



## Comparative Proximate Composition of Fishes in Fresh Water in Lapai Market, Niger State, Nigeria

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### ABSTRACT

The comparative proximate compositions of some smoked and fresh fishes of fresh water in Lapai market, Niger State, were carried out according to the procedures of AOAC (1990). The species used for the study include *Clarias gariepinus*, *Heterotis niloticus* and *Tilapia zilli*. The nutrient compositions of raw muscles determined were protein, moisture, fat, fibre, ash and nitrogen-free-extract. In both smoked and fresh species of the fishes, crude protein was highest in *Clarias* (60.00%) and (18.84%) respectively, and at lowest in *Heterotis* (51.15%) and (17.22%) respectively. Both smoked and fresh fishes showed significant differences ( $P < 0.05$ ) in the nutrient compositions. The results of this research work would be of great value in classifying species examined in terms of nutritive contents in area of study and its surrounding.

**Keywords:** Smoked, fresh, *Clarias gariepinus*.

### INTRODUCTION

Fish has been recognized as one of the cheapest sources of animal protein. Fish is a cheap animal protein, source of employment, revenue and foreign exchange earnings for the nation. More importantly fish is widely accepted and consumed for its high nutritive value, being rich in protein, fat/lipids and contain some quantities of vitamins and minerals as well as carbohydrates for human growth and health. It is also palatable and tender as well as source of feeds to other animals.

In Nigeria, fish contributes on the average 20 – 25% input animal intake and could be as high as 80% in coastal and riverine communities (FAO, 2004). Tobar (1993) and Ajana (2002) in Bamidele (2007) reported that the average annual demand for fish in Nigeria between 1995 and 2000 was estimated at 1.22 million metric tones and that this might increase to about 1.425 million metric tonnes by 2025 from domestic fish supply of 1.52 million tones as against 1.75 million tones demanded.

The measurement of some proximate composition of fishes such as protein, fats/lipids, ash/minerals, moisture and NFE is often necessary to ensure that they meet the requirements of food regulation and commercial specification (Waterman, 2000). The aim of this

study was to determine the proximate composition (i.e. protein, moisture, fats/lipids, ash/minerals, fibre and NFE) of some fresh water fish species (fresh and smoked) in the area of study to provide information on the species of fish with highest nutritive value, and best quality in terms of protein, fat, and ash/minerals.

### METHODOLOGY

#### Experimental Location

The collection place Lapai was located in vegetative zone of Guinea Savannah middle belt of Nigeria with temperature of 23°C – 34°C and a minimum rainfall of 107.3mm, at longitude 9' 02°N and latitude 6' 34°E of the equator (Anonymous, 2010).

#### Experimental Animal

Fresh water fish (smoked and fresh) used for this study were collected randomly from Lapai market on the market day. Twenty (40) fishes each of *Clarias gariepinus*, *Tilapia zilli* and *Heterotis niloticus* (both smoked and fresh) were used for the study. That is, twenty (20)

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smoked and twenty (20) fresh of each specie were used. The fishes were bought from businessmen and women on the market day.

### Data Collection and Statistical Analysis

Collected samples were taken to laboratory where only the raw muscles were removed, homogenized by mortar and crushed with a pistol and kept in a desiccators for proximate analysis. The proximate composition analyzed were moisture, protein, fats, ash, fibre and NFE. The proximate analyses were done according to the procedures of AOAC (1990).

Data collected were processed and analyzed using one way Analysis of Variance (ANOVA) according to the procedures of Steel and Torrie (1980). Significant means were compared using Duncan Multiple Range Test at probability level of 5%.

## RESULTS

Results of the proximate analyses on different species of smoked and fresh are presented in Tables 3.1 and 3.2 respectively:

Table 3.1: Proximate composition of smoked fishes

Nutrients	Nutrient Compositions (%) of species of fish		
	CG	HN	TZ
Moisture	16.36 <sup>c</sup>	30.74 <sup>a</sup>	22.47 <sup>b</sup>
Protein	60.00 <sup>a</sup>	51.14 <sup>c</sup>	56.19 <sup>b</sup>
Fats/lipids	12.60 <sup>b</sup>	11.65 <sup>c</sup>	14.56 <sup>a</sup>
Ash/minerals	1.64 <sup>a</sup>	1.39 <sup>b</sup>	1.33 <sup>c</sup>
Fibre	0.97 <sup>b</sup>	0.98 <sup>a</sup>	0.98 <sup>a</sup>
NFE	8.42 <sup>a</sup>	4.09 <sup>c</sup>	4.44 <sup>b</sup>

Note: CG: *Clarias gariepinus*  
HN: *Heterotis niloticus*  
TZ: *Tilapia zilli*

Where <sup>a</sup>, <sup>b</sup> and <sup>c</sup> means superscript. And data on the same column carrying the same letter differ insignificantly from each other.

Table 3.2: Proximate composition of some fresh fishes

Nutrients	Nutrient Compositions (%) of species of fish		
	CG	HN	TZ
Moisture	73.05 <sup>b</sup>	72.10 <sup>c</sup>	75.94 <sup>a</sup>
Protein	18.84 <sup>a</sup>	17.22 <sup>c</sup>	17.30 <sup>b</sup>
Fats/lipids	3.18 <sup>a</sup>	2.90 <sup>b</sup>	2.00 <sup>c</sup>
Ash/minerals	1.99 <sup>a</sup>	1.98 <sup>b</sup>	1.64 <sup>c</sup>
Fibre	0.78 <sup>c</sup>	0.81 <sup>a</sup>	0.79 <sup>b</sup>
NFE	2.17 <sup>c</sup>	4.98 <sup>a</sup>	2.33 <sup>b</sup>

Note: CG: *Clarias gariepinus*

HN: *Heterotis niloticus*

TZ: *Tilapia zilli*

Where <sup>a</sup>, <sup>b</sup> and <sup>c</sup> means superscript. And data on the same column carrying the same letter differ insignificantly from each other.

From the table 3.1 and 3.2, proximate composition of the nutrients content (protein, moisture, ash/minerals, fibre, fats/lipids and NFE) determined vary significantly in both smoked and fresh species of fish ( $P < 0.05$ ).

Both smoked and fresh, *Clarias gariepinus* had the highest protein content, followed by *Tilapia zilli* and least *Heterotis niloticus*; 60.00% and 18.84%, 56.19% and 17.30%, 51.15% and 17.22%, respectively. Also *Clarias* had the highest fats/lipids and ash/minerals content in fresh, 3.18% and 1.99% respectively, while smoked *Tilapia* had the highest fat/lipids content. Fibre content of the species of fish differed insignificantly, 0.97%, 0.98% and 0.98 for *Clarias*, *Heterotis* and *Tilapia* respectively. *Clarias gariepinus* had the highest NFE content in smoked, (8.42%) while *Heterotis niloticus* had the highest in fresh, (4.98%).

## DISCUSSION

The significant differences of the proximate composition of nutrients in smoked and fresh as well as among the species is in agreement with Sallam *et al.* (2007) who reported that the chemical composition of fish muscle varies greatly within species and even among the individuals within the same species and such variation depends on age, size, sex, environment and season.

Higher protein content in *Clarias gariepinus* makes it a highly valued food fish and it should be explored to increase the protein availability and intake of the populace. CFCD (2002) reported that *Clarias* protein content is more than that of egg yolk of birds. Also high fat content in fishes had been recommended for treatment of post operation patients (Ma-mat Jais *et al.*; 1998).

In comparison generally with exception of moisture and ash contents, the nutrients composition were higher in smoked fishes than in fresh fishes.

## Conclusion

The study revealed that there were significant variations in the proximate composition within

species as well as between smoked and fresh species of fish, *Clarias* contain more protein content in both smoked and fresh, it also revealed that *Tilapia* (smoked) had the highest fat while fresh *Clarias* had the highest fat content.

The fish species with the highest nutrient composition in terms of protein, minerals and fat as revealed by the study is *Clarias* and then *Clarias* has higher quality in nutrient composition for diet intake.

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