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Impact of Heavy metal Mercury chloride on the respiratory metabolism of freshwater fish Channa gachua (ham)

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Abstract

Respiration is a fundamental physiological activity in animals. Respiratory metabolism is stress indicators. In present work, fresh water fish *Channa gachua (ham)* Exposed to different concentration of heavy metal Mercury chloride for 96 hours (Lc_{50}-1.04ppm).After Exposure 24 hrs., 48hrs, 96hrs and 96hrs respectively. After 24 and 48 hrs a significant Increase in respiratory rate was observed and significant decrease in respiratory rate was observed after 72 hrs and 96 hours respectively.

Key words- Respiration, *Channa gachua* , $Lc_{50,}$

Introduction

Environmental pollution due to various factors, especially tremendous use of toxic chemicals in Industrial filed, Medical & Agricultural field. Aquatic flora & fauna directly exposed with contaminated water. Fresh water fish *Channa gachua (ham)* respiratory organ (gills) surface continuously bath with toxic chemicals water Therefore; gills are at a relatively higher risk of being exposed to toxic substances. Toxic chemicals some heavy metals like mercury chloride adversely effects on fishes and other aquatic animals. It causes changes in oxygen consumption and damage to respiratory surfaces of gills. Alter normal function of respiratory system. Changes in respiratory system is considered as indicator of stress of water pollution. Changes in respiration have been used by many researchers as an indicator of stress in aquatic animals exposed to harmful substances (Martin et.al 1988; Kulkarni et.al 2005; Tilak et.al 2005, Siddiqui Afsheen T.M 2007; Vijaykumar et.al 2009)

Materials and methods

The fresh water fish *Channa gachua* collected from Girna River near Malegaon (Nashik) and brought to the laboratory without any mechanical damage. Fish were fed on alternative day with small pieces of live earthworms. Use clean, dechlorinated water for experiments. The fish were exposed to 96 hrs Lc50 concentration of Mercuric chloride (1.04 ppm).Each Batch 10 fishes were exposed to 24 hrs, 48hrs, 72hrs and 96 hrs for toxicant. Oxygen consumption rates in control and exposed fish were measured using Winkler's standard iodometric method recommended by APHA (2005).

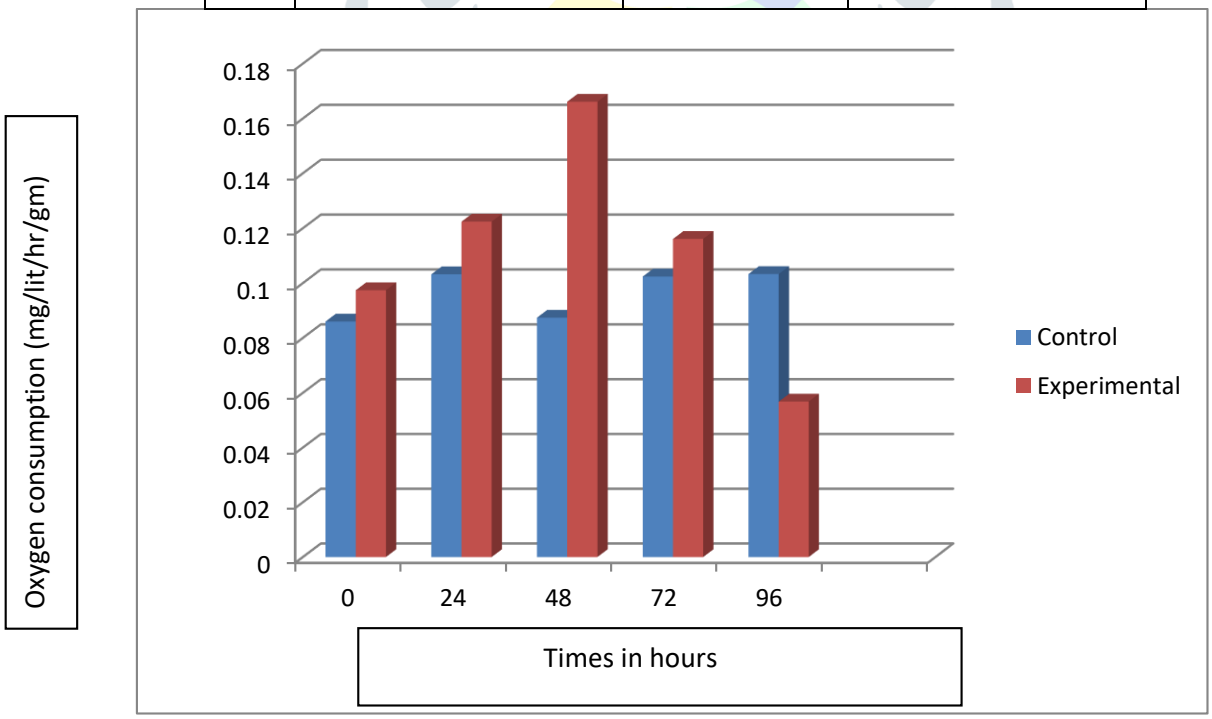
Result

The Present investigation revealed, Acute exposure of fresh water fish *Channa gachua* to mercury chloride and are presented in Table(1) showed significant Increase in oxygen consumption at 24 hours, a very significant increases up to 48 hours. The initial increase in rate of oxygen consumption observed in the present study can be the first responses of the animals to the pollutants stress afterwards decrease at 72 hours and 96 hours. The respiratory

rate slowly decreased, which was the lowest value before death. The difference in oxygen consumption rate was found to be greater in fish exposed to mercuric chloride. The heavy metal Mercury chloride affects the metabolic pathway of fresh water fish *Channa gachua.*

Table-1) **Effects of Heavy metal Mercury chloride on oxygen consumption of fresh water fish *Channa gachua* (Exposed 96-hrs LC_{50} concentration 1.0413ppm)**

Sr. No	Exposure period (Hrs)	Control	Exposed to 1.0413 (ppm)
1.	0	0.086	0.0974
2.	24	0.1032	0.1224
3.	48	0.0874	0.1661
4.	72	0.1024	0.1161
5.	96	0.1033	0.0568



Graph-1) Effects of mercury chloride on oxygen consumption of fresh water fish *Channa gachua* (Exposed 96-hrs LC_{50} concentration 1.0413 ppm)

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