ORGANOPHOSPHATE PESTICIDES INDUCES ALTERATIONS ON TOTAL PROTEIN IN FRESHWATER MALE CRUSTACEAN, BARYTELPHUSA GUERINI

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Abstract: The pollution of water is most problematic source due to industrialization, civilization and green revolution. The impact of pollution on ecosystem and human health is a recent international issue which creates the environmental disturbances. The enormous use of pesticides pollutes the river and major water sources. The aquatic biota present in these sources faces the problem of aquatic pollution. The present research paper deals with the effect of pesticide i.e. Sumidon and Acephate on freshwater male crab, *Barytelphusa guerini* from Godavari River, Nanded. The crab in polluted water exhibited significant decline in the total protein content in blood as compared to control values. The obtained results were expressed in terms of tables and graphs.

Key words: Acephate, *Barytelphusa guerini,* Sumidon, Total Protein.

Introduction: The water pollution is greatest problematic source now days because of industrialization, civilization and green revolution. The impact of pollution on ecosystem and human health is a recent international issue which creates the environmental disturbances. These environmental issues affects on the biota and humans, by both natural and anthropogenic stress. The assessment of environmental status has become an important issue in the striving for a sustainable society and use of natural resources.

The water pollution due to pesticides is one of the serious pollutants in the aquatic biota. The increasing use of pesticides causes predominant environmental contaminants in the developing countries. Once these pesticides are released in the environment they causes accumulation in the soil, water and ultimately reach to the tissue of the organisms. The effect of these aquatic pollutants on living organisms is having great attention in research field.

The present research findings denote the use of organophosphate pesticides i.e. Sumidon and Acephate stress blood protein level on a fresh water crab, *Barytelphusa guerini* for 24, 48, 72 and 96 hours period of exposure. The changes in protein level reveal that the animal is in stress condition (12).

Materials and Methods: The freshwater male crabs, *Barytelphysa guerini* were subjected to one sub-lethal concentrations 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 (3).

The protein contents in blood of fresh water crab, *Barytelphusa guerini* were studied under influence of Sumidon and Acephate stress. The estimation of protein content was done by the method of Reference (9) using crystalline bovine serum albumin (BSA) as the standard. The blood was drawn from the base of chelate leg of each crab with the help of hypodermic syringe rinsed with sodium oxalate solution and used individually for analysis.

The obtained values were calculated from standard graph of protein. The same procedure was repeated for six readings under each observation. The results were compared with the animals maintained in the control set. The obtained values are plotted in graph and discussed in detail.

The total protein content in blood expressed as mg/100 ml of blood.

Results: Protein being an importance constituent of animal tissues, has a main role in cell metabolism. They are the main organic constituents of blood. In present study effect of organophosphate pesticides i.e. Sumidon and Acephate in blood of freshwater male crab, *Barytelphusa guerini* were studied. The animals were exposed up to 96 periods of exposure.

The total protein content in blood of Sumidon and Acephate exposed animals showed variations. The organophosphrous pesticides have deleterious effects on the total protein contents in blood of freshwater crab, *Barytelphusa guerin*i. The amount of protein content in blood for 24, 48, 72 and 96 hours were found to be 5.5, 4.0, 3.8 and 2.2 mg/100 ml of blood for Sumidon exposure. The results showed gradual decrease in total blood content with increase in time up to 96 hours. The decreasing trend was same on protein content in blood of exposed animals under Acephate stress. The total protein in blood exposed to Acephate was found to be for 24, 48, 72 and 96 hours i.e. 5.2, 5.6, 4.0 and 3.8 mg/100 ml of blood.

Discussion: Today the uses of pesticides are of wide use in modern agriculture for production of high quality food. The enormous use of some pesticides causes serious health and environmental damage. Repeated exposure to sub-lethal doses of some pesticides can cause physiological and behavioral changes in living organisms.

The aquatic organisms that run through agricultural areas have high probability of being contaminated by runoff and ground water leaching by a variety of chemicals. The use of pesticides which on entering the aquatic environment bring multiple changes in organism by changing their nutritional value, growth of organisms, behavioral pattern etc. (13).

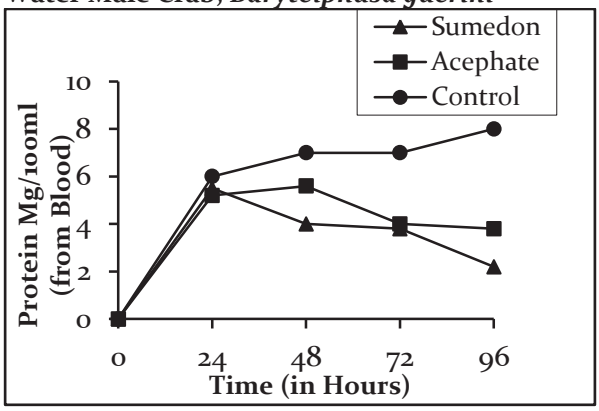
Table 1 - Total Protein (mg/100 ml of blood) of Fresh Water Male Crab, *Barytelphusa guerini* for 24, 48, 72 & 96 hours period of exposure under stress of Pesticides i.e Sumidon and Acephate

Exposure Time hrs)	Sumidon	Acephate	Control
24 hours	5.5 ± 0.65	5.2 ± 0.24	06 ± 0.28
48 hours	4.0 ± 0.42	5.6 ± 0.64	07 ± 0.62
72 hours	3.8 ± 0.26	4.0 ± 0.22	07 ± 0.38
96 hours	2.2 ± 0.42	3.8 ± 0.20	08± 0.66

(Six observations ± S. D.)

Proteins are importance constituents playing main role in cell metabolism. The use of pesticides causes the effect on the protein contents in animals. Therefore to elucidate this biological problem the effect of organophosprous pesticides i.e. Sumidon and Acephate on the total Protein Content in blood of fresh water crustacean, *Barytelphusa guerini* were investigated.

Fig 1. - Effect of Pesticides i.e. Sumidon and Acephate on Total Protein in blood of Fresh Water Male Crab, *Barytelphusa guerini*



Aquatic ecosystems run through agricultural areas have higher chances of being contaminated by runoff and groundwater. The tremendous use of pesticides enters in aquatic environment. This causes the physiological changes in organism. The aquatic ecosystem is the greater part of the natural environment, which is facing the threat of shrinking genetic base and biodiversity due to indiscriminate use of pesticides (11).

The animals in stress condition require extra energy for metabolism. The loss of energy in the animal body fulfilled from the stored depots in the form of protein, glycogen and fat in various tissues. The biochemical composition in treated animals changes according to toxicants. The crustaceans resist against this stress condition by their own way. They try to minimize the effect of this altered situation by removing the toxicant. The amount of protein content gives proper idea of the stress.

To overcome the present stress situation for elevation of repair level, the proteolysis in tissues takes place which results in decreased of protein contents (6). The decreasing level of total protein contents in various tissues of crab was studied. (7).

The present study reveals effects of two organophosphate pesticides on exposure to sublethal concentrations of sumidon and acephate on blood of a fresh water male crustacean, *Barytelphusa guerini* was studied. The changes in total protein content in blood was studied. The protein level in blood was found to be decreased as compared to control set animals. The declining trend was found to be more on sumidon as compared to acephate.

The number of researchers found physiological changes on aquatic organisms under pesticidal stress in fresh water animals (2, 4, 8, 10). The result shows that the protein is very sensitive indicator of under toxic condition.

The impairment in protein synthesis decreases total protein content of tissue. This mechanism is for the enhancement of proteolysis to meet the high energy demand under pesticidal stress. The fall in protein level during pollutant exposure may be due to increased in protein catabolism and decreased anabolism of protein (5).

The present investigation reveals that pesticides i.e. Acephate and Sumidon at sub-lethal concentrations induce energy demand in the whole body tissue and the crab try to withstand the toxic stress imposed at the cellular level by operating some sort of regulatory pathway.

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