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# NUTRITIONAL ANALYSIS OF *Rastrelliger kanagurta* AND *Mystus tengara*

**B. Silambumuthu, M. Mageswari, S. Chinnamani and S. Sivasuriyan***

PG & Research Department of Zoology, Rajah Serfoji Govt. College (Autonomous)
Thanjavur – 613 005, Tamilnadu

**ABSTRACT**

In the present study to investigate the carbohydrate, protein, lipid and amino acid content and inorganic elements in *Rastrelliger kanagurta* and *Mystus tengara* fishes. Shows the levels of Carbohydrate (73.34, 89.08 mg/gm), protein (89.00, 98.33 mg/gm), amino acid (18.33, 34.66 mg/gm) and lipids (78.56, 21.42 mg/gm). Carbohydrate and lipids was decreased in *Rastrelliger kanagurta* when compared to *Mystus tengara*. Protein and amino acid content was decreased in *Mystus tengara* when compared to *Rastrelliger kanagurta*. The elements were found in *Rastrelliger kanagurta* and *Mystus tengara*. In *Rastrelliger kanagurta* shows the presence of calcium, phosphate, sodium, magnesium, potassium, iron and chloride whereas sulphate, nitrate were absent. In *Mystus tengara* shows the presence of calcium, phosphate, sodium, magnesium, sulphate and chloride whereas potassium, iron and nitrate were absent.

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***Corresponding author***
**Dr. S. Sivasuriyan**,
*Assistant Professor*
*PG and Research Department of Zoology, Rajah Serfoji Govt. College (Autonomous)*
*Thanjavur – 613 005, Tamilnadu*

## INTRODUCTION

Fish play an important role in human nutrition in India, particularly to people of coastal areas. Good and adequate nutrition plays a very important role in the expression of mental, physical and intellectual qualities in humans. To ensure access to the nutritionally adequate food for the improvement in the quality of diet of a poor person in the society, fish is the only medium which can serve the very purpose. They have the ability to reduce blood lipid level, particularly serum triglycerides and also have a good source for human nutrition due to their therapeutic role in reducing certain cardiovascular disorders.

The precipitate availability of fish in India is now 9.5 kg with 56% of Indians considered fish eaters. India requirements for fish will be around 10 million tons. A common approach for increasing fish production in ponds is direct application of fertilizers, which enhances production of plankton that serves as natural food items for fish (Siddiqui and Khan, 2009; Khan and Abidi, 2010). So, success of any fish culture largely depends on a continual supply of food through natural (fertilization) and supplementary food. The combination of three to four species may ensure maximum utilization of available natural and food in ponds because of their different feeding habits (Suresh Babu *et al* ., 2013).

Nutrient content varies with fish species and depending on the health status of the fish. There are limited data on the nutritional composition of fish species which are commonly consumed by the poor in developing countries of Asia and sub-Saharan Africa. Therefore, the crust of this study was to evaluate the nutritional content in *Rastrelliger kanagurta* and *Mystus tengara* fishes.

## MATERIALS AND METHODS

### Collection of fish

*Rastrelliger kanagurta* and *Mystus tengara* were collected from Malayur, Pudukkottai district, Thanjavur. The fish was washed with saline and used for experimental work.

### Preparation of homogenate

The *Rastrelliger kanagurta* and *Mystus tengara* were sacrificed and flesh was dissected out, washed with ice-cold physiological saline. The 1g tissues was weighed and homogenized using a Teflon homogenizer. Tissue homogenate was prepared in 0.1 M Tris Hcl buffer (pH 7.4) and used for the estimation of various biochemical parameters.

### Biochemical estimations

Protein was estimated by the method of Lowry *et al.* (1951). Total lipids in tissues were estimated by the method of Folch *et al.* (1957). To estimate the amount of carbohydrate present in the given sample by using Anthrone method. Amino acid in tissues were estimated by the method of Rosen (1957).

### Qualitative analysis of Inorganic elements

Fish (500mg) was prepared and treated with $HNO_3$ and HCl (3:1 v/v) for 1 hour. After the filtration, the filtrate was used to perform the following tests (Khandelwal 2006).

### Statistical analysis

The results were presented as mean ± SD. Data was statistically analyzed using student "t" test. P. values set as lower than 0.05 was considered as statistically significant.

## RESULTS AND DISCUSSION

The present study was carried out to analyze the various biochemical parameters in *Rastrelliger kanagurta* and *Mystus tengara*. The observations made on different fishes were compared as follows.

**Table 1: Shows the levels of Carbohydrate, protein, lipids and amino acid in *Rastrelliger kanagurta* and *Mystus tengara*.**

| Fish | Carbohydrate (mg/gm) | Protein (mg/gm) | Lipids (mg/gm) | Amino acids (mg/gm) |
|---|---|---|---|---|
| *Rastrelliger kanagurta* | 73.34±2.28 | 89.00±1.76 | 18.33±2.58 | 78.56±20.81 |
| *Mystus tengara* | 89.08±3.37 | 98.33±4.84 | 34.66±1.93 | 21.42±11.56 |

Values were expressed as mean ± SD.

* Significantly different from *Rastrelliger kanagurta* (P< 0.05)

Carbohydrate and lipids was decreased in *Rastrelliger kanagurta* when compared to *Mystus tengara*. Protein and amino acid content was decreased in *Mystus tengara* when compared to *Rastrelliger kanagurta*.

Biochemical studies are very important from the nutritional point of view. Protein is essential for the sustenance of life and accordingly exists in the largest quantity of all nutrients as a component of the human body (Sudhakar *et al* .,

2011). In various fish species, proteins are of important as structural compounds, biocatalysts and hormones for control of growth and differentiations (Amal and Naheb, 2012). Protein in fish is a main component constituent of tissue and organs. They are precursors of other nitrogen compounds (enzymes, hormones, slurry, neurotransmitters, cofactors, etc) and constitute an important energy source. The effect of dietary lipid levels on fish growth performance varies considerably within species, size, age, diet and composition, range of lipids level tested and rearing conditions (Arredondo *et al.*, 2013).

Inadequate protein levels in the diets result in a reduction of growth and loss of weight. However, when an excess of protein is supplied in the diet, only part of it is used for protein synthesis (growth) and the remaining is transformed into energy (Arredondo *et al* ., 2013). Each body cell is composed mainly of protein. Protein makes up the membrane surrounding the cell and also occurs within the cell. During growth period, adolescence and pregnancy, the number of cell increases and more protein is required for cell growth. In all stages of life tissue protein is constantly being broken down and must be replaced by dietary protein. Protein plays a vital role in the formation of enzymes, antibodies and hormones and other substances that regulate the body process.

Muscle rich in proteins, forms mechanical tissue intended for mobility and do not participate in metabolism. Liver being the centre for various metabolisms is also rich inproteins. Fish and shellfish are important source of protein and income for people in Southeastern Asia They are also increasingly marketed for the health benefits to consumers (Agusa *et al* ., 2007).

**Qualitative elements analysis in *Rastrelliger kanagurta* and *Mystus tengara***

The following elements were found in *Rastrelliger kanagurta* and *Mystus tengara*. In *Rastrelliger kanagurta* shows the presence of calcium, phosphate, sodium, magnesium, potassium, iron and chloride whereas sulphate, nitrate were absent. In *Mystus tengara* shows the presence of calcium, phosphate, sodium, magnesium, sulphate and chloride whereas potassium, iron and nitrate were absent. (Table 2).

**Table 2: Qualitative analysis of inorganic elements in *Rastrelliger kanagurta* and *Mystus tengara***

| S.No | Elements | *Rastrelliger kanagurta* | *Mystus tengara* |
|---|---|---|---|
| 1. | Calcium | ++ | ++ |
| 2. | Magnesium | ++ | ++ |
| 3. | Sodium | + | + |
| 4. | Potassium | + | - |
| 5. | Iron | + | - |
| 6. | Sulphate | - | + |
| 7. | Phosphate | + | ++ |
| 8. | Chloride | ++ | ++ |
| 9. | Nitrate | - | - |

Note: (-) Absence (+) Presence (++) present with high intensity of the colour

The elements are separate entities from the other essential nutrients like proteins, fats, carbohydrates, and vitamins. Animal husbandry had demonstrated the need for minerals in the diet (Hegsted *et al* ., 1976). In this century, biological assay methods clarified the significance and importance of mineral elements for human and animal nutrition and modern analytical techniques led to the detection of trace elements as essential nutrients and this is still an active area of current research. Micronutrient deficiencies are a major public health problem in many developing countries, with infants and pregnant women especially at risk (Batra and Seth, 2002).

Infants deserve extra concern because they need adequate micronutrients to maintain normal growth and development (Rush, 2000).

The micronutrient deficiencies which are of greatest public health significance are iron deficiency, causing varying degrees of impairment in cognitive performance, lowered work capacity, lowered immunity to infections, pregnancy complications e.g. babies with low birth weight, poor learning capacity and reduced psychomotor skills (Batra and Seth, 2002). In the present study all the elements present in *Rastrelliger kanagurta* and *Mystus tengara* as compared to fresh water fish.

Minerals may be broadly classified as macro (major) or micro (trace) elements. The third category is the ultra-trace elements. The macro-minerals include calcium, phosphorus, sodium and chloride, while the micro-elements include iron, copper, cobalt, potassium, magnesium, iodine, zinc, manganese, molybdenum, fluoride, chromium, selenium and sulfur (Eruvbetine, 2003).

Every form of living matter requires these inorganic elements or minerals for their normal life processes. Minerals may be broadly classified as macro (major) or micro (trace) elements. The third category is the ultra-trace elements. The macro-minerals include calcium, phosphorus, sodium and chloride, while the micro-elements include iron, copper, cobalt, potassium, magnesium, iodine, zinc, manganese, molybdenum, fluoride, chromium, selenium and sulfur (Eruvbetine, 2003).

The macro-minerals are required in amounts greater than 100 mg/dl and the micro-minerals are required in amounts less than 100 mg/dl. The ultra-trace elements include boron, silicon, arsenic and nickel which have been found in animals and are believed to be essential for these animals. Evidence for requirements and essentialness of others like cadmium, lead, tin, lithium and vanadium is weak (Albion Research Notes, 1996).

## CONCLUSION

Over all, the study concludes that locally obtainable *Rastrelliger kanagurta* fish has rich nutrition which may be use growth and development and can be a substantial aid in redressing the problems of malnutrition, diabetic and cardiovascular patients in our country.

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