Int J Pharm Bio Sci 2014 July; 5(3): (B) 741 - 743

Research Article **Biochemistry**

International Journal of Pharma and Bio Sciences **ISSN 0975-6299**

SEASONAL STRESS ON FATTY ACIDS IN COMMON CARP WITH RELATION TO ACETYL CHOLINE ESTERASE

S.MD.M.N. IQBAL* AND P. INDIRA[1]

[*]Department of Zoology, S.K.P. Government Degree College, Guntakal
[1]Department of Zoology, Sri Krishnadevaraya University, Anantapuram.

ABSTRACT

Summer season with 30^0C is taken as control, where as rainy season with 20^0C is taken as cold stress and winter season with 15^0C is taken as cold adaptation. During summer season (control) The Acetyl Choline Esterase Increases, fats decreases and fatty acids increases. The fatty acids are utilized by the fish for its strenuous activity during summer. During Rainy, season due to cold stress the fats increases and fatty acids decreases. In winter season due to cold adaptation the fats decreases and fatty acids increases with regard to tissue variation during cold stress the fats is more and fatty acids are less in osmotic tissues and facts are less and fatty acids are more in non osmotic tissues. Less AchE is synthesized in non osmotic tissues and more in osmotic tissues. In case of species variations during cold stress AchE is more in cyprinus carpio followed by labeo rohita and least in Catla Catla whereas, fats occurs invise versa.

KEY WORDS : Seasons, stress, Acetylcholine Esterase, fatty acids.

S.MD.M.N. IQBAL
Department of Zoology, S.K.P. Government Degree College, Guntakal

***Corresponding author**

INTRODUCTION

Common carp i.e., Cattla cattla, Labeo rohita, Cyprinus carpio have taken as experimental animals. Summer season has taken as control, Rainy season is considered as cold stress, and winter season as cold adaptation. Seasonal cold stress and cold adaptation on fatty acids in relation to Acetylcholine Esterase in common carp has been studied. AchE activity taken as an indicator to seasonal / thermal stress of aquatic environment[1]. All definitions of stress however show the common premise of a stimulus acting on a biological system and the subsequently reaction of a system[2].

MATERIALS AND METHODS

The common carps i.e., Cattla cattla, Labeo rohita, Cyprinus carpio are collected at 8AM from fisheries departmental pond at Anantapuram, A.P. during their respective seasons. They have been imported to lab for blood and organ collection. The assay for Acetylcholine Esterase, fats and fatty acids has been carried out in the laboratory at - 4^0C

Table 1
Seasonal variations and tissue variations in common carp fishes (AchE activity and fat content (Mg of Acetyl choline hydrolyzed/ mg protein/ hour)

Seasons	Seasonal variations in common carp		Tissue Variation in common carp			
			Non Osmotic tissues		Osmotic tissues	
	Fats	AchE activity	Fats	AchE activity	Fats	AchE activity
Summer Season	0.549	1.263	0.428	1.489	0.554	0.711
Rainy Season	2.155	0.761	1.698	0.488	2.612	0.241
Winter Season	0.757	0.483	0.59	0.488	1.005	0.371

Table 2
Species Variations in common carp fishes

Seasons	*Catla catla*		*Labeo rohita*		*Cyprinus carpio*	
	Fats	AchE activity	Fats	AchE activity	Fats	AchE activity
Summer Season	0.415	1.206	0.415	1.141	0.656	1.146
Rainy Season	2.435	0.218	2.004	0.395	1.986	0.48
Winter Season	0.4	0.367	1.057	0.546	0.753	0.546

RESULTS AND DISCUSSION

In Common carp fishes during summer season (Control) The Acetyl Choline Esterase activity increases fats decreases and the fatty acids increases (Table 1).This increased fatty acids are utilized by the fish for its strenuous activity during summer season. This has also been reported in the Brain of Kill fish Fundulus heteroclites[3]. In common carp as for as tissue variation is considered during control in non- osmotic tissues the AchE activity is higher than that of osmotic tissues. The fatty content is high and fatty acids are less in osmotic tissues than that of non osmotic tissues. The increase Ache activity in non osmotic tissues clearly indicates that the brain is more affected and will control and co-ordinate the whole body in carp fishes Tab-I In case of species variation is considered the AchE activity occurs as follows Tab-II Catla catla > Labeo rohita>cyprinus carpio whereas fat content occurs in vise versa. The responses increases due to increase of thermal temperature[4.] During the rainy season 22^0C (cold stress) the AchE activity decreases in common carp fishes, and the fatty content increases with a decrease of fatty acids. As temperature decreases the release of AchE decreases which causes the fat content to increase and decrease of fatty acids- Table I

In case of non osmotic and osmotic tissues the AchE activity decreases but the decrease is more in non osmotic tissues than that of osmotic tissues. Non osmotic tissues show high AchE activity and low fat content, and high fatty acid content, whereas in osmotic tissues somewhat more fat content less fatty acids and AchE activity – Table- I As for as species variation is considered the AchE activity occurs as follows- Table-II. Catla catla > Labeo Rohita> Cyprinus carpio the fats occurs in vise versa. Cold stress is higher in Cyprinus carpio followed by Labeo Rohita and Lower in Catla catla. Due to cold adaptation during the winter season 15^0 C the level of AchE activity increases and Ach content (Fats) decreases (Table 1), but it never reaches to control during adaptation Acetyl choline is utilized by the elevation of AchE activity in all the tissues is also observed by (Radha Krishna[5]). In case of tissue variations during cold adaptation the AchE is higher in non osmotic tissues than that of osmotic tissues whereas Ach (fat) content is higher in osmotic tissues and lower in non-osmotic tissues. It indicates that non osmotic tissues are more actively involved for nervous activity than that of osmotic tissues- Table –I As for as species variation is considered the amount of AchE activity occurs as follows –Table-II Cyprinus carpio > Labeo rohita> Catla catla Fats occur in vise versa.

CONCLUSION

Temperature and AchE activity is directly related. so increased temperature decreses fats and increases amino acids. When temperature decreases, AchE release decreases and fats content increases.

REFERENCES

1. Parvathi, C.1982. Physiological and Biochemical responses of carps, cyprinus carpio, Labeo rohita. Ph.D. Thesis S.K. university, Anantapuram.
2. Pickering, A.D. 1981. Introduction:- The concept of biological stress, in: stress and fish (A.D. Pickering. ed) Academic press, London and New yark. PP 1-9.
3. Baslow , M.H. and Nigrelli. R.F, The effect of thermal acclimation on brain cholinesterase activity of the kill fish, Fundulus heteroclitus. zoologica, 45, 41-51, (1964).
4. Brown, B.E, Observation of the tolerance of the Isopod. Asellus meridianus Rac to copper and led wat. Res., 10: 555-559 (1967).
5. Radhakrishnaiah, K, some accepts of the energetics of thermal adaptation in eurythermal fresh water teleost Talapia mosambica, Ph.D. Thesis. S.V. University Tirupathi (1977).