



Sublethal Malathion Induced Changes in The Liver of Fresh Water Fish, *Catla catla* : A Histopathological Study.

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Abstract

In the laboratory, fresh water static model ecosystem was established using glass aquaria to simulate natural ecosystem in which healthy *Catla catla* were introduced to study the toxic effects of malathion on the liver of fresh water fish *Catla catla*. The fishes were exposed to the sublethal dose of Malathion (0.5ppm) for 30 days in the laboratory.

The normal structure of liver of fish *Catla catla* shows the hepatic parenchyma, bile canaliculi and blood vessels. Histopathological changes in the liver for 30 days of exposure to Malathion were studied. The observation revealed degenerative changes in the liver. Malathion exposed *Catla catla* exhibited highly vacuolated hepatic cells with loss of their polyhedral shape. Hepatic cells showed edema in hepatocytes. Cytoplasmic degeneration, nuclear displacement, cloudy swellings are some more changes seen in the liver of malathion exposed *Catla catla*. The cell membranes are prominently seen as ruptured.

Keywords: *Catla catla*, Sublethal, Malathion, Histopathology, Liver

Introduction

The pesticides used to kill pests of agriculture, forestry and wild life have found their way to the aquatic ecosystem through the runoff water, intensively managed agriculture, forestry operations, through wind actions, effluents, release from the pesticide factories and to some extent through domestic effluents. This contamination of aquatic environment may be detrimental to aquatic food chain and ultimately to man. The pesticides are known to cause fish mortality or make them unsuitable for consumption, as fish is the most important factor of aquatic food chain and also it is major component of human food. Malathion is a widely used organophosphorus pesticide, and is released into environment through its production, formulations, and its widespread use. In fish *Catla catla* the sublethal concentration of Malathion induced histopathological alteration in liver.

Materials and Methods

Live specimen of major carp *Catla catla* were selected for the present study and were collected from the state government fish farm at Mahan (Dis. Akola) and were brought to the laboratory in well oxygenated bags. They were disinfected in 1% KMnO₄ and were maintained in glass aquaria. They were fed with food prepared from rice bran and groundnut cake daily after water was changed in the morning. After two weeks healthy and active fishes weighing about 125±2 gm and of approximately of equal length were sorted and kept in separate aquaria for experimental work. As per standard methods, the physicochemical parameters of aged tap water were determined periodically (APHA, 1998).

To study the Malathion induced histopathological changes in various organs the experiments were conducted in two phases. In first

phase the lethal concentration and sublethal concentrations of Malathion were studied (Finney, 1952). In second phase of experiment the fishes were exposed to sublethal concentration of Malathion which was (0.5ppm) which agreed with the observation of Anees.M.A (1995) for 30 days. At the end, the control and experimental fishes were dissected after giving blow on head and liver was obtained.

Liver was blotted on filter paper to remove blood stains and was cut into pieces of small size. They were fixed in aqueous bouin's fluid for 16 to 20 hours. After fixation the tissue were washed, dehydrated, cleared and infiltrated in wax. Blocks were prepared and sections were cut at 5μ thickness. Slides were stained with haematoxyline-eosine. Microphotography was done to study Malathion induced histological changes in the liver of fresh water fish *Catla catla*.

Result and Discussion

The normal structure of liver of fish *Catla catla* shows the hepatic parenchyma, bile canaliculi and blood vessels. The parenchymatous cells forming cords lie regularly and get separated by bile canaliculi and blood sinusoids. The polygonal hepatic cells bear a prominent central nuclei and granular cytoplasm. Each sinusoid consists of an outer peripheral connective tissue and an inner lining of endothelial cells (fig1).

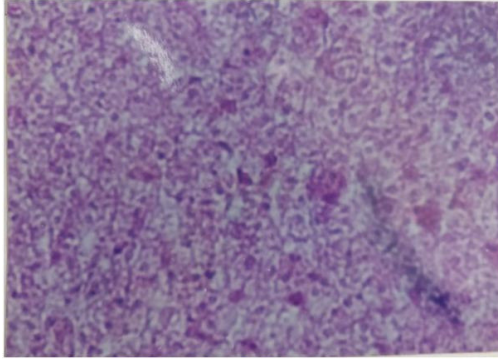


Fig 1: T.S. of Liver of fish *Catla catla* showing normal structure of liver with compact arrangement of hepatic cells.

(X 400, H and E)

Histopathological observation revealed degenerative changes in the liver. Malathion exposed *Catla catla* exhibited highly vacuolated hepatic cells with loss of their polyhedral shape. Hepatic cells of *Catla catla* showed edema in hepatocytes. Cytoplasmic degeneration, nuclear displacement, cloudy swellings are some more changes seen in the liver of Malathion exposed *Catla catla*. The cell membranes are prominently seen as ruptured.

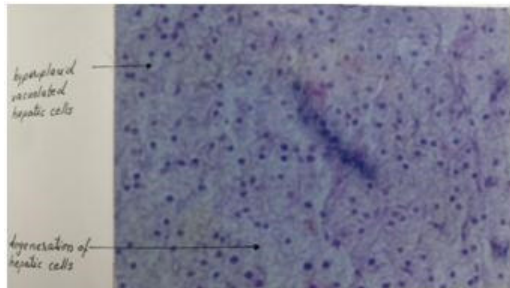


Fig 2: T.S. of Liver of the fish, *Catla catla* exposed to 0.5ppm of Malathion for 30 days showing hyperplastic vacuolated hepatic cells with degeneration of hepatic cells at some places.

(X 400, H and E)

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