

### What is permethrin?

Permethrin is an insecticide in the pyrethroid family. Pyrethroids are synthetic chemicals that act like natural extracts from the chrysanthemum flower. Permethrin is used in a number of ways to control insects. Products containing permethrin may be used in public health mosquito control programs. They may be used on food and feed crops, on ornamental lawns, on livestock and pets, in structures and buildings, and on clothing. Permethrin may also be used in places where food is handled, such as restaurants. Permethrin was first registered with the United States Environmental Protection Agency (U.S. EPA) in 1979, and was re-registered in 2006.



### What are some products that contain permethrin?

Products containing permethrin may be liquids, powders, dusts, aerosol solutions, sprays, and treated clothing. Permethrin is used in cattle ear tags and flea collars, or in spot-on treatments for dogs. There are currently more than 1400 registered products containing permethrin. Some products are used to treat scabies and head lice on people. These products are drugs and are regulated by the U.S. Food and Drug Administration (FDA).

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 report a pesticide problem, please call 1-800-858-7378.

### How does permethrin work?

Permethrin can affect insects if they eat it or touch it. Permethrin affects the nervous system in insects, causing muscle spasms, paralysis and death. Permethrin is more toxic to insects than it is to people and dogs. This is because insects can't break it down as quickly as people and dogs. Cats are more sensitive to permethrin than dogs or people because it takes their bodies a long time to break it down.

### How might I be exposed to permethrin?

People can be exposed to pesticides by eating them, breathing them in, getting them on their skin, or getting them in their eyes. Permethrin may be breathed in if a spray or fogger is used indoors, or if wind causes a spray or dust to be blown in someone's face. Dogs may be exposed to permethrin in products that are applied to their skin for flea and tick treatments. People can have skin exposure or breathe in products containing permethrin while applying the products, or during public health

mosquito control efforts. Permethrin may be eaten if people forget to wash their hands after using products that contain permethrin. Exposure to permethrin can be limited by reading the pesticide label and following all of the 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 symptoms from a brief exposure to permethrin?

Health effects from permethrin will depend on how someone is exposed to it. Dogs and cats that have permethrin on their skin may act strangely, and flick their paws, twitch their skin or ears, or roll on the ground. Animals that have licked treated skin may drool a lot or smack their lips. Cats that have been exposed by accident to products with high (45-65%) levels of permethrin may seem anxious and can't walk normally. They may also have muscle tremors and seizures and they may die from the exposure.

When people get permethrin on their skin, they may have irritation or tingling, burning and itching at that spot. If permethrin gets in the eyes it can cause redness, pain or burning. If people eat permethrin it could cause sore throat, abdominal pain, nausea and vomiting. People that have breathed in permethrin have had irritation in the nose and lungs, difficulty breathing, headaches, dizziness, nausea and vomiting.



### What happens to permethrin when it enters the body?

Less than 1% of the permethrin put on the skin of people was taken into the body. If permethrin is eaten, most of it is quickly absorbed. The pyrethroids easily pass through the lungs into the body if inhaled, but no specific data on permethrin was found.

Once permethrin is absorbed, it quickly moves throughout the body. The greatest amounts of permethrin have been found 3 to 4 hours after it was eaten. Permethrin leaves the body mainly in the urine, but may also be in the feces. In laboratory tests in rats, half of the permethrin was gone from the animals' bodies within a day.

### Is permethrin likely to contribute to the development of cancer?

Permethrin was classified by the International Agency for Research on Cancer (IARC) as "not classifiable as to its carcinogenicity to humans" in 1991. This means that IARC could not decide whether or not permethrin can cause cancer. The U.S. EPA decided that permethrin was "likely to be carcinogenic to humans" if it was eaten. This decision was based on the structure of permethrin, what happens to it in the body, laboratory tests that caused tumors in mice and evidence of tumors in rats.

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

Researchers fed dogs and mice permethrin for up to 2 years and found that their livers increased in weight. The dogs fed permethrin had more tremors than dogs that did not eat it. Rabbits that had permethrin on their skin for 21 days had skin irritation, but no other signs of toxicity. Researchers are not sure whether long-term exposure to permethrin can affect the body's hormone system.

A group of women used a product containing 4% permethrin over their entire bodies to treat a scabies problem during pregnancy. Another group of pregnant women used a product containing 1% permethrin to treat head lice. Exposure to permethrin did not affect the pregnancies of any of the women in either group.

Rats that were fed permethrin when they were pregnant had offspring that weighed less, and some of their offspring developed extra ribs more often than control rats. Pregnant rabbits that were fed permethrin lost their fetuses more often and the offspring that lived had less bone growth.

### Are children more sensitive to permethrin than adults?

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

### What happens to permethrin in the environment?

If permethrin gets into the soil, it is broken down by microorganisms. Sunlight may also break down permethrin on the soil surface and on the surface of water. Permethrin does not mix well with water. When permethrin gets into surface water like lakes or streams, it sticks very strongly to sediment and can stay there for more than a year. Since permethrin sticks to sediment and does not mix well with water, it won't usually contaminate groundwater. Permethrin does not evaporate very easily when it is applied to surfaces. Permethrin was applied indoors near a window in an experiment where it was exposed to daylight. After 20 days, 60% of the permethrin that was applied was still on the surface.

If permethrin is applied to plants, it may stay on the leaves for between 1 and 3 weeks. Scientists applied permethrin to soil and then planted sugar beets, wheat, lettuce and cotton in the soil.

Scientists found trace amounts of the permethrin residue in the edible parts of the plants at 30 and 120 days after planting. Trace amounts of permethrin have been found in foods including bananas, collard greens, squash and watermelon. However, less than 1% of the more than 1700 food samples tested had detectable levels of permethrin.



### Can permethrin affect birds, fish, or other wildlife?

Permethrin is highly toxic to fish and other animals that live in either salt water or fresh water. Permethrin is low in toxicity to birds, but some aerosol products made with permethrin may also contain other ingredients that can harm birds if they inhale it. Permethrin is highly toxic to bees and other beneficial insects.

### Where can I get more information?

For more detailed information see the [Permethrin Technical Fact Sheet](#) or call the National Pesticide Information Center, Monday - Friday, between 7:30 AM and 3:30 PM Pacific Time (10:30 AM to 6:30 PM Eastern Time) at 1-800-858-7378 or visit us on the web at [www.npic.orst.edu](http://www.npic.orst.edu). NPIC provides objective, science-based answers to questions about pesticides.

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