

**FACTORS ASSOCIATED WITH FISH SPOILAGE AMONG FISH MONGERS IN OGUN
WATERSIDE LOCAL GOVERNMENT AREA, OGUN STATE**

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ABSTRACT

This study investigated the factors associated with fish spoilage among fish mongers in Ogun Waterside Local Government Area, Ogun State. The study also identified different fish processing and preservation methods used by fish mongers. Three communities were purposively selected out of 23 fishing communities due to their nearness to water resources. A simple random sampling technique was used to select 114 respondents from a total of 570 registered fish mongers. Descriptive statistics such as frequency counts and percentages were used to summarize the data while inferential statistical tool used to analyze the data was Chi square. The results show that 38.6% of the respondents were within the age category of 30-39. Fish mongers were female dominated (75.4%), 35.1% of the respondents had no formal education and 65.8% were married. The most important processing and preservation method was smoking (88.6%). Factor associated with fish spoilage were lack of equipment for processing and storage (54.0%), and inadequate access to loan and credits (51.0%). Chi-square analysis showed that sex, educational level and marital status (Cal. χ^2 6.44 Tab. χ^2 5.991, Cal. χ^2 25.968 Tab. χ^2 15.507, Cal. χ^2 29.107 Tab. χ^2 18.307) were all statistically significant to factors associated with fish spoilage. It is concluded that lack of equipment for processing and storage and inadequate access to loan and credits contributed to fish spoilage. Therefore, efforts at providing equipment for processing and access to loan and credits should be given attention.

Keywords: Fish spoilage, fish mongers and preservation methods

INTRODUCTION

Fishing entails the harvesting of fish from open or common access resources for man's use. Fishing plays an important part in the social and economic lives of man in Nigeria and it is very nutritious and good for human consumption. World production of fish has been between 100 and 110 million tonnes per annum with as high as 112 million tonnes in 1995. Of this, roughly 80 million tonnes are used for direct human consumption and almost all of the remaining 30 million tonnes is used for the feeding of animals used for human consumption or for the production of dairy products (FAO, 1997).

Global Africa Network (GAN) (2010) observes that Nigerians are large consumers of fish and it remains one of the main products consumed in terms of animal protein. About 50 percent of fish demand is currently being met by local supply. The fisheries sector is estimated to contribute 3.5

percent of Nigeria's GDP and provides direct and indirect employment to over six million people. It is a means of income generation for those who harvest, process and market it and provides job for people. Fish and fish based products are very important in the development of national economy and also serve as raw material for agro-allied industry. The nutritional importance of fish is very high and ranks just as good as meat and better than wheat or any plant protein source in essential amino acids content. It is also good for complementing high carbohydrate diet (Tobor, 1990). Despite the importance of fish production in Nigeria, fish mongers still suffer a great loss, due to lack of proper storage and poor handling. Huge quantities of fish are lost after capture. There is an enormous waste of food, particularly in developing countries where fish represents a significant proportion of protein intake.

Most of the fish harvested in the tropics are used for direct human consumption; however, a significant quantity is also lost through the absence of adequate technology and the know-how to prevent post-harvest losses in most tropical countries. About half of the fish produced in the remote coastal areas and hinterland of many tropical countries spoil before they get to the consumers due to poor handling, preservation and processing practices adopted by the artisanal fishermen, and fisheries entrepreneurs (Abolagba and Osifo, 2004). In the same vein, Abu and Akinrotimi (2012) opined that in developing countries such as Nigeria where majority of fisher folks are living in the rural area, where there is no access to modern storage facilities, drying and smoking becomes the only viable option in fish preservation. Post-harvest losses in fish products are therefore a major bane of the Nigeria fish industry especially at the artisanal level which are characterized with subsistence operation (Bolorunduro *et al*, 2005). In effect, Adewuyi *et al* (2010) asserted that there is problem of protein deficiency in Nigeria even with increase in the major sources of animal protein such as livestock and poultry industries. The protein deficiency is believed to be associated with the inability of fish farming industry to supply the required quantity of fish. The development of the fish industry according to Adewuyi *et al* (2010) will increase local production and save much of the foreign exchange being used for fish importation.

Capture fisheries include the artisanal fisheries and industrial fisheries. The capture fisheries sub-sector account for over 90 percent of the total domestic production. Its further expansion is limited by the fishery resources of the available coastal water of Nigeria. It is further limited by the high cost of fishing in fish hunting, while a great percent of the population in the hinterland only

consume fish and its products. Much of this production is in tropic and sub-tropic countries, contributing significantly to rural and urban food supply as well as to international trade, helping to meet important nutrition and income goals in poorer countries (Muir, 2001).

According to Eyo (2001), various factors have been identified that contribute to the short fall in fish production level in the marine as well as fresh fish. The problems identified include:

1. Difficulty of access in the coastal water
2. Inadequate fishing inputs
3. Environmental pollution and poor water management
4. Lack of maintenance facilities for implement and gears
5. Illegal operation of foreign vessel in the countries territorial waters (poaching).
6. Import restriction on fishing implements and gears
7. The unscientific use of chemical and poison by local fishermen in harvesting fish
8. Lack of good and adequate marketing channels for the disposal of catch
9. Lack of adequate processing and reservation methods
10. Lack of essential facilities in fishing areas to serve as attraction in preventing rural urban movement of fishermen.

The growth of agriculture has to some extent helped to alleviate the problem of diminishing supply from traditional resources but with the growth of human populations, there are still likely to be shortfalls in supply. This means, per capital supply will diminish and fish price may rise as a consequence. It is estimated that the demand for fish for all use will rise to 140 to 150 million tonnes by the year 2010 (FAO 1997). Therefore, there is ecological, social and the economical reason why it is very important to ensure that once

caught, fish reaches the consumer by the most efficient means, and the final sale is transacted to the satisfaction of both the sellers who in the act represents the interest of all the other stakeholders in the fishing industry in reducing the amount of fish wasted or lost between capture and consumption.

The fragility of fresh fish as food item indicates that, if marketing conditions are disrupted or changed from normal, fish that cannot be sold within designated shelf – life become spoilt and so will have to be discarded. This is, particularly, a problem with fish that is not preserved in any way and at tropical ambient temperatures may only have few hours of useful storage life remaining by the time it reaches retail stage. In many cases, if it's not sold today, it will no longer be edible tomorrow.

In many developing countries such as Nigeria, a number of fish farming development programmes such as Nigerian Union of Fishermen and sea food dealers programme have being engaged in. All these aimed at improving the production of fish both for consumption and income generation. Some of these programmes have failed, thereby, resulting into a great loss through fish spoilage. Under the hot and generally humid conditions, fish deteriorates rapidly. This is after lauding and methods of processing have been developed as a means of prolonging shelf life and getting the fish to distant market. Processed fish are prone to infestation by certain insect species and mites which can cause considerable losses. Insect pest like flies may lay eggs on fish during the early stage of sun drying and mites may attack dried fish if not properly dried.

Fish spoils become inedible more rapidly than any other food, unless consumed soon after catch; it becomes unacceptable and thereby may lose the nutritional value, which reduces the market value and market price. This is due to losses in the

quantity and quality of harvested fish. Much waste or spoilage in fishes is caused by many factors, thereby reducing the income generating capabilities of fish mongers. Meanwhile, much has not been done on the methods of processing and preservation of fish in Nigeria. Due to handling methods of harvested fish and environmental factors, a great spoilage has been caused thereby affecting the standard of living and the level of income of fish mongers. Therefore, there is the need to look at the factors associated with fish spoilage and provide necessary solutions to the problem. It is against this that the following questions will be answered.

- What are the selected personal characteristics of fish mongers in the study area?
- What are the different methods of processing and preservation
- What are the factors causing fish spoilage in the study area?
- Did fish mongers have contact with extension agents in the study area?

Objectives of the study are to:

- determine the selected personal characteristics of fish mongers in the selected communities
- examine the different methods of processing and preservation
- identify the factors causing fish spoilage in the study area
- determine respondents contact with extension agents in the study area

Hypothesis of the study

There is no significant relationship between the selected personal characteristics of fish mongers and the factors associated with fish spoilage

METHODOLOGY

The study was conducted in Ogun Waterside Local Government Area of Ogun State. It is located in the riverine area and bounded in the West by

Ijebu-East Local Government, in the North and East by Ondo State and in the South by Lagos State and Atlantic Ocean. The temperature is high, about 30°C, while the average minimum is over 25°C daily. Conventional rainfall is experienced here. Two periods of maximum rainfall are experienced and these usually coincide with the passage of the overhead sun across the equator northwest (April-June) and Southwards (September – October). The relative humidity is constantly high (usually over 80%) because of the nearness to the Atlantic and the ever prevailing moisture laden southwest winds blowing across the coast. Waterside is blessed with abundant natural resources which include tree species like Opepe, Obeche etc. The land surface lies within the lowland of the coastal lowland of Nigeria. The relief is about 70m above sea level. Waterside resources include different fishes and crustaceans from swam, Rivers, Lagoon and Atlantic Ocean in large quantities e.g. Tilapia, (Epiya), catfish (Aro) etc. Reptiles, crocodiles, sand deposit especially at Ode Omi, Irokun, Iwopin and Imakun-Omi. The area is popularly noted for fishing. The target population of the study consisted of all registered fish mongers in the study area.

Out of all the communities in the study area, only three communities were purposively selected for the study, this is due to the nearness to water. The communities are Iwopin, Ode-Omi and Imakun-Omi with 211, 169 and 190 registered fish mongers respectively. Twenty percent of registered fish mongers with 42, 34 and 38 from each community were randomly selected resulting in a total of 114 respondents. The variables measured include selected personal characteristics. The respondents were asked to indicate their age, sex, level of education, marital status, duration of processing and preservation, mode of fishing whether full time or part time. Other variables

measured include methods of fish processing and preservation effect of fish spoilage and contact with extension agents. Factors associated with fish spoilage were also measured.

RESULTS AND DISCUSSION

Selected personal characteristics of respondents

The result in Table 1 shows that 38.6% of the respondents were within the age group of 30-39 years and 30.7% were within the age group of 40-49 years. This implies that most of the respondents are middle-aged group and are more involved with very few old mongers involved in fish processing and preservation. This may be as a result of the tedious tasks involved in fish processing and preservation. The result also reveals that 75.4% of the fish mongers were females. This implies that fish marketing is a female dominated activity. The result reveals that 35.1% have no formal education. This shows that fish processing and preservation in the communities does not require much knowledge of how to read or write, thus attracting more people from the class without any formal education. Majority of the respondents (65.8%) were married. This implies that most households are into fish business because of its immediate benefit of ensuring income and food security for the well being of fishmongers within the household. Majority (68.4%) of the respondents have between 1 and 10 years of experience. Majority of the respondents (77.2%) were full time fish mongers. This implies that the majority depend on fish business as a mean of their livelihood in order to improve their standard of living

Table 1: Distribution of Respondent based on selected personal characteristics

Personal characteristics	Frequency	Percent
Age		
20-29	18	15.8
30-39	44	38.6
40-49	35	30.7

50-59	12	10.5
60 and above	5	4.4
Sex		
Male	28	24.6
Female	86	75.4
Educational status		
No formal education	40	35.1
Adult education	19	16.7
Primary education	32	28.1
Secondary education	17	14.9
Others (NCE, OND, HND)	6	5.2
Marital status		
Married	75	65.8
Single	9	7.9
Separated/Divorced	21	18.4
Widow/Widower	9	7.9
Year of experience		
1-10	78	68.4
11-20	26	22.8
21-30	4	3.5
31-40	4	3.5
41-50	2	1.8
Mode of operation		
Part time	26	22.8
Full time	88	77.2
Total	114	100.0

Fish processing and preservation methods

Results in Table 2 show that majority (88.6%) practiced smoking as fish processing and preservation method. Other methods practiced include drying (24%), freezing (23.7%) and salting (21.9%).

This implies that they have little or no knowledge about boiling as a method of processing. The method mostly practiced is smoking. This implies that this is the only method well practiced by the fish mongers. Abolagba and

Akise (2011) in their study on a survey on the processing and utilisation of fatty fish reported that majority of fish processors used only the smoking method. Little or lack of knowledge of other methods may be responsible for fish spoilage.

Table 2: Distribution of respondents based on the processing and preservation methods

Processing and preservation methods	No	Yes
Salting	89 (78.1)	25 (21.9)
Drying	86 (75.4)	28 (24.6)
Smoking	13 (11.4)	101 (88.6)
Boiling	114 (100)	0 (0.0)
Freezing	87 (76.3)	27 (23.7)
Fish Canning	113 (99.1)	1(0.9)

Factors associated with fish spoilage

The results in table 3 show the factors associated with fish spoilage among fish mongers in order of severity. These include lack of equipment for processing and storage (54.0%), inadequate access to loan and credits (51.0%), inadequate innovation information (50.0%), poor infrastructure facilities (46.0%) and high selling price of fish (40.0%). This shows that these factors have direct relationships with processing and preservation methods. This also implies that, the higher the degree of these problems the higher the degree of fish spoilage.

Table 3: Distribution of respondents according to factors associated with fish spoilage

Factors associated with fish spoilage	No	Low	Medium	High
Lack of equipment for processing and storage	18 (16)	26 (23)	8 (7)	62 (54)
Inadequate access to loan and credits	32 (28)	17 (15)	7 (6)	58 (51)
Inadequate innovation information	15 (13)	34 (30)	8 (7)	57 (50)
Poor infrastructural facilities	22 (19)	27 (24)	13 (11)	52 (46)
High selling price of fish	9 (8)	44 (39)	16 (14)	45 (40)
Inconsistent Government policies and implementation	39 (34)	32 (28)	12 (11)	31 (27)
Effect of oil spillage	43 (38)	46 (40)	7 (6)	18 (16)

Inadequate local consumption 29 (24) 51 (45) 28 (25) 6 (5)
demand

Contact with extension agent

Results in Table 4 show that 88.6% of respondents have not met with extension agent at all and 60.5% of the respondents were not aware of improved processing methods. This finding is line with Bolorunduro *et al* (2005) in a study on adoption of improved fish preservation technologies who discovered that institutional constraint is manifested in the poor awareness creation on improved technologies by ADPs that could reduce post-harvest losses. This implies that fish mongers may not practice improved processing methods and this is likely to be the reason for fish spoilage among fish mongers.

Table 4: Distribution of respondents based on contact with extension agents and knowledge of improved methods

Items	Yes	No
I have met with extension agents before	13 (11.4)	101 (88.6)
Are you aware of improved fish processing and preservation methods	45 (39.5)	69 (60.5)

Relationship of selected personal characteristics variables and the factors associated with fish spoilage

Table 5 shows that variables such as age, sex, educational level, marital status and mode of operation were tested for their relationship with the factors associated with fish spoilage. The result of chi-square analysis shows that sex, educational level and marital status have significant relationship with factors associated with fish spoilage. In all these variables the calculated χ^2 are greater than the tabulated χ^2 (sex cal χ^2 6.433 > Tab. χ^2 5.991, educational level Cal. χ^2 25.968 > Tab χ^2 15.507 and marital status Cal χ^2 29.107> Tab χ^2 18.307).This implies that sex, educational

level and marital status contribute significantly to factors associated with fish spoilage.

Table 5: Relationship of personal characteristics and factors associated with fish spoilage

Variables	Calculated X ²	Tabulated X ²	Df	Decision
Age	7.218	15.507	8	NS
Sex	6.433	5.991	2	S
Educational level	25.968	15.507	8	S
Marital status	29.107	18.307	10	S
Mode of operation	2.931	5.991	2	NS

S -Significant

NS - Not significant

CONCLUSION

Major conclusion of this study indicate lack of equipment for processing and storage, inadequate access to loan and credit, inadequate innovation information, poor infrastructural facilities and high selling price of fish as factors associated with fish spoilage. In order to actualize the vision of fish security among rural and urban households, government ought to give urgent attention to the identified problems as well as appropriate processing and marketing of fish so as to prevent the fish mongers from loss of fish and reduction in income.

Based on these findings, the following recommendations were made:

- Extension activities should be intensified to disseminate technical knowledge among the households for efficient fish business.
- Private individuals and corporate organisations should invest more on processing and preservation of fish to ensure food security and create effective and ready market for the marketers.
- Intensive public enlightenment campaign should be made on the importance of different fish processing and storage techniques

- Interested fish mongers should be given proper fishing attachment training and loan made available to them for large-scale fish business

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