

## PROSPECT OF RETORT POUCH FOOD TECHNOLOGY IN THE NIGERIAN FISHERY INDUSTRY: AN OVERVIEW

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### ABSTRACT

Retort pouch as a packaging material for varieties of food items such as fish, vegetables fruits and food crops was highlighted. Materials required for the processing of pouches were listed and the methodology of production discussed. The paper provided insight for investors to invest in the technology of pouching as a means of engaging unemployed youths in Nigeria.

**Key words: Retort Pouch, Packaging, Processing, Raw Materials.**

### INTRODUCTION

Retort pouch is a multi-layered laminated packaging material made up of polyester, aluminum foil and high density polyethylene nylon. It is a packaging material for various types of food items such as fish, meat, rice, spaghetti, fruits and vegetables. It is a transparent mould container which can be sterilized by autoclaving. It can therefore withstand high temperature and pressure as cans. This innovation has gained world recognition because of its inherent advantages over cans. Apart from commanding good taste and its flexibility, light weight, portability handy to heat up within a short time, it is easy to cook and above all, it is cheaper to produce than canned foods (Yamaguchi, 2003). Retort pouch food processing is new in Nigeria compared to developed countries such as USA, Europe and Japan where it is a widely used. With the abundant raw materials from food crops, fruits, vegetables, dairy products, fish and spices which are primary requirements for retort food industries, Nigeria is a fertile ground for this technology (Adelowo; 1993). Considering losses arising from food spoilage due to inadequate storage facilities, retort pouching will enhance better preservation and utilization of our foods. The objective of this paper is to give an overview of the technology and show the investment opportunities open to private firms and industries in Nigeria.

### Materials required for food pouching

Materials required for food pouching include raw materials (e.g. meat, fish, vegetables, fruits spices etc), pouch package, kitchen utensils, portable water, filling and sealing machine (Rotary or straight type pouch machine), retort gauge pressure, Autoclave (for sterilization), cooling machine and conveyor machine.

### Packing foods into pouches.

Raw materials e.g. meat, fish, vegetables, fruits are dressed and blanched in 15% brine for 15 minutes and parboiled, drained and then filled into the pouches. First the pouches are examined for defects such as puncturing, piercing, tearing etc. Each pouch should be opened manually and food materials are put into the pouch using sterilized gloves at all stages to prevent contamination. Care should be taken not to contaminate the sealing area. Filling should not be done to the brim to ensure sealing integrity.

### Vacuum sealing and heat processing

Vacuum sealing is done to prevent bursting of the pouches during retorting (Tokyo Jidoki Co. Ltd. 2000). It also ensures product stability, assist uniform heat transfer and facilitate cartooning. This operation is performed by an automatic double element, vacuum sealing machine. Heat processing is carried out in a retort specially designed for heat processing foods in flexible pouches. After loading the retort, the water for heating should be admitted to about 100mm above the retort sack. Steam should be introduced to raise the process temperature to 280°F. The overheat pressure should be maintained at 25p.s.i. Heat processing should be carried out to a lethal  $F_0 = 10$ . After retorting, the pouches should be transferred to the pouch drying machine to dry automatically. Figure 1 shows the schematic diagram of manufacturing process of retort pouch.

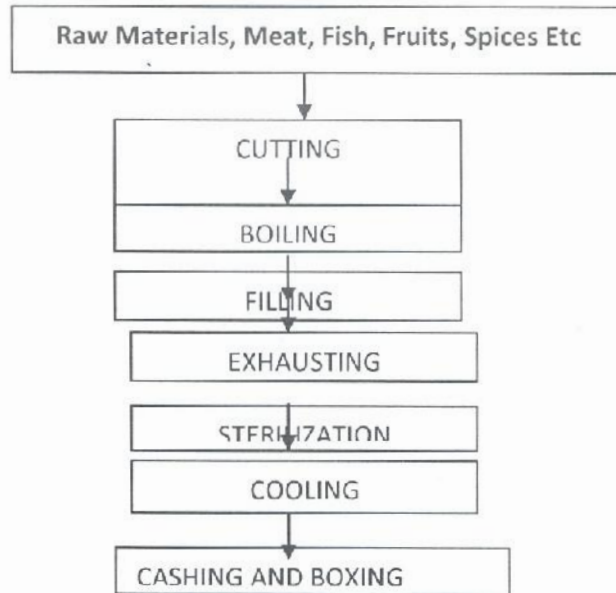
### Evaluation and Testing.

Processed pouches should be evaluated on the basis of the sterility of the pack content and organoleptic and sensory evaluation studies. Pouches should be selected randomly for chemical analysis, storage and consumer acceptance studies. Bacteria to be heat sterilized is generally *Clostridium botulinum* type A and other infectious and contagious disease (Connell, 2005).

Equipments used for pouching food.

Two types of equipments are used for pouching foods (Figure 2 and 3). They are the rotary and straight type. The former can produce between 30-40 pouches per minute while the latter can produce up to 80 pouches per minute (Japan canners association (2001)). The optimum temperature range for steam air retort pouches is presented in figure 4. The temperature is between 105°C – 120°C and 60-80°C for vapour ratio at a gauge pressure of 1kg (Lampi, 2002). Fig. 5 describes the process of steam-air sterilization for pouches. Sterilization of pouches begins at 70-80°C and climax at 120°C at retort pressure 1.5kg/cm<sup>2</sup> (Japan canners Association, 2001).

Figure 1: Shows the schematic diagram of manufacturing process of retort pouch food.



Source: Japan Canners Association (2001).

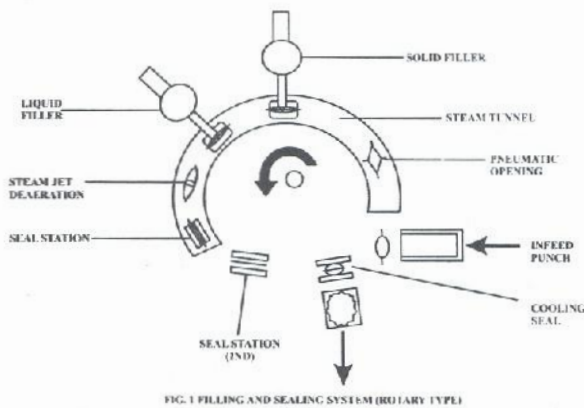


Figure 2: Filling and sealing system (rotary).

