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READ THE ENTIRE LABEL BEFORE USING THIS PRODUCT.

USE ONLY IN ACCORDANCE WITH INSTRUCTIONS.

KEEP OUT OF REACH OF CHILDREN

ARREST 25 EC



INGREDIENTS

Propiconazole25%
Other ingredients75%

PROTECTIVE, CURATIVE & SYSTEMIC FUNGICIDE

ARREST 25 EC is a systemic foliar fungicide with a broad range of activity including Banana Leaf Spot, Rust, Sheath Blight of Rice and Blister Blight of Tea. It is used on grasses grown for seed, mushrooms, corn, wild rice, peanuts, almonds, sorghum, oats, pecans, apricots, peaches, nectarines, plums and prunes.

On cereals it controls diseases caused by Erysiphe graminis, Leptosphaeria nodorum, Pseudocerospora herpotrichoides, Puccinia spp., Pyrenophora teres, Rhynchosporium secalis, and Septoria spp. It contains as its active ingredient Propiconazole 25% EC.

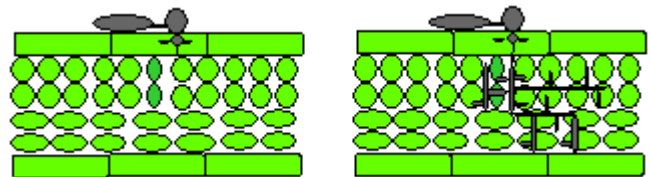
Trade Names Of Other Firms: Trade names for products containing Propiconazole include Alamo®, Banner®, Benit, Desmel, Orbit, Radar, Tilt, Fidis, Spire, Practis, Bumper, Mantis, Restore, Banner Maxx, Taspa, Juno, Novel and Break

What is ARREST 25 EC and how does it work?

ARREST 25 EC is a systemic fungicide, which inhibits the biosynthesis of ergosterol by fungi. Ergosterol is a vitamin-like compound needed by fungi to form their cell walls. The mode of action is demethylation of C-14 during ergosterol biosynthesis, and leading to accumulation of C-14 methyl sterols. The biosynthesis of these ergosterols is critical to the formation of cell walls of fungi. This lack of normal sterol production slows or stops the growth of the fungus, effectively preventing further infection and/or invasion of host tissues. Therefore, propiconazole is considered to be fungistatic or growth inhibiting rather than fungicidal or killing. It is a triazole fungicide that has **protective, curative, and systemic activity**.



Preventative - Fungicide prevents the establishment of an infection. Fungicides that are preventative only must be applied before infection eg. SYSTAKIL 80 WP.



Curative - Fungicide interrupts the development of an established infection before visible symptoms and production of spores eg. ARREST 25 EC.

Key Benefits of ARREST 25 EC:

- 1) Broad spectrum fungicide
- 2) Highly effective against pests, both in adult and larval stage
- 3) Low potential to leach to groundwater

PRECAUTIONS

Causes moderate eye irritation. Do not get in eyes. Harmful if swallowed or absorbed through the skin. Keep out of reach of children.

Wear overalls over long pants, and a long-sleeved shirt, goggles or a face shield, apron and chemical resistant gloves during mixing, loading, clean-up and repair activities. Wear pants, a long-sleeved shirt and chemical resistant gloves during application.

Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

SYMPTOMS OF POISONING

Irritation on skin or eyes.

MEDICAL TREATMENT

if ingested, induce emesis or lavage stomach. Treat symptomatically.

FIRST AID

If poisoning is suspected, immediately contact a physician or a poison control centre. Take container, label or product name and Pest Control Product Registration Number with you when seeking medical attention.

If skin contacts, wash exposed areas of skin with soap and warm water. This product may produce temporary allergic side effects characterised by redness of the eyes, mild bronchial irritation and redness or rash on exposed skin areas. Persons having allergic reaction should contact a physician immediately.

If eyes contact, flush for 15-20 minutes with large amount of water and seek medical attention immediately. If inhaled, remove patient to fresh air. In all cases, notify a physician and present this label.

DIRECTIONS OF USE

Crops	Disease	Dosage/ha (ml) (Formula tion)	Waiting period (Days)
Wheat	Leaf rust, stem rust, strips rust	500	30
Rice	Sheath blight	500	30
Groundnut	Early and late leaf spots, rust	500	15

Tea

Blister blight

125-250

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DISPOSAL METHODS

Do not contaminate water, food or feed by storage of disposal. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, completely empty bag into application equipment. Dispose of empty bag and box in a sanitary landfill or by incineration, or if allowed by state or local authorities, by burning. Stay out of smoke from burning containers.

STORAGE CONDITION

Store in the closed, original container in a cool, well-ventilated area. Do not store for prolonged periods in direct sunlight. Store in a locked room or place away from children, animals, food, feedstuffs, seed and fertilizers. Triple or preferably pressure rinse containers before disposal. Add rinsing to spray tank.

For More Details including effects on environment email contact@ivorychem.com with Subject "ARREST25 EC DETAILS"

More Details:

TOXICOLOGICAL EFFECTS

- Acute Toxicity:** The acute toxicity to mammals for propiconazole technical are an acute oral LD50 for rats of 1,517 mg/kg and 1,344 mg/kg for rabbits. The acute dermal LD50 for rabbit was reported to be >4,000 mg/kg. Propiconazole was considered a slight irritant in rabbit skin and eye irritation studies. A skin sensitization study in guinea pigs demonstrated no allergic effect. The acute toxicity to mammals for the formulated products Orbit 3.6E, Tilt 3.6E and Banner 1.1E was as follows: acute oral LD50 for rats of 1,310 mg/kg. The acute dermal LD50 for rabbit was reported to be >5,010 mg/kg. The formulated products were considered a moderate irritant in rabbit skin and eye irritation studies. A skin sensitization study in guinea pigs resulted in the formulated product being considered a sensitizer.

- Chronic Toxicity:** In two-year feeding studies in mice, the NOEL was established at 100 ppm. Significant increases were noted in the incidence of spontaneous liver tumors (benign) observed in male mice at the highest feeding level only. In two-year rat feeding studies, the no-effect-level was established at 100 ppm. There were no tumors in the rat at any feeding level. In one-year feeding studies in dogs, the NOEL was established at 250 ppm, the highest level tested. Based on the available chronic toxicity data, EPA has established the RfD for propiconazole at 0.013 mg/kg/day. This RfD is based on a 1-year dog feeding study with a NOEL of 1.25 mg/kg/day and an uncertainty factor of 100. The uncertainty factor of 100 was applied to account for inter-species extrapolation and intra-species variability. Mild irritation of the gastric mucosa was the effect observed at the LEL of 6.2 mg/kg/day.
- Reproductive Effects:** Over a two-year period, rats and their offspring were fed a diet containing propiconazole at concentrations up to 2,500 ppm. Although the high dose resulted in diminished body weight, and increases in relative liver weight of adults and pups, no reproductive, foetal, or embryonic parameters were affected. EPA notes developmental toxicity NOELs of 30 mg/kg/day in rats and 400 mg/kg/day, the Highest Dose Tested (HDT) in rabbits. Developmental toxicity was observed in rats at 90 mg/kg/day; these effects occurred in the presence of maternal toxicity. In rabbits, no developmental delays or alterations were noted; increased abortions were observed at the maternally toxic dose of 400 mg/kg/day. The developmental NOELs are more than 24- and 320-fold higher in rats and rabbits, respectively, than the NOEL of 1.25 mg/kg/day from the 1- year feeding study in dogs, which is the basis of the RfD. In the two-generation reproductive toxicity study in the rat, the reproductive/developmental toxicity NOEL of 25 mg/kg/day was greater than the parental (systemic) toxicity NOEL (<5 mg/kg/day; Lowest Dose Tested (LDT)). EPA notes that the NOEL of 25 mg/kg/day, for reproductive (pup) toxicity, was 20-fold higher than the NOEL of 1.25 mg/kg/day from the 1-year feeding study in dogs, which is the basis of the RfD. The reproductive (pup) LEL of 125 mg/kg/day was based on decreased offspring survival of second generation (F2) pups, and on decreased body weight throughout lactation, and an increase in the incidence of hepatic cellular swelling for both generations of offspring (F1 and F2 pups). Because these reproductive effects occurred in the presence of parental (systemic) toxicity, these data do not suggest an increased post- natal sensitivity to children and infants (that infants and children might be more sensitive than adults) to propiconazole exposure.
- Teratogenic Effects:** Propiconazole was administered orally in doses up to 300 mg/kg/day during days 6-15 post-conception in rats, and up to 180 mg/kg/day on days 6-18 of gestation to Chinchilla rabbits. No teratogenic or foetotoxic effects were observed from either group, at any dose.
- Mutagenic Effects:** No evidence of mutagenic potential were seen in the following studies: Gene Mutation - Ames test, mouse lymphoma test in-vitro, in-vitro test with saccharomyces cerevisiae and mouse lymphoma test, host mediated assay. Chromosomal Aberration - Dominant lethal test, cytogenetic study in spermatogonia, cytogenetic study in spermatocytes, and a nucleus anomaly test. Primary DNA damage - Unscheduled DNA synthesis test (human fibroblasts), unscheduled DNA synthesis test (rat hepatocyte) and sister chromatin exchange test.

- **Carcinogenic Effects:** In 2-year feeding studies, the no-effect-level was established at 100 ppm. There were no tumors in the rat at any feeding level. Using its Guidelines for Carcinogen Risk Assessment published September 24, 1986 (51 FR 33992), EPA has classified propiconazole as Group "C" for carcinogenicity (possible human carcinogen). The Cancer Peer Review Committee recommended the RfD approach for quantitation of human risk. Therefore, the RfD is deemed protective of all chronic human health effects, including cancer.
- **Organ Toxicity:** No information was found.
- **Fate in Humans and Animals:** Animals rapidly metabolize propiconazole to a wide variety of compounds. The n-propyl side chain of the dioxolane ring can be oxidized to give a series of metabolites consisting of formic, acetic, and propionic acids. The propionic acid group can be further oxidized to an alpha-hydroxy acid. Cleavage of the dioxolane ring and deketalization yields the alkanol metabolite. Alterations of the phenyl ring of the alkanol yield dechlorinated and hydroxylated ring metabolites that rapidly form glucuronic acid and sulfuric acid conjugates.

ECOLOGICAL EFFECTS

- **Effects on Birds:** Propiconazole had the following LD50s for avian species: mallard duck >2,510 mg/kg, Peking duck >3,000 mg/kg, Japanese quail 2,223 mg/kg, and bobwhite quail 2,825 mg/kg
- **Effects on Aquatic Organisms:** Propiconazole had the following EC50/LC50 values in ppm for freshwater fish species: bluegill 1.3-10.2, brown trout 3.3, rainbow trout 0.9-13.2, carp 6.8-21.0, catfish 2.0-5.1, and fathead minnow 7.6. Another laboratory trial found LC50 (96-hour) values to be 20 mg/l water for brown trout and >100 mg/l for

carp. Propiconazole had the following EC50/LC50 values in ppm for freshwater invertebrate species: crayfish 42.0, water flea 3.2-11.5. The marine species oyster and Mysid shrimp had EC50/LC50 values of 0.3 and 0.5-1.4, respectively

- **Effects on Other Animals (Nontarget species):** Propiconazole does not appear to have any adverse effects on soil microbes as evidenced by soil biochemical analyses. Evaluations were made at concentrations up to and including 100 ppm. At this highest level, no changes were observed in cellulose, starch, or protein decomposition, nitrification, nitrogen fixation, or respiration. Propiconazole displayed no toxic effects to earthworm

ENVIRONMENTAL FATE

- **Breakdown of Chemical in Soil and Groundwater:** The soil movement and leaching potential of propiconazole is limited. Mobility is restricted in soils high in montmorillonite clay and/or organic matter. Also, soil movement is less in acidic soils. Leaching in soils that are acidic, and high in clay and organic matter will be restricted to the top 2-3 inches. In alkaline, low organic matter soils (typical of the Southwestern U.S.), propiconazole may leach to a maximum depth of 8-10 inches. Therefore, leaching into underground water supplies is unlikely. Propiconazole displays moderate soil longevity. In an aerobic soil under controlled conditions, the soil half-life of C14-labeled propiconazole ranged from 30 to 112 days, depending on where the C14 label was placed on the molecule. Under field conditions, the longevity is somewhat higher. The half-life under these conditions ranged from a low of 96 days in a sandy loam to 575 days in a silt loam in Texas. In North Carolina, the half-life in soil dropped to 229 day
- **Breakdown of Chemical in**

Surface Water: Propiconazole was evaluated at three pH concentrations, and a standard temperature of 20 degrees C; no significant hydrolysis was observed. Propiconazole is subject to photolysis, but after 12 days of exposure to natural light, only 20% photolysis was recorded. However, using 1% acetone as a photosensitizer, the half-life was reduced to <1 day. Therefore, should propiconazole enter a natural pond situation (which contains several natural photosensitizers), propiconazole should undergo rapid photodegradation.

- **Breakdown of Chemical in Vegetation:** Propiconazole is readily absorbed by plant tissues, and is transported systemically within the plant. Thus, leaves that emerge following the application will also be protected from fungal infection. Systemic movement is predominately upward (from roots to foliage, or lower leaves to upper leaves), but limited downward translocation also occurs. Plants metabolize propiconazole by hydroxylation of the n-propyl group on the dioxolane ring to yield four beta-hydroxy isomers which form sugar conjugates. Further metabolism involves cleavage of the dioxolane ring and deketalization to form the alkanol metabolite. Hydroxylation and dechlorination of the phenyl ring occur to some degree. Cleavage of the alkyl bridge between the phenyl and triazole rings results in formation of a triazole alanine conjugate which can undergo some oxidation.

PHYSICAL PROPERTIES AND GUIDELINES

Physical Properties:

- **Appearance:** Clear, yellow liquid.
- **Chemical Name:** 1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1*H*-1,2,4-

triazole

- **CAS Number:** 60207-90-1
- **Molecular formula:** C₁₄H₁₅Cl₂N₃O
- **Molecular Weight:** 328.20
- **Water Solubility:** 110 ppm
- **Solubility in Other Solvents:** 100 % Soluble at 20 degrees C in methanol, acetone, Ether, chloroform and benzene; 6% in hexane



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