**Institute for
Interlaboratory Studies**

Results of Proficiency Test
Phthalates in Textile
May 2023

CONTENTS

Appendices:

1   INTRODUCTION

Phthalates are commonly used as plasticizers to increase softness of plastic, especially in PVC. In the clothing industry, they can be found in synthetic textile, synthetic leather, buttons, coated fabric, plastisol and dye printing.

Since 2019 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the determination of Phthalates in Textile every year. During the annual proficiency testing program 2022/2023 it was decided to continue the proficiency test for the determination of Phthalates in Textile.

In this interlaboratory study 73 laboratories in 26 countries registered for participation, see appendix 4 for the number of participants per country. In this report the results of the proficiency test on Phthalates in Textile are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2   SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory.
It was decided to send two different textile samples of 3 grams each labelled #23570 and #23571 respectively.
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/IEC17043:2010. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on a regular basis by sending out questionnaires.

2.2   PROTOCOL

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

2.3   CONFIDENTIALITY STATEMENT

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

2.4   SAMPLES

For the first sample a batch of brown cotton was selected with a detectable level of Di-n-hexyl phthalate (DNHP). The batch was cut into small pieces and after homogenization 85 small plastic bags were filled with approximately 3 grams each and labelled #23570. The homogeneity of the subsamples was checked by determination of DNHP using an in house test method on 10 stratified randomly selected subsamples.

	DNHP in %M/M
sample #23570-1	0.1462
sample #23570-2	0.1490
sample #23570-3	0.1496
sample #23570-4	0.1537
sample #23570-5	0.1512
sample #23570-6	0.1574
sample #23570-7	0.1487
sample #23570-8	0.1573
sample #23570-9	0.1493
sample #23570-10	0.1480

Table 1: homogeneity test results of subsamples #23570

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

	DNHP in %M/M
r (observed)	0.0108
reference method	iis memo 1701
0.3 x R (reference method)	0.0203

Table 2: evaluation of the repeatability of subsamples #23570

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

For the second sample a batch of pink cotton was selected with a detectable level of Benzyl butyl phthalate (BBP). The batch was cut into small pieces and after homogenization 85 small plastic bags were filled with approximately 3 grams each and labelled #23571. The homogeneity of the subsamples was checked by determination of BBP using an in house test method on 10 stratified randomly selected subsamples.

	BBP in %M/M
sample #23571-1	0.0563
sample #23571-2	0.0573
sample #23571-3	0.0561
sample #23571-4	0.0567
sample #23571-5	0.0549
sample #23571-6	0.0549
sample #23571-7	0.0572
sample #23571-8	0.0521
sample #23571-9	0.0516
sample #23571-10	0.0502

Table 3: homogeneity test results of subsamples #23571

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

	BBP in %M/M
r (observed)	0.0071
reference method	iis memo 1701
0.3 x R (reference method)	0.0074

Table 4: evaluation of the repeatability of subsamples #23571

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

To each of the participating laboratories one textile sample labelled #23570 and one textile sample labelled #23571 were sent on April 5, 2023.

2.5 ANALYZES

The participants were requested to determine on samples #23570 and #23571 fourteen individual Phthalates and the total of other Phthalates:

BBP - Benzyl butyl phthalate	CAS No. 85-68-7
DEHP - Di-(2-ethylhexyl) phthalate	CAS No. 117-81-7
DBP - Dibutyl phthalate	CAS No. 84-74-2
DIDP - Di-iso-decyl phthalate	CAS No. 26761-40-0 & 68515-49-1
DINP - Di-iso-nonyl phthalate	CAS No. 28553-12-0 & 68515-48-0
DNOP - Di-n-octyl phthalate	CAS No. 117-84-0
DCHP - Dicyclohexyl phthalate	CAS No. 84-61-7
DEP - Diethyl phthalate	CAS No. 84-66-2
DMP - Dimethyl phthalate	CAS No. 131-11-3
DNHP - Di-n-hexyl phthalate	CAS No. 84-75-3
DIBP - Di-iso-butyl phthalate	CAS No. 84-69-5

DNPP - Di-n-pentyl phthalate   CAS No. 131-18-0
DPrP - Di-n-propyl phthalate   CAS No. 131-16-8
DMEP - Di-(2-methoxyethyl) phthalate   CAS No. 117-82-8

To ensure homogeneity it was requested not to use less than 0.5 gram per determination. It was also requested to report if the laboratory was accredited for the determined components and to report some analytical details.

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

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

3   RESULTS

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

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

3.1   STATISTICS

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

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

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

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

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

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

3.2   GRAPHICS

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

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

3.3   Z-SCORES

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

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

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

The z-scores were calculated according to:

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

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

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

$$|z| < 1 \quad \text{good}$$
$$1 < |z| < 2 \quad \text{satisfactory}$$
$$2 < |z| < 3 \quad \text{questionable}$$
$$3 < |z| \quad \text{unsatisfactory}$$

4   EVALUATION

In this proficiency test no problems were encountered with the dispatch of the samples. Two participants reported test results after the final reporting date and five other participants did not report any test results. Not all participants were able to report all components requested.

In total 68 laboratories reported 132 numerical test results. Observed was 1 outlying test result, which is 0.8%. In proficiency studies outlier percentages of 3% - 7.5% are quite normal.

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

4.1   EVALUATION PER SAMPLE AND PER COMPONENT

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

Two test methods ISO14389 and CPSC-CH-C1001-09.4 are used for determining Phthalates in textile. Regretfully, the CPSC-CH-C1001-09.4 test method does not contain any precision statements. The ISO14389:22 method does provide a variety of precision data. There are precision data mentioned for 4 different procedures in ISO14389:22 of which procedure 4 prescribes the extraction with THF followed by precipitation with Acetonitrile. The relative reproducibility for 7 different Phthtalates ranges from 31.5% - 124.9%.

For several years iis organizes PTs on Phthalates in Polymers. In 2017 it was decided to use the iis PT data gathered since 2010 for Phthtalates in Polymers to estimate a more realistic target reproducibility, see iis memo 1701 (see lit. 13). The target reproducibility was estimated as the RSD (relative standard deviation) of 16% of the mean multiplied by 2.8.
It was decided to use the estimated iis target reproducibility for Phthtalates in Polymers also for the Phthtalates in Textile because as explained above test method ISO14389:22 mentioned a variety of precision data.

sample #23570

DNHP: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the estimated target reproducibility derived from iis memo 1701.

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

sample #23571

BBP: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the estimated target reproducibility derived from iis memo 1701.

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

4.2   PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Component	unit	n	average	2.8 * sd	R(target)
DNHP	%M/M	64	0.069	0.038	0.031

Table 5: reproducibility of the component in sample #23570

Component	unit	n	average	2.8 * sd	R(target)
BBP	%M/M	67	0.100	0.043	0.045

Table 6: reproducibilitiy of the component in sample #23571

Without further statistical calculations it can be concluded that for Di-n-hexyl phthalate (DNHP) there is not a good compliance of the group of participating laboratories with the target reproducibility, but for Benzyl butyl phthalate (BBP) there is a good compliance. The problematic component has been discussed in paragraph 4.1.

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

	May 2023	April 2022	March 2021	March 2020	March 2019
Number of reporting laboratories	68	69	68	69	69
Number of test results	132	271	200	134	188
Number of statistical outliers	1	7	4	12	8
Percentage of statistical outliers	0.8%	2.6%	2.0%	9.0%	4.3%

Table 7: comparison with previous proficiency tests

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

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

Component	May 2023	April 2022	March 2021	March 2020	March 2019	Target
BBP	15%	---	14%	---	12%	16%
DEHP	---	12%	---	---	---	16%
DBP	---	17%	17%	---	29 - 31%	16%
DINP	---	21%	---	---	---	16%
DNOP	---	14%	---	---	---	16%
DCHP	---	---	16%	---	---	16%
DNHP	20%	---	---	12%	---	16%
DMEP	---	---	---	17%	---	16%

Table 8: development of the uncertainties over the years

The uncertainty (RSD%) of BBP observed in this PT is in line with previous iis PTs. For DNHP the uncertainty is larger but also in line with previous PTs.

4.4 EVALUATION OF THE ANALYTICAL DETAILS

Test method ISO14389 is reported by 61% of the participants and test method CPSC-CH-C1001-09.4 is reported by 22% of the participants. The majority of the other participants reported an in house test method.

For this PT also some analytical details were requested. The reported details are given in appendix 3. Based on the answers given by the reporting participants the following can be summarized:
- 92% of the participants mentioned that they are accredited for the determination of Phthalates in Textile.
- 32% of the participants used the samples as received and 68% further cut the samples prior to analysis.
- 59% of the participants used less than 0.5 grams as sample intake and 28% used 0.5 grams. It is remarkable that 59% of the group had used a lower sample intake than it was instructed in the letter of instructions.
- Almost all of the participants used ultrasonic as technique to release or to extract the Phthalates from the textile.
- Almost all of the participants used THF or a THF mixture as extraction solvent.
- The extraction time varied from 30 minutes to 6 hours. 87% of the participants used an extraction time of 60 minutes.
- The extraction temperature varied from room temperature to 65°C. 85% of the participants used an extraction temperature of 60°C.

Although a different way of working is mentioned in the amount of sample intake and the sample preparation a vast majority of the group follow the same analytical procedures. Therefore, no separate statistical analysis has been performed.

5 DISCUSSION

Almost all reporting participants were able to detect DNHP in sample #23570 and BBP in sample #23571. One particpant dit not report DNHP.

When the results of this interlaboratory study were compared to the Ecolabelling Standards and Requirements for Textiles in EU, such as OEKO-TEX® 100 and the similar Bluesign® RSL (see Table 9), it was noticed that almost all participants would have made identical decisions about the acceptability of the textiles for the determined components. About 90% of the reporting participants would have rejected sample #23570 for all categories. Seven participants would have accepted the sample. For sample #23571 all participants would have rejected the sample for to high phthalates for all catergories

Ecolabelling Standard	baby in %M/M	in direct skin contact in %M/M	no direct skin contact in %M/M
OEKO-TEX® 100	<0.05	<0.05	<0.05
Bluesign® RSL	<0.05	<0.05	<0.05

Table 9: Maximum allowed level of sum of Phthalates according to Ecolabelling Standards

In this PT the average of the homogeneity test results are not in line with the average (consensus value) from the PT results. There are several reasons for this. First, the goal of the homogeneity testing is very different from the goal of the evaluation of the reported PT results. In order to prove the homogeneity of the PT samples, a test method is selected with a high precision (smallest variation). The accuracy (trueness) of the test method is less relevant.

Secondly, the homogeneity testing is done by one laboratory only. The test results of this (ISO/IEC 17025 accredited) laboratory will have a bias (systematic deviation) depending on the test method used. The desire to detect small variations between the PT samples leads to the use of a sensitive test method with high precision, which may be a test method with significant bias.

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

6   CONCLUSION

Although, it can be concluded that the majority of the participants has no (major) problem with the determination of the Phthalates in the textile samples of this PT, each participating laboratory will have to evaluate its performance in this study and decide about any corrective actions if necessary. Therefore, participation on a regular basis in this scheme could be helpful to improve the performance and thus increase of the quality of the analytical results.

APPENDIX 1

Determination of DNHP - Di-n-hexyl phthalate (CAS No. 84-75-3) on sample #23570; results in %M/M

lab	method	value	mark	z(targ)	remarks
210	ISO14389	0.084913		1.46	
339		-----		-----	
551	CPSC-CH-C1001-09.4	0.055	C	-1.26	First reported 0.11
623	In house	0.040		-2.62	
841	ISO14389	0.06589		-0.27	
2115	ISO14389	0.049		-1.80	
2121	ISO14389	0.03	C	-3.53	First reported 0.12
2131	In house	0.0563		-1.14	
2135	ISO14389	0.0795		0.97	
2165	GB/T 20388	0.0682		-0.06	
2223		-----		-----	
2258	CPSC-CH-C1001-09.4	0.0361	C	-2.97	First reported not detected
2265		0.0696		0.07	
2272	ISO14389	0.0703		0.13	
2295	CPSC-CH-C1001-09.4	0.0618		-0.64	
2310	CPSC-CH-C1001-09.4	0.075		0.56	
2311	ISO14389	0.0687		-0.02	
2313	ISO14389	0.0799		1.00	
2314	CPSC-CH-C1001-09.4	0.0733		0.40	
2320		0.065716		-0.29	
2326	ISO14389	0.064277		-0.42	
2330	ISO14389	0.0647		-0.38	
2347	ISO14389	0.0697		0.08	
2350	CPSC-CH-C1001-09.4	0.1018		2.99	
2352	ISO14389	0.0706		0.16	
2357	ISO14389	0.0698		0.08	
2358	In house	0.068255		-0.06	
2363	CPSC-CH-C1001-09.4	0.069		0.01	
2365	CPSC-CH-C1001-09.4	0.07027		0.13	
2366	CPSC-CH-C1001-09.4	0.0691		0.02	
2370	ISO14389	0.0682		-0.06	
2372	CPSC-CH-C1001-09.4	0.071579		0.25	
2375	ISO14389	0.088		1.74	
2378	ISO14389	0.071		0.19	
2379	ISO14389	0.0661		-0.25	
2380	ISO14389	0.06718		-0.15	
2381	CPSC-CH-C1001-09.4	0.0610		-0.71	
2386	ISO14389	0.1251	R(0.01)	5.10	
2410	CPSC-CH-C1001-09.4	0.076		0.65	
2449	ISO14389	0.05504	C	-1.25	First reported 825.1
2452	ISO14389	0.0770		0.74	
2453	ISO14389	0.060		-0.80	
2459	ISO14389	0.068		-0.08	
2481	In house	0.0941	C	2.29	First reported 0.941
2492	CPSC-CH-C1001-09.4	0.0624	C	-0.59	First reported 0.1176
2561	ISO14389	0.069		0.01	
2582	ISO14389	0.07029	C	0.13	First reported 0.7029
2590	ISO14389	0.049	C	-1.80	First reported 0.0308
2665	CPSC-CH-C1001-09.4	0.1033		3.13	
2674	CPSC-CH-C1001-09.4	0.0682		-0.06	
2678		-----		-----	
2734	ISO14389	0.0723		0.31	
2737	ISO14389	0.063414		-0.49	
2741	ISO14389	0.0740		0.47	
2744	ISO14389	0.0576		-1.02	
2789		-----		-----	
2793	ISO14389	0.080613		1.07	
2809	ISO14389	0.075		0.56	
2977	ISO14389	0.06937		0.05	
3001	ISO14389	0.07		0.10	
3014	ISO14389	Not Detected		-----	Possibly a false negative test result?
3017		-----		-----	
3022		-----		-----	
3116	ISO14389	0.072		0.28	
3154		-----		-----	
3166	In house	0.065		-0.35	
3172	ISO8124-6	0.0986		2.70	
3176	EN14372	0.0421		-2.43	
3197	ISO14389	0.0913		2.04	
3210	In house	0.0726		0.34	
3222	ISO16191-1	0.0850		1.46	
3228	GB/T 20388	0.0679		-0.09	
3230	In house	0.05851		-0.94	

normality	suspect	
n	64	
outliers	1	
mean (n)	0.06887	
st.dev. (n)	0.013742	RSD = 20%
R(calc.)	0.03848	
st.dev.(iis memo 1701)	0.011019	
R(iis memo 1701)	0.03085	
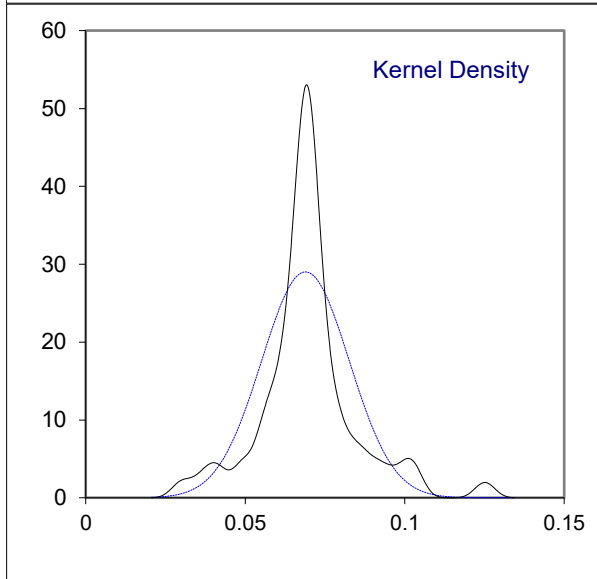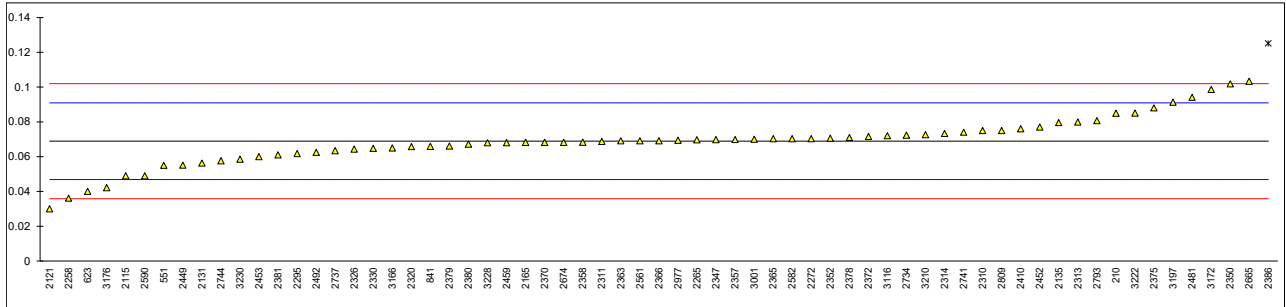
Determination of BBP - Benzyl butyl phthalate (CAS No. 85-68-7) on sample #23571; results in %M/M

lab	method	value	mark	z(targ)	remarks
210	ISO14389	0.1019261		0.15	
339		-----		-----	
551	CPSC-CH-C1001-09.4	0.0743		-1.59	
623	In house	0.068		-1.98	
841	ISO14389	0.09359		-0.37	
2115	ISO14389	0.11		0.66	
2121	ISO14389	0.10		0.03	
2131	In house	0.109		0.59	
2135	ISO14389	0.0974		-0.14	
2165	GB/T 20388	0.1113		0.74	
2223		-----		-----	
2258	CPSC-CH-C1001-09.4	0.0939		-0.36	
2265		0.1028		0.20	
2272	ISO14389	0.0977		-0.12	
2295	CPSC-CH-C1001-09.4	0.1105		0.69	
2310	CPSC-CH-C1001-09.4	0.09		-0.60	
2311	ISO14389	0.0960		-0.22	
2313	CPSC-CH-C1001-09.4	0.0848		-0.93	
2314	ISO14389	0.0845		-0.95	
2320		0.114688		0.95	
2326	ISO14389	0.087832		-0.74	
2330	ISO14389	0.0796		-1.25	
2347	GB/T20388	0.1114		0.74	
2350	CPSC-CH-C1001-09.4	0.1069		0.46	
2352	ISO14389	0.1108		0.71	
2357	ISO14389	0.1094		0.62	
2358	In house	0.109211		0.61	
2363	CPSC-CH-C1001-09.4	0.1090		0.59	
2365	CPSC-CH-C1001-09.4	0.10995		0.65	
2366	CPSC-CH-C1001-09.4	0.114		0.91	
2370	ISO14389	0.103		0.22	
2372	CPSC-CH-C1001-09.4	0.108056		0.53	
2375	ISO14389	0.102		0.15	
2378	ISO14389	0.1098		0.64	
2379	EN14372	0.0953		-0.27	
2380	ISO14389	0.11071		0.70	
2381	CPSC-CH-C1001-09.4	0.1010		0.09	
2386	ISO14389	0.1357		2.27	
2410	CPSC-CH-C1001-09.4	0.114		0.91	
2449	ISO14389	0.08251	C	-1.07	First reported 550.4
2452	ISO14389	0.1159		1.03	
2453	ISO14389	0.078		-1.35	
2459	CPSC-CH-C1001-09.4	0.084		-0.98	
2481		-----		-----	
2492	CPSC-CH-C1001-09.4	0.0624		-2.33	
2561	ISO14389	0.097		-0.16	
2582	ISO14389	0.11493	C	0.97	First reported 1.1493
2590	ISO14389	0.0715		-1.76	
2665	CPSC-CH-C1001-09.4	0.0522	C	-2.97	First reported 0.1581
2674	CPSC-CH-C1001-09.4	0.1098		0.64	
2678		-----		-----	
2734	ISO14389	0.1123		0.80	
2737	ISO14389	0.101211		0.10	
2741	ISO14389	0.0853		-0.89	
2744	ISO14389	0.0970		-0.16	
2789		-----		-----	
2793	ISO14389	0.117753		1.14	
2809	ISO14389	0.094		-0.35	
2977	ISO14389	0.09029		-0.58	
3001	ISO14389	0.084		-0.98	
3014	ISO14389	0.10085		0.08	
3017	ABNT NBR16525	0.08501	C	-0.91	First reported not detected
3022		-----		-----	
3116	ISO14389	0.119		1.22	
3154	ISO16181-1	0.126		1.66	
3166	In house	0.109		0.59	
3172	ISO8124-6	0.1125		0.81	
3176	EN14372	0.1008		0.08	
3197	ISO14389	0.0999		0.02	
3210	In house	0.0875		-0.76	
3222	ISO16181-1	0.1180		1.16	
3228	GB/T 20388	0.1075		0.50	
3230	In house	0.0860		-0.85	

normality	OK	
n	67	
outliers	0	
mean (n)	0.09956	
st.dev. (n)	0.015391	RSD = 15%
R(calc.)	0.04310	
st.dev.(iis memo 1701)	0.015929	
R(iis memo 1701)	0.04460	

Kernel Density
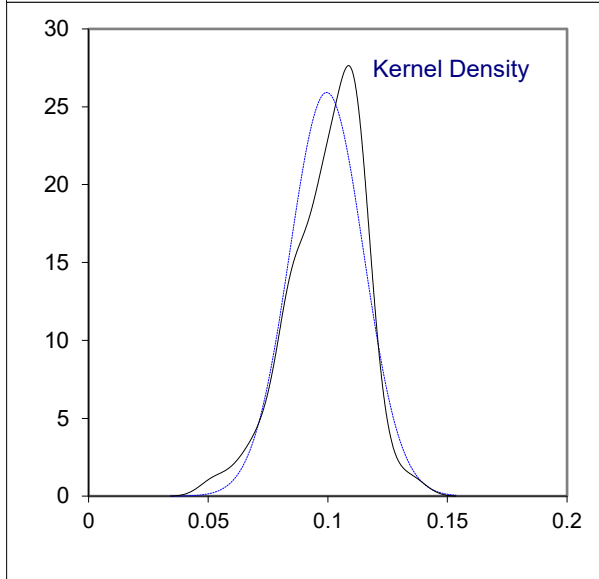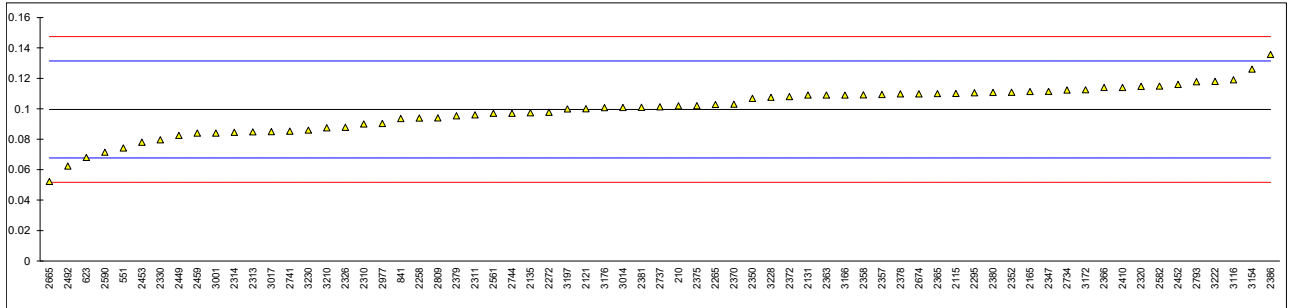
APPENDIX 2 Other reported test results

Abbreviations of components:

BBP   = Benzyl butyl phthalate (CAS No. 85-68-7)
DEHP   = Di-(2-ethylhexyl) phthalate (CAS No. 117-81-7)
DBP   = Dibutyl phthalate (CAS No. 84-74-2)
DIDP   = Di-iso-decyl phthalate (CAS No. 26761-40-0 & 68515-49-1)
DINP   = Di-iso-nonyl phthalate (CAS No. 28553-12-0 & 68515-48-0)
DNOP = Di-n-octyl phthalate (CAS No. 117-84-0)
DCHP = Dicyclohexyl phthalate (CAS No. 84-61-7)
DEP   = Diethyl phthalate (CAS No. 84-66-2)
DMP   = Dimethyl phthalate (CAS No. 131-11-3)
DNHP = Di-n-hexyl phthalate (CAS No. 84-75-3)
DIBP   = Di-iso-butyl phthalate (CAS No. 84-69-5)
DNPP = Di-n-pentyl phthalate (CAS No. 131-18-0)
DPrP   = Di-n-propyl phthalate (CAS No. 131-16-8)
DMEP = Di-(2-methoxyethyl) phthalate (CAS No. 117-82-8)
Other   = Total Other Phthalates

sample #23570; results in %M/M

lab	BBP	DEHP	DBP	DIDP	DINP	DNOP	DCHP
210	-----	-----	-----	-----	-----	-----	-----
339	-----	-----	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----	-----	-----
623	0.003	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
841	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
2115	-----	-----	-----	-----	-----	-----	-----
2121	-----	-----	-----	-----	-----	-----	-----
2131	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2135	-----	-----	-----	-----	-----	-----	-----
2165	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2223	-----	-----	-----	-----	-----	-----	-----
2258	not detected	0.055	0.0042	not detected	not detected	not detected	0.0286
2265	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2272	-----	-----	-----	-----	-----	-----	-----
2295	-----	-----	-----	-----	-----	-----	-----
2310	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2313	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2314	-----	-----	-----	-----	-----	-----	-----
2320	<0.003	<0.003	<0.003	<0.005	<0.005	<0.003	<0.003
2326	ND	ND	ND	ND	ND	ND	ND
2330	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected
2347	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2350	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
2352	-----	-----	-----	-----	-----	-----	-----
2357	-----	-----	-----	-----	-----	-----	-----
2358	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2363	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2365	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2366	-----	-----	-----	-----	-----	-----	-----
2370	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
2372	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2375	-----	-----	-----	-----	-----	-----	-----
2378	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2379	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected
2380	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2381	-----	-----	-----	-----	-----	-----	-----
2386	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2410	-----	-----	-----	-----	-----	-----	-----
2449	----- C	-----	-----	-----	-----	-----	-----
2452	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2453	-----	-----	-----	-----	-----	-----	-----
2459	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2481	-----	-----	-----	-----	-----	-----	-----
2492	-----	-----	-----	-----	-----	-----	-----
2561	-----	-----	-----	-----	-----	-----	-----
2582	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2590	-----	-----	-----	-----	-----	-----	-----
2665	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2674	-----	-----	-----	-----	-----	-----	-----
2678	-----	-----	-----	-----	-----	-----	-----
2734	not detected	not detected	not detected	not detected	not detected	not detected	not detected

lab	BBP	DEHP	DBP	DIDP	DINP	DNOP	DCHP
2737	-----	-----	-----	-----	-----	-----	-----
2741	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2744	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2789	-----	-----	-----	-----	-----	-----	-----
2793	not detected	not detected	not detected	not detected	not detected	not detected	not applicable
2809	-----	-----	-----	-----	-----	-----	-----
2977	not detected	not detected	not detected	not detected	not detected	not detected	-----
3001	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected
3014	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
3017	0.08051	0.0978	0.01014	not detected	not detected	not detected	-----
3022	-----	-----	-----	-----	-----	-----	-----
3116	-----	-----	-----	-----	-----	-----	-----
3154	-----	0.0027	-----	-----	-----	-----	-----
3166	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-----
3172	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
3176	-----	-----	-----	-----	-----	-----	-----
3197	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020
3210	-----	-----	-----	-----	-----	-----	-----
3222	-----	-----	-----	-----	-----	-----	-----
3228	not detected	not detected	not detected	not detected	not detected	not detected	not detected
3230	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected

Lab 2449 first reported 825.1

sample #23570; results in %M/M ---- continued ----

lab	DEP	DMP	DIBP	DNPP	DPrP	DMEP	Other
210	-----	-----	-----	-----	-----	-----	-----
339	-----	-----	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----	-----	-----
623	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
841	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.06589
2115	-----	-----	-----	-----	-----	-----	-----
2121	-----	-----	-----	-----	-----	-----	-----
2131	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2135	-----	-----	-----	-----	-----	-----	-----
2165	-----	-----	not detected	not detected	-----	not detected	-----
2223	-----	-----	-----	-----	-----	-----	-----
2258	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2265	not detected	not detected	not detected	not detected	not detected	not detected	0.1817
2272	-----	-----	-----	-----	-----	-----	-----
2295	-----	-----	-----	-----	-----	-----	-----
2310	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2313	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2314	-----	-----	-----	-----	-----	-----	-----
2320	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
2326	ND	ND	ND	ND	ND	ND	ND
2330	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	-----
2347	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-----
2350	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
2352	-----	-----	-----	-----	-----	-----	-----
2357	-----	-----	-----	-----	-----	-----	-----
2358	not detected	not detected	not detected	not detected	not detected	not detected	-----
2363	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2365	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2366	-----	-----	-----	-----	-----	-----	-----
2370	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
2372	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.071579
2375	-----	-----	-----	-----	-----	-----	-----
2378	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2379	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	0.0661
2380	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-----
2381	-----	-----	-----	-----	-----	-----	-----
2386	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-----
2410	-----	-----	-----	-----	-----	-----	-----
2449	-----	-----	-----	-----	-----	-----	-----
2452	-----	-----	not detected	not detected	-----	not detected	not detected
2453	-----	-----	-----	-----	-----	-----	-----
2459	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2481	-----	-----	-----	not detected	-----	not detected	-----
2492	-----	-----	-----	-----	-----	-----	-----
2561	-----	-----	-----	-----	-----	-----	-----
2582	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2590	-----	-----	-----	-----	-----	-----	-----
2665	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2674	-----	-----	-----	-----	-----	-----	-----
2678	-----	-----	-----	-----	-----	-----	-----
2734	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2737	-----	-----	-----	-----	-----	-----	-----
2741	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-----
2744	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2789	-----	-----	-----	-----	-----	-----	-----
2793	-----	-----	not detected	-----	-----	not detected	-----
2809	-----	-----	-----	-----	-----	-----	-----
2977	-----	-----	not detected	not detected	-----	not detected	-----
3001	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected
3014	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.0572
3017	-----	-----	-----	-----	-----	-----	-----
3022	-----	-----	-----	-----	-----	-----	-----
3116	-----	-----	-----	-----	-----	-----	-----
3154	-----	-----	-----	-----	-----	-----	-----
3166	Not Detected	Not Detected	Not Detected	Not Detected	-----	-----	-----
3172	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	-----
3176	-----	-----	-----	-----	-----	-----	-----
3197	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020
3210	-----	-----	-----	-----	-----	-----	-----
3222	-----	-----	-----	-----	-----	-----	-----
3228	-----	-----	not detected	not detected	-----	not detected	-----
3230	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected

sample #23571; results in %M/M

lab	DEHP	DBP	DIDP	DINP	DNOP	DCHP	DEP
210	-----	-----	-----	-----	-----	-----	-----
339	-----	-----	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----	-----	-----
623	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
841	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
2115	-----	-----	-----	-----	-----	-----	-----
2121	-----	-----	-----	-----	-----	-----	-----
2131	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2135	-----	-----	-----	-----	-----	-----	-----
2165	not detected	not detected	not detected	not detected	not detected	not detected	-----
2223	-----	-----	-----	-----	-----	-----	-----
2258	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2265	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2272	-----	-----	-----	-----	-----	-----	-----
2295	-----	-----	-----	-----	-----	-----	-----
2310	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2313	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2314	-----	-----	-----	-----	-----	-----	-----
2320	<0.003	<0.003	<0.005	<0.005	<0.003	<0.003	<0.003
2326	ND	ND	ND	ND	ND	ND	ND
2330	Not detected	Not detected	Not detected	Not detected	Not detected	Not detectedv	Not detected
2347	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2350	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
2352	-----	-----	-----	-----	-----	-----	-----
2357	-----	-----	-----	-----	-----	-----	-----
2358	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2363	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2365	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2366	-----	-----	-----	-----	-----	-----	-----
2370	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
2372	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2375	-----	-----	-----	-----	-----	-----	-----
2378	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2379	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected
2380	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2381	-----	-----	-----	-----	-----	-----	-----
2386	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2410	-----	-----	-----	-----	-----	-----	-----
2449	-----	-----	-----	-----	-----	-----	-----
2452	not detected	not detected	not detected	not detected	not detected	not detected	-----
2453	-----	-----	-----	-----	-----	-----	-----
2459	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2481	-----	-----	-----	-----	-----	-----	-----
2492	-----	-----	-----	-----	-----	-----	-----
2561	-----	-----	-----	-----	-----	-----	-----
2582	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2590	-----	-----	-----	-----	-----	-----	-----
2665	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2674	-----	-----	-----	-----	-----	-----	-----
2678	-----	-----	-----	-----	-----	-----	-----
2734	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2737	-----	-----	-----	-----	-----	-----	-----
2741	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2744	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2789	-----	-----	-----	-----	-----	-----	-----
2793	not detected	not detected	not detected	not detected	not detected	not applicable	-----
2809	-----	-----	-----	-----	-----	-----	-----
2977	not detected	not detected	not detected	not detected	not detected	-----	-----
3001	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected
3014	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
3017	0.00051	not detected	not detected	not detected	0.00107	-----	-----
3022	-----	----- C	-----	-----	-----	-----	-----
3116	-----	-----	-----	-----	-----	-----	-----
3154	-----	-----	-----	-----	-----	-----	-----
3166	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-----	Not Detected
3172	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
3176	-----	-----	-----	-----	-----	-----	-----
3197	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020
3210	-----	-----	-----	-----	-----	-----	-----
3222	-----	-----	-----	-----	-----	-----	-----
3228	not detected	not detected	not detected	not detected	not detected	not detected	-----
3230	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected

Lab 3022 first reported 0.08501

sample #23571; results in %M/M ---- continued ----

lab	DMP	DNHP	DIBP	DNPP	DPrP	DMEP	Other
210	-----	-----	-----	-----	-----	-----	-----
339	-----	-----	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----	-----	-----
623	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
841	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.09359
2115	-----	-----	-----	-----	-----	-----	-----
2121	-----	-----	-----	-----	-----	-----	-----
2131	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2135	-----	-----	-----	-----	-----	-----	-----
2165	-----	not detected	not detected	not detected	-----	not detected	-----
2223	-----	-----	-----	-----	-----	-----	-----
2258	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2265	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2272	-----	-----	-----	-----	-----	-----	-----
2295	-----	-----	-----	-----	-----	-----	-----
2310	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2313	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2314	-----	-----	-----	-----	-----	-----	-----
2320	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
2326	ND	ND	ND	ND	ND	ND	ND
2330	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	-----
2347	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-----
2350	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
2352	-----	-----	-----	-----	-----	-----	-----
2357	-----	-----	-----	-----	-----	-----	-----
2358	not detected	not detected	not detected	not detected	not detected	not detected	not applicable
2363	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2365	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2366	-----	-----	-----	-----	-----	-----	-----
2370	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
2372	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.108056
2375	-----	-----	-----	-----	-----	-----	-----
2378	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2379	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	0.0953
2380	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-----
2381	-----	-----	-----	-----	-----	-----	-----
2386	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-----
2410	-----	-----	-----	-----	-----	-----	-----
2449	-----	----- C	-----	-----	-----	-----	-----
2452	-----	not detected	not detected	not detected	-----	not detected	not detected
2453	-----	-----	-----	-----	-----	-----	-----
2459	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2481	-----	not detected	-----	not detected	-----	not detected	-----
2492	-----	-----	-----	-----	-----	-----	-----
2561	-----	-----	-----	-----	-----	-----	-----
2582	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2590	-----	-----	-----	-----	-----	-----	-----
2665	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2674	-----	-----	-----	-----	-----	-----	-----
2678	-----	-----	-----	-----	-----	-----	-----
2734	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2737	-----	-----	-----	-----	-----	-----	-----
2741	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-----
2744	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2789	-----	-----	-----	-----	-----	-----	-----
2793	-----	not detected	not detected	-----	-----	not detected	-----
2809	-----	-----	-----	-----	-----	-----	-----
2977	-----	not detected	not detected	not detected	-----	not detected	-----
3001	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected
3014	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
3017	-----	-----	-----	-----	-----	-----	-----
3022	-----	-----	-----	-----	-----	-----	-----
3116	-----	-----	-----	-----	-----	-----	-----
3154	-----	-----	-----	-----	-----	-----	-----
3166	Not Detected	Not Detected	Not Detected	Not Detected	-----	-----	-----
3172	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	-----
3176	-----	-----	-----	-----	-----	-----	-----
3197	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020	<0,0020
3210	-----	-----	-----	-----	-----	-----	-----
3222	-----	-----	-----	-----	-----	-----	-----
3228	-----	not detected	not detected	not detected	-----	not detected	-----
3230	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected

Lab 2449: first reported 550.4

APPENDIX 3 Analytical details

lab	ISO/IEC 17025 accr.	Sample preparation	Sample intake in grams	Release/ extraction technique	Extraction solvent	Extraction time in minutes	Extraction temperature in °C
210	Yes	Further cut	---	Ultrasonic	---	---	---
339	---	---	---	---	---	---	---
551	Yes	Further cut	0.5	Ultrasonic	THF / n-Hexane	60	60
623	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60
841	Yes	Further cut	0.5	Ultrasonic	THF	60	60
2115	Yes	Used as received	0.3	Ultrasonic	THF / n-Hexane	60	60
2121	Yes	Used as received	0.3	Ultrasonic	THF / n-Hexane	60	60
2131	Yes	Used as received	0.5	Ultrasonic	THF / n-Hexane	60	60
2135	Yes	Used as received	0.3	Ultrasonic	THF / ACN	60	60
2165	Yes	Used as received	1.5	Ultrasonic	THF	60	60
2223	---	---	---	---	---	---	---
2258	Yes	Used as received	0.062	---	THF / ACN	120	40
2265	Yes	Further cut	0.3	Ultrasonic	THF / n-Hexane	60	60
2272	Yes	Further cut	0.3	Ultrasonic	THF / n-Hexane	60	60
2295	Yes	Further cut	0.4	Ultrasonic	THF / n-Hexane	30	room temp.
2310	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60
2311	Yes	Further cut	0.3	Ultrasonic	THF	60	60
2313	Yes	Further cut	0.5	Ultrasonic	THF / n-Hexane	60	60
2314	Yes	Further cut	0.5	Ultrasonic	THF / n-Hexane	60	60
2320	Yes	Further cut	0.5	Ultrasonic	THF / n-Hexane	60	60
2326	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60
2330	Yes	Further cut	0.30	Ultrasonic	THF / n-Hexane	60	60
2347	Yes	Further cut	0.3	Ultrasonic	THF	60	60
2350	Yes	Used as received	0.5	Ultrasonic	THF / ACN	150	60
2352	Yes	Further cut	0.3	Ultrasonic	THF / n-Hexane	60	60
2357	---	---	---	---	---	---	---
2358	Yes	Used as received	0.1	Ultrasonic	THF / n-Hexane	60	50
2363	No	Further cut	2.5	Mechanical Shaking	THF	90	---
2365	Yes	Further grinded	0.1	Ultrasonic	THF / n-Hexane	60	60
2366	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60
2370	Yes	Further cut	0.3	Ultrasonic	THF	60	60
2372	Yes	Further cut	0.3	Ultrasonic	----	60	room temp.
2375	Yes	Further cut	0.3	Ultrasonic	THF	60	60
2378	Yes	Further cut	0.1	Ultrasonic	THF	60	60
2379	Yes	Further cut	0.3	Ultrasonic	THF / n-Hexane	60	60
2380	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60
2381	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60.
2386	Yes	Further cut	0.5	Ultrasonic	THF / ACN	60	60
2410	Yes	Further cut	0.2	Ultrasonic	THF / n-Hexane	60	---
2449	Yes	Further cut	0.3	Ultrasonic	THF / ACN	120	40
2452	Yes	Used as received	0.1	Ultrasonic	THF / n-Hexane	60	60
2453	---	---	---	---	---	---	---
2459	Yes	Further cut	0.50	Ultrasonic	THF / n-Hexane	60	60
2481	Yes	Further cut	0.5	Ultrasonic	THF	60	60
2492	Yes	Used as received	0.3	Ultrasonic	THF	60	60
2561	Yes	Used as received	0.2	Mechanical Shaking	THF	60	60
2582	Yes	Further cut	0.30	Ultrasonic	THF	60	60
2590	Yes	Used as received	0.3	Ultrasonic	THF / n-Hexane	---	---
2665	Yes	Used as received	0.5	Mechanical Shaking	THF	30	22
2674	Yes	Used as received	2.0	Ultrasonic	THF / n-Hexane	----	----
2678	---	---	---	---	---	---	---
2734	Yes	Further cut	1.5	Ultrasonic	THF / n-Hexane	60	60
2737	Yes	Further cut	0.5	Ultrasonic	THF	60	60
2741	Yes	Further cut	0.5	Ultrasonic	THF / ACN	60	60
2744	Yes	Used as received	0,3	Ultrasonic	THF / ACN	30	60
2789	---	---	---	---	---	---	---
2793	Yes	Used as received	0.300	Ultrasonic	THF / ACN	60	60
2809	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60
2977	No	Used as received	0.3	Ultrasonic	THF	60	60
3001	No	Further cut	0.3	Soxhlet	THF	60	60
3014	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60
3017	No	Further cut	2.0	Soxhlet	n-Hexane	240	65
3022	---	---	---	---	---	---	---
3116	Yes	Further cut	0.5	Ultrasonic	THF	60	60
3154	Yes	Used as received	0.5	Ultrasonic	Toluene	60	60
3166	Yes	Further cut	0.5	Thermal Desorption	Dichloromethane	60	25
3172	Yes	---	---	---	---	---	---
3176	Yes	Used as received	0,5	Soxhlet	Diethylether	360	40
3197	Yes	Further cut	0.3	Ultrasonic	THF / n-Hexane	60	60
3210	Yes	Further cut	1	Ultrasonic	Toluene	60	60
3222	No	Used as received	1	Ultrasonic	THF / n-Hexane	60	60
3228	Yes	Further cut	0.5	Ultrasonic	THF	60	60
3230	Yes	Further cut	0.1	Ultrasonic	THF / n-Hexane	60	60

APPENDIX 4

Number of participants per country

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

APPENDIX 5

Abbreviations

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

Literature

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