Pesticides Containing a Single Fluorinated Carbon

- EPA undertakes comprehensive scientific assessments to evaluate any potential pesticide risks to human health and the environment
- EPA ensures that no human health risks of concern exist when pesticides are used according to the label
- Many of the uses of these pesticides are reduced risk compared to other product uses currently on the market
- When setting dietary limits, EPA ensures with “reasonable certainty” that no harm will result to human health
- In 2023, EPA's Office of Pollution Prevention and Toxics (OPPT) established a definition for PFAS that specifically does not include single fluorinated carbons

- Extensive scientific evidence and public input demonstrate molecules with only one fluorinated carbon generally lack the persistence and bioaccumulation properties that are commonly associated with forever chemicals.
- Single fluorinated pesticides registered or proposed for use by EPA have been registered in other countries, including the European Union, Canada, and Australia, among others

EPA's pesticides program is committed to protecting human health and the environment through rigorous, science-based evaluation. As part of its obligation to ensure that all pesticide products and uses are safe, EPA evaluates them using gold-standard science, robust data requirements, and comprehensive assessment methodologies. This process ensures that EPA's pesticide reviews allow farmers and other users to have the tools they need to control pests to provide for a safe and abundant food supply while maintaining the highest standards to ensure human health and the environment are protected.

In 2023, the Biden EPA that went through a public rulemaking process and clearly defined PFAS as not including single fluorinated compounds. This deliberate exclusion of single fluorinated carbons was based on extensive scientific evidence and public input

demonstrating that molecules with only one fluorinated carbon lack the persistence and bioaccumulation properties that are commonly associated with forever chemicals.

EPA-approved single fluorinated compounds are not forever chemicals, they are not PFAS, and do not pose any risks of concern when used as labeled.

These compounds are also not the same as those that are commonly used to fluoridate drinking water and would have no fluoridation uses; they happen to contain fluorine atoms, like many other naturally occurring and synthetic compounds.

Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), a pesticide cannot be registered unless EPA determines its use will not pose unreasonable adverse effects on human health or the environment. The same standard applies to pesticides that contain a single fluorinated carbon. Regardless of whether a chemical meets a specific structural definition or is part of a category or class of chemicals, the Agency utilizes a comprehensive assessment process under FIFRA to evaluate the potential risks of pesticide use. This robust, chemical-specific process considers both hazard and exposure in determining whether the pesticide under review may pose risk to human health and the environment.

EPA's rigorous evaluation process concludes no human health risks of concern when approved pesticides are used according to their approved

labels. This assessment includes comprehensive toxicity studies across multiple species and life stages, specific evaluation of children's safety and developmental effects, assessment of reproductive and chronic health impacts and environmental fate and exposure analysis.

These pesticides undergo the same gold-standard scientific evaluation required for all EPA pesticide registrations under FIFRA, including studies mandated by 40 CFR 158. Uses of single fluorinated carbon compounds can represent significantly reduced risks and greater benefits over older alternatives.

When setting tolerances (the maximum amount of pesticide residue legally allowed on foods), the Federal Food, Drug, and Cosmetic Act (FFDCA) requires EPA to ensure that a “reasonable certainty of no harm” will result from the combined exposure to food and water. This includes residues from both the parent pesticide (i.e., the pesticide being registered) as well as any breakdown products. During the risk assessment process of setting these tolerances, EPA takes a conservative approach to ensure that we meet the requirements under FFDCA. This includes the application of safety factors to hazard values and the assumption that people are consuming foods containing maximum residue levels. The actual residues in food, as confirmed by comprehensive monitoring from USDA, are typically well below the tolerances set by EPA. As with all registered pesticides, EPA has

thoroughly evaluated approved pesticides containing a single fluorinated carbon to ensure they meet this strict safety standard.

These rigorous processes rely on a variety of data sources, including registrant-submitted data that meet stringent EPA regulatory requirements, publicly available scientific literature, and feedback received from stakeholders through public comments. EPA ensures transparency by issuing public notices in the Federal Register and offering the public opportunity to comment on applications for products containing new active ingredients and significant uses, including those that contain a single fluorinated carbon. This multi-layered approach ensures that every scientific aspect of these compounds is thoroughly evaluated before any registration decision is made.

For consumers who remain concerned despite the safety data, organic products remain available and popular. However, it must also be noted that organic does not mean pesticide-free. Organic farming also relies on pesticides for crop protection and some organic-approved pesticides have higher toxicity profiles than modern synthetic alternatives.

To learn more about EPA's rigorous adherence to gold standard science and safety in the approval of single fluorinated carbon compounds, read our fact check <https://epa.gov/newsreleases/fact-check-epa-debunks-false-claims-agency-recently-approved-forever-chemical>.

Below is a list of frequently asked questions regarding pesticidal substances containing a single fluorinated carbon and how they are evaluated by the Agency to better inform the public about EPA's gold-standard science pesticide registration process. This web page does not, and is not intended to, interpret or amend any regulatory or statutory provision, nor does it consider, decide, or prejudge any pending petitions for rulemaking under the pesticide program. Rather, this information is being provided purely on an informational basis. EPA does not, and will not, use the information on the webpage for any regulatory purpose.

How does EPA evaluate pesticides containing a single fluorinated carbon?

Under FIFRA, EPA must ensure that any pesticide registered by the Agency does not pose unreasonable adverse effects on human health or the environment through comprehensive evaluation. This standard applies to every pesticide. Pesticides containing a single fluorinated carbon undergo the same rigorous, science-based assessment. As part of EPA pesticide registration decisions, EPA evaluates a broad range of factors, including whether a compound or its degradates are persistent in the environment; whether they may bioaccumulate;

and whether they pose a particular hazard (e.g., reproductive or chronic toxicity) to humans, wildlife, or other off-target vegetation.

EPA may only register a pesticide for use once the Agency's scientific evaluation demonstrates it does not pose unreasonable adverse effects, regardless of whether the molecule contains a single fluorinated carbon. This determination applies equally to all pesticides, ensuring consistent application of the highest scientific standards.

Are there any benefits of pesticides containing a single fluorinated carbon?

Yes, registered pesticides that contain a single fluorinated carbon may offer many benefits for farmers, users, and the public. Some of these products offer new uses for farmers of specialty and minor use crops, such as fruits and vegetables, who often have fewer tools available to protect crops from pests. These products may end up being more effective, which in turn could lead to potentially high crop yields, more efficient utilization of cropland, and less water and pesticide usage. Other products have offered new modes of action for controlling pests, which helps with managing pest resistance and can be incorporated into

Integrated Pest Management (IPM) strategies. <https://epa.gov/safepestcontrol/integrated-pest-management-ipm-principles>

Over time, pesticide manufacturers have moved away from classes of chemicals, such as organochlorines (DDT, dieldrin, etc.), that are generally more toxic and can accumulate in the environment and food chains. Many single fluorinated carbon compounds can be a less toxic alternative compared to some legacy pesticides. Some uses of these pesticides have also qualified for reduced risk status <https://epa.gov/pesticide-registration/conventional-reduced-risk-pesticide-program>. EPA individually evaluates every proposed pesticidal compound to ensure its use does not pose unreasonable adverse effects to human health or the environment and meets the standard for registration.

Have other countries registered pesticides containing a single fluorinated carbon?

Yes, pesticides containing a fluorinated carbon registered or proposed for registration by EPA in recent years have also been registered or are

being considered for registration by other countries. This includes the European Union, United Kingdom, Canada, Australia, Brazil, Argentina, New Zealand, and South Korea, among others.

Dozens of pesticides containing single fluorinated carbons have been registered over the past several decades by both Republican and Democrat administrations, including the Biden Administration's 2023 registration of fluazaindolizine and dozens of similar approvals spanning multiple previous administrations.

Background on the Definition of PFAS

In 2023, EPA's Office of Pollution Prevention and Toxics (OPPT) in a final rule defined PFAS as a chemical containing at least one of these three structures:

1. R-(CF2)-CF(R')R'', where both the CF2 and CF moieties are saturated carbons

1. R-CF2OCF2-R', where R and R' can either be F, O, or saturated carbons

1. CF3C(CF3)R'R'', where R' and R" can either be F or saturated carbons.

In its response to comments, OPPT explained that molecules containing a single, fully or partially fluorinated carbon are less likely to persist in the environment or pose greater

bioaccumulation or toxicity risks than molecules with two or more fluorinated carbons.

Last updated on November 26, 2025