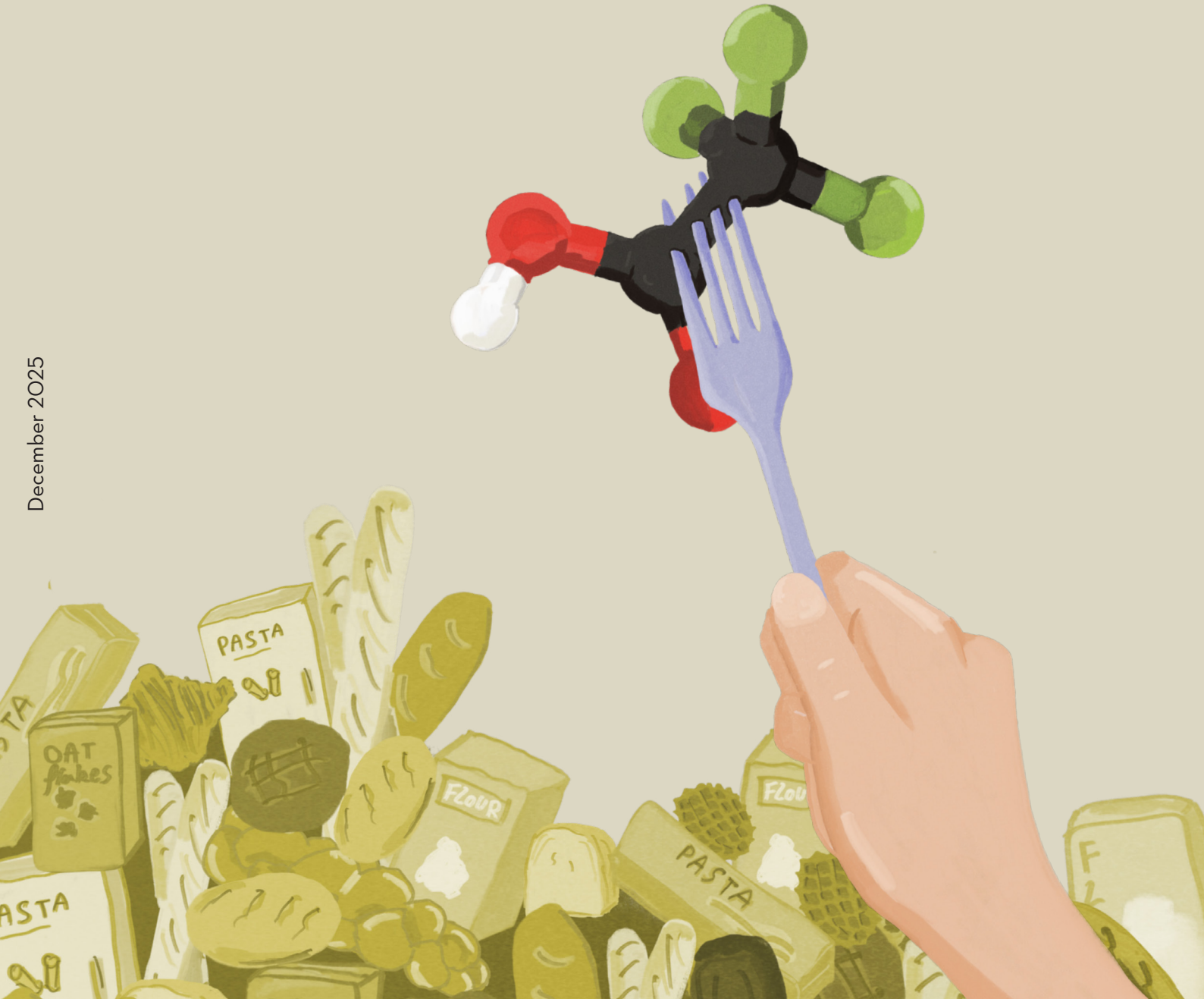
Q & A

Pesticide Action Network Europe

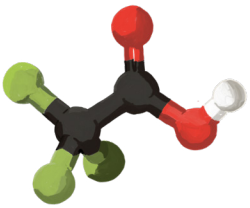
Unseen and Unregulated:

TFA, the 'forever chemical' in Europe's Cereals



December 2025

TFA in Cereals Report: Q&A



What exactly did your study investigate?

This study assessed the presence of trifluoroacetic acid (TFA) in commonly consumed cereal-based food products across Europe. To date, this assessment has not been conducted by food safety authorities. TFA is an ultra-short molecule of a man-made class of substances called per- and polyfluoroalkyl substances (PFAS), also called 'forever chemicals' because of their very high persistence. It is also a common metabolite of PFAS pesticides that contain a-CF3 group. TFA is not only persistent but also toxic for human health and its hazard assessment is currently ongoing.

Environmental NGOs collected **66 cereal samples, including wheat, oats, rye and maize products from 16 EU countries.** Most samples were purchased from regular supermarkets. The samples were shipped to an accredited laboratory specialised in TFA analysis. As previous studies have already established a direct link between TFA contamination in crops and the use of PFAS pesticides, we decided to focus on **conventional products** for this study. The objective was to obtain a first indication of the extent of dietary exposure to TFA.

Why did you choose cereal products?

Cereal products such as bread and pasta are dietary staples consumed daily by millions of people across Europe, including vulnerable groups such as children and pregnant women. Additionally, cereals also have large cultivated areas and are widely treated with PFAS pesticides. Today, the number of studies that have assessed TFA contamination in cereal crops are very few. Recently in June 2025, an Austrian study by the NGO Global 2000 detected high TFA levels across all 48 cereal-based products tested. This is the **first time such a broad, EU-wide dataset on TFA in cereal-based foods has been compiled**.

What were the most important results?

- TFA was detected in **81.8% of samples**, showing widespread contamination.
- **High contamination levels**: the average TFA concentration was **78.9 µg/kg**, with a median of **39.5 µg/kg** and peak values of up to **360 µg/kg. Wheat products are significantly more contaminated than other cereal-based products**.
- **Food, beyond drinking water, is the most significant route of exposure**: the average TFA level found, 78.9 µg/kg is **107 times higher than the average TFA concentration in tap water** [1], and 19.3 times higher than the highest detected level.
- No specific EU MRLs exist for TFA; therefore, the default MRL of 0.01 mg/kg should apply. Yet **54 samples exceeded the default MRL**.

These findings collectively show that TFA contamination of Europe's food supply is already well underway and that food is a significant exposure pathway, more than water. The continued use of PFAS pesticides directly contributes to exposure to this contaminant in humans.

How representative is your dataset?

66 samples is a first start to understand the contamination of cereal products with TFA. The geographic breadth, variety of cereals analysed, and consistency of findings- widespread contamination, elevated average concentrations, and frequent detections across regions- make the results highly indicative of a structural EU-wide issue.

Why were wheat-based products more contaminated with TFA?

The available scientific literature suggests that wheat may be particularly efficient at absorbing and accumulating PFAS, especially TFA. One study found that wheat plants accumulated TFA more rapidly and to a higher degree in both roots and above-ground tissues compared with other PFAS. The researchers attributed this to TFA's very small molecular size, which allows it to pass easily through the root barrier along a concentration gradient, whereas longer-chain PFAS are largely filtered out. In addition to this passive transport, the study also indicates that TFA can enter wheat plants through active, energy-dependent uptake processes. To our knowledge, no studies have yet examined the mechanisms of TFA uptake in other major cereals, including rye and maize.

Did contamination vary between countries?

TFA contamination is not comparable between countries due to variations in the number and types of products analysed across countries. However, contamination was observed across almost all regions, highlighting the both local TFA emissions from the widespread use of PFAS pesticides across European member states, as well as the global diffuse contamination as a breakdown product from F-gases.

How much TFA is someone actually ingesting?

Based on our findings, an adult weighing 60 kg ingests 15.1 µg of TFA per day while a child weighing 20kg ingests 12.7 µg of TFA per day on average. Moreover, this estimate does not yet include widespread exposure from drinking water and other foods. TFA has previously been detected in fruits, vegetables, tea, beer and wine, meaning total intake is likely significantly higher. Children, who consume cereals more frequently and have lower body weight, are at particular risk.

Is TFA harmful?

Yes. TFA is undergoing **classification as "toxic to reproduction" (category 1B)** under EU chemical law, meaning it is presumed to impair fertility and fetal development in humans. Specifically, industry-sponsored studies have identified the following:

- Eye and skeletal malformations in rabbit offspring
- effects on liver health in rats, including enzyme alterations;

- impacts on thyroid function in rat offspring, which regulates metabolism and brain development;
- immune system suppression in rat offspring, a concern which TFA shares with many PFAS;
- reduced sperm count and quality in rats.

Because TFA accumulates in water, soils, and food chains, long-term exposure is a major concern, especially for children and pregnant women. Additionally, TFA's neurodevelopmental toxicity and carcinogenicity has not been investigated at all. The continued use of PFAS pesticides directly contributes to exposure to this contaminant in humans.

Should consumers be worried?

Under EU law, Maximum Residue Levels (MRLs) are set as legal limit concentrations in food or feed that are considered safe for the most vulnerable groups of our population, including children. At the time of this report, **MRLs have not been set for TFA**. In such cases, where no MRLs have been established the Regulation considers appropriate to set a default precautionary value of 0.01 mg/kg. This is even more appropriate for TFA, which is to be classified as toxic to reproduction. Yet, 54 samples exceeded the default MRL.

Consumer behaviour is not to blame. Rather, current exposure levels of TFA indicate a systemic regulatory failure. Political action is urgent to ban PFAS pesticides and other sources of TFA.

Is a ban on PFAS pesticides feasible?

Many European farmers already operate successfully without PFAS pesticides, demonstrating that these substances are not essential for productive agriculture. Even when using synthetic pesticides there are many non-PFAS alternatives. Effective, modern and safer alternatives, namely the use of integrated pest management (IPM) techniques, are already widely available. Moreover, banning PFAS pesticides is a must. The continued approval of the 31 PFAS pesticides remaining on the market is incompatible with the Pesticide Regulation, which stipulates that an active substance cannot be approved if its toxicologically 'relevant' metabolites exceed a threshold of 0.1 µg/L in groundwater. The European Commission has acknowledged TFA as a relevant metabolite of PFAS pesticides in groundwater. It frequently and significantly exceeds this threshold across the EU. Therefore, Member States and the Commission are obliged to ban PFAS pesticides, following the example of Denmark.

See our position paper for further information on PAN Europe's position on TFA.

What do PAN Europe & members urge policymakers to do now?

Our network urges the EU to adopt a comprehensive response, including:

1. An immediate ban on all PFAS pesticides, the principal agricultural source of TFA.
2. A phase-out of F-gases and other sources of TFA thanks to the adoption and implementation of the proposal for a universal PFAS restriction.
3. A protective and precautionary ADI that accounts for scientific uncertainty and acknowledges the available evidence of TFA's harms.
4. EU-wide monitoring of TFA in food and water.
5. Support for farmers transitioning to agroecological and non-chemical crop protection methods.

Only a combination of regulatory action and systemic agricultural change can stop further TFA accumulation and protect public health.