TECHNICAL BULLETIN

PFAS in fresh produce

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Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are compounds with carbon atoms linked to each other and bonded to fluorine atoms at most, or all the carbon bonding sites. These 'forever chemicals' are used in household products and certain pesticides and have the ability to persist in the environment and accumulate in living organisms.

The maximum levels for PFAS in certain foods are laid out in Regulation (EC) 2022/2388 which specifically focuses on limits for perfluorooctane sulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), and perfluorohexane sulfonic acid (PFHxS), which are types of PFAS that are or have been widely used for commercial and industrial purposes.

Since Brexit, the United Kingdom has operated its own version of the REACH regime, compliance which is overseen by the Health and Safety Executive (HSE). Currently, there are just two UK REACH restrictions of PFAS in force within the UK – PFOA and PFOS.

These chemicals are generally used in household products such as non-stick cookware, however, certain pesticides contain PFAS which then could make it into humans via diet.

While the full impact of PFAS pesticides are not well understood, 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. Estimates of the time it takes PFAS to fully degrade in the environment range from a decade to over 1,000 years.

A review of the UK government testing programme (2023) by Pesticide Action Network (PAN) UK (https://www.pan-uk.org/site/wp-content/uploads/PANUK_PFAS_PressRelease.pdf), revealed the presence of PFAS pesticides 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.

Whilst the study reports a wide range of fruit and vegetables commonly consumed in the UK to contain PFAS pesticides, there is no supporting data available on the actual level of PFAS present.

The table over page shows 55 pesticides that contain PFAS and the current EU and GB approval status. Many actives are no-longer approved for use however, historic use of these pesticides and the persistent nature of PFAS resulting from their breakdown will contribute to the contamination within the environment; and enter the food chain. Therefore, a clearer understanding of the hazards can only be established by the specific analysis of PFAS in the foods we consume.

> "PAN UK's findings mirror PAN Europe's recent research revealing that residues of 31 different PFAS pesticides were detected in European fruits 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. (4\2) However, the situation in the UK is even worse: of the 55 samples of UK-grown strawberries tested in 2022, 91% contained residues of PFAS pesticides."
>
> **PAN UK, APRIL 9, 2024**

Contact us to find out more about our PFAS analysis service

+44 (0) 151 350 6666
ukenquiries@sgs.com
sgs.com/food
sgs.com/linkedinagrifood

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This table shows a list of common pesticides containing PFAS and the regulatory status (as of April 2024) for both Europe (EU) and Great Britain (GB)

Pesticide active ingredient	General uses	EU approved	GB approved
Acifluorfen-sodium	Herbicide for crops, ornamentals, and rights-of-way		
Benfluralin	Herbicide for crops, ornamentals, and rights-of-way		
Bicyclopyrone	Herbicide for crops		
Bifenthrin	Insecticide for crops and household pests		
Broflanilide	Insecticide for crops and household pests		
Bromethalin	Rodenticide for crops, parks, and households		
Chlorfenapyr	Insecticide for crops and ornamentals		
Cyflufenamid	Fungicide for crops and ornamentals	✓	✓
Cyflumetofen	Insecticide for crops and ornamentals	✓	✓
Gamma - Cyhalothrin	Insecticide for livestock and poultry housing and pet kennels	✓	✓
Lambda-Cyhalothrin	Insecticide for crops and ornamentals	✓	✓
Dithiopyr	Herbicide for lawns and turf		
Ethalfluralin	Herbicide for crops		
Fipronil	Insecticide for household pest control, including pet flea/tick treatments, ornamentals, landscapes, and trails.		
Fluazifop-P-butyl	Herbicide for crops, ornamentals, and landscapes	✓	✓
Fludioxonil	Fungicide for crops and ornamentals	✓	✓
Fluensulfone	Nematicide for crops, ornamentals, and lawns		
Flufenacet	Herbicide for crops	✓	✓

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Pesticide active ingredient	General uses	EU approved	GB approved
Fluopicolide	Fungicide for crops, ornamentals, and landscapes	✓	✓
Fluopyram	Fungicide and nematicide for crops, ornamentals, and landscapes	✓	✓
Fluridone	Herbicide for aquatic environments		
Flurprimidol	Plant growth regulator for ornamentals and landscapes		
Flutolanil	Fungicide for crops and ornamentals	✓	✓
Fluvalinate	Insecticide for crops and ornamentals		
Fomesafen	Herbicide for crops		
Hexaflumuron	Termiticide		
Hydramethylnon	Insecticide for household pests		
Indoxacarb	Insecticide for crops and household use, including flea control on pets		✓ until 31/10/24
Lactofen	Herbicide for crops and ornamentals		
Mefentrifluconazole	Fungicide for crops, ornamentals, and turf	✓	✓
Norflurazon	Herbicide for cranberries		
Novaluron	Insecticide for crops, animal agriculture settings, ornamentals, and landscapes		
Noviflumuron	Termiticide		
Oxathiapiprolin	Fungicide for crops	✓	✓
Oxyfluorfen	Herbicide for crops and ornamentals	✓ until 21/12/24	✓ until 31/10/24
Penoxsulam	Herbicide for crops, lawns, and aquatic settings	✓	✓

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Pesticide active ingredient	General uses	EU approved	GB approved
Penthiopyrad	Fungicide for crops and turf	✓	✓
Picoxystrobin	Fungicide for crops		
Prodiamine	Herbicide for ornamentals and landscapes		
Prosulfuron	Herbicide for cereal crops	✓ until 31/7/24	✓
Pyrasulfotole	Herbicide for cereal crops	-	-
Pyridalyl	Insecticide for crops and ornamentals	✓	✓
Pyrifluquinazon	Insecticide for crops		
Pyroxasulfone	Herbicide for crops, non-crop areas, and fallow land		
Saflufenacil	Herbicide for crops, non-crop areas, and fallow land		
Tefluthrin	Insecticide for crops	✓	✓
Tembotrione	Herbicide for corn	✓	✓
Tetraconazole	Fungicide for crops and ornamentals	✓	✓
Tetraniliprole	Insecticide for crops and landscapes		
Tiafenacil	Herbicide for crops and fallow land		
Tralopyril	Algaecide for antifouling paint on boat bottoms		
Trifloxystrobin	Fungicide for crops and ornamentals	✓	✓
Triflumizole	Fungicide for crops and ornamentals		
Trifluralin	Herbicide for crops and ornamentals		
Triflusulfuron-methyl	Herbicide for sugar beets		✓

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