

International Journal of Applied Research and Technology
ISSN 2277-0585

Publication details, including instructions for authors and subscription information:
<http://www.esxpublishers.com>

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Available online: March 31, 2014

To cite this article:

Nwachukwu, A. N., Brown, P. N., Emereole, C. O. and Amaechi, N. C. (2014). Effect of Age on the Meat Quality of *Heterobranchus bi-dorsalis* of Different Age Groups. *International Journal of Applied Research and Technology*. 3(3): 118 – 121.

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Effect of Age on the Meat Quality of *Heterobranchus bi-dorsalis* of Different Age Groups

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(Received: 13 March 2014 / Accepted: 23 March 2014 / Published: 31 March 2014)

Abstract

Heterobranchus bi-dorsalis is greatly utilized in human nutrition in Nigeria because of its good meat quality and flavour. Mature big ones are preferred; but to grow to this size takes upwards 6 months or more and more money spent on supplementary exotic feeds used. This study was undertaken to see whether age affects the nutrient quality of the meat. Three age groups – 1, 3 and 6 months designated fingerlings (T_1), juveniles (T_2) and adults (T_3), respectively, were used. These were slaughtered, dried in an oven at 55°C and proximate compositions of their meats determined. Indices of evaluation were crude protein and fat contents because meats high in protein and low in fat are known as “Healthy Foods.” Highest mean crude protein content of $57.05 \pm 0.02\%$ was observed in the fingerlings, followed by $56.82 \pm 0.02\%$ in the juveniles. Lowest crude protein value of $51.92 \pm 0.01\%$ was seen in the adults. There was no significant difference ($P > 0.05$) in the protein contents of the meats of the different age groups. Highest fat content of $15.05 \pm 0.01\%$ was recorded in the juveniles, followed by $12.04 \pm 0.02\%$ in the fingerlings. Lowest fat content of $8.04 \pm 0.01\%$ was observed in the adults. There was significant difference ($P < 0.05$) in the fat contents of the three meats of different ages. However, these values were generally low and so all the three age groups fall into what is described as “Healthy Foods.” That is, foods high in protein and low in fat. The study therefore showed that age has no negative effect on the nutrient quality of the fish meat of any age. Farmers can harvest at any age and consumers can go for any age group for consumption.

Keywords: *Heteroboanchus bi-doralis*, Nutrient, Quality, Age.

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Introduction

The catfish *Heterobranchius bidorsalis* like its counterpart *H. longifilis* is a good aquaculture candidate in West Africa (Lengendre, 1989) and in Nigeria it is highly cherished as pond fish by farmers because of its high rate of survival in low water volumes with low dissolved oxygen. It can also live successfully for quite a long time in moist mud breathing the atmospheric oxygen with its barbels (Nwachukwu, 2003).

It is greatly utilized in human nutrition in Nigeria because of its good meat quality and flavour. As a result, it commands high market value. It has become the choice of farmers because of the aforementioned biological, ecological and nutritional qualities. It is voracious and omnivorous in food habit; grows to a large size in 6 months or more. The voracious food habit has led to use of supplementary feeds to augment what is naturally available in ponds. This is an added cost to the fish farmer who must grow it to the acceptable large size for the market. Our local feed stuffs are not able to meet this fast growth rate, hence, exotic exorbitant feeds like coppers are now used by most farmers to enhance growth and large size. Consequently, cost of production is now on the increase. In addition to its general acceptance by many cultures in Nigeria as good food fish, the recent “point and kill” now in vogue in our restaurants and hotels nationwide has raised its demand and hence its culture now by many more farmers. “Point and Kill” is a marketing strategy whereby the fish are kept alive in shallow containers in hotels and restaurants where customers visibly see them, point at the size they like and such a one is netted out, weighed and the price told the customer. If he accepts the price, the fish is slaughtered, prepared and served him. It is so lucrative now that hotels and restaurants rush after catfish farmers to have stock for their business. Farmers now grow the fish to larger sizes that attract hotel/resultant buyers because Nigerians have the ostentatious food habit of preferring “the bigger fish, bigger snail, bigger chicken, bigger livestock, et cetera.” In all this, the nutritive qualities of these “bigger this, bigger that” does not come to the minds of both the producer and the consumer.

This study was therefore undertaken to evaluate the nutrient quality of the meats of this fish at different age groups—fingerlings, juveniles and adults, to see whether age has anything to do with its meat quality. Percentage protein and fat contents were used for this evaluation because Akobundu (1999) described foods rich in protein and low in fat as “Healthy Foods.” Knowledge of the protein/fat contents of these meats of different ages, will help catfish farmers to either grow the fish to sexually mature adults that take longer time to reach, or sell them off either at the juvenile or the fingerling stages that have shorter time duration to attain. If it is no use to grow them to mature adults that take longer time and more money to feed them to that age/size before sales are made, it will be an economic breakthrough for the farmer because he will no longer wait for the long maturity period of 6 months or more before harvesting his fish. Production cost arising from feeding will be reduced. Net gain will increase and farmer’s income enhanced. It will generally result in a “quick return on investments.” Farmers will then make quick turnover on their investments.

Materials and Methods

Thirty (30) fingerlings (1month), ten (10) juveniles (3months) and two (2) adults (6months) old obtained from Avigram fish farms, Owerri, in Imo State, Nigeria, were used in this study in Abia State University, Umuahia Campus, Umuahia, Nigeria. The live fish in each age group were washed with clean water, slaughtered and cut into pieces with a chopping knife. The pieces were oven-dried at 55°C for 24 hours. The dried fish were each ground whole in Corona handmill to powder for proximate analysis. They were packaged in small dry polyethylene bags and labelled treatments T₁, T₂ and T₃, representing the fingerlings, juveniles and the adults, respectively. One gram (1g) of each of the fish samples (T₁–T₃) was used to estimate crude protein as total nitrogen, using the semi-micro Kjeldahl’s digestion method (Dewis and Freitas, 1970). Two grams (2g) of each of the samples were used for crude fibre, moisture and ash analyses, according to methods described by the Association of Official Analytical Chemists (1995), while fat was determined by the Gravimetric Solvent Extraction Method of James (1995). The available carbohydrate content of each sample was estimated by the difference.

The data obtained in this study were subjected to standard analysis of variance (ANOVA) and means separated by Duncan’s Multiple Range Test (DMRT) according to Gomez and Gomez (1981).

Results and Discussion

The proximate compositions of the different meats showed that the highest mean crude protein content of 57.05±0.01% was observed in the fingerlings (T₁) aged one (1) month, followed by 56.82±0.02% in the juveniles (T₂) aged three (3) months. The lowest crude protein value of 51.92±0.04% was recorded in the adults (T₃) aged six (6) months. Analysis of variance (ANOVA) showed that there was no significant difference in the protein contents of the meats of the fingerlings, juveniles and the adults. (Table 1). The mean crude protein recorded in the fingerlings (T₁) appear more nutritive in their protein content. However, since there was no significant difference (P>0.05) statistically in their protein contents, any of the age groups is good as human food.

The highest fat content of 15.05±0.01% was observed in the juveniles (T₂), followed by 12.04±0.02% recorded in the fingerlings (T₁). The lowest fat content of 8.04±0.01% was seen in the adult fish (T₃). Statistical analysis showed there was a significant difference (P<0.05) in the fat contents of the three meat samples. Since there was no significant difference in their protein contents, the adults with the lowest fat content is most suited as “Healthy Food,” according to Akobundu (1999). That is, food high in protein and low in fat. However, Uhegbu *et al* (2009) asserted that fat is an energy food and also an important “vehicle” for fat soluble vitamins; as a result, the juveniles would be preferred as food fish for this purpose. Also, the protein content is as good as those of the fingerling and the adults and so could also serve as “Healthy Food.” Another energy food is the carbohydrate. The highest carbohydrate content of 20.5±0.01% was observed in the adult fish (T₃), followed by 6.81±0.02% recorded in juveniles (T₂). The lowest carbohydrate content of 4.73±0.02% was seen in the fingerlings (T₁). Statistically, the carbohydrate contents of the three samples were significantly different (P<0.05). In terms

of value, they were generally low. These agree with the findings of Messiah (1992) that the higher the protein and fat contents of meat, the lower the carbohydrate content and as good as any meat fit for human consumption.

Conclusion and Recommendations

Findings in this study shows that age has no negative influence on the nutrient quality of *H.bi-dorsalis* meat at the fingerling, juvenile and the adult stages. Any of them is good in human nutrition either as “Healthy Food” or as “Energy-giving Food,” or as a “Vehicle” for fat soluble vitamins that make for good nutritive in humans. We therefore recommend that consumers go for any of the age groups for food. Farmers on the other hand can harvest any age group for the market. This will enhance their economy as “return on investment” could be recouped in a shorter time than when harvest is only made at the adult stage that takes a longer time to come about.

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Table

Table 1: Proximate compositions of the meats of fingerlings, juveniles and adults of *H.bi-dorsalis*

Sample	Mean % Crude Protein	Mean % Fat	Mean % Ash	Means% Crude Fibre	Mean% Moisture	Mean% Carbohydrate
Fingerlings (T ₁)	57.05±0.01 ^a	12.04±0.02 ^a	17.52±0.01 ^a	—	8.66±0.01*	4.73±0.02 ^a
Juveniles (T ₂)	56.82±0.02 ^a	15.05±0.01 ^b	12.98±0.02 ^b	—	8.28±0.02*	6.81±0.01 ^b
Adults (T ₃)	51.92± 0.04 ^a	8.04±0.01 ^a	11.28±0.01 ^c	—	8.6± 0.03*	20.05±0.01 ^c

Mean values in the same column with the same superscript are not significantly different (P>0.05)