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The Food Industry in Nigeria: Development and Quality Assurance

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Abstract: In Nigeria, the food processing sector is dominated by small and medium enterprises, as well as multinational food companies. Quality standards are usually related to improving the safety of food products suitable for consumption in accordance to specifications by food regulatory bodies. These standards are essential elements for local and international businesses which contribute to economic progress through industrial development and trade. This review takes a critical look on the Nigerian food industry development in terms of quality standards that are necessary to be given consideration in the production of food and also ways of improving food production in Nigeria through the use of Total Quality Management (TQM) technique and the use of computerized systems to produce high quality and high value products while at the same time reducing production time and cost.

Key words: Food industry, quality assurance, Nigeria, TQM, computerized systems

INTRODUCTION

Nigeria like many other developing countries faces the challenge of providing adequate food supply for its teeming population. Policies and programmes aimed at boosting agricultural and food production are being actively promoted. Nigeria needs to take appropriate and pragmatic steps to ensure food safety and quality for domestic consumption and export. An effective national food safety policy is needed to provide assurance that food supplied to the consumers is adequate, nutritious, of good quality and wholesome (Omotayo and Denloye, 2002). The Government of Nigeria launched the National Policy of Food Hygiene and Safety in 2000 as an integral part of the Nigerian National Health Policy. The overall goal of this policy is the attainment of high level of food hygiene and safety practices which will promote health, control food-borne diseases, minimize and finally eliminate the risk of diseases related to poor food hygiene and safety. The policy seeks to stimulate and promote legislations concerning food in areas of production, storage, handling, processing, preservation, trade, transportation and marketing. It also seeks to improve the quality of healthcare through ensuring that all food consumed in Nigeria, whether imported or exported are wholesome, nutritious, free from contaminants and accessible to the consumers at affordable price. Implementation of the policy is aimed at addressing the unsatisfactory level of food hygiene and safety practices which to a large extent is responsible for the prevalence of food-borne diseases in Nigeria (Omotayo and Denloye, 2002).

In food processing, controllable factors that either positively or negatively influence the finished products are referred to as the quality control (Pearl, 1999). Quality control is also the ongoing effort to maintain the integrity of a process in order to maintain the reliability of achieving an outcome. To be able to achieve product of consistent and high quality, the use of good and sound raw material is of optimum importance. Maintenance of quality also means there should be set standards which will serve as guideline in the assurance of consumer protection and safety as well as being related to improving future processing. Quality standards should ensure that food suitable for consumption is processed in a hygienic manner, is nutritious and safe (Hayati and Khairul, 2009).

However, a preventive strategy based on thorough analysis of prevailing conditions which ensures that the objectives of the quality assurance programme are met is recommended for the food industry (Pearl, 1999). The Hazard Analysis Critical Control Point (HACCP) and Total Quality Management (TQM) embody these requirements as certified under the International Standard Organization (ISO 9000: Quality Management and quality Assurance Standards. Guidelines for Selection and Use).

The Codex Alimentarius Commission (2006) and Orriss and Whitehead (2000) stated that producers at all stages of production, processing and distribution must be responsible for safe food and should establish food safety assurance programmes while the government on the other hand, plays the primary role of providing leadership for the implementation of the food safety assurance system.

In recognition of a total food chain approach in the production and delivery of safe food to consumers, Mohamad (2004a) explains that the responsibility encompasses all stakeholders throughout the food chain, including farmers and the suppliers of farm and slaughterhouse produce and packinghouse operators, food manufacturers, transport operators, wholesale and

retail traders, caterers and street vendors and also the contribution made by consumers.

Globalization of food trade has focused its attention on strengthening measures taken to ensure quality and safety especially on imported foods (Orriss and Whitehead, 2000). Different countries have specific regulations, legislation, guidelines and Acts which are considered necessary to be complied to and implemented by food industries when they process their products. It is the responsibility of the government to ensure that the established standards, legislation and enforcement programmes are kept by the food industry to control food quality and safety.

In Nigeria, the responsibilities for regulating and monitoring food safety standards and practices devolve on the following government organizations and agencies:

i National Agency for Food and Drug Administration and Control (NAFDAC)
ii Federal Ministry of Health
iii Standards Organization of Nigeria (SON)
iv National Codex Committee
v Federal Ministry of Agriculture
vi States and Local Governments.

The National Agency for Food and Drug Administration and Control (NAFDAC) is the major agency responsible for regulating and controlling the manufacture, importation, exportation, advertisement, distribution, sale and use of food, drugs, cosmetics, medical devices, chemicals and prepackaged water. However, in line with the government policy on Food Hygiene and Safety, responsible agencies are mandated to:

- Protect the public against injury to health through the consumption of unwholesome food.
- Restrain the sale of foods which are unhygienically prepared, adulterated, contaminated, spoilt, improperly labeled.
- Ensure proper inspection and registration of all food premises.
- Conduct public health surveillance of food premises, food handlers and equipment used for food processing.
- Educate the populace on sound hygiene and safety practices.
- Ensure inter-ministerial and multi-sectional collaborative activities.
- Collaborate with non-governmental organizations and ensure community participation.

Towards the achievement of the objectives of the policy, the collective activities of the responsible agencies are performed through regulations, regular inspection and surveillance activities, registration of premises and products, laboratory certification and enforcement activities. Furthermore, company certification and award procedures for manufacturers who meet the requirements of the relevant standards are in place (Omotayo and Denloye, 2002).

Quality standards play critical role to facilitate goods and services exchange across borders (Hayati and Khairul, 2009). However some of the main food safety and quality problems encountered with Nigeria's exports are poor packaging, problem of HACCP with regards to product quality and dearth of compliance and health certificates. In the importation of foods to Nigeria some major food safety and quality problems encountered are:

- Spoilage and nearness to expiry dates
- Poor handling and dehydration
- Substandard/fake products
- Non-indication of production dates
- Deceitful labeling
- Over pricing
- Instruction manuals in foreign languages

These food safety and quality problems encountered in the importation and exportation of foods can be eliminated if conscientious efforts are made by the regulatory bodies of the individual countries to keep to established international and local standards. If implemented, this will raise the quality, safety and reliability levels of food products and can definitely provide economical benefits (Mohamad, 2004b).

Quality improvement in the Nigerian food industry: Quality is defined as any of the features that make something what it is or the degree of excellence or superiority (Amerine *et al*., 1965). Quality improvement is the purposeful change of a process to improve the reliability of achieving an outcome. The aim of quality control is to achieve as good and as consistent a standard of quality in the product being produced as is compatible with the market for which the product is designed (Hawthorn, 1967). In food processing, the general rule is that effective methods must be carefully applied to conserve the original qualities of the raw materials because processing cannot improve the raw materials (Pearl, 1999). Some of the main objectives of quality control in the food industry are to assure that food laws are complied with in an effective manner, to protect consumers from dangers and ensure that they get the proper quality and weight as per payments. To provide protection to the business from cheating by its suppliers, damage to equipment and false accusations by customers, suppliers or middlemen.

The main standards needed to be carried out by food manufacturers in Nigeria to fulfill the quality assurance practices are the Hazard Analysis Critical Control Point (HACCP) and the Good Manufacturing Practices/Good

Hygiene Practices (GMP/GHP). The introduction of HACCP system in Nigeria became necessary for all stakeholders of the food industry due to the current global requirement for its application in international trade. The Codex Alimentarius Commission (CAC) and World Trade Organization had adopted the guidelines for HACCP application because of its ability to ensure food safety management and Nigeria could not be left out because the system ensures the export of safe and wholesome processed foods to other countries.

HACCP: The Hazard Analysis Critical Control Point (HACCP) is recognized internationally as a tool to control food related hazard. It was initiated by the United States' National Aeronautic Space Agency for the production of zero defect food for astronauts in the space. The application of HACCP is the choice of many major importing countries, as it is confirmed by the increased adoption of the mandatory application of the HACCP system as a requirement for both domestically produced and imported food products (Taylor, 2001; Jin *et al*., 2008; Trienekens and Zuurbier, 2008).
Enforcement of the HACCP system will help the implementation of other quality systems or standards practiced by food manufacturers. FDA (2001) lists some advantages of the HACCP implementation as this:

i Focus on identifying and preventing hazards from contaminating food.
ii Is based on sound science.
iii Permits more efficient and effective government oversight, primarily because record keeping allows investigators to see how well a firm is complying with food safety laws over a period rather than how well it is doing on any given day.
iv Places responsibility for ensuring food safety appropriately on the food manufacturers or distributors.
v Helps food companies compete more effectively in the world market and.
vi Reduces barriers to international trade.

Generally, HACCP implementation consists of seven principles. According to FDA (2001), the seven points are:

- Analyze hazards.
- Identify critical control points.
- Establish preventive measures with critical limits for each control points.
- Establish procedures to monitor critical control points.
- Establish corrective action to be taken when monitoring shows that a critical limit has not been met.
- Establish procedures to verify that the system is working properly and
- Establish effective record keeping to document the HACCP system.

Hazards have been defined as the unacceptable contamination, growth and survival of bacteria in food that may affect safety or quality (spoilage) or the unacceptable production or persistence in foods of substances such as toxins, enzymes or products of microbial metabolism (ICMF, 1998). In other words, it is a biological, chemical or physical property that may cause a food to be unsafe for consumption.

CCP: The Critical Control Points (CCP) in a food process means where there is a high probability that improper control may cause, allow or contribute to a hazard or to filth in the final food or decomposition of the final food. This should be identified and carefully chosen on the basis of risk of severity of the hazard, where severity means the seriousness of the consequences when a hazard occurs and risk is an estimate of the probability or likelihood of a hazard occurring. It is only the risk which can be controlled. The CCP may be a location, procedure or processing step at which hazards can be controlled. Two types of CCP may be identified:

CCP1 : Ensures full control of hazard
CCP2 : Minimizes but does not assure full control.

At the CCP, the hazard can be prevented, eliminated or reduced to acceptable levels. The CCP should truly be critical. Some of the CCPs are there as a result of company rules for good manufacturing practice, product reputation, company policy (Pearl, 1999).

GMP: Good Manufacturing Practices should be strictly adhered to by food processing industries to maintain healthy conditions during production operations. They also provide good guidelines, understanding and raises awareness of the standards needed to be observed in food processing by manufacturers and their employees (Hayati and Khairul, 2009). Good health and personal cleanliness of food handlers as well as knowledge of food handling techniques are needed for god hygiene practice to be implemented.
GMPs' pre-requisite programmes comprise the basic, universal steps and procedures that control operating conditions within establishments and ensure favourable conditions for the production of safe food. These differ from HACCP systems which focus on the critical points in a manufacturing process that affects food safety. GMPs are the control factors that relate to the entire operation and are not process-specific. GMPs include programmes such as facilities/grounds, equipment/ utensils, pest control, receiving and storage, process control, product recall and personnel training.

GMPs are like any policy programme any manufacturer has implemented. They require a written programme, an appropriate training programme and schedule, a maintenance schedule and most importantly management commitment. Management commitment is the vital component of any programme the company implements. Management's role takes on many forms from providing funds, guidance, human resources, to following the rules themselves. Once management has committed to the implementation of a programme other components will fall in place.

Total quality management in the Nigerian food industry: Total Quality Management (TQM) is a management concept that directs the efforts of all employees and managers of an organization towards customer satisfaction by continuous improvement of operations management processes. Total implies that everyone in the organization must be involved in producing the final product or service to customer. Quality means that the product or service to be delivered must meet the minimum acceptable standards (or exceed it through operations management). Management suggests that TQM will not evolve by accident. TQM is a carefully planned and managed process that involves the entire staff of an organization and its system (Leon, 1999).

Regardless of the size and scope of a food industry, it is impossible to establish a single division devoted to "quality", as quality is the responsibility and purpose of every company employee. Applying this theory demands the cooperation of each employee and an understanding of the methodology necessary to establish, implement, and evaluate a Quality Assurance Program. Total quality management is one of the latest quality systems which ensures that everybody in an organization is fully committed to achieving all aspects of quality.

Quality control is one aspect of the overall control production which in its totality constitutes the management function. The success of any quality control system depends on the sympathetic interest of top management. The requirements in terms of information availability, risk precaution and control in the food industry continues to grow. Training and continuing education are compulsory to prepare the staff to deal in a good way with their duties. (Clemens and Reiner, 2009). The food industry in Nigeria that are keen to increase the quality of the enterprise should particularly promote the employee orientation and motivation.

Use of computerized systems in Nigerian food industry: Food manufacturing and processing is one of the success stories of the global economy. One of the reasons for food productions success has been the embracing of modern technology that has allowed many processes in the production industry to be computerized. Computer-aided food processing /research is one of the most exciting developments in food processing and research that may have major impacts on new breed of Nigerian Food Scientists and Technologists (Sanni, 2003). Computer applications in food processing include process control, process design and simulation, computerized food inspection system, computerized nutrient analysis and information storage and retrieval. In developed countries, the use of computerized system technology has continued to grow in the food industry as the cost of components decrease. As components are continually being improved to withstand the rigors of the food processing environment, food companies have continued to update production facilities, equipment and manufacturing processes in an attempt to produce high quality, high value products. The new process design strives to achieve safe quality products while at the same time reducing production time and cost. Computer systems is becoming instrumental in providing for the safety of FDA regulated food products though the FDA must verify that proper controls are employed to assure that accurate, consistent and reliable results are obtained for computer control and data storage systems. The Food Industry in Nigeria should be encouraged by government financially, to partake in the usage of computerized systems in order to take advantage of the modern technology and also be able to stay competitive in today's fast paced world.

Conclusion and recommendations: Promoting safety of food is a global issue and all regulatory bodies must ensure that established standards are maintained and safety of foods guaranteed. This will make way for economic progress and development. The current curricula for students of Food Science and Technology in Nigeria should be revisited to catch up with the current global trend vis-à-vis the use of computerized systems to produce high quality and high value products. This will also ensure reduction in production cost and time.

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