FAO Fisheries Report No. 400
FAO, Rapport sur les pêches N° 400 FIIU/R400

N° References Listed

Report of the

FAO EXPERT CONSULTATION ON FISH TECHNOLOGY IN AFRICA

Abidjan, Côte d'Ivoire,
25-28 April 1988

Rapport de la

CONSULTATION D'EXPERTS FAO SUR LA TECHNOLOGIE DU POISSON EN AFRIQUE

Abidjan, Côte d'Ivoire,
25-28 avril 1988

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THE FISH CURING INDUSTRY OF GHANA

BY

Gladys Nerquaye-Tetteh
Senior Research Officer
Food Research Institute
P. O. Box M 20
ACCRA

(Paper presented at FAO Expert Consultation on Fish Technology in Abidjan – 25th to 28th April 1988)

THE FISH CURING INDUSTRY OF GHANA

ABSTRACT

Fish continue to be the main source of animal protein in Ghana. Various traditional methods are employed to process the fish with the ultimate aim of preservation. Ghana has for years played a very important role in this respect within the West African sub-region.

This paper is evaluating the existing processing methods with the aim of highlighting the advantages and disadvantages. The equipment used for the processing as well as storage, packaging, transportation and marketing of the processed fish are also documented. An attempt is made to establish problems encountered in the fish curing industry in Ghana.

INTRODUCTION

Ghana government like many governments of other African countries demands the greatest utilization of all her natural resources. It is the policy of the government of Ghana therefore to make the country self-sufficient in fish production. Millions of Cedis have already been invested in the fishing industry to achieve this aim.

Fish is a very important food item in the diets of most Ghanaians. It happens to be the cheapest source of animal protein as compared to meat, dairy products, poultry and game meat.

Ghanaian fisheries may be said to consist of three main sectors namely:

1. Long distance fleet.
2. Inshore vessels fishing in the continental shelf of the country.
3. Indigenous canoe fleet which, are scattered all along the coast of Ghana.

The Ghanaian fishermen are renowned for their fishing prowess and they contribute significantly to the country's fish needs whilst their "wives" as well as other women handle the processing, marketing and distribution of the catches. Below is the level of fish production since 1980 (Table 1).

Table 1 Marine Fish Production (Landings by Fleet '000mt)

Year	1980	1981	1982	1983	1984	1985	1986	1987
Canoe fleet	151.8	149.8	140.9	137.0	171.2	159.9	190.2	168.0
Inshore fleet	15.6	16.9	16.4	19.7	14.7	17.9	21.9	19.0
Deep sea fleet	19.1	15.4	12.9	16.8	16.4	21.9	22.3	20.0
Ghana Tuna fleet	7.6	18.4	28.9	31.7	29.1	34.4	34.7	35.0
Total Domestic catch	184.1	200.7	199.1	205.2	231.4	234.1	269.1	242.0

Source: Fisheries Department, Accra.

Fish flesh contains the following four basic ingredients in varying proportions: water; protein; fat; and minerals. The proportions of these constituents are species specific and the main variables between the species are in the fat content. Most tropical fish however fall within the semi-fat category.

Fresh fish is handled differently at sea in relation to the three levels of fishing operations. The canoe fishermen go to sea either at dawn or in the late afternoon when temperatures are fairly low. The fish catch are put into the bottom of the canoes and sorted roughly into species. The crew might walk on the fish causing crushing and bruising which facilitates spoilage. When the catch is heavy, the guts of the fish at the under are also squeezed out to infest the external surfaces of the fish.

The smaller inshore vessels of below 20ft do not have facilities for carrying ice to sea but the larger vessels have fish holds equipped with deck head cooling grids. The catch is stored in bulk with or without ice depending on the facilities on the vessels. The bulk storage causes bruising and crushing of the lower fish and where the fish are not iced the centre of the pile heats up causing spoilage. Even where icing facilities exist on board in most cases the catch may be of poor quality because either ice was not taken to sea or insufficient ice was put on the fish.

The deep vessels that operate in Ghana have facilities for freezing and cold storage of the fish. The catch is sorted into species regardless of size and arranged in metal trays with average capacity of 20kilograms of fish.

Fish is a very perishable commodity. Spoilage occurs as a result of a series complicated changes brought about in the dead fish mainly by enzymatic and bacterial actions. Bacterial and autolytic spoilage, are biological systems which operate under certain optimum conditions. Therefore, altering these conditions can provide ways of preventing or reducing spoilage.

FISH CURING IN GHANA

The curing methods used in Ghana to preserve fish are smoking, salting and drying, fermentation, drying and frying. These methods are carried out at the traditional level and cater for 70-80% of the total fresh landed in the country. The tropical climatic conditions as well as the socio-economic climate prevailing in Ghana demand that freshly harvested fish should be preserved in one form or the other. Fish for processing is obtained from various sources such as local fishermen, commercial boats and sometimes from imported frozen fish.

Preparation of the fish for processing depends on the species of fish and type of processing method used. The fish may be pre-washed using sea or fresh water or not washed. The fish may also be scaled or not, left whole or cut up into pieces, gutted and gills removed or left without gutting.

FISH SMOKING

Fish smoking is a very important occupation of Ghanaian women. It is the main source of income for those who deal in it. Fish smoking caters for about 70% of processed fish. They have over the years acquired remarkable skill in the smoking process.

Two main types of fish smoking are practiced in Ghana namely: hot smoking and smoke drying. Of these methods, smoke drying is the most widely used. Generally, large sized fish such as Grouper, Sea Breams, Snapper, and Tuna are hot smoked. The smoking is done using smouldering fire generated from firewood for 1-4 hours at temperatures high enough to cook the fish but not dry it. The product is succulent with moisture content of 50-70% with average shelf life of 1-3days. It has been observed that since hot smoked fish has a short shelf life, it is sold more often in the coastal areas witch are close to the processing area and where there is ready market for the smoked fish.

Small and medium sized fish such as Sardines and Anchovies are normally smoke- dried. Smoke dried fish have low moisture levels and therefore have good storage even under the prevailing hot and humid climatic conditions. For this reason it is widely distributed throughout the country since its handling during transportation is easier than hot smoked fish. Smoke-dried fish is also stored for months using traditional methods for marketing during the lean fish season. Handling and transportation of smoke dried fish is easier than hot smoked fish.

The fish smoking equipment used in Ghana consist basically of open chamber in which fish are placed over a burning fire. The equipment is popularly referred to as oven although it is not an oven in the true sense of the word. The smoking ovens are of two main types namely: Round/Cylindrical and Rectangular. They are constructed from either mud/clay or 44 gallon oil drum and are usually not of standard size and specifications.

Cylindrical/Round Metal Oven

There are two types of this oven. One type is constructed from two or more 44-gallon oil drums opened and joined together to form a larger cylinder. A stoke hole is cut on one side of the cylinder for feeding in of firewood. A metallic grill is fitted about a third from the top of the oven to form a compartment where the fish are arranged for smoking. Examples of specification of the oil drum ovens are 0.3 – 0.5cm for thickness; 75 – 108cm for height; 252 – 416cm for circumference; 85 – 144cm for diameter; with average volume of 235 – 516cm^3. The main advantage associated with the use of this oven is that it can be moved from place to place as the fishermen move from one fishing area to another. Some of the disadvantages are that it gets rusty fast, it is cumbersome to operate and it has a low capacity. The other type of round oven is constructed with mud or clay. It is similar in shape and operation to the metal oven. However the round mud oven cannot be moved from place to place with the fishermen. When constructed under a shelter, it will last longer than the metal oven.

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to be in the range of 1:3 to 1:6 with most processors using the 1:6 ratio. The pickle method of salting is most practiced and the fish kept in salt for 1-3days. The salted fish is spread out on the ground to dry in the sun for 1-6 days. In a few places, the drying is done on racks. The moisture levels of salted fish range from 35-50% and the salt levels also range from 7-19%. The salt and moisture levels contribute positively to the good keeping quality of the salted product. Salted-dried fish is widely consumed in Ghana, in the coastal as well as hinterland areas. The high salt levels of the product require desalting during food preparation.

FERMENTATION

Fermented fish is also salted but at lower levels. It is widely used in Ghana as a condiment in the preparation of some soups and stews. Fermented fish is soft with moisture content of 48-65% and strongly flavoured.

The dominant group of microorganisms isolated from samples collected from the open markets in Accra, were, gram- positive *Micrococci* accounting for 72% of the total microorganisms isolated. Other gram- positive organisms isolated in much smaller numbers were *Staphylococcus aureus* (1.6%), *Bacillus* species (4.4%), and *Staphylococcus* species (3.2%). The gram- negative rods isolated accounted 17% of the total number of microorganisms isolated. No *Salmonella* or *Shigella* species were isolated. *Clostridia* species were also not isolated (Nerquaye-Tetteh *et. al*, 1978). These results show that fermented fish prepared

the traditional way did not constitute a serious health hazard contrary to what is perceived by some consumers in Ghana. However, the methods used need to be standardised as well as hygienically controlled. To understand the mechanism involved in the processing, further studies need to be carried out.

SUNDRYING OF FISH

Sun-drying of fish is done by spreading the fresh fish on the ground usually, in the sand along the beach to dry in the sun. Anchovy species are normally sun-dried. The end product has a lot of sand on it, which reduces its consumer acceptance.

CONCLUSION

Though methods used for curing fish in Ghana is rudimentary, they are very important in the preservation of fish and in providing employment for a large number of people. There are however, some disadvantages associated with the methods used. The ratio of salt to fish is not standardized resulting in salt wastage in some instances. The brine produced during the salting is re-used a number of times and this can be a source of bacterial contamination to fresh batches of fish. Drying of the fish direct on the ground can also be a source of bacterial contamination and introduction of sand into the product. Smoking of fish using the traditional round ovens is cumbersome. The ovens also have poor

circulation of heat and smoke and inefficient fuel wood usage. In cases where sticks are used to separate the layers of fish, the sticks exert pressure on the fish resulting in poor quality product. The packaging and storage facilities used for processed fish products, in Ghana, need to be studied and the necessary improvements made. The quality of traditional processed fish products should also be studied to determine how the various techniques of traditional preservation affect the nutritional quality. This is important because fish is the main source of animal protein for human consumption and animal feed.