



Choosing an Insecticide for Bed Bugs

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Division of Environmental Health
Pesticide Control Program

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Bed bugs are very tough! Most insecticides that are available to the public **WILL NOT** kill bed bugs. Often the bugs just hide until the insecticide dries up and is no longer effective. Sometimes bed bugs move to avoid insecticides, and end up in nearby rooms or apartments.

There are no magic sprays that will get rid of a bed bug infestation. Using a chemical to get rid of bed bugs **WILL NOT WORK** unless you also remove clutter, clean and launder everything, seal off hiding places, and follow other, non-chemical steps to control bed bugs. Without special training about how and where to apply chemicals, which depends on the specific circumstances, consumers are not likely to effectively control bed bugs with chemicals.



Consumers are strongly discouraged from using chemicals to control bed bugs.

AFTER you have followed all the steps in *Controlling Bed Bugs: a Step-by-Step Guide for Alaskans* (available at <http://dec.alaska.gov/eh/pest/bedbugs/>) if you decide you still want to use insecticides yourself, there is a **LOT** of information you need to know.

If You Decide to Use an Insecticide

- ✓ Make sure you select an insecticide that is labeled for **indoor use**. There are very few insecticides that can safely be used indoors, where there is a greater risk of exposure, especially for children and pets. If you use an insecticide that is labeled for garden, outdoor, or agricultural use you could cause serious health problems for people and pets in your home.
- ✓ Make sure the insecticide specifically says that it is effective against **bed bugs**. Most insecticides don't work at all on bed bugs.
- ✓ **Follow ALL directions** on the insecticide label carefully.
- ✓ **NEVER apply more than the listed amount**. If it doesn't work the first time, applying more will not solve the problem.
- ✓ **Don't** use any insecticide on a mattress or bedding unless the product label specifically says it can be applied there.



Call the Pros!

If chemical controls are going to be used for bed bugs, consumers are strongly encouraged to work with a certified pest control professional.

Certified pest control professionals have special, training, equipment, and methods to help control bed bugs. They also have access to more effective insecticides.

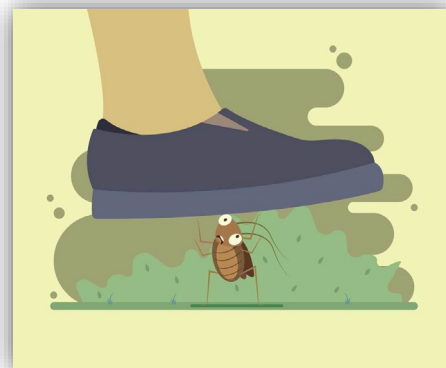
Some pest control companies will do telephone consultation and assistance for remote areas.

Type of Pesticides

Contact Insecticides

There are many different types of liquids, sprays, and aerosols that claim to kill bed bugs. Most state that they **kill on contact.** This sounds good, but it actually means that you have to spray it directly ON the bed bug for it to work. It will not be effective on bugs that are hiding, and it won't kill eggs either. For most sprays, once it dries it will no longer work.

If you can see the bed bug well enough to spray it, it would be quicker, cheaper, and safer to just squish the bug or vacuum it up. Contact insecticides are not an effective way to control bed bugs.



Other Sprays

Some sprays leave behind **chemical residues** that are meant to kill bed bugs after the product has dried. Unfortunately, bed bugs don't usually die just from walking across a sprayed area. They need to sit on the dried product – sometimes for several days – to absorb enough to kill them. These products can be effective when sprayed into cracks, baseboards, seams, and smaller areas where bed bugs like to spend time.

Pyrethroid Products

Most insecticides that are labeled for indoor use are made from a type of insecticide in the pyrethroid family. However, bed bugs are highly resistant to pyrethroids. Studies show that bed bugs have developed unique ways to protect themselves from these insecticides. **Pyrethroid products are not effective bed bug killers** unless mixed with other products.

Pyrethroid products are often mixed with other types of insecticides; some of these mixtures can be effective against bed bugs. Look for products containing pyrethroids plus piperonyl butoxide, imidicloprid, acetamiprid, or dinetofuran.

Pyrethroids Include:

- Allethrin
- Bifenthrin
- Cyfluthrin
- Cyhalothrin
- Cypermethrin
- Cyphenothrin
- Deltamethrin
- Esfenvalerate
- Etofenprox
- Fenpropathrin
- Fenvalerate
- Fluvalinate
- Imiprothrin
- Permethrin
- Prallethrin
- Resmethrin
- Sumithrin
(d-phenothrin)
- Tefluthrin
- Tetramethrin
- Tralomethrin
- Other products ending in "thrin"

Insecticide Dusts

There are many types of insecticidal dusts, but only some are effective against bed bugs. Dusts can be dangerous to people and pets if they are inhaled, so they must be applied carefully.

Dusts should be applied in cracks and crevices or other protected areas for two reasons. First, bed bugs tend to hide in these areas, so there is a better chance of the pesticide affecting them there. Second, there is less risk of disturbing the dust so that it drifts into open areas where it could be inhaled.

Dusts can be applied to areas like behind headboards, along the bed frame, and under baseboards. Dusts can also be puffed in behind electrical outlets and switch plates and used in the empty spaces behind walls to catch bed bugs travelling from one room to another.

It only takes a very light layer of dust to work. To be affected, bed bugs must walk through the dust, which then sticks to them. Bed bugs are very small and they will tend to avoid thicker layers of dust. Also, too much dust is more likely to become airborne, which could be dangerous. One of the best ways to apply a thin layer of dust is using a dry paintbrush. A 'puffer' is used to apply dust into wall voids or crevices.

- **Diatomaceous earth** is an all-natural dust product that is often advertised as being effective against bed bugs. This product is effective against many insects, but does not work well against bed bugs. Diatomaceous earth works by scraping or chafing away the waxy outer coating of an insect, which then causes the insect to lose so much moisture it dies. Recent studies have shown that diatomaceous earth is not an effective bed bug killer because the bed bugs are not prone to water loss and are tolerant of dehydration.
- **Boric acid** is another dust that is often suggested to combat bed bugs. This product is effective against many insects, but not against bed bugs. Boric acid is a stomach poison, so it must be eaten in order to work. Bed bugs feed only on blood, and will not ingest boric acid dust. As a result, boric acid will not kill bed bugs.
- **Other Insecticidal Dusts** - Some insecticidal dusts combine silica with other insecticides. Bed bugs won't die immediately from these dusts. They need to sit on the dust – sometimes for several days – to absorb enough to kill them. These products can be effective when applied in cracks, baseboards, seams, and smaller areas where bed bugs like to hide.

Foggers or “Bug Bombs”

Many total release foggers (also called “bug bombs”) are labeled for treatment of bed bugs. However, studies show that foggers or bug bombs are ineffective against bed bugs, and they present several dangers.

- Most foggers use pyrethroids. As discussed above, bed bugs are highly resistant to this type of chemical, and are not affected by brief exposure to the low concentrations provided by foggers.
- Foggers can't reach the tiny cracks and crevices where bed bugs hide.
- While foggers may not kill bed bugs, the bugs don't like the residue, and are likely to move away from it. This may cause bed bugs to move into new rooms or apartments, making an infestation even harder to treat.
- Numerous explosions and house fires have been caused by foggers.
- Foggers also scatter insecticides throughout the living area, which could expose you, your children, and your pets to the insecticide residue.



Insecticide Strips

Insecticide strips may be an option for treating smaller items that can't be laundered, like luggage, pillows, or books. Items are placed in an airtight container with insecticide strips. These strips work by releasing odorless vapors that build up inside the container over several days and kill bed bugs. Most strips contain dichlorvos (DDVP) or permethrin.

Insect Growth Regulators

An insect growth regulator interferes with an insect's ability to develop from a nymph into a reproductive adult. There is only one insect growth regulator that is labeled for bed bug control; hydroprone, which is available as a liquid or an aerosol. This product is designed to be sprayed into cracks and crevices where young bed bug nymphs will come in contact with the dried residues.

Recent laboratory studies have shown that hydroprone does not sterilize bed bugs. Although many bed bugs die during or shortly after molting to adulthood, those that survive are still able to feed, mate, and produce at least one batch of eggs. As a result, hydroprone products are not an effective way to control bed bugs, even though bed bugs are listed on the label.

Some studies show that the insect growth regulator methoprene may be effective against bed bugs.

Insect Repellents

Some insecticide products work to repel bugs (make them stay away). There are many effective repellents for insects such as mosquitoes, cockroaches, and ants. However, none of the current insecticide products appear to be repellent to bed bugs, especially once the product dries. Insect repellents and insecticides will not repel bed bugs.

Insect Baits

Baits used to control ants and cockroaches kill the insect after they eat the bait. Bed bugs feed only on blood, so they will not consume insect baits. Insect baits will not kill bed bugs.

"All-Natural" Pesticide Products

Most natural products are contact sprays or repellents. As explained above, contact sprays and repellents are not effective against bed bugs.

Home Remedies

Do not try to kill bed bugs with home remedies like rubbing alcohol, kerosene, gasoline, bleach, cedar oil, or thyme oil. These products will not work, and some could even be dangerous to you and your family.

Foreign Products

Do not purchase insecticides from foreign countries. Many nations do not require the rigorous safety testing for insecticides that we do in the United States. Some nations also use active ingredients that are no longer allowed in the United States because they are dangerous.

Summary

Just because a product says that it will kill bed bugs, does not necessarily mean it will help control your bed bug problem!

DO NOT use these types of products:

- Pesticides that contain only Pyrethroids (see list above)
- Diatomaceous earth
- Boric Acid
- Products that claim to “kill on contact”
- Total release foggers or “bug bombs”
- Pesticides that contain only Hydroprene
- Insect baits
- “All natural” products
- Home remedies
- Foreign products

AFTER you have cleaned, vacuumed, and followed all the other steps in Controlling Bed Bugs: a Step-by-Step Guide for Alaskans (available at <http://dec.alaska.gov/eh/pest/bedbugs/>), if you decide you still want to use insecticides yourself, follow these tips:

- Apply silica dusts to cracks and crevices ONLY
- Look for products that contain the active ingredients
 - piperonyl buteroxide
 - imidicloprid
 - acetamiprid, or
 - dinetofuran.
- Make sure the product label specifically says that it is meant to be used for bed bugs
- Follow the label directions carefully.

Active Ingredients are listed on the product label



To control General Household Pests indoors and around the exterior perimeter of residential, institutional, public, commercial, and industrial buildings.

EPA Reg. No. 8033-96-279 EPA Est. No. 279-NY-1

Active Ingredient:	By Wt.
Acetamiprid	22.73 %
Bifenthrin	27.27 %
Inert Ingredients:	50.00 %
	100.00%

*Cis isomers 97% minimum, trans isomers 3% maximum.

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

FIRST AID	
If swallowed	<ul style="list-style-type: none"> • Call poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
On skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.

HOTLINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-(800)-331-3148 for Emergency Assistance.

NOTE TO PHYSICIAN

This product contains a pyrethroid. If large amounts have been ingested, the stomach and intestine should be evacuated. Treatment is symptomatic and supportive. Digestible fats, oils, or alcohol may increase absorption and so should be avoided. All treatments should be based on observed signs and symptoms of distress in the patient. Overexposure to materials other than this product may have occurred.

For Information Regarding the Use of this Product Call 1-800-321-1FMC (1362).