right solutions.
right partner.

FREE **WEBINAR**

PFAS in food & food Contact Material

Technical and Regulatory Challenges Explained

ALS Introduction

Food & Agrisciences

Who we are

A global leader in testing

ALS provides comprehensive testing solutions to clients in a wide range of industries around the world.

Countries
70+

Locations
450+

Staff worldwide
22k+

Revenue (AUD)
2.9b+

Our values

SAFE | RESILIENT | CURIOUS | COMMITTED | CARING | HONEST

Our brand promise

right solutions. right partner.

Our vision

To be the global leader in the discipline of scientific analysis in pursuit of a better world for all.

Our mission

To help our clients leverage the power of testing and data-driven insights for a safer and healthier world.

Our purpose

To help make the world a better place through science, assurance, and sustainability.

Your trusted partner for more reliable food testing

Experience the advantage of personalized, tailored solutions to ensure the safety, quality and authenticity of food, agriculture and consumer products

Who we are

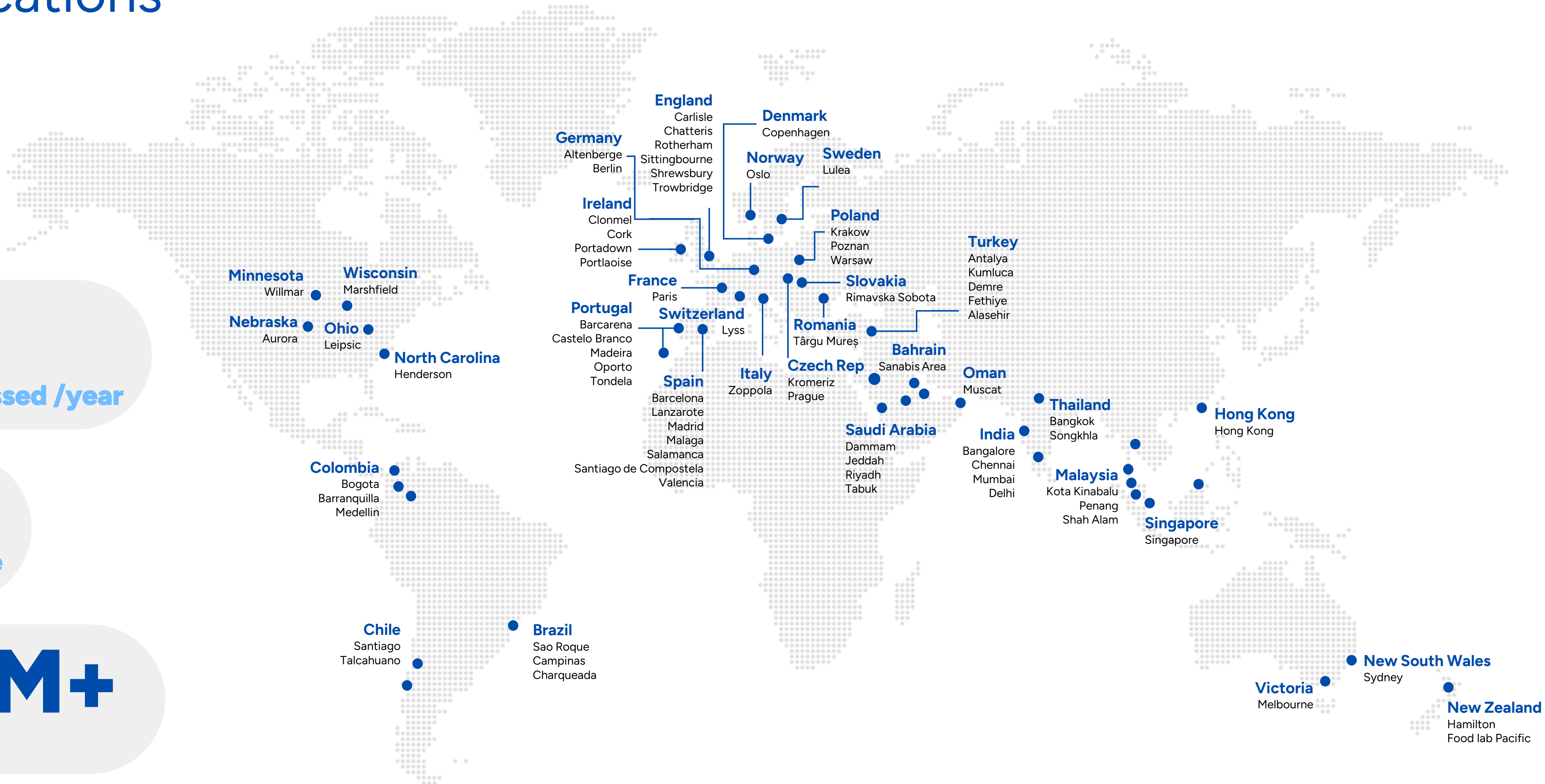
Food Locations

28+
Countries

8M+
Samples processed /year

3k+
Staff worldwide

$375M+
Global Revenue



right solutions. right partner.

Continued **growth within food**

Enhance ALS Food’s leading operating model and capabilities

- Geographic expansion in large European markets
- Expand our capabilities and speciality testing
- Broader technical services offering for clients
- Focus on end markets

Wessling Group acquisition:

Established a significant presence in Europe's largest TIC markets, complementing our existing reach in Europe.

With 26 locations across Germany, France, Switzerland and Romania, Wessling brings both geographical expansion and enhanced range of services for our clients including:

- Extended range of contaminants (2-and 3-MCPD-esters & glycylesters, glyphosate & AMPA, MOSH/MOAH, pesticides in complex matrices, herbs, spices and oils, emerging mycotoxins, Alternaria toxins, etc.)
- Wide range of preservatives in cosmetics
- Consumer product and food contact materials testing, including sensory and emission chamber tests
- Biodegradability & composability studies

Key analytical **offerings**

Testing services

- Microbiological
- Nutritional
- Contaminants
- Pesticides & agrochimicals
- Allergens
- Vitamins
- Minerals
- Additives
- Food authenticity
- Food packaging & Non-food
- Specialist chemestry

Specialist chemistry services

We are able to offer a number of highly specialist techniques, including

- PFAS/PFOS/PFOA
- MOSH/MOAH/POSH
- 2-and 3-MCPD & glycidyl esters
- Packaging migration studies
- Packaging migration studies
- Light stable isotopes
- Heavy and metallic isotopes
- Radionuclides
- Dioxins and Dioxin like PCB's
- Rapid screening using NIR and NMR against custom databases
- NGS and other DNA based testing


The science behind food safety
and the people who make it global

PFAS definition

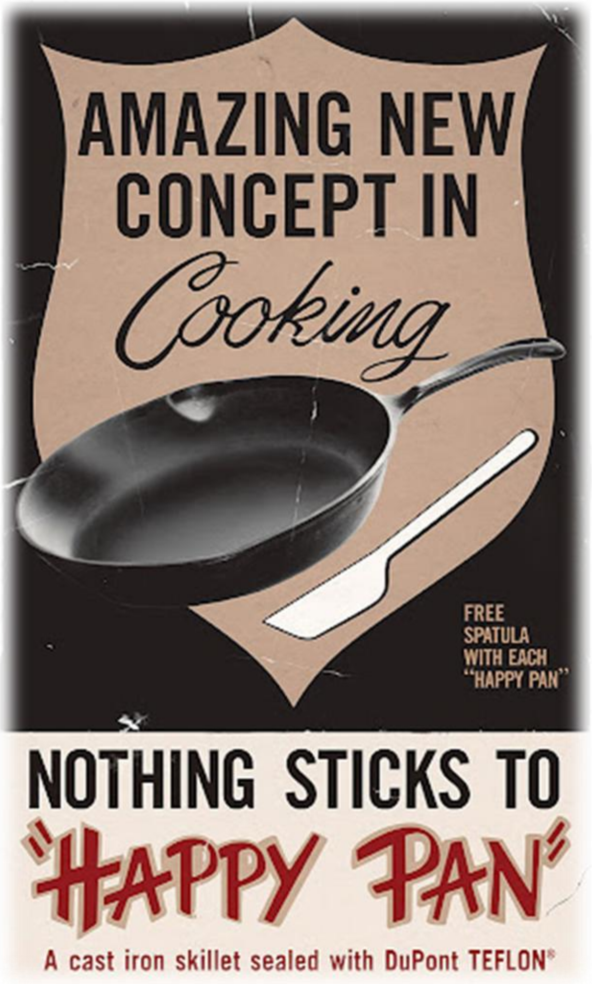
Enhance ALS Food's leading operating model and capabilities

Per- and polyfluoroalkyl substances are a group of synthetic organofluorine chemical compounds that have multiple fluorine atoms attached to an alkyl chain;

→ **There are 7 million such chemicals according to PubChem**.

PFAS came into use after the invention of Teflon in 1938 to make fluoropolymer coatings and products that resist heat, oil, stains, grease, and water.

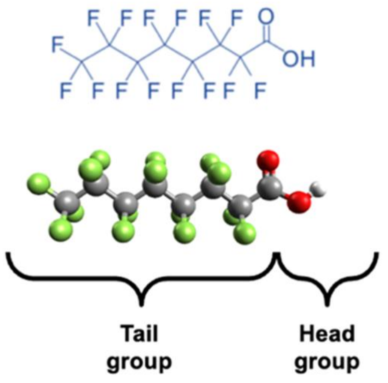
Many PFAS such as PFOS and PFOA pose health and environmental concerns because they are persistent organic pollutants; they were branded as "forever chemicals"



PFAS definition

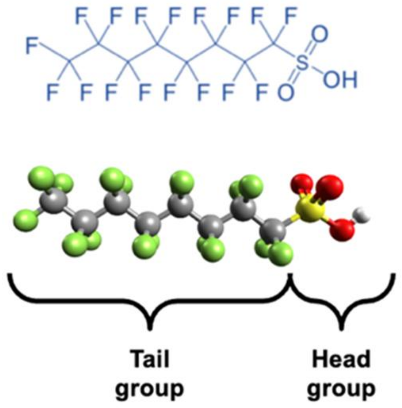
- **PFASs**
  - **Non-polymers**
    - **Perfluoroalkyl acids (PFAAs)** CnF2n+1R
      - Perfluoroalkyl carboxylic acids (PFCAs)
      - Perfluoroalkane sulfonic acids (PFSAs)
      - Perfluoroalkyl phosphonic acids (PFPAs)
      - Perfluoroalkyl phosphinic acids (PFPIAs)
    - **Perfluoroalkane sulfonyl fluoride (PASF)** CnF2n+1SO2F
      - **PASF-based derivates** CnF2n+1SO2-R, R = NH, NHCH2CH2OH, etc.
    - **Perfluoroalkyl iodides (PFAIs)** CnF2n+1I
      - **Fluorotelomer iodoes (FTIs)** CnF2n+1CH2CH2I
        - **FT-based derivatives** CnF2n+1CH2CH2-R, R = NH, NHCH2CH2OH, etc.
    - **Per- and polyfluoroalkyl ethers (PFPEs) - based derivates -** Polyfluoroalkyl ether carboxylic acids
  - **Polymers**
    - **Fluoropolymers**
      - Polytetrafluoroethylene (PTFE), Polyvinylidene Fluoride (PVDF), Fluorinated ethylene propylene (FEP), Perfluoroalkoxyl polymer (PFA), etc
    - **Side-chain fluorinated polymers**
      - Flurinated (meth)acrylate polymers, Fluorinate urethane polymers, Fluorinated oxetane polymers
    - **Perfluoropolyethers**

PFOA



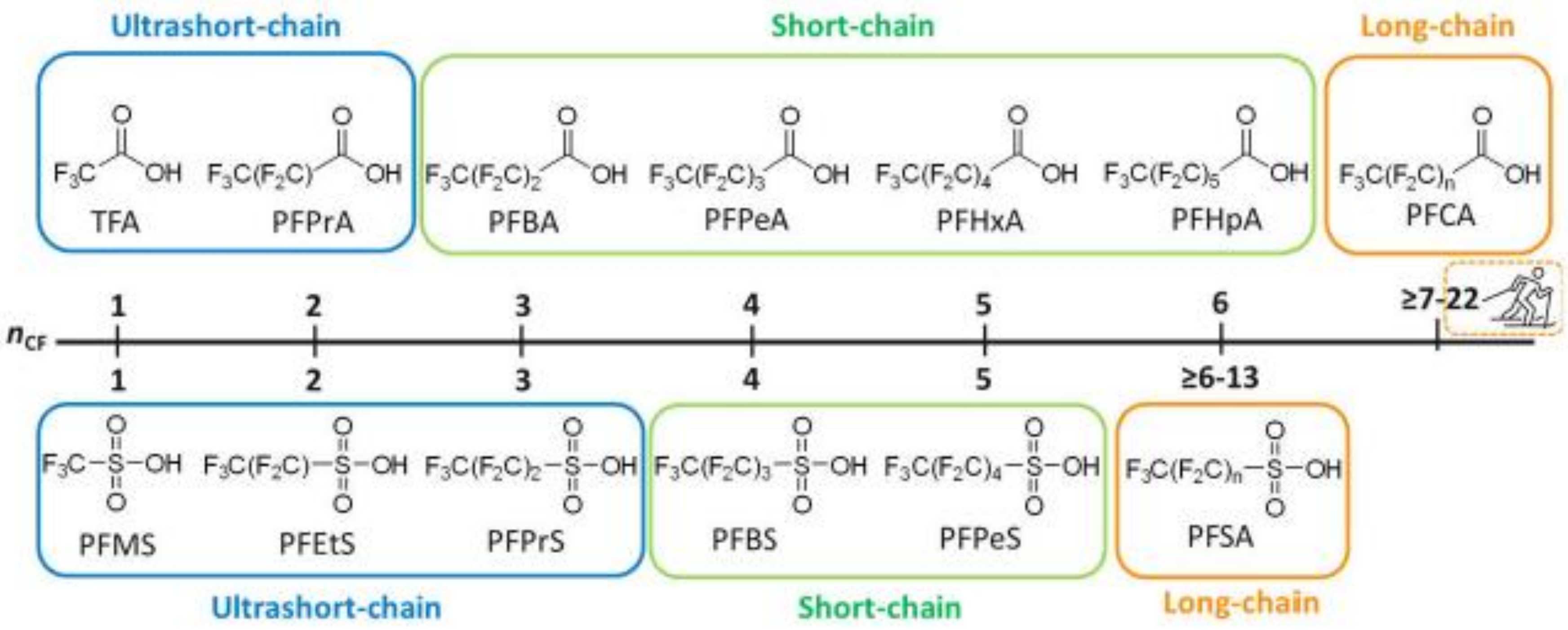
Carboxylate head

PFOS



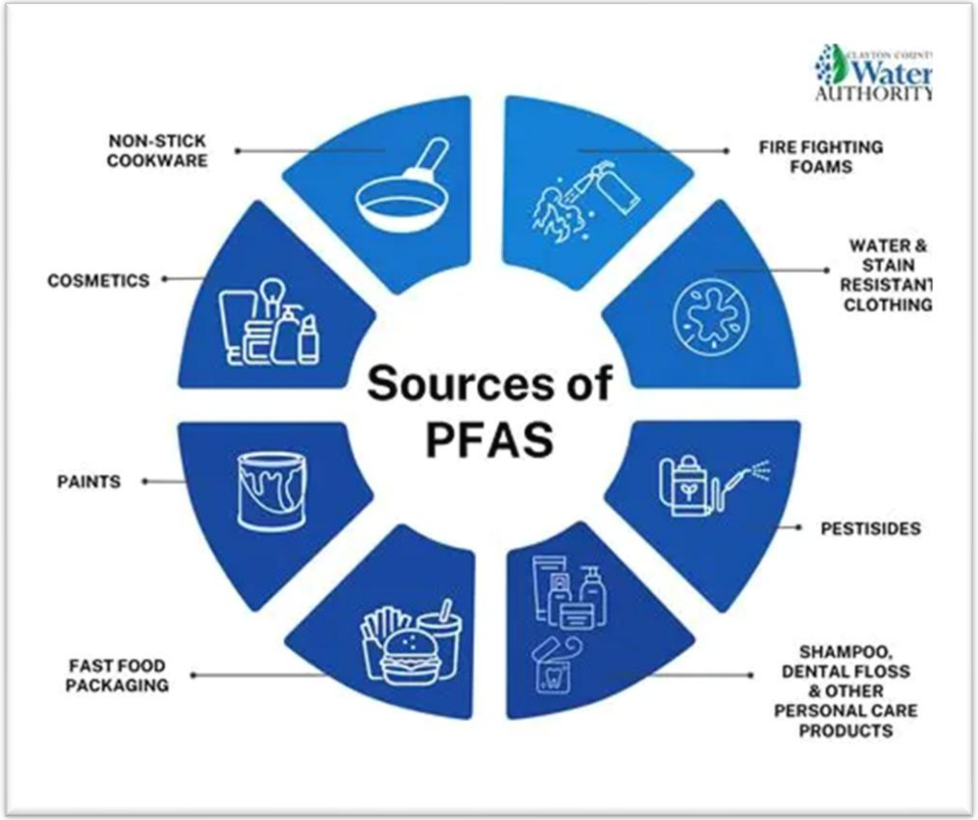
Sulfonic head

PFAS definition



PFAS Where they are?

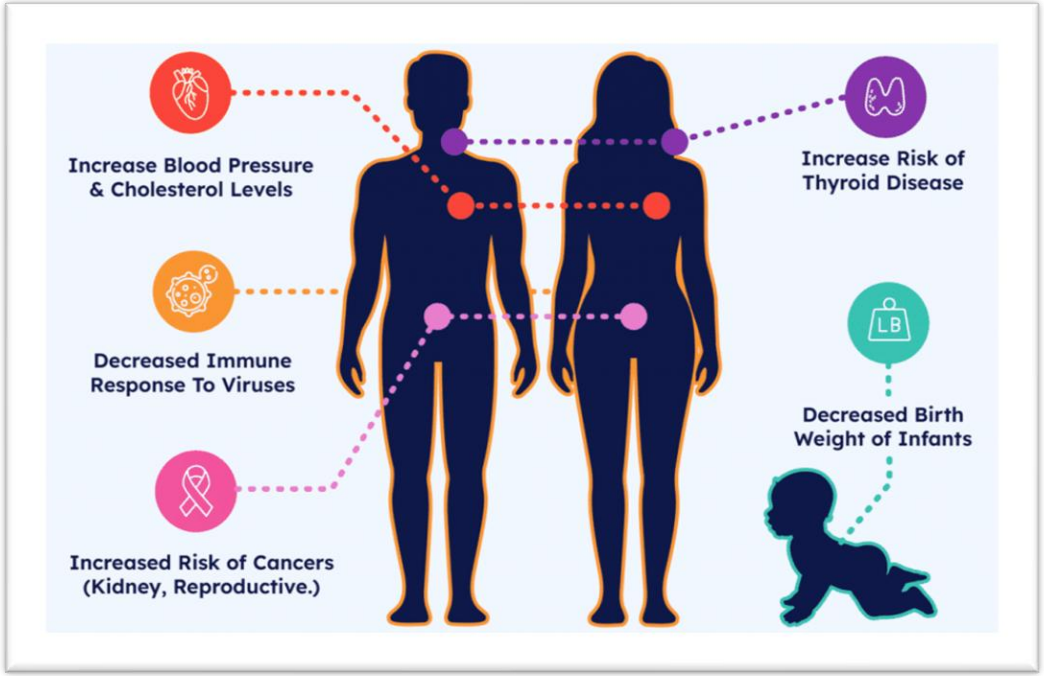
- Household products
- Medical articles for medical implants/prostheses
- Metal plating
- Oil processing and mining production;
- The production of oil- and water-repellent papers and packaging
- The automotive sector
- The aerospace and defense sector
- In construction
- The electronics sector
- The energy sector
- Fire protection products



PFAS presence and effects on the human health

Over time, they have penetrated **groundwater** and even accumulated in **plants**.

The risk of entering the **food chain**, therefore, exists and is increasing, being absorbed into the bloodstream with consequences impacting on human health



PFAS Food Legislation

Globally, PFAS legislation varies widely, with significant activity in

- → Europe
- → North America
- → Asia-Pacific region

Stockholm Convention, which aims to eliminate or restrict the use of persistent organic pollutants, including certain PFAS

PFAS European Commission Recommendation (EU) 2022/1431

EUROPEAN MONITORING PFAS ON FOODS

In accordance with Commission Recommendation (UE) 2022/1431 of 24/08/2022 on the **monitoring of perfluoroalkyl substances in food**, EU Member States, in collaboration with food business operators, should monitor during the years 2022, 2023, 2024 and 2025 the presence of PFAS in food and collect more comprehensive data for monitoring perfluoroalkyl substances in food.

PFAS European Regulations

Member States should test for the presence in food of the following PFASs

a. Perfluorooctane sulfonic acid (PFOS);
b. Perfluorooctanoic acid (PFOA);
c. Perfluorononanoic acid (PFNA);
d. Perfluorohexane sulfonic acid (PFHxS).

Member States should, if possible, test also for the presence of:

b. Perfluoropentanoic acid (PFPeA);
c. Perfluorohexanoic acid (PFHxA);
d. Perfluoroheptanoic acid (PFHpA);
e. Perfluorodecanoic acid (PFDA);
f. Perfluoroundecanoic acid (PFUnDA);
g. Perfluorododecanoic acid (PFDoDA);
h. Perfluorotridecanoic acid (PFTrDA);
i. Perfluorotetradecanoic acid (PFTeDA);
j. Perfluorobutane sulfonic acid (PFBS);
k. Perfluoropentanesulfonic acid (PFPS);
l. Perfluoroheptane sulfonic acid (PFHpS);
m. Perfluorononane sulfonic acid (PFNS);
n. Perfluorodecane sulfonic acid (PFDS);
o. Perfluorododecane sulfonic acid (PFDoDS);
p. Perfluoroundecane sulfonic acid (PFUnDS);
q. Perfluorotridecane sulfonic acid (PFTrDS);
r. Perfluorooctane sulphonamide (FOSA)
s. Perfluorobutanoic acid (PFBA);

PFAS European Regulations

Member States should also consider testing for the presence in food of emerging PFASs, such as:

a. *2-[(6-chlor-1,1,2,2,3,3,4,4,5,5,6,6-dodecafluorhexyl)oxy]-1,1,2,2-tetrafluorethansulfonic acid (the acid form of F53B);*
b. *2,3,3,3-tetrafluor-2-(heptafluorpropoxy)-propanoic acid (the acid form of GenX);*
c. *(2,2,3-Trifluor-3-[1,1,2,2,3,3-hexafluor-3-(trifluormethoxy)propoxy]-propionic acid (the acid form of ADONA);*
d. *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);*
e. *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);*
f. *Fluorotelomer alcohols and sulfonates.*

The limits of quantification of the analytical methods should be below or at:

a. 0,002 µg/kg for PFOS, 0,001 µg/kg for PFOA, 0,001 µg/kg for PFNA and 0,004 µg/kg for PFHxS in fruits, vegetables, starchy roots and tubers and food for infants and young children;
b. 0,010 µg/kg for PFOS, 0,010 µg/kg for PFOA, 0,020 µg/kg for PFNA and 0,040 µg/kg for PFHxS in milk;
c. 0,10 µg/kg for PFOS, PFOA, PFNA and PFHxS in fish meat and meat of terrestrial animals;
d. 0,30 µg/kg for PFOS, PFOA, PFNA and PFHxS in eggs, crustaceans and molluscs;
e. 0,50 µg/kg for PFOS, PFOA, PFNA and PFHxS in edible offal of terrestrial animals and in fish oil.

PFAS European Regulations

Data collection: Member states are encouraged to collect data on PFAS levels in a wide range of foods to assess human exposure.

Analytical methods: The recommendation emphasizes the use of sensitive analytical methods to detect low concentrations of PFAS.

Risk assessment: The data collected will support risk assessments and help refine regulatory measures to protect public health.

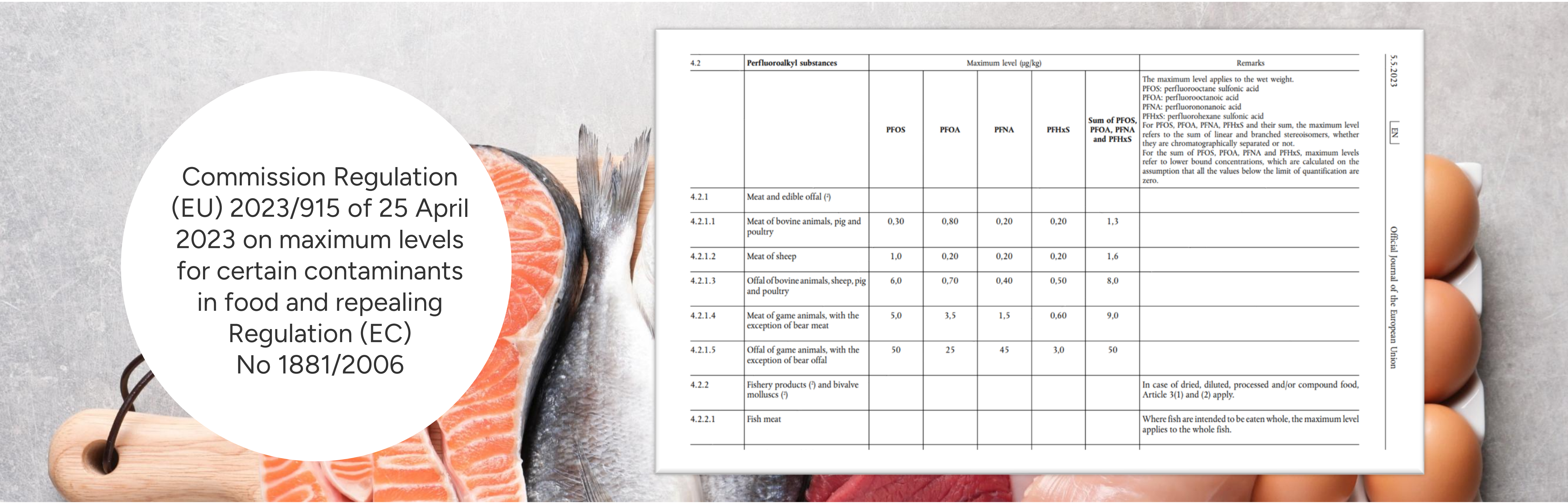
PFAS European Regulations

EUROPEAN MAXIMUN LEVELS

Commission Regulation (EU) 2022/2388 of 7 December 2022 amending Regulation (EC) No 1881/2006 as regards maximum levels of perfluoroalkyl substances in certain foodstuffs was passed.

In May 2023, the maximum levels were transferred to the new Contaminants Regulation (EU) 2023/915

Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food and repealing Regulation (EC) No 1881/2006



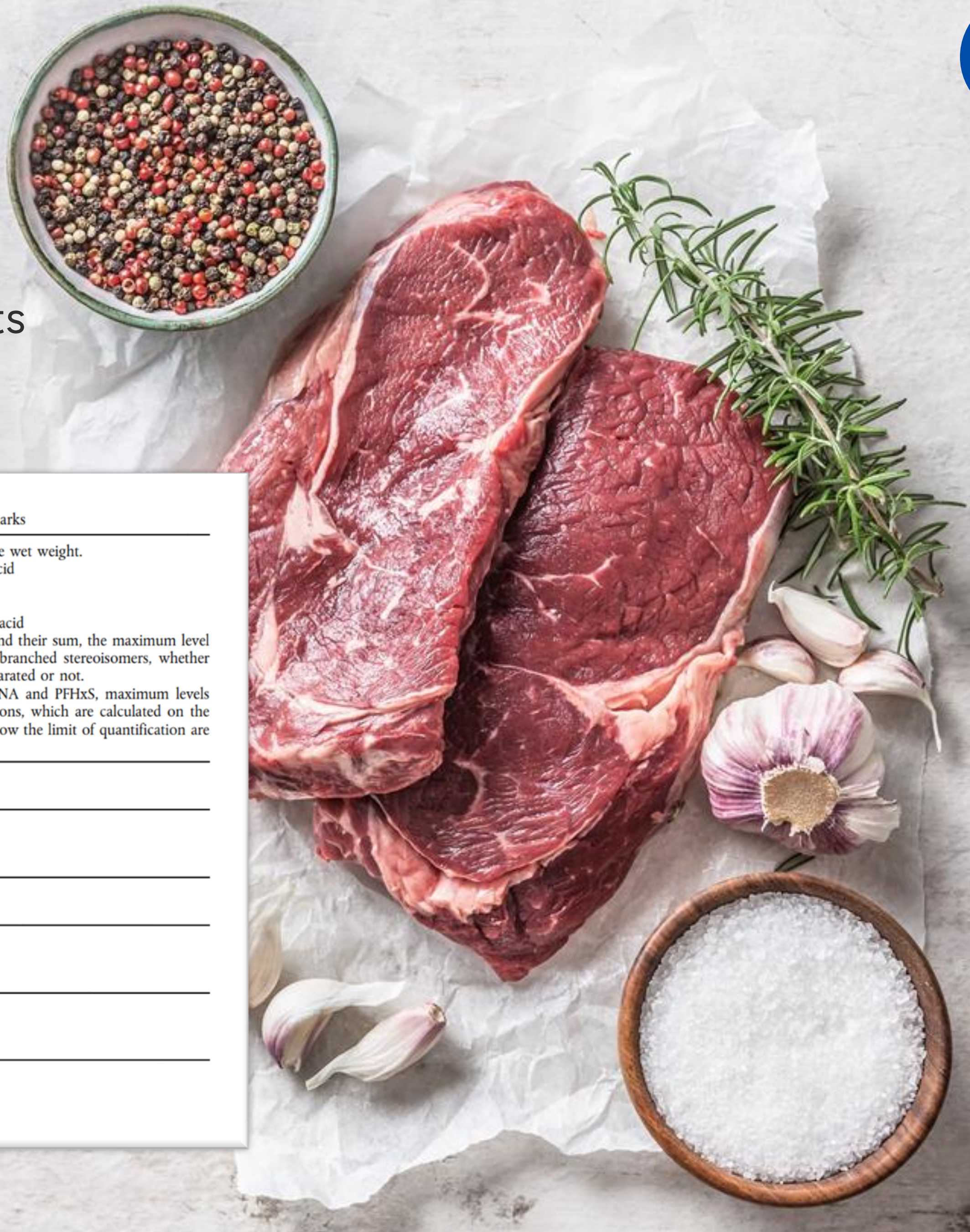
4.2	Perfluoroalkyl substances	Maximum level (μg/kg)					Remarks
		PFOS	PFOA	PFNA	PFHxS	Sum of PFOS, PFOA, PFNA and PFHxS	The maximum level applies to the wet weight. PFOS: perfluorooctane sulfonic acid PFOA: perfluorooctanoic acid PFNA: perfluorononanoic acid PFHxS: perfluorohexane sulfonic acid For PFOS, PFOA, PFNA, PFHxS and their sum, the maximum level refers to the sum of linear and branched stereoisomers, whether they are chromatographically separated or not. For the sum of PFOS, PFOA, PFNA and PFHxS, maximum levels refer to lower bound concentrations, which are calculated on the assumption that all the values below the limit of quantification are zero.
4.2.1	Meat and edible offal (²)						
4.2.1.1	Meat of bovine animals, pig and poultry	0,30	0,80	0,20	0,20	1,3	
4.2.1.2	Meat of sheep	1,0	0,20	0,20	0,20	1,6	
4.2.1.3	Offal of bovine animals, sheep, pig and poultry	6,0	0,70	0,40	0,50	8,0	
4.2.1.4	Meat of game animals, with the exception of bear meat	5,0	3,5	1,5	0,60	9,0	
4.2.1.5	Offal of game animals, with the exception of bear offal	50	25	45	3,0	50	
4.2.2	Fishery products (³) and bivalve molluscs (³)						In case of dried, diluted, processed and/or compound food, Article 3(1) and (2) apply.
4.2.2.1	Fish meat						Where fish are intended to be eaten whole, the maximum level applies to the whole fish.

PFAS European Regulations

EUROPEAN MAXIMUN LEVELS

Contaminants Regulation (EU) 2023/915 introduced Limits for **PFOS PFOA PFNA PFHxS** in **Meat and edible offal**

4.2	Perfluoroalkyl substances	Maximum level (μg/kg)					Remarks
		PFOS	PFOA	PFNA	PFHxS	Sum of PFOS, PFOA, PFNA and PFHxS	The maximum level applies to the wet weight. PFOS: perfluorooctane sulfonic acid PFOA: perfluorooctanoic acid PFNA: perfluorononanoic acid PFHxS: perfluorohexane sulfonic acid For PFOS, PFOA, PFNA, PFHxS and their sum, the maximum level refers to the sum of linear and branched stereoisomers, whether they are chromatographically separated or not. For the sum of PFOS, PFOA, PFNA and PFHxS, maximum levels refer to lower bound concentrations, which are calculated on the assumption that all the values below the limit of quantification are zero.
4.2.1	Meat and edible offal (²)						
4.2.1.1	Meat of bovine animals, pig and poultry	0,30	0,80	0,20	0,20	1,3	
4.2.1.2	Meat of sheep	1,0	0,20	0,20	0,20	1,6	
4.2.1.3	Offal of bovine animals, sheep, pig and poultry	6,0	0,70	0,40	0,50	8,0	
4.2.1.4	Meat of game animals, with the exception of bear meat	5,0	3,5	1,5	0,60	9,0	
4.2.1.5	Offal of game animals, with the exception of bear offal	50	25	45	3,0	50	



PFAS European Regulations

In **Fishery products and bivalve molluscs**

4.2	**Perfluoroalkyl substances**	Maximum level (μg/kg)					Remarks
		PFOS	**PFOA**	**PFNA**	**PFHxS**	**Sum of PFOS, PFOA, PFNA and PFHxS**	The maximum level applies to the wet weight. PFOS: perfluorooctane sulfonic acid PFOA: perfluorooctanoic acid PFNA: perfluorononanoic acid PFHxS: perfluorohexane sulfonic acid For PFOS, PFOA, PFNA, PFHxS and their sum, the maximum level refers to the sum of linear and branched stereoisomers, whether they are chromatographically separated or not. For the sum of PFOS, PFOA, PFNA and PFHxS, maximum levels refer to lower bound concentrations, which are calculated on the assumption that all the values below the limit of quantification are zero.
4.2.2	Fishery products (²) and bivalve molluscs (²)						In case of dried, diluted, processed and/or compound food Article 3(1) and (2) apply.
4.2.2.1	Fish meat						Where fish are intended to be eaten whole, the maximum leve applies to the whole fish.
4.2.2.1.1	Muscle meat of fish, except products listed in 4.2.2.1.2 and 4.2.2.1.3 Muscle meat of fish listed in 4.2.2.1.2 and 4.2.2.1.3, in case it is intended for the production of food for infants and young children	2,0	0,20	0,50	0,20	2,0	

PFAS European Regulations

In **Eggs**

4.2	**Perfluoroalkyl substances**	Maximum level (μg/kg)					Remarks
		PFOS	**PFOA**	**PFNA**	**PFHxS**	**Sum of PFOS, PFOA, PFNA and PFHxS**	The maximum level applies to the wet weight. PFOS: perfluorooctane sulfonic acid PFOA: perfluorooctanoic acid PFNA: perfluorononanoic acid PFHxS: perfluorohexane sulfonic acid For PFOS, PFOA, PFNA, PFHxS and their sum, the maximum level refers to the sum of linear and branched stereoisomers, whether they are chromatographically separated or not. For the sum of PFOS, PFOA, PFNA and PFHxS, maximum levels refer to lower bound concentrations, which are calculated on the assumption that all the values below the limit of quantification are
.2.3	Eggs	1,0	0,30	0,70	0,30	1,7	

PFAS European Regulations

Maximum levels: The regulation sets maximum levels for PFAS that are as low as reasonably achievable to minimize health risks.

Vulnerable populations: Special attention is given to infants and young children, with stricter maximum levels for food intended for these groups.

Market restrictions: Food containing contaminants exceeding the maximum levels cannot be placed on the market or used as food ingredients.

PFAS United States Regulations

- Absence of federal regulations

- Maine state has taken steps to regulate PFAS in food at the state level.
- **PFOS action levels**
  - 3.4 parts per billion (ppb) for beef
  - 210 parts per trillion (ppt) for milk prohibits the use of PFAS in food packaging materials

- 12 other states have enacted regulations targeting PFAS in food packaging, such as fast-food wrappers, microwave popcorn bags, and pizza boxes.

- Currently, there are several additional proposed bills pending in various states aiming to regulate PFAS in food packaging.

U.S. FOOD & DRUG Administration

When the FDA **finds a detectable level of a chemical contaminant in food**, such as PFAS, the agency conducts an **assessment** to evaluate whether the level detected presents a possible **human health concern** and warrants further FDA action.

The FDA's approach considers a number of factors, including whether

- There is an established action level or tolerance
- How much of the specific food people typically eat,
- The level of the contaminant detected in that food
- The toxicity of the specific contaminant(s).

There are currently eight PFAS (PFOA, PFOS, PFNA, PFHxS, HFPO-DA [GenX], PFBS, PFBA, and PFHxA) from environmental contamination for which there are **toxicological reference values** that are used to assess the potential human health concern for levels found in food

PFAS United States Regulations

U.S. FOOD & DRUG Administration

[FDA Announcements on PFAS and Other U.S. Government Information | FDA]

https://www.fda.gov/food/process-contaminants-food/fda-announcements-pfas-and-other-us-government-information

FDA Announcements

2025

- Constituent Update: FDA Releases Additional PFAS Results (December 19, 2025)
- Constituent Update: FDA Shares Testing Results for PFAS in Bottled Water (March 11, 2025)
- Constituent Update: FDA Adds Firms to Import Alert Due to PFAS in Clams (February 18, 2025)
- Constituent Update: FDA Determines Authorization for 35 Food Contact Notifications Related to PFAS Are No Longer Effective (January 3, 2025)

2024

- Constituent Update: FDA Shares Testing Results for PFAS in Clams (December 18, 2024)
- Constituent Update: The FDA Issues Request for Information on PFAS in Seafood (November 19, 2024)
- Constituent Update: April 2024 Update on PFAS (April 18, 2024)
- Constituent Update: FDA Issues Import Alert for Food Products with Chemical Contaminants Including PFAS (March 20, 2024)
- Constituent Update: FDA Announces PFAS Used in Grease-Proofing Agents for Food Packaging No Longer Being Sold in the U.S. (February 28, 2024)
- FDA Press Release: FDA, Industry Actions End Sales of PFAS Used in U.S. Food Packaging (February 28, 2024)

2023

- CFSAN Constituent: FDA Update on PFAS Activities (May 31, 2023)

2022

- Constituent Update: FDA Issues RFI on Fluorinated Polyethylene Food Contact Containers (July 19, 2022)
- Constituent Update: FDA Shares Results on PFAS Testing in Seafood (July 6, 2022)
- Constituent Update: Update on FDA's Continuing Efforts to Understand and Reduce Exposure to PFAS from Foods (February 24, 2022)

PFAS Chinese Regulations

China's competent authorities **restrict or prohibit** the *production* and *use* of PFOS, PFOA and, in some cases, PFHxS

EXEMPTIONS

- → Photo imaging
- → Semiconductor manufacturing
- → Aviation hydraulic fluids
- → Certain firefighting foams

GB 5009.253-2016

Standardized analytical method for determining PFOS and PFOA in animal-derived foods

- → Supports official monitoring
- → Enforcement activities, and risk management

PFAS Food Contact Materials

Food Contact Materials - reduce or eliminate the use of PFAS

- In the **European Union**, certain PFAS are subject to restrictions under REACH. In addition, PFOA, its salts and PFOA-related compounds have been banned in the EU since 4 July 2020 under the POPs Regulation. In early 2023, 5 national authorities submitted a proposal to ECHA to restrict PFAS as a group under REACH;
- ***United States***, the FDA has established voluntary phase-out agreements with industries to stop using certain types of PFAS in FCMs. In addition, some states, such as Maine and Washington, have passed laws that restrict or ban the use of PFAS in food packaging materials.
- ***Canada***, the government has proposed a phased approach to restrict PFAS, which may include future restrictions on certain food packaging materials.
- **Japan** regulates food-contact utensils, containers and packaging through a positive-list system for substances used in synthetic resins (fully enforced from June 2025). This framework can restrict the use of PFAS in food-contact materials when they are not permitted under the applicable standards/positive list.

PFAS Food Contact Materials

PFAS contained in food contact materials are not regulated by **specific migration limits**.

The only reference in force is Framework Regulation 1935/2004, Art. 3, for which migrating substances must not be harmful to human health; it is therefore important to monitor PFAS in food packaging.

PFAS Food Contact Materials

CHAPTER II

SUSTAINABILITY REQUIREMENTS

Article 5

Requirements for substances in packaging

Regulation (EU) 2025/40

of the European Parliament and of the Council of 19 December 2024 on packaging and packaging waste, amending Regulation (EU) 2019/1020 and Directive (EU) 2019/904, and repealing Directive 94/62/EC

5. From 12 August 2026, food-contact packaging shall not be placed on the market if it contains per- and polyfluorinated alkyl substances (PFAS) in a concentration equal to or above the following limit values to the extent that the placing on the market of packaging containing such a concentration of PFAS is not prohibited pursuant to another Union legal act:

a. 25 ppb for any PFAS as measured with targeted PFAS analysis (polymeric PFAS excluded from quantification);

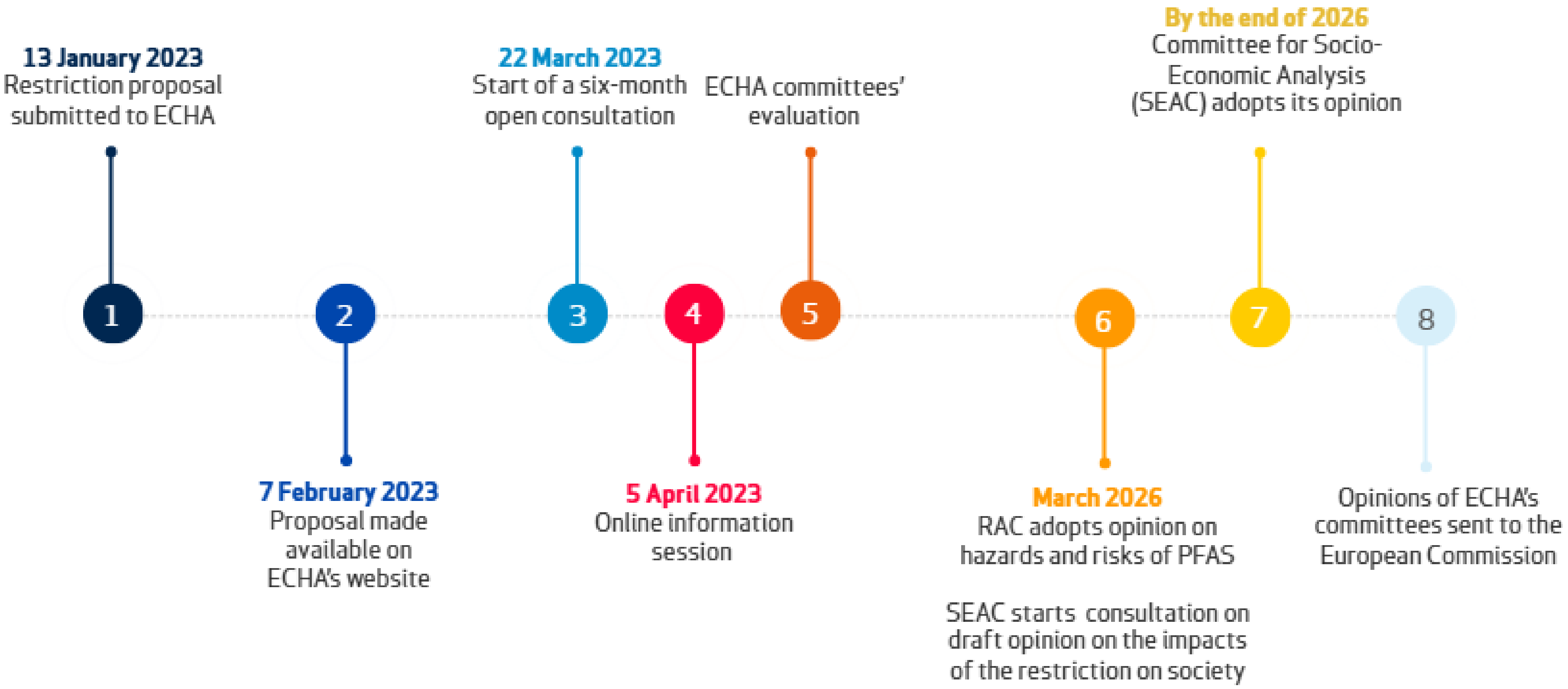
b. 250 ppb for the sum of PFAS measured as the sum of targeted PFAS analysis, where applicable with prior degradation of precursors (polymeric PFAS excluded from quantification); and

c. 50 ppm for PFASs (including polymeric PFAS); if total fluorine exceeds 50 mg/kg the manufacturer, importer or downstream user as defined respectively in Article 3, points (9), (11) and (13) of Regulation (EC) No 1907/2006 shall, upon request, provide to the manufacturer or the importer as defined respectively in Article 3(1), points (13) and (17), of this Regulation proof of the quantity of fluorine measured as content of either PFAS or non-PFAS in order for them to draw up the technical documentation as referred to in Annex VII to this Regulation.

'PFAS' means any substance that contains at least one fully fluorinated methyl (CF_3–) or methylene (–CF_2–) carbon atom (without any H/Cl/Br/I attached to it), except substances that only contain the following structural elements: CF_3–X or X–CF_2–X′, where X = –OR or –NRR′ and X′ = methyl (–CH_3), methylene (–CH_2–), an aromatic group, a carbonyl group (–C(O)–), –OR″, –SR″ or –NR″R‴; and where R/R′/R″/R‴ is a hydrogen (–H), methyl (–CH_3), methylene (–CH_2–), an aromatic group or a carbonyl group (–C(O)–).

PFAS Food Contact Materials

- On 13 January 2023 the ECHA received a restriction proposal under the REACH Regulation (EC) No 1907/2006 from five national authorities (Denmark, Germany, the Netherlands, Norway and Sweden).
- The group of PFAS proposed to be restricted includes more than 10,000 substances
- A record number of over 5,600 comments were submitted during ECHA's 6-month public consultation of stakeholders



PFAS Food Contact Materials

By 12 August 2030

the Commission shall carry out an assessment to determine whether

TO AMEND OR TO REPEAL

article 5 of Regulation (EU) 2025/40

in order to avoid overlaps with restrictions or bans relating to the use of PFAS laid down pursuant to:

Regulation (EC) No 1935/2004
REACH Regulation (EC) No 1907/2006
Regulation (EU) 2019/1021

PFAS Food Contact Materials

U.S. FOOD & DRUG Administration

In February 2024, the **FDA announced** that substances containing PFAS used as grease-proofing agents on paper and paperboard for food contact use

ARE NO LONGER BEING SOLD by manufacturers into the U.S. market..

FDA Announcements

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2022

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- Constituent Update: FDA Shares Results on PFAS Testing in Seafood (July 6, 2022)

Technical challenges in **PFAS** detection

Why PFAS are difficult to analyze

Ultra-trace levels
(very low reporting limits)

- → Low limits of detection/ quantification with tight precision.
- → Small variations in extraction efficiency, instrument sensitivity, or calibration can create large relative errors.
- → Risk of MS source contamination, mobile phase impurities, or matrix load

Complex matrices
(foods, packaging)

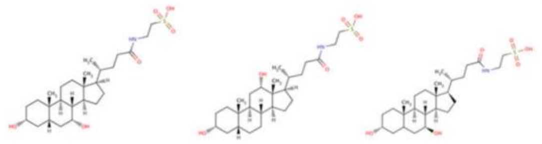
→ **Fats, proteins, salts, pigments, surfactants, and other coextractables that:**

- Cause ion suppression/enhancement in electrospray MS,
- Reduce extraction recovery,
- Increase variability between samples,
- Contaminate the LC-MS system, leading to carryover or sensitivity loss.

→ **PFAS may be present:**

- Bound to proteins (e.g., in some biological matrices),
- Associated with lipids or emulsions,
- Distributed heterogeneously, making subsampling and homogenization critical.

→ “One-size-fits-all” preparation rarely works: different matrices often require different cleanup strategies



Taurochenodesoxycholic acid (TCDCA) 516-35-8 | Taurodesoxycholic acid (TDCA) 516-50-7 | Tauroursodeoxycholic acid (TUDCA) 14605-22-2

PFOS(-)	CE (35)	499.1>79.9
TCDA	CE (35)	499.2>79.9

Technical challenges in **PFAS** detection

Why PFAS are difficult to analyze

Back-ground contamination
(very low reporting limits)

- **PFAS contamination can arise from:**
  - Sampling materials
  - Laboratory consumables
  - Solvents and reagents
  - Instrument and LC flow path
  - Airborne dust and surfaces
- **PFAS contamination control:**
  - Field blanks
  - Trip blanks
  - Method blanks, equipment rinsates
  - Dedicated PFAS-clean workflows and lab areas.

Chemical diversity
(many analytes, different behaviors)

- **PFAS include thousands of compounds with varying.**
  - Chain length
  - Functional groups
  - Properties.
- Target methods cover only a subset; unknowns and precursors may not be captured unless using sum parameters (e.g., TOF/HRMS screening, TOP assay).
- Short-chain PFAS can be harder to retain chromatographically; long-chain PFAS can adsorb to surfaces, both complicate quantitation

Method performance depends heavily on QA/QC

- **PFAS methods typically require:**
- Isotopically labeled internal standards
- Matrix-matched calibration or standard addition
- Strict acceptance criteria for blanks, recoveries, duplicates, and ongoing calibration checks
- Careful management of carryover and memory effects.

PFAS Sampling materials

As molecules with a ubiquitous nature, the analysis of PFAS is highly exposed to contamination risks and requires extreme sensitivity of detection, therefore **must be taken precautions during**

SAMPLING **PACKAGING** **TRANSPORT** **STORAGE** **IN THE LABORATORY**

in order to avoid affecting the content, analytical determination or making the sample unrepresentative.

Commission Implementing Regulation (EU) 2022/1428 laying down methods of sampling and analysis for the control of perfluoroalkyl substances in certain foodstuffs, **provides guidelines for sampling and suggest the type of packaging to use during sampling and transport of samples**

PFAS methods of analysis

Compliant with
REGULATION (EU) 2022/1428
that define specific performance requirements for methods of analysis of **PFOS PFOA PFNA PFHxS**

B.3. **Methods of analysis: specific performance requirements**

Laboratories may select any validated method of analysis for the respective matrix provided that the selected method meets the specific performance criteria set out in Table 5.

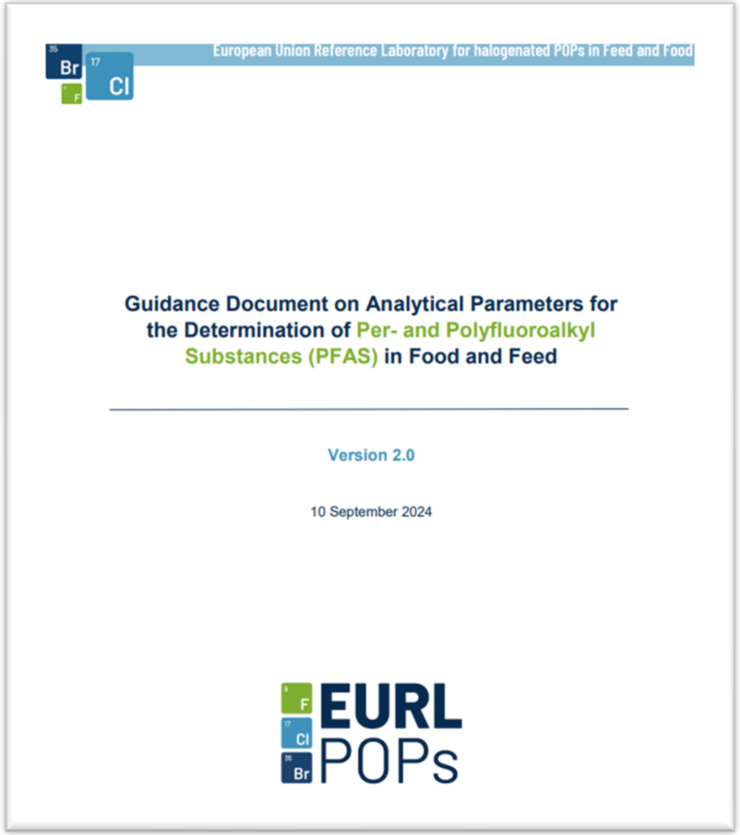
Fully validated methods (i.e. methods validated by a collaborative trial for the respective matrix) shall be used or, where this is not possible, other validated methods (e.g. in-house validated methods for the respective matrix), provided that they fulfil the performance criteria set out in Table 5.

Where possible, the validation of in-house validated methods shall include the use of a certified reference material and/or participation in inter-laboratory studies.

Table 5

Parameter	Criterion
Applicability	Foods specified in Regulation (EC) No 1881/2006
Selectivity	Analytical methods shall demonstrate the ability to reliably and consistently separate the analytes of interest from other co-extracted and possibly interfering compounds that may be present.
Within-laboratory reproducibility (intermediate precision)(RSD_R)	≤ 20 %
Trueness	-20 % to +20 %
LOQ	The LOQ for PFOS, PFOA, PFNA and PFHxS each ≤ the maximum level for the respective individual PFAS. Compliance with this requirement entails that no LOQ shall be derived for the concentration of the sum of PFOS, PFOA, PFNA and PFHxS, which is calculated by summing up only the concentrations of PFOS, PFOA, PFNA and PFHxS, which were quantified at or above their respective LOQ.

PFAS methods of analysis



European Union Reference Laboratory for halogenated POPs in Feed and Food

Guidance Document on Analytical Parameters for the Determination of Per- and Polyfluoroalkyl Substances (PFAS) in Food and Feed

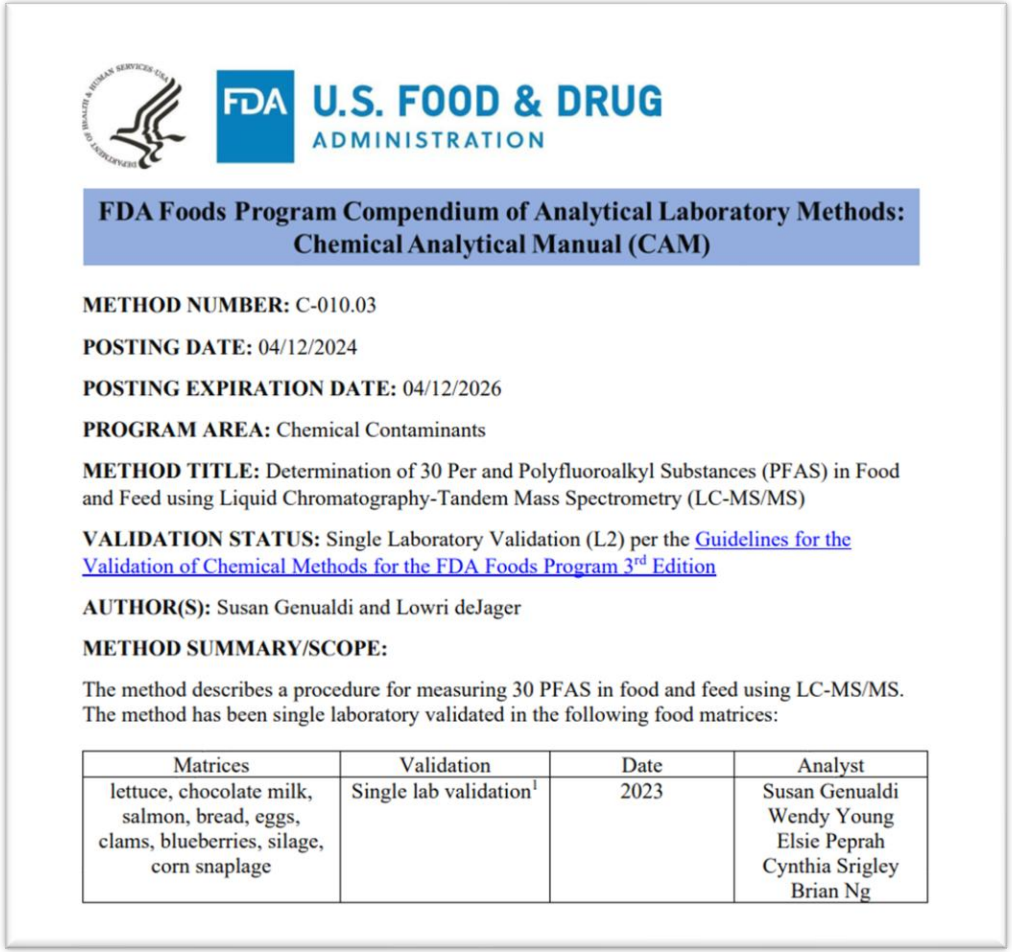
Version 2.0

10 September 2024

EURL POPs

EURL POPS: GUIDANCE DOCUMENT ON PFAS ANALYSIS IN FOOD AND FEED

Details instructions for laboratories on the analytical parameters and methodologies for detecting PFAS in food and feed.



U.S. FOOD & DRUG ADMINISTRATION

FDA Foods Program Compendium of Analytical Laboratory Methods: Chemical Analytical Manual (CAM)

METHOD NUMBER: C-010.03

POSTING DATE: 04/12/2024

POSTING EXPIRATION DATE: 04/12/2026

PROGRAM AREA: Chemical Contaminants

METHOD TITLE: Determination of 30 Per and Polyfluoroalkyl Substances (PFAS) in Food and Feed using Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

VALIDATION STATUS: Single Laboratory Validation (L2) per the Guidelines for the Validation of Chemical Methods for the FDA Foods Program 3rd Edition

AUTHOR(S): Susan Genualdi and Lowri deJager

METHOD SUMMARY/SCOPE:

The method describes a procedure for measuring 30 PFAS in food and feed using LC-MS/MS. The method has been single laboratory validated in the following food matrices:

Matrices	Validation	Date	Analyst
lettuce, chocolate milk, salmon, bread, eggs, clams, blueberries, silage, corn snaplage	Single lab validation[1]	2023	Susan Genualdi Wendy Young Elsie Peprah Cynthia Srigley Brian Ng

U.S. FOOD & DRUG Administration

Method for detect 30 PFAS in food and feed using LC/MS/MS

PFAS methods of analysis

United States Department of Agriculture

Food Safety and Inspection Service

CLG-PFAS 2.04

Screening, Determination, and Confirmation of PFAS by UHPLC-MS-MS

This method describes the laboratory procedure screening, confirmation, and determination of per- and polyfluorinated alkyl substances (PFAS) residues in bovine (cattle), porcine (swine), poultry, and *Siluriformes* muscle and bovine plasma at levels in Table 13 and Table 14.

United States Department of Agriculture (USDA) method CLG-PFAS 2.04

Method screens, determines, and confirms 16 PFAS residues in animal tissues using UHPLC-MS/MS with detection limits in the low ppt range

AOAC SMPR® 2023.003

***Standard Method Performance Requirements* (SMPRs®) for Per- and Polyfluoroalkyl Substances (PFAS) in Produce, Beverages, Dairy Products, Eggs, Seafood, Meat Products, and Feed**

Intended Use: Compliance Monitoring by Trained Technicians

1 Purpose

What: AOAC *Standard Method Performance Requirements* (SMPRs®) are voluntary consensus standards developed in accordance with the AOAC policy, "AOAC Due Process for Development of AOAC Non-Method Consensus Standards and Documents." SMPRs describe a scientific community's recommended minimum method performance characteristics and analytical requirements for a specific method-related intended use.

Who: Drafted by AOAC working groups, SMPRs are adopted by AOAC by a consensus of stakeholders affiliated with its integrated science programs and projects which are composed of volunteer subject matter experts representing academia, government, industry, and nonprofit sectors from around the world.

Use: AOAC SMPRs are used in the AOAC core science programs as a resource for AOAC method experts, including expert review panels, in the evaluation of validation study data for methods submitted to the AOAC *Official Methods of Analysis*℠ and AOAC *Performance Tested Methods*℠ programs. AOAC SMPRs also may be used to provide acceptance criteria for the verification of methods and serve as a resource to guide method development and optimization.

2 Applicability

Quantitative analysis of selected PFAS in produce, beverages, dairy products, eggs, seafood, meat products, and feed (*see* Tables 1–3). Preference will be given to methods applicable to all analyte/matrix combinations listed in Table 4 and as many other analyte/matrix category combinations as possible.

3 Analytical Technique

Mass spectrometry-based methods

4 Definitions

Limit of quantitation (LOQ).—Minimum concentration or mass of analyte in a given matrix that can be reported as a quantitative result.

Matrix blank.—Sample with PFAS <30% of LOQ that is brought through entire measurement procedure and analyzed in the same manner as a test sample.

Procedural blank.—Sample that does not contain the matrix that is brought through entire measurement procedure and analyzed in the same manner as a test sample.

Recovery.—Ratio of the calculated concentration versus the expected concentration, expressed as a percentage.

Repeatability.—Variation arising when all efforts are made to keep conditions constant by using the same instrument and operator (in the same laboratory) and repeated in the same day. Expressed as the repeatability standard deviation (SD_r); or % repeatability relative standard deviation ($\%RSD_r$).

Reproducibility.—Variation arising when identical test materials are analyzed in different laboratories by different operators on different instruments. Standard deviation or relative standard deviation calculated from among-laboratory data. Expressed as the reproducibility standard deviation (SD_R); or % reproducibility relative standard deviation ($\%RSD_R$).

5 Method Performance Requirements

See Tables 4–7.

6 System Suitability Tests and/or Analytical Quality Control

Suitable methods will include at least procedural blanks and matrix spikes. Procedural blank levels should be ≤30% of the levels in samples analyzed in each batch. In the case of unavoidable background contamination from solvent bottles, etc., subtraction of procedural blank concentrations may be performed. Measures should be taken to reduce background contamination during each stage of sampling and analysis. Materials used should be free of PFAS and contact with fluoropolymer materials should be avoided.

Selectivity of the method should be evaluated to demonstrate that known cholic acid interferences including TDCA, TCDCA, and TUDCA (*see* Appendix A) do not co-elute with the PFOS *m/z* 499→80 MS/MS transition when using low-resolution mass spectrometry. Baseline separation of these compounds must be achieved between the cholic acids and all PFOS isomers represented by the branched standard, or it should be demonstrated that these interferences are removed prior to the chromatographic separation (during extraction and/or cleanup steps). The MS/MS transition *m/z* 499→124 is present in all three cholic acids and should be monitored to confirm separation or removal of cholic acids from samples. This evaluation is not necessary when using high-resolution mass spectrometry.

For PFAS with only one specific MS/MS transition (e.g., PFBA and PFPeA), a second confirmation of identity (e.g., high-resolution mass spectrometry) is needed if reporting results from the analysis of food samples.

A branched PFOS standard should be included in the analysis for retention time confirmation of isomers. The PFOS standards used for ∑PFOS analysis should be specified.

7 Reference Material(s)

U.S. National Institute of Standards and Technology (NIST) has multiple reference materials (RMs) in production, and interested parties should check https://shop.nist.gov to keep up to date on any newly available RMs.

Australian National Measurement Institute: https://www.industry.gov.au/national-measurement-institute/chemical-and-biological-measurement-services/proficiency-testing-services

FAPAS: www.fapas.com

8 Validation Guidance

Method validation.—Validation must be conducted at the target LOQ and at least two additional concentration levels within 2–100x of the target LOQ. In each case, a suitable matrix blank should be spiked at least in triplicate.

LOQ is the lowest concentration of mass of the analyte in the test material that has been validated with acceptable performance (recovery and repeatability) by applying the complete analytical method and identification criteria (1). The following positive identification criteria are to be met simultaneously:

(AOAC) International standard method performance requirement (SMPR 2023.003)

Define the minimum method performance requirements for PFAS analysis in Produce, beverages, dairy products, eggs, seafood, meat products, feed

PFAS methods of analysis

China GB 5009.253-2016

Method of determination of PFOS and PFOA in Animal-derived Food

In 2025, China proposed a draft to replace GB 5009.253-2016, expanding the scope to include 30 PFAS compounds

GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB 5009.253-2016

National Standard for Food Safety -

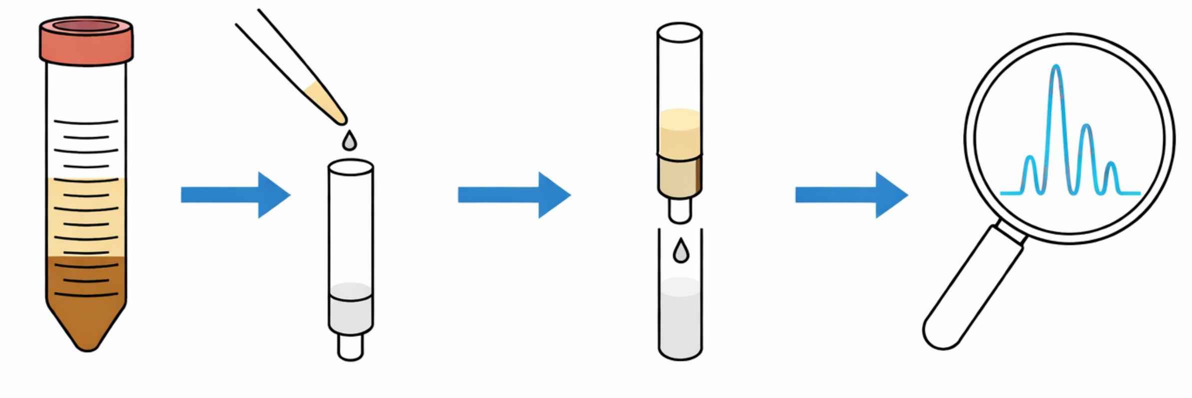
Determination of Perfluorooctane Sulfonate (PFOS) and

Perfluorooctanoic Acid (PFOA) in Animal-derived Food

Issued on: August 31, 2016 **Implemented on: March 1, 2017**

Issued by: National Health and Family Planning Commission of the People's Republic of China

PFAS methods of analysis



ALS in Italy - internal method

- Sample is homogenized and fortified with isotopically labeled surrogates
- Addition of water for dry sample hydratation
- Extraction of PFAS from the food samples using acidified (formic or acetic acid) acetonitrile with modified QuEChERS extraction
- Clean-up using solid phase extraction (for complex samples)
- The resulting extract is filtered and fortified with isotopically labeled internal standard solution and analyzed using LC-MS/MS.

PFAS Food Contact Materials

European Regulation 40/2025

Compliance decision logic (summary)

- Run targeted LC-MS/MS PFAS:
- Check each individual PFAS vs 25 ppb
- Check sum of targeted PFAS vs 250 ppb

- Assess compliance with 50 ppm including polymeric PFAS using an approach fit for polymers (often involving fluorine-based methods plus supporting evidence).

- If TF > 50 mg/kg, prepare supporting documentation quantifying fluorine attribution (PFAS vs non-PFAS), as may be requested

PFAS Food Contact Materials

PFAS extraction from packaging

2.3.2. PFAS extraction and clean-up

The extraction procedure was similar to the method applied by Schaider et al. (2017) with some modifications. Aliquots of approximately 2 g were weighed in 50 mL propylene tubes and 50 μL of the IS solution (in the range 6.5–10.9 ng mL^{-1}) was added. Samples were extracted twice with 20 mL of MeOH by sonication at room temperature during 30 min each. The two extracts were combined and evaporated to ~0.5 mL under a gentle stream of N_2 at 50 °C. The extract was diluted with 1.5 mL MeOH:ACN (1:1, v/v) containing 0.3% of acetic acid and underwent a clean-up step using an ENVI-Carb cartridge (500 mg). Cartridges were previously washed with 5 mL of MeOH and conditioned with 3 mL of MeOH:ACN (1:1, v/v) containing 0.3% of acetic acid. After the sample extract was loaded, the target compounds were eluted with 3 mL of MeOH:ACN (1:1, v/v) containing 0.3% of acetic acid. After that, the extract was evaporated till dryness, reconstituted in 100 μL of MeOH, diluted 1:1 with water and transferred to a chromatographic vial for LC-MS/MS analysis.

Notes on precursors:
Where relevant, an additional step aimed at converting **PFAS precursors** into measurable perfluoroalkyl acids (e.g., an oxidation step) can be used to avoid underestimation of the "sum" due to precursor presence.

PFAS Food Contact Materials

European Regulation 40/2025

Verification of 50 ppm "PFASs including polymeric PFAS"

Method family: Approaches capable of capturing polymeric PFAS contribution

Methods addressing polymeric content directly (where available for the specific polymer type), and/or Fluorine-based screening/quantification approaches combined with confirmatory targeted testing.

Strategy is to combine:

- → Targeted LC-MS/MS (**non-polymeric PFAS profile**)
- → Plus, **Fluorine-based determination** (TF/TOF/EOF) to support inclusion of polymeric PFAS presence where relevant

PFAS Accreditation ALS in Italy

ACCREDIA
ENTE ITALIANO DI ACCREDITAMENTO

Allegato al certificato di accreditamento n. **00141** rev. **8** del **17/09/2025**

ALS Italia S.r.l. Via Fontana 2 33080 Zoppola PN	UNI CEI EN ISO/IEC 17025:2018	
	Revisione: **21**	Data: **03/11/2025**
	Sede **B**	pag. **14** di **31**

Alimenti/Food, Biota/Biota

Denominazione della prova / Campi di prova	*Metodo di prova*	*Tecnica di prova*	*O&I*
Acido 11-cloroeicosafluoro-3-ossaundecano-1-solfonico (11Cl-PF3OUdS)/11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS), Acido 1H,1H,2H,2H-perfluorodecansolfonico (8:2 FTS)/1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS), Acido	MP.1319.R6.2025	LC-MS/MS	

Acido 11-cloroeicosafluoro-3-ossaundecano-1-solfonico (11Cl-PF3OUdS)/11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS), Acido 1H,1H,2H,2H-perfluorodecansolfonico (8:2 FTS)/1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS), Acido 1H,1H,2H,2H-perfluoroesansolfonico (4:2 FTS)/1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS), Acido 1H,1H,2H,2H-perfluoroottansolfonico (6:2 FTS)/1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS), Acido 2-[(6-clor-1,1,2,2,3,3,4,4,5,5,6,6-dodecafluoresil) ossi]-1,1,2,2-tetrafluoretansulfonico (F53B)/2-[(6-chlor-1,1,2,2,3,3,4,4,5,5,6,6-dodecafluorhexyl)oxy]-1,1,2,2-tetrafluc ethansulfonic acid (F53B), Acido 2H-2H-perfluorodecanoico (8:2 FTCA)/2H-2H-Perfluorodecanoic acid (FOEA), Acido 4-8-diossa-3H-perfluorononanoico (ADONA)/4-8-dioxa-3H-perfluorononanoic acid (ADONA), Acido 7H-perfluoroeptanoico (HPFHpA)/7H-Perfluoroheptanoic acid (HPFHpA), Acido dimerico esafluoropropilossido (HFPO-DA) (GenX)/Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX), Acido perfluoro-3,7-dimetilottanoico/Perfluoro-3,7-dimethyloctanoic acid, Acido perfluoro-n-esadecanoico (PFHxDA)/Perfluoro-n-hexadecanoic acid (PFHxDA), Acido perfluoro-n-ottadecanoico (PFODA)/Perfluoro-n-octadecanoic acid (PFODA), Acido perfluorobutanoico (PFBA) /Perfluorobutanoic acid (PFBA), Acido perfluorobutansolfonico (PFBS)/Perfluorobutanesulfonic acid (PFBS), Acido perfluorodecanoico (PFDA)/Perfluorodecanoic acid (PFDA), Acido perfluorodecansolfonico (PFDS)/Perfluorodecanesulfonic acid (PFDS), Acido perfluorododecanoico (PFDoA)/Perfluorododecanoic acid (PFDoA), Acido perfluorododecanosolfonico (PFDOS)/Perfluorododecanesulfonic Acid (PFDOS Acido perfluoroeptanoico (PFHpA)/Perfluoroheptanoic acid (PFHpA), Acido perfluoroeptansolfonico (PFHpS)/Perfluoroheptanesulfonic acid (PFHpS), Acido perfluoroesanoico (PFHxA)/Perfluorohexanoic acid (PFHxA), Acido perfluoroesansolfonico (PFHxS)/Perfluorohexanesulfonic acid (PFHxS), Acido perfluorononanoico (PFNA)/Perfluorononanoic acid (PFNA), Acido perfluorononansolfonico (PFNS)/Perfluorononanesulfonic acid (PFNS), Acido perfluoroottanoico (PFOA)/Perfluorooctanoic acid (PFOA), Acido perfluoroottanosolfonico (PFOS)/Perfluorooctanesulfonic acid (PFOS), Acido perfluoropentanoico (PFPeA)/Perfluoropentanoic acid (PFPeA), Acido perfluoropentansolfonico (PFPeS)/Perfluoropentanesulfonic acid (PFPeS), Acid perfluorotetradecanoico (PFTeDA)/Perfluorotetradecanoic acid (PFTeDA), Acid perfluorotridecanoico (PFTrDA)/Perfluorotridecanoic acid (PFTrDA), Acido perfluorotridecansolfonico (PFTrDS)/Perfluorotridecanesulfonic Acid (PFTrDS), Acido perfluoroundecanoico (PFUnDA)/Perfluoroundecanoic acid (PFUnDA), Acido perfluoroundecansolfonico (PFUnDS)/Perfluoroundecansulfonic acid (PFUnDS), N-(carbossimetil)-N,N-dimetil-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoroottil)solfc nil]ammino]- (Capstone B)/N-(carboxymethyl)-N,N-dimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooc yl)sulfonyl]amino]- (Capstone B), N-[3-(Dimetilossidiammino)propil]-3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-1-ottans olfonammide (Capstone A)/N-[3-(Dimethyloxidoamino)propyl]-3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-1-oc anesulfonamide (Capstone A), Perfluoro ottan sulfonamide (PFOSA)/Perfluorooctanesulphonamide (PFOSA) (≥ 0,003 μg/kg PFBS, PFHxA, PFPeS, PFHxS, PFHPS, PFDoA, PFTrDA, PFDS, PFHxDA in ortofrutta ≥ 0,002 μg/kg PFOA, PFNA, PFOS, PFUdA, PFTeDA, PFDOS in ortofrutta ≥ 0,004 μg/kg PFPeA, PFHpA, PFNS, PFDA in ortofrutta ≥ 0,2 μg/kg (ovoprodott ≥ 0,01 μg/kg (latte, in tale matrice non è accreditato PFDOS) ≥0.1μg/kg (altre matrici))

PFAS Next Accreditation ALS in Italy

Perfluoroundecanoic acid (PFUnDA)	Perfluorobutanoic acid (PFBA)
Perfluorotridecanoic acid (PFTrDA)	Perfluorobutane sulfonic acid (PFBS)
Perfluorotetradecanoic acid (PFTeDA)	Perfluoroundecane sulfonic acid (PFUnDS)
Perfluoropentanoic acid (PFPeA)	Perfluorotridecane sulfonic acid (PFTrDS)
Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid (PFPeS)
Perfluorooctane Sulfonate (PFOS)	Perfluorooctane sulfonamide (PFOSA)
Perfluorononanoic acid (PFNA)	Perfluoro-3,7-dimethyloctanoic acid (P37DMOA)
Perfluorononane sulfonic acid (PFNS)	7H-perfluoroheptanoic acid (HPFHpA)
Perfluorohexanoic acid (PFHxA)	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propanoic acid (HFPO-DA) (Gen-X)
Perfluorohexane sulfonic acid (PFHxS)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)
Perfluorohexadecanoic acid (PFHxDA)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)
Perfluoroheptanoic acid (PFHpA)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)
Perfluoroheptane sulfonic acid (PFHpS)	2H-2H-Perfluorodecanoic acid (FOEA)
Perfluorododecane sulfonic acid (PFDoDS)	4-8-dioxa-3H-perfluorononanoic acid (ADONA)
Perfluorodecanoic acid (PFDA)	Acido 2-[(6-clor-1,1,2,2,3,3,4,4,5,5,6,6-dodecafluoresil) ossi]-1,1,2,2-tetrafluoretansulfonico (F53B)
Perfluorodecane sulfonic acid (PFDS)	Acido 11-cloroeicosafluoro-3-ossaundecano-1-solfonico (11Cl-PF3OUdS)

List of PFAS validated in packaging (paper, cardboard, plastic)

Targeted LC-MS/MS PFAS method

LOQ 1µg/kg

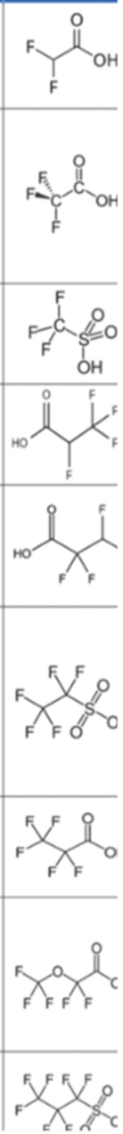
PFAS Ultra Short Chain PFAS

Increase Interest in USC-PFAS

- → Very high mobility in water
- → Evolving toxicological/regulatory aspects
- → They can be "final products" of degradation
- → Difficult to remove
- → Widespread presence

Analyte	Sources
TFA	• Atmospheric degradation of F-gases (HFCs, HCFCs, HFOs) as novel fluorinated refrigerant replacements of CFCs • Direct industrial emissions • CF_3-containing precursors (pesticides e.g. flufenacet, fluazinam; pharmaceuticals; other PFAS) • Thermolysis of fluoropolymers • PFAS destruction technologies - mineralization
PFPrA	• Atmospheric degradation of F-gases like TFA • Direct industrial emissions • Degradation of firefighting fluid component (perfluoro-2-methyl-3-pentanone (PFMP)
PFMeS	• Super acid used in organic synthesis • Lithium ion batteries
PFEtS, PFPrS	• AFFFs • Residual/byproduct of ECF-based products

luoroacetic acid	DFA	381-73-7
luoroacetic acid (aka fluoroethanoic acid)	TFA, (aka PFEtA)	76-05-1
luoromethane sulfonic d (aka Perfluoromethane fonic acid)	TFMS, (aka PFMeS)	1493-13-6
,3,3-Tetrafluoropropanoic d	2333-TFPA	359-49-9
,3,3-Tetrafluoropropanoic d, (aka Flupropanate)	2233-TFPA	756-09-2
fluoroethane sulfonic d	PFEtS	354-88-1
fluoroethane sulfonic d	PFPrA	422-64-0
fluoro-2-methoxyacetic d	PFMOAA	674-13-5
fluoropropane sulfonic d	PFPrS	423-41-6



PFAS Ultra Short Chain PFAS

Analytical Aspects

- Optimized **LC–MS/MS** methods
- Often using dedicated columns
- Attention to blanks and laboratory contamination
- Limits of quantification can be challenging (**ubiquitous compounds**)

PFAS Ultra Short Chain PFAS

TFA in cereals

The European Pesticide Action Network (PAN Europe), which conducted the research in collaboration with environmental NGOs, published a report in December 2025 revealing widespread contamination of cereal-based food products across Europe.

"forever chemical" trifluoroacetic acid has been found in over 80% of European 66 cereal samples tested

averaging ~80 ppb and reaching up to 360 ppb

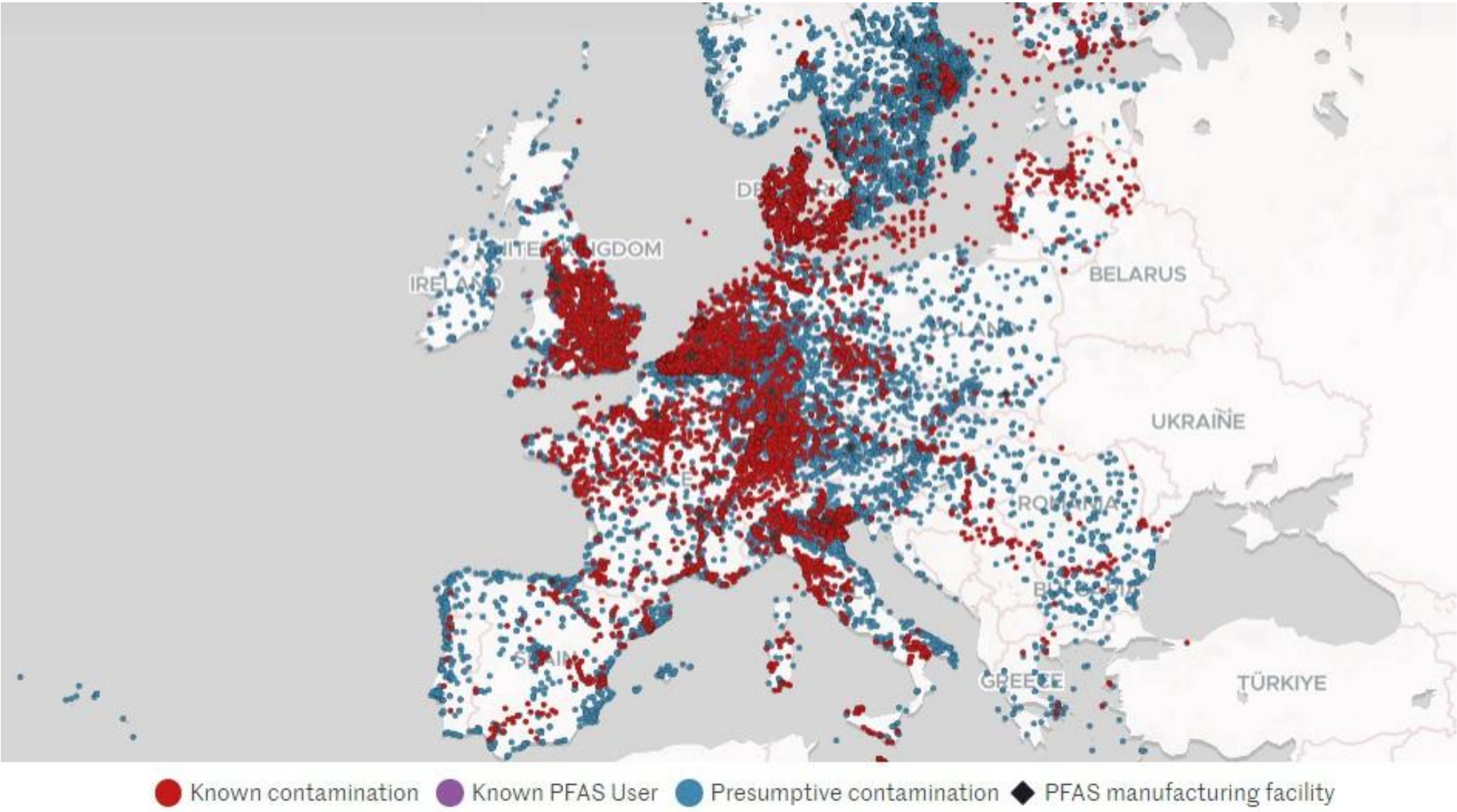
TFA in wine

Members of the PAN Europe presents the results of the investigation into trifluoroacetic acid (TFA) contamination in wine carried out across ten European wine-producing EU countries by).
A steep rise in contamination: **exponential rise in TFA levels in wine** since 2010. TFA was not detected in wines from before 1988, while wines from 2021–2024 show average levels of 122 µg/L, with some peaks of over 300 µg/L

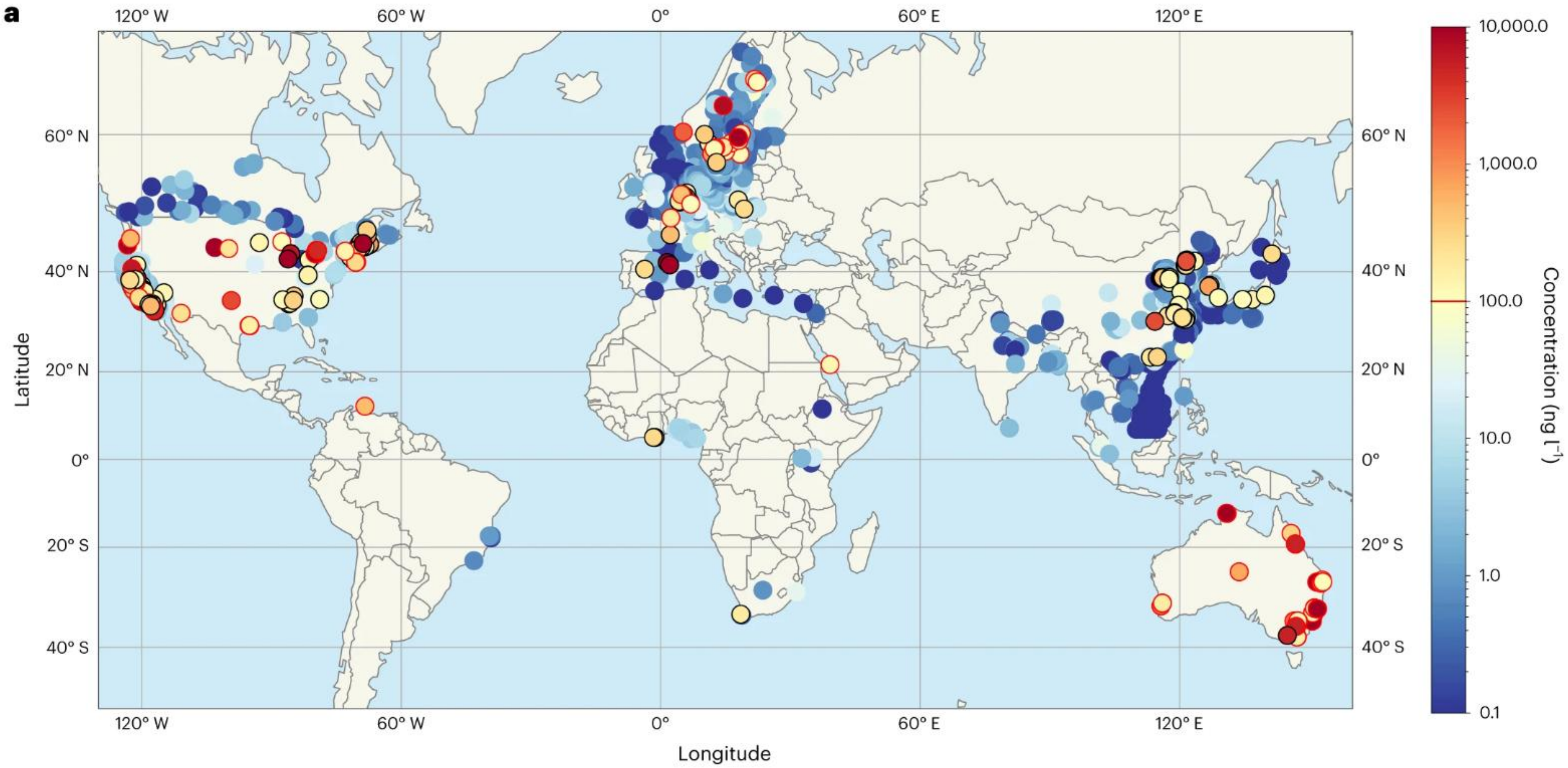
Non-profit organisation is calling for urgent action, urging the European Commission and its member states:

- → To **monitor** trifluoroacetic acid in FOOD products
- → To **ban** the use of PFAS pesticides and F-gases
- → To establishes a protective **safety value** for TFA

PFAS Data of Monitoring



PFAS Data of Monitoring



THANK YOU

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