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TEMPERATURE DEPENDENT ALTERATIONS OF NUCLEIC ACID CONTENT IN VARIOUS TISSUES OF FRESHWATER CRAB *BARYTELPHUSA GUERINI* FROM NANDED REGION (MS)

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ABSTRACT

The effect of temperature on nucleic acid content on various tissues of freshwater crab, *Barytelphusa guerini* for 24, 48,72 & 96 hours has been studied experimentally. The value of RNA contents were decreased at both low & high temperature as compared to normal temperature except gill. The animal may need extra energy to overcome the stress, and ultimately metabolism is directed to rise up. In gills for recovery and maintenance of physiology the RNA content starts to rise up to attain the normal situation. Where the value of DNA content were decreases to both temperature as compared to normal temperature. The values of RNA & DNA content were expressed in mg/g wet wt. of tissue.

KEY WORDS - Temperature, Nucleic acid, *Barytelphusa guerini*.

INTRODUCTION

The temperature is directly conducted with life activities of living organisms. Several variations in biochemical constituents of tissues have been associated with differences in environmental temperature. In the biological sense, animals and their environment are infact insuperable. The ambient environment labiality imposes considerable stress upon the inhabiting organisms which in term have to adapt or adjust to survive. In the natural process of temp acclimation, most of the poikilotherms adjust their metabolic rates to maintain physiological activity at constant level thus these animals attain a measure of independence of temperature (Prosser and Brown 1961).

Nucleic acids are nitrogen containing compounds of higher molecular complexes. In animals, nucleic acid plays the key role in protein synthesis. Nucleic acid content is also considered as an index of capacity of an organism for protein synthesis.

In present investigation the effect of temperature on various biochemical activities were studied on nucleic acid contents of various tissues of fresh water crab, *Barytelphusa guerini*.

MATERIAL AND METHOD

The *Barytelphusa guerini* were collected from paddy fields of Nanded Dist. They were collected from their natural habitats and brought to the laboratory. The crabs were fed with small pieces of goat muscles. Healthy crabs weighing between 35-40 g were selected for present work. They were acclimatized for 03 days and simultaneously control groups was maintained. The animals were sacrificed and the tissues like Leg muscle, Gill and Hepatopancreas pulled out. The DNA & RNA contents were estimated by Schmidt-Thanhauser Schneider. Procedure given by Volkin and Cohn (1967).

RESULT AND DISCUSSION

The RNA and DNA content were estimated and remarkable variations observed during exposure period of 24, 48, 72 and 96 hours to low and high temperatures.

In the present study the RNA content of the tissues to low temperature were found to be decreasing as compared to normal temperature. The RNA content in leg muscle and hepatopancreas to high temperature decreases except gill .The amount of DNA content in leg muscle, hepatopancreas and gill to low and high temperature decreases as compared to normal temperature.

Table 1- RNA content *Barytelphusa guerini* different levels of temperatures.

Exposure hours	Leg muscle			Gill			Hepatopancreas		
	NT	LT	HT	NT	LT	HT	NT	LT	HT
24	2.323± 0.322	2.252± 0.648	1.982± 0.2	7.882± 0.4	7.724± 0.447	8.691± 0.447	1.382± 0.447	1.040± 0.011	1.281±0 .2
48	2.442± 0.44	2.308± 0.429	1.788± 0.447	7.924± 0.102	7.221± 0.282	8.755± 0.447	1.556± 0.115	1.071± 0.012	1.442±0 .282
72	2.697± 0.565	2.030± 0.853	1.621± 0.138	8.487± 0.4	7.106± 0.001	8.982± 0.207	1.712± 0.447	1.074± 0.014	1.623±0 .282
96	2.791± 0.563	2.495± 0.132	1.874± 0.274	8.881± 0.207	6.955± 0.050	7.992± 0.102	1.108± 0.001	1.087± 0.010	1.488±0 .282

(All values of mean of six observations +_SD)

Table 2- DNA content in *Barytelphusa guerini* to different levels of temperatures.

Exposure Hours	Leg Muscle			Gill			Hepatopancreas		
	NT	LT	HT	NT	LT	HT	NT	LT	HT
24	0.117± 0.005	0.086± 0.006	0.082± 0.008	0.189± 0.008	0.164± 0.002	0.177± 0.001	0.104± 0.002	0.093± 0.012	0.088± 0.008
48	0.102± 0.002	0.092± 0.012	0.089± 0.008	0.183± 0.006	0.168± 0.009	0.171± 0.003	0.112± 0.005	0.099± 0.005	0.092± 0.012
72	0.095± 0.010	0.099± 0.005	0.094± 0.013	0.181± 0.006	0.173± 0.009	0.169± 0.008	0.101± 0.002	0.108± 0.003	0.098± 0.005
96	0.089± 0.008	0.110± 0.005	0.108± 0.003	0.192± 0.003	0.178± 0.009	0.166± 0.001	0.097± 0.010	0.110± 0.005	0.106± 0.003

(All values of mean of six observations ±SD)

Abbreviations : NT- Normal Temperature, LT- low Temperature, HT- High Temperature

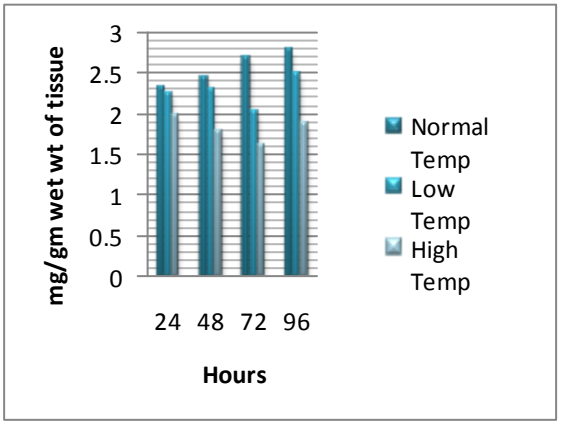

Fig-RNA content in leg muscle of freshwater crab,

Barytelphusa guerini to normal, low & high temperatures

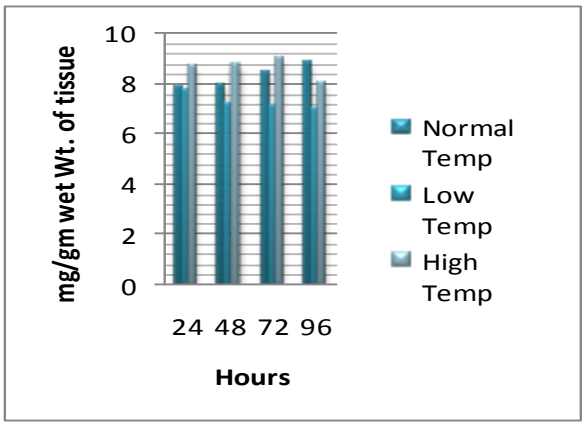

Fig-RNA content in Gill of] freshwater crab,

Barytelphusa guerini to normal, low & high temperatures

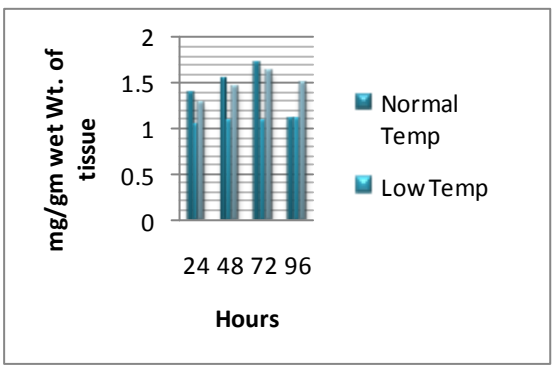

Fig-RNA content in Hepatopancreas of freshwater crab,

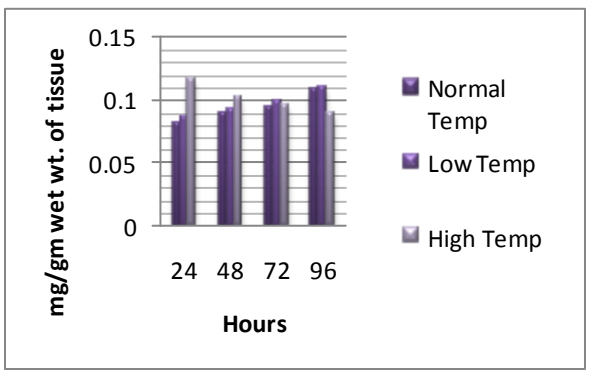

Fig-DNA content in LegMuscle Muscle of freshwater crab,

Barytelphusa guerini to different levels temperatures

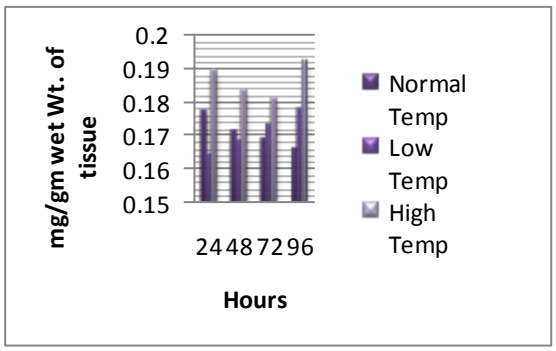

Fig-DNA content in Gill of freshwater crab,

Barytelphusa guerini to different levels temperatures

Barytelphusa guerini to different levels temperatures

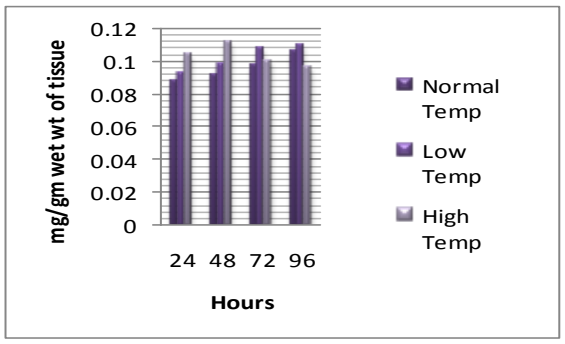

Fig-DNA content in Hepatopancreas of freshwater crab,

Barytelphusa guerini to different levels temperatures

The entire ecosystem of freshwater and marine invertebrates including crustaceans have been receiving tremendous attention because of the alterations in ecological abiotic factors and anthropogenic events. These uncertain (Amarval,V. et al,2009) ecological variations are known to provoke changes in the physiological functions of animals by either affecting directly or indirectly. The sudden environmental stress concentrations cause severe adverse effect on the health of organisms. The effects may be seen at cellular and even at molecular level like natural disaster. The man made pollutants like heavy metals also cause delitarious effects on the crustaceans which are more sensitive to pesticides other than various organisms (Epifanio, 1979).

Nucleic acids play the key role in protein synthesis. It is familiar fact that a close relationship exist between nucleic acid level and rate of protein synthesis hence it may be considered as an index of capacity of an organisms for protein synthesis. The fall and rise of nucleic acid content may be due to recovery of metabolic and physiologic processes to attain the normal stage. The fall in RNA and DNA content can be attributed to the reduced rate of protein synthesis due to stress. Bhavan et al.2010 reported DNA concentration was found to be equal in male and female prawns (*Macrobrachium rosenbergii*).Rosa & Nunes 2003 investigated seasonal variations in nucleic acid in juvenile Norway Lobster (*Nephrops norvegicus*), in

which DNA content increased from autumn to winter, lowest observed in winter due to reduction in feeding activity.

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