

Analysis of Types of Contamination in Food Products Using the Hazard Analysis Critical Control Point (HACCP) Method

(Case Study on PT.XYZ Biscuit Division)

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Abstract :- This article discusses the analysis of the type of contamination in food products using the Hazard Analysis Critical Control Point (HACCP) method. Food contamination can occur at various stages of production, from raw materials to serving. This study aims to identify common types of contamination, including biological, chemical, and physical contamination, as well as to apply HACCP principles in controlling these risks. This method involves determining Critical Control Points (CCPs) in the production process where controls can be applied to prevent or reduce contamination. The results of the analysis show that the implementation of HACCP can effectively improve food safety by reducing the number of contamination incidents. The article also recommends practical steps for the implementation of HACCP in the food industry, as well as the importance of training for the workforce to ensure the success of this system.

Keywords:- Contamination, HACCP, Disease, Food, CCP.

I. INTRODUCTION

The food industry sector faces major challenges in maintaining the safety and quality of its products. Various risks, ranging from biological, chemical, to physical hazards, can arise at every stage of the production process. Failure to manage this risk can have a significant impact, both on consumers and business sustainability. Therefore, food safety is very important. Food contamination has a great impact on health so much that it causes disease, which is caused by bacteria, viruses, parasites, or chemicals that enter the body through contaminated food. Chemical contamination can lead to acute poisoning or long-term illness, such as cancer. Many foodborne illnesses can lead to long-term disability and death. HACCP plays a very important role in food contamination control which aims to identify and detect the mixing of foreign objects during the production process. This research aims to, identify the types of contamination in food, apply the HACCP system in the food production process, determine the CCP in the biscuit making process. The main goal of this principle is to prevent harm to food products, so that consumers get safe and quality products. By implementing this system, the food industry can control potential hazards that may occur at every stage of production, from raw materials to finished products.

II. BASIC CONCEPTS OF HACCP

➤ *Haccp Definition*

HACCP is an important and effective food safety control system. By understanding and applying its principles, the food industry can produce safe and quality products, as well as meet the requirements of applicable laws and regulations. Its application also helps to increase consumer confidence in the products produced, as it protects consumers from health risks that may arise from the consumption of contaminated products. This can increase the company's competitiveness in an increasingly competitive market.

➤ *Haccp Principles*

HACCP has principles that play an important role in the ongoing production stage. Here are the 7 main principles of this system that must be applied in the food industry:

- Identify Potential Hazards at All Stages of Food Production
- Determine Controllable Production Stages to Reduce Hazards
- Set Critical Boundaries for CCPs
- Establish a CCP Monitoring System
- Set Corrective Action if CCP is Out of Control
- Establish HACCP System Verification Procedures
- Develop Documentation for the Implementation of HACCP PRINCIPLES

III. TYPES OF CONTAMINATION IN FOOD PRODUCTS

➤ *Physical Contamination*

Physical contamination is commonly found in foodstuffs, which are visible objects and are usually solid objects/substances such as hair, plastic, pests, insects and others. This has a great impact on health that can cause indigestion in humans, and has no effect on others.

➤ *Chemical Contamination*

Chemical contamination comes from contamination of chemical materials/substances. These chemicals can come from within the food ingredient itself or originate from outside. Such as perfume, floor cleaner, oil and so on. The impact of chemical contamination that enters the body greatly affects health such as acute poisoning, long-term illness

(cancer) and even death.

➤ *Biological Contamination*

Biological contamination is a hazard that comes from pathogenic microorganisms that can contaminate food. Such

as microbes, bacteria, molds, parasites, parasites, viruses, parasites and humans. Biological contamination of food can cause several effects, including infections and food poisoning such as diarrhea.

Table 1 Types of Hazards and Examples

Types of Hazards	Example	
Biology	Vegetative Cells	: Salmonella sp, Escherichia coli
	Mold	: Aspergillus, Penicillium, Fusarium
	Virus	: Hepatitis A
	Parasite	: Cryptosporidium sp
	Bacterial spores	: Clostridium botulinum, Bacillus cereus
Chemistry	Microbial toxins, unauthorized additives, pesticide residues, heavy metals, allergen materials	
Physical	Broken glass, pieces of cans, plastics, stones or pebbles, hair, nails, jewelry, etc.	

IV. APPLICATION OF HACCP METHOD IN THE PROCESS OF MAKING BISCUITS

A. Hazard Identification in the Manufacturing Process

Identification is an effort to recognize and estimate potential hazards that can occur in a system. To identify these hazards, a risk management system called Hazard Analysis and Critical Control Point (HACCP) can be used. HACCP is a systematic method that aims to identify and control hazard risks in the food supply chain.

B. Determination of Critical Control Points

A Critical Control Point (CCPs) is a measure or procedure by which controls can be applied and food safety hazards can be prevented, eliminated or lowered to an acceptable extent (up to a safe point).

➤ Critical Control Points (CCPs) Can be:

- Raw materials
- Location
- Procedure or processing

where the control can be applied to prevent or reduce danger.

C. Determination of Critical Boundaries for Each Control Point

➤ Critical Limits

In general, critical limits can be classified into:

- Physical limits (temperature, time)
- Chemical limits (pH, salt content)

The use of microbiological limits (number of microbes and so on) should be avoided because it takes time to measure, unless there is a rapid test for such measurements.

CCPs OR CRITICAL CONTROL POINTS (TPK-1) are points where hazards can remain under control.

D. Monitoring and Corrective Action

Monitoring is defined as checking that a processing and handling procedure on the CCP can be controlled or scheduled testing and observation of the effectiveness of the process to control the CCP and its critical limits in ensuring product safety.

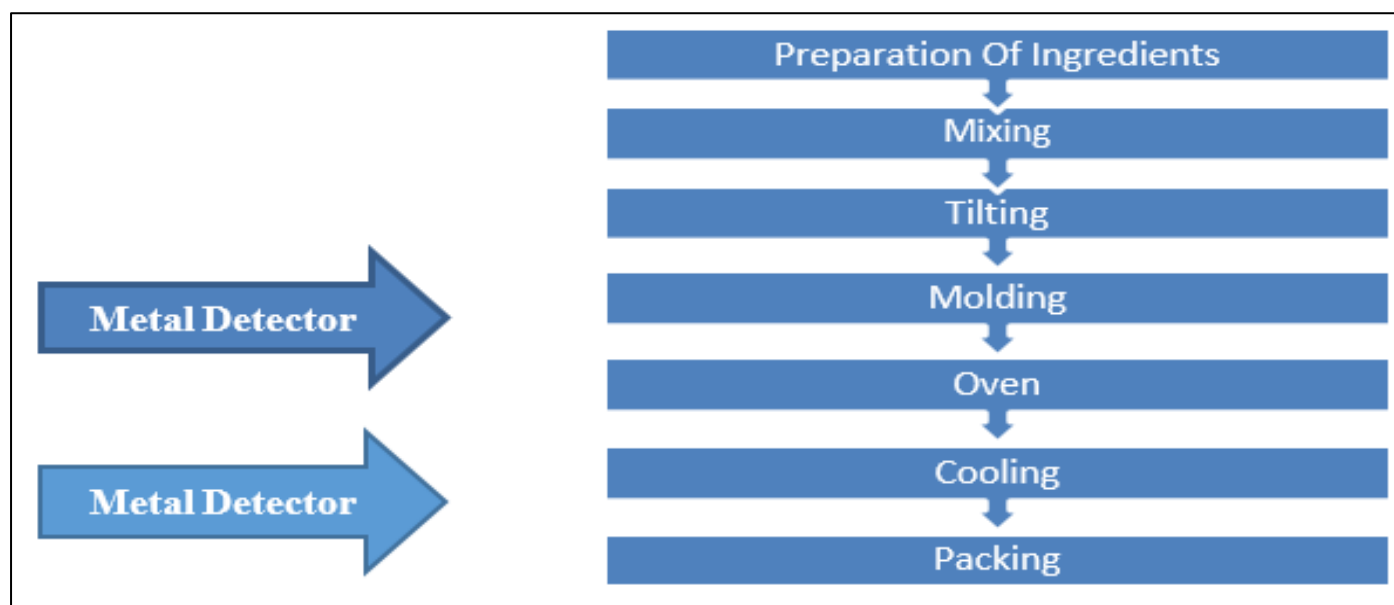


Fig 1 Biscuit Making Flowchart

➤ *Types of Monitoring*

- 5 (five) types of Monitoring that are Important to be Carried out Include:

- ✓ Observation
- ✓ Evaluation
- ✓ Sensory
- ✓ Measurement of physical properties
- ✓ Chemical testing and microbiology testing.

➤ *Determination of Corrective Action*

Corrective action is taken if there is a deviation from the critical limit of a CCP. Corrective actions taken in the event of deviations depend on the level of risk of food products. In high-risk food products, for example, corrective action can be in the form of stopping the production process before all irregularities are corrected, or the product is withheld/not marketed and tested for safety. Corrective actions that can be taken in addition to stopping the production process include eliminating products and reworking products, as well as preventive measures.

E. Verification and Recording➤ *Verification Activities*

Some verification activities include:

- Establishment of a proper verification inspection schedule

- Re-examination of the HACCP plan
- CCP record check
- Examination of deviation records and visual inspection disposition of activities to observe if CCP is not controlled
- Random sampling
- Written records regarding verification inspections that determine conformity with the HACCP plan, or deviations from the plan and corrective actions taken.

➤ *Data Recording/Documentation*

Data storage is an important part of HACCP. Data storage can ensure that the information collected during the installation, modification, and operation of the system will be available to anyone involved in the process, as well as from outside parties (auditors). Data storage helps ensure that the system remains sustainable in the long run. The data should include an explanation of how the CCP is defined, the provision of procedures and verification of data as well as the retention records of normal procedures.

V. RESEARCH METHODOLOGY

A research method is a scientific way to obtain valid data with the aim of discovering, developing, or proven, a certain knowledge so that it can in turn be used to understand, solve, and anticipate problems in a certain field. The methods used in this study are observation and interviews, which are descriptive.

VI. RESEARCH RESULTS➤ *Types of Contamination Found*

Table 2 Types of Contamination and Findings

NO	TYPES OF CONTAMINATION	FINDINGS
1	PHYSICAL	PLASTIC (GLOVES)
2	CHEMISTRY	-
3	BIOLOGICAL	-

➤ *Effectiveness of HACCP Implementation*

The implementation of HACCP (Hazard Analysis and Critical Control Point) on food is very effective because it focuses on preventing contamination and food safety risks. With HACCP, companies can identify potential hazards before they become real problems.

The benefits obtained from the implementation of HACCP include:

- Increase consumer confidence in the products produced.
- Reduce the risk of contamination and losses due to unsafe products.
- Meet the requirements of applicable laws and regulations, both at the national and international levels.
- Improve the efficiency of the production process and reduce waste.
- Assist companies in undergoing food safety audits and obtaining the necessary certifications.

VII. CONCLUSION

In the process of making biscuits at PT. XYZ Biscuit Division, of course, there is a potential for contamination. In this study, the company carried out prevention using the Hazard Analysis and Critical Control Point (HACCP). After prevention is carried out using the Hazard Analysis and Critical Control Point (HACCP) can be concluded that the potential for contamination tends to decrease, although it still exists. The findings of contamination that occurred at PT. XYZ Biscuit Division.

➤ *Implications for the Food Industry*

The implementation of HACCP has an influence on the sustainability of a food processing industry business. The implementation of HACCP provides benefits to The food industry in maintaining food safety and avoiding chemical, biological, and physical contamination thereby reducing the risk of food poisoning. The implementation of HACCP also results in better cleanliness and production and can reduce the cost of hazard risk or cost in production. Most of the relevant

industries or agencies have fulfilled the elements in the appropriate HACCP program. Training and education on sustainable HACCP are urgently needed to ensure that the HACCP system implemented is more stable and the need to use complete personal protective equipment (PPE) to always maintain hygiene during the production process.

➤ *Recommendations for Better HACCP Implementation*

- *Proper documentation and record-keeping*

Document and document each procedure well, including hazard analysis, determination of critical control points (TKK), and determination of critical boundaries.

- *Training*

Provide training to personnel on HACCP principles and their application. You can also provide specific training for specific roles in the HACCP plan.

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