

Pesticide Toxicity Profile: Thiophthalimide Pesticides¹

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This document provides a general overview of human toxicity, a listing of laboratory animal and wildlife toxicities, and a cross reference of chemical, common, and trade names of thiophthalimide pesticides registered for use in Florida.

General

There are currently only two members of the chemical family of thiophthalimide pesticides that remain on the market in the United States: captan and folpet. Captan, one of the most widely used fungicides in the world, has many crops on its label, including fruits, nuts, and ornamentals, and is used for control of fungal and bacterial diseases. It also has application as a seed protectant. Practically every acre of Florida strawberries receives captan applications as well as approximately half of the US apple acreage. The first commercially available captan product entered the US market in 1949. Current commercial formulations available include wettable powders, dusts, water-dispersible granules, and flowables. There are also many products containing captan formulated especially for home garden use. There are limited numbers of uses for folpet in Florida, but it is labeled as a foliar treatment for control of scab on avocado. It is formulated as a wettable powder for this use. There are several commercial products of folpet in combination with bis(tributyltin) oxide. This combination is applied to wood products as a stain for prevention of damage caused

by mildew and other wood decay organisms. Folpet first entered the market in 1962.

Toxicity

These fungicides may cause moderate irritation of the skin, respiratory tract, and eyes. Captan has a low acute toxicity and generally carries the signal word, CAUTION. It is not likely that captan would cause reproductive effects in humans at usual levels of exposure. Although the EPA concluded that captan does not produce birth defects or mutagenicity, they classify captan as a probable human carcinogen. Animal studies have shown that captan is rapidly metabolized, and residues are excreted in the urine. Folpet is considered slightly toxic by ingestion. Long-term effects have varied in laboratory animals exposed to folpet. Mammalian toxicities for the thiophthalimide pesticides are shown in Table 1. Table 2 lists the toxicities to wildlife by the common name of the pesticide. Table 3 provides a cross listing of some trade names under which these products are registered and sold in Florida.

Additional Information

Nesheim, O.N., F.M. Fishel and M.A. Mossler. 2005. *Toxicity of pesticides*. PI-13. Gainesville: University of Florida Institute of Food and Agricultural Sciences. <http://edis.ifas.ufl.edu/pi008>

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Table 1. Thiophthalimide pesticide mammalian toxicities (mg/kg of body weight).

Common name	Rat oral LD ₅₀	Rabbit dermal LD ₅₀
Captan	9,000	---
Folpet	>10,000	>5,000

Table 2. Thiophthalimide pesticide wildlife toxicity ranges.

Common name	Bird acute oral LD ₅₀ (mg/kg)*	Fish (ppm)**	Bee†
Captan	ST	HT	PNT
Folpet	ST	HT	PNT

* Bird LD₅₀: Practically nontoxic (PNT) = >2,000; slightly toxic (ST) = 501–2,000; moderately toxic (MT) = 51–500; highly toxic (HT) = 10–50; very highly toxic (VHT) = <10.

** Fish LC₅₀: PNT = >100; ST = 10–100; MT = 1 – 10; HT = 0.1–1; VHT = <0.1.

† Bee: HT = highly toxic (applied product and residues kill upon contact); MT = moderately toxic (kills if applied over bees); PNT = relatively nontoxic (relatively few precautions necessary).

Table 3. Cross reference list of common, trade and chemical names of thiophthalimide pesticides.

Common name	Trade names*	Chemical name
Captan	Captan®, Captec, Cap-Up, Fungitrol	N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide
Folpet	Folpet®	N-[(trichloromethyl)thio]phthalimide

* Does not include manufacturer's prepackaged mixtures.