

Biopesticides

Biopesticides are pesticides and need to be addressed as an integral part of the activity's IEE or EA using the Pesticide Procedures found in 22 CFR 216.3(b). The "Pesticide Evaluation Report – Safe Use Action Plan" (PERSUAP) is just an informal and convenient name we often give to the analysis that is undertaken to address the twelve elements required under 216.3(b) for that section of the activity's IEE or EA. While pesticides that are made from biological substances are often better and safer choices than those made from chemicals, they are not always. For example, some strains of bacteria can be very safe when correctly used but others can create serious problems for beneficial or non-target species. For example, the bacterium *Actinomyces* which is marketed to control caterpillars and thrips has had some recent questions raised about its potentially negative effect on wild bees which are essential for pollinating crops. Or rotenone, nicotine, and pyrethrum based pesticides can create poisoning problems for applicators if they are not properly used.

For additional background and explanation I have copied a helpful general definition of "pesticides" below which includes the definition of biopesticides within it; then a more detailed definition of "biopesticides", and then a short description of how EPA regulates biopesticides. These are taken from the US Environmental Protection Agency's website found at <http://www.epa.gov/pesticides> USAID is part of the US Government and EPA is the USG's lead agency on pesticides so we follow their definitions and look to their registrations and approved labels for pesticides.

There will always be some grey areas as to whether some substances are pesticides. For example, not long ago a Mission asked whether ordinary household bleach is a pesticide (it is not), and another asked if those bug zappers with the ultraviolet light lures are pesticides (they are not). However in most cases whether a substance is created from petrochemical ingredients or natural ingredients and its purpose is to kill pests (consider the two Latin roots of the word pesticide – "pestis" for pest and "cadaere" for kill) it is a pesticide that needs to be addressed under 216.3(b) procedures.

Biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. For example, canola oil and baking soda have pesticidal applications and are considered biopesticides. At the end of 2001, there were approximately 195 registered biopesticide active ingredients and 780 products. Biopesticides fall into three major classes:

(1) **Microbial pesticides** consist of a microorganism (e.g., a bacterium, fungus, virus or protozoan) as the active ingredient. Microbial pesticides can control many different kinds of pests, although each separate active ingredient is relatively specific for its target pest[s]. For example, there are fungi that control certain weeds, and other fungi that kill specific insects.

The most widely used microbial pesticides are subspecies and strains of *Bacillus thuringiensis*, or Bt. Each strain of this bacterium produces a different mix of proteins, and specifically kills one or a few related species of insect larvae. While some Bt's control moth larvae found on plants, other Bt's are specific for larvae of flies and mosquitoes. The target insect species are determined

by whether the particular Bt produces a protein that can bind to a larval gut receptor, thereby causing the insect larvae to starve

(2) Plant-Incorporated-Protectants (PIPs) are pesticidal substances that plants produce from genetic material that has been added to the plant. For example, scientists can take the gene for the Bt pesticidal protein, and introduce the gene into the plant's own genetic material. Then the plant, instead of the Bt bacterium, manufactures the substance that destroys the pest. The protein and its genetic material, but not the plant itself, are regulated by EPA.

(3) **Biochemical pesticides** are naturally occurring substances that control pests by non-toxic mechanisms. Conventional pesticides, by contrast, are generally synthetic materials that directly kill or inactivate the pest. Biochemical pesticides include substances, such as insect sex pheromones, that interfere with mating, as well as various scented plant extracts that attract insect pests to traps. Because it is sometimes difficult to determine whether a substance meets the criteria for classification as a biochemical pesticide, EPA has established a special committee to make such decisions.

Pest Control Devices

What about pest control devices? EPA also has a role in regulating devices used to control pests. More specifically, a "device" is any instrument or contrivance (other than a firearm) intended for trapping, destroying, repelling, or mitigating any pest. A mousetrap is an example of a device. Unlike pesticides, EPA does not require devices to be registered with the Agency. Devices are subject to certain labeling, packaging, record keeping, and import/export requirements, however.

For more information on devices, see [Pest Control Devices](#).

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What are the advantages of using biopesticides?

Biopesticides are usually inherently less toxic than conventional pesticides.

Biopesticides generally affect only the target pest and closely related organisms, in contrast to broad spectrum, conventional pesticides that may affect organisms as different as birds, insects, and mammals.

Biopesticides often are effective in very small quantities and often decompose quickly, thereby resulting in lower exposures and largely avoiding the pollution problems caused by conventional pesticides.

When used as a component of Integrated Pest Management (IPM) programs, biopesticides can greatly decrease the use of conventional pesticides, while crop yields remain high.

To use biopesticides effectively, however, users need to know a great deal about managing pests.

How does EPA encourage the development and use of biopesticides?

In 1994, the Biopesticides and Pollution Prevention Division was established in the Office of Pesticide Programs to facilitate the registration of biopesticides. This Division promotes the use of safer pesticides, including biopesticides, as components of IPM programs. The Division also coordinates the Pesticide Environmental Stewardship Program (PESP).

Since biopesticides tend to pose fewer risks than conventional pesticides, EPA generally requires much less data to register a biopesticide than to register a conventional pesticide. In fact, new biopesticides are often registered in less than a year, compared with an average of more than 3 years for conventional pesticides.

While biopesticides require less data and are registered in less time than conventional pesticides, EPA always conducts rigorous reviews to ensure that pesticides will not have adverse effects on human health or the environment. For EPA to be sure that a pesticide is safe, the Agency

requires that registrants submit a variety of data about the composition, toxicity, degradation, and other characteristics of the pesticide.

For More Information:

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Regulating Biopesticides

Highlights

- [2007 Biopesticide Research Program Guidelines and Grant Proposal Application Forms \(PDF\)](#) (495 KB, 43 pgs)
- [FY2007 Work Plan for New Biopesticide Active Ingredients](#)
- [EPA's Statement on Bt10](#)
- [FY2006 New Biopesticide Active Ingredients](#)
- [Highlights Archive](#)

Quick Resources

- [US Regulatory Agencies' Unified Biotechnology Website](#)
- [Current Plant Incorporated Protectant \(PIP\) Experimental Use Permits](#)
- [What are Biopesticides?](#)
- [Biopesticide Contacts at EPA](#)
- [Octenol Fact Sheet](#)
- [Recent Biopesticide Federal Register Notices](#)
- [Starlink™ Corn Archive](#)

Before a pesticide can be marketed and used in the United States, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires that EPA evaluate the proposed pesticide to assure that its use will not pose unreasonable risks of harm to human health and the environment. This regulation involves an extensive review of health and safety information.

Biopesticides include naturally occurring substances that control pests (biochemical pesticides), microorganisms that control pests (microbial pesticides), and pesticidal substances produced by plants containing added genetic material (plant-incorporated protectants) or PIPs.

The Biopesticide Registration Tools provide links to information tools to assist applicants. The Fact Sheets sections provides links to information about each of the biopesticide active ingredients. The Product Lists section provides various lists of individual biopesticide products to assist the public in identifying appropriate biopesticide product for pest problems. Finally, the PIPs section provides extensive information regarding the regulation of genetically engineered plants.

Biopesticide Registration Tools

The federal pre-marketing approval of pesticides - termed registration -- is a complex process. The documents linked from this page augment the general registration process as they relate specifically to the registration of biopesticides. The e-mail address bppdconsistency@epa.gov has been created to respond to issues concerning biopesticide registration inconsistency that affect processing of submissions.

Biopesticide Regulatory Action Leaders will meet to discuss these issues and provide an answer usually within two to three weeks. Resolution of these issues will be posted to this site.

Since this e-mail address is only for the submission of generic issues regarding consistency in the regulation of biopesticides. Other questions regarding biopesticides should be directed to the appropriate biopesticide Regulatory Action Leader or the Biopesticide Ombudsman, Brian Steinwand (steinwand.brian@epa.gov). If you have questions about conventional pesticides or antimicrobials, please contact the Ombudsman for the [Registration Division](#) or the [Antimicrobial Division](#).

Biopesticide Active Ingredient Fact Sheets

This collection of fact sheets contains chemical specific information about biopesticide active ingredients. Additionally, some of the fact sheets include a detailed technical document, bibliographies, regulatory history, Federal Register notices, and/or registrant and product lists.

Biopesticide Ingredient & Product Lists

Lists of EPA registered (approved) biopesticide ingredients & products are provided, including a [listing by active ingredient](#) (100k [PDF](#)), and lists of biopesticide active ingredients by year first approved.

Plant Incorporated Protectants (PIPs)

Plant-Incorporated Protectants are pesticidal substances produced by plants and the genetic material necessary for the plant to produce the substance. For example, scientists can take the gene for a specific Bt pesticidal protein, and introduce the gene into the plant's genetic material. Then the plant manufactures the pesticidal protein that controls the pest when it feeds on the plant. Both the protein and its genetic material are regulated by EPA; the plant itself is not regulated.