



BIOCHEMICAL COMPOSITION IN DIFFERENT TISSUES OF *HETEROPNEUSTES FOSSILIS* (*BLOCH*)

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ABSTRACT

In the present study we are investigate the nutritional qualities of Soluble Proteins, Structural proteins, Carbohydrates, Ninhydrine positive substances and Lipids, of *Heteropneustes fossilis*. The investigation showed that the chemical composition is not the same in all fishes. It was also observed that the biochemical composition of fish depends mostly on size, age, sex, season, as well as breeding season. Gill, liver and intestine tissues contain more amount of Structural proteins and less amount of ninhydrin positive substances. Muscle tissue contain more amount of Structural proteins, less amount of carbohydrates. Brain tissue contain more amount of carbohydrates less amount of ninhydrin positive substances Lipids content was more in intestine. All biochemical parameters differ significantly ($P < 0.001$) among the species under investigation. . The present work is a compendium of information on biomedical and pharmaceutical uses of fish processing wastes.

Keywords: *Heteropneustes fossilis*, protein, Carbohydrates, lipid, liver, etc.

INTRODUCTION

Fresh water fish constitutes an essential source of protein in our food (Uboma E MV et al.,1981). The depletion of fishery resources from the sparkling water throughout the world, as properly as developing dietary deficiency in growing country, underscore the requirement for greater utilization of handy fishery assets as human meals (Bijukumar, A et al.,2013).The biochemical and mineral composition shows the fish quality.

Therefore, proximate biochemical and mineral composition of a fish helps to examine its dietary and suitable for eating price in phrases of strength in contrast to exclusive fishes. The predominant parts of fish are additionally divided into four categories, namely; protein, carbohydrate, lipid, and moisture. The chemical composition is historically used as an indicator of the dietary value, in addition, due to the fact of the physiological circumstance of fish and its habitat (Aberoumad A. and Pourshafi K. (2010); Kromhout, D *et al.*,1995) The biochemical evaluation of these ingredients may range considerably from species to species, having a bet on age, sex, surroundings and season [Fawole, O *et al* 2007; Love RM.,1970) Fish obtained high-quality molecule and vital vitamins for human diets (Stansby, M.E. 19627; Kumaran, R *et al.*,2012). Fishes appearing lengthy migrations earlier than they attain the particular floor would possibly make use of protein moreover to lipids for energy, so depleting every the lipid and protein reserves, main to an everyday discount of the organic compound of the fish (Andrew A.E., 2001).The biochemical composition of fish is intently regarding feed intake, migratory and sexual adjustments in reference to spawning. The fish will have hunger intervals for herbal or physiological motives such as at some point of migration, spawning or attributable to exterior elements like as scarcity of food. Fishes are the expensive components of excessive grade protein and one of kind natural products. They are critical supply of animal protein and have been extensive ordinary as a supply of protein, carbohydrate and lipid for the renovation of wholesome physique (Pro. Steffens W., 2006).tein contents of fish give rich source of some important amino acids (Fisheries, F.A. (2013).These vital amino acids and protein are ultimately providing health benefits for human beings (. Limin L, X. Feng and H. Jing (2006). Most of the undeveloped countries of are facing lot of nutritional deficiency due to low levels of proteins, vitamins and minerals in their diet (Eyo, A. A. 2001). Lipids are molecules composed of fatty acid and glycerol that makes up the fats and oils. Water in the form of moisture, is necessary for all organisms to maintain homeostasis in the body. Fish meat is usually preferred in respect of other white and red meat as it has low levels of lipid and high levels of water when compared with chicken, mutton, and beef (Nestel, P. J. 2000).

MATERIALS AND METHODS

Collection of samples

Heteropneustes fossilis were collected from mucharla nagaram, near kakatiya university, Warangal rearing pond. They were treated with 5% KmnO₄ for five minutes for dormant disinfection. The fish weighing 100-150 gms of Heteropneustes fossilis was maintained at constant temperature of $28 \pm 1^{\circ}\text{C}$ under laboratory conditions for acclimation. Fish sample in fresh organ like gill, liver, intestine, muscle and brain were washed, filtered, finely minced and homogenized for chemical analysis

Estimation of Biochemical Parameters

The Folin- Ciocalteu phenol method of Lowry (Lowry O.H *et al.*, 1951) was adopted for the estimation of protein. The carbohydrate was estimated by Anthrone method(Carroll, N.V et al., 1956). Estimation of lipid (. Folch J *et al.*, 1957) .respectively. Moisture content of the samples was determined according the method of (A.O.A.C. 1990). Pre weighed dry samples were dried the moisture content in an oven at 105°C until a constant mass was obtained.

Aim and Objective of Present Study

The aim of the Present study was to determine the relative composition of proteins,Carbohydrates, N.PS,and Lipids in *Heteropneustes fossilis*. To detect the proximate composition of proteins,Carbohydrates, N.PS,and Lipids in the gill, liver, intestine, muscle, and brain.

RESULTS

Quantitative analysis on biochemical components such as proteins (TCA soluble, precipitated proteins) carbohydrates and ninhydrin positive substances of different tissues of *H. fossilis* in control have been estimated and the results obtained from the quantitative analysis on the biochemical contents of various tissues of fresh water cat fish *H. fossilis* are presented in **Table. I.** and **Figure.I.** respectively.

In this study a total biochemical contents of different tissues of *H. fossilis* were observed as follows. Soluble Proteins are more in liver tissue, less in brain tissue (liver>gill>muscle>intestine>brain) Structural Proteins are more in gill tissue, less in brain tissue (gill>liver>intestine>muscle>brain).Carbohydrates are more in brain tissue, less in Muscle tissue (brain>liver>intestine>gill>muscle) ninhydrin positive substances (N.PS) are more in muscle, less in brain (muscle>gill>liver>intestine>brain).Lipids are more in Intestine tissue, less in gill tissue (intestine>liver>brain>muscle>gill)

Gill , liver and intestine tissues contain more amount of Structural proteins and less amount of ninhydrin positive substances.Muscle tissue contain more amount of Structural proteins, less amount of carbohydrates. Brain tissue contain more amount of carbohydrates less amount of ninhydrin positive substances.

Tab 1. Biochemical constituents of Soluble Proteins, structural Proteins carbohydrates and , Ninhydrine positive substances and lipids in different tissues of *H. fossilis*

Tissue	Soluble Proteins	structural Proteins	carbohydrates	Ninhydrine positive substances	Lipid
Gill	4.99 ± 0.22	16.11 ± 0.25	3.60 ± 0.39	3.09 ± 0.39	1.16 ± 0.01
Liver	6.10 ± 0.22	14.38 ± 0.31	6.38 ± 0.59	2.88 ± 0.44	3.15 ± 0.1
Intestine	3.42 ± 0.17	11.21 ± 0.59	4.85 ± 0.41	2.66 ± 0.35	4.35 ± 1.2
Muscle	4.49 ± 0.11	10.66 ± 0.52	2.36 ± 0.55	3.83 ± 0.39	1.57 ± 0.05
Brain	2.49 ± 0.21	6.49 ± 0.37	7.22 ± 0.99	2.49 ± 0.16	2.16 ± 1.3

Values are expressed as fresh weight of tissue mg/gr mean ± SE of tissue; n=6;

Statistically significant value to respective control value *P < 0.001, **P < 0.05, ***P < 0.005

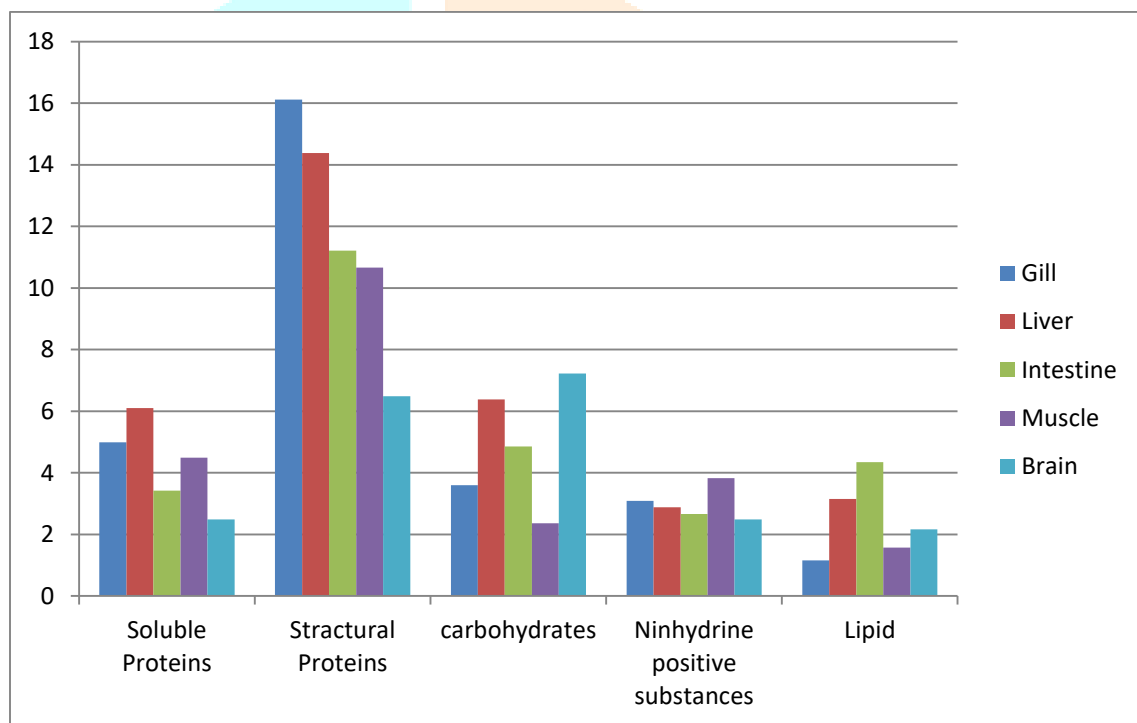


Fig.1. Graphical Representation of Biochemical constituents of Soluble Proteins, structural Proteins carbohydrates and , Ninhydrine positive substances, lipid in different tissues of *H. fossilis*

DISCUSSION

Fish has the important source of easily digestible protein and constitutes a major share in the world food market and can meet the protein hunger, nutritional security in the upcoming years. The proximate composition of fish species greatly varies during the spawning season due to physiological reason and changes of climate conditions . (Damian, G ET AL.,2007; . Boran, G. and M. Rangoda, 2011). More studies have been carried out on the proximate composition of fishes (Stansby, M., 1962; . Love, R.M., 1970).The proximate composition of fish species often different from one to another area (Afroza Begum ET AL., 2013; Folch J ET AL,1957). The essential cause of change in proximate composition and minerals may be due intake of food, size, habitat and season of fish (Deka BK ET AL 2012;[Begum M, Minar MH.,2012; Begum M, Akhter T, Minar MH.,2012). Among all the major constituents studies the protein is an important component in the fish body, which is essential for all living organisms. Protein is not only for enzyme development and hormonal activity (Wilson RP. 1986), but is also an essential source of energy in all living (Halver JE, Hardy RW,2002)According to Tripathy *et al.*, the increase in protein content of liver, intestine, gills muscles and ovary in normal condition to exposure of some chemical Impact (. Tripathy G., H. Singh and Shasmal J.,2006) In conclusion our data suggested that protein content ranged from 21.470 ± 0.18 to 111.317 ± 0.37 . Protein content in liver and ovary (111.317 ± 0.37 , 106.033 ± 0.33 mg/g) which was observed in the study in accordance with the authors (Yang J. and Chen H. ,2003). A numerous research discovered increase in protein concentration in the liver and ovary with increase in size of the fish. Reason for increasing protein in ovary because of the spawning of fish during breeding. Liver is an important organ involved in metabolic processes and in the detoxification and xenobiotics, which was analyzed (Schmidt Nielson B 1975). The decrease in the content of protein observed in the present study in most of the fish tissues may be due to directing the free amino acids for the synthesis of protein or due to metabolic moderate of the keto acids to gluconeogenesis pathway for the synthesis of protein (. Fanta E.F *et al.*,2003). Carbohydrates are main source of energy in the living organism and play an important role in the cellular metabolism by providing energy to the all body cells. The carbohydrate content ranged from 1.202 ± 0.05 to 4.473 ± 0.03 mg/g. In the present study, maximum carbohydrate was observed in muscle. However, in muscle of *Heteropneustes fossilis*, the carbohydrate content (4.35 ± 0.03 mg/g). Glycogen is the major form of storage in liver and muscle. Liver is the site of metabolism. Second large quantity of carbohydrate present in liver (4.417 ± 0.19 mg/g). Among all tissues, liver showed higher carbohydrate content because of synthesis in enzyme. Fish liver is a powerful organ for the study of environmental quality biomarkers, due to its role in the animal metabolism by (Yang J. and Chen H. 2003). Lipid from fish known to contain polyunsaturated fatty acids, which help to rectifying coronary heart diseases from human beings. In the present study, the lipid content of different tissues varied from 1.16 ± 0.01 to 4.35 ± 0.03 mg/g however in *H.fossilis* lipid content (4.35 ± 0.03 mg/g) in the intestine is high when compared to other tissues. Most of the intestinal lipase activity is located in proximate part of intestine (. Piggot, G.M. and B.W. Tucker, 1990). Maturity and Age variation in the same species and may also contribute to the significant difference in the total lipid content(Marks, P.J.,1980)

.The decreased level of tissue lipid content may be due to inhibition of oxidative phosphorylation or mobilization of glycerol and agreed with Chezhian A et al 2010). The differences in these values may be due to many factors such as lipid content in fish different according to species, seasons and geographical variations. Moisture increase might be due to spawning season and availability of more water and more activeness and vigour of fish. Moisture is one of the major components of all species and all type of fish (Mazumde,2008). In the current study, moisture content of fish ranged from 67.25%-77.46%. The moisture content present in intestine (77.46 ± 0.007). Similar to the results obtained by other researchers such as (Job, B et al 2015) determined moisture ranges from 77.69 to 79.11%. Percentage of moisture is a good indicator of its relative contents of energy, protein, carbohydrate and lipid. Intestine must observe massive quantity of water, so the moisture content increased in intestine of *H.fossilis*. Pengaruh waktu delignifikasi terhadap pembentukan alfa selulosa dan identifikasi selulosa asetat hasil asetilasi dari limbah kulit pisang kepok. Yannasandy et al.,2017)

CONCLUSION

Biochemical studies of fish tissues are of considerable interest for their specificity in relation to the food values of the fish and for the evaluation of their physiological needs at different periods of life. Studies it can be conclude that the protein was used for body building during different phases of maturation. This fish is the most preferable food for human consumption because of its relatively high value of protein content in the fish. This study concludes that obtainable fish food can be a substantial aid in redressing the problems of malnutrition and can help in pharmaceutical industries to medicines and formulate drugs from biochemical and mineral profile of fresh water fishes.

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