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Biochemical Composition of *Sardinella longiceps* from Sonmiani Coast, Balochistan

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Abstract: The present study on the biochemical composition of *Sardinella longiceps* was enumerated from head, trunk and tail region throughout the year from Sonmiani coast, Balochistan. In total 60 samples were collected 30 each in winter and summer respectively. Results of the present research showed that moisture was observed highest in head region (71.0%) followed trunk and tail region (70.0%) in winter season. While in case of summer season highest percentage of moisture was observed in head region (70.58%) followed by trunk and tail region (68.66%, 68.57%). Highest percentage of protein was observed in trunk (16.21%) followed by tail and head region (15.36%, 15.30%) respectively in winter season. While in case of summer season trunk possess (15.53%) followed by head region (14.53%) and low in tail region (11.48%). Lipid percentage was found high in trunk region (14.40%) followed by tail region (14.33%) and lowest in head region (10.33%) in winter season. In summer season percentage of fat was observed maximum in tail region (13.04%) followed by trunk (13.04%) and low in head region (12.0%).In terms of carbohydrate percentage, it was found in less amount. It was concluded that trunk region of *Sardinella longiceps* considered excellent and healthier part in terms of nutrition throughout the year.

Keywords: Biochemical, Trunk Region, Nutrition, *Sardinella Longiceps*, Sonmiani

1. INTRODUCTION

Sonmiani is a small coastal town in the southeast of Balochistan Province in Pakistan. It is located at the Northern most point of the Arabian Sea. The coast is approximately 145 km away from Northwest of Karachi. Fish is nutritious food items which are widely consumed in many parts of the world. Fish products have been identified as an important and cheap source of nutrients such as protein, lipid and minerals (Dahl *et al*. 2006). The health benefits related to fish consumption are due to the presence of proteins, unsaturated fatty acids, carbohydrates and micronutrients. It provide valuable source of animal protein. As compare to mammalian protein fish protein is rich in amino acid such as methionine, lysine and low in tryptophan (Nowsad, 2007). Its muscle contains all the nutrients required for maintenance of human body (Abdullahi *et al*., 2001). It helps to control weight and prevent heart disease (Cahu *et al*., 2004). The major constituents of fish muscle are water, proteins fats and ash, minerals. The determination of the proximate composition of fish is very important in order to know its nutritive value, as well as for processing and preservation (Mridha *et al* 2005 and Pervaiz *et al* 2015).The percentage of water is good indicator of its relative contents of energy, proteins and lipids (Dempson *et al.* 2004). Increasing awareness about healthy food and fish is finding more acceptances because of its special nutritional qualities. In Pakistan the nutritional value of sardines has not yet been studied completely therefore, it is necessary to elucidate the major biochemical components of this commercially important fish Sardinella *longiceps*. It is commonly called as Indian oil Sardine and locally known as Loower or Kashuk. It is a purely marine/ estuarine in habitat (Sinduja *et al.*, 2013). It is pelagic fish and known to be high nutritive value. Sardine contains 3rd highest of omega -3 among other marine fish after Mackerel and Salman (Ann and Hindumathy 2013). Earlier number of research papers published on various parameters including biology and biochemical studies of *Sardinella longiceps*, are available from elsewhere. No published information is available on biochemical composition of this commercially important fish from Pakistani coast. The present study has been initiated to elucidate biochemical composition of *Sardinella longiceps* through estimating its major biochemical components like total proteins, fats, ash (minerals) and carbohydrates contents from different body portions. The finding of this study is expected to be useful in the elucidation of nutritional value of *Sardinella longiceps.*

2. MATERIALS AND METHODS

Sample Collection

Experimental fish was collected from Sonmiani during the winter from December 2015 to February 2016 and summer from April - June 2016 from coast of Balochistan. In total 60 samples, 30 each in winter and summer respectively. The sample were preserved in ice boxes and transported to the laboratory, Institute of Biochemistry University of Sindh, Jamshoro for subsequent studies. Fish were washed and dried completely with the help of blotting paper. Total body length was taken with the help of a measuring tap and

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total body weight was taken by a digital balance. The mean length of the fish was 19.83 cm and the mean weight 89.3 gram was recorded. In order to study the biochemical composition of different regions of the body, the fish were cut into three parts head, trunk and tail. Moisture was determine by weighing the samples 3 grams each then placed the samples in oven at 105ċ for four hours, transferred the samples from oven into a desiccators and allowed to be cooled by using methods of AOAC (1995) . Proteins was determine by Lowery *et al* ,. (1951). Samples (01 gram) from each part (Head, Trunk and Tail) crushed with the help of pestle and mortar transferred the crushed samples into test tubes and added 3ml of phosphate buffer. Then placed in refrigerator overnight, centrifuged the sample for 30 minutes 0.5 ml of supernatant and added 2.5 alkaline copper sulphates allowed to stand the mixture for 10 minutes at room temp. Added 0.2 ml Folin reagent and allowed for 30 minutes to complete the reaction. Determined the absorption by spectrophotometer and draw a standard curve of absorbance at 660 nm. Determination of fat (Barnes and Black stock (1973). 1 gm of sample (from Head, Trunk, Tail) added with 10 ml of chloroform-methanol mixture homogenate was filtered through a Whatman No.1 filter Added 0.2 ml 0.9% aqueous NaCl.

Transferred the liquid into separating funnel and kept the mixture into oven allowed to stand at 40^{o}C over night. The lower layer was separated and collected into a dry clean conical flask. Allowed to remove the moisture in a dedicator weighed the residues and the fats percentage was calculated. Total carbohydrates were determined by Suplhuric Acid method. Determination of Ash by AOAC (1995) 3gram of sample weight the crucible weight crucible and sample transferred the sample into furnace and heated at 600 ^{O}C for 5 hours.

3. RESULTS

Results of present study revealed that percentage of moisture was observed highest in head region (71.0%) followed trunk and tail region (70.0%) in winter season. While in case of summer season highest percentage of moisture was observed in head region (70.58%) followed by trunk and tail region (68.66%, 68.57%). In case of protein content trunk region possess (16.21%) highest percentage of protein followed by tail and head region (15.36%, 15.30%) respectively in winter season. In case of summer season trunk possess highest values of protein (15.53%) followed by head region (14.53%) and low in tail region (11.48%). Lipid percentage was found high in trunk region (14.40%) followed by tail region (14.33%) and lowest in head region (10.33%) in winter season. In summer season percentage of fat was observed maximum in tail region (13.04%) followed by trunk (13.04%) and low in head region (12.0%).In terms of carbohydrate percentage, it was found in less amount **(Table 1-6).** Finally, it was concluded that trunk region of *Sardine longiceps* is considered excellent and healthier part in terms of nutrition throughout the year.

Table 1. Biochemical composition of head region from *Sardine longiceps* during winter season from coast Sonmiani

Months	Mean length(cm)	Mean weight (g)	Moisture %	Protein %	Lipid %	Carbohydrate %	Ash%
December	20.2	76.5	68	15.30	13.20	0.84	2.33
January	20.5	78	68.30	15.17	12.90	0.88	2.33
February	20.4	70	71	14.36	10.33	0.86	3

Table 2. Biochemical composition of trunk region from *Sardine longiceps* during winter season from coast Sonmiani

Months	Mean length (cm)	Mean weight (g)	Moisture % head	Protein %	Lipid %	Carbohydrate %	Ash%
April	19.1	74	70.58	14.53	12	0.85	2
May	19.3	74	70	14.10	12.18	0.87	2
June	19.5	76	70	14.43	12.46	0.87	2

Table 3. Biochemical composition of tail region from *Sardine longiceps* during winter season from coast Sonmiani

Months	Mean length(cm)	Mean weight (g)	Moisture %	Protein %	Lipid %	Carbohydrate %	Ash%
December	20.2	76.5	66	16.21	14.40	0.82	2.38
January	20.5	78	66.53	15.56	14.25	0.82	2.47
February	20.4	70	70	14.80	11.96	0.70	1.81

Table 4. Biochemical composition of head region from *Sardine longiceps* during summer season from coast Sonmiani

Months	Mean length(cm)	Mean weight (g)	Moisture %	Protein %	Lipid %	Carbohydrate %	Ash%
December	20.2	76.5	66	15.36	14.20	0.93	2.69
January	20.5	78	66.33	15.25	14.33	0.88	2.70
February	20.4	70	70	14.28	11.86	0.85	2.60

Table 5. Biochemical composition of trunk region from *Sardine longiceps* during summer season from coast Sonmiani

Months	Mean length (cm)	Mean weight (g)	Moisture %	Protein %	Lipid %	Carbohydrate %	Ash%
April	19.1	74	68.33	11.48	12.33	0.84	2
May	19.3	74	68.57	11.46	13	0.81	3
June	19.5	76	68.33	11.83	13.27	0.80	2.33

Table6. Biochemical composition of tail region from *Sardine longiceps* during summer season from coast Sonmiani

Months	Mean length (cm)	Mean weight (g)	Moisture %	Protein %	Lipid %	Carbohydrate %	Ash%
April	19.1	74	68.33	15.53	12.66	0.90	2.33
May	19.3	74	68.66	15.20	12.78	0.91	3
June	19.5	76	68.48	15.34	13.04	0.89	2.33

4. DISCUSSION

Present study was based on biochemical composition of *Sardinella longiceps* from coast Sonmiani Balochistan. From the present finding moisture percentage was found between 66.0-71.0%. Numerous researchers also found similar results like Tawfik, (2009) also reported 77.8% of moisture for the *Carangoides fulvoguttatus*. These variations in moisture content may be affected by lipid contents of diet as well as during different stages of life cycle (Sahu *et al*., 2014; Salam and Davies, 1994) these all values are similar with the present findings. Percentage of protein content was observed between 11.46-16.21% in the present study from the fish *Sardinella longiceps* coast Sonmiani. Some other investigators estimated the crude protein (17.8 and 19.1%) in fish (Susan *et al*., 1999: Hasan *et al*., 2015) reported protein content in *Labeo rohita* ranged from 16.4% to 18.55%.and mean value of protein content was 17.34% which similar to the results of (Memon, *et al*, 2011; Pradhan *et al.,* 2012) reported protein percentage (18.83 %, 19.00 %, and 20.64 % in *Labeo calbasu*, *Labeo gonius* and *Labeo rohita* respectively. Fat percentage in the present finding was ranged between 10.33- 14.40 %. the result of different researchers also support the finding like (Naeem *et al.,* 2011) reported fat percentage 6.98-33.83 in *Notopterous notopterous*. Abbasi and Ogar (2012) reported fat content 17.1 in Snake head fish *Parachanna obscura*. Anusuya and Farzana *et al* (2013) reported fat % 21.3 in *Notopterous notopterous*. Hemalatha (2014) showed percentage of result 12.8% in *Channa straita*. All above results are in accordance with the present findings. Ash content was noticed from 2.0-3.0 % from the fish *Sardinella longiceps*. Similar results were also presented by Ahmed *et al*.,(2015). They researched on wild and pond raised *Catla catla* and reported that higher ash contents were found in head of large sized fish. These scientists' results support our finding. Generally, the ash content Level gives an indication that fish may be good sources of minerals such as calcium, zinc, potassium, magnesium and iron (Bolawa, *et al*., 2011).

5. CONCLUSION

A result of present study revealed that trunk region of *Sardinella longiceps* is considered excellent and healthier part in terms of nutrition throughout the year.

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