



STUDY ON BIOCHEMICAL COMPOSITION OF MUSCLE TISSUE OF MARINE FISH (RHABDOSARGUS SARBA) OF PURI COAST

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Abstract: The chemical composition of marine fish helps in functional food elaboration. It also elaborates the nutritional value and ethno biological value of the fishes. In this study, proximate composition or biochemical composition and mineral content were determined in one fish species, *Rhabdosargus sarba* from Puri coast, Odisha, India. The sample fish was collected from the Puri market and investigation was done experimentally. The various types of biochemical substances are present in *Rhabdosargus sarba* fish was determined by various types of methods. Length, breath and weight were also measured. Firstly, fish sample was prepared and protein analysis was done by Lowry's method. Carbohydrate analysis was done by Anthrone method and minerals analysis was done by XRF. The moisture content of the flesh was 48.88% .and the protein content was $1.86 \pm 0.03\%$ and carbohydrate was $2.6 \pm 0.15\%$. Eu_2O_3 had the highest mineral content. The most abundant trace elements were Zn and Mn. It was observed that this species of fish is a good source of protein, minerals and carbohydrates.

Keywords: Marine fish, moisture, protein, carbohydrate, minerals.

I. INTRODUCTIONS

Rhabdosargus sarba is a marine fish which belongs to kingdom-Animalia, Phylum-Chordata, Class-Actinoptergii, Order- Perciformes, Family- Sparidae, Genus- *Rhabdosargus* , Species- *R.sarba*.(Forsskal,1775)..The human body needs nutrients to enable it function effectively and to maintain health; such nutrients are sourced from foods. Water, carbohydrate, protein fats, vitamins and minerals are include in food nutrients. Fishes are known to provide protein, fat and vitamins which are great benefit to human health as it has been proven by many scientists (Job et al). Approximately 16 percent of animal protein consumed by the world's population are derived from fishes, and over one billion people depend on fish as their main source of animal proteins (FAO,2000). Due to increase in population the demand of fish on the market has increased .The amount of proteins lipids, minerals and vitamins influence its nutritional and medicinal values. Fish proteins have high biological values because they are characterized by the presence of essential amino acids in good proportions (Salma El,O.Guizani et al , Shaji, S.A. et al , Womeni,H.M. et al, Toppe,J. et al). Fishes are also richest source of ω_3 fatty acids (Ackman,R.G. et al). Many studies have shown that eicosapentaenoic acid (EOA or $20:5\omega_3$) and docosahexaenoic acid (DHA or $22:6\omega_3$) are present in important amount in fish tissue (Njinkoue,J.M. et al , J.R.E.Rasoarahona et al).These polyunsaturated fatty acids have been shown to play a vital role in human nutrition (Tanaka, T. et al). They have curative and preventive effects on many human diseases such as cardiovascular diseases, cancers, rheumatoid arthritis, and inflammation (Clandinin, M.T. et al, Raatz, S.K. et al. Fish also contain minerals which helps a lot in humans body functions because they maintain acid base balance and help hemoglobin formation (Duran, A. et al). Moisture content of fish depends upon its weight and water content of body. Carbohydrates are stored as glycogens that can be mobilize to satisfy energy demands. The growth rate of catfish fingerlings was greater when their diets contained some carbohydrates rather than only lipids for all the non-protein energy(Garling and Wilson,1977).

According to FAO fisheries, India is a very important economic activity and a flourishing sector with varied resources and potentials. After Indian independence, fisheries with agriculture been recognized as an important sector (FAO).

II. RESEARCH METHODOLOGY

Materials and collection of sample: The fish species Rhabdosargus sarba was chosen and purchased from the sea market from Puri coast. Then the fish sample was put in icebox containing ice with a fish/ice ratio of 1:2 and transported to the laboratory. The average weight and length of the fish used in this study were 168.74g and 23cm respectively.



Fig.II.1. Rhabdosargus sarba fish sample

Sample preparation: After morphometric measurement of fish, it was dissected with a cleaned stainless steel knife. The head and viscera were discarded. The edible part that is flesh was cut into small pieces and minced. Central vertebrae removed thoroughly. Weight of fresh flesh was measured for moisture analysis. Then for proteins, carbohydrate and minerals estimation the flesh were kept in oven for drying at 95-105°C for 48 hours and homogenized. Then it was ground into powder by the help of mortal pestle (Njinkoue, J.M. et al). Also the dried flesh was weighted for moisture measurement.



Fig.II.2. Flesh of R.sarba



Fig. II. 3.Weight of flesh before dried



Fig.II. 4 flesh of fish after dried



Fig.II. 5.powder of flesh of R.sarba fish



Fig.II. 6. Weight or powder of flesh.

Determination of biochemical composition: The protein was estimated by Lowry method (Lowry, 1951). Total carbohydrate content was estimated by the method of Quantitative determination of carbohydrates with Dreywood's anthrone reagent .Science. 107:254-255. The mineral content was estimated by XRF method (Fitton,G, 1997).the moisture content was determined by measuring the weight of fresh flesh and dried flesh of fish.

For chemical composition , moisture content was determined by using the hot air oven, by drying the sample until a constant weight obtained (AOAC,1990).In mineral some main and some trace minerals were determined in edible part of the species. Various minerals like Si, P, S, Cl, Ti, Mn, Fe, Cu, Zn,Br, Zr, C were determined.

Statistical method: All the results expressed are the mean of three measurements. Data were presented as mean \pm standard deviation.

III. RESULTS AND DISCUSSION

Results: The average weight and length of the sample used in this study, $170.74 \pm 0.03\text{g}$ and $23.5 \pm 0.15\text{cm}$ respectively. Below the protein, moisture, carbohydrate and mineral content of the edible part is determined.

In this species of fish protein content was $1.86 \pm 0.03\%$ and the carbohydrate content was $2.6 \pm 0.15\%$. And the moisture content of the sample recorded was 48.89%. Then the total weight of fish was 170.70g, so total protein and carbohydrate were present 3.17g and 4.43g respectively in *R.sarba* fish. The mineral contents in *Rhabdosargus sarba* fish are shown in table no. 1.

Table III. 1: mineral content of the flesh of fish sample:

SL.NO.	COMPOUND NAME	CONCENTRATION AMOUNT(ppm)
01	SiO ₂	10360 ±10 ppm
02	P ₂ O ₅	157750±5.33 ppm
03	SO ₃	292810±5.00 ppm
04	Cl	66020±5.16 ppm
05	K ₂ O	355370±1 ppm
06	CaO	104170±5.00 ppm
07	MnO	0.0 ppm
08	Fe ₂ O ₃	7480±1.00 ppm
09	CuO	242.4±2.00 ppm
10	ZnO	1220±5.68 ppm
11	As ₂ O ₃	151.0±1.52 ppm
12	SeO ₂	74.1±0.25 ppm
13	Br	270.7±0.41 ppm
14	SrO	219.5±2.47 ppm
15	Eu ₂ O ₃	816.0±2.52 ppm
16	Er ₂ O ₃	2960±7.21 ppm
17	PbO	36.0±2.09 ppm
18	CO ₂	0.0 ppm
19	Re ₈	36.5±0.40 ppm

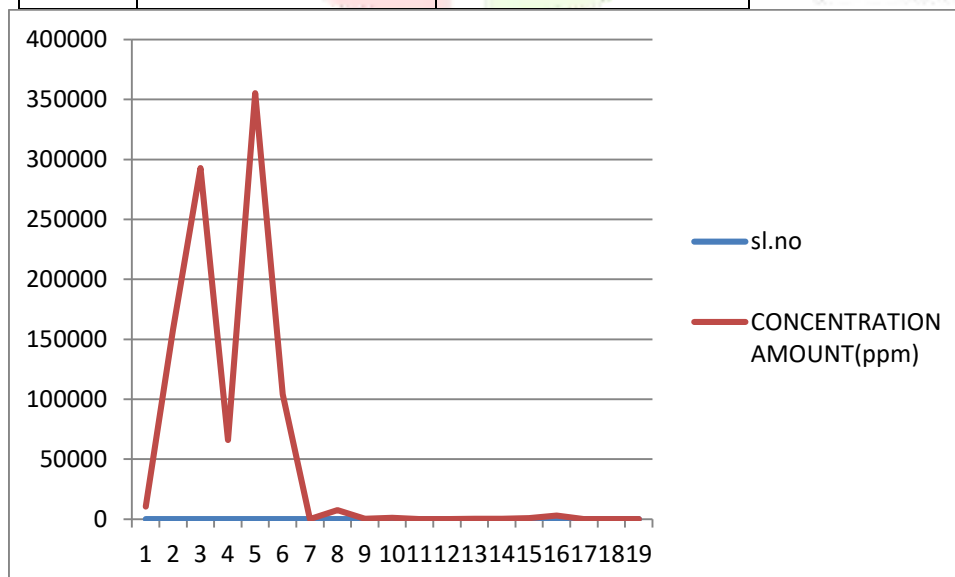
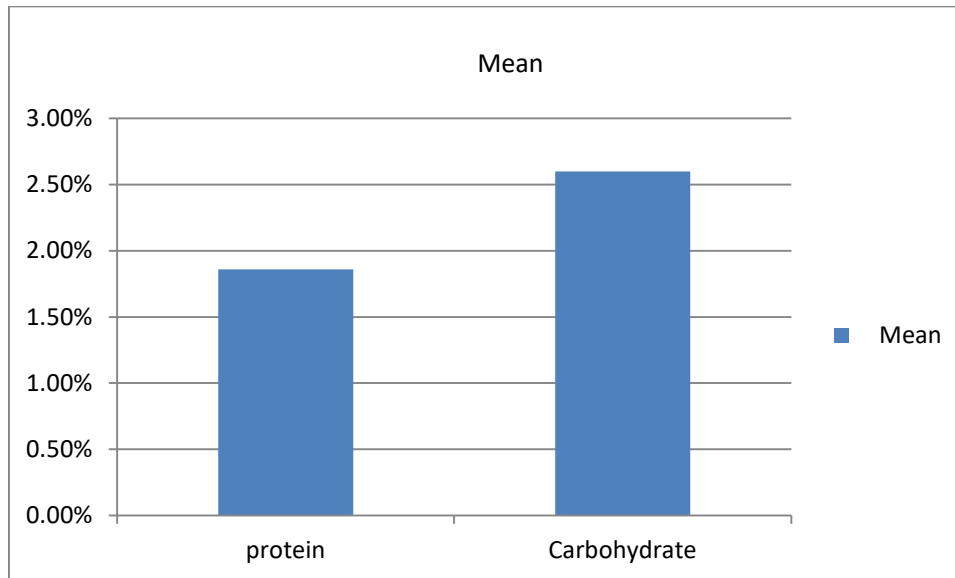


Fig.III.7: Where X- axis shows name of the element which are SL. NO. 1-19 shown in Table:1 and Y- axis represents concentration amount in ppm. So the data represents that P, K and S minerals were high in fish where as Mn, Pb, and Re minerals low in fish.

Table.III. 2; Mean \pm SD of protein and carbohydrate:

	Mean	\pm SD
protein	1.86%	0.03
Carbohydrate	2.6%	0.15

Fig.III.8: Mean \pm SD of the flesh of *Rhabdosargus sarba*

Discussion: In the above investigation showed that the protein content of the flesh of the *Rhabdosargus sarba* fish was $1.86\pm 0.03\%$. So this species of fish show a good source of protein and the carbohydrate content was $2.6\pm 0.15\%$. And the moisture content of the sample recorded was 48.89%. Also this experiment show the mineral content which were, P and K had highest mineral content in the fish species and Mn and CO₂ were lowest mineral contents. The finding of the current study was different from the study on *P.tyus* and *P.elongatus* (Njinkoue, J.M. et al, 2016) where the protein content was $16.17\pm 0.31\%$ and carbohydrate content was 0.19. The difference in composition was due to the different species and different environmental conditions.

IV. CONCLUSION

This fish species contains various types of biochemical components. . It was observed that this species of fish is a good source of protein minerals and also carbohydrates. As this species contain above amount of chemical substances which are very essential for our body and it is a very good source of food.

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