### The Asian Journal of Animal Science (June to November, 2009), Vol. 4 Issue 1 : (39-43)

# **RSEARCH PAPER**

# On the study of carbohydrates in teleosts-VI Effects of cortisone administration on glucose and glycogen contents in Tilapia mossambica (Peters) and Macrones gulio (Hamilton)

# Y.K. LAHIR

#### Accepted : February, 2009

#### ABSTRACT

Correspondence to : **Y.K. LAHIR** Department of Biology, Jai Hind College, Basantsing Institute of Science, A-Rd, Chruchgate, MUMBAI (M.S.) INDIA This investigation is a comparative study on the effect of cortisone administration on glucose and glycogen contents in Tilapia mossambica, a fresh water herbivore fish and Macrones gulio, a carnivore marine fish. As result of cortisone administration in T. mossambica, the glucose contents in liver and blood increased within 4 hours and remained higher than the control values up to 24 hours but these values declined in heart and body muscles during first 4 hours. Thereafter, these values elevated in heart muscles but remained constant in the body muscles. The glucose contents in these two tissues remained far below the control values up to 24 hours. In case of *M.gulio*, the glucose contents declined during first 4 hours in liver, blood heart and body muscles. Thereafter, these values increased but did not reach the control values except the blood glucose contents which were higher than the control values after 24 hours. The glycogen contents in liver, heart and body muscles of T. mossambica decreased during first 4 hours and elevated thereafter. The liver glycogen contents increased and were higher than the control values after 24 hours while glycogen contents in body muscles reached very close to control values but glycogen values in heart muscle were less than the control values. The glycogen contents in liver, heart and body muscles of M. gulio also declined during 24 ours and did not exhibit the tendency to rise like in the tissues of T. mossabica.

## Key words : Tilapia mossambica, Macrones gulio, Cortisone, Glucose, Glycogen

Horward (1979) reported that the conversion of cortisole to cortisone – E was a reversible oxidative reaction and it occurred primarily in liver. Cortisone facilitated the normal production of glucose and glycogen in liver. The total effect of cortisone/cortisole is reported to be an increased synthesis of carbohydrates and their storage. Barrington and Jorgensen (1968) have reported phylogenic perspective of adrenocortical tissues among fishes. Hoar and Randall (1969) have reviewed the work on cortisole with respect to growth hormone cells, release of ACTH, osmoregulation, protein metabolism, secratory rates and loss of weight among fishes. Peter and Peter (1985) have mentioned that adrenal steroids have distinct effects on protein and carbohydrate metabolism in mammals. These adrenal steroids facilitate gluconeogenesis from non-carbohydrate precursors such as amino acids, glycerol. Further, they suggested that these steroids promotes deposition of glycogen, elevation of blood glucose and inhibit the utilization of glucose in the tissues.

Adrenosteroid hormones were reported to be absent in the plasma of lamprey (Buss and Larsen 1975) but as a result of ACTH stimulation in myxine, their presence was detected in low concentration. Idler and Truscott (1972) and Peter and Peter (1985) mentioned that cortisol, cortisone and aldosterone have been detected in teleosts and selachii and these hormones are absent in chondrithyes – helocephali. Falkmer and Matty (1966) found that hypophysectomy did not produce any change in blood sugar in myxine. Peter and Peter (1985) reported that hypophysectomy affected carbohydrate metabolism in teleost. Butler (1968) found hypoglycemia in Anguilla anguilla and Anguilla rostrata and reduction in hepatic glycogen in fasting fishes but muscle glycogen was found to be unchanged. Bentley and Follett (1965) observed that cortisole increased blood glucose and rise in liver glycogen in Lampetra fluviatilis. Mommsen et al. (1999) have reviewed the work related to cortisole, its dynamics, mechanism and metabolic regulation in teleost. They further, reported that there exists an inconsistency within the literature available related to cortisone and carbohydrates. In the present investigation, an effort has been made to compare the effects of cortisone on glucose and glycogen in liver, blood, heart and body muscles of Tilapia mossambica, a fresh water herbivore fish and *Macrones gulio*, a marine carnivore fish.