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Proceeding Paper

ANALYSIS IMPLEMENTATION OF THE HACCP (HAZARD ANALYSIS AND CRITICAL CONTROL POINT) SYSTEM IN THE PROCESSING OF HOME INDUSTRY SMOKED CATFISH IN BENGKULU CITY

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Abstract

HACCP (Hazard Analysis and Critical Control Point) is a recognized food safety standardization. With the concept of each stage of the food processing process, the type, source, cause, hazards in food products are identified, both biological hazards, chemical hazards and physical hazards. It is known that the application of HACCP in the processing of Home Industry Smoked Catfish in Bengkulu City. The research method used is descriptive qualitative. Qualitative descriptive analysis is used to determine the analysis of the application of HACCP. This research was conducted by means of direct observation or observation at Rumah Salai in Bengkulu City. The results of the study showed that there were four important points or Critical Control Points. Data from observations conducted by researchers based on SNI New Smoked Fish 2013, SNI 01-4852-1998 at Rumah Salai in Bengkulu City. From the results of data processing, shows AnalysisImplementation of the HACCP (Hazard Analysis and Critical Control Point) System in the Processing of Smoked Catfish at Rumah Salai in Bengkulu City. Found the cause of contamination and risk for consumption which if not controlled. Consisting of biological, chemical, physical hazards such as not using personal protective equipment, contamination from the environment and equipment are the most dominant causes of contamination. Determination of the critical control point CCP (Critical Control Point) in the smoked catfish production process, namely at the weeding, racking, smoking and cooling stages.

Keywords: CCP, HACCP, Home Industry, Smoked Fish

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INTRODUCTION

Food is anything that comes from biological sources of agricultural, plantation, forestry, fishery, livestock, aquatic and water products, whether processed or unprocessed, which is intended as food or

drink for human consumption, including food additives, food raw materials, preparation, processing and manufacture of food or drink.(Ministry of Health, 2023).

Based on the WHO report, it is estimated that foodborne diseases are caused by 31 agents in the form of bacteria, viruses, parasites, toxins, and other chemicals. Stating that every year 600 million or almost 1 in 10 people in the world fall ill after consuming contaminated food. Therefore, to prevent an increase in food poisoning, it is important to carry out Hazard Analysis Critical Control Point (HACCP) on food. Food safety according to(Government Regulation, 2019)are conditions and efforts required to prevent food from possible biological, chemical and other contamination that can disrupt, harm and endanger human health and do not conflict with religion, beliefs and culture so that it is safe for consumption.

Hazard Analysis Critical Control Point (HACCP) is a recognized food safety standardization. With the HACCP concept, each stage of the food processing process can identify the type, source and cause of hazards in food products, both biological hazards (Microbiology), Chemical hazards and physical hazards (Vatria, 2022). Thus, the application of HACCP in every food processing process can provide a guarantee of safe food, HACCP is a food safety assurance system in the form of a systematic approach to identifying hazards and placing a control system to prevent them. Mchtar & Bahar (2022) HACCP is carried out on materials, products or processes to determine the components, conditions or stages of the process that must be strictly supervised with the aim of ensuring that the products produced are safe and meet the safety requirements set for each food production. The results of initial observations conducted by the survey in the Home Industry of Smoked Catfish in Bengkulu City are in accordance with the GMP guidelines as the main requirement in the food production process in Indonesia, However, there are still containers on the transportation equipment that are no longer suitable for use. This can cause contamination in smoked fish production. In the storage of raw materials or fish ponds from livestock itself, where a cover or carpet is used, on which there are tools or items that should not be placed on the fish pond. The purpose is to find out the application of Hazard Analysis and Critical Control Point (HACCP) in the processing of Home Industry "Smoked Catfish in Bengkulu City.

MATERIALS AND METHODS

The type of research used is descriptive qualitative. Qualitative descriptive analysis is used to determine the HACCP Implementation Analysis. This research was conducted by means of Observation or direct observation related to the hazards that can occur during the Smoked Catfish p/roduction process through identification at critical points so that corrective actions can be taken on criteria that are not in accordance with the standardization of the Bengkulu Smoked Catfish Home Industry.

Population is the entire object to be studied. The research population is a general area consisting of objects or subjects that have certain characteristics determined by the researcher to be studied and then drawn conclusions. The population referred to in this study is Smoked Catfish in Bengkulu City. The sample in this research was Smoked Catfish. There are 2 employees working in the Bengkulu City Smoked Catfish home industry.

Sampling in this study the author uses Literature Study used as the basis for supporting theories that will be used to solve problems in the study. Literature study contains theories related to HACCP. And Field study (Observation) aims to find out the real conditions at the research location, namely at PT. Rumah Salai Bengkulu by observing the conditions in the process of processing Smoked Catfish and using aids in the form of cameras and stationery. Description of Ethical Exemption "Ethical Exemption" No. KEPK.BKL/ 252/05/2024 Institution: Poltekkes Kemenkes Bengkulu. In the analysis with univariate analysis to see the frequency distribution of independent and dependent variables so that each variable can be known with the proposed formula.

RESULTS AND DISCUSSION

This research was conducted in the Household Industry of Smoked Catfish in Bengkulu City. From the results of the observational data collection conducted by the researcher at Rumah Salai in Bengkulu City, based on the 2013 Indonesian National Standard for Smoked Fish, SNI 01-4852-1998 Hazard Analysis and Critical Control Point (HACCP) System and its implementation guidelines, as well as the teaching materials for the HACCP course for the 2022/2023 academic year. The production process of smoked catfish in Bengkulu City is one of the products available at Rumah Salai in Bengkulu City. Smoked Catfish is produced through stages of raw material selection, sorting, washing and draining, arranging on racks, smoking, cooling, packaging, and shipping. And there is a product description of Home Smoked in Bengkulu City that can be seen in Table one.

*Table 1***:** *Description of Home Smoked in Bengkulu City*

Specification	Information
Product name	Smoked Catfish
Composition	Main raw material: Catfish
Processing process	Processing process according to the production process drawing
Product Usage	Processed before consumption
Packaging Type	PP plastic (Polypropylene) and cardboard box
Shelf Life	7 – 10 days at room temperature

Labeling	Product Name, Product Type, Halal Label, Barcode, Production Date, Composition

The results of the analysis of potential hazards in the processing body are seen in table 2, then in table 3 is the determination of critical control points, and in table 4 you can see the determination of monitoring procedures.

Table 2: Results of Potential Hazard Analysis of Process Materials (P1)

Materials/ Process	Source of Danger	Potential Dangers	Types of Hazards	Preventive measure
Selection of Raw Materials	Mossy fish pond	Allows moss to stick to fish	Physique	Before being processed, the fish is left for at least 1 day with the water changed so that the fish is detoxified with good water sanitation.
	Using a shelf cover and containing items.	Allows items to enter the fish pond.	Physique	Checks are carried out before processing to ensure the fish is free from foreign objects.
	Fish storage baskets are not sterile	Allows fish to be contaminated with microorganisms (ALT, Escherichia coli/E.coli, Salmonella, Staphylococcus aureus, mold) that stick to the fish storage basket.	Biology	Fish storage baskets are washed before and after use.
	Employees do not wear gloves when selecting raw materials	Allows fish to be contaminated with microorganisms (ALT, Escherichia coli/E.coli, Salmonella, Staphylococcus aureus, Mold) that stick to the hands of employees.	Biology	Facilitate employees with complete and create guidelines on occupational safety and health, especially regarding the use of during the production process.
The Providernon	The kitchen staff did not wear aprons, masks, and head coverings.	It allows fish blood splatters to stick to the employees' clothes and there are other elements as well, and it allows for hair to fall out.	Physique	Memfasilitayouryanwown withn yescompletep and maket Guidelines on occupational safety and health especially useran Personal Protective Equipment selmaproduction process.
	The knife is made of rusty iron.	Possiblen daginger fishn catfish contactedminethe logm payeswaterlayesn pisau.	Chemistry	Washing the knifeu before and afterh is usedyoun.
	Wooden pencil	It allows catfish meat to be contaminated (ALT, Escherichia coli/E. coli, Salmonella, Staphylococcus aureus, mold) that adheres to the cutting board, leading to the contamination of the fish.	Biology and Physical	Menggalater onyou are hereinless (Food gra*de).* Washing the clothesLenan before dan afterh is usedyoun. The wooden cutting board is replaced with a plastic cutting board. (Food grade)
	The Presence of Vectors (Flies) Observation	It allows fish to become contaminated if flies land on the fish meat.	Biology	The process of wastingnon and production process is carried out separatedh.

Laundering	The rubber is not sterile.	It allows fish to be contaminated with microorganisms (ALT, Escherichia coli/E. coli, Salmonella, Staphylococcus aureus, mold) that adhere to non-sterile rubber containers.	Biology	Washing clothesk youret before and afterh is usedyoun
	Awashing machinen	It allows fish to become contaminated from water that contains rusty metals (Cadmium (Cd), Mercury (Hg), Lead). (Pb).	Chemistry	Choosing certified quality water sources.
Screening	Employees are not wearing masks and using	It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles in the air trigger health issues.	Biology	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety, especially regarding the use of PPE during the production process, and replacing gloves.
	Apeyesng Drainern alreadyh changedh wacolor	It allows fish to be contaminated with microorganisms (ALT, Escherichia coli/E. coli, Salmonella, Staphylococcus aureus, mold) that adhere to the draining basket.	Biology	Replacing the strainer basket.
Rack Composition	Employees are not wearing masks and are using wet gloves.	It allows catfish to be contaminated by microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles can trigger health problems.	Biology	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety, especially regarding the use of PPE during the production process, and replacing
	The rack still has remnants from past smoking or burnt marks.	Allowsn fishn fishn contactedminethereri rak compiler yesit's burntn trigger mawithlah healthyesn	Chemistry	The racks are cleaned and washed with clean water before and after the smoking process.
Smoking Fish	Employees are not wearing masks and using	It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles in the air trigger health issues.	Biology	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety, especially regarding the use of PPE during the production process, and replacing
	Temperature change	This allows for the possibility that the catfish meat contaminated with salmonella microorganisms still remains on the catfish meat that has been subjected to a temperature of	Biology	The smoking process of catfish is carried out at a temperature of 70°C-100°C, which has been determined to reach the maximum internal temperature

	A rusty and already holed chimney.	60°C during the cooking process, indicating that it has not been fully cooked.	Chemistry	so that salmonella bacteria are killed. repairing the chimney
Cooling	Employees are not wearing masks and using The basket has no lid and contains items.	It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles in the air trigger health issues.	Biology	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety, especially regarding the use of PPE during the production process, and replacing
	Temperature change	Allowing dust to stick to the smoked catfish meat.	Biology	using a covered basket
		It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects the temperature changes of fish while inside the smoking chamber and outside the smoking chamber.	Biology	Providing a special space for the cooling process in an enclosed area at room temperature according to specifications.

Table 3: Determination of Critical Control Point CCP (P2)

Stages of The Process	**Source of Danger**	**Potential Danger**	**Ccp/ Not Ccp**
Selection of Raw Materials	Mossy fish pond	Allows moss to stick to fish	Not CCP
	Using a shelf cover and containing items.	Allows items to enter the fish pond.	
	Fish storage baskets are not sterile	Allows fish to be contaminated with microorganisms (ALT, Escherichia coli/E.coli, Salmonella, Staphylococcus aureus, mold) that stick to the fish storage basket.	
	Employees do not wear gloves when selecting raw material	Allows fish to be contaminated with microorganisms (ALT, Escherichia coli/E.coli, Salmonella, Staphylococcus aureus, Mold) that stick to the hands of employees.	
Removing the Fish's Entrails	The kitchen staff did not wear aprons, masks, and head coverings.	It allows fish blood splatters to stick to the employees' clothes and there are other elements as well, and it allows for hair to fall out.	CCP
	The knife is made of rusty iron	Possiblein daiginger fishin catfish contactedimineithe logim paiyesiwaterilaiyesin pisaiu.	
	wooden penci		

	The Presence of Vectors (Flies) Observation	It allows catfish meat to be contaminated (ALT, Escherichia coli/E. coli, Salmonella, Staphylococcus aureus, mold) that adheres to the cutting board, leading to the contamination of the fish. It allows fish to become contaminated if flies land on the fish meat.	
Laundering	The rubber is not sterile.	It allows fish to be contaminated with microorganisms (ALT, Escherichia coli/E. coli, Salmonella, Staphylococcus aureus, mold) that adhere to non-sterile rubber containers.	Not CCP
	AIwashing machinein	It allows fish to become contaminated from water that contains rusty metals (Cadmium (Cd), Mercury (Hg), Lead). (Pb).	
Sceerining	Employees are not wearing masks and using	It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles in the air trigger health issues.	Not CCP
	Apeiyesing Drainerin alreadyih changedih waicolori	It allows fish to be contaminated with microorganisms (ALT, Escherichia coli/E. coli, Salmonella, Staphylococcus aureus, mold) that adhere to the draining basket.	
Rack Composition	Employees are not wearing masks and are using wet gloves.	It allows catfish to be contaminated by microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles can trigger health problems.	CCP
	The rack still has remnants from past smoking or burnt marks.	Allowsin fishin fishin contactedimineithereiri rack compiler yesiit's burntin trigger maiwithilaih healthiyesin	
Smoking Fish	Employees are not wearing masks and using	It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles in the air trigger health issues.	CCP
	Temperature change A rusty and already holed chimney.	This allows for the possibility that the catfish meat contaminated with salmonella microorganisms still remains on the catfish meat that has been subjected to a temperature of 60°C during the cooking process, indicating that it has not been fully cooked.	

Cooling	Employees are not wearing masks and using The basket has no lid and contains items. temperature change	It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles in the air trigger health issues. Allowing dust to stick to the smoked catfish meat. It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects the temperature changes of fish while inside the smoking chamber and outside the smoking chamber.	CCP
Packing	Employees are not wearing masks and not using gloves. Packing area in an open space.	It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold) that cling to gloves, and the negative effects of pollution particles in the air trigger health issues Allowing dust to stick to catfish during the packing process.	Not CCP
Delivery	temperature change	It allows catfish to become contaminated with microorganisms (ALT, Escherichia coli, salmonella, Staphylococcus aureus, mold if the packaging is torn or damaged.	Not CCP

Setting Critical Limits (P3)

Principle 3 of HACCP is used for establishing critical limits and corrective actions at critical control points (CCP) to reduce and eliminate hazards in the produced products as an effort to protect the health and lives of consumers, as well as to meet quality and food safety standards. In the research (Masela, A 2020), PT. Samudra Sakti Sepakat has established procedures, control of critical points along with specific characteristics and their own handling. The main factors to consider in monitoring plant location are the raw material location, market location, labor, and the level of water and industrial waste disposal.

Table 4: Determination of Monitoring Procedures (P4)

Stages of The Process	**Critical Threshold**	**Monitoring**				
		What	**Who**	**when**	**where**	**who**
Removing the Fish's Entrails	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety (OHS), as well as the use of PPE during the production process.	Personal protective equipment for employees: masks, gloves,	fish cleaning staff	every time the fish cleaning process is carried out	fish cleaning place	Checking the completeness of employe PPE, inspecting weeding equipment.

	Washing knives before and after use. Replacing stainless steel knives (Food grade). Washing cutting boards before and after use. The wooden cutting board is replaced with a plastic cutting board. (Food grade) The weeding process and the production process are carried out in separate locations.	aprons, head coverings. Thelayesn Wastenon				Checking the weeding equipment must be clean and free from dirt, bacteria, and mold. Checking the fish cleaning process.
Rack Composition	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety (OHS), as well as the use of PPE during the production process Changing gloves. The smoking process of catfish is carried out at a temperature of 70°C-100°C, which has been determined to reach the maximum center temperature so that salmonella bacteria are killed. Repairing the chimney.	Personal protective equipment for employees: masks, gloves, aprons, head coverings. Condition of the assembly rack Assembly equipment	Employee in the shelving department. Assembly rack	Every process of arranging shelves Every arrangement	Place of arrangement Place of arrangement	Checking the completeness of employee PPE, inspecting the arrangement rack. Checking the condition of the catfish smoking rack.
The Process of Smoking Fish	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety (OHS), as well as the use of PPE during the production process Menggalaterthe roomnon. Process Changing gloves. The smoking process of catfish is carried out at a temperature of 70°C-100°C, which has been determined to reach the maximum center temperature so that salmonella bacteria are killed. Repairing the chimney.	Personal protective equipment for employees: masks, gloves, aprons, head coverings.	Employees in the smoking section. AI at smoking	During the smoking process. Every smoking process	Smoking place Sucking place	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety (OHS), as well as the use of PPE during the production process. Changing gloves. Checking the temperature during the smoking of catfish is done at a temperature of 70°C-100°C,

						which has been established to reach the maximum internal temperature so that salmonella bacteria are killed. Repairing the chimney.
Cooling	Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety (OHS), as well as the use of PPE during the production process Changing gloves. The basket is covered, and the items are moved to their proper place. Providing a special space for the cooling process in an enclosed area at room temperature according to specifications.	employee protective equipment	employee	Every cooling process Every weeding process	Cooling place Weeding place	Checking the completeness of personal protective equipment (PPE) Checking the location and process during cooling.

Determination of corrective action (P5)

The establishment of corrective actions needs to be prepared, especially if during monitoring it is found that the critical limits previously identified are not met, necessitating both immediate actions and preventive measures. The following are the corrective actions identified for each critical limit in the HACCP establishment and the determination of corrective actions at Rumah Salai in Bengkulu City. Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety, especially regarding the use of PPE during the production process. Washing knives before and after use or replacing stainless steel knives (food grade). Washing cutting boards before and after use or replacing wooden cutting boards with plastic ones. (Food grade). The weeding process and the production process are carried out in separate locations. Using racks that are free from dirt, germs, and mold, cleaned and washed with clean water before and after the smoking process. In the process of smoking catfish, a temperature of 70°C-100°C is used to reach the maximum internal temperature, ensuring that salmonella bacteria are killed. Improving the ice cream chimney, the cooling process should be carried out by covering and relocating items to their proper places. Providing a dedicated space for the cooling process in an enclosed area at room temperature according to

specifications. (Latampung, N., & Ikhtiar, M. 2023) corrective actions were taken for each hazard in food as well as in the processing stages. Food handlers are expected to remember the importance of personal hygiene and sanitation in restaurants to prevent food from being easily contaminated by bacteria. This research is also in line with (Jumono, AI., Dihainsih, E., & Rochmainai, I 2020).

Hazard Analysis in the Processing of Smoked Catfish Based on the data processing results above, Table 1 shows the HACCP System Application Analysis in the processing of smoked catfish in Bengkulu City, which identifies the causes of contamination in smoked catfish and the risks associated with its consumption if not properly controlled. Principle 1 of HACCP is carried out to analyze hazards by determining the sources of hazards, potential hazards, types of hazards, risks, risk levels, and preventive measures at each stage of the production process of AIsap catfish in Bengkulu. It allows fish blood to stick to employees' clothing and there are other elements involved. It allows hair to fall, it allows catfish meat to be contaminated with metals from knife equipment, it allows catfish meat to be contaminated (ALT, Escherichia coli/E.coli, Salmonella, Staphylococcus aureus, mold) that sticks to the cutting board, thus contaminating the fish. It allows fish to be contaminated if flies land on the fish meat. It allows catfish to be contaminated with microorganisms (ALT, Escherichia coli, Salmonella, Staphylococcus aureus, mold) that stick to gloves and the negative effects of germ pollution particles in the air. It allows fish to be contaminated from a burnt shelving unit, triggering health problems. It allows catfish to be contaminated with microorganisms (ALT, Escherichia coli, Salmonella, Staphylococcus aureus, mold) that stick to gloves and the negative effects of germ pollution particles in the air, triggering health issues. It allows catfish meat to be contaminated with Salmonella microorganisms still present on the catfish meat that is cooked at 60°C during the vacuum process, so it is not fully cooked. It allows for contamination from a rusty chimney.

Muchtar & Bahar (2022) conclude that the identification results show three types of hazards in the tuna smoking process, namely biological hazards, chemical hazards, and physical hazards. Determining CCP with the help of the decision tree SNI 01-4852-1998 regarding hazard analysis and critical control point (HACCP) management and its implementation guidelines, the establishment of critical limits at the production stage, which is the TTK, refers to the SNI for New Smoked Fish 2013 concerning the handling of Smoked Catfish and is mandated in SNI 2725.3: 2009 regarding pathogenic microorganisms in Smoked Fish. The critical points identified in the production process of Smoked Catfish at Rumah Salai in Bengkulu City are as follows: The arrangement process on the rack at this stage is a CCP because there is a potential chemical hazard in the form of contamination from the burnt rack that cannot be eliminated or minimized in the subsequent stages. The smoking process at this stage is a CCP due to the biological

hazard that cannot be eliminated or minimized during smoking because at a temperature of 60°C, salmonella does not die. The cooling process at this stage is a CCP because the biological hazard during the cooling process cannot be minimized. It allows dust to adhere to smoked catfish. This enables the fish to be contaminated with microorganisms such as ALT, Escherichia coli, salmonella, Staphylococcus aureus, and mold, which is caused by the temperature differences of the fish while inside and outside the smoking chamber. (Based on Hasibuan, N. E., Aizka, AI., & Rohaini, AI, 2020)

The 12 steps of HACCP implementation at PT. Tridaya Eramina Bahari include the formation of the HACCP team, product description, identification of use, preparation of the process flow diagram, examination of the process flow diagram, hazard analysis, establishment of Critical Control Points (CCP), setting critical limits, establishing monitoring procedures, corrective actions, verification actions, as well as establishment and documentation, which have been implemented. However, there are three process stages that need to improve food safety. The evaluation results of the HACCP implementation at PT. Tridaya Eramina Bahari indicate that the Critical Control Points (CCP) are at the stages of raw material acceptance, packaging and labeling, as well as metal detection. The establishment of critical limits and corrective actions at the critical control points (CCP) is outlined in Table 3, carried out to reduce and eliminate hazards in the produced products as an effort to protect consumer health and life, as well as to meet food quality and safety standards. (Maisela, AI 2020) At PT. Samudra Sakti Sepakat, procedures have been established for Critical Control Point management with specific characteristics and its own handling. The main factors to consider in monitoring plant location are raw material location, market location, labor and wage levels, as well as water and industrial waste disposal.

The determination of the monitoring system and requirements for monitoring the processing of catfish in AIsap Bengkulu is as follows: Checking the comple koteness of employee personal protective equipment (PPE). Checking the weeding equipment. The weeding equipment must be clean and free from dirt, bacteria, and mold. Checking the condition of the racks for smoked catfish. Checking the temperature of the smoking chamber for catfish. Checking the location and process during cooling. (Wicaksani, AI. L., & Aldriyani, R 2018) During the production process that does not yet comply with SNI, monitoring is not conducted routinely during the blast chilling and dishing process.

The determination of corrective actions at the Bengkulu Smokehouse is as follows: Facilitating employees with complete personal protective equipment (PPE) and creating guidelines on occupational health and safety, especially regarding the use of PPE during the production process. Washing knives before and after use or replacing stainless steel knives (food grade). Washing cutting boards before and after use or replacing wooden cutting boards with plastic ones. (Food grade). The weeding process and the production

process are carried out separately. Using racks free from dirt, dust, and mold, cleaned and washed with clean water before and after the smoking process. In the process of smoking catfish, a temperature of 70°C-100°C is used to reach the maximum center temperature so that salmonella bacteria are killed. repairing the chimney. In the cooling process, the basket is covered and the items are moved to their proper place. Providing a dedicated space for the cooling process in an enclosed area at room temperature according to specifications. (Latampung, N., & Ikhtiar, M. 2023) which involves corrective actions for each hazard in food as well as during the processing stages. Food handlers are expected to remember the importance of personal hygiene and sanitation in restaurants to prevent food from being easily contaminated by bacteria. This research is also in line with (Jumiono, AI, Dihansih, E., & Rochmana, I 2020)

CONCLUSION

The conclusion that can be drawn based on the research data obtained from the application of the HACCP system in the processing of smoked catfish home industry in Bengkulu City is based on the SNI for smoked catfish from 2013 by the Indonesian National Standardization Agency, SNI 01-4852-1998 at Rumah Salai in Bengkulu City. The research results indicate that there are four critical points or Critical Control Points in the production process of smoked catfish, namely at the stages of cleaning, stacking, smoking, and cooling. And the cause of contamination was found, posing a risk for consumption if left unchecked. It consists of biological, chemical, and physical hazards, such as not using personal protective equipment, contamination from the environment, and equipment, which are the most dominant causes of contamination. It is recommended for writers that this research can enhance their knowledge and experience regarding the analysis of the implementation of the HACCP system in the processing of smoked catfish home industry in Bengkulu City. In the home industry, it is essential to provide employees with complete personal protective equipment (PPE), replace equipment that does not meet standards (Food Grade), and clean the equipment before and after production.

The implementation of HACCP in the smoking house in Bengkulu City requires cooperation among employees, especially in fostering awareness of food safety to ensure the safety of the products produced. For educational institutions, this research can be utilized as a reference and provide information to broaden understanding about the analysis of the implementation of the HACCP system in the processing of smoked catfish home industry in Bengkulu City. Future research is expected to develop this study with different methods and samples so that the research on the analysis of the application of the HACCP system in the processing of catfish home industry in Bengkulu City can be more comprehensive.

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