

Conference Paper

## Implementation Analysis of Hazard Analysis and Critical Control Points in the Traditional food “Pudak Barokah” at Small Medium Enterprise in Gresik, Indonesia

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### ABSTRACT

Gresik is one of the several centers of the snacks industry. In order to assure food quality and safety, analysis is required to address hazards during the production process. Pudak were made by heating coconut milk, then combined with flour, rice flour, sugar, salt, water, and pandan suji leaves. Pour heated coconut milk over the top, whisked until it is smooth and with no lumps, add cooled coconut milk and vanilla, cover the mixture in leaf wrap, and steam for one hour before serving. This study was carried out to identify and minimize hazards during the production process of pudaks (one of traditional food) and provide recommendations for establishing the Hazard Analysis Critical Control Point (HACCP) system. During the production process, there are three different kinds of possible hazards: biological, physical, and chemical. The Critical Control Point (CCP) might be acknowledged, allowing for a comprehensive implementation of the HACCP. In this publication, the dangers of CCP were analyzed along with suggestions for reducing them.

*Keywords: Pudak, HACCP, CCP, Gresik*

### Introduction

The community is expected to play a significant role in the fast-paced, fiercely competitive global development in order to implement various government-set programs, including those that address the community's food needs. In order to accomplish this, consumers must be able to participate in order to fulfill these needs.

Pudak is one of the distinctive food gift from Gresik. Pudak is much in demand by domestic or foreign tourists because it is a peculiar taste being wrapped in areca nut leaves. There is a chance that some pudaks were made during the production process contain of biological hazards, such as microbial or bacterial contamination found in the ingredients, physical hazards from fine dust or sand contained in areca leaves to wrap the slurred dough, or chemical hazards during the production process making of pudak itself. It is all possible, but it also be overcome or controlled.

Food safety is the primary and most important requirement of all existing quality parameters. Product quality affects consumer purchasing decisions. Food quality includes adequate nutritional value, free from chemical and microbiological contamination. Quality assurance on food safety is carried out based on final product testing alone, and cannot guarantee overall quality (Priyanto et al., 2022). The findings of laboratory final product testing are no longer sufficient to assure food quality, especially food safety. Consumers will believe that safe products comes from raw

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materials that have been properly handled, processed, and distributed (Ministry of Industry of the Republic of Indonesia, 2010).

To produce food products that are safe for consumption, it is necessary to implement food safety standards (National Standardization Agency 1998). One of the accepted guidelines for food safety standards is Hazard Analysis and Critical Control Point (HACCP). HACCP is a tool (system) that is used to identify hazards and set up a preventative control system. HACCP is applied to the entire chain of food product processing (Thaheer, 2005; Pramesti, 2013). The basic requirements program is a way of producing good food (Good Manufacturing Practice, GMP) or good hygiene practice (GHP) that will be followed by all food business operators, who have a good reputation for ensuring that food delivered to consumers is healthy and safe (Prasetyo, 2000).

The quality management system functions as a framework within every process activity, including the HACCP system (Nurmawati, 2012). As a result, HACCP must be observed during the production of pudak to improve food safety. The dangers that could occur during the production of pudaks are expected to be able to be identified, analyzed, and controlled by observation and application.

## Material and Methods

### Research method

Observations were taken on the production process to evaluate manufacturing practices that have been carried out based on food manufacturing standards. The condition of Pudak Barokah SME were compared based on GMP standards.

## Results and Discussion

Ingredients that are needed for making pudak consist of, wheat flour, coconut milk, rice flour, salt, sugar, water and also pandan suji leaves, staples, etc.

Table 1. Product description

Spesification	Descriptions
Product name	Pudak Barokah
Raw materials	Rice flour
Process	Steam Process
Packaging Type	Betel leaf
Product characteristics	Densely scented with suji leaves and coconut milk, net 35 gr
Shelf life	Three days
Consumer	Children to the elderly people

Table 2. Details of Pudak Barokah SME's requirements for SOP (Standard Operating Procedure) Implementation

No	SOP Aspect	Deviations
1	Water safety	Alternative water sources must be chosen for ingredients usage
2	Surface conditions or sanitation that comes into touch with food	Areca leaf is used instead of plastic tub as a container for the dough before it is wrapped with areca leaf.
3	Prevention of cross contamination	Bad placement of the production room (close to restroom), chances of contamination is high.
4	Worker hygiene	Lack of sink facilities in the production room.

*To be continued...*

5	Prevention and protection from adulteration	Poor location and container placement
6	Proper labeling and storing	The label used does not contain a clear description of the production date, ingredients, and expiration date
7	Employee health control	There is no monitoring of employee health
8	Combating Pests	There is no barrier or fence in preventing insects from entering the production room

Table 3. Deviation identifications of GMP aspects of production in Pudak Barokah

No	GMP Aspects	Deviations	Category
1	Locations	The production site is located in a village far from the city	Minor
2	Building	a. Floor with walls forming right angles for cleaning b. The room's doors and vents don't have curtains or screens	Mayor
3	Sanitation facilities	Good toilet facilities apart from the placement is too close to the production room	Mayor Serius
4	Process monitoring	No periodic direct process supervision from the business owner for employees	Mayor
5	Employee	Employees do not use head covers, masks and gloves during the production process	Serius
6	Product label or description	No clear statement on the packaging label, such as halal information and expiration date	Serius
7	Storage	Product storage are using areca leaves and hanging on the wall	Minor
8	Maintenance and sanitation program	Dust and smoke can enter because the door and ventilation are continually open	Mayor
9	Documentation and recording	No complete and regular documentation of records regarding inspections, cleaning activities, and other provisions that are related to the production process	Minor
10	Training	Employees do not have training focused on GMP	Mayor

## Information:

Minor : The level of deviation is less serious and does not cause a risk to the quality of food safety of the product

Major : The level of deviation that can cause a risk to the quality of product safety

Serious : The level of irregularities that are serious and can cause a risk to the quality of food product safety if it is not immediately followed up.

From Table 3, it appears that there are still some aspects of GMP that are considered to have serious deviations that can cause risks to the quality of food product safety. These aspects include sanitation facilities, employees, and product labels or information. Improvements to the conditions of these three aspects need to be followed up immediately. Thus, observations were made on the implementation of compliance with food safety standards, with hazard analysis and critical control process (HACCP).

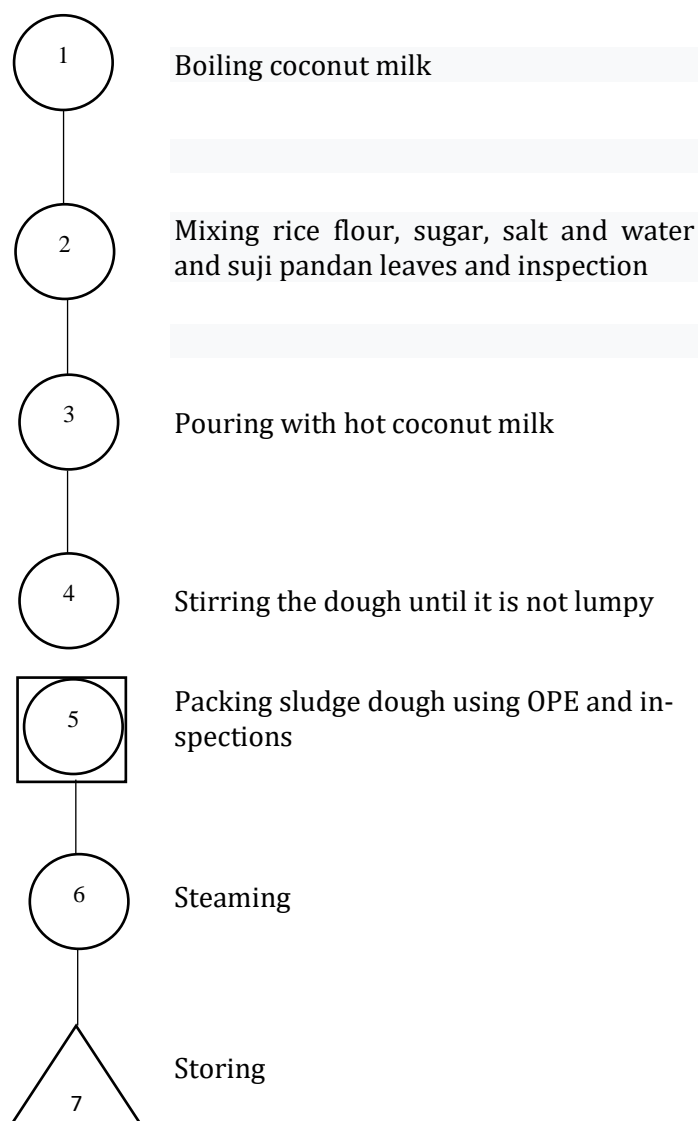
HACCP is carried out on the Barokah SME production system, with the following analysis results:

1. Identification of the usage plan

Barokah pudak product consumers are range from children to the elderly. This product is not suitable for babies. Pudak is a ready-to-consume type of product without any further processing.

2. Preparation of a flow chart

Flow charts were made based on observations of the process of production of pudaks. Number of work operations on pudaks, can be observed on the operation process map or the operation process chart (OPC), which are shown in figure 1 and table 4.



3. Flowchart confirmation in the field  
Flow chart confirmation is a comparison of the created diagram that has been made with the actual production process.
4. Hazard identification  
The hazard identification stage is used to provide an overview of the potential hazards that may occur in the entire production system. Table 4 will include potential risks based on interviews, barokah SME data, and some research.

Table 4. Hazard Identification on Puduk Production

No	Stage Process	Potential Hazard	Information
1	Coconut milk boiling	Biological: None Physical: Dust, coconut fibers or coconut shells still attached Chemical: None	Place for heating coconut milk is next to the bathroom
2	Basic ingredients mixing	Biological: Worker hand contamination, containing bacteria. Physical: Dust, or small animal waste in wheat flour or rice flour. Chemical: None	Employees do not use head-gear, gloves and masks in accordance at the production site during processing
3	Coconut milk pouring	Biological: None Physical: Dust. Chemical: None	Employees do not use head-gear, gloves and masks in accordance at the production site during processing
4	Dough stirring	Biological: None Physical: Dust Chemical: None	Employees do not use head-gear, gloves and masks in accordance at the production site during processing
5	Dough packing with OPE	Biological: None Physical: Dust that is still left in the areca palm Chemical: None	Employees do not use head-gear, gloves and masks in accordance at the production site during processing
6	Steaming	Biological: None Physical: None Chemical: None	Employees do not use head-gear, gloves and masks in accordance at the production site during processing
7	Storage	Biological: None Chemical: None Physical: Dust	Employees do not use head-gear, gloves and masks in accordance at the production site during processing

Identification of the determination of critical control points or critical control points in the production process of barokah SME puduk is carried out starting from boiling coconut milk to

storage. CCP can be determined using a decision tree. Based on CCP identification, three processes have CCP, which are coconut milk boiling, ingredients mixing and steaming.

The following explanation:

a. Coconut milk boiling.

This process carried a great potential danger, mainly due to it being a location that is directly adjacent to a public road, causing a lot of dust and smoke contamination from vehicles. In addition, worker contamination also occurs, due to incomplete uniform attributes during production. This gave rise to several harmful bacteria. Then the base used to slice the is also not guaranteed sanitation, even the owner regularly uses the same broom fibers to sweep the floor and the base. In this process, disciplinary workers need to be carried out, replacement of appropriate tools (according to their initial function), and redesign the layout facilities, such as the transition of spatial functions.

b. Mixing all ingredients into one.

Two mistakes that resulted from workers' indiscipline occurred during this process. First, workers do not use complete attributes that should be worn during the production process of food such as masks, headgear, and gloves. As a result, food will be contaminated by workers. Second, the owner decides to use well water as water to mix the dough. The owner should have been aware of the dangers posed by well water even though the water was boiled first, in fact the well water was also not suitable for consumption, even though it comes with a reason which is to minimize production costs. In this process, it is necessary to discipline workers and socialize the dangers of well water or other things that could endanger food if consumed.

c. Steaming.

This process workers do not use the complete attributes that should be used during the process of food production. Aside from socialization activities about food business safety, improving worker discipline is once again the most crucial item that needs to be done.

The CCP process must be carried out correctly according to SSOP, to eliminate the danger that can be potentially occurs. Negligence when carrying out several processes can cause danger to the production system. The Critical Point (CP) process also requires control to prevent potential hazards. Based on the identification of hazards and critical control points in pudak production, the critical limits to prevent biological, physical and chemical hazards in food processing can be seen in Table 5. There are still several processes that can lead to risks in Pudak production process. Risks include, among other things, contamination of food preparations due to unhygienic employees, the use of less supportive tools, and poor layout of production space.

Table 5. CCP critical limits

Potential hazard	CCP	Critical limits
Physical hazards in the form of dust and insect smoke can spread bacteria	-Coconut milk boiling, - Basic ingredients mixing, -Packing using OPE or areca leaf	- Protective use
Biological hazards in the form of contamination of food preparations by bacteria	Dough mixing	Use employee hygiene protectors such as headgear, gloves, and masks
Chemical hazard does not exist	-	-

## Conclusion

The process of making pudaks ranges from boiling coconut milk, mixing ingredients, adding hot coconut milk to the dough, packaging, and steaming, to storing processes there are 3 types of potential hazards in terms of biological, physical, and chemical. Based on the identification of CCP, obtained three processes that have CCP, namely the process of boiling coconut milk, mixing ingredients, and packaging the dough using leaf wrap. Thus, personal hygiene (of the workers) and sanitation (of the production site) is very important to determine the quality of food products.

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## References

- Kementrian Perindustrian RI. (2010). *Peraturan Menteri Perindustrian Republik Indonesia tentang pedoman cara produksi pangan olahan yang baik (Good Manufacturing Practices)*. Nomor: 75/M-IND/PER/7/2012.
- Nurmawati. (2012). Proses pembentukan pola perilaku kerja karyawan PT. Indopherin Jaya melalui budaya organisasi 5S (Studi Kasus Pada Karyawan PT. Indopherin Jaya, Kota Probolinggo). *Skripsi*. Universitas Brawijaya, Malang.
- Pramesti, N. (2013). Analisis persyaratan dasar dan konsep Hazard Analysis Critical Control Point (HACCP) dengan rekomendasi perancangan ulang tata letak fasilitas (Studi kasus: KUD DAU Malang). *Skripsi*. Universitas Brawijaya, Malang.
- Prasetyo, A.T. (2000). Implementasi GMP dan HACCP dalam Menunjang quality assurance industri pangan. *Skripsi*. Universitas Brawijaya, Malang.
- Priyanto, A. D., Estiasih, T., Putranto, A. W., Widyasari, W., & Putra, R. K. (2022). Education of Good Manufacturing Practice and Hazard Analysis and Critical Control Points on Fresh Milk Processing at CV Milknesia Nusantara. *J-Dinamika: Jurnal Pengabdian Masyarakat*, 7(1), 104-108.
- Thaheer, H. (2005). *Sistem manajemen HACCP (Hazard Analysis Critical Control Points)*. Jakarta: PT. Bumi Aksara.