

Research Article

Bio-chemical composition of Catfish, *Rita rita* from Indus River near Jamshoro

Parvaiz Khan¹, Naeem Tariq Narejo¹, Shaista Jalbani¹, Abdul Jabbar Laghari² and Fahmida Memon³

1. Department of Freshwater Biology and Fisheries, University of Sindh, Jamshoro-Pakistan

2. Center for Advanced Research in Chemical Sciences, University of Sindh, Jamshoro-Pakistan

3. Department of Physiology, University of Sindh, Jamshoro-Pakistan

*Corresponding author's email: dr_ntnarejo46@yahoo.com

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Abstract

For biochemical composition of catfish *Rita rita*, 60 specimens ranged from 10.1-40.0 cm and 75.0-632.0g in total length and weight respectively were collected from Indus river near Jamshoro during November 2015 - January 2016. The study on biochemical composition was enumerated from fillets of head, trunk and tail region at 3 different length groups (small, medium and large). Results of study revealed that highest % of moisture was observed from head region (84.5) followed by tail (83.6) and lowest was observed (82.5) in trunk, in case of % protein contents highest was observed from tail (12.1) followed by trunk (10.43) and lowest in head (8.33), % fat contents was observed highest in head (6.83) followed by trunk (6.7) lowest in tail (3.7) while ash was observed highest in trunk (3.1) followed by tail (2.7) and lowest in head (2.0) at each length group.

Keywords: Bio-chemical; Catfish; *Rita rita*; Indus river; Jamshoro

Introduction

Fish is the only source of animal protein exhibits in high production capacity in small unit [1]. Flesh of fish is also considered useful for the control of eye and cardiovascular tissues. Fish growth is effected by numerous factors such as season, temperature, food space and physical activity [2]. Fish are cold blooded and survive in water and any change in their media directly affected to the fish. Changes may be in size shape length, weight or may be related to lipid, protein and fat [3]. Body composition is a good indicator of a physiological health of fish. Its analysis provides an idea about percentage of

moisture, protein, fat and ash and their relation into size and condition factor [4]. The water percentage % in fish body is good indicator for the relative content of energy protein and lipids. It is inversely proportion to relative lipids, protein and energy contents [5] as lower the water percentage in fish greater will be percentage of lipid and protein so high the energy content in fish [6]. Fish body mainly composes of fat, protein and inorganic content while carbohydrate and some other non-protein part of usually in negligible quantities for accessing the nutritional value of fish food. Biochemical analysis of fat, ash and protein is very important) [7] which ensure the

eating quality as well as fish nutritional values [8]. Fresh water catfish *Rita rita* belongs to family Bagridae and genus Rita. This fish was found to abundant contently in Pakistan, India and Myanmar [9]. It's important commercial fish due to its meat taste [10]. However it has become critically endangered and red listed. Many scientist works on different aspects of this commercially important food fish like [11, 12] but no literature is available on body composition of this important catfish. So, present work will be useful for consumers to get nutritional rich fillet of fish for consumption.

Materials and methods

60 specimens of *Rita rita* were collected from Indus river near Jamshoro during November 2015 - January 2016. The experimental fish was ranged from 10.1-40.0cm and 75.0- 632 g in length and weight respectively. The fish divided into three fillet /region (head, trunk and tail region) at three length groups stated from 10.1-20.0, 20.1-30.0cm. Live specimen of experimental fish was transported in plastic container to the laboratory Institute of Biochemistry, University of Sindh, Jamshoro. Fish were removed from plastic container and were killed, blotted dry with a paper towel and weight on electronic digital balance (Model CT, 1200-s, made in USA). Total length of fish was measured to the nearest 0.1 mm from tip of maxilla to the tip of longest caudal fin ray using measuring tap then placed in pre weight aluminum foil, labeled the file placed the spaceman in foil and dried to constant mass by slow heating in a oven at 700°C to analyzed the quantity of moisture, protein, ash and fat contents in each part in relation to length of fish. Each dried part was crushed and powder in pastel and mortar, homogenized in a moulinex electoral blander and preserved in plastic bottle with proper labeling. In nutrition the first and most important is to know the

quality of flesh, for that purpose some basic quality parameters were analyzed to find their nutritional value, which help to calculate environmental suitability for fish included as total moisture contents, total protein contents, total fat contents and total Ash contents. Water contents was measured by weighing difference before and after oven drying at 65-80°C in an electronic oven (Memmert) each dry specimens was powdered and homogenized for further analysis. The protein concentrations in (Head, Trunk and Tail) at different length were measured by the method reported by [13] and the total protein content was calculated from the standard curve. The fat contain was estimated by method of [14]. Ash content was determined by dry aishing method using muffel furance (Sybron thermoline 1300) for ten hours at 600 °C Dry extraction method was used to determine fat content following [14]. Carbohydrates are found in negligible amount in a fish [15, 16] hence no attempt was made in the present study to calculate carbohydrate contents.

Results

An investigation was conducted to determine the proximate composition of head, trunk and tail region of catfish *Rita rita* at three different length groups. 60 specimens of *Rita rita* were collected from Indus river near Jamshoro during November 2015 - January 2016. Data on total length, total weight, wet weight of head, trunk and tail of *Rita rita* presented in (Table 1). The size ranged from 10.1-40.0 cm and 75.0-632.0g in total length and weight respectively. The study on biochemical composition of catfish, *Rita rita* was enumerated from the fillet of head, trunk and tail region of *Rita rita* from 3 different length groups. Results of study revealed that highest % of moisture was observed from head (84.5) followed by tail (83.6) and lowest was observed (82.5) in trunk, in case

of % protein contents was found to be highest from tail (12.1) followed by trunk (10.43) and lowest in head (8.33), % fat contents was observed highest in head (6.83) followed by trunk (6.7) lowest in tail (3.7) while ash was observed highest in trunk (3.1) followed by tail (2.7) and lowest

in head (2.0) at each length group and presented in Tables (2, 3 and 4).

Finally concluded that fillet of *Rita rita* from tail region was considered excellent and healthier part in terms of nutrition in relation to head and trunk.

Table 1. Data on total length, total weight, wet weight of head, trunk and tail of *Rita rita* from Indus river near Jamshoro, Sindh, Pakistan

Total group		Total weight (g)		Mean Wet weight of HL	Mean. Wt weight of trunk	Mean. Wet weight of tail
Range	Mean	Range	Mean			
10.1-20.0	16.5± 0.5	60-90	75± 1.0	25± 1.0	39± 1.0	7.5± 0.5
20.1-30.0	26.2± 0.8	180-400	290± 2.0	97± 1.0	150± 1.0	29.0± 2.0
30.1-40.0	37.0 ± 1.0	500-764	632± 2.8	210± 1.0	320± 1.0	32.0± 2.0

Table 2. Bio-chemical composition of head region of *Rita rita* from Indus river near Jamshoro, Sindh, Pakistan

% Moisture		% Protein		%Fat		% Aish	
Range	Mean	Range	Mean	Range	Mean	Range	Mean
87.2-88.5	87.8 ± 0.2	6.42-6.97	6.7± 1.3	4.8-5.70	5.2± 0.8	1.43-1.7	1.5± 0.5
84.5-85.37	84.9± 0.1	8.85-9.42	9.1± 0.9	5.37-6.24	5.7± 0.3	1.88-3.2	2.4± 0.6
80.21-81.9	81.0± 1.0	8.16-10.18	9.2± 0.8	9.89-10.26	9.6± 0.4	1.58-2.9	2.1± 0.9
	84.5		8.33		6.83		2.0

Table 3. Bio-chemical composition of trunk region of *Rita rita* from Indus river near Jamshoro, Sindh, Pakistan

%Moisture		% Protein		%Fat		% Aish	
Range	Mean	Range	Mean	Range	Mean	Range	Mean
83.52-85.53	84.60± 1.0	10.04- 11.12	10.7± 0.7	3.18-4.89	4.1± 0.9	3.81-4.81	3.9± 0.3
81.07-82.61	81.9± 0.1	8.09-10.81	9.9± 0.1	6.43-8.18	7.6± 0.4	2.24-3.53	2.8± 0.2
80.63-80.89	80.7± 0.3	9.19-12.30	10.7± 0.7	7.75-9.11	8.4± 0.6	2.51-3.15	2.8± 0.2
	82.4		10.43		6.7		3.1

Table 4. Bio-chemical composition of tail region of *Rita rita* from Indus river near Jamshoro, Sindh, Pakistan

% Moisture		% Protein		%Fat		% Aish	
Range	Mean	Range	Mean	Range	Mean	Range	Mean
85.74-87.96	86.7 ± 0.3	9.10-11.70	11.0± 1.0	1.39-2.78	2.2± 0.8	2.86-3.07	2.9± 0.9
82.44-84.79	83.7± 0.3	11.67-12.46	12.1± 0.9	2.70-3.90	2.6± 0.4	2.25-2.96	2.6± 0.4
79.28-81.25	80.5± 0.5	12.68-13.92	13.2± 0.8	5.37-6.80	6.4± 0.6	2.09-3.07	2.7± 0.3
	83.6		12.1		3.7		

Statistical analysis

Analysis of variance (ANOVA) was used to compare means of the proximate composition data. Further analysis was

carried out where there were significant differences ($p < 0.05$) using Least Significant Difference [17].

Discussion

Moisture

From the above results, the moisture percentage (%) was found $87.2-88.5 \pm 0.2$. This result coincides with the findings of [18] in *Macrognathus aculeatus*, [19] in *Puntis gonionotus* and [20] in *Amblypharyngodon mola*, *Puntis chola*, *Gudusia chapra* and in *Puntis atherinoides*. These findings also agreed with observation of [21] in several freshwater fish species. Usually moisture and lipid contents in fish fillets are inversely related and their sum is approximately 80% [22].

Protein

The protein content (%) was 13.92 ± 0.8 which is more or less coincides with the findings of [20] in *G. chapra* and *P. chola*. The results of protein percentage in *Labeo rohita* and *Labeo calbasu* are in accordance with the current research. The range of protein contents as given by [23] which were 16.6% and 14.7% respectively are in agreement with present findings. [24] also found the result of protein percentage in silver pomfret (*Stromateus cinereus*) was 16.70% and Ribbon fish (*Trichiurus haumela*) was 16.6% while the percentage was much higher in *Clarias gariepinus* 19.64% and in *Cirrhinus reba* 19.74% found by [25, 26] respectively are similar with the study.

Fat

The fat content (%) was 7.75 ± 1.52 . The result is very much higher than some other commercial native fish of Bangladesh like *Channa striatus*, *Ophiocephalus punctatus* and *Heteropneustes fossilis* whose fat content was 0.64%, 1.08% and 1.23% respectively estimated by [27] are found to be similar with present study.

Ash

The ash content was 2.68-3.07 which was nearer to the result of [28] in *Tilapia guinensis* and *Tilapia melanotheron* which contained 1.30% and 1.06% respectively.

[20] Stated that *A. coila* and in *A. mola* also find similar ash percentage ranged between 1.6% to 3.2%. The ash content of the *O. rubicundus* was also more or less similar to that of small indigenous species. [29] found higher amount of ash content in *Clarias. gariepinus* (3.06%) than the studied fish, while [30] in his experiment found lower amount of ash content in six freshwater fishes *Labeo rohita* (1.31%), *Catla catla* (0.93%), *Cirrihinus cirrhosus* (1.40%), *Labeo calbasu* (1.02%), *Mystus seeghala* (0.91%) and *Wallago attu* (0.72%). According to [31], variation in proximate composition of fish flesh may vary with species variation, season, age and feeding habit of the fish. Generally moisture content showed inverse relationship with lipid content also found in the Pungus fish. The inverse relationship has also been reported in marine fishes such as *Mugil cephalus* [32]; *Sarda sarda* [33]. Therefore, this fish can play a significant role to fulfill the nutrient demand of the people in Pakistan.

Conclusion

Results of present study revealed that tail region possess (11.04 – 13.29%) highest percentage of protein followed by trunk region (10.43) and lowest in head region (8.33) at each length group.

Finally concluded that fillet of *Rita rita* from tail region was considered excellent and healthier part in terms of nutrition in relation to head and trunk.

Authors' contributions

Conceived and designed the experiments: NT Narejo, Performed the experiments: P Khan & AJ Laghari, Contributed reagents/ materials/ analysis tools: Center for Advanced Research in Chemical Sciences and Department of Physiology, University of Sindh, Jamshoro, Wrote the paper: P Khan & NT Narejo.

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