Results of Proficiency Test OPP, PCP and TeCP in textile December 2016

Organised by: Institute for Interlaboratory Studies (iis)
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since the 1990's, many countries have adopted environmental standards and requirements restricting the use of harmful chemicals in the production of textiles and clothing. Laws and regulations impose some of these standards and requirements. In addition to mandatory environmental standards and requirements for textiles, some Eco-labelling schemes are imposing environmental requirements for textile products on a voluntary basis, e.g. Milieukeur (Netherlands), Bluesign© (Switzerland) and Öko-Tex Standard 100 (Germany).
The Institute for Interlaboratory Studies organizes since 2004 a scheme of proficiency test for Orthophenylphenol (OPP), Pentachlorophenol (PCP) and Tetrachlorophenols (TeCP) in textile. In the annual proficiency test program of 2016/2017, this proficiency test was continued.
In this interlaboratory study 90 laboratories in 22 different countries did register for participation. See appendix 3 for the number of participants per country. In this report, the results of the 2016 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 was the organiser of this proficiency test (PT). Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. It was decided to send two different samples (labelled #16645 and #16646, 3 grams each) which were positive on OPP and/or PCP. The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 QUALITY SYSTEM

The Institute for Interlaboratory Studies 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 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 April 2014 (iis-protocol, version 3.3). 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

Two different batches of textile were obtained from a third party. The first bulk material, an off white cotton fabric positive on OPP, was cut into pieces. From this batch, after mixing well, 120 subsamples of 3 grams each were packed and labelled #16645.

The homogeneity of 8 stratified randomly selected subsamples of #16645 was checked by determination of OPP. The determination is performed in accordance with an in-house test method for OPP. See the following table for the test results.

	OPP in mg/kg
Sample #16645-1	43.0
Sample #16645-2	45.8
Sample #16645-3	42.3
Sample #16645-4	44.0
Sample #16645-5	44.6
Sample #16645-6	44.5
Sample #16645-7	42.5
Sample #16645-8	49.1

Table 1: homogeneity test results of subsamples of #16645

From the above test results the repeatability was calculated and compared with 0.3 times the corresponding reproducibility of the reference method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	OPP in mg/kg
r (observed)	6.2
reference method	iis-memo (see lit.18)
0.3 x R (reference method)	7.7

Table 2: evaluation of the repeatability of subsamples #16645

The second bulk material, a black cotton fabric positive on PCP, was cut into pieces. From this batch, after mixing well, 120 subsamples of 3 grams each were packed and labelled #16646.
The homogeneity of 8 stratified randomly selected samples was checked by determination of PCP. The determination is performed in accordance with LFBG82.02.8 for PCP. See the following table for the test results.

	PCP in mg/kg
Sample #16646-1	4.91
Sample #16646-2	5.66
Sample #16646-3	4.88
Sample #16646-4	5.47
Sample #16646-5	5.23
Sample #16646-6	5.02
Sample #16646-7	5.68
Sample #16646-8	5.29

Table 3: homogeneity test results of subsample #16646

From the above test results the repeatability was calculated and compared with 0.3 times the corresponding reproducibility of the reference method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	PCP in mg/kg
r (observed)	0.89
reference method	iis-memo (see lit.18)
0.3 x R (reference method)	1.26

Table 4: repeatability of subsamples #16646

The repeatabilities of Orthophenylphenol (OPP) and Pentachlorophenol (PCP) were in agreement with 0.3 times the respective target requirement. Therefore, homogeneity of the subsamples was assumed.
To each participating laboratory one sample of approx. 3 grams, labelled #16645 and one sample of approx. 3 grams, labelled #16646 were sent on November 16, 2016. A letter of instructions was added to the sample package.

2.5 ANALYSES

The participants were asked to determine on samples #16645 and #16646 the concentrations of Orthophenylphenol (OPP), Pentachlorophenol (PCP), 2,3,4,5-Tetrachlorophenol, 2,3,4,6-Tetrachlorophenol and 2,3,5,6-Tetrachlorophenol applying the analysis procedure that is routinely used in the laboratory. Also some test method details were requested to be reported.

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 to 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 evaluation.

To get comparable test results a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the reference test methods (when applicable) that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis-cts/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal www.kpmd.co.uk/sgs-iis-cts/. The reported test results are tabulated per determination in 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 (no reanalyses). Additional or corrected test results are used for the data analysis and the original test results are placed under 'Remarks' in the test 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 April 2014 (iis-protocol, version 3.3).

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 subsequently to Dixon's, Grubbs' and or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test and by R(0.01) for the Rosner test. Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test and by R(0.05) for the Rosner 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. 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 of this interlaboratory study.

The target standard deviation was calculated from the target reproducibility (preferably taken from a standardized test method) by division with 2.8. In case no literature reproducibility was available, other target values were used. In some cases a reproducibility based on former iis proficiency tests was 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 is done in order to evaluate whether the reported test results are fit-for-purpose.

The z-scores were calculated according to:

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

The $z_{(target)}$ scores are listed in the test result tables of appendix 1.
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 serious problems occurred, although two participants reported the test results after the final reporting date and four participants did not report any test results at all. Not all laboratories were able to report all analyses requested. In total 86 of the 90 participants reported 271 numerical test results. No statistical outliers were observed. In proficiency studies outlier percentages of 3% - 7.5% are quite normal.

Due to the lack of relevant reference test methods for the determination of OPP, calculated reproducibilities were compared with reproducibilities estimated from the Horwitz equation until 2015. For Pentachlorophenol (PCP), both existing methods (LFGB 82.02-8 and ISO17070:2006, the latter method superseding DIN53313:1996 and DIN14494:2003), mention identical precision data for leather only. These precision data for leather are in full agreement with the Horwitz equation and were used in the calculation of the z-scores due to lack of a better alternative. In other PTs for other determinations, a quality improvement is visible over the years as a decrease of the dispersion is observed. However, in the case of OPP and PCP a quality improvement is not clearly visible and therefore it is doubtful whether the target reproducibility based on the Horwitz equation will ever be met. This goal may be unreachable. In 2015, it was decided to estimate a target reproducibility based on iis PT data of OPP/PCP proficiency tests from 2004 unto 2014. This estimation of the target reproducibilities for OPP and PCP was based on a Horwitz-like equation as it was assumed that the variation in the PT test results will be dependent on the concentration. This developed Horwitz-like equation to estimate the target reproducibilities for the evaluation of the quality of the PT test results is used by iis from 2015 (see lit.18).

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section the results are discussed per sample and per test. The different test methods that are reported by the laboratories are taken into account for explaining the observed differences when possible and applicable. These test methods are also mentioned in the tables in appendix 1 together with the reported test results. The abbreviations used in these tables are listed in appendix 4.

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.

Sample #16645

OPP: The determination of this component may be problematic at the level of 18 mg/kg. No statistical outliers were detected. The calculated reproducibility is not in agreement with the estimated reproducibility found in previous iis PTs (see lit 18). However the observed level of 18 mg/kg for OPP is lower than the Eco labelling Limit of 50 mg/kg for OPP, see also paragraph 6.

PCP / 2,3,4,5-TeCP / 2,3,4,6-TeCP / 2,3,5,6-TeCP:
The concentrations of these components were near or below the detection limit. Therefore no significant conclusions were drawn.

Sample #16646

OPP: The determination of this component may be problematic at the low level of 3 mg/kg. No statistical outliers were detected. The calculated reproducibility is not in agreement with the estimated reproducibility found in previous iis PTs (see lit 18). However the observed level of 3 mg/kg for OPP is much lower than the Eco labelling Limit of 50 mg/kg for OPP (see also paragraph 6); therefore no z-scores were calculated for this determination.

PCP: The determination of this component was not problematic. No statistical outliers were detected. The calculated reproducibility is in agreement with the estimated reproducibility found in previous iis PTs (see lit 18). See paragraph 6 for discussion.

2,3,4,5-TeCP / 2,3,4,6-TeCP / 2,3,5,6-TeCP:
The concentrations of these components were near or below the detection limit. Therefore no significant conclusions were drawn.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the estimated target reproducibilities (see 4.1) and the reproducibilities as found for the group of participating laboratories.
The number of significant test results, the average results, the calculated reproducibilities (standard deviation*2.8) and the target reproducibilities are compared in the next table:

	unit	*n*	*Average*	*2.8 * sd*	*R (lit)*
OPP	mg/kg	74	18.0	19.3	12.0
PCP	mg/kg	50	<0.1	n.a.	n.a.
2,3,4,5-TeCP	mg/kg	48	<0.1	n.a.	n.a.
2,3,4,6-TeCP	mg/kg	49	<0.1	n.a.	n.a.
2,3,5,6-TeCP	mg/kg	47	<0.1	n.a.	n.a.

Table 5: reproducibility of phenols on textile sample #16645

	unit	*n*	*Average*	*2.8 * sd*	*R (lit)*
OPP	mg/kg	63	3.10	3.86	(2.67)
PCP	mg/kg	86	9.12	7.25	6.70
2,3,4,5-TeCP	mg/kg	50	<0.1	n.a.	n.a.
2,3,4,6-TeCP	mg/kg	48	<0.1	n.a.	n.a.
2,3,5,6-TeCP	mg/kg	47	<0.1	n.a.	n.a.

Table 6: reproducibility of phenols on textile sample #16646
The figures between brackets: the level of OPP in the PT is below the range of OPP used in lit 18 (6 – 520 mg/kg).

Without further statistical calculations, it can be concluded that for OPP the total group of participating laboratories may have difficulties with the analysis. See also the discussion in paragraphs 4.1 and 6.

5 COMPARISON WITH PREVIOUS INTERLABORATORY STUDIES

The observed variation expressed as the relative standard deviation RSD of the test results in 2016 PT was for PCP similar to the variations as observed in the previous rounds. For OPP the observed variation was somewhat larger.

	Dec 2016	*Nov 2015*	*Nov 2014*	*Nov 2013*	*2012 - 2009*	*lit. 18*
OPP	38%	24%	27%	29%	17 - 35%	24%
PCP	28%	38%	26%	20%	15 - 31%	26%

Table 7: Comparison of uncertainties in iis proficiency tests

6 DISCUSSION

The effect of the reported analytical details (see appendix 2) on the determination of OPP in sample #16645 and on PCP in sample #16646 were investigated, see table 8 for OPP and table 9 for PCP.

Analytical Details	*unit*	*n*	*Average*	*2.8 * sd*	*R (lit)*
ISO/IEC 17025 accredited	mg/kg	57	17.1	17.3	11.4
Not ISO/IEC 17025 accredited	mg/kg	16	21.5	23.7	13.9
Basic / Ultrasonic extraction	mg/kg	43	18.0	21.0	11.9
Steam distillation	mg/kg	23	19.0	12.6	12.5

Table 8: reproducibility of OPP on textile sample #16645

Analytical Details	*unit*	*n*	*Average*	*2.8 * sd*	*R (lit)*
ISO/IEC 17025 accredited	mg/kg	62	9.26	6.08	6.78
Not ISO/IEC 17025 accredited	mg/kg	22	8.65	9.86	6.40
Basic / Ultrasonic extraction	mg/kg	51	9.48	8.34	6.92
Steam distillation	mg/kg	27	8.55	4.31	6.34

Table 9: reproducibility of PCP on textile sample #16646

The performance of the ISO/IEC 17025 accredited laboratories is clearly different from the performance of the not accredited laboratories. The reproducibility (=2.8 * sd) of the ISO/IEC 17025 accredited laboratories is smaller than the reproducibility of the laboratories without ISO/IEC 17025 accreditation for both the OPP and for the PCP determination. The differences in the consensus values are less significant for both the OPP and the PCP determination.

Remarkable is the effect of steam distillation on the reproducibility. It appears that the reproducibility for the OPP determination with steam distillation, is significantly smaller than the reproducibility for basic/ultrasonic extraction and also in good agreement with the reproducibilities observed in previous iis PTs (see lit 18).

When the test results of this interlaboratory study were compared to the Ecolabelling Standards and Requirements for Textiles in EU (see table 10) it could be noticed that the majority of the participants was able to detect OPP in sample #16645 and in sample #16646 and PCP in sample #16646. All reported test values for OPP were <50.0 mg/kg for both samples #16645 and #16646. Thus both materials of textile would have been accepted based on the OPP analyses for all four classes mentioned in table 10 by all reporting laboratories. Further it could be noticed that all reported test values for PCP are above >0.5 mg/kg for sample #16646. Thus this textile material would have been rejected for all classes by all reported laboratories.

Remarkable are the test results for PCP on sample #16645. The majority of the laboratories would have accepted the textile material based on the PCP determination but five laboratories would have rejected this material for Baby Clothes and four of them also for the other three classes. Another 13 laboratories reported a larger value for “less than” than the specification for baby clothes (0.05 mg/kg).

Also noticable are the test results for the sum of TeCPs on samples #16645 and #16646. The majority of the laboratories would have accepted both textile materials based on the sum of TeCPs but three laboratories would have rejected this material for Baby Clothes and one of them also for the other three classes for sample #16645. Another 11 laboratories reported a larger value for “less than” than the specification for baby clothes (0.05 mg/kg).

Ecolabel	Class 1 Baby clothes (mg/kg)	Class 2 Clothes direct skin contact (mg/kg)	Class 3 Clothes, no direct contact with skin (mg/kg)	Class 4 Decoration material (mg/kg)
Orthophenylphenol	50.0	100.0	100.0	100.0
Pentachlorophenol	0.05	0.5	0.5	0.5
Sum of Tetrachlorophenols	0.05	0.5	0.5	0.5

Table 10: Ecolabelling Standards and Requirements for Textiles in EU

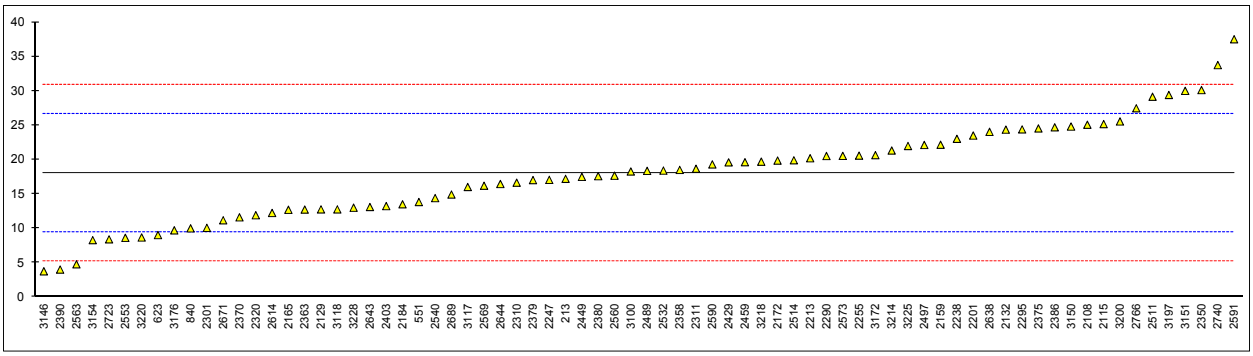
APPENDIX 1

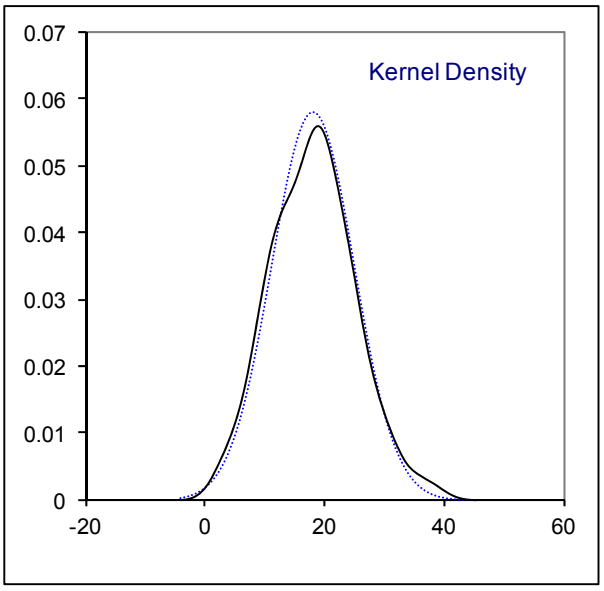
Determination of Orthophenylphenol (OPP) on sample #16645; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	In house	17.2		-0.20	
551	In house	13.83		-0.99	
623	LFGB B82.02.8Mod.	9.02		-2.11	
840	DIN53313	10.0		-1.88	
2108	In house	25.07		1.64	
2115	LFGB B82.02.8	25.17		1.67	
2129	EPA 3545A/DIN EN ISO 17070	12.76	C	-1.24	first reported: 2.833
2132	In house	24.36		1.48	
2159	In house	22.16		0.96	
2165	LFGB B82.02.8	12.7		-1.25	
2172	In house	19.86		0.42	
2184	LFGB B82.02.8	13.5		-1.06	
2201	In house	23.5		1.28	
2213	In house	20.2		0.50	
2238	LFGB B82.02.8	23.02		1.16	
2247	In house	17.05		-0.23	
2255	In house	20.58		0.59	
2290	ISO17070	20.52		0.58	
2295	In house	24.4		1.49	
2301	LFGB B82.02.8	10.07		-1.87	
2310	In house	16.641		-0.33	
2311	In house	18.67		0.15	
2320	In house	11.909		-1.44	
2350	In house	30.114		2.83	
2358	In house	18.501		0.11	
2363	In house	12.73		-1.24	
2370	In house	11.6		-1.51	
2375	In house	24.538		1.52	
2379	In house	17.02		-0.24	
2380	LFGB B82.02.8	17.591		-0.11	
2386	In house	24.70		1.56	
2390	In house	4.003	C	-3.29	first reported: 4.87706
2403	GB/T20386	13.234		-1.13	
2429	In house	19.60		0.36	
2449	In house	17.492		-0.13	
2453		-----		-----	
2459	LFGB B82.02.8	19.625		0.37	
2467		-----		-----	
2489	LFGB B82.02.8	18.36		0.07	
2495		-----		-----	
2497	In house	22.13		0.96	
2511	In house	29.15		2.60	
2514	In house	19.90		0.43	
2532	LFGB B82.02.8	18.4		0.08	
2540	In house	14.4		-0.85	
2553	In house	8.62		-2.21	
2560	ISO17070	17.66		-0.09	
2563	ISO17070	4.77	C	-3.11	first reported: 2.96
2569	LFGB B82.02.8	16.2		-0.43	
2573	ISO17070	20.54		0.58	
2590	LFGB B82.02.8	19.301		0.29	
2591	In house	37.510		4.56	
2614	LFGB B82.02.8	12.236		-1.36	
2633		-----		-----	
2638	In house	24.035	C	1.40	first reported: 33.603
2643	In house	13.10		-1.16	
2644	UNI11057	16.45		-0.37	
2658		-----		-----	
2671	In house	11.175		-1.61	
2689	In house	14.922		-0.73	
2719		-----		-----	
2723	ISO17070	8.4		-2.26	
2730		-----		-----	
2740	Oeko-Tex Std.100/DIN12673	33.75		3.68	
2749		-----		-----	
2766	In house	27.47		2.21	
2767		-----		-----	
3100	LFGB B82.02.8	18.27		0.05	
3117	GB/T20386	16.014		-0.48	
3118	In house	12.76		-1.24	
3146	ISO13365	3.75		-3.35	
3150	In house	24.81		1.58	
3151	In house	30	C	2.80	first reported: 37.0
3153		-----		-----	
3154	In house	8.285		-2.28	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	20.65		0.61	
3176	In house	9.71		-1.95	
3192		-----		-----	
3197	In house	29.40		2.66	
3200	LFGB B82.02.8	25.55		1.76	
3209		-----		-----	
3210	In house	<40		-----	
3214	ISO17070	21.32		0.77	
3218	LFGBG B82.02.8	19.7		0.39	
3220	In house	8.67		-2.19	
3225	ISO17070	21.98		0.92	
3228	LFGB B82.02.8	13		-1.18	
3232		-----		-----	
3233		-----		-----	
3237		-----		-----	

normality	OK	
n	74	
outliers	0	
mean (n)	18.044	
st.dev. (n)	6.8907	
R(calc.)	19.294	
R(iis-memo)	11.962	Compare R(Horwitz) = 5.201





Determination of Pentachlorophenol (PCP) on sample #16645; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	In house	0.8		-----	possibly a false positive test result?
551	In house	N.D		-----	
623	LFGB B82.02.8Mod.	n.d.		-----	
840	DIN53313	ND		-----	
2108		-----		-----	
2115		-----		-----	
2129	EPA 3545A/DIN EN ISO 17070	-----		-----	
2132	In house	<0.01		-----	
2159	In house	<0.05		-----	
2165	LFGB B82.02.8	ND		-----	
2172		-----		-----	
2184	LFGB B82.02.8	Not detected		-----	
2201	ISO17070	<0.05		-----	
2213	LFGB B82.02.8	<0.05 mg/kg		-----	
2238	LFGB B82.02.8	ND[<0.5]		-----	
2247	ISO17070	nd		-----	
2255	In house	nd		-----	
2290	ISO17070	< 0.5		-----	
2295		-----		-----	
2301	LFGB B82.02.8	ND		-----	
2310	LFGB B82.02.8	NOT DETECTED		-----	
2311	LFGB B82.02.8	Not detected		-----	
2320	LFGB B82.02.8	N.D		-----	
2350	In house	<0.125		-----	
2358	In house	<0.125		-----	
2363	In house	ND		-----	
2370	LFGB B82.02.8	n.d.		-----	
2375		-----		-----	
2379	LFGB B82.02.8	not detected		-----	
2380	LFGB B82.02.8	N.D		-----	
2386	In house	<0,1		-----	
2390	In house	ND		-----	
2403	LFGB B82.02.8	ND		-----	
2429	LFGB B82.02.8	<0.05		-----	
2449		-----		-----	
2453	LFGB B82.02.8	< LQ [0.6 mg/kg]		-----	
2459		-----		-----	
2467		-----		-----	
2489	LFGB B82.02.8	ND		-----	
2495	ISO17070	<1		-----	
2497	ISO17070	0.0078		-----	
2511		-----		-----	
2514		-----		-----	
2532	LFGB B82.02.8	Not Detected		-----	
2540		-----		-----	
2553	In house	ND		-----	
2560	ISO17070	<0.05		-----	
2563		-----		-----	
2569	LFGB B82.02.8	ND		-----	
2573	ISO17070	Not detected		-----	
2590	LFGB B82.02.8	< L.O.Q.		-----	
2591	In house	0.000		-----	
2614	LFGB B82.02.8	ND		-----	
2633	ISO17070	n.d.		-----	
2638	ISO17070	n.d		-----	
2643	LFGB B82.02.8	< 0.05		-----	
2644		-----		-----	
2658	ISO17070	0.9		-----	possibly a false positive test result?
2671		-----		-----	
2689		-----		-----	
2719	ISO17070	<0.05		-----	
2723	ISO17070	< 0.5		-----	
2730	XP G08-015	0.00		-----	
2740		-----		-----	
2749		-----		-----	
2766		-----		-----	
2767	LFGB B82.02.8	0.776		-----	possibly a false positive test result?
3100	LFGB B82.02.8	<0.1		-----	
3117	GB/T20386	0		-----	
3118	In house	ND		-----	
3146	In house	<0,1		-----	
3150	ISO17070	<0,1		-----	
3151		-----		-----	
3153	LFGB B82.02.8	<0.05		-----	
3154		-----		-----	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	<0.05		-----	
3176	LFGB B82.02.8	2.80		-----	possibly a false positive test result?
3192	In house	<0,20		-----	
3197	LFGB B82.02.8	ND		-----	
3200		-----		-----	
3209		-----		-----	
3210	In house	<0.05		-----	
3214	ISO17070	<0.05		-----	
3218		-----		-----	
3220	In house	0.44		-----	possibly a false positive test result?
3225	ISO17070	<0.2		-----	
3228	LFGB B82.02.8	ND		-----	
3232		-----		-----	
3233	In house	<0.05		-----	
3237		-----		-----	

normality	n.a.
n	50
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
R(lit.)	n.a.

Determination of 2,3,4,5-Tetrachlorophenol on sample #16645; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	In house	1.2		-----	possibly a false positive test result?
551	In house	N.D		-----	
623	LFGB B82.02.8Mod.	n.d.		-----	
840	DIN53313	ND		-----	
2108		-----		-----	
2115		-----		-----	
2129		-----		-----	
2132	In house	<0.01		-----	
2159	In house	<0.05		-----	
2165	LFGB B82.02.8	ND		-----	
2172		-----		-----	
2184	LFGB B82.02.8	Not detected		-----	
2201	ISO17070	<0.05		-----	
2213	LFGB B82.02.8	<0.05 mg/kg		-----	
2238	LFGB B82.02.8	ND[<0.5]		-----	
2247	ISO17070	nd		-----	
2255	In house	nd		-----	
2290	ISO17070	< 0.5		-----	
2295		-----		-----	
2301		-----		-----	
2310	LFGB B82.02.8	NOT DETECTED		-----	
2311	LFGB B82.02.8	Not detected		-----	
2320	LFGB B82.02.8	N.D		-----	
2350	In house	<0.125		-----	
2358	In house	<0.125		-----	
2363	In house	ND		-----	
2370	LFGB B82.02.8	n.d.		-----	
2375		-----		-----	
2379	LFGB B82.02.8	not detected		-----	
2380	LFGB B82.02.8	N.D		-----	
2386	In house	<0,1		-----	
2390	In house	ND		-----	
2403	LFGB B82.02.8	ND		-----	
2429	LFGB B82.02.8	<0.05		-----	
2449		-----		-----	
2453		-----		-----	
2459		-----		-----	
2467		-----		-----	
2489	LFGB B82.02.8	ND		-----	
2495	ISO17070	<1		-----	
2497	ISO17070	0.001		-----	
2511		-----		-----	
2514		-----		-----	
2532	LFGB B82.02.8	Not Detected		-----	
2540		-----		-----	
2553	In house	ND		-----	
2560	ISO17070	<0.05		-----	
2563		-----		-----	
2569	LFGB B82.02.8	ND		-----	
2573	ISO17070	Not detected		-----	
2590	LFGB B82.02.8	< L.O.Q.		-----	
2591	In house	0.000		-----	
2614	LFGB B82.02.8	ND		-----	
2633		-----		-----	
2638	ISO17070	n.d		-----	
2643	LFGB B82.02.8	< 0.05		-----	
2644		-----		-----	
2658		-----		-----	
2671		-----		-----	
2689		-----		-----	
2719	ISO17070	<0.05		-----	
2723	ISO17070	< 0.5		-----	
2730		-----		-----	
2740		-----		-----	
2749		-----		-----	
2766		-----		-----	
2767	LFGB B82.02.8	0.107		-----	
3100	LFGB B82.02.8	<0.1		-----	
3117	GB/T20386	0		-----	
3118	In house	ND		-----	
3146	In house	<0,1		-----	
3150	ISO17070	<0,1		-----	
3151		-----		-----	
3153		-----		-----	
3154		-----		-----	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	<0.05		-----	
3176	LFGB B82.02.8	0.088		-----	
3192		-----		-----	
3197	LFGB B82.02.8	ND		-----	
3200		-----		-----	
3209		-----		-----	
3210	In house	<0.05		-----	
3214	ISO17070	<0.05		-----	
3218		-----		-----	
3220	In house	Not Detected		-----	
3225	ISO17070	<0.2		-----	
3228	LFGB B82.02.8	ND		-----	
3232		-----		-----	
3233		-----		-----	
3237		-----		-----	

normality	n.a.
n	48
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
R(lit.)	n.a.

Determination of 2,3,4,6-Tetrachlorophenol on sample #16645; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	In house	0		-----	
551	In house	N.D		-----	
623	LFGB B82.02.8Mod.	n.d.		-----	
840	DIN53313	ND		-----	
2108		-----		-----	
2115		-----		-----	
2129		-----		-----	
2132	In house	<0.01		-----	
2159	In house	<0.05		-----	
2165	LFGB B82.02.8	ND		-----	
2172		-----		-----	
2184	LFGB B82.02.8	Not detected		-----	
2201	ISO17070	<0.05		-----	
2213	LFGB B82.02.8	<0.05 mg/kg		-----	
2238	LFGB B82.02.8	ND[<0.5]		-----	
2247	ISO17070	nd		-----	
2255	In house	nd		-----	
2290	ISO17070	< 0.5		-----	
2295		-----		-----	
2301		-----		-----	
2310	LFGB B82.02.8	NOT DETECTED		-----	
2311	LFGB B82.02.8	Not detected		-----	
2320	LFGB B82.02.8	N.D		-----	
2350	In house	<0.125		-----	
2358	In house	<0.125		-----	
2363	In house	ND		-----	
2370	LFGB B82.02.8	n.d.		-----	
2375		-----		-----	
2379	LFGB B82.02.8	not detected		-----	
2380	LFGB B82.02.8	N.D		-----	
2386	In house	<0,1		-----	
2390	In house	ND		-----	
2403	LFGB B82.02.8	ND		-----	
2429	LFGB B82.02.8	<0.05		-----	
2449		-----		-----	
2453		-----		-----	
2459		-----		-----	
2467		-----		-----	
2489	LFGB B82.02.8	ND		-----	
2495	ISO17070	<1		-----	
2497	ISO17070	0.001		-----	
2511		-----		-----	
2514		-----		-----	
2532	LFGB B82.02.8	Not Detected		-----	
2540		-----		-----	
2553	In house	ND		-----	
2560	ISO17070	<0.05		-----	
2563		-----		-----	
2569	LFGB B82.02.8	ND		-----	
2573	ISO17070	Not detected		-----	
2590	LFGB B82.02.8	< L.O.Q.		-----	
2591	In house	0.031		-----	
2614	LFGB B82.02.8	ND		-----	
2633		-----		-----	
2638	ISO17070	n.d		-----	
2643	LFGB B82.02.8	< 0.05		-----	
2644		-----		-----	
2658		-----		-----	
2671		-----		-----	
2689		-----		-----	
2719	ISO17070	<0.05		-----	
2723	ISO17070	< 0.5		-----	
2730		-----		-----	
2740		-----		-----	
2749		-----		-----	
2766		-----		-----	
2767	LFGB B82.02.8	0.092		-----	
3100	LFGB B82.02.8	<0.1		-----	
3117	GB/T20386	0		-----	
3118	In house	ND		-----	
3146	In house	<0,1		-----	
3150	ISO17070	<0,1		-----	
3151		-----		-----	
3153		-----		-----	
3154		-----		-----	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	<0.05		-----	
3176	LFGB B82.02.8	0.052		-----	
3192		-----		-----	
3197	LFGB B82.02.8	ND		-----	
3200		-----		-----	
3209		-----		-----	
3210	In house	<0.05		-----	
3214	ISO17070	<0.05		-----	
3218		-----		-----	
3220	In house	Not Detected		-----	
3225	ISO17070	<0.2		-----	
3228	LFGB B82.02.8	ND		-----	
3232		-----		-----	
3233		-----		-----	
3237		-----		-----	

normality	n.a.
n	49
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
R(lit.)	n.a.

Determination of 2,3,5,6-Tetrachlorophenol on sample #16645; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	In house	0.4		-----	
551	In house	N.D		-----	
623	LFGB B82.02.8Mod.	n.d.		-----	
840	DIN53313	ND		-----	
2108		-----		-----	
2115		-----		-----	
2129		-----		-----	
2132	In house	<0.01		-----	
2159	In house	<0.05		-----	
2165	LFGB B82.02.8	ND		-----	
2172		-----		-----	
2184	LFGB B82.02.8	Not detected		-----	
2201	ISO17070	<0.05		-----	
2213	LFGB B82.02.8	<0.05 mg/kg		-----	
2238	LFGB B82.02.8	ND[<0.5]		-----	
2247	ISO17070	nd		-----	
2255	In house	nd		-----	
2290	ISO17070	< 0.5		-----	
2295		-----		-----	
2301		-----		-----	
2310	LFGB B82.02.8	NOT DETECTED		-----	
2311	LFGB B82.02.8	Not detected		-----	
2320	LFGB B82.02.8	N.D		-----	
2350	In house	<0.125		-----	
2358	In house	<0.125		-----	
2363	In house	ND		-----	
2370	LFGB B82.02.8	n.d.		-----	
2375		-----		-----	
2379	LFGB B82.02.8	not detected		-----	
2380	LFGB B82.02.8	N.D		-----	
2386	In house	<0,1		-----	
2390	In house	ND		-----	
2403	LFGB B82.02.8	ND		-----	
2429	LFGB B82.02.8	<0.05		-----	
2449		-----		-----	
2453		-----		-----	
2459		-----		-----	
2467		-----		-----	
2489	LFGB B82.02.8	ND		-----	
2495	ISO17070	<1		-----	
2497	ISO17070	0.001		-----	
2511		-----		-----	
2514		-----		-----	
2532	LFGB B82.02.8	Not Detected		-----	
2540		-----		-----	
2553	In house	ND		-----	
2560	ISO17070	<0.05		-----	
2563		-----		-----	
2569	LFGB B82.02.8	ND		-----	
2573	ISO17070	Not detected		-----	
2590	LFGB B82.02.8	< L.O.Q.		-----	
2591	In house	0.000		-----	
2614	LFGB B82.02.8	ND		-----	
2633		-----		-----	
2638	ISO17070	n.d		-----	
2643	LFGB B82.02.8	< 0.05		-----	
2644		-----		-----	
2658		-----		-----	
2671		-----		-----	
2689		-----		-----	
2719	ISO17070	<0.05		-----	
2723	ISO17070	< 0.5		-----	
2730		-----		-----	
2740		-----		-----	
2749		-----		-----	
2766		-----		-----	
2767	LFGB B82.02.8	0.114		-----	
3100	LFGB B82.02.8	<0.1		-----	
3117	GB/T20386	0		-----	
3118	In house	ND		-----	
3146	In house	<0,1		-----	
3150	ISO17070	<0,1		-----	
3151		-----		-----	
3153		-----		-----	
3154		-----		-----	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	<0.05		-----	
3176	LFGB B82.02.8	0.026		-----	
3192		-----		-----	
3197	LFGB B82.02.8	ND		-----	
3200		-----		-----	
3209		-----		-----	
3210	In house	<0.05		-----	
3214	ISO17070	<0.05		-----	
3218		-----		-----	
3220	In house	Not Detected		-----	
3225	ISO17070	<0.2		-----	
3228	LFGB B82.02.8	ND		-----	
3232		-----		-----	
3233		-----		-----	
3237		-----		-----	

normality	n.a.
n	47
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
R(lit.)	n.a.

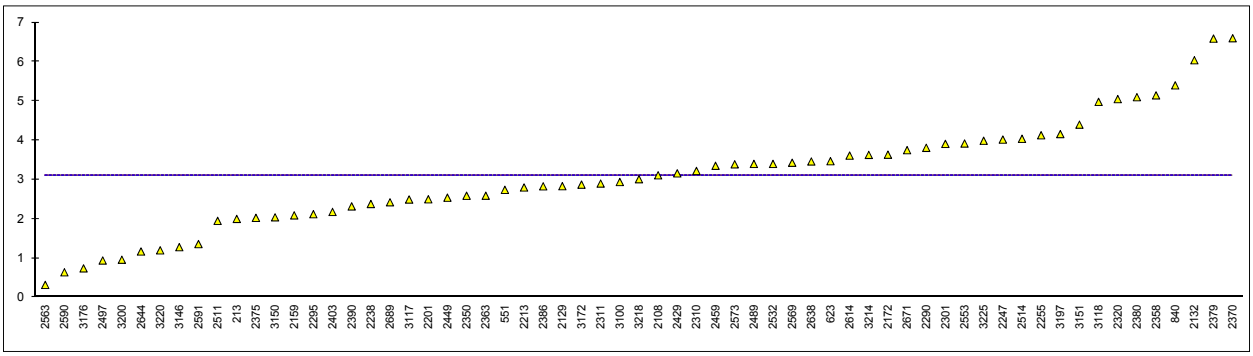
Determination of Orthophenylphenol (OPP) on sample #16646; results in mg/kg

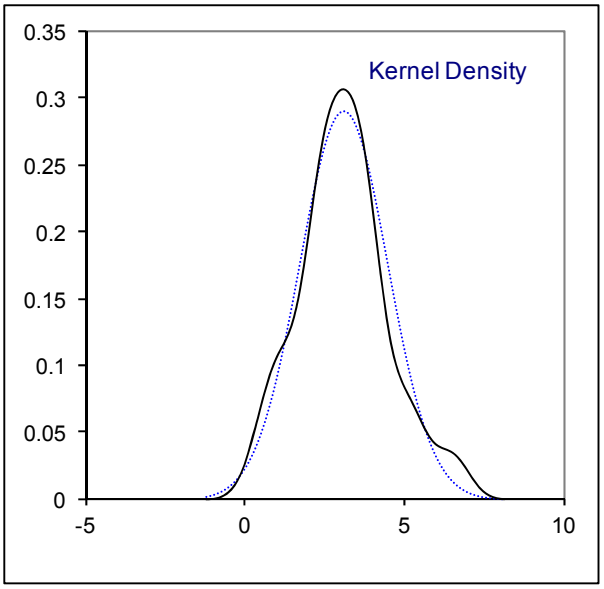
lab	method	value	mark	z(targ)	remarks
213	In house	2.0		-----	
551	In house	2.74		-----	
623	LFGB B82.02.8Mod.	3.47		-----	
840	DIN53313	5.4		-----	
2108	In house	3.11		-----	
2115		-----		-----	
2129	EPA 3545A/DIN EN ISO 17070	2.833	C	-----	first reported: 12.76
2132	In house	6.04		-----	
2159	In house	2.09		-----	
2165	LFGB B82.02.8	ND		-----	
2172	In house	3.635		-----	
2184	LFGB B82.02.8	Not detected		-----	
2201	In house	2.50		-----	
2213	In house	2.8		-----	
2238	LFGB B82.02.8	2.38		-----	
2247	In house	4.02		-----	
2255	In house	4.13		-----	
2290	ISO17070	3.81		-----	
2295	In house	2.12		-----	
2301	LFGB B82.02.8	3.91		-----	
2310	In house	3.221		-----	
2311	In house	2.90		-----	
2320	In house	5.050		-----	
2350	In house	2.5897		-----	
2358	In house	5.146		-----	
2363	In house	2.59		-----	
2370	In house	6.60		-----	
2375	In house	2.0269		-----	
2379	In house	6.59		-----	
2380	LFGB B82.02.8	5.1		-----	
2386	In house	2.83		-----	
2390	In house	2.3186		-----	
2403	GB/T20386	2.177		-----	
2429	In house	3.16		-----	
2449	In house	2.541		-----	
2453		-----		-----	
2459	LFGB B82.02.8	3.352		-----	
2467		-----		-----	
2489	LFGB B82.02.8	3.4		-----	
2495		-----		-----	
2497	In house	0.941		-----	
2511	In house	1.95		-----	
2514	In house	4.04		-----	
2532	LFGB B82.02.8	3.4		-----	
2540		-----		-----	
2553	In house	3.92		-----	
2560	ISO17070	<5.00		-----	
2563	ISO17070	0.32		-----	
2569	LFGB B82.02.8	3.43		-----	
2573	ISO17070	3.39		-----	
2590	LFGB B82.02.8	0.641		-----	
2591	In house	1.359		-----	
2614	LFGB B82.02.8	3.612		-----	
2633		-----		-----	
2638	In house	3.462		-----	
2643	In house	< 5		-----	
2644	UNI11057	1.17		-----	
2658		-----		-----	
2671	In house	3.75		-----	
2689	In house	2.424		-----	
2719		-----		-----	
2723	ISO17070	< 1.0		-----	
2730		-----		-----	
2740	Oeko-Tex Std.100/DIN12673	traces		-----	
2749		-----		-----	
2766		-----		-----	
2767		-----		-----	
3100	LFGB B82.02.8	2.94		-----	
3117	GB/T20386	2.494		-----	
3118	In house	4.98		-----	
3146	ISO13365	1.28		-----	
3150	In house	2.04		-----	
3151	In house	4.40		-----	
3153		-----		-----	
3154		-----		-----	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	2.873		-----	
3176	In house	0.74		-----	
3192		-----		-----	
3197	In house	4.16		-----	
3200	LFGB B82.02.8	0.96		-----	
3209		-----		-----	
3210	In house	<40		-----	
3214	ISO17070	3.63		-----	
3218	LFGB B82.02.8	3.01		-----	
3220	In house	1.2		-----	
3225	ISO17070	3.99		-----	
3228	LFGB B82.02.8	ND		-----	
3232		-----		-----	
3233		-----		-----	
3237		-----		-----	

	normality	OK
	n	63
	outliers	0
	mean (n)	3.097
	st.dev. (n)	1.3774
	R(calc.)	3.857
	R(iis-memo)	(2.674)

Compare R(Horwitz) = 1.163





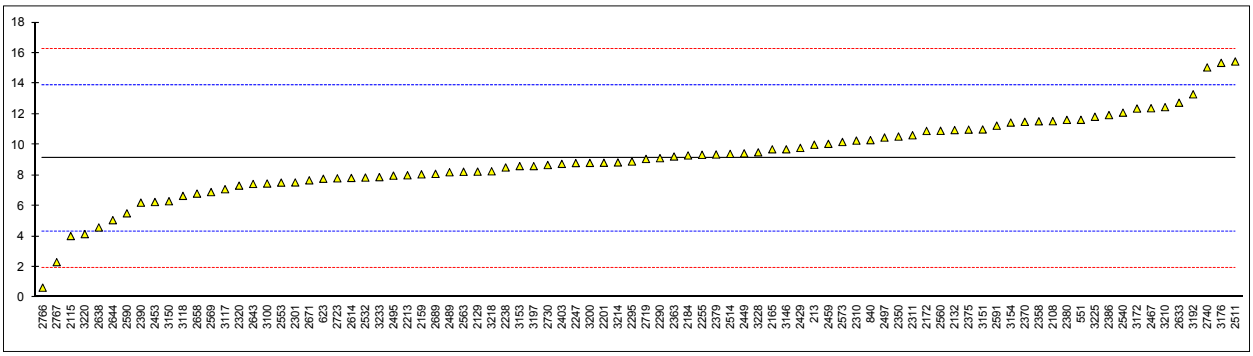
Determination of Pentachlorophenol (PCP) on sample #16646; results in mg/kg

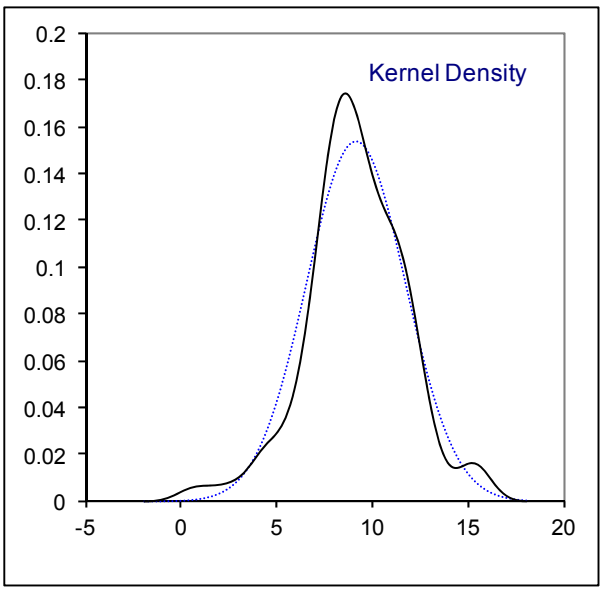
lab	method	value	mark	z(targ)	remarks
213	In house	10.0		0.37	
551	In house	11.63		1.05	
623	LFGB B82.02.8Mod.	7.771		-0.56	
840	DIN53313	10.3		0.49	
2108	LFGB B82.02.8	11.54		1.01	
2115	LFGB B82.02.8	4.02		-2.13	
2129	EPA 3545A/DIN EN ISO 17070	8.238		-0.37	
2132	In house	10.96		0.77	
2159	In house	8.06		-0.44	
2165	LFGB B82.02.8	9.7		0.24	
2172	LFGB B82.02.8	10.90		0.74	
2184	LFGB B82.02.8	9.3		0.07	
2201	ISO17070	8.82		-0.13	
2213	LFGB B82.02.8	8		-0.47	
2238	LFGB B82.02.8	8.51		-0.26	
2247	ISO17070	8.80		-0.13	
2255	In house	9.34		0.09	
2290	ISO17070	9.12		0.00	
2295	In house	8.9		-0.09	
2301	LFGB B82.02.8	7.53		-0.67	
2310	LFGB B82.02.8	10.270		0.48	
2311	LFGB B82.02.8	10.62		0.63	
2320	LFGB B82.02.8	7.322		-0.75	
2350	In house	10.5337		0.59	
2358	In house	11.533		1.01	
2363	In house	9.23		0.04	
2370	LFGB B82.02.8	11.5		0.99	
2375	In house	10.99		0.78	
2379	LFGB B82.02.8	9.36		0.10	
2380	LFGB B82.02.8	11.626		1.05	
2386	In house	11.94		1.18	
2390	In house	6.2083		-1.22	
2403	LFGB B82.02.8	8.745		-0.16	
2429	LFGB B82.02.8	9.79		0.28	
2449	In house	9.435		0.13	
2453	LFGB B82.02.8	6.25		-1.20	
2459	LFGB B82.02.8	10.055		0.39	
2467	In house	12.39		1.37	
2489	LFGB B82.02.8	8.2		-0.39	
2495	ISO17070	7.975		-0.48	
2497	ISO17070	10.47		0.56	
2511	In house	15.45		2.64	
2514	In house	9.40		0.12	
2532	LFGB B82.02.8	7.85		-0.53	
2540	LFGB B82.02.8	12.1		1.24	
2553	LFGB B82.02.8	7.52		-0.67	
2560	ISO17070	10.91		0.75	
2563	ISO17070	8.228		-0.37	
2569	LFGB B82.02.8	6.9		-0.93	
2573	ISO17070	10.18		0.44	
2590	LFGB B82.02.8	5.510		-1.51	
2591	In house	11.248		0.89	
2614	LFGB B82.02.8	7.823		-0.54	
2633	ISO17070	12.75		1.52	
2638	ISO17070	4.584		-1.90	
2643	LFGB B82.02.8	7.43		-0.71	
2644	UNI11057	5.06		-1.70	
2658	ISO17070	6.8		-0.97	
2671	In house	7.67		-0.61	
2689	LFGB B82.02.8	8.092		-0.43	
2719	ISO17070	9.069		-0.02	
2723	ISO17070	7.8		-0.55	
2730	XP G08-015	8.67		-0.19	
2740	Oeko-Tex Std.100/DIN12673	15.06		2.48	
2749		-----		-----	
2766	ISO17070	0.64		-3.55	
2767	LFGB B82.02.8	2.312		-2.85	
3100	LFGB B82.02.8	7.46		-0.69	
3117	GB/T20386	7.088		-0.85	
3118	In house	6.65		-1.03	
3146	In house	9.7		0.24	
3150	ISO17070	6.30		-1.18	
3151	In house	11.0		0.78	
3153	LFGB B82.02.8	8.6		-0.22	
3154	In house	11.45		0.97	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	12.37		1.36	
3176	LFGB B82.02.8	15.36		2.61	
3192	In house	13.30		1.75	
3197	LFGB B82.02.8	8.60		-0.22	
3200	LFGB B82.02.8	8.81		-0.13	
3209		-----		-----	
3210	In house	12.46		1.39	
3214	ISO17070	8.84		-0.12	
3218	LFGB B82.02.8	8.26		-0.36	
3220	In house	4.15		-2.08	
3225	ISO17070	11.83		1.13	
3228	LFGB B82.02.8	9.5		0.16	
3232		-----		-----	
3233	In house	7.88		-0.52	
3237		-----		-----	

normality	suspect
n	86
outliers	0
mean (n)	9.123
st.dev. (n)	2.5887
R(calc.)	7.248
R(iis-memo)	6.699

Compare R(LFGB B82.02.8) = 3.193





Determination of 2,3,4,5-Tetrachlorophenol on sample #16646; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	In house	0		-----	
551	In house	N.D		-----	
623	LFGB B82.02.8Mod.	n.d.		-----	
840	DIN53313	ND		-----	
2108		-----		-----	
2115		-----		-----	
2129		-----		-----	
2132	In house	<0.01		-----	
2159	In house	<0.05		-----	
2165	LFGB B82.02.8	ND		-----	
2172		-----		-----	
2184	LFGB B82.02.8	Not detected		-----	
2201	ISO17070	<0.05		-----	
2213	LFGB B82.02.8	<0.05 mg/kg		-----	
2238	LFGB B82.02.8	ND[<0.5]		-----	
2247	ISO17070	nd		-----	
2255	In house	nd		-----	
2290	ISO17070	< 0.5		-----	
2295		-----		-----	
2301		-----		-----	
2310	LFGB B82.02.8	NOT DETECTED		-----	
2311	LFGB B82.02.8	Not detected		-----	
2320	LFGB B82.02.8	N.D		-----	
2350	In house	<0.125		-----	
2358	In house	<0.125		-----	
2363	In house	ND		-----	
2370	LFGB B82.02.8	n.d.		-----	
2375		-----		-----	
2379	LFGB B82.02.8	not detected		-----	
2380	LFGB B82.02.8	N.D		-----	
2386	In house	<0,1		-----	
2390	In house	ND		-----	
2403	LFGB B82.02.8	ND		-----	
2429	LFGB B82.02.8	<0.05		-----	
2449		-----		-----	
2453		-----		-----	
2459		-----		-----	
2467	In house	0.0964		-----	
2489	LFGB B82.02.8	ND		-----	
2495	ISO17070	<1		-----	
2497	ISO17070	0.0001		-----	
2511		-----		-----	
2514		-----		-----	
2532	LFGB B82.02.8	Not Detected		-----	
2540		-----		-----	
2553	LFGB B82.02.8	ND		-----	
2560	ISO17070	<0.05		-----	
2563		-----		-----	
2569	LFGB B82.02.8	ND		-----	
2573	ISO17070	Not detected		-----	
2590	LFGB B82.02.8	< L.O.Q.		-----	
2591	In house	0.051		-----	
2614	LFGB B82.02.8	ND		-----	
2633		-----		-----	
2638	ISO17070	n.d		-----	
2643	LFGB B82.02.8	< 0.05		-----	
2644		-----		-----	
2658		-----		-----	
2671		-----		-----	
2689		-----		-----	
2719	ISO17070	<0.05		-----	
2723	ISO17070	< 0.5		-----	
2730		-----		-----	
2740		-----		-----	
2749		-----		-----	
2766		-----		-----	
2767	LFGB B82.02.8	0.037		-----	
3100	LFGB B82.02.8	<0.1		-----	
3117	GB/T20386	0		-----	
3118	In house	ND		-----	
3146	In house	<0,1		-----	
3150	ISO17070	<0,1		-----	
3151		-----		-----	
3153		-----		-----	
3154		-----		-----	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	<0.05		-----	
3176	LFGB B82.02.8	0.084		-----	
3192		-----		-----	
3197	LFGB B82.02.8	ND		-----	
3200		-----		-----	
3209		-----		-----	
3210	In house	<0.05		-----	
3214	ISO17070	<0.05		-----	
3218		-----		-----	
3220	In house	Not Detected		-----	
3225	ISO17070	<0.2		-----	
3228	LFGB B82.02.8	ND		-----	
3232		-----		-----	
3233		-----		-----	
3237		-----		-----	

normality	n.a.
n	50
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
R(lit.)	n.a.

Determination of 2,3,4,6-Tetrachlorophenol on sample #16646; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	In house	0		-----	
551	In house	N.D		-----	
623	LFGB B82.02.8Mod.	n.d.		-----	
840	DIN53313	ND		-----	
2108		-----		-----	
2115		-----		-----	
2129		-----		-----	
2132	In house	<0.01		-----	
2159	In house	<0.05		-----	
2165	LFGB B82.02.8	ND		-----	
2172		-----		-----	
2184	LFGB B82.02.8	Not detected		-----	
2201	ISO17070	<0.05		-----	
2213	LFGB B82.02.8	<0.05 mg/kg		-----	
2238	LFGB B82.02.8	ND[<0.5]		-----	
2247	ISO17070	nd		-----	
2255	In house	nd		-----	
2290	ISO17070	< 0.5		-----	
2295		-----		-----	
2301		-----		-----	
2310	LFGB B82.02.8	NOT DETECTED		-----	
2311	LFGB B82.02.8	Not detected		-----	
2320	LFGB B82.02.8	N.D		-----	
2350	In house	<0.125		-----	
2358	In house	<0.125		-----	
2363	In house	ND		-----	
2370	LFGB B82.02.8	n.d.		-----	
2375		-----		-----	
2379	LFGB B82.02.8	not detected		-----	
2380	LFGB B82.02.8	N.D		-----	
2386	In house	<0,1		-----	
2390	In house	ND		-----	
2403	LFGB B82.02.8	ND		-----	
2429	LFGB B82.02.8	<0.05		-----	
2449		-----		-----	
2453		-----		-----	
2459		-----		-----	
2467	In house	0.0835		-----	
2489	LFGB B82.02.8	ND		-----	
2495	ISO17070	<1		-----	
2497	ISO17070	0.0001		-----	
2511		-----		-----	
2514		-----		-----	
2532	LFGB B82.02.8	Not Detected		-----	
2540		-----		-----	
2553	LFGB B82.02.8	ND		-----	
2560	ISO17070	<0.05		-----	
2563		-----		-----	
2569	LFGB B82.02.8	ND		-----	
2573	ISO17070	Not detected		-----	
2590	LFGB B82.02.8	< L.O.Q.		-----	
2591	In house	0.000		-----	
2614	LFGB B82.02.8	ND		-----	
2633		-----		-----	
2638	ISO17070	n.d		-----	
2643	LFGB B82.02.8	< 0.05		-----	
2644		-----		-----	
2658		-----		-----	
2671		-----		-----	
2689		-----		-----	
2719	ISO17070	<0.05		-----	
2723	ISO17070	< 0.5		-----	
2730		-----		-----	
2740		-----		-----	
2749		-----		-----	
2766		-----		-----	
2767	LFGB B82.02.8	0.057		-----	
3100	LFGB B82.02.8	<0.1		-----	
3117	GB/T20386	0		-----	
3118	In house	ND		-----	
3146	In house	<0,1		-----	
3150	ISO17070	<0,1		-----	
3151		-----		-----	
3153		-----		-----	
3154		-----		-----	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	<0.05		-----	
3176	LFGB B82.02.8	0.16		-----	
3192		-----		-----	
3197	LFGB B82.02.8	ND		-----	
3200		-----		-----	
3209		-----		-----	
3210	In house	<0.05		-----	
3214	ISO17070	<0.05		-----	
3218		-----		-----	
3220	In house	0.35		-----	
3225	ISO17070	<0.2		-----	
3228	LFGB B82.02.8	ND		-----	
3232		-----		-----	
3233		-----		-----	
3237		-----		-----	

normality	n.a.
n	48
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
R(lit.)	n.a.

Determination of 2,3,5,6-Tetrachlorophenol on sample #16646; results in mg/kg

lab	method	value	mark	z(targ)	remarks
213	In house	0.2		-----	
551	In house	N.D		-----	
623	LFGB B82.02.8Mod.	n.d.		-----	
840	DIN53313	ND		-----	
2108		-----		-----	
2115		-----		-----	
2129		-----		-----	
2132	In house	<0.01		-----	
2159	In house	<0.05		-----	
2165	LFGB B82.02.8	ND		-----	
2172		-----		-----	
2184	LFGB B82.02.8	Not detected		-----	
2201	ISO17070	<0.05		-----	
2213	LFGB B82.02.8	<0.05 mg/kg		-----	
2238	LFGB B82.02.8	ND[<0.5]		-----	
2247	ISO17070	nd		-----	
2255	In house	nd		-----	
2290	ISO17070	< 0.5		-----	
2295		-----		-----	
2301		-----		-----	
2310	LFGB B82.02.8	NOT DETECTED		-----	
2311	LFGB B82.02.8	Not detected		-----	
2320	LFGB B82.02.8	N.D		-----	
2350	In house	<0.125		-----	
2358	In house	<0.125		-----	
2363	In house	ND		-----	
2370	LFGB B82.02.8	n.d.		-----	
2375		-----		-----	
2379	LFGB B82.02.8	not detected		-----	
2380	LFGB B82.02.8	N.D		-----	
2386	In house	<0,1		-----	
2390	In house	ND		-----	
2403	LFGB B82.02.8	ND		-----	
2429	LFGB B82.02.8	<0.05		-----	
2449		-----		-----	
2453		-----		-----	
2459		-----		-----	
2467		-----		-----	
2489	LFGB B82.02.8	ND		-----	
2495	ISO17070	<1		-----	
2497	ISO17070	0.031		-----	
2511		-----		-----	
2514		-----		-----	
2532	LFGB B82.02.8	Not Detected		-----	
2540		-----		-----	
2553	LFGB B82.02.8	ND		-----	
2560	ISO17070	<0.05		-----	
2563		-----		-----	
2569	LFGB B82.02.8	ND		-----	
2573	ISO17070	Not detected		-----	
2590	LFGB B82.02.8	< L.O.Q.		-----	
2591	In house	0.000		-----	
2614	LFGB B82.02.8	ND		-----	
2633		-----		-----	
2638	ISO17070	n.d		-----	
2643	LFGB B82.02.8	< 0.05		-----	
2644		-----		-----	
2658		-----		-----	
2671		-----		-----	
2689		-----		-----	
2719	ISO17070	<0.05		-----	
2723	ISO17070	< 0.5		-----	
2730		-----		-----	
2740		-----		-----	
2749		-----		-----	
2766		-----		-----	
2767	LFGB B82.02.8	0.035		-----	
3100	LFGB B82.02.8	<0.1		-----	
3117	GB/T20386	0		-----	
3118	In house	ND		-----	
3146	In house	<0,1		-----	
3150	ISO17070	<0,1		-----	
3151		-----		-----	
3153		-----		-----	
3154		-----		-----	

lab	method	value	mark	z(targ)	remarks
3172	UNI11057	<0.05		-----	
3176	LFGB B82.02.8	0.25		-----	
3192		-----		-----	
3197	LFGB B82.02.8	ND		-----	
3200		-----		-----	
3209		-----		-----	
3210	In house	<0.05		-----	
3214	ISO17070	<0.05		-----	
3218		-----		-----	
3220	In house	Not Detected		-----	
3225	ISO17070	<0.2		-----	
3228	LFGB B82.02.8	ND		-----	
3232		-----		-----	
3233		-----		-----	
3237		-----		-----	

normality	n.a.
n	47
outliers	n.a.
mean (n)	<0.1
st.dev. (n)	n.a.
R(calc.)	n.a.
R(lit.)	n.a.

APPENDIX 2

Details of the methods used by the participants

lab	Accredited in accordance with ISO/IEC17025 to determine these components?	Which technique was used to release/extract the components
213	No	Steam distillation
551	Yes	Basic / Ultrasonic extraction
623	Yes	Basic / Ultrasonic extraction
840	Yes	Basic / Ultrasonic extraction
2108	Yes	Basic / Ultrasonic extraction
2115	Yes	Steam distillation
2129	Yes	Soxhlet / AES extraction
2132	No	Basic / Ultrasonic extraction
2159	Yes	Basic / Ultrasonic extraction
2165	Yes	Basic / Ultrasonic extraction
2172	Yes	Basic / Ultrasonic extraction
2184	Yes	Basic / Ultrasonic extraction
2201	Yes	Steam distillation
2213	Yes	Basic / Ultrasonic extraction
2238	Yes	Steam distillation
2247	Yes	Steam distillation
2255	Yes	Basic / Ultrasonic extraction
2290	Yes	Steam distillation
2295	Yes	Soxhlet / AES extraction
2301	Yes	---
2310	Yes	Steam distillation
2311	Yes	Steam distillation
2320	Yes	Basic / Ultrasonic extraction
2350	No	Basic / Ultrasonic extraction
2358	Yes	Basic / Ultrasonic extraction
2363	No	Basic / Ultrasonic extraction
2370	Yes	Basic / Ultrasonic extraction
2375	No	Basic / Ultrasonic extraction
2379	No	Steam distillation
2380	Yes	Basic / Ultrasonic extraction
2386	Yes	Basic / Ultrasonic extraction
2390	Yes	Basic / Ultrasonic extraction
2403	Yes	Steam distillation
2429	Yes	Steam distillation
2449	No	Basic / Ultrasonic extraction
2453	No	Steam distillation
2459	Yes	Basic / Ultrasonic extraction
2467	No	Basic / Ultrasonic extraction
2489	Yes	Steam distillation
2495	Yes	Steam distillation
2497	Yes	Basic / Ultrasonic extraction
2511	No	Basic / Ultrasonic extraction
2514	Yes	Basic / Ultrasonic extraction
2532	Yes	Steam distillation
2540	Yes	Steam distillation
2553	Yes	Basic / Ultrasonic extraction
2560	Yes	Basic / Ultrasonic extraction
2563	Yes	Soxhlet / AES extraction
2569	Yes	Steam distillation
2573	Yes	Steam distillation
2590	No	Basic / Ultrasonic extraction
2591	No	Basic / Ultrasonic extraction
2614	Yes	---
2633	---	Basic / Ultrasonic extraction
2638	No	Basic / Ultrasonic extraction
2643	Yes	Basic / Ultrasonic extraction
2644	No	Basic / Ultrasonic extraction
2658	Yes	Steam distillation

lab	Accredited in accordance with ISO/IEC17025 to determine these components?	Which technique was used to release/extract the components
2671	Yes	---
2689	Yes	Steam distillation
2719	Yes	Basic / Ultrasonic extraction
2723	Yes	Steam distillation
2730	No	Basic / Ultrasonic extraction
2740	Yes	Soxhlet / AES extraction
2749	---	---
2766	No	Basic / Ultrasonic extraction
2767	No	Basic / Ultrasonic extraction
3100	Yes	Steam distillation
3117	---	---
3118	No	Basic / Ultrasonic extraction
3146	No	Basic / Ultrasonic extraction
3150	Yes	Basic / Ultrasonic extraction
3151	No	Basic / Ultrasonic extraction
3153	Yes	Steam distillation
3154	Yes	Basic / Ultrasonic extraction
3172	Yes	Basic / Ultrasonic extraction
3176	Yes	Basic / Ultrasonic extraction
3192	Yes	Basic / Ultrasonic extraction
3197	Yes	Steam distillation
3200	Yes	Steam distillation
3209	---	---
3210	No	Basic / Ultrasonic extraction
3214	Yes	Steam distillation
3218	Yes	Steam distillation
3220	Yes	Basic / Ultrasonic extraction
3225	Yes	Basic / Ultrasonic extraction
3228	Yes	Basic / Ultrasonic extraction
3232	---	---
3233	No	Basic / Ultrasonic extraction
3237	---	---

APPENDIX 3

Number of participants per country

4 labs in BANGLADESH
1 lab in BRAZIL
3 labs in FRANCE
10 labs in GERMANY
5 labs in HONG KONG
12 labs in INDIA
3 labs in INDONESIA
6 labs in ITALY
3 labs in KOREA
1 lab in MOROCCO
16 labs in P.R. of CHINA
4 labs in PAKISTAN
1 lab in PORTUGAL
1 lab in ROMANIA
1 lab in SPAIN
2 labs in SRI LANKA
2 labs in SWITZERLAND
2 labs in TAIWAN R.O.C.
1 lab in THAILAND
1 lab in TUNISIA
8 labs in TURKEY
3 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
W = test result withdrawn on request of participant
ex = test result excluded from statistical evaluation
n.a. = not applicable
n.e. = not evaluated
n.d. = not detected
fr. = first reported

Literature:

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, April 2014
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