



**BIOCHEMICAL ANALYSIS OF A COMMERCIALY IMPORTANT GOBIID FISH
OXYURICHTHYS TENTACULARIS (VALENCIENNES, 1837) OF ASHTAMUDI LAKE-
KERALA, INDIA**

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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*, (local name Koozhali) a gobioid species, is commercially one of the most demanded food fish of Ashtamudi estuary. The present study focused on the proximate composition of the fish *Oxyurichthys tentacularis*. A total of 76 specimens were used for the analysis. Specimens were brought to the laboratory, washed thoroughly and weighed. Protein content was determined by estimating the total nitrogen using the macro-Kjeldahl method (AOAC, 2000). Moisture, Lipid, carbohydrate and ash content was determined based on (AOAC, 2000). The results showed that, moisture forms the major constituent (76.2%) of fish followed by protein (15.6%), carbohydrate (6.7%), lipid (5%) and ash (1.0%). Fish as a protective food assumes greater significance, which can play a pivotal role in mitigating protein deficiency or malnutrition. In view of their good class protein contents, low fat contents, moderate carbohydrate, coupled with the good mineral contents, of the fish species studied, it may be concluded that the fish species is of high nutritional value and could be recommended for human consumption and which constitutes an integral component for the livelihood and food security of the population inhabiting the Ashtamudi Lake area.

KEYWORDS: *Oxyurichthys tentacularis*, Ashtamudi Lake, proximate composition.

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. Fishes play an important role in the diet of human beings since it is a good source of animal protein (Nunes et al. 1992). Regular consumption of fish can promote the defense mechanism for protection against invasion of human pathogens because fish food has antimicrobial peptide (Ravichandran et al. 2010). The four major constituents in the edible portion of fishes are water, protein, lipid (fat or oil) and ash (minerals). The analysis of these four basic constituents of fish muscle is often referred to as proximate analysis. Today there is an ever increasing awareness about healthy food and fish is finding more acceptances because of its special nutritional qualities. Small indigenous fish species are valuable sources of macro and micronutrients and play an important role to provide essential nutrient to the people. They provide a major source of animal protein. Hence it is essential to know proximate composition of fish to report their nutrient

composition from public health point of view. In this context a proper understanding about the biochemical constituents of fish has become a primary requirement for the nutritionists and dieticians. Extensive studies on proximate composition of fishes are available from many regions of the world (Lowery et al. 1951; Stansby, 1962; Love 1970; Atwater 1988; Adeyeye 2002; Mazumder et al. 2008; Obodai et al. 2009). Studies on proximate analysis of estuarine fishes in India are very few, and those available are restricted to commercially important fishes only. The studies include (Sinha and Pal 1990; Das and Sahu 2001; Shekhar et al. 2004). The *Oxyurichthys tentacularis*, is one of the important food fish of Ashtamudi lake. Though its abundance and distribution is noted in other estuaries and backwaters of India, perhaps this is the only estuary in India where there is a commercial fishery for this gobioid species. Even the fish has much importance in the Ashtamudi Lake, no studies were taken hitherto. Therefore, the objective of this study was to evaluate the proximate composition of *O. tentacularis* from Ashtamudi Lake.

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. Specimens were brought to the laboratory, washed thoroughly and weighed. Fishes were thawed and the bone and skin were separated from the flesh to do biochemical analysis. 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 (AOAC, 2000). 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).

RESULTS AND DISCUSSION

The results in table 1, and fig.1. clearly indicate that the major component of fish muscle was found to be moisture. It was found that the moisture content of the fish was 76.28% (% by weight). It was observed that the protein content of the fish was 15.62% (% by weight). These results showed that in all these fishes, a good quantity of protein is present in these fishes, so they can be safely used in food to supplement protein. The lipid content was the lowest of the fish was 1.47% (% by weight). The carbohydrate content of the fish was 1.47% (% by weight). The ash content was observed as 2.63%. Of the proximate mean components, even so, fish and fishery products contain water, protein, fat, ash, carbohydrates, minerals and vitamins (Lall 1994). The biochemical composition of fish varies from one species to another, depending on a number of factors including age, fishing grounds, fishing season, sex of the fish, feed intake and also migratory swimming (Lall 1994; Nazrul and Razzaq 2005). The proportion of water in the fish muscle varies generally, though in a majority of cases the variation is much narrower between 70-80%. The higher moisture content of the fish species (than other constituents) supports the fact that water is the main

component of fishes and accounts for between 70 and 80% of the weight of the fish (Tenny et al. 1984). Ogunlade et al. (2005) reported that the moisture content of the muscle of fin fishes varied between 70 and 75%. Protein, like most animal food, has excellent nutritive value because it has all the essential amino acids required by the human body (Love 1980).

There exists an inverse relationship between the water content and lipid content of fish. Fish with fat content as low as 0.5% and as high as 16-18% are of common occurrence. The low fat content of the fish could be due to high level of activity which may utilize the fat as a source of energy (Wardlaw et al. 1994). Thus the low fat content recorded for the fish, is because of it as a bottom dweller. The low fat content suggests that these fish species could be recommended for people with problem of obesity (Obodai et al. 2009). The lower carbohydrate content suggests a higher metabolic rate of that species (Mohanty 2010). The ash content was on a moderate amount and is important dietary elements.

Table 1: Mean length and weight of *Oxyurichthys tentacularis*.

Mean Length	Mean weight	Mean standard length(m)
115.23 mm	13 g	88.13 mm

Table 2: Percentage of the Biochemical composition of *Oxyurichthys tentacularis*.

Moisture	Protein	Carbohydrate	Lipid	Ash
76.28%	15.62%	1.76%	1.47%	2.63%

CONCLUSION

Fish as a protective food assumes greater significance, which can play a pivotal role in mitigating protein deficiency or malnutrition. In view of their good class protein contents, low fat contents, moderate carbohydrate, coupled with the good mineral contents, of the fish species studied, it may be concluded that the fish species is of high nutritional value and could be recommended for human consumption and which constitutes an integral component for the livelihood and food security of the population inhabiting the Ashtamudi Lake area.

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