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EFFECTS OF MONOCHROTOPHOS PESTICIDE ON LIVER, GILL AND KIDNEY OF FRESH WATER FISH *CHANNA PUNCTATUS*

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ABSTRACT
Use of insecticides is the important requirement of better crop production in agriculture. With the use of insecticides and pesticides the level of other toxic effects on aquatic ecosystem is also increased. In the present investigation *Channa punctatus* was exposed with the sub lethal concentration of pesticide Monochrotophos. The fishes were acclimatized first and then exposed to the Monochrotophos for 10 days. After the exposure, the histopathological changes in the vital organs like, gills, liver and kidney was done. Histopathological investigations showed the severe damages in tissue structure like degeneration of cytoplasm in the hepatocytes which lead to the atrophy. Rupture in blood vessels and disturbed structure of pancreas and liver cell was prominent. Histopathological investigation of kidney reveals necrosis, cellular hypertrophy with granular cytoplasm.

KEY WORDS: Monochrotophos, *Channa punctatus*, Liver, Kidney

INTRODUCTION

India is known as the agriculture country. A greater emphasis has been given to control on the insects and pests so as to bring about the increase in crop production. Large population living in the villages is involved in the agricultural practices with the increasing enemies of the crops like insects and the pest. The productivity of agriculture is coming down day by day. To overcome this problem the use of chemical like insecticides and pesticides became popular. Increased use of insecticide is though increasing the agricultural production but consequently affecting the aquatic life and the human beings. After use of the insecticides and pesticides the agricultural runoff of water drains that to the nearby water reservoirs and cause water pollution which is one of the most catastrophic issues of twenty first century. Keeping in view the large scale use of monochrotophos the organophosphate which is used in growing paddy, maize, bengal etc., it is one of the popular pesticide. The agricultural runoff of water body goes directly in the nearby water sources and causes the water pollution and consequently the toxic effects on the fish. In the present investigation the study on the effects of monochrotophos on the vital tissue like kidney, liver has been undertaken which reveals the catastrophic effects on the fish and consequently the bioaccumulation has been causing threat to the mankind. Fisheries is one of the most important economical source of the food, it is one the most crucial opportunities of employment also. To get the complete picture of catastrophic effect of toxicants, which is lead due to exposure of aquatic animals like fish, histopathological investigation is the most important tool work as the biological markers to estimate the condition of toxicity on the life on cellular level (Jayantha Rao *et al*, 1985; Tilak *et al*, 2001, srivastava et al 2008). Keeping this important parameter in view, the present investigation has been undertaken to find out the toxic effect on the fish *Chana punctatus* on the basis of histopathological investigation.

MATERIALS AND METHODS

In the present investigation histolopathological studies of the sublethal concentrations of Monocrotophos (MCP) was performed on the fish *Channa punctatus* (Bloch). Fresh water fish *Channa punctatus* (Bloch) measuring 6 to 9 cm in length and weighing 6.5 to 7.5 g were collected from local water reservoirs. Brought in laboratory and allowed to acclimatize to the laboratory conditions for 10 days. Important parameters for maintaining the fish were strictly followed by as per the parameters recommended by APHA (2005). The fishes with good condition factors were selected for the experimental purpose. After the exposure the vital tissues gill, liver and kidney were isolated from the control and experimental fish aquariums. The tissues were fixed rinsed and cleaned in saline solution. Tissues were fixed in Bouin's fixatives for 48 hours. The tissues were first cleaned with the solution of lithium bicarbonate solution so as to remove excess of picric acid, processed with the ascending grade of alcohol, cleared in Xylene and gave a hot

impregnation with paraffin wax. Embedded with paraffin wax. Block were prepared and processed on the microtome so as to cut the section of tissues on 5µ on the rotator microtome.

RESULTS AND DISCUSSION

Histopathological Changes in Gill: Detail microscopic examination has revealed the structure of gill as the primary gill lamellae are flat like structure of leaf with the appropriate supporting axis with gill lamellae on each side of it. Normal structure of gill is seen. The surface is covered with squamous epithelium normal cells are observed separated by the mucous cells (fig 1). In the experimental samples that is after the exposure of fish with Monochrotophos that is organopesticide has revealed an abnormal structure (Fig 2). The histopathological changes revealed as the bulging of tip which shows the distortion of the shape in the secondary gill lamellae. This way it has been observed that the exposure.

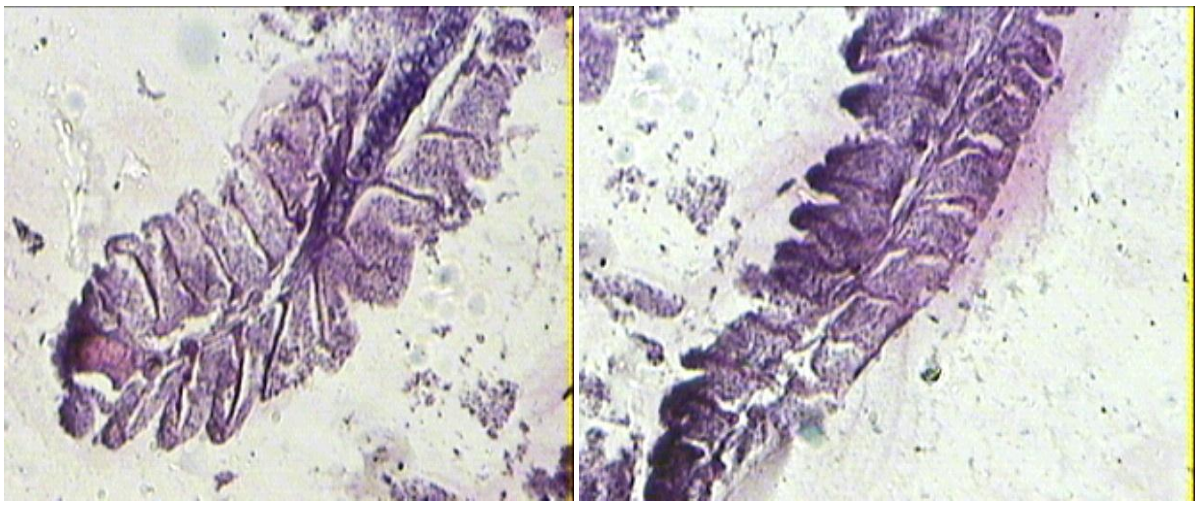

Fig 1). Gills of Control fish

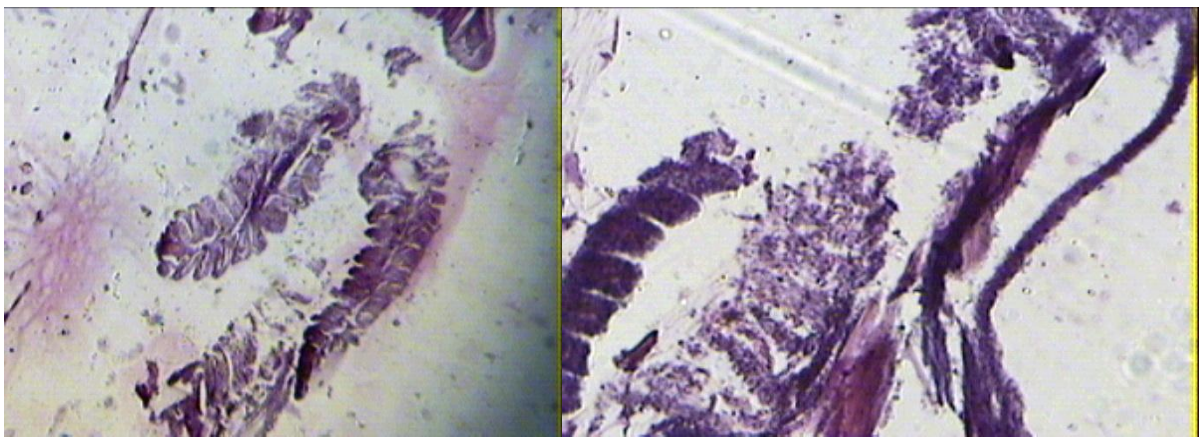

Fig 2). Experimental : Gills of fish is affected with monocrotophos

Similar observations were made by several workers such as on exposure of Sockeye salmon with an acute exposure to ester of 2, 4-D revealed hyperplasia and hypertrophy of the epithelial cells of the gills (Eller, 1971). On investigating the histopathological changes in gill of *Labeo rohita* (Vijaya Lakshmi and Tilak, 1996) observed the histopatholigical changes such as hypertrophy and hyperplasia on the gill lamellae of the fish. Similar results were observed by M.S. Butchiram and K. S Tilak (2009), on the fish *Chana Punctatus* when exposed with Alachlor.

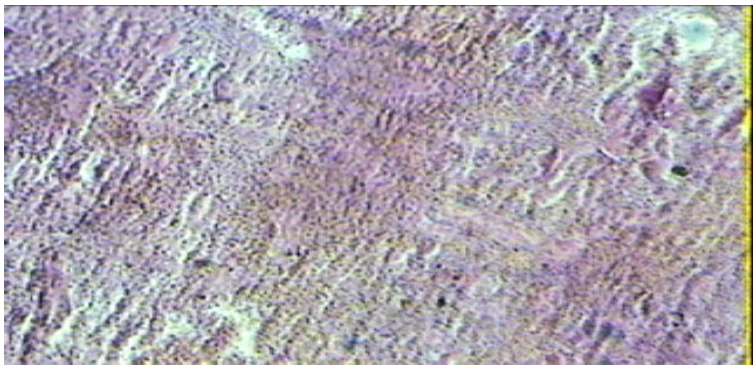

Fig 3). Control Kidney of *chana punctatus*

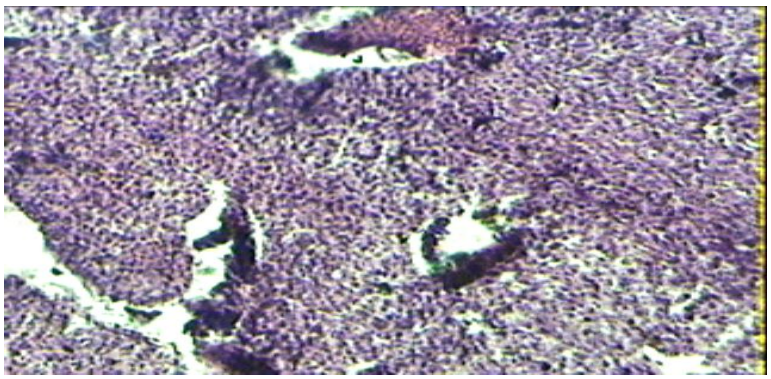

Fig 4).Treated Kidney with monocrophos of *chana punctatus*

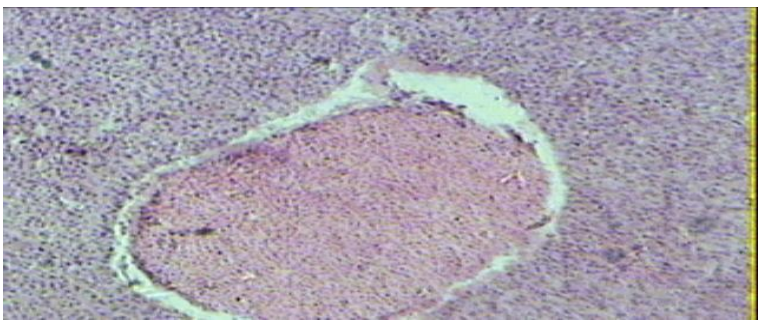

Fig 5). Liver with pancreas control

Fig 6). Treated with monocrotophos :

Histopathological Effects on Liver: The liver of the fish is covered with serous membrane and composed of parenchymal cells also called the hepatic cells. The hepatic cells of the liver are roundish polygonal in structure which is innervated with clear spherical nucleus (fig 3,4). Generally large quantities of lipid glycogen granules are present in the cytoplasm. The histopathological investigation of the fish liver on exposure to the Monochrotophos has revealed the necrosis of hepatic cells as well as it has shown the degeneration of cytoplasm. M.S Butchiram and K. S. Tilak (2009), on exposure of fish *Chana punctatus* exposed with Alachor.

Histopathological Changes in Kidney: The Kidney of the fish is pronephric Kidney that is having head and body kidney. The fundamental unit of kidney is nephron. The Bowman's capsule It consists of an inner and outer layer of single flattened epethelia.(Fig 5,6). In the present investigation, it has been observed that the sublethal concentration of the organphosphate pesticide, monochrotophos has shown the prominent pathological changes in the structure of the nephron. The large pathological changes have been observed in haemopoietic tissues have been observed. The cellular hypertrophy and granular cytoplasm was seen, which reveals the kidney failure. Similar results were observed by Thurston *et al*, 1984, Meede and Herman (1986), Ravindrakumar (2000).

CONCLUSION

Thus it can be concluded that the use of Monochrotophos which has been legally banned in India is justified. It has been proved by several workers and has been conformed in present investigation that use of this organophosphate causes serious damage to the vital organ of fish like Gill, Liver and Kidney. Liver showing necrosis of pancreas and hepatocytes.

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