

Pesticide Toxicity Profile: Miscellaneous Organic Fungicides¹

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

General

This miscellaneous group of fungicides consists of diverse members – dodine, etridiazole, iprodione, mefenoxam (metalaxyl-m), thiabendazole and triforine. In Florida, they vary in their use sites. Dodine is registered for use on trees and small fruit. Etridiazole is a soil treatment for combating the effects of a complex of soil pathogens in nursery and greenhouse crops, cotton, and tobacco. Iprodione is applied to a wide variety of ornamentals and fruit, turfgrass, some vegetables, and a few field crops, including peanut and rice. Mefenoxam is an important seed treatment as well as a basal treatment and soil fungicide. Applied as a soil treatment, it is labeled for citrus and many vegetable and ornamental crops and for a few field crops, including cotton, peanut and tobacco. Thiabendazole is used primarily

as a postharvest treatment to citrus and other vegetables, but has some foliar uses for field crops including rice, soybean, and wheat. As an additive to prevent mildew, it is applied to some materials such as fabrics, canvas, paper products, and paint. Triforine is used alone or in mixtures containing insecticides for control of ornamental pests. Commercial products available target homeowners. A wide range of formulations exist for this miscellaneous group of fungicides, depending on active ingredient.

Toxicity

Most product labels of this fungicide group list either the signal word CAUTION or WARNING on their labels. Those products having the signal word DANGER have precautionary statements regarding corrosiveness and potential irreversible eye damage. Appropriate protective measures regarding eyewear use for applicators and handlers are listed on those labels. Dodine is absorbed across the skin and is irritating to skin, eyes, and the gastrointestinal tract. Acute oral and dermal toxicity is moderate.

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Poisonings in humans have not been reported. Based on animal studies, ingestion would probably cause nausea, vomiting, and diarrhea. Etridiazole contact may result in irritation of the skin and eyes. Systemic toxicity is low. Iprodione, mefenoxam, and triforine exhibit low acute oral and dermal toxicity in laboratory animals; there have been no human poisonings reported. Mammals rapidly excrete triforine as a metabolite in the urine. Most experience with thiabendazole has been with its medicinal use against intestinal parasites. Oral doses administered for this purpose are far greater than those likely to be absorbed in the course of occupational exposure. Symptoms and signs that sometimes follow ingestion of thiabendazole are dizziness, nausea, vomiting, diarrhea, fever, flushing, chills, rash, and headache. Adverse effects from use of thiabendazole as a fungicide have not been reported. Ecologically, the main concern with these miscellaneous organic fungicides is with dodine and its high toxicity to fish. Of this pesticide group, only triforine is considered to be moderately toxic to bees. Most of these are considered to have little toxicity to birds. Mammalian toxicities for the miscellaneous organic fungicides 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 of the trade names that these products are registered and sold by in Florida.

Additional Information

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Table 1. Miscellaneous organic fungicide mammalian toxicities (mg/kg of body weight).

Common name	Rat oral LD ₅₀	Rabbit dermal LD ₅₀
Dodine	1,000	>1,500
Etridiazole	1,077	>5,000
Iprodione	>4,400	>2,000
Mefenoxam	>5,000 (Ridomil Gold GR)	>2,000 (Ridomil GR)
Thiabendazole	3,100	>2,000
Triforine	>16,000	>10,000

Table 2. Miscellaneous organic fungicide wildlife toxicity ranges.

Common name	Bird acute oral LD ₅₀ (mg/kg)*	Fish (ppm)**	Bee [†]
Dodine	ST	HT	PNT
Etridiazole	ST	MT	---
Iprodione	ST - PNT	MT	PNT
Mefenoxam	PNT	PNT	PNT
Thiabendazole	PNT	ST	PNT
Triforine	ST - PNT	PNT	MT

*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 (kills upon contact as well as residues); 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 miscellaneous organic fungicides.

Common name	Trade names*	Chemical name
Dodine	Dodine®, Elast®, Syllit®	1-dodecylguanidine acetate
Etridiazole	Banrot®, Terraclor®, Terramaster®, Terrazole®, Truban®	5-ethoxy-3-trichloromethyl-1,2,4-thiadiazole
Iprodione	Iprodione®, Rovral®, Sextant®	3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecarboxamide
Mefenoxam	Ridomil Gold®	N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-DL-alanine methyl ester
Thiabendazole	Freshgard®, Mertect®, Metasol®, Sta-Fresh®	2-(4-thiazolyl)-1H-benzimidazole
Triforine	Orthenex®	N,N-[1,4-piperazinediylbis(2,2,2-trichloroethylidene)]-bis[formamide]

*Does not include manufacturer's prepackaged mixtures.