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# Biochemical Analysis of Some Selected Dried Fish from Barpeta District of Assam, India

**Manmi Kalita**[1*] **& Pradip Kumar Sarma**[2]

[1] Assistant Professor, Department of Zoology, Barama College, Barama, Assam, India

[2] Associate Professor, Department of Zoology, Bhattadev University, Bajali, Assam, India

*Corresponding Author: **Manmi Kalita**

**Abstract:** To assess the biochemical analysis, thirteen species of dried fish were selected, including Gudusia chapra, Amblypharyngodon mola, Cirrhinus mrigala, Chela laubuca, Esomus danricus, Puntius sophore, Systomus sarana, Chanda nama, Parambassis ranga, Channa punctuatus, Heteropneustes fossilis, Mastacembelus armatus , Trichogaster fasciata were selected. Samples were collected from the Barpeta district of Assam, India. The protein content of the selected dried fish ranged from 12.89% to 19.14% , lipid varied between 0.256% to 6.86%, carbohydrate content ranged from 0.58% to 1.52% . The moisture content varied from 12.6 % to 39.14%and ash content vaird from 0.9 % to 5.06%. The highest protein, lipid, carbohydrate, moisture and ash were found in H. fossilis, P. sophore, C. nama, C. punctatus and T. fasciata respectively. The lowest content of protein, lipid, carbohydrate, moisture and ash were found in E. danricus, M. armatus, H. fossilis, P. ranga and C. mrigala respectively. This analysis indicates that dried fish can serve as a valuable source of nutrition for the nation.

**Keywords**: Biochemical analysis, sun dried fish, protein, carbohydrate, ash, nutrition.

## Introduction:

Fish is a rich source of protein and essential nutrients. So it plays a vital role in the diet of human beings (Geetha et al., 2014: Hazarika et al., 2016). Fish is one of the most perishable food items and several preservation methods are implemented worldwide for preserving fish. Drying implies the removal of water from the fish body through evaporation with the effect of the sun and wind which gives characteristic colour texture and flavour of the fish products (Nowsad, 2005). The consumer preference of the dried fish product is not only because of their traditionally desirable taste and flavour, but also their high content of (n-3) polyunsaturated fatty acids especially in fish lipids. These fatty acids seem to have various health benefits, such as decreasing the risk of stroke, reducing serum triacylglycerol levels, reducing blood pressure, and insulin resistance and

modulating the glucose metabolism (Li, et al., 2003; Rasul et al., 2021).Drying is one of the well-known oldest, effective and low-cost fish preservation techniques by lowering the moisture level to inhibit the growth of microorganisms and enzymatic chemical reactions (Mansur et al., 2013; Rasul et al., 2018; Qiu et al., 2019). Dried fish is an important source of crude protein, amino acids, water, lipids fatty acids and ash or minerals. The proximate composition (i. e. moisture, protein, lipid, ash) are important parameters of fishery product quality assessment, which influence the nutritive value, quality, functional properties and sensory properties of fish product (Kar et al., 2020). So far no work has been attempted on this aspect of the dried fish undivided Barpeta district. That is why this paper deals with the study of biochemical analysis of thirteen selected dried fishes from Barpeta district, Assam, India.

## Materials and Methods:

### Study areas and sample collection:

The experimental material used for the experiment was dry fish and this was obtained from the local fish market of undivided Barpeta district (latitude: 26°19′1.20′′N; longitude: 91°00′0.00′′E), Assam, India. For each species, 50 samples were collected from the various vendors of the study areas. The collected dried fish samples were taken to the laboratory in air tight polythene bags and stored at 4°C for further biochemical investigation. The whole experiment was conducted during the month of January, 2022 to December, 2022.

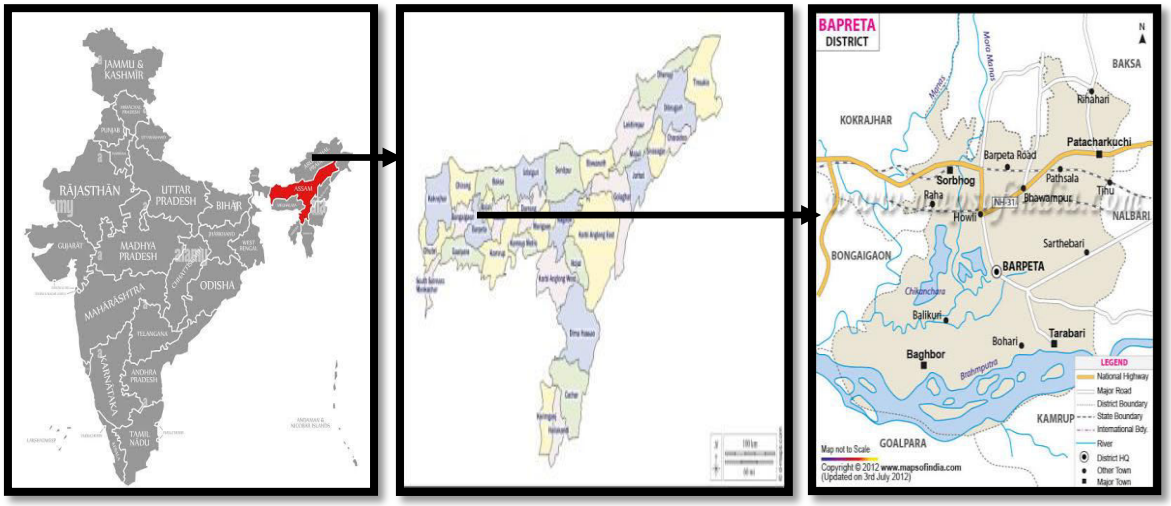


**Figure 1: Locational map of study area. Source (Google map)**

### Method for Biochemical Analysis:

#### 1. Protein content:

Protein content was determined by Lowry's method with slight modification (Lowry et al., 1951). To a 10 mg of sample 1 ml of 1N NaOH was added for protein extraction in water bath for 30 minutes. Thereafter, it was cooled at room temperature and neutralized with 1 ml of 1N HCL. The extracted sample was centrifuged at 2000 rpm for 10 minutes, and an aliquot of the sample (1 ml) was

further diluted with distilled water (1/9 v/v). From the diluted sample, 1 ml was taken and treated with 2.5 ml of mixed reagent (carbonate – tartarate – copper) and 0.5 ml of 1N Folin's reagent. After 30 minutes, sample absorbency was read at 750 nm using UV-visible spectrophotometer (EVOLUTION 201, Thermo Scientific) and results were expressed in percentage.

**2. Lipid content**:

3 gm of dried sample was extracted with petroleum ether in a soxhlet apparatus for about 8 hours. After that the petroleum ether was removed by fractional distillation. The flask was dried at room temperature and the amount of lipid in the flask was calculated.

% lipid= (weight of lipid/ weight of sample) x 100.

**3. Moisture content:**

5g of dried fish sample was taken and kept at 105° C in the hot air oven until a constant weight is obtained. The difference in weight can be calculated and expressed as % moisture content of the sample. Percentage can be calculated by the following formula:

Moisture % = (weight of tissue – dry weight of tissue/weight of tissue) x100

**4. Ash content:**

About 3-5g prepared sample was taken in pre-weighed porcelain crucible and was placed in muffle furnace at 550°C for 6 hours. Then the crucibles were a cooled in desiccators. After recording the weight of ash, the ash content of the sample can be computed as below;

% Ash content = (Weight of ash /weight of sample) × 100

**5. Carbohydrate content**:

Carbohydrate content was calculated based on difference calculation [carbohydrate = 100% - (% of moisture+% of ash+ % of protein+ % of lipid)].

**Table. 1. Biochemical analysis of selected thirteen dried fish species.**

| Sl. No | Family | Species Name | Protein (%) | Lipid (%) | Carbohydrate (%) | Moisture (%) | Ash (%) |
|---|---|---|---|---|---|---|---|
| 1 | Clupeidae | Gudusia chapra (Hamilton, 1822) | 13.97±1.6 | 3.42±0.2 | 0.94±0.48 | 19.88±1.271 | 2.14±0.288 |
| 2 | Cyprinidae | Amblypharyngodon mola (Hamilton, | 17.14±0.207 | 4.22±0.192 | 1.3±0.628 | 13.46±0.375 | 1.88±0.396 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1822) | | | | | |
| 3 | Cyprinidae | Cirrhinus mrigala (Hamilton, 1822) | 18.5±0.158 | 1.08±0.148 | 0.9±0.583 | 28.62±0.192 | 0.9±0.158 |
| 4 | Cyprinidae | Chela laubuca (Hamilton, 1822) | 16.54±0.16 | 2.32±0.4 | 1.31±0.62 | 9.84±0.834 | 1.68±0.363 |
| 5 | Cyprinidae | Esomus danricus (Hamilton, 1822) | 12.89±0.14 | 5.33±0.72 | 1.32±0.54 | 24.5±1.051 | 2.56±0.378 |
| 6 | Cyprinidae | Puntius sophore (Hamilton, 1822) | 15.82±0.192 | 6.86±0.270 | 1.1±0.412 | 32.96±0.207 | 3.26±0.207 |
| 7 | Cyprinidae | Systomus sarana (Hamilton, 1822) | 15.7±0.17 | 4.19±0.12 | 0.9±0.58 | 32.88±0.270 | 4.36±0.472 |
| 8 | Ambassidae | Chanda nama (Hamilton, 1822) | 15.32±0.131 | 3.5±0.223 | 1.52±0.563 | 25.22±0.756 | 4.44±0.241 |
| 9 | Ambassidae | Parambassis ranga (Hamilton, 1822) | 13.78±0.18 | 3.06±0.22 | 1.51±0.56 | 12.6±0.366 | 4.14±0.482 |
| 10 | Channidae | Channa punctatus (Bloch, 1793) | 18.5±0.265 | 0.26±0.114 | 0.94±0.498 | 39.14±0.270 | 1.16±0.114 |
| 11 | Heteropneustidae | Heteropneustes fossilis (Bloch, 1794) | 19.14±0.182 | 1.74±0.182 | 0.58±0.421 | 27.54±0.321 | 1.1±0.273 |
| 12 | Mastacembelidae | Mastacembellus armatus (Lacepede, 1800) | 16.48±0.131 | 0.256±0.097 | 1.134±0.366 | 29.16±0.241 | 2.96±0.167 |
| 13 | Osphronemidae | Trichogaster fasciata (Bloch and Schneider, 1801) | 15.2±0.158 | 2.3±0.158 | 1.06±0.336 | 26.38±0.192 | 5.06±0.167 |

**Results and Discussion:**

**Protein content:**

The results showed a wide variation in proximate composition of moisture, ash, protein, lipid, carbohydrate present in the dried sample depending on the species. The protein content of the dried fish samples was in the range 19.14% to12.89%. The highest protein content was found as 19.14% in H. fossilis and the lowest was 12.89% in E. danricus. Flowra et al. (2012) reported the protein content of five selected dried fish species in the range of 44.08% (M. vittatus) and 65.65% (T. haumela) of the moisture basis and 53.45 to 76.39% respectively on dry matter basis. Flowra and Tumpa (2012) found that protein content of selected dried fishes ranged from 28.20 % (Wallago attu) to 51.19 % (Palaemon sp.). Azam et al. (2003) reported that the protein content ranged between 40.69 to 66.52% in fourteen selected dried fish species. Mansur et al. (2013) found the protein content ranged from 49.23 (Wallago attu) to 62.85% (Channa striatus) in three selected dried fish species.

**Lipid content:**

The lipid content ranged from 0.256% to 6.86%. The highest lipid content was found as 6.86% in P. sophore and the lowest was 0.256% in M. armatus. Flowra et al. (2012) found the highest lipid content was in M. vittatus (17.76% based on moisture content and 21.54% on dry matter) and the lowest in C. punctatus (1.91 and 2.31% based on moisture content and dry matter content respectively). Again Flowra and Tumpa (2012) reported the fat content of five dried fish species ranged from 5.38% (Labeo bata) to 15.86 % (Wallago attu). Islam et al. (2013) found lipid content in the range of 3.21 to 14.03% where the highest value in Amblypharyngodon mola and the lowest in Channa punctatus. Geetha et al. (2014) reported the lipid content in the range of 0.65-0.4%.

**Carbohydrate content:**

The carbohydrate content of selected dried fish species ranged from 0.58% to 1.52%. The highest carbohydrate content was found as 1.52% in C. nama and the lowest was 0.58% in H. fossilis. According to Jahan et al. (2017), the highest value of carbohydrate was 19.23% (P. sophore) and the lowest was 1.75% (C. mrigala). According to Stirling (1972), 1 - 12.5% carbohydrate was found in the liver of dried fishes

**Moisture content:**

The moisture content of the selected samples was in the range 12.60% to 39.14%. The highest moisture content was found as 39.14% in C. punctatus and the lowest was 12.60% in P. ranga. According to Hazarika et al. (2016), the moisture content of the dried fish samples was in the range 2.77 to 8.92, with the highest value in Amblypharyngodon mola and the lowest in Barilius tileo. Flowra et al. (2012) reported the level of moisture in the range of 24.58% to 14.06%. Geetha et al.

(2014) reported the moisture value of sundried Trichiurus lepturus L., in the range of 4.0 - 8.3 depending on sampling site. Flowra and Tumpa (2012) reported that the moisture content of five selected dried fish species ranged from 12.13% to 18.18%. Mansur et al. (2013) found that the moisture content had ranged from 19.17 to 23.12 in three selected dried fish species.

**Ash content:**

The ash content among the dried fish ranged from 0.9% to 5.06%. The highest value was found in T. fasciata and lowest was found in C. mrigala. According Hussain et al. (1992) the ash content ranged from 14-21.6%. Aram et al. (2003) found the range of ash content to be 5.08 to 12.14%. Islam et al. (2003) reported the ash content of Cirrhina reba to be 1.7%. Ash content describes the presence of minerals which indicates the importance of the species qualitatively and our report matches comparatively with other findings.

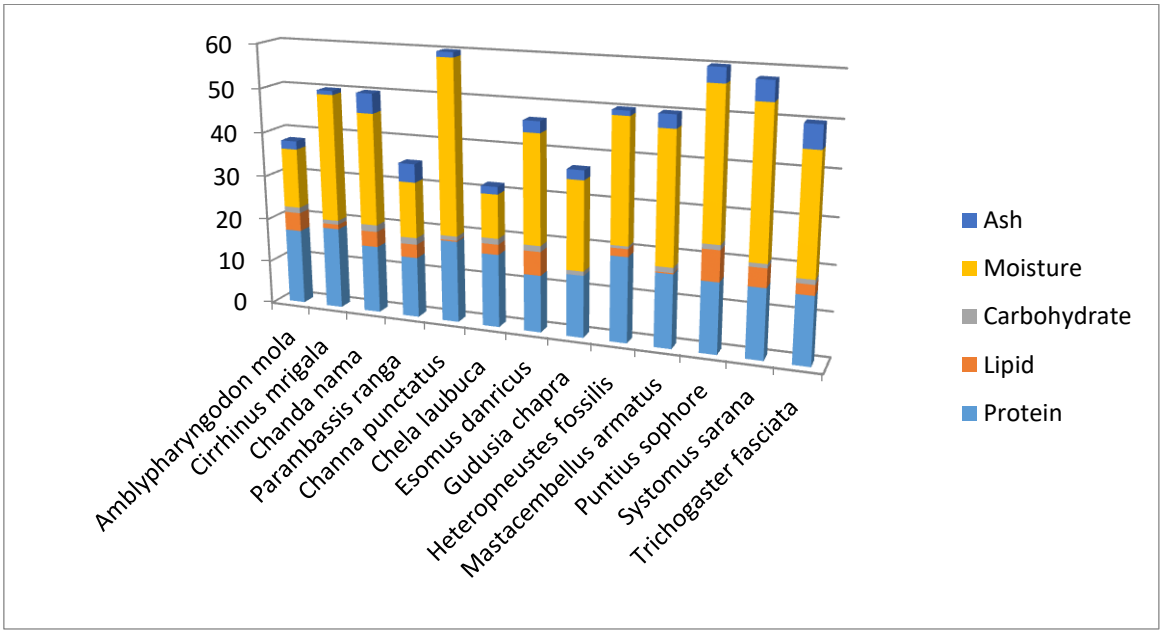


**Figure 2: Comparison between biochemical parameters of thirteen dried fish species.**

**Conclusion:**

The study indicates that biochemical analysis of fish varies and is influenced by factors such as species, size, age, sex, geographical change and seasonal distribution. The results suggest that dried fish can serve as a valuable source of nutrition for the people.

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