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HAZARD ANALYSIS AND CRITICAL CONTROL POINT ON PROCESSING OF TUNA MEATBALLS AT CV. SAKANA INDO PRIMA DEPOK WEST JAVA

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ABSTRACT

This research was conducted at CV. Sakana Indo Prima Depok West Java from 2nd until 23rd January, 2019. This research aims to identify hazards and determine critical control points in the processing of tuna meatballs. This research is done by a case study method. The research procedures include an observation of the tuna meatball processing, potential hazard analysis, identification of critical control points, microbiological test and organoleptic test. The data obtained were analyzed descriptively. The possible hazards of the production process of tuna meatballs are biological, physical and chemical hazards. The results of the hazard analysis obtained by the critical control point are at the stage of the process of receiving raw materials and draining process. Microbiology test results of the tuna meatball final products is equal to 1.8×10^4. The organoleptic test results show that the tuna meatball products has good appearances, its surface is not hollow, compact and bright. The aroma of tuna meatballs has a spesific aroma of tuna. The taste produced of the tuna meatballs are savory and salted. The texture of the tuna meatballs is solid, compact and has good elasticity.

Keywords: *tuna meatballs, hazard analysis, critical control points, organoleptic, microbiology*

INTRODUCTION

Fish is a source of food and a source of protein that is relatively inexpensive and beneficial to society, fish also contains unsaturated fatty acids, vitamins and minerals that are needed by the body (Muchtadi 2007). Based on the calculation of fish consumption figures calculated from BPS National Socio-Economic Survey (Susenas), it can be seen that fish consumption figures in 2017 are increasing, this can be seen from the increase in fish supply (kg / capita / year) in 2012-2017 by 37, 17 percent.

Processing fishery products is potential and is expected to increase economic growth from the fisheries sector in

Indonesia. The potential of natural resources in Indonesia can support fisheries processing activities. These natural resources must be utilized optimally in order to increase the country's foreign exchange. With the processing of fishery products, it is expected that it will give a higher selling value to fishery products. Good processing of fishery products is processing that has gone through the stage of supervision and quality control. Quality control and supervision control must be improved in order to be able to face competition in the export activities of fisheries processing. One way to improve quality is by implementing a food safety system in the process of handling and processing to consumers in accordance with international standards. Hazard Control and Critical Control Points can be done with *Hazard Analysis Critical Control Point* (HACCP) method.

According to BSN (1998) on SNI 01-4852-1998, HACCP is a processes in identifying, evaluating and controlling real hazards for food security. HACCP is applied by producers, one of which is to maintain and guarantee food security to consumers. The HACCP function is to control physical, chemical, biological hazards and ensure food safety. *Hazard Analysis Critical Control Point* (HACCP) is needed to determine the stages of the processing that is controlled by risks and hazards that arise (Sudarmaji 2005). In fulfilling food security, the production process must meet the standards of *Good Manufacturing Practices* (GMP) and *Sanitation Standard Operating Procedures* (SSOP).

Good Manufacturing Practices (GMP) is a food production process that aims to ensure that food producers meet specified requirements to produce quality food products that are safe for consumption in accordance with consumer demands (Susianawati 2006). GMP must be applied by industries that produce food products as a preventive effort so that food consumed is safe, feasible and has excellence quality (Anggraini and Yudhastuti 2014).

Sanitation Standard Operating Procedures (SSOP) is the process of maintaining sanitary conditions that generally relate to all production facilities or areas of the company and are not limited to certain stages. Sanitation is a disease prevention process by regulating or eliminating interrelated environmental factors in the transfer of the disease. SSOP is an obligatory industrial sanitation program to improve the quality of products produced and guarantee the safety of food production (Triharjono et al. 2013).

CV. Sakana Indo Prima is a company engaged in the processing of fish jelly products. The type of business that is managed is in the form of processing various processed fish and shrimp in the Depok and Semarang regions. This developing company

produces processed fish such as meatballs, *kaki naga*, *keong mas*, *otak-otak*, and fish sticks. CV. Sakana Indo Prima strives to maintain the quality of products produced and always strives to maintain the availability of raw materials for products by storing a number of fish in cold storage. This research aims to analyze hazards and determine critical control points in the processing of tuna meatballs on CV. Sakana Indo Prima.

RESEARCH METHODS

This research was conducted at CV. Sakana Indo Prima Depok West Java from 2nd until 23rd January, 2019.

The research is done by case study method. The data was analyzed descriptively. The research procedures include observation of the process flow of processing tuna meatballs from receiving raw material until the final product of tuna meatballs and then analyzed using a comparative descriptive method.

The research procedures include observation of the process flow of processing tuna meatballs, potential hazard analysis, identification of critical control points, microbiological test and an organoleptic test. The flow of processing of tuna meatballs is carried out by the process of observing, seeing and directly following the processing of tuna meatballs at the CV. Sakana Indo Prima. Hazard potential analysis is a procedure of identifying and evaluating the possibility of hazard in product processing, which can allow harm to consumers health in ensuring the safety of food product. Identify the critical control point can be done based approach sensible premise and uses a decision tree

RESULTS AND DISCUSSION

The results of the observations included product descriptions, process flow of processing tuna meatballs, potential hazard analysis, identification of critical control points, microbiological test and organoleptic test.

Product Description

Tuna meatballs are the one of product produced by CV. Sakana Indo Prima. The raw material for fish meatballs is a paste of tuna meat mixed with several additional ingredients such as garlic, shallots, eggs, sugar and salt. The dough is formed with the meatball forming machine, with a weight size of fish meatballs reaching 14-15 grams per item. The process of making meatballs goes through twice the boiling process so that the resulting meatballs are not crumpled and not broken due to changes in temperature that occur too quickly. The product is packaged using plastic made of polyethylene with the weight of the product in the packaging that is 500 grams

Process Flow and Hazard Analysis

Analysis on the flow of the fish meatball processing process starts from tracing and searching for the causes of the danger of each stage of the process. Every hazard that has been identified is grouped based on the dangers of chemical, biological and physical properties. The hazards identified were analyzed whether these hazards could be controlled with GMP and SSOP or not.

Hazard Analysis in the Processing Process of Tuna Meatballs

Hazard analysis on the flow of processing of fish meatballs starts from tracing and searching for the factors that cause harm to each stage of the process. Every hazard that has been identified is grouped based on the dangers of chemical, biological and physical. Hazard analysis can be seen in table 1.

Table 1. Hazard Analysis of Processing of Tuna Meatballs

No	Process Flow of	Hazardous Causes	Potential Hazards	SSOP	GMP
1.	Receiving Raw Materials	-Contamination from workers and equipment. - Chemical contamination from the growth of histamine-forming bacteria. - Sort imperfect.	Biological: Contamination of pathogenic bacteria (TPC, *E. Coli, Salmonella, S. aureus, V. cholera, V. Para)* Chemistry: Increased histamine levels, heavy metal content Physical: Filth	√	√
2.	Washing of Raw Materials	- Worker contamination and Washing which is not clean	biologically: Pathogenic bacterial contamination Physical: Contamination of foreign matter	√	
3.	Dozing of Raw Materials	Contamination of workers and equipment. Sort imperfect.	Biological: Pathogenic bacterial contamination Physical: Contamination of foreign matter Unscrupulous residue	√	√
4.	Weighing	contamination of workers and equipment	biological: Pathogenic bacterial contamination	√	√
5.	Kneading	Contamination of workers and equipment	Biological: Pathogenic bacterial contamination Physical: Contamination of foreign matter	√	√
6.	Printing	Contamination of workers and equipment	Biological: Pathogenic bacterial contamination Physical: Contamination of foreign matter	√	
7.	Boiling	Contamination of workers and equipment	Physical: Contamination of foreign matter		√

8.	Draining	contamination of workers and equipment	Biological: Growth of pathogenic bacteria Physical: Contamination of foreign materials		√
9 .	Packaging	contamination of workers and equipment	Biological: Pathogenic bacterial contamination Physical: Contamination of foreign matter	√	

Identify Critical Control point

The Determination of the critical control point can be done with the predefined results of the hazard identification, and obtained the potential danger which categorized as a significant hazard. The Identification of the Critical Control Points can be seen in table 2.0

Table 2. Identification of Critical Control point

Number	**process Flow**	**Hazards**	**CCP / Not-CCP**
1	Receiving Raw Materials	- Pathogenic bacterial contamination - Chemical contamination from the growth of histamine - Heavy metal content	CCP
2	Washing of Raw Materials	- Pathogenic bacterial contamination - Contamination of foreign matter	Not CCP
3	Dozing of Raw Materials	- Pathogenic bacterial contamination - Contamination of foreign matter - Sort imperfect	Not CCPs
4	Weighing	- Pathogenic bacterial contamination	Not CCPs
5	Kneading	- Pathogenic bacterial contamination - Contamination of foreign matter	Not CCP
6	Printing	- Pathogenic bacterial contamination - Contamination of foreign matter	Not CCP
7	Boiling	- Contamination of foreign matter	Not CCP
8	Draining	-Growth of pathogenic bacteria	CCP

		- Contamination of foreign matter	
9.	Packaging	- Pathogenic bacterial contamination - Contamination of foreign matter	Not CCP

Based on 2 critical control points in processing of fish meatballs that are determined by hazard identification using a decision tree (Maudy 2018). The critical control point is in the process flow of the receipt of raw materials and the flow of the draining process. The control phase that must be carried out is inspection of raw materials by testing the heavy metal content of the raw material and taking corrective actions to the *supplier* to provide raw materials that do not contain heavy metals. the draining process is included in the critical control point so that there is a need for supervision of workers and equipment used at this stage. The possibility of the growth of pathogenic bacteria at this stage can be said to be moderate because they see the draining room which is only given bulkhead with the production room .

Microbiology Test

The microbilogical test was done by the Total Plate Number (ALT) method for water and ice testing, and the final product testing was done by the testing of Total Plate count (TPC) method. The details of the microbiological testing can be seen in table 3.

Table 3. Microbiological Test Results ALT and TPC Method

No	Samples	Unit	Laboratory Results	Quality Standard
1.	Water	CFU / g	1.20×10^1	1.0×10^2
2.	Ice		4.0×10^1	1.0×10^2
3.	Final Product		1.8×10^4	1.0×10^5

Based on the results of the test it appears that bacterial growth in water and ice used during the production process at CV. Sakana Indo Prima still meets quality standards. The water quality standard stated in SNI 01-353-2006 is 10^2 CFU/g and the results of the water sample test at CV. Sakana Indo Prima 1.20×10^1 CFU/g. Ice standard quality standards that are blinded in SNI 4872: 2015 are 1.0×10^2 CFU / g while the ice used during the production process shows microbiological

test results of 4.0 x 10^1 CFU / g. The value of the

Total Plate Count on fish meatballs, which is 1.8 x 10^4 CFU / g , is below the limit of the quality requirements of fish meatballs, which is equal to 1.0 x 10^5 CFU / g. The results of the TPC analysis on fish meatball products indicate that the application of HACCP on the CV. Sakana Indo Prima can be categorized quite well with the results of microbial testing below the quality standard. The test results show that fish meatballs produced by CV. Sakana Indo Prima is worthy of consumption.

Organoleptic test

Testing of organoleptic characteristics of fish meatball final products in CV. Sakana Indo Prima is conducted regularly by QC. Testing the organoleptic characteristic of the final tuna meatball products include appearance, , aroma, taste and texture. Testing of organoleptic characteristics is done to improve the quality of fish meatball products. The results of organoleptic observations of fish meatball final products conducted at CV. Sakana Indo Prima is in good condition and can be accepted as a food product and can be consumed. Organoleptic observation was assisted by using tuna meatball sensory sheets that were in accordance with SNI 7266: 2014. Products that have poor organoleptic testing, result, will be carried out an improvement process in subsequent production.

Conclusion

Based on the results of observations made at CV. Sakana Indo Prima Depok, West Java, regarding hazard analysis and critical control points in processing tuna fish meatballs, conclusions can be drawn:

1. The results showed that the processing of tuna meatballs on CV. Sakana Indo Prima has implemented the HACCP system properly in accordance with SNI 01-3851-1998, it can be seen that each processing process has been in line with GMP (*Good Manufacturing Practice)* and SSOP (*Sanitation Standard Operating Procedure*). Based on the results of identification, critical control points (CCP) are found in the process flow of receiving raw materials and the imitation process.
2. On the results of microbiological testing of water and ice using ALT parameters, still meeting the quality standards as well as testing the final products of tuna meatballs using TPC parameters still meets quality standards and shows that fish meatballs are acceptable and safe for public consumption.
3. Organoleptic testing at CV. Sakana Indo Prima is carried out regularly to improve the fish meatball products produced. The organoleptic test results show that tuna

meatball products have a good appearance, namely a surface that is not hollow, compact and bright. The aroma of tuna meatballs has a spesific aroma of tuna. The taste produced of the tuna meatballs are savory and salted. The texture of fish meatballs is dense, compact and has good elasticity.

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