

# **CHAPTER ONE**

## **OVERVIEW**

### **1- INTRODUCTION**

Hazard Analysis and Critical Control Point (HACCP) system is a preventive approach for food hygiene and control. The system can control any point in the food chain that could contribute a hazardous situation. The Food management systems are obligatory in the World Trade Organization (WTO) in food trade as recommended in the Codex Alimentations Commission (CAC).

The HACCP system, which is science based and systematic, identifies specific hazards and measures for their control to ensure the safety of food.

HACCP can be applied throughout the food chain from primary production to final consumption and its implementation should be guided by scientific evidence of risks to human health. As well as enhancing food safety, implementation of HACCP can provide other significant benefits. In addition, the application of HACCP systems can aid inspection by regulatory authorities and promote international trade by increasing confidence in food safety.

### **2- PROBLEM STATEMENT:**

During some recent years, among all aspects of the initiations, creations and innovations influenced the Business organizations, perhaps quality revolution have been the most effective and comprehensive one .

Total quality management, continuous quality improvement and total quality have been the factor for close relation of the rhetoricians and executors because the total quality has suggested a management philosophy and a collection of tools and techniques useful for performance and preserving the loyalty and customers long term satisfaction .

Both in manufacturing and public health care quality allows organizations to pursue their own objectives. In the manufacturing industry, where its benefits first became evident, quality improves the performance of companies by eliminating product defects, enhancing attractiveness of product design.

Due to the sharp rising incidences in microbial food borne diseases and increased all types of hazard all over the world the control system becomes obligatory in the World Trade.

The Sudanese food business industries are facing many problems related to managing and saving food from hazards.

the increase demand to provide products with high level of quality and safety lead many competitive food industries to apply at least one food safety managing system which include HAACP.

### **3- STUDY QUESTIONS**

Based on research statement, the questions are as follow :

What is the Role of implementing HACCP in food safety and customer satisfaction ?

- (a) what is the importance of implementing HACCP ?
- (b) what is the Role of HACCP in food safety?
- (c) what is the Role of the applying HACCP in customer satisfaction?
- (d) what are the constraints facing the implementation of HACCP ?

### **4- OBJECTIVES OF THE STUDY**

General objective : To study the Role of implementing HACCP in products safety.

The specific objectives of this study is :

- (1)- To define the HACCP and its implementation process
- (2)- To analyze the Role of HACCP in food safety.
- (3)- To study the Role of applying HACCP in customer satisfaction .

(4)- To determine the difficulties facing the implementation of HACCP .

(5) - To recommend which areas that need improvement.

## **5- THE STUDY HYPOTHESES**

The study was based on following hypotheses

(1)- There is Relation between HACCP and food safety .

(2)- There is Relation between HACCP and customer satisfaction .

(3)- There is Relation between management commitment and HAACP implementation process .

## **6- STUDY VARIABLES :**

InDependant variables : Represented on top management commitment to implementation steps , principles of the HACCP, perquisite program and adequate training .

Dependant variables\_ : quality , safety of products , and customer satisfaction

Demographic variables : age , gender , years of experiences .

## **7. SIGNIFICANCE OF THE STUDY**

The study service its important from two aspects:

**(A)The importance of theory:**

The importance of study stems from need to clarify the process of implementation of HACCP and overcome the difficulties of implementation, in addition provides an increased body of knowledge in food business (companies and industries) because knowing the impact of applying HACCP in food safety and the impact of HACCP in customer satisfaction (for their products and services) can gives managers greater rational decision.

### **(B) The importance of its practical :**

It concentrate the light on the prevention prospective rather than detection, prevention will reduce time, cost , and effort while it increased achieving the target goals.

HACCP is a protective program help to minimize food hazards and produce safe food. It concenter as competitive advantages for both managers and consumers.

## **8-LIMITATION OF THE STUDY**

### **(1)- Spatial Boundaries:**

This study conducted at cofftea company .

### **(2)-Temporal limits:**

From October 2017 to march 2018.

### **(3)-Objective Limits :**

This study focus on implementation of HACCP and how it relates to safety and quality of the products , the impact of HACCP in customer satisfaction, also study discus what are the difficulties in the implementation of HACCP process .

### **(4)- Human Boundaries :**

The study was limited to quality mangers and food safety team who responsible of applying and monitoring the HACCP program and also employees at the marketing and customers service department.

## **9-METHODOLOGY:**

For the purpose of this research the researcher adopted the descriptive analytical approach and quality tools which relevant to the nature and type of this study.

## **10-THE TERMENOLOGY OF STUDY**

10.1 Control:(a) To manage the conditions of an operation to maintain compliance with established criteria. (b) The state where correct procedures are being followed and criteria are being met.

10.2 Control Measure: Any action or activity that can be used to prevent, eliminate or reduce a significant hazard.

10.3 Control Point: Any step at which biological, chemical, or physical factors can be controlled.

10.4 Corrective Action: Procedures followed when a deviation occurs.

10.5 Criterion: A requirement on which a judgement or decision can be based.

10.6 Critical Control Point: A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

10.7 Critical Limit: A maximum and/or minimum value to which a biological, chemical or physical parameter must be controlled at a CCP to prevent, eliminate or reduce to an acceptable level the occurrence of a food safety hazard.

10.8 customer satisfaction: The term explains the satisfaction and contentment of customers from the service or products provide by the company.

10.9 Deviation: Failure to meet a critical limit.

10.10 HACCP: A systematic approach to the identification, evaluation, and control of food safety hazards.

10.11 HACCP Plan: The written document which is based upon the principles of HACCP and which delineates the procedures to be followed

10.12 HACCP Team: The group of people who are responsible for developing, implementing and maintaining the HACCP system.

10.13 Hazard: A biological, chemical, or physical agent that is reasonably likely to cause illness or injury in the absence of its control.

10.14 Hazard Analysis: The process of collecting and evaluating information on hazards associated with the food under consideration to decide which are significant and must be addressed in the HACCP plan.

10.15 Monitor: To conduct a planned sequence of observations or measurements to assess whether a CCP is under control and to produce an accurate record for future use in verification.

10.16 Prerequisite Programs: Procedures, including Good Manufacturing Practices, that address operational conditions providing the foundation for the HACCP system.

10.17 Step : A point, procedure, operation or stage in the food system from primary production to final consumption

10.18 Severity: The seriousness of the effect(s) of a hazard.

10.19 Validation: That element of verification focused on collecting and evaluating scientific and technical information to determine if the HACCP plan, when properly implemented, will effectively control the hazards.

10.120 Verification: Those activities, other than monitoring, that determine the validity of the HACCP plan and that the system is operating according to the plan.

# CHAPTER TWO

## BACK GROUND AND LITERATURE REVIEW

### 1- INTRODUCTION :

This chapter discuss the literature review on quality management system, definition of quality and explanation of HACCP process.

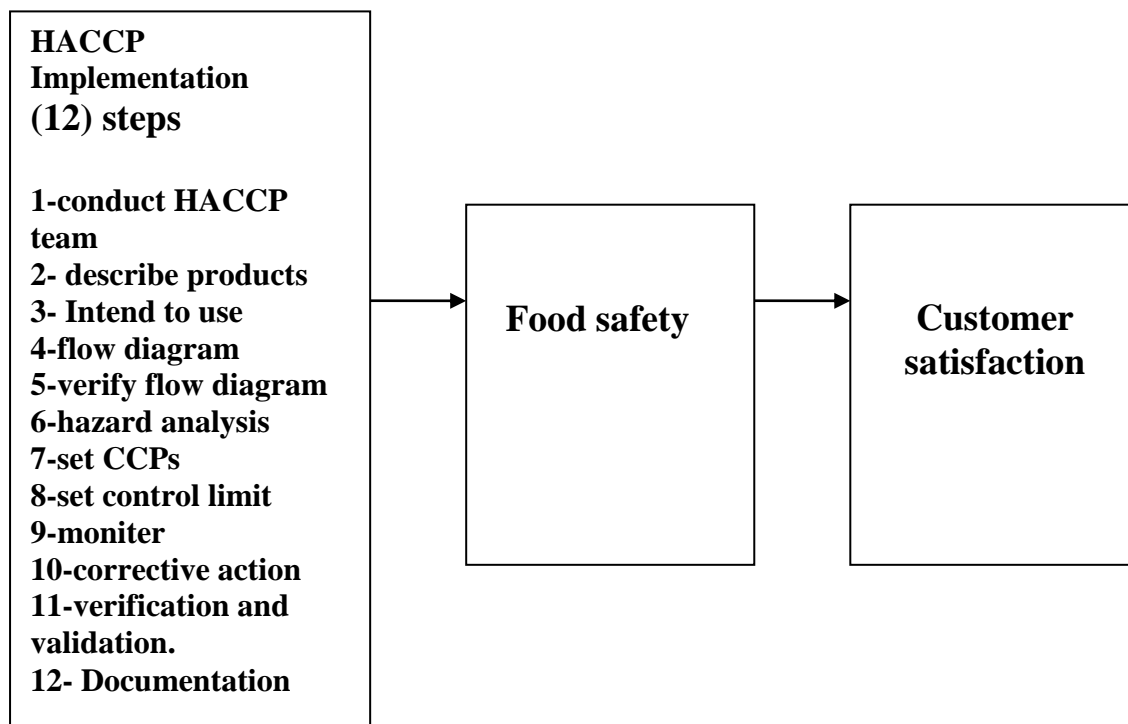
This chapter overview the study model, case study and focus on previous study on HACCP implementation principles and impact on food safety at different food business studies .

### 2-THEORITICAL FRAME WORK OF THE STUDY :

In this thesis the theoretical back ground divided into two parts, the first part is general idea about HACCP history , principles , and implementation steps, while second part related to customers satisfaction.

Researcher study the relation between the following variables:

Figure (2-1) shows the study model :



Source : prepared by researcher

### 3- QUALITY :

Before we study the subject of quality in any depth, we must be clear on what we mean by the term "Quality". Consider the following definitions: Fitness for use ,( Juran,1988,p.28 ). Therefore quality products should meet or exceed customer requirements.

Quality is Conformance to requirements .thus requirement must be clearly stated so that they cannot be misunderstood,(Crosby ,1984,p.45).

Deming ( 1986, p.45) did not define quality but emphasized that quality can only be judged by customer : quality may mean different things to different people .

Quality is a dynamic state associated with products, services, people, processes, and environments that meet or exceeds expectations and helps produce superior value, (Goetsch ,1995).

#### 3.1 Quality Evolution :

In the paper the process of total quality management [in *Managing Quality*, London: Philip Allan, 1990, Dales, Lascelles and Plunkett outline another four-level model of the evolution of quality management. In addition to the framework it proposes, clear definitions of quality terms are also provided.

- 1. Level 1 Inspection 1900:** Measure the characteristics of a product and compare them with its specifications; the goal here is the fitness of standards. This is the passive "inspecting" attitude.
- 2. Level 2 Quality Control 1940:** Inspection performed by the workers themselves with a feedback loop to the production line; Here we avoid the "inspector" effect and allow some learning to take place.
- 3. Level 3 Quality Assurances 1960:** Set of (implemented) predefined and



systematic activities necessary to give confidence in the process quality; one step further, Quality procedures are designed and planned as a whole to ensure that no bad products be delivered. Do not just rely on everybody's work and control. This introduces the notion of a coherent set of quality procedures/tests. The given confidence (in the definition of QA) is important both for the producer and for the customer.

**4-Level 4 Total Quality Management 1980:** Management centered on quality and based on the participation of everybody which aims at the customer satisfaction and at the improvement of the company's personnel and society. The ultimate step, a quality assurance plan is operational but the management, the workers and the customers continuously interact to review and improve this plan .

#### **4-TOTAL QUALITY MANAGEMENT (TQM):**

**Total:** Make-up of the whole.

**Quality:** Degree of excellence a product or service provides

**Management:** Act, art or manner of handling, controlling, directing etc.

Therefore, TQM is an art of managing the whole to achieve excellence. TQM is also defined as both a philosophy and a set of benchmarks that represent the foundation of a continuously improving organization. It is an application of quantitative methods and human resources to improve all the processes within an organization and exceed customer needs at present and in the future. (Goetsch, 1995).

TQM schemes address the approach that a manufacturing organization needs to take to ensure product quality. They aim to involve every member of the organization in the achievement of management objectives to produce safe, wholesome food, enhance customer satisfaction and confidence, and identify means of ongoing improvement. TQM is a comprehensive and structured approach to organizational management that seeks to improve the

quality of products and services through ongoing refinements in response to continuous feedback. The fundamental requirements of TQM approach are communication at all levels, so that process and product requirements can be translated from the corporate quality statement to the operatives running the process. TQM schemes embracing HACCP and document control form an important framework within which quality requirements can be communicated effectively .

## **5- INTERNATIONAL STANDERDIZATION ORGANIZATION (ISO):**

In 1946, representatives from 25 countries joined together to create a common and unified industrial standard; the organization created was the International Organization of Standardization (ISO). It has published more than 18,500 international standards in a 60-year time period beginning in 1947. These standards range from agriculture and Construction Standards, to mechanical engineering, to state-of-the-art information technology advances (ISO, 2011).

Until this time, ISO was primarily known for creating technical specifications for specific industries such as clothing size and laser technology.

The ISO 22000 Food safety management system was created similarly to other ISO management systems, more specifically to the ISO 9001 Quality Management System. The ISO management system forces the continuous process improvement approach through analysis and considerations (ISO.org).

## **5- HISTORY OF HACCP**

HACCP originated in the 1960's, when the National Aeronautics and Space Administration (NASA), the Pillsbury Company, and the U.S. Army Laboratories collaborated together to provide safe food for upcoming space expeditions. It was decided that NASA's engineering management requirements, Critical Control Points, would be used as a guideline for this food safety initiative. Critical Control Points (CCP) was used to test weapon and engineering system reliability and by using CCP, NASA and Pillsbury were able to hire contractors to identify and eliminate the "critical failure areas" in the food processing procedures.

After the success of NASA providing safe food for their space expeditions, Pillsbury had a recall on a product called Farina, which is a cereal used in infant food. They were finding glass pieces and remnants in the food, which caused contamination. A microbiologist at Pillsbury, Howard Baumann, who also helped in the NASA initiative, advocated for the company to adopt a HACCP plan. Because of this outbreak and Baumann's success with HACCP, a panel discussion was held in 1971 at the National Conference on Food Protection that examined Critical Control Points and Good Manufacturing Practices (GMP) in producing safe food. The outcome of this meeting lead to the FDA asking Pillsbury to establish and manage a training program for the inspection of canned foods for FDA inspectors. The program was first held in September 1972 for 21 days, with 11 days of classroom lecture and 10 days of canning plant evaluations. The name of this class was titled, "Food Safety through the Hazard Analysis and Critical Control Point System", and this was the first time HACCP was used to educate other food facilities in the industry.

## **6- HACCP IMPLEMENTATION :**

Today, training for developing and implementing HACCP Food Safety management systems are offered by several food safety companies. DFA of California is an accredited HACCP trainer through the International HACCP Alliance and is qualified to perform nationally recognized HACCP training according to Codex Alimentarius. This is a benefit to the Dried Fruit & Tree Nut and Fresh Produce industry because DFA knows the ins and outs of our member's facilities. Secondly, we currently have the resources to train and conduct HACCP verification audits on your time-table.

Since the signing of the FSMA (Food Safety Modernization Act) in 2011, companies in the food industry have been making drastic changes in order to comply with the regulation. The proposed Produce Safety and Preventive Controls rules are expected to be finalized in 2014 with staggered dates for compliance. One of the requirements of the rules is Preventive Controls (HACCP). "HACCP is important because it prioritizes and controls potential hazards in food production. By controlling major food risks, such as microbiological, chemical and physical contaminants, the industry can better assure consumers that its products are as safe as good science and technology allows. By reducing foodborne hazards, public health protection is strengthened" (International HACCP Alliance).

## **7- HACCP PRINCIPLES**

The successful application of HACCP requires the full commitment and involvement of management and the work force. It also requires a multidisciplinary approach; this multidisciplinary approach should include, when appropriate, expertise in agronomy, veterinary health, production, microbiology, medicine, public health, food technology, environmental health, chemistry and engineering, according to the particular study. The

application of HACCP is compatible with the implementation of quality management systems, such as the ISO 9000 series, and is the system of choice in the management of food safety within such systems.

According to Codex Alimentarius, 1997, There are seven principles in HACCP approach, they are detailed below:

**(i) Identify hazards**

Look at each step (e.g. purchasing, delivery, storage, preparation, cooking, chilling etc.) in your operation and identify what can go wrong e.g.

Salmonella in a cooked chicken product due to cross contamination with raw meat (biological hazard), contamination of uncovered food with detergent(chemical hazard) or a piece of broken glass fallen into an uncovered food (physical hazard).

**(ii) Determine the critical control points (CCPs)**

Identify the points in your operation that ensures control of the hazards e.g. cooking raw meat thoroughly will kill pathogens such as E. coli O157.

**(iii) Establish critical limit(s)**

Set limits to enable you to identify when a CCP is out of control e.g. when cooking beef burgers, the centre of the burger must reach a minimum temperature of 75°C (or an equivalent time temperature combination e.g. 70°C for 2 minutes) to ensure pathogens are destroyed.

**(iv) Establish a system to monitor control of the CCP**

When CCPs and critical limits have been identified it is important to have a way to monitor and record what is happening at each CCP. Typically monitoring will involve measuring parameters such as temperature and time.

However, how you monitor and how often will depend on the size and nature of your business. Monitoring should in all cases be simple, clear and easy to do e.g. probe refrigerated food to ensure that it is being maintained below 5°C.

**(v) Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control**

When monitoring indicates that a CCP is not under control, corrective action must be taken e.g. the temperature of the food in a refrigerator rises to 10°C due to a technical fault. Discard the food and repair the refrigerator using the manufacturer's instructions to ensure the correct temperature of 5°C is achieved.

**(vi) Establish procedures for verification to confirm the HACCP system is working effectively**

Review and correct the system periodically and whenever you make changes to your operation e.g. when replacing an oven verify that the time/temperature settings in the new oven achieves the minimum safe cooking temperature for a particular dish by probing the food.

**(vii) Establish documentation concerning all procedures and records appropriate to these principles and their application**

For the successful implementation of HACCP based procedures, appropriate documentation and records must be kept and be readily available. It is unrealistic to operate HACCP based procedures or to demonstrate compliance with the current legislation without providing evidence such as written records. As with the HACCP based procedures themselves, the complexity of the record keeping will very much depend on the nature and

complexity of the business. The aim should be to ensure control is maintained without generating excessive paperwork ( Food Safety Authority of Ireland,2002).

## **8- HACCP IMPLEMENTATION STEPS :**

There are twelve steps of HACCP implementation as Codex Alimentarius Commission (1997). Hazard analysis and critical control point (HACCP) system and guidelines for its application.

- Step one : Assemble a HACCP team with the appropriate product-specific knowledge and expertise to develop an effective Food Safety Plan. The team should comprise individuals familiar with all aspects of the production process, plus specialists with expertise in specific areas, such as engineering or microbiology. It may be necessary to use external sources of expertise in some cases.

- Step two: Describe the product in full detail, including composition, physical/chemical structure, microcidal/static treatments, packaging, storage conditions, and distribution methods.

- Step three: Identify the intended/expected use of the product by the end user. It is also important to identify the consumer target groups. Vulnerable groups, such as children or the elderly, may need to be considered specifically.

- Step four: Construct a flow diagram that provides an accurate representation of each step in the manufacturing process—from raw materials to end product—and may include details of the factory and equipment layout, ingredient specifications, features of equipment design, time/temperature data, cleaning and hygiene procedures, and storage conditions.

- Step five: Perform an onsite confirmation of the flow diagram to confirm that it is aligned with actual operations. The operation should be observed at each stage and any discrepancies between the diagram and normal practice should be recorded and amended. It is essential that the flow diagram is accurate, since the hazard analysis and identification of Critical Control Points (CCPs) rely on the data it contains.

- Step six: Conduct a hazard analysis for each process step to identify any biological, chemical, or physical hazards. This assessment also includes rating the hazard using a risk matrix, determining if the hazard is likely to occur, and identifying the preventive controls for the process step.

- Step seven: Determine Critical Control Points (CCPs) those areas where previously identified hazards may be eliminated. The final HACCP Plan will focus on the control and monitoring of the process at these points.

- Step eight : Establish critical limits and develop processes that limit risk at CCPs. More than one critical limit may be defined for a single step. Criteria used to set critical limits must be measurable and include rating and ranking of hazards for each step of the flow chart.

- Step nine: Monitor CCPs and develop processes for ensuring that critical limits are followed. Monitoring procedures must be able to detect loss of control at the CCP and should provide this information in time to make appropriate adjustments so that control of the process is regained before critical limits are exceeded. Where possible, process adjustments should be made when monitoring results indicate a trend towards a loss of control at a CCP.

- Step ten :Establish preplanned corrective actions to be taken for each CCP in the HACCP plan that can then be applied when the CCP is not under control. If monitoring indicates a deviation from the critical limits for a CCP,



action (e.g., proper isolation and disposition of affected product) must be taken that will bring it back under control.

- Step eleven : Establish procedures for verification to determine whether the HACCP system is working correctly. Verification procedures should include detailed reviews of all aspects of the HACCP system and its records. The documentation should confirm that CCPs are under control and should also indicate the nature and extent of any deviations from the critical limits and the corrective actions taken in each case.
- Step twelve : Establish proper documentation and recordkeeping for all HACCP processes to ensure that the business can verify that controls are in place and are being properly maintained.

### **8.1 Prerequisite Programs:**

The production of safe food products requires that the HACCP system be built upon a solid foundation of prerequisite programs. Examples of common prerequisite programs . Each segment of the food industry must provide the conditions necessary to protect food while it is under their control. This has traditionally been accomplished through the application of cGMPs. These conditions and practices are now considered to be prerequisite to the development and implementation of effective HACCP plans. Prerequisite programs provide the basic environmental and operating conditions that are necessary for the production of safe, wholesome food. Many of the conditions and practices are specified in federal, state and local regulations and guidelines (e.g., cGMPs and Food Code). The Codex Alimentarius General Principles of Food Hygiene describe the basic conditions and practices expected for foods intended for international trade. In addition to the requirements specified in regulations, industry often adopts policies and procedures that are specific to their operations. Many of these are proprietary.

While prerequisite programs may impact upon the safety of a food, they also are concerned with ensuring that foods are wholesome and suitable for consumption . HACCP plans are narrower in scope, being limited to ensuring food is safe to consume.

The existence and effectiveness of prerequisite programs should be assessed during the design and implementation of each HACCP plan. All prerequisite programs should be documented and regularly audited. Prerequisite programs are established and managed separately from the HACCP plan. Certain aspects, however, of a prerequisite program may be incorporated into a HACCP plan. For example, many establishments have preventive maintenance procedures for processing equipment to avoid unexpected equipment failure and loss of production. During the development of a HACCP plan, the HACCP team may decide that the routine maintenance and calibration of an oven should be included in the plan as an activity of verification. This would further ensure that all the food in the oven is cooked to the minimum internal temperature that is necessary for food safety ,( Codex Alimentarius ,1997).

## **8.2 Examples of prerequisite program :**

**These are some examples of prerequisite programs** as WHO.int/foodsafety/areas founded in 2001

**Facilities:** The establishment should be located, constructed and maintained according to sanitary design principles. There should be linear product flow and traffic control to minimize cross-contamination from raw to cooked materials.

**Supplier Control:** Each facility should assure that its suppliers have in place effective GMP and food safety programs. These may be the subject of continuing supplier guarantee and supplier HACCP system verification.

**Specifications:** There should be written specifications for all ingredients, products, and packaging materials.

**Production Equipment:** All equipment should be constructed and installed according to sanitary design principles. Preventive maintenance and calibration schedules should be established and documented.

**Cleaning and Sanitation:** All procedures for cleaning and sanitation of the equipment and the facility should be written and followed. A master sanitation schedule should be in place.

**Personal Hygiene:** All employees and other persons who enter the manufacturing plant should follow the requirements for personal hygiene.

### **8.3 Education and Training**

The success of a HACCP system depends on educating and training management and employees in the importance of their role in producing safe foods. This should also include information the control of foodborne hazards related to all stages of the food chain. It is important to recognize that employees must first understand what HACCP is and then learn the skills necessary to make it function properly. Specific training activities should include working instructions and procedures that outline the tasks of employees monitoring each CCP.

Management must provide adequate time for thorough education and training. Personnel must be given the materials and equipment necessary to

perform these tasks. Effective training is an important prerequisite to successful implementation of a HACCP plan.

#### **8.4 Benefits of HACCP implementation**

New food production and processing practices, emerging food-borne pathogens, and changing eating habits and demographics have contributed to a higher awareness of food-borne illness in recent years. Increasingly, prevention has become the focus. HACCP systems control food safety hazards through prevention, elimination and reduction. To address food safety concerns, market forces are driving HACCP implementation throughout the food continuum, particularly the processing sector. Bas, M., Ersun, 2006, When a food illness outbreak occurs, many points in the food continuum suffer, including the retail sector. In response, many retailers and grocers have begun to insist that their suppliers have effective food safety systems, including HACCP, implemented in their facilities. This action drives the adoption of HACCP by many processors to retain their current market and customer base or, in fact, expand it.

##### **8.4.1 common benefits of HACCP :**

Although the adoption of HACCP systems worldwide is due primarily to the added food safety protection provided to the consumer, a number of other benefits to the food industry, including your company, can be realized by implementing a successful HACCP system.

Sarah Mortimore is co-author of several successful books of HACCP she wrote about the benefits of HACCP in her book( HACCP- a practical approach 1994,p300).

Some of these benefits are mentioned below :

**(i).Increased Focus and Ownership of Food Safety:**

Food safety is the responsibility of everyone in the food supply chain. Through the process of developing and implementing a HACCP system, your company's employees will become more aware of food safety and their roles in maintaining and contributing to food safety. This increased awareness leads to increased ownership and pride in the production of a safe product

**(ii). Increased Buyer and Consumer Confidence:**

There is an increasing trend for buyers to request HACCP from their suppliers. Food processors who have implemented a HACCP system provide buyers and consumers with a greater degree of confidence that the facility is producing a safe food products( S.mortimire 1994,p301)..

**(iii). Maintaining or Increasing Market Access:**

Market forces continue to drive food safety awareness and HACCP implementation throughout the food processing sector. As food safety systems, particularly HACCP, become more common, market access is limited for processors who do not implement them. In many cases buyer demands require HACCP implementation to maintain market share and/or gain access to previously inaccessible markets. HACCP implementation may also permit re-entry into a market that had been lost. Considering the economic implications, HACCP implementation may be a necessary cost of business.

**(iv). Business Liability Protection:**

Implementation of a HACCP system can provide your facility with some degree of increased business liability protection and may lead to reduced

insurance premiums. This will be an important factor once the Consumer Protection Bill has been passed by Parliament.

**(v). Reduced Operational Costs:**

The process of developing and implementing a HACCP system requires that the entire manufacturing process be reviewed and analyzed, and written procedures developed. This process often reveals areas where operational costs can be streamlined. For example, developing a sanitation program may identify that excessive chemical concentrations are being used. Reducing chemicals to the correct concentration may decrease sanitation cost.

**(vi). Efficient Oversight:**

Similarly, HACCP implementation can provide your company with ongoing efficient oversight. It can be cost effective to implement HACCP in spite of the associated costs.

Activities that are performed on a regular basis, such as product and process monitoring, employee training and review of procedures, allow your company to maintain control over the facility and product. You may find there are certain areas of the process that can be made more efficient and productive( S.mortimore, 1994,p301)..

**(vii). Improved Product Quality and Consistency:**

The implementation of a HACCP system may indirectly enhance product quality. Procedures that minimize the presence and growth of pathogenic micro-organisms can also minimize the presence and growth of spoilage micro-organisms, leading to an increased product shelf life. In addition, the attention given to standardized procedures will improve product consistency.

**(viii). Reduced Wastage:**

The preventative nature of HACCP allows a company to control costs by minimizing the amount of product requiring rework or rejection, and focusing resources on areas that have been identified as critical in the manufacture of a safe food product. You will find that many problems are addressed before they escalate and before products are dispatched from your facility; you will not simply be waiting for the results of end product testing. With the regular monitoring inherent in a HACCP system, you will become aware of problems earlier, and your costs of wastage will be reduced( S.mortimore 1994,p300).

**9- CUSTOMERS SATISFACTION:**

Bolton (1993 ) define Customer satisfaction is as emotional response to the experience provided by, (or associated with) particular products or services purchased, retail outlets, or even molar patterns of behaviour, as well as the overall marketplace.

Another author Hunt (1977) defines customer satisfaction as a process of evaluation rendered that the experience was at least as good as it was supposed to be,.

Tise and David (1988) elaborated hunt definition where they said customer satisfaction is a process of consumer's response to the evaluation of the perceived discrepancy between prior expectations and the actual performance of the product as perceived after its consumption Satisfaction is the customer's fulfilment response. It is a judgemental that a product or service feature, or the product or service itself, provides a pleasurable level of consumption .

The findings indicate that marketing resources impact on financial performance indirectly through creating customer satisfaction and loyalty and building superior market performance. Adopting contingency

perspective ,the authors present and test a fit as moderation models that posit that overall firm performance is influenced by how well marketing organization structural characteristics (i.e, formalization, centralization and specialization ) and strategic behavioral emphases (i.e, customers , competitors , innovation and cost control ) complement alternatives business strategy i.e , prospector ,analyzer ,low –cost defender , and differentiated defender ,(Gornroos,1990)

## **9.1 Customers and food safety**

In 2006,205 people in U.S were sick and 3 died in an E.coli O157:H7 outbreak linkage to baby spinach grown in California .

Excessive investigation done to determine cause of contamination with E.coli , which was contamination with presence of cattle feces and wild pigs the investigation has less success to identify the exact way by which E.coli contamination had occurred.

In response to industry interest, the U.S department of agricultures marketing service (AMS) publish an advance notice of proposed Rulemarketing to explore the idea of implementing a national marketing agreements ,focused on reducing microbial contamination in vegetables.

Marketing orders and agreements provide legal tools for agricultural producers ,processors ,manufacturers and retailers to work together to mitigate financial turmoil in supply chain ,a new marketing order or agreement must be developed by industry representatives , also at least one food safety management system are legal requirements to any manufacturing , companies deal with food or drinks . all this effort to safe the food from contamination and satisfy the customers.( foodsafetyforum.org)



## **10-PREVIOUS STUDY :**

### **10.1 local studies :**

#### **The study of Hiba Mohamed (2012)**

HACCP (Hazard Analysis Critical Control Point) in Sudanese biscuit processing plant ,was done in wad madani 2012 , The purpose was to set up specific HACCP plan for Sudanese biscuit processing plant in an existing biscuit processing plant in Wad Madani, central Sudan. A specific generic HACCP model was developed to improve safety and quality of biscuit produced in this plant. This was based on actual conditions in the biscuit manufacturing plant, the seven principles of HACCP and several existing generic models of HACCP using qualitative approach. Six-member HACCP team was constituted and HACCP chart, verification procedures and record-keeping were initiated.

#### **Findings :**

Four CCPs were identified in the production of biscuit in the manufacturing plant. The most important identified CCPs were raw material receipt and storage, blending, packaging and product storage.

However, the HACCP plan in this study has not been implemented in the biscuit making process. Based on the findings of this study, the author recommend implementation of HACCP system in all food facilities(sustech.edu.2016).

#### **The study of Nuha mousa (2015)**

Hazard Analysis Critical Control Point (HACCP) prerequisites and Critical Control Point in raw milk postcollocation and distribution in Omdurman area. as a base to know the availability of Hazard Analysis Critical Control Point

(HACCP) application. Farms were randomly selected and follow up diagrams of milk distribution chain was constructed. To explore milk quality changes during distribution, milk samples were collected from different locations.

**Objectives** : to evaluate the application of HACCP program in farms. And to study the relation between HACCP and bacterial load in a raw milk .

**The findings** : questionnaire showed that 43% of milkers were primary educated .and 38% illiterate. Knowledge about safety and hygiene while milking and milk distribution was limited, and training was lacking.(uofk.edu,2015)

### **The study of Osman shawgy(2016)**

Evaluate the HACCP system in milk farms , farmers' milking hygiene practices and awareness of cattle and milk-borne zoonoses in Khartoum, Sudan. Data were collected from a total of 30 randomly selected dairy farmers using structured questionnaire.

**Objective of The study:** was to evaluate the effect of implement a HACCP program in a commercial stirred yoghurt and awareness of milk producers on good production practice (GPP) and antimicrobial resistance (AMR)in Khartoum state farms.

### **The findings** :

Thus through research and analysis concluded that the Hazard Analysis of Critical control point has a great and important impact on the milk processing industry within the state of Khartoum.(sustech.edu,2017).

### **The study of Hashim abdelrahim (2017)**

The role of Hazard Analysis Critical Control Point process in the meat processing industry in Khartoum State.

#### **Objectives of study :**

The research aims identifying the Impact of Implementation of Hazard Analysis Critical Control Point on food safety for the processors of the meat industry in Khartoum state, find out the difference between two meat industries in Khartoum state, one is HACCP implemented & the other one is non implemented.

**The findings :** . all the variables had a significant impact of the process of Hazard Analysis of Critical Control Point An analysis of the correlation coefficient from the data collected reveal that the Hazard Analysis process has a direct impact upon the safety program in the meat industry in Khartoum state. The industries that apply this system have several programs to monitor food safety, other than those industries have not started this system did not apply it. .(sustech.edu,2017).

## **10.2 Arabic studies :**

### **The study of Suliman abdallah(2004)**

The constraints of HACCP and food safety programs in 100 food businesses in Al–Ain city, United Arab of Emirates.

#### **Methodology :**

Descriptive study aim to categorize the constrains of applying HACCP in UAE . Questionnaire distributed to all participants , the response was 95%

#### **The findings :**

by asking the managers. Many of managers (47%) had high school education degree, but less than half (46%) of them had been employed 6-15 years in this work. Most of those managers

(95%) did not send food samples or swabs (97%) to the laboratory for testing the bacterial contamination. About 84% of the employee suggested that must be given more training to improve food safety in their businesses, because 94% of those respondents were lack of prerequisite program of food safety and knowledge about HACCP (91%).

**Recommendation** : Developing and implementing written standard operating procedures in food businesses are one of the first steps to build effective HACCP and other food safety system in Al-Ain city.(adafca.ae)

### **The study of Dina kandar (2010)**

Evaluate the progress of HACCP implementation in the UAE.

Today governments and other parties involved in food control are under constant pressure to find more efficient and effective mechanisms to carry out their mandates for food control. This has led to international recognition of the importance of the HACCP system as a food control tool and guidance on the role of government agencies in the application of such a system has been developed. Based on this international guidance, four main elements identified as key activities have been used in this study . The internal Strengths and Weaknesses, as well as the external Opportunities and Threats that the government is facing towards the implementation of a HACCP-based food control system have been identified.

**The results of study** : analysis shows that the government's dedicated role has been an essential driving force to encourage the implementation of a HACCP-based food control system. Some areas of difficulty, including the dependence on high levels of food imports are highlighted .(foodcontrol,2010).

### **The study of Mooza Albusaidi (2016)**

Technical barriers and benefits associated with the implementation of HACCP program in the Sultanate of Oman.

A survey, using qualitative surveys and interviews, was conducted out to verify the level of implementation of the seafood safety and quality requirements. A total of 22 (92% returned) HACCP processors, and 15 (83% returned) non-HACCP processors and 15 (75%) officials completed the questionnaires.(foodcontrol.2018)

#### **study findings :**

- 1-The research assessed HACCP implementation in the Omani seafood sector.
- 2-Significant gaps in aspects of seafood safety and quality are highlighted.
- 3-The use of HACCP in Omani seafood processors is limited and the reasons assessed.
- 4- The poor use of prerequisites programmes makes HACCP implementation more complex.
- 5- Inspection resources and the location of the processors are poorly matched.

### **The study of Abdelaziz Elshaik (2011)**

Barriers and solutions to food safety management in hospitality businesses, this paper published in 2011.

#### **Design/methodology/approach:**

In - depth interviews, supported by documentary analysis, in restaurants and hotels in Barbados, Dubai, Nigeria and Oman.

#### **Findings:**

Recent research in Barbados, Dubai, Nigeria and Oman supports the findings of parallel UK research between 2002 and 2005, showing that the barriers to food safety management are likely to have global relevance, and also the potential for global solutions(foodsafety fourm.com).

### **11.3 foreign studies:**

#### **The study of S. Tayler (2002)**

Barriers to HACCP implementation in Hospitality & Food Management.  
At School of Leisure, The University of Salford, Salford, Greater Manchester, UK .

The study discuss the importance of small companies across the food chain and identifies the slow uptake of HACCP in these companies as an area of concern for the production of safe food.

**The study results** : This sets the scene for an analysis of the barriers to HACCP implementation which include (1) availability of appropriate training in HACCP methodology, (2)access to technical expertise and(3) the general resource problems of time and money.

#### **Findings :**

He find that documentation and validation of HACCP process is the main difficulties .

#### **The study of Irish J. Agric (2003)**

Applications of hazard analysis and critical control point (HACCP) system in foodservice areas, United state of America.

The study showed that education with knowledge of food safety and proper food handling are needed and will help the food service personnel (workers and managers) with a better understanding in food service and better hygiene

practices which resulted in safer foods. Besides, risk assessment, HACCP has been applied in most of the food production areas. For most of the food chain, HACCP is mandatory by law and government's regulations.(WHO.int/20017)

### **The study of Fang Dianmin(2003)**

Evaluation of HACCP (Hazard analysis and critical control points) in nutritional meals for students, china .

was employed in the production of Five critical control points including raw materials purchasing, food cooking and heating, rinsing and sterilizing of containers, containers specific for cooked food and time interval from cooker to table were determined after hazard analysis. The objects, methods, frequencies, personnel for inspection as well as measures of correcting errors were prescribed clearly.

**The results:** indicated that the eligible rate of the final products increased greatly due to the enforcement of HACCP (Chinese journal of food hygiene,2003).

### **The study of Cross Ref (2010)**

The barriers that impede the adoption of hazard analysis and critical control point (HACCP) by food processing firms in Ontario, Canada. The study identifies four broad groupings of barriers to HACCP implementation which are :

- 1- namely perceptions that HACCP is of “questionable appropriateness” to the firm.
- 2- the scale of change required to achieve implementation.
- 3- low priority given to enhancement of food safety controls.

4- financial constraints.

The severity of these identified barriers differs significantly between firms that have implemented HACCP and those that have not. In particular, HACCP implementation is impeded significantly by barriers related to financial constraints. The most important driver promoting implementation is customer requirements for HACCP to be implemented in supplier facilities (Prediocal, 2010).

### **The study of K. Ropkins and A J. Beck (2010)**

The implementation of HACCP in organic product .

This article presents an overview of the implementation of HACCP and discusses its application to the control of organic . Although this is likely to result in many of the advantages previously identified for microbiological HACCP, that is, more effective, efficient, and economical hazard management, a number of areas are identified that require further research and development.

### **Recommendations:**

(1) a need to refine the methods of chemical contaminant identification and risk assessment employed.

(2) develop more cost-effective monitoring and control methods for routine chemical contaminant surveillance of food.

(3) improve the effectiveness of process optimization for the control of chemical contaminants in food chemical contaminants in the food chain. (online articles, 2010).



## **11- CASE STUDY : COFFTEA**

### **11.1 History**

COFFTEA was founded in 1984 by Mr. Mohamed Salih Idris who is now the Chairman of the Group. As the name suggests, COFFTEA is an acronym for COFFEE and TEA and is synonymous to its core activities which is trading in Coffee and Tea.

COFFTEA started out as the main bulk distributor of Tea and Coffee to wholesalers in all regions of Sudan. In 2002, COFFTEA launched the first tea packing factory with its flagship brand ALGAZALTAIN. The factory packs the finest blends of CTC tea using the highest standards for tea packing both as loose packets and Tea Bags. During this period, it undertook nation-wide marketing and distribution for its quality products thus achieving their No. 1 position in this sector.

### **11.2 Vision and mission:**

COFFTEA's vision is to be the finest tea and coffee packer not only in Sudan but across the Globe. The current leadership and management is not only vibrant but dynamic too. With a workforce of about 450 employees, COFFTEA prides of having some of the finest professionals from various sectors; which in essence is one of its biggest assets.

COFFTEA's mission is to attain and maintain complete customer satisfaction, quality products accessibility and over all convenience.

### **11.3 Site and work environment**

Over the years COFFTEA has experienced continuous growth and expansion in its scale of operations. It is due to this growth which initiated the launch of the ultra modern 20,000 sq. m factory located on the outskirts of Khartoum city. The factory is equipped with the latest machinery and equipments including testing laboratories, automated blending and packing facilities. Most importantly, COFFTEA has implemented and adhered to the highest hygiene and working standards for its operations. The factory houses all the departments in one location thus making it operate effectively and efficiently (cofftea.com).

### **11.4 Process and Product control tools:**

Tea processing is the method in which the leaves from the tea plant *Camellia sinensis* are transformed into the dried leaves for brewing tea. The categories of tea are distinguished by the processing they undergo. In its most general form, tea processing involves different manners and degree of oxidation of the leaves, stopping the oxidation, forming the tea and drying it. The innate flavour of the dried tea leaves is determined by the type of cultivar of the tea bush, the quality of the plucked tea leaves, and the manner and quality of the production processing they undergo. After processing, a tea may be blended with other teas or mixed with flavourants to alter the flavour of the final tea,

#### **A-Processing:**

When to start processes, a commitment must be made to the good manufacturing practices and personal hygiene.

The packaging should be carried out in clean containers that have never been used and do not allow moisture to enter and do not lead to contamination or change in product qualities, properties and suitability for human consumption.

The packages used shall comply with the Sudanese standard specifications of the product (SSMO - Lens culinaris 2015: 4897)

**B- Product Control: General requirements:**

- 1- It should be available in dry packages
- 2- To be clean and free from odors.
- 3- They should be of color, size and natural texture.
- 4-To be free from foreign substances (organic / inorganic)  
(SSMO - Lens culinaris 2015: 4897).

**11.5 COFFTEA products:**

The company produces several bages of Tea and coffee

**Tea Bags:**

Algazalteen , green tea, mint flavored ,cardamom flavored and cinnamon flavored these come on 25 ,50 and 100 tea bages .

**Lose Tea:**

algazalteen black tea , alshirog ,tumsah , and akafaera they are available in 450grams ,100 grams and 30 grams .

**Coffee :**

Green un roasted coffee 30 and 60 kilo grams

Roasted coffee 50 kg

Al funjal fine roasted coffee 100,250 and 900gs

# CHAPTER THREE

## METHODOLOGY

### 1-INTRODUCTION

This chapter explains in detail the methodology used in gathering the information necessary in this study . it is highlight the sources of data used and the survey design ,which includes the sampling plan and data analysis method employed, the methodology developed in the research is largely driven by research objectives of the thesis .

### 2-METHODOLOGY

Having reach of identifying from the literature of the attributes and preliminary structure of the COFFTEA company and HACCP implementation program. Case study research aiming to investigate the role of implementing HACCP in COFFYEA by adopting analytical descriptive case study approach.

### 3-POPULATION OF THE STUDY :

The population of this study is collection of units within which the survey will be conducted .samadel et al (2007,p.747)argued that there is tow different type of population :

- 1) The target population: consist of the group of units about which information is ideally wanted.
- 2) The survey population : the units that we are able to survey.

The target population of this study are the employees of quality department and marketing department in COFFTEA company , whereby

the employees have been selected to participate in the study are the survey population .

### **3.1 Determining the sample size :**

An important consideration in sample design is the choice of sample size , larger sample provide greater precision but are more costly to undertake .

A common approach is to choosing the sample size is to specify the precision desired and then determine the optimal sample size providing the precision .

Roscoe(1975,p. 57) propose that the appropriate sample sizes for most research be greater than 30 and less than 500.

Taking into consideration these guidelines we decided to choose the whole population of study which are 30 employees.

## **4. QUESTIONNAIRE DESGIN :**

The aim of questionnaire design is to translate the research objective into specific questions. The answers to these questions should provide data for answering all or some of the research questions .planning and designing the questionnaire is one of the most critical stages in surveys development process , and from the literature review it seems that most problems with questionnaire data can be traced back to the design phase of the project .

The questionnaire consist of two part :

Part 1: Demographic information about respondents.

Part 2 :HACCP questions (20 statements ).

#### **4.1 Questionnaire rating scale:**

The survey consists of two parts. In part one respondents were asked about their demographic backgrounds, this is a nominal scale.

The second part of the survey respondents were asked about their evaluation of the statement (excellent, very good, good, weak, very weak). This type of scale is considered an interval scale.

#### **5- DATA COLLECTION:**

Oppenheim (1992, p.19) defines research methods as those used for data collection and generation. There are two methods of data collection that can be used by any business research: secondary and primary.

**Secondary Data:** Secondary data collection methods are all resources that are available to a researcher to obtain necessary information for a research problem. Using the typology put by Sandrus et al (2011, p.87), secondary data can be categorized as documentaries versus surveys. Documentary data include written (e.g. books, journals) and non-written (e.g. Television and CD-ROM).

**Primary Data:** This research uses the quantitative method interval scale in measuring the relation between HACCP implementation and safety of food, also between HACCP and customer satisfaction, and categorize the barriers of applying HACCP in COFTEA.

#### **6- PROCEDURE :**

The data from the questionnaire was collected during February 2018.

The analysis was quantitative by using SPSS (Statistical Package for Social Sciences) software program.

The analysis of data includes descriptive statistics such as mean, frequencies, percentage and standard deviation, in order to determine

whether there is significance relation between HACCP and safety of food , also between HACCP and customer satisfaction by using chi-square testing.

## **7- RELIABILITY AND VALIDITY:**

**Reliability** is define as the extent to which a questionnaire test observation or any measurement produces the same results on repeated trials .The result of reliability test reflect cronbach alpha( Nunnally ,1978,p.266).

Spss used Cornbach alpha value of (0.87) which reflect the measuring is highly reliable .

**Validity** define as the extent to which the instrument measure what it purport to measure , specific intended domain of content (nunnally ,1978,p232).

### **7.1 Reliability and consistency of the questionnaire:**

Stability means that the questionnaire gives a similar result or the same results if it is re-applied more than once in the same conditions. To verify this, 15 samples were distributed to the sample by means of internal consistency (Alpha cronbach). The coefficient of Alpha cronbach = (0.84) Indicates the stability of the scale and validity of the study and the coefficient of honesty is the square islands of stability coefficient is (0.92) This indicates that there is a high sincerity of the scale and favor of the study, which confirms the accuracy of the questionnaire and enjoy the confidence and acceptance of the results of this study results.

Alpha cronbach Method:

Where the stability was calculated using the formula Alpha cronbach described below:

$$\text{Coefficient of stability} = \frac{N}{N - 1} \frac{(1 - \text{total variances of questions})}{\text{variance of total scores}}$$

Where n = the number of existing statements.

## **8- ETHICS AND HUMAN SUBJECT ISSUES:**

No names or signs will appear in questionnaire, collection will be under full confidentiality, by using only numbers to facilitate analysis process ..



# CHAPTER FOUR

## DATA ANALYSIS AND DISCUSSION

### 1- INTRODUCTION :

This chapter analyzes the data of the study , the analysis obtained using descriptive and analytical statistics , the descriptive data helped the researcher to select the appropriate analysis or procedure in hypothesis testing .

### 2- STATISTICAL METHODS :

Its numerical statement of facts capable of analysis and interpretation and the science of statistics is the study of principles and the methods applied in collecting ,presenting ,analysis and interpreting the numerical data in any field of inquiry .

"I like to think of statistics as the science of learning from data .."

(kettering ,1997,p.1229).

A total of 20 questions related to three dimensions in the questionnaire (see appendix 1) were asked to the population of the study . the respondents were 30 employees , response was 100% , The Data analyzed by SPSS(16) .

#### 2.1 Statistical tools :

The researcher used many statistical tools include the following :

- 1- frequency tables
- 2- percentages
- 3- graphs
- 4- median

5- chi square test

### 3- STEP OF ANALYSIS :

Quantitative data in this study originated from across sectional survey.

The step for quantitative analysis are summarized in table (4-0)

Step one	Data integrity test	Checking quality ,reliability and validity of data
Step two	Descriptive analysis	Measures of frequencies for survey items ,percentages , chi square testing
Step three	Data compression	

Source: prepared by researcher

### 4- DATA ANALYSIS :

The analysis of data was done for the two parts of the questionnaire as follow :

#### (1)Demographic Data

The primary purpose of this section is to describe the participants in this study who completed the survey, with respect to following demographic variables : (1) Gender ,(2) Ages ,(3) academic certificates and (4) years of experiences.

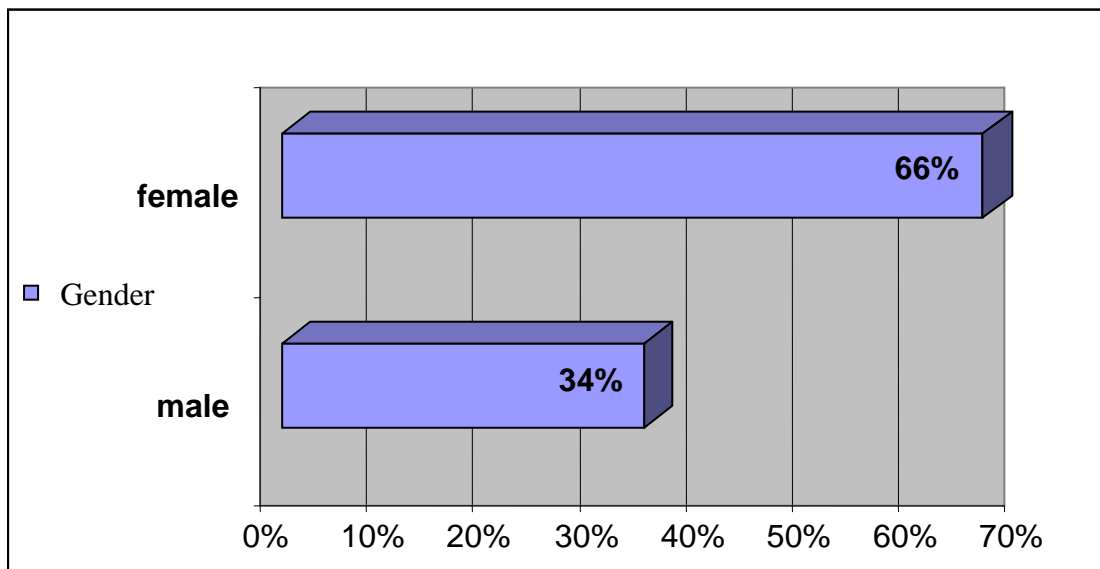
## 1-Gender:

Table (4-1) display the respondents by gender

<b>gender</b>	<b>frequency</b>	<b>percentage</b>
Female	<b>20</b>	<b>66 %</b>
Male	<b>10</b>	<b>34 %</b>
Total	<b>30</b>	<b>100%</b>

Source: prepared by researcher as result from the data analysis

figure (4-0) shows the percentage of male and female.



Source: prepared by researcher as result from the data analysis

The result shows (66%) of survey respondents were females and (33.4%) were males .

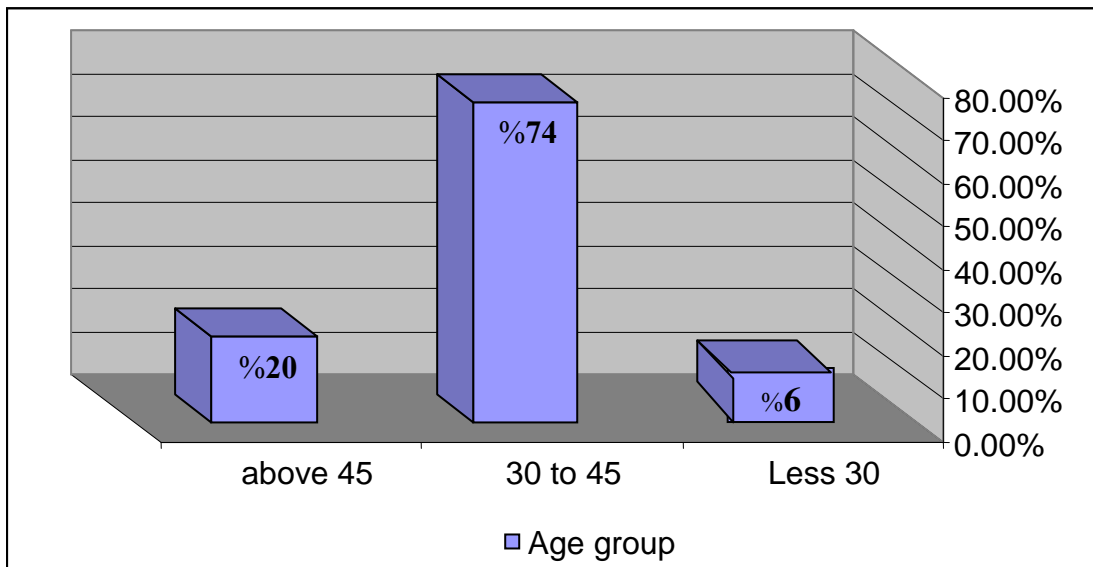
## 2-Age Group

Table (4-2) display respondents by age

Years old	frequency	percentage
Less than 30	2	6%
From 30 to 45	22	74%
Above 45	6	20%
Total	30	100%

Source prepared by researcher as results from data analysis

Figure (4-1) shows the percentages of age group



Source: prepared by researcher as result from the data

The analysis shows that (74%) were young employees. While (20%) were above 45 years old and only (6%) were less than 30 years old.

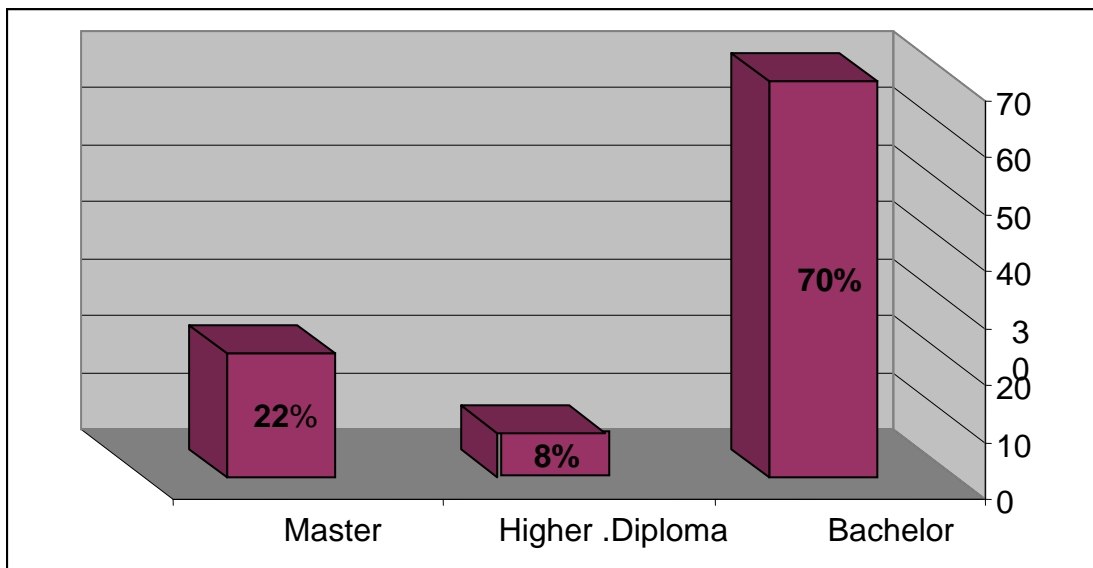
### 3- Academic Certificates

Table (4-3) shows respondents by academic certificates

<b>Academic</b>	<b>Frequency</b>	<b>Percentage</b>
Bachelors	21	70%
Higher diploma	3	8%
Master	6	22%
Total	30	100%

Source: prepared by researcher as results of data analysis

Figure (4-2) shows the percentage of academic certificates



Source: prepared by researcher

The analysis shows that (80%) of employees were Bachelor holders , (6.7%) had higher diploma ,(13.3%) completed master study , no one have degree of philosophy doctor .

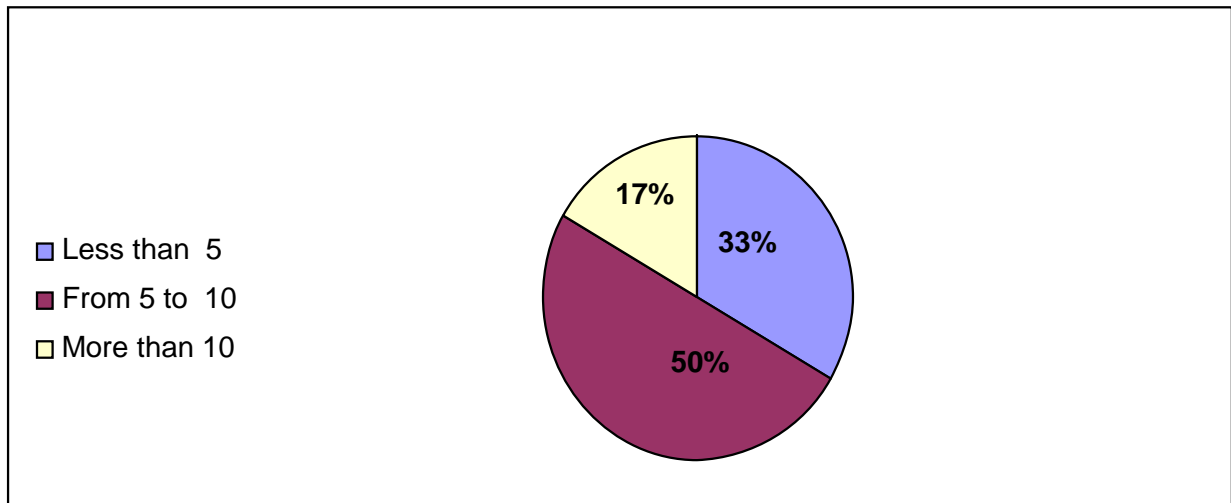
## 4-Years of Experiences

Table (4-4 ) shows respondents by years of experiences

<b>Experiences</b>	<b>Frequency</b>	<b>Percentage</b>
Less 5years	<b>10</b>	<b>33.3</b>
From 5 to 10	<b>15</b>	<b>50</b>
More than 10	<b>5</b>	<b>16.7</b>
Total	<b>30</b>	<b>100%</b>

Source: prepared by researcher as result of data analysis

Figure (4\_3) shows the percentage of years of experiences :



Source: prepared by researcher as results of data analysis

Analysis shows (50%) of employees had experiences between 5 years to 10 years ,( 33.3%) were newly candidate with experiences less than 5 years ,while (16.7%) had more than 10 yeas of experiences.

## 5- Relation between HACCP implementation and demographic variables

Table (4-5) Relation between HACCP implementation and demographic variables .

Statements	Chi square	Degree of freedom	Sig	Statistically significant
<b>Gender</b>	<b>1.4</b>	<b>2</b>	<b>0.3</b>	<b>NO</b>
<b>Age</b>	<b>3.7</b>	<b>6</b>	<b>0.5</b>	<b>NO</b>
<b>Academic certificates</b>	<b>3.5</b>	<b>4</b>	<b>0.4</b>	<b>NO</b>
<b>Years of experiences</b>	<b>26</b>	<b>6</b>	<b>0.00</b>	<b>YES</b>

Prepared by researcher as source of data analysis

From the above tables results showed:

Gender : chi square value is (1.4 ) with significant value of (3) which is more than p.value (0.05) that's mean there is no statically significant relation in HACCP implementation process due to gender variable.

Age : chi square value is (3.7 ) with significant value of (5) which is more than p.value (0.05) that's mean there is no statically significant relation in HACCP implementation process due to age variable.

Academic certificates : chi square value is (3.5 ) with significant value of (4) which is more than p.value (0.05) that's mean there is no statically significant relation in HACCP implementation process due to academic certificates variable.

Years of Experiences : chi square value is (26 ) with significant value of (.00) which is less than p.value (0.05) that's mean there is statically significant relation in HACCP implementation process due to gender variable.

## (2) Dimensions of the questionnaire :

### (i) **First dimension** : evaluating the difficulties in implementation of HACCP

Table (4-6) shows statements, frequencies and percentages of this dimension:

Statements	excellent	Very good	good	weak	Very weak
Employees have awareness about HACCP	0	10	18	2	0
	00%	33.3%	60%	6.7%	00%
Top management has commitment to apply HACCP	3	4	20	3	0
	10%	13.3%	66.7%	10%	00%
food safety training program	1	3	19	7	0
	3.3%	10%	63.4%	23.3%	00
Workers are following the safety instructions inside the production area .	0	2	20	8	0
	00%	6.7%	66.7%	26.6%	00
Top management initiate and monitoring follow up meetings to evaluate the food safety team work .	2	6	16	6	0
	6.7%	20%	53.3%	20%	00%
Documentation and verification of all HACCP processes .	0	0	23	4	0
	00	00	76.7%	23.3%	00%

Source prepared by researcher using SPSS

From the table above, the findings are:

Employees have awareness about HACCP : (10) Employees with percentage of (33.3%) answer very good , while (18) Employees with percentage of(60%) answered good, and (2) Employees with percentage of (6.7%) answered weak.



Top management has commitment to apply HACCP: (3) Employees with percentage of (10%) answered excellent, (4) Employees with percentage of (13.3% ) answered very good , while (20)Employees with percentage of (66.7% ) answered good and (3) Employees with percentage of (10%) answered weak.

Food safety training program: (1) Employees with percentage of (3.3%) answered excellent, (3) Employees with percentage of (10% ) answered very good , while (19)Employees with percentage of (63.7% ) answered good and (7) Employees with percentage of (23%) answered weak.

Workers are following the safety instructions: (2) Employees with percentage of (6.7% ) answered very good , while (20) Employees with percentage of (66.7% ) answered good and (8) Employees with percentage of (26.6%) answered weak.

Top management initiate and monitoring follow up meetings to evaluate the food safety team program (2)Employees with percentage of (6.2%) answered excellent, (6) Employees with percentage of (20% ) answered very good , while (16) Employees with percentage of (53.3% ) answered good and (6) Employees with percentage of (20%) answered weak.

Documentation of HACCP processes: (23) Employees with percentage of (76.7% ) answered good and (4) employees with percentage of (23.3%) answered weak.

Table (4-7) shows the statistical measurements for this dimension:

No	Statement	Chi square	Degree of freedom	sig	Median	Evaluating scale
1	Employees have awareness about HACCP	10.3	1	0.00	4	Good
2	Top management has commitment to apply HACCP	12.	1	0.00	4	Good
3	Top management has commitment to food safety training program	14	2	0.00	4	Good
4	All workers following the safety instructions inside the production area .	12	3	0.00	4	Good
5	Top management initiate and monitoring follow up meetings to evaluate the food safety team work .	14	3	0.00	4	Good
6	Documentation and verification of all HACCP processes .	11	3	0.00	4	Good

Source : prepared by researcher

From above table the findings are :

Employees have awareness about HACCP: the test show chi square value of (10.3) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered (good).

Top management have commitment to apply HACCP : the test show chi square value of (12) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered (good).

Food safety training program :the test show chi square value of (12) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered (good).

Workers are following the safety instructions: the test show chi square value of (12) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered (good)

Top management initiate and monitored the follow up meetings: the test show chi square value of (14) with significant value of (0.00) which has

statistical meaning there is significant different in evaluating scale, for those who answered (good).

Documentation of all HACCP processes: the test show chi square value of (11) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered (good).

**(ii)Second dimension :** The impact of HACCP in food safety

Table (4-8) the frequencies and percentages of this dimension :

<b>Statements</b>	<b>Excellent</b>	<b>Very good</b>	<b>Good</b>	<b>Weak</b>	<b>Very weak</b>
perquisite program applied , monitored and documented	<b>5</b>	<b>20</b>	<b>5</b>	<b>0</b>	<b>0</b>
	<b>16.7%</b>	<b>66.6%</b>	<b>16.7%</b>	<b>00</b>	<b>00</b>
hazards analysis and assessment	<b>6</b>	<b>19</b>	<b>5</b>	<b>0</b>	<b>0</b>
	<b>20%</b>	<b>63.3%</b>	<b>16.7%</b>	<b>00</b>	<b>00%</b>
products inspection and sample testing	<b>9</b>	<b>20</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<b>30%</b>	<b>66.7%</b>	<b>3.3%</b>	<b>00%</b>	<b>00%</b>
CCPs are clearly defined and monitored	<b>8</b>	<b>18</b>	<b>4</b>	<b>0</b>	<b>0</b>
	<b>26.6%</b>	<b>60%</b>	<b>13.3%</b>	<b>00%</b>	<b>00%</b>
storage area are complied to storing requirements	<b>6</b>	<b>21</b>	<b>3</b>	<b>0</b>	<b>0</b>
	<b>20%</b>	<b>70%</b>	<b>10%</b>	<b>00%</b>	<b>00%</b>
Corrective actions are clearly defined and documented .	<b>6</b>	<b>20</b>	<b>4</b>	<b>0</b>	<b>0</b>
	<b>20%</b>	<b>66.7%</b>	<b>13.3%</b>	<b>00%</b>	<b>00%</b>
Testing and inspections of raw materials	<b>7</b>	<b>22</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<b>23.4%</b>	<b>73.3%</b>	<b>10.3%</b>	<b>00%</b>	<b>00%</b>
calibration of instruments of measurement	<b>3</b>	<b>21</b>	<b>6</b>	<b>0</b>	<b>0</b>
	<b>10%</b>	<b>70%</b>	<b>20%</b>	<b>00%</b>	<b>00%</b>

Source :prepared by researcher using SPSS

From the table above , the result shows :

Perquisite program are applied monitored and documented: (5)Employees with percentage of (16.7%) answered excellent, (20) Employees with percentage of (66.7% ) answered very good , while (5)employees with percentage of (16.7% ) answered good and (0) Employees with percentage of (00%) answered weak.

Hazards analysis and assessments: (6)Employees with percentage of (20 %) answered excellent, (19) Employees with percentage of (63.3% ) answered very good , while (5)Employees with percentage of (16.7% ) answered good and (0) Employees with percentage of (00%) answered weak

Product inspection and sample testing : (9)Employees with percentage of (30%) answered excellent, (20) Employees with percentage of (66,7% ) answered very good , while (1)employees with percentage of (3.3% ) answered good and (0) Employees with percentage of (00%) answered weak.

CCPs are clearly defined and monitored: (8)Employees with percentage of (26.7%) answered excellent, (18) employees with percentage of (60% ) answered very good , while (4)Employees with percentage of (13.3% ) answered good and (0) Employees with percentage of (00%) answered weak.

Storage area are complied to storing requirements : (6)Employees with percentage of (20%) answered excellent, (21) employees with percentage of (70% ) answered very good , while (3)Employees with percentage of (10% ) answered good ,and (0) Employees with percentage of (00%) answered weak.

Corrective actions are clearly defined: (6)Employees with percentage of (20%) answered excellent, (20) Employees with percentage of (66.7% ) answered very good , while (4)Employees with percentage of (13.3% ) answered good and (0) employees with percentage of (00%) answered weak.

Testing and inspection of raw materials: (7)Employees with percentage of (23.4%) answered excellent, (22) employees with percentage of (73.3% ) answered very good , while (1)employees with percentage of (10.3% ) answered good and (0) Employees with percentage of (00%) answered weak.

Calibration of instruments of measurement: (3)Employees with percentage of (10%) answered excellent, (21) employees with percentage of (70% ) answered very good , while (6)employees with percentage of (20% ) answered good and (0) Employees with percentage of (00) answered weak.

Table (4-9) shows the statistical measurements of this dimension :

No	Statements	Chi square	Degree of freedom	Sig	median	Evaluating scale
1	perquisite program applied , monitored and documented	15	3	0.00	4	very good
2	hazards analysis and assessment	15	3	0.00	4	very good
3	products inspection and sample testing	17	3	0.00	4	very good
4	CCPs are clearly defined and monitored	16	3	0.00	4	very good
5	storage area are complied to storing requirements	15	3	0.00	4	very good
6	corrective actions are clearly defined and documented .	17	3	0.00	4	very good
7	testing and inspections of raw materials	16	3	0.00	4	very good
8	calibration of instruments of measurement	17	3	0.00	4	very good

Source : prepared by researcher

From the above table , results are :

Perquisite program are applied and monitored: the test show chi square value of (15) with significant value of (0.00) which has statistical meaning , there is significant different in evaluating scale, trending for those who answered(very good)

Hazard analysis and assessments : the test show chai square value of (15) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good)

Products inspection and sample teasting : the test show chai square vale of (17) with p-value of (0.00) which has statistical meaning there is significant different in evaluating scale, trending for those who answered(very good)

CCPS are clearly defined and monitored: the test show chai square value of (16) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good)

Storage area are complied to the storing requirements : the test show chi square value of (15) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good)

Corrective actions area clearly defined: the test show chi square value of (17) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good).

Testing and inspection of raw materials : the test show chi square value of (16) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good).

Calibration of instruments of measurements : the test show chi square value of (17) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered (very good).

**(iii)Third dimension:** the impact of HACCP in customer satisfaction

Table (4-10) shows the frequencies and percentages of the evaluation statements for this dimension.

<b>Statements</b>	<b>Excellent</b>	<b>v.good</b>	<b>good</b>	<b>Weak</b>	<b>Very weak</b>
Response to customer complaints	<b>9</b>	<b>17</b>	<b>4</b>	<b>0</b>	<b>0</b>
	<b>30%</b>	<b>56.7%</b>	<b>13.4%</b>	<b>00%</b>	<b>00%</b>
Products components , production and expiratory date are clearly defined	<b>6</b>	<b>18</b>	<b>6</b>	<b>0</b>	<b>0</b>
	<b>20%</b>	<b>60%</b>	<b>20%</b>	<b>00%</b>	<b>00%</b>
Customer requirements are input into products design	<b>3</b>	<b>17</b>	<b>10</b>	<b>0</b>	<b>0</b>
	<b>10%</b>	<b>56.7%</b>	<b>33.3%</b>	<b>00%</b>	<b>00%</b>
Products are identified for intended and unintended use	<b>2</b>	<b>22</b>	<b>6</b>	<b>0</b>	<b>0</b>
	<b>6.7%</b>	<b>73.3%</b>	<b>20</b>	<b>00%</b>	<b>00%</b>
Products Recalling and traceability	<b>7</b>	<b>19</b>	<b>4</b>	<b>0</b>	<b>0</b>
	<b>23.3%</b>	<b>63.3%</b>	<b>13.4%</b>	<b>00%</b>	<b>00%</b>
Increase company profits after implementation of HACCP	<b>10</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<b>33.3%</b>	<b>66.7%</b>	<b>00%</b>	<b>00%</b>	<b>00%</b>

Source: prepared by researcher using SPSS

From above Table ,Result shows:

Response to customer complaints :(9)Employees with percentage of (30%) answered excellent, (17) Employees with percentage of (56.7% ) answered very good , while (6)employees with percentage of (20% ) answered good and (0) employees with percentage of (00%) answered weak

Products components, production and expiratory dates are clearly defined:

(6)Employees with percentage of (20%) answered excellent, (18) employees



with percentage of (60% ) answered very good , while (6)Employees with percentage of (20% ) answered good and (0) employees with percentage of (00%) answered weak.

Customer requirements are input into products design :(3)Employees with percentage of (10%) answered excellent, (17) employees with percentage of (56.7% ) answered very good , while (10)employees with percentage of (33.3% ) answered good and (0) employees with percentage of (00%) answered weak

Products are identified for intended and unintended use :(2)Employees with percentage of (6.7%) answered excellent, (22) employees with percentage of (73.7% ) answered very good , while (6)employees with percentage of (20% ) answered good and (0) employees with percentage of (00%) answered weak.

Products recalling and traceability :(7)Employees with percentage of (23.3%) answered excellent, (19) employees with percentage of (63.7% ) answered very good , while (4)employees with percentage of (13.4% ) answered good and (0) employees with percentage of (00%) answered weak

Increase company profits after implementation of HACCP : (10)employees with percentage of (33.3%) answered excellent, (20) employees with percentage of (66.7% ) answered very good , while (0)employees with percentage of (00% ) answered good and (0) employees with percentage of (00%) answered weak

Table (4-11) shows the statistical measurements for this dimension:

No.	Statement	Chi square	Degree of freedom	sig	Median	Evaluating scale
1	Response to customer complaints	10	1	0.00	4	Very Good
2	Products components , production and expiratory date are clearly defined	12	1	0.00	4	Very Good
3	Customer requirements are input into products design	14	2	0.00	4	Very Good
4	Products are identified for intended and unintended use	12	3	0.00	4	Very Good
5	Products recalling and traceability	14	3	0.00	4	Very Good
6	Increase company profits after implementation of HACCP	11	3	0.00	4	Very Good

Source : prepared by researcher as result of data analysis

Response to customer complaints: the test show chi square value of (10) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good)

Products components, production and expiratory date are clearly defined: the test show chi square value of (12) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good)

Customer requirements are inputs into product design: the test show chi square value of (14) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good)

Products are identified for intended and unintended use : the test show chi square value of (12) with significant value of (0.00) which has statistical

meaning there is significant different in evaluating scale, for those who answered(very good).

Products recalling and traceability: the test show chi square value of (14) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good)

Increase company profit after implementation of HACCP: the test show chi square value of (11) with significant value of (0.00) which has statistical meaning there is significant different in evaluating scale, for those who answered(very good).

## 5-TEST OF HYPOTHESIS:

### (1) There is relation between management commitment and HACCP implementation:

Table (4-12) statistical measurements of first hypothesis

Hypothesis	median	Chi square	Degree of freedom	Sig	Statistically significant
Difficulties in implementation HACCP process	4	23	3	0.00	Yes

Source : prepared by researcher as results of data analysis

From the above table: the chi square value is (23) with significant value of (0.00) which is less than p-value (0.05) that's mean there is difficulties in implementation of HACCP.

### (2)There is Relation between HACCP and food safety:

Table (4-13) statistical measurements of the second hypothesis

Hypothesis	median	Chi square	Degree of freedom	Sig	Statistically significant
HACCP	4	46	3	0.00	Yes
Food safety					

Source: prepared by researcher as result of data analysis

From the above table the chi square value is (46) with significant value of (0.00) which is less than p-value (0.05) that's mean there is Relation between implementation of HACCP and food safety .

### **(3)There is Relation between HACCP and customer satisfactions**

Table (4-14) statistical measurements of the third hypothesis

<b>Hypothesis</b>	<b>median</b>	<b>Chi square</b>	<b>Degree of freedom</b>	<b>Sig</b>	<b>Statistically significant</b>
HACCP	4	24	2	0.00	Yes
Customer satisfaction					

Source: prepared by researcher as result of data analysis

From the above table the chi square value is (24) with significant value of (0.00) which is less than p-value (0.05) that's mean there is Relation between implementation of HACCP and customer satisfaction .

## **6- DISCUSSION:**

Analysis of data showed:

There was great presence of females in quality and marketing fields.

Gender is not significant variables in HACCP implementation process.

80% of Employees were young, their age between 30 and 45 years old, which consider as competitive advantages for the company because Innovation and creativity are generating from this group, and they are low resistant to new change in work environment than those who above 45 years old, age is not a significant variables in HACCP implementation process.

Academic certificates is not a significant variables in HACCP implementation process.

Employees with Different Years of Experiences in one department, the mix between old and new candidates could give a wide board to exchange knowledge and experiences, years of Experiences is significant variables in HACCP implementation process.

**Hypothesis 1** : Analysis shows there is relation between management commitment and HACCP implementation process, and there are some difficulties facing the implementation process, this challenges or buriers are :

- 1- lack of awareness about HACCP in the company
- 2- The training Douse not enough.
- 3- Documentation is the greatest challenges

**Hypothesis 2** :

Analysis shows there is relation between implementation of HACCP and food safety.

**Hypothesis 3** :

Analysis shows there is Relation between implementation of HACCP and customer satisfaction.

# CHAPER FIVE

## CONCLUSION AND RECOMMENDATIONS

### 1- INTRODUCTION:

This chapter examines the results of study, discuss the findings, highlight area of improvement and provide suggestions for future research.

### 2- CONCLUSION:

The solution of the problem statement and the achievement of the purpose of the research have been achieved at through the process of finding relevant literature , collecting and analyzing of data as seen in previous stages of the study, According to that results the findings are :

- 1- Implementing of HACCP have positive role on food safety while it control all internal process from handling raw materials until preparation of final product .
- 2- Also Implementing of HACCP have great role on customer satisfaction.
- 3-some factors act as implementation barriers in HACCP program represented in lacking of HACCP awareness ,insufficient training and careless about documentations .

### **3- RECOMMENDATIONS :**

The findings of the study increase the insight of managers and owners about the effect of HACCP in order to lead their effort to successful implementation.

My recommendations are :

- 1- All employee must know much better about HACCP and its principles for better work environment and product .
- 2- Annual training must be established , so that every one inside company will know the latest update on food management systems .
- 3- More focus on customer complaints help improving products " customer complaints are gifts " .
- 4- Studies in other organization should be conducted to ensure the reliability of results.
- 5- Bench marking project between organizations in same fields can help to develop/improve the internal process .
- 6- Documented information must be kept for all HACCP instructions and corrective actions.

### **4- SUGGESTION OF FUTURE RESARCHES :**

- 1- Difficulties facing HACCP implementation in food business .
- 2- Evaluation the role of perquisite programs in food safety .
- 3- Comprehensive study of HACCP plan, implementation, and follow up .



# REFERENCES :

## Sources

القران الكريم  
الحديث الشريف

## References in English language:

Crosby PB(1979)quality is free,New York:McGraw-HIL

Deming ,W. E.(1986).out of the crisis ,Masschusetts institute of technology .

Goetsch, David L. and Stanley Davis.(1995) Implementing Total Quality.  
Upper Saddle River, N.J.: Prentice-Hall.

Gronroos ,C(1990)service management and marketing .singapore .maxwell  
Macmillan

Juran .J.Met al.(1988) quality control handbook New York:McGraw-HIL

Jum c, nunnally(1975)introductory statistics for psychology and  
education :McGraw-HIL

Kottler, P&Clarke.NJ(1987).marketing for health care  
organization ,NJ:prentice-Hall

Oppenheim, A. (1992). Questionnaire Design, Interviewing and Attitude  
Measurement, London, Pinter. Pp 303.

Pillip allan ,(1990).Dales.Total quality management,London printer .

Sarah mortimore (1994) HACCP –a practical approach, London, printer, UK

## **Scientific researches and studies in English language**

Berlowitz DR, Young GJ, Hickey EC, Mittman BS, Czarnoswski E. Quality improvement implementation in the nursing home. *Health Serv Res.* 2003;38(1 Pt 1): 65–83.

Bas, M., Ersun, A. o., & Kivanç, G. (2006). Implementation of HACCP and prerequisite programs in food businesses in Turkey. *Food Control*, 17(2), 118–126.

Codex Alimentarius (1993). Guidelines for the application of the hazard analysis critical control point system ALINORM 93/131.

Codex Alimentarius Commission (1997). Hazard analysis and critical control point (HACCP) system and guidelines for its application. In *General requirements (food hygiene)*, (2nd ed.). Supplement to vol. 1B (pp. 33–45). FAO/WHO.

Doye T. (1998) HACCP - present status in food safety control. In *Food Safety: the implications of change from producerism to consumerism*.

Hunt, H. Keith. 1977. "CS/D--Overview and Future Research Direction." in *Conceptualization and Measurement of Consumer Satisfaction and Dissatisfaction*. H. Keith Hunt, ed. Cambridge, MA: Marketing Science Institute.

Mortlock M. P., A.C. Peters and C.J. Griffith (1990) Food hygiene and hazard analysis critical control point in the United Kingdom food industry: practices, perceptions and attitudes. *J. Food Protection* 62:786-792.

Lewis MA. Productivity and quality of public hospital medical staff: A dominican-case study. *Int J Health Plan M.*1991; 6(4): 287-308.

Weiner BJ, Alexander JA, Shortell SM, Baker LC, Becker M and Geppert JJ. Quality improvement implementation and hospital performance on quality indicators. *Health Serv Res.* 2006; 41(2):307-34.

## **Journals and scientific papers in English**

Adams, C. (2000). HACCP applications in the food service industry. *Journal of the Association of Food and Drug Officials*, 94(4), 22–25.

Bolton, R. N., & Drew, J. H. (1993, January). A longitudinal analysis of the impact of service changes on customer attitudes. *Journal of Marketing*

Food Safety Authority of Ireland (2001). Survey of the implementation of HACCP and food hygiene training in Irish food businesses.

Giampaoli, J., Sneed, J., Cluskey, M., & Koenig, H. F. *Foodservice journal*(2002)

Eds. J.J. Sheridan., M. O'Keeffe and M. Rogers. Food and Nutrition Press Inc. 189-196.

Roscoe.A.M,lang.D.,J.N(1975) Follow up method questionnaire length .and market differences in mail survey,the journal of marketing.

Sanders .L., &chan , S .(1996)measurements and utilization issues *AIR professtional file*,59(2).

Tse,, David K. and Peter C. Wilton.1988. "Models of Consumer Satisfaction: An Extension,"*Journal of Marketing.Research*, 25 (May): 204-212.

### **Web sites**

Anonymous (1999) Strategies for implementing HACCP in Small and/or less developed businesses. World Health Organisation. Available at <http://www.who.int/fsf>

[https://www.foodsafetyforum.org/global2/documents\\_en.asp](https://www.foodsafetyforum.org/global2/documents_en.asp)accessed24/8/2008

<https://www.iso.org/obp/ui#iso:std:iso22000>.

<https://www.Sustech.edu>

<https://www.uofk.edu>