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Comparative Assessment of Nutritional Composition in Selected Freshwater Fishes from Amravati City

Dr. Siddhu. H. Rathod

Department of Zoology, Vidya Bharati Mahavidyalaya, C.K Naidu road, Amravati, Maharashtra, India

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ABSTRACT

This study assesses the nutritional composition of nine freshwater fish species Rasbora daniconius, Wallago attu, Pangasius pangasius, Channa punctatus, Notopterus notopterus, Labeo rohita, Anguilla bengalensis, Barilius tileo, and Ompok pabda—collected from the Amravati fish market. Moisture and ash contents, key indicators of nutritional value, were analyzed. Moisture levels ranged from 52.52 ± 0.69% in Pangasius pangasius to 76.16 ± 0.09% in Channa punctatus, while ash content varied from 0.76 ± 0.24% in Barilius tileo to 1.58 ± 0.01% in Channa punctatus ($P < 0.05$). Despite their relatively smaller size compared to marine species, these fishes offer significant protein, moisture, and mineral content, making them a vital, low-cost nutritional source for populations in the Amravati region. Their nutritional richness suggests strong potential for promoting dietary diversity, improving food security, and supporting local fisheries through sustainable utilization.

Keywords: Freshwater fishes, Total Protein, Ash, Moisture.

INTRODUCTION

Due to increase population, world is facing many problems in which most important is shortage of food and under nourishment. Meat, milk and eggs are the major sources of protein which is obtained from animals. With the increasing of fish farming meat production is increasing to fulfil the requirements of proteins. Good quality protein is obtained with the development of fisheries (**Islam *et al.* 2020**). In fish, essential nutrients such as proteins, essential fatty acids, vitamins, and minerals have vital importance to reinforce normal immune function. The nutritional value of fish meat lies in its protein, lipid, vitamin and mineral contents and also in its caloric value (Higashi, 1962).

Recently fish meat focused more as a potential source of animal protein and essential nutrients for human diet and is considered superior to other meats sources in having significantly low lipids and high digestibility. The analysis of the major constituents (i.e., proximate composition) of fishes is necessary for providing information of the concentrations of

protein, lipid, ash and moisture of the particular species **(Kongsbak *et al.*, 2008).** Fishes are not only excellent source of protein they are also an important source of vitamins, antioxidant as well as minerals including Calcium, Iodine, Selenium, Iron, etc. (Decker *et al.* 2001; Sarkar et *al.,* 2013) and also a good source of highly unsaturated fatty acid (HUFA) and polyunsaturated fatty acid (PUFA) especially omega-3 fatty acid viz. eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) (**Huynh *et al.,* 2007).**

So the aim of the present study was to determine the nutritive composition of selected fishes to provide knowledge of nutritive value prior to human consumption.

Materials and Methods:

Nine freshwater species—*Rasbora daniconius, Wallago attu, Pangasius pangasius, Channa punctatus, Notopterus notopterus, Labeo rohita, Anguilla bengalensis, Barilius tileo,* and *Ompok pabda*—were procured weekly from the Amravati fish market. Muscle tissues were dissected, homogenized, and analysed for moisture and ash content following **AOAC (2000)** methods. Moisture was determined by oven drying at 105°C to constant weight, while ash content was assessed by incineration at 550°C in a muffle furnace. Triplicate analyses were performed, and results were expressed as Mean ± SD. Data were statistically analysed using ANOVA to determine significant differences ($P < 0.05$).

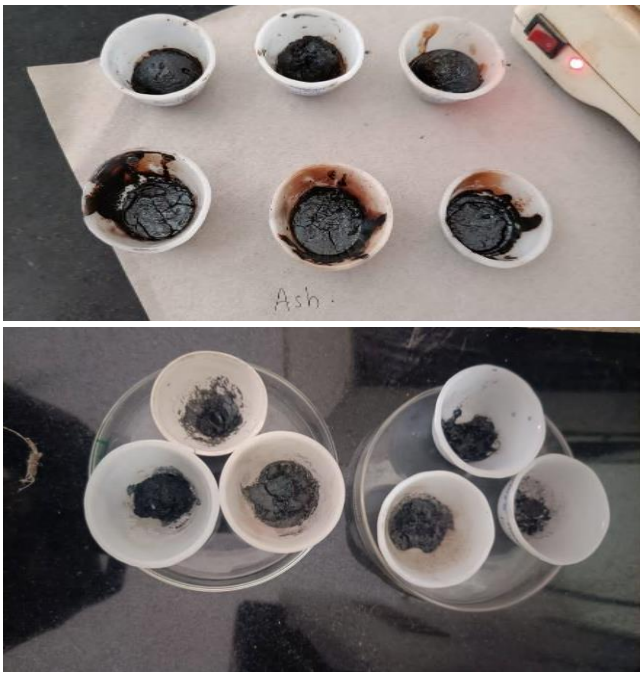


Fig. No. 1: Collection of different meat samples for investigation of Moisture, Ash, and Protein

Observation and Results:

In the present study, the moisture content in the collected fish species muscle tissue ranged from 52.52 ± 0.69% to 76.16 ± 0.09% (Table 1), showing significant variation among the different species ($P < 0.05$). The moisture content recorded for *Rasbora daniconius, Wallago attu, Pangasius pangasius, Channa punctatus, Notopterus notopterus, Labeo rohita, Anguilla bengalensis, Barilius tileo,* and *Ompok pabda* was 68.99±0.07%, 72.18±0.19%, 52.52±0.69%, 76.16±0.09%, 58.12±0.49%, 66.12±0.05%, 62.12±0.056%, 70.12±0.268%, and 60.18±0.04%, respectively. The highest moisture content was found in *Channa punctatus* (76.16%), while the lowest was observed in *Pangasius pangasius* (52.52%), both showing statistically significant differences ($P < 0.05$).

Also the ash content among the nine fish species ranged from 0.76 ± 0.24% to 1.58 ± 0.01% (Table 1). The ash content in the muscle tissue of *Rasbora daniconius, Wallago attu, Pangasius pangasius, Channa punctatus, Notopterus notopterus, Labeo rohita, Anguilla bengalensis, Barilius tileo, and*

Ompok pabda was found to be 0.98±0.007%, 1.12±0.09%, 1.52±0.05%, 1.58±0.01%, 0.78±0.01%, 0.96±0.04%, 1.12±0.41%, 0.76±0.24%, and 1.24±0.063%, respectively. The ash content was significantly higher in *C. punctatus* (1.58%) and lower in *B. tileo* (0.76%) (P < 0.05).

The total protein in muscle tissue was found 16.12 to 31.52± 0.14 for all investigated fish species (Table 2). The protein content of *Rasbora daniconius, Wallago attu, Pangasius pangasius, Channa punctatus, Notopterus notopterus, Labeo rohita, Anguilla bengalensis, Barilius tileo, and Ompok pabda* was 25.20±0.02, 29.81± 0.22, 31.52± 0.14, 26.52±0.17, 30.12±0.30, 22.78±0.10, 22.10±0.03, 16.12±0.014 and 21.92± 0.049 respectively. Significantly ($P <$ 0.05) higher total protein was found in, *P. pangasius* (31.52%) and *N. notopterus* (19.94 %) and lower in *B. tileo* (16.12%). Also total protein in liver tissue was found lowest in B. *tileo* (14.10) and higher in *P. pangasius* (29.81) for all investigated fish species.

Table 1. Moisture and Ash Content in the Muscle Tissue of Nine Fish Species Collected from the Amravati Fish Market (Mean ± SD)

Sr. No	Fish Species	Moisture Content (%)	Ash Content (%)
1	*Rasbora daniconius*	68.99 ± 0.07	0.98±0.007
2	*Wallago attu*	72.18 ± 0.19	1.12±0.09
3	*Pangasius pangasius*	52.52 ± 0.69	1.52±0.05
4	*Channa punctatus*	76.16 ± 0.09	1.58±0.01
5	*Notopterus notopterus*	58.12 ± 0.49	0.78±0.01
6	*Labeo rohita*	66.12±0.05	0.96±0.04
7	*Anguilla bengalensis*	62.12±0.056	1.12±0.41
8	*Barilius tileo*	70.12±0.268	0.76±0.24
9	*Ompok pabda*	60.18±0.04	1.24±0.063

Table 2. Total protein in the Muscle Tissue of Nine Fish Species Collected from the Amravati Fish Market (Mean ± SD)

Sr. No	Fish Species	Total Protein (Muscle) gm./100gm	Total Protein (Liver) gm./100gm
1	*Rasbora daniconius*	25.20±0.02	21.91± 0.17
2	*Wallago attu*	29.81± 0.22	26.59± 0.49
3	*Pangasius pangasius*	31.52± 0.14	29.81± 0.14
4	*Channa punctatus*	26.52±0.17	18.18± 0.09
5	*Notopterus notopterus*	30.12±0.30	21.22± 0.51
6	*Labeo rohita*	22.78±0.10	19.12± 0.49
7	*Anguilla bengalensis*	22.10±0.03	18.76 ±0.049
8	*Barilius tileo*	16.12±0.014	14.10± 0.106
9	*Ompok pabda*	21.92± 0.049	17.16± 0.240

Fig. No. 1) Moisture Content in the Muscle Tissue of Nine Fish Species Collected from the Amravati Fish Market (Mean ± SD).

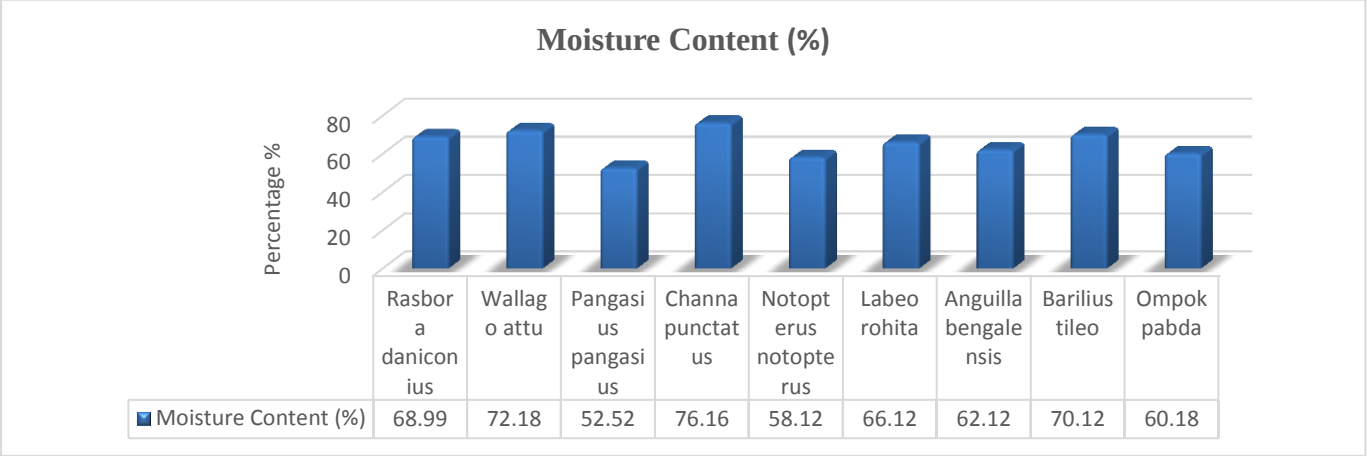


Fig No. 2) Ash Content in the Muscle Tissue of Nine Fish Species Collected from the Amravati Fish Market (Mean ± SD)

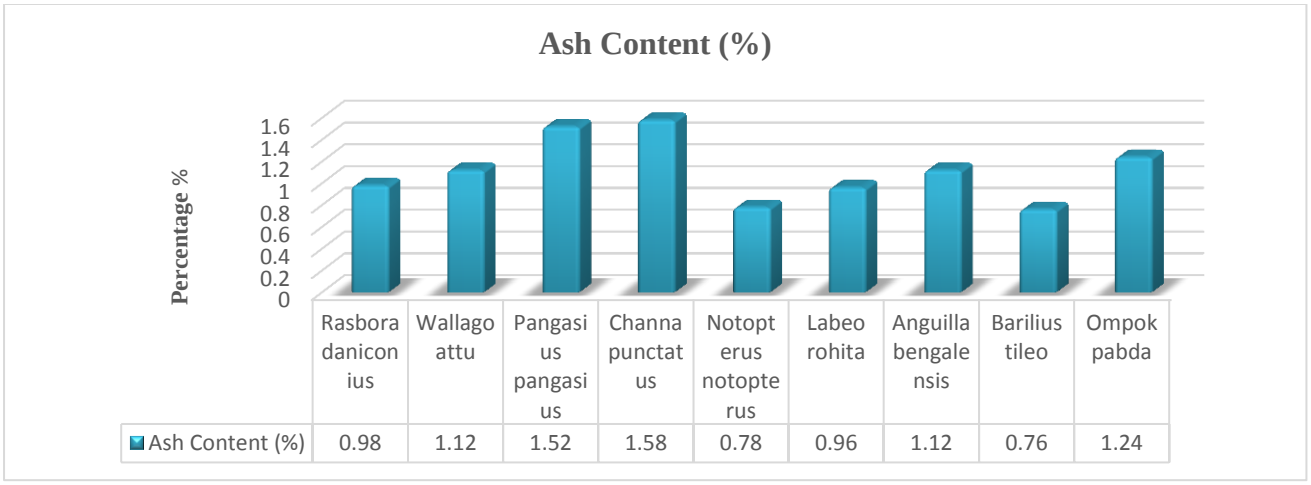
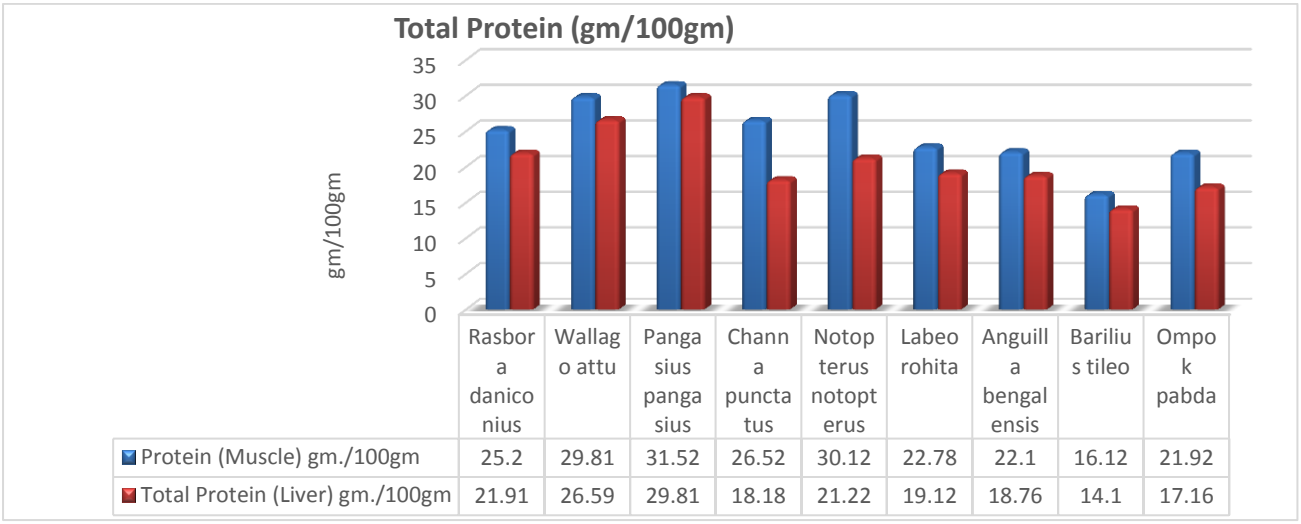


Fig No. 3) Total protein in the Muscle Tissue of Nine Fish Species Collected from the Amravati Fish Market (Mean ± SD)



Discussion and Conclusion:

Significant interspecies differences in nutritional composition were evident among the nine freshwater fish species. *Channa punctatus* exhibited the highest moisture (76.16 ± 0.09%) and ash (1.58 ± 0.01%) levels, whereas *Pangasius pangasius* and *Barilius tileo* recorded the lowest values for these parameters, respectively. Such variation reflects differences in body composition and nutrient reserves, with lower moisture often indicating greater protein or lipid density.

The elevated ash content in *Channa punctatus, Pangasius pangasius*, and *Ompok pabda* highlights their mineral richness, offering dietary benefits such as improved bone health and metabolic support. Protein concentrations (reported separately) align with levels in commercially important fish (**Zaitsev *et al.,* 2003**), largely due to the dominance of structural proteins in muscle tissue.

Overall, these freshwater fishes represent a valuable source of essential nutrients for both rural and urban communities. Promoting their sustainable consumption can enhance regional nutrition, support small-scale fisheries, and contribute to food security initiatives.

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