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Enhancing Food Safety Measures in Micro Small Medium Enterprises: A Comprehensive Analysis of MSMEs in Kemiling Bandar Lampung

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Abstract (Arial 11 Pts)

MSMEs in the food business, especially in Indonesia, encounter major obstacles in adhering to food safety requirements because of their restricted resources and technical knowledge. This study investigates the effects of applying Hazard Analysis and Critical Control Points (HACCP) methodology on enhancing food safety standards at a particular MSME, Desi Kue, situated in Bandar Lampung, Indonesia. The study uses surveys, interviews, and hazard analysis assessments to identify potential dangers and suggest effective management techniques to improve food safety processes at Desi Kue. Customized education and training programs are crucial for enhancing awareness and comprehension of food safety among MSME stakeholders. The report emphasizes the importance of adjusting food safety policies and resources to tackle the specific difficulties encountered by MSMEs. MSMEs can effectively adopt HACCP principles by working with regulatory organizations and industry associations. This will help improve consumer trust, ensure public health, and promote sustainable growth in the food sector. This study offers significant insights for Desi Kue and MSMEs in Indonesia and other developing countries, enabling them to capitalize on prospects for competitiveness and growth in the global market by implementing strong food safety management systems.

Keywords: *Micro-small medium enterprises, hazard analysis, and critical control points, food safety,*

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1. Introduction

Micro, small, and medium companies (MSMEs) are vital to Indonesia's economy, especially in the food industry. These companies encompass a wide range of industries, including local market sellers and small-scale food producers. They play a crucial role in creating employment opportunities and fostering economic growth in different regions of Indonesia. MSMEs struggle to comply with food safety requirements because of their low resources, lack of technical experience, and difficulties in developing complete food safety management systems, despite their economic significance. MSMEs face several complex hurdles in upholding food safety regulations. The smaller size of these businesses may lead to restricted access to financial resources and technical expertise needed to establish strong food safety protocols. The decentralized nature of MSMEs in the food supply chain makes it challenging to adequately monitor and control food safety measures. MSMEs are in danger of unintentionally jeopardizing food safety, which can negatively impact public health, customer trust, and the reputation of the food business.

MSMEs can overcome these problems by implementing systematic approaches to food safety management, including the Hazard Analysis and Critical Control Points (HACCP) methodology. HACCP offers a systematic framework for recognizing, assessing, and managing risks in food manufacturing procedures, guaranteeing the safety of food items for consumption. MSMEs can use HACCP-based food safety management systems to methodically identify hazards, set critical control points, and apply preventative measures to reduce risks during food manufacturing. Additionally, adopting HACCP principles allows MSMEs to improve their competitiveness and market reach by showcasing their dedication to food safety and quality assurance. Adhering to globally acknowledged food safety standards boosts customer trust and creates new commercial prospects, both locally and globally. Investing in food safety management systems can help MSMEs reduce the likelihood of foodborne illness outbreaks, protect public health, and enhance the resilience and sustainability of the food business.

Food quality safety and effectiveness in the production process are important things to note to gain an edge in the global market. Contamination of food by germs and toxic substances is still a problem for developing countries, including Indonesia. Unsafe food due to contamination by pathogenic microbes and foreign substances can trigger various diseases from mild to harmful to health. This is the background of HACCP or hazard analysis and critical point control that is very important applied in the boga service business, including campus canteen business. Campus canteen is a boga service business in the field of procurement and food service to people in the campus environment. The existence of UMKMs is strongly felt the benefits to the community. In addition to the relatively cheap price, a varied menu and ample portions of food are some of the reasons students like to eat in the campus cafeteria.

Foods that are not safe to consume are very dangerous for health. HACCP is a quality assurance system that is based on the awareness or perception that *hazards* can arise at various points or stages of danger. The main key to HACCP is hazard anticipation and identification of surveillance points that prioritize preventive measures

rather than controlling final product testing. The HACCP system is not a *zero-or-no-risk* food assurance system but is designed to minimize the risk of food safety hazards. The HACCP system is also considered a management tool used to produce food supply chains and proxy processes against contamination of microbiological, chemical, and physical hazards.

Desi Kue is an MSME based in Bandar Lampung, Indonesia. The city is situated in Indonesia. This business is renowned for its wide variety of traditional market meals available for purchase. Desi Kue is researching to improve the way the business complies with food safety rules. MSMEs are crucial in the economy, particularly in the food industry, as they make substantial contributions to employment and the economic growth of communities. This research will be motivated by recognizing the significant impact that MSMEs have on the economy. This research will be motivated by the recognition that has been received. This research aims to examine the various ways in which micro, small, and medium-sized businesses (MSMEs) impact the economic prosperity of specific areas. MSMEs often face challenges when they realize the importance of ensuring the safety of their food supply. MSMEs are smaller in size, therefore the reason for this.

This study aims to identify potential hazards and provide effective control measures to improve the existing food safety standards at Desi Kue's operations. These changes will allow Desi Kue to improve the current food safety regulations. The research project will utilize the HACCP technique, which stands for hazard analysis and critical control point, to achieve the study's objective. This method is a strategic approach aimed at identifying, evaluating, and controlling risks associated with food manufacturing processes to ensure the safety of the food for consumption. Hazard Analysis and Critical Control Points (HACCP) is a systematic process. Some individuals also use the term HACCP as an acronym for Hazard Analysis and Critical Control Points.

The need for the application of HACCP in UMKMs is due to the condition of canteens and food handlers who lack awareness of the safety of the food served. As well as a lack of knowledge about sanitation and food safety. So it is possible for contamination and potential hazards that are indicated as biological, chemical, and physical hazards. This research is motivated by the urgent need to quickly reduce that gap. A thorough HACCP analysis will be conducted as part of the research to provide prospective solutions for improving food safety standards. The implementation of these solutions is expected to result in significant success for both the company and its clients. The results of this study are expected to improve food safety standards in Desi Kue and the micro, small, and medium-sized company sectors. This claim is grounded in the expectation that the entire food business will gain advantages from the results of this study.

2. Empirical Literature Review

Hazard Analysis and Critical Control Points (HACCP)

Hazard Analysis and Critical Control Point (HACCP) is a systematic approach to identifying and controlling potential hazards in food production. It was developed by the Pillsbury Company, U.S. Army Natick Laboratories, and NASA to ensure the safe production of food for the manned space program. The HACCP concept has three principles: identification and assessment of hazards, determination of critical control points, and establishment of a system to monitor critical control points. The seven principles of HACCP were published in 1989 and have been revised twice. In 1997, a third revision was conducted by merging seven principles with five preliminary steps of HACCP, known as the 12 steps of HACCP.

Table 1. 12 Steps of HACCP

Step 1 Conduct HACCP team
Step 2 Describe the food and its distribution
Step 3 Describe the intended use and consumers of the food
Step 4 Develop a flow diagram which describes the processes
Step 5 Verify the flow diagram
Principle 1 Conduct a hazard analysis
Principle 2 Determine the critical control points
Principle 3 Establish critical limits
Principle 4 Establish monitoring procedures
Principle 5 Establish corrective actions
Principle 6 Establish verification procedures
Principle 7 Establish record-keeping and documentation procedures

source: NACMCF, 1997

HAZARD ANALYSIS CRITICAL CONTROL POINT

HACCP or hazard analysis and critical control points is a management system used to protect food from biological, chemical, and physical hazards. The system is implemented as a precaution against hazards that are expected to occur and is not a reaction to the appearance of danger. So, this system is a preventive measure

before danger arises. HACCP is a system that ensures that all potential food hazards are systematically controlled at any time. The concept of HACCP is a systematic method of food safety management and is based on familiar principles, aimed at identifying hazards that may occur at any stage in the food supply chain, and control measures are placed to prevent such hazards from occurring. This method is very logical and examines all stages in food production from the monitoring stage to the consumer, including all processes and distribution activities.

FOOD CONTAMINATION

Food contamination comes from physical, chemical, and biological contamination. Physical contamination in food is an agent that can be found through physical observation. Physical contamination can be hair, bones, dust, nails, and other physical objects. Chemical contamination can come from chemical elements or compounds. According to the Regulation of the Head of the Indonesian Food and Drug Supervisory Agency, chemical contamination is a contamination in food derived from chemical elements or compounds that can harm and endanger human health, can be heavy metal contamination, mycotoxin contamination, antibiotic contamination, sulfonamide contamination, or other chemical contamination. Biological contamination comes from biological materials and can be microbial contamination or other pollutants such as protozoan and nematodes.

3. Method, Data, and Analysis

This study's research methodology includes various essential components to thoroughly investigate the challenges encountered by micro, small, and medium-sized enterprises (MSMEs) in the food industry related to food safety compliance and the adoption of Hazard Analysis and Critical Control Points (HACCP) methodology. The sample method targets one of the MSMEs in the food industry in Bandar Lampung, Indonesia, Desi Kue

Data gathering methods include systematic surveys and semi-structured interviews carried out with entrepreneurs, employees, and food handlers in the chosen MSMEs. The surveys and interviews will collect descriptive data on the understanding and consciousness of cleanliness and food safety, along with the particular obstacles faced in executing HACCP protocols. Survey instruments will be created to assess variables concerning food safety knowledge, attitudes, and behaviors, while interview protocols will lead detailed talks to delve into participants' experiences and viewpoints. The measurement methods would involve using recognized scales and tools to assess food safety knowledge, attitudes, and practices, tailored to the specific circumstances of micro, small, and medium enterprises (MSMEs) in the food sector. The surveys and interviews will include questions designed to evaluate respondents' comprehension of food safety principles, their compliance with sanitation procedures, and their involvement in using the HACCP methodology. Using open-ended questions in the interview protocols will provide detailed insights into the difficulties encountered by MSMEs and their views on the efficacy of food safety measures.

4. Result and Discussion

The author must provide an ample level of detail in presenting the results. This enables readers to discern the specific statistical analyses performed and the reasons behind them. Furthermore, this detail serves to substantiate the author's eventual conclusions.

The section labeled "Discussion and Analysis" serves to elucidate the underlying logic behind the obtained results, addressing the question of "Why do these results manifest as they do?" It not only expounds upon relevant theories but also draws connections to the empirical evidence derived from the results. This section goes beyond mere explanation of figures and delves into a comprehensive analysis aimed at bridging the identified gap that the study seeks to address.

Table 2. Hazard analysis assessment and control measures

NO.	ACTIVITIES	IDENTIFY HAZARD		CAUSE/SOURCE/ JUSTIFICATION OF DANGER	CONTROL MEASURES
		DANGER	TYPES OF DANGERS		
1.	Raw Material Receipts	Biology	*E. Coli, Salmonella*	Environment & sanitation	Do a selection process
		Chemistry	Pesticides		
		Physical	Rocks, hair, dirt		

2.	Storage of Raw Materials	Biology	*E. Coli,* insects	Bacteria that are resistant to cold temperatures	Separating on contamina ted materials
3.	Raw Materia l Sorting	Biology	*E. Coli,* insects	Handling of raw materials that is not good, the hands of the maker (chef) are dirty	do a selection process
4.	Washi ng raw materi als	Biology	*E.Coli,* insects	Sanitation in the previous treatment, the use of dirty water. Washing on the side of the road, the danger of vehicle emission. Slip on the floor	Do repeated washing & use clean water. dry place after washing
		Chemistr y	Pesticides, heavy metals		
5.	Cutting/slicing	Biology	*E. Coli,* Salmonella, insects	Sanitation in previous processing, environment, and dirty tools. Not wearing gloves. hands hit by a knife, body aches	cutting using a clean tool and using cooking gloves
		Physical	Hair, dirt, dust		
8.	Mixing raw materials	Biology	Salmonella insect	Environment & sanitation of food handlers	Perform the selection process & use cooking aids
		Physical	Stone, hair		
9.	Cooking Process	Biology	*E. Coli, Salmon ella,*	Environment & sanitation of food handlers sore hands, risk of getting hot oil, slippery floor	Do the selection cell process & use cooking aids
10.	Cooling (Resting)	Biology	*E. Coli, Salmon ella, insect*	Environment & sanitation of food handlers	Do the selection process & use cooking aids
		Physical	*Dust*		
11.	Packing	Biology	*E. Coli, Salmon ella, insect*	Environment & sanitation of food handlers	using cooking aids, using gloves
		Physical	*Stone, hair, steples*		
12.	Serving	Biology	*Salmo nella insect*	Sanitation of the place of presentation & room does not meet insects	Give cover to the container

Source: Data Has Been Processed, 2024

a. Identify Hazards in the Process of Ready-to-Eat Food Processing

The table above illustrates the identification of hazards that arise during the manufacturing of ready meals. At the beginning of the ready meals production process, raw materials are obtained and any biological, chemical, and physical hazards are identified. Bacteria like E. coli and Salmonella cause this specific type of biological danger, which occurs in unclean environments. Pesticides, thrown into the environment by farmers during chemical spraying, are responsible for this type of chemical danger. Stone, hair, and dirt are instances of bodily harm that can result from environmental factors and the personal actions of someone handling food.

This stage is categorized as a Critical Control Point (CCP) based on its severity, which is considered to be severe. To regulate the issue, the recommended solution is to conduct the selection process concurrently with the receipt and purchase of raw materials. The initial washing stage is the subsequent phase in the process. At this stage, biological hazards in the form of E. coli and insects were identified. The dangers were caused by sanitation issues in previous treatments and the use of polluted water.



The severity level of this stage is moderate and classified as the CCP stage. Implementing control measures such as washing the area many times with clean or running water can help manage the situation. The cutting and slicing stage follows the procedure. Biological hazards such as E. coli, Salmonella, and insect bacteria were identified at this phase. The biological dangers resulted from poor hygiene practices in previous processes, together with unclean environments and devices. This stage is considered significantly more severe than the preceding stages and is classified as CCP. Utilizing sterile implements for incisions is a control strategy that can be employed. The next step is to begin the process of merging the basic materials. During this phase, Salmonella and insects were identified as biological dangers. The dangers resulted from the environment and the cleanliness practices of food handlers. This stage is classified as CCP, signifying that it needs medical intervention. Control methods involve doing the selection procedure and utilizing several culinary aids.

the cooking method is the subsequent stage in the process. At this point, biological dangers including E. coli, Salmonella, and insects resulting from the environment and sanitation of food handlers were recognized. This stage is categorized as a Critical Control Point (CCP) based on its severity, which is considered to be severe. To prevent contamination, control procedures such as implementing the selection process and utilizing cooking aids during food preparation can be employed. The next stage is the packing phase. At this stage, biological hazards such as E. coli, Salmonella, and bacterial pathogens were identified. The dangers resulted from the environmental conditions and sanitation practices of the food handlers. This stage is categorized as a Critical Control Point (CCP) based on its severity, which is considered to be severe. Both the selection process and the use of culinary tools are control strategies that can be put into practice. Salmonella bacteria provide biological dangers due to their resistance to severe temperatures and the presence of endospores, enabling them to multiply even during the heating process. Physical risks including rocks, hair, and sand can be generated by the environment and food handlers. If the food has not been sold out, the next stage is resting. The severity of this stage is classified in the CCP category, signifying it is highly intense. To regulate the issue, one can cook meals in moderation and refrain from reheating unconsumed food. Next in the sequence is the serving step. This phase detected biological threats such as Salmonella bacteria and insects due to inadequate environmental conditions and lack of sanitation in the preceding manufacturing cycle. This step also found physical dangers such as dust and hair resulting from the cleaning of the presenting area, which should be regularly cleansed. The severity is currently deemed to be high and is categorized as CCP. To prevent insects from infecting ready-to-eat food and causing it to spoil, cover containers with lids.

b.Final results & Evaluation of HACCP Implementation in UMKM Desi Kue

The insufficient understanding and consciousness regarding sanitation and food safety among individuals involved in micro, small, and medium enterprises (MSMEs) such as Desi Kue hinder the adoption of Hazard

Analysis and Critical Control Points (HACCP) protocols. The lack of understanding is due to limited access to information on food safety standards, misconceptions about the challenges in ensuring food safety, and a general unawareness of proper protocols for dealing with food safety concerns. MSMEs frequently depend on basic techniques like visually assessing the doneness of food, reheating leftovers, or disposing of food that seems ruined to maintain food safety.

The undisclosed HACCP guidelines designed for small and medium companies (SMEs) can be a factor in the insufficient knowledge regarding sanitation and food safety procedures. Without specific protocols and standardized procedures tailored to the distinctive obstacles encountered by MSMEs, firms such as Desi Kue may find it challenging to properly enforce complete food safety precautions. As a result, the lack of information and awareness makes MSMEs susceptible to various dangers such as biological, chemical, and physical contamination, which can impact the safety and quality of their food products.

Physical injury can be more subtle than biological or chemical toxins, making it a particularly dangerous threat. Biological and chemical hazards can cause immediate health dangers, but physical hazards may not be easily visible to customers. Physical contaminants like foreign objects or debris may appear harmless but can nonetheless present significant health hazards if consumed. This underscores the critical need for vigilance and rigorous quality control protocols in food manufacturing.

Given these obstacles, it is crucial for MSMEs such as Desi Kue to prioritize education and training programs focused on improving knowledge and comprehension of sanitation and food safety standards among all stakeholders. MSMEs can empower their employees to proactively detect and manage possible dangers by offering thorough training programs, sharing pertinent information, and promoting a culture of food safety inside their organizations. Collaborating with regulatory bodies, industry associations, and academic institutions can help provide customized guidelines and resources to assist MSMEs in efficiently applying HACCP principles. By tackling the root causes of the lack of knowledge and awareness regarding sanitation and food safety, small and medium-sized enterprises such as Desi Kue can improve their ability to protect the quality and safety of their food items. This, in turn, can boost consumer trust, ensure public health, and support the sustainable development of the food sector.

5. Conclusion and Implications

to ensure food safety compliance, micro, small, and medium-sized companies (MSMEs) like Desi Kue must use the Hazard Analysis and Critical Control Points (HACCP) approach. The hazards found in the food manufacturing process highlight the need for methodical techniques like HACCP to reduce risks and shield customers from physical, chemical, and biological contaminants. The difficulties MSMEs have implementing HACCP procedures emphasize the necessity of focused education and training programs to raise stakeholder awareness and comprehension of food safety regulations. The results also highlight how crucial it is to adapt policies and materials to the unique requirements and limitations faced by MSMEs in the food sector. Working together with academic institutions, industry groups, and regulatory agencies can help MSMEs apply HACCP more successfully by disseminating knowledge and offering them real-world assistance. MSMEs can improve their capacity to protect the quality and integrity of their food products by addressing the underlying causes of knowledge gaps and encouraging a culture of food safety.

Beyond Desi Kue, the MSME sector in Indonesia and other developing nations is affected by the findings of this study. In addition to safeguarding customer confidence and public health, strengthening food safety procedures among MSMEs also helps the food industry remain resilient and sustainable. MSMEs can seize new chances for expansion and competitiveness in the global market by investing in food safety management systems and placing a high priority on continuous development.

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