Results of Proficiency Test
pH and Formaldehyde
in leather
November 2017

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. R.J. Starink
Correctors: dr. R. Visser & ing. G.A. Oosterlaken-Buijs
Report: iis17A10

January 2018

CONTENTS

Appendices:

1 INTRODUCTION

Worldwide, many consumer products are produced from leather. During the production of leather products, many different types of auxiliary agents and dyes are used to process leather. Neither in the U.S. nor in the European Union there is general legislation that limits the presence of formaldehyde in leather. Many countries have adopted environmental standards and requirements restricting the use of harmful chemicals. Laws and regulations impose some of these standards and requirements. In addition to mandatory environmental standards and requirements for leather, there are some Ecolabelling schemes imposing environmental requirements for textile & leather products on a voluntary basis. Well-known organisations are Öko-Tex Standard 100 (Germany) and Bluesign® (Switzerland), which has created a Bluesign® system substances list (BSSL).
Since 2013, the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for Formaldehyde and pH in leather. During the annual proficiency testing program 2017/2018, it was decided to continue the round robin for the analysis of Formaldehyde content and pH.
In this interlaboratory study 103 laboratories in 28 different countries registered for participation. See appendix 3 for the number of participating laboratories per country.
In this report, the results of the 2017 Formaldehyde and pH in leather 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 preparation and analyses of fit-for-use and homogeneity were subcontracted to an ISO17025 accredited laboratory. It was decided to use in this proficiency test one leather sample (labelled #17640) positive on Formaldehyde and one leather sample (labelled #17641) especially for pH determination. 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 (iis) in Spijkenisse, the Netherlands, has implemented a quality system based on ISO/IEC 17043:2010. 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 March 2017 (iis-protocol, version 3.4). 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

The first batch, brown leather pieces was obtained from a third party laboratory. The batch was used before in a previous interlaboratory study (iis13A04L). Therefore, the samples were considered to be homogeneous (see report iis13A04L). Each participant received a sample of approx. 6 grams packed in a polypropylene bag and wrapped in aluminium foil (labelled #17640).

The second batch was a black leather sample, which was shreddered into small pieces. After homogenisation, 130 subsamples of approx. 10 grams were prepared and labelled sample #17641. The homogeneity of the subsamples was checked on 8 stratified randomly selected samples. See the following table for the test results.

	pH
Sample #17641-1	3.28
Sample #17641-2	3.28
Sample #17641-3	3.27
Sample #17641-4	3.27
Sample #17641-5	3.26
Sample #17641-6	3.28
Sample #17641-7	3.26
Sample #17641-8	3.27

Table 1: homogeneity test results of subsamples #17641

From the above test results, the observed repeatability was calculated and compared with 0.3 times the target reproducibility (based on the repeatability) in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	pH
r (observed)	0.02
Reference test method	ASTM D2810:13
0.3*R (ref. test method)	0.04

Table 2: repeatability of subsamples #17641

The calculated repeatability was in agreement with 0.3 times the estimated reproducibility (based on the repeatability) of the reference test method. Therefore, homogeneity of the subsamples #17641 was assumed.

To each of the participants, 1 sample labelled #17640 and 1 sample labelled #17641 was sent on October 11, 2017.

2.5 ANALYSES

The participants were requested to determine on sample #17640, the content of Formaldehyde (HPLC) and/or the content of Formaldehyde (colorimetric). On sample #17641 was requested to determine the pH “undiluted”, pH “ten times diluted extract” and/or the “difference between pH of extract and pH of ten times diluted extract”

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 results, but report as much significant figures as possible. It was also requested not to report ‘less than’ results, which are above the detection limit, because such test results cannot be used for meaningful statistical calculations.

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 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.com/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 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 the appendix 1 of this report. The laboratories are represented by their code numbers.

Directly after the deadline, a reminder was sent to those laboratories that did not report 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. Additional or corrected test results are used for the data analysis and the original 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 organisation 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 March 2017 (iis-protocol, version 3.4).

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.

In accordance to ISO 5725 the original test results per determination were submitted to Dixon’s, Grubbs’ and/or Rosner’s outlier tests. 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. 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. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation, it is mentioned in the report and it will have significant consequences for the evaluation of the test results.

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

3.2 GRAPHICS

In order to visualise 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 standard. 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. The Kernel Density Graph 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 was projected over the Kernel Density Graph for reference.

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.

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-purpose.

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 result tables in appendix 1.

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 should be done in order to evaluate whether the reported test results are fit-for-use.

Absolute values for z<2 are very common and absolute values for z>3 are very rare.
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

During the execution of this proficiency test, no problems were encountered with the delivery of the samples. Only one laboratory did not report any test results.
Finally, the 102 reporting laboratories sent in total 378 numerical test results. Observed were 16 outlying test results, which is 4.2% of the numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

For the determination Formaldehyde in Leather, the test methods ISO17226-1 and ISO17226-2 are considered to be the official test methods. Therefore, the target reproducibilities were estimated from the reproducibility data as mentioned in the annexes of ISO17226-1 and ISO17226-2.

For the determination pH of Leather, the test methods ASTM D2810:13 and ISO4045:08 are considered to be the official test methods. Regretfully, ISO4045 does not provide precision data. Therefore, the reproducibility of ASTM D2810 was taken to estimate the target reproducibility. This appears to be very strict. In general, the reproducibility of a method is three times the repeatability. However, in ASTM D2810, the repeatability is 0.03 pH units and the reproducibility is 0.06 pH units (factor of 2 instead of 3). Also, the repeatability and reproducibility are based on the values of duplicate tests. Therefore, in this report the reproducibility for this test is calculated by three times the repeatability times the square root of two (0.127 pH units), assuming that the sample material was not sufficient for most participants to perform the determination at least in duplicate.

Not all original 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 paragraph, 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 methods are also in the table together with the original data. The abbreviations, used in these tables, are listed in appendix 4.

Sample #17640:

Formaldehyde content (HPLC): This determination was not problematic. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the estimated requirements of ISO17226-1:08.

Formaldehyde content (colorimetric): This determination was very problematic. No statistical outliers were observed. The reported test results appear to be trimodally distributed. Therefore, no significant conclusions were drawn.

Sample #17641:

pH of extract: This determination was very problematic. Seven statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the requirements of ASTM D2810:13.

pH of ten times diluted extract: This determination was very problematic. Three statistical outliers were observed and two test results were excluded (see page 19 and 20). The calculated reproducibility after rejection of the suspect data is not at all in agreement with the requirements of ASTM D2810:13.

Difference between pH of extract and pH ten times diluted extract: One statistical outlier was observed and four test results were excluded, as the reported test result for “pH of extract” was a statistical outlier. Regretfully, no precision data are available for “the difference in pH”, therefore no significant conclusions were drawn.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the calculated reproducibilities estimated from the target test methods and the reproducibilities as found for the group of participating laboratories.
The number of significant results, the average results, the calculated reproducibilities (standard deviation*2.8) and the target reproducibilities (ISO17226 and ASTM D2810), are compared in the next tables.

Parameter	unit	n	Average	2.8 * sd	R (target)
Formaldehyde (HPLC)	mg/kg	70	63.0	16.2	37.6
Formaldehyde (colorimetric)	mg/kg	53	191	206	(44)

Table 3: reproducibilities of tests on sample #17640

Reproducibility between brackets is estimated and should be used with due care.

Parameter	unit	n	Average	2.8 * sd	R (target)
pH of extract	-	87	3.40	0.27	0.13
pH of extract ten times diluted	-	73	4.09	0.35	0.13
Difference between pH’s	-	73	0.69	0.27	n.a.

Table 4: reproducibilities of test on sample #17641

From the above tables, it can be concluded that, without statistical calculations, the group of participating laboratories has severe difficulties with the determination of formaldehyde (colorimetric) and pH, but have no problems with the HPLC analysis, when compared with the requirements of the target test methods for these samples.

See also the discussions in paragraphs 4.1 and 5.

4.3 COMPARISON OF THE PROFICIENCY TEST OF NOVEMBER 2017 WITH PREVIOUS PTS

Parameter	November 2017	November 2016	October 2015	October 2014	October 2013
Number of reporting labs	102	106	116	108	48
Number of results reported	378	240	239	224	52
Number of statistical outliers	16	16	7	7	6
Percentage outliers	4.2%	6.7%	2.9%	3.1%	11.5%

Table 5: Comparison with previous proficiency tests

Surprisingly, the uncertainty of the 2017 PT on the HPLC determination of Formaldehyde in leather is much smaller than the uncertainty of the target test method. No improvement is visible for the colorimetric determination of Formaldehyde in leather and for the pH determination in comparison with the results in previous PTs. These targets are probably too strict to be met (see below table).

Parameter	Nov 2017	Nov 2016	Oct 2015	Oct 2014	Oct 2013	Est. from target test method
Formaldehyde (HPLC)	9%	20%	23%	30%	22%	22% (17226-1)
Formaldehyde (colorimetric)	39%	26%	22%	33%	25%	9% (17226-2)
pH (undiluted)	2.8%	2.1%	2.6%	3.2%	n.e.	0.9% (D2810)
pH (10x diluted)	3.0%	2.3%	n.e.	n.e.	n.e.	0.9% (D2810)

Table 6: Development of relative uncertainties over the years

In this PT one of the samples from a previous PT (#13092 of iis13A04L) was re-used as sample #17640. An overview of the differences in results is given in below table:

		#13092 in iis13A04L			#17640 in iis17A10		
Parameter	unit	n	average	2.8 * sd	n	average	2.8 * sd
Formaldehyde (HPLC)	mg/kg	23	72.4	44.6	70	63.0	16.2
Formaldehyde (colorimetric)	mg/kg	19	165	115	53	191	206

Table 7: comparison of results of identical samples in iis13A04L and iis17A10

It is remarkable to see that the used testing material is stable for at least 4 years.

4.4 EVALUATION OF THE ANALYTICAL DETAILS

The reported details of the analytical test methods that were used by the participants are listed in appendix 2. About 69% of the participating laboratories reported to be accredited for the determination of Formaldehyde and pH in leather.

For this PT, some analytical details of the determination: Formaldehyde (colorimetric) in leather were requested. A variety of analytical details was reported. Only a few laboratories reported to have corrected the absorbance measured for “Formaldehyde” with the absorbance measured for “interfering compounds”. This is remarkable, as this is mentioned in the test method.
It appeared that from the reported answers no effect was observed on the reported test results for Formaldehyde (colorimetric) in sample #17641.

5 DISCUSSION

The standard test method for formaldehyde content is ISO17226. Part 1 and part 2 describe the determination of the formaldehyde content by extraction of the formaldehyde from the leather with a detergent solution. The difference between both parts of ISO17226 is the method of quantification. Quantification of the formaldehyde is done by HPLC in part 1 and by colorimetric analysis in part 2. Therefore part 2 is not selective for formaldehyde, whereas part 1 is selective. The test results from part 2 will in general be higher than the test results from part 1, which is the case with the leather sample in this PT. In the case of dispute part 1 shall be used in preference.

Looking at the reproducibility statements of both methods, it is remarkable that the reproducibility of the colorimetric method is smaller than the reproducibility of the HPLC method. Maybe the precision data for the colorimetric method were obtained with samples and/or conditions that did not influence the test (as the method describes that the test could for example be influenced by absorbances from the leather colouring).

Analytical Details Colorimetric method
In this PT several analytical details were asked on the report form for test method ISO17226-2 (colorimetric). Especially about corrections for absorbances found in reagents and acetyl acetone colouring components (see Appendix 2 for the analytical details).
In total 72 participants completed this section of the report form. Regretfully, the reported details are inconsistent and therefore it was impossible to draw significant conclusions.

Sample #17640 in comparison to formaldehyde limits
When the results of this interlaboratory study were compared to the Standard “Limit of Harmful Matters in Leather” of the Chinese Leather Industry Committee Organization: GB20400-2006 and Öko-Tex Standard 100 (table 8), it may be noticed that not all participants would make identical decisions about the acceptability of the leather.

	Category A Products for babies: underclothes, bedding, etc	Category B Products with **Direct** skin contact	Category C Products Without direct skin contact
Formaldehyde in mg/kg	<20	<75	<300

Table 8: Summary of limits from Standard GB20400:2006 and Öko-Tex 100

When using ISO17226 part 1, all reporting laboratories would reject this sample for category A. For category B, ten laboratories would reject this sample, while all other reporting laboratories would accept this sample. One of the reporting laboratories would also reject this sample for category C.
When using ISO17226 part 2, all reporting laboratories would reject this sample for category A and B (except one for category B only). Forty-eight laboratories would accept this sample for category C, while five of the reporting laboratories would reject this sample for category C.
Compared to other labelling standards different decisions would be made concerning the acceptance or rejection of the sample.

Sample #17641 was chosen to determine the pH only as the leather was not positive on formaldehyde. Two different test methods are available to determine the pH of leather, ASTM D2810 and ISO4045. The difference between the two test methods is the dilution of the extract (10 times) in ISO4045, in case the pH of the undiluted extract is not between 4.00 and 10.00. Three participants reported to have used ASTM D2810. These three participants measured only the pH of the extract. Ten participants reported to have used ISO4045 and reported a pH<4.00, but they did not report a test result for the difference between pH of extract and pH of a ten times diluted solution.

6 CONCLUSION

In this proficiency test the Formaldehyde content and pH were determined. The variation observed for the Formaldehyde content (HPLC method) in this interlaboratory study has improved enormously, while the variation observed for the Formaldehyde content (colorimetric) and pH in this interlaboratory study are more or less in line with the previous proficiency tests. The variations observed for these determinations in this interlaboratory study can be caused by the preparation or the conditioning of the sample and/or by the performance of the analysis. Consequently, the reproducibility cannot be improved by only one change in the analysis. Each laboratory has to 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.

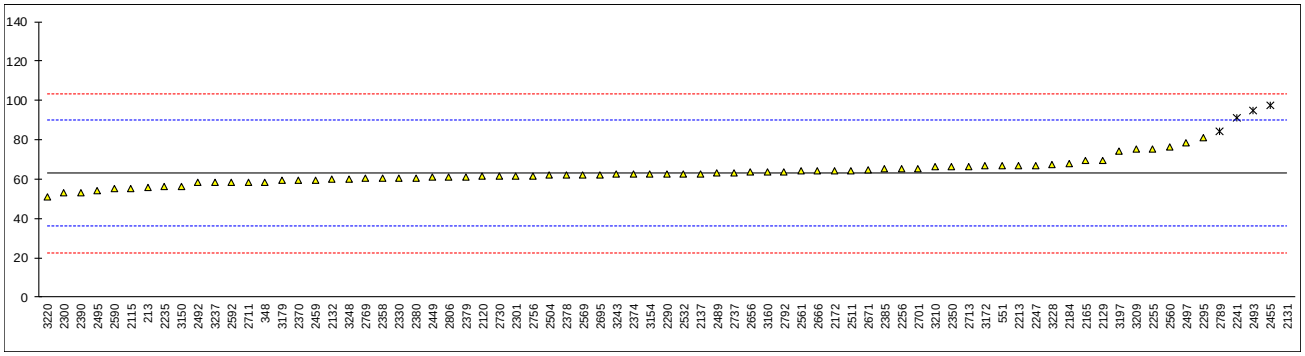
APPENDIX 1

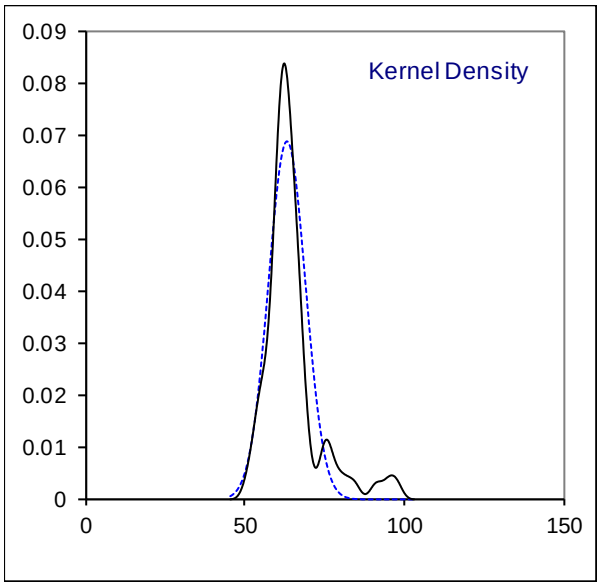
Determination of Formaldehyde content (HPLC) on sample #17640; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	ISO17226-1	55.47		-0.56	
348	In house	58.52		-0.33	
362		-----		-----	
551	ISO17226-1	66.73		0.28	
2115	ISO17226-1	55.15		-0.58	
2120	ISO17226-1	61.42		-0.12	
2129	ISO17226-1	69.7		0.50	
2131	ISO17226-1	2592	R(0.01)	188.22	
2132	ISO17226-1	60.0		-0.22	
2137	ISO17226-1	62.86		-0.01	
2139		-----		-----	
2159		-----		-----	
2165	ISO17226-1	69.34		0.47	
2172	ISO17226-1	64.39		0.10	
2184	ISO17226-1	67.72		0.35	
2213	ISO17226-1	67		0.30	
2235	ISO17226-1	56.08		-0.52	
2241	ISO17226-1	91.0	R(0.01)	2.08	
2247	ISO17226-1	67.0		0.30	
2255	ISO17226-1	75.3		0.92	
2256	ISO17226-1	65.08		0.15	
2273		-----		-----	
2290	ISO17226-1	62.63		-0.03	
2293		-----		-----	
2295	ISO17226-1	81		1.34	
2300	ISO17226-1	52.83		-0.76	
2301	ISO17226-1	61.68		-0.10	
2330	ISO17226-1	60.44		-0.19	
2350	ISO17226-1	66.42		0.25	
2351		-----		-----	
2358	ISO17226-1	60.36		-0.20	
2360		-----		-----	
2364		-----		-----	
2370	ISO17226-1	59.6		-0.25	
2374	ISO17226-1	62.42		-0.04	
2378	ISO17226-1	62.0		-0.07	
2379	ISO17226-1	61.10		-0.14	
2380	ISO17226-1	60.6		-0.18	
2381		-----		-----	
2385	ISO17226-1	65		0.15	
2389		-----		-----	
2390	ISO17226-1	53.21		-0.73	
2449	ISO17226-1	60.93		-0.15	
2453		-----		-----	
2455	ISO17226-1	97.37	R(0.01)	2.56	
2459	ISO17226-1	59.690		-0.25	
2460		-----		-----	
2477		-----		-----	
2488		-----		-----	
2489	ISO17226-1	63.04		0.00	
2492	ISO17226-1	58.2		-0.36	
2493	ISO17226-1	94.8	R(0.01)	2.37	
2495	ISO17226-1	54.068		-0.67	
2497	ISO17226-1	78.421		1.15	
2501		-----		-----	
2504	ISO17226-1	61.8089		-0.09	
2511	ISO17226-1	64.438		0.11	
2519		-----		-----	
2532	ISO17226-1	62.75		-0.02	
2560	ISO17226-1	76.3		0.99	
2561	ISO17226-1	64.37		0.10	
2563		-----		-----	
2569	ISO17226-1	62.2		-0.06	
2572		-----		-----	
2587		-----		-----	
2590	ISO17226-1	55.01		-0.59	
2592	ISO17226-1	58.40		-0.34	
2639		-----		-----	
2643		-----		-----	
2650		-----		-----	
2656	ISO17226-1	63.7	C	0.05	First reported 0.9
2666	ISO17226-1	64.3734		0.10	
2671	ISO17226-1	64.85		0.14	
2674		-----		-----	
2695	ISO17226-1	62.21		-0.06	
2701	ISO17226-1	65.20		0.16	
2711	ISO17226-1	58.4		-0.34	

lab	method	value	mark	z(targ)	remarks
2713	ISO17226-1	66.56		0.26	
2730	ISO17226-1	61.476		-0.11	
2737	ISO17226-1	63.15		0.01	
2741		-----		-----	
2743		-----		-----	
2756	ISO17226-1	61.7715		-0.09	
2769	ISO17226-1	60.3		-0.20	
2783		-----		-----	
2789	ISO17226-1	84.1	R(0.05)	1.57	
2792	ISO17226-1	63.76		0.06	
2806	ISO17226-1	61.0		-0.15	
3146		-----		-----	
3150	ISO17226-1	56.5		-0.48	
3154	ISO17226-1	62.62		-0.03	
3160	ISO17226-1	63.75		0.06	
3172	ISO17226-1	66.6		0.27	
3179	ISO17226-1	59.333		-0.27	
3197	ISO17226-1	74.2		0.83	
3209	ISO17226-1	75.03		0.90	
3210	In house	66.21		0.24	
3216		-----		-----	
3220	ISO17226-1	50.79		-0.91	
3228	ISO17226-1	67.13		0.31	
3237	ISO17226-1	58.30		-0.35	
3243	ISO17226-1	62.4		-0.04	
3248	ISO17226-1	60		-0.22	

normality	suspect
n	70
outliers	5
mean (n)	63.004
st.dev. (n)	5.7952
R(calc.)	16.227
st.dev.(ISO17226-1:08)	13.4363
R(ISO17226-1:08)	37.622



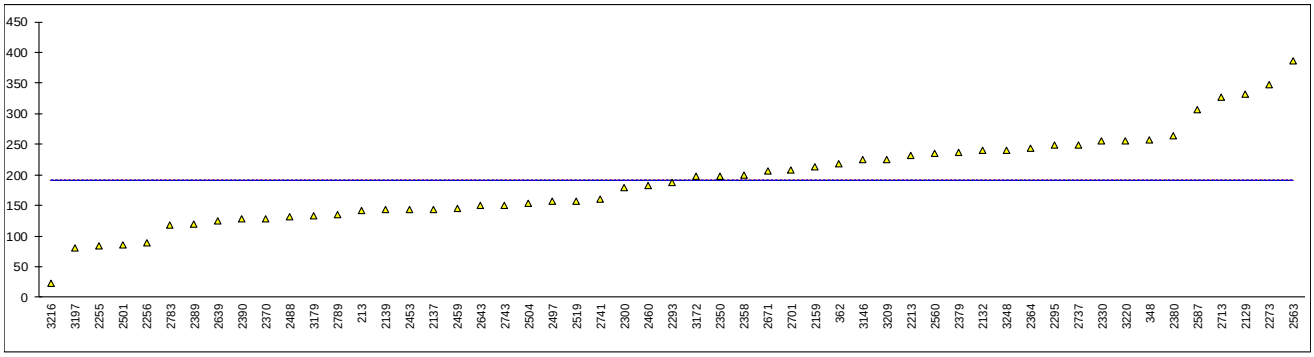


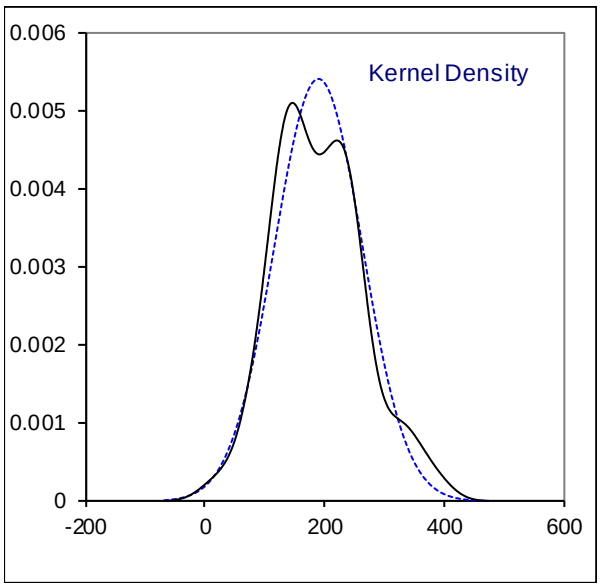
Determination of Formaldehyde content (colorimetric) on sample #17640; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	ISO17226-2	141.82		-----	
348	In house	256.64		-----	
362	ISO17226-2	217.7		-----	
551		-----		-----	
2115		-----		-----	
2120		-----		-----	
2129	ISO17226-2	332.1		-----	
2131		-----		-----	
2132	ISO17226-2	240		-----	
2137	ISO17226-2	144.02		-----	
2139	ISO17226-2	143.39		-----	
2159	In house	212.75		-----	
2165		-----		-----	
2172		-----		-----	
2184		-----		-----	
2213	ISO17226-2	231		-----	
2235		-----		-----	
2241		-----		-----	
2247		NA		-----	
2255	ISO17226-2	84.8		-----	
2256	ISO17226-2	88.94		-----	
2273	ISO17226-2	347.66		-----	
2290		-----		-----	
2293	ISO17226-2	187.595		-----	
2295	ISO17226-2	249		-----	
2300	ISO17226-2	179.63		-----	
2301		-----		-----	
2330	ISO17226-2	255.89		-----	
2350	ISO17226-2	198.31		-----	
2351		-----		-----	
2358	ISO17226-2	200.0		-----	
2360		-----		-----	
2364	ISO17226-2	244		-----	
2370	ISO17226-2	129.0		-----	
2374		-----		-----	
2378		-----		-----	
2379	ISO17226-2	236.315		-----	
2380	ISO17226-2	264.5		-----	
2381		-----		-----	
2385		-----		-----	
2389	ISO17226-2	119.7		-----	
2390	ISO17226-2	128.20		-----	
2449		-----		-----	
2453	ISO17226-2	143.9		-----	
2455		-----		-----	
2459	ISO17226-2	145.50		-----	
2460	ISO17226-2	183.02		-----	
2477		-----		-----	
2488	ISO17226-2	131		-----	
2489		-----		-----	
2492		-----		-----	
2493		-----		-----	
2495		-----		-----	
2497	ISO17226-2	157.11		-----	
2501	ISO17226-2	85.9	C	-----	First reported 566.89
2504	ISO17226-2	153.6018		-----	
2511		-----		-----	
2519	ISO17226-2	157.5		-----	
2532		-----		-----	
2560	ISO17226-2	236.00		-----	
2561		-----		-----	
2563	ISO17226-2	386.2		-----	
2569		-----		-----	
2572		-----		-----	
2587	ISO17226-2	306.14		-----	
2590		-----		-----	
2592		-----		-----	
2639	GB/T19941	125.64		-----	
2643	ISO17226-2	150.13		-----	
2650		-----		-----	
2656		-----		-----	
2666		-----		-----	
2671	ISO17226-2	205.54		-----	
2674		-----		-----	
2695		-----		-----	
2701	ISO17226-2	207.96		-----	
2711		-----		-----	
2713	ISO17226-2	327.43		-----	

lab	method	value	mark	z(targ)	remarks
2730		-----		-----	
2737	ISO17226-2	249.40		-----	
2741	ISO17226-2	160		-----	
2743	ISO17226-2	150.7578		-----	
2756		-----		-----	
2769		-----		-----	
2783	ISO17226-2	118.3980		-----	
2789	ISO17226-2	134.3		-----	
2792		-----		-----	
2806		-----		-----	
3146	ISO17226-2	225.0		-----	
3150		-----		-----	
3154		-----		-----	
3160		-----		-----	
3172	ISO17226-2	197.2		-----	
3179	ISO17226-2	133.58		-----	
3197	ISO17226-2	80.4		-----	
3209	ISO17226-2	225.52		-----	
3210		-----		-----	
3216	ISO17226-2	22.1		-----	
3220	ISO17226-2	256.10		-----	
3228		-----		-----	
3237		-----		-----	
3243		-----		-----	
3248	ISO17226-2	240		-----	

			Only accredited labs	Only accredited that follow test method Reagents and other comp. checked
	normality	OK	OK	OK
	n	53	41	13
	outliers	0	0	0
	mean (n)	191.100	197.889	167.287
	st.dev. (n)	73.6659	72.6838	64.3375
	R(calc.)	206.264	203.515	180.145
	st.dev.(ISO17226-2:08)	(15.7941)	(16.3278)	(13.9222)
	R(ISO17226-2:08)	(44.223)	(45.718)	(38.982)



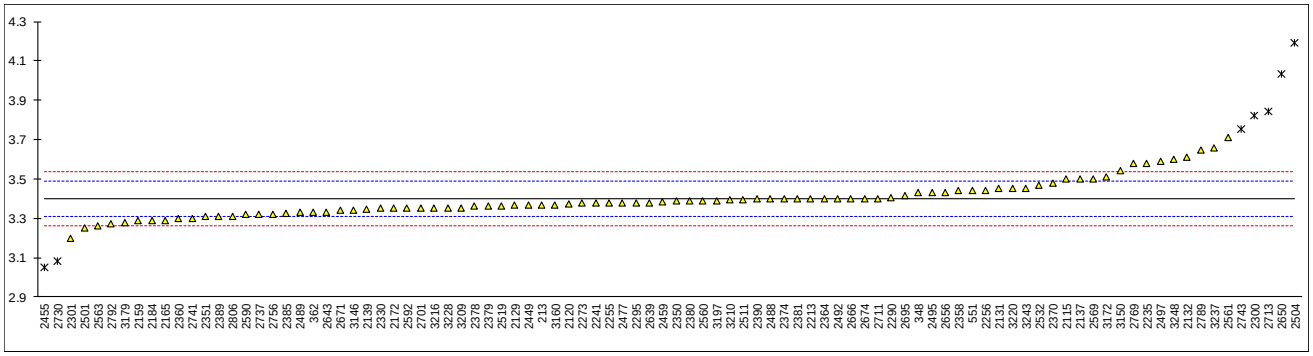


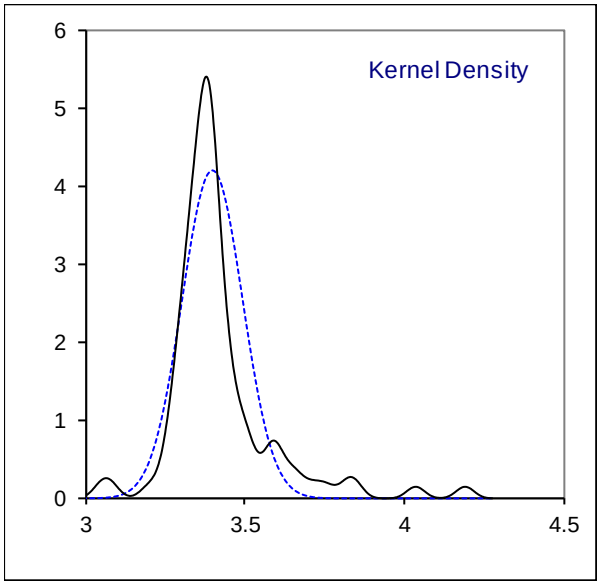
Determination of pH of extract on sample #17641; unitless results

lab	method	value	mark	z(targ)	remarks
213	ISO4045	3.37		-0.61	
348	ISO4045	3.43		0.71	
362	ISO4045	3.33		-1.49	
551	ISO4045	3.44		0.92	
2115	ISO4045	3.5		2.24	
2120	ISO4045	3.375		-0.50	
2129	ISO4045	3.37		-0.61	
2131	ISO4045	3.45		1.14	
2132	ISO4045	3.61		4.66	
2137	ISO4045	3.50		2.24	
2139	ISO4045	3.345		-1.16	
2159	In house	3.29		-2.37	
2165	ISO4045	3.29		-2.37	
2172	ISO4045	3.35		-1.05	
2184	ISO4045	3.29		-2.37	
2213	ISO4045	3.40		0.05	
2235	ISO4045	3.58		4.00	
2241	ISO4045	3.38		-0.39	
2247		-----		-----	
2255	ISO4045	3.38		-0.39	
2256	ISO4045	3.443		0.99	
2273	ISO4045	3.38		-0.39	
2290	ISO4045	3.407		0.20	
2293		-----		-----	
2295	ISO4045	3.38		-0.39	
2300	ISO4045	3.82	R(0.05)	9.28	
2301	ISO4045	3.20		-4.35	
2330	ISO4045	3.35		-1.05	
2350	ISO4045	3.39		-0.17	
2351	ISO4045	3.31		-1.93	
2358	ISO4045	3.44		0.92	
2360	ISO4045	3.30		-2.15	
2364	ISO4045	3.40		0.05	
2370	ISO4045	3.48		1.80	
2374	ISO4045	3.40		0.05	
2378	ISO4045	3.36		-0.83	
2379	ISO4045	3.36		-0.83	
2380	ISO4045	3.39		-0.17	
2381	ISO4045	3.40		0.05	
2385	ISO4045	3.325		-1.60	
2389	ISO4045	3.31		-1.93	
2390	ISO4045	3.4		0.05	
2449	ASTM D2810	3.37		-0.61	
2453		-----		-----	
2455	ISO4045	3.05	R(0.05)	-7.65	
2459	ISO4045	3.385		-0.28	
2460		-----		-----	
2477	ISO4045	3.38		-0.39	
2488	ISO4045	3.4		0.05	
2489	ISO4045	3.33		-1.49	
2492	In house	3.40		0.05	
2493		-----		-----	
2495	ISO4045	3.43		0.71	
2497	ISO4045	3.59		4.22	
2501	ISO4045	3.25		-3.25	
2504	ISO4045	4.19	C,R(0.01)	17.42	First reported 3.89
2511	ISO4045	3.394		-0.09	
2519	ASTM D2810	3.36		-0.83	
2532	ISO4045	3.47		1.58	
2560	ISO4045	3.39		-0.17	
2561	ISO4045	3.71		6.86	
2563	ISO4045	3.26		-3.03	
2569	ISO4045	3.5		2.24	
2572		-----		-----	
2587		-----		-----	
2590	ISO4045	3.32		-1.71	
2592	ISO4045	3.35		-1.05	
2639	QB/T2724	3.38	C	-0.39	First reported 3.63
2643	ASTM D2810	3.33		-1.49	
2650	ISO4045	4.035	R(0.01)	14.01	
2656	ISO4045	3.43		0.71	
2666	ISO4045	3.40		0.05	
2671	ISO4045	3.34		-1.27	
2674	ISO4045	3.40		0.05	
2695	ISO4045	3.415		0.38	
2701	ISO4045	3.35		-1.05	
2711	ISO4045	3.40		0.05	
2713	ISO4045	3.845	R(0.05)	9.83	

lab	method	value	mark	z(targ)	remarks
2730	ISO4045	3.08	R(0.05)	-6.99	
2737	ISO4045	3.32		-1.71	
2741	ISO4045	3.3		-2.15	
2743	ISO4045	3.755	R(0.05)	7.85	
2756	INH-13	3.32		-1.71	
2769	ISO4045	3.577		3.94	
2783		-----		-----	
2789	ISO4045	3.65		5.54	
2792	ISO4045	3.27		-2.81	
2806	ISO4045	3.31		-1.93	
3146	ISO4045	3.34		-1.27	
3150	ISO4045	3.54		3.12	
3154		-----		-----	
3160	ISO4045	3.37		-0.61	
3172	ISO4045	3.51		2.46	
3179	ISO4045	3.28		-2.59	
3197	ISO4045	3.39		-0.17	
3209	ISO4045	3.353		-0.99	
3210	ISO4045	3.393		-0.11	
3216	ISO4045	3.35		-1.05	
3220	ISO4045	3.45		1.14	
3228	ISO4045	3.35		-1.05	
3237	ISO4045	3.66		5.76	
3243	ISO4045	3.45		1.14	
3248	ISO4045	3.6		4.44	

		Only ISO4045
normality	not OK	not OK
n	87	80
outliers	7	7
mean (n)	3.398	3.402
st.dev. (n)	0.0947	0.0971
R(calc.)	0.265	0.272
st.dev.(D2810:13)	0.0455	0.0455
R(D2810:13)	0.127	unknown



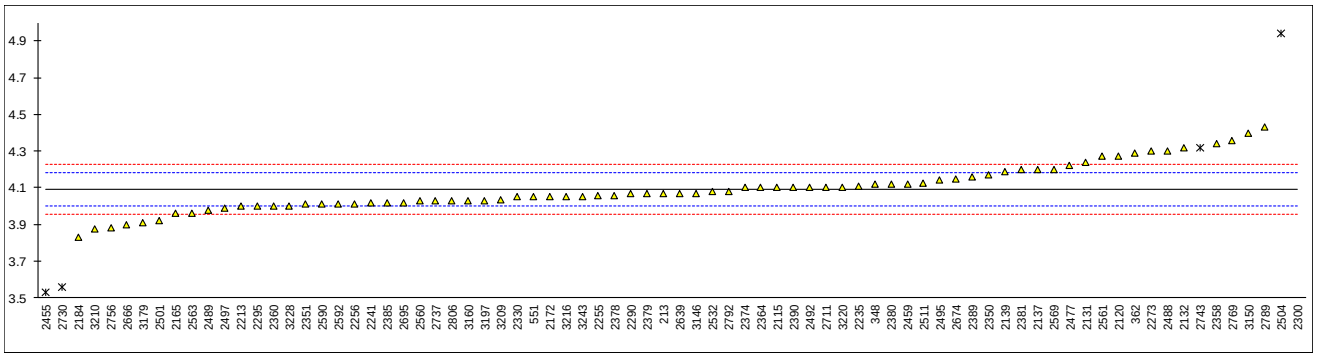


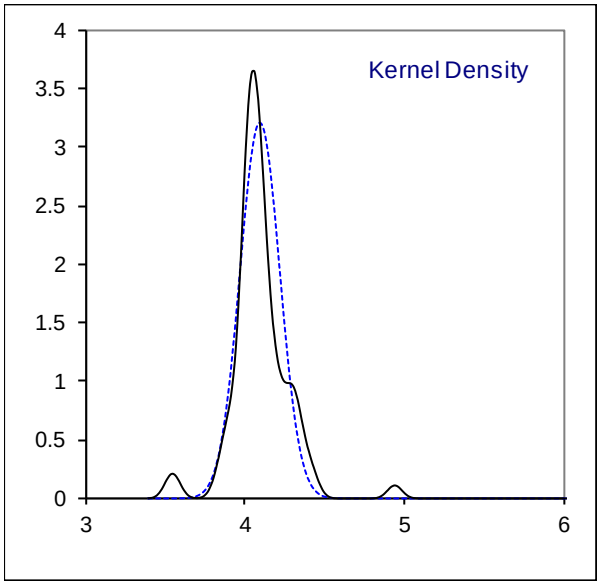
Determination of pH of ten times diluted extract on sample #17641; unitless results

lab	method	value	mark	z(targ)	remarks
213	ISO4045	4.07		-0.52	
348	ISO4045	4.12		0.58	
362	ISO4045	4.29		4.32	
551	ISO4045	4.05		-0.96	
2115	ISO4045	4.1		0.14	
2120	ISO4045	4.272		3.93	
2129		-----		-----	
2131	ISO4045	4.24		3.22	
2132	ISO4045	4.32		4.98	
2137	ISO4045	4.20		2.34	
2139	ISO4045	4.190		2.12	
2159		-----		-----	
2165	ISO4045	3.96		-2.93	
2172	ISO4045	4.05		-0.96	
2184	ISO4045	3.83		-5.79	
2213	ISO4045	4.00		-2.05	
2235	ISO4045	4.11		0.36	
2241	ISO4045	4.02		-1.61	
2247		-----		-----	
2255	ISO4045	4.06		-0.74	
2256	ISO4045	4.012		-1.79	
2273	ISO4045	4.30		4.54	
2290	ISO4045	4.067		-0.58	
2293		-----		-----	
2295	ISO4045	4.0		-2.05	
2300	ISO4045	7.21	R(0.01)	68.56	
2301		-----		-----	
2330	ISO4045	4.05		-0.96	
2350	ISO4045	4.17		1.68	
2351	ISO4045	4.01		-1.83	
2358	ISO4045	4.34		5.42	
2360	ISO4045	4.00		-2.05	
2364	ISO4045	4.10		0.14	
2370		-----		-----	
2374	ISO4045	4.10		0.14	
2378	ISO4045	4.06		-0.74	
2379	ISO4045	4.07		-0.52	
2380	ISO4045	4.12		0.58	
2381	ISO4045	4.20		2.34	
2385	ISO4045	4.020		-1.61	
2389	ISO4045	4.16		1.46	
2390	ISO4045	4.1		0.14	
2449		-----		-----	
2453		-----		-----	
2455	ISO4045	3.53	R(0.01)	-12.39	
2459	ISO4045	4.12	C	0.58	First reported 5.565
2460		-----		-----	
2477	ISO4045	4.22		2.78	
2488	ISO4045	4.3		4.54	
2489	ISO4045	3.98		-2.49	
2492		4.10		0.14	
2493		-----		-----	
2495	ISO4045	4.14		1.02	
2497	ISO4045	3.99		-2.27	
2501	ISO4045	3.92		-3.81	
2504	ISO4045	4.94	C,ex	18.62	First reported 4.88, test result excluded as “pH of extract” was outlier”
2511	ISO4045	4.128		0.76	
2519		-----		-----	
2532	ISO4045	4.08		-0.30	
2560	ISO4045	4.03		-1.39	
2561	ISO4045	4.27		3.88	
2563	ISO4045	3.96		-2.93	
2569	ISO4045	4.2		2.34	
2572		-----		-----	
2587		-----		-----	
2590	ISO4045	4.01		-1.83	
2592	ISO4045	4.01		-1.83	
2639	QB/T2724	4.07	C	-0.52	First reported 4.32
2643		-----		-----	
2650		-----		-----	
2656		-----		-----	
2666	ISO4045	3.90		-4.25	
2671		-----		-----	
2674	ISO4045	4.15		1.24	
2695	ISO4045	4.020		-1.61	
2701		-----		-----	
2711	ISO4045	4.1		0.14	
2713		-----		-----	

lab	method	value	mark	z(targ)	remarks
2730	ISO4045	3.56	R(0.01)	-11.73	
2737	ISO4045	4.03		-1.39	
2741		-----		-----	
2743	ISO4045	4.320	ex	4.98	Test result excluded as “pH of extract” was outlier”
2756	INH-13	3.88		-4.69	
2769	ISO4045	4.360		5.86	
2783		-----		-----	
2789	ISO4045	4.43		7.40	
2792	ISO4045	4.08		-0.30	
2806	ISO4045	4.03		-1.39	
3146	ISO4045	4.07		-0.52	
3150	ISO4045	4.40		6.74	
3154		-----		-----	
3160	ISO4045	4.03		-1.39	
3172		-----		-----	
3179	ISO4045	3.91		-4.03	
3197	ISO4045	4.03		-1.39	
3209	ISO4045	4.036		-1.26	
3210	ISO4045	3.874		-4.83	
3216	ISO4045	4.05		-0.96	
3220	ISO4045	4.10		0.14	
3228	ISO4045	4.00		-2.05	
3237		-----		-----	
3243	ISO4045	4.05		-0.96	
3248		-----		-----	

normality	OK
n	73
outliers	3 (+2excl)
mean (n)	4.093
st.dev. (n)	0.1246
R(calc.)	0.349
st.dev.(D2810:13)	0.0455
R(D2810:13)	0.127



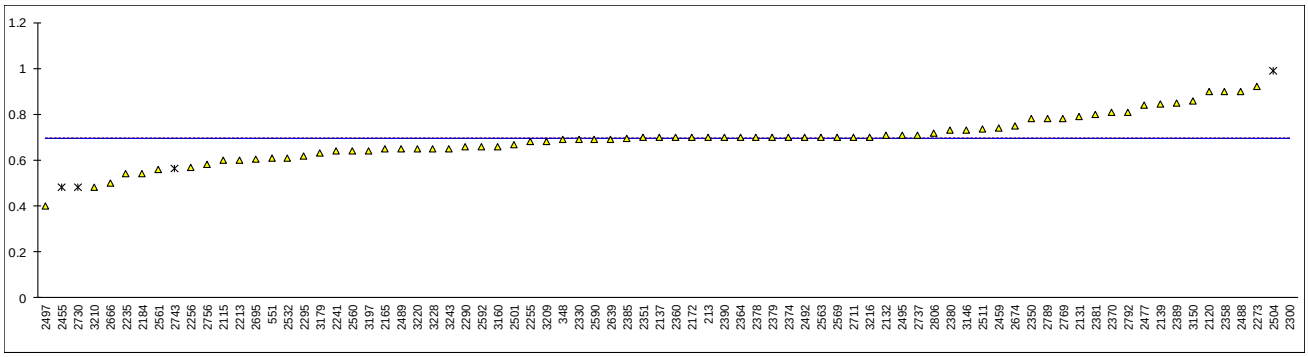


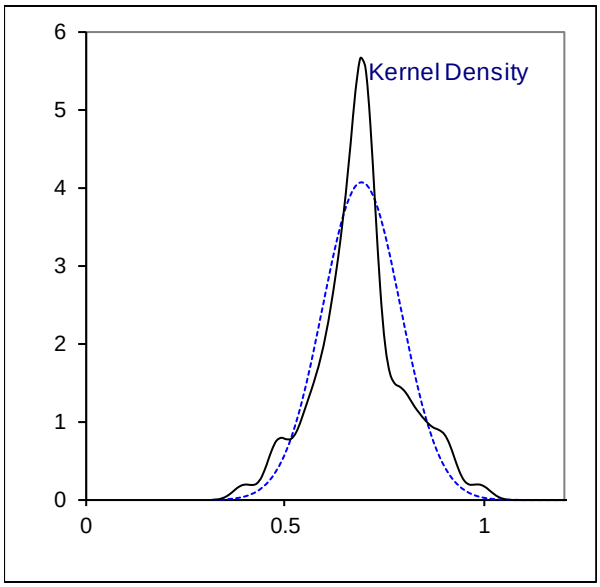
Determination of difference between pH of extract and pH of ten times diluted extract on sample #17641; unitless results

lab	method	value	mark	z(targ)	Remarks
213	ISO4045	0.7		-----	
348	ISO4045	0.69		-----	
362		-----		-----	
551	ISO4045	0.61		-----	
2115	ISO4045	0.6		-----	
2120	ISO4045	0.897		-----	
2129		-----		-----	
2131	ISO4045	0.79		-----	
2132	ISO4045	0.71		-----	
2137	ISO4045	0.7		-----	
2139	ISO4045	0.845		-----	
2159		-----		-----	
2165	ISO4045	0.65		-----	
2172	ISO4045	0.70		-----	
2184	ISO4045	0.54		-----	
2213	ISO4045	0.60		-----	
2235	ISO4045	0.54		-----	
2241	ISO4045	0.64		-----	
2247		-----		-----	
2255	ISO4045	0.68		-----	
2256	ISO4045	0.569		-----	
2273	ISO4045	0.92		-----	
2290	ISO4045	0.66		-----	
2293		-----		-----	
2295	ISO4045	0.62		-----	
2300	ISO4045	3.4	R(0.01)	-----	
2301		-----		-----	
2330	ISO4045	0.69		-----	
2350	ISO4045	0.78		-----	
2351	ISO4045	0.70		-----	
2358	ISO4045	0.90		-----	
2360	ISO4045	0.70		-----	
2364	ISO4045	0.7		-----	
2370	ISO4045	0.81		-----	
2374	ISO4045	0.7		-----	
2378	ISO4045	0.70		-----	
2379	ISO4045	0.7		-----	
2380	ISO4045	0.73		-----	
2381	ISO4045	0.80		-----	
2385	ISO4045	0.695		-----	
2389	ISO4045	0.85		-----	
2390	ISO4045	0.7		-----	
2449		-----		-----	
2453		-----		-----	
2455	ISO4045	0.48	ex	-----	Test result excluded as “pH of extract” was outlier”
2459	ISO4045	0.74	C	-----	First reported 2.18
2460		-----		-----	
2477	ISO4045	0.84		-----	
2488	ISO4045	0.9		-----	
2489	ISO4045	0.65		-----	
2492		0.70		-----	
2493		-----		-----	
2495	ISO4045	0.71		-----	
2497	ISO4045	0.4		-----	
2501	ISO4045	0.67		-----	
2504	ISO4045	0.99	ex	-----	Test result excluded as “pH of extract” was outlier”
2511	ISO4045	0.734		-----	
2519		-----		-----	
2532	ISO4045	0.61		-----	
2560	ISO4045	0.64	C	-----	Reported -0.64, iis changed it to absolute figure
2561	ISO4045	0.56		-----	
2563	ISO4045	0.7		-----	
2569		0.7		-----	
2572		-----		-----	
2587		-----		-----	
2590	ISO4045	0.69		-----	
2592	ISO4045	0.66		-----	
2639	QB/T2724	0.69		-----	
2643		-----		-----	
2650		-----		-----	
2656		-----		-----	
2666	ISO4045	0.50		-----	
2671		-----		-----	
2674	ISO4045	0.75		-----	
2695	ISO4045	0.605		-----	
2701		-----		-----	
2711	ISO4045	0.7	C	-----	First reported 4.1
2713		-----		-----	

lab	method	value	mark	z(targ)	Remarks
2730	ISO4045	0.48	ex	-----	Test result excluded as “pH of extract” was outlier”
2737	ISO4045	0.71		-----	
2741		-----		-----	
2743	ISO4045	0.565	ex	-----	Test result excluded as “pH of extract” was outlier”
2756	INH-13	0.58		-----	
2769	ISO4045	0.783		-----	
2783		-----		-----	
2789	ISO4045	0.78		-----	
2792	ISO4045	0.81		-----	
2806	ISO4045	0.72		-----	
3146	ISO4045	0.73		-----	
3150	ISO4045	0.86		-----	
3154		-----		-----	
3160	ISO4045	0.66		-----	
3172		-----		-----	
3179	ISO4045	0.63		-----	
3197	ISO4045	0.64		-----	
3209	ISO4045	0.683		-----	
3210	ISO4045	0.481		-----	
3216	ISO4045	0.7		-----	
3220	ISO4045	0.65		-----	
3228	ISO4045	0.65	C	-----	First reported -0.65
3237		-----		-----	
3243	ISO4045	0.65		-----	
3248		-----		-----	

normality	OK
n	73
outliers	1 (+4 excl)
mean (n)	0.694
st.dev. (n)	0.0979
R(calc.)	0.274
st.dev.(lit)	n.a.
R(lit)	n.a.





APPENDIX 2
Analytical Details ISO17226-2

labnrs	1. Is your laboratory accredited in accordance with ISO/IEC17025?	Were the reagents checked for absence of formaldehyde?	If yes, please give absorbance of reagents	Was for "released Formaldehyde" the sample tested for other compounds which may cause a coloring with acetylacetone?	If yes, please give absorbance	Was the absorbance of the solution for the determination "released Formaldehyde" corrected for above absorbances?	If yes, please give absorbance of the sample solution before and after correction	Remarks on Additional Questions:
213	Yes	Yes	0,0051	---		---		
348	Yes	Yes	0.0271	Yes	0.723	No		
362	Yes	No		---		---		
551	Yes	---		---		---		
2115	Yes	Yes		---		---		
2120	No	Yes	Is depending on several circumstances	---		---		
2129	Yes	No	0,0029	No		No		
2131	Yes	No		No		No		
2132	Yes	Yes	0.0008	Yes	0.0907	Yes	Before 0.5927, After 0.5075	
2137	Yes	Yes	0.0004	Yes	0.0837	Yes	Before 0.84645 After 0.76365	
2139	No	No		No		No		
2159	Yes	No		No		No		-
2165	Yes	---		---		---		
2172	Yes	No		No		No		
2184	---	---		---		---		
2213	Yes	Yes		---		---		
2235	Yes	---		---		---		
2241	Yes	Yes		---		---		
2247	Yes	Yes	# 17635 :0.003; # 17636 :0.012;	No		No		
2255	Yes	No		No		No		
2256	Yes	Yes	0.001	Yes	0.3982	Yes	Before: 0.8810, After: 0.4828	
2273	Yes	Yes	0.034	No		No		
2290	Yes	Yes		---		---		
2293	Yes	Yes	-0.006	Yes	0.184	No		
2295	Yes	Yes	1nm	Yes	2.67nm	No		
2300	Yes	Yes	0.0	No		No		

labnrs	1. Is your laboratory accredited in accordance with ISO/IEC17025?	Were the reagents checked for absence of formaldehyde?	If yes, please give absorbance of reagents	Was for "released Formaldehyde" the sample tested for other compounds which may cause a coloring with acetylacetone?	If yes, please give absorbance	Was the absorbance of the solution for the determination "released Formaldehyde" corrected for above absorbances?	If yes, please give absorbance of the sample solution before and after correction	Remarks on Additional Questions:
2301	---	---		---		---		
2330	Yes	Yes	0.0257	No		No		
2350	No	No		No		No		
2351	---	---		---		---		
2358	Yes	Yes	0.052	No		No		
2360	---	---		---		---		
2364	Yes	Yes	0.0251	No		No		
2370	Yes	Yes	0.008Abs	No		No		
2374	Yes	No		No		No		
2378	---	---		---		---		
2379	No	Yes	0.0231	Yes	0.0006	No		
2380	Yes	No		No		No		
2381	---	---		---		---		
2385	Yes	---		---		---		
2389	---	---		---		---		
2390	Yes	Yes	0.000	No		No		
2449	---	---		---		---		
2453	No	Yes	0.033	---		---		
2455	Yes	---		---		---		
2459	Yes	No		No		No		
2460	Yes	Yes	0.017	Yes	0.339	No		
2477	---	---		---		---		
2488	Yes	Yes		---		---		
2489	Yes	---		---		---		
2492	Yes	No		No		No		
2493	Yes	---		---		---		
2495	Yes	No		No		No		
2497	Yes	No		No		No		
2501	Yes	Yes	Dimedone: 0.001	Yes	sodium dodecyl sulfate: 0.007	Yes	Before: 0.303, After: 0.295	The sample was diluted by 1000 times.

labnrs	1. Is your laboratory accredited in accordance with ISO/IEC17025?	Were the reagents checked for absence of formaldehyde?	If yes, please give absorbance of reagents	Was for "released Formaldehyde" the sample tested for other compounds which may cause a coloring with acetylacetone?	If yes, please give absorbance	Was the absorbance of the solution for the determination "released Formaldehyde" corrected for above absorbances?	If yes, please give absorbance of the sample solution before and after correction	Remarks on Additional Questions:
2504	Yes	Yes	0.0038290	No		No		
2511	---	---		---		---		
2519	No	No		No		No		
2532	Yes	No		No		No	-	-
2560	Yes	No	N/A	No		No		N/A
2561	Yes	Yes		Yes		Yes		
2563	Yes	No		Yes		Yes		
2569	Yes	---		---		---		
2572	---	---		---		---		
2587	Yes	No		No		No		
2590	Yes	No		---		---		
2592	Yes	No		---		---		
2639	Yes	Yes	0.036	Yes	0.030	No		
2643	Yes	Yes	0.0200	No		Yes	before : 0.8113, after: 0.7835	
2650	---	---		---		---		
2656	No	No		No		No		
2666	Yes	No		No		No		
2671	---	---		---		---		
2674	---	---		---		---		
2695	Yes	No		No		No		
2701	---	---		---		---		
2711	---	---		---		---		
2713	No	Yes	0.0031	Yes		Yes	Before 0.1621x10 dilute, after 0.0434x10 dilute	
2730	No	No		---		---		
2737	Yes	No		No		No		
2741	Yes	Yes	0.003	Yes	0.24	Yes	Before: 5.04; after: 4.8	/
2743	Yes	Yes	all measured against a blank constituted by all the reagents	No		No		
2756	Yes	Yes	no absorbance was observed for reagents	---		---		

labnrs	1. Is your laboratory accredited in accordance with ISO/IEC17025?	Were the reagents checked for absence of formaldehyde?	If yes, please give absorbance of reagents	Was for "released Formaldehyde" the sample tested for other compounds which may cause a coloring with acetylacetone?	If yes, please give absorbance	Was the absorbance of the solution for the determination "released Formaldehyde" corrected for above absorbances?	If yes, please give absorbance of the sample solution before and after correction	Remarks on Additional Questions:
2769	No	---		---		---		
2783	No	No		No		No		
2789	No	Yes	0,1114	Yes	0,0193	Yes	Before correction: 0,7402 After correction: 0,7209	Absorbance of reagents (0,1114) is corrected by the spectophotometer and considered as base zero
2792	No	---		---		---		
2806	No	---		---		---		
3146	Yes	No		No		No		blank check
3150	Yes	No		No		No		
3154	Yes	---		---		---		
3160	No	No		No		---		
3172	Yes	---		---		---		
3179	Yes	Yes	-0,003	Yes	-0,004	No		
3197	Yes	Yes	0.0002	Yes	0.0004	No		
3209	Yes	No		No		No		
3210	Yes	Yes		---		---		
3216	---	---		---		---		
3220	Yes	Yes	Dimedone - Absorbance is 0.107	No		Yes	Before correction - 0.792; After correction - 0.685	
3228	Yes	---		---		---		
3237	Yes	No		---		---		
3243	Yes	No		No		No		
3248	Yes	Yes	0	Yes	0	Yes	0.0638	

APPENDIX 3

Number of participants per country

4 labs in BANGLADESH
1 lab in BRAZIL
1 lab in BULGARIA
1 lab in CAMBODIA, Kingdom of
1 lab in ETHIOPIA
3 labs in FRANCE
8 labs in GERMANY
1 lab in GUATEMALA
1 lab in HUNGARY
6 labs in HONG KONG
8 labs in INDIA
2 labs in INDONESIA
12 labs in ITALY
5 labs in SOUTH KOREA
2 labs in MEXICO
1 lab in MOROCCO
17 labs in P.R. of CHINA
4 labs in PAKISTAN
3 labs in PORTUGAL
5 labs in SPAIN
1 lab in SWITZERLAND
1 lab in TAIWAN R.O.C.
2 labs in THAILAND
1 lab in TUNISIA
6 labs in TURKEY
2 labs in U.S.A.
1 lab in UNITED KINGDOM
3 labs in VIETNAM

APPENDIX 4

Abbreviations:

C = final 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
n.a. = not applicable
n.d. = not detected
n.e. = not evaluated
W = test result withdrawn on request of participant
ex = test result excluded from the statistical evaluation

Literature:

1. iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, March 2017
2. Öko-Tex Standard 100; January 2017.
3. Blue Sign (BSSL) version 6.0 July 01, 2016
4. Impacts of Environmental Standards and requirements in EU Countries. Aug 99.
5. Horwitz. Journal of AOAC International Vol. 79 No.3. 1996.
6. P.L. Davies. Fr Z. Anal. Chem. 351. 513 (1988).
7. W.J. Conover. Practical; Nonparametric Statistics. J. Wiley&Sons. NY. p.302 (1971).
8. ISO 5725:86.
9. ISO 5725. parts 1-6:94.
10. ISO105 E4:94.
11. ISO14184-1:94.
12. ISO13528:05.
13. M. Thompson and R. Wood. J. AOAC Int. 76. 926. (1993).
14. Analytical Methods Committee Technical brief, No.4 January 2001.
15. P.J. Lowthian and M. Thompson, The Royal Society of Chemistry 2002, Analyst 2002, 127 p1359-1364
16. Official Journal of the European Communities L133/29: May 2002.
17. Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), p165-172, (1983)