Turning the tide on PFAS: Risks, costs & ways forward

Banning PFAS Pesticides: A Source of Widespread TFA Contamination

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24 September 2025, European Parliament

Who we are: Pesticide Action Network *(PAN)* Europe

- Science-based NGO with toxicologists, legal experts & policy officers
- Network of **50+ member organisations across Europe**
- Mission: eliminate dependency on pesticides
- Promote **ecologically sound & socially just alternatives**

PFAS pesticides

- *Global, deliberate,* and *direct* contamination of our environment and food chain
- Excluded from the proposal to restrict PFAS
- Regulated under the Pesticide Regulation 1107/2009

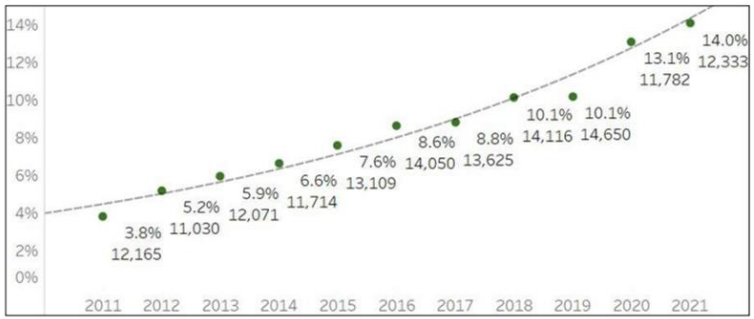
PFAS pesticides in the EU

- **32** PFAS active substances **APPROVED**

  ≈15% of all synthetic pesticides

- Rising sales in the studied Member States (AT, BE, DE, FR, NL)
- Increasing residues in fruit & vegetables (tripled between 2011–2021)

Figure 1. *Average PFAS contamination in fruit sampled in the EU in the period 2011-2021.*

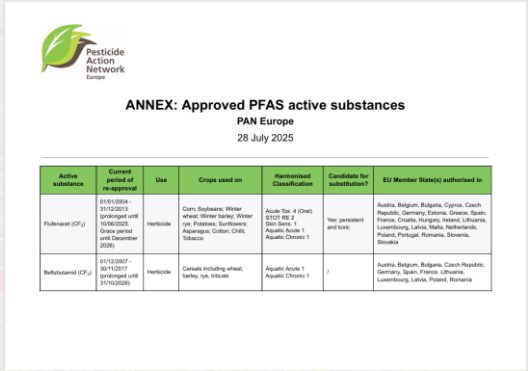


PFAS pesticides in the EU

32 PFAS pesticides

- 10 **candidates for substitution (‘more hazardous’)**
- 7 suspected **carcinogens** or **toxic to reproduction**
- 2 PFAS (flufenacet and fludioxonil) identified as **endocrine disruptors**
- 21 **highly toxic to aquatic life**

- **Persistent** and/or degrade into trifluoroacetic acid (TFA)



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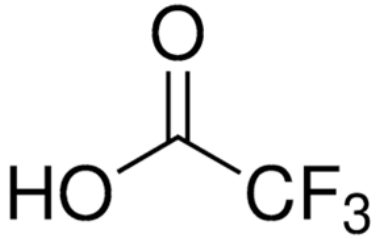
ANNEX: Approved PFAS active substances

PAN Europe

28 July 2025

Active substance	Current period of re-approval	Use	Crops used on	Harmonised Classification	Candidate for substitution?	EU Member State(s) authorised in
Flufenacet (CF_3)	01/01/2004 - 31/12/2013 (prolonged until 10/06/2025. Grace period until December 2026)	Herbicide	Corn; Soybeans; Winter wheat; Winter barley; Winter rye; Potatoes; Sunflowers; Asparagus; Cotton; Chilli; Tobacco	Acute Tox. 4 (Oral) STOT RE 2 Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 1	Yes: persistent and toxic	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Germany, Estonia, Greece, Spain, France, Croatia, Hungary, Ireland, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia
Beflubutamid (CF_3)	01/12/2007 - 30/11/2017 (prolonged until 31/10/2028)	Herbicide	Cereals including wheat, barley, rye, triticale	Aquatic Acute 1 Aquatic Chronic 1	/	Austria, Belgium, Bulgaria, Czech Republic, Germany, Spain, France, Lithuania, Luxembourg, Latvia, Poland, Romania

PFAS (C-CF3) pesticides are TFA precursors



- Extremely **persistent, mobile & soluble** → TFA accumulates in the water cycle and enters the food chain

- **Crops contaminated in two ways:**
  - Directly from PFAS pesticides
  - Indirectly from contaminated water/soil

- PFAS pesticides are the **primary source of TFA contamination** in rural areas (76% groundwater contamination) *(UBA, Joerss et al.)*

TFA concentrations in water resources - our work

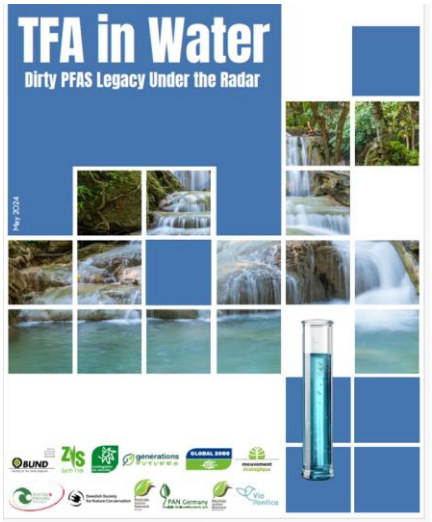
Surface water (23 samples): 100% > 0.1 µg/L

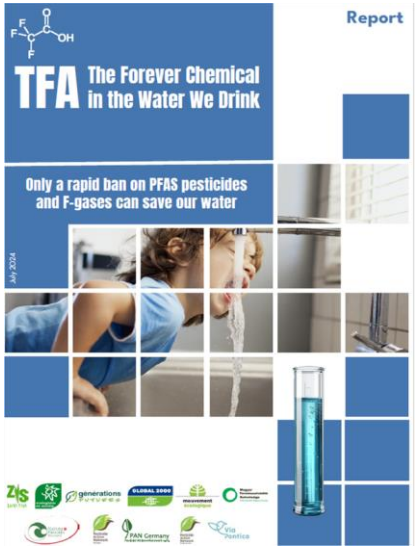
Groundwater (6 samples): 100% > 0.1 µg/L

Tap water: Detected in 94% of samples
Accounts for 95% of the 25 analysed PFAS

Bottled water: Detected in 63% of samples
Accounts for 99% of the 25 analysed PFAS

⚠️ **TFA is widespread and the predominant PFAS pollutant in drinking water**





A Steep Rise in TFA Contamination in Wine - our work

Before 1988: No TFA detected

Since 2010: Exponential increase

2021–2024 wines:

Average: **122 µg/L**
Peaks: **> 300 µg/L**

⚠️ **Clear evidence of rising contamination over time**

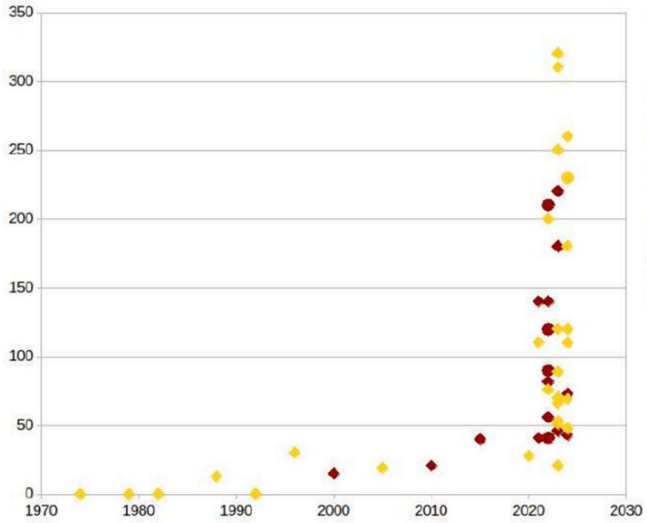


Figure 2b: TFA Levels in 49 Wine Samples from 1974 to 2024 [µg/L].

Diamonds represent conventional wines, circles represent organic wines. Red symbols indicate red wine; yellow symbols indicate white wine.

- Organic Wine / White
- Organic Wine / Red
- Conventional Wine / White
- Conventional Wine / Red

TFA in cereal products

Found in **all 48 samples**

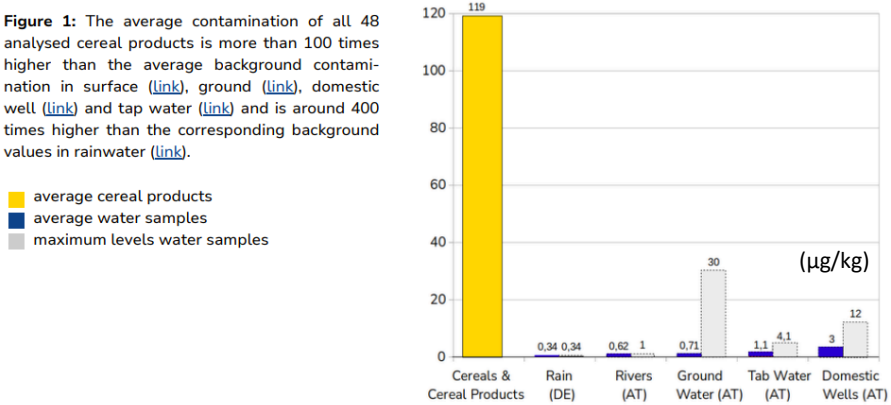
Range: **13–420 µg/kg**

Organic: median 47 µg/kg

Conventional: median 165 µg/kg (**3.5× higher**)

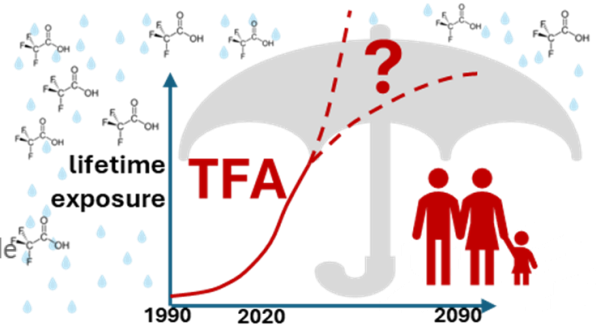
3× increase vs. EU study (2016/17)

Figure 1: The average contamination of all 48 analysed cereal products is more than 100 times higher than the average background contamination in surface (link), ground (link), domestic well (link) and tap water (link) and is around 400 times higher than the corresponding background values in rainwater (link).



Source: Global 2000, The Forever Chemical in our Daily Bread, 2025

TFA concentrations in the environment are rising ‘irreversibly’



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The Global Threat from the Irreversible Accumulation of Trifluoroacetic Acid (TFA)

Hans Peter H. Arp*, Andrea Gredelj, Juliane Glüge, Martin Scheringer, and Ian T. Cousins

TFA - toxicity

- Liver toxicity in rats
- Developmental toxicity in rabbits (eye and skeletal malformations)
- Reproduction toxicity in rat offspring (reproductive organs, thyroid, sperm quality)

ECHA: Germany proposed harmonised classification for TFA as t**oxic to reproduction Category 1B**, as well as persistent, mobile & toxic (PMT) and very persistent and very mobile (vPvM)

ECHA
EUROPEAN CHEMICALS AGENCY

The PFAS Pesticides is legal obligation

Pesticide Regulation (EC) 1107/2009 (Article 4)

Pesticide residues should have no harmful effects on humans + environment + **groundwater**
i.e. relevant metabolites **< 0.1 µg/L**

TFA – 'foetal toxicity' in rabbit studies – toxic to reproduction – ***RELEVANT METABOLITE***

TFA is exceeding the threshold of 0.1 µg/L: a clear indication that the requirements of the Pesticide Regulation, namely its Article 4(3) and Article 29(1)(e), and the Groundwater Directive **are no longer met by pesticide products containing PFAS active substances**.

Substitution of PFAS pesticides in agriculture

PFAS pesticides are “non-essential”

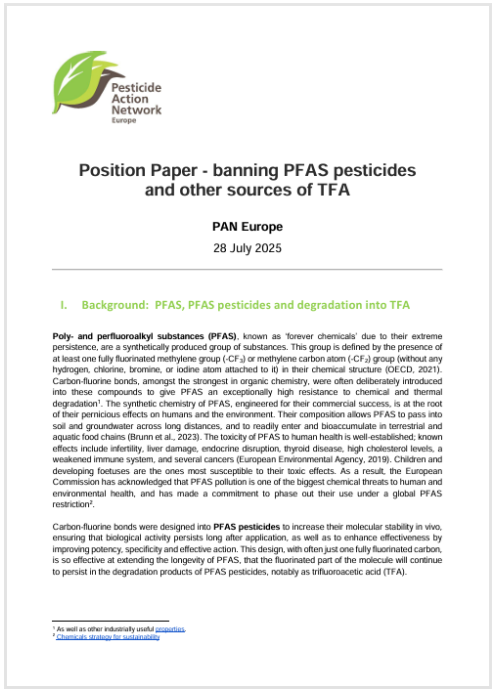
Sustainable Use of Pesticides Directive (SUD) → pesticides must be used as a last resort

Increase efforts to move away from current intensive agriculture: Implement true Integrated Pest Management (IPM), boost organic agriculture; support farmers in their transition (via CAP)

Conclusion

- PFAS pesticides are in use in the EU and are one of the **main sources of TFA pollution**
- TFA, a harmful substance, is **accumulating everywhere** it can be measured, including our drinking water and the food chain - the most widespread PFAS in the environment
- **All PFAS pesticides must be banned** based on TFA emissions according to the Pesticide Regulation
- PFAS pesticides are non essential, non-chemical alternatives must be prioritised as required by law

Thank you



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Position Paper - banning PFAS pesticides and other sources of TFA

PAN Europe

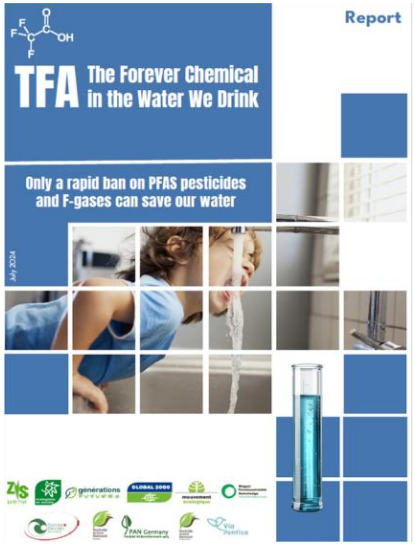
28 July 2025

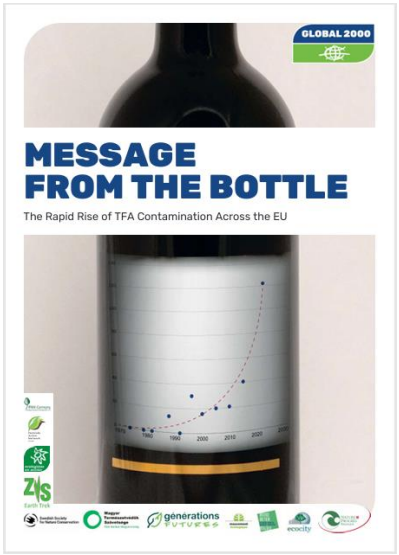
I. Background: PFAS, PFAS pesticides and degradation into TFA

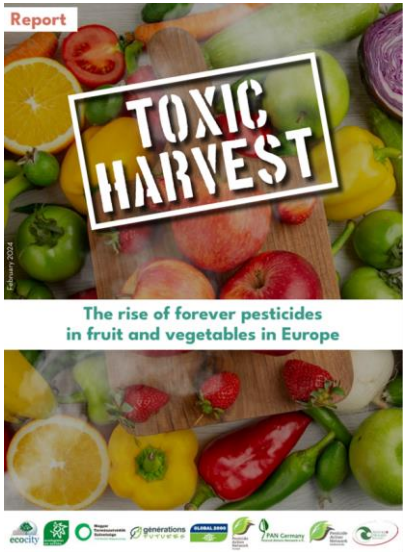
Poly- and perfluoroalkyl substances (PFAS), known as 'forever chemicals' due to their extreme persistence, are a synthetically produced group of substances. This group is defined by the presence of at least one fully fluorinated methylene group (-CF_2-) or methylene carbon atom (-CF_2) group (without any hydrogen, chlorine, bromine, or iodine atom attached to it) in their chemical structure (OECD, 2021). Carbon-fluorine bonds, amongst the strongest in organic chemistry, were often deliberately introduced into these compounds to give PFAS an exceptionally high resistance to chemical and thermal degradation[1]. The synthetic chemistry of PFAS, engineered for their commercial success, is at the root of their pernicious effects on humans and the environment. Their composition allows PFAS to pass into soil and groundwater across long distances, and to readily enter and bioaccumulate in terrestrial and aquatic food chains (Brunn et al., 2023). The toxicity of PFAS to human health is well-established; known effects include infertility, liver damage, endocrine disruption, thyroid disease, high cholesterol levels, a weakened immune system, and several cancers (European Environmental Agency, 2019). Children and developing foetuses are the ones most susceptible to their toxic effects. As a result, the European Commission has acknowledged that PFAS pollution is one of the biggest chemical threats to human and environmental health, and has made a commitment to phase out their use under a global PFAS restriction[2].

Carbon-fluorine bonds were designed into **PFAS pesticides** to increase their molecular stability in vivo, ensuring that biological activity persists long after application, as well as to enhance effectiveness by improving potency, specificity and effective action. This design, with often just one fully fluorinated carbon, is so effective at extending the longevity of PFAS, that the fluorinated part of the molecule will continue to persist in the degradation products of PFAS pesticides, notably as trifluoroacetic acid (TFA).

[1] As well as other industrially useful properties.
[2] Chemicals strategy for sustainability







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