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PESTICIDE APPLICATION OF MAJOR FESTPAC FACILITIES

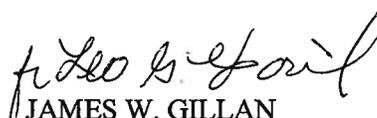
Due to the concern of introducing mosquito-borne diseases into Guam, particularly Zika virus, Dengue Fever, and Chikungunya, the Division of Environmental Health of this Department, has requested assistance through the U.S. Centers for Disease Control and Prevention (CDC) to conduct insecticide application at the major FestPac facilities, including those Guam Department of Education schools identified as lodging sites for the visiting delegates who will be participating at the Festival of the Pacific Arts 2016 (FestPac). The spraying will occur only after students have been dismissed.

The CDC has contracted with a vendor, Vector Disease Control International (VDCI), who is on island and will be applying insecticides to control adult and larval mosquitoes not only at the lodging sites but also at major FestPac facilities starting Friday, May 6 to 22, 2016. VDCI will be applying two insecticides, Suspend® SC (Deltamethrin), and VectoBac® WDG (*Bacillus thuringiensis*, subsp. *israelensis*). Both Suspend® SC and VectoBac® WDG are registered with the U.S. Environmental Protection Agency for mosquito control. The National Pesticide Information Center has generated fact sheets for Suspend® SC and VectoBac® WDG, and attached.

The decision to spray is a precaution to ensure that mosquito-borne diseases, such as Zika virus, Dengue Fever, and Chikungunya do not become introduced and established on Guam. Based on the insecticide labels, the threat to human health is minimal and has low toxicity. However, the Office of the Pesticide Programs of the United States Environmental Protection Agency (EPA) has stated: "Where possible, persons who potentially are more sensitive, such as pregnant women and infants (less than two years old), should avoid any unnecessary pesticide exposure."

The public is reminded to protect themselves against mosquito bites and eliminate mosquito breeding sites. Residents are encouraged to use an EPA registered insect repellent for mosquitoes. When used as directed, insect repellent is the best way to protect yourself from mosquito bites - even children and pregnant women should protect themselves. Residents should wear long-sleeved shirts and pants during prolonged outdoor activities. When available, residents can keep mosquitoes outside by using air conditioning or by repairing and using window/door screens. Residents can prevent mosquitos from laying their eggs by disposing of items that can collect water, such as old tires, potted plants and containers (i.e., birdbaths, pet dishes, wheelbarrows, rain catchments, trash bins), and filling in any low areas where water can puddle.

For further information, please contact the Mosquito Control and Surveillance Program of DEH at 735-7221.


JAMES W. GILLAN
Director

What is deltamethrin?

Deltamethrin is an insecticide belonging to the pyrethroid family. Pyrethroids are the man-made versions of pyrethrins, natural insecticides from chrysanthemum flowers. Deltamethrin is used outdoors on lawns, ornamental gardens, golf courses, and indoors as a spot or crack and crevice treatment. In its purest form, deltamethrin is colorless or white to light beige crystals that have no odor.

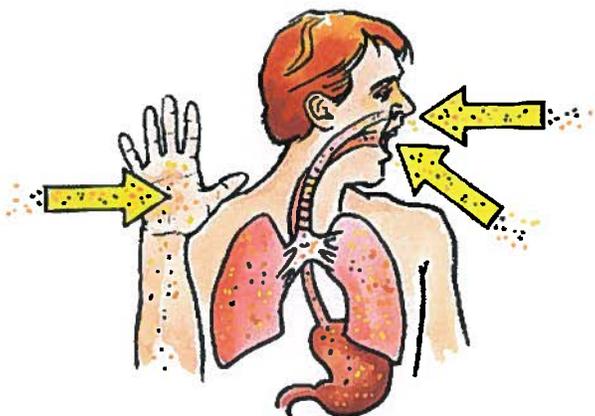
Deltamethrin was first described in 1974 and entered the marketplace in 1978.



What are some products that contain deltamethrin?

Deltamethrin is in a variety of products used to kill a wide range of insects. Deltamethrin can be formulated in insecticide products as aerosols, sprays, dusts, granules and wettable powders. The illegal, unregistered product known as "Chinese Chalk" or "Miraculous Chalk" often contains deltamethrin as the active ingredient. "Chinese Chalk", "Miraculous Chalk", and products like them are not registered for use in the United States and illegal products such as these should be avoided at all times.

Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 1-800-222-1222. If you wish to discuss a pesticide problem, please call 1-800-858-7378.



How does deltamethrin work?

Deltamethrin can kill insects by direct contact or if they eat it. It disrupts their normal nervous system function. It is less toxic to mammals due to their higher body temperature, larger body size, and decreased sensitivity to the chemical.

How might I be exposed to deltamethrin?

You can be exposed to deltamethrin if you touch, eat, or breathe it in. As an example, it could be breathed in if a fine mist or dust containing deltamethrin gets in the air you breathe. Exposure to deltamethrin can be limited by reading and following label directions.

NPIC General Fact Sheets are designed to provide scientific information to the general public. This document is intended to promote informed decision-making. Please refer to the Technical Fact Sheet for more information.

What are some signs and symptoms from a brief exposure to deltamethrin?

When deltamethrin gets on the skin, it can cause skin sensations like tingling, itching, burning, or numbness at that spot. These sensations usually go away within 48 hours. Deltamethrin can be mildly irritating if it gets in the eye. If enough deltamethrin is breathed in, it can cause headaches and dizziness. Although not common, individuals who have ingested large amounts of deltamethrin have experienced nausea, vomiting, abdominal pain, and muscle twitches. Deltamethrin is low in toxicity when it is touched or breathed in and is low to moderately toxic if eaten.

Deltamethrin can affect dogs and cats if they eat, breathe, or touch it. It can cause vomiting, drooling, in-coordination, and muscle tremors if they eat enough of it. If deltamethrin gets on their skin, it can sometimes cause skin sensations that result in biting, scratching, or licking of the exposed area.



What happens to deltamethrin when it enters the body?

In animal studies, deltamethrin was readily absorbed when it was eaten. Some of the chemical was broken down into other chemicals before they were excreted within 2 days. In a rat study, deltamethrin was poorly absorbed through the skin. The small amount that was absorbed through the skin left the body within 24 hours.

Is deltamethrin likely to contribute to the development of cancer?

The evidence from animal studies indicates that deltamethrin does not cause cancer. The U.S. EPA classifies deltamethrin as Not Likely to Be a Human Carcinogen by all routes of exposure.

Has anyone studied non-cancer effects from long-term exposure to deltamethrin?

Yes, studies have been done using laboratory animals. In multiple studies with mice and dogs, no effects were observed at the highest doses tested, over a 2 year period. Deltamethrin did not cause birth defects in laboratory animals that ate deltamethrin during their pregnancy.

Are children more sensitive to deltamethrin than adults?

While [children may be especially sensitive to pesticides](#) compared to adults, it is currently unknown whether children have increased sensitivity specifically to deltamethrin. However, studies in rats showed that young rats were more sensitive than older rats when they were both fed deltamethrin.

What happens to deltamethrin in the environment?

When deltamethrin gets in the soil, it has a tendency to bind tightly to soil particles. It has a half-life ranging from 5.7-209 days. Half-life is the measure of time it takes for half of the applied amount to break down. The half-life can change based on soil chemistry, temperature, water content and the amount of organic matter in the soil. Deltamethrin does not break down as quickly in soil with a high clay or organic matter content. Deltamethrin is broken down by microbes, light, and water. Its two major breakdown products move more easily in the soil than deltamethrin itself.

Deltamethrin is not likely to evaporate into the air or dissolve easily into water.

Deltamethrin has a half-life of 5.9-17 days on plant surfaces. It is unlikely to be taken up by plants, since it binds to soil particles so tightly.

Can deltamethrin affect birds, fish, or other wildlife?

Deltamethrin is moderately to highly toxic to fish under laboratory conditions. However, when products are used according to the label, deltamethrin is less likely to affect fish. This is because it is more likely to be bound to the sediment.

Deltamethrin is practically non-toxic to birds when they eat it.

Deltamethrin is highly toxic to honeybees under laboratory conditions. It did not harm bees in field studies, and formulated products actually had a repellent effect that lasted for 2-3 hours.

Earthworms were not affected when soil was treated with deltamethrin.



Where can I get more information?

For more detailed information call the National Pesticide Information Center, Monday - Friday, between 8:00 AM and 12:00 PM Pacific Time (11:00 AM to 3:00 PM Eastern Time) at 1-800-858-7378 or visit us on the web at <http://npic.orst.edu>. NPIC provides objective, science-based answers to questions about pesticides.

Date Reviewed: February 2010

NPIC is a cooperative agreement between Oregon State University and the U.S. Environmental Protection Agency (U.S. EPA, cooperative agreement # X8-83458501). The information in this publication does not in any way replace or supercede the restrictions, precautions, directions, or other information on the pesticide label or any other regulatory requirements, nor does it necessarily reflect the position of the U.S. EPA.

What is *Bacillus thuringiensis* (Bt)?

Bt is a microbe naturally found in soil. It makes proteins that are toxic to immature insects (larvae). There are many types of *Bt*. Each targets different insect groups. Target insects include beetles, [mosquitoes](#), black flies, caterpillars, and moths.

With *Bt* pesticides, routine testing is required to ensure that unwanted toxins and microbes are not present. *Bt* has been registered for use in pesticides by the US Environmental Protection Agency (EPA) since 1961.



What are some products that contain *Bacillus thuringiensis* (Bt)?

Currently, *Bt* strains are found in over 180 registered pesticide products. *Bt* products are used on crops and ornamental plants. Others are used in and around buildings, in aquatic settings, and in aerial applications. These [products](#) are commonly sprays, dusts, granules, and pellets. Some of these products are approved for use in [organic](#) agriculture.

Some crops have been engineered to make the *Bt* toxin. These [plant-incorporated protectants](#) include corn, cotton, and soybeans.

Always [follow label instructions](#) and take steps to minimize exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 1-800-222-1222. If you wish to [discuss a pesticide problem](#), please call 1-800-858-7378.

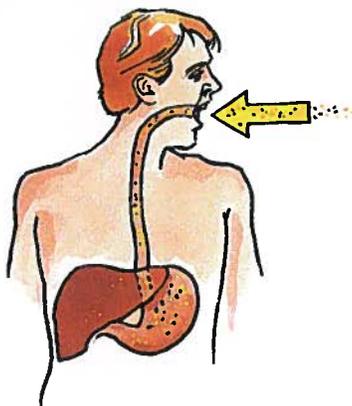


How does *Bacillus thuringiensis* (Bt) work?

Bt makes toxins that target insect larvae when eaten. In their gut, the toxins are activated. The activated toxin breaks down their gut, and the insects die of infection and starvation. Death can occur within a few hours or weeks.

The different types of *Bt* create toxins that can only be activated by the target insect larvae. In contrast, when people eat the same toxins, the toxins are not activated and no harm occurs.

Each type of *Bt* toxin is highly specific to the target insect. For example, the 'kurstaki' type targets caterpillars. The 'isrealensis' type targets immature flies and mosquitoes. Little to no direct toxicity to non-target insects has been observed.



How might I be exposed to *Bacillus thuringiensis* (Bt)?

People are most commonly exposed to *Bt* through their diet, at very low levels. Exposure can also occur if you breathe it in or get it on your skin or eyes. For example, this can occur while [applying sprays or dusts](#) during windy conditions. You may also be exposed after using a product if you don't wash your hands before eating or smoking. Since *Bt* is commonly found in soils, exposures not related to pesticides are also possible.

Pets might be exposed to this product in treated birdbaths or water fountains. You can [limit your exposure](#) and reduce the risk by carefully following the label instructions.

What are some signs and symptoms from a brief exposure to *Bacillus thuringiensis* (Bt)?

Bt is low in toxicity to people and other mammals. Several studies have found no evidence of sickness or infection as a result of exposure. However, some products with *Bt* have caused eye and skin irritation. In one study, rats breathed in very high doses of concentrated *Bt*. Some had runny noses, crusty eyes, and goose bumps. Others were less active or lost weight.

In another study, people were surveyed before and after aerial applications of *Bt*. Most people were not affected. However, some people with hay fever reported certain symptoms. These included difficulty with sleep and concentration, stomach upset, and nose/throat irritation. Seasonal factors, such as pollen, may have contributed to some of the effects.

Scientists also evaluated whether *Bt* can cause allergic reactions. Researchers found that farmworkers exposed for one to four months did not experience any problems related to their airways, nose, or skin. However, further exposure showed evidence of an immune response and the potential for skin allergies to develop.

What happens to *Bacillus thuringiensis* (Bt) when it enters the body?

When eaten, *Bt* is confined to the gut. It does not reproduce, and the toxin is broken down like other proteins in the diet. *Bt* leaves the body within 2 to 3 days.

If breathed in, *Bt* can move to the lungs, blood, lymph, and kidneys. *Bt* is then attacked by the immune system. Levels of *Bt* decrease quickly one day after exposure.

Is *Bacillus thuringiensis* (Bt) likely to contribute to the development of cancer?

No data were found on the carcinogenic effects of *Bt* in humans. However, in one animal study, rats were fed very high doses of *Bt* for 2 years. No evidence of cancer was observed.

Has anyone studied non-cancer effects from long-term exposure to *Bacillus thuringiensis* (Bt)?

In a 2-year study, rats were fed high doses of *Bt* daily. Female rats had lower body weights. However, no evidence of an infection was found.

Bt is only activated in the alkaline environment of the insect gut, compared to the acidic environment of human stomachs. In human stomachs, it is easily digested. As such, no adverse effects are expected after long-term dietary exposure to *Bt*, whether its proteins are sprayed on plants or grown within plant tissues.

Are children more sensitive to *Bacillus thuringiensis* (Bt) than adults?

[Children may be especially sensitive to pesticides](#) compared to adults. However, there are currently no data showing that children have increased sensitivity specifically to *Bt*.

What happens to *Bacillus thuringiensis* (Bt) in the environment?

Toxins created by *Bt* are rapidly broken down by sunlight and in acidic soil. Other microbes in soil can also break it down. *Bt* does not readily leach in soil. It typically remains in the top several inches of soil. *Bt* remains dormant in most natural soil conditions. However, there has been some reproduction in nutrient rich soils. On the soil surface, dormant *Bt* cells last only a few days. However, below the soil surface, they can last for months or years. The [half-life](#) in unfavorable soil is about 4 months. *Bt* toxins break down much faster. In one study, 12% remained after 15 days.

In water, *Bt* does not readily reproduce. A study found *Bt* toxins in the air were broken down rapidly by sunlight. Forty-one percent (41%) of the toxin remained after 24 hours. On plant surfaces, sunlight breaks down *Bt*; the half-life of *Bt* toxins is 1-4 days.



Can *Bacillus thuringiensis* (Bt) affect birds, fish, or other wildlife?

Bt is practically non-toxic and non-pathogenic to birds, fish, and shrimp. No adverse effect or infection was found in rats given large doses of two different *Bt* strains. There is no evidence that *Bt* can cause a disease outbreak among wild animals.

Little to no direct toxicity to non-target insects and other shelled invertebrates has been observed. *Bt* does not seem to hurt earthworms. However, the **aizawai** strain is highly toxic to honeybees. Other strains have minimal toxicity to honeybees.

Water fleas exposed to the **kurstaki** and **israelensis** strains showed moderate toxicity. The **aizawai** strains are highly toxic to water fleas. However, evidence suggests that toxicity to these non-targets may be related to impurities from the production of *Bt*.

Where can I get more information?

For more detailed information about *Bacillus thuringiensis* (*Bt*) please visit the list of [referenced resources](#) or call the National Pesticide Information Center, between 8:00 AM and 12:00 PM Pacific Time (11:00 AM to 3:00 PM Eastern Time), Monday - Friday, at 1-800-858-7378 or visit us on the web at <http://npic.orst.edu>. NPIC provides objective, science-based answers to questions about pesticides.

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