

*Nutritional Analysis of Striped Spiny Eel: *Macrogathus pancalus* (Hamilton, 1822) in Laboratory Condition*

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Abstract - The objective of the study was to conduct a nutritional analysis (proximate composition and mineral composition) of a small indigenous fish species, striped spiny eel: *Macrogathus pancalus*. It is locally known as Pakal fish. Fish specimens were obtained from the local markets (Boro bazar, Jhikorgacha market, Doratana market) of Jashore district. All the nutritional analysis was done by standard AOAC methods. Findings from the study showed that the moisture percentage was about 77%; ash percentage was about 2%; crude protein percentage was (18%); crude lipid percentage was 3%. Fe content of the fish sample was 0.62mg/100g and Ca content was 0.13mg/100g of fresh sample.

Keywords - Nutritional, Indigenous Fish, *Macrogathus Pancalus*.

I. INTRODUCTION

Bangladesh with an area of 1,47,570 km², is a deltaic country in the Ganges, Brahmaputra and Meghna (GBM) drainage systems. A huge number of freshwater [1,2] and marine fish species exist in this country. Prawns, crabs and molluscs also found in Bangladeshi freshwater [3-5] in abundance. Freshwater capture fisheries have been estimated as 28.19% of the country's total fish production [6]. Fisheries make up about 22% of total animal protein consumption [7]. Among all the fish species, small indigenous fish species (SIS) are of great importance in the food and nutrition security of rural people.

Macrogathus pancalus is a striped spiny eel species, locally called by various names Pakal, Baim, Guchibaim, Turi etc. In English, it is known as Stripped Spiny Eel or Barred Spiny Eel [8]. It is a species of Mastacembelidae family and found in India, Bangladesh, Nepal, Myanmar

and Pakistan [9]. A very limited number of studies have been found on proximate and mineral analysis of this species. The objective of this study was to conduct a nutritional analysis (proximate and minerals) of *Macrogathus pancalus*.

II. MATERIALS AND METHODS

A. Sample Collection and Processing

Fresh fish specimens were collected from three local fish markets of Jashore district: Jhikorgacha market, Boro bazar and Palbari market. Samples were immediately brought to the food analysis laboratory of Jashore University of Science and Technology after buying. Their length, width and weight were taken with standard twelve-inch ruler and electronic balance. Then the samples were washed with distilled water and were carefully degutted to prevent microbial contamination. Only the fish flesh was collected for nutritional analysis.



Figure 1: *Macrognathus pancalus* (Pakal)

B. Nutritional Analysis

Proximate analysis was conducted by AOAC (Association of Official Analytical Chemists) methods [10]. The samples were analyzed in triplicate.

Moisture: Moisture was analyzed by heating the weighed sample in oven drying method. The samples were heated at 105°C for 4 hours.

Ash (total minerals): The ash percentage was determined by using muffle furnace. The samples were heated in the furnace at 600°C for 6 hours.

Crude Protein: Protein content was estimated by micro-Kjeldahl method. In this method, three processes were used: digestion, distillation and titration. Total amount of Nitrogen is calculated by this method, followed by a multiplication with 6.25 (Jone's factor) [11].

Crude Lipid: Crude lipid percentage was measured by Soxhlet apparatus. A non-polar solvent was used to extract the crude lipid content.

Mineral analysis: Calcium and Iron content of the samples were also estimated by standard methods of AOAC [12]. Calcium oxalate precipitation method was used in case of Ca determination and UV-spectrophotometric method was used for Fe estimation.

III. RESULTS AND DISCUSSION

A. Proximate Composition

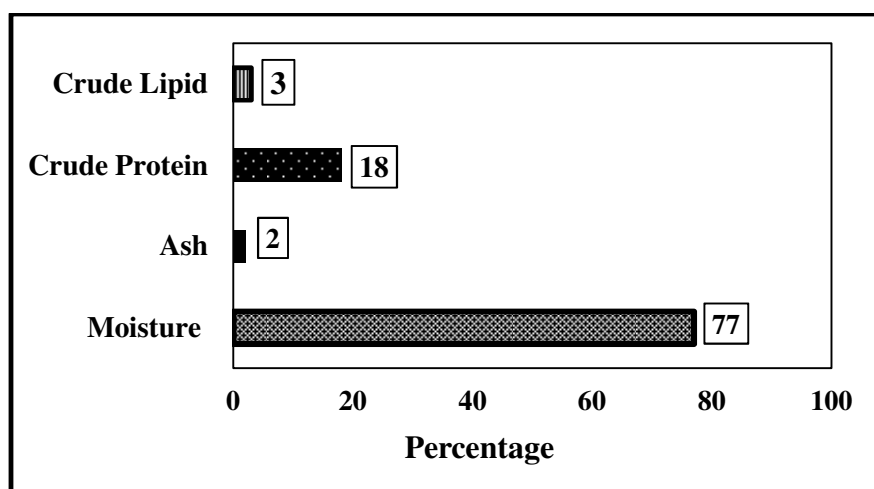
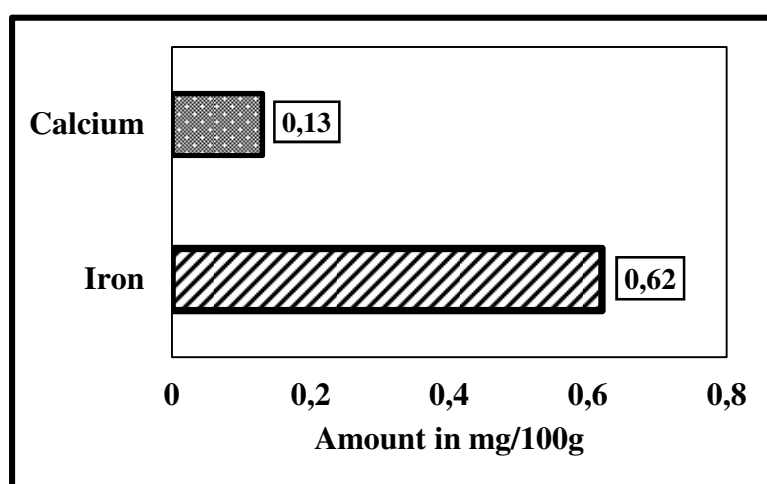
Figure 2 elucidates the proximate composition of Pakal fish. The moisture percentage was higher than all other proximate components of the fish samples. Moisture

percentage was about seventy-seven percent (77%). The ash content was very low (about 2%) in the fish samples. On the contrary, crude protein content was about eighteen percent (18%), whereas, crude lipid content was about three percent (3%).

B. Iron and Calcium Content

Figure 3 shows the Fe and Ca content in the Pakal fish. Iron content was found to be 0.62 mg and Ca content was found to be only 0.13 mg per 100 g of fresh flesh of the fish species.

Table 1 illustrates the comparison of the proximate and mineral content of *Macrognathus pancalus* with findings from other two studies. The moisture percentage was found to be 77% in current study. Almost similar findings were found in other studies also such as 79% by Bogard *et al* and 75% by Debashis *et al*. More or less similar findings were observed in case of protein content. Bogard *et al*, Debashis *et al* found the protein content to be 18% and 17% respectively. The current study found that the sample had contained 16% protein. Findings regarding fat content were almost same in Debashis *et al* and in present study (3%). The ash content varied between the studies. Two studies (Boagrd *et al* and current study) found the ash content as 1%, whereas, Debashis *et al* found the ash content to be 4%. This may be due to the analysis of the fish flesh only rather than analyzing the whole fish with bones. Since bones contain a higher amount of ash (total minerals), excluding the bones in current study produced such findings.

Figure 2: Proximate Composition of *Macrognathus pancalus*Figure 3: Fe and Ca content of *Macrognathus pancalus*Table 1: Comparison of the proximate and mineral content of *Macrognathus pancalus* with findings from other studies

Proximate and Mineral composition	Various studies		
	Bogard <i>et al</i> , 2015 [13]	Debashis <i>et al</i> , 2018 [14]	Current study, 2019
Moisture ^a	78.6	75.12± 0.40	77.18± 2.05
Crude Protein ^a	17.9	16.53± 0.06	16.3± 0.84
Crude Lipid ^a	1.7	3.02± 0.13	3.2± 0.30
Ash ^a	1.0	3.58± 0.05	0.69± 0.03
Calcium ^b	449	-	0.13
Iron ^b	1.9	-	0.62

N.B.: ^a Amount is given as g/100g fresh sample, ^b Amount is given as mg/100g fresh sample

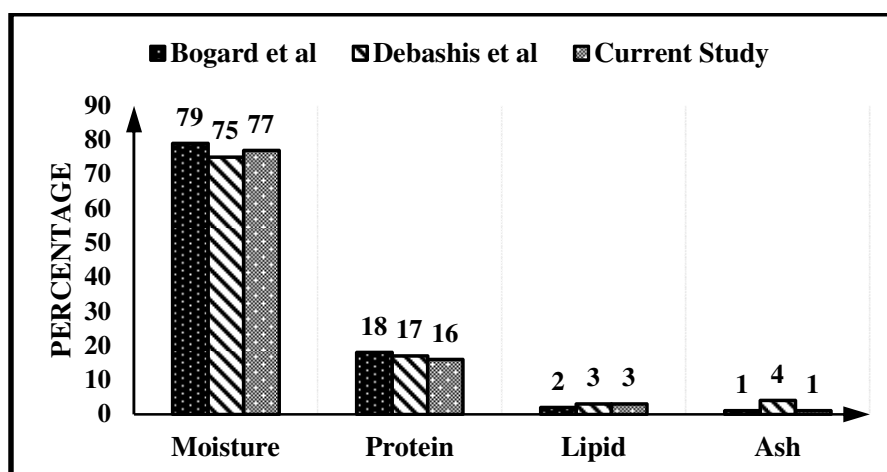


Figure 4: Comparison of the proximate composition of *Macrognathus pancalus*

In case of Ca content, Bogard *et al* found 449 mg/100g, whereas, the current study found the calcium content in the selected fish species as 0.13mg/100g only. This large variation in the calcium content may also be explained by the fact that in current study, only the fish flesh was analyzed and not the entire fish body with bones. Concerning the amount of iron in *Macrognathus pancalus*, the findings from Bogard *et al* and current study were almost same (1.9 mg/100g and 0.62 mg/100g, respectively).

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