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Comparative Study of the Proximate Composition of Some Wild Tilapiine Fishes in Epe Lagoon, Lagos, Nigeria

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ABSTRACT

The proximate composition of some wild tilapiine fishes in Epe Lagoon, Lagos, Nigeria was analyzed. The species were *Sarotherodon melanotheron*, *Tilapia guineensis*, *Tilapia mariae*, *Sarotherodon galilaeus* and an ecotype cichlid popularly called 'wesafu'. Major nutrient compositions of raw muscles like protein, fat, moisture and ash were determined in the laboratory. Proximate compositions were found to be varied among the species. Protein was determined in *Sarotherodon melanotheron* (19.13%), *T. guineensis* (18.71%), *T. mariae* (18.08%), *S. galilaeus* (18.34%) and 'wesafu' (21.80%), respectively. Lipid content was recorded as 0.82, 0.40, 0.60, 0.65, and 0.90% for the tilapia species. The highest level of moisture content was found in *T. guineensis* (81.70%) and the lowest was in 'wesafu' (78.50%). The percentage of ash content was highest in *S. galilaeus* and *S. melanotheron* (1.75%) and lowest in *T. guineensis* (1.00%). The present study revealed highest protein content in the ecotype cichlid, wesafu (19.22%) and lowest value in *T. mariae* (18.08%) while fat was highest in 'wesafu' (0.90%). The results of this study reveal the nutritional significance of the ecotype cichlid, 'wesafu' above other cichlids of the lagoon.

Key words: Proximate, composition, Tilapiine, fishes

INTRODUCTION

Globally, tilapia has become the second most important farmed fish consumed next to carps (Fitzsimmons, 2008). The relative environmental friendliness of tilapia production, coupled with diversified production strategies and strong domestic market in those countries producing it as well as growing International trade will drive tilapia production and demand globally. Tilapias are omnivorous fish which naturally feed on plankton, diatoms, small crustaceans, higher plants and decomposing vegetative matters. This cichlid has been used in recycling wastes into high quality flesh (Alkobaby *et al.*, 2008). They are capable of digesting high level of carbohydrate in their diet. The diet of fish has a great influence on their general chemical composition, and particularly on their fatty acid composition (Henderson and Tocher, 2007). The chemical composition of fish muscle varies from one species to another and individuals within the same species (Alkobaby *et al.*, 2008). Such variation depends on the age, size, sex, environment and season. In fact the variation in the chemical composition of fish is closely related to the feed intake, migratory pattern, swimming and sexual changes in connection with spawning (Sallam *et al.*, 2007).

The study was conducted to assess the proximate composition of the tilapiine fishes of Epe Lagoon; namely *Sarotherodon melanotheron*, *Tilapia guineensis*, *Tilapia mariae*, *Sarotherodon galilaeus* and an ecotype cichlid, 'wesafu', endemic to Epe Lagoon.

MATERIALS AND METHODS

Sampling: Fresh specimens of tilapiine fishes were purchased from fishermen at Epe Lagoon landing site in Lagos state. The samples were collected aseptically and transported in an insulated container under chilled condition to the Fish Technology laboratory, Nigerian Institute for Oceanography and Marine Research Victoria Island, for analysis.

Proximate composition analysis: Proximate analyses were carried out in triplicate determination on the samples after dressing. These analyses include moisture content, total lipid, crude protein and ash. The moisture content was determined by drying samples to constant weight at $105\pm 2^\circ\text{C}$ using the oven dry method (AOAC, 1994). Lipid determination was carried out using the modified Bligh and Dyer procedure (AOAC, 1994). The ash content of the fish samples were determined by igniting the samples at 550°C for 5-6 h until the samples were completely free of carbon particles in a carbotite Sheffield LMF3 muffle furnace while the total nitrogen was determined by the Kjeldahl method as described by Vlieg (1984) and a factor of 6.25 was used for converting the total nitrogen to crude protein content of the fish samples.

RESULTS AND DISCUSSION

Table 1 showed the results of the proximate composition of wild samples of the cichlid fishes. The moisture content was in the range of (78.50-81.70%), lipid (0.40-0.9%) and ash (1.00-1.75%) while protein was in the range of (18.08-21.80%).

The protein content, 18.34, 19.13, 18.71, 18.08 and 21.80% for *T. galilaeus*, *S. melanotheron*, *T. guineensis*, *T. mariae* and Wesafu, respectively vary considerably from species to species. This is in agreement with Alkobaby *et al.* (2008) who reported that the chemical composition of fish flesh varies greatly from one species to another and even among the individuals within the same species. According to the author, such variation depends on age, size, sex, environment and season. Sallam *et al.* (2007) further stressed that the variation is closely related to feed intake, migratory, swimming and sexual changes in connection with spawning. The highest percentage of protein for 'wesafu' in this study is probably due to presence of certain amino acids in 'wesafu' which may be absent in other cichlids studied. Hammed *et al.* (2010) reported that 'wesafu' has the highest value of phenylalanine, isoleucine, leucine and valine than other cichlids studied. The results of the lipid

Table 1: Proximate composition of wild specimen of cichlid in Epe Lagoon

Species	Proximate composition (%)			
	Moisture	Ash	Lipid	Crude protein
<i>S. galilaeus</i>	79.33	1.75	0.65	18.34
<i>S. melanotheron</i>	80.35	1.75	0.82	19.13
<i>T. guineensis</i>	81.70	1.00	0.40	18.71
<i>T. mariae</i>	80.83	1.30	0.60	18.08
"Wesafu"	78.50	1.20	0.90	21.80

content revealed that the ecotype cichlid, 'Wesafu' has the highest lipid content (0.9%) while *T. guineensis* has the least (0.4%). The results obtained showed that the fish species studied belong to the low-oil category and therefore can be classified as lean fish. Stansby (1982) and Ackman (1989) reported that fishes with lipid content below 5% are lean fishes.

The main composition of fish muscle is moisture. The moisture content of the fishes studied varied between 78.5-80.83%. The moisture contents for the fish samples were within reasonable range as reported by Gallagher *et al.* (1991). FAO (1999) reported that moisture and lipid contents in fish muscle are inversely related and their sum is approximately 80% with other components accounting for the remaining 20% which partially agree with the finding of the present study. The findings of this study reveal the nutritional significance of the ecotype cichlid, 'wesafu' above other cichlids of the lagoon.

CONCLUSION

This study has shown that "wesafu" has higher protein content than most other cichlid and would help to provide the much needed animal protein in our diets.

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