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Food Safety Risk Assessment in Risk Management

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<p>Abstract</p> <p>The purpose of this thesis was to conduct a study on food safety risk assessment and suggest methods in managing potential risks in the field of risk management for industry stakeholders; notably food suppliers, processors, distributors, and consumers.</p> <p>The research work firstly, aimed at developing research theory on food safety. Secondly, it sought to develop risk assessment and thirdly, food risk management. An inductive approach was implemented to generate theoretical content. In order to define the methods to assess and manage risks, a work breakdown structure of food safety and risk assessment was necessary in order to propose food management tools to either minimize or suppress food contamination. Other components such as food storage, transportation and risk (biological or chemical) assessment are discussed in the empirical section. This was achieved with the iteration of empirical data and secondary data sources notably books, articles.</p> <p>Primary sources data collection through interviews helped in the analysis and interpretations in view to bring more clarifications concerning the objectives of the subject. Interviews were conducted with four Finnish food companies concerning their attitude and commitment to issues of food safety and food risk management.</p> <p>The results of the research work suggest some essential methods such as preventive actions capable to address the issue of food risk in risk management.</p>		
<p><u>Key words</u> Food safety, risk assessment, management, hazard identification, preventive actions</p>		

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LIST OF ABBREVIATIONS

CAC	Codex Alimentarius Commission
CCP	Critical Control Point
FDA	Food Drug Administration
HACCP	Hazard Analysis Critical Control Point
HORECA	Finnish acronym used for hotels, restaurants, and events planners
GHP	Good Hygiene Practices
GMP	Good Manufacturing Practices
WHO	World Health Organization

1 INTRODUCTION

The exponential growth of the global population and the demand for food is one of the most important questions facing policy makers, the food industry and its stakeholders. Inherent in this problem is the question of providing not just sufficient food to meet the increasing demand but safe and nutritious food that meets the health needs of consumers. This is because according to the World Health Organization (WHO,2020), globally, 1 in 10 people fall sick after consuming contaminated food. How can organisations in the industry mitigate food safety problem and protect consumers from such potential health dangers in food supply chains?

‘‘Unsafe food poses global health threats, putting people’s life in danger and every year over 200 million children fall victims of food safety-related diseases. Infant, pregnant women and the elderly are not exempt from contracting illness due to food safety’’ (World Health Organization, 2020).

According to WHO, food can become contaminated at any point of production and distribution, and the primary responsibility lies with food producers. Foodborne illness or more commonly referred to as food poisoning is usually the consequence of the consumption of contaminated food. Negligence to meet food safety standards can result in financial costs to food-processing companies. Additionally, that can result in critical health conditions for consumers besides, significant loss of money. The firm in turn, can suffer reputation damage and this can potentially lead to the closure of food processing structures.

According to the U.S. Department of Agriculture, food safety refers to the conditions and practices that preserve the quality of food to prevent contamination and food-borne illnesses (U.S. Department of Agriculture, 2019).

In essence,, it is a discipline that deals with the handling, preparation, and storage of food in ways to avoid any form of food poisoning that may arise from mishandling.

Risk management is the process of weighing policy alternatives to accept, minimize or reduce assessed risks and to select and implement appropriate options (World Health

Organization,2020). This section particularly aims at seeking to eliminate, reduce and control all types of risks on a general level.

After explaining the background and the nature of the problem of food safety, the remainder of the thesis is structured as follows: I spell out the purpose and central research question of the study. This is followed by the clarification, the delimitations or the scope of the study. Subsequently, a conceptual framework is proposed to guide and clarify the major themes regarding risk management, risk assessment in food safety. The theoretical part (chapter 1) deals, with the legal aspects of food processing. These include food safety regulations in Finland and how similar cases are often treated in places where food is handled. Chapter 2 centres on the methodical approach chosen for conducting the study. It further explains the nature of the research method: how relevant data is collected analysed and interpreted.

The third chapter focuses on the analysis and results of the study. Chapter 4 discuss the results to help better understand the measures employed by stakeholders to avoid major risks associated with food production, distribution and consumption. Chapter 5 draws conclusion based on the analysis of the data and extant literature. Additionally, I state the limitations of the study and offer policy recommendations.

1.1 Purpose of the study and Research Questions

The purpose of this study is to assess and possibly suggest methods for applying safety measures linked to food safety.

Therefore, the main aim is to:

- (i) better understand how to mitigate or even avoid the manifestations of food related risks.
- (i) seek guidelines and better tools for the identification and analysis of food security hazard since prevention is better than cure in that, it is safer, easier and cost-effective.

In order to carry out this study, the following main question is posed:

How can risk management be applied in food handling, storage, and transportation?

The above question is followed by two sub questions

What are the means and tools necessary for hazard identification and characterization and risk characterization?

What are the strengths and weaknesses of such tools in food processing industry?

1.2 Delimitations of study

Distinctive and objective approach to food safety assessment is the focus of this research given the broadness of the topic itself. The research will solely be based on tools and techniques to the identification, assessment of food safety. Anything outside of the topic will not be discussed. Moreover, this study is not meant to refute previously done findings or even more to suggest a universal solution regarding the topic but to have a different perspective about it as it keeps being a continuous research subject.

1.3 Conceptual Framework

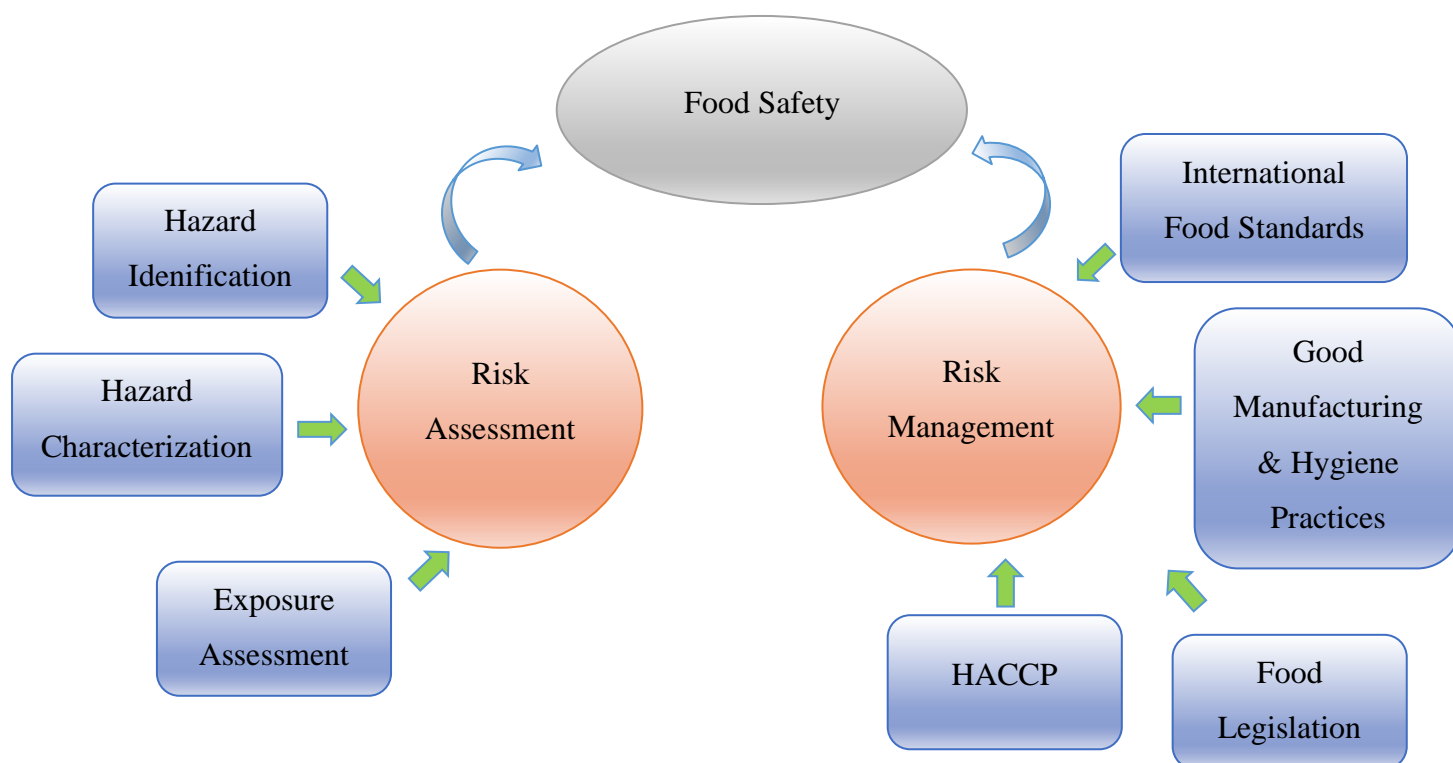


Figure 1. Framework of Food Safety

2 FOOD SAFETY

For some decades now, unsafe food has been a global threat endangering the lives of millions of people and drawing public attention. Hence, the need for education in food safety has become more than vital for people's own safety.

According to Voeller (2014), the definition used by food regulators about food security goes by activities associated with ensuring the adequacy of the food supply. (p.61)

On the other hand, safe food implies different meanings depending upon who is asked. For the public safe food refers to zero risk, whereas the food manufacturer would question 'the acceptable risk'. manufacturers argue that given the wide range of food products and the complexity of the distribution chain, that 'zero risk' is difficult to

achieve. The notion of food safety is acceptable only if strategies have been put in place in the food supply to ensure the occurrence of contamination throughout the process. (Forsythe 2000, 1).

In the food industry, the following components such as bioterrorism, quality assurance, sanitation, physical site, physical site security, border security, supply chain management or international trade are strategies that are almost, in not always, applicable by any food operator.

2.1 Food Handling and Processing

To ensure appropriate food safety, consumer and food operators have each a role at their level to play to mitigate the widespread of foodborne illnesses. Hence, the implementation of some hygienic protocol is of utmost importance before and during its transits in grocery stores and into households for consumption. The FAO/WHO developed a few keys to safe food handling which are applicable either at home or food industries:

*Keep clean, Separate raw and cooked, cook thoroughly, keep food at safe temperatures
Use safe water and raw materials.*

Those rules call for the importance to adopt hygienic methods to treat food in a clean environment with the aim of inhibiting the growth of bacteria. What usually transpires after food handling (in raw state) is its transformation into finished or semi-processed food product that often pass by a series of processes.

Food processing evokes transformation of agricultural products into food, or of one form of food into other forms. A group of researchers by the European Food Information Council (EUFIC) who carried a consumer study defined food processing as a method used to turn fresh foods into food products. The transformation often

involves a variety of processes such as washing, chopping, pasteurizing, freezing, fermenting, packaging, cooking, or addition of ingredients to obtain extended shelf life of the product (Eufic 2017).

Food processing entails three stages as follows: Primary, secondary, and tertiary.

1. Primary processing consists of the conversion of inedible raw products into food ingredients. This primary stage follows an order of transformation (growing, raising, cultivation, slaughtering, harvesting, storing, processing, packing and transportation) to finally obtain a product that would be send to the market for retail or to factories as ingredients for secondary or tertiary processes.
2. Secondary processing involves the conversion of food ingredients into edible foods. At this middle level of processing, foods can be prepared either at home or in food industries. Bread baking is a typical example secondary processing necessitating ingredient such as flour, yeast, salt and other ingredients to get the finished product.
3. Tertiary processing focuses on prepared foods ready for commercialization. This final food processing entails ready-to-eat or heat-and-serve foods such as Tv dinners or frozen meals (Hitzmann 2017,30)

2.2 Benefits and Drawbacks of Food Processing

In order to satisfy the demand of people, it is almost impossible to keep food products for commercialization or other uses in their raw state without them getting perished. This part deals with the advantages and disadvantages of food processing.

2.2.1 Benefits of food processing

Food processing is beneficial for multiple reasons of which *Safety, shelf life and preservation.*

The processing of food ensures food safety by removing toxins by pasteurization, shelf life and preservation by air-tight packaging and the use of preservatives.

It is worth mentioning convenience because processing and packaging technologies help to answer modern day time-constraints by providing a wide range of convenient foods: ready meals, bagged salads, sliced and canned fruits and vegetables.

In terms of costs, food processing can decrease the cost of foods. For instance, some food items have similar nutritional value as fresh ones at a lower cost as result of pre-cooking process and therefore can be bought in bulk and can last longer. This way, processing increases the shelf life of food and decrease the amount of waste, reducing thereby the overall costs of food production (Eufic, 2017).

Furthermore, some processed foods have it that they are less prone to perishability which enables easier and better handling and transportation from food industry operator to the end consumers.

2.2.2 Drawbacks of food processing

Pros of food processing cannot exist without its cons. It is necessary to mention the limitations of food processing from a different prism.

Nutrient's loss or decreasing, additive ingredients, high calorie content.

Any food going through any processing technique incur nutritional value loss or decreasing resulting from different processing steps. Significant amount of nutrients can be lost depending on the food processing method used. During the

processing of food, manifestation of the alteration of primary nutriment, minerals and vitamins occurs, depriving the food from its natural nutrient substances.

A study conducted on nutrients retention by the U.S. Department of Agriculture (USDA), showed deficiency of nutritional values of different food items after cooking process (USDA 2007).

It is known that food additives are used either for extend shelf life (preservatives) or to improve taste in food. However, for some they represent a highly potential health risk. For example, additives ingredients such as sugar, high fructose corn syrup, salt, fat, artificial colors can be endangering factors to diabetics (Giller, 2012).

In many cases, processed foods have a high caloric content with very little nutrients, which leads to weight-gain and obesity. Scientifically, dietary fiber is loss when processing whole grains into refined grains (Giller 2012).

It is crucial to recognize the benefits of food processing thanks to its capacity of addressing the issue of mass nutrition of the population by its fast accessibility and convenience. However, it remains true that processing stage, given the steps food must go through, can as well be regarded as a potential vehicle to food contamination. Food safety incidents occurred in the processing stage (microbial contamination, microorganisms' growth) usually where food come into contact with the multiple surfaces in the factory environment. Moreover, abusive use of chemical additives on foodstuffs contribute to such incidents it does not meet the optimum required by international standards. Prevention measures such as disinfection, chilling and packaging have the potential to reduce microbial risks, control microbial growth and protect the food product from further exposure (Zhou& Jin. 2013,16; FAO/WHO 2008, 41).

2.3 Food Storage and Transportation

Depending on temperature, water content, nutrient composition and the presence or absence of antibiotic compounds, food items remain harmless to human health for periods from a few hours to many years. Depending on the quality of the food, scientists use shelf life to quantify the length of time a food can be stored and remain suitable for consumption or commercial sale. However, some factors such as environmental conditions, identity of food, methods of preservations might influence the storage times. Easily perishable foodstuffs (fresh fish, meat, shellfish, fruits, and vegetables) can be stored for only a few days and sometimes even under cool storage unlike little water-contained or antibiotic compounds foods that can sustain longer storage periods (Hammond et al., 2015).

Storage and transport are indissociable parts in food supply chain especially if transportation of food over long-distance demands avoidance of perishable goods in the process. People living in urban agglomeration immensely depend on foodstuff harvested from remote farms or localities where agriculture is largely performed. The issue of logistics at this point reveals to be of extreme importance to channel food supplies fresh and edible to consumers upon arrival. Hammond et al., stresses that technological advances in food transport were achieved to shorten transport time leading to decreasing in spoilage en route. The incorporation of cooling equipment such as refrigerator in transportation has significantly reduced waste across the supply chain (Hammond et al. 2015,763).

Food transportation operations are addressed under Regulation (EC) No 852/2004 of the European parliament and of the Council. The regulation establishes requirements for:

1. Conveyance and/or containers used for transporting foodstuffs are to be kept clean and maintained in good repair and condition to protect foodstuffs from contamination and are, where necessary, to be designed and constructed to permit adequate cleaning and/or disinfection.

2. Where conveyances and/or containers are used for transporting anything in addition to foodstuffs or for transporting different foodstuffs at the same time, there is, where necessary, to be effective separation of products.
3. Foodstuffs in conveyances and/or containers are to be placed and protected as to minimize the risk of contamination.
4. Where necessary, conveyances and/or containers used for transporting foodstuffs are to be capable of maintaining foodstuffs at appropriate temperatures and allow those temperatures to be monitored (Eur-lex, 2004).

3 FOOD SUPPLY CHAIN

3.1 Food Safety in Food Production Chain

Supply chain designed to deliver retail-level products with characteristics that consumers desire has expanded significantly as an organizational tool in the agricultural and food industry in recent years. Besides processing of most food products into more convenient product forms ready for consumption makes food safety a permanent concern in the food supply chain. For that reason, producers must ensure food safety guidelines are incorporated into contracts within food supply chain enabling easy traceability from the consumer to the farm level of any products likely to cause foodborne illness (Van Alfen 2014, volume 2 218).

Furthermore, global food supply chain has it that it consistently aims at delivering fresh and affordable foods to the consumers because of many advantages gained through the chain such as cost savings and continuous supply of ingredients. However, ensuring food is hygienically and safely produced in remote areas, at healthy state at the time of consumption represent a great challenge to be dealt with. Contributing

factors such as longer chains increased transport times, thus risk of damage or quality deterioration which by the time it reaches consumers table can constitute a huge vector of food contamination (Eufic,2017).

Food ending up on final consumer's table is mostly the result of the multiple processes of its transformation. The processes include production, processing, distribution, consumption, and disposal and that's what it's called food supply chain
Factors such as longer supply chains increase transport times, thus risk of damage or quality deterioration (Eufic, 2017).

4 RISK ASSESSMENT

In the intention for the reader to grasp this chapter and its constituents, it would be convenient to give a definition to risk assessment.

“Risk assessment is the qualitative and the quantitative characterization and estimation of potential adverse health effects associated with exposure of individuals or populations to hazards such as materials, situations, chemical or microbial agents”
Indeed, this treat plays a crucial part in the food supply chain of which the objective is to halt the harms that could potentially create food contamination in the process. Haas et al., sustains that risk assessment is not used singularly but as part of what in a broader context as risk analysis (Haas et al 2014, 63-64).

This chapter aims at exploring the different steps of risk assessment through their analysis with the intention to provide proper risk management measures proportionally of the identified risk.

4.1 Hazard Identification

In the risk assessment process, hazard identification is the first step. It plays a major role in the identification of biological, chemical, and physical agents capable of causing adverse health effects which may be present in a particular food or group of foods. This primary criterion allows recognition and evaluation of whether the microbial toxin represents a potential hazard over food (Forsythe 2000, 337).

Basically, the identification of one the above stated hazards categories allow to immediately find a solution specifically designed to suppress or avoid contamination that may result from it. The case of biological hazard is predominant whether in home food handling or industry processing. Motarjemi & Lelieveld argue that rodents in warehouse, dust, manure, contaminated water, or raw materials are for instance potential vectors of several pathogens such as *Listeria*, *Salmonella*, leptospira, lassa virus, etc (Motarjemi & Lelieveld 2014, 407).

4.1.1 Microbiological

According to Pelczar (2020) microbiology is defined as the study of microbes, a diverse group of generally minute simple life-forms including bacteria, archaea, fungi, protozoa, and viruses.

For Charlebois, four million cases of domestically acquired food-borne are recorded each year in Canada and 90% of those cases are caused by some microorganisms such as *Clostridium perfringens*, *Campylobacter*, and *Salmonella* (Charlebois 2017, 137). In such cases, risk often occurs along food production chain from the production of raw materials all the way to the exposure of the consumer.

	Where found	Sources
Viruses A wide range which cause diseases, including hepatitis A	Most common in shellfish, raw fruit and vegetables	Associated with poor hygiene and cultivation in areas contaminated with untreated sewage and animal and plant refuse
Bacteria Includes <i>Bacillus</i> spp., <i>Campylobacter</i> , <i>Clostridium</i> , <i>Escherichia coli</i> , <i>Salmonella</i> , <i>Shigella</i> , <i>Staphylococcus</i> and <i>Vibrio</i>	Raw and processed foods: cereal, fish and seafood, vegetables, dried food and raw food of animal origin (including dairy products)	Associated with poor hygiene and unclean conditions generally: carried by animals such as rodents and birds, and human secretions
Moulds <i>Aspergillus flavus</i> and related fungi	Nuts and cereals	Products stored in high humidity and temperature
Protozoa Amoebae and Sporidia	Vegetables, fruits and raw milk	Contaminated production areas and water supplies
Helminths A group of internal parasites including <i>Ascaris</i> , <i>Fasciola</i> , <i>Opisthorchis</i> , <i>Taenia</i> , <i>Trichinella</i> and <i>Trichuris</i>	Vegetables and uncooked or undercooked meat and raw fish	Contaminated soil and water in production areas

Table 1. Microbiological contaminants. *Source*: The Microbiology of Safe Food

4.1.2 Chemical

For a longer conservation food and feed undoubtedly necessitate addition of chemical agents constituting substantial risk to humans and animals. Indeed, it is therefore important to determine the type and scope of the risk by collecting information on the exposure to the chemicals, the short and long-term effects of the agents likely to happen on the consumers. Assessment to the exposure to chemicals transmitted via food is often done through food consumption data and data on the content of chemical agents (Finnish Food Authority, 2020).

In addition, chemical agents' transmission can as well happen through food contact materials also known as materials and articles that come into direct contact with food.

Packing materials contain substances with a specific migration limit (SML) or dual-use additives likely to have technological effects on the food. The level of those substances must not exceed the maximum permitted defined in the food additives legislation otherwise they can migrate into food from the packaging. Usually, the concentration of those chemicals on packaging is often mentioned on documents addressing regulatory compliance. Moreover, the Finnish Food Act 23/2006 ensures food control guidelines for both monitoring food contact material companies and the safety and other compliance of contact materials in food establishments.

4.2 Hazard Characterization

After hazard identification, this second phase of risk assessment particularly deals with the evaluation of the nature of the ill consequences associated with microbiological hazards that may be present in food. It may also include a dose-response assessment of which the function is to translate the final exposure to a pathogen population into a health response in the population of consumers. Hazard characterization aims at providing first an estimation of the nature, severity and duration of the adverse effects linked with microorganism present in the food (Forsythe 2000, 341).

4.3 Exposure Assessment

“Exposure assessment is the qualitative and/or quantitative evaluation of the likely intake of biological, chemical and physical agents via food as well as exposure from other sources if relevant” (Forsythe 2000, 339). This section depicts channels through which a pathogen enters the food chain and subsequently finds its way in the production, distribution and consumption of food.

In exposure assessment, evaluation of level of microbial toxins in the food at the time of consumption is the objective. It is crucial to find out those microorganisms’

concentration in order to implement a response proportional to the magnitude of the damages that it can incur.

4.4 Risk Characterization

This component of risk assessment deals with hazard frequency estimation. As the final stage of risk assessment, it provides scientific advice for risk management. According to Codex Alimentarius Commission (CAC), it is defined as: “ the qualitative and/or quantitative estimation, including attendant uncertainties of the probability of occurrence and severity of known or potential adverse health effects in a given population based on hazard identification, hazard characterization and exposure assessment” (FAO/WHO 2008). This approach provides an estimate of the nature, severity and duration of the adverse effects and brings together data.

If proven qualitative, risk frequency ranks upon three levels: *Low, medium or high*. However, if the nature is quantitative, then results show whether there is 1 in 1 million chance of illness (Safefood360.com).

FAO/WHO points out that health-based guidance value is proposed once data gives enough estimation of the gravity of a particular hazard or toxic effects (considered to have a threshold dose). In exceptional cases, genotoxic and carcinogenic substances would be *ex officio* disqualified for use as food additives, pesticides, or veterinary drugs as degree of risk exists already at any level of exposure.

For chemical risk assessment, types of risk characterization advice have been developed for genotoxic and carcinogenic substances:

1. a recommendation that the exposure should be as low as reasonably achievable (ALARA);
2. quantification of the risk at different levels of exposure (e.g.-toxin); and
3. ranking of compounds producing similar hazards according to their estimated risk (e.g. genotoxic and carcinogenic substances) (FAO/WHO 2009).

5 FOOD SAFETY MANAGEMENT

Risk management is the process of weighing policy alternatives to accept, minimize or reduce assessed risks and to select and implement appropriate options (World Health Organization 2020).

Charlebois (2017) points out that the importance of a risk management plan lies in the evaluation and implementation of food safety policy. Preventative and corrective actions can be achieved only through a well operative risk management system and this includes the implementation of strong infrastructures such as food safety standards, laws, regulations, and policies. Mass education of the people about food risks and its consequences is as important in order to mitigate foodborne illnesses.

In this chapter, the aim is to propose different management tools for the prevention or avoidance of food contamination. These approaches will serve as guidance to food stakeholders in their quality food sustainability program.

5.1 Risk Communication

Over the years, communication has proved to be an essential and effective way to make spread awareness about risks associated food safety issues.. The widespread of foodborne diseases has triggered some awareness on behalf of organizations, governments, and food industry stakeholders to adopt a more expressive language to consumers to reduce the magnitude of damages caused by unsafe food. Flow of information regarding food safety risks and consequences resulting from it is considered as risk communication.

Charlebois notes that it is the food industry operators and other stakeholder's responsibility to relate information to the consumer and foster public trust or confidence in how food safety risks must be adequately dealt with. He stresses that metrics such as food safety education and training (safe food handling) are considered to be risk communication means as practices in the home and in the food service and

processing industry appear to be areas where outbreak most likely occur (Charlebois 2017, 158).

5.2 Hazard Analysis Critical Control Point (HACCP)

According to the definition given by the U.S. government internet database, *Food & Drug Administration*, HACCP is referred to as a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling to manufacturing, distribution and consumption of the finished product.

The HACCP system was created by the Pillsbury company, the United States Army and NASA within the framework to provide their astronauts with the best quality food with 'zero defects' in it. HACCP is a tool that assesses not only hazards but goes as far as establishing control systems. As a scientifically based protocol, HACCP is adaptable to change with the most advanced equipment design, processing procedures or technological developments (Forsythe 2000,260).

It is important to note that it was common to perform end-product testing to detect the presence of toxins in food. However, that method proved to be ineffective. After conducting a series of food testing samples, it was clear that HACCP was a much better approach for assured food safety (Forsythe 2000, 312).

If this food control system is highly and thoroughly implemented, then chemical and microbiological hazards can be avoided during food supply and production chain. Table 2 below shows the seven principles which offers a on how to treat raw material at proper temperature and to deal with hazard type once characterized.

Table 6. HACCP control chart for chicken nuggets production

Process Step; CCP No	Hazards	Critical Limits	Monitoring Procedure	Frequency	Preventive measure	Corrective action	Record	Responsible person
Raw ingredients & Packaging Material; CCP#1	Microbial Chemical & Physical Contaminations	Pure product to be used	Apply supply quality control or assurance	Each supply from supplier	Test raw material supply; Checked MSDS; Approved Supplier List and review; Specification of the material	Change supplier or brand in interval; Employee Training for raw material testing	Materials Receiving & testing report	Assigned receiver (QC/QA)
Raw Meat Storage; CP#1	Microbial growth	Under 4°C Max. Four days	Temperature log is properly monitored	Routinely (Every hour)	Proper storage temperature and time maintain	Reject the raw Meat and incinerate	Temperature log sheet; Destroy report	Assigned executive (QC/QA)
Frying; CCP#2	Survival of Pathogens	Cooking temperature 100°C	Check the Cooking Time and core temperature; Follow up the time and temperature and record keeping	Each Batch	Check The Core Temperature of product	Adjust the temperature and time by setting the equipment; Call the Maintenance team to repair	Time and Core Temperature of product log; Maintenance register	Assigned executive (QC/QA)
Packing; CCP#3	Physical contamination	No foreign material; No leakage	Metal detection system; Visual Inspection by packing Supervisor	Each Pack	Personal hygiene and physical inspection	Retain, rework or discard based foreign material identified	Metal detection system report, Inspection Report	Assigned executive (QC/QA)
Storage & Distribution; CP#2	Microbial Growth	Under 4°C Max. Shelf-life six months	Check the storage temperature and shelf-life and record keeping	Every day	Check the time and temperature	Retain or reject based on product testing by panelist	Temperature log; Delivery report	Assigned executive (QC/QA)

Table 2. HACCP Control Chart. *Source: Asian Food Science Journal, The Implementation of Hazard Analysis Critical Control Point (HACCP) Plan for Chicken Nugget Plant 2021*

HACCP is one the method offering relatively low to no risk when food is handled with great care also under strict working hygienic conditions.

Decision by management to use the HACCP system
 Training and formation of the HACCP team
 Development of the HACCP plan document, including the following parts (CRC 1997a):

Assemble the HACCP team
 Describe the food product and its distribution
 Identify the intended use and consumers
 Develop and verify the flow diagram for the production process
 On-site confirmation of the flow diagram

- (1) **Conduct a hazard analysis**
- (2) **Determine the critical control points (CCPs) (see Fig. 7.1)**
- (3) **Establish critical limits**
- (4) **Establish monitoring procedures**
- (5) **Establish corrective actions**
- (6) **Establish verification procedures**
- (7) **Establish documentation and record-keeping procedures**

Table 2. Establishing and Implementing HACCP. *Source: The microbiology of safe food, Forsythe, 2000.*

5.3 Good Manufacturing Practice (GMP) and Good Hygiene Practice (GHP)

GMP and GHP reveal to be effective food safety management means for they provide principles and procedures to operate in a suitable environment for the production of quality food. According to WHO, GMP defines quality measures for both production and quality control. It goes as further to defines measures to ensure that processes necessary for production and testing validated and documented. On the other hand, GHP establishes the basic hygienic measures which establishments should meet, and which are the prerequisites to other approaches like HACCP (Forsythe 2000,293).

General GHP requirements go as follows:

1. The hygienic design and construction of food manufacturing premises.
2. The hygienic design, construction, and proper use of machinery.
3. Cleaning and disinfection procedures (including pest control)
4. General hygienic and safety practices in food processing including:

The microbial quality of raw foods, hygienic operation of each process step, hygiene of personnel and their training in the hygiene and safety of food (Forsythe 2000, 293).

5.4 International Food Standards

Consumer health's protection and fair practices in the international food trades are the objectives of the Codex Alimentarius Commission (CAC). This body clusters standards codes of practices, guidelines, and other food- related recommendations recognized on a global level. Codex sets codes of hygienic practices defining the production, processing, manufacturing, transport and storage practices for individual

foods or groups of foods that are considered essential to ensure the safety and suitability of food for consumption. Moreover, the standards set the basis for many national standards, also providing the international trading community with a substantial foundation (Motajermi & Lelieveld 2014, 1071).

Certified food manufacturers operating whether in processed food, semi-processed or raw food ought to meet the codes set by this cluster in which case their operations will be considered illegal and most likely to put consumers health at high-risk exposure.

On the other hand, IFS Food Standard is a common food safety and quality standard with a uniform evaluation system used to qualify and select suppliers. It aims at building confidence in products and processes by ensuring safety, quality, legality, and compliance with specified customer requirements. This initiative concerns more food processing companies and those specialized in packing loose food products. Food manufacturers audit is performed by a list a requirement set by the IFS food standard:

Senior management responsibility, Quality and food safety management system, Resource management, Planning and production process, Measurements, analysis, improvements, Food Defense (International Featured Standards, Food 6.1)

6 THE RESEARCH SETTING: THE FINNISH FOOD AUTHORITY

The Finnish Food Authority is an organization that aims at humans', animals' and plants' welfare, and at supporting and developing agricultural sector and information systems linked to its operations. Moreover, the organization goes as a far as promoting, monitoring and studying the safety and quality of food, the health and wellbeing of animals and plants; enhancing products utilized in agricultural and forestry production.

6.1.1 Food Legislation in Finland

Given the proliferation of foodborne illnesses worldwide, laws and regulations enforcement were to be applied rigorously with the purpose of reduction, elimination and avoidance of risks arising right from point of production to point of distribution.

Forsythe (2000) sustains that food safety requires enhanced levels of international cooperation in setting standards and regulations. However, uniform food safety measures do not exist around the world and such differences can lead to disagreements among countries (Forsythe 2000,361).

Regulation is one the three types of legislation within the EU and is defined as a legal act which has general applications and is binding in its entirety and directly applicable to the citizens, courts and governments of all member states. For instance, member states of the European parliament and of the council have collectively agreed on food regulation which means they have accepted uniformity and applicability of that law across the European community with the aim of protecting the health of consumers and ensure fair practices in the food trade.

In Finland, the Ministry of Agriculture and Forestry established Food laws and regulations under Food Act (23/2006) with some the following objectives:

- 1) to ensure that food is safe and is safely handled as well to ensure the health-related quality of food and that its quality in other respects accords with the food regulations.
- 2) to protect the consumer from health hazards and financial losses caused by food that violate the food regulations.
- 3) to ensure the traceability of food.
- 4) to secure a high-quality system of food control.

In sum, food regulation enforcement falls within the category of risk management to discipline different stakeholders in the way they handle food be it harvesting to serving level but also to protect the people given the fact that poorly handled food

presents a serious health hazard . The legislation in Finland in that regard is tight and displays no sign of tolerance when it comes to smatter of food safety.

7 RESEARCH METHODOLOGY

7.1 Research Design and Research Approach

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari 2004, 36). The research work lies on two categories of research designs: Exploratory and descriptive research.

Exploratory research is a method designed to answer *what?* question of a research problem. This method is somewhat unique that it helps giving clear understanding of an issue or phenomenon if the researcher is unsure of its precise nature.

Exploratory study can be used to formulate problems more precisely and develop hypotheses; seek new insights and assess topics in new light (Saunders, Lewis & Thornhill 2019,220).

On the other hand, descriptive research is designed to create an accurate profile of events, persons or situations, focusing on the *How?* of a research question. Methods for descriptive research entail: questionnaire survey, interviews and analysis of secondary data. Collected data and analysis will help in supporting my findings on

food safety risk assessment and also in suggesting feasible ways to avoid any food related issue likely to cause serious health damage.

The research approach that was used in this thesis is inductive approach. As a data-driven approach inductive approach is adequate to explore a topic and to produce theoretical content (Saunders, Lewis & Thornhill 2019). Therefore, primary, and secondary data sources such as questionnaires, e-books, articles and journals will be collected for development of the theory.

I employed a qualitative method to study and analyze food safety risk assessment and suggest preventive measures for the mitigation of food contamination.

7.2 Data Collection and Analysis

Saunders et al., (2019) recommend the use of both primary and secondary data to answer their research questions or meet their research objectives. Secondary data refers to the use of books, written articles, documents, magazines, interviews transcripts etc. Newly collected produced data also called primary data can be acquired through surveys or interviews and observations. However, the lack of time, money or access could make it impossible to gather detailed large data.

The redaction of this thesis is based both on secondary and primary data collection. Books, articles, journals were exploited to create the literature content of this research while interview questions served to collect topic-related data. The researcher repeatedly tried reaching out to many food operating companies managers as possible since January 2021 only to eventually get the answers from four of them. The identity of those companies will be kept anonymous according to the wish of the managers.

The interview questions dealt with applied tools for hazard identification and characterization, implementation of HACCP, contribution to preventive and corrective actions against food poisoning, strengths and weaknesses of risk management tools, sustainable strategies in providing safe food products to customers.

In order to create a theoretical context, I used secondary data such books, eBooks, articles. In addition to that, organization websites dealing with food safety were utilized as reliable sources for data collection which were then analyzed to generate more insights. Furthermore, the collection of the data from different case companies was done through interview questionnaire (primary data) with the intent to perform an analysis and then produce an interpretation in order to address research questions and objectives.

More specifically, the data collection allowed me to produce information on food safety risk assessment and how it can be applied on a chosen case company.

7.3 Reliability and Trustworthiness

When a researcher wants to assess the level of quality of research work, reliability and validity are used as metrics. Thietart stresses that reliability focuses on whether the study could be repeated by another researcher or at another time with the same results. The latter entails two different levels: the reliability of the measuring instrument and the more reliability of the research (Thietart 2001,187).

The researcher ensures the accuracy and consistency of the research work from reliable source. Thus, the collection of reliable data was made through interview questions to the managers of food operating companies. The methodology consisted in conducting interview via email to the concerned parties. Moreover, the interviewees felt at ease with that method given the fact that they had enough time to ponder over the questions. Initially, the objective was to find a particular case company to conduct the research on, but given the complexity of the task, the interview questions was shaped for five food companies. Attempts to reach out to some companies were unsuccessful, however only four replied to the questionnaire. Besides, while some managers took some weeks to answer, others did not respond at all to the interview questions.

Gathered data from the interview questions were analyzed and interpreted as understood by the researcher. In addition to primary data, other sources such as e-books, journals, articles were used as complementary to produce relevant content for this research.

The interview questions are in Appendix 1, while the answers of the interviewees can be found in the following appendices.

8 RESEARCH FINDINGS

This chapter lays out the findings gathered from the empirical section and the interview questions. The following sub sections such as challenges in ensuring food security, hazard identification tools, contribution to corrective actions against food poisoning, strengths and weaknesses, implementation of sustainably strategies for safe food are the subjects of discussion over risk management of food safety.

Furthermore, it highlights the views of the interviewees over the handling of food safety each in the different sections of this chapter presented below.

8.1 Target customers

This section provides the answers of the interviewees, who are mainly into pork /meat, beef, and sheep production. I also describe how the nature of the relations to customers varies from one company to another. While one focuses on businesses as target customers, the other deals directly with final consumers.

Founded in 1988, company 1 is a family- owned company employing 45 people. It operates in the manufacturing of frozen meat, chicken products, sauces. However, their main product is kebab which is adapted for different customer categories. Its main

targets include industrial customers, HoReCa. The company has a preference in Finnish meat raw materials and resort less to the use of additives for products manufacturing.

Company 2 specializes in ready-to-eat food products, as one of Finland's leading company and with a total headcount of over 1000 employees, it is recognized as a giant in the food manufactory industry. Its market target includes also industrial customers. Company 2 focuses on consumers ' ' who value high quality domestic production. [...] Our products are targeted at both single people and large families.''

Company 3 was established in 1992. Its main business lies in meat, poultry, steaks, meatballs, and sausages production. According to the company's latest financial statements, its turnover was over € 84 million with net sales increased by 9.4%. It hired over 350 employees who took part in the company mission and vision.

Company 4 is also on the line of family-owned business just like the other companies, specializing in meat sausages and cold smoked roasts. They mainly supply to central stores and retail stores in addition to wholesalers and HoReCa customers.

The companies' introduction report gives little insight into who they are and the type of operations they conduct. In addition to the managers who were interviewed, the author thought important to use their answers with secondary data sources to answer the research problem.

8.2 Challenges in ensuring Food Safety

To the question regarding emerging problems in ensuring food safety, company 1 stressed the presence of microbes in production every now and then.

On the other hand, company 2 highlighted compliance. He pointed out that the microbiological quality must be in good condition until the expiry date. He went on by saying that maintenance of temperature limits for cooked meat products and poultry (+72, +75 degrees) is of extreme importance to avoid food alteration. Packaging stage must be equally as hygienic as possible so that the cooked meat is not contaminated at that stage. Company 3 did not provide any answer to the question.

Company 4 however, put an emphasis on good hygiene and quality maintenance throughout the process as the biggest challenges.

On the basis of above given data, it can be argued that presence of foreign gems during production stands as a big challenge especially if cooking temperature limits are not observed. In that case, it can be suggested that temperature-constant monitoring system can be set or assigned team can be put in place to monitor production process uninterruptedly to avoid such incident to be happening.

As seen on chapter 5, it is virtually impossible to eliminate presence of gems during production stage. Notwithstanding the implementation of high measures to attain ‘zero risk’, the fact till remains that one can only minimize as much as possible the level of microbial risk when handling food.

8.3 Case of unsafe food within production chain

To the question of case of unsafe food occurring within production chain, company 1 replied affirmatively whereby the CCP limit (heating) were not reached resulting to internal disposal of the products. Worth noting that, CCP refers to a step at which control can be applied and is essential to prevent or eliminate food safety hazard or reduce it to an acceptable level (Food and Drug Administration). It can be understood for company 1 that failure to apply CCP adequately led to a total waste of products to avoid food contamination at final point.

Company 2’s manager however recalled a case whereby after an error had been detected from the logistics centers thanks to effective self-monitoring. Immediate traceability was made to return the defective items back to the factory before they

could reach end consumers for their safety. Company 3 did not provide an answer to the question.

The manager of company 4 on the other hand, did mention of thorough product research and manufacturing control to avoid risk of contamination within the production chain.

When relying on the managers' answers stated above, promptitude to respond to the issue of case of unsafe food can be remarked either through disposal of flawed products or through recalling to main production factories. Furthermore, proactiveness defines companies in showing their capacity in acting quickly to deal with difficulty. In risk management, the act of anticipating counts as strategy to respond to corrective actions. It remains important however, that the quick reaction aimed at attaining a common goal which is assuring total food and consumer safety.

8.4 Hazard identification and characterization applied tools /HACCP

Implementation

The interviewees admitted using HACCP system as a tool for hazard identification and characterization. Thanks to the layout of flow chart, after identification of hazards, other principles can be applied in adjustment of raw material.

The quality manager of company 1 named organoleptic control, time, temperature measurements, sampling, weight and production control as HACCP tools or elements to lower or eliminate hazard. According to the manager of company 2 critical control points in production are the internal temperature of mature products, which must never fall below a certain temperature. He adds that each process is subject to a separate risk assessment and is reviewed annually.

The manager of company 3 referred to quality system SFSSC22000 used to define risk assessment practices and classification. After conducting analysis for each product and nature of hazard identified, the severity of the hazards at each stage of the manufacture of the product, including transport are assessed. He sustains also that the controllability

of the hazards irrespective of the stage is a critical control point that must be clarified. Additionally, the probability of danger is estimated numerically from 1 to 10.

Company 4 uses in addition to HACCP, flowcharts for each product or group of products, in which the product have been assessed and taken into account in practice. She points out to the realization of critical control points in manufacturing which is a prerequisite to get products approved for sale.

Basically, the HACCP system in food production chain is viewed as an utmost part whereby types of hazards are identified on different CCP levels and dealt with either by temperature maintenance on storage or cooking level and quality management on packing level followed by testing methods to check whether presence of microbes if any. It is practically impossible to attain a risk-free outcome, if haven't food manufacturers incorporated it their risk management strategies.

The companies interviewed admitted the crucial implementation of HACCP at production where its components including controlled temperature allows each production stage not to fall into a high-risk threshold.

8.5 Contribution to preventive and corrective actions against food poisoning

Internal chain-wide requirements, staff training sampling is the way of company 1 to preventive action against food poisoning. Being the first point of contact, the manager of company 2 reckons to notify the parties concerned should bacteria likely to cause food poisoning in products be detected. He goes further by stating immediate withdrawal of products would be executed in the worst case.

Company 3 admits ensuring compliance with work instructions and quality system requirements for all employees. Skilled staff through training by far reduces the risk of severe incidents to be happening. The manager of company 4 put an emphasis on staff training and hygienic operations enforcement to employees working in the factory in various areas in order to minimize cross-contamination.

The analysis of this section points to the strong observation of hygiene rules to tackle food contamination. The achievement of food safety stems right from proactive steps to prevent prospective challenges arising from hazards. On a macro level, people have a role to play in mitigating the spread of viruses and bacteria not to fall victims to of all sorts of health safety hazards. While food manufacturers have the obligations to ensure hygiene and manufacturing practices training to their workforce, they should also encourage its rigorous implementation and enforcement within production chain process.

Moreover, the permanent monitoring of the hygiene behavior of staff can be opted for to address the shortcomings likely to occur.

8.6 Implementation of sustainable strategies for food safety

To ensure the continuity of providing safe food for consumers producers must build up sustainable strategies to guarantee the safety of the latter.

According to the manager of the 1st company, their strategies lie on compliance with legislation, self-monitoring and standard requirements (FSSC 22000) observation. So, as long as their policies are aligned with IFS (International Food Standard), they are confident with their sustainable safe food methodology.

Company 2's approach instead, is the mechanism applied to produce first-class and high-quality products and this goes through careful selection of raw materials by the time they are being brought for processing.

“The strategy recognizes good product quality, controls doing and acting. Besides, the quality system and audits ensure that the instructions operate in accordance with the instructions” The manager of company 3.

The identification of hazard to product safety and risk management is as one of the implemented strategies according to company. The quality manager of company further explained that raw materials, processes, material flows and products as well as related risks pass through risk mapping scanner. Selection of raw material sources,

operating instructions, process values, specifications, control limits and control measures are sub elements of their well schemed risk management.

The answers given by the interviewees can be closely linked to the operating mode mentioned in chapter 5.3 and 5.4 which recommend again good manufacturing practices in addition to quality and food safety requirement and compliance with legislation. Strictly application of some key elements such as raw material sources, material flow, operating instructions, specifications, control limits that include risk management display long-term strategy for food safety. The requirements suggested by the IFS constitute a *sine qua non* condition to deliver maximum quality products for customers satisfaction.

8.7 A Future for a Better Food Safety

The advent of new technologies and technical know-how depending on the environment one operates in, are meant to either optimize or/and render better the quality of what industries produce.

In light of this, company 1 put an emphasis on digitization of CCP controls for an optimized control over products processing. While the manager of the 2nd company bets on automation based on numerous rapid testing methods, machine vision, X-ray equipment's, robots metal detectors. Those advanced mechanisms would locate in real time shortcomings, shortening response time and ultimately not delivering faulty products to consumers.

Food industries ought to bring new ideas in order to deliver only the best to customers. Otherwise, they might suffer the negatives consequences. ‘‘Reputation is extremely important for all businesses but absolutely important in the food industry’’ (Manager of company 3).

Although the manager of company 4 opines that new technologies and attitudinal changes will certainly make it easier to produce safe, quality and improved food products, she does not underestimate the possibility of emerging threats such as contaminants, diseases, and food fraud. Therefore, food operators must be able to react quickly and effectively to the new threats.

the improvement of food production in the following:

Better quality food optimization, rapid testing methods, digitization of CCP, real time shortcoming location and many more.

Better food safety lies in the afore mentioned sophisticated resources that will not only considerably reduce the probability of incurring food risk during processing but also ensure an almost risk-free guarantee to provide end customers with the best possible products for their consumption.

While recognising the feasibility of the previously stated prospect, in order to provide quality food to people, huge costs in acquiring those technologies cannot be ignored for food industry operators. They would also want to be making high profit margin hence a raise in price of food products. So basically, this highlights the type of challenge we will also face in the future.

shortcomings of the study

Owing to the absence of adequate single-handed company from which this work could have been elaborated directly, the researcher leaned on available resources to pull off the work. Food risk assessment and risk management-related questions could have been from top to bottom approached from a different angle, had the author got the opportunity to fully focus on a single company. Evidently, a specific company-backed study would have allowed to go in-dept as to delve into the outlines of the topic given the broadness of the subject itself.

Unfortunately, in the attempt on focusing on just one case study, the researcher faced some challenges such as rejection, lack of responses from those solicited. Other constraints prevented the writer to further push the development of ideas thoroughly after several trials.

It should also be noted that perhaps had a face-to-face exchange with the interviewees taken place, the structure of this research would have been molded differently maybe without twist in comprehension either from the managers' side or from the interviewer's own end.

9 CONCLUSION AND RECOMMENDATIONS

This research aimed to identify diverse risk assessment for food security. Based on a qualitative analysis of risk management in response to avoidance of industrial food poisoning, it can be concluded that implementation of sustainable strategies, and preventive actions are crucial factors to consider when assessing and designing plans for food security.

To answer the research questions, it was necessary to raise many food safety related points such as food handling and processing, risk assessment and its safety management. The analysis of the above-mentioned sections demonstrates the various stages and precautionary measures employed in food processing.

Good hygiene and good manufacturing practices were highlighted as some of the key elements to managing microbiological risk. This is because food is likely to rapidly develop virulent bacteria if handled in unhygienic conditions. Moreover, the finding stressed the role it played in mitigating the widespread of foodborne illnesses.

Furthermore, different types of risks needed to be addressed for the purpose of categorizing in which pooling food can fall into for clear assessment and response after identifying the hazard. In the context of chemical hazard, where food contamination could occur either through food additives or food contact material, food producers are to execute food regulation and safety and in compliance with food act.

Policy and managerial recommendations

It is recommended that communication and good hygiene practices are important preventive measures to limit the widespread of food hazards. To ensure that it is put in practice, mass education must be executed through different channels such as media, food programs sessions including different stakeholders, from food industries to consumers.

In other words, stakeholders operating in food sectors have a major role to play in continuously providing safe food to consumers and this should be accomplished through innovation, update, and implementation of programs such as Hazard Analysis

Critical Control Point (HACCP) which serves as a useful tool to identify and characterize hazards. In addition, Quality Management should be applied to make sure of the absence of foreign materials and packaging of food at adequate temperature.

Follow-up guidelines provided by International Food Standards to keep up with quality products. Food safety can be achieved only by if previously discussed mechanisms are set to reach that objective.

On a wide scale, all resources involved in the whole production chain, must be subject to scrutiny right from supply chain to end products to prevent a cross-contamination throughout process. Hence, the systematic process of evaluating the potential risks that may arise from each stage could be foreseen and addressed adequately.

While this research illustrates the methods to safe food handling, it also raises the question of the vulnerability of risk management resources in providing risk -zero in the whole food supply chain.

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Riskienhallinta elintarvikkeiden käsittelyssä, varastoinnissa ja kuljetuksessa

Tämän tutkimuksen tarkoituksena on arvioida ja mahdollisesti ehdottaa menetelmiä elintarviketurvallisuuden varmistamiseksi. Olisin kiitollinen, jos voisit käyttää muutaman minuutin vastataksesi seuraaviin kysymyksiin.

Perustiedot vastaajista:

Case Company:

Vastaajan asema yhtiössä:

Vastaajan vuosien kokemus nykyisessä roolissa:

Haastattelija: Mariette Domche, Satakunnan ammattikorkeakoulu (SAMK)

Kysymykset

1. Kertoisitteko lisää itsestänne ja siitä, mitkä ovat pääasialliset tehtävänne yrityksessä?
2. Mitä elintarvikkeita tuotatte, ja millaiset asiakkaat ovat kohderyhmäänne?
3. Mitkä ovat pääasialliset haasteet tai ongelmat, joita yrityksellänne on ruoan turvallisuuden takaamisessa?
4. Oletteko koskaan kohdanneet ei-turvallisten elintarvikkeiden tapauksia tuotantoketjussanne?
 - Jos vastasitte kyllä: mitä riskienhallintatyökaluja käytitte ongelman ratkaisemiseksi?
 - Jos vastasitte ei, miten reagoisitte ruoan saastumiseen / ei-turvalliseen ruokaan, jos sellainen tilanne tulisi eteen?
5. Mitä työkaluja käytetään vaarojen tunnistamiseen ja luokitteluun?

6. Käytättekö vaarojen arviointia ja kriittisiä hallintapisteitä elintarvikkeiden valmistuksen aikana? Jos vastasitte kyllä, kertokaa miten?
7. Miten osallistutte henkilökohtaisesti ruokamyrkytysten leviämisen estämiseen?
8. Mitkä ovat nykyisten riskienhallintatyökalujen vahvuudet ja heikkoudet?
9. Mitä strategioita käytätte tarjotaksenne kestäviä ja turvallisia elintarvikkeita asiakkailenne?
10. Kuinka osallistutte henkilökohtaisesti hyviin hygieniäkäytäntöihin työsi aikana?
11. Millaisena näette elintarviketurvallisuuden tulevaisuuden? Helpottavatko uudet tekniikat tai asenteiden muutos turvallisten elintarvikkeiden tuottamisen ja markkinointia?

Paljon kiitoksia avustanne!

Risk management in food handling, storage and transportation

The purpose of this study is to assess and possibly suggest methods for ensuring food safety. I should be grateful if you could spend a few minutes to respond to the following questions.

Basic information about respondents:

Case Company:

Respondent's position in the Company:

Respondent's years of experience in current role:

Interviewer: Satakunnan ammattikorkeakoulu (SAMK)

Questions:

1. Could you tell more about yourself and what your main functions are in the company?
2. What food items do you produce and who are your target customers?
3. What are the main challenges or emerging problems that your company faces in ensuring food safety?
4. Have you ever encountered a case of unsafe food within your production chain?
 - If yes: what risk management tools did you use to solve the problem?

- If no, how would you respond to food contamination/unsafe food, should any incident of the kind happen?

5. What are the tools applied for hazard identification and characterization?
6. Do you apply Hazard Analysis and Critical Control Point during food processing? If yes, how?
7. How do you personally contribute to the preventive and corrective actions against the spread of food poisoning?
8. What are the strengths and weaknesses of your current risk management tools?
9. What sustainable strategies do you apply in providing safe food products to customers?
10. On a personal level, how do you participate in good hygiene practices during your work?
11. How do you see the future of food safety? Will new technologies or attitudinal shift make it easier to produce and market safe food?

Yritys: 1

Vastaajan asema yhtiössä: Quality Manager/ HR

Vastaajan vuosien kokemus nykyisessä roolissa: yli 10 v.

Haastattelu sähköpostitse: 08.02.2021

Haastattelija: Mariette Domche

Kysymykset

1. Kertoisitteko lisää itsestänne ja siitä, mitkä ovat pääasialliset tehtävänne yrityksessä?

Laatutiedot, näytteenotto, asiakirja päivitykset, läsnä tarkastuksissa, omavalvonta, sisäiset koulutukset, kaikki, mikä liittyy standardin vaatimusten täyttämiseen perustuen FSSC 22000.

2. Mitä elintarvikkeita tuotatte, ja millaiset asiakkaat ovat kohderyhmänne?

Valmistamme pääasiassa pakastettuja lihatuotteita (kebapituotteet) ja kanatuotteet. Asiakkaat ovat SK, Horeca, teollisuuden asiakkaat ja VK asiakkaat.

3. Mitkä ovat pääasialliset haasteet tai ongelmat, joita yrityksellänne on ruoan turvallisuuden takaamisessa?

Aina silloin tällöin mikrobeja voi esiintyä tuotannossa.

4. Oletteko koskaan kohdanneet ei-turvallisten elintarvikkeiden tapauksia tuotantoketjussanne?

- Jos vastasitte kyllä: mitä riskinhallintatyökaluja käytitte ongelman ratkaisemiseksi?

Kyllä, esimerkiksi CCP-rajaa ei saavutettu (lämmitys), tämän vuoksi tuotteet on hävitetty sisäisesti.

- Jos vastasitte ei, miten reagoisitte ruoan saastumiseen / ei-turvalliseen ruokaan, jos sellainen tilanne tulisi eteen?

5. Mitä työkaluja käytetään vaarojen tunnistamiseen ja luokitteluun?

Ruokaviraston malliin perustuvat vaara-analyysit. Vaarat on jaettu biologisiin, mikrobiologisiin, kemiallisiin ja vieraisiin esineisiin.

6. Käytättekö vaarojen arviointia ja kriittisiä hallintapisteitä elintarvikkeiden valmistuksen aikana? Jos vastasitte kyllä, kertokaa miten?

Kyllä, aistinvarainen hallinta, aika, lämpötilan mittaukset, näytteenotto, paino, tuotannon valvonta.

7. Miten osallistutte henkilökohtaisesti ruokamyrkytysten leviämisen estämiseen?

Koko ketjun sisäiset vaatimukset täytetään sisäisesti, henkilökunnan koulutus, näytteenotto.

8. Mitkä ovat nykyisten riskienhallintatyökalujen vahvuudet ja heikkoudet?

Ruokaviraston malli on helppokäyttöinen ja arviointi on saatavilla kaikista vaaroista.

9. Mitä strategioita käytätte tarjotaksenne kestäviä ja turvallisia elintarvikkeita asiakkailenne?

Noudattaa lainsäädäntöä, omavalvonta ja täyttää kaikki standardin vaatimukset (FSSC 22000).

10. Kuinka osallistutte henkilökohtaisesti hyviin hygieniakäytäntöihin työsi aikana?

Edeltää hyvää esimerkkiä suojavaatteista, käsien hygienia ja huomauttaa ja poistaa kaikki poikkeamat, jotka saattavat vaarantaa tämän.

11. Millaisena näette elintarviketurvallisuuden tulevaisuuden? Helpottavatko uudet tekniikat tai asenteiden muutos turvallisten elintarvikkeiden tuottamisen ja markkinointia?

Varmasti, meillä on esim. digitalisoitu siivouksen seuranta, mitä tarkoittaa, että kun tämä on täytetty, päivämäärä ja kellonaika sekä nimikirjaimet tulevat automaattisesti eikä niitä voi muuttaa jälkikäteen. Työn alla on myös CCP kontrollien digitalisointi

Yritys: 2

Vastaajan asema yhtiössä: Laatuasiantuntija

Vastaajan vuosien kokemus nykyisessä roolissa: 1,5 v

Interview via E-mail: 1.02.2021

Haastattelija: Mariette Domche

Kysymykset

1. Kertoisitteko lisää itsestänne ja siitä, mitkä ovat pääasialliset tehtävänne yrityksessä?

Toimin Saarioinen Oy:n laatuasiantuntijana. Tehtäviini kuuluvat kattavasti elintarviketurvallisuus ja siihen liittyvien toimintatapojen kehittäminen, elintarvikelainsäädäntö sekä elintarviketurvallisuusstandardeihin liittyvät asiantuntijatehtävät. Toimin tehtaiden laatuorganisaatioiden sekä tuotekehityksen tukena selvityksissä ja päätöksenteossa. Teen auditointeja, sekä sisäisiä että ulkoisia.

2. Mitä elintarvikkeita tuotatte, ja millaiset asiakkaat ovat kohderyhmänne?

Valmisruokia, sisältäen mm. lihajalosteita, pizzoja, keittoja, laatikkoruokia, salaatteja, hilloja, marmeladeja, salaatikastikkeita, välipaloja. Kohderyhmiämme ovat kuluttajat sekä FS- ja teollisuusasiakkaat.

3. Mitkä ovat pääasialliset haasteet tai ongelmat, joita yrityksellänne on ruoan turvallisuuden takaamisessa?

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4. Oletteko koskaan kohdanneet ei-turvallisten elintarvikkeiden tapauksia tuotantoketjussanne? Kyllä

- Jos vastasitte kyllä: mitä riskinhallintatyökaluja käytitte ongelman ratkaisemiseksi?

En täysin ehkä ymmärrä kysymystä, mutta elintarvikkeiden turvallisuuden hallinta alkaa turvallisten raaka-aineiden valinnasta, käytämme siis luotettavia raaka-ainetoimittajia, raaka-aineilta vaaditaan myös tarkat spesifikaatiot. Tuotteiden turvallisuus perustuu mm. tarkkaan reseptiin, valmistuksen hallintaan ja tuotteen tutkimuksiin. Tuotteet pakataan niiden turvallisuutta ylläpitäviin materiaaleihin ja tuotteiden logistiikasta huolehditaan.

- Jos vastasitte ei, miten reagoisitte ruoan saastumiseen / ei-turvalliseen ruokaan, jos sellainen tilanne tulisi eteen?

5.Mitä työkaluja käytetään vaarojen tunnistamiseen ja luokitteluun?

Vaarat tunnistetaan ja luokitellaan HACCP-menetelmän avulla.

6. Käytättekö vaarojen arviointia ja kriittisiä hallintapisteitä elintarvikkeiden valmistuksen aikana? Kyllä

Jos vastasitte kyllä, kertokaa miten? Kaikille tuotteille tai tuoteryhmille on laadittu vuokaaviot ja HACCP, joissa tuotteeseen liittyvät vaarat on arvioitu ja otettu huomioon käytännön tekemiseen. Näitä asiakirjoja ylläpidetään säännöllisesti esim. raaka-aineen tai valmistustavan muuttuessa. Kriittisten hallintapisteiden toteutuminen valmistuksessa on edellytys tuotteen hyväksymiselle myyntiin.

7.Miten osallistutte henkilökohtaisesti ruokamyrkytysten leviämisen estämiseen?

Ohjeistamalla, opastamalla ja kouluttamalla henkilökuntaamme ja ulkopuolisia työntekijöitä tehtaalla ja sen eri hygienia-alueilla hygieenisesti toimimiseen ja ristikontaminaatiot minimoiden.

8.Mitkä ovat nykyisten riskienhallintatyökalujen vahvuudet ja heikkoudet?

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9. Mitä strategioita käytätte tarjotaksenne kestäviä ja turvallisia elintarvikkeita asiakkailleenne?

Tuoteturvallisuus perustuu tuotteiden turvallisuutta uhkaavien vaarojen tunnistamiseen ja riskien hallintaan. Riskikartoitus kattaa raaka-aineet, prosessit, materiaalivirrat ja tuotteet sekä niihin liittyvät riskit. Riskit hallitaan raaka-ainelähteiden valinnalla, toimintaohjeilla, prosessiarvoilla, spesifikaatioilla, ohjausrajoilla ja erilaisilla valvontatoimilla. Riskien hallintatavat on kuvattu viranomaisten valvomissa omavalvontasuunnitelmissa.

10. Kuinka osallistutte henkilökohtaisesti hyviin hygieniakäytäntöihin työsi aikana?

Työni on tukea tuotantolaitoksia hyvien hygieniakäytäntöjen ylläpidossa selvittämällä, ratkaisemalla ja mahdollisesti ohjeistamalla erilaisissa tilanteissa.

11. Millaisena näette elintarviketurvallisuuden tulevaisuuden? Helpottavatko uudet tekniikat tai asenteiden muutos turvallisten elintarvikkeiden tuottamisen ja markkinointia?

Elintarviketurvallisuus ei ole itsestäänselvyys vaan se vaatii hallittuja toimintoja, jatkuvaa seuranta ja sitoutumista sovittuihin sääntöihin ja käytäntöihin. Uudet tekniikat ja asennemuutokset helpottavat varmasti turvallisten elintarvikkeiden tuottamista, toisaalta kuluttajat ovat entistä tietoisempia ja osaavat vaatia, kysyä ja kyseenalaistaa. Lisäksi uusia uhkia syntyy jatkuvasti (tehokkaampi tutkimus esim. vierasaineiden löytymiseksi, ympäristön saastuminen, epäpuhtaudet, sairaudet, elintarvikepetokset). Näihin kaikkiin on pystyttävä reagoimaan nopeasti ja tehokkaasti.

Yritys: 3

Vastaajan asema yhtiössä: Laatupäällikkö

Vastaajan vuosien kokemus nykyisessä roolissa: 4½ vuotta

Haastattelu sähköpostitse: 14.4.2021

Haastattelija: Mariette Domche

Kysymykset

1. Kertoisitteko lisää itsestänne ja siitä, mitkä ovat pääasialliset tehtävänne yrityksessä?

Toimin Laatupäällikkönä Kivikylän Kotipalvaamon kaikilla laitoksilla (Lappi, Säskylä, Huittinen). Pääasiallinen tehtäväni on vastata laatuun liittyvistä asioista, kuten laitosten omavalvontasuunnitelmista, fssc-22000 sertifiointien vaatimusten noudattamisesta, työohjeista, riskianalyyseistä, jne. Toimin myös jatkuvasti tuotekehitystehtävissä, ja olenkin päivittäin tekemisissä uutuustuotteiden suunnittelussa.

2. Mitä elintarvikkeita tuotatte, ja millaiset asiakkaat ovat kohderyhmänne?

Tuotamme pääasiassa porsaanlihatuotteita, mutta myös muita lihatuotteita (broiler, nauta, lammas, hevonen) on tuotannossa. Lihasta valmistamme raakalihatuotteita kuluttaja-, ja horeca-puolelle, makkaroitu, eineksiä ja perinnepalvituotteita. Pääkohderyhmämme on laadukasta kotimaista tuotantoa arvostava kuluttaja. Pakkauskokoja teemme monenlaisia, tuotteitamme kohdennetaan niin yksinasuille, kuin suurperheillekin.

3. Mitkä ovat pääasialliset haasteet tai ongelmat, joita yrityksellänne on ruoan turvallisuuden takaamisessa?

Raakalihavalmisteiden kanssa pääasialliset haasteet ovat vaatimuksenmukaisuus. Tuotteet eivät saa sisältää vierasesineitä, kuten luun sirpaleita tai suojarusteiden kappaleita. Myös mikrobiologinen laatu pitää olla kunnossa aina viimeiseen käyttöpäivään asti. Lihan valmistuksessa tärkeää on nopea raaka-aineen kierto ja kylmäketjun katkeamattomuus. Kypsien lihatuotteiden kohdalla tarkin kontrolli on sisälämpötilojen raja-arvoissa. Porsaan ja naudanlihavalmisteiden kypsä sisälämpötila ei saa missään tilanteessa alittaa + 72 asteen

lämpötilaa, joka takaa tuoteturvallisuuden. Siipikarjalla vastaava raja on + 75 astetta. Riittävän nopea jäädyttäminen on myös tarpeen. Kypsien lihavalmisteiden käsittely pakkausvaiheessa tulee olla mahdollisimman hygieenistä, ettei kypsennetty liha kontaminoidu enää siinä vaiheessa. Näillä peruspilareilla turvataan mikrobiologinen laatu ja kuluttajan turvallisuus. Lisäksi on useita ns. tukiohjelmia lisäksi, kuten allergeenien hallintaohjelma, henkilöstön hygienia ja perehdytys, vierasesinehallinta, kovamuovi-, ja lasirekisteri, kuljetusten hallinta, vastaanottotarkastukset, jne.

4. Oletteko koskaan kohdanneet ei-turvallisten elintarvikkeiden tapauksia tuotantoketjussanne?- Jos vastasitte kyllä: mitä riskinhallintatyökaluja käytitte ongelman ratkaisemiseksi?

Takaisin vetoja emme ole minun aikani joutuneet tekemään, mutta logistiikkakeskuksesta on palautettu tehtaalle erä, joissa on toimivan omavalvonnan ansiosta huomattu jokin virhe jo ennen kuin tuote on päätynyt kuluttajille asti. Tällöin on toimittu kylmästi niin, että virheellinen erä on jouduttu kokonaisuudessaan hävittämään kuluttajan turvallisuuden varmistamiseksi.

- Jos vastasitte ei, miten reagoisitte ruoan saastumiseen / ei-turvalliseen ruokaan, jos sellainen tilanne tulisi eteen?

5.Mitä työkaluja käytetään vaarojen tunnistamiseen ja luokitteluun?

Vaarojen tunnistamisessa ja luokittelussa turvaudumme pääsääntöisesti kokeneiden työntekijöiden kokemukseen ja kirjalliseen / opittuun tietoon esimerkiksi mikrobiologian suhteen. Vaara-arvioinnissa käytetään aina kaavaa (vaaran todennäköisyys kertaa vaaran vaakavuus) = tuoteturvallisuusriskin suuruus. Suuruuden perusteella valitaan tarvittavat hallintakeinot.

6.Käytättekö vaarojen arviointia ja kriittisiä hallintapisteitä elintarvikkeiden valmistuksen aikana?

Jos vastasitte kyllä, kertokaa miten? Jokaisesta prosessista on vaara-arviointi tehty erikseen ja ne myös tarkistetaan vuosittain. Kriittisiä hallintapisteitä tuotannossamme on kypsien tuotteiden sisälämpötila, joka ei saa koskaan alittaa tiettyä lämpötilaa.

7.Miten osallistutte henkilökohtaisesti ruokamyrkytysten leviämisen estämiseen?

Olen ensimmäinen yhteyshenkilö esimerkiksi tuotteitamme päivittäin tutkivan akkreditoitun laboratorion kanssa. Jos tuotteissa todetaan esimerkiksi jotain ruokamyrkytystä aiheuttavaa bakteeria, on minun velvollisuuteni ilmoittaa siitä tarvittaville tahoille, jotta jakelu pysähtyy. Pahimmassa tapauksessa tuloksena olisi julkinen takaisin veto.

8. Mitkä ovat nykyisten riskienhallintatyökalujen vahvuudet ja heikkoudet?

9. Mitä strategioita käytätte tarjotaksenne kestäviä ja turvallisia elintarvikkeita asiakkailenne? Tiettyjä linjanvetoja esim. raaka-aineiden kotimaisuudesta on vedetty jo yrityksen alkuaikana, joka osaltaan takaa jo tuoteturvallisuuden. Tavoittemme on tietysti tehdä vain ensiluokkaisia valmisteita kuluttajille, emme pyri ikinä mahdollisimman halpaan hintaan vaan laadukkaaseen ja turvalliseen tuotteesen.

10. Kuinka osallistutte henkilökohtaisesti hyviin hygieniakäytäntöihin työsi aikana?

Minun vastuualueeni on hygieniakäytäntöjen osalta valvoa osastojen hygieniakäyttämistä ja puuttua yhdessä esimiesten kanssa havaittuihin epäkohtiin. Varsinaiseen tuotantotyöhön en osallistu.

11. Millaisena näette elintarviketurvallisuuden tulevaisuuden?

Helpottavatko uudet tekniikat tai asenteiden muutos turvallisten elintarvikkeiden tuottamisen ja markkinointia? Näen elintarviketurvallisuuden yhä enemmän automatisoidumpana. Käytetään apuna erilaisia pikatestausmenetelmiä, konenäköjä, röntgenlaitteita, robotteja, metallinpaljastimia suoraan linjoissa jne. Menetelmät kehittyvät siihen suuntaan, että suurin osa ongelmista pystytään paikantamaan reaaliajassa, jolloin reagointiaika lyhenee, eikä lopulta ole edes mahdollista toimittaa kuluttajille virheellisiä tuotteita.

Yritys: 4

Vastaajan asema yhtiössä: talouspäällikkö

Vastaajan vuosien kokemus nykyisessä roolissa: 13

Haastattelu sähköpostitse: 17.05.2021

Haastattelija: Mariette Domche

Kysymykset

1. Kertoisitteko lisää itsestänne ja siitä, mitkä ovat pääasialliset tehtävänne yrityksessä?

Taloushallinto, hr, ict, logistiikka

2. Mitä elintarvikkeita tuotatte, ja millaiset asiakkaat ovat kohderyhmäänne?

Päätuotteita ovat meetvurstit ja kylmäsavupaistit. Asiakkaitamme ovat pääosin isot keskusliikkeet ja vähittäiskaupat. Lisäksi myyntiä tukuille ja horeca-puolelle.

3. Mitkä ovat pääasialliset haasteet tai ongelmat, joita yrityksellänne on ruoan turvallisuuden takaamisessa?

Talossa on oma Laboratorio, jossa tutkitaan saapuvat raaka-aineet ja tuotanto määritellyiltä osin. Tuotantoa ja tuoteturvallisuutta valvotaan BRC-laaturjestelmän avulla. Suurimmat haasteet ovat hyvän hygienian varmistaminen ja laadun säilyminen koko prosessin ajan. Laaturjestelmässä määritellään tuotannon lämpötilat ja lähtevässä logistiikassa tutkitaan kuljetusvälineen siisteys ja lämpötila ennen tuotteiden lähetystä asiakkaille/ lähettämöön.

4.Oletteko koskaan kohdanneet ei-turvallisten elintarvikkeiden tapauksia tuotantoketjussanne?

Ei, tutkimusten avulla mahdolliset riskit on voitu välttää ennakoinnin avulla.

- Jos vastasitte kyllä: mitä riskinhallintatyökaluja käytitte ongelman ratkaisemiseksi?

- Jos vastasitte ei, miten reagoisitte ruoan saastumiseen / ei-turvalliseen ruokaan, jos sellainen tilanne tulisi eteen? Tuotteet tulisi hävittää biojätteenä

5. Mitä työkaluja käytetään vaarojen tunnistamiseen ja luokitteluun?

Laatujärjestelmä SFSSC 22000 on vaihdettu tänä keväänä BRC:ksi. Molemmissa laatujärjestelmissä on määritelty vaarojen arvioinnin käytännöt ja luokittelut.

Jokaisen tuotteen prosessille on tehty analyysi. On selvitetty mikrobiologiset, kemialliset ja fysikaaliset vaarat, arvioitu vaarojen vakavuutta sekä esiintymisen todennäköisyyttä (vaaran merkittävyyttä) kussakin tuotteen valmistusvaiheessa kuljetus mukaan lukien. Samalla on myös selvitetty vaarojen hallittavuutta ja sitä onko vaihe tai kohta kriittinen hallintapiste (CCP), laadunvalvontapiste vai hallintapiste. Vaaran todennäköisyys on arvioitu numeerisesti 1-10

6. Käytättekö vaarojen arviointia ja kriittisiä hallintapisteitä elintarvikkeiden valmistuksen aikana?

Jos vastasitte kyllä, kertokaa miten? Kyllä, ks yllä.

7. Miten osallistutte henkilökohtaisesti ruokamyrkytysten leviämisen estämiseen?

Varmistamalla työhöjeiden ja laatujärjestelmän vaatimusten noudattamisen kaikkien työntekijöiden osalta. Varmistamalla koulutuksen avulla työntekijöiden osaaminen

8. Mitkä ovat nykyisten riskienhallintatyökalujen vahvuudet ja heikkoudet?

Vahvuutena on järjestelmän jatkuva päivitys ja auditoinnit. Dokumentointi joka vaiheessa. Heikkoutena on runsas käsityö ja manuaalinen työ.

9. Mitä strategioita käytätte tarjotaksenne kestäviä ja turvallisia elintarvikkeita asiakkailenne? Strategiaan on kirjattu tuotteiden hyvä laatu. Se ohjaa tekemistä ja toimintaa. Laatujärjestelmä ja auditoinnit varmistavat ohjeiden mukaisen toiminnan.

10. Kuinka osallistutte henkilökohtaisesti hyviin hygieniakäytäntöihin työsi aikana?

Osallistun auditoinnina laadun valvontaan ja kehittämiseen.

11. Millaisena näette elintarviketurvallisuuden tulevaisuuden? Helpottavatko uudet tekniikat tai asenteiden muutos turvallisten elintarvikkeiden tuottamisen ja markkinointia?

Elintarvikkeiden tulee olla ehdottomasti turvallisia ja laadukkaita, jotta yritys pystyy jatkamaan toimintaansa. Maine on äärimmäisen tärkeä kaikille yrityksille, mutta aivan äärimmäisen tärkeä elintarvikealalla.