



TOTAL PROTEIN CONTENTS ANALYSIS IN MUSCLE OF INDIAN MAJOR CARPS

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ABSTRACT

The total protein contents (TPCs) in muscle of *Labeo rohita*, *Catla catla* and *Cirrhinus mrigala* collected from Jehlum, Ravi and Chenab was evaluated. Fish was sacrificed to obtained muscle and muscle homogenate was prepared for TPCs estimation. The lower TPCs were observed in River Ravi as 2.24 ± 0.10 , 2.35 ± 0.15 and 3.42 ± 0.15 for *Cirrhinus mrigala*, *Catla catla* and *Labeo rohita*, respectively as compared to other sites while higher TPCs were noted in fishes sampled from Jehlum River. These results pointed out the elevated rank of pollution of river Ravi. Among fishes, *Labeo rohita* had elevated protein in respect of *Cirrhinus mrigala* and *Catla catla*.

1. INTRODUCTION

Throughout the world, population is growing day by day and similar trend is observed in Pakistan. This increase in population result in increased use of automobiles and industries which ultimately produce pollution such as vehicle smoke, dyes, pigments, plastics, rubber, and electroplating (Ilyas and Javed, 2013).

The release of anthropogenic contaminants caused persistent ecotoxicology effects throughout the globe (Ramesh *et al.*, 2009). Individuals as well as organs effected by these pollutants on large stage (Adeyemoet *et al.*, 2008). The toxicants including heavy metals cause severe threats to aquatic species by altering their behavioral, biochemical and physiological systems and genetic (Scott and Sloman, 2004). Fish is more sensitive to contaminants as compared to other animals in aquatic ecosystem (Alinnor, 2005).

The species which are present in aquatic ecosystem store these contaminants in their body which ultimately affect their productivity and reproductive system and they also affect human health indirectly as fish is used as food (Vinodhini and Narayanan, 2009).

Traditionally, muscle of fish is used as food and it cause adverse effects to health of human beings (Pirrone and Mahaffey, 2005). The concentration of protein content depends upon the stress of environment, toxicants concentration, tissue type and spawning season (Ramani *et al.*, 2001) and also altered due to their feed and environmental changes throughout the year which ultimately affect the biochemical systems of fish (Tzikaset *et al.*, 2007).

In Pakistan, *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* are very valuable for aquaculture because of their short growth period, and feed on cheap food. The basic theme of this research was to explore the TPCs of major carps

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2. MATERIALS AND METHODS

Major carps viz. *Labeo rohita*, *Catla catla* and *Cirrhinus mrigala* were captured from three natural sites included River Ravi, Jhelum and Chenab. The fish were transported to Fisheries Research Farms, UAF, and were dissected and muscle was removed for estimation of total protein content. After that muscle were homogenate in 0.2 M cold phosphate buffer of pH 6.5 (1:4 w/v) with the help of pestle and mortar. Homogenized was filtered and centrifuged for 10 minutes at 10,000 rpm and 4°C. After centrifugation a clear supernatant was obtained which was used TPCs analysis. Biuret method was followed to estimate the TPCs (Gornaliet al., 1949).

The 0.50 ml of supernatants, 0.5 ml of Biuret reagent and 0.5 ml of distilled water was added in test tube and mixed well. The mixture was kept in water bath for 15 minutes and incubated at 37°C temperature. The absorbance was checked spectrophotometrically at 540 nm. Following formula was used to calculate Protein contents:

Protein contents (mg/mL)= Absorbance × Standard factor × Dilution factor

Where

Standard factor: 5.45

Dilution factor: Added distilled water

Data analysis: Data presentation: Mean± SD and data performance: Statistix 8.0 version.

3. RESULTS AND DISCUSSION

The inferences of this work demonstrate that the TPCs in *L. rohita* muscle were calculated as 3.42±0.15, 4.5±0.2 and 5.5±0.2 mg/mL in River Ravi, Chenab and Jhelum, respectively. *Catla catla* captured form Ravi, Chenab and Jhelum showed TPCs as 2.35±0.15, 3.54±0.09 and 4.67±0.15 mg/mL, respectively. Similar results were observed for *Cirrhinus mrigala* (Table 1). It was noted that higher TPCs were found in fishes from river Jhelum in respect of other. However, lowest muscles TPCs were noted in fishes of Ravi: reason may be high load of contaminants.

Primarily, proteins are building blocks and basic biochemical substances which maintain the glucose level in blood and provide energy during stress. It also play important role in interaction mechanisms in cells of individuals and play important role in physiological processes. Also, involved in catalyzing different metabolic functions within living organisms (Magar and Shaikh, 2012).

Environmental factors greatly affect the biochemical responses included physico-chemical parameters and nutritional status of water, health, age and season (Lohner et al., 2001). Fish muscle are considered as biochemical profile which are indicator of stress in aquatic ecosystem. Striking differences were observed in fish muscle, the specimen which was collected from downstream contaminated by industrial and sewage discharge than the specimen from upstream site of River Ravi. Fish health is indicated by three nutrients such as carbohydrate, protein and lipids. Variations in these nutrients are indicator of chronic stress (Mayer et al., 1992). Somaiah et al. (2014) noted the 17.91% decline in muscle protein contents of *L. rohita* exposed to phenthoate in relation to control.

4. CONCLUSION

The inferences of this study showed the decrease in TPCs in muscle of fish collected from three rivers. The fish is a good indicator to estimate the pollutant loads in aquatic bodies

5. CONFLICT OF INTEREST

All authors have declared that there is no conflict of interest regarding publication of this article.

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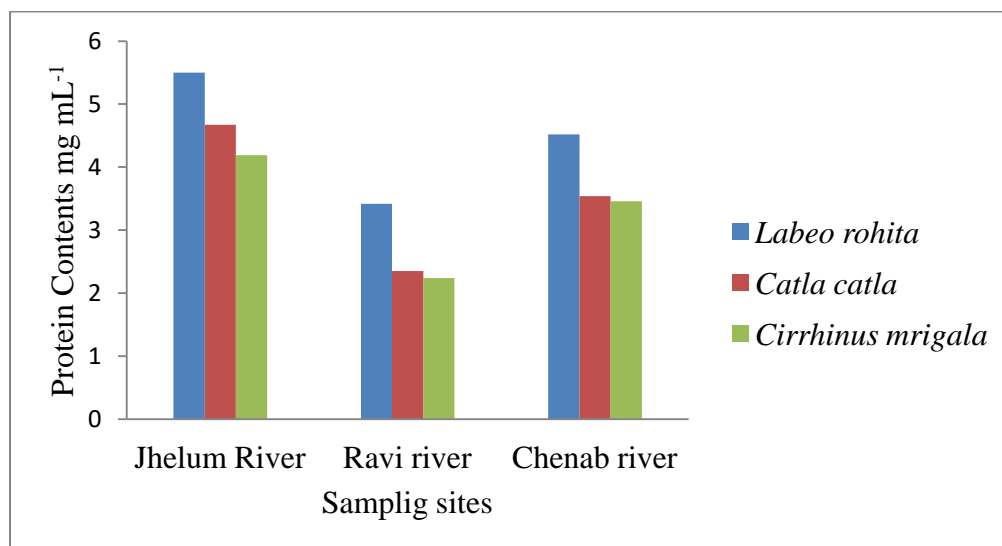
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Table 1: Comparison among Indian major carps for total protein contents (mg/mL) sampled from three natural sites

Fish Species	Sampling sites			Overall Means
	River Jhelum	River Ravi	River Chenab	
<i>Labeo rohita</i>	5.50±0.2a	3.42±0.15c	4.52±0.2b	4.48±1.04A
<i>Catla catla</i>	4.67±0.15a	2.35±0.15c	3.54±0.09b	3.52±1.16B
<i>Cirrhina mrigala</i>	4.19±0.07a	2.24±0.1c	3.46±0.16b	3.29±0.98C
Overall Means	4.78±0.66A	2.267±0.65C	3.84±0.59B	

Means sharing similar letter in a row or in a column are statistically non-significant ($P>0.05$). Small letters represent comparison among interaction means and capital letters are used for overall mean

**Fig. 1: Comparative protein contents in mg/ml in Indian major carps sampled from three rivers**