Histopathological and behavioural alteration in intestine of air-breathing catfish of *Heteropneustes fossilis* after exposure to flubendiamide

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Abstract
Many factors are behind the various types of environmental pollution main component of living organism like fish. The harmful effect of any toxicant which was moved to water bodies can be assessed by investigating health of fish fauna. In the present study, an attempt has been made to examine the sublethal (concentration 0.1ml/L) toxic effect of flubendiamide in fresh water fish, *Heteropneustes fossilis* the histopathalogical changes observe in Itestine have been observed after 7 days, 14 days, 21days and 28days of exposure to flubendiamide, which were duration dependants.

Keywords: Histopathological alterations, *Heteropneustes fossilis* Intestine, Flubendiamide

1. Introduction
The pathological lesions were noticed in intestine, brain, spinal cord, kideny and stomach in fish after three weeks exposure to 0.075µ /gm/Taxaphene by. The chronic toxisity may ultimetely cause the death or may result in the elimination of species of interferance with an organisms natural defence mechanisms natural defence mechanism blindness and weakness. Individuals over a long period of time, though a host of effect such as induced sterility. It state that intestine cord disarry, connective tissue, damage, vacculation in cytoplasm of *hepatocytes* and degeneration of nucleolus in intestine tissue, when ophiocephalus puntactus was exposed to dizonon [1]. The environmental pollutants indicate that the subleathal doeses of most of the pesticide cause variation extent of histopathological injuries to different organs of fish, the amount of damages are usually dependent on dose, duration of exposure and type of pesticide Kulshresta [2].

The heavy metals chiefly include Lead, Mercury, cadmium, chromium, copper, Zink, Magnase, Nickle, Silver, etc. The heavy metals viz Arsenic, cadmium, lead, Mercury are considered highly toxic to humans, animals, fish and environment. The Nickel is needed in small amounts to produce but it becomes slightly toxic in excess quantity. Its chronic exposure can cause decreases in body weight, heart and Intestine damage and skin irritation [3].

The different environmental pollutants are likely to affect biological system in different ways according to their chemical properties. Gills are sensitive organs which are easily damaged by numerous pollutants even at low concentration [4]. Gills are not only prime organs for gaseous exchange but also they perform several other physiological functions including osmoregulation and excretion. Changes in environmental parameters often damage this vital organ because of its delicate structure [5] have studied the toxic impact of the trace element Zinc chloride on gills and accessory respiratory organs of fish, *Heteropneustes fossilis.* But the effect of flubendiamide on the fish *Heteropneustes fossilis* has not been studied until now. Hence the present investigation Effect of flubendiamide on histopathology of Intestinel of fish, Histopathological alterations in Intestine of the fish *Heteropneustes fossilis* exposed to flubendiamide for 28 days has been study. Histopathological alterations in Intestine of the fish *Heteropneustes fossilis* exposed to flubendiamide for 28 days.

2. Materials and Methods
Live specimens of freshwater fish, *Heteropneustes fossilis* (Bloch) were selected for the present research work. The fish were obtain for experimental purpose from the Adan dam Taluka-Karanja (lad) Dist. Washim (M.S).Fish were washed with 1% $KMnO_4$ Solution for five minutes for dermal disinfection. The fish were allowed to acclimatize to the laboratory condition for period of fortnight before conducting the experiment. Particularly in the morning hours fish fed on small pieces of boiled eggs, once in a day.

The 10 fishes including males and females, weighing between 70-75 gm in separate aquaria containing aged tap water. As per standard methods, the physiochemical parameters of used aged tap water were determined periodically, [6] to study the toxic effect of Flubendiamide on Intestine, the experiments were conducted in two phases. In the first phase of experiment lethal concentrations &sub leathal concentration of experimental toxicant Flubendiamide were studied. 96h LC 50 and sub lethal concentration for the fish *Heteropneustes fossilis*, the approximaly 5 times less concentration (0.1ml/L) as sub lethal concentration was used to exposed the fishes for 28 days to the histological structure of Intestine. In second set of experiment the fish were exposed to sub lethal concentration of toxicant Flubendiamide toxicant 0.1ml/L. The experiment was carried out in sub lethal concentration of toxicant Flubendiamide for period of 7, 14, 21 and 28 days. Parallel sets of control fish were run simultaneously in separate aquaria.

After 7, 14, 21, and 28 days 4 fish of control as well as experimental group were weighed and sacrificed immediately by giving a blow on head and were dissected. The gills from both control and experimental fish were removed and rinsed in saline to removed cell debris. Then Intestine cut into small pieces of desirable size and fix to aqueous bouins fixative separately. The Intestine were embedded in paraffin wax using routine technique &sections were cut at 5µ thickness and stained with hematoxyline-Eosin staining method. Histological observations were made by employing light microscopy to assess the toxicant flubendiamide effects on fish tissues.

3. Result and Discussion

Histopathology of gill

Control: The normal intestine is characterized by following regions. The outer peritoneum of serus coat followed by longitudinal muscle layer, sub mucosa and mucosa. The mucosa is produced into a large number of fingers like projection into the lumen known as villi. The epithelial linging of the villi consist of prismatic cells with basal nuclei containg goblet cells.

It is coiled, elongated structure showing following layers. Serosa this is the outermost covering consisting of epithelial cells. Subserosa or muscularis layer consist of smooth muscle fibers arranged in definite pattern the outer being longitudinal and inner circular. Sub mucosa consisting of connective tissue fiber blood vessels and nerve ending. Muscularies mucosa with two layers of muscles that is outer longitudinal and inner circular muscles.

Gastric mucosa epithelial coat forming inner layer, formed of columner pristamatic cell with basically located nuclei. The columnar cells of mucosa seem to be modified to form globlet cells which resecretory in function. The entire mucosa was seen folded into number of finger like processes. (Fig.1).

Experimental

The maximum damage observed in the Intestine of air breathing catfish *Heteropneustes fossilis* exposed to toxicant Flubendiamide. The Intestinel, after 7 days of exposure showed appreciable degenerative changes in villi that is the epithelial cells of villi showed vaculation (Fig.2).

After 14 days of exposure of *Heteropnuestes fossilis* to sublethel concentration (0.1m/L) showed, cells membranes the columner epithelial cells situated at the base and tips of few villi were degenerated and cellular exudates were also observed (Fig. 3).

Heteropnestes fossilis was exposed to sublethal concentration (0.1ml/L) of flubendamide, exposed for a period of 21 days Sssf

Organ intestine showed elongation of mucus cells filled with secretary material were observed Mucus secreating globet cells showed hyper activity and the globlet cells situated the tip of villi were bust and the lumen of intestine filled with mucus plug (Fig. 4).

Increasing globelet cells indicates that the toxicants flubendiamide trigger mucus cell activities. Focal necroses, proliferation of villi, desquamation superficial parts of villi and necrosis of the tips of villi were observed in intestine of fish, when the fish, *Heteropneustes fossilis* exposed to sublethal concentration (0.1ml/L).of experimental toxicant flubendamide for period of 28 days. (Fig.5).

Derse and Strong (1963) on the other hand suggested that the toxicant itself was absorbed through the gills and interfered with the respiratory apparatus of the animal and thus the latter was killed. The study efforts have been made to examine the toxicity of lead nitrate on the bronchial respiratory organs of *Heteropneustes fossilis. (*Parashar and Banerjee 1999a) have recently attempted to investigate the toxic impact of this lead salt on the accessory respiratory system of air breathing teleosts. The fish exposed to chemical pollutants can either increase or decrease their haematological levels. These changes depend on fish species, age, the cycle of the sexual maturity of sperm and disease.

The lamellae were thin and elongated, particularly the secondary lamellae. The pillar cells appear much reduced in size. This action consisted of rapid cell lysis throughout the epithelium that became completely distributed [7].

In sublethal medium, the respiration rate of fish decreased in the subsequent period of exposure which might be due to acclimatization of fish in chemical environment [8].

Thus the results of the present investigation with the effect of flubendiamide on the histopathology of the Intestine of *Heteropnestues fossilis* were similar to those of above authors.

Fig. 2 :-T.S. through the intestine of fish,*Heteropneustes fossilis ,exposed to Sublethal conc. of flubendamide for 7 days. H/E,x630*

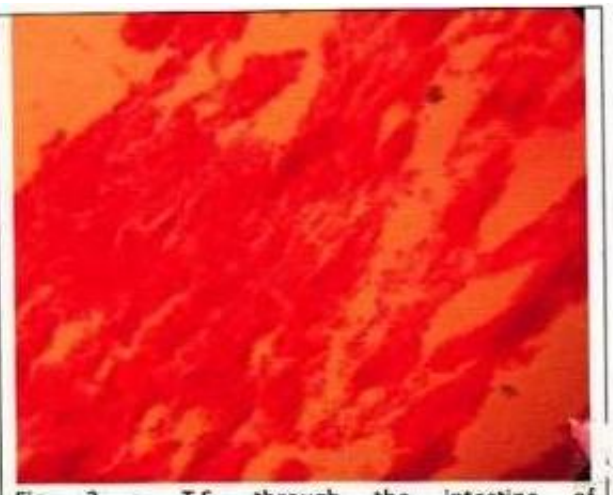

Fig. 3 :- T.S. through the intestine of fish,*Heteropneustes fossilis ,exposed to Sublethal conc. of flubendamide for 14 days. H/E,x630*

Fig. 1 :- T.S. through the intestine of fish,*Heteropneustes fossilis (control). Hematoxylin –eosin, x630*

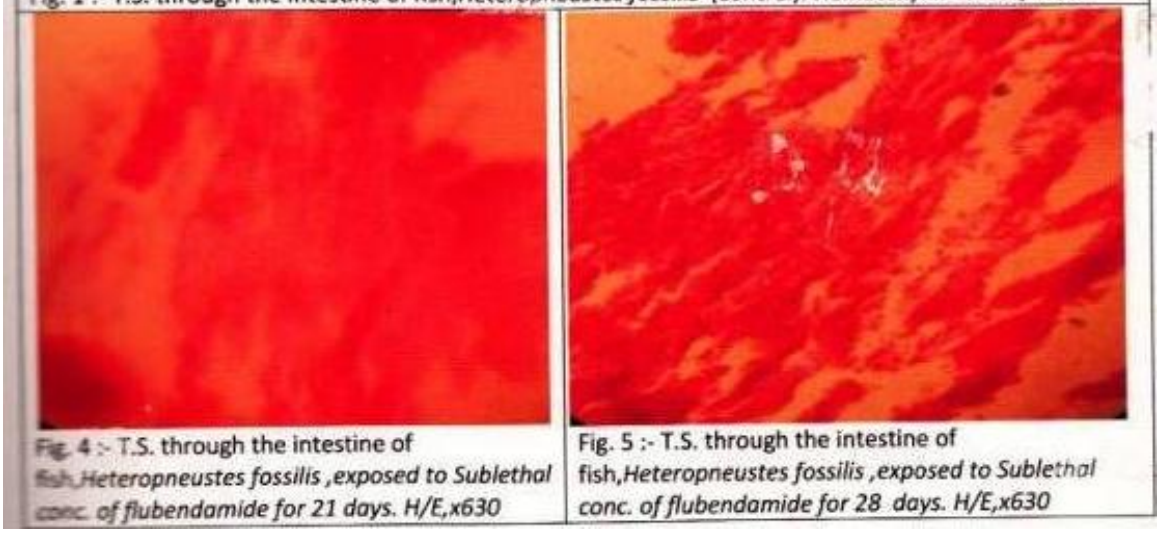

Fig. 4 :- T.S. through the intestine of fish,*Heteropneustes fossilis ,exposed to Sublethal conc. of flubendamide for 21 days. H/E,x630*

Fig. 5 :- T.S. through the intestine of fish,*Heteropneustes fossilis ,exposed to Sublethal conc. of flubendamide for 28 days. H/E,x630*

4. References

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