

Proximate Composition Properties of Different Fish Species Obtained from Lagos, Nigeria

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Abstract

*Proximate body composition is the analysis of water, fat, protein and ash contents of fish. Proximate analysis of three fish species such as *Tilapia oreochromis*, *Pseudolithus senegalensis* and *Ethmalosa fimbriata* were carried out with standard methods. The lower the crude fibre content, the greater the lipids and protein contents. It is concluded that *Tilapia oreochromis* contains lowest water and highest protein (38.19%) and carbohydrate (10.41) contents. Therefore *Tilapia oreochromis* has the best quality from the point of view of higher biological values of protein and fat and it is recommended for most consumption.*

Key words: Proximate Composition, *Tilapia oreochromis*, *Pseudolithus senegalensis*, *Ethmalosa fimbriata*.

Introduction

Proximate body composition is the analysis of water, fat, protein and ash content of the fish (Love,1980). Proximate composition is a good indicator of physiology which is needed for routine analysis of fisheries (Cui and Wootton, 1988). Lipid is regarded as one of the most important food reserves and has led to the use of fat indices as a measure of relationship between percentage of water and fat (Salam and Davies, 1994). A number of investigators have attempted to relate changes in body composition to seasonal variables (Dawson and Grimm, 1980; Jarboe and Grant,1996). The feeding frequency has an influence on body composition (Cui and Wootton, 1988). Body size or age has been shown to have a definite effect on body composition (Ali et al 2005, 2006 a,b). Several studies have shown significant changes in whole body composition or in the composition of specific organs or muscle tissues due to age, feeding frequency, migration, ration, sex, starvation and temperature (Millikin, 1992; Weatherly and Gill 1983). Fish is one of the most important sources of animal protein available in the tropics and has been widely accepted as a good source of protein and other vital nutrients for the maintenance of a healthy body (Andrew, 2001). The less developed countries capture 50% of the world harvest and a large proportion of the catch are consumed internally(FAO, 1985). In many Asian countries over 50% of the animal

protein intake comes from fish while in Africa, the proportion is 17.50% (Williams et al,1988). In Nigeria, fish constitute 40% of the animal protein intake (Olatunde,1998). They have significant role in nutrition, income, employment and foreign exchange earning of the country. Fresh fish is a central point in fish for food utilization. The knowledge of fish composition is essential for its maximal utilization (Silva and Chamul,2000). Fish is safer and healthier to be consumed when compared with goat, mutton, buffalo meat and chicken meat. Compared to other sources of protein, fish are well known to be excellent sources of protein which can be seen from amino acid composition and protein digestibility (Louka et al,2004). The aim of this study is the comparison of proximate composition of three selected different fishes.

Material and Methods

Sampling. A good number of fish samples of *Tilapia oreochromis*, *Pseudolithus senegalensis* and *Bonga Ethmalosa Fimbriata* were obtained from Makoko and Carter Bridge Rivers in Lagos, Nigeria. The fish samples were kept in cold iced box and transported to the laboratory.

Proximate Composition. Proximate composition of fishes was determined using AOAC methods (1990). All analysis was done in triplicate. Moisture content was measured by weighing differences before and after oven drying at 100-105°C for 16h. Lipid determination was carried out using the modified Bligh and Dyer procedure (1959), the ash

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content of the fish was determined by igniting the sample at 5500C for 5-6 hours until the sample was completely free from carbon particles in a carbolite muffle furnace while the total nitrogen was determined by Kjeldahl method as described by AOAC,1994 and a factor of 6.25 was used for converting the total nitrogen to crude protein of the fish sample.

Statistical Analysis. All data were analyzed by one-way ANOVA analysis using SPSS 11.5 for windows. A value of $P < 0.05$ was used to indicate significant differences.

Table 1. Proximate Composition (%) of *Tilapia oreochromis*

Parameters measured	% composition	
	Site 1%	Site 2%
Lipid content	18.6	16.25
Protein content	38.19	30.84
Moisture content	27.66	38.95
Ash content	1.76	3.37
Carbohydrate content	10.41	7.46
Crude fibre content	3.38	3.13

Table2. Proximate Composition (%) of *Pseudolithus senegalensis*

Parameters measured	% composition	
	Site 1	Site 2
Lipid content	2.40	2.80
Protein content	28.09	30.20
Moisture content	62.80	60.90
Ash content	5.90	4.60
Carbohydrate content	0.634	1.30
Crude fibre content	0.176	0.20

Table 3. Proximate Compositions (%) of *Bonga Ethmalosa fimbriata*.

Parameters measured	% composition	
	Site 1%	Site 2%
Lipid content	7.60	7.92
Protein content	16.29	12.56
Moisture content	63.04	67.90
Ash content	10.30	8.09
Carbohydrate content	0.98	1.12
Crude fibre content	1.79	2.41

* Data are mean of 3 replicates.

Results and Discussion

Mean percentage for moisture protein, fat, ash and carbohydrate content of fishes are given in tables 1 – 3. The three fishes had moisture content ranging from 27.66% to 67.90% (Table 1 – 3). Similar result reported by Hiu in 2004.

The result of the fish body composition analysis revealed a strong similarity between *Tilapia oreochromis* obtained from the two sites. The nutritional composition of these

fishes fell within reported values for fish (Siaw et al, 19985). This means that they can be utilized for production of other valued fish products. Protein and fat are the major nutrients in fish and their levels help define the nutritional status of the particular organism.

The chemical composition of fish varies greatly from one individual to another depending on age, sex environment and season. *T. oreochromis* belong to a high protein category because it is within the range of 30 – 38 %. They have higher protein content than the fatty fishes, meats or poultry and in ideal source of animal protein. *P. senegalensis* have a low lipid content of less than 5%. Fishes with lipid content below 5% are lean (Stanby,1982), hence *P. senegalensis* is considered a lean fish. The low lipid content value might be as a result of the environment, species and the type of diet the fishes feed on.

Moisture content in the three species was within the range as previously reporting by Gallagher et al, 1991. According to FAO, 1999 moisture and lipid content in fish fillet are inversely related. The range for the ash content gave an indication that the fish samples may be good sources of minerals such as calcium, potassium, zinc, iron and magnesium.

T. Oreochromis has the best quality of fish from the point of view of nutrient in comparison with other fishes. *T. Oreochromis* can be referred to as a high protein fish. They can be utilized maximally by food processors in fish canning and other value added fish products such as fish burger, fish cake and fish crackers. Hence they are suitable as potential industrial material for possible utilization for different products.

It can be concluding that the nutritional body composition of the selected fishes, including nutrients, is within nutritional ranges required by humans. Fat composition exhibited seasonal variations in all species of fish. Biological values of protein in fishes is high and it contains all essential amino acids and fish fat also contains essential fatty acids and omega -3 fatty acids. Fish contain most minerals, therefore consumption of fish is good for people's health.

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