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Research Article

TOTAL PROTEIN ALTERATION IN TISSUES OF FRESHWATER TELEOST, CHANNA GACHUA AFTER EXPOSURE TO AN INSECTICIDE CONFIDOR

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ABSTRACT

Toxicity of an insecticide Confidor on protein content of liver and gonads of freshwater fish, *Channa gachua* were studied during 24, 48, 72 and 96hrs in laboratory condition. Physicochemical parameters like, pH, temperature, O₂ and CO₂ content, alkalinity, and total hardness were assessed. LC₅₀ value of confidor to *Channa gachua* was calculated for 96hrs, it was 0.9ppm. The animals were exposed to lethal concentration for acute period. Then control as well as experimental fishes were sacrificed and then liver and gonad were separated for biochemical analysis. Protein content of liver and gonad was found to be decreased after acute exposure to an insecticide confidor.

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INTRODUCTION

Confidor is a systemic insecticide. It contains imidacloprid 17.80%SL. Imidacloprid is highly toxic to an acute basis to aquatic invertebrates. It is broadly used in agricultural field to control pest production on crop. Pesticidal application greatly enhance the agricultural crop yields and protects them from various diseases caused by insects. But excessive use of such a chemical pesticides adversely damage the soil surface contaminates and pollute the terrestrial as well as aquatic environment. Fish serves as a bioindicator species because it has great sensitivity to changes in aquatic environment. These pollutants produce harmful effects on physiology of fish and damage their systems. These pesticides also reach up to the human being through food chain. Nutritional value of fish depends on their biochemical composition which is affected by the water pollution (Gehan, 2012). Sneakheaded fish *Channa gachua* is popular edible fish in Khandesh region. It is supplementary diet for protein than meat. It is collected by the fisherman and sold in local market regularly so it has great economic importance. For this reason the present investigation was undertaken to study the toxic effects of an insecticide confidor on the biochemical content of the freshwater fish, *Channa gachua*.

MATERIALS AND METHODS

The fishes *Channa gachua* were collected from the Gadad and Girna river dams near Chalisgoan city, Dist Jalgaon in

Maharashtra. They were collected from their natural habitat and brought to the laboratory. Physicochemical parameters of water were analyzed by following standard method of APHA (1985). The fishes were acclimatized to laboratory conditions for 10 days prior to subjecting them to experiments. Healthy and active fishes were chosen for experiments. Static bioassay studies were carried out by Finney's method (1971). Two groups of these fishes were formed. One group was considered as experimental group exposed to reagent grade of Confidor for 24, 48, 72, and 96 hours for acute exposure. Another group was without pollutants and was considered as control.

Biochemical parameter was assessed in five individual animals, pesticide treated and control groups were made. The fishes were starved for one day prior to experimentation in order to avoid the metabolic differences, if any due to differential feeding and food reserves. The protein was estimated from Liver and Gonad in control and experimental fishes. Total proteins were estimated by using Lowry's method (Lowry et.al.1951). The amount of protein was calculated by referring to a standard graph value and it was expressed in terms of percentage in wet tissue. The Bovine serum albumen was used as a standard.

RESULTS AND DISCUSSION

The protein content of the liver and gonad was found to be decreased after acute treatment by Confidor. The percent decrease of protein in liver as compare to control, after 96hrs treatment with Confidor was 9.903 to 2.245%. The percent

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decrease of protein in gonad as compare to control after 96hrs treatment with Confidor was 10.627 to 4.043 %. The percent depletion in protein content was found more in the liver than gonad after pesticidal stress as a period of exposure increased. Results were summarized in table.

Table Effects of insecticide Confidor on Protein content in liver and gonad of *Channa gachua* during period of acute exposure.

Tissue	Treatment	Acute			
		24h	48 h	72 h	96 h
Liver	Control	9.903	9.592	9.311	9.001
		±1.4048	±2.7382	±2.32005	±1.3921
Gonad	Control	10.627	10.426	10.225	10.124
		±1.3397	±2.3658	±1.9753	±1.7041
Liver	Confidor	6.763	5.624	3.480	2.245
		±1.4612	±2.0352	±1.3336	±1.4750
Gonad	Confidor	8.4872	7.3402	6.1928	4.043
		±2.2939	±2.02667	±1.40441	±1.8703

Values expressed as % of wet wt. of tissue: ± indicates S.D. of five observations; values are significant at P<0.05**

Proteins are important organic substances require in tissue binding and repair, under extreme stress conditions protein supplies energy in metabolic pathway and biochemical reaction (Senthilkumar *et al.*, 2007). Decreased protein level in experimental tissues as compare to control may be due to stress induced by pesticide. Depletion of tissue protein content at acute exposure of pesticides to freshwater fish, *Channa gachua* suggest the possible utilization of protein for various metabolic purpose of enhanced property proteolysis to meet the high energy demand under pollution stress conditions. The fact may be due to activation of protein synthetic processes. Depletion of tissue proteins in fishes exposed to various toxicants has been reported by several investigators, Choudhary and Gaur (2001); Shobha *et al.*, (2007); Mastan, (2008); Rajput *et al.*, (2012). Decrement in the total proteins suggest the existence of a high protein synthesis. The decrease in protein levels may be due to their degradation. According to Malla Reddy, (1987), the degradation products may in terms be fed into a tricarboxylic-acid cycle through the aminotransferase system to cope up with the high energy demand augmented during malathion stress. Decreased trend of protein content in various tissues of freshwater fish, *Labeo rohita* were reported after acute exposure to phenthoate by Somaiah *et al.*, (2014) and noted that, it may be due to metabolic utilization of keto acids in the synthesis of glucose or for the osmotic and ionic regulation. Bais and Lokhande, (2012), studied cadmium chloride toxicity in freshwater fish, *Ophiocephalus stiatius* and reported reduction in protein level in various tissues.

Protein reduction in liver, brain and ovary of freshwater fish, *Channa punctatus* was reported by Agrahari *et al.*, (2006). Tiwari and Singh, (2009) also reported liver and muscle tissue protein depletion in fish *Colisa fasciatus* due to toxicity of ethanolic extract of *Nerium indicum* mill. Similar depletion in protein level were observed by various reporters in fish as Malla Reddy and Bashamohideen, (1995); Tilak *et al.*,(2005); Chezian *et al.*, (2010).

CONCLUSION

In the present study, an insecticide confidor induce changes in the normal level of protein in tissues of freshwater fish,

Channa gachua. It is clearly indicate that pesticide confidor affects the natural food value of fish.

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