

VARIATION OF PROTEIN CONTENTS IN THE MUSCLE OF FISH *PUNTIUS SARANA* (HAMILTON) FROM GODAVARI RIVER AT NANDED REGION, MAHARASHTRA STATE

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Abstract: The seasonal variations in protein content of fresh water fish *Puntius sarana* from Godavari River at Nanded region, Maharashtra State were observed from April 2015 to March 2016. The obtained results showed that protein content was high in the month of July (16.9 ± 1.20) the lowest was in the January (13.9 ± 1.50) and December (14.2 ± 1.20). Then there was a slight increase in the protein content in the month of February, March, April, May and June which ranges 14.3 ± 1.70 , 14.7 ± 1.50 , 15.1 ± 1.30 , 16.2 ± 1.40 , 16.3 ± 1.60 g/g tissue respectively. Variation of protein content during different seasons of the year helps nutritionists and researchers who are striving to improve the nutritive value, processing and marketing of endangered fish species and in fishing industry.

Keywords: Protein, Monthly variations, seasonal variations, *Puntius sarana*.

1. INTRODUCTION

Fish are known to be a very healthy food items. They are an excellent source and also contain various minerals and vitamins necessary for good health. Scientists reported that societies with high fish intake have considerably lower chances of acute myocardial infarctions, atherosclerosis and other ischemic heart diseases. The present availability of protein is much below the minimum daily requirements and the livestock sector alone will not be able to meet the protein requirements of ever increasing human population. Fish is an excellent and relatively cheaper source of high biological value. Fish protein contains all essential amino acids in the required proportion and hence has a high nutritional value, which contribute to their high biological value. Cereal proteins are usually low in lysine and or the sulphur containing amine acids like methionine and cysteine, where as fish protein is an excellent source of these amino acids. Fish also contains threonine, tryptophan, isoleucine, leucine, phenylalanine, and valine amino acids. In diets based mainly on cereals, a supplement of fish can, therefore, raise the biological value significantly. Fish is also rich in the non-protein amino acid taurine, which has a unique role in neurotransmission.

Although several studies deal with the proximate composition of biochemical components of many commercially important fishes, but no works has been carried out on *Puntius sarana* particularly from Nanded region of Maharashtra State. Therefore, the present study was undertaken to show seasonal and monthly variations in the amount of total protein content in muscle of *Puntius sarana*, to determine the nutritional value and variations during the fishing season which is very important in recent years.

2. MATERIALS AND METHODS

Samples of *Puntius sarana* were collected from fish market at monthly intervals during the period of April 2015 to March 2016. They were immediately transported to the laboratory of Fishery Science department of N.E.S. Science College, Nanded. In the laboratory the fishes were washed with cold tap water. Then total length, total weight and sex were determined. Body muscles samples (free from skin and scales) of each month were collected and homogenized in a homogenizer, before the analysis of biochemical components. Weight of *Puntius sarana* varied from 13.35 grams to 228.58 grams and length varied from 11.00 cm to 26.60 cm.

Protein Estimation:

Biuret Method:

This is the most widely used method for protein estimation. It is carried out by using standard kit Erba. The peptide bonds of protein react with copper II ions in alkaline solutions to form blue-violet complex (biuret reaction). Each copper ion complexing with 5 or 6 peptide bonds. Tartarate is added as a stabilizer whilst Iodide is used to prevent auto-reduction of the alkaline copper complex. The color is proportional to the protein concentration and is measured at 546 nm (520-560nm).

Statistical Analysis: The values are expressed as mean \pm standard deviation (SD).

Table 1. Monthly changes in protein content of *Puntius sarana* (g/g tissue).

Sr.No.	Month	Protein content of <i>P.sarana</i> muscles
1.	January	13.9 \pm 1.50
2.	February	14.3 \pm 1.70
3.	March	14.7 \pm 1.50
4.	April	15.1 \pm 1.30
5.	May	16.2 \pm 1.40
6.	June	16.3 \pm 1.60
7.	July	16.9 \pm 1.20
8.	August	16.7 \pm 1.40
9.	September	15.9 \pm 1.70
10.	October	14.8 \pm 1.80
11	November	14.5 \pm 1.60
12.	December	14.2 \pm 1.20

3. RESULT

The protein composition of *Puntius sarana* was determined over the period of one year and obtained results are present in Table1. Protein content varied from 13.9 \pm 1.50 to 16.9 \pm 1.20 g/g tissue. The highest protein content was in July and the lowest protein content was in January and December. The protein content was 16.7 \pm 1.40, 16.2 \pm 1.70, 14.8 \pm 1.80, 14.5 \pm 1.60 g/g tissue of protein content in the month of August, September, October and November respectively. A decrease in the protein content in the month of December was recorded (Table1). Seasonal variation showed highest values of protein percentage in summer season of *Puntius sarana*, whereas, the lowest protein percentage was recorded in winter season. The decrease in the protein content in some months probably may be due to spawning.

4. DISCUSSION

It was observed that the proportions of the components of muscle tissues varied with the changes of season. The variation of the protein fraction may be due to the planktonic feed and to climatic biochemical composition of the fish. The protein content of fish changes with season. The seasonal variation in protein content of *Puntius sarana* was assessed from April 2015 to March 2016. In winter season food availability is less and fish consume less feed which resulted in poor growth. During winter season, gonads of fish are at rest and amino acids related to depletion and select materials for building of gonads. Slight increase in food intake (Feb-Mar), after winter may be a stimulant for building energy reserve to be used in impending gonadal maturation. In spring season pre-spawning and spawning stages comes. Protein content is slightly

raised as temperature and food availability changes. Rising of protein content may be a mechanism of maturation of gonad and storage of reserves to meet and spawning requirements. During April- May low quantitative feeding observed in *Puntius sarana* could be due to spawning activity. Incidentally, the fish during spawning months has been to be active and agile and this results in the utilization of some of the muscle reserves of energy results in decline of muscle protein. In summer season protein content increases. Fish take more food in comparison to other season, resulting in higher protein percentage as no gonadal elements are present so the food is consumed by the fish is utilized in the building of the muscle. During autumn season the protein content declines as protein for germ building is mobilized from muscle. In this period gonadal development starts so the food that fish eats utilizes for making gonads. In this stage fish feeds less as again temperature and food availability changes.

5. CONCLUSION

The results suggest that the protein content of fish greatly varies during the different seasons. It might be due to physiological reasons and changes in environmental condition i.e. spawning, migration and starvation or heavy feeding. This study provides valuable information on variations in protein content of fish species studies in order to take necessary precautions in processing from a manufacture point of view.

Biochemical studies of fish tissue are of considerable interest for their specificity in relation to the food values of the fish and for the evolution of their physiological needs at different periods of life. It is also necessary to have data about the composition of fish in order to make the best use of it as food and also to develop the technology of processing fish and fish products.

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