

**Conference Paper** 

# Design of Hazard Analysis Critical Control Point (HACCP) in Rendang Padang Restaurant

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\*Corresponding author: ABSTRACT E-mail: yelviasunarti@gmail.com Food safety ar

Food safety and nutrition will determine the degree of health. Many restaurants sell various types of food but not yet known whether the food served is safe or not. One of the typical foods from Padang restaurants is rendang. The cooking process of rendang needs a long time, so rendang is made in large quantities. It causes rendang to experience storage long enough that it can trigger bacterial growth. Therefore, HACCP is needed to prevent food contamination. This study aims to determine the design of HACCP in rendang padang restaurant. This research used survey and direct interview methods with the owner to determine the design and implementation of HACCP. Based on the analysis, show that the formulation of the HACCP stages shows that the main points of Critical ingredients are spices and coconut milk, receipt and preparation of raw materials, preparation of equipment used, cooking process, storage, and distribution. Corrective action that can be taken is to return raw materials and provide advice to the seller and always clean. From the results of bacterial testing on rendang, it meets the requirements of SNI 7474:2009. Padang restaurant entrepreneurs are advised to choose suppliers of raw materials implement a food safety system and apply personal hygiene and food sanitation hygiene.

Keywords: Food Safety, HACCP, Rendang Padang Restaurant, CCP

## Introduction

Food and drink are important basic needs for humans. The food needed of course must be of good nutritional value attention to hygiene and sanitation including food processing, cleanliness of food handlers, and how to serve the food. Currently, there is a wide selection of food and drink available in public places with varying quality. It can be ascertained, where there is the activity of humans, food vendors can be found. Food is one of the parts that are important for human health considering that at any time there can be diseases caused by food (Chandra, 2006).

Food that doesn't unsafe caused of the presence of harmful foreign substances have an impact on the emergence of various mild to severe diseases dangerous (Febriana & Artanti, 2009). Safe and healthy food of equal quality and high nutrition, a very important role in the growth, maintenance, and improvement of the degree of health and increase public intelligence. Unsafe food will affect human health which in turn causes problems with nutritional status. Lack of attention will result in an impact in the form of a decrease in the health of consumers, ranging from food poisoning due to unhygienic storage and presentation process to the risk arises cancer due from the use of food additives dangerous.

Based on the WHO report, estimates of foodborne diseases are caused by 31 agents in the form of bacteria, viruses, parasites, toxins, and other chemicals. It is stated that every year as many as 600 million or almost 1 in 10 people in the world fall ill after consuming contaminated food. Of these, 420,000 people died including 125,000 children under the age of 5 years. Diarrhea is responsible for more than half of the global burden of foodborne illness-causing 500 million people to fall ill and 230,000 deaths each year. Children are at risk of developing food-borne diarrheal diseases, with 220 million falling ill and 96,000 dying each year. Diarrhea is often caused

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by raw or undercooked foods such as meat, eggs, fresh produce, and dairy products that are contaminated with the pathogens Escherichia coli and Salmonella (WHO, 2015). Therefore, to prevent an increase in food poisoning outbreaks, it is important to handle the Hazard Analysis Critical Control Point (HACCP) on food. Hazard Analysis Critical Control Point (HACCP) is a program of monitoring, control, and regulatory procedures designed to keep food from being contaminated before serving. The application of HACCP does not mean stopping bacterial growth to zero, but minimizing it to a level that can be considered safe (Arisman, 2009). The HACCP draft is a food safety method that aims to identify hazards that may occur at each stage of the food manufacturing process and control measures to prevent these hazards from occurring. Currently, many people work away from home and have high mobility so people rarely cook food for consumption at home. Therefore, food safety must be considered so that food is not easily contaminated which will have the impact of being a source of disease. To prevent this, it is necessary to carry out a Hazard Analysis Critical Control Point (HACCP) starting from the process of purchasing raw materials, cooking, to distribution so that food is safe for consumption by consumers. One of the famous Indonesian culinary icons is the Padang restaurant. The hallmark of food from Padang restaurants is beef rendang.

Based on the results of a preliminary study from several Padang Restaurants in Indonesia, regions make one to three kilograms of rendang a day so that it can be consumed within a few days or it can take one day depending on the number of buyers. This is because the process of making rendang takes quite a long time. However, this can pose a risk of food contamination, namely contamination of biological, physical, and chemical hazards. Cooking rendang in large quantities will experience long storage. If rendang is stored for a long time with food temperatures that are not optimal, it will trigger the growth of bacteria and mold viruses. Not only that, but rendang can also change color, smell, shape, and taste. This can cause food poisoning with symptoms such as diarrhea, vomiting, fever, and so on, and rendang is no longer suitable for consumption. In line with the 2014 research by Prasafitra, Suada, & Swacita, the longer the serving of rendang meat without being re-cooked, or stored at room temperature, the faster the reductase time, so it is estimated that the number of bacteria will increase and the smell, texture, and taste of the food will quickly change for the worse. Similar research showed that the total microbes in rendang increased after one to three days of storage. Based on this, the authors want to research the analysis of rendang hazard and critical control points (HACCP) case studies at Padang Restaurant.

# **Material and Methods**

# Date and Place

The research was conducted in March-May 2022 at Padang Restaurant which is located in Gunung Anyar, Surabaya.

#### Method

This study used a survey method by following the entire process of making rendang, from receiving raw materials to packaging the final product. This study conducted direct interviews with restaurant owners and made a direct visit to Padang restaurant, located in Gunung Anyar Surabaya.

#### Research design

This research is a type of qualitative research with a case study approach. This study aims to determine the process of making rendang, product description, identify the final purpose of using the product, develop flow, confirm flow, identify hazard analysis, determine critical control points.

(TKK), determining critical limits for each CCP, monitoring critical limits for each TKK, determining corrective actions, establishing verification procedures, as well as documenting and recording the process of making rendang at Padang Restaurant.

## Research time and location

This research was conducted in May 2022. The location of this research is Padang Restaurant

#### Research informants

The informants in this study were employees of a Padang restaurant who were tasked with buying the ingredients for making rendang and the employees who cook rendang. Techniques used for selecting informants using purposive sampling. This is because informants who have been mentioned directly in charge of the process of making rendang

#### Data source

In this study, data collection can be in the form of primary data, namely data taken directly from respondents using in-depth interviews, observation, measurement, and assessment of meat color.



Figure 1. The production process of rendang in Padang Restaurant

# **Results and Discussion**

Padang restaurant has implemented a security system for HACCP food in every production. Application of HACCP in the production process in catering the rendang meat menu includes 10 steps of implementation with 7 principles of HACCP. The steps for implementing HACCP are determining the HACCP team, product description, diagram determination flow, hazard identification, Critical determination Control Point (CCP), setting critical limits for each CCP, monitoring, corrective action, verification microbiology, and documentation. The description of the rendang meat menu is as follows in table 1.

	Tab	le	1. I	Des	scri	pti	on	of	ren	ıda	ng	in	pac	lang	re	esta	ur	ant	ΰS
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Product name	Rendang					
Composition	Beef, red chili, kaffir lime leaves, lemon grass, turmeric, galangal, cinnamon, cori-					
	ander, cumin, kandis acid, gelugur acid, candlenut, nutmeg, onion, garlic, ginger,					
	coconut milk					
Packaging	Plastic for food					
	Food wrapping paper					
Expired date	2 days, 7 days (if reheated)					
place	Padang restaurant					
To be continued						

Product use	Directly consumed
Storage con- ditions	Served in a display case using an open bowl
Distribution	Distribution from the kitchen to the serving area using an open bowl

Based on table 1 show that the product description is a complete explanation of the product regarding the composition, structure physics/chemistry, treatments, packaging, storage conditions, and durability as well as a distribution method. But this restaurant does not list the physical/chemical structure of the menu beef rendang. The physical structure can be taste, shape, and other organoleptic appearance. Chemical structure including Aw, pH, etc. not yet described.

# Analysis of critical control points in Rendang Padang restaurants

The first principle of HACCP is the identification of dangers that may arise during the process of rendang meat menu production. Based on the analysis, the critical control point is shown in table 2.

Process	Hazard	Source of	prevention	Q1	Q2	Q3	ССР	CCP/not	Reason
		hazard						ССР	
Receipt and prep- aration of raw ma- terials	Physique : Dust, Wood	The pres- ence of contami- nation during the process of transpor- tation and sale in the market	bring gro- ceries closed	Yes	Yes -	-	-	ССР	At the time after washing, raw mate- rials are not placed in a closed container which causes dust to stick back
	Chemical : Plastic chemical compounds used as con- tainers	Cross con- tamina- tion from plastic	Use safe containers for food	Yes	No	Yes	-	ССР	Plastic monomers contaminate raw materials
Prepara- tion of tools used	Physique : Dust,	Tool stor- age in the open	-Storing cooking utensils in a closed place -wash be- fore use	Yes	No	No	-	Not CCP	This stage has re- moved the dust be- fore cooking
	Chemical : Dishwash- ing liquid	Rinsing unclean cooking utensils	Wash and rinse until clean	Yes	No	Yes	No	ССР	Chemicals in dish- washing liquid can contaminate food

Table 2. Analysis of Critical Control Points in rendang production

To be continued...

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cooking	Physique : Dust, Rock flakes	Dirty kitchen condi- tions	Keeping the kitchen clean	Yes	Yes	-	-	ССР	Invisible physical danger is consumed
	biology: Heat Re- sistant Pan- toge	There are heat-re- sistant bacteria	Tempera- ture set- ting to kill bacteria	Yes	Yes	-	-	ССР	Bacteria contained in raw materials can be removed with the right tempera- ture
Storage and dis- tribution	Physique: Dust	-Sales lo- cation be- side the road - The con- tainer is not closed	Use closed containers and keep clean	Yes	No	Yes	No	ССР	Flying dust can con- taminate the ren- dang in the window
	Biology : -Flies as an intermedi- ary for bac- terial con- tamination - Bacterial Growth	- cold food tempera- ture - the con- tainer is not closed	Tempera- ture regu- lation dur- ing storage and closed containers	Yes	No	Yes	No	ССР	During storage, ren- dang is not reheated
	Chemical: Plastic/food wrapping paper	Cross- contami- nation from plas- tic/paper	Choose to use safe packaging	Yes	No	Yes	No	ССР	Transfer of plas- tic/paper mono- mers to food result- ing in contamina- tion

Identification of hazards in the process of rendang meat menu overall is following SNI No. 01-4852- 1998. Hazards identified in beef are a natural microbe in meat, namely the amount *E. coli* calculated by the TPC method (Total Plate Counts). If the number of these bacteria exceeds the standard, it will increase the risk of other diseases (Kuntoro et al., 2012). Potency Biological hazards in beef in the form of bacteria *Salmonella, Y. enterolitica, L. monocytogenes, S. aureus, and C. perferingens*. Chemical hazards to meat can be in the form of formalin, and physical hazards in the form of gravel (Puspitasari, 2015). Hazard identification is important at every stage of the production process. Danger significant and preventive measures must be identified. Significant danger will be taken into account in determining the CCP (Handayani, 2012).

The HACCP principle is CCP (Critical Control Point). CCP Determination can be done using a tree decision. The critical limit is a control point taken to eliminate a hazard or reduce it to a safe limit (Afrianto, 2008). Critical limits must be specified and validated first. Criteria that are often used as the critical limit are the result measurement of temperature, time, humidity level, pH, Aw, chlorine content, texture, and appearance visual (Afrianto, 2008). establishment of the CCP and critical limit at each CCP shown in Table 1. Accepting being designated as CCP 1 because meat and other ingredients are mobilized from the supplier and no control from the supplier. Beef may be contaminated microbiology derived from workers and an unhygienic environment (Puspitasari et al., 2016). This restaurant has used the related checklist specifications that must be met, namely temperature, physical appearance, and TPC content must be according to SNI meat carcass. Test TPC content is done before the collaboration with the supplier is done. If the meat is not meet

these specifications, then the meat must be returned to the supplier. Using a checklist, sorting, and material handling the right way can reduce the risk of harm(Andoni, 2012). The critical limits accept that must be met for frozen material in a restaurant is -8oC, while for rendang seasoning is 5oC (Cold). Frozen meat storage temperature should be maintained at a temperature of -18oC (Afrianto, 2008). Frozen meat carcasses stored at -6oC up to -17oC can last for 3-12 months (Gustiani, 2009). Instant rendang seasoning and coconut milk in packages stored in a chiller with a temperature 0°C-5°C. Other ingredients such as oil fry, all-purpose seasoning, and salt are stored in a warehouse at room temperature. The day before cooking, the beef still frozen must be thawed first. Defrosting is done to thaw the meat. Defrosting is done by letting the meat sit in a chiller at 1°C-4°C for 12-24 hours (Andoni, 2012). After that, the meat is cut into dice and put in a chiller otherwise immediately used. Cut meat and put it in the chiller must be immediately cooked. The first step of cooking beef rendang is to stir-fry instant rendang seasoning in hot oil. After the seasoning changes color and smells good, add water, stirred, and allowed it to boil. After the boil, pieces of meat and coconut milk are included, then cover the pan for 30 minutes. Meat time almost cooked, added monosodium glutamate (MSG) and salt, then cooked again until cooked. There is a potential danger significant ones that can be eliminated during the process of cooking frozen raw materials, so that is designated as CCP (Afrianto, 2008). Meat beef is cooked at 74°C for 2 hours. The cooking process starts with boiling the meat Boiling is intended to kill microbes mesothermic. Cooking time above 15 minutes can reduce the risk of re-contamination by microbes after food processing is finished (Dewi, 2015). Cooking meat at a temperature 70oC for 2 minutes can kill the content *E. coli* bacteria and other pathogens (Afrianto, 2008).

# Conclusion

Based on research, it was obtained that, the critical control points from raw materials for spices and coconut milk, the stage of receiving raw materials, the stage of preparing raw materials, the stage of preparing the tools used, the cooking process, as well as storage and distribution.

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