

## EFFECT OF DIAZINON ON RESPIRATORY AND EXCRETORY SYSTEMS OF *CHANNA PUNCTATUS*

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**Received** : 12.09.16; **Revised** : 10.10.16; **Accepted** : 10.11.16

### ABSTRACT

The impact of pesticide like Diazinon was localized histochemically on the activities of the neutral lipid and phospholipids on gill 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 injury caused by this pesticide.

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KEY WORDS : Gill, Kidney Neutral lipid phospholipids

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### 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 appreciably 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.

Fishes are the important part of aquatic biota. When pesticide enters into the body of fishes, creates physiological as well as histochemical changes in the body of fishes. Fat is the important content of animal body, found in the form of lipid. Lipids provide food of high calory. Lipids are stored in the body as reserve food material, because these could be readily stored in the body on account of insoluble characteristic. It takes part in the formation of plasma membrane and endomembrane of the

cell. These are very essential for their proper functioning. These regulate cell permeability, control the transport and metabolism of synthesized and dietary fat and participate in blood coagulation.

Very little work has been done on the lipid content of different tissues of fish body effected with pesticides. The present study has been designed to understand the changes in neutral and phospholipids in the gills and stomach of *Channa punctatus* when treated with Diazinon.

### 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 into 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

**TABLE-1 : Distribution of neutral lipids 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-2 : Distribution of neutral lipids 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.

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. Neutral lipids-propylene glycol Sudan black B method<sup>14</sup>.
2. Phospho-lipids Baker's acid-Haematin test<sup>16</sup>.

## Results and Discussion

### Neutral lipid

#### Gills

In control fishes a positive reaction was observed in gill raker, adductor muscle, abductor muscle and secondary gill lamellae. The impact of Diazinon on the activity of neutral lipids was adverse in secondary gill lamellae and primary gill lamellae. Detailed observations are given in Table-1.

#### Kidney

In control fishes uniform rich deposition of lipid was noticed in glomerulii and medullary region while in proximal convoluted tubule and distal

convoluted tubule has less deposition of lipid while Diazinon showed adverse impact on distal convoluted tubule and glomerulii. Detailed observations are given in Table-2.

### Phospholipids

#### Gills

In the presence of phospholipids in control fish gills could be noticed more only in gill raker and in other tissues less deposition of phospholipids. But Diazinon treatment made very adverse impact on adductor, abductor muscle and primary gill lamellae. Detail observations are given Table-3.

#### Kidney

The presence of phospholipids in control fish kidney could be noticed more only in distal convoluted tubule and in remaining tissues. There is less deposition of phospholipids. After Diazinon treatment very poor deposition of phospholipids on glomerulii occurs. Detail observations are given Table-4.

A surfactant when treated with lipid it dilutes

TABLE - 3: Distribution of phospholipids in the gill 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 phospholipids 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.

other molecule of the solution, dilute molecules which have high attractive force of attractions and in this way lowers the surface tension at the interface. The surface tension reducing properties of surfactant are dependent mainly upon phospholipids<sup>9,15</sup>. Thus, lipids mainly the phospholipid possess greatest physiological importance. Present histochemical study showed that the pesticide Diazinon has adverse effect on the lipid in gills and kidney<sup>11,3,4,5</sup>. Nutritional etiology of fatty liver has been recorded<sup>5</sup>. Lipids after carbon tetra chloride poisoning on squirrel has been

recorded<sup>18</sup>. Diazinon has ecological risk in agricultural use<sup>8</sup>. 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 paralysis. Diazinon has toxic effects on various organs on fresh water fish<sup>2,6,7,10,11,13,17</sup>. Measurement of bioconcentration of pesticide by fresh water fish has been recorded<sup>12</sup>. Thus it may be concluded that our observations may be helpful to dispel doubts concerning the reliability of a pesticide exposure to the fishes.

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