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# Proximate Composition of Three Small Indigenous Fish Species Encountered in the Local Fish Market of Kokrajhar, BTAD, Assam

KEYWORDS: Proximate composition, moisture, lipid, Channa, Amblypharyngodon, fish, Bodoland

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**ABSTRACT** *The present study was aimed at the evaluation of proximate composition of three small indigenous fishes available in Kokrajhar district. Proximate composition includes moisture, lipid, protein and ash content. The selected fish species were Channa punctatus (Bloch), Channa gachua (Hamilton) and Amblypharyngodon mola (Hamilton). The analysis was carried out following the standard methods. Out of the three species Amblypharyngodon has the highest moisture and lipid content. Channa gachua has the highest fat content while Channa punctatus has the highest protein content. The results of the analysis revealed similarity between the two Channa species while a slight variation in the Amblypharyngodon mola species. Present study reported that the selected small fishes were highly nutritive and could be incorporated in the daily diet of the local people.*

**Introduction**

All around the world it is well established that fishes are the excellent sources of animal protein and many other nutrients required for a healthy body (Andrew, 2001). Fish is one of the major food stuffs in our diet due to its essential fatty acids, amino acids and some important vitamins and minerals. Fishes are the cheapest source of vital nutrients (Sanayaimadevi et al., 2015) which are the key of a healthy nation. Fishes play the main role in the field of communities suffering from malnutrition and protein deficiency. Fish is prescribed to consume by the people for a preventive measure in cardiovascular diseases and many other life threatening health problems (Damsgaard et al., 2006; Mayer et al., 2006; Dahl et al., 2006; Mozaffarian et al., 2006). Fish offers essential nutrients that cannot be sufficiently fulfilled by egg, milk, meat or any other cereal products (Aberoumand, 2012). The estimation of proximate composition of fish species not only evaluates the nutritional importance but also gives the justification for better processing and preservation (Mridha, 2005).

Proximate composition of fish shows variation from species to species and within same species. The variation normally rises from few factors like as size, age, season, sex, geographical position and environmental habitat (Stansby, 1962).The exact analysis of fish composition mainly depends on the species of fish relating to its feeding habit and its habitat. It is experimentally studied that the fish reared under the extensive and semi extensive conditions has more nutritive value for human consumption than the ones found in the wild (Ahmed et al., 2012). Therefore the present study was confined at the investigation of the nutritive value of some species of pond fishes. Small indigenous species is the only vital source of protein and other important vitamins for the rural poor people of Assam. *Amblypharyngodon mola* (Hamilton), locally known as Mola, is a naturally occurring auto_stocked fish in Kokrajhar, Assam. Generally the fish is surface feeder and planktivorous (Rahman et al., 2014). At present frozen block of *A. mola* is exported to Europe, USA etc (Nowsad et al., 2010). *Channa punctatus* (Bloch) locally known as Taki, is well consumed for its taste, high nutritive value and medicinal qualities. The fish is prescribed as a diet during convalescence (Haniffa et al., 2004). This fish is traditionally consumed by the Bodo peoples of the rural area of Kokrajhar Assam.

*C. punctatus* is carnivore in nature mainly feed upon small fishes, zooplankton, rotifers, insects, crustacean larvae etc. (Rahman et al., 2014). *Channa gachua* (Hamilton), locally known as Gorai is also highly consumed by the Bodo peoples throughout the year especially in the rainy seasons. These species are mostly available in the water logged areas of this region. Breast feeding mothers of the rural area are traditionally recommended to consume these fishes to promote their health condition.

Proximate body composition highlights the estimation of moisture, lipid, protein and ash contents of fish. There are plenty of literatures available on biochemical aspects and nutritional values of fishes of India and many other countries. But there is so far no report on the nutritional status of the small fishes of Kokrajhar, Assam, which are commercially not much exploited.

**Materials and methods**

Fresh fishes were collected from the local markets of Kokrajhar during May 2015 and were immediately packed into an ice container to sustain freshness and taken to the laboratory. The fishes were identified by Dr. Rama Nanda Sinha, Department of Zoology, Kokrajhar Science College. Upon arrival to the laboratory, the fishes were washed with distilled water. The length breadth and body weight were measured to the nearest centimetre and gram. The whole body of the fishes were oven dried and the fishes went through electric blender for getting homogenous powder. The fish powder was used as samples which were stored separately in different airtight containers and was used for the determination of proximate composition.

**Proximate composition**

***Moisture*:** Moisture was estimated by following method described by AOAC (2000). A representative fish sample was taken into moisture bottle and dried at 100±5° C in a hot air oven for about 16 hrs. Moisture was calculated by the formula

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Moisture (% by weight) = 100(W1- W2)/(W1 –W)
where, W= Weight in g of the empty dish,
W1 = Weight in g of the dish with the material before drying.
W2 = Weight in g of the dish with the material after drying.

***Ash content*:** Ash or total mineral content was estimated following AOAC (2000). A representative fish sample was ignited in a muffle furnace at 550° C to obtain ash.

Total ash (% by weight) = 100 (W2- W)/(W1-W)
Where, W= Weight in g of the empty dish,
W1 = Weight in g of the dish with the material before ashing
W2= weight of the dish with ash.

***Fat*:** Fat was estimated following AOAC (2000) using Soxhlet extraction method.

% Total lipid = Weight of fat in the sample / original weight of the sample x 100.

***Crude protein percentage*:** Crude protein was determined by the method of AOAC (2000) microkjheldahl technique.

% Total Nitrogen = 14 x N x X x 250 x 100/1000 x V1 x W,
Where, N = normality of $H_2SO_4$,
X= ml of standard $H_2SO_4$ required for titration of samples,
V1=ml of digested extract taken for distillation
W=weight of sample Since average nitrogen content of the fish protein were 16 percent so 1 g nitrogen =100/16=6.25g protein Hence %protein=%total NITROGEN *6.25 (conversion factor)

Three samples were used for each determination. Data are presented as measure ± S.D.

**Results and discussion**
The data on average length, weight and breadth of the fishes under study are depicted in table 1. Mean percentage of moisture, protein, lipid and ash content of the fishes are given in table no 2. The proximate composition of the fish samples reported highest to lowest amount of moisture content in the order *Channa punctatus*> *Channa gachua*> *Amblypharyngodon mola*. The ash content was recorded as *Amblypharyngodon mola*> *Channa punctatus*> *Channa gachua*. Fat content of the fish species followed the order *Amblypharyngodon mola*> *Channa gachua*> *Channa punctatus*. Highest to lowest amount of total lipid in the order of *Channa gachua*> *Channa punctatus*> *Amblypharyngodon mola*.

**Table no. 1: Measurement of length, breadth and weight of fish species**

| Name of the species | Local name | Length (cm) | Breadth (cm) | Weight (g) |
|---|---|---|---|---|
| *Channa gachua* | *Cheng (Assamese) Nisla (Bodo)* | 11.3±0.01 | 1.7±0.01 | 13.408±0.03 |
| *Channa punctatus* | *Gorai (Assamese) Gwri (Bodo)* | 12.7±0.03 | 2.1±0.02 | 17.155±0.04 |
| *Amblypharyngodon mola* | *Mola (Assamese) Mawa (Bodo)* | 11.8±0.01 | 1.9±0.02 | 13.589±0.02 |

**Table no. 2: Proximate composition of the three indigenous fish species of ponds**

| Name of the species | Moisture (%) | Protein (%) | Lipid (%) | Ash (%) |
|---|---|---|---|---|
| *Channa gachua* | 78.10±0.67 | 21.41±0.42 | 2.87±0.15 | 1.88±0.11 |
| *Channa punctatus* | 77.53±0.53 | 22.75±0.47 | 2.85±0.08 | 2.01±0.13 |
| *Amblypharyngodon mola* | 78.16±0.64 | 18.31±0.41 | 3.56±0.17 | 1.86±0.10 |

Knowledge of the moisture content of food items gives useful hints of existing qualities and susceptibility to fungi infection. Rahman and his team (2014) reported that *Channa punctatus* and *Amblypharyngodon mola* contain 73.44% and 74.40% of moisture content respectively. Bijayalaksmi and co-workers, 2014 reported that the total moisture content of *A. mola* to be 77.19% whereas the present study recorded a slight higher value (78.16%) of the same species. The variation of the data may be due to geographical differences, food habits, season, sex, habitat etc.

In the present study, the protein content of *A. mola* has been reported to be of lower value than *C. punctatus* and *C. gachua*. This finding coincides to a more extent with the reports of Mazumdar (2008). The lower protein content of *A. mola* may be justified from the point of view that *C. punctatus* are carnivorous and consume animal protein whereas *A. mola* is mainly plankton feeder.

The present study reported that *A. mola* contained more lipid content than *C. punctatus* and *C. gachua* which is in agreement with the findings of Rahman and his colleagues (2014). The report of the present study revealed a significant difference in the data made by Bijayalakshmi (2014) and Mazumdar (2008); they concluded higher lipid content of *C. punctatus*.

The difference in the present values could be due to the fact that the species belonged to different locations. Age variation, season and maturity in the same species may also contribute to the significant differences in the total lipid (Piggot and Tucker, 1990)

Ash is a measure of the mineral content of the fish species. It is the inorganic residue that is left after the organic matter has been burnt off (Adewmi et al., 2014). Present findings revealed slightly lower value of ash content of the fish species as reported by Kamal and his co-workers (2007). The variation in the result may be originated from different habitats, food habits and other geographical inequalities.

**Conclusion**
Fish is the essential food recommended for the prevention of many life threatening diseases of human being. The state of Assam is enriched with a plenty of natural resources where there are so many indigenous small fishes in ponds, beels and above all in the river Brahmaputra. Most of the species are unknown and not studied at all. The rural people consume these small fishes mainly in their diet due to their low cost and availability. Therefore further research has to be done to find out the nutritional values of these small food fishes for making a healthy society and for enhancing the nutritional awareness among the villager.

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