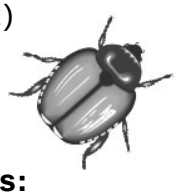
PESTICIDE INFO

# *Bacillus thuringiensis*

**ALWAYS READ AND FOLLOW THE LABEL**

*Information on this page is not to be substituted for label directions*

**Active Ingredient (a.i.):**
*Bacillus thuringiensis* (Bt)



**Target Pest Category:**
insecticide

**Examples of Trade Names:**
Dipel, Foray, Bioprotec, Vectobac, Thuricide, BTK

**What it is:**
A biological insecticide (biopesticide) produced by fermentation of the naturally-occurring soil bacterium *Bacillus thuringiensis*. The bacteria form spores that are killed before being made into commercial pesticide products. When they form spores they also produce a crystal-like structure that is toxic to certain groups of insects.

**Chemical Family:**
Microbial

**Types of Formulation:**
granules, wettable powder, aqueous concentrate, powder

**How it works** (Mode of Action)**:**
Bt must be eaten before it can kill the target insects. The crystals break down the cells lining the insect gut. This causes the insects to stop feeding within 1 day. Other bacteria pass through the damaged gut tissue and multiply in the insect's body. This infection causes death within 2-3 days. Bt only kills immature stages of certain moths (caterpillars), beetles (grubs), mosquitoes and black flies.

**Toxicity based on pure active ingredient:**

| Species | $LD_{50}$ / $LC_{50}$ | Relative Toxicity* |
|---|---|---|
| Mammal (rat) | $LD_{50}$ Oral : $4.7x10^{11}$ spores/kg | No infectivity or toxicity |
| | $LD_{50}$ Dermal: $3.4x10^{11}$ spores/kg | No infectivity or toxicity |
| Bird (chickens) 63 day feeding trial: | $5.1x10^{7}$ spores/g diet showed no ill effects | Practically non toxic |
| Bees (oral) | $LD_{50}$ > 0.1 mg/bee | Practically non toxic |
| Fish | $LC_{50}$ $>12x10^{9}$ spores/L | Practically non toxic |

*****For description of relative toxicity categories please click here.

**What it controls:**
There are different strains of Bt that are specifically toxic to leaf-feeding caterpillars and beetle grubs, and to mosquito and black fly larvae in aquatic breeding sites. Note: the specific crop-pest combination must be on the label.

**Application Timing:**
- Apply Bt when the immature stages of the target pest are feeding.
- Do not apply if there is a risk of rain within 24 hours of application.
- Repeat applications as necessary at 10-day intervals (in the absence of rain).

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**Application Tips:**

- During hot sunny weather, apply Bt in late afternoon to reduce exposure to UV light and maximize residual control (3-10 days).
- Thorough coverage and proper application rate is essential.
- Use an approved spreader-sticker with granule and powder formulations for hard-to wet crops such as cabbage or to improve weather fastness of the spray deposits.

**Mixing Instructions:**

- Avoid mixing in water with pH greater than 8.
- Avoid mixing with other pesticides or nutrient sprays unless the mixtures are known not to decrease the effectiveness of Bt.
- Do not mix more Bt product than can be used in a 12-hour period.

**Storage:**

- Store in a cool, dry place.
- Use liquid products within 6 months of purchase, powders and granules within 1 year.

**Applicator Safety and Re-entry:**

- Powder Bt products may cause eye irritation and/or sensitization.
- Avoid breathing spray mist or dust
- Wear a long-sleeved shirt, long pants, and waterproof gloves when handling, mixing/loading or applying the product and during all cleanup and repair activities.
- Treated areas are safe to re-enter right after application.

**Environmental Considerations:**

- Bt does not affect other non-target insects or aquatic invertebrates.
- Bt is a naturally-occurring pathogen that readily breaks down in the environment.
- Bt is degraded very rapidly when exposed to UV light and is unstable in water pH greater than 8.
- Bt poses no threat to groundwater.

**Resistance Management:**

- Bt belongs to the Group 11 insecticides for resistance management. Due to its short biological half-life and its specificity, Bt is less likely than chemical pesticides to cause field resistance in target insects. Where possible, Bt products provide an alternative chemistry to rotate with other insecticides as part of a good resistance management program.

**Integrated Pest Management:**

- Applied at label rates, Bt products are compatible with all IPM programs using biological control of insect and mite pests, and of weeds.

**Pesticide Labels:**

- Labels for pesticides registered in Canada can be found on the Pest Management Regulatory Agency (PMRA) label search web page: http://www.eddenet.pmra-arla.gc.ca/4.0/4.01.asp

Last Updated: August/2004