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Research Paper Zoology

Study of macromolecular contents of different tissues of Channa punctatus under stress condition

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ABSTRACT

Channa has a wide natural distribution extending from Iran in the west, to China in the east, and parts of Siberia in the Far East. They are one of the most common staple food fish in Thailand, Cambodia, Vietnam and other South East Asian countries where they are extensively cultured. Apart from their importance as a food fish, snakeheads are also consumed as a therapeutic for wound healing as well as reducing post-operative pain and discomfort, and collected for the international aquarium pet trade. The stress response is complex and involves a series of behavioral and physiological adaptive response which enables the fish to overcome the effects of stress. These response involve all levels of animal organization and is collectively called integrated stress response. Present study has been undertaken to examine the changes in fish, Channa punctatus after chronic exposure to such levels of stress due to starvation in laboratory condition, which are normally present in water bodies around Akola.

KEYWORDS: Channa punctatus , stress response, chronic exposure.

Introduction

Channa is a genus of the Channidae family of snakehead fish. This genus contains about 29 species, but the most well known are probably the northern snakehead (Channa argus) and the giant snakehead (Channa micropeltes). It has a great demand in market because of its high nutritional value. Study of food and feeding habits of fishes have manifold importance in fishery biology. Seasonal change in temperature not only influence food consumption and rate of digestion but also quality and quantity of available food organisms. Studies on the food and feeding habits of different fishes have been made by different workers (Bulow 1970, Alikunhi 1952, Collvin et al. 1985, Bhuiyan and Islam 1988, Bhuiyan et al. 1992, 1994, 1999). Food stress and space stress has been recognized to play a vital role in almost all aspects of living systems either directly or indirectly (Dhawan and Kaur, 1997; Shukla et al., 1994). However, very few reports are available on the extent of changes in the nutritive value of fish after prolonged exposures to stress The stress has been defined as response of the cell or organism to any demand placed on it which causes an extension of the physiological state beyond the normal resting state. The stress response is complex and involves a series of behavioural and physiological adaptive response which enables the fish to overcome the effects of stress. These response involve all levels of animal organization and is collectively called integrated stress response . Under natural conditions numerous fish species endure long periods of starvation associated mainly with seasonal changes in food.

Material and method

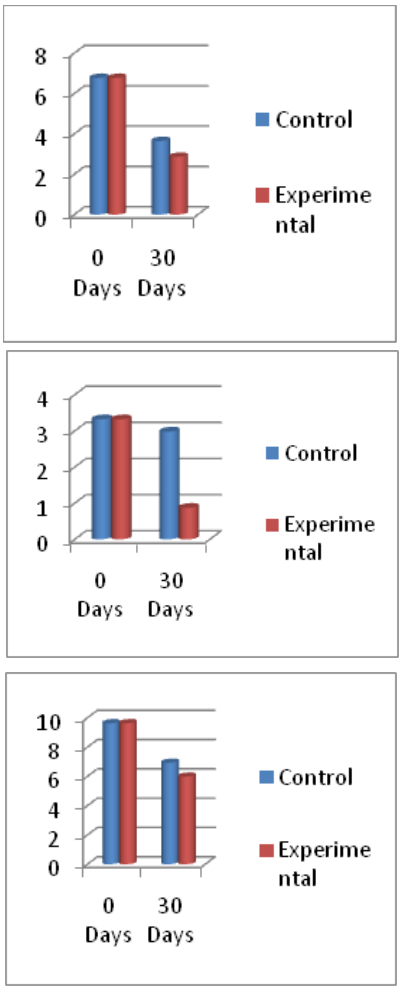
The samples for the present study were collected from the local market, Mature Channa punctatus weighing from 150-200 gms. and mean length 27± 3 cm were procured and acclimated at 24.50C – 35.50C for 15 days. (Shrama and Davis, 1980) The natural photoperiod was maintained during the period. They were acclimatized to laboratory conditions for 2 weeks. Thirty individuals were placed in aquarium for 60 days, from end of November 2011 to end of January 2012. The aquarium having 40 liters of Tap water which was dechlorinated (pH 7.0- 7.9) at least for experimentation. They were fed alternate days, regularly during acclimatization period. After acclimatization for two weeks, healthy specimens of Channa punctatus were divided into control and fasting groups. Each group contained 10 individuals. Control was fed on chopped earthworms or small pieces of earthworms. However, the food was withheld from the fasting group. Liver , Muscle, Gill were immediately dissected out for estimation of DNA and RNA.(Sornarej 1995)

Observation and result

It is evident from the starvation studies that the fasting decreases significantly the activity of fish. Starvation resulted in changes in body weight and chemical composition. Muscle rich in proteins, forms mechanical tissue intended for mobility and do not participate in metabolism. Liver being the centre for various metabolisms is also rich in proteins. And DNA contents is responsible for the formation of protein molecules. Decrease in DNA and RNA content of muscles and liver in stress, decrease in DNA and RNA content in gills.

Graph:- Variation in the DNA contents (mg/g) of the liver , Gills and Muscles of Channa punctatus.

Graph:- Variation in the RNA contents (mg/g) of the liver of Channa punctatus.



The values of result were represented by means ± the standard deviations of the means.It is evident from the starvation studies that the fasting decreases significantly the activity of fish.The concentration of DNA and RNA depicted that affect the concentration of glycogen and protein from the different tissues of Channa punctatus.

Summary and conclusion

Around Akola region only some small water bodies are their in which Channa punctatus cultured naturally. But during summer, environmental temperature go rise upto 48o C, that's why water bodies become start to convert into dry lands, naturally aquatic animals gathered in a small place available for to sustained there life. Fish like Channa punctatus getting starve and under stress due to the small water available for sustained there life. Gills, muscles and liver are the important organ of fish Channa punctatus for to survive, and all the activity of these organ depend upon the protein available for to produce energy and DNA is responsible for to produce the protein molecules. DNA bound inside the cell with the help of nuclear membrane. During the stress, some enzymes are responsible for the shading of cells ultimately responsible for the loss in genetic material.

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