Institute for
Interlaboratory Studies

Results of Proficiency Test
Heavy Metals by Perspiration
in Textile
November 2023

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since the 1990's many countries have adopted environmental standards and requirements restricting the use of harmful chemicals in the production of textiles and clothing. Laws and regulations impose some of these standards and requirements. In addition to mandatory environmental standards and requirements for textiles some Ecolabelling schemes are imposing environmental requirements for textile products on a voluntary basis e.g. EU Ecolabel regulation 2014/350/EU, OEKO-TEX® Standard (Switzerland), bluesign® Restricted Substances List (Switzerland) and American Apparel and Footwear Association (United States).

Since 2002 the Institute of Interlaboratory Studies (iis) organizes a proficiency scheme for the determination of Heavy Metals by Perspiration in Textile every year. During the annual proficiency testing program 2023 it was decided to continue the proficiency test for the determination of Heavy Metals by Perspiration in Textile.

In this interlaboratory study 78 laboratories in 24 countries registered for participation, see appendix 4 for the number of participants per country. In this report the results of Heavy Metals by Perspiration in Textile proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to a laboratory that has performed the tests in accordance with for ISO/IEC17043 relevant requirements of ISO/IEC17025.
It was decided to send two different textile samples of approximately 3 grams each labelled #23740 and #23741 respectively.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

All data presented in this report must be regarded as confidential and for use by the participating companies only. Disclosure of the information in this report is only allowed by means of the entire report. Use of the contents of this report for third parties is only allowed by written permission of the Institute for Interlaboratory Studies. Disclosure of the identity of one or more of the participating companies will be done only after receipt of a written agreement of the companies involved.

2.4 SAMPLES

For the first sample a batch of purple cotton pieces was selected which was artificially fortified with Copper by a third party. After homogenization 100 small plastic bags were filled with approximately 3 grams each and labelled #23740.
The batch for sample #23740 was used in a previous proficiency test on Heavy Metals by Perspiration in Textile as sample #14205 in iis14A03. Therefore, homogeneity of the subsamples was assumed.

For the second sample a batch of green cotton pieces was selected which was artificially fortified with Chromium and Mercury by a third party. After homogenization 100 small plastic bags were filled with approximately 3 grams each and labelled #23741.
The batch for sample #23741 was used in a previous proficiency test on Heavy Metals by Perspiration in Textile as sample #18631 in iis18A10. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories two textile samples labelled #23740 and #23741 respectively were sent on October 4, 2023.

2.5 ANALYZES

The participants were requested to determine on both samples: Antimony as Sb, Arsenic as As, Cadmium as Cd, Chromium as Cr, Cobalt as Co, Copper as Cu, Lead as Pb, Mercury as Hg and Nickel as Ni, applying the analysis procedure that is routinely used in the laboratory, but also to use preferably a solid/liquid ratio of 1/50 g/ml as prescribed in EN16711-2:15.
It was also requested to report if the laboratory was accredited for the requested components and to report some analytical details.

It was explicitly requested to treat the samples as if they were routine samples and to report the test results using the indicated units on the report form and not to round the test results, but report as much significant figures as possible. It was also requested not to report ‘less than’ test results, which are above the detection limit, because such test results cannot be used for meaningful statistical evaluations.

To get comparable test results a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the reference test methods (when applicable) that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis-cts/.

The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal www.kpmd.co.uk/sgs-iis-cts/. The reported test results are tabulated per determination in appendices 1 and 2 of this report. The laboratories are presented by their code numbers.

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no reanalyzes). Additional or corrected test results are used for data analysis and the original test results are placed under 'Remarks' in the result tables in appendices 1 and 2. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report ‘iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation’ of June 2018 (iis-protocol, version 3.5).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as ‘<…’ or ‘>…’ were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test, a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either ‘unknown’, ‘OK’, ‘suspect’ or ‘not OK’. After removal of outliers, this check was repeated. If a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

The assigned value is determined by consensus based on the test results of the group of participants after rejection of the statistical outliers and/or suspect data.

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner’s outlier test can be used. Outliers are marked by D(0.01) for the Dixon’s test, by G(0.01) or DG(0.01) for the Grubbs’ test and by R(0.01) for the Rosner’s test. Stragglers are marked by D(0.05) for the Dixon’s test, by G(0.05) or

DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. In this PT, the criterion of ISO13528, paragraph 9.2.1. was met for all evaluated tests, therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

Finally, the reproducibilities were calculated from the standard deviations by multiplying them with a factor of 2.8.

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements (derived from e.g. ISO or ASTM test methods), the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

When a laboratory did use a test method with a reproducibility that is significantly different from the reproducibility of the reference test method used in this report, it is strongly advised to recalculate the z-score, while using the reproducibility of the actual test method used, this in order to evaluate whether the reported test result is fit-for-use.

The z-scores were calculated according to:

$z_{(target)}$ = (test result - average of PT) / target standard deviation

The $z_{(target)}$ scores are listed in the test result tables in appendix 1.

Absolute values for z<2 are very common and absolute values for z>3 are very rare. Therefore, the usual interpretation of z-scores is as follows:

	|z|	< 1	good
1 <	|z|	< 2	satisfactory
2 <	|z|	< 3	questionable
3 <	|z|		unsatisfactory

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples. Five participants reported test results after the final reporting date and five other participants did not report any test results. Not all participants were able to report all elements requested. In total 73 participants reported 196 numerical test results. Observed were 10 outlying test results, which is 5.1%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

Not all data sets proved to have a normal Gaussian distribution. These are referred to as “not OK” or “suspect”. The statistical evaluation of these data sets should be used with due care, see also paragraph 3.1.

4.1 EVALUATION PER SAMPLE AND PER ELEMENT

In this section the reported test results are discussed per sample and per element. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data in appendix 1. The abbreviations, used in these tables, are explained in appendix 5.

For the determination of Heavy Metals by Perspiration in Textile the EN16711-2 is considered to be the official test method. This method mentions the standard deviation and variation coefficient per element between laboratories. The reproducibility of each metal was calculated by multiplying the variation coefficient of the metal with 2.8.

sample #23740

Copper as Cu: The group of participants met the target requirements. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN16711-2:15.

The participants agreed on a concentration near or below the limit of detection for all other elements mentioned in paragraph 2.5. Therefore, no z-scores are calculated for these elements. The reported test results are given in appendix 2.

sample #23741

Chromium as Cr: The group of participants met the target requirements. Three statistical outliers were observed. The calculated reproducibility after rejection of the outliers is in agreement with the requirements of EN16711-2:15.

Mercury as Hg: The group of participants met the target requirements. Four statistical outliers were observed. The calculated reproducibility after rejection of the outliers is in agreement with the requirements of EN16711-2:15.

The participants agreed on a concentration near or below the limit of detection for all other elements mentioned in paragraph 2.5. Therefore, no z-scores are calculated for these elements. The reported test results are given in appendix 2.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the reference test method and the reproducibility as found for the group of participating laboratories. The number of significant test results, the average, the calculated reproducibility (2.8 * standard deviation) and the target reproducibility derived from the reference method are presented in the next two tables.

Element	unit	n	average	2.8 * sd	R(lit)
Copper as Cu	mg/kg	67	55.9	13.1	25.1

Table 1: reproducibility of test on sample #23740

Element	unit	n	average	2.8 * sd	R(lit)
Chromium as Cr	mg/kg	70	8.0	2.4	3.4
Mercury as Hg	mg/kg	49	0.20	0.13	0.17

Table 2: reproducibilities of tests on sample #23741

Without further statistical calculations it can be concluded that for all tests there is a good compliance of the group of participants with the reference test method.

4.3 COMPARISON OF THE PROFICIENCY TEST OF NOVEMBER 2023 WITH PREVIOUS PTS

	November 2023	November 2022	November 2021	November 2020	November 2019
Number of reporting laboratories	73	83	86	79	96
Number of test results	196	324	418	314	408
Number of statistical outliers	10	6	12	11	13
Percentage of statistical outliers	5.1%	1.9%	2.9%	3.5%	3.2%

Table 3: comparison with previous proficiency tests

In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

The performance of the determinations of the proficiency test was compared to uncertainties observed in PTs over the years, expressed as relative standard deviation (RSD) of the PTS, see next table.

Element	November 2023	November 2022	November 2021	November 2020	2010-2019	EN16711-2
Antimony as Sb	--	10%	--	--	8-19%	20%
Arsenic as As	--	8%	--	--	9%	20%
Cadmium as Cd	--	--	9-12%	--	9-18%	10%
Chromium as Cr	10%	--	--	--	10-19%	15%
Cobalt as Co	--	--	12%	--	8-14%	13%
Copper as Cu	8%	9%	10%	8-13%	9-22%	16%
Lead as Pb	--	--	--	--	35-40%	40%
Mercury as Hg	24%	--	--	--	34-41%	31%
Nickel as Ni	--	7%	11%	10%	7-14%	10%

Table 4: development of the uncertainties over the years

The uncertainties observed in this PT are comparable or better than the uncertainties observed in previous PTs.

Sample #23740 was used in a previous PT as sample #14205 in iis14A03. The averages found in both PTs for this sample are similar. The calculated reproducibility for Chromium improved in the 2023 PT compared to the 2014 PT.

Element	unit	sample #23740			sample #14205		
		n	average	R(calc)	n	average	R(calc)
Copper as Cu	mg/kg	67	55.9	13.1	81	57.05	16.69

Table 5: comparison of sample #23740 with #14205

Sample #23741 was used in a previous PT as sample #18634 in iis18A10. The averages found in both PTs for this sample are similar. The calculated reproducibility for the Chromium and Mercury improved in the 2023 PT compared to the 2018 PT.

Element	unit	sample #23741			sample #18631		
		n	average	R(calc)	n	average	R(calc)
Chromium as Cr	mg/kg	70	8.0	2.4	88	9.1	2.5
Mercury as Hg	mg/kg	49	0.20	0.13	71	0.26	0.25

Table 6: comparison of sample #23741 with #18631

4.4 EVALUATION OF THE ANALYTICAL DETAILS

For this PT some analytical details were requested and are listed in appendix 3. Based on the answers given by the participants the following can be summarized:

- About 90% of the participants mentioned that they are ISO/IEC17025 accredited to determine the reported elements.
- About 50% mentioned to use the sample as received and the other about 50% did further cut or further grind the sample prior to analysis.
- About 55% used a sample intake of 1 gram and about 35% used 0.5 grams.
- The vast majority of the participants used a ratio of 1 g to 50 mL. Remarkably, two

participants reported a ratio of 1g to 20-30 mL. Please note that in the method it is described that there can be a risk that not all the fabric is wetted sufficiently when a smaller amount of simulant is used.

For the elements present in the samples the calculated reproducibility is in agreement with the requirements of the target reproducibility, therefore no separate statistical analysis has been performed.

5 DISCUSSION

Almost all participants identified all added metals in both textile samples correctly: sample #23740 contained Copper and sample #23741 contained Chromium and Mercury.

When the results of this interlaboratory study were compared to the three guidelines from the table below, it was noticed that not all participants would have made identical decisions about the acceptability of sample #23740 and sample #23741.
All reporting participants except one would have rejected sample #23740 and all reporting participants except three would have rejected sample #23741.

	OEKO-TEX® 100 Class 2: direct skin contact in mg/kg	bluesign® RSL Range A: next to skin use in mg/kg	2014/350/EU: all textile products except baby in mg/kg
Method:	----	EN16711-2	EN ISO 105-E04
Antimony as Sb	30.0	10	30.0
Arsenic as As	1.0	0.2	1.0
Cadmium as Cd	0.1	0.1	0.1
Chromium as Cr	2.0	0.5	1.0
Cobalt as Co	4.0	1.0	1.0
Copper as Cu	50.0	50	50.0
Lead as Pb	1.0	1.0	1.0
Mercury as Hg	0.02	0.02	0.02
Nickel as Ni	4.0	1.0	1.0

Table 7: Overview from different ecolabelling schemes (latest version)

6 CONCLUSION

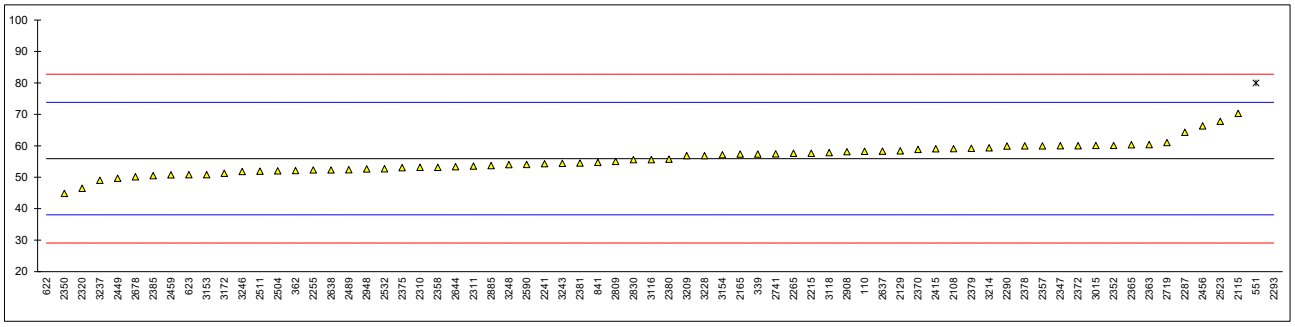
Each participating laboratory will have to evaluate its performance in this study and decide about any corrective actions if necessary. Therefore, participation on a regular basis in this scheme could be helpful to improve the performance and thus increase of the quality of the analytical results.

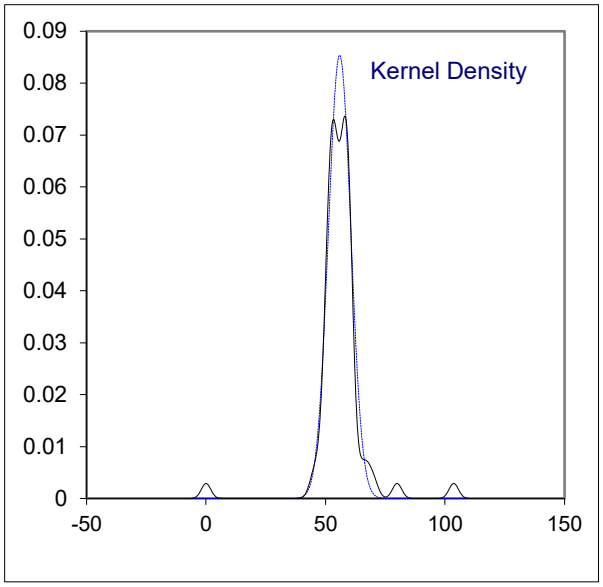
APPENDIX 1

Determination of Copper as Cu on sample #23740; results in mg/kg

lab	method	value	mark	z(targ)	remarks
110	EN16711-2	58.23		0.26	
210		-----		-----	
339	ISO105E04	57.382		0.16	
362	In house	52.1		-0.43	
551	ISO105E04	79.9781	R(0.01)	2.69	
622	EN16711-2	0.000	R(0.01)	-6.25	
623	EN16711-2	50.79		-0.57	
841	ISO105E04	54.7		-0.14	
2108	EN16711-2	59.07		0.35	
2115	EN16711-2	70.29		1.61	
2129	EN16711-2	58.3957		0.28	
2165	EN16711-2	57.366		0.16	
2215		57.619		0.19	
2241	EN16711-2	54.27		-0.18	
2255	EN16711-2	52.30		-0.40	
2265	EN16711-2	57.6		0.19	
2287	EN16711-2	64.28		0.93	
2290	EN16711-2	59.91		0.45	
2293	EN16711-2	103.7	C,R(0.01)	5.34	first reported: 1605.99
2310	EN16711-2	53.1		-0.32	
2311	EN16711-2	53.55		-0.27	
2320	EN16711-2	46.428		-1.06	
2347	EN16711-2	60.00		0.46	
2350	EN16711-2	44.857		-1.24	
2352	EN16711-2	60.1		0.47	
2357	EN16711-2	59.96		0.45	
2358	EN16711-2	53.139		-0.31	
2363	EN16711-2	60.35		0.49	
2365	EN16711-2	60.30		0.49	
2370	ISO105E04	58.8		0.32	
2372	EN16711-2	60		0.46	
2375	EN16711-2	53		-0.33	
2378	EN16711-2	59.96		0.45	
2379	EN16711-2	59.2157		0.37	
2380	EN16711-2	55.743		-0.02	
2381	EN16711-2	54.50		-0.16	
2385	EN16711-2	50.5		-0.61	
2415	EN16711-2	59.0		0.34	
2449	ISO105E04	49.678		-0.70	
2456	EN16711-2	66.34		1.16	
2459	EN16711-2	50.76		-0.58	
2489	EN16711-2	52.37		-0.40	
2504	DIN54233-3	52.016		-0.44	
2511	EN16711-2	51.9		-0.45	
2523		67.747		1.32	
2532	EN16711-2	52.7		-0.36	
2561		-----		-----	
2582		-----		-----	
2590	EN16711-2	54.06		-0.21	
2637	EN16711-2	58.3		0.27	
2638	EN16711-2	52.31		-0.40	
2644	EN16711-2	53.34		-0.29	
2678	EN16711-2	50.1		-0.65	
2719		61		0.57	
2734		-----		-----	
2741	EN16711-2	57.42		0.17	
2758	EN16711-2	not determined		-----	
2809	EN16711-2	55.0		-0.10	
2830	EN16711-2	55.593		-0.04	
2885	In house	53.71		-0.25	
2908	EN16711-2	58.09		0.24	
2948	EN16711-2	52.62		-0.37	
2989		-----		-----	
3015	EN16711-2	60.06		0.46	
3116	EN16711-2	55.6		-0.04	
3118	EN16711-2	57.811	C	0.21	first reported: 34.199
3153	EN16711-2	50.799		-0.57	
3154	EN16711-2	57.11		0.13	
3172	EN16711-2	51.225		-0.52	
3209	EN16711-2	56.844		0.10	
3210	EN16711-2	<57.6726		-----	
3214	EN16711-2	59.36		0.38	
3228	EN16711-2	56.844		0.10	
3237	EN16711-2	49.00		-0.77	
3243	EN16711-2	54.4		-0.17	

lab	method	value	mark	z(targ)	remarks
3246	EN16711-2	51.82		-0.46	
3248	ISO105E04	54	C	-0.21	first reported: 33
6191	EN16711-2	not analyzed		-----	
	normality	OK			
	n	67			
	outliers	3			
	mean (n)	55.9214			
	st.dev. (n)	4.67389	RSD = 8.4%		
	R(calc.)	13.0869			
	st.dev.(EN16711-2:15)	8.94742			
	R(EN16711-2:15)	25.0528			

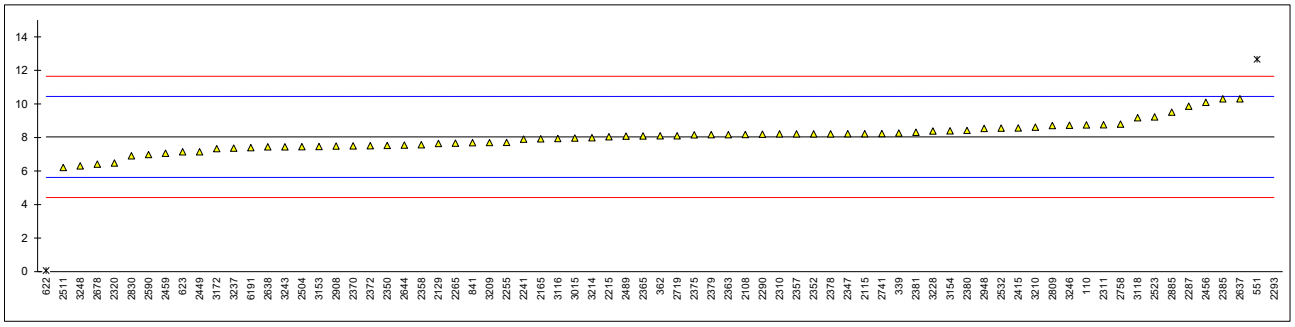


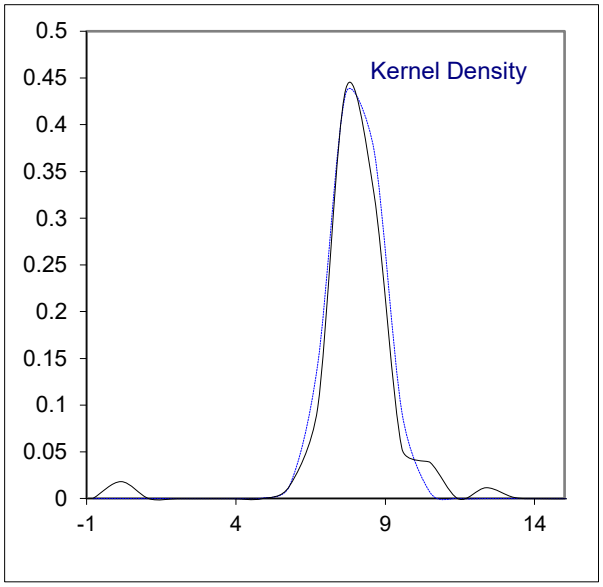


Determination of Chromium as Cr on sample #23741; results in mg/kg

lab	method	value	mark	z(targ)	remarks
110	EN16711-2	8.736		0.58	
210		-----		-----	
339	ISO105E04	8.263		0.19	
362	In house	8.1		0.06	
551	ISO105E04	12.6574	R(0.01)	3.84	
622	EN16711-2	0.054	R(0.01)	-6.62	
623	EN16711-2	7.13		-0.75	
841	ISO105E04	7.68		-0.29	
2108		8.164		0.11	
2115	EN16711-2	8.21		0.15	
2129	EN16711-2	7.6346		-0.33	
2165	EN16711-2	7.916		-0.10	
2215		8.028		0.00	
2241	EN16711-2	7.896		-0.11	
2255	EN16711-2	7.70		-0.28	
2265	EN16711-2	7.65		-0.32	
2287	EN16711-2	9.856		1.51	
2290	EN16711-2	8.19		0.13	
2293	EN16711-2	238.2	C,R(0.01)	191.03	first reported: 13.29
2310	EN16711-2	8.2		0.14	
2311	EN16711-2	8.744		0.59	
2320	EN16711-2	6.473		-1.29	
2347	EN16711-2	8.21		0.15	
2350	EN16711-2	7.511		-0.43	
2352	EN16711-2	8.2		0.14	
2357	EN16711-2	8.20		0.14	
2358	EN16711-2	7.561		-0.39	
2363	EN16711-2	8.16		0.11	
2365	EN16711-2	8.09		0.05	
2370	ISO105E04	7.49		-0.45	
2372	EN16711-2	7.5		-0.44	
2375	EN16711-2	8.15		0.10	
2378	EN16711-2	8.20		0.14	
2379	EN16711-2	8.1562		0.10	
2380	EN16711-2	8.413		0.32	
2381	EN16711-2	8.30		0.22	
2385	EN16711-2	10.3		1.88	
2415	EN16711-2	8.56		0.44	
2449		7.13		-0.75	
2456	EN16711-2	10.09		1.71	
2459	EN16711-2	7.05		-0.82	
2489	EN16711-2	8.08		0.04	
2504	DIN54233-3	7.442		-0.49	
2511	EN16711-2	6.2		-1.52	
2523		9.219		0.98	
2532	EN16711-2	8.55		0.43	
2561		-----		-----	
2582		-----		-----	
2590	EN16711-2	6.97		-0.88	
2637	EN16711-2	10.3		1.88	
2638	EN16711-2	7.43		-0.50	
2644	EN16711-2	7.54		-0.41	
2678	EN16711-2	6.4		-1.35	
2719		8.1		0.06	
2734		-----		-----	
2741	EN16711-2	8.222		0.16	
2758	EN16711-2	8.797		0.63	
2809	EN16711-2	8.70		0.55	
2830	EN16711-2	6.90		-0.94	
2885		9.497		1.22	
2908	EN16711-2	7.475		-0.46	
2948	EN16711-2	8.53		0.41	
2989		-----		-----	
3015	EN16711-2	7.96		-0.06	
3116	EN16711-2	7.93		-0.09	
3118	EN16711-2	9.179		0.95	
3153	EN16711-2	7.452		-0.48	
3154	EN16711-2	8.39		0.30	
3172	EN16711-2	7.325		-0.59	
3209	EN16711-2	7.684		-0.29	
3210	EN16711-2	8.6153		0.48	
3214	EN16711-2	7.98		-0.04	
3228	EN16711-2	8.376		0.29	
3237	EN16711-2	7.36		-0.56	
3243	EN16711-2	7.43		-0.50	

lab	method	value	mark	z(targ)	remarks
3246	EN16711-2	8.72		0.57	
3248	ISO105E04	6.3		-1.44	
6191	EN16711-2	7.386		-0.54	
	normality	suspect			
	n	70			
	outliers	3			
	mean (n)	8.0326			
	st.dev. (n)	0.84060	RSD = 10.5%		
	R(calc.)	2.354			
	st.dev.(EN16711-2:15)	1.20489			
	R(EN16711-2:15)	3.3737			

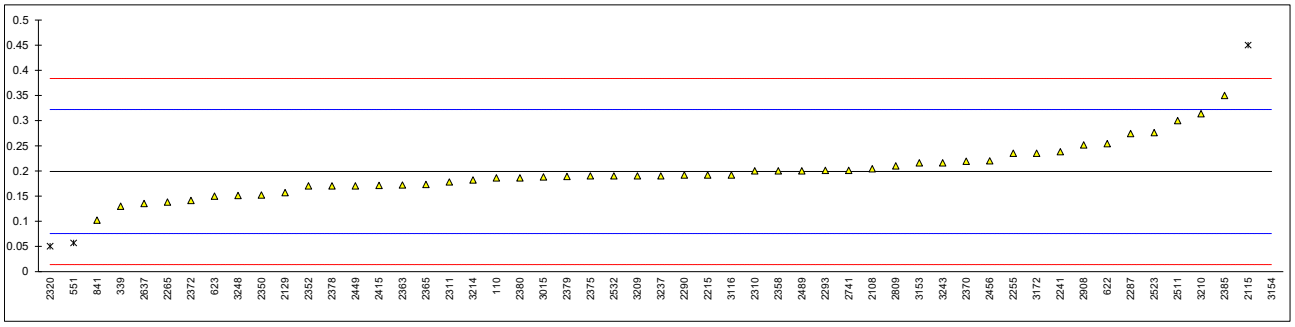


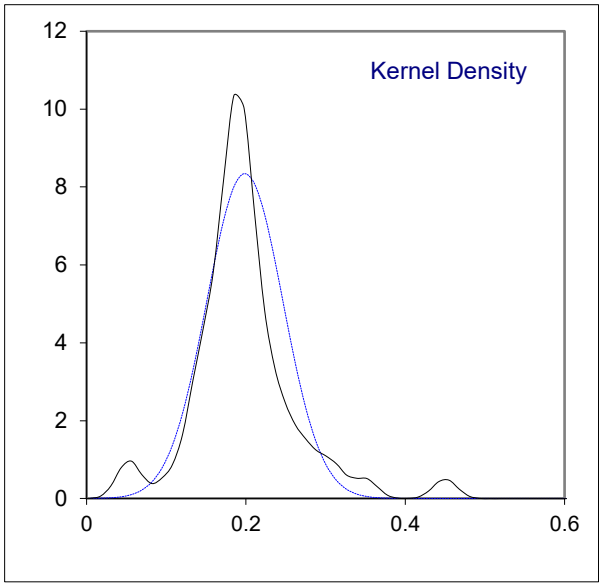


Determination of Mercury as Hg on sample #23741; results in mg/kg

lab	method	value	mark	z(targ)	remarks
110	EN16711-2	0.186		-0.21	
210		-----		-----	
339	ISO105E04	0.13		-1.12	
362	In house	<0.01		<-3.06	possibly a false negative test result
551	ISO105E04	0.0568	R(0.01)	-2.30	
622	EN16711-2	0.254		0.90	
623	EN16711-2	0.15		-0.79	
841	ISO105E04	0.102	C	-1.57	first reported: 2.2
2108		0.2043		0.09	
2115	EN16711-2	0.45	R(0.01)	4.08	
2129	EN16711-2	0.1569		-0.68	
2165	EN16711-2	<0.5		-----	
2215		0.192		-0.11	
2241	EN16711-2	0.238		0.64	
2255	EN16711-2	0.235		0.59	
2265	EN16711-2	0.138		-0.99	
2287	EN16711-2	0.2742		1.22	
2290	EN16711-2	0.192		-0.11	
2293	EN16711-2	0.201		0.04	
2310	EN16711-2	0.2		0.02	
2311	EN16711-2	0.178		-0.34	
2320	EN16711-2	0.05	R(0.01)	-2.41	
2347		-----		-----	
2350	EN16711-2	0.152		-0.76	
2352	EN16711-2	0.17		-0.47	
2357		-----		-----	
2358	EN16711-2	0.2		0.02	
2363	EN16711-2	0.172		-0.44	
2365	EN16711-2	0.173		-0.42	
2370	ISO105E04	0.219		0.33	
2372	EN16711-2	0.141		-0.94	
2375	EN16711-2	0.19		-0.14	
2378	EN16711-2	0.17		-0.47	
2379	EN16711-2	0.1890		-0.16	
2380	EN16711-2	0.186		-0.21	
2381		-----		-----	
2385	EN16711-2	0.35		2.45	
2415	EN16711-2	0.171		-0.45	
2449		0.17		-0.47	
2456	EN16711-2	0.22		0.34	
2459	EN16711-2	ND		-----	
2489	EN16711-2	0.2		0.02	
2504	DIN54233-3	< 0.500		-----	
2511	EN16711-2	0.3		1.64	first reported 1.080
2523		0.2763	C	1.26	
2532	EN16711-2	0.19		-0.14	
2561		-----		-----	
2582		-----		-----	
2590	EN16711-2	< L.O.Q		-----	
2637	EN16711-2	0.135		-1.04	
2638	EN16711-2	not analyzed		-----	
2644	EN16711-2	not detected		-----	
2678	EN16711-2	not detected		-----	
2719		-----		-----	
2734		-----		-----	
2741	EN16711-2	0.201		0.04	
2758	EN16711-2	not determined		-----	
2809	EN16711-2	0.210		0.18	
2830		-----		-----	
2885		Not detected		-----	
2908	EN16711-2	0.2518		0.86	
2948		-----		-----	
2989		-----		-----	
3015	EN16711-2	0.188		-0.18	
3116	EN16711-2	0.192		-0.11	
3118	EN16711-2	<0.01		<-3.06	possibly a false negative test result
3153	EN16711-2	0.216		0.28	
3154	EN16711-2	3.24	C,R(0.01)	49.34	first reported: 1.52
3172	EN16711-2	0.235		0.59	
3209	EN16711-2	0.190		-0.14	
3210	EN16711-2	0.3137		1.86	
3214	EN16711-2	0.182		-0.27	
3228		-----		-----	
3237	EN16711-2	0.19		-0.14	
3243	EN16711-2	0.216		0.28	

lab	method	value	mark	z(targ)	remarks
3246	EN16711-2	nd		-----	
3248	ISO105E04	0.151		-0.78	
6191	EN16711-2	not analyzed		-----	
	normality	suspect			
	n	49			
	outliers	4			
	mean (n)	0.1988			
	st.dev. (n)	0.04783	RSD = 24%		
	R(calc.)	0.1339			
	st.dev.(EN16711-2:15)	0.06163			
	R(EN16711-2:15)	0.1726			





APPENDIX 2 Other reported elements

Other reported elements on sample #23740; results in mg/kg

lab	Sb	As	Cd	Cr
110	not detected, <0.1 mg/kg	not detected, <0.1 mg/kg	not detected, <0.1 mg/kg	not detected, <0.1 mg/kg
210	-----	-----	-----	-----
339	not detected	not detected	not detected	not detected
362	<1.0	<0.1	<0.05	<0.05
551	0.0000	0.0069	0.0000	0.0017
622	0.036	0.000	0.000	0.098
623	Not Detected	Not Detected	Not Detected	Not Detected
841	<0.2	<0.2	<0.2	<0.2
2108	not detected	not detected	not detected	not detected
2115	-----	-----	-----	-----
2129	not detected	not detected	not detected	not detected
2165	Not Detected	Not Detected	Not Detected	Not Detected
2215	<0.5	<0.02	<0.02	<0.1
2241	not applicable	not applicable	not applicable	not applicable
2255	Not Detected	Not Detected	Not Detected	Not Detected
2265	not detected	not detected	not detected	not detected
2287	<3.0	<0.2	<0.1	<1.0
2290	<1.0	<0.1	<0.03	<0.5
2293	0.517	0.229	0.0019	0.29
2310	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected
2320	<3	<0.06	<0.03	<0.3
2347	<1	<0.1	<0.05	<1
2350	<0.5	<0.02	<0.02	<0.1
2352	-----	-----	-----	-----
2357	<1.0	<0.1	<0.05	<0.5
2358	not detected	not detected	not detected	not detected
2363	not detected	not detected	not detected	not detected
2365	<1.0	<0.06	<0.03	<0.3
2370	<1	<0.2	<0.1	<0.5
2372	<1.0	<0.2	<0.1	<0.5
2375	<3	<0.06	<0.03	<0.3
2378	<3	<0.06	<0.03	<0.3
2379	Not detected	Not detected	Not detected	Not detected
2380	-----	-----	-----	-----
2381	-----	-----	-----	-----
2385	<0.1	<0.1	<0.05	<0.1
2415	-----	-----	-----	-----
2449	-----	-----	-----	-----
2456	not detected	not detected	not detected	not detected
2459	ND	ND	ND	ND
2489	Not Detected	Not Detected	Not Detected	Not Detected
2504	< 0.5000	< 0.200	< 0.200	< 0.200
2511	-----	-----	-----	-----
2523	N.D.	N.D.	N.D.	N.D.
2532	Not detected	Not detected	Not detected	Not detected
2561	-----	-----	-----	-----
2582	-----	-----	-----	-----
2590	< L.O..Q	< L.O..Q	< L.O..Q	< L.O..Q
2637	<0.005	<0.01	<0.005	<0.01
2638	not detected	not detected	not detected	not detected
2644	not detected	not detected	not detected	not detected
2678	not detected	not detected	not detected	not detected
2719	-----	-----	-----	-----
2734	-----	-----	-----	-----
2741	<3	<0.1	<0.05	<0.5
2758	not determined	not detected	not detected	not detected
2809	not detected	not detected	not detected	not detected
2830	-----	-----	-----	-----
2885	Not detected	Not detected	Not detected	Not detected
2908	Below quantification limit	Below quantification limit	Below quantification limit	Below quantification limit
2948	-----	-----	-----	-----
2989	-----	-----	-----	-----
3015	<1.0	<0.1	<0.03	<0.5
3116	<0.5	<0.02	<0.02	<0.1
3118	<0.25	<0.05	<0.05	<0.50
3153	< 1	< 0.3	< 0.03	< 0.5
3154	not detected	not detected	not detected	not detected
3172	< 0.2	< 0.02	< 0.02	< 0.1
3209	<1.00	<0.10	<0.05	<0.50
3210	<5	<0.2	<0.1	<1
3214	<1.0	<0.1	<0.03	<0.5

lab	Sb	As	Cd	Cr
3228	<0.5	<0.02	<0.02	<0.5
3237	-----	-----	-----	-----
3243	0.008	0.022	0.008	0.015
3246	nd	nd	nd	nd
3248	<0.5	<0.02	<0.02	<0.1
6191	not analyzed	not detected	not detected	not detected

Other reported elements on sample #23740; results in mg/kg (continued)

lab	Co	Pb	Hg	Ni
110	not detected, <0.1 mg/kg	not detected, <0.1 mg/kg	not detected, <0.1 mg/kg	0.118
210	-----	-----	-----	-----
339	not detected	not detected	not detected	not detected
362	<0.5	<0.1	<0.01	<0.5
551	0.0023	0.0000	0.0000	0.0938
622	0.000	0.000	0.019	0.168
623	Not Detected	Not Detected	Not Detected	0.1
841	ND	<0.2	<0.1	<0.2
2108	not detected	not detected	not detected	0.1626
2115	-----	-----	-----	0.075
2129	not detected	not detected	not detected	not detected
2165	Not Detected	Not Detected	Not Detected	Not Detected
2215	<0.1	<0.1	<0.02	<0.2
2241	not applicable	not applicable	not applicable	not applicable
2255	Not Detected	Not Detected	Not Detected	Not Detected
2265	not detected	not detected	not detected	not detected
2287	<1.0	<0.2	<0.02	<0.5
2290	<0.3	<0.1	<0.01	<0.3
2293	0.013	0	0.0	0.184
2310	not detected	not detected	not detected	0.11
2311	Not Detected	Not Detected	Not Detected	0.094
2320	<0.3	<0.06	<0.01	<0.1
2347	<0.5	<0.1	<0.01	<0.5
2350	<0.1	<0.06	<0.005	<0.1
2352	-----	-----	-----	-----
2357	<0.5	<0.1	<0.01	<0.5
2358	not detected	not detected	not detected	not detected
2363	not detected	not detected	not detected	not detected
2365	<0.3	<0.06	<0.02	<0.1
2370	<0.1	<0.2	<0.02	<0.5
2372	<0.1	<0.2	<0.02	<0.5
2375	<0.3	<0.06	<0.006	<0.3
2378	<0.3	<0.06	<0.006	<0.1
2379	Not detected	Not detected	Not detected	0.1297
2380	-----	-----	-----	-----
2381	-----	-----	-----	-----
2385	<0.1	<0.1	<0.01	<0.5
2415	-----	-----	-----	-----
2449	-----	-----	-----	-----
2456	not detected	not detected	not detected	not detected
2459	ND	ND	ND	ND
2489	Not Detected	Not Detected	Not Detected	-----
2504	< 0.200	< 0.200	< 0.500	< 0.200
2511	-----	-----	-----	-----
2523	N.D.	N.D.	N.D.	0.095
2532	Not detected	Not detected	Not detected	Not detected
2561	-----	-----	-----	-----
2582	-----	-----	-----	-----
2590	< L.O..Q	< L.O..Q	< L.O..Q	< L.O..Q
2637	<0.002	<0.005	<0.005	0.12
2638	not detected	not detected	not analyzed	not detected
2644	not detected	not detected	not detected	not detected
2678	not detected	not detected	not detected	not detected
2719	-----	-----	-----	-----
2734	-----	-----	-----	-----
2741	<0.5	<0.1	<0.02	<0.2
2758	not detected	not detected	not determined	0.142
2809	not detected	not detected	not detected	not detected
2830	-----	-----	-----	-----
2885	Not detected	Not detected	Not detected	Not detected
2908	Below quantification limit	Below quantification limit	-----	Below quantification limit
2948	-----	-----	-----	-----
2989	-----	-----	-----	-----
3015	<0.3	<0.1	<0.01	<0.3
3116	<0.1	<0.1	<0.005	0.130
3118	<0.25	<0.05	<0.01	<0.25
3153	< 1	< 0.3	< 0.01	0.144
3154	not detected	not detected	not detected	not detected
3172	< 0.1	< 0.1	< 0.005	< 0.1
3209	<0.50	<0.10	<0.02	<0.50
3210	<1	<0.2	<0.02	<1
3214	<0.3	<0.1	<0.01	<0.3
3228	<0.5	<0.02	<0.02	<0.5
3237	-----	-----	-----	-----
3243	0.008	0.038	0.003	0.16

lab	Co	Pb	Hg	Ni
3246	nd	nd	nd	nd
3248	<0.1	<0.1	<0.005	<0.01
6191	not analyzed	not detected	not analyzed	not analyzed

Other reported metals on sample #23741; results in mg/kg

lab	Sb	As	Cd	Co
110	not detected, <0.1 mg/kg	not detected, <0.1 mg/kg	not detected, <0.1 mg/kg	not detected, <0.1 mg/kg
210	-----	-----	-----	-----
339	not detected	not detected	not detected	not detected
362	<1.0	<0.1	<0.05	<0.5
551	0.0000	0.0088	0.0000	0.0047
622	0.005	0.003	0.000	0.025
623	Not Detected	Not Detected	Not Detected	Not Detected
841	<0.2	<0.2	<0.2	ND
2108	not detected	not detected	not detected	not detected
2115	-----	-----	-----	-----
2129	not detected	not detected	not detected	not detected
2165	Not Detected	Not Detected	Not Detected	Not Detected
2215	<0.5	<0.02	<0.02	<0.1
2241	not applicable	not applicable	not applicable	not applicable
2255	Not Detected	Not Detected	Not Detected	Not Detected
2265	not detected	not detected	not detected	not detected
2287	<3.0	<0.2	<0.1	<1.0
2290	<1.0	<0.1	<0.03	<0.3
2293	0.306	0.16	0.0	0.013
2310	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected
2320	<3	<0.06	<0.03	<0.3
2347	<1	<0.1	<0.05	<0.5
2350	<0.5	<0.02	<0.02	<0.1
2352	-----	-----	-----	-----
2357	<1.0	<0.1	<0.05	<0.5
2358	not detected	not detected	not detected	not detected
2363	not detected	not detected	not detected	not detected
2365	<1.0	<0.06	<0.03	<0.3
2370	<1	<0.2	<0.1	<0.1
2372	<1.0	<0.2	<0.1	<0.1
2375	<3	<0.06	<0.03	<0.3
2378	<3	<0.06	<0.03	<0.3
2379	Not detected	Not detected	Not detected	Not detected
2380	-----	-----	-----	-----
2381	-----	-----	-----	-----
2385	<0.1	<0.1	<0.05	<0.1
2415	-----	-----	-----	-----
2449	-----	-----	-----	-----
2456	not detected	not detected	not detected	not detected
2459	ND	ND	ND	ND
2489	Not Detected	Not Detected	Not Detected	Not Detected
2504	< 0.500	< 0.200	< 0.200	< 0.200
2511	-----	-----	-----	-----
2523	N.D.	N.D.	N.D.	N.D.
2532	Not detected	Not detected	Not detected	Not detected
2561	-----	-----	-----	-----
2582	-----	-----	-----	-----
2590	< L.O..Q	< L.O..Q	< L.O..Q	< L.O..Q
2637	0.005	<0.01	<0.005	0.005
2638	not detected	not detected	not detected	not detected
2644	not detected	not detected	not detected	not detected
2678	not detected	not detected	not detected	not detected
2719	-----	-----	-----	-----
2734	-----	-----	-----	-----
2741	<3	<0.1	<0.05	<0.5
2758	not determined	not detected	not detected	not detected
2809	not detected	not detected	not detected	not detected
2830	-----	-----	-----	-----
2885	Not detected	Not detected	Not detected	Not detected
2908	Below quantification limit	Below quantification limit	Below quantification limit	Below quantification limit
2948	-----	-----	-----	-----
2989	-----	-----	-----	-----
3015	<1.0	<0.1	<0.03	<0.3
3116	<0.5	<0.02	<0.02	<0.1
3118	<0.25	<0.05	<0.05	<0.25
3153	< 1	< 0.3	< 0.03	< 1
3154	not detected	not detected	not detected	not detected
3172	< 0.2	< 0.02	< 0.02	< 0.1
3209	<1.00	<0.10	<0.05	<0.50
3210	<5	<0.2	<0.1	<1
3214	<1.0	<0.1	<0.03	<0.3
3228	<0.5	<0.02	<0.02	<0.5
3237	-----	-----	-----	-----
3243	0.063	0.022	0.005	0.004

lab	Sb	As	Cd	Co
3246	nd	nd	nd	nd
3248	<0.5	<0.02	<0.02	<0.1
6191	not analyzed	not detected	not detected	not analyzed

Other reported metals on sample #23741; results in mg/kg (continued)

lab	Cu		Pb	Ni
110	0.323		not detected, <0.1 mg/kg	0.175
210	-----		-----	-----
339	not detected		not detected	not detected
362	<5.0		<0.1	<0.5
551	0.2155		0.0000	0.1208
622	0.000		0.000	0.059
623	Not Detected		Not Detected	0.14
841	<5		<0.2	<0.2
2108	not detected		not detected	0.2209
2115	0.31		-----	0.15
2129	not detected		not detected	not detected
2165	Not Detected		Not Detected	Not Detected
2215	<5		<0.1	<0.2
2241	not applicable		not applicable	not applicable
2255	Not Detected		Not Detected	Not Detected
2265	not detected		not detected	not detected
2287	<5.0		<0.2	<0.5
2290	<1.0		<0.1	<0.3
2293	37.06	C	0.008	0.227
2310	not detected		not detected	0.13
2311	<1.0		Not Detected	0.095
2320	<5		<0.06	<0.1
2347	<5		<0.1	<0.5
2350	<5		<0.06	0.127
2352	-----		-----	-----
2357	<5.0		<0.1	<0.5
2358	not detected		not detected	not detected
2363	not detected		not detected	not detected
2365	<5.0		<0.06	0.143
2370	<5		<0.2	<0.5
2372	<5		<0.2	<0.5
2375	<5.0		<0.06	<0.3
2378	<5.0		<0.06	<0.1
2379	Not detected		Not detected	0.1661
2380	-----		-----	-----
2381	-----		-----	-----
2385	<5		<0.1	<0.5
2415	-----		-----	-----
2449	-----		-----	-----
2456	not detected		not detected	not detected
2459	ND		ND	ND
2489	Not Detected		Not Detected	0.13
2504	< 0.500		< 0.200	0.200
2511	-----		-----	-----
2523	0.423		N.D.	0.175
2532	Not detected		Not detected	0.12
2561	-----		-----	-----
2582	-----		-----	-----
2590	< L.O..Q		< L.O..Q	< L.O..Q
2637	0.23		0.007	0.19
2638	not detected		not detected	not detected
2644	0.37		not detected	not detected
2678	1.7		not detected	not detected
2719	-----		-----	-----
2734	-----		-----	-----
2741	<5		<0.1	<0.2
2758	not determined		not detected	0.179
2809	not detected		not detected	not detected
2830	-----		-----	-----
2885	Not detected		Not detected	0.170
2908	Below quantification limit		Below quantification limit	Below quantification limit
2948	-----		-----	-----
2989	-----		-----	-----
3015	<1.0		<0.1	<0.3
3116	<5		<0.1	0.163
3118	<0.25		<0.05	<0.25
3153	< 1		< 0.3	0.122
3154	not detected		not detected	not detected
3172	< 1		< 0.1	< 0.1
3209	<1.00		<0.10	<0.50
3210	<5		<0.2	<1
3214	<1.0		<0.1	<0.3
3228	<0.5		<0.02	<0.5
3237	-----		-----	-----
3243	0.61		0.024	0.147

lab	Cu	Pb	Ni
3246	nd	nd	nd
3248	<5	<0.1	<0.01
6191	not analyzed	not detected	not analyzed

Lab 2293 first reported: 107.70

APPENDIX 3 Analytical Details

lab	ISO/IEC1702 accr.	sample preparation	Sample intake (g)	Ratio gram textile per ml
110	Yes	Further cut	1 g	1 gram textile per 50 mL perspiration liquid
210	---	---		---
339	No	Used as received	1g	1 gram textile per 50 mL perspiration liquid
362	Yes	Used as received	1g	1 gram textile per 50 mL perspiration liquid
551	---	---		---
622	Yes	Used as received	0.5 grams	1 gram textile per 50 mL perspiration liquid
623	Yes	Further cut	0.5	1 gram textile per 50 mL perspiration liquid
841	Yes	Further cut	0.5 grams	1 gram textile per 50 mL perspiration liquid
2108	Yes	Further cut	0,5 g	1 gram textile per 50 mL perspiration liquid
2115	Yes	Used as received	1 g	1 gram textile per 50 mL perspiration liquid
2129	Yes	Further cut	1g	1 gram textile per 50 mL perspiration liquid
2165	Yes	Used as received	0.5g	1 gram textile per 50 mL perspiration liquid
2215	Yes	Further cut	1.0097	1 gram textile per 50 mL perspiration liquid
2241	Yes	Used as received		1 gram textile per 50 mL perspiration liquid
2255	Yes	Used as received	0.9001/1.125	1 gram textile per 50 mL perspiration liquid
2265	Yes	Used as received	1 gram	1 gram textile per 30 mL perspiration liquid
2287	No	Further cut	0.5g	1 gram textile per 50 mL perspiration liquid
2290	Yes	---		---
2293	Yes	Further cut	1.0 grams	1 gram textile per 50 mL perspiration liquid
2310	Yes	Further cut		1 gram textile per 50 mL perspiration liquid
2311	Yes	Further cut	1	1 gram textile per 50 mL perspiration liquid
2320	Yes	Used as received	0.5	0.5 gram textile per 25 mL perspiration liquid
2347	Yes	---	0.5g	1 gram textile per 50 mL perspiration liquid
2350	Yes	Further cut	approx. 1.0g	1 gram textile per 50 mL perspiration liquid
2352	Yes	Used as received	1g	1 gram textile per 50 mL perspiration liquid
2357	---	---		---
2358	Yes	Further cut	1g	1 gram textile per 50 mL perspiration liquid
2363	Yes	Used as received	1g	1 gram textile per 50 mL perspiration liquid
2365	Yes	Further cut	0.5g	0.5 gram textile per 25mL perspiration liquid
2370	Yes	Further cut	1g	1 gram textile per 50 mL perspiration liquid
2372	Yes	Further cut	1g	1 gram textile per 50 mL perspiration liquid
2375	Yes	Further cut	0.5 gram	1 gram textile per 50 mL perspiration liquid
2378	Yes	Used as received	1g	1 gram textile per 50 mL perspiration liquid
2379	Yes	Used as received	0.5 g	1 gram textile per 50 mL perspiration liquid
2380	Yes	Further cut	0.50 g	0.50 g textile per 25 ml perspiration liquid
2381	Yes	Used as received	1g	1 gram textile per 50 mL perspiration liquid
2385	Yes	Used as received		1 gram textile per 50 mL perspiration liquid
2415	No	Used as received	0.5 gram	1 gram textile per 50 mL perspiration liquid
2449	---	---		---
2456	Yes	Further cut		1 gram textile per 50 mL perspiration liquid
2459	Yes	Used as received	1 gram	1 gram textile per 50 mL perspiration liquid
2489	No	Further cut	0.5015g/0.5006g	1 gram textile per 50 mL perspiration liquid
2504	Yes	#23740 : Further cut #23741: used as recieved	1 gram	1 gram textile per 50 mL perspiration liquid
2511	---	---		---
2523	Yes	Used as received	1.0000g	1 gram textile per 50 mL perspiration liquid
2532	---	---		---
2561	---	---		---
2582	---	---		---
2590	Yes	Used as received	1g	1 gram textile per 50 mL perspiration liquid
2637	Yes	Used as received		1 gram textile per 50 mL perspiration liquid
2638	No	Further cut	1 gm	1 gram textile per 50 mL perspiration liquid
2644	Yes	Used as received	0.5	1 gram textile per 20 mL perspiration liquid
2678	Yes	Used as received	0.5	1 gram textile per 50 mL perspiration liquid
2719	Yes	Further cut	1g	1 gram textile per 30 mL perspiration liquid
2734	---	---		---
2741	Yes	Further cut	1	1 gram textile per 50 mL perspiration liquid
2758	No	Used as received	1	1 gram textile per 50 mL perspiration liquid
2809	Yes	Further cut	1	1 gram textile per 50 mL perspiration liquid
2830	Yes	Used as received		1 gram textile per 50 mL perspiration liquid
2885	No	Further cut	1.0 g	1 gram textile per 50 mL perspiration liquid
2908	Yes	Further cut	1g	1 gram textile per 50 mL perspiration liquid
2948	---	---	1.0	---
2989	---	---		---
3015	---	---		---
3116	Yes	Further cut	1g	1 gram textile per 50 mL perspiration liquid
3118	Yes	Used as received	0.5	1 gram textile per 50 mL perspiration liquid
3153	Yes	Further cut	3 grams	0.5 grams textile per 25ml perspiration Liquid
3154	Yes	Further cut	0.5 gram	1 gram textile per 50 mL perspiration liquid
3172	Yes	Used as received	1	1 gram textile per 50 mL perspiration liquid
3209	Yes	---		---
3210	Yes	Used as received		1 gram textile per 50 mL perspiration liquid
3214	Yes	Further cut	1	1 gram textile per 50 mL perspiration liquid
3228	Yes	Used as received	0.5g	1 gram textile per 50 mL perspiration liquid
3237	Yes	Used as received	0.5g	1 gram textile per 50 mL perspiration liquid

lab	ISO/IEC1702 accr.	sample preparation	Sample intake (g)	Ratio gram textile per ml
3243	Yes	Used as received	0,5	1 gram textile per 50 mL perspiration liquid
3246	Yes	Further cut	1,0 g	1 gram textile per 50 mL perspiration liquid
3248	Yes	Used as received	0.5G	1 gram textile per 50 mL perspiration liquid
6191	Yes	Used as received	1	1 gram textile per 50 mL perspiration liquid

APPENDIX 4

Number of participants per country

3 labs in BANGLADESH
1 lab in BRAZIL
1 lab in BULGARIA
3 labs in FRANCE
7 labs in GERMANY
1 lab in GUATEMALA
4 labs in HONG KONG
4 labs in INDIA
3 labs in INDONESIA
6 labs in ITALY
1 lab in JAPAN
2 labs in KOREA, Republic of
3 labs in MOROCCO
12 labs in P.R. of CHINA
5 labs in PAKISTAN
2 labs in SRI LANKA
1 lab in SWITZERLAND
4 labs in TAIWAN
2 labs in THAILAND
2 labs in TUNISIA
2 labs in TURKEY
1 lab in U.S.A.
1 lab in UNITED KINGDOM
7 labs in VIETNAM

APPENDIX 5

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= calculation difference between reported test result and result calculated by iis
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?

Literature

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