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# Evaluation of Nutritional Properties of a Commonly Consumed Indigenous Fish Species: *Nandus nandus* (Hamilton, 1822) in Bangladesh

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## Abstract:

The primary objective of the current study was to evaluate the nutritional properties of an indigenous fish species, Gangetic leaf fish: Nandusnandus. It is usually known as Bheda, Meni, Roina, Nandui etc. Fish samples were obtained from the local fish markets (Boro bazar, Jhikorgacha market, Doratana market) of south-western district of Bangladesh, Jashore. Only the fish flesh was taken for analysis rather than the whole fish with bones. All the nutritional analysis was done by standard AOAC methods. Results showed that moisture percentage was about 78%; ash percentage was about 1%; crude protein percentage was (19%); crude lipid percentage was about 2%. Calcium content of the fish sample was 0.30mg/100g and Iron content was 0.90mg/100g of fresh sample.

*Keywords* **—Nutritional properties, indigenous fish, *Nandusnandus*.**

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## I. INTRODUCTION

Bangladesh is a South-Asian riverine country surrounded by India and Myanmar. It owns a vast amount of freshwater fisheries [1,2] including prawns, crabs and molluscs [3-5]. About 43,126.1 million Bangladeshi Taka is earned from fish export, which is 2% of country's total foreign income [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.

Nandusnandus is Gangetic leaf fish, locally called by various names royna, veda, meni, nandui etc. In English, it is also known as Mud perch [8]. It is a species of Nandidae family and found in India, Bangladesh, Nepal, Thailand, 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 evaluate the nutritional properties (proximate and minerals) of Nandusnandus.

## II. MATERIALS AND METHODS

### *A. Sample Collection and Processing*

Fresh fish specimens were collected from three local fish markets of Jahsore 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: Nandusnandus (Royna)

### *B. Sample Description*

The taxonomy and other information of the sample are provided in the following table.

TABLE I
TAXONOMY AND OTHER INFORMATION OF THE SAMPLE

| Taxonomy | | Other Information | |
|---|---|---|---|
| Kingdom | Animalia | English Name | Mottled Nandus, Mud Perch |
| Phylum | Chordata | Local name | Bheda, Meni, Roina, Nandui |
| Class | Actinopterygii | Length | 7.0-9.0 cm |
| Order | Perciformes | Width | 3.5-4.3 cm |
| Family | Nandidae | Geographic Range | Bangladesh, India, Nepal, Pakistan, Myanmar and Thailand |
| Genus | Nandus | | |
| Species | *Nandusnandus* | | |

### *C. Laboratory 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 105oC for 4 hours.

**Ash (total minerals)**: The ash percentage was determined by using muffle furnace. The samples were heated in the furnace at 600oC 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 Royna fish. The moisture percentage was higher than all other proximate components of the fish samples. Moisture percentage was about seventy-eight percent (78%). The ash content was very low (about 1%) in the fish samples. On the contrary, crude protein content was about nineteen percent (19%), whereas, crude lipid content was about two percent (2%).

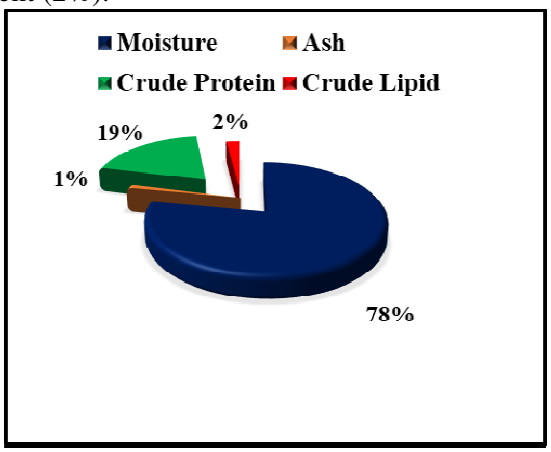


Figure 2: Proximate Composition of Nandusnandus

### *B. Iron and Calcium Content*

Figure 3 shows the Fe and Ca content in the Royna fish. Iron content was found to be 0.90 mg and Ca content was found to be only 0.30 mg per 100 g of fresh flesh of the fish species.

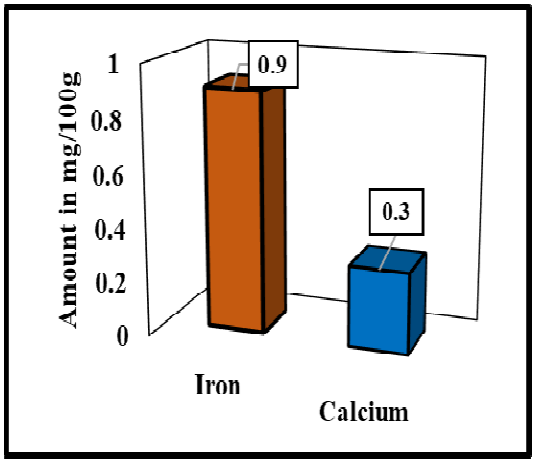


Figure 3: Fe and Ca content of Nandusnandus

Table 2 illustrates the comparison of the proximate and mineral content of *Nandusnandus*with findings from other three studies. The moisture percentage was found to be 78% in current study. Almost similar findings were found in another study also, 78% by Jana *et al*. More or less similar findings were observed in case of protein content. Hossain *et al*, Shaheen*et al* found the protein content to be 18% and 16% respectively. The current study found that the sample had contained 19% protein. Findings regarding the fat content was almost same in Hossain *et al* andShaheen*et al*.

TABLE 2
COMPARISON OF THE PROXIMATE AND MINERAL CONTENT OF *Nandusnandus*WITH FINDINGS FROM OTHER STUDIES

| Nutrient Profile | Various studies | | | |
|---|---|---|---|---|
| | Hossain *et al*, 1999 [13] | Shaheen *et al*, 2013 [14] | Jana *et al*, 2018 [15] | Current study, 2019 |
| Moisture[a] | 75.52 | 75.8± 2.8 | 78.18± 0.19 | 77.63± 1.9 |
| Protein[a] | 17.69 | 15.8± 0.9 | 16.74± 0.10 | 19.0 |
| Lipid[a] | 4.86 | 4.0± 1.1 | 1.77± 0.11 | 2.2± 0.5 |
| Ash[a] | 4.71 | 3.8 | 2.14± 0.13 | 0.6 |
| Calcium[b] | - | 516 | - | 0.30 |
| Iron[b] | - | 1.9 | - | 0.90 |

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

The ash content varied between the studies. Two studies (Hossain et al and Shaheen et al) found the ash content as 4%., whereas, Jana et al found the ash content to be 2%, but in current study, the percent of ash was only 1%. 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.

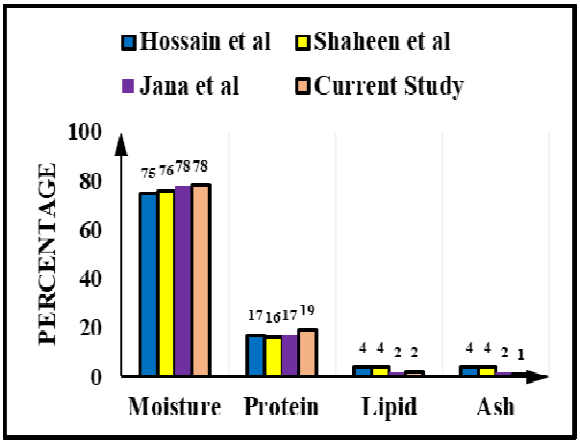


Figure 4: Comparison of the proximate composition of Nandusnandus

In case of Ca content, Shaheen et al found 516 mg/100g, whereas, the current study found the calcium content in the selected fish species as 0.3mg/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 Nandusnandus, the findings from Shaheen et al and current study were almost same (1.9 mg/100g and 0.9 mg/100g, respectively).

## CONCLUSIONS

Finding of the study might be useful for analysis of dietary intake data of the particular fish species, personal food preferences or choices. Further research is encouraged to explore the vitamins, amino acid and fatty acid content of *Nandusnandus.*

## ACKNOWLEDGMENT

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## CONFLICT OF INTEREST

No conflict of interest was present among the authors.

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