Enhancing Food Safety Standards in Kuah Kuwi Noodle MSMEs through Evaluation and Scoring

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Abstract - This study aims to evaluate food safety practices and scoring mechanisms in micro, small, and medium enterprises (MSMEs), with a focus on a noodlebased culinary business, Bakmi Kuah Kuwi. The research adopts a qualitative approach through direct observation and interviews with business owners to examine production activities from raw material procurement to final product presentation. The assessment emphasizes the role of Prerequisite Programs (PRPs) as the foundational support for implementing the Hazard Analysis and Critical Control Points (HACCP) system. Results show that the majority of hazards can be controlled effectively through PRPs and Operational Prerequisite Programs (OPRPs), including sanitation, temperature regulation, and supplier management. However, several Critical Control Points (CCPs) were identified—specifically in the noodle boiling, gyoza steaming, and cooling stages—which require strict monitoring due to their high biological risk. The findings underscore the importance of structured food safety practices in MSMEs and recommend continuous improvement through formal documentation, regular training, and systematic hazard control to ensure product quality and consumer protection.

Keywords: Food Production; Food Safety; HACCP; MSMEs, Risk Assessment

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1. INTRODUCTION

Food can be defined as a material entity that obtains its status as food, not because of its physical or chemical characteristics, but because it is viewed socially and culturally as something that is fit for consumption. Consumption aims to meet the body's nutritional needs and provide a pleasant sensory experience, such as taste, aroma, texture, and visuals. (Barton, 2024). A material is considered edible if its safety is guaranteed and does not pose a health risk when consumed under normal conditions. This includes aspects such as Microbiological safety (free from pathogenic bacteria, viruses, or parasites), Chemical safety (does not contain pesticide residues, heavy metals, or hazardous contaminants), Physical safety (does not contain foreign objects such as metal or glass chips), and proper storage and processing conditions so that the food remains fit for consumption (Putri, 2022).

According to WHO (World Health Organization), food safety means ensuring that food consumed does not endanger health as long as it is processed and used according to its intended purpose. Maintaining food safety is very important for Micro, Small, and Medium Enterprises (MSMEs) so that the products they produce do not endanger consumer health. Unfortunately, there are still many MSMEs who do not understand the importance of implementing proper sanitation and hygiene in the production process, thus opening up opportunities for contamination, both biologically, physically, and chemically (van Asselt, 2022).

Noodle is one type of traditional culinary that is popular with Indonesian people, has great potential to be developed as a superior product in the Micro, Small, and Medium Enterprises (MSMEs) sector. In MSME Noodle Kuah Kuwi, the use of local ingredients such as natural chicken broth, spices, and fresh noodles that are produced independently provides added value both in terms of health and uniqueness of taste. Noodle is not only a filling food choice, but also functions as a culinary commodity with high economic value, which can be adjusted to market trends, for example by adopting the concept of healthy food low in MSG and high in protein (Cioca, 2023). Noodle Kuah Kuwi made from noodles has several toppings such as shredded chicken, wonton chips, vegetables, and gyoza. MSME Noodle Kuah Kuwi is one of the foods that is popular among students because of its strategic location and low price. In addition, Noodle is made by maintaining food safety in terms of physical, chemical, and biological aspects so that it is safe from all kinds of contamination. the importance of maintaining food safety can improve the quality of a food product, food quality focuses on taste, variety, appearance, aroma, freshness, and temperature of food. The UMKM management needs to be consistent in maintaining and even improving the high-quality food menu that aims to maximize customer satisfaction. High-quality products are considered to be able to meet and even exceed customer desires and expectations, which creates customer satisfaction.

One very important method in maintaining food safety is through in-depth risk analysis. This analysis is a systematic process to identify, evaluate, and control potential hazards that can arise at every stage of production. These hazards can come from various sources, such as pathogenic microorganisms (biological) that can cause disease, hazardous chemicals such as pesticide residues, substandard preservatives, or heavy metals that accumulate in raw materials (chemical), as well as foreign objects such as glass fragments, plastic, or metal that can physically contaminate the product (physical). This risk analysis process is not only limited to the final product, but must also include the raw materials and additional materials used, because each element can be a source of significant risk if not managed properly (Lee, 2022).

To ensure that the hazard identification process runs effectively, a number of thorough technical preparations are required. The first step is to compile a list of materials used in production, including raw materials, additional materials, and packaging. Furthermore, the creation of a detailed and accurate food production process. The production process can be made in a flow diagram. This diagram functions as a stage that describes each step of production, making it easier for business actors to identify critical points that have the potential to be sources of contamination or hazards. Then, describe the product thoroughly for analysis, including physical, chemical, and microbiological characteristics, as well as information related to consumption, storage, and processing methods. This information is very important to understand how the product can be contaminated and how the risk can be minimized (Garcia, 2021).

Risk assessment is carried out in two main stages. The first stage is hazard analysis, which involves identifying and evaluating potential hazards at each point in the process. The second stage is grouping risks based on the severity of the impact and the probability of the hazard occurring. Thus, risks can be classified into several categories, such as high, medium, and low risk, which then become the basis for determining the priority of control actions. The

designed control strategy must be dynamic and adaptive, able to adjust to changes in production conditions and the technology used. This approach ensures that food safety can be maintained consistently, providing maximum protection for consumers and maintaining the reputation of business actors (Nguyen, 2023).

The following is a table of risk classification in the HACCP system based on the categories of low risk, medium risk, and high risk which refer to the level of severity and the chance of a hazard occurring (probability), in accordance with general standards and practices in HACCP.

Tabel 1. Risk Assessment

Risk Assessment		Severity				
		Negligible	Minor	Moderate	Major	Catastrophic
Likelihood	Almost certain	5	10	15	20	25
	Likely	4	8	12	16	20
	Possible	3	6	9	12	15
	Unlikely	2	4	6	8	10
	Rare	1	2	3	4	5

	1 – 4 (Low risk)
	5 - 10 (Medium Risk)
	12 - 25 (High Risk)

2. EXPERIMENTAL

Following the analysis of raw materials, the subsequent step involves examining the production process to assess any potential for direct contact with the product. Prior to conducting a more detailed evaluation, it is essential to first gain a clear understanding of the process involved in the preparation of Noodle and Topping, which is outlined as follows :

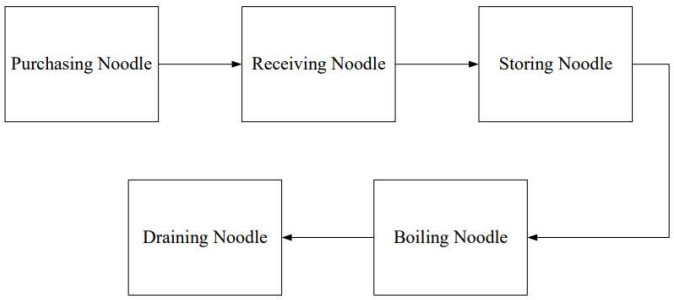

Figure 1 Flowchart of Noodle Preparation

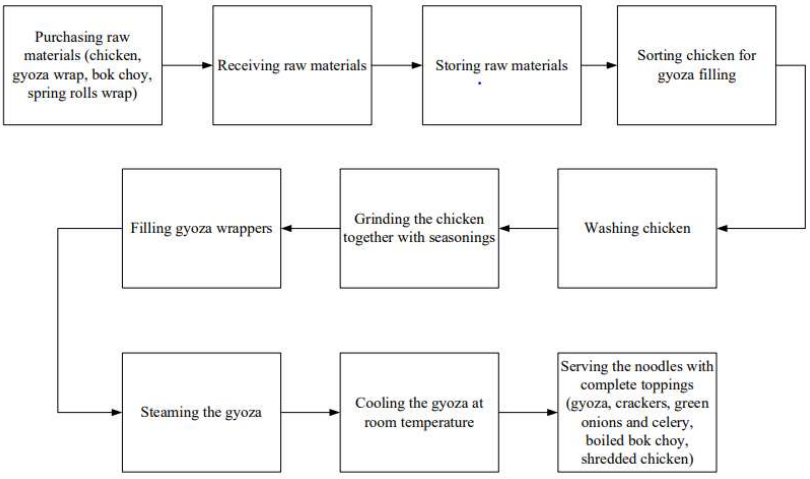

Figure 2 Flowchart of Topping Preparation

The data collection process involved several stages, including direct observation at the Noodle Kuah Kuwi business site located at IKIP Gununganyar Indah Housing Complex, Block A/30, Surabaya, interviews with the business owner, and documentation of the production process.

Observations showed that most raw materials, such as the noodles, are purchased from a supplier, while the gyoza is homemade using chicken filling and store-bought gyoza wrappers. At the site, the main processes carried out are boiling the noodles and adding the toppings. The gyoza topping is prepared separately in advance. The interview with the owner was conducted directly during a purchase transaction, following prior permission to take notes and ask questions. The owner also granted consent for their noodle product to be used as the subject of this study. This activity aimed to gain deeper insights into the implementation of food safety principles, particularly CCP (Critical Control Point) analysis, within a micro-scale food business. Although certain products like Noodle can be produced independently or by large-scale manufacturers, it remains crucial to comply with proper food processing standards to ensure the quality and safety of the final product.

3. RESULTS AND DISCUSSION

Kuah Kuwi is a micro, small, and medium enterprise (MSME) specializing in noodle soup dishes, located in the IKIP Gununganyar Indah Residential Complex, Block A/30, Surabaya. Bakmi Kuah Kuwi is a noodle-based main course that features a combination of ingredients aimed at enhancing both nutritional value and taste. The product consists of boiled noodles served in savory chicken broth, complemented by a variety of toppings such as steamed chicken gyoza, shredded chicken, boiled pokcoy, crispy chips, and sliced scallions and celery. All raw materials are sourced from trusted suppliers and processed through stages that adhere to hygiene and food safety principles, including proper storage, preparation of gyoza filling, and final serving procedures. This product emphasizes not only flavor and culinary quality, but also ensures consumer safety through the consistent application of sanitation standards at every stage of production.

Figure 3 Point of Sale Visits

Prerequisite Programs (PRPs) form the essential foundation for the implementation of the Hazard Analysis and Critical Control Points (HACCP) system. PRPs consist of fundamental practices and operational conditions necessary to establish a hygienic environment and support the safe production of food. These programs include environmental sanitation, facility hygiene, waste management, pest control, employee training, and raw material storage control. Without effective PRPs, the HACCP system cannot operate efficiently, as uncontrolled environmental factors may introduce hazards into the production process. PRPs serve as the initial preventive measures against biological, chemical, and physical hazards before they reach critical control points. Therefore, the successful implementation of HACCP is highly dependent on the consistency and effectiveness of well-established prerequisite programs.

Table 2 Prerequisite Programs (PRPs)

No	Process Prerequisite	Yes	No
1	Personal Hygiene	√	
2	Post Control	√	
3	Foreign Materials Control Programs	√	
4	Facility Location	√	
5	Recall & Withdrawal	√	
6	Rework Management	√	
7	Waste Management	√	
8	Space Design	√	
9	Cleaning and Sanitation	√	
10	Supplier Control	√	
11	Water Quality	√	
12	Storage and Temperature Control	√	
13	Transportation and Distribution Control	√	
14	Training	√	
15	Labeling	√	
16	Glass and Hard Material Control	√	
17	Lighting	√	
18	Drainage	√	
19	Ventilation	√	
20	Health Check for Workers	√	
21	Visitor Control	√	
22	Maintenance Program	√	
23	Customer Communication	√	

Product composition analysis serves to identify the raw materials utilized and evaluate any potential risks that may pose harm to consumers. This analytical process entails a thorough examination of each component involved in the manufacturing process, from the initial stages of processing to the final, consumable product. Furthermore, the storage conditions of raw materials are critically assessed, as inadequate storage can heighten the risk of contamination. It is essential that these materials are stored in hygienic environments with adequate air circulation, shielded from direct sunlight, and kept free from pests. Controlling temperature and humidity is also imperative to maintain the integrity and safety ofthe materials. Through this analysis, high-risk ingredients can be detected and subjected to special handlingprocedures to ensure both the safety and quality of the final product.

Table 3 Identification of Material Hazards

No	Raw Material	Hazard Identification			Hazzard Assessment				Control Action	Control Category
		Type	Hazard	Cause	Probability	Severity	Risk	Significance		
A	**Noodle**									
1	Noodle	Physical	Foreign object (plastic)	Contamination during packaging or transport	4	3	12	Yes	Inspect before boiling	PRP
		Biology	Bacterial contamination	Unhygienic storage	5	4	20	Yes	Store in cold temperature	PRP
2	Water	Biology	-	-	-	-	-	-	-	-
3	Chicken broth	Physical	Foreign object (insect)	No hair covering used	4	4	16	Yes	Use hair covering	PRP
		Biology	Bacterial growth	Unhygienic storage	4	4	16	Yes	Store at room temperature, covered	PRP
		Chemical	MSG residue	Seasoning added	2	1	2	No	Use proper dosage per SOP / avoid MSG	PRP
B	**Topping**									
1	Chicken	Physical	Bone fragments	Rough cutting process	3	2	6	Yes	Inspect before use	PRP
		Biology	Bacterial contamination (Salmonella)	Poor handling after purchase	5	6	30	Yes	Store below 4°C	PRP
		Chemical	Chicken feed residue	Farm uses feed with chemicals	2	1	2	No	Buy from trusted	PRP

									supplier	
2	Gyoza wrap	Physical	Plastic fragments from packaging	While opening the package	2	1	1	No	Be more careful	PRP
		Biology	Mold	Prolonged storage	2	2	4	No	Store in cool, closed container	PRP
3	Bok choy	Biology	Microbes and worm eggs	Unclean washing	3	3	9	Yes	Soak with salt water during washing	PRP
		Chemical	Pesticide residue	Pesticide-sprayed farming	3	3	9	Yes	Buy from trusted vegetable supplier	PRP
4	Spring roll wrap	Biology	Mold	Stored in humid temperature	1	3	3	No	Use immediately after opening	PRP
5	Chives	Biology	Microbes and worms	Unclean washing	3	3	9	Yes	Wash thoroughly	PRP
6	Celery leaves	Biology	Microbes and worms	Unclean washing	3	3	9	Yes	Wash thoroughly	PRP
		Chemical	Pesticides	Non-environmentally friendly farming	3	4	12	Yes	Buy from trusted vegetable supplier	PRP

7	Fried shallots	Physical	Foreign object (insect)	Improper storage	3	1	3	No	Use sealed container	PRP
		Biology	Mold if damp	Stored in open, humid place	3	3	9	Yes	Store in dry, sealed place	PRP
8	Chili oil	Chemical	Oil oxidation (rancid smell)	Stored too long after opening	3	4	12	Yes	Store sealed, check expiration date	PRP
9	Sweet soy sauce (Bangau)	Chemical	High sodium content	Industry standard product	1	1	1	No	Use in moderation	PRP
10	Tomato ketchup (ABC)	Physical	Damaged bottle cap	Improper handling	1	1	1	No	Check packaging	PRP

Bakmi Kuah Kuwi are predominantly classified under Prerequisite Programs (PRPs). PRPs refer to fundamental hygiene measures and operational procedures such as proper storage, sanitation, supplier control, and personal hygiene that collectively form the foundation of a food safety management system. The classification of these hazards as PRPs is due to their manageable nature through routine preventive actions, without requiring specific monitoring at critical stages. Examples include bacterial contamination in noodles caused by unhygienic storage, which can be controlled by storing the product at appropriate cold temperatures; the presence of foreign objects in chicken broth due to the absence of hair coverings, which can be addressed through the use of proper protective equipment; and microbial or chemical contamination in vegetables, which can be mitigated by thorough washing and sourcing from trusted suppliers. Additional control actions involve storing fried shallots in sealed containers, checking expiration dates on chili oil, and using food additives like MSG according to standard operating procedures. These findings indicate that while food safety risks are present, they can be effectively controlled through consistent application of PRPs, and no Critical Control Points (CCPs) were identified in this section of the hazard assessment.

4. CONCLUSION

The assessment of food safety procedures in a micro-scale enterprise producing Noodle Kuah Kuwi highlights the critical role of systematically implemented Prerequisite Programs (PRPs) in supporting the effective operation of the Hazard Analysis and Critical Control Points (HACCP) framework. On-site evaluations, including direct observations and interviews with personnel, allowed for an in-depth analysis of key stages in the production process—ranging from raw material procurement and storage to processing and final product presentation. The findings suggest that most potential hazards can be effectively controlled through the application of PRPs and Operational Prerequisite Programs (OPRPs), particularly in areas such as temperature management, equipment hygiene, and supplier verification. Nevertheless, several Critical Control Points (CCPs) were identified—namely the noodle boiling process, gyoza steaming, and the cooling phase post-steaming—which pose considerable risks,

especially in terms of biological contamination. These processes necessitate precise control of time and temperature to minimize safety hazards. While the enterprise exhibits a foundational awareness of food safety principles, further advancements are needed, especially in formal record-keeping, staff competency development, and continuous monitoring, to ensure a more resilient and sustainable food safety management system.

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