

## COMPARATIVE STUDY OF THE PROXIMATE COMPOSITIONS OF SOME SCALED AND UNSCALED FISH

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### ABSTRACT

A study on the proximate composition of 4 scaled and unscaled fish samples were carried out in September, 2019 using standard procedures. The protein content between  $7.02 \pm 2.05\%$  in the scaled fish samples, while that of unscaled fish ranged from  $18.29 \pm 2.26\%$ . Concentrations of fats were  $2.21 \pm 0.70\%$  in scaled while unsealed were  $2.58 \pm 21.10\%$ . Fibre values ranged from  $0.130 \pm 0.037\%$  in the scaled and unscaled were observed to be  $0.26 \pm 0.11\%$ . Carbohydrate recorded in scaled fish samples ranged from  $12.03 \pm 5.65$  in unscaled fish samples ranged from  $9.71 \pm 2.30\%$ . Ash content observed was  $(0.61 \pm 0.36\%$  in scaled fish samples while unscaled fish samples shows  $1.93 \pm 0.69\%$  Moisture contents recorded in scaled was  $67.74 \pm 5.17\%$  while unscaled shows  $67.18 \pm 3.73\%$ . They was no significance difference at  $P > 0.05$  except for ash content. *Bargus bayad* had the highest crude protein content and could be recommended as a possible effective way to solve protein malnutrition

**Keywords:** scaled fish, unscaled fish, proximate analysis, nutrient

### INTRODUCTION

Fish are major source of high quality protein, and occupies a key place in human nutrition (Nargis, 2006). Fish and shell fish contain about 19% protein similar in amino acid composition to that found in muscle meats. The content varies from 1 to 20% depending upon the species and the season of the year. Fish proteins are of high biological importance. Essential. Medical doctors recommended that fish should be used instead of meat several times a week because of the possible benefits of fish oils for coronary heart diseases (The Nation, 2009). Many researchers have assessed the proximate composition of fish (Yazadanet *et al.*, 2009). Nutritional value of fishes caught in the open sea and oceans is greatly dependent on proper shipping, storage and handling. Fishes constitute 60-70% of the

total animal protein intake of riverine community residents, as found in most communities in Nigeria. Fish proteins are rich in essential amino acids particularly methionine and lysine in contrast to most proteins from plant sources, which lack adequate amounts of one or more essential amino acids. Fish proteins are considered nutritionally equivalent or slightly superior as compared with red meat. They are highly sensitive to proteolytic digestion, with high digestibility and a high biological growth promoting value (Nargis, 2006). The *in vivo* digestibility of proteins of raw fish meat is in the range of 90-98%, and that of shellfish about 85%. This enhanced digestibility is mainly due to the absence of collagenous fibres and tendons in fish muscle, which is characteristic of land animals (Vahiyili, 2006).

Fish food is one of the few natural food sources of vitamin D and contains important amounts of vitamin E necessary for healthy skin and bone development. Fish is also considered a good source of fluorine and iodine, needed for the development of strong teeth and the prevention of goiter. In many countries, over 50% of the animal protein intake comes from fish, while in Africa; the proportion is 22% as estimated by the FAO (NEPAD, 2005). This implies that any short fall in fish availability will adversely affect the animal protein intake of people in tropical countries. The present study is aimed at evaluating the nutritional composition of some commonly sold fishes (scaled and unscaled) in Ega market, Idah local government area in Kogi State, Nigeria.

## MATERIALS AND METHOD

### Study Area

Ega market is located close to the popular Ega River in Idah Local Government, Kogi state. The popular Ega market which serves as a business ground for local traders in the community and traders from outside the community, has an annual rainfall between 1016 to 1524mm. The market welcomes traders and goods from Aganebode across the river, while the Bode market is the first point of contact on arrival from the Idah side. In both markets, Igala and Etsako languages are used for commercial transactions.

### Sample collection

This study was carried out in the month of September, 2010. A total of 8 samples of both scaled and unscaled fish were used to carry out the study, four (4) samples each for scaled and unscaled fish. The scaled fish were *Nile tilapia*, *Sardinella madarensis*, *Lates niloticus* and *Atlantic herring*. The unscaled fish were *Bargrus bajad*, *Clariasgariiepinus*, *Synodontis*

*clarias* and *Synodontis membranaceus*. Fishes were identified based on visible taxonomic characters as; number of fins, colour, body shape, type of mouth. Fresh samples of the fish types were bought from reliable fish sellers at Ega market, Idah Local Government, Kogi State. They were transported immediately to biochemistry laboratory, Kogi State University for the proximate analysis.

### Biometric measurements

Individual data for length, weight and sex were taken and recorded in their fresh state. The standard length was measured with the aid of a graduated fish measuring board. The weight was measured in gram (g) and centimeter (cm) using weighing balance (Sartorius 1219MP) standard and a meter rule respectively. The sex was determined by visual examination of the gonads. The size range of the fish sampled were as follows; *O. niloticus* 5.21-10.10cm, *S. madarensis* 8.34-16.40cm, *L. niloticus* 9.32-15.60cm, *Atlantic herring* 11.12-18.50cm, *B. bayad* 6.22-13cm, *C. gariepinus* 10.08-24cm, *S. clarias* 5.80-12.60cm and *S. membranaceus* 7.16-17.50cm.

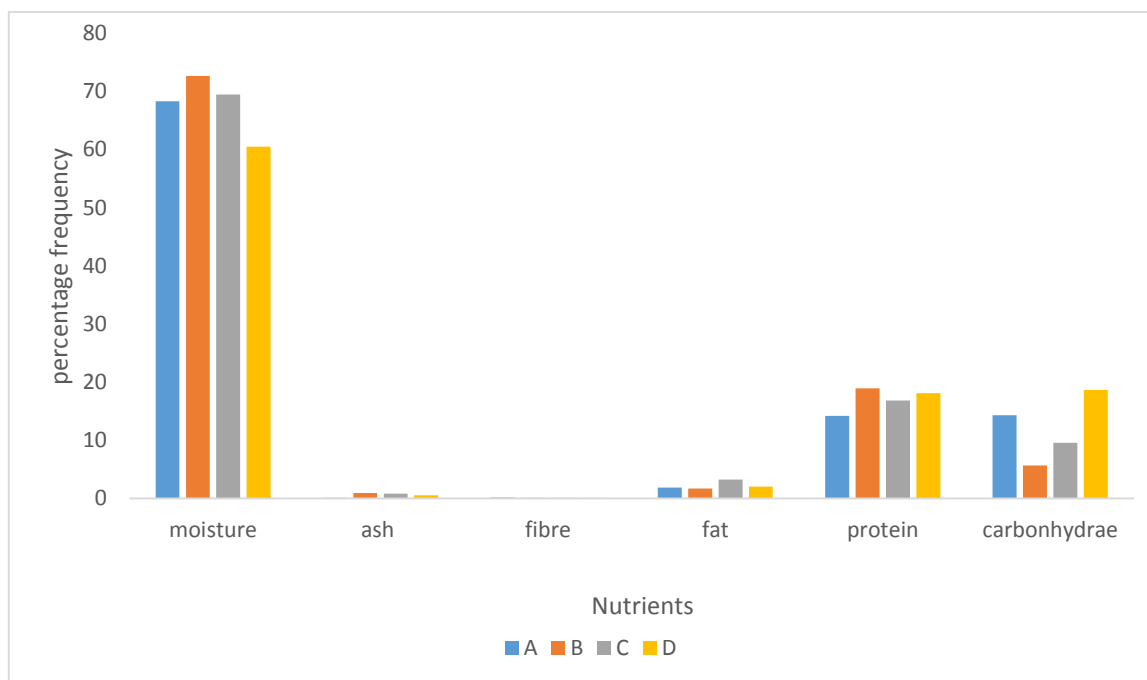
### Preparation for Analysis

Fish samples were gutted, washed, filleted and finely crushed into a uniform paste. Each homogenized sample was neatly packed into a sterile transparent container and appropriately labelled. The proximate composition of processed fish samples was determined according to the Association of Official Analytical Chemists (AOAC) (2005) methods.

### Statistical Analysis

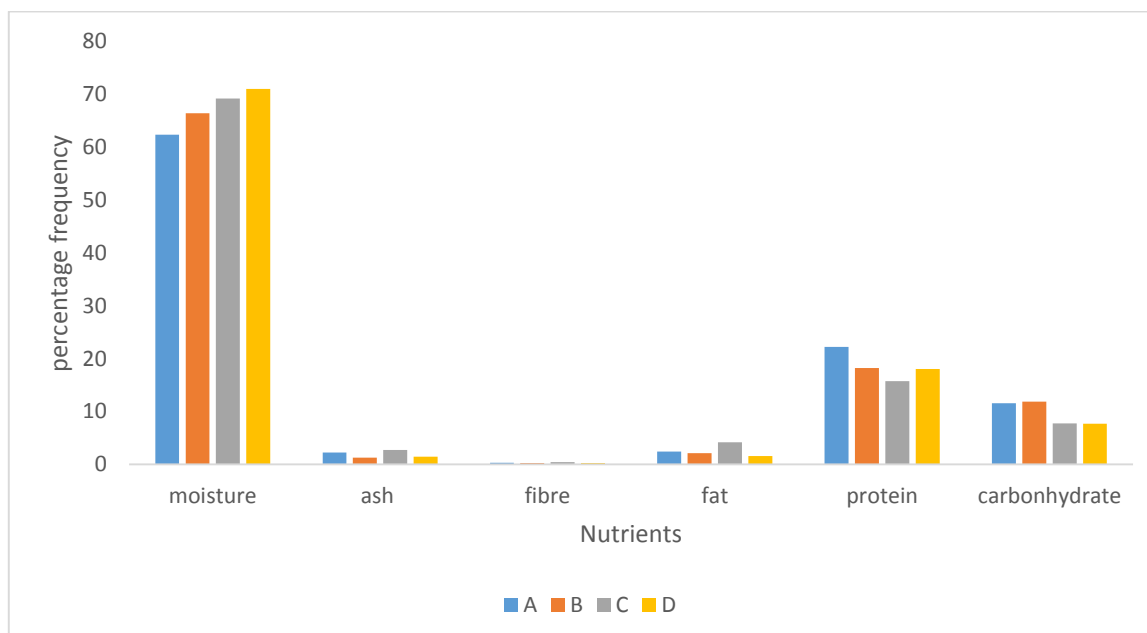
The data of positive results obtained were subjected to T-Test to compare difference of proximate composition of scaled and unscaled fishes using Statistical package for social sciences version 20.0.

## RESULT AND DISCUSSION



**Fig. 1: Distribution of moisture content, ash content, crude fibre, fat content, crude protein and carbohydrate of scale fishes from proximate analysis**

A=Nile tilapia B=Sardinellamadarensis, C = Latesniloticus and D= Atlantic herring



**Fig. 2: Distribution of moisture content, ash content, crude fibre, fat content, crude protein and carbohydrate of unscaled fishes from proximate analysis**

A=Bargrusbajad B= Clariasgariepinus C=Synodontisclariasand D= Synodontismembranaceus

**Table 1: Percentage proximate composition of scaled and unscaled fishes. Data= mean  $\pm$  SD**

Samples	Proximate composition					
	Moisture%	Ash%	Crude fibre%	Protein%	Fat%	Carbohydrate %
Scaled	67.74 $\pm$ 5.17 <sup>a</sup>	0.61 $\pm$ 0.36 <sup>a</sup>	0.130 $\pm$ 0.03 <sup>a</sup>	17.02 $\pm$ 2.05 <sup>a</sup>	2.21 $\pm$ 0.70 <sup>a</sup>	12.03 $\pm$ 5.65 <sup>a</sup>
Unscaled	67.18 $\pm$ 3.78 <sup>a</sup>	1.93 $\pm$ 0.69 <sup>b</sup>	0.26 $\pm$ 0.11 <sup>a</sup>	18.29 $\pm$ 2.26 <sup>a</sup>	2.58 $\pm$ 1.10 <sup>a</sup>	9.71 $\pm$ 2.30 <sup>a</sup>

Means in a column followed by different letters are significantly different (P < 0.05).

From Table 1, scaled and unscaled fish recorded almost the same moisture content of 67.74% and 67.18% respectively. Unscaled fish had the highest ash content of 1.93% while scaled fish had the ash content of 0.193%. Scaled and unscaled fish had almost the same crude fibre of 0.13% and 0.26%. Scaled fish had the highest crude protein of 17.02% while unscaled fish had crude protein of 18.29%. Scaled fish had the highest carbohydrate of 12.03%, while unscaled fish had crude protein of 9.71%. Scaled and unscaled fish had almost the same Fat content of 2.21% and 2.58%.

Most of the fish species sampled from Egah market had moderate percentage crude protein content in Scaled and unscaled samples. High values of crude protein were observed in unscaled than scaled fish samples. This result agrees with Ogonnaya and Ibrahim, 2009 who worked on proximate composition of catfish *Clarias lazera*. There was no significant difference at P > 0.05

*Bargus bajadand Sardinela maderensis*, recorded high values of crude protein in both scaled and unscaled fish samples. High crude protein value may be due to season of the year, effect of spawning, migration and food availability (Abdullahi 2001). Crude protein content in fish could be affected by age,

nutrition, physiological condition and genetic factors. .

Percentage Crude lipid content was low in both scaled and unscaled samples of most fish species. This is in conformity with the range (< 1-20%) reported earlier by Osibonaet al (2006). The low lipid value in the sampled species could be due to poor storage mechanism and the use of fat reserves during spawning activities (Osibonaet al., 2006).

The percentage moisture content of all the fish species sampled was within the range earlier reported by Effiong and Tafa, (2005).

The relationship between moisture and lipid is well established in this work. The moisture content is inversely proportional to the lipid content. This result agrees with FAO (1999). However, Osibonaet al., (2006) did not observe this pattern in his study on *Clarias gariepinus* and attributed it to the fact that this species is a non-fatty fish.

## CONCLUSION

It could be concluded that, the scaled and unscaled fishes are good source of protein and other nutrients even though each species has different proximate composition. However, higher protein, crude fibre, ash content and lipid were found in unscaled fish samples, while higher moisture content and

carbohydrate were observed in scaled fish samples. There was no significant difference at  $P > 0.05$  except for ash content.

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