Results of Proficiency Test
PAH in Polymers, total
February 2021

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. C.M. Nijssen-Wester
Correctors: ing. A.S. Noordman-de Neef & ing. R.J. Starink
Report: iis21P02

April 2021

CONTENTS

1 INTRODUCTION

Polycyclic Aromatic Hydrocarbons (PAH) are often, not intentionally, introduced in plastic and rubber with processing additives of plastics and rubber. As essential raw materials of consumer components in articles under REACH, the PAH risk of plastics and rubbers shall be identified. Enterprises shall strictly monitor PAH in high-risk materials, to ensure that the products comply with regulation requirements and with trust of consumers. As early as 2008, the Board of Technical Work Equipment and Consumer Products (AtAV) of Germany includes 16 types of PAH in GS certification. On December 7th, 2013, Regulation (EU) 1272/2013 was published and new PAH requirements have been added under entry 50 of ANNEX XVII of REACH. On August 4th, 2014, the committee for product safety amended the PAH testing requirements under GS-Mark in accordance with § 21, subsection no.3 of the German Product Safety Act. This AfPS GS PAH specification was updated in August 2019 and is mandatory from July 2020. Differences between the 2019 and the 2014 version include reducing the number of PAHs from 18 to 15 and only sum up the PAHs quantified from 0.2 mg/kg.

Since 2015 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the determination of PAH in Polymers every year. During the annual proficiency testing program 2020/2021 it was decided to continue the proficiency test for the analysis of PAH in Polymers.

In this interlaboratory study 103 laboratories from 27 different countries registered for participation. See appendix 4 for the number of participants per country.
In this report the results of this proficiency test are presented and discussed. This report is also electronically available through the iis website ww.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 one sample of approximately 3 grams labelled #21505. 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

A batch of green PVC rings was selected which was made positive for PAH by a third party. After homogenization the batch was divided over 30 subsamples in small bags of approximately 3 grams each and labelled #21505.
The homogeneity of the subsamples was checked by determination of Anthracene, Chrysene and Benzo[a]pyrene with an in-house test method on 8 stratified randomly selected subsamples.

	Anthracene in mg/kg	Chrysene in mg/kg	Benzo[a]pyrene in mg/kg
Sample #21505-1	4.42	4.18	4.59
Sample #21505-2	4.43	4.43	4.44
Sample #21505-3	4.28	4.24	4.47
Sample #21505-4	4.50	4.29	4.49
Sample #21505-5	4.49	4.36	4.58
Sample #21505-6	4.25	4.33	4.50
Sample #21505-7	4.42	4.18	4.59
Sample #21505-8	4.43	4.43	4.44

Table 1: homogeneity test results of subsamples #21505

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

	Anthracene in mg/kg	Chrysene in mg/kg	Benzo[a]pyrene in mg/kg
r (observed)	0.28	0.22	0.31
reference test method	IEC62321-10:20	IEC62321-10:20	IEC62321-10:20
0.3 x R (reference test method)	0.70	0.69	0.73

Table 2: evaluation of the repeatabilities of subsamples #21505

The calculated repeatabilities were in agreement with 0.3 times the reproducibility of the reference test method. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories one sample labelled #21505 was sent on January 13, 2021.

2.5 ANALYZES

The participants were asked to determine on samples #21505 the concentrations of any of the following PAH (CAS No.)

- Total PAH
- Naphthalene (91-20-3)
- Acenaphthylene (208-96-8)
- Acenaphthene (83-32-9)
- Fluorene (86-73-7)
- Phenanthrene (85-01-8)
- Anthracene (120-12-7)
- Fluoranthene (206-44-0)
- Pyrene (129-00-0)
- Sum of Phenanthrene, Anthracene, Fluoranthene and Pyrene
- Benzo[a]anthracene (56-55-3)
- Chrysene (218-01-9)
- Triphenylene (217-59-4)
- Sum of Chrysene and Triphenylene
- Benzo[b]fluoranthene (205-99-2)
- Benzo[j]fluoranthene (205-82-3)
- Benzo[k]fluoranthene (207-08-9)
- Sum of [b],[j] and [k] Benzofluoranthenes
- Benzo[e]pyrene (192-97-2)
- Benzo[a]pyrene (50-32-8)
- Indeno[1,2,3-c,d]pyrene (193-39-5)
- Dibenzo[a,h]anthracene (53-70-3)
- Benzo[g,h,i]perylene (191-24-2)
- Cyclopenta[c,d]pyrene (27208-37-3)

Also, it was requested to report some analytical details.

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

To get comparable 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 appropriate reference test methods that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis-cts/. The participating laboratories are also requested to confirm sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

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

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination

Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no reanalyzes). Additional or corrected test results are used for data analysis and the original test results are placed under ‘Remarks’ in the 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 organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5).
For the statistical evaluation, the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as '<…' or '>…' were not used in the statistical evaluation.

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

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

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

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

Finally, the reproducibilities were calculated from the standard deviations by multiplying these 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. 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 (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

3.3 Z-SCORES

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

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

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

The z-scores were calculated according to:

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

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

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

	$\lvert z \rvert$	< 1	good
$1 <$	$\lvert z \rvert$	< 2	satisfactory
$2 <$	$\lvert z \rvert$	< 3	questionable
$3 <$	$\lvert z \rvert$		unsatisfactory

4 EVALUATION

During the execution of this proficiency test some problems occurred with the dispatch of the samples due to the COVID-10 pandemic. Therefore, the reporting time on the data entry portal was extended with another week. Eight participants reported the test results after the extended final reporting date and two participants did not report any test results at all. Not all laboratories were able to report all components.
In total 101 participants reported 589 numerical test results. Observed were 23 outlying test results, which is 3.9%. In proficiency studies outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER COMPONENT

In this section the reported test results are discussed 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 in appendix 1 together with the original data. The abbreviations used in these tables are explained in appendix 5.

The majority of the participants reported to have used AfPS GS 2014:01 PAK, which is invalid since 1 July 2020. A quarter of all participants reported to have used AfPS GS 2019:01 PAK. This test method was published in May 2019 and has superseded AfPS GS 2014:01 PAK in July 2020. The main difference is the number of PAH determined. In the AfPS GS 2019:01 PAK version the number is reduced from 18 to 15 PAH (not listed are Acenaphthylene, Acenaphthene and Fluorene). This method also clarifies that only PAHs that have been quantified from 0.2 mg/kg are considered for the sum of 15 PAHs. The calculation of the total PAH has been evaluated using the AfPS GS 2019:01 PAK version. Furthermore, two participants reported to have used IEC62321-10 (PAHs in polymers and electronics by GC-MS), seven participants reported to have done an in-house method and seven other participants used other test methods.

Regretfully, in the common test methods AfPS GS 2014:01 PAK and 2019:01 PAK no precision data are mentioned. However, the method IEC62321-10 (published in 2020) did have a precision statement. In table 5 of this method the repeatability and reproducibility are mentioned for 18 PAHs based on four samples with different concentrations measured by 20 to 30 laboratories. All reproducibility data was used and compared by iis. When all reproducibilities were made relative to the concentrations, this data showed that the relative reproducibility of all PAHs for concentrations between 22.8 mg/kg to 1041 mg/kg was around 50%. Below this concentration, the relative reproducibility varied between 50% and 1000%, which is expected because lower concentrations usually show higher variation. Based on this, iis decided to use all data between 22.8 and 1041 mg/kg to calculate a relative reproducibility for PAH. This relative reproducibility is 53.2% of the concentration.

Looking at the PT reports of previous years, the relative calculated reproducibility of the group is in line with this relative target reproducibility of 53.2%. This was also found for PAHs with concentrations below 20 mg/kg. In the iis PTs it appears that the participants are able to determine PAH at lower concentrations with the same variation as the higher concentrations. Therefore, iis decided to evaluate all PAHs that were present in the sample above the limit of 0.2 mg/kg with a relative reproducibility of 53.2%.

Total PAH: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of IEC62321-10:20.
The total PAH level was also calculated by iis over the 15 PAHs which level exceed 0.2 mg/kg according to AfPS GS 2019:01, chapter §3.2. Five participants reported a different total PAH than calculated by iis.

Naphthalene: This determination may be problematic at the low concentration of 0.24 mg/kg. Six statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of IEC62321-10:20.

Phenanthrene: This determination may be problematic at the low concentration of 0.24 mg/kg. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of IEC62321-10:20.

Anthracene: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of IEC62321-10:20.

Sum of Phenanthrene, Anthracene, Fluoranthene and Pyrene: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of IEC62321-10:20.

Chrysene: This determination was not problematic. Six statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of IEC62321-10:20.

Benzo[a]pyrene: This determination was not problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of IEC62321-10:20.

Since Triphenylene was not present higher than 0.2 mg/kg, the sum of Chrysene and Triphenylene gave the same test result as the determination of Chrysene. Therefore, this sum was not evaluated separately, but added to the table of Chrysene. Remarkably, nine participants first reported “not detected” or a test result <0.2 mg/kg for this sum, whereas they also reported the presence of Chrysene.

The participants did agree on a concentration near or below the limit of detection for the other PAH. Therefore, no z-scores were calculated. These components are listed 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 literature reference methods are presented in the next tables.

Component	unit	n	average	2.8 * sd	R(target)
Total PAH	mg/kg	62	13.95	4.42	7.42
Naphthalene	mg/kg	63	0.24	0.21	0.13
Phenanthrene	mg/kg	56	0.24	0.24	0.13
Anthracene	mg/kg	98	4.38	1.54	2.33
Sum of Ph, An, Fl and Py *)	mg/kg	64	4.60	1.59	2.45
Chrysene	mg/kg	95	4.63	1.57	2.46
Benzo[a]pyrene	mg/kg	96	4.49	1.40	2.39

Table 3: reproducibilities of components on sample #21505

*) Sum of Phenanthrene, Anthracene, Fluoranthene and Pyrene

Without further statistical calculations, it could be concluded that the group of participating laboratories have no problems with the analysis of PAH in polymer at the evaluated concentration levels of sample #21505 that are not close to the detection limit of 0.2 mg/kg. See also the discussion in paragraphs 4.1, 4.4 and 5.

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

	February 2021	February 2020	February 2019	February 2018	February 2017
Number of reporting laboratories	101	103	96	104	91
Number of test results	589	2271	1844	1772	957
Number of statistical outliers	23	81	53	46	61
Percentage of statistical outliers	3.9%	3.6%	2.9%	2.6%	6.4%

Table 4: 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, expressed as relative standard deviation (RSD) of the proficiency tests. The conclusions are given in the next table.

Component	February 2021	February 2020	February 2019	February 2018	February 2017	Target IEC
Total PAH	11%	12-15%	15%	n.e.	n.e.	19%
Naphthalene	31%***	16-25%	24%	30%	43%	19%
Acenaphthylene	n.e.	29%	n.e.	23%	n.e.	19%
Acenaphthene	n.e.	12-25%	17%	14 - 29%	13%	19%
Fluorene	n.e.	12-14%	16%	n.e.	15%	19%
Phenanthrene	37%***	14-37%	13 - 14%	13%	13 - 41%	19%
Anthracene	13%	15%	20%	12 - 37%	15%	19%
Fluoranthene	n.e.	16%	12%	14%	12%	19%
Pyrene	n.e.	11-42%	16%	12 - 13%	14 - 33%	19%
Sum of pH, An, Fl and Py *)	12%	14-51%	n.e.	n.e.	n.e.	19%
Benzo[a]anthracene	n.e.	25%	15 - 18%	23%	17%	19%
Chrysene	12%	34%	23%	n.e.	n.e.	19%
Triphenylene	n.e.	n.e.	n.e.	n.e.	n.e.	19%
Benzo[b]fluoranthene	n.e.	27%	16 - 18%	22%	n.e.	19%
Benzo[j]fluoranthene	n.e.	32%	18%	25%	n.e.	19%
Benzo[k]fluoranthene	n.e.	30%	21%	23%	n.e.	19%
Sum of [b],[j] and [k] Benzof.**)	n.e.	26%	14 - 18%	30%	n.e.	19%
Benzo[e]pyrene	n.e.	23%	20%	19%	n.e.	19%
Benzo[a]pyrene	11%	26%	21%	26%	17%	19%
Indeno[1,2,3-c,d]pyrene	n.e.	21%	23%	29%	n.e.	19%
Dibenzo[a,h]anthracene	n.e.	33%	n.e.	n.e.	n.e.	19%
Benzo[g,h,i]perylene	n.e.	21%	19%	31%	n.e.	19%
Cyclopenta(c,d)pyrene	n.e.	n.e.	n.e.	26%	n.e.	19%

Table 5: development of uncertainties (RSD) over the years

*) Sum of Phenanthrene, Anthracene, Fluoranthene and Pyrene
**) Sum of [b],[j] and [k] Benzofluoranthenes
***) concentration of this PAH close to 0.2 mg/kg

The uncertainties observed in this PT are in line with the uncertainties observed in previous PTs. The uncertainties are close to or in line with the requirements mentioned in the target.

4.4 EVALUATION OF THE ANALYTICAL DETAILS

For this PT, some analytical details were requested (see appendix 3). Based on the answers given by the participants the following can be summarized:

- 84% of the participants mentioned that they are accredited for determination of PAH.
- 78% of the participants mentioned that they have further cut or grinded the samples before use, and 22% of the participants used the samples as received.
- 76% of the participants mentioned to have used 0.5 grams, 9% used 0.2-0.3 grams and 15% used 1 or more grams.

5 DISCUSSION

All laboratories would have rejected sample #21503 for all categories containing too much Anthracene, Chrysene and Benzo[a]pyrene. Several participants would have accepted sample #21503 for category 3 other products – sum 15 PAH, when only total PAH was reported.

Parameter	Category 1	Category 2		Category 3	
	Materials intended to be placed in the mouth, or materials coming into long-term contact with skin (more than 30s) during the intended use - in toys according to Directive 2009/48/EC or - for the use by children[a,b] up to 3 years of age	Materials not covered by category 1, coming into long-term contact (more than 30s) or short-term repetitive contact[c] with skin during the intended or foreseeable use[d]		Materials covered neither by category 1 nor by category 2, coming into short-term contact (up to 30s) with skin during the intended or foreseeable use	
		a. use by children	b. other consumer products	a. use by children	b. other consumer products
Benzo[a]pyrene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[e]pyrene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[a]anthracene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[b]fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[j]fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[k]fluoranthene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysen mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenenzo[a,h]anthracene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[ghi]perylene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno[1,2,3-cd]pyrene mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Phenanthrene, Pyrene, Anthracene, Fluoranthene mg/kg	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum
Naphthalene mg/kg	< 1	< 2		< 10	
Sum 15 PAH mg/kg	< 1	< 5	< 10	< 20	< 50

Table 6: Category limits from German GS-Mark per July 2020

6 CONCLUSION

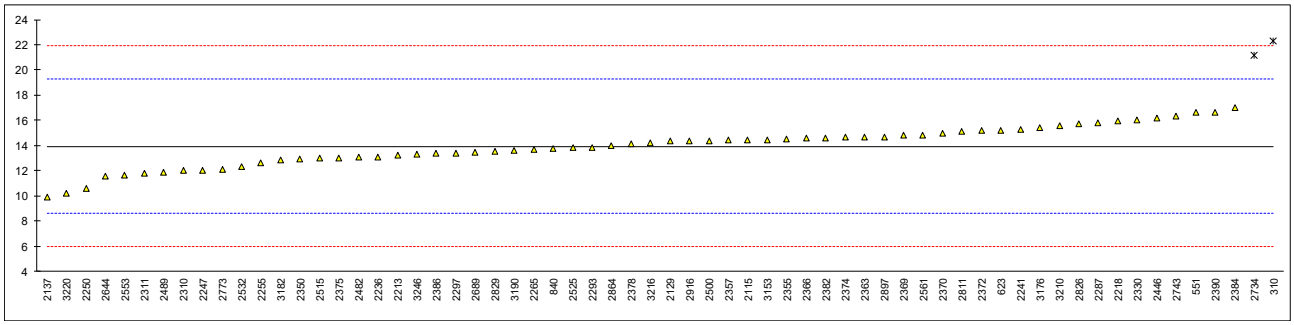
It can be concluded that the observed variation in this interlaboratory study may not be caused by just one critical point in the analysis. Each participating laboratory will have to evaluate its performance in this study and decide about any corrective actions if necessary. Therefore, participation on a regular basis in this scheme could be helpful to improve the performance and the quality of the analytical results.

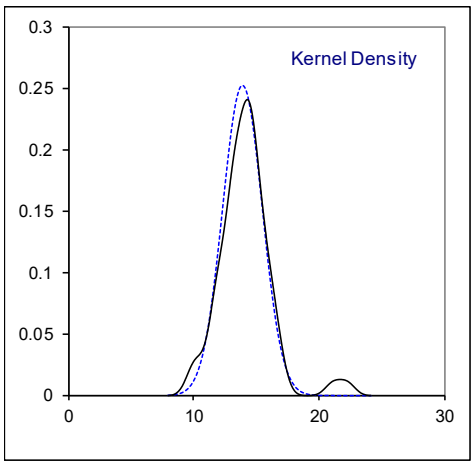
APPENDIX 1

Determination of Total PAH in sample #21505; results in mg/kg

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
310	AfPS GS 2014	22.32	R(0.01), E	3.16	calculation difference, iis calculated: 13.07
339		-----		-----	
551	AfPS GS 2014	16.62	E	1.01	calculation difference, iis calculated: 15.02
623	AfPS GS 2014	15.22		0.48	
840	AfPS GS 2014	13.77		-0.07	
841		-----		-----	
1910		-----		-----	
2115	AfPS GS 2019	14.47		0.20	
2129	AfPS GS 2014	14.33		0.15	
2137	KS M6956	9.88		-1.53	
2159		-----		-----	
2165		-----		-----	
2166		-----		-----	
2184		-----		-----	
2213	AfPS GS 2014	13.2		-0.28	
2218	ZEK01.4-08	15.919		0.74	
2236	In house	13.0782		-0.33	
2241	AfPS GS 2019	15.259		0.50	
2247	AfPS GS 2014	12.02		-0.73	
2250	AfPS GS 2014	10.56	C	-1.28	first reported: 0.17
2255	AfPS GS 2014	12.612		-0.50	
2256		-----		-----	
2265	AfPS GS 2014	13.69		-0.10	
2272		-----		-----	
2287	AfPS GS 2019	15.82		0.71	
2293	AfPS GS 2019	13.807		-0.05	
2295		-----		-----	
2297	AfPS GS 2014	13.41		-0.20	
2310	AfPS GS 2014	12		-0.73	
2311	AfPS GS 2014	11.822		-0.80	
2320		-----		-----	
2330	AfPS GS 2014	16.01		0.78	
2347		-----		-----	
2350	AfPS GS 2014	12.913		-0.39	
2352		-----		-----	
2353	AfPS GS 2014	NA		-----	
2355	AfPS GS 2014	14.48		0.20	
2357	AfPS GS 2014	14.411		0.18	
2358	AfPS GS 2014	N/A		-----	
2363	AfPS GS 2014	14.66		0.27	
2365	AfPS GS 2014	NA		-----	
2366	AfPS GS 2019	14.57		0.24	
2369	AfPS GS 2014	14.80		0.32	
2370	AfPS GS 2019	14.972		0.39	
2372	AfPS GS 2014	15.172		0.46	
2374	AfPS GS 2019	14.640		0.26	
2375	AfPS GS 2014	13.00		-0.36	
2378	AfPS GS 2019	14.145		0.08	
2379	AfPS GS 2019	Not tested		-----	
2380		-----		-----	
2382	AfPS GS 2014	14.58		0.24	
2384	AfPS GS 2019	17.04		1.17	
2386	AfPS GS 2014	13.39		-0.21	
2390	AfPS GS 2014	16.621		1.01	
2426		-----		-----	
2446	§64 LFGB B82.02-30	16.19		0.85	
2481		-----		-----	
2482	AfPS GS 2019	13.07		-0.33	
2489	AfPS GS 2014	11.86		-0.79	
2492		-----		-----	
2500	AfPS GS 2014	14.4039		0.17	
2511		-----		-----	
2515	AfPS GS 2014	12.98		-0.36	
2525	AfPS GS 2014	13.80		-0.05	
2532	AfPS GS 2014	12.36		-0.60	
2553	AfPS GS 2014	11.62		-0.88	
2561	AfPS GS 2014	14.815		0.33	
2569		-----		-----	
2573	AfPS GS 2014	ND		-----	
2590		-----		-----	
2605		-----		-----	
2629		-----		-----	
2644	AfPS GS 2014	11.54		-0.91	

lab	method	value	mark	z(targ)	remarks
2674		-----		-----	
2689	AfPS GS 2019	13.44		-0.19	
2734	AfPS GS 2014	21.18	R(0.01), E	2.73	calculation difference, iis calculated: 19.32
2737		-----		-----	
2743	ZEK01.4-08	16.3653	E	0.91	calculation difference, iis calculated: 14.53
2773	ZEK01.4-08	12.10	C	-0.70	first reported 11.72
2811	AfPS GS 2019	15.15		0.45	
2821		-----		-----	
2826	AfPS GS 2014	15.744		0.68	
2829	In house	13.51	E	-0.16	calculation difference, iis calculated: 9.87
2864	AfPS GS 2014	13.99		0.02	
2897	AfPS GS 2019	14.661		0.27	
2910		-----		-----	
2916	EN62321-10	14.39		0.17	
3100		-----		-----	
3116		-----		-----	
3153	AfPS GS 2019	14.47		0.20	
3163		-----		-----	
3172		-----		-----	
3176	In house	15.44		0.56	
3182	ZEK01.4-08	12.89	C	-0.40	first reported: 12.66
3185		-----		-----	
3190	AfPS GS 2014	13.628		-0.12	
3210	In house	15.542		0.60	
3216	AfPS GS 2014	14.229		0.11	
3220	AfPS GS 2014	10.22	C	-1.41	first reported: 9.94
3228		-----		-----	
3237		-----		-----	
3246	AfPS GS 2014	13.308		-0.24	
	normality	OK			
	n	62			
	outliers	2			
	mean (n)	13.9453			
	st.dev. (n)	1.57968	RSD = 11%		
	R(calc.)	4.4231			
	st.dev.(IEC62321-10:20)	2.64960			
	R(IEC62321-10:20)	7.4189			

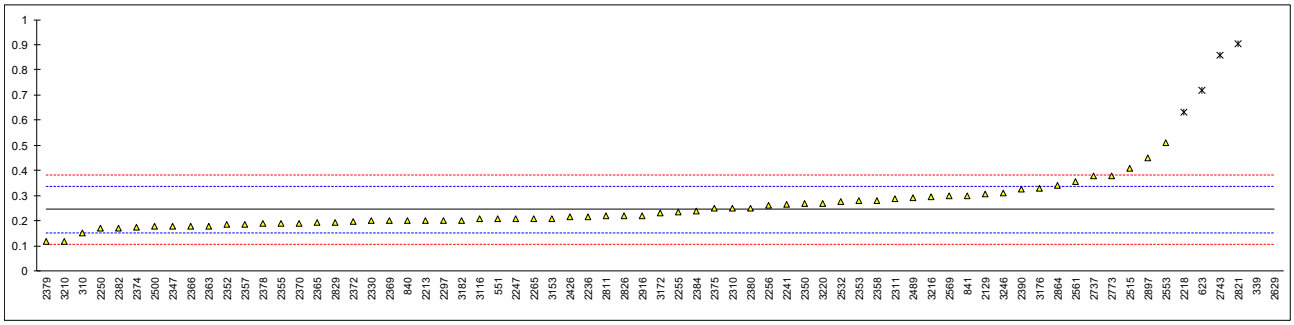


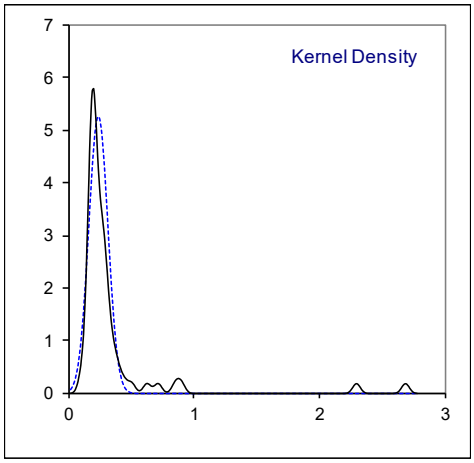


Determination of Naphthalene in sample #21505; results in mg/kg

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
310	AfPS GS 2014	0.1504		-2.03	
339	AfPS GS 2014Mod.	2.3	R(0.01)	44.21	
551	AfPS GS 2014	0.21	C	-0.75	first reported: 1.81
623	AfPS GS 2014	0.72	C,R(0.01)	10.22	first reported: 0.53
840	AfPS GS 2014	0.20		-0.96	
841	AfPS GS 2014	0.301		1.21	
1910		-----		-----	
2115	AfPS GS 2019	<0.2		-----	
2129	AfPS GS 2014	0.305		1.30	
2137		-----		-----	
2159	AfPS GS 2014	<Rep. Limit		-----	
2165	AfPS GS 2019	<0.2		-----	
2166	AfPS GS 2019Mod.	<0.2		-----	
2184	AfPS GS 2019	<0.2		-----	
2213	AfPS GS 2014	0.2		-0.96	
2218	ZEK01.4-08	0.632	R(0.01)	8.33	
2236	In house	0.2172		-0.59	
2241	AfPS GS 2019	0.267		0.48	
2247	AfPS GS 2014	0.21		-0.75	
2250	AfPS GS 2014	0.17		-1.61	
2255	AfPS GS 2014	0.234		-0.23	
2256		0.261		0.35	
2265	AfPS GS 2014	0.21		-0.75	
2272		-----		-----	
2287		-----		-----	
2293	AfPS GS 2019	Not Detected		-----	
2295		-----		-----	
2297	AfPS GS 2014	0.20		-0.96	
2310	AfPS GS 2014	0.25		0.11	
2311	AfPS GS 2014	0.286		0.89	
2320	AfPS GS 2019	Not Detected		-----	
2330	AfPS GS 2014	0.20		-0.96	
2347	AfPS GS 2019	0.18		-1.39	
2350	AfPS GS 2014	0.268		0.50	
2352	IEC62321-10	0.186		-1.26	
2353	AfPS GS 2014	0.281306		0.79	
2355	AfPS GS 2014	0.19		-1.18	
2357	AfPS GS 2014	0.186		-1.26	
2358	AfPS GS 2014	0.281306		0.79	
2363	AfPS GS 2014	0.18		-1.39	
2365	AfPS GS 2014	0.194		-1.09	
2366	AfPS GS 2019	0.18		-1.39	
2369	AfPS GS 2014	0.20		-0.96	
2370	AfPS GS 2019	0.190		-1.18	
2372	AfPS GS 2014	0.197		-1.03	
2374	AfPS GS 2019	0.174		-1.52	
2375	AfPS GS 2014	0.25		0.11	
2378	AfPS GS 2019	0.189		-1.20	
2379	AfPS GS 2019	0.1162		-2.76	
2380	AfPS GS 2014	0.25		0.11	
2382	AfPS GS 2014	0.172		-1.56	
2384	AfPS GS 2019	0.24		-0.10	
2386		-----		-----	
2390	AfPS GS 2014	0.324	C	1.71	first reported: 1.366
2426	AfPS GS 2014	0.215		-0.64	
2446	§64 LFGB B82.02-30	<0.2		-----	
2481	In house	not analyzed		-----	
2482	AfPS GS 2019	< 0,2		-----	
2489	AfPS GS 2014	0.29		0.98	
2492		-----		-----	
2500	AfPS GS 2014	0.1782		-1.43	
2511		-----		-----	
2515	AfPS GS 2014	0.41		3.56	
2525	AfPS GS 2014	<0,20		-----	
2532	AfPS GS 2014	0.2777		0.71	
2553	AfPS GS 2014	0.51		5.71	
2561	AfPS GS 2014	0.355		2.37	
2569	AfPS GS 2014	0.3		1.19	
2573	AfPS GS 2014	ND		-----	
2590		-----		-----	
2605	AfPS GS 2014	<0.20		-----	
2629	ZEK01.4-08	2.69	R(0.01)	52.60	
2644		-----		-----	

lab	method	value	mark	z(targ)	remarks
2674	AfPS GS 2014	not detected		-----	
2689	AfPS GS 2019	not detected		-----	
2734	AfPS GS 2014	Not detected	C	-----	first reported: 3.24
2737	AfPS GS 2019	0.38		2.91	
2743	ZEK01.4-08	0.8595	C,R(0.01)	13.23	first reported: 0.929
2773	ZEK01.4-08	0.380	C	2.91	first reported: Not Detected
2811	AfPS GS 2019	0.22		-0.53	
2821	AfPS GS 2014	0.905	R(0.01)	14.20	
2826	AfPS GS 2014	0.22		-0.53	
2829	In house	0.194		-1.09	
2864	AfPS GS 2014	0.34	C	2.05	first reported: 0.57
2897	AfPS GS 2019	0.450		4.42	
2910	AfPS GS 2014	not detected		-----	
2916	EN62321-10	0.22		-0.53	
3100	AfPS GS 2019	<0.2		-----	
3116	AfPS GS 2014	0.2091		-0.77	
3153	AfPS GS 2019	0.21		-0.75	
3163		-----		-----	
3172	AfPS GS 2019	0.2298		-0.32	
3176	In house	0.33		1.84	
3182	ZEK01.4-08	0.20		-0.96	
3185	AfPS GS 2019	not detected		-----	
3190		-----		-----	
3210	In house	0.119		-2.70	
3216	AfPS GS 2014	0.294		1.06	
3220	AfPS GS 2014	0.27	C	0.54	first reported: Not Detected
3228	AfPS GS 2019	not detected		-----	
3237		-----		-----	
3246	AfPS GS 2014	0.312		1.45	
	normality	not OK			
	n	63			
	outliers	6			
	mean (n)	0.2447			
	st.dev. (n)	0.07588	RSD = 31%		
	R(calc.)	0.2125			
	st.dev.(IEC62321-10:20)	0.04649			
	R(IEC62321-10:20)	0.1302			

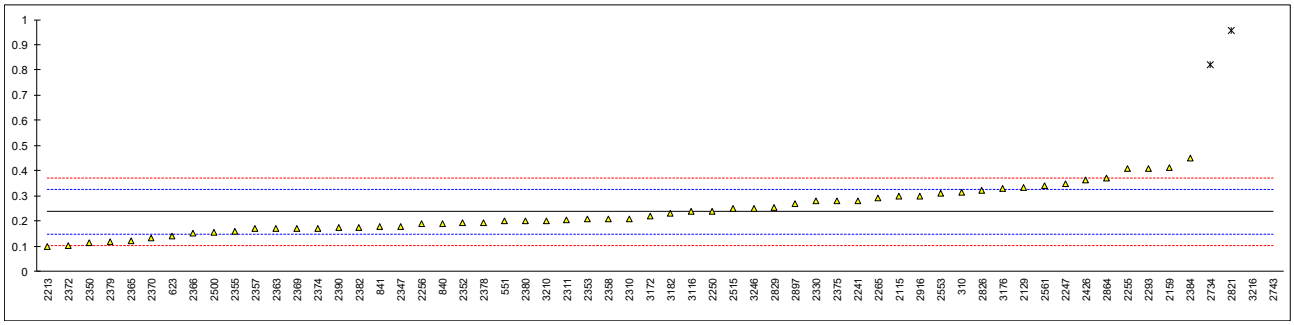


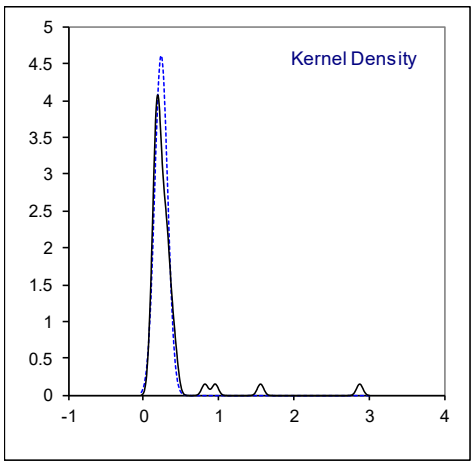


Determination of Phenanthrene in sample #21505; results in mg/kg

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
310	AfPS GS 2014	0.3139		1.70	
339	AfPS GS 2014Mod.	<0.1		<3.04	possible a false negative test result?
551	AfPS GS 2014	0.20		-0.82	
623	AfPS GS 2014	0.14		-2.16	
840	AfPS GS 2014	0.19		-1.05	
841	AfPS GS 2014	0.18		-1.27	
1910		-----		-----	
2115	AfPS GS 2019	0.3		1.40	
2129	AfPS GS 2014	0.335		2.17	
2137		-----		-----	
2159	AfPS GS 2014	0.412		3.88	
2165	AfPS GS 2019	<0.2		-----	
2166	AfPS GS 2019Mod.	<0.2		-----	
2184	AfPS GS 2019	<0.2		-----	
2213	AfPS GS 2014	0.1		-3.04	
2218		-----		-----	
2236	In house	Not Detected		-----	
2241	AfPS GS 2019	0.281		0.97	
2247	AfPS GS 2014	0.35	C	2.50	first reported: not detected
2250	AfPS GS 2014	0.24		0.06	
2255	AfPS GS 2014	0.407		3.77	
2256		0.189		-1.07	
2265	AfPS GS 2014	0.29		1.17	
2272		-----		-----	
2287		-----		-----	
2293	AfPS GS 2019	0.408		3.79	
2295		-----		-----	
2297	AfPS GS 2014	<0.2		-----	
2310	AfPS GS 2014	0.21		-0.60	
2311	AfPS GS 2014	0.206		-0.69	
2320	AfPS GS 2019	Not Detected		-----	
2330	AfPS GS 2014	0.28		0.95	
2347	AfPS GS 2019	0.18		-1.27	
2350	AfPS GS 2014	0.115		-2.71	
2352	IEC62321-10	0.193		-0.98	
2353	AfPS GS 2014	0.207766		-0.65	
2355	AfPS GS 2014	0.16		-1.71	
2357	AfPS GS 2014	0.169		-1.51	
2358	AfPS GS 2014	0.207766		-0.65	
2363	AfPS GS 2014	0.17		-1.49	
2365	AfPS GS 2014	0.122		-2.56	
2366	AfPS GS 2019	0.15		-1.93	
2369	AfPS GS 2014	0.17		-1.49	
2370	AfPS GS 2019	0.132		-2.33	
2372	AfPS GS 2014	0.104		-2.95	
2374	AfPS GS 2019	0.171		-1.47	
2375	AfPS GS 2014	0.28		0.95	
2378	AfPS GS 2019	0.194		-0.96	
2379	AfPS GS 2019	0.1187		-2.63	
2380	AfPS GS 2014	0.20		-0.82	
2382	AfPS GS 2014	0.175		-1.38	
2384	AfPS GS 2019	0.45		4.72	
2386		-----		-----	
2390	AfPS GS 2014	0.174		-1.40	
2426	AfPS GS 2014	0.365		2.84	
2446	§64 LFGB B82.02-30	<0.1		<-3.04	possible a false negative test result?
2481	In house	not analyzed		-----	
2482	AfPS GS 2019	< 0,2		-----	
2489	AfPS GS 2014	Not Detected		-----	
2492		-----		-----	
2500	AfPS GS 2014	0.1572		-1.77	
2511		-----		-----	
2515	AfPS GS 2014	0.25		0.29	
2525	AfPS GS 2014	<0,20		-----	
2532	AfPS GS 2014	Not Detected		-----	
2553	AfPS GS 2014	0.31		1.62	
2561	AfPS GS 2014	0.34		2.28	
2569	AfPS GS 2014	Not detected		-----	
2573	AfPS GS 2014	not detected		-----	
2590		-----		-----	
2605	AfPS GS 2014	<0.20		-----	
2629	ZEK01.4-08	<0.2		-----	
2644		-----		-----	

lab	method	value	mark	z(targ)	remarks
2674	AfPS GS 2014	not detected		-----	
2689	AfPS GS 2019	not detected		-----	
2734	AfPS GS 2014	0.82	C,R(0.01)	12.94	first reported: 0.59
2737		-----		-----	
2743	ZEK01.4-08	2.8823	C,R(0.01)	58.71	first reported: 4.0456
2773	ZEK01.4-08	Not Detected		-----	
2811	AfPS GS 2019	not determined		-----	
2821	AfPS GS 2014	0.957	R(0.01)	15.98	
2826	AfPS GS 2014	0.32		1.84	
2829	In house	0.253		0.35	
2864	AfPS GS 2014	0.37	C	2.95	first reported: not detected
2897	AfPS GS 2019	0.270	C	0.73	first reported: not detected
2910	AfPS GS 2014	not detected		-----	
2916	EN62321-10	0.30		1.40	
3100	AfPS GS 2019	<0.2		-----	
3116	AfPS GS 2014	0.2384		0.03	
3153	AfPS GS 2019	<0.20		-----	
3163		-----		-----	
3172	AfPS GS 2019	0.2201		-0.38	
3176	In house	0.33		2.06	
3182	ZEK01.4-08	0.23	C	-0.16	first reported: <0.10
3185	AfPS GS 2019	not detected		-----	
3190	AfPS GS 2014	<0.2		-----	
3210	In house	0.201		-0.80	
3216	AfPS GS 2014	1.561	R(0.01)	29.38	
3220	AfPS GS 2014	Not Detetced	-----		
3228	AfPS GS 2019	not detected		-----	
3237		-----		-----	
3246	AfPS GS 2014	0.25	C	0.29	first reported: not detected
	normality	OK			
	n	56			
	outliers	4			
	mean (n)	0.2371			
	st.dev. (n)	0.08668	RSD = 37%		
	R(calc.)	0.2427			
	st.dev.(IEC62321-10:20)	0.04506			
	R(IEC62321-10:20)	0.1262			

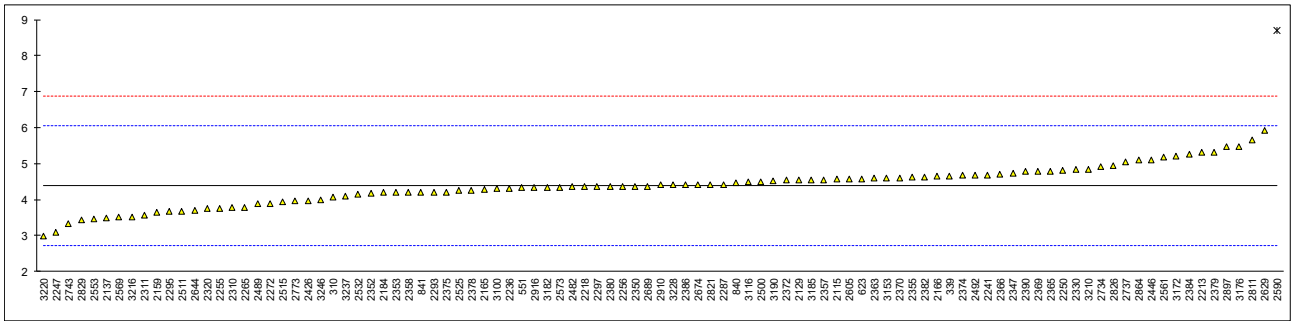


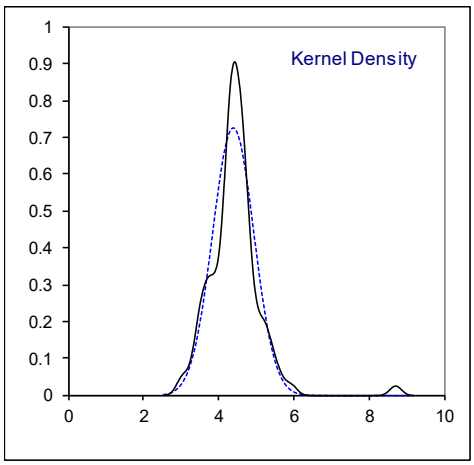


Determination of Anthracene in sample #21505; results in mg/kg

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
310	AfPS GS 2014	4.0598		-0.39	
339	AfPS GS 2014Mod.	4.64		0.31	
551	AfPS GS 2014	4.32		-0.07	
623	AfPS GS 2014	4.58		0.24	
840	AfPS GS 2014	4.47		0.11	
841	AfPS GS 2014	4.201		-0.22	
1910		-----		-----	
2115	AfPS GS 2019	4.56		0.22	
2129	AfPS GS 2014	4.535		0.19	
2137	KS M6956	3.49		-1.07	
2159	AfPS GS 2014	3.654		-0.87	
2165	AfPS GS 2019	4.29		-0.11	
2166	AfPS GS 2019Mod.	4.637		0.31	
2184	AfPS GS 2019	4.2		-0.22	
2213	AfPS GS 2014	5.3		1.10	
2218	ZEK01.4-08	4.358		-0.03	
2236	In house	4.3062		-0.09	
2241	AfPS GS 2019	4.687		0.37	
2247	AfPS GS 2014	3.09		-1.55	
2250	AfPS GS 2014	4.82		0.53	
2255	AfPS GS 2014	3.761		-0.74	
2256		4.36		-0.03	
2265	AfPS GS 2014	3.77		-0.73	
2272	AfPS GS 2019	3.89	C	-0.59	first reported: 2.93
2287	AfPS GS 2019	4.42		0.05	
2293	AfPS GS 2019	4.201		-0.22	
2295	AfPS GS 2014	3.67		-0.85	
2297	AfPS GS 2014	4.36		-0.03	
2310	AfPS GS 2014	3.77		-0.73	
2311	AfPS GS 2014	3.555		-0.99	
2320	AfPS GS 2019	3.75		-0.76	
2330	AfPS GS 2014	4.83		0.54	
2347	AfPS GS 2019	4.72		0.41	
2350	AfPS GS 2014	4.362		-0.02	
2352	IEC62321-10	4.168		-0.26	
2353	AfPS GS 2014	4.20098		-0.22	
2355	AfPS GS 2014	4.62		0.29	
2357	AfPS GS 2014	4.557		0.21	
2358	AfPS GS 2014	4.20098		-0.22	
2363	AfPS GS 2014	4.60		0.26	
2365	AfPS GS 2014	4.782		0.48	
2366	AfPS GS 2019	4.71		0.40	
2369	AfPS GS 2014	4.78		0.48	
2370	AfPS GS 2019	4.61		0.28	
2372	AfPS GS 2014	4.533		0.18	
2374	AfPS GS 2019	4.682		0.36	
2375	AfPS GS 2014	4.21		-0.21	
2378	AfPS GS 2019	4.251		-0.16	
2379	AfPS GS 2019	5.3060		1.11	
2380	AfPS GS 2014	4.36		-0.03	
2382	AfPS GS 2014	4.62		0.29	
2384	AfPS GS 2019	5.26		1.06	
2386	AfPS GS 2014	4.41		0.04	
2390	AfPS GS 2014	4.779		0.48	
2426	AfPS GS 2014	3.970		-0.49	
2446	§64 LFGB B82.02-30	5.11		0.88	
2481	In house	not analyzed		-----	
2482	AfPS GS 2019	4.35		-0.04	
2489	AfPS GS 2014	3.87		-0.61	
2492	In house	4.685		0.37	
2500	AfPS GS 2014	4.5028		0.15	
2511		3.68		-0.84	
2515	AfPS GS 2014	3.94		-0.53	
2525	AfPS GS 2014	4.24		-0.17	
2532	AfPS GS 2014	4.14		-0.29	
2553	AfPS GS 2014	3.45		-1.12	
2561	AfPS GS 2014	5.17		0.95	
2569	AfPS GS 2014	3.5		-1.06	
2573	AfPS GS 2014	4.34		-0.05	
2590	AfPS GS 2014	8.7	C,R(0.01)	5.19	first reported: 6.511
2605	AfPS GS 2014	4.57		0.23	
2629	ZEK01.4-08	5.93		1.86	
2644	AfPS GS 2014	3.69		-0.83	

lab	method	value	mark	z(targ)	remarks
2674	AfPS GS 2014	4.41		0.04	
2689	AfPS GS 2019	4.37		-0.01	
2734	AfPS GS 2014	4.91		0.64	
2737	AfPS GS 2019	5.04		0.79	
2743	ZEK01.4-08	3.3152		-1.28	
2773	ZEK01.4-08	3.95		-0.52	
2811	AfPS GS 2019	5.65		1.52	
2821	AfPS GS 2014	4.413		0.04	
2826	AfPS GS 2014	4.934		0.66	
2829	In house	3.43		-1.14	
2864	AfPS GS 2014	5.09		0.85	
2897	AfPS GS 2019	5.468		1.31	
2910	AfPS GS 2014	4.4		0.02	
2916	EN62321-10	4.32		-0.07	
3100	AfPS GS 2019	4.30		-0.10	
3116	AfPS GS 2014	4.486		0.13	
3153	AfPS GS 2019	4.60		0.26	
3163		-----		-----	
3172	AfPS GS 2019	5.193		0.98	
3176	In house	5.47		1.31	
3182	ZEK01.4-08	4.32		-0.07	
3185	AfPS GS 2019	4.54		0.19	
3190	AfPS GS 2014	4.509		0.15	
3210	In house	4.830		0.54	
3216	AfPS GS 2014	3.507		-1.05	
3220	AfPS GS 2014	2.99		-1.67	
3228	AfPS GS 2019	4.4		0.02	
3237	AfPS GS 2014	4.1		-0.34	
3246	AfPS GS 2014	3.982		-0.48	
	normality	OK			
	n	98			
	outliers	1			
	mean (n)	4.3808			
	st.dev. (n)	0.54903	RSD = 13%		
	R(calc.)	1.5373			
	st.dev.(IEC62321-10:20)	0.83236			
	R(IEC62321-10:20)	2.3306			

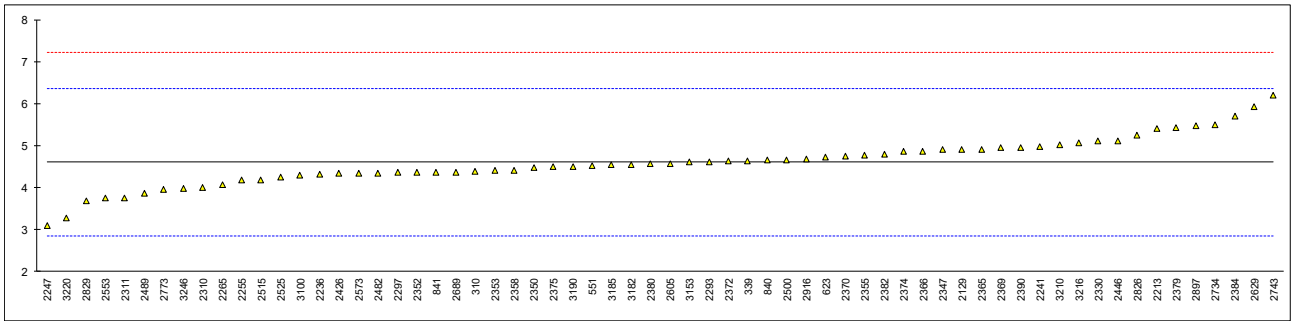


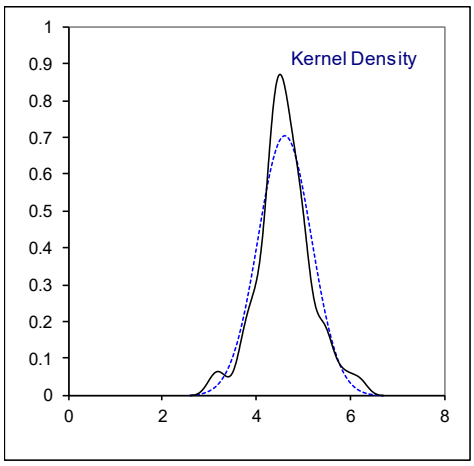


Determination of Sum of Phenanthrene, Anthracene, Fluoranthene and Pyrene in sample #21505; results in mg/kg

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
310	AfPS GS 2014	4.374		-0.26	
339	AfPS GS 2014Mod.	4.64		0.04	
551	AfPS GS 2014	4.52		-0.09	
623	AfPS GS 2014	4.72	C	0.13	first reported: not detected
840	AfPS GS 2014	4.66		0.07	
841	AfPS GS 2014	4.37		-0.27	
1910		-----		-----	
2115		-----		-----	
2129	AfPS GS 2014	4.9	C	0.34	first reported: <0.2
2137		-----		-----	
2159		-----		-----	
2165		-----		-----	
2166		-----		-----	
2184		-----		-----	
2213	AfPS GS 2014	5.4		0.91	
2218		-----		-----	
2236	In house	4.3062		-0.34	
2241	AfPS GS 2019	4.968		0.42	
2247	AfPS GS 2014	3.09		-1.73	
2250		-----		-----	
2255	AfPS GS 2014	4.17		-0.49	
2256		-----		-----	
2265	AfPS GS 2014	4.06		-0.62	
2272		-----		-----	
2287		-----		-----	
2293	AfPS GS 2019	4.609		0.01	
2295		-----		-----	
2297	AfPS GS 2014	4.36		-0.28	
2310	AfPS GS 2014	4.01		-0.68	
2311	AfPS GS 2014	3.761		-0.96	
2320		-----		-----	
2330	AfPS GS 2014	5.11		0.58	
2347	AfPS GS 2019	4.90		0.34	
2350	AfPS GS 2014	4.477		-0.14	
2352	IEC62321-10	4.361		-0.28	
2353	AfPS GS 2014	4.408746		-0.22	
2355	AfPS GS 2014	4.78		0.20	
2357		-----		-----	
2358	AfPS GS 2014	4.408746		-0.22	
2363	AfPS GS 2014	<0.1		<-5.13	possible false negative test result?
2365	AfPS GS 2014	4.904		0.34	
2366	AfPS GS 2019	4.86		0.29	
2369	AfPS GS 2014	4.95		0.40	
2370	AfPS GS 2019	4.742		0.16	
2372	AfPS GS 2014	4.637		0.04	
2374	AfPS GS 2019	4.853		0.29	
2375	AfPS GS 2014	4.49		-0.13	
2378		-----		-----	
2379	AfPS GS 2019	5.4247		0.94	
2380	AfPS GS 2014	4.56		-0.05	
2382	AfPS GS 2014	4.8	C	0.23	first reported: <0.10
2384	AfPS GS 2019	5.71		1.27	
2386		-----		-----	
2390	AfPS GS 2014	4.953		0.40	
2426	AfPS GS 2014	4.335	C	-0.31	first reported: 4.55
2446	§64 LFGB B82.02-30	5.11		0.58	
2481	In house	not analyzed		-----	
2482	AfPS GS 2019	4.35		-0.29	
2489	AfPS GS 2014	3.87		-0.84	
2492		-----		-----	
2500	AfPS GS 2014	4.6600		0.07	
2511		-----		-----	
2515	AfPS GS 2014	4.19		-0.47	
2525	AfPS GS 2014	4.24		-0.41	
2532		-----	W	-----	first reported: not detected
2553	AfPS GS 2014	3.76		-0.96	
2561		-----		-----	
2569		-----		-----	
2573	AfPS GS 2014	4.34	C	-0.30	first reported: ND
2590		-----		-----	
2605	AfPS GS 2014	4.57		-0.04	
2629	ZEK01.4-08	5.93		1.52	
2644		-----		-----	

lab	method	value	mark	z(targ)	remarks
2674		-----		-----	
2689	AfPS GS 2019	4.37		-0.27	
2734	AfPS GS 2014	5.50		1.03	
2737		-----		-----	
2743	ZEK01.4-08	6.1975	C	1.82	first reported: 7.3608
2773	ZEK01.4-08	3.95	C	-0.75	first reported: Not Detected
2811	AfPS GS 2019	not analyzed		-----	
2821		-----		-----	
2826	AfPS GS 2014	5.254		0.75	
2829	In house	3.68		-1.05	
2864		-----		-----	
2897	AfPS GS 2019	5.468		0.99	
2910		-----		-----	
2916	EN62321-10	4.68		0.09	
3100	AfPS GS 2019	4.30		-0.35	
3116		-----		-----	
3153	AfPS GS 2019	4.60		0.00	
3163		-----		-----	
3172		-----		-----	
3176		-----		-----	
3182	ZEK01.4-08	4.55	C	-0.06	first reported: 4.32
3185	AfPS GS 2019	4.54		-0.07	
3190	AfPS GS 2014	4.509		-0.11	
3210	In house	5.030		0.49	
3216	AfPS GS 2014	5.068	C	0.53	first reported: not detected
3220	AfPS GS 2014	3.27	C	-1.52	first reported: Not Detected
3228		-----		-----	
3237		-----		-----	
3246	AfPS GS 2014	3.982		-0.71	
	normality	suspect			
	n	64			
	outliers	0			
	mean (n)	4.6024			
	st.dev. (n)	0.56673	RSD = 12%		
	R(calc.)	1.5868			
	st.dev.(IEC62321-10:20)	0.87445			
	R(IEC62321-10:20)	2.4485			





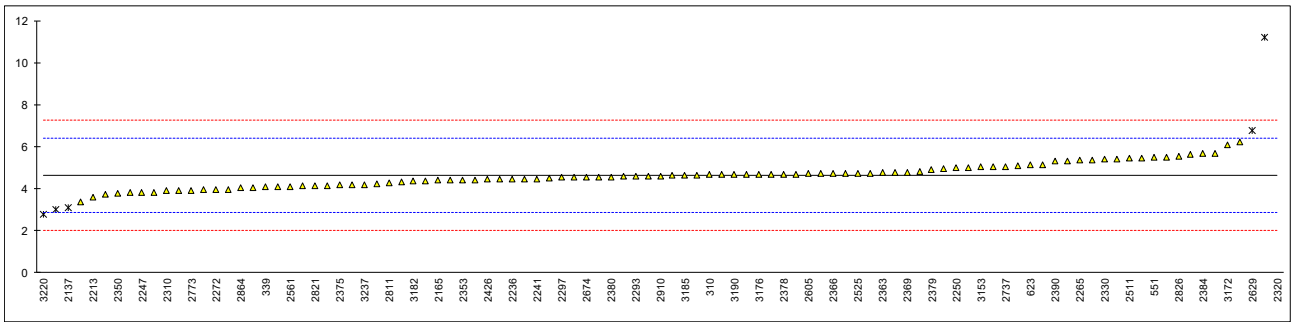
Determination of Chrysene in sample #21505; results in mg/kg

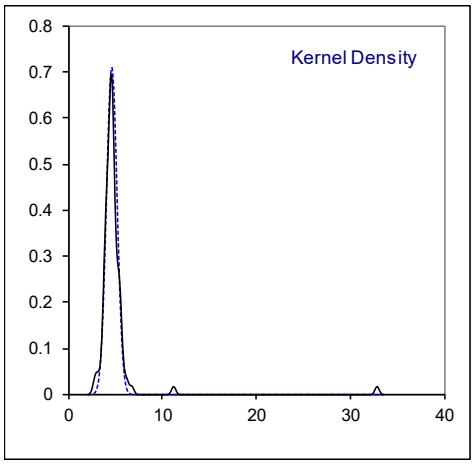
lab	method	value	mark	z(targ)	Sum C+T*		remarks
230		-----		-----	-----		
310	AfPS GS 2014	4.6691		0.04	-----		
339	AfPS GS 2014Mod.	4.09		-0.61	-----		
551	AfPS GS 2014	5.50		0.99	5.50		
623	AfPS GS 2014	5.11		0.55	5.11	C	first reported: not detected
840	AfPS GS 2014	4.45		-0.20	-----		
841	AfPS GS 2014	4.441		-0.21	-----		
1910	In house	4.0415		-0.67	-----		
2115	AfPS GS 2019	5.01		0.43	-----		
2129	AfPS GS 2014	4.41		-0.25	4.41	C	first reported: <0.2
2137	KS M6956	3.10	R(0.05)	-1.74	-----		
2159	AfPS GS 2014	3.833		-0.91	-----		
2165	AfPS GS 2019	4.39		-0.27	-----		
2166	AfPS GS 2019Mod.	4.938		0.35	-----		
2184	AfPS GS 2019	4.3		-0.38	-----		
2213	AfPS GS 2014	3.6		-1.17	3.6		
2218	ZEK01.4-08	5.133		0.57	-----		
2236	In house	4.447		-0.21	-----		
2241	AfPS GS 2019	4.472		-0.18	4.472		
2247	AfPS GS 2014	3.83		-0.91	3.83		
2250	AfPS GS 2014	5.01		0.43	-----		
2255	AfPS GS 2014	4.21		-0.48	4.21		
2256		4.64		0.01	-----		
2265	AfPS GS 2014	5.35		0.82	-----		
2272	AfPS GS 2019	3.97	C	-0.75	-----		first reported: 2.99
2287	AfPS GS 2019	5.51		1.00	-----		
2293	AfPS GS 2019	4.587		-0.05	4.587		
2295	AfPS GS 2014	5.45		0.93	-----		
2297	AfPS GS 2014	4.52		-0.12	-----		
2310	AfPS GS 2014	3.92		-0.81	3.9		
2311	AfPS GS 2014	4.095		-0.61	-----		
2320	AfPS GS 2019	32.80	R(0.01)	32.02	-----		
2330	AfPS GS 2014	5.40		0.88	5.40		
2347	AfPS GS 2019	4.70		0.08	4.7		
2350	AfPS GS 2014	3.792		-0.95	-----		
2352	IEC62321-10	4.70		0.08	-----		
2353	AfPS GS 2014	4.40356		-0.26	-----		
2355	AfPS GS 2014	4.60		-0.03	-----		
2357	AfPS GS 2014	4.672		0.05	-----		
2358	AfPS GS 2014	4.40356		-0.26	-----		
2363	AfPS GS 2014	4.75		0.14	<0.1		possible a false negative test result?
2365	AfPS GS 2014	4.715		0.10	-----		
2366	AfPS GS 2019	4.72		0.10	-----		
2369	AfPS GS 2014	4.77		0.16	4.77		
2370	AfPS GS 2019	5.09		0.52	5.09		
2372	AfPS GS 2014	5.412		0.89	-----		
2374	AfPS GS 2019	4.722		0.10	4.722		
2375	AfPS GS 2014	4.16		-0.53	-----		
2378	AfPS GS 2019	4.70		0.08	-----		
2379	AfPS GS 2019	4.9162		0.33	-----		
2380	AfPS GS 2014	4.55		-0.09	-----		
2382	AfPS GS 2014	4.76		0.15	4.8	C	first reported: <0.10
2384	AfPS GS 2019	5.69		1.21	-----		
2386	AfPS GS 2014	4.54		-0.10	-----		
2390	AfPS GS 2014	5.293		0.75	5.293		
2426	AfPS GS 2014	4.430		-0.23	4.430	C	first reported: ND
2446	§64 LFGB B82.02-30	6.24		1.83	6.24		
2481	In house	5.3		0.76	-----		
2482	AfPS GS 2019	4.35		-0.32	4.35		
2489	AfPS GS 2014	3.97		-0.75	3.97		
2492	In house	4.150		-0.55	-----		
2500	AfPS GS 2014	4.8349		0.23	4.8349		
2511		5.43		0.91	-----		
2515	AfPS GS 2014	4.53		-0.11	4.53		
2525	AfPS GS 2014	4.73		0.11	-----		
2532	AfPS GS 2014	4.18		-0.51	-----	W	first reported: Not Detected
2553	AfPS GS 2014	3.92		-0.81	3.92		
2561	AfPS GS 2014	4.10		-0.60	-----		
2569	AfPS GS 2014	3.8		-0.94	-----		
2573	AfPS GS 2014	4.74		0.13	4.74	C	first reported: ND
2590	AfPS GS 2014	11.2	C,R(0.01)	7.47	-----		first reported: 7.609
2605	AfPS GS 2014	4.71		0.09	-----		
2629	ZEK01.4-08	6.76	R(0.05)	2.42	6.76		
2644	AfPS GS 2014	3.37		-1.43	-----		

lab	method	value	mark	z(targ)	Sum C+T*		remarks
2674	AfPS GS 2014	4.53		-0.11	-----		
2689	AfPS GS 2019	4.69		0.07	-----		
2734	AfPS GS 2014	5.69		1.21	5.69		
2737	AfPS GS 2019	5.06		0.49	-----		
2743	ZEK01.4-08	3.7380		-1.01	3.7380		
2773	ZEK01.4-08	3.92		-0.81	3.92	C	first reported: Not Detected
2811	AfPS GS 2019	4.26		-0.42	-----		
2821	AfPS GS 2014	4.143		-0.55	-----		
2826	AfPS GS 2014	5.544		1.04	5.544		
2829	In house	2.99	R(0.05)	-1.86	-----		
2864	AfPS GS 2014	4.03		-0.68	-----		
2897	AfPS GS 2019	3.932		-0.79	-----		
2910	AfPS GS 2014	4.6		-0.03	-----		
2916	EN62321-10	5.38		0.85	-----		
3100	AfPS GS 2019	4.58		-0.06	-----		
3116	AfPS GS 2014	5.033		0.46	-----		
3153	AfPS GS 2019	5.03		0.45	5.03		
3163		-----		-----	-----		
3172	AfPS GS 2019	6.104		1.68	-----		
3176	In house	4.69		0.07	-----		
3182	ZEK01.4-08	4.34		-0.33	4.34		
3185	AfPS GS 2019	4.63		0.00	-----		
3190	AfPS GS 2014	4.683		0.06	-----		
3210	In house	5.615		1.12	-----		
3216	AfPS GS 2014	4.127		-0.57	-----		
3220	AfPS GS 2014	2.76	R(0.05)	-2.13	2.76	C	first reported: Not Detected
3228	AfPS GS 2019	4.5		-0.15	-----		
3237	AfPS GS 2014	4.2		-0.49	-----		
3246	AfPS GS 2014	4.621		-0.01	-----		

	normality	OK
	n	95
	outliers	6
	mean (n)	4.6299
	st.dev. (n)	0.56097 RSD = 12%
	R(calc.)	1.5707
	st.dev.(IEC62321-10:20)	0.87968
	R(IEC62321-10:20)	2.4631

*) Sum C+T = Sum of Chrysene and Triphenylene (Triphenylene not present >0.2 mg/kg)

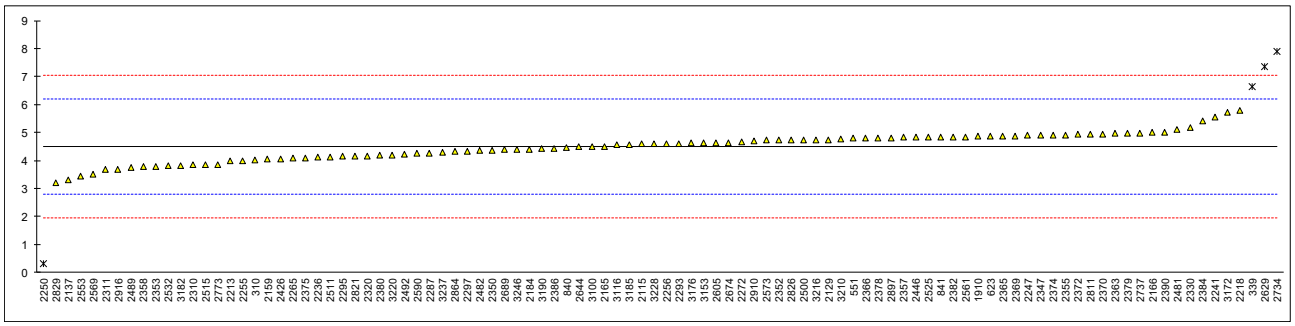


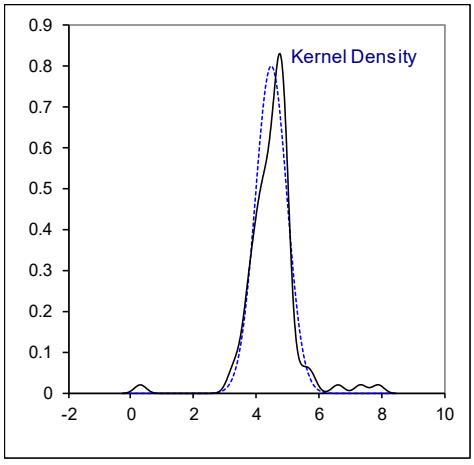


Determination of Benzo[a]pyrene in sample #21505; results in mg/kg

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
310	AfPS GS 2014	4.0312		-0.54	
339	AfPS GS 2014Mod.	6.62	R(0.01)	2.49	
551	AfPS GS 2014	4.79		0.35	
623	AfPS GS 2014	4.86		0.43	
840	AfPS GS 2014	4.46		-0.04	
841	AfPS GS 2014	4.836		0.40	
1910	In house	4.8547		0.42	
2115	AfPS GS 2019	4.60		0.13	
2129	AfPS GS 2014	4.745		0.30	
2137	KS M6956	3.29		-1.41	
2159	AfPS GS 2014	4.039		-0.53	
2165	AfPS GS 2019	4.51		0.02	
2166	AfPS GS 2019Mod.	5.000		0.59	
2184	AfPS GS 2019	4.4		-0.11	
2213	AfPS GS 2014	4		-0.58	
2218	ZEK01.4-08	5.796		1.53	
2236	In house	4.1078		-0.45	
2241	AfPS GS 2019	5.552		1.24	
2247	AfPS GS 2014	4.89		0.47	
2250	AfPS GS 2014	0.32	R(0.01)	-4.89	
2255	AfPS GS 2014	4.0		-0.58	
2256		4.61		0.14	
2265	AfPS GS 2014	4.07		-0.50	
2272	AfPS GS 2019	4.65	C	0.18	first reported: 2.98
2287	AfPS GS 2019	4.25		-0.28	
2293	AfPS GS 2019	4.611		0.14	
2295	AfPS GS 2014	4.14		-0.41	
2297	AfPS GS 2014	4.33		-0.19	
2310	AfPS GS 2014	3.85		-0.75	
2311	AfPS GS 2014	3.68		-0.95	
2320	AfPS GS 2019	4.15		-0.40	
2330	AfPS GS 2014	5.16		0.78	
2347	AfPS GS 2019	4.89		0.47	
2350	AfPS GS 2014	4.375		-0.14	
2352	IEC62321-10	4.722		0.27	
2353	AfPS GS 2014	3.79333		-0.82	
2355	AfPS GS 2014	4.91		0.49	
2357	AfPS GS 2014	4.827		0.39	
2358	AfPS GS 2014	3.7933		-0.82	
2363	AfPS GS 2014	4.96		0.55	
2365	AfPS GS 2014	4.874		0.45	
2366	AfPS GS 2019	4.81		0.37	
2369	AfPS GS 2014	4.88		0.45	
2370	AfPS GS 2019	4.95		0.54	
2372	AfPS GS 2014	4.926		0.51	
2374	AfPS GS 2019	4.892		0.47	
2375	AfPS GS 2014	4.10		-0.46	
2378	AfPS GS 2019	4.811		0.37	
2379	AfPS GS 2019	4.9731		0.56	
2380	AfPS GS 2014	4.19		-0.35	
2382	AfPS GS 2014	4.85		0.42	
2384	AfPS GS 2019	5.40		1.06	
2386	AfPS GS 2014	4.44		-0.06	
2390	AfPS GS 2014	5.009		0.60	
2426	AfPS GS 2014	4.040		-0.53	
2446	§64 LFGB B82.02-30	4.83		0.40	
2481	In house	5.1		0.71	
2482	AfPS GS 2019	4.37		-0.14	
2489	AfPS GS 2014	3.73		-0.89	
2492	In house	4.215		-0.33	
2500	AfPS GS 2014	4.7308		0.28	
2511		4.12		-0.44	
2515	AfPS GS 2014	3.85		-0.75	
2525	AfPS GS 2014	4.83		0.40	
2532	AfPS GS 2014	3.8		-0.81	
2553	AfPS GS 2014	3.43		-1.24	
2561	AfPS GS 2014	4.85		0.42	
2569	AfPS GS 2014	3.5		-1.16	
2573	AfPS GS 2014	4.72		0.27	
2590	AfPS GS 2014	4.244		-0.29	
2605	AfPS GS 2014	4.64		0.17	
2629	ZEK01.4-08	7.34	R(0.01)	3.34	
2644	AfPS GS 2014	4.48		-0.01	

lab	method	value	mark	z(targ)	remarks
2674	AfPS GS 2014	4.64		0.17	
2689	AfPS GS 2019	4.38		-0.13	
2734	AfPS GS 2014	7.90	C,R(0.01)	3.99	first reported: 6.75
2737	AfPS GS 2019	4.98	C	0.57	first reported: 2.18
2743	ZEK01.4-08	not detectable	C	-----	first reported: 0.6054
2773	ZEK01.4-08	3.85		-0.75	
2811	AfPS GS 2019	4.93		0.51	
2821	AfPS GS 2014	4.143		-0.41	
2826	AfPS GS 2014	4.726		0.27	
2829	In house	3.2	C	-1.51	first reported: 2.6
2864	AfPS GS 2014	4.32		-0.20	
2897	AfPS GS 2019	4.811		0.37	
2910	AfPS GS 2014	4.7		0.24	
2916	EN62321-10	3.68		-0.95	
3100	AfPS GS 2019	4.49		0.00	
3116	AfPS GS 2014	4.567		0.09	
3153	AfPS GS 2019	4.63		0.16	
3163		-----		-----	
3172	AfPS GS 2019	5.712		1.43	
3176	In house	4.62		0.15	
3182	ZEK01.4-08	3.80		-0.81	
3185	AfPS GS 2019	4.57		0.09	
3190	AfPS GS 2014	4.436		-0.07	
3210	In house	4.777		0.33	
3216	AfPS GS 2014	4.739		0.29	
3220	AfPS GS 2014	4.19		-0.35	
3228	AfPS GS 2019	4.6		0.13	
3237	AfPS GS 2014	4.3		-0.23	
3246	AfPS GS 2014	4.393		-0.12	
	normality	OK			
	n	96			
	outliers	4			
	mean (n)	4.4927			
	st.dev. (n)	0.49879	RSD = 11%		
	R(calc.)	1.3966			
	st.dev.(IEC62321-10:20)	0.85362			
	R(IEC62321-10:20)	2.3901			





APPENDIX 2

Other reported PAH in sample #21505; results in mg/kg

lab	Acenaphtylene	Acenaphthene	Fluorene	Fluoranthene	Pyrene	Benzo[a]anthracene	Triphenylene
230	-----	-----	-----	-----	-----	-----	-----
310	0.0125	0.0157	0.0282	below det. limit	below det. limit	below det. limit	-----
339	0.389	<0.1	<0.1	<0.1	<0.1	<0.1	-----
551	-----	-----	-----	-----	-----	-----	-----
623	not detected	not detected	not detected	not detected	not detected	not detected	not detected
840	not detected	not detected	not detected	not detected	not detected	not detected	-----
841	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-----
1910	-----	-----	-----	-----	-----	not detected	-----
2115	-----	-----	-----	-----	-----	-----	-----
2129	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
2137	-----	-----	-----	-----	-----	-----	-----
2159	<Rep. Limit	<Rep. Limit	<Rep. Limit	<Rep. Limit	<Rep. Limit	<Rep. Limit	Not Applic.
2165	not detected	not detected	not detected	not detected	not detected	not detected	-----
2166	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-----
2184	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2213	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2218	-----	-----	-----	-----	-----	-----	-----
2236	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-----
2241	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-----
2247	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Analyzed
2250	-----	-----	-----	-----	-----	-----	-----
2255	n.d	n.d	n.d	n.d	n.d	n.d	n.d
2256	-----	-----	-----	-----	-----	-----	-----
2265	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	-----
2272	-----	-----	-----	-----	-----	-----	-----
2287	-----	-----	-----	-----	-----	-----	-----
2293	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Analyzed
2295	-----	-----	-----	-----	-----	-----	-----
2297	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-----
2310	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Analyzed
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-----
2320	Not Detected	0.44	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2330	Not detected	Not detected	Not detected	Not detected	Not detected	Not detected	Not applic.
2347	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-----
2350	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1	N.A.
2352	-----	-----	-----	-----	-----	-----	-----
2353	ND	ND	ND	ND	ND	ND	NA
2355	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-----
2357	-----	-----	-----	-----	-----	-----	-----
2358	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	N/A
2363	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2365	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
2366	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	out capability
2369	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-----
2370	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2372	not detected	not detected	not detected	n.d.	n.d.	not detected	not analyzed
2374	-----	-----	-----	-----	-----	-----	-----
2375	-----	-----	-----	-----	-----	-----	-----
2378	-----	-----	-----	-----	-----	-----	-----
2379	Not detected	Not detected	0.0636	Not detected	Not detected	Not detected	Not tested
2380	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-----
2382	＜0.10	＜0.10	＜0.10	＜0.10	＜0.10	＜0.10	＜0.10
2384	Not Det [<0.1]	Not Det [<0.1]	Not Det [<0.1]	Not Det [<0.1]	Not Det [<0.1]	Not Det [<0.1]	-----
2386	-----	-----	-----	-----	-----	-----	-----
2390	not detected	not detected	not detected	not detected	not detected	not detected	-----
2426	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2446	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
2481	not analyzed	not analyzed	not analyzed	not analyzed	not analyzed	not detected	not analyzed
2482	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	-----
2489	ND	ND	ND	ND	ND	ND	-----
2492	-----	-----	-----	-----	-----	-----	-----
2500	not detected	not detected	not detected	not detected	not detected	not detected	not applicable
2511	-----	-----	-----	-----	-----	-----	-----
2515	ND	ND	ND	ND	ND	ND	-----
2525	<0,20	<0,20	<0,20	<0,20	<0,20	<0,20	-----
2532	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2553	not detected	not detected	not detected	not detected	not detected	not detected	not analysed
2561	-----	-----	-----	-----	-----	-----	-----
2569	ND	ND	ND	ND	ND	ND	-----
2573	ND	ND	ND	ND	ND	ND	ND
2590	-----	-----	-----	-----	-----	-----	-----
2605	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-----

lab	Acenaphtylene	Acenaphthene	Fluorene	Fluoranthene	Pyrene	Benzo[a]anthracene	Triphenylene
2629	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	not determ.
2644	-----	-----	-----	-----	-----	-----	-----
2674	not detected	not detected	not detected	not detected	not detected	not detected	-----
2689	not detected	not detected	not detected	not detected	not detected	not detected	not analyzed
2734	not detected	not detected	not detected	not detected	not detected	not detected	not detected
2737	-----	-----	-----	-----	-----	-----	-----
2743	-----	-----	-----	-----	-----	-----	-----
2773	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2811	not analyzed	not analyzed	not analyzed	not determined	not determined	not determined	not analyzed
2821	below det.limit	below det. limit	0.310	below det. limit	below det. limit	below det. limit	-----
2826	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2829	not detected	not detected	0.152	not detected	not detected	not detected	-----
2864	not detected	not detected	not detected	not detected	not detected	not detected	-----
2897	not analyzed	not analyzed	not analyzed	not detected	not detected	not detected	not analyzed
2910	not detected	not detected	not detected	not detected	not detected	not detected	-----
2916	0.02	0.07	0.06	0.02	0.03	0.01	Not analyzed
3100	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-----
3116	-----	-----	-----	-----	-----	-----	-----
3153	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3163	-----	-----	-----	-----	-----	-----	-----
3172	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-----
3176	-----	-----	-----	-----	-----	-----	-----
3182	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-----
3185	not detected	not detected	not detected	not detected	not detected	not detected	-----
3190	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-----
3210	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-----
3216	not detected	not detected	not detected	not detected	not detected	not detected	not analysed
3220	Not Detetced	Not Detetced	Not Detetced	Not Detetced	Not Detetced	Not Detetced	-----
3228	not detected	not detected	not detected	not detected	not detected	not detected	-----
3237	-----	-----	-----	-----	-----	-----	-----
3246	not detected	not detected	not detected	not detected	not detected	not detected	not applicable

Other reported PAH in sample #21505; results in mg/kg -- continued --

Ben[b] = Benzo[b]fluoranthene
Ben[j] = Benzo[j]fluoranthene
Ben[k] = Benzo[k]fluoranthene
[b]/[j]/[k] = sum of [b]/[j]/[k]Benzofluoranthenes

lab	Ben[b]	Ben[j]	Ben[k]	[b]/[j]/[k]	Benzo[e]pyrene	Indeno[1,2,3]pyrene
230	-----	-----	-----	-----	-----	-----
310	below det. limit	below det. limit	below det. limit	below det. limit	below det. limit	below det. limit
339	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
551	-----	-----	-----	-----	-----	-----
623	not detected	not detected	not detected	not detected	not detected	not detected
840	not detected	not detected	not detected	not detected	not detected	not detected
841	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1
1910	not detected	not detected	not detected	not detected	not detected	-----
2115	-----	-----	-----	-----	-----	-----
2129	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
2137	-----	-----	-----	-----	-----	-----
2159	<Rep. Limit	<Rep. Limit	<Rep. Limit	<Rep. Limit	<Rep. Limit	<Rep. Limit
2165	not detected	not detected	not detected	-----	not detected	not detected
2166	<0.2	<0.2	<0.2	-----	<0.2	<0.2
2184	not detected	not detected	not detected	-----	not detected	not detected
2213	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2218	-----	-----	-----	-----	-----	-----
2236	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2241	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
2247	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2250	-----	-----	-----	-----	-----	-----
2255	n.d	n.d	n.d	n.d	n.d	n.d
2256	-----	-----	-----	-----	-----	-----
2265	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
2272	-----	-----	-----	-----	-----	-----
2287	-----	-----	-----	-----	-----	-----
2293	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2295	-----	-----	-----	-----	-----	-----
2297	<0.2	<0.2	<0.2	<0.2	<0.2	-----
2310	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected

lab	Ben[b]	Ben[j]	Ben[k]	[b]/[j]/[k]	Benzo[e]pyrene	Indeno[1,2,3]pyrene
2311	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2320	Not Detected	Not Detected	Not Detected	-----	Not Detected	Not Detected
2330	Not detected	Not detected	0.14	0.14	Not detected	Not detected
2347	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
2350	>0.1	>0.1	>0.1	>0.1	>0.1	>0.1
2352	-----	-----	-----	-----	-----	-----
2353	ND	ND	ND	ND	ND	ND
2355	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2357	-----	-----	-----	-----	-----	-----
2358	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
2363	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2365	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2366	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2369	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2370	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2372	not detected	not detected	not detected	not detected	not detected	not detected
2374	-----	-----	-----	-----	-----	-----
2375	-----	-----	-----	-----	-----	-----
2378	-----	-----	-----	-----	-----	-----
2379	Not tested	Not detected	Not detected	Not detected	Not detected	Not detected
2380	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2382	＜0.10	＜0.10	＜0.10	＜0.10	＜0.10	＜0.10
2384	Not Det. [<0.1]	Not Det. [<0.1]	Not Det. [<0.1]	Not Det. [<0.1]	Not Det. [<0.1]	Not Det. [<0.1]
2386	-----	-----	-----	-----	-----	-----
2390	not detected	not detected	not detected	not detected	not detected	not detected
2426	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2446	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2481	not detected	not detected	not detected	not detected	not detected	not analyzed
2482	-----	-----	-----	< 0,2	< 0,2	< 0,2
2489	ND	ND	ND	ND	ND	ND
2492	-----	-----	-----	-----	-----	-----
2500	not detected	not detected	not detected	not detected	not detected	not detected
2511	-----	-----	-----	-----	-----	-----
2515	ND	ND	ND	ND	ND	ND
2525	<0,20	<0,20	<0,20	<0,20	<0,20	<0,20
2532	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2553	not detected	not detected	not detected	not detected	not detected	not detected
2561	-----	-----	-----	-----	-----	-----
2569	ND	ND	ND	-----	ND	ND
2573	ND	ND	ND	ND	ND	ND
2590	-----	-----	-----	-----	-----	-----
2605	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2629	<0.2	<0.2	<0.2	<0.2	7.13	<0.2
2644	-----	-----	-----	-----	-----	-----
2674	not detected	not detected	not detected	-----	not detected	not detected
2689	not detected	not detected	not detected	not detected	not detected	not detected
2734	not detected	not detected	not detected	not detected	not detected	not detected
2737	-----	-----	-----	-----	-----	-----
2743	-----	-----	-----	-----	3.7321	-----
2773	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
2811	not analyzed	not analyzed	not analyzed	not determined	not determined	not determined
2821	below det. limit	below det. limit	below det. limit	below det. limit	below det. limit	below det. limit
2826	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2829	not detected	not detected	0.072	0.072	not detected	not detected
2864	not detected	not detected	not detected	-----	not detected	not detected
2897	not detected	not detected	not detected	not detected	not detected	not detected
2910	not detected	not detected	not detected	-----	not detected	not detected
2916	0.01	0.01	0.01	0.01	0.01	0.03
3100	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
3116	-----	-----	-----	-----	-----	-----
3153	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3163	-----	-----	-----	-----	-----	-----
3172	< 0.2	< 0.2	< 0.2	-----	< 0.2	< 0.2
3176	-----	-----	-----	-----	-----	-----
3182	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
3185	not detected	not detected	not detected	not detected	not detected	not detected
3190	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
3210	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
3216	not detected	not detected	not detected	not detected	not detected	not detected
3220	Not Detetced	Not Detetced	Not Detetced	Not Detetced	Not Detetced	Not Detetced
3228	not detected	not detected	not detected	not detected	not detected	not detected
3237	-----	-----	-----	-----	-----	-----
3246	not detected	not detected	not detected	not detected	not detected	not detected

Other reported PAH in sample #21505; results in mg/kg -- continued --

lab	Dibenzo[a,h]anthracene	Benzo[g,h,i]perylene	Cyclopenta[c,d]pyrene
230	-----	-----	-----
310	below detection limit	below detection limit	-----
339	<0.1	<0.1	-----
551	-----	-----	-----
623	not detected	not detected	not detected
840	not detected	not detected	not detected
841	<0.1	<0.1	<0.1
1910	not detected	-----	-----
2115	-----	-----	-----
2129	<0,2	<0,2	<0,2
2137	-----	-----	-----
2159	<Reporting Limit	<Reporting Limit	<Reporting Limit
2165	not detected	not detected	-----
2166	<0.2	<0.2	-----
2184	not detected	not detected	not detected
2213	<0.1	<0.1	<0.1
2218	-----	-----	-----
2236	Not Detected	Not Detected	-----
2241	<0.10	<0.10	<0.10
2247	NOT DETECTED	NOT DETECTED	NOT ANALYSED
2250	-----	-----	-----
2255	n.d	n.d	n.d
2256	-----	-----	-----
2265	<0,2	<0,2	<0,2
2272	-----	-----	-----
2287	-----	-----	1.64
2293	Not Detected	Not Detected	Not Detected
2295	-----	-----	-----
2297	-----	<0.2	-----
2310	Not Detected	Not Detected	Not Detected
2311	Not Detected	Not Detected	Not Detected
2320	Not Detected	0.28	Not Detected
2330	Not detected	Not detected	Not detected
2347	<0.10	<0.10	<0.10
2350	>0.1	>0.1	>0.1
2352	-----	-----	-----
2353	ND	ND	NA
2355	<0.1	<0.1	-----
2357	-----	-----	-----
2358	n.d.	n.d.	N/A
2363	<0.1	<0.1	<0.1
2365	<0.1	<0.1	<0.1
2366	<0.1	<0.1	out capability
2369	<0.1	<0.1	-----
2370	<0.1	<0.1	<0.1
2372	not detected	not detected	not detected
2374	-----	-----	-----
2375	-----	-----	-----
2378	-----	-----	-----
2379	Not detected	Not detected	Not detected
2380	<0.1	<0.1	<0.1
2382	＜0.10	＜0.10	＜0.10
2384	Not Detected [<0.1]	Not Detected [<0.1]	-----
2386	-----	-----	-----
2390	not detected	not detected	not detected
2426	Not Detected	Not Detected	Not Detected
2446	<0.1	<0.1	-----
2481	not detected	not analyzed	not analyzed
2482	< 0,2	< 0,2	< 0,2
2489	ND	ND	ND
2492	-----	-----	-----
2500	not detected	not detected	not applicable
2511	-----	-----	-----
2515	ND	ND	ND
2525	<0,20	<0,20	-----
2532	Not Detected	Not Detected	Not Detected
2553	not detected	not detected	not detected
2561	-----	-----	-----
2569	ND	ND	ND
2573	ND	ND	ND
2590	-----	-----	-----
2605	<0.20	<0.20	-----
2629	<0.2	<0.2	<0.2
2644	-----	-----	-----

lab	Dibenzo[a,h]anthracene	Benzo[g,h,i]perylene	Cyclopenta[c,d]pyrene
2674	not detected	not detected	not detected
2689	not detected	not detected	not analyzed
2734	not detected	not detected	not detected
2737	-----	-----	5.04
2743	-----	-----	-----
2773	Not Detected	Not Detected	Not Detected
2811	not determined	not determined	not analyzed
2821	below detection limit	below detection limit	-----
2826	<0.2	<0.2	<0.2
2829	0.068	not detected	-----
2864	not detected	not detected	-----
2897	not detected	not detected	not analyzed
2910	not detected	not detected	-----
2916	0.03	0.01	Not analyzed
3100	<0.2	<0.2	-----
3116	-----	-----	-----
3153	<0.20	<0.20	-----
3163	-----	-----	-----
3172	< 0.2	< 0.2	-----
3176	-----	-----	-----
3182	<0.10	<0.10	-----
3185	not detected	not detected	-----
3190	<0.2	<0.2	<0.2
3210	<0.1	<0.1	<0.1
3216	not detected	not detected	not analysed
3220	Not Detetced	Not Detetced	Not Detetced
3228	not detected	not detected	-----
3237	-----	-----	-----
3246	not detected	not detected	not applicable

APPENDIX 3

Summary of reported analytical details

lab	ISO/IEC 17025	Sample preparation	Intake sample
230	---	---	---
310	No	Further cut	0,5 gram
339	No	Used as received	0.5
551	Yes	Further cut	0.5g
623	Yes	Further cut	0.5 gram
840	Yes	Further cut	0.5
841	Yes	Further cut	0.5032 grams
1910	No	Further cut	0,5 g
2115	Yes	Used as received	1gm
2129	Yes	Used as received	0.5 g
2137	Yes	Used as received	0.5
2159	Yes	Further cut	0,5 Gram
2165	Yes	Further cut	2g
2166	Yes	Further cut	0.5 - 1.0
2184	Yes	Used as received	2 grams
2213	Yes	Further cut	1
2218	No	Further cut	0.25g
2236	Yes	Further cut	0.5 grams
2241	Yes	Further cut	0.3g
2247	Yes	Further cut	Approx. 1gm
2250	Yes	Further cut	0,5
2255	Yes	Used as received	0.5
2256	Yes	Further cut	0.5
2265	Yes	Further cut	0,25g
2272	Yes	Further cut	0.5gram
2287	No	Further cut	0.5g
2293	Yes	---	0.5 gm
2295	Yes	Further cut	0.5 grams
2297	Yes	Used as received	0.5
2310	Yes	Further cut	0.5 gram
2311	Yes	Further cut	0.5
2320	Yes	Further cut	0.5g
2330	No	Further cut	0.50 g
2347	No	Further cut	0.5g
2350	No	Further cut	0.5g
2352	Yes	Further cut	0.5g
2353	Yes	Used as received	0.5g
2355	Yes	Further cut	0.5g
2357	---	---	---
2358	Yes	Used as received	0.5 g
2363	Yes	Further cut	0.5g
2365	Yes	Further cut	0.5g
2366	Yes	Further cut	0.1g
2369	Yes	Further cut	---
2370	Yes	Further cut	0.5 g
2372	Yes	Further cut	0.5g
2374	Yes	Further cut	0.5g
2375	Yes	Further cut	0.5 grams
2378	No	Used as received	0.5g
2379	Yes	Further cut	0.5 g
2380	Yes	Further cut	0.5 g
2382	Yes	Further cut	0.5g
2384	Yes	Further grinded	0.5g
2386	Yes	Further cut	0,5
2390	Yes	Further cut	0.5074gm
2426	Yes	Further cut	0.5008g
2446	Yes	Further cut	0,5 g
2481	Yes	Further grinded	0.5 g
2482	Yes	Further cut	0,5
2489	Yes	Further cut	0.5068 g
2492	Yes	Further cut	0.5 g and 0.25 g
2500	Yes	Further cut	0.5g
2511	---	---	---
2515	Yes	Further cut	about 0.5 gram
2525	Yes	Further cut	0,5 g
2532	Yes	Further cut	0.5 grams
2553	Yes	Used as received	0.5048g
2561	Yes	Used as received	1
2569	No	Further cut	0.5 g
2573	Yes	Used as received	0.5g
2590	Yes	Further cut	0.5g
2605	Yes	Further cut	0.500
2629	No	Used as received	0.5 gram
2644	---	Used as received	1 g
2674	Yes	Further cut	2g
2689	Yes	Further cut	0.25 g
2734	Yes	Further cut	2,75g
2737	Yes	Further cut	0.5 grams
2743	Yes	Used as received	0.50g
2773	Yes	Further cut	0.5005g
2811	No	Used as received	ca. 0,5g
2821	Yes	Used as received	0,5 g
2826	Yes	Further cut	0.5g
2829	No	Further cut	0.5 g
2864	Yes	Further grinded	0.25 g
2897	Yes	Further cut	0.500g
2910	Yes	Further grinded	2g
2916	No	Further grinded	0.25 g per sample
3100	Yes	Further cut	0.5g
3116	Yes	Used as received	0.5g
3153	Yes	Further cut	0.25g
3163	---	---	---
3172	---	---	---
3176	Yes	Further cut	1
3182	No	Further cut	0.5 gram
3185	Yes	Further cut	0.5g
3190	Yes	Further cut	0.5
3210	Yes	Further cut	1 g
3216	No	Used as received	0,5 g
3220	Yes	Further cut	1gm
3228	Yes	Further cut	2
3237	Yes	Further cut	0,5 gr
3246	Yes	Used as received	0.2

APPENDIX 4

Number of participants per country

2 labs in BANGLADESH
1 lab in BRAZIL
1 lab in CAMBODIA
3 labs in FRANCE
11 labs in GERMANY
1 lab in GUATEMALA
8 labs in HONG KONG
9 labs in INDIA
1 lab in INDONESIA
8 labs in ITALY
1 lab in JAPAN
1 lab in MALAYSIA
1 lab in MAURITIUS
27 labs in P.R. of CHINA
2 labs in PAKISTAN
1 lab in POLAND
2 labs in SOUTH KOREA
1 lab in SPAIN
2 labs in SRI LANKA
3 labs in TAIWAN
2 labs in THAILAND
2 labs in THE NETHERLANDS
1 lab in TUNISIA
5 labs in TURKEY
1 lab in U.S.A.
1 lab in UNITED KINGDOM
5 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
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, June 2018
2 ASTM E178:02
3 ASTM E1301:03
4 ISO5725:86
5 ISO5725, parts 1-6, 1994
6 ISO13528:2005
7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
9 Horwitz. Journal of AOAC International, 79.3, (1996)
10 IP367:96
11 DIN38402 T41/42
12 W.J. Conover,Practical; Nonparametric Statistics, J. Wiley&Sons, NY., 302. (1971)
13 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
14 J.N. Miller, Analyst, 118, 455, (1993)
15 Analytical Methods Committee, Technical Brief, No 4, January 2001
16 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364, (2002)
17 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)