TECHNICAL DATA BULLETIN

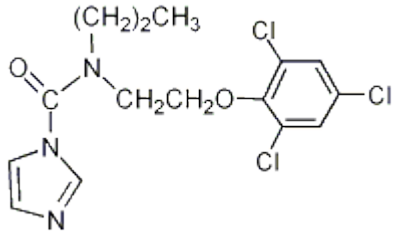
PROCHLORAZ TECHNICAL

1 INTRODUCTION

Prochloraz is a broad-spectrum fungicide. It acts by inhibiting ergosterol biosynthesis. It is effective against a wide range of diseases affecting field crops, fruit, turf and vegetables.

2 ACTIVE INGREDIENT

Common name	:	Prochloraz
IUPAC name	:	*N*-propyl-*N*-[2-(2,4,6-trichlorophenoxy)ethyl]imidazole-1-carboxamide
Chemical Abstracts name	:	*N*-propyl-*N*-[2-(2,4,6-trichlorophenoxy)ethyl]-1*H*-imidazole-1-carboxamide
CAS No	:	*67747–09–5*
Empirical formula	:	$C_{15}H_{16}Cl_3N_3O_2$
Molecular weight	:	376.7
Structural formula		



3 PHYSICOCHEMICAL PROPERTIES

Technical Purity	:	95% w/w Min.
Appearance	:	Odourless, white crystalline powder; (tech. is a mildly aromatic, light-brown semi-solid).
Boiling point	:	Decomposes without boiling
Melting Point	:	46.3–50.3 °C (>99% pure)
Density	:	1.42 (20 °C)
Vapour Pressure	:	1.5×10^{-1} mPa (25 °C); 9.0×10^{-2} mPa (20 °C)
Partition co-efficient	:	logP = 3.53
Solubility in water	:	In water 34.4 mg/l (25 °C).

Solubility in solvents	:	Readily soluble in a wide range of organic solvents, e.g. in toluene, dichloromethane, DMSO, acetone, ethyl acetate, methanol and isopropanol >600, *n*-hexane 7.5 (all in g/l, 25 °C).
Stability	:	No degradation in water after 30 d (pH 5–7, 22 °C). Decomposes in concentrated acids and alkalis, in the presence of sunlight, and on prolonged heating at high temperatures (200 °C).

4 APPLICATIONS

Biochemistry:
Sterol demethylation (ergosterol biosynthesis) inhibitor.

Mode of action:
Fungicide with protective and eradicant action.

Uses:
A protectant and eradicant fungicide effective against a wide range of diseases affecting field crops, fruit, turf and vegetables. An EC is recommended for use in cereals (400–600 g a.i./ha) against *Pseudocercosporella*, *Pyrenophora*, *Rhynchosporium* and *Septoria* spp., with useful activity against *Erysiphe* spp.; in oilseed rape (500 g/ha) against *Pyrenopeziza*, *Botrytis*, *Pyrenopeziza* and *Sclerotinia* spp. Useful activity is also shown against *Ascochyta* and *Botrytis* spp. in field legumes; and *Cercospora* and *Erysiphe* spp. in beet. Good activity against storage or transit diseases of citrus and tropical fruit when applied as a dip treatment (0.5–0.7 g/l). A WP is recommended in mushrooms against *Verticillium fungicola* and *Mycogone perniciosa*, and in rice against *Pyricularia.* A seed treatment (0.2–0.5 g/kg) will control several cereal diseases caused by *Cochliobolus*, *Fusarium*, *Pyrenophora* and *Septoria* spp., and, in flax, *Pyrenopeziza.*

Formulation types:
EC; EW; FS; LS; SC; WP.

Compatibility:
Forms a complex with some metal ions, e.g. prochloraz-manganese used for WP formulations and prochloraz-copper chloride used for FS formulations.

5. TOXICITY

Oral: Acute oral LD_{50} for rats 1023, mice 1600–2400 mg/kg.

Skin and eye: Acute percutaneous LD_{50} for rats >2100 mg/kg

Inhalation: LC_{50} (4 h) for rats >2.16 mg/l air.

NOEL: (2 y) for dogs 4 mg/kg b.w. daily.

ADI: 0.01 mg/kg b.w.

Toxicity class: WHO (a.i.) III.

6. ECOTOXICITY

Birds: Acute oral LD_{50} for bobwhite quail 662, mallard ducks >1954 mg/kg. Dietary LC_{50} (5 d) for bobwhite quail and mallard ducks >5200 mg/kg.

Fish: LC_{50} (96 h) for rainbow trout 1.5, bluegill sunfish 2.2 mg/l.

Daphnia: EC_{50} (48 h) 4.3 mg/l.

Algae: E_bC_{50} (72 h) for *Selenastrum capricornutum* 0.1 mg/l; E_rC_{50} 1.54 mg/l.

Bees: Toxic to bees. LD_{50} (96 h, contact) 141 µg/bee; (48 h, oral) >101 µg/bee.

Worms: LC_{50} for earthworms (*Eisenia foetida*) >1000 mg/kg soil.

7 ENVIRONMENTAL FATE

Animals: In all species examined, prochloraz is rapidly metabolised initially by cleavage of the imidazole ring and quantitatively eliminated from the body, following oral administration. Whilst absorption following dermal exposure is low, residues in plasma and tissues are again rapidly eliminated from the body.

Plants: The primary plant metabolite, *N*-formyl-*N'*-1-propyl-*N*-(2-(2,4,6-trichlorophenoxy)ethyl)urea, is formed from cleavage of the imidazole ring. This is degraded to *N*-propyl-*N*-(2-(2,4,6-trichlorophenoxy)ethyl)urea, which occurs in both free and conjugated forms. Other metabolites include 2-(2,4,6-trichlorophenoxy)ethanol, 2-(2,4,6-trichlorophenoxy)acetic acid, traces of 2,4,6-trichlorophenol and conjugates of the above. Little unchanged prochloraz is present.

Soil/Environment: Degrades in the soil to a range of mainly volatile metabolites (degradation is not pH-dependent). Prochloraz is well adsorbed onto soil particles, and is not readily leached; $\underline{K_d}$ 152 (sandy loam), 256 (silty clay loam). In a further study, mean $\underline{K_{oc}}$ 1463. Possesses low toxicity to a wide range of soil microflora and microfauna, but has inhibitory effects on soil fungi. $\underline{DT_{50}}$ under field conditions is 5–37 d..

8. HANDLING & STORAGE

Handling:
Keep away from food, drink, and animal feedstuff. KEEP OUT OF REACH OF CHILDREN. Wear suitable Personal protective equipment when handling and spraying.

Storage:
Store in the original container in a dry, cool, ventilated, LOCKED area. DO NOT store in prolonged sunlight. DO NOT store with food, seed, or animal feedstuff.

9. DISPOSAL CONSIDERATIONS

Packages or surplus material & washing from the machines & containers should be disposed of in a safe manner so as to prevent environmental water pollution.The used packages shall not be left outside to prevent their re-use.Packages shall be broken & buried away from habitation.