EURL Proficiency Test on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Bovine Meat 2024

EURL-PT-POP_2401-BM

FOOD

Report

PCDD/Fs and PCBs

(Report Version 1.1)

15 April 2025

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Summary

Test sample	**FOOD:** Bovine Meat [2401-BM]
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 food business operators
Statistical evaluation	ISO 13528:2022 [1], IUPAC Protocol [2]
Report of final results	15 April 2025 (Version 1.1) Annex 3: Table with z-scores for sum parameters
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 **Bovine Meat** was organized by the EURL for halogenated POPs in Feed and Food to be performed between February and April 2024. The objective was 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 **Bovine Meat**.

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 2024. 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 food business operators were invited to participate in this proficiency test.

First results were discussed by representatives of European Commission, NRLs and the EURL at the EURL/NRL workshop in May 2024 in Freiburg, Germany.

1.1. Samples and coding

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

Bovine Meat	**Sample no. 2401-BM-xxx**

Each participant received about **90 g** of the test sample as a fully preserved canned product.

1.2. Analytes of interest

Participants were requested to determine the following parameters:

- 17 2,3,7,8-substituted PCDD/Fs
- WHO-PCDD/F-TEQ (using WHO_{2005}-TEF)
- 12 dioxin-like PCBs
- WHO-PCB-TEQ (using WHO_{2005}-TEF)
- WHO-PCDD/F-PCB-TEQ (using WHO_{2005}-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

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 or action levels 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 **pg/g fat** for PCDD/Fs and dioxin-like PCBs and **ng/g fat** for non-dioxin-like PCBs. TEQ-based results have to be calculated using the WHO-TEFs of 2005 [3].

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

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 / action level, 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 had to be reported in **pg BEQ/g fat**, for PCDD/Fs and DL- 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

129 laboratories registered for this proficiency test. 98 laboratories reported results for at least one parameter for PCDD/Fs and PCBs. Six laboratories reported two sets of results.

Table 1: Participating laboratories

Participating laboratories	Region	No. of participants
National Reference Laboratories	European Union Other Countries	27 5
Official Laboratories	European Union Other European Countries Africa Americas Asia Oceania	69 4 - 1 - -
Commercial Laboratories	European Union Other European Countries Africa Americas Asia Oceania	18 2 - 1 2 -
	Total	**129**

2.1. Number of reported results

Table 2: Reported results for PCDD/F and PCB sum parameters and lipid 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]	Lipid content
All laboratories	**75**	**75**	**75**	**98**	**8**	**91**
NRLs	**21**	**21**	**21**	**25**	**4**	**24**

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

Bovine Meat	PCDD/Fs, PCBs [Physico-chemical methods]	PCDD/Fs, PCBs [Bioanalytical screening methods]
yes	85	5
no	5	3

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	non-ortho-PCBs	mono-ortho-PCBs	Indicator PCBs
HRMS	50	52	49	44
MS/MS	16	14	14	25
LRMS	3	3	3	10
ECD	-	-	-	5

3. Test for sufficient homogeneity

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 2401-BM 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 was 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, no assigned values could be calculated for:

- 2,3,7,8-TCDD
- 1,2,3,7,8,9-HxCDF
- 1,2,3,4,7,8,9-HpCDF
- 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 Bovine Meat 2401-BM

Sum parameters	Assigned value All participants	Assigned value ISO/IEC 17025 accreditation	Deviation
	pg/g, ng/g (fat)	pg/g, ng/g (fat)	%
WHO-PCDD/F-PCB-TEQ ub rep	3.86	3.92	<2
WHO-PCDD/F-TEQ ub rep	1.84	1.88	2
WHO-PCB-TEQ ub rep	2.12	2.15	<2
Sum Indicator PCBs ub rep	39.0	39.0	-

4.1. PCDD/Fs and PCBs – Sum parameters

The assigned values for the test sample 2401-BM 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)
	pg/g (fat)			ng/g (fat)
Bovine Meat (2401-BM)	3.86	1.84	2.12	39.0

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)
	pg/g (fat)		
Bovine Meat (2401-BM)	3.9	1.8	2.1

4.2. PCDD/Fs and PCBs – Individual congeners

The assigned values of individual congeners for the test sample 2401-BM were calculated as a consensus of the participants' results, taking into account the calculation criteria described above (Figures 1-4; tabular summary in Annex 1). The contribution of the assigned values of individual congeners to the WHO-PCDD/F-TEQ and WHO-PCB-TEQ for the test sample 2401-BM is shown in Figures 5 and 6.

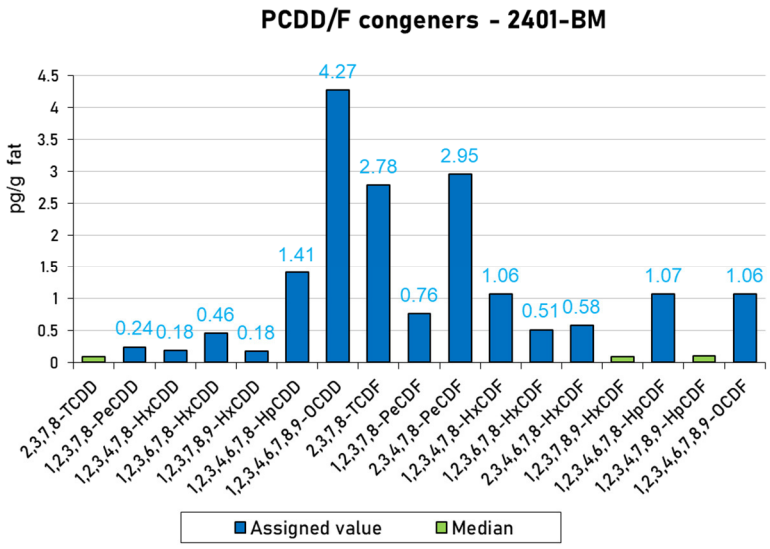


Figure 1: Assigned values (blue) and median values (green) for PCDD/F congeners for Bovine Meat (2401-BM) [pg/g (fat)]

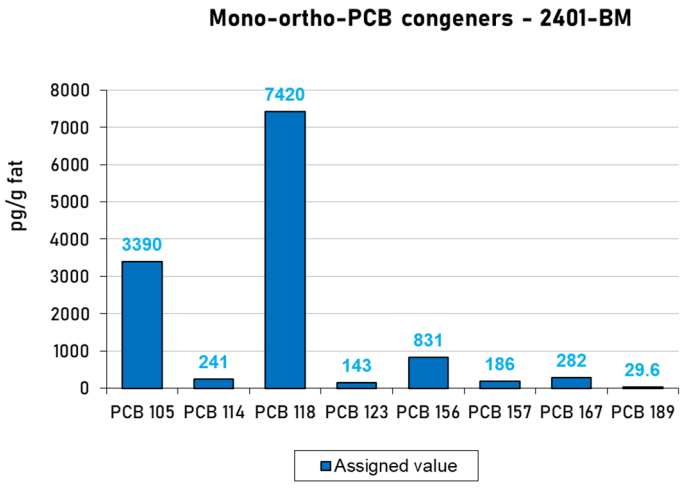


Figure 2: Assigned values (blue) for Mono-ortho-PCB congeners for Bovine Meat (2401-BM) [pg/g (fat)]

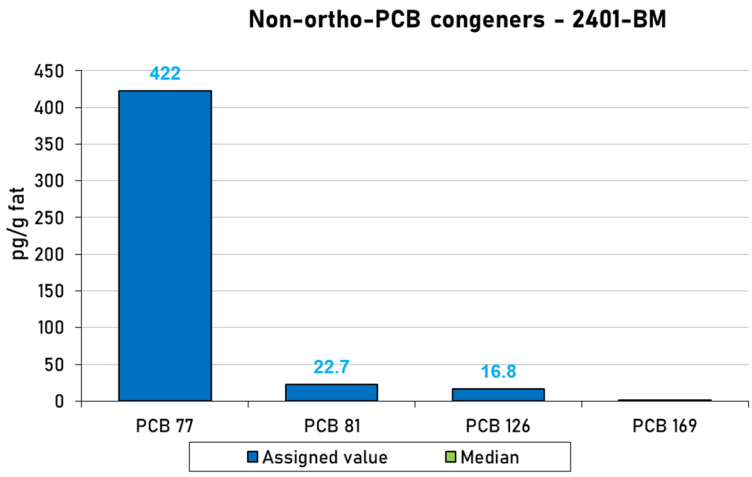


Figure 3: Assigned values (blue) and median values (green) for Non-ortho-PCB congeners for Bovine Meat (2401-BM) [pg/g (fat)]

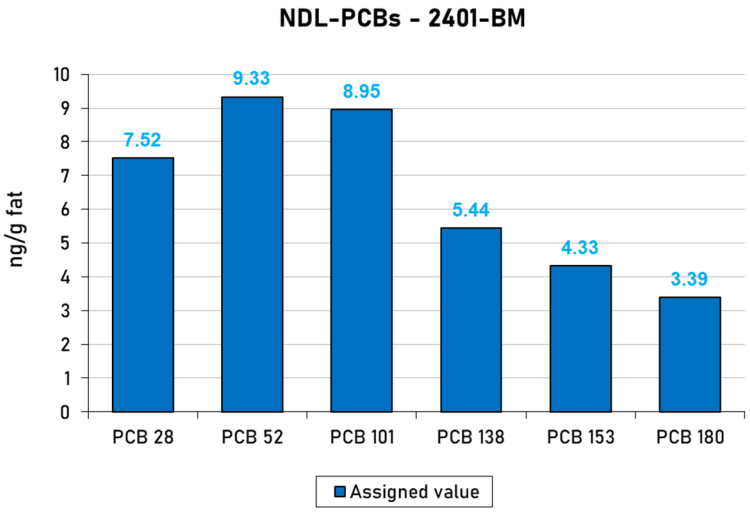


Figure 4: Assigned values (blue) for NDL-PCB congeners for Bovine Meat (2401-BM) [ng/g (fat)]

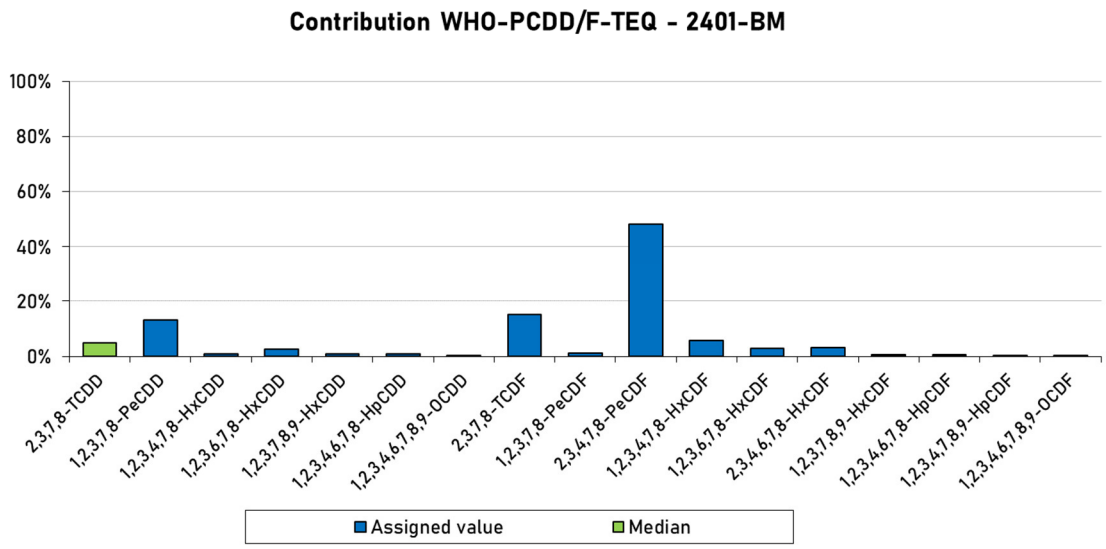


Figure 5: Contributions in % to WHO-PCDD/F-TEQ for PCDD/F assigned (blue) and median (green) values for Bovine Meat (2401-BM)

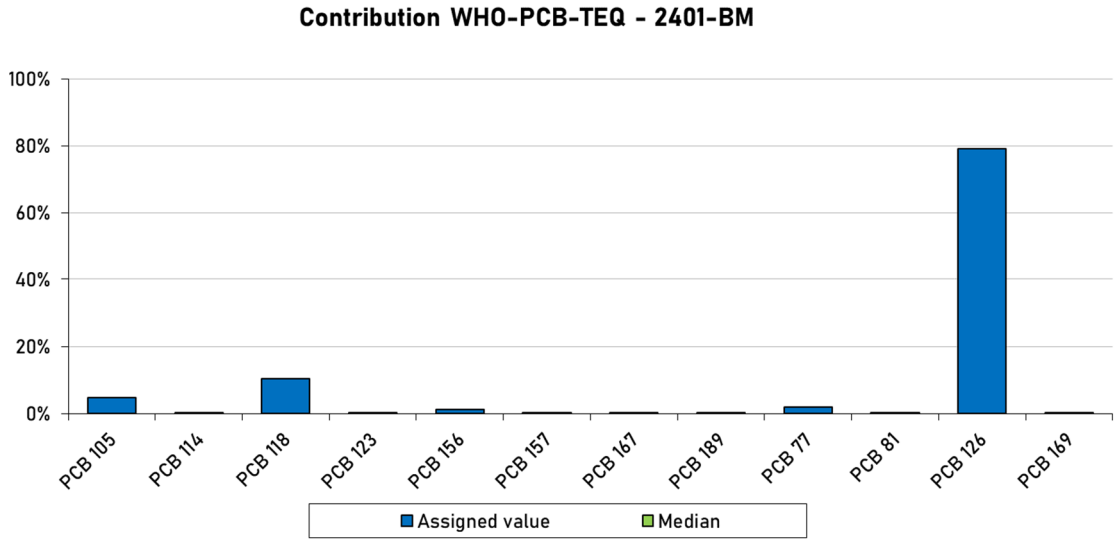


Figure 6: Contributions in % to WHO-PCB-TEQ for PCB assigned (blue) and median (green) values for Bovine Meat (2401-BM)

4.3. Lipid content

For the lipid content an assigned value of **6.49 %** for the test sample 2401-BM was calculated as a consensus of the participants' results, taking into account the calculation criteria described above.

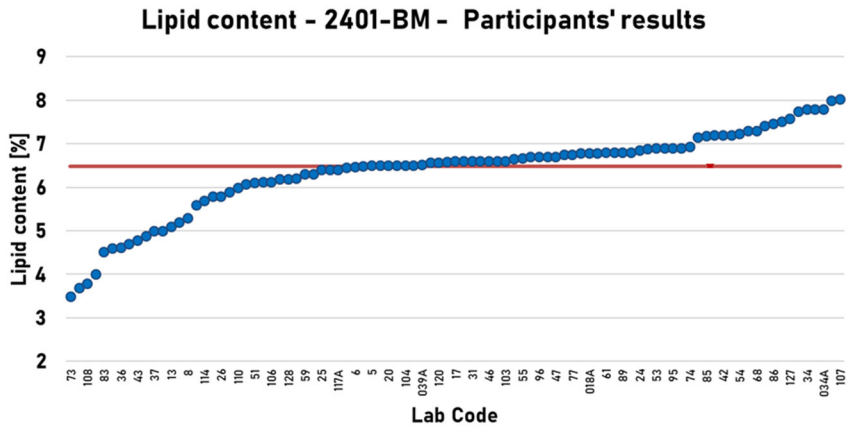


Figure 7: Participant's results (blue dots) compared to the assigned value (red line) of the lipid content in % for Bovine Meat (2401-BM)

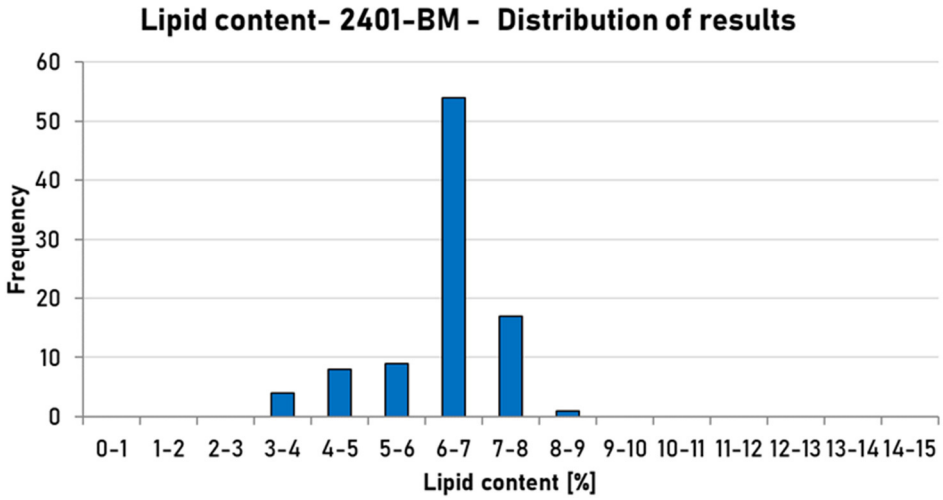


Figure 8: Frequency of reported values for the lipid content in % for Bovine Meat (2401-BM)

4.4. Comparison of assigned values with legal limits

Maximum levels for food are defined in Commission Regulation (EC) No 2023/915 of 25 April 2023 setting maximum levels for certain contaminants in foodstuff. Maximum levels for Dioxins and PCBs in Foodstuffs can be found under Annex 1 Section 4.1. Action Level are defined in Commission Recommendation (2013) on the reduction of the presence of dioxins, furans and PCBs in feed and food, 2013/711/EU.

Table 8: Maximum levels according to Commission Regulation (EC) No 2023/915 of 25 April 2023 and Action Levels according to Commission Recommendation 2013/711/EU:

Annex 1 Section 4.1: Dioxins and PCBs 4.1.1.1 Meat of bovine animals	Unit	Maximum level	Action level*
WHO-PCDD/F-PCB-TEQ	**pg/g fat**	**4.0**	**-**
WHO-PCDD/F-TEQ	**pg/g fat**	**2.5**	**1.75**
WHO-PCB-TEQ	**pg/g fat**	**-**	**1.75**
Sum of 6 non-dioxin-like PCBs**	**ng/g fat**	**40**	**-**

* Commission Recommendation 2013/711/EU
** sum of PCB 28, 52, 101, 138, 153, 180

For the Bovine Meat test sample 2401-BM the assigned values for the sum parameters WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ, WHO-PCB-TEQ and sum of six NDL-PCBs were in the range of 0.5 to 4 of the respective maximum levels and/or action levels (Figure 9).

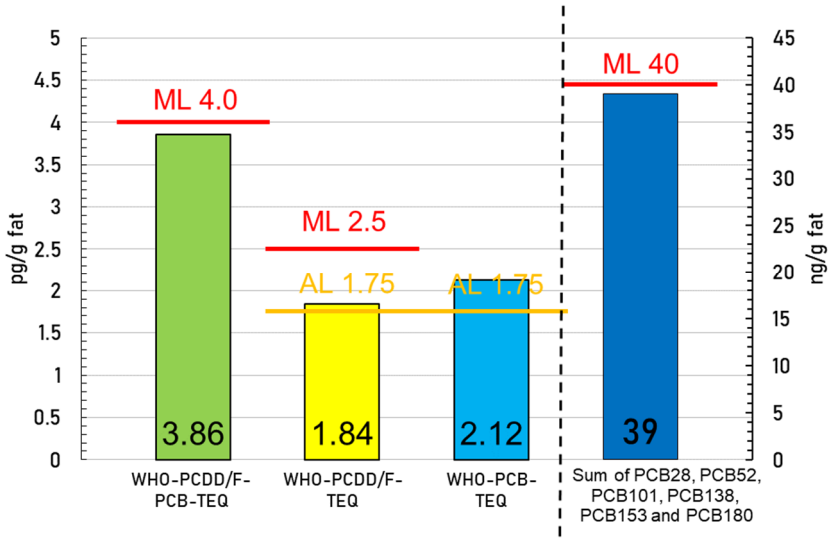


Figure 9: Comparison of the assigned values for sum parameters for Bovine Meat (2401-BM) with maximum levels (red lines) and action levels (yellow line) [pg/g and ng/g (fat)]

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 or action level).

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

The concentrations of the sum parameters WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ, WHO-PCB-TEQ and sum of six NDL-PCBs for the test samples 2401-BM were in the range (about 0.5 to 4 times) of the respective maximum levels and/or action levels (tabular summaries of participants' results and z-scores see annex 2 and 3).

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

Bovine Meat (2401-BM)	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum of six indicator PCBs
|z-score| ≤ 2	66 %	60 %	69 %	80 %
2 < |z-score| < 3	12 %	15 %	9 %	8 %
|z-score| ≥ 3	22 %	25 %	22 %	12 %

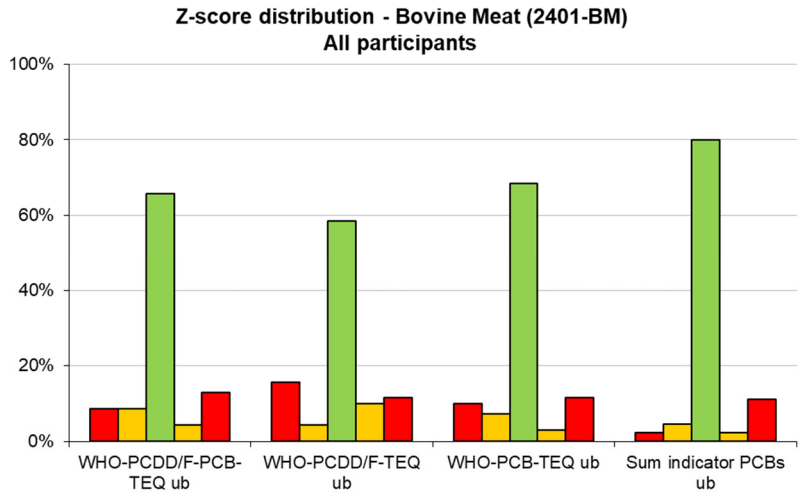


Figure 10: Distribution of all participants' z-scores and NRLs only for sum parameters for Bovine Meat (2401-BM) [Green bars: -2 ≤ z-score ≤ 2, orange bars: -3 < z-score < -2, 2 < z-score < 3, red bars: z-score ≤ -3, z-score ≥ 3]

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). This applies only for the sum parameters WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ, WHO-PCB-TEQ and sum of six NDL-PCBs as the assigned values for these parameters in the sample 2401-BM were in the range of 0.5 to 4 of the respective maximum levels and/or action levels.

Table 10: Difference between reported and calculated sum parameters for PCDD/Fs and PCBs for Bovine Meat (2401-BM) given in percentage of participants' results

Bovine Meat (2401-BM)	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum of six indicator PCBs
Deviation ≤ 10 %	100%	100%	100%	99%
Deviation > 10 %	-	-	-	1%

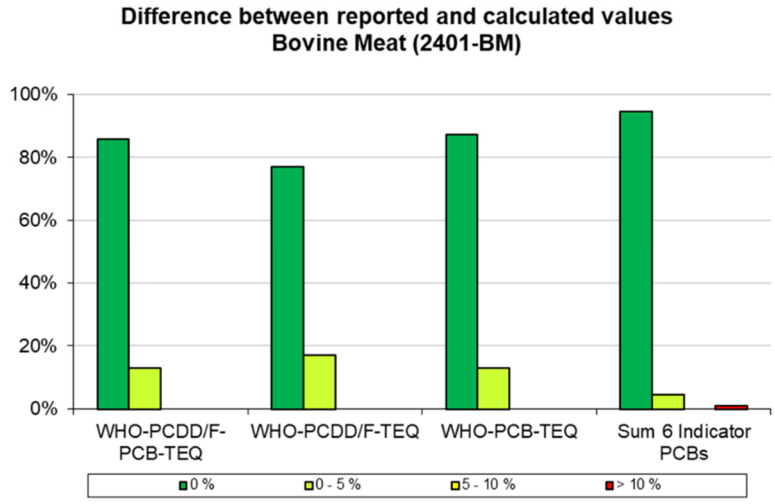


Figure 11: Difference between reported and calculated sum parameters for PCDD/Fs and PCBs for Bovine Meat (2401-BM) given in percentage of participants' results [Green bars: 0%, yellow bars: 0-5 %, orange bars 5-10 %, red bars: > 10 %]

The comparison of the reported values and the calculated values by the EURL showed no significant differences.

5.1.4. Difference between upper and lower bound calculation

According to Commission Regulation (EU) 2017/644 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 levels 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 2401-BM the assigned values for all sum parameters were below the respective maximum levels.

Table 11: Difference between upper and lower bound calculation for Bovine Meat (2401-BM) given in percentage of participants' results

Bovine Meat (2401-BM)	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum of six indicator PCBs
0 – 10 %*	96%	88%	100%	99%
10 – 20 %*	4%	8%	-	1%
20 – 50 %*	-	4%	-	-
> 50 %*	-	-	-	-

* Difference between upper and lower bound calculation

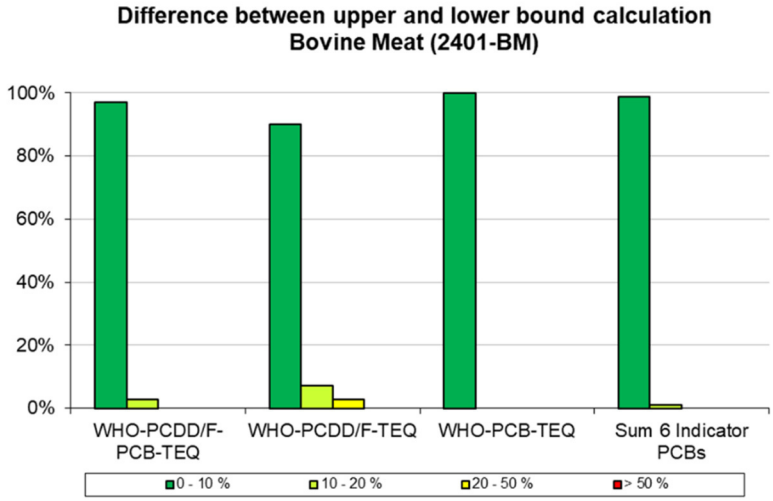


Figure 12: Difference between upper and lower bound calculation for Bovine Meat (2401-BM) given in percentage of participants' results [Green bars: 0 – 10 %, yellow bars: 10 – 20 %, orange bars: 20 – 50 %, red bars: > 50 %]

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	| 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 non-dioxin-like PCBs

- Calculation of maximum achievable scores (| z-score | ≤ 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:

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

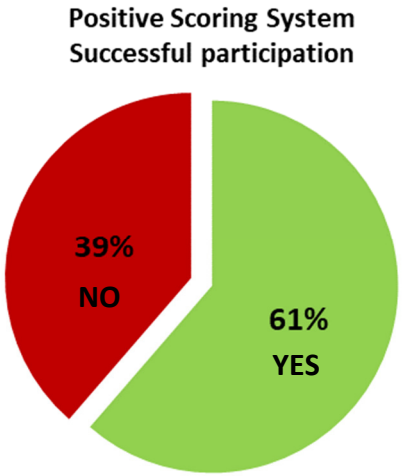
- Calculation of achieved scoring percentage for each participant:

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

- 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.



5.2. Participants' results for bioanalytical screening methods

According to Commission Regulation (EU) No 2017/644, "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:

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

x: *participant's result (BEQ from bioanalytical screening method)*

x_a: *assigned value (physical-chemical methods)*

$\sigma_{BAp_{rel}}$: *relative bioassay target standard deviation*

For PCDD/F-BEQ, PCB-BEQ and PCDD/F-PCB-BEQ the relative bioassay target standard deviation $\sigma_{BAp_{rel}}$ 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 2401-BM 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".

Table 12: Evaluation of assigned values for Bovine Meat

	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ
2401-BM	< ML	< ML	>AL	>AL

Nine laboratories reported results using CALUX bioassay for PCDD/F-PCB-BEQ and hereof five also for PCDD/F-BEQ and five for PCB-BEQ.

Table 13: Participants' assessment of analytical results using bioanalytical screening methods for 2401-BM

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

5.2.2. Participants' bioassay-scores

Concentrations for WHO-PCDD/F-PCB-TEQ, WHO-PCDD/F-TEQ and WHO-PCB-TEQ in the test sample 2401-BM are in the range (about 0.5 to 2 times) of the respective maximum levels and/or action levels.

Table 14: Distribution of participants' bioassay-scores for BEQ parameters for Bovine Meat (2401-BM)

Percentage of participants' results	PCDD/F-PCB-BEQ	PCDD/F-BEQ	PCB/F-BEQ
$\lvert$ **bioassay-score** $\rvert \leq 2$	100%	67%	68%
$2 < \lvert$ **bioassay-score** $\rvert < 3$	-	-	33%
$\lvert$ **bioassay-score** $\rvert \geq 3$	-	33%	-

6. Participants' feedback

A questionnaire for feedback from participants of this EURL proficiency test was available as online survey between 23 April 2024 and 31 May 2024. The survey was anonymous, but participants could also give their laboratory name. The identity of the laboratories is kept confidential. The survey included several questions related to different topics (participants' information, organization of the proficiency test, PT test samples and evaluation of results and summary of data) and a possibility to include comments and further suggestions. In total, 10 laboratories (13 % of all PT participants) replied to this survey.

Table 15: Participating laboratories in the feedback survey

Type of laboratory	Answers
National Reference Laboratory (NRL)	5
Official Laboratory (OFL)	3
Commercial laboratory	1
Other (e.g. research and development)	1
No Answer	0

General aspects

How satisfied are you with the organization of this proficiency test in general? Please rate the parts below according to your experience, with 0 stars meaning "no opinion" and 5 stars meaning "full satisfaction".

Announcement

Instructions

Sample shipment

Reporting of results

Preliminary report

Specific aspects of this proficiency test

We would like to know a bit more about specific aspects of this proficiency test. Please rate the aspects below according to your experience, with 0 stars meaning "no opinion" and 5 stars meaning "full satisfaction".

Was all necessary information for participation and performance of the PT provided in an understandable way?	★★★★★
Was the time frame acceptable?	★★★★½
Was the handling of EUSurvey as webtool for reporting and source of instructions manageable?	★★★★★
Was the evaluation of participant's results and the information in the preliminary report clear and comprehensible?	★★★★★

Additional comments:

- The amount of sample received was not enough for BIOSSAY and CONFIMATORY METHOD. We had subscribed for both participation. *EURL comment: if you need more test material please let us know before shipment (the amount of one portion of reference material can be found in the announcement) you can add this as a comment during registration*
- Very suitible matrix, would be good to investigate and see if something could be done to achieve assigned value for BDE-209. Maybe spike PT with just that to make it easier to analyze? or if it is hard to press the LOQ to the level it needs to be, maybe allow a higher LOQ? *EURL comment: BDE-209 was spiked 20-times higher than the recommended LOQ of 0.01µg/kg w.w.; unfortunately, no assigned value could be calculated*
- HBCDD: Sample was below the limit of quantification. *EURL comment: The aim was to spike HBCDD at the recommended LOQ of 0.01µg/kg w.w.; unfortunately, no assigned value could be calculated at that low level*

Was the selected sample adequate for the goal to assess analytical performance of laboratories in relevant matrices?

Choice of matrix	★★★★★
Level of contamination	★★★★

7. 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).

All homogeneity and stability testing was performed under accreditation according to DIN EN ISO/IEC 17025:2018.

8. Results of participants

An overview of the PCDD/F and PCB results for the PT test sample Bovine Meat (2401-BM) are given in the following annexes. Laboratories are coded according to the laboratory codes sent after registration.

9. 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)

10. Annex

Bovine Meat – 2401-BM	
1	Assigned values – PCDD/F, PCB
2	Participants' results – Tables – PCDD/F, PCB
3	Participants' z-scores / bioassay-scores – Tables – PCDD/F, PCB
4	Participants' z-scores – Charts – PCDD/F, PCB
5	Scoring system – PCDD/F, PCB
6	Homogeneity and stability test – PCDD/F, PCB
7	Participants' methods – PCDD/F, PCB

EURL for halogenated POPs in Feed and Food
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EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
15 April 2025

Annex 1: Assigned values of PCDD/Fs and PCBs

Test sample - Bovine Meat (2401-BM)

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

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

Bovine Meat (2401-BM)
Sum parameters - Results

Analyte	Result pg/g fat	**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		3.86	0.732	0.11	64	3.98
WHO-PCDD/F-PCB-TEQ lower bound rep		3.80	0.730	0.11	64	3.98
WHO-PCDD/F-PCB-TEQ upper bound cal		3.87	0.723	0.11	64	3.99
WHO-PCDD/F-PCB-TEQ lower bound cal		3.81	0.711	0.11	64	3.96

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

Bovine Meat (2401-BM)
PCDD/F - Assigned values

Analyte	Result pg/g fat	**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		1.84	0.417	0.066	62	1.87
WHO-PCDD/F-TEQ lower bound rep		1.79	0.385	0.062	61	1.80
WHO-PCDD/F-TEQ upper bound cal		1.84	0.418	0.066	62	1.87
WHO-PCDD/F-TEQ lower bound cal		1.80	0.379	0.061	61	1.82
2,3,7,8-TCDD						0.0905
1,2,3,7,8-PeCDD		0.242	0.0643	0.011	53	0.240
1,2,3,4,7,8-HxCDD		0.184	0.0387	0.0070	48	0.191
1,2,3,6,7,8-HxCDD		0.460	0.108	0.017	60	0.474
1,2,3,7,8,9-HxCDD		0.176	0.0483	0.0085	51	0.180
1,2,3,4,6,7,8-HpCDD		1.41	0.299	0.049	59	1.45
1,2,3,4,6,7,8,9-OCDD		4.27	0.718	0.12	59	4.30
2,3,7,8-TCDF		2.78	0.660	0.11	57	2.75
1,2,3,7,8-PeCDF		0.758	0.198	0.031	64	0.780
2,3,4,7,8-PeCDF		2.95	0.761	0.12	62	3.00
1,2,3,4,7,8-HxCDF		1.06	0.191	0.030	65	1.09
1,2,3,6,7,8-HxCDF		0.510	0.0983	0.015	64	0.517
2,3,4,6,7,8-HxCDF		0.581	0.122	0.020	59	0.585
1,2,3,7,8,9-HxCDF						0.0900
1,2,3,4,6,7,8-HpCDF		1.07	0.177	0.028	61	1.06
1,2,3,4,7,8,9-HpCDF						0.100
1,2,3,4,6,7,8,9-OCDF		1.06	0.200	0.034	54	1.03

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

Bovine Meat (2401-BM)
Dioxin-like PCB - Assigned values

Analyte	Result pg/g fat	**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		2.12	0.378	0.060	62	2.16
WHO-PCB-TEQ lower bound rep		2.12	0.383	0.060	63	2.16
WHO-PCB-TEQ upper bound cal		2.11	0.379	0.060	62	2.16
WHO-PCB-TEQ lower bound cal		2.11	0.385	0.061	63	2.15
PCB 105		3390	599	96	61	3460
PCB 114		241	48.5	7.9	59	241
PCB 118		7420	1000	160	59	7440
PCB 123		143	27.5	4.8	52	146
PCB 156		831	134	21	61	819
PCB 157		186	28.3	4.5	61	184
PCB 167		282	49.5	8.1	58	277
PCB 189		29.6	6.74	1.1	55	30.6
PCB 77		422	80.3	13	58	410
PCB 81		22.7	4.76	0.78	58	22.7
PCB 126		16.8	3.07	0.49	62	17.4
PCB 169						0.301

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Bovine Meat (2401-BM)
Non dioxin-like PCB - Assigned values

Analyte	Result ng/g fat	**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		39.0	6.16	0.87	78	40.1
Sum Indicator PCBs lower bound rep		38.8	5.98	0.85	77	40.0
Sum Indicator PCBs upper bound cal		39.1	6.33	0.89	79	40.1
Sum Indicator PCBs lower bound cal		39.1	6.33	0.89	79	40.1
PCB 28		7.52	1.56	0.23	72	7.75
PCB 52		9.33	1.66	0.23	80	9.38
PCB 101		8.95	1.44	0.20	81	8.90
PCB 138		5.44	1.04	0.14	82	5.59
PCB 153		4.33	0.908	0.13	78	4.39
PCB 180		3.39	0.513	0.072	80	3.44

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

Bovine Meat (2401-BM)
WHO-TEQ - Assigned values - Bioanalytical screening methods

Analyte	Result pg BEQ/g fat	**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		3.9	0.73	0.11	64	4.0
WHO-PCDD/F-TEQ ub rep		1.8	0.40	0.062	66	1.9
WHO-PCB-TEQ ub rep		2.1	0.38	0.060	62	2.2

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Bovine Meat (2401-BM)
Lipid 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]
Lipid content		6.49	0.794	0.11	87	6.60

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EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
15 April 2025

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

Test sample - Bovine Meat (2401-BM)

* 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 PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
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Bovine Meat (2401-BM)
Sum parameters - Results

LC	Sample	Result pg/g fat	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		Result ng/g fat	Sum 6 Indicator PCBs reported		Sum 6 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	2401-BM																		
2	2401-BM																		
3	2401-BM		4.2	4.2	4.2	4.2	1.92	1.92	1.92	1.92	2.28	2.28	2.28	2.28		42.5	42.5	42.5	42.5
4	2401-BM															36.1	36.1	36.1	36.1
5	2401-BM		3.22	3.21	3.22	3.21	1.13	1.13	1.13	1.13	2.09	2.08	2.09	2.08		39.3	39.3	39.3	39.3
6	2401-BM		2.73	2.5	2.74	2.49	0.944	0.713	0.954	0.714	1.79	1.78	1.79	1.78		34.5	34.5	34.5	34.5
7	2401-BM		2.98	2.98	2.98	2.98	0.886	0.886	0.886	0.886	2.09	2.09	2.09	2.09		40.3	40.3	40.3	40.3
8	2401-BM		4.61	4.31	4.62	4.32	2.3	2.04	2.31	2.05	2.31	2.27	2.31	2.27		43.1	43.1	43.1	43.1
9	2401-BM		3.51	3.42	3.51	3.43	1.14	1.05	1.13	1.05	2.37	2.37	2.38	2.38		48.1	48.1	48.1	48.1
10	2401-BM		3.79	3.77	3.79	3.77	1.95	1.95	1.95	1.95	1.84	1.82	1.84	1.82		41	41	41	41
11	2401-BM		3.99	3.96	3.99	3.96	1.96	1.96	1.96	1.96	2.03	2	2.03	2		32.9	32.9	32.9	32.9
12	2401-BM															35.6	35.6	35.6	35.6
13	2401-BM															39.8	39.8	39.8	39.8
14	2401-BM																		
15	2401-BM																		
16	2401-BM		3.04	2.89	3.04	3.04	1.51	1.36	1.51	1.51	1.53	1.53	1.53	1.53		35.6	35.6	35.6	35.6
17	2401-BM		3.28	3.17	3.26	3.15	1.37	1.26	1.38	1.27	1.91	1.91	1.88	1.88					
18	2401-BM															30.7	30.7	30.7	30.7
19	2401-BM		3.54	3.4	3.54	3.41	1.85	1.73	1.85	1.73	1.69	1.68	1.69	1.68		26.4	26.4	26.4	26.4
20	2401-BM		0.218	0.191	0.218	0.191	0.087	0.0597	0.0869	0.0596	0.131	0.131	0.131	0.131		2.05	2.05	2.05	2.05
21	2401-BM		4.37	4.36	4.38	4.36	2.08	2.07	2.08	2.07	2.3	2.29	2.3	2.29		42.2	42.2	42.3	42.3
22	2401-BM		5.97	5.94	5.97	5.94	3.16	3.16	3.16	3.16	2.81	2.78	2.81	2.78		43.4	43.4	43.4	43.4
23	2401-BM		3.96	4.12	3.98	3.95	1.76	1.66	1.66	1.65	2.36	2.3	2.32	2.3		44.2	44.2	44.2	44.2
24	2401-BM															64.7	64.7	64.7	64.7
25	2401-BM		3.02	2.98	3.08	2.97	1.15	1.11	1.21	1.1	1.87	1.87	1.87	1.87		37.9	37.9	37.9	37.9
26	2401-BM		3.3	3.3	3.3	3.3	1.27	1.27	1.27	1.27	2.04	2.04	2.03	2.03		47.9	47.9	47.9	47.9
27	2401-BM																		
28	2401-BM															34.5	34.5	34.5	34.5
29	2401-BM		4.4	4.37	4.41	4.38	1.95	1.95	1.95	1.95	2.46	2.43	2.46	2.43		31.7	31.7	31.7	31.7
30	2401-BM																		
31	2401-BM															36.9	36.9	36.9	36.9
32	2401-BM		4.2	4.2	4.22	4.2	2.2	2.2	2.23	2.23	2	2	1.99	1.97		37.7	37.7	37.7	37.7
33	2401-BM																		
34	2401-BM		4.01	4.01	4.02	4.02	1.8	1.8	1.81	1.81	2.21	2.21	2.21	2.21		33.7	33.7	33.7	33.7
35	2401-BM																		
36	2401-BM		1790	1780	1780	1780	14.4	13.1	13.4	13.2	1770	1770	1770	1770		106	106	309	309
37	2401-BM															34.3	34.3	34.4	34.4
38	2401-BM		2.33	2.19	2.33	2.2	1.14	1.04	1.14	1.04	1.19	1.16	1.19	1.16		23.3	23.3	23.3	23.3
39	2401-BM															54.1	54.1	54.1	54.1
40	2401-BM		5.16	5.08	5.16	5.08	2.22	2.16	2.22	2.16	2.94	2.92	2.94	2.92		56.4	56.4	56.4	56.4
41	2401-BM		3.02	2.99	3.01	2.99	1.42	1.4	1.41	1.4	1.6	1.59	1.6	1.59		44.9	44.9	44.9	44.9
42	2401-BM															44.1	44.1	44.1	44.1
43	2401-BM															33.3	33.3	33.3	33.3
44	2401-BM		4.29	4.12	4.29	4.12	1.86	1.75	1.86	1.75	2.43	2.37	2.43	2.37		49.7		49.8	49.8
45	2401-BM		3.61	3.59	3.61	3.58	1.48	1.47	1.48	1.47	2.13	2.11	2.13	2.11		39.9	39.9	39.8	39.8
46	2401-BM															43	43	43.5	43.5
47	2401-BM		4.55	4.42	4.56	4.42	2.3	2.17	2.3	2.17	2.26	2.24	2.26	2.25		41	41	41	41
48	2401-BM																		
49	2401-BM		4.4	4.2	4.37	4.2	2.2	2	2.16	2	2.2	2.2	2.21	2.2		41	41	41.1	41.1
50	2401-BM																		
51	2401-BM		4.8	4.75	4.8	4.75	2.2	2.15	2.2	2.15	2.6	2.6	2.6	2.6		41.5	41.5	41.5	41.5
52	2401-BM																		
53	2401-BM															50	50	49.8	49.8
54	2401-BM		3.39	3.28	3.4	3.28	1.8	1.71	1.8	1.71	1.59	1.56	1.6	1.57		40.2	40.2	40.2	40.2
55	2401-BM		4.16	4.15	4.15	4.14	1.96	1.96	1.96	1.96	2.2	2.19	2.19	2.18		38.8	38.8	38.8	38.8
56	2401-BM																		
57	2401-BM															37	37	36.6	36.6
58	2401-BM		4.8	4.65	4.8	4.65	2.25	2.14	2.25	2.14	2.55	2.51	2.55	2.51		41.5	41.5	41.5	41.5
59	2401-BM		3.78	3.68	3.78	3.68	1.66	1.56	1.66	1.56	2.13	2.13	2.12	2.12		42.1	42.1	42.1	42.1
60	2401-BM		4.02	4.01	4.02	4.01	1.83	1.82	1.83	1.82	2.19	2.19	2.19	2.19		43.4	43.4	43.4	43.4
61	2401-BM		2.58	2.52	2.59	2.52	1.05	0.984	1.05	0.984	1.54	1.54	1.54	1.54		31.4	31.4	31.4	31.4
62	2401-BM																		
63	2401-BM																		
64	2401-BM															81	71	81.1	71.1
65	2401-BM		4.94	4.73	5.06	4.79	2.33	2.18	2.33	2.18	2.74	2.62	2.73	2.61		46.9	46.9	46.9	46.9
66	2401-BM															36.3	36.3	36.3	36.3
67	2401-BM		5.6	5.6	5.62	5.62	2.5	2.5	2.56	2.56	3.1	3.1	3.06	3.06		66	66	66	66
68	2401-BM															36.6	36.6	36.6	36.6
69	2401-BM		2.19	2.19	2.19	2.19	2.08	2.08	2.08	2.08	0.112	0.112	0.112	0.112		40.7	40.7	40.7	40.7
70	2401-BM		3.79	3.67	3.79	3.67	2.04	1.92	2.04	1.92	1.75	1.75	1.75	1.75		72.5	72.5	72.5	72.5
71	2401-BM																		
72	2401-BM		3.8	3.8	3.83	3.83	2.1	2.1	2.07	2.07	1.8	1.8	1.76	1.76		30.5	30.5	30.5	30.5
73	2401-BM															55.1	55.1	55.1	55.1
74	2401-BM		3.93	3.77	3.83	3.67	1.87	1.73	1.87	1.73	1.98	1.96	1.96	1.94		34.5	34.5	34.5	34.5

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Sum parameters - Results

LC	Sample	Result pg/g fat	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		Result ng/g fat	Sum 6 Indicator PCBs reported		Sum 6 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
75	2401-BM		21.9	20.6	21.9	20.6	8.51	7.2	8.52	7.21	13.4	13.4	13.4	13.4		124	124	124	124
76	2401-BM																		
77	2401-BM															43	43	43	43
78	2401-BM																		
79	2401-BM		3.65	3.54	3.64	3.53	1.43	1.32	1.43	1.32	2.21	2.21	2.21	2.21		29.9	29.9	29.8	29.8
80	2401-BM		4.21	4.2	4.21	4.2	2	2	2	2	2.21	2.2	2.21	2.2		38.8	38.8	38.8	38.8
81	2401-BM		4.07	4.07	4.07	4.07	2.02	2.02	2.02	2.02	2.05	2.05	2.05	2.05		33.1	33.1	33.1	33.1
82	2401-BM																		
83	2401-BM		5.11	5.11	5.12	5.12	2.57	2.57	2.58	2.58	2.55	2.55	2.54	2.54		40	40	39.6	39.6
84	2401-BM																		
85	2401-BM		3.82	3.71	3.83	3.71	1.85	1.73	1.85	1.73	1.97	1.97	1.98	1.98		37.7	37.7	37.8	37.8
86	2401-BM																	50.2	50.2
87	2401-BM																		
88	2401-BM		4.24	4.24	4.24	4.24	2.34	2.34	2.34	2.34	1.9	1.9	1.9	1.9		42.4	42.4	42.3	42.3
89	2401-BM		4.13	4.11	4.13	4.11	2.15	2.13	2.15	2.13	1.98	1.98	1.98	1.98		36.9	36.9	36.9	36.9
90	2401-BM		2.69	2.69	2.69	2.69	1.68	1.68	1.68	1.68	1.01	1.01	1.01	1.01		26.5	26.5	26.5	26.5
91	2401-BM																		
92	2401-BM																		
93	2401-BM		4.26	4.26	4.25	4.25	1.98	1.98	1.98	1.98	2.28	2.27	2.27	2.27		38.5	38.5	38.5	38.5
94	2401-BM		3.67	3.48	3.65	3.49	1.56	1.37	1.55	1.39	2.11	2.11	2.1	2.1		44.2	44.2	44.2	44.2
95	2401-BM		3.99	3.99	3.99	3.99	1.69	1.69	1.69	1.69	2.3	2.3	2.3	2.3		40	40	40	40
96	2401-BM		4.2	4.2	4.19	4.19	1.9	1.9	1.9	1.9	2.3	2.3	2.29	2.29					
97	2401-BM																		
98	2401-BM																		
99	2401-BM		4.31	4.17	4.31	4.17	1.92	1.78	1.92	1.78	2.38	2.38	2.39	2.39		31.5	31.5	31.5	31.5
100	2401-BM																		
101	2401-BM		3.42	3.28	3.42	3.28	1.55	1.44	1.55	1.44	1.87	1.84	1.87	1.84		34.1	34.1	34.1	34.1
102	2401-BM															31.9	31.9	31.9	31.9
103	2401-BM		4.35	4.32	4.34	4.32	1.95	1.94	1.95	1.93	2.4	2.39	2.39	2.39		63.3	63.3	63.3	63.3
104	2401-BM		2.83	2.82	2.83	2.82	1.49	1.48	1.49	1.48	1.34	1.34	1.34	1.34		60.6	60.6	60.6	60.6
105	2401-BM															38.2	38.2	38.2	38.2
106	2401-BM		5.85	5.21	5.85	5.21	2.57	2.07	2.57	2.07	3.28	3.14	3.28	3.14		49.6	49.6	49.6	49.6
107	2401-BM		2.32	2.32	2.33	2.33	0.747	0.747	0.748	0.748	1.58	1.58	1.58	1.58		21.2	21.2	21.2	21.2
108	2401-BM															36.5	36.5	36.5	36.5
109	2401-BM															44	44	44	44
110	2401-BM		3.91	3.91	3.92	3.91	2.46	2.46	2.46	2.45	1.45	1.45	1.46	1.46					
111	2401-BM																		
112	2401-BM		3.77	3.08	3.75	3.08	1.74	1.07	1.73	1.07	2.02	2.01	2.02	2.01		27.4	27.4	27.4	27.4
113	2401-BM																		
114	2401-BM		5.27	5.03	5.27	5.03	2.3	2.06	2.3	2.06	2.97	2.97	2.97	2.97		49.5	49.5	49.5	49.5
115	2401-BM																		
116	2401-BM		4.06	4	4.06	4.01	1.8	1.74	1.8	1.75	2.26	2.26	2.26	2.26		34.1	34.1	34.1	34.1
117	2401-BM															40.1	40.1	40.1	40.1
118	2401-BM																		
119	2401-BM																		
120	2401-BM		4.22	4.21	4.24	4.21	1.74	1.73	1.76	1.74	2.48	2.47	2.48	2.47					
121	2401-BM		4.13	4.13	4.12	4.12	1.7	1.7	1.7	1.7	2.43	2.43	2.42	2.42		41.5	41.5	41.5	41.5
122	2401-BM																		
123	2401-BM		3.26	3.02	3.48	3.48	1.88	1.72	1.99	1.99	1.49	1.49	1.49	1.49		23.1	23.1	23.1	23.1
124	2401-BM		3.1	3.1	3.11	3.1	1.01	1.01	1.01	1	2.09	2.09	2.1	2.1		35	35	35.3	35.3
125	2401-BM																		
126	2401-BM		3.78	3.77	3.79	3.78	1.55	1.55	1.56	1.55	2.23	2.23	2.23	2.23		41	41	41	41
127	2401-BM		6.97	6.78	6.97	6.81	3.98	3.97	3.98	3.97	2.98	2.81	2.99	2.84		61.3	61.3	61.3	61.3
128	2401-BM		3.85	3.85	3.86	3.86	1.54	1.54	1.54	1.54	2.31	2.31	2.32	2.32		42.6	42.6	42.6	42.6
018A	2401-BM															30.7	30.7	30.7	30.7
034A	2401-BM		3.85	3.85	3.85	3.85	1.75	1.75	1.75	1.75	2.1	2.1	2.1	2.1		33.5	33.5	33.5	33.5
039A	2401-BM		3.96	3.91	3.96	3.92	1.85	1.8	1.85	1.81	2.11	2.11	2.11	2.11		54.5	54.5	54.5	54.5
049A	2401-BM		5.3	5.1	5.33	5.16	2.3	2.2	2.34	2.19	3	3	2.99	2.97		51	51	51.1	51.1
066A	2401-BM		4.07	4.06	4.06	4.06	1.83	1.82	1.82	1.82	2.24	2.24	2.24	2.24		41.6	41.6	41.6	41.6
117A	2401-BM															40.1	40.1	40.1	40.1
20*	2401-BM		3.36	3.33	3.36	3.32	1.35	1.32	1.35	1.31	2.01	2.01	2.01	2.01		31.3	31.3	31.3	31.3
75*	2401-BM		5.43	5.1	5.43	5.11	2.11	1.79	2.11	1.79	3.32	3.32	3.32	3.32		30.8	30.8	30.8	30.8

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Assessment of analytical results, Measurement uncertainty

			Assessment of analytical results						**Measurement uncertainty [%]**			
LC	Sample		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**		WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs
1	2401-BM											
2	2401-BM											
3	2401-BM					X			21.3	20.5	20.8	30.0
4	2401-BM											20.4
5	2401-BM								20.0	20.0	20.0	20.0
6	2401-BM								28.4	24.6	14.3	14.3
7	2401-BM								30.0	30.0	30.0	30.0
8	2401-BM				x	x			15.0	15.0	15.0	20.0
9	2401-BM					X	X		17.0	25.0	17.0	6.000
10	2401-BM								20.0	16.0	17.0	20.0
11	2401-BM								23.3	21.2	28.8	25.8
12	2401-BM											33.0
13	2401-BM											16.0
14	2401-BM											
15	2401-BM											
16	2401-BM								29.0	29.0	29.0	29.0
17	2401-BM								25.0	25.0	25.0	
18	2401-BM											30.0
19	2401-BM								30.0	30.0	20.0	20.0
20	2401-BM								20.0	11.0	20.0	15.0
21	2401-BM					X			18.5	18.0	19.0	19.0
22	2401-BM				x	x			38.2	30.6	28.5	37.8
23	2401-BM								1.7	0.8	1.0	19.4
24	2401-BM						x					32.0
25	2401-BM								26.0	26.0	27.0	22.0
26	2401-BM								33.6	37.7	31.0	53.0
27	2401-BM											
28	2401-BM											25.0
29	2401-BM					X			27.9	27.5	28.2	25.1
30	2401-BM											
31	2401-BM											23.0
32	2401-BM				X				9.5	13.6	15.0	10.6
33	2401-BM											
34	2401-BM					X			19.0	17.4	22.2	25.4
35	2401-BM											
36	2401-BM		x	x	x	x	x		35.0	35.0	35.0	35.0
37	2401-BM											22.2
38	2401-BM								20.0	15.0	15.0	15.0
39	2401-BM											40.0
40	2401-BM		X			X	x		15.0	15.0	15.0	15.0
41	2401-BM						X		35.0	35.0	35.0	35.0
42	2401-BM											30.0
43	2401-BM											18.0
44	2401-BM		x				x		17.0	16.0	20.0	17.0
45	2401-BM					x			30.0	30.0	30.0	25.0
46	2401-BM											10.0
47	2401-BM								19.5	25.0	30.0	30.0
48	2401-BM											
49	2401-BM				x	x			20.0	20.0	20.0	20.0
50	2401-BM											
51	2401-BM					X			22.8	27.3	19.1	20.5
52	2401-BM											
53	2401-BM						X					16.0
54	2401-BM				X		X		50.0	31.4	39.6	31.6
55	2401-BM								21.0	13.0	16.0	7.0
56	2401-BM											
57	2401-BM											30.0
58	2401-BM				X	X			25.0	16.4	18.9	22.7
59	2401-BM					X	X		13.4	15.2	20.0	15.3
60	2401-BM								21.0	22.5	21.0	20.0
61	2401-BM								30.0	30.0	30.0	30.0
62	2401-BM											
63	2401-BM											
64	2401-BM						X					24.0
65	2401-BM		x		x	x	x		30.0	30.0	30.0	30.0
66	2401-BM											30.0
67	2401-BM		X		X	X	X		20.0	20.0	20.0	20.0
68	2401-BM											20.0
69	2401-BM								38.0	38.0	38.0	28.0
70	2401-BM						X		24.2	22.0	10.0	10.0
71	2401-BM											
72	2401-BM											
73	2401-BM											33.1
74	2401-BM								30.0	30.0	30.0	30.0

Bovine Meat (2401-BM)
Assessment of analytical results, Measurement uncertainty

			Assessment of analytical results						Measurement uncertainty [%]			
LC	Sample		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**		WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs
75	2401-BM		x	x		x	x		24.0	41.0	37.0	24.0
76	2401-BM											
77	2401-BM											30.0
78	2401-BM											
79	2401-BM								30.0	30.0	30.0	30.0
80	2401-BM								30.0	30.0	30.0	30.0
81	2401-BM								17.0	18.0	16.0	12.0
82	2401-BM											
83	2401-BM				X	x			30.0	30.0	30.0	30.0
84	2401-BM											
85	2401-BM								20.0	20.0	20.0	25.0
86	2401-BM											
87	2401-BM											
88	2401-BM								23	28	25	9
89	2401-BM								30	30	30	30
90	2401-BM								25	29	29	19
91	2401-BM											
92	2401-BM											
93	2401-BM					X			15	15	15	15
94	2401-BM								21	17	35	9
95	2401-BM					X			15	16	14	15
96	2401-BM								30	30		
97	2401-BM											
98	2401-BM											
99	2401-BM								30	30	30	25
100	2401-BM											
101	2401-BM								44	44	44	44
102	2401-BM											30
103	2401-BM						x		41	31	26	31
104	2401-BM		4pg/g fat	2.5 pg/g fat	1.75 pg/g fat	1.75 pg/g fat	40 ng/g fat		50	50	50	50
105	2401-BM											25
106	2401-BM		X		X	X			20	20	20	20
107	2401-BM								30	30	30	30
108	2401-BM											9
109	2401-BM											20
110	2401-BM				X				15	15	15	
111	2401-BM											
112	2401-BM								25	25	25	25
113	2401-BM											
114	2401-BM		X			X			20	25	22	21
115	2401-BM											
116	2401-BM					X			15	15	15	15
117	2401-BM											32
118	2401-BM											
119	2401-BM											
120	2401-BM					x			44	44	44	
121	2401-BM											
122	2401-BM											
123	2401-BM				X				38	38	38	38
124	2401-BM								19	20	19	22
125	2401-BM											
126	2401-BM					X			20	20	20	10
127	2401-BM		X	X	X	X	X		20	20	20	20
128	2401-BM					x			20	20	20	20
018A	2401-BM											30
034A	2401-BM								19	17.4	22.24	25.38
039A	2401-BM								33	26	30	28
049A	2401-BM		x		x	x	x		20	20	20	20
066A	2401-BM					X			20	20	20	20
117A	2401-BM											32

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Difference between upper bound (ub) - lower bound (lb) calculation, Comparison of reported and calculated sum parameters

LC	Sample	Difference between upper and lower bound calculation for reported sum parameters [%				Difference between reported and calculated upper bound sum parameters [%]				Correct calculation	Difference between reported and calculated lower bound sum parameters [%]				Correct calculation
		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	(deviation ≤ 10 %)	WHO-PCDD/F-PCB-TEQ	WHO-PCDD/F-TEQ	WHO-PCB-TEQ	Sum 6 Indicator PCBs	(deviation ≤ 10 %)
1	2401-BM														
2	2401-BM														
3	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
4	2401-BM				0.0				0.0	yes				0.0	yes
5	2401-BM	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
6	2401-BM	8.4	24.5	0.6	0.0	0.0	1.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
7	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
8	2401-BM	6.5	11.3	1.7	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
9	2401-BM	2.6	7.9	0.0	0.0	0.0	1.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
10	2401-BM	0.5	0.0	1.1	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
11	2401-BM	0.8	0.0	1.5	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
12	2401-BM				0.0				0.0	yes				0.0	yes
13	2401-BM				0.0				0.0	yes				0.0	yes
14	2401-BM														
15	2401-BM														
16	2401-BM	4.9	9.9	0.0	0.0	0.0	0.0	0.0	0.0	yes	5.0	10.0	0.0	0.0	yes
17	2401-BM	3.4	8.0	0.0		1.0	1.0	2.0		yes	1.0	1.0	2.0		yes
18	2401-BM				0.0				0.0	yes				0.0	yes
19	2401-BM	4.0	6.5	0.6	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
20	2401-BM	12.4	31.4	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
21	2401-BM	0.2	0.5	0.4	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
22	2401-BM	0.5	0.0	1.1	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
23	2401-BM	-4.0	5.7	2.5	0.0	1.0	6.0	2.0	0.0	yes	4.0	1.0	0.0	0.0	yes
24	2401-BM				0.0				0.0	yes				0.0	yes
25	2401-BM	1.3	3.5	0.0	0.0	2.0	5.0	0.0	0.0	yes	0.0	1.0	0.0	0.0	yes
26	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
27	2401-BM														
28	2401-BM				0.0				0.0	yes				0.0	yes
29	2401-BM	0.7	0.0	1.2	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
30	2401-BM														
31	2401-BM				0.0				0.0	yes				0.0	yes
32	2401-BM	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	yes	0.0	1.0	2.0	0.0	yes
33	2401-BM														
34	2401-BM	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	yes	0.0	1.0	0.0	0.0	yes
35	2401-BM														
36	2401-BM	0.6	9.0	0.0	0.0	1.0	7.0	0.0	66.0	no	0.0	1.0	0.0	66.0	no
37	2401-BM				0.0				0.0	yes				0.0	yes
38	2401-BM	6.0	8.8	2.5	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
39	2401-BM				0.0				0.0	yes				0.0	yes
40	2401-BM	1.6	2.7	0.7	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
41	2401-BM	1.0	1.4	0.6	0.0	0.0	1.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
42	2401-BM				0.0				0.0	yes				0.0	yes
43	2401-BM				0.0				0.0	yes				0.0	yes
44	2401-BM	4.0	5.9	2.5		0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0		yes
45	2401-BM	0.6	0.7	0.9	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
46	2401-BM				0.0				1.0	yes				1.0	yes
47	2401-BM	2.9	5.7	0.9	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
48	2401-BM														
49	2401-BM	4.5	9.1	0.0	0.0	1.0	2.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
50	2401-BM														
51	2401-BM	1.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
52	2401-BM														
53	2401-BM				0.0				0.0	yes				0.0	yes
54	2401-BM	3.2	5.0	1.9	0.0	0.0	0.0	1.0	0.0	yes	0.0	0.0	1.0	0.0	yes
55	2401-BM	0.2	0.0	0.5	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
56	2401-BM														
57	2401-BM				0.0				1.0	yes				1.0	yes
58	2401-BM	3.1	4.9	1.6	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
59	2401-BM	2.6	6.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
60	2401-BM	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
61	2401-BM	2.3	6.3	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
62	2401-BM														
63	2401-BM														
64	2401-BM				12.3				0.0	yes				0.0	yes
65	2401-BM	4.3	6.4	4.4	0.0	2.0	0.0	0.0	0.0	yes	1.0	0.0	0.0	0.0	yes
66	2401-BM				0.0				0.0	yes				0.0	yes
67	2401-BM	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	yes	0.0	2.0	1.0	0.0	yes
68	2401-BM				0.0				0.0	yes				0.0	yes
69	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
70	2401-BM	3.2	5.9	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
71	2401-BM														
72	2401-BM	0.0	0.0	0.0	0.0	1.0	1.0	2.0	0.0	yes	1.0	1.0	2.0	0.0	yes
73	2401-BM				0.0				0.0	yes				0.0	yes
74	2401-BM	4.1	7.5	1.0	0.0	3.0	0.0	1.0	0.0	yes	3.0	0.0	1.0	0.0	yes

Bovine Meat (2401-BM)

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

LC	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	
75	2401-BM	5.9	15.4	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
76	2401-BM														
77	2401-BM				0.0				0.0	yes				0.0	yes
78	2401-BM														
79	2401-BM	3.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
80	2401-BM	0.2	0.0	0.5	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
81	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
82	2401-BM														
83	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	yes	0.0	0.0	0.0	1.0	yes
84	2401-BM														
85	2401-BM	2.9	6.5	0.0	0.0	0.0	0.0	1.0	0.0	yes	0.0	0.0	1.0	0.0	yes
86	2401-BM														
87	2401-BM														
88	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
89	2401-BM	0.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
90	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
91	2401-BM														
92	2401-BM														
93	2401-BM	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
94	2401-BM	5.2	12.2	0.0	0.0	1.0	1.0	0.0	0.0	yes	0.0	1.0	0.0	0.0	yes
95	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
96	2401-BM	0.0	0.0	0.0		0.0	0.0	0.0		yes	0.0	0.0	0.0		yes
97	2401-BM														
98	2401-BM														
99	2401-BM	3.2	7.3	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
100	2401-BM														
101	2401-BM	4.1	7.1	1.6	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
102	2401-BM				0.0				0.0	yes				0.0	yes
103	2401-BM	0.7	0.5	0.4	0.0	0.0	0.0	0.0	0.0	yes	0.0	1.0	0.0	0.0	yes
104	2401-BM	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
105	2401-BM				0.0				0.0	yes				0.0	yes
106	2401-BM	10.9	19.5	4.3	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
107	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
108	2401-BM				0.0				0.0	yes				0.0	yes
109	2401-BM				0.0				0.0	yes				0.0	yes
110	2401-BM	0.0	0.0	0.0		0.0	0.0	1.0		yes	0.0	0.0	1.0		yes
111	2401-BM														
112	2401-BM	18.3	38.5	0.5	0.0	1.0	1.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
113	2401-BM														
114	2401-BM	4.6	10.4	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
115	2401-BM														
116	2401-BM	1.5	3.3	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	1.0	0.0	0.0	yes
117	2401-BM				0.0				0.0	yes				0.0	yes
118	2401-BM														
119	2401-BM														
120	2401-BM	0.2	0.6	0.4		0.0	1.0	0.0		yes	0.0	1.0	0.0		yes
121	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
122	2401-BM														
123	2401-BM	7.4	8.5	0.0	0.0	6.0	6.0	0.0	0.0	yes	13.0	14.0	0.0	0.0	no
124	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	yes	0.0	1.0	0.0	1.0	yes
125	2401-BM														
126	2401-BM	0.3	0.0	0.0	0.0	0.0	1.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
127	2401-BM	2.7	0.3	5.7	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	1.0	0.0	yes
128	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
018A	2401-BM				0.0				0.0	yes				0.0	yes
034A	2401-BM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
039A	2401-BM	1.3	2.7	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	1.0	0.0	0.0	yes
049A	2401-BM	3.8	4.3	0.0	0.0	1.0	2.0	0.0	0.0	yes	1.0	0.0	1.0	0.0	yes
066A	2401-BM	0.2	0.5	0.0	0.0	0.0	1.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes
117A	2401-BM				0.0				0.0	yes				0.0	yes
20*	2401-BM	0.9	2.2	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	1.0	0.0	0.0	yes
75*	2401-BM	6.1	15.2	0.0	0.0	0.0	0.0	0.0	0.0	yes	0.0	0.0	0.0	0.0	yes

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
PCDD/F - Results

LC	Sample	Result pg/g fat	WHO-PCDD/F-TEQ reported		WHO-PCDD/F-TEQ calculated		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
			upper bound	lower bound	upper bound	lower bound																	
1	2401-BM																						
2	2401-BM																						
3	2401-BM		1.92	1.92	1.92	1.92	0.09	0.25	0.21	0.5	0.17	1.34	4.39	3.12	0.94	2.96	1.1	0.58	0.61	0.05	1.02	0.1	1.03
4	2401-BM																						
5	2401-BM		1.13	1.13	1.13	1.13	0.0441	0.147	0.138	0.285	0.0925	1.05	3.71	1.45	0.54	1.79	0.867	0.395	0.405	< 0.0368	0.945	< 0.0736	0.949
6	2401-BM		0.944	0.713	0.954	0.714	< 0.0252	< 0.0549	< 0.344	< 0.0747	< 0.467	1.73	3.58	1.63	0.396	1.37	0.989	< 0.318	< 0.272	< 0.118	1.04	< 0.0402	0.997
7	2401-BM		0.886	0.886	0.886	0.886	0.047	0.095	0.152	0.442	0.134	0.858	3.36	1.2	0.585	1.2	0.748	0.399	0.355	0.045	0.891	0.055	0.558
8	2401-BM		2.3	2.04	2.31	2.05	< 0.1	0.28	< 0.5	0.58	< 0.5	1.48	4.75	3.43	0.89	3.55	1.24	0.52	0.71	< 0.5	1.09	< 1	< 2
9	2401-BM		1.14	1.05	1.13	1.05	< 0.0853	0.201	0.207	0.326	0.185	1.19	3.98	1.01	0.485	1.46	0.905	0.508	0.482	0.0746	1.1	0.128	1.23
10	2401-BM		1.95	1.95	1.95	1.95	0.11	0.24	0.19	0.43	0.21	1.46	3.86	2.95	0.8	3.12	1.14	0.49	0.59	0.12	1.18	< 0.0406	0.87
11	2401-BM		1.96	1.96	1.96	1.96	0.0923	0.238	0.193	0.483	0.166	1.37	4.38	2.91	0.808	3.26	1.09	0.525	0.594	0.0726	1.15	0.0958	0.98
12	2401-BM																						
13	2401-BM																						
14	2401-BM																						
15	2401-BM																						
16	2401-BM		1.51	1.36	1.51	1.51	0.0625	0.0625	0.0625	0.566	0.0625	1.48	3.29	2.72	0.66	2.72	0.854	0.37	0.516	0.0625	0.932	0.122	1.77
17	2401-BM		1.37	1.26	1.38	1.27	< 0.1	0.14	0.15	0.39	0.14	1.1	3.78	1.98	0.58	2.15	0.84	0.44	0.46	< 0.1	1.1	< 0.1	0.95
18	2401-BM																						
19	2401-BM		1.85	1.73	1.85	1.73	< 0.1	0.339	< 0.1	0.678	0.389	2.09	5.7	2.49	1.03	2.5	0.962	0.54	0.67	< 0.1	0.994	< 0.1	< 0.1
20	2401-BM		0.087	0.0597	0.0869	0.0596	< 0.0004	< 0.0262	< 0.00534	0.0209	0.0066	0.0735	0.289	0.078	0.0345	0.112	0.0655	0.0305	0.0313	< 0.00138	0.0774	0.0095	0.0696
21	2401-BM		2.08	2.07	2.08	2.07	0.141	0.324	0.232	0.595	0.222	1.77	5.18	2.66	0.822	3.09	1.18	0.589	0.713	< 0.0541	1.34	< 0.135	< 1.35
22	2401-BM		3.16	3.16	3.16	3.16	0.344	0.688	0.994	0.319	0.221	2.16	5.99	3.56	1.02	3.9	1.29	0.773	1.14	0.43	2.62	0.417	2.43
23	2401-BM		1.76	1.66	1.66	1.65	0.09	0.257	0.186	0.38	0.16	1.16	3.75	2.53	0.717	2.47	0.897	0.489	0.51	< 0.098	0.897	< 0.098	0.838
24	2401-BM																						
25	2401-BM		1.15	1.11	1.21	1.1	< 0.08	0.21	< 0.1	0.314	< 0.1	1.07	4.58	1.23	0.443	1.72	0.932	0.522	0.434	< 0.1	0.911	< 0.1	0.866
26	2401-BM		1.27	1.27	1.27	1.27	0.062	0.153	0.158	0.316	0.119	1.16	4.19	1.5	0.577	2.02	0.944	0.453	0.489	0.056	1.06	< 0.1	1.02
27	2401-BM																						
28	2401-BM																						
29	2401-BM		1.95	1.95	1.95	1.95	0.1	0.2	0.2	0.59	0.17	1.45	4.69	2.95	0.84	3.19	1.14	0.55	0.63	0.11	1.23	0.12	1.13
30	2401-BM																						
31	2401-BM																						
32	2401-BM		2.2	2.2	2.23	2.23	0.095	0.41	0.212	0.531	0.256	1.58	4.93	3.15	0.881	3.29	1.22	0.581	0.676	0.131	1.19	0.137	1.17
33	2401-BM																						
34	2401-BM		1.8	1.8	1.81	1.81	0.0579	0.253	0.191	0.436	0.156	1.31	3.99	2.75	0.675	3	0.949	0.461	0.5	0.0525	0.956	0.0748	1.03
35	2401-BM																						
36	2401-BM		14.4	13.1	13.4	13.2	1.36	< 0.21	4.36	4.61	45.9	11.7	12.5	11.9	0.41	10.7	10.1	2.56	3.35	0.41	7.49	7.74	< 0.39
37	2401-BM																						
38	2401-BM		1.14	1.04	1.14	1.04	< 0.05	0.152	0.154	0.316	0.126	0.967	2.83	1.33	0.497	1.76	0.638	0.341	0.35	< 0.5	0.597	< 0.2	< 2
39	2401-BM																						
40	2401-BM		2.22	2.16	2.22	2.16	0.055	0.267	< 0.185	0.612	< 0.185	2.13	6.25	3.69	1.02	3.59	1.3	0.662	0.662	< 0.185	1.33	< 0.185	< 0.369
41	2401-BM		1.42	1.4	1.41	1.4	0.0628	0.159	0.115	0.315	0.114	1.16	3.2	2.26	0.529	2.34	0.753	0.389	< 0.113	0.433	0.795	< 0.264	0.499
42	2401-BM																						
43	2401-BM																						
44	2401-BM		1.86	1.75	1.86	1.75	< 0.05	< 0.05	0.18	0.49	< 0.05	1.87	7.35	3.78	0.82	3.37	1.24	0.43	0.64	< 0.05	1.38	< 0.05	1.29
45	2401-BM		1.48	1.47	1.48	1.47	0.0543	0.176	0.168	0.34	0.169	1.04	3.36	2.38	0.591	2.45	0.876	0.317	0.448	< 0.08	0.902	< 0.1	0.716
46	2401-BM																						
47	2401-BM		2.3	2.17	2.3	2.17	< 0.114	0.356	0.254	0.491	0.185	1.59	4.29	3.21	0.874	3.74	1.03	0.62	0.636	< 0.0863	0.979	< 0.085	1.03
48	2401-BM																						
49	2401-BM		2.2	2	2.16	2	< 0.11	0.27	< 0.056	1	0.23	< 2.4	1.3	2.9	0.78	3.5	1.1	0.53	0.74	< 0.15	1	< 0.12	1.1
50	2401-BM																						
51	2401-BM		2.2	2.15	2.2	2.15	< 0.0384	0.324	< 0.0942	0.474	0.266	1.46	4.62	3.21	1.04	3.71	1.17	0.561	0.704	0.145	1.21	0.212	1.18
52	2401-BM																						
53	2401-BM																						
54	2401-BM		1.8	1.71	1.8	1.71	< 0.076	0.241	0.188	0.435	0.161	1.37	4.44	2.85	0.756	2.9	0.95	0.471	0.505	< 0.076	0.904	< 0.076	0.888
55	2401-BM		1.96	1.96	1.96	1.96	0.105	0.304	0.214	0.509	0.197	1.37	4	2.69	0.781	3.04	1.07	0.513	0.657	< 0.0346	0.973	0.126	0.931
56	2401-BM																						
57	2401-BM																						
58	2401-BM		2.25	2.14	2.25	2.14	< 0.1	0.264	0.233	0.59	0.234	1.78	5.08	3.56	0.89	3.64	1.31	0.633	0.714	< 0.08	1.25	< 0.25	1.08
59	2401-BM		1.66	1.56	1.66	1.56	< 0.0913	0.228	0.223	0.411	0.221	1.39	4	2.66	0.774	2.44	1.05	0.456	0.45	< 0.098	1.21	0.0815	0.63
60	2401-BM		1.83	1.82	1.83	1.82	0.095	0.236	0.172	0.405	0.159	1.26	4.22	2.78	0.855	2.89	1.11	0.537	0.585	< 0.09	1.04	0.097	1.23
61	2401-BM		1.05	0.984	1.05	0.984	< 0.054	0.113	0.13	0.276	0.086	0.887	3.17	1.16	0.516	1.66	0.879	0.42	0.423	< 0.069	0.959	0.066	0.873
62	2401-BM																						
63	2401-BM																						
64	2401-BM																						
65	2401-BM		2.33	2.18	2.33	2.18	< 0.133	0.315	0.232	0.581	0.198	1.78	5.33	3.4	0.92	3.72	1.27	0.6	0.645	< 0.133	1.14	< 0.13	1.14
66	2401-BM																						
67	2401-BM		2.5	2.5	2.56	2.56	0.07	0.34	0.35	0.62	0.3	2.2	5.9	3.5	0.99	4.3	1.5	0.78	0.8	0.1	1.2	0.11	1.5
68	2401-BM																						
69	2401-BM		2.08	2.08	2.08	2.08	0.105	0.31	0.241	0.5	0.261	1.58	4.6	3.28	0.822	3.09	1.17	0.584	0.669	0.111	1.3	0.151	1.18
70	2401-BM		2.04	1.92	2.04	1.92	< 0.1	0.27	0.21	0.48	< 0.1	1.83	4.69	2.15	1.61	3.65	0.93	0.46	0.58	< 0.1	0.89	< 0.1	1.77
71	2401-BM																						
72	2401-BM		2.1	2.1	2.07	2.07	0.03	0.37	0.38	0.44	0.24	1.4	4.6	3.1	0.72	3.1	1.2	0.64	0.76	0.11	1.4	0.19	0.023
73	2401-BM																						
74	2401-BM		1.87	1.73	1.87	1.73	< 0.1	0.24	0.21	0.47	< 0.2	1.4	4.2	2.6	0.74	3	1.1	0.5	0.55	< 0.2	1.1	< 0.3	0.92

Bovine Meat (2401-BM)
PCDD/F - Results

LC	Sample	Result pg/g fat	WHO-PCDD/F-TEQ reported		WHO-PCDD/F-TEQ calculated		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
			upper bound	lower bound	upper bound	lower bound																	
75	2401-BM		8.51	7.2	8.52	7.21	< 0.619	< 0.619	3.72	1.86	< 0.619	4.96	27.9	9.91	4.34	11.8	5.57	3.72	5.57	2.48	19.2	< 0.619	39
76	2401-BM																						
77	2401-BM																						
78	2401-BM																						
79	2401-BM		1.43	1.32	1.43	1.32	< 0.02	0.42	< 0.21	< 0.16	< 0.21	1.16	3.91	1.55	0.7	1.93	0.73	0.53	< 0.15	< 0.13	0.99	< 0.24	1.19
80	2401-BM		2	2	2	2	0.0777	0.271	0.161	0.584	0.183	2.22	9.76	3.26	0.797	3.11	1.06	0.516	0.747	0.0627	1.16	0.111	1.46
81	2401-BM		2.02	2.02	2.02	2.02	0.0806	0.365	0.155	0.497	0.185	1.39	4.5	2.62	0.718	3.2	1.11	0.525	0.522	0.046	1	0.14	0.926
82	2401-BM																						
83	2401-BM		2.57	2.57	2.58	2.58	0.14	0.32	1.62	0.59	0.24	1.61	5.44	3.74	0.96	3.87	1.29	0.68	0.7	0.11	1.28	0.12	1.54
84	2401-BM																						
85	2401-BM		1.85	1.73	1.85	1.73	< 0.11	0.227	0.198	0.495	0.179	1.46	4.58	2.84	0.864	2.94	0.969	0.512	0.499	< 0.055	1.01	< 0.069	0.858
86	2401-BM																						
87	2401-BM																						
88	2401-BM		2.34	2.34	2.34	2.34	0.0985	0.302	0.218	0.503	0.418	1.51	4.64	3.14	0.824	3.96	1.15	0.636	0.735	0.101	1.51	0.14	1.16
89	2401-BM		2.15	2.13	2.15	2.13	0.094	0.316	0.234	0.552	0.198	1.59	4.73	3.23	0.918	3.35	1.14	0.573	0.661	< 0.147	1.09	0.085	0.992
90	2401-BM		1.68	1.68	1.68	1.68	0.35	0.204	0.35	0.4	0.29	1.47	5.1	1.5	0.4	1.7	1.48	0.7	0.26	0.9	0.1	0.1	1.27
91	2401-BM																						
92	2401-BM																						
93	2401-BM		1.98	1.98	1.98	1.98	0.084	0.222	0.199	0.497	0.143	1.38	4.3	2.87	0.882	3.38	1.13	0.578	0.605	0.051	1.09	0.069	1.01
94	2401-BM		1.56	1.37	1.55	1.39	< 0.158	0.178	0.177	0.362	0.123	1.22	4.06	1.91	0.795	2.28	1.06	0.558	0.574	< 0.0647	1.18	< 0.094	1.26
95	2401-BM		1.69	1.69	1.69	1.69	0.0905	0.234	0.178	0.457	0.136	1.26	3.96	2.44	0.711	2.66	0.974	0.511	0.523	0.051	0.94	0.0625	0.892
96	2401-BM		1.9	1.9	1.9	1.9	0.1	0.27	0.15	0.5	0.18	1.5	4.3	2.7	0.78	3	1.1	0.53	0.58	0.06	0.96	< 0.04	0.94
97	2401-BM																						
98	2401-BM																						
99	2401-BM		1.92	1.78	1.92	1.78	< 0.101	0.182	< 0.131	0.449	< 0.115	1.67	4.7	3.01	0.62	3.3	0.943	0.623	0.606	< 0.127	1.12	< 0.125	0.702
100	2401-BM																						
101	2401-BM		1.55	1.44	1.55	1.44	< 0.1	0.24	0.18	0.581	0.18	1.31	3.88	2.28	0.612	2.17	0.868	0.511	0.488	< 0.05	0.844	< 0.2	1.19
102	2401-BM																						
103	2401-BM		1.95	1.94	1.95	1.93	0.0651	0.272	< 0.0556	0.446	< 0.0637	1.73	< 0.346	3.09	0.986	3.12	1.26	0.574	0.646	< 0.032	1.2	0.0965	1.04
104	2401-BM		1.49	1.48	1.49	1.48	0.164	0.169	0.394	0.362	0.177	1.19	4.34	1.67	0.529	2.04	1.17	0.311	0.428	0.541	0.521	< 0.1	0.811
105	2401-BM																						
106	2401-BM		2.57	2.07	2.57	2.07	< 0.13	< 0.24	< 0.4	< 0.4	< 0.35	2.98	11.4	4.02	1.1	4.22	1.59	0.61	1	< 0.12	1.57	< 0.26	< 3.3
107	2401-BM		0.747	0.747	0.748	0.748	0.022	0.0718	0.125	0.206	0.0499	0.686	2.99	0.754	0.34	1.23	0.794	0.337	0.259	0.038	0.937	0.101	1.23
108	2401-BM																						
109	2401-BM																						
110	2401-BM		2.46	2.46	2.46	2.45	< 0.004	0.222	< 0.004	< 0.004	< 0.004	1.78	3.78	5.44	2.5	4.22	1.72	0.778	0.667	< 0.004	1.22	< 0.004	< 0.004
111	2401-BM																						
112	2401-BM		1.74	1.07	1.73	1.07	< 0.183	< 0.313	< 0.384	< 0.354	< 0.37	0.98	4.71	2.07	0.62	2.12	0.68	0.56	0.62	< 0.513	0.71	< 0.229	< 1.58
113	2401-BM																						
114	2401-BM		2.3	2.06	2.3	2.06	0.109	< 0.19	< 0.05	0.562	0.297	< 2.2	< 11	3.77	1.02	3.84	1.52	0.772	0.625	0.134	< 1.6	0.176	< 1.7
115	2401-BM																						
116	2401-BM		1.8	1.74	1.8	1.75	< 0.05	0.157	0.15	0.501	0.142	1.36	4.22	2.91	0.737	3.21	1.07	0.465	0.516	< 0.05	1.22	0.09	1.17
117	2401-BM																						
118	2401-BM																						
119	2401-BM																						
120	2401-BM		1.74	1.73	1.76	1.74	< 0.0233	0.331	0.622	0.38	0.22	1.36	4.57	2.34	0.867	2.53	1.17	0.516	0.672	< 0.0377	1.2	< 0.0145	1.27
121	2401-BM		1.7	1.7	1.7	1.7	0.0541	0.23	0.171	0.387	0.126	1.13	3.52	2.89	0.64	2.79	0.815	0.441	0.482	0.0721	0.842	< 0.0586	0.969
122	2401-BM																						
123	2401-BM		1.88	1.72	1.99	1.99	0.376	0.368	0.375	0.499	0.218	1.82	4.97	1.65	0.696	2.3	0.904	0.517	0.619	0.286	0.335	0.337	1.29
124	2401-BM		1.01	1.01	1.01	1	0.036	0.11	0.15	0.3	0.1	1.01	3.48	0.98	0.42	1.69	0.89	0.35	0.4	< 0.031	0.89	0.074	1.02
125	2401-BM																						
126	2401-BM		1.55	1.55	1.56	1.55	0.066	0.156	0.233	0.498	0.156	1.57	4.22	2.59	0.585	2.47	0.986	0.479	0.486	< 0.05	0.884	< 0.1	0.867
127	2401-BM		3.98	3.97	3.98	3.97	0.51	0.406	0.287	6.34	2.61	5.32	16.5	6.9	1.1	3.63	1.3	0.435	0.721	< 0.15	1.25	< 0.15	1.33
128	2401-BM		1.54	1.54	1.54	1.54	0.082	0.196	0.165	0.365	0.14	1.02	3.33	2.3	0.699	2.44	0.939	0.409	0.477	0.059	0.944	0.083	0.844
018A	2401-BM																						
034A	2401-BM		1.75	1.75	1.75	1.75	0.0585	0.234	0.153	0.407	0.149	1.31	4.07	2.6	0.752	2.95	0.995	0.441	0.497	0.0509	0.789	0.0964	0.849
039A	2401-BM		1.85	1.8	1.85	1.81	< 0.048	0.4	0.3	0.44	0.43	1.14	3.41	2.44	0.85	2.51	0.99	0.49	0.59	0.36	0.98	< 0.048	1.1
049A	2401-BM		2.3	2.2	2.34	2.19	< 0.11	0.27	< 0.048	1.1	0.22	< 2.2	1.2	3.3	0.92	3.9	1.1	0.6	0.8	< 0.14	1.1	< 0.13	0.97
066A	2401-BM		1.83	1.82	1.82	1.82	0.157	0.175	0.247	0.423	0.187	1.35	4.12	2.63	0.812	2.88	1.14	0.535	0.543	< 0.073	1.06	< 0.092	0.9
117A	2401-BM																						
20*	2401-BM		1.35	1.32	1.35	1.31	< 0.0316	0.4	0.0413	0.319	0.101	1.12	4.41	1.19	0.526	1.71	0.999	0.466	0.476	< 0.021	1.18	0.145	1.06
75*	2401-BM		2.11	1.79	2.11	1.79	< 0.154	< 0.154	0.921	0.461	< 0.154	1.23	6.91	2.46	1.07	2.92	1.38	0.921	1.38	0.614	4.76	< 0.154	9.67

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Dioxin-like PCB - Results

LC	Sample	Result pg/g fat	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	2401-BM																	
2	2401-BM																	
3	2401-BM		2.28	2.28	2.28	2.28	3710	249	7590	160	875	203	291	33.5	426	26.7	18.2	0.5
4	2401-BM																	
5	2401-BM		2.09	2.08	2.09	2.08	3160	225	7630	146	786	176	300	35.5	366	20.5	16.6	< 0.295
6	2401-BM		1.79	1.78	1.79	1.78	2700	212	6650	118	713	158	293	107	350	20.5	14.1	< 0.187
7	2401-BM		2.09	2.09	2.09	2.09	2530	205	6360	159	723	156	250	30.6	425	21.9	17.2	0.37
8	2401-BM		2.31	2.27	2.31	2.27	3690	273	7440	135	858	184	281	< 50	485	26	18.3	< 1.3
9	2401-BM		2.37	2.37	2.38	2.38	2690	247	8600	176	865	192	406	43	361	17.1	19.1	0.999
10	2401-BM		1.84	1.82	1.84	1.82	2860	193	5870	107	716	211	1010	24.7	368	18.7	14.5	< 0.568
11	2401-BM		2.03	2	2.03	2	2830	201	6480	117	705	158	257	23.6	386	17.9	16.3	< 1
12	2401-BM																	
13	2401-BM																	
14	2401-BM																	
15	2401-BM																	
16	2401-BM		1.53	1.53	1.53	1.53	3160	265	7230	153	744	239	368	27	407	14.4	11.1	0.21
17	2401-BM		1.91	1.91	1.88	1.88	2830	189	6760	112	786	159	254	31	353	21	15	0.21
18	2401-BM																	
19	2401-BM		1.69	1.68	1.69	1.68	2780	178	5590	114	597	138	201	20	334	18.2	13.5	< 0.3
20	2401-BM		0.131	0.131	0.131	0.131	181	14.7	480	42.1	55.9	12.3	22.5	2.25	19.8	1.32	1.04	0.0179
21	2401-BM		2.3	2.29	2.3	2.29	3710	249	7530	168	887	203	300	32	597	31.3	18.3	< 0.216
22	2401-BM		2.81	2.78	2.81	2.78	5200	304	14000	155	1230	171	340	26	506	23	20.8	< 1
23	2401-BM		2.36	2.3	2.32	2.3	4050	245	9430	178	940	203	289	27.8	512	20.7	17.8	< 0.788
24	2401-BM																	
25	2401-BM		1.87	1.87	1.87	1.87	2730	208	6220	161	731	154	502	57.9	324	19.2	15	0.302
26	2401-BM		2.04	2.04	2.03	2.03	3610	239	8590	151	929	194	336	34.5	374	24.4	15.6	0.221
27	2401-BM																	
28	2401-BM																	
29	2401-BM		2.46	2.43	2.46	2.43	3530	261	7610	161	953	201	343	39.9	455	25.2	19.8	< 1
30	2401-BM																	
31	2401-BM																	
32	2401-BM		2	2	1.99	1.97	3090	312	6320	134	754	172	218	27	401	19.7	15.9	< 0.72
33	2401-BM																	
34	2401-BM		2.21	2.21	2.21	2.21	3040	220	6530	121	732	190	247	30.8	406	21.7	18.2	0.177
35	2401-BM																	
36	2401-BM		1770	1770	1770	1770	226	7370	314	266	< 1.4	49100	2130	27600	133	233	7460	34000
37	2401-BM																	
38	2401-BM		1.19	1.16	1.19	1.16	1720	123	3570	74.5	397	91.2	140	16.7	226	12.2	9.48	< 1
39	2401-BM																	
40	2401-BM		2.94	2.92	2.94	2.92	4220	403	9790	225	1210	< 14.8	344	40.8	556	29.3	23.7	< 0.738
41	2401-BM		1.6	1.59	1.6	1.59	3720	278	7930	< 2.71	836	172	242	20.2	386	< 2.46	11.6	< 0.25
42	2401-BM																	
43	2401-BM																	
44	2401-BM		2.43	2.37	2.43	2.37	4150	386	11200	242	1070	254	347	38	523	26.4	17.8	< 2
45	2401-BM		2.13	2.11	2.13	2.11	3200	221	7000	146	730	180	278	25.5	401	22.7	17.1	< 0.5
46	2401-BM								7600									
47	2401-BM		2.26	2.24	2.26	2.25	3630	231	7790	148	823	179	263	< 57.6	457	24.7	18	< 0.447
48	2401-BM																	
49	2401-BM		2.2	2.2	2.21	2.2	3600	190	6200	41	820	200	300	31	470	25	18	< 0.55
50	2401-BM																	
51	2401-BM		2.6	2.6	2.6	2.6	3820	295	8130	167	960	215	334	37.8	500	28	21.2	0.243
52	2401-BM																	
53	2401-BM																	
54	2401-BM		1.59	1.56	1.6	1.57	4020	219	7530	116	720	176	261	23.9	396	20.4	11.3	< 0.951
55	2401-BM		2.2	2.19	2.19	2.18	3460	222	7390	66.7	808	179	272	38.6	439	23.2	17.6	< 0.25
56	2401-BM																	
57	2401-BM																	
58	2401-BM		2.55	2.51	2.55	2.51	4200	295	8160	138	929	207	274	26	534	32.7	20.2	< 1.25
59	2401-BM		2.13	2.13	2.12	2.12	3830	281	7570	146	1010	211	325	38.1	460	27.5	16.6	0.221
60	2401-BM		2.19	2.19	2.19	2.19	3470	238	7530	166	846	185	273	33.4	454	23.8	17.5	0.262
61	2401-BM		1.54	1.54	1.54	1.54	1890	198	5200	104	589	108	201	21.8	263	16.9	12.5	0.201
62	2401-BM																	
63	2401-BM																	
64	2401-BM																	
65	2401-BM		2.74	2.62	2.73	2.61	4750	318	9720	149	1100	249	303	34.1	562	19.1	20.5	< 4.01
66	2401-BM																	
67	2401-BM		3.1	3.1	3.06	3.06	5630	477	10900	271	1190	265	386	49	758	35	24	< 0.1
68	2401-BM																	
69	2401-BM		0.112	0.112	0.112	0.112	27.5	2.58	118	2.79	13	2.93	6.29	1.14	0.402	0.106	0.992	0.258
70	2401-BM		1.75	1.75	1.75	1.75	3900	334	7460	631	849	192	283	28.4	351	21.5	12.9	0.18
71	2401-BM																	
72	2401-BM		1.8	1.8	1.76	1.76	2440	188	3610	112	614	152	221	21	312	16.9	15	0.19
73	2401-BM																	
74	2401-BM		1.98	1.96	1.96	1.94	3270	241	7100	141	< 20	170	255	26.1	405	21.5	15.6	< 0.5

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Dioxin-like PCB - Results

LC	Sample	Result pg/g fat	WHO-PCB-TEQ reported		WHO-PCB-TEQ calculated		PCB 105	PCB 114	PCB 118	PCB 123	PCB 156	PCB 157	PCB 167	PCB 189	PCB 77	PCB 81	PCB 126	PCB 169
			upper bound	lower bound	upper bound	lower bound												
75	2401-BM		13.4	13.4	13.4	13.4	9080	614	20100	1710	2530	592	871	83	1350	48.9	36.5	284
76	2401-BM																	
77	2401-BM																	
78	2401-BM																	
79	2401-BM		2.21	2.21	2.21	2.21	2310	223	5690	< 0.5	505	122	< 0.5	21.4	288	23	17.9	4.1
80	2401-BM		2.21	2.2	2.21	2.2	3600	249	7230	138	766	172	271	< 174	457	26.4	17.7	0.235
81	2401-BM		2.05	2.05	2.05	2.05	3170	230	6780	130	884	174	269	30.3	420	22.2	16.4	0.22
82	2401-BM																	
83	2401-BM		2.55	2.55	2.54	2.54	3580	263	7650	182	847	197	336	30.6	535	31.5	20.8	0.27
84	2401-BM																	
85	2401-BM		1.97	1.97	1.98	1.98	3360	208	7190	149	785	183	264	< 29.3	401	22.5	15.6	0.187
86	2401-BM																	
87	2401-BM																	
88	2401-BM		1.9	1.9	1.9	1.9	3840	353	8080	122	856	212	285	28.2	407	22.7	14.3	0.285
89	2401-BM		1.98	1.98	1.98	1.98	2780	218	6070	113	724	149	241	25.5	406	22.9	16.2	0.217
90	2401-BM		1.01	1.01	1.01	1.01	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	85.7	10.5	9.7	0.79
91	2401-BM																	
92	2401-BM																	
93	2401-BM		2.28	2.27	2.27	2.27	3460	240	7340	< 118	865	201	277	< 32.6	425	25.2	18.4	0.262
94	2401-BM		2.11	2.11	2.1	2.1	3490	231	7110	144	810	180	323	25.5	474	26.6	16.7	0.312
95	2401-BM		2.3	2.3	2.3	2.3	3370	291	7570	147	873	188	276	29.1	412	25.3	18.6	0.215
96	2401-BM		2.3	2.3	2.29	2.29	3450	288	7520	88.5	817	183	269	33.5	422	25	18.5	0.38
97	2401-BM																	
98	2401-BM																	
99	2401-BM		2.38	2.38	2.39	2.39	3590	325	7420	103	873	203	305	31.8	473	29.8	19.4	0.192
100	2401-BM																	
101	2401-BM		1.87	1.84	1.87	1.84	2870	170	6190	115	634	157	224	21	386	11.8	14.9	< 1
102	2401-BM																	
103	2401-BM		2.4	2.39	2.39	2.39	3630	141	7910	551	902	201	328	29.8	502	26.9	19.2	< 0.0111
104	2401-BM		1.34	1.34	1.34	1.34	4060	9000	257	205	1160	257	1850	53	94.2	14.7	7.9	0.884
105	2401-BM																	
106	2401-BM		3.28	3.14	3.28	3.14	4210	< 350	7820	< 500	1050	211	< 500	< 100	744	< 100	26.7	< 2
107	2401-BM		1.58	1.58	1.58	1.58	1950	196	6020	133	653	136	232	21.8	242	17.2	12.6	0.234
108	2401-BM																	
109	2401-BM																	
110	2401-BM		1.45	1.45	1.46	1.46	3330	178	7980	576	719	124	219	16.7	465	14.4	10.1	< 0.01
111	2401-BM																	
112	2401-BM		2.02	2.01	2.02	2.01	3140	284	6640	310	640	170	506	21.2	339	17.5	16.2	< 0.38
113	2401-BM																	
114	2401-BM		2.97	2.97	2.97	2.97	4240	304	9010	173	1080	250	395	37.3	582	31	24.3	0.303
115	2401-BM																	
116	2401-BM		2.26	2.26	2.26	2.26	3270	210	6920	156	803	170	260	25.3	435	25.3	18.5	0.202
117	2401-BM																	
118	2401-BM																	
119	2401-BM																	
120	2401-BM		2.48	2.47	2.48	2.47	4030	248	9280	183	981	228	362	38.5	439	28	19.6	< 0.145
121	2401-BM		2.43	2.43	2.42	2.42	3980	283	8600	146	904	202	308	28.8	539	28	19.1	0.511
122	2401-BM																	
123	2401-BM		1.49	1.49	1.49	1.49	2050	242	1540	166	681	194	226	31.3	175	11.3	13	0.417
124	2401-BM		2.09	2.09	2.1	2.1	2700	217	7220	120	755	165	276	27.6	294	21.4	16.8	1.25
125	2401-BM																	
126	2401-BM		2.23	2.23	2.23	2.23	3450	349	7650	144	843	173	229	30.3	369	19.6	17.9	0.245
127	2401-BM		2.98	2.81	2.99	2.84	3600	271	8320	218	925	189	338	39.5	705	39.9	23.4	< 5
128	2401-BM		2.31	2.31	2.32	2.32	3620	304	8290	177	891	198	267	30.9	488	26	18.4	0.225
018A	2401-BM																	
034A	2401-BM		2.1	2.1	2.1	2.1	3040	200	6600	109	734	169	238	24.1	385	21	17.1	0.274
039A	2401-BM		2.11	2.11	2.11	2.11	2970	315	6690	206	768	159	271	27.2	376	24.4	16.5	2.3
049A	2401-BM		3	3	2.99	2.97	5700	410	12000	82	1300	250	380	32	550	31	23	< 0.66
066A	2401-BM		2.24	2.24	2.24	2.24	3520	197	7110	153	785	188	284	27.4	435	22.2	18.1	0.293
117A	2401-BM																	
20*	2401-BM		2.01	2.01	2.01	2.01	2760	224	7320	642	854	187	344	34.3	302	20.2	15.9	0.273
75*	2401-BM		3.32	3.32	3.32	3.32	2250	152	4990	424	627	147	216	20.6	335	12.1	9.06	70.3

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Non dioxin-like PCB - Results

LC	Sample	Result ng/g fat	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	2401-BM											
2	2401-BM											
3	2401-BM		42.5	42.5	42.5	42.5	8.45	10.2	9.38	5.87	4.98	3.66
4	2401-BM		36.1	36.1	36.1	36.1	15.3	7.02	2.37	6.37	2.72	2.32
5	2401-BM		39.3	39.3	39.3	39.3	6.96	9.75	9.29	5.32	4.51	3.43
6	2401-BM		34.5	34.5	34.5	34.5	7.19	8.2	7.63	3.78	4.48	3.24
7	2401-BM		40.3	40.3	40.3	40.3	7.91	9.31	9.24	6.49	4.38	2.97
8	2401-BM		43.1	43.1	43.1	43.1	15.5	8.65	7.83	3.54	4.54	3.05
9	2401-BM		48.1	48.1	48.1	48.1	5.69	10.1	12.6	6.42	9.15	4.16
10	2401-BM		41	41	41	41	6.46	8.96	9.95	7.16	4.66	3.76
11	2401-BM		32.9	32.9	32.9	32.9	7.75	7.65	6.8	4.33	3.58	2.77
12	2401-BM		35.6	35.6	35.6	35.6	6.67	9.02	8.29	5.07	3.86	2.68
13	2401-BM		39.8	39.8	39.8	39.8	7.39	7.25	10.2	6.34	5.01	3.56
14	2401-BM											
15	2401-BM											
16	2401-BM		35.6	35.6	35.6	35.6	6.15	8.6	7.7	4.8	4.8	3.5
17	2401-BM											
18	2401-BM		30.7	30.7	30.7	30.7	4.11	5.85	7.86	5.28	4.22	3.35
19	2401-BM		26.4	26.4	26.4	26.4	5.7	7.68	5.46	3.1	2.5	1.93
20	2401-BM		2.05	2.05	2.05	2.05	0.322	0.467	0.525	0.344	0.211	0.182
21	2401-BM		42.2	42.2	42.3	42.3	9.07	10.6	8.81	5.59	4.57	3.61
22	2401-BM		43.4	43.4	43.4	43.4	7.08	4.84	11.8	5.62	9.06	5.01
23	2401-BM		44.2	44.2	44.2	44.2	10.7	10.3	9.34	5.94	4.44	3.52
24	2401-BM		64.7	64.7	64.7	64.7	10.2	12.7	14.3	9.14	11.1	7.25
25	2401-BM		37.9	37.9	37.9	37.9	5.1	8.11	9.06	5.59	6.03	3.98
26	2401-BM		47.9	47.9	47.9	47.9	10.2	10.9	10.6	6.87	5.24	4.1
27	2401-BM											
28	2401-BM		34.5	34.5	34.5	34.5	5.31	6.22	8.54	6.98	4.28	3.18
29	2401-BM		31.7	31.7	31.7	31.7	4.22	6.09	8.03	6.06	4.05	3.25
30	2401-BM											
31	2401-BM		36.9	36.9	36.9	36.9	7.12	8.11	8.72	5.35	4.5	3.1
32	2401-BM		37.7	37.7	37.7	37.7	7.24	9.78	8.17	4.74	4.25	3.55
33	2401-BM											
34	2401-BM		33.7	33.7	33.7	33.7	6.36	8.46	7.91	4.4	3.66	2.93
35	2401-BM											
36	2401-BM		106	106	309	309	47.6	29.7	2.18	212	15.8	1.84
37	2401-BM		34.3	34.3	34.4	34.4	6.43	8	7.35	4.58	5.03	2.97
38	2401-BM		23.3	23.3	23.3	23.3	6.47	4.45	5.19	2.87	2.33	1.99
39	2401-BM		54.1	54.1	54.1	54.1	16.4	9.8	10.8	5.9	7.9	3.3
40	2401-BM		56.4	56.4	56.4	56.4	18.2	10.7	11	6.28	5.26	4.98
41	2401-BM		44.9	44.9	44.9	44.9	13.5	8.52	8.67	6.3	4.5	3.42
42	2401-BM		44.1	44.1	44.1	44.1	7.85	9.98	9.97	6.09	6.23	3.98
43	2401-BM		33.3	33.3	33.3	33.3	6.99	7.79	7.38	4.33	3.98	2.8
44	2401-BM		49.7		49.8	49.8	12.6	12.2	10.6	6.14	4.35	3.91
45	2401-BM		39.9	39.9	39.8	39.8	8.37	10.1	8.9	5.02	4.15	3.3
46	2401-BM		43	43	43.5	43.5	8.2	9.7	9.1	6.5	6.4	3.6
47	2401-BM		41	41	41	41	9.16	9.38	9.33	5.49	4.23	3.43
48	2401-BM											
49	2401-BM		41	41	41.1	41.1	9.6	10	8.9	5	4.2	3.4
50	2401-BM											
51	2401-BM		41.5	41.5	41.5	41.5	8.13	10.1	9.29	5.67	4.53	3.73
52	2401-BM											
53	2401-BM		50	50	49.8	49.8	9.8	12.2	11.3	6.5	5.5	4.5
54	2401-BM		40.2	40.2	40.2	40.2	7.22	10.8	8.76	5.59	4.39	3.39
55	2401-BM		38.8	38.8	38.8	38.8	7.13	8.69	9.05	5.67	4.53	3.71
56	2401-BM											
57	2401-BM		37	37	36.6	36.6	5.2	7.6	9.5	5.6	5.2	3.5
58	2401-BM		41.5	41.5	41.5	41.5	7.03	9.55	9.21	5.98	5.74	3.96
59	2401-BM		42.1	42.1	42.1	42.1	8.44	10	9.8	5.52	4.61	3.7
60	2401-BM		43.4	43.4	43.4	43.4	8.43	9.89	9.39	5.64	6.56	3.45
61	2401-BM		31.4	31.4	31.4	31.4	6.76	6.91	7.3	4.25	3.55	2.59
62	2401-BM											
63	2401-BM											
64	2401-BM		81	71	81.1	71.1	25	7.1	16	< 5	< 5	23
65	2401-BM		46.9	46.9	46.9	46.9	9.4	10.3	10.9	6.06	5.45	4.74
66	2401-BM		36.3	36.3	36.3	36.3	7.22	8.81	7.9	4.91	4.15	3.32
67	2401-BM		66	66	66	66	16.2	16.4	13.8	6.4	7.9	5.3
68	2401-BM		36.6	36.6	36.6	36.6	5.67	7.2	9.61	6.8	4.1	3.23
69	2401-BM		40.7	40.7	40.7	40.7	8.3	9.6	8.4	5.5	5.6	3.3
70	2401-BM		72.5	72.5	72.5	72.5	34.8	11.5	11.7	6.86	3.57	4.05
71	2401-BM											
72	2401-BM		30.5	30.5	30.5	30.5	7.6	6.3	6.8	4.8	2.8	2.2
73	2401-BM		55.1	55.1	55.1	55.1	12.5	13.9	11.9	7.46	5.48	3.81
74	2401-BM		34.5	34.5	34.5	34.5	7.5	8.1	7.9	4.6	3.4	3

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

Bovine Meat (2401-BM)
Non dioxin-like PCB - Results

LC	Sample	Result ng/g fat	Sum 6 Indicator PCBs reported		Sum 6 Indicator PCBs calculated		PCB 28	PCB 52	PCB 101	PCB 138	PCB 153	PCB 180
			upper bound	lower bound	upper bound	lower bound						
75	2401-BM		124	124	124	124	23.9	30.4	23.9	18.4	15.6	12
76	2401-BM											
77	2401-BM		43	43	43	43	7.04	8.96	8.04	8.67	6.73	3.59
78	2401-BM											
79	2401-BM		29.9	29.9	29.8	29.8	< 0.0005	9	9.3	3.5	2.6	5.4
80	2401-BM		38.8	38.8	38.8	38.8	8.18	10.1	8.48	4.69	3.93	3.44
81	2401-BM		33.1	33.1	33.1	33.1	7.09	7.56	7.79	4.06	3.36	3.27
82	2401-BM											
83	2401-BM		40	40	39.6	39.6	7.8	10.4	8.47	5.33	4.36	3.24
84	2401-BM											
85	2401-BM		37.7	37.7	37.8	37.8	8.58	9.01	8.29	5.12	3.68	3.08
86	2401-BM				50.2	50.2	17.3	9.64	8.3	5.22	6.83	2.95
87	2401-BM											
88	2401-BM		42.4	42.4	42.3	42.3	8.21	10.1	10.5	6.21	3.97	3.29
89	2401-BM		36.9	36.9	36.9	36.9	8.77	8.88	8.23	4.65	3.69	2.67
90	2401-BM		26.5	26.5	26.5	26.5	5.33	3.33	4.45	3.83	2.45	7.1
91	2401-BM											
92	2401-BM											
93	2401-BM		38.5	38.5	38.5	38.5	8.82	9.19	8.32	4.94	3.94	3.24
94	2401-BM		44.2	44.2	44.2	44.2	6.84	12	10.1	5.87	4.87	4.54
95	2401-BM		40	40	40	40	6.67	9.93	9.69	5.45	4.3	3.97
96	2401-BM											
97	2401-BM											
98	2401-BM											
99	2401-BM		31.5	31.5	31.5	31.5	6.97	7.14	6.6	4.62	3.35	2.77
100	2401-BM											
101	2401-BM		34.1	34.1	34.1	34.1	7.73	7.96	7.58	4.31	3.62	2.91
102	2401-BM		31.9	31.9	31.9	31.9	6.87	7.92	6.9	4.06	2.45	3.73
103	2401-BM		63.3	63.3	63.3	63.3	12.7	15.9	13.3	9.82	6.39	5.2
104	2401-BM		60.6	60.6	60.6	60.6	10.4	12	10.6	9.6	11.1	6.94
105	2401-BM		38.2	38.2	38.2	38.2	7.6	9.14	8.13	5.57	4.25	3.48
106	2401-BM		49.6	49.6	49.6	49.6	11.6	11.7	11.4	5.91	5.15	3.79
107	2401-BM		21.2	21.2	21.2	21.2	5.12	4.46	4.56	2.9	2.32	1.81
108	2401-BM		36.5	36.5	36.5	36.5	9.17	5.12	8.17	7.23	3.66	3.19
109	2401-BM		44	44	44	44	7.08	10.1	11.1	5.47	6.77	3.48
110	2401-BM											
111	2401-BM											
112	2401-BM		27.4	27.4	27.4	27.4	5.05	5.17	5.98	5.56	3.04	2.62
113	2401-BM											
114	2401-BM		49.5	49.5	49.5	49.5	10.3	12.4	10.6	6.65	5.37	4.22
115	2401-BM											
116	2401-BM		34.1	34.1	34.1	34.1	5.64	8.48	7.94	5.01	3.83	3.17
117	2401-BM		40.1	40.1	40.1	40.1	9.8	10	8.4	5.2	4	2.7
118	2401-BM											
119	2401-BM											
120	2401-BM											
121	2401-BM		41.5	41.5	41.5	41.5	7.17	11.3	9.59	5.77	4.15	3.54
122	2401-BM											
123	2401-BM		23.1	23.1	23.1	23.1	6.14	3.79	4.24	3.47	2.63	2.84
124	2401-BM		35	35	35.3	35.3	6.78	9.04	8	4.52	3.76	3.24
125	2401-BM											
126	2401-BM		41	41	41	41	7.41	9.62	9.63	6.42	4.02	3.91
127	2401-BM		61.3	61.3	61.3	61.3	22	11.7	10.4	7.27	6.25	3.7
128	2401-BM		42.6	42.6	42.6	42.6	8.78	10.7	9.21	5.7	4.5	3.71
018A	2401-BM		30.7	30.7	30.7	30.7	4.11	5.85	7.86	5.28	4.22	3.35
034A	2401-BM		33.5	33.5	33.5	33.5	6.74	8.21	7.42	4.52	3.76	2.87
039A	2401-BM		54.5	54.5	54.5	54.5	16.3	9.7	11	6.08	7.96	3.5
049A	2401-BM		51	51	51.1	51.1	12	13	11	6.6	4.9	3.6
066A	2401-BM		41.6	41.6	41.6	41.6	8.76	10.2	8.94	5.69	4.43	3.6
117A	2401-BM		40.1	40.1	40.1	40.1	9.8	10	8.4	5.2	4	2.7
20*	2401-BM		31.3	31.3	31.3	31.3	4.91	7.13	8.02	5.25	3.22	2.78
75*	2401-BM		30.8	30.8	30.8	30.8	5.93	7.53	5.94	4.57	3.88	2.94

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Bioanalytical screening methods - Results, Assessment of analytical results

LC	Sample	Result pg BEQ/g fat	PCDD/Fs + DL-PCBs	PCDD/Fs	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	Bioassay Cut-off Action Level DL-PCBs
1	2401-BM																					
2	2401-BM																					
3	2401-BM																					
4	2401-BM																					
5	2401-BM																					
6	2401-BM																					
7	2401-BM																					
8	2401-BM		4.4			YES	YES	YES	YES										1.28			
9	2401-BM																					
10	2401-BM																					
11	2401-BM																					
12	2401-BM																					
13	2401-BM		3.6			no				0.57			4			3.5			2.66			
14	2401-BM																					
15	2401-BM																					
16	2401-BM		2.4	1.4	1	no	no	no	no	0.25		0.25	4	2.5						1.75		
17	2401-BM																					
18	2401-BM																					
19	2401-BM																					
20	2401-BM																					
21	2401-BM																					
22	2401-BM																					
23	2401-BM																					
24	2401-BM																					
25	2401-BM																					
26	2401-BM																					
27	2401-BM																					
28	2401-BM																					
29	2401-BM																					
30	2401-BM																					
31	2401-BM																					
32	2401-BM																					
33	2401-BM																					
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35	2401-BM																					
36	2401-BM																					
37	2401-BM																					
38	2401-BM																					
39	2401-BM																					
40	2401-BM																					
41	2401-BM																					
42	2401-BM																					
43	2401-BM																					
44	2401-BM																					
45	2401-BM																					
46	2401-BM																					
47	2401-BM																					
48	2401-BM																					
49	2401-BM																					
50	2401-BM																					
51	2401-BM																					
52	2401-BM																					
53	2401-BM																					
54	2401-BM																					
55	2401-BM																					
56	2401-BM																					
57	2401-BM																					
58	2401-BM		4.7	2.3	2.4	yes	yes	yes	yes	0.51	0.3	0.21	4	2.5			1.75	1.75	2.56	1.87	1.31	1.31
59	2401-BM																					
60	2401-BM		4.3			x	x	x	x	0.5			1						0.5			
61	2401-BM																					
62	2401-BM																					
63	2401-BM		3.9			yes				0.82			4	2.5			1.75	1.75	3.2	1.9		
64	2401-BM																					
65	2401-BM																					
66	2401-BM																					
67	2401-BM																					
68	2401-BM																					
69	2401-BM																					
70	2401-BM																					
71	2401-BM																					
72	2401-BM																					
73	2401-BM																					
74	2401-BM																					

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Bioanalytical screening methods - Results, Assessment of analytical results

LC	Sample	Result pg BEQ/g fat	**PCDD/Fs + DL-PCBs**	**PCDD/Fs**	**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	PCDD/Fs	DL-PCBs	**Maximum Level** on which evaluation is based on PCDD/Fs+ DL-PCBs	PCDD/Fs	DL-PCBs	**Action Level** on which evaluation is based on PCDD/Fs+ DL-PCBs	PCDD/Fs	DL-PCBs	**Bioassay Cut-off** Maximum Level PCDD/Fs+ DL-PCBs	PCDD/Fs	**Bioassay Cut-off** Action Level PCDD/Fs	DL-PCBs
75	2401-BM																					
76	2401-BM																					
77	2401-BM																					
78	2401-BM																					
79	2401-BM																					
80	2401-BM																					
81	2401-BM																					
82	2401-BM																					
83	2401-BM																					
84	2401-BM																					
85	2401-BM																					
86	2401-BM																					
87	2401-BM																					
88	2401-BM																					
89	2401-BM																					
90	2401-BM																					
91	2401-BM																					
92	2401-BM																					
93	2401-BM		4.6			yes	n/a	n/a	n/a				4	2.5			1.75	1.75				
94	2401-BM																					
95	2401-BM																					
96	2401-BM																					
97	2401-BM																					
98	2401-BM																					
99	2401-BM																					
100	2401-BM																					
101	2401-BM																					
102	2401-BM																					
103	2401-BM																					
104	2401-BM																					
105	2401-BM																					
106	2401-BM																					
107	2401-BM																					
108	2401-BM																					
109	2401-BM																					
110	2401-BM																					
111	2401-BM		2.6	0.12	2.5	NO	NO	NO	NO	0.1	0.1	0.1	4	4	4	2.5	2.5	2.5				
112	2401-BM																					
113	2401-BM																					
114	2401-BM																					
115	2401-BM																					
116	2401-BM																					
117	2401-BM																					
118	2401-BM																					
119	2401-BM																					
120	2401-BM																					
121	2401-BM																					
122	2401-BM																					
123	2401-BM																					
124	2401-BM																					
125	2401-BM																					
126	2401-BM																					
127	2401-BM																					
128	2401-BM																					
018A	2401-BM																					
034A	2401-BM																					
039A	2401-BM																					
049A	2401-BM																					
066A	2401-BM																					
117A	2401-BM																					

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Lipid content - Results

LC	Sample	Result %	Lipid content	Lipid content	Lipid content
			Physico-chemical methods	Bioanalytical methods	Mean
1	2401-BM				
2	2401-BM				
3	2401-BM		5.8		5.8
4	2401-BM				
5	2401-BM		6.5		6.5
6	2401-BM		6.5		6.5
7	2401-BM		7.7		7.7
8	2401-BM		5.3	5.3	5.3
9	2401-BM		6.2		6.2
10	2401-BM		7.3		7.3
11	2401-BM		7.2		7.2
12	2401-BM		6.5		6.5
13	2401-BM		5.1	5.1	5.1
14	2401-BM				
15	2401-BM				
16	2401-BM		4.6	4.6	4.6
17	2401-BM		6.6		6.6
18	2401-BM		6.8		6.8
19	2401-BM				
20	2401-BM		6.5		6.5
21	2401-BM		6.2		6.2
22	2401-BM		4.9		4.9
23	2401-BM		6.6		6.6
24	2401-BM		6.9		6.9
25	2401-BM		6.4		6.4
26	2401-BM		5.8		5.8
27	2401-BM				
28	2401-BM		6.7		6.7
29	2401-BM		6.5		6.5
30	2401-BM				
31	2401-BM		6.6		6.6
32	2401-BM		6.6		6.6
33	2401-BM				
34	2401-BM		7.8		7.8
35	2401-BM				
36	2401-BM		4.6		4.6
37	2401-BM		5.0		5.0
38	2401-BM				
39	2401-BM		6.8		6.8
40	2401-BM		5.2		5.2
41	2401-BM				
42	2401-BM		7.2		7.2
43	2401-BM		4.8		4.8
44	2401-BM				
45	2401-BM		6.6		6.6
46	2401-BM		6.6		6.6
47	2401-BM		6.7		6.7
48	2401-BM				
49	2401-BM		6.6		6.6
50	2401-BM				
51	2401-BM		6.1		6.1
52	2401-BM				
53	2401-BM		6.9		6.9
54	2401-BM		7.2		7.2
55	2401-BM		6.7		6.7
56	2401-BM				
57	2401-BM				
58	2401-BM		6.5	6.7	6.6
59	2401-BM		6.3		6.3
60	2401-BM		6.5	6.5	6.5
61	2401-BM		6.8		6.8
62	2401-BM				
63	2401-BM			6.5	6.5
64	2401-BM		6.7		6.7
65	2401-BM		6.1		6.1
66	2401-BM		7.8		7.8
67	2401-BM		4.0		4.0
68	2401-BM		7.3		7.3
69	2401-BM		6.8		6.8
70	2401-BM		7.2		7.2
71	2401-BM				
72	2401-BM		6.9		6.9
73	2401-BM		3.5		3.5
74	2401-BM		6.9		6.9

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Lipid content - Results

LC	Sample	Result %	Lipid content	Lipid content	Lipid content
			Physico-chemical methods	Bioanalytical methods	Mean
75	2401-BM		5.6		5.6
76	2401-BM				
77	2401-BM		6.8		6.8
78	2401-BM				
79	2401-BM		3.7		3.7
80	2401-BM		6.1		6.1
81	2401-BM		7.4		7.4
82	2401-BM				
83	2401-BM		4.5		4.5
84	2401-BM				
85	2401-BM		7.2		7.2
86	2401-BM		7.5		7.5
87	2401-BM				
88	2401-BM		4.7		4.7
89	2401-BM		6.8		6.8
90	2401-BM				
91	2401-BM				
92	2401-BM				
93	2401-BM		6.7	6.7	6.7
94	2401-BM		6.9		6.9
95	2401-BM		6.9		6.9
96	2401-BM		6.7		6.7
97	2401-BM				
98	2401-BM				
99	2401-BM		6.8		6.8
100	2401-BM				
101	2401-BM		7.2		7.2
102	2401-BM		5.0		5.0
103	2401-BM		6.6		6.6
104	2401-BM		6.5		6.5
105	2401-BM		5.9		5.9
106	2401-BM		6.1		6.1
107	2401-BM		8.0		8.0
108	2401-BM		3.8		3.8
109	2401-BM		7.5		7.5
110	2401-BM		6.0		6.0
111	2401-BM				
112	2401-BM				
113	2401-BM				
114	2401-BM		5.7		5.7
115	2401-BM				
116	2401-BM				
117	2401-BM		6.4		6.4
118	2401-BM				
119	2401-BM				
120	2401-BM		6.6		6.6
121	2401-BM				
122	2401-BM				
123	2401-BM		6.5		6.5
124	2401-BM		6.3		6.3
125	2401-BM				
126	2401-BM		8.0		8.0
127	2401-BM		7.6		7.6
128	2401-BM		6.2		6.2
018A	2401-BM		6.8		6.8
034A	2401-BM		7.8		7.8
039A	2401-BM		6.5		6.5
049A	2401-BM		6.7		6.7
066A	2401-BM		6.9		6.9
117A	2401-BM		6.4		6.4

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
15 April 2025

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

Test sample - Bovine Meat (2401-BM)

Z-scores of sum parameters and individual results

Calculation of z-score on basis of assigned value

$z = (x - x_a) / \sigma_p$

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

Bioassay-scores of BEQ results

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

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

x_a: assigned value (pyhsical-chemical methods)
x: participant's result (BEQ from bioanalytical screening method)
$\sigma_{bioassay}$: 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 PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Sum parameters - Z-scores

LC	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	2401-BM																		
2	2401-BM																		
3	2401-BM		0.9	1.1	0.9	1.0	0.4	0.7	0.4	0.7	0.8	0.8	0.8	0.8		0.6	0.6	0.6	0.6
4	2401-BM															-0.5	-0.5	-0.5	-0.5
5	2401-BM		-1.7	-1.6	-1.7	-1.6	-3.9	-3.7	-3.9	-3.7	-0.1	-0.2	-0.1	-0.1		0.1	0.1	0.0	0.0
6	2401-BM		-2.9	-3.4	-2.9	-3.5	-4.9	-6.0	-4.8	-6.0	-1.6	-1.6	-1.5	-1.6		-0.8	-0.7	-0.8	-0.8
7	2401-BM		-2.3	-2.2	-2.3	-2.2	-5.2	-5.1	-5.2	-5.1	-0.1	-0.1	-0.1	-0.1		0.2	0.3	0.2	0.2
8	2401-BM		1.9	1.3	1.9	1.3	2.5	1.4	2.6	1.4	0.9	0.7	0.9	0.8		0.7	0.7	0.7	0.7
9	2401-BM		-0.9	-1.0	-0.9	-1.0	-3.8	-4.1	-3.9	-4.2	1.2	1.2	1.3	1.3		1.6	1.6	1.5	1.5
10	2401-BM		-0.2	-0.1	-0.2	-0.1	0.6	0.9	0.6	0.8	-1.3	-1.4	-1.3	-1.4		0.3	0.4	0.3	0.3
11	2401-BM		0.3	0.4	0.3	0.4	0.7	0.9	0.7	0.9	-0.4	-0.6	-0.4	-0.5		-1.0	-1.0	-1.1	-1.1
12	2401-BM															-0.6	-0.5	-0.6	-0.6
13	2401-BM															0.1	0.2	0.1	0.1
14	2401-BM																		
15	2401-BM																		
16	2401-BM		-2.1	-2.4	-2.1	-2.0	-1.8	-2.4	-1.8	-1.6	-2.8	-2.8	-2.7	-2.7		-0.6	-0.5	-0.6	-0.6
17	2401-BM		-1.5	-1.7	-1.6	-1.7	-2.6	-3.0	-2.5	-2.9	-1.0	-1.0	-1.1	-1.1					
18	2401-BM															-1.4	-1.4	-1.4	-1.4
19	2401-BM		-0.8	-1.1	-0.9	-1.0	0.1	-0.3	0.1	-0.4	-2.0	-2.1	-2.0	-2.0		-2.2	-2.1	-2.2	-2.2
20	2401-BM		-9.4	-9.5	-9.4	-9.5	-9.5	-9.7	-9.5	-9.7	-9.4	-9.4	-9.4	-9.4		-6.3	-6.3	-6.3	-6.3
21	2401-BM		1.3	1.5	1.3	1.4	1.3	1.6	1.3	1.5	0.8	0.8	0.9	0.9		0.5	0.6	0.5	0.5
22	2401-BM		5.5	5.6	5.4	5.6	7.2	7.7	7.2	7.6	3.3	3.1	3.3	3.2		0.8	0.8	0.7	0.7
23	2401-BM		0.3	0.8	0.3	0.4	-0.4	-0.7	-1.0	-0.8	1.1	0.8	1.0	0.9		0.9	0.9	0.9	0.9
24	2401-BM															4.4	4.5	4.4	4.4
25	2401-BM		-2.2	-2.2	-2.0	-2.2	-3.8	-3.8	-3.4	-3.9	-1.2	-1.2	-1.1	-1.1		-0.2	-0.2	-0.2	-0.2
26	2401-BM		-1.5	-1.3	-1.5	-1.3	-3.1	-2.9	-3.1	-2.9	-0.4	-0.4	-0.4	-0.4		1.5	1.6	1.5	1.5
27	2401-BM																		
28	2401-BM															-0.8	-0.7	-0.8	-0.8
29	2401-BM		1.4	1.5	1.4	1.5	0.6	0.9	0.6	0.8	1.6	1.5	1.7	1.5		-1.2	-1.2	-1.3	-1.3
30	2401-BM																		
31	2401-BM															-0.4	-0.3	-0.4	-0.4
32	2401-BM		0.9	1.1	0.9	1.0	2.0	2.3	2.1	2.4	-0.6	-0.6	-0.6	-0.7		-0.2	-0.2	-0.2	-0.2
33	2401-BM																		
34	2401-BM		0.4	0.6	0.4	0.6	-0.2	0.1	-0.2	0.1	0.4	0.4	0.5	0.5		-0.9	-0.9	-0.9	-0.9
35	2401-BM																		
36	2401-BM		4627.3	4674.2	4589.5	4661.9	68.3	63.2	62.8	63.3	8339.1	8339.1	8378.6	8378.6		11.5	11.5	46.0	46.0
37	2401-BM															-0.8	-0.8	-0.8	-0.8
38	2401-BM		-4.0	-4.2	-4.0	-4.2	-3.8	-4.2	-3.8	-4.2	-4.4	-4.5	-4.4	-4.5		-2.7	-2.7	-2.7	-2.7
39	2401-BM															2.6	2.6	2.6	2.6
40	2401-BM		3.4	3.4	3.3	3.3	2.1	2.1	2.1	2.0	3.9	3.8	3.9	3.8		3.0	3.0	2.9	2.9
41	2401-BM		-2.2	-2.1	-2.2	-2.2	-2.3	-2.2	-2.3	-2.2	-2.5	-2.5	-2.4	-2.5		1.0	1.0	1.0	1.0
42	2401-BM															0.9	0.9	0.9	0.9
43	2401-BM															-1.0	-0.9	-1.0	-1.0
44	2401-BM		1.1	0.8	1.1	0.8	0.1	-0.2	0.1	-0.3	1.5	1.2	1.5	1.2		1.8		1.8	1.8
45	2401-BM		-0.6	-0.6	-0.7	-0.6	-2.0	-1.8	-2.0	-1.8	0.0	0.0	0.1	0.0		0.2	0.2	0.1	0.1
46	2401-BM															0.7	0.7	0.8	0.8
47	2401-BM		1.8	1.6	1.8	1.6	2.5	2.1	2.5	2.1	0.7	0.6	0.7	0.7		0.3	0.4	0.3	0.3
48	2401-BM																		
49	2401-BM		1.4	1.1	1.3	1.0	2.0	1.2	1.7	1.1	0.4	0.4	0.5	0.4		0.3	0.4	0.3	0.3
50	2401-BM																		
51	2401-BM		2.4	2.5	2.4	2.5	2.0	2.0	2.0	1.9	2.3	2.3	2.3	2.3		0.4	0.5	0.4	0.4
52	2401-BM																		
53	2401-BM															1.9	1.9	1.8	1.8
54	2401-BM		-1.2	-1.4	-1.2	-1.4	-0.2	-0.4	-0.2	-0.5	-2.5	-2.6	-2.4	-2.6		0.2	0.2	0.2	0.2
55	2401-BM		0.8	0.9	0.7	0.9	0.7	0.9	0.7	0.9	0.4	0.3	0.4	0.3		0.0	0.0	-0.1	-0.1
56	2401-BM																		
57	2401-BM															-0.3	-0.3	-0.4	-0.4
58	2401-BM		2.4	2.2	2.4	2.2	2.2	2.0	2.2	1.9	2.0	1.8	2.1	1.9		0.4	0.5	0.4	0.4
59	2401-BM		-0.2	-0.3	-0.2	-0.3	-1.0	-1.3	-1.0	-1.3	0.0	0.0	0.0	0.0		0.5	0.6	0.5	0.5
60	2401-BM		0.4	0.6	0.4	0.5	-0.1	0.2	-0.1	0.1	0.3	0.3	0.4	0.4		0.8	0.8	0.7	0.7
61	2401-BM		-3.3	-3.4	-3.3	-3.4	-4.3	-4.5	-4.3	-4.5	-2.7	-2.7	-2.7	-2.7		-1.3	-1.3	-1.3	-1.3
62	2401-BM																		
63	2401-BM																		
64	2401-BM															7.2	5.5	7.2	5.5
65	2401-BM		2.8	2.4	3.1	2.6	2.7	2.2	2.7	2.1	2.9	2.4	2.9	2.4		1.4	1.4	1.3	1.3
66	2401-BM															-0.5	-0.4	-0.5	-0.5
67	2401-BM		4.5	4.7	4.5	4.8	3.6	4.0	3.9	4.2	4.6	4.6	4.5	4.5		4.6	4.7	4.6	4.6
68	2401-BM															-0.4	-0.4	-0.4	-0.4
69	2401-BM		-4.3	-4.2	-4.3	-4.3	1.3	1.6	1.3	1.6	-9.5	-9.5	-9.5	-9.5		0.3	0.3	0.3	0.3
70	2401-BM		-0.2	-0.3	-0.2	-0.4	1.1	0.7	1.1	0.7	-1.7	-1.7	-1.7	-1.7		5.7	5.8	5.7	5.7
71	2401-BM																		
72	2401-BM		-0.2	0.0	-0.1	0.1	1.4	1.7	1.3	1.5	-1.5	-1.5	-1.7	-1.7		-1.5	-1.4	-1.5	-1.5
73	2401-BM															2.8	2.8	2.7	2.7
74	2401-BM		0.2	-0.1	-0.1	-0.4	0.2	-0.3	0.2	-0.4	-0.7	-0.8	-0.7	-0.8		-0.8	-0.7	-0.8	-0.8

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Sum parameters - Z-scores

LC	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
75	2401-BM		46.7	44.2	46.6	44.1	36.3	30.2	36.3	30.1	53.2	53.2	53.5	53.5		14.5	14.6	14.5	14.5
76	2401-BM																		
77	2401-BM															0.7	0.7	0.7	0.7
78	2401-BM																		
79	2401-BM		-0.5	-0.7	-0.6	-0.7	-2.2	-2.6	-2.2	-2.7	0.4	0.4	0.5	0.5		-1.6	-1.5	-1.6	-1.6
80	2401-BM		0.9	1.1	0.9	1.0	0.9	1.2	0.9	1.1	0.4	0.4	0.5	0.4		0.0	0.0	-0.1	-0.1
81	2401-BM		0.5	0.7	0.5	0.7	1.0	1.3	1.0	1.2	-0.3	-0.3	-0.3	-0.3		-1.0	-1.0	-1.0	-1.0
82	2401-BM																		
83	2401-BM		3.2	3.4	3.2	3.4	4.0	4.4	4.0	4.3	2.0	2.0	2.0	2.0		0.2	0.2	0.1	0.1
84	2401-BM																		
85	2401-BM		-0.1	-0.2	-0.1	-0.3	0.1	-0.3	0.1	-0.4	-0.7	-0.7	-0.6	-0.6		-0.2	-0.2	-0.2	-0.2
86	2401-BM																	1.9	1.9
87	2401-BM																		
88	2401-BM		1.0	1.2	1.0	1.1	2.7	3.1	2.7	3.0	-1.0	-1.0	-1.0	-1.0		0.6	0.6	0.5	0.5
89	2401-BM		0.7	0.8	0.7	0.8	1.7	1.9	1.7	1.8	-0.7	-0.7	-0.6	-0.6		-0.4	-0.3	-0.4	-0.4
90	2401-BM		-3.0	-2.9	-3.0	-2.9	-0.9	-0.6	-0.9	-0.7	-5.2	-5.2	-5.2	-5.2		-2.1	-2.1	-2.1	-2.1
91	2401-BM																		
92	2401-BM																		
93	2401-BM		1.0	1.2	1.0	1.2	0.8	1.1	0.8	1.0	0.8	0.7	0.8	0.8		-0.1	-0.1	-0.1	-0.1
94	2401-BM		-0.5	-0.8	-0.6	-0.8	-1.5	-2.3	-1.6	-2.3	0.0	0.0	0.0	0.0		0.9	0.9	0.9	0.9
95	2401-BM		0.3	0.5	0.3	0.5	-0.8	-0.6	-0.8	-0.6	0.8	0.8	0.9	0.9		0.2	0.2	0.2	0.2
96	2401-BM		0.9	1.1	0.8	1.0	0.3	0.6	0.3	0.6	0.8	0.8	0.9	0.9					
97	2401-BM																		
98	2401-BM																		
99	2401-BM		1.2	1.0	1.1	0.9	0.4	-0.1	0.4	-0.1	1.2	1.2	1.3	1.3		-1.3	-1.3	-1.3	-1.3
100	2401-BM																		
101	2401-BM		-1.1	-1.4	-1.2	-1.4	-1.6	-2.0	-1.6	-2.0	-1.2	-1.3	-1.1	-1.3		-0.8	-0.8	-0.9	-0.9
102	2401-BM															-1.2	-1.2	-1.2	-1.2
103	2401-BM		1.3	1.4	1.2	1.3	0.6	0.8	0.6	0.7	1.3	1.3	1.3	1.3		4.2	4.2	4.1	4.1
104	2401-BM		-2.7	-2.6	-2.7	-2.6	-1.9	-1.7	-1.9	-1.8	-3.7	-3.7	-3.6	-3.6		3.7	3.7	3.7	3.7
105	2401-BM															-0.1	-0.1	-0.2	-0.2
106	2401-BM		5.2	3.7	5.1	3.7	4.0	1.6	4.0	1.5	5.5	4.8	5.5	4.9		1.8	1.9	1.8	1.8
107	2401-BM		-4.0	-3.9	-4.0	-3.9	-5.9	-5.8	-5.9	-5.8	-2.5	-2.5	-2.5	-2.5		-3.0	-3.0	-3.1	-3.1
108	2401-BM															-0.4	-0.4	-0.4	-0.4
109	2401-BM															0.9	0.9	0.8	0.8
110	2401-BM		0.1	0.3	0.1	0.3	3.4	3.7	3.4	3.6	-3.2	-3.2	-3.1	-3.1					
111	2401-BM																		
112	2401-BM		-0.2	-1.9	-0.3	-1.9	-0.5	-4.0	-0.6	-4.1	-0.5	-0.5	-0.4	-0.5		-2.0	-2.0	-2.0	-2.0
113	2401-BM																		
114	2401-BM		3.7	3.2	3.6	3.2	2.5	1.5	2.5	1.4	4.0	4.0	4.1	4.1		1.8	1.8	1.8	1.8
115	2401-BM																		
116	2401-BM		0.5	0.5	0.5	0.5	-0.2	-0.3	-0.2	-0.3	0.7	0.7	0.7	0.7		-0.8	-0.8	-0.9	-0.9
117	2401-BM															0.2	0.2	0.2	0.2
118	2401-BM																		
119	2401-BM																		
120	2401-BM		0.9	1.1	1.0	1.0	-0.5	-0.3	-0.4	-0.3	1.7	1.7	1.8	1.7					
121	2401-BM		0.7	0.9	0.6	0.8	-0.8	-0.5	-0.8	-0.6	1.5	1.5	1.5	1.5		0.4	0.5	0.4	0.4
122	2401-BM																		
123	2401-BM		-1.6	-2.1	-1.0	-0.9	0.2	-0.4	0.8	1.1	-3.0	-3.0	-2.9	-2.9		-2.7	-2.7	-2.7	-2.7
124	2401-BM		-2.0	-1.8	-2.0	-1.9	-4.5	-4.4	-4.5	-4.4	-0.1	-0.1	0.0	0.0		-0.7	-0.7	-0.6	-0.6
125	2401-BM																		
126	2401-BM		-0.2	-0.1	-0.2	-0.1	-1.6	-1.3	-1.5	-1.4	0.5	0.5	0.6	0.6		0.3	0.4	0.3	0.3
127	2401-BM		8.1	7.8	8.0	7.9	11.6	12.2	11.6	12.1	4.1	3.3	4.2	3.5		3.8	3.9	3.8	3.8
128	2401-BM		0.0	0.1	0.0	0.1	-1.6	-1.4	-1.6	-1.4	0.9	0.9	1.0	1.0		0.6	0.7	0.6	0.6
018A	2401-BM															-1.4	-1.4	-1.4	-1.4
034A	2401-BM		0.0	0.1	-0.1	0.1	-0.5	-0.2	-0.5	-0.3	-0.1	-0.1	0.0	0.0		-0.9	-0.9	-1.0	-1.0
039A	2401-BM		0.3	0.3	0.2	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0		2.6	2.7	2.6	2.6
049A	2401-BM		3.7	3.4	3.8	3.5	2.5	2.3	2.7	2.2	4.2	4.2	4.2	4.1		2.1	2.1	2.0	2.0
066A	2401-BM		0.5	0.7	0.5	0.7	-0.1	0.2	-0.1	0.1	0.6	0.6	0.6	0.6		0.4	0.5	0.4	0.4
117A	2401-BM															0.2	0.2	0.2	0.2
20*	2401-BM		-1.3	-1.2	-1.3	-1.3	-2.7	-2.6	-2.7	-2.7	-0.5	-0.5	-0.5	-0.5		-1.3	-1.3	-1.3	-1.3
75*	2401-BM		4.1	3.4	4.0	3.4	1.5	0.0	1.5	-0.1	5.7	5.7	5.7	5.7		-1.4	-1.4	-1.4	-1.4

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
PCDD/F - Z-scores

LC	Sample	Z-score [σ_p = 10 %]	WHO-PCDD/F-TEQ reported		WHO-PCDD/F-TEQ calculated		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
			upper bound	lower bound	upper bound	lower bound																		
1	2401-BM																							
2	2401-BM																							
3	2401-BM		0.4	0.7	0.4	0.7			0.2	0.7	0.4	-0.2	-0.2	0.1	0.6	1.2	0.0	0.2	0.7	0.2		-0.2		-0.1
4	2401-BM																							
5	2401-BM		-3.9	-3.7	-3.9	-3.7			-2.0	-1.3	-1.9	-2.4	-1.3	-0.7	-2.4	-1.4	-2.0	-0.9	-1.1	-1.5		-0.6		-0.5
6	2401-BM		-4.9	-6.0	-4.8	-6.0							1.1	-0.8	-2.1	-2.4	-2.7	-0.3				-0.1		-0.3
7	2401-BM		-5.2	-5.1	-5.2	-5.1			-3.0	-0.9	-0.2	-1.2	-2.0	-1.1	-2.8	-1.1	-3.0	-1.5	-1.1	-1.9		-0.8		-2.4
8	2401-BM		2.5	1.4	2.6	1.4			0.8		1.3		0.2	0.6	1.2	0.9	1.0	0.8	0.1	1.1		0.1		
9	2401-BM		-3.8	-4.1	-3.9	-4.2			-0.8	0.6	-1.5	0.3	-0.8	-0.3	-3.2	-1.8	-2.5	-0.7	0.0	-0.9		0.1		0.8
10	2401-BM		0.6	0.9	0.6	0.8			0.0	0.2	-0.3	1.0	0.2	-0.5	0.3	0.3	0.3	0.4	-0.2	0.1		0.5		-0.9
11	2401-BM		0.7	0.9	0.7	0.9			-0.1	0.2	0.3	-0.3	-0.1	0.1	0.2	0.3	0.5	0.1	0.1	0.1		0.4		-0.4
12	2401-BM																							
13	2401-BM																							
14	2401-BM																							
15	2401-BM																							
16	2401-BM		-1.8	-2.4	-1.8	-1.6			-3.7	-3.3	1.2	-3.2	0.2	-1.1	-0.1	-0.6	-0.4	-1.0	-1.4	-0.6		-0.6		3.3
17	2401-BM		-2.6	-3.0	-2.5	-2.9			-2.1	-0.9	-0.8	-1.0	-1.1	-0.6	-1.4	-1.2	-1.4	-1.0	-0.7	-1.0		0.1		-0.5
18	2401-BM																							
19	2401-BM		0.1	-0.3	0.1	-0.4			2.0		2.4	6.1	2.4	1.7	-0.5	1.8	-0.8	-0.5	0.3	0.8		-0.4		
20	2401-BM		-9.5	-9.7	-9.5	-9.7					-4.8	-4.8	-4.7	-4.7	-4.9	-4.8	-4.8	-4.7	-4.7	-4.7		-4.6		-4.7
21	2401-BM		1.3	1.6	1.3	1.5			1.7	1.3	1.5	1.3	1.3	1.1	-0.2	0.4	0.2	0.6	0.8	1.1		1.3		
22	2401-BM		7.2	7.7	7.2	7.6			9.2	22.0	-1.5	1.3	2.7	2.0	1.4	1.7	1.6	1.1	2.6	4.8		7.2		6.5
23	2401-BM		-0.4	-0.7	-1.0	-0.8			0.3	0.1	-0.9	-0.5	-0.9	-0.6	-0.4	-0.3	-0.8	-0.8	-0.2	-0.6		-0.8		-1.0
24	2401-BM																							
25	2401-BM		-3.8	-3.8	-3.4	-3.9			-0.7		-1.6		-1.2	0.4	-2.8	-2.1	-2.1	-0.6	0.1	-1.3		-0.7		-0.9
26	2401-BM		-3.1	-2.9	-3.1	-2.9			-1.8	-0.7	-1.6	-1.6	-0.9	-0.1	-2.3	-1.2	-1.6	-0.5	-0.6	-0.8		0.0		-0.2
27	2401-BM																							
28	2401-BM																							
29	2401-BM		0.6	0.9	0.6	0.8			-0.9	0.4	1.4	-0.2	0.1	0.5	0.3	0.5	0.4	0.4	0.4	0.4		0.7		0.3
30	2401-BM																							
31	2401-BM																							
32	2401-BM		2.0	2.3	2.1	2.4			3.5	0.8	0.8	2.3	0.6	0.8	0.7	0.8	0.6	0.8	0.7	0.8		0.6		0.5
33	2401-BM																							
34	2401-BM		-0.2	0.1	-0.2	0.1			0.2	0.2	-0.3	-0.6	-0.4	-0.3	-0.1	-0.5	0.1	-0.5	-0.5	-0.7		-0.5		-0.1
35	2401-BM																							
36	2401-BM		68.3	63.2	62.8	63.3				113.5	45.1	1299.0	36.5	9.6	16.4	-2.3	13.1	42.6	20.1	23.8		30.0		
37	2401-BM																							
38	2401-BM		-3.8	-4.2	-3.8	-4.2			-1.9	-0.8	-1.6	-1.4	-1.6	-1.7	-2.6	-1.7	-2.0	-2.0	-1.7	-2.0		-2.2		
39	2401-BM																							
40	2401-BM		2.1	2.1	2.1	2.0			0.5		1.7		2.6	2.3	1.6	1.7	1.1	1.1	1.5	0.7		1.2		
41	2401-BM		-2.3	-2.2	-2.3	-2.2			-1.7	-1.9	-1.6	-1.8	-0.9	-1.3	-0.9	-1.5	-1.0	-1.4	-1.2			-1.3		-2.6
42	2401-BM																							
43	2401-BM																							
44	2401-BM		0.1	-0.2	0.1	-0.3				-0.1	0.3		1.6	3.6	1.8	0.4	0.7	0.8	-0.8	0.5		1.4		1.1
45	2401-BM		-2.0	-1.8	-2.0	-1.8			-1.4	-0.4	-1.3	-0.2	-1.3	-1.1	-0.7	-1.1	-0.8	-0.9	-1.9	-1.1		-0.8		-1.6
46	2401-BM																							
47	2401-BM		2.5	2.1	2.5	2.1			2.4	1.9	0.3	0.3	0.6	0.0	0.8	0.8	1.3	-0.1	1.1	0.5		-0.4		-0.1
48	2401-BM																							
49	2401-BM		2.0	1.2	1.7	1.1			0.6		5.9	1.5		-3.5	0.2	0.1	0.9	0.2	0.2	1.4		-0.3		0.2
50	2401-BM																							
51	2401-BM		2.0	2.0	2.0	1.9			1.7		0.2	2.6	0.2	0.4	0.8	1.9	1.3	0.5	0.5	1.1		0.7		0.6
52	2401-BM																							
53	2401-BM																							
54	2401-BM		-0.2	-0.4	-0.2	-0.5			0.0	0.1	-0.3	-0.4	-0.1	0.2	0.1	0.0	-0.1	-0.5	-0.4	-0.7		-0.8		-0.8
55	2401-BM		0.7	0.9	0.7	0.9			1.3	0.8	0.5	0.6	-0.1	-0.3	-0.2	0.2	0.2	0.0	0.0	0.7		-0.5		-0.6
56	2401-BM																							
57	2401-BM																							
58	2401-BM		2.2	2.0	2.2	1.9			0.5	1.3	1.4	1.6	1.3	0.9	1.4	0.9	1.2	1.2	1.2	1.1		0.8		0.1
59	2401-BM		-1.0	-1.3	-1.0	-1.3			-0.3	1.1	-0.5	1.3	-0.1	-0.3	-0.2	0.1	-0.9	0.0	-0.5	-1.1		0.7		-2.0
60	2401-BM		-0.1	0.2	-0.1	0.1			-0.1	-0.3	-0.6	-0.5	-0.5	-0.1	0.0	0.6	-0.1	0.2	0.3	0.0		-0.1		0.8
61	2401-BM		-4.3	-4.5	-4.3	-4.5			-2.7	-1.5	-2.0	-2.6	-1.9	-1.3	-2.9	-1.6	-2.2	-0.9	-0.9	-1.4		-0.5		-0.9
62	2401-BM																							
63	2401-BM																							
64	2401-BM																							
65	2401-BM		2.7	2.2	2.7	2.1			1.5	1.3	1.3	0.6	1.3	1.2	1.1	1.1	1.3	1.0	0.9	0.6		0.3		0.4
66	2401-BM																							
67	2401-BM		3.6	4.0	3.9	4.2			2.0	4.5	1.7	3.5	2.8	1.9	1.3	1.5	2.3	2.1	2.6	1.9		0.6		2.1
68	2401-BM																							
69	2401-BM		1.3	1.6	1.3	1.6			1.4	1.5	0.4	2.4	0.6	0.4	0.9	0.4	0.2	0.5	0.7	0.8		1.1		0.6
70	2401-BM		1.1	0.7	1.1	0.7			0.6	0.7	0.2		1.5	0.5	-1.1	5.6	1.2	-0.6	-0.5	0.0		-0.8		3.3
71	2401-BM																							
72	2401-BM		1.4	1.7	1.3	1.5			2.6	5.3	-0.2	1.8	0.0	0.4	0.6	-0.3	0.3	0.7	1.3	1.5		1.5		-4.9
73	2401-BM																							
74	2401-BM		0.2	-0.3	0.2	-0.4			0.0	0.7	0.1		0.0	-0.1	-0.3	-0.1	0.1	0.2	-0.1	-0.3		0.1		-0.7

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
PCDD/F - Z-scores

LC	Sample	Z-score [σ_p = 10 %]	WHO-PCDD/F-TEQ reporte		WHO-PCDD/F-TEQ calculat		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
			upper bound	lower bound	upper bound	lower bound																		
75	2401-BM		36.3	30.2	36.3	30.1				96.1	15.2		12.6	27.7	12.8	23.6	15.0	21.3	31.5	42.9		84.7		179.0
76	2401-BM																							
77	2401-BM																							
78	2401-BM																							
79	2401-BM		-2.2	-2.6	-2.2	-2.7			3.7				-0.9	-0.4	-2.2	-0.4	-1.7	-1.6	0.2			-0.4		0.6
80	2401-BM		0.9	1.2	0.9	1.1			0.6	-0.6	1.3	0.2	2.9	6.4	0.9	0.3	0.3	0.0	0.1	1.4		0.4		1.9
81	2401-BM		1.0	1.3	1.0	1.2			2.5	-0.8	0.4	0.3	-0.1	0.3	-0.3	-0.3	0.4	0.2	0.1	-0.5		-0.3		-0.6
82	2401-BM																							
83	2401-BM		4.0	4.4	4.0	4.3			1.6	39.0	1.4	1.8	0.7	1.4	1.7	1.3	1.6	1.1	1.7	1.0		1.0		2.3
84	2401-BM																							
85	2401-BM		0.1	-0.3	0.1	-0.4			-0.3	0.4	0.4	0.1	0.2	0.4	0.1	0.7	0.0	-0.4	0.0	-0.7		-0.3		-1.0
86	2401-BM																							
87	2401-BM																							
88	2401-BM		2.7	3.1	2.7	3.0			1.2	0.9	0.5	6.9	0.4	0.4	0.6	0.4	1.7	0.4	1.2	1.3		2.1		0.5
89	2401-BM		1.7	1.9	1.7	1.8			1.5	1.4	1.0	0.6	0.6	0.5	0.8	1.1	0.7	0.4	0.6	0.7		0.1		-0.3
90	2401-BM		-0.9	-0.6	-0.9	-0.7			-0.8	4.5	-0.7	3.2	0.2	1.0	-2.3	-2.4	-2.1	2.0	1.9	-2.8		-4.5		1.0
91	2401-BM																							
92	2401-BM																							
93	2401-BM		0.8	1.1	0.8	1.0			-0.4	0.4	0.4	-0.9	-0.1	0.0	0.2	0.8	0.7	0.3	0.7	0.2		0.1		-0.2
94	2401-BM		-1.5	-2.3	-1.6	-2.3			-1.3	-0.2	-1.1	-1.5	-0.7	-0.2	-1.6	0.2	-1.1	0.0	0.5	-0.1		0.5		0.9
95	2401-BM		-0.8	-0.6	-0.8	-0.6			-0.2	-0.2	0.0	-1.1	-0.5	-0.4	-0.6	-0.3	-0.5	-0.4	0.0	-0.5		-0.6		-0.8
96	2401-BM		0.3	0.6	0.3	0.6			0.6	-0.9	0.4	0.1	0.3	0.0	-0.1	0.1	0.1	0.2	0.2	0.0		-0.5		-0.6
97	2401-BM																							
98	2401-BM																							
99	2401-BM		0.4	-0.1	0.4	-0.1			-1.2		-0.1		0.9	0.5	0.4	-0.9	0.6	-0.6	1.1	0.2		0.2		-1.7
100	2401-BM																							
101	2401-BM		-1.6	-2.0	-1.6	-2.0			0.0	-0.1	1.3	0.1	-0.4	-0.5	-0.9	-1.0	-1.3	-0.9	0.0	-0.8		-1.1		0.6
102	2401-BM																							
103	2401-BM		0.6	0.8	0.6	0.7			0.6		-0.2		1.1		0.6	1.5	0.3	0.9	0.6	0.6		0.6		-0.1
104	2401-BM		-1.9	-1.7	-1.9	-1.8			-1.5	5.7	-1.1	0.0	-0.8	0.1	-2.0	-1.5	-1.5	0.5	-2.0	-1.3		-2.6		-1.2
105	2401-BM																							
106	2401-BM		4.0	1.6	4.0	1.5							5.6	8.3	2.2	2.3	2.2	2.5	1.0	3.6		2.3		
107	2401-BM		-5.9	-5.8	-5.9	-5.8			-3.5	-1.6	-2.8	-3.6	-2.6	-1.5	-3.6	-2.8	-2.9	-1.3	-1.7	-2.8		-0.6		0.8
108	2401-BM																							
109	2401-BM																							
110	2401-BM		3.4	3.7	3.4	3.6			-0.4				1.3	-0.6	4.8	11.5	2.2	3.1	2.6	0.7		0.7		
111	2401-BM																							
112	2401-BM		-0.5	-4.0	-0.6	-4.1							-1.5	0.5	-1.3	-0.9	-1.4	-1.8	0.5	0.3		-1.7		
113	2401-BM																							
114	2401-BM		2.5	1.5	2.5	1.4					1.1	3.4			1.8	1.7	1.5	2.2	2.6	0.4				
115	2401-BM																							
116	2401-BM		-0.2	-0.3	-0.2	-0.3			-1.8	-0.9	0.4	-1.0	-0.2	-0.1	0.2	-0.1	0.4	0.0	-0.4	-0.6		0.7		0.5
117	2401-BM																							
118	2401-BM																							
119	2401-BM																							
120	2401-BM		-0.5	-0.3	-0.4	-0.3			1.8	11.9	-0.9	1.3	-0.2	0.4	-0.8	0.7	-0.7	0.5	0.1	0.8		0.6		1.0
121	2401-BM		-0.8	-0.5	-0.8	-0.6			-0.2	-0.4	-0.8	-1.4	-1.0	-0.9	0.2	-0.8	-0.3	-1.2	-0.7	-0.9		-1.1		-0.4
122	2401-BM																							
123	2401-BM		0.2	-0.4	0.8	1.1			2.6	5.2	0.4	1.2	1.5	0.8	-2.0	-0.4	-1.1	-0.7	0.1	0.3		-3.4		1.1
124	2401-BM		-4.5	-4.4	-4.5	-4.4			-2.7	-0.9	-1.7	-2.2	-1.4	-0.9	-3.2	-2.2	-2.1	-0.8	-1.6	-1.6		-0.8		-0.2
125	2401-BM																							
126	2401-BM		-1.6	-1.3	-1.5	-1.4			-1.8	1.3	0.4	-0.6	0.6	-0.1	-0.3	-1.1	-0.8	-0.3	-0.3	-0.8		-0.9		-0.9
127	2401-BM		11.6	12.2	11.6	12.1			3.4	2.8	63.9	69.1	13.9	14.3	7.4	2.3	1.2	1.1	-0.7	1.2		0.8		1.3
128	2401-BM		-1.6	-1.4	-1.6	-1.4			-1.0	-0.5	-1.0	-1.0	-1.4	-1.1	-0.9	-0.4	-0.9	-0.6	-1.0	-0.9		-0.6		-1.0
018A	2401-BM																							
034A	2401-BM		-0.5	-0.2	-0.5	-0.3			-0.2	-0.8	-0.6	-0.8	-0.4	-0.2	-0.3	0.0	0.0	-0.3	-0.7	-0.7		-1.3		-1.0
039A	2401-BM		0.1	0.1	0.1	0.1			3.3	3.2	-0.2	7.2	-1.0	-1.0	-0.6	0.6	-0.7	-0.3	-0.2	0.1		-0.4		0.2
049A	2401-BM		2.5	2.3	2.7	2.2			0.6		7.0	1.3		-3.6	0.9	1.1	1.6	0.2	0.9	1.9		0.1		-0.4
066A	2401-BM		-0.1	0.2	-0.1	0.1			-1.4	1.7	-0.4	0.3	-0.2	-0.2	-0.3	0.4	-0.1	0.4	0.2	-0.3		0.0		-0.8
117A	2401-BM																							
20*	2401-BM		-2.7	-2.6	-2.7	-2.7			3.3	-3.9	-1.5	-2.1	-1.0	0.2	-2.9	-1.5	-2.1	-0.3	-0.4	-0.9		0.5		0.0
75*	2401-BM		1.5	0.0	1.5	-0.1				20.0	0.0		-0.6	3.1	-0.6	2.1	-0.1	1.5	4.0	6.9		17.2		40.6

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

Bovine Meat (2401-BM)
Dioxin-like PCB - Z-scores

LC	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	2401-BM																		
2	2401-BM																		
3	2401-BM		0.8	0.8	0.8	0.8		0.5	0.2	0.1	0.6	0.3	0.5	0.2	0.7	0.0	0.9	0.4	
4	2401-BM																		
5	2401-BM		-0.1	-0.2	-0.1	-0.1		-0.3	-0.3	0.1	0.1	-0.3	-0.3	0.3	1.0	-0.7	-0.5	-0.1	
6	2401-BM		-1.6	-1.6	-1.5	-1.6		-1.0	-0.6	-0.5	-0.9	-0.7	-0.8	0.2	13.1	-0.9	-0.5	-0.8	
7	2401-BM		-0.1	-0.1	-0.1	-0.1		-1.3	-0.7	-0.7	0.6	-0.6	-0.8	-0.6	0.2	0.0	-0.2	0.1	
8	2401-BM		0.9	0.7	0.9	0.8		0.4	0.7	0.0	-0.3	0.2	-0.1	0.0		0.7	0.7	0.4	
9	2401-BM		1.2	1.2	1.3	1.3		-1.0	0.1	0.8	1.2	0.2	0.2	2.2	2.3	-0.7	-1.2	0.7	
10	2401-BM		-1.3	-1.4	-1.3	-1.4		-0.8	-1.0	-1.0	-1.3	-0.7	0.7	12.9	-0.8	-0.6	-0.9	-0.7	
11	2401-BM		-0.4	-0.6	-0.4	-0.5		-0.8	-0.8	-0.6	-0.9	-0.8	-0.8	-0.4	-1.0	-0.4	-1.1	-0.1	
12	2401-BM																		
13	2401-BM																		
14	2401-BM																		
15	2401-BM																		
16	2401-BM		-2.8	-2.8	-2.7	-2.7		-0.3	0.5	-0.1	0.3	-0.5	1.4	1.5	-0.4	-0.2	-1.8	-1.7	
17	2401-BM		-1.0	-1.0	-1.1	-1.1		-0.8	-1.1	-0.4	-1.1	-0.3	-0.7	-0.5	0.2	-0.8	-0.4	-0.5	
18	2401-BM																		
19	2401-BM		-2.0	-2.1	-2.0	-2.0		-0.9	-1.3	-1.2	-1.0	-1.4	-1.3	-1.4	-1.6	-1.0	-1.0	-1.0	
20	2401-BM		-9.4	-9.4	-9.4	-9.4		-4.7	-4.7	-4.7	-3.5	-4.7	-4.7	-4.6	-4.6	-4.8	-4.7	-4.7	
21	2401-BM		0.8	0.8	0.9	0.9		0.5	0.2	0.1	0.9	0.3	0.5	0.3	0.4	2.1	1.9	0.4	
22	2401-BM		3.3	3.1	3.3	3.2		2.7	1.3	4.4	0.4	2.4	-0.4	1.0	-0.6	1.0	0.1	1.2	
23	2401-BM		1.1	0.8	1.0	0.9		1.0	0.1	1.4	1.2	0.7	0.5	0.1	-0.3	1.1	-0.4	0.3	
24	2401-BM																		
25	2401-BM		-1.2	-1.2	-1.1	-1.1		-1.0	-0.7	-0.8	0.6	-0.6	-0.9	3.9	4.8	-1.2	-0.8	-0.5	
26	2401-BM		-0.4	-0.4	-0.4	-0.4		0.3	0.0	0.8	0.3	0.6	0.2	1.0	0.8	-0.6	0.4	-0.4	
27	2401-BM																		
28	2401-BM																		
29	2401-BM		1.6	1.5	1.7	1.5		0.2	0.4	0.1	0.6	0.7	0.4	1.1	1.7	0.4	0.6	0.9	
30	2401-BM																		
31	2401-BM																		
32	2401-BM		-0.6	-0.6	-0.6	-0.7		-0.4	1.5	-0.7	-0.3	-0.5	-0.4	-1.1	-0.4	-0.2	-0.7	-0.3	
33	2401-BM																		
34	2401-BM		0.4	0.4	0.5	0.5		-0.5	-0.4	-0.6	-0.8	-0.6	0.1	-0.6	0.2	-0.2	-0.2	0.4	
35	2401-BM																		
36	2401-BM		8339.1	8339.1	8378.6	8378.6		-4.7	147.9	-4.8	4.3		1314.9	32.8	4657.2	-3.4	46.3	2215.2	
37	2401-BM																		
38	2401-BM		-4.4	-4.5	-4.4	-4.5		-2.5	-2.4	-2.6	-2.4	-2.6	-2.5	-2.5	-2.2	-2.3	-2.3	-2.2	
39	2401-BM																		
40	2401-BM		3.9	3.8	3.9	3.8		1.2	3.4	1.6	2.9	2.3		1.1	1.9	1.6	1.5	2.1	
41	2401-BM		-2.5	-2.5	-2.4	-2.5		0.5	0.8	0.3		0.0	-0.4	-0.7	-1.6	-0.4		-1.5	
42	2401-BM																		
43	2401-BM																		
44	2401-BM		1.5	1.2	1.5	1.2		1.1	3.0	2.5	3.5	1.4	1.8	1.2	1.4	1.2	0.8	0.3	
45	2401-BM		0.0	0.0	0.1	0.0		-0.3	-0.4	-0.3	0.1	-0.6	-0.2	-0.1	-0.7	-0.2	0.0	0.1	
46	2401-BM									0.1									
47	2401-BM		0.7	0.6	0.7	0.7		0.4	-0.2	0.2	0.2	0.0	-0.2	-0.3		0.4	0.4	0.4	
48	2401-BM																		
49	2401-BM		0.4	0.4	0.5	0.4		0.3	-1.1	-0.8	-3.6	-0.1	0.4	0.3	0.2	0.6	0.5	0.4	
50	2401-BM																		
51	2401-BM		2.3	2.3	2.3	2.3		0.6	1.1	0.5	0.8	0.8	0.8	0.9	1.4	0.9	1.2	1.3	
52	2401-BM																		
53	2401-BM																		
54	2401-BM		-2.5	-2.6	-2.4	-2.6		0.9	-0.5	0.1	-0.9	-0.7	-0.3	-0.4	-1.0	-0.3	-0.5	-1.6	
55	2401-BM		0.4	0.3	0.4	0.3		0.1	-0.4	0.0	-2.7	-0.1	-0.2	-0.2	1.5	0.2	0.1	0.2	
56	2401-BM																		
57	2401-BM																		
58	2401-BM		2.0	1.8	2.1	1.9		1.2	1.1	0.5	-0.2	0.6	0.6	-0.1	-0.6	1.3	2.2	1.0	
59	2401-BM		0.0	0.0	0.0	0.0		0.6	0.8	0.1	0.1	1.1	0.7	0.8	1.4	0.5	1.1	-0.1	
60	2401-BM		0.3	0.3	0.4	0.4		0.1	-0.1	0.1	0.8	0.1	0.0	-0.2	0.6	0.4	0.2	0.2	
61	2401-BM		-2.7	-2.7	-2.7	-2.7		-2.2	-0.9	-1.5	-1.4	-1.5	-2.1	-1.4	-1.3	-1.9	-1.3	-1.3	
62	2401-BM																		
63	2401-BM																		
64	2401-BM																		
65	2401-BM		2.9	2.4	2.9	2.4		2.0	1.6	1.5	0.2	1.6	1.7	0.4	0.8	1.7	-0.8	1.1	
66	2401-BM																		
67	2401-BM		4.6	4.6	4.5	4.5		3.3	4.9	2.3	4.5	2.2	2.1	1.8	3.3	4.0	2.7	2.1	
68	2401-BM																		
69	2401-BM		-9.5	-9.5	-9.5	-9.5		-5.0	-4.9	-4.9	-4.9	-4.9	-4.9	-4.9	-4.8	-5.0	-5.0	-4.7	
70	2401-BM		-1.7	-1.7	-1.7	-1.7		0.8	1.9	0.0	17.1	0.1	0.2	0.0	-0.2	-0.8	-0.3	-1.2	
71	2401-BM																		
72	2401-BM		-1.5	-1.5	-1.7	-1.7		-1.4	-1.1	-2.6	-1.1	-1.3	-0.9	-1.1	-1.5	-1.3	-1.3	-0.5	
73	2401-BM																		
74	2401-BM		-0.7	-0.8	-0.7	-0.8		-0.2	0.0	-0.2	-0.1		-0.4	-0.5	-0.6	-0.2	-0.3	-0.4	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Dioxin-like PCB - Z-scores

LC	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
75	2401-BM		53.2	53.2	53.5	53.5		8.4	7.7	8.5	54.8	10.2	10.9	10.4	9.0	11.0	5.8	5.9	
76	2401-BM																		
77	2401-BM																		
78	2401-BM																		
79	2401-BM		0.4	0.4	0.5	0.5		-1.6	-0.4	-1.2		-2.0	-1.7		-1.4	-1.6	0.1	0.3	
80	2401-BM		0.4	0.4	0.5	0.4		0.3	0.2	-0.1	-0.2	-0.4	-0.4	-0.2		0.4	0.8	0.3	
81	2401-BM		-0.3	-0.3	-0.3	-0.3		-0.3	-0.2	-0.4	-0.5	0.3	-0.3	-0.2	0.1	0.0	-0.1	-0.1	
82	2401-BM																		
83	2401-BM		2.0	2.0	2.0	2.0		0.3	0.5	0.2	1.4	0.1	0.3	1.0	0.2	1.3	1.9	1.2	
84	2401-BM																		
85	2401-BM		-0.7	-0.7	-0.6	-0.6		0.0	-0.7	-0.2	0.2	-0.3	-0.1	-0.3		-0.2	0.0	-0.4	
86	2401-BM																		
87	2401-BM																		
88	2401-BM		-1.0	-1.0	-1.0	-1.0		0.7	2.3	0.4	-0.7	0.2	0.7	0.1	-0.2	-0.2	0.0	-0.7	
89	2401-BM		-0.7	-0.7	-0.6	-0.6		-0.9	-0.5	-0.9	-1.0	-0.6	-1.0	-0.7	-0.7	-0.2	0.0	-0.2	
90	2401-BM		-5.2	-5.2	-5.2	-5.2										-4.0	-2.7	-2.1	
91	2401-BM																		
92	2401-BM																		
93	2401-BM		0.8	0.7	0.8	0.8		0.1	0.0	-0.1		0.2	0.4	-0.1		0.0	0.6	0.5	
94	2401-BM		0.0	0.0	0.0	0.0		0.1	-0.2	-0.2	0.0	-0.1	-0.2	0.7	-0.7	0.6	0.9	0.0	
95	2401-BM		0.8	0.8	0.9	0.9		0.0	1.0	0.1	0.1	0.3	0.1	-0.1	-0.1	-0.1	0.6	0.5	
96	2401-BM		0.8	0.8	0.9	0.9		0.1	1.0	0.1	-1.9	-0.1	-0.1	-0.2	0.7	0.0	0.5	0.5	
97	2401-BM																		
98	2401-BM																		
99	2401-BM		1.2	1.2	1.3	1.3		0.3	1.7	0.0	-1.4	0.3	0.5	0.4	0.4	0.6	1.6	0.8	
100	2401-BM																		
101	2401-BM		-1.2	-1.3	-1.1	-1.3		-0.8	-1.5	-0.8	-1.0	-1.2	-0.8	-1.0	-1.5	-0.4	-2.4	-0.6	
102	2401-BM																		
103	2401-BM		1.3	1.3	1.3	1.3		0.4	-2.1	0.3	14.3	0.4	0.4	0.8	0.0	0.9	0.9	0.7	
104	2401-BM		-3.7	-3.7	-3.6	-3.6		1.0	181.7	-4.8	2.2	2.0	1.9	27.8	4.0	-3.9	-1.8	-2.6	
105	2401-BM																		
106	2401-BM		5.5	4.8	5.5	4.9		1.2		0.3		1.3	0.7			3.8		2.9	
107	2401-BM		-2.5	-2.5	-2.5	-2.5		-2.1	-0.9	-0.9	-0.3	-1.1	-1.3	-0.9	-1.3	-2.1	-1.2	-1.3	
108	2401-BM																		
109	2401-BM																		
110	2401-BM		-3.2	-3.2	-3.1	-3.1		-0.1	-1.3	0.4	15.1	-0.7	-1.7	-1.1	-2.2	0.5	-1.8	-2.0	
111	2401-BM																		
112	2401-BM		-0.5	-0.5	-0.4	-0.5		-0.4	0.9	-0.5	5.8	-1.1	-0.4	4.0	-1.4	-1.0	-1.1	-0.2	
113	2401-BM																		
114	2401-BM		4.0	4.0	4.1	4.1		1.3	1.3	1.1	1.0	1.5	1.7	2.0	1.3	1.9	1.8	2.2	
115	2401-BM																		
116	2401-BM		0.7	0.7	0.7	0.7		-0.2	-0.6	-0.3	0.5	-0.2	-0.4	-0.4	-0.7	0.2	0.6	0.5	
117	2401-BM																		
118	2401-BM																		
119	2401-BM																		
120	2401-BM		1.7	1.7	1.8	1.7		0.9	0.1	1.3	1.4	0.9	1.1	1.4	1.5	0.2	1.2	0.8	
121	2401-BM		1.5	1.5	1.5	1.5		0.9	0.9	0.8	0.1	0.4	0.4	0.5	-0.1	1.4	1.2	0.7	
122	2401-BM																		
123	2401-BM		-3.0	-3.0	-2.9	-2.9		-2.0	0.0	-4.0	0.8	-0.9	0.2	-1.0	0.3	-2.9	-2.5	-1.1	
124	2401-BM		-0.1	-0.1	0.0	0.0		-1.0	-0.5	-0.1	-0.8	-0.5	-0.6	-0.1	-0.3	-1.5	-0.3	0.0	
125	2401-BM																		
126	2401-BM		0.5	0.5	0.6	0.6		0.1	2.2	0.2	0.0	0.1	-0.3	-0.9	0.1	-0.6	-0.7	0.3	
127	2401-BM		4.1	3.3	4.2	3.5		0.3	0.6	0.6	2.6	0.6	0.1	1.0	1.7	3.4	3.8	2.0	
128	2401-BM		0.9	0.9	1.0	1.0		0.3	1.3	0.6	1.2	0.4	0.3	-0.3	0.2	0.8	0.7	0.5	
018A	2401-BM																		
034A	2401-BM		-0.1	-0.1	0.0	0.0		-0.5	-0.9	-0.6	-1.2	-0.6	-0.5	-0.8	-0.9	-0.4	-0.4	0.1	
039A	2401-BM		0.0	0.0	0.0	0.0		-0.6	1.5	-0.5	2.2	-0.4	-0.7	-0.2	-0.4	-0.5	0.4	-0.1	
049A	2401-BM		4.2	4.2	4.2	4.1		3.4	3.5	3.1	-2.1	2.8	1.7	1.7	0.4	1.5	1.8	1.8	
066A	2401-BM		0.6	0.6	0.6	0.6		0.2	-0.9	-0.2	0.3	-0.3	0.1	0.0	-0.4	0.2	-0.1	0.4	
117A	2401-BM																		
20*	2401-BM		-0.5	-0.5	-0.5	-0.5		-0.9	-0.4	-0.1	17.4	0.1	0.0	1.1	0.8	-1.4	-0.6	-0.3	
75*	2401-BM		5.7	5.7	5.7	5.7		-1.7	-1.8	-1.6	9.8	-1.2	-1.0	-1.2	-1.5	-1.0	-2.3	-2.3	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Non dioxin-like PCB - Z-scores

LC	Sample	Z-score [σ_p = 15 %]	Sum Indicator PCBs reported		Sum Indicator PCBs calculated		Z-score [σ_p = 20 %]	PCB 28	PCB 52	PCB 101	PCB 138	PCB 153	PCB 180
			upper bound	lower bound	upper bound	lower bound							
1	2401-BM												
2	2401-BM												
3	2401-BM		0.6	0.6	0.6	0.6		0.6	0.5	0.2	0.4	0.8	0.4
4	2401-BM		-0.5	-0.5	-0.5	-0.5		5.2	-1.2	-3.7	0.9	-1.9	-1.6
5	2401-BM		0.1	0.1	0.0	0.0		-0.4	0.2	0.2	-0.1	0.2	0.1
6	2401-BM		-0.8	-0.7	-0.8	-0.8		-0.2	-0.6	-0.7	-1.5	0.2	-0.2
7	2401-BM		0.2	0.3	0.2	0.2		0.3	0.0	0.2	1.0	0.1	-0.6
8	2401-BM		0.7	0.7	0.7	0.7		5.3	-0.4	-0.6	-1.7	0.2	-0.5
9	2401-BM		1.6	1.6	1.5	1.5		-1.2	0.4	2.0	0.9	5.6	1.1
10	2401-BM		0.3	0.4	0.3	0.3		-0.7	-0.2	0.6	1.6	0.4	0.5
11	2401-BM		-1.0	-1.0	-1.1	-1.1		0.2	-0.9	-1.2	-1.0	-0.9	-0.9
12	2401-BM		-0.6	-0.5	-0.6	-0.6		-0.6	-0.2	-0.4	-0.3	-0.5	-1.0
13	2401-BM		0.1	0.2	0.1	0.1		-0.1	-1.1	0.7	0.8	0.8	0.3
14	2401-BM												
15	2401-BM												
16	2401-BM		-0.6	-0.5	-0.6	-0.6		-0.9	-0.4	-0.7	-0.6	0.5	0.2
17	2401-BM												
18	2401-BM		-1.4	-1.4	-1.4	-1.4		-2.3	-1.9	-0.6	-0.1	-0.1	-0.1
19	2401-BM		-2.2	-2.1	-2.2	-2.2		-1.2	-0.9	-1.9	-2.2	-2.1	-2.2
20	2401-BM		-6.3	-6.3	-6.3	-6.3		-4.8	-4.7	-4.7	-4.7	-4.8	-4.7
21	2401-BM		0.5	0.6	0.5	0.5		1.0	0.7	-0.1	0.1	0.3	0.3
22	2401-BM		0.8	0.8	0.7	0.7		-0.3	-2.4	1.6	0.2	5.5	2.4
23	2401-BM		0.9	0.9	0.9	0.9		2.1	0.5	0.2	0.5	0.1	0.2
24	2401-BM		4.4	4.5	4.4	4.4		1.8	1.8	3.0	3.4	7.8	5.7
25	2401-BM		-0.2	-0.2	-0.2	-0.2		-1.6	-0.7	0.1	0.1	2.0	0.9
26	2401-BM		1.5	1.6	1.5	1.5		1.8	0.8	0.9	1.3	1.1	1.0
27	2401-BM												
28	2401-BM		-0.8	-0.7	-0.8	-0.8		-1.5	-1.7	-0.2	1.4	-0.1	-0.3
29	2401-BM		-1.2	-1.2	-1.3	-1.3		-2.2	-1.7	-0.5	0.6	-0.3	-0.2
30	2401-BM												
31	2401-BM		-0.4	-0.3	-0.4	-0.4		-0.3	-0.7	-0.1	-0.1	0.2	-0.4
32	2401-BM		-0.2	-0.2	-0.2	-0.2		-0.2	0.2	-0.4	-0.6	-0.1	0.2
33	2401-BM												
34	2401-BM		-0.9	-0.9	-0.9	-0.9		-0.8	-0.5	-0.6	-1.0	-0.8	-0.7
35	2401-BM												
36	2401-BM		11.5	11.5	46.0	46.0		26.6	10.9	-3.8	189.9	13.2	-2.3
37	2401-BM		-0.8	-0.8	-0.8	-0.8		-0.7	-0.7	-0.9	-0.8	0.8	-0.6
38	2401-BM		-2.7	-2.7	-2.7	-2.7		-0.7	-2.6	-2.1	-2.4	-2.3	-2.1
39	2401-BM		2.6	2.6	2.6	2.6		5.9	0.3	1.0	0.4	4.1	-0.1
40	2401-BM		3.0	3.0	2.9	2.9		7.1	0.7	1.1	0.8	1.1	2.3
41	2401-BM		1.0	1.0	1.0	1.0		4.0	-0.4	-0.2	0.8	0.2	0.0
42	2401-BM		0.9	0.9	0.9	0.9		0.2	0.3	0.6	0.6	2.2	0.9
43	2401-BM		-1.0	-0.9	-1.0	-1.0		-0.4	-0.8	-0.9	-1.0	-0.4	-0.9
44	2401-BM		1.8		1.8	1.8		3.4	1.5	0.9	0.6	0.0	0.8
45	2401-BM		0.2	0.2	0.1	0.1		0.6	0.4	0.0	-0.4	-0.2	-0.1
46	2401-BM		0.7	0.7	0.8	0.8		0.5	0.2	0.1	1.0	2.4	0.3
47	2401-BM		0.3	0.4	0.3	0.3		1.1	0.0	0.2	0.0	-0.1	0.1
48	2401-BM												
49	2401-BM		0.3	0.4	0.3	0.3		1.4	0.4	0.0	-0.4	-0.2	0.0
50	2401-BM												
51	2401-BM		0.4	0.5	0.4	0.4		0.4	0.4	0.2	0.2	0.2	0.5
52	2401-BM												
53	2401-BM		1.9	1.9	1.8	1.8		1.5	1.5	1.3	1.0	1.4	1.6
54	2401-BM		0.2	0.2	0.2	0.2		-0.2	0.8	-0.1	0.1	0.1	0.0
55	2401-BM		0.0	0.0	-0.1	-0.1		-0.3	-0.3	0.1	0.2	0.2	0.5
56	2401-BM												
57	2401-BM		-0.3	-0.3	-0.4	-0.4		-1.5	-0.9	0.3	0.1	1.0	0.2
58	2401-BM		0.4	0.5	0.4	0.4		-0.3	0.1	0.1	0.5	1.6	0.8
59	2401-BM		0.5	0.6	0.5	0.5		0.6	0.4	0.5	0.1	0.3	0.5
60	2401-BM		0.8	0.8	0.7	0.7		0.6	0.3	0.2	0.2	2.6	0.1
61	2401-BM		-1.3	-1.3	-1.3	-1.3		-0.5	-1.3	-0.9	-1.1	-0.9	-1.2
62	2401-BM												
63	2401-BM												
64	2401-BM		7.2	5.5	7.2	5.5		11.6	-1.2	3.9			28.9
65	2401-BM		1.4	1.4	1.3	1.3		1.3	0.5	1.1	0.6	1.3	2.0
66	2401-BM		-0.5	-0.4	-0.5	-0.5		-0.2	-0.3	-0.6	-0.5	-0.2	-0.1
67	2401-BM		4.6	4.7	4.6	4.6		5.8	3.8	2.7	0.9	4.1	2.8
68	2401-BM		-0.4	-0.4	-0.4	-0.4		-1.2	-1.1	0.4	1.3	-0.3	-0.2
69	2401-BM		0.3	0.3	0.3	0.3		0.5	0.1	-0.3	0.1	1.5	-0.1
70	2401-BM		5.7	5.8	5.7	5.7		18.1	1.2	1.5	1.3	-0.9	1.0
71	2401-BM												
72	2401-BM		-1.5	-1.4	-1.5	-1.5		0.1	-1.6	-1.2	-0.6	-1.8	-1.8
73	2401-BM		2.8	2.8	2.7	2.7		3.3	2.4	1.6	1.9	1.3	0.6
74	2401-BM		-0.8	-0.7	-0.8	-0.8		0.0	-0.7	-0.6	-0.8	-1.1	-0.6

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Non dioxin-like PCB - Z-scores

LC	Sample	Z-score [σ_p = 15 %]	Sum Indicator PCBs reported		Sum Indicator PCBs calculated		Z-score [σ_p = 20 %]	PCB 28	PCB 52	PCB 101	PCB 138	PCB 153	PCB 180
			upper bound	lower bound	upper bound	lower bound							
75	2401-BM		14.5	14.6	14.5	14.5		10.9	11.3	8.4	11.9	13.0	12.7
76	2401-BM												
77	2401-BM		0.7	0.7	0.7	0.7		-0.3	-0.2	-0.5	3.0	2.8	0.3
78	2401-BM												
79	2401-BM		-1.6	-1.5	-1.6	-1.6			-0.2	0.2	-1.8	-2.0	3.0
80	2401-BM		0.0	0.0	-0.1	-0.1		0.4	0.4	-0.3	-0.7	-0.5	0.1
81	2401-BM		-1.0	-1.0	-1.0	-1.0		-0.3	-0.9	-0.6	-1.3	-1.1	-0.2
82	2401-BM												
83	2401-BM		0.2	0.2	0.1	0.1		0.2	0.6	-0.3	-0.1	0.0	-0.2
84	2401-BM												
85	2401-BM		-0.2	-0.2	-0.2	-0.2		0.7	-0.2	-0.4	-0.3	-0.8	-0.5
86	2401-BM				1.9	1.9		6.5	0.2	-0.4	-0.2	2.9	-0.6
87	2401-BM												
88	2401-BM		0.6	0.6	0.5	0.5		0.5	0.4	0.9	0.7	-0.4	-0.1
89	2401-BM		-0.4	-0.3	-0.4	-0.4		0.8	-0.2	-0.4	-0.7	-0.7	-1.1
90	2401-BM		-2.1	-2.1	-2.1	-2.1		-1.5	-3.2	-2.5	-1.5	-2.2	5.5
91	2401-BM												
92	2401-BM												
93	2401-BM		-0.1	-0.1	-0.1	-0.1		0.9	-0.1	-0.4	-0.5	-0.5	-0.2
94	2401-BM		0.9	0.9	0.9	0.9		-0.5	1.4	0.6	0.4	0.6	1.7
95	2401-BM		0.2	0.2	0.2	0.2		-0.6	0.3	0.4	0.0	0.0	0.9
96	2401-BM												
97	2401-BM												
98	2401-BM												
99	2401-BM		-1.3	-1.3	-1.3	-1.3		-0.4	-1.2	-1.3	-0.8	-1.1	-0.9
100	2401-BM												
101	2401-BM		-0.8	-0.8	-0.9	-0.9		0.1	-0.7	-0.8	-1.0	-0.8	-0.7
102	2401-BM		-1.2	-1.2	-1.2	-1.2		-0.4	-0.8	-1.1	-1.3	-2.2	0.5
103	2401-BM		4.2	4.2	4.1	4.1		3.4	3.5	2.4	4.0	2.4	2.7
104	2401-BM		3.7	3.7	3.7	3.7		1.9	1.4	0.9	3.8	7.8	5.2
105	2401-BM		-0.1	-0.1	-0.2	-0.2		0.1	-0.1	-0.5	0.1	-0.1	0.1
106	2401-BM		1.8	1.9	1.8	1.8		2.7	1.3	1.4	0.4	0.9	0.6
107	2401-BM		-3.0	-3.0	-3.1	-3.1		-1.6	-2.6	-2.5	-2.3	-2.3	-2.3
108	2401-BM		-0.4	-0.4	-0.4	-0.4		1.1	-2.3	-0.4	1.6	-0.8	-0.3
109	2401-BM		0.9	0.9	0.8	0.8		-0.3	0.4	1.2	0.0	2.8	0.1
110	2401-BM												
111	2401-BM												
112	2401-BM		-2.0	-2.0	-2.0	-2.0		-1.6	-2.2	-1.7	0.1	-1.5	-1.1
113	2401-BM												
114	2401-BM		1.8	1.8	1.8	1.8		1.8	1.6	0.9	1.1	1.2	1.2
115	2401-BM												
116	2401-BM		-0.8	-0.8	-0.9	-0.9		-1.3	-0.5	-0.6	-0.4	-0.6	-0.3
117	2401-BM		0.2	0.2	0.2	0.2		1.5	0.4	-0.3	-0.2	-0.4	-1.0
118	2401-BM												
119	2401-BM												
120	2401-BM												
121	2401-BM		0.4	0.5	0.4	0.4		-0.2	1.1	0.4	0.3	-0.2	0.2
122	2401-BM												
123	2401-BM		-2.7	-2.7	-2.7	-2.7		-0.9	-3.0	-2.6	-1.8	-2.0	-0.8
124	2401-BM		-0.7	-0.7	-0.6	-0.6		-0.5	-0.2	-0.5	-0.8	-0.7	-0.2
125	2401-BM												
126	2401-BM		0.3	0.4	0.3	0.3		-0.1	0.2	0.4	0.9	-0.4	0.8
127	2401-BM		3.8	3.9	3.8	3.8		9.6	1.3	0.8	1.7	2.2	0.5
128	2401-BM		0.6	0.7	0.6	0.6		0.8	0.7	0.1	0.2	0.2	0.5
018A	2401-BM		-1.4	-1.4	-1.4	-1.4		-2.3	-1.9	-0.6	-0.1	-0.1	-0.1
034A	2401-BM		-0.9	-0.9	-1.0	-1.0		-0.5	-0.6	-0.9	-0.8	-0.7	-0.8
039A	2401-BM		2.6	2.7	2.6	2.6		5.8	0.2	1.1	0.6	4.2	0.2
049A	2401-BM		2.1	2.1	2.0	2.0		3.0	2.0	1.1	1.1	0.7	0.3
066A	2401-BM		0.4	0.5	0.4	0.4		0.8	0.5	0.0	0.2	0.1	0.3
117A	2401-BM		0.2	0.2	0.2	0.2		1.5	0.4	-0.3	-0.2	-0.4	-1.0
20*	2401-BM		-1.3	-1.3	-1.3	-1.3		-1.7	-1.2	-0.5	-0.2	-1.3	-0.9
75*	2401-BM		-1.4	-1.4	-1.4	-1.4		-1.1	-1.0	-1.7	-0.8	-0.5	-0.7

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Bioanalytical screening methods - Bioassay-scores

LC	Sample	Bioassay-score [$\sigma_{bioassay}$ = 20 %]	PCDD/F + DL-PCB	PCDD/F	DL-PCB
1	2401-BM				
2	2401-BM				
3	2401-BM				
4	2401-BM				
5	2401-BM				
6	2401-BM				
7	2401-BM				
8	2401-BM		0.6		
9	2401-BM				
10	2401-BM				
11	2401-BM				
12	2401-BM				
13	2401-BM		-0.4		
14	2401-BM				
15	2401-BM				
16	2401-BM		-1.9	-1.1	-2.6
17	2401-BM				
18	2401-BM				
19	2401-BM				
20	2401-BM				
21	2401-BM				
22	2401-BM				
23	2401-BM				
24	2401-BM				
25	2401-BM				
26	2401-BM				
27	2401-BM				
28	2401-BM				
29	2401-BM				
30	2401-BM				
31	2401-BM				
32	2401-BM				
33	2401-BM				
34	2401-BM				
35	2401-BM				
36	2401-BM				
37	2401-BM				
38	2401-BM				
39	2401-BM				
40	2401-BM				
41	2401-BM				
42	2401-BM				
43	2401-BM				
44	2401-BM				
45	2401-BM				
46	2401-BM				
47	2401-BM				
48	2401-BM				
49	2401-BM				
50	2401-BM				
51	2401-BM				
52	2401-BM				
53	2401-BM				
54	2401-BM				
55	2401-BM				
56	2401-BM				
57	2401-BM				
58	2401-BM		1.0	1.4	0.7
59	2401-BM				
60	2401-BM		0.5		
61	2401-BM				
62	2401-BM				
63	2401-BM		0.0		
64	2401-BM				
65	2401-BM				
66	2401-BM				
67	2401-BM				
68	2401-BM				
69	2401-BM				
70	2401-BM				
71	2401-BM				
72	2401-BM				
73	2401-BM				
74	2401-BM				

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Bioanalytical screening methods - Bioassay-scores

LC	Sample	Bioassay-score [$\sigma_{bioassay}$ = 20 %]	PCDD/F + DL-PCB	PCDD/F	DL-PCB
75	2401-BM				
76	2401-BM				
77	2401-BM				
78	2401-BM				
79	2401-BM				
80	2401-BM				
81	2401-BM				
82	2401-BM				
83	2401-BM				
84	2401-BM				
85	2401-BM				
86	2401-BM				
87	2401-BM				
88	2401-BM				
89	2401-BM				
90	2401-BM				
91	2401-BM				
92	2401-BM				
93	2401-BM		0.9		
94	2401-BM				
95	2401-BM				
96	2401-BM				
97	2401-BM				
98	2401-BM				
99	2401-BM				
100	2401-BM				
101	2401-BM				
102	2401-BM				
103	2401-BM				
104	2401-BM				
105	2401-BM				
106	2401-BM				
107	2401-BM				
108	2401-BM				
109	2401-BM				
110	2401-BM				
111	2401-BM		-1.7	-4.7	1.0
112	2401-BM				
113	2401-BM				
114	2401-BM				
115	2401-BM				
116	2401-BM				
117	2401-BM				
118	2401-BM				
119	2401-BM				
120	2401-BM				
121	2401-BM				
122	2401-BM				
123	2401-BM				
124	2401-BM				
125	2401-BM				
126	2401-BM				
127	2401-BM				
128	2401-BM				
018A	2401-BM				
034A	2401-BM				
039A	2401-BM				

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Lipid content - Z-scores

LC	Sample	Z-score [σ_p = 10 %]	Lipid content Physico-chemical methods	Lipid content Bioanalytical methods	Lipid content Mean
1	2401-BM				
2	2401-BM				
3	2401-BM		-1.1		-1.1
4	2401-BM				
5	2401-BM		0.0		0.0
6	2401-BM		0.0		0.0
7	2401-BM		1.9		1.9
8	2401-BM		-1.8	-1.8	-1.8
9	2401-BM		-0.4		-0.4
10	2401-BM		1.2		1.2
11	2401-BM		1.1		1.1
12	2401-BM		0.0		0.0
13	2401-BM		-2.1	-2.1	-2.1
14	2401-BM				
15	2401-BM				
16	2401-BM		-2.9	-2.9	-2.9
17	2401-BM		0.2		0.2
18	2401-BM		0.5		0.5
19	2401-BM				
20	2401-BM		0.0		0.0
21	2401-BM		-0.4		-0.4
22	2401-BM		-2.5		-2.5
23	2401-BM		0.2		0.2
24	2401-BM		0.6		0.6
25	2401-BM		-0.1		-0.1
26	2401-BM		-1.1		-1.1
27	2401-BM				
28	2401-BM		0.3		0.3
29	2401-BM		0.0		0.0
30	2401-BM				
31	2401-BM		0.2		0.2
32	2401-BM		0.1		0.1
33	2401-BM				
34	2401-BM		2.0		2.0
35	2401-BM				
36	2401-BM		-2.9		-2.9
37	2401-BM		-2.3		-2.3
38	2401-BM				
39	2401-BM		0.5		0.5
40	2401-BM		-2.0		-2.0
41	2401-BM				
42	2401-BM		1.1		1.1
43	2401-BM		-2.6		-2.6
44	2401-BM				
45	2401-BM		0.2		0.2
46	2401-BM		0.2		0.2
47	2401-BM		0.3		0.3
48	2401-BM				
49	2401-BM		0.2		0.2
50	2401-BM				
51	2401-BM		-0.6		-0.6
52	2401-BM				
53	2401-BM		0.6		0.6
54	2401-BM		1.2		1.2
55	2401-BM		0.3		0.3
56	2401-BM				
57	2401-BM				
58	2401-BM		0.0	0.2	0.1
59	2401-BM		-0.3		-0.3
60	2401-BM		0.0	0.0	0.0
61	2401-BM		0.5		0.5
62	2401-BM				
63	2401-BM			0.0	0.0
64	2401-BM		0.3		0.3
65	2401-BM		-0.6		-0.6
66	2401-BM		2.0		2.0
67	2401-BM		-3.8		-3.8
68	2401-BM		1.2		1.2
69	2401-BM		0.5		0.5
70	2401-BM		1.0		1.0
71	2401-BM				
72	2401-BM		0.6		0.6
73	2401-BM		-4.6		-4.6
74	2401-BM		0.7		0.7

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Lipid content - Z-scores

LC	Sample	Z-score [σ_p = 10 %]	**Lipid content** Physico-chemical methods	**Lipid content** Bioanalytical methods	**Lipid content** Mean
75	2401-BM		-1.4		-1.4
76	2401-BM				
77	2401-BM		0.4		0.4
78	2401-BM				
79	2401-BM		-4.3		-4.3
80	2401-BM		-0.6		-0.6
81	2401-BM		1.4		1.4
82	2401-BM				
83	2401-BM		-3.0		-3.0
84	2401-BM				
85	2401-BM		1.1		1.1
86	2401-BM		1.5		1.5
87	2401-BM				
88	2401-BM		-2.8		-2.8
89	2401-BM		0.5		0.5
90	2401-BM				
91	2401-BM				
92	2401-BM				
93	2401-BM		0.4	0.4	0.4
94	2401-BM		0.6		0.6
95	2401-BM		0.6		0.6
96	2401-BM		0.3		0.3
97	2401-BM				
98	2401-BM				
99	2401-BM		0.5		0.5
100	2401-BM				
101	2401-BM		1.1		1.1
102	2401-BM		-2.3		-2.3
103	2401-BM		0.2		0.2
104	2401-BM		0.0		0.0
105	2401-BM		-0.9		-0.9
106	2401-BM		-0.6		-0.6
107	2401-BM		2.4		2.4
108	2401-BM		-4.1		-4.1
109	2401-BM		1.6		1.6
110	2401-BM		-0.8		-0.8
111	2401-BM				
112	2401-BM				
113	2401-BM				
114	2401-BM		-1.2		-1.2
115	2401-BM				
116	2401-BM				
117	2401-BM		-0.1		-0.1
118	2401-BM				
119	2401-BM				
120	2401-BM		0.1		0.1
121	2401-BM				
122	2401-BM				
123	2401-BM		0.0		0.0
124	2401-BM		-0.3		-0.3
125	2401-BM				
126	2401-BM		2.3		2.3
127	2401-BM		1.7		1.7
128	2401-BM		-0.4		-0.4
018A	2401-BM		0.5		0.5
034A	2401-BM		2.0		2.0
039A	2401-BM		0.1		0.1
049A	2401-BM		0.3		0.3
066A	2401-BM		0.6		0.6
117A	2401-BM		-0.1		-0.1

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
15 April 2025

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

Test sample - Bovine Meat (2401-BM)

Z-scores of sum parameters and individual results

Calculation of z-score on basis of assigned value

$z = (x - x_a) / \sigma_p$

x_a: assigned value
x: participant's result
σ_p: fitness-for-purpose-based standard deviation for proficiency assessment

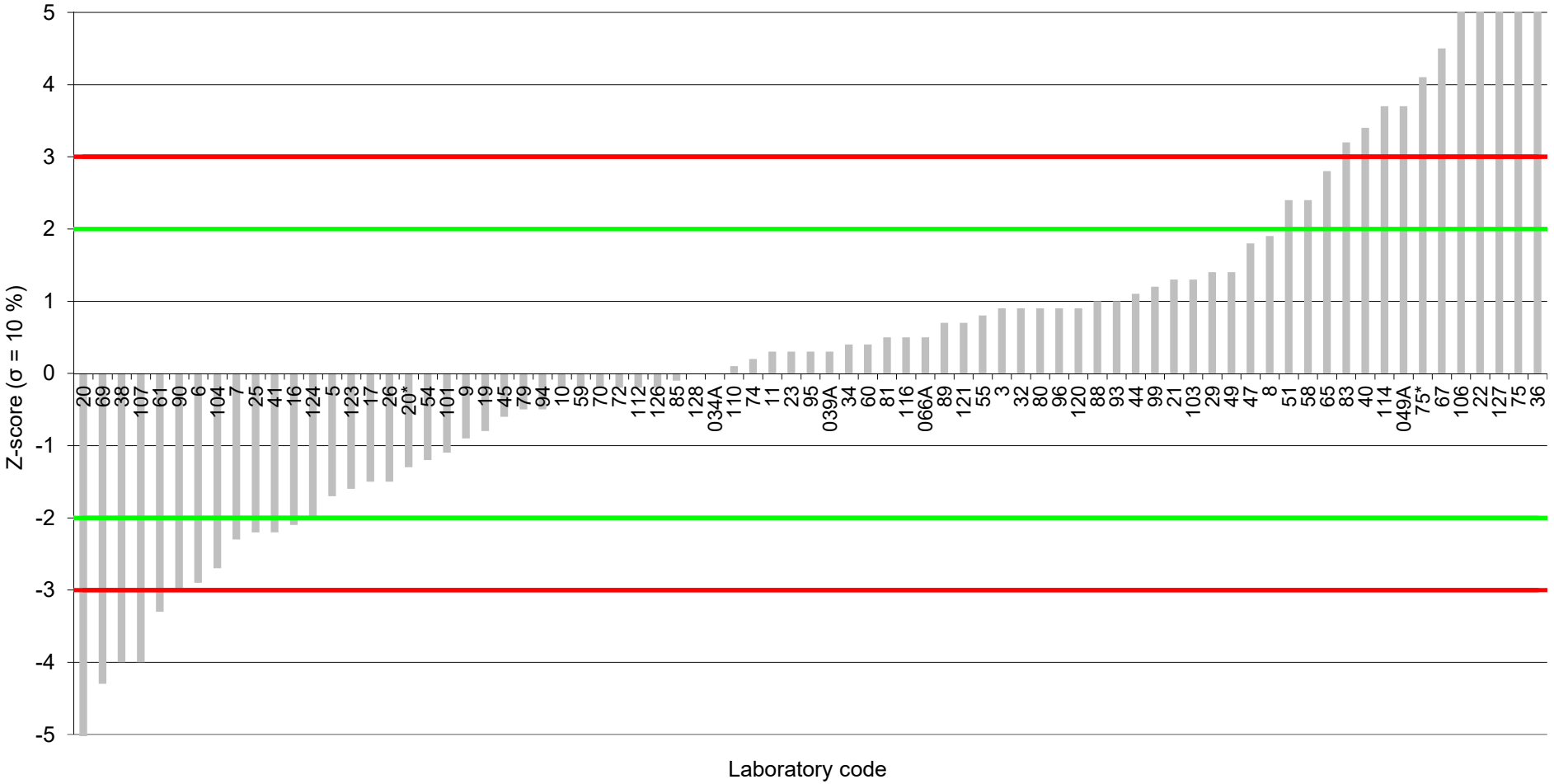
10%: WHO-PCDD/F-TEQ, WHO-PCB-TEQ and WHO-PCDD/F-PCB-TEQ
15%: Sum of six indicator PCBs (PCB 28, 52, 101, 138, 153, 180)
20%: Evaluated individual PCDD/F and PCB congeners

± 2 z-scores:
± 3 z-scores:

Bovine Meat (2401-BM)

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

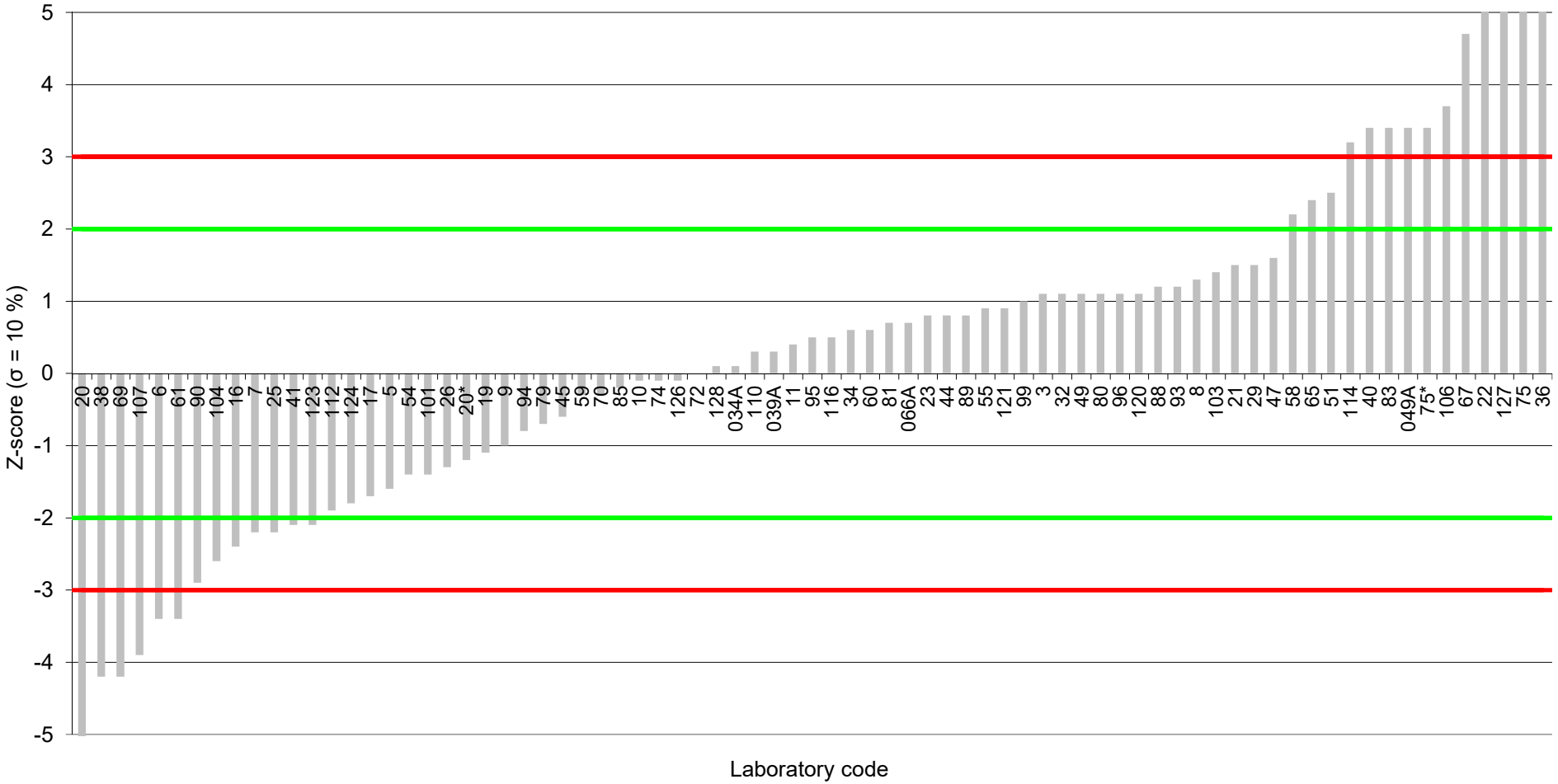
Assigned value: 3.86 pg/g fat



Bovine Meat (2401-BM)

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

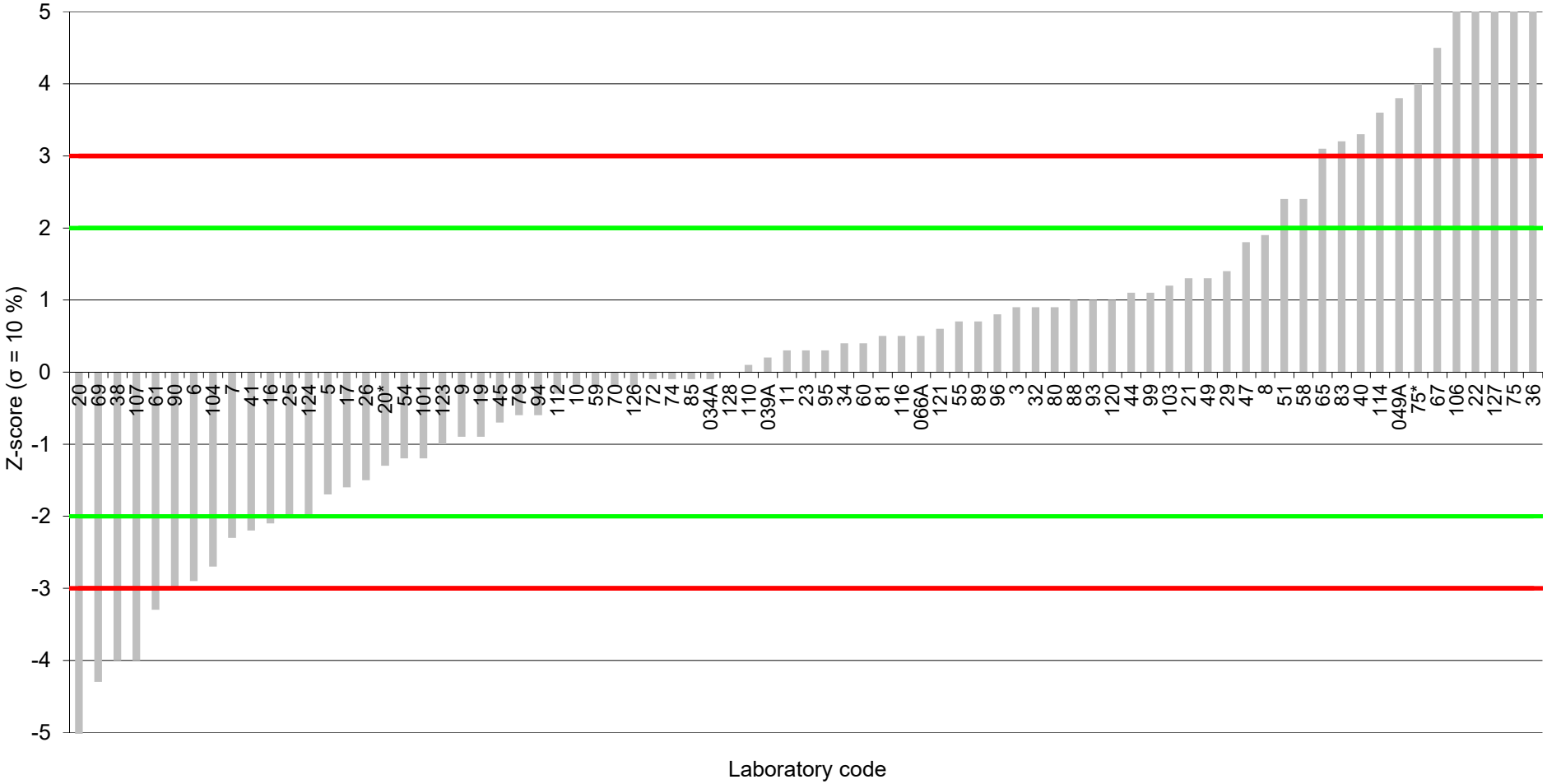
Assigned value: 3.8 pg/g fat



Bovine Meat (2401-BM)

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

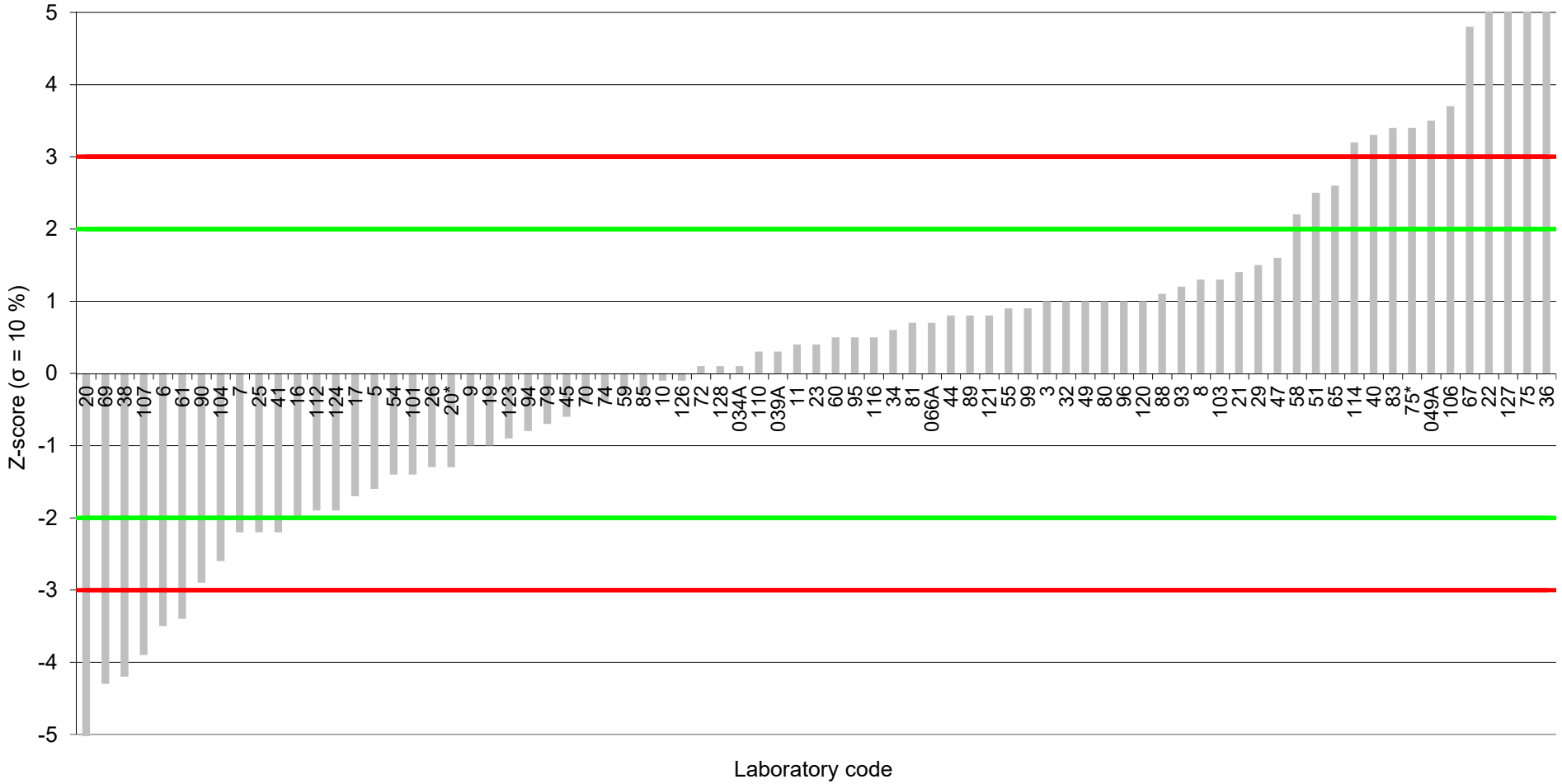
Assigned value: 3.87 pg/g fat



Bovine Meat (2401-BM)

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

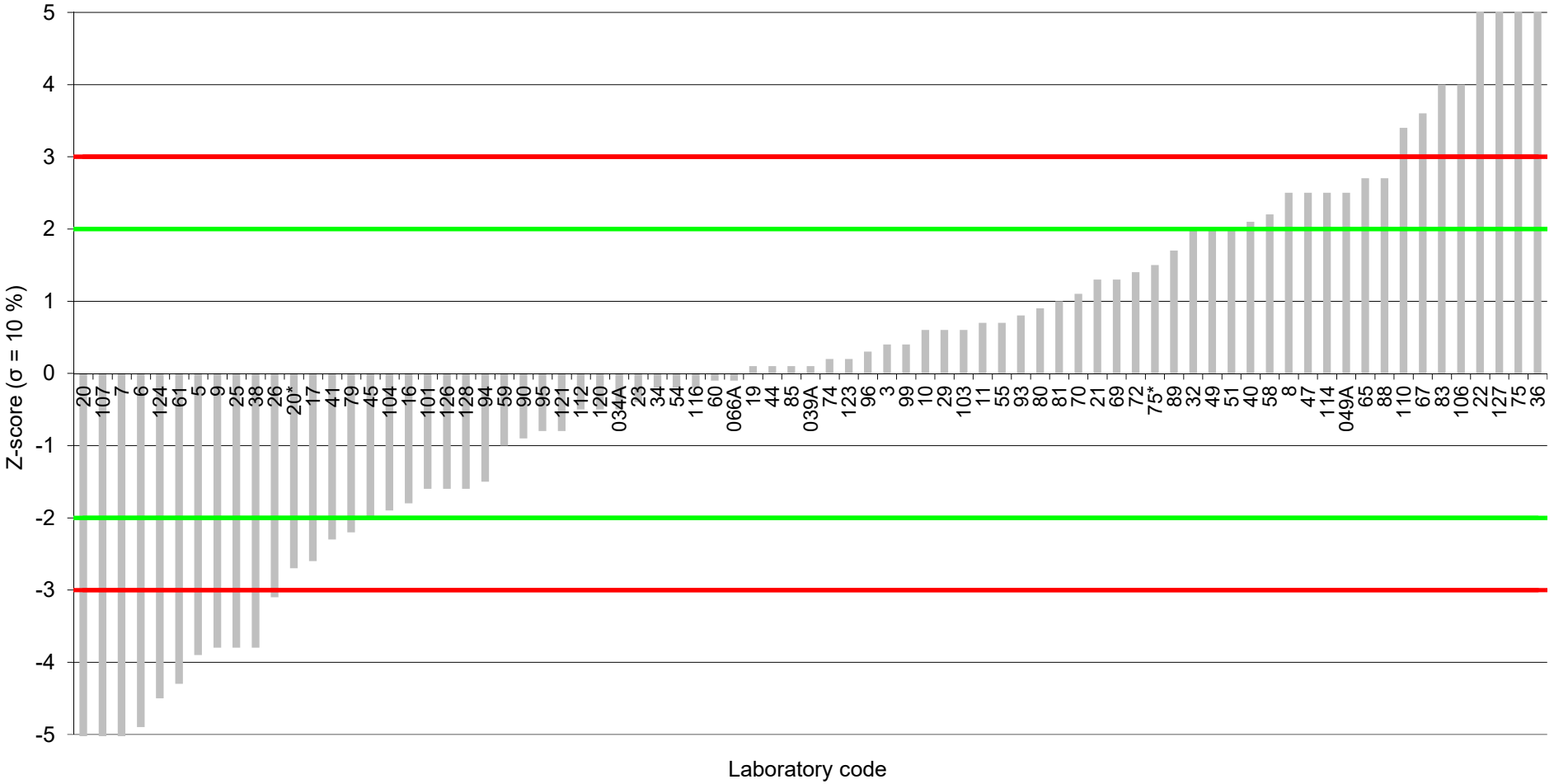
Assigned value: 3.81 pg/g fat



Bovine Meat (2401-BM)

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

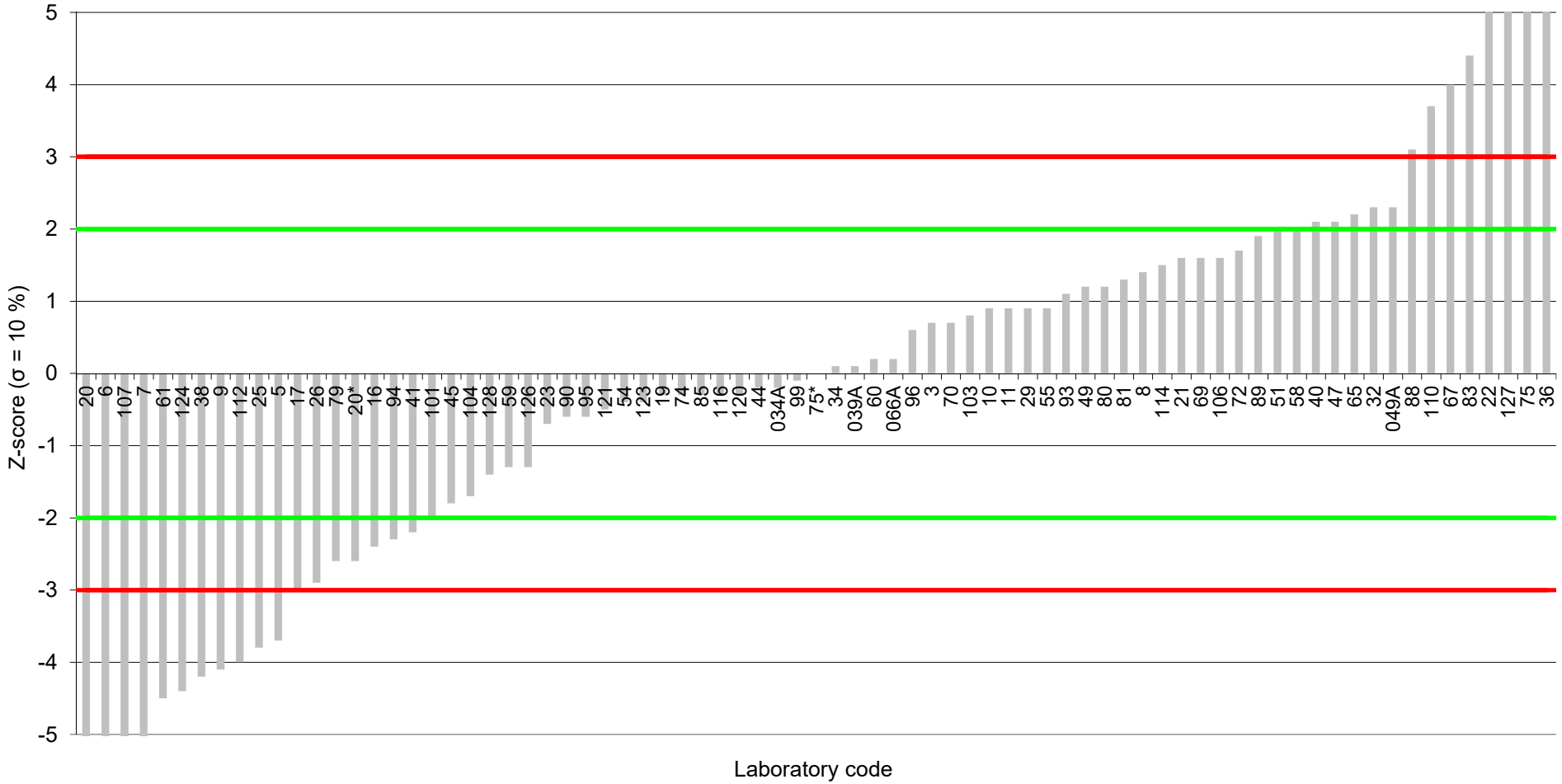
Assigned value: 1.84 pg/g fat



Bovine Meat (2401-BM)

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

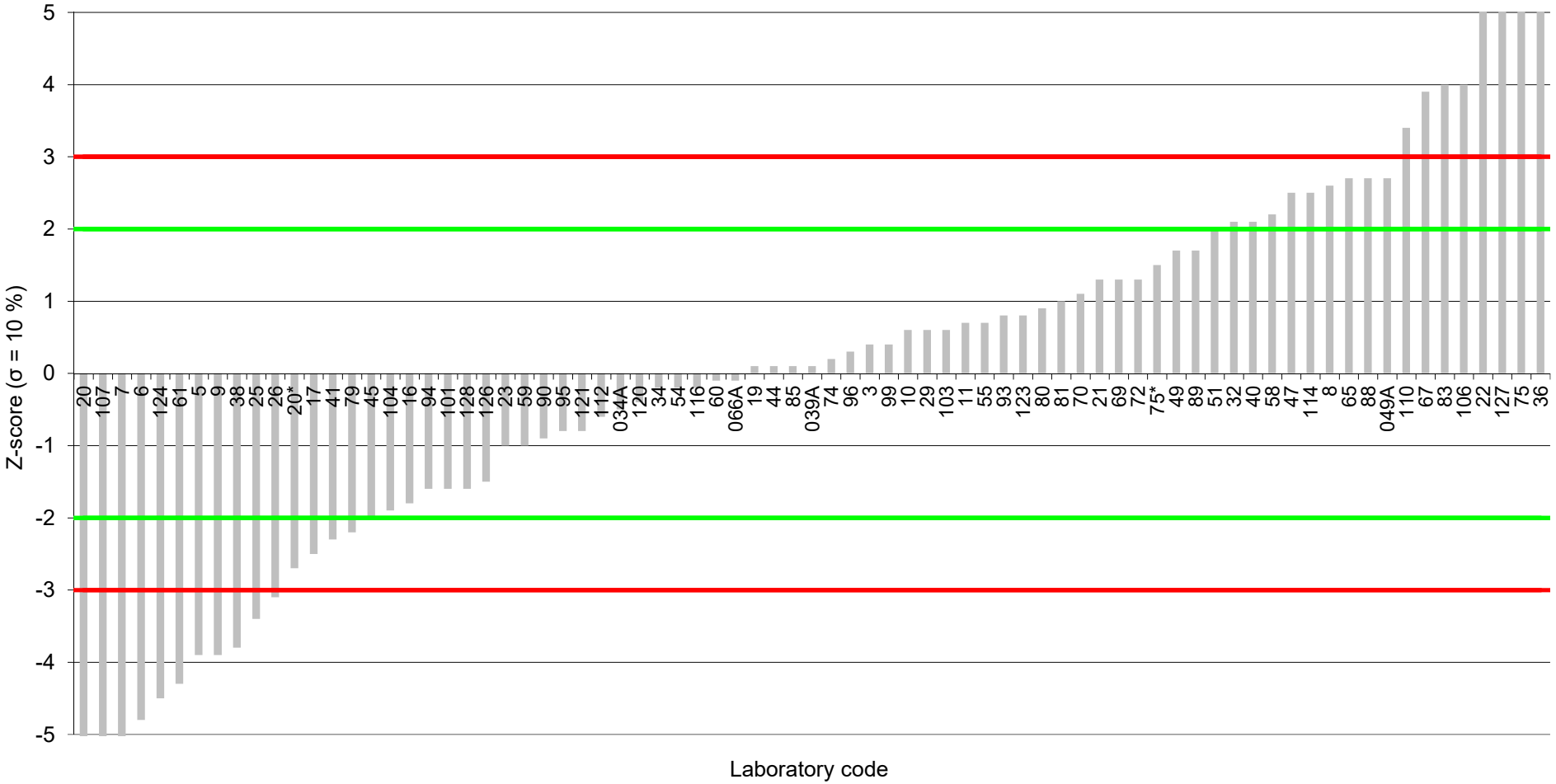
Assigned value: 1.79 pg/g fat



Bovine Meat (2401-BM)

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

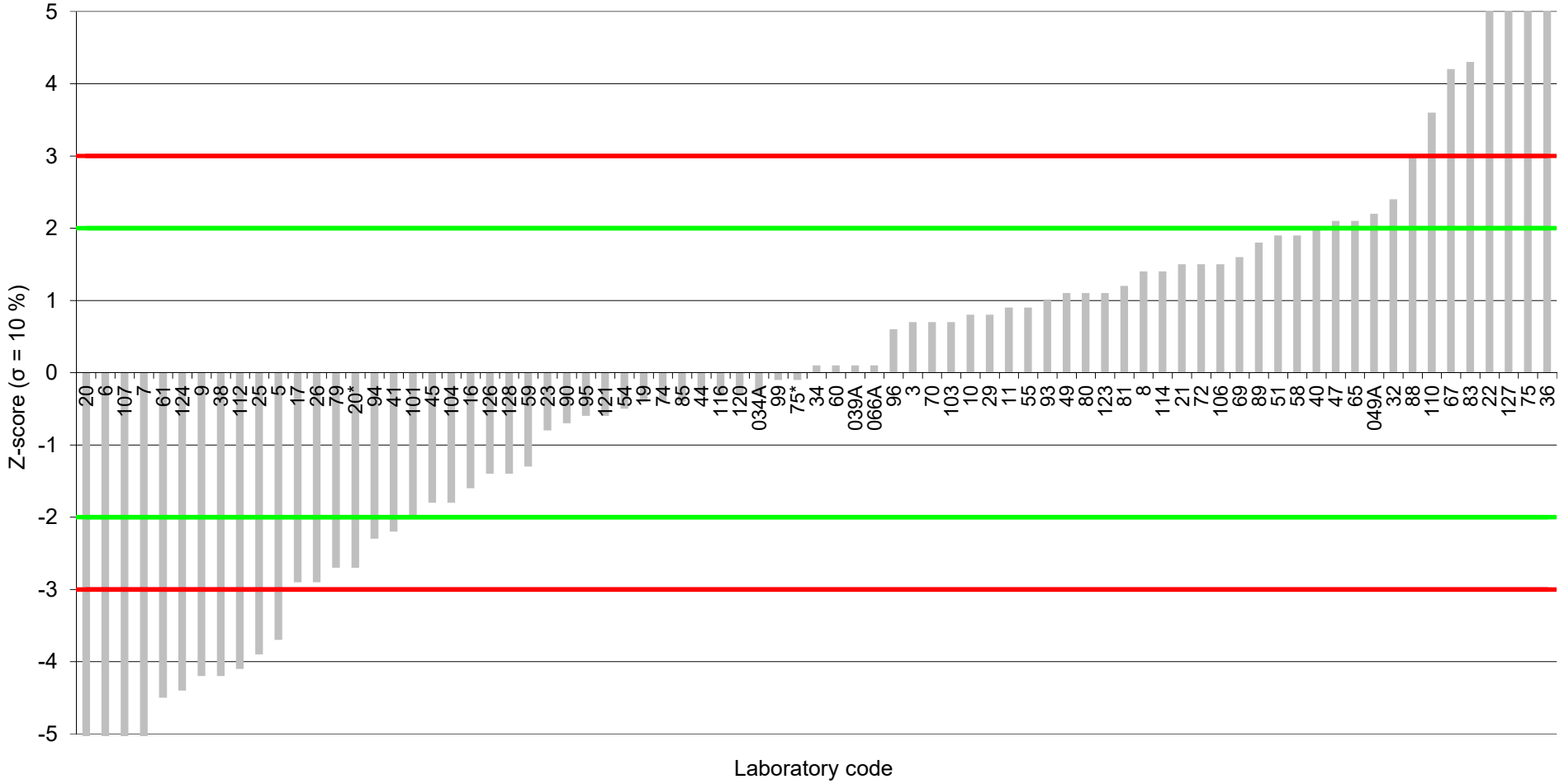
Assigned value: 1.84 pg/g fat



Bovine Meat (2401-BM)

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

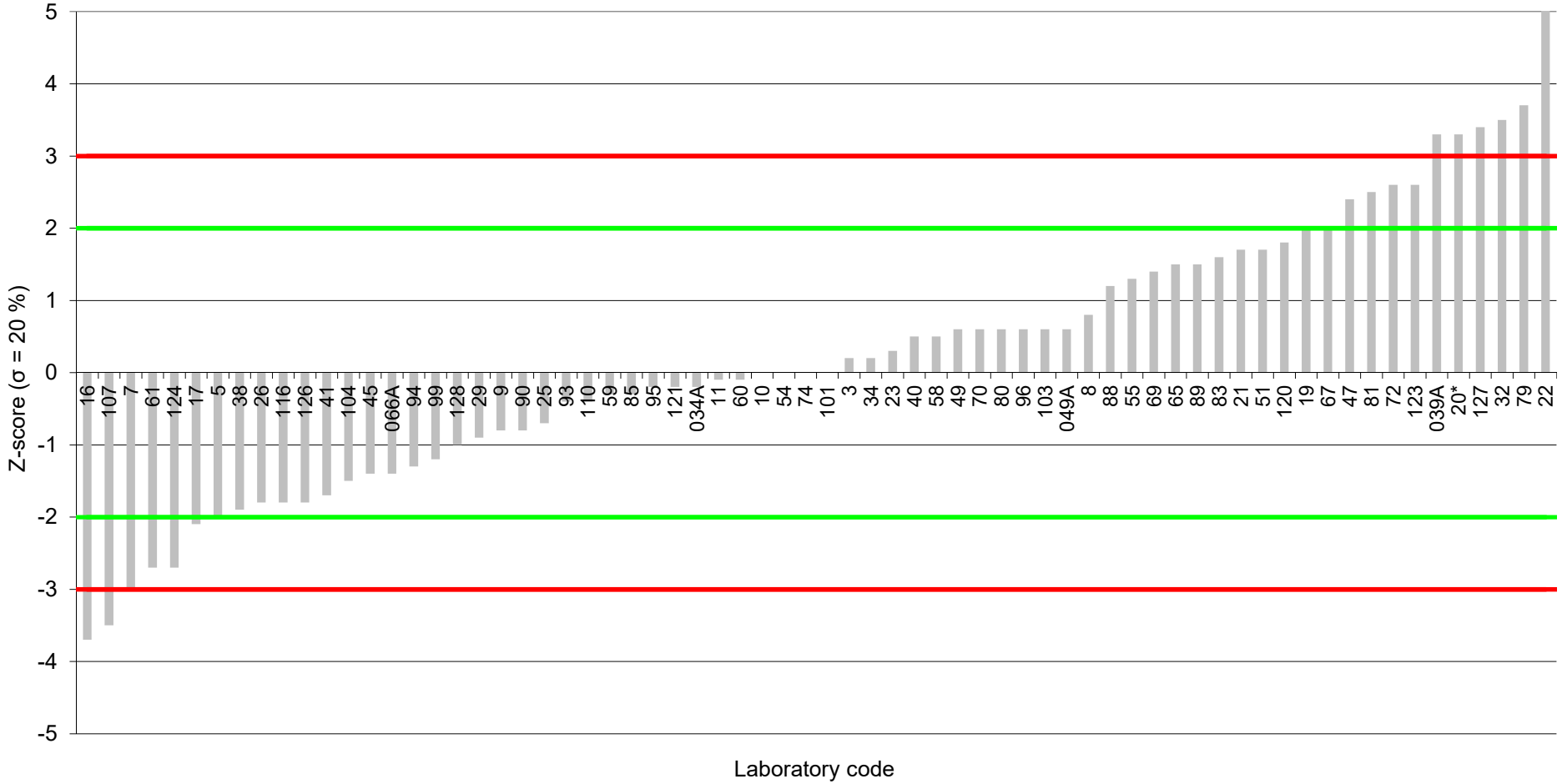
Assigned value: 1.8 pg/g fat



Bovine Meat (2401-BM)

1,2,3,7,8-PeCDD

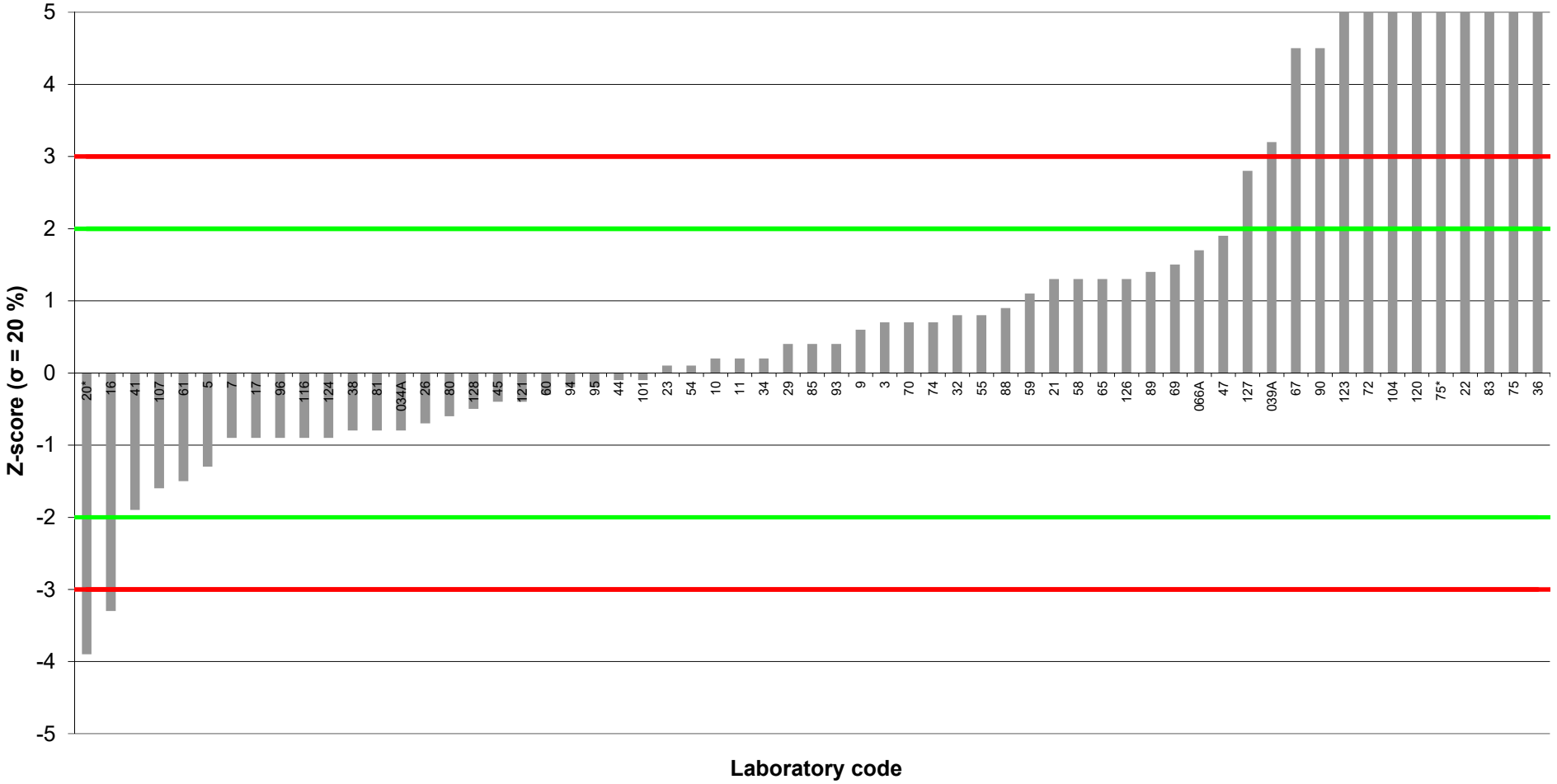
Assigned value: 0.242 pg/g fat



Bovine Meat (2401-BM)

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

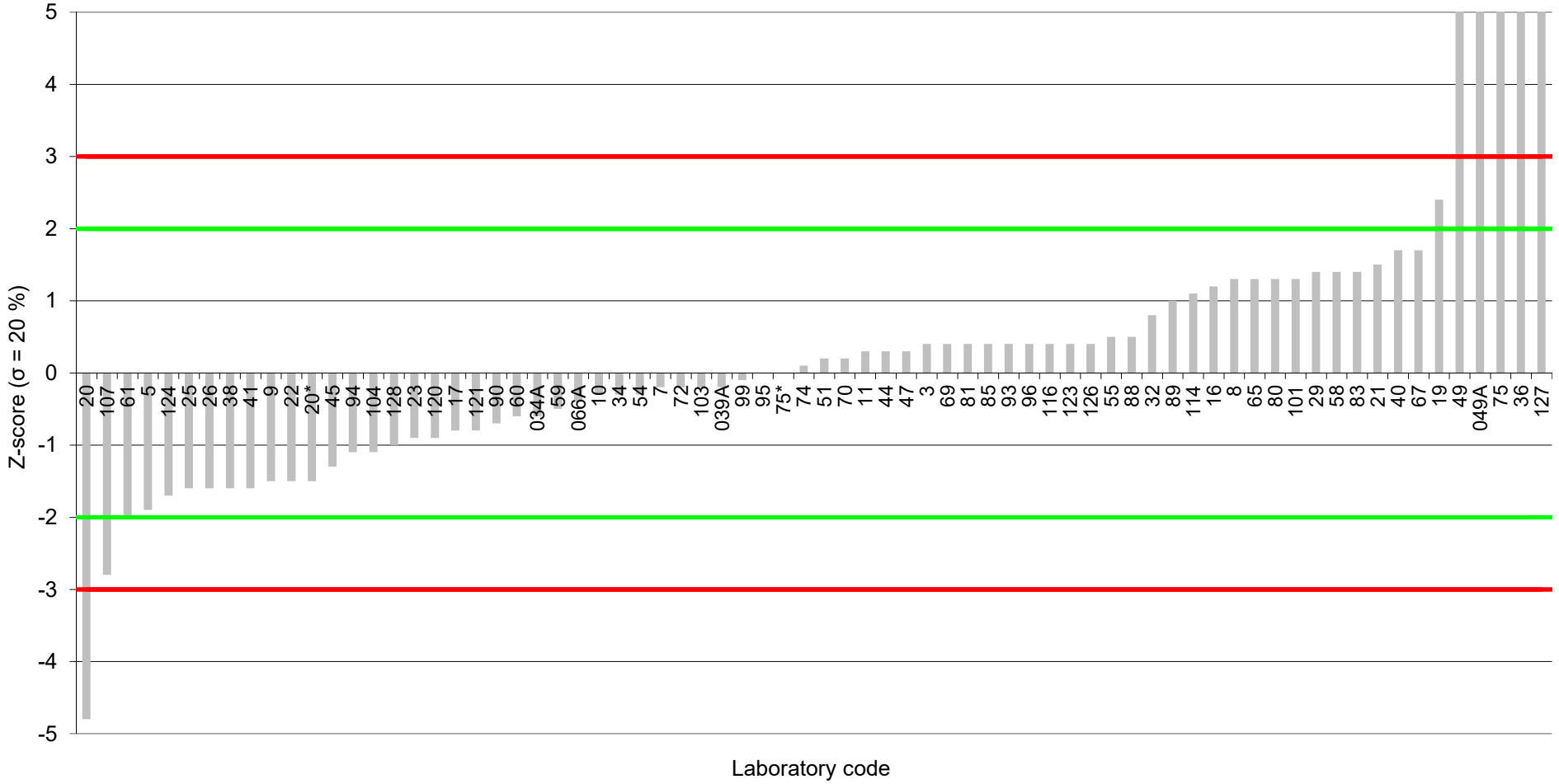
Assigned value: 0.184 pg/g fat



Bovine Meat (2401-BM)

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

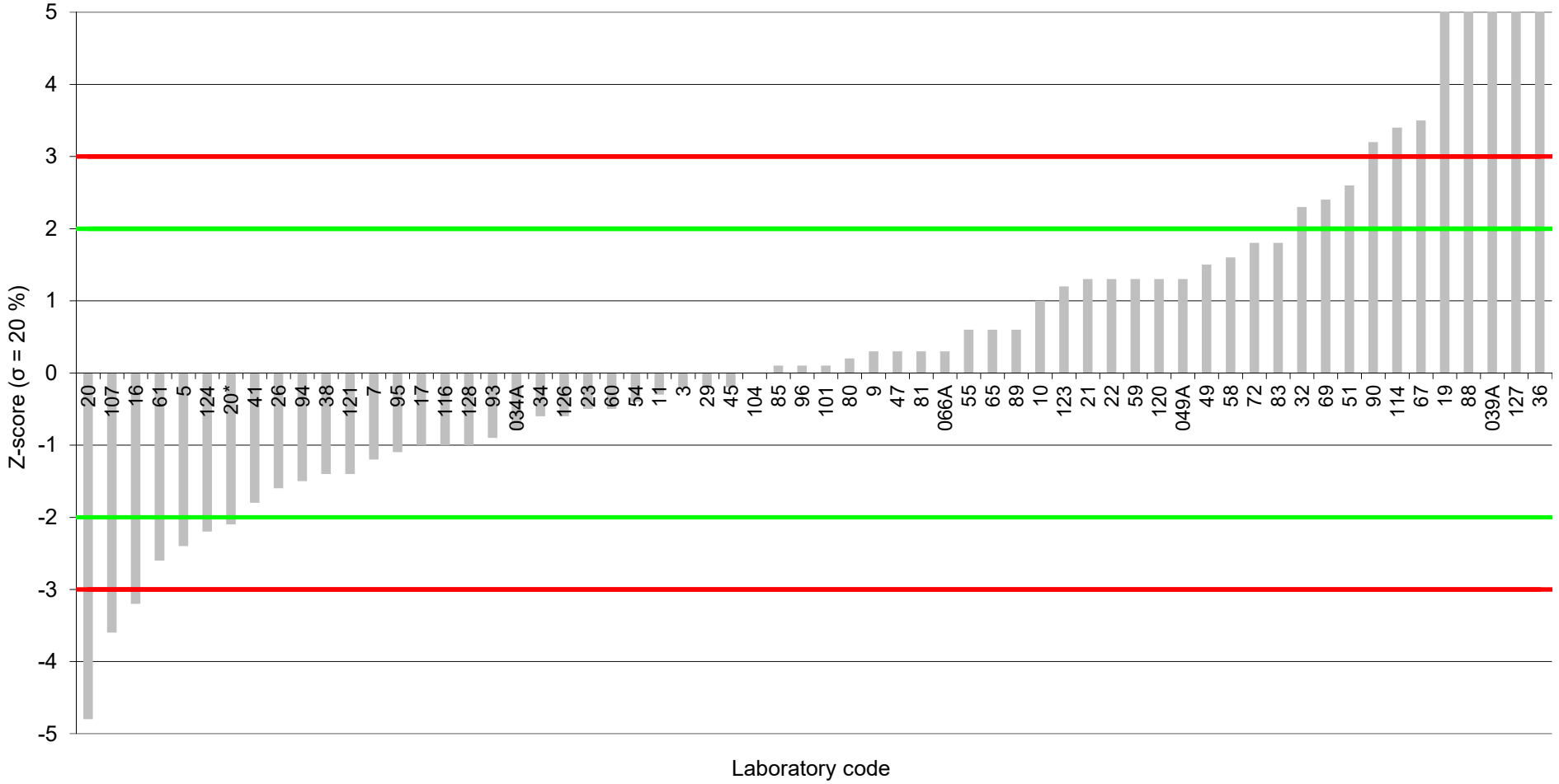
Assigned value: 0.46 pg/g fat



Bovine Meat (2401-BM)

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

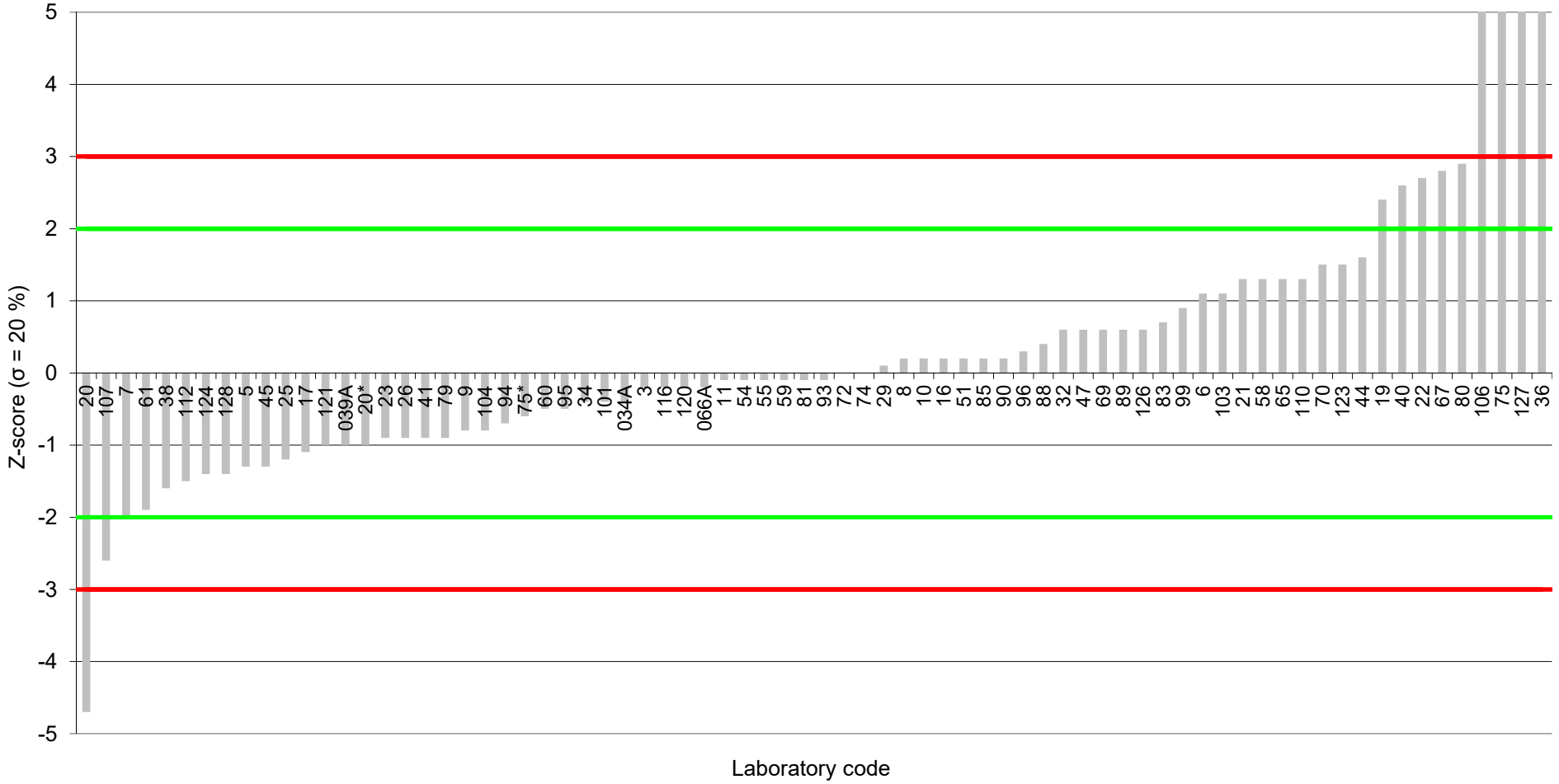
Assigned value: 0.176 pg/g fat



Bovine Meat (2401-BM)

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

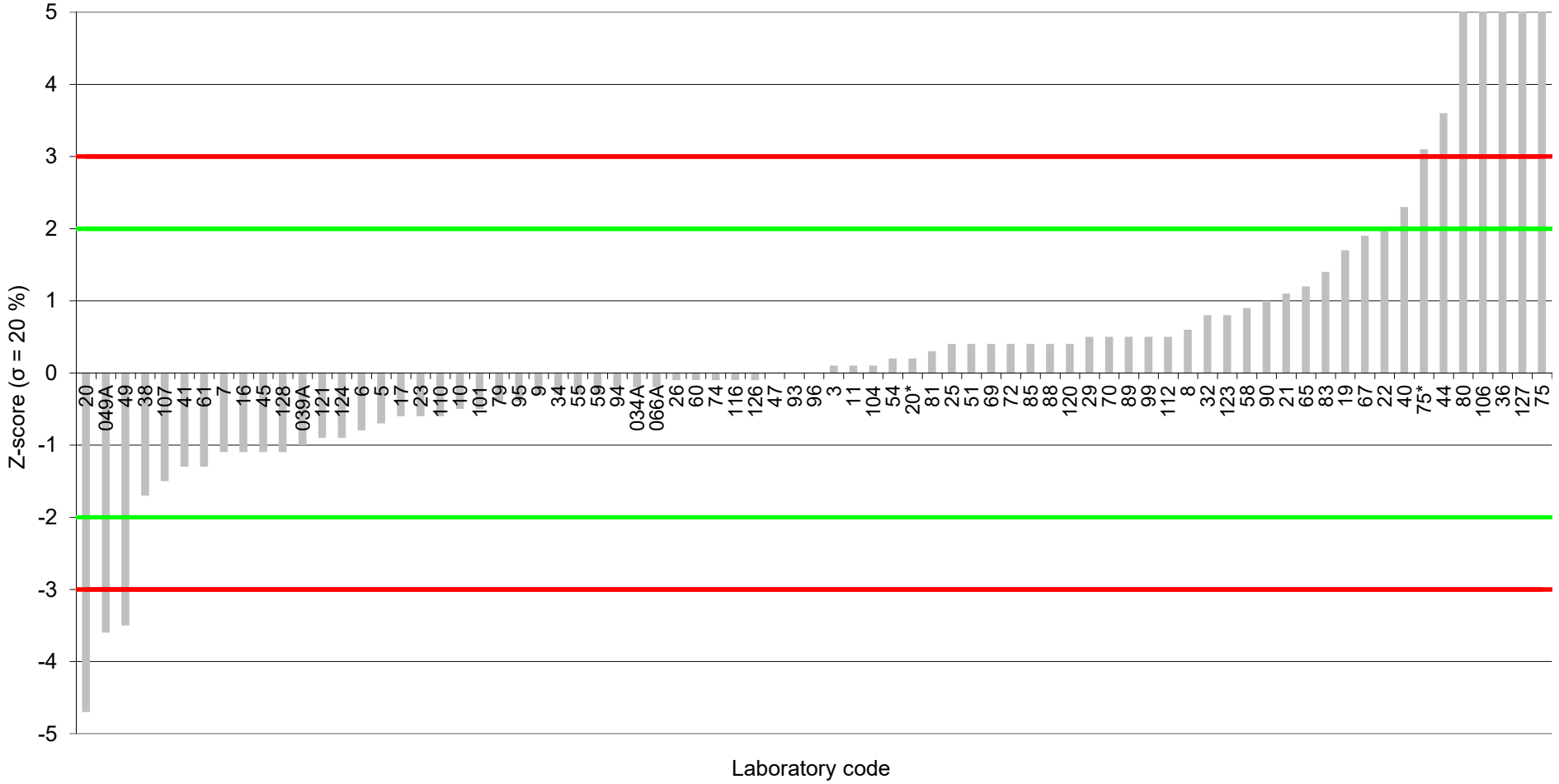
Assigned value: 1.41 pg/g fat



Bovine Meat (2401-BM)

OCDD

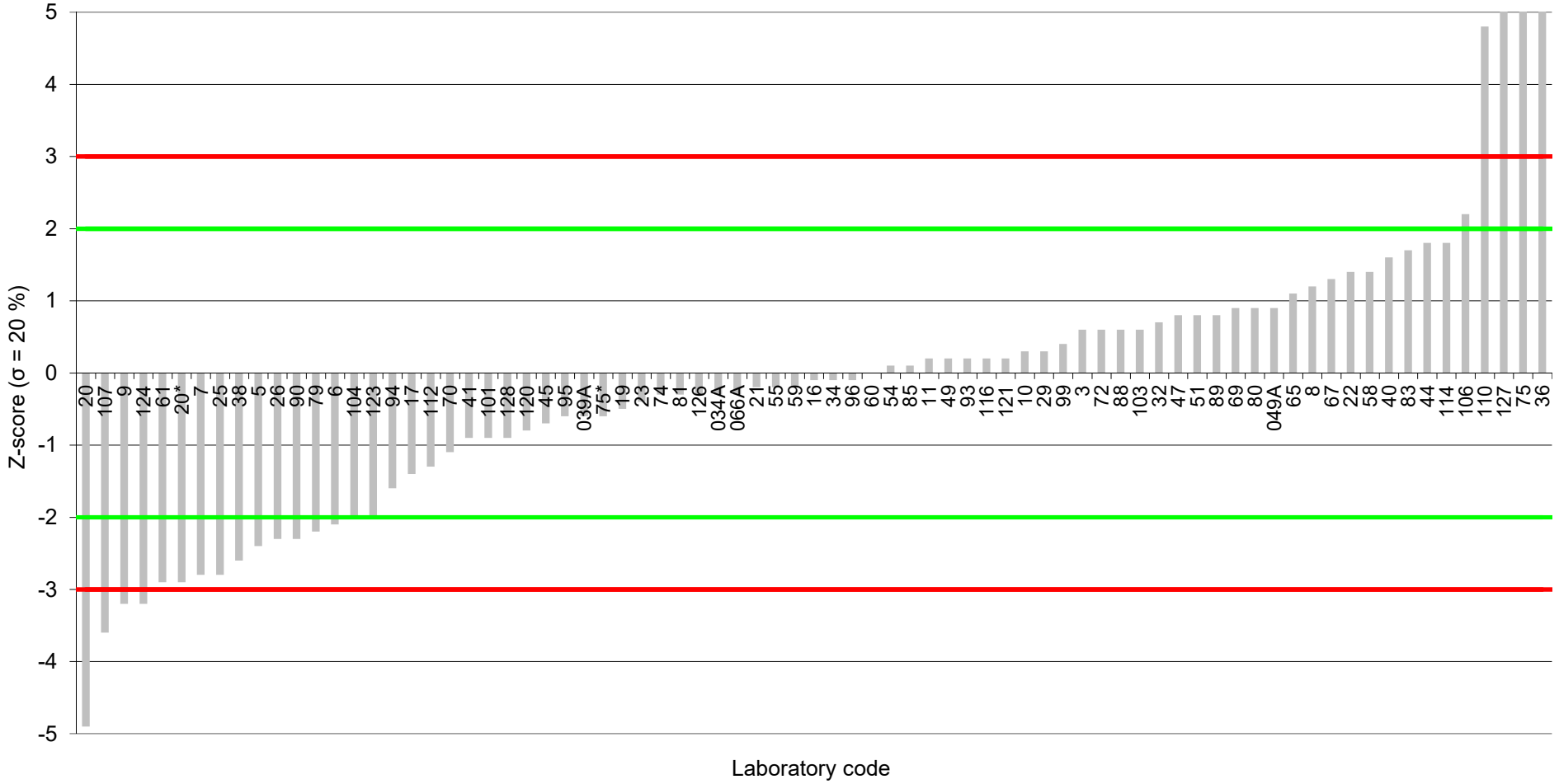
Assigned value: 4.27 pg/g fat



Bovine Meat (2401-BM)

2,3,7,8-TCDF

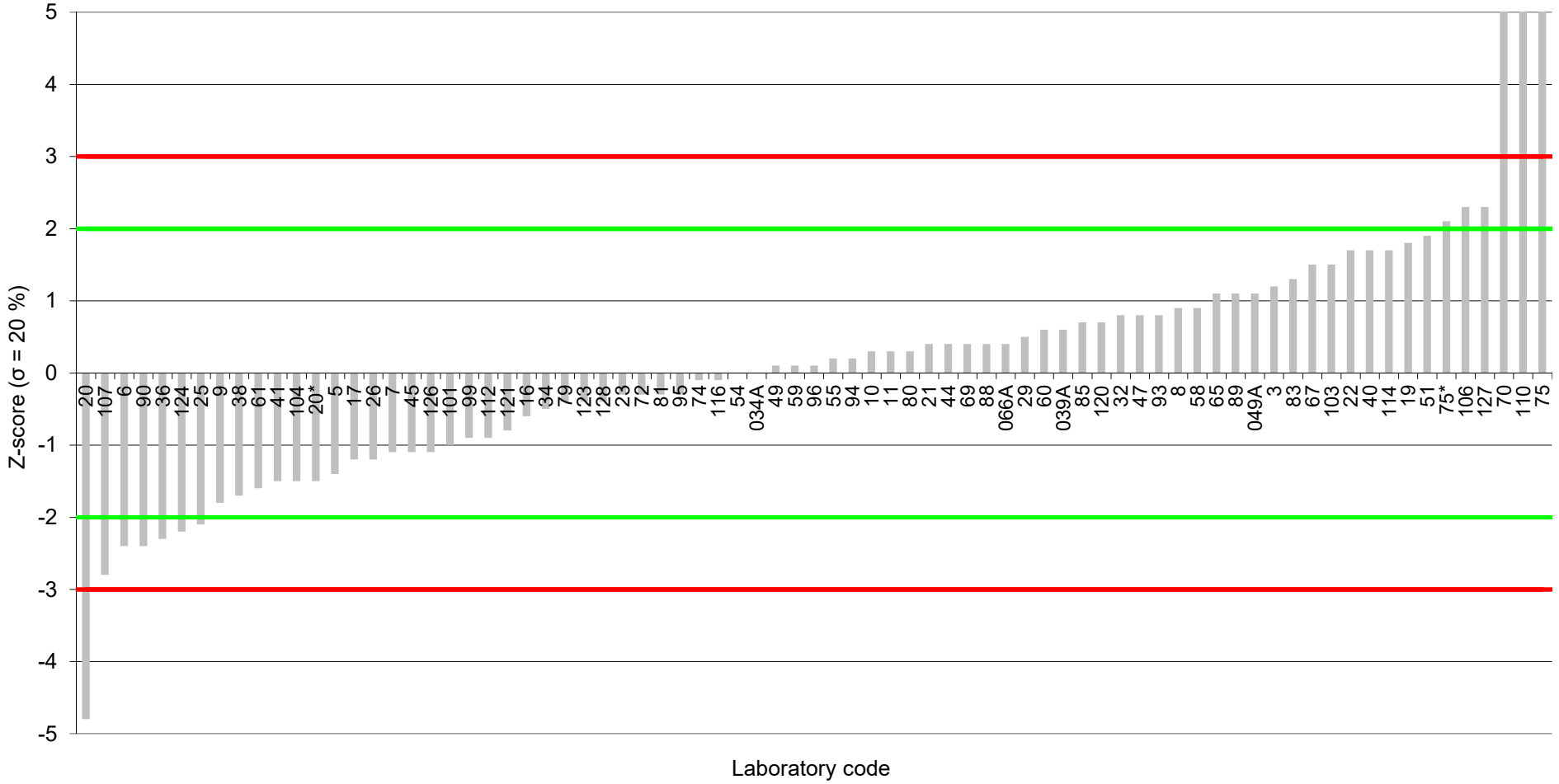
Assigned value: 2.78 pg/g fat



Bovine Meat (2401-BM)

1,2,3,7,8-PeCDF

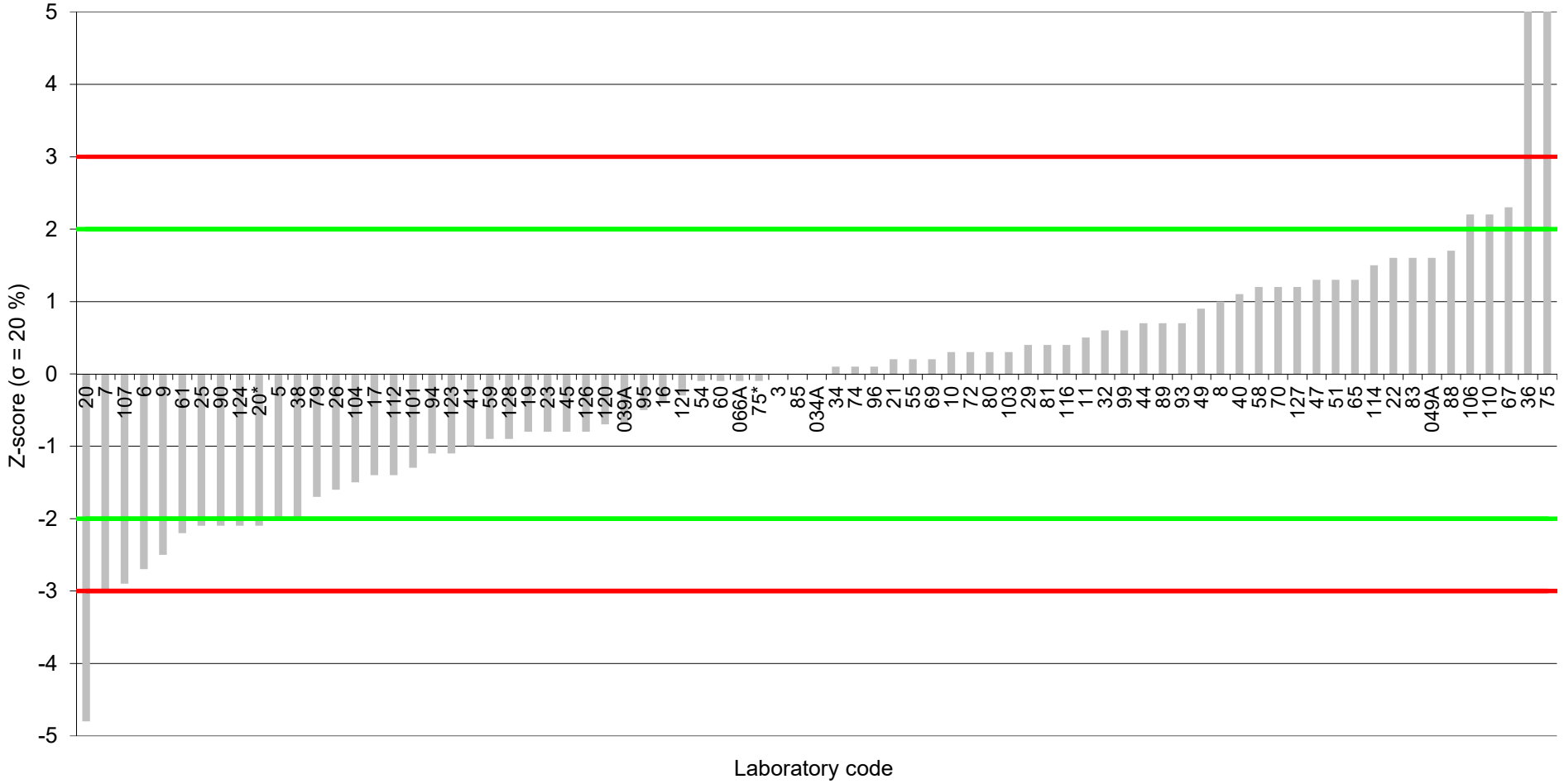
Assigned value: 0.758 pg/g fat



Bovine Meat (2401-BM)

2,3,4,7,8-PeCDF

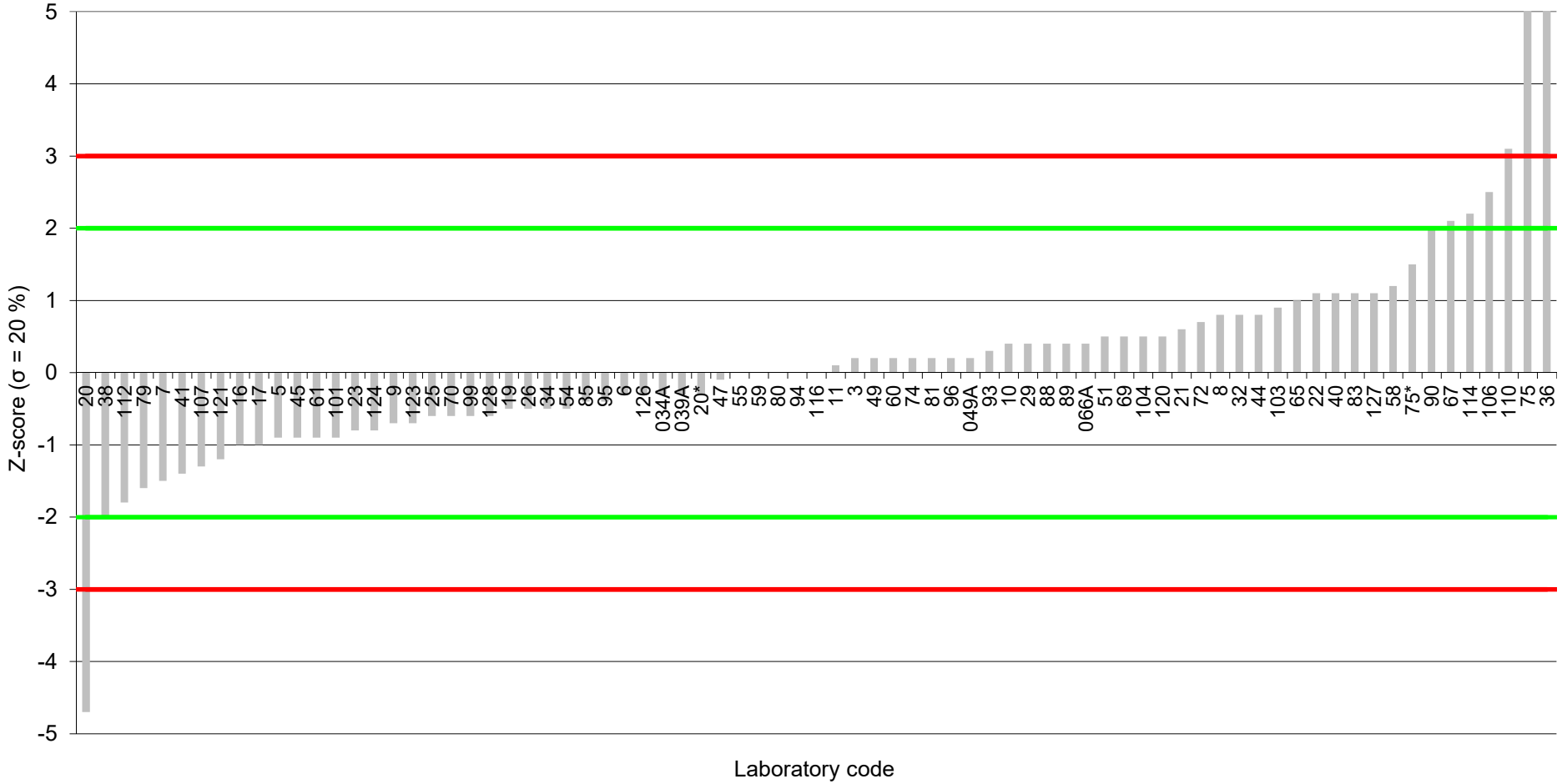
Assigned value: 2.95 pg/g fat



Bovine Meat (2401-BM)

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

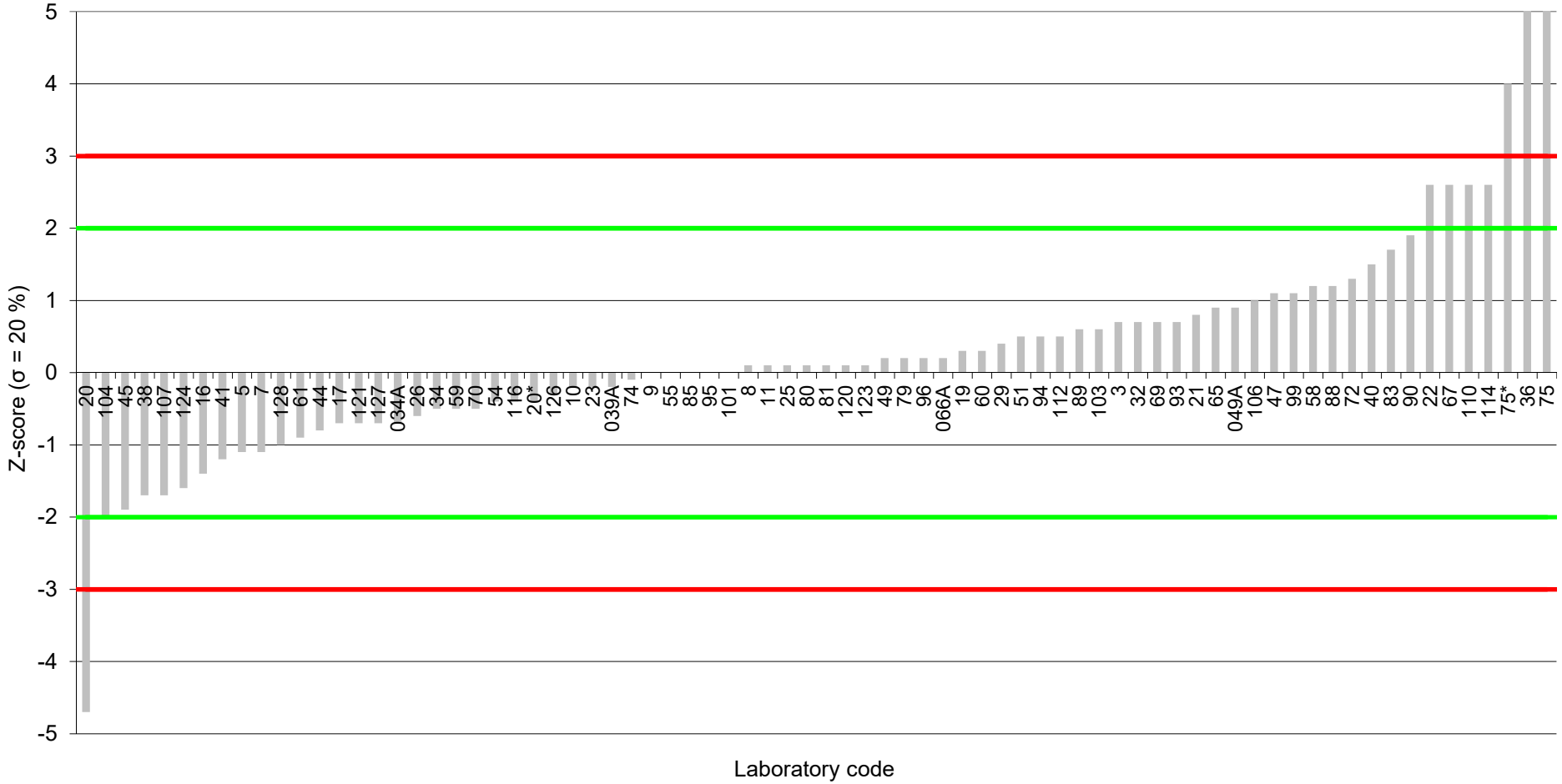
Assigned value: 1.06 pg/g fat



Bovine Meat (2401-BM)

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

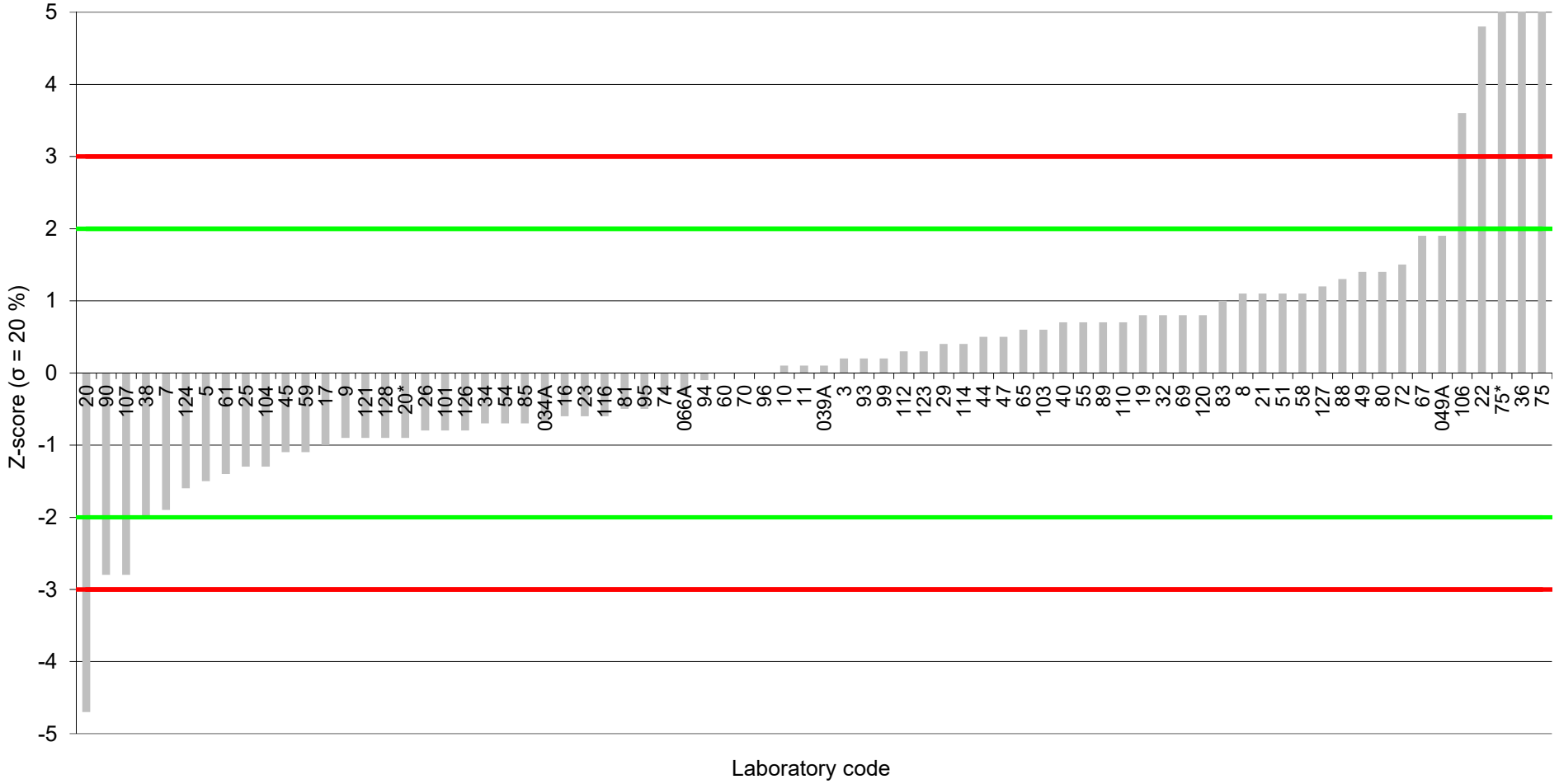
Assigned value: 0.51 pg/g fat



Bovine Meat (2401-BM)

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

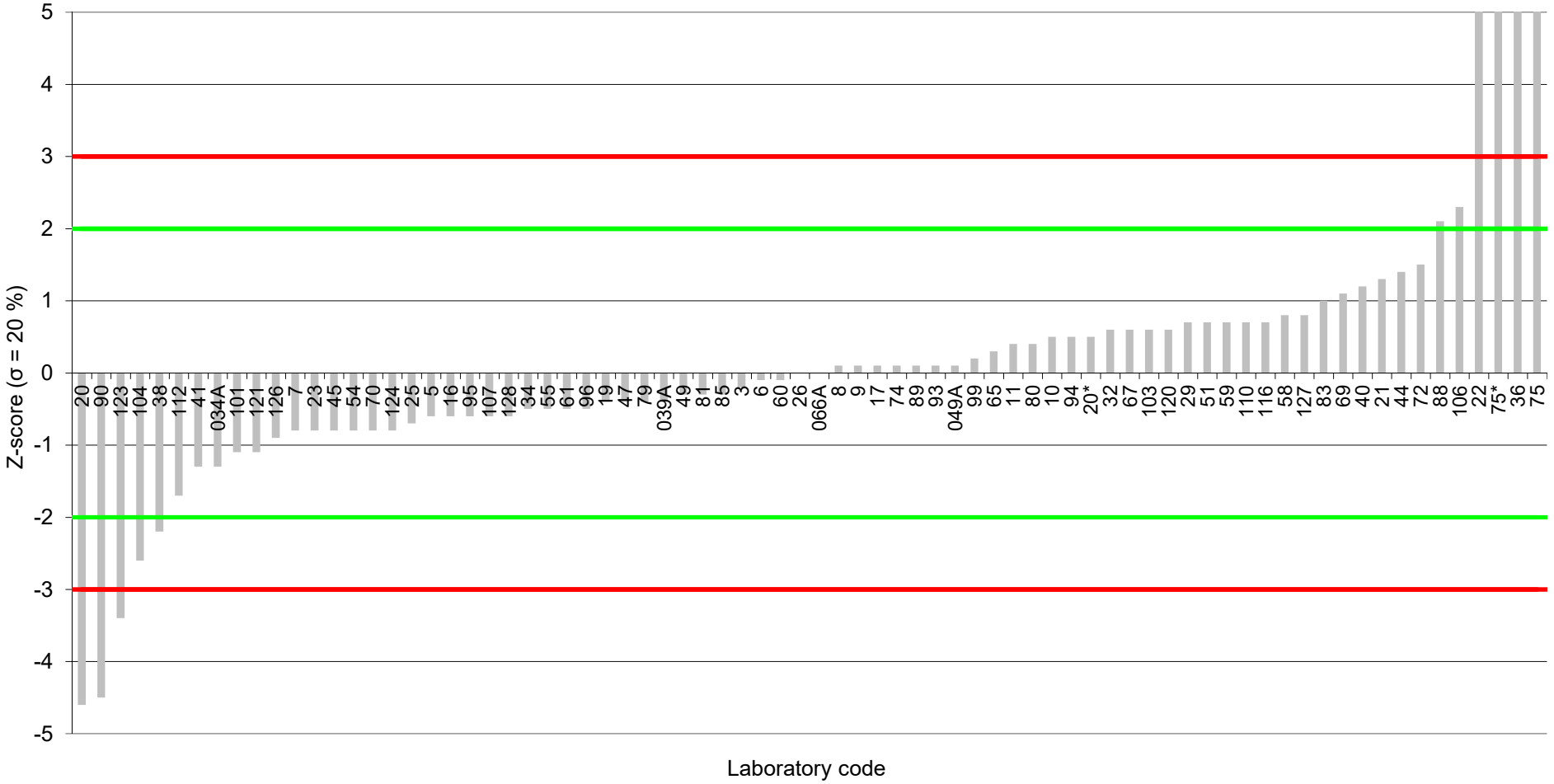
Assigned value: 0.581 pg/g fat



Bovine Meat (2401-BM)

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

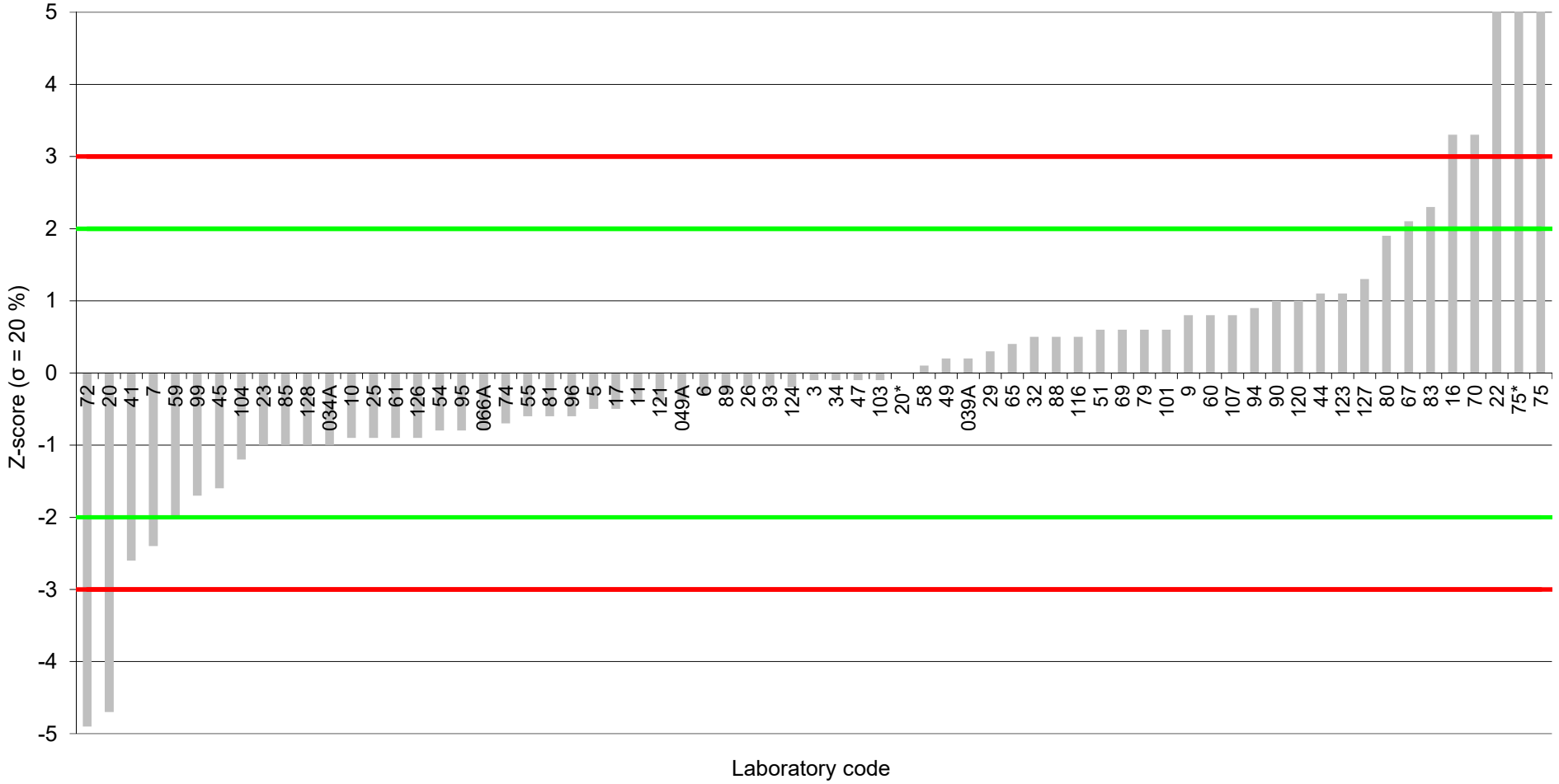
Assigned value: 1.07 pg/g fat



Bovine Meat (2401-BM)

OCDF

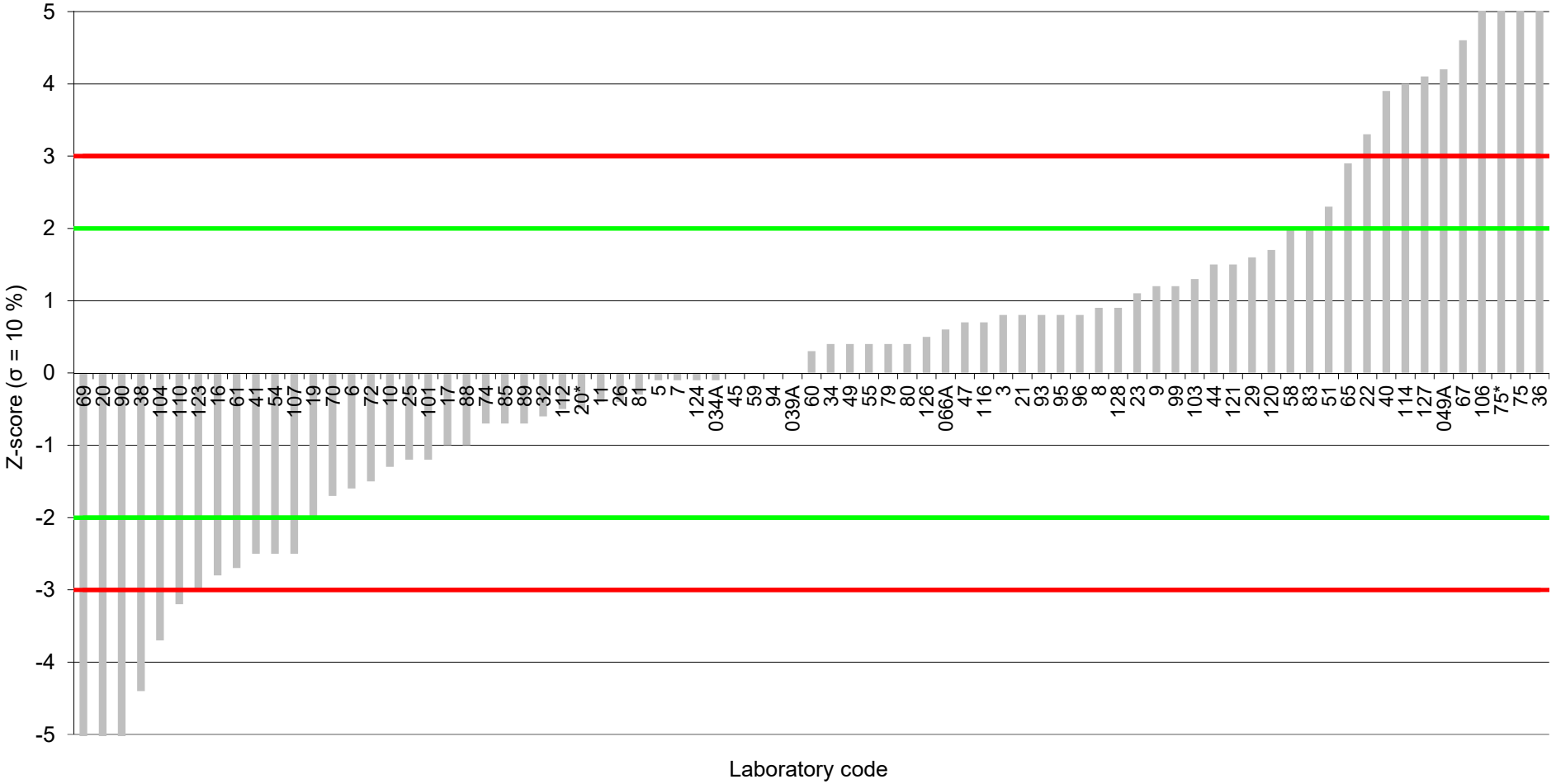
Assigned value: 1.06 pg/g fat



Bovine Meat (2401-BM)

WHO-PCB-TEQ upper bound (reported)

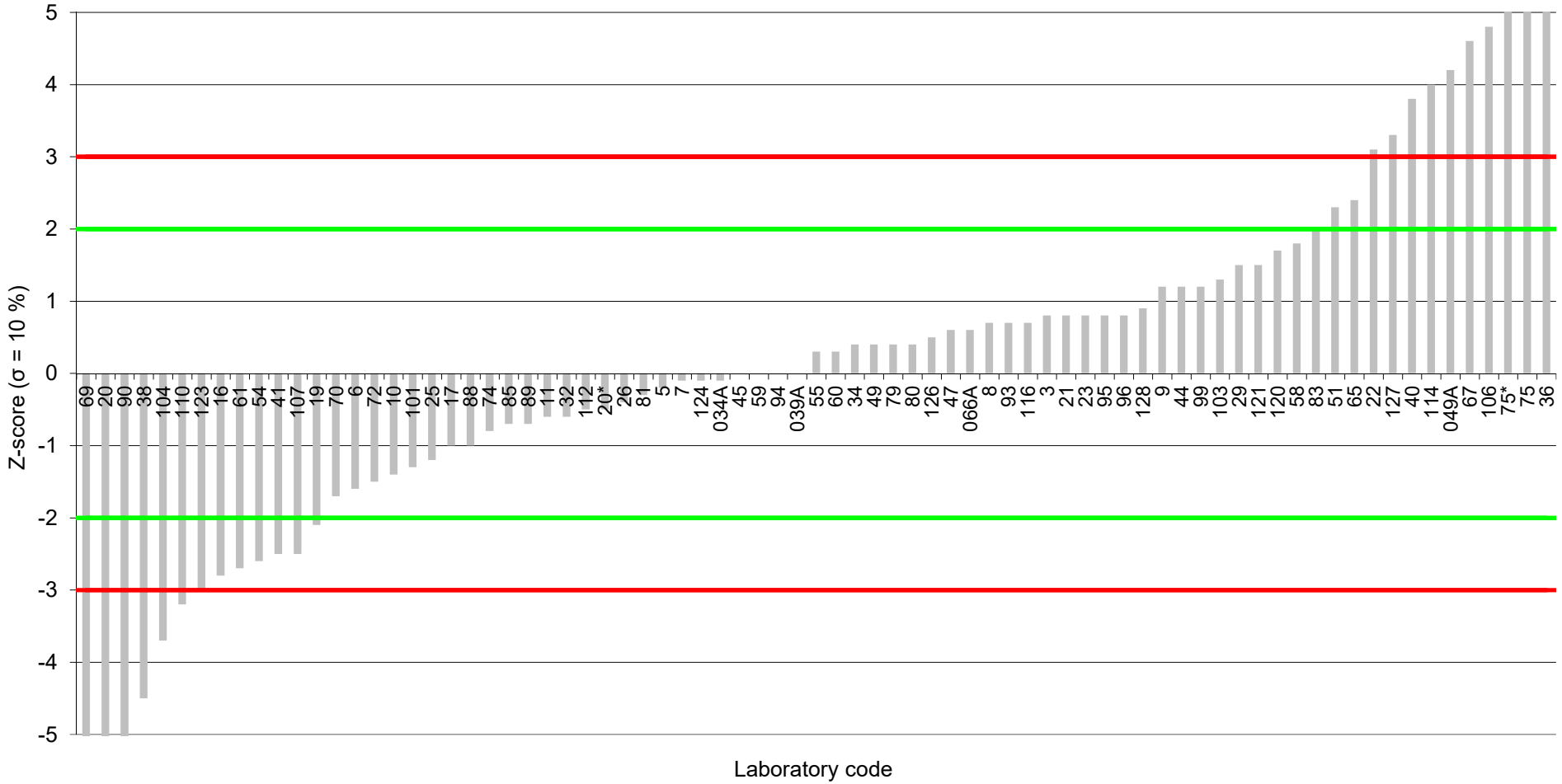
Assigned value: 2.12 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

WHO-PCB-TEQ lower bound (reported)

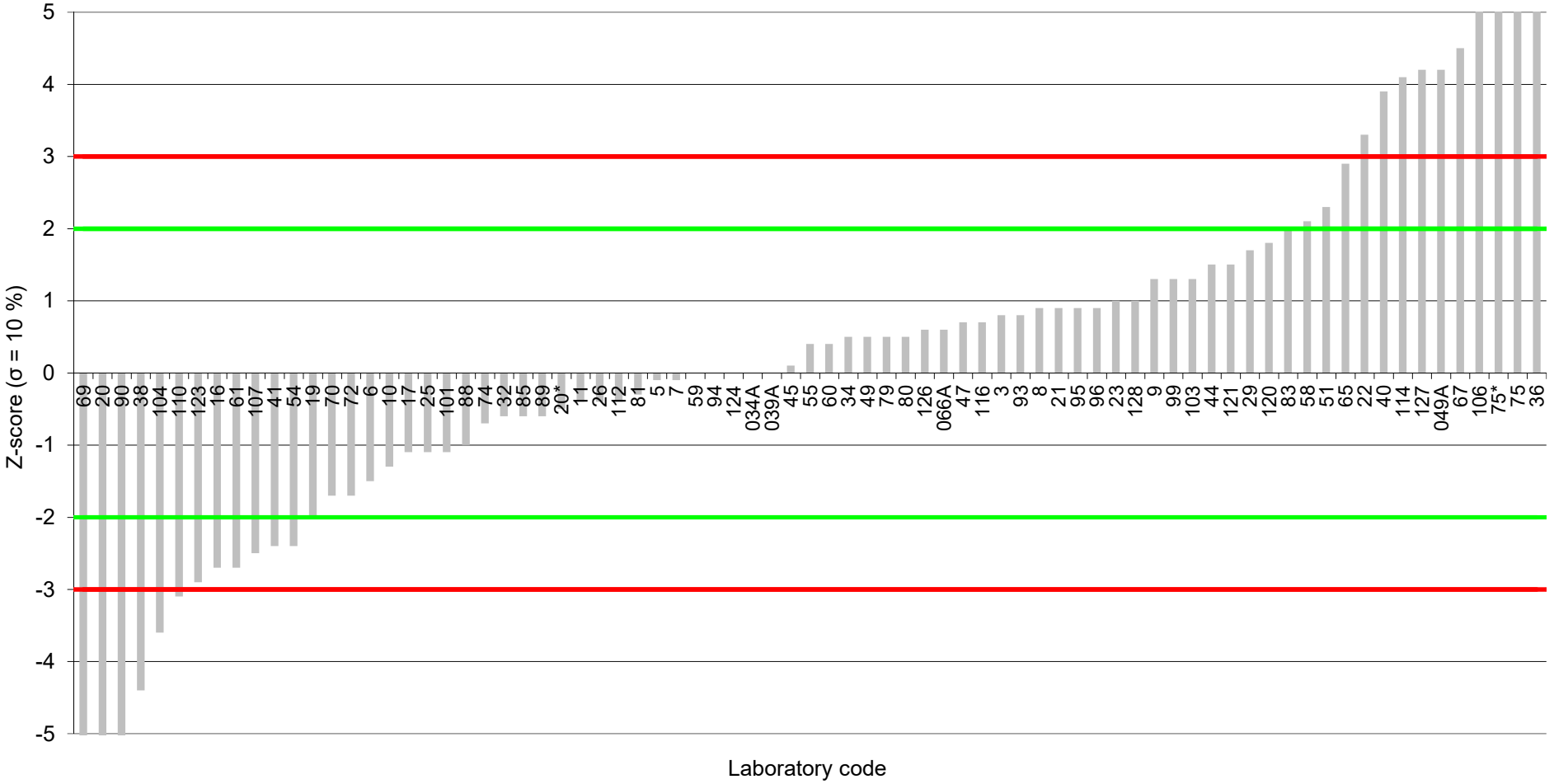
Assigned value: 2.12 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

WHO-PCB-TEQ upper bound (calculated)

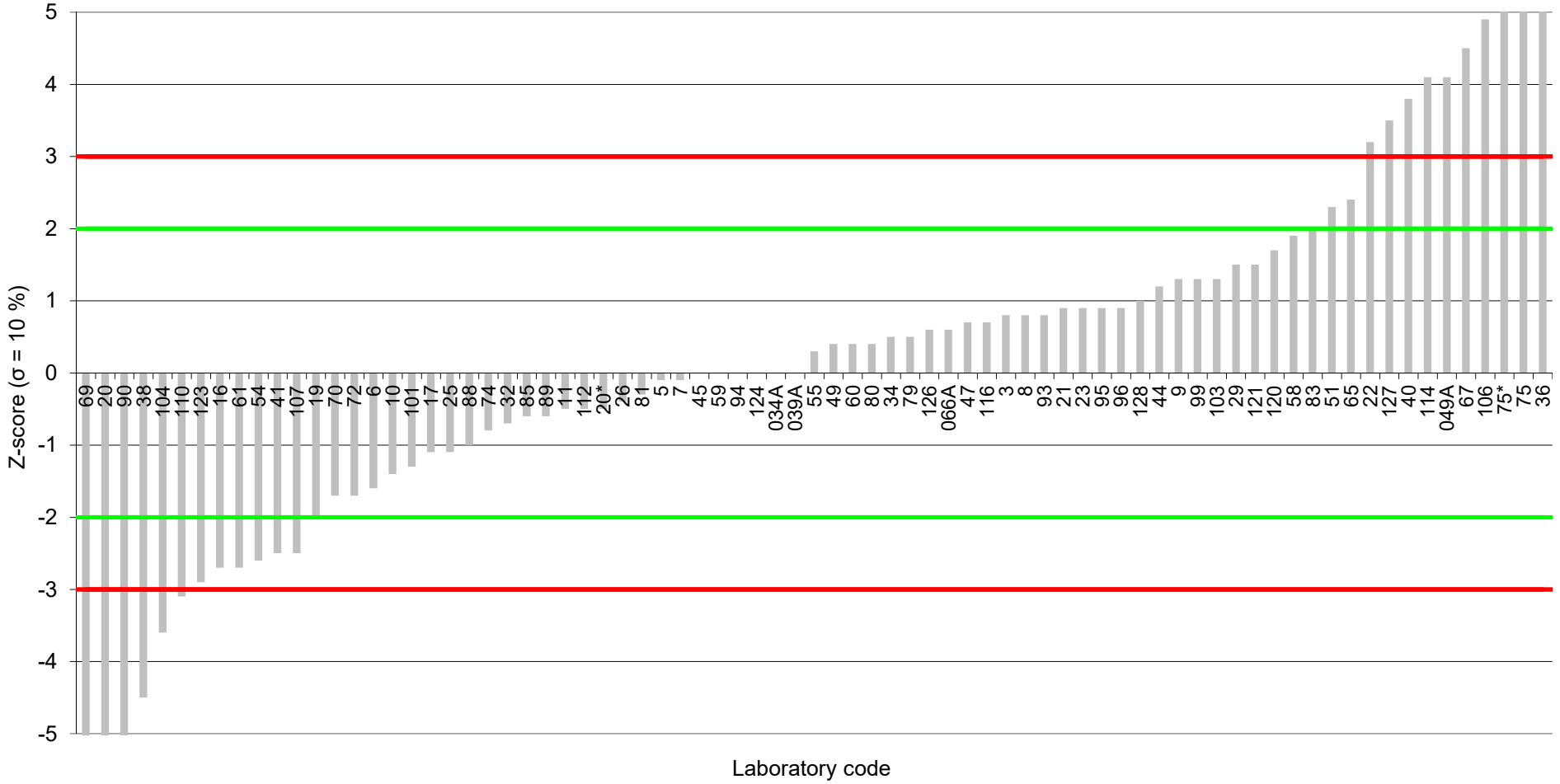
Assigned value: 2.11 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

WHO-PCB-TEQ lower bound (calculated)

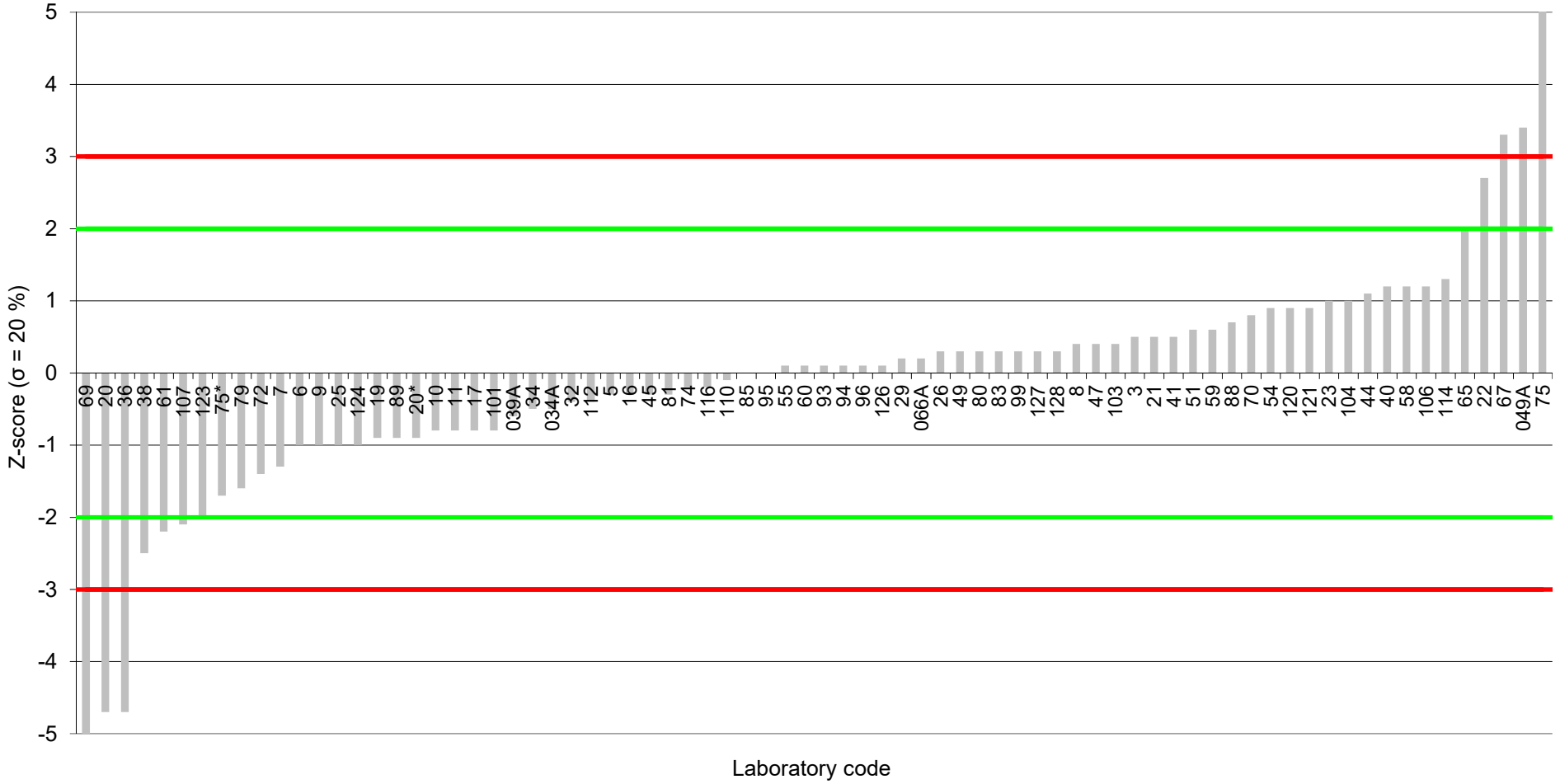
Assigned value: 2.11 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 105

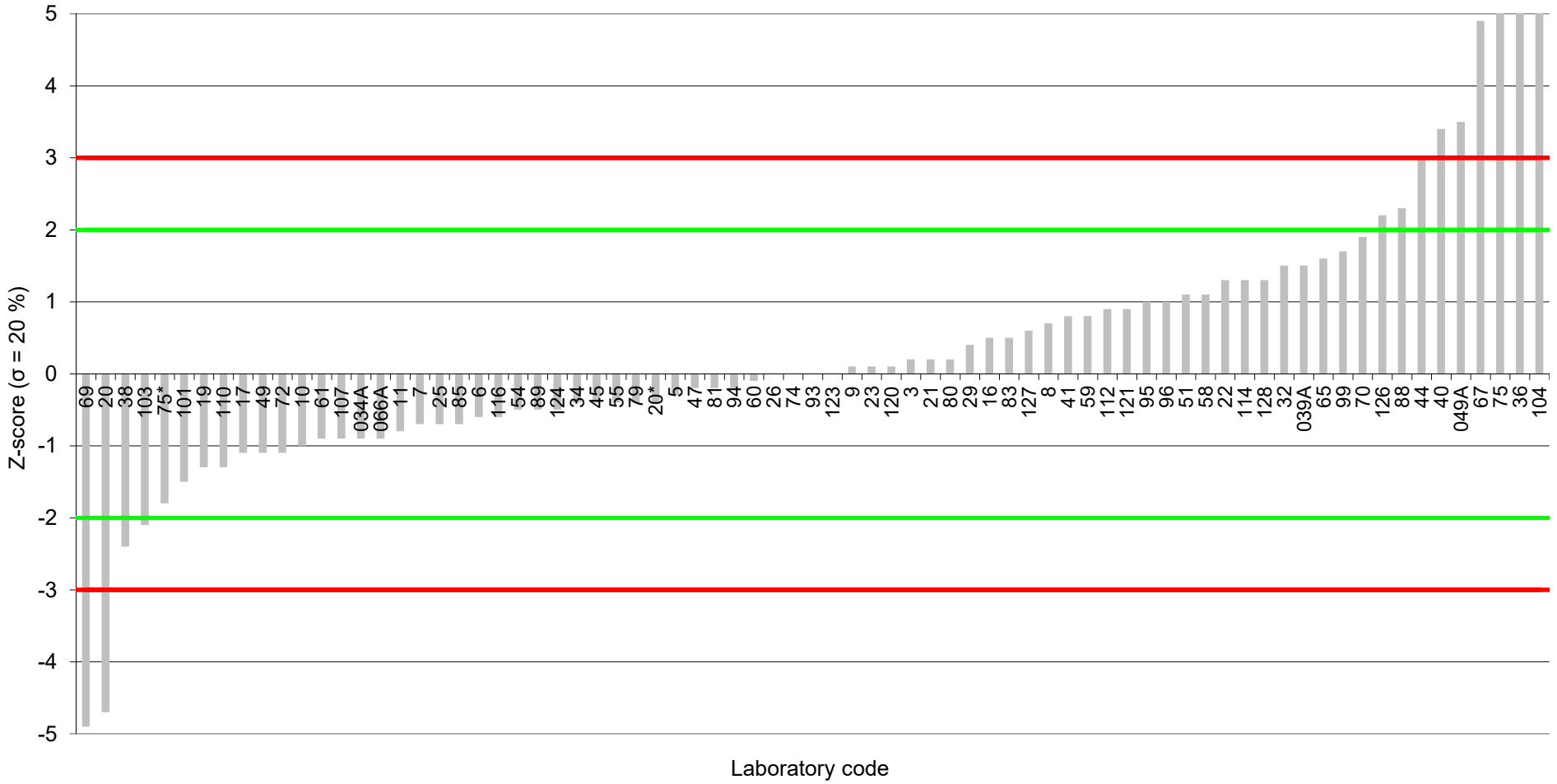
Assigned value: 3390 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 114

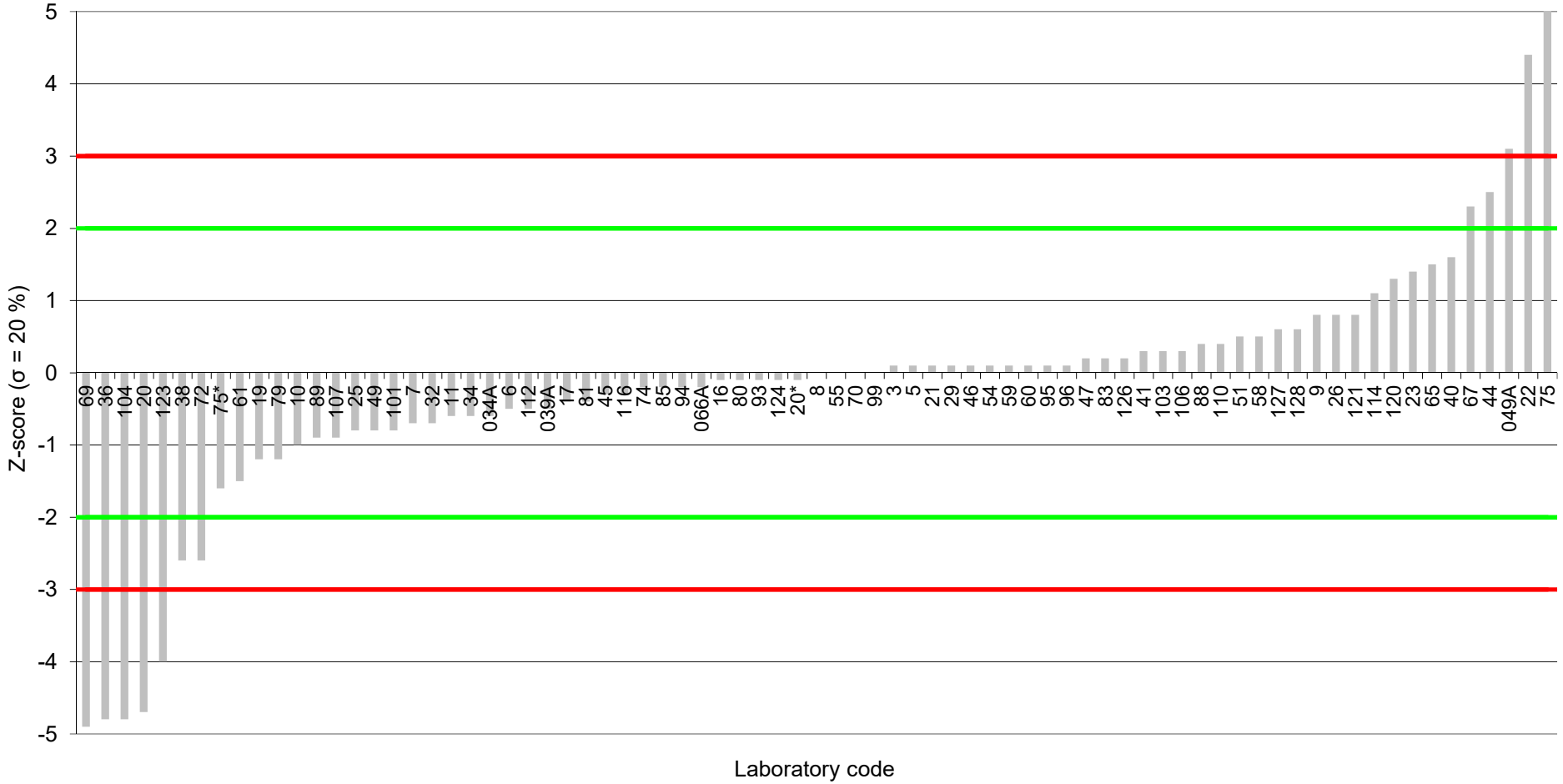
Assigned value: 241 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 118

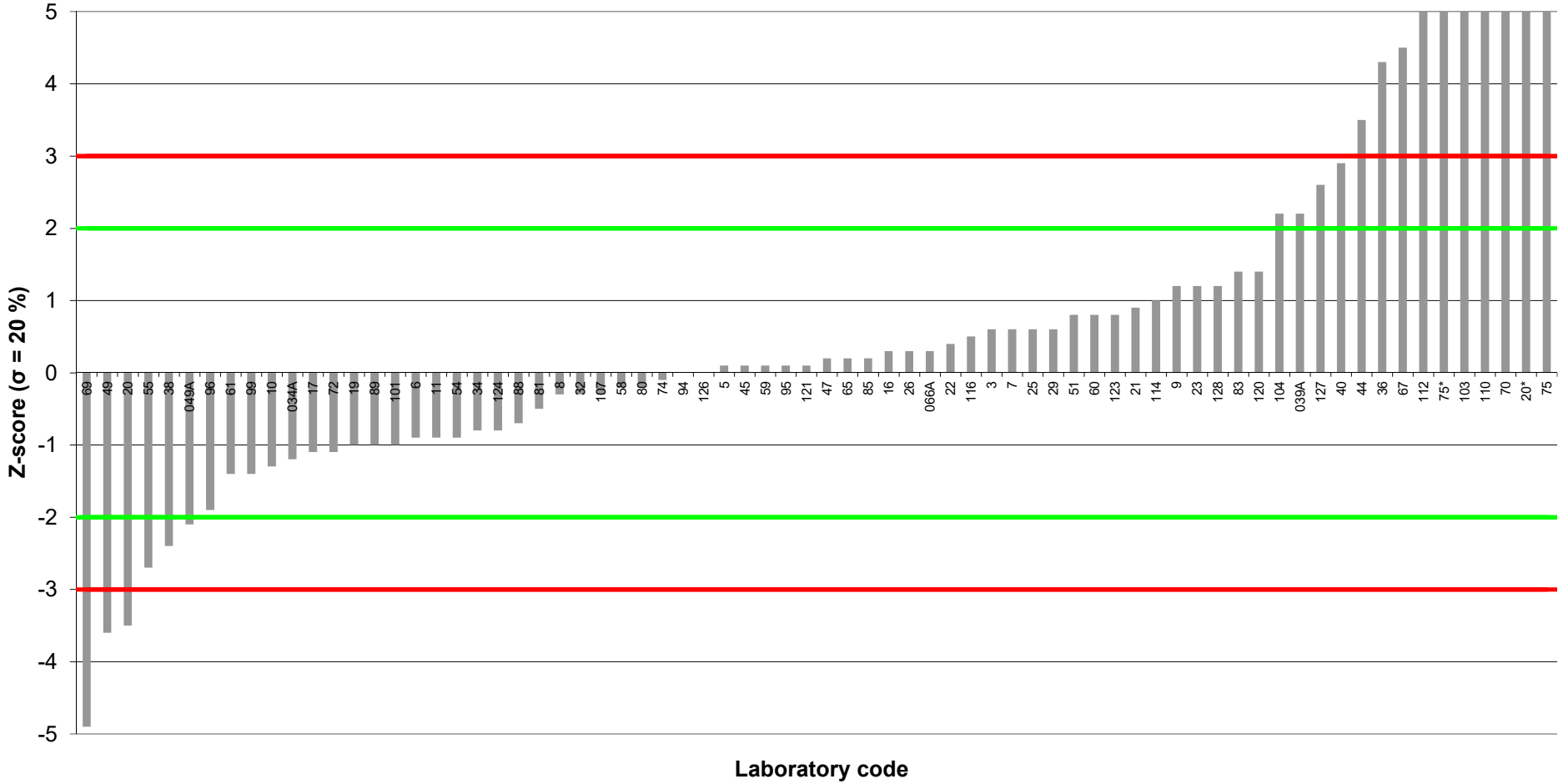
Assigned value: 7420 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 123

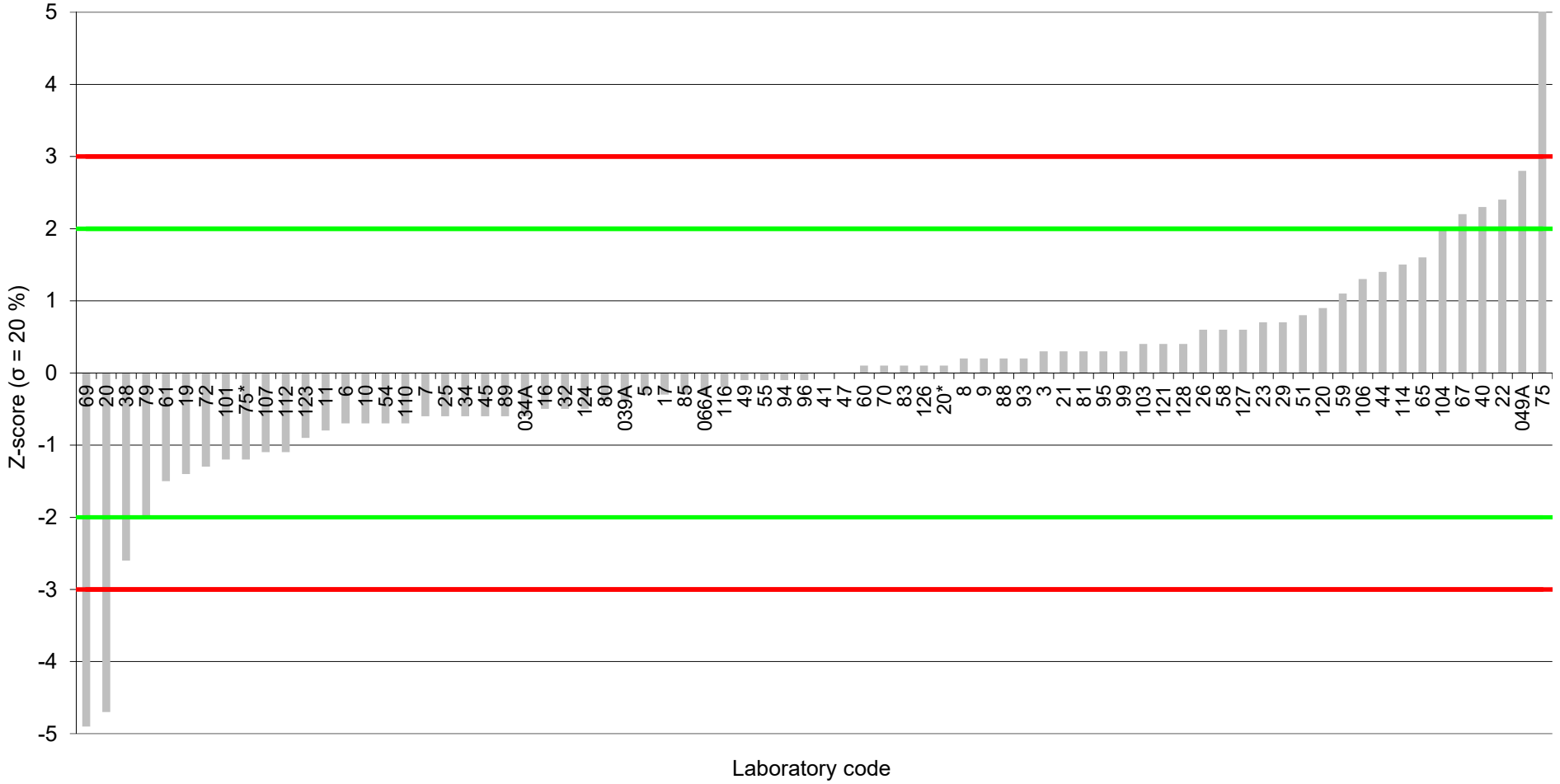
Assigned value: 143 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 156

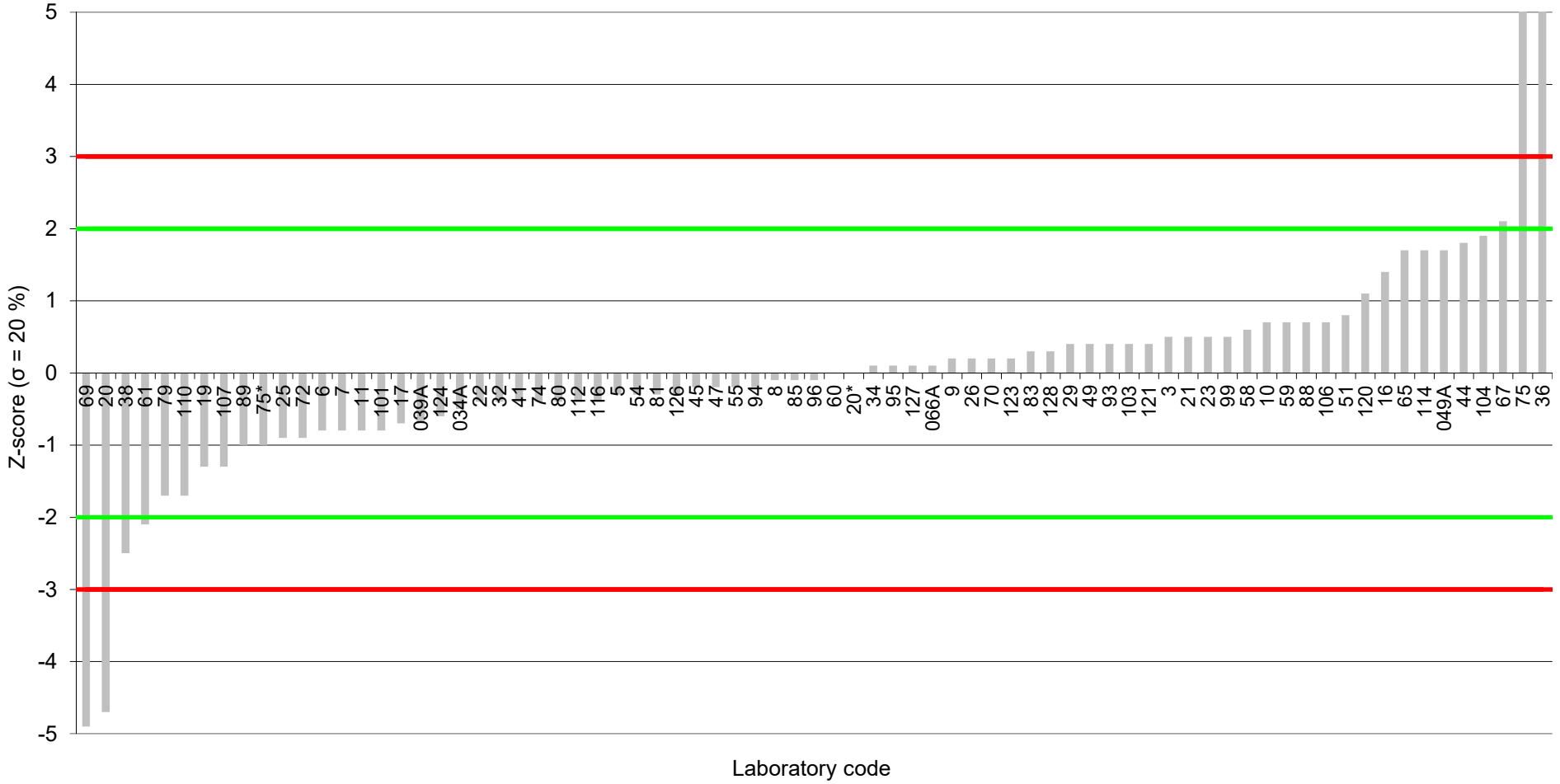
Assigned value: 831 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 157

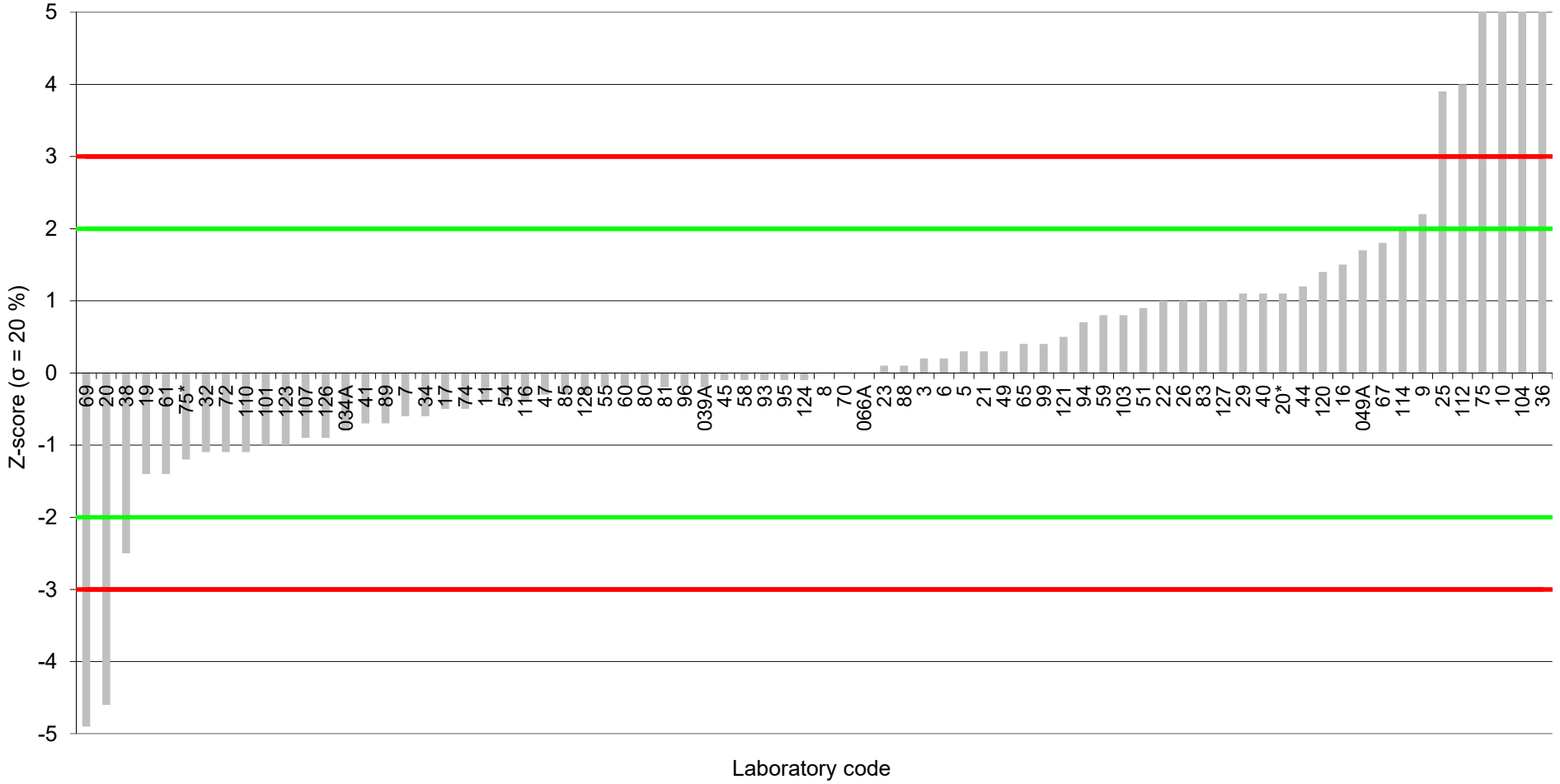
Assigned value: 186 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 167

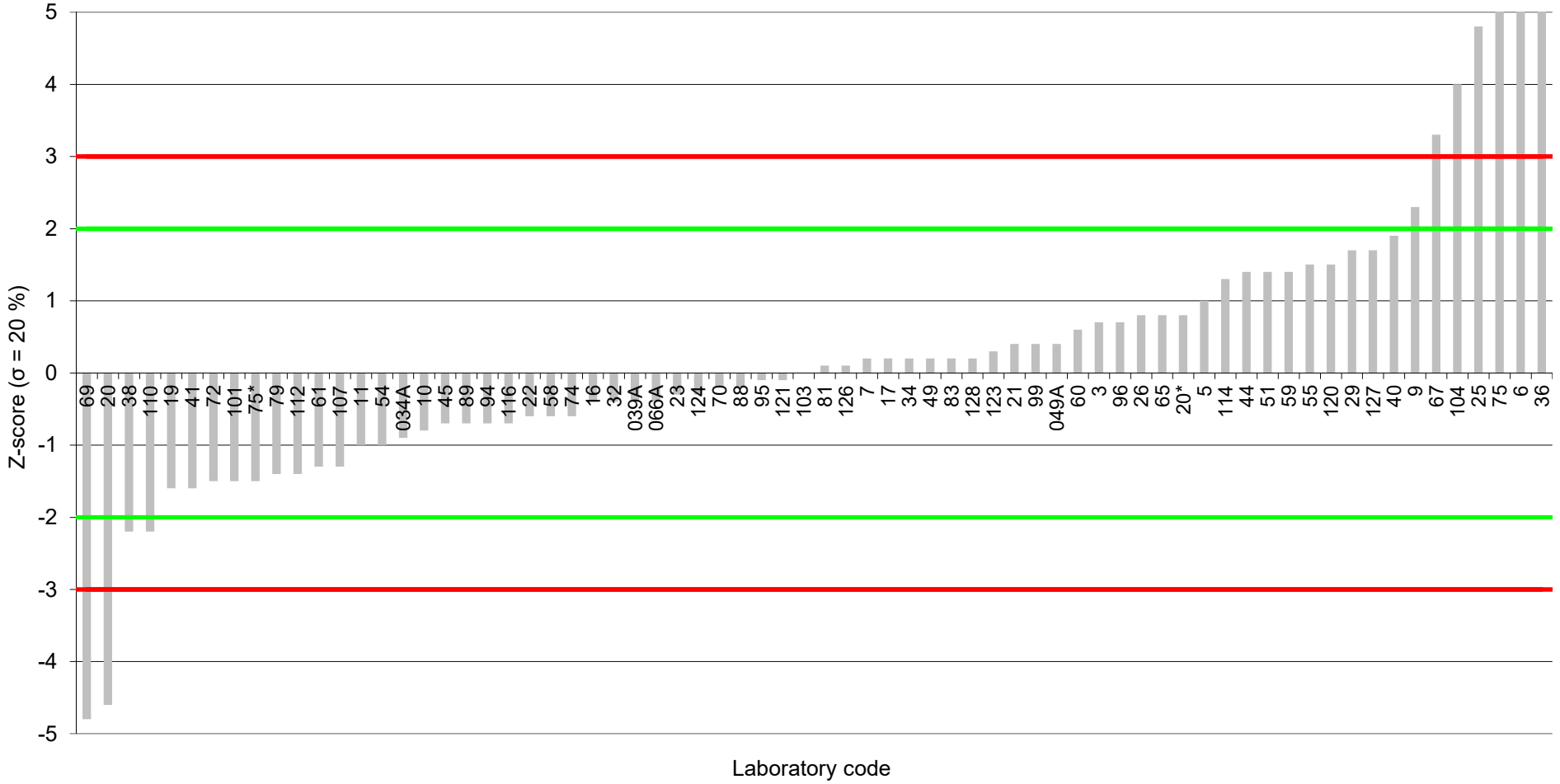
Assigned value: 282 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 189

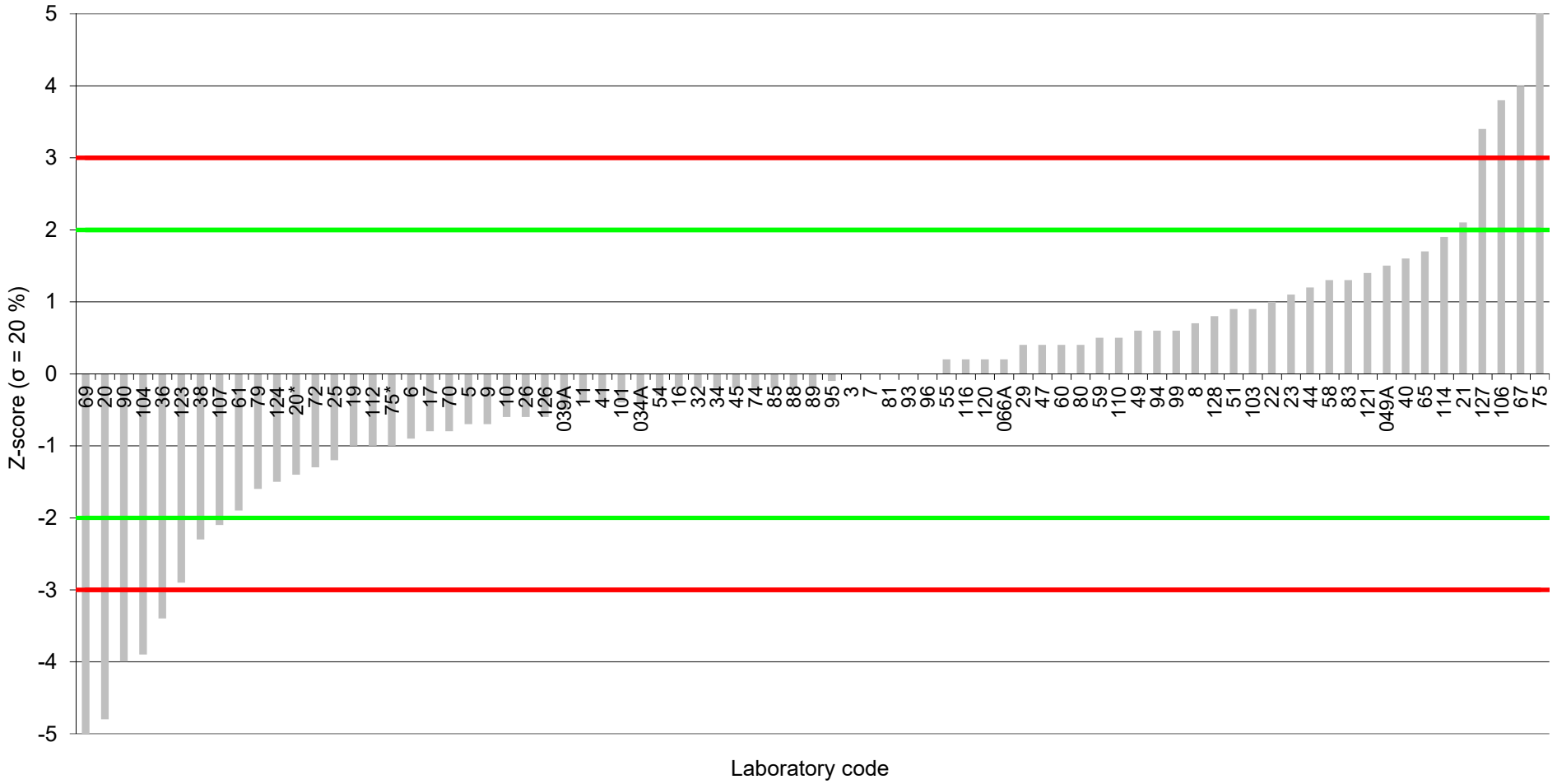
Assigned value: 29.6 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 77

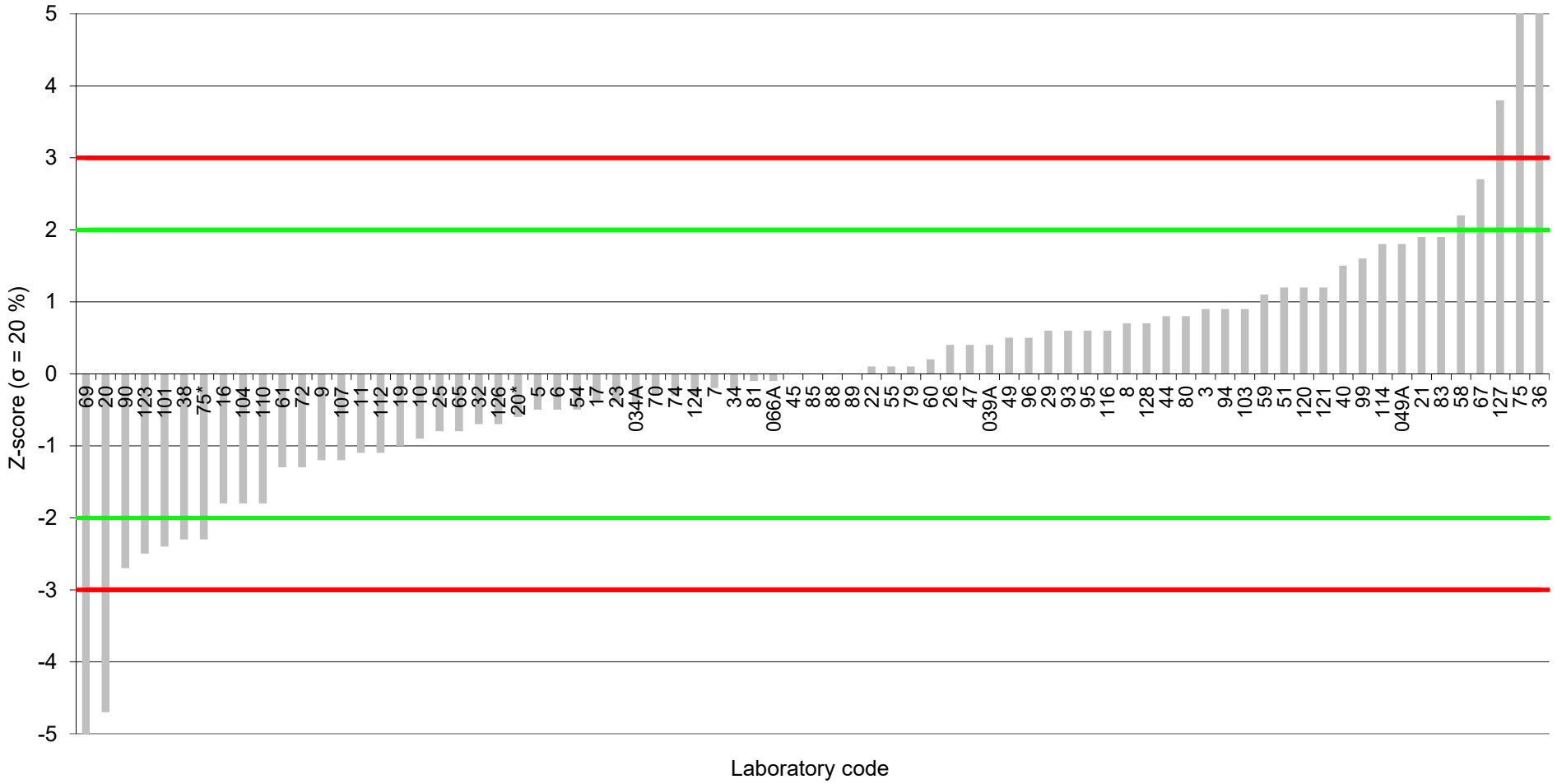
Assigned value: 422 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 81

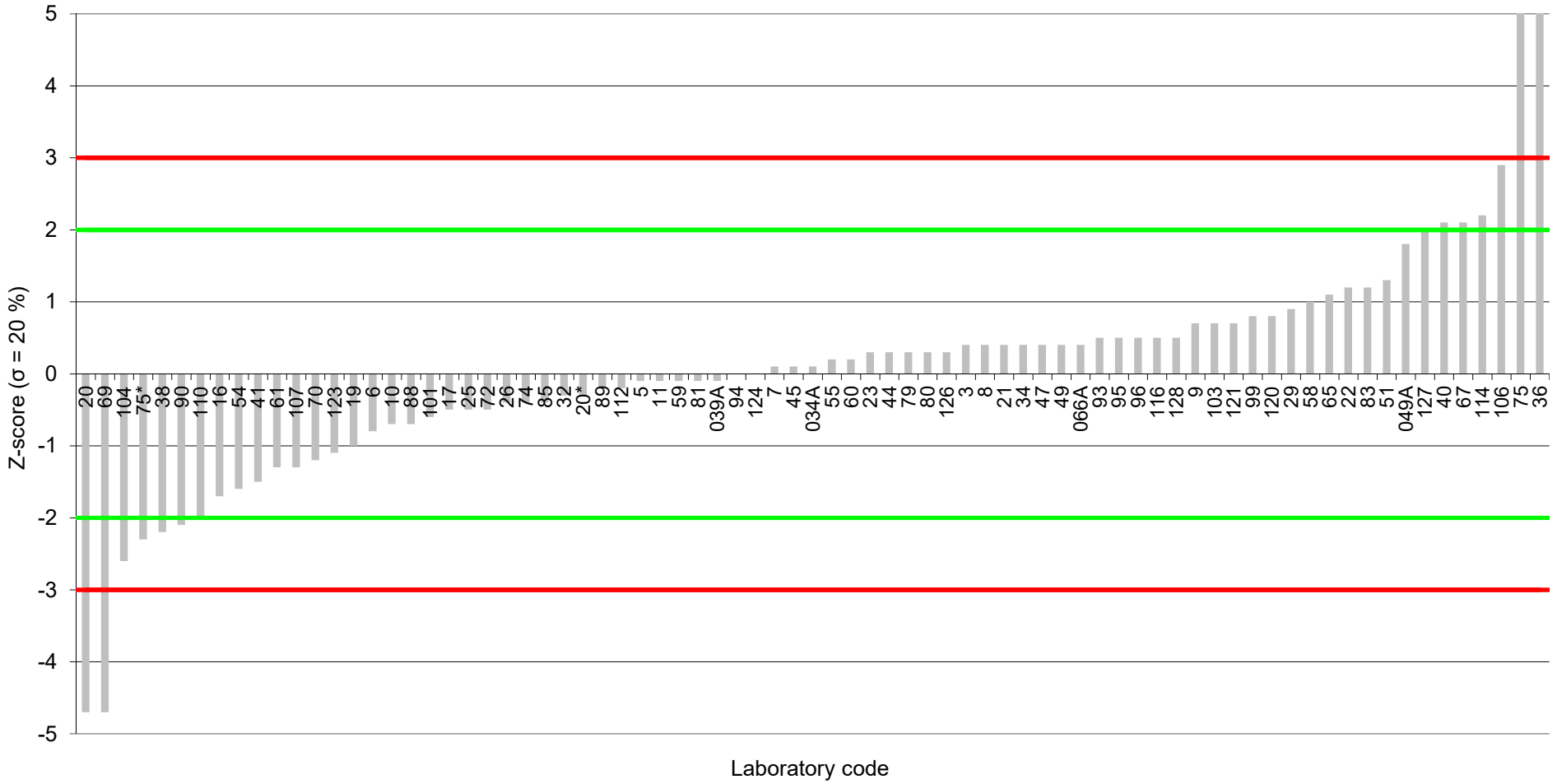
Assigned value: 22.7 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

PCB 126

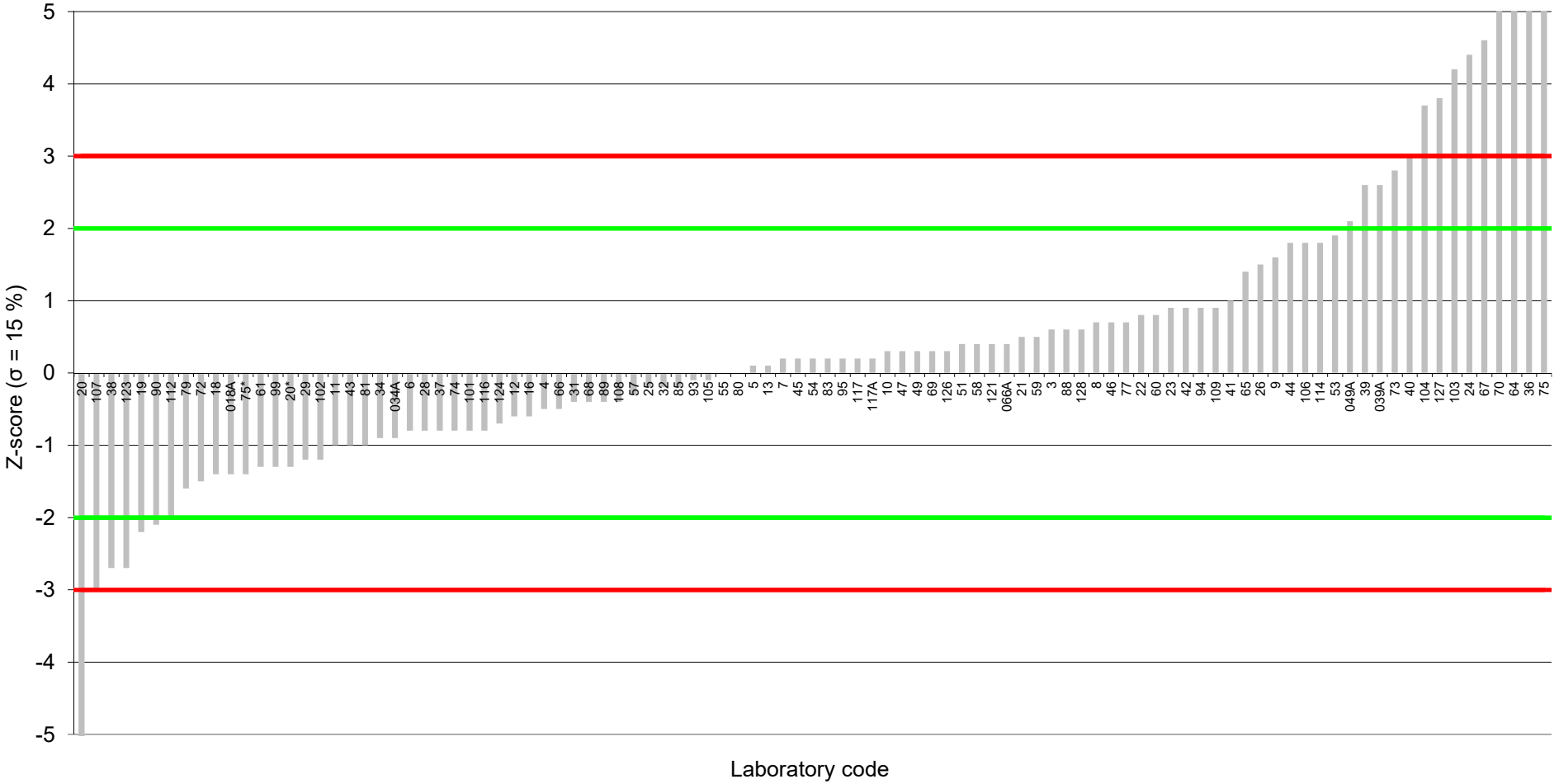
Assigned value: 16.8 ng/kg (12% moisture content)



Bovine Meat (2401-BM)

Sum of 6 NDL-PCBs upper bound (reported)

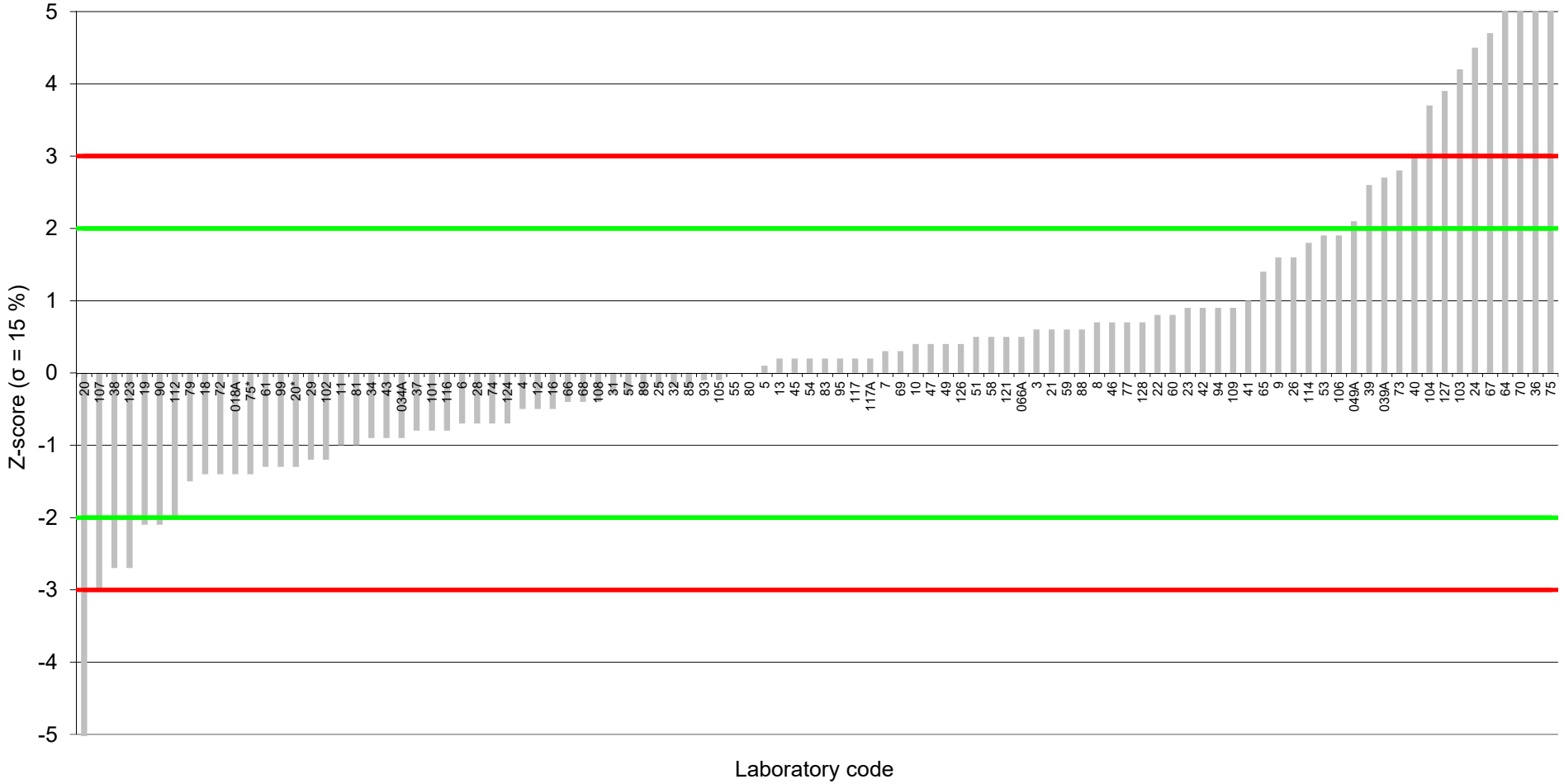
Assigned value: 39 ng/g fat



Bovine Meat (2401-BM)

Sum of 6 NDL-PCBs lower bound (reported)

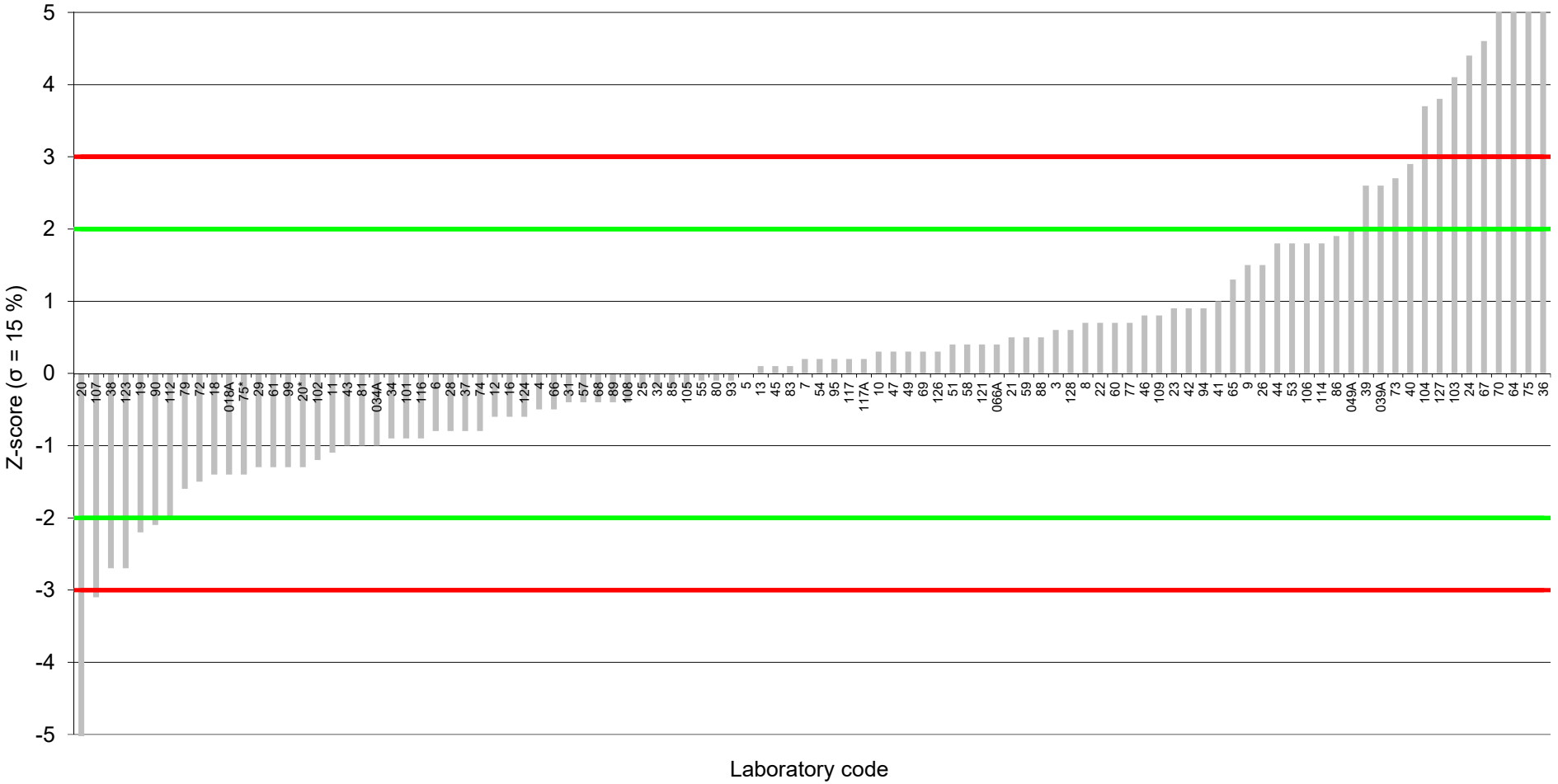
Assigned value: 38.8 ng/g fat



Bovine Meat (2401-BM)

Sum of 6 NDL-PCBs upper bound (calculated)

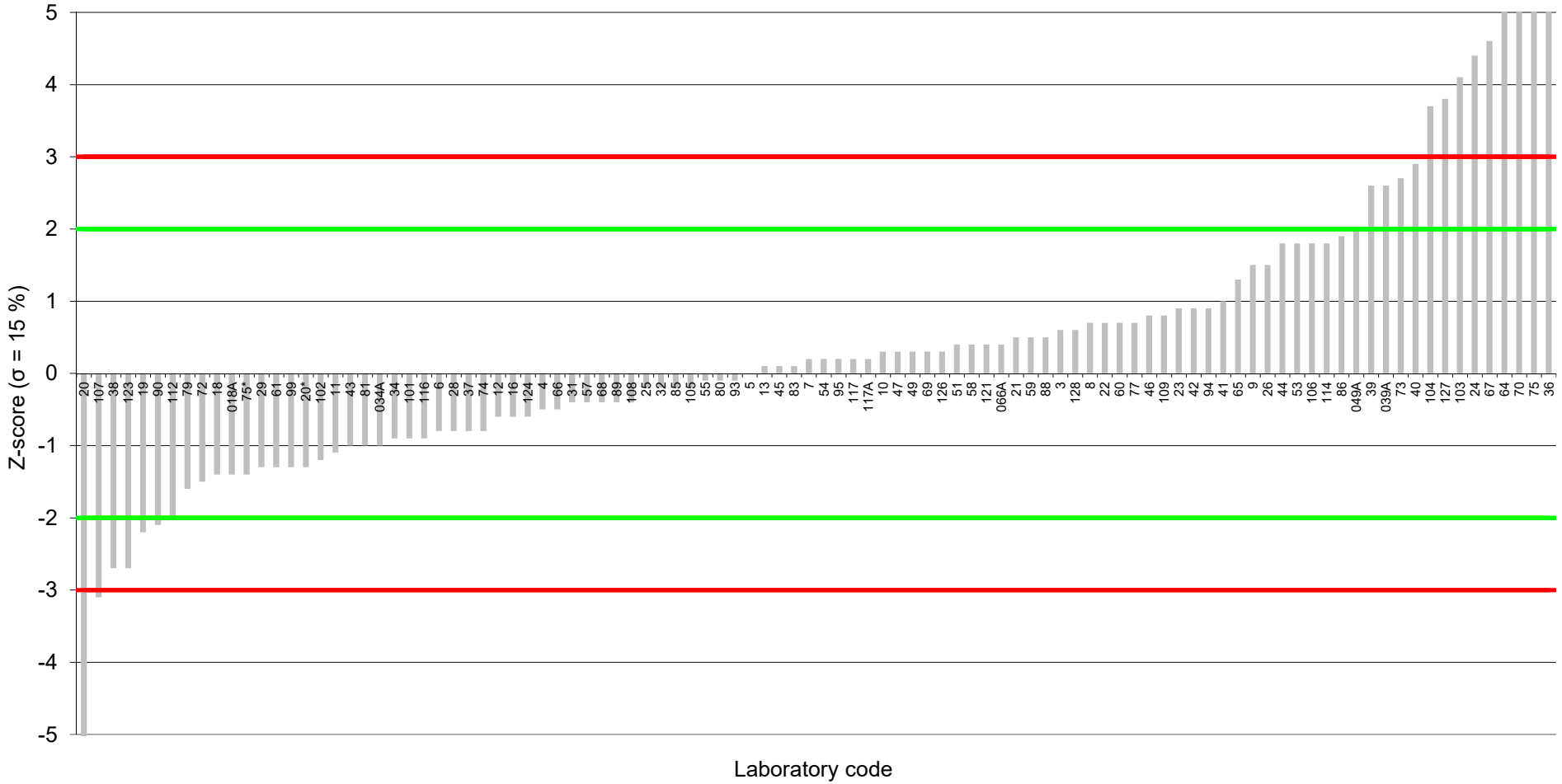
Assigned value: 39.1 ng/g fat



Bovine Meat (2401-BM)

Sum of 6 NDL-PCBs lower bound (calculated)

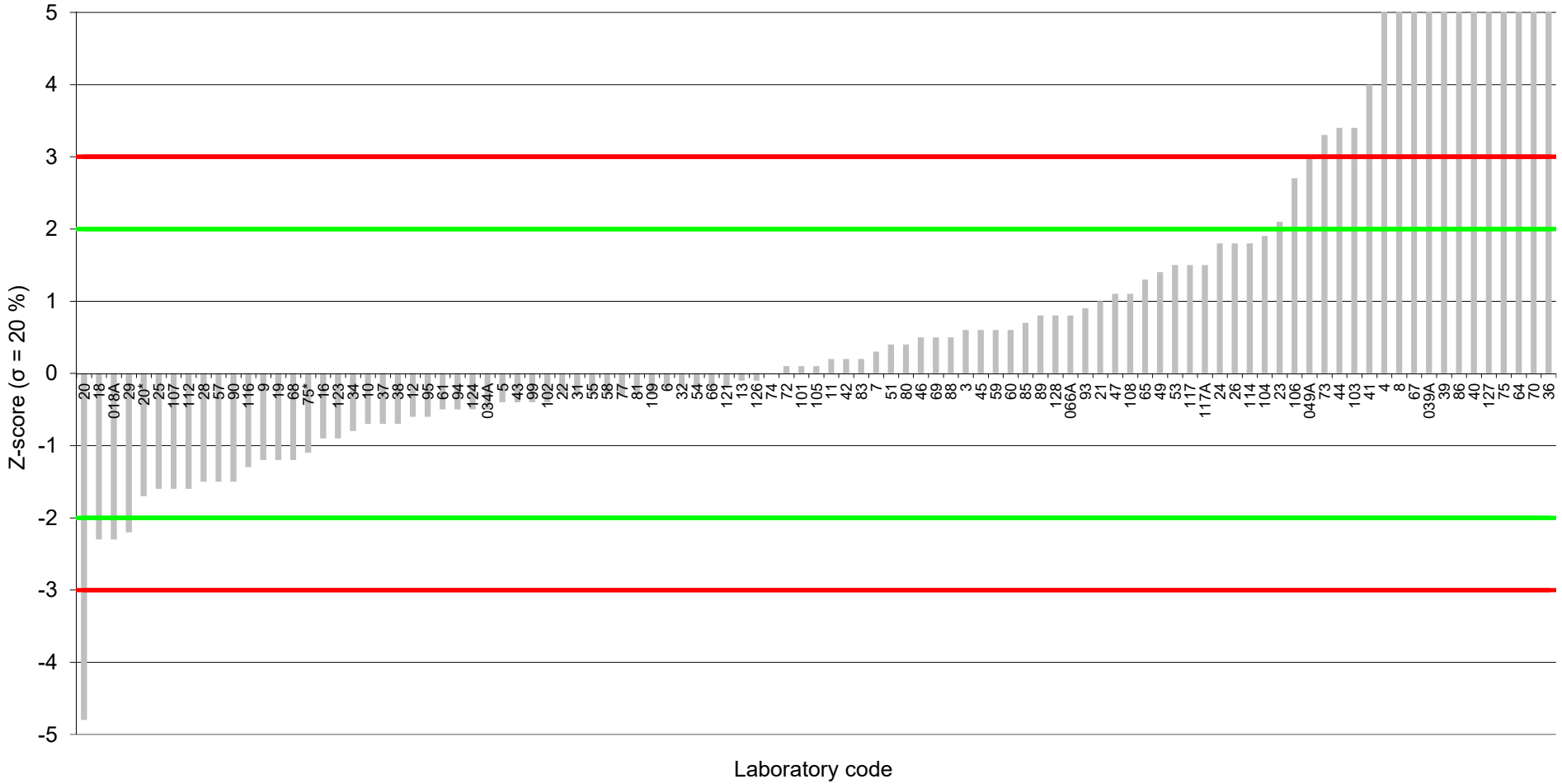
Assigned value: 39.1 ng/g fat



Bovine Meat (2401-BM)

PCB 28

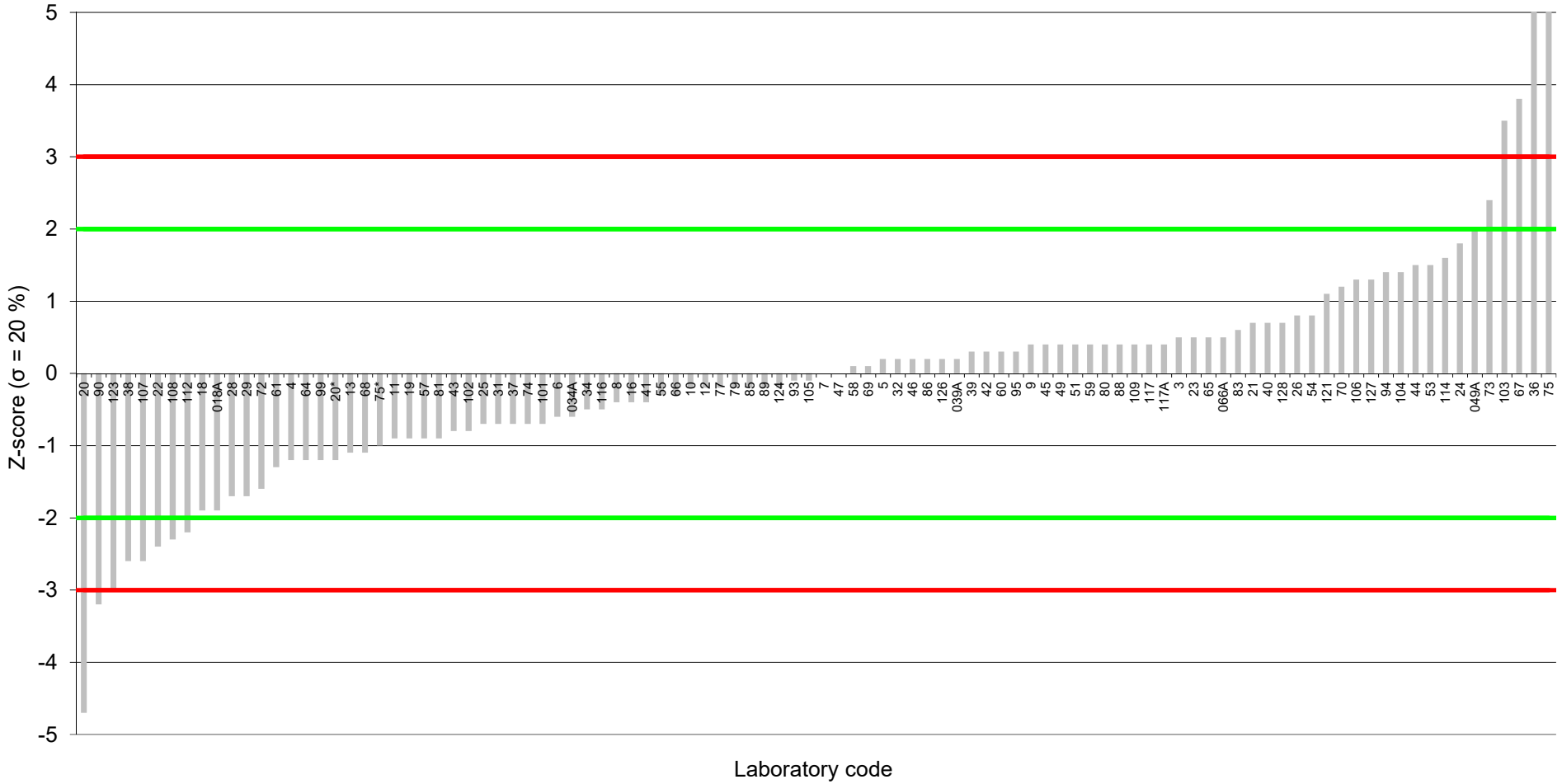
Assigned value: 7.52 ng/g fat



Bovine Meat (2401-BM)

PCB 52

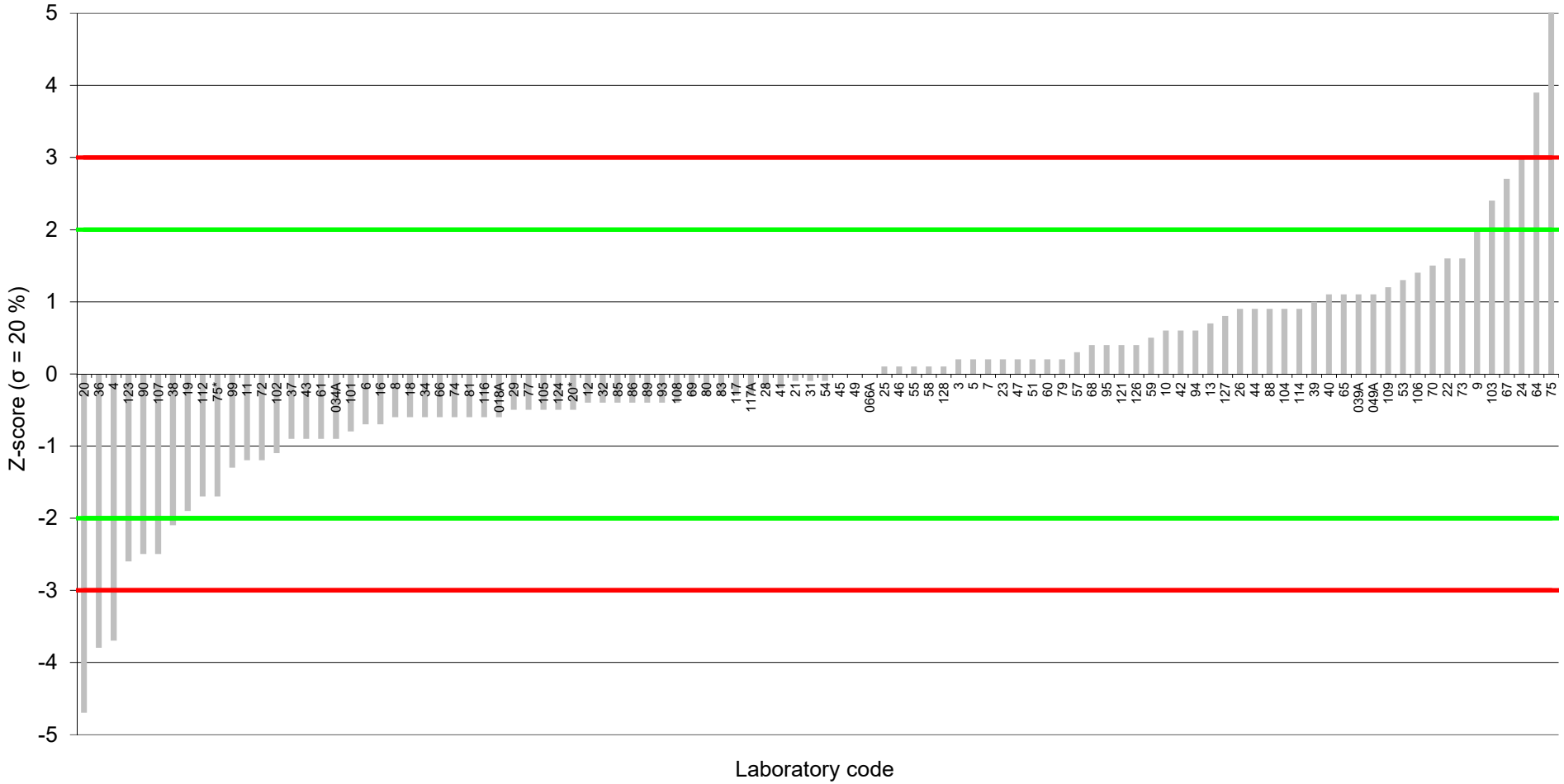
Assigned value: 9.33 ng/g fat



Bovine Meat (2401-BM)

PCB 101

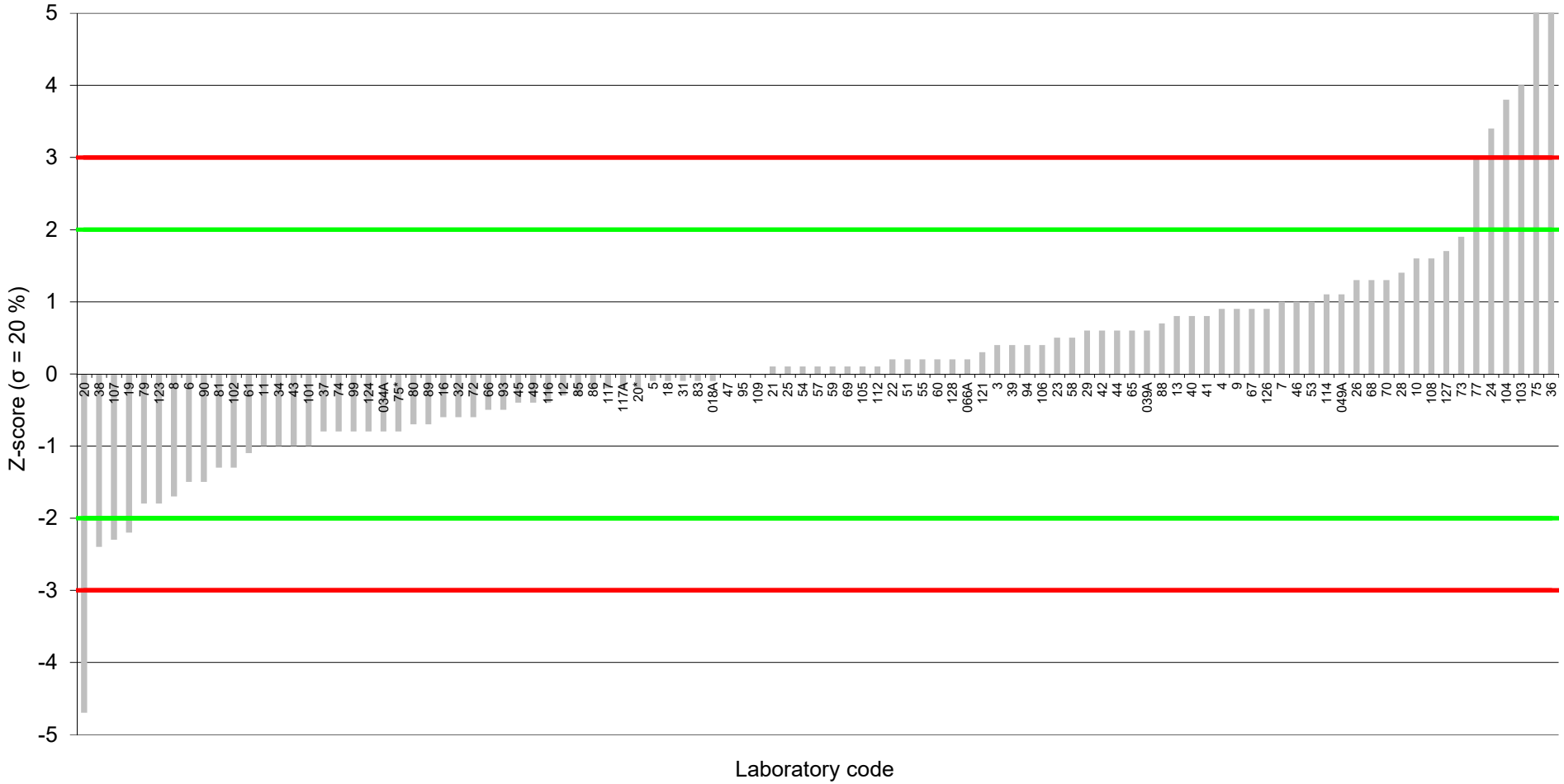
Assigned value: 8.95 ng/g fat



Bovine Meat (2401-BM)

PCB 138

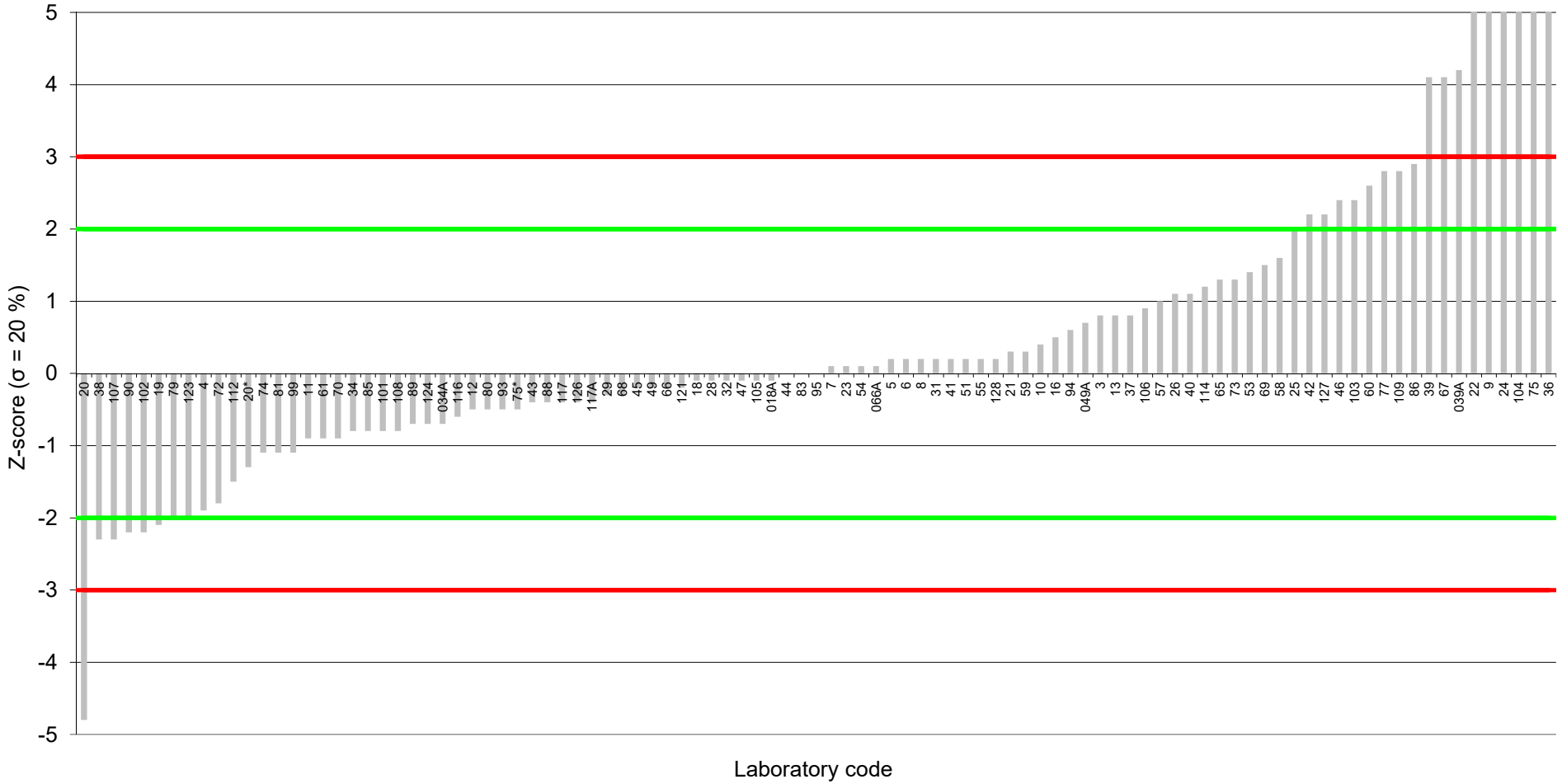
Assigned value: 5.44 ng/g fat



Bovine Meat (2401-BM)

PCB 153

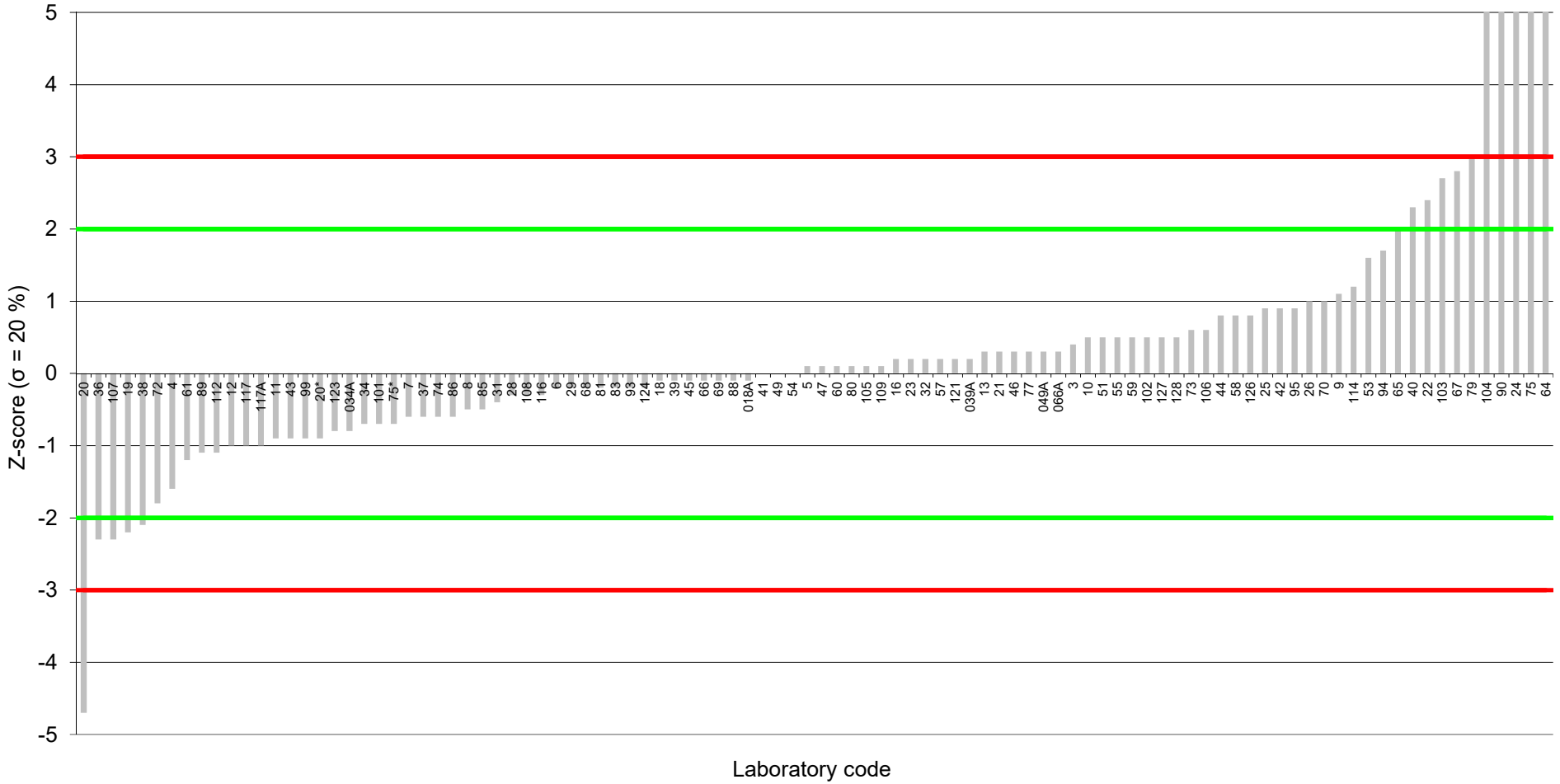
Assigned value: 4.33 ng/g fat



Bovine Meat (2401-BM)

PCB 180

Assigned value: 3.39 ng/g fat



EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
15 April 2025

Annex 5: Scoring system for PCDD/Fs and PCBs

Test sample - Bovine Meat (2401-BM)

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 PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
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 Iz-scorel ≥ 2, no parameter with Iz-scorel ≥ 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	2401-BM																	
2	2401-BM																	
3	2401-BM		0.9	0.4	0.8	0.6	Passed	100%	100%	100%	yes		**yes**					
4	2401-BM					-0.5	Passed			65%	yes		**no**				**x**	
5	2401-BM		-1.7	-3.9	-0.1	0.1	Failed	92%	100%	100%	yes		**no**	**x**				
6	2401-BM		-2.9	-4.9	-1.6	-0.8	Failed	76%	93%	100%	yes		**no**	**x**				
7	2401-BM		-2.3	-5.2	-0.1	0.2	Failed	80%	100%	100%	yes		**no**	**x**				
8	2401-BM		1.9	2.5	0.9	0.7	Passed	100%	100%	82%	yes		**yes**					
9	2401-BM		-0.9	-3.8	1.2	1.6	Failed	83%	93%	82%	yes		**no**	**x**				
10	2401-BM		-0.2	0.6	-1.3	0.3	Passed	100%	93%	100%	yes		**yes**					
11	2401-BM		0.3	0.7	-0.4	-1.0	Passed	100%	100%	100%	yes		**yes**					
12	2401-BM					-0.6	Passed			100%	yes		**yes**					
13	2401-BM					0.1	Passed			100%	yes		**yes**					
14	2401-BM																	
15	2401-BM																	
16	2401-BM		-2.1	-1.8	-2.8	-0.6	Failed	72%	100%	100%	yes		**no**	**x**	**x**			
17	2401-BM		-1.5	-2.6	-1.0		Passed	94%	100%		yes		**yes**					
18	2401-BM					-1.4	Passed			91%	yes		**yes**					
19	2401-BM		-0.8	0.1	-2.0	-2.2	Passed	87%	100%	76%	yes		**yes**					
20	2401-BM		-9.4	-9.5	-9.4	-6.3	Failed	0%	0%	0%	yes		**no**	**x**	**x**	**x**	**x**	
21	2401-BM		1.3	1.3	0.8	0.5	Passed	100%	96%	100%	yes		**yes**					
22	2401-BM		5.5	7.2	3.3	0.8	Failed	58%	76%	68%	yes		**no**	**x**	**x**		**x**	
23	2401-BM		0.3	-0.4	1.1	0.9	Passed	100%	100%	91%	yes		**yes**					
24	2401-BM					4.4	Failed			44%	yes		**no**	**x**			**x**	
25	2401-BM		-2.2	-3.8	-1.2	-0.2	Failed	84%	85%	100%	yes		**no**	**x**				
26	2401-BM		-1.5	-3.1	-0.4	1.5	Failed	94%	100%	100%	yes		**no**	**x**				
27	2401-BM																	
28	2401-BM					-0.8	Passed			100%	yes		**yes**					
29	2401-BM		1.4	0.6	1.6	-1.2	Passed	100%	100%	91%	yes		**yes**					
30	2401-BM																	
31	2401-BM					-0.4	Passed			100%	yes		**yes**					
32	2401-BM		0.9	2.0	-0.6	-0.2	Passed	86%	100%	100%	yes		**yes**					
33	2401-BM																	
34	2401-BM		0.4	-0.2	0.4	-0.9	Passed	100%	100%	100%	yes		**yes**					
35	2401-BM																	
36	2401-BM		4627.3	68.3	8339.1	11.5	Failed	3%	0%	6%	no		**no**	**x**	**x**	**x**	**x**	**x**
37	2401-BM					-0.8	Passed			100%	yes		**yes**					
38	2401-BM		-4.0	-3.8	-4.4	-2.7	Failed	91%	50%	59%	yes		**no**	**x**		**x**	**x**	
39	2401-BM					2.6	Passed			65%	yes		**no**				**x**	
40	2401-BM		3.4	2.1	3.9	3.0	Failed	93%	76%	76%	yes		**no**	**x**				
41	2401-BM		-2.2	-2.3	-2.5	1.0	Failed	97%	100%	82%	yes		**no**	**x**				
42	2401-BM					0.9	Passed			91%	yes		**yes**					
43	2401-BM					-1.0	Passed			100%	yes		**yes**					
44	2401-BM		1.1	0.1	1.5	1.8	Passed	93%	81%	82%	yes		**yes**					
45	2401-BM		-0.6	-2.0	0.0	0.2	Passed	100%	100%	100%	yes		**yes**					
46	2401-BM					0.7	Passed		100%	91%	yes		**yes**					
47	2401-BM		1.8	2.5	0.7	0.3	Passed	94%	100%	100%	yes		**yes**					
48	2401-BM																	
49	2401-BM		1.4	2.0	0.4	0.3	Passed	87%	93%	100%	yes		**yes**					
50	2401-BM																	
51	2401-BM		2.4	2.0	2.3	0.4	Failed	97%	100%	100%	yes		**no**	**x**				
52	2401-BM																	
53	2401-BM					1.9	Passed			100%	yes		**yes**					
54	2401-BM		-1.2	-0.2	-2.5	0.2	Passed	100%	100%	100%	yes		**yes**					
55	2401-BM		0.8	0.7	0.4	0.0	Passed	100%	96%	100%	yes		**yes**					
56	2401-BM																	
57	2401-BM					-0.3	Passed			100%	yes		**yes**					
58	2401-BM		2.4	2.2	2.0	0.4	Failed	100%	96%	100%	yes		**no**	**x**				
59	2401-BM		-0.2	-1.0	0.0	0.5	Passed	100%	100%	100%	yes		**yes**					
60	2401-BM		0.4	-0.1	0.3	0.8	Passed	100%	100%	91%	yes		**yes**					
61	2401-BM		-3.3	-4.3	-2.7	-1.3	Failed	80%	91%	100%	yes		**no**	**x**				
62	2401-BM																	
63	2401-BM																	
64	2401-BM					7.2	Failed			27%	yes		**no**	**x**			**x**	
65	2401-BM		2.8	2.7	2.9	1.4	Failed	100%	100%	100%	yes		**no**	**x**				
66	2401-BM					-0.5	Passed			100%	yes		**yes**					
67	2401-BM		4.5	3.6	4.6	4.6	Failed	71%	34%	32%	yes		**no**	**x**	**x**	**x**	**x**	
68	2401-BM					-0.4	Passed			100%	yes		**yes**					

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
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.
69	2401-BM		-4.3	1.3	-9.5	0.3	Failed	97%	0%	100%	yes		no	x		x		
70	2401-BM		-0.2	1.1	-1.7	5.7	Failed	88%	93%	82%	yes		no	x				
71	2401-BM																	
72	2401-BM		-0.2	1.4	-1.5	-1.5	Passed	83%	93%	100%	yes		yes					
73	2401-BM					2.8	Passed			74%	yes		no				x	
74	2401-BM		0.2	0.2	-0.7	-0.8	Passed	100%	100%	100%	yes		yes					
75	2401-BM		46.7	36.3	53.2	14.5	Failed	0%	0%	0%	yes		no	x	x	x	x	
76	2401-BM																	
77	2401-BM					0.7	Passed			82%	yes		yes					
78	2401-BM																	
79	2401-BM		-0.5	-2.2	0.4	-1.6	Passed	78%	100%	93%	yes		yes					
80	2401-BM		0.9	0.9	0.4	0.0	Passed	92%	100%	100%	yes		yes					
81	2401-BM		0.5	1.0	-0.3	-1.0	Passed	94%	100%	100%	yes		yes					
82	2401-BM																	
83	2401-BM		3.2	4.0	2.0	0.2	Failed	92%	100%	100%	yes		no	x				
84	2401-BM																	
85	2401-BM		-0.1	0.1	-0.7	-0.2	Passed	100%	100%	100%	yes		yes					
86	2401-BM									74%							x	
87	2401-BM																	
88	2401-BM		1.0	2.7	-1.0	0.6	Passed	92%	96%	100%	yes		yes					
89	2401-BM		0.7	1.7	-0.7	-0.4	Passed	100%	100%	100%	yes		yes					
90	2401-BM		-3.0	-0.9	-5.2	-2.1	Failed	65%	38%	53%	yes		no	x	x	x	x	
91	2401-BM																	
92	2401-BM																	
93	2401-BM		1.0	0.8	0.8	-0.1	Passed	100%	100%	100%	yes		yes					
94	2401-BM		-0.5	-1.5	0.0	0.9	Passed	100%	100%	100%	yes		yes					
95	2401-BM		0.3	-0.8	0.8	0.2	Passed	100%	100%	100%	yes		yes					
96	2401-BM		0.9	0.3	0.8		Passed	100%	100%		yes		yes					
97	2401-BM																	
98	2401-BM																	
99	2401-BM		1.2	0.4	1.2	-1.3	Passed	100%	100%	100%	yes		yes					
100	2401-BM																	
101	2401-BM		-1.1	-1.6	-1.2	-0.8	Passed	100%	96%	100%	yes		yes					
102	2401-BM					-1.2	Passed			91%	yes		yes					
103	2401-BM		1.3	0.6	1.3	4.2	Failed	100%	89%	24%	yes		no	x			x	
104	2401-BM		-2.7	-1.9	-3.7	3.7	Failed	92%	44%	53%	yes		no	x		x	x	
105	2401-BM					-0.1	Passed			100%	yes		yes					
106	2401-BM		5.2	4.0	5.5	1.8	Failed	40%	76%	91%	yes		no	x	x			
107	2401-BM		-4.0	-5.9	-2.5	-3.0	Failed	54%	91%	59%	yes		no	x	x		x	
108	2401-BM					-0.4	Passed			91%	yes		yes					
109	2401-BM					0.9	Passed			91%	yes		yes					
110	2401-BM		0.1	3.4	-3.2		Failed	57%	89%		yes		no	x	x			
111	2401-BM										yes							
112	2401-BM		-0.2	-0.5	-0.5	-2.0	Passed	100%	85%	91%	yes		yes					
113	2401-BM																	
114	2401-BM		3.7	2.5	4.0	1.8	Failed	80%	93%	100%	yes		no	x				
115	2401-BM																	
116	2401-BM		0.5	-0.2	0.7	-0.8	Passed	100%	100%	100%	yes		yes					
117	2401-BM					0.2	Passed			100%	yes		yes					
118	2401-BM																	
119	2401-BM																	
120	2401-BM		0.9	-0.5	1.7		Passed	94%	100%		yes		yes					
121	2401-BM		0.7	-0.8	1.5	0.4	Passed	100%	100%	100%	yes		yes					
122	2401-BM																	
123	2401-BM		-1.6	0.2	-3	-2.7	Failed	83%	78%	82%	no		no	x				x
124	2401-BM		-2	-4.5	-0.1	-0.7	Failed	72%	100%	100%	yes		no	x	x			
125	2401-BM																	
126	2401-BM		-0.2	-1.6	0.5	0.3	Passed	100%	96%	100%	yes		yes					
127	2401-BM		8.1	11.6	4.1	3.8	Failed	49%	81%	74%	yes		no	x	x		x	
128	2401-BM		0	-1.6	0.9	0.6	Passed	100%	100%	100%	yes		yes					
018A	2401-BM					-1.4	Passed			91%	yes		yes					
034A	2401-BM		0	-0.5	-0.1	-0.9	Passed	100%	100%	100%	yes		yes					
039A	2401-BM		0.3	0.1	0	2.6	Passed	77%	96%	65%	yes		no				x	
049A	2401-BM		3.7	2.5	4.2	2.1	Failed	87%	60%	91%	yes		no	x		x		
066A	2401-BM		0.5	-0.1	0.6	0.4	Passed	100%	100%	100%	yes		yes					
117A	2401-BM					0.2	Passed			100%	yes		yes					

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
15 April 2025

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

Test sample - Bovine Meat (2401-BM)

EURL Proficiency Test on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Sum parameters - Homogeneity test - Data

Analyte	Result pg/g fat	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
WHO-PCDD/F-PCB-TEQ upper bound		4.03	4.04	5%
WHO-PCDD/F-PCB-TEQ middle bound		4.03	4.04	5%
WHO-PCDD/F-PCB-TEQ lower bound		4.03	4.04	5%

EURL Proficiency Test on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
PCDD/F - Homogeneity test - Data

Analyte	Result pg/g fat	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
WHO-PCDD/F-TEQ upper bound		1.88	1.93	9%
WHO-PCDD/F-TEQ middle bound		1.88	1.93	9%
WHO-PCDD/F-TEQ lower bound		1.88	1.92	9%
2,3,7,8-TCDD		0.0817	0.0828	20%
1,2,3,7,8-PeCDD		0.223	0.226	16%
1,2,3,4,7,8-HxCDD		0.204	0.210	13%
1,2,3,6,7,8-HxCDD		0.532	0.536	12%
1,2,3,7,8,9-HxCDD		0.179	0.174	18%
1,2,3,4,6,7,8-HpCDD		1.44	1.47	8%
1,2,3,4,6,7,8,9-OCDD		4.40	4.40	9%
2,3,7,8-TCDF		2.75	2.88	13%
1,2,3,7,8-PeCDF		0.750	0.759	9%
2,3,4,7,8-PeCDF		3.05	3.16	11%
1,2,3,4,7,8-HxCDF		1.07	1.07	6%
1,2,3,6,7,8-HxCDF		0.495	0.490	7%
2,3,4,6,7,8-HxCDF		0.595	0.600	10%
1,2,3,7,8,9-HxCDF		0.0709	0.0715	20%
1,2,3,4,6,7,8-HpCDF		0.973	0.970	8%
1,2,3,4,7,8,9-HpCDF		0.0997	0.102	16%
1,2,3,4,6,7,8,9-OCDF		1.14	1.11	9%

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

Bovine Meat (2401-BM)
DL-PCB - Homogeneity test - Data

Analyte	Result pg/g fat	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
WHO-PCB-TEQ upper bound		2.14	2.15	7%
WHO-PCB-TEQ middle bound		2.14	2.15	7%
WHO-PCB-TEQ lower bound		2.14	2.15	7%
PCB 105		3060	3040	9%
PCB 114		239	239	4%
PCB 118		7070	7050	2%
PCB 123		124	125	5%
PCB 156		824	822	3%
PCB 157		164	159	7%
PCB 167		265	266	3%
PCB 189		29.5	29.6	10%
PCB 77		356	387	14%
PCB 81		21.3	21.5	8%
PCB 126		17.0	17.2	8%
PCB 169				

EURL Proficiency Test on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
NDL-PCB - Homogeneity test - Data

Analyte	Result ng/g fat	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
Sum Indicator PCBs upper bound		35.0	34.8	2%
Sum Indicator PCBs middle bound		35.0	34.8	2%
Sum Indicator PCBs lower bound		35.0	34.8	2%
PCB 28		6.89	6.84	6%
PCB 52		8.95	8.98	3%
PCB 101		7.95	7.89	3%
PCB 138		4.56	4.56	2%
PCB 153		3.57	3.57	2%
PCB 180		3.10	3.11	3%

EURL Proficiency Test on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Selected congeners - Homogeneity test - Data

Sample	Replicate	Result pg/g / ng/g fat	WHO-PCDD/F-TEQ (ub)	PCB 153	PCB 81
27	1		1.91	3.38	22.8
	2		1.77	3.43	19.7
65	1		1.97	3.72	23.0
	2		1.84	3.50	22.8
117	1		1.61	3.64	22.8
	2		2.06	3.53	20.5
129	1		1.92	3.58	20.0
	2		1.79	3.60	23.1
131	1		2.07	3.49	19.9
	2		2.02	3.56	19.4
160	1		1.52	3.62	20.8
	2		2.14	3.59	18.1
232	1		2.04	3.64	19.9
	2		1.53	3.58	20.9
238	1		1.99	3.68	19.5
	2		1.97	3.61	22.5
254	1		1.93	3.50	23.2
	2		1.91	3.56	22.9
272	1		1.75	3.59	22.6
	2		1.95	3.51	22.1
Cochran's C-test					
C			0.409	0.557	0.231
$C_{critical}$ (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 $\bar{x}$			1.88	3.57	21.3
Standard deviation of sample averages s_x			0.080	0.068	1.27
Wthin-sample standard deviation s_w			0.216	0.065	1.44
Between-sample standard deviation s_s			0.000	0.05	0.76
Standard deviation for proficiency assessment σ_{PT}			0.377	0.713	4.3
s_s / σ_{PT}			0.00	0.0707	0.179
Test for homogeneity ($s_s \leq 0.3\ \sigma_{PT}$)			passed	passed	passed

EURL Proficiency Test on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Selected congeners - Stability test - Data

Sample	Replicate	Result pg/g / ng/g fat	WHO-PCDD/F-TEQ (ub)	PCB 153	PCB 81
7	1		2.067	3.57	21.6
	2		2.139	3.56	22.5
82	1		1.521	3.68	21.0
	2		1.528	3.60	21.1
210	1		1.751	3.52	20.6
	2		1.794	3.67	20.2
Stability test					
General average (stability test) $\bar{y}$			1.80	3.60	21.17
General average (homogeneity test) $\bar{x}$			1.88	3.57	21.34
Standard deviation for proficiency assessment σPT			0.38	0.713	4.27
$\lvert \bar{y} - \bar{x} \rvert$			0.08	0.0339	0.18
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 PFASs in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food
15 April 2025

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

Test sample - Bovine Meat (2401-BM)

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Physico-chemical Methods PCDD/Fs and PCBs - Internal standards

			Use of isotope-labelled internal standards for all relevant …			**Other internal standards**		
LC	Sample	**Weighed sample** [g]	PCDD/F congeners (yes/no)	DL-PCB congeners (yes/no)	NDL-PCB congeners (yes/no)	PCDD/Fs	DL-PCBs	NDL-PCBs
1	2401-BM							
2	2401-BM							
3	2401-BM	100	yes	yes	yes			
4	2401-BM							
5	2401-BM	100	yes	yes	yes			
6	2401-BM	2.0	yes	yes	yes			
7	2401-BM	5	yes	yes	yes			
8	2401-BM	3.5	yes	yes	yes			
9	2401-BM	44	YES	YES	YES			
10	2401-BM	15	Yes	Yes	Yes	Recovery standards: 13C-1,2,3,4-TCDD; 13C-1,9-HxCDD	Recovery standards: 13C-PCB-101, 13C-PCB-138	
11	2401-BM	14.0	yes	yes	yes			
12	2401-BM	10.06			yes			
13	2401-BM	1			yes			
14	2401-BM							
15	2401-BM							
16	2401-BM	2	yes	yes	yes			
17	2401-BM	42	yes	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		
18	2401-BM	2.05						yes
19	2401-BM							
20	2401-BM	43	yes	yes	yes			
21	2401-BM	74.5	yes	yes	yes			
22	2401-BM	16.69	Yes	Yes	Yes			
23	2401-BM	89.1	yes	yes	yes	no	no	no
24	2401-BM	5						PCB 209
25	2401-BM	35	yes	yes	yes			
26	2401-BM	30	yes	yes	yes			
27	2401-BM							
28	2401-BM	10.8			yes			
29	2401-BM	29	YES	YES	YES			
30	2401-BM							
31	2401-BM	14.7			yes			
32	2401-BM	61.7	No (were used 15 labelled congeners)	Yes	Yes			
33	2401-BM							
34	2401-BM	3	yes	yes	yes			
35	2401-BM							
36	2401-BM	2.03	yes	yes	yes			
37	2401-BM	50			yes			C13-PCB-178
38	2401-BM							
39	2401-BM	20						
40	2401-BM	2.71	yes	yes	yes			
41	2401-BM							
42	2401-BM	8.06			yes			
43	2401-BM	15	no	no	Yes			PCB-111 (injection standard)
44	2401-BM							
45	2401-BM	30	yes	yes	yes			
46	2401-BM	15		yes	yes			
47	2401-BM	60.3	yes	yes	yes			
48	2401-BM							
49	2401-BM	37.4	yes	yes	yes			
50	2401-BM							
51	2401-BM	23.81	yes	yes	yes			
52	2401-BM							
53	2401-BM	5.0			YES			SYRINGE STANDARD PCB-155-13C12
54	2401-BM	36.32	Yes	Yes	Yes			
55	2401-BM	7.5	Yes	Yes	Yes	-	-	-
56	2401-BM							
57	2401-BM							
58	2401-BM	10	yes	yes	yes	1,2,3,4- TCDD	PCB 111	PCB 111
59	2401-BM	25	yes	yes	yes			
60	2401-BM	10	yes	yes	yes			
61	2401-BM	20.00	yes	yes	yes			
62	2401-BM							
63	2401-BM							
64	2401-BM	10	no	no	no	no	no	yes
65	2401-BM	103.79	yes	yes	yes	-	-	-
66	2401-BM	4.0			yes			
67	2401-BM	110	yes	yes	yes			
68	2401-BM	3	----	----	yes	----	----	----
69	2401-BM	40	yes	yes	no			PCB-155 and PCB-54
70	2401-BM	50	Yes	Yes	Yes			
71	2401-BM							
72	2401-BM	35	yes	yes	yes			
73	2401-BM	20	N/A	N/A	Yes	N/A	N/A	3,3',4,4',5-Pentachlorobiphenyl 13C12
74	2401-BM	4	yes	yes	yes			
75	2401-BM	14.5758	Yes	Yes	Yes			
76	2401-BM							
77	2401-BM	5			no		PCB 209	
78	2401-BM							

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Physico-chemical Methods PCDD/Fs and PCBs - Internal standards

LC	Sample	Weighed sample [g]	Use of isotope-labelled internal standards for all relevant … PCDD/F congeners (yes/no)	DL-PCB congeners (yes/no)	NDL-PCB congeners (yes/no)	Other internal standards PCDD/Fs	DL-PCBs	NDL-PCBs
79	2401-BM	10	yes	yes	yes			
80	2401-BM	12	yes	yes	yes			
81	2401-BM	15	yes	yes	yes			
82	2401-BM							
83	2401-BM	20	Yes	Yes	Yes			
84	2401-BM							
85	2401-BM	20.6	yes	yes	yes			
86	2401-BM	2						
87	2401-BM							
88	2401-BM	2.64	yes	yes	yes			
89	2401-BM	30	yes	yes	yes			
90	2401-BM							
91	2401-BM							
92	2401-BM							
93	2401-BM	2.50	Yes	Yes	Yes			
94	2401-BM	35.74	yes	yes	yes			
95	2401-BM	32.5	yes	yes	yes			
96	2401-BM	60	yes	yes		1,2,3,4-TCDD, isotope-labelled	PCB 80, isotope-labelled	
97	2401-BM							
98	2401-BM							
99	2401-BM	20 (10)	yes (except 1,2,3,7,8,9-HxCDD and 1,2,3,4,6,7,8,9-OCDF)	yes	no			TCMX, PCB-209, trans-nonachlor
100	2401-BM							
101	2401-BM	25	yes	yes	yes			
102	2401-BM	4.0			NO			PCB 209
103	2401-BM	25.2	yes	yes	yes	ISS. Well EPA1613-ISS	ISS. Well P48-RS	ISS. Well P48-RS
104	2401-BM	2.0	yes	yes	yes			
105	2401-BM	20			yes			PCB 198
106	2401-BM	40	yes	yes	yes			
107	2401-BM	5	yes	yes	yes			
108	2401-BM	1			no			PCB 209
109	2401-BM	2	no	no	yes			
110	2401-BM	30	yes	yes				
111	2401-BM							
112	2401-BM	5	yes	yes	yes			
113	2401-BM							
114	2401-BM	20	yes	yes	yes	all 13C-: CB70, CB111, CB138, CB178, 1378-TCDD, 12478-PeCDD, 123468-HxCDD, 1234679-HpCDD	moPCBs: all 13C-: CB60, CB70, CB111, CB127, CB159, CB170 (for noPCBs see PCDD/Fs)	all 13C-: CB60, CB70, CB111, CB127, CB159, CB170
115	2401-BM							
116	2401-BM	3	yes	yes	yes			
117	2401-BM	10			no			PCB112 , PCB143
118	2401-BM							
119	2401-BM							
120	2401-BM	22	yes	yes	no	no	no	pcb 77L for 28&52; pcb 123L for 101; pcb 167L for 138&153; pcb 189L for 180
121	2401-BM		yes	yes	yes			
122	2401-BM							
123	2401-BM	10	YES	YES	YES	1,2,3,4-TCDD – 13C12		
124	2401-BM	20	yes	yes	yes			
125	2401-BM							
126	2401-BM	25	yes	yes	yes			
127	2401-BM	48	yes	yes	yes			
128	2401-BM	20	yes	yes	yes			
018A	2401-BM	2						yes
034A	2401-BM	3	yes	yes	yes			
039A	2401-BM	15	yes	yes	yes	1234-TCDD	1234-TCDD	1234-TCDD
049A	2401-BM	37	yes	yes	yes			
066A	2401-BM	4	YES	YES	YES			
117A	2401-BM	10			no			PCB112 , PCB143

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Physico-chemical Methods PCDD/Fs and PCBs - Extraction

LC	Sample	Extraction					
		Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
1	2401-BM						
2	2401-BM						
3	2401-BM		Column Extraction	hexane/dichloromethane 1:1			
4	2401-BM						
5	2401-BM	Freeze-drying	Twisselman	Toluene / Cyclohexan (50/50)	6		
6	2401-BM	NA	Ultrasonic bath	diethyl ether / dichloromethane 1:1	0.5 h	ambient	ambient
7	2401-BM	freeze drying	Twisselmann	n-Hexan; Cyclohexan/Toluol (1:1); DCM/n-Hexan (1:1)	8h	82	atm
8	2401-BM	freeze drying	ASE	hexane	1	100	10,3
9	2401-BM	Freeze Drying	SOXHLET	PCDD/F DL-PCB TOLUENE/CYCLOHEXANE (1/1) NDL-PCB HEXANE/DCM (1/1)	24H		
10	2401-BM		Soxhlet	DCM/Hexane (1/1)	12h	boiling	
11	2401-BM	Gefriertrocknung	Soxhlet	Toluol	16h		
12	2401-BM	drying	soxhlet	toluene/acetone 70/30	4	185	
13	2401-BM	homogenisation	shaking	DEE	2x 1/2 hours	abient	normal
14	2401-BM						
15	2401-BM						
16	2401-BM				15 minutes	ambient	
17	2401-BM	freeeze drying	Soxhlet	toluene	overnight	boiling	
18	2401-BM	80°C 72h	BUCHI	TOLUENE/ACETONE 70/30	0,75	120	10
19	2401-BM						
20	2401-BM	drying	Soxhlet (hot extraction)	Hexane/acetone 80/20	1	50	Atmospheric
21	2401-BM	homogenize	shaking with solvent	hexane/acetone 50/50	0.1 for each step (4 consecutive extractions)	22	
22	2401-BM	Yes, Freeze-Drying	ASE	Toluene	45 minutes	135	
23	2401-BM	Freeze-drying	ASE	Esano-Acetone 4:1	0,20	125	
24	2401-BM			Ethyl-acetate	18	20-22	
25	2401-BM	freeze drying	ASE	Petrolether/Aceton (90/10)	1	90	10
26	2401-BM	drying	Soxhlet	Hexane	2	70	
27	2401-BM						
28	2401-BM	drying	Speed Extractor Buchi	toluene/acetone (70/30)	1	100	10
29	2401-BM	FREEZE-DRYING	ASE	TOLUENE	0,5	135	1500
30	2401-BM						
31	2401-BM	drying	Soxhlet	Toluène/Acétone (70/30)	8 H		
32	2401-BM	sample mixed with sodium sulphate before extraction	Soxhlet	DCM:Hexane (50:50)	24 h		
33	2401-BM						
34	2401-BM	drying	PLE	Tolune/Acetone (70/30)			
35	2401-BM						
36	2401-BM	-					
37	2401-BM	/	cold extraction	chloroform + methanol + water		room temperature	atmospheric pressure
38	2401-BM						
39	2401-BM		Cold extraction	Petroleum ether / acetone (2/1)	2	22	
40	2401-BM	Drying by Steamroom	solid/liquid extraction	Hexane/IPA (60/40) + Toluène/Acétone (70/30)	/	/	/
41	2401-BM						
42	2401-BM	drying	ASE	Toluene / acetone 70/30	0.3		
43	2401-BM	no	ultra turrax	hexane/acetone 50/50 (v/v)	0,017	ambiente	ambiente
44	2401-BM						
45	2401-BM	dried with sodium sulfate	cold extraction	dichlormethane:cyclohexane - 1:1	1.5 h	room temperature	0.1
46	2401-BM	homogenise in ultraturrax with solvent (water/ethanol)	liquid-liquid	TBME/Hexane (1/1)	ultraturrax 30" (twice)	ambient	ambient
47	2401-BM		Soxhlet	Hexane:Acetone (41:59)	24		
48	2401-BM						
49	2401-BM	none	Soxhlet	Toluene	40		
50	2401-BM						
51	2401-BM	homogenisation, drying with Na2SO4		dichlormethane/cyclohexane (1/1)		room temperature	ambient
52	2401-BM						
53	2401-BM	OVEN DRYING (45°C)	ASE	ACETONE:HEXANE 1:1	1/3	100	10,34
54	2401-BM		Cold extraction	Ethanol / Diethylether / Hexaan (1:1:3)		ambient	
55	2401-BM	Drying	ASE	Toluene / Acetone (70/30)	0.25 h	120 °C	10 Mpa
56	2401-BM						
57	2401-BM						
58	2401-BM	freeze drying	ASE	dichloromethane/hexane (50/50)	0.3	100	10
59	2401-BM	Homogenisation, isolation of fat + lipid content (%)	Soxhlet, ASE	Soxhlet: hexane, ASE: hexane:DCM (4:1,v/v)	Soxhlet: 8 h, ASE: 30 min	ASE: 120 °C	ASE: 10 MPa
60	2401-BM		cold extractioin	DCM/Cyclohexane		RT	
61	2401-BM	freeze drying	twisselman	Cyclohexan/Toluol (50/50)	8	boiling point	
62	2401-BM						
63	2401-BM						
64	2401-BM	drying/Na2SO4	Twisselmann	light petrol-ether	6	-	-
65	2401-BM	homogenization	cold extraction	hexane	-	20	-
66	2401-BM	drying	ASE	Toluene/acetone (70/30)	0,5	120	10
67	2401-BM	Na2SO4	Soxhlet	Hex/DCM=1/1	16	/	/
68	2401-BM	Freeze drying	BUCHI Speedextractor E914	Toluène/Acetone (70/30: v/v)	50 min	120 °c	100 bars
69	2401-BM	freeze-drying	ASE	n-hexane:dichloromethane	0.75	100	10 aprox
70	2401-BM		Soxhlet	DCM	18	Boiling point	
71	2401-BM						
72	2401-BM	drying	ASE	n-esano/toluene	0,7		
73	2401-BM	Homogeneisation	NBN EN 1528-2: mix sample with sand and anhydrous Na2SO4, place the mixture in a column and extraction by passing the extraction solvent through the column.	2/1 (v/v) ,n-hexane/acetone	1	Room temperature	Atmospheric pressure
74	2401-BM	Fat extraction	shaking out	Hexan, Butanol	1	room temperature	no
75	2401-BM	Freeze-drying	ASE	hex:acetone 3:2	1	110	1500 psi
76	2401-BM						
77	2401-BM	drying with Natrium sulfate	Soxtherm	Ethyl Acetate/Cyclohexane (10/9,85)	2 h	190	
78	2401-BM						

Bovine Meat (2401-BM)
Physico-chemical Methods PCDD/Fs and PCBs - Extraction

LC	Sample	Extraction					
		Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [MPa]
79	2401-BM	no	ASE	Hexan	0.3	80	10
80	2401-BM		ASE	pentane/acetone 88/12	0,5	80	1500
81	2401-BM	Mixed with sodium sulphate	ASE	Hexane/Acetone (70:30)	1	125	10.3
82	2401-BM						
83	2401-BM	Drying - Microwave	ASE	Hexane 100%	0.3	125	
84	2401-BM						
85	2401-BM	drying	ASE	toluene (85%) / ethanol (15%)	20 min	120	10
86	2401-BM	none	mechanical shaking	ethyl acetate + 1 % acetic acid	0.08	ambient	
87	2401-BM						
88	2401-BM	no	ASE	Toluen:Ethanol (90:10)	1	100	10,342
89	2401-BM	PAA	twisselman	Cyclohexan/Toluol (50/50)	8	boiling point	
90	2401-BM						
91	2401-BM						
92	2401-BM						
93	2401-BM	fat extraction					
94	2401-BM	drying	ASE	HEXANE	0.33	100	10.13
95	2401-BM	freeze drying, mixing with sodium sulphate	PSE	DCM:n-hexane (1:1)	3 cycles per 2 minutes	100°C	10
96	2401-BM	homogenizing	cold extraction	petrolether/acetone 3/1		room temperature	
97	2401-BM						
98	2401-BM						
99	2401-BM	thorough homogenization, drying with anhydrous Sodium Sulfate	Soxhlet (ultrasonic bath, agitate)	cyclohexane:2-propanol 2:1 (dichloromethane:acetone 2:1)	21 (2.5)	109 (20)	0.1
100	2401-BM						
101	2401-BM	no	Ultrasonic bath	n-Hexane	0,5		
102	2401-BM		ASE	Hexane / Acetone 80/20	0,5	120	11,0
103	2401-BM		Soxhlet	toluene	8		
104	2401-BM			acetona/hexan/diclormetan			
105	2401-BM	mixed with sodium sulfate, sand	column cold extraction	n-Hexan/Aceton (2/1)		room temperature	
106	2401-BM	-	Soxhlet	hexane-dichloromethane 1:1	20h	boiling point of solvent mixture	-
107	2401-BM	freeze drying	Soxhlet extraction	Hexane	8	68	0,101
108	2401-BM			hexan	1		
109	2401-BM	freeze drying	ASE	toluene/acetone 70/30	Approximately 1 hour	120	10
110	2401-BM	drying	ASE	HEXANE / DICLOROMETANE	1	120	10
111	2401-BM						
112	2401-BM	Drying	ASE	Toluene:Cyclohexane	1h	130	
113	2401-BM						
114	2401-BM		PLE	EtOH:Tol (7:3)	2*20 min	100 degC	1500 psi (=10MPa)
115	2401-BM						
116	2401-BM	freeze-drying	extraction with homogenizator	saturated sodium chloride solution/ isopropanol/cyclohexane/water (15/50/120/60)	2x 2 min		
117	2401-BM	drying	soxhlet	hexaan	3	69°C	
118	2401-BM						
119	2401-BM						
120	2401-BM	hydromatrix and sand added to the sample in the extraction cell	ASE350	Hexane:Acetone 5:1	half an houre	100	10,34
121	2401-BM		liquid	acetone/hexane(1:1)	30min		
122	2401-BM						
123	2401-BM	DRYNG	RANDALL	PETROLEUM ETHER	2		
124	2401-BM	freeze drying	Twisselmann	Cyclohexan / Toluol (1:1, v/v)	6	boiling point	
125	2401-BM						
126	2401-BM	homogenisation, lyophilization	Soxhlet	hexane/ ethanol 50/50	4		
127	2401-BM	Drying with 150g sodium sulfate	Soxhlet	Toluene	24h		
128	2401-BM	Blending with anhydrous sodium sulfate		cyclohexane/dichloromethane (1,1, v/v)			
018A	2401-BM	80°C 72h	BUCHI	TOLUENE/ACETONE 70/30	0,75	120	10
034A	2401-BM	drying	PLE	Tolune/Acetone (70/30)			
039A	2401-BM		Cold extraction	Cyclohexane/dichlormetane (1/1)	app. 3 h	room temperature	
049A	2401-BM	none	Soxhlet	Toluene	36		
066A	2401-BM	drying	ASE	Toluene/acetone (70/30)	0,5	120	10
117A	2401-BM	drying	soxhlet	hexaan	3	69°C	

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Physico-chemical Methods PCDD/Fs and PCBs - Clean-up

		Clean-up									
LC	Sample	Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Others	Final volume [µl]: PCDD/F	Final volume [µl]: DL-PCB (non-ortho-PCBs)	Final volume [µl]: DL-PCB (mono-ortho-PCBs)	Final volume [µl]: Indicator PCBs
1	2401-BM										
2	2401-BM										
3	2401-BM	no	yes	yes	yes						
4	2401-BM										
5	2401-BM	no	yes	no	yes	yes	acidic treatment	25.00	25.00	50.00	50.00
6	2401-BM	no	yes	no	yes	yes		30	30	30	30
7	2401-BM	no	yes	no	yes	yes	silica/AgNO3	50	50	50	50
8	2401-BM	no	yes	no	yes	yes	no	20	20	500	500
9	2401-BM	NO	YES	YES	YES	YES	NO	10	10	10	50
10	2401-BM	Yes	Yes	Yes	No	Yes	Sufuric acid treatment of the final extract	10	50	50	200
11	2401-BM	no	yes	yes	yes	no		20	100	100	100
12	2401-BM		yes	yes							50
13	2401-BM		yes								500
14	2401-BM										
15	2401-BM										
16	2401-BM	no					Miura				
17	2401-BM	no	yes (Dextech)	no	yes (Dextech)	yes (Dextech)		10	10	80	
18	2401-BM	No	Yes	Yes	no	no					50
19	2401-BM										
20	2401-BM	no	yes	no	yes	yes		25	25	60	60
21	2401-BM	no	yes	no	yes	yes		25	100	100	100
22	2401-BM	No	Yes	Yes	Yes	Yes		10	20	20	20
23	2401-BM	no	yes	no	yes	yes	no	25,0	50,0	50,0	50,0
24	2401-BM	yes									300
25	2401-BM	yes	yes	no	no	yes		16	16	20	1000
26	2401-BM	no	yes	no	yes	yes		10	10	200	200
27	2401-BM										
28	2401-BM						florisil + silica + silica/sulfuric acid 22% + silica/sulfuric acid 44%				50 (toluene)
29	2401-BM	no	yes	no	yes	yes		10.00	80.00	80.00	80.00
30	2401-BM										
31	2401-BM	no	yes	yes	no	no					50 µl
32	2401-BM	no	yes	no			basic set of "power-prep system" columns	20	40	40	40
33	2401-BM										
34	2401-BM	No	Yes	no	yes	Yes		12	12	50	50
35	2401-BM										
36	2401-BM	no	yes	yes	no	no		40	40	40	40
37	2401-BM	no	yes	no	yes	no	no	/	/	/	250 µl
38	2401-BM										
39	2401-BM	yes	yes								1500
40	2401-BM	no	yes	no	yes	yes	no	20	20	125	125
41	2401-BM										
42	2401-BM	yes	yes	yes							50
43	2401-BM	no	yes	no	no	no					1000
44	2401-BM										
45	2401-BM	no	yes	no	yes	yes	no	40	40	200	200
46	2401-BM	yes	no	no	no	no	styrene divinylbenzene			50	50
47	2401-BM	yes	yes	no	no	yes	no	15	15	75	75
48	2401-BM										
49	2401-BM	no	yes	no	yes	yes	Silica/AgNO3	50	50	100	100
50	2401-BM										
51	2401-BM	no	yes	no	yes	yes	AgNO3 (MIURA)	20	20	20	20
52	2401-BM										
53	2401-BM	NO	YES	NO	NO	NO	SPE SILICA COLUMN 1g/6mL				250
54	2401-BM	no	yes	yes	yes	no		10	50	50	50
55	2401-BM	No	Yes	Yes	No	Yes		10.00	10.00	50.00	50.00
56	2401-BM										
57	2401-BM										
58	2401-BM	no	yes	yes	no	yes	carbon/florisil	10	20	50	50
59	2401-BM	no	yes	yes	yes	yes	PowerPrep FMS columns (basic-neutral silica, alumina, carbon)	10	10	20	20
60	2401-BM	no	yes	no	yes	yes		25	25	100	100
61	2401-BM	no	yes	no	yes	yes	no	30	30	400	400
62	2401-BM										
63	2401-BM										
64	2401-BM	no	no	no	yes	no	no				500
65	2401-BM	no	yes	no	yes	no	no	10	50	50	50
66	2401-BM	no	yes	yes	no	no					50
67	2401-BM	yes	yes	no	no	yes		20-30 ul	20-30 ul	20-30 ul	20-30 ul
68	2401-BM	----	----	----	----	----	Florisil + Silice + Silice à 22% H2SO4 + Silice à 44% H2SO4	----	----	----	50 µL
69	2401-BM	no	yes	no	yes	yes		20	50	50	500
70	2401-BM	No	Yes	No	Yes	Yes	-	50.00	50.00	50.00	50.00
71	2401-BM										
72	2401-BM		yes	yes	yes	yes					
73	2401-BM	Yes	Yes	No	Yes	No	N/A	N/A	N/A	N/A	100
74	2401-BM	no	yes	no	yes	yes	no	200	200	200	200
75	2401-BM	yes	yes	no	yes	yes		20	20	20	20
76	2401-BM										
77	2401-BM	yes									1000
78	2401-BM										
79	2401-BM	yes	yes	no	yes	yes		50	50	100	100
80	2401-BM	no	yes	no	yes	yes	Silver nitrate column	20	20	1000	1000
81	2401-BM	no	yes	no	yes	yes		20	20	40	40
82	2401-BM										

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Physico-chemical Methods PCDD/Fs and PCBs - Clean-up

		Clean-up									
LC	Sample	Gelchromatography	Silica/sulfuric acid column	Florisil column	Alumina column	Carbon column	Others	Final volume [µl]: PCDD/F	Final volume [µl]: DL-PCB (non-ortho-PCBs)	Final volume [µl]: DL-PCB (mono-ortho-PCBs)	Final volume [µl]: Indicator PCBs
83	2401-BM	No	Yes - Miura	Yes - Miura	Yes - Miura	Yes - Miura	N/A	25 µl	25 µl	500 µl	500 µl
84	2401-BM										
85	2401-BM	no	yes	no	yes	yes		20	20	500	500
86	2401-BM	no	no	no	no	no					
87	2401-BM										
88	2401-BM	no	yes	no	yes	yes		10	10	200	200
89	2401-BM	no	yes	no	yes	yes	no	30	30	400	400
90	2401-BM										
91	2401-BM										
92	2401-BM										
93	2401-BM	No	Yes	No	Yes	Yes	No	500	500	500	500
94	2401-BM	NO	YES	YES	YES	YES	NO	30	non-ortho DL-PCBs are in the PCDD/F fraction	100	Indicator PCBs are in mono-ortho DL-PCB fraction
95	2401-BM	no	yes	no	no	yes	no	20	30	30	50
96	2401-BM	yes	yes	no	yes	yes		30	30	30	
97	2401-BM										
98	2401-BM										
99	2401-BM	yes	yes	no	yes	yes	basic silica, silver nitrate silica	10	10	30	1000
100	2401-BM										
101	2401-BM	no	yes	no	yes	yes	NA	12	20	20	20
102	2401-BM						Hexane + Sulfuric acid 90% + SPE Bond Elut PCB (Varian - Silica gel + SCX)(hexane)				1,0 ml of PCB 209 (100 ng/ml) (isooctane solvent)
103	2401-BM	no	yes		yes	yes		20	20	50	50
104	2401-BM						Miura	20ul	20ul	200ul	200ul
105	2401-BM	yes	no	no	no	no	silica column				1000
106	2401-BM	no	yes	yes	no	no	-	25	25	250	250
107	2401-BM	no	yes (MiURA system)	yes (MiURA system)	yes (MiURA system)	yes (MiURA system)		50	50	100	100
108	2401-BM	no	yes	no	no	no	no				1000
109	2401-BM	no	yes	yes	no	no					50
110	2401-BM	no	yes	yes	no	yes	multi cap	25	25	25	
111	2401-BM										
112	2401-BM		yes	yes		yes		20	20	500	500
113	2401-BM										
114	2401-BM	no	yes	no	yes	yes	Silver nitrate column	250 µl	250 µl	100 µl	100 µl
115	2401-BM										
116	2401-BM	no	yes	no	yes	yes	AgNO3 column	1500	1500	1500	1500
117	2401-BM	no	yes	no	yes	no	no				1000
118	2401-BM										
119	2401-BM										
120	2401-BM	no	no	no	no	no	cleanup performed by automatic system GO-2HT Miura using columns: silver nitrate silica gel, sulfuric acid silica gel, carbon, alumina	20	20	20	20
121	2401-BM		yes		yes		MgSio3	20	20	20	20
122	2401-BM										
123	2401-BM	NO	YES	NO	YES	YES		20	20	200	
124	2401-BM	no	yes	no	yes	yes	no	20	25	500	500
125	2401-BM										
126	2401-BM	no	yes	no	yes	yes		20.00	20.00	500.00	500.00
127	2401-BM	yes	yes	no	yes	yes		50	50	50	50
128	2401-BM	no	yes	yes	yes	yes	no	15	15	25	25
018A	2401-BM	No	Yes	Yes	no	no					50
034A	2401-BM	No	Yes	Yes	No	Yes		12	12	50	50
039A	2401-BM		yes	yes		yes		10	100	100	100
049A	2401-BM	no	yes	no	yes	yes	Silica/AgNO3	50	50	100	100
066A	2401-BM	no	yes	no	yes	yes		10	20	50	50
117A	2401-BM	no	yes	no	yes	no	no				1000

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Bovine Meat 2024 [EURL-PT-POP_2401-BM]

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

Bovine Meat (2401-BM)

Physico-chemical Methods PCDD/Fs and PCBs - Detection

		PCDD/F				**Dioxin-like PCB (non-ortho-PCB)**				**Dioxin-like PCB (mono-ortho-PCB)**				**Indicator PCB**			
LC	Sample	GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector	GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector	GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector	GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector
1	2401-BM																
2	2401-BM																
3	2401-BM	PTV	5	SLB	HRMS	PTV	3	HT-8	HRMS	PTV	3	HT-8	HRMS	PTV	3	HT-8	HRMS
4	2401-BM																
5	2401-BM	splitless	1.8	DB-5MS	HRMS (Autospec Ultima Waters)	splitless	1.0	HT8-PCB	HRMS (Autospec Ultima Waters)	splitless	1.0	HT8-PCB	HRMS (Autospec Ultima Waters)	splitless	1.0	HT8-PCB	HRMS (Autospec Ultima Waters)
6	2401-BM	splitless	1.6	DB5	HRMS	splitless	1.6	DB5	HRMS	splitless	1.6	DB5	HRMS	splitless	1.6	DB5	HRMS
7	2401-BM	PTV	2	DB 5 ms	HRMS	PTV	2	DB 5 ms	HRMS	PTV	1	XLB	HRMS	PTV	1	XLB	HRMS
8	2401-BM	MMI	5	5% fenil-metilpolisiloxane	GC-MS TQ	MMI	5	5% fenil-metilpolisiloxane	GC-MS TQ	MMI	1	5% fenil-metilpolisiloxane	GC-MS TQ	MMI	1	5% fenil-metilpolisiloxane	GC-MS TQ
9	2401-BM	SPLITLESS	2	DB5MS	HRMS	SPLITLESS	1	DB5MS	HRMS	SPLITLESS	1	DB5MS	HRMS	SPLITLESS	1	DBXLB	HRMS
10	2401-BM	Splitless	1	ZB-5MS Plus 60 x 0.25 x 0.25	Autospec Premier HRMS	Splitless	1	ZB-5MS 60 x 0.25 x 0.25	Autospec Premier HRMS	Splitless	1	ZB-5MS 60 x 0.25 x 0.25	Autospec Premier HRMS	PTV	2	ZB-50 30 x 0.25 x 0.25	ThermoScientific TSQ Quantum XLS Ultra GC-MS/MS
11	2401-BM	PTV	2	60m DB-5 MS, 0,25mm, 0,25µm	HRMS	splitless	1	60m DB-5 MS, 0,25mm, 0,25µm	HRMS	splitless	1	60m DB-5 MS, 0,25mm, 0,25µm	HRMS	splitless	1	60m DB-5 MS, 0,25mm, 0,25µm	HRMS
12	2401-BM																
13	2401-BM													splitless	2	crosslinked 5% PH ME Siloxane	ECD
14	2401-BM																
15	2401-BM																
16	2401-BM	splitless	2	DB-5MS	MSMS	split	1	HT-8	MSMS								
17	2401-BM	splitless	1,5	Thermo TR-Dioxin (5% diphenyl - 95% polysilphenylene siloxane)	HRMS	splitless	1,5	Thermo TR-Dioxin (5% diphenyl - 95% polysilphenylene siloxane)	HRMS	splitless	1,5	Thermo TR-Dioxin (5% diphenyl - 95% polysilphenylene siloxane)	HRMS				
18	2401-BM													Splitless	2	HT8 PCB :8% phenyl polycarborane siloxane	MS MS
19	2401-BM																
20	2401-BM	PTV	1	5% Polysilarylene - 95% Polydimethilsyloxane (Zebron-dioxins)	HRMS	PTV	1	5% Polysilarylene - 95% Polydimethilsyloxane (Zebron-dioxins)	HRMS	PTV	1	low polarity si-arylene column (Zebron-XLB)	HRMS	PTV	1	low polarity si-arylene column (Zebron-XLB)	HRMS
21	2401-BM	splitless	1	DB5MS	APGC-MSMS	splitless	1	DB5MS	APGC-MSMS and HRMS	splitless	1	DB5MS	APGC-MSMS and HRMS	splitless	1	DB5MS	APGC-MSMS and HRMS
22	2401-BM	Splitless	1	DB5MS	HRMS	Splitless	1	DB5MS	HRMS	Splitless	1	DB5MS	HRMS	Splitless	1	DB5MS	HRMS
23	2401-BM	MMI	6,0	DB5- MS	LRMS Triple Quadrupole	MMI	2	DB5- MS	LRMS Triple Quadrupole	MMI	2	DB5- MS	LRMS Triple Quadrupole	MMI	2	DB5- MS	LRMS Triple Quadrupole
24	2401-BM													splitless	1.0	VF-5MS	MS/MS
25	2401-BM	splittless	1,2	db-xlb 30mx0,18mmx0,18µm	HRMS	splittless	1,2	db-xlb 30mx0,18mmx0,18µm	HRMS	splittless	1,2	db-xlb 30mx0,18mmx0,18µm	HRMS	splittless	1,2	db-xlb 30mx0,18mmx0,18µm	HRMS
26	2401-BM	MMI	5	Vf-Xms	MSMS	MMI	5	Vf-Xms	MSMS	MMI	2	HT8	MSMS	MMI	2	HT8	MSMS
27	2401-BM																
28	2401-BM													splitless	1	HT8 - 8% phényl-polysiloxilane-carborane	LRMS (GC-MS/MS)
29	2401-BM	Splitless	1	5% Phenyl (equiv) polysilphenylene-siloxane	HRMS	Splitless	1	TR-PCB 8 MS	HRMS	Splitless	1	TR-PCB 8 MS	HRMS	Splitless	1	TR-PCB 8 MS	HRMS
30	2401-BM																
31	2401-BM													splitless	2	HT 8 - PCB	LRMS (GC/MS/MS)
32	2401-BM	Splitless	2	DB-5MS (60 m, 0.25 mm id, 0,25 mm film)	HRMS (Mat-95 XP)	Splitless	1	DB-5MS (60 m, 0.25 mm id, 0,25 mm film)	HRMS (Mat-95 XP)	Splitless	1	DB-5MS (60 m, 0.25 mm id, 0,25 mm film)	HRMS (Mat-95 XP)	Splitless	1	DB-5MS (60 m, 0.25 mm id, 0,25 mm film)	HRMS (Mat-95 XP)
33	2401-BM																
34	2401-BM	Splitless	2	DB5MS	HRMS	Splitless	2	DB5MS	HRMS					Splitless	1	HT8PCB	HRMS
35	2401-BM																
36	2401-BM	splitless	5	select-pah	MS (QQQ)	splitless	3	select-pah									
37	2401-BM	/	/	/	/	/	/	/	/	/	/	/	/	splitless	1 µl	XLB	LR-MS
38	2401-BM																
39	2401-BM													split ratio 7,0	1	Rxi®-5SIL MS w/Integra-Guard®	ECD
40	2401-BM	Splitless	2	DB5	APGC	Splitless	1	DB5	APGC	Splitless	1	DB5	APGC	Splitless	1	DB5	APGC
41	2401-BM																
42	2401-BM													splitless	1	RXI-XLB	LRMS
43	2401-BM													Splitless	1	Rxi-XLB	LRMS: GCMSMS
44	2401-BM																
45	2401-BM	PTV	5	Rtx-Dioxin2	MS/MS	PTV	5	Rtx-Dioxin2	MS/MS	splitless	1	HT-8	MS/MS	splitless	1	HT-8	MS/MS
46	2401-BM									splitless	1	DB-XLB	MS/MS (QqQ)	splitless	1	DB-XLB	MS/MS (QqQ)
47	2401-BM	spitless	2	RTX-5MS, BPX-DXN	HRMS	spitless	2	RTX-5MS, HT8-PCB	HRMS	spitless	2	RTX-5MS, HT8-PCB	HRMS	spitless	2	RTX-5MS, HT8-PCB	HRMS
48	2401-BM																
49	2401-BM	PTV	2	DBDIOXIN, DB-5	HRMS	PTV	2	DBDIOXIN, DB-5	HRMS	PTV	2	DBDIOXIN, DB-5	HRMS	PTV	2	DBDIOXIN, DB-5	HRMS
50	2401-BM																
51	2401-BM	PTV Large Volume	5	DB-5MS	HRMS	PTV Large Volume	5	DB-5MS	HRMS	splitless	1	HT8-PCB	HRMS	splitless	1	HT8-PCB	HRMS
52	2401-BM																
53	2401-BM													SPLITLESS	1	HT8 SGE	GC-MS TRIPLE QUAD
54	2401-BM	Splitless	1	VF-Xms	LRMS	Splitless	1	Rxi 5Sil MS	LRMS	Splitless	1	Rxi 5Sil MS	LRMS	Splitless	1	Rxi 5Sil MS	LRMS
55	2401-BM	Splitless	2	RTX-PCB 40m	HRMS	Splitless	2	RTX-PCB 40m	HRMS	Splitless	2	RTX-PCB 40m	HRMS	Splitless	2	RTX-PCB 40m	HRMS
56	2401-BM																
57	2401-BM																
58	2401-BM	PTV, splitless	2	DB-5MS	HRMS	PTV, splitless	1	DB-5MS	HRMS	PTV, splitless	1	DB-5MS	HRMS	PTV, splitless	1	DB-5MS, HT-8	HRMS
59	2401-BM	splitless	3	DB-5ms (60m x 0,25mm x 0,25um)	HRMS	splitless	3	DB-5ms (60m x 0,25mm x 0,25um)	HRMS	splitless	2	DB-5ms (60m x 0,25mm x 0,25um), HT8 (60m x 0,25mm x 0,25um)	HRMS	splitless	2	DB-5ms (60m x 0,25mm x 0,25um), HT8 (60m x 0,25mm x 0,25um)	HRMS
60	2401-BM	splitless	2	DB 5 MS	HRMS	splitless	2	DB 5 MS	HRMS	splitless	2	HT 8	HRMS	splitless	2	HT 8	HRMS
61	2401-BM	PTV	5	DB5	HRMS (DFS)	PTV	5	DB5	HRMS (DFS)	PTV	2	DB5	HRMS (DFS)	PTV	2	DB5	HRMS (DFS)
62	2401-BM																
63	2401-BM																
64	2401-BM													splitless	1	ZB-5MS	LRMS
65	2401-BM	splitless	5	VFX ms 60m	HRMS	splitless	5	VFX ms 60m	HRMS								
66	2401-BM													splitless	2	HT8-PCB	HRMS

EURL Proficiency Study on the Determination of PCDD/Fs, PCBs, PBDEs, HBCDDs and PFAS in Bovine Meat 2024 [EURL-PT-POP_2401-BM]
EURL for halogenated Persistent Organic Pollutants (POPs) in Feed and Food

Bovine Meat (2401-BM)
Physico-chemical Methods PCDD/Fs and PCBs - Detection

		PCDD/F				**Dioxin-like PCB (non-ortho-PCB)**				**Dioxin-like PCB (mono-ortho-PCB)**				**Indicator PCB**			
LC	Sample	GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector	GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector	GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector	GC injection	Injected volume [µl]	GC separation: Stationary phase	Detector
67	2401-BM	splitless (MMI)	5	DB5MS 60m	MS/MS	splitless (MMI)	1	DB5MS 60m	MS/MS	splitless (MMI)	1	DB5MS 60m	MS/MS	splitless (MMI)	1	DB5MS 60m	MS/MS
68	2401-BM	----	----	----	----	----	----	----	----	----	----	----	----	Split / Splitless	1 µl	HP5-MS	MS/MS
69	2401-BM	splitless	2	TG-Dioxin	HRMS	splitless	1	TG-Dioxin	HRMS	splitless	1	TG-Dioxin	HRMS	PTV	2	DB-XLB	GC-MS/MS
70	2401-BM	Splitless	1.5	DB-5MS	HRMS, DFS	Splitless	1.5	DB-5MS	HRMS, DFS	Splitless	1.5	DB-5MS	HRMS, DFS	Splitless	1.5	DB-5MS	HRMS, DFS
71	2401-BM																
72	2401-BM	splitless	1	5% phenyl, 94% methyl, 1% vinylsilicone (60 m x 0.25 mm x 0.1 µm film)	HRMS	splitless	1	5% phenyl, 94% methyl, 1% vinylsilicone (60 m x 0.25 mm x 0.1 µm film)	HRMS	splitless	1	8% phenylpolycarborane-siloxane (60 m x 0.25 mm x 0.25 µm film)	HRMS	splitless	1	8% phenylpolycarborane-siloxane (60 m x 0.25 mm x 0.25 µm film)	HRMS
73	2401-BM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	splitless	2	TR-PCB-8MS Thermo-scientific	MS-MS
74	2401-BM	MMI	4	DB 5 MS	GC-MSMS	MMI	4	DB 5 MS	GC-MSMS	MMI	4	DB 5 MS	GC-MSMS	MMI	4	DB 5 MS	GC-MSMS
75	2401-BM	splitless	2	DB-5ms	HRMS	splitless	1	DB-XLB	HRMS	splitless	1	DB-XLB, DB-5ms	HRMS	splitless	1	DB-XLB	HRMS
76	2401-BM																
77	2401-BM														1 µl	HP5MS 30m x 0,25 mm; 0,25 µm	LRMS
78	2401-BM																
79	2401-BM	PTV	5	DB-5MS UI	MS/MS	PTV	2	DB-5MS UI	MS/MS	PTV	2	DB-5MS UI	MS/MS	PTV	2	DB-5MS UI	MS/MS
80	2401-BM	splitless	2	DB5-MS	HRMS	splitless	2	DB5-MS	HRMS	PTV	1	HT8	HRMS	PTV	1	HT8	HRMS
81	2401-BM	splitless	1	DB-5MS 60m X 0.25mm X 0.1µm	HRMS	splitless	1	HT8-PCB 60m x0,25mm x 0,25µm	HRMS	splitless	1	HT8-PCB 60m x0,25mm x 0,25µm	HRMS	splitless	1	HT8-PCB 60m x0,25mm x 0,25µm	HRMS
82	2401-BM																
83	2401-BM	PTV in splitless mode	6 µl	RTX Dioxin 2	HRMS	PTV in splitless mode	6 µl	RTX Dioxin 2	HRMS	PTV in splitless mode	2 µl	HT 8/RTX Dioxin 2	HRMS	PTV in splitless mode	2 µl	HT 8/RTX Dioxin 2	HRMS
84	2401-BM																
85	2401-BM	PTV	5	DB5-MS (5%-phenyl)-methylpolysiloxane	MS/MS	PTV	5	DB5-MS (5%-phenyl)-methylpolysiloxane	MS/MS	Splitless	3	DB5-MS (5%-phenyl)-methylpolysiloxane	MS/MS	Splitless	3	DB5-MS (5%-phenyl)-methylpolysiloxane	MS/MS
86	2401-BM													PTV	3	(5%-phenyl)-methylpolysiloxane	GC-QQQ
87	2401-BM																
88	2401-BM	splitless	2	%5 phenyl %95 polydimethylsiloxane	APGC-MSMS	splitless	2	%5 phenyl %95 polydimethylsiloxane	APGC-MSMS	splitless	2	%5 phenyl %95 polydimethylsiloxane	APGC-MSMS	splitless	2	%5 phenyl %95 polydimethylsiloxane	APGC-MSMS
89	2401-BM	PTV	5	DB5	HRMS (DFS)	PTV	5	DB5	HRMS (DFS)	PTV	2	DB5	HRMS (DFS)	PTV	2	DB5	HRMS (DFS)
90	2401-BM																
91	2401-BM																
92	2401-BM																
93	2401-BM	PTV	100	DB-5 MS	HRMS	PTV	100	DB-5 MS	HRMS	Splitless	2	DB-5 MS	HRMS	Splitless	2	DB-5 MS	HRMS
94	2401-BM	PTV	2	5% DiPhenyl 95% Dimethyl Polysiloxane	HRMS	PTV	2	5% DiPhenyl 95% Dimethyl Polysiloxane	HRMS	PTV	1	5% DiPhenyl 95% Dimethyl Polysiloxane	HRMS	PTV	1	8% Phenyl (equiv) Policarborane-siloxane Phase	LRMS/MS
95	2401-BM	pulsed splitless	2	Zebron ZB-dioxin	APGC-MSMS	pulsed splitless	2	Zebron ZB-dioxin	APGC-MSMS	pulsed splitless	2	Zebron ZB-dioxin	APGC-MSMS	pulsed splitless	1	Zebron ZB-dioxin	APGC-MSMS
96	2401-BM	splitless	2	DB-5MS	HRMS	splitless	1	DB-5MS	HRMS	splitless	1	DB-5MS	HRMS				
97	2401-BM																
98	2401-BM																
99	2401-BM	splitless	2-3	DB-5MS	HRMS (R>10000)	splitless	1	DB-5MS	HRMS (R>10000)	splitless	1	DB-5MS	HRMS (R>10000)	splitless	1	HT-8	µECD
100	2401-BM																
101	2401-BM	splitless	2	DB 5MS	GC-MSMS	splitless	1	DB 5MS	GC-MSMS	splitless	1	DB 5MS	GC-MSMS	splitless	1	DB 5MS	GC-MSMS
102	2401-BM													Split/splitless	1	5 % diphenyl 95 % dimethylsiloxane (30m, 0.25 mm, 0.25 µm)	GC/ECD
103	2401-BM	splitless	2	DB-5MS	HRMS	splitless	2	DB-XLB	HRMS	splitless	2	DB-XLB	HRMS	splitless	2	DB-XLB	HRMS
104	2401-BM	PTV	5		GCMS	PTV	5		GCMS	PTV	5		GCMS	PTV	5		GCMS
105	2401-BM													PTV	2	DB-xlb	GC-MSMS
106	2401-BM	splitless	4	Rxi-5 Sil MS	MS/MS (triple quadrupole)	splitless	4	Rxi-5 Sil MS	MS/MS (triple quadrupole)	splitless	4	Rxi-5 Sil MS	MS/MS (triple quadrupole)	splitless	4	Rxi-5 Sil MS	MS/MS (triple quadrupole)
107	2401-BM	PTV	7 µl	DB5-MS	HRMS	PTV	7 µl	DB5-MS	HRMS	PTV	7 µl	DB5-MS	HRMS	PTV	7 µl	DB5-MS	HRMS
108	2401-BM													splitless	2	DB-1701	GC-ECD SCION
109	2401-BM													splitless	2	DB-XLB	MS MS
110	2401-BM	splitless	1,5	diphenyl dimethyl polysiloxane	HRMS	splitless	1,5	diphenyl dimethyl polysiloxane	HRMS	splitless	1,5	diphenyl dimethyl polysiloxane	HRMS				
111	2401-BM																
112	2401-BM	splitless	2	TR-Dioxin	HRMS	splitless	2	TR-Dioxin	HRMS	splitless	2	TR-Dioxin	HRMS	splitless	2	TR-Dioxin	HRMS
113	2401-BM																
114	2401-BM	PTV	100 µl	Rtx-Dioxin2	HRMS	PTV	100 µl	Rtx-Dioxin2	HRMS	PTV	5 µl	Rtx-Dioxin2	HRMS	Splitless	1 µl	Ht8	HRMS
115	2401-BM																
116	2401-BM	splitless	2	5% (1,4-bis(dimethylsiloxy) phenylene/95% dimethyl	HRMS	splitless	2	5% (1,4-bis(dimethylsiloxy) phenylene/95% dimethyl	HRMS	splitless	2	5% (1,4-bis(dimethylsiloxy) phenylene/95% dimethyl	HRMS	splitless	2	5% (1,4-bis(dimethylsiloxy) phenylene/95% dimethyl	HRMS
117	2401-BM													split	1	ID-HT8	LRMS
118	2401-BM																
119	2401-BM																
120	2401-BM	splitless	1	db5ms	HRMS	splitless	1	HT8	HRMS	splitless	1	HT8	HRMS	splitless	1	HT8	HRMS
121	2401-BM	splitless	2	DB5MS	HRMS	splitless	1	DB5MS	HRMS	splitless	1	DB5MS	HRMS	splitless	1	DB5MS	HRMS
122	2401-BM																
123	2401-BM	PTV	15	5-MS	LRMS - GCMSMS	PTV	15	5-MS	LRMS - GCMSMS	PTV	15	5-MS	LRMS - GCMSMS	PTV	15	5-MS	LRMS - GCMSMS
124	2401-BM	PTV	5	DB5-MS	HRMS	PTV	5	DB5-MS	HRMS	SSL	1	HT8-PCB	HRMS	SSL	1	HT8-PCB	HRMS
125	2401-BM																
126	2401-BM	splitless	1	DB5-MS	HRMS	splitless	1	DB5-MS	HRMS	splitless	1	DB5-MS	HRMS	splitless	1	DB5-MS	HRMS
127	2401-BM	splitless	1	RTX-Dioxin-2	LRMS APGC Waters (MS/MS)	splistless	1	DB-5 MS type and RTX HT-8 (separate of PCB 28/31)	Q-Exactive Orbitrap R=60000	splistless	1	DB-5 MS type and RTX HT-8	Q-Exactive Orbitrap R=60000	splistless	1	DB-5 MS type and RTX HT-8	Q-Exactive Orbitrap R=60000
128	2401-BM	splitless	2,0	60 m DB-5 MS capillary column	HRMS	splitless	1,5	60 m DB-5 MS capillary column	HRMS	splitless	1,5	60 m DB-5 MS capillary column	HRMS	splitless	1,0	60 m HT8 capillary column	GCMSMS
018A	2401-BM													Splitless	2	HT8 PCB :5% phenyl polycarborane siloxane	MS MS
034A	2401-BM	Splitless	2	DB5MS	HRMS	Splitless	2	DB5MS	HRMS					Splitless	1	HT8PCB	HRMS
039A	2401-BM	splitless	2	DB-5 MS	HRMS	splitless	1	DB-5 MS	HRMS	splitless	1	DB-5 MS	HRMS	splitless	1	DB-5 MS	HRMS
049A	2401-BM	PTV	8, 5	DBDIOXIN, DB-5	HRMS	PTV	8, 5	DBDIOXIN, DB-5	HRMS	PTV	2	DBDIOXIN, DB-5	HRMS	PTV	2	DBDIOXIN, DB-5	HRMS
066A	2401-BM	splitless	2	DB-5MS	HRMS	splitless	2	DB-5MS	HRMS	splitless	2	HT8-PCB	HRMS	splitless	2	HT8-PCB	HRMS
117A	2401-BM													split	1	ID-HT8	LRMS

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Bovine Meat (2401-BM)
Bioanalytical screening methods PCDD/Fs and PCBs - Clean-up and Separation

LC	Sample		**Weighed sample** [g]	**Extraction** Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Extraction pressure [Mpa]
8	2401-BM		1.998	freeze drying	ASE	hexane	1	100	10,3
13	2401-BM		1,75 g of fat	homogenisation	shaking	water: isopropanol: n-Hexan/DEE 1:1:2	2 h	ambient	normal
16	2401-BM		2				15 min	ambient	
58	2401-BM		36	freeze-drying	ASE	hexane:dichloromethane 2:1	0,5	110	10,3
60	2401-BM		10		cold extractioin	DCM/Cyclohexane		RT	
63	2401-BM		15	homogenisation; drying with Na2SO4	Column	n-hexane/acetone 2/1 v/v	2	22-25 (room ambient temperature)	-
93	2401-BM		2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

			Clean-up (PCDD/Fs and PCBs)						**Clean-up (Separate analysis of PCDD/Fs and PCBs)**			
LC	Sample		Silica/sulfuric acid column	Alumina column	Florisil column	Carbon/celite column	Others	Separate analysis of PCDD/Fs and DL-PCBs	Alumina column	Florisil column	Carbon/celite column	Others
8	2401-BM		yes	no	no	no		no				
13	2401-BM		yes	no	no	no		no				
16	2401-BM		yes	no	no	yes		yes	no	no	yes	
58	2401-BM		yes	no	no	yes	no	yes	no	no	yes	no
60	2401-BM		yes	no	no	no		no				
63	2401-BM		yes	no	no	no	-	no	-	-	-	-
93	2401-BM		yes	no	no	no	overnight pretreatment with sulphuric acid, then extracted with Hexane/Diethylether (97/3%)	no	n.a.	n.a.	n.a.	no separate analysis only PCDD/Fs + DL-PCBs (+ other AhR- agonist that ends up in final extract)

Bovine Meat (2401-BM)
Bioanalytical screening methods PCDD/Fs and PCBs - Cell bioassay

LC	Sample	Name, type and provider of cell line	Method validated according to EU Regulation	Sample replicates on microtiter plate	Type of calibrators	Type of calibration function	Curve fitting method	Procedure blank correction	Recovery correction	Type of recovery reference sample(s)	Matrix of recovery reference sample(s)	Level(s) of recovery reference sample(s)		
												PCDD/F + DL-PCB	PCDD/F	DL-PCB
8	2401-BM	DR CALUX provided by BDS		triplicate	TCDD	CALIBRATION CURVE	SSP	YES	YES	animal fat reference material	animal fat	2,44		
13	2401-BM	rat hepatoma cells Revvlux1.1	yes	triplicate	TCDD	linear	SSR	yes	yes	GC/HRMS confirmed		yes-BRMoofrom BDS Holand		
16	2401-BM		yes	duplicates	2,3,7,8-TCDD and PCB 126			no	yes	oil spiked and confirmed				
58	2401-BM	H1L6.1c3, XDS Inc.	yes	duplicates	TCDD, PCB 126	4-PL	SSR	yes	yes	spiked, GC/HRMS confirmed	pork fat	3,28	1,89	1,39
60	2401-BM	rat Hepatoma Typs H4IE 1.1 c4 (University of California, Davis)	yes	triplicates	TCDD	curve model	WSSR regression	yes	yes	QC sample GC-HRMS confirmed	compound feed	62		
63	2401-BM	H4IIE, rat hepatome wild type, from Helmholtz-Zentrum Neuherberg/Germany	yes	triplicates	TCDD	S-Curve, 4-Parameter-Fit	SSR	yes	yes	EURL-PT-DBE_1802-BE	beef meat	3,3 pg WHO2005-PCDD/F+dlPCB-TEQ/g fat	0,6 pg WHO2005-PCDD/F-TEQ/g fat	2,7 pg WHO2005-dlPCB-TEQ/g fat
93	2401-BM	rat H4IIE (Wageningen University, now BDS)	yes	triplicates	reference samples milk fat	exponential fit	no	yes, automatically	yes, automatically	reference samples	milk fat	0.59/1.01/2.58/3.07/6.61 pg TEQ/g		

LC	Sample	Bioassay cut-off value(s) calculated from				Other approach to bioassay cut-off value(s)
		matrix-matched calibration experiments (spiking) during initial validation	multiple analysis (n>6) of a sample contaminated at the GC/MS DL	multiple analysis (n>6) of a sample contaminated at 2/3 level of interest	matrix-matched calibration experiments (confirmed samples) during re-evaluation	
8	2401-BM		YES			
13	2401-BM					2/3 of limit
16	2401-BM					
58	2401-BM	no	no	no	no	3/4 of maximum level
60	2401-BM	no	yes	no	no	
63	2401-BM	yes	no	no	yes	-
93	2401-BM	no	no	no	no	using bioassay cut-off 2/3 ML for PCDD/Fs = 1.35 pg TEQ/g

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Bovine Meat (2401-BM)

Physico-chemical Methods PCDD/Fs and PCBs - Additional Information

LC	Sample		**Additional information** Physical-chemical methods		**Additional information** Bioanalytical methods
73	2401-BM		Weighed sample= massmeat weighed at the start before fat extraction	N/A= non-applicable	
8	2401-BM		INDICATOR PCBs UNDER VALIDATION/ACCREDITATION		
17	2401-BM		additional purification with silica/sulfuric acid after extraction		
55	2401-BM			Automatic purification MIURA	
69	2401-BM		Indicator PCBs:	Extraction: SLE (n-hexane); Clean-up: acid treatment + SPE (silica)	
93	2401-BM		Sample weight: 2.504 g fat		no separate analysis only Total BEQ: PCDD/Fs + DL-PCBs (+ other AhR- agonist that ends up in final extract); this method is used as a screening assay, samples classified as suspect are subsequently analysed by GCHRMS analysis
102	2401-BM		0,2 g fat (ASE)	Only NDL PCBs	
114	2401-BM		Treatment of the extract with MTBE and drying with Na2SO4 after extraktion and prior to fat determination	CB123 was quantified with the indicator PCBs on the Ht8 column due to a potential coelution ont the Rtx-Dioxin2 column.	
120	2401-BM		method is accreditated for PCDD/PCDFs and DL-PCBs only	there are obtained two fractions after Miura purification: (1) contains PCDD/Fs and mono-orto-PCBs; (2) contains other DL-PCBs; for Indicator PCBs two fractions are put together	
126	2401-BM		Clean-up with DEX Tech Plus (Fa. LC Tech) with Alumina and Carbon columns of 2g fat sample		