

# Seasonal Variation Of The Proximate Composition of A Gobiid Fish *Oxyurichthys Tentacularis*, Gobiidae (Valenciennes, 1837) From Ashtamudi Lake- Kerala

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## ABSTRACT

The value of fish as health food is well known, but poorly documented. Fish is the cheapest animal protein that is accessible to the poor and it is aptly called the 'rich food of the poor'. Small indigenous fishes are known to be micronutrient rich and they are also cheap sources of quality animal proteins. But in spite of all these advantages of consuming fish, its nutritive value is not well documented. *Oxyurichthys tentacularis* is one of the most demanded food fish of Ashtamudi lake. The present study focused on the seasonal variation of protein, lipids, carbohydrates, minerals of *Oxyurichthys tentacularis* were recorded. The results indicate that the protein content depends on season. The frequency of changes in the composition of biochemical constituents of any organism varies with variation of environmental changes. The results also showed that *Oxyurichthys tentacularis* is a low fat high protein fish. In the present study the results clearly showed that there is considerable variation in the proximate composition of male and female fish *O. tentacularis* in different seasons. **Keywords:** *Oxyurichthys Tentacularis*, Proximate Composition, Seasonal Variation Ashtamudi Estuary.

## I. INTRODUCTION

Fish is fundamental for the livelihood and food security of large population groups in the productive and densely populated river basins in Asia. Around 56% of India's population is fish eating. Fish is a first class protein source which contains all the essential amino acids in their right proportion, other nitrogenous compounds, water, lipids, carbohydrates, minerals and vitamins (Nunes et al., 1992). Broad studies on proximate composition of fishes of marine fresh water, and estuarine are available from various regions of the world (Stansby, 1962; Love, 1970; Connell, 1975; Huss, 1995; Andrew, 2001; Mazumder et al., 2008; Rubbi et al., 1987; Nazrul and Razzaq, 2005; Obodai et al., 2009). Studies on proximate analysis of estuarine

fishes in India is very few (Somvanshi, 1987; Chamundeshwari and Vijayaragahwan, 2001; Ravichandran et al., 2011; Immaculate et al., 2012; Sheril and Hindumathy 2013). The proximate composition of fish varies greatly from species to species and from individual to individual which depending on sex, age, environment and season. The *Oxyurichthys tentacularis*, is one of the important food fish of Astamudi lake. Even the fish and its fisheries has much significance in the Astamudi lake, of Kollam district there were, no studies were taken hitherto. Therefore, this study was conducted. The objective of this study was to evaluate the seasonal variation of the proximate composition of *Oxyurichthys tentacularis* from Ashtamudi lake.

## II. MATERIALS AND METHODS

The specimens of *O. tentacularis* were collected from Ashtamudi lake (8° 53'- 9° 02' N; 76° 31'- 76° 41' E) using a modified gill net, locally known as "koozhalivala", with the help of local fishermen. A total of 220 specimens were used for the analysis. Specimens were brought to the laboratory, washed thoroughly and analyzed. Total length, and weight were measured. Sex was determined through naked eye according to the appearance of the gonads. The percentage of proximate composition of fish was determined by conventional method of AOAC., 2000. For Estimation of moisture the initial weight of the sample was taken then the samples were dried in an oven at about 100-105°C for about 8 to 10 h until the constant weight was reached and the samples were minced in an electric grinder. The protein content of the fish was determined by micro Kjeldahl method. In this the conversion of organic nitrogen to ammonium sulphate by digestion of flesh with concentrated sulphuric acid in a micro kjeldahl flask. The digest was then diluted, made alkaline with sodium hydroxide and distilled. The liberated ammonia was collected in a boric acid solution and total nitrogen was determined titrimetrically. For the estimation of fat: the dried samples left after moisture determinations were finely grinded and the fat was extracted with chloroform and methanol mixture. After extraction, the solvent was evaporated and the extracted materials were weighed. The ash content of a sample is residue left after ashing in a muffle furnace at about 550-600°C till the residue become white. The percentage of ash was then calculated by subtracting the ash weight from initial weight. The carbohydrate was hydrolyzed with acid and the absorbance was recorded in spectrophotometer (LABOMED, UVD-3000) at the specific wavelength of 550 nm AOAC., 2000.

## III. RESULTS AND DISCUSSION

The major component of fish was moisture. It was found that the moisture content of the male fish was ranged from 76.1% (june) to 78.5% (may), and in female the Moisture content was ranged from 76.4% (december) to 79.8%(april). In both of the sexes high moisture content was observed in march- may and september – october. These months were considered as the spawning season of the fish. The result also indicated that the average moisture content was high in the female fish than male fish. The protein content was varied from 15.0 % (april) to 16.5% (december) in male and 13.2 % (september) to 16.6% (june) in female. The result also indicated that the average protein content was high in the male fish than in the Female fish. High amount of protein was analysed during november – january and june- july in both sexes. It is clear that these months are the post spawning period of the fishes.

The lipid content of the male fish was ranged from 0.1% (september) to 0.7% (january) and 0.1% (september) to 1.6 % (december) in female . The result revealed that both in males and females the lipid content decreased during the spawning season (march – may and august – october). The result also indicated that the average lipid content was high in the female fish than in the male fish. The ash content was varied from 1.0% (February) to 1.9% (November) in male and 1.4% ( September) 2.2% ( June) in female. There were no remarkable variation in the case of ash content during all season. It was found that the Carbohydrate content of the male fish was ranged from 5.2 % (September) to 6.8% (July) and 4.3% ( May) to 6.7% ( July) in female. The result showed that there were no considerable variation in the case of Carbohydrate content during all the season. The chemical composition of fish varies greatly from one species and one individual to another depending on sex, age, environment and season. Therefore a substantial normal variation is observed for the constituents of fish muscle. Moreover,

biochemical composition is important as an aspect of quality of raw material, and is often dependent on sex (Andrew, 2001) and stage of sexual maturity (Connell, 1975; Huss,1995). Islam and Razzaq (2005) detected seasonal variations in the proximate biochemical composition of muscles of the *Glossogobius giuris*. The major component of fish was moisture that varied seasonally in both male and female. Shearer (1994) concluded that percentages of lipid and water are inversely related. The lipid and protein balance is important in assessing the flesh quality and as an indicator of seasonal cycles of reproduction and feeding (Love,1970). In many species, there is a build up of lipids during the feeding season and decrease during spawning. In fatty fish like oil sardine, mackerel, herring etc. the main site of storage of lipids is the muscle. The lipid content such fish show wide variations with season and sexual maturity. The lipid content of the muscle of oil sardine (*Sardinella longiceps*) is about 3-4% in June-July, which increases to about 18% by November-December.

Rubbi et al. (1987) mentioned proximate composition of some commercial species of fresh water fish. The results of *Oxyurichthys tentacularis* clearly indicate that proximate composition of fish depends on season, sex and reproductive cycle. It is evident that these results were in good agreement with the work of Khuda et al. (1964), Somvanshi et al. (1983), Rubbi et al. (1987), Chamundeshwari and Vijayaragahwan (2001). In the present study the results clearly show that there is substantial variation in the proximate composition of male and female fish *Oxyurichthys tentacularis* in different seasons.

#### IV. CONCLUSION

Fish is known to be one of the cheapest sources of animal protein. The nutrient profile of fish varies depending on species, size, geographical locations and production systems. In the present study the results clearly showed that there is considerable variation in

the proximate composition of male and female fish *O. tentacularis* in different seasons.

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#### VI. REFERENCES

- [1]. Ackman, R. G. 1989. Nutritional composition in seafoods. *Progress in Food and Nutrition Sci.*, 13: 161-240.
- [2]. Andrew, A. E. 2001. *Fish processing Technology*. University of Horin press. Nigeria., 7-8 pp..
- [3]. AOAC. 1990. *Official Methods Analysis* (15th edn). Association of Official Analytical Chemists: Washington D.C.
- [4]. Chamundeshwari,D., Vijayaragahwan,S. 2001. Biochemical composition of carcass, muscle and liver of *Labeo rohita* fed on soyabean and Glycine based diets with lysine and methionine. *J. Aqua. Biol.*,6(2):81-83.
- [5]. Connell, J. J. 1975. *Control of Fish Quality*, Fishing News Books Ltd., England ,180 pp
- [6]. Dabrowski, K. 1978. The density and chemical composition of fish muscle. *Experientia*, 34(10), 1263-1265.
- [7]. Huss, H. H. 1995. Quality and quality changes in fresh fish. *FAO Fisheries Technical*
- [8]. *Italiana delle Scienze Veterinarie* 43, 669-674.
- [9]. Love, R. M. 1970. *The chemical biology of fishes*. Academic Press, New York. 547 pp.
- [10]. Mazumder M, Rahman S. A, Ahmed M. M, Begum, M and Hossain M, A. 2008. Proximate Composition of Some Small Indigenous Fish Species (SIS) in Bangladesh. *Int. J. Sustain. Crop Prod.* 3:18-23.

- [11]. Nazrul, I. M., Razzaq, M. A. 2005. Seasonal Variation of Proximate Composition of Fresh Water Gobi, *Glossogobius giuris* (Hamilton) from the River Padma. *Pakistan. J. of Biological Sciences.*, 8(4): 532-536.
- [12]. Nunes, M. L., Batisa, J., Morcio de Campos, R. 1992. Physical, chemical and sensory analysis of sardine (*Sardine pilchardis*) stored in ice. *J. of the Sci. of Food and Agriculture*, 59: 37-43.
- [13]. Obodai E. A., Abbey, I. D. And Maccarthy, C. 2009. Biochemical composition of some marine fish species of Ghana. *Int. J. Biol. Chem. Sci.*, 3(2): 406-409.
- [14]. Ravichandran S., Kumaravel K., Pamela Florence, E. 2011. Nutritive Composition of Some Edible Fin Fishes. *Inter. J. Zool. Res.* 7:241-251.
- [15]. Rubbi, S. F, Mujibar M, Khan A, R. , Jahan S, S and Majeda, B. 1987. Proximate composition and quality of some commercial species of fresh water fish. *Bangladesh J. Sci.* 5:1-20.
- [16]. Sandhya M. P and Smita R. S 2013. Fish muscle protein highest source of energy. *Int. J. Biodivers. Conserv.*, 5(7):433-435.
- [17]. Sheril. S. and Hindumathy, C. K. 2013. Chemical composition and amino acid profile of *Sardinella longiceps* collected from Western coastal areas of Kerala, India. *J. Biol. Earth Sci*; 3(1): B1 29-B134
- [18]. Somvanshi V. S., 1987. Seasonal changes in the biochemical composition of a hillstream fish *Garra mullya* (Sykes). *Indian J. fish.* 30:55-60.
- [19]. Stansby, M. E. 1962. Proximate composition of fish. In: *Fish in Nutrition* (Eds. E. Heen, R. Kreuzer) pp. 55-60, Fishing News Books Ltd, London.
- [20]. Takama, K., Love, R. M. and Smith, G. L. 1985. Selectivity in mobilisation of stored Technical Report NMFS Circular 432, FAO Fisheries Synopsis 118.

**Table 1.** Seasonal variation in the Percentage of the Proximate composition of male fish *Oxyurichthys tentacularis*

Months	Moisture	Protein	Carbohydrate	Lipid	Ash
January	76.2	16.3	6.4	0.7	1.2
February	76.2	15.6	6.7	0.5	1.0
March	77.6	15.3	6.3	0.2	1.3
April	78.3	15.0	5.4	0.2	1.5
May	78.5	15.2	5.3	0.2	1.2
June	76.1	16.5	6.3	0.5	1.4
July	76.3	16.3	6.8	0.6	1.2
August	76.5	15.1	6.5	0.2	1.3
September	77.1	15.2	5.2	0.1	1.4
October	78.2	15.9	5.6	0.3	1.6
November	76.2	16.4	5.4	0.4	1.9
December	76.5	16.5	6.1	0.5	1.7
Average	76.9	15.7	6.0	0.4	1.4

**Table 2.** Seasonal variation in the Percentage of the Proximate Composition of emale fish *Oxyurichthys tentacularis*

Months	Moisture	Protein	Carbohydrate	Lipid	Ash
January	76.9	16.3	5.4	1.2	1.7
February	77.6	15.6	5.7	0.6	1.5
March	78.6	14.8	6.3	0.4	1.8
April	79.8	14.6	5.1	0.5	1.9
May	78.5	15.2	4.3	0.4	1.6
June	77.1	16.6	5.1	1.1	2.2
July	76.5	15.3	6.7	0.8	1.5
August	76.5	14.1	5.3	0.5	1.8
September	79.6	13.2	5.2	0.1	1.4
October	78.2	15.6	5.1	0.4	1.6
November	77.2	16.5	4.4	0.9	2.1
December	76.4	16.1	4.8	1.6	1.7
Average	77.7	15.3	5.3	0.7	2.0