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The Comparative Study of Biochemical Composition of Catla and Rohu Fish with special references to their Moisture, Ash, Protein and Fat Content in Begusarai District, Bihar

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Abstract

Fish products are an important component of the human diet, which improves their nutritional standards. The nutritional value of fish naturally depends on their biochemical composition. In the present study, an attempt was made to compare the biochemical compositions of freshwater fish Labeo rohita and Catla catla in the following aspects: moisture, ash, protein and fat. Samples were collected from wholesale markets and local retail markets in Begusarai were surveyed to assess their nutritional value. Biochemical composition of two fishes named Rohu (Labeo rohita) and Catla (Catla catla). The mean value of moisture was 76.38% in Labeo rohita, 75.03% in Catla catla,. The mean value of Ash was 1.87% in Labeo rohita, 1.64% in Catla catla. The average value of fat content was 7.39% in Labeo rohita, 6.24% in Catla catla. The average value of protein was 17.17% in Labeo rohita, 16.44% in Catla catla. Each of these two fishes was collected from six different sources. The sources were Wholesale Markets and Local Retail Markets. Significantly highest amount of moisture content was 77.82% in Rohu (Labeo rohita), Ash, protein and fat variation was highest in Catla (Catla catla) fishes. This study helps people to compare the moisture, ash, protein and fat variation among these fishes. From this study, we observed that all these cultures species are rich in food value.

Keywords— *Biochemical, Labeo rohita, Catla catla, Bihar*

INTRODUCTION

Fish is known as one of the most important sources of animal proteins and other essential nutrients in the human diet. Fish is widely used throughout the world because, in addition to being a good source of biologically valuable proteins, it also offers other benefits, such as lowering blood cholesterol. Therefore, fish protein can be used to supplement essential amino acids and also to improve the overall protein quality of a mixed diet. FAO, 2005. Fish products are an important component of human diets, improving their nutritional standards. The nutritional value of fish naturally depends on their biochemical composition. Prado et al. al., 2009. Fish and fishing have played an important role in Indian diet, culture and economy since ancient times. Fisheries in India are an important sector of the Indian economy, accounting for 1.07 percent of the total GDP. Over the past 75 years, the Indian fishing industry has undergone a remarkable transformation from a traditional activity to a commercial enterprise. India's fish production has grown 22-fold since independence, from 7.5 lakh tonnes in 1950-51 to a record 162.48 lakh tonnes in 2021-22, reflecting an annual growth rate of 10.34 percent. India is currently the world's third largest

fish producing country, accounting for approximately 8 percent of global fish production. Domestic fish production, mainly due to aquaculture, grew exceptionally strongly. In 2000-2001, domestic fish production was 28.23 thousand tons, which increased to 121.21 thousand tons in 2021-22, which is a significant increase of 400%. This growth is due to the joint efforts of fisheries scientists, state and federal governments and the commitment of fishermen, fish farmers and entrepreneurs. Fish is low fat, high quality protein. Fish is full of omega-3 fatty acids and vitamins such as vitamin D and B2 (riboflavin). Fish is rich in calcium and phosphorus and an excellent source of minerals such as iron, zinc, iodine, magnesium and potassium. Fish oil is also one of the most important natural sources of polyunsaturated fatty acids, as it contains two important x-3 PUFAs, EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid), which have proven beneficial effects on the human body. . Most fish have a protein content of 15-30% by weight, a fat content of 0-25% by weight and a moisture content of 50-80% by weight. That is why it is important to analyze the biochemical composition of proteins, fats and ash. The biochemical composition of fish varies between species and within the same species. Although several studies deal with the biochemical composition of many commercially important fish, no work has been done on Rohu and Catla under different environmental conditions. It is important to find out the biochemical composition of the fish that we eat regularly. This study was conducted to evaluate the biochemical composition of locally available Rohu and Catla.

MATERIALS AND METHODS

A. Collection of samples

Fish samples were collected from 3 wholesale markets and 3 local retail marketof Begusarai Bihar using a sterile aseptic container together with ice. They were transported to laboratory of G. D. College Begusarai with isolated iceboxes. For the analysis, 2 species of fish were selected. These were *Labeo rohita and Catla catla*. In this study, following parameters of fish samples were examined. Moisture, Ash, Protein, and Fat.

B. Preparation of samples

After reaching to laboratory samples were washed thoroughly with distilled water. Only the edible portions were taken for experiment.

C. Methods of estimation

We estimated Moisture and ash contents of the fishes by AOAC method the crude protein of the fish was conducted byMicro- Kjeldhal method and Fat content was determined by Bligh and Dryer method.

Calculations:

Calculation of Moisture:

Calculation of Ash:

$$\text{Moisture (\%)} = \frac{\text{Weight loss}}{\text{Original weight of the sample taken}} \times 100$$

$$\text{Ash (\%)} = \frac{\text{Weight of dry samples}}{\text{Original weight of the samples taken}} \times 100$$

Calculation of Fat:

$$\text{Fat (\%)} = \frac{\text{Weight of the residus}}{\text{Weight of the samples taken}} \times 100$$

Calculation of Protein:

(%) Of Nitrogen = (Titration Reading-Blank Reading) ×Strength Of Acidx100/5×100/Weight Of The Samplein this case empirical factor was 6.25 for the fish

Protein (%) = % of Total N_2×6.25

RESULTS AND DISCUSSIONS

The nutrient values of 24 fishes collected from different Wholesale Market and Local Retails Markets are presented in Tables (1 & 2). We analysed Moisture %, Ash %, Fat % and Protein %.

Table 1: Proximate Composition of *Labeo rohita* fishes

Sample	Moisture %	Ash %	Fat %	Protein %
Wholesale Market-1-Rohu	74.35	2.42	7.35	17.65
Wholesale Market-2-Rohu	76.79	2.07	7.90	17.45
Wholesale Market-3-Rohu	75.29	1.82	8.26	17.04
Local Retail Market-1-Rohu	76.65	1.78	7.40	17.05
Local Retail Market-2-Rohu	77.82	1.72	6.79	17.66
Local Retail Market-3-Rohu	77.43	1.46	6.65	16.22
Average	76.38	1.87	7.39	17.17

Proximate Composition of *Labeo rohita* fishes

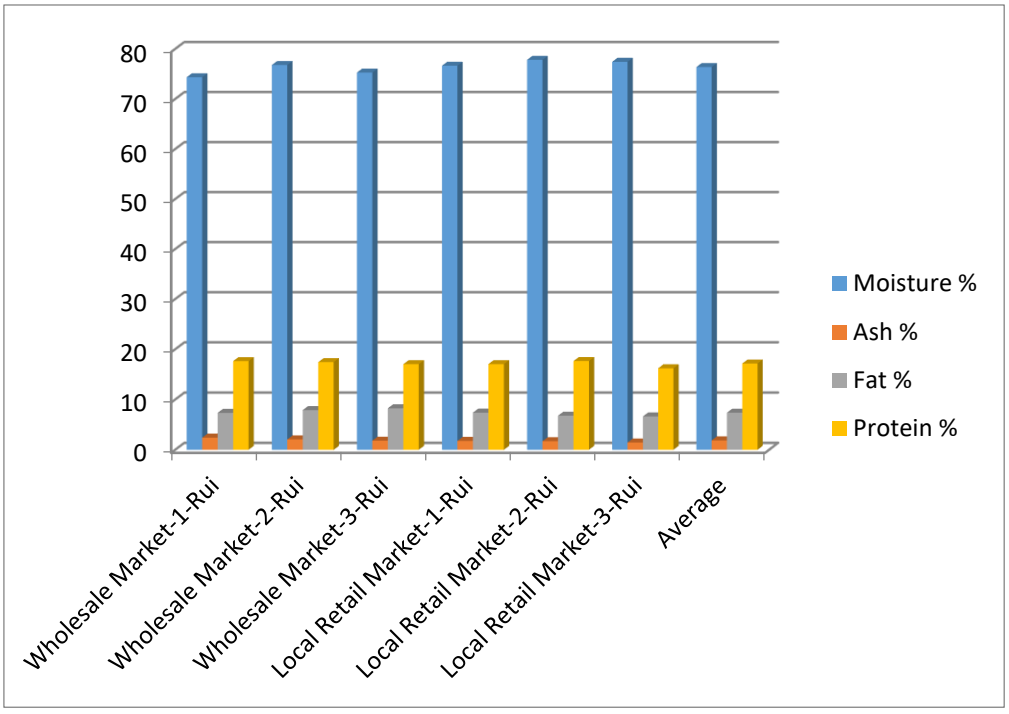

Fig-1: Variation of moisture, ash, fat and protein among Rohu (*Labeo rohita*) fishes which collected from six different sources.

Table 2: Proximate Composition of Catla (*Catla catla*) fishes

Samples	Moisture %	Ash %	Fat %	Protein %
Wholesale Market-1-Catla	73.74	2.10	7.10	16.93
Wholesale Market-2-Catla	75.35	1.65	7.22	16.72
Wholesale Market-3-Catla	74.65	1.68	7.00	16.58
Local Retail Market-1-Catla	74.36	1.54	7.02	16.18
Local Retail Market-2-Catla	76.72	1.62	6.52	17.15
Local Retail Market-3-Catla	75.40	1.26	6.24	15.09
Average	75.03	1.64	6.84	16.44

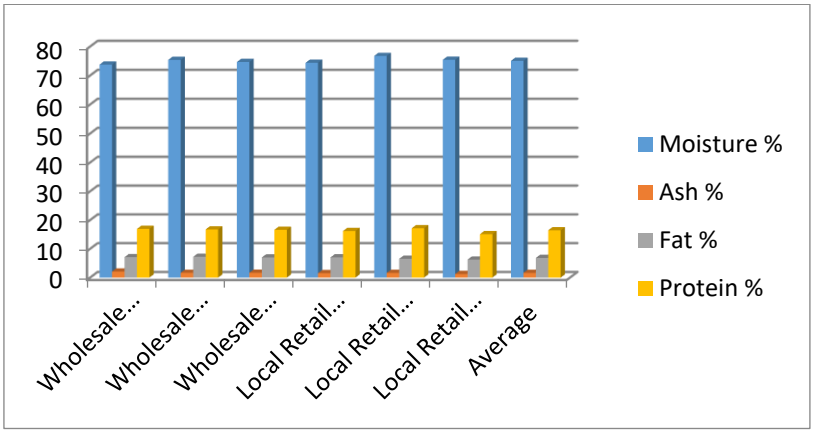

Fig-2: Variation of moisture, ash, fat and protein among Catla (*Catla catla*) fishes which collected from six different sources.

Moisture variation:

From table 1 we found that moisture percentage of Rohu (*Labeo rohita)* fishes which collected from six different sources were ranged from 74.35% to 77.82%. The average value of moisture content was 76.38% which was near to the finding of Pradhan *et al*. (2012) and Mahboob *et al.* (2004). From fig-1 we found that moisture content was highest in the Rohu fish which was collected from Local Retail Market-2. In case of Catla (in table 2) it was examined that moisture percentage of Catla (*Catla catla*) fishes which collected from six different sources were ranged from 73.74% to 76.72%. Theaverage value of moisture content was 75.03% which was less or more similar to the findings reported by Shakir *et al.* (2013) and Manirujjaman *et al*. (2014). From Table-2 we found that moisture content was highest in the Catla (*Catla catla*) which was collected from Local Retail Market-2

Ash variation:

Maximum and minimum Ash contents of Rohu (*Labeo rohita*) fishes were collected from six different sources was from 1.46% to 2.42%. The average value of Ash variation was 1.87%. We also find less or more similar results

with the studyof Pradhan et al (2012) and Mahboob et al (2004). We found highest content of Ash in the Wholesale- Market-1- Rohu. From table 2 we analysed that Ash variation of Catla (*Catla catla*) fishes which collected from six different sources is ranged from 1.26% to 2.10%. The average value of Ash was 1.64%. The ash content of the fish comply with the ranges found by Shakir et al (2013) and Manirujjaman, M., et al (2014). From Table-2 we found that Ash percentage was highest in Catla (*Catla catla*) which was collected from Whole sale Market -1.

Fat variation:

In the present investigation, the fat contents in all sample 24 ranges from 6.24 to 8.26 %. From table - 1. Fat variation of Rohu (*Labeo rohita*) fishes was ranged from 6.65% to 8.26%. The average value of Fat variation is 7.39% which was supported by the study of Pradhan *et al.* (2012) and Mahboob *et al*. (2004). From Table-1 we found that Fat variation was highest in the *Catla catla* fish which was collected from Whole Sale Market and Local Retail Market. From table 2 it is examined that Fat variation of Catla (*Catla catla*) fishes which collected from six different sources. It is ranges from 6.22% to 7.10%. The average value of Fat variation is 6.84 which was lower than that reported by Hafiz Abdullah Shakir et al (2013) and Manirujjaman,M., et al (2014).

Protein variation:

The estimated protein content variation of Rohu (*Labeo rohita*) fishes of six different sources different sources was ranged from 16.22% to 17.66%. The average value of Protein variation was 17.17% which is near to the finding of Pradhan et al(2012) and Mahboob et al (2004). From table 2 it was observed that Protein variation of Catla (*Catla catla*) fishes ranged from 15.09% to 16.93%. The average value of Protein variation was 16.44% which supported the finding reported by byShakir et al (2013) and Manirujjaman et al (2014). From Table-2 we found that Protein content was highest in the Catla (*Catla catla*) which was collected from Wholesale Market-1.

CONCLUSIONS

From the present experiment it can be stated that biochemical composition of different fishes varies with species. All the two species are rich in protein content so they are important source of animal protein. As they have high amount of protein increasing the productions of these three species can reduce the animal protein requirements of India. These results also suggest that the proximate composition of fish species greatly varies due to physiological reasons and changes in environmental conditions.

REFERENCES

1. AOAC (Association of Official Agrichemicals). (1990). Official Methods of Analysis of the Association of Official Agricultural Chemist. HeIritz, K. (Ed.). 15th Ed. Vol.2. Association of Official Analytical Chemists, Inc., Suite 400, 2200 Wilson Boulevard, Arlington, Virginia 22201 USA.p. 685-1298.
2. Bligh E.G. and Dyer W. (1959). Total lipid Extraction and Purification. Can. J. Biochem. Physiol. 37:99-110p.
3. *Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, Government of India. "Annual Report 2021-22" (PDF). p. 9.*

4. Falls, M. (2012). Factors that Influence Food Access in the United States: A Snapshot of Food Access in Ohio and Kentucky, Maimouna Falls, Wright State University
5. Hafiz Abdullah Shakir, Javed Iqbal Qazi, Abdul Shakoor Chaudhry, Ali Hussain & Shaukat Ali, 2013, Nutritional comparison of three fish species co- cultured in an earthen pond, BIOLOGIA (PAKISTAN) 2013, 59 (2), 353-356
6. Imad Patrick Saoud, Malek Batal, Joly Ghanawi & Nada Lebbos. Seasonal evaluation of nutritional benefits of two fish species in the eastern Mediterranean Sea International Journal of Food Science and Technology 2008, 43, 538–542
7. Kamal D, Khan AN, Rahman MA, Ahamed F., 2007. Biochemical composition of some small indigenous fresh water fishes from the River Mouri, Khulna, India. Pak J Biol Sci. 2007 May 1;10(9):1559-61.
8. M. Manirujjaman, M.M.H. Khan, Meftah Uddin, Minarul Islam, Matiar Rahman, M. Khatun, Shahangir Biswas, M. A. Islam, et al. "Comparison of Different Nutritional Parameters and Oil Properties of Two Fish Species (*Catla catla* and *Cirrhinus cirrhosus*) from Wild and Farmed Sources Found in India." *Journal of Food and Nutrition Research* 2.1 (2014): 47-50.
9. Md. Sarower-E-Mahfuj, M. Belal Hossain and M.H. Minar, 2012. Biochemical Composition of an Endangered Fish, *Labeo bata*(Hamilton, 1822) from India Waters. *American Journal of Food Technology, 7: 633-641.*
10. Mohajira Begum and Maruf Hossain Minar, 2012. Comparative Study About Body Composition of Different SIS, Shell Fish and Ilish; Commonly Availablein India Trends in Fisheries Research Vol. 1 No. 1 (2012)
11. P. Barua, M.A Pervez, D. Sarkar and S. Sarker, 2012. Proximate biochemical composition of some commercial marine fishes from Bay of Bengal,India. Mesopot. J. Mar. Sci., 2012, 27 (1): 59 – 66
12. Pearson D. (1999). Pearson's Composition and Analysis of Foods. University of Reading, Reading, UK.
13. Prado Simone S., Rodrigo P. P. Almeida (2009). Role of symbiotic gut bacteria in the development of *Acrosternum hilare* and *Murgantia histrionica* Volume 132, Issue 1, 1-98.
14. Reza Ghaedian, John Neil Coupland, Eric Andrew Decker, David Julian McClements.1998. Ultrasonic Determination of Fish Composition. Journal of Food Engineering Volume 35, Issue 3, February 1998, Pages 323–337
15. Shahid Mahboob, Fauzia Liaquat, Sadia Liaquat, Muhammad Hassan and Muhammad Rafique, 2004. Proximate Composition of Meat and Dressing Losses of Wild and Farmed Labeo rohita (Rohu), Pakistan J. Zool., vol. 36(1), pp. 39-43
16. Shamim Ahmed, A.F.M. Arifur Rahman, Md. Ghulam Mustafa, M. Belal Hossain and Nazmun Nahar, 2012. Nutrient Composition of Indigenous andExotic Fishes of Rainfed Waterlogged Paddy Fields in Lakshmipur, India. World Journal of Zoology 7 (2): 135-140
17. Sunil Chandra Pradhan, Ajya Ku Patra and Kapil C. Mohanty. December, 2012. Biochemical Studies of Muscle And Liver of Labeo Rohita (Ham.) in Relation to Season And Sex. International Journal of Current Research, Vol. 4, Issue, 12, pp. 228-234.