Technical Information



THE INTELLIGENT CHEMICAL ISOPROTHIOLANE



Chemical and Physical Properties

| Common name : | Isoprothiolane | Structure formula |
|-------------------------|--|----------------------|
| Chemical name(IUPAC): | diisopropyl 1,3-dithiolan-2-ylidenemalonate | |
| Trade name : | Fuji-One | |
| Melting point : | 54.6-55.2℃ | |
| Vapor pressure: | 4.93 × 10-4 Pa (25 °C) | |
| Solubility: | water; 48.5mg/L acetone; 4,061g/L chloroform; 4,126g/L | |
| Partition coefficient : | log Pow = 2.80 | \setminus U |

Toxicology (technical)

Acute toxicity

Oral: Rat LD₅₀(mg/kg) Dermal: Rat LD₅₀ (mg/kg) Inhalation: Rat LC₅₀(mg/L/4h) Skin Irritation: Guinea pig Eye irritation: Rabbit Skin sensitization: Guinea pig

우 300< LD50≦2,000 ♂♀ >2,000 ♂♀ >2.77 Moderate irritant Slightly irritant Positive

Acute toxicity to aquatic organisms

Carp LC₅₀ (96h) : Daphnia EC₅₀ (48h) : Algae ErC₅₀ (0-72h): 11.4 mg/L 19.0 mg/L 10.8 mg/L

Characteristics of Isoprothiolane

1. Both preventive and curative effect on rice blast

- 2. Effective on every stage of life cycle of blast fungus (Strong inhibition on penetration stage)
- 3. High efficacy against leaf and panicle blast
- 4. Long lasting effect and strong systemic action
- 5. Additional effect on rice growth as a PGR and suppression of Brown Plant Hopper (BPH), which are registered in Japan

Mode of Action



Isoprothiolane belongs to F2 class (code6) fungicides in FRAC MOA classification and affects lipid metabolism and/or bio-synthesis of fatty acid such as methylation of phospholipid.
No resistant isolate is observed to Isoprothiolane as written in p. 4.

> This figure is referring to FRAC information (www.frac.info).

Inhibitory effect of Isoprothiolane on the infection cycle of rice blast (EC_{90})



Penetration stage is most sensitive → Main Target

IPT: Isoprothiolane

Action of Isoprothiolane against blast fungi-1 Appressorium formation



Method: The appressorium formed in the absence (UTC) or presence of IPT was removed from plant cell and supporting surface of appressorium was observed by electron microscope.

Results

In UTC hollow as the trace of penetration hyphae was observed. In IPT treated no hollow or trace was observed.

UTC: Untreated Control

IPT treatment

Thin cell wall

Hyphae with

abnormal shape is

Normal growth of hyphae is inhibited

Short cell

formed

Action of Isoprothiolane against blast fungi-2 Hyphae growth Hyphae/UTC Hyphae/IPT (5ppm) treated



Araki & Miyagi (1976) Ann. Phytopath. Soc. Japan 42:401-406





IPT has better curative efficacy than competitors and similar preventive efficacy to competitors even in the field



Sensitivity test of Isoprothiolane against blast fungus in Japan

Translocation of Isoprothiolane between leaves



Method: 400 ppm of ¹⁴C-labeled IPT was applied to the 3rd leaf blade of 4-leaf stage seedling. Translocation of IPT was examined by autoradiography

High translocation activity was observed in rice seedling by autoradiography. Systemic action is expected from leaves to hole plants.



Ohtsuka & Saka (1988), Japan. Jour. Crop Sci., 57:631-635



Isoprothiolane improves grain ripening of inferior panicle and inferior grains

ISOPROTHIOLANE





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