

ACETAMIPRID INDUCED CHANGES IN TOTAL LEUCOCYTES AND ERYTHROCYTES COUNT IN A FRESHWATER FISH, *CHANNA PUNCTATUS* (BLOCH)

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ABSTRACT

In spite of adverse effects of insecticides and insecticides on the living beings, we are constantly using these biohazardous chemicals. In the present investigation, acetamiprid has been used to study its comparative effects of different sub-lethal concentrations on total leucocytes and erythrocytes count in a fresh water fish *Channa punctatus* (Bloch).

INTRODUCTION

Acetamiprid is a broad-spectrum agricultural synthetic insecticide. This pesticide is practiced in agricultural as well as in garden. As it is a broad-spectrum insecticide it is used excessively for getting effective results besides knowing standard concentration doses of insecticides knowingly and unknowingly by framers and peoples. It enter into water and it may have effect on the morphology, physiology and behavior of fresh water organisms.

In the present study an attempt has been made to find out changes in the total leucocytes count (TLC) and in erythrocytes count in the blood of fresh water fish *Channa punctatus* (Bloch) exposed to sublethal concentrations of a commonly broad spectrum pesticide Acetamiprid.

MATERIALS AND METHODS

In the present investigation healthy freshwater fish *Channas punctatus* (Bloch) were purchased from local fisherman. The fishes used were of average length 12 to 15 cm and weight 50 to 70 g. The fishes were disinfected with 01% KMNO₄ and acclimatized in laboratory condition for 7 days before experimentation in glass aquaria. The fishes were fed with standard fishmeal. A group of 6 healthy fishes were transferred to each test aquaria contained a sub lethal concentration of Acetamiprid 12.5 ppm, 18.0 ppm, 25.0 ppm respectively. A control group of fish aquaria was also maintained simultaneously. LC₅₀ value of Acetamiprid (20%) were calculated according to 'standard methods' of American Public Health Association (1971). The LC₅₀ value is 50 mg/L. The fishes were exposed to various sub lethal concentrations.

After required exposure the fishes were sacrificed and blood was collected from caudal artery with the help of a syringe using 0.5% EDTA as anticoagulant.

The blood samples were used for the estimation of TLC and erythrocytes with the help of haematocytometer using a Neubaur's counting chamber following the methods given by Dacie and Lewis (1971).

RESULTS AND DISCUSSION

It was observed that the values of TLC were increased and the count of the erythrocyte decreases in different sub lethal concentrations of Acetamiprid treated group of fishes (as shown in Table 2 and 3).

Ramanujan and Mohanty (1997) have reported increased lymphocytes significantly due to Thiodon exposure in *H. fossils*.

Mukhopadhyay and Dehadrai (1980) have also observed decreased lymphocyte and monocyte and increased neutrophil percentage due to Malathion treatment in *Clarias batrachus*. Bhargava *et al.*, (1999) have reported increased lymphocyte count due to treatment of malathion in *Channa punctatus* (Bloch), whereas, Kumar and Bandeyri (1991) have observed increased lymphocytes and neutrophils with decreased percentage of monocytes.

Bhatakar and Dhande (2000) have reported hematological changes in *Labeo rohita* on exposure to Sub-lethal concentrations of Furadan. P. Bhaskara Thathaji *et al.*, (2008) also record the marked describes in erythrocytes in fish *Cyprinus carpio* Communis, exposed to sub-lethal concentrations of an herbicide, Butachlor and Machete.

Table 1: Acute toxicity data of Acetamiprid to *Channa punctatus* (Bloch)

S. n.	mg/liter	ppm	No of animals exposed	Mortality noted after time interval (in hrs.)					Percent mortality within 52 hours
				12	24	36	48	52	
1	control	00	6	-	-	-	-	-	00
2	10	10	6	-	-	-	-	-	00
3	20	20	6	-	-	-	1	-	16.00
4	30	30	6	-	-	1	0	1	33.00
5	40	40	6	-	-	1	1	0	33.00
6	50	50	6	-	-	1	1	1	50.00
7	60	60	6	-	1	1	2	1	83.00
8	70	70	6	-	1	1	2	2	100.00

Table 2: Total leucocytes at different sub-lethal concentrations of Acetamiprid to *Channa punctatus* (Bloch)

Hours exposure	Total leucocyte count (TLC) x 10 ³ /Cu mm.			
	12.5ppm	18.5ppm	25ppm	Control
24	4.50 ± 0.05	49.80 ± 0.9	10.90 ± 1.6	47.35 ± 0.16
48	13.02 ± 1.0	13.56 ± 0.8	16.05 ± 0.8	49.00 ± 0.7
72	16.92 ± 0.8	22.32 ± 1.6	48.69 ± 1.87	48.55 ± 1.6
96	53.94 ± 1.6	55.50 ± 0.8	55.88 ± 0.7	47.45 ± 0.08

Values represents mean of five observations, ± indicates the Standard Deviation (SD)

Table 3: Total Erythrocytes at different sub-lethal concentrations of Acetamiprid to *Channa punctatus* (Bloch)

Hours exposure	Total erythrocytes count (TEC) x 10 ⁶ /Cu mm.			
	12.5ppm	18.5ppm	25ppm	Control
24	1.37 ± 0.01	1.51 ± 0.16	7.80 ± 0.3	4.17 ± 0.08
48	2.85 ± 0.08	2.07 ± 0.02	1.72 ± 0.16	4.17 ± 0.08
72	2.44 ± 0.03	2.37 ± 0.08	1.78 ± 0.08	4.17 ± 0.08
96	3.25 ± 0.2	2.92 ± 0.4	2.32 ± 0.1	4.17 ± 0.08

Values represents mean of five observations, ± indicates the Standard Deviation (SD)

In the present observation, the values of TLC were increased in acetamiprid treated different sub-lethal concentration group of fishes as time passes. Increase in the leucocytes count suggests that result of direct stimulation of immunological defenses due to the presence of toxic substances or may be associated with induced tissue damage.

Mukhopadhyay and Dehadrai (1980) have reported the increase in number of WBC due to stress of pesticide malathion in fresh water fish *channa punctatus* (Bloch). Nath and Banerjee (1991) have reported increase in total leucocytes

count due to BHC and malathion treatment, so it may be assumed that increased leucocytes tendency may be a part of immunological defense system during prolonged exposure of certain insecticides.

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