

## **Alphamethrin induced biochemical alterations in kidney of *Clarias batrachus***

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### **ABSTRACT**

An attempt has been made to investigate Alphamethrin induced Biochemical alterations in Kidney of *Clarias batrachus* at 96 hours  $LC_{50}$  values ( $74 \mu\text{l/l}$ ). Exposed fishes showed an increase in DNA content but decrease in RNA and protein content. Findings of the present investigation exhibit that Alphamethrin is extremely toxic to the studied fishes and may induced the biochemical alterations in kidney of *Clarias batrachus*.

**Key words:** Alphamethrin, biochemical change, kidney and *Clarias batrachus*

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### **INTRODUCTION**

Alphamethrin (Synthetic pyrethroid insecticides) is toxic to fish and other aquatic animals [1, 2 and 3] but non toxic to birds [4] because it is slowly metabolized and eliminated by the fish than mammals [5]. It is widely used in crop production and public health programme. If fish are exposed to toxic chemicals, they exhibit several biochemical and physiological stress responses as compared to higher vertebrates [6 and 7]. In view of this, the present work has been undertaken to investigate Alphamethrin induced biochemical changes in kidney of *Clarias batrachus*.

### **MATERIALS AND METHODS**

#### **Test Specimen**

Healthy cat fishes (*Clarias batracus*) of approximately equal sizes were collected from local fish market (Indore) and acclimatized to the lab condition; and were regularly fad with soya meal and prawn powder.

#### **Test chemical**

Alphamethrin was used as test chemicals at sub lethal dose of 96 hours  $LC_{50}$  values ( $74 \mu\text{l/l}$ ).

#### **Experimental design**

In present work, fishes were divided into two major groups

- (1) **Control group**- 10 fishes were kept in normal water at pH (7) and temperature ( $25-30^\circ\text{C}$ ).
- (2) **Experimental groups**- 20 fishes were exposed to sub lethal dose of Alphamethrin ( $74 \mu\text{l/l}$ ).

#### **Autopsy**

Fishes of control and treated groups were sacrificed at 0 hours, 24 hours, 48 hours, 72 hours and 96 hours. The kidney were removed, blotted, weighed and processed for following biochemical tests.

Following standard biochemical methods were used for present study, depicted in the manual of biochemical tests and experiment [8].

1. Extraction and Estimation of DNA by by DPA method

2. Extraction and Estimation of RNA by by Orcinol method
3. Estimation of total protein by Biuret method

## RESULTS AND DISCUSSION

**Table-1: Showing exposure of Alphamethrin in DNA content of Kidney of *Clarias batrachus***

S. No.	Exposure time (Hour)	DNA(mg/g wt. of tissue)		Differences	% Alteration
		Control	Experimental		
1	0	2.10	2.10	0	0
2	24	2.10	2.70	0.60	+ 28.50
3	48	2.10	3.20	1.10	+ 52.38
4	72	2.10	3.84	1.74	+ 82.85
5	96	2.10	4.26	2.16	+ 102.85

**Table-2: Showing exposure of Alphamethrin in RNA content of Kidney of *Clarias batrachus***

S. No.	Exposure time (Hour)	RNA(mg/g wt. of tissue)		Differences	% Alteration
		Control	Experimental		
1	0	43.64	43.64	0	0
2	24	43.64	39.42	4.22	-9.67
3	48	43.64	30.40	13.24	-30.33
4	72	43.64	22.65	20.98	-48.07
5	96	43.64	16.72	26.92	-61.68

**Table-3: Showing exposure of Alphamethrin in Protein content of Kidney of *Clarias batrachus***

S. No.	Exposure time (Hour)	Protein (mg/g wt. of tissue)		Differences	% Alteration
		Control	Experimental		
1	0	3.60	3.60	0	0
2	24	3.60	3.10	0.50	-13.88
3	48	3.60	2.42	1.18	-32.77
4	72	3.60	1.30	2.30	-63.88
5	96	3.60	0.78	2.82	-78.33

In present investigation, DNA content were found to be increase as 2.10, 2.70, 3.20, 3.84 and 4.26 mg/g wt. of tissue on exposure of 74  $\mu$ l/l Alphamethrin up to 96 hours (Table-1). However, RNA and Protein content were found to be decrease from 43.64 to 16.72 mg/g wt. of tissue (Table-2) and; 3.60 to 0.78 mg/g wt. of tissue respectively on exposure of 74  $\mu$ l/l Alphamethrin up to 96 hours (Table-3).

Whereas, Bulow *et al.* [9] and Brachet *et al.* [10] reported the reduction in RNA content of brain, liver, and muscles and these alterations in RNA contents of different organs might also be due to variation in RNA polymerase activity [11]. Das and Mukherjee [12] observed the decrease in proteins content of muscle of *Labeo rohita* in response to Cypermethrin exposure and decreased in protein level may be attributed to impaired synthetic machinery caused by cypermethrin effect [13]. However, depletion (15–50%) in protein content of liver, muscle, brain, and gill of *Heteropneustes fossilis* were also observed after exposure of Cypermethrin [14]. These authors [14] also found that the decrease in protein content in response to Alphamethrin may be due to the extensive proteolysis (by increased protease activity). It has been also observed that increase in DNA content is might be due to increased Thymidin uptake in the hepatic DNA [11]. The DNA content found increase up to 97.5 percent and RNA, ALP, ACP and protein content decreased up to 60.5, 69.5, 66.0 and 88.2 percent respectively after 96 hours exposure (80 $\mu$ l/l) of Cypermethrin on Kidney of *Clarias batrachus* [15]. Results of the present investigation also support the findings of previous authors [16, 17, 18 and 15].

Result exhibits that Alphamethrin is highly toxic to the studied fishes therefore, it should be careful about its appropriate dose for better management of aquaculture.

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