

Metasystox pesticide alterations in protein content of fresh water crab *Barytelphusa cunicularis*

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Abstract: An experiment was carried out to assess impact of Metasystox pesticide on protein content of fresh water crab *Barytelphusa cunicularis*. Crab were exposed to different concentration of metasystox pesticide. The LC₅₀ values of *Barytelphusa cunicularis* for 24, 48, 72 and 96 hrs were 1.5 ppm, 1.25, 0.75 and 0.50 ppm metasystox. After periods of exposure, the crabs were dissected, tissues such as the hepatopancreas, gonads, were taken out for biochemical assay. During the acute study when crabs were exposed to 1.5 ppm (LC₅₀ value of 24 hours) metasystox a significant increase in protein levels was observed compared with the control group in all tissues such as hepatopancreas, ovary, testes. Changes occurred in the total protein, in the tissues like hepatopancreas and gonads of the fresh water crab *Barytelphusa cunicularis* after exposure to pesticide metasystox.

Keywords: Metasystox pesticide, *Barytelphusa cunicularis*, Toxicity

INTRODUCTION

Water is essential to the ecosystem and has been called the key to life, as all life on earth depends on water. Since civilization, man has used water for his economic gain and sustainability. The rivers sustained discharges domestic resources, agricultural flows and industrial extraction. The growing demand for water and the problems of scarcity increases. Other hand water pollution is getting worse and worse and need attention. A variety of germs, chemicals such as heavy metals, disinfectants and their products, dyes and pesticides etc. contaminate water bodies. Many water resources have been polluted by industrialization, urbanization, and other man-made problems. Many rivers in the world get heavy sewage, domestic waste, industrial waste and agricultural waste etc. The rivers of India have been polluted. Since water is a unique solution with the properties of dissolving and freezing by various chemical reactions, it can be easily contaminated. Both species, both living and non-living pollutants, are present in industrial & agricultural waste. Many of pollutants are causing serious water pollution. Toxic liquid is dumped into rivers daily by industrial field such as Water-soluble drugs are acid, alkalis, fluorides, dyes, mercury, chromium and lead. Water is a basic requirement for life and our future source of food. Man-made water pollution has created serious problems for water quality management and threatened the water system. (Trivedy and Saxsena 1999).

Accumulation of industrial pollution and the flow of agriculture into water bodies has become a major concern. Pollutants serve as a major form of pressure on the organism and the organism that responds by developing the necessary energy. The physical and chemical changes that take place in the water induced stress on aquatic life. Some species are more sensitive to toxic drugs and can help identify the environmental system, which may enable toxic chemicals to be identified and eliminated before they have any effects on humans. Some pesticides are extremely toxic and some that are less toxic in staining refer to the length of time. Pathan, et. al. (2009) studied the effect of industrial pollution on fresh water fish *Rasbora daniconius*, The largest industry plays a crucial role in polluting the water system. Fish & crustacean are exposed to a variety of industrial pollutants caused abnormal behavior and struggling for respiration in fishes

Over the past year, heavy metals, industrial waste, automotive emissions, widespread use of pesticides and solid waste disposal have been the source of large amounts of heavy metals that are considered to be highly polluting the water system. Among the pesticides, the organophosphate group of pesticides is a major health hazard worldwide due to its widespread distribution in the environment and its high toxicity in living organisms. Organophosphate pesticides metasystox is well known for its toxicity and the mechanism of their toxic action is well known. The pesticide Metasystox causes severe damage to various organs, disrupting the body's chemical and chemical processes that can kill organisms after exposure.

The present study reveals total protein content in tissues such as the hepatopancreas, gonads and *Barytelphusa cunicularis* after exposure to pesticide metasystox

MATERIALS AND METHODS

Barytelphusa cunicularis water crab was collected at Girna Dam, near Malegaon, Dist-Nashik (Maharashtra district) Lab. Before the start of experimental crab they were acclimatized to laboratory conditions for at least 3-5 days. Water parameters were recorded. Approximately the same size of crabs was used during the experiment. Food was not provided during the experiment.

In chemical experiments the crabs were divided into five groups consisting of 10 crabs each. The first groups were considered to be controlled; but groups IInd, IIIrd, IVth and Vth were exposed to 1.5 ppm, 1.25, 0.75 and 0.50 ppm metasystox (Lc50 values of 24, 48, 72 and 96 Hrs respectively). After periods of exposure, the crabs were dissected, tissues such as the hepatopancreas, gonads, were taken out for biochemical assay. Total protein is measured by the method of Raymont, et.al. (1964).

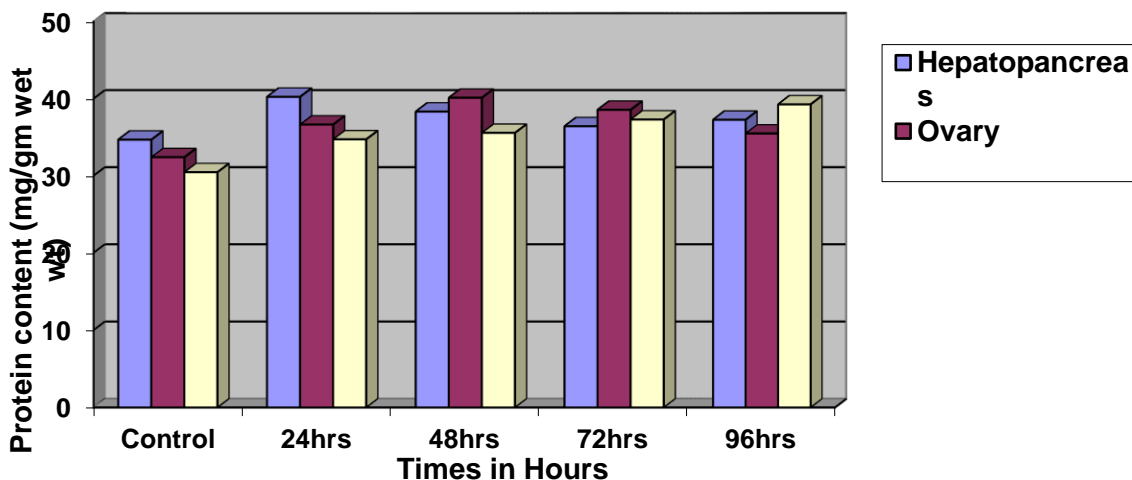
RESULT & DISCUSSION

The results of the present study show that protein content was higher in the hepatopancreas than in the ovary, testes and protein levels in the hepatopancreas, ovary, testes 34.68 ± 2.26 , 32.40 ± 2.64 and 30.46 ± 2.58 respectively. During the acute study when crabs were exposed to 1.5 ppm (Lc50 value of 24 hours) metasystox a significant increase in protein levels was observed compared with the control group in all tissues such as hepatopancreas, ovary, testes

Table -1) Acute impact of metasystox pesticide on protein content of Fresh water crab *Barytelphusa cunicularis*

Exposure periods	Hepatopancreas	Ovary	Testes
Control	34.68 ± 2.26	32.40 ± 2.64	30.46 ± 2.58
24 hrs	40.24 ± 3.16	36.64 ± 2.84	34.72 ± 2.76
48 hrs	38.32 ± 2.84	40.12 ± 3.08	35.56 ± 2.74
72 hrs	36.42 ± 2.36	38.56 ± 2.86	37.30 ± 2.68
96 hrs	37.26 ± 2.28	35.48 ± 2.34	39.26 ± 2.64

Graph-1



Acute impact of metasystox pesticide on protein content of Fresh water crab *Barytelphusa cunicularis*

Proteins are known as body building block elements of body, they play a key role in the process of cell-cell interaction. Any Contamination to the body directly or indirectly affects protein metabolism.

In the present study, when crabs were exposed to a severe concentration of metasystox pesticides, there was a significant increase in protein levels in the hepatopancreas, ovaries and testes after chronic exposure to metasystox pesticides. Increased protein content after acute exposure to metasystox pesticide may be due to anaerobic metabolism

that may increase under stressful conditions may cause changes in protein content. Similar results were observed by Patil madhuri, et al. (1989) studied effect of benzene on the Histopathology of the ovary of the fresh water prawn *Macrobrachium Lammerti*, result shown that an increase in protein content may be due to toxic stress and energy levels in carbohydrate metabolism.

Ahirrao et al.,(2004) reported effect of Sevin pesticide on the protein content of fresh water snail *Thiara lineata*. Pinho et al.,(2003) noted an increase in protein levels that may be due to increased protease levels and higher potency of hepatopancreas proteins after exposure to microcystins in the *Chasmagnathus granulatus*. Kharat et al.,(2009) reported an increase in protein levels in fresh water *Macrobrachium kistnensis* expressed in TBTCL.

Atul R Chourpagar et al.(2011) conducted acute toxicity of copper sulphate & mercuric chloride they observed crab was more sensitive for mercuric chloride than copper sulphate

Naghabhushanum et al.(1987) reported a decrease in the protein content in fresh water of prawn *Macrobrachium kistnensis* exposed to pesticides and decreased total protein intake promotes the development of proteolysis.

Ramesh .V.,et al.(2015) reported a decrease in the protein, lipid content in fish & crabs by increasing the level of trace metals. Another worker Madhusand reddy et al., (2012) studied sub lethal effects of Chlorpyrifos on protein metabolism of Edible Crab *Barytelphusa guerini*. They founded total protein content decreased whereas amino acid and ammonia increases in CPF exposed & maximum recovery was shown in cessation of intoxication, activities of protease and aminotransferases were elevated in tissues by transfer crab in fresh water improves biochemical constituents of protein & enzyme metabolism.

Gul-e-Zehra Naqvi, et al.(2017) studied effect of Pesticides on protein in fish (*Oreochromis mossambicus*) tissues result shown Studies show that the complete protein content was inhibited in *Oreochromis mossambicus* after being exposed to organophosphate pesticides (chlorpyrifos, malathion), synthetic pyrethroids (lambda-cyhalothrin, malathion) and herbicide (buctril). Levels of total protein content showed a decrease in pesticide-treated fish in the order of cypermethrin, malathion, chlorpyrifos, lambda-cyhalothrin and buctril respectively for 48 hours. The present study reports an allergic reaction in the response to pesticides in fish. The pesticide acts as a stress inducer that affects the normal function of fish.

Valarmathi and Azariah ,et al.(2002) reported alteration in total protein content of crab. *Sesarma quadratum* exposed to copper chloride. Kharat, et al., (2009) reported that tributyltin chloride toxicity, on the protein content in fresh water prawn *Macrobrachium kistnensi*. Vijayavel and Balasubramaniam (2006) studied the fluctuations of biochemical constituents in the edible estuarine crab *Scylla serrata* exposed to naphthalene. Saravana Bhavan and Geraldine (2009) studied the effect of Carbaryl pesticide on protein contents of fresh water prawn *Macrobrachium malcolmsoni*. Dhapte, et al.,(2001) studied the effect of endosulfan on protein contents of *Nemacheilus botia*. Sreeya G Nair, et al. (2017) studied effects of quinalphos, an organophosphate pesticide on *Cirrhinus mrigala* result shown that the percentage of mortality of *C. mrigala* increased with increase in concentration of pesticide, quinalphos as well as increase in exposure duration. Similar result observed Yadav ,et al. (2009) studied toxicity of Metasystox on fresh water prawn *Macrobrachium lammeri*.

The present investigation has been undertaken to account for the changes occurred in the total protein, in the tissues like hepatopancreas and gonads of the fresh water crab *Barytelphusa cunicularis* after exposure to pesticide metasystox.

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