

‘Forever chemicals’ detected in UK food, prompting concerns regarding impact on human health

New research launched today reveals that many common UK food items contain PFAS pesticides. Pesticide Action Network UK (PAN UK) analysed the latest results from the UK government’s residue testing programme, finding that ten different PFAS pesticides were present in spices and a range of fruit and vegetables including grapes, cherries spinach and tomatoes. Strawberries were found to be the worst offenders, with 95% of the 120 samples tested by the government in 2022 containing PFAS pesticides.**(1)**

A family of roughly 10,000 chemicals, PFAS have been branded as ‘forever chemicals’ because of their ability to persist in the environment and accumulate in the blood, bones and tissue of living organisms, including humans.**(2)** Estimates of the time it takes PFAS to fully degrade in the environment range from a decade to over 1,000 years.**(3)** While they are generally used in household products such as non-stick cookware, certain pesticides contain PFAS which then make it into human bodies via diet.

Nick Mole from PAN UK said, *“Given the growing body of evidence linking PFAS to serious diseases such as cancer, it is deeply worrying that UK consumers are being left with no choice but to ingest these chemicals, some of which may remain in their bodies long into the future. With some plastic food packaging also contaminated with PFAS, and PFAS present in UK drinking water and soil, we urgently need to develop a better understanding of the health risks associated with ingesting these ‘forever chemicals’ and do everything we can to exclude them from the food chain.”*

Produce found to contain PFAS pesticides	Total number of samples tested by UK government	Percentage of samples containing PFAS pesticides (all rounded down)
Strawberries	120	95%
Grapes	109	61%
Cherries	121	56%
Spinach	96	42%
Tomatoes	96	38%
Peaches/nectarines	97	38%
Cucumber	96	22%
Apricots	97	20%
Beans	96	15%
Spices	72	8%
Cabbage	96	7%
Lettuce	97	7%
Potatoes	145	2%
Apples	96	2%

Despite evidence that ‘forever chemicals’ are already present in the majority of people’s blood, there is relatively little UK research looking into the associated health problems – a situation often used by the government and chemicals industry to delay action.**(4)** However, peer-reviewed studies conducted in other countries have connected PFAS exposure to a range of serious health problems including an increased risk of cancer and decreases in both fertility and the immune system’s ability to fight infections.**(5)** There is particular concern over childhood exposure since PFAS has also been linked to behavioural changes as well as developmental effects or delays in children, including low birth weight and accelerated puberty.**(6)**

The results analysed by PAN UK were taken from the latest data from the UK Government's Expert Committee on Pesticide Residues in Food (PRiF) which tests roughly 2,500 one-kilogram samples of food each year. **(7)** Food items are taken from the shelves of supermarkets and other food outlets across Great Britain, meaning that all food tested was originally destined to be purchased and eaten by ordinary consumers.

PAN UK's findings mirror recent research revealing that residues of 31 different PFAS pesticides were detected in European fruit and vegetables between 2011 and 2021. Like the UK, strawberries were found to be the most likely EU-grown produce to contain 'forever chemicals' with a high of 37% in 2021. **(8)** However, this figure is dwarfed by its UK equivalent which shows that, of the 55 samples of UK-grown strawberries tested in 2022, 91% (50) contained residues of PFAS pesticides.

There are 25 PFAS pesticides currently in use in the UK, six of which are classified as 'Highly Hazardous'. **(9)** The list includes the insecticide lambda-cyhalothrin which, in addition to being a 'forever chemical', is highly toxic to both humans and bees. **(10)** In 2022, 9,200 kg of lambda-cyhalothrin was applied to 1.69 million hectares of UK land, the equivalent of eleven times the size of Greater London. **(11)** Farmers are generally unaware that they are spraying 'forever chemicals' on their crops because there is no information on the label.

The Environment Agency does not actively sample rivers for any of the 25 PFAS pesticides currently in use in the UK, so the extent to which these chemicals are running off agricultural fields to contaminate rivers and other water sources remains unknown. **(12)**

Mole added, *"Pesticides are the only chemicals that are designed to be toxic and then released intentionally into the environment. Despite this, the UK government's much-delayed plans for limiting the negative impacts of PFAS focus solely on industrial chemicals, ignoring pesticides entirely. **(13)** PFAS pesticides are absolutely unnecessary for growing food and are an easily avoidable source of PFAS pollution. Getting rid of them would be a massive win for consumers, farmers and the environment."*

Dr Shubhi Sharma from CHEM Trust said: *"PFAS are a group of entirely human-made chemicals that didn't exist on the planet a century ago and have now contaminated every single corner. No one gave their consent to be exposed to these harmful chemicals, we haven't had the choice to opt out, and now we have to live with this toxic legacy for decades to come. The very least we can do is to stop adding to this toxic burden by banning the use of PFAS as a group"*.

PAN UK is urging the UK government to urgently ban the 25 PFAS pesticides currently in use and increase support for farmers to help them end their reliance on chemicals and adopt safer and more sustainable alternatives. The organisation is also echoing health and environment NGOs that are calling for the UK to work towards achieving a PFAS-free economy by 2035. **(14)**

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NOTES TO EDITOR:

- (1) All data related to pesticide residues in food is based on PAN UK's analysis of the UK Government's Expert Committee on Pesticide Residues in Food (PRiF) latest testing results (2022) which can be downloaded at: https://s3.eu-west-1.amazonaws.com/data.defra.gov.uk/PRiF/2022_PRiF_Annual_Data.ods

The ten PFAS pesticides found in this data were as follows:

PFAS pesticide active substance	Type of pesticide	Found in... <i>(According to 2022 results of UK government residue testing programme)</i>
Cyflufenamid	Fungicide	Grapes, strawberries
Flubendiamide	Insecticide	Spice
Fluopicolide	Fungicide	Cabbage, cucumber, lettuce, spinach
Fluopyram	Fungicide	Beans, cherries, cucumber, grapes, lettuce, peaches/nectarines, potatoes, strawberries, tomatoes
Lambda-cyhalothrin	Insecticide	Apricots, beans, cabbage, cherries, grapes, lettuce, peaches/nectarines, spinach, strawberries, tomatoes
Pyridalyl	Insecticide	Tomatoes
Sulfoxaflor	Insecticide	Apples, beans, cabbage, cherries, cucumber, grapes, lettuce, peaches/nectarines, spinach, strawberries
Tau-fluvalinate	Insecticide	Cabbage, cherries, spinach
Tetraconazole	Fungicide	Apples, beans, grapes
Trifloxystrobin	Fungicide	Apricots, beans, cherries, grapes, peaches/nectarines, strawberries, tomatoes

- (2) Koskela et al, "Perfluoroalkyl substances in human bone: concentrations in bones and effects on bone cell differentiation" (2017): <https://www.nature.com/articles/s41598-017-07359-6>
- (3) Royal Society of Chemistry, "Cleaning up UK drinking water": <https://www.rsc.org/policy-evidence-campaigns/environmental-sustainability/sustainability-reports-surveys-and-campaigns/cleaning-up-uk-drinking-water/>
- (4) National Institute of Environmental Health Sciences (NIH), "Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)": <https://www.niehs.nih.gov/health/topics/agents/pfc>
- (5) The Lancet, "Forever chemicals: the persistent effects of perfluoroalkyl and polyfluoroalkyl substances on human health" (2023): [https://www.thelancet.com/journals/ebiom/article/PIIS2352-3964\(23\)00372-9/fulltext](https://www.thelancet.com/journals/ebiom/article/PIIS2352-3964(23)00372-9/fulltext)
- (6) Rapazzo et al, "Exposure to Perfluorinated Alkyl Substances and Health Outcomes in Children": A Systematic Review of the Epidemiologic Literature" (2017): <https://www.mdpi.com/1660-4601/14/7/691>
- (7) UK government's Expert Committee on Pesticide Residues in Food (PRiF), "Pesticide residues in food: results of monitoring programme": <https://www.gov.uk/government/collections/pesticide-residues-in-food-results-of-monitoring-programme>
- (8) PAN Europe, "Toxic Harvest The rise of forever PFAS pesticides in fruit and vegetables in Europe" (2024): <https://www.pan-europe.info/resources/reports/2024/02/toxic-harvest-rise-forever-pfas-pesticides-fruit-and-vegetables-europe>

- (9) Pesticide active substance approvals and expirations are taken from the UK government's GB approvals register: <https://www.hse.gov.uk/pesticides/pesticides-registration/active-substance-register.xlsx>

Pesticide product approvals are taken from the UK government's Pesticides Register of Great Britain and Northern Ireland Authorised Products:
<https://secure.pesticides.gov.uk/pestreg/ProdSearch.asp>

PAN International List of Highly Hazardous Pesticides (2021): http://pan-international.org/wp-content/uploads/PAN_HHP_List.pdf

The 25 PFAS pesticides currently approved for use in the UK are:

PFAS pesticide active substance approved for use in UK	Type of pesticide	Number of pesticide products approved in the UK	UK approval expiry date	Highly Hazardous Pesticide?
Cyflufenamid	Fungicide	24	31/03/2026	
Cyflumetofen	Acaricide	1	31/05/2026	
Diflufenican	Herbicide	143	31/12/2027	
Flazasulfuron	Herbicide	26	31/07/2032	
Flonicamid	Insecticide	15	31/08/2026	
Fluazifop-P	Herbicide	3	31/12/2026	
Fluazinam	Fungicide	46	28/02/2029	Yes
Flufenacet	Herbicide	127	31/10/2027	
Fluopicolide	Fungicide	1	31/05/2026	
Fluopyram	Fungicide	25	31/01/2029	
Flutolanil	Fungicide	5	28/02/2029	
Lambda-Cyhalothrin	Insecticide	50	31/03/2026	Yes
Mefentrifluconazole	Fungicide	14	20/03/2029	
Oxathiapiprolin	Fungicide	10	03/03/2027	
Penthiopyrad	Fungicide	9	31/05/2025	
Picolinafen	Herbicide	15	30/06/2031	
Prosulfuron	Herbicide	10	31/07/2028	
Pyroxulam	Herbicide	6	30/04/2025	
Sulfoxaflor	Insecticide	1	18/08/2025	Yes
Tau-Fluvalinate	Insecticide	8	31/08/2029	Yes
Tefluthrin	Insecticide	2	01/01/2012	Yes
Tembotrione	Herbicide	1	31/07/2028	
Tetraconazole	Fungicide	1	31/12/2028	Yes
Trifloxystrobin	Fungicide	45	31/07/2033	
Triflusulfuron-methyl	Herbicide	29	31/12/2028	

- (10) University of Hertfordshire Pesticide Properties DataBase, "Lambda-cyhalothrin":
<https://sitem.herts.ac.uk/aeru/ppdb/en/Reports/415.htm>

- (11) UK government's Pesticide Usage Survey Statistics (PUS STATS):
<https://pusstats.fera.co.uk/data>
- (12) Environment Agency, "Water Quality Archive": <https://environment.data.gov.uk/water-quality/def/determinand-groups.html>
- (13) Health and Safety Executive, "Analysis of the most appropriate regulatory management options" (April 2023): <https://www.hse.gov.uk/reach/assets/docs/pfas-rmoa.pdf>
- (14) PFAS Free, "Joint NGO Action Plan for PFAS" (2023):
<https://www.pfasfree.org.uk/download/joint-ngo-action-plan-pfas>