_3	ICP-OES with matrix matched standards, calibration with commercial solutions (Kraft)
	Ag, Bi, Sb, Cu, Ca, Te, Cd, Zn	2 g	Dissolution with tartaric acid/HNO_3	ICP-OES with matrix matched standards, calibration with commercial solutions (Kraft)
	Se	2 g	Dissolution with HNO_3	ICP-OES with matrix matched standards, calibration with commercial solutions (Kraft)
8	As	1 g	Dissolution with HNO_3/$HClO_4$	ICP-OES with matrix matched standards, commercial mono-element solutions
	As, Ag, Bi, Sn, Se, Cd, Cu, Te, Zn	1 g	Dissolution with HNO_3/HCl separation of Pb as chloride	ICP-OES with matrix matched standards, commercial mono-element solutions
	Sb, Ag, Bi	1 g	Dissolution with HNO_3/HCl separation of Pb as chloride	FAAS with matrix matched standards, commercial mono-element solutions
9	Ag, As, Bi, Sn, Sb, Cu, Cd, Ca, Te, Zn	2 g	Dissolution with tartaric acid/HNO_3	ICP-OES with matrix matched standards, calibration with commercial solutions (Kraft)
	Se	2 g	Dissolution with HCl	ICP-OES with matrix matched standards, calibration with commercial solutions (Kraft)

The laboratories were asked to analyse six subsamples. They were free to choose any suitable analytical method. Table 2 shows the analytical methods used by the participating laboratories.
For all analytical methods where a calibration was necessary this calibration was performed using liquid standard solutions. All participating laboratories were asked to use only standard solutions prepared from pure metals or stoichiometric compounds or well checked commercial calibration solutions.

5.2 Analytical results and statistical evaluation

The analytical results of the certification inter-laboratory comparison are listed in Tables 3 to 24. These tables show the single results (M_i) of each laboratory, the respective laboratories' mean values (M), absolute and relative intra-laboratory standard deviation (s and s_{rel}, respectively), the standard deviation of laboratory means (s_M), and in addition the square root of mean of variances of data sets under repeatability conditions ($\overline{s}_i$) where n is the number of accepted data sets. The continuous line marks the certified value (mean of the laboratories' means), the broken lines mark the standard deviation, calculated from the laboratories' means.
In the related figures for each laboratory its mean value and single standard deviation is given. Outliers which have been excluded are highlighted in yellow.

Table 3: Results for As in BAM-M110

Lab./Meth.	8/I-1	2/I(R)	9/I	4/I	3/A	1/I	6/I	3/I	8/I-2	7/I		
M_i [%]	0.096	0.101	0.103	0.106	0.112	0.108	0.110	0.110	0.113	0.118		*n*
	0.102	0.106	0.104	0.105	0.106	0.107	0.110	0.109	0.113	0.118		10
	0.099	0.105	0.102	0.106	0.109	0.110	0.109	0.110	0.114	0.118		
	0.096	0.103	0.105	0.106	0.108	0.111	0.110	0.110	0.114	0.119		
	0.089	0.098	0.105	0.105	0.102	0.107	0.111	0.111	0.116	0.115		
	0.091	0.099	0.100	0.106	0.104	0.109	0.110	0.111	0.113	0.116		
					0.108							
***M* [%]**	**0.096**	**0.102**	**0.103**	**0.106**	**0.107**	**0.109**	**0.110**	**0.110**	**0.114**	**0.117**		**0.107**
s [%]	0.0048	0.0032	0.0018	0.0004	0.0033	0.0014	0.0006	0.0006	0.0012	0.0013	s_M [%]	0.0062
											$\bar{s}_i$ [%]	0.0023
s_{rel}	0.05076	0.03126	0.01763	0.00387	0.03059	0.01274	0.00514	0.00583	0.01027	0.01125		0.05779

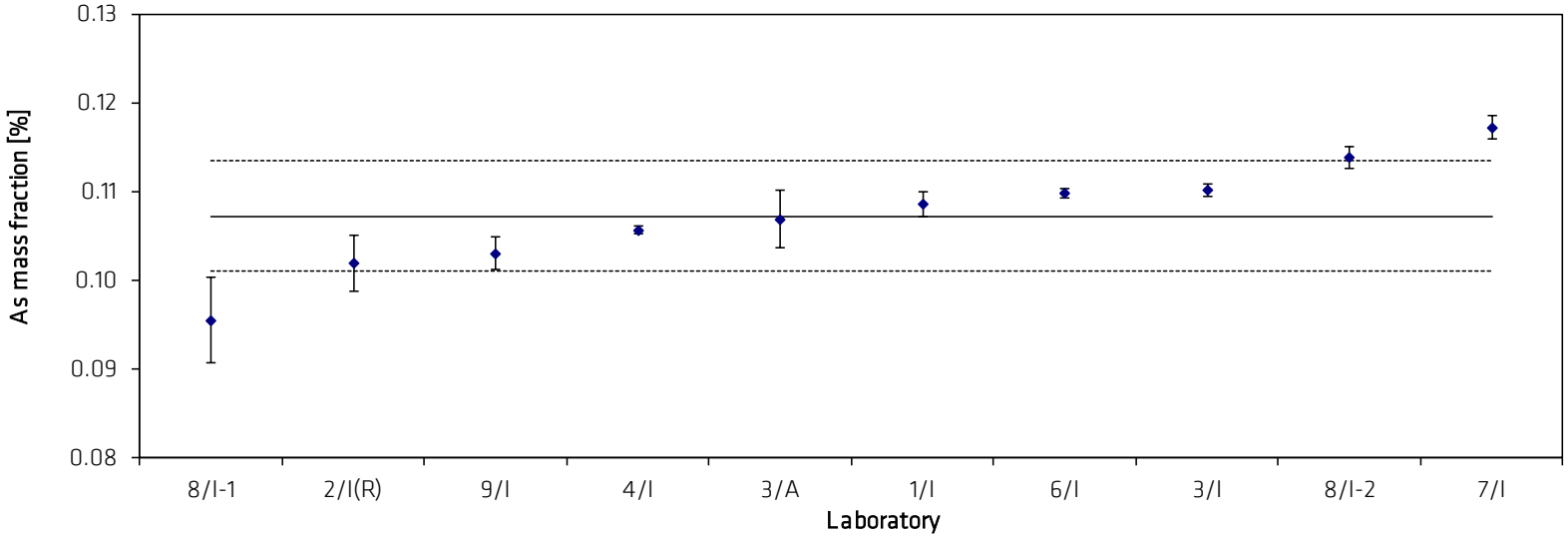


Table 4: Results for Bi in BAM-M110

Lab./Meth.	3/I	9/I(R)	8/A	1/I(R)	8/I	7/I	4/I	6/I	2/I		
M_i [%]	0.0120	0.0123	0.0127	0.0131	0.0124	0.0126	0.0128	0.0130	0.0133		*n*
	0.0119	0.0123	0.0123	0.0120	0.0124	0.0124	0.0127	0.0130	0.0130		9
	0.0120	0.0122	0.0122	0.0122	0.0127	0.0127	0.0128	0.0129	0.0132		
	0.0121	0.0124	0.0125	0.0125	0.0127	0.0126	0.0129	0.0130	0.0130		
	0.0120	0.0126	0.0123	0.0126	0.0127	0.0126	0.0127	0.0130	0.0130		
	0.0120	0.0117	0.0119	0.0120	0.0126	0.0126	0.0128	0.0129	0.0130		
M [%]	**0.0120**	**0.0123**	**0.0123**	**0.0124**	**0.0126**	**0.0126**	**0.0128**	**0.0130**	**0.0131**		**0.0126**
s [%]	0.0001	0.0003	0.0003	0.0004	0.0001	0.0001	0.0001	0.0001	0.0001	s_M [%]	0.000352
										$\bar{s}_i$ [%]	0.0002
s_{rel}	0.00614	0.02463	0.02118	0.03354	0.01170	0.00647	0.00589	0.00398	0.01016		0.02804

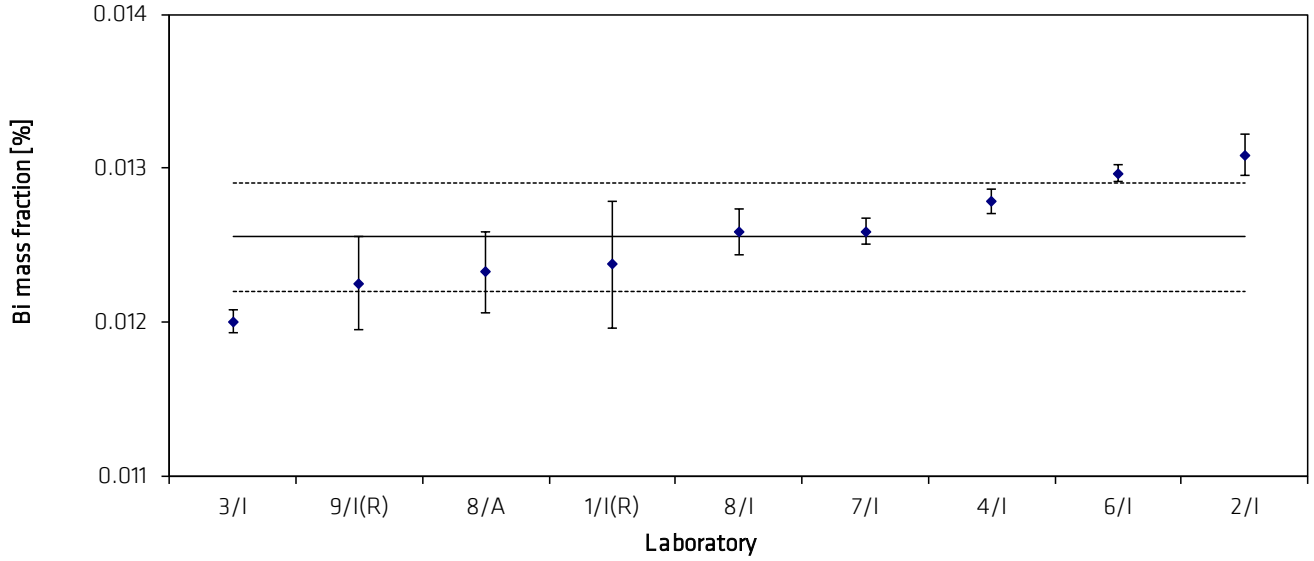


Table 5: Results for Sb in BAM-M110

Lab./Meth.	2/I	9/I	3/I	1/I(R)	7/I	6/I	4/I	3/T	8/A		
M_i [%]	2.966	2.974	2.990	3.059	3.070	3.060	3.10	3.248	3.20		*n*
	2.944	2.905	3.022	3.025	3.051	3.041	3.09	3.221	3.32		9
	2.946	2.995	3.034	3.026	3.062	3.032	3.12	3.206	3.34		
	2.968	2.993	2.998	3.065	3.054	3.051	3.13	3.277	3.16		
	2.976	2.995	3.027	3.005	3.022	3.093	3.10	3.299	3.37		
	2.989	2.959	3.001	3.008	3.021	3.071	3.11	3.251	3.15		
M [%]	**2.965**	**2.970**	**3.012**	**3.031**	**3.047**	**3.058**	**3.108**	**3.250**	**3.257**		**3.078**
s [%]	0.0177	0.0350	0.0180	0.0253	0.0207	0.0220	0.0147	0.0344	0.0977	s_M [%]	0.1089
										$\bar{s}_i$ [%]	0.0400
s_{rel}	0.00596	0.01180	0.00598	0.00836	0.00680	0.00718	0.00474	0.01058	0.03000		0.03540

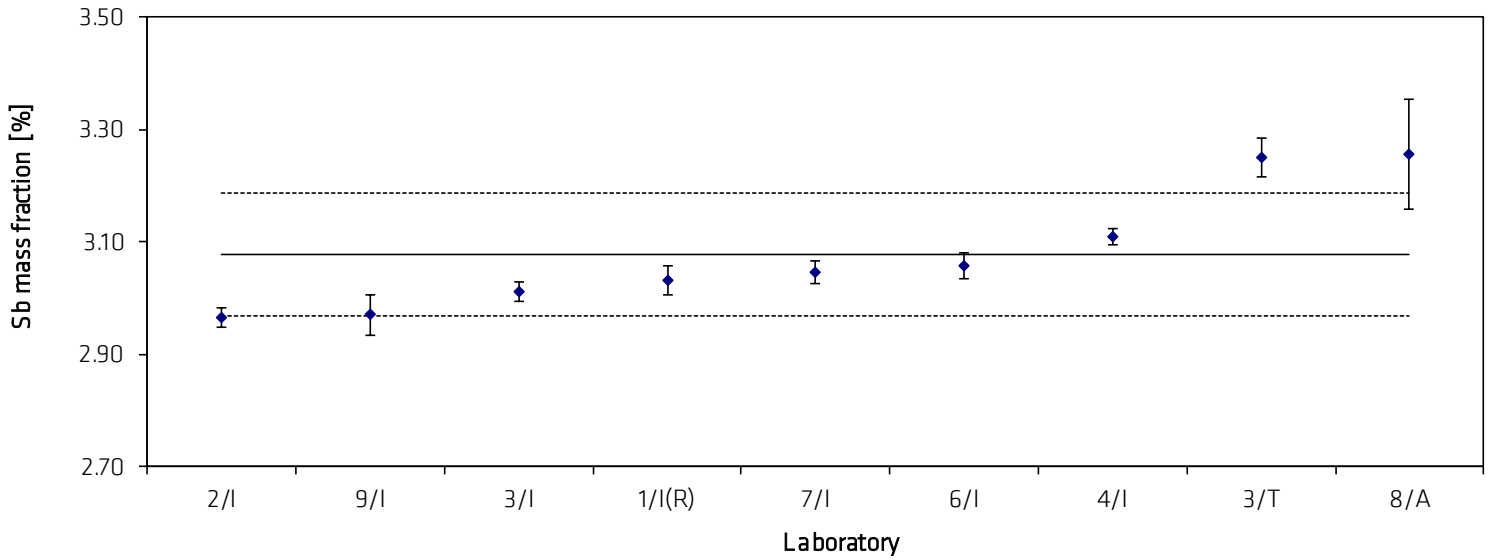


Table 6: Results for Se in BAM-M110

Lab./Meth.	4/I	9/I	6/I	7/I	1/I	2/I	3/I	8/I		
M_i [%]	0.0090	0.009	0.009	0.0101	0.0117	0.0109	0.0116	0.0122		*n*
	0.0089	0.009	0.009	0.0097	0.0112	0.0113	0.0117	0.0122		8
	0.0095	0.009	0.011	0.0109	0.0108	0.0111	0.0118	0.0119		
	0.0090	0.009	0.008	0.0108	0.0110	0.0118	0.0113	0.0122		
	0.0091	0.010	0.009	0.0108	0.0111	0.0111	0.0118	0.0121		
	0.0091	0.009	0.011	0.0108	0.0112	0.0112	0.0117	0.0121		
***M* [%]**	**0.0091**	**0.0092**	**0.0095**	**0.0105**	**0.0111**	**0.0112**	**0.0116**	**0.0121**		**0.0106**
s [%]	0.0002	0.0004	0.0012	0.0005	0.0003	0.0003	0.0002	0.0001	s_M [%]	0.0012
									$\bar{s}_i$ [%]	0.0005
s_{rel}	0.02305	0.04454	0.12892	0.04750	0.02802	0.02739	0.01477	0.00965		0.11092

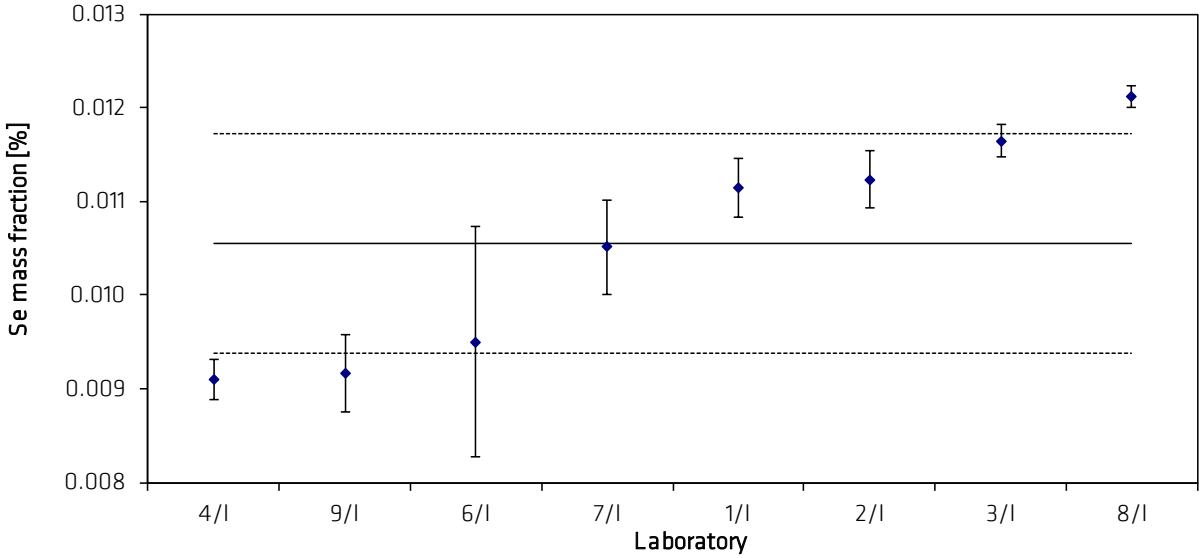


Table 7: Results for Sn in BAM-M110

Lab./Meth.	1/I	4/I	2/I	6/I	9/I	3/A	7/I	3/I	8/I		
M_i [%]	0.1267	0.127	0.1298	0.129	0.1292	0.1303	0.1350	0.1361	0.139		*n*
	0.1283	0.127	0.1268	0.128	0.1267	0.1292	0.1355	0.1354	0.139		9
	0.1265	0.128	0.1277	0.128	0.1256	0.1285	0.1357	0.1361	0.137		
	0.1281	0.129	0.1294	0.128	0.1298	0.1310	0.1363	0.1362	0.142		
	0.1267	0.127	0.1282	0.130	0.1312	0.1291	0.1355	0.1357	0.143		
	0.1244	0.128	0.1287	0.129	0.1303	0.1255	0.1348	0.1356	0.138		
M [%]	**0.1268**	**0.1277**	**0.1284**	**0.1287**	**0.1288**	**0.1289**	**0.1355**	**0.1359**	**0.1397**		**0.1311**
s [%]	0.0014	0.0008	0.0011	0.0008	0.0022	0.0019	0.0005	0.0003	0.0023	s_M [%]	0.0046
										$\bar{s}_i$ [%]	0.0014
s_{rel}	0.01096	0.00640	0.00862	0.00635	0.01695	0.01480	0.00384	0.00255	0.01674		0.03497

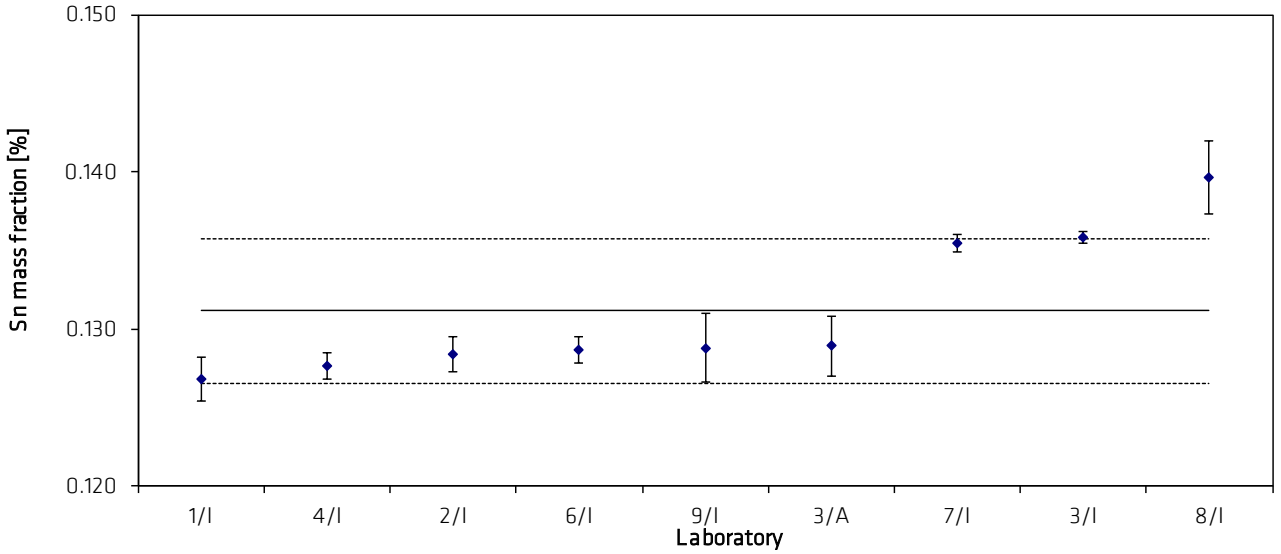


Table 8: Results for Ag in BAM-M110

Lab./Meth.	4/I	3/I	6/I	9/I	7/I	2/I	8/I	1/I		
M_i [mg/kg]	20.2	21.0	20.8	22.7	22.2	22.8	26	25.5		*n*
	20.2	20.9	21.0	22.2	22.1	23.1	24	25.3		8
	20.7	21.2	21.3	21.9	22.6	23.0	25	25.9		
	20.4	21.1	23.0	22.3	22.6	22.0	26	25.1		
	20.6	21.3	21.1	22.4	22.6	22.1	25	25.7		
	20.7	21.2	20.6	22.3	22.2	22.6	25	24.6		
M **[mg/kg]**	**20.4**	**21.1**	**21.3**	**22.3**	**22.4**	**22.6**	**25.2**	**25.3**		**22.6**
s [mg/kg]	0.217	0.131	0.867	0.274	0.230	0.452	0.753	0.467	s_M [mg/kg]	1.805
									$\bar{s}_i$ [mg/kg]	0.492
s_{rel}	0.011	0.006	0.041	0.012	0.010	0.020	0.030	0.018		0.080

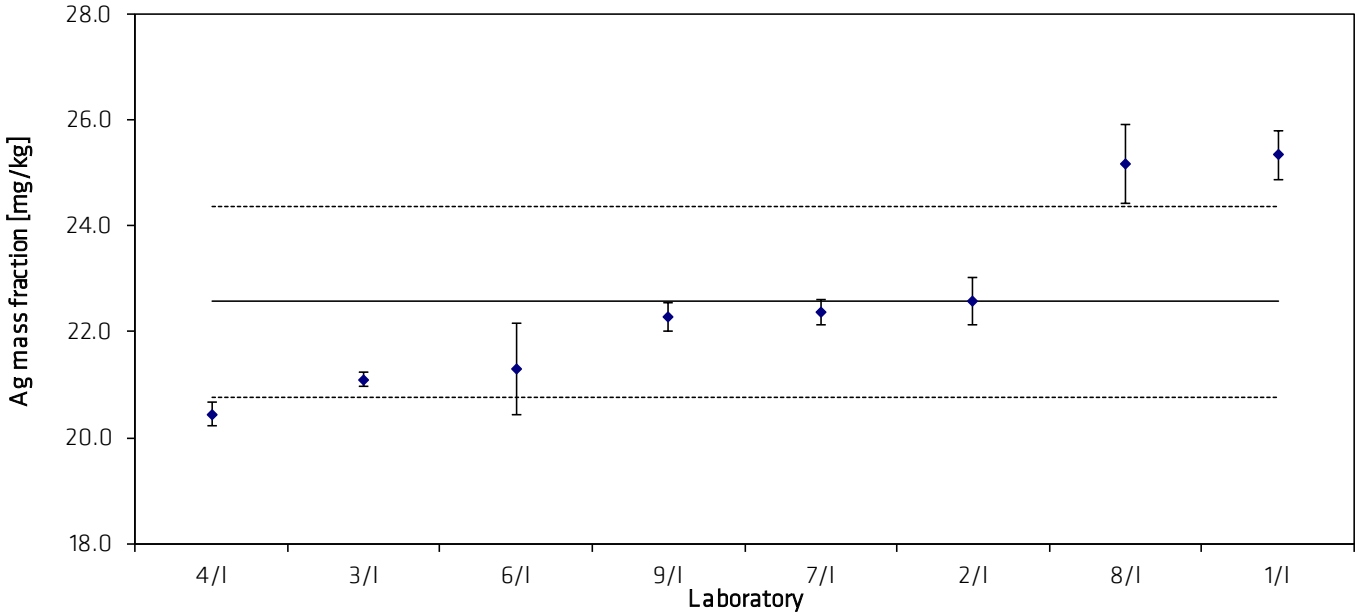


Table 9: Results for Cu in BAM-M110

Lab./Meth.	3/I	9/I	6/I	7/I	2/I	1/I	3/EA	8/I		
M_i [mg/kg]	6.1	6.3	6.0	6.3	6.5	6.8	7.2	9.5		*n*
	5.9	5.9	6.3	6.3	6.7	6.7	6.9	14.3		7
	5.9	6.0	6.2	6.4	6.3	6.8	6.6	8.2		
	6.0	6.2	6.1	6.3	5.9	6.7	6.9	8.7		
	6.2	6.2	6.2	6.4	6.2	6.6	7.0	12.3		
	6.0	6.0	5.9	6.3	6.8	6.4	6.8	8.3		
M [mg/kg]	**6.01**	**6.09**	**6.12**	**6.32**	**6.39**	**6.66**	**6.90**	**10.22**		**6.36**
s [mg/kg]	0.136	0.130	0.147	0.045	0.333	0.144	0.190	2.513	s_M [mg/kg]	0.325
									$\overline{s}_i$ [mg/kg]	0.180
s_{rel}	0.023	0.021	0.024	0.007	0.052	0.022	0.028	0.246		0.051

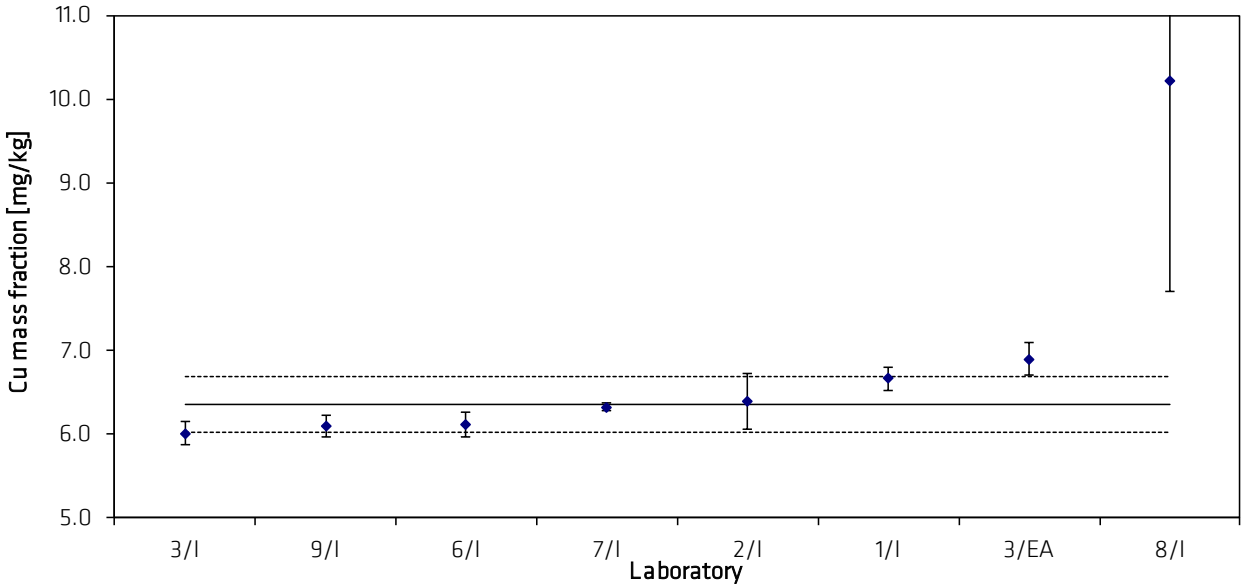


Table 10: Results for Te in BAM-M110

Lab./Meth.	6/I	9/I	3/EA	7/I	3/I	2/I	1/I		
M_i [mg/kg]	2.6	3.5	3.81	3.7	3.8	4.2	5.1		*n*
	2.7	3.6	3.43	3.9	3.5	4.4	5.7		7
	2.7	3.5	3.38	3.6	3.6	4.1	5.2		
	2.1	3.6	3.51	3.5	3.6	4.0	5.1		
	2.6	3.5	3.69	3.5	3.6	4.2	5.6		
	3.0	3.5	3.55	3.4	3.7	4.0	< 5.0		
M [mg/kg]	**2.62**	**3.52**	**3.56**	**3.60**	**3.62**	**4.14**	**5.34**		**3.77**
s [mg/kg]	0.293	0.059	0.162	0.160	0.111	0.136	0.303	s_M [mg/kg]	0.825
								$\bar{s}_i$ [mg/kg]	0.194
s_{rel}	0.112	0.017	0.045	0.044	0.031	0.033	0.057		0.219

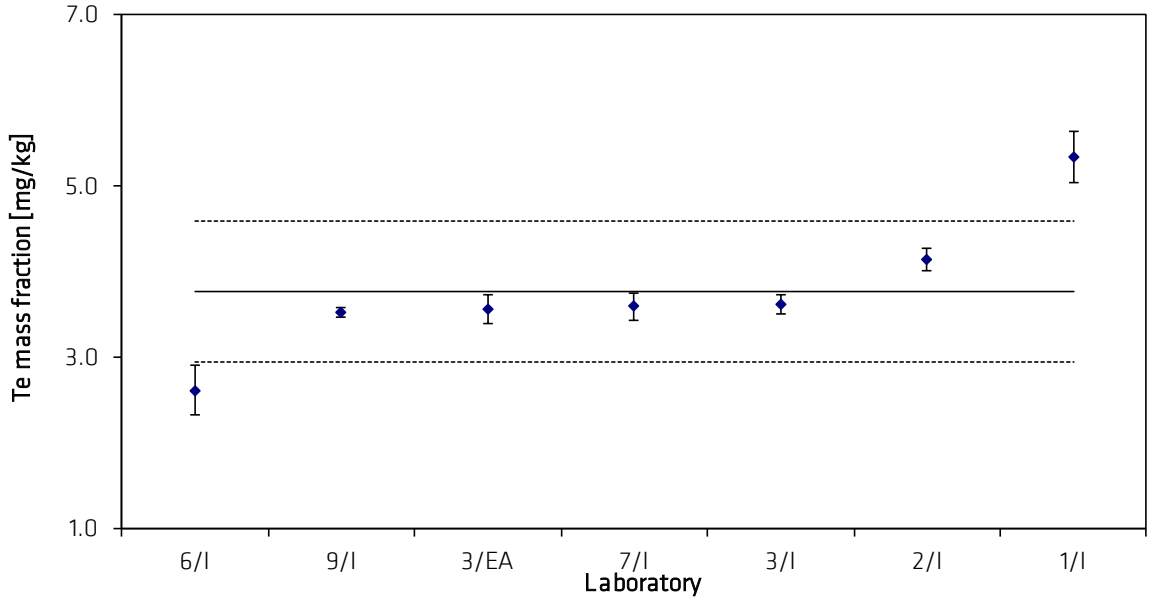


Table 11: Results for Cd in BAM-M110

Lab./Meth.	3/I	7/I	1/I	2/I	6/I	4/I	9/I(R)	8/I		
M_i [mg/kg]	0.120	0.20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.3		*n*
	0.134	0.20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0		2
	0.121	0.22	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.7		
	0.122	0.21	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.9		
	0.123	0.21	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.6		
	0.134	0.21	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.0		
M **[mg/kg]**	**0.126**	**0.21**	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**	**1.58**		**0.17**
s [mg/kg]	0.007	0.008						1.011	s_M [mg/kg]	0.058
									$\bar{s_i}$ [mg/kg]	0.007
s_{rel}	0.053	0.036						0.638		0.350

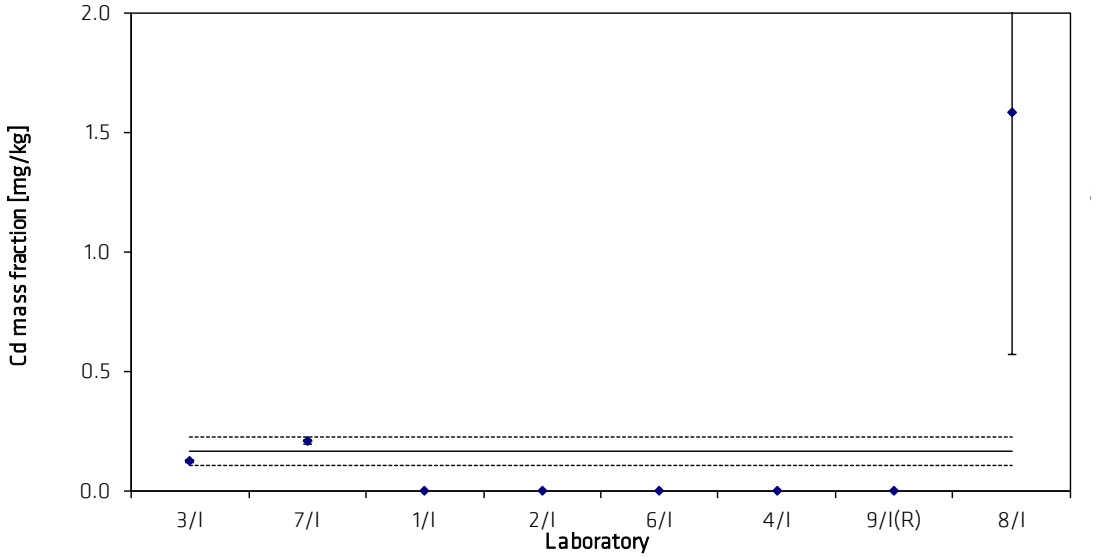


Table 12: Results for Ca in BAM-M110

Lab./Meth.	3/I	1/I	2/I	6/I	4/I	7/I		
M_i [mg/kg]	0.9	< 1.0	< 1.0	< 1.0	1.6	13.5		*n*
	1.4	< 1.0	< 1.0	< 1.0	1.8	16.1		2
	1.2	< 1.0	< 1.0	< 1.0	1.7	14.0		
	0.6	< 1.0	< 1.0	< 1.0	1.9	17.2		
	[4.01]	< 1.0	< 1.0	< 1.0	1.9	19.4		
	0.7	< 1.0	< 1.0	< 1.0	1.8	20.7		
M **[mg/kg]**	**0.97**	**< 1**	**< 1**	**< 1**	**1.80**	**16.80**		**1.39**
s [mg/kg]	0.351				0.108	2.877	s_M [mg/kg]	0.585
							$\bar{s}_i$ [mg/kg]	0.164
s_{rel}	0.362				0.060	0.171		0.422

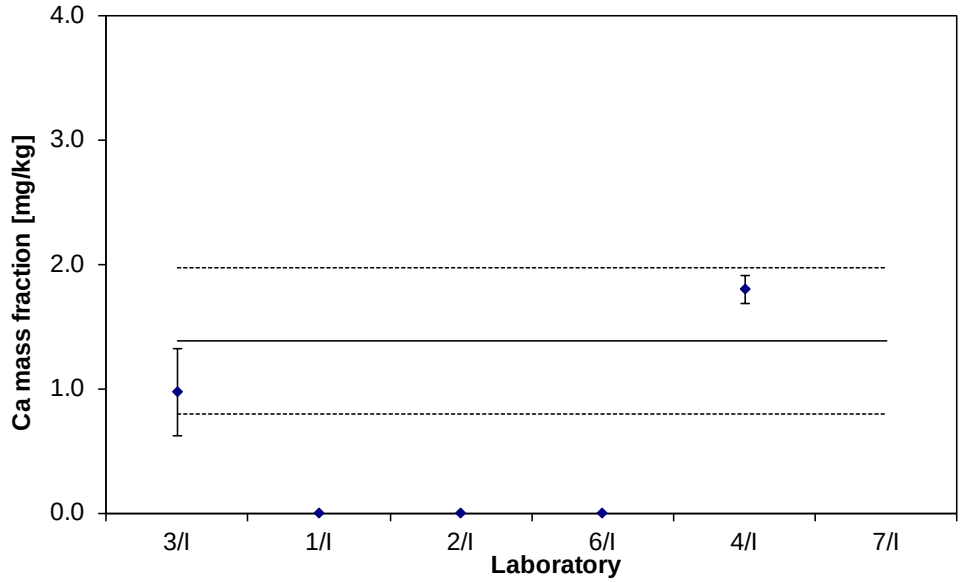


Table 13: Results for Zn in BAM-M110

Lab./Meth.	9/I	3/I	1/I	2/I	6/I	4/I	7/I		
M_i [mg/kg]	0.28	0.22	< 1	< 1	< 1	< 1	< 1		*n*
	0.28	0.24	< 1	< 1	< 1	< 1	< 1		2
	0.25	0.42	< 1	< 1	< 1	< 1	< 1		
	0.26	0.16	< 1	< 1	< 1	< 1	< 1		
	0.31	0.56	< 1	< 1	< 1	< 1	< 1		
	0.28	0.16	< 1	< 1	< 1	< 1	< 1		
***M* [mg/kg]**	**0.27**	**0.29**	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**		**0.28**
s [mg/kg]	0.021	0.161						s_M [mg/kg]	0.014
								$\bar{s}_i$ [mg/kg]	0.115
s_{rel}	0.076	0.548							0.050

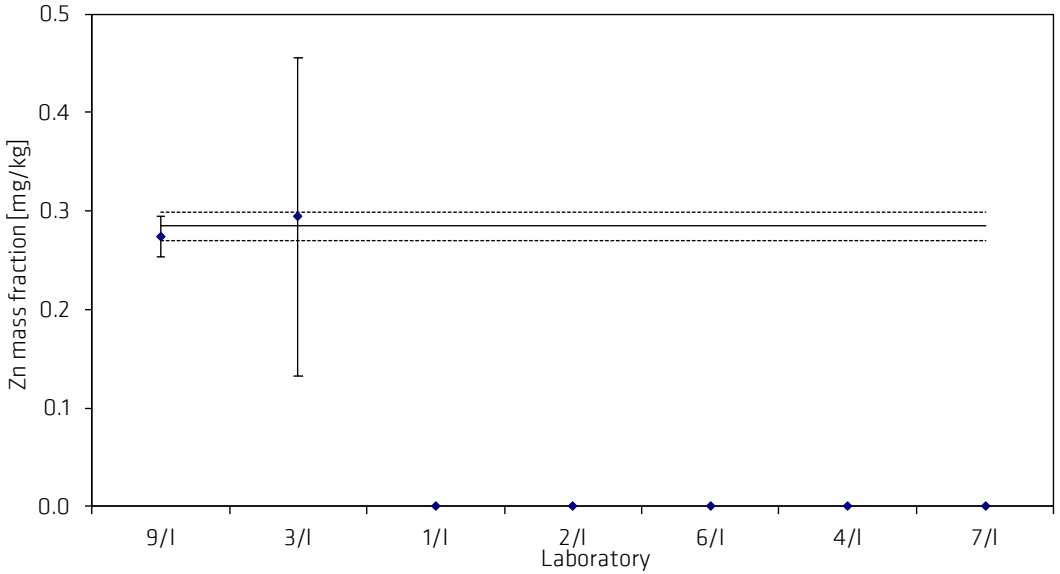


Table 14: Results for As in BAM-M110a

Lab./Meth.	8/I-1	6/I	2/I(R)	9/I	4/I	3/A	3/I	1/I	8/I-2	7/I		
M_i [%]	0.092	0.094	0.101	0.102	0.106	0.106	0.112	0.110	0.113	0.119		*n*
	0.092	0.098	0.106	0.104	0.106	0.103	0.112	0.110	0.112	0.117		10
	0.093	0.095	0.105	0.103	0.106	0.108	0.111	0.112	0.112	0.117		
	0.099	0.098	0.103	0.104	0.106	0.109	0.109	0.109	0.112	0.115		
	0.089	0.097	0.098	0.104	0.107	0.109	0.110	0.111	0.115	0.117		
	0.092	0.098	0.099	0.102	0.106	0.103	0.109	0.109	0.110	0.117		
***M* [%]**	**0.093**	**0.097**	**0.102**	**0.103**	**0.106**	**0.106**	**0.110**	**0.110**	**0.112**	**0.117**		**0.106**
s [%]	0.0033	0.0017	0.0032	0.0011	0.0007	0.0029	0.0014	0.0012	0.0016	0.0011	s_M [%]	0.0073
											$\bar{s}_i$ [%]	0.0020
s_{rel}	0.03567	0.01737	0.03126	0.01026	0.00668	0.02771	0.01299	0.01106	0.01454	0.00904		0.06924

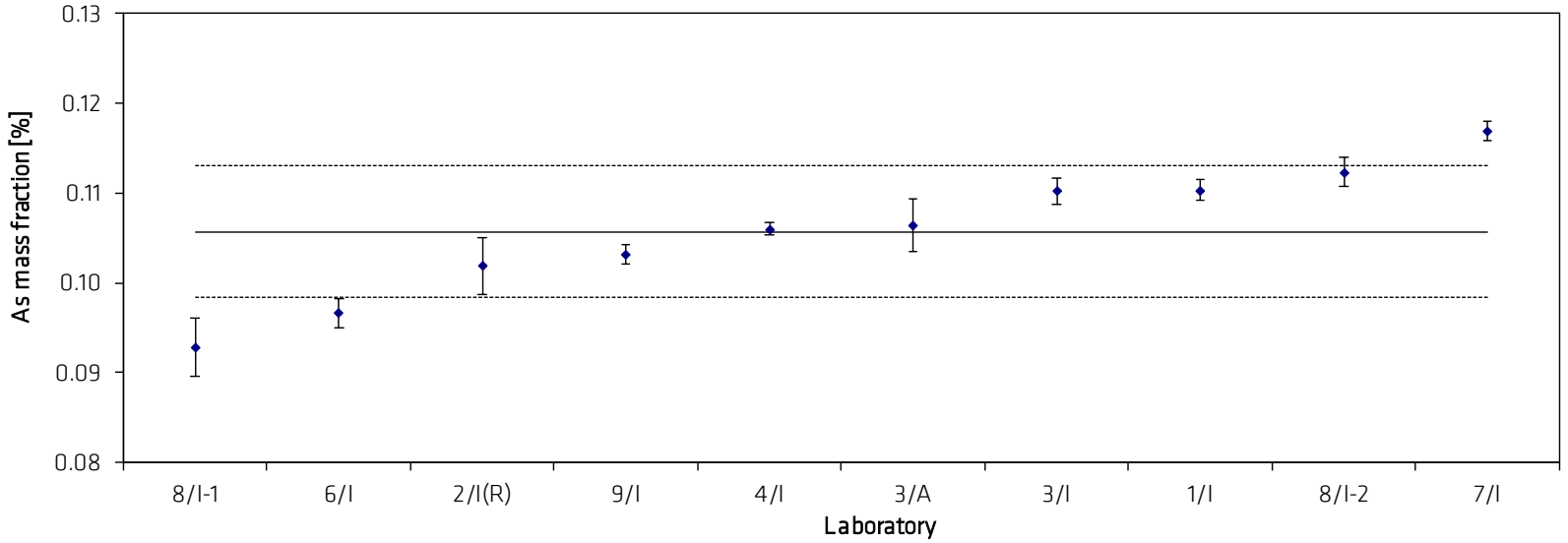


Table 15: Results for Bi in BAM-M110a

Lab./Meth.	3/I	1/I(R)	8/I	2/I	7/I	9/I(R)	4/I	6/I		
M_i [%]	0.0123	0.0121	0.0125	0.0126	0.0125	0.0123	0.0128	0.0132		*n*
	0.0122	0.0114	0.0125	0.0129	0.0127	0.0138	0.0128	0.0130		8
	0.0120	0.0125	0.0125	0.0126	0.0127	0.0122	0.0129	0.0129		
	0.0119	0.0124	0.0123	0.0126	0.0126	0.0116	0.0127	0.0132		
	0.0119	0.0125	0.0125	0.0124	0.0127	0.0128	0.0129	0.0128		
	0.0120	0.0122	0.0124	0.0124	0.0127	0.0133	0.0128	0.0132		
***M* [%]**	**0.0121**	**0.0122**	**0.0125**	**0.0126**	**0.0127**	**0.0127**	**0.0128**	**0.0131**		**0.0126**
s [%]	0.0002	0.0004	0.0001	0.0002	0.0001	0.0008	0.0001	0.0002	s_M [%]	0.0003
									$\bar{s}_i$ [%]	0.0003
s_{rel}	0.01439	0.03207	0.00672	0.01458	0.00692	0.06455	0.00587	0.01349		0.02611

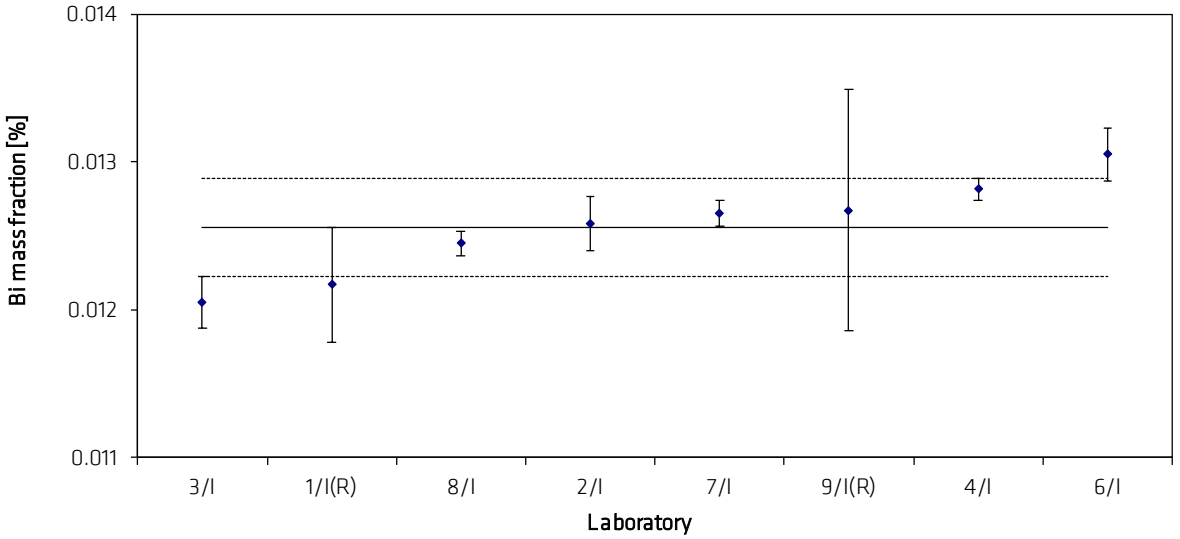


Table 16: Results for Sb in BAM-M110a

Lab./Meth.	2/I(R)	9/I	3/I	7/I	1/I(R)	6/I	4/I	3/T		
M_i [%]	2.88	3.013	3.050	3.039	3.039	3.077	3.10	3.151		*n*
	2.87	2.985	3.057	3.020	3.085	3.043	3.12	3.123		8
	2.83	2.970	3.029	3.057	3.030	3.021	3.10	3.219		
	2.91	3.016	2.988	3.004	3.010	3.058	3.10	3.169		
	2.88	3.038	2.988	3.007	3.071	3.022	3.11	3.257		
	2.92	3.018	2.992	3.076	2.977	3.062	3.12	3.188		
M [%]	**2.8817**	**3.0067**	**3.0174**	**3.0337**	**3.0355**	**3.0472**	**3.1083**	**3.1845**		**3.0394**
s [%]	0.0319	0.0247	0.0319	0.0289	0.0397	0.0226	0.0098	0.0482	s_M [%]	0.0865
									$\bar{s}_i$ [%]	0.0303
s_{rel}	0.01106	0.00822	0.01057	0.00951	0.01308	0.00743	0.00316	0.01513		0.02845

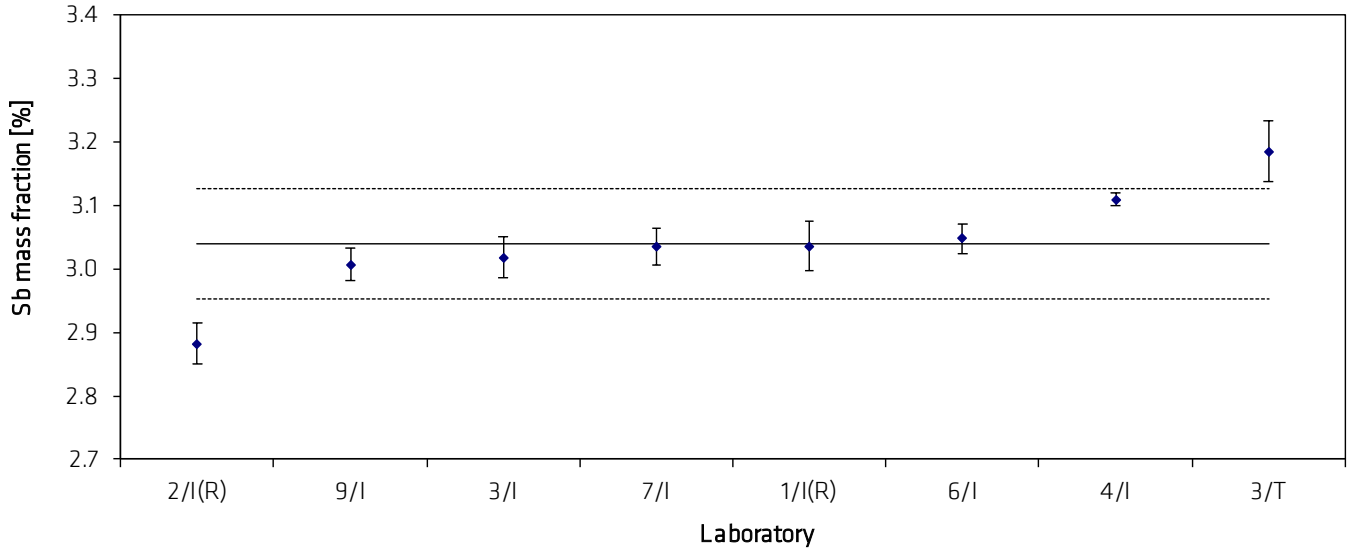


Table 17: Results for Se in BAM-M110a

Lab./Meth.	9/I	6/I(R)	7/I	1/I	4/I	8/I	3/I	2/I		
M_i [%]	0.008	0.0101	0.0103	0.0105	0.0102	0.0113	0.0127	0.0121		*n*
	0.011	0.0099	0.0102	0.0101	0.0109	0.0112	0.0124	0.0123		8
	0.012	0.0099	0.0100	0.0104	0.0099	0.0111	0.0123	0.0123		
	0.011	0.0100	0.0102	0.0102	0.0108	0.0113	0.0120	0.0130		
	0.009	0.0100	0.0103	0.0107	0.0108	0.0112	0.0123	0.0123		
	0.008	0.0100	0.0102	0.0108	0.0109	0.0114	0.0122	0.0120		
***M* [%]**	**0.0097**	**0.0100**	**0.0102**	**0.0104**	**0.0106**	**0.0113**	**0.0123**	**0.0123**		**0.0109**
s [%]	0.0017	0.0001	0.0001	0.0002	0.0004	0.0001	0.0002	0.0004	s_M [%]	0.0010
									$\bar{s}_i$ [%]	0.0007
s_{rel}	0.17480	0.00802	0.01164	0.02321	0.04027	0.00932	0.01889	0.02840		0.09379

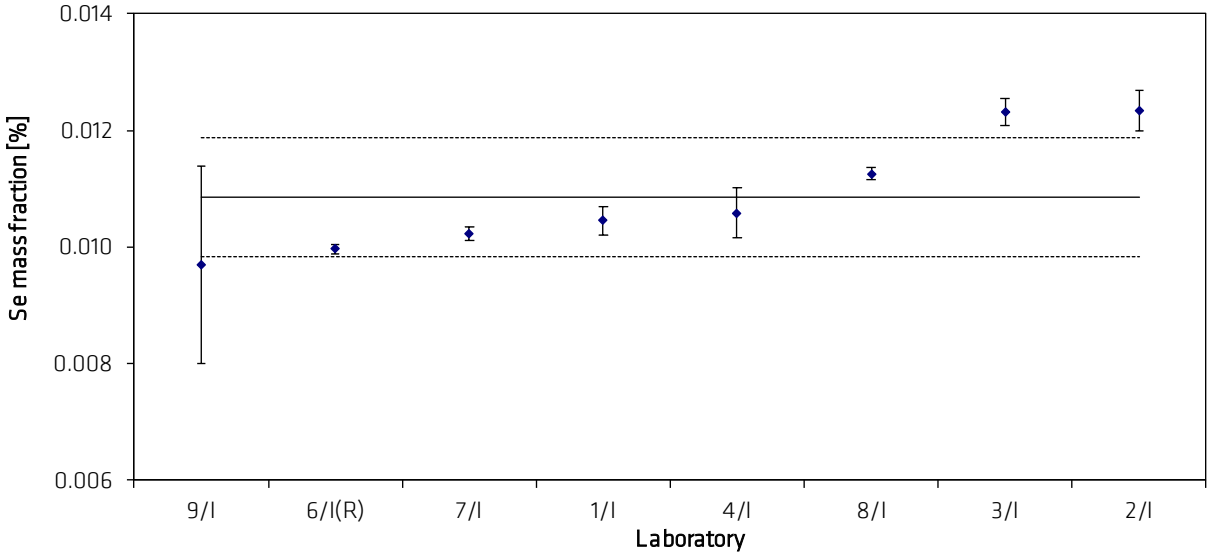


Table 18: Results for Sn in BAM-M110a

Lab./Meth.	2/I(R)	1/I	4/I	3/A	6/I	9/I	3/I	7/I	8/I		
M_i [%]	0.1213	0.1245	0.127	0.1306	0.132	0.1324	0.1379	0.1371	0.142		*n*
	0.1226	0.1239	0.128	0.1314	0.131	0.1314	0.1371	0.1369	0.143		9
	0.1227	0.1281	0.127	0.1296	0.130	0.1299	0.1362	0.1362	0.143		
	0.1209	0.1296	0.127	0.1283	0.131	0.1317	0.1345	0.1357	0.140		
	0.1197	0.1291	0.128	0.1318	0.130	0.1319	0.1352	0.1362	0.141		
	0.1202	0.1284	0.128	0.1291	0.132	0.1298	0.1344	0.1370	0.142		
***M* [%]**	**0.1212**	**0.1273**	**0.1275**	**0.1301**	**0.1310**	**0.1312**	**0.1359**	**0.1365**	**0.1418**		**0.1314**
s [%]	0.0012	0.0024	0.0005	0.0014	0.0009	0.0011	0.0014	0.0006	0.0012	s_M [%]	0.0060
										$\bar{s}_i$ [%]	0.0013
s_{rel}	0.01014	0.01912	0.00430	0.01049	0.00683	0.00826	0.01061	0.00424	0.00824		0.04603

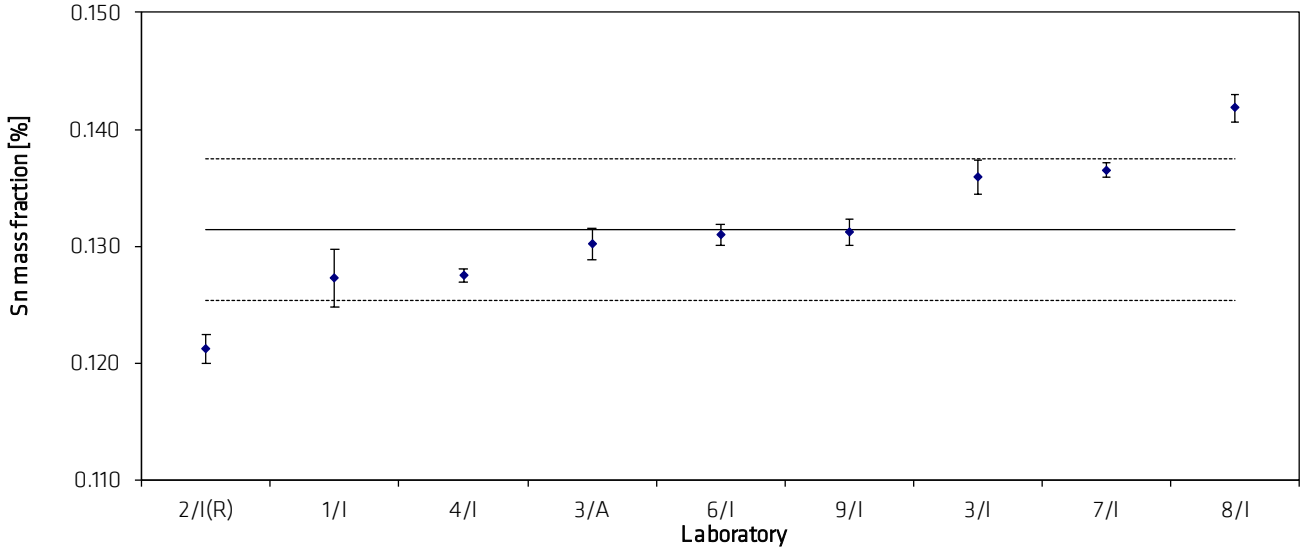


Table 19: Results for Ag in BAM-M110a

Lab./Meth.	2/I	4/I	3/I	9/I	6/I	7/I	8/I	1/I		
M_i [mg/kg]	19.9	19.5	21.5	22.3	22.2	22.4	25	24.9		*n*
	19.7	21.1	21.5	22.1	21.9	22.5	24	26.1		8
	19.3	19.2	21.2	21.6	21.8	22.7	25	26.1		
	20.2	21.0	20.9	22.0	22.0	22.5	24	25.8		
	19.8	20.9	21.0	21.8	21.6	22.5	26	25.3		
	19.8	20.8	20.9	21.2	22.2	22.7	26	24.9		
M [mg/kg]	**19.80**	**20.40**	**21.17**	**21.84**	**21.95**	**22.55**	**25.00**	**25.51**		**22.28**
s [mg/kg]	0.288	0.843	0.270	0.401	0.235	0.110	0.894	0.546	s_M [mg/kg]	2.040
									$\bar{s}_i$ [mg/kg]	0.524
s_{rel}	0.015	0.041	0.013	0.018	0.011	0.005	0.036	0.021		0.092

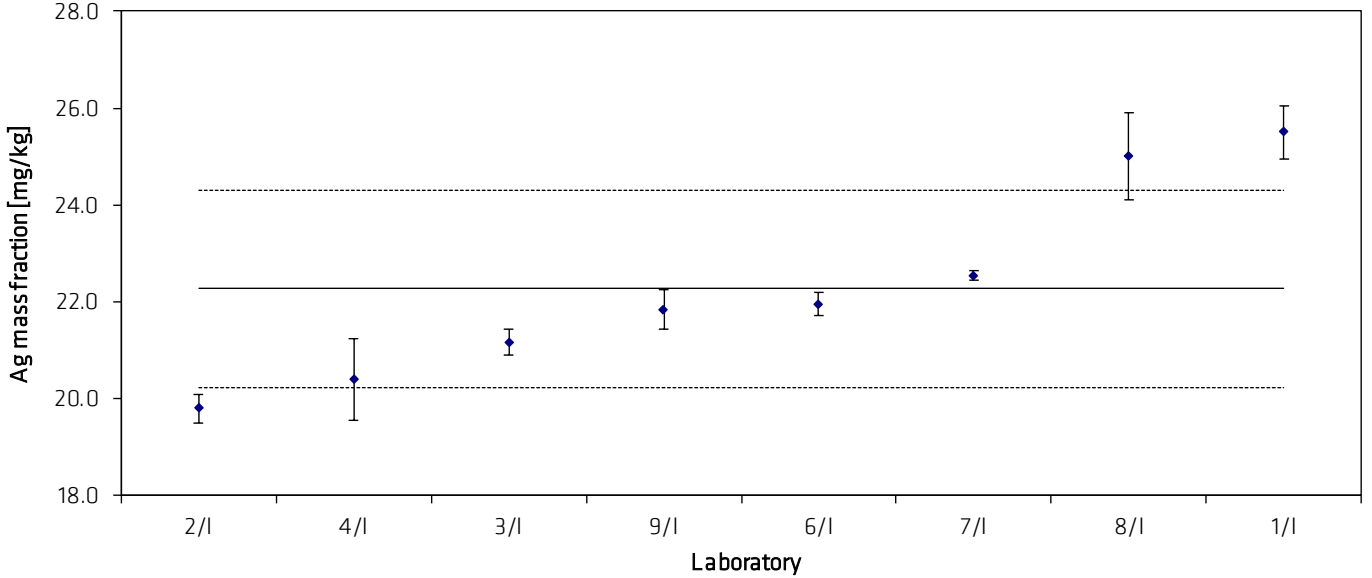


Table 20: Results for Cu in BAM-M110a

Lab./Meth.	2/I	3/I	9/I	6/I	7/I	1/I	3/EA	8/I		
M_i [mg/kg]	5.3	6.1	6.2	6.6	6.3	6.6	7.07	7.6		*n*
	5.2	6.1	6.0	6.2	6.4	6.9	6.81	7.6		8
	5.1	6.1	6.0	6.3	6.4	6.9	6.60	7.1		
	5.3	5.9	6.1	6.5	6.5	6.6	6.71	6.7		
	5.3	5.9	6.0	6.2	6.5	6.6	6.77	6.8		
	5.5	6.0	5.9	6.3	6.7	6.7	6.81	8.1		
***M* [mg/kg]**	**5.27**	**6.01**	**6.01**	**6.35**	**6.46**	**6.71**	**6.80**	**7.32**		**6.37**
s [mg/kg]	0.140	0.113	0.106	0.164	0.127	0.151	0.156	0.542	s_M [mg/kg]	0.616
									$\bar{s}_i$ [mg/kg]	0.231
s_{rel}	0.027	0.019	0.018	0.026	0.020	0.023	0.023	0.074		0.097

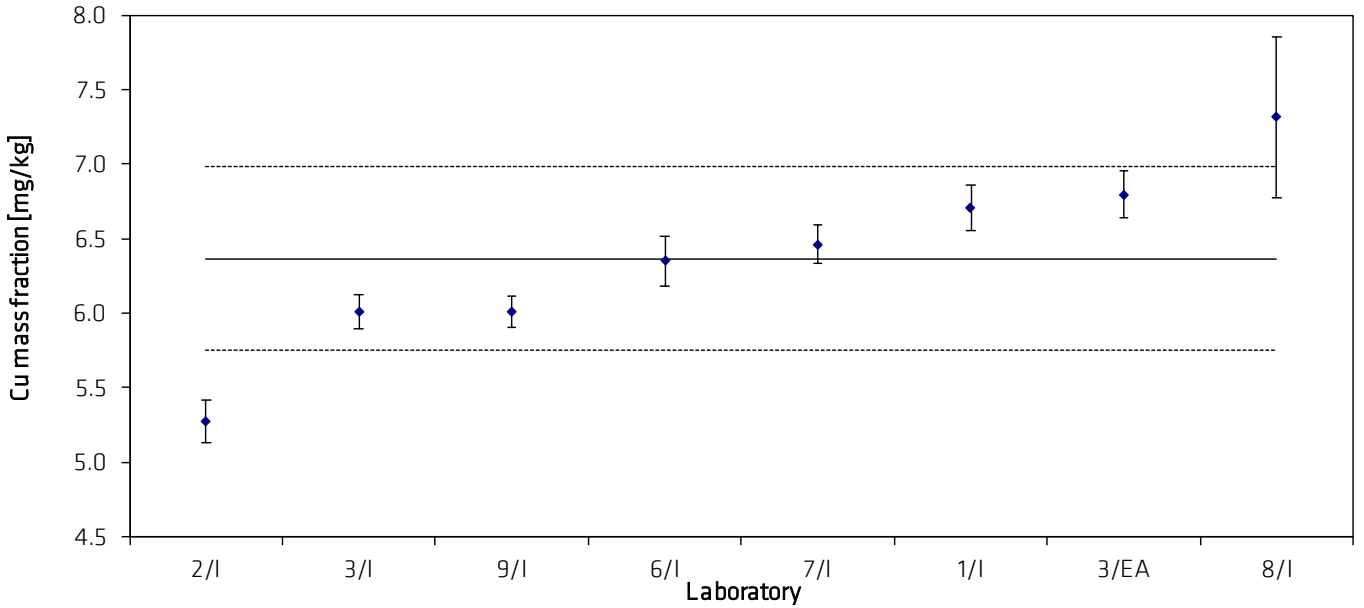


Table 21: Results for Te in BAM-M110a

Lab./Meth.	6/I	3/EA	9/I	3/I	7/I	2/I	1/I		
M_i [mg/kg]	2.8	3.25	3.6	3.7	3.6	4.1	5.3		*n*
	3.3	3.41	3.6	3.7	3.5	3.8	5.5		6
	3.9	3.46	3.5	3.8	3.8	3.8	5.1		
	3.3	3.58	3.6	3.7	4.0	4.0	5.3		
	3.4	3.43	3.5	3.5	4.0	3.9	5.6		
	3.3	3.37	3.5	3.5	4.0	4.0	5.2		
M **[mg/kg]**	**3.33**	**3.42**	**3.55**	**3.65**	**3.81**	**3.96**	**5.34**		**3.62**
s [mg/kg]	0.350	0.108	0.041	0.135	0.238	0.116	0.212	s_M [mg/kg]	0.235
								$\bar{s}_i$ [mg/kg]	0.193
s_{rel}	0.105	0.032	0.012	0.037	0.062	0.029	0.040		0.065

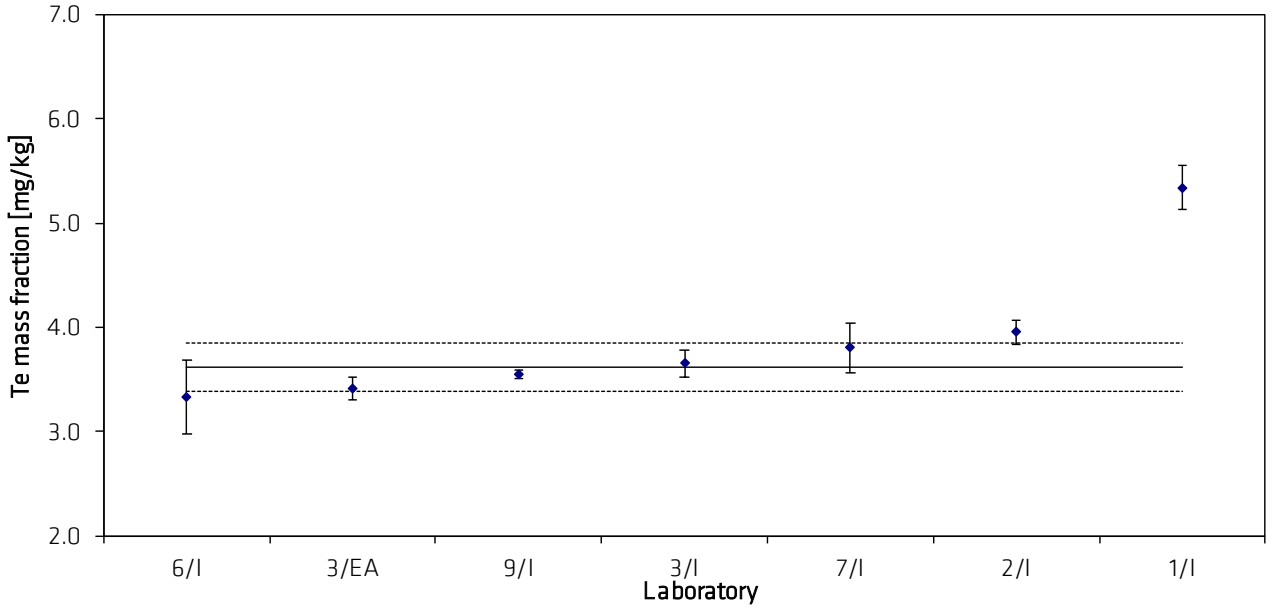


Table 22: Results for Cd in BAM-M110a

Lab./Meth.	3/I	7/I	1/I	2/I	6/I	4/I	9/I(R)		
M_i [mg/kg]	0.119	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		*n*
	0.121	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		2
	0.119	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
	0.115	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
	0.121	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
	0.117	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
M [mg/kg]	**0.12**	**0.20**	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**		**0.16**
s [mg/kg]	0.002	0.004						s_M [mg/kg]	0.059
								$\bar{s}_i$ [mg/kg]	0.002
s_{rel}	0.018	0.020							0.367

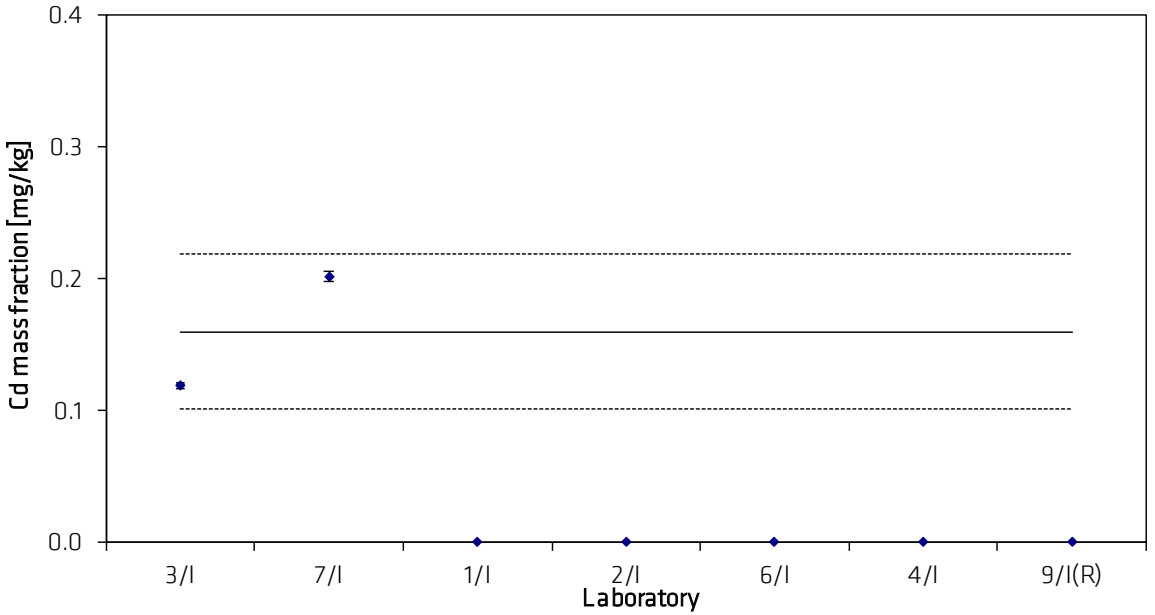
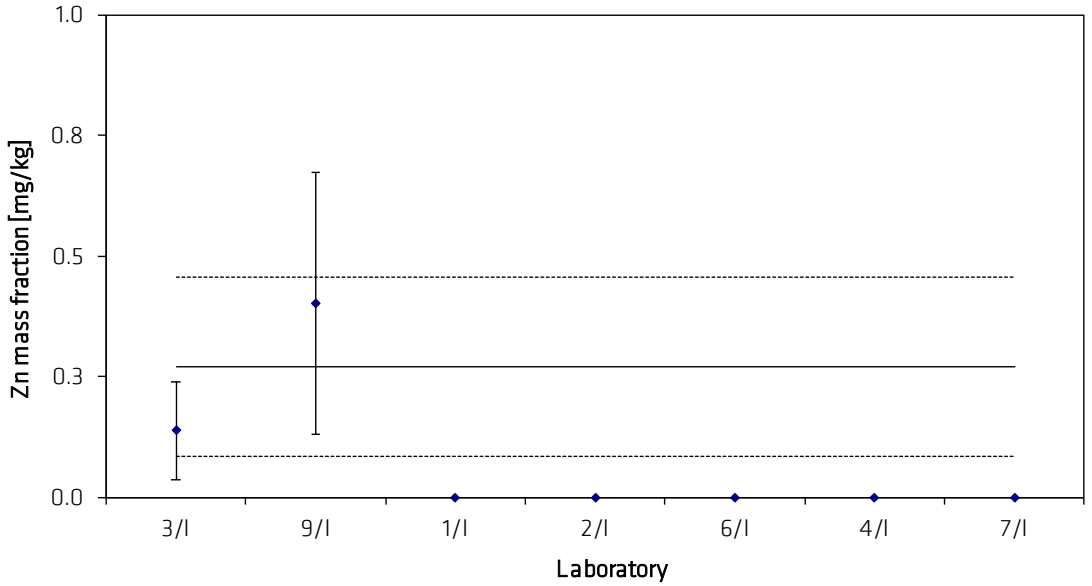


Table 23: Results for Ca in BAM-M110a

Lab./Meth.	3/I	1/I	2/I	6/I	4/I	7/I		
M_i [mg/kg]	1.2	< 1.0	< 1.0	< 1.0	< 1.0	16.9		n
	0.7	< 1.0	< 1.0	< 1.0	< 1.0	16.7		1
	0.9	< 1.0	< 1.0	< 1.0	< 1.0	16.4		
	0.3	< 1.0	< 1.0	< 1.0	< 1.0	12.3		
	1.3	< 1.0	< 1.0	< 1.0	< 1.0	16.0		
	1.2	< 1.0	< 1.0	< 1.0	< 1.0	13.5		
M [mg/kg]	**0.94**	**< 1**	**< 1**	**< 1**	**< 1**	**15.31**		**0.94**
s [mg/kg]	0.403					1.931	s_M [mg/kg]	
							$\bar{s}_i$ [mg/kg]	
s_{rel}	0.427					0.126		

Table 24: Results for Zn in BAM-M110a

Lab./Meth.	3/I	9/I	1/I	2/I	6/I	4/I	7/I		
M_i [mg/kg]	0.33	0.26	< 1	< 1	< 1	< 1	< 1		*n*
	0.15	0.27	< 1	< 1	< 1	< 1	< 1		2
	0.07	0.26	< 1	< 1	< 1	< 1	< 1		
	0.07	0.28	< 1	< 1	< 1	< 1	< 1		
	0.08	0.39	< 1	< 1	< 1	< 1	< 1		
	0.13	0.95	< 1	< 1	< 1	< 1	< 1		
M [mg/kg]	**0.14**	**0.40**	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**		**0.27**
s [mg/kg]	0.101	0.272						s_M [mg/kg]	0.186
								$\bar{s}_i$ [mg/kg]	0.205
s_{rel}	0.732	0.678							0.690



The statistical evaluation of the data was performed using the software program SoftCRM 1.2.2. [5]. The following results were obtained:

Table 25: Outcome of statistical tests of results obtained for As and Bi in BAM-M110

	As	Bi
Number of data sets	10	9
Snedecor-F-Test and Bartlett-Test	Pooling not allowed	Pooling not allowed
Dixon (α = 0.05)	---	---
Dixon (α = 0.01)	---	---
Nalimov (α = 0.05)	Lab. 8-1	---
Nalimov (α = 0.01)	---	---
Grubbs (α = 0.05)	---	---
Grubbs (α = 0.01)	---	---
Grubbs Pair (α = 0.05)	---	---
Grubbs Pair (α = 0.01)	---	---
Cochran	---	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: normal	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.01)	Distribution: normal	Distribution: normal

The straggler (Lab. 8-1 for As) was not removed.

Table 26: Outcome of statistical tests of results obtained for Sb and Se in BAM-M110

	Sb	Se
Number of data sets	9	9
Snedecor-F-Test and Bartlett-Test	Pooling not allowed	Pooling not allowed
Dixon (α = 0.05)	---	---
Dixon (α = 0.01)	---	---
Nalimov (α = 0.05)	---	---
Nalimov (α = 0.01)	---	---
Grubbs (α = 0.05)	---	---
Grubbs (α = 0.01)	---	---
Grubbs Pair (α = 0.05)	---	---
Grubbs Pair (α = 0.01)	---	---
Cochran	---	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: normal	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.01)	Distribution: normal	Distribution: normal

Table 27: Outcome of statistical tests of results obtained for Sn and Ag in BAM-M110

	Sn	Ag
Number of data sets	9	8
Snedecor-F-Test and Bartlett-Test	Pooling not allowed	Pooling not allowed
Dixon (α = 0.05)	---	---
Dixon (α = 0.01)	---	---
Nalimov (α = 0.05)	Lab. 8	---
Nalimov (α = 0.01)	---	---
Grubbs (α = 0.05)	---	---
Grubbs (α = 0.01)	---	---
Grubbs Pair (α = 0.05)	---	---
Grubbs Pair (α = 0.01)	---	---
Cochran	---	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: not normal	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: not normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.01)	Distribution: normal	Distribution: normal

The straggler (Lab. 8 for Sn) was not removed.

Table 28: Outcome of statistical tests of results obtained for Cu in BAM-M110

	1st run	2nd run
Number of data sets	8	7
Snedecor-F-Test and Bartlett-Test	Pooling not allowed	Pooling not allowed
Dixon (α = 0.05)	Lab. 8	---
Dixon (α = 0.01)	Lab. 8	---
Nalimov (α = 0.05)	Lab. 8	---
Nalimov (α = 0.01)	Lab. 8	---
Grubbs (α = 0.05)	Lab. 8	---
Grubbs (α = 0.01)	Lab. 8	---
Grubbs Pair (α = 0.05)	---	---
Grubbs Pair (α = 0.01)	---	---
Cochran	---	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: not normal	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: not normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: not normal	Insufficient data
Skewness & Kurtosis Test (α = 0.01)	Distribution: not normal	Insufficient data

The outlier (Lab. 8, 1st run) was removed.

Table 29: Outcome of statistical tests of results obtained for Te in BAM-M110

Number of data sets	7
Snedecor-F-Test and Bartlett-Test	Pooling not allowed
Dixon (α = 0.05)	---
Dixon (α = 0.01)	---
Nalimov (α = 0.05)	Lab. 1
Nalimov (α = 0.01)	---
Grubbs (α = 0.05)	---
Grubbs (α = 0.01)	---
Grubbs Pair (α = 0.05)	---
Grubbs Pair (α = 0.01)	---
Cochran	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: normal
Skewness & Kurtosis Test (α = 0.01)	Distribution: normal

The straggler (Lab. 1) was not removed.

Table 30: Outcome of statistical tests of results obtained for As and Bi in BAM-M110a

	As	Bi
Number of data sets	10	8
Snedecor-F-Test and Bartlett-Test	Pooling not allowed	Pooling not allowed
Dixon (α = 0.05)	---	---
Dixon (α = 0.01)	---	---
Nalimov (α = 0.05)	---	---
Nalimov (α = 0.01)	---	---
Grubbs (α = 0.05)	---	---
Grubbs (α = 0.01)	---	---
Grubbs Pair (α = 0.05)	---	---
Grubbs Pair (α = 0.01)	---	---
Cochran	---	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: normal	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.01)	Distribution: normal	Distribution: normal

Table 31: Outcome of statistical tests of results obtained for Sb and Se in BAM-M110a

	Sb	Se
Number of data sets	10	8
Snedecor-F-Test and Bartlett-Test	Pooling not allowed	Pooling not allowed
Dixon (α = 0.05)	---	---
Dixon (α = 0.01)	---	---
Nalimov (α = 0.05)	Lab. 2	---
Nalimov (α = 0.01)	---	---
Grubbs (α = 0.05)	---	---
Grubbs (α = 0.01)	---	---
Grubbs Pair (α = 0.05)	---	---
Grubbs Pair (α = 0.01)	---	---
Cochran	---	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: normal	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.01)	Distribution: normal	Distribution: normal

The straggler (Lab. 2 for Sb) was not removed.

Table 32: Outcome of statistical tests of results obtained for Sn and Ag in BAM-M110a

	Sn	Ag
Number of data sets	9	8
Snedecor-F-Test and Bartlett-Test	Pooling not allowed	Pooling not allowed
Dixon (α = 0.05)	---	---
Dixon (α = 0.01)	---	---
Nalimov (α = 0.05)	---	---
Nalimov (α = 0.01)	---	---
Grubbs (α = 0.05)	---	---
Grubbs (α = 0.01)	---	---
Grubbs Pair (α = 0.05)	---	---
Grubbs Pair (α = 0.01)	---	---
Cochran	---	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: not normal	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: not normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.01)	Distribution: normal	Distribution: normal

Table 33: Outcome of statistical tests of results obtained for Cu in BAM-M110a

	Cu
Number of data sets	9
Snedecor-F-Test and Bartlett-Test	Pooling not allowed
Dixon (α = 0.05)	---
Dixon (α = 0.01)	---
Nalimov (α = 0.05)	Lab. 2
Nalimov (α = 0.01)	---
Grubbs (α = 0.05)	---
Grubbs (α = 0.01)	---
Grubbs Pair (α = 0.05)	---
Grubbs Pair (α = 0.01)	---
Cochran	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: not normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: not normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: normal
Skewness & Kurtosis Test (α = 0.01)	Distribution: normal

The straggler (Lab. 2) was not removed.

Table 34: Outcome of statistical tests of results obtained for Te in BAM-M110a

	1st run	2nd run
Number of data sets	7	6
Snedecor-F-Test and Bartlett-Test	Pooling not allowed	Pooling not allowed
Dixon (α = 0.05)	Lab. 1	---
Dixon (α = 0.01)	Lab. 1	---
Nalimov (α = 0.05)	Lab. 1	---
Nalimov (α = 0.01)	Lab. 1	---
Grubbs (α = 0.05)	Lab. 1	---
Grubbs (α = 0.01)	Lab. 1	---
Grubbs Pair (α = 0.05)	Lab. 1	---
Grubbs Pair (α = 0.01)	---	---
Cochran	---	---
Kolmogorov-Smirnov-Lilliefors Test (α = 0.05)	Distribution: not normal	Distribution: normal
Kolmogorov-Smirnov-Lilliefors Test (α = 0.01)	Distribution: normal	Distribution: normal
Skewness & Kurtosis Test (α = 0.05)	Distribution: not normal	Insufficient data
Skewness & Kurtosis Test (α = 0.01)	Distribution: not normal	Insufficient data

The outlier (Lab. 1, 1st run) was not removed.

The certified mass fractions of all elements were calculated as mean of the accepted data sets. These values are given in Table 35.
The resp. combined uncertainties were calculated from the spread resulting from the certification inter-laboratory comparison (u_{ilc}) and the uncertainty contributions from possible inhomogeneity over the length ($u_{bb}(1)$) and over area ($u_{bb}(2)$) of the material using Equation 3.

$$u_{\text{combined}} = \sqrt{u_{ilc}^2 + u_{bb}^2(1) + u_{bb}^2(2)} \qquad (3)$$

with

$u_{ilc} = \sqrt{\frac{s_M^2}{n}}$: uncertainty contribution resulting from inter-laboratory comparison

n : number of data sets used for calculating the certified mass fraction of each element

Table 35a: Uncertainty calculation for BAM-M110

	uncertainty contribution from									u_{bb} (rel)	
	M	n	s_M	u_{ilc}	u_{bb} (1) Length	u_{bb} (2) Area	u(comb)	U		Length	Area
	%		%	%	%	%	%	%			
As	0.1070	10	0.0062	0.0020	0.0008	0.0033	0.0039	0.00777		0.7192	3.0509
Bi	0.0126	9	0.0004	0.0001	0.0000	0.0001	0.0002	0.00036		0.1433	1.0819
Sb	3.0780	9	0.1090	0.0363	0.0069	0.0107	0.0385	0.07699		0.2254	0.3462
Se	0.0106	8	0.0012	0.0004	0.0005	0.0002	0.0007	0.00131		4.3256	1.8205
Sn	0.1311	9	0.0046	0.0015	0.0006	0.0008	0.0019	0.00371		0.4914	0.6248
	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			
Ag	22.5700	8	1.8050	0.6382	0.1486	0.4657	0.8039	1.6078		0.6585	2.0636
Cd	< 1										
Cu	6.3600	7	0.3250	0.1228	0.0367	0.1229	0.1776	0.3552		0.5778	1.9319
Ca	< 2										
Te	3.7700	7	0.8250	0.3118	0.0970	0.2651	0.4206	0.8412		2.5724	7.0311
Zn	< 1										

Table 35b: Uncertainty calculation for BAM-M110a

	uncertainty contribution from									u_{bb} (rel)	
	M	n	s_M	u_{ilc}	u_{bb} (1) Length	u_{bb} (2) Area	u(comb)	U		Length	Area
	%		%	%	%	%	%	%			
As	0.1060	10	0.0073	0.0023	0.0008	0.0028	0.0037	0.00745		0.7666	2.6471
Bi	0.0126	8	0.0003	0.0001	0.0000	0.0001	0.0001	0.00027		0.1313	0.6515
Sb	3.0394	8	0.0865	0.0306	0.0072	0.0070	0.0322	0.06441		0.2382	0.2311
Se	0.0109	8	0.0010	0.0004	0.0005	0.0001	0.0006	0.00126		4.6600	1.0715
Sn	0.1314	9	0.0060	0.0020	0.0005	0.0006	0.0022	0.00432		0.4117	0.4687
	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			
Ag	22.2800	8	2.0400	0.7212	0.1315	0.2894	0.7882	1.5764		0.5901	1.2990
Cd	< 1										
Cu	6.3700	8	0.6160	0.2178	0.0478	0.0784	0.2363	0.4727		0.7511	1.2301
Ca	< 2										
Te	3.6200	6	0.2350	0.0959	0.0968	0.2183	0.2574	0.5148		2.6753	6.0312
Zn	< 1										

The expanded uncertainties U are calculated by multiplication of $u_{combined}$ with a coverage factor of k = 2 using Equation 4.

$$U = k \cdot u_{\text{combined}} \qquad (4)$$

The calculated mass fractions and their resp. expanded uncertainties are given on Pages 3 and 4 of this report.

In addition to the wet chemical characterization some of the laboratories analysed the material with spark emission to check if there is agreement between SOES and wet chemistry. Tab. 36 shows the mean values of wet chemical and spark emission results as well as their standard deviations. The agreement between wet chemistry and SOES is good for all elements except of tellurium. This element is interfered by antimony. If this interference is not compensated, higher Te-contents can be obtained.

Tab. 36a: Comparison wet chemistry vs. SOES (BAM-M110)

Element	**Wet chemical analysis**			**Spark emission**		
	Mass fraction in %	**Std.-dev.** in %	***n***	**Mass fraction** in %	**Std.-dev.** in %	***n***
As	0.107	0.007	10	0.111	0.009	16
Bi	0.0126	0.0004	8	0.0129	0.0005	17
Sn	0.131	0.005	9	0.129	0.007	16
Se	0.0106	0.0012	8	0.0114	0.0011	17
Sb	3.078	0.109	8	3.065	0.086	18
	in mg/kg	in mg/kg		in mg/kg	in mg/kg	
Ag	22.6	1.9	8	23.1	2.4	17
Cd	< 1		7	< 3		14
Cu	6.36	0.33	7	6.53	0.64	17
Ca	< 2		5	< 3		12
Te*	3.8	0.9	7	6.2	2.3	15
Zn	< 1		7	0.94	0.55	11

* In SOES Te is inferred by Sb. If this interference is not compensated, higher Te-contents can be obtained.

Tab. 36b: Comparison wet chemistry vs. SOES (BAM-M110a)

Element	Wet chemical analysis			Spark emission		
	Mass fraction in %	**Std.-dev.** in %	***n***	**Mass fraction** in %	**Std.-dev.** in %	***n***
As	0.106	0.008	10	0.108	0.006	9
Bi	0.0126	0.0003	8	0.0129	0.0005	9
Sn	0.131	0.006	9	0.130	0.006	10
Se	0.0109	0.0010	8	0.0105	0.0013	10
Sb	3.039	0.087	8	3.072	0.070	9
	in mg/kg	in mg/kg		in mg/kg	in mg/kg	
Ag	22.3	2.1	8	22.3	1.8	9
Cd	< 1		7	< 2		10
Cu	6.37	0.62	8	6.90	0.23	9
Ca	< 1		5	< 1		7
Te*	3.6	0.3	6	6.4	1.6	10
Zn	< 1		7	0.67	0.40	6

* In SOES Te is inferred by Sb. If this interference is not compensated, higher Te-contents can be obtained.

6. Instructions for users and stability

The certified reference materials BAM-M110 and BAM-M110a are intended for the calibration and quality control of spark emission spectrometers used for the analysis of similar materials. They are also suitable for wet chemical analysis.
The surface of the material should be cleaned by turning or milling before analysis.
An area of 8 mm in diameter in the centre of the discs should be avoided for spark optical emission spectrometry.
If chips prepared from the compact material are used for wet chemical analysis, a minimum sample intake of 0.2 g has to be used.
The material will remain stable provided that it is not subjected to excessive heat (eg, during preparation of the working surface).

7. References

[1] ISO Guide 31, Reference materials - Contents of certificates, labels and accompanying documentation, 2015

[2] ISO Guide 34, General requirements for the competence of reference material producers, 2009

[3] ISO Guide 35, Reference materials - General and statistical principles for certification. Third edition, 2006

[4] Guidelines for the development and production of BAM Reference Materials, 2016

[5] Bonas G, Zervou M, Papaeoannou T, Lees M: Accred Qual Assur (2003) 8:101-107

8. Information on and purchase of the CRM

Certified reference materials BAM-M110 and BAM-M110a are supplied by

Bundesanstalt für Materialforschung und -prüfung (BAM)
Fachbereich 1.6: Anorganische Referenzmaterialien
Richard-Willstätter-Str. 11, D-12489 Berlin, Germany
Phone +49 (0)30 - 8104 2061
Fax: +49 (0)30 – 8104 72061
E-Mail: sales.crm@bam.de

Each disc of BAM-M110/BAM-M110a will be distributed together with a detailed certificate containing the certified values and their uncertainties, the mean values and standard deviations of all accepted data sets and information on the analytical methods used and the names of the participating laboratories.
Information on certified reference materials can be obtained from BAM, http://www.bam.de.
www.webshop.bam.de
Tel. +49 30 8104 1111.

Annex 1: Calculation of uncertainty contribution of potential inhomogeneity (length), SOES

As in BAM-M110:

Sample	*Number*	*Sum*	*Mean*	*Variance*
1_AA	6	0.632089	0.105348167	2.01505E-05
1_AD	6	0.624862	0.104143667	4.82859E-05
1_AO	6	0.633751	0.105625167	1.49076E-05
1_AP	6	0.637543	0.106257167	1.60821E-05
2_AE	6	0.643265	0.107210833	2.28682E-05
2_AT	6	0.643466	0.107244333	2.27795E-05
3_AR	6	0.64663	0.107771667	2.01247E-05
4_AB	6	0.636528	0.106088	3.05109E-05
4_AH	6	0.631619	0.105269833	3.39586E-05
5_AU	6	0.632639	0.105439833	1.38496E-05
6_AF	6	0.640949	0.106824833	1.92663E-05
6_AL	6	0.642639	0.1071065	2.79204E-05
6_AS	6	0.64264	0.107106667	1.59666E-05
6_AY	6	0.649033	0.108172167	2.00687E-05
6_Z	6	0.63203	0.105338333	3.28489E-05
7_AG	6	0.636896	0.106149333	2.39773E-05
7_AX	6	0.637541	0.106256833	2.09047E-05
7_Y	6	0.644941	0.107490167	2.15094E-05
8_AM	6	0.647495	0.107915833	2.683E-05
8_AQ	6	0.634181	0.105696833	1.73241E-05
8_AV	6	0.635435	0.105905833	2.85687E-05
8_AW	6	0.643	0.107166667	2.49856E-05
9_AC	6	0.635162	0.105860333	2.5577E-05
9_AJ	6	0.649647	0.1082745	3.08642E-05
9_AK	6	0.643337	0.107222833	2.71682E-05
9_AN	6	0.638041	0.106340167	2.32875E-05
9_AZ	6	0.637277	0.106212833	2.00474E-05
			0.106497753	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	0.000161831	26	6.22427E-06	0.258295333	0.999909681	1.577861217
Within groups	0.003253164	135	2.40975E-05			
Total	0.003414995	161				

within-sd	0.004908921	
effective n	5.00	
s_bb	0	
s_bb_min	0.000765905	
u_bb	0.000765905	0.765905
u_bb(rel.)	0.719175181	

Bi in BAM-M110:

Sample	*Number*	*Sum*	*Mean*	*Variance*
1_AA	6	0.080111	0.013351833	1.85102E-08
1_AD	6	0.07988	0.013313333	1.96103E-08
1_AO	6	0.080159	0.013359833	3.95177E-09
1_AP	6	0.0804	0.0134	1.2388E-08
2_AE	6	0.080543	0.013423833	1.6487E-08
2_AT	6	0.080611	0.013435167	6.10217E-09
3_AR	6	0.080761	0.013460167	1.3815E-08
4_AB	6	0.080284	0.013380667	1.97467E-08
4_AH	6	0.080402	0.013400333	8.29027E-09
5_AU	6	0.080046	0.013341	3.8012E-09
6_AF	6	0.080423	0.013403833	5.89217E-09
6_AL	6	0.08057	0.013428333	1.40975E-08
6_AS	6	0.080574	0.013429	4.622E-09
6_AY	6	0.081022	0.013503667	8.30467E-09
6_Z	6	0.080144	0.013357333	8.73587E-09
7_AG	6	0.080744	0.013457333	1.81699E-08
7_AX	6	0.079968	0.013328	9.28E-09
7_Y	6	0.080553	0.0134255	1.03619E-08
8_AM	6	0.080582	0.013430333	3.20667E-09
8_AQ	6	0.080395	0.013399167	1.05782E-08
8_AV	6	0.080628	0.013438	2.928E-09
8_AW	6	0.080529	0.0134215	1.04939E-08
9_AC	6	0.080491	0.013415167	1.01118E-08
9_AJ	6	0.080427	0.0134045	1.07091E-08
9_AK	6	0.080668	0.013444667	8.48067E-09
9_AN	6	0.080659	0.013443167	6.83937E-09
9_AZ	6	0.080186	0.013364333	4.50507E-09
			0.013405926	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	3.07986E-07	26	1.18456E-08	1.184477039	0.262465026	1.577861217
Within groups	1.3501E-06	135	1.00007E-08			
Total	1.65808E-06	161				

within-sd	0.000100004	
effective n	5.00	
s_bb	1.92089E-05	
s_bb_min	1.56029E-05	
u_bb	1.92089E-05	0.019209
u_bb(rel.)	0.143286303	

Sb in BAM-M110:

Sample	*Number*	*Sum*	*Mean*	*Variance*
1_AA	6	4.991088	0.831848	0.000137952
1_AD	6	4.985722	0.830953667	0.000176817
1_AO	6	4.993463	0.832243833	0.000121654
1_AP	6	5.001511	0.833585167	0.000135242
2_AE	6	5.01913	0.836521667	0.000170681
2_AT	6	5.01425	0.835708333	0.000120528
3_AR	6	5.006979	0.8344965	0.000153743
4_AB	6	4.997951	0.832991833	0.000145125
4_AH	6	4.994504	0.832417333	0.000149982
5_AU	6	5.004979	0.834163167	0.000128243
6_AF	6	5.005251	0.8342085	0.000169715
6_AL	6	4.992882	0.832147	0.000139423
6_AS	6	4.994137	0.832356167	8.47771E-05
6_AY	6	5.002234	0.833705667	0.00014496
6_Z	6	5.007882	0.834647	0.000158907
7_AG	6	4.994479	0.832413167	0.000176654
7_AX	6	5.010772	0.835128667	0.000183891
7_Y	6	5.004521	0.834086833	0.000122768
8_AM	6	5.004623	0.834103833	0.000142545
8_AQ	6	5.005176	0.834196	0.000146754
8_AV	6	4.995276	0.832546	0.000150164
8_AW	6	4.999945	0.833324167	0.000136131
9_AC	6	4.997828	0.832971333	0.000131682
9_AJ	6	5.008269	0.8347115	0.000139661
9_AK	6	5.001716	0.833619333	0.00017744
9_AN	6	5.004517	0.834086167	0.000156171
9_AZ	6	4.990119	0.8316865	0.000112764
			0.833513605	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	0.000264146	26	1.01595E-05	0.070076585	1	1.577861217
Within groups	0.01957187	135	0.000144977			
Total	0.019836017	161				

within-sd	0.012040632	
effective n	5.00	
s_bb	0	
s_bb_min	0.001878617	
u_bb	0.001878617	1.878617
u_bb(rel.)	0.225385327	

Se in BAM-M110:

Sample	*Number*	*Sum*	*Mean*	*Variance*
1AA	6	0.080673	0.0134455	5.05614E-07
1AD	6	0.081668	0.013611333	1.15201E-07
1AO	6	0.076602	0.012767	9.64224E-08
1AP	6	0.080621	0.013436833	2.63604E-06
2AT	6	0.07338	0.01223	4.78284E-08
3AR	6	0.078283	0.013047167	2.90694E-08
4AB	6	0.07807	0.013011667	2.55631E-07
6AL	6	0.081332	0.013555333	5.86207E-08
6AS	6	0.073625	0.012270833	2.5371E-08
7Y	6	0.078055	0.013009167	1.94003E-07
8AW	6	0.076258	0.012709667	9.83691E-08
9AC	6	0.08119	0.013531667	1.09335E-08
9AJ	6	0.076654	0.012775667	3.95511E-08
9AN	6	0.075081	0.0125135	4.30883E-08
9AZ	6	0.070656	0.011776	2.841E-08
			0.012912756	

Source of variation	*sums of squares*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.5744E-05	14	1.83887E-06	6.59228581	1.81518E-08	1.825908246
Within groups	2.0921E-05	75	2.78943E-07			
Total	4.6665E-05	89				

within-sd	0.000528151	
effective n	5.00	
s_bb	0.000558557	
s_bb_min	9.54476E-05	
u_bb	0.000558557	0.558557
u_bb(rel.)	4.325624403	

Sn in BAM-M110:

Sample	*Number*	*Sum*	*Mean*	*Variance*
1_AA	6	0.85223	0.142038333	2.18693E-06
1_AD	6	0.849589	0.141598167	9.15621E-07
1_AO	6	0.855666	0.142611	9.48648E-07
1_AP	6	0.851834	0.141972333	9.56273E-07
2_AE	6	0.852796	0.142132667	7.0776E-07
2_AT	6	0.863833	0.143972167	1.11128E-06
3_AR	6	0.854458	0.142409667	1.31033E-06
4_AB	6	0.857359	0.142893167	3.29719E-07
4_AH	6	0.850491	0.1417485	7.53244E-07
5_AU	6	0.849673	0.141612167	2.38791E-06
6_AF	6	0.855593	0.142598833	8.52945E-07
6_AL	6	0.855589	0.142598167	7.91143E-07
6_AS	6	0.859972	0.143328667	1.27396E-06
6_AY	6	0.856154	0.142692333	8.17565E-07
6_Z	6	0.856418	0.142736333	2.74576E-07
7_AG	6	0.852037	0.142006167	5.95833E-07
7_AX	6	0.846087	0.1410145	4.57972E-07
7_Y	6	0.855255	0.1425425	1.15326E-06
8_AM	6	0.862219	0.143703167	3.38206E-07
8_AQ	6	0.857917	0.142986167	1.11621E-06
8_AV	6	0.861526	0.143587667	4.13733E-07
8_AW	6	0.857395	0.142899167	4.20603E-07
9_AC	6	0.852756	0.142126	7.77494E-07
9_AJ	6	0.856151	0.142691833	3.23931E-07
9_AK	6	0.861224	0.143537333	6.14836E-07
9_AN	6	0.85739	0.142898333	3.47847E-07
9_AZ	6	0.863098	0.143849667	2.75781E-07
			0.142621667	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	8.54767E-05	26	3.28757E-06	3.953231025	7.74425E-08	1.577861217
Within groups	0.000112268	135	8.31615E-07			
Total	0.000197745	161				

within-sd	0.000911929	
effective n	5.00	
s_bb	0.00070085	
s_bb_min	0.000142282	
u_bb	0.00070085	0.70085
u_bb(rel.)	0.491404754	

Ag in BAM-M110:

Sample	*Number*	*Sum*	*Mean*	*Variance*
1_AA	6	0.011192	0.001865333	7.50267E-10
1_AD	6	0.011189	0.001864833	4.10167E-10
1_AO	6	0.011302	0.001883667	2.07067E-10
1_AP	6	0.011315	0.001885833	1.39367E-10
2_AE	6	0.011429	0.001904833	6.89667E-11
2_AT	6	0.011443	0.001907167	2.19367E-10
3_AR	6	0.011412	0.001902	1.476E-10
4_AB	6	0.011282	0.001880333	5.24267E-10
4_AH	6	0.011276	0.001879333	1.86267E-10
5_AU	6	0.011177	0.001862833	9.37367E-10
6_AF	6	0.01141	0.001901667	4.53067E-10
6_AL	6	0.011411	0.001901833	1.96167E-10
6_AS	6	0.011355	0.0018925	4.131E-10
6_AY	6	0.011464	0.001910667	4.78667E-10
6_Z	6	0.011391	0.0018985	2.459E-10
7_AG	6	0.01135	0.001891667	2.49467E-10
7_AX	6	0.01137	0.001895	4.064E-10
7_Y	6	0.011387	0.001897833	2.90967E-10
8_AM	6	0.011436	0.001906	3.868E-10
8_AQ	6	0.011391	0.0018985	3.415E-10
8_AV	6	0.01141	0.001901667	3.61867E-10
8_AW	6	0.011405	0.001900833	2.25367E-10
9_AC	6	0.011376	0.001896	3.144E-10
9_AJ	6	0.011408	0.001901333	3.93867E-10
9_AK	6	0.011477	0.001912833	3.24567E-10
9_AN	6	0.011438	0.001906333	2.47467E-10
9_AZ	6	0.011356	0.001892667	3.01867E-10
			0.001894148	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.91058E-08	26	1.11945E-09	3.277466252	3.87128E-06	1.577861217
Within groups	4.61107E-08	135	3.4156E-10			
Total	7.52164E-08	161				

within-sd	1.84814E-05	
effective n	5.00	
s_bb	1.24731E-05	
s_bb_min	2.88352E-06	
u_bb	1.24731E-05	0.012473
u_bb(rel.)	0.658507682	

Cu in BAM-M110:

Sample	*Number*	*Sum*	*Mean*	*Variance*
1_AA	6	0.00381	0.000635	8.24E-11
1_AD	6	0.00382	0.000636667	9.98667E-11
1_AO	6	0.003867	0.0006445	3.15E-11
1_AP	6	0.003885	0.0006475	4.711E-10
2_AE	6	0.003888	0.000648	3.6E-11
2_AT	6	0.003928	0.000654667	3.78667E-11
3_AR	6	0.003903	0.0006505	3.83E-11
4_AB	6	0.003879	0.0006465	1.271E-10
4_AH	6	0.003848	0.000641333	4.78667E-11
5_AU	6	0.003837	0.0006395	4.787E-10
6_AF	6	0.003898	0.000649667	2.18667E-11
6_AL	6	0.003936	0.000656	2.044E-10
6_AS	6	0.003882	0.000647	3.84E-11
6_AY	6	0.003898	0.000649667	3.98667E-11
6_Z	6	0.003892	0.000648667	3.06667E-12
7_AG	6	0.003876	0.000646	3.52E-11
7_AX	6	0.003867	0.0006445	3.07E-11
7_Y	6	0.003881	0.000646833	7.09667E-11
8_AM	6	0.003912	0.000652	3E-11
8_AQ	6	0.003904	0.000650667	4.42667E-11
8_AV	6	0.003906	0.000651	1.08E-11
8_AW	6	0.003889	0.000648167	8.16667E-12
9_AC	6	0.003884	0.000647333	5.82667E-11
9_AJ	6	0.003889	0.000648167	1.89667E-11
9_AK	6	0.003927	0.0006545	2.23E-11
9_AN	6	0.003904	0.000650667	2.02667E-11
9_AZ	6	0.003905	0.000650833	7.85667E-11
			0.000647623	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	3.9262E-09	26	1.51008E-10	1.86449025	0.011923766	1.577861217
Within groups	1.09338E-08	135	8.09914E-11			
Total	1.486E-08	161				

within-sd	8.99952E-06	
effective n	5.00	
s_bb	3.74209E-06	
s_bb_min	1.40413E-06	
u_bb	3.74209E-06	0.003742
u_bb(rel.)	0.577818999	

Te in BAM-M110:

Sample	*Number*	*Sum*	*Mean*	*Variance*
1_AA	6	0.005612	0.000935333	2.35143E-08
1_AD	6	0.005691	0.0009485	3.35775E-08
1_AO	6	0.0058	0.000966667	1.40451E-08
1_AP	6	0.005713	0.000952167	1.47446E-08
2_AE	6	0.005672	0.000945333	2.58655E-08
2_AT	6	0.005696	0.000949333	2.66579E-08
3_AR	6	0.005793	0.0009655	1.94659E-08
4_AB	6	0.005592	0.000932	2.03428E-08
4_AH	6	0.005543	0.000923833	2.5241E-08
5_AU	6	0.005605	0.000934167	1.45254E-08
6_AF	6	0.005689	0.000948167	2.03826E-08
6_AL	6	0.005714	0.000952333	2.38095E-08
6_AS	6	0.005806	0.000967667	2.62679E-08
6_AY	6	0.005805	0.0009675	2.10823E-08
6_Z	6	0.005575	0.000929167	3.07294E-08
7_AG	6	0.005735	0.000955833	2.53634E-08
7_AX	6	0.005641	0.000940167	2.14922E-08
7_Y	6	0.005767	0.000961167	2.93454E-08
8_AM	6	0.005763	0.0009605	3.20803E-08
8_AQ	6	0.005658	0.000943	2.1424E-08
8_AV	6	0.005794	0.000965667	4.82091E-08
8_AW	6	0.005755	0.000959167	2.5109E-08
9_AC	6	0.005612	0.000935333	2.58371E-08
9_AJ	6	0.005792	0.000965333	2.58739E-08
9_AK	6	0.005612	0.000935333	2.45259E-08
9_AN	6	0.005681	0.000946833	2.09014E-08
9_AZ	6	0.00575	0.000958333	2.16603E-08
			0.00094979	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.74239E-08	26	1.05476E-09	0.043014333	1	1.577861217
Within groups	3.31037E-06	135	2.45212E-08			
Total	3.33779E-06	161				

within-sd	0.000156593	
effective n	5.00	
s_bb	0	
s_bb_min	2.44321E-05	
u_bb	2.44321E-05	0.024432
u_bb(rel.)	2.572364231	

As in BAM-M110a:

Sample	*Number*	*Sum*	*Mean*	*Variance*
3_BK	6	0.639494	0.106582333	1.90953E-05
4_BF	6	0.641214	0.106869	2.21449E-05
4_BH	6	0.636378	0.106063	1.49525E-05
4_BO	6	0.627601	0.104600167	2.24072E-05
4_BT	6	0.634807	0.105801167	1.5035E-05
5_BE	6	0.624027	0.1040045	2.23884E-05
5_BN	6	0.629423	0.104903833	1.89767E-05
6_BD	6	0.642282	0.107047	2.37412E-05
6_BP	6	0.626769	0.1044615	3.03375E-05
6_BR	6	0.640362	0.106727	2.21307E-05
6_BS	6	0.640376	0.106729333	2.75613E-05
7_BG	6	0.64071	0.106785	2.36121E-05
7_BL	6	0.641596	0.106932667	3.17057E-05
7_BQ	6	0.640708	0.106784667	2.68686E-05
8_BA	6	0.643534	0.107255667	2.24656E-05
8_BC	6	0.640279	0.106713167	3.10502E-05
8_BI	6	0.645027	0.1075045	1.70795E-05
8_BM	6	0.639726	0.106621	2.78408E-05
9_BB	6	0.638338	0.106389667	2.99313E-05
9_BJ	6	0.636053	0.106008833	1.97568E-05
			0.1062392	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	0.00011189	19	5.88897E-06	0.251085243	0.999389508	1.691495727
Within groups	0.002345407	100	2.34541E-05			
Total	0.002457297	119				

within-sd	0.00484294	
effective n	5.00	
s_bb	0	
s_bb_min	0.00081448	
u_bb	0.00081448	0.814482
u_bb(rel.)	0.76664937	

Bi in BAM-M110a:

Sample	*Number*	*Sum*	*Mean*	*Variance*
3_BK	6	0.080597	0.013432833	1.08382E-08
4_BF	6	0.080756	0.013459333	1.18699E-08
4_BH	6	0.080077	0.013346167	1.78158E-08
4_BO	6	0.080221	0.013370167	7.42657E-09
4_BT	6	0.080161	0.013360167	1.96766E-08
5_BE	6	0.080145	0.0133575	7.4803E-09
5_BN	6	0.079829	0.013304833	6.68457E-09
6_BD	6	0.080704	0.013450667	1.12899E-08
6_BP	6	0.080432	0.013405333	1.62459E-08
6_BR	6	0.080775	0.0134625	7.9403E-09
6_BS	6	0.080782	0.013463667	1.88003E-08
7_BG	6	0.080718	0.013453	5.8208E-09
7_BL	6	0.080493	0.0134155	4.1963E-09
7_BQ	6	0.080357	0.013392833	1.1903E-08
8_BA	6	0.08052	0.01342	6.8052E-09
8_BC	6	0.080569	0.013428167	1.52714E-08
8_BI	6	0.080472	0.013412	2.7528E-09
8_BM	6	0.080674	0.013445667	2.23275E-08
9_BB	6	0.08048	0.013413333	1.13419E-08
9_BJ	6	0.080309	0.013384833	2.69897E-09
			0.013408925	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.20377E-07	19	1.15988E-08	1.058352872	0.404799305	1.691495727
Within groups	1.09593E-06	100	1.09593E-08			
Total	1.31631E-06	119				

within-sd	0.00010469	
effective n	5.00	
s_bb	1.1309E-05	
s_bb_min	1.7606E-05	
u_bb	1.7606E-05	0.017606
u_bb(rel.)	0.131301527	

Sb in BAM-M110a:

Sample	*Number*	*Sum*	*Mean*	*Variance*
3_BK	6	5.013724	0.835620667	0.000133237
4_BF	6	5.003072	0.833845333	0.000145758
4_BH	6	5.002408	0.833734667	0.00014509
4_BO	6	4.996387	0.832731167	0.000181384
4_BT	6	4.998752	0.833125333	0.000137405
5_BE	6	4.997649	0.8329415	0.00015454
5_BN	6	4.993702	0.832283667	0.000104549
6_BD	6	5.002134	0.833689	0.000146906
6_BP	6	5.002417	0.833736167	0.000124852
6_BR	6	5.007159	0.8345265	0.000197713
6_BS	6	4.998532	0.833088667	0.000172952
7_BG	6	5.007189	0.8345315	0.000139814
7_BL	6	5.007804	0.834634	0.000128838
7_BQ	6	4.989089	0.831514833	6.49292E-05
8_BA	6	4.996866	0.832811	0.000124957
8_BC	6	5.004661	0.834110167	0.000167302
8_BI	6	5.004438	0.834073	0.000112352
8_BM	6	5.002615	0.833769167	0.000169805
9_BB	6	4.991002	0.831833667	0.000118445
9_BJ	6	4.998824	0.833137333	0.000116488
			0.833486867	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	0.000113713	19	5.9849E-06	0.042943815	1	1.691495727
Within groups	0.013936591	100	0.000139366			
Total	0.014050304	119				

within-sd	0.01180533	
effective n	5.00	
s_bb	0	
s_bb_min	0.00198541	
u_bb	0.00198541	1.985413
u_bb(rel.)	0.238205628	

Se in BAM-M110a:

Sample	*Number*	*Sum*	*Mean*	*Variance*
3BK	6	0.068766	0.011461	5.5712E-08
4BH	5	0.063897	0.0127794	3.04117E-07
4BO	6	0.073572	0.012262	3.35239E-07
6BD	6	0.075079	0.012513167	6.93302E-08
6BS	6	0.070715	0.011785833	3.42694E-08
7BC	6	0.068881	0.011480167	1.87765E-07
7BG	6	0.069531	0.0115885	5.17727E-08
8BA	6	0.076823	0.012803833	1.40699E-07
8BM	6	0.069731	0.011621833	2.09594E-08
9BJ	6	0.074902	0.012483667	4.77611E-08
			0.01207794	

ANOVA						
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.55661E-05	9	1.72956E-06	14.28183762	5.79794E-11	2.077451954
Within groups	5.93401E-06	49	1.21102E-07			
Total	2.15001E-05	58				

within-sd	0.000348	
effective n	5.00	
s_bb	0.00056718	
s_bb_min	6.9952E-05	
u_bb	0.00056718	0.567179
u_bb(rel.)	4.695990873	

Sn in BAM-M110a:

Sample	*Number*	*Sum*	*Mean*	*Variance*
3_BK	6	0.864821	0.144136833	2.31468E-06
4_BF	6	0.862648	0.143774667	2.88967E-07
4_BH	6	0.853665	0.1422775	1.11841E-06
4_BO	6	0.85962	0.14327	8.39825E-07
4_BT	6	0.859829	0.143304833	1.10775E-06
5_BE	6	0.857677	0.142946167	7.01475E-07
5_BN	6	0.86054	0.143423333	3.12619E-07
6_BD	6	0.858488	0.143081333	1.20074E-06
6_BP	6	0.865011	0.1441685	1.19831E-06
6_BR	6	0.861709	0.143618167	6.09481E-07
6_BS	6	0.864341	0.144056833	2.26056E-07
7_BG	6	0.865511	0.144251833	1.4873E-06
7_BL	6	0.867138	0.144523	6.92782E-07
7_BQ	6	0.864035	0.144005833	5.95908E-07
8_BA	6	0.856428	0.142738	6.32194E-07
8_BC	6	0.858657	0.1431095	1.47002E-06
8_BI	6	0.861226	0.143537667	6.96589E-07
8_BM	6	0.861299	0.143549833	4.92233E-07
9_BB	6	0.853112	0.142185333	3.24853E-07
9_BJ	6	0.856581	0.1427635	9.44807E-08
			0.143436133	

ANOVA						
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	4.87152E-05	19	2.56396E-06	3.125883693	0.000115808	1.691495727
Within groups	8.20234E-05	100	8.20234E-07			
Total	0.000130739	119				

within-sd	0.00090567	
effective n	5.00	
s_bb	0.00059055	
s_bb_min	0.00015231	
u_bb	0.00059055	0.590546
u_bb(rel.)	0.41171341	

Ag in BAM-M110a:

Sample	*Number*	*Sum*	*Mean*	*Variance*
3_BK	6	0.011421	0.0019035	2.903E-10
4_BF	6	0.011424	0.001904	1E-10
4_BH	6	0.011192	0.001865333	6.25467E-10
4_BO	6	0.011242	0.001873667	7.11467E-10
4_BT	6	0.011266	0.001877667	5.03067E-10
5_BE	6	0.011291	0.001881833	5.56967E-10
5_BN	6	0.011253	0.0018755	5.279E-10
6_BD	6	0.011426	0.001904333	1.01867E-10
6_BP	6	0.011355	0.0018925	3.547E-10
6_BR	6	0.011416	0.001902667	4.61467E-10
6_BS	6	0.01146	0.00191	3.176E-10
7_BG	6	0.011385	0.0018975	1.375E-10
7_BL	6	0.011438	0.001906333	1.40267E-10
7_BQ	6	0.011406	0.001901	2.052E-10
8_BA	6	0.011396	0.001899333	9.30667E-11
8_BC	6	0.011385	0.0018975	4.155E-10
8_BI	6	0.011426	0.001904333	1.41467E-10
8_BM	6	0.01141	0.001901667	5.77867E-10
9_BB	6	0.011332	0.001888667	3.08267E-10
9_BJ	6	0.011366	0.001894333	3.32667E-10
			0.001894083	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.84242E-08	19	9.69693E-10	2.80964559	0.000460568	1.691495727
Within groups	3.4513E-08	100	3.4513E-10			
Total	5.29372E-08	119				

within-sd	1.8578E-05	
effective n	5.00	
s_bb	1.1176E-05	
s_bb_min	3.1244E-06	
u_bb	1.1176E-05	0.011176
u_bb(rel.)	0.59007068	

Cu in BAM-M110a:

Sample	*Number*	*Sum*	*Mean*	*Variance*
3_BK	6	0.003939	0.0006565	8.55E-11
4_BF	6	0.003916	0.000652667	1.14667E-11
4_BH	6	0.003831	0.0006385	1.183E-10
4_BO	6	0.003856	0.000642667	7.70667E-11
4_BT	6	0.003863	0.000643833	6.37667E-11
5_BE	6	0.003867	0.0006445	5.23E-11
5_BN	6	0.003856	0.000642667	1.42667E-11
6_BD	6	0.003907	0.000651167	6.01667E-11
6_BP	6	0.003938	0.000656333	6.66667E-11
6_BR	6	0.003906	0.000651	1.56E-11
6_BS	6	0.003953	0.000658833	1.32567E-10
7_BG	6	0.003922	0.000653667	8.62667E-11
7_BL	6	0.003956	0.000659333	1.74667E-11
7_BQ	6	0.003919	0.000653167	5.17667E-11
8_BA	6	0.003895	0.000649167	2.25667E-11
8_BC	6	0.003886	0.000647667	5.78667E-11
8_BI	6	0.00391	0.000651667	7.66667E-11
8_BM	6	0.003903	0.0006505	5.39E-11
9_BB	6	0.003919	0.000653167	4.52567E-10
9_BJ	6	0.00388	0.000646667	2.66667E-12
			0.000650183	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	3.70897E-09	19	1.95209E-10	2.569550769	0.001308284	1.691495727
Within groups	7.597E-09	100	7.597E-11			
Total	1.1306E-08	119				

within-sd	8.7161E-06	
effective n	5.00	
s_bb	4.8834E-06	
s_bb_min	1.4659E-06	
u_bb	4.8834E-06	0.004883
u_bb(rel.)	0.751082966	

Te in BAM-M110a:

Sample	*Number*	*Sum*	*Mean*	*Variance*
3_BK	6	0.005577	0.0009295	2.02523E-08
4_BF	6	0.005686	0.000947667	1.98655E-08
4_BH	6	0.005854	0.000975667	1.60407E-08
4_BO	6	0.00557	0.000928333	1.95403E-08
4_BT	6	0.005632	0.000938667	1.74303E-08
5_BE	6	0.005428	0.000904667	1.96951E-08
5_BN	6	0.005589	0.0009315	2.87227E-08
6_BD	6	0.005651	0.000941833	2.86814E-08
6_BP	6	0.005495	0.000915833	2.56326E-08
6_BR	6	0.005697	0.0009495	2.44391E-08
6_BS	6	0.005557	0.000926167	2.47774E-08
7_BG	6	0.005843	0.000973833	1.94098E-08
7_BL	6	0.005671	0.000945167	3.08882E-08
7_BQ	6	0.005858	0.000976333	3.08675E-08
8_BA	6	0.005788	0.000964667	2.38195E-08
8_BC	6	0.005666	0.000944333	1.49275E-08
8_BI	6	0.005801	0.000966833	2.01742E-08
8_BM	6	0.005561	0.000926833	1.79382E-08
9_BB	6	0.005789	0.000964833	2.8883E-08
9_BJ	6	0.005568	0.000928	1.9014E-08
			0.000944008	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	4.93212E-08	19	2.59585E-09	0.115115634	0.999998611	1.691495727
Within groups	2.25499E-06	100	2.25499E-08			
Total	2.30431E-06	119				

within-sd	0.00015017	
effective n	5.00	
s_bb	0	
s_bb_min	2.5255E-05	
u_bb	2.5255E-05	0.025255
u_bb(rel.)	2.675280647	

Annex 2: Calculation of uncertainty contribution of potential inhomogeneity (area)

Arsenic in BAM-M110:

at:		5-Au unten															
r_0	*0.09608*	*0.09922*															
r_in	0.10279	0.10118	0.10144	0.10109	0.10263	0.10019	0.10018										
r_out	0.11093	0.10951	0.11171	0.10950	0.10701	0.10380	0.10343	0.10577	0.10693	0.10831	0.10423	0.10454	0.10767	0.10557	0.10437	0.10716	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	0.000149681	1	0.000149681	29.67199047	2.10173E-05	4.324793743											
Within groups	0.000105935	21	5.04453E-06														
Total	0.000255616	22															
within-sd	0.002246003																
effective n	6.32																
s_bb	0.004783885			u_bb(rel.)	4.59407952												
s_bb_min	0.000496312																
u_bb	0.004783885			0.104131527													
at:		5-Au oben															
r_0	*0.08184*	*0.08562*															
r_in	0.09856	0.10208	0.10044	0.10318	0.10480	0.09814	0.09985	0.10046									
r_out	0.11010	0.11191	0.10683	0.10954	0.10544	0.10367	0.10269	0.10241	0.10296	0.10524	0.10379	0.10552	0.10445	0.10633	0.10649	0.10268	
reuungsursacdratsummen (	*heitsgrade*	*(e Quadratsum*	*rüfgröße (F)*	*P-Wert*	*tischer F-Wert*												
Unterschiede	0.000117259	1	0.000117259	16.38607129	0.000536564	4.300949502											
Innerhalb de	0.000157433	22	7.15604E-06														
Gesamt	0.000274692	23															
within-sd	0.002675078																
effective n	6.77																
s_bb	0.004033022			u_bb(rel.)	3.904837242												
s_bb_min	0.000564571																
u_bb	0.004033022			0.103282719													
at:		2-AE unten															
r_0	*0.10933*	*0.11535*															
r_in	0.10437	0.10391	0.10314	0.10641	0.12088	0.10413	0.10451	0.10859									
r_out	0.11238	0.11228	0.11162	0.11274	0.10708	0.10549	0.10402	0.10489	0.10673	0.10634	0.10509	0.10533	0.10505	0.10436	0.10543	0.10326	0.10454
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	9.34712E-08	1	9.34712E-08	0.00527066	0.942752632	4.279344309											
Within groups	0.000407888	23	1.77342E-05														
Total	0.000407981	24															
within-sd	0.004211204																
effective n	6.89																
s_bb	0			u_bb(rel.)	0.814285181												
s_bb_min	0.000871279																
u_bb	0.000871279			0.10699925													
at:		2-AE oben															
r_0	*0.09353*	*0.09680*															
r_in	0.10788	0.10712	0.10542	0.10365	0.10591	0.10367	0.10306	0.10445									
r_out	0.11183	0.11048	0.10682	0.10888	0.10465	0.10557	0.10537	0.10251	0.10423	0.10575	0.10384	0.10444	0.10417	0.10447	0.10542	0.10388	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	2.06836E-06	1	2.06836E-06	0.382748015	0.542489501	4.300949502											
Within groups	0.000118887	22	5.40397E-06														
Total	0.000120956	23															
within-sd	0.002324645																
effective n	6.77																
s_bb	0			u_bb(rel.)	0.46523198												
s_bb_min	0.000490613																
u_bb	0.000490613			0.1054555													
							Mean:	3.0509352									

Bismuth in BAM-M110:

at:	5-Au unten																	
r_0	*0.01281*	*0.01296*																
r_in	0.01319	0.01306	0.01318	0.01314	0.01322	0.01302	0.01302											
r_out	0.01348	0.01353	0.01342	0.01348	0.01336	0.01334	0.01321	0.01342	0.01355	0.01353	0.01323	0.01332	0.01338	0.01326	0.01331	0.01324		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	3.29816E-07	1	3.29816E-07	29.56917236	2.14838E-05	4.324793743
Within groups	2.34235E-07	21	1.1154E-08			
Total	5.64051E-07	22				
within-sd	0.000105613					
effective n	6.32					
s_bb	0.000224547			u_bb(rel.)	1.69493138	
s_bb_min	2.33378E-05					
u_bb	0.000224547			0.013248125		

at:	5-Au oben																	
r_0	*0.01227*	*0.01241*																
r_in	0.01316	0.01323	0.01307	0.01331	0.01323	0.01304	0.01318	0.01309										
r_out	0.01351	0.01344	0.01340	0.01360	0.01324	0.01328	0.01316	0.01338	0.01324	0.01333	0.01346	0.01336	0.01337	0.01340	0.01342	0.01328		

reuungsursac	*dratsummen (*	*iheitsgrade (e*	*Quadratsum*	*rüfgröße (F)*	*P-Wert*	*tischer F-Wert*
Unterschiede	2.1816E-07	1	2.1816E-07	20.09224435	0.000185667	4.300949502
Innerhalb de	2.38875E-07	22	1.08579E-08			
Gesamt	4.57035E-07	23				
within-sd	0.000104201					
effective n	6.77					
s_bb	0.000174998			u_bb(rel.)	1.319219498	
s_bb_min	2.19915E-05					
u_bb	0.000174998			0.01326525		

at:	2-AE unten																	
r_0	*0.01346*	*0.01367*																
r_in	0.01314	0.01330	0.01320	0.01330	0.01375	0.01314	0.01324	0.01328										
r_out	0.01348	0.01365	0.01341	0.01357	0.01335	0.01335	0.01335	0.01335	0.01328	0.01335	0.01336	0.01326	0.01320	0.01328	0.01338	0.01323	0.01325	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.26782E-08	1	2.26782E-08	1.060581619	0.313791463	4.279344309
Within groups	4.91805E-07	23	2.13828E-08			
Total	5.14483E-07	24				
within-sd	0.000146229					
effective n	6.89					
s_bb	1.37129E-05			u_bb(rel.)	0.226959935	
s_bb_min	3.0254E-05					
u_bb	3.0254E-05			0.013330125		

at:	2-AE oben																	
r_0	*0.01265*	*0.01276*																
r_in	0.01335	0.01329	0.01316	0.01330	0.01330	0.01330	0.01341	0.01323										
r_out	0.01351	0.01347	0.01329	0.01339	0.01337	0.01330	0.01324	0.01323	0.01323	0.01331	0.01335	0.01334	0.01328	0.01327	0.01322	0.01323		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.45102E-09	1	2.45102E-09	0.353421147	0.558247845	4.300949502
Within groups	1.52573E-07	22	6.93513E-09			
Total	1.55024E-07	23				
within-sd	8.32774E-05					
effective n	6.77					
s_bb	0			u_bb(rel.)	0.132113924	
s_bb_min	1.75756E-05					
u_bb	1.75756E-05			0.013303344		

							Mean:	1.0819077										

Antimony in BAM-M110:

at:		5-Au unten																
r_0	*0.81907*	*0.82220*																
r_in	0.83007	0.82653	0.82756	0.82596	0.82870	0.82815	0.82338											
r_out	0.82425	0.82568	0.82779	0.82344	0.83083	0.82888	0.82878	0.82597	0.82778	0.82520	0.82774	0.82824	0.83001	0.82611	0.82727	0.83108		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.96722E-07	1	2.96722E-07	0.060783488	0.807655861	4.324793743
Within groups	0.000102514	21	4.88163E-06			
Total	0.000102811	22				
within-sd	0.00220944					
effective n	6.32					
s_bb	0			u_bb(rel.)	0.059013839	
s_bb_min	0.000488232					
u_bb	0.000488232			0.827318138		

at:		5-Au oben																
r_0	*0.79908*	*0.80261*																
r_in	0.82508	0.82941	0.82616	0.83021	0.82878	0.82304	0.82823	0.82916										
r_out	0.82336	0.82546	0.82520	0.82360	0.82868	0.83251	0.82492	0.82923	0.82847	0.82745	0.82887	0.82829	0.82975	0.82692	0.82956	0.82900		

reuungsursac	*dratsummen (*	*heitsgrade (e*	*Quadratsum*	*rüfgröße (F)*	*P-Wert*	*tischer F-Wert*
Unterschiede	2.73608E-08	1	2.73608E-08	0.00440328	0.947692779	4.300949502
Innerhalb de	0.000136702	22	6.21372E-06			
Gesamt	0.000136729	23				
within-sd	0.002492734					
effective n	6.77					
s_bb	0			u_bb(rel.)	0.063572208	
s_bb_min	0.000526088					
u_bb	0.000526088			0.827543313		

at:		2-AE unten																
r_0	*0.82663*	*0.83291*																
r_in	0.82962	0.82826	0.82877	0.83305	0.84835	0.82795	0.83000	0.83188										
r_out	0.82084	0.82209	0.82482	0.82329	0.82504	0.82637	0.82652	0.82801	0.82881	0.82780	0.82517	0.82469	0.82148	0.82785	0.82535	0.82652	0.83143	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	0.000235598	1	0.000235598	12.31887535	0.001882423	4.279344309
Within groups	0.000439874	23	1.91249E-05			
Total	0.000675471	24				
within-sd	0.004373207					
effective n	6.89					
s_bb	0.005605664			u_bb(rel.)	0.676389559	
s_bb_min	0.000904797					
u_bb	0.005605664			0.828762594		

at:		2-AE oben																
r_0	*0.80708*	*0.81042*																
r_in	0.83141	0.82914	0.82892	0.82496	0.82955	0.82739	0.82859	0.83036										
r_out	0.82499	0.82471	0.82437	0.82404	0.82634	0.83022	0.83143	0.82879	0.82502	0.83064	0.83048	0.82588	0.82884	0.82858	0.82515	0.82687		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.22675E-05	1	1.22675E-05	2.178733614	0.154100282	4.300949502
Within groups	0.000123872	22	5.63055E-06			
Total	0.00013614	23				
within-sd	0.002372879					
effective n	6.77					
s_bb	0.000990179			u_bb(rel.)	0.119582305	
s_bb_min	0.000500792					
u_bb	0.000990179			0.828031313		
							Mean:	0.346167										

Selenium in BAM-M110:

at:		9AJ											
r_0	*0.006399256*	*0.006726744*											
r_in	0.012745	0.012296	0.01218	0.012587	0.012427	0.012291	0.012242	0.012034					
r_out	0.012864	0.012611	0.012756	0.012513	0.012598	0.013107	0.012826	0.012848	0.01294	0.012339	0.012776	0.012353	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*							
Between groups	6.24386E-07	1	6.24386E-07	11.65418412	0.003095271	4.413873419							
Within groups	9.6437E-07	18	5.35761E-08										
Total	1.58876E-06	19											
within-sd	0.000231465												
effective n	6.18												
s_bb	0.00030387			u_bb(rel.)	2.527854086								
s_bb_min	5.37486E-05												
u_bb	0.00030387			0.012020864									
at:		6AL											
r_0	*0.008744861*	*0.011055139*											
r_in	0.013133	0.01303	0.012856	0.013162	0.013035	0.013262	0.013411	0.013123					
r_out	0.124012	0.119917	0.117395	0.122838	0.119998	0.119485	0.121928	0.120657	0.119087	0.122098	0.118284	0.117538	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*							
Between groups	4.82094E-07	1	4.82094E-07	4.49659933	0.048113314	4.413873419							
Within groups	1.92983E-06	18	1.07213E-07										
Total	2.41193E-06	19											
within-sd	0.000327434												
effective n	6.18												
s_bb	0.000246257			u_bb(rel.)	0.345502723								
s_bb_min	7.60335E-05												
u_bb	0.000246257			0.071274955									
							Mean:	1.8205481					

Tin in BAM-M110:

at:		5-Au unten																
r_0	*0.13726*	*0.13832*																
r_in	0.14023	0.13934	0.13978	0.14014	0.14042	0.13923	0.13902											
r_out	0.14063	0.14044	0.14172	0.14147	0.14051	0.14181	0.14111	0.14184	0.14197	0.14281	0.13941	0.14147	0.14140	0.14226	0.14073	0.14109		
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*												
Between groups	1.18029E-05	1	1.18029E-05	20.5807904	0.000180171	4.324793743												
Within groups	1.20433E-05	21	5.7349E-07															
Total	2.38462E-05	22																
within-sd	0.000757291																	
effective n	6.32																	
s_bb	0.001332967			u_bb(rel.)	0.948639338													
s_bb_min	0.000167343																	
u_bb	0.001332967			0.140513571														
at:		5-Au oben																
r_0	*0.13908*	*0.14034*																
r_in	0.14029	0.14143	0.13956	0.14296	0.14085	0.14088	0.13890	0.14009										
r_out	0.14237	0.14179	0.14271	0.14301	0.14242	0.14160	0.14175	0.14129	0.14128	0.14118	0.14237	0.14274	0.14084	0.14234	0.14130	0.14171		
reuungsursac	*dratsummen (*	*heitsgrade (e*	*Quadratsum*	*rüfgröße (F)*	*P-Wert*	*tischer F-Wert*												
Unterschiede	8.99341E-06	1	8.99341E-06	11.54539121	0.002584533	4.300949502												
Innerhalb de	1.71371E-05	22	7.78961E-07															
Gesamt	2.61306E-05	23																
within-sd	0.000882588																	
effective n	6.77																	
s_bb	0.001101589			u_bb(rel.)	0.77977542													
s_bb_min	0.000186269																	
u_bb	0.001101589			0.141270031														
at:		2-AE unten																
r_0	*0.14231*	*0.14433*																
r_in	0.14071	0.14090	0.14057	0.14063	0.14653	0.13965	0.14084	0.14157										
r_out	0.14106	0.14196	0.14297	0.14330	0.14128	0.14144	0.14097	0.14229	0.14182	0.14226	0.14078	0.14021	0.14008	0.14180	0.14109	0.14048	0.14032	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*												
Between groups	1.74836E-10	1	1.74836E-10	8.75774E-05	0.992613983	4.279344309												
Within groups	4.59162E-05	23	1.99636E-06															
Total	4.59164E-05	24																
within-sd	0.001412924																	
effective n	6.89																	
s_bb	0			u_bb(rel.)	0.206657832													
s_bb_min	0.000292328																	
u_bb	0.000292328			0.141454906														
at:		2-AE oben																
r_0	*0.14217*	*0.14316*																
r_in	0.14049	0.14162	0.14035	0.14033	0.14037	0.14172	0.14156	0.14156										
r_out	0.14124	0.14263	0.14047	0.14056	0.14083	0.14080	0.14005	0.14069	0.13955	0.14102	0.14122	0.14164	0.14178	0.14089	0.14108	0.14036		
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*												
Between groups	2.95021E-08	1	2.95021E-08	0.060001274	0.808764288	4.300949502												
Within groups	1.08172E-05	22	4.91691E-07															
Total	1.08467E-05	23																
within-sd	0.000701207																	
effective n	6.77																	
s_bb	0			u_bb(rel.)	0.104984239													
s_bb_min	0.000147989																	
u_bb	0.000147989			0.140962688														
							Mean:	0.62484										

Silver in BAM-M110:

at:		5-Au unten																
r_0	*0.001736031*	*0.001763969*																
r_in	0.00186	0.001821	0.001805	0.001849	0.001867	0.00179	0.00181											
r_out	0.001891	0.001897	0.001907	0.00189	0.001886	0.001888	0.00187	0.00191	0.0019	0.00189	0.00186	0.00187	0.0019	0.00189	0.00188	0.0019		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.72654E-08	1	1.72654E-08	45.76609739	1.0835E-06	4.324793743
Within groups	7.92229E-09	21	3.77252E-10			
Total	2.51877E-08	22				

within-sd	1.9423E-05		
effective n	6.32		
s_bb	5.1693E-05	u_bb(rel.)	2.780816635
s_bb_min	4.292E-06		
u_bb	5.1693E-05	0.001858915	

at:		5-Au oben																
r_0	*0.00137*	*0.00141*																
r_in	0.00183	0.00186	0.00183	0.00188	0.00186	0.00174	0.00187	0.00184										
r_out	0.00190	0.00188	0.00188	0.00192	0.00189	0.00190	0.00186	0.00189	0.00187	0.00190	0.00186	0.00190	0.00192	0.00190	0.00190	0.00188		

reuungsursac	*dratsummen (*	*heitsgrade (e*	*Quadratsum*	*rüfgröße (F)*	*P-Wert*	*tischer F-Wert*
Unterschiede	1.3906E-08	1	1.3906E-08	16.66724325	0.00049315	4.300949502
Innerhalb de	1.83553E-08	22	8.34332E-10			
Gesamt	3.22613E-08	23				

within-sd	2.88848E-05		
effective n	6.77		
s_bb	4.39437E-05	u_bb(rel.)	2.357927101
s_bb_min	6.09609E-06		
u_bb	4.39437E-05	0.001863656	

at:		2-AE unten																
r_0	*0.00201*	*0.00210*																
r_in	0.00192	0.00189	0.00189	0.00195	0.00220	0.00188	0.00190	0.00198										
r_out	0.00194	0.00194	0.00194	0.00191	0.00193	0.00192	0.00191	0.00192	0.00191	0.00191	0.00192	0.00189	0.00188	0.00188	0.00189	0.00188	0.00190	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	9.09551E-09	1	9.09551E-09	2.413437953	0.133951171	4.279344309
Within groups	8.66799E-08	23	3.76869E-09			
Total	9.57754E-08	24				

within-sd	6.13897E-05		
effective n	6.89		
s_bb	2.78073E-05	u_bb(rel.)	1.440723856
s_bb_min	1.27012E-05		
u_bb	2.78073E-05	0.001930094	

at:		2-AE oben																
r_0	*0.00151*	*0.00153*																
r_in	0.00196	0.00192	0.00193	0.00193	0.00196	0.00191	0.00193	0.00194										
r_out	0.00194	0.00190	0.00189	0.00191	0.00191	0.00191	0.00191	0.00190	0.00188	0.00191	0.00192	0.00191	0.00191	0.00190	0.00190	0.00191		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	4.37008E-09	1	4.37008E-09	20.63461573	0.000160326	4.300949502
Within groups	4.65925E-09	22	2.11784E-10			
Total	9.02933E-09	23				

within-sd	1.45528E-05		
effective n	6.77		
s_bb	2.4785E-05	u_bb(rel.)	1.290253289
s_bb_min	3.07135E-06		
u_bb	2.4785E-05	0.001920938	

Mean:	2.06356

Copper in BAM-M110:

at:	5-Au unten																	
r_0	*0.000586*	*0.000598*																
r_in	0.000621	0.000611	0.000607	0.000624	0.000630	0.000602	0.000607											
r_out	0.000633	0.000635	0.000642	0.000638	0.000631	0.000640	0.000628	0.000639	0.000642	0.000645	0.000619	0.000633	0.000637	0.000639	0.000631	0.000632		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.08224E-09	1	2.08224E-09	34.30344152	8.1817E-06	4.324793743
Within groups	1.27471E-09	21	6.07007E-11			
Total	3.35696E-09	22				
within-sd	7.79106E-06					
effective n	6.32					
s_bb	1.78847E-05			u_bb(rel.)	2.86196835	
s_bb_min	1.72163E-06					
u_bb	1.78847E-05			0.000624911		

at:	5-Au oben																	
r_0	*0.000601*	*0.000613*																
r_in	0.000619	0.000634	0.000613	0.000643	0.000625	0.000601	0.000623	0.000619										
r_out	0.000646	0.000634	0.000638	0.000652	0.000638	0.000637	0.000631	0.000638	0.000631	0.000638	0.000634	0.000648	0.000641	0.000643	0.000638	0.000638		

reuungsursac	*dratsummen (*	*heitsgrade (e*	*Quadratsum²*	*rüfgröße (F)*	*P-Wert*	*itischer F-Wert*
Unterschiede	1.53002E-09	1	1.53002E-09	20.50201124	0.000166152	4.300949502
Innerhalb de	1.64181E-09	22	7.46278E-11			
Gesamt	3.17183E-09	23				
within-sd	8.63874E-06					
effective n	6.77					
s_bb	1.46629E-05			u_bb(rel.)	2.325256236	
s_bb_min	1.82319E-06					
u_bb	1.46629E-05			0.000630594		

at:	2-AE unten																	
r_0	*0.000673*	*0.000707*																
r_in	0.000647	0.000637	0.000632	0.000649	0.000749	0.000623	0.000637	0.000662										
r_out	0.000648	0.000656	0.000655	0.000654	0.000647	0.000647	0.000640	0.000658	0.000650	0.000643	0.000644	0.000630	0.000630	0.000640	0.000638	0.000633	0.000635	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	5.9976E-10	1	5.9976E-10	1.105504087	0.303983486	4.279344309
Within groups	1.2478E-08	23	5.42522E-10			
Total	1.30778E-08	24				
within-sd	2.32921E-05					
effective n	6.89					
s_bb	2.8825E-06			u_bb(rel.)	0.741924089	
s_bb_min	4.81903E-06					
u_bb	4.81903E-06			0.000649531		

at:	2-AE oben																	
r_0	*0.000558*	*0.000566*																
r_in	0.000652	0.000647	0.000646	0.000646	0.000653	0.000644	0.000653	0.000653										
r_out	0.000650	0.000649	0.000635	0.000640	0.000643	0.000646	0.000634	0.000641	0.000625	0.000643	0.000649	0.000647	0.000651	0.000641	0.000643	0.000640		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.56688E-10	1	2.56688E-10	7.050643777	0.014454341	4.300949502
Within groups	8.00937E-10	22	3.64062E-11			
Total	1.05763E-09	23				
within-sd	6.03376E-06					
effective n	6.77					
s_bb	5.70452E-06			u_bb(rel.)	0.883351752	
s_bb_min	1.27342E-06					
u_bb	5.70452E-06			0.000645781		

							Mean:	1.931867										

Tellurium in BAM-M110:

at:		5-Au unten																
r_0	*0.000744082*	*0.000821918*																
r_in	0.000795	0.000865	0.000932	0.000794	0.000784	0.000797	0.000781											
r_out	0.001012	0.00098	0.000943	0.00096	0.000869	0.000832	0.000822	0.00086	0.00089	0.000942	0.000884	0.000876	0.000883	0.000867	0.00087	0.000857		
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*												
Between groups	2.77906E-08	1	2.77906E-08	9.188226055	0.006351627	4.324793743												
Within groups	6.35163E-08	21	3.02459E-09															
Total	9.13069E-08	22																
within-sd	5.49962E-05																	
effective n	6.32																	
s_bb	6.25993E-05			u_bb(rel.)	7.288178911													
s_bb_min	1.21528E-05																	
u_bb	6.25993E-05			0.000858915														
at:		5-Au oben																
r_0	*0.000530*	*0.000632*																
r_in	0.000808	0.000806	0.000769	0.000810	0.000826	0.000815	0.000826	0.000754										
r_out	0.000979	0.001054	0.000835	0.000942	0.000869	0.000762	0.000821	0.000776	0.000768	0.000811	0.000809	0.000899	0.000854	0.001006	0.000873	0.000832		
reuungsursac	*dratsummen (*	*heitsgrade*	*e Quadratsum*	*rüfgröße (F)*	*P-Wert*	*tischer F-Wert*												
Unterschiede	2.34968E-08	1	2.34968E-08	4.363250776	0.048505739	4.300949502												
Innerhalb de	1.18473E-07	22	5.38515E-09															
Gesamt	1.4197E-07	23																
within-sd	7.33836E-05																	
effective n	6.77																	
s_bb	5.1726E-05			u_bb(rel.)	6.195192552													
s_bb_min	1.54875E-05																	
u_bb	5.1726E-05			0.000834938														
at:		2-AE unten																
r_0	*0.000784*	*0.000876*																
r_in	0.000755	0.000783	0.000798	0.000848	0.000854	0.000776	0.000781	0.000813										
r_out	0.001042	0.001002	0.000964	0.000950	0.000927	0.000826	0.000816	0.000897	0.000845	0.000804	0.000835	0.000861	0.000887	0.000828	0.000817	0.000800	0.000801	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*												
Between groups	3.10819E-08	1	3.10819E-08	7.164442998	0.013473294	4.279344309												
Within groups	9.97821E-08	23	4.33835E-09															
Total	1.30864E-07	24																
within-sd	6.58662E-05																	
effective n	6.89																	
s_bb	6.23067E-05			u_bb(rel.)	7.407268624													
s_bb_min	1.36274E-05																	
u_bb	6.23067E-05			0.000841156														
at:		2-AE oben																
r_0	*0.000651*	*0.000809*																
r_in	0.000848	0.000856	0.000871	0.000817	0.000887	0.000757	0.000810	0.000835										
r_out	0.001043	0.000971	0.000848	0.001213	0.000841	0.000970	0.001228	0.000840	0.000806	0.000858	0.000811	0.000853	0.000849	0.000870	0.000870	0.000866		
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*												
Between groups	3.9388E-08	1	3.9388E-08	3.133269619	0.090568718	4.300949502												
Within groups	2.7656E-07	22	1.25709E-08															
Total	3.15948E-07	23																
within-sd	0.00011212																	
effective n	6.77																	
s_bb	6.29414E-05			u_bb(rel.)	7.167959188													
s_bb_min	2.36628E-05																	
u_bb	6.29414E-05			0.000878094														
							Mean:	7.031096										

Arsenic in BAM-M110a:

at:	8-BC unten															
r_0	*0.09454*	*0.09788*														
r_in	0.10332	0.10264	0.10289	0.10373	0.10461	0.10246	0.10375	0.10319								
r_out	0.11441	0.11053	0.10943	0.10867	0.10714	0.10518	0.10352	0.10472	0.10473	0.10629	0.10441	0.10399	0.10525	0.10713	0.10775	0.10734

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	6.85189E-05	1	6.85189E-05	12.05122715	0.002167293	4.300949502
Within groups	0.000125084	22	5.68564E-06			
Total	0.000193603	23				

within-sd	0.002384458
effective n	6.77
s_bb	0.003046668
s_bb_min	0.000503236
u_bb	0.003046668

u_bb(rel.)	2.89843776
	0.105114156

at:	8-BC oben															
r_0	*0.10068*	*0.10283*														
r_in	0.10123	0.10156	0.10247	0.10185	0.09852	0.10107	0.10116	0.09972								
r_out	0.10866	0.10576	0.10550	0.10574	0.10180	0.10351	0.10338	0.10535	0.10451	0.10475	0.10364	0.10367	0.10374	0.10320		

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	6.48734E-05	1	6.48734E-05	27.94152758	3.57436E-05	4.351243503
Within groups	4.64351E-05	20	2.32176E-06			
Total	0.000111308	21				

within-sd	0.001523731
effective n	6.50
s_bb	0.003102149
s_bb_min	0.000336087
u_bb	0.003102149

u_bb(rel.)	3.019667093
	0.102731491

at:	6-RP unten															
r_0	*0.09465*	*0.09749*														
r_in	0.09629	0.09927	0.10038	0.10038	0.09956	0.09641	0.10179	0.10068								
r_out	0.10472	0.10508	0.10686	0.10445	0.10344	0.10043	0.10073	0.10156	0.10459	0.10323	0.10116	0.10233	0.10156	0.09938	0.10169	0.10202

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	6.0106E-05	1	6.0106E-05	14.84028983	0.000864052	4.300949502
Within groups	8.91041E-05	22	4.05019E-06			
Total	0.00014921	23				

within-sd	0.002012508
effective n	6.77
s_bb	0.002877667
s_bb_min	0.000424737
u_bb	0.002877667

u_bb(rel.)	2.848508039
	0.101023656

at:	6-RP oben															
r_0	*0.09685*	*0.09991*														
r_in	0.10340	0.10166	0.10293	0.09842	0.09942	0.09922	0.10162	0.10032								
r_out	0.10566	0.10757	0.10706	0.10510	0.10165	0.10004	0.10166	0.10291	0.10300	0.10236	0.10337	0.10121	0.10167	0.10065	0.10206	0.10021

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	2.15459E-05	1	2.15459E-05	4.570092996	0.04389569	4.300949502
Within groups	0.00010372	22	4.71453E-06			
Total	0.000125266	23				

within-sd	0.002171298
effective n	6.77
s_bb	0.001576847
s_bb_min	0.000458249
u_bb	0.001576847

u_bb(rel.)	1.547747699
	0.101880094

Mean:	2.6471141

Bismuth in BAM-M110a:

at:		8-BC unten															
r_0	*0.01263*	*0.01272*															
r_in	0.01337	0.01335	0.01330	0.01332	0.01339	0.01320	0.01337	0.01323									
r_out	0.01345	0.01350	0.01343	0.01350	0.01338	0.01341	0.01333	0.01337	0.01341	0.01329	0.01335	0.01331	0.01333	0.01342	0.01342	0.01335	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	3.05525E-08	1	3.05525E-08	7.162672229	0.013791399	4.300949502
Within groups	9.38414E-08	22	4.26552E-09			
Total	1.24394E-07	23				
within-sd	6.53109E-05					
effective n	6.77					
s_bb	6.23162E-05			u_bb(rel.)	0.466723447	
s_bb_min	1.37838E-05					
u_bb	6.23162E-05			0.013351844		

at:		8-BC oben															
r_0	*0.01335*	*0.01344*															
r_in	0.01310	0.01320	0.01311	0.01323	0.01299	0.01330	0.01319	0.01308									
r_out	0.01331	0.01326	0.01330	0.01322	0.01323	0.01325	0.01324	0.01327	0.01334	0.01325	0.01321	0.01328	0.01330	0.01321			

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	6.55824E-08	1	6.55824E-08	14.7362852	0.001025368	4.351243503
Within groups	8.9008E-08	20	4.4504E-09			
Total	1.5459E-07	21				
within-sd	6.67113E-05					
effective n	6.50					
s_bb	9.6979E-05			u_bb(rel.)	0.734452573	
s_bb_min	1.47144E-05					
u_bb	9.6979E-05			0.01320425		

at:		6-RP unten															
r_0	*0.01276*	*0.01288*															
r_in	0.01309	0.01316	0.01317	0.01311	0.01330	0.01308	0.01334	0.01319									
r_out	0.01322	0.01332	0.01333	0.01333	0.01323	0.01327	0.01328	0.01314	0.01341	0.01336	0.01336	0.01327	0.01327	0.01310	0.01326	0.01329	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	5.03108E-08	1	5.03108E-08	6.869134366	0.01560492	4.300949502
Within groups	1.61132E-07	22	7.32418E-09			
Total	2.11443E-07	23				
within-sd	8.55814E-05					
effective n	6.77					
s_bb	7.96887E-05			u_bb(rel.)	0.602438654	
s_bb_min	1.80618E-05					
u_bb	7.96887E-05			0.013227688		

at:		6-RP oben															
r_0	*0.01308*	*0.01322*															
r_in	0.01318	0.01309	0.01333	0.01315	0.01314	0.01322	0.01332	0.01313									
r_out	0.01337	0.01353	0.01350	0.01332	0.01331	0.01320	0.01320	0.01339	0.01327	0.01335	0.01321	0.01324	0.01320	0.01332	0.01331	0.01332	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	7.80853E-08	1	7.80853E-08	8.299646024	0.008677007	4.300949502
Within groups	2.06982E-07	22	9.40827E-09			
Total	2.85067E-07	23				
within-sd	9.69963E-05					
effective n	6.77					
s_bb	0.000100725			u_bb(rel.)	0.759928688	
s_bb_min	2.04709E-05					
u_bb	0.000100725			0.0132545		

							Mean:	0.6514743									

Antimony in BAM-M110a:

at:		8-BC unten															
r_0	*0.81207*	*0.81528*															
r_in	0.82618	0.82487	0.82956	0.82642	0.82631	0.82789	0.82140	0.82797									
r_out	0.82337	0.82268	0.82157	0.82167	0.82347	0.82665	0.82546	0.82706	0.82617	0.82508	0.82519	0.82520	0.82640	0.82809	0.82744	0.82860	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	6.0876E-06	1	6.0876E-06	1.183213397	0.28847659	4.300949502											
Within groups	0.000113189	22	5.14497E-06														
Total	0.000119277	23															
within-sd	0.002268253																
effective n	6.77																
s_bb	0.000373165			u_bb(rel.)	0.057970049												
s_bb_min	0.000478711																
u_bb	0.000478711			0.825790813													
at:		8-BC oben															
r_0	*0.83188*	*0.83541*															
r_in	0.82754	0.83122	0.82938	0.82900	0.83182	0.83048	0.83425	0.83016									
r_out	0.82988	0.82427	0.82707	0.83216	0.82946	0.82927	0.83069	0.82977	0.82660	0.83170	0.83151	0.82842	0.83346	0.83420			
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	1.78353E-06	1	1.78353E-06	0.285793567	0.598822308	4.351243503											
Within groups	0.000124813	20	6.24064E-06														
Total	0.000126596	21															
within-sd	0.002498127																
effective n	6.50																
s_bb	0			u_bb(rel.)	0.066371762												
s_bb_min	0.000551008																
u_bb	0.000551008			0.830184304													
at:		6-RP unten															
r_0	*0.82238*	*0.82594*															
r_in	0.82549	0.82674	0.83062	0.82471	0.82945	0.82471	0.82688	0.82716									
r_out	0.82455	0.82384	0.82485	0.82479	0.83082	0.82814	0.83206	0.82940	0.83045	0.82970	0.82934	0.83189	0.83032	0.82899	0.82879	0.83049	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	1.50864E-05	1	1.50864E-05	2.370943288	0.137873265	4.300949502											
Within groups	0.000139987	22	6.36304E-06														
Total	0.000155073	23															
within-sd	0.002522508																
effective n	6.77																
s_bb	0.001135201			u_bb(rel.)	0.137132949												
s_bb_min	0.000532371																
u_bb	0.001135201			0.827810188													
at:		6-RP oben															
r_0	*0.81455*	*0.83898*															
r_in	0.74711	0.82957	0.83157	0.83126	0.83313	0.82988	0.82946	0.83074									
r_out	0.82313	0.82390	0.82456	0.82770	0.82880	0.82182	0.82781	0.82925	0.82789	0.82830	0.82841	0.83074	0.82762	0.83250	0.82996	0.83147	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	0.000292231	1	0.000292231	1.024560065	0.322443459	4.300949502											
Within groups	0.006274968	22	0.000285226														
Total	0.006567198	23															
within-sd	0.016888629																
effective n	6.77																
s_bb	0.001017278			u_bb(rel.)	0.432542058												
s_bb_min	0.003564319																
u_bb	0.003564319			0.824039875													
							Mean:	0.231119									

Selenium in BAM-M110a:

at:		9AJ										
r_0	*0.00882844*	*0.00926356*										
r_in	0.011467	0.010863	0.01117	0.011606	0.011346	0.010764	0.010978	0.011328				
r_out	0.011789	0.011633	0.011442	0.011998	0.011513	0.011508	0.010964	0.011029	0.01125	0.011099	0.011191	0.011415
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*						
Between groups	2.1641E-07	1	2.1641E-07	2.290069916	0.14756457	4.413873419						
Within groups	1.70099E-06	18	9.44994E-08									
Total	1.9174E-06	19										
within-sd	0.000307407											
effective n	6.18											
s_bb	0.000140431			u_bb(rel.)	1.263875974							
s_bb_min	7.13831E-05											
u_bb	0.000140431			0.011111136								
at:		6AL										
r_0	*0.01041749*	*0.01071051*										
r_in	0.011525	0.011878	0.011338	0.01119	0.011317	0.011964	0.011555	0.011513				
r_out	0.011717	0.011777	0.01175	0.011591	0.011505	0.011372	0.011532	0.011706	0.011703	0.011644	0.011614	0.011969
reuungsursac	*dratsummen (*	*heitsgrade (e*	*Quadratsum*	*rüfgröße (F)*	*P-Wert*	*tischer F-Wert*						
Unterschiede	7.10533E-08	1	7.10533E-08	1.676514	0.2117517	4.413873419						
Innerhalb de	7.62869E-07	18	4.23816E-08									
Gesamt	8.33922E-07	19										
within-sd	0.000205868											
effective n	6.18											
s_bb	6.81034E-05			u_bb(rel.)	0.591530283							
s_bb_min	4.78046E-05											
u_bb	6.81034E-05			0.011513091								
							Mean:	1.0717273				

Tin in BAM-M110a:

at:		8-BC unten															
r_0	*0.13710*	*0.13815*															
r_in	0.14338	0.14174	0.14157	0.14031	0.14113	0.14208	0.14152	0.14290									
r_out	0.14133	0.14190	0.14223	0.14311	0.14205	0.14204	0.14280	0.14163	0.14251	0.14167	0.14223	0.14161	0.14326	0.14193	0.14117	0.14171	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	3.15739E-07	1	3.15739E-07	0.58121157	0.453934638	4.300949502											
Within groups	1.19513E-05	22	5.43242E-07														
Total	1.22671E-05	23															
within-sd	0.00073705																
effective n	6.77																
s_bb	0			u_bb(rel.)	0.109581783												
s_bb_min	0.000155553																
u_bb	0.000155553			0.141951656													
at:		8-BC oben															
r_0	*0.14401*	*0.14528*															
r_in	0.14100	0.14097	0.14027	0.14222	0.13985	0.14096	0.14189	0.14046									
r_out	0.14191	0.14102	0.14099	0.14085	0.13960	0.13918	0.14039	0.14215	0.14235	0.14093	0.14204	0.14181	0.14145	0.14184			
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	2.62206E-07	1	2.62206E-07	0.322093862	0.576667938	4.351243503											
Within groups	1.62813E-05	20	8.14066E-07														
Total	1.65435E-05	21															
within-sd	0.000902256																
effective n	6.50																
s_bb	0			u_bb(rel.)	0.141076132												
s_bb_min	0.000199009																
u_bb	0.000199009			0.141065098													
at:		6-RP unten															
r_0	*0.15220*	*0.15307*															
r_in	0.14259	0.14238	0.14278	0.14245	0.14199	0.14207	0.14273	0.14210									
r_out	0.14327	0.14321	0.14249	0.14378	0.14233	0.14177	0.14420	0.14279	0.14269	0.14361	0.14421	0.14389	0.14294	0.14244	0.14251	0.14333	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	2.66398E-06	1	2.66398E-06	7.039543729	0.014521931	4.300949502											
Within groups	8.32547E-06	22	3.7843E-07														
Total	1.09894E-05	23															
within-sd	0.000615167																
effective n	6.77																
s_bb	0.000581066			u_bb(rel.)	0.407086297												
s_bb_min	0.00012983																
u_bb	0.000581066			0.14273775													
at:		6-RP oben															
r_0	*0.13965*	*0.14113*															
r_in	0.13873	0.14092	0.14232	0.14242	0.14279	0.14197	0.14308	0.14129									
r_out	0.14154	0.14372	0.14339	0.14318	0.14221	0.14182	0.14380	0.14305	0.14226	0.14378	0.14345	0.14324	0.14307	0.14438	0.14404	0.14248	
Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*											
Between groups	1.04244E-05	1	1.04244E-05	9.678262368	0.00509252	4.300949502											
Within groups	2.36961E-05	22	1.0771E-06														
Total	3.41205E-05	23															
within-sd	0.001037832																
effective n	6.77																
s_bb	0.001175098			u_bb(rel.)	0.825266121												
s_bb_min	0.000219033																
u_bb	0.001175098			0.142390156													
							Mean:	0.46869									

Silver in BAM-M110a:

at:		8-BC unten															
r_0	*0.00168*	*0.00170*															
r_in	0.00191	0.00186	0.00193	0.00192	0.00192	0.00193	0.00186	0.00189									
r_out	0.00193	0.00191	0.00191	0.00193	0.00192	0.00190	0.00191	0.00191	0.00191	0.00191	0.00192	0.00190	0.00192	0.00192	0.00193	0.00194	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.18008E-09	1	1.18008E-09	3.456105611	0.076446935	4.300949502
Within groups	7.51187E-09	22	3.41449E-10			
Total	8.69196E-09	23				
within-sd	1.84783E-05					
effective n	6.77					
s_bb	1.11306E-05			u_bb(rel.)	0.583037579	
s_bb_min	3.89982E-06					
u_bb	1.11306E-05			0.001909063		

at:		8-BC oben															
r_0	*0.00188*	*0.00189*															
r_in	0.00187	0.00190	0.00188	0.00189	0.00187	0.00189	0.00189	0.00188									
r_out	0.00190	0.00190	0.00187	0.00191	0.00190	0.00190	0.00190	0.00190	0.00190	0.00193	0.00190	0.00190	0.00192	0.00189			

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.84127E-09	1	1.84127E-09	10.99731376	0.003445644	4.351243503
Within groups	3.34859E-09	20	1.67429E-10			
Total	5.18986E-09	21				
within-sd	1.29395E-05					
effective n	6.50					
s_bb	1.60473E-05			u_bb(rel.)	0.847879832	
s_bb_min	2.85403E-06					
u_bb	1.60473E-05			0.001892634		

at:		6-RP unten															
r_0	*0.00169*	*0.00171*															
r_in	0.00183	0.00187	0.00187	0.00185	0.00184	0.00181	0.00188	0.00187									
r_out	0.00191	0.00191	0.00190	0.00191	0.00191	0.00190	0.00191	0.00189	0.00191	0.00191	0.00190	0.00191	0.00190	0.00187	0.00190	0.00189	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.30021E-08	1	1.30021E-08	46.69564271	7.27573E-07	4.300949502
Within groups	6.12575E-09	22	2.78443E-10			
Total	1.91278E-08	23				
within-sd	1.66866E-05					
effective n	6.77					
s_bb	4.33547E-05			u_bb(rel.)	2.309555353	
s_bb_min	3.52168E-06					
u_bb	4.33547E-05			0.001877188		

at:		6-RP oben															
r_0	*0.00185*	*0.00188*															
r_in	0.00191	0.00190	0.00191	0.00187	0.00192	0.00189	0.00190	0.00190									
r_out	0.00192	0.00192	0.00192	0.00190	0.00191	0.00186	0.00190	0.00193	0.00192	0.00192	0.00193	0.00193	0.00192	0.00192	0.00192	0.00192	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.16033E-09	1	1.16033E-09	4.103000958	0.055105923	4.300949502
Within groups	6.22163E-09	22	2.82801E-10			
Total	7.38196E-09	23				
within-sd	1.68167E-05					
effective n	6.77					
s_bb	1.13858E-05			u_bb(rel.)	0.597128933	
s_bb_min	3.54914E-06					
u_bb	1.13858E-05			0.00190675		

							Mean:	1.29898									

Copper in BAM-M110a:

at:		8-BC unten															
r_0	*0.000567*	*0.000575*															
r_in	0.000650	0.000633	0.000650	0.000639	0.000645	0.000651	0.000630	0.000639									
r_out	0.000644	0.000638	0.000644	0.000656	0.000650	0.000645	0.000648	0.000643	0.000644	0.000641	0.000646	0.000644	0.000650	0.000644	0.000643	0.000646	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	5.63333E-11	1	5.63333E-11	1.724589784	0.2026362	4.300949502
Within groups	7.18625E-10	22	3.26648E-11			
Total	7.74958E-10	23				

within-sd	5.71531E-06
effective n	6.77
s_bb	1.86989E-06
s_bb_min	1.20621E-06
u_bb	1.86989E-06

u_bb(rel.)	0.290468486
0.00064375	

at:		8-BC oben															
r_0	*0.000651*	*0.000659*															
r_in	0.000633	0.000636	0.000628	0.000641	0.000624	0.000635	0.000635	0.000629									
r_out	0.000642	0.000638	0.000628	0.000636	0.000632	0.000630	0.000637	0.000641	0.000644	0.000642	0.000642	0.000641	0.000643	0.000639			

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.59041E-10	1	1.59041E-10	5.953987851	0.024119012	4.351243503
Within groups	5.34232E-10	20	2.67116E-11			
Total	6.93273E-10	21				

within-sd	5.16833E-06
effective n	6.50
s_bb	4.51202E-06
s_bb_min	1.13997E-06
u_bb	4.51202E-06

u_bb(rel.)	0.710084714
0.00063542	

at:		6-RP unten															
r_0	*0.000583*	*0.000593*															
r_in	0.000635	0.000642	0.000645	0.000636	0.000633	0.000620	0.000646	0.000641									
r_out	0.000653	0.000656	0.000650	0.000657	0.000651	0.000645	0.000660	0.000648	0.000649	0.000658	0.000658	0.000661	0.000647	0.000644	0.000648	0.000650	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	1.19002E-09	1	1.19002E-09	27.79426271	2.73343E-05	4.300949502
Within groups	9.41937E-10	22	4.28153E-11			
Total	2.13196E-09	23				

within-sd	6.54334E-06
effective n	6.77
s_bb	1.30182E-05
s_bb_min	1.38096E-06
u_bb	1.30182E-05

u_bb(rel.)	2.019206093
0.000644719	

at:		6-RP oben															
r_0	*0.000629*	*0.000637*															
r_in	0.000639	0.000643	0.000649	0.000645	0.000660	0.000646	0.000651	0.000642									
r_out	0.000652	0.000664	0.000660	0.000651	0.000653	0.000640	0.000655	0.000659	0.000650	0.000657	0.000659	0.000663	0.000653	0.000663	0.000661	0.000655	

Source of variation	*sums of squares (SS)*	*degrees of freedom (df)*	*Mean squares (MS)*	*F-value*	*P-value*	*critical F-value*
Between groups	4.38021E-10	1	4.38021E-10	11.02806189	0.003104539	4.300949502
Within groups	8.73812E-10	22	3.97187E-11			
Total	1.31183E-09	23				

within-sd	6.30228E-06
effective n	6.77
s_bb	7.67073E-06
s_bb_min	1.33009E-06
u_bb	7.67073E-06

u_bb(rel.)	1.177564509
0.000651406	

							Mean:	1.230086									

Tellurium in BAM-M110a:

at:		8-BC unten															
r_0	0.000758	0.000842															
r_in	0.000878	0.000822	0.000811	0.000843	0.000854	0.000824	0.000860	0.000832									
r_out	0.001073	0.001018	0.001040	0.000947	0.000938	0.000952	0.000875	0.000855	0.000921	0.000848	0.000881	0.000854	0.000875	0.000862	0.000872	0.000953	

Source of variation	sums of squares (SS)	degrees of freedom (df)	Mean squares (MS)	F-value	P-value	critical F-value
Between groups	3.60803E-08	1	3.60803E-08	10.04832373	0.004435289	4.300949502
Within groups	7.8995E-08	22	3.59068E-09			
Total	1.15075E-07	23				

within-sd	5.99223E-05
effective n	6.77
s_bb	6.92792E-05
s_bb_min	1.26465E-05
u_bb	6.92792E-05

u_bb(rel.)	7.858125667
	0.000881625

at:		8-BC oben															
r_0	0.000777	0.000841															
r_in	0.000805	0.000831	0.000847	0.000806	0.000829	0.000826	0.000818	0.000823									
r_out	0.000991	0.000930	0.000925	0.000953	0.000918	0.000864	0.000807	0.000845	0.000862	0.000850	0.000843	0.000886	0.000815	0.000834			

Source of variation	sums of squares (SS)	degrees of freedom (df)	Mean squares (MS)	F-value	P-value	critical F-value
Between groups	1.65922E-08	1	1.65922E-08	8.149175027	0.009794678	4.351243503
Within groups	4.07212E-08	20	2.03606E-09			
Total	5.73135E-08	21				

within-sd	4.51227E-05
effective n	6.50
s_bb	4.73224E-05
s_bb_min	9.95265E-06
u_bb	4.73224E-05

u_bb(rel.)	5.556426533
	0.00085167

at:		6-RP unten															
r_0	0.000682	0.000760															
r_in	0.000843	0.000794	0.000829	0.000839	0.000838	0.000840	0.000855	0.000848									
r_out	0.001024	0.000962	0.000959	0.000968	0.000862	0.000850	0.000789	0.000845	0.000885	0.000893	0.000832	0.000861	0.000804	0.000850	0.000828	0.000933	

Source of variation	sums of squares (SS)	degrees of freedom (df)	Mean squares (MS)	F-value	P-value	critical F-value
Between groups	1.24485E-08	1	1.24485E-08	3.948809452	0.059495851	4.300949502
Within groups	6.93544E-08	22	3.15247E-09			
Total	8.1803E-08	23				

within-sd	5.61469E-05
effective n	6.77
s_bb	3.70578E-05
s_bb_min	1.18497E-05
u_bb	3.70578E-05

u_bb(rel.)	4.309514795
	0.000859906

at:		6-RP oben															
r_0	0.000771	0.000855															
r_in	0.000835	0.000811	0.000889	0.000799	0.000797	0.000801	0.000843	0.000765									
r_out	0.000996	0.001014	0.000938	0.000947	0.000887	0.000881	0.000869	0.000920	0.000815	0.000822	0.000789	0.000863	0.000847	0.000831	0.000822	0.000824	

Source of variation	sums of squares (SS)	degrees of freedom (df)	Mean squares (MS)	F-value	P-value	critical F-value
Between groups	2.0213E-08	1	2.0213E-08	5.769683533	0.025186598	4.300949502
Within groups	7.70729E-08	22	3.50332E-09			
Total	9.7286E-08	23				

within-sd	5.91888E-05
effective n	6.77
s_bb	4.96838E-05
s_bb_min	1.24917E-05
u_bb	4.96838E-05

u_bb(rel.)	5.856995228
	0.000848281

							Mean:	6.031176									