

ANTIFUNGAL AND INSECT TOXICITY ACTIVITIES OF THE ETOFENPROX 10EC

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ABSTRACT

Insecticidal activity of Etofenprox 10 EC was evaluated against three species of stored grain pests. Viz. *Sitophilus oryzae*, *Tribolium castaneum* and *Callosobruchus chinensis* and one species of forest pest the termite *Odontomermes breunneus*. Highest activity was observed at 1 g/cm² both against stored grain pests and termites which persisted for more than 60 days. The test chemical was also examined against five different species of plant pathogenic fungi (*Fusarium oxysporium*, *Alternaria solani*, *Curvularia liunata*, *Helminthosporium* and *Sclerotium rolfsii*). Among these, *S. rolfsii* and *Helminthosporium* were more susceptible at lower concentration than the test of the fungi. Minimum Inhibitory Concentration (MIC) value of the test chemical was determined against all the fungi.

KEY WORDS: Etofenprox 10EC, plant pathogenic fungi, MIC, toxicity,

INTRODUCTION

Etofenprox, a pyrethroid- like insecticide active through contact and ingestion, is effective against a range of agricultural and horticultural insect pests and also used as indoor and as an outdoor (fog) treatment to control a variety of flying and crawling insect pests, Etofenprox a non-ester pyrethroid has very low mammalian toxicity and highest safety factor(WHO 2008).Etofenprox 10EC has insecticidal activity and provides very quick killing action against various insect pests, but has a remarkable weak toxicity to mammals. It has low toxicity to fish and certain spiders on important natural enemy of insects in paddy fields. (Anonymous). Vasuki et al (1995) have reported the insecticidal activity of Etofenprox against different mosquito species. Reports are available regarding bio efficacy of Etofenprox against *Blatta germanica* , bed bugs, houseflies and fleas.(Pulsintsva et al 1992).Jebansen (1998) have reported the sub-toxic effect of Etofenprox on predation of *Culex quinquefasciatus* by *Diplonyehus indicus*. In this communication we report the insecticidal activity of Etofenprox 10EC against stored grain pests, termites and antifungal activity against some plant pathogenic fungi.

MATERIAL AND METHOD

Chemical: The test chemical viz. Etofenprox10EC (common name Trebon) was obtained from local market.

Insects: Stored grain pests (*S. oryzae*, *T. castaneum* and *C. chinensis*) were maintained in the laboratory at controlled temperature at 28 ± 2 °C. Adult stages of each species were used to study the toxicity. Termite’s workers were collected from field and acclimatized to laboratory conditions for 48hrs before use.

Plant Pathogenic fungi: Five different species of plant pathogenic fungi viz. *F. oxysporium* (NCIM 1043), *A. solani* (NCIM 887), *C. lunata* (NCIM 716), *Helminthosporium* (NCIM 1079) and *S. rolfsii* (NCIM 1084) were sub cultured on potato dextrose agar medium (PDA) and maintained in the laboratory, at room temperature.

Toxicity studies: Serial dilution of the test chemical were made in distilled water and the desired concentrations (0.001 to 1.0 µg/cm² were applied on the inner surfaces of 9cm² glass petri dishes to form a uniform residual film of the test chemical. After drying the film completely, adult stages of the insect were released in the petri dishes and insecticidal activity was recorded after 24hrs. For each concentration, three replicates were taken. The persistence of the test chemical was examined against test insects for two months.

Fungicidal activity: Fungicidal activity was examined by following the procedure (Nene and Tapliyal 1979). The test concentration ranged from 10 to 300ppm. The plates were incubated at room temperature. Normal potato dextrose agar served as control. The bioassay was done with three replicates. Observation were recorded when control plates showed 100% growth. Percentage mycelia inhibition was calculated by the formula.

% Inhibition = Control-Treated

$$\frac{\text{Control} - \text{Treated}}{\text{Control}} \times 100$$

Where C= average diameter of the fungal colony (in cm) in control plate

T= average diameter of the fungal colony (in cm) in treated plates.

MIC= Minimum Inhibition Concentration

MIC values of Etofenprox against the test fungi were determined.

RESULTS AND DISCUSSION

Insecticidal activity of Etofenprox 10 EC against four insect pests is depicted in Table 1. Highest insecticidal activity was obtained at 1 µg/cm² against all the four test insect species. As the concentration was decreased (0.1µg/cm²) there was a decrease in the activity against *S. oryzae* and *T. castaneum*. However 100% mortality continued to be elicited

even at 0.1 µg/cm² in case of *O. obesus* and *C. chinensis*. Persistence of insecticidal activity was found to be more than two months in case of stored grain pests and termites at 1µg/cm² concentration. As the concentration was reduced there was a decrease in the persistence in case of *S. oryzae*. However, 60-75% mortality persisted in case of other insects. The fungicidal activity of Etofenprox 10EC (Table 2 and 3) showed that the plant pathogenic fungi viz. *Helminthosporium* and *S. rolfsi* were more susceptible. This was followed by *A. solani*, *C. lunata* and *F. oxysporium*.

Table 1: Insecticidal activity of Etofenprox 10EC (% Mortality)

Insect	Concentration µg/cm ²	% Mortality in different days						
		1	10	20	30	40	50	60
Control	-	00	00	00	00	00	00	00
<i>S. Oryzae</i>	0.1	66.66	16.6	00	00	00	00	00
	1.0	100	100	100	100	100	100	90
<i>T.castaneum</i>	0.1	60.5	43.3	60	55.2	62.3	55.5	50
	1.0	100	100	100	100	100	100	100
<i>C. chinensis</i>	0.1	100	60	55.29	55.32	58.29	55.23	45.80
	1.0	100	100	100	100	100	100	100
<i>O. brunneus</i>	0.1	100	100	100	72.29	70.14	60.23	56.25
	1.0	100	100	100	100	100	100	100

Table 2: Fungicidal activity of Etofenprox 10EC (% mycelia inhibition)

Organism α	Concentration in ppm								
	1	10	50	75	100	125	150	200	300
<i>S. rolfsi</i>	0	40.53	90.68	90.82	100	-	-	-	-
<i>Helminth.</i>	0	29.33	79.80	100	-	-	-	-	-
<i>C. lunata</i>	0	38.5	49.23	62.28	77.80	85.69	100	-	-
<i>F. oxysporium</i>	0	0	15.23	29.25	46.66	58.23	65.33	70.0	75.0
<i>A. solani</i>	0	5.0	38.23	69.25	80.53	100	-	-	-

Table 3: MIC values of plant pathogenic fungi

Plant pathogenic fungi	MIC values (ppm)
<i>S. rolfsi</i>	80-100
<i>Helminthosporium</i>	60-75
<i>C.lunata</i>	130-150
<i>F. oxysporium</i>	300
<i>A. solani</i>	110-125

The above results show that Etofenprox 10 EC exhibits broad spectrum insecticidal and fungicidal activity Thus, it may be gainfully deployed for multiple purposed ranging from control of stored grain pests and termites as well as some plant pathogenic fungi. Its performance under filed conditions, however need to be re ascertained before incorporation in management protocols.

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