Techniques in the improvement of consumer taste of *Heterotis niloticus*

AP Ekanem¹ & G Ikongo²

¹Department of Fisheries and Aquaculture, Institute of Oceanography, University of Calabar, PMB 1115 Calabar, Nigeria
²Department of Fisheries and Aquaculture, University of Calabar, Nigeria.

Correspondence: albertekanem@yahoo.com

Abstract: Improvement of the consumer taste of *Heterotis niloticus* was investigated by salting techniques. Table size fish were degutted, cut into uniform sizes, soaked in salt solutions at concentrations ranging from 0-100g/l for 6h. The salted pieces of *H. niloticus* were allowed to drain for an hour before being subjected to fire wood smoking in a kiln for 48h. Taste of *H. niloticus* was greatly improved at 50g/l salt as reported by all members of a 5-man organoleptic taste panel. Improvement of the consumer taste of *H. niloticus* by salting demonstrated in this study would improve the market value and aquaculture potentials of the species which has been discriminated against, despite excellent muscle quality because of poor consumer taste.

Key Words: *Heterotis niloticus*, taste, salting.

Introduction

*Heterotis niloticus* commonly known as African Arowana or bony-tongues, and as Ecomog fish in Nigeria, belongs to the family Ostoeglossidae (Paugy, 1990). This species is wide spread throughout Africa, where it is native to all the watersheds in Sahelo-Sudanese region, Senegal, and Gambia as well as parts of Eastern Africa. This range includes the basins of the Corubal, Volta, Que’mé’, Niger, benoue and Nile River as well as those of Lake Chad and Lake Turkana. It has been successfully introduced to Cote D’ Voire, the Cross river in Nigeria, the Sanagal and Nyong river in Cameroon, and Ogooue river in Gabon as well as lower and middle Congo river basin, including Ubamji and Kasai river.

In a recent study to investigate the physicochemical changes in smoked fresh water fishes stored in ambient temperature, Daramola et al (2007) reported the best taste and meat quality in *Oreochromis niloticus* and *H. niloticus*. *Heterotis* consume a variety of food resources ranging from aquatic invertebrates to small seeds. The thick-walled gizzard generally contains sand that probably aids in the digestion of seed coats. It is the only plankton feeder in the family Osteoglossidae (Paugy, 1990). It is equipped with an epibranchial spiral and suprabranchial organs that enable it concentrate small planktonic food particles (Winemiller and Fiogbe 2005). It has an auxiliary air breathing organ which enables it to survive in oxygen-depleted conditions. This characteristic and its firm muscle quality have endeared *H. niloticus* to aquaculturist in many African countries. A study carried out in Lake Hlan in Southern Benin shows that it has a peak spawning period between May and August with an approximate number of larvae per nest ranging from 3953 to 6125 (Adite et al, 2005). The maximum observed length and weight of *H. niloticus* as observed in Lake Kainyi is 100 cm and 10 kg respectively.

Its fast growth rate and an excellent muscle quality make it a good candidate for aquaculture but the poor taste of the fish makes it unpopular among fish consumers. Achionye-Nzeeh and Omoniyi (2002) reported low lipid composition (13%) in *H. niloticus* with very thick scale in comparison with *Gnathonemus cyprinoides* (light scale) with highest lipid content (26%). Haematological characteristics showed a positive correlation between blood cells, haemoglobin and packed cells volume but no positive correlations between WBC, RBC and some physical parameters (length and weight) of *H. niloticus* (Ayotunde et al., 2009).

The objective of the study is to improve the consumer taste of *H. niloticus* by salting and smoking, thereby increasing the market value of the species.
Data collection and analyses

*Heterotis niloticus* of table size (1.5 to 2.5 Kg) were purchased from fishermen at Itu Head Bridge in Akwa Ibom State. The fish were slaughtered, scaled and degutted; cut into sizes of about 50g and soaked in different concentrations of salt solution (50, 70, 90,100 g/l) for a period of 4 hours. At the expiration of the salting period, the salted fish were placed on wire gauze and allowed to drain before being subjected to smoking in a smoking kiln along-side the unsalted fish of the same sizes serving as control. Smoking was done using red-hot charcoal from fire wood. They were smoked to an average moisture content of 12.02±0.03%. The samples and controls were replicated three times. A panel of 5 consumers randomly selected from among students and staff of the department of Fisheries and Aquaculture was constituted to assist in determining the taste of the salted-smoked and unsalted-smoked fish (organoleptic test).

The taste determination started with the unsalted fish, which served as the control. The control carries the true taste of *Heterotis niloticus*. At each interval between consumption of fish from each treatment group, a glass of water was served to the consumers to wash down what has been consumed, thereby reducing biases.

Statistical Analysis

The homogeneity of the three replicates of the samples was checked by the Mann-Whitney U-test, before data of the replicates were pooled and treated as one group. Significant differences in the taste within the experimental groups were evaluated using the Kruskal-Wallis test and the Mann-Whitney U-test. Significance was accepted when P<0.05.

Results and Discussion

The results of the organoleptic taste on the fish are presented in Figure1. Above 50 g/l salt concentration, more than 50% of the panel members reported that the fish was too salty. At 50g/l salt solution, all panelist reported acceptable and palatable taste for the fish. There was a significant difference in taste between salted and unsalted fish (P<0.05). Compared to the control, the panelist reported a marked improvement in taste at 50 g/l concentration.

*Heterotis niloticus* is one of the fish species that has great potentials for commercial aquaculture in Nigeria and other countries within the Sub-Saharan African countries where fish offers about 40% protein intakes of the people (Olatunde, 1989). In addition to excellent flesh quality, it is a good source of essential amino acids (Monentöham et al, 2009). The greatest set back to the consumers demand of this fish has been the poor taste thereby affecting the market value despite the excellent meat quality. As a result, *H. niloticus* is being used in many places for animal feed preparation.

Addressing this problem (improvement of consumer taste) constituted the primary objective of this study. The salting/smoking techniques demonstrated in this study led to the improvement of the taste of *H. niloticus*. Salting and smoking of fish has long been practiced by traditional fish processors whose aims have been to reduce post harvest losses (Bostock, 1987, Eyo, 2001) of fish and not necessarily for improvement of taste. Although, no reasons have been given for the poor taste of *H. niloticus*, it could be viewed in the light of the various changes undergone by fish after death which leads to oxidative damage and microbial infestation. These changes which are controlled by the ambient temperature and humidity, in addition to reducing the nutritive values of the meat but also result in poor taste which may now be controlled by products of bacterial metabolisms and activities of moulds. Rancidity in fish has been attributed to oxidation of fat which are observed in fish at onset of spoilage (Connell, 1995). The reason for the poor taste of *H. niloticus* is not fully understood and need to be investigated in a separate study.
Conclusions

Considering its potentials as a good aquaculture candidate, Cultivation of *H. niloticus* should be encouraged. With the cheap and easy to apply techniques of improving its taste which was a limiting factor before now, farmers stand a great chance to boast their economy in table fish production. The specie would attract least cost of production because it utilizes a wide variety of food to attain a good rate of growth within a short time. In addition to hatchery fingerlings production, sourcing of fingerlings of *H. niloticus* from the wild is additional advantage for aquaculture.

References


© ECOSERVE PUBLISHERS, CALABAR