Impact of Chromium on Lactate in different types of muscles of a fresh water fish, Labeorohita

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ABSTRACT
Chromium is a metallic element considered as heavy metal treated as major pollutant. Lactate is the major end product of anaerobic glycolysis in muscle. Muscle is the nutritional part of the fish. The present investigation was carried out to study the effect of chromium on Lactate in selected muscle tissues of a fresh water fish, Labeorohita. The alterations in Lactate activity on exposure to sublethal concentration (1/10th of LC50, 96hrs) of chromium for 7 days and 30 days was investigated in the present study. In the present investigation cardiac muscle is found to have higher Lactate content compared to the rest of the tissues and the sequence is as follows: PR > CR > PP > CW > CM

Introduction:-
Chromium is a metallic element which can exist in several valence states. However, in the aquatic environment it is always found in trivalent or hexavalent. Hexavalent chromium is the strong oxidizing agent which reacts readily with reducing agents. Chromium salts are used extensively in the metal finishing industry as electroplating, cleaning agents, and as mordants in the textile industry. They are also used in cooling waters, in the leather tanning industry, in catalytic manufacture, in pigments and primer paints, and in fungicides and wood preservatives. Cr(VI) is considered the toxic form because it readily crosses cell membranes and reduced to Cr(III) which complexes with intracellular macro molecules, including genetic material, and is ultimately responsible for the toxic and mutagenic capacities of chromium (Farag et al., 2006; Li et al., 2010; Rahman et al., 2012; Venkatramreddy and Paul, 2011).

Material & Methods:-
Labeo rohita is a fresh water major carp commonly found in AP. Labeo rohita ranging in weight from 15 ± 2 gms and length of 10 ± 2 cm were procured from local ponds and transported to the laboratory, treated with 0.05 % KMnO4 solution for 2 min to avoid dermal infection. Fishes were kept in large cement tanks to partial catabolism of fatty acids and proteins which serve as additional source of lactate (Shul Man, 1972).

Results:-
Lactate is the major end product of anaerobic glycolysis in muscle. In the present study cardiac muscle is found to have highest lactic acid content compared to the rest of the tissues (Fig.1) and the sequence is as follows: PR > CR > PP > CW > CM

Discussion:-
Lactic acid is the major end product of anaerobic glycolysis in muscles. As the fishes having single circulatory route; heart pumps reduced blood that is relatively low in oxygen and high in Co2 (Lagler et al., 1977). This could be the reason, that cardiac muscle in control fish has shown high amount of lactate. Caudal white and pectoral pink muscles have higher amounts of lactate than pectoral red and caudal red. Due to glycogenolysis pectoral pink and caudal white muscles shows higher lactate content and may be due to oxidative glycolytic nature pectoral red and caudal red muscles have shown lesser amounts (Fig.1). Highest lactic acid content was shown by the cardiac muscle and may be due to partial catabolism of fatty acids and proteins which serve as additional source of lactate (Shul Man, 1972).

In the present investigation lactate content increased significantly in both 7 days and 30 days experimental fish (Fig.1). The increasing order for both 7 and 30 days is as follows: PR > CR > PP > CW > CM

The increase in lactic acid may be due to break down of glycogen and proteolysis. The consistent increase in the tissues is may be due to prevailing hypoxic conditions in the animal with the failure of respiratory lamella (Girija, 1987) in gills. Due to aerobic nature in red muscle and anaerobic nature in white muscle of control fish have shown higher lactate amount in cardiac muscle followed by caudal white, pectoral pink, caudal red and pectoral red (Fig.1). Under sublethal concentrations of chromium lactate content is increased and pyruvate content decrease due to prevalence of anaerobiosis in fish (Azhar Baig, 1988).
REFERENCE


