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EFFECT OF DIAZINON ON THE ACTIVITY OF BASIC PROTEIN IN GILLS AND KIDNEY OF *CHANNA PUNCTATUS*

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ABSTRACT

The impact of pesticide like Diazinon was localized histochemically on the activities of basic protein, the reticulin and fibrin on *gills* and *kidney* of *Channa punctatus*. It has been observed that the pesticide interfere with protein and lipid metabolism. Our experimental evidences may be useful in revealing the mechanism of injuries caused by this pesticide.

Keywords: *Kidney, Gills, Basic Protein, Reticulin and Fibrin.*

1. INTRODUCTION

The wide use of agricultural pesticides in discriminately has developed an ecological crisis due to environmental pollution. These pesticides residue are washed away by rain water into rivers. Most of the pesticides used have appreciately long life period and also quite stable. However, some of them undergo biodegradation on soil, water or in animals and plant bodies. Pesticides are highly toxic to the organism and poorly effected of organisms.

During the second word war II introduction of DDT, a synthetic organic insecticide gave entirely a new concept in pest control. Now a day, a very large number of such insecticides belonging to different group like chlorinated hydrocarbon, organo-phosphorus compounds etc. are used. These pesticides are commonly used because of their broad-spectrum insecticidal efficiency and relative low cost. These pesticides provide a useful tool for agriculturalist and hygienist for crop protection and disease control. This chemical, if resistant in nature, prove to be still more hazardous both to plants and animals, especially in aquatic environment. The pesticide and their residue which are used in farming continuously discharge into environment, resulting to the imbalance of natural equilibrium and affect food chain. Because are part of food chain, keeping this in view the present investigation was undertaken to evaluate the impact of used pesticide on the protein content of gills and kidney of *Channa punctatus*.

Very little work has done on effect of pesticide on basic protein in different tissues of fish body. The present study has been designed to understand the changes in reticulin and fibrin (basic protein) in the gills and kidney of *Channa punctatus* when treated with Diazinon.

2. MATERIAL AND METHODS

Live specimen of *Channa punctatus* were collected from local agencies and were acclimatized to laboratory condition for 7 days. The fishes were divided in to two groups with 20 fishes each. The first group was kept in Diazinon solution of 3.1 mg/l. The second group served as control and was maintained under laboratory condition in ordinary tap water. The treatment was applied on fishes for one month. After one month the fishes were sacrificed one by one by decapitation. The tissues (Gills and Kidney) were removed carefully and fixed in 10% neutral formalin (as a fixative). Paraffin sections were prepared and subjected to the following histochemical tests:

1. Gomori's (1937) Reticulin Method[9].
2. Mallory's PTAH Method[11].

3. RESULTS AND DISCUSSION

Reticulin

Gills

Control fish showed a strong reaction in gill raker, adductor muscle and abductor muscle. While in secondary gill lamellae and primary gill lamellae showed moderate activity.

After Diazinon treatment poor reaction is seen in all the tissue of gills. Details are given in table 1.

Kidney

The kidney of control fishes showed very strong activity in distal convoluted tubule and strong activity is seen in proximal convoluted tubule, glomerulii and medullary region.

After Diazinon treatment poor reaction is seen in all the tissue of kidney. Details are given in table 2.

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Fibrin

Gills

The gills of control fishes showed dull activity reaction in gill raker and adductor muscle. While in abductor muscle, secondary gill lamellae and primary gill lamellae shows moderate activity.

After Diazinon treatment gill raker, adductor muscle and abductor muscle shows dull activity and remaining tissue shows nil activity. Details are given in table 3.

Kidney

The kidney of control fishes showed moderate activity in proximal convoluted tubule, distal convoluted tubule and medullary region. While in glomerulii shows dull activity.

After diazinon treatment proximal convoluted tubule and distal convoluted tubule showed dull activity, while glomerulii and medullary region shows nil activity. Details are given in table 4.

Reticulin is a basic protein present in the fibrous elements of connective tissue. Reticulin fibers are fine, delicate, type III collagen fibers forming a supportive meshwork in various tissues, notably in the liver, spleen, lymph nodes, and bone marrow. They are critical for maintaining structural integrity and are often studied in histopathology to assess conditions like liver fibrosis, cirrhosis, or bone marrow disorders (e.g., myelofibrosis). Reticulin fibers are rich in glycoproteins and are typically visualized using silver impregnation techniques, such as Gomori's Reticulin Method, due to their argyrophilic (silver-binding) properties. The reticular fibres are found ensheathes by a thin layer of protoplasm in which pale oval nuclei are present. Fibrin is derived from the fibrinogen of plasma which represents about 4% of the total plasma protein. Fibrinogen is converted into fibrin by addition of small quantity of thrombin, present over the wide range. It takes shining blue color after Mallory's stain[21,22]. A connective tissue usually consists of a cellular portion in an enveloping framework of non-cellular substances, which is made up of basic protein. Reticulin fiber posses reticulin. In the present attempt two basic proteins namely reticulin and fibrin were examined histochemically after treatment of Diazinon. Though, there exists a considerable idea about the disarrangement of these fibers as their non-cellular substances produced vary types of lesions in gills and kidney in Diazinon treatment on the tissue. Based on our findings it is summarized that diazinon treatment badly affected the reticulin and fibrin fibers in the gills and kidney. Mechanism involved is not yet fully known as these are not cellular proteins. Statistics on the basic protein fiber is lacking. Our study confirm the action of pesticides on non-cellular protein, hence our observation in the laboratory and experimental set up may not be directly applicable to pesticide toxicological level but the data nevertheless suggest the possibility that continuous treatment of the pesticide can produce extensive change in the connective tissue of gills and kidney of *Channa punctatus*[4,10]. Present histochemical study showed that the pesticide Diazinon has adverse affect on the lipid in gills and kidney[16,17,18,19,20]. Nutritional etiology of fatty liver has been recorded[5]. Lipids after carbon tetra chloride poisoning on squirrel has been recorded[13]. Diazinon has ecological risk in agricultural use[3]. It has been recorded that Diazinon treated fish showed abnormal behavior which include restlessness, arena movements, loss of equilibrium, increased opercular activities, strong spasm, and paralysis12. Diazinon has toxic effects on various organs on fresh water fish[1,2,6,8,14,15]. Measurement of bio-concentratation of pesticide by fresh water fish has been recorded[7]. Thus it may be concluded that our observations may be helpful to dispel doubts concerning the reliability of a pesticide exposure to the fishes.

Table 1: Distribution of reticulin in the Gills of *Channa punctatus* after the treatment of Diazinon.

Treatment	Gill raker	Adductor muscle	Abductor muscle	Primary gill lamellae	Secondary gill lamellae
Control	++	++	++	+	+
Diazinon	□	□	_	_	_

+++, Very Strong Activity, ++, Strong activity, +, Moderate Activity, □, Dull Activity and □ Nil Activity.

Table 2: Distribution of reticulin in the Kidney of *Channa punctatus* after the treatment of Diazinon.

Treatment	Proximal Convoluted tubule	Distal Convoluted tubule	Glomerulii	Medullary Region
Control	++	+++	++	+
Diazinon	_	_	□	_

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+++, Very Strong Activity, ++, Strong activity, +, Moderate Activity, □, Dull Activity and □ Nil Activity.

Table 3: Distribution of fibrin in the Gills of *Channa punctatus* after the treatment of Diazinon.

Treatment	Gill raker	Adductor muscle	Abductor muscle	Secondary gill lamellae	Primary gill lamellae
Control	□	□	+	+	+
Diazinon	□	□	□	_	_

+++, Very Strong Activity, ++, Strong activity, +, Moderate Activity, □, Dull Activity and □ Nil Activity.

Table 4: Distribution of fibrin in the Kidney of *Channa punctatus* after the treatment of Diazinon.

Treatment	Proximal Convoluted tubule	Distal Convoluted tubule	Glomerulii	Medullary Region
Control	+	+	□	+
Diazinon	□	□	_	_

+++, Very Strong Activity, ++, Strong activity, +, Moderate Activity, □, Dull Activity and □ Nil Activity.

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