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RESEARCH ARTICLE

BIOCHEMICAL STUDY OF SELECTED FRESH WATER FISHES IN GRAND ANICUT

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Abstract

Biochemical composition of total carbohydrate, Protein and Lipid were estimated in the five selected fresh water fishes from Grant Anicut namely *Anabas testudineus*, *Cirrhinus reba*, *Mastacembelus armatus*, *Puntius sophore* and *Puntius vittatus* Tiruchirapalli district, Tamilnadu, South India. Edible muscle layer was utilized for this study. The maximum levels of carbohydrate were noted in *Cirrhinus reba* and minimum level was noted in *Mastacembelus armatus* fish. Among the fresh water fishes maximum level protein were noted in *Mastacembelus armatus* and low level of protein was observed in *Puntius vittatus*. The maximum level of lipids was present in *Cirrhinus reba* and minimum level of lipids was noted in *Anabas testudineus*.

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INTRODUCTION

Kallanai (also known as the Grand Anicut) is an ancient dam built across the Kaveri River in Tiruchirapalli District in the state of Tamil Nadu in South India. The dam was originally constructed by the Chola king Karikala around the 2nd Century AD and is considered to be one of the oldest water-diversion or water-regulator structures in the world which is still in use. It still stands as a symbol of Tamil Engineering. Fish have rich source of essential nutrients required for supplementing both infant and adult diets (Botta *et al.*, 1978). Fish normally has more poly unsaturated fatty acids than animal fats. An increasing amount of evidences suggest that due to its high content of polyunsaturated fatty acid (PUFA) fish flesh and fish oil are beneficial in reducing the serum cholesterol (Huynh *et al.*, 2007). Carbohydrates are the most economical and inexpensive sources of energy for fish diets (Eyo, 2001). Protein is the most expensive part of fish feed, formed by linkages of individual amino acids, is important to accurately determine the protein requirements for each species and size of cultured fish (Cui and Wootton, 1988; Love, 1980). Lipids are high-energy nutrients that can be utilized partially to spare protein in aquaculture feeds. Lipids supply about twice the energy as proteins and carbohydrates. Lipids typically comprise about 15% of fish diets, supply essential fatty acids (EFA) and serve as transporters for fat-soluble vitamins. The present study was planned to identify the biochemical compound from some fishes from Grant Anicut.

MATERIALS AND METHODS

Collection of fishes

Puntius sophore, *Cirrhinus reba*, *Mastacembelus armatus*, *Puntius vittatus* and *Anabas testudineus* were collected from the Grant Anicut, Tiruchirapalli district, Tamilnadu, South India for biochemical analysis. Tissue was collected from all fishes. The carbohydrates content can be measured by Anthrone method (Hedge *et al.*, 1962). The total

protein and lipids of fresh water food fishes were analysed by Lowry's method (Lowry *et al.*, 1951) and Titrating method (Cox and Pearson, 1962) for lipid. The results obtained in the present investigation were subject to statistical analysis.

RESULTS AND DISCUSSION

Carbohydrate, protein and lipids were analyzed to investigate the biochemical parameters of the fresh water organism. Total carbohydrate content of *Anabas testudineus*, *Cirrhinus reba*, *Mastacembelus armatus*, *Puntius sophore* and *Puntius vittatus* were analyzed and presented in Fig - 1. The maximum levels of carbohydrate were noted in *Cirrhinus reba* (0.69 ± 0.065 mg/g) fish then other fishes. The minimum level was noted in *Mastacembelus armatus* (0.48 ± 0.052) fish. The maximum levels of carbohydrate were noted in *Cirrhinus reba* (0.69 ± 0.065 mg/g) fish when compared with other fishes.

Maximum level protein was noted in *Mastacembelus armatus* (2.00 ± 0.086 mg/g) compare than other fishes studied. At the same time low level of protein was observed in *Puntius vittatus* (1.10 ± 0.076 mg/g). The proximate composition of fish varied from species to species and even within the same species from one individual to another (Stansby, 1962). According to Graves (1970) the body composition of fish seems to depend on age, sex, season and diet. The maximum level of lipids was present in *Cirrhinus reba* (1.90 ± 0.050 mg/g) and the minimum level of lipids was observed in *Anabas testudineus* (0.60 ± 0.88 mg/g). Deviation may be due to the natural feeding habits and availability of feed, fasting during spawning, and migration etc (Viswanathan and Mathew, 2000). This deterioration of protein is connected with denaturation of fish protein that associated with frozen fish (Reay, 1933). Proteins are important biomolecules involved in a wide spectrum of cellular functions (Prasanth, 2006). Dalela *et al.*, (1981) observed a decrease in protein content in *Mystus vittatus* under pesticide exposure and reported that the depletion of protein may be due to the excretion of proteins by kidney due to kidney failure or impaired protein synthesis as a result of liver disorders. Patel and Parmar (1993) observed maximum decrease in protein contents in the liver of *Channa orientalis* and *Baleophthalmus dussumieri*.

Das (2009) reported that different species showed different lipid level at different condition (Temperature, Freezing time, Location size). Lipid content of Ruhu (*Labeo rohita*), Grass carp (*Ctenopharyngodon idella*) and Tilapia (*Oreochromis mossambica*) were 5.12%, 4.61% and 2.55% respectively in fresh condition and 3.31%, 2.82% and 1.83% respectively in freezing condition. The present study almost similar to Das (2009).

The present study concluded that the *Mastacembelus armatus* recommend to diabetes and Heart risk patients of down trodden people for malnutrition. The availability of the fish in the natural fresh water is low, so we recommend fishing former to cultivate large-scale.

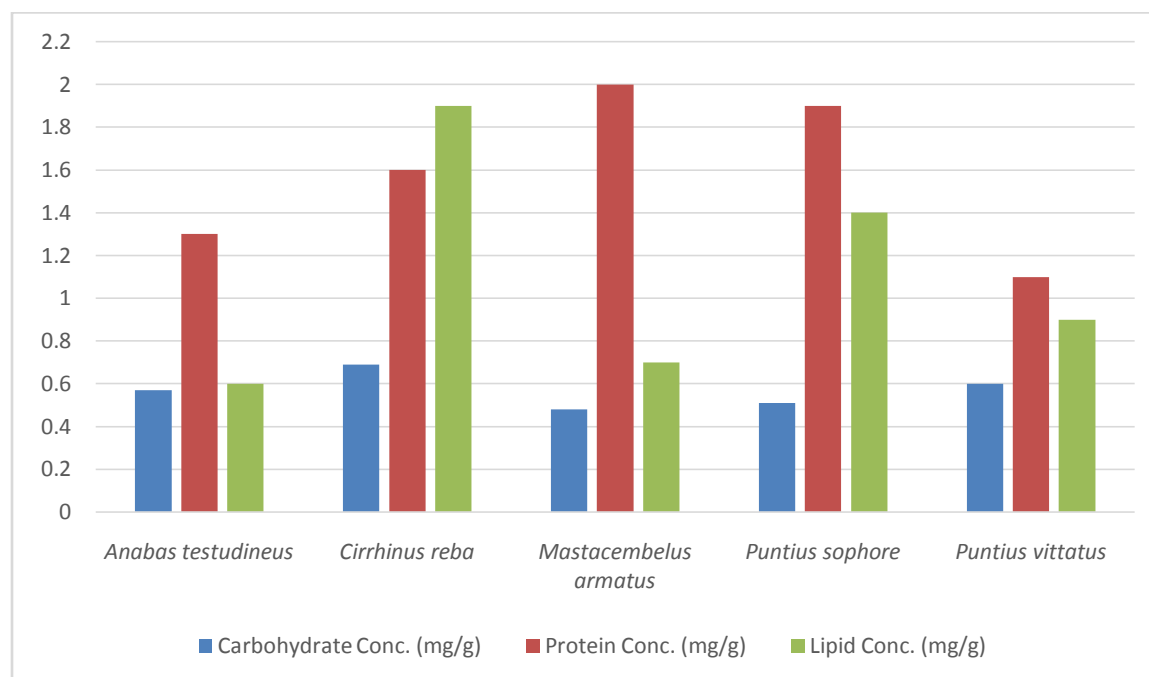


Fig – 1. Estimation of Total Carbohydrate, Protein and Lipids

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