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ORIGINAL RESEARCH ARTICLE

Comparative Variation of Biochemical Parameters in Cultural and Natural Fishes (Indian Major Carps)

S. Saranya[1], K. Saravanan*[2], K. Durairaj[3] and B. Durga[1]

[1]*Research Scholar, Dept of Zoology, Govt Arts College for women (Auto), Kumbakonam,Tamilnadu, India*
[2]*Asst. Professor, PG and Research Dept of Zoology, Govt Arts College (Auto), Kumbakonam, Tamilnadu, India*
[3]*Asst. Professor, PG and Research Dept of Zoology, Thiru.Vi.Ka. Govt Arts College, Thiruvarur, Tamilnadu, India*

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ABSTRACT

Protein, carbohydrate and lipid which constitute a major components of the body, play an important role in body construction and energy metabolism. Biochemical composition determines the quality of flesh. Biochemical composition of fish is dependent on species, age, size, sex, environmental factors and most importantly quality of feed and feeding habits. Among the freshwater fishes major carps (*Catla catla, Rohu - Labeo rohita and Mrigal - Cirrhinus mrigala*). Predominated with its share increasing from 6.9% in 1987 to 85.2% in 1997 The production of rohu was marginally higher with 35%followed by *mrigal* (32%) and catla (29%). Among the different animal food, fish plays a primary role in human nutrition. The different characteristics of fish flesh, which is almost entirely different from other sources. Provide a unique position to the fish as for as nutrition is concerned. The uniqueness associated with various biomolecules particularly proteins, lipids, carbohydrates make fish a highly nutritious commodity.

Key words: Energy metabolism, Biochemical composition and fresh water fishes.

1. INTRODUCTION

Fish flesh contains for basic ingredient and varying proportion of water, protein, fat, ash, carbohydrate and other important nutrients and substances like mineral and vitamins [1]. Sivakumar *et al*. [2] has reported that normally fish contains 72% water, 19% protein, 8% fat, 0.5% calcium, 0.25% phosphorus and 0.1% vitamin A, D, B and C etc., Fish have a low calorific value and low fat content but a high protein content. Further, n-3 fatty acids found in fish prevent coronary heart diseases [3]. This study was undertaken to determine whether fresh water fish could be recommended as a less expensive substitute for marine fish, particularly in combating protein malnutrition in early childhood, preventing heart diseases and in cases of deficiency of minerals and vitamins. A study of the nutrient values of fresh water fish is important in fish processing industries such as production of dry fish, canning and preparation of fish meals. The world's fisheries provide more than 2.6 billion people with at least 20% of their average annual per capita protein intake, according to the United Nation's Food and Agriculture Organization (FAO). One of the renowned and fastest growing Indian major carps, *Catla* is characterized by a deep body and enormously large, *Rohu* is characterized by a moderately elongate body with dorsal profile more elongated than the ventral profile and the *mrigal* is a bottom feeder and feeds on plant matter including decaying vegetation. It attains maturity towards the end of second year and the spawning season generally coincides with the southwest monsoon. The fish attains a maximum length of one meter. Considering aquaculture production by category the freshwater fishes contributed to over 90% of the aquaculture production [4].

Fisheries play an important role in the world food economy. Fish is the primary source of protein for some 950 million people worldwide and represents an important part of the diet of many more. In less than 50 years, the world's average per capita consumption of fish has almost doubled. Globally, fish provide about 16% of the animal protein consumed by humans and are a

Corresponding Author: K. Saravanan, **E-mail:** prof.ksgac2009@gmail.com

valuable source of minerals and essential fatty acids [5].

2. MATERIALS AND METHODS

In the experimental fish was collected from the Coleroon River (95 miles) nearby anaikarai (Thanjavur district). Anaikarai is a village panchayat under Thiruvidaimaruthur Taluk in Thanjore district, Tamil Nadu. Anaikarai connected with two major bridge nearly 1 kilometer long on both side. It is island in the basin of Cauvary River. Nearly 2000 families live in Anaikari with the main occupation of agriculture and fishing, they are well known of river fishes. Cauvary river commonly called collidam in Anaikari people.

Fish (400±600g and 20±30cm) belonging to the family Cyprinidae, namely *Catla* (*Catla catla* – Hamilton - Bachanan), *Rohu* (*Labeo rohita* – Hamilton - Bachanan) and *Mrigal* (*Cirrhinus mrigala* – Hamilton - Bachanan) a common Indian major carps that Natural fish feeds on planktons, algae and decaying vegetation and Cultural fish feeds on rice bran, oil cake and cabbage leaf. In Natural fishes collected on Anakkarai River, Thanjavur District, India and Cultural fish collected on Sivashana fish form, Maelavalli, Thiruvarur District, India. In the experiment carried out for five months (Nov, Dec, Jan, Feb, Mar). Carbohydrate was determined by Anthrone method [6], Protein was estimated following the method of Lowry *et al*. [7], Lipids were extracted as described by Floch *et al*. [8], and estimated by the method of Barnes and Black stock [9].

3. RESULTS

The observation on the variation in the study of biochemical parameters are shown in (**Table 1 & 2**).

During the study in *catla*, the muscle carbohydrate (g/g) was well marked. It was maximum at March (Natural fish-0.921g/g). The differences of muscle carbohydrate were observed in both cultural and natural fishes. In *rohu*, the amount of muscle carbohydrate (g/g) was noted. It was maximum at January (Natural fish-0.993g/g) during the end of experimental days. The differences of muscle carbohydrate were observed. In *mrigal*, the muscle carbohydrate (g/g) was recorded. It was maximum at January (Natural fish-0.898g/g) during the end of experimental days.

In *catla*, the concentration muscle protein (g/g) was well noted. It was maximum at March (Natural fish-19.920g/g) during the end of experimental period. The normal value of muscle protein 18g is also estimated. The differences of muscle protein were observed. In *rohu*, the concentration muscle protein (g/g) was well marked. It was maximum at March (Natural fish-20.021g/g) Sivakumar *et al.* [10] during the end of experimental days. The normal value of muscle protein 19 g is also estimated. The differences of muscle protein were observed. The observed value of muscle protein observed by the help of spectrophotometer. In *mrigal*, the concentration muscle protein (g/g) was well marked. It was maximum at March (Natural fish-19.560g/g) during the end of experimental days. The normal value of muscle protein 17g is also estimated. The differences of muscle protein were observed. The observed value of muscle protein observed by the help of spectrophotometer.

In *catla*, the concentration muscle lipid (g/g) was well marked. It was maximum at March (Natural fish-3.961g/g) during the end of experimental days. The observed value of muscle lipid observed by the help of spectrophotometer. In *rohu*, the concentration muscle lipid (g/g) was well marked. It was maximum at January (Natural fish-4.905g/g) during the end of experimental days. In *mrigal*, the concentration muscle lipid (g/g) was well marked. It was maximum at March (Natural fish-3.731g/g) during the end of experimental days. The observed value of muscle lipid observed by the help of spectrophotometer.

Table 1: Showing the Cultural fish Biochemical parameters

S. No	Months	*Catla catla*			*Labeo rohita*			*Cirrhinus mrigala*		
		Carbohydrate (g/g)	Protein (g/g)	Lipid (g/g)	Carbohydrate (g/g)	Protein (g/g)	Lipid (g/g)	Carbohydrate (g/g)	Protein (g/g)	Lipid (g/g)
1	Nov	0.641	15.415	3.519	0.656	17.850	5.118	0.615	15.505	2.985
2	Dec	0.578	16.038	2.825	0.628	18.000	4.372	0.560	16.254	2.452
3	Jan	0.688	17.581	2.239	0.738	17.945	3.092	0.543	16.872	2.079
4	Feb	0.702	18.216	2.537	0.721	18.915	2.916	0.695	17.986	2.275

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5	Mar	0.751	18.516	2.967	0.791	19.210	3.160	o.732	18.327	2.532

Table 2: Showing the Natural fish Biochemical parameter

S. No	Months	*Catla catla*			*Labeo rohita*			*Cirrhinus mrigala*		
		Carbohydrate (g/g)	Protein (g/g)	Lipid (g/g)	Carbohydrate (g/g)	Protein (g/g)	Lipid (g/g)	Carbohydrate (g/g)	Protein (g/g)	Lipid (g/g)
1	Nov	0.595	19.725	3.092	0.631	19.090	4.158	0.693	17.905	2.239
2	Dec	0.898	18.818	3.465	0.990	19.745	3.679	0.871	18.436	3.359
3	Jan	0.901	19.400	3.839	0.993	19.600	4.905	0.898	19.181	2.772
4	Feb	0.820	18.945	3.792	0.851	19.210	4.021	0.798	18.760	3.564
5	Mar	0.921	19.920	3.961	0.956	20.021	4.231	0.884	19.560	3.731

4. DISCUSSION

The present study of the obviously carbohydrate, protein and lipid on the biochemical parameters of Indian major carps (*catla, rohu* and *mrigal*). Study of between the biochemical parameters in cultural and natural Indian major carps in five month duration [11]. In Natural Indian major carps, first one *catla* is a surface feeder, feeding on zooplankton.

Second one rohu is column feeder, feeding on algae and third one *mrigal* is bottom feeder, feeding on mud, algae and decaying vegetation. But cultural fish feeding on, supplementary feeds such as rice bran, oil cake and cabbage leaf. Biochemical changes based on the feeding, so this species are selected. So present study for the Natural and Cultural fish. The concentration of carbohydrate (g/g) was well marked. It was maximum at 0.993 g/g (Natural fish-*rohu*) during the end of experimental days. The normal value of carbohydrate 0.5-1.0g/g is also estimated. The concentration of carbohydrate (g/g) was well marked. It was minimum at 0.543g/g (Cultural fish-*mrigal*) during the end of experimental days. The normal value of carbohydrate 0.5-1.0 g/g is also estimated Joshi *et al*. [12]. The concentration on protein (g/g) was well marked. It was maximum at 20.021 g/g (Natural fish-*rohu*) during the end of experimental days. The normal value of protein 15-25 g/g is also estimated. The concentration on protein (g/g) was well marked. It was minimum at 15.505 g/g (Cultural fish-*mrigal*) during the end of experimental days.

The normal value of protein 15-25 g/g is also estimated. The concentration on lipid (g/g) was well marked. It was maximum at 4.905g/g (Natural fish-*rohu*) during the end of experimental days. The normal value of lipid 2-5g/g is also estimated the remarkable variations observed by Ganadhara *et al.* [13]. The concentration on lipid (g/g) was well marked. It was minimum at 2.079 g/g (cultural fish-*mrigal*) during the end of experimental days. The normal value of lipid 2-5 g/g is also estimated.

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