

ACUTE TOXICITY OF CuSO₄ IN THE FRESH WATER FISH: HISTOPATHOLOGY OF THE STOMACH

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ABSTRACT

Toxicity tests of CuSO₄ were carried out using fish, *Macrones cavasius* exposed for 96 hr. Histopathological changes in the stomach were studied. Several changes were found in the texture of the digestive tract, epithelial cells and mucosal layer; atrophy of the mucosa was present. It may be noted that rupture of the cells and deformation in texture of the tissue may affect the functional activity of the digestive enzymes. This may interfere with the digestion, resulting in reduced appetite and growth rate.

KEY WORDS: CuSO₄, Histological effect, *Macrones cavasius*.

INTRODUCTION

The studies dealing with the effects of toxicants on gastrointestinal absorption may not be related to preventive values (Goldenthal, 1959) but these observations indicate the severity of toxic effects on non-target and target species. Mathur (1979) reported that fishes which died due to pesticide toxicity showed pathological changes; these changes were present in the liver, kidney and intestine of Guppies and Brown trout exposed to sublethal concentration of DDT (King, 1962). Mathur *et al* (1981) studied the pathological alterations in the liver and intestine of *Rana cyanoflictis* in aldrin toxicity and found pyknotic nuclei, cytoplasmic vacuolations and cell necrosis. Recently, Parveen (1980), Mandal and Kulshreshta (1980), Natarajan (1981) and Belsare and Belsare (1984) have reported these changes in different fishes using different pesticides. Jawale *et al.*, (2010) reported hematological changes in the fresh water fish, *Cyprinus carpio* exposed to sub-lethal concentration of piscicidal compounds. Shaikh *et al.*, (2012). Observed Behavioural changes in *Lamellidens marginalis* due to acute toxicity of cadmium. In the present study, an attempt has been made to determine pathological alterations Induced by CuSO₄, the stomach of the fish *Macrones cavasius* exposed to concentration for 96 hours.

MATERIALS AND METHODS

The test fish, *Macrones cavasius* were collected from Pimpri dam water near Udgir. Dist. Latur and brought to laboratory. Only Acclimatization, The fish were fed an alternate day with live earthworm. Dechlorinated water was used for acclimatization and for experiment; it was changed every other day. A control group was simultaneously kept in each experiment. The physico-chemical characteristics of test water were: pH 7.5, D.O.6.3 ppm, temperature 27°C, total hardness 4.6 mg/l, salinity 3.6 ppm, according to APHA (1971). Food was stopped 24 hours before exposure to the test. LC₅₀ for 96 h were obtained for CuSO₄ respectively. Surviving fishes were taken out and killed immediately. The stomach was isolated and prepared for the pathological observations using water Bouins fixative and haematoxiline and eosin (H & E) stains.

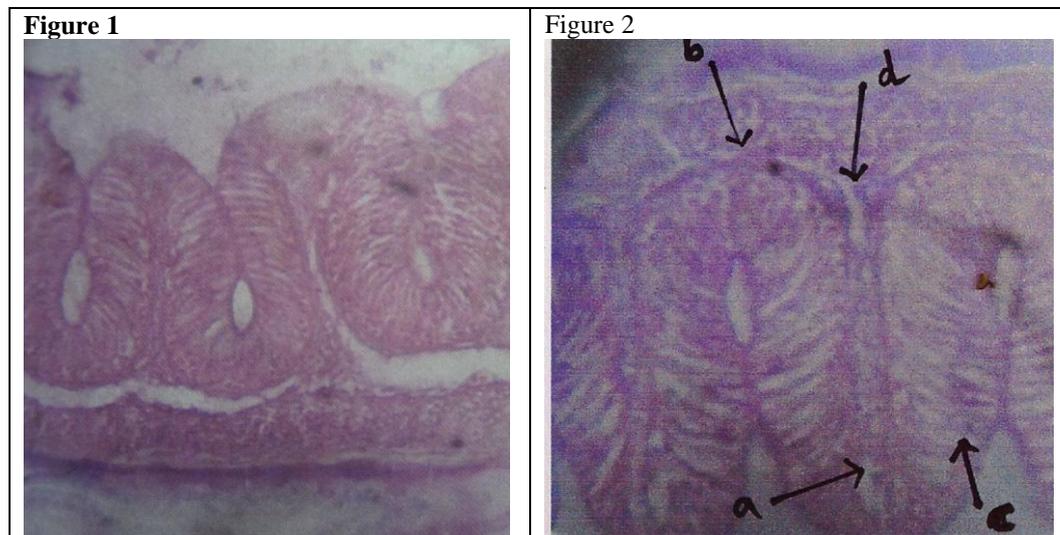
RESULTS AND DISCUSSION

The stomach with the-normal mucosa in control fishes is shown in Figure1. After exposure to CuSO₄ (Figure 2) damage to the tissue was evident-Epithelial cells were enlarged, gastric gland showed necrosis of cell (base structure) with pyknotic nuclei. Absorptive area and muscle layers were mostly affected with vacuolations in the mucosal membrane.

CuSO₄ exposed fishes the epithelial cells and gastric glands were enlarged; broken villi were present with small discharged mucosal part in the lumen. Vacuolations were also observed at the absorptive edges. Enlargement of gastric glands, swelling of epithelial cells with vacuolations in the mucosal layer and blocking of the villi were, however, present.

CuSO₄ cause damage not only to the absorptive area of the stomach but they also disturb the physiological processes and absorption of digested food. Similar results were reported by King (1962) in *Lepomis microchirus* using DDT as a pesticide. The vacuolations produced by pesticides in the stomach disturb the texture of the tissue which may modify the digestive enzyme secretion and consequently the digestive process since digestive enzyme are important in inducing change before absorption. Dysfunction or rupture of the cell (Khillare, 1985) affects the appetite, consequently the production of energy for the metabolism and many other processes maybe showed. Similar results were earlier reported by Parveen (1980) in *Chana gachua* exposed to DDT.

Takashi (1982) reported that pesticides treatment induced several abnormalities in the tissues; ulceration of the gastric mucosa, lack of appetite, reduction in growth and reproduction. Thus the results of the present study are in agreement with the findings of other workers.



Figs. 1-2. 1. Showing the normal structure of the stomach.
2. After CuSO_4 treatment showing
a. Rupture to the absorptive area,
b. Vacuolations in the mucosal layer several cell necrosis.
c. Enlargement of the epithelial cells, autolysis of the muscles and vacuolations in the mucosal region.
d. enlargement of the epithelial cells and vacuolations in the mucosal layer.

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