

# Free Amino Acid Contents Increases Under Pesticide Stress In Freshwater Crab, *Barytelphusaguerini*(H. Milne-Edwards) From Godavari Basin, Nanded, Maharashtra

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**ABSTRACT:** The injudicious use of pesticides causes threat to environmental health. The use of pesticides affects the water environment and the aquatic animals living in water. The present study was performed to assess the toxic effect of Sumidon and Acephate in fresh water crab, *Barytelphusaguerini*. The parameter studied was total free amino acid content in gills of crab. The freshwater crabs were exposed to 24, 48, 72 and 96 period of exposure. The obtained results were compared with the animals maintained in control set. The amount of total FAA content was found to be increased as compared to control set animals.

**KEY WORDS:** Sumidon, Acephate, FAA Content, Gills, *Barytelphusaguerini*.

## I. INTRODUCTION

The use of pesticides is one of the most alarming toxic substances that are deliberately added to our environment. They are intended for preventing, destroying, repelling or mitigating any pest. The enormous use of pesticides causes potential toxicity to human and other animals. The commonly used pesticides in India are those belonging to the organophosphorus groups, carbamates groups, organochlorine and pyrethroids. Recently the use of organophosphorus has gained importance due to ban of the pesticides belonging to organochlorine group i.e. DDT, Aldrin, Lindane and Endosulfan. These pesticides have the potency to bioaccumulate in the body of animals (WHO, 2004; Kachhway et. al., 2013).

Today's rapid industrialization and increase in human population we are facing the pollution of water bodies. The important sources of water pollution are industrial effluent, domestic, sewage, drainage and pesticides. These sources pollute the river and major water sources. Sumidon and Acephate are the well known organophosphate pesticides used in agriculture. This is for the application in most of the irrigated crops like sugarcane, banana, rice etc. The persistence of these pesticides is widely known and has the residual effect in the plants and animals which come in contact.

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. But since last decade, their natural environment is being disturbed due to the pollution. The increasing population density, faster urbanization and industrial growth has increased the complexity of pollution and led to deterioration of environment. 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 *Barytelphusaguerini* are regarded as indicator organism and are a potential biological tool for assessing the health of a particular ecosystem. Hence the attempt was made to study the effect of pollutant i.e. Sumidon on the FAA contents in fresh water crab *Barytelphusaguerini*.

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The biochemical reactions in animal architecture act as a building block is amino acids. They play a key molecule in cellular metabolism. Proteins in an animal are being constantly degraded and re-synthesized from the free amino acid pool in tissue (Saha and Das, 1994). The present study was conducted to find out the effect of pesticides on the free amino acid contents in freshwater male crab, *Barytelphusaguerini*.

**II. MATERIAL AND METHODS**

The freshwater male crab, *Barytelphusaguerini* are available abundantly in the paddy fields of Nanded, Maharashtra. The crabs were maintained in the glass aquarium jars and acclimatized to the laboratory conditions. The male crabs weighing between 35 to 50 gms were selected for the present investigation. They were subjected to one sub-lethal concentration of 1.2 ppm of Sumidon and 3.5 ppm of Acephate. The animals were exposed for 0, 24, 48, 72 and 96 hrs period of exposure. Only healthy crabs were selected for the present study (Ambore, 1976).

Total free amino acid content in tissue was extracted and estimated by the following procedure of Moore and Stein (1948). The fresh water crab, *Barytelphusaguerini* was dissected and the gills were isolated. 100 mg fresh tissue material was ground in mortar and pestle with 5.0 ml of 80 percent ethanol. It was centrifuged and the supernatant used for estimation. To 1 ml of supernatant, 1 ml of freshly prepared Ninhydrin Reagent was added. The supernatant along with Ninhydrin Reagent heated at 60° C in a water bath for 20 minutes. A quantity of 5.0 ml dilutant solution added to the test tube when it still in the water bath. The contents were cooled and the developed color read at 570 nm in a Spectrophotometer against water blank.

The values for total free amino acid content were expressed as mg/gm wet weight of the tissue.

**III. RESULTS**

The results of amino-acids content in gills of fresh water crab, *Barytelphusaguerini* under stress of Sumidon and Acephate for 24 hrs, 48 hrs, 72 hrs and 96 hrs period of exposure have been represented in the table and graphs 1 & 2; the values were expressed in mg/gm wet wt. of tissue.

The freshwater crab, *Barytelphusaguerini* exposed to sub-lethal concentration of toxicant showed remarkable changes in total FAA contents in gills. The values obtained for free amino acid content under Sumidon stress at 24 hrs, 48 hrs, 72 hrs and 96 hrs period of exposure were found to be 05.16, 06.40, 08.14 and 08.84 mg/gm wet wt. of tissue respectively. The free amino acid contents in gills of fresh water crab, *Barytelphusaguerini* was found to be increased up to 96 hrs period of exposure as compared to control set. The values obtained for total free amino acid content in gills of freshwater crab, *Barytelphusaguerini* in control set were found to be 02.82, 03.32, 03.20 and 03.14 mg/gm wet wt. of tissue for 24, 48, 72 & 96 hours period of exposure respectively.

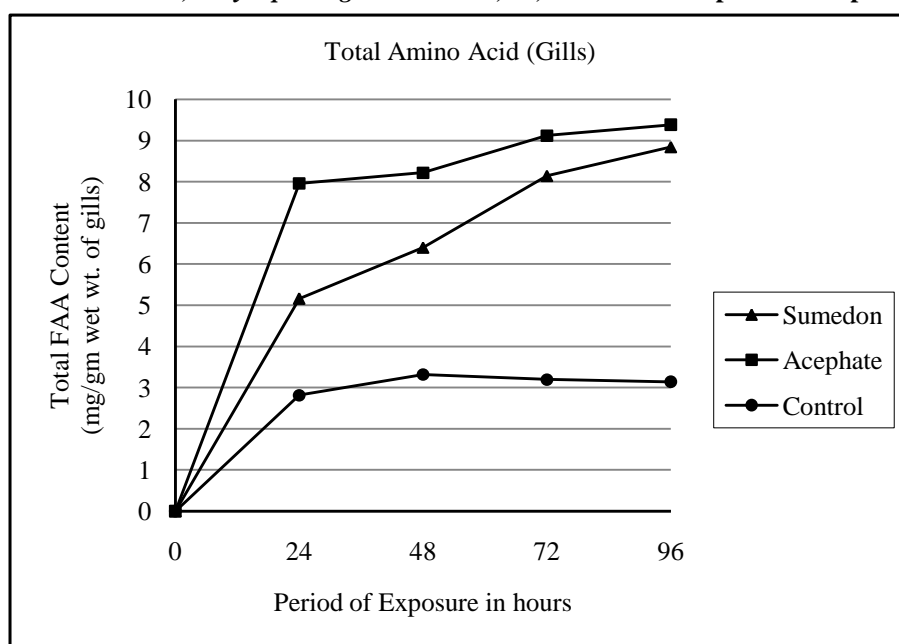
**Table: Effect of Pesticides i.e. Sumidon and Acephate on Total FAA Content of Fresh Water Male Crab, *Barytelphusaguerini* for 24, 48, 72 & 96 hours period of exposure**

Sr. No	Exposure Period	Total FAA Content (mg/gm wet wt of tissue) (Control Set)	Total FAA Content (mg/gm wet wt of tissue) (Sumidon)	Total FAA Content (mg/gm wet wt of tissue) (Acephate)
1	24 hrs	2.82 ± 0.32	05.16 ± 0.14	07.96 ± 0.14
	48 hrs	3.32 ± 0.36	06.40 ± 0.16	08.22 ± 0.16
	72 hrs	3.20 ± 0.24	08.14 ± 0.45	09.12 ± 0.28
	96 hrs	3.14 ± 0.54	08.84 ± 0.54	09.38 ± 0.16

**(Each Value is Mean of Five Observations ± S. D.)**

The amount of free amino acid contents in fresh water crab, *Barytelphusaguerini* exposed to under Acephate stress were found to be 07.96, 08.22, 09.12 and 09.38 mg/gm wet wt. of tissue for 24, 48, 72 & 96 hours period of exposure respectively. The obtained values were compared with control set values and the increasing trend was observed up to 96 period of exposure. The obtained values were expressed in terms of graphical representation. The graph shows the amount of total free amino acid contents in in experimental and control freshwater crab, *Barytelphusaguerini* under stress of sumidon and acephate in gills.

**Graph: Effect of Pesticides i.e. Sumidon and Acephate on Total FAA Content in Gills of Fresh Water Male Crab, *Barytelphusaguerini* for 24, 48, 72 & 96 hours period of exposure**



#### IV. DISCUSSION

Amino acids are the main component in biochemical reactions and are a biochemical building block. The different types of amino acids are present in the body of living organisms in Free State or in combined state (i.e. not associated with proteins). Amino acids are vital components for all living organisms. They are important fuel molecules, signaling factors and major substrates for the synthesis of a wide range of bioactive molecules and proteins. They are actively participated in the metabolic activities serves as prime metabolic source of living cells and they also act as neurotransmitters. They also function in the detoxification pathways involving ammonia and serve as attachment sites for carbohydrates. Overall, amino acids play a key molecule in certain cellular metabolism. Proteins in an animal are being constantly degraded and re-synthesized from the free amino acid pool in tissue (Saha and Das, 1994; Babsky *et al.* 1989; Sawant *et al.*, 2012).

The present investigation showed the alterations in the free amino acid content in pesticidal stress when fresh water crab exposed to Sumidon and Acephate stress. The free amino acid contents and total protein contents are interconnected with each other. As the total protein content in tissues is decreased due to degradation of proteins the amino acid content is increased because the proteins are made up from chain of amino acids. Apparently under stress of the pesticides carbohydrates and protein reserves and fat depleted to meet the greater energy demands. It also appears that proteins are broken down to justify the increased energy demands as reflected in increased level of total free amino acids which may be fed into TCA cycle as keto acids for energy production as suggested by many workers (Kabeer Ahmed *et al.*, 1978; Pedersen and Lundbye 1997; Gangotri and Matkar 2005).

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