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23. Effects of Pesticides on Fresh Water Fish *Catla catla* collected from Koradi Dam of Buldana District (M.S.)

R. S. Kale

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Abstract

Industrialization throughout the world affects the faunal diversity of the water, as the waste water from these industries is directly dumped into the water bodies without any treatment. Water pollution is a global issue, as the rising population leads to a number of industries such as pesticides, paper and fertilizers. These chemicals pollute the ponds, lakes, and river water. Fishes are the major source of proteinous food of our masses. Once the effluents are discharged into the water bodies, the toxins are incorporated in the bodies of fishes resulting in bioaccumulation of these toxins and when such fishes are consumed as food by the people, some of the toxins cause several health hazards in them due to biomagnifications. The pesticides, fertilizers and chemicals can adversely affect the physiology of organisms.

Key words : - Pesticides, fertilizers, chemicals, Profenofos, health hazards, *Catla catla*.

Introduction

The chemicals from different industries directly affect the faunal diversity of our country specifically fishes are mostly affected among them. Pesticides are used worldwide in agriculture and aquaculture to control the pest and insects (Yonar *et al.*, 2012). Organophosphate pesticides like ethion, dimethoate, monocrotophos and chlorpyrifos are widely used for paddy crop pests. The wide spread use of synthetic organic pesticides over decades has led its frequent exposure to the environment. Also acute and chronic exposures of humans to pesticides occur during their commercial production and their application. These chemicals are sub-lethal for fish and their toxicity leads towards the mortality of fish. The aim of present study is to check out the sub lethal effects Profenofos on biochemical constituent of fresh water fish *Catla catla*.

Material and Methods

Catla catla fish were caught from Koradi Dam. The fishes were nearly 4-5 gms. Healthy

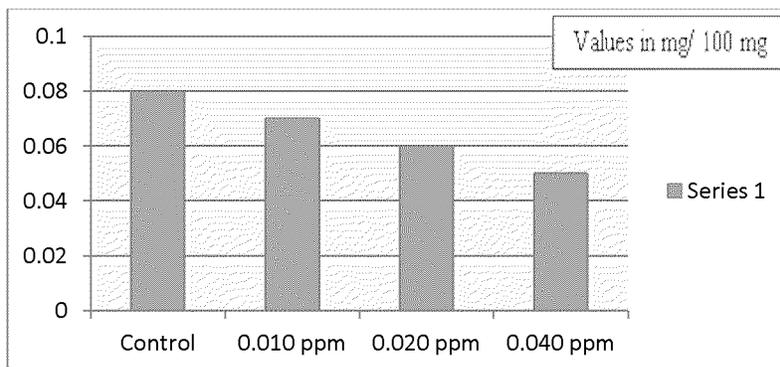
fishes were carefully packed in a medium sized polythene bag with sufficient oxygen which would help them to carry on their normal processes of metabolic activities during their period of transportation. When arriving in Laboratory fishes were carefully transferred into large glass aquarium.

They were kept for acclimatization in the normal laboratory conditions for a period of ten days. During this period standard formulated feed was given to all the fish as per the conditions suggested by Behunger (1973). Feeding was stopped one day before commencing of experiments in order to minimize the quantity of excretory products in the test tank. After acclimatization the fish were weighted totally and individually and then transferred into the treatment tubs carefully. The physico chemical conditions of well water used in the present study has the following characteristics; Dissolved oxygen - 7.8 - 8 ppm; Salinity- 0.4 - 0.6 ppm; Alkalinity - 250 mg/l ; Hardness 376mg/l; pH - 7.3 to 7.6; Temperature - $27 \pm 2^{\circ}\text{C}$.

The fishes were exposed to different acute concentrations of Profenofos 50% Ec (0-4-bromo-2-chlorophenyl 0-ethyl S-propyl phosphorothioate) to arrive at LC50. The LC50 was determined by the procedure of Finney (1971). Based on the results of the acute toxicity study, with a LC50 value of 0.6 ppm doses of sub acute value of Profenofos 50% E.C. were selected for sub acute exposure following the procedure of Desi *et al.* (1985). Fishes were divided in three treated and one control. In each aquarium 2 fishes are released. In the experimental set up profenofos sub acute values of 0.015, 0.030 and 0.06 ppm were added to the glass aquarium. Muscle sample from the experimental fishes were dissected out by sacrificing the fishes after 48 hrs time intervals. Protein estimation of muscle was carried out by Folin-Phenol reagent method (Lowry *et al.*, 1951), carbohydrate by Anthrone reagent method (Roe, 1955) and cholesterol by (Allain, 1974).

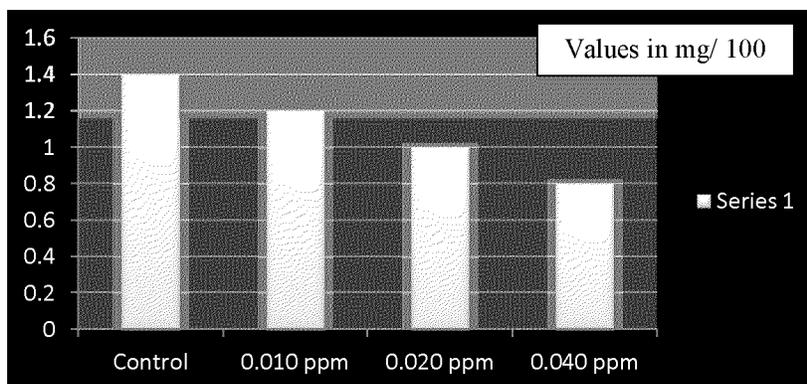
Results

The LC50 value of Profenofos for *Catla catla* was 0.6 ppm. The sub acute concentrations were 0.015 ppm, 0.030 ppm and 0.06 ppm were taken for concentrations. The concentration of Profenofos showed the spontaneous biochemical changes, and reduces the levels of biochemicals such as Protein, carbohydrate and Cholesterol.



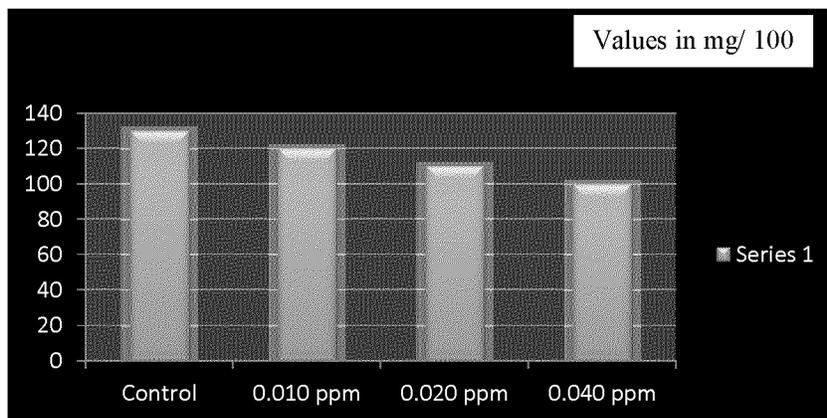
Conc. of profenofos

Estimation of Carbohydrate in the muscle sample of *Catla catla*



Conc. of profenofos

Estimation of Protein in the muscle sample of *Catla catla*



Conc. of profenofos

Estimation of Cholesterol in the muscle samples of *Catla catla*

Discussion

The biochemical analysis of the present study reveals a significant decrease in all the biochemical parameters. A significant decrease in the level of total proteins in the fishes treated with profenofos was observed. Proteins are the most abundant carbon compound in all the living organisms (Parameswaran *et al.*, 1987) and dominant biochemical constituent in the tissues of fishes (Pillay and Nair, 1973). Similarly, (Holbrook, 1980) found that the toxicant may directly cease protein synthesis.

There was a significant reduction in the levels of carbohydrate content. The oxidation requirements of the living organisms require carbohydrate and they are used as chemical energy through the breakdown of glucose by the citric acid cycle (Quastel, 1969). The metabolism of carbohydrate decreases when the fish are exposed to toxicants is due to the fact that carbohydrate forms the immediate source of energy that increases the stress caused by the toxicant. Similarly, Cholesterol levels were also found to be decreased in muscles of profenofos treated fishes as compared to the normal untreated fishes. Thus, from the present study it indicates that inculcation of chemicals particularly profenofos, in Koradi Dam should be restricted for the wellbeing of human health in this region.

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