NPTN fact sheets are designed to answer questions that are commonly asked by the general public about pesticides that are regulated by the U.S. Environmental Protection Agency (US EPA). This document is intended to be educational in nature and helpful to consumers for making decisions about pesticide use.

National Pesticide Telecommunications Network

Hexaflumuron

(Technical Fact Sheet)

For general information please refer to the General Fact Sheet

The Pesticide Label: Labels provide directions for the proper use of a pesticide product. *Be sure to read the entire label before using any product.* A signal word, on each product label, indicates the product's potential hazard.

CAUTION - low toxicity **WARNING - moderate toxicity** **DANGER - high toxicity**

What is hexaflumuron?

- Hexaflumuron is a termiticide first registered in the United States in 1994.
- This chemical is used as part of a termite inspection, monitoring, and baiting system.
- It is the first active ingredient registered with the EPA as a reduced-risk pesticide. A reduced risk pesticide is one the EPA believes poses less risk to human health and the environment than existing alternatives (1).

What is the mechanism of action of hexaflumuron?

- Hexaflumuron is an insect growth regulator (IGR) that works by inhibiting the insect's growth. It interferes with chitin synthesis, which termites need to form a new exoskeleton.
- Hexaflumuron is part of a pest monitoring system and is used selectively only in baiting stations where termite activity is present and only when the activity continues. Termites are social insects that share food and feeding sites. Foraging termites recruit nestmates to feeding sites by leaving a pheromone trail to the site, allowing the entire nest to feed on the bait containing hexaflumuron.
- Pest control operators use hexaflumuron as part of aboveground and underground baiting systems. They place it in a tamper-resistant bait station where foraging termites consume it.

Will I be exposed to hexaflumuron?

- Manufacturers impregnate hexaflumuron in a bait matrix at a 0.5% concentration and then enclose it in a tamper-resistant bait station. It is added to the station only after evidence of termite foraging is detected. This virtually guarantees no exposure, drift, or ground or surface water contamination (1). Only a qualified pest control company can apply this chemical.

- It is unlikely that humans, pets, or non-target species will be exposed.

What is the toxicity of hexaflumuron?

Animals

- Hexaflumuron has a low toxicity to rats when they ingest it. The oral LD_{50} for male and female rats is > 5000 mg/kg (2). See **Laboratory Testing box** and boxes on **LD_{50}** and **Toxicity Categories.**

- Hexaflumuron is non-irritating to rabbit's skin and eyes (3).

Humans

- Based on its oral LD_{50} in laboratory animals, hexaflumuron is considered to be of very low toxicity to humans. See box on **Toxicity Categories.** Scientists do not consider it a skin sensitizer (2).

Laboratory Testing: Before pesticides are registered by the U.S. EPA, they must undergo laboratory testing for short-term (acute) and long-term (chronic) health effects. Laboratory animals are purposely fed high enough doses to cause toxic effects. These tests help scientists judge how these chemicals might affect humans, domestic animals, and wildlife in cases of overexposure. When pesticide products are used according to the label directions, toxic effects are not likely to occur because the amount of pesticide that people and pets may be exposed to is low compared to the doses fed to laboratory animals.

Toxicity Category (*Signal Word*) (4)

	High Toxicity (*Danger*)	**Moderate Toxicity (*Warning*)**	**Low Toxicity (*Caution*)**	**Very Low Toxicity (*Caution*)**
Oral LD50	Less than 50 mg/kg	50 - 500 mg/kg	500 - 5000 mg/kg	Greater than 5000 mg/kg
Dermal LD50	Less than 200 mg/kg	200 - 2000 mg/kg	2000 - 5000 mg/kg	Greater than 5000 mg/kg
Inhalation LC50	Less than 0.05 mg/l	0.05 - 0.5 mg/l	0.5 - 2 mg/l	Greater than 2 mg/l
Eye Effects	Corrosive	Irritation persisting for 7 days	Irritation reversible within 7 days	Minimal effects, gone within 24 hrs
Skin Effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation

LD50/LC50: A common measure of acute toxicity is the lethal dose (LD50) or lethal concentration (LC50) that causes death (resulting from a single or limited exposure) in 50 percent of the treated animals. LD50 is generally expressed as the dose in milligrams (mg) of chemical per kilogram (kg) of body weight. LC50 is often expressed as mg of chemical per volume (e.g., liter (L)) of medium (i.e., air or water) the organism is exposed to. Chemicals are considered highly toxic when the LD50/LC50 is small and practically non-toxic when the value is large. However, the LD50/LC50 does not reflect any effects from long-term exposure (i.e., cancer, birth defects, or reproductive toxicity) that may occur at levels below those that cause death.

Does hexaflumuron break down and leave the body?

Animals

- Researchers have no current information about the way animals metabolize or excrete hexaflumuron.

Humans

- Researchers have no current information about the way humans metabolize or excrete hexaflumuron.

Is hexaflumuron a carcinogen?

Animals

- Rats and mice fed up to 500 mg/kg/day for 104 weeks do not develop cancer (2). **See Cancer box.**

Humans

- Based on the results of animal studies, hexaflumuron is not expected to increase the risk of cancer in humans (2).

Cancer: The U.S. EPA has strict guidelines that require testing of pesticides for their potential to cause cancer. These studies involve feeding laboratory animals large *daily* doses of the pesticide over most of the lifetime of the animal. Based on these tests, and any other available information, EPA gives the pesticide a rating for its potential to cause cancer in humans. For example, if a pesticide does not cause cancer in animal tests at large doses, then the EPA considers it unlikely the pesticide will cause cancer in humans. Testing for cancer is not done on human subjects.

Does hexaflumuron cause reproductive or teratogenic effects?

- Since there is very limited potential for human exposure to hexaflumuron, EPA does not require developmental testing at this time (2).

What is the environmental fate and behavior of hexaflumuron?

- Hexaflumuron does not penetrate or translocate into plant or fruit tissue (5).
- In anaerobic soil hexaflumuron has a half-life ranging from 40-64 days (5). **See Half-life box.**
- Hexaflumuron has low mobility in the soil. It binds strongly to soil particles and is not highly soluble in water. Therefore, it is not likely to contaminate surface or groundwater (5).
- Based on use pattern, hexaflumuron is not expected to present a groundwater hazard (2).

Half-life is the time required for half of the compound to degrade.

1 half-life	**=**	**50% degraded**
2 half-lives	**=**	**75% degraded**
3 half-lives	**=**	**88% degraded**
4 half-lives	**=**	**94% degraded**
5 half-lives	**=**	**97% degraded**

Remember that the amount of chemical remaining after a half-life will always depend on the amount of the chemical originally applied.

What effects does hexaflumuron have on wildlife?

- Hexaflumuron is determined to be highly toxic to aquatic invertebrates, based on a 0.1 ppb LD_{50} in *Daphnia magna*. However, based on the use pattern, these hazards are unlikely to occur in the environment (2,6).

- Hexaflumuron is virtually non-toxic to birds based on the oral LD_{50} > 2000 mg/kg/day (2).

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