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

EURL-PT-POP_2502-HY

FEED

Final Report

PFAS

(Report Version 1.0)

21 May 2026

Funded by the European Union

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Summary

Test sample	**FEED:** Hay [2502-HY]
Analytes of interest **Optional** for NRLs:	**Main PFAS** (PFOS, PFOA, PFNA, PFHxS, Sum of PFOS, PFOA, PFNA, PFHxS) **Other PFAS** (perfluoroalkylcarboxylic acids, perfluoroalkylsulfonic acids, perfluoroalkane sulphonamides)
Methods	Any kind of method
Participants	NRLs, OFLs, other official laboratories, commercial laboratories performing the analysis of samples taken by feed business operators
Statistical evaluation	ISO 13528:2022 [1], IUPAC Protocol [2]
Report of preliminary results	21 May 2026 (Version 1.0)
Publication	EURL POPs reserves all rights to publish and present the anonymised results of the interlaboratory study in scientific journals and/or during conferences.

1. Structure of the ILS, test material and analytes

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

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

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

1.1. Samples and coding

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

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

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

1.2. Analytes of interest

NRLs for halogenated POPs in feed and food are encouraged to determine the following additional parameters for PFASs:

Main PFAS

- Total perfluorooctane sulfonic acid (total PFOS[1]), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS)
- Sum of total PFOS[1], PFOA, PFNA, PFHxS

Other PFAS

- **Perfluoroalkylsulfonic acids (PFSAs):** perfluorobutanesulfonic acid (PFBS), perfluoropentanesulfonic acid (PFPeS), perfluoroheptanesulfonic acid (PFHpS), linear perfluorooctanesulfonic acid (L-PFOS), branched perfluorooctanesulfonic acids (br-PFOS), perfluorononanesulfonic acid (PFNS), perfluorodecanesulfonic acid (PFDS), perfluoroundecane sulfonic acid (PFUnDS), perfluorododecane sulfonic acid (PFDoDS), perfluorotridecane sulfonic acid (PFTrDS)
- **Perfluoroalkylcarboxylic acids (PFCAs):** perfluorobutanoic acid (PFBA), perfluoropentanoic acid (PFPeA), perfluorohexanoic acid (PFHxA), perfluoroheptanoic acid (PFHpA), perfluorodecanoic acid (PFDA), perfluoroundecanoic acid (PFUnDA), perfluorododecanoic acid (PFDoDA), perfluorotridecanoic acid (PFTrDA), perfluorotetradecanoic acid (PFTeDA)
- Perfluorooctane sulphonamide **(FOSA)**
- 2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **(DONA)**
- 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **(GenX)**
- Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate (major component of **F-53B**)
  Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate
  (minor component of **F-53B**)
- 1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide (**Capstone A**)
- 1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide (**Capstone B**)

[1] sum of linear and branched stereoisomers, whether they are chromatographically separated or not

1.3. Methods

All kinds of detection and quantification methods could be applied.

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 PFAS

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,
- 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 **µg/kg, relative to a feed with a moisture content of 12 %.**

2. Participating laboratories

This proficiency test was open for participation of:

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

92 laboratories registered for this proficiency test. For PFAS, 41 sets of results were reported for at least one parameter, respectively. Two laboratories laboratory submitted second sets of data.

Table 1: Participating laboratories

Participating laboratories	Region	No. all participants	No. participants PFAS
National Reference Laboratories	European Union	24	15
	Other Countries	2	1
Official Laboratories	European Union	53	22
	Other European Countries	1	-
	Africa	-	-
	Americas	2	-
	Asia	-	-
	Oceania	-	-
Commercial Laboratories	European Union	9	2
	Other European Countries	-	-
	Africa	-	-
	Americas	1	-
	Asia	-	-
	Oceania	-	-
	Total	**92**	**40**

2.1. Number of reported results

Table 2: Reported results for individual PFCAs for hay (2502-HY) of all laboratories

Analyte	Abbreviation	2502-HY
Perfluorobutanoic acid	(PFBA)	29
Perfluoropentanoic acid	(PFPeA)	31
Perfluorohexanoic acid	(PFHxA)	34
Perfluoroheptanoic acid	(PFHpA)	34
Perfluorooctanoic acid	(PFOA)	41
Perfluorononanoic acid	(PFNA)	41
Perfluorodecanoic acid	(PFDA)	35
Perfluoroundecanoic acid	(PFUnDA)	34
Perfluorododecanoic acid	(PFDoDA)	35
Perfluorotridecanoic acid	(PFTrDA)	30
Perfluorotetradecanoic acid	(PFTeDA)	29

Table 3: Reported results for individual PFSAs for hay (2502-HY) of all laboratories

Analyte	Abbreviation	2502-HY
Perfluorobutanesulfonic acid	(PFBS)	34
Perfluoropentanesulfonic acid	(PFPeS)	29
Perfluorohexanesulfonic acid	(PFHxS)	41
Perfluoroheptanesulfonic acid	(PFHpS)	30
Linear Perfluorooctanesulfonic acid	(L-PFOS)	33
Perfluorononanesulfonic acid	(PFNS)	30
Perfluorodecanesulfonic acid	(PFDS)	32
Perfluoroundecanesulfonic acid	(PFUnDS)	18
Perfluorododecanesulfonic acid	(PFDoDS)	21
Perfluorotridecanesulfonic acid	(PFTrDS)	17

Table 4: Reported results for PFAS sum parameters for hay (2502-HY) of all laboratories

Analyte	Abbreviation	2502-HY
Sum of branched perfluorooctanesulfonic acids	(br-PFOS)	28
Sum of branched & linear perfluorooctanesulfonic acids	(Total-PFOS)	39
Sum of Total-PFOS, PFOA, PFNA, PFHxS (upper bound)	-	38
Sum of Total-PFOS, PFOA, PFNA, PFHxS (lower bound)	-	39

Table 5: Reported results for other PFAS for hay (2502-HY) of all laboratories

Analyte	Abbreviation	2502-HY
Perfluorooctane sulphonamide	(FOSA)	10
2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid	(DONA)	22
2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid	(GenX)	22
Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate	(major component of F-53B)	20
Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate	(minor component of F-53B)	18
1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide	(Capstone A)	1
1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide	(Capstone B)	2

2.2. Accreditation

Table 6: Reported accreditation according to ISO/IEC 17025 by participants for PFAS

Hay	PFAS
Accreditation	21
No accreditation	14

2.3. Detection methods

Any kind of chromatographic separation and detection methods could be applied for analysis. Most of the participating laboratories applied ultra- or high-performance liquid chromatography (U/HPLC) as separation method combined with low resolution tandem mass spectrometry (MS/MS) as detection method. High resolution mass spectrometry (Orbitrap HRMS) was also applied as detection method.

3. Test for sufficient homogeneity

The test for sufficient homogeneity was performed according to ISO 13528:2020 [1] and the International Harmonized Protocol for the Proficiency Testing of Analytical Chemistry Laboratories [2]. Therefore, 10 portions of the test samples 2502-HY were analyzed in duplicate for PFAS. 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. 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 individual PFAS compounds, and sum parameters (including limits of quantification (LOQs)), if possible. Additionally, the median of all values was calculated. For individual substances (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 taken for evaluation and calculation if these levels are equal to or above the LOQ; otherwise, the LOQ will be taken instead.

Assigned values were calculated for the

- perfluoroalkylcarboxylic acids: PFBA, PFPeA, PFHxA, PFHpA, PFOA
- perfluoroalkylsulfonic acids: PFBS, PFHxS, L-PFOS, br-PFOS, total PFOS (sum of branched and linear Perfluorooctanesulfonic acids), PFNS, PFDS, PFUnDS, PFDoDS, PFTrDS
- the sum parameter sum of total-PFOS, PFOA, PFNA, PFHxS in the test sample "hay" (2502-HY), including limits of quantification (LOQs).

Assigned values could not be calculated for the

- perfluoroalkylcarboxylic acids: PFNA, PFDA, PFUnDA, PFDoDA, PFTrDA, PFTeDA
- perfluoroalkylsulfonic acids: PFPeS, PFHpS, PFTrDS
- and other PFAS substances, due to the limited number of reported results above the LOQ, but median values of participants' results are given in this report.

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 the results of the participants. Additionally, the results of all participants reporting results and the results of participants having accreditation according to ISO/IEC 17025 were compared for PFOA, PFHxS, total PFOS and for the sum parameter sum of total-PFOS, PFOA, PFNA, PFHxS (ub and lb). 21 of 40 reporting laboratories were accredited according to ISO/IEC 17025 for PFAS in feed. No significant differences between the assigned values calculated for both data sets for PFAS were observed for most of the analytes (Table 7).

Table 7: Comparison of assigned values for 2502-HY for all participants and participants with reported accreditation according to ISO/IEC 17025 for PFAS

Sum parameters	Assigned value All participants	Assigned value ISO/IEC 17025 accreditation	Deviation
	µg/kg product (12% moisture content)		%
PFOA	5.50	5.87	<7
PFHxS	0.203	0.204	<1
Total PFOS	5.14	5.35	<4
Sum of total PFOS, PFOA, PFNA, PFHxS (ub)	11.4	11.3	<1
Sum of total PFOS, PFOA, PFNA, PFHxS (lb)	11.2	11.2	-

4.1. Assigned values of individual substances

The assigned values for the test sample 2502-HY were calculated as consensus of participants' results for individual PFAS, taking into account the calculation criteria described above (Table 8 and 9; tabular summary see annex 1; Figure 1 and 2).

Table 8: Assigned values for perfluoroalkylcarboxylic acids (rounded to three significant figures)

Hay (2502-HY)	Assigned value PFCAs µg/kg product (12% moisture content)
PFBA	17.1
PFPeA	4.43
PFHxA	1.15
PFHpA	0.394
PFOA	5.50

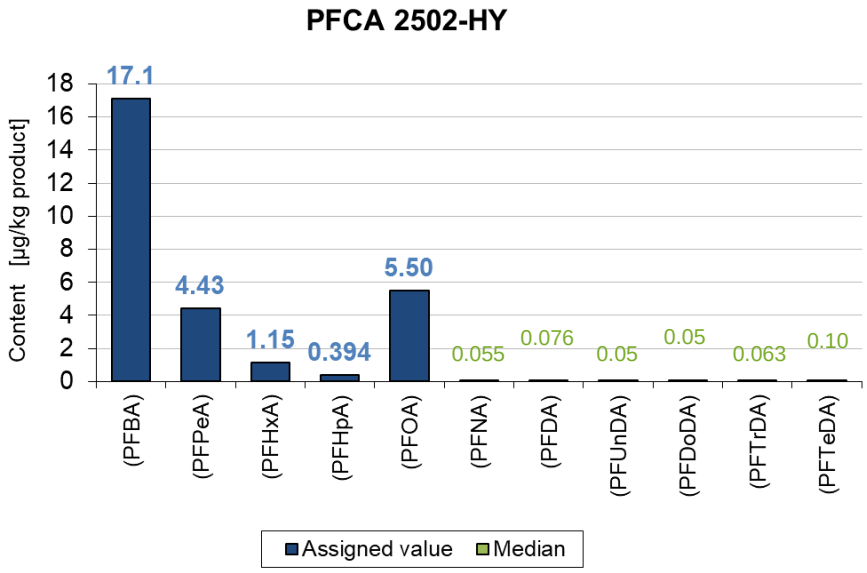

Figure 1: Assigned values (blue) and median values (green) for PFCAs individual substances for hay (2502-HY) [µg/kg product (12% moisture content)]

Table 9: Assigned values for perfluoroalkylsulfonic acids (rounded to three significant figures)

Hay (2502-HY)	Assigned value PFSAs µg/kg product (12% moisture content)
PFBS	0.0858
PFHxS	0.203
L-PFOS	4.26
PFNS	4.94
PFDS	5.11
PFUnDS	0.323
PFDoDS	0.263

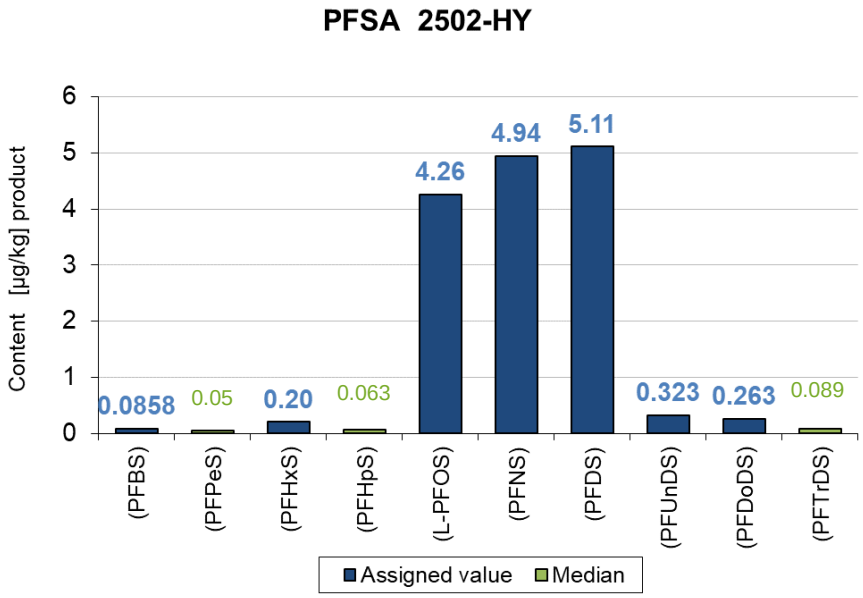

Figure 2: Assigned values (blue) and median values (green) for PFSAs individual substances for hay (2502-HY) [µg/kg product (12% moisture content)]

4.2. Assigned values of sum parameter

The assigned values for the test sample 2502-HY were calculated as consensus of participants' results for sum parameters, taking into account the calculation criteria described above (Table 10; tabular summary see annex 1; Figure 3).

Table 10: Assigned values for sum parameters (rounded to three significant figures)

Hay (2502-HY)	Assigned value µg/kg product (12% moisture content)
Sum of branched perfluorooctanesulfonic acids (br-PFOS)	0.813
Sum of branched & linear perfluorooctanesulfonic acids (Total-PFOS)	5.14
Sum of Total PFOS, PFOA, PFNA, PFHxS (ub)	11.4
Sum of Total PFOS, PFOA, PFNA, PFHxS (lb)	11.2

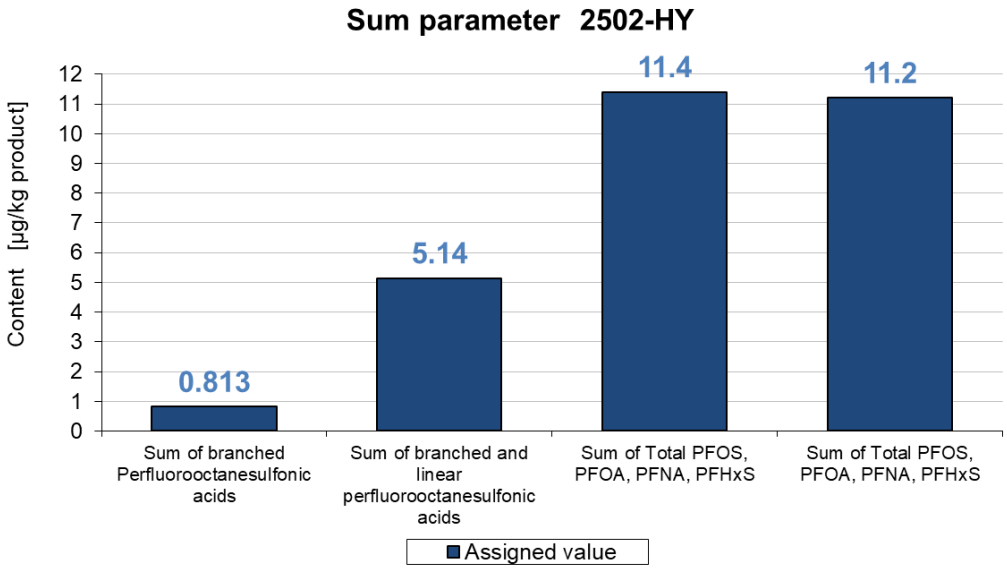

Figure 3: Assigned values for sum parameters of branched and linear PFOS and sum of total-PFOS, PFOA, PFNA and PFHxS for hay (2502-HY) [µg/kg product (12% moisture content)]

5. Scoring of results – Z-scores

For evaluation of results, 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 individual PFAS substances and sum parameters, the relative standard deviation for proficiency assessment $\sigma_{p_{rel}}$ is defined as 20 %.

Z-scores for individual substances and sum parameters 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. Participants' z-scores of individual substances

Z-scores for individual substances were calculated (Table 11 and 12; tabular summary see annex 3; Figure 4 and 5).

Table 11: Distribution of participants' z-scores for PFCAs for hay (2502-HY)

Percentage of participants' results PFCAs	$\lvert z\text{-score} \rvert \leq 2$	$2 < \lvert z\text{-score} \rvert < 3$	$\lvert z\text{-score} \rvert \geq 3$
PFBA	85%	7%	7%
PFPeA	90%	3%	7%
PFHxA	83%	9%	9%
PFHpA	87%	7%	7%
PFOA	88%	5%	7%

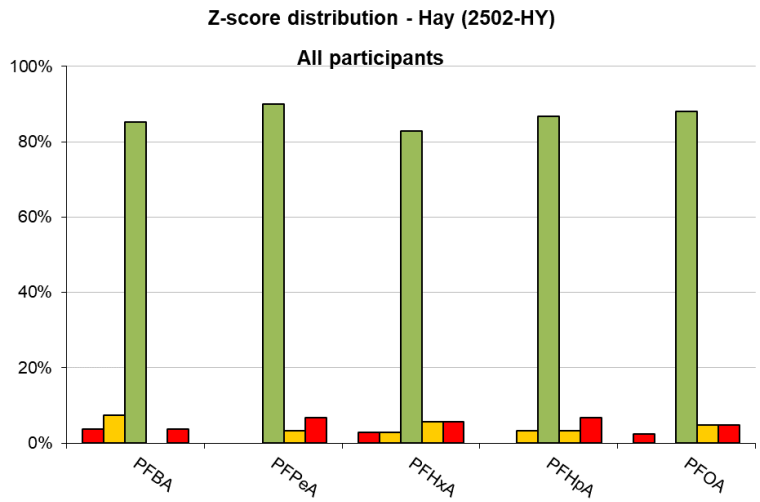

Figure 4: Distribution of participants' z-scores for individual PFCAs for hay (2502-HY) [Green bars: -2 ≤ z-score ≤ 2, orange bars: -3 < z-score < -2, 2 < z-score < 3, red bars: z-score ≤ -3, z-score ≥ 3]

Table 12: Distribution of participants' z-scores for PFSAs for hay (2502-HY)

Percentage of participants' results PFSAs	|z-score| ≤ 2	2 < |z-score| < 3	|z-score| ≥ 3
PFBS	89%	-	11%
PFHxS	79%	8%	13%
L-PFOS	94%	3%	3%
PFNS	77%	3%	19%
PFDS	69%	16%	16%
PFUnDS	81%	-	19%
PFDoDS	67%	17%	17%

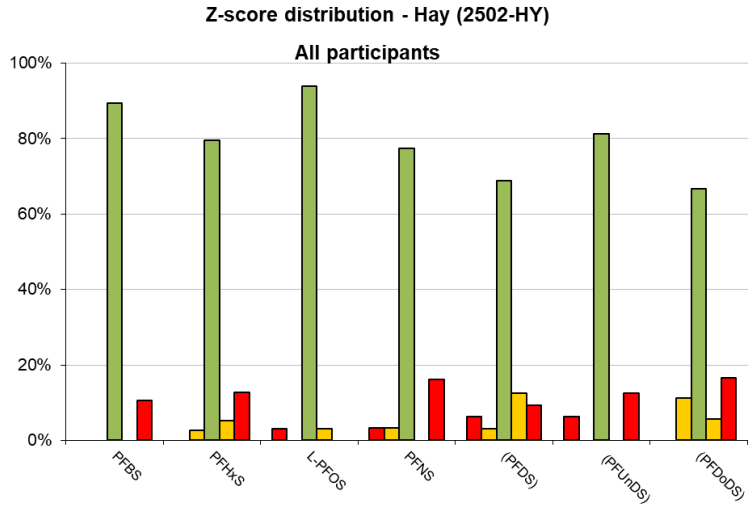

Figure 5: Distribution of participants' z-scores for individual PFSAs for hay (2502-HY) [Green bars: -2 ≤ z-score ≤ 2, orange bars: -3 < z-score < -2, 2 < z-score < 3, red bars: z-score ≤ -3, z-score ≥ 3]

5.2. Participants' z-scores of sum parameters

Z-scores for sum parameters were calculated (Table 13; tabular summary see annex 3; Figure 6).

Table 13: Distribution of participants' z-scores for sum parameters for hay (2502-HY)

Percentage of participants' results Sum parameters	|z-score| ≤ 2	2 < |z-score| < 3	|z-score| ≥ 3
Sum of branched perfluorooctanesulfonic acids (br-PFOS)	68%	11%	21%
Sum of branched & linear perfluorooctanesulfonic acids (Total-PFOS)	88%	5%	8%
Sum of Total PFOS, PFOA, PFNA, PFHxS (ub)	95%	3%	3%
Sum of Total PFOS, PFOA, PFNA, PFHxS (lb)	93%	5%	3%

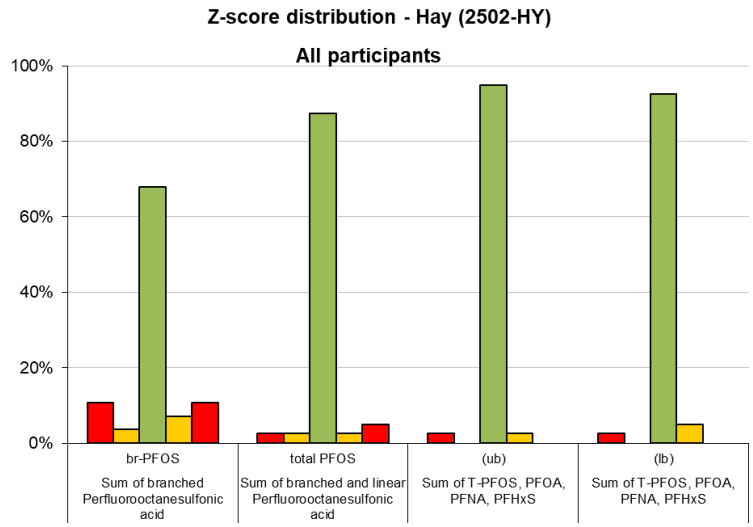

Figure 6: Distribution of participants' z-scores for sum parameters for hay (2502-HY) [Green bars: -2 ≤ z-score ≤ 2, orange bars: -3 < z-score < -2, 2 < z-score < 3, red bars: z-score ≤ -3, z-score ≥ 3]

6. Quality control

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

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

7. Results of participants

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

8. References

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

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

9. Annex

Hay – 2502-HY	
Annex 1	Assigned values – PFAS compounds and sum parameters
Annex 2	Participants' results – Tables – PFAS compounds and sum parameters
Annex 3	Participants' z-scores – Tables – PFAS compounds and sum parameters
Annex 4	Participants' z-scores – Charts – PFAS compounds and sum parameters
Annex 5	Test for sufficient homogeneity and stability – PFAS
Annex 6	Participants' methods – PFAS

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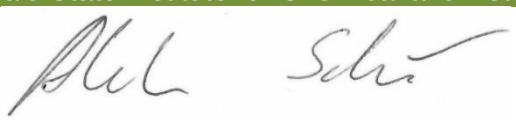

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EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 1: Assigned values of PFAS compounds and sum parameters

Test sample - Hay (2502-HY)

Assigned values of individual substances and sum parameters

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

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

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

Hay (2502-HY)

Perfluoroalkylcarboxylic acids (PFCAs) - Assigned values

Analyte		Result µg/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
Perfluorobutanoic acid	(PFBA)		17.1	3.85	0.98	24	17.4
Perfluoropentanoic acid	(PFPeA)		4.43	1.15	0.27	28	4.68
Perfluorohexanoic acid	(PFHxA)		1.15	0.256	0.058	31	1.18
Perfluoroheptanoic acid	(PFHpA)		0.394	0.0707	0.017	26	0.398
Perfluorooctanoic acid	(PFOA)		5.50	0.859	0.18	37	5.46
Perfluorononanoic acid	(PFNA)						0.0550
Perfluorodecanoic acid	(PFDA)						0.0760
Perfluoroundecanoic acid	(PFUnDA)						0.0500
Perfluorododecanoic acid	(PFDoDA)						0.0500
Perfluorotridecanoic acid	(PFTrDA)						0.0625
Perfluorotetradecanoic acid	(PFTeDA)						0.100

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

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

Hay (2502-HY)

Perfluoroalkylsulfonic acids (PFSAs) - Assigned values

Analyte		Result µg/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
Perfluorobutanesulfonic acid	(PFBS)		0.0858	0.0165	0.0042	24	0.0990
Perfluoropentanesulfonic acid	(PFPeS)						0.0500
Perfluorohexanesulfonic acid	(PFHxS)		0.203	0.0428	0.0093	33	0.204
Perfluoroheptanesulfonic acid	(PFHpS)						0.0630
Linear Perfluorooctanesulfonic acid	(L-PFOS)		4.26	0.481	0.11	30	4.17
Sum of branched Perfluorooctanesulfonic acids	(br-PFOS)		0.813	0.176	0.052	18	0.814
Sum of branched and linear perfluorooctanesulfonic acids	(total PFOS)		5.14	0.748	0.16	35	5.20
Perfluorononanesulfonic acid	(PFNS)		4.94	0.962	0.25	23	4.80
Perfluorodecanesulfonic acid	(PFDS)		5.11	1.03	0.27	22	5.01
Perfluoroundecane sulfonic acid	(PFUnDS)		0.323	0.0479	0.017	13	0.333
Perfluorododecane sulfonic acid	(PFDoDS)		0.263	0.0669	0.022	15	0.280
Perfluorotridecane sulfonic acid	(PFTrDS)						0.0890

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

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

Hay (2502-HY)

Sum of PFOS, PFOA, PFNA, PFHxS - Assigned values

Analyte		Result µg/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
Sum of total PFOS, PFOA, PFNA, PFHxS	(ub)		11.4	1.78	0.37	36	11.0
Sum of total PFOS, PFOA, PFNA, PFHxS	(lb)		11.2	1.61	0.33	37	11.0

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

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

Hay (2502-HY)

Other PFAS - Assigned values

Analyte		Result µg/kg (12% moisture content)	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
Perfluorooctane sulphonamide	(FOSA)						0.100
2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid	(DONA)						0.0720
2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid	(GenX)						0.150
Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate	(major component of F-53B)						0.0500
Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate	(minor component of F-53B)						0.0500
1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide	(Capstone A)						0.900
1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide	(Capstone B)						2.95

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

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

Hay (2502-HY)

Moisture content (PFAS) - Assigned value

Analyte	Result %	**Assigned value** [outliers removed]	**Robust standard deviation** [outliers removed]	**Standard uncertainty** [outliers removed]	**No. of results contributing to assigned value**	**Median** [all values]
Moisture content		8.28	0.638	0.14	32	8.27

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

Annex 2: Participants' results of PFAS compounds and sum parameters

Test sample - Hay (2502-HY)

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

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

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

Hay (2502-HY)

Perfluoroalkylcarboxylic acids (PFCAs) - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
1		2502-HY												
2		2502-HY												
3		2502-HY												
4		2502-HY												
5		2502-HY												
6		2502-HY												
7		2502-HY												
8		2502-HY												
9	A	2502-HY		23.1	4.68	1.17	0.385	9.2	0.0449	<0.1	<0.1	<0.1	<0.1	<0.1
10		2502-HY												
11	A	2502-HY				1.16		6.37	0.039	0.043	<0.01	<0.01	<0.01	<0.05
12	A	2502-HY		20	4.1	1.4	<0.5	5.9	<0.5	<0.5	<0.5	<0.5		
13	A	2502-HY		19.5	5.01	1.18	0.421	5.09	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5
14		2502-HY												
15	A	2502-HY						5.18	0.101					
16	A	2502-HY		18.3	4.72	1.18	0.447	5.08	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
17		2502-HY												
18	A	2502-HY		13	3.2	0.91	0.36	4.7	<0.076	<0.076	<0.076	<0.076	<0.076	<0.076
19		2502-HY												
20		2502-HY												
21		2502-HY												
22		2502-HY												
23	A	2502-HY		17	4.2	1.2	0.37	6.6	<0.088	<0.088	<0.088	<0.088	<0.088	<0.088
24	A	2502-HY		19.8	4.68	1.24	<0.01	4.7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25		2502-HY												
26	A	2502-HY		17.3	4.97	0.987	0.363	5.87	0.0337	0.0317	0.018	<0.028	<0.046	<1.9
27	A	2502-HY						8.46	0.055					
28		2502-HY												
29		2502-HY												
30	A	2502-HY		15.9	7.61	0.79	0.62	5.69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
31		2502-HY												
32	A	2502-HY		<10	2.98	0.93	0.261	4.78	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
33	A	2502-HY		12	3.34	0.812	0.292	4.3	0.055	<0.05	<0.05	<0.05	<0.05	<0.2
34		2502-HY												
35		2502-HY												
36	A	2502-HY		18	5.7	1.2	0.45	5.5	0.049	<0.048	<0.048	<0.048	<0.048	<0.048
37	A	2502-HY		<0.5	6.17	1.23	0.465	6	0.042	0.051	0.0292	<0.05	<0.05	<0.05
38	A	2502-HY			2.62	0.187	0.19	8.95	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5
39	A	2502-HY		18.6	4.85	1.52	0.51	6.54	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
40		2502-HY												
41	A	2502-HY		18.3	4.6	1.23	0.405	5.46	0.062	0.069	<0.05	<0.2	<0.05	<0.05
42	A	2502-HY		<0.05	3.3	1.4	0.45	4.6	<0.05	0.073	<0.05	<0.05	<0.05	
43	A	2502-HY						4.32	<0.05					
44	A	2502-HY		18.7	4.18	1.13	0.423	5.4	0.0357	0.0352	0.023	0.0219		
45		2502-HY												
46	A	2502-HY						7.19	<0.1					
47		2502-HY												
48		2502-HY												
49		2502-HY												
50		2502-HY												
51		2502-HY												
52	A	2502-HY				1.2	0.35	5.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
53	A	2502-HY		8.62	3.32	0.684	0.378	4.97	0.041	0.042	0.027	0.021	<0.015	<0.015
54	A	2502-HY		50.9	14.3	5.07	1.01	1.01	0.014	0.16	0.18	<0.5	<0.5	<0.5
55		2502-HY												
56		2502-HY												
57		2502-HY												

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

Hay (2502-HY)

Perfluoroalkylcarboxylic acids (PFCAs) - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
58		2502-HY												
59	A	2502-HY		17.4	5.57	1.71	0.3	5.55	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1
60		2502-HY												
61		2502-HY												
62		2502-HY												
63		2502-HY												
64	A	2502-HY						5.37	0.07					
65		2502-HY												
66	A	2502-HY		17.6	5	1.39	0.456	5.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
67		2502-HY												
68	A	2502-HY						5.9	<0.005					
69		2502-HY												
70		2502-HY												
71		2502-HY												
72		2502-HY												
73		2502-HY												
74		2502-HY												
75		2502-HY												
76	A	2502-HY			6.48	1.48	<1	8.15	<0.1	<1		<1		
77	A	2502-HY		21.2	<5		<5	6.58	<0.1	<5	<0.1	<0.1		
78	A	2502-HY				0.887	0.362	4.51	0.047	0.051	0.026	0.021		
79	A	2502-HY				1.1	0.39	7.5	<0.71	<0.51	<0.05	<0.05	<0.075	<0.075
80	A	2502-HY		9.5	2.7	0.63	0.29	4.1	0.053	0.051	0.042	0.022	<0.1	<0.1
81		2502-HY												
82		2502-HY												
83	A	2502-HY		24	5.9	1.2	0.47	6.1	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
84		2502-HY												
85		2502-HY												
86	A	2502-HY		15	3.3	0.98	0.35	6.3	0.029	0.025	<0.05	<0.05	<0.05	<0.05
87		2502-HY												
88		2502-HY												
89	A	2502-HY		10.4	4.28	1.17	<1	5.08	<1	<1	<1	<1	<1	<1
90		2502-HY												
91		2502-HY												
92		2502-HY												
93	A	2502-HY		15.6	4.45	1.66	0.387	5.05	0.037	0.028	0.023	0.017	<0.05	<0.05
94		2502-HY												
95		2502-HY												
96		2502-HY												
97	A	2502-HY		2.51	<0.5	5.64	0.64	5.87	<0.2	<0.1	<0.1	<0.05	<0.05	<0.1
Additional Sets														
36	B	2502-HY		18	5	1.1	0.39	5.2	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048
86	B	2502-HY		15	3.3	0.98	0.35	4.6	0.029	0.025	<0.05	<0.05	<0.05	<0.05

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

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

Hay (2502-HY)

Perfluoroalkylsulfonic acids (PFSAs) - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
1		2502-HY													
2		2502-HY													
3		2502-HY													
4		2502-HY													
5		2502-HY													
6		2502-HY													
7		2502-HY													
8		2502-HY													
9	A	2502-HY		<0.1	<0.1	0.201	<0.1			7.89	7.95	7.04	0.268	0.264	<0.1
10		2502-HY													
11	A	2502-HY		0.096	<0.05	0.221	<0.05	4.31	1.27	5.58	11.5	8.45	0.275	0.51	0.058
12	A	2502-HY		<0.5	<0.5	0.7	<0.5			5.6	6.6	4.8			
13	A	2502-HY		0.096	<0.1	0.197	<0.1	4.58	1.03	5.6	4.73	4.81			
14		2502-HY													
15	A	2502-HY				0.204				4.43					
16	A	2502-HY		<0.1	<0.1	0.193	<0.1	4.49	1.07	5.56	6.57	7.27		0.46	
17		2502-HY													
18	A	2502-HY		<0.069	<0.072	0.23	<0.072	3.9	0.69	4.6	4.8	4.7			
19		2502-HY													
20		2502-HY													
21		2502-HY													
22		2502-HY													
23	A	2502-HY		<0.088	<0.088	0.15	<0.26	4.7	0.81	5.4	4.7	<0.88	<0.88	<0.88	<0.088
24	A	2502-HY		0.15	<0.01	0.39	<0.01	4.79	5.69	10.5	4.83	5.05	0.37	0.23	<0.01
25		2502-HY													
26	A	2502-HY		0.0757	<0.088	0.177	<0.044	4.13	0.71	4.83	4.4	5.33	0.367	0.145	<0.089
27	A	2502-HY				0.331				6.97					
28		2502-HY													
29		2502-HY													
30	A	2502-HY		0.06	<0.05	0.29	<0.05	3.53	0.64	4.17	6.75	4.2	0.28	0.37	<0.2
31		2502-HY													
32	A	2502-HY		<0.2	<0.2	0.263	<0.2	3.49	0.696	4.17	4.84	6.15			
33	A	2502-HY		0.0656	<0.05	0.17	<0.05	3.84	0.67	4.51	4.69	6.56	0.343	0.152	<1
34		2502-HY													
35		2502-HY													
36	A	2502-HY		0.086	<0.048	0.25	<0.048	4.36	0.86	5.2	4.8	4.2	0.32	0.26	0.075
37	A	2502-HY		0.109	<0.01	0.243	<0.01	4.56	1.35	5.85	3.66	1.44	0.121	<0.05	<0.05
38	A	2502-HY		<0.1	<0.1	<0.1	<0.1	6.73	0.104	8.95	3.69	1.76			
39	A	2502-HY		<0.5	<0.5	<0.5	<0.5	4.79	1.24	6.03	4.58	6.27	<0.5	<0.5	<0.5
40		2502-HY													
41	A	2502-HY		0.1	<0.05	0.193	<0.05	4.56		5.57	4.75	4.47			
42	A	2502-HY		0.098	<0.05	0.22	0.068	4.1	0.33	4.4	25	26	1.1	0.26	<0.05
43	A	2502-HY				0.143		2.58	0.385	2.97					
44	A	2502-HY				0.181		3.81	0.604	4.41	5.04	4.97	0.287	0.287	0.0723
45		2502-HY													
46	A	2502-HY				0.25				5.06					
47		2502-HY													
48		2502-HY													
49		2502-HY													
50		2502-HY													
51		2502-HY													
52	A	2502-HY		<0.1	<0.1	0.17	<0.1	4.8	0.29	5.1	1.9	2.3			
53	A	2502-HY		0.0818	<0.015	0.188	<0.015	4.36	0.836	5.2	5.89	5.41	0.322	0.327	<0.015
54	A	2502-HY		<0.5		0.17		0.057		0.087	2.28				
55		2502-HY													
56		2502-HY													
57		2502-HY													
58		2502-HY													
59	A	2502-HY		0.17	<0.1	0.23	<0.1	4.13	1.07	5.2	4.05	8	0.41	0.23	0.11
60		2502-HY													
61		2502-HY													
62		2502-HY													
63		2502-HY													
64	A	2502-HY				0.16		4.1							
65		2502-HY													
66	A	2502-HY		<0.25	<0.25	<0.25	<0.25	4.17	0.582	4.75	4.02	3.93		<0.25	
67		2502-HY													
68	A	2502-HY				0.115		5.28	1.61	6.89					
69		2502-HY													
70		2502-HY													
71		2502-HY													
72		2502-HY													

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

Hay (2502-HY)

Perfluoroalkylsulfonic acids (PFSAs) - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
73		2502-HY													
74		2502-HY													
75		2502-HY													
76	A	2502-HY		<1		0.28				5.94		4.85			
77	A	2502-HY		<0.1		0.32				6.31					
78	A	2502-HY		0.073	<0.02	0.149	0.025	3.78	0.818	4.59					
79	A	2502-HY		0.082		0.18	<0.3	4.9		5.6		3.6			
80	A	2502-HY		0.07	<0.05	0.19	<0.05	4.7	1	5.7	8.8	7.7	0.37	0.28	<0.1
81		2502-HY													
82		2502-HY													
83	A	2502-HY		<0.3	<0.15	0.33	<0.15	<0.15	<0.15	5.1	6.5	4.1	0.3	0.22	<0.15
84		2502-HY													
85		2502-HY													
86	A	2502-HY		0.095	<0.05	0.2	<0.05	4	0.81	4.8	4.4	8.3		0.38	
87		2502-HY													
88		2502-HY													
89	A	2502-HY		0.076	<0.05	0.213	0.058			3.76	8.73	7.67	1.19	1.16	1.11
90		2502-HY													
91		2502-HY													
92		2502-HY													
93	A	2502-HY		<0.05	<0.05	0.189	0.027	3.99	0.881	4.87	4.45	4.69		0.287	
94		2502-HY													
95		2502-HY													
96		2502-HY													
97	A	2502-HY		<0.2		0.49		3.93				5.74			
Additional Sets															
36	B	2502-HY		0.075	<0.048	0.25	<0.048	4.5	0.85	5.4	5.7	5.3	0.3		
86	B	2502-HY		0.095	<0.05	0.17	<0.05	4	0.81	4.8	4.4	5.4		0.32	
		2502-HY													
11*	A	2502-HY		0.096	<0.05	0.221	<0.05	4.31	1.27	5.58	4.52	4.98	0.275	0.223	0.058

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

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

Hay (2502-HY)

Sum of Total PFOS, PFOA, PFNA, PFHxS - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Sum of total-PFOS, PFOA, PFNA, PFHxS **(ub)**	Sum of total-PFOS, PFOA, PFNA, PFHxS **(lb)**
1		2502-HY			
2		2502-HY			
3		2502-HY			
4		2502-HY			
5		2502-HY			
6		2502-HY			
7		2502-HY			
8		2502-HY			
9	A	2502-HY		17.3	17.3
10		2502-HY			
11	A	2502-HY		12.2	12.2
12	A	2502-HY		12.6	12.1
13	A	2502-HY		11	10.9
14		2502-HY			
15	A	2502-HY		9.92	9.92
16	A	2502-HY		10.9	10.8
17		2502-HY			
18	A	2502-HY		9.6	9.5
19		2502-HY			
20		2502-HY			
21		2502-HY			
22		2502-HY			
23	A	2502-HY		12	12
24	A	2502-HY		15.6	15.6
25		2502-HY			
26	A	2502-HY		11	11
27	A	2502-HY		15.8	15.8
28		2502-HY			
29		2502-HY			
30	A	2502-HY		10.2	10.2
31		2502-HY			
32	A	2502-HY		9.41	9.21
33	A	2502-HY		9.04	9.04
34		2502-HY			
35		2502-HY			
36	A	2502-HY		11	11
37	A	2502-HY		12.1	12.1
38	A	2502-HY		13.4	13.3
39	A	2502-HY		13.6	12.6
40		2502-HY			
41	A	2502-HY		11.3	11.3
42	A	2502-HY			
43	A	2502-HY		7.44	7.49
44	A	2502-HY		10	10
45		2502-HY			
46	A	2502-HY		12.6	12.5
47		2502-HY			
48		2502-HY			
49		2502-HY			
50		2502-HY			
51		2502-HY			
52	A	2502-HY		10.6	10.5
53	A	2502-HY		10.4	10.4
54	A	2502-HY		1.57	1.57
55		2502-HY			
56		2502-HY			
57		2502-HY			

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

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

Hay (2502-HY)

Sum of Total PFOS, PFOA, PFNA, PFHxS - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Sum of total-PFOS, PFOA, PFNA, PFHxS **(ub)**	Sum of total-PFOS, PFOA, PFNA, PFHxS **(lb)**
58		2502-HY			
59	A	2502-HY		11.1	11
60		2502-HY			
61		2502-HY			
62		2502-HY			
63		2502-HY			
64	A	2502-HY		9.7	9.7
65		2502-HY			
66	A	2502-HY		10.2	9.87
67		2502-HY			
68	A	2502-HY		13	12.9
69		2502-HY			
70		2502-HY			
71		2502-HY			
72		2502-HY			
73		2502-HY			
74		2502-HY			
75		2502-HY			
76	A	2502-HY		14.5	14.4
77	A	2502-HY		13.2	13.3
78	A	2502-HY		9.3	9.3
79	A	2502-HY		14	13
80	A	2502-HY			10
81		2502-HY			
82		2502-HY			
83	A	2502-HY		12	11
84		2502-HY			
85		2502-HY			
86	A	2502-HY		11	11
87		2502-HY			
88		2502-HY			
89	A	2502-HY			
90		2502-HY			
91		2502-HY			
92		2502-HY			
93	A	2502-HY		10.2	10.2
94		2502-HY			
95		2502-HY			
96		2502-HY			
97	A	2502-HY		10.5	10.3
Additional Sets					
36	B	2502-HY		11	11
86	B	2502-HY		9.6	9.6

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

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

Hay (2502-HY)

Other PFAS - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
1		2502-HY								
2		2502-HY								
3		2502-HY								
4		2502-HY								
5		2502-HY								
6		2502-HY								
7		2502-HY								
8		2502-HY								
9	A	2502-HY		<0.1	<0.1	<0.1	<0.1	<0.1		
10		2502-HY								
11	A	2502-HY			<0.05	<0.05				
12	A	2502-HY								
13	A	2502-HY								
14		2502-HY								
15	A	2502-HY								
16	A	2502-HY		<0.1	<0.1	<0.5	<0.1	<0.1		
17		2502-HY								
18	A	2502-HY			<0.072		<0.072	<0.072		
19		2502-HY								
20		2502-HY								
21		2502-HY								
22		2502-HY								
23	A	2502-HY		<0.088	<0.088		<0.26	<0.26		
24	A	2502-HY		<0.01	<0.01	<0.01	<0.01	<0.01		
25		2502-HY								
26	A	2502-HY			<0.089	<0.094	<0.044	<0.044		
27	A	2502-HY								
28		2502-HY								
29		2502-HY								
30	A	2502-HY			<0.05	<0.2	<0.05	<0.05		
31		2502-HY								
32	A	2502-HY								
33	A	2502-HY			<0.05	<0.2	<0.05	<0.05		
34		2502-HY								
35		2502-HY								
36	A	2502-HY			<0.048	<0.048	<0.048	<0.048		
37	A	2502-HY			<0.05	<0.05	<0.05	<0.05		
38	A	2502-HY		<0.1	<0.4	<0.4				
39	A	2502-HY		<0.5	<0.5	<0.5				
40		2502-HY								
41	A	2502-HY			<0.05	<0.05	<0.05	<0.05		
42	A	2502-HY					<0.05	<0.05		
43	A	2502-HY								
44	A	2502-HY								
45		2502-HY								
46	A	2502-HY								
47		2502-HY								
48		2502-HY								
49		2502-HY								
50		2502-HY								
51		2502-HY								
52	A	2502-HY				<0.5				
53	A	2502-HY			<0.015	<0.015	<0.015	<0.015		
54	A	2502-HY								
55		2502-HY								
56		2502-HY								
57		2502-HY								
58		2502-HY								
59	A	2502-HY		<0.15	<0.1	<0.5	<0.1	<0.1		<5
60		2502-HY								
61		2502-HY								
62		2502-HY								
63		2502-HY								

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

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

Hay (2502-HY)

Other PFAS - Results

LC	Data set	Sample	Result µg/kg 12% moisture content	Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
64	A	2502-HY								
65		2502-HY								
66	A	2502-HY								
67		2502-HY								
68	A	2502-HY								
69		2502-HY								
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76	A	2502-HY								
77	A	2502-HY				<5				
78	A	2502-HY								
79	A	2502-HY			<0.38	<0.04	<0.075	<0.075		
80	A	2502-HY			<0.05	<0.1	<0.05			
81		2502-HY								
82		2502-HY								
83	A	2502-HY		<0.15	<0.15	<0.15	<0.15		<0.9	<0.9
84		2502-HY								
85		2502-HY								
86	A	2502-HY		<0.1	<0.1	<0.5	<0.1	<0.1		
87		2502-HY								
88		2502-HY								
89	A	2502-HY								
90		2502-HY								
91		2502-HY								
92		2502-HY								
93	A	2502-HY		<0.01	<0.01	<0.05	<0.01	<0.01		
94		2502-HY								
95		2502-HY								
96		2502-HY								
97	A	2502-HY								
Additional Sets										
36	B	2502-HY			<0.048	<0.48	<0.048	<0.048		
86	B	2502-HY		<0.1	<0.1	<0.5	<0.1	<0.1		

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

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

Hay (2502-HY)

Moisture content (PFAS) - Results

LC	Data set	Sample	Result %	**Moisture content** PFAS
1		2502-HY		
2		2502-HY		
3		2502-HY		
4		2502-HY		
5		2502-HY		
6		2502-HY		
7		2502-HY		
8		2502-HY		
9	A	2502-HY		91.6
10		2502-HY		
11	A	2502-HY		8.7
12	A	2502-HY		7.4
13	A	2502-HY		8.29
14		2502-HY		
15	A	2502-HY		
16	A	2502-HY		8.28
17		2502-HY		
18	A	2502-HY		8
19		2502-HY		
20		2502-HY		
21		2502-HY		
22		2502-HY		
23	A	2502-HY		8
24	A	2502-HY		8.46
25		2502-HY		
26	A	2502-HY		7.9
27	A	2502-HY		8.21
28		2502-HY		
29		2502-HY		
30	A	2502-HY		
31		2502-HY		
32	A	2502-HY		
33	A	2502-HY		7.5
34		2502-HY		
35		2502-HY		
36	A	2502-HY		7.7
37	A	2502-HY		7.9
38	A	2502-HY		8.3
39	A	2502-HY		
40		2502-HY		
41	A	2502-HY		8.4
42	A	2502-HY		9.52
43	A	2502-HY		8.24
44	A	2502-HY		7.73
45		2502-HY		
46	A	2502-HY		8.4
47		2502-HY		
48		2502-HY		
49		2502-HY		
50		2502-HY		
51		2502-HY		
52	A	2502-HY		
53	A	2502-HY		12
54	A	2502-HY		9.5
55		2502-HY		
56		2502-HY		
57		2502-HY		

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

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

Hay (2502-HY)

Moisture content (PFAS) - Results

LC	Data set	Sample	Result %	**Moisture content** PFAS
58		2502-HY		
59	A	2502-HY		
60		2502-HY		
61		2502-HY		
62		2502-HY		
63		2502-HY		
64	A	2502-HY		9.1
65		2502-HY		
66	A	2502-HY		91.1
67		2502-HY		
68	A	2502-HY		8.25
69		2502-HY		
70		2502-HY		
71		2502-HY		
72		2502-HY		
73		2502-HY		
74		2502-HY		
75		2502-HY		
76	A	2502-HY		12
77	A	2502-HY		9.37
78	A	2502-HY		8.22
79	A	2502-HY		8.5
80	A	2502-HY		8.61
81		2502-HY		
82		2502-HY		
83	A	2502-HY		7.5
84		2502-HY		
85		2502-HY		
86	A	2502-HY		8
87		2502-HY		
88		2502-HY		
89	A	2502-HY		7.52
90		2502-HY		
91		2502-HY		
92		2502-HY		
93	A	2502-HY		
94		2502-HY		
95		2502-HY		
96		2502-HY		
97	A	2502-HY		
Additional Sets				
36	B	2502-HY		7.7
86	B	2502-HY		8

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

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

21 May 2026

Annex 3: Participants' z-scores of PFAS compounds and sum parameters - Tables

Test sample - Hay (2502-HY)

Z-scores of individual substances and sum parameters

Calculation of z-score on basis of assigned value

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

x_a: assigned value

x: participant's result

σ_{prel}: fitness-for-purpose-based standard deviation for proficiency assessment

20%: Evaluated individual substances and sum parameters

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

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

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

Hay (2502-HY)

Perfluoroalkylcarboxylic acids (PFCAs) - Z-scores

LC	Data set	Sample	Z-score [σ_p = 20 %]	Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
1		2502-HY												
2		2502-HY												
3		2502-HY												
4		2502-HY												
5		2502-HY												
6		2502-HY												
7		2502-HY												
8		2502-HY												
9	A	2502-HY		1.8	0.3	0.1	-0.1	3.4						
10		2502-HY												
11	A	2502-HY				0.0		0.8						
12	A	2502-HY		0.8	-0.4	1.1		0.4						
13	A	2502-HY		0.7	0.7	0.1	0.3	-0.4						
14		2502-HY												
15	A	2502-HY						-0.3						
16	A	2502-HY		0.4	0.3	0.1	0.7	-0.4						
17		2502-HY												
18	A	2502-HY		-1.2	-1.4	-1.0	-0.4	-0.7						
19		2502-HY												
20		2502-HY												
21		2502-HY												
22		2502-HY												
23	A	2502-HY		0.0	-0.3	0.2	-0.3	1.0						
24	A	2502-HY		0.8	0.3	0.4		-0.7						
25		2502-HY												
26	A	2502-HY		0.1	0.6	-0.7	-0.4	0.3						
27	A	2502-HY						2.7						
28		2502-HY												
29		2502-HY												
30	A	2502-HY		-0.4	3.6	-1.6	2.9	0.2						
31		2502-HY												
32	A	2502-HY			-1.6	-1.0	-1.7	-0.7						
33	A	2502-HY		-1.5	-1.2	-1.5	-1.3	-1.1						
34		2502-HY												
35		2502-HY												
36	A	2502-HY		0.3	1.4	0.2	0.7	0.0						
37	A	2502-HY			2.0	0.3	0.9	0.5						
38	A	2502-HY			-2.0	-4.2	-2.6	3.1						
39	A	2502-HY		0.4	0.5	1.6	1.5	0.9						
40		2502-HY												
41	A	2502-HY		0.4	0.2	0.3	0.1	0.0						
42	A	2502-HY			-1.3	1.1	0.7	-0.8						
43	A	2502-HY						-1.1						
44	A	2502-HY		0.5	-0.3	-0.1	0.4	-0.1						
45		2502-HY												
46	A	2502-HY						1.5						
47		2502-HY												
48		2502-HY												
49		2502-HY												
50		2502-HY												
51		2502-HY												
52	A	2502-HY				0.2	-0.6	-0.4						
53	A	2502-HY		-2.5	-1.3	-2.0	-0.2	-0.5						
54	A	2502-HY		9.9	11.1	17.0	7.8	-4.1						
55		2502-HY												
56		2502-HY												
57		2502-HY												
58		2502-HY												
59	A	2502-HY		0.1	1.3	2.4	-1.2	0.0						
60		2502-HY												

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

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

Hay (2502-HY)

Perfluoroalkylcarboxylic acids (PFCAs) - Z-scores

LC	Data set	Sample	Z-score [σ_p = 20 %]	Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
61		2502-HY												
62		2502-HY												
63		2502-HY												
64	A	2502-HY						-0.1						
65		2502-HY												
66	A	2502-HY		0.1	0.6	1.0	0.8	-0.3						
67		2502-HY												
68	A	2502-HY						0.4						
69		2502-HY												
70		2502-HY												
71		2502-HY												
72		2502-HY												
73		2502-HY												
74		2502-HY												
75		2502-HY												
76	A	2502-HY			2.3	1.4		2.4						
77	A	2502-HY		1.2				1.0						
78	A	2502-HY				-1.1	-0.4	-0.9						
79	A	2502-HY				-0.2	-0.1	1.8						
80	A	2502-HY		-2.2	-2.0	-2.3	-1.3	-1.3						
81		2502-HY												
82		2502-HY												
83	A	2502-HY		2.0	1.7	0.2	1.0	0.5						
84		2502-HY												
85		2502-HY												
86	A	2502-HY		-0.6	-1.3	-0.7	-0.6	0.7						
87		2502-HY												
88		2502-HY												
89	A	2502-HY		-2.0	-0.2	0.1		-0.4						
90		2502-HY												
91		2502-HY												
92		2502-HY												
93	A	2502-HY		-0.4	0.0	2.2	-0.1	-0.4						
94		2502-HY												
95		2502-HY												
96		2502-HY												
97	A	2502-HY		-4.3		19.5	3.1	0.3						
Additional Sets														
36	B	2502-HY		0.3	0.6	-0.2	-0.1	-0.3						
86	B	2502-HY		-0.6	-1.3	-0.7	-0.6	-0.8						

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

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

Hay (2502-HY)

Perfluoroalkylsulfonic acids (PFSAs) - Z-scores

LC	Data set	Sample	Z-score [σ_p = 20 %]	Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
1		2502-HY													
2		2502-HY													
3		2502-HY													
4		2502-HY													
5		2502-HY													
6		2502-HY													
7		2502-HY													
8		2502-HY													
9	A	2502-HY				0.0				2.7	3.0	1.9	-0.9	0.0	
10		2502-HY													
11	A	2502-HY		0.6		0.4		0.1	2.8	0.4	6.6	3.3	-0.7	4.7	
12	A	2502-HY				12.2				0.4	1.7	-0.3			
13	A	2502-HY		0.6		-0.1		0.4	1.3	0.4	-0.2	-0.3			
14		2502-HY													
15	A	2502-HY				0.0				-0.7					
16	A	2502-HY				-0.2		0.3	1.6	0.4	1.6	2.1		3.7	
17		2502-HY													
18	A	2502-HY				0.7		-0.4	-0.8	-0.5	-0.1	-0.4			
19		2502-HY													
20		2502-HY													
21		2502-HY													
22		2502-HY													
23	A	2502-HY				-1.3		0.5	0.0	0.3	-0.2				
24	A	2502-HY		3.7		4.6		0.6	30.0	5.2	-0.1	-0.1	0.7	-0.6	
25		2502-HY													
26	A	2502-HY		-0.6		-0.6		-0.2	-0.6	-0.3	-0.5	0.2	0.7	-2.2	
27	A	2502-HY				3.2				1.8					
28		2502-HY													
29		2502-HY													
30	A	2502-HY		-1.5		2.1		-0.9	-1.1	-0.9	1.8	-0.9	-0.7	2.0	
31		2502-HY													
32	A	2502-HY				1.5		-0.9	-0.7	-0.9	-0.1	1.0			
33	A	2502-HY		-1.2		-0.8		-0.5	-0.9	-0.6	-0.3	1.4	0.3	-2.1	
34		2502-HY													
35		2502-HY													
36	A	2502-HY		0.0		1.2		0.1	0.3	0.1	-0.1	-0.9	0.0	-0.1	
37	A	2502-HY		1.4		1.0		0.4	3.3	0.7	-1.3	-3.6	-3.1		
38	A	2502-HY						2.9	-4.4	3.7	-1.3	-3.3			
39	A	2502-HY						0.6	2.6	0.9	-0.4	1.1			
40		2502-HY													
41	A	2502-HY		0.8		-0.2		0.4		0.4	-0.2	-0.6			
42	A	2502-HY		0.7		0.4		-0.2	-3.0	-0.7	20.3	20.4	12.0	-0.1	
43	A	2502-HY				-1.5		-2.0	-2.6	-2.1					
44	A	2502-HY				-0.5		-0.5	-1.3	-0.7	0.1	-0.1	-0.6	0.5	
45		2502-HY													
46	A	2502-HY				1.2				-0.1					
47		2502-HY													
48		2502-HY													
49		2502-HY													
50		2502-HY													
51		2502-HY													
52	A	2502-HY				-0.8		0.6	-3.2	0.0	-3.1	-2.7			
53	A	2502-HY		-0.2		-0.4		0.1	0.1	0.1	1.0	0.3	0.0	1.2	
54	A	2502-HY				-0.8		-4.9		-4.9	-2.7				
55		2502-HY													
56		2502-HY													
57		2502-HY													
58		2502-HY													
59	A	2502-HY		4.9		0.7		-0.2	1.6	0.1	-0.9	2.8	1.3	-0.6	
60		2502-HY													
61		2502-HY													
62		2502-HY													
63		2502-HY													
64	A	2502-HY				-1.1		-0.2							
65		2502-HY													
66	A	2502-HY						-0.1	-1.4	-0.4	-0.9	-1.2			
67		2502-HY													
68	A	2502-HY				-2.2		1.2	4.9	1.7					
69		2502-HY													
70		2502-HY													
71		2502-HY													
72		2502-HY													

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

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

Hay (2502-HY)

Perfluoroalkylsulfonic acids (PFSAs) - Z-scores

LC	Data set	Sample	Z-score [σ_p = 20 %]	Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
73		2502-HY													
74		2502-HY													
75		2502-HY													
76	A	2502-HY				1.9				0.8		-0.3			
77	A	2502-HY				2.9				1.1					
78	A	2502-HY		-0.7		-1.3		-0.6	0.0	-0.5					
79	A	2502-HY		-0.2		-0.6		0.8		0.4		-1.5			
80	A	2502-HY		-0.9		-0.3		0.5	1.2	0.5	3.9	2.5	0.7	0.3	
81		2502-HY													
82		2502-HY													
83	A	2502-HY				3.1				0.0	1.6	-1.0	-0.4	-0.8	
84		2502-HY													
85		2502-HY													
86	A	2502-HY		0.5		-0.1		-0.3	0.0	-0.3	-0.5	3.1		2.2	
87		2502-HY													
88		2502-HY													
89	A	2502-HY		-0.6		0.2				-1.3	3.8	2.5	13.4	17.1	
90		2502-HY													
91		2502-HY													
92		2502-HY													
93	A	2502-HY				-0.3		-0.3	0.4	-0.3	-0.5	-0.4		0.5	
94		2502-HY													
95		2502-HY													
96		2502-HY													
97	A	2502-HY				7.1		-0.4				0.6			
Additional Sets															
36	B	2502-HY		-0.6		1.2		0.3	0.2	0.3	0.8	0.2	-0.4		
86	B	2502-HY		0.5		-0.8		-0.3	0.0	-0.3	-0.5	0.3		1.1	
		2502-HY													
11*	A	2502-HY		0.6		0.4		0.1	2.8	0.4	-0.4	-0.1	-0.7	-0.8	

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

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

Hay (2502-HY)

Sum of Total PFOS, PFOA, PFNA, PFHxS - Z-scores

LC	Data set	Sample	Z-score [σ_p = 20 %]	Sum of total-PFOS, PFOA, PFNA, PFHxS **(ub)**	Sum of total-PFOS, PFOA, PFNA, PFHxS **(lb)**
1		2502-HY			
2		2502-HY			
3		2502-HY			
4		2502-HY			
5		2502-HY			
6		2502-HY			
7		2502-HY			
8		2502-HY			
9	A	2502-HY		2.6	2.7
10		2502-HY			
11	A	2502-HY		0.4	0.4
12	A	2502-HY		0.5	0.4
13	A	2502-HY		-0.2	-0.1
14		2502-HY			
15	A	2502-HY		-0.6	-0.6
16	A	2502-HY		-0.2	-0.2
17		2502-HY			
18	A	2502-HY		-0.8	-0.8
19		2502-HY			
20		2502-HY			
21		2502-HY			
22		2502-HY			
23	A	2502-HY		0.3	0.4
24	A	2502-HY		1.8	2.0
25		2502-HY			
26	A	2502-HY		-0.2	-0.1
27	A	2502-HY		1.9	2.1
28		2502-HY			
29		2502-HY			
30	A	2502-HY		-0.5	-0.4
31		2502-HY			
32	A	2502-HY		-0.9	-0.9
33	A	2502-HY		-1.0	-1.0
34		2502-HY			
35		2502-HY			
36	A	2502-HY		-0.2	-0.1
37	A	2502-HY		0.3	0.4
38	A	2502-HY		0.9	0.9
39	A	2502-HY		1.0	0.6
40		2502-HY			
41	A	2502-HY		0.0	0.0
42	A	2502-HY			
43	A	2502-HY		-1.7	-1.7
44	A	2502-HY		-0.6	-0.5
45		2502-HY			
46	A	2502-HY		0.5	0.6
47		2502-HY			
48		2502-HY			
49		2502-HY			
50		2502-HY			
51		2502-HY			
52	A	2502-HY		-0.4	-0.3
53	A	2502-HY		-0.4	-0.4
54	A	2502-HY		-4.3	-4.3
55		2502-HY			
56		2502-HY			
57		2502-HY			

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

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

Hay (2502-HY)

Sum of Total PFOS, PFOA, PFNA, PFHxS - Z-scores

LC	Data set	Sample	Z-score [σ_p = 20 %]	Sum of total-PFOS, PFOA, PFNA, PFHxS **(ub)**	Sum of total-PFOS, PFOA, PFNA, PFHxS **(lb)**
58		2502-HY			
59	A	2502-HY		-0.1	-0.1
60		2502-HY			
61		2502-HY			
62		2502-HY			
63		2502-HY			
64	A	2502-HY		-0.7	-0.7
65		2502-HY			
66	A	2502-HY		-0.5	-0.6
67		2502-HY			
68	A	2502-HY		0.7	0.8
69		2502-HY			
70		2502-HY			
71		2502-HY			
72		2502-HY			
73		2502-HY			
74		2502-HY			
75		2502-HY			
76	A	2502-HY		1.4	1.4
77	A	2502-HY		0.8	0.9
78	A	2502-HY		-0.9	-0.8
79	A	2502-HY		1.1	0.8
80	A	2502-HY			-0.5
81		2502-HY			
82		2502-HY			
83	A	2502-HY		0.3	-0.1
84		2502-HY			
85		2502-HY			
86	A	2502-HY		-0.2	-0.1
87		2502-HY			
88		2502-HY			
89	A	2502-HY			
90		2502-HY			
91		2502-HY			
92		2502-HY			
93	A	2502-HY		-0.5	-0.4
94		2502-HY			
95		2502-HY			
96		2502-HY			
97	A	2502-HY		-0.4	-0.4
Additional Sets					
36	B	2502-HY		-0.2	-0.1
86	B	2502-HY		-0.8	-0.7

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

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

Hay (2502-HY)

Other PFAS - Z-scores

LC	Data set	Sample	Z-score [σ_p = 20 %]	Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
1		2502-HY								
2		2502-HY								
3		2502-HY								
4		2502-HY								
5		2502-HY								
6		2502-HY								
7		2502-HY								
8		2502-HY								
9	A	2502-HY								
10		2502-HY								
11	A	2502-HY								
12	A	2502-HY								
13	A	2502-HY								
14		2502-HY								
15	A	2502-HY								
16	A	2502-HY								
17		2502-HY								
18	A	2502-HY								
19		2502-HY								
20		2502-HY								
21		2502-HY								
22		2502-HY								
23	A	2502-HY								
24	A	2502-HY								
25		2502-HY								
26	A	2502-HY								
27	A	2502-HY								
28		2502-HY								
29		2502-HY								
30	A	2502-HY								
31		2502-HY								
32	A	2502-HY								
33	A	2502-HY								
34		2502-HY								
35		2502-HY								
36	A	2502-HY								
37	A	2502-HY								
38	A	2502-HY								
39	A	2502-HY								
40		2502-HY								
41	A	2502-HY								
42	A	2502-HY								
43	A	2502-HY								
44	A	2502-HY								
45		2502-HY								
46	A	2502-HY								
47		2502-HY								
48		2502-HY								
49		2502-HY								
50		2502-HY								
51		2502-HY								
52	A	2502-HY								
53	A	2502-HY								
54	A	2502-HY								
55		2502-HY								
56		2502-HY								
57		2502-HY								
58		2502-HY								
59	A	2502-HY								
60		2502-HY								
61		2502-HY								
62		2502-HY								
63		2502-HY								

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

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

Hay (2502-HY)

Other PFAS - Z-scores

LC	Data set	Sample	Z-score [σ_p = 20 %]	Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
64	A	2502-HY								
65		2502-HY								
66	A	2502-HY								
67		2502-HY								
68	A	2502-HY								
69		2502-HY								
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76	A	2502-HY								
77	A	2502-HY								
78	A	2502-HY								
79	A	2502-HY								
80	A	2502-HY								
81		2502-HY								
82		2502-HY								
83	A	2502-HY								
84		2502-HY								
85		2502-HY								
86	A	2502-HY								
87		2502-HY								
88		2502-HY								
89	A	2502-HY								
90		2502-HY								
91		2502-HY								
92		2502-HY								
93	A	2502-HY								
94		2502-HY								
95		2502-HY								
96		2502-HY								
97	A	2502-HY								
Additional Sets										
36	B	2502-HY								
86	B	2502-HY								

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

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

Hay (2502-HY)

Moisture content (PFAS) - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	**Moisture content** PFAS
1		2502-HY		
2		2502-HY		
3		2502-HY		
4		2502-HY		
5		2502-HY		
6		2502-HY		
7		2502-HY		
8		2502-HY		
9	A	2502-HY		100.6
10		2502-HY		
11	A	2502-HY		0.5
12	A	2502-HY		-1.1
13	A	2502-HY		0.0
14		2502-HY		
15	A	2502-HY		
16	A	2502-HY		0.0
17		2502-HY		
18	A	2502-HY		-0.3
19		2502-HY		
20		2502-HY		
21		2502-HY		
22		2502-HY		
23	A	2502-HY		-0.3
24	A	2502-HY		0.2
25		2502-HY		
26	A	2502-HY		-0.5
27	A	2502-HY		-0.1
28		2502-HY		
29		2502-HY		
30	A	2502-HY		
31		2502-HY		
32	A	2502-HY		
33	A	2502-HY		-0.9
34		2502-HY		
35		2502-HY		
36	A	2502-HY		-0.7
37	A	2502-HY		-0.5
38	A	2502-HY		0.0
39	A	2502-HY		
40		2502-HY		
41	A	2502-HY		0.1
42	A	2502-HY		1.5
43	A	2502-HY		0.0
44	A	2502-HY		-0.7
45		2502-HY		
46	A	2502-HY		0.1
47		2502-HY		
48		2502-HY		
49		2502-HY		
50		2502-HY		
51		2502-HY		
52	A	2502-HY		
53	A	2502-HY		4.5
54	A	2502-HY		1.5
55		2502-HY		
56		2502-HY		
57		2502-HY		

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

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

Hay (2502-HY)

Moisture content (PFAS) - Z-scores

LC	Data set	Sample	Z-score [σ_p = 10 %]	**Moisture content** PFAS
58		2502-HY		
59	A	2502-HY		
60		2502-HY		
61		2502-HY		
62		2502-HY		
63		2502-HY		
64	A	2502-HY		1.0
65		2502-HY		
66	A	2502-HY		100.0
67		2502-HY		
68	A	2502-HY		0.0
69		2502-HY		
70		2502-HY		
71		2502-HY		
72		2502-HY		
73		2502-HY		
74		2502-HY		
75		2502-HY		
76	A	2502-HY		4.5
77	A	2502-HY		1.3
78	A	2502-HY		-0.1
79	A	2502-HY		0.3
80	A	2502-HY		0.4
81		2502-HY		
82		2502-HY		
83	A	2502-HY		-0.9
84		2502-HY		
85		2502-HY		
86	A	2502-HY		-0.3
87		2502-HY		
88		2502-HY		
89	A	2502-HY		-0.9
90		2502-HY		
91		2502-HY		
92		2502-HY		
93	A	2502-HY		
94		2502-HY		
95		2502-HY		
96		2502-HY		
97	A	2502-HY		
Additional Sets				
36	B	2502-HY		-0.7
86	B	2502-HY		-0.3

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

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

21 May 2026

Annex 4: Participants' z-scores of PFAS compounds and sum parameters - Charts

Test sample - Hay (2502-HY)

Z-scores of individual substances and sum parameters

Calculation of z-score on basis of assigned value

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

x_a: assigned value

x: participant's result

σ_{prel}: fitness-for-purpose-based standard deviation for proficiency assessment

20%: Evaluated individual substances and sum parameters

± 2 z-scores:

± 3 z-scores:

Hay (2502-HY)

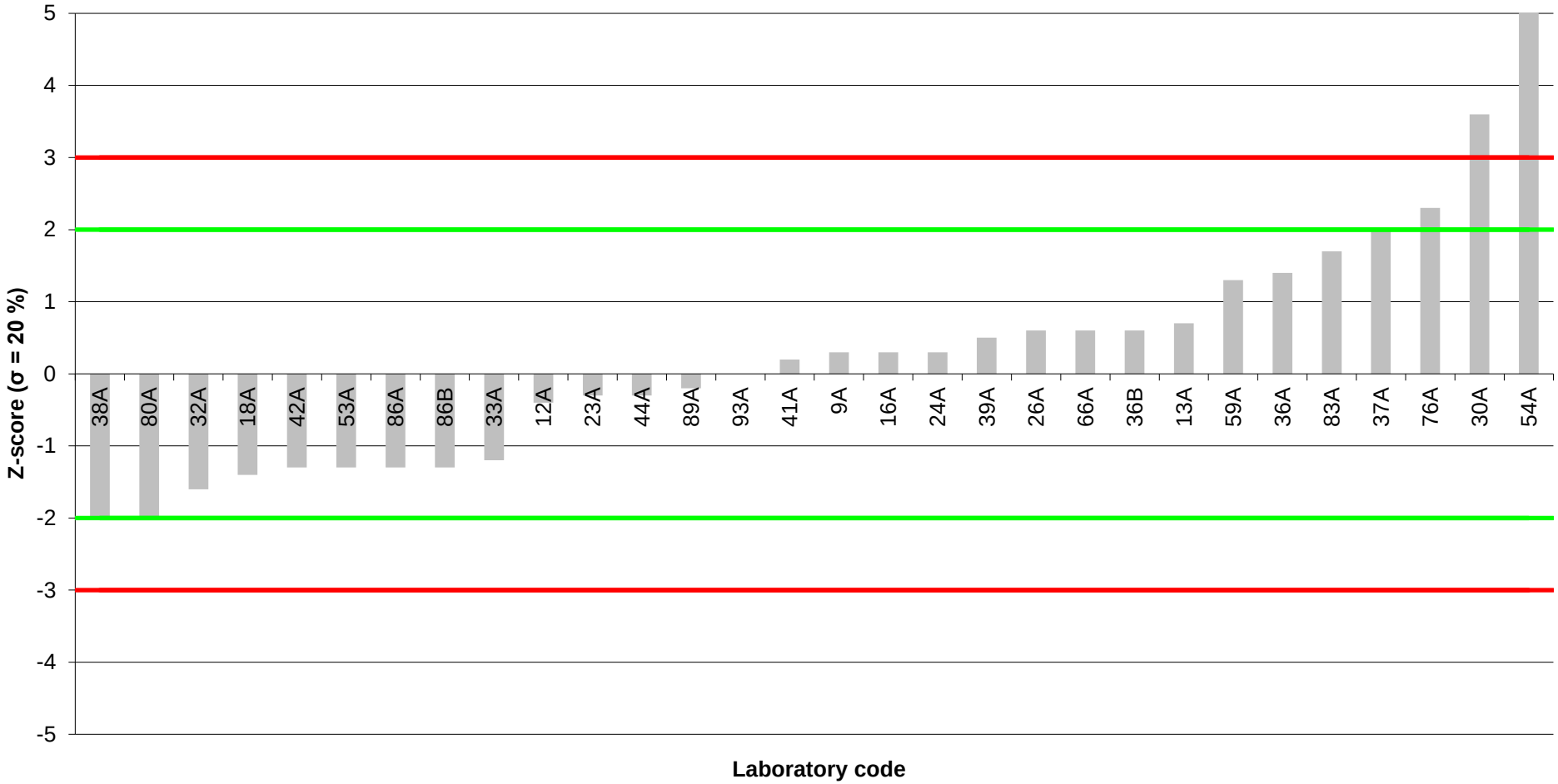
Perfluorobutanoic acid

Assigned value: 17.1 µg/kg product

Hay (2502-HY)

Perfluoropentanoic acid

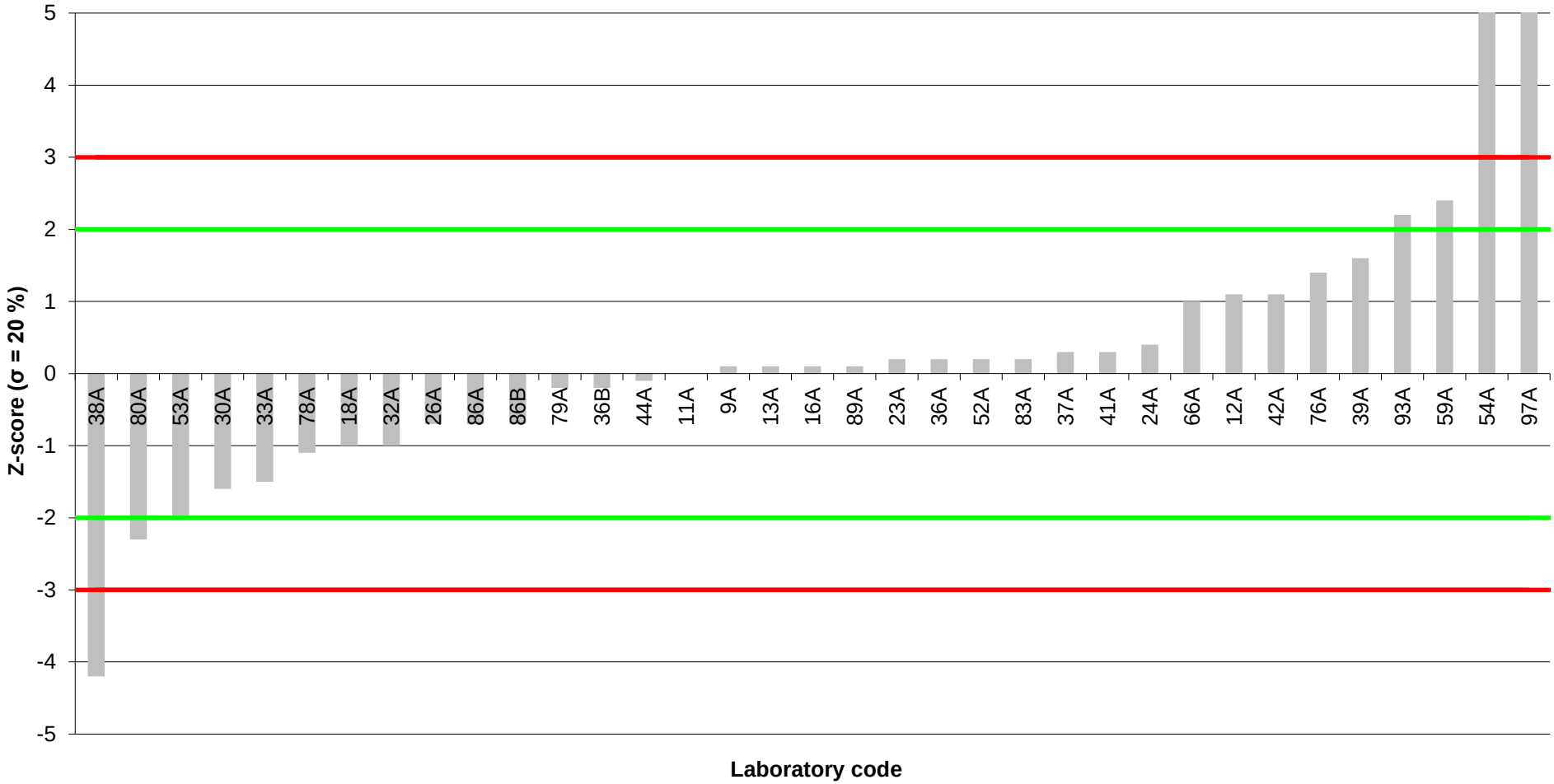
Assigned value: 4.43 µg/kg product



Hay (2502-HY)

Perfluorohexanoic acid

Assigned value: 1.15 µg/kg product



Hay (2502-HY)

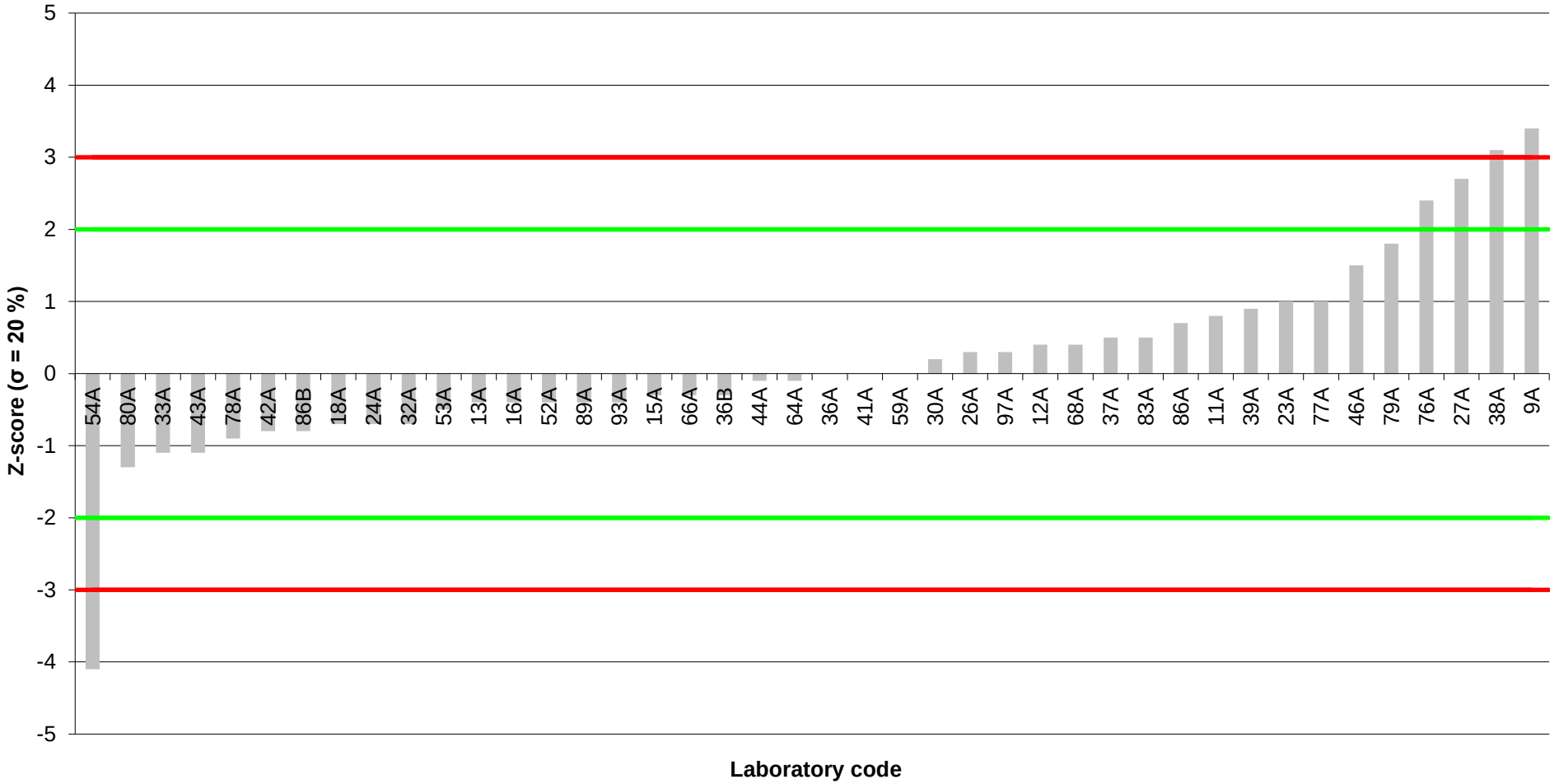
Perfluoroheptanoic acid

Assigned value: 0.394 µg/kg product

Hay (2502-HY)

Perfluorooctanoic acid

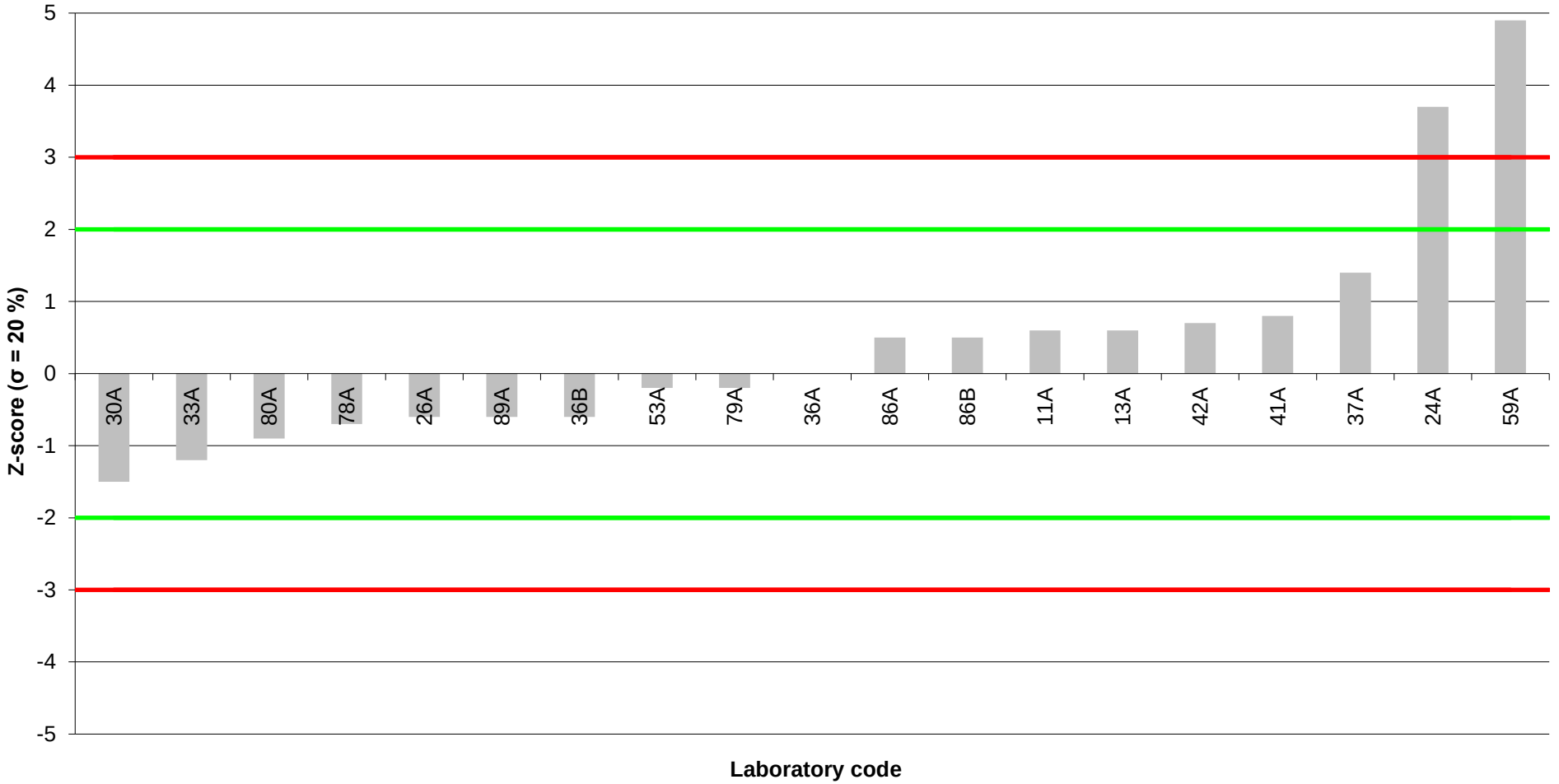
Assigned value: 5.5 µg/kg product



Hay (2502-HY)

Perfluorobutanesulfonic acid

Assigned value: 0.0858 µg/kg product



Hay (2502-HY)

Perfluorohexanesulfonic acid

Assigned value: 0.203 µg/kg product

Hay (2502-HY)

Linear Perfluorooctanesulfonic acid

Assigned value: 4.26 µg/kg product

Hay (2502-HY)

Sum of branched Perfluorooctanesulfonic acid

Assigned value: 0.813 µg/kg product

Hay (2502-HY)

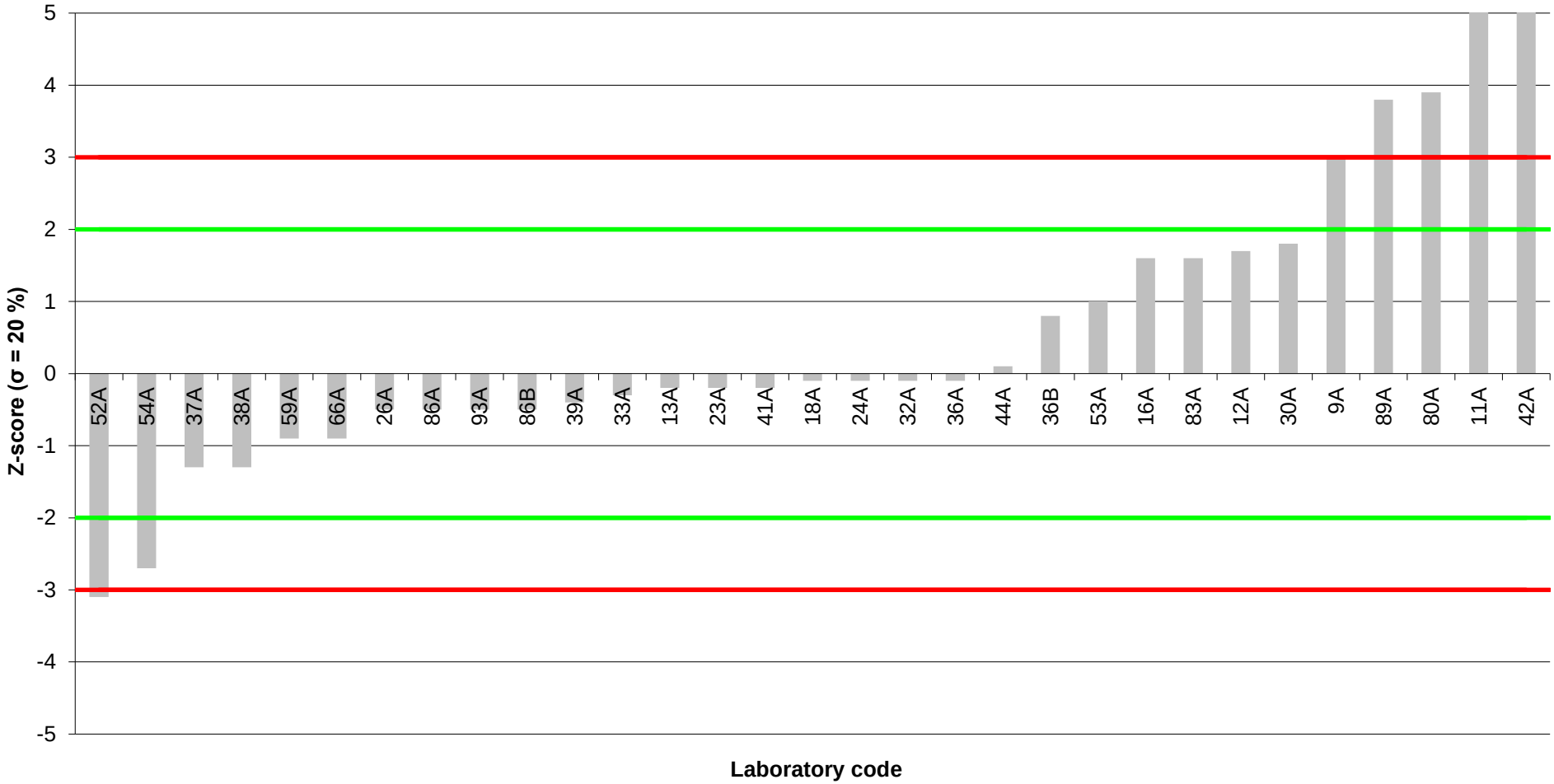
Sum of branched and linear Perfluorooctanesulfonic acid

Assigned value: 5.14 µg/kg product

Hay (2502-HY)

Perfluorononanesulfonic acid

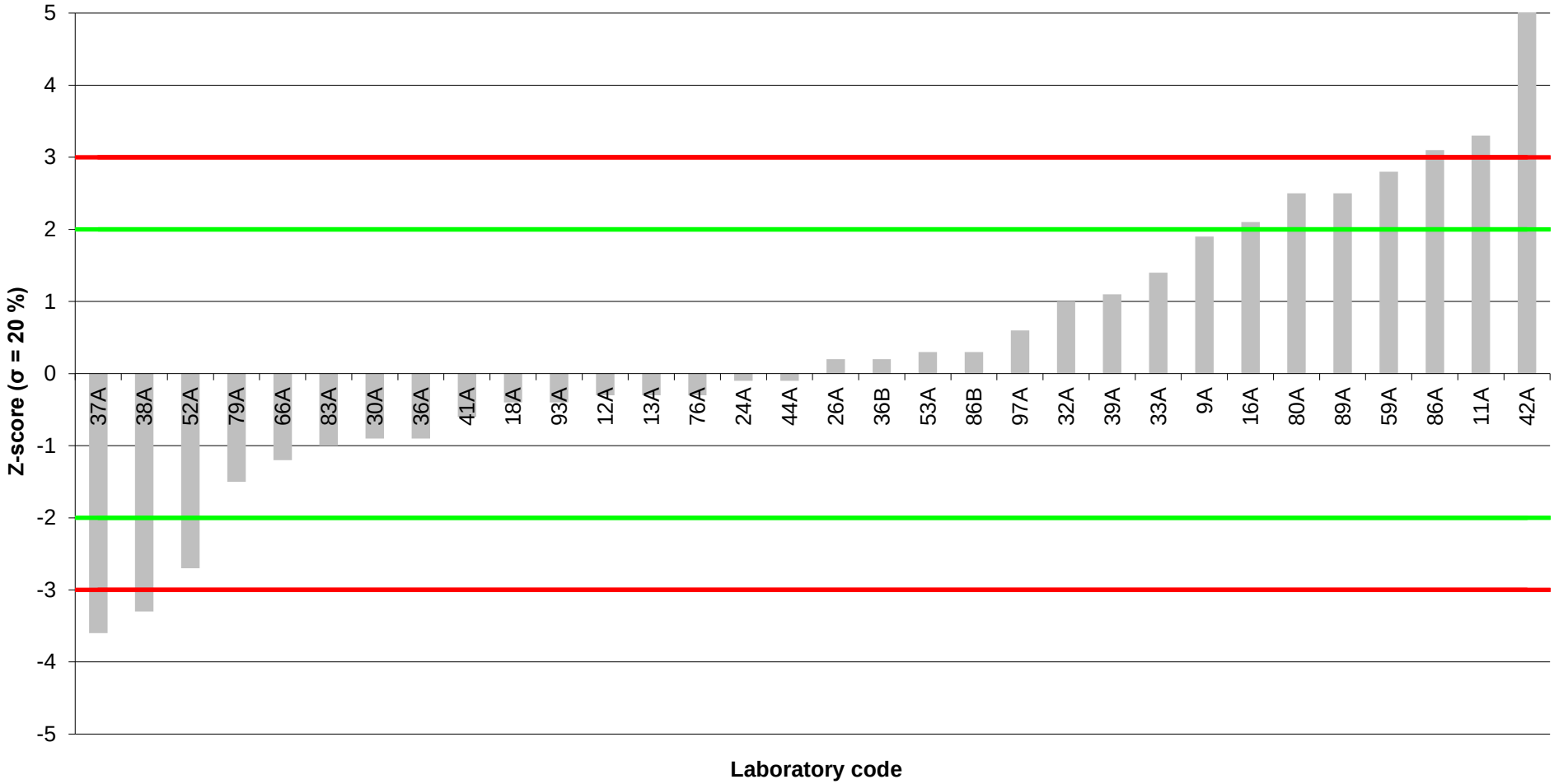
Assigned value: 4.94 µg/kg product



Hay (2502-HY)

Perfluorodecanesulfonic acid

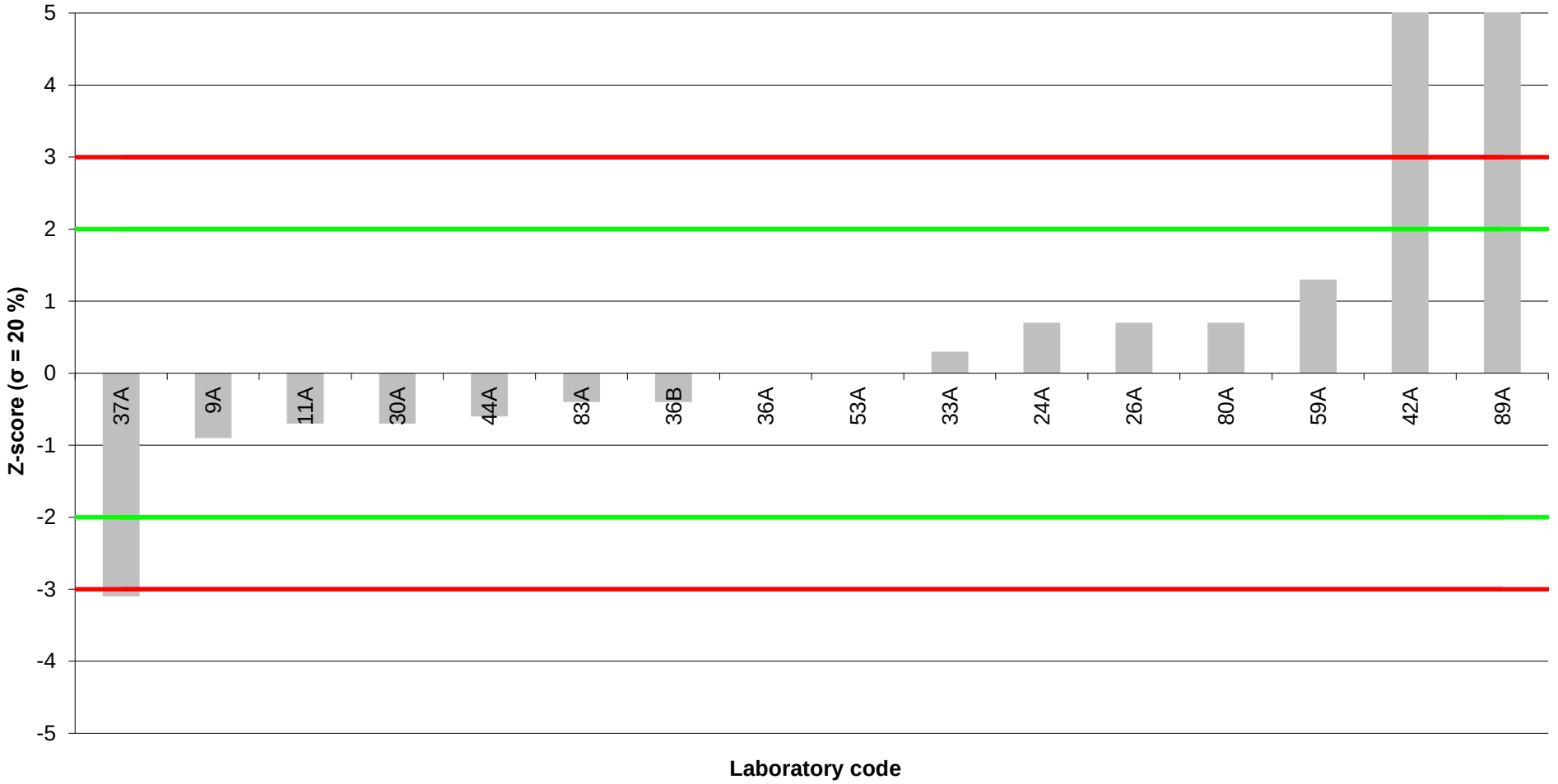
Assigned value: 5.11 µg/kg product



Hay (2502-HY)

Perfluoroundecane sulfonic acid

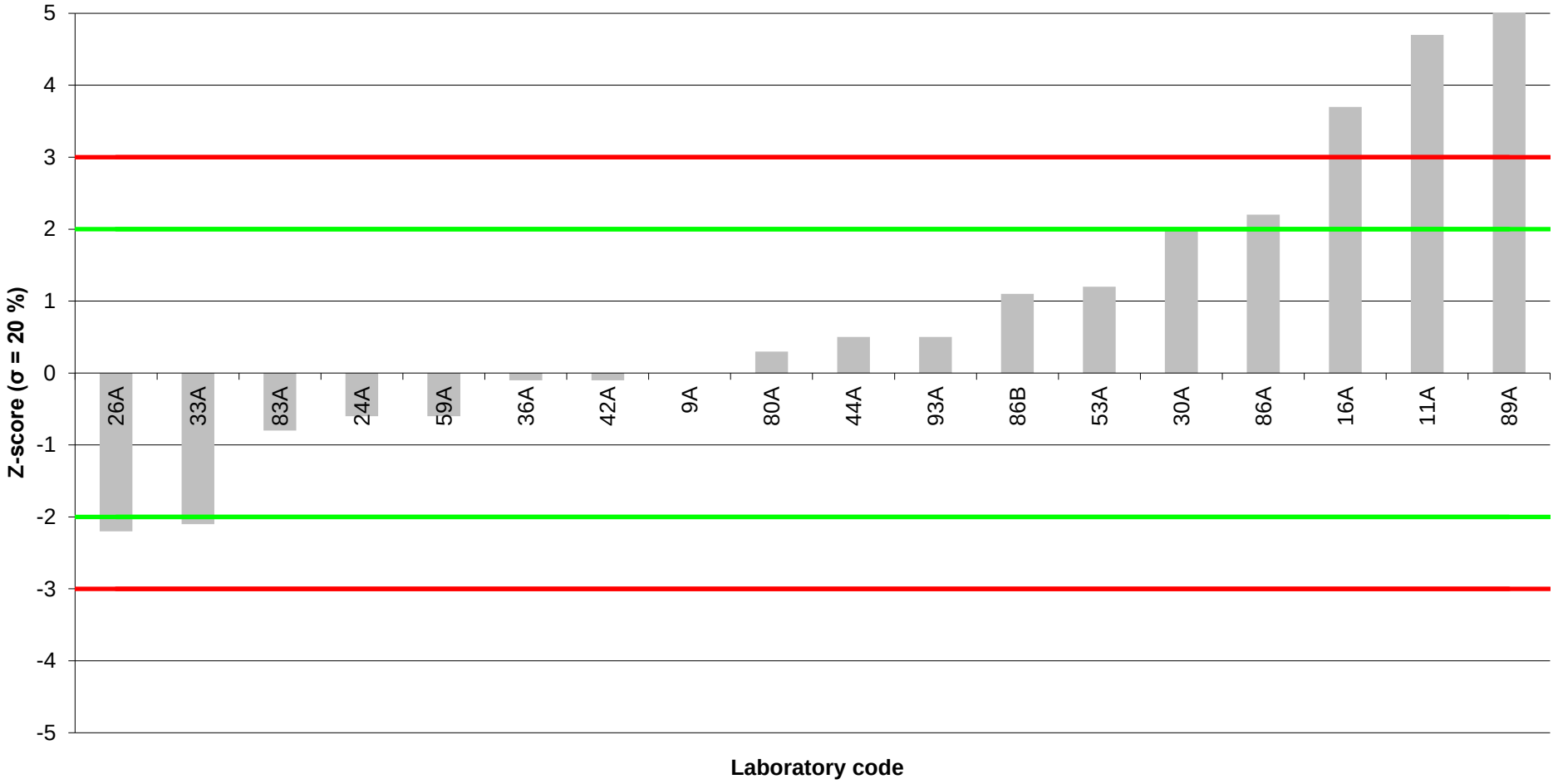
Assigned value: 0.323 µg/kg product



Hay (2502-HY)

Perfluorododecane sulfonic acid

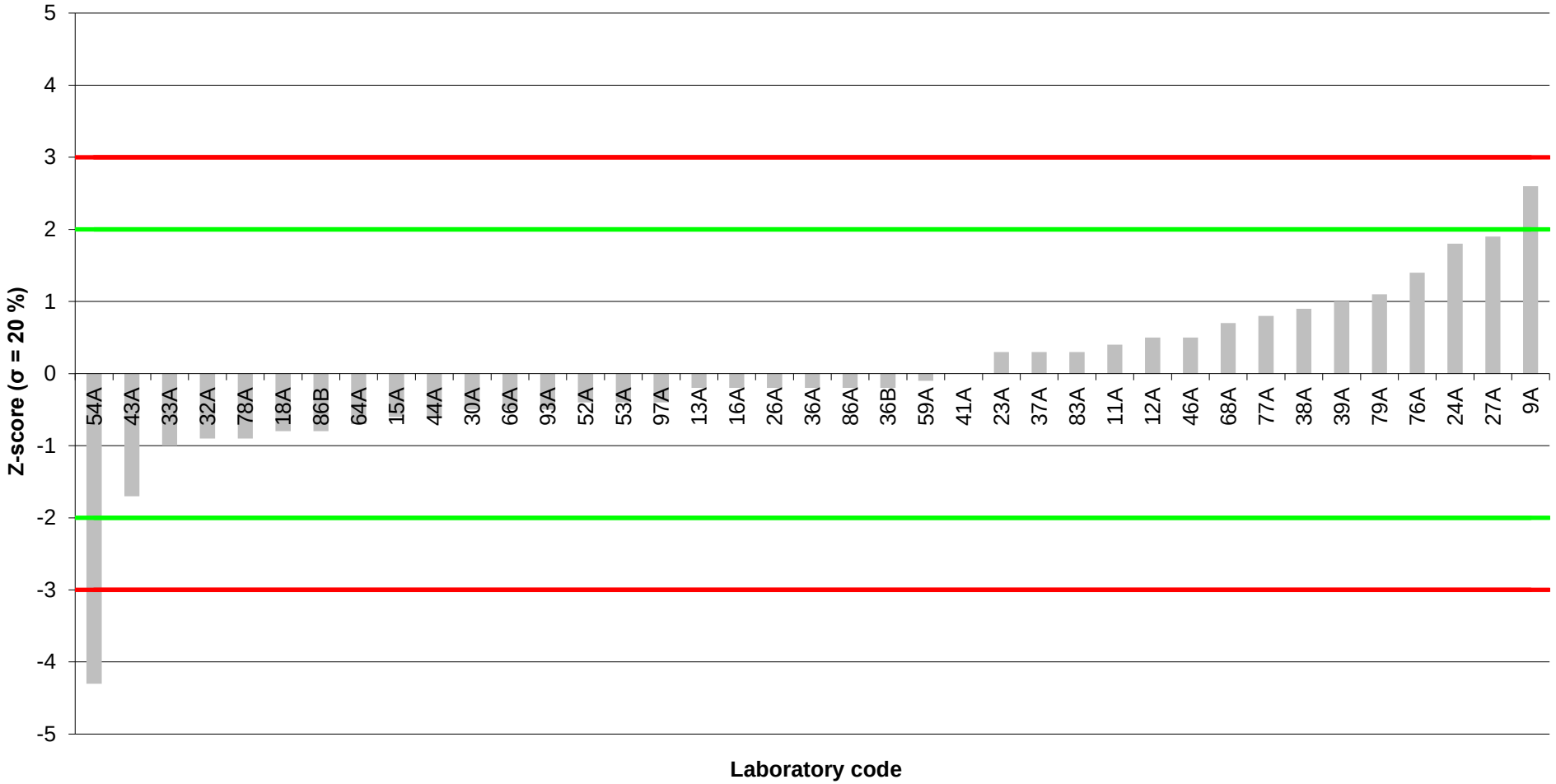
Assigned value: 0.263 µg/kg product



Hay (2502-HY)

Sum of total PFOS, PFOA, PFNA, PFHxS (ub)

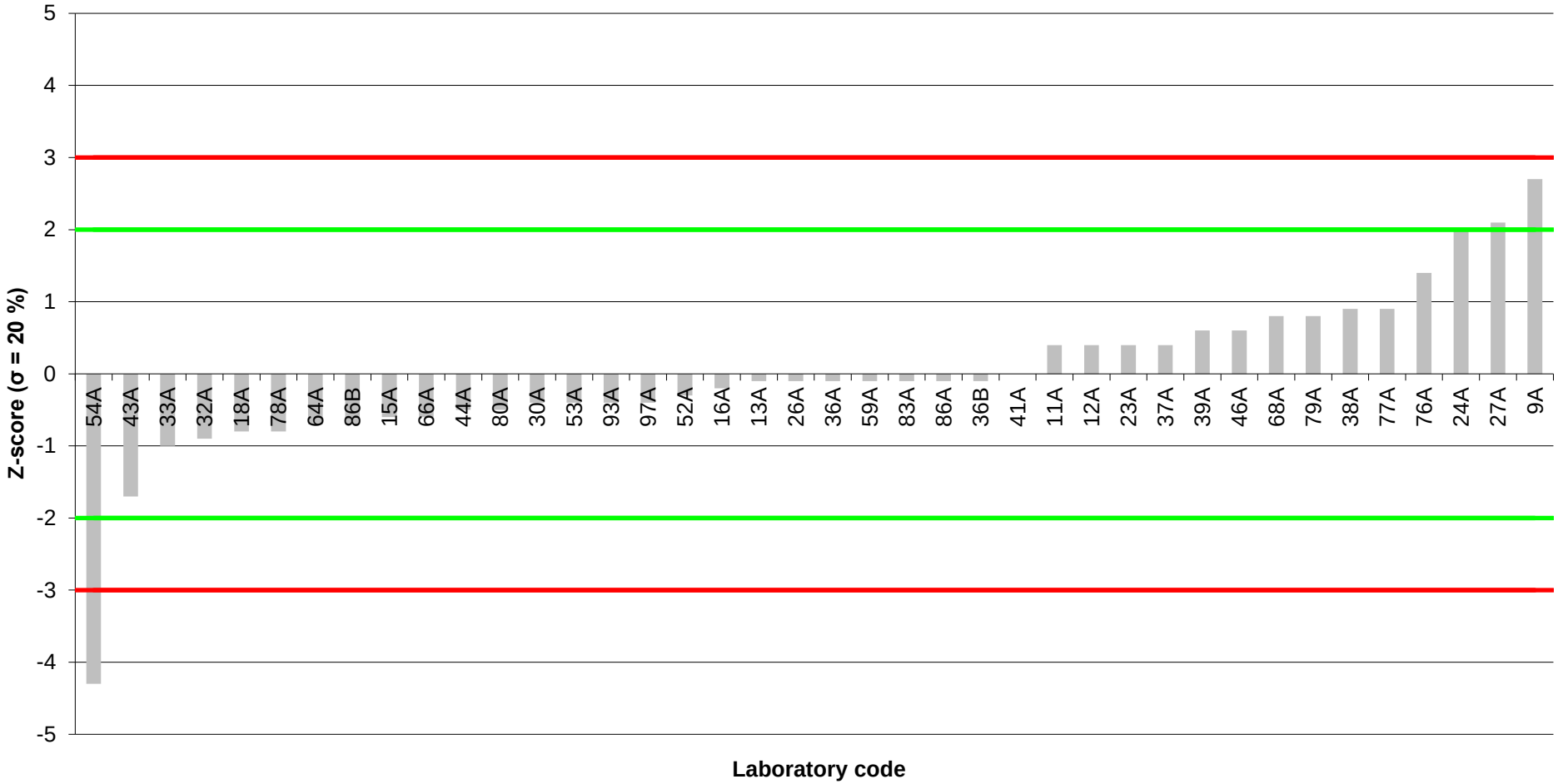
Assigned value: 11.4 µg/kg product



Hay (2502-HY)

Sum of total PFOS, PFOA, PFNA, PFHxS (lb)

Assigned value: 11.2 µg/kg product



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EURL for Halogenated Persistent Organic Pollutants (POPs) in Feed and Food
21 May 2026

Annex 5: Test for sufficient homogeneity and stability for PFAS

Test sample - Hay (2502-HY)

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

Hay (2502-HY)
PFCAs, PFSAs - Homogeneity test - Data

Analyte	Result µg/kg 12% moisture content	**Mean** (n = 10, duplicate analysis)	**Median** (n = 10, duplicate analysis)	**Relative standard deviation** [%]
PFBA		21.6	21.4	3%
PFPeA		4.53	4.50	3%
PFHxA		1.24	1.24	2%
PFHpA		0.444	0.445	3%
PFHxS		0.241	0.242	4%
PFOA		5.54	5.54	1%
L-PFOS		3.81	3.85	4%
PFNS		3.58	3.58	4%
PFDS		3.93	3.93	3%

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

Hay (2502-HY)
Selected compounds - Homogeneity test - Data

Sample	Replicate	Result µg/kg 12% moisture content	PFPeA	PFOA	L-PFOS
6	1		4.452	5.49	3.867
	2		4.417	5.53	3.636
9	1		4.423	5.46	3.725
	2		4.564	5.57	3.619
69	1		4.458	5.52	3.567
	2		4.555	5.50	3.916
71	1		4.469	5.47	3.759
	2		4.697	5.57	3.915
85	1		4.519	5.56	3.944
	2		4.538	5.53	3.679
111	1		4.573	5.54	4.036
	2		4.506	5.58	3.605
136	1		4.431	5.58	4.134
	2		4.692	5.53	3.880
152	1		4.871	5.55	3.829
	2		4.496	5.61	3.834
181	1		4.447	5.54	3.879
	2		4.418	5.48	3.890
185	1		4.499	5.63	3.964
	2		4.502	5.54	3.573
Cochran's C-test					
C			0.473	0.277	0.272
$C_{critical}$ (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 $\bar{x}$			4.526	5.538	3.8125
Standard deviation of sample averages s_x			0.074	0.030	0.0910
Wthin-sample standard deviation s_w			0.122	0.047	0.1850
Between-sample standard deviation s_s			0.000	0.000	0.000
Standard deviation for proficiency assessment σ_{PT}			0.91	1.11	0.763
s_s / σ_{PT}			0.000	0.000	0.000
Test for homogeneity ($s_s \leq 0.3\ \sigma_{PT}$)			passed	passed	passed

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

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

Hay (2502-HY)

Selected compounds - Stability test - Data

Sample	Replicate	Result µg/kg 12% moisture content	**PFPeA**
71	1		4.538
	2		4.600
147	1		4.565
	2		4.515
202	1		4.608
	2		4.528
Stability test			
General average (stability test) $\bar{y}$			4.56
General average (homogeneity test) $\bar{x}$			4.53
Standard deviation for proficiency assessment σPT			0.905
$\lvert \bar{y} - \bar{x} \rvert$			0.0324
Test for stability ($\lvert \bar{y} - \bar{x} \rvert \leq 0.3$ σPT)			passed

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

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

21 May 2026

Annex 6: Participant's methods for PFAS

Test sample - Hay (2502-HY)

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

Hay (2502-HY)
Methods PFAS - Accreditation, weighed sample, internal standards

LC	Data set	Sample	Accreditation according to ISO/IEC 17025	Weighed sample [g]	Use of isotope-labelled internal standards for … PFCAs (yes/no)	PFSAs (yes/no)	Other PFAS (yes/no)	Other internal standards	Use of recovery / injection (yes/no)	Matrix calibration (yes/no)
1		2502-HY								
2		2502-HY								
3		2502-HY								
4		2502-HY								
5		2502-HY								
6		2502-HY								
7		2502-HY								
8		2502-HY								
9	A	2502-HY	yes	5.02	yes	yes	yes	13C3 Gen-X	yes	no
10		2502-HY								
11	A	2502-HY	yes	2	yes	yes	yes	13C3-HFPO-DA,	yes	no
12	A	2502-HY	yes	3	yes	yes	no		no	no
13	A	2502-HY	yes	1	yes	yes	no		no	no
14		2502-HY								
15		2502-HY								
16	A	2502-HY	no	1	yes	yes	yes	FOSA, GenX	yes	no
17		2502-HY								
18	A	2502-HY	no	0.502	yes	yes	no		no	yes
19		2502-HY								
20		2502-HY								
21		2502-HY								
22		2502-HY								
23	A	2502-HY	no	2	yes	yes	yes		no	no
24	A	2502-HY	no	5	yes	yes	yes		no	no
25		2502-HY								
26	A	2502-HY	yes	1	yes	yes	yes		yes	no
27	A	2502-HY	yes	1	yes	yes	no		no	no
28		2502-HY								
29		2502-HY								
30	A	2502-HY	no	1	yes	no	no	Isotope-labelled IS were used except for PFPeS, PFHpS, PFNS, PFDS, PFUnDS, PFDoDS, PFTrDA, PFTrDS, DONA, F53B Major, F53B Minor	yes	no
31		2502-HY								
32	A	2502-HY	yes	1	yes	yes			no	no
33	A	2502-HY	no	1	yes	yes	yes	GenX 13C3 , PFUnDA 13C2,	no	no
34		2502-HY								
35		2502-HY								
36	A	2502-HY	no	2	yes	yes	yes	MHFPO-DA	yes	no
37	A	2502-HY	no	1	yes	yes	yes		yes	no
38	A	2502-HY	no	2.5	yes	yes	no		yes	no
39	A	2502-HY	yes	1.0033	yes	yes	yes		no	no
40		2502-HY								
41	A	2502-HY	yes	1	yes	yes	yes		yes	no
42	A	2502-HY	yes	5	yes	yes	yes		no	no
43	A	2502-HY	yes	2	yes	yes	no		yes	no
44	A	2502-HY	yes	1	yes	yes	yes		yes	no
45		2502-HY								
46	A	2502-HY	yes	2	yes	yes			no	no
47		2502-HY								
48		2502-HY								
49		2502-HY								
50		2502-HY								
51		2502-HY								
52		2502-HY								
53	A	2502-HY	no	1	yes	yes	yes		no	no
54	A	2502-HY	no	2	yes	yes	no		yes	no
55		2502-HY								
56		2502-HY								
57		2502-HY								
58		2502-HY								
59		2502-HY								
60		2502-HY								

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

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

Hay (2502-HY)

Methods PFAS - Accreditation, weighed sample, internal standards

LC	Data set	Sample	Accreditation according to ISO/IEC 17025	Weighed sample [g]	Use of isotope-labelled internal standards for … PFCAs (yes/no)	PFSAs (yes/no)	Other PFAS (yes/no)	Other internal standards	Use of recovery / injection (yes/no)	Matrix calibration (yes/no)
61		2502-HY								
62		2502-HY								
63		2502-HY								
64	A	2502-HY	yes	1	yes	yes			no	no
65		2502-HY								
66	A	2502-HY	yes	1	yes	yes	no		yes	no
67		2502-HY								
68	A	2502-HY	yes	2	yes	yes	no		no	no
69		2502-HY								
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76	A	2502-HY	yes	0.5	yes	yes			no	no
77	A	2502-HY	no	5	yes	yes	no		no	no
78	A	2502-HY	yes	1	yes	yes	no		yes	no
79	A	2502-HY	yes	0.9705	yes	yes	yes	13C4-PFBA, 13C3-PFPeA, 13C2-PFHxA, 13C4-PFHpA, 13C4-PFOA, 13C5-PFNA, 13C2-PFDA, 13C2-PFUnDA, 13C2-PFDoDA, 13C2-PFTeDA, 13C2-PFHxDA, 13C3-PFBS, 18O2-PFHxS, 13C4-PFOS, 13C8-FOSA, 13C3-GenX, M3HFPO-DA, M8-PFOS, M8-PFOA	yes	no
80	A	2502-HY	yes	1	yes	yes	yes		no	no
81		2502-HY								
82		2502-HY								
83	A	2502-HY	no	1	yes	yes	yes		no	yes
84		2502-HY								
85		2502-HY								
86	A	2502-HY	yes	1	yes	yes	yes		yes	no
87		2502-HY								
88		2502-HY								
89	A	2502-HY	no	5	yes	yes			no	no
90		2502-HY								
91		2502-HY								
92		2502-HY								
93	A	2502-HY						M3HFPO-DA	no	no
94		2502-HY								
95		2502-HY								
96		2502-HY								
97		2502-HY								
Additional Sets										
36	B	2502-HY	no	2	yes	yes	yes	MHFPO-DA	yes	no
86	B	2502-HY	no	1	yes	yes	yes		yes	no

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

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

Hay (2502-HY)

Methods Perfluoroalkylcarboxylic acids (PFCAs) - Internal standards

LC	Data set	Sample		Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
1		2502-HY												
2		2502-HY												
3		2502-HY												
4		2502-HY												
5		2502-HY												
6		2502-HY												
7		2502-HY												
8		2502-HY												
9	A	2502-HY		13C4 PFBA	13C5 PFPeA	13C2 PFHxA	13C4 PFHpA	13C8 PFOA	13C5 PFNA	13C2 PFDA	13C2 PFUnA	13C2 PFDoA	13C2 PFDoA	13C2 PFTA
10		2502-HY												
11	A	2502-HY				13C6-PFHxA		13C8-PFOA	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTrDA	13C2-PFTeDA
12	A	2502-HY		PFBA	PFPeA	PFHxA	PFOA	PFOA	PFOA	PFDA	PFDA	PFDoDA		
13	A	2502-HY		M4PFBA	M5PFPeA	M2PFHxA	M4PFHpA	M4PFOA	M5PFNA	M6PFDA	M7PFUnDA	M2PFDoDA	M2PFDoDA	M2PFTeDA
14		2502-HY												
15		2502-HY						13C-PFOA	13C-PFNA					
16	A	2502-HY		PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFDoDA	PFTeDA
17		2502-HY												
18	A	2502-HY		PFBA-13C4	PFPeA-13C5	PFHxA-13C5	PFHpA-13C2	PFOA-13C8	PFNA-13C9	PFDA-13C6	PFUnA-13C7	PFDoA-13C2	PFTeDA-13C2+PFDoA-13C2	PFTeDA-13C2
19		2502-HY												
20		2502-HY												
21		2502-HY												
22		2502-HY												
23	A	2502-HY		13C4-PFBA	13C5-PFPeA	13C5-PFHxA	13C4-PFHpA	13C4-PFOA	13C5-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTrDA	13C2-PFTeDA
24	A	2502-HY												
25		2502-HY												
26	A	2502-HY		M13C4 PFBA	M13C3 PFPeA	M13C2 PFHxA	M13C4 PFHpA	M13C4 PFOA	M13C5 PFNA	M13C2 PFDA	M13C2 PFUnDA	M13C2 PFDoDA	M13C2 PFDoDA	M13C2 PFTeDA
27	A	2502-HY						13C4-PFOA	13C9-PFNA					
28		2502-HY												
29		2502-HY												
30	A	2502-HY		PFBA-13C4	PFPeA-13C3	PFHxA-13C2	PFHpA-13C7	PFOA-13C4	PFNA-13C5	PFDA-13C2	PFUnDA-13C2	PFDoDA-13C2	PFDoDA-13C2	PFTeDA-13C2
31		2502-HY												
32	A	2502-HY		PFBA-13C4	PFPeA-13C3	PFHxA-13C2	PFHpA-13C4	PFOA-13C4	PFNA-13C5	PFDA-13C2	PFDoDA-13C2	PFDoDA-13C2	PFDoDA-13C2	PFDoDA-13C2
33	A	2502-HY		PFBA 13C4	PFPeA 13C3	PFHxA 13C2	PFHpA 13C4	PFOA 13C4	PFNA 13C5	PFDA 13C2	PFUnDA 13C2	PFDoDA 13C2	PFDoDA 13C2	PFTeDA 13C2
34		2502-HY												
35		2502-HY												
36	A	2502-HY		MPFBA	MPFPeA	MPFHxA	MPFHpA	MPFOA	MPFNA	MPFDA	MPFUnDA	MPFDoDA	MPFDoDA/MPFTeDA	MPFTeDA
37	A	2502-HY		PFBA 13C3	PFPeA 13C5	PFHxA 13C6	PFHpA 13C7	PFOA 13C8	PFNA 13C9	PFDA 13C9	PFUnDA 13C9	PFDoDA 13C12	PFTeDA 13C2	PFTeDA 13C2
38	A	2502-HY			13C5-PFPeA	13C6-PFHxA	13C7-PFHpA	13C8-PFOA	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFDoDA	13C2-PFTeDA
39	A	2502-HY		MPFBA	M5PFPeA	13C2-FPHA	M4PFHpA	13C4-PFOA	13C-PFNA	13C2-PFDA	13C2-PFuDA	13C2-PFDoA	13C2-PFDoA	M2PTeDA
40		2502-HY												
41	A	2502-HY		13C4-PFBA	13C5-PFPeA	13C5-PFHxA	13C4-PFHpA	13C8-PFOA	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFDoDA	13C2-PFTeDA
42	A	2502-HY		PFPeA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFNA	
43	A	2502-HY						M8PFOA	M9PFNA					
44	A	2502-HY		13C-PFBA	13C-PFPeA	13C-PFHxA	13C-PFHpA	13C-PFOA	13C-PFNA	13C-PFDA	13C-PFUnDA	13C-PFDoDA		
45		2502-HY												
46	A	2502-HY						PFOA	PFNA					
47		2502-HY												
48		2502-HY												
49		2502-HY												
50		2502-HY												
51		2502-HY												
52		2502-HY				13C5-PFHxA	13C4-PFHpA	13C8-PFOA	13C9-PFNA	13C2-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA	13C2-PFTeDA
53	A	2502-HY		PFBA13C3	PFPeA13C3	PFHxA13C2	PFHpA13C4	PFOA13C4	PFDA13C2	PFDA13C2	PFUnDA13C2	PFDoDA13C2	PFTeDA13C2	PFTeDA13C2
54	A	2502-HY		M2PFOA	M2PFOA	M2PFOA	M2PFOA	M2PFOA	M2PFOA	M2PFOA	M2PFOA	M2PFOA	M2PFOA	M2PFOA
55		2502-HY												
56		2502-HY												
57		2502-HY												
58		2502-HY												
59		2502-HY		Perfluoro-n-(1,2,3,4-13C4)butansäure (MPFBA)	Perfluoro-n-(13C5)pentansäure (M5PFPeA)	Perfluoro-n-(1,2,3,4,6-13C5)hexansäure (M5PFHxA)	Perfluoro-n-[1,2,3,4-13C4]heptansäure (M4PFHpA)	Perfluoro-n-(13C8)octansäure (M8PFOA)	Perfluoro-n-(13C9)nonansäure (M9PFNA)	Perfluoro-n-(1,2,3,4,5,6-13C6)decansäure (M6PFDA)	Perfluoro-n-(1,2,3,4,5,6,7-13C7)undecansäure (M7PFUdA)	Perfluoro-n-(1,2-13C2)dodecansäure (MPFDoA)	Perfluoro-n-(1,2-13C2)dodecansäure (MPFDoA)	Perfluoro-n-(13C2)tetradecansäure (M2PFTeDA)
60		2502-HY												
61		2502-HY												
62		2502-HY												
63		2502-HY												
64	A	2502-HY						13C8-PFOA	13C9-PFNA					
65		2502-HY												
66	A	2502-HY		13C4-PFBA	13C5-PFPeA	1,2,3,4,6-13C5-PFHxA	1,2,3,4-13C4-PFHpA	13C8-PFOA	13C9-PFNA	1,2,3,4,5,6-13C6-PFDA	1,2,3,4,5,6,7-13C7-PFUnDA	1,2-13C2-PFDoDA	1,2-13C2-PFDoDA	1,2-13C2-PFTeDA
67		2502-HY												
68	A	2502-HY						13C PFOA	13C PFNA					
69		2502-HY												
70		2502-HY												
71		2502-HY												
72		2502-HY												
73		2502-HY												
74		2502-HY												
75		2502-HY												
76	A	2502-HY			13C-PFBA	13C-PFHxA	13C-PFHpA	13C-PFOA	13C-PFNA	13C-PFDA		13C-PFDoDA		

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

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

Hay (2502-HY)

Methods Perfluoroalkylcarboxylic acids (PFCAs) - Internal standards

LC	Data set	Sample		Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
77	A	2502-HY		M-PFBA	M-PFPeA		M-PFHpA	M-PFOA	M-PFNA	M-PFDA	M-PFUnDA	M-PFDoDA		
78	A	2502-HY				Perfluoro-n-[1,2,3,4,6-13C12] hexanoic acid	Perfluoro-n-[1,2,3,4-13C12] heptanoic acid	Perfluoro-n-[1,2,3,4-13C12] octanoic acid	Perfluoro-n-[1,2,3,4,5-13C12] nonanoic acid	Perfluoro-n-[1,2-13C12] decanoic acid	Perfluoro-n-[1,2,3,4,5,6,7-113C12]undecanoic acid	Perfluoro-n-[1,2-13C12] dodecanoic acid		
79	A	2502-HY				PFHxA - IS	PFHpA - IS	PFOA - IS	PFNA - IS	PFDA - IS	PFUnDA - IS	PFDoDA - IS	PFDoDA - IS	PFTeDA - IS
80	A	2502-HY		PFBA-13C2	PFPeA-13C5	PFHxA-13C2	PFOA-13C4	PFOA-13C4	PFNA-13C5	PFDA-13C2	PFUnDA-13C2	PFDoDA-13C2		PFTeDA-13C2
81		2502-HY												
82		2502-HY												
83	A	2502-HY		Perfluoro-n-(13C4)butanoic acid	Perfluoro-n-(13C5)pentanoic acid	Perfluoro-n-(1,2,3,4,6-13C5)hexanoic acid	Perfluoro-n-(1,2,3,4-13C4)heptanoic acid	Perfluoro-n-(13C8)octanoic acid	Perfluoro-n-(13C9)nonanoic acid	Perfluoro-n-(1,2,3,4,5,6-13C6)decanoic acid	Perfluoro-n-(1,2,3,4,5,6,7-13C7)undecanoic acid	Perfluoro-n-(1,2-13C2)dodecanoic acid		Perfluoro-n-(1,2-13C2)tetradecanoic acid
84		2502-HY												
85		2502-HY												
86	A	2502-HY		PFBA-13C4	PFPeA-13C5	PFHxA-13C5	PFHpA-13C4	PFOA-13C8	PFNA-13C9	PFDA-13C6	PFUnA -13C7	PFDoA -13C2	PFDoA -13C2 and PFTeDA-13C2 (mean value)	PFTeDA-13C2
87		2502-HY												
88		2502-HY												
89	A	2502-HY		PFBA 13C4	PFPeA 13C5	PFHxA 13C5	PFHpA 13C4	PFOA 13C8	PFNA 13C9	PFDA 13C6	PFUnA 13C6	PFDoA 13C2	PFDoA 13C2	PFTeDA13C2
90		2502-HY												
91		2502-HY												
92		2502-HY												
93	A	2502-HY		MPFBA	M5PFPeA	M5PFHxA	M4PFHpA	M8PFOA	M9PFNA	M6PFDA	M7PFUdA	MPFDoA	MPFDoA	M2PFTeDA
94		2502-HY												
95		2502-HY												
96		2502-HY												
97		2502-HY		13C5PFPeA		13C6PFHxA	13C8PFOA	13C8PFOA						
Additional Sets														
36	B	2502-HY		MPFBA	MPFPeA	MPFHxA	MPFHpA	MPFOA	MPFNA	MPFDA	MPFUnDA	MPFDoDA	MPFDoDA	MPFTeDA
86	B	2502-HY		PFBA-13C4	PFPeA-13C5	PFHxA-13C5	PFHpA-13C4	PFOA-13C8	PFNA-13C9	PFDA-13C6	PFUnA -13C7	PFDoA -13C2	PFDoA -13C2 and PFTeDA-13C2 mean value	PFTeDA-13C2

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

Hay (2502-HY)

Methods Perfluoroalkylcarboxylic acids (PFCAs) - Recovery standards

LC	Data set	Sample		Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
1		2502-HY												
2		2502-HY												
3		2502-HY												
4		2502-HY												
5		2502-HY												
6		2502-HY												
7		2502-HY												
8		2502-HY												
9	A	2502-HY		13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA
10		2502-HY												
11	A	2502-HY				13C6-PFHxA		13C2-PFOA	13C5-PFNA	13C5-PFNA	13C5-PFNA	13C5-PFNA	13C5-PFNA	13C5-PFNA
12	A	2502-HY												
13	A	2502-HY												
14		2502-HY												
15		2502-HY						NA	NA					
16	A	2502-HY		PFBA	PFBA	PFBA	PFOA	PFOA	PFOA	PFDA	PFDA	PFDA	PFDA	PFDA
17		2502-HY												
18	A	2502-HY												
19		2502-HY												
20		2502-HY												
21		2502-HY												
22		2502-HY												
23	A	2502-HY												
24	A	2502-HY												
25		2502-HY												
26	A	2502-HY		M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS
27	A	2502-HY												
28		2502-HY												
29		2502-HY												
30	A	2502-HY		PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8
31		2502-HY												
32	A	2502-HY		none	none	none	none	none	none	none	none	none	none	none
33	A	2502-HY		PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8
34		2502-HY												
35		2502-HY												
36	A	2502-HY		M3PFBA-inj	M3PFBA-inj	M3PFBA-inj	M3PFBA-inj	M2PFOA-inj	M2PFOA-inj	MPFDA-inj	MPFDA-inj	MPFDA-inj	MPFDA-inj	MPFDA-inj
37	A	2502-HY		PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4
38	A	2502-HY			13C4-PFHxA	13C4-PFHxA	13C4-PFHxA	13C2-PFOA	13C5-PFNA	13C2-PFDA	13C2-PFDA	13C2-PFDA	13C2-PFDA	13C2-PFDA
39	A	2502-HY												
40		2502-HY												
41	A	2502-HY												
42	A	2502-HY												
43	A	2502-HY						MPFOA	MPFNA					
44	A	2502-HY		R-PFBA	R-PFBA	R-PFHxA	R-PFOA	R-PFOA	R-PFNA	R-PFDA	R-PFDA	R-PFDA		
45		2502-HY												
46	A	2502-HY												
47		2502-HY												
48		2502-HY												
49		2502-HY												
50		2502-HY												
51		2502-HY												
52		2502-HY												
53	A	2502-HY		PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8
54	A	2502-HY		MPFBA	M5PFPeA	M5PFHxA	M4PFHpA	M8PFOA	M9PFNA	M6PFDA	M7PFUnDA	MPFDoDA	MPFDoDA	MPFDoDA
55		2502-HY												
56		2502-HY												
57		2502-HY												
58		2502-HY												
59		2502-HY												
60		2502-HY												
61		2502-HY												
62		2502-HY												
63		2502-HY												
64	A	2502-HY												
65		2502-HY												
66	A	2502-HY		2,3,4-13C3-PFBA	2,3,4-13C3-PFBA	1,2-13C2-PFOA	1,2-13C2-PFOA	1,2-13C2-PFOA	1,2-13C2-PFOA	1,2-13C2-PFDA	1,2-13C2-PFDA	1,2-13C2-PFDA	1,2-13C2-PFDA	1,2-13C2-PFDA
67		2502-HY												
68	A	2502-HY						none	none					
69		2502-HY												
70		2502-HY												
71		2502-HY												
72		2502-HY												
73		2502-HY												
74		2502-HY												
75		2502-HY												
76	A	2502-HY												
77	A	2502-HY												

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

Hay (2502-HY)

Methods Perfluoroalkylcarboxylic acids (PFCAs) - Recovery standards

LC	Data set	Sample		Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
78	A	2502-HY				Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate		
79	A	2502-HY				PFOA - M8	PFOA - M8	PFOA - M8	PFOA - M8	PFOA - M8	PFOA - M8	PFOA - M8	PFOA - M8	PFOA - M8
80	A	2502-HY												
81		2502-HY												
82		2502-HY												
83	A	2502-HY												
84		2502-HY												
85		2502-HY												
86	A	2502-HY		PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4
87		2502-HY												
88		2502-HY												
89	A	2502-HY												
90		2502-HY												
91		2502-HY												
92		2502-HY												
93	A	2502-HY												
94		2502-HY												
95		2502-HY												
96		2502-HY												
97		2502-HY												
Additional Sets														
36	B	2502-HY		M3PFBA-inj	M3PFBA-inj	M3PFBA-inj	M3PFBA-inj	M2PFOA-inj	M2PFOA-inj	MPFDA-inj	MPFDA-inj	MPFDA-inj	MPFDA-inj	MPFDA-inj
86	B	2502-HY		PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4

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

Hay (2502-HY)
Methods Perfluoroalkylsulfonic acids (PFSAs) - Internal Standards

LC	Data set	Sample		Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
1		2502-HY													
2		2502-HY													
3		2502-HY													
4		2502-HY													
5		2502-HY													
6		2502-HY													
7		2502-HY													
8		2502-HY													
9	A	2502-HY		13C3 PFBS	13C2 PFHxA	18O2 PFHxS	13C8 PFOA			13C4 PFOS	13C2 PFDA	13C2 PFUnA	13C2 PFDoA	13C2 PFTA	13C2 PFTA
10		2502-HY													
11	A	2502-HY		13C3-PFBS	13C2-PFPeS	13C3-PFHxS	13C2-PFHpS	13C8-PFOS	13C8-PFOS	13C8-PFOS	13C2-PFNS	13C2-PFDS	13C2-PFUnDS	13C2-PFUnDS	13C2-PFTrDS
12	A	2502-HY		PFBA	PFHxA	PFOA	PFOS			PFOS	PFOS	PFOS			
13	A	2502-HY		M3PFBS	M3PFBS	M3PFHxS	M4PFOS	M4PFOS	M4PFOS	M4PFOS	M4PFOS	M4PFOS			
14		2502-HY													
15		2502-HY				13C-PFHxS				13C-PFOS					
16	A	2502-HY		PFBS	PFBS	PFHxs	PFHxS	PFOS		PFOS	PFOS	PFOS		PFOS	
17		2502-HY													
18	A	2502-HY		PFBS-13C3	PFHxS-13C3	PFHxS-13C3	lin-PFOS-13C8	lin-PFOS-13C8	lin-PFOS-13C8		lin-PFOS-13C8	lin-PFOS-13C8			
19		2502-HY													
20		2502-HY													
21		2502-HY													
22		2502-HY													
23	A	2502-HY		13C3-PFBS	13C3-PFBS	18O2-PFHxS	18O2-PFHxS	13C8-PFOS	13C8-PFOS	13C8-PFOS	13C8-PFOS	13C8-PFOS	13C2-PFDoA	13C2-PFTeDA	13C2-PFDoA
24	A	2502-HY													
25		2502-HY													
26	A	2502-HY		M13C3 PFBS	M13C3 PFBS	M18O2 PFHxS	M18O2 PFHxS	M13C4 PFOS	M13C4 PFOS	M13C4 PFOS	M13C4 PFOS	M13C2 PFDA	M13C2 PFDoDA	M13C2 PFDoDA	M13C2 PFTeDA
27	A	2502-HY				13C3-PFHxS				13C4-PFOS					
28		2502-HY													
29		2502-HY													
30	A	2502-HY		PFBS-13C4	PFHxS-18O2	PFHxS-18O2	PFOS-13C4	PFOS-13C4	PFOS-13C4		PFOS-13C4	PFOS-13C4	PFDoDA-13C2	PFTeDA-13C2	PFTeDA-13C2
31		2502-HY													
32	A	2502-HY		PFBS-13C3	PFBS-13C3	PFHxS-18O2	PFHxS-18O2	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C8	PFOS-13C8			
33	A	2502-HY		PFBS 13C3	PFHxA 13C2	PFHxS 18O2	PFHxS 18O2	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFUnDA 13C2	PFDoDA 13C2	PFUnDA 13C2	PFTeDA 13C2	PFTeDA 13C2
34		2502-HY													
35		2502-HY													
36	A	2502-HY		MPFBS	MPFHxS	MPFHxS	MPFHxS	MPFOS	MPFOS	MPFOS	MPFHxS	MPFUnDA	MPFUnDA	MPFDoDA/MPFTeDA	MPFTeDA
37	A	2502-HY		PFBS 13C4	PFBS 13C4	PFHxS 13C6	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8
38	A	2502-HY		13C3-PFBS	13C3-PFHxS	13C3-PFHxS	13C3-PFHxS	13C8-PFOS	13C8-PFOS	13C8-PFOS	13C8-PFOS	13C8-PFOS			
39	A	2502-HY		M3PFBS	18O-PFHS	18O-PFHS	18O-PFHS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS
40		2502-HY													
41	A	2502-HY		13C3-PFBS	13C3-PFHxS	13C3-PFHxS	13C8-PFOS	13C8-PFOS		13C8-PFOS	13C8-PFOS	13C8-PFOS			
42	A	2502-HY		PFBS	PFHxS	PFHxS	PFHxS	PFOS	PFOS	PFOS	PFHpA	PFHpA	PFUnDA	PFHxS	PFBS
43	A	2502-HY				M3PFHxS		M8PFOS	M8PFOS	M8PFOS					
44	A	2502-HY				13C-PFHxS		13C-PFOS	13C-PFOS		13C-PFNS	13C-PFDS	13C-PFUnDS	13C-PFDoDS	13C-PFTrDS
45		2502-HY													
46	A	2502-HY				PFHxS				PFOS					
47		2502-HY													
48		2502-HY													
49		2502-HY													
50		2502-HY													
51		2502-HY													
52		2502-HY		13C3-PFBS	13C3-PFBS	13C3-PFHxS	13C3-PFHxS	13C8-PFOS	13C8-PFOS	13C8-PFOS	13C8-PFOS	13C2-PFDA			
53	A	2502-HY		PFBS13C3	PFBS13C3	PFHxS18O2	PFHxS18O2	PFOS13C4	PFOS13C4	PFOS13C4	PFDA13C2	PFDA13C2	PFUnDA13C2	PFTeDA13C2	PFTeDA13C2
54	A	2502-HY		MPFOS	-	MPFOS	-	MPFOS	-	MPFOS	MPFOS	-	-	-	-
55		2502-HY													
56		2502-HY													
57		2502-HY													
58		2502-HY													
59		2502-HY		Perfluoro-1-(2,3,4-13C3)butansulfonsäure (Na.salz) (M3PFBS)	Perfluoro-n-(1,2,3,4,6-13C5)hexansäure (M5PFHxA)	Perfluoro-1-(2,3,4-13C3)hexansulfonsäure (Na.salz) (M3PFHxS)	Perfluoro-n-(13C8)octansäure (M8PFOA)	Perfluoro-n-(13C8)octansulfonsäure (Natriumsalz) (M8PFOS)	Perfluoro-n-(13C8)octansulfonsäure (Natriumsalz) (M8PFOS)	Perfluoro-n-(13C8)octansulfonsäure (Natriumsalz) (M8PFOS)	Perfluoro-n-(1,2,3,4,5,6-13C6)decansäure (M6PFDA)	Perfluoro-n-(1,2-13C2)dodecansäure (MPFDoA)	Perfluoro-n-(1,2-13C2)dodecansäure (MPFDoA)	Perfluoro-n-(13C2)tetradecansäure (M2PFTeDA)	Perfluoro-n-(13C2)tetradecansäure (M2PFTeDA)
60		2502-HY													
61		2502-HY													
62		2502-HY													
63		2502-HY													
64	A	2502-HY				13C3-PFHxS		13C8-PFOS							
65		2502-HY													
66	A	2502-HY		2,3,4-13C3-PFBS	1,2,3-13C3-PFHxS	1,2,3-13C3-PFHxS	1,2,3-13C3-PFHxS	13C8-PFOS	13C8-PFOS		13C8-PFOS	13C8-PFOS		13C8-PFOS	
67		2502-HY													
68	A	2502-HY				13C PFHxS		13C PFOS	13C PFOS	13C PFOS					
69		2502-HY													
70		2502-HY													
71		2502-HY													
72		2502-HY													
73		2502-HY													
74		2502-HY													
75		2502-HY													
76	A	2502-HY		13C-PFBS		13C-PFHxS				13C-PFOS		13C-PFDoDA			
77	A	2502-HY		M-PFBS		M-PFHxS				M-PFOS					
78	A	2502-HY		sodium perfluoro-1-[2,3,4-13C12] butanesulfonate	sodium perfluoro-1-hexane[18O2]sulfonate	sodium perfluoro-1-hexane[18O2]sulfonate	sodium perfluoro-1-hexane[18O2]sulfonate	Sodium perfluoro-1-[1,2,3,4-13C12] octanesulfonate	Sodium perfluoro-1-[1,2,3,4-13C12] octanesulfonate	Sodium perfluoro-1-[1,2,3,4-13C12] octanesulfonate					
79	A	2502-HY		PFBS - IS		PFHxS - IS	PFHxS - IS	PFOS - IS		PFOS - IS		PFDoDA - IS			
80	A	2502-HY		PFBS-13C3		PFHxS-18O2	PFOS-13C4	PFOS-13C4	PFOS-13C4						
81		2502-HY													

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

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

Hay (2502-HY)

Methods Perfluoroalkylsulfonic acids (PFSAs) - Internal Standards

LC	Data set	Sample		Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
82		2502-HY													
83	A	2502-HY		Sodium perfluoro-1-(2,3,4-13C3)butanesulfonate		Sodium perfluoro-1-(1,2,3-13C3)hexanesulfonate		Sodium perfluoro-1-(13C8)octanesulfonate							
84		2502-HY													
85		2502-HY													
86	A	2502-HY		PFBS-13C3	PFHxS-13C3	PFHxS-13C3	PFHxS-13C3	PFOS-13C8	PFOS-13C8		PFOS-13C8	PFDA-13C6		PFDoA -13C2	
87		2502-HY													
88		2502-HY													
89	A	2502-HY		PFBS 13C3	PFHxS 13C3	PFHxS 13C3	PFOS 13C8			PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8
90		2502-HY													
91		2502-HY													
92		2502-HY													
93	A	2502-HY		M3PFBS	M3PFBS	M3PFHxS	M3PFHxS	M8PFOS	M8PFOS	M8PFOS	M8PFOS	M8PFOS		M8PFOS	
94		2502-HY													
95		2502-HY													
96		2502-HY													
97		2502-HY				13C6PFHxS		13C8PFOS				13C11PFUnDA			
Additional Sets															
36	B	2502-HY		MPFBS	MPFHxS	MPFHxS	MPFHxS	MPFOS	MPFOS	MPFOS	MPFHxS	MPFUnDA	MPFUnDA		
86	B	2502-HY		PFBS-13C3	PFHxS-13C3	PFHxS-13C3	PFHxS-13C3	PFOS-13C8	PFOS-13C8		PFOS-13C8	PFOS-13C8		PFOS-13C8	

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

Hay (2502-HY)
Methods Perfluoroalkylsulfonic acids (PFSAs) - Recovery Standards

LC	Data set	Sample		Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
1		2502-HY													
2		2502-HY													
3		2502-HY													
4		2502-HY													
5		2502-HY													
6		2502-HY													
7		2502-HY													
8		2502-HY													
9	A	2502-HY		13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA
10		2502-HY													
11	A	2502-HY		13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS
12	A	2502-HY													
13	A	2502-HY													
14		2502-HY													
15		2502-HY				NA				NA					
16	A	2502-HY		PFOS	PFOS	PFOS	PFOS	PFOS		PFOS	PFOS	PFOS		PFOS	
17		2502-HY													
18	A	2502-HY													
19		2502-HY													
20		2502-HY													
21		2502-HY													
22		2502-HY													
23	A	2502-HY													
24	A	2502-HY													
25		2502-HY													
26	A	2502-HY		M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS
27	A	2502-HY													
28		2502-HY													
29		2502-HY													
30	A	2502-HY		PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8
31		2502-HY													
32	A	2502-HY		none	none	none	none	none	none	none	none	none			
33	A	2502-HY		PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8
34		2502-HY													
35		2502-HY													
36	A	2502-HY		M3PFBA-inj	M3PFBA-inj	M3PFBA-inj	M3PFBA-inj	MPFOS-inj	MPFOS-inj	MPFOS-inj	M3PFBA-inj	MPFDA-inj	MPFDA-inj	MPFDA-inj	MPFDA-inj
37	A	2502-HY		PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4
38	A	2502-HY		18O2-PFHxS	18O2-PFHxS	18O2-PFHxS	18O2-PFHxS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS	13C4-PFOS			
39	A	2502-HY													
40		2502-HY													
41	A	2502-HY													
42	A	2502-HY													
43	A	2502-HY				MPFOS		MPFOS	MPFOS	MPFOS					
44	A	2502-HY				R-PFHxS		R-PFOS	R-PFOS		R-PFOS	R-PFOS	R-PFOS	R-PFDA	R-PFDA
45		2502-HY													
46	A	2502-HY													
47		2502-HY													
48		2502-HY													
49		2502-HY													
50		2502-HY													
51		2502-HY													
52		2502-HY													
53	A	2502-HY		PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8
54	A	2502-HY		M3PFBS	-	M3PFHxS	-	M8PFOS	-	M8PFOS	M8PFOS	-	-	-	-
55		2502-HY													
56		2502-HY													
57		2502-HY													
58		2502-HY													
59		2502-HY													
60		2502-HY													
61		2502-HY													
62		2502-HY													
63		2502-HY													
64	A	2502-HY													
65		2502-HY													
66	A	2502-HY		1,2,3,4-13C4-PFOS	1,2,3,4-13C4-PFOS	1,2,3,4-13C4-PFOS	1,2,3,4-13C4-PFOS	1,2,3,4-13C4-PFOS	1,2,3,4-13C4-PFOS		1,2,3,4-13C4-PFOS	1,2,3,4-13C4-PFOS		1,2,3,4-13C4-PFOS	
67		2502-HY													
68	A	2502-HY				none		none	none	none					
69		2502-HY													
70		2502-HY													
71		2502-HY													
72		2502-HY													
73		2502-HY													
74		2502-HY													
75		2502-HY													
76	A	2502-HY													
77	A	2502-HY													
78	A	2502-HY		Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate	Sodium perfluoro-[13C8]octanesulfonate					
79	A	2502-HY		PFOS - M8		PFOS - M8	PFOS - M8	PFOS - M8		PFOS - M8		PFOA - M8			
80	A	2502-HY													
81		2502-HY													
82		2502-HY													
83	A	2502-HY													

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

Hay (2502-HY)
Methods Perfluoroalkylsulfonic acids (PFSAs) - Recovery Standards

LC	Data set	Sample		Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
84		2502-HY													
85		2502-HY													
86	A	2502-HY		PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4		PFOS-13C4	PFOS-13C4		PFOS-13C4	
87		2502-HY													
88		2502-HY													
89	A	2502-HY													
90		2502-HY													
91		2502-HY													
92		2502-HY													
93	A	2502-HY													
94		2502-HY													
95		2502-HY													
96		2502-HY													
97		2502-HY													
Additional Sets															
36	B	2502-HY		MPFBA injection	MPFBA injection	MPFBA injection	MPFBA injection	MPFOS injection	MPFOS injection	MPFOS injection	MPFBA injection	MPFDA-inj	MPFDA-inj		
86	B	2502-HY		PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4		PFOS-13C4	

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

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

Hay (2502-HY)

Methods Other PFAS - Internal Standards

LC	Data set	Sample		Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
1		2502-HY								
2		2502-HY								
3		2502-HY								
4		2502-HY								
5		2502-HY								
6		2502-HY								
7		2502-HY								
8		2502-HY								
9	A	2502-HY		13C8 PFOSA	13C4 PFOS	13C3 Gen-X	13C4 PFOS	13C4 PFOS		
10		2502-HY								
11	A	2502-HY			13C3-HFPO-DA	13C3-HFPO-DA		13C3-HFPO-DA		
12	A	2502-HY								
13	A	2502-HY								
14		2502-HY								
15		2502-HY								
16	A	2502-HY		FOSA	PFHpA	GenX	PFOS	PFOS		
17		2502-HY								
18	A	2502-HY			PFHpA-13C2		lin-PFOS-13C8	lin-PFOS-13C8		
19		2502-HY								
20		2502-HY								
21		2502-HY								
22		2502-HY								
23	A	2502-HY		13C8-FOSA	13C4-PFHpA		13C8-PFOS	13C8-PFOS		
24	A	2502-HY								
25		2502-HY								
26	A	2502-HY			M13C3 GenX	M13C3 GenX	M13C4 PFOS	M13C2 PFDA		
27	A	2502-HY								
28		2502-HY								
29		2502-HY								
30	A	2502-HY			GenX-13C3	GenX-13C3	PFOS-13C4	PFOS-13C4		
31		2502-HY								
32	A	2502-HY								
33	A	2502-HY			PFHpA 13C4	GenX 13C3	PFDA 13C2	PFDoDA 13C2		
34		2502-HY								
35		2502-HY								
36	A	2502-HY			MPFOA	MHFPO-DA	MPFOS	MPFOS		
37	A	2502-HY			HFPODA 13C3	HFPODA 13C3	PFOS 13C8	PFOS 13C8		
38	A	2502-HY		13C8-FOSA	13C3-GenX	13C3-GenX				
39	A	2502-HY		13C8-FOSA	13C-GENX	13C-GENX				
40		2502-HY								
41	A	2502-HY								
42	A	2502-HY					PFHpA	PFOA		
43	A	2502-HY								
44	A	2502-HY								
45		2502-HY								
46	A	2502-HY								
47		2502-HY								
48		2502-HY								
49		2502-HY								
50		2502-HY								
51		2502-HY								
52		2502-HY				13C3_PFBS				
53	A	2502-HY			GenX13C3	GenX13C3	PFNA13C5	PFDA13C2		
54	A	2502-HY		-	-	-	-	-	-	-
55		2502-HY								
56		2502-HY								
57		2502-HY								
58		2502-HY								
59		2502-HY		Perfluoro-n-(13C8)octansulfonamid (M8FOSA)	Perfluoro-4,8-dioxa-3H-nonansäure-13C2-Carboxyl Ammoniumsalz	2,3,3,3-Tetrafluoro-2(1,1,2,2,3,3,3-heptafluoropropoxy)-13C3-prppanoic acid (M3HFPO- DA)	Perfluoro-n-(1,2-13C2)dodecansäure (MPFDoA)	Perfluoro-n-(1,2-13C2)dodecansäure (MPFDoA)	Perfluoro-1-(2,3,4-13C3)hexansulfonsäure (Na.salz) (M3PFHxS)	Perfluoro-1-(2,3,4-13C3)hexansulfonsäure (Na.salz) (M3PFHxS)
60		2502-HY								
61		2502-HY								
62		2502-HY								
63		2502-HY								
64	A	2502-HY								
65		2502-HY								
66	A	2502-HY								
67		2502-HY								

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

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

Hay (2502-HY)

Methods Other PFAS - Internal Standards

LC	Data set	Sample		Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
68	A	2502-HY								
69		2502-HY								
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76	A	2502-HY								
77	A	2502-HY				M-GenX				
78	A	2502-HY								
79	A	2502-HY			PFHpA - IS	GenX - IS	PFDA - IS	PFDoDA - IS		
80	A	2502-HY				GenX-13C3				
81		2502-HY								
82		2502-HY								
83	A	2502-HY		Perfluoro-1-(13C8)octanesulfonamide						
84		2502-HY								
85		2502-HY								
86	A	2502-HY		PFOSA-13C8	PFHxA-13C5	HFPO-DA-13C3	PFUdA-13C7	PFUdA-13C7		
87		2502-HY								
88		2502-HY								
89	A	2502-HY								
90		2502-HY								
91		2502-HY								
92		2502-HY								
93	A	2502-HY		M8FOSA	M8PFOA	M3HFPO-DA	M8PFOS	M8PFOS		
94		2502-HY								
95		2502-HY								
96		2502-HY								
97		2502-HY								
Additional Sets										
36	B	2502-HY			MPFOA	MHFPO-DA	MPFOS	MPFOS		
86	B	2502-HY		PFOSA-13C8	PFHxA-13C5	HFPO-DA-13C3	PFUdA-13C7	PFUdA-13C7		

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

Hay (2502-HY)

Methods Other PFAS - Recovery Standards

LC	Data set	Sample		Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
1		2502-HY								
2		2502-HY								
3		2502-HY								
4		2502-HY								
5		2502-HY								
6		2502-HY								
7		2502-HY								
8		2502-HY								
9	A	2502-HY		13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA	13C4 PFOA		
10		2502-HY								
11	A	2502-HY			13C2-PFOA	13C2-PFOA				
12	A	2502-HY								
13	A	2502-HY								
14		2502-HY								
15		2502-HY								
16	A	2502-HY		PFOS	PFOA	PFOA	PFOS	PFOS		
17		2502-HY								
18	A	2502-HY								
19		2502-HY								
20		2502-HY								
21		2502-HY								
22		2502-HY								
23	A	2502-HY								
24	A	2502-HY								
25		2502-HY								
26	A	2502-HY			M13C8 PFOS	M13C8 PFOS	M13C8 PFOS	M13C8 PFOS		
27	A	2502-HY								
28		2502-HY								
29		2502-HY								
30	A	2502-HY			PFOS-13C8	PFOS-13C8	PFOS-13C8	PFOS-13C8		
31		2502-HY								
32	A	2502-HY								
33	A	2502-HY			PFOS 13C8	PFOS 13C8	PFOS 13C8	PFOS 13C8		
34		2502-HY								
35		2502-HY								
36	A	2502-HY			M2PFOA-inj	M3PFBA-inj	MPFOS-inj	MPFOS-inj		
37	A	2502-HY			PFOS 13C4	PFOS 13C4	PFOS 13C4	PFOS 13C4		
38	A	2502-HY		13C4-PFOS	13C4-PFHxA	13C4-PFHxA				
39	A	2502-HY								
40		2502-HY								
41	A	2502-HY								
42	A	2502-HY								
43	A	2502-HY								
44	A	2502-HY								
45		2502-HY								
46	A	2502-HY								
47		2502-HY								
48		2502-HY								
49		2502-HY								
50		2502-HY								
51		2502-HY								
52		2502-HY								
53	A	2502-HY			PFOS13C8	PFOS13C8	PFOS13C8	PFOS13C8		
54	A	2502-HY		-	-	-	-	-	-	-
55		2502-HY								
56		2502-HY								
57		2502-HY								
58		2502-HY								
59		2502-HY								
60		2502-HY								
61		2502-HY								
62		2502-HY								
63		2502-HY								
64	A	2502-HY								
65		2502-HY								
66	A	2502-HY								
67		2502-HY								
68	A	2502-HY								
69		2502-HY								

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

Hay (2502-HY)

Methods Other PFAS - Recovery Standards

LC	Data set	Sample		Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,2,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76	A	2502-HY								
77	A	2502-HY								
78	A	2502-HY								
79	A	2502-HY			PFOA - M8	PFOA - M8	PFOA - M8	PFOA - M8		
80	A	2502-HY								
81		2502-HY								
82		2502-HY								
83	A	2502-HY								
84		2502-HY								
85		2502-HY								
86	A	2502-HY								
87		2502-HY								
88		2502-HY								
89	A	2502-HY								
90		2502-HY								
91		2502-HY								
92		2502-HY								
93	A	2502-HY								
94		2502-HY								
95		2502-HY								
96		2502-HY								
97		2502-HY								
Additional Sets										
36	B	2502-HY			M2PFOA-inj	M3PFBA-inj	MPFOS injection	MPFOS injection		
86	B	2502-HY		PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4	PFOS-13C4		

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

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

Hay (2502-HY)

Methods Perfluoroalkylcarboxylic acids (PFCAs) - Measurement uncertainty [%]

LC	Data set	Sample	Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
1		2502-HY											
2		2502-HY											
3		2502-HY											
4		2502-HY											
5		2502-HY											
6		2502-HY											
7		2502-HY											
8		2502-HY											
9	A	2502-HY	30	30	30	30	30	30	30	30	30	30	30
10		2502-HY											
11	A	2502-HY			30		25	25	30	30	30	30	30
12	A	2502-HY					26.22						
13	A	2502-HY	25	24	18	14	13	17	19	15	21	50	25
14		2502-HY											
15		2502-HY					20	20					
16	A	2502-HY	8.2	1.42	0.37	0.215	1.37						
17		2502-HY											
18	A	2502-HY	40	40	50	30	30	30	30	30	30	50	40
19		2502-HY											
20		2502-HY											
21		2502-HY											
22		2502-HY											
23	A	2502-HY	37	37	37	37	37	37	37	37	37	37	37
24	A	2502-HY											
25		2502-HY											
26	A	2502-HY		22	32	21	32	24	22	21	31		
27	A	2502-HY					18	25					
28		2502-HY											
29		2502-HY											
30	A	2502-HY	50	50	50	50	50	50	50	50	50	50	50
31		2502-HY											
32	A	2502-HY		1.489	0.465	0.131	2.389						
33	A	2502-HY	10	10	10	20	10	10	10	10	10		25
34		2502-HY											
35		2502-HY											
36	A	2502-HY	30	30	30	30	30	30	30	30	30	30	35
37	A	2502-HY		3.08	0.615	0.233	3	0.021	0.0255	0.0146			
38	A	2502-HY		1.309	0.094	0.095	4.476						
39	A	2502-HY	50	50	50	50	50	50	50	50	50	50	50
40		2502-HY											
41	A	2502-HY	88	88	88	88	88	88	88	88	88	88	88
42	A	2502-HY	37	21	18	19	21	23	28	29	17	82	
43	A	2502-HY					28	26					
44	A	2502-HY	40	22	28	23	33	26	29	18	30		
45		2502-HY											
46	A	2502-HY					3.6	0.05					
47		2502-HY											
48		2502-HY											
49		2502-HY											
50		2502-HY											
51		2502-HY											
52		2502-HY			0.6	0.18	2.5						
53	A	2502-HY	40	40	40	40	40	40	40	40	40	40	40
54	A	2502-HY											
55		2502-HY											
56		2502-HY											
57		2502-HY											
58		2502-HY											
59		2502-HY	50	50	50	50	50	50	50	50	50	50	50
60		2502-HY											
61		2502-HY											
62		2502-HY											
63		2502-HY											
64	A	2502-HY											
65		2502-HY											

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

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

Hay (2502-HY)

Methods Perfluoroalkylcarboxylic acids (PFCAs) - Measurement uncertainty [%]

LC	Data set	Sample		Perfluorobutanoic acid **PFBA**	Perfluoropentanoic acid **PFPeA**	Perfluorohexanoic acid **PFHxA**	Perfluoroheptanoic acid **PFHpA**	Perfluorooctanoic acid **PFOA**	Perfluorononanoic acid **PFNA**	Perfluorodecanoic acid **PFDA**	Perfluoroundecanoic acid **PFUnDA**	Perfluorododecanoic acid **PFDoDA**	Perfluorotridecanoic acid **PFTrDA**	Perfluorotetradecanoic acid **PFTeDA**
66	A	2502-HY		30	30	30	30	30	30	30	30	30	30	30
67		2502-HY												
68	A	2502-HY						20	20					
69		2502-HY												
70		2502-HY												
71		2502-HY												
72		2502-HY												
73		2502-HY												
74		2502-HY												
75		2502-HY												
76	A	2502-HY			50	50	50	50	50	50		50		
77	A	2502-HY		44				44						
78	A	2502-HY				29	30	34	29	34	28	30		
79	A	2502-HY				29	34	20	17	21	19	23	59	34
80	A	2502-HY		45	45	20	20	25	20	25	40	40	55	45
81		2502-HY												
82		2502-HY												
83	A	2502-HY		40	46	50	50	50						
84		2502-HY												
85		2502-HY												
86	A	2502-HY		33	31	31	31	24	35	36	43	38	59	42
87		2502-HY												
88		2502-HY												
89	A	2502-HY		20	30	35	30	40	40	40	40	40	40	50
90		2502-HY												
91		2502-HY												
92		2502-HY												
93	A	2502-HY												
94		2502-HY												
95		2502-HY												
96		2502-HY												
97		2502-HY		0.5		1.24	0.32	2.47						
Additional Sets														
36	B	2502-HY		30	30	30	30	30	30	30	30	30	30	35
86	B	2502-HY		33	31	31	31	31	35	36	43	38	59	42

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

Hay (2502-HY)
Methods Perfluoroalkylsulfonic acids (PFSAs) - Measurement uncertainty [%]

LC	Data set	Sample		Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
1		2502-HY													
2		2502-HY													
3		2502-HY													
4		2502-HY													
5		2502-HY													
6		2502-HY													
7		2502-HY													
8		2502-HY													
9	A	2502-HY		30	30	30	30	30	30	30	30	30	30	30	30
10		2502-HY													
11	A	2502-HY		30	30	30	30	30	30	30	30	30	30	50	30
12	A	2502-HY								23.02					
13	A	2502-HY		15	27	19	25	15	15	15	21	44			
14		2502-HY													
15		2502-HY				20				20					
16	A	2502-HY				0.064		1.21	0.29	1.45	1.71	2.25		0.207	
17		2502-HY													
18	A	2502-HY		40	40	26	40	30	40	26	40	50			
19		2502-HY													
20		2502-HY													
21		2502-HY													
22		2502-HY													
23	A	2502-HY		37	37	37	37	37	37	37	37	37	37	37	37
24	A	2502-HY													
25		2502-HY													
26	A	2502-HY		30		42		32		32					
27	A	2502-HY				15				16					
28		2502-HY													
29		2502-HY													
30	A	2502-HY		50	50	50	50	50	50	50	50	50	50	50	50
31		2502-HY													
32	A	2502-HY				0.132		1.744	0.348	2.086	2.418	3.074			
33	A	2502-HY		20	15	15	15	10	10	10	10	10			
34		2502-HY													
35		2502-HY													
36	A	2502-HY		30	30	30	30	30	30	30	30	45	45	60	60
37	A	2502-HY		0.055		0.121		2.28	0.677	2.93	1.83	0.719	0.061		
38	A	2502-HY						3.365	0.052	4.476	1.847	0.882			
39	A	2502-HY		50	50	50	50	50	50	50	50	50	50	50	50
40		2502-HY													
41	A	2502-HY		88	88	88	88	88		88	88	88			
42	A	2502-HY		13	24	14	22	24			33	38	80	39	35
43	A	2502-HY				29		29	30	26					
44	A	2502-HY				31		29	45	25	37	31	44	33	38
45		2502-HY													
46	A	2502-HY				0.125				2.53					
47		2502-HY													
48		2502-HY													
49		2502-HY													
50		2502-HY													
51		2502-HY													
52		2502-HY				0.09		2.4	0.14	2.5	0.9	1.1			
53	A	2502-HY		40	40	40	40	40	40	40	40	40	40	40	40
54	A	2502-HY													
55		2502-HY													
56		2502-HY													
57		2502-HY													
58		2502-HY													
59		2502-HY		50	50	50	50	50	50	50	50	50	50	50	50
60		2502-HY													
61		2502-HY													
62		2502-HY													
63		2502-HY													
64	A	2502-HY													
65		2502-HY													
66	A	2502-HY		30	30	30	30	30	30	30	30	30		30	
67		2502-HY													
68	A	2502-HY				20		20	20						
69		2502-HY													
70		2502-HY													
71		2502-HY													
72		2502-HY													
73		2502-HY													
74		2502-HY													
75		2502-HY													
76	A	2502-HY		50		50				50		50			
77	A	2502-HY				44				44					
78	A	2502-HY		22	28	21	17	20	20	29					
79	A	2502-HY		28		24	23	21		21		52			
80	A	2502-HY		35	30	30	45	40	40		35	50	50	50	50
81		2502-HY													
82		2502-HY													
83	A	2502-HY				48				44	48	46	48	46	
84		2502-HY													

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

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

Hay (2502-HY)

Methods Perfluoroalkylsulfonic acids (PFSAs) - Measurement uncertainty [%]

LC	Data set	Sample		Perfluorobutanesulfonic acid **PFBS**	Perfluoropentanesulfonic acid **PFPeS**	Perfluorohexanesulfonic acid **PFHxS**	Perfluoroheptanesulfonic acid **PFHpS**	Linear Perfluorooctane-sulfonic acid **L-PFOS**	Sum of branched Perfluorooctanesulfonic acid **br-PFOS**	Sum of branched and linear Perfluorooctanesulfonic acid **total PFOS**	Perfluorononanesulfonic acid **PFNS**	Perfluorodecanesulfonic acid **PFDS**	Perfluoroundecanesulfonic acid **PFUnDS**	Perfluorododecanesulfonic acid **PFDoDS**	Perfluorotridecanesulfonic acid **PFTrDS**
85		2502-HY													
86	A	2502-HY		39	34	43	43	41	41	35	38	40		53	
87		2502-HY													
88		2502-HY													
89	A	2502-HY		20	20	20	20			20	20	20	20	30	35
90		2502-HY													
91		2502-HY													
92		2502-HY													
93	A	2502-HY													
94		2502-HY													
95		2502-HY													
96		2502-HY													
97		2502-HY				0.22		0.71				2.18			
Additional Sets															
36	B	2502-HY		30	30	30	30	30	30	30	30	45	45		
86	B	2502-HY		39	34	51	43	41	41	35	38	40		53	

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

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

Hay (2502-HY)

Methods Other PFAS - Measurement uncertainty

LC	Data set	Sample		Perfluorooctane sulphonamide **FOSA**	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid **DONA**	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid **GenX**	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate **major component of F-53B**	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate **minor component of F-53B**	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone A**	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide **Capstone B**
1		2502-HY								
2		2502-HY								
3		2502-HY								
4		2502-HY								
5		2502-HY								
6		2502-HY								
7		2502-HY								
8		2502-HY								
9	A	2502-HY		30.00	30.00	30.00	30	30		
10		2502-HY								
11	A	2502-HY			50.00	30.00				
12	A	2502-HY								
13	A	2502-HY								
14		2502-HY								
15		2502-HY								
16	A	2502-HY								
17		2502-HY								
18	A	2502-HY			40.00		40	40		
19		2502-HY								
20		2502-HY								
21		2502-HY								
22		2502-HY								
23	A	2502-HY		37.00	37.00					
24	A	2502-HY								
25		2502-HY								
26	A	2502-HY								
27	A	2502-HY								
28		2502-HY								
29		2502-HY								
30	A	2502-HY			50.00	50.00	50	50		
31		2502-HY								
32	A	2502-HY								
33	A	2502-HY			20.00	10.00	25	20		
34		2502-HY								
35		2502-HY								
36	A	2502-HY			30.00	30.00	30	50		
37	A	2502-HY								
38	A	2502-HY								
39	A	2502-HY		50.00	50.00	50.00				
40		2502-HY								
41	A	2502-HY								
42	A	2502-HY					43	45		
43	A	2502-HY								
44	A	2502-HY								
45		2502-HY								
46	A	2502-HY								
47		2502-HY								
48		2502-HY								
49		2502-HY								
50		2502-HY								
51		2502-HY								
52		2502-HY								
53	A	2502-HY			40.00	40.00	40	40		
54	A	2502-HY								
55		2502-HY								
56		2502-HY								
57		2502-HY								
58		2502-HY								
59		2502-HY		50.00	50.00	50.00	50	50		50
60		2502-HY								
61		2502-HY								
62		2502-HY								
63		2502-HY								
64	A	2502-HY								
65		2502-HY								
66	A	2502-HY								
67		2502-HY								
68	A	2502-HY								
69		2502-HY								

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

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

Hay (2502-HY)

Methods Other PFAS - Measurement uncertainty

LC	Data set	Sample		Perfluorooctane sulphonamide	2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluor-3-(trifluoromethoxy)propoxy]-propionic acid	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoic acid	Potassium 9-chlorohexadecafluoro-3-oxanonane-1-sulfonate	Potassium 11-chloroeicosafluoro-3-oxaundecane-1-sulfonate	1-Propanaminium, N,N-dimethyl-N-oxide-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide	1-Propanaminium, N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl]amino]-, hydroxide
				FOSA	**DONA**	**GenX**	**major component of F-53B**	**minor component of F-53B**	**Capstone A**	**Capstone B**
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76	A	2502-HY								
77	A	2502-HY								
78	A	2502-HY								
79	A	2502-HY			27.00	16.00	42	57		
80	A	2502-HY			50.00	50.00	50			
81		2502-HY								
82		2502-HY								
83	A	2502-HY								
84		2502-HY								
85		2502-HY								
86	A	2502-HY		44.00	44.00	44.00	44	44		
87		2502-HY								
88		2502-HY								
89	A	2502-HY								
90		2502-HY								
91		2502-HY								
92		2502-HY								
93	A	2502-HY								
94		2502-HY								
95		2502-HY								
96		2502-HY								
97		2502-HY								
Additional Sets										
36	B	2502-HY			30.00	30.00	30	50		
86	B	2502-HY		44.00	44.00	44.00	44	44		

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

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

Hay (2502-HY)

Methods Sum PFAS - Measurement uncertainty

LC	Data set	Sample		Sum of total-PFOS, PFOA, PFNA, PFHxS **(ub)**	Sum of total-PFOS, PFOA, PFNA, PFHxS **(lb)**
1		2502-HY			
2		2502-HY			
3		2502-HY			
4		2502-HY			
5		2502-HY			
6		2502-HY			
7		2502-HY			
8		2502-HY			
9	A	2502-HY		30	30
10		2502-HY			
11	A	2502-HY		25	25
12	A	2502-HY			
13	A	2502-HY		17	17
14		2502-HY			
15		2502-HY		25	25
16	A	2502-HY		2	1.9
17		2502-HY			
18	A	2502-HY		20	20
19		2502-HY			
20		2502-HY			
21		2502-HY			
22		2502-HY			
23	A	2502-HY		37	37
24	A	2502-HY			
25		2502-HY			
26	A	2502-HY		22.7	22.7
27	A	2502-HY		38	38
28		2502-HY			
29		2502-HY			
30	A	2502-HY		50	50
31		2502-HY			
32	A	2502-HY		4.706	4.606
33	A	2502-HY		6.9	6.9
34		2502-HY			
35		2502-HY			
36	A	2502-HY		21	21
37	A	2502-HY		6.068	6.068
38	A	2502-HY		6.692	6.642
39	A	2502-HY		50	50
40		2502-HY			
41	A	2502-HY		88	88
42	A	2502-HY			
43	A	2502-HY		20	20
44	A	2502-HY		21	21
45		2502-HY			
46	A	2502-HY			
47		2502-HY			
48		2502-HY			
49		2502-HY			
50		2502-HY			
51		2502-HY			
52		2502-HY		3.6	3.6
53	A	2502-HY		40	40
54	A	2502-HY			
55		2502-HY			
56		2502-HY			
57		2502-HY			
58		2502-HY			

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Hay (2502-HY)

Methods Sum PFAS - Measurement uncertainty

LC	Data set	Sample		Sum of total-PFOS, PFOA, PFNA, PFHxS **(ub)**	Sum of total-PFOS, PFOA, PFNA, PFHxS **(lb)**
59		2502-HY		50	50
60		2502-HY			
61		2502-HY			
62		2502-HY			
63		2502-HY			
64	A	2502-HY		10	10
65		2502-HY			
66	A	2502-HY		50	50
67		2502-HY			
68	A	2502-HY		20	20
69		2502-HY			
70		2502-HY			
71		2502-HY			
72		2502-HY			
73		2502-HY			
74		2502-HY			
75		2502-HY			
76	A	2502-HY		50	50
77	A	2502-HY		44	
78	A	2502-HY		57	57
79	A	2502-HY		14	14
80	A	2502-HY			
81		2502-HY			
82		2502-HY			
83	A	2502-HY		33	36
84		2502-HY			
85		2502-HY			
86	A	2502-HY		20	20
87		2502-HY			
88		2502-HY			
89	A	2502-HY			
90		2502-HY			
91		2502-HY			
92		2502-HY			
93	A	2502-HY		28	28
94		2502-HY			
95		2502-HY			
96		2502-HY			
97		2502-HY		2.57	2.57
Additional Sets					
36	B	2502-HY		21	21
86	B	2502-HY		23	23

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Hay (2502-HY)
Methods PFAS - Extraction

LC	Data set	Sample		**Extraction** Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Centrifugation	Further information
1		2502-HY								
2		2502-HY								
3		2502-HY								
4		2502-HY								
5		2502-HY								
6		2502-HY								
7		2502-HY								
8		2502-HY								
9	A	2502-HY		Homogenization	QuECHERS		1			
10		2502-HY								
11	A	2502-HY			Liquid-Liquid extraction	Ammonia, acetonitrile 0.1/99.9	2	room temperature	10 min 3500 x g	
12	A	2502-HY			Extraction with 15 ml MeOH, 30 min sonication, 30 min shaking	MeOH	1	50°C	5 min	
13	A	2502-HY			QuECHERS	Water / Acetonitirl	1	RT	5 min, 4000 U/min, below 12 °C	addition of 10 mL water,10 mL acetonitrile and internal standard, agitate intensively, 60 min ultrasonic bath (agitate all 15 min), addition of buffering salts for phase-separation, agitate intensively, centrifugation (4000 U/min, T<12°C), 5 mL aliquot, Add 5 mL water + mix, Use 80% (8 mL) for SPE
14		2502-HY								
15		2502-HY								
16	A	2502-HY		Addition of 10 mL water and 10 mL acetonitrile. Sample was shaken for 15 min. QuEChERS extraction packet was added to the extract and shaken again.	QuECHERS	Acetonitrile	15 min	room temperature	4500 rpm, -10 °C, 7 min	
17		2502-HY								
18	A	2502-HY		extraction with organic solvent and purification with envicarb	Liquid-Liquid extraction					
19		2502-HY								
20		2502-HY								
21		2502-HY								
22		2502-HY								
23	A	2502-HY		drying and homogenisation	Liquid-Liquid extraction	Methanol	1.15	RT	yes	
24	A	2502-HY		Extraction with acidified water/ acetonnitrile	QuECHERS	-	-	-	-	-
25		2502-HY								
26	A	2502-HY			1g of sample is extracted with 15 ml MeOH/KOH 0,01M during 16 hours - Evaporate 5ml of supernatant until 1ml, dilute with 4ml of water	MeOH/KOH 0,01M	16	ambiant	Yes	
27	A	2502-HY			QuECHERS	acetonitrile/water 1:1	0.5	ambient	4000 rpm	
28		2502-HY								
29		2502-HY								
30	A	2502-HY		Sample was crushed	Extraction from the solid matrix using methanol + 0.01M KOH	Methanol + 0.01M KOH	16	Room temperature	10min at 4°C and 4750 tr/min	Organic layer was concentrated from 5 mL to 1 mL
31		2502-HY								
32	A	2502-HY			extraction with methanol and clean up with SPE	20 mL methanol	1.25	room temperatur	15 min	
33	A	2502-HY		Pre-treatment includes a grinding, freeze-drying and supplementation step.	Extraction solid/liquid : involves the use of a methanol solution containing potassium hydroxide.	KOH 0.01M in MeOH	15	ambient	1300 g	
34		2502-HY								
35		2502-HY								
36	A	2502-HY		sample was homogenised before being weighed	QuECHERS	Acetonitrile NH4OH 1% / Water (50/50)	0.5	room temperature	10 min 10000 rpm	
37	A	2502-HY		Freeze drying / grinding	Liquide/solide extraction					
38	A	2502-HY			Liquid-Liquid extraction	CH3OH with NaOH 2mM	0.3	RT	4000 rpm	
39	A	2502-HY		sample is weighed and spiked with internal standard.	Methanol extraction and filtration over carbon S cartridge.	Methanol	1 hour	room temperature	10 min 4000 rpm	
40		2502-HY								
41	A	2502-HY		Sample + 10 mL H2O + 10 mL ACN; 60 min ultrasonic extraction (shaking by hand every 15 min); Cooling down to room temp; Addition of 4 g MgSO4, 1 g NaCl, 250 mg carbon;Shaking by hand rapidly;Centrifugation	QuECHERS	10 mL H2O + 10 mL ACN	1	room temp, max 50 °C due to ultrasonic extraction	yes	
42	A	2502-HY			Liquid-Liquid extraction	1% Formix Acid & 2% Formic Acid	15 minutes	Room temperature	Yes	
43	A	2502-HY		Sample was homogenized using tube mill grinder (Retsch). A 5 g portion of sample was dried in an oven (109°C, 4 hr) to determine the moisture content (this portion was not used for analysis).	solid-liquid extraction	10 mL water, sample mixed and left to soak. Then 10 mL ACN added.	15 min sonication	30°C	4000 rpm, 4°C for 5 min	
44	A	2502-HY			QuECHERS, Liquid-Liquid extraction	Water/ACN	40 min (20 min shaking + 20 min sonication)	RT	15 min at 3500 rpm	
45		2502-HY								
46	A	2502-HY		hydrolysis NaOH; extraktion	QuECHERS	ACN/2 mol NaOH	1	40	yes	
47		2502-HY								
48		2502-HY								
49		2502-HY								
50		2502-HY								
51		2502-HY								
52		2502-HY								
53	A	2502-HY		lyophilisation	extraction solide/liquide avec methanol hydroxide de potassium					

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Hay (2502-HY)
Methods PFAS - Extraction

LC	Data set	Sample		Extraction Sample preparation/pre-treatment	Extraction technique	Extraction solvent	Extraction time [h]	Extraction temperature [ºC]	Centrifugation	Further information
54	A	2502-HY		Weight sample, introduce in a PP tube and addition of internal standard	Solid-liquid extraction	10 ml of NaOH 10 mM in methanol	2 in an orbital digestor, 120 rpm	room temperature (25 ºC)	20 min at 2500 rpm, 20 ºC	The supernatant was completly recovered in a PP tube and evaporated near to 1 ml under N2 stream. Then, it was reconstituted with 45 ml of HPLC water and votexed.
55		2502-HY								
56		2502-HY								
57		2502-HY								
58		2502-HY								
59		2502-HY								
60		2502-HY								
61		2502-HY								
62		2502-HY								
63		2502-HY								
64	A	2502-HY			QuECHERS					
65		2502-HY								
66	A	2502-HY		addition of 10ml water to sample	Liquid-Liquid extraction	Acetonitrile	1.3	Roomtemperature	4000 rpm	
67		2502-HY								
68	A	2502-HY		1ml 200mM NaOH was added to the sample.	Liquid-Liquid extraction	MeOH	0.5	room	yes	
69		2502-HY								
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76	A	2502-HY		ACN/H20 (50/50), ISTD, shaking, QuEChERS, SPE, evaporation to dryness,	QuECHERS	ACN/ Water (50/50)	20 min	ambient	5500 U	
77	A	2502-HY			QuECHERS	Acetonitrile	0.017	Ambient	no	
78	A	2502-HY				methanol/potassium hydroxide	17	ambient		
79	A	2502-HY			Liquid-Liquid extraction	5 mL UHPLC water / 100 µL Formic acid / 20 mL acetonitrile.	0.5	room temperature	10min 3600rpm	5 mL of 400 mM NaOH +5 mL of sample extract =>30min 60 °C waterbath then 5 mL of 25 mM sodium acetate buffer.
80	A	2502-HY			ultrasonic extraction	acetonitrile				
81		2502-HY								
82		2502-HY								
83	A	2502-HY		none	QuECHERS	acetonitrile	2min	21	5 min, 4000rpm	
84		2502-HY								
85		2502-HY								
86	A	2502-HY			Liquid-Liquid extraction	ACETONITRILE			4000 G X 20 MIN	DOUBLE EXTRACTION WITH ACETONITRILE IN ULTRASONIC BATH
87		2502-HY								
88		2502-HY								
89	A	2502-HY		soxhlet extraction with methanol, liquid-liquid partition, uptake in methanol	Soxthlet	methanol	4h	boiling point	no	concentration of the methanol extract
90		2502-HY								
91		2502-HY								
92		2502-HY								
93	A	2502-HY		Addition of 8 mL of water, mix	QuECHERS	Acetonitrile 15 mL	0,1	Ambient	10 min, 5400 g	
94		2502-HY								
95		2502-HY								
96		2502-HY								
97		2502-HY								
Additional Sets										
36	B	2502-HY		sample was homogenised before being weighed	QuECHERS	Acetonitrile NH4OH 1% / Water (50/50)	0.5	room temp	10 min 10000 rpm	
86	B	2502-HY			Liquid-Liquid extraction	ACETONITRILE			4000 G X 20 MIN	DOUBLE EXTRACTION WITH ACETONITRILE IN ULTRASONIC BATH

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

Hay (2502-HY)

Methods PFAS - Clean-up

LC	Data set	Sample		Clean-up				
				Solid phase extraction	Dispersive solid phase extraction	No clean-up	Other clean-up	Further information
1		2502-HY						
2		2502-HY						
3		2502-HY						
4		2502-HY						
5		2502-HY						
6		2502-HY						
7		2502-HY						
8		2502-HY						
9	A	2502-HY				yes		
10		2502-HY						
11	A	2502-HY		yes	no	no		SPE (Strata PFAS Strata-GCB (250 mg top) and Strata-X-AW (100 mg bottom)
12	A	2502-HY		yes	no	no		200 mg WAX Phenomenex
13	A	2502-HY		yes	no	no		SPE (Strata X-AW, 200 mg, 3 mL), Wash: 2 mL 0,1% formic acid; 2 mL methanol, Elute: 4 mL methanol (w=0,1% ammonia), Dry, Dilute in 250 µL mixture of 0,1% formic acid : methanol, ratio 1 : 2
14		2502-HY						
15		2502-HY						
16	A	2502-HY		no	yes	no		
17		2502-HY						
18	A	2502-HY		yes	no	no		
19		2502-HY						
20		2502-HY						
21		2502-HY						
22		2502-HY						
23	A	2502-HY		no	no	no	ENVI-Carb	
24	A	2502-HY		yes	no	no		
25		2502-HY						
26	A	2502-HY		yes	no	no		first purification on cartbridge SPE Chromabond PFAS - second purification on cartbridge SPE Envi carb 500mg
27	A	2502-HY		yes	yes	no		SPE column: Strata-X-AW 33 um Polymeric weak anion / dSPE: 150 mg MgSO4 + 50 mg PSA
28		2502-HY						
29		2502-HY						
30	A	2502-HY		yes	no	no		
31		2502-HY						
32	A	2502-HY		yes	no	no		Strata X AW 60mg/3mL
33	A	2502-HY		yes	no	no		Clean-up on 2 SPE cartridges: CHROMABOND PFAS and ENVI-Carb
34		2502-HY						
35		2502-HY						
36	A	2502-HY		yes	no	no		Carbon S SPE followed by weak anion exchange SPE
37	A	2502-HY		yes	no	no		
38	A	2502-HY		yes	no	no		Waters SPE column GCB-WAX 50mg-200mg
39	A	2502-HY		no	no	no	Carbon S cleanup	Agilent Bond Elut Carbon S
40		2502-HY						
41	A	2502-HY		yes	no	no		SPE using Oasis WAX 6 cc, 150 mg Sorbent, 30 µm particle size
42	A	2502-HY		no	no	no	BondElut	
43	A	2502-HY		no	yes	no		EURL dSPE method: 2.0 g MgSO4, 0.5 g NaCl, 0.1 g GCB, 0.1 g C18
44	A	2502-HY		yes	no	no		Strata X-AW, 200 mg and GCB, 200 mg
45		2502-HY						
46	A	2502-HY		no	yes	no		
47		2502-HY						
48		2502-HY						
49		2502-HY						
50		2502-HY						
51		2502-HY						
52		2502-HY						
53	A	2502-HY		yes	no	no		purification sur SPE Chromabond PFAS purification sur SPE ENVI carb
54	A	2502-HY		yes	no	no		SPE Oasis WAX 3cc
55		2502-HY						
56		2502-HY						
57		2502-HY						
58		2502-HY						

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Hay (2502-HY)

Methods PFAS - Clean-up

LC	Data set	Sample		Clean-up				
				Solid phase extraction	Dispersive solid phase extraction	No clean-up	Other clean-up	Further information
59		2502-HY						
60		2502-HY						
61		2502-HY						
62		2502-HY						
63		2502-HY						
64	A	2502-HY		no	yes	no		
65		2502-HY						
66	A	2502-HY		yes	no	no		WAX column
67		2502-HY						
68	A	2502-HY		yes	no	no		
69		2502-HY						
70		2502-HY						
71		2502-HY						
72		2502-HY						
73		2502-HY						
74		2502-HY						
75		2502-HY						
76	A	2502-HY		yes	no	no		
77	A	2502-HY		no	yes	no		Dispersive Spe Clean Up Kit (25 mg di PSA (primary Secondary Amine) 25mg di C18E (octasecylsilane end-capped) 150 mg di MgSO4
78	A	2502-HY		yes	no	no		Oasis WAX (150 mg, 6 ml) (Waters Corp., USA), ENVI Carb Solid Phase (500 mg, 6 mL) (Supelco, USA)
79	A	2502-HY		yes	no	no		SPE Strata X-AW(top)/Strata XL (bottom),
80	A	2502-HY		no	yes	no	degreasing using n-hexane	
81		2502-HY						
82		2502-HY						
83	A	2502-HY		no	yes	no		
84		2502-HY						
85		2502-HY						
86	A	2502-HY		yes	yes	no		SPE CLEAN-UP WITH STRATA X-AW 200 mg - dSPE-Envicarb 80mg
87		2502-HY						
88		2502-HY						
89	A	2502-HY		no	no	no	liquid-liquid partition	
90		2502-HY						
91		2502-HY						
92		2502-HY						
93	A	2502-HY		no	yes	no		Bond Elut QuEChERS dSPE kit (1200 MgSO4, 400 mg PSA, 400 mg C18, 200 mg GCB)
94		2502-HY						
95		2502-HY						
96		2502-HY						
97		2502-HY						
Additional Sets								
36	B	2502-HY		yes	no	no		Carbon S SPE followed by Weak anion exchange SPE
86	B	2502-HY		yes	yes	no	SPE CLEAN-UP WITH STRATA X-AW 200 mg - dSPE-Envicarb 80mg	SPE CLEAN-UP WITH STRATA X-AW 200 mg - dSPE-Envicarb 80mg

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

Hay (2502-HY)

Methods PFAS - Detection, LOQ, measurement uncertainty

				Chromatographic separation and detection method						**Limit of quantification**	**Measurement uncertainty**
LC	Data set	Sample		Injection volume [µl]	HPLC separation: stationary phase	HPLC separation: mobile Phase A / B (relative amounts (v/v))	Gradient	Ionization mode	MS/MS / HRMS conditions	Determination of LOQ	Estimation
1		2502-HY									
2		2502-HY									
3		2502-HY									
4		2502-HY									
5		2502-HY									
6		2502-HY									
7		2502-HY									
8		2502-HY									
9	A	2502-HY									
10		2502-HY									
11	A	2502-HY		10	Acquity UPLC BEH C18, 150 x 3.0 mm, 2.7 µm	(2 mM ammonium acetate in water, acetonitrile (95/5))/ acetonitrile, methanol (60/40)	A/B: 0 min 90/10; 0.10 min 60/40; 3 min 50/50; 6 min 30/70; 16 min 5/95; 17 min 2/98; 18 min 2/98	ESI	dynamic multiple reaction monitoring	Spiking experiments according to the Guidance Document	according to the guidance document
12	A	2502-HY		10	Gemini NX 100*3mm, 3µm	5 mmol ammoniumacetat/MeOH	30%B to 100%B in 12 min	pos	API 5500, ABSciex	most 0,5 µg/kg, Signal/noise 9:1	Uncertainty of controlchart x deviations in proficiency tests
13	A	2502-HY		2	Pre-Column: Agilent InfinityLab PFC Delay Column, 4.6 x 30 mm, Column: Agilent Zorbax Eclipse XDB-C18, 1.8-Micron, 600Bar, 4,6 x 100mm	Eluent A: 5 mmol NH4FA in H2O; Eluent B: 5 mmol NH4FA in MeOH	30% B (0 min); 50% B (1 min); 98 % B (11 min) hold 5 min	ESI, negative mode, capillary voltage:3000 V, nebulizer pressure: 20 psi, Sheath-Gas: T = 250 °C, flow rate: 11L/min, Gas flow rate: 14 L/min		Measurement of different spiked samples, LOQ is the value were the following criteria are fulfilled: Recovery: 70-120%; RSD </=20%, Peak identification criteria fulfilled	Analysis of the QM-samples over 1-2 years, According to SANTE/11312/2021V2: Appendix C, Approach 1 (Estimating MU based on intra-laboratory validation/QC data.)
14		2502-HY									
15		2502-HY									
16	A	2502-HY		5	Luna Omega PS C18 (2.1 x 100 mm)	(A) Water + 10 mM ammonium acetate (B) acetonitrile:methanol (1/1, V/V)		ESI neg	Full Scan	The LOQ was estimated as the lowest concentration of the sample fortified with acceptable precision and trueness, by applying the complete analytical method and identification criteria	The expanded measurement uncertainties were obtained using a top-down approach as reported in the "Guidance document on measurement uncertainty for laboratories performing PCDD/F and PCB analysis using isotope dilution mass spectrometry – 2017". For the MU of the sum of four PFASs the RSS approach was used.
17		2502-HY									
18	A	2502-HY								spiked samples	estimation
19		2502-HY									
20		2502-HY									
21		2502-HY									
22		2502-HY									
23	A	2502-HY		10	C18	ammonium acetate/methanol	yes	ES-	MS/MS	Recoverys	MU was calculated according to the guide dokument Nordtest Report TR537, Coverage faktor (k) 2
24	A	2502-HY		-	-	-	-	-	-	-	-
25		2502-HY									
26	A	2502-HY		10	Hypersil Gold	MeOH / H2O (70 / 30)	Yes	Electrospray		blank value *3,3 or S/N=10	
27	A	2502-HY		10	Atlantis T3	2 mM ammonium acetate in MeOH / 2 mM ammonium acetate in deionized water	yes	ESI-		spiking of small amount of analytes into matrix	from validation parameters - RSD and bias
28		2502-HY									
29		2502-HY									
30	A	2502-HY		10	Column Waters CORTECS UPLC T3 ; 2.1 x 150 mm ; 1.6 µm	Phase A : Water + 2 mM ammonium acetate ; Phase B : Acetonitrile (99:1)		ESI	MRM	LOQ were determined during method development and validation	Uncertainties were determined during method development and validation
31		2502-HY									
32	A	2502-HY		20	XBridge C18, 2.1x150 mm, 3.5 µm	A: 2mM ammoniuimacetat in water +5% acetonitrile, B: acetonitrile/methanol (60/40, v/v)	0 min: 70% A, 9 min: 25% A, 12 min: 5% A, 15 min: 2% A, 19.5 min: 2% A, 20.5 min: 90% A, 24 min: 90% A	ESI negativ		lowes validated level	
33	A	2502-HY		2	Acquity Premier HSST3 1.8µm VanGuard FIT 2.1X100 mm	Eau/MeOH 95/5 buffered with 2mM ammonium acetate		Electrospray negative mode		LOQ was determined on spiked samples of dry products in intermediate fidelity condition	uncertainty from method validation including bias and precision
34		2502-HY									
35		2502-HY									
36	A	2502-HY		5	Column : Acquity UPLC BEH C18 1,7 µm	Mobile phase A : Water - acetate ammonium 20 mM/Methanol 96/4 v/v - Mobile phase B : Methanol/ Water - acetate ammonium 20 mM 96/4 v/v	Run time : 13 minutes	ESI -	gas flow rate: 60 (sheet) 12 (auxillary) 3 (sweep) - capillary temp: 269 °C - auxillary ga heater temp: 437°C - Spray voltage: 2.5kV	Lowest validated level of a similar procedure using Quecher extraction.	MU of a similar procedure using Quecher extraction in food.
37	A	2502-HY		5	C18			ESI (-)			
38	A	2502-HY		10	BEH C18 100mm 2.1mm 1.7um	H2O+ ammonium acetate 2mM / CH3OH + ammonium acetate 2mM		ESI neg	MS/MS		Bottom up approach
39	A	2502-HY		25	18C-column	Watery solvent/MeOH 70%/30%	starting condition 100% Watery solvent.	negative ESI	tandem mass spectometry, PFAS measured as MRMs	0.5 - via validation -> low spike	50% via validation -> high spike
40		2502-HY									
41	A	2502-HY		5	Waters xBridge BEH C18 2.5 µm 2.1 x 150 mm using an Agilent UHPLC	Channel A: 100 % Water with 2 mM CH3COONH4Channel B: 40 % ACN/60 % MeOH	2 min 90 % Channel A 9 min 15 % Channel A 12 min 2 % Channel A 15 min 2 % Channel A 15.1 min 90 % Channel A 20 min 90 % Channel A	ESI-	Dynamic MRM, Agilent 6470 mass spec	According to Guidance Document	Es gelten die extrapolierten Analysenspielräume des VDLUFA
42	A	2502-HY		20		A : 20mM ammonium acetate in water B : methanol	80/20 - 20/80 - 80/20	Negative Electron Spray Ionisation			
43	A	2502-HY		5	Raptor C18	A: 5 mM ammonium acetate in water, B: acetonitrile	0 min 20% B, 2.5 min 45%B, 6.5 min 70% B, 9-12 min 100% B, 12.1-17.5 min 20%B	Heated ESI	Sheath gas: 50 arb, Aux gas: 10 arb, Sweep gas 1 arb. Ion transfer tube temp: 325°C, vaporizer temp: 300°C, neg spray voltage: 2500 V	Spiking and recovery experiments.	Based on reproducibility of reference materials (previous PT materials) and bias from participation in PTs.
44	A	2502-HY		10	C18	A: 2 mmol/L ammonium acetate + 0,1 % acetic acid; B: methanol/acetonitrile 60:40 v %	0-0,5 min: 20% B; 0,5-2 min to 55% B, 2-10 min to 80% B, 10-13 min to 98% B hold until 17,5 min, 17,5-18,5 min to 20% B	negativ			top-down approach as discribed in the "Guidance document on measurment uncertainty for laboratories performing PCDD/F and PCB analysis"
45		2502-HY									
46	A	2502-HY									calculated
47		2502-HY									
48		2502-HY									
49		2502-HY									
50		2502-HY									
51		2502-HY									
52		2502-HY									
53	A	2502-HY		10		LC-MS/MS xevo TQXS waters unispray négatif		Unispray negatif			
54	A	2502-HY		5	Hypersil GOLD PFP 50 x 3 (3 um)	A) water 10mM NH4Ac / B) methanol 10 mM NH4Ac	1 min A 90%, increase B to 90% in 10 min, B 90% for 2 min, A to 90% in 2 min, maintain 90% A for 1 min	ESI negative	SRM, optimal CE for each transition, gas (nitrogen) temperature at 300 °C, nebulizer pressure 40 psi, capillary voltage 3000 V,	10 times S/N ratio of the spiked IS for each available compound	not calculated

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

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

Hay (2502-HY)

Methods PFAS - Detection, LOQ, measurement uncertainty

				Chromatographic separation and detection method						**Limit of quantification**	**Measurement uncertainty**
LC	Data set	Sample	Injection volume [µl]	HPLC separation: stationary phase	HPLC separation: mobile Phase A / B (relative amounts (v/v))	Gradient	Ionization mode	MS/MS / HRMS conditions	Determination of LOQ	Estimation
55		2502-HY								
56		2502-HY								
57		2502-HY								
58		2502-HY								
59		2502-HY								
60		2502-HY								
61		2502-HY								
62		2502-HY								
63		2502-HY								
64	A	2502-HY	10	C18	Water/Methanol	Yes	Negative ESI	Triple Quad	0.03	10.00
65		2502-HY								
66	A	2502-HY	100	C18	A: 0,1% formic acid in water / B. 0,25% NH3 and 0,05% formic acid in methanol	yes	ESI negativ	- Gastemperatur: 250 °C - Gas-Flow: 11 l/min - Nebulizer: 25 psi - Sheath-Gas-Temp.: 375 °C - Sheath-Gas-Flow: 11 l/min - Capillary: 3000 V (negativ) - Nozzle Voltage: 0 V	LOQ is lowest validated level (EURL PFAS Guidance Doc)	calculated, data from QC-samples, valdiation and PTs
67		2502-HY								
68	A	2502-HY	40	luna omega polar	10mM Nh4OH/10mM NH4OH in methanol				estimated taking into account instrumental responses and blank, confirmed with fortification experiments	lab reproducibility and precision from fortification experiments
69		2502-HY								
70		2502-HY								
71		2502-HY								
72		2502-HY								
73		2502-HY								
74		2502-HY								
75		2502-HY								
76	A	2502-HY	2	Polar C18		yes	negative	Unispray Ionization	Lowest validation level	Preliminary estimation based on Validation and QC Recovery
77	A	2502-HY	2	LC Acquity BEH Shield RP18 1,7µm	100% H2O + 10mM Ammonium Acetate / Methanol:Acetonitrile 80:20 +10mM Ammonium Acetate	yes	ESI	MRM mode	The lowest concentration or mass of the analyte that has been validated with acceptable accuracy by applying the complete analytical method and identification criteria	Horwitz -Thompson
78	A	2502-HY	10	Gemini C18 chromatographic column (3 µm, 50 x 2,0 mm).	Mobile phases:20 mM ammonium acetate aqueous solution and methanol		negative electrospray ionisation mode		LOD and LOQ were estimated based on analysis of 10 blank spiked samples	MU were estimated based on precision and truenes from fortyfication experiment
79	A	2502-HY	20	Luna Omega 1.6 µm PS C18 100A LC Column (100 x 2.1 mm)	Mobile Phase A 20 mM Ammonium acetate in Water Mobile Phase B 100% Acetonitrile	intial 85%A,1.2min 85%A, 8.6min 2%A, 9.25min 2%A, 9.35min 85%A, 11.5min 85%A stop	ESI, negative mode	IonSpray Voltage (IS):-1500 V (ESI-), Curtain gas (CUR):48 psi, Temperatuur (TEM):400 °C, Gas 1 (GS1): 40 psi, Gas 2 (GS2):80 psi collision-gas (CAD): 9	Depending on the presence of a background signal in the chemical blank, the LOQ is determined in either two ways. If there is no signal in the procedural blank, the LOQ is equal to the lowest point in the calibration curve for which the S/N is higher or equal to 6. If there is a background signal in the procedural blank, the LOQ is determined as 3.3 times the highest concentration in the procedural blanks. If the procedural blank deviates from the samples, the LOQ may be determined based on real samples that comply with the quality criteria.	weighted measurement uncertainty from validation
80	A	2502-HY		reversed phase C18			multiple reaction monitoring mode (ESI neg)			
81		2502-HY								
82		2502-HY								
83	A	2502-HY	4	BEH C18 AX	5mM NH4OAc water / 5mM NH4OAc MeOH	40% B / 95% B in 4min	ESI		Estimation of spiked blank matrix	the highest MU of all validated Matrizes with the same Method as used with this method
84		2502-HY								
85		2502-HY								
86	A	2502-HY	20	Phenomenex luna omega PS, C18,1.6 um (100 x 2.1 mm)	A) ACN; B) AMMONIUM ACETATE 2mM in H2O	gradient from 0.1- 0.20 mL/min	ESI-	Capillary Voltage 0.90 kV; Desolvatation Temperature 500 °C; Desolvation gas flow: 1000 L/Hr; Cone gas flow: 20 L/hr	ON SPIKED MATRIX	considering precision and bias contribution.
87		2502-HY								
88		2502-HY								
89	A	2502-HY	5	Phenyl	A:Water/Formiat B: Methanol/Carbonat	binary	ESI	MRM mode	signal to noise ratio of 10 at spiked plant samples	standard deviation x 2 at 6 samples with 1 µg/kg
90		2502-HY								
91		2502-HY								
92		2502-HY								
93	A	2502-HY	2	Waters Acquity UPLC BEH C18	2 mM ammoniumacetate in 5% Methanol/Methanol		Negative		Lowest validationslevel where criteria were fulfilled	Not yet calculatet, new method under validation
94		2502-HY								
95		2502-HY								
96		2502-HY								
97		2502-HY								
Additional Sets										
36	B	2502-HY	5	Acquity UPLC BEH C18 1,7 µm	Mobile phase A : Water - acetate ammonium 20 mM/Methanol 96/4 v/v Mobile phase B : Methanol/ Water - acetate ammonium 20 mM 96/4 v/v	Run time : 13 minutes	ESI-	capillary: 0.90kV - Desolvation temp: 500°C - Desolvation: 1000 L/H - Cone : 150 L/H	Lowest validated level of a similar procedure using Quecher extraction.	MU of a similar procedure using Quecher extraction on food.
86	B	2502-HY	20	Phenomenex luna omega PS, C18,1.6 um (100 x 2.1 mm)	A) ACN; B) AMMONIUM ACETATE 2mM in H2O	gradient from 0.1- 0.20 mL/min	ESI-	Capillary Voltage 0.90 kV; Desolvatation Temperature 500 °C; Desolvation gas flow: 1000 L/Hr; Cone gas flow: 20 L/hr	ON SPIKED MATRIX	considering precision and bias contribution.