

## HISTOPATHOLOGICAL EFFECT OF ORGANOCHLORIDE ENDOSULPHAN ON INTESTINE AND STOMACH OF LARVIVOROUS FISH *RASBORA DANICONIUS*.

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### ABSTRACT

In this present investigation histopathological effects produced by acute and chronic exposure of pesticide organochloride endosulphan on intestine and stomach of larvivorous fish *Rasbora daniconius* was studied. *R. daniconius* was exposed to three sub lethal concentration of endosulfan 0.0060 ppm, 0.0080 ppm and 0.0120 ppm and it was observed that effects are more severe in chronically exposed fish than in acute exposed one.

**KEY WORDS:** Endosulphan, Histology, *Rasbora daniconius*

### INTRODUCTION

Pollution of aquatic environment by pesticides and their residues is well known. Pesticides and their residues find their way into water bodies of aquatic organisms like fishes through gills. Pesticides after entering in the body of fish bring about histopathological changes in different target and non target organs. In this present investigation pathological effects produced by acute and chronic exposure of pesticide organochloride endosulphan on intestine and stomach of larvivorous fish *Rasbora daniconius* is studied.

### MATERIAL AND METHODS

The test fish *Rasbora daniconius* was exposed to 96 hr. LC<sub>50</sub> concentration of the pesticide organochloride endosulphan. Ten healthy fishes showing normal activity were selected for each test. Simultaneously a control was also maintained. After end of acute exposure (96 hr) the survived fishes decapitated immediately, intestine was removed and fixed in Bowin's fluid for 24 hrs. In second set of experiment the test fish *R. daniconius* were exposed to three sub lethal concentration of endosulphan 0.0120ppm, 0.0060ppm, 0.0080ppm as for a period 45 days the survived fishes were taken out dissected to remove tissue. Removed tissues were kept in Bowin's fluid for 24hrs and blocks were prepared in paraffin wax at 58-60<sup>0</sup>C. The sections were cut (6-7um) and stained with Ehrichs Haematoxylin-eosin and also by Mallorys triple stain (MTS). After studying the tissues under microscope histopathological observations of the intestine and stomach were recorded.


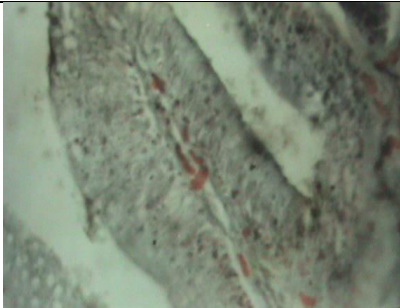



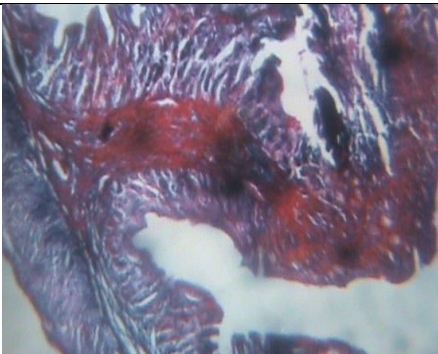

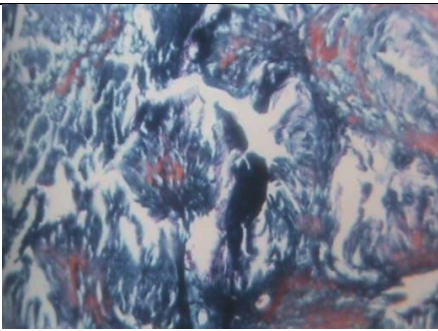
### RESULTS AND DISCUSSIONS

**Intestine:** The histological structure of the intestine of *R. daniconius* shows serosa, muscularis, submucosa and mucosa but the muscularis and mucosa are thin and hence the wall of intestine is thin and lumen faces many mucosal folds in the stomach. The intestinal mucosal epithelium is composed of a single layer of high columnar epithelial cells and mucosal cells. The lamina propria of intestine is composed of loose connective tissue and its capillary network is well developed. The muscularis mucosa and the submucosa are absent in the intestinal wall (PLATE 1)

**Histopathological changes:** Destruction of mucosa and particularly of columnar epithelial cells has been prominent besides the granular degeneration, vacuolization and necrosis in intestine of *R. daniconius* exposed acutely and chronically to endosulfan, the effects being more severe in chronically exposed fish to three sub-lethal concentration 0.0060 ( PLATE 2), 0.0080 (PLATE 3), 0.0120 (PLATE 4) than in acutely exposed one. Similar histopathological changes in intestine through pesticides like sodium arsenite, endrin nicotine, thiodan, BHC, Malathion, chlordane, aldrin on intestine have been reported by Mandal and K Relshrestha (1980). Sharma and Shukla (2001) showed similar histological alteration in various tissues of *Cirrhina mrigal* including intestine due to toxicological effects of different pesticides.

**Stomach:** The histological structure of stomach shows that it is made up of four layers serosa, muscularis, mucosa, sub mucosa. Thickness of three layers differs in different regions of digestive tract. The serosa is the outer most cellular membrane muscularis mucosa comprises of two layers of smooth muscle fibers. The submucosa consists of loose connective tissue with blood capillaries. The mucosa is the inner most layer which is thrown finger like projection the mucosal folds. The membrane is made up of columnar epithelial cells (PLATE 5)

**Effect on stomach:** The effect of acute and chronic treatment of pesticides viz. endosulphan was studied on stomach of *R. daniconius*. The changes due to chronic treatment of endosulphan were more pronounced than acute to three sublethal concentrations of endosulphan. The mucosal folds were damaged at so many places where as the sub mucosa showed vacuolization. Histopathological changes in stomach due to chronic treatment of three sublethal concentrations 0.0060ppm (PLATE 6), 0.0080 ppm (PLATE 7) and 0.0120ppm (PLATE 8) of endosulphan induced changes like shrinkage of mucosal folds and vacuolization in mucosal as well as submucosal cells necrotic effects was also noticed. The effect was similar in all the three sublethal concentration and the intensity of damage was dose dependant. Peter (1982) observed the influence of stress on the stomach of the European eel *Anguilla* and found that stress shrunken the stomach.

 <p><b>PLATE 1:</b> Microphotograph of longitudinal section of intestine of <i>R. daniconius</i> for control MT X 400</p>	 <p><b>PLATE 4:</b> Microphotograph of cross section of intestine of <i>R. daniconius</i> exposed to endosulfan 0.0120ppm for 45 days MT X 400</p>
 <p><b>PLATE 2:</b> Microphotograph of cross section of intestine of <i>R. daniconius</i> exposed to endosulfan 0.0060ppm for 45 days MT X 400</p>	 <p><b>PLATE 5:</b> Microphotograph of cross section of stomach of <i>R. daniconius</i> for control MT X 400</p>
 <p><b>PLATE 3:</b> Microphotograph of cross section of intestine of <i>R. daniconius</i> exposed to endosulfan 0.0080ppm for 96 hrs MT X 400</p>	 <p><b>PLATE 6:</b> Microphotograph of cross section of stomach of <i>R. daniconius</i> exposed to endosulfan 0.0060ppm for 45days MT X 800</p>
 <p><b>PLATE 7:</b> Microphotograph of cross section of stomach of <i>R. daniconius</i> exposed to endosulfan 0.0080ppm for 96 hrs MT X 400</p>	 <p><b>PLATE 8:</b> Microphotograph of cross section of stomach of <i>R. daniconius</i> exposed to endosulfan 0.0120ppm for 45 days MT X 400</p>

## REFERENCES

- Mandal P. K and Kulshrestha A.K. (1980).** Histopathological changes induced by the sublethal sumithion in *Clarias batrachus* Ind. *J. Exp. Biol.* **18:** 547-552.
- Peter G. (1982).** The effects of stress on stomach of the European eel , *Anguilla anguilla* L. *J. Fish Biol.* **21:**497-512
- Sharma and Shukla G.R.(2001).** Histopathological alteration in fish tissues induced by pesticide toxicity. *Aquacult.* **2(1):**31-43.