

Organic Pesticides and Biopesticides

Organic Pesticides

You may prefer to use a "natural" or "organic" pesticide when you need to control a pest. Organic pesticides are usually considered as those pesticides that come from natural sources. These natural sources are usually plants, as is the case with pyrethrum (pyrethrins), rotenone or ryania (botanical insecticides), or minerals, such as boric acid, cryolite, or diatomaceous earth. Organic pesticides are largely insecticides.

Even if a product is considered to be organic, it is still a pesticide. It is important to be careful when using any pesticide, even organic or natural pesticides. Just because a product is thought to be organic, or natural, does not mean that it is not toxic. Some organic pesticides are as toxic, or even more toxic, than many synthetic chemical pesticides. Organic pesticides have specific modes of action, just as do synthetic pesticides.

To determine the relative toxicity of any pesticide to humans, check the signal word given on the pesticide label. Least toxic products carry the signal word CAUTION on their label. Products with the signal word WARNING on the label are more toxic. The most toxic pesticides have the signal word DANGER on their labels. Signal words are not an indication of the potential for environmental harm.

While some organic pesticides may be nontoxic or are only slightly toxic to people, they may be very toxic to other animals. For instance, the organic pesticide ryania is very toxic to fish. Also, some organic pesticides may be toxic to beneficial insects, such as honeybees, if they are combined with other materials, such as combining pyrethrins with rotenone.

All pesticides, according to law, can only be used EXACTLY according to label directions. Be sure to carefully read the label of ANY pesticide you use and follow the instructions exactly as they are written. Be sure you use all pesticide products only when and where the label says they can be used.

Biopesticides

Biopesticides are an important group of pesticides that can reduce pesticide risks. Biopesticides, in general:

- Have a narrow target range and a very specific mode of action;
- Are slow acting;
- Have relatively critical application times;
- Suppress, rather than eliminate, a pest population;
- Have limited field persistence and a short shelf life;
- Are safer to humans and the environment than conventional pesticides;
- Present no residue problems.

The two types of biopesticides are biochemical and microbial. Biochemical pesticides may have a similar structure to, and function like, naturally occurring chemicals, and have nontoxic modes of action.

Insect pheromones, for example, are naturally-occurring chemicals that insects use to locate mates. Man-made pheromones are used to disrupt insect mating by creating confusion during the search for mates, or can be used to attract male insects to traps. Pheromones are often used to detect or monitor insect populations, or in some cases, to control them.

Microbial insecticides are another kind of biopesticide. They come from naturally-occurring or genetically altered bacteria, fungi, algae, viruses or protozoans. They suppress pests by:

- Producing a toxin specific to the pest;
- Causing a disease;
- Preventing establishment of other microorganisms through competition; or
- Other modes of action.

An example of a microbial pesticide is *Bacillus thuringiensis*, or "Bt." *Bacillus thuringiensis* is a naturally occurring soil bacteria that is toxic to the larvae of several species of insects but not toxic to nontarget organisms. *Bacillus thuringiensis* can be applied to plant foliage or incorporated into the genetic material of crops. *Bacillus thuringiensis*, as discovered, is toxic to the caterpillars (larvae) of moths and butterflies. Several strains of *Bt* have

been developed and now strains are available that control fly larvae. These can be used in controlling mosquitoes and blackflies.

Parts of this publication come from information supplied by the United States Environmental Protection Agency

Prepared by Robert G. Bellinger, Extension Pesticide Coordinator, Clemson University. (New 03/99.)

This information is supplied with the understanding that no discrimination is intended and no endorsement by the Clemson University Cooperative Extension Service is implied. All recommendations are for South Carolina conditions and may not apply to other areas. Use pesticides only according to the directions on the label. All recommendations for pesticide use are for South Carolina only and were legal at the time of publication, but the status of registration and use patterns are subject to change by action of state and federal regulatory agencies. Follow all directions, precautions and restrictions that are listed.