Policy Briefing

February 2024

Ban PFAS Pesticides

Pesticide Action Network Europe

Summary

While it is now notorious that PFAS are used in diverse consumer products (such as frying pans, textiles, food packaging etc), it is less well known that PFAS pesticides are intentionally sprayed on food crops. Yet, food is a systematic and direct route of exposure to PFAS pesticides for citizens. 37 pesticide active substances approved in the European Union are PFAS according to EU regulators. Some are persistent themselves and others break down into persistent metabolites, such as trifluoroacetic acid (TFA). They directly pollute soils, water resources and the food chain, thereby contributing to the ever-increasing background level of exposure of citizens and the environment to 'forever chemicals'. PFAS active substances also raise additional environmental and human health concerns beyond persistence, such as endocrine disruption, toxicity for the reproduction and toxicity for aquatic species. Yet, these substances have been approved by regulators, 'slipping through the cracks' of Pesticide Regulation. More worryingly, the proposal for a 'universal' EU ban on PFAS excludes PFAS pesticides.

PAN Europe and its members investigated the scale of PFAS pesticide contamination of fruit and vegetables sold in the EU in the decade 2011-2021. Our research is based on data from the national monitoring programmes for pesticide residues in food across EU Member States. It was carried out in collaboration with Ecocity, Ecologistas en Acción, Magyar Természetvédők Szövetsége (Friends of the Earth Hungary), Générations Futures, Global 2000 (Friends of the Earth Austria), PAN Germany, PAN Netherlands and Nature & Progrès Belgique. The results show an increasing exposure of European consumers via daily food products. While this source of PFAS contamination is currently downplayed compared with that from other better-known PFAS, continued accumulation of PFAS in the food chain and arising chemical cocktails, pose chronic risks to human health. A ban on PFAS pesticides is urgent to curb PFAS exposure via food and protect citizens' health, in particular that of the most vulnerable groups, such as pregnant women, babies and children.

Introduction

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made organic chemicals used in a wide range of consumer products and industrial applications since the 1950s. Their popularity and widespread use stem from their water and oil-repellent properties. These high-performance characteristics, however, come at a price. For decades, the scientific community has been sounding the alarm about the persistence and potential toxicity of these chemicals to which exposure is nearly inevitable due to their widespread pollution. PFAS do not break down easily, persist in our environment and bioaccumulate in living organisms, including humans, up to levels that can cause adverse effects. Some of them are also very mobile and may reach water resources, including drinking water. This raises questions about the long-term health impacts of chronic exposure to PFAS both for humans and ecosystems. While some PFAS are suspected carcinogens, others are linked to developmental issues in children, and many show adverse effects even at low concentrations, impacting the immune and endocrine systems[1], among others. PFAS persistence and bioaccumulation also raise concern about the issue of the non-reversibility of PFAS environmental pollution for future generations.

As part of the European Green Deal, the European Union committed to phase out PFAS chemicals in line with its zero-pollution ambition for a non-toxic environment. To implement this promise, a proposal for a 'universal' restriction of PFAS was submitted to the European Chemical Agency (ECHA) in early 2023[2]. This is the first step of a long-term regulatory action aiming to significantly restrict the presence of these persistent pollutants in Europe.

Among their many uses, PFAS are used in pesticides, either as active substances or as co-formulants, to increase the effectiveness of pesticides against pests (namely their stability)[3]. In the proposal for a universal PFAS restriction, a very first EU official list including 47 PFAS active substances was published. To date, 37 of these 47 substances, representing 16% of the synthetic active substances[4] approved in the EU, are still authorised for use as pesticides in food production. It leads to a deliberate spread of PFAS across European agricultural fields and results in direct contamination of our food but also of water resources and the environment. EU farmers are rarely aware of spraying PFAS as this is not indicated on their products.

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[1] European Environment Agency, Emerging Chemical Risks in Europe - PFAS.

[2] ECHA, registry of restriction intentions: Proposal for a PFAS restriction.

[3] The chemical engineering introducing a fluorinated backbone, with strong carbon-fluoride bonds, improves both the hydrophobic (water repellent) and lipophobic (fat/oil repellent) properties of substances, and therefore their stability.

[4] Burtscher-Schaden H, Durstberger T, Zaller JG. Toxicological Comparison of Pesticide Active Substances Approved for Conventional vs. Organic Agriculture in Europe. Toxics. 2022;10(12):753. Published 2022 Dec 2. doi:10.3390/toxics10120753.
PAN Europe and Générations Futures, Europe's toxic harvest, unmasking PFAs pesticide authorised in Europe, November 2023.

Introduction

Surprisingly, EU regulators have proposed to exempt active substances used in pesticides from the foreseen PFAS phasing out proposal[5], on the assumption that these are sufficiently regulated by the existing Pesticide Law[6]. However, as revealed by the report "Europe's toxic harvest, unmasking PFAS pesticides authorised in Europe" by PAN Europe and Générations Futures, PFAS active substances are 'slipping through the cracks' of a flawed pesticide assessment system. The persistence of active substances and that of their metabolites is not sufficiently regulated. Moreover, other important aspects of the risk assessment of active substances, including the evaluation of their potential endocrine disrupting properties, environmental impact and chronic toxicity are poorly assessed. This results in unjustified and worrying exposure of people and the environment to PFAS pesticides, in contradiction with the precautionary principle.

PFAS contamination due to pesticides, including through dietary exposure, is currently downplayed by decision makers because many of these substances have been less studied by the scientific community that other very-known PFAS food contaminants such as perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). Yet, the consumption of food products with pesticide residues is the main source of exposure to pesticides in the general population[7] and the maximum residues limits set for authorised pesticides in food are overall much higher than for other PFAS food contaminants[8]. Moreover, the presence of PFAS in pesticides, sometimes in cocktails, raises important questions regarding the risks of a chronic exposure of consumers to these chemicals via their food. PAN Europe sought to gain a better insight into the scale of the food contamination with residues of PFAS pesticides in Europe and its evolution over the last decade. We focused on conventional fruit and vegetables sold in the EU.

The study is based on official data from the national monitoring programmes of pesticide residues in food in EU Member States. Only randomly sampled products were incorporated in the study to address an exposure that is representative for EU consumers. The most commonly consumed fruit and vegetables were selected. The analysis was carried out at European Union level (aggregation of all national data), but also at the level of 8 different Member States (Austria, Belgium, France, Germany, Greece, Hungary, the Netherlands, Spain). While all the national results are available in the technical report Toxic harvest: the rise of forever pesticides in fruit and vegetables in Europe. This briefing aims to present the European results.

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[5] In contrast, co-formulants are included in the scope of the proposal for a PFAS restriction.

[6] Regulation (EC) No 1107/2009.

[7] HBM4EU, Pesticides report, June 2022, cf p. 14.

[8] In fruit and vegetables, the indicative levels of concentrations are 0.01 µg/kg for PFOS, 0.01 µg/kg for PFOA, 0.005 µg/kg for PFNA and 0.015 µg/kg for PFHxS according to Commission Recommendation (EU) 2022/1431. For residues of pesticides, the general default MRL for non-authorised pesticides is 0.01mg/kg, meaning 10µg/kg.For approved pesticides, MRL are usually set at higher levels.

Highlights

Our analysis reveals a significant exposure of European consumers to PFAS via their food.

- **Substantial contamination growth**

In total, residues of 31 different PFAS pesticides were detected in fruit and vegetables in the EU between 2011 and 2021.

The average proportion of fruit and vegetables containing residues of at least PFAS pesticide in the EU has nearly tripled over the decade according to the trendline. It has risen by 220% for EU fruit and by 247% for EU vegetables. The most pronounced average increase occurred for apricots (+333%), peaches (+362%) and strawberries (+534%).

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

Figure 2. *Average PFAS contamination in vegetables sampled in the EU in the period 2011-2021.*

Highlights

- **High contamination of EU-grown products in 2021:**
    - Fruit: 20% of European-grown fruit contains residues of at least one PFAS pesticide. Summer fruit, namely strawberries (37%), peaches (35%) and apricots (31%) were particularly contaminated in comparison to imported fruit (12% of strawberries; 11% of peaches; 21% of apricots).
    - Vegetables: While European-grown vegetables (12%) were on average less heavily contaminated with residues of PFAS pesticides than fruit (20%), some were particularly polluted: chicories (42%), cucumbers (30%), peppers (27%).

- **Eat local, they say?**

On average, 18% of imported fruit were contaminated with residues of PFAS pesticides in 2021, i.e. slightly less than European-grown fruit. However, some products like imported table grapes were more frequently contaminated (37%) than European-grown ones (22%).

- **Cocktails in a bite:**

Residues of up to four different PFAS pesticides were detected in a single sample of EU-grown strawberries and table grapes. Similarly, residues of up to three different PFAS pesticides were detected in a single sample of peaches, apricots, pears and apples.

Highlights

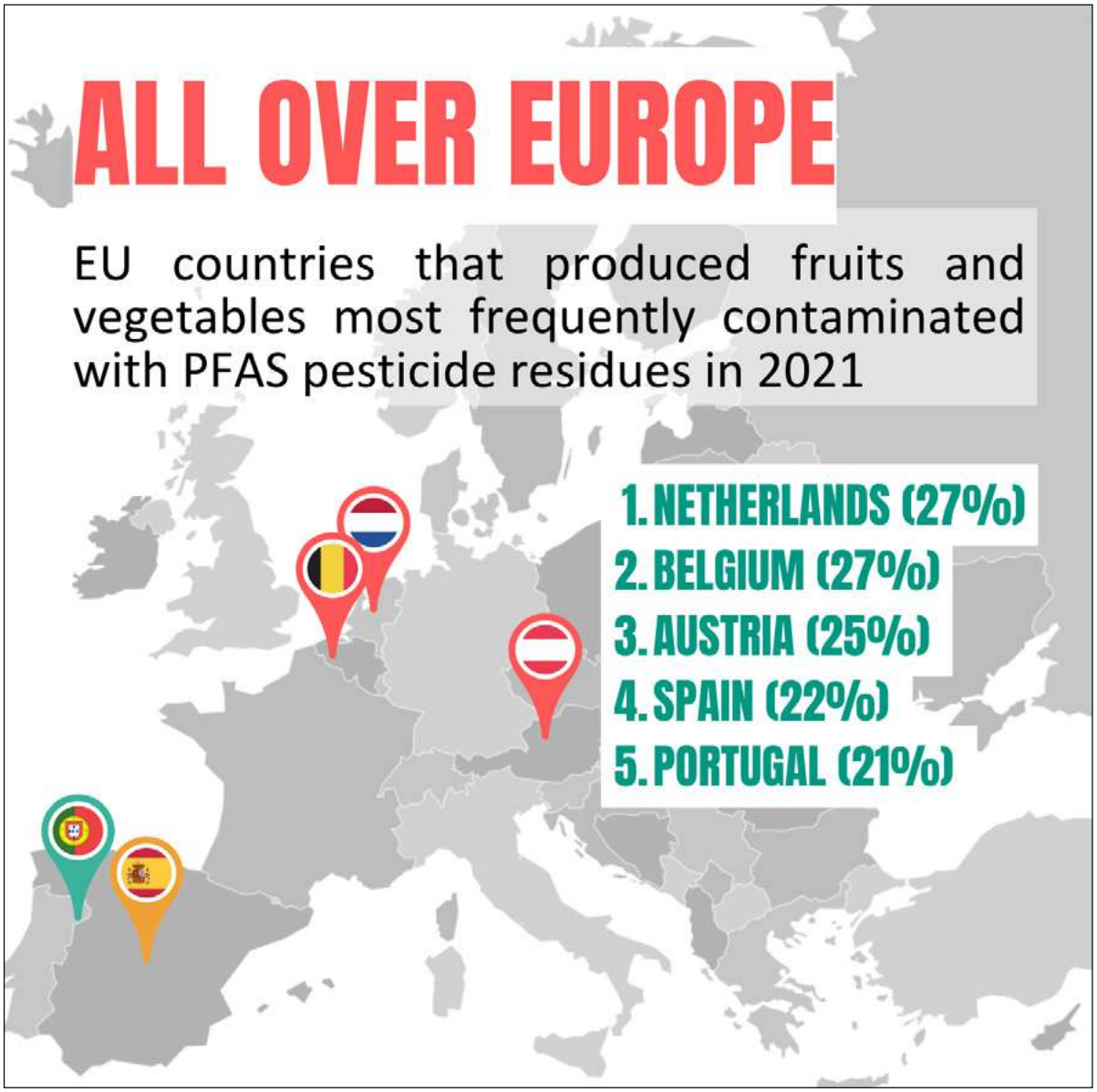
- **Who is leading the PFAS race?**

The most frequently contaminated products were grown by the Netherlands (27%) and Belgium (27%), followed by Austria (25%), Spain (22%) and Portugal (21%).

Among imported fruit and vegetables, the most likely to contain PFAS pesticide residues are the ones from Costa Rica (41%), India (38%), South Africa (28%), Colombia (26%) and Morocco (24%).

- **Which PFAS are most frequently detected?**

In European-grown products, the most often detected PFAS active substances in 2021 were the fungicide fluopyram, the insecticide flonicamid and the fungicide trifloxystrobin.



‘PFASticides’ in food: raising alarms

The results of this study are alarming for the following reasons:

- By zooming in on the top 10 PFAS active substances, we see that there is already evidence about their persistence or that of their metabolites, along with their known or potential toxicity to human health. Namely, the evidence points at acknowledged and/or unaddressed concerns with regard to harm to the unborn child, brain damage, disruption of the endocrine system and cancer risk. The analysis corroborates the findings of a recent report by PAN Europe and Générations Futures[9]. Other potential adverse effects such as impact on the immune system or the nervous system, particularly during early development, are poorly investigated or not investigated at all.

- Although required by law, the cocktail effects arising from a combined dietary and non-dietary exposure to several chemical substances, including different pesticides or other chemicals, is still not assessed by regulators, including when setting maximum residue limits (MRLs)[10]. Therefore, the background level of exposure of citizens to chemicals arising from multiple sources and pathways, is not taken into account. This leads to the setting of safety levels, including MRLs, that broadly underestimate the risks, particularly for persistent substances such as PFAS. Evidently, this is highly problematic as in today's world, it is virtually impossible to escape exposure to cocktails of chemicals. The report shows that this risk exists even with single food products such as fruit, which commonly contain three or four PFAS pesticide residues (e.g. strawberries, grapes, peaches and apricots).

- As explained in the technical report, the study is not meant to provide a comprehensive overview of the exposure of European consumers to PFAS through their diet. It is restricted to PFAS pesticide active substances and therefore disregards other possible sources of PFAS contamination including co-formulants, metabolites and the notorious food contaminants perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA).

[9] Europe Toxic Harvest: unmasking PFAS pesticides authorised in Europe, November 2023. URL link.

[10] MRLs set the highest level of a pesticide residue that is legally tolerated in or on food or feed when pesticides are applied correctly.

Zooming in on the top 10 PFAS active substances detected in EU-grown fruit and vegetables in 2021

Name*	Latest substance assessment**	Persistence ***	Toxicity for the environment ****	Toxicity for humans *****	MRLs for most contaminated fruit and/or with the highest probability of cocktails (mg/kg)*****
Fluopyram	2013	High to very high	Toxic to aquatic life with long lasting effects (chronic). Potential endocrine disrupting effects in birds and fish.	Potential for carcinogenicity.	-Strawberries: 2 -Peaches: 1.5 -Apricots: 1.5 -Table grapes: 2
Flonicamid	2010	Low but emitter of highly persistent TFA metabolite	Toxicity to bees.	Potential harm to the unborn child (foetotoxicity).	-Strawberries: 0.7 - Peaches: 0.4 -Apricots: 0.03 -Table grapes: 0.03
Trifloxystrobin	2017	High to very high and emitter of highly persistent TFA metabolite	Very toxic to aquatic life (acute) with long lasting effects (chronic).	Potential for reproductive toxicity. Risk of groundwater contamination above the drinking water limit. Unfinalised consumer risk assessment for drinking water.	-Strawberries: 1 -Peaches: 3 -Apricots: 3 -Table grapes: 3
Lambda Cyhalothrin	2014 (approved as Candidate for Substitution)	Moderate to high but emitter of highly persistent TFA metabolite	Very toxic to aquatic life (acute) with long lasting effects (chronic).	Neurotoxicity. Potential endocrine disrupting effects Toxicological gap for some impurities. Unfinalised consumer risk assessment for food products.	-Strawberries: 0.2 - Peaches: 0.15 - Apricots: 0.15 -Table grapes: 0.08

Zooming in on the top 10 PFAS active substances detected in EU-grown fruit and vegetables in 2021

Name*	Latest substance assessment**	Persistence ***	Toxicity for the environment ****	Toxicity for humans *****	MRLs for most contaminated fruit and/or with the highest probability of cocktails (mg/kg)******
Triflumuron	2011 (banned since 2021)	Low	Toxic to birds with long lasting effects. Very toxic to aquatic life.		-Strawberries: 0.01 - Peaches: 0.4 - Apricots: 1 -Table grapes: 0.01
Fluopicolide	2009 (approved as Candidate for Substitution)	High to very high and emitter of highly persistent TFA metabolite	Toxic for mammals with long lasting effects. Potential for high toxicity for aquatic organisms.	Suspected of damaging the unborn child. Risk of groundwater contamination above the drinking water limit. Potential for reproductive toxicity.	-Strawberries: 0.01 -Peaches: 0.01 -Apricots: 0.01 -Table grapes: 2
Sulfoxaflor	2020 (use restricted to greenhouse)	Very high and emitter of highly persistent TFA metabolite	Very toxic to aquatic life (acute) with long lasting effects (chronic). Very toxic to bees, with long lasting effects.		-Strawberry: 0.5 -Peaches: 0.5 -Apricots: 0.5 -Table grapes: 2
tau-Fluvalinate	2010	High and emitter of highly persistent TFA metabolite	Very toxic to aquatic life (acute) with long lasting effects (chronic). Very toxic for non-target arthropods.	Uncertainty regarding the representativeness of formulations used for genotoxicity and carcinogenicity studies.	-Strawberries: 0.3 -Peaches: 0.3 -Apricots: 0.3 -Table grapes: 1
Tetraconazole	2008	Very high	Toxic to aquatic life with long lasting effects (chronic). Potential toxicity to birds.	Unfinalised consumer risk assessment. One metabolite (1,2,4 triazole) damaging fertility and the unborn child.	-Strawberries: 0.15 (until 09/2023 2) -Peaches: 0.03 -Apricots: 0.03 -Table grapes: 0.07
Cyflufenamid	2009	Very high and emitter of highly persistent TFA metabolite			Strawberries: 0.04 -Peaches: 0.06 -Apricots: 0.06 -Table grapes: 0.2

* Active substances are displayed in order of detection.

** Publication date of the latest EFSA peer review regarding the risk assessment of the active substance.

*** Persistence of the active substance itself or its metabolites according to EFSA peer review. TFA emitter according to the German Environmental Agency (UBA).

**** According to the latest EFSA peer review and harmonised classification in line with Regulation (EC) 1172/2008.

***** According to the latest EFSA peer review and harmonised classification in line with Regulation (EC) 1172/2008.

****** For pesticides found hazardous for human health, MRLs are at the limit of detection or at the default value of 0.01mg/kg in line with Article 18(1)(b) of Regulation (EC) No 396/2005.

Conclusion

The results show that using PFAS in pesticides leads to an increasingly common exposure of European consumers to PFAS pesticides via their food. This source of PFAS exposure should be considered a priority for regulators, instead of being downplayed compared with other sources of exposure. Continued accumulation of PFAS in soils, waters, the food chain and arising cocktails pose chronic risks to both human health and the environment. A ban on PFAS pesticides and residues in food is urgent to protect citizen health, including that of the most vulnerable groups, such as pregnant women, babies and children.

Policy demands

1. Ban PFAS active substances in pesticides

The increasingly frequent detection of PFAS in EU-grown food is a clear demonstration of the shortcomings in the pesticide approval procedure. While the EU Pesticide Regulation aims to ensure that pesticides do not cause harm to human health, animal health and any unacceptable effects to the environment, harmful pesticides evidently continue to be present in the EU market.

To stop the approval of PFAS pesticides in Europe, there is immediate need to:

a) Consider persistence of an active substance or that of its metabolites as an unacceptable effect on the environment in light of the intrinsic toxic properties of synthetic active substances and the cumulative nature of the PFAS pollution.

b) Revise Annex II of the Pesticide Regulation to ban Persistent, Mobile and Toxic (PMT) and very Persistent and very Mobile (vPvM) active substances.

c) Improve the implementation of the EU Pesticide Regulation. This includes banning promptly 'cut-off' substances and phasing out Candidates for Substitution, stopping the prolongation of substances with data gaps, banning substances with critical areas of concerns or with incomplete dossiers on toxicity (e.g. Endocrine Disruptors), taking regulatory measures based on independent literature, not only on industry studies.

d) Implement the precautionary principle in both risk assessment and risk management to fulfil the primary objective of the Regulation, which is to ensure a high level of protection of humans, animals and the environment.

e) Urgently address the regulatory gap on exposure to mixtures by implementing a Mixture Assessment Factor (MAF) of at least 10 if not higher.

2. Ban the manufacture and export of PFAS pesticides

PFAS active substances must be included in the scope of the universal PFAS restriction. This will ensure that PFAS pesticides are no longer manufactured in the EU to be exported to third countries.

3. Apply a zero-residue policy in food

The maximum residue limits for PFAS active substances must all be urgently reduced at the default level of detection of residues to discourage their use and protect consumers and farm animals. This must also apply to EU-imported food products and feeds to ensure they do not contain residues of banned PFAS pesticides.

4. Move towards a pesticide-free agriculture

In line with the European Green Deal, a significant reduction of EU dependency to synthetic pesticides, including PFAS pesticides, is urgent. This is essential to protect farmers', farmworkers' and citizens' health, tackle the biodiversity crisis, the pollution of aquatic and other ecosystems, and support the much-needed transition towards resilient food systems. The need to significantly reduce pesticide use has been stressed by the scientific community, and repeatedly called for by EU citizens. A recent IPSOS citizens poll showed again a high level of concern about risks of pesticides to food, health and the environment, and a preference for a precautionary approach to the regulation and use of pesticides. As many as 82% of Europeans expressed concerns about the environmental impact of pesticides and 76% were concerned about the impact on their health. A ban on PFAS pesticides will meet citizens' expectations and encourage the use of nature-based alternatives.

TOXIC HARVEST

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