Results of Proficiency Test
Free and Released
Formaldehyde in Textile
November 2021

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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CONTENTS

1 INTRODUCTION

Since 2008 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Free Formaldehyde in Textile every year. This proficiency scheme was extended with Released Formaldehyde in 2013. During the annual proficiency testing program 2021/2022 it was decided to continue the proficiency test for the analysis of Free and Released Formaldehyde in Textile.

In this interlaboratory study 187 laboratories in 39 different countries registered for participation. See appendix 3 for the number of participants per country.
In this report the results of the Free and Released Formaldehyde 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 an ISO/IEC17025 accredited laboratory.
It was decided to send two different textile samples: approximately 5 grams blue cotton pieces labelled #21755 and approximately 5 grams green cotton pieces labelled #21756. Both samples are positive on Formaldehyde.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for the statistical evaluation.

2.1 QUALITY SYSTEM

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, has implemented a quality system based on ISO/IEC17043:2010. 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 approximately 1300 grams blue cotton was obtained from a third party. After cutting and homogenization 220 bags were filled with approximately 5 grams each and labelled #21755. Each subsample was wrapped in aluminum foil and packed again in a bag.
The homogeneity of the subsamples was checked by the determination of Free Formaldehyde according to an in house method on 5 stratified randomly selected subsamples.

	Free Formaldehyde in mg/kg
sample #21755-1	120.0
sample #21755-2	122.5
sample #21755-3	122.8
sample #21755-4	122.0
sample #21755-5	121.0

Table 1: homogeneity test results of subsamples #21755

From the above test results the repeatability was calculated and compared with 0.3 times the estimated reproducibility calculated with the Horwitz equation in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Free Formaldehyde in mg/kg
r (observed)	3.2
reference method	Horwitz
0.3 x R (reference method)	7.9

Table 2: evaluation of the repeatability of subsamples #21755

The calculated repeatability is in agreement with 0.3 times the estimated reproducibility calculated with the Horwitz equation. Therefore, homogeneity of the subsamples was assumed.

For the second sample a batch of approximately 1200 grams green cotton was prepared. After cutting and homogenization 220 bags were filled with approximately 5 grams each and labelled #21756. Each subsample was wrapped in aluminum foil and packed again in a bag. The homogeneity of the subsamples was checked by the determination of Formaldehyde according to an in house method on 10 stratified randomly selected subsamples.

	Formaldehyde in mg/kg
sample #21756-1	43.6
sample #21756-2	44.3
sample #21756-3	42.9
sample #21756-4	43.5
sample #21756-5	43.4

	Formaldehyde in mg/kg
sample #21756-6	44.6
sample #21756-7	43.7
sample #21756-8	45.8
sample #21756-9	43.9
sample #21756-10	44.5

Table 3: homogeneity test results of subsamples #21756

From the above test results the repeatability was calculated and compared with 0.3 times the estimated reproducibility calculated with the Horwitz equation in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Formaldehyde in mg/kg
r (observed)	2.3
reference method	Horwitz
0.3 x R (reference method)	3.3

Table 4: evaluation of the repeatability of subsamples #21756

The calculated repeatability is in agreement with 0.3 times the estimated reproducibility calculated with the Horwitz equation. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories one textile sample labelled #21755 and one textile sample labelled #21756 was sent at October 6, 2021.

2.5 ANALYZES

The participants were requested to determine Free and Released Formaldehyde on both samples #21755 and #21756.
It was also requested to report if the laboratory was accredited for the reported 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/. The reported test results are tabulated per determination in appendix 1 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 appendix 1. 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, 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:

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

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. Thirteen participants reported test results after the final reporting date and four other participants were not able to report any test results. Not all participants were able to report all parameters requested.
In total 183 participants reported 529 numerical test results. Observed were 12 outlying test results, which is 2.3%. 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 TEST

In this section the reported test results are discussed per sample and per test. 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 4.

The method for determination of the Free Formaldehyde is specified in the Standards of the Ecolabelling Institutes. It should be noted that ISO14184-1 corresponds to the Japanese method specified in the Japanese Law 112 and is described in the Japanese Standard JIS L1096. In test methods ISO14184-1:11 and ISO14184-2:11 some information on precision data is given. In table B.1 of ISO14184-1 and table C.2 of ISO14184-2 precision values are mentioned, but they were obtained using slightly different methods than mentioned in both ISO14184 methods. Therefore, it was concluded that reliable reproducibility data cannot be obtained from the ISO14184 test methods. Therefore, the calculated reproducibility was compared against the estimated reproducibility calculated with the Horwitz equation.

sample #21755

Free Formaldehyde: This determination was not problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated with the Horwitz equation.

Released Formaldehyde: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in full agreement with the estimated reproducibility calculated with the Horwitz equation.

sample #21756

Free Formaldehyde: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated reproducibility calculated with the Horwitz equation.

Released Formaldehyde: This determination may be problematic. Three statistical outlier were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the estimated reproducibility calculated with the Horwitz equation.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the estimated reproducibility calculated with the Horwitz equation 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 estimated using the Horwitz equation are presented in the next table.

Component	unit	n	average	2.8 * sd	R(target)
Free Formaldehyde	mg/kg	179	71.9	13.6	16.9
Released Formaldehyde	mg/kg	79	79.1	17.7	18.3

Table 5: reproducibilities of components on sample #21755

Component	unit	n	average	2.8 * sd	R(target)
Free Formaldehyde	mg/kg	181	71.6	14.1	16.9
Released Formaldehyde	mg/kg	78	121.8	31.3	26.5

Table 6: reproducibilities of components on sample #21756

Without further statistical calculations, it can be concluded that for most components there is a good compliance of the group of participants with the reference methods. The problematic tests have been discussed in paragraph 4.1 and 5.

4.3 COMPARISON OF THE PROFICIENCY TEST OF NOVEMBER 2021 WITH PREVIOUS PTS

	November 2021	November 2020	November 2019	November 2018	November 2017
Number of reporting laboratories	183	174	183	185	184
Number of test results	529	705	489	512	511
Number of statistical outliers	12	15	11	11	15
Percentage of statistical outliers	2.3%	2.1%	2.2%	2.1%	2.9%

Table 7: 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 tests was compared expressed as relative standard deviation (RSD) of the PTs, see next table.

	November 2021	November 2020	November 2019	November 2018	November 2017
Free Formaldehyde	7%	6-9%	7-9%	12-13%	9-10%
Released Formaldehyde	8-9%	8-10%	8-9%	11%	7-8%

Table 8: comparison of the uncertainties over the years

The uncertainties observed in this PT for Free and Released Formaldehyde are in line compared to the uncertainties observed in previous PTs.

4.4 EVALUATION OF ANALYTICAL DETAILS

The analytical details that were reported by the participants are listed in appendix 2. About 88% of the reporting laboratories mentioned to be accredited for the determination of Free and Released Formaldehyde in textile.

For this PT the sample intake for Free and Released determination was requested separately. It appeared that for both Free and Released determination about 85% of the reporting laboratories used 1 grams of sample intake and about 8% used 0.5 grams. Participants that used more than 1 grams of sample intake did so somewhat more often at the Free determination (12%) compared to the Released determination (3%).
About 50% reported to have done the Dimedone confirmation test to verify the positive test results of the Formaldehyde determination especially for sample #21756.

No further sub analysis is performed as most of the observed reproducibilities are.in line with the target reproducibilities.

5 DISCUSSION

In this PT the average of the homogeneity test results is not in line with the average (consensus value) from the PT results. There are several reasons for this. First, the goal of the homogeneity testing is different from the goal of the evaluation of the reported PT results. In order to prove the homogeneity of the PT samples, a test method is selected with a high precision (smallest variation). The accuracy (trueness) of the test method is less relevant. Secondly, the homogeneity testing is done by one laboratory only. The test results of this ISO/IEC17025 accredited laboratory will have a bias (systematic deviation) depending on the test method used. The desire to detect small variations between the PT samples leads to the use of a sensitive test method with high precision, which may be a test method with significant bias.

Also, each test result reported by the laboratories that participate in the PT will have a bias. However, some will have a positive bias and others a negative bias. These different biases compensate each other in the PT average (consensus value). Therefore, the PT consensus value may deviate from the average of the homogeneity test. At the same time the accuracy of the PT consensus value is more reliable than the accuracy of the average of the homogeneity test.

When the results of this interlaboratory study were compared to the Ecolabelling Standards and Requirements for Textiles in EU and with the similar Bluesign® BSSL, it was noticed that not all participants would make identical decisions about the acceptability of the textiles for the determined components, see next table.

Ecolabel	baby clothes	in direct skin contact	no direct skin contact
Oeko-Tex 100	<16 mg/kg	<75 mg/kg	<150 mg/kg
Bluesign® BSSL	<15 mg/kg	<75 mg/kg	<300 mg/kg

Table 9: Bluesign® BSSL and Ecolabelling Standards and Requirements for Textiles in EU

sample #21755
For the category “baby clothes” all reporting laboratories would have rejected the sample.
For the category “in direct skin contact” 26% of the reporting laboratories would have rejected the sample for free formaldehyde while this is 71% for released formaldehyde.
For the category “no direct skin contact” all of the reporting laboratories would have accepted the sample.

sample #21756
For the category “baby clothes” all reporting laboratories would have rejected the sample.
For the category “in direct skin contact” 20% of the reporting laboratories would have rejected the sample for free formaldehyde while all laboratories would reject for released formaldehyde, except for one laboratory.
For the category “no direct skin contact” all of the reporting laboratories would have accepted the sample, except for two laboratories who would reject the sample based on Oeko-Tex 100.

6 CONCLUSION

In this proficiency test the Free- and Released Formaldehyde were determined. The variation observed for Free- and Released Formaldehyde in this interlaboratory study are in line with observations in the previous proficiency tests. A possible explanation for the variation could be the preparation or the conditioning of the sample and/or by the performance of the analysis by the laboratory.

Each laboratory should evaluate its performance in this study and make decisions about necessary corrective actions. 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

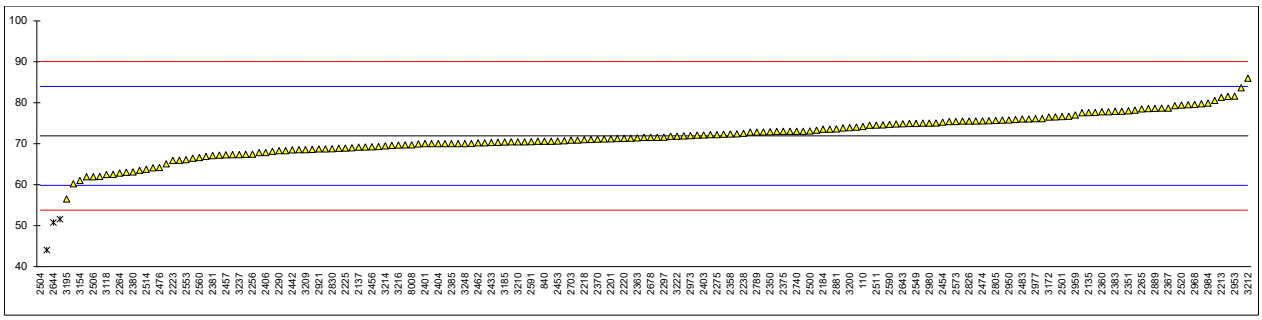
Determination of Free Formaldehyde on sample #21755; results in mg/kg

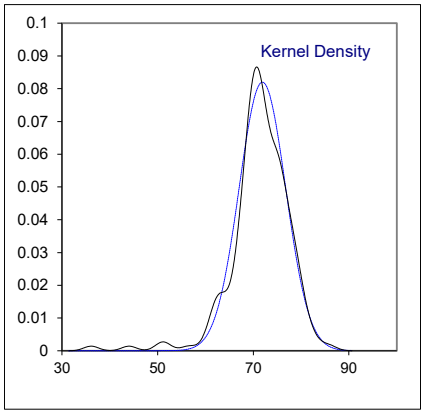
lab	method	value	mark	z(targ)	remarks
110	ISO14184-1	74.19		0.38	
210	ISO14184-1	71.156		-0.12	
339	ISO14184-1	72.2		0.05	
362	ISO14184-1	72.95		0.17	
551	ISO14184-1	72.09		0.03	
622	ISO14184-1	44.01	C,R(0.01)	-4.61	first reported 44.69
623	ISO14184-1	51.56	R(0.01)	-3.37	
840	ISO14184-1	70.6		-0.22	
841	ISO14184-1	69.3		-0.43	
2102		-----		-----	
2115	ISO14184-1	75.74		0.63	
2132	ISO14184-1	69.60		-0.38	
2135	ISO14184-1	77.62		0.94	
2137	ISO14184-1	69.15		-0.46	
2146	ISO14184-1	74.60		0.45	
2159	ISO14184-1	70.62		-0.21	
2165	ISO14184-1	71.79		-0.02	
2170	ISO14184-1	83.65		1.94	
2182	ISO14184-1	62.5		-1.56	
2184	ISO14184-1	73.5		0.26	
2201	ISO14184-1	71.18		-0.12	
2213	ISO14184-1	81.3		1.55	
2218	ISO14184-1	70.97		-0.16	
2220	JIS L1041L	71.3		-0.10	
2223	ISO14184-1	65.9		-0.99	
2225	ISO14184-1	68.91		-0.50	
2226	ISO14184-1	66.42	C	-0.91	first reported 91.60
2232	ISO14184-1	70.43		-0.24	
2236	ISO14184-1	71.53		-0.06	
2238	ISO14184-1	72.51		0.10	
2247	ISO14184-1	69.20		-0.45	
2250	ISO14184-1	74.91		0.50	
2255	ISO14184-1	62.0		-1.64	
2256	ISO14184-1	67.41		-0.74	
2264	GB/T2912	62.79		-1.51	
2265	ISO14184-1	78.48		1.09	
2269	ISO14184-1	65.94		-0.99	
2275	ISO14184-1	72.2		0.05	
2279	ISO14184-1	66.86		-0.84	
2284	ISO14184-1	77.9		0.99	
2289	ISO14184-1	76.70		0.79	
2290	ISO14184-1	68.3		-0.60	
2293	ISO14184-1	70.59		-0.22	
2295	ISO14184-1	79.5		1.26	
2297	ISO14184-1	71.6		-0.05	
2310	ISO14184-1	70		-0.32	
2311	ISO14184-1	75.057		0.52	
2313	ISO14184-1	67.20		-0.78	
2314	ISO14184-1	68.51		-0.56	
2330	ISO14184-1	62.98		-1.48	
2347	ISO14184-1	70		-0.32	
2350	ISO14184-1	72.88		0.16	
2351	ISO14184-1	78		1.01	
2356	ISO14184-1	71.5		-0.07	
2358	ISO14184-1	72.36		0.07	
2360	ISO14184-1	77.8		0.97	
2363	ISO14184-1	71.4		-0.08	
2364	ISO14184-1	75.0		0.51	
2365	ISO14184-1	71.87		-0.01	
2366	ISO14184-1	71		-0.15	
2367	ISO14184-1	78.7		1.12	
2370	ISO14184-1	71.12		-0.13	
2372	ISO14184-1	67.3		-0.76	
2373	ISO14184-1	78.7		1.12	
2375	ISO14184-1	73		0.18	
2378	ISO14184-1	75.9		0.66	
2379	ISO14184-1	75.50		0.59	
2380	ISO14184-1	63.1		-1.46	
2381	ISO14184-1	67.10		-0.80	
2382	ISO14184-1	74.0		0.35	
2383	GB/T2912	77.9		0.99	
2385	ISO14184-1	70		-0.32	
2390	ISO14184-1	73.01		0.18	
2401	ISO14184-1	70		-0.32	

lab	method	value	mark	z(targ)	remarks
2403	ISO14184-1	72.13		0.04	
2404	ISO14184-1	70.0		-0.32	
2406	ISO14184-1	67.82		-0.68	
2425	ISO14184-1	69.7		-0.37	
2426	ISO14184-1	75.4		0.58	
2429	ISO14184-1	70.30		-0.27	
2433	ISO14184-1	70.29		-0.27	
2442	ISO14184-1	68.47		-0.57	
2449	ISO14184-1	75.6		0.61	
2453	ISO14184-1	70.65		-0.21	
2454	ISO14184-1	75.24		0.55	
2456	ISO14184-1	69.23		-0.44	
2457	ISO14184-1	67.27		-0.77	
2462	ISO14184-1	70.2		-0.28	
2474	ISO14184-1	75.56		0.60	
2475	ISO14184-1	77.80		0.97	
2476	ISO14184-1	64.2		-1.28	
2483	ISO14184-1	76.0		0.68	
2492	In house	72.87		0.16	
2500	ISO14184-1	73.12		0.20	
2501	ISO14184-1	76.62		0.78	
2504	ISO14184-1	36.09	C,R(0.01)	-5.92	first reported 51.56
2506	ISO14184-1	61.9		-1.66	
2511	ISO14184-1	74.509		0.43	
2514	ISO14184-1	63.75		-1.35	
2519	ISO14184-1	76.0		0.68	
2520	ISO14184-1	79.4		1.24	
2549	ISO14184-1	74.93		0.50	
2553	ISO14184-1	66.11		-0.96	
2560	ISO14184-1	66.63		-0.87	
2561	ISO14184-1	78.175		1.04	
2567		-----		-----	
2569	ISO14184-1	72.4		0.08	
2572	ISO14184-1	68.3		-0.60	
2573	ISO14184-1	75.4		0.58	
2582	ISO14184-1	61.89		-1.66	
2589	ISO14184-1	71.26		-0.11	
2590	ISO14184-1	74.7		0.46	
2591	In house	70.462621		-0.24	
2605	GB/T2912	68.85		-0.51	
2609	ISO14184-1	74.83		0.48	
2618		-----		-----	
2638	ISO14184-1	67.37		-0.75	
2643	ISO14184-1	74.85		0.49	
2644	ISO14184-1	50.72	R(0.01)	-3.50	
2667	ISO14184-1	68.972		-0.49	
2668	ISO14184-1	70.87		-0.17	
2674	ISO14184-1	72.8		0.15	
2678	ISO14184-1	71.50		-0.07	
2703	ISO14184-1	70.855		-0.17	
2712	ISO14184-1	76.12		0.70	
2719	ISO14184-1	73		0.18	
2740	ISO14184-1	73		0.18	
2741	ISO14184-1	70.7		-0.20	
2743	ISO14184-1	73.85		0.32	
2773		-----		-----	
2789	ISO14184-1	72.8		0.15	
2793	ISO14184-1	79.290		1.22	
2805	ISO14184-1	75.70		0.63	
2826	JIS L1041	75.5		0.59	
2827	ISO14184-1	70.01		-0.31	
2830	ISO14184-1	68.75		-0.52	
2881	ISO14184-1	73.60		0.28	
2889	ISO14184-1	78.604		1.11	
2903	ISO14184-1	77.63		0.95	
2921	JIS L1041	68.71		-0.53	
2926	ISO14184-1	68.6		-0.55	
2948	ISO14184-1	68.72		-0.53	
2950	ISO14184-1	75.8	C	0.64	first reported 139.8
2953	ISO14184-1	81.62		1.61	
2955	ISO14184-1	60.2		-1.94	
2958	ISO14184-1	78.6		1.11	
2959	ISO14184-1	77		0.84	
2968	ISO14184-1	79.60	C	1.27	first reported 46.82
2973	ISO14184-1	71.96		0.01	
2977	ISO14184-1	76.1		0.69	
2979	ISO14184-1	79.76		1.30	
2980	ISO14184-1	75		0.51	

lab	method	value	mark	z(targ)	remarks
2982	ISO14184-1	81.57		1.60	
2984	ISO14184-1	79.90		1.32	
3100	GB/T2912	67.8		-0.68	
3110	ISO14184-1	69.9		-0.33	
3116	ISO14184-1	70.42		-0.25	
3118	ISO14184-1	62.46		-1.56	
3134	ISO14184-1	63.5		-1.39	
3146	ISO14184-1	75.51		0.60	
3153	ISO14184-1	68.13		-0.63	
3154	ISO14184-1	60.98		-1.81	
3160	ISO14184-1	77.57		0.94	
3172	ISO14184-1	76.479		0.76	
3176	ISO14184-1	76.50		0.76	
3182	ISO14184-1	65.1		-1.13	
3185	ISO14184-1	70.38		-0.25	
3190	ISO14184-1	72.32		0.07	
3195	ISO14184-1	56.5		-2.55	
3197	ISO14184-1	64.1		-1.29	
3200	ISO14184-1	73.91		0.33	
3207		70		-0.32	
3209	GB/T2912	68.53		-0.56	
3210	In house	70.42		-0.25	
3212	ISO14184-1	85.98		2.33	
3214	ISO14184-1	69.46		-0.41	
3216	ISO14184-1	69.68		-0.37	
3218	ISO14184-1	71.32		-0.10	
3222	ISO14184-1	71.8		-0.02	
3225	ISO14184-1	73.5		0.26	
3228	ISO14184-1	73.3		0.23	
3230	ISO14184-1	80.552	C	1.43	first reported 94.546
3237	ISO14184-1	67.3		-0.76	
3246	ISO14184-1	74.5		0.43	
3248	ISO14184-1	70		-0.32	
8005	JIS L1041	70.22		-0.28	
8008	JTS ST1.6	69.7		-0.37	

normality	OK	
n	179	
outliers	4	
mean (n)	71.909	
st.dev. (n)	4.8641	RSD=7%
R(calc.)	13.620	
st.dev.(Horwitz)	6.0454	
R(Horwitz)	16.927	





Determination of Released Formaldehyde on sample #21755; results in mg/kg

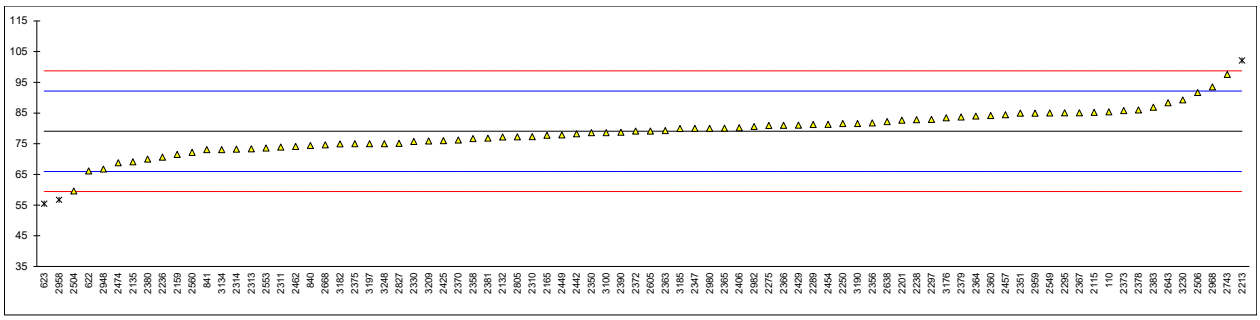
lab	method	value	mark	z(targ)	remarks
110	ISO14184-2	85.34		0.96	
210		-----		-----	
339		not analyzed		-----	
362		-----		-----	
551		Not tested		-----	
622	ISO14184-2	66.12		-1.98	
623	ISO14184-2	55.45	R(0.05)	-3.60	
840	ISO14184-2	74.4		-0.71	
841	ISO14184-2	73.1		-0.91	
2102		-----		-----	
2115	ISO14184-2	85.2		0.94	
2132	ISO14184-2	77.17		-0.29	
2135	ISO14184-2	69.098		-1.52	
2137		-----		-----	
2146		-----		-----	
2159	ISO14184-2	71.50		-1.15	
2165	ISO14184-2	77.75		-0.20	
2170		-----		-----	
2182		-----		-----	
2184		-----		-----	
2201	ISO14184-2	82.70		0.56	
2213	ISO14184-2	102.1	R(0.05)	3.52	
2218		-----		-----	
2220		-----		-----	
2223		-----		-----	
2225		-----		-----	
2226		-----		-----	
2232		Not applicable		-----	
2236	ISO14184-2	70.65		-1.28	
2238	ISO14184-2	82.81		0.57	
2247		-----		-----	
2250	ISO14184-2	81.55		0.38	
2255	ISO14184-2	not determined		-----	
2256		-----		-----	
2264		-----		-----	
2265		-----		-----	
2269		-----		-----	
2275	ISO14184-2	80.94		0.29	
2279		not analyzed		-----	
2284		NA		-----	
2289	ISO14184-2	81.25		0.33	
2290		-----		-----	
2293		-----		-----	
2295	ISO14184-2	85.1		0.92	
2297	ISO14184-2	82.9		0.59	
2310	ISO14184-2	77.3		-0.27	
2311	ISO14184-2	73.883		-0.79	
2313	ISO14184-2	73.34		-0.87	
2314	ISO14184-2	73.22		-0.89	
2330	ISO14184-2	75.74		-0.51	
2347	ISO14184-2	80		0.14	
2350	AATCC112	78.57		-0.08	
2351	ISO14184-2	85		0.91	
2356	ISO14184-2	81.8		0.42	
2358	ISO14184-2	76.67		-0.37	
2360	ISO14184-2	84.2		0.78	
2363	ISO14184-2	79.3		0.04	
2364	ISO14184-2	84.0		0.75	
2365	ISO14184-2	80.04		0.15	
2366	ISO14184-2	81		0.30	
2367	ISO14184-2	85.1		0.92	
2370	ISO14184-2	76.18		-0.44	
2372	ISO14184-2	79.1		0.01	
2373	ISO14184-2	85.8		1.03	
2375	ISO14184-2	75		-0.62	
2378	ISO14184-2	86.0		1.06	
2379	ISO14184-2	83.72		0.71	
2380	ISO14184-2	70.0		-1.38	
2381	ISO14184-2	76.80		-0.35	
2382	ISO14184-2	out of capacity		-----	
2383	GB/T2912	86.9		1.20	
2385		-----		-----	
2390	ISO14184-2	78.72		-0.05	
2401		-----		-----	

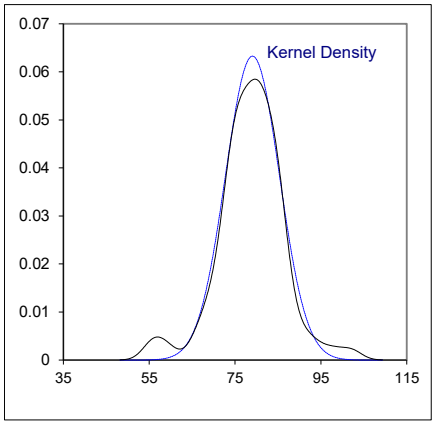
lab	method	value	mark	z(targ)	remarks
2403		-----		-----	
2404		-----		-----	
2406	ISO14184-2	80.22		0.18	
2425	ISO14184-2	76.0		-0.47	
2426		-----		-----	
2429	ISO14184-2	81.03		0.30	
2433		-----		-----	
2442	ISO14184-2	78.20		-0.13	
2449	ISO14184-2	77.9		-0.18	
2453		-----		-----	
2454	ISO14184-2	81.31		0.34	
2456		-----		-----	
2457	ISO14184-2	84.44		0.82	
2462	ISO14184-2	74.1		-0.76	
2474	ISO14184-2	68.80		-1.57	
2475		-----		-----	
2476		-----		-----	
2483		-----		-----	
2492		-----		-----	
2500		-----		-----	
2501		-----		-----	
2504	ISO14184-2	59.57		-2.97	
2506	ISO14184-2	91.66		1.92	
2511		-----		-----	
2514		-----		-----	
2519		-----		-----	
2520		-----		-----	
2549	ISO14184-2	85.05		0.91	
2553	ISO14184-2	73.59		-0.84	
2560	ISO14184-2	72.20		-1.05	
2561		-----		-----	
2567		-----		-----	
2569		-----		-----	
2572		-----		-----	
2573		-----		-----	
2582		-----		-----	
2589		-----		-----	
2590		-----		-----	
2591		-----		-----	
2605	ISO14184-2	79.12		0.01	
2609		-----		-----	
2618		-----		-----	
2638	ISO14184-2	82.23		0.48	
2643	ISO14184-2	88.36		1.42	
2644		-----		-----	
2667		-----		-----	
2668	ISO14184-2	74.66		-0.67	
2674		-----		-----	
2678		-----		-----	
2703		-----		-----	
2712		-----		-----	
2719		-----		-----	
2740		-----		-----	
2741		-----		-----	
2743	ISO14184-2	97.6	C	2.83	first reported 195.10
2773		-----		-----	
2789		-----		-----	
2793		-----		-----	
2805	ISO14184-2	77.22		-0.28	
2826		-----		-----	
2827	ISO14184-2	75.10		-0.60	
2830		-----		-----	
2881		-----		-----	
2889		-----		-----	
2903		-----		-----	
2921		-----		-----	
2926		-----		-----	
2948	ISO14184-2	66.75		-1.88	
2950		-----		-----	
2953		-----		-----	
2955	ISO14184-2	Not performed		-----	
2958	ISO14184-2 proc. annex B	56.7	R(0.05)	-3.41	
2959	ISO14184-2	85		0.91	
2968	ISO14184-2	93.52		2.21	
2973		-----		-----	
2977		not analyzed		-----	
2979		-----		-----	
2980	ISO14184-2	80		0.14	

lab	method	value	mark	z(targ)	remarks
2982	ISO14184-2	80.62		0.24	
2984		-----		-----	
3100	GB/T2912	78.6		-0.07	
3110		-----		-----	
3116		-----		-----	
3118		-----		-----	
3134	ISO14184-2	73.1		-0.91	
3146		-----		-----	
3153		-----		-----	
3154		-----		-----	
3160		-----		-----	
3172		-----		-----	
3176	ISO14184-2	83.44		0.67	
3182	ISO14184-2	74.9		-0.64	
3185	ISO14184-2	79.94		0.13	
3190	ISO14184-2	81.55		0.38	
3195		-----		-----	
3197	ISO14184-2	75.0		-0.62	
3200		-----		-----	
3207		-----		-----	
3209	AATCC112	75.92		-0.48	
3210		-----		-----	
3212		-----		-----	
3214		-----		-----	
3216	ISO14184-2	not determined		-----	
3218		-----		-----	
3222		-----		-----	
3225		-----		-----	
3228		-----		-----	
3230	ISO14184-2	89.254		1.56	
3237		-----		-----	
3246		-----		-----	
3248	ISO14184-2	75		-0.62	
8005		-----		-----	
8008		-----		-----	

	normality	OK
	n	79
	outliers	3
	mean (n)	79.062
	st.dev. (n)	6.3058
	R(calc.)	17.656
	st.dev.(Horwitz)	6.5526
	R(Horwitz)	18.347

RSD=8%





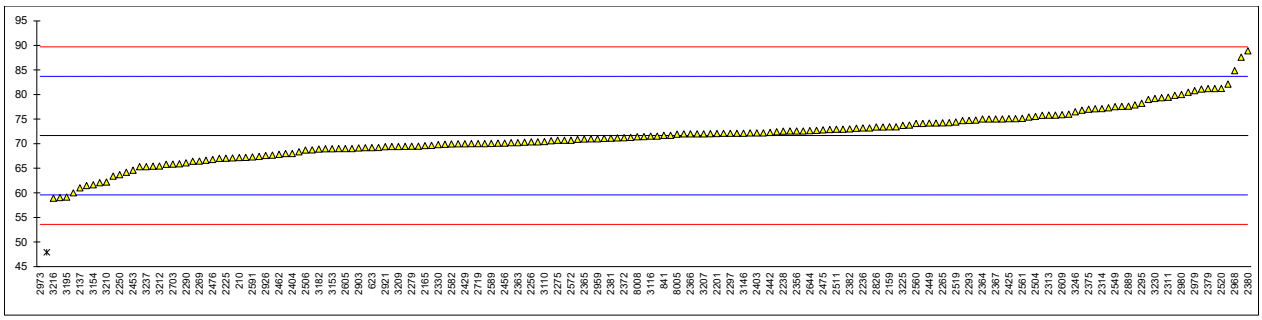
Determination of Free Formaldehyde on sample #21756; results in mg/kg

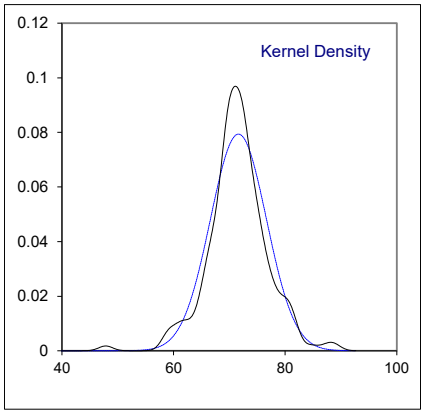
lab	method	value	mark	z(targ)	remarks
110	ISO14184-1	70.19		-0.24	
210	ISO14184-1	67.171		-0.74	
339		75.1		0.57	
362	ISO14184-1	69.42		-0.37	
551	ISO14184-1	70.91		-0.12	
622	ISO14184-1	61.47		-1.69	
623	ISO14184-1	69.2		-0.41	
840	ISO14184-1	72.1		0.08	
841	ISO14184-1	71.7		0.01	
2102		-----		-----	
2115	ISO14184-1	67.4		-0.70	
2132	ISO14184-1	69.48		-0.36	
2135	ISO14184-1	79.83		1.36	
2137	ISO14184-1	61.02		-1.76	
2146	ISO14184-1	72.01		0.06	
2159	ISO14184-1	73.43		0.30	
2165	ISO14184-1	69.59		-0.34	
2170	ISO14184-1	80.48		1.47	
2182	ST1.6	63.4		-1.37	
2184	ISO14184-1	72.0		0.06	
2201	ISO14184-1	72.06		0.07	
2213	ISO14184-1	82.1		1.73	
2218	ISO14184-1	71.07		-0.10	
2220	JIS L1041L	70.0		-0.27	
2223	ISO14184-1	65.9		-0.95	
2225	ISO14184-1	67.03		-0.77	
2226	ISO14184-1	68.33	C	-0.55	first reported 88.92
2232	ISO14184-1	66.43		-0.87	
2236	ISO14184-1	73.18		0.25	
2238	ISO14184-1	72.57		0.15	
2247	ISO14184-1	65.80		-0.97	
2250	ISO14184-1	63.68		-1.32	
2255	ISO14184-1	67.0		-0.77	
2256	ISO14184-1	70.34		-0.22	
2264	JIS L1041	59.99		-1.93	
2265	ISO14184-1	74.24		0.43	
2269	ISO14184-1	66.45		-0.86	
2275	ISO14184-1	70.68		-0.16	
2279	ISO14184-1	69.47		-0.36	
2284	ISO14184-1	73.2		0.26	
2289	ISO14184-1	68.95		-0.45	
2290	ISO14184-1	66.1		-0.92	
2293	ISO14184-1	74.74		0.51	
2295	ISO14184-1	78.2		1.09	
2297	ISO14184-1	72.1		0.08	
2310	ISO14184-1	77.3		0.94	
2311	ISO14184-1	79.449		1.29	
2313	ISO14184-1	75.80		0.69	
2314	ISO14184-1	77.12		0.91	
2330	ISO14184-1	69.81		-0.30	
2347	GB/T2912	71		-0.11	
2350	ISO14184-1	72.19		0.09	
2351	ISO14184-1	75		0.56	
2356	ISO14184-1	72.6		0.16	
2358	ISO14184-1	72.95		0.22	
2360	ISO14184-1	70.7		-0.16	
2363	ISO14184-1	70.2		-0.24	
2364	ISO14184-1	75.0		0.56	
2365	ISO14184-1	70.96		-0.11	
2366	ISO14184-1	72		0.06	
2367	ISO14184-1	75.0		0.56	
2370	ISO14184-1	72.70		0.17	
2372	ISO14184-1	71.2		-0.07	
2373	ISO14184-1	75.8		0.69	
2375	ISO14184-1	77		0.89	
2378	ISO14184-1	76.0		0.72	
2379	ISO14184-1	81.19		1.58	
2380	ISO14184-1	88.9		2.86	
2381	ISO14184-1	71.10		-0.09	
2382	ISO14184-1	73.0		0.22	
2383	ISO14184-1	70.6		-0.17	
2385	ISO14184-1	79		1.22	
2390	ISO14184-1	69.88		-0.29	
2401	ISO14184-1	68		-0.61	

lab	method	value	mark	z(targ)	remarks
2403	ISO14184-1	72.20		0.09	
2404	ISO14184-1	68.0		-0.61	
2406	ISO14184-1	69.95		-0.28	
2425	ISO14184-1	75.09		0.57	
2426	ISO14184-1	77.1		0.90	
2429	ISO14184-1	69.97		-0.28	
2433	ISO14184-1	75.77		0.68	
2442	ISO14184-1	72.29		0.11	
2449	ISO14184-1	74.2		0.42	
2453	ISO14184-1	64.60		-1.17	
2454	ISO14184-1	73.42		0.29	
2456	ISO14184-1	70.12		-0.25	
2457	ISO14184-1	67.21		-0.74	
2462	ISO14184-1	67.8		-0.64	
2474	ISO14184-1	67.66		-0.66	
2475	ISO14184-1	72.79		0.19	
2476	ISO14184-1	66.8		-0.80	
2483	ISO14184-1	75.0		0.56	
2492	In house	74.29		0.44	
2500	ISO14184-1	72.41		0.13	
2501	ISO14184-1	72.86		0.20	
2504	ISO14184-1	75.55		0.65	
2506	ISO14184-1	68.7		-0.49	
2511	ISO14184-1	72.938		0.21	
2514	ISO14184-1	69.66		-0.33	
2519	ISO14184-1	74.4		0.46	
2520	ISO14184-1	81.22		1.59	
2549	ISO14184-1	77.54		0.98	
2553	ISO14184-1	64.18		-1.24	
2560	ISO14184-1	74.10		0.41	
2561	ISO14184-1	75.15		0.58	
2567		-----		-----	
2569	ISO14184-1	77.6		0.99	
2572	ISO14184-1	70.7		-0.16	
2573	ISO14184-1	74.2		0.42	
2582	ISO14184-1	69.92		-0.29	
2589	ISO14184-1	70.05		-0.26	
2590	ISO14184-1	73.44		0.30	
2591	In house	67.296649		-0.72	
2605	GB/T2912	69.00		-0.44	
2609	ISO14184-1	75.92		0.71	
2618		-----		-----	
2638	ISO14184-1	70.34		-0.22	
2643	ISO14184-1	73.13		0.25	
2644	ISO14184-1	72.66		0.17	
2667	ISO14184-1	69.231		-0.40	
2668	ISO14184-1	68.72		-0.49	
2674	ISO14184-1	72.2		0.09	
2678	ISO14184-1	70.10		-0.26	
2703	ISO14184-1	65.85		-0.96	
2712	ISO14184-1	71.44		-0.03	
2719	ISO14184-1	70		-0.27	
2740	ISO14184-1	69		-0.44	
2741	ISO14184-1	73.8		0.36	
2743	ISO14184-1	74.70		0.51	
2773		-----		-----	
2789	ISO14184-1	72.6		0.16	
2793	ISO14184-1	79.35	C	1.28	first reported 45.483
2805	ISO14184-1	75.41		0.62	
2826	JIS L1041	73.4		0.29	
2827	ISO14184-1	76.81		0.86	
2830	ISO14184-1	71.25		-0.07	
2881	ISO14184-1	74.80		0.52	
2889	ISO14184-1	77.635		0.99	
2903	ISO14184-1	69.11		-0.42	
2921	JIS L1041	69.38		-0.38	
2926	ISO14184-1	67.6		-0.67	
2948	ISO14184-1	72.58		0.15	
2950	ISO14184-1	87.6	C	2.65	first reported 153.5
2953	ISO14184-1	77.89		1.04	
2955	ISO14184-1	65.3		-1.05	
2958	ISO14184-1	81.1		1.57	
2959	ISO14184-1	71		-0.11	
2968	ISO14184-1	84.85	C	2.19	first reported 49.91
2973	ISO14184-1	34.95	C,R(0.01)	-6.09	first reported 45.37
2977	ISO14184-1	74.1		0.41	
2979	ISO14184-1	80.78		1.52	
2980	ISO14184-1	80		1.39	

lab	method	value	mark	z(targ)	remarks
2982	ISO14184-1	81.21		1.59	
2984	ISO14184-1	47.86	R(0.01)	-3.95	
3100	GB/T2912	66.6		-0.84	
3110	ISO14184-1	70.4		-0.21	
3116	ISO14184-1	71.52		-0.02	
3118	ISO14184-1	62.03		-1.60	
3134	ISO14184-1	59.03		-2.09	
3146	ISO14184-1	72.13		0.08	
3153	ISO14184-1	68.95		-0.45	
3154	ISO14184-1	61.61		-1.67	
3160	ISO14184-1	71.53		-0.02	
3172	ISO14184-1	69.183		-0.41	
3176	ISO14184-1	72.0		0.06	
3182	ISO14184-1	68.9		-0.46	
3185	ISO14184-1	71.16		-0.08	
3190	ISO14184-1	69.44		-0.37	
3195	ISO14184-1	59.1		-2.08	
3197	ISO14184-1	67.1		-0.75	
3200	ISO14184-1	72.11		0.08	
3207		72		0.06	
3209	GB/T2912	69.42		-0.37	
3210	In house	62.20		-1.57	
3212	ISO14184-1	65.45	C	-1.03	first reported 3.65
3214	ISO14184-1	65.40		-1.04	
3216	ISO14184-1	58.89		-2.12	
3218	ISO14184-1	68.99		-0.44	
3222	ISO14184-1	70.3		-0.22	
3225	ISO14184-1	73.7		0.34	
3228	ISO14184-1	71.7		0.01	
3230	ISO14184-1	79.167	C	1.25	first reported 101.973
3237	ISO14184-1	65.3		-1.05	
3246	ISO14184-1	76.5		0.81	
3248	ISO14184-1	70		-0.27	
8005	JIS L1041	71.92		0.05	
8008	JTS ST1.6	71.4		-0.04	

	normality	suspect
	n	181
	outliers	2
	mean (n)	71.647
	st.dev. (n)	5.0258 RSD=7%
	R(calc.)	14.072
	st.dev.(Horwitz)	6.0267
	R(Horwitz)	16.875





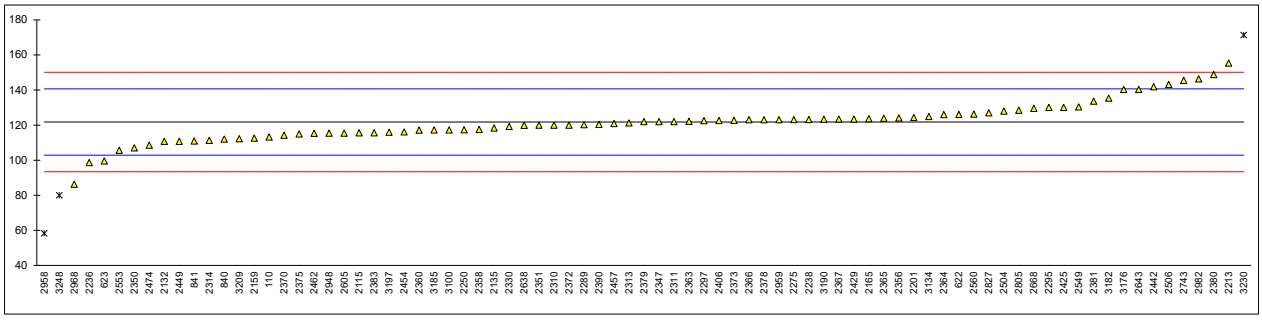
Determination of Released Formaldehyde on sample #21756; results in mg/kg

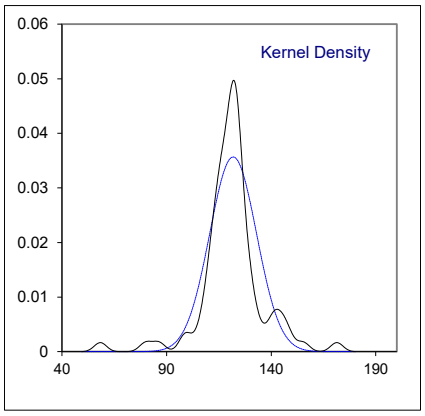
lab	method	value	mark	z(targ)	remarks
110	ISO14184-2	113.2		-0.91	
210		-----		-----	
339		Non analysé		-----	
362		-----		-----	
551		Not tested		-----	
622	ISO14184-2	126.07		0.46	
623	ISO14184-2	99.5		-2.35	
840	ISO14184-2	112.0		-1.03	
841	ISO14184-2	110.9		-1.15	
2102		-----		-----	
2115	ISO14184-2	115.6		-0.65	
2132	ISO14184-2	110.7		-1.17	
2135	ISO14184-2	118.28		-0.37	
2137		-----		-----	
2146		-----		-----	
2159	ISO14184-2	112.50		-0.98	
2165	ISO14184-2	123.59		0.19	
2170		-----		-----	
2182		-----		-----	
2184		-----		-----	
2201	ISO14184-2	124.24		0.26	
2213	ISO14184-2	155.3		3.55	
2218		-----		-----	
2220		-----		-----	
2223		-----		-----	
2225		-----		-----	
2226		-----		-----	
2232		Not applicable		-----	
2236	ISO14184-2	98.60		-2.45	
2238	ISO14184-2	123.14		0.15	
2247		-----		-----	
2250	ISO14184-2	117.37		-0.46	
2255	ISO14184-2	not determined		-----	
2256		-----		-----	
2264		-----		-----	
2265		-----		-----	
2269		-----		-----	
2275	ISO14184-2	123.12		0.14	
2279		not analyzed		-----	
2284		NA		-----	
2289	ISO14184-2	120.23		-0.16	
2290		-----		-----	
2293		-----		-----	
2295	ISO14184-2	130		0.87	
2297	ISO14184-2	122.5		0.08	
2310	ISO14184-2	120		-0.19	
2311	ISO14184-2	122.027		0.03	
2313	ISO14184-2	121.2		-0.06	
2314	ISO14184-2	111.2		-1.12	
2330	ISO14184-2	119.22		-0.27	
2347	GB/T2912	122		0.02	
2350	AATCC112	107.05		-1.56	
2351	ISO14184-2	120		-0.19	
2356	ISO14184-2	124.0		0.24	
2358	ISO14184-2	117.50		-0.45	
2360	ISO14184-2	117.1		-0.49	
2363	ISO14184-2	122.2		0.05	
2364	ISO14184-2	126.0		0.45	
2365	ISO14184-2	123.87		0.22	
2366	ISO14184-2	123		0.13	
2367	ISO14184-2	123.4		0.17	
2370	ISO14184-2	114.18		-0.80	
2372	ISO14184-2	120		-0.19	
2373	ISO14184-2	122.7		0.10	
2375	ISO14184-2	115		-0.72	
2378	ISO14184-2	123.0		0.13	
2379	ISO14184-2	121.95		0.02	
2380	ISO14184-2	148.7		2.85	
2381	ISO14184-2	133.58		1.25	
2382	ISO14184-2	out of capacity		-----	
2383	ISO14184-2	115.6		-0.65	
2385		-----		-----	
2390	ISO14184-2	120.41		-0.14	
2401		-----		-----	

lab	method	value	mark	z(targ)	remarks
2403		-----		-----	
2404		-----		-----	
2406	ISO14184-2	122.61		0.09	
2425	ISO14184-2	130.0		0.87	
2426		-----		-----	
2429	ISO14184-2	123.46		0.18	
2433		-----		-----	
2442	ISO14184-2	141.90		2.13	
2449	ISO14184-2	110.7		-1.17	
2453		-----		-----	
2454	ISO14184-2	116.03		-0.61	
2456		-----		-----	
2457	ISO14184-2	120.88		-0.09	
2462	ISO14184-2	115.3		-0.68	
2474	ISO14184-2	108.56		-1.40	
2475		-----		-----	
2476		-----		-----	
2483		-----		-----	
2492		-----		-----	
2500		-----		-----	
2501		-----		-----	
2504	ISO14184-2	128.03		0.66	
2506	ISO14184-2	143.18		2.26	
2511		-----		-----	
2514		-----		-----	
2519		-----		-----	
2520		-----		-----	
2549	ISO14184-2	130.36		0.91	
2553	ISO14184-2	105.64		-1.71	
2560	ISO14184-2	126.20		0.47	
2561		-----		-----	
2567		-----		-----	
2569		-----		-----	
2572		-----		-----	
2573		-----		-----	
2582		-----		-----	
2589		-----		-----	
2590		-----		-----	
2591		-----		-----	
2605	ISO14184-2	115.38		-0.68	
2609		-----		-----	
2618		-----		-----	
2638	ISO14184-2	119.85		-0.20	
2643	ISO14184-2	140.26		1.96	
2644		-----		-----	
2667		-----		-----	
2668	ISO14184-2	129.55		0.82	
2674		-----		-----	
2678		-----		-----	
2703		-----		-----	
2712		-----		-----	
2719		-----		-----	
2740		-----		-----	
2741		-----		-----	
2743	ISO14184-2	145.5	C	2.51	first reported 291.05
2773		-----		-----	
2789		-----		-----	
2793		-----		-----	
2805	ISO14184-2	128.39		0.70	
2826		-----		-----	
2827	ISO14184-2	127.01		0.55	
2830		-----		-----	
2881		-----		-----	
2889		-----		-----	
2903		-----		-----	
2921		-----		-----	
2926		-----		-----	
2948	ISO14184-2	115.35		-0.68	
2950		-----		-----	
2953		-----		-----	
2955	ISO14184-2	Not performed		-----	
2958	ISO14184-2 proc. annex B	58.3	R(0.01)	-6.71	
2959	ISO14184-2	123		0.13	
2968	ISO14184-2	86.28	C	-3.75	first reported 50.75
2973		-----		-----	
2977		not analyzed		-----	
2979		-----		-----	
2980		-----	W	-----	test result withdrawn, reported 80

lab	method	value	mark	z(targ)	remarks
2982	ISO14184-2	146.31		2.60	
2984		-----		-----	
3100	GB/T2912	117.2		-0.48	
3110		-----		-----	
3116		-----		-----	
3118		-----		-----	
3134	ISO14184-2	124.9		0.33	
3146		-----		-----	
3153		-----		-----	
3154		-----		-----	
3160		-----		-----	
3172		-----		-----	
3176	ISO14184-2	140.25		1.95	
3182	ISO14184-2	135.4		1.44	
3185	ISO14184-2	117.16		-0.49	
3190	ISO14184-2	123.34		0.17	
3195		-----		-----	
3197	ISO14184-2	115.9		-0.62	
3200		-----		-----	
3207		-----		-----	
3209	AATCC112	112.21		-1.01	
3210		-----		-----	
3212		-----		-----	
3214		-----		-----	
3216	ISO14184-2	not determined		-----	
3218		-----		-----	
3222		-----		-----	
3225		-----		-----	
3228		-----		-----	
3230	ISO14184-2	171.340	C,R(0.01)	5.24	first reported 189.613
3237		-----		-----	
3246		-----		-----	
3248	ISO14184-2	80	C,R(0.05)	-4.42	first reported 72
8005		-----		-----	
8008		-----		-----	

	normality	suspect
	n	78
	outliers	3
	mean (n)	121.767
	st.dev. (n)	11.1919
	R(calc.)	31.337
	st.dev.(Horwitz)	9.4568
	R(Horwitz)	26.479





APPENDIX 2 Analytical details

lab	ISO/IEC 17025 accredited	Sample Intake Free Formaldehyde (grams)	Sample Intake Released Formaldehyde (grams)	Dimedone confirmation test	Dimedone confirmation done because of
110	Yes	1 gram	1 gram	No	the sample cannot hang freely as it is cut. we do the diffusion with special set up
210	Yes			---	
339	---			---	
362	Yes	1		No	
551	Yes	1		Yes	
622	No	0.5 gram	0.5 gram	Yes	
623	Yes	1	1	Yes	
840	Yes	0.5	1	No	
841	Yes	1 grams	1 grams	Yes	Dimedone confirmation for only sample #21756 Free Formaldehyde (ISO 14184-1): extracted solution have color
2102	---			---	
2115	Yes	1 g	1 g	Yes	there is lose color
2132	Yes	1 gram	1 gram	Yes	4) Because result is/are greater than reporting limit.
2135	Yes	1	1	No	
2137	Yes	1		No	
2146	Yes	1,5 g		Yes	
2159	Yes	1,0 gram	1,0 gram	Yes	N/A
2165	Yes	0.5g	1.0g	No	
2170	Yes	1.0 gram	Sample not enough to conduct the test	No	
2182	---			---	
2184	Yes	1g		No	
2201	Yes	1.00g	1.00g	Yes	To confirm absorption is due to formaldehyde
2213	No	1 gm	1 gm	No	
2218	No	0.5g		Yes	
2220	Yes	2.5068g #21755 and 2.5120g #21756		Yes	to confirm the actual presence of formaldehyde within the sample.
2223	Yes	1 g		No	
2225	Yes	5g	No	Yes	some absorption of sample #21756 not be due to formaldehyde
2226	Yes	1.0 gr		No	
2232	Yes	1		Yes	Dimedone is used to confirm the actual presence of formaldehyde within a sample
2236	Yes	1.0	1.0	Yes	It is our routine practice to perform dimedone confirmation.
2238	Yes	#21755: one 1.0070g,another 1.0062g #21756: one 1.0073g,another 0.9938g	#21755: one 1.0078g,another 1.0069g #21756: one 1.0026g,another 1.0069g	No	
2247	Yes	1gm approx.	-	No	Release of Formaldehyde not conducted due to insufficient sample
2250	Yes	0,5	1	No	
2255	Yes		1.0	Yes	
2256	Yes	1.0017 g & 1.0025 g		Yes	If the calculated absorbance greater than the reporting limit,carry out a confirmation test with dimedone.
2264	Yes	2.5 g	-	Yes	
2265	Yes	2,5		Yes	
2269	Yes	1 gram		Yes	If there is a doubt that the absorption may not be due to formaldehyde but for example to an extracted coloring agent, carry out a confirmation test with dimedone.
2275	Yes	1.0000g	1.0000g	Yes	
2279	Yes	2.5 gram	NA	Yes	color agent was found in the sample solution
2284	Yes	21755:1.002g; 21756:1.010g	NA	No	
2289	Yes	1gram	1gram	No	
2290	Yes			---	
2293	Yes	1.0		No	
2295	Yes	1 gram	1 gram	No	
2297	Yes	1g	1g	No	

lab	ISO/IEC 17025 accredited	Sample Intake Free Formaldehyde (grams)	Sample Intake Released Formaldehyde (grams)	Dimedone confirmation test	Dimedone confirmation done because of
2310	Yes	1g	1g	No	
2311	Yes	1	1	Yes	
2313	Yes	1.0	1.0	No	
2314	Yes	1.0	0.5	No	
2330	Yes	1 gram	1 gram	Yes	to confirm the result of Formaldehyde
2347	Yes	0.5g	1g	No	
2350	Yes	1 g	1 g	No	N/A
2351	Yes	1g	1g	No	
2356	Yes	21755#: 1.0002g / 1.0001g 21756#: 1.0001g / 1.0003g	21755#: 1.0002g / 1.0001g 21756#: 1.0002g / 1.0003g	Yes	21755#:NA 21756#:The sample faded slightly.
2358	---			---	
2360	Yes	#21755: 1.0034g #21756: 1.0036g	#21755: 1.0063g #21756: 1.0013g	Yes	There is doubt that the absorption may not be due to formaldehyde but, for example, to an extracted colouring agent, carry out a confirmation test with dimedone, so we cofirm with dimedone.
2363	Yes	1g	0.5g	No	
2364	Yes	#21755 Free Form. :1.0001g/1.0002g #21756 Free Form.:1.0001g/1.0002g	#21755 Released Form.:1.0001g/1.0000g #21756 Released Form. :1.0001g/1.0002g	Yes	according to our internal SOP, this is the mandatory requirement.
2365	Yes	0.5g	0.5g	No	
2366	Yes	1g	1g	No	
2367	Yes	#21755 1.0013g #21756 1.0014g	#21755 1.0024g #21756 1.0023g	Yes	
2370	Yes	1 g	1 g	Yes	dimedone confirmation test Exclude other compounds from interfering with color development.
2372	Yes	1g	1g	Yes	
2373	Yes	1g	1g	Yes	In the process of water extraction, the dye of the test fabric is transferred to the water extraction solution.
2375	Yes	0.5	1	No	
2378	Yes	1g	1g	No	
2379	Yes	1 g	1 g	Yes	The sample is more than LOQ.
2380	Yes	1.0	1.0	Yes	N/A
2381	Yes	1.00	1.00	No	
2382	Yes	1g	/	No	/
2383	Yes	1g	1g	Yes	because the color change may caused by sample color fading
2385	Yes	1		No	
2390	Yes	1 gram	1gram	Yes	Light turquoise colour found in sample 21756 in ISO 14184-1
2401	Yes	1.0g		Yes	
2403	Yes	2 grams	Not applicable	No	
2404	Yes	2g		No	
2406	No	0.5 gram	0.5 gram	Yes	There are discoloration in the sample solution of Sample #21756
2425	Yes	1.0 g	1.0 g	No	
2426	Yes	1		---	
2429	Yes	1	1	No	
2433	Yes	1 gram per trial.	-	Yes	to confirm the presence of formaldehyde.
2442	Yes	1.0058g	1.0022g	Yes	since extracted solution may contain coloring agent.
2449	Yes	1 gram	1 gram	Yes	
2453	No	±1.5g		No	
2454	Yes	1.0000g	1.0000g	Yes	
2456	Yes	All quanitty shipped		Yes	For detailed explanation for each sample look at comments field. Dimedone test was performed anyway, just to be in no doubt.
2457	Yes	1 gram	1 gram	No	
2462	Yes	0.5064	0.5047	No	
2474	Yes	1 gram	1 gram	No	
2475	Yes	1		---	
2476	---	1 (one)	NA	---	
2483	Yes	1.00		No	
2492	Yes	2.5		No	
2500	Yes	1.0003g		Yes	

lab	ISO/IEC 17025 accredited	Sample Intake Free Formaldehyde (grams)	Sample Intake Released Formaldehyde (grams)	Dimedone confirmation test	Dimedone confirmation done because of
2501	Yes	1g		No	
2504	Yes	1 gram	1 gram	No	NA
2506	Yes	1g	1g	Yes	Sample #21756: there was discoloration in the extracting solution.
2511	---			---	
2514	Yes	21755=1.003 21756=1.005		Yes	
2519	No	1		Yes	Because of the colored extract.
2520	Yes	1gram		Yes	
2549	Yes	1 gm	1 gm	No	
2553	Yes	1	1	Yes	reporting limit exceeded
2560	Yes	1.0 gm	1.0 gm	No	
2561	Yes	2.5	n/a	No	
2567	---			---	
2569	No	1 gm		---	
2572	Yes			---	
2573	Yes	1g		No	
2582	Yes	21755-1.0018g 21756-1.0012g		Yes	
2589	Yes	1g	NA	No	
2590	Yes	1g	1g	No	
2591	Yes	2.5		No	
2605	Yes	4g	4g	Yes	
2609	Yes	1.00		No	
2618	---			---	
2638	No	1 gm	1 gm	Yes	Colour bleed observed
2643	Yes	1 g	1 g	No	
2644	Yes	1 g		Yes	we always carry out confimration test in case of positive results
2667	No	2.5g	NA	Yes	
2668	Yes	1 g	0.5 g	No	
2674	Yes	1g		Yes	
2678	Yes	1		Yes	a released color is observed after the extraction step
2703	Yes	2.5	N/A	Yes	the extract solution was coloured
2712	Yes	2.5 g each sample		Yes	confirmation test result: the absorbance of the sample solution is 0.021 the absorbance of the control solution is 0.009
2719	Yes	1g		Yes	
2740	Yes	1 g (see remarks)	1 g (see remarks)	Yes	sample intake: combined testing of free and released formaldehyd dimedone confirmation: standard procedure in case of positive results
2741	Yes	1.0022 g	/	Yes	Sample #21756: doubt that the absorption may not be due to formaldehyde.
2743	Yes	1 g	1 g	Yes	ISO 14184-1 SAMPLE 21756 The water solution extracted was green coloured
2773	---			---	
2789	Yes	1		Yes	Dimedone confirmation test is done but is not subtracted because there is no turbidity or coloring agent in the sample.
2793	No	1,00 g	No	Yes	for Sample #21756: green cotton, a coloration was observed the Absorbance of sample+dimedon is sustracted
2805	No	1g	1g	Yes	Because sample #21756 have color
2826	Yes	1 gram	NA	Yes	Absorbance difference corresponding to formaldehyde eluted from the sample exceeds 0.05
2827	Yes	0.5g	0.5g	No	
2830	Yes	1g		Yes	
2881	Yes	1g	1g	Yes	Dimedon is used to bind formaldehyde (only for sample 21756).
2889	Yes	2 gram		Yes	Beacuse extracted solution has color, to check the method.
2903	---			---	
2921	Yes	1 gram		No	none
2926	Yes	2.5		Yes	Extract solution was coloured (the blue one)/ to confirm absorbance is due to formaldehyde.
2948	---	1	1	Yes	due to color release
2950	No	1		Yes	Due to Colour contamination

lab	ISO/IEC 17025 accredited	Sample Intake Free Formaldehyde (grams)	Sample Intake Released Formaldehyde (grams)	Dimedone confirmation test	Dimedone confirmation done because of
2953	No	1		No	
2955	Yes	1 gm	Not performed	No	
2958	Yes	1 g	1 g	No	
2959	Yes	1.000±0.01g	1.000±0.01g	No	
2968	No	0,9972 g green 0,979 g green 1,0139 g blue 1,0934 g blue	0,9682 g blue 0,9600 g blue 0,8732 g green 0,9251 g green	No	
2973	No	2x 1 g		No	
2977	No	4	0	No	
2979	Yes	1 gram		Yes	
2980	No	1	1	Yes	
2982	Yes	1 gm	1 gm	No	
2984	Yes	#21755 : 1.0024 g; 1.0015 g #21756 : 1.0022 g; 1.0029 g		Yes	sample #21756 : the water become colored
3100	Yes	1g	1g	No	
3110	---			---	
3116	Yes	1 gram		Yes	The amount of formaldehyde determined in the samples was higher than the laboratory reporting limit.
3118	No	1 gram		Yes	for confirmation that the absorption of sample is due to formaldehyde, not from coloring reagent
3134	No	2 samples of 1 g each in 100ml H2O	2 samples of 1g each in 50ml H2O	No	We performed a chromotropic acid confirmation test. Additionally, second extraction iso 14184-1 of 1g of sample #21755 gave 5mg/Kg
3146	Yes	Between 0.50g and 1.00g	Released Formaldehyde was not tested.	No	
3153	Yes	1 gram	NA	No	NA
3154	Yes			No	
3160	---			---	
3172	Yes			---	
3176	Yes	1	1	Yes	To be sure the exact formaldehyde amount
3182	Yes	1.00 grams	1.00 grams	Yes	discoloration
3185	Yes	1g	1g	No	
3190	No	1.0000g	1.0000g	No	
3195	Yes	2g	/	No	/
3197	Yes	1 g	1 g	No	
3200	Yes	21755 1.0031g 21756 1.0027g	No Testing	No	
3207	Yes	1 gram		Yes	Sample #21755 Dimedone = 1 ppm Sample #21756 Dimedone = 1 ppm
3209	Yes	1g	1g	Yes	For method GB/T 2912, It is suspected that the absorbance value is not from formaldehyde, but from the color of the sample solution
3210	Yes	1		No	
3212	Yes	1		Yes	Coloration of the filtration
3214	Yes	1 g		No	
3216	Yes	Approx. 1g for each sample. Two replicates made from each sample	-	Yes	The sample referenced as #21756 (Green cotton) is tested with Dimedone because the extraction solution has a greenish colour which may interfere with the determination of formaldehyde.
3218	Yes	1.0g	/	No	/
3222	Yes	1 g		Yes	the result is near to the mandatory limit (European Regulation n. 1907/2006)
3225	Yes	0.5	Nil	Yes	It is positive so confirmation is needed.
3228	Yes	1.0		No	
3230	Yes	3 times 1 gram	2 times 2 grams	No	
3237	Yes	1 gr	-	Yes	-
3246	Yes	2.00		No	
3248	No	1.0000g	1.0000g	Yes	Result is greater than reporting limit
8005	Yes	1 gram		Yes	amount of formaldehyde determined in the samples was higher than the laboratory reporting limit.
8008	---			---	

APPENDIX 3

Number of participants per country

10 labs in	BANGLADESH
1 lab in	BELGIUM
1 lab in	BRAZIL
1 lab in	BULGARIA
2 labs in	CAMBODIA
4 labs in	EGYPT
1 lab in	FINLAND
4 labs in	FRANCE
9 labs in	GERMANY
1 lab in	GREECE
1 lab in	GUATEMALA
17 labs in	HONG KONG
11 labs in	INDIA
5 labs in	INDONESIA
9 labs in	ITALY
1 lab in	LITHUANIA
2 labs in	MAURITIUS
2 labs in	MEXICO
2 labs in	MOROCCO
45 labs in	P.R. of CHINA
7 labs in	PAKISTAN
1 lab in	PERU
1 lab in	PHILIPPINES
2 labs in	POLAND
1 lab in	PORTUGAL
2 labs in	SINGAPORE
1 lab in	SLOVENIA
3 labs in	KOREA, Republic of
4 labs in	SPAIN
3 labs in	SRI LANKA
1 lab in	SWITZERLAND
5 labs in	TAIWAN
4 labs in	THAILAND
1 lab in	THE NETHERLANDS
3 labs in	TUNISIA
6 labs in	TURKEY
3 labs in	U.S.A.
2 labs in	UNITED KINGDOM
8 labs in	VIETNAM

APPENDIX 4

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
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected

Literature

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