

**DIAZINON DISRUPT LIPID ON EXCRETORY ORGAN AND STOMACH OF  
*CHANNA PUNCTATUS***RAGINI AHIRWAR AND \*R P SINGH<sup>1</sup>Department of Zoology,  
Post Graduate College  
GHAZIPUR (U.P.) INDIA.<sup>1</sup>Department of Zoology,  
BN (PG) College,  
RATH, HAMIRPUR (U.P.) INDIA.

\*Corresponding Author

E-mail: rpsinghbnv@gmail.com

**Received** : 4.3.16; **Revised** : 28.3.16; **Accepted** : 11.4.16**ABSTRACT**

The impact of pesticide like Diazinon was localized histochemically on the activities of the neutral lipid and phospholipid on kidney and stomach 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.

Figure : 00

References : 14

Tables : 04

KEY WORDS : Kidney, Lipid, Neutral, Phospholipid, Stomach.

**Introduction**

The wide discriminately use of agricultural pesticides 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.

**TABLE-1 : 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.

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**TABLE-2: Distribution of neutral lipids in the stomach of *Channa punctatus* after the treatment of Diazinon.**

Treatment	Mucosa		Submucosa	Muscularis		Serosa
	Epithelial Cells	Gastric Glands		Circular Muscles	Longitudinal Muscles	
Control	+++	++	++	++	+	++
Diazinon	±	±	±	±	-	-

+++ , Very Strong Activity, ++, Strong Activity, +, Moderate Activity, ±, Dull Activity and - Nil Activity.

When pesticide enters 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 calorific value. 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 affected with pesticides. The present study was 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 on 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. Neutral lipids-propylene glycol Sudan black B method<sup>9</sup>.
2. Phospho-lipids Baker's acid-Haematin test<sup>11</sup>.

### Results and Discussion

#### Neutral lipid in Kidney

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

**TABLE- 3: Distribution of phospholipids in the stomach of *Channa punctatus* after the treatment of Diazinon.**

Treatment	Mucosa		Submucosa	Muscularis		Serosa
	Epithelial Cells	Gastric Glands		Circular Muscles	Longitudinal Muscles	
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.

tubule has less deposition of lipid while Diazinon show adverse impact on distal convoluted tubule and glomerulii. Detail observation are given in Table-1.

#### Stomach

In control fishes uniform rich deposition of lipid was noticed throughout. Diazinon showed adverse effect on all the tissue layers. Detailed observations are given in Table-2.

#### Phospholipids in 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 phospholipid on glomerulii region occurs. Detail observations are given Table 4.

#### Stomach

Control fishes showed a positive reaction of phospholipids throughout except Serosa layer. Diazinon exhibit very poor and feeble reaction for phospholipids in various tissues layers. Detail observations are given Table-3.

A surfactant when treated with lipid it dilutes 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>4,10</sup>. Thus, lipids mainly the phospholipid possess greatest physiological importance. Present histochemical study showed that the pesticide Diazinon has adverse affect on the lipid in gills and kidney. Nutritional etiology of fatty liver has been recorded<sup>5</sup>. Lipids after carbon tetra chloride poisoning on squirrel has been recorded<sup>13</sup>. Diazinon has ecological risk in agricultural use<sup>3</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, paralysis<sup>12</sup>. Diazinon has toxic effects on various organs on fresh water fish<sup>1,2,6,8,14</sup>. Measurement of bioconcentration of pesticide by fresh water fish has been recorded<sup>7</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.

## References

1. AL-ARABI, S.A.M. ( 1992) Toxicity of Diazinon to three species of Indian major carps. *Bdesh. J. Tran. Dev.* **5**(1):79.
2. ALAM, M.G.M. (1995) Toxicity of Diazinon to the fry of Indian major carps *Cirrhinus mrigala*, Hamilton. *Bdesh. J. Zool.* **23**(2):183.
3. GIDDING, J.M. (2000) Ecological risk on Diazinon from agricultural use in the Sacramento- San Joaquin river basins California. *Risk analysis* **20**:245.
4. HARLAN, P. (1966) Pulmonary lipid composition of species with and without surfactant. *Am. J. Physiol.* **211**:855.
5. HEARD, K. AND PLATT, P. (1964) The nutritional etiology of fatty liver. In Dawson(Eds. R.M.C. and

- Rhodes, D.N.) Metabolis and physiological significance of lipids. *New York John Wiley and Sons*. Pp.435-442.
6. HAQUE, M.M. (1998) Toxicity of Diazinon and Submition to *Puntius gonionotus*. *Bdesh. J. Trans. Dev.* **6** (1):19.
  7. KANAZAWA, J. (2006) Measurement of bioconcentration factors of pesticide by fresh water fish and their correlation physicochemical properties. *Pest. Sci.* **12** (4):417.
  8. LOVELY, F. ( 1998) Toxicity of three commonly used organophosphorus insecticide to Thai sharputi (*Barbodes gonionotus*) and African cat fish (*Clarias garipinus*). *Department of Fishries Biology and Genetics, Bangladesh*. 83p M. S. Thesis.
  9. MANUS, M.C. (1946) Lipids in the liver of squirrel after the carbon tetra chloride treatment. *Acta. Histochem.* **51** :214.
  10. MORGAN, P. (1956) Comparison of the composition and surface activity of alveolar and whole lung lipids in the dog. *Biochem. Biophy. Acta.* **106** : 403.
  11. PEARSE, A.G.E. (1961) *Histochemical theoretical and applied J.* and A Churchill Ltd. London.
  12. RAHMAN, M.Z. (2002) Effect of Diazinon 60 EC on *Anabas testudineus*, *Channa punctatus*, and *Barbodes gonionotus*. *Naga I.C.L.A.R.M.* **25** (2):8.
  13. RANA, S.V.S. (1971) Lipids in the liver of squirrel after the carbon tetra chloride treatment. *Acta. Histochem.* **41** : 125.
  14. RAO, K. R. (1985) Toxicity of Elsan to Indian snakehead *Channa punctatus*. *Ind. J. Fish.* **32** :153.