

Toxic Effect of Urea and Dap Fertilizer on Amino Acid Content in Hepatopancrease and Muscle of a Fresh Water Crab *Barytelphusa cunicularis*(west-wood)

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Abstract:

A fresh water crab, *Barytelphusa cunicularis* were exposed to different concentration of fertilizer Urea(3.5ppm) and DAP(0.25ppm) up to 96 hr exposure period. Decrease in Amino acid content of Hepatopancreases and muscles are same in both fertilizer but, maximum decrease was observed in DAP than Urea.

Introduction

Agricultural expansion and the intensive use of synthetic chemical fertilizers, primarily Urea (nitrogen source) and Di-ammonium Phosphate (DAP) (nitrogen and phosphorus source), have significantly enhanced global crop yields. However, excessive application of these agrochemicals often exceeds soil absorption capacity. During the monsoon season, heavy rainfall leads to massive agricultural runoff, transporting residual fertilizers from arable lands into nearby aquatic ecosystems such as rivers, streams, lakes, and ponds.

This continuous influx of nitrogenous and phosphatic compounds causes severe degradation of water quality, triggering eutrophication, dissolved oxygen depletion, and alteration of ambient pH. Aquatic organisms, particularly non-target macro-invertebrates like the freshwater crab *Barytelphusa cunicularis*, are constantly exposed to these dissolved pollutants through cutaneous absorption and respiratory gills.

fertilizers are one of the major causes of pollution, which affects the life of fishes and aquatic animals in various ways an important investigation made on the biochemical changes followed by treatment of pollutants. Phillips et al. (1964); Me Katney, (1965); Yomashita, (1967); Bano et al (1981); Goel and Gupta (1985); Jana Sasadhar and Bandyopadhyay, (1987); Hymavathi and Rao, (2000).

The indiscriminate and extensive use of fertilizer causes serious threat to aquatic organism, which causes to disturbed aquatic fauna i.e. Crab, prawn, and shrimps, molluscs, sand fishes these are having high economic and nutritive value, but toxicity of fertilizers causes the mortality and decrease the rate of organic constituents.

Hence present work was undertaken to find out the effect of fertilizer Urea (3.5) ppm and DAP (0.25) ppm on Amino acid content of Hepatopancreas and muscles of fresh water crab, *Barytelphusa cunicularis*.

MATERIALS AND METHODS

Only healthy uniform size range between (30 to 40 gms) The fresh water male crab, *Barytelphusa cunicularis* were used for experimentation. Obtained 50% mortality for lethal concentration of the two fertilizers were 3.5 ppm of urea and 0.25 ppm of DAP respectively. Stock solution of both the fertilizers were prepared in water and then to get required concentration of test solution, one day before animals were exposed into their respective lethal concentration and maintained in glass aquarium. Before exposure they were starved for 24 hours to eliminate nutritional effecting order to eliminate variation in composition due to differential feeding. The crabs were divided in to two groups, each group containing ten animals, one group served as control without fertilizer and other as experimental. After each 24, 48, 72 and 96 hours exposure time period blood and tissue were taken for estimating the organic constituents. The blood was drawn from the base of the chelate leg of each crab with the help of hypodermic syringe rinsed with sodium oxalate

solution, and from the tissues the organic constituents are estimated. The total free amino acid (TFA) content was estimated by using the modified method of Danielson (Harold, 1958).

RESULTS

Decrease in amino acid content was observed in Hepatopancrease and Muscles in Urea and DAP fertilizer from 24hours to 96 hours. Maximum decrease was observed in DAP than Urea as compare to control. Table (1.1 to 1.2)

Table. 1.1

Effect of lethal concentration of Urea and DAP on Aminoacid content in Hepatopancrease of *Barytelphusa cunicularis* (An average of 6 observatio ± S.D.)

Time in hour	Control	Urea	DAP
24	14.8 ± 0.081	13.65± 0.006	12.48 ± 0.0063
48	14.64± 0.012	12.6 ± 0.051	11.45 ± 0.0075
72	13.6 ± 0.063	10.65 ± 0.005	9.44 ± 0.0103
96	12.48 ± 0.0075	9.55± 0.0083	8.22 ± 0.0051

Table. 1.2

Effect of lethal concentration of Urea and DAP on Aminoacid content in Muscles of *Barytelphusa cunicularis*

(An average of 6 observations ± S.D.)

Time in hour	Control	Urea	DAP
24	10.28 ± 0.0075	8.32 ± 0.01	7.28 ± 0.0051
48	10.2 ± 0.0089	7.21 ± 0.0040	6.82 ± 0.0089
72	9.48 ± 3.582	6.79 ± 0.0051	6.48 ± 0.0233
96	9.22 ± 0.0075	6.2± 0.075	5.75 ± 0.1048

DISCUSSION

The food of animals chiefly consists of varied complex organic substances such as carbohydrates, proteins, amino acids and fats. The basic food stuffs get oxidized to meet most of the energy requirements of the animals. The amino acid is a unit of protein are required for

growth and repair of tissue and also for the synthesis of various secretions of the body. Besides these, there are a number of substances such as vitamins and inorganic compounds, which the animals can not synthesized and still essential in carrying out both energy yielding and an aerobic growth promoting reactions. In addition to protein, carbohydrate, amino acid and fat requires in animal body, mineral elements which serve structural and physiological functions. The amino

acid content in muscle initially increases from 24 hours in Urea and DAP as compare to control and it decreases up to 96 hours in both fertilizer Urea and DAP. Apparently under stress of the fertilizer's carbohydrate and protein reserves and fats depleted to meet the greater energy demand. It also appears that proteins are broken down to justify the increased energy demand as reflected in increased level of total free amino acid may be fed into (TCA) cycle as keto acids for energy production as suggested by many workers Kabeer Ahmad, *et al.* (1978) and Ramalingam and Ramalingam (1982). The total protein content decreased and total free amino acid content increased in the selected tissues like muscle, hepatopancreas and gills of freshwater crab, *Barytelphusa guerini* after exposure to sub lethal concentration of Hildon (Keshvan, *et al.*, 1983; and Kamble, 1984). Jacob Doss, *et al.* (2008) observed activity level of protein, free amino acid, and urea in gill, muscle, and brain, liver of *Heteropenesta fossilis* exposed to sublethal concentration of cypermethrin for 7 days and 15 days study, the result indicated a decrease in protein activity with increase in free amino acids, ammonia and urea. The decrease protein activity indicated the accumulation of cypermethrin, which results in the gradual increase in free amino acid, ammonia and urea activities. Madhusudhan Rao, *et al.* (1984) worked on effect of seven on total protein, free amino acid, pyruvic acid. Alanine amino transferase (AAT) in certain organs of a bivalve mollusc, *Lamelliden marginalis*, observed that the total protein, free amino acids, pyruvic acid contents showed significant decrease. Kulkarni, *et al.* (2005) studied on impact of Kulkarni, *et al.* (2005) studied on impact of Hildon on biochemical constituents in the fresh water muscle, *Lamellidens Corrianus* and reported that significant decrease in total protein and total free amino acid content in foot was observed after 24, 48, 72, and 96 hours. The total protein content of hepatopancreas showed no significant decrease after 24 hours. In gills significant decrease in total protein content was observed. Keshvan *et al.* (2005) studied impact of Hildon. Amino acids are important energy substances, and are involved in specific physiological function. Amino acids vary from species to species, as different metabolism is able to synthesis different substances. Earlier Woolfson (1983) observed amino acids are as source of energy. (Forman Formiaian and Lauterio, 1979), reported that essential amino acid ratios are the key to adequate diet and that high level of a particular protein may actually inhibit growth by providing an excess of one or more amino acids.

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