German Federal Institute for Risk Assessment

FAQ

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Trifluoroacetic acid (TFA) in food: What are the health risks?

TFA is one of the perfluorooctane sulfonic acids, a widespread group of persistent industrial chemicals. It is difficult to break down and therefore remains in the environment for a long time, enters the food chain and has been detected in various foods. Below, the German Federal Institute for Risk Assessment (BfR) answers questions about TFA.

What is TFA and what are its properties?
Trifluoroacetic acid (TFA) is a short-chain perfluorocarboxylic acid and the smallest compound in the group of perfluorinated and polyfluorinated alkyl compounds (PFAS). PFAS are industrial chemicals that are used in numerous industrial processes and consumer products due to their specific technical properties. TFA belongs to the group of ultra-short-chain PFAS and contains three fluorine atoms. It is very stable, difficult to degrade and long-lasting.

What are the sources of TFA that we are aware of?
Many PFAS are broken down into TFA. Source materials containing PFAS, from which TFA is formed and released into the environment, are found, for example, in fluorinated refrigerants and propellants, medicines for humans and animals, and plant protection products (PPP). Due to the widespread use of PFAS, as well as its persistence and high mobility, TFA has been detected throughout the environment, in water bodies, rainwater, soil and also in plants.

How can TFA end up in food?
Its stability, mobility and widespread prevalence enable TFA to be transported via the water cycle into our food. For example, TFA seeps into the soil with rainwater or through irrigation and may be taken up by plant roots. TFA has also been measured in drinking water.

In which foods have TFA been detected so far?
The media have reported findings of TFA in various foods, e.g. fruit, vegetables, wine, cereal products and drinking water. To date, the BfR does not have sufficient data to assess a scientifically sound health risk arising from TFA in food. In response to enquiries from the

public, the BfR has carried out initial assessments based on the published figures (see links in the box below). As measurement methods continue to be refined, the data on TFA in food will expand. Furthermore, it should be noted that TFA originates from many different sources and can enter food via various routes.

How long do TFA remain in the human organism?
TFA is taken up via food or drinking water and is excreted unchanged by humans. The half-life of TFA in humans has been reported as two to three days. This means that within approximately two to three days, half of the TFA taken up is excreted. In the case of TFA, this occurs primarily via the kidneys.

What are the maximum residue levels (MRLs) for TFA in food?
Maximum residue levels are the maximum permitted levels of a pesticide or its breakdown product(s) in food. No maximum residue levels have yet been set for TFA. As the potential sources of TFA are very diverse, it remains to be seen on what basis maximum residue levels will be set and whether monitoring data will first be collected in the Member States.
Nor are any maximum levels for TFA currently set out in the EU Contaminants Regulation (Regulation (EU) 2023/915). The Regulation establishes binding maximum levels for certain contaminants in food.

Is TFA regularly tested for in food monitoring?
No, to date, TFA is not routinely tested for in food monitoring. Furthermore, their detection is challenging. In future, the topic of 'TFA in plant-based foods' will be addressed in food monitoring. Initially, the focus will be primarily on foods that are important for a healthy diet. In addition, within this framework, the methods for determining TFA are to be further developed, validated in laboratories and established.

How is TFA detected in food, and what are the analytical challenges involved?
TFA in food is often determined using the Quick Polar Pesticides Method method (https://www.quppe.eu/). In this process, TFA is extracted from the sample material, then separated using liquid chromatography and detected and quantified by mass spectrometry. Depending on the type of sample, the limits of quantification (LOQs) range from 0.01 to 0.05 milligrams per kilogram of food.
Measuring TFA at trace levels is challenging, as it is a small, polar molecule that is difficult to separate from other components in the sample. Furthermore, the widespread prevalence of TFA means that solvents and chemicals often contain traces of TFA, which places particular demands on the analytical method, especially when determining low concentrations.

What health risks does TFA pose?
According to current data, no health effects are to be expected at the currently known concentrations of TFA in drinking water or food.
In high concentrations, TFA can cause severe skin burns, eye damage and adverse health effects if inhaled (this relates to intake via the skin and the respiratory tract, not via food). Furthermore, the Committee for Risk Assessment of the European Chemicals Agency (ECHA) and the BfR classify TFA as a reproductive toxin, it may damage the unborn child and is suspected of damaging fertility. It should be noted that this is purely a hazard classification. This does not, in itself, indicate actual health risks, as these are generally determined by the

intake of the substance (exposure). The reproductive toxicity (hazard to reproduction) was only detected in animal models at TFA amounts significantly higher than those found in the environment.

What are the latest developments in the health risk assessment of TFA?
At the request of the European Commission, EFSA has reviewed the health-based guidance values (HBGV) for TFA. The assessment was carried out in collaboration with the Member States and the European Chemicals Agency (ECHA). The ECHA is responsible for the classification of the chemical hazards of TFA (https://www.efsa.europa.eu/de/topics/per-and-polyfluoroalkyl-substances-pfas).

In its new assessment, EFSA has lowered the guidance values for TFA in food. The Acceptable Daily Intake (ADI) has been reduced from 0.05 mg per kilogram of body weight (mg/kg bw/d) to 0.014 mg/kg bw/d. The ADI refers to the amount of a substance that can be ingested in the diet on a daily basis throughout a person's lifetime without any appreciable health risk (lifetime exposure). In addition, an acute reference dose (ARfD) of 0.07 mg/kg bw has been established. The ARfD indicates the estimated maximum amount of a substance that can be taken up over the course of a single day with one or more meals without any appreciable health risk (single, very high exposure). The current EFSA assessment forms the basis for future risk assessments of TFA in food.

What is the current status regarding the classification of the human toxicological (toxic to humans) properties of TFA?
For the hazard classification of TFA, the Federal Office for Chemicals (BfC), in collaboration with the BfR and the Federal Environment Agency (UBA), submitted a dossier on harmonised classification (CLH dossier) to the European Chemicals Agency (ECHA) in May 2025 (see link in the box below). The BfC is part of the Federal Institute for Occupational Safety and Health (BAuA) and is the competent German authority for the European REACH Regulation and the Regulation on Classification, Labelling and Packaging (CLP Regulation). The Regulation on Classification, Labelling and Packaging (CLP Regulation) governs the classification, labelling and packaging of hazardous substances. The CLH dossier has been in review by ECHA's Committee for Risk Assessment (RAC) since November 2025.

The RAC publicly discussed the German CLH dossier on TFA in early June 2026 and agreed to the classification with Rep. 1B (H360Df; reproductive toxicity) and Acute Tox. 3 (H331; acute toxicity by inhalation) and Acute Tox. 4 (H302; acute toxicity following ingestion) (as per the minutes of the 77th meeting). The RAC thus largely concurs with the assessment carried out by the German authorities.
(https://echa.europa.eu/documents/d/guest/rac77_final_minutes_en)

The BfR assumes that the final RAC opinion (RAC-Opinion) on TFA (which has not yet been published) will not change. However, the harmonised classification will only become legally binding once it has been implemented in the ATP[1] (including transition periods).

[1] Regulation on Adaptation to Technical Progress, ATP

Further information on the BfR website regarding TFA in food

BfR communication, trifluoroacetic acid (TFA) in wine
https://www.bfr.bund.de/en/notification/trifluoroacetic-acid-tfa-in-wine/

BfR communication, trifluoroacetic acid (TFA) in cereal products
https://www.bfr.bund.de/en/notification/trifluoroacetic-acid-tfa-in-cereal-products-based-on-current-knowledge-no-health-impairments-are-expected/

BfR press release, Trifluoroacetic acid (TFA): Assessment submitted for classification into new hazard classes
https://www.bfr.bund.de/en/press-release/trifluoroacetic-acid-tfa-assessment-for-classification-in-new-hazard-classes-submitted/

Questions and answers on PFAS
https://www.bfr.bund.de/en/service/frequently-asked-questions/topic/here-to-stay-per-and-polyfluoroalkyl-substances-pfas-in-food-and-in-the-environment/

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the German Federal Ministry of Agriculture, Food and Regional Identity (BMLEH). It protects people's health preventively in the fields of public health and veterinary public health. The BfR provides advice to the Federal Government as well as the Federal States ('Laender') on questions related to food, feed, chemical and product safety. The BfR conducts its own research on topics closely related to its assessment tasks.

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Publisher:
German Federal Institute for Risk Assessment
Max-Dohrn-Straße 8-10
10589 Berlin, Germany
T +49 30 18412-0
F +49 30 18412-99099
bfr@bfr.bund.de
bfr.bund.de/en

Institution under public law
Represented by the President Professor Dr Dr Dr h. c. Andreas Hensel
Supervisory Authority: Federal Ministry of Agriculture, Food and Regional Identity
VAT ID No. DE 165 893 448
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