

INTRODUCTION

Lately a lifestyle change to a steady increase of consumption in all aspects of life, notably the significant increase in food consumption, change in dietary habits, and the trend towards more processed foods instead of eating fresh food. The owner of these increase and change a major development in the food industry.

Due to increased demand for food of a high and safe health quality, it has become necessary to identify the risk of contamination that might be exposed to food, the risk analysis and assessment of the degree of negative impact on food safety, and then determine control actions and prevent for food in various stages of preparation manufacturing and trading.(mohamd nayouf, iso22000)

ISO 22000 is one of ISO family; which is an international standard specifies the requirements for food safety management system (FSMS) that involves the following elements:

- Interactive communication.
- System management.
- Prerequisite programs.
- HACCP principles.

Critical reviews of the above elements have been conducted by many scientists communication along the food chain is essential to ensure that all relevant food safety hazards been identified and adequately controlled at each step within the food chain. This implies communication between organizations both upstream and downstream in the food chain (Wikipedia).

1.1 ISO 22000:

ISO 22000 is a Food Safety Management System that can be applied to any organization in the food chain, farm to fork. Becoming certified to ISO 22000 allows a company to show their customers that they have a food safety management system in place.

ISO 22000 integrate the principles of the Hazard Analysis and Critical Control Point (HACCP) system and application steps developed by the Codex Alimentarius Commission. By means of auditable requirements, it combines the

HACCP plan with prerequisite programmes. Hazard analysis is the key to an effective food safety management system, since conducting a hazard analysis assists in organizing the knowledge required to establish an effective combination of control measures. ISO 22000 requires that all hazards that may be reasonably expected to occur in the food chain, including hazards that may be associated with the type of process and facilities used, are identified and assessed. Thus it provides the means to determine and document why certain identified hazards need to be controlled by a particular organization and why others need not. (Wikipedia)

1.2 Benefits of ISO 22000

- Embed and improve the internal processes needed to provide consistently safe food
- Provide confidence to the organization and the management team that the organization's practices and procedures are in place and that they are effective and robust
- Provide confidence to customers and other stakeholders (through the ISO 22000 certification process) that the organization has the ability to control food safety hazards and provide safe products
- Provide a means of continual improvement that ensures that the food safety management system is reviewed and updated so that all activities related to food safety are continually optimized and effective
- Ensure adequate control at all stages of the food supply chain to prevent the introduction of food safety hazards. (Mark Ames-2009).

1.3 Statement of the problem

Implementing food safety management system (ISO 22000) has wide benefits on organizations and customers, so problem of this research is measuring the role of implementation of ISO 22000 on organization.

1.4 Importance of the research:

The importance of this research is that it:

- Know the extent of the company practice of this concept, and to obtain data showing the extent of the company's eagerness to go about food safety management system and the impact of this trend on the company performance.
- This study will help companies that seeking to embrace the principle of food safety management system in the ways and methods used in this study to develop and improve its image, and win the other companies respect.
- Can help the researchers who want to take benefit of this study in several aspects, to get more data to identify the nature of the study and the method used.

1.5 Research Objectives:

The research aims to achieve the following:

1. To provides a framework for management commitment, communication with suppliers and customers, and continuous improvement of the food safety system.
2. To recognize and harmonize standard for controlling food safety hazards.
3. To demonstrates an organization's commitment to food safety.

1.6 Research Hypotheses:

1. There is no role of ISO 22000 on the management system.
2. There is no role of Standard on workers.
3. There is no role of standard on the production process.
4. There is no role of the standard on product quality.
5. There is no role of standard on internal and external environment.

CHAPTER ONE

LITERATURE REVIEW

2.1 ISO IN GENERAL

History of ISO:

ISO (International Organization for Standardization) is an independent, non-governmental membership organization and the world's largest developer of voluntary International Standards.

It made up of 162 member countries that are the national standards bodies around the world, with a Central Secretariat that been based in Geneva, Switzerland.(www.iso.org).

What are standards?

International Standards make things work. They give excellent specifications for products, services and systems, to ensure quality, safety and efficiency. They are instrumental in facilitating international trade.

ISO has published more than 21000 International Standards covering almost every industry, from technology, to food safety, to agriculture and healthcare. ISO International Standards affect everyone, everywhere (www.iso.org).

ISO story:

The ISO story began in 1946 when delegates from 25 countries met at the Institute of Civil Engineers in London and decided to create a new international organization 'to facilitate the international coordination and unification of industrial standards'. In February 1947 the new organization, ISO, officially began operations (José Alcorta, 2015).

Since then, it has published over 19500 International Standards covering almost all aspects of technology and manufacturing.

Today it has members from 161 countries and 3368 technical bodies to take care of standard development. More than 150 people work full time for ISO's Central Secretariat in Geneva, Switzerland (www.iso.org).

History of ISO 9000:

- **1987 version:**

ISO 9000:1987 had the same structure as the UK Standard BS 5750.

ISO 9000:1987 was also influenced by existing U.S. and other Defense Standards "MIL SPECS", and so was well suited to manufacturing. The emphasis was placed on procedures rather than the overall process of management.

- **1994 version:**

ISO 9000:1994 emphasized quality assurance via preventative actions, instead of just checking final product, and continued to require evidence of compliance with documented procedures. That could lead to many paper and procedure manuals. There were three standards as in 1987: 9001, 9002 and 9003.

- **2000 version:**

“The text of the international Standard ISO 9001:2000 has been prepared by Technical Committee ISO/TC176. The transportation into a European Standard has been managed by the CEN Management Centre (CMC) with assistance of CEN/BT WG 107.”

The three quality assurance requirement standards ISO 9001:1994, ISO 9002:1994, and ISO 9003:1994 are replaced by a single quality management system requirement standard: **ISO 9001:2000**.

Design and does in fact engage in the creation of new products.

“Process management” was the monitoring and optimizing of a company's tasks and activities, instead of just inspecting the final product. The 2000 version also demands involvement by upper executives, in order to integrate quality into the business system and avoid delegation of quality functions to junior administrators. Another goal is to improve effectiveness via process performance metrics numerical measurement of the effectiveness of tasks and activities. Expectations of continual process improvement and tracking customer satisfaction were made explicit.

2.2 FOOD SAFETY

In parallel with improvements in the scientific basis of food microbiology, developments have also been made in the more prosaic business of ensuring that this knowledge is applied in a systematic way in order to be certain that foods are produced, processed and served with the minimum risk of causing illness.

With the advent of microbiology as an experimental scientific discipline, the possibility of testing foods to see if they contained pathogens or other organisms of concern became a possible means for controlling quality. This approach persists to this day although it now plays more of a complementary role to other management schemes since its limitations are widely recognized. The distribution of organisms in solid foods means that truly representative samples for testing were not easily obtained - the only way to increase confidence in a test result is to take an unfeasibly large proportion of the lot for testing. Hence, with any realistic sampling scheme there is an appreciable chance that acceptable product will be rejected or that unacceptable product will be accepted. A further drawback is that results from failing samples do not necessarily indicate where in the production process a problem arose. Therefore, in the absence of any remedial information similar failures in the future cannot be prevented. Thus, it became recognized that application of good practices during the manufacture or production of food was a more effective way of controlling quality.

Introduction to Food Microbiology 15 Bacteriologists are better employed in devising means to prevent or overcome contamination than in examining more and more samples, control of processing is of far greater importance than examination of the finished article. (Wilson 1970).

The introduction of Good Manufacturing Practices (GMP) provided a framework for the hygienic production of food rather than retrospectively identifying problems by accepting or rejecting batches based on microbiological testing.

Codes of GMP have been produced by a range of bodies such as the Codex Alimentarius Commission and a number of trade associations. These cover aspects such as plant layout and design and the control of operating procedures. Their principal limitation lies in their broad-brush coverage, which means that they tend

to be general in scope and qualitative in terms of the advice provided. This failing was recognized quite early on and led to the development of more systematic approaches based on an analysis of individual processing operations to identify which important steps were critical to the control of microbial hazards and ensuring that control was exercised and monitored at these points. (DA-WEN SUN, 2012)

Hazard Analysis and Critical Control Point (HACCP) scheme, as it came to be known, was subject to considerable development following its inception in the 1960s when it was developed by the Pillsbury Corporation to assure the safety of foods used in the United States' space program. Its format and principles is now the subject of internationally recognized agreement and it forms the basis of food hygiene regulations throughout the world.

Microbiological Risk Analysis has been described as the third wave of food safety following GMP and HACCP. It comprises three interrelated activities:

- ❖ Risk Assessment
- ❖ Risk Communication
- ❖ Risk Management

Microbiological Risk Assessment (MRA) is the scientific part and has as its objective the provision of a formal, validated and transparent estimate of the level of risks, which can be communicated to policy- and decision makers to inform Risk Management and Risk Communication. The impetus for internationally agreed risk assessment procedures came initially from world trade talks in the 1990s, where it was recognized that to prevent food safety being used as a nontariff barrier to international trade in foods, decisions regarding any risk that they might pose should be based on sound, transparent and agreed procedures for the assessments of risk.

Microbiological risk assessment consists of four stages:

- ❖ Hazard identification - the identification of pathogens, which may be present in a particular food.
- ❖ Hazard characterization - a qualitative/quantitative evaluation of the adverse effects of a pathogen including if possible the relationship between pathogen dose and effect (dose/response).

- ❖ Exposure assessment - an estimate of the likely intake of the particular pathogen based on food consumption patterns and incidence of the pathogen.
- ❖ Risk characterization - a qualitative/quantitative estimate (including its attendant uncertainties) of the probability and consequences of illness caused by the pathogen.

A number of risk assessments have been produced (see, for example WHO/FAO 2005, 2006) and these can be used to inform policy decisions and in the assessment of alternative control measures. Ultimately, an MRA should contribute to establishing an agreed Food Safety Objective – a statement of the maximum frequency of occurrence or level of a pathogen in a food considered acceptable for consumer protection – something that should be deliverable through the application of good hygiene practices and HACCP.(Notermans and Barendsz 2002).

2.3 HACCP

Introduction to HACCP

Food safety in the early twenty-first century is an international challenge requiring close cooperation between countries in agreeing standards and in setting up transnational surveillance systems. The lessons of the past two decades are plain to those engaged in the food industry. No longer can farmers grow just what they want or use technical aids to farming without taking into account the effect on the quality of the food produced (Rooney and Wall, 2003). The behavior of European consumers has been gradually changing.

They currently require not only much higher dietary quality, hygiene and health standards in the products they purchase, but they also look for certification and reassurance of products' origins (national or geographical) and production methods. This heightened consumer awareness is reflected in the demand for products endowed with individual characteristics due to specific production methods, composition or origin (national or geographic; Anon, 2004).

No matter how professional and effective a company may be, there is always the possibility of a serious problem arising which is unforeseen or eventually develops into a major crisis. However, thinking through the possible ramifications of such an eventuality and preparing responses and scenarios to deal with it, always ensures that an organization is better prepared for the unexpected (Doeg,

1995). The HACCP system is a science-based system created to identify specific hazards and actions to control them in order to ensure food safety and quality. It can be considered an efficient tool for both the food industry and health authorities in preventing foodborne diseases (Vela and Fernandez, 2003). A 'hazard' is 'a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect' (Codex Alimentarius, 1997). A HACCP system should be developed for every food production line and adapted for the individual products and processes (da Cruz et al., 2006). HACCP systems have become mandatory for food industry in the European Union (European Community Directive, 1993).

Food complaints fall into seven broad categories within which there are a number of possible subcategories:

1. A complaint from a consumer:

Food complaints fall into four broad categories:

- (i) Foreign objects found in food or food not meeting the consumers' expectations.
- (ii) Poor food premises conditions.
- (iii) Poor food handling practices.
- (iv) Alleged cases of food poisoning.

2. A complaint from the regulatory authorities:

- (a) Often instigated by a complaint from consumers and falling into the same broad sub-categories as given above.
- (b) As a result of routine monitoring and premise visits.
- (c) As a result of investigations into events such as outbreaks of 'food poisoning'.

3. A phone call from the police for example, warning of:

- (i) An incidence of food poisoning in the area.
- (ii) Detection of 'food fraud'.
- (iii) Malicious action or intended action against the company or its products.

4. A threatening message direct to the company as per 3 (iii) above HACCP and ISO 22000 – Application to Foods of Animal Origin.
5. An enquiry from the media.
6. The knock-on effect of a problem in another country.
7. An industry issue, such as the use of an ingredient (Doeg, 1995).

To be effective, a food safety management system (FSMS) as exemplified by HACCP and mandatory under 2001/471/EC requires monitoring and control (of critical limits) of those process stages deemed critical to food safety. These process stages, identified as critical control points (CCPs), should be monitored and all non-compliances immediately corrected by removing the offending material, by re-skilling staff and by rectifying identified process or equipment faults (Ryan, 2007). HACCP procedures should be documented at all times. Record keeping is essential for providing documentation to the HACCP system and to verify the proper functioning of the system. Documentation and record keeping examples are given in Codex Alimentarius (2001).

Consumer awareness of the benefits that the HACCP approach provides is absolutely essential for effective implementation of HACCP programs.

What should be avoided is a consumer's misconception that HACCP represents only an extension of industry self-certification programs without food authority control over the process (Kvenberg, 1998). HACCP systems are often seen as unnecessary, burdensome and bureaucratic in the food industry. They are often ineffective because the premise of the system is not emphasized. HACCP was intended to be 'a minimalist system that ensures maximum control'. It is important that employees understand its many benefits, including reduced waste and downtime. The system can become overly complicated due to a lack of internal knowledge of microbiological and toxicological issues, forcing those involved to seek advice from outside sources (Mortimore, 2003). A study revealed that in companies with less than 50 employees, HACCP implementation decreased proportionally as the number of employee has decreased (Panisello et al., 1999).

An analysis of the barriers to HACCP implementation which include availability of appropriate training in HACCP methodology, access to technical expertise and the required resources (infrastructure and personnel) is available.

The burden that these places on the small business are documentation, validation and verification (Taylor, 2001).

History of HACCP

The acronym HACCP is one that evokes ‘food safety’. Originally developed to ensure microbiological safety of foodstuffs, HACCP has been broadened to include chemical and physical hazards in foods.

The recent growing worldwide concern about food safety amongst public health authorities, consumers and other concerned parties, fuelled by the continuous reports of foodborne ‘disease’ outbreaks have been a major impetus in the introduction and widespread application of the HACCP.

HACCP is merely a tool and is not designed to be a stand-alone program.

To be effective, other tools should include adherence to good manufacturing practices (GMPs), use of standard sanitation operating procedures and personal hygiene programs (Rushing and Ward, 1999).

The HACCP system for managing food safety concerns grew from two major developments. The first breakthrough was associated with W.E. Deming, whose theories of quality management are widely regarded as a major factor in turning around the quality of Japanese products in the 1950s. Dr. Deming and others developed Total Quality Management (TQM) systems, which emphasized a total systems approach to manufacturing that could improve quality while lowering costs (FAO, 1998). The second breakthrough was the HACCP proposal by the Pillsbury Company, NASA and the US Army laboratories. This was based on the failure, mode and effect analysis (FMEA) as used by engineers in construction designs.

The HACCP concept was introduced in the United States in 1971 at the Conference of Food Protection where it was ‘recommended for widespread use’.

The call for change was galvanized in the early 1990s with a tragic outbreak of *Escherichia coli* O157:H7 foodborne illness in the Northwest of the United States. Four children died and hundreds of people were taken ill in this outbreak, which resulted from the consumption of undercooked, contaminated ground beef. Food Safety and Inspection Services (FSIS) developed the regulatory proposal that became the Pathogen Reduction/HACCP Systems Rule (published as a final rule in

1996; Hulebak and Schlosser, 2002). Subsequently, as a means of safe food production, HACCP principles were adopted worldwide as given in Codex Alimentarius Commission (1997) and the National Advisory Committee on Microbiological Criteria for Foods (NACMCF, 1992).

HACCP became a mandatory program for approximately 4000 seafood processors in December 1997 and for foreign processors that ship seafood to the United States (FDA, 2001). The following month, in January 1998, the USDA's Food Safety and Inspection Service (FSIS) began implementing HACCP in the meat and poultry industry.(HACCP and ISO 22000;Application to Foods of Animal Origin- Ioannis S. Arvanitoyannis 2009).



Fig. (2.1): The seven principles of HACCP program

Source: <http://www.iso.org>

2.4 ISO 22000

Introduction to ISO 22000

ISO 22000 is the new international generic FSMS standard for food safety management systems. It defines a set of general food safety requirements that apply to all organizations in the food chain.

Recognized worldwide, this universal standard harmonizes key requirements and overcomes the difficulties of various food safety standards by region, country, activity, organization and food-type. If an organization is part of the food chain, ISO 22000 requires the establishment of a food safety management system (FSMS) and usage of this system to ensure that food products do not cause adverse human health effects.

The requirements of ISO 22000 can be applied to all types of organizations within the food chain ranging from feed producers, primary producers, food manufacturers, transport and storage operators, subcontractors to retail and food service outlets, together with inter-related organizations such as producers of equipment, packaging materials, cleaning agents, additives and ingredients.

Organizations are cognizant of the need to demonstrate and provide evidence of their ability to provide safe food. ISO 22000 will help these organizations to establish an FSMS and implement it in the food plant with proper improvement and update of the FSMS system. This standard promotes conformity of products and services to international standards by providing assurance about quality, safety and reliability.

The ISO 22000 standard intends to define the food safety management requirements that companies need to meet and exceed in order to comply with food safety regulations all over the world. It is intended to be one standard that encompasses the entire consumer and market needs. It speeds and simplifies processes without compromising other quality or safety management systems.

ISO 22000 uses generally recognized methods of food safety management such as interactive communication across the food chain, system management, control of food safety hazards through PRPs and HACCP plans, and continual improvement as well as periodic updating of the management system. Furthermore, the requirement of Emergency preparedness and response plan of ISO 22000 is also a basic requirement of ISO 14001 that is the worldwide Environmental Management System (EMS; Culley, 1998). This standard has many elements in common with ISO 9001, it has its roots in BS 7750 (Quality Standard), and it is related to Eco-Management and Audit Regulation (EMAR). One of the strengths of ISO 14001 is that it is not a performance standard.

It does not specify how the requirements of any section should be satisfied, nor does it specify levels of environmental performance that an organization should achieve (Ritchie and Hayes, 1998).

The standard has become necessary because of the significant increase of illnesses caused by infected food in both developed and developing countries. In addition to the health hazards, food borne illnesses can give rise to considerable economic costs including medical treatment, absence from work, insurance payments and legal compensation. As a result, a number of countries have developed national standards for the supply of safe food and individual companies and groupings in the food sector have developed their own standards or programs for auditing their suppliers.

While ISO 22000 can be implemented on its own, it is designed to be fully compatible with ISO 9001:2000.

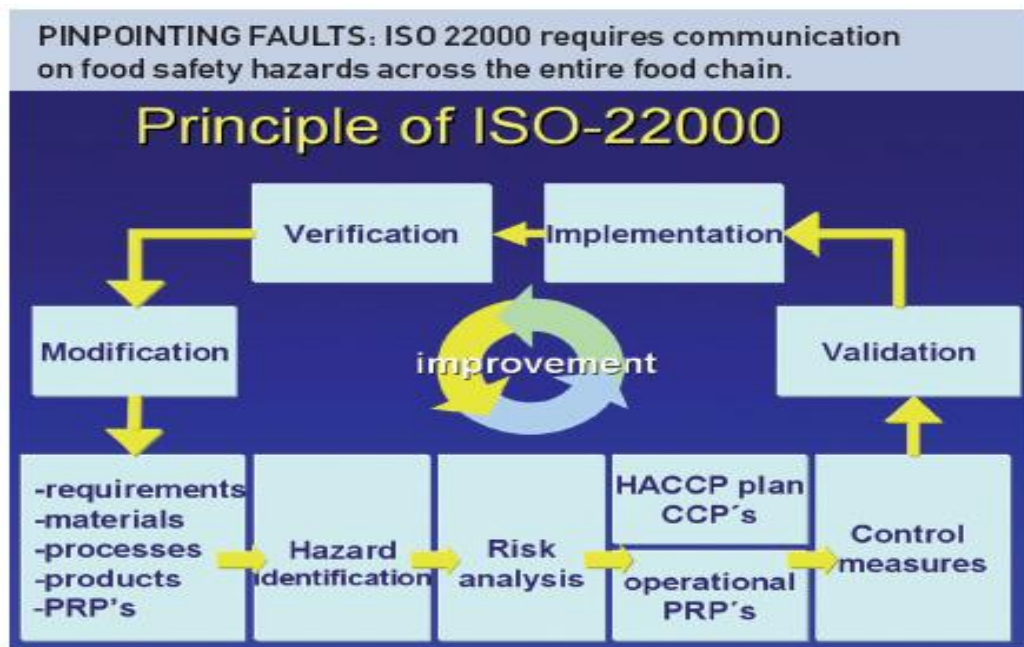


Fig. (2.2): The nine principles of ISO 22000

Source: <http://www.iso.org>

2.5 Previous Studies:

Study No.1 “A survey on food safety management systems implementation”

Authors: Igor Tomaševića, Nada Šmigića, IlijaĐekića, VladeZarićb, Nikola Tomića, Andreja Rajkovića, 2013.

Abstract

This paper reports incentives, costs, difficulties and benefits of food safety management systems implementation in the Serbian meat industry.

The survey involved 77 producers out of which 93.5% claimed that they had a fully operational and certified HACCP system in place, while 6.5% implemented HACCP, but they had no third party certification. ISO 22000 was implemented and certified in 9.1% of the companies, while only 1.3% had implemented and certified IFS standard. The most important incentive for implementing food safety management systems for Serbian meat producers was to increase and improve safety and quality of meat products. Investment in the new equipment, civil work in the plant including redesign of production facilities were the costs related to the initial set-up with the greatest importance.

The results indicated that the major difficulty encountered during HACCP implementation and operation was associated with the finance, namely the fact that companies were not able to recoup costs related to the implementation/operation of HACCP system. The most important identified benefit was increased safety of food products with mean rank scores 6.45. The increased quality of food products and working discipline of staff employed in food processing were also found as important benefits of implementing/operating HACCP in Serbian meat industry. The study shows that the level of HACCP, as standalone food safety system or incorporated in part to ISO 22000, implementation is high and its benefits to the meat industry in Serbia are widespread and significant.

Study No.2 “Implementation of Quality Systems by Mexican Exporters of Processed Meat”

Authors: Maldonado-Siman, E.1; Bernal-Alcántara, R.1; Cadena-Meneses, J. A.1; Altamirano-Cárdenas, J. R.2; Martínez-Hernández, P. A.1, 2014.

Abstract:

Requirements of hazard analysis and critical control points (HACCP) are becoming essential for international trade in food commodities as a safety assurance component. This research reports the level of the adoption of ISO 9000 and the HACCP system by Federal Inspection Type (TIF) pork-exporting enterprises. Implementation and operating costs are reported as well as the benefits involved in this food industry process.

In Mexico, there are 97 companies classified as TIF enterprises, and 22 are registered as exporters of processed pork with the National Services for Safety and Quality and Animal Health of the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food. Surveys were administered to 22 companies, with a 95.2% response rate. Enterprise characteristics were evaluated, as well as their operating activities. Fieldwork consisted of administering structured questionnaires to TIF exporters. All the surveyed enterprises had implemented HACCP, whereas the ISO 9000 regulation was applied in only 30%. Of total production, 75% is exported to 13 countries, and 25% goes to the Mexican market niche.

Results indicate that the main factors for adopting HACCP are related to accessibility to international markets, improving quality, and reducing product quality audits by customers. The results also indicated that staff training was the most important issue. Microbiological testing was the highest cost of the operation. The main benefits reported were related to better access to international markets and a considerable reduction in microbial counts. This study shows the willingness of Mexican pork processors to implement food safety protocols for producing safe and quality products to compete in the international food trade.

Study No.3 “Comparison of implementing HACCP systems of exporter Mexican and Chinese meat enterprises”

Authors: Ema Maldonado-Simana, Li Baib, Rodolfo Ramírez-Valverde, Shunlong Gong, Raymundo Rodríguez-de Lara, 2014.

Abstract

International trade scrutinises food safety practices and procedures, and food businesses have to review their safety procedures more rigorously. HACCP is increasingly relied on to ensure food safety in both meat-producing and meat-processing enterprises.

The objective of this study was to compare incentives, costs, difficulties and benefits of Chinese and Mexican meat-exporting enterprises related to food safety management systems implementation. A questionnaire was applied to identify the main factors involved in HACCP implementation. Data were collected among 32 Chinese and 42 Mexican companies, and analysed using the SAS package. The implementation of the HACCP system was filled out in all exporting meat industries.

The results indicated that the major incentives were related to improving product quality for both countries, whilst improving control of the process was the first motivation in the Chinese industry and access to new foreign markets was the first motivation in the Mexican one. In addition, both countries' industries reported that staff training was the most important implementing cost, while product testing was the major operating cost. The difficulties found during HACCP implementation and operation activities were associated with availability of personnel for other tasks for China and costs of certification for Mexico. The reported benefits were relevant for the two countries, due to the ability to reduce microbial counts and increased access to foreign and domestic markets. A better understanding of the costs and benefits associated with HACCP systems could be helpful and is necessary in every segment of the food chain in every sector of domestic and international markets in order to assure food quality and safety.

Study No.4 “Reasons and constraints to implementing an ISO 22000 food safety management system: Evidence from Spain”

Authors: Carmen Escanciano, María Leticia Santos-Vijande, 2013.

Abstract

This study attempts to fill a gap in the literature on food safety management systems (FSMS) by providing quantitative empirical evidence about the reasons for implementing a FSMS based on ISO 22000, as well as by analyzing the main constraints that may prevent the adoption of the standard in the food industry. The survey is based on a sample of 189 Spanish firms with ISO 22000 certification distributed at all levels of the food chain. The future of this standard is then discussed in the light of the views expressed by its users.

The results constitute information of interest for consultants and for the ISO itself now that the time to review this family of standards is approaching. The profile of the ISO 22000 certified company in Spain is an SME food producer with a presence in foreign markets, and with two or more management systems implemented. While there exist external pressures that lead companies to adopt a FSMS based on ISO 22000, the reasons that are most determinant in this decision are internal in nature, specifically the desire to improve efficiency, productivity and quality. Results also identify three major constraints limiting the dissemination and use of ISO 22000: it is not a well-known standard, many food companies are unaware of its potential and they also perceive high costs associated to the adoption.

CHAPTER TWO

MATERIALS AND METHODS

This chapter contains description of and methods followed by the researcher for determining the study population and sample, the study tool, the verification steps of the accuracy and stability of the search tool, also a description of the study design and statistical methods that used in data analysis.

3.1 Study methodology:

This study based on theoretical background of methodology and the quantitative design using a hypothesis testing approach.

3.2 Study population:

The study population consisted of a sample of meat factory employees.

3.3 Study sample:

The study sample consisted of (40) questionnaires from a meat factory employees, were selected as the stratified random method. The tables on the next chapter show the distribution of the sample according to the variables.

3.4 Study tool:

The researcher has developed a study tool to become a tool for data collection in this study, and that a review of previous literature on the subject of the role of implementation ISO 22000 on performance of meat production. The study tool include on the three main parts are:

The first: deals with the general demographic information about the respondent on the questionnaire.

The second: was devoted to know the role of implementation ISO 22000 on performance of meat production from an employee perspective has included study tool is sufficient to cover all the paragraphs of the object of study.

The third: The researcher used the Likert scale, which calculates the weights of those paragraphs as follows:

Grade (5) as a weight for each answer "Totally agree"

Grade (4) as a weight for each answer "agree"

Grade (3) as a weight for each answer "some to extent"

Grade (2) as a weight for each answer "Disagree"

Grade (1) as a weight for each answer "Totally disagree"

3.5 Study procedures:

I have been conducting this study, according to the following steps:

1. Preparation of the study measurements of the final image.
2. Identify the study sample.
3. Distribute the study tool on the study sample, and retrieval, where distributed (40) questionnaires, have been retrieved (40), which formed the study sample.
4. Enter the data into the computer and processed statistically using the Statistical Package for Social Sciences (SPSS).
5. Extracting, analyzing and discussing the results.

3.6 Statistical Analysis:

To get results as accurate as possible, has been used SPSS statistical software, also Chi-square test for the significance of differences between the answers.

CHAPTER THREE

RESULTS

In This chapter analysis and results, analysis from primary data (questionnaires) will be shown and results will be interpreted.

4.1 Descriptive of the Variables Study

Table 4.1: The sample distribution by gender variable

| Gender | Frequency | Percentage |
|--------|-----------|------------|
| Male | 27 | 67.5% |
| Female | 13 | 32.5% |
| Total | 40 | 100% |

Source: prepared by researcher, using SPSS, 2016

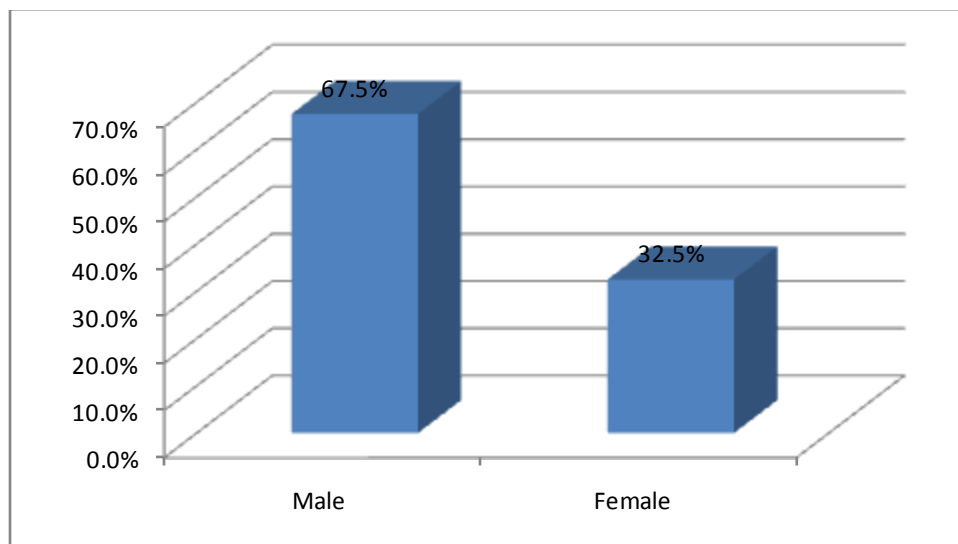


Fig (4.1): percentage of male and female

Table (4.1) and Fig (4.1) shows that 67.5% of the samples are male and 32.5% are female.

Table 4.2: The sample distribution by age variable.

| Age group | Frequency | Percentage |
|-------------|-----------|------------|
| 25 and less | 6 | 15% |
| 25 – 40 | 30 | 75% |
| 41 and more | 4 | 10% |
| Total | 40 | 100% |

Source: prepared by researcher, using SPSS, 2016

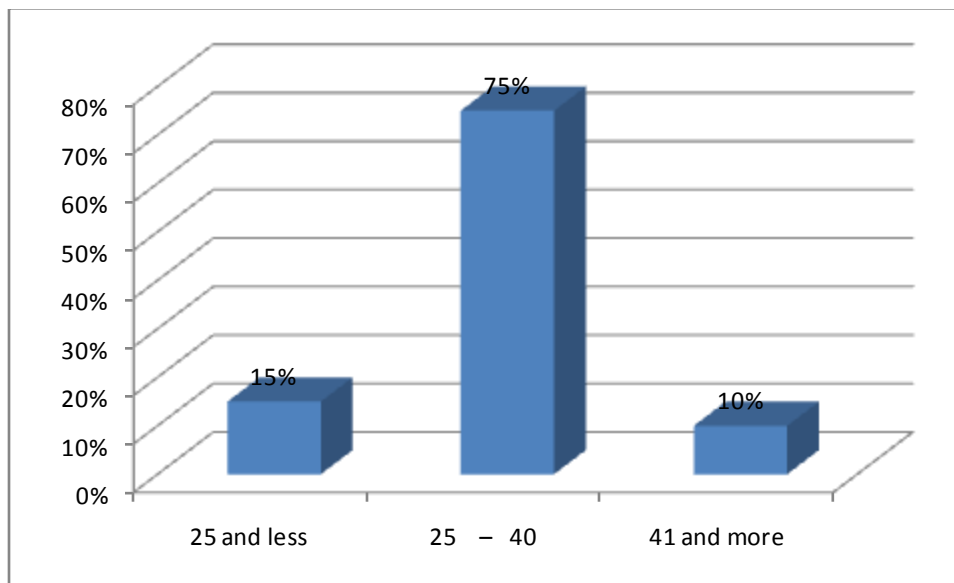


Fig (4.2): percentage of age

Table (4.2) and Fig (4.2) shows that 75% of the employees their ages between (25–40), 15% less than (25), and 10% more than (41).

Table 4.3: The sample distribution by qualification variable

| Qualification | Frequency | Percentage |
|------------------|-----------|------------|
| Diploma and less | 12 | 30% |
| Bachelor | 22 | 55% |
| Post graduate | 6 | 15% |
| Total | 40 | 100% |

Source: prepared by researcher, using SPSS, 2016

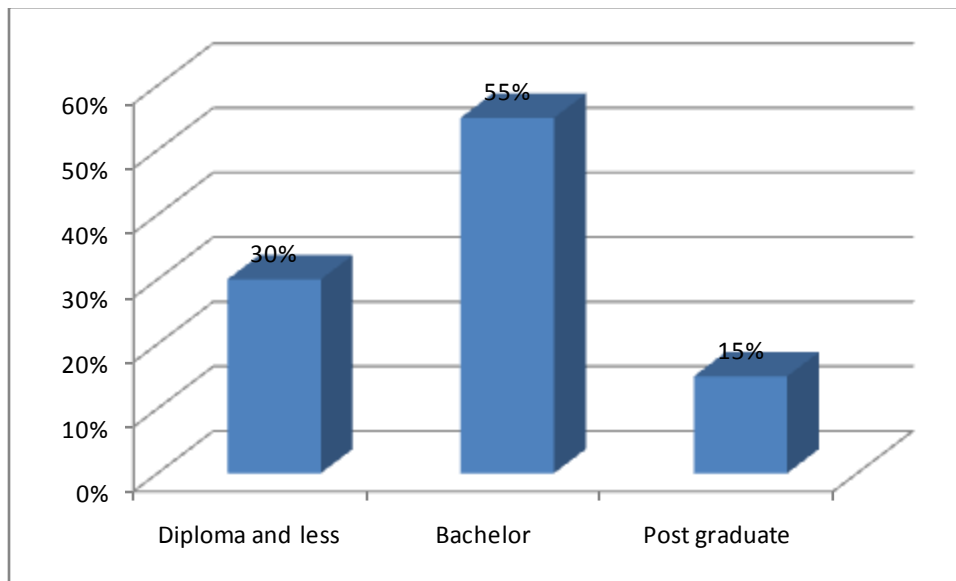


Fig (4.3): percentage of educational level

Table (4.3) and Fig (4.3) shows that 55% Bachelor degree holders, 30% Diploma and less, 15% Post graduate degree.

Table 4.4: The sample distribution by job level variable

| Job | Frequency | Percentage |
|------------|-----------|------------|
| Manager | 12 | 30% |
| Supervisor | 4 | 10% |
| Employee | 15 | 37.5% |
| Worker | 9 | 22.5% |
| Total | 40 | 100% |

Source: prepared by researcher, using SPSS, 2016

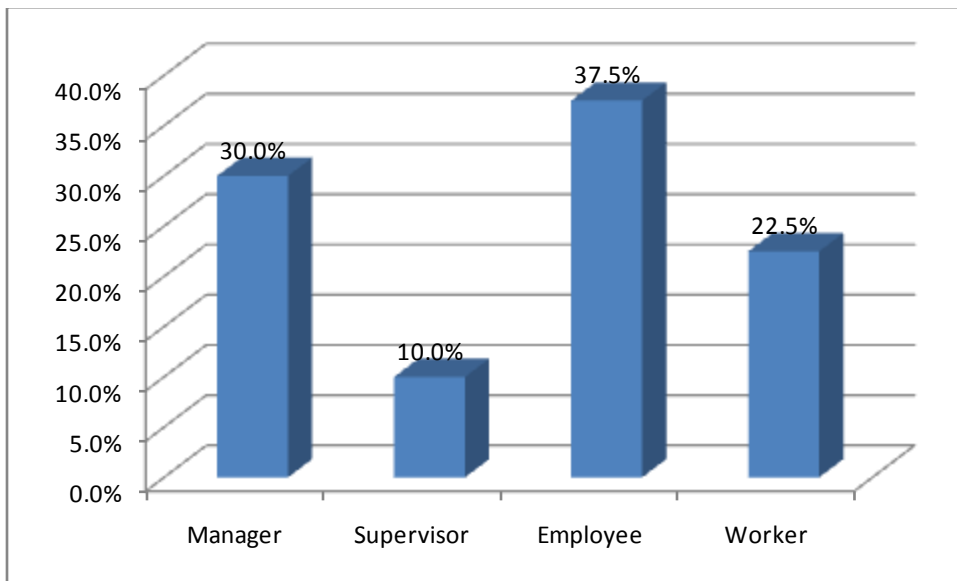


Fig (4.4): percentage of job level

Table (4.4) and Fig (4.4) shows that 37.5% of the Employees' category, 30% Managers, 22.5% of the workers' category, and 10% Supervisors.

Table 4.5: The sample distribution by years of experience variable

| Experience | Frequency | Percentage |
|-------------------|-----------|------------|
| 5 years and less | 23 | 57.5% |
| 5 – 10 years | 9 | 22.5% |
| 11 years and more | 8 | 20% |
| Total | 40 | 100% |

Source: prepared by researcher, using SPSS, 2016

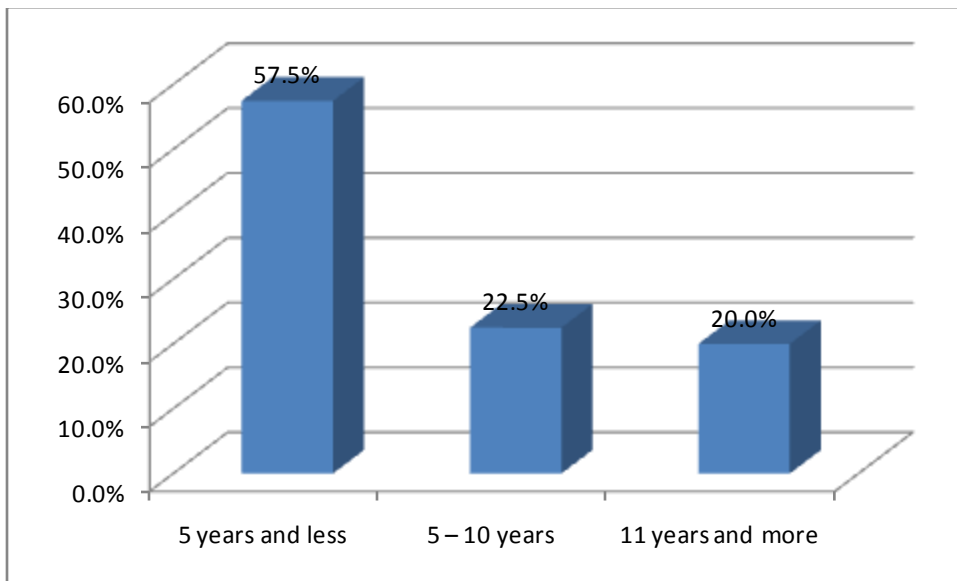


Fig (4.5): percentage of experience of employee

Table (4.5) and Fig (4.5) shows that 57.5% of the employee they have 5 years and less of experience in work, 22.5% of the employee they have between 5 to 10 years of experience, and 20% have 11 years and more of experience in work.

Table 4.6: The sample distribution by awareness of ISO 22000 variable

| Aware | Frequency | Percentage |
|----------------|-----------|-------------|
| Aware strongly | 5 | 12.5% |
| Aware | 21 | 52.5% |
| To some extent | 14 | 35% |
| Total | 40 | 100% |

Source: prepared by researcher, using SPSS, 2016

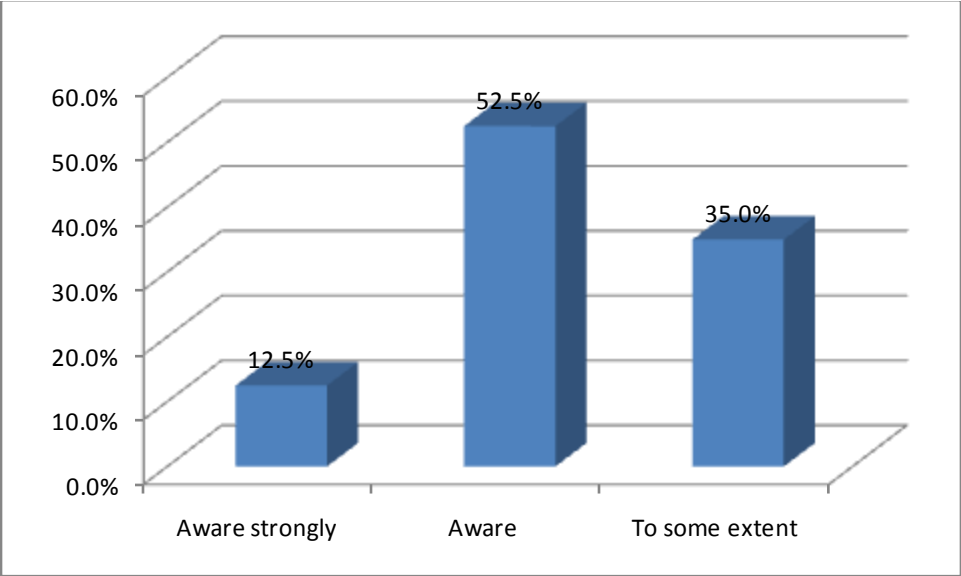


Fig (4.6): percentage of awareness of ISO 22000

Table (4.6) and Fig (4.6) show that 52.5% of employees are aware of ISO 22000, 12.5% are aware strongly, and 35% are aware to some extent of ISO 22000.

4.4 Test hypothesis:

- **Discussion the first hypothesis**
" The role of ISO 22000 on the management system "

Table (4.7): Frequency distribution of the first hypothesis phrases Answers:

| No | Phrases | Frequency and percentages% | | | | |
|----|---|----------------------------|-------------|----------------|-----------|------------------|
| | | Totally agree | Agree | To Some extent | Disagree | Totally disagree |
| 1 | Top management support application of ISO 22000 | 26 65% | 9 22.5% | 5 12.5% | 0 0.0% | 0 0.0% |
| 2 | The application of international standards, such as food safety specification supports Enterprise Manager and works on continuous improvement | 29 72.5% | 11 27.5% | 0 0.0% | 0 0.0% | 0 0.0% |
| 3 | Senior management encourage thoughts, suggestions and ideas | 19 47.5% | 14 35% | 7 17.5% | 0 0.0% | 0 0.0% |
| 4 | Management reviews the food safety system periodically | 17 42.5% | 15 37.5% | 8 20% | 0 0.0% | 0 0.0% |
| 5 | It is published food safety policy within the organization | 19 47.5% | 9 22.5% | 9 22.5% | 3 7.5% | 0 0.0% |
| 6 | Administration works to improve the food safety system through internal and external audits | 17 42.5% | 11 27.5% | 12 30% | 0 0.0% | 0 0.0% |
| 7 | The management reconnaissance customer opinion | 18 45% | 11 27.5% | 9 22.5% | 2 5% | 0 0.0% |
| 8 | Fulfilling requirements of the standard means increased costs to the enterprise | 12 30% | 5 12.5% | 13 32.5% | 6 15% | 4 10% |
| 9 | Application of standard returns profits to the Foundation | 18 45% | 16 40% | 2 5% | 0 0.0% | 4 10% |

| | | | | | | |
|----|---|-------------|------------|----------|-----------|-----------|
| 10 | Management embrace the concept of continuous improvement | 21 52.5% | 9 22.5% | 6 15% | 4 10% | 0 0.0% |
| 11 | Application of standard leads to strengthen the relationship with suppliers and beneficial owners | 17 42.5% | 14 35% | 8 20% | 1 2.5% | 0 0.0% |

Source: prepared by researcher, using SPSS, 2016

Table (4.7) show that the highest percentage of answers of questions ranging between (**Totally agree** and **Agree**).

Table (4.8): Chi-square test results

| No. | Phrases | Chi-square value | P-value | Median | Trend |
|-----|---|------------------|---------|--------|---------------|
| 1 | Top management support application of ISO 22000 | 18.65 | 0.000 | 5 | Totally agree |
| 2 | The application of international standards, such as food safety specification supports Enterprise Manager and works on continuous improvement | 8.10 | 0.004 | 5 | Totally agree |
| 3 | Senior management encourage thoughts, suggestions and ideas | 5.45 | 0.066 | - | - |
| 4 | Management reviews the food safety system periodically | 3.35 | 0.187 | - | - |
| 5 | It is published food safety policy within the organization | 13.20 | 0.004 | 4 | Agree |
| 6 | Administration works to improve the food safety system through internal and external audits | 1.55 | 0.461 | - | - |
| 7 | The management reconnaissance customer opinion | 13.00 | 0.005 | 4 | Agree |
| 8 | Fulfilling requirements of the standard means increased costs to the enterprise | 8.75 | 0.068 | - | - |
| 9 | Application of standard returns profits to the Foundation | 20.00 | 0.000 | 4 | Agree |
| 10 | Management embrace the concept of continuous improvement | 17.40 | 0.001 | 5 | Totally agree |

| | | | | | |
|--------------|---|---------------|--------------|----------|--------------|
| 11 | Application of standard leads to strengthen the relationship with suppliers and beneficial owners | 15.00 | 0.002 | 4 | Agree |
| Value | | 324.57 | 0.000 | 4 | Agree |

Source: prepared by researcher, using SPSS, 2016

From the tables above (4.7) and (4.8) we conclude that for the first hypothesis "**The role of ISO 22000 on the management system**" there is significant differences between answers of study individuals and in favor of **agree**.

- **Discussion the second hypothesis**
" The role of Standard on workers "

Table (4.9): Frequency distribution of the second hypothesis phrases Answers:

| No. | Phrases | Frequency and percentages% | | | | |
|-----|---|----------------------------|-------------|----------------|-----------|------------------|
| | | Totally agree | Agree | To Some extent | Disagree | Totally disagree |
| 12 | Senior management do sessions of awareness of the importance of the application of the standard for all employees | 16 40% | 12 30% | 10 25% | 2 5% | 0 0.0% |
| 13 | The application of the standard means increased pressure at work | 7 17.5% | 7 17.5% | 13 32.5% | 8 20% | 5 12.5% |
| 14 | Training for the staff and new personnel | 13 32.5% | 16 40% | 10 25% | 1 2.5% | 0 0.0% |
| 15 | Job description is clear and written for all employees | 15 37.5% | 9 22.5% | 10 25% | 2 5% | 4 10% |
| 16 | All employees involved in the improvement and development of the system | 15 37.5% | 11 27.5% | 13 32.5% | 1 2.5% | 0 0.0% |
| 17 | All staff involved in the decision-making with regard to the tasks entrusted to them | 12 30% | 9 22.5% | 9 22.5% | 8 20% | 2 5% |
| 18 | Direct communication between managers and employees easily | 22 55% | 16 40% | 1 2.5% | 1 2.5% | 0 0.0% |

| | | | | | | |
|----|--|-----------|-------------|-----------|-----------|-----------|
| 19 | All staff and employees followed food safety policy to maintain a safe product | 18 45% | 15 37.5% | 6 15% | 1 2.5% | 0 0.0% |
| 20 | All employees in the production areas keep of safety uniforms | 22 55% | 17 42.5% | 1 2.5% | 0 0.0% | 0 0.0% |

Source: prepared by researcher, using SPSS, 2016

Table (4.9) show that the highest percentage of answers of questions ranging between (**Totally agree** and **Agree**). It is noted also 32.5% of employees see that the application of the standard means increased pressure at work.

Table (4.10): Chi-square test results:

| No. | Phrases | Chi-square value | P-value | Median | Trend |
|--------------|---|------------------|--------------|----------|---------------|
| 12 | Senior management do sessions of awareness of the importance of the application of the standard for all employees | 10.40 | 0.015 | 4 | Agree |
| 13 | The application of the standard means increased pressure at work | 4.50 | 0.343 | - | - |
| 14 | Training for the staff and new personnel | 12.60 | 0.006 | 4 | Agree |
| 15 | Job description is clear and written for all employees | 13.25 | 0.010 | 4 | Agree |
| 16 | All employees involved in the improvement and development of the system | 11.60 | 0.009 | 4 | Agree |
| 17 | All staff involved in the decision-making with regard to the tasks entrusted to them | 6.75 | 0.150 | - | - |
| 18 | Direct communication between managers and employees easily | 34.20 | 0.000 | 5 | Totally agree |
| 19 | All staff and employees followed food safety policy to maintain a safe product | 18.60 | 0.000 | 4 | Agree |
| 20 | All employees in the production areas keep of safety uniforms | 18.05 | 0.000 | 5 | Totally agree |
| Value | | 170.14 | 0.000 | 4 | Agree |

Source: prepared by researcher, using SPSS, 2016

From the tables above (4.9) and (4.10) we conclude that for the second hypothesis "**The role of Standard on workers**" there is significant differences between answers of study individuals and in favor of **agree**.

- **Discussion the third hypothesis:**
" The role of standard on the production process "

Table (4.11): Frequency distribution of the third hypothesis phrases Answers:

| No. | Phrases | Frequency and percentages% | | | | |
|-----|---|----------------------------|-------------|----------------|-----------|------------------|
| | | Totally agree | Agree | To Some extent | Disagree | Totally disagree |
| 21 | Supplying standard enterprise general framework for the process manufacturing | 24 60% | 14 35% | 2 5% | 0 0.0% | 0 0.0% |
| 22 | Production processes are described with precision in all phases | 19 47.5% | 19 47.5% | 2 5% | 0 0.0% | 0 0.0% |
| 23 | The application of hazard analysis HACCP system reduces contamination of the product during the manufacturing and thus lead to the production of a safe product | 29 72.5% | 8 20% | 3 7.5% | 0 0.0% | 0 0.0% |
| 24 | The application of the standard works to improve the functioning of the manufacturing process and methods of surveillance | 26 65% | 11 27.5% | 3 7.5% | 0 0.0% | 0 0.0% |
| 25 | Hazard Analysis and Critical Control Points- HACCP system lead to reduce waste | 18 45% | 15 37.5% | 7 17.5% | 0 0.0% | 0 0.0% |
| 26 | Selection and evaluation of suppliers according to specific foundations by the company | 14 35% | 15 37.5% | 11 27.5% | 0 0.0% | 0 0.0% |

Source: prepared by researcher, using SPSS, 2016

Table (4.11) show that the highest percentage of answers of questions in favor of **(Totally agree)**.

Table (4.12): Chi-square test results:

| No. | Phrases | Chi-square value | P-value | Median | Trend |
|--------------|---|------------------|--------------|----------|----------------------|
| 21 | Supplying standard enterprise general framework for the process manufacturing | 18.20 | 0.000 | 5 | Totally agree |
| 22 | Production processes are described with precision in all phases | 14.45 | 0.001 | 4 | Agree |
| 23 | The application of hazard analysis HACCP system reduces contamination of the product during the manufacturing and thus lead to the production of a safe product | 28.55 | 0.000 | 5 | Totally agree |
| 24 | The application of the standard works to improve the functioning of the manufacturing process and methods of surveillance | 20.45 | 0.000 | 5 | Totally agree |
| 25 | Hazard Analysis and Critical Control Points-HACCP system lead to reduce waste | 4.85 | 0.088 | - | - |
| 26 | Selection and evaluation of suppliers according to specific foundations by the company | 0.65 | 0.723 | - | - |
| Value | | 65.10 | 0.000 | 5 | Totally Agree |

Source: prepared by researcher, using SPSS, 2016

From the tables above (4.11) and (4.12) we conclude that for the third hypothesis "**The role of standard on the production process**" there is significant differences between answers of study individuals and in favor of **totally agree**.

- **Discussion the fourth hypothesis:**
" The role of the standard on product quality "

Table (4.13): Frequency distribution of the fourth hypothesis phrases Answers:

| No. | Phrases | Frequency and percentages% | | | | |
|-----|---|----------------------------|-------------|----------------|-----------|------------------|
| | | Totally agree | Agree | To Some extent | Disagree | Totally disagree |
| 27 | Application of standard leads to the production of a high quality product | 25 62.5% | 12 30% | 3 7.5% | 0 0.0% | 0 0.0% |
| 28 | Product quality is being developed on a regular basis according to customer needs and consumers | 17 42.5% | 19 47.5% | 4 10% | 0 0.0% | 0 0.0% |
| 29 | Product quality specifications to be determined clearly | 18 45% | 15 37.5% | 7 17.5% | 0 0.0% | 0 0.0% |
| 30 | HACCP system helps in product quality | 23 57.5% | 9 22.5% | 6 15% | 2 5% | 0 0.0% |
| 31 | There are labs for analysis required | 27 67.5% | 12 30% | 1 2.5% | 0 0.0% | 0 0.0% |
| 32 | All measurement devices are calibrated periodically | 25 62.5% | 8 20% | 5 12.5% | 2 5% | 0 0.0% |
| 33 | Check and analysis of the raw materials that affect the quality of the product | 22 55% | 10 25% | 8 20% | 0 0.0% | 0 0.0% |

Source: prepared by researcher, using SPSS, 2016

Table (4.13) show that the highest percentage of answers of questions in favor of **(Totally agree)**.

Table (4.14): Chi-square test results:

| No. | Phrases | Chi-square value | P-value | Median | Trend |
|--------------|---|------------------|--------------|----------|----------------------|
| 27 | Application of standard leads to the production of a high quality product | 18.35 | 0.000 | 5 | Totally agree |
| 28 | Product quality is being developed on a regular basis according to customer needs and consumers | 9.95 | 0.007 | 4 | Agree |
| 29 | Product quality specifications to be determined clearly | 4.85 | 0.088 | - | - |
| 30 | HACCP system helps in product quality | 25.00 | 0.000 | 5 | Totally agree |
| 31 | There are labs for analysis required | 25.55 | 0.000 | 5 | Totally agree |
| 32 | All measurement devices are calibrated periodically | 31.80 | 0.000 | 5 | Totally agree |
| 33 | Check and analysis of the raw materials that affect the quality of the product | 8.60 | 0.014 | 5 | Totally agree |
| Value | | 192.09 | 0.000 | 5 | Totally agree |

Source: prepared by researcher, using SPSS, 2016

From the tables above (4.13) and (4.14) we conclude that for the fourth hypothesis "**The role of the standard on product quality**" there is significant differences between answers of study individuals and in favor of **totally agree**.

- **Discussion the fifth hypothesis:**
" Internal and external environment "

Table (4.15): Frequency distribution of the fifth hypothesis phrases Answers:

| No. | Phrases | Frequency and percentages% | | | | |
|-----|--|----------------------------|-------------|----------------|-----------|------------------|
| | | Totally agree | Agree | To Some extent | Disagree | Totally disagree |
| 34 | Manufacturing environment meets the requirements of the standard | 16 40% | 11 27.5% | 12 30% | 0 0.0% | 1 2.5% |
| 35 | Keep and maintain a clean and sterile environment | 21 52.5% | 9 22.5% | 9 22.5% | 1 2.5% | 0 0.0% |

| | | | | | | |
|----|---------------------|-------------|-------------|----------|---------|-----------|
| 36 | Convenient location | 19 47.5% | 15 37.5% | 4 10% | 2 5% | 0 0.0% |
|----|---------------------|-------------|-------------|----------|---------|-----------|

Source: prepared by researcher, using SPSS, 2016

Table (4.15) show that the highest percentage of answers of questions in favor of **(Totally agree)**.

Table (4.16): Chi-square test results:

| No. | Phrases | Chi-square value | P-value | Median | Trend |
|--------------|--|------------------|--------------|----------|---------------|
| 34 | Manufacturing environment meets the requirements of the standard | 12.20 | 0.007 | 4 | Agree |
| 35 | Keep and maintain a clean and sterile environment | 20.40 | 0.000 | 5 | Totally agree |
| 36 | Convenient location | 20.60 | 0.000 | 4 | Agree |
| Value | | 88.17 | 0.000 | 4 | Agree |

Source: prepared by researcher, using SPSS, 2016

From the tables above (4.13) and (4.14) we conclude that for the fifth hypothesis "**Internal and external environment**" there is significant differences between answers of study individuals and in favor of **agree**.

DISCUSSIONS

Based on the research findings the most important incentive for implementing food safety management systems was to increase and improve safety and quality of meat products with 72.5% totally agree; which agreed with Study No.1 that sees the increased quality of food products and working discipline of staff employed in food processing were also found as important benefits of implementing/operating HACCP in Serbian meat industry. Also the results indicated that the standard has role on staff with 32.5% totally agree the training is very important for the staff and new personnel; which agreed with Study No.3 that sees staff training was the most important implementing cost. Some studies reported that many food companies are unaware of its potential and they also perceive high costs associated to the adoption (Study No.4); in contrast 52.5% of employees are aware of ISO 22000 and its importance in the factory where the researcher distributed the questionnaire.

CONCLUSIONS

The solution of the problem statement, and the achievement of the purpose of the research have been arrived at through the process of finding relevant literature, collecting and analyzing of data as seen from the previous stages of the study.

Based on the literature reviewed and findings of analysis, this study ended by several conclusions as follow:

- Implementation of ISO 22000 has positive role on the management system, where management embraces the concept of continuous improvement.
- Implementation of ISO 22000 have positive role on workers, where all employees have clear and written job description and 52.5% are aware of the standard and its importance.
- Implementation of ISO 22000 have positive role on the production process, from the first step of handling the raw materials and throw all steps of production until preparing the final product, ISO 22000 had helped in these processes improvement.
- Implementation of ISO 22000 have positive role on product quality; where HACCP system helps in product quality and check and analysis of the raw materials that affect the quality of the product.
- Implementation of ISO 22000 have positive role on internal and external environment; where they keep and maintain a clean and sterile environment.

RECOMMENDATIONS

The findings of this study increase the insight of managers and owners about the effects of Implementation of ISO 22000 in order to lead their efforts to successful implementation, accordingly my recommendations are:

- All the employees must know much better about ISO 22000 and all its principles for better work environment and better products.
- Top management has to commit every decision and everything leading to improve the work at both wide and small scope.
- Annual training must be established, so that everyone inside the company will know the latest updates in the ISO 22000 and gain more knowledge necessary to improve the work.
- More focus on customer's complaints helps improving products.
- From the results of this research the advantages of ISO 22000 appeared very clear, so researcher recommended that other companies in the field of food production need to implement ISO 22000.

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Appendix

استبانة بحث علمي

السادة/ العاملين بمصنع ميمو للحوم

تحية طيبة وبعد،،،

أضع بين أيديكم استبانته لأغراض البحث العلمي لموضوع "دور تطبيق نظام ادارة سلامة الغذاء ISO 22000:2005 في مجال اللحوم"

أرجو من سيادتكم التفضل والتعاون با لإجابة على جميع العبارات الواردة في الاستبانة و أؤكد بأن المعلومات التي سيتم جمعها من خلال إجاباتكم ستحاط بالسرية التامة وتستخدم لأغراض البحث العلمي لذلك آمل تعاونكم و الإجابة على هذه الأسئلة بموضوعية.

البيانات الشخصية :

- الجنس : ذكر انثى
- العمر: 25 فأقل 25-40 41 فأكثر
- المؤهل : دبلوم فاضل بكالوريوس دراسات عليا
- الوظيفة : مدير مشرف موظف عامل
- عدد سنين الخبرة : 5 اعوام فأقل 5 - 10 أعوام 11 عام فأكثر
- ماهو مدى ادراكك بالايزو 22000:2005 : مدرك بشدة مدرك الى حد ما

| م | البيان | اوافق بشدة | اوافق | الى حد ما | لا اوافق بشدة | لا اوافق بشدة |
|--|--|------------|-------|-----------|---------------|---------------|
| • دور المواصفة على نظام الإدارة | | | | | | |
| 1 | تدعم الإدارة العليا تطبيق المواصفة | | | | | |
| 2 | تطبيق مواصفات عالمية مثل مواصفة سلامة الغذاء يدعم إدارة المؤسسة و يعمل على التحسين المستمر | | | | | |
| 3 | تشجع الإدارة العليا الآراء و المقترحات و الافكار | | | | | |
| 4 | تراجع الإدارة نظام سلامة الغذاء بصورة دورية | | | | | |
| 5 | يتم نشر سياسة سلامة الغذاء داخل المؤسسة | | | | | |
| 6 | تعمل الإدارة على تحسين نظام سلامة الغذاء من خلال المراجعات الداخلية و الخارجية | | | | | |

| | | | | | | |
|------------------------------------|--|--|--|--|----|---|
| | | | | | 7 | تقوم الإدارة بإستطلاع رأي العملاء |
| | | | | | 8 | إستيفاء متطلبات المواصفة يعني زيادة التكاليف على المؤسسة |
| | | | | | 9 | يعود تطبيق المواصفة بالارباح على المؤسسة |
| | | | | | 10 | تتبنى الإدارة مفهوم التحسين المستمر |
| | | | | | 11 | تطبيق المواصفة يؤدي إلى توطيد العلاقة مع الموردين و اصحاب المنفعة |
| • دور المواصفة على العاملين | | | | | | |
| | | | | | 12 | تقوم الإدارة العليا بدورات توعية باهمية تطبيق المواصفة لجميع العاملين |
| | | | | | 13 | تطبيق المواصفة يعني زيادة ضغط العمل |
| | | | | | 14 | يتم تدريب العاملين و الافراد الجدد |
| | | | | | 15 | يوجد وصف وظيفي واضح و مكتوب لجميع العاملين |
| | | | | | 16 | يشارك جميع الموظفين في تحسين و تطوير النظام |
| | | | | | 17 | كل الموظفين يشتركون في صناعة القرارات فيما يختص بالمهام الموكلة لهم |
| | | | | | 18 | يتم التواصل المباشر بين المدراء و الموظفين بسهولة |
| | | | | | 19 | يتبع جميع الموظفين و العاملين سياسة سلامة الغذاء للحفاظ على منتج آمن |
| | | | | | 20 | يحافظ جميع العاملين في مناطق الانتاج على زي السلامة |

| م | البيان | اوافق بشدة | اوافق | الى حد ما | لااوافق | لا اوافق بشدة |
|---|--|------------|-------|-----------|---------|---------------|
| • دور المواصفة على العملية الإنتاجية | | | | | | |
| 21 | تمد المواصفة المؤسسة بالإطار العام للعملية التصنيعية | | | | | |
| 22 | عمليات الإنتاج يتم وصفها بكل دقة في جميع المراحل | | | | | |
| 23 | تقلل تلوث المنتج HACCP بتطبيق نظام تحليل المخاطر اثناء التصنيع و بالتالي يؤدي الى إنتاج منتج آمن | | | | | |
| 24 | تطبيق المواصفة يعمل على تحسين سير العملية التصنيعية و طرق المراقبة | | | | | |
| 25 | HACCP نظام تحليل المخاطر و تحديد النقاط الحرجة يؤدي الى تقليل الفاقد | | | | | |
| 26 | يتم اختيار و تقييم الموردين وفق اسس محددة من قبل المؤسسة | | | | | |
| • دور المواصفة على جودة المنتج | | | | | | |
| 27 | تطبيق المواصفة يؤدي إلى إنتاج منتج ذو جودة عالية | | | | | |
| 27 | جودة المنتج يتم تطويرها بصورة دورية حسب حاجة | | | | | |

| | | | | | | |
|-------------------------------------|--|--|--|--|--|----|
| | | | | | العملاء او المستهلكين | |
| | | | | | مواصفات جودة المنتج يتم تحديدها بكل وضوح | 28 |
| | | | | | HACCP نظام تحليل المخاطر وتحديد النقاط الحرجة يساعد في جودة المنتج | 29 |
| | | | | | توجد معامل لإجراء التحاليل المطلوبة | 30 |
| | | | | | كل اجهزة القياس يتم معايرتها بصورة دورية | 31 |
| | | | | | يتم فحص و تحليل المواد الخام التي تؤثر على جودة المنتج | 32 |
| ● البيئة الداخلية و الخارجية | | | | | | |
| | | | | | بيئة التصنيع مستوفية بمتطلبات المواصفة | 33 |
| | | | | | يتم المحافظة على بيئة نظيفة ومعقمة | 34 |
| | | | | | الموقع الجغرافي ملائم | 35 |