

**STUDY ON PROTEIN LEVEL IN A FRESHWATER FISH *CHANNA GACHUA* EXPOSED TO ENDOSULFAN****Deshmukh . D. R.**

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(E-mail : [deshmukhdnyan@gmail.com](mailto:deshmukhdnyan@gmail.com))**ABSTRACT**

In the present work the fish *Channa gachua* were exposed to 0.0049 ppm concentration of endosulfan pesticide for 30 days (Chronic toxicity). The changes in the total proteins level of organs such as brain, liver, gill, kidney and muscle were observed and shows decreased protein level. The decrease in proteins content under endosulfan toxicity in different tissues of *C. gachua* indicates the proteolysis, prompting the suggestion that the proteins were utilized to meet the excess energy demands imposed by the toxic stress. The percent decrease of total proteins were observed and compared with control fishes.

**KEY WORDS:** *Channa gachua*, Endosulfan, protein level, Toxicity.**INTRODUCTION**

The pesticides have been recognized as one of the serious pollutants of the aquatic ecosystems with deleterious effects on the living resources. Increasing number and amount of industrial, agricultural and commercial chemicals discharged into the aquatic environment having led to various deleterious effects on the aquatic organisms Glashan and Hughies (2001). Aquatic organisms, including fish, accumulate pollutants directly from contaminated water and indirectly via the food chain Sasaki, (1997) The protein components of cell becomes necessary in the light of the radical changes that take place in protein profiles during pesticide intoxication. both the protein degradation and synthesis are sensitive over a wide range of conditions and show changes to a variety of physical and chemical modulators. The physiological and biochemical alterations observed in an animal under any physiological stress can be correlated with the structural and functional changes of cellular proteins. Proteins occupy a unique position in the metabolism of cell because of the proteinaceous nature of all the enzymes which mediate at various metabolic pathways Robert et al. (2006) and Michael and David Nelson (2008).

Endosulfan (Thiodon (R) 6,7,8,9,10, 10 hexachloro 1-5, 5a, 6, 9, 9a hexahydro, 6, 9 methano-2,4,3-benzodioxathiepine 3-oxide) is an organochlorine insecticide used extensively in the Guntur District, Andhra Pradesh, India, for controlling pests of cotton. Endosulfan is registered as a fish toxicant by French et al., (1957). These studies are very important as the differences in pesticide toxicity among various fish may be due to differences in their capacity to detoxify the compound. Indiscriminate application of these pesticides in order to increase food production may effect on target organisms including economically important food fishes and other biotic ecosystem.

Pesticides also influence the activity of different enzymes. A slight variation in enzyme activities would affect the organism Roy (2002). Aminotransferases mobilize the aminoacids into carbohydrate and lipid metabolism. There exists a rapid turnover of free aminoacids from cell to cell, tissue to tissue through the circulating fluid and utilize for various purposes through inter conversions Tilak *et al.*, (2005). Transaminases form an important group of enzymes mediating carbohydrates, protein and lipid metabolism. Transamination represents the mechanism causing eventual deposition of nitrogenous waste products like ammonia and urea resulting in the production of carbon compounds, which contribute towards gluconeogenesis and fattyacid formation. Therefore in the present study, an attempt has been made to carried the toxicity of endosulfan on the protein metabolic alterations in different tissues of fish *C. gachua*. Botta *et al.*, (1978) observed that fish is rich source of essential nutrients required for supplementary for diet. Deshmukh (2015), studied toxicity of endosulfan on protein level in a freshwater fish *Wallago attu*. Deshmukh (2016), observed that effect of endosulfan on protein level in a freshwater fish *Cyprinus carpio*.

**MATERIALS AND METHODS**

In the present investigation, live specimens of *C. gachua* were collected from paithan and were brought to the laboratory without any mechanical injury. The fishes were maintained in glass aquaria and were allowed to acclimatize for nearly about four weeks before being used for the test. To determine the effect of chronic treatment of endosulfan pesticide on total protein level a separate set of experiment was specially run for 30days. Ten fishes were exposed for

30 days period. The fishes are exposed to sub-lethal concentrations of endosulfan is 0.0049 ppm. The total protein content was estimated by Lowry *et al.*, (1951) .

### RESULTS AND DISCUSSION

The fishes *C. gachua* exposed to endosulfan pesticide for chronic toxicity shows decrease in protein level in different tissue of the fish similar result were also observation are also observed in various pesticides. It was also observed that alterations in protein were dependent on the concentrations and specific toxicant. During the chronic treatment (0.0049 ppm concentration of endosulfan) the protein level is decreased after exposure to 30 days are shown in Table 1.

Protein is most characteristic organic compound found in the living cell while the protoplasm of the cell is composed of protein. They play vital role in the process of interaction of cellular medium. During present investigation increase in muscle and stomach protein content of *C. punctatus* had been observed during 24 hours and 48 hours respectively after exposure to sub-lethal concentration of malathion. Proteins are building blocks of animal body. Rajeshwar Rao *et al.*, (1983) suggested that incline in protein content might be due to pesticidal stress and the energy was derived from carbohydrate metabolism.

**Table 1. Changes in the total protein (mg/g wet weight of tissue) in different tissues of *C. gachua* on exposure to sublethal concentrations of endosulfan (0.0049 ppm) for 20 days.(Chronic exposure)**

Organs	Endosulfan		
	Control	Sub-Lethal	% Change
Brain	107.28	97.40	-9.88
	± 0.6	± 0.006	
Gill	87.04	74.09	-12.95
	± 0.04	± 0.005	
Kidney	121.13	114.20	-6.93
	± 0.004	± 0.005	
Liver	135.35	116.40	-18.95
	± 0.07	± 0.006	
Muscle	131.25	119.10	-12.15
	± 0.3	± 0.007	

Each value is a mean of 10 observation ± S.D.

Fish is having little amount of carbohydrates so alternative source of energy is protein to meet the increased energy demand. Sambasiva Rao (1999), Durga Prasad and Veeraiah, (2002) stated that the reduction in proteins supports the view that a pesticide exerts a proteolytic effect. Tiak *et al.*, (2001) observed the total protein depletion in tissues of muscle, liver, kidney, brain and gill of fish *Labeo rohita* exposed to both technical as well as 20% EC of chlorpyrifos. Tripathi, G. and Priyanka Verma, (2004), observed the decrease in protein content in the tissues of brain, liver and muscle of fish *C. batrachus* in sublethal concentration of endosulfan and fenvalerate. Gopala Rao (2006), observed the depletion of proteins under exposure to kelthane an organochlorine insecticide in the freshwater fish *Channa punctatus*. Tilak *et al.*, (2009), observed significant decrease in the protein content under sublethal concentrations of alachlor in *C. punctatus*. Decrease in total proteins in liver, muscle, kidney and gills under dimethoate toxicity in fish Arias Dussumieri were observed. Chezhan *et al.*, (2010), observed that the decreased trend of protein content in various tissues of *L. rohita* may be due to metabolic utilization of keto acids in the synthesis of glucose or for the osmotic and ionic regulation . The present study revealed that the reduction in protein levels in the tissues of *C. gachua* exposure to endosulfan pesticide. Similar observation was noted in *C. punctatus* exposed to technical grade malathion by Agrhari *et al.*, (2006), and Somaiah *et al.*, (2014).

Proteins are important biomolecules involved in a wide spectrum of cellular functions by Prasanth (2006). Dalela *et al.* (1981), reported that decrease in protein content in *Mystus vittatus* exposure to pesticide may be due to the excretion of



proteins by kidney and this is due to kidney failure or impaired protein synthesis as a result of liver disorders. maximum The decrease in protein contents in the liver of *C. orientalis* and *Baleophthalmus dussumieri* reported by Patel and Parmar (1993) .

### Conclusion

The decreased in proteins level under the stress of endosulfan toxicity observed in different tissues of *C. gachua* indicates the proteolysis, and suggest that the proteins were utilized to meet the excess energy demands imposed by the toxic stress.

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