EURL Proficiency Test on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025

EURL-PT-POP_2502-HY

FEED

Final Report

PCDD/Fs and PCBs

(Report Version 1.0)

21 May 2026

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Health and Digital Executive Agency (HADEA). Neither the European Union nor the granting authority can be held responsible for them.

EURL for halogenated POPs in Feed and Food
c/o State Institute for Chemical and Veterinary Analysis Freiburg
Bissierstraße 5
79114 Freiburg
D-Germany
contact@eurl-pops.eu
+49 761 8855 500
eurl-pops.eu

Summary

Test sample	**FEED:** Hay [2502-HY]
Analytes of interest **Mandatory** for NRLs:	**PCDD/Fs** (17 2,3,7,8-substituted PCDD/Fs) **PCBs** (12 DL-PCBs, 6 NDL-PCBs)
Methods	**PCDD/Fs, DL-PCBs:** GC-HRMS, GC-MS/MS and alternative methods; Bioanalytical screening methods **NDL-PCBs:** Any kind of method
Participants	NRLs, OFLs, other official laboratories, commercial laboratories performing the analysis of samples taken by feed business operators
Statistical evaluation	ISO 13528:2022 [1], IUPAC Protocol [2]
Report of final results	21 May 2026 (Version 1.0)
Publication	EURL POPs reserves all rights to publish and present the anonymised results of the interlaboratory study in scientific journals and/or during conferences.

1. Structure of the ILS, test material and analytes

This proficiency test (PT) on the determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in **Hay** was organized by the EURL for halogenated POPs in Feed and Food to be performed between August and November 2025. The objective is to assess analytical performance of laboratories and interlaboratory comparability of results from analyses of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in one sample of **Hay**.

National Reference Laboratories (NRLs) for halogenated POPs in Feed and Food from EU member states were requested to participate as part of their work programme for 2025. NRLs were invited to encourage the participation of Official Laboratories (OFLs) from their member states as part of their duties following Article 101 of regulation (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017. Furthermore, participation of OFLs allowed the extension of the data basis for calculation of assigned values and evaluation of results. **Other official laboratories** and **commercial laboratories** performing the analysis of samples taken by feed business operators were invited to participate in this proficiency test.

The evaluated results were discussed by representatives of European Commission, NRLs and the EURL at the EURL/NRL workshop on 26 November 2025.

1.1. Samples and coding

The test sample was prepared from contaminated feed from a feeding study and fortified with some analytes of interest using analytical standards or technical mixtures of PCDD/Fs, PCBs, PBDEs and HBCDDs.

Hay	**Sample no. 2502-HY-xxx**

Each participant received about **90 g** of the test sample in a HDPE bottle.

1.2. Analytes of interest

NRLs for halogenated POPs in feed and food were requested to determine the following parameters:

- 17 2,3,7,8-substituted PCDD/Fs
- WHO-PCDD/F-TEQ (using WHO2005-TEF)
- 12 dioxin-like PCBs
- WHO-PCB-TEQ (using WHO2005-TEF)
- WHO-PCDD/F-PCB-TEQ (using WHO2005-TEF)
- Six non-dioxin-like PCBs (indicator PCBs): PCB 28, 52, 101, 138, 153, 180
- Sum of six non-dioxin-like PCBs (indicator PCBs)
- PCDD/F-PCB-BEQ, PCDD/F-BEQ and/or PCB-BEQ, if applicable (using bioanalytical screening methods)

1.3. Methods

One or more of the following **detection methods** could be applied:

- GC-HRMS-, GC-MS/MS-methods or other alternative methods for PCDD/Fs and dioxin-like PCBs
- Bioanalytical screening methods for PCDD/Fs and dioxin-like PCBs
- Any kind of method for non-dioxin-like PCBs, PBDEs and HBCDDs.

1.4. Coding of laboratories and confidentiality

The identity of participating laboratories will be kept confidential.
For NRLs of EU member states, the suggested “protocol for management of underperformance in comparative testing or lack of collaboration of National Reference Laboratories (NRLs)” will be followed. The confidentiality of NRLs will be kept according to this protocol.
For OFLs of EU member states cooperating with NRL, the respective NRLs will inform the EURL for halogenated POPs about the participating OFLs and will receive the respective laboratory codes, invoices for participation fee and certificates of participation of the OFLs.

1.5. Results of PCDD/Fs and PCBs

1.5.1. Results of PCDD/Fs and PCBs determined by physico-chemical methods (GC-HRMS, GC-MS/MS, GC-LRMS, GC-ECD, …)

Laboratories should

- use their own reference standards for identification and quantification,
- report results for each analyte,
- report the limit of quantification (LOQ), at least for each non-quantified analyte,
- report upper, middle and lower bound results for WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ, WHO-PCB-TEQ and sum of six indicator PCBs,
- report if sample exceeds respective EU maximum levels or action thresholds for WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ and/or WHO-PCB-TEQ or the maximum level for the sum of six non-dioxin-like PCBs beyond reasonable doubt taking into account the measurement uncertainty,
- report the measurement uncertainty, applied for checking of compliance, for WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ, WHO-PCB-TEQ and the sum of six indicator PCBs,
- give method information and
- give information about the accreditation of the laboratory according to ISO/IEC 17025 *(for metrological traceability of consensus values of participants used as assigned values).*

Results had to be reported in **ng/kg product, relative to a feed with a moisture content of 12 %** for PCDD/Fs and dioxin-like PCBs and in **µg/kg product, relative to a feed with a moisture content of 12 %** for indicator PCBs. TEQ-based results had to be calculated using the WHO-TEFs of 2005 [3].

1.5.2. Results of PCDD/Fs and PCBs determined by bioanalytical screening methods

Laboratories should

- use their own reference standards,
- report if the samples are suspected to be noncompliant with EU legal limits and confirmation is required,
- report PCDD/F and/or PCB results in BEQ, if applicable,
- report the reporting limit, maximum level / action threshold, which the evaluation is based on, and the bioassay cut-off, if applicable,
- give method information
- and give information about the accreditation of the laboratory according to ISO/IEC 17025.

Results have to be reported in **ng BEQ/kg, relative to a feed with a moisture content of 12 %**, for PCDD/Fs and dioxin-like PCBs.

2. Participating laboratories

This proficiency test was open for participation of:

- National Reference Laboratories (NRLs) of EU member states
- National Reference Laboratories of other European countries
- Official laboratories
- Commercial laboratories

92 laboratories registered for this proficiency test.

Table 1: Participating laboratories

Participating laboratories	Region	No. of participants
National Reference Laboratories	European Union Other Countries	24 2
Official Laboratories	European Union Other European Countries Africa Americas Asia Oceania	53 1 - 2 - -
Commercial Laboratories	European Union Other European Countries Africa Americas Asia Oceania	9 - - 1 - -
	Total	**92**

2.1. Number of reported results

Table 2: Reported results for PCDD/F and PCB sum parameters and moisture content

Reported results	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum of six indicator PCBs	PCDD/F-PCB-BEQ [Bioanalytical screening methods]	Moisture content
All laboratories	60	60	59	69	7	70
NRLs	19	19	18	21	2	21

Table 3: Reported accreditation according to ISO/IEC 17025 by participants for PCDD/Fs and PCBs

Hay	PCDD/Fs, PCBs [Physico-chemical methods]	PCDD/Fs, PCBs [Bioanalytical screening methods]
yes	51	5
no	4	1

2.2. Detection methods

The following detection methods were applied:

- GC-HRMS-, GC-MS/MS-, GC-LRMS-methods for PCDD/Fs and non- ortho PCBs
- GC-HRMS-, GC-MS/MS-, GC-LRMS-, GC-ECD-methods for mono-ortho-PCBs and indicator PCBs
- Bioanalytical screening methods for PCDD/Fs and dioxin-like PCBs

Table 4: Overview of physico-chemical detection methods for PCDD/Fs and PCBs applied by participants

Detection methods	PCDD/Fs	DL-PCBs	Indicator PCBs
HRMS	37	37	31
MS/MS	17	15	31
LRMS	1	1	1
ECD	-	-	3

3. Test for sufficient homogeneity and stability

The test for sufficient homogeneity was performed according to ISO 13528:2022 [1] and the International Harmonized Protocol for the Proficiency Testing of Analytical Chemistry Laboratories [2].

Therefore, 10 portions of the test samples 2502-HY were analyzed in duplicate for PCDD/Fs and PCBs. The test for sufficient homogeneity was performed for the sum parameters WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ, WHO-PCB-TEQ, the sum of six non-dioxin-like PCBs and individual congeners. The test materials showed sufficient homogeneity for this proficiency test. The stability check of the analytes of interest applying room temperature storage was performed according to ISO 13528:2022 [1]. The test material showed sufficient stability for this proficiency test.

4. Determination of the assigned value

Statistical evaluation of the PT results was performed by the EURL for halogenated POPs in feed and food according to ISO 13528:2022 [1] and the International Harmonized Protocol for the Proficiency Testing of Analytical Chemistry Laboratories [2].

The determination of the assigned value was performed according [1] by estimating of the assigned value as the consensus of participants' results (using only results of physico-chemical methods). The Huber robust mean was taken as assigned value after excluding extreme outliers (outside the range of ± 50% of the median of all reported results) and examination of the distribution of the remaining results using histogram and Kernel density estimation, if necessary.

Assigned values were calculated for WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ, WHO-PCB-TEQ, the sum of six non-dioxin-like PCBs and individual PCDD/F and PCB congeners (including limits of quantification (LOQs)), if possible. Additionally, the median of all values is calculated.

For individual congeners (including LOQs) assigned values were only calculated according to the above-mentioned procedure, if more than 2/3 of all results are above the LOQ and less than 1/3 of all results (including LOQs) are outside the range of ± 50% of the median of all reported results. Levels for individual congeners are only used for evaluation and calculation if these levels are equal to or above the LOQ; otherwise, the LOQ is used instead.

Due to high variation of participants' results or the limited number of reported results above the LOQ, no assigned values could be calculated for:

- 2,3,7,8-TCDD
- 1,2,3,7,8,9-HxCDF
- PCB 169

Since there are no traceable reference values available, the assigned values in this PT were calculated based on the Huber robust mean of the participants' results. Therefore, the assigned values are only traceable to these submitted results. Additionally, the results of all participants reporting results and the results of participants having accreditation according ISO/IEC 17025 were compared for PCDD/F and PCB sum parameters. No significant differences between the assigned values calculated for both data sets were observed (Table 5).

Table 5: Comparison of assigned values for all participants and participants with reported accreditation according to ISO/IEC 17025 for PCDD/F and PCB sum parameters in Hay 2502-HY

Sum parameters	Assigned value All participants	Assigned value ISO/IEC 17025 accreditation	Deviation
	ng/kg, µg/kg product (12 % moisture content)	ng/kg, µg/kg product (12 % moisture content)	%
WHO-PCDD/F-PCB-TEQ ub rep	0.621	0.630	1
WHO-PCDD/F-TEQ ub rep	0.200	0.203	1
WHO-PCB-TEQ ub rep	0.411	0.414	1
Sum Indicator PCBs ub rep	9.13	9.13	<1

4.1. PCDD/Fs and PCBs – Sum parameters

The assigned values for the test sample 2502-HY were calculated as consensus of participants' results for the PCDD/F and PCB sum parameters, taking into account the calculation criteria described above.

Table 6: Assigned values for physico-chemical methods for PCDD/Fs and PCBs (rounded to three significant figures)

Test sample	WHO-PCDD/F-PCB-TEQ (ub)	WHO-PCDD/F-TEQ (ub)	WHO-PCB-TEQ (ub)	Sum Indicator PCBs (ub)
	ng/kg product (12 % moisture content)			µg/kg product (12 % moisture content)
Hay (2502-HY)	0.621	0.200	0.411	9.13

Table 7: Assigned values for PCDD/Fs and DL-PCBs for comparison with BEQ results of bioanalytical screening methods (rounded to two significant figures)

Test sample	WHO-PCDD/F-PCB-TEQ (ub)	WHO-PCDD/F-TEQ (ub)	WHO-PCB-TEQ (ub)
	ng/kg product (12 % moisture content)		
Hay (2502-HY)	0.62	0.20	0.41

4.2. PCDD/Fs and PCBs – Individual congeners

The assigned values for the test sample 2502-HY for individual congeners were calculated as a consensus of the participants' results, taking into account the calculation criteria described above. They are shown graphically in Figures 1, 3, 4 and 5 (tabular summary see annex 1). Figures 2 and 6 display the contribution of the individual congeners to the WHO-PCDD/F-TEQ or the WHO-PCB-TEQ in this Hay sample.

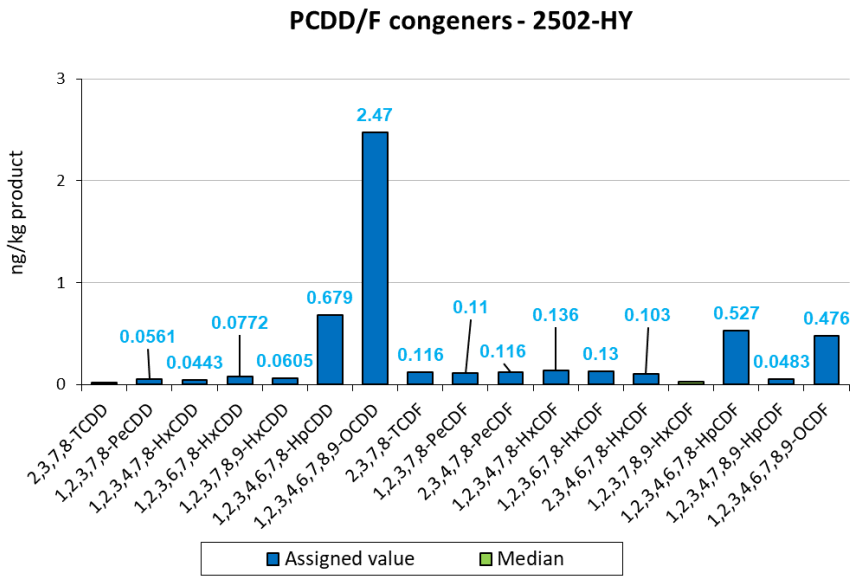


Figure 1: Assigned values (blue) and median values (green) for PCDD/F congeners for Hay (2502-HY) [ng/kg product (12% moisture content)]

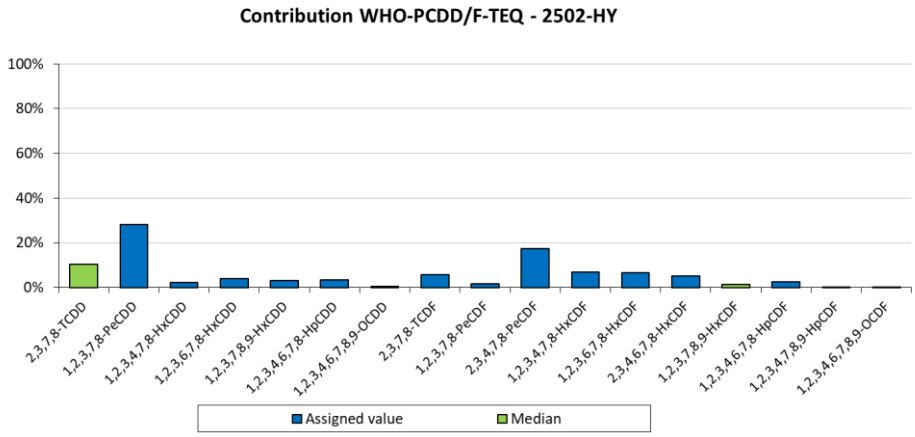


Figure 2: Contributions in % to WHO-PCDD/F-TEQ for PCDD/F assigned (blue) and median (green) values for Hay (2502-HY)

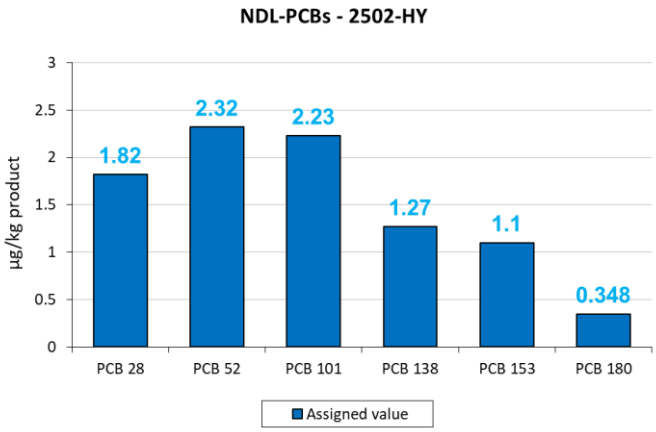


Figure 3: Assigned values (blue) for NDL-PCB congeners for Hay (2502-HY) [µg/kg product (12% moisture content)]

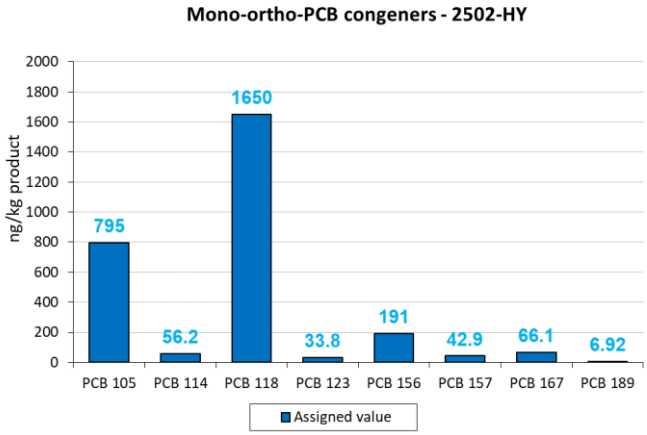


Figure 4: Assigned values (blue) for Mono-ortho-PCB congeners for Hay (2502-HY) [ng/kg product (12% moisture content)]

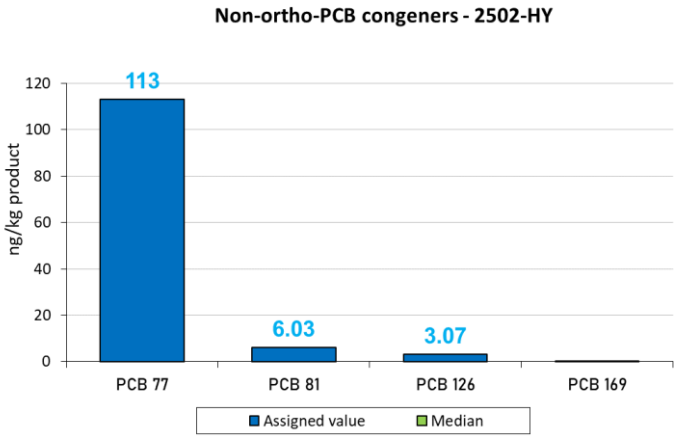


Figure 5: Assigned values (blue) and median values (green) for Non-ortho-PCB congeners for Hay (2502-HY) [ng/kg product (12% moisture content)]

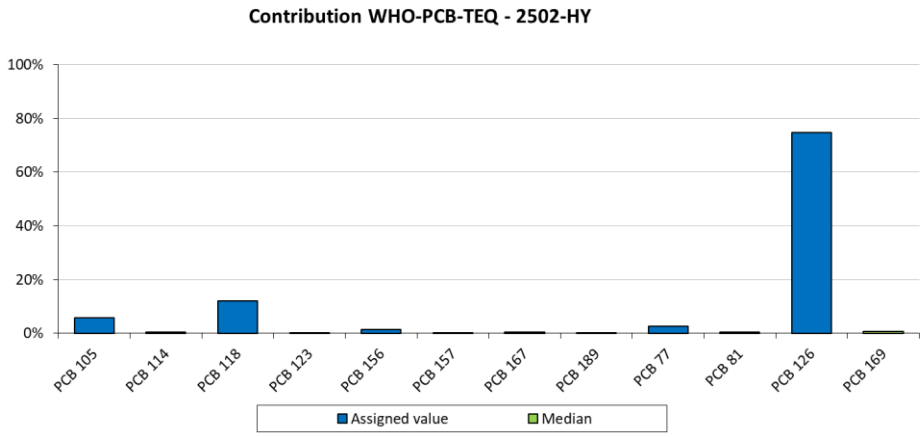


Figure 6: Contributions in % to WHO-PCB-TEQ for PCB assigned (blue) and median (green) values for Hay (2502-HY)

4.3. Moisture content

Since the legal maximum values and action thresholds for feed are based on a moisture content of 12 % in order to ensure comparability of feed samples, an assigned value was calculated as a consensus of the participants' results, taking into account the calculation criteria described above. A moisture content of **8.21%** was calculated for sample 2502-HY. The participants' results are shown in Figure 7a. The outliers occur because the moisture content was incorrectly reported as dry matter. Figure 7b displays the frequency distribution of participants' results for the moisture content.

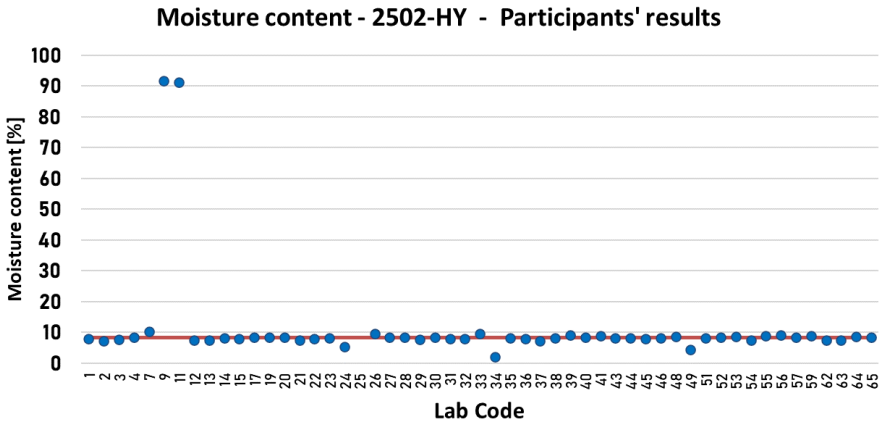


Figure 7a: Participant's results for the moisture content in % for Hay (2502-HY).

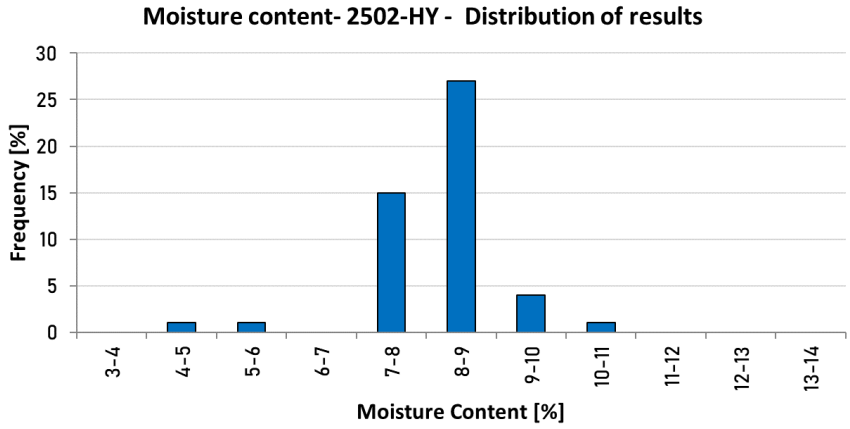


Figure 7b: Frequency of participant's results for the moisture content in % for Hay (2502-HY)

4.4. Comparison of assigned values with legal limits

Maximum levels and action thresholds for feed are defined in the Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed (Annex I Section V and Annex II).

Table 8: Maximum levels and action thresholds for feed materials:

Undesirable Substances Hay		Maximum level	Action threshold
WHO-PCDD/F-PCB-TEQ	ng/kg product*	**1.25**	**-**
WHO-PCDD/F-TEQ	ng/kg product*	**0.75**	**0.5**
WHO-PCB-TEQ	ng/kg product*	**-**	**0.35**
Sum of 6 NDL PCBs (sum of PCB 28, 52, 101, 138, 153, 180)	µg/kg product*	**10**	**-**

* *relative to a feed with a moisture content of 12%*

For the hay test sample 2502-HY the assigned values for the WHO-PCDD/F-PCB-TEQ, WHO-PCB-TEQ and the sum of 6 NDL PCBs were in the range of 0.5 to 4 of the respective ML or AL (Figure 8).

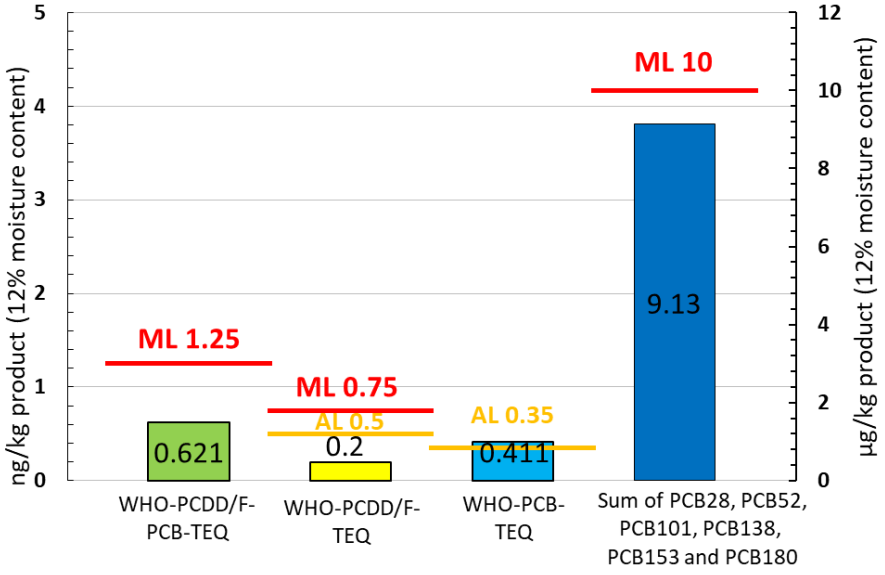


Figure 8: Comparison of the assigned values for sum parameters for Hay (2502-HY) with maximum levels (red lines) and action thresholds (yellow line) [ng/kg and µg/kg product (12% moisture content)

5. Scoring of results – Z-scores

5.1. Participants' results for physico-chemical methods

5.1.1. Z-scores

Criteria for successful participation of laboratories using physico-chemical methods were based on the evaluation of the results of the sum parameters WHO-PCDD/F-TEQ, WHO-PCB-TEQ, WHO-PCDD/F-PCB-TEQ and the sum of six non-dioxin-like PCBs and evaluated individual congeners. The criteria will be applicable for sum parameter concentrations in the range (about 0.5 to 4 times) of the level of interest (maximum level or action threshold).

For evaluation of results of physico-chemical methods the z-scores were calculated according to the following formula:

$$z = \frac{(x - x_a)}{\sigma_{p_{rel}} * x_a}$$

x: *participant's result*

x_a: *assigned value*

$\sigma_{p_{rel}}$: *relative fitness-for-purpose-based "standard deviation for proficiency assessment"*

For WHO-PCDD/F-TEQ, WHO-PCB-TEQ and WHO-PCDD/F-PCB-TEQ the relative standard deviation for proficiency assessment $\sigma_{p_{rel}}$ was defined as 10 %, for the sum of six non-dioxin-like PCBs (PCB 28, 52, 101, 138, 153, 180) as 15 % and for evaluated individual PCDD/F, PCB congeners as 20 %.

Z-scores for individual congeners were only calculated and reported if levels for these congeners are equal to or above the LOQ. Otherwise no z-scores will be given.

Interpretation of z-scores:

$\lvert z\text{-score} \rvert \leq 2$	*satisfactory performance*
$2 < \lvert z\text{-score} \rvert < 3$	*questionable performance (warning signal)*
$\lvert z\text{-score} \rvert \geq 3$	*unsatisfactory performance (action signal)*

5.1.2. PCDD/Fs and PCBs - Participants' z-scores

Tabular summaries of participants' results and z-scores can be found in annex 2 and 3.

Table 9: Distribution of all participants' and NRLs only z-scores for sum parameters

Hay (2502-HY)	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum of six indicator PCBs
all Participants				
|z-score| ≤ 2	90%	73%	94%	93%
2 < |z-score| < 3	8%	10%	3%	3%
|z-score| ≥ 3	2%	17%	3%	4%
NRLs				
|z-score| ≤ 2	95%	79%	94%	90%
2 < |z-score| < 3	-	5%	-	5%
|z-score| ≥ 3	5%	16%	6%	5%

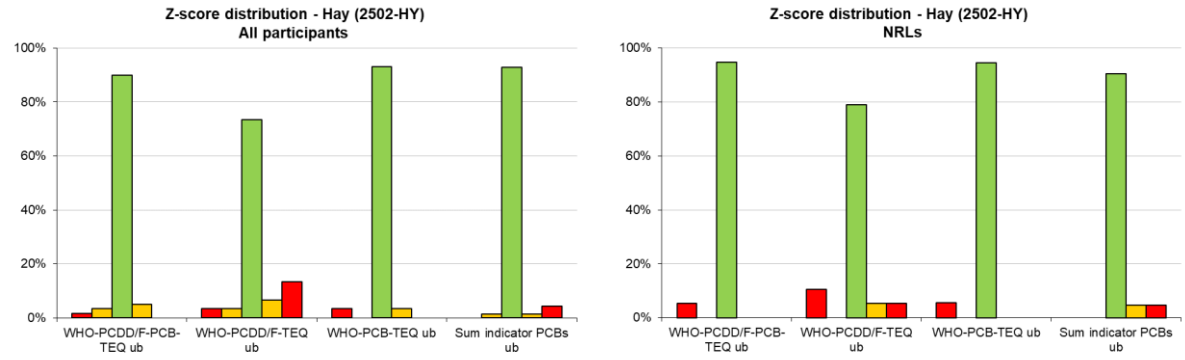


Figure 9: Distribution of all participants' z-scores and NRLs only for sum parameters for Hay (2502-HY)
[Green bars: -2 ≤ z-score ≤ 2, orange bars: -3 < z-score < -2, 2 < z-score < 3, red bars: z-score ≤ -3, z-score ≥ 3]

5.1.3. Comparison of reported and calculated sum parameters

In addition to the calculation of the sum parameters for reported individual PCDD/F and PCB congener values, the calculated sum parameters for PCDD/Fs and PCBs by the EURL were compared with the ones reported by each participant. As the reported sum parameters are decisive to compare the results with the legal limits, an incorrect calculation might lead to a wrong assessment of a sample. In case of a significant deviation of the reported sum parameter value from the (EURL) calculated one (deviation >10 %) the laboratory has therefore not successfully participated in the PT according to the positive scoring system (see 5.1.5).

Only 2-3% of the laboratories had differences > 10% between reported and calculated upper bound sum parameters for the WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ and the WHO-PCB-TEQ. This suggests that the calculation bases used by these laboratories may contain errors and should be checked (Table 10 and Figure 10).

Table 10: Difference between reported and calculated sum parameters for PCDD/Fs and PCBs for hay (2502-HY) given in percentage of participants' results

Hay (2502-HY)	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum of six indicator PCBs
Deviation ≤ 10 %	100%	98%	97%	100%
Deviation > 10 %	-	2%	3%	-

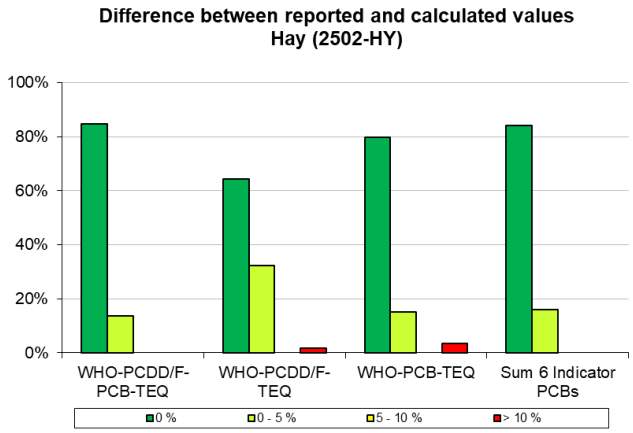


Figure 10: Difference between reported and calculated sum parameters for PCDD/Fs and PCBs [Green bars: 0 %, light green bars: 0-5 %, yellow bars: 5-10 %, red bars: > 10 %] for Hay (2502-HY) given in percentage of participants' results

5.1.4. Difference between upper and lower bound calculation

According to Commission Regulation (EC) No 152/2009 the difference between upper bound level and lower bound level shall not exceed 20 % for confirmation of exceedance of maximum level or in case of need of action thresholds for PCDD/Fs and DL-PCBs. For indicator PCBs the difference between upper bound and lower bound levels for the sum of six indicator PCBs shall be ≤ 20 % at the level of interest. Participants with a larger deviation should review their analytical methods, especially with regard to sensitivity and limit of quantification.
For the test samples 2502-HY the assigned values for the sum parameters WHO-PCDD/F-PCB-TEQ and the sum of the 6 NDL-PCBs were below the respective maximum levels, but in

the range of 0.5 to 4-times of the maximum level. The assigned value for the WHO-PCB-TEQ sum parameters was above the respective action threshold. The assigned value for the WHO-PCDD/F-TEQ was below that range and therefore not assessed according to the Commission Regulation (EC) No 152/2009.

No significant differences were found between the upper and lower bound calculations for any of the assessed sum parameters for this contamination range in Hay sample 2502-HY (Table 11 and Figure 11), except for the WHO-PCDD/F-TEQ 8% of the laboratories applied methods not sensitive enough in this very low concentration range (below 0.5 times the ML).

Table 11: Difference between upper and lower bound calculation for Hay (2502-HY) given in percentage of participants' results

Hay (2502-HY)	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum of six indicator PCBs
0 – 10 %*	82%	67%	98%	99%
10 – 20 %*	10%	13%	2%	1%
20 – 50 %*	8%	12%	-	-
> 50 %*	-	8%	-	-

* Difference between upper and lower bound calculation

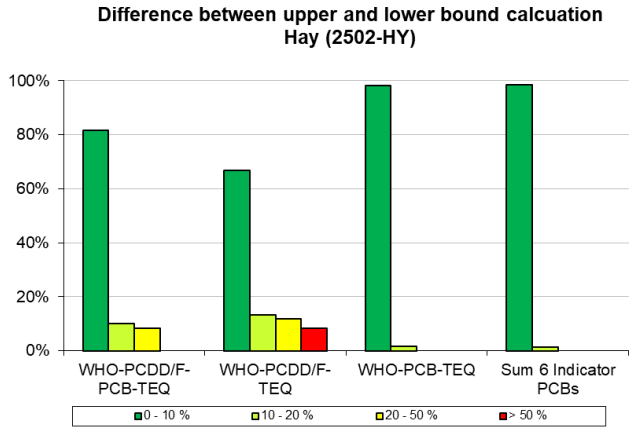


Figure 11: Difference between upper and lower bound calculation for Hay (2502-HY) given in percentage of participants' results [Green bars: 0 – 10 %, light green bars: 10 – 20 %, yellow bars: 20 – 50 %, red bars: > 50 %]

5.1.5. Positive scoring system

The “positive scoring system” gives one assessment for each PT sample covering all relevant PCDD/F and PCB sum parameters and congeners.

The total score for the positive scoring system was calculated according to the following general principles:

- Calculation of z-scores for sum parameters and evaluated individual congeners
- Calculation of the positive scores according to the following table:

Positive scoring system	I z-score I ≤ 2	2 < I z-score I < 3	I z-score I ≥ 3
Individual congeners	**Positive score**	**Positive score**	**Positive score**
Contribution to sum parameter* > 10 %	12	6	0
Contribution to sum parameter* 3-10 %	8	4	0
Contribution to sum parameter* < 3 %	6	3	0
Not evaluated congeners	0	0	0

* separately for the respective sum parameters WHO-PCDD/F-TEQ, WHO-PCB-TEQ and the sum of six non-dioxin-like PCBs

- Calculation of maximum achievable scores (I z-score I ≤ 2) for PCDD/F and DL-PCB and non-dioxin-like PCB congeners separately:

$$Maximum\ Score = \sum_{i=1}^{n} Max.Score_{(>10\%)i} + \sum_{i=1}^{m} Max.Score_{(3-10\%)i} + \sum_{i=1}^{p} Max.Score_{(<3\ \%)i}$$

- Calculation of the participant’s scores for PCDD/F and DL-PCB and non-dioxin-like PCB congeners separately:

$$Participant's\ Score = \sum_{i=1}^{n} Score_{(>10\%)i} + \sum_{i=1}^{m} Score_{(3-10\%)i} + \sum_{i=1}^{p} Score_{(<3\ \%)i}$$

- Calculation of achieved scoring percentage for each participant:

$$Participant's\ Scoring\ Percentage = \frac{Participant's\ score}{Maximum\ score} \cdot 100$$

- Criteria for successful participation:

Sum parameters:	≤ 1 parameter with | z-score | > 2, no parameter with | z-score | ≥ 3
PCDD/F congeners:	≥ 75 % of maximum score
DL-PCB congeners:	≥ 75 % of maximum score
Non-dioxin-like PCB congeners:	≥ 75 % of maximum score
Difference between reported and calculated results for sum parameters	≤ 10 %

The assessment based on the positive scoring system is performed for each PT test sample. A laboratory participates successfully in a PT for PCDD/Fs and PCBs, if all above mentioned criteria for the reported analytes are met for each PT test sample.

Table 12: Successful participation rate according to positive scoring system for Hay (2502-HY)

Scoring system	Successful participation		Reason for not successful participation			
Percentage of participants' results	yes	no	Only sum parameters	Sum parameters + individual congeners	Only individual congeners	Calculation of sum parameters
2502-HY	87 %	13 %	4 %	5 %	3 %	4 %

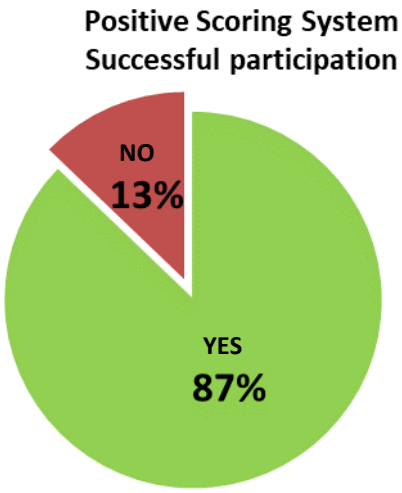


Figure 12: Successful participation rate according to the positive scoring system for Hay (2502-HY)

5.2. Participants' results for bioanalytical screening methods

According to Commission Regulation (EC) No 152/2009, "a screening method in principle classifies a sample as compliant or suspected to be non-compliant. For this, the calculated BEQ level is compared to the cut-off value […]. Samples below the cut-off value are declared compliant, samples equal or above the cut-off value as suspected to be non-compliant, requiring analysis by a confirmatory method".

Therefore, the main criterion for evaluation of results from bioanalytical screening methods is their ability to reliably identify compliant samples and samples suspected to be non-compliant with established legal limits.

For further evaluation of the performance of bioanalytical screening methods, bioassay-scores are applied: The reported BEQ-values derived from bioanalytical screening methods are compared with the WHO-TEQ assigned values calculated on basis of the results of physical-chemical methods for the concentration range of 0.5 to 2 times the level of interest.

Because bioanalytical screening methods focus mainly on distinguishing between compliant and potentially non-compliant samples, a direct comparison of bioassay-scores and z-scores is not possible. However, bioassay scores may serve as a tool to assess method performance within the scope of external quality control measures of the respective laboratory.

Bioassay-scores are calculated according to the following formula:

$$bioassay - score = \frac{(x - x_a)}{x_a * \sigma_{BArel}}$$

x: *participant's result (BEQ from bioanalytical screening method)*
x_a: *assigned value (physical-chemical methods)*
σ_{BArel}: *relative bioassay target deviation (20%)*

For PCDD/F-BEQ, PCB-BEQ and PCDD/F-PCB-BEQ the relative bioassay target deviation σ_{BArel} was defined as 20%.

5.2.1. Assessment of analytical results

As a consequence of the comparison of the assigned values of the test sample 2502-HY with legal limits, the assessment of the analytical results using bioanalytical screening methods should read "compliant with the maximum level for WHO-PCDD/F-PCB-TEQ and WHO-PCDD/F-TEQ", "suspected to be non-compliant with the action threshold for WHO-PCB-TEQ" and "compliant with the action threshold for WHO-PCDD/F-TEQ".

Table 13: Evaluation of assigned values for Hay

	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ
2502-HY	< ML	< ML	< AL	> AL

Seven laboratories reported results using CALUX bioassay for Total-BEQ and hereof five also for PCDD/F-BEQ and/or PCB-BEQ. Two laboratories suspected that the sample to be non-compliant with the ML for WHO-PCDD/F-PCB-TEQ, and one suspected it to be non-compliant with the ML for WHO-PCDD/F-TEQ, which are false positive reports. One laboratory reported that the sample complied with the AL for WHO-PCDD/F-TEQ. Since the assigned value was above the AL WHO-PCDD/F-TEQ, this was a false negative report, therefore this laboratory should review the applied method (Table 14).

Table 14: Participants' assessment of analytical results using bioanalytical screening methods for 2502-HY

Laboratories' assessment of analytical results	WHO-PCDD/F-PCB-TEQ Maximum level	WHO-PCDD/F-TEQ Maximum level	WHO-PCDD/F-TEQ Action threshold	WHO-PCB-TEQ Action threshold
Suspected to be non-compliant	2	1	1	3
Compliant	5	4	3	1

5.2.2. Participants' bioassay-scores

Concentrations of the assigned values for the WHO-PCDD/F-PCB-TEQ and the WHO-PCB-TEQ are in the range (about 0.5 to 2 times) of the respective maximum levels or action threshold in the test sample 2502-HY.

Table 15: Distribution of participants' bioassay-scores for BEQ parameters for Hay (2502-HY)

Percentage of participants' results	PCDD/F-PCB-BEQ	PCDD/F-BEQ	PCB-BEQ
$\lvert$ **bioassay-score** $\rvert \leq 2$	66%	100 %	100 %
$2 < \lvert$ **bioassay-score** $\rvert < 3$	17%	-	-
$\lvert$ **bioassay-score** $\rvert \geq 3$	17%	-	-

6. Quality control

The Deutsche Akkreditierungsstelle GmbH attests that the provider of proficiency testing Chemisches und Veterinäruntersuchungsamt Freiburg, EU Reference Laboratory (EURL) for halogenated persistent organic pollutants (POPs) in feed and food is competent under the terms of DIN EN ISO/IEC 17043:2010 to carry out proficiency testing in the testing field of determination of halogenated persistent organic pollutants (POPs) in food and feed (Accreditation number: D-EP-18625-01-00; https://www.dakks.de/de/akkreditierte-stelle.html?id=D-EP-18625-01-01).

Homogeneity and stability testing were performed under accreditation according to DIN EN ISO/IEC 17025:2018.

7. Results of participants

An overview of the PCDD/F and PCB results for the PT test sample Hay (2502-HY) are given in the following annexes. Laboratories are coded according to the laboratory codes sent after registration.

8. References

[1] ISO 13528:2022, Statistical methods for use in proficiency testing by interlaboratory comparisons, International Organization for Standardization

[2] M. Thompson, S.L.R. Ellison, R. Wood: The International Harmonized Protocol For The Proficiency Testing Of Analytical Chemistry Laboratories, Pure Appl. Chem., Vol. 78, No. 1, pp. 145-196, 2006.

[3] M. van den Berg et al., The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds. Toxicological Sciences 93(2), 223-241 (2006)

9. Annex

Hay – 2502-HY	
Annex 1	Assigned values – PCDD/F, PCB
Annex 2	Participants' results – Tables – PCDD/F, PCB
Annex 3	Participants' z-scores / bioassay-scores – Tables – PCDD/F, PCB
Annex 4	Participants' z-scores – Charts – PCDD/F, PCB
Annex 5	Scoring system – PCDD/F, PCB
Annex 6	Test for sufficient homogeneity and stability – PCDD/F and PCB
Annex 7	Participants' methods – PCDD/F, PCB

EURL for halogenated POPs in Feed and Food
c/o State Institute for Chemical and Veterinary Analysis of Food Freiburg

Coordinator: Alexander Schächtele
(Head of EURL POPs)
Phone: +49 761 8855 500 E-Mail: eurl-pops@cvuafr.bwl.de

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 1: Assigned values of PCDD/Fs and PCBs

Test sample - Hay (2502-HY)

Assigned values of sum parameters and individual congeners

Estimation of the assigned value as the consensus of participants' results
Assigned value = Huber robust mean after exlusion of extreme outliers

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Sum parameters - Assigned values

Analyte	Result ng/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
WHO-PCDD/F-PCB-TEQ upper bound rep		0.621	0.0648	0.011	57	0.619
WHO-PCDD/F-PCB-TEQ lower bound rep		0.583	0.0779	0.013	57	0.591
WHO-PCDD/F-PCB-TEQ upper bound cal		0.620	0.0634	0.011	55	0.615
WHO-PCDD/F-PCB-TEQ lower bound cal		0.587	0.0758	0.013	55	0.591

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

PCDD/F - Assigned values

Analyte	Result ng/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
WHO-PCDD/F-TEQ upper bound rep		0.200	0.0336	0.0058	53	0.200
WHO-PCDD/F-TEQ lower bound rep		0.182	0.0397	0.0068	54	0.184
WHO-PCDD/F-TEQ upper bound cal		0.203	0.0322	0.0057	50	0.202
WHO-PCDD/F-TEQ lower bound cal		0.186	0.0362	0.0063	51	0.184
2,3,7,8-TCDD						0.0210
1,2,3,7,8-PeCDD		0.0561	0.0131	0.0024	48	0.0591
1,2,3,4,7,8-HxCDD		0.0443	0.00828	0.0016	44	0.0480
1,2,3,6,7,8-HxCDD		0.0772	0.0137	0.0024	49	0.0765
1,2,3,7,8,9-HxCDD		0.0605	0.0102	0.0019	47	0.0608
1,2,3,4,6,7,8-HpCDD		0.679	0.0751	0.013	54	0.679
1,2,3,4,6,7,8,9-OCDD		2.47	0.237	0.042	51	2.49
2,3,7,8-TCDF		0.116	0.0166	0.0029	50	0.116
1,2,3,7,8-PeCDF		0.110	0.0114	0.0020	52	0.110
2,3,4,7,8-PeCDF		0.116	0.0182	0.0032	52	0.115
1,2,3,4,7,8-HxCDF		0.136	0.0142	0.0024	53	0.136
1,2,3,6,7,8-HxCDF		0.130	0.0146	0.0025	54	0.129
2,3,4,6,7,8-HxCDF		0.103	0.0142	0.0025	52	0.100
1,2,3,7,8,9-HxCDF						0.0300
1,2,3,4,6,7,8-HpCDF		0.527	0.0539	0.0092	54	0.520
1,2,3,4,7,8,9-HpCDF		0.0483	0.0113	0.0022	42	0.0500
1,2,3,4,6,7,8,9-OCDF		0.476	0.0769	0.014	49	0.474

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Dioxin-like PCB - Assigned values

Analyte	Result ng/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
WHO-PCB-TEQ upper bound rep		0.411	0.0325	0.0055	54	0.411
WHO-PCB-TEQ lower bound rep		0.406	0.0338	0.0057	54	0.408
WHO-PCB-TEQ upper bound cal		0.410	0.0326	0.0057	52	0.410
WHO-PCB-TEQ lower bound cal		0.406	0.0339	0.0059	52	0.406
PCB 105		795	83.9	14	54	779
PCB 114		56.2	10.1	1.7	53	55.3
PCB 118		1650	213	37	53	1670
PCB 123		33.8	6.68	1.2	50	33.5
PCB 156		191	19.0	3.2	54	191
PCB 157		42.9	4.03	0.69	53	43.0
PCB 167		66.1	7.08	1.2	53	66.1
PCB 189		6.92	0.820	0.14	53	6.87
PCB 77		113	12.8	2.2	51	110
PCB 81		6.03	0.772	0.13	52	6.10
PCB 126		3.07	0.293	0.051	52	3.04
PCB 169						0.110

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Non dioxin-like PCB - Assigned values

Analyte	Result µg/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
Sum Indicator PCBs upper bound rep		9.13	0.836	0.13	62	9.19
Sum Indicator PCBs lower bound rep		9.09	0.864	0.14	63	9.12
Sum Indicator PCBs upper bound cal		9.11	0.886	0.14	62	9.18
Sum Indicator PCBs lower bound cal		9.09	0.884	0.14	62	9.12
PCB 28		1.82	0.275	0.045	59	1.86
PCB 52		2.32	0.283	0.045	63	2.32
PCB 101		2.23	0.242	0.037	65	2.21
PCB 138		1.27	0.184	0.029	63	1.24
PCB 153		1.10	0.153	0.025	61	1.09
PCB 180		0.348	0.0535	0.0086	61	0.339

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

WHO-TEQ - Assigned values - Bioanalytical screening methods

Analyte	Result ng BEQ/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
WHO-PCDD/F-PCB-TEQ ub rep		0.62	0.065	0.011	57	0.62
WHO-PCDD/F-TEQ ub rep		0.20	0.034	0.0058	53	0.20
WHO-PCB-TEQ ub rep		0.41	0.032	0.0055	54	0.41

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Moisture content (PCDD/F, PCB) - Assigned value

Analyte	Result %	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
Moisture content		8.21	0.630	0.11	49	8.25

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 2: Participants' results of PCDD/Fs and PCBs

Test sample - Hay (2502-HY)

* Modified/additional results reported after distribution of preliminary results to all participating laboratories

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Sum parameters - Results

LC	Data set	Sample	Result ng/kg 12% moisture content	WHO-PCDD/F-PCB-TEQ reported upper bound	WHO-PCDD/F-PCB-TEQ reported lower bound	WHO-PCDD/F-PCB-TEQ calculated upper bound	WHO-PCDD/F-PCB-TEQ calculated lower bound	WHO-PCDD/F-TEQ reported upper bound	WHO-PCDD/F-TEQ reported lower bound	WHO-PCDD/F-TEQ calculated upper bound	WHO-PCDD/F-TEQ calculated lower bound	WHO-PCB-TEQ reported upper bound	WHO-PCB-TEQ reported lower bound	WHO-PCB-TEQ calculated upper bound	WHO-PCB-TEQ calculated lower bound	Result µg/kg 12% moisture content	Sum 6 Indicator PCBs reported upper bound	Sum 6 Indicator PCBs reported lower bound	Sum 6 Indicator PCBs calculated upper bound	Sum 6 Indicator PCBs calculated lower bound
1	A	2502-HY		0.64	0.64	0.64	0.637	0.2	0.2	0.2	0.2	0.44	0.44	0.437	0.437		8.32	8.32	8.32	8.32
2	A	2502-HY		0.62	0.62	0.622	0.622	0.21	0.21	0.205	0.205	0.42	0.42	0.417	0.417		9.61	9.61	9.61	9.61
3	A	2502-HY		0.623	0.623	0.623	0.623	0.211	0.211	0.211	0.211	0.413	0.413	0.412	0.412		9.53	9.53	9.52	9.52
4	A	2502-HY		0.61	0.61	0.611	0.611	0.19	0.19	0.193	0.193	0.42	0.42	0.418	0.418					
5		2502-HY																		
6		2502-HY																		
7	A	2502-HY		0.68	0.68	0.682	0.681	0.22	0.22	0.22	0.219	0.46	0.46	0.462	0.462		12	12	12.5	12.5
8	A	2502-HY		0.587	0.485	0.589	0.483	0.182	0.138	0.185	0.139	0.405	0.347	0.404	0.344		9.9	9.9	10.4	10.4
9	A	2502-HY		0.637	0.558	0.58	0.58	0.185	0.153	0.174	0.174	0.405	0.405	0.406	0.406		9.47	9.47	9.46	9.46
10		2502-HY																		
11	A	2502-HY		0.6	0.598	0.601	0.598	0.19	0.188	0.191	0.188	0.41	0.41	0.41	0.41		8.9	8.9	8.9	8.9
12	A	2502-HY		0.632	0.626	0.631	0.626	0.223	0.217	0.222	0.217	0.41	0.41	0.409	0.409		9.53	9.53	9.54	9.54
13	A	2502-HY															9.17	8.67	9.16	8.66
14	A	2502-HY		0.52	0.52	0.52	0.52	0.15	0.15	0.15	0.15	0.371	0.371	0.37	0.37		8.11	8.11	8.1	8.1
15	A	2502-HY		0.6	0.43	0.595	0.434	0.183	0.014	0.175	0.0144	0.42	0.42	0.42	0.42		11	11	11	11
16	A	2502-HY		0.644	0.642	0.644	0.642	0.211	0.209	0.211	0.209	0.433	0.433	0.433	0.433		9.16	9.16	9.16	9.16
17	A	2502-HY															8.92	8.45	8.93	8.45
18	A	2502-HY		0.56	0.57	0.516	0.515	0.17	0.18	0.181	0.18	0.39	0.39	0.335	0.335		9.08	9.08	9.11	9.11
19		2502-HY																		
20	A	2502-HY		0.659	0.598	0.66	0.594	0.239	0.178	0.24	0.175	0.42	0.42	0.42	0.419		9.56	9.56	99.5	99.5
21	A	2502-HY															9.42	9.42	9.42	9.42
22	A	2502-HY		0.62	0.62	0.62	0.62	0.215	0.215	0.215	0.215	0.405	0.405	0.405	0.405					
23		2502-HY																		
24	A	2502-HY		0.641	0.557	0.64	0.556	0.216	0.161	0.216	0.161	0.425	0.396	0.424	0.395					
25	A	2502-HY		0.602	0.602	0.601	0.601	0.2	0.2	0.199	0.199	0.402	0.402	0.402	0.402		9.67	9.67	9.66	9.66
26	A	2502-HY		0.571	0.571	0.571	0.571	0.183	0.183	0.183	0.183	0.388	0.388	0.388	0.388		8.33	8.33	8.34	8.34
27	A	2502-HY		0.553	0.526	0.553	0.526	0.166	0.143	0.166	0.143	0.387	0.383	0.387	0.383		9.4	9.4	9.41	9.41
28	A	2502-HY		0.543	0.543	0.543	0.543	0.184	0.184	0.184	0.184	0.359	0.359	0.359	0.359		8.15	8.15	8.24	8.24
29		2502-HY																		
30		2502-HY																		
31	A	2502-HY		0.8	0.51	0.804	0.513	0.39	0.1	0.394	0.103	0.41	0.41	0.41	0.41		8.2	8.2	8.11	8.11
32		2502-HY																		
33	A	2502-HY															9.19	9.19	9.19	9.19
34	A	2502-HY		0.688	0.683	0.688	0.683	0.246	0.241	0.246	0.241	0.442	0.442	0.442	0.442		11.6	11.6	11.6	11.6
35		2502-HY																		
36	A	2502-HY															9.28	8.78	9.39	8.91
37		2502-HY																		
38	A	2502-HY		0.693	0.693	0.693	0.693	0.273	0.273	0.273	0.273	0.42	0.42	0.42	0.42		9.86	9.86	9.86	9.86
39	A	2502-HY		0.656	0.65	0.656	0.651	0.21	0.209	0.21	0.209	0.446	0.441	0.446	0.442		10.2	10.2	10.2	10.2
40	A	2502-HY															15.6	14.6	15.6	14.6
41	A	2502-HY															9.26	9.26	9.25	9.25
42	A	2502-HY		0.577	0.494	1.21	0.42	0.171	0.119	0.8	0.0149	0.406	0.376	0.405	0.405				6.97	4.1
43		2502-HY																		
44	A	2502-HY		0.653	0.644	0.655	0.645	0.19	0.181	0.191	0.181	0.463	0.463	0.464	0.464		8.95	8.95	8.95	8.95
45		2502-HY																		
46	A	2502-HY		0.614	0.605	0.59	0.581	0.19	0.186	0.192	0.186	0.422	0.419	0.398	0.395		9.2	9.2	9.2	9.2
47	A	2502-HY		0.538	0.538			0.113	0.113											
48	A	2502-HY		0.61	0.59	0.614	0.588	0.22	0.2	0.224	0.198	0.39	0.39	0.39	0.39		9.42	9.42	9.42	9.42
49	A	2502-HY		0.65	0.54	0.652	0.537	0.2	0.12	0.202	0.117	0.45	0.42	0.45	0.42		9.32	9.32	9.32	9.32
50	A	2502-HY		0.558	0.546	0.557	0.546	0.164	0.152	0.163	0.152	0.394	0.394	0.394	0.394		9.15	9.15	9.15	9.15
51	A	2502-HY															10.1	9.7	10.2	9.66
52		2502-HY																		
53		2502-HY																		
54	A	2502-HY		0.696	0.689	0.696	0.69	0.221	0.217	0.221	0.218	0.475	0.472	0.475	0.472		9.02	9.02	9.03	9.03
55	A	2502-HY		0.667	0.639	0.667	0.639	0.254	0.226	0.254	0.226	0.413	0.413	0.413	0.413		7.89	7.89	7.89	7.89
56		2502-HY																		
57	A	2502-HY		0.75	0.69	0.751	0.696	0.24	0.19	0.247	0.192	0.5	0.5	0.504	0.504		9.6	9.6	9.54	9.54
58	A	2502-HY		0.679	0.663	88.8	88.8	0.246	0.242	0.245	0.242	0.433	0.421	88.6	88.6		10.3	10.3	10.3	10.3
59		2502-HY																		
60	A	2502-HY		0.601	0.601	0.602	0.602	0.188	0.188	0.188	0.188	0.412	0.412	0.414	0.414		8.92	8.92	8.92	8.92
61		2502-HY																		
62	A	2502-HY		0.6	0.56	0.596	0.564	0.202	0.175	0.202	0.176	0.39	0.39	0.394	0.388		10.1	10.1	10.1	10.1
63	A	2502-HY		0.44	0.44	0.449	0.443	0.405	0.405	0.405	0.405	0.038	0.0355	0.0435	0.0377					
64	A	2502-HY		0.255	0.245	0.255	0.245	0.116	0.106	0.116	0.106	0.139	0.139	0.139	0.139		14.7	14.7	14.7	14.7
65	A	2502-HY		0.64	0.62	0.642	0.621	0.221	0.212	0.221	0.212	0.42	0.41	0.421	0.409		8.95	8.95	8.96	8.96
66	A	2502-HY		0.591	0.591	0.59	0.59	0.195	0.195	0.195	0.195	0.396	0.396	0.395	0.395					
67	A	2502-HY															9.6	9.1	9.6	9.1

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Sum parameters - Results

LC	Data set	Sample	Result ng/kg 12% moisture content	WHO-PCDD/F-PCB-TEQ reported upper bound	WHO-PCDD/F-PCB-TEQ reported lower bound	WHO-PCDD/F-PCB-TEQ calculated upper bound	WHO-PCDD/F-PCB-TEQ calculated lower bound	WHO-PCDD/F-TEQ reported upper bound	WHO-PCDD/F-TEQ reported lower bound	WHO-PCDD/F-TEQ calculated upper bound	WHO-PCDD/F-TEQ calculated lower bound	WHO-PCB-TEQ reported upper bound	WHO-PCB-TEQ reported lower bound	WHO-PCB-TEQ calculated upper bound	WHO-PCB-TEQ calculated lower bound	Result µg/kg 12% moisture content	Sum 6 Indicator PCBs reported upper bound	Sum 6 Indicator PCBs reported lower bound	Sum 6 Indicator PCBs calculated upper bound	Sum 6 Indicator PCBs calculated lower bound
68	A	2502-HY		0.633	0.577	0.633	0.577	0.229	0.174	0.23	0.174	0.404	0.404	0.403	0.403		9.12	9.12	9.12	9.12
69	A	2502-HY		0.598	0.583	0.598	0.583	0.182	0.18	0.182	0.18	0.416	0.403	0.416	0.403		9	9	9	9
70	A	2502-HY		0.488	0.478	0.0978	0.0972	0.149	0.155	0.074	0.0735	0.333	0.329	0.0238	0.0237		6.83	6.33	6.83	6.33
71	A	2502-HY		0.606	0.591	0.606	0.591	0.181	0.179	0.181	0.179	0.425	0.412	0.425	0.412		8.98	8.98	8.98	8.98
72	A	2502-HY		0.617	0.617	0.617	0.617	0.243	0.243	0.243	0.243	0.374	0.374	0.374	0.374		7.77	7.77	7.76	7.76
73	A	2502-HY				0.078				0.0664				0.0116			7.84	7.86	7.87	7.86
74		2502-HY																		
75		2502-HY																		
76	A	2502-HY															5.86	5.25	5.87	5.25
77	A	2502-HY															14.3	13.4	14.1	13.4
78	A	2502-HY		0.557	0.532	0.557	0.531	0.17	0.148	0.171	0.148	0.387	0.384	0.386	0.383		7.94	7.94	7.95	7.95
79	A	2502-HY		0.638	0.634	0.637	0.634	0.199	0.196	0.198	0.196	0.44	0.438	0.439	0.438		9.42	9.42	9.43	9.43
80	A	2502-HY		0.67	0.65	0.67	0.646	0.26	0.23	0.253	0.229	0.42	0.42	0.417	0.417		8.7	8.7	8.61	8.61
81	A	2502-HY		0.508	0.481	0.508	0.481	0.171	0.151	0.171	0.151	0.337	0.33	0.337	0.33		10.4	10.4	10.4	10.4
82	A	2502-HY		0.512	0.459	0.512	0.459	0.167	0.138	0.167	0.138	0.345	0.321	0.345	0.321		8.31	8.31	8.3	8.3
83	A	2502-HY															9.4	8.9	9.4	8.9
84	A	2502-HY		0.8	0.79	0.807	0.794	0.28	0.28	0.285	0.285	0.52	0.51	0.522	0.509		8.4	8.4	8.38	8.38
85	A	2502-HY		0.594	0.579	0.594	0.578	0.179	0.177	0.179	0.177	0.414	0.401	0.415	0.401		8.94	8.94	8.93	8.93
86	A	2502-HY															8.73	8.73	8.73	8.73
87	A	2502-HY															8.42	7.92	8.43	7.93
88	A	2502-HY		0.72	0.71	0.716	0.71	0.233	0.227	0.233	0.227	0.483	0.483	0.483	0.483		11	11	11	11
89	A	2502-HY		0.737	0.46	0.737	0.46	0.379	0.109	0.379	0.11	0.358	0.35	0.358	0.35		6.55	6.55	7.95	7.95
90		2502-HY																		
91		2502-HY																		
92	A	2502-HY		0.698	0.453	0.699	0.454	0.309	0.079	0.309	0.0787	0.39	0.375	0.39	0.375					
93	A	2502-HY		0.542	0.541	0.542	0.541	0.168	0.168	0.168	0.168	0.373	0.373	0.374	0.373		9.1	9.1	9.1	9.1
94	A	2502-HY		0.68	0.5	0.682	0.499	0.31	0.15	0.31	0.146	0.37	0.35	0.372	0.353					
95		2502-HY																		
96	A	2502-HY															9.76	9.26	9.76	9.26
97		2502-HY																		
Additional Sets																				
41	B	2502-HY															10	10	9.97	9.97
65	B	2502-HY		0.65	0.63	0.645	0.631	0.229	0.226	0.229	0.226	0.42	0.4	0.416	0.405		9.18	9.18	9.19	9.19
85	B	2502-HY		0.574	0.559	0.575	0.559	0.169	0.167	0.169	0.166	0.406	0.393	0.406	0.393		8.98	8.98	8.98	8.98
41	C	2502-HY															9.15	9.15	9.15	9.15
		2502-HY																		
58*	A	2502-HY		0.679	0.663	0.678	0.663	0.246	0.242	0.245	0.242	0.433	0.421	0.433	0.421		10.3	10.3	10.3	10.3

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Assessment of analytical results, Measurement uncertainty

LC	Data set	Sample	**Assessment of analytical results** Exceeds maximum level for **WHO-PCDD/F-PCB-TEQ**	Exceeds maximum level for **WHO-PCDD/F-TEQ**	Exceeds action level for **WHO-PCDD/F-TEQ**	Exceeds action level for **WHO-PCB-TEQ**	Exceeds maximum level for **Sum 6 Indicator PCBs**	**Measurement uncertainty [%]** WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs
1	A	2502-HY	no	no	no	no	no	22.6	22	22.8	20
2	A	2502-HY	no	no	no	no	no	30	30	30	30
3	A	2502-HY	no	no	no	no	no	30	30	30	30
4	A	2502-HY	no	no	no	no		25	25	25	
5		2502-HY									
6		2502-HY									
7	A	2502-HY	no	no	no	yes	no	21.5	19.7	22.3	26.4
8	A	2502-HY	no	no	no	no	no	12	12	20	20
9	A	2502-HY	no	no	no	yes	no	25	25	25	25
10		2502-HY									
11	A	2502-HY	no	no	no	no	no	20	20	20	20
12	A	2502-HY	no	no	no	no	no	13.8	14.4	18.9	13.5
13	A	2502-HY					no				55
14	A	2502-HY	no	no	no	no	no	20	20	20	15
15	A	2502-HY	no	no	no	no	yes	40	33	47	30
16	A	2502-HY	no	no	no	yes	no	18	22	16	10
17	A	2502-HY					no				55
18	A	2502-HY	no	no	no	no	no	20	20	20	25
19		2502-HY									
20	A	2502-HY	no	no	no	no	no	30	30	30	30
21	A	2502-HY					no				16
22	A	2502-HY	no	no	no	no		20	20	20	
23		2502-HY									
24	A	2502-HY	no	no	no	no	no	20		15	15
25	A	2502-HY	no	no	no	no	no	17	18	16.6	14
26	A	2502-HY	no	no	no	no	no	17	20	17	23
27	A	2502-HY	no	no	no	no	no	30	30	30	25
28	A	2502-HY	no	no	no	no	no	32	27	18	31
29		2502-HY									
30		2502-HY									
31	A	2502-HY	no	no	no	yes	no	25	43	20	30
32		2502-HY									
33	A	2502-HY					no				30
34	A	2502-HY	no	no	no	yes	yes	13.8	13.9	14.4	13.8
35		2502-HY									
36	A	2502-HY					no				20
37		2502-HY									
38	A	2502-HY	no	no	no	no	no	34.8	27.8	26.7	37.3
39	A	2502-HY	no	no	no	yes	no	18.7	18	19	19
40	A	2502-HY					no				50
41	A	2502-HY					no				20
42	A	2502-HY	no	no	no						
43		2502-HY									
44	A	2502-HY	no	no	no	no	no	25.6	21.1	25.7	20.2
45		2502-HY									
46	A	2502-HY	no	no	no	no	no			30	30
47	A	2502-HY	no	no	no			29	29		
48	A	2502-HY	no	no	no	no	no	25.08	24.44	31.59	18.26
49	A	2502-HY	no	no	no	no	no	27.5	26.4	28	25.3
50	A	2502-HY	no	no	no	no	no	25	28.5	33.4	5.6
51	A	2502-HY					no				31.9
52		2502-HY									
53		2502-HY									
54	A	2502-HY	no	no	no	yes	no	17	25	17	6
55	A	2502-HY	no	no	no	no	no	20.87	25	30	30
56		2502-HY									
57	A	2502-HY	no	no	no	no	no	23	24	24	25
58	A	2502-HY	no	no	no	no	no	23	23	24	21
59		2502-HY									
60	A	2502-HY	no	no	no	no	no	20	20	20	20

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Assessment of analytical results, Measurement uncertainty

LC	Data set	Sample	Assessment of analytical results: Exceeds maximum level for WHO-PCDD/F-PCB-TEQ	Exceeds maximum level for WHO-PCDD/F-TEQ	Exceeds action level for WHO-PCDD/F-TEQ	Exceeds action level for WHO-PCB-TEQ	Exceeds maximum level for Sum 6 Indicator PCBs	Measurement uncertainty [%]: WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs
61		2502-HY									
62	A	2502-HY	no	no	no	no	no	25	35	30	20
63	A	2502-HY	no	no	no	no		38	38	38	
64	A	2502-HY	no	no	no	no	no	24.17	22	10	10
65	A	2502-HY	no	no	no	no	no	41	31	26	31
66	A	2502-HY	no	no	no	no		30	30	30	
67	A	2502-HY					no				50
68	A	2502-HY	no	no	no	no	no	20	20	20	20
69	A	2502-HY	no	no	no	no	no	21.3	21.3	20.8	30
70	A	2502-HY	no	no	no	no	no	35	35	35	40
71	A	2502-HY	no	no	no	no	no	21.3	21.3	20.8	30
72	A	2502-HY	no	no	no	no	no	44	44	44	44
73	A	2502-HY	no	no	no	no	no				8.5
74		2502-HY									
75		2502-HY									
76	A	2502-HY					no				50
77	A	2502-HY					no				50
78	A	2502-HY	no	no	no	no	no	22.02	14.3	16.74	16.74
79	A	2502-HY	no	no	no	yes	no	15	15	15	15
80	A	2502-HY	no	no	no	no	no	51	39	34	22
81	A	2502-HY	no	no	no	no	yes	50	31.4	39.6	31.6
82	A	2502-HY	no	no	no	no	no	23.5	29.4	32.4	18.1
83	A	2502-HY					no				18.4
84	A	2502-HY	no	no	no	no	no	44	44	44	44
85	A	2502-HY	no	no	no	yes	yes	21.3	20.5	20.8	30.4
86	A	2502-HY					no				15
87	A	2502-HY					no				88
88	A	2502-HY	no	no	no	no	no	25	41	37	23
89	A	2502-HY	no	no	no	no	no	33	23	23.7	21.9
90		2502-HY									
91		2502-HY									
92	A	2502-HY	no	no	no	no		9.07	8.91	14.7	
93	A	2502-HY	no	no	no	no	no	30	30	30	30
94	A	2502-HY	no	no	no	no		0.1	0.05	0.06	
95		2502-HY									
96	A	2502-HY					no				50
97		2502-HY									
Additional Sets											
41	B	2502-HY					no				20
65	B	2502-HY	no	no	no	no	no	41		26	31
85	B	2502-HY	no	no	no	yes	yes	21.3	20.5	20.8	30.4
41	C	2502-HY					no				20

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Difference between upper bound (ub) - lower bound (lb) calculation, Comparison of reported and calculated sum parameters

LC	Data set	Sample	Difference between upper and lower bound calculation for reported sum parameters [%]				Difference between reported and calculated upper bound sum parameters [%]				Correct calculation (deviation ≤ 10 %)	Difference between reported and calculated lower bound sum parameters [%]				Correct calculation (deviation ≤ 10 %)
			WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs		WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs	
1	A	2502-HY	0	0	0	0	0	0	1	0	yes	0	0	1	0	yes
2	A	2502-HY	0	0	0	0	0	2	1	0	yes	0	2	1	0	yes
3	A	2502-HY	0	0	0	0	0	0	0	0	yes	0	0	0	0	yes
4	A	2502-HY	0	0	0		0	-2	0		yes	0	-2	0		yes
5		2502-HY														
6		2502-HY														
7	A	2502-HY	0	0	0	0	0	0	0	-4	yes	0	0	0	-4	yes
8	A	2502-HY	17	24	14	0	0	-2	0	-5	yes	0	-1	1	-5	yes
9	A	2502-HY	12	17	0	0	9	6	0	0	yes	-4	-14	0	0	yes
10		2502-HY														
11	A	2502-HY	0	1	0	0	0	-1	0	0	yes	0	0	0	0	yes
12	A	2502-HY	1	3	0	0	0	0	0	0	yes	0	0	0	0	yes
13	A	2502-HY				5				0	yes				0	yes
14	A	2502-HY	0	0	0	0	0	0	0	0	yes	0	0	0	0	yes
15	A	2502-HY	28	92	0	0	1	4	0	0	yes	-1	-3	0	0	yes
16	A	2502-HY	0	1	0	0	0	0	0	0	yes	0	0	0	0	yes
17	A	2502-HY				5				0	yes				0	yes
18	A	2502-HY	-2	-6	0	0	8	-6	14	0	no	10	0	14	0	no
19		2502-HY														
20	A	2502-HY	9	26	0	0	0	0	0	-941	yes	1	2	0	-941	yes
21	A	2502-HY				0				0	yes				0	yes
22	A	2502-HY	0	0	0		0	0	0		yes	0	0	0		yes
23		2502-HY														
24	A	2502-HY	13	25	7		0	0	0		yes	0	0	0		yes
25	A	2502-HY	0	0	0	0	0	1	0	0	yes	0	1	0	0	yes
26	A	2502-HY	0	0	0	0	0	0	0	0	yes	0	0	0	0	yes
27	A	2502-HY	5	14	1	0	0	0	0	0	yes	0	0	0	0	yes
28	A	2502-HY	0	0	0	0	0	0	0	-1	yes	0	0	0	-1	yes
29		2502-HY														
30		2502-HY														
31	A	2502-HY	36	74	0	0	-1	-1	0	1	yes	-1	-3	0	1	yes
32		2502-HY														
33	A	2502-HY				0				0	yes				0	yes
34	A	2502-HY	1	2	0	0	0	0	0	0	yes	0	0	0	0	yes
35		2502-HY														
36	A	2502-HY				5				-1	yes				-1	yes
37		2502-HY														
38	A	2502-HY	0	0	0	0	0	0	0	0	yes	0	0	0	0	yes
39	A	2502-HY	1	0	1	0	0	0	0	0	yes	0	0	0	0	yes
40	A	2502-HY				6				0	yes				0	yes
41	A	2502-HY				0				0	yes				0	yes
42	A	2502-HY	14	30	7		-110	-368	0		yes	15	87	-8		no
43		2502-HY														
44	A	2502-HY	1	5	0	0	0	-1	0	0	yes	0	0	0	0	yes
45		2502-HY														
46	A	2502-HY	1	2	1	0	4	-1	6	0	yes	4	0	6	0	yes
47	A	2502-HY	0	0												
48	A	2502-HY	3	9	0	0	-1	-2	0	0	yes	0	1	0	0	yes
49	A	2502-HY	17	40	7	0	0	-1	0	0	yes	1	2	0	0	yes
50	A	2502-HY	2	7	0	0	0	1	0	0	yes	0	0	0	0	yes
51	A	2502-HY				4				-1	yes				0	yes
52		2502-HY														
53		2502-HY														
54	A	2502-HY	1	2	1	0	0	0	0	0	yes	0	0	0	0	yes
55	A	2502-HY	4	11	0	0	0	0	0	0	yes	0	0	0	0	yes
56		2502-HY														
57	A	2502-HY	8	21	0	0	0	-3	-1	1	yes	-1	-1	-1	1	yes
58	A	2502-HY	2	2	3	0	-12978	0	-20362	0	yes	-13294	0	-20945	0	yes
59		2502-HY														
60	A	2502-HY	0	0	0	0	0	0	0	0	yes	0	0	0	0	yes
61		2502-HY														
62	A	2502-HY	7	13	0	0	1	0	-1	0	yes	-1	-1	1	0	yes

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Difference between upper bound (ub) - lower bound (lb) calculation, Comparison of reported and calculated sum parameters

LC	Data set	Sample	Difference between upper and lower bound calculation for reported sum parameters [%]				Difference between reported and calculated upper bound sum parameters [%]				Correct calculation (deviation ≤ 10 %)	Difference between reported and calculated lower bound sum parameters [%]				Correct calculation (deviation ≤ 10 %)
			WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs		WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs	
63	A	2502-HY	0	0	7		-2	0	-14		yes	-1	0	-6		yes
64	A	2502-HY	4	9	0	0	0	0	0	0	yes	0	0	0	0	yes
65	A	2502-HY	3	4	2	0	0	0	0	0	yes	0	0	0	0	yes
66	A	2502-HY	0	0	0		0	0	0		yes	0	0	0		yes
67	A	2502-HY				5				0	yes				0	yes
68	A	2502-HY	9	24	0	0	0	0	0	0	yes	0	0	0	0	yes
69	A	2502-HY	3	1	3	0	0	0	0	0	yes	0	0	0	0	yes
70	A	2502-HY	2	-4	1	7	80	50	93	0	no	80	53	93	0	no
71	A	2502-HY	2	1	3	0	0	0	0	0	yes	0	0	0	0	yes
72	A	2502-HY	0	0	0	0	0	0	0	0	yes	0	0	0	0	yes
73	A	2502-HY				0				0	yes				0	yes
74		2502-HY														
75		2502-HY														
76	A	2502-HY				10				0	yes				0	yes
77	A	2502-HY				6				1	yes				0	yes
78	A	2502-HY	4	13	1	0	0	-1	0	0	yes	0	0	0	0	yes
79	A	2502-HY	1	2	0	0	0	1	0	0	yes	0	0	0	0	yes
80	A	2502-HY	3	12	0	0	0	3	1	1	yes	1	0	1	1	yes
81	A	2502-HY	5	12	2	0	0	0	0	0	yes	0	0	0	0	yes
82	A	2502-HY	10	17	7	0	0	0	0	0	yes	0	0	0	0	yes
83	A	2502-HY				5				0	yes				0	yes
84	A	2502-HY	1	0	2	0	-1	-2	0	0	yes	-1	-2	0	0	yes
85	A	2502-HY	3	1	3	0	0	0	0	0	yes	0	0	0	0	yes
86	A	2502-HY				0				0	yes				0	yes
87	A	2502-HY				6				0	yes				0	yes
88	A	2502-HY	1	3	0	0	1	0	0	0	yes	0	0	0	0	yes
89	A	2502-HY	38	71	2	0	0	0	0	-21	yes	0	-1	0	-21	yes
90		2502-HY														
91		2502-HY														
92	A	2502-HY	35	74	4		0	0	0		yes	0	0	0		yes
93	A	2502-HY	0	0	0	0	0	0	0	0	yes	0	0	0	0	yes
94	A	2502-HY	26	52	5		0	0	-1		yes	0	3	-1		yes
95		2502-HY														
96	A	2502-HY				5				0	yes				0	yes
97		2502-HY														
Additional Sets																
41	B	2502-HY				0				0	yes				0	yes
65	B	2502-HY	3	1	5	0	1	0	1	0	yes	0	0	-1	0	yes
85	B	2502-HY	3	1	3	0	0	0	0	0	yes	0	1	0	0	yes
41	C	2502-HY				0				0	yes				0	yes
		2502-HY														
58*	A	2502-HY	2	2	3	0	0	0	0	0	yes	0	0	0	0	yes

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

PCDD/F - Results

LC	Data set	Sample	Result ng/kg 12% moisture content	WHO-PCDD/F-TEQ reported upper bound	WHO-PCDD/F-TEQ reported lower bound	WHO-PCDD/F-TEQ calculated upper bound	WHO-PCDD/F-TEQ calculated lower bound	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
1	A	2502-HY		0.2	0.2	0.2	0.2	0.021	0.051	0.048	0.08	0.06	1.14	3.73	0.13	0.097	0.13	0.13	0.11	0.095	0.032	0.46	0.045	0.55
2	A	2502-HY		0.21	0.21	0.205	0.205	0.018	0.057	0.048	0.076	0.064	0.741	2.62	0.153	0.115	0.129	0.145	0.141	0.09	0.016	0.58	0.061	0.447
3	A	2502-HY		0.211	0.211	0.211	0.211	0.022	0.059	0.047	0.069	0.076	0.736	2.63	0.161	0.12	0.122	0.132	0.131	0.11	0.025	0.566	0.04	0.439
4	A	2502-HY		0.19	0.19	0.193	0.193	0.02	0.06	0.04	0.07	0.06	0.68	2.6	0.11	0.11	0.11	0.11	0.13	0.09	0.03	0.51	0.03	0.49
5		2502-HY																						
6		2502-HY																						
7	A	2502-HY		0.22	0.22	0.22	0.219	0.02	0.071	0.039	0.076	0.061	0.728	2.45	0.112	0.109	0.135	0.155	0.125	0.108	0.03	0.515	<0.093	<0.608
8	A	2502-HY		0.182	0.138	0.185	0.139	<0.025	0.04	<0.05	<0.05	<0.05	0.56	2.3	0.12	0.1	0.12	0.13	0.12	0.11	<0.05	0.58	<0.1	0.36
9	A	2502-HY		0.185	0.153	0.174	0.174	0.0177	0.0393	0.0523	0.0807	0.0806	0.605	2.23	0.112	0.107	0.101	0.132	0.135	0.0945	0.0201	0.501	0.0499	0.468
10		2502-HY																						
11	A	2502-HY		0.19	0.188	0.191	0.188	0.0166	0.0591	0.0358	0.0691	0.0553	0.597	2.64	0.125	0.112	0.103	0.138	0.119	0.108	<0.03	0.52	0.0465	0.316
12	A	2502-HY		0.223	0.217	0.222	0.217	0.0263	0.0622	0.0521	0.0605	0.0606	0.781	2.74	0.139	0.133	0.141	0.133	0.127	0.099	<0.048	0.563	0.0417	0.539
13	A	2502-HY																						
14	A	2502-HY		0.15	0.15	0.15	0.15	0.0122	0.0384	0.0328	0.0548	0.0586	0.606	2.06	0.1	0.086	0.095	0.114	0.102	0.085	0.024	0.447	0.036	0.435
15	A	2502-HY		0.183	0.014	0.175	0.0144	<0.06	<0.06	<0.03	<0.03	<0.03	0.72	2.6	<0.03	<0.08	<0.06	<0.02	<0.02	<0.02	<0.02	0.64	<0.06	<0.11
16	A	2502-HY		0.211	0.209	0.211	0.209	0.0237	0.0681	0.0368	0.0731	0.0689	0.708	2.57	0.115	0.117	0.112	0.129	0.141	0.101	<0.0162	0.549	0.052	0.464
17	A	2502-HY																						
18	A	2502-HY		0.17	0.18	0.181	0.18	0.017	0.0485	0.041	0.0769	0.0602	0.7	2.47	0.108	0.123	0.111	0.117	0.119	0.093	0.029	0.53	<0.068	0.411
19		2502-HY																						
20	A	2502-HY		0.239	0.178	0.24	0.175	<0.05	0.07	<0.05	0.09	<0.05	0.64	2.6	0.12	0.11	0.1	0.14	0.13	0.11	<0.05	0.5	<0.05	0.52
21	A	2502-HY																						
22	A	2502-HY		0.215	0.215	0.215	0.215	0.02	0.069	0.051	0.074	0.063	0.721	2.5	0.134	0.119	0.115	0.141	0.131	0.113	0.028	0.559	0.044	0.605
23		2502-HY																						
24	A	2502-HY		0.216	0.161	0.216	0.161	<0.048	0.051	0.05	0.073	0.06	0.663	2.46	0.098	0.106	0.11	0.14	0.106	0.09	<0.048	0.474	<0.193	<1.93
25	A	2502-HY		0.2	0.2	0.199	0.199	0.0235	0.0469	0.0397	0.0972	0.062	0.713	2.63	0.107	0.123	0.129	0.152	0.123	0.106	0.0313	0.597	0.0538	0.458
26	A	2502-HY		0.183	0.183	0.183	0.183	0.0097	0.0604	0.0431	0.086	0.0608	0.649	2.18	0.12	0.102	0.113	0.121	0.123	0.0737	0.014	0.443	0.0339	0.394
27	A	2502-HY		0.166	0.143	0.166	0.143	<0.0214	0.0295	0.035	0.0605	0.0487	0.639	2.1	0.0943	0.0923	0.126	0.14	0.126	0.0948	<0.0251	0.512	0.0308	0.207
28	A	2502-HY		0.184	0.184	0.184	0.184	0.014	0.0618	0.0408	0.111	0.0474	0.614	2.19	0.0972	0.105	0.097	0.123	0.107	0.0955	0.0147	0.466	0.0345	0.448
29		2502-HY																						
30		2502-HY																						
31	A	2502-HY		0.39	0.1	0.394	0.103	<0.088	<0.092	<0.13	<0.28	<0.23	0.65	<3.9	0.12	0.084	0.21	0.14	<0.16	<0.088	<0.19	0.49	<0.2	0.47
32		2502-HY																						
33	A	2502-HY																						
34	A	2502-HY		0.246	0.241	0.246	0.241	0.0312	0.068	0.0509	0.1	0.111	0.74	2.55	0.147	0.12	0.118	0.238	0.147	0.104	<0.0473	0.451	0.0434	0.433
35		2502-HY																						
36	A	2502-HY																						
37		2502-HY																						
38	A	2502-HY		0.273	0.273	0.273	0.273	0.0379	0.0933	0.119	0.0949	0.0711	0.58	2.94	0.198	0.108	0.0964	0.0901	0.16	0.166	0.0458	0.794	0.0648	0.599
39	A	2502-HY		0.21	0.209	0.21	0.209	0.0252	0.0597	0.0476	0.083	0.069	0.674	2.61	0.126	0.113	0.118	0.146	0.133	0.112	<0.00933	0.538	0.0448	0.48
40	A	2502-HY																						
41	A	2502-HY																						
42	A	2502-HY		0.171	0.119	0.8	0.0149	<0.25	<0.25	<0.25	<0.25	<0.25	0.81	4.49	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.53	<0.25	0.51
43		2502-HY																						
44	A	2502-HY		0.19	0.181	0.191	0.181	<0.00955	0.0493	0.0443	0.0842	0.0628	0.812	2.88	0.122	0.0974	0.114	0.17	0.151	0.134	0.0168	0.671	0.0442	0.508
45		2502-HY																						
46	A	2502-HY		0.19	0.186	0.192	0.186	0.021	0.05	0.053	0.073	0.063	0.7	2.5	0.12	0.11	0.108	0.14	0.125	0.088	<0.048	0.54	<0.096	0.46
47	A	2502-HY		0.113	0.113					0.221			1.09									0.379		1.04
48	A	2502-HY		0.22	0.2	0.224	0.198	<0.0268	0.0646	0.0474	0.0718	0.0608	0.677	2.53	0.163	0.122	0.142	0.136	0.12	0.111	0.0177	0.566	0.0541	0.629
49	A	2502-HY		0.2	0.12	0.202	0.117	<0.04	<0.04	0.08	0.08	0.07	0.57	2.34	0.14	0.11	0.1	0.16	0.11	0.09	<0.04	0.43	<0.1	0.58
50	A	2502-HY		0.164	0.152	0.163	0.152	<0.011	0.0354	0.0504	0.0853	0.0608	0.679	2.31	0.113	0.114	0.0947	0.145	0.131	0.124	0.0106	0.518	0.0439	0.434
51	A	2502-HY																						
52		2502-HY																						
53		2502-HY																						
54	A	2502-HY		0.221	0.217	0.221	0.218	0.016	0.0677	0.0513	0.0821	0.0851	0.768	2.77	0.111	0.112	0.125	0.165	0.165	0.118	<0.035	0.602	0.0644	0.669
55	A	2502-HY		0.254	0.226	0.254	0.226	<0.0286	0.0834	0.0465	0.0856	0.0816	0.715	2.06	0.117	0.12	0.15	0.186	0.139	0.126	0.0189	0.507	0.0691	0.474
56		2502-HY																						
57	A	2502-HY		0.24	0.19	0.247	0.192	<0.05	0.06	<0.05	0.07	0.06	0.5	2.2	0.11	0.11	0.16	0.13	0.12	0.11	0.09	0.5	0.08	0.67
58	A	2502-HY		0.246	0.242	0.245	0.242	0.0237	0.0708	0.0573	0.102	0.0959	0.839	3.31	0.245	0.12	0.126	0.146	0.148	0.106	<0.035	0.583	0.0729	0.412
59		2502-HY																						
60	A	2502-HY		0.188	0.188	0.188	0.188	0.0185	0.0556	0.0414	0.0703	0.0578	0.686	2.29	0.119	0.108	0.106	0.139	0.132	0.0876	0.007	0.572	0.045	0.48
61		2502-HY																						
62	A	2502-HY		0.202	0.175	0.202	0.176	0.021	0.051	<0.1	0.064	<0.1	0.66	2.5	0.123	0.112	0.115	0.13	0.124	0.092	<0.05	0.53	<0.1	<1
63	A	2502-HY		0.405	0.405	0.405	0.405	0.071	0.043	0.04	0.151	0.034	0.077	0.239	1.07	0.212	0.378	0.108	0.149	0.079	0.042	0.194	0.103	0.79
64	A	2502-HY		0.116	0.106	0.116	0.106	<0.00968	0.0387	0.00968	0.0774	0.0387	0.436	2.38	0.0581	0.029	0.0194	0.126	0.155	0.0194	0.0194	0.484	0.00968	0.3
65	A	2502-HY		0.221	0.212	0.221	0.212	0.02	0.073	<0.056	0.085	0.084	0.679	2.5	0.112	0.125	0.117	0.14	0.131	0.117	<0.032	0.544	0.048	0.479
66	A	2502-HY		0.195	0.195	0.195	0.195	0.012	0.063	0.033	0.07	0.064	0.662	2.41	0.121	0.114	0.11	0.141	0.127	0.103	0.035	0.625	0.048	0.469
67	A	2502-HY																						
68	A	2502-HY		0.229	0.174	0.23	0.174	<0.05	0.064	0.053	0.078	0.051	0.562	1.8	0.095	0.099	0.115	0.122	0.121	0.096	<0.05	0.478	<0.05	0.304
69	A	2502-HY		0.182	0.18	0.182	0.18	0.015	0.057	0.043	0.067	0.054	0.632	2.45	0.116	0.103	0.1	0.132	0.115	0.097	<0.018	0.512	0.043	0.48

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

PCDD/F - Results

LC	Data set	Sample	Result ng/kg 12% moisture content	WHO-PCDD/F-TEQ reported upper bound	WHO-PCDD/F-TEQ reported lower bound	WHO-PCDD/F-TEQ calculated upper bound	WHO-PCDD/F-TEQ calculated lower bound	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
70	A	2502-HY		0.149	0.155	0.074	0.0735	0.0142	0.0472	0.00418	0.00514	0.00527	0.00485	0.000519	0.00942	0.00228	0.0219	0.0108	0.011	<0.0048	0.00837	0.00408	<0.00075	0.0000889
71	A	2502-HY		0.181	0.179	0.181	0.179	0.015	0.055	0.043	0.069	0.052	0.634	2.45	0.113	0.103	0.103	0.13	0.12	0.096	<0.018	0.518	0.043	0.48
72	A	2502-HY		0.243	0.243	0.243	0.243	0.0293	0.0783	0.0825	0.0649	0.0753	0.718	2.73	0.0994	0.116	0.163	0.131	0.123	0.11	<0.0053	0.549	0.0478	0.494
73	A	2502-HY				0.0664		<0.015	<0.021	<0.024	<0.031	<0.041	<0.019	<0.024	<0.021	<0.035	<0.035	<0.013	<0.016	<0.013	<0.021	<0.029	<0.037	<0.039
74		2502-HY																						
75		2502-HY																						
76	A	2502-HY																						
77	A	2502-HY																						
78	A	2502-HY		0.17	0.148	0.171	0.148	<0.02	0.034	0.044	0.07	0.06	0.827	2.31	0.113	0.106	0.103	0.136	0.133	0.096	<0.01	0.594	<0.125	0.487
79	A	2502-HY		0.199	0.196	0.198	0.196	0.015	0.054	0.029	0.067	0.039	0.688	2.66	0.126	0.107	0.146	0.15	0.134	0.113	<0.025	0.588	0.038	0.474
80	A	2502-HY		0.26	0.23	0.253	0.229	<0.021	0.1	0.086	0.11	0.094	0.81	2.5	0.16	0.082	0.11	0.12	0.13	0.095	<0.031	0.48	0.06	0.59
81	A	2502-HY		0.171	0.151	0.171	0.151	<0.0194	0.0453	0.0367	0.0604	0.0584	0.685	2.34	0.1	0.101	0.0996	0.125	0.113	0.0727	0.0304	0.534	0.0408	0.409
82	A	2502-HY		0.167	0.138	0.167	0.138	<0.0072	<0.0223	0.069	0.102	0.0728	0.62	2.4	0.112	0.13	0.131	0.141	0.148	0.125	0.0464	0.516	0.0681	0.447
83	A	2502-HY																						
84	A	2502-HY		0.28	0.28	0.285	0.285	0.054	0.094	0.084	0.11	0.062	0.68	2.23	0.2	0.11	0.085	0.14	0.14	0.11	0.04	1.16	0.043	0.31
85	A	2502-HY		0.179	0.177	0.179	0.177	0.015	0.057	0.042	0.065	0.052	0.634	2.45	0.114	0.102	0.095	0.124	0.121	0.091	<0.018	0.515	0.048	0.512
86	A	2502-HY																						
87	A	2502-HY																						
88	A	2502-HY		0.233	0.227	0.233	0.227	<0.0047	0.0838	0.0745	0.0885	0.0605	0.782	2.85	0.14	0.13	0.144	0.177	0.149	0.112	<0.0094	0.689	0.0605	0.759
89	A	2502-HY		0.379	0.109	0.379	0.11	<0.088	<0.132	<0.132	<0.132	<0.132	0.607	2.4	0.082	0.114	0.151	0.146	0.142	0.121	<0.088	0.489	<0.088	0.493
90		2502-HY																						
91		2502-HY																						
92	A	2502-HY		0.309	0.079	0.309	0.0787	0.027	<0.125	<0.125	<0.125	<0.125	0.649	2.95	0.099	<0.125	<0.125	0.153	0.14	<0.125	<0.125	0.496	<0.125	0.437
93	A	2502-HY		0.168	0.168	0.168	0.168	0.023	0.0359	0.0352	0.0655	0.0568	0.69	2.22	0.102	0.087	0.107	0.116	0.12	0.0994	0.0196	0.521	0.0448	0.416
94	A	2502-HY		0.31	0.15	0.31	0.146	<0.05	0.05	<0.25	<0.25	<0.25	0.72	<7	0.1	<0.25	0.12	0.13	0.12	0.12	<0.25	0.53	<0.25	<7
95		2502-HY																						
96	A	2502-HY																						
97		2502-HY																						
Additional Sets																								
41	B	2502-HY																						
65	B	2502-HY		0.229	0.226	0.229	0.226	0.024	0.07	0.059	0.081	0.081	0.727	2.52	0.112	0.137	0.125	0.154	0.146	0.124	<0.032	0.559	0.056	0.471
85	B	2502-HY		0.169	0.167	0.169	0.166	0.013	0.051	0.041	0.062	0.051	0.59	2.39	0.119	0.098	0.092	0.122	0.115	0.092	<0.018	0.486	<0.044	0.517
41	C	2502-HY																						

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Dioxin-like PCB - Results

LC	Data set	Sample	Result ng/kg 12% moisture content	WHO-PCB-TEQ reported upper bound	WHO-PCB-TEQ reported lower bound	WHO-PCB-TEQ calculated upper bound	WHO-PCB-TEQ calculated lower bound	PCB 105	PCB 114	PCB 118	PCB 123	PCB 156	PCB 157	PCB 167	PCB 189	PCB 77	PCB 81	PCB 126	PCB 169
1	A	2502-HY		0.44	0.44	0.437	0.437	764	51.2	1580	29.8	191	42.4	66.7	6.54	117	6.69	3.38	0.11
2	A	2502-HY		0.42	0.42	0.417	0.417	813	60.3	1950	41.2	188	46.2	68.8	7.05	128	6.4	3.04	0.09
3	A	2502-HY		0.413	0.413	0.412	0.412	863	55.3	1740	38.2	208	44.6	68.6	6.7	129	7.1	3.02	0.15
4	A	2502-HY		0.42	0.42	0.418	0.418	796	46	1800	46	209	46	71	6.2	121	6.4	3.1	0.1
5		2502-HY																	
6		2502-HY																	
7	A	2502-HY		0.46	0.46	0.462	0.462	1020	67.9	2180	41.4	223	49.6	76.2	7.56	123	5.9	3.35	0.084
8	A	2502-HY		0.405	0.347	0.404	0.344	910	83	2000	47	200	56	76	<10	110	6.1	2.3	<2
9	A	2502-HY		0.405	0.405	0.406	0.406	870	60.6	1810	28.9	202	44.1	54.3	6.26	128	4.3	2.97	0.0778
10		2502-HY																	
11	A	2502-HY		0.41	0.41	0.41	0.41	751	54.6	1550	33.4	197	51.8	70.1	7.7	115	6.15	3.12	0.09
12	A	2502-HY		0.41	0.41	0.409	0.409	846	57.9	1800	38	199	44.2	69.7	7.06	125	6.47	2.99	0.134
13	A	2502-HY																	
14	A	2502-HY		0.371	0.371	0.37	0.37	817	51.2	1550	33.7	188	39.5	67.8	8.82	98.6	5.75	2.74	0.073
15	A	2502-HY		0.42	0.42	0.42	0.42	629	41.4	1310	33.5	144	38.9	207	4.72	77.3	4.18	3.39	<0.004
16	A	2502-HY		0.433	0.433	0.433	0.433	863	59.1	1770	33.2	216	44.8	69.8	6.98	123	6.68	3.23	0.12
17	A	2502-HY																	
18	A	2502-HY		0.39	0.39	0.335	0.335	763	45.6	1.65	36.6	183	40.6	62.5	5.9	108	5.96	2.86	0.083
19		2502-HY																	
20	A	2502-HY		0.42	0.42	0.42	0.419	819	73.9	1670	36.8	203	43.4	78.5	<10	117	7.29	3.15	0.09
21	A	2502-HY																	
22	A	2502-HY		0.405	0.405	0.405	0.405	828	67.2	1700	34.3	198	43.5	55.2	7.12	121	6.26	3	0.095
23		2502-HY																	
24	A	2502-HY		0.425	0.396	0.424	0.395	753	58	1580	34.6	185	43.5	65.1	6.77	116	6.63	3	<0.965
25	A	2502-HY		0.402	0.402	0.402	0.402	628	44	1300	24.7	156	35.2	55.8	6.39	107	6.47	3.19	0.0866
26	A	2502-HY		0.388	0.388	0.388	0.388	755	52.7	1500	31.4	179	38.3	62.9	6.13	104	5.88	2.94	0.0985
27	A	2502-HY		0.387	0.383	0.387	0.383	765	67.5	1770	24.3	178	41.5	63.6	5.9	100	6.25	2.84	<0.126
28	A	2502-HY		0.359	0.359	0.359	0.359	732	45.3	1510	15.4	168	37	56.1	6.81	105	5.37	2.67	0.0835
29		2502-HY																	
30		2502-HY																	
31	A	2502-HY		0.41	0.41	0.41	0.41	870	54	1900	33	210	45	73	7.2	98	5.2	3	0.099
32		2502-HY																	
33	A	2502-HY																	
34	A	2502-HY		0.442	0.442	0.442	0.442	771	68.7	1730	36.2	240	48.8	70.2	8.19	137	7.99	3.34	0.103
35		2502-HY																	
36	A	2502-HY																	
37		2502-HY																	
38	A	2502-HY		0.42	0.42	0.42	0.42	903	49.3	1870	40.8	195	29.4	63	5.01	107	6.15	3.1	0.101
39	A	2502-HY		0.446	0.441	0.446	0.442	832	58	1720	44	202	43.5	70.2	6.6	126	6.03	3.38	<0.149
40	A	2502-HY																	
41	A	2502-HY																	
42	A	2502-HY		0.406	0.376	0.405	0.405	789	81.9	1700	38.4	194	44.3	68.5	7.22	102	4.95	2.76	1
43		2502-HY																	
44	A	2502-HY		0.463	0.463	0.464	0.464	854	57.1	1700	40.9	210	47.4	79.1	7.25	125	7.02	3.56	0.107
45		2502-HY																	
46	A	2502-HY		0.422	0.419	0.398	0.395	779	60.3	1660	33.9	187	41.6	63.6	6.7	126	6.39	2.96	<0.1
47	A	2502-HY																	
48	A	2502-HY		0.39	0.39	0.39	0.39	822	69.6	1850	27.2	191	43	59.1	6.98	107	6.5	2.81	0.139
49	A	2502-HY		0.45	0.42	0.45	0.42	742	53.3	1390	31	195	39.8	66.1	8.2	99.7	6.11	3.32	<1
50	A	2502-HY		0.394	0.394	0.394	0.394	764	60.2	1600	35.2	189	43.1	67.1	6.65	118	7.1	2.94	0.1
51	A	2502-HY																	
52		2502-HY																	
53		2502-HY																	
54	A	2502-HY		0.475	0.472	0.475	0.472	882	68.3	1800	30.3	208	45.9	73.7	7.63	141	3.53	3.63	<0.116
55	A	2502-HY		0.413	0.413	0.413	0.413	761	47.6	1450	27.5	185	45.1	64.2	6.17	115	5.18	3.2	0.088
56		2502-HY																	
57	A	2502-HY		0.5	0.5	0.504	0.504	870	63	930	45	230	50	83	8.9	100	6.1	4.2	0.12
58	A	2502-HY		0.433	0.421	88.6	88.6	885	59.9	1790	29.8	200	45.1	70.5	6.49	133	6.22	885	<0.424
59		2502-HY																	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Dioxin-like PCB - Results

LC	Data set	Sample	Result ng/kg 12% moisture content	WHO-PCB-TEQ reported upper bound	WHO-PCB-TEQ reported lower bound	WHO-PCB-TEQ calculated upper bound	WHO-PCB-TEQ calculated lower bound	PCB 105	PCB 114	PCB 118	PCB 123	PCB 156	PCB 157	PCB 167	PCB 189	PCB 77	PCB 81	PCB 126	PCB 169
60	A	2502-HY		0.412	0.412	0.414	0.414	863	57	1670	34	196	42	65	6.6	115	6.4	3.1	0.095
61		2502-HY																	
62	A	2502-HY		0.39	0.39	0.394	0.388	690	66	1470	30	170	37	60	6.2	101	5.7	3	<0.2
63	A	2502-HY		0.038	0.0355	0.0435	0.0377	5.53	0.307	17.8	3.78	2.3	0.728	3.31	0.335	1.34	<0.239	0.365	<0.194
64	A	2502-HY		0.139	0.139	0.139	0.139	965	81.5	1850	195	244	220	69.9	7.13	11.1	0.494	0.281	0.00968
65	A	2502-HY		0.42	0.41	0.421	0.409	856	28.5	1680	122	204	44.7	72.2	6.87	121	6.56	3.05	<0.369
66	A	2502-HY		0.396	0.396	0.395	0.395	685	53.6	1460	26.7	166	37.7	57.4	5.56	118	6.26	3.04	0.096
67	A	2502-HY																	
68	A	2502-HY		0.404	0.404	0.403	0.403	809	59.7	1560	31.1	213	43.1	66.1	5.49	99.2	5.6	3.04	0.131
69	A	2502-HY		0.416	0.403	0.416	0.403	700	48.3	1400	29.3	178	43.8	60	7.39	105	5.76	3.17	<0.44
70	A	2502-HY		0.333	0.329	0.0238	0.0237	0.0243	0.00154	0.044	<0.0000227	0.00663	0.00119	0.00187	0.000173	0.0114	<0.0000477	0.237	<0.00453
71	A	2502-HY		0.425	0.412	0.425	0.412	711	48.4	1400	28.5	180	41.7	60	7.31	110	5.63	3.25	<0.44
72	A	2502-HY		0.374	0.374	0.374	0.374	741	46	1670	27.6	158	39.3	56.7	6.78	103	5.19	2.77	0.0923
73	A	2502-HY				0.0116		<0.016	<0.012	<0.033	<0.01	<0.14	<0.072	<0.088	<0.012	<0.012	<0.02	<0.062	<0.18
74		2502-HY																	
75		2502-HY																	
76	A	2502-HY																	
77	A	2502-HY																	
78	A	2502-HY		0.387	0.384	0.386	0.383	711	51.2	1480	37.8	170	36.6	53	6.94	104	5.51	2.95	<0.1
79	A	2502-HY		0.44	0.438	0.439	0.438	768	53.5	1770	<60.8	200	42	73.3	7.32	110	6.56	3.31	0.209
80	A	2502-HY		0.42	0.42	0.417	0.417	780	40	1200	21	170	41	65	7.3	120	6.6	3.3	0.11
81	A	2502-HY		0.337	0.33	0.337	0.33	905	57	1880	37.8	193	42	66	6.94	113	5.51	2.21	<0.243
82	A	2502-HY		0.345	0.321	0.345	0.321	697	71.2	1510	25.7	181	39.8	63.4	6.5	94.1	4.41	2.32	<0.8
83	A	2502-HY																	
84	A	2502-HY		0.52	0.51	0.522	0.509	896	65.8	1820	37.9	189	43	69	9	213	13.7	3.9	<0.43
85	A	2502-HY		0.414	0.401	0.415	0.401	680	44.5	1370	29.6	170	42.9	58.4	7.22	107	5.46	3.17	<0.44
86	A	2502-HY																	
87	A	2502-HY																	
88	A	2502-HY		0.483	0.483	0.483	0.483	868	59.8	1950	21.3	213	49.2	74.6	7.84	134	7.58	3.63	0.23
89	A	2502-HY		0.358	0.35	0.358	0.35	679	45.5	1430	47.4	168	40	61	5.91	44.5	4.72	2.7	<0.264
90		2502-HY																	
91		2502-HY																	
92	A	2502-HY		0.39	0.375	0.39	0.375	788	55.6	1580	32.6	197	40.6	62.6	5.93	106	4.33	2.8	<0.5
93	A	2502-HY		0.373	0.373	0.374	0.373	765	50	1680	28	182	57.2	68.7	<6.71	103	6.17	2.74	0.0748
94	A	2502-HY		0.37	0.35	0.372	0.353	707	47.6	1520	<40	168	<40	60.1	<40	98	5.1	2.67	<0.5
95		2502-HY																	
96	A	2502-HY																	
97		2502-HY																	
Additional Sets																			
41	B	2502-HY																	
65	B	2502-HY		0.42	0.4	0.416	0.405	861	30.3	1730	114	207	47	80	7.24	126	6.56	2.98	<0.369
85	B	2502-HY		0.406	0.393	0.406	0.393	671	45.4	1380	29.7	177	42.1	58.8	7.13	106	5.37	3.08	<0.44
41	C	2502-HY																	
		2502-HY																	
58*	A	2502-HY		0.433	0.421	0.433	0.421	885	59.9	1790	29.8	200	45.1	70.5	6.49	133	6.22	3.13	<0.424

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Non dioxin-like PCB - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Sum 6 Indicator PCBs reported upper bound	Sum 6 Indicator PCBs reported lower bound	Sum 6 Indicator PCBs calculated upper bound	Sum 6 Indicator PCBs calculated lower bound	PCB 28	PCB 52	PCB 101	PCB 138	PCB 153	PCB 180
1	A	2502-HY		8.32	8.32	8.32	8.32	1.76	2.32	2	1.05	0.89	0.3
2	A	2502-HY		9.61	9.61	9.61	9.61	1.74	2.32	2.33	1.42	1.41	0.394
3	A	2502-HY		9.53	9.53	9.52	9.52	2.01	2.31	2.2	1.52	1.16	0.32
4	A	2502-HY											
5		2502-HY											
6		2502-HY											
7	A	2502-HY		12	12	12.5	12.5	2.48	3.55	3.15	1.58	1.35	0.39
8	A	2502-HY		9.9	9.9	10.4	10.4	2.1	2.9	2.2	1.6	1.2	0.38
9	A	2502-HY		9.47	9.47	9.46	9.46	1.52	2.39	2.71	1.18	1.27	0.391
10		2502-HY											
11	A	2502-HY		8.9	8.9	8.9	8.9	2	2.32	2.06	1.18	1.01	0.334
12	A	2502-HY		9.53	9.53	9.54	9.54	2.42	2.15	2.19	1.27	1.18	0.325
13	A	2502-HY		9.17	8.67	9.16	8.66	2.02	2.19	2	1.48	0.97	<0.5
14	A	2502-HY		8.11	8.11	8.1	8.1	1.69	2.15	1.98	1.07	0.925	0.287
15	A	2502-HY		11	11	11	11	2.85	2.74	2.65	1.34	1.11	0.28
16	A	2502-HY		9.16	9.16	9.16	9.16	1.77	2.4	2.32	1.27	1.07	0.33
17	A	2502-HY		8.92	8.45	8.93	8.45	1.96	2.04	2.12	1.03	1.3	<0.48
18	A	2502-HY		9.08	9.08	9.11	9.11	1.94	2.38	2.19	1.24	1.04	0.32
19		2502-HY											
20	A	2502-HY		9.56	9.56	99.5	99.5	20.9	25.1	23.3	13	13.8	3.42
21	A	2502-HY		9.42	9.42	9.42	9.42	1.43	1.94	3.03	1.41	1.24	0.37
22	A	2502-HY											
23		2502-HY											
24	A	2502-HY											
25	A	2502-HY		9.67	9.67	9.66	9.66	2.08	2.53	2.3	1.29	1.09	0.37
26	A	2502-HY		8.33	8.33	8.34	8.34	1.64	2.16	2.11	1.12	0.984	0.321
27	A	2502-HY		9.4	9.4	9.41	9.41	1.79	2.18	2.31	1.43	1.32	0.384
28	A	2502-HY		8.15	8.15	8.24	8.24	1.41	2.11	2.11	1.23	1.05	0.333
29		2502-HY											
30		2502-HY											
31	A	2502-HY		8.2	8.2	8.11	8.11	1.3	2	2.1	1.2	1.2	0.31
32		2502-HY											
33	A	2502-HY		9.19	9.19	9.19	9.19	1.45	2.17	2.44	1.24	1.46	0.43
34	A	2502-HY		11.6	11.6	11.6	11.6	2.94	2.83	2.48	1.66	1.37	0.359
35		2502-HY											
36	A	2502-HY		9.28	8.78	9.39	8.91	1.78	2.08	2.32	1.53	1.2	<0.48
37		2502-HY											
38	A	2502-HY		9.86	9.86	9.86	9.86	2.25	2	2.85	1.44	1.06	0.26
39	A	2502-HY		10.2	10.2	10.2	10.2	1.69	2.61	2.27	1.35	1.88	0.356
40	A	2502-HY		15.6	14.6	15.6	14.6	3.72	1.09	1.74	2.16	5.89	<1
41	A	2502-HY		9.26	9.26	9.25	9.25	1.9	2.4	2.28	1.21	1.12	0.34
42	A	2502-HY				6.97	4.1	<0.97	2.02	1.79	<0.92	<0.98	0.29
43		2502-HY											
44	A	2502-HY		8.95	8.95	8.95	8.95	1.68	2.28	2.21	1.3	1.13	0.346
45		2502-HY											
46	A	2502-HY		9.2	9.2	9.2	9.2	2.1	2.3	2.21	1.24	1.03	0.316
47	A	2502-HY											
48	A	2502-HY		9.42	9.42	9.42	9.42	1.91	2.38	2.59	1.24	0.951	0.352
49	A	2502-HY		9.32	9.32	9.32	9.32	2.04	2.18	2.1	1.23	1.48	0.29
50	A	2502-HY		9.15	9.15	9.15	9.15	1.87	2.47	2.13	1.21	1.09	0.384
51	A	2502-HY		10.1	9.7	10.2	9.66	1.86	2.68	2.29	1.64	1.19	<0.5
52		2502-HY											
53		2502-HY											
54	A	2502-HY		9.02	9.02	9.03	9.03	1.79	2.54	2.09	1.25	0.993	0.37
55	A	2502-HY		7.89	7.89	7.89	7.89	1.55	2.08	1.82	1.17	0.959	0.311
56		2502-HY											
57	A	2502-HY		9.6	9.6	9.54	9.54	2.5	2.4	2.1	1.1	1.1	0.34
58	A	2502-HY		10.3	10.3	10.3	10.3	1.82	2.83	2.4	1.42	1.46	0.373
59		2502-HY											

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Non dioxin-like PCB - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	**Sum 6 Indicator PCBs reported** upper bound	lower bound	**Sum 6 Indicator PCBs calculated** upper bound	lower bound	PCB 28	PCB 52	PCB 101	PCB 138	PCB 153	PCB 180
60	A	2502-HY		8.92	8.92	8.92	8.92	1.8	2.37	2.18	1.19	1.05	0.332
61		2502-HY											
62	A	2502-HY		10.1	10.1	10.1	10.1	2.14	2.5	2.6	1.46	1.06	0.33
63	A	2502-HY											
64	A	2502-HY		14.7	14.7	14.7	14.7	4.99	3.19	2.68	2.12	1.55	0.184
65	A	2502-HY		8.95	8.95	8.96	8.96	1.77	2.49	2.15	1.29	0.944	0.311
66	A	2502-HY											
67	A	2502-HY		9.6	9.1	9.6	9.1	1.8	2.4	2.2	1.7	1	<0.5
68	A	2502-HY		9.12	9.12	9.12	9.12	1.89	2.5	2.21	1.14	1.04	0.343
69	A	2502-HY		9	9	9	9	1.84	2.24	2.3	1.16	1.14	0.32
70	A	2502-HY		6.83	6.33	6.83	6.33	0.949	1.33	1.74	1.35	0.964	<0.5
71	A	2502-HY		8.98	8.98	8.98	8.98	1.86	2.21	2.27	1.18	1.14	0.32
72	A	2502-HY		7.77	7.77	7.76	7.76	1.4	1.89	2.07	1.27	0.889	0.243
73	A	2502-HY		7.84	7.86	7.87	7.86	1.64	2.91	2.24	1.07	<0.0024	<0.0032
74		2502-HY											
75		2502-HY											
76	A	2502-HY		5.86	5.25	5.87	5.25	0.83	1.26	1.38	0.98	0.8	<0.62
77	A	2502-HY		14.3	13.4	14.1	13.4	3.65	2.64	3.2	1.74	2.12	<0.75
78	A	2502-HY		7.94	7.94	7.95	7.95	1.43	2.05	1.98	1.15	1	0.337
79	A	2502-HY		9.42	9.42	9.43	9.43	2.29	2.22	2.3	1.19	1.1	0.328
80	A	2502-HY		8.7	8.7	8.61	8.61	1.9	2.2	2.1	1.1	1	0.31
81	A	2502-HY		10.4	10.4	10.4	10.4	2	2.74	2.69	1.43	1.18	0.33
82	A	2502-HY		8.31	8.31	8.3	8.3	1.77	2.05	2.12	1.06	0.97	0.33
83	A	2502-HY		9.4	8.9	9.4	8.9	1.9	2.4	2.3	1.2	1.1	<0.5
84	A	2502-HY		8.4	8.4	8.38	8.38	1.7	2.2	1.9	1.3	0.95	0.33
85	A	2502-HY		8.94	8.94	8.93	8.93	1.84	2.19	2.26	1.15	1.16	0.33
86	A	2502-HY		8.73	8.73	8.73	8.73	1.93	2.38	2.02	1.14	0.97	0.29
87	A	2502-HY		8.42	7.92	8.43	7.93	1.95	1.89	2.14	1.1	0.85	<0.5
88	A	2502-HY		11	11	11	11	2.38	2.9	2.54	1.47	1.29	0.378
89	A	2502-HY		6.55	6.55	7.95	7.95	1.4	2.12	2.05	1.1	0.985	0.297
90		2502-HY											
91		2502-HY											
92	A	2502-HY											
93	A	2502-HY		9.1	9.1	9.1	9.1	1.87	2.38	2.24	1.2	1.07	0.343
94	A	2502-HY											
95		2502-HY											
96	A	2502-HY		9.76	9.26	9.76	9.26	1.8	2.51	2.25	1.67	1.03	<0.5
97		2502-HY											
Additional Sets													
41	B	2502-HY		10	10	9.97	9.97	1.97	2.6	2.54	1.29	1.19	0.38
65	B	2502-HY		9.18	9.18	9.19	9.19	1.92	2.55	2.16	1.22	1.02	0.318
85	B	2502-HY		8.98	8.98	8.98	8.98	1.83	2.36	2.04	1.21	1.21	0.33
41	C	2502-HY		9.15	9.15	9.15	9.15	1.86	2.37	2.25	1.27	1.07	0.33
		2502-HY											
17*	A	2502-HY		8.92	8.45	8.93	8.45	1.96	2.04	2.12	1.3	1.03	<0.48

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Bioanalytical screening methods - Results, Assessment of analytical results

LC	Data set	Sample	Result ng BEQ/kg 12% moisture content	Result PCDD/Fs + DL-PCBs	Result PCDD/Fs	Result DL-PCBs	Assessment of analytical results — Sample suspected to be noncompliant with … Maximum Level PCDD/Fs+DL-PCBs	Maximum Level PCDD/Fs	Action Level PCDD/Fs	Action Level DL-PCBs	Reporting Limit PCDD/Fs+ DL-PCBs	Reporting Limit PCDD/Fs	Reporting Limit DL-PCBs	Maximum Level on which evaluation is based on PCDD/Fs+ DL-PCBs	Maximum Level on which evaluation is based on PCDD/Fs	Maximum Level on which evaluation is based on DL-PCBs	Action Level on which evaluation is based on PCDD/Fs+ DL-PCBs	Action Level on which evaluation is based on PCDD/Fs	Action Level on which evaluation is based on DL-PCBs	Bioassay Cut-off Maximum Level PCDD/Fs+ DL-PCBs	Bioassay Cut-off Maximum Level PCDD/Fs	Bioassay Cut-off Action Level PCDD/Fs+ DL-PCBs	Bioassay Cut-off Action Level PCDD/Fs	Bioassay Cut-off Action Level DL-PCBs
1	A	2502-HY																						
2	A	2502-HY																						
3	A	2502-HY																						
4	A	2502-HY																						
5		2502-HY																						
6		2502-HY																						
7	A	2502-HY																						
8	A	2502-HY																						
9	A	2502-HY																						
10		2502-HY																						
11	A	2502-HY		0.7			yes	yes	yes	yes										0.5				
12	A	2502-HY																						
13	A	2502-HY																						
14	A	2502-HY																						
15	A	2502-HY																						
16	A	2502-HY																						
17	A	2502-HY																						
18	A	2502-HY																						
19		2502-HY																						
20	A	2502-HY																						
21	A	2502-HY		0.9			no				0.2			1.3			0.85			0.83		0.57		
22	A	2502-HY																						
23		2502-HY																						
24	A	2502-HY																						
25	A	2502-HY																						
26	A	2502-HY																						
27	A	2502-HY																						
28	A	2502-HY																						
29		2502-HY																						
30		2502-HY																						
31	A	2502-HY																						
32		2502-HY																						
33	A	2502-HY																						
34	A	2502-HY																						
35		2502-HY																						
36	A	2502-HY																						
37		2502-HY																						
38	A	2502-HY																						
39	A	2502-HY																						
40	A	2502-HY																						
41	A	2502-HY																						
42	A	2502-HY																						
43		2502-HY																						
44	A	2502-HY																						
45		2502-HY																						
46	A	2502-HY																						
47	A	2502-HY			0.1	0.5	no	no	no	yes		0.3	0.3							0.5		0.5	0.5	
48	A	2502-HY																						
49	A	2502-HY																						
50	A	2502-HY																						
51	A	2502-HY																						
52		2502-HY																						
53		2502-HY																						
54	A	2502-HY																						
55	A	2502-HY																						
56		2502-HY																						
57	A	2502-HY		0.7	0.2	0.5	no	no			0.1	0.1	0.1	0.83	0.5					0.83	0.5			
58	A	2502-HY																						
59		2502-HY																						
60	A	2502-HY																						
61		2502-HY																						
62	A	2502-HY																						
63	A	2502-HY																						
64	A	2502-HY																						
65	A	2502-HY																						
66	A	2502-HY																						
67	A	2502-HY																						
68	A	2502-HY																						
69	A	2502-HY																						
70	A	2502-HY																						
71	A	2502-HY																						
72	A	2502-HY																						
73	A	2502-HY																						

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Bioanalytical screening methods - Results, Assessment of analytical results

LC	Data set	Sample	Result ng BEQ/kg 12% moisture content	Result: PCDD/Fs + DL-PCBs	Result: PCDD/Fs	Result: DL-PCBs	Assessment of analytical results – Sample suspected to be noncompliant with … Maximum Level PCDD/Fs+DL-PCBs	Maximum Level PCDD/Fs	Action Level PCDD/Fs	Action Level DL-PCBs	Reporting Limit PCDD/Fs+ DL-PCBs	Reporting Limit PCDD/Fs	Reporting Limit DL-PCBs	Maximum Level on which evaluation is based on PCDD/Fs+ DL-PCBs	Maximum Level on which evaluation is based on PCDD/Fs	Maximum Level on which evaluation is based on DL-PCBs	Action Level on which evaluation is based on PCDD/Fs+ DL-PCBs	Action Level on which evaluation is based on PCDD/Fs	Action Level on which evaluation is based on DL-PCBs	Bioassay Cut-off Maximum Level PCDD/Fs+ DL-PCBs	Bioassay Cut-off Maximum Level PCDD/Fs	Bioassay Cut-off Action Level PCDD/Fs+ DL-PCBs	Bioassay Cut-off Action Level PCDD/Fs	Bioassay Cut-off Action Level DL-PCBs
74		2502-HY																						
75		2502-HY																						
76	A	2502-HY																						
77	A	2502-HY																						
78	A	2502-HY		0.5	0.2	0.3	no	no	no	yes	0.4	0.2	0.2	1.3	0.75			0.5	0.35	0.94	0.56		0.38	0.27
79	A	2502-HY		1.4			yes				0.3			1.3	0.75			0.5	0.35			0.5		
80	A	2502-HY																						
81	A	2502-HY																						
82	A	2502-HY																						
83	A	2502-HY																						
84	A	2502-HY																						
85	A	2502-HY																						
86	A	2502-HY																						
87	A	2502-HY																						
88	A	2502-HY																						
89	A	2502-HY																						
90		2502-HY																						
91		2502-HY																						
92	A	2502-HY																						
93	A	2502-HY																						
94	A	2502-HY		0.5			no	no	no	no				0.75			0.35			0.5				
95		2502-HY																						
96	A	2502-HY																						
97		2502-HY																						

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Moisture content - Results

LC	Data set	Sample	Result %	Moisture content				Moisture content
				Physico-chemical methods PCDD/F	Physico-chemical methods DL-PCBs	Physico-chemical methods NDL-PCBs	Bioanalytical methods	Mean
1	A	2502-HY		7.9	7.9	7.9		7.9
2	A	2502-HY		7.28	7.28	7.28		7.28
3	A	2502-HY		7.81	7.81	7.81		7.81
4	A	2502-HY		8.5	8.5			8.5
5		2502-HY						
6		2502-HY						
7	A	2502-HY		10.2	10.2	10.2		10.2
8	A	2502-HY						
9	A	2502-HY		91.6	91.6	91.6		91.6
10		2502-HY						
11	A	2502-HY		91.3	91.3	91.3	91.3	91.3
12	A	2502-HY		7.4	7.4	7.4		7.4
13	A	2502-HY				8.29		8.29
14	A	2502-HY		7.4	7.4	7.4		7.4
15	A	2502-HY						
16	A	2502-HY		8.28	8.28	8.28		8.28
17	A	2502-HY				91.8		91.8
18	A	2502-HY		7.98	7.98	7.98		7.98
19		2502-HY						
20	A	2502-HY		8.47	8.47	8.47		8.47
21	A	2502-HY				8	8	8
22	A	2502-HY		8.4	8.4			8.4
23		2502-HY						
24	A	2502-HY		8.5	8.5	8.5		8.5
25	A	2502-HY		7.5	7.5	7.5		7.5
26	A	2502-HY		7.9	7.9	7.9		7.9
27	A	2502-HY		8.21	8.21	8.21		8.21
28	A	2502-HY		5.3	5.3	5.3		5.3
29		2502-HY						
30		2502-HY						
31	A	2502-HY						
32		2502-HY						
33	A	2502-HY				8.3		8.3
34	A	2502-HY		9.6	9.6	9.6		9.6
35		2502-HY						
36	A	2502-HY				7.71		7.71
37		2502-HY						
38	A	2502-HY		8.3	8.3	8.3		8.3
39	A	2502-HY		8.41		8.41		8.41
40	A	2502-HY						
41	A	2502-HY				8.4		8.4
42	A	2502-HY						
43		2502-HY						
44	A	2502-HY		7.67	7.67	7.67		7.67
45		2502-HY						
46	A	2502-HY		8.4				8.4
47	A	2502-HY						
48	A	2502-HY		8.03	8.03	8.03		8.03
49	A	2502-HY		7.87	7.87	7.87		7.87
50	A	2502-HY						
51	A	2502-HY				8.8		8.8
52		2502-HY						
53		2502-HY						
54	A	2502-HY		9.5	9.5	9.5		9.5
55	A	2502-HY		2.1	2.1	2.1		2.1
56		2502-HY						
57	A	2502-HY		8.18	8.18	8.18	8.18	8.18
58	A	2502-HY		8.05	8.05	8.05		8.05
59		2502-HY						

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Moisture content - Results

LC	Data set	Sample	Result %	Moisture content				Moisture content
				Physico-chemical methods PCDD/F	Physico-chemical methods DL-PCBs	Physico-chemical methods NDL-PCBs	Bioanalytical methods	Mean
60	A	2502-HY		7.34	7.34	7.34		7.34
61		2502-HY						
62	A	2502-HY		8.25	8.25	8.25		8.25
63	A	2502-HY						
64	A	2502-HY		9.1				9.1
65	A	2502-HY		8.51	8.51	8.51		8.51
66	A	2502-HY		8.9	8.9			8.9
67	A	2502-HY				8.9		8.9
68	A	2502-HY		8.25	8.25	8.25		8.25
69	A	2502-HY		8.12	8.12	8.12		8.12
70	A	2502-HY		7.9	7.9	7.9		7.9
71	A	2502-HY		8.12	8.12	8.12		8.12
72	A	2502-HY		8.6	8.6	8.6		8.6
73	A	2502-HY		4.42	4.42	4.42		4.42
74		2502-HY						
75		2502-HY						
76	A	2502-HY				12		12
77	A	2502-HY				9.37		9.37
78	A	2502-HY		8.22	8.22	8.22	7.88	8.135
79	A	2502-HY		8.5	8.5	8.5		8.5
80	A	2502-HY		8.61	8.61	8.61		8.61
81	A	2502-HY		7.5	7.5	7.5		7.5
82	A	2502-HY		9	9	9		9
83	A	2502-HY				7.5		7.5
84	A	2502-HY		9.2	9.2	9.2		9.2
85	A	2502-HY		8.4	8.4	8.4		8.4
86	A	2502-HY				8		8
87	A	2502-HY				8.51		8.51
88	A	2502-HY		8.96	8.96	8.96		8.96
89	A	2502-HY		7.52	7.52	7.52		7.52
90		2502-HY						
91		2502-HY						
92	A	2502-HY		7.56	7.56			7.56
93	A	2502-HY		8.73	8.73	8.37		8.61
94	A	2502-HY		8.4	8.4		8.4	8.4
95		2502-HY						
96	A	2502-HY				91.5		91.5
97		2502-HY						
Additional Sets								
41	B	2502-HY				8.4		8.4
65	B	2502-HY		8.51	8.51	5.81		7.61
85	B	2502-HY		8.4	8.4	8.4		8.4
41	C	2502-HY				8.4		8.4
		2502-HY						
17*	A	2502-HY				8.2		8.2

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 3: Participants' z-scores and bioassay-scores of PCDD/Fs and PCBs - Tables

Test sample - Hay (2502-HY)

Z-scores of sum parameters and individual results

Calculation of z-score on basis of assigned value

$z = (x - x_a) / (\sigma_{prel} * xa)$

x_a: assigned value
x: participant's result
σ_{prel}: relative fitness-for-purpose-based standard deviation for proficiency assessment
10%: WHO-PCDD/F-TEQ, WHO-PCB-TEQ and WHO-PCDD/F-PCB-TEQ
15%: Sum of six indicator PCBs (PCB 28, 52, 101, 138, 153, 180)
20%: Evaluated individual PCDD/F and PCB congeners

Bioassay-scores of BEQ results

Calculation of bioassay-score on basis of assigned value from physical-chemical methods

bioassay-score $= (x - x_a) / (\sigma_{BArel} * xa)$

x_a: assigned value (pyhsical-chemical methods)
x: participant's result (BEQ from bioanalytical screening method)
σ_{BArel}: relative bioassay target deviation
20%: PCDD/F-PCB-BEQ, PCDD/F-BEQ and PCB-BEQ

* Modified/additional results reported after distribution of preliminary results to all participating laboratories

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Sum parameters - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	WHO-PCDD/F-PCB-TEQ reported		WHO-PCDD/F-PCB-TEQ calculated		WHO-PCDD/F-TEQ reported		WHO-PCDD/F-TEQ calculated		WHO-PCB-TEQ reported		WHO-PCB-TEQ calculated		Z-score [σ_p = 15 %]	Sum Indicator PCBs reported		Sum Indicator PCBs calculated	
				upper bound	lower bound	upper bound	lower bound	upper bound	lower bound	upper bound	lower bound	upper bound	lower bound	upper bound	lower bound		upper bound	lower bound	upper bound	lower bound
1	A	2502-HY		0.3	1.0	0.3	0.9	0.0	1.0	-0.1	0.8	0.7	0.8	0.7	0.8		-0.6	-0.6	-0.6	-0.6
2	A	2502-HY		0.0	0.6	0.0	0.6	0.5	1.5	0.1	1.0	0.2	0.3	0.2	0.3		0.4	0.4	0.4	0.4
3	A	2502-HY		0.0	0.7	0.0	0.6	0.5	1.6	0.4	1.3	0.0	0.2	0.0	0.1		0.3	0.3	0.3	0.3
4	A	2502-HY		-0.2	0.5	-0.1	0.4	-0.5	0.4	-0.5	0.4	0.2	0.3	0.2	0.3					
5		2502-HY																		
6		2502-HY																		
7	A	2502-HY		1.0	1.7	1.0	1.6	1.0	2.1	0.8	1.8	1.2	1.3	1.3	1.4		2.1	2.1	2.5	2.5
8	A	2502-HY		-0.5	-1.7	-0.5	-1.8	-0.9	-2.4	-0.9	-2.5	-0.1	-1.5	-0.1	-1.5		0.6	0.6	0.9	1.0
9	A	2502-HY		0.3	-0.4	-0.6	-0.1	-0.8	-1.6	-1.4	-0.6	-0.1	0.0	-0.1	0.0		0.2	0.3	0.3	0.3
10		2502-HY																		
11	A	2502-HY		-0.3	0.3	-0.3	0.2	-0.5	0.3	-0.6	0.1	0.0	0.1	0.0	0.1		-0.2	-0.1	-0.2	-0.1
12	A	2502-HY		0.2	0.7	0.2	0.7	1.2	1.9	0.9	1.7	0.0	0.1	0.0	0.1		0.3	0.3	0.3	0.3
13	A	2502-HY															0.0	-0.3	0.0	-0.3
14	A	2502-HY		-1.6	-1.1	-1.6	-1.1	-2.5	-1.8	-2.6	-1.9	-1.0	-0.9	-1.0	-0.9		-0.7	-0.7	-0.7	-0.7
15	A	2502-HY		-0.3	-2.6	-0.4	-2.6	-0.9	-9.2	-1.4	-9.2	0.2	0.3	0.2	0.3		1.4	1.4	1.4	1.4
16	A	2502-HY		0.4	1.0	0.4	0.9	0.5	1.5	0.4	1.2	0.5	0.7	0.6	0.7		0.0	0.1	0.0	0.1
17	A	2502-HY															-0.2	-0.5	-0.1	-0.5
18	A	2502-HY		-1.0	-0.2	-1.7	-1.2	-1.5	-0.1	-1.1	-0.3	-0.5	-0.4	-1.8	-1.7		0.0	0.0	0.0	0.0
19		2502-HY																		
20	A	2502-HY		0.6	0.3	0.6	0.1	2.0	-0.2	1.8	-0.6	0.2	0.3	0.2	0.3		0.3	0.3	66.1	66.3
21	A	2502-HY															0.2	0.2	0.2	0.2
22	A	2502-HY		0.0	0.6	0.0	0.6	0.7	1.8	0.6	1.6	-0.1	0.0	-0.1	0.0					
23		2502-HY																		
24	A	2502-HY		0.3	-0.4	0.3	-0.5	0.8	-1.2	0.6	-1.3	0.3	-0.2	0.3	-0.3					
25	A	2502-HY		-0.3	0.3	-0.3	0.2	0.0	1.0	-0.2	0.7	-0.2	-0.1	-0.2	-0.1		0.4	0.4	0.4	0.4
26	A	2502-HY		-0.8	-0.2	-0.8	-0.3	-0.9	0.1	-1.0	-0.2	-0.6	-0.4	-0.5	-0.4		-0.6	-0.6	-0.6	-0.6
27	A	2502-HY		-1.1	-1.0	-1.1	-1.0	-1.7	-2.1	-1.8	-2.3	-0.6	-0.6	-0.6	-0.6		0.2	0.2	0.2	0.2
28	A	2502-HY		-1.3	-0.7	-1.2	-0.7	-0.8	0.1	-0.9	-0.1	-1.3	-1.2	-1.2	-1.2		-0.7	-0.7	-0.6	-0.6
29		2502-HY																		
30		2502-HY																		
31	A	2502-HY		2.9	-1.3	3.0	-1.3	9.5	-4.5	9.4	-4.5	0.0	0.1	0.0	0.1		-0.7	-0.7	-0.7	-0.7
32		2502-HY																		
33	A	2502-HY															0.0	0.1	0.1	0.1
34	A	2502-HY		1.1	1.7	1.1	1.6	2.3	3.2	2.1	3.0	0.8	0.9	0.8	0.9		1.8	1.8	1.8	1.8
35		2502-HY																		
36	A	2502-HY															0.1	-0.2	0.2	-0.1
37		2502-HY																		
38	A	2502-HY		1.2	1.9	1.2	1.8	3.7	5.0	3.4	4.7	0.2	0.3	0.2	0.3		0.5	0.6	0.5	0.6
39	A	2502-HY		0.6	1.1	0.6	1.1	0.5	1.5	0.3	1.2	0.9	0.9	0.9	0.9		0.8	0.8	0.8	0.8
40	A	2502-HY															4.7	4.0	4.7	4.0
41	A	2502-HY															0.1	0.1	0.1	0.1
42	A	2502-HY		-0.7	-1.5	9.5	-2.8	-1.5	-3.5	29.4	-9.2	-0.1	-0.7	-0.1	0.0				-1.6	-3.7
43		2502-HY																		
44	A	2502-HY		0.5	1.0	0.6	1.0	-0.5	-0.1	-0.6	-0.3	1.3	1.4	1.3	1.4		-0.1	-0.1	-0.1	-0.1
45		2502-HY																		
46	A	2502-HY		-0.1	0.4	-0.5	-0.1	-0.5	0.2	-0.5	0.0	0.3	0.3	-0.3	-0.3		0.1	0.1	0.1	0.1
47	A	2502-HY		-1.3	-0.8			-4.4	-3.8											
48	A	2502-HY		-0.2	0.1	-0.1	0.0	1.0	1.0	1.0	0.6	-0.5	-0.4	-0.5	-0.4		0.2	0.2	0.2	0.2
49	A	2502-HY		0.5	-0.7	0.5	-0.9	0.0	-3.4	0.0	-3.7	0.9	0.3	1.0	0.3		0.1	0.2	0.2	0.2
50	A	2502-HY		-1.0	-0.6	-1.0	-0.7	-1.8	-1.6	-2.0	-1.8	-0.4	-0.3	-0.4	-0.3		0.0	0.0	0.0	0.0
51	A	2502-HY															0.7	0.4	0.8	0.4
52		2502-HY																		
53		2502-HY																		
54	A	2502-HY		1.2	1.8	1.2	1.8	1.1	1.9	0.9	1.7	1.6	1.6	1.6	1.6		-0.1	-0.1	-0.1	0.0
55	A	2502-HY		0.7	1.0	0.8	0.9	2.7	2.4	2.5	2.2	0.0	0.2	0.1	0.2		-0.9	-0.9	-0.9	-0.9
56		2502-HY																		
57	A	2502-HY		2.1	1.8	2.1	1.9	2.0	0.4	2.2	0.3	2.2	2.3	2.3	2.4		0.3	0.4	0.3	0.3
58	A	2502-HY		0.9	1.4	1422.3	1502.8	2.3	3.3	2.1	3.0	0.5	0.4	2151.0	2172.3		0.9	0.9	0.9	0.9
59		2502-HY																		
60	A	2502-HY		-0.3	0.3	-0.3	0.3	-0.6	0.3	-0.7	0.1	0.0	0.1	0.1	0.2		-0.2	-0.1	-0.1	-0.1
61		2502-HY																		
62	A	2502-HY		-0.3	-0.4	-0.4	-0.4	0.1	-0.4	0.0	-0.5	-0.5	-0.4	-0.4	-0.4		0.7	0.7	0.7	0.7
63	A	2502-HY		-2.9	-2.5	-2.8	-2.5	10.3	12.3	10.0	11.8	-9.1	-9.1	-8.9	-9.1					
64	A	2502-HY		-5.9	-5.8	-5.9	-5.8	-4.2	-4.2	-4.3	-4.3	-6.6	-6.6	-6.6	-6.6		4.1	4.1	4.1	4.1
65	A	2502-HY		0.3	0.6	0.4	0.6	1.1	1.6	0.9	1.4	0.2	0.1	0.3	0.1		-0.1	-0.1	-0.1	-0.1
66	A	2502-HY		-0.5	0.1	-0.5	0.1	-0.3	0.7	-0.4	0.5	-0.4	-0.2	-0.4	-0.3					
67	A	2502-HY															0.3	0.0	0.4	0.0
68	A	2502-HY		0.2	-0.1	0.2	-0.2	1.5	-0.4	1.3	-0.6	-0.2	0.0	-0.2	-0.1		0.0	0.0	0.0	0.0
69	A	2502-HY		-0.4	0.0	-0.4	-0.1	-0.9	-0.1	-1.0	-0.3	0.1	-0.1	0.1	-0.1		-0.1	-0.1	-0.1	-0.1
70	A	2502-HY		-2.1	-1.8	-8.4	-8.3	-2.6	-1.5	-6.4	-6.0	-1.9	-1.9	-9.4	-9.4		-1.7	-2.0	-1.7	-2.0
71	A	2502-HY		-0.2	0.1	-0.2	0.1	-1.0	-0.2	-1.1	-0.4	0.3	0.1	0.4	0.1		-0.1	-0.1	-0.1	-0.1
72	A	2502-HY		-0.1	0.6	0.0	0.5	2.2	3.4	2.0	3.1	-0.9	-0.8	-0.9	-0.8		-1.0	-1.0	-1.0	-1.0
73	A	2502-HY				-8.7				-6.7				-9.7			-0.9	-0.9	-0.9	-0.9
74		2502-HY																		
75		2502-HY																		
76	A	2502-HY															-2.4	-2.8	-2.4	-2.8
77	A	2502-HY															3.8	3.2	3.7	3.2
78	A	2502-HY		-1.0	-0.9	-1.0	-1.0	-1.5	-1.9	-1.6	-2.0	-0.6	-0.5	-0.6	-0.6		-0.9	-0.8	-0.8	-0.8
79	A	2502-HY		0.3	0.9	0.3	0.8	-0.1	0.8	-0.2	0.5	0.7	0.8	0.7	0.8		0.2	0.2	0.2	0.2
80	A	2502-HY		0.8	1.1	0.8	1.0	3.0	2.6	2.5	2.3	0.2	0.3	0.2	0.3		-0.3	-0.3	-0.4	-0.4

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Sum parameters - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	WHO-PCDD/F-PCB-TEQ reported		WHO-PCDD/F-PCB-TEQ calculated		WHO-PCDD/F-TEQ reported		WHO-PCDD/F-TEQ calculated		WHO-PCB-TEQ reported		WHO-PCB-TEQ calculated		Z-score [σ_p = 15 %]	Sum Indicator PCBs reported		Sum Indicator PCBs calculated	
				upper bound	lower bound	upper bound	lower bound	upper bound	lower bound	upper bound	lower bound	upper bound	lower bound	upper bound	lower bound		upper bound	lower bound	upper bound	lower bound
81	A	2502-HY		-1.8	-1.7	-1.8	-1.8	-1.5	-1.7	-1.6	-1.9	-1.8	-1.9	-1.8	-1.9		0.9	1.0	0.9	1.0
82	A	2502-HY		-1.8	-2.1	-1.7	-2.2	-1.7	-2.4	-1.8	-2.6	-1.6	-2.1	-1.6	-2.1		-0.6	-0.6	-0.6	-0.6
83	A	2502-HY															0.2	-0.1	0.2	-0.1
84	A	2502-HY		2.9	3.6	3.0	3.5	4.0	5.4	4.0	5.3	2.7	2.6	2.7	2.5		-0.5	-0.5	-0.5	-0.5
85	A	2502-HY		-0.4	-0.1	-0.4	-0.2	-1.1	-0.3	-1.2	-0.5	0.1	-0.1	0.1	-0.1		-0.1	-0.1	-0.1	-0.1
86	A	2502-HY															-0.3	-0.3	-0.3	-0.3
87	A	2502-HY															-0.5	-0.9	-0.5	-0.9
88	A	2502-HY		1.6	2.2	1.5	2.1	1.7	2.5	1.5	2.2	1.8	1.9	1.8	1.9		1.4	1.4	1.4	1.4
89	A	2502-HY		1.9	-2.1	1.9	-2.2	9.0	-4.0	8.7	-4.1	-1.3	-1.4	-1.3	-1.4		-1.9	-1.9	-0.8	-0.8
90		2502-HY																		
91		2502-HY																		
92	A	2502-HY		1.2	-2.2	1.3	-2.3	5.5	-5.7	5.2	-5.8	-0.5	-0.8	-0.5	-0.8					
93	A	2502-HY		-1.3	-0.7	-1.3	-0.8	-1.6	-0.8	-1.7	-1.0	-0.9	-0.8	-0.9	-0.8		0.0	0.0	0.0	0.0
94	A	2502-HY		1.0	-1.4	1.0	-1.5	5.5	-1.8	5.3	-2.2	-1.0	-1.4	-0.9	-1.3					
95		2502-HY																		
96	A	2502-HY															0.5	0.1	0.5	0.1
97		2502-HY																		
Additional Sets																				
41	B	2502-HY															0.6	0.7	0.6	0.6
65	B	2502-HY		0.5	0.8	0.4	0.7	1.5	2.4	1.3	2.2	0.2	-0.1	0.1	0.0		0.0	0.1	0.1	0.1
85	B	2502-HY		-0.8	-0.4	-0.7	-0.5	-1.6	-0.8	-1.7	-1.1	-0.1	-0.3	-0.1	-0.3		-0.1	-0.1	-0.1	-0.1
41	C	2502-HY															0.0	0.0	0.0	0.0
		2502-HY																		
58*	A	2502-HY		0.9	1.4	0.9	1.3	2.3	3.3	2.1	3.0	0.5	0.4	0.6	0.4		0.9	0.9	0.9	0.9

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

PCDD/F - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	WHO-PCDD/F-TEQ reported upper bound	WHO-PCDD/F-TEQ reported lower bound	WHO-PCDD/F-TEQ calculated upper bound	WHO-PCDD/F-TEQ calculated lower bound	Z-score [σ_p = 20 %]	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
1	A	2502-HY		0.0	1.0	-0.1	0.8			-0.5	0.4	0.2	0.0	3.4	2.6	0.6	-0.6	0.6	-0.2	-0.8	-0.4		-0.6	-0.3	0.8
2	A	2502-HY		0.5	1.5	0.1	1.0			0.1	0.4	-0.1	0.3	0.5	0.3	1.6	0.2	0.6	0.3	0.4	-0.6		0.5	1.3	-0.3
3	A	2502-HY		0.5	1.6	0.4	1.3			0.3	0.3	-0.5	1.3	0.4	0.3	1.9	0.5	0.3	-0.1	0.0	0.3		0.4	-0.9	-0.4
4	A	2502-HY		-0.5	0.4	-0.5	0.4			0.3	-0.5	-0.5	0.0	0.0	0.3	-0.3	0.0	-0.3	-1.0	0.0	-0.6		-0.2	-1.9	0.1
5		2502-HY																							
6		2502-HY																							
7	A	2502-HY		1.0	2.1	0.8	1.8			1.3	-0.6	-0.1	0.0	0.4	0.0	-0.2	0.0	0.8	0.7	-0.2	0.2		-0.1		
8	A	2502-HY		-0.9	-2.4	-0.9	-2.5			-1.4				-0.9	-0.3	0.2	-0.5	0.2	-0.2	-0.4	0.3		0.5		-1.2
9	A	2502-HY		-0.8	-1.6	-1.4	-0.6			-1.5	0.9	0.2	1.7	-0.5	-0.5	-0.2	-0.1	-0.6	-0.1	0.2	-0.4		-0.2	0.2	-0.1
10		2502-HY																							
11	A	2502-HY		-0.5	0.3	-0.6	0.1			0.3	-1.0	-0.5	-0.4	-0.6	0.3	0.4	0.1	-0.6	0.1	-0.4	0.2		-0.1	-0.2	-1.7
12	A	2502-HY		1.2	1.9	0.9	1.7			0.5	0.9	-1.1	0.0	0.8	0.5	1.0	1.0	1.1	-0.1	-0.1	-0.2		0.3	-0.7	0.7
13	A	2502-HY																							
14	A	2502-HY		-2.5	-1.8	-2.6	-1.9			-1.6	-1.3	-1.5	-0.2	-0.5	-0.8	-0.7	-1.1	-0.9	-0.8	-1.1	-0.9		-0.8	-1.3	-0.4
15	A	2502-HY		-0.9	-9.2	-1.4	-9.2							0.3	0.3								1.1		
16	A	2502-HY		0.5	1.5	0.4	1.2			1.1	-0.8	-0.3	0.7	0.2	0.2	0.0	0.3	-0.2	-0.3	0.4	-0.1		0.2	0.4	-0.1
17	A	2502-HY																							
18	A	2502-HY		-1.5	-0.1	-1.1	-0.3			-0.7	-0.4	0.0	0.0	0.2	0.0	-0.3	0.6	-0.2	-0.7	-0.4	-0.5		0.0		-0.7
19		2502-HY																							
20	A	2502-HY		2.0	-0.2	1.8	-0.6			1.2		0.8		-0.3	0.3	0.2	0.0	-0.7	0.1	0.0	0.3		-0.3		0.5
21	A	2502-HY																							
22	A	2502-HY		0.7	1.8	0.6	1.6			1.1	0.8	-0.2	0.2	0.3	0.1	0.8	0.4	0.0	0.2	0.0	0.5		0.3	-0.4	1.4
23		2502-HY																							
24	A	2502-HY		0.8	-1.2	0.6	-1.3			-0.5	0.6	-0.3	0.0	-0.1	0.0	-0.8	-0.2	-0.3	0.1	-0.9	-0.6		-0.5		
25	A	2502-HY		0.0	1.0	-0.2	0.7			-0.8	-0.5	1.3	0.1	0.3	0.3	-0.4	0.6	0.6	0.6	-0.3	0.1		0.7	0.6	-0.2
26	A	2502-HY		-0.9	0.1	-1.0	-0.2			0.4	-0.1	0.6	0.0	-0.2	-0.6	0.2	-0.4	-0.1	-0.6	-0.3	-1.4		-0.8	-1.5	-0.9
27	A	2502-HY		-1.7	-2.1	-1.8	-2.3			-2.4	-1.0	-1.1	-1.0	-0.3	-0.7	-0.9	-0.8	0.4	0.1	-0.2	-0.4		-0.1	-1.8	-2.8
28	A	2502-HY		-0.8	0.1	-0.9	-0.1			0.5	-0.4	2.2	-1.1	-0.5	-0.6	-0.8	-0.2	-0.8	-0.5	-0.9	-0.4		-0.6	-1.4	-0.3
29		2502-HY																							
30		2502-HY																							
31	A	2502-HY		9.5	-4.5	9.4	-4.5							-0.2		0.2	-1.2	4.1	0.1				-0.4		-0.1
32		2502-HY																							
33	A	2502-HY																							
34	A	2502-HY		2.3	3.2	2.1	3.0		1.1	0.7	1.5	4.2	0.4	0.2	1.3	0.5	0.1	3.8	0.7	0.0		-0.7	-0.5	-0.5
35		2502-HY																							
36	A	2502-HY																							
37		2502-HY																							
38	A	2502-HY		3.7	5.0	3.4	4.7		3.3	8.4	1.1	0.9	-0.7	1.0	3.5	-0.1	-0.8	-1.7	1.2	3.1		2.5	1.7	1.3
39	A	2502-HY		0.5	1.5	0.3	1.2		0.3	0.4	0.4	0.7	0.0	0.3	0.4	0.1	0.1	0.4	0.1	0.4		0.1	-0.4	0.0
40	A	2502-HY																							
41	A	2502-HY																							
42	A	2502-HY		-1.5	-3.5	29.4	-9.2							1.0	4.1								0.0		0.4
43		2502-HY																							
44	A	2502-HY		-0.5	-0.1	-0.6	-0.3		-0.6	0.0	0.5	0.2	1.0	0.8	0.3	-0.6	-0.1	1.3	0.8	1.5		1.4	-0.4	0.3
45		2502-HY																							
46	A	2502-HY		-0.5	0.2	-0.5	0.0		-0.5	1.0	-0.3	0.2	0.2	0.1	0.2	0.0	-0.3	0.1	-0.2	-0.7		0.1		-0.2
47	A	2502-HY		-4.4	-3.8					19.9			3.0										-1.4		5.9
48	A	2502-HY		1.0	1.0	1.0	0.6		0.8	0.3	-0.3	0.0	0.0	0.1	2.0	0.5	1.1	0.0	-0.4	0.4		0.4	0.6	1.6
49	A	2502-HY		0.0	-3.4	0.0	-3.7			4.0	0.2	0.8	-0.8	-0.3	1.0	0.0	-0.7	0.9	-0.8	-0.6		-0.9		1.1
50	A	2502-HY		-1.8	-1.6	-2.0	-1.8		-1.8	0.7	0.5	0.0	0.0	-0.3	-0.1	0.2	-0.9	0.3	0.0	1.0		-0.1	-0.5	-0.4
51	A	2502-HY																							
52		2502-HY																							
53		2502-HY																							
54	A	2502-HY		1.1	1.9	0.9	1.7		1.0	0.8	0.3	2.0	0.7	0.6	-0.2	0.1	0.4	1.1	1.3	0.7		0.7	1.7	2.0
55	A	2502-HY		2.7	2.4	2.5	2.2		2.4	0.2	0.5	1.7	0.3	-0.8	0.0	0.5	1.5	1.8	0.3	1.1		-0.2	2.2	0.0
56		2502-HY																							
57	A	2502-HY		2.0	0.4	2.2	0.3		0.3		-0.5	0.0	-1.3	-0.5	-0.3	0.0	1.9	-0.2	-0.4	0.3		-0.3	3.3	2.0
58	A	2502-HY		2.3	3.3	2.1	3.0		1.3	1.5	1.6	2.9	1.2	1.7	5.6	0.5	0.4	0.4	0.7	0.1		0.5	2.5	-0.7
59		2502-HY																							
60	A	2502-HY		-0.6	0.3	-0.7	0.1		0.0	-0.3	-0.4	-0.2	0.1	-0.4	0.1	-0.1	-0.4	0.1	0.1	-0.7		0.4	-0.3	0.0
61		2502-HY																							
62	A	2502-HY		0.1	-0.4	0.0	-0.5		-0.5		-0.9		-0.1	0.1	0.3	0.1	0.0	-0.2	-0.2	-0.5		0.0		
63	A	2502-HY		10.3	12.3	10.0	11.8		-1.2	-0.5	4.8	-2.2	-4.4	-4.5	41.1	4.6	11.3	-1.0	0.7	-1.2		-3.2	5.7	3.3
64	A	2502-HY		-4.2	-4.2	-4.3	-4.3		-1.6	-3.9	0.0	-1.8	-1.8	-0.2	-2.5	-3.7	-4.2	-0.4	1.0	-4.1		-0.4	-4.0	-1.8
65	A	2502-HY		1.1	1.6	0.9	1.4		1.5		0.5	1.9	0.0	0.1	-0.2	0.7	0.0	0.1	0.0	0.7		0.2	0.0	0.0
66	A	2502-HY		-0.3	0.7	-0.4	0.5		0.6	-1.3	-0.5	0.3	-0.1	-0.1	0.2	0.2	-0.3	0.2	-0.1	0.0		0.9	0.0	-0.1
67	A	2502-HY																							
68	A	2502-HY		1.5	-0.4	1.3	-0.6		0.7	1.0	0.1	-0.8	-0.9	-1.4	-0.9	-0.5	0.0	-0.5	-0.3	-0.3		-0.5		-1.8
69	A	2502-HY		-0.9	-0.1	-1.0	-0.3		0.1	-0.1	-0.7	-0.5	-0.3	0.0	0.0	-0.3	-0.7	-0.1	-0.6	-0.3		-0.1	-0.5	0.0
70	A	2502-HY		-2.6	-1.5	-6.4	-6.0		-0.8	-4.5	-4.7	-4.6	-5.0	-5.0	-4.6	-4.9	-4.1	-4.6	-4.6			-5.0		-5.0
71	A	2502-HY		-1.0	-0.2	-1.1	-0.4		-0.1	-0.1	-0.5	-0.7	-0.3	0.0	-0.1	-0.3	-0.6	-0.2	-0.4	-0.3		-0.1	-0.5	0.0
72	A	2502-HY		2.2	3.4	2.0	3.1		2.0	4.3	-0.8	1.2	0.3	0.5	-0.7	0.3	2.0	-0.2	-0.3	0.3		0.2	-0.1	0.2

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

PCDD/F - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	WHO-PCDD/F-TEQ reported upper bound	WHO-PCDD/F-TEQ reported lower bound	WHO-PCDD/F-TEQ calculated upper bound	WHO-PCDD/F-TEQ calculated lower bound	Z-score [σ_p = 20 %]	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
73	A	2502-HY				-6.7																			
74		2502-HY																							
75		2502-HY																							
76	A	2502-HY																							
77	A	2502-HY																							
78	A	2502-HY		-1.5	-1.9	-1.6	-2.0			-2.0	0.0	-0.5	0.0	1.1	-0.3	-0.1	-0.2	-0.6	0.0	0.1	-0.3		0.6		0.1
79	A	2502-HY		-0.1	0.8	-0.2	0.5			-0.2	-1.7	-0.7	-1.8	0.1	0.4	0.4	-0.1	1.3	0.5	0.2	0.5		0.6	-1.1	0.0
80	A	2502-HY		3.0	2.6	2.5	2.3			3.9	4.7	2.1	2.8	1.0	0.1	1.9	-1.3	-0.3	-0.6	0.0	-0.4		-0.4	1.2	1.2
81	A	2502-HY		-1.5	-1.7	-1.6	-1.9			-1.0	-0.9	-1.1	-0.2	0.0	-0.3	-0.7	-0.4	-0.7	-0.4	-0.7	-1.5		0.1	-0.8	-0.7
82	A	2502-HY		-1.7	-2.4	-1.8	-2.6				2.8	1.6	1.0	-0.4	-0.1	-0.2	0.9	0.6	0.2	0.7	1.1		-0.1	2.0	-0.3
83	A	2502-HY																							
84	A	2502-HY		4.0	5.4	4.0	5.3			3.4	4.5	2.1	0.1	0.0	-0.5	3.6	0.0	-1.3	0.1	0.4	0.3		6.0	-0.5	-1.7
85	A	2502-HY		-1.1	-0.3	-1.2	-0.5			0.1	-0.3	-0.8	-0.7	-0.3	0.0	-0.1	-0.4	-0.9	-0.4	-0.3	-0.6		-0.1	0.0	0.4
86	A	2502-HY																							
87	A	2502-HY																							
88	A	2502-HY		1.7	2.5	1.5	2.2			2.5	3.4	0.7	0.0	0.8	0.8	1.0	0.9	1.2	1.5	0.7	0.4		1.5	1.3	3.0
89	A	2502-HY		9.0	-4.0	8.7	-4.1							-0.5	-0.1	-1.5	0.2	1.5	0.4	0.5	0.9		-0.4		0.2
90		2502-HY																							
91		2502-HY																							
92	A	2502-HY		5.5	-5.7	5.2	-5.8							-0.2	1.0	-0.7			0.6	0.4			-0.3		-0.4
93	A	2502-HY		-1.6	-0.8	-1.7	-1.0			-1.8	-1.0	-0.8	-0.3	0.1	-0.5	-0.6	-1.0	-0.4	-0.7	-0.4	-0.2		-0.1	-0.4	-0.6
94	A	2502-HY		5.5	-1.8	5.3	-2.2			-0.5				0.3		-0.7		0.2	-0.2	-0.4	0.8		0.0		
95		2502-HY																							
96	A	2502-HY																							
97		2502-HY																							
Additional Sets																									
41	B	2502-HY																							
65	B	2502-HY		1.5	2.4	1.3	2.2			1.2	1.7	0.2	1.7	0.4	0.1	-0.2	1.2	0.4	0.7	0.6	1.0		0.3	0.8	-0.1
85	B	2502-HY		-1.6	-0.8	-1.7	-1.1			-0.5	-0.4	-1.0	-0.8	-0.7	-0.2	0.1	-0.5	-1.0	-0.5	-0.6	-0.5		-0.4		0.4
41	C	2502-HY																							

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Dioxin-like PCB - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	WHO-PCB-TEQ reported upper bound	WHO-PCB-TEQ reported lower bound	WHO-PCB-TEQ calculated upper bound	WHO-PCB-TEQ calculated lower bound	Z-score [σ_p = 20 %]	PCB 105	PCB 114	PCB 118	PCB 123	PCB 156	PCB 157	PCB 167	PCB 189	PCB 77	PCB 81	PCB 126	PCB 169
1	A	2502-HY		0.7	0.8	0.7	0.8		-0.2	-0.4	-0.2	-0.6	0.0	-0.1	0.0	-0.3	0.2	0.5	0.5	
2	A	2502-HY		0.2	0.3	0.2	0.3		0.1	0.4	0.9	1.1	-0.1	0.4	0.2	0.1	0.7	0.3	0.0	
3	A	2502-HY		0.0	0.2	0.0	0.1		0.4	-0.1	0.3	0.7	0.4	0.2	0.2	-0.2	0.7	0.9	-0.1	
4	A	2502-HY		0.2	0.3	0.2	0.3		0.0	-0.9	0.5	1.8	0.5	0.4	0.4	-0.5	0.4	0.3	0.0	
5		2502-HY																		
6		2502-HY																		
7	A	2502-HY		1.2	1.3	1.3	1.4		1.4	1.0	1.6	1.1	0.8	0.8	0.8	0.5	0.4	-0.1	0.5	
8	A	2502-HY		-0.1	-1.5	-0.1	-1.5		0.7	2.4	1.1	2.0	0.2	1.5	0.7		-0.1	0.1	-1.3	
9	A	2502-HY		-0.1	0.0	-0.1	0.0		0.5	0.4	0.5	-0.7	0.3	0.1	-0.9	-0.5	0.7	-1.4	-0.2	
10		2502-HY																		
11	A	2502-HY		0.0	0.1	0.0	0.1		-0.3	-0.1	-0.3	-0.1	0.2	1.0	0.3	0.6	0.1	0.1	0.1	
12	A	2502-HY		0.0	0.1	0.0	0.1		0.3	0.2	0.5	0.6	0.2	0.2	0.3	0.1	0.5	0.4	-0.1	
13	A	2502-HY																		
14	A	2502-HY		-1.0	-0.9	-1.0	-0.9		0.1	-0.4	-0.3	0.0	-0.1	-0.4	0.1	1.4	-0.6	-0.2	-0.5	
15	A	2502-HY		0.2	0.3	0.2	0.3		-1.0	-1.3	-1.0	0.0	-1.2	-0.5	10.7	-1.6	-1.6	-1.5	0.5	
16	A	2502-HY		0.5	0.7	0.6	0.7		0.4	0.3	0.4	-0.1	0.7	0.2	0.3	0.0	0.4	0.5	0.3	
17	A	2502-HY																		
18	A	2502-HY		-0.5	-0.4	-1.8	-1.7		-0.2	-0.9	-5.0	0.4	-0.2	-0.3	-0.3	-0.7	-0.2	-0.1	-0.3	
19		2502-HY																		
20	A	2502-HY		0.2	0.3	0.2	0.3		0.2	1.6	0.1	0.4	0.3	0.1	0.9		0.2	1.0	0.1	
21	A	2502-HY																		
22	A	2502-HY		-0.1	0.0	-0.1	0.0		0.2	1.0	0.2	0.1	0.2	0.1	-0.8	0.1	0.4	0.2	-0.1	
23		2502-HY																		
24	A	2502-HY		0.3	-0.2	0.3	-0.3		-0.3	0.2	-0.2	0.1	-0.2	0.1	-0.1	-0.1	0.1	0.5	-0.1	
25	A	2502-HY		-0.2	-0.1	-0.2	-0.1		-1.1	-1.1	-1.1	-1.3	-0.9	-0.9	-0.8	-0.4	-0.3	0.4	0.2	
26	A	2502-HY		-0.6	-0.4	-0.5	-0.4		-0.3	-0.3	-0.5	-0.4	-0.3	-0.5	-0.2	-0.6	-0.4	-0.1	-0.2	
27	A	2502-HY		-0.6	-0.6	-0.6	-0.6		-0.2	1.0	0.4	-1.4	-0.3	-0.2	-0.2	-0.7	-0.6	0.2	-0.4	
28	A	2502-HY		-1.3	-1.2	-1.2	-1.2		-0.4	-1.0	-0.4	-2.7	-0.6	-0.7	-0.8	-0.1	-0.4	-0.5	-0.7	
29		2502-HY																		
30		2502-HY																		
31	A	2502-HY		0.0	0.1	0.0	0.1		0.5	-0.2	0.8	-0.1	0.5	0.2	0.5	0.2	-0.7	-0.7	-0.1	
32		2502-HY																		
33	A	2502-HY																		
34	A	2502-HY		0.8	0.9	0.8	0.9		-0.2	1.1	0.2	0.4	1.3	0.7	0.3	0.9	1.1	1.6	0.4	
35		2502-HY																		
36	A	2502-HY																		
37		2502-HY																		
38	A	2502-HY		0.2	0.3	0.2	0.3		0.7	-0.6	0.7	1.0	0.1	-1.6	-0.2	-1.4	-0.3	0.1	0.0	
39	A	2502-HY		0.9	0.9	0.9	0.9		0.2	0.2	0.2	1.5	0.3	0.1	0.3	-0.2	0.6	0.0	0.5	
40	A	2502-HY																		
41	A	2502-HY																		
42	A	2502-HY		-0.1	-0.7	-0.1	0.0		0.0	2.3	0.2	0.7	0.1	0.2	0.2	0.2	-0.5	-0.9	-0.5	
43		2502-HY																		
44	A	2502-HY		1.3	1.4	1.3	1.4		0.4	0.1	0.2	1.1	0.5	0.5	1.0	0.2	0.5	0.8	0.8	
45		2502-HY																		
46	A	2502-HY		0.3	0.3	-0.3	-0.3		-0.1	0.4	0.0	0.0	-0.1	-0.2	-0.2	-0.2	0.6	0.3	-0.2	
47	A	2502-HY																		
48	A	2502-HY		-0.5	-0.4	-0.5	-0.4		0.2	1.2	0.6	-1.0	0.0	0.0	-0.5	0.0	-0.3	0.4	-0.4	
49	A	2502-HY		0.9	0.3	1.0	0.3		-0.3	-0.3	-0.8	-0.4	0.1	-0.4	0.0	0.9	-0.6	0.1	0.4	
50	A	2502-HY		-0.4	-0.3	-0.4	-0.3		-0.2	0.4	-0.2	0.2	-0.1	0.0	0.1	-0.2	0.2	0.9	-0.2	
51	A	2502-HY																		
52		2502-HY																		
53		2502-HY																		
54	A	2502-HY		1.6	1.6	1.6	1.6		0.5	1.1	0.5	-0.5	0.4	0.3	0.6	0.5	1.2	-2.1	0.9	
55	A	2502-HY		0.0	0.2	0.1	0.2		-0.2	-0.8	-0.6	-0.9	-0.2	0.3	-0.1	-0.5	0.1	-0.7	0.2	
56		2502-HY																		
57	A	2502-HY		2.2	2.3	2.3	2.4		0.5	0.6	-2.2	1.7	1.0	0.8	1.3	1.4	-0.6	0.1	1.8	
58	A	2502-HY		0.5	0.4	2151.0	2172.3		0.6	0.3	0.4	-0.6	0.2	0.3	0.3	-0.3	0.9	0.2	1436.4	
59		2502-HY																		

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Dioxin-like PCB - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	WHO-PCB-TEQ reported upper bound	WHO-PCB-TEQ reported lower bound	WHO-PCB-TEQ calculated upper bound	WHO-PCB-TEQ calculated lower bound	Z-score [σ_p = 20 %]	PCB 105	PCB 114	PCB 118	PCB 123	PCB 156	PCB 157	PCB 167	PCB 189	PCB 77	PCB 81	PCB 126	PCB 169
60	A	2502-HY		0.0	0.1	0.1	0.2		0.4	0.1	0.1	0.0	0.1	-0.1	-0.1	-0.2	0.1	0.3	0.0	
61		2502-HY																		
62	A	2502-HY		-0.5	-0.4	-0.4	-0.4		-0.7	0.9	-0.5	-0.6	-0.5	-0.7	-0.5	-0.5	-0.5	-0.3	-0.1	
63	A	2502-HY		-9.1	-9.1	-8.9	-9.1		-5.0	-5.0	-4.9	-4.4	-4.9	-4.9	-4.7	-4.8	-4.9		-4.4	
64	A	2502-HY		-6.6	-6.6	-6.6	-6.6		1.1	2.3	0.6	23.8	1.4	20.6	0.3	0.2	-4.5	-4.6	-4.5	
65	A	2502-HY		0.2	0.1	0.3	0.1		0.4	-2.5	0.1	13.0	0.3	0.2	0.5	0.0	0.4	0.4	0.0	
66	A	2502-HY		-0.4	-0.2	-0.4	-0.3		-0.7	-0.2	-0.6	-1.1	-0.7	-0.6	-0.7	-1.0	0.2	0.2	0.0	
67	A	2502-HY																		
68	A	2502-HY		-0.2	0.0	-0.2	-0.1		0.1	0.3	-0.3	-0.4	0.6	0.0	0.0	-1.0	-0.6	-0.4	0.0	
69	A	2502-HY		0.1	-0.1	0.1	-0.1		-0.6	-0.7	-0.8	-0.7	-0.3	0.1	-0.5	0.3	-0.4	-0.2	0.2	
70	A	2502-HY		-1.9	-1.9	-9.4	-9.4		-5.0	-5.0	-5.0		-5.0	-5.0	-5.0	-5.0	-5.0		-4.6	
71	A	2502-HY		0.3	0.1	0.4	0.1		-0.5	-0.7	-0.8	-0.8	-0.3	-0.1	-0.5	0.3	-0.1	-0.3	0.3	
72	A	2502-HY		-0.9	-0.8	-0.9	-0.8		-0.3	-0.9	0.1	-0.9	-0.9	-0.4	-0.7	-0.1	-0.4	-0.7	-0.5	
73	A	2502-HY				-9.7														
74		2502-HY																		
75		2502-HY																		
76	A	2502-HY																		
77	A	2502-HY																		
78	A	2502-HY		-0.6	-0.5	-0.6	-0.6		-0.5	-0.4	-0.5	0.6	-0.5	-0.7	-1.0	0.0	-0.4	-0.4	-0.2	
79	A	2502-HY		0.7	0.8	0.7	0.8		-0.2	-0.2	0.4		0.2	-0.1	0.5	0.3	-0.1	0.4	0.4	
80	A	2502-HY		0.2	0.3	0.2	0.3		-0.1	-1.4	-1.4	-1.9	-0.5	-0.2	-0.1	0.3	0.3	0.5	0.4	
81	A	2502-HY		-1.8	-1.9	-1.8	-1.9		0.7	0.1	0.7	0.6	0.1	-0.1	0.0	0.0	0.0	-0.4	-1.4	
82	A	2502-HY		-1.6	-2.1	-1.6	-2.1		-0.6	1.3	-0.4	-1.2	-0.3	-0.4	-0.2	-0.3	-0.8	-1.3	-1.2	
83	A	2502-HY																		
84	A	2502-HY		2.7	2.6	2.7	2.5		0.6	0.9	0.5	0.6	-0.1	0.0	0.2	1.5	4.4	6.4	1.4	
85	A	2502-HY		0.1	-0.1	0.1	-0.1		-0.7	-1.0	-0.8	-0.6	-0.5	0.0	-0.6	0.2	-0.3	-0.5	0.2	
86	A	2502-HY																		
87	A	2502-HY																		
88	A	2502-HY		1.8	1.9	1.8	1.9		0.5	0.3	0.9	-1.8	0.6	0.7	0.6	0.7	0.9	1.3	0.9	
89	A	2502-HY		-1.3	-1.4	-1.3	-1.4		-0.7	-1.0	-0.7	2.0	-0.6	-0.3	-0.4	-0.7	-3.0	-1.1	-0.6	
90		2502-HY																		
91		2502-HY																		
92	A	2502-HY		-0.5	-0.8	-0.5	-0.8		0.0	-0.1	-0.2	-0.2	0.2	-0.3	-0.3	-0.7	-0.3	-1.4	-0.4	
93	A	2502-HY		-0.9	-0.8	-0.9	-0.8		-0.2	-0.6	0.1	-0.9	-0.2	1.7	0.2		-0.4	0.1	-0.5	
94	A	2502-HY		-1.0	-1.4	-0.9	-1.3		-0.6	-0.8	-0.4		-0.6		-0.5		-0.7	-0.8	-0.7	
95		2502-HY																		
96	A	2502-HY																		
97		2502-HY																		
Additional Sets																				
41	B	2502-HY																		
65	B	2502-HY		0.2	-0.1	0.1	0.0		0.4	-2.3	0.2	11.9	0.4	0.5	1.1	0.2	0.6	0.4	-0.1	
85	B	2502-HY		-0.1	-0.3	-0.1	-0.3		-0.8	-1.0	-0.8	-0.6	-0.4	-0.1	-0.6	0.2	-0.3	-0.5	0.0	
41	C	2502-HY																		
		2502-HY																		
58*	A	2502-HY		0.5	0.4	0.6	0.4		0.6	0.3	0.4	-0.6	0.2	0.3	0.3	-0.3	0.9	0.2	0.1	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Non dioxin-like PCB - Z-scores

LC	Data set	Sample	Z-score [σ_p = 15 %]	Sum Indicator PCBs reported upper bound	Sum Indicator PCBs reported lower bound	Sum Indicator PCBs calculated upper bound	Sum Indicator PCBs calculated lower bound	Z-score [σ_p = 20 %]	PCB 28	PCB 52	PCB 101	PCB 138	PCB 153	PCB 180
1	A	2502-HY		-0.6	-0.6	-0.6	-0.6		-0.2	0.0	-0.5	-0.9	-1.0	-0.7
2	A	2502-HY		0.4	0.4	0.4	0.4		-0.2	0.0	0.2	0.6	1.4	0.7
3	A	2502-HY		0.3	0.3	0.3	0.3		0.5	0.0	-0.1	1.0	0.3	-0.4
4	A	2502-HY												
5		2502-HY												
6		2502-HY												
7	A	2502-HY		2.1	2.1	2.5	2.5		1.8	2.7	2.1	1.2	1.1	0.6
8	A	2502-HY		0.6	0.6	0.9	1.0		0.8	1.3	-0.1	1.3	0.5	0.5
9	A	2502-HY		0.2	0.3	0.3	0.3		-0.8	0.2	1.1	-0.4	0.8	0.6
10		2502-HY												
11	A	2502-HY		-0.2	-0.1	-0.2	-0.1		0.5	0.0	-0.4	-0.4	-0.4	-0.2
12	A	2502-HY		0.3	0.3	0.3	0.3		1.6	-0.4	-0.1	0.0	0.4	-0.3
13	A	2502-HY		0.0	-0.3	0.0	-0.3		0.5	-0.3	-0.5	0.8	-0.6	
14	A	2502-HY		-0.7	-0.7	-0.7	-0.7		-0.4	-0.4	-0.6	-0.8	-0.8	-0.9
15	A	2502-HY		1.4	1.4	1.4	1.4		2.8	0.9	0.9	0.3	0.0	-1.0
16	A	2502-HY		0.0	0.1	0.0	0.1		-0.1	0.2	0.2	0.0	-0.1	-0.3
17	A	2502-HY		-0.2	-0.5	-0.1	-0.5		0.4	-0.6	-0.2	-0.9	0.9	
18	A	2502-HY		0.0	0.0	0.0	0.0		0.3	0.1	-0.1	-0.1	-0.3	-0.4
19		2502-HY												
20	A	2502-HY		0.3	0.3	66.1	66.3		52.4	49.1	47.2	46.2	57.7	44.1
21	A	2502-HY		0.2	0.2	0.2	0.2		-1.1	-0.8	1.8	0.6	0.6	0.3
22	A	2502-HY												
23		2502-HY												
24	A	2502-HY												
25	A	2502-HY		0.4	0.4	0.4	0.4		0.7	0.5	0.2	0.1	0.0	0.3
26	A	2502-HY		-0.6	-0.6	-0.6	-0.6		-0.5	-0.3	-0.3	-0.6	-0.5	-0.4
27	A	2502-HY		0.2	0.2	0.2	0.2		-0.1	-0.3	0.2	0.6	1.0	0.5
28	A	2502-HY		-0.7	-0.7	-0.6	-0.6		-1.1	-0.5	-0.3	-0.2	-0.2	-0.2
29		2502-HY												
30		2502-HY												
31	A	2502-HY		-0.7	-0.7	-0.7	-0.7		-1.4	-0.7	-0.3	-0.3	0.5	-0.5
32		2502-HY												
33	A	2502-HY		0.0	0.1	0.1	0.1		-1.0	-0.3	0.5	-0.1	1.6	1.2
34	A	2502-HY		1.8	1.8	1.8	1.8		3.1	1.1	0.6	1.5	1.2	0.2
35		2502-HY												
36	A	2502-HY		0.1	-0.2	0.2	-0.1		-0.1	-0.5	0.2	1.0	0.5	
37		2502-HY												
38	A	2502-HY		0.5	0.6	0.5	0.6		1.2	-0.7	1.4	0.7	-0.2	-1.3
39	A	2502-HY		0.8	0.8	0.8	0.8		-0.4	0.6	0.1	0.3	3.5	0.1
40	A	2502-HY		4.7	4.0	4.7	4.0		5.2	-2.7	-1.1	3.5	21.8	
41	A	2502-HY		0.1	0.1	0.1	0.1		0.2	0.2	0.1	-0.2	0.1	-0.1
42	A	2502-HY				-1.6	-3.7			-0.6	-1.0			-0.8
43		2502-HY												
44	A	2502-HY		-0.1	-0.1	-0.1	-0.1		-0.4	-0.1	0.0	0.1	0.1	0.0
45		2502-HY												
46	A	2502-HY		0.1	0.1	0.1	0.1		0.8	0.0	0.0	-0.1	-0.3	-0.5
47	A	2502-HY												
48	A	2502-HY		0.2	0.2	0.2	0.2		0.2	0.1	0.8	-0.1	-0.7	0.1
49	A	2502-HY		0.1	0.2	0.2	0.2		0.6	-0.3	-0.3	-0.2	1.7	-0.8
50	A	2502-HY		0.0	0.0	0.0	0.0		0.1	0.3	-0.2	-0.2	0.0	0.5
51	A	2502-HY		0.7	0.4	0.8	0.4		0.1	0.8	0.1	1.5	0.4	
52		2502-HY												
53		2502-HY												
54	A	2502-HY		-0.1	-0.1	-0.1	0.0		-0.1	0.5	-0.3	-0.1	-0.5	0.3
55	A	2502-HY		-0.9	-0.9	-0.9	-0.9		-0.7	-0.5	-0.9	-0.4	-0.6	-0.5
56		2502-HY												
57	A	2502-HY		0.3	0.4	0.3	0.3		1.9	0.2	-0.3	-0.7	0.0	-0.1
58	A	2502-HY		0.9	0.9	0.9	0.9		0.0	1.1	0.4	0.6	1.6	0.4
59		2502-HY												

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Non dioxin-like PCB - Z-scores

LC	Data set	Sample	Z-score [σ_p = 15 %]	Sum Indicator PCBs reported upper bound	Sum Indicator PCBs reported lower bound	Sum Indicator PCBs calculated upper bound	Sum Indicator PCBs calculated lower bound	Z-score [σ_p = 20 %]	PCB 28	PCB 52	PCB 101	PCB 138	PCB 153	PCB 180
60	A	2502-HY		-0.2	-0.1	-0.1	-0.1		-0.1	0.1	-0.1	-0.3	-0.2	-0.2
61		2502-HY												
62	A	2502-HY		0.7	0.7	0.7	0.7		0.9	0.4	0.8	0.7	-0.2	-0.3
63	A	2502-HY												
64	A	2502-HY		4.1	4.1	4.1	4.1		8.7	1.9	1.0	3.3	2.0	-2.4
65	A	2502-HY		-0.1	-0.1	-0.1	-0.1		-0.1	0.4	-0.2	0.1	-0.7	-0.5
66	A	2502-HY												
67	A	2502-HY		0.3	0.0	0.4	0.0		-0.1	0.2	-0.1	1.7	-0.5	
68	A	2502-HY		0.0	0.0	0.0	0.0		0.2	0.4	0.0	-0.5	-0.3	-0.1
69	A	2502-HY		-0.1	-0.1	-0.1	-0.1		0.1	-0.2	0.2	-0.4	0.2	-0.4
70	A	2502-HY		-1.7	-2.0	-1.7	-2.0		-2.4	-2.1	-1.1	0.3	-0.6	
71	A	2502-HY		-0.1	-0.1	-0.1	-0.1		0.1	-0.2	0.1	-0.4	0.2	-0.4
72	A	2502-HY		-1.0	-1.0	-1.0	-1.0		-1.2	-0.9	-0.4	0.0	-1.0	-1.5
73	A	2502-HY		-0.9	-0.9	-0.9	-0.9		-0.5	1.3	0.0	-0.8		
74		2502-HY												
75		2502-HY												
76	A	2502-HY		-2.4	-2.8	-2.4	-2.8		-2.7	-2.3	-1.9	-1.1	-1.4	
77	A	2502-HY		3.8	3.2	3.7	3.2		5.0	0.7	2.2	1.9	4.6	
78	A	2502-HY		-0.9	-0.8	-0.8	-0.8		-1.1	-0.6	-0.6	-0.5	-0.5	-0.2
79	A	2502-HY		0.2	0.2	0.2	0.2		1.3	-0.2	0.2	-0.3	0.0	-0.3
80	A	2502-HY		-0.3	-0.3	-0.4	-0.4		0.2	-0.3	-0.3	-0.7	-0.5	-0.5
81	A	2502-HY		0.9	1.0	0.9	1.0		0.5	0.9	1.0	0.6	0.4	-0.3
82	A	2502-HY		-0.6	-0.6	-0.6	-0.6		-0.1	-0.6	-0.2	-0.8	-0.6	-0.3
83	A	2502-HY		0.2	-0.1	0.2	-0.1		0.2	0.2	0.2	-0.3	0.0	
84	A	2502-HY		-0.5	-0.5	-0.5	-0.5		-0.3	-0.3	-0.7	0.1	-0.7	-0.3
85	A	2502-HY		-0.1	-0.1	-0.1	-0.1		0.1	-0.3	0.1	-0.5	0.3	-0.3
86	A	2502-HY		-0.3	-0.3	-0.3	-0.3		0.3	0.1	-0.5	-0.5	-0.6	-0.8
87	A	2502-HY		-0.5	-0.9	-0.5	-0.9		0.4	-0.9	-0.2	-0.7	-1.1	
88	A	2502-HY		1.4	1.4	1.4	1.4		1.5	1.3	0.7	0.8	0.9	0.4
89	A	2502-HY		-1.9	-1.9	-0.8	-0.8		-1.2	-0.4	-0.4	-0.7	-0.5	-0.7
90		2502-HY												
91		2502-HY												
92	A	2502-HY												
93	A	2502-HY		0.0	0.0	0.0	0.0		0.1	0.1	0.0	-0.3	-0.1	-0.1
94	A	2502-HY												
95		2502-HY												
96	A	2502-HY		0.5	0.1	0.5	0.1		-0.1	0.4	0.0	1.6	-0.3	
97		2502-HY												
Additional Sets														
41	B	2502-HY		0.6	0.7	0.6	0.6		0.4	0.6	0.7	0.1	0.4	0.5
65	B	2502-HY		0.0	0.1	0.1	0.1		0.3	0.5	-0.2	-0.2	-0.4	-0.4
85	B	2502-HY		-0.1	-0.1	-0.1	-0.1		0.0	0.1	-0.4	-0.2	0.5	-0.3
41	C	2502-HY		0.0	0.0	0.0	0.0		0.1	0.1	0.0	0.0	-0.1	-0.3
		2502-HY												
17*	A	2502-HY		-0.2	-0.5	-0.1	-0.5		0.4	-0.6	-0.2	0.1	-0.3	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Bioanalytical screening methods - Bioassay-scores

LC	Data set	Sample	Bioassay-score [$\sigma_{bioassay}$ = 20 %]	PCDD/F + DL-PCB	PCDD/F	DL-PCB
1	A	2502-HY				
2	A	2502-HY				
3	A	2502-HY				
4	A	2502-HY				
5		2502-HY				
6		2502-HY				
7	A	2502-HY				
8	A	2502-HY				
9	A	2502-HY				
10		2502-HY				
11	A	2502-HY		0.6		
12	A	2502-HY				
13	A	2502-HY				
14	A	2502-HY				
15	A	2502-HY				
16	A	2502-HY				
17	A	2502-HY				
18	A	2502-HY				
19		2502-HY				
20	A	2502-HY				
21	A	2502-HY		2.1		
22	A	2502-HY				
23		2502-HY				
24	A	2502-HY				
25	A	2502-HY				
26	A	2502-HY				
27	A	2502-HY				
28	A	2502-HY				
29		2502-HY				
30		2502-HY				
31	A	2502-HY				
32		2502-HY				
33	A	2502-HY				
34	A	2502-HY				
35		2502-HY				
36	A	2502-HY				
37		2502-HY				
38	A	2502-HY				
39	A	2502-HY				
40	A	2502-HY				
41	A	2502-HY				
42	A	2502-HY				
43		2502-HY				
44	A	2502-HY				
45		2502-HY				
46	A	2502-HY				
47	A	2502-HY			-1.5	1.1
48	A	2502-HY				
49	A	2502-HY				
50	A	2502-HY				
51	A	2502-HY				
52		2502-HY				
53		2502-HY				
54	A	2502-HY				
55	A	2502-HY				
56		2502-HY				

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Bioanalytical screening methods - Bioassay-scores

LC	Data set	Sample	Bioassay-score [$\sigma_{bioassay}$ = 20 %]	PCDD/F + DL-PCB	PCDD/F	DL-PCB
57	A	2502-HY		0.3	-0.8	1.0
58	A	2502-HY				
59		2502-HY				
60	A	2502-HY				
61		2502-HY				
62	A	2502-HY				
63	A	2502-HY				
64	A	2502-HY				
65	A	2502-HY				
66	A	2502-HY				
67	A	2502-HY				
68	A	2502-HY				
69	A	2502-HY				
70	A	2502-HY				
71	A	2502-HY				
72	A	2502-HY				
73	A	2502-HY				
74		2502-HY				
75		2502-HY				
76	A	2502-HY				
77	A	2502-HY				
78	A	2502-HY		-1.0	0.0	-1.3
79	A	2502-HY		6.3		
80	A	2502-HY				
81	A	2502-HY				
82	A	2502-HY				
83	A	2502-HY				
84	A	2502-HY				
85	A	2502-HY				
86	A	2502-HY				
87	A	2502-HY				
88	A	2502-HY				
89	A	2502-HY				
90		2502-HY				
91		2502-HY				
92	A	2502-HY				
93	A	2502-HY				
94	A	2502-HY		-1.2		
95		2502-HY				
96	A	2502-HY				
97		2502-HY				

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Moisture content - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	Moisture content				Moisture content
				Physico-chemical methods PCDD/F	Physico-chemical methods DL-PCBs	Physico-chemical methods NDL-PCBs	Bioanalytical methods	Mean
1	A	2502-HY		-0.4	-0.4	-0.4		-0.4
2	A	2502-HY		-1.1	-1.1	-1.1		-1.1
3	A	2502-HY		-0.5	-0.5	-0.5		-0.5
4	A	2502-HY		0.4	0.4			0.4
5		2502-HY						
6		2502-HY						
7	A	2502-HY		2.4	2.4	2.4		2.4
8	A	2502-HY						
9	A	2502-HY		101.6	101.6	101.6		101.6
10		2502-HY						
11	A	2502-HY		101.2	101.2	101.2	101.2	101.2
12	A	2502-HY		-1.0	-1.0	-1.0		-1.0
13	A	2502-HY				0.1		0.1
14	A	2502-HY		-1.0	-1.0	-1.0		-1.0
15	A	2502-HY						
16	A	2502-HY		0.1	0.1	0.1		0.1
17	A	2502-HY				101.8		101.8
18	A	2502-HY		-0.3	-0.3	-0.3		-0.3
19		2502-HY						
20	A	2502-HY		0.3	0.3	0.3		0.3
21	A	2502-HY				-0.3	-0.3	-0.3
22	A	2502-HY		0.2	0.2			0.2
23		2502-HY						
24	A	2502-HY		0.4	0.4	0.4		0.4
25	A	2502-HY		-0.9	-0.9	-0.9		-0.9
26	A	2502-HY		-0.4	-0.4	-0.4		-0.4
27	A	2502-HY		0.0	0.0	0.0		0.0
28	A	2502-HY		-3.5	-3.5	-3.5		-3.5
29		2502-HY						
30		2502-HY						
31	A	2502-HY						
32		2502-HY						
33	A	2502-HY				0.1		0.1
34	A	2502-HY		1.7	1.7	1.7		1.7
35		2502-HY						
36	A	2502-HY				-0.6		-0.6
37		2502-HY						
38	A	2502-HY		0.1	0.1	0.1		0.1
39	A	2502-HY		0.2		0.2		0.2
40	A	2502-HY						
41	A	2502-HY				0.2		0.2
42	A	2502-HY						
43		2502-HY						
44	A	2502-HY		-0.7	-0.7	-0.7		-0.7
45		2502-HY						
46	A	2502-HY		0.2				0.2
47	A	2502-HY						
48	A	2502-HY		-0.2	-0.2	-0.2		-0.2
49	A	2502-HY		-0.4	-0.4	-0.4		-0.4
50	A	2502-HY						
51	A	2502-HY				0.7		0.7
52		2502-HY						
53		2502-HY						
54	A	2502-HY		1.6	1.6	1.6		1.6
55	A	2502-HY		-7.4	-7.4	-7.4		-7.4
56		2502-HY						
57	A	2502-HY		0.0	0.0	0.0	0.0	0.0
58	A	2502-HY		-0.2	-0.2	-0.2		-0.2
59		2502-HY						

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Moisture content - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	Moisture content				Moisture content
				Physico-chemical methods PCDD/F	Physico-chemical methods DL-PCBs	Physico-chemical methods NDL-PCBs	Bioanalytical methods	Mean
60	A	2502-HY		-1.1	-1.1	-1.1		-1.1
61		2502-HY						
62	A	2502-HY		0.0	0.0	0.0		0.0
63	A	2502-HY						
64	A	2502-HY		1.1				1.1
65	A	2502-HY		0.4	0.4	0.4		0.4
66	A	2502-HY		0.8	0.8			0.8
67	A	2502-HY				0.8		0.8
68	A	2502-HY		0.0	0.0	0.0		0.0
69	A	2502-HY		-0.1	-0.1	-0.1		-0.1
70	A	2502-HY		-0.4	-0.4	-0.4		-0.4
71	A	2502-HY		-0.1	-0.1	-0.1		-0.1
72	A	2502-HY		0.5	0.5	0.5		0.5
73	A	2502-HY		-4.6	-4.6	-4.6		-4.6
74		2502-HY						
75		2502-HY						
76	A	2502-HY				4.6		4.6
77	A	2502-HY				1.4		1.4
78	A	2502-HY		0.0	0.0	0.0	-0.4	-0.1
79	A	2502-HY		0.4	0.4	0.4		0.4
80	A	2502-HY		0.5	0.5	0.5		0.5
81	A	2502-HY		-0.9	-0.9	-0.9		-0.9
82	A	2502-HY		1.0	1.0	1.0		1.0
83	A	2502-HY				-0.9		-0.9
84	A	2502-HY		1.2	1.2	1.2		1.2
85	A	2502-HY		0.2	0.2	0.2		0.2
86	A	2502-HY				-0.3		-0.3
87	A	2502-HY				0.4		0.4
88	A	2502-HY		0.9	0.9	0.9		0.9
89	A	2502-HY		-0.8	-0.8	-0.8		-0.8
90		2502-HY						
91		2502-HY						
92	A	2502-HY		-0.8	-0.8			-0.8
93	A	2502-HY		0.6	0.6	0.2		0.5
94	A	2502-HY		0.2	0.2		0.2	0.2
95		2502-HY						
96	A	2502-HY				101.4		101.4
97		2502-HY						
Additional Sets								
41	B	2502-HY				0.2		0.2
65	B	2502-HY		0.4	0.4	-2.9		-0.7
85	B	2502-HY		0.2	0.2	0.2		0.2
41	C	2502-HY				0.2		0.2
		2502-HY						
17*	A	2502-HY				0.0		0.0

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 4: Participants' z-scores of PCDD/Fs and PCBs - Charts

Test sample - Hay (2502-HY)

Z-scores of sum parameters and individual results

Calculation of z-score on basis of assigned value

$z = (x - x_a) / (\sigma_{p\,rel} * xa)$

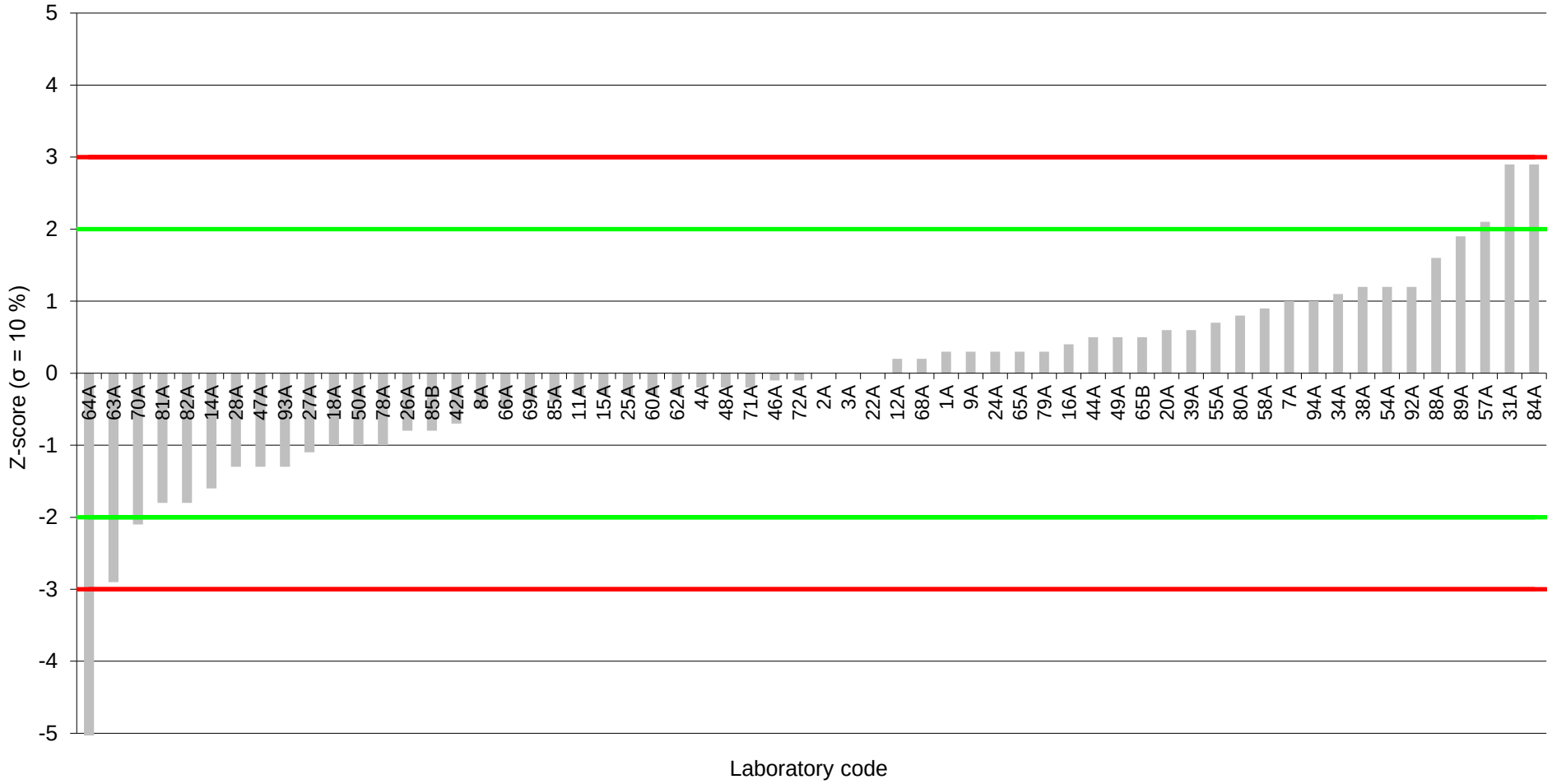
x_a: assigned value
x: participant's result
σ_p: fitness-for-purpose-based standard deviation for proficiency assessment
10%: WHO-PCDD/F-TEQ, WHO-PCB-TEQ and WHO-PCDD/F-PCB-TEQ
15%: Sum of six indicator PCBs (PCB 28, 52, 101, 138, 153, 180)
20%: Evaluated individual PCDD/F and PCB congeners

± 2 z-scores:
± 3 z-scores:

Hay (2502-HY)

WHO-PCDD/F-PCB-TEQ upper bound (reported)

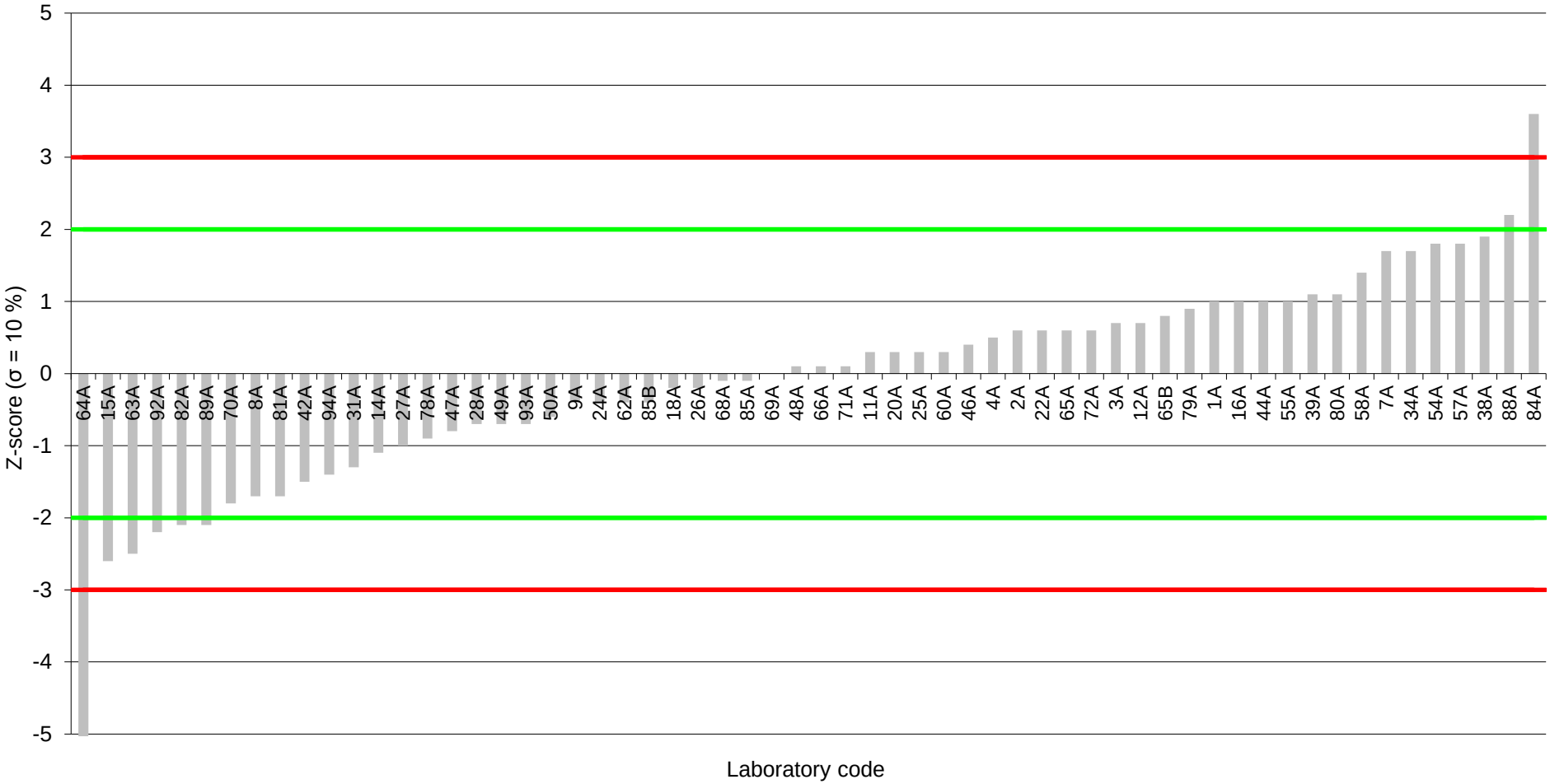
Assigned value: 0.621 ng/kg (12% moisture content)



Hay (2502-HY)

WHO-PCDD/F-PCB-TEQ lower bound (reported)

Assigned value: 0.583 ng/kg (12% moisture content)



Hay (2502-HY)

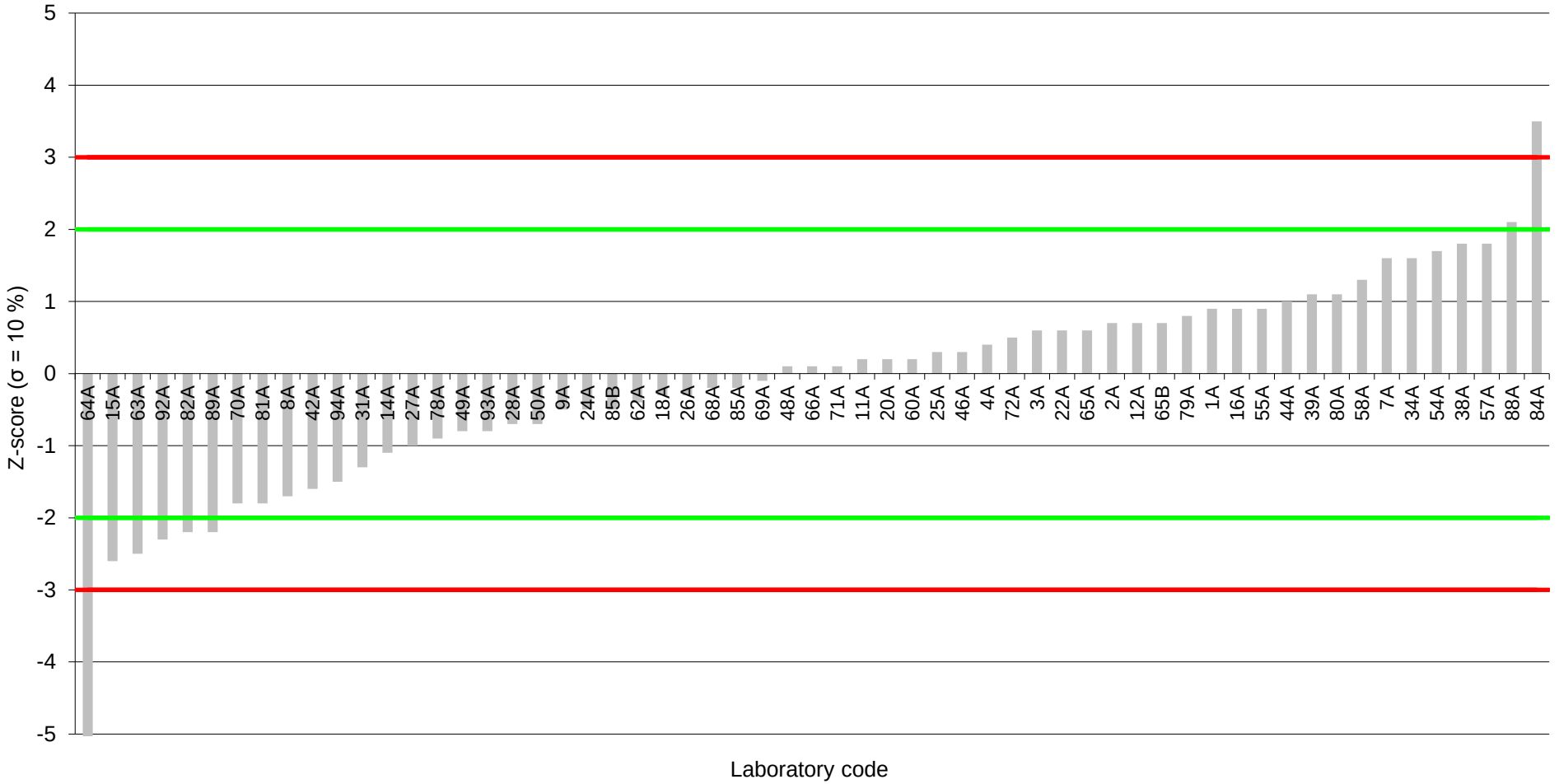
WHO-PCDD/F-PCB-TEQ upper bound (calculated)

Assigned value: 0.62 ng/kg (12% moisture content)

Hay (2502-HY)

WHO-PCDD/F-PCB-TEQ lower bound (calculated)

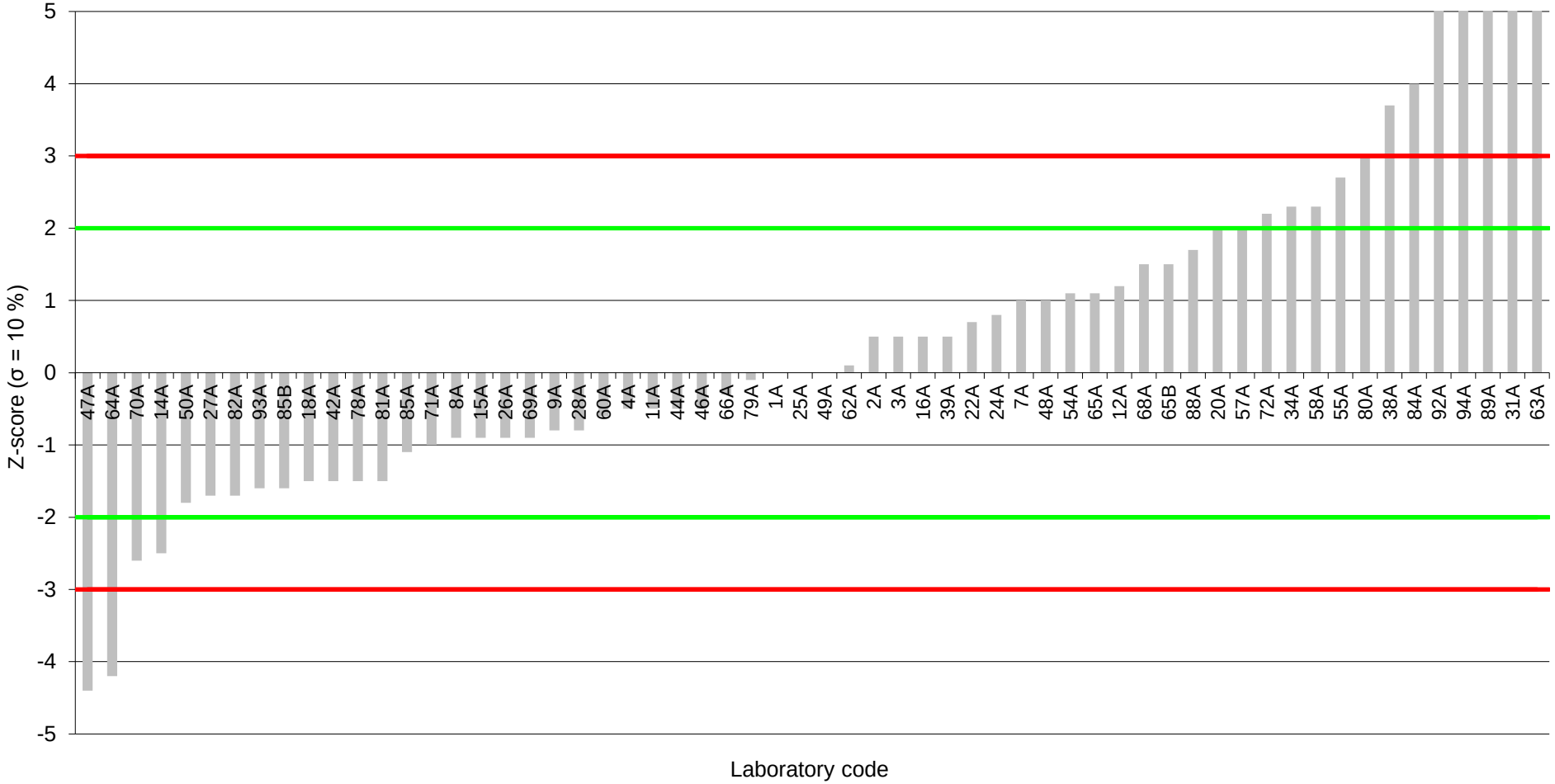
Assigned value: 0.587 ng/kg (12% moisture content)



Hay (2502-HY)

WHO-PCDD/F-TEQ upper bound (reported)

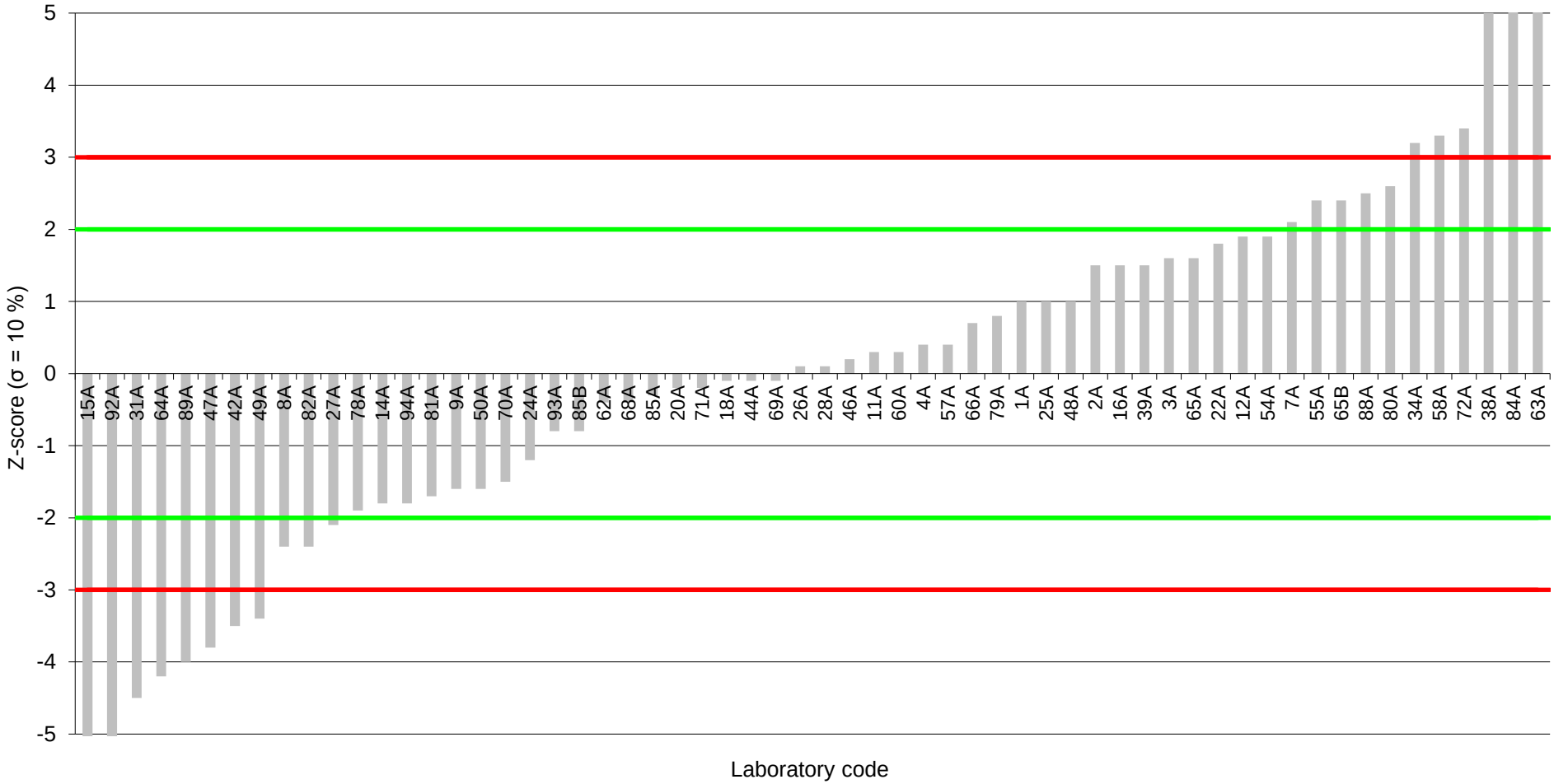
Assigned value: 0.2 ng/kg (12% moisture content)



Hay (2502-HY)

WHO-PCDD/F-TEQ lower bound (reported)

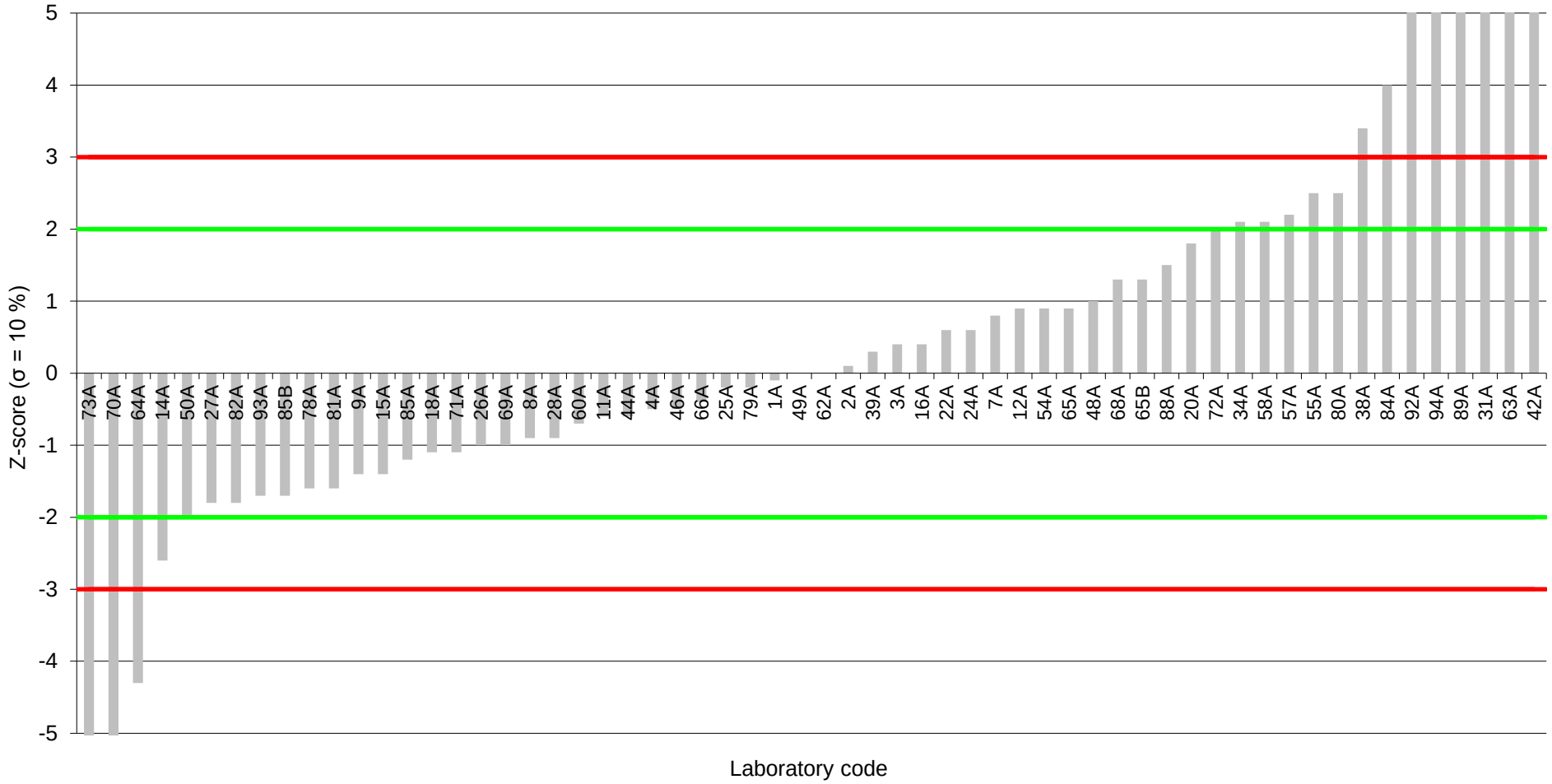
Assigned value: 0.182 ng/kg (12% moisture content)



Hay (2502-HY)

WHO-PCDD/F-TEQ upper bound (calculated)

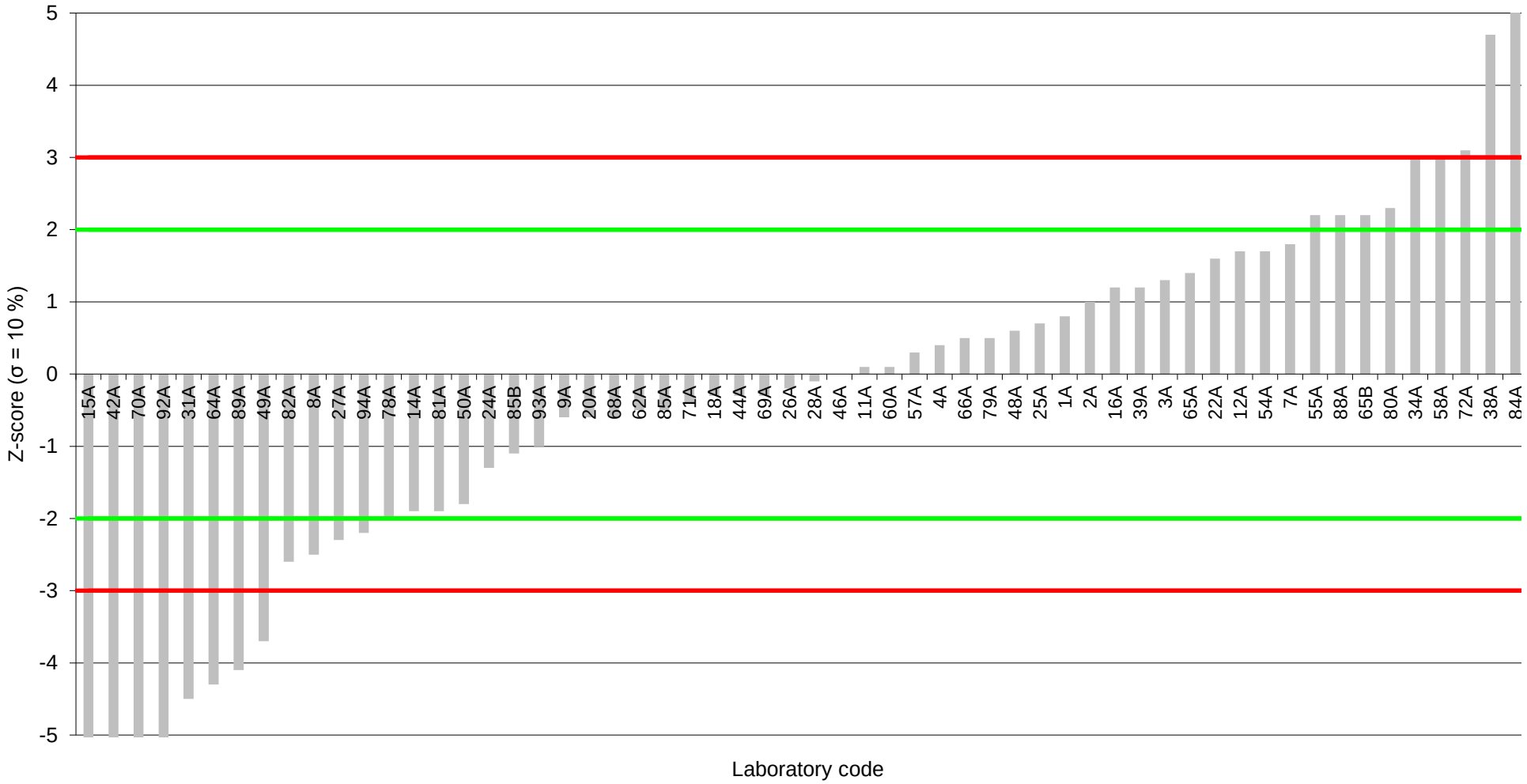
Assigned value: 0.203 ng/kg (12% moisture content)



Hay (2502-HY)

WHO-PCDD/F-TEQ lower bound (calculated)

Assigned value: 0.186 ng/kg (12% moisture content)



Hay (2502-HY)

1,2,3,7,8-PeCDD

Assigned value: 0.0561 ng/kg (12% moisture content)

Hay (2502-HY)

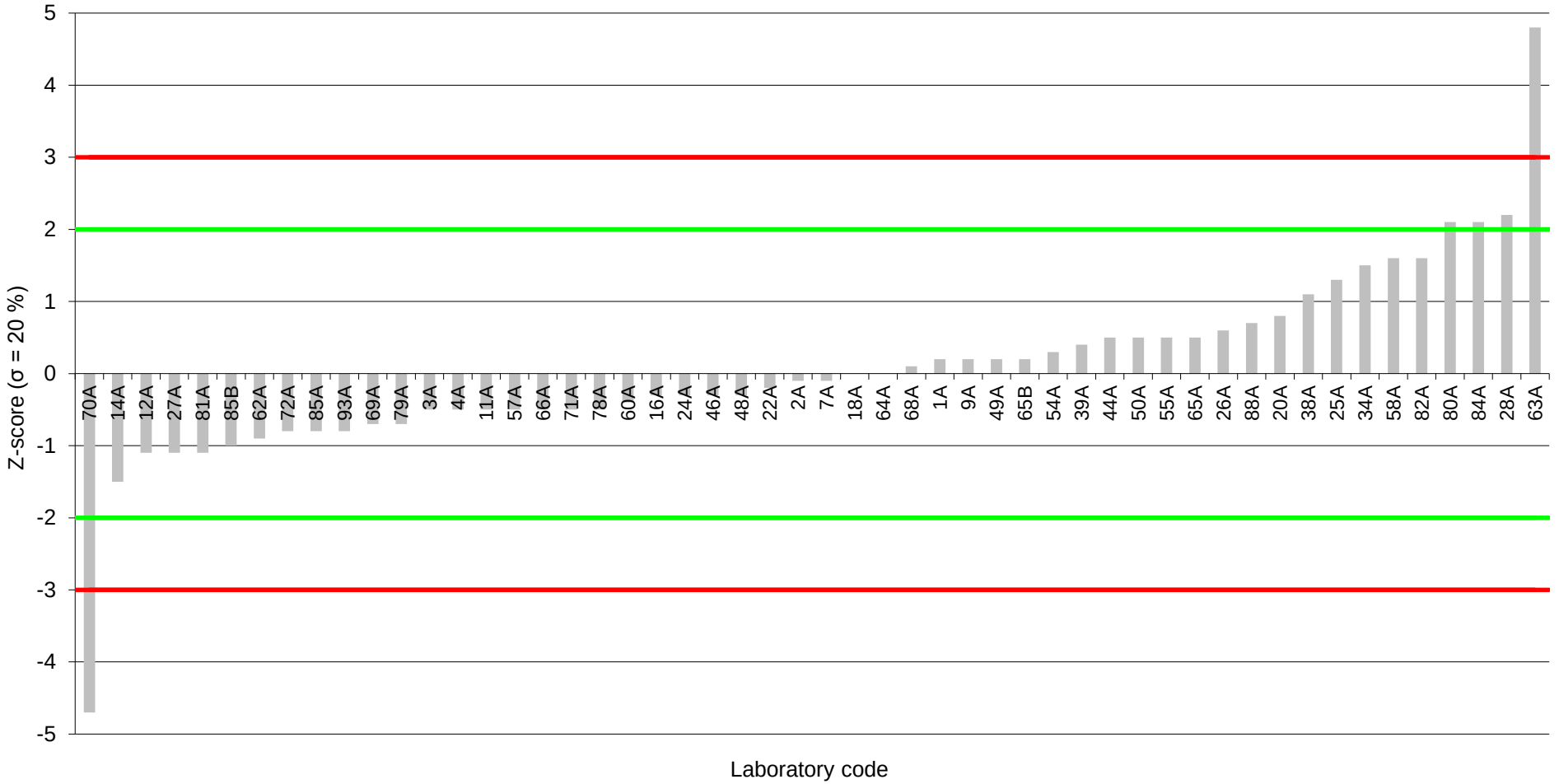
1,2,3,4,7,8-HxCDD

Assigned value: 0.0443 ng/kg (12% moisture content)

Hay (2502-HY)

1,2,3,6,7,8-HxCDD

Assigned value: 0.0772 ng/kg (12% moisture content)



Hay (2502-HY)

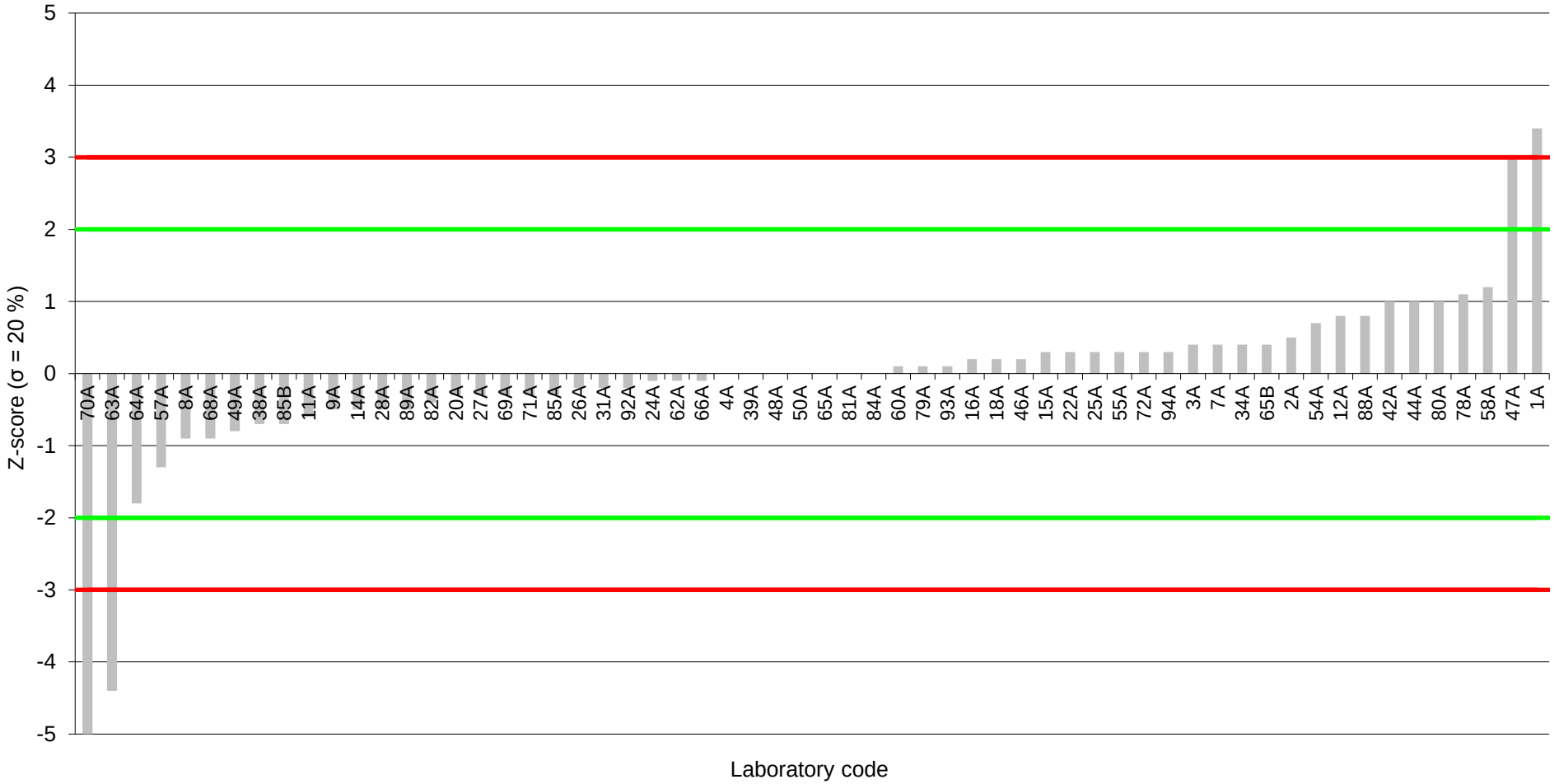
1,2,3,7,8,9-HxCDD

Assigned value: 0.0605 ng/kg (12% moisture content)

Hay (2502-HY)

1,2,3,4,6,7,8-HpCDD

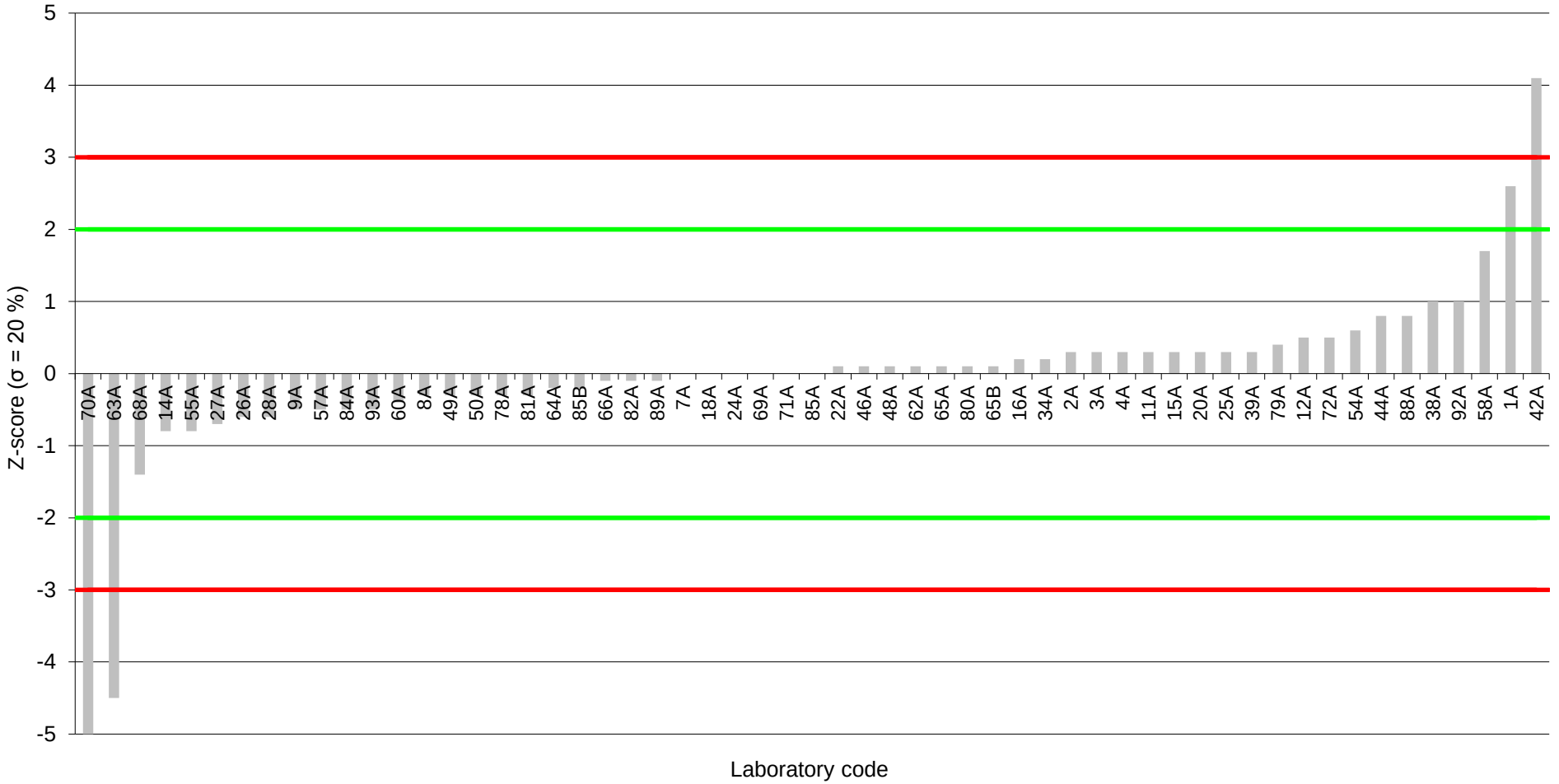
Assigned value: 0.679 ng/kg (12% moisture content)



Hay (2502-HY)

OCDD

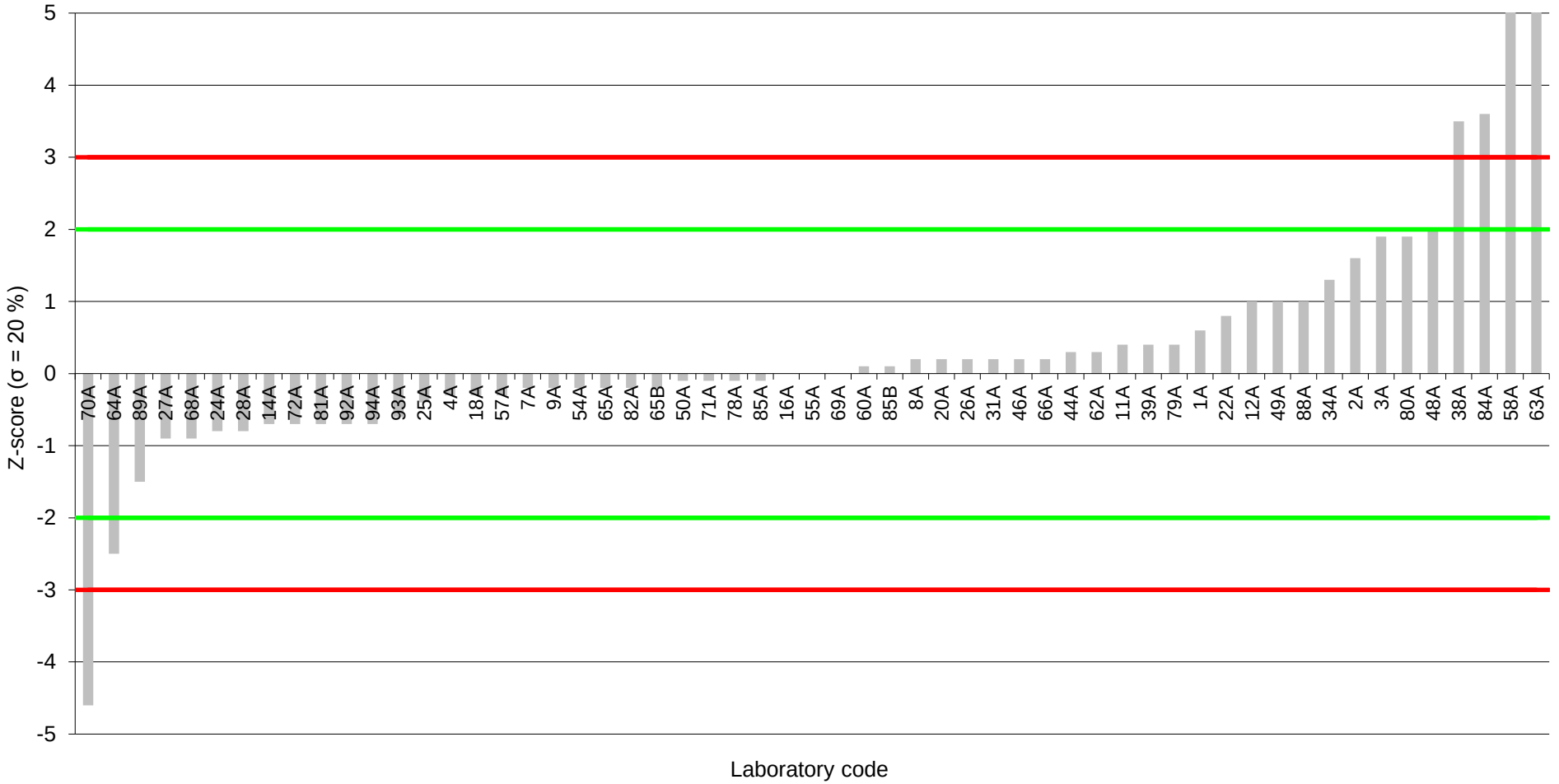
Assigned value: 2.47 ng/kg (12% moisture content)



Hay (2502-HY)

2,3,7,8-TCDF

Assigned value: 0.116 ng/kg (12% moisture content)



Hay (2502-HY)

1,2,3,7,8-PeCDF

Assigned value: 0.11 ng/kg (12% moisture content)

Hay (2502-HY)

2,3,4,7,8-PeCDF

Assigned value: 0.116 ng/kg (12% moisture content)

Hay (2502-HY)

1,2,3,4,7,8-HxCDF

Assigned value: 0.136 ng/kg (12% moisture content)

Hay (2502-HY)

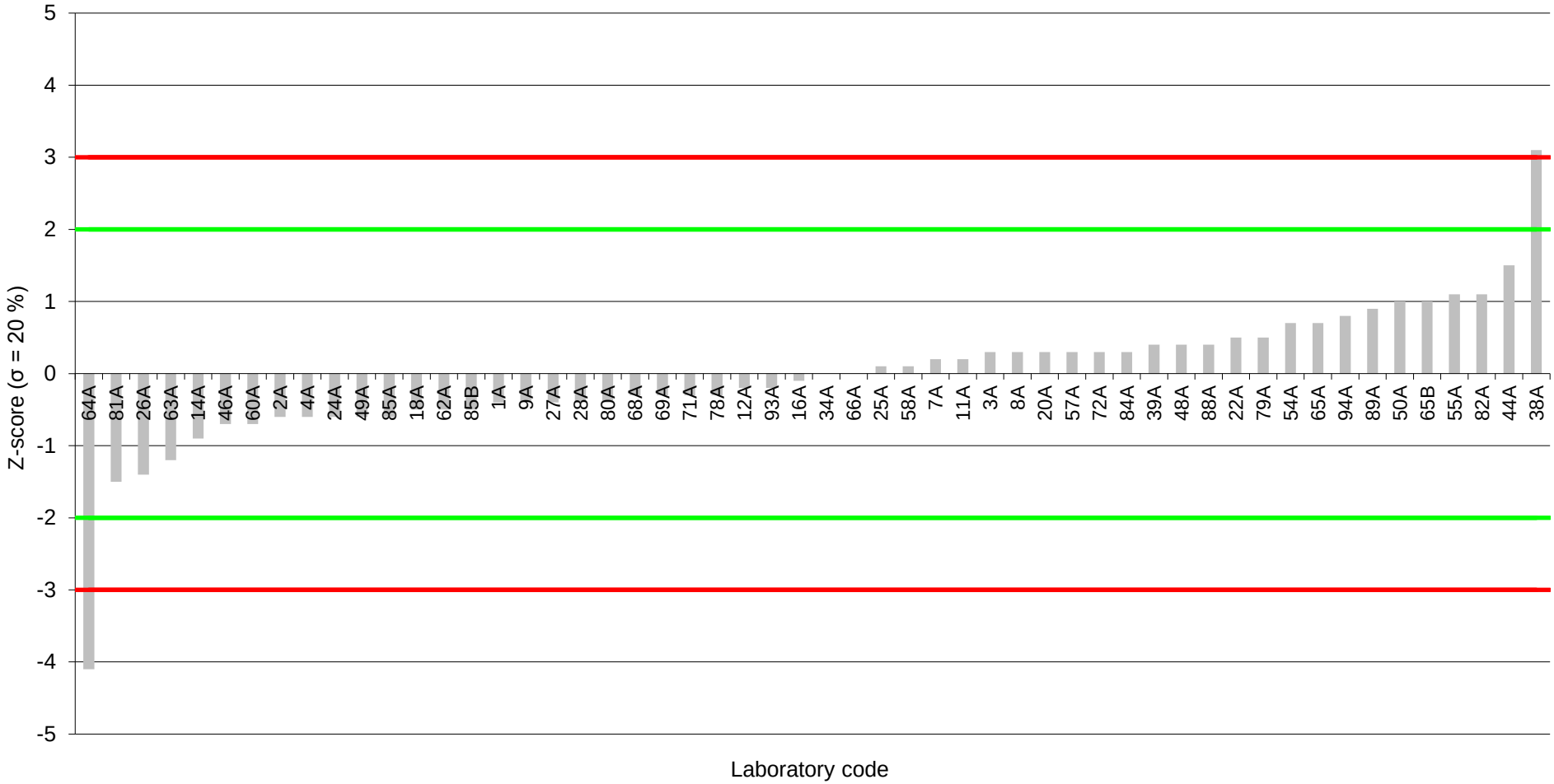
1,2,3,6,7,8-HxCDF

Assigned value: 0.13 ng/kg (12% moisture content)

Hay (2502-HY)

2,3,4,6,7,8-HxCDF

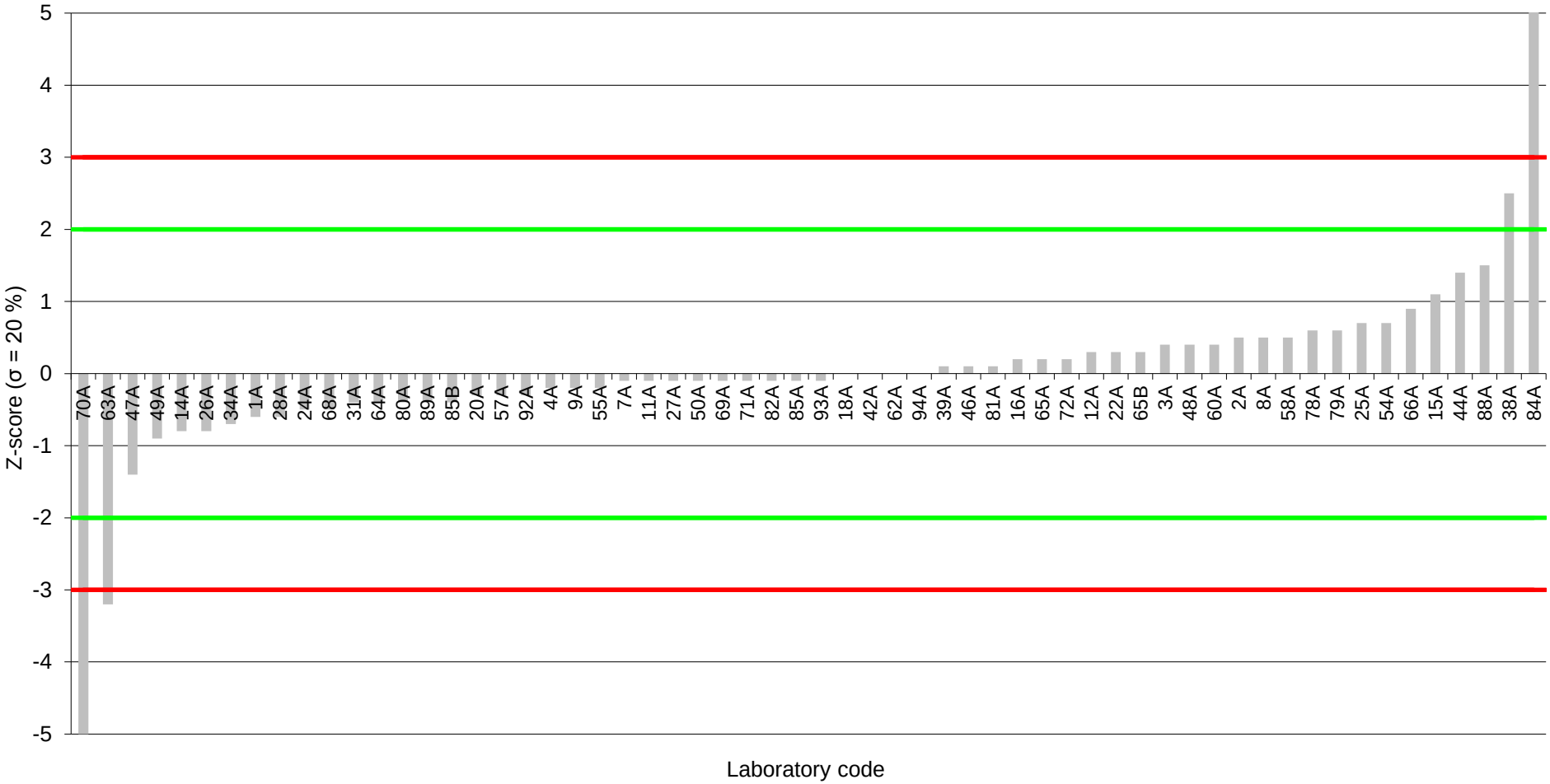
Assigned value: 0.103 ng/kg (12% moisture content)



Hay (2502-HY)

1,2,3,4,6,7,8-HpCDF

Assigned value: 0.527 ng/kg (12% moisture content)



Hay (2502-HY)

1,2,3,4,7,8,9-HpCDF

Assigned value: 0.0483 ng/kg (12% moisture content)

Hay (2502-HY)

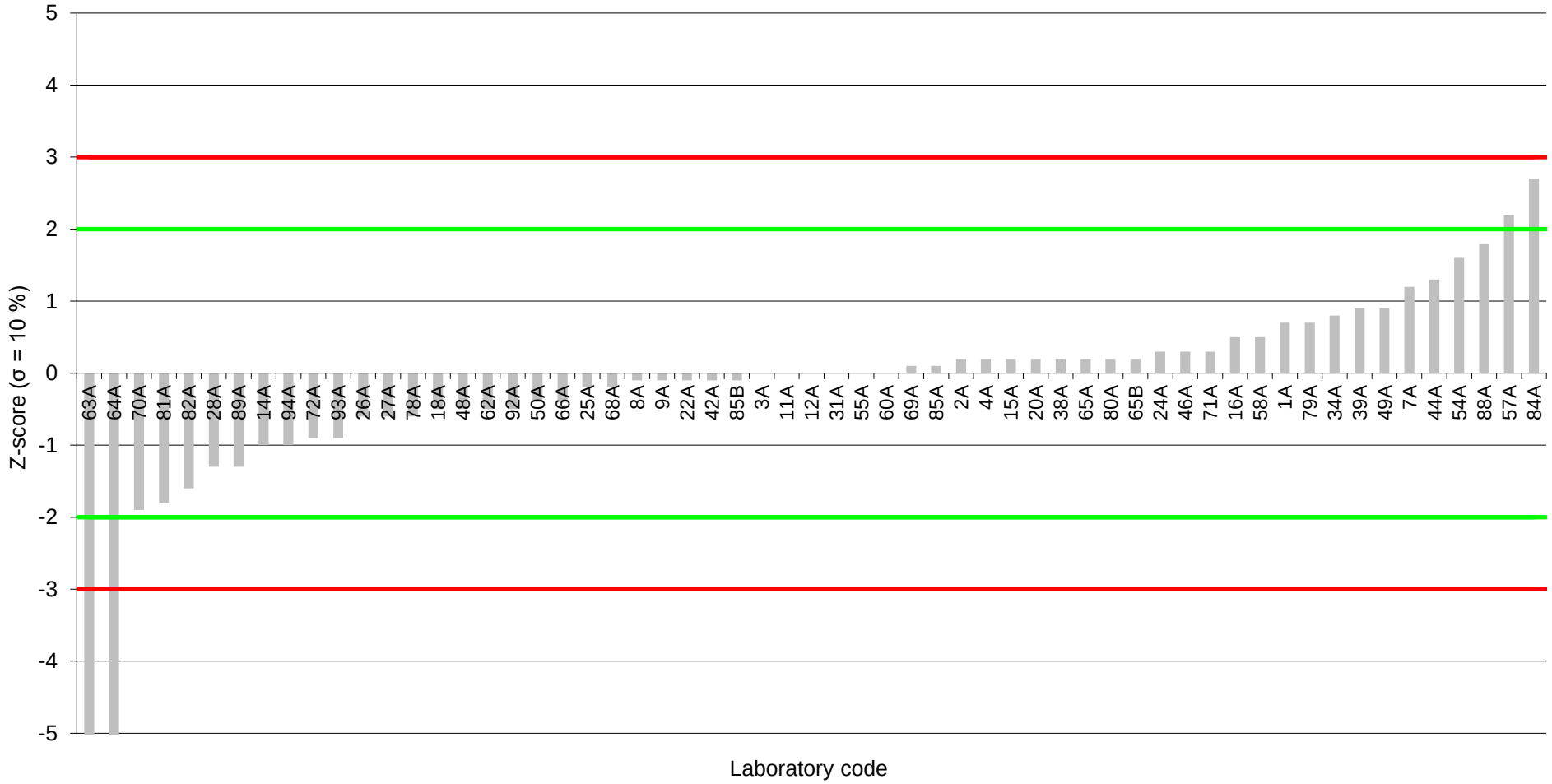
OCDF

Assigned value: 0.476 ng/kg (12% moisture content)

Hay (2502-HY)

WHO-PCB-TEQ upper bound (reported)

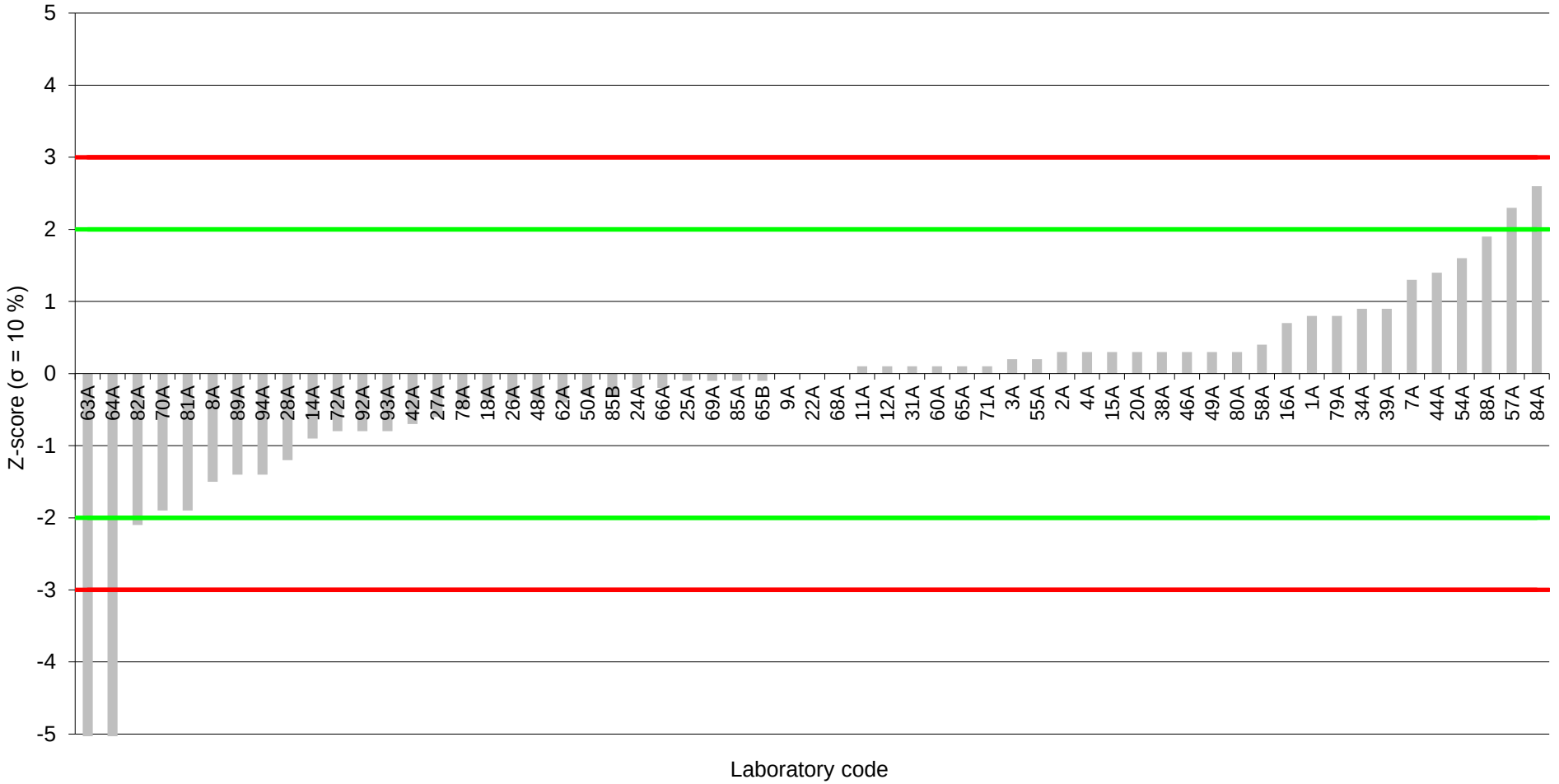
Assigned value: 0.411 ng/kg (12% moisture content)



Hay (2502-HY)

WHO-PCB-TEQ lower bound (reported)

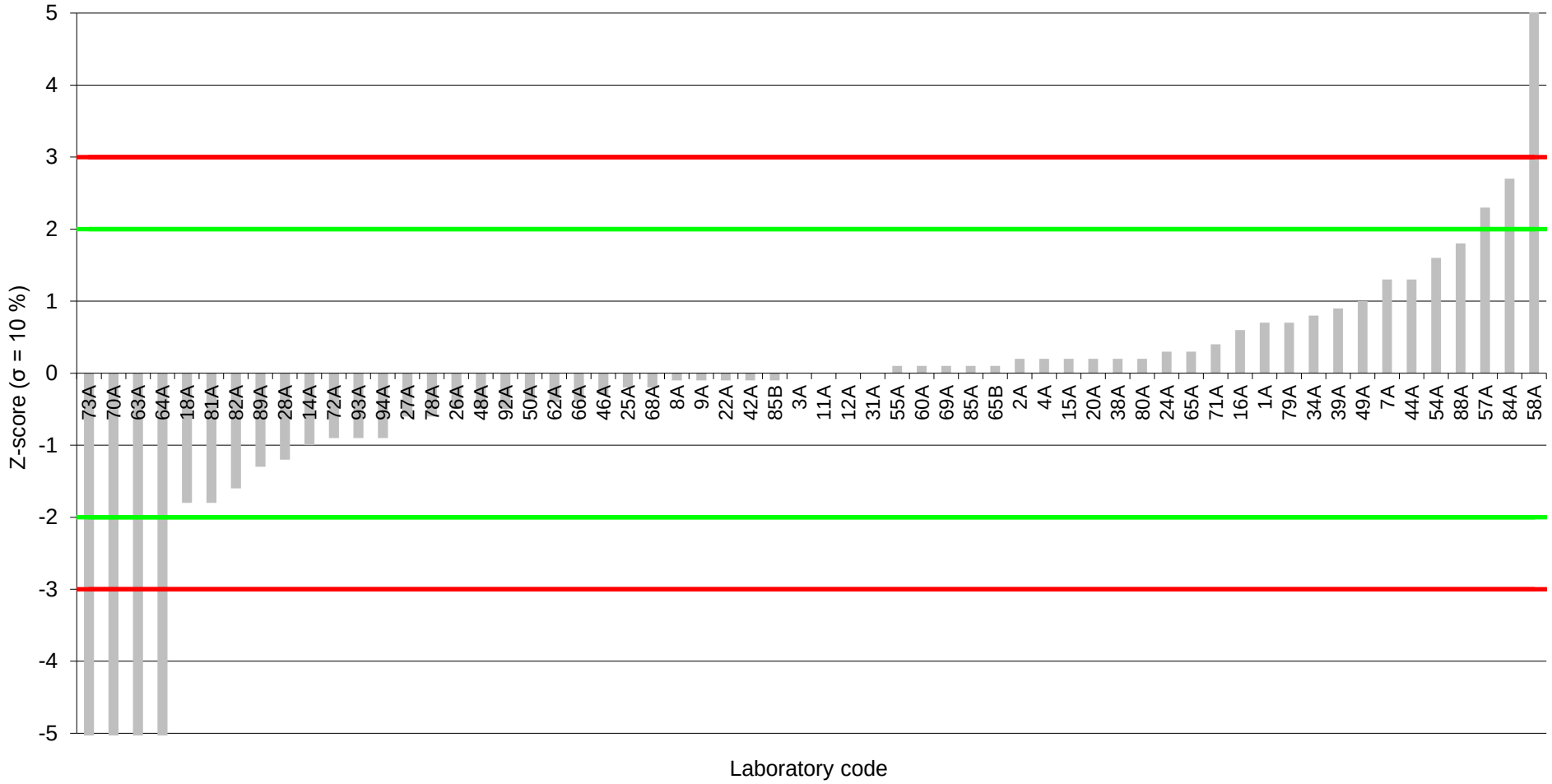
Assigned value: 0.406 ng/kg (12% moisture content)



Hay (2502-HY)

WHO-PCB-TEQ upper bound (calculated)

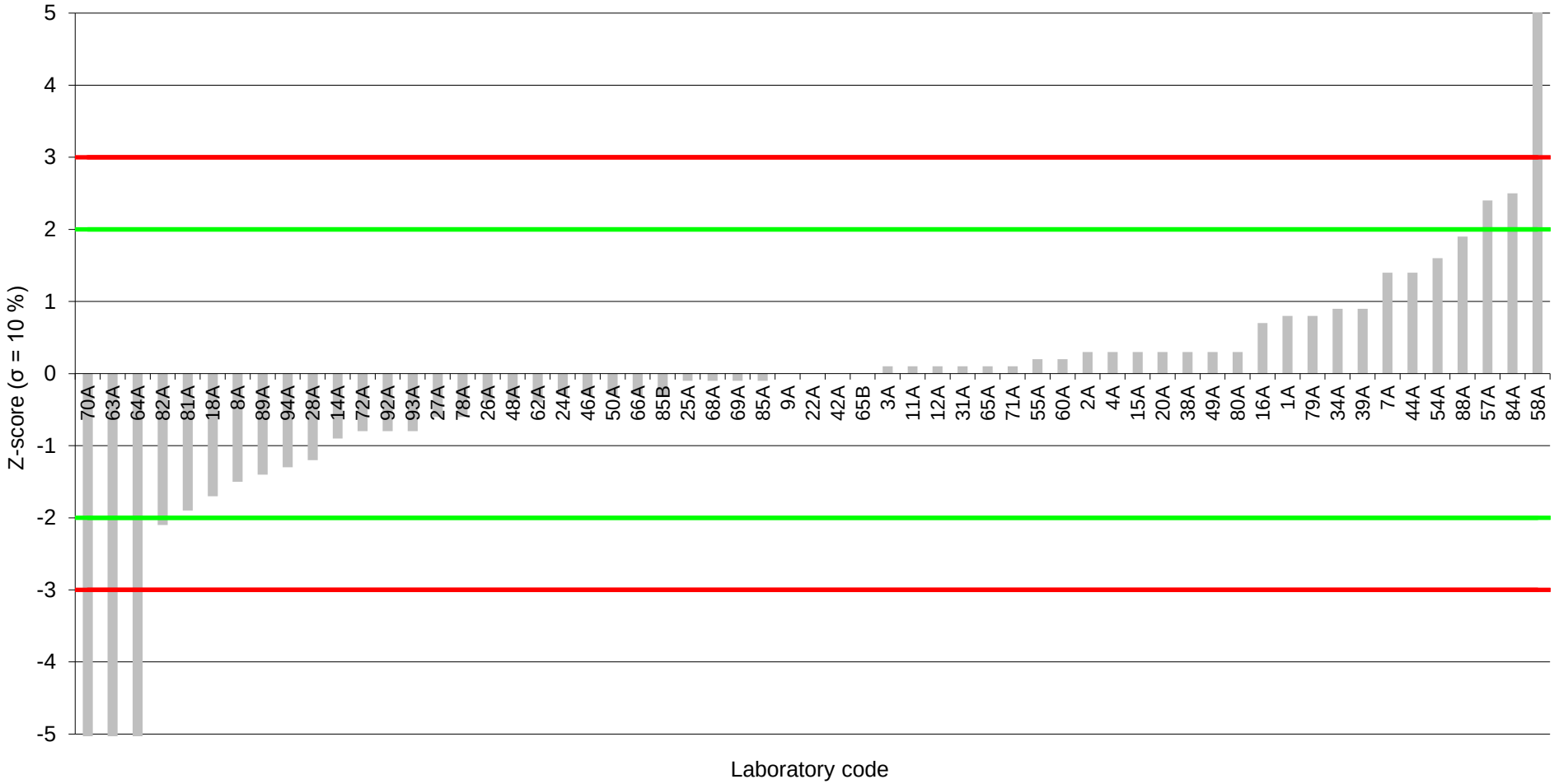
Assigned value: 0.41 ng/kg (12% moisture content)



Hay (2502-HY)

WHO-PCB-TEQ lower bound (calculated)

Assigned value: 0.406 ng/kg (12% moisture content)



Hay (2502-HY)

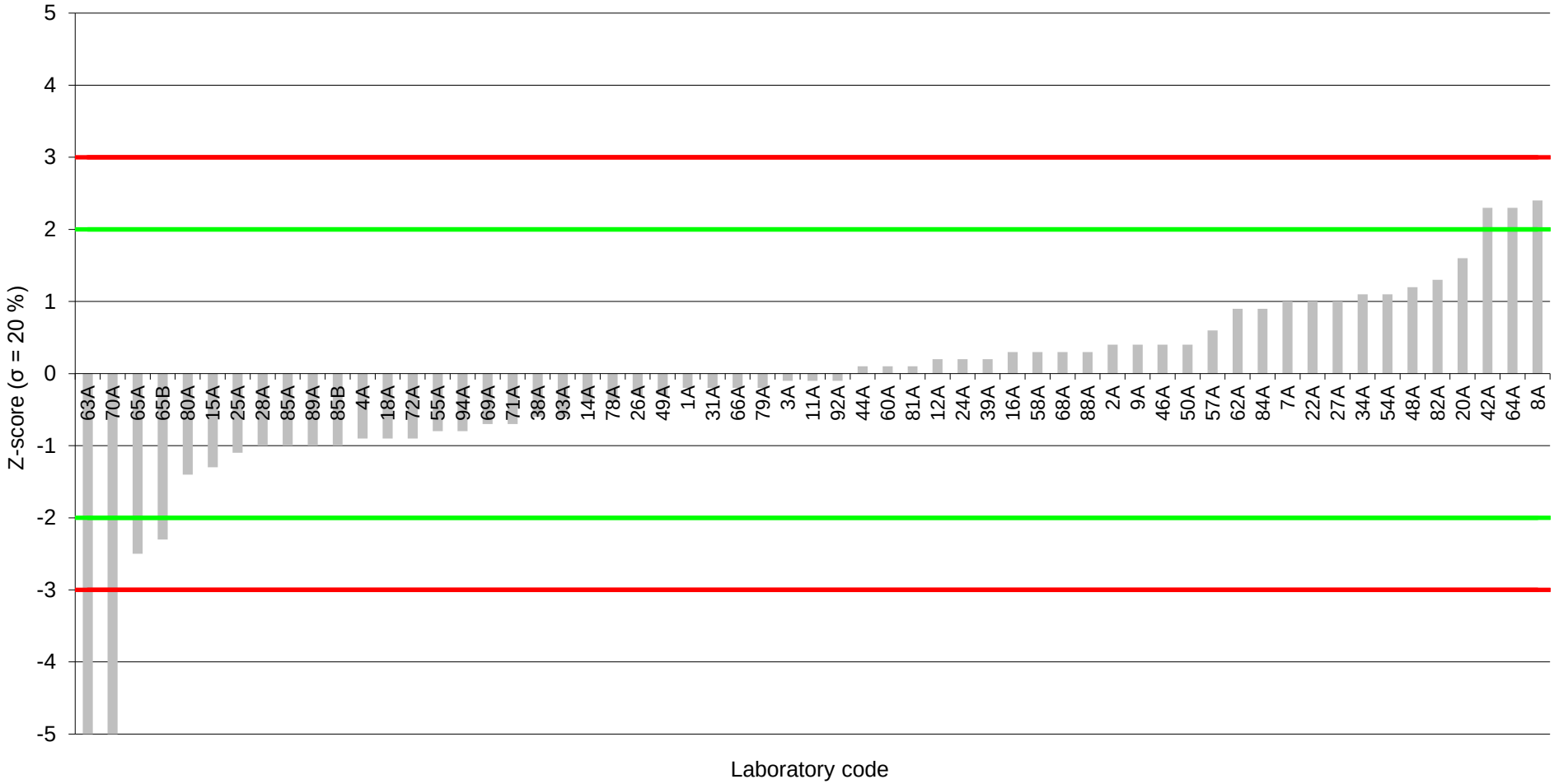
PCB 105

Assigned value: 795 ng/kg (12% moisture content)

Hay (2502-HY)

PCB 114

Assigned value: 56.2 ng/kg (12% moisture content)



Hay (2502-HY)

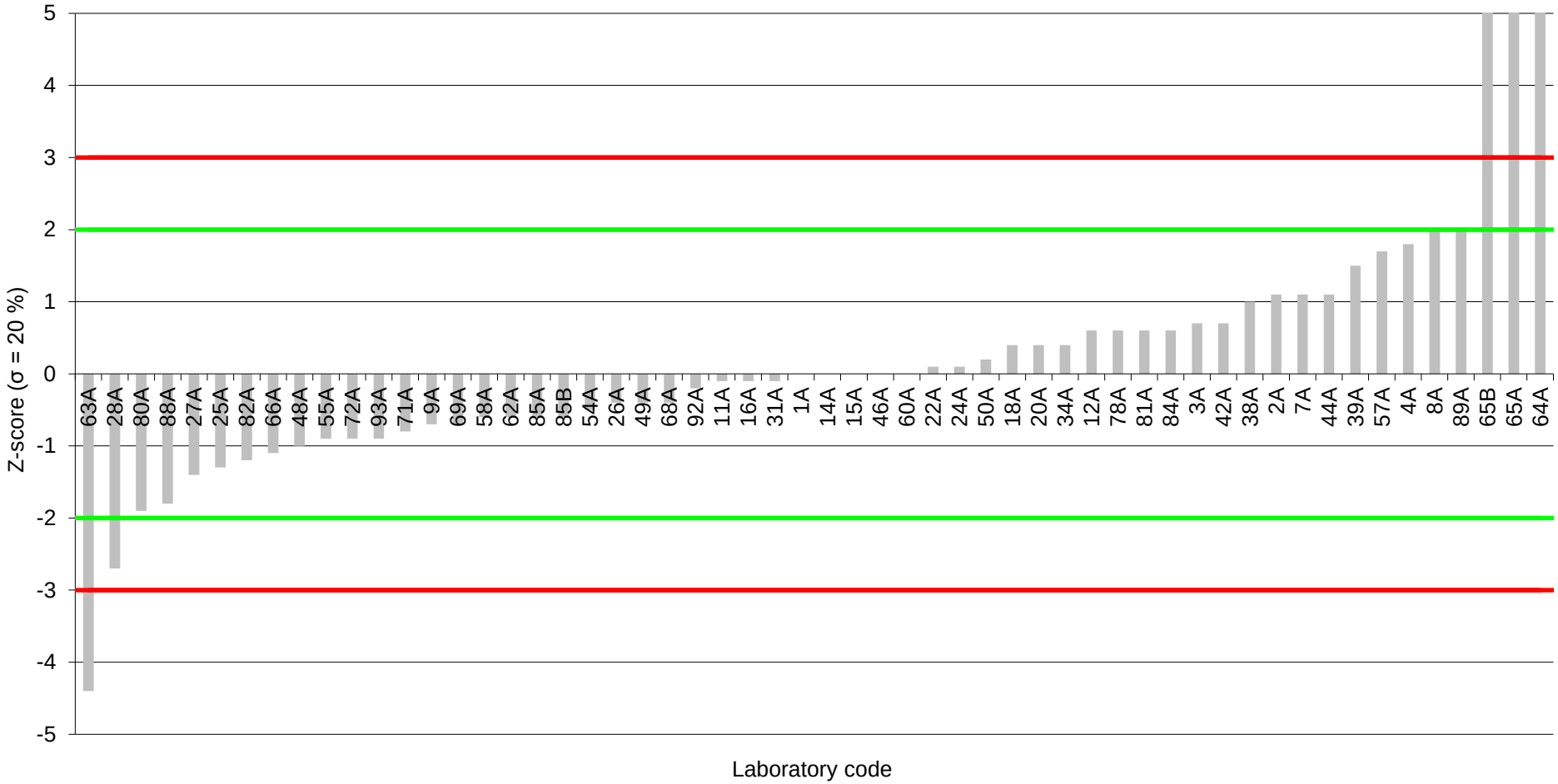
PCB 118

Assigned value: 1650 ng/kg (12% moisture content)

Hay (2502-HY)

PCB 123

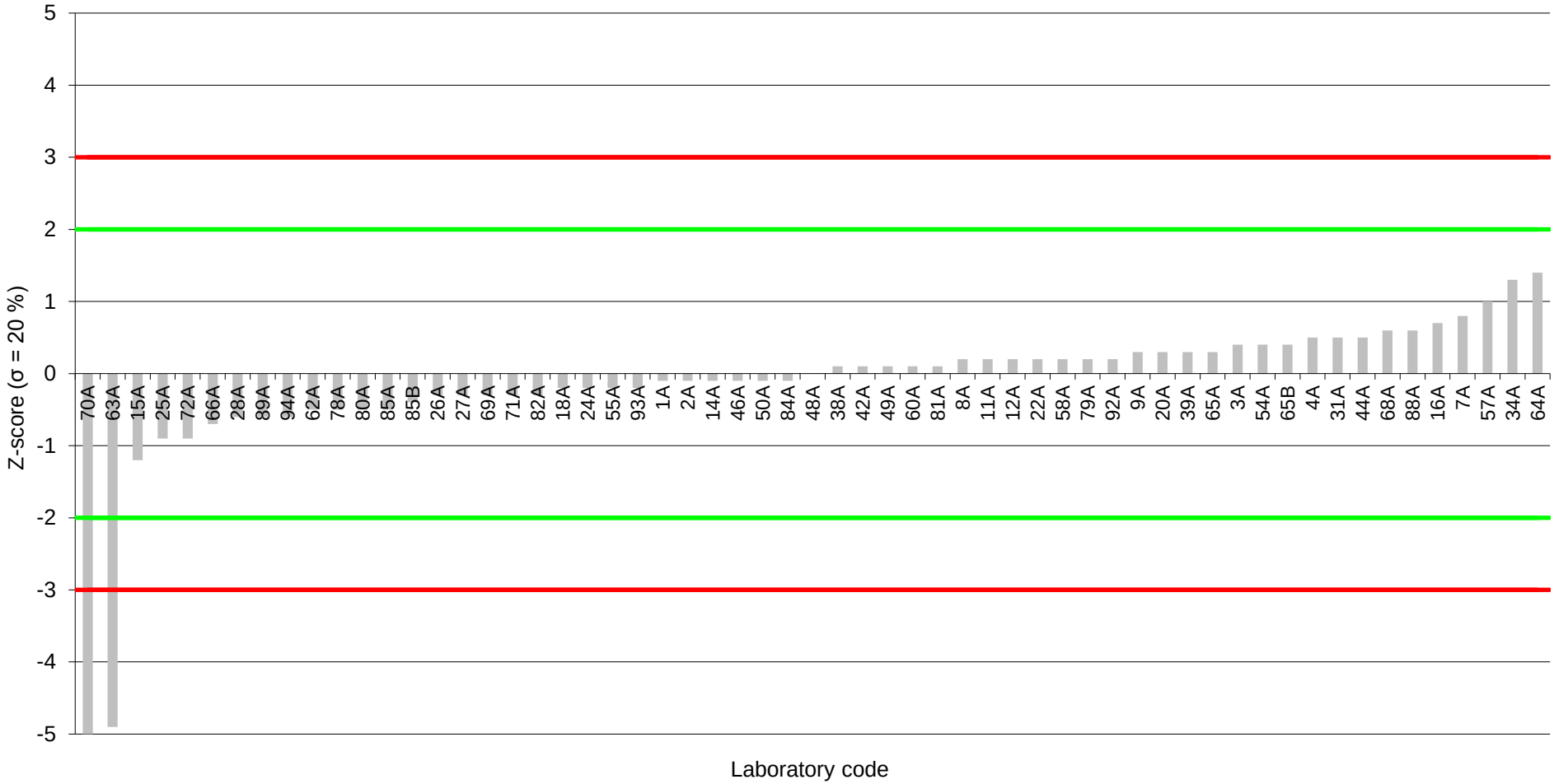
Assigned value: 33.8 ng/kg (12% moisture content)



Hay (2502-HY)

PCB 156

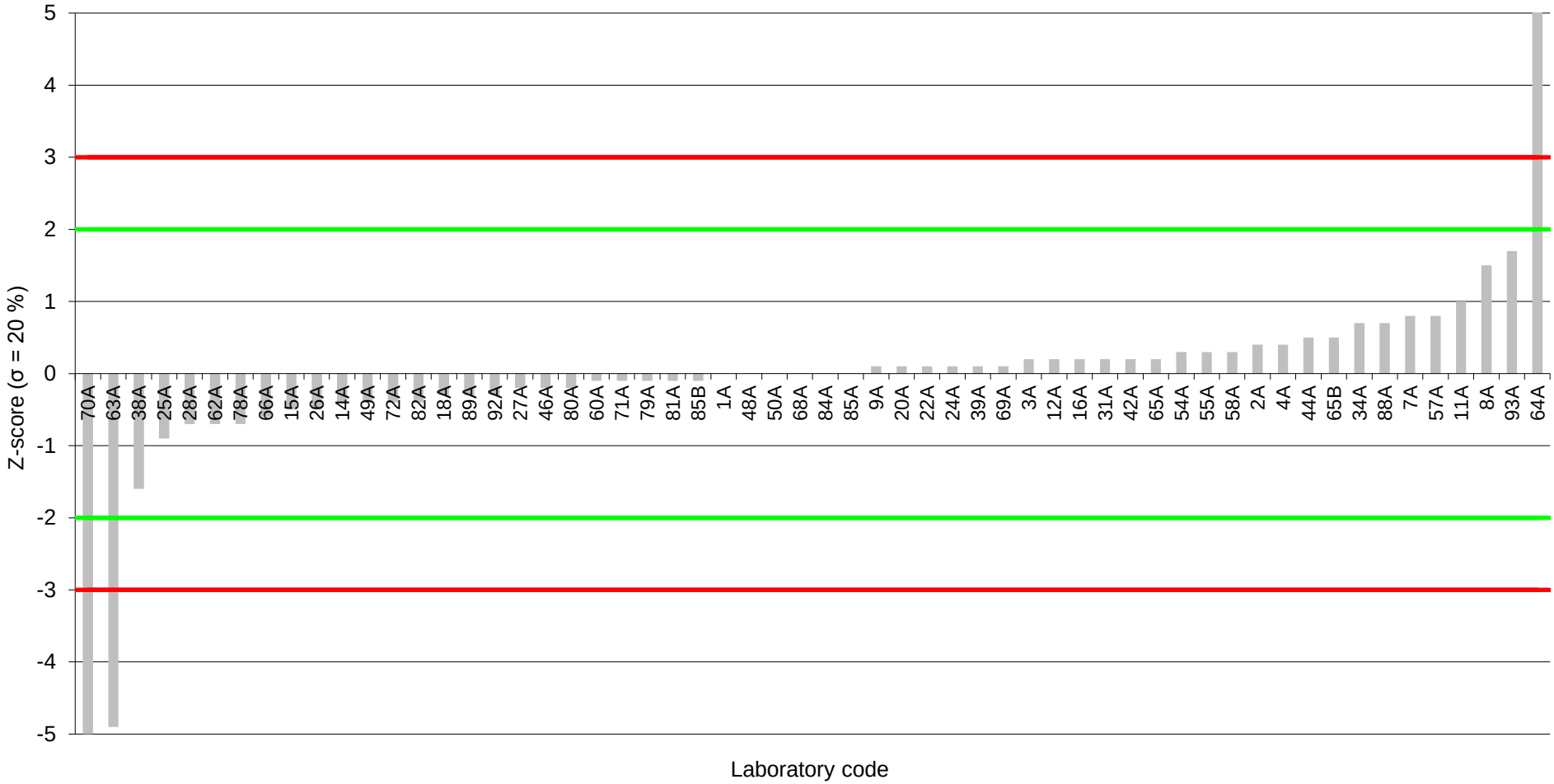
Assigned value: 191 ng/kg (12% moisture content)



Hay (2502-HY)

PCB 157

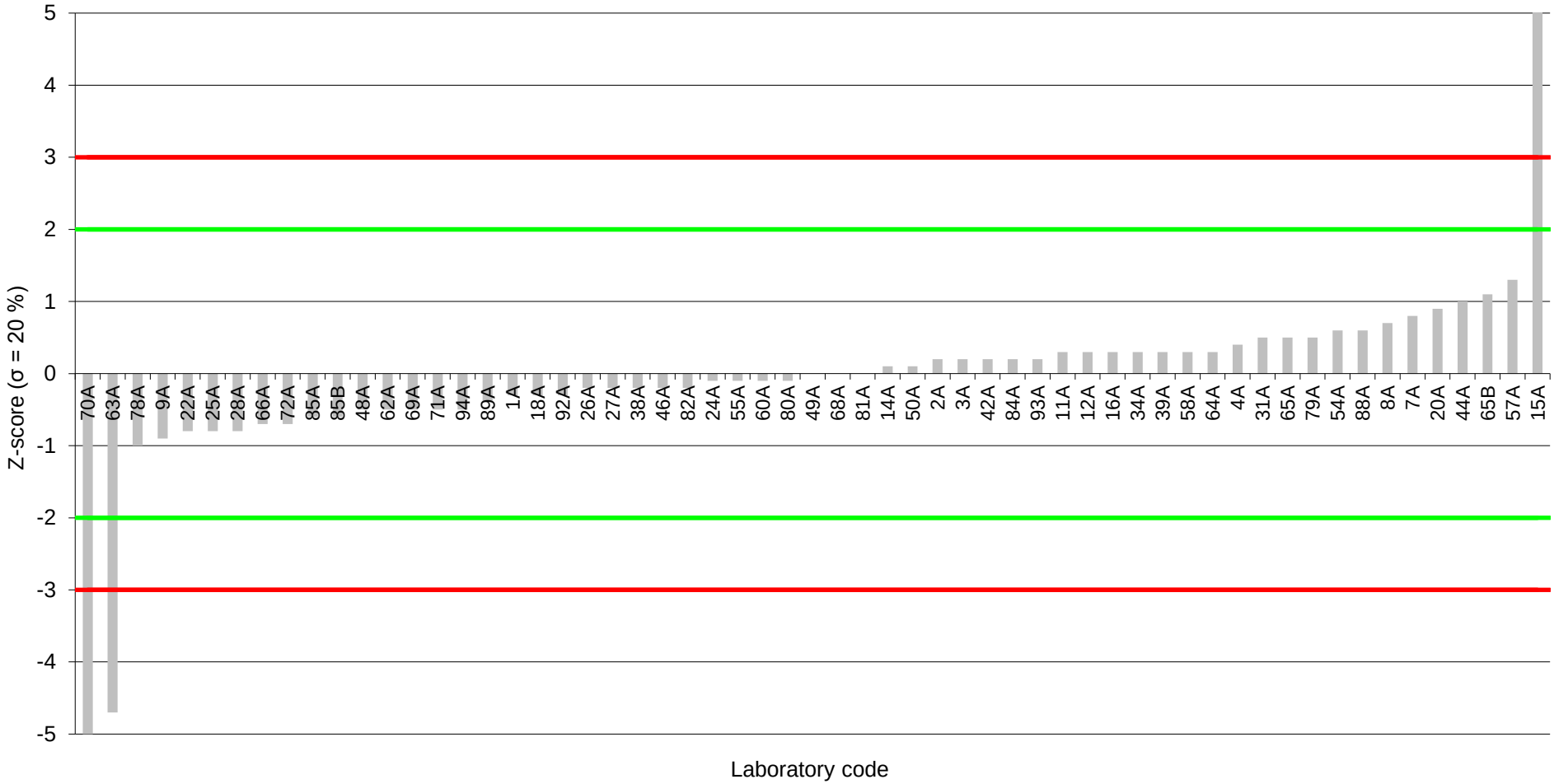
Assigned value: 42.9 ng/kg (12% moisture content)



Hay (2502-HY)

PCB 167

Assigned value: 66.1 ng/kg (12% moisture content)



Hay (2502-HY)

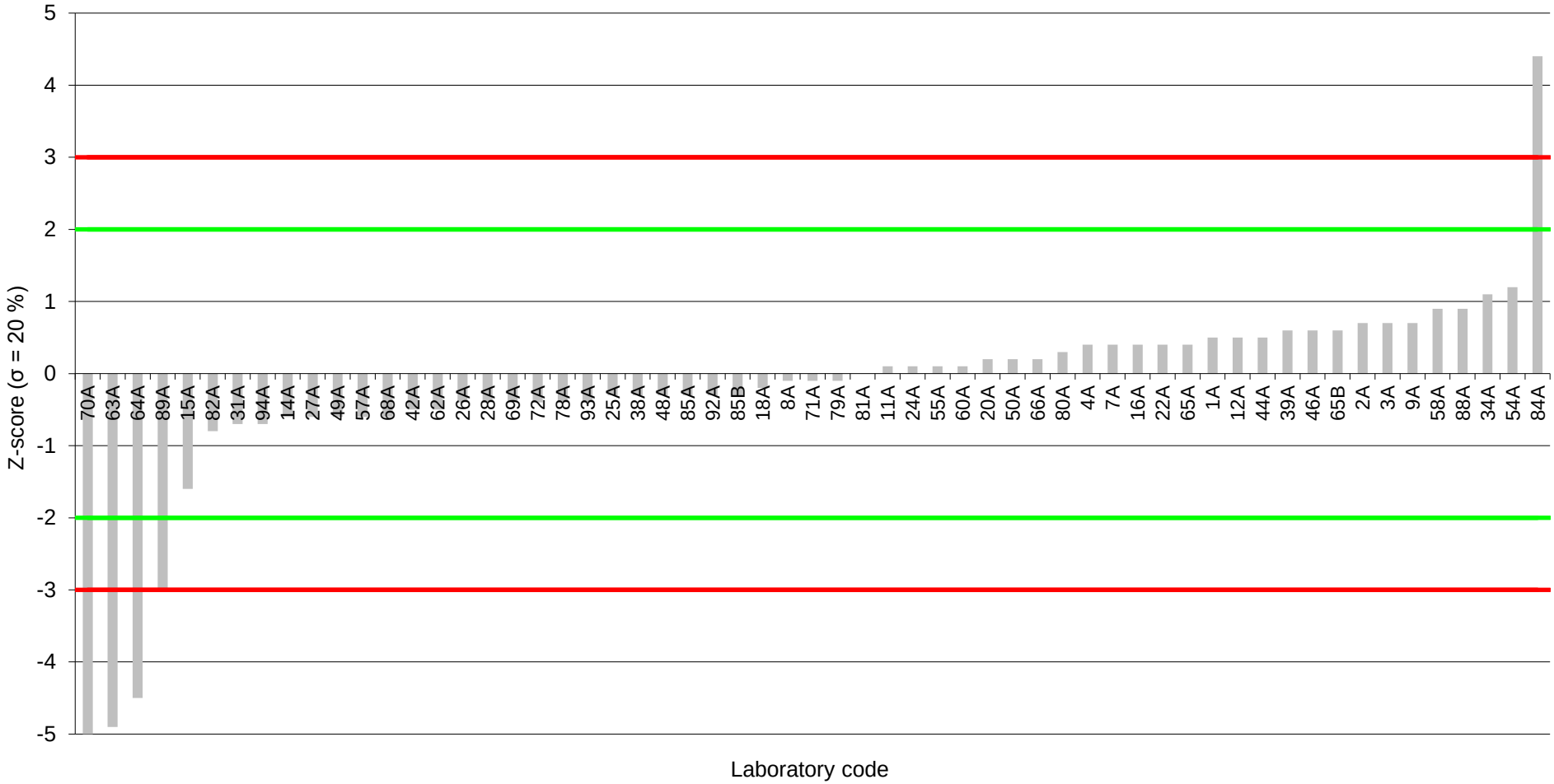
PCB 189

Assigned value: 6.92 ng/kg (12% moisture content)

Hay (2502-HY)

PCB 77

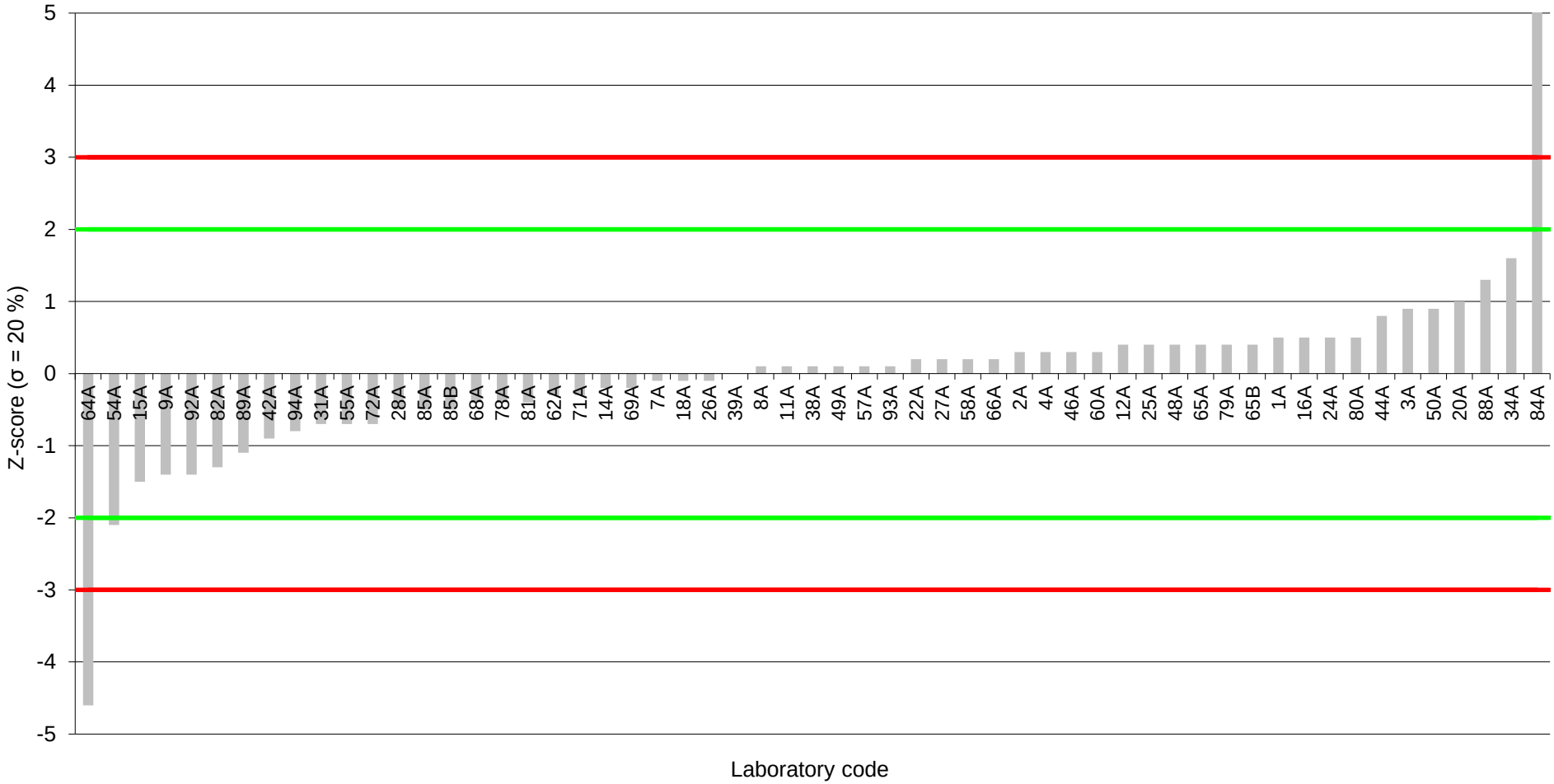
Assigned value: 113 ng/kg (12% moisture content)



Hay (2502-HY)

PCB 81

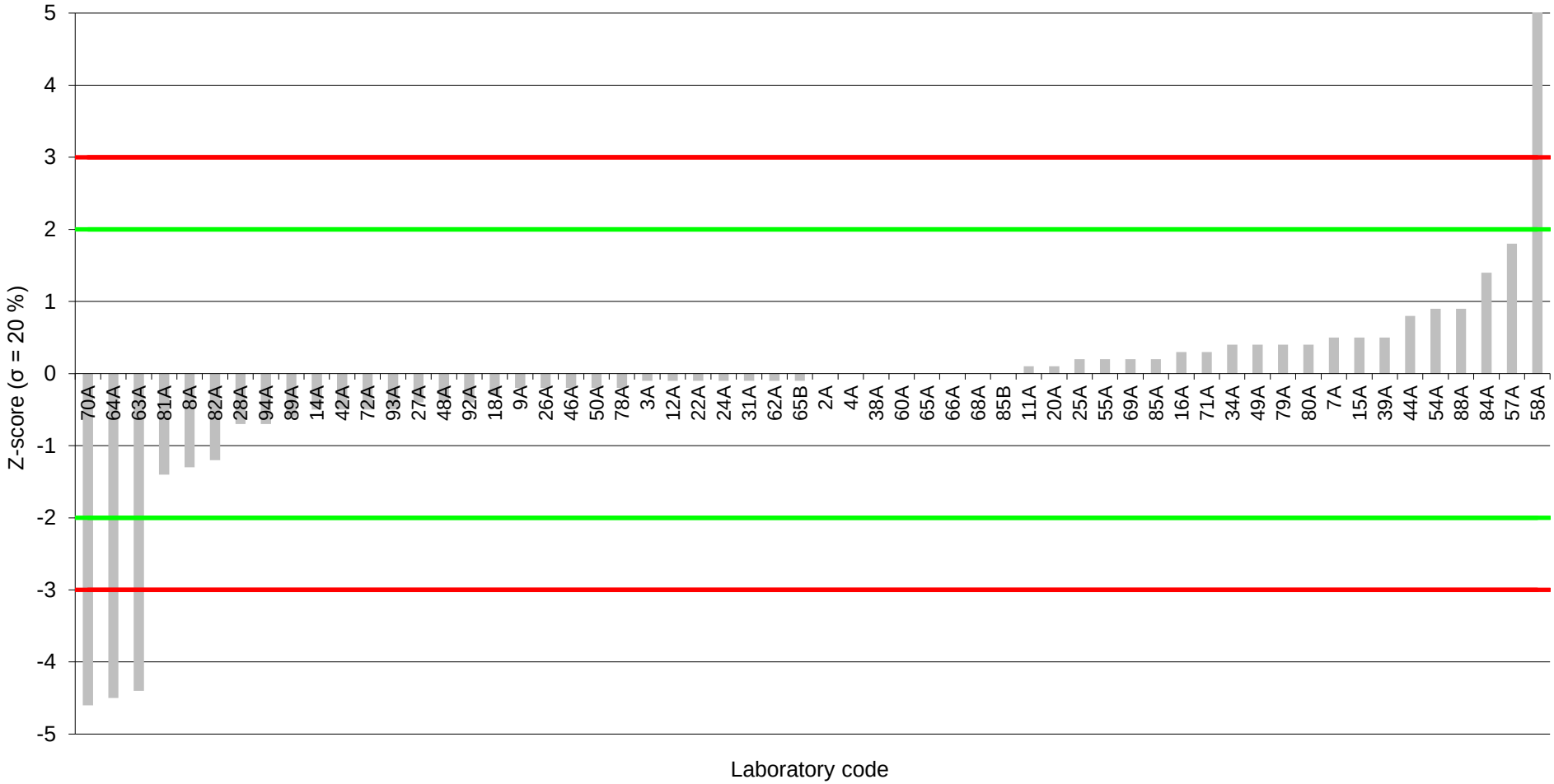
Assigned value: 6.03 ng/kg (12% moisture content)



Hay (2502-HY)

PCB 126

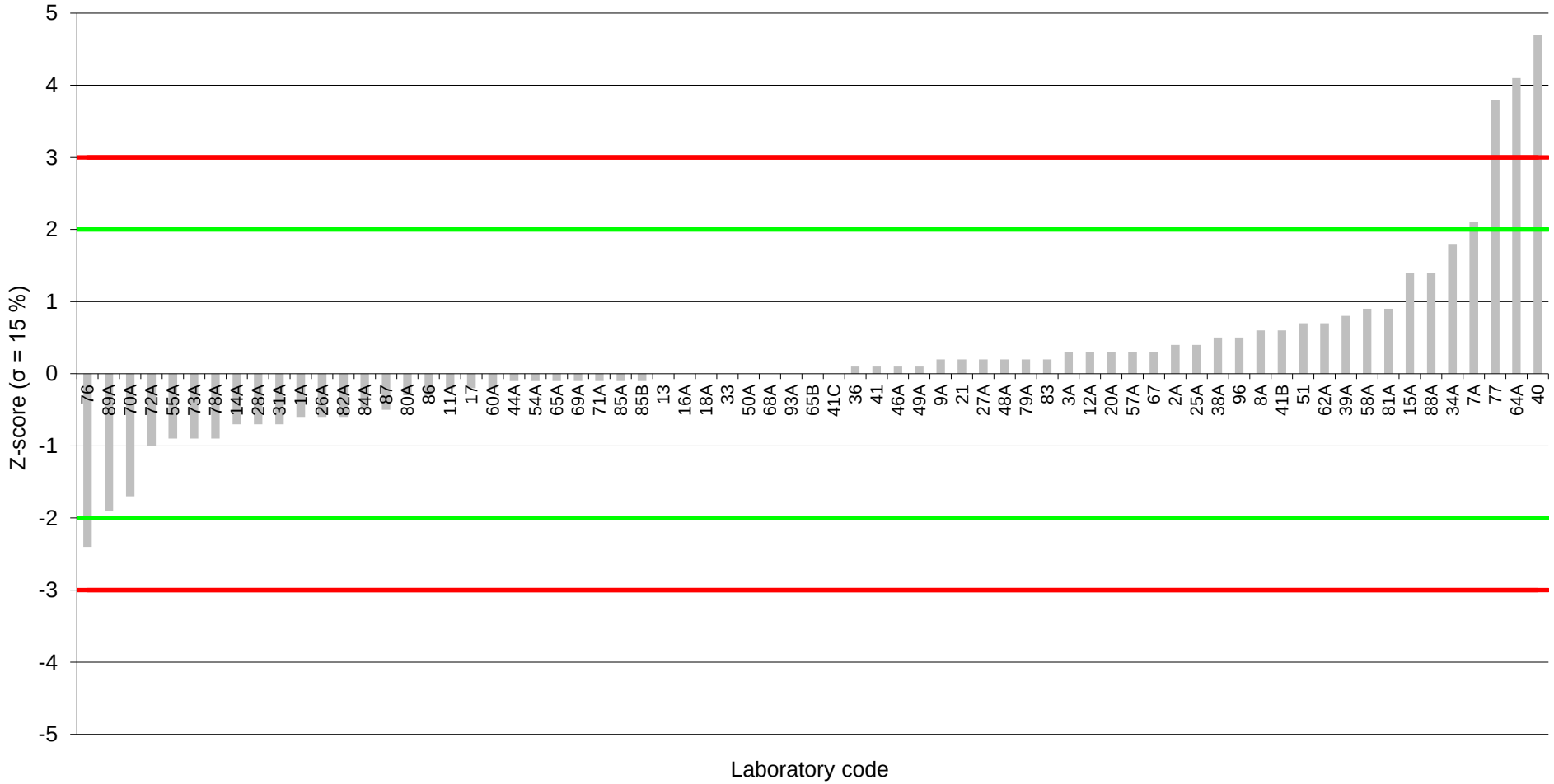
Assigned value: 3.07 ng/kg (12% moisture content)



Hay (2502-HY)

Sum of 6 NDL-PCBs upper bound (reported)

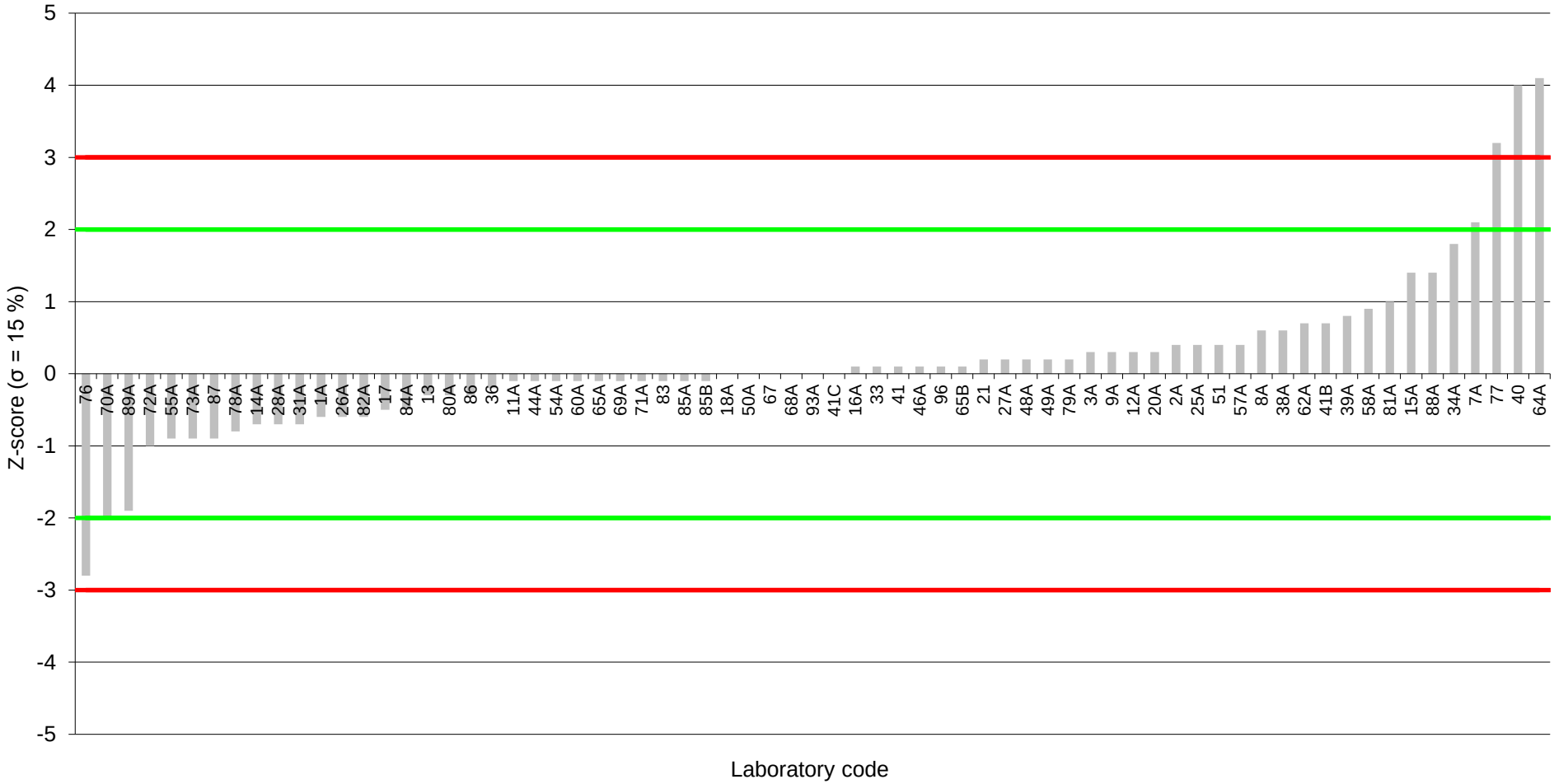
Assigned value: 9.13 µg/kg (12% moisture content)



Hay (2502-HY)

Sum of 6 NDL-PCBs lower bound (reported)

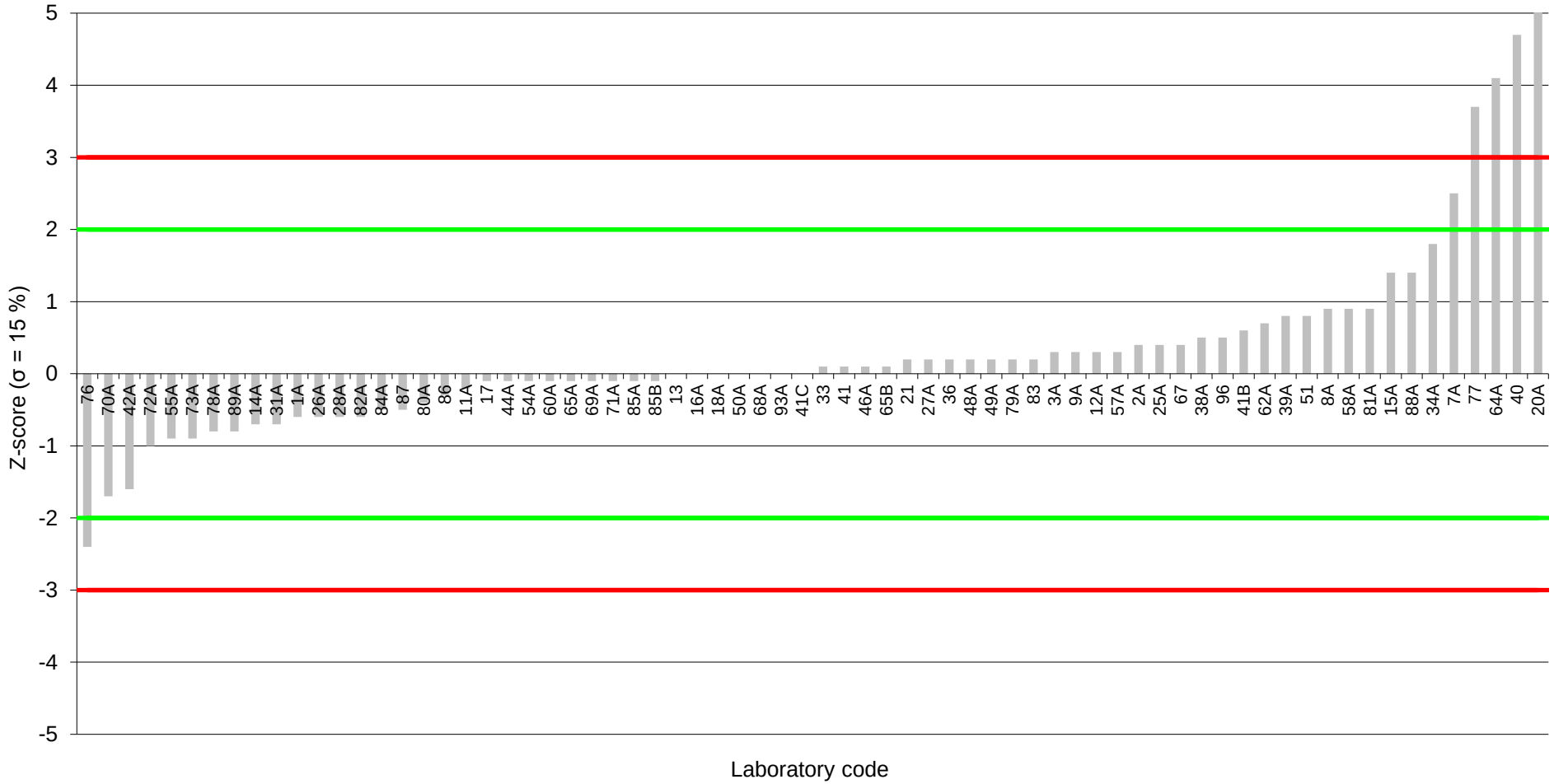
Assigned value: 9.09 µg/kg (12% moisture content)



Hay (2502-HY)

Sum of 6 NDL-PCBs upper bound (calculated)

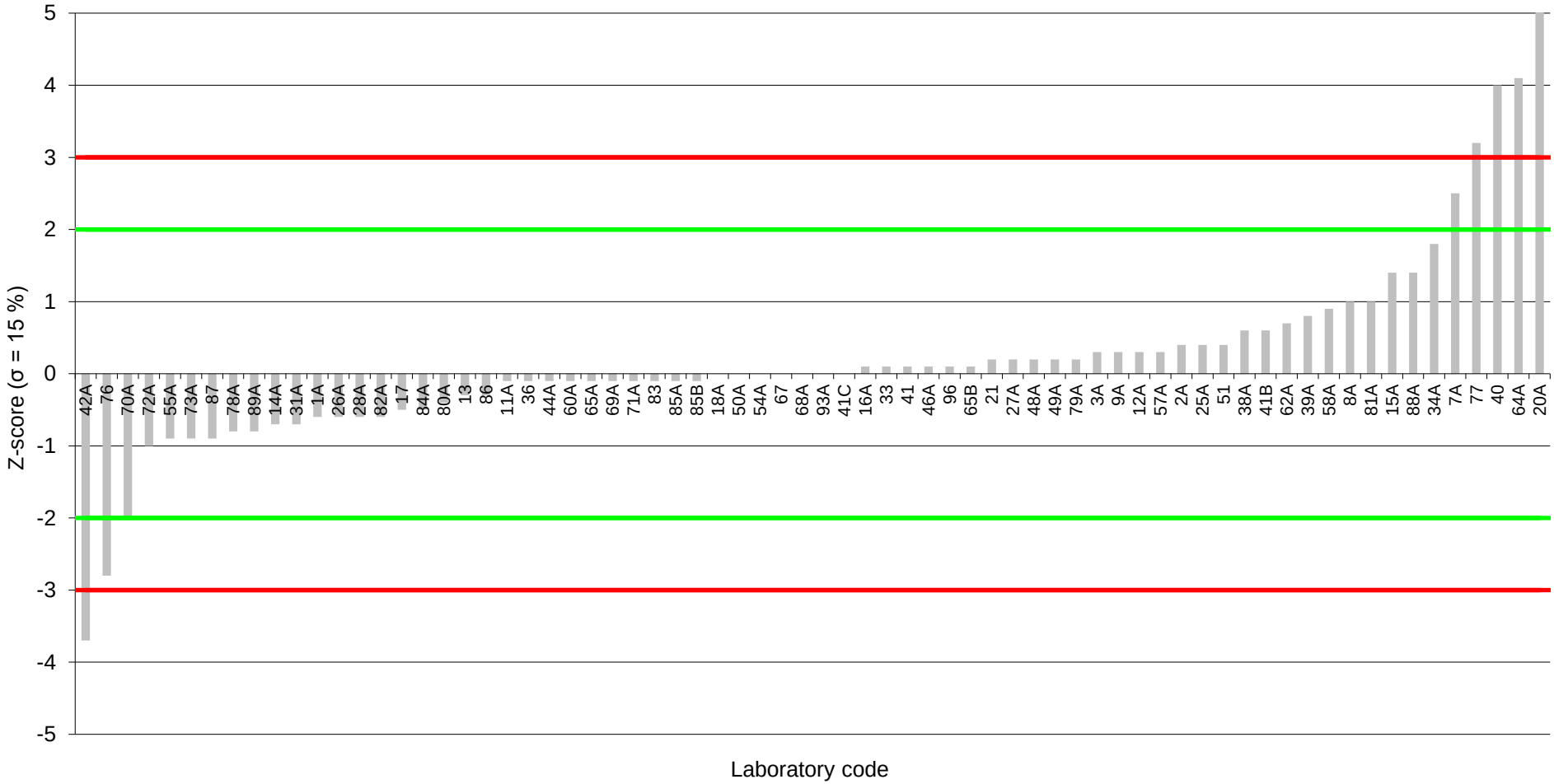
Assigned value: 9.11 µg/kg (12% moisture content)



Hay (2502-HY)

Sum of 6 NDL-PCBs lower bound (calculated)

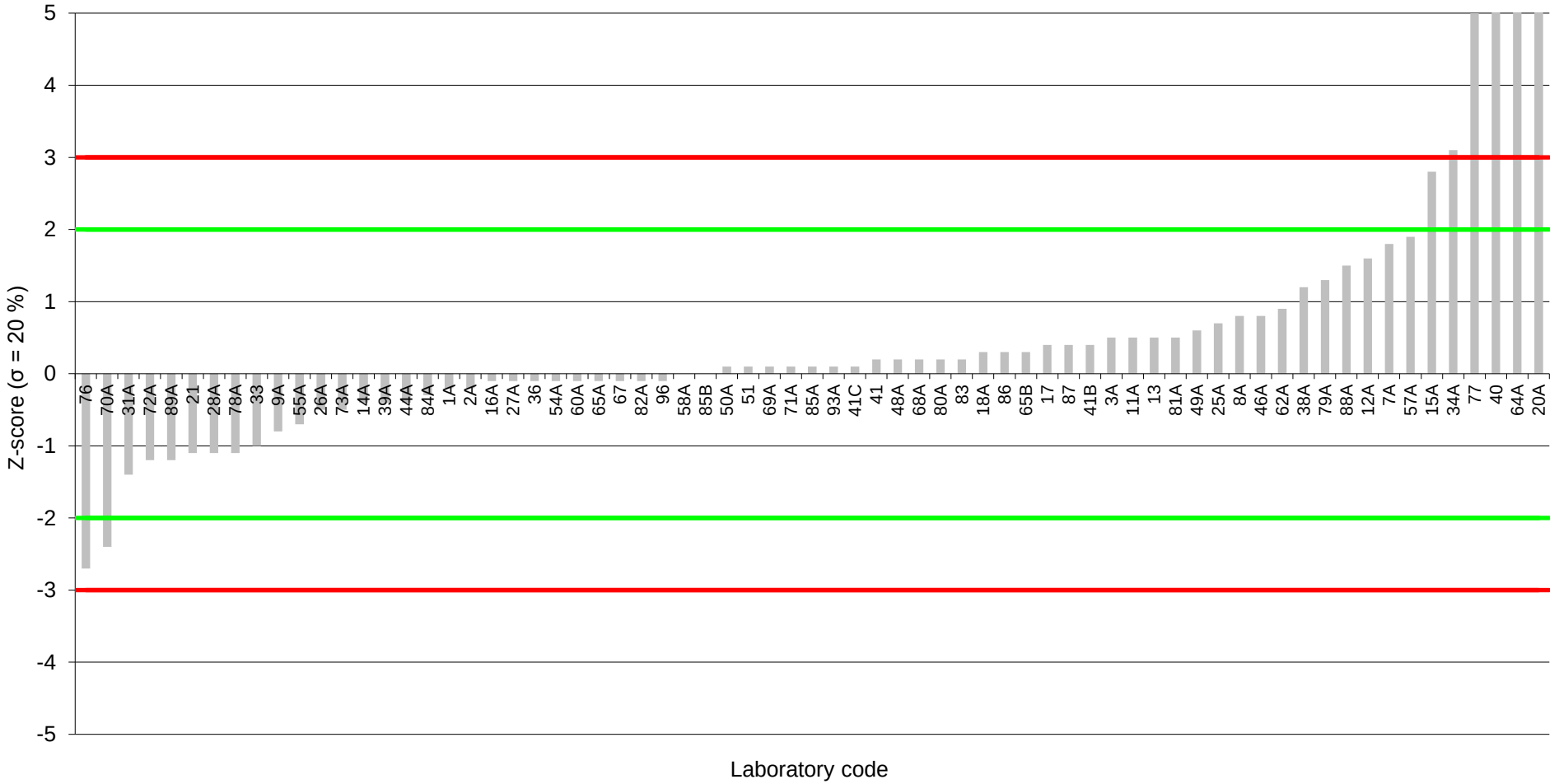
Assigned value: 9.09 µg/kg (12% moisture content)



Hay (2502-HY)

PCB 28

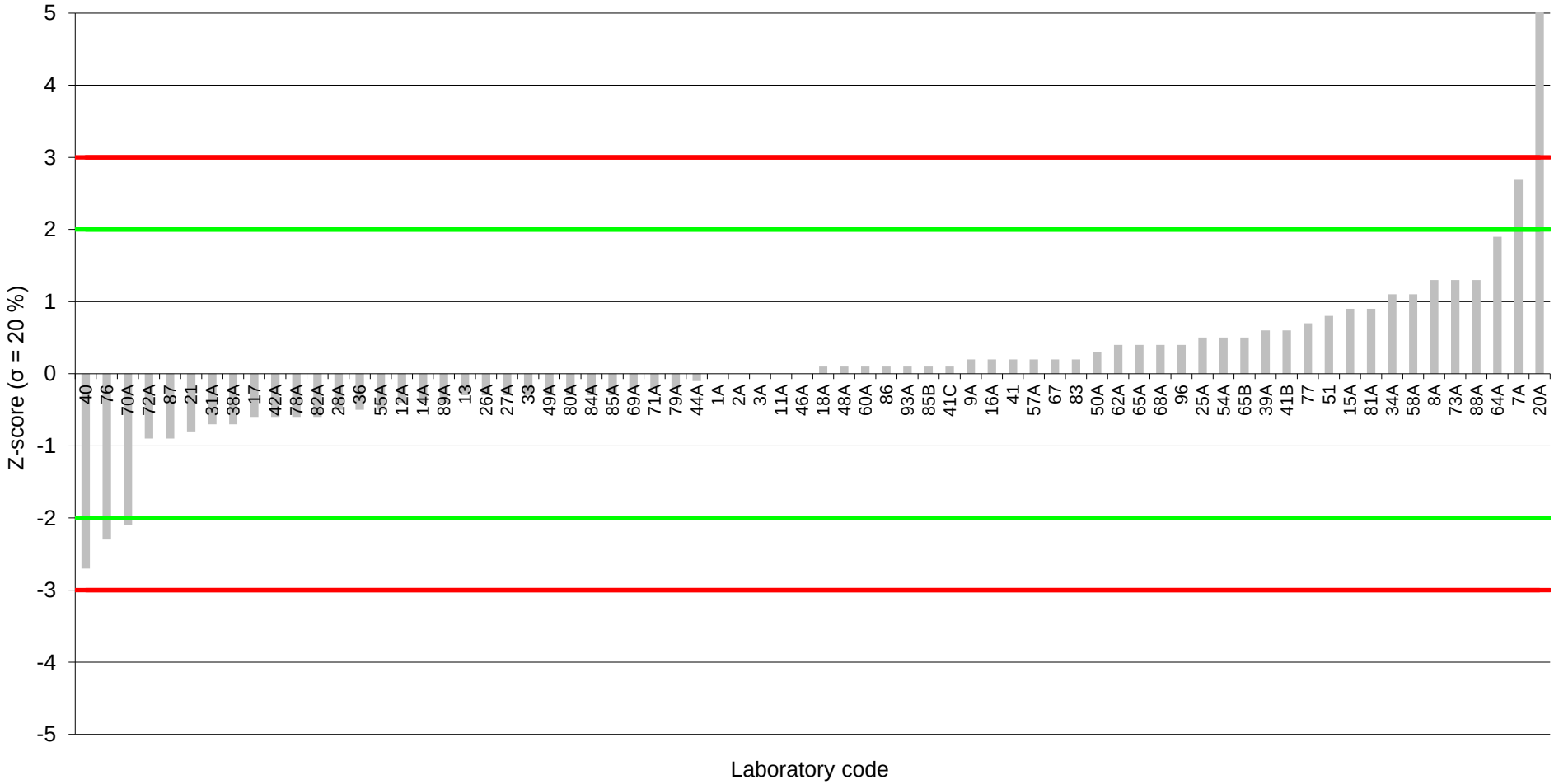
Assigned value: 1.82 µg/kg (12% moisture content)



Hay (2502-HY)

PCB 52

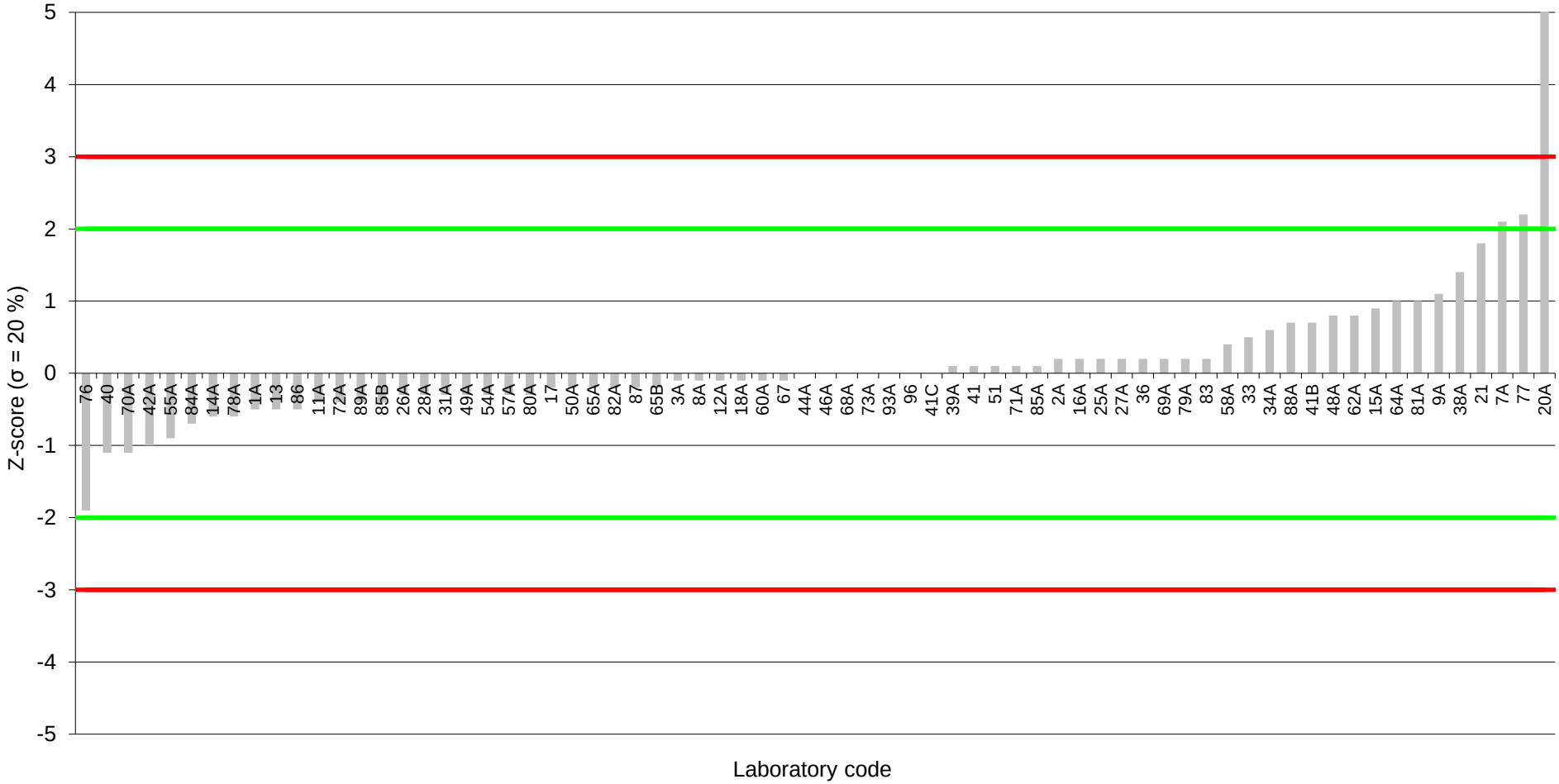
Assigned value: 2.32 µg/kg (12% moisture content)



Hay (2502-HY)

PCB 101

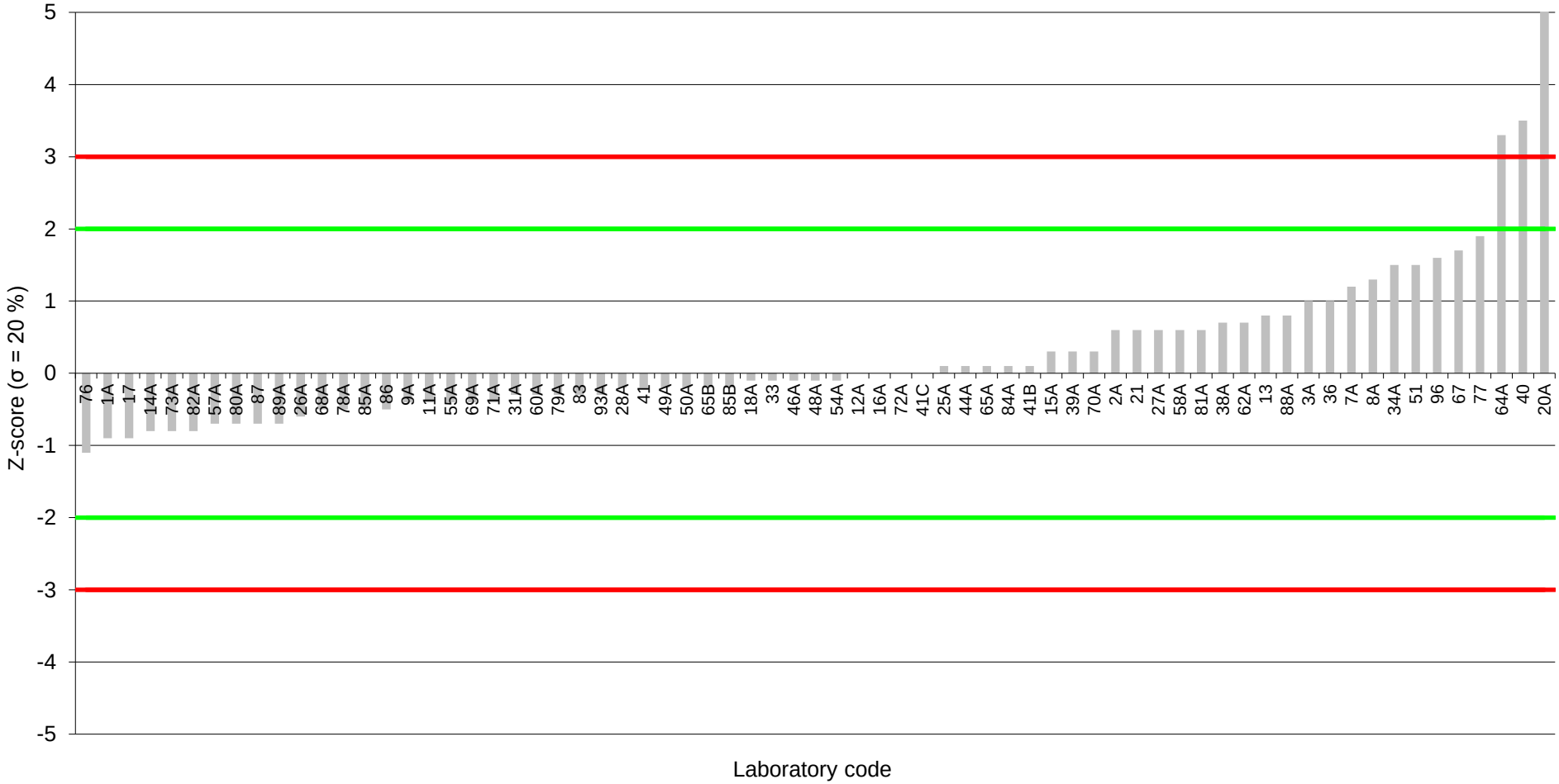
Assigned value: 2.23 µg/kg (12% moisture content)



Hay (2502-HY)

PCB 138

Assigned value: 1.27 µg/kg (12% moisture content)



Hay (2502-HY)

PCB 153

Assigned value: 1.1 µg/kg (12% moisture content)

Hay (2502-HY)

PCB 180

Assigned value: 0.348 µg/kg (12% moisture content)

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 5: Scoring system for PCDD/Fs and PCBs

Test sample - Hay (2502-HY)

Positive scoring system

The "positive scoring system" gives one assessment for the PT sample covering all relevant PCDD/F and PCB sum parameters and congeners.
The criteria are applicable for sum parameter concentrations in the range (about 0.5 to 4 times) of the level of interest.

The total score for the positive scoring system is calculated according to the following general principles:

- Calculation of z-scores for sum parameters and evaluated individual congeners
- Calculation of the positive scores according to the following table:

Positive scoring system	| z-score | ≤ 2	2 < | z-score | < 3	| z-score | ≥ 3
Individual congeners	Positive score	Positive score	Positive score
Contribution to sum parameter* > 10 %	12	6	0
Contribution to sum parameter* 3 – 10 %	8	4	0
Contribution to sum parameter* < 3 %	6	3	0
Not evaluated congeners	0	0	0

*separately for the respective sum parameters WHO-PCDD/F-TEQ, WHO-PCB-TEQ and the sum of six indicator PCBs

- Calculation of maximum achievable scores (| z-score | ≤ 2) for PCDD/F and DL-PCB and indicator PCB congeners separately:
  Maximum score = Σmax. score(> 10 %) + Σmax. score(3-10 %) + Σmax. score(< 3 %)
- Calculation of the participant's scores for PCDD/F and DL-PCB and indicator PCB congeners separately:
  Participant's score = Σscore(> 10 %) + Σscore(3-10 %) + Σscore(< 3 %)
- Calculation of achieved scoring percentage for each participant:
  Participant's scoring percentage = Participant's score / Maximum score • 100

Criteria for successful participation:

Sum parameters:	≤ 1 parameter with |z-score| > 2, no parameter with |z-score| ≥ 3
PCDD/F congeners:	≥ 75 % of maximum score
DL-PCB congeners:	≥ 75 % of maximum score
Indicator PCB congeners:	≥ 75 % of maximum score
Difference between reported and calculated results for sum parameters	≤ 10 %

Successful participation for PCDD/Fs and PCBs, if all above mentioned criteria for the reported analytes are met.

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Summary Scoring system

LC		Sample	Scoring system	WHO-PCDD/F-PCB-TEQ z-score	WHO-PCDD/F-TEQ* z-score	WHO-PCB-TEQ z-score	Sum Indicator PCBs z-score	Sum Parameters (≤ 1 parameter with |z-score| ≥ 2, no parameter with |z-score| ≥ 3)	PCDD/F congeners* (≥ 75 % of max. score)	DL-PCB congeners (≥ 75 % of max. score)	NDL-PCB congeners (≥ 75 % of max. score)	Calculation of sum parameters (deviation ≤ 10 %)	Evaluation	Successful participation	Reason for not successful participation				
															Sum parameters	PCDD/F congeners	DL-PCB congeners	NDL-PCB congeners	Calculation sum param.
1	A	2502-HY		0.3	0.0	0.7	-0.6	Passed	91%	100%	100%	yes		**yes**					
2	A	2502-HY		0.0	0.5	0.2	0.4	Passed	100%	100%	100%	yes		**yes**					
3	A	2502-HY		0.0	0.5	0.0	0.3	Passed	100%	100%	100%	yes		**yes**					
4	A	2502-HY		-0.2	-0.5	0.2		Passed	100%	100%		yes		**yes**					
5		2502-HY																	
6		2502-HY																	
7	A	2502-HY		1.0	1.0	1.2	2.1	Passed	100%	100%	82%	yes		**yes**					
8	A	2502-HY		-0.5	-0.9	-0.1	0.6	Passed	100%	96%	100%	yes		**yes**					
9	A	2502-HY		0.3	-0.8	-0.1	0.2	Passed	100%	100%	100%	yes		**yes**					
10		2502-HY																	
11	A	2502-HY		-0.3	-0.5	0.0	-0.2	Passed	100%	100%	100%	yes		**yes**					
12	A	2502-HY		0.2	1.2	0.0	0.3	Passed	100%	100%	100%	yes		**yes**					
13		2502-HY					0.0	Passed			100%	yes		**yes**					
14	A	2502-HY		-1.6	-2.5	-1.0	-0.7	Passed	100%	100%	100%	yes		**yes**					
15	A	2502-HY		-0.3	-0.9	0.2	1.4	Passed	100%	93%	91%	yes		**yes**					
16	A	2502-HY		0.4	0.5	0.5	0.0	Passed	100%	100%	100%	yes		**yes**					
17		2502-HY					-0.2	Passed			100%	yes		**yes**					
18	A	2502-HY		-1.0	-1.5	-0.5	0.0	Passed	100%	85%	100%	no		**no**					**x**
19		2502-HY																	
20	A	2502-HY		0.6	2.0	0.2	0.3	Passed	100%	100%	0%	yes		**no**				**x**	
21		2502-HY					0.2	Passed			100%	yes		**yes**					
22	A	2502-HY		0.0	0.7	-0.1		Passed	100%	100%		yes		**yes**					
23		2502-HY																	
24	A	2502-HY		0.3	0.8	0.3		Passed	100%	100%		yes		**yes**					
25	A	2502-HY		-0.3	0.0	-0.2	0.4	Passed	100%	100%	100%	yes		**yes**					
26	A	2502-HY		-0.8	-0.9	-0.6	-0.6	Passed	100%	100%	100%	yes		**yes**					
27	A	2502-HY		-1.1	-1.7	-0.6	0.2	Passed	92%	100%	100%	yes		**yes**					
28	A	2502-HY		-1.3	-0.8	-1.3	-0.7	Passed	97%	96%	100%	yes		**yes**					
29		2502-HY																	
30		2502-HY																	
31	A	2502-HY		2.9	9.5	0.0	-0.7	Passed	78%	100%	100%	yes		**yes**					
32		2502-HY																	
33		2502-HY					0.0	Passed			100%	yes		**yes**					
34	A	2502-HY		1.1	2.3	0.8	1.8	Passed	86%	100%	82%	yes		**yes**					
35		2502-HY																	
36		2502-HY					0.1	Passed			100%	yes		**yes**					
37		2502-HY																	
38	A	2502-HY		1.2	3.7	0.2	0.5	Passed	68%	100%	100%	yes		**yes**					
39	A	2502-HY		0.6	0.5	0.9	0.8	Passed	100%	100%	82%	yes		**yes**					
40		2502-HY					4.7	Failed			30%	yes		**no**	**x**			**x**	
41		2502-HY					0.1	Passed			100%	yes		**yes**					
42	A	2502-HY		-0.7	-1.5	-0.1		Passed	77%	96%	100%	no		**no**					**x**
43		2502-HY																	
44	A	2502-HY		0.5	-0.5	1.3	-0.1	Passed	100%	100%	100%	yes		**yes**					
45		2502-HY																	
46	A	2502-HY		-0.1	-0.5	0.3	0.1	Passed	100%	100%	100%	yes		**yes**					
47	A	2502-HY		-1.3	-4.4			Passed	38%					**yes**					
48	A	2502-HY		-0.2	1.0	-0.5	0.2	Passed	100%	100%	100%	yes		**yes**					
49	A	2502-HY		0.5	0.0	0.9	0.1	Passed	94%	100%	100%	yes		**yes**					
50	A	2502-HY		-1.0	-1.8	-0.4	0.0	Passed	100%	100%	100%	yes		**yes**					
51		2502-HY					0.7	Passed			100%	yes		**yes**					
52		2502-HY																	
53		2502-HY																	
54	A	2502-HY		1.2	1.1	1.6	-0.1	Passed	100%	96%	100%	yes		**yes**					
55	A	2502-HY		0.7	2.7	0.0	-0.9	Passed	92%	100%	100%	yes		**yes**					
56		2502-HY																	
57	A	2502-HY		2.1	2.0	2.2	0.3	Failed	95%	93%	100%	yes		**no**	**x**				
58	A	2502-HY		0.9	2.3	0.5	0.9	Passed	87%	85%	100%	yes		**yes**					
59		2502-HY																	
60	A	2502-HY		-0.3	-0.6	0.0	-0.2	Passed	100%	100%	100%	yes		**yes**					
61		2502-HY																	
62	A	2502-HY		-0.3	0.1	-0.5	0.7	Passed	100%	100%	100%	yes		**yes**					
63	A	2502-HY		-2.9	10.3	-9.1		Failed	40%	0%		yes		**no**	**x**		**x**		
64	A	2502-HY		-5.9	-4.2	-6.6	4.1	Failed	64%	51%	59%	yes		**no**	**x**		**x**	**x**	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Summary Scoring system

LC		Sample	Scoring system	WHO-PCDD/F-PCB-TEQ z-score	WHO-PCDD/F-TEQ* z-score	WHO-PCB-TEQ z-score	Sum Indicator PCBs z-score	Sum Parameters (≤ 1 parameter with |z-score| ≥ 2, no parameter with |z-score| ≥ 3)	PCDD/F congeners* (≥ 75 % of max. score)	DL-PCB congeners (≥ 75 % of max. score)	NDL-PCB congeners (≥ 75 % of max. score)	Calculation of sum parameters (deviation ≤ 10 %)	Evaluation	Successful participation	Reason for not successful participation				
															Sum parameters	PCDD/F congeners	DL-PCB congeners	NDL-PCB congeners	Calculation sum param.
65	A	2502-HY		0.3	1.1	0.2	-0.1	Passed	100%	89%	100%	yes		**yes**					
66	A	2502-HY		-0.5	-0.3	-0.4		Passed	100%	100%		yes		**yes**					
67		2502-HY					0.3	Passed			100%	yes		**yes**					
68	A	2502-HY		0.2	1.5	-0.2	0.0	Passed	100%	100%	100%	yes		**yes**					
69	A	2502-HY		-0.4	-0.9	0.1	-0.1	Passed	100%	100%	100%	yes		**yes**					
70	A	2502-HY		-2.1	-2.6	-1.9	-1.7	Passed	12%	0%	80%	no		**no**			**x**		**x**
71	A	2502-HY		-0.2	-1.0	0.3	-0.1	Passed	100%	100%	100%	yes		**yes**					
72	A	2502-HY		-0.1	2.2	-0.9	-1.0	Passed	95%	100%	100%	yes		**yes**					
73	A	2502-HY					-0.9	Passed			100%	yes		**yes**					
74		2502-HY																	
75		2502-HY																	
76		2502-HY					-2.4	Passed			80%	yes		**yes**					
77		2502-HY					3.8	Failed			50%	yes		**no**	**x**			**x**	
78	A	2502-HY		-1.0	-1.5	-0.6	-0.9	Passed	100%	100%	100%	yes		**yes**					
79	A	2502-HY		0.3	-0.1	0.7	0.2	Passed	100%	100%	100%	yes		**yes**					
80	A	2502-HY		0.8	3.0	0.2	-0.3	Passed	78%	100%	100%	yes		**yes**					
81	A	2502-HY		-1.8	-1.5	-1.8	0.9	Passed	100%	100%	100%	yes		**yes**					
82	A	2502-HY		-1.8	-1.7	-1.6	-0.6	Passed	97%	100%	100%	yes		**yes**					
83		2502-HY					0.2	Passed			100%	yes		**yes**					
84	A	2502-HY		2.9	4.0	2.7	-0.5	Failed	69%	85%	100%	yes		**no**	**x**				
85	A	2502-HY		-0.4	-1.1	0.1	-0.1	Passed	100%	100%	100%	yes		**yes**					
86		2502-HY					-0.3	Passed			100%	yes		**yes**					
87		2502-HY					-0.5	Passed			100%	yes		**yes**					
88	A	2502-HY		1.6	1.7	1.8	1.4	Passed	87%	100%	100%	yes		**yes**					
89	A	2502-HY		1.9	9.0	-1.3	-1.9	Passed	100%	96%	100%	yes		**yes**					
90		2502-HY																	
91		2502-HY																	
92	A	2502-HY		1.2	5.5	-0.5		Passed	100%	100%		yes		**yes**					
93	A	2502-HY		-1.3	-1.6	-0.9	0.0	Passed	100%	100%	100%	yes		**yes**					
94	A	2502-HY		1.0	5.5	-1.0		Passed	100%	100%		yes		**yes**					
95		2502-HY																	
96		2502-HY					0.5	Passed			100%	yes		**yes**					
97		2502-HY																	
Additional sets																			
41	B	2502-HY					0.6	Passed			100%	yes		**yes**					
65	B	2502-HY		0.5	1.5	0.2	0.0	Passed	100%	89%	100%	yes		**yes**					
85	B	2502-HY		-0.8	-1.6	-0.1	-0.1	Passed	100%	100%	100%	yes		**yes**					
41	C	2502-HY					0.0	Passed			100%	yes		**yes**					

*Sum parameters outside the range of 0.5 to 4 times of the level of interest / no legal limits defined; results not included in overall assessment

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 6: Test for sufficient homogeneity and stability for PCDD/Fs, PCBs

Test sample - Hay (2502-HY)

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Sum parameters - Homogeneity test - Data

Analyte	Result ng/kg (12% Moisture Content)	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
WHO-PCDD/F-PCB-TEQ upper bound		0.649	0.646	4%
WHO-PCDD/F-PCB-TEQ middle bound		0.648	0.646	4%
WHO-PCDD/F-PCB-TEQ lower bound		0.648	0.645	4%

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
PCDD/F - Homogeneity test - Data

Analyte	Result ng/kg (12% Moisture Content)	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
WHO-PCDD/F-TEQ upper bound		0.197	0.197	1%
WHO-PCDD/F-TEQ middle bound		0.197	0.197	1%
WHO-PCDD/F-TEQ lower bound		0.197	0.197	1%
2,3,7,8-TCDD		0.0185	0.0181	0%
1,2,3,7,8-PeCDD		0.0592	0.0546	1%
1,2,3,4,7,8-HxCDD		0.0419	0.0432	0%
1,2,3,6,7,8-HxCDD		0.0851	0.0873	1%
1,2,3,7,8,9-HxCDD		0.0621	0.0632	1%
1,2,3,4,6,7,8-HpCDD		1.22	1.21	8%
1,2,3,4,6,7,8,9-OCDD*				
2,3,7,8-TCDF		0.109	0.110	1%
1,2,3,7,8-PeCDF		0.0990	0.100	1%
2,3,4,7,8-PeCDF		0.104	0.103	1%
1,2,3,4,7,8-HxCDF		0.124	0.125	1%
1,2,3,6,7,8-HxCDF		0.117	0.117	1%
2,3,4,6,7,8-HxCDF		0.101	0.101	1%
1,2,3,7,8,9-HxCDF		0.0286	0.0287	0%
1,2,3,4,6,7,8-HpCDF		0.471	0.471	1%
1,2,3,4,7,8,9-HpCDF		0.0423	0.0435	1%
1,2,3,4,6,7,8,9-OCDF		0.519	0.507	6%

*interferences from solvent; not evaluated

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
DL-PCB - Homogeneity test - Data

Analyte	Result ng/kg (12% Moisture Content)	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
WHO-PCB-TEQ upper bound		0.451	0.449	4%
WHO-PCB-TEQ middle bound		0.451	0.449	4%
WHO-PCB-TEQ lower bound		0.451	0.449	4%
PCB 105		806	806	3%
PCB 114		54.2	53.7	6%
PCB 118		1670	1650	4%
PCB 123		31.6	31.2	8%
PCB 156		196	196	4%
PCB 157		41.7	41.9	5%
PCB 167		67.5	68.0	3%
PCB 189		6.69	6.82	12%
PCB 77		114	114	2%
PCB 81		6.84	6.86	2%
PCB 126		3.47	3.44	5%
PCB 169		<0.5		

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
NDL-PCB - Homogeneity test - Data

Analyte	Result µg/kg (12% Moisture Content)	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
Sum Indicator PCBs upper bound		9.02	8.94	4%
Sum Indicator PCBs middle bound		9.02	8.94	4%
Sum Indicator PCBs lower bound		9.02	8.94	4%
PCB 28		1.99	1.93	12%
PCB 52		2.48	2.48	3%
PCB 101		2.13	2.11	5%
PCB 138		1.12	1.11	3%
PCB 153		0.965	0.970	3%
PCB 180		0.317	0.313	4%

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Selected congeners - Homogeneity test - Data

Sample	Replicate	Result ng/kg or µg/kg (12% Moisture Content)	1,2,3,7,8-PeCDF	WHO-PCDD/F-TEQ (ub)	PCB 77
6	1		0.1020	0.21	111.54
	2		0.1025	0.20	118.94
9	1		0.1059	0.19	117.15
	2		0.0971	0.20	112.95
69	1		0.0932	0.19	112.95
	2		0.0968	0.20	115.33
71	1		0.0887	0.19	113.90
	2		0.1164	0.20	117.13
85	1		0.1002	0.20	118.76
	2		0.1007	0.19	116.85
111	1		0.0956	0.20	117.17
	2		0.1118	0.20	113.49
136	1		0.1006	0.22	109.74
	2		0.0936	0.19	114.34
152	1		0.1028	0.21	112.99
	2		0.1109	0.20	111.98
181	1		0.0997	0.21	115.38
	2		0.0901	0.20	112.71
185	1		0.0834	0.18	112.92
	2		0.0883	0.21	110.40
Cochran's C-test					
C			0.568	0.467	0.410
$C_{critical}$ (α = 0.05, m = 2, n = 10)			0.602	0.602	0.602
$C_{critical}$ (α = 0.01, m = 2, n = 10)			0.718	0.718	0.718
$C < C_{critical}$			yes	yes	yes
Outliers			no evidence for analytical outliers	no evidence for analytical outliers	no evidence for analytical outliers
Homogeneity test					
General average $\bar{x}$			0.0990	0.20	114.38
Standard deviation of sample averages s_x			0.00600	0.0055	1.907
Wthin-sample standard deviation s_w			0.00823	0.0115	2.583
Between-sample standard deviation s_s			0.00143	0.00000	0.54691
Standard deviation for proficiency assessment σ_{PT}			0.0198	0.020	22.877
s_s / σ_{PT}			0.0724	0	0.0239
Test for homogeneity ($s_s \leq 0.3\ \sigma_{PT}$)			passed	passed	passed

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Selected congeners - Stability test - Data

Sample	Replicate	Result ng/kg (12% Moisture Content)	1,2,3,7,8-PeCDF	WHO-PCDD/F-TEQ (ub)	PCB 77
33	1		0.0989	0.19	115.94
	2		0.0978	0.20	112.15
150	1		0.1075	0.19	118.49
	2		0.0999	0.19	114.43
85	1		0.1040	0.19	119.25
	2		0.0973	0.19	112.05
Stability test					
General average (stability test) $\bar{y}$			0.101	0.193	115.38
General average (homogeneity test) $\bar{x}$			0.099	0.197	114.38
Standard deviation for proficiency assessment σPT			0.0198	0.020	22.877
$\lvert \bar{y} - \bar{x} \rvert$			0.00190	0.00447	1.0004
Test for stability ($\lvert \bar{y} - \bar{x} \rvert \leq 0.3$ σPT)			passed	passed	passed

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 7: Participants' methods for PCDD/Fs and PCBs

Test sample - Hay (2502-HY)

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods PCDD/Fs - Accreditation, weighed sample, internal standards

LC	Data set	Sample	**Accreditation** according to ISO/IEC 17025	**Weighed sample** [g]	**Use of isotope-labelled internal standards for** PCDD/F congeners (yes/no)	**Other internal standards** PCDD/Fs
1	A	2502-HY	yes	20	yes	
2	A	2502-HY	yes	10	yes	
3	A	2502-HY	yes	8.5	yes	
4	A	2502-HY	yes	25.02	yes	13C-1,2,3,4-Cl4DD, 13C- 1,2,3,4,6-Cl5DF, 13C -1,2,3,4,6,9-Cl6DF, 13C- 1,2,3,4,6,8,9-Cl7DF
5		2502-HY				
6		2502-HY				
7	A	2502-HY	yes	10	yes	
8		2502-HY				
9	A	2502-HY	yes	5	yes	
10		2502-HY				
11	A	2502-HY	yes	10	yes	
12	A	2502-HY	yes	15	yes	
13		2502-HY				
14	A	2502-HY	yes	18	yes	
15		2502-HY				
16	A	2502-HY	yes	10	yes	
17		2502-HY				
18	A	2502-HY	yes	10	yes	
19		2502-HY				
20	A	2502-HY	yes	10	yes	
21		2502-HY				
22	A	2502-HY	yes	5.24	yes	
23		2502-HY				
24	A	2502-HY	yes	12.5	yes	
25	A	2502-HY	yes	25	yes	
26	A	2502-HY	yes	3	yes	
27	A	2502-HY	yes	20	yes	
28	A	2502-HY	yes	10	yes	
29		2502-HY				
30		2502-HY				
31	A	2502-HY	yes	5	yes	13C-1234-TCDD and 37Cl4-2378-TCDD
32		2502-HY				
33		2502-HY				
34	A	2502-HY	yes	20	yes	
35		2502-HY				
36		2502-HY				
37		2502-HY				
38	A	2502-HY	yes	6.07	yes	
39	A	2502-HY	yes	25.7464	yes	
40		2502-HY				
41		2502-HY				
42		2502-HY				
43		2502-HY				
44	A	2502-HY	yes	8	yes	
45		2502-HY				
46	A	2502-HY	yes	15	yes	
47		2502-HY				
48	A	2502-HY	no	10.07	yes	
49	A	2502-HY	yes	5	yes	
50		2502-HY				
51		2502-HY				
52		2502-HY				
53		2502-HY				
54	A	2502-HY	yes	32.66	yes	
55	A	2502-HY	yes	40	yes	
56		2502-HY				
57	A	2502-HY	yes	9.08	yes	Addition of 13C 1,2,3,4-TCDD as recovery standard (added prior to injection)
58	A	2502-HY	yes	25	yes	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods PCDD/Fs - Accreditation, weighed sample, internal standards

LC	Data set	Sample	**Accreditation** according to ISO/IEC 17025	**Weighed sample** [g]	**Use of isotope-labelled internal standards for** PCDD/F congeners (yes/no)	**Other internal standards** PCDD/Fs
59		2502-HY				
60	A	2502-HY	yes	36	yes	
61		2502-HY				
62	A	2502-HY	yes	12.51	yes	1,2,3,4-Tetrachlorodibenzo-p-dioxin (13C6,99%) / 1,2,3,4,6,9-Hexachlorodibenzofuran (13C12, 98,7%)
63		2502-HY				
64	A	2502-HY	yes	30	yes	
65	A	2502-HY	yes	25.08	yes	
66	A	2502-HY	yes	15	yes	
67		2502-HY				
68	A	2502-HY	yes	10	yes	
69	A	2502-HY	yes	25	yes	
70	A	2502-HY	no	30.2	yes	
71	A	2502-HY	yes	25	yes	
72	A	2502-HY	no	10.0589	yes	
73	A	2502-HY	yes	5	yes	
74		2502-HY				
75		2502-HY				
76		2502-HY				
77		2502-HY				
78	A	2502-HY	yes	10	yes	
79	A	2502-HY	yes	9.204	yes	
80	A	2502-HY	yes	15	yes	
81	A	2502-HY	yes	9.8	yes	
82	A	2502-HY	yes	31.97	yes	
83		2502-HY				
84	A	2502-HY	yes	10.2	yes	
85	A	2502-HY	yes	23.8	yes	
86		2502-HY				
87		2502-HY				
88	A	2502-HY	yes	42.9536	yes	
89	A	2502-HY	yes	29.737	yes	
90		2502-HY				
91		2502-HY				
92	A	2502-HY	no	40.2	yes	
93	A	2502-HY	yes	14	yes	
94	A	2502-HY	yes	20	yes	
95		2502-HY				
96		2502-HY				
97		2502-HY				
Additional Sets						
41		2502-HY				
65	B	2502-HY	yes	25.07	yes	
85	B	2502-HY	yes	23.8	yes	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods DL-PCBs - Accreditation, weighed sample, internal standards

LC	Data set	Sample	**Accreditation** according to ISO/IEC 17025	**Weighed sample** [g]	**Use of isotope-labelled internal standards for** DL-PCB congeners (yes/no)	**Other internal standards** DL-PCBs
1	A	2502-HY	yes	20	yes	
2	A	2502-HY	yes	10	yes	
3	A	2502-HY	yes	8.5	yes	
4	A	2502-HY	yes	25.02	yes	
5		2502-HY				
6		2502-HY				
7	A	2502-HY	yes	10	yes	
8		2502-HY				
9	A	2502-HY	yes	5	yes	
10		2502-HY				
11	A	2502-HY		10	yes	
12	A	2502-HY	yes	15	yes	
13		2502-HY				
14	A	2502-HY	yes	18	yes	
15		2502-HY				
16	A	2502-HY	yes	10	yes	
17		2502-HY				
18	A	2502-HY	yes	10	yes	
19		2502-HY				
20	A	2502-HY	yes	10	yes	
21		2502-HY				
22	A	2502-HY	yes	5.24	yes	
23		2502-HY				
24	A	2502-HY	yes	12.5	yes	
25	A	2502-HY	yes	25	yes	
26	A	2502-HY	yes	3	yes	
27	A	2502-HY	yes	20	yes	
28	A	2502-HY	yes	10	yes	
29		2502-HY				
30		2502-HY				
31	A	2502-HY	yes	5	yes	13C-1234-TCDD and 13C-PCB-159
32		2502-HY				
33		2502-HY				
34	A	2502-HY	yes	20	yes	
35		2502-HY				
36		2502-HY				
37		2502-HY				
38	A	2502-HY	yes	6.07	yes	
39		2502-HY				
40		2502-HY				
41		2502-HY				
42		2502-HY				
43		2502-HY				
44	A	2502-HY	yes	8	yes	
45		2502-HY				
46		2502-HY				
47		2502-HY				
48	A	2502-HY	no	10.07	yes	
49	A	2502-HY	yes	5	yes	
50		2502-HY				
51		2502-HY				
52		2502-HY				
53		2502-HY				
54	A	2502-HY	yes	32.66	yes	
55	A	2502-HY	yes	40	yes	
56		2502-HY				
57	A	2502-HY	yes	9.08	yes	Addition of 13C 1,2,3,4-TCDD as recovery standard (added prior to injection)
58	A	2502-HY	yes	1.5	yes	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods DL-PCBs - Accreditation, weighed sample, internal standards

LC	Data set	Sample	**Accreditation** according to ISO/IEC 17025	**Weighed sample** [g]	**Use of isotope-labelled internal standards for** DL-PCB congeners (yes/no)	**Other internal standards** DL-PCBs
59		2502-HY				
60	A	2502-HY	yes	36	yes	
61		2502-HY				
62	A	2502-HY	yes	12.51	yes	1,2,3,4-Tetrachlorodibenzo-p-dioxin (13C6,99%) / 1,2,3,4,6,9-Hexachlorodibenzofuran (13C12, 98,7%)
63		2502-HY				
64		2502-HY				
65	A	2502-HY	yes	25.08	yes	
66	A	2502-HY	yes	15	yes	
67		2502-HY				
68	A	2502-HY	yes	10	yes	
69	A	2502-HY	yes	25	yes	
70	A	2502-HY	no	30.2	yes	
71	A	2502-HY	yes	25	yes	
72	A	2502-HY	no	10.0589	yes	
73	A	2502-HY	yes	5	yes	
74		2502-HY				
75		2502-HY				
76		2502-HY				
77		2502-HY				
78	A	2502-HY	yes	10	yes	
79	A	2502-HY	yes	9.204	yes	
80	A	2502-HY	yes	15	yes	
81	A	2502-HY	yes	9.8	yes	
82	A	2502-HY	yes	31.97	yes	
83		2502-HY				
84	A	2502-HY	yes	10.2	yes	
85	A	2502-HY	yes	23.8	yes	
86		2502-HY				
87		2502-HY				
88	A	2502-HY	yes	42.9536	yes	
89	A	2502-HY	yes	29.737	yes	
90		2502-HY				
91		2502-HY				
92	A	2502-HY	no	40.5	yes	
93	A	2502-HY	yes	14	yes	
94	A	2502-HY	yes	20	yes	
95		2502-HY				
96		2502-HY				
97		2502-HY				
Additional Sets						
41		2502-HY				
65	B	2502-HY	yes	25.07	yes	
85	B	2502-HY	yes	23.8	yes	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods NDL-PCBs - Accreditation, weighed sample, internal standards

LC	Data set	Sample	**Accreditation** according to ISO/IEC 17025	**Weighed sample** [g]	**Use of isotope-labelled internal standards for** NDL-PCB congeners (yes/no)	**Other internal standards** NDL-PCBs
1	A	2502-HY		20	yes	
2	A	2502-HY	yes	10	yes	
3	A	2502-HY	yes	8.5	yes	
4		2502-HY				
5		2502-HY				
6		2502-HY				
7	A	2502-HY	yes	10	yes	
8		2502-HY				
9	A	2502-HY	yes	5	yes	
10		2502-HY				
11	A	2502-HY	yes	10	yes	
12	A	2502-HY	yes	15	no	PCB-20, PCB-97
13	A	2502-HY	yes	12	yes	
14	A	2502-HY	yes	18	yes	
15		2502-HY				
16	A	2502-HY	yes	10	yes	
17	A	2502-HY	yes	5	yes	
18	A	2502-HY		10	yes	
19		2502-HY				
20	A	2502-HY	yes	10	yes	
21	A	2502-HY	yes	10	no	
22		2502-HY				
23		2502-HY				
24	A	2502-HY	yes	12.5	yes	
25	A	2502-HY	yes	25	yes	
26	A	2502-HY	yes	3	yes	
27	A	2502-HY	yes	5	no	TCMX, PCB-209, trans-nonachlor
28	A	2502-HY	yes	10	yes	
29		2502-HY				
30		2502-HY				
31	A	2502-HY	yes	5	yes	13C-1234-TCDD and 13C-PCB-159
32		2502-HY				
33	A	2502-HY	no	2	yes	
34	A	2502-HY	yes	20	yes	
35		2502-HY				
36	A	2502-HY	yes	2	yes	
37		2502-HY				
38	A	2502-HY	yes	6.07	yes	
39	A	2502-HY	yes	25.7464	yes	
40		2502-HY				
41	A	2502-HY	yes	6	yes	
42		2502-HY				
43		2502-HY				
44	A	2502-HY	yes	8	yes	
45		2502-HY				
46		2502-HY				
47		2502-HY				
48	A	2502-HY	no	10.07	yes	
49	A	2502-HY	yes	5	yes	
50		2502-HY				
51	A	2502-HY	yes	1.2	yes	3,3',4,4',5-Pentachlorobiphenyl 13C12
52		2502-HY				
53		2502-HY				
54	A	2502-HY	yes	6.04	yes	
55	A	2502-HY	yes	40	yes	
56		2502-HY				
57	A	2502-HY	yes	9.1	yes	Addition of 12C PCB 112 as recovery standard (added prior to injection)
58	A	2502-HY	yes	1.5	yes	
59		2502-HY				

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods NDL-PCBs - Accreditation, weighed sample, internal standards

LC	Data set	Sample	**Accreditation** according to ISO/IEC 17025	**Weighed sample** [g]	**Use of isotope-labelled internal standards for** NDL-PCB congeners (yes/no)	**Other internal standards** NDL-PCBs
60	A	2502-HY	yes	36	yes	
61		2502-HY				
62	A	2502-HY	yes	12.51	yes	2,2',3,3',4,4',5-Heptachlorobiphenyl (PCB170, 13C12,99%)
63		2502-HY				
64		2502-HY				
65	A	2502-HY	yes	25.08	yes	
66		2502-HY				
67	A	2502-HY	yes	5	yes	
68	A	2502-HY		10	yes	
69	A	2502-HY	yes	25	yes	
70	A	2502-HY	no	30.2	yes	
71	A	2502-HY	yes	25	yes	
72	A	2502-HY	no	10.0589	no	54 (for 28&52), 123 (for 101), 167 (for 138&153), 189 (for 180)
73	A	2502-HY	yes	5	yes	
74		2502-HY				
75		2502-HY				
76	A	2502-HY	no	9	no	
77	A	2502-HY	yes	5	yes	
78	A	2502-HY	yes	10	yes	
79	A	2502-HY	yes	9.204	yes	
80	A	2502-HY	yes	15	yes	
81	A	2502-HY	yes	9.8	yes	
82	A	2502-HY	yes	31.97	yes	
83	A	2502-HY	yes	1	yes	PCB-209
84	A	2502-HY	yes	2.1	yes	
85	A	2502-HY	yes	23.8	yes	
86	A	2502-HY	yes	5	yes	
87	A	2502-HY	yes	5	no	PCB 171, to check the extraction, not used for quantification
88	A	2502-HY	yes	42.9536	yes	
89	A	2502-HY	yes	29.737	yes	
90		2502-HY				
91		2502-HY				
92		2502-HY				
93	A	2502-HY	yes	14	yes	
94		2502-HY				
95		2502-HY				
96	A	2502-HY	yes	5	no	
97		2502-HY				
Additional Sets						
41	B	2502-HY	yes	6	yes	
65	B	2502-HY	yes	25.07	yes	
85	B	2502-HY	yes	23.8	yes	
41	C	2502-HY	yes	6.0	yes	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Physico-chemical Methods PCDD/Fs - Extraction

LC	Data set	Sample		Extraction					
				Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
1	A	2502-HY			Twisselmann	Ethanol / Toluene (70:30, v/v)	6 h	boiling point	
2	A	2502-HY			Twisselmann	Toluene	6	110	0,101
3	A	2502-HY			Pressurized liquid extraction , Twisselmann	2-Propanol/Toluol 25:75	8h/30min	82/120	atm/10psi
4	A	2502-HY			Soxhlet	toluene/iso-propanol (23/77)	overnight	boiling	
5		2502-HY							
6		2502-HY							
7	A	2502-HY		-	Pressurized liquid extraction	(1) Toluene - (2) Toluene:Ethanol 90:10	0.25	100	10.3
8		2502-HY							
9	A	2502-HY			ASE	DCM/Hexane	0,3	125	
10		2502-HY							
11	A	2502-HY			Soxhlet	toluene/acetone 7/3	6		
12	A	2502-HY		homogenisation using sea sand	Soxhlet	toluene	15	111 (boiling point of toluene)	ambient pressure
13		2502-HY							
14	A	2502-HY			Soxhlet	Toluene/acetone 70:30	12	70-90 °C	0.1
15		2502-HY							
16	A	2502-HY			Pressurized liquid extraction	Hexane/Acetone (70:30)	1	125	10.3
17		2502-HY							
18	A	2502-HY			Soxhlet	toluene/ethanol 70/30	12	bp	ambient
19		2502-HY							
20	A	2502-HY			ASE	Toluene/ethanol 80/20	0.3	100	10.3
21		2502-HY							
22	A	2502-HY			Pressurized liquid extraction	Toluene/Ethanol (70:30)	3x5 min	120	10
23		2502-HY							
24	A	2502-HY			Soxhlet	Toluene	6	-	-
25	A	2502-HY		-	Soxhlet	Hexane-Acetone 80/20	4	69	Atm
26	A	2502-HY		drying	Pressurized liquid extraction	Toluene / Acetone (70 / 30)	1	120	10
27	A	2502-HY		thorough homogenization	Soxhlet	toluene:methanol 2:1	21	109	0,1
28	A	2502-HY		Drying	Pressurized liquid extraction	Toluene / Acetone (70/30)	0.25	120	10
29		2502-HY							
30		2502-HY							
31	A	2502-HY		Drying	Cold extraction	Toluene/Acetone 70/30	1.5		
32		2502-HY							
33		2502-HY							
34	A	2502-HY		homogenization; drying to determine moisture content	Pressurized liquid extraction , Soxhlet	ASE: toluene, toluene:EtOH (9:1, v/v); Soxhlet: toluene	ASE: 40 min; Soxhlet: 8 h	ASE: 100 °C	ASE: 10,34 MPa; Soxhlet: atm. pressure
35		2502-HY							
36		2502-HY							
37		2502-HY							
38	A	2502-HY			Pressurized liquid extraction	TOLUENE	0.45	135	15
39	A	2502-HY		Homogenization	Soxhlet	toluene/ethanol 50/50	24	120	0.1013
40		2502-HY							
41		2502-HY							
42		2502-HY							
43		2502-HY							
44	A	2502-HY			Pressurized liquid extraction	Toluol/Ethanol (9/1)		100	10
45		2502-HY							
46	A	2502-HY			Soxhlet	toluol	2	230	normal pressure
47		2502-HY							
48	A	2502-HY		No	Pressurized liquid extraction	Toluene/Ethanol (90/10)	1	100	10,34
49	A	2502-HY			Pressurized liquid extraction	Toluene	0.5	135	1500
50		2502-HY							
51		2502-HY							
52		2502-HY							
53		2502-HY							
54	A	2502-HY			Soxhlet	Toluene/ cyclohenane (1:1) and Toluene / ethanol (3:7)	48		
55	A	2502-HY			Soxhlet	toluene	24		
56		2502-HY							
57	A	2502-HY		Drying according to EU 152/2009	Liquid-liquid extraction	n-hexane	1 hour followed by 2 x 0.5 hour	Roomtemperature	
58	A	2502-HY		no	Soxhlet	DCM	24	boiling temp	
59		2502-HY							
60	A	2502-HY			Soxhlet	Toluene / Ethanol (30/70)	12	boiling point of solvant mixture	
61		2502-HY							
62	A	2502-HY			Soxhlet	Toluene	2	160	N/A
63		2502-HY							
64	A	2502-HY			Soxhlet	Toluene/Ethanol 70/30	18	Boiling point	
65	A	2502-HY			Pressurized liquid extraction	toluene			
66	A	2502-HY			Twisselmann	Ethanol/Toluol (7:3)	8	boiling point	
67		2502-HY							
68	A	2502-HY		drying	Soxhlet	DCM:hex 1:1	6	80	room
69	A	2502-HY		drying	Pressurized liquid extraction	toluene	0,5	180	140
70	A	2502-HY		no	Soxhlet				
71	A	2502-HY		drying	Pressurized liquid extraction	toluene	0,5	180	140
72	A	2502-HY		hydromatrix added	ASE	Hexane/Acetone (5:1)	20 min	100 °C	1500 psi
73	A	2502-HY		drying Na2SO4	Pressurized liquid extraction	Toluene/ethanol 70/30	1	100	10

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Physico-chemical Methods PCDD/Fs - Extraction

LC	Data set	Sample		Extraction					
				Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
74		2502-HY							
75		2502-HY							
76		2502-HY							
77		2502-HY							
78	A	2502-HY		no	Pressurized liquid extraction	toluene / acetone (70/30, v/v)	0,5	100	10
79	A	2502-HY			Pressurized liquid extraction	Toluene:Ethanol 9:1	1	100	10
80	A	2502-HY		none	Soxhlet	Toluene	12		
81	A	2502-HY			Soxtherm	Hexane/Dichloromethane/Ethanol (60/60/30)	2h19min	150	
82	A	2502-HY		drying the sample in a vacuum oven, then, mixed with sodium sulphate before extraction	Twisselmann	n-hexane:DCM (1:1)	24		
83		2502-HY							
84	A	2502-HY		drying	ASE, Pressurized liquid extraction	Acetone/Esano (4/1 v/v)	0.45	110	11.7
85	A	2502-HY		Drying	ASE	Toluol	0,5 (3 x 10 min)	180	14
86		2502-HY							
87		2502-HY							
88	A	2502-HY			ASE	hexane:acetone 3:2	1	110	10.34
89	A	2502-HY			Pressurized liquid extraction	Toluene	1	150	13
90		2502-HY							
91		2502-HY							
92	A	2502-HY			Soxhlet	Toluene: Cyclohexene 50:50	24	Boiling	
93	A	2502-HY			Pressurized liquid extraction	pentane/acetone 88/12	0,5	80	1500
94	A	2502-HY			Pressurized liquid extraction	Toluene ; Toluene/Ethanol (9:1)	45 min	100	10,34
95		2502-HY							
96		2502-HY							
97		2502-HY							
Additional Sets									
41		2502-HY							
65	B	2502-HY			Soxhlet	toluene	8		
85	B	2502-HY		Drying	Soxhlet	Toluol	24	100	-

Hay (2502-HY)
Physico-chemical Methods DL-PCBs - Extraction

LC	Data set	Sample		**Extraction** Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
1	A	2502-HY			Twisselmann	Ethanol / Toluene (70:30, v/v)	6 h	boiling point	
2	A	2502-HY			Twisselmann	Toluene	6	110	0,101
3	A	2502-HY			Pressurized liquid extraction , Twisselmann	2-Propanol/Toluol 25:75	8h/30 min	82/120	atm/ 10psi
4	A	2502-HY			Soxhlet	toluene/iso-propanol (23/77)	overnight	boiling	
5		2502-HY							
6		2502-HY							
7	A	2502-HY			Pressurized liquid extraction	(1) Toluene - (2) Toluene:Ethanol 90:10	0.25	100	10.3
8		2502-HY							
9	A	2502-HY			ASE	DCM/Hexane	0,3	125	
10		2502-HY							
11	A	2502-HY			Soxhlet	toluene/acetone 7/3	6		
12	A	2502-HY			Soxhlet	toluene	15	111 (boiling point of toluene)	ambient pressure
13		2502-HY							
14	A	2502-HY			Soxhlet	Toluene/acetone 70:30	12	70-90 °C	0.1
15		2502-HY							
16	A	2502-HY			Pressurized liquid extraction	Hexane/Acetone (70:30)	1	125	10.3
17		2502-HY							
18	A	2502-HY			Soxhlet	toluene/ethanol 70/30	12	bp	ambient
19		2502-HY							
20	A	2502-HY			ASE	toluene/ethanol 80/20	0.3	100	10.3
21		2502-HY							
22	A	2502-HY			Pressurized liquid extraction	Toluene/Ethanol (70:30)	3x5min	120	10
23		2502-HY							
24	A	2502-HY			Soxhlet	Toluene	6	-	-
25	A	2502-HY			Soxhlet	Hexane-Acetone 80/20	4	68	-
26	A	2502-HY			Pressurized liquid extraction	Toluene / Acetone (70 / 30)	1	120	10
27	A	2502-HY			Soxhlet	toluene:methanol 2:1	21	109	0,1
28	A	2502-HY			Pressurized liquid extraction	Toluene / Acetone (70/30)	0.25	120	10
29		2502-HY							
30		2502-HY							
31	A	2502-HY			Cold extraction	Toluene/Acetone 70/30	1.5		
32		2502-HY							
33		2502-HY							
34	A	2502-HY			Pressurized liquid extraction , Soxhlet	ASE: toluene, toluene:EtOH (9:1, v/v); Soxhlet: toluene	ASE: 40 min; Soxhlet: 8 h	ASE: 100 °C	ASE: 10,34 MPa; Soxhlet: atm. pressure
35		2502-HY							
36		2502-HY							
37		2502-HY							
38	A	2502-HY			Pressurized liquid extraction	Toluene	0,45	135	15
39	A	2502-HY							
40		2502-HY							
41		2502-HY							
42		2502-HY							
43		2502-HY							
44	A	2502-HY			Pressurized liquid extraction	Toluol/Ethanol (9/1)		100	10
45		2502-HY							
46	A	2502-HY							
47		2502-HY							
48	A	2502-HY			Pressurized liquid extraction	Toluene / Ethanol (90/10)	1	100	10,34
49	A	2502-HY			Pressurized liquid extraction	Toluene	0.5	135	1500
50		2502-HY							
51		2502-HY							
52		2502-HY							
53		2502-HY							
54	A	2502-HY			Soxhlet	Toluene/Cyclohexane (1:1) and Toluene/Ethanol (3/7)	48		
55	A	2502-HY			Soxhlet				
56		2502-HY							
57	A	2502-HY			liquid-liquid extraction	n-hexane	1 hour followed by 2x0.5 hour	Roomtemperature	
58	A	2502-HY			ultrasonic bath	Hx	4	40	
59		2502-HY							
60	A	2502-HY			Soxhlet	Toluene / Ethanol (30/70)	12	boiling point of solvant mixture	
61		2502-HY							
62	A	2502-HY			Soxhlet	Toluene	2	160	N/A
63		2502-HY							
64	A	2502-HY							
65	A	2502-HY			Pressurized liquid extraction	toluene			
66	A	2502-HY			Twisselmann	Ethanol/Toluol (7:3)	8	boiling point	
67		2502-HY							
68	A	2502-HY			Soxhlet	DCM:hex 1:1	6	80	room
69	A	2502-HY			Pressurized liquid extraction	toluene	0,5	180	140
70	A	2502-HY			Soxhlet				
71	A	2502-HY			Pressurized liquid extraction	toluene	0,5	180	140
72	A	2502-HY			ASE	Hexane/Acetona (5:1)	20 min	100 °C	1500 psi
73	A	2502-HY			Pressurized liquid extraction	Toluene/ethanol 70/30	1	100	10

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Physico-chemical Methods DL-PCBs - Extraction

LC	Data set	Sample		Extraction Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
74		2502-HY							
75		2502-HY							
76		2502-HY							
77		2502-HY							
78	A	2502-HY			Pressurized liquid extraction	toluene /acetone (70/30, v/v)	0,5	100	10
79	A	2502-HY			Pressurized liquid extraction	Toluene:Ethanol 9:1	1	100	10
80	A	2502-HY			Soxhlet	Toluene	12		
81	A	2502-HY			Soxtherm	Hexane/Dichloromethane/Ethanol (60/60/30)	2h19min	150	
82	A	2502-HY			Twisselmann	n-hexane:DCM (1:1)	24		
83		2502-HY							
84	A	2502-HY			ASE, Pressurized liquid extraction	ACETONE/ESANO (4/1 v/v)	0.45	110	11.7
85	A	2502-HY			ASE	Toluol	0,5 (3 x 10min)	180	14
86		2502-HY							
87		2502-HY							
88	A	2502-HY			ASE	hexane:acetone (3:2)	1	110	10.34
89	A	2502-HY			Pressurized liquid extraction	Toluene	1	150	13
90		2502-HY							
91		2502-HY							
92	A	2502-HY			Soxhlet	Toluene:Cyclohexene 50:50	24	Boiling	
93	A	2502-HY			Pressurized liquid extraction	pentane/acetone 88/12	0,5	80	1500
94	A	2502-HY			Pressurized liquid extraction	Toluene ; Toluene:Ethanol (9:1)	45 min	100	10,34
95		2502-HY							
96		2502-HY							
97		2502-HY							
Additional Sets									
41		2502-HY							
65	B	2502-HY			Soxhlet	toluene	8		
85	B	2502-HY			Soxhlet	Toluol	24	100	-

Hay (2502-HY)
Physico-chemical Methods NDL-PCBs - Extraction

LC	Data set	Sample		**Extraction** Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
1	A	2502-HY			Twisselmann	Ethanol / Toluene (70:30, v/v)	6 h	boiling point	
2	A	2502-HY			Twisselmann	Toluene	6	110	0,101
3	A	2502-HY			Pressurized liquid extraction , Twisselmann	2-Propanol/Toluol 25:75	8h/30 min	82/120	atm/ 10psi
4		2502-HY							
5		2502-HY							
6		2502-HY							
7	A	2502-HY			Pressurized liquid extraction	(1) Toluene - (2) Toluene:Ethanol 90:10	0.25	100	10.3
8		2502-HY							
9	A	2502-HY			ASE	DCM/Hexane	0,3	125	
10		2502-HY							
11	A	2502-HY			Soxhlet	toluene/acetone 7/3	6		
12	A	2502-HY			Soxhlet	toluene	15	111 (boiling point of toluene)	ambient pressure
13	A	2502-HY			Cold extraction	water/acetone/hexane 1/2/1 (v/v/v)+NaCl	about 16 h	ambient temperature	0.101 (ambient)
14	A	2502-HY			Soxhlet	Toluene/acetone 70:30	12	70-90 °C	0.1
15		2502-HY							
16	A	2502-HY			Pressurized liquid extraction	Hexane/Acetone (70:30)	1	125	10.3
17	A	2502-HY			Edge (CEM) Automated Solvent Extraction System	Cyclohexane / Ethyl acetate (1/1)	0,12	110	Not applicable
18	A	2502-HY			Soxhlet	toluene/ethanol 70/30	12	bp	ambient
19		2502-HY							
20	A	2502-HY			ASE	toluene/ethanol 80/20	0.3	100	10.3
21	A	2502-HY			shaking	DEE	2 x 1/2 hour	RT	normal
22		2502-HY							
23		2502-HY							
24	A	2502-HY			Soxhlet	Toluene	6	-	-
25	A	2502-HY			Soxhlet	Hexane-Acetone 80/20	4	68	
26	A	2502-HY			Pressurized liquid extraction	Toluene / Acetone (70 / 30)	1	120	10
27	A	2502-HY			Cold extraction	dichloromethane:acetone 2:1	2,5	20	0,1
28	A	2502-HY			Pressurized liquid extraction	Toluene / Acetone (70/30)	0.25	120	10
29		2502-HY							
30		2502-HY							
31	A	2502-HY			Cold extraction	Toluene/Acetone 70/30	1.5		
32		2502-HY							
33	A	2502-HY			Pressurized liquid extraction	toluene/acetone 70/30	0.75	120	10
34	A	2502-HY			Pressurized liquid extraction , Soxhlet	ASE: toluene, toluene:EtOH (9:1, v/v); Soxhlet: toluene	ASE: 40 min; Soxhlet: 8 h	ASE: 100 °C	ASE: 10,34 MPa; Soxhlet: atm. pressure
35		2502-HY							
36	A	2502-HY			Ultra Turrax	hexane/acetone 50/50 v/v	0.017	Room temperature	1 atm
37		2502-HY							
38	A	2502-HY			Pressurized liquid extraction	Toluene	0,45	135	15
39	A	2502-HY			Soxhlet	toluene/ethanol 50/50	24	120	0.1013
40		2502-HY							
41	A	2502-HY			Pressurized liquid extraction	n-hexane	2 cycles. 6 min. heating the cell and 5 min. static time per cycle.	120 °C	11,72
42		2502-HY							
43		2502-HY							
44	A	2502-HY			Pressurized liquid extraction	Toluol/Ethanol (9/1)		100	10
45		2502-HY							
46		2502-HY							
47		2502-HY							
48	A	2502-HY			Pressurized liquid extraction	Toluene / Ethanol (90/10)	1	100	10,34
49	A	2502-HY			Pressurized liquid extraction	Toluene	0.5	135	1500
50		2502-HY							
51	A	2502-HY			Cold extraction	Toluene/methanol 10:3 (v/v)	1.5	20	
52		2502-HY							
53		2502-HY							
54	A	2502-HY			Soxhlet	Hexane/Dichloromethane (1/1)	24		
55	A	2502-HY			Soxhlet				
56		2502-HY							
57	A	2502-HY			liquid-liquid extraction	n-hexane	1 hour followed by 2x0.5 hour	Roomtemperature	
58	A	2502-HY			ultrasonic bath	Hx	4	40	
59		2502-HY							
60	A	2502-HY			Soxhlet	Toluene / Ethanol (30/70)	12	boiling point of solvant mixture	
61		2502-HY							
62	A	2502-HY			Soxhlet	Toluene	2	160	N/A
63		2502-HY							
64		2502-HY							
65	A	2502-HY			Pressurized liquid extraction	toluene			
66		2502-HY							
67	A	2502-HY			Pressurized liquid extraction	Ethylacetate/Cyclohexane (1/1 v/v)	0,25	100	10
68	A	2502-HY			Soxhlet	DCM:hex 1:1	6	80	room
69	A	2502-HY			Pressurized liquid extraction	toluene	0,5	180	140
70	A	2502-HY			Soxhlet				
71	A	2502-HY			Pressurized liquid extraction	toluene	0,5	180	140

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Physico-chemical Methods NDL-PCBs - Extraction

LC	Data set	Sample		Extraction Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
72	A	2502-HY			ASE	Hexane/Acetona (5:1)	20 min	100 °C	1500 psi
73	A	2502-HY			Pressurized liquid extraction	Toluene/ethanol 70/30	1	100	10
74		2502-HY							
75		2502-HY							
76	A	2502-HY			Soxhlet	Cyclohexane/ethylacetate (1:1)	6 h	reflux	
77	A	2502-HY			Quechers	Acetonitrile	0.05	Ambient	Ambient
78	A	2502-HY			Pressurized liquid extraction	toluene /acetone (70/30, v/v)	0,5	100	10
79	A	2502-HY			Pressurized liquid extraction	Toluene:Ethanol 9:1	1	100	10
80	A	2502-HY			Soxhlet	Toluene	12		
81	A	2502-HY			Soxtherm	Hexane/Dichloromethane/Ethanol (60/60/30)	2h19min	150	
82	A	2502-HY			Twisselmann	n-hexane:DCM (1:1)	24		
83	A	2502-HY			Quechers modified	acetonitrile	2min	22	101.5
84	A	2502-HY			ASE, Pressurized liquid extraction	ACETONE/ESANO (4/1 v/v)	0.45	110	11.7
85	A	2502-HY			ASE	Toluol	0,5 (3 x 10min)	180	14
86	A	2502-HY			Pressurized liquid extraction	ACETONE:HEXANE 50:50	0.33	100	10.34
87	A	2502-HY			Column extraction	acetone, petrolether	1	room temperature	
88	A	2502-HY			ASE	hexane/acetone 3/2	1	110	10.34
89	A	2502-HY			Pressurized liquid extraction	Toluene	1	150	13
90		2502-HY							
91		2502-HY							
92		2502-HY							
93	A	2502-HY			Pressurized liquid extraction	pentane/acetone 88/12	0,5	80	1500
94		2502-HY							
95		2502-HY							
96	A	2502-HY			Pressurized liquid extraction	Cyclohexane/Ethyl acetate	2x5min	100°C	10MPa
97		2502-HY							
Additional Sets									
41	B	2502-HY			Pressurized liquid extraction	n-hexane	12 min. heating the cell, 15 min. static time (sum of 3 cycles)	120 °C	10
65	B	2502-HY			Soxhlet	toluene	8		
85	B	2502-HY			Soxhlet	Toluol	24	100	-
41	C	2502-HY			Pressurized liquid extraction	n-hexane	2 cycles. 6 min. heating the cell and 5 min. static time per cycle.	120 °C	11,72

Hay (2502-HY)

Bioanalytical screening methods PCDD/Fs and DL-PCBs - Extraction

LC	Data set	Sample	**Accreditation** according to ISO/IEC 17025	**Weighed sample** [g]	**Extraction** Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
1		2502-HY								
2		2502-HY								
3		2502-HY								
4		2502-HY								
5		2502-HY								
6		2502-HY								
7		2502-HY								
8		2502-HY								
9		2502-HY								
10		2502-HY								
11	A	2502-HY	yes	4		Soxhlet	toluene/acetone 7/3	4		
12		2502-HY								
13		2502-HY								
14		2502-HY								
15		2502-HY								
16		2502-HY								
17		2502-HY								
18		2502-HY								
19		2502-HY								
20		2502-HY								
21	A	2502-HY	yes	6	homogenisation	shaking	water: isopropanol: n-Hexan/DEE 1:1:2	2	RT	normal
22		2502-HY								
23		2502-HY								
24		2502-HY								
25		2502-HY								
26		2502-HY								
27		2502-HY								
28		2502-HY								
29		2502-HY								
30		2502-HY								
31		2502-HY								
32		2502-HY								
33		2502-HY								
34		2502-HY								
35		2502-HY								
36		2502-HY								
37		2502-HY								
38		2502-HY								
39		2502-HY								
40		2502-HY								
41		2502-HY								
42		2502-HY								
43		2502-HY								
44		2502-HY								
45		2502-HY								
46		2502-HY								
47		2502-HY								
48		2502-HY								
49		2502-HY								
50		2502-HY								
51		2502-HY								
52		2502-HY								
53		2502-HY								
54		2502-HY								
55		2502-HY								
56		2502-HY								
57	A	2502-HY	yes	9.1	Drying according to EU 152/2009	liquid-liquid extraction	n-hexane	1 hour followed by 2x0.5 hour	Roomtemperature	
58		2502-HY								
59		2502-HY								
60		2502-HY								
61		2502-HY								
62		2502-HY								
63		2502-HY								
64		2502-HY								
65		2502-HY								
66		2502-HY								
67		2502-HY								
68		2502-HY								
69		2502-HY								
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76		2502-HY								
77		2502-HY								
78	A	2502-HY	yes	10	no	shaking	toluene: methanol 80:20 v/v.	1	-	-
79	A	2502-HY	yes	2	homogenisation	shaking	hexane/diethyl ether (97/3) after mixing of sample with methanol/water (85/15)	2x 1h	RT	
80		2502-HY								
81		2502-HY								
82		2502-HY								
83		2502-HY								
84		2502-HY								
85		2502-HY								
86		2502-HY								
87		2502-HY								
88		2502-HY								
89		2502-HY								
90		2502-HY								
91		2502-HY								

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Bioanalytical screening methods PCDD/Fs and DL-PCBs - Extraction

LC	Data set	Sample		**Accreditation** according to ISO/IEC 17025		**Weighed sample** [g]		**Extraction** Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
92		2502-HY											
93		2502-HY											
94	A	2502-HY		no		9			Pressurized liquid extraction	hexane: acetone (9:1)	15 min	100	10,34
95		2502-HY											
96		2502-HY											
97		2502-HY											

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods PCDD/Fs - Clean-up

LC	Data set	Sample		**Clean-up** Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Fully automated system	Semi-automated system	Other columns / clean-up method	Final volume [µl]: PCDD/F
1	A	2502-HY		x	x	x	x	x	DexTech			20
2	A	2502-HY							Miura			30
3	A	2502-HY			x	x		x	Miura			50
4	A	2502-HY							DexTech		additional purification with silica/sulfuric acid after extraction	10
5		2502-HY										
6		2502-HY										
7	A	2502-HY							DexTech			10
8		2502-HY										
9	A	2502-HY			x		x					20
10		2502-HY										
11	A	2502-HY			x		x	x	DexTech			25
12	A	2502-HY			x		x	x				15
13		2502-HY										
14	A	2502-HY			x		x	x	DexTech			40
15		2502-HY										
16	A	2502-HY			x		x	x			acid hydrolysis with sulphuric acid	20
17		2502-HY										
18	A	2502-HY			x		x	x				15
19		2502-HY										
20	A	2502-HY			x	x	x	x	Miura			25
21		2502-HY										
22	A	2502-HY			x	x	x	x	Miura			15
23		2502-HY										
24	A	2502-HY			x		x	x				20
25	A	2502-HY									POWER PREP system	20
26	A	2502-HY							Miura			12
27	A	2502-HY			x		x	x			basic silica, silver nitrate silica	10
28	A	2502-HY			x	x		x				10
29		2502-HY										
30		2502-HY										
31	A	2502-HY							Miura			10
32		2502-HY										
33		2502-HY										
34	A	2502-HY			x		x	x		x	Power-Prep FMS with PBDE Free disp. columns	10
35		2502-HY										
36		2502-HY										
37		2502-HY										
38	A	2502-HY			x	x	x	x		x		10
39	A	2502-HY			x		x	x				25
40		2502-HY										
41		2502-HY										
42		2502-HY										
43		2502-HY										
44	A	2502-HY							DexTech			30
45		2502-HY										
46	A	2502-HY			x		x					
47		2502-HY										
48	A	2502-HY			x		x	x				10
49	A	2502-HY			x		x	x				10
50		2502-HY										
51		2502-HY										
52		2502-HY										
53		2502-HY										
54	A	2502-HY			x		x	x				10
55	A	2502-HY		x	x	x		x				15
56		2502-HY										
57	A	2502-HY			x		x	x				20
58	A	2502-HY			x		x	x				20
59		2502-HY										
60	A	2502-HY							Miura		acidic treatment	25
61		2502-HY										
62	A	2502-HY			x		x	x				20
63		2502-HY										
64	A	2502-HY			x		x	x				50
65	A	2502-HY							DexTech			20
66	A	2502-HY			x		x	x	DexTech			30
67		2502-HY										
68	A	2502-HY		x	x			x		x		10
69	A	2502-HY			x		x					50
70	A	2502-HY							DexTech			
71	A	2502-HY			x		x					50
72	A	2502-HY							Miura			20
73	A	2502-HY			x		x	x			Automated FMS Ep-110	40

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods PCDD/Fs - Clean-up

LC	Data set	Sample		Clean-up									Final volume [µl]: PCDD/F
				Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Fully automated system	Semi-automated system	Other columns / clean-up method		
74		2502-HY											
75		2502-HY											
76		2502-HY											
77		2502-HY											
78	A	2502-HY			x	x		x					20
79	A	2502-HY			x		x	x	DexTech				500
80	A	2502-HY			x		x	x	Miura		Silica/AgNO3		50
81	A	2502-HY			x		x						10
82	A	2502-HY			x						basic set of "power-prep system" columns		20
83		2502-HY											
84	A	2502-HY			x		x	x					10
85	A	2502-HY			x		x						50
86		2502-HY											
87		2502-HY											
88	A	2502-HY			x		x	x			Automated system Power Prep		20
89	A	2502-HY			x		x	x	DexTech				25
90		2502-HY											
91		2502-HY											
92	A	2502-HY			x		x	x					10
93	A	2502-HY			x		x	x	Miura		Silver nitrate column		20
94	A	2502-HY			x		x	x	DexTech				20
95		2502-HY											
96		2502-HY											
97		2502-HY											
Additional Sets													
41		2502-HY											
65	B	2502-HY							DexTech				20
85	B	2502-HY			x		x						50

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods DL-PCBs - Clean-up

LC	Data set	Sample		**Clean-up**									
				Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Fully automated system	Semi-automated system	Other columns / clean-up method	Final volume [µl]: PCDD/F
1	A	2502-HY		x	x	x	x	x	DexTech			500
2	A	2502-HY							Miura			100
3	A	2502-HY			x	x		x	Miura			50
4	A	2502-HY							DexTech		additional purification with silica/sulfuric acid after extraction	100
5		2502-HY										
6		2502-HY										
7	A	2502-HY							DexTech			100
8		2502-HY										
9	A	2502-HY			x		x					50
10		2502-HY										
11	A	2502-HY			x		x	x	DexTech			100
12	A	2502-HY			x		x					15
13		2502-HY										
14	A	2502-HY			x		x	x	DexTech			200
15		2502-HY										
16	A	2502-HY			x		x	x			acid hydrolysis with sulphuric acid	20
17		2502-HY										
18	A	2502-HY			x		x	x				15
19		2502-HY										
20	A	2502-HY			x	x	x	x	Miura			500
21		2502-HY										
22	A	2502-HY			x	x	x	x	Miura			25
23		2502-HY										
24	A	2502-HY			x		x	x				20
25	A	2502-HY									POWER PREP system	80
26	A	2502-HY							Miura			50
27	A	2502-HY			x		x	x			basic silica, silver nitrate silica	10
28	A	2502-HY			x	x		x				50
29		2502-HY										
30		2502-HY										
31	A	2502-HY							Miura			20
32		2502-HY										
33		2502-HY										
34	A	2502-HY			x		x	x		x	Power-Prep FMS with PBDE Free disp. columns	20
35		2502-HY										
36		2502-HY										
37		2502-HY										
38	A	2502-HY			x		x	x		x		20
39		2502-HY										
40		2502-HY										
41		2502-HY										
42		2502-HY										
43		2502-HY										
44	A	2502-HY							DexTech			30
45		2502-HY										
46		2502-HY										
47		2502-HY										
48	A	2502-HY			x		x	x				200
49	A	2502-HY			x		x	x				80
50		2502-HY										
51		2502-HY										
52		2502-HY										
53		2502-HY										
54	A	2502-HY			x		x					10
55	A	2502-HY		x	x	x		x				15
56		2502-HY										
57	A	2502-HY			x		x	x				100
58	A	2502-HY			x		x					20
59		2502-HY										
60	A	2502-HY							Miura		acidic treatment	50
61		2502-HY										
62	A	2502-HY			x		x	x				20
63		2502-HY										
64		2502-HY										
65	A	2502-HY							DexTech			50
66	A	2502-HY			x		x	x	DexTech			30
67		2502-HY										
68	A	2502-HY		x	x			x		x		20
69	A	2502-HY			x		x					100
70	A	2502-HY							DexTech			
71	A	2502-HY			x		x					100
72	A	2502-HY							Miura			20
73	A	2502-HY			x		x	x			Automated FMS Ep-110	40

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods DL-PCBs - Clean-up

LC	Data set	Sample		Clean-up									Final volume [µl]: PCDD/F
				Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Fully automated system	Semi-automated system	Other columns / clean-up method		
74		2502-HY											
75		2502-HY											
76		2502-HY											
77		2502-HY											
78	A	2502-HY			x	x							50
79	A	2502-HY			x		x	x	DexTech				500
80	A	2502-HY			x		x	x	Miura		Silica/AgNO3		100
81	A	2502-HY			x		x						50
82	A	2502-HY			x						basic set of "power-prep system" columns		40
83		2502-HY											
84	A	2502-HY			x		x						20
85	A	2502-HY			x		x						100
86		2502-HY											
87		2502-HY											
88	A	2502-HY			x		x	x			Automated system Power Prep		20
89	A	2502-HY			x		x	x	DexTech				100
90		2502-HY											
91		2502-HY											
92	A	2502-HY			x		x						20
93	A	2502-HY			x		x	x			Silver nitrate column		1000
94	A	2502-HY			x		x	x	DexTech				500
95		2502-HY											
96		2502-HY											
97		2502-HY											
Additional Sets													
41		2502-HY											
65	B	2502-HY							DexTech				50
85	B	2502-HY			x		x						100

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods NDL-PCBs - Clean-up

LC	Data set	Sample		Clean-up								
				Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Fully automated system	Semi-automated system	Other columns / clean-up method	Final volume [µl]: PCDD/F
1	A	2502-HY		x	x	x	x	x	DexTech			
2	A	2502-HY							Miura			100
3	A	2502-HY			x	x		x	Miura			50
4		2502-HY										
5		2502-HY										
6		2502-HY										
7	A	2502-HY							DexTech			100
8		2502-HY										
9	A	2502-HY			x		x					50
10		2502-HY										
11	A	2502-HY			x		x	x	DexTech			100
12	A	2502-HY			x		x					1000
13	A	2502-HY		x	x							300
14	A	2502-HY			x		x	x	DexTech			200
15		2502-HY										
16	A	2502-HY			x		x	x			acid hydrolysis with sulphuric acid	20
17	A	2502-HY		x							Silica gel column, desactivated with 3,5% H2O	2500
18	A	2502-HY			x		x	x				500
19		2502-HY										
20	A	2502-HY			x	x	x	x	Miura			500
21	A	2502-HY									acid hydrolysis	500
22		2502-HY										
23		2502-HY										
24	A	2502-HY			x		x	x				20
25	A	2502-HY									Power Prep System	80
26	A	2502-HY							Miura			50
27	A	2502-HY		x	x							1000
28	A	2502-HY			x	x		x				50
29		2502-HY										
30		2502-HY										
31	A	2502-HY							Miura			20
32		2502-HY										
33	A	2502-HY			x	x						50
34	A	2502-HY			x		x	x		x	20	Power-Prep FMS with PBDE Free disp. columns
35		2502-HY										
36	A	2502-HY			x							1000
37		2502-HY										
38	A	2502-HY			x	x	x			x		20
39	A	2502-HY			x		x	x				100
40		2502-HY										
41	A	2502-HY			x						Clean-up was carried out after pressurized liquid extraction ("cold pyrolysis")	1000
42		2502-HY										
43		2502-HY										
44	A	2502-HY							DexTech			30
45		2502-HY										
46		2502-HY										
47		2502-HY										
48	A	2502-HY			x		x	x				200
49	A	2502-HY			x		x	x				80
50		2502-HY										
51	A	2502-HY			x							100
52		2502-HY										
53		2502-HY										
54	A	2502-HY			x	x						50
55	A	2502-HY		x	x			x				75
56		2502-HY										
57	A	2502-HY			x	x						100
58	A	2502-HY			x		x					50
59		2502-HY										
60	A	2502-HY							Miura		acidic treatment	50
61		2502-HY										
62	A	2502-HY			x		x	x				200
63		2502-HY										
64		2502-HY										
65	A	2502-HY							DexTech			50
66		2502-HY										
67	A	2502-HY		x							Silica 10% water	1000
68	A	2502-HY		x	x			x		x		20
69	A	2502-HY			x		x					1000
70	A	2502-HY							DexTech			
71	A	2502-HY			x		x					1000

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods NDL-PCBs - Clean-up

LC	Data set	Sample		**Clean-up** Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Fully automated system	Semi-automated system	Other columns / clean-up method	Final volume [µl]: PCDD/F
72	A	2502-HY							Miura			20
73	A	2502-HY			x		x	x			Automated FMS EP-110	40
74		2502-HY										
75		2502-HY										
76	A	2502-HY								x		0,2
77	A	2502-HY									SpE: 150 mg PSA (Primary Secondary amine) 150 mg C18 (octadecysilane) 900 mg MgSO4	6000
78	A	2502-HY			x	x						20
79	A	2502-HY			x		x	x	DexTech			500
80	A	2502-HY			x		x	x	Miura		Silica/AgNO3	100
81	A	2502-HY			x		x					50
82	A	2502-HY			x						basic set of "power-prep system" columns	40
83	A	2502-HY									dispersive SPE	1000
84	A	2502-HY			x	x					NT3 - Extrelut	50
85	A	2502-HY			x		x					1000
86	A	2502-HY			x							250
87	A	2502-HY			x							1000
88	A	2502-HY			x		x	x			Automated Power-Prep	20
89	A	2502-HY			x		x	x	DexTech			100
90		2502-HY										
91		2502-HY										
92		2502-HY										
93	A	2502-HY			x		x	x			Silver nitrate column	1000
94		2502-HY										
95		2502-HY										
96	A	2502-HY		x								
97		2502-HY										
Additional Sets												
41	B	2502-HY			x						Clean-up was carried out during extraction ("hot pyrolysis")	1000
65	B	2502-HY							DexTech			50
85	B	2502-HY			x		x					1000
41	C	2502-HY			x						Clean-up was carried out during pressurized liquid extraction ("hot pyrolysis")	1000

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Bioanalytical screening methods PCDD/Fs and DL-PCBs - Clean-up

LC	Data set	Sample		Clean-up (PCDD/Fs and DL-PCBs)						Clean-up (Separate analysis of PCDD/Fs and PCBs)				
				Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Other column	Separate analysis (yes/no)	Alumina column	Florisil column	Carbon column	Other column
1		2502-HY												
2		2502-HY												
3		2502-HY												
4		2502-HY												
5		2502-HY												
6		2502-HY												
7		2502-HY												
8		2502-HY												
9		2502-HY												
10		2502-HY												
11	A	2502-HY			x									
12		2502-HY												
13		2502-HY												
14		2502-HY												
15		2502-HY												
16		2502-HY												
17		2502-HY												
18		2502-HY												
19		2502-HY												
20		2502-HY												
21	A	2502-HY			x									
22		2502-HY												
23		2502-HY												
24		2502-HY												
25		2502-HY												
26		2502-HY												
27		2502-HY												
28		2502-HY												
29		2502-HY												
30		2502-HY												
31		2502-HY												
32		2502-HY												
33		2502-HY												
34		2502-HY												
35		2502-HY												
36		2502-HY												
37		2502-HY												
38		2502-HY												
39		2502-HY												
40		2502-HY												
41		2502-HY												
42		2502-HY												
43		2502-HY												
44		2502-HY												
45		2502-HY												
46		2502-HY												
47		2502-HY												
48		2502-HY												
49		2502-HY												
50		2502-HY												
51		2502-HY												
52		2502-HY												
53		2502-HY												
54		2502-HY												
55		2502-HY												
56		2502-HY												
57	A	2502-HY			x							x		
58		2502-HY												
59		2502-HY												
60		2502-HY												
61		2502-HY												
62		2502-HY												
63		2502-HY												

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Bioanalytical screening methods PCDD/Fs and DL-PCBs - Clean-up

LC	Data set	Sample		Clean-up (PCDD/Fs and DL-PCBs)						Clean-up (Separate analysis of PCDD/Fs and PCBs)				
				Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Other column	Separate analysis (yes/no)	Alumina column	Florisil column	Carbon column	Other column
64		2502-HY												
65		2502-HY												
66		2502-HY												
67		2502-HY												
68		2502-HY												
69		2502-HY												
70		2502-HY												
71		2502-HY												
72		2502-HY												
73		2502-HY												
74		2502-HY												
75		2502-HY												
76		2502-HY												
77		2502-HY												
78	A	2502-HY			x			x		x			x	
79	A	2502-HY			x									
80		2502-HY												
81		2502-HY												
82		2502-HY												
83		2502-HY												
84		2502-HY												
85		2502-HY												
86		2502-HY												
87		2502-HY												
88		2502-HY												
89		2502-HY												
90		2502-HY												
91		2502-HY												
92		2502-HY												
93		2502-HY												
94	A	2502-HY			x		x							
95		2502-HY												
96		2502-HY												
97		2502-HY												

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods PCDD/Fs - Detection

				PCDD/F			
LC	Data set	Sample		GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector
1	A	2502-HY		PTV	5	DB5-MS	HRMS
2	A	2502-HY		PTV	7	DB-5ms	HRMS
3	A	2502-HY		PTV	1	DB-5ms	HRMS
4	A	2502-HY		Splitless	1.5	Thermo TR-Dioxin (5% diphenyl - 95% polysilphenylene siloxane)	HRMS
5		2502-HY					
6		2502-HY					
7	A	2502-HY		PTV	5	VF-5 MS	HRMS
8		2502-HY					
9	A	2502-HY		PTV	10	VFX-ms 60m	MS/MS
10		2502-HY					
11	A	2502-HY		Splitless	2	DB5 MS	HRMS
12	A	2502-HY		PTV, Splitless	1	Macherey-Nagel OPTIMA 5 HT + 10m Guard Column, 60m x 0.25mm x 0.25µm	MS/MS
13		2502-HY					
14	A	2502-HY		PTV	5	ZB-Dioxin	MS/MS
15		2502-HY					
16	A	2502-HY		Splitless	2	DB-5MS 60m X 0.25mm X 0.1µm	HRMS
17		2502-HY					
18	A	2502-HY		Splitless	5	(5%-phenyl)-methylpolysiloxane	MS/MS
19		2502-HY					
20	A	2502-HY		PTV in splitless mode	6	RTX Dioxin 2	HRMS
21		2502-HY					
22	A	2502-HY		Splitless	2	60 m DB-5 MS capillary column	HRMS
23		2502-HY					
24	A	2502-HY		Splitless	3	-	MS/MS
25	A	2502-HY		PTV	2	Phenomenex ZB-Dioxin	HRMS
26	A	2502-HY		Splitless	2	DB5MS	HRMS
27	A	2502-HY		Splitless	2	DB-5MS	HRMS
28	A	2502-HY		Splitless	2	RTX-PCB 40m	HRMS
29		2502-HY					
30		2502-HY					
31	A	2502-HY		Splitless	2	DB5-MS	MS/MS
32		2502-HY					
33		2502-HY					
34	A	2502-HY		Splitless	3	DB-5ms UI	HRMS
35		2502-HY					
36		2502-HY					
37		2502-HY					
38	A	2502-HY		Splitless	1	DB5MS	HRMS
39	A	2502-HY		Splitless	1	DB5MS	MS/MS
40		2502-HY					
41		2502-HY					
42		2502-HY					
43		2502-HY					
44	A	2502-HY		PTV	5	DB-5MS	HRMS
45		2502-HY					
46	A	2502-HY		Splitless			MS/MS
47		2502-HY					
48	A	2502-HY		Splitless	2	% 5 phenyl, % 95 polydimethyl siloxane	MS/MS
49	A	2502-HY		Splitless	1	5% Phenyl (equiv) polysilphenylene-siloxane	HRMS
50		2502-HY					
51		2502-HY					
52		2502-HY					
53		2502-HY					
54	A	2502-HY		Splitless	2	DB5MS	HRMS
55	A	2502-HY		Splitless	2		HRMS
56		2502-HY					
57	A	2502-HY		Splitless	2	DB-5 MS	MS/MS
58	A	2502-HY		Splitless	2.5	DB5MS, DB17	MS/MS

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods PCDD/Fs - Detection

				PCDD/F			
LC	Data set	Sample		GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector
59		2502-HY					
60	A	2502-HY		Splitless	1.8	DB-5MS	HRMS
61		2502-HY					
62	A	2502-HY		PTV	2.5	5% Diphenyl / 95% Dimethylpolysiloxan	MS/MS
63		2502-HY					
64	A	2502-HY		Splitless	1.5	DB-5MS	HRMS
65	A	2502-HY		Splitless	2	DB-5MS	HRMS
66	A	2502-HY		PTV	5	DB5	HRMS
67		2502-HY					
68	A	2502-HY		PTV	5	db-5ms ui	MS/MS
69	A	2502-HY		PTV	5	5SLB-MS; DB-Dioxin	HRMS
70	A	2502-HY		Splitless	1.5		MS/MS
71	A	2502-HY		PTV	5	5SLB-MS; DB-Dioxin	HRMS
72	A	2502-HY		Splitless	1	DB5ms	HRMS
73	A	2502-HY		Splitless	5	DB-5MS	MS/MS
74		2502-HY					
75		2502-HY					
76		2502-HY					
77		2502-HY					
78	A	2502-HY		PTV	2	(5%-phenyl)-methylpolysiloxane) DB5-MS	HRMS
79	A	2502-HY		PTV	100	DB-5 MS	HRMS
80	A	2502-HY		PTV	8	DBDIOXIN (8 µL), DB-5 (5 µL)	HRMS
81	A	2502-HY		Splitless	1	VF-Xms	LRMS
82	A	2502-HY		Splitless	2	DB-5MS (60 m, 0.25 mm id, 0,25 mm film)	HRMS
83		2502-HY					
84	A	2502-HY		Splitless	1	5% Phenyl, 94% Methyl, 1% Vinylsilicone 60m*0.25mm*0.1 um	HRMS
85	A	2502-HY		PTV	5	DB-Dioxin, 5SLB-MS	HRMS
86		2502-HY					
87		2502-HY					
88	A	2502-HY		Splitless	1.5	DB-5ms	HRMS
89	A	2502-HY		Splitless	5	XLB	MS/MS
90		2502-HY					
91		2502-HY					
92	A	2502-HY		Splitless	2	DB5	HRMS
93	A	2502-HY		Splitless	2	DB5-MS	HRMS
94	A	2502-HY		MMI	5	5% fenil-metilpolisiloxane	MS/MS
95		2502-HY					
96		2502-HY					
97		2502-HY					
Additional Sets							
41		2502-HY					
65	B	2502-HY		Splitless	2	DB-5MS	HRMS
85	B	2502-HY		PTV	5	DB-Dioxin, 5SLB-MS	HRMS

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods DL-PCBs - Detection

				DL-PCBs			
LC	Data set	Sample		GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector
1	A	2502-HY		PTV, Splitless	1 (mono-ortho), 5 (non-ortho)	HT8-PCB (mono-ortho) / DB5-MS (non-ortho)	HRMS
2	A	2502-HY		PTV	7	DB-5ms	HRMS
3	A	2502-HY		PTV	2	XLB	HRMS
4	A	2502-HY		Splitless	1,5	Thermo TR-Dioxin (5% diphenyl - 95% polysilphenylene siloxane)	HRMS
5		2502-HY					
6		2502-HY					
7	A	2502-HY		Splitless	2	HT-8	HRMS
8		2502-HY					
9	A	2502-HY		PTV	2	VFXms-60m /SLB	HRMS, MS/MS
10		2502-HY					
11	A	2502-HY		Splitless	2	HT 8	HRMS
12	A	2502-HY		PTV, Splitless	1	Macherey-Nagel OPTIMA 5 HT + 10m Guard Column, 60m x 0.25mm x 0.25µm	MS/MS
13		2502-HY					
14	A	2502-HY		PTV	1	HT-8	MS/MS
15		2502-HY					
16	A	2502-HY		Splitless	1	HT8-PCB 60m x0,25mm x 0,25µm	HRMS
17		2502-HY					
18	A	2502-HY		Splitless	5	(5%-phenyl)-methylpolysiloxane	MS/MS
19		2502-HY					
20	A	2502-HY		PTV in splitless mode	2	HT8/RTX D 2	HRMS
21		2502-HY					
22	A	2502-HY		Splitless	1,5	60 m DB-5 MS capillary column	HRMS
23		2502-HY					
24	A	2502-HY		Splitless	3		MS/MS
25	A	2502-HY		PTV	2	SGE HT8	HRMS
26	A	2502-HY		Splitless	2	HT8PCB	HRMS
27	A	2502-HY		Splitless	1	DB-5MS	HRMS
28	A	2502-HY		Splitless	2	RTX-PCB 40m	HRMS
29		2502-HY					
30		2502-HY					
31	A	2502-HY		Splitless	1	DB5-MS	MS/MS
32		2502-HY					
33		2502-HY					
34	A	2502-HY		Splitless	2	DB-5ms UI	HRMS
35		2502-HY					
36		2502-HY					
37		2502-HY					
38	A	2502-HY		Splitless	1	DB5MS	HRMS
39		2502-HY					
40		2502-HY					
41		2502-HY					
42		2502-HY					
43		2502-HY					
44	A	2502-HY		PTV, Splitless	1 and 5	DB-5MS and HT8-PCB	HRMS
45		2502-HY					
46		2502-HY					
47		2502-HY					
48	A	2502-HY		Splitless	2	% 5 phenyl, % 95 polydimethyl siloxane	MS/MS
49	A	2502-HY		Splitless	1	TR-PCB 8 MS	HRMS
50		2502-HY					
51		2502-HY					
52		2502-HY					
53		2502-HY					
54	A	2502-HY		Splitless	1	DB5MS	HRMS
55	A	2502-HY		Splitless	2		HRMS
56		2502-HY					
57	A	2502-HY		Splitless	1	DB5-MS	MS/MS
58	A	2502-HY		Splitless	2	DB5MS	MS/MS

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods DL-PCBs - Detection

LC	Data set	Sample		**DL-PCBs** GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector
59		2502-HY					
60	A	2502-HY		Splitless	1 - 1.8	HT8-PCB / DB-5MS	HRMS
61		2502-HY					
62	A	2502-HY		PTV	2.5	5% Diphenyl / 95% Dimethylpolysiloxan	MS/MS
63		2502-HY					
64		2502-HY					
65	A	2502-HY		Splitless	2	DB-XLB	HRMS
66	A	2502-HY		PTV	5	DB5	HRMS
67		2502-HY					
68	A	2502-HY		Splitless	1	DB 5MS UI	MS/MS
69	A	2502-HY		PTV	5	HT-8	HRMS
70	A	2502-HY		Splitless	1.5		MS/MS
71	A	2502-HY		PTV	5	HT-8	HRMS
72	A	2502-HY		Splitless	1	HT8	HRMS
73	A	2502-HY		Splitless	5	DB-5MS	MS/MS
74		2502-HY					
75		2502-HY					
76		2502-HY					
77		2502-HY					
78	A	2502-HY		PTV	1	(5%-phenyl)-methylpolysiloxane)	HRMS
79	A	2502-HY		PTV, Splitless	100 / 2	DB-5 MS	HRMS
80	A	2502-HY		PTV	2	DBDIOXIN, DB-5	HRMS
81	A	2502-HY		Splitless	1	VF-Xms	LRMS
82	A	2502-HY		Splitless	1	DB-5MS (60 m, 0.25 mm id, 0,25 mm film)	HRMS
83		2502-HY					
84	A	2502-HY		Splitless	1	8% Phenylpolycarborane-siloxane 60m*0.25 mm*0.25 um	HRMS
85	A	2502-HY		PTV	5	DB-Dioxin, HT-8	HRMS
86		2502-HY					
87		2502-HY					
88	A	2502-HY		Splitless	1.5	DB-XLB, DB-5ms	HRMS
89	A	2502-HY		Splitless	2	XLB	MS/MS
90		2502-HY					
91		2502-HY					
92	A	2502-HY		Splitless	1	DB5	HRMS
93	A	2502-HY		PTV, Splitless	1-2	DB5-MS (no-PCB) and HT8 (mo-PCB)	HRMS
94	A	2502-HY		MMI	1	5% fenil-metilpolisiloxane	MS/MS
95		2502-HY					
96		2502-HY					
97		2502-HY					
Additional Sets							
41		2502-HY					
65	B	2502-HY		Splitless	2	DB-XLB	HRMS
85	B	2502-HY		PTV	5	DB-Dioxin, HT-8	HRMS

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods NDL-PCBs - Detection

				NDL-PCBs			
LC	Data set	Sample		GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector
1	A	2502-HY		Splitless	1	HT8-PCB	HRMS
2	A	2502-HY		Splitless	1	DB-5ms	MS/MS
3	A	2502-HY		PTV	2	XLB	HRMS
4		2502-HY					
5		2502-HY					
6		2502-HY					
7	A	2502-HY		Splitless	2	HT-8	HRMS
8		2502-HY					
9	A	2502-HY		PTV	2	VFXms 60m / SLB	HRMS, MS/MS
10		2502-HY					
11	A	2502-HY		Splitless	2	HT 8	HRMS
12	A	2502-HY		PTV, Splitless	1	Macherey-Nagel OPTIMA 5 HT + 10m Guard Column, 60m x 0.25mm x 0.25µm	MS/MS
13	A	2502-HY		PTV, Splitless	1	HP-5MS UI	MS/MS
14	A	2502-HY		PTV	1	HT-8	MS/MS
15		2502-HY					
16	A	2502-HY		Splitless	1	HT8-PCB 60m x0,25mm x 0,25µm	HRMS
17	A	2502-HY		PTV	1	DB-608	MS/MS
18	A	2502-HY		Splitless	5	(5%-phenyl)-methylpolysiloxane	MS/MS
19		2502-HY					
20	A	2502-HY		PTV in splitless mode	2	HT8/RTX D 2	HRMS
21	A	2502-HY		Splitless	2	crosslinked 5% PH ME Siloxane	ECD
22		2502-HY					
23		2502-HY					
24	A	2502-HY		Splitless	3		MS/MS
25	A	2502-HY		PTV	2	SGE HT8	HRMS
26	A	2502-HY		Splitless	2	HT8PCB	HRMS
27	A	2502-HY		Splitless	1	HT-8	MS/MS, ECD
28	A	2502-HY		Splitless	2	RTX-PCB 40m	HRMS
29		2502-HY					
30		2502-HY					
31	A	2502-HY		Splitless	1	DB5-MS	MS/MS
32		2502-HY					
33	A	2502-HY		Splitless	2	HT8 PCB 60m DI 0.25	MS/MS
34	A	2502-HY		Splitless	2	DB-5ms UI	HRMS
35		2502-HY					
36	A	2502-HY		Splitless	1	Rxi-XLB	MS/MS
37		2502-HY					
38	A	2502-HY		Splitless	1	DB5MS	HRMS
39	A	2502-HY		Splitless	1	DB5MS	MS/MS
40		2502-HY					
41	A	2502-HY		Splitless	2	SGE HT-8; 50 m, 0,22 mm, 0,25 µm	MS/MS
42		2502-HY					
43		2502-HY					
44	A	2502-HY		Splitless	1	HT8-PCB	HRMS
45		2502-HY					
46		2502-HY					
47		2502-HY					
48	A	2502-HY		Splitless	2	% 5 phenyl, % 95 polydimethyl siloxane	MS/MS
49	A	2502-HY		Splitless	1	TR-PCB 8 MS	HRMS
50		2502-HY					
51	A	2502-HY		Splitless	2	TR-PCB-8MS	MS/MS
52		2502-HY					
53		2502-HY					
54	A	2502-HY		Splitless	1	DBXLB	HRMS
55	A	2502-HY		Splitless	2		HRMS
56		2502-HY					
57	A	2502-HY		Splitless	1	DB5-MS	MS/MS
58	A	2502-HY		Splitless	1	DB5MS, DB17	MS/MS
59		2502-HY					

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Physico-chemical Methods NDL-PCBs - Detection

				NDL-PCBs			
LC	Data set	Sample		GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector
60	A	2502-HY		Splitless	1	HT8-PCB	HRMS
61		2502-HY					
62	A	2502-HY		PTV	1	5% Diphenyl / 95% Dimethylpolysiloxan	MS/MS
63		2502-HY					
64		2502-HY					
65	A	2502-HY		Splitless	2	DB-XLB	HRMS
66		2502-HY					
67	A	2502-HY		Splitless	1	HP 5ms UI (5% Phenyl - 95% Dimethylpolysiloxane)	MS/MS
68	A	2502-HY		Splitless	1		MS/MS
69	A	2502-HY		PTV	5		HRMS
70	A	2502-HY		Splitless	1		MS/MS
71	A	2502-HY		PTV	5		HRMS
72	A	2502-HY		Splitless	1		HRMS
73	A	2502-HY		Splitless	5	DB-5MS	MS/MS
74		2502-HY					
75		2502-HY					
76	A	2502-HY		Splitless	2		ECD
77	A	2502-HY		PTV	2	5% phenyl, 95% dimethyl arylene polysiloxane	MS/MS
78	A	2502-HY		PTV	1	(5%-phenyl)-methylpolysiloxane	HRMS
79	A	2502-HY		Splitless	2	DB-5 MS	HRMS
80	A	2502-HY		PTV	2	DBDIOXIN, DB-5	HRMS
81	A	2502-HY		Splitless	1	VF-Xms	LRMS
82	A	2502-HY		Splitless	1	DB-5MS (60 m, 0.25 mm id, 0,25 mm film)	HRMS
83	A	2502-HY		PTV	2	HP5MSui	MS/MS
84	A	2502-HY		Splitless	1	8% Phenylpolycarborane-siloxane 60m*0.25 mm*0.25 um	HRMS
85	A	2502-HY		PTV	5	HT-8	HRMS
86	A	2502-HY		Splitless	1	HT8 SGE	MS/MS
87	A	2502-HY		Splitless	1	HP5-MS UI, 2x 15m x 0,25mm x 0,25µm	MS/MS
88	A	2502-HY		Splitless	1.5	DB-XLB	HRMS
89	A	2502-HY		Splitless	2	XLB	MS/MS
90		2502-HY					
91		2502-HY					
92		2502-HY					
93	A	2502-HY		PTV	1	HT8	HRMS
94		2502-HY					
95		2502-HY					
96	A	2502-HY		Splitless	1	HP-5MS UI	
97		2502-HY					
Additional Sets							
41	B	2502-HY		Splitless	2	SGE HT-8; 50 m, 0,22 mm, 0,25 µm	MS/MS
65	B	2502-HY		Splitless	2	DB-XLB	HRMS
85	B	2502-HY		PTV	5	HT-8	HRMS
41	C	2502-HY		Splitless	2	SGE HT-8; 50 m, 0,22 mm, 0,25 µm	MS/MS

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)
Bioanalytical screening methods PCDD/Fs and DL-PCBs - Cell bioassay

LC	Data set	Sample		Method validated according to EU Regulation	Name, type and provider of cell line	Sample replicates on microtiter plate	Type of calibrators	Type of calibration function	Curve fitting method	Type of recovery reference	Matrix of recovery reference	Level(s) of recovery reference sample(s)			Procedure blank correction	Recovery correction
												PCDD/F + DL-PCB	PCDD/F	DL-PCB		
1		2502-HY														
2		2502-HY														
3		2502-HY														
4		2502-HY														
5		2502-HY														
6		2502-HY														
7		2502-HY														
8		2502-HY														
9		2502-HY														
10		2502-HY														
11	A	2502-HY		x	rat Hepatoma Typs H4L 1.1 c4 (University of California, Davis)	triplicates	TCDD	curve model	WSSR regession	QC sample GC-HRMS confirmed		78,2			x	
12		2502-HY														
13		2502-HY														
14		2502-HY														
15		2502-HY														
16		2502-HY														
17		2502-HY														
18		2502-HY														
19		2502-HY														
20		2502-HY														
21	A	2502-HY		x	H4IIE, rat hepatoma cells Pgudluc1.1, BDS Holand	triplicate	TCDD	linear	SSR	certified					x	x
22		2502-HY														
23		2502-HY														
24		2502-HY														
25		2502-HY														
26		2502-HY														
27		2502-HY														
28		2502-HY														
29		2502-HY														
30		2502-HY														
31		2502-HY														
32		2502-HY														
33		2502-HY														
34		2502-HY														
35		2502-HY														
36		2502-HY														
37		2502-HY														
38		2502-HY														
39		2502-HY														
40		2502-HY														
41		2502-HY														
42		2502-HY														
43		2502-HY														
44		2502-HY														
45		2502-HY														
46		2502-HY														
47		2502-HY														
48		2502-HY														
49		2502-HY														
50		2502-HY														
51		2502-HY														
52		2502-HY														
53		2502-HY														
54		2502-HY														
55		2502-HY														
56		2502-HY														
57	A	2502-HY		x	Rat hepatoma cellen (H4IIE), BioDetection Systems	Triplicates	2,3,7,8-TCDD		Linear	GC/HRMS confirmed		70.00	70.00	70.00	x	x
58		2502-HY														
59		2502-HY														
60		2502-HY														
61		2502-HY														
62		2502-HY														
63		2502-HY														
64		2502-HY														
65		2502-HY														
66		2502-HY														
67		2502-HY														
68		2502-HY														
69		2502-HY														
70		2502-HY														
71		2502-HY														
72		2502-HY														
73		2502-HY														
74		2502-HY														
75		2502-HY														
76		2502-HY														
77		2502-HY														
78	A	2502-HY		x	mouse hepatoma H1L6.1c3	duplicates	TCDD, PCB-126	4-PL	SSR	home reference material (spiked, GC/HRMS confirmed)		1.07	0.46	0.61	x	x
79	A	2502-HY		x	Rat H4IIE	triplicates	reference samples	exponential	F-statistic	reference samples		0.02/0.29/0.48/0.70/1.57/ 3.35 ng TEQ/kg				x

Hay (2502-HY)
Bioanalytical screening methods PCDD/Fs and DL-PCBs - Cell bioassay

LC	Data set	Sample		Method validated according to EU Regulation	Name, type and provider of cell line	Sample replicates on microtiter plate	Type of calibrators	Type of calibration function	Curve fitting method	Type of recovery reference	Matrix of recovery reference	Level(s) of recovery reference sample(s)			Procedure blank correction	Recovery correction
												PCDD/F + DL-PCB	PCDD/F	DL-PCB		
80		2502-HY														
81		2502-HY														
82		2502-HY														
83		2502-HY														
84		2502-HY														
85		2502-HY														
86		2502-HY														
87		2502-HY														
88		2502-HY														
89		2502-HY														
90		2502-HY														
91		2502-HY														
92		2502-HY														
93		2502-HY														
94	A	2502-HY			BDS DR CALUX	triplicate	TCDD	linear curve model	SSR	Reference material		2,44 ngTEQ/kg			x	x
95		2502-HY														
96		2502-HY														
97		2502-HY														

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Bioanalytical screening methods PCDD/Fs and DL-PCBs - Bioassay cut-off

LC	Data set	Sample		**Bioassay cut-off** matrix-matched	multiple analysis (n>6) of a	multiple analysis (n>6) of a sample	matrix-matched
1		2502-HY					
2		2502-HY					
3		2502-HY					
4		2502-HY					
5		2502-HY					
6		2502-HY					
7		2502-HY					
8		2502-HY					
9		2502-HY					
10		2502-HY					
11	A	2502-HY			x		
12		2502-HY					
13		2502-HY					
14		2502-HY					
15		2502-HY					
16		2502-HY					
17		2502-HY					
18		2502-HY					
19		2502-HY					
20		2502-HY					
21	A	2502-HY					
22		2502-HY					
23		2502-HY					
24		2502-HY					
25		2502-HY					
26		2502-HY					
27		2502-HY					
28		2502-HY					
29		2502-HY					
30		2502-HY					
31		2502-HY					
32		2502-HY					
33		2502-HY					
34		2502-HY					
35		2502-HY					
36		2502-HY					
37		2502-HY					
38		2502-HY					
39		2502-HY					
40		2502-HY					
41		2502-HY					
42		2502-HY					
43		2502-HY					
44		2502-HY					
45		2502-HY					
46		2502-HY					
47		2502-HY					
48		2502-HY					
49		2502-HY					
50		2502-HY					
51		2502-HY					
52		2502-HY					
53		2502-HY					
54		2502-HY					
55		2502-HY					
56		2502-HY					

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Hay 2025 [EURL-PT-POP_2502-HY]

EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Hay (2502-HY)

Bioanalytical screening methods PCDD/Fs and DL-PCBs - Bioassay cut-off

LC	Data set	Sample		**Bioassay cut-off** matrix-matched	multiple analysis (n>6) of a	multiple analysis (n>6) of a sample	matrix-matched
57	A	2502-HY					
58		2502-HY					
59		2502-HY					
60		2502-HY					
61		2502-HY					
62		2502-HY					
63		2502-HY					
64		2502-HY					
65		2502-HY					
66		2502-HY					
67		2502-HY					
68		2502-HY					
69		2502-HY					
70		2502-HY					
71		2502-HY					
72		2502-HY					
73		2502-HY					
74		2502-HY					
75		2502-HY					
76		2502-HY					
77		2502-HY					
78	A	2502-HY		x			
79	A	2502-HY					
80		2502-HY					
81		2502-HY					
82		2502-HY					
83		2502-HY					
84		2502-HY					
85		2502-HY					
86		2502-HY					
87		2502-HY					
88		2502-HY					
89		2502-HY					
90		2502-HY					
91		2502-HY					
92		2502-HY					
93		2502-HY					
94	A	2502-HY				x	
95		2502-HY					
96		2502-HY					
97		2502-HY					