

Estimation of Protein Contents of Chocolate Mahseer (*Neolissochilus Hexagonolepis*, McClelland) of Iyei River of Manipur

Wahengbam Sarjubala Devi¹, Ch. Sarojnalini²

¹Life Sciences Department, Fishery Research Laboratory, Manipur University
Canchipur, Manipur, India
wsarjubala@yahoo.com

²Life Sciences Department, Fishery Research Laboratory, Manipur University
Canchipur, Manipur, India
sarojnalini_ch.@yahoo.com

Abstract: *The seasonal variations in protein content of muscle in Chocolate mahseer (*Neolissochilus hexagonolepis*, McClelland, 1839) (*Cyprinidae: Cypriniformes*) from Iyei river in Tamenglong district were determined from December 2007 to January 2008 for their nutritional value. The highest protein content was $35.20 \pm 0.03\%$ in the month of November. The lowest protein content was $18.51 \pm 0.09\%$ in the weight of $51.44 \pm 0.07\text{g}$ fish.*

Keywords: Chocolate mahseer, protein, seasonal variation, Iyei river

1. Introduction

Neolissochilus hexagonolepis (McClelland, 1839) (Family-Cyprinidae) is locally known as “Ngara” in Manipur and it is commonly known as Chocolate Mahseer. Manipur, a northeastern state of India cover a geographical area of 22, 327 Km² and is located in global geographical position 93 0 03' and 94 0 78' E longitude and 23 0 83' and 25 0 68' N latitude. Its unique topography has an oval shaped central valley of 2, 230 Km² completely surrounded by rugged hills constituting 90% of the total geographical area. The altitude of the hills ranges from 2000 to 3000 m and that of the valley varies from 750 to 900 m above mean sea level. It has an annual rainfall of 1426 mm and temperature varies from 10 to 35 C. The species of Mahseer occurs in the rivers of Assam, Bangladesh, Myanmar, China and Nepal. It is most abundant in northeast India [1].

The proteins, being more complex in composition, contains, in addition to the Carbon, Hydrogen & Oxygen elements found in carbohydrates, nitrogen (16%) and sometimes sulfur. In proteins these elements are combined in the form of amino acids [2]. Fish proteins contain all the essential amino acids (not synthesized and need to be provided in the diet) in the required proportion and hence have a high nutritional value, which contribute to their high biological value. Cereal proteins are usually low in lysine and the Sulphur- containing amino acids like methionine and cysteine, whereas fish protein is an excellent source of these amino acids. Fish is a highly proteinous food consumed by the populace. A larger percentage of consumers do eat fish because of its availability, flavor and palatability while fewer do so because of its nutritive value. Therefore studies on the proximate composition and elemental composition of the freshwater fishes have not really caught the attention of researchers in fisheries; hence the consumer and fishery workers are left with limited or paucity of information on the

importance of a particular fish species in their daily diets [3].

The objectives of the research work was to collect the alive chocolate Mahseer from Iyei river located in Tamenglong district, Manipur and to study the soluble protein contents of the fresh muscles of the different sized fish.

2. Materials and Methods

2.1 Sample collection

Fresh Chocolate Mahseer was collected from Iyei river of Tamenglong district, Manipur. The fish were caught with cast net during night time. The fish were kept in a polythene bag containing small pieces of ice and brought to the Fishery Research Laboratory Life Sciences Department, Manipur University.

2.2 Sample preparation

The fish were washed with running tap water and blotted with blotting paper. The standard length and weight was measured using a single pan digital balance. The fish was descaled with sharp knife dorso-lateral portion muscle was collected and bones are removed from the fish muscle. All analyses were triplicates by sampling from the homogenates.

2.3 Estimation of Soluble Protein content

Determination of soluble protein was done by Lowry et al method [4]. 100mg of the sample was homogenized in 10ml of phosphate buffer (pH=7). After homogenization it was centrifuged at 5000 r.p.m for 10minutes and the supernatant was collected in a test tube. From this supernatant 0.2ml was taken and the volume was made upto 1ml with distilled water. Then 5ml of Copper Sulphate reagent was added and kept for ten minutes, after that 0.5ml of Folin-Ciocalteu

reagent (FCR) was mixed thoroughly. The test mixture was than incubated at room temperature in dark for 30 minutes. The absorbance was taken at 660nm against a reagent blank on a spectrophotometer. The soluble protein was calculated and expressed as a percentage (%) using a standard curve prepared from Bovine serum albumin (BSA).

2.4 Statistical analysis

The values are expressed as mean±standard deviation (SD). The data were evaluated by using the SPSS (Version 12.0).

Table 1: Standard length and weight of Chocolate Mahseer

Standard length (cm)	Weight (gram)	Soluble Protein contents (%)
9.60±0.01	14.92±0.12	24.75±0.01
10.10±0.01	15.70±0.11	34.65±0.01
11.01±0.21	107.42±0.01	31.90±0.06
11.90±0.04	20.20±0.05	34.65±0.03
12.00±0.06	29.00±0.05	31.90±0.02
14.20±0.06	51.44±0.07	18.51±0.09
15.70±0.05	70.02±0.09	24.64±0.07
16.30±0.04	80.13±0.04	24.86±0.08
18.60±0.03	85.44±0.03	20.35±0.08
18.10±0.06	84.74±0.03	35.20±0.04
19.40±0.02	107.44±0.20	31.90±0.05
22.20±0.02	215.72±0.06	24.53±0.03
25.60±0.01	308.41±0.07	24.54±0.03
29.70±0.01	520.00±0.06	20.90±0.01

Data was expressed as mean ± SD of triplicate sample

Table 2 Seasonal changes in protein content of Chocolate Mahseer (*N. hexagonolepis*)

Months	Protein content of Chocolate Mahseer muscle
January	31.90±0.06
February	34.65±0.01
March	34.92±0.01
April	31.90±0.05
May	24.53±0.03
June	20.90±0.01
July	20.35±0.08
August	18.51±0.09
September	24.53±0.03
October	24.54±0.03
November	35.20±0.02
December	34.65±0.01

Data was expressed as mean ± SD of three separated determination

3. Result and Discussion

The soluble protein content with standard length and weight of different sizes of Chocolate Mahseer was shown in table 1. The nutritional elements showed variable values in the species analyzed. Protein content was 18.51±0.09 %, 24.64±0.07%, in 14.2 cm and 15.7 cm long fish. The highest protein content was 34.65% found in 10.1 and 11.9cm standard length and weight of 15.70 g and 20.2g fish. The lowest protein content was 18.51±0.09% in 14.2 cm long and weight of 51.44±0.07g fish. The seasonal variation of the protein content was shown in table 2. The variation of the protein fraction may be due to the planktonic feed and to climatic changes in the year which influence the general biochemical composition of the fish. The protein contents of fish changes with season [5], [6]. High-lipid fishes had less water and more protein than low-lipid fishes. This is in line with the report of Steffens [7], that protein forms the largest quantity of dry matter in fish. It is widely accepted that the protein composition of tissues of fishes are related to many factors such as feeding, growth maturation and spawning [8] such as and metabolism, mobility of the fishes and geographical area [9].

4. Conclusion

From the above experimental analysis it was concluded that the fish have good protein content. This investigation provides the valuable information on variations in soluble

protein content of fish. It is also necessary to have data about the chemical composition of fish in order to make best use of fish as food.

References

- [1] M. Dasgupta, Mahseer of northeastern India- A review on the biology. In: Mahseer the game fish (Ed. P. Nautiyal). Rachana Publication, Srinagar (Garhwal): B54-B66, 1994.
- [2] M. T. Dowd, A. Dent "Elements of foods and Nutrition. In: Chapter IV. Requirements for regulation and protection minerals and water" (2nd Ed.), 2003.
- [3] S.O Adewoye, J. S. Omotosho, "Nutritive composition of some freshwater fishes in Nigeria" Biosci. Res. Comm. 11(4) pp. 333-336, 1997.
- [4] O.H. Lowry, N.T. Rosebrough, A.L. Farr, R.J. Randall, "Protein measurement with the folin phenol reagent", J. Biol. Chem. 193, pp. 265-275, 1951.
- [5] J.M. Njinkoue, G. Barnathan, J. Miralles, E. M. Gaydoud, A. Sambe, "Lipids and fatty acids in muscle, liver and skin of three edible fish from the Senegalese coast: *Sardinella maderensis*, *Sardinella aurita* and *Cephalopholis taeniops*", Comparative Biochemistry and Physiology 131, pp. 395-402, 2002.
- [6] Z. Tzikas, I. Amvrosiadis, N. Soutos, S. P. Georgakis, "Seasonal variation in the chemical composition and microbiological condition of Mediterranean horse mackerel (*Trachurus mediterraneus*) muscle from the North Aegean Sea (Greece)", *J. food control*. 18, pp. 251-257, 2007.
- [7] W. Steffens, "Freshwater fish-wholesome foodstuffs", Bulg. J. Agric. Sci., 12, pp.320-328, 2006.
- [8] A.K. Jafri, "Seasonal changes in the biochemical composition of the common carp, *Cirrhinus mrigala* (Ham.)", *Broteria*, 36, pp. 29-44, 1968.
- [9] M.F. Stansby, Proximate composition of fish. In: R.Heen and R. Krezer, Fish in nutrition, London Publ. News (books) Ltd., 1962.

Author Profile



Wahengbam Sarjubala Devi received the B.Sc. and M.Sc. degrees in Zoology from Manipur University in 2001 and 2007, respectively. She is now working as a research in Life Sciences Department, Manipur University, Canchipur, India. Her research interest is in the field of Cold water fisheries, Biochemistry of Fish and Nutrition etc.



Dr. Ch. Sarojnalini is currently working as an Associate Professor in Fishery Section, Life Sciences Department, Manipur University tilldate.