



## ACUTE EFFECT OF METASYSTOX PESTICIDE ON BEHAVIORAL RESPONSE OF FRESH WATER CRAB *BARYTELPHUSA CUNICULARIS*

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### ABSTRACT:

Present investigation observes the behavioral changes of crabs exposure to metasystox pesticide and identification of stress conditions. The  $LC_{50}$  values of fresh water crab *Barytelphusa cunicularis* exposed to metasystox pesticides were calculated. The  $LC_{50}$  values of metasystox pesticides for 24, 48, 72 and 96 hours were found to be 1.5ppm, 1.25, 0.75 and 0.50 ppm respectively. Metasystox pesticide affect directly on central as well as peripheral nervous system of crab *Barytelphusa cunicularis*. Interfere behavioral response indicates stress condition of crab.

**Key words-** *Barytelphusa cunicularis*, behavioral response, toxicity.

### INTRODUCTION

In India tremendously use of pesticides in agricultural field every year's new pesticides introduced in market. Pesticides through different ways enter in to water bodies and contaminate aquatic system. Polluted water consists of toxic chemicals which are adversely effects on flora and fauna. Industrial waste, domestic waste and agricultural waste directly or indirectly thrown in to water resources without any processing. Polluted water included toxic chemicals which easily react with aquatic system and enters in to body of aquatic organism and cause adverse effects such as disrupt metabolic activities, interfere physiological process of organism. Farmers mainly use organophosphate pesticides, In the present study Metasystox pesticide used which is an organophosphorus group of pesticides. It was first introduced to the United States of America market in 1952 (Ma.et al., 2003). Organophosphorus pesticides can be ingested by all means, including inhalation, ingestion, and absorption. Their toxicity is not limited to the critical stage; however, enduring effects

have long been observed. Neurotransmitters such as acetylcholine are essential for brain development, and many organophosphate pesticides have neurotoxic effects on biological development from a low level of exposure. Since the cost of this pesticide is low and its effect is high, it has been widely used by local farmers (Garcia et.al., 2003)

Pesticides which are neurotoxic, known to modify the behavior of the animals. Observing behavioral changes is actually a sensitive measure of the response of organism to a particular toxicant. Pollution stress on behavior includes a wide range of effects; it may upset many behavioral characteristics including predator avoidance, migratory response learning ability, discrimination of food and feeding etc. Though many workers have focused their attention towards the impact of pollutants on Behavior of fishes and other crustaceans. But very few workers have reported the impact of pollutants Behavior of on fresh water crustaceans especially on *Barytelphusa*. Present investigation observe the

behavioral changes of crabs exposure to metasytox pesticide and identification of stress conditions

#### **MATERIAL AND METHODS:**

The fresh water crab *Barytelphusa cunicularis* were used in the present investigation were collected from Girna Dam near Malegaon, Dist-Nashik. Crabs were maintained in the laboratory in plastic troughs containing tap water. Fed with pieces of earthworm and water was changed after every alternate day. The crabs were acclimatized to the laboratory conditions at least 3-5 days prior to the commencement of the experiment and approximately same sizes of crabs were used. Crabs were not fed during experiment. Water parameter such as hardness, pH, and temperature etc. were recorded. In the present investigation, eight batches of crabs were made and exposed to different concentration of pesticide Metasytox. The first batch of crabs were treated as control and II<sup>nd</sup>, III<sup>rd</sup>, IV<sup>th</sup> and V<sup>th</sup> batches of crabs were exposed to 1.5 ppm, 1.25, 0.75 and 0.50 ppm of Metasytox (LC<sub>50</sub> values of 24,48,72 and 96 hours respectively)

#### **RESULT & DISCUSSION:**

The LC<sub>50</sub> values of fresh water crab *Barytelphusa cunicularis* exposed to metasytox pesticides were calculated. The LC<sub>50</sub> values of metasytox pesticides for 24, 48, 72 and 96 hours were found to be 1.5ppm, 1.25, 0.75 and 0.50 ppm respectively (Fig-1). The present experiment shows that the percentage mortality increases with increase in concentration of pesticides and exposure period

Jyotima shrivastava *et.al.*, (2013) Studied behavioural responses of freshwater crab *barytelphusa guerini* to chlorpyrifos exposure, they have been found treated crab showed restless ness, alter behavior response and

increase oxygen consumption of crab compared to control crab.

Similar observation has been made by Sarojini *et.al.* (1989) on commercial crab *Scylla serrata* exposed to phosalone pesticide the crab got paralyzed with increase in the exposure period Sambasiva Rao, *et.al.*, (1990) studied the toxicity of endocel pesticide on marine edible crab *Scylla serrata* they further stated that toxicity of endocel is temperature dependent. Keshavan, *et.al.*, (2005) has studied the uncoordinated movement in fresh water crab *Barytelphusa guerini* exposed to Hilden pesticide. Chandrakant Patil *et.al.*, (2008) reported the toxicity of pesticide monocrotophus on physiological, biochemical and histological alteration on fresh water crab *Barytelphusa guerini*. Martine *et.al.*,(2010) studied effect of (LF-EMF) low frequency electromagnetic fields on behavior of fresh water crab *Barytelphusa cunicularis*, reported crabs show a total aggregation between 60-90 minutes. Serotonin neurotransmitter are involving in aggregation behavior of fresh water crab *Barytelphusa cunicularis*.

Another worker Deasi R.B., (2010) reported female crab *Barytelphusa guerini* showed sensitive response against Dimethoate, treated crab show imbalance, irregular movement than control group, treated crab showed progressive deteriorated feeding response. Dimethoate alter normal behavior of female crab. Senthil Kumar *et al.*, (2007) studied LC<sub>50</sub> of chlorpyrifos to *Siralothelphusa hydrodroma*, they reported that crabs show a higher tolerance than fishes, possibly due to hard chitin exoskeleton crabs. Nisha *et.al.*, (2016) reported acute effect of chromium trivalent and hexavalent on behaviour response of zebra fish *Danio rerio*. Treated fish showed jerky movements, over

secretion of mucous, color changes compared to normal fish.

In The present investigation, Metasystox pesticide affect directly on central as well as peripheral nervous system of crab *Barytelphusa cunicularis*. Alter normal behavior response of crab. Result clearly suggested metasystox acts very toxic chemical for fresh water crab *Barytelphusa cunicularis*. Finding recommended to farmers use biopesticide for agricultural activities to balance aquatic ecosystem.

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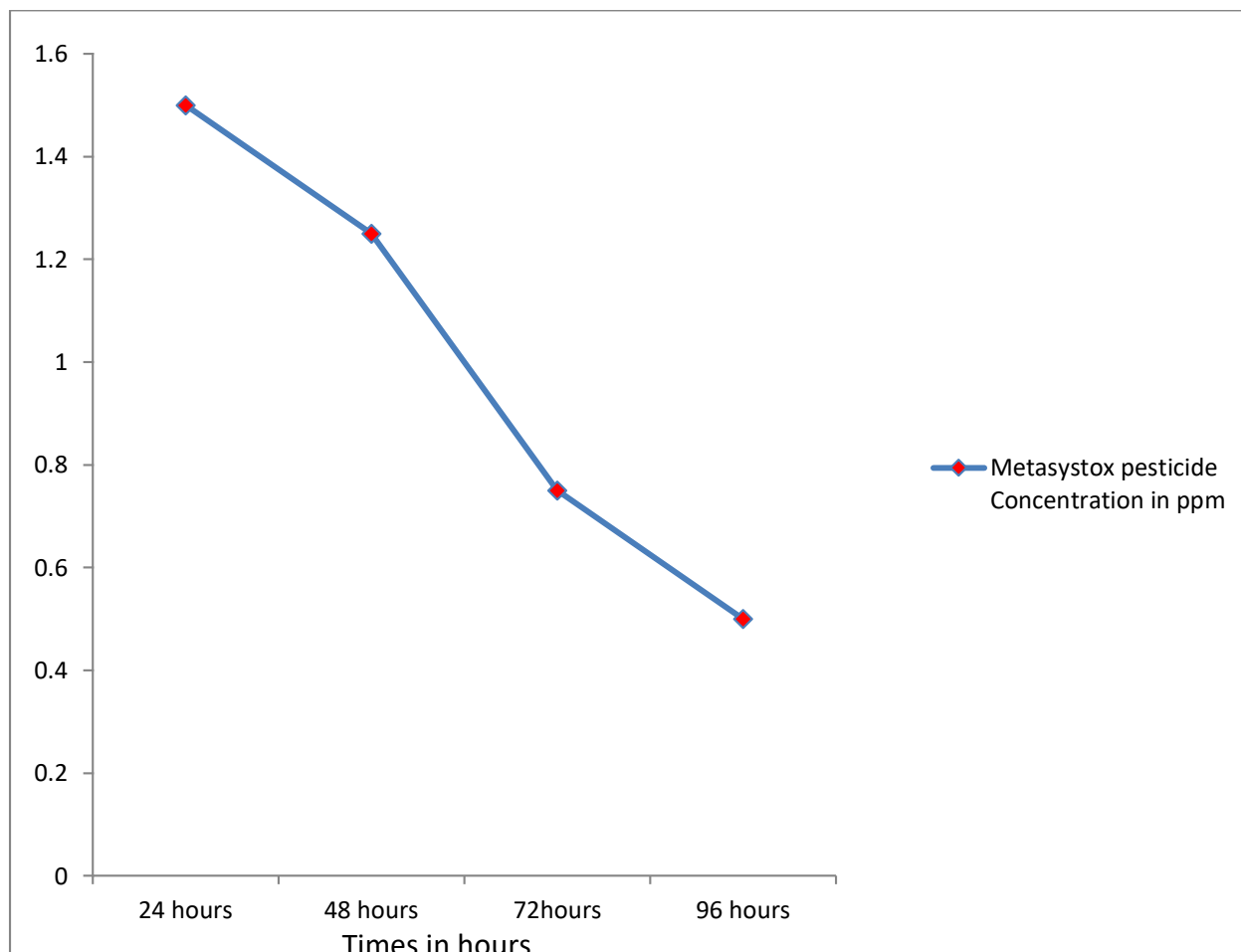


Fig-1)  $LC_{50}$  values of fresh water crab *Barytelphusa cunicularis* exposed to metasystox pesticides

Observations	Control crabs	Treated crabs (After 24 hour's exposure with the concentration of 1.5 ppm of metasystox pesticides)
Movement Patterns	Normal Body balance & posture	Excitation and increase in rate of movements. Irregular, erratic, color change
Response towards food	consumed the food normally	Unable to notice the food. Over secretion of mucous
Response towards Light	crabs were subjected to constant light	crabs were more sensitive and preferred comparatively dark areas
Offence & defense	Excitement high	Excitement low, high Scaphognathite activity

**Table-1)** Behavioural changes of crab *Barytelphusa cunicularis* after exposure to Metasystox Pesticides shows response as