
**ACEPHATE ENHANCES GLYCOGEN METABOLISM IN FRESHWATER CRAB,
BARYTELPHUSA GUERINI, FROM GODAVARI BASIN, NANDED, MAHARASHTRA****NAGESH NAGTHANE, MANOJ DESHPANDE, NAGRALE NARAYAN, JAGTAP ASHWINI,
B.BALAJIRAO, RAVI BARDE**

Abstract: The fresh water male crab, *Barytelphusa guerini* was selected for experimentation. The crabs are available in the paddy fields of Nanded district. The animals were collected and brought to the laboratory for acclimatization. They were subjected to sub-lethal concentration of pollutant stress. The effect of pollutant i.e. Acephate on the glycogen contents in the in different tissues of fresh water male crab was studied. The freshwater crabs were subjected to sub-lethal concentration of Acephate (3.5 ppm) up to 96 hours after regular intervals. The amount of glycogen content on hepatopancreas of freshwater male crab was found to be decreased as compared to control set experimental animals. The results were Plotted and discussed in details.

Keywords: *Barytelphusa guerini*, Acephate, Hepatopancreas, Total Glycogen.

Introduction: The contamination of pollutants in ecosystem constitutes an immense environmental stress. This results the contamination of such pollutants on river, lakes and streams etc. Many pollutants reach the aquatic environment following spraying operations. Therefore, usage of these pollutants in the form of pesticides, insecticides has impact on environment, leading to the development of various types of adjustments, adaptations, such as morphological, physiological, biochemical and behavioral etc., in aquatic life at various levels of organization in the organisms to suit their environment. The rapid increase in use of such pollutants in agriculture poses serious hazards to aquatic animals. Insecticides like Acephate are biologically active, they are extensively used in plant protection, operations on account of their less persistence in the environment, their excessive use produces more hazards to the aquatic animals. These pesticides pose a critical stress on the aquatic biota, like crabs, which are economically important and used as a commercial food of human beings [1], [2].

The crabs are economically important as they are used as a food source which fulfills the human need of food to some extent in our country. Due to pollution of water since last decade, their natural environment is being disturbed. The increasing population density, faster urbanization and industrial growth has increased the complexity of pollution and led to deterioration of environment.

The freshwater crab *Barytelphusa guerini* are regarded as indicator organism and are a potential biological tool for assessing the health of a particular ecosystem. Hence the present investigation was made to study the effect of pollutant i.e. Acephate the glycogen contents in fresh water crab *Barytelphusa guerini*.

Materials and Methods: The freshwater male crab, *Barytelphusa guerini* used for experimentation. The

species were collected from paddy fields of Nanded, Maharashtra. The crabs were acclimatized to the laboratory conditions. The near about same sized freshwater male crabs, *Barytelphusa guerini* between 35 to 50 gms weights were selected for the present study. The animals were subjected to one sub-lethal concentration of 3.5 ppm of Acephate up to 96 hours period of exposure. Only healthy crabs were selected for the present study [3].

The animals under stressed state were exposed to sub-lethal concentration of acephate for 0, 24, 48, 72 and 96 hrs period of exposure. The estimation of glycogen content was done by the method of Anthrone [4] using glucose powder as the standard. The values were calculated from standard graph of glucose. The same procedure was repeated for six readings under each observation. The obtained results were compared with the animals maintained in the control set. The obtained values are plotted in graph and discussed in detail.

The total polysaccharides (glycogen) expressed as mg/gm wet wt. of tissue.

Results: The freshwater male crab, *Barytelphusa guerini* exposed to sub-lethal concentration of Acephate as a toxicant showed remarkable changes in glycogen content in hepatopancreas. The values obtained for total glycogen content for experimental crabs for 24 hrs, 48 hrs, 72 hrs and 96 hrs period of exposure were found to be 85.22, 84.22, 83.12 and 79.86 mg/gm wet wt. of tissue respectively. The glycogen content in hepatopancreas of fresh water male crab, *Barytelphusa guerini* was found to be suddenly decreased at 24 hrs period of exposure as compared to control set. The decreasing trend was observed in hepatopancreas of freshwater male crab, *Barytelphusa guerini*. The deceased glycogen content at 24 hours was found to be increased slightly up to 96 period of exposure. The values obtained for control set were found to be 95.12, 96.16, 96.18 and

97.26 mg/gm wet wt. of tissue for 24, 48, 72 & 96 hours period of exposure respectively.

Table 1: Effect of Acephate on Total Glycogen Content in Hepatopancreas of Freshwater Male Crab, *Barytelphusa guerini* for 24, 48, 72 & 96 hours period of exposure

Sr.No	Exposure Period	Total Glycogen Content (mg/gm wet wt of tissue) (Control Set)	Total Glycogen Content (mg/gm wet wt of tissue) (Experimental Set)
1	24 hrs	95.12 ± 0.35	85.22 ± 0.64
	48 hrs	96.16 ± 0.10	84.22 ± 0.72
	72 hrs	96.18 ± 0.14	83.12 ± 0.92
	96 hrs	97.26 ± 0.52	79.86 ± 0.62

Discussion: Carbohydrates are organic nutrients to be utilized to generate required energy [5]. They serve as precursors for the dispensable amino acids and some nutrients, which are metabolic intermediates necessary for growth [6]. The susceptibility of animal tissue to different chemical agents may vary from animal to animals and also within the same animal among the different tissues of the individual animals. The freshwater crab *Barytelphusa guerini* are regarded as indicator organism and are a potential biological tool for assessing the health of a particular ecosystem. Hence the effect of pollutant i.e. Acephate on the glycogen contents in fresh water crab *Barytelphusa guerini* studied in the present investigation.

biodiversity due to indiscriminate use of pesticides. The aquatic animals are susceptible to such various pollutants, but they have to adjust to these new circumstances by changing their metabolic activities[7],[8].

The study of the effect of pollutants stress on aquatic animals is an important aspect of chemical contamination of the aquatic environment. These pollutants are discharged into water resources cause's hazardous effects on aquatic life. Today life many pesticides are vigorously utilized in agricultural field. The incorporation of these heavy metals in lower organisms has been recorded to cause serious morphological alternations in vital tissues. The extent of severity of tissue damage is a consequence of the concentration of the toxicant and is time dependent. The severity of damage depends on the toxic potentiality of a particular compound or pesticide accumulated in the tissue [9][10].

The animals in stress condition require greater energy demand to perform metabolic activities. Therefore they use sources of energy are carbohydrates, proteins and fat. The obtained experimental results were compared with the animals in control set. The present research shows depletion of carbohydrate i.e. total glycogen content was observed in the hepatopancreas of the freshwater male crab, *Barytelphusa guerini*, when exposed to Acephate. The decrease in glycogen content in hepatopancreas of crab may be because carbohydrates are stored in the hepatic tissues in the form of glycogen and whenever energy is required the glycogen smashed up into glucose and utilized as a source of energy to overcome stress condition induced by insecticides. Glycogen content therefore decreases and an increase in the level of total sugar in the tissues generally occurs. Reference [11] observed a decrease in glycogen and total sugar content in the selected tissues of freshwater crab, *Barytelphusa guerini*, after exposure to sublethal concentration of Hildan. Similar results were noted by effect of inorganic pollutants on the physiology of freshwater

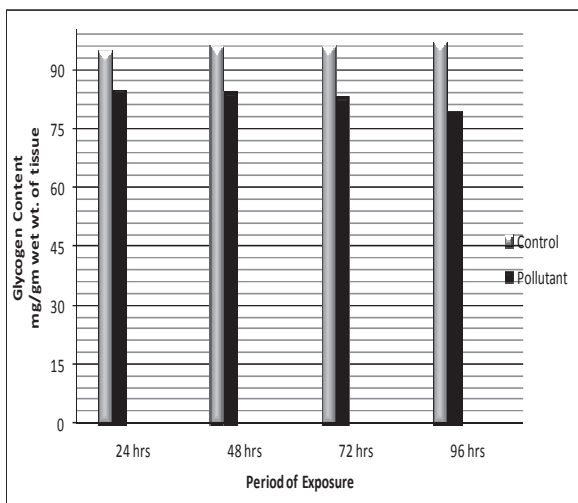


Fig.1 Effect of Acephate on Total Glycogen Content in Hepatopancreas of Fresh Water Male Crab, *Barytelphusa guerini* in Control and Experimental Set for 24, 48, 72 & 96 hours period of exposure

The water resources that run through agricultural areas get contaminated by various pollutants. The use of pesticides entering the aquatic environment brings multiple changes in organism. The aquatic ecosystem is the greater part of the natural environment, which is facing the threat of shrinking genetic base and

crab, *Barytelphusa guerini* [12].

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Nagesh Nagthane / Shri Chatrapati Shivaji Junior College/ Markhel tal. Degloor Dist. Nanded/ Jr. Lecturer/
 Manoj Deshpande/ Mahesh Junior College/Shirur Tajband tal. Ahmedpur/ Dist Latur/ Jr. Lecturer/
 Nagrale Narayan / Department of Zoology SGB College/ Purna/ Dist Parbhani/ Research Scholar/
 Jagtap Ashwini /Department of Zoology/ Yeshwant College/ Nanded / Asst. professor/
 B.Balajirao /Department of Zoology/ Yeshwant College, Nanded / Asst. professor/
 Ravi Barde / Department of Zoology SGB College/ Purna/ Dist Parbhani / Asso. professor/
 ravibarde4u@rediffmail.com