17. Comparative Assessment of Protein Content in Tilapia and Catla Fish

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Abstract

As primary sources of dietary protein, fish play a vital role in meeting human nutritional requirements. Tilapia and Catla are two distinct species of fish that are widely consumed and hold significant importance in both aquaculture and human nutrition. This study presents a comparative analysis of the protein content in Tilapia and Catla fish species. Samples of Tilapia and Catla were obtained from Kumbhari Dam of Akola district, and their protein content was analysed using Biuret method. Results indicate that Tilapia exhibited a protein content of 24.6100 ± 0.894 mg/dl, while Catla demonstrated a protein content of 26.1300 ± 1.820 mg/dl. This study provides valuable insights into the nutritional composition of Tilapia and Catla fish and their potential contribution to human health. Further research is warranted to explore the implications of these findings in the context of nutrition and aquaculture management.

Key words: Catla, Tilapia, Nutrition, Protein.

Introduction

The word "protein" is derived from the Greek word "proteios" which means "of primary importance". In fact, proteins play an important role in all biochemical and physiological body processes; they act as enzymes, hormones, receptors, antibodies and are required for the structural integrity of cells. Proteins are the most essential for the maintenance of human life. Tissue, muscles, organs, enzymes and hormones are protein in nature (Jain. N. K. 1996). The biological importance of proteins can be judge by the fact that the animals can live for a long time without fat or carbohydrate but not by the proteins. Proteins mainly supply new tissues repair working parts and make up the loss (e.g. gland secretion) in the vital process (Agarwal. O. P. 2011). Animal derived proteins provide the essential amino acid requirements of a healthy diet. Among animal proteins, fish proteins have a well-balanced amino acid composition that is imperative for beneficial synthesizing and utilizing proteins in the body. Lack or low levels of

any amino acid reduce the other amino acid utilization proportionately. This is why plant-derived proteins are potentially at a disadvantage for use in the body since they have relatively low levels of the essential amino acids methionine and lysine. Health studies have revealed that fish protein is suggested as a weight-loss diet to obese patients Esen Alp Erbay and Ahmet Faruk Yeşilsu (2021). Composition of the fish vary greatly between and within the species depending on the catch season, maturity and location where the protein content remains relatively constant and water and fat content alter. The crude protein content with contribution of non-protein nitrogenous (NPN) compounds like free amino acids, polyamines, peptides, Page 4 Shri. R.L.T College of Science, Akola. P.G Department of Zoology nucleotides of fish, crustaceans and mollusks is slightly up to percentage (Shahidi& Simpson, 2004). Fish protein is composed of 20-30% sarcoplasmic composed of mainly albumins besides hemoproteins, 66-77 % myofibrillar such as myosin, actin, actomyosin and troponin and 3-5 % stromal proteins including collagens (Gates, 2016). Fish proteins have perfect water holding capacity and gelling capability supply peerless functional properties to fish processing industries (Taheri et al., 2013.).

Aims and Objectives

Present study was conducted 1. To estimate Protein Concentration 2. To know the nutritional status of fishes.

Materials and Method

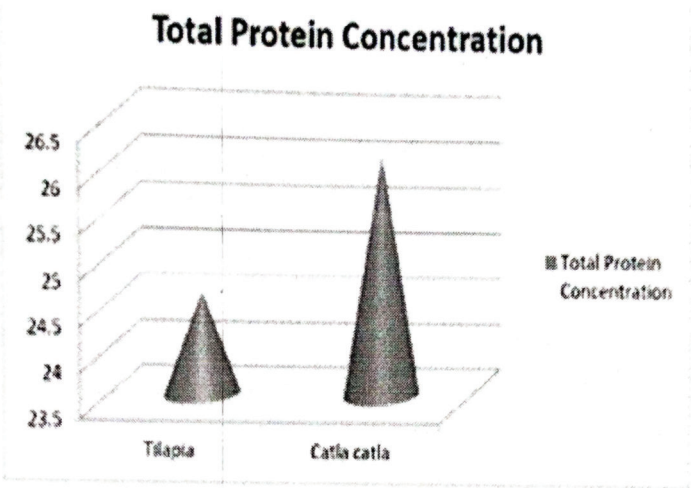
Study Area: Present study was conducted in Akola district fresh water fishes Tilapia and Catla catla were collected from Kumbhari Dam (20°39'59"N 77°4'36"E) the study was conducted in the Department of Zoology Shri R. L. T. College of Science, Akola. Estimation of protein was carried out by Biuret method (Dr. Mahesha H. B. 2012).

Observation and Results

The value of fish proteins is as high as meat protein and inferior to milk and egg protein. Fish protein has a stable composition of essential amino acids an appropriate level of protein content is needed for an adequate diet for the assurance of long-term health. Protein is required for the construction of several essential compounds such as antibodies, enzymes, hormones and utilized for the structural formation of tissues and cells in the body. In present study Total tissue protein of Tilapia and Catla catla was analysed it is found that total protein content in the liver of Tilapia was found to be 24.6100 ± 0.894 and in Catla was 26.1300 ± 1.820.

Table: 1 Total Protein concentrations (mg/dl) (Mean ± SE)

Sr. No.	Fish species	Total Protein Concentration
1	Tilapia	24.6100 ± 0.894
2	Catla	26.1300 ± 1.820



Graph 1: Showing Concentration of Total Protein

Discussion

Estimation of Tissue protein carried out in the Laboratory of Department of Zoology Shri R. L. T. College of Science Akola using the standard methods as reported by Mahesha Padtade, 2022. As per the observation and results it is found that the concentration of fish protein in Tilapia reported was 24.6100 ± 0.894 and in Catla concentration was found to be 26.1300 ± 3.1523 gm/100 gm of tissue. Protein obtained from the fish and fish protein is best dietary option than any other material as mentioned by Hayes & Flower, 2013, Venugopal and Shahidi 2009, Yanez et al., 1976; Friedman, 1996, BomiRyu (2021). Utilization of Tilapia and Catla as fish protein as option due to its high availability and simple breeding property, source of protein stock is not only to empower its abundance in aquaculture production but also as enrichment material for low protein food products such as food products for children less than five years, Tilapia raised for human consumption for a long time suggesting that the Nile tilapia, Oreochromisniloticus has been cultured for more than 3000 years. Rieuapassa et al., 2022 reported 56.93+0.31 % of protein, 92.28% FTP reported by Ma.danfai, 1985, more than 100 tilapia species have been identified Balarin, 1979, and Tilapia as more commercial farming option, LAN M. Mackie 2008. Riepassa et al., 2022 analysed protein level in tilapia and found 56.93 0.31% of protein. Boran & Karaçam, (2011) reported protein content between 13.0 19.8% in horse mackerel, garfish, golden mullet, and shad in the Black Sea i,e .01 18.60%, 13.99 - 18.45%, 13.31-17.20% and 14.30- 19.80% respectively. Islam & Joadder, 2005 observed 14.09 % (February) to 16.03 % protein content in G Guiris, M. R. Wangkheirakpam, 2019 determined the protein content and amino acid balance in fishes, Rieuwpassa et al., (2021) 56.93+0.31% of

protein reported in Tilapia. Soumyashree and Parida (2020) reported protein concentration in Cirrhinus reba, Mystus vittatus, Puntius denisonni, Clarias batrachus and the results obtain were 2.167±0.01, 1.856±0.094, 2.254±0.094,1.454±0.440 respectively. Proteins derived from fish have a superior balance of dietary vital amino acids when matched to other animal protein sources present study shows Tilapia and Catla catla are good source of protein and is recommended as good food for diet when compared with Asean manual of food analysis.

Conclusion

Many researchers worked on determining concentration of protein in different fishes our results show similarity with the observations of the researchers which is mentioned in the Discussion.

Catla catla shows comparatively more concentration of protein as compared to Tilapia.

Our study suggests good quality of both the fishes as dietary purposes and good option as fulfilling protein requirement, the proximate content expressed in g/100 gm values suggests that they are high source of protein for consumers when results compared with the guidelines of ASEAN manual of food analysis.

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