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Full Length Research Paper

Estimation of fillet yield for four tropical freshwater fish species

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Filleting was carried out on four different species of tropical fresh water fishes namely- *Clarias gariepinus, Heterobranchus logifilis, Synodontis schall and Heterotis niloticus. The fillet yield was calculated as percentages* relative to whole fish and the inedible parts. An opinion poll was also drawn on the acceptance of fillets by the faculty members. *Heterotis niloticus* had the highest fillet percentage of 59.20; *Synodontis schall* recorded the lowest fillet percentage of 41.37 and the highest inedible parts of 54.73% while H*eterotis niloticus* had the highest fillet percentage among all the species. *Clarias gariepinus* and *Heterobranchus longifilis* had almost similar fillet yield of 52.50% and 52.70% respectively. All the fish species are favoured fish that are found in commercial quantity all year round in Bayelsa State, Nigeria. The result of the opinion poll showed that majority(65.63%) preferred whole fish while 18.75% were indifferent and 15.62% preferred fillets. The fish fillet product may take some time for it to be accepted in this part of the world but it will continue to be a value added product for exportation.

Keywords: Carcass, Fish fillets, Value chain, Fish processing

INTRODUCTION

The fish industry is dynamic and in the last two decades, the utilization and processing of fish have diversified significantly, particularly, into high valued fresh and processed products. This is also coupled with the changes in consumer's tastes and advances in technology, packaging, logistics and transport. Value addition mainly focused on increased convenience foods and wider variety of high value added products. Improved processing technology enables higher yield and results in a more lucrative product being demanded from available raw material of fish for human consumption. Morris (2013) Value chain efforts require well packaged product of raw materials that will readily attract customers. Fish filleting may not be common in the developing world but it is a means of introducing tropical fish products into the international markets. With the emphasis of value chain and requirements of international markets for tropical fish species, fish farmers and fish processors should be enlightened and encouraged to develop infrastructures to produce well packaged fish products for export and local consumption. Fish Fillets is one of such products, and according to Clucas and Sutcliffe (1981), fillet is a strip of flesh cut from a whole fish parallel to the line of backbone, it could be block or single fillet of which it is in high demand in developed world. Filleting may be labour intensive, yet can be a means of providing livelihood support to a large number of people living in the coastal areas and many commercial culture systems in many developing countries. Filleting of Tilapia is well practised in Tanzania and mainly for exports. It reduces bulky

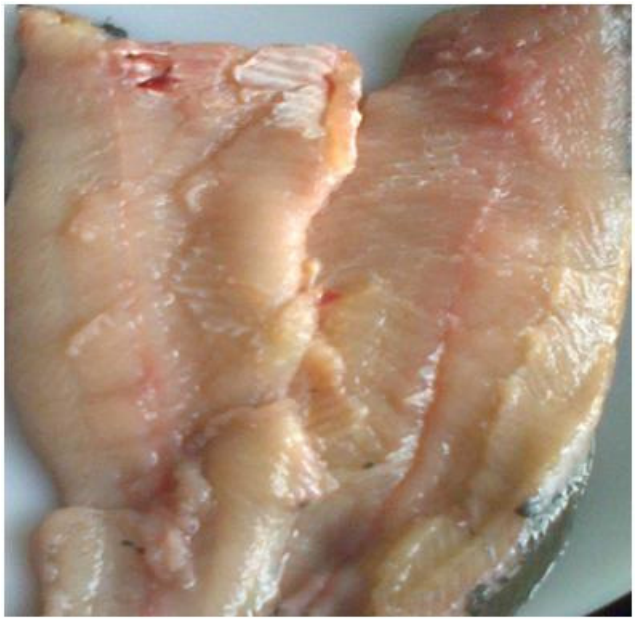

Figure 1. Fillet of *Heterotis niloticus*.

transportation of fresh fish products from point of production to the retail shop, saves house wife the drudgery of cleaning and processing of raw fish before cooking (Miller,1974). Fresh water fish species in Nigeria are yet to be favoured for such filleting production. Eyo (2001) gave the carcass analysis and filleting yield of 10 freshwater fish species, other works on such practice is scarce. Hickling (1963) gave the percentage edible fillets of *Sarotherodon species* to be very low as 24-46% depending on whole weight of fish compared to Trout with 70% edible fillets. The species of fish selected for this study were common fish species that are readily available all year round. Two of these species (*Clarias gariepinus* and *Heterobranchus longifilis*) are always available in commercial quantity and are well favoured cultured species accepted for taste by consumers. The other two (Heterotis *niloticus* and *Synodontis species*) are common features in fishers catches and of commercial quantity before the onset of rains. All these species are tasty fish of freshwater origin. This study aimed to determine the fillets percentages obtainable from some of our indigenous fish species and preferred mode of fish consumption in our locality.

MATERIALS AND METHODS

The specimens used were bought at different times at Amassoma and Swali markets in Bayelsa State. They were transported to the wet laboratory of the Department of Fisheries/Livestock Production Technology, Niger Delta University. Samples of six live fish of each species were stunned manually and measurements of weight and length were taken. These samples of the different species were then cut open at the side to carefully remove the gut. Filleting was carried out by cutting through from the opercula region down to the caudal end on both side of the fish sample. The head was severed from the frame and weighed separately. Hence, the weight of the head, gut, frame and fillet were taken. A pooled mean of these weights were calculated and used to estimate the percentage of each part of the dress out - Fillets, head, gut and frame relative to the weight of whole fish. Also, an opinion pool was drawn using informal question and answer method. This is to inquire about the disposition of the community to fish fillets or whole fish consumption. (Figure 1)

RESULTS AND DISCUSSION

Heterotis niloticus had the highest fillet percentage of 59.22 while *Synodontis schall* had the lowest fillet percentage of 41.37. *Heterobranchus longifilis* and *Clarias gariepinus* had 52.70% and 52.50% respectively as shown in Table 2 .When fish are manually filleted, flesh attached to the bones are usually discarded as waste which account for between 40-60% of the total weight of fish depending on the fish species (Eyo, 2001). *Clarias gariepinus and Heterobranchus longifilis* are both of the catfish family, hence the possibility of the close filleting percentage obtained. Lazur (1997) reported a dress out of 61.70% for catfish in Florida. Eyo (2001) also reported 42.74% fillet for *Clarias gariepinus* with 54.83% of inedible parts. *Heterotis niloticus* may seem to be a favourable fillet product except for the laborious de-

Table 1. Mean Dress out weight of Four Tropical Freshwater Fish Species.

Species	Mean whole Weight of fish (g)	Mean Total Length(cm)	Mean weight of gut (g)	Mean weight of Frame (g)	Mean weight of Head (g)	Mean Weight Of Edible Fillets (g)
Clarias gariepinus	843.30±40.35	50.76±2.13	51.60±4.27	104.70±23.51	253.83±19.91	442.67±30.83
Heterobranchus bidorsalis	1016.60±31.89	48.90±6.63	62.10±7.87	107.70±10.39	248.10±15.74	535.30±23.13
Synodontis schall	173.45±40.17	26.90±4.61	14.78±2.81	14.12±4.06	66.04±22.05	71.77±13.70
Heterotis niloticus	440.71±140.54	29±3.04	15.5±5.50	105±47.17	45±17.42	261±54.60

Table 2. Dress out percentages of Four Tropical Freshwater Fish Species.

Species	Percentage of gut	Percentage of frame	Percentage of head	Percentage of edible fillets	Percentage of inedible parts
Clarias gariepinus	6.12	12.41	30.10	52.50	48.63
Heterobranchus bidorsalis	6.11	10.60	24.40	52.70	47
Synodontis schall	8.52	8.14	38.07	41.37	54.73
Heterotis niloticus	3.52	23.82	10.21	59.22	37.55

Table 3. Opinion poll on Fish Fillet Acceptance

Preference	Frequency	Percentage
Fillet	5	15.62
Whole fish	21	65.63
Indifferent	6	18.75
	32	100.0

scaling involved in the processing while the three other species are scale less and may enjoy better patronage than Heterotis niloticus in the filleting industry. Adequate stunning manually is also required and allow easy filleting and fillet dress out percentages accepted could be from 33-40% (Poli,et al 2005 ; Morris, 2013) The flesh of Synodontis species are white and of excellent flavour as observed in this study and by Reed et al,(1967), *Heterobranchus* sp flesh is known to be less oily than *Clarias sp* and it is highly prized while *Heterotis s*p flesh is tough and dry with low oil content and strong flavour like meat(Reed,et al,1967). Majority of block fillets or single fillets are products prepared in factories and are often frozen. There is high demand for such convenient food in the developed world while you can only see it in large hotels and super marts in this part of the world. Large scale processing plants for filleting will be necessary to produce properly packaged and hygienic fillets for export, because fillets must be prepared with great care under strict hygienic conditions. Also when selecting fish species for culture it is desirable to consider the dress out weight after removal of visceral, scales, skin and head. In Nigeria, fish are often sold whole, although, exceptionally big fishes are cut into pieces for smoking. The opinion poll also revealed this trend as shown in Table 3, the results showed that 65.6% of the respondents preferred whole fish while only 15.62% preferred fillets and 18.75% seemed indifferent as situation permits, this could also mean that a large percentage of people in our environment may prefer their meal served with the whole fish, head and bones inclusive.

CONCLUSION

According to Edwardson (1976) Fish are known to be raised cheaper in tropical climates, favouring our indigenous fish species ability to enter international market at a good price with value added packaging. Fish farmers and fish processors should be enlightened and encouraged to develop infrastructures to produce well packaged fish fillets for export and local consumption. Efforts to mechanize the filleting process will go a long

way in achieving this and reducing protein meant for human consumption to be discarded as waste for livestock.

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