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NPTN General 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 (U.S. EPA). This document is intended to be helpful to professionals and to the general public for making decisions about pesticide use.

Potassium Salts of Fatty Acids

(General Fact Sheet)

For less general information, please refer to the Technical 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 are potassium salts of fatty acids?

- Potassium salts of fatty acids are commonly referred to as soap salts. They are used as insecticides, herbicides, fungicides, and algacides. The first pesticide product containing soap salts was registered for use in 1947 (1).
- Potassium salts of fatty acids are produced by adding potassium hydroxide to fatty acids found in animal fats and in plant oils. Fatty acids are extracted from palm, coconut, olive, castor, and cottonseed plants to form this active ingredient (2).
- Potassium salts of fatty acids are used as multi-purpose food additives and the Food and Drug Administration (FDA) classifies them as GRAS (generally recognized as safe) (3).
- Residues from the use of this active ingredient, in accordance with labeling guidelines, are not anticipated to exceed levels that occur naturally, or levels that are intentionally added to food. The United States Environmental Protection Agency (EPA) does not require a food tolerance for this active ingredient (1, 4).

What products contain potassium salts of fatty acids?

- Safer Agro-Chem.s Insecticidal Soap®
- Safer Moss and Algae Attack Concentrate®
- Safer Sharpshooter Weed and Grass Killer Concentrate®
- M-Pede Insecticide/Fungicide®

How do potassium salts of fatty acids work?

- Fatty acids penetrate an insects body covering and disrupt the cell membranes. The cell contents leak out causing the insect to dehydrate and die (5, 6).

- Potassium salts of fatty acids are somewhat selective towards soft-bodied insects, such as aphids, whiteflies, and mealy bugs. Flying adult insects with a stronger outer covering, such as ladybird beetles and bees, may be less affected by this active ingredient. However, insects in the immature, flightless stage of development are more vulnerable to the effects of this active ingredient (5, 7).
- Potassium salts of fatty acids can be toxic to plants. Plants that have hairy leaves may hold the soap on their surfaces longer, resulting in a burn (7, 8).
- Potassium salts of fatty acids are also toxic to certain types of fungi (5, 9).

Laboratory Testing: Before pesticides are registered by the U.S. EPA, they must undergo laboratory testing for short-term and long-term 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.

How toxic are potassium salts of fatty acids?

Animals

- Potassium salts of fatty acids are very low in toxicity when ingested (1). See boxes on **Laboratory Testing**, **LD50/LC50**, and **Toxicity Categories**.
- Potassium salts of fatty acids are very low in toxicity by skin exposure (1).

Humans

- Ingestion of high doses of potassium salts of fatty acids may cause general stomach upset and vomiting in humans (7).
- Potassium salts of fatty acids can be irritating to the skin and eyes (1).

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.

Do potassium salts of fatty acids cause developmental or birth defects?

- Scientists note that potassium salts of fatty acids cause reproductive and developmental effects when administered to laboratory animals at high doses (1, 7).
- Scientists conclude that potassium salts of fatty acids, when used in accordance with labeling guidelines, will not pose any significant hazard (1).

Do potassium salts of fatty acids break down and leave the body?

- The body breaks down fatty acids, which provide an energy source for living cells (1, 5).

Toxicity Category (*Signal Word*) (10)

	High Toxicity (<i>Danger</i>)	Moderate Toxicity (<i>Warning</i>)	Low Toxicity (<i>Caution</i>)	Very Low Toxicity (<i>Caution</i>)
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

What happens to potassium salts of fatty acids in the environment?

- Potassium salts of fatty acids are not persistent. The soil half-life is less than one day. Microbes in the soil rapidly break down this active ingredient (1). See box on **Half-life**.

What effect do potassium salts of fatty acids have on wildlife?

- Fatty acids are a significant part of the normal daily diet of mammals, birds and fish (1).
- Potassium salts of fatty acids are practically nontoxic to birds and slightly toxic to cold-water and warm-water fish (1).
- Potassium salts of fatty acids are highly toxic to aquatic invertebrates. The EPA requires all product labels containing this active ingredient to state that the product is not to be applied directly to water and not to contaminate water by cleaning equipment or disposing of wash water containing potassium salts of fatty acids (1, 11).

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.

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