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HAZARD ANALYSIS AND CRITICAL CONTROL POINT ON HANDLING WGGS GURAME AT KURNIA MITRA MAKMUR PURWAKARTA LTD, WEST JAVA

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ABSTRACT

This research aims to analyze the hazards and determine the critical control points in the process of handling WGGS gurame at Kurnia Mitra Makmur Purwakarta. Ltd, West Java. The research began in July to November 2019. The research method was carried out with a case study method and then analyzed descriptively. The research data consisted of hazard analysis, CCP, microbiology, organoleptic, and chemistry. Hazards that may occur in the handling of WGGS gurame are biological, physical, and chemical hazards. The result of the hazard analysis obtained by the critical control point is in the washing II. Microbiological test results for raw materials worth 3.6 x 10^2 and the final product worth 2.0 x 10^2 so that they still meet quality standards and are safe for public consumption. Organoleptic testing of raw materials for WGGS gurame products showed that the raw materials used for gurame fish have good physical characteristics, odors, and textures that are still good and accepted, which is then continued for the next process. Chemical test results for raw materials are acceptable because there was no detection of antibiotic residues and small amounts of metal contamination.

Keyword : Hazard Analysis, Identification of Critical Control Point, Mikrobiological, Organoleptic, WGGS Gurame

Introduction

Gurame fish (*Osphronemus gurame*) including native fish of Indonesia that have spread to Southeast Asia and China. At first, carp were only found in Sumatra, Java and Kalimantan and then were introduced to Asia and Australia. Featured in the field of aquaculture because it has a higher selling value compared to freshwater fish further because of high nutritional value, the taste of the meat is also tasty, tasty and compact (Ghufran and Kordi 2012).

The development of gurame fisheries products needs to be done, most of the gurame cultivation is only sold in fresh form. WGGS (whole, gill, broken heart, scaled) is one form of product diversification made from gurame fish, which is fish that has been approved for removal of scales, gills, and bowels and then frozen with freezing machines (Naimah 2015). Raw materials made from fish which are very perishable (very perishable) compared to other food commodities (Pratama 2013).

In connection with the above, it is necessary to implement a monitoring system that guarantees the safety of products produced by the fishery products industry. Food processing companies are sponsored using the Hazard Analysis Control Point (HACCP). The HACCP system must be based on GMP (Good Manufacturing Practices) and the application of SSOP (Standard Sanitation Ooperating Procedure). HACCP security systems are needed to secure products that are safe from potential hazards. Install hazard analysis and transfer of critical points to guarantee products excluded from physical, chemical and microbiological hazards (Dewi 2015).

The process of handling WGGS gurame conducted by PT. Kurnia Mitra Makmur Purwakarta has not implemented HACCP that conforms to the standard and is only equipped with Halal certificates, SKP (Certificate of Feasibility Processing), and GMP. Therefore, research was conducted to analyze the danger and control points of critical points on WGGS gurame handling products.

Research Methods

The method used in this research is the case study method, data collection through active participation and interviews. Case studies are research that emphasizes a deeper understanding of certain phenomena. Case studies are also useful in exploring problems that have not or are still little known about certain phenomena (Yona 2006). Active participation means to participate in part or whole in a process flow in a production unit (Nento 2015). Interview is a way of collecting data by means of one-sided question and answer which is done systematically and based on the research objectives (Marzuki 1986 in Nento 2015).

Discussion descriptively with a qualitative approach. Descriptive research is a study that is strived to mencandra or observe problems systematically and accurately about the facts and the nature of certain objects. A qualitative approach is a research procedure that produces descriptive data in the form of personal documentation, field notes, written words from respondents. The goal is to find out activities in the field in detail and comprehensively (Biological 2015). The research procedure was carried out by following the flow process of the WGGS handling process starting from receiving materials to becoming the final product (Figure 1) which then analyzed the potential hazards and identification of critical control points, microbiological and organoleptic testing and comparing the results of microbiological testing with SNI 2332 in 2006 and 2015

Result

Table 1. Product Description WGGS Gurame at Kurnia Mitra Makmur Purwakarta Ltd.

Description	Information
Product Name	*Fish Gurame Whole ptg 2*
Species Name	*Osphronemus gourami*
Origin of Raw Materials	Tulungagung, East Java and Indramayu
Receiving Raw Materials	Transported by truck in a fiber box measuring 86 x 55 x 53 cm The maximum temperature of the raw material when receiving is 10^{o}C
Product Result	Cut gourami fish that have been removed scales, gills and stomach contents in a frozen state
Raw Material	- Main : Gurame (*Osphronemus gourami)* - Helper : water and ice
Process Stage	Receiving raw materials, Sorting I, Weighing I, temporary storage, Cutting the part into 2/3 according to size, Gill and stomach contents removal, washing I, Weighing II, Washing II, Arrangement in Longpan, Freezing I, Welding, Freezing II, Weighing end, packing and labeling, storage in cold storage, transportation.
Packing	Gurame WGGS is packed in 64 x 48 x 0.05 cm plastic as the primary packaging. Packed with a master carton containing 10 kg of WGGS carp, coated with plastic measuring 58 x 48 x 0.05 cm.
Material Packaging	Plastic material *polyethylene, master carton*
Storage	Stored in a cold storage room (maximum temperature of cold storage -20 ^{o}C ± 2^{o}C)
Labeling	Product name, production code, net weight, shelf life, storage instructions, manufacturer's name, BPOM number, GMP number
Usage Limits	18 monts
Storage Instructions	Stored at temperature -18 ^{o}C
Instructions for use	Ready to be cooked
Distribution	Delivery to customers using containers equipped with cooling machines with the temperature -25^{o}C thermoking brand

Physical, Biological and Chemical Hazard Analysis

Hazard analysis begins by tracing the factors that cause hazard in each process of handling WGGS gurame. The hazards that have

been identified are then classified according to their biological, chemical and physical characteristics. These hazards are analyzed to find out whether or not they can be controlled by GMP and SSOP if they cannot be controlled, it is necessary to control efforts..

Table 2. Hazard Analysis of WGGS Gurame Product

No	Process	Hazard Potential	Hazard Source	Prob (L/M/H)	Sev (L/M/H)	Sign (S/NS)	Precaution
1.	Receiving Raw Material	Biological	Contamination from workers, equipment and raw materials	L	H	NS	- Can be controlled with SSOP for workers and equipment -Microbiological test results of raw materials from suppliers
		Chemical	Water pollution from fish suppliers	L	M	NS	Water chemistry test results from suppliers
		Physical	Contamination from suppliers when harvesting fish and transportation	L	L	NS	Can be controlled with GMP and SSOP
2.	Sorting	Biological	Contamination from workers and equipment, increased temperature	L	H	NS	Can be controlled with SSOP and GMP by ensuring clean equipment and workers and cold chain application
3.	Weighing I	Biological	Contamination from workers and equipment	L	H	NS	Can be controlled with SSOP by maintaining and supervising worker and equipment hygiene
4.	Temporary Storage	Biological	Contamination from workers and equipment	L	H	NS	Can be controlled with SSOP by maintaining and supervising worker and equipment hygiene
5.	Scalling	Biological	Contamination from workers and equipment, increased temperature	L	H	NS	Can be controlled with SSOP
		Chemical	Contamination from rusty material	L	H	NS	- Can be controlled with GMP and SSOP - Do not use rusty tools and clean the equipment properly
		Physical	Remaining scales	L	L	NS	Can be controlled by GMP and SSOP
6.	Cutting into 2/3 part	Biological	Contamination from workers and equipment, increased temperature	L	H	NS	Can be controlled with SSOP
		Physical	Remaining scales and blood	L	L	NS	Can be controlled by GMP and SSOP
7.	Gilling	Chemical	Contamination from rusty material	L	H	NS	- Can be controlled with GMP and SSOP - Do not use rusty tools and clean the equipment properly
		Physical	Remaining scales	L	L	NS	Can be controlled by GMP and SSOP
8.	Gutting	Biological	Contamination from workers and equipment, increased temperature	L	H	NS	Can be controlled with SSOP for workers and equipment and GMP by adding ice
		Physical	Remaining gutted	L	L	NS	Can still be overcome with GMP by removing the remaining gutted regularly
9.	Washing I	Biological	Contamination from workers and equipment	L	H	NS	Can be controlled with SSOP that is controlling water quality, worker hygiene, and equipment used
		Physical	Remaining scales, gills and gutted	M	L	NS	- Can be controlled by GMP and SSOP - The water used should be cold water in a flowing state
10.	Weighing II	Biological	Contamination from workers and equipment	L	H	NS	Can be controlled with SSOP by maintaining and supervising

No	Process	Hazard Potential	Hazard Source	Prob (L/M/H)	Sev (L/M/H)	Sign (S/NS)	Precaution
							worker and equipment hygiene
11.	Washing II	Biological	Contamination from workers and equipment	L	H	NS	Can be controlled with SSOP by maintaining and supervising worker and equipment hygiene
		Chemical	Chlorine levels are not according to the regulations	H	H	S	Adjustment of chlorine levels with applicable regulations
12.	Layering	Biological	Contamination from workers and equipment	L	H	NS	Can be controlled with SSOP in washing layers correctly and correctly
13.	Freezing I	Biological	Contamination from workers and equipment	L	H	NS	-Can be controlled with GMP -Keep freezing temperatures low
14.	Glazing	Biological	Contamination from workers and equipment	L	H	NS	Can be controlled with SSOP and GMP
		Physical	The process of removing layers on the product is not correct	M	M	NS	Can be controlled with SSOP and GMP
15.	Freezing II	Biological	Contamination from workers and equipment	L	M	NS	-Can be controlled with GMP -Keep freezing temperatures low
16.	Final Weighing	Biological	Contamination from workers and equipment	L	M	NS	Can be controlled with SSOP
		Physical	The process of removing layers on the product is not correct	M	M	NS	Can be controlled by removing layers manually
17.	Packaging and Labeling	Biological	Contamination from workers and equipment	L	M	NS	Can be controlled with SSOP
18.	Storing in cold storage room	Biological	Contamination from workers and equipment	L	L	NS	-Can be controlled with GMP -Keep freezing temperatures low
19.	Stuffing	Biological	Contamination from workers and equipment	L	M	NS	Can be controlled with SSOP

Determination of Critical Control Points

Table 3. Identification of CCP on WGGS Gurame Product

Process	Significant Hazard	Identification of the CCP				
		Q1	Q2	Q3	Q4	CCP
Washing II	Use of high chlorine levels	Yes	No	Yes	No	CCP

There are two critical control points of the process of handling WGGS carp, namely at the stage of receiving raw materials and washing II. The receiving phase of raw materials that needs to be monitored is the physical hazard that contains metal debris on the raw materials. PT. Kurnia Mitra Makmur Purwakarta doesn't have a metal detector yet. Metal detector is a metal detecting machine physically. The washing step II uses 50 ml of 50 ppm chlorine. According to the Decree of the Minister of Maritime Affairs and Fisheries No. KEP / 01 / MEN / 2002, water used in washing fish can be added to chlorine at levels not exceeding 10 ppm. This is also in line with the provisions of SNI 7143: 2013 (BSN 2013), flushing carp with cold water and can contain a maximum of 10 mg / kg of chlorine if needed while maintaining a cold chain (0ºC - 5ºC). The use of chlorine in food can cause both short and long term disturbances especially in the gastrointestinal tract (Rohmah and Sulostyorini 2016).

Microbiology Test

Microbiological testing was carried out using the ALT method on raw materials and final product of WGGS gurame (Table 4)

Table 4. Microbiology Test Results of WGGS Gurame

No	The Process Stage	Unit	Value	Quality Standard
1.	Raw material	Colony/g	3.6×10^1	5.0×10^5
2.	Final product		2.0×10^1	1.0×10^5

The value of the Total Plate Numbers (ALT) on raw materials and final products are 3.6×10^1 and 2.0×10^1, respectively. These values are below the quality requirements of fresh and frozen fish, which are 5.0×10^3 and 1.0×10^5. These values can change during

storage the room temperature is due to an increase in the number of bacteria due to many factors. Increasing the number of bacterial colonies can be affected by food (nutrition), humidity, temperature, oxygen content and pH (Widyaningsih et al 2017). The results of product microbiology testing are categorized as good because they are still below the quality standard so that the product is fit for consumption.

Organoleptic Test

According to Patang (2014), organoleptic testing is a way of assessment using only the human senses (sensory). This method is very fast, easy, and practical to do, but its accuracy depends on the level of intelligence of the person who carries it out (Septiarini 2008). Organoleptic testing is carried out at the stage of receiving raw materials, samples in the form of whole gurame received from suppliers. Organoleptic testing is done by individual panels. According to Rogers (2018), the individual panels are highly skilled, highly trained, have very high specific sensitivity and are very experienced. The individual panel was very familiar with the nature, role and method of processing the material to be assessed and mastered the methods of organoleptic analysis very well. The individual panel of organoleptic testing of raw materials is one person QC staff. Organoleptic test results are recorded in the receiving control form. Organoleptic test of raw materials is done by taking a sample of 8 fish. Organoleptic assessment refers to the company standard table of Kurnia Mitra Makmur Purwakarta Ltd.

Table 5. Organoleptic Test Results of WGGS Gurame Product

No	Temperature(°C)	The Scent	Elasticity	Physical
1.	9,2	2	2	2
2.	7,3	2	2	2
3.	4,5	2	2	2
4.	3,9	2	2	2
5.	8,2	2	2	2
6.	6,7	2	2	2
7.	5,8	2	2	2
8.	7,7	2	2	2
	Well	Good	Good	Good

Based on Table 5, organoleptic tests of raw materials are categorized as good and in accordance with company standards. Based on the quality standards of raw materials Kurnia Mitra Makmur Purwakarta. Ltd.

Chemical Test

Table 6. Chemical Test Results of WGGS Gurame Product

No	Parameter	Unit	Value	Standard* (SNI 2729:2013)
1.	Lead (Pb)	mg/kg	Not Detected	Maximum 0.3
2.	Arsenic (As)	mg/kg	0.04	Maximum 1.0
3.	Mercury (Hg)	mg/kg	Not Detected	Maximum 0.5
4.	Cadmium (Cd)	mg/kg	Not Detected	Maximum 0.1
5.	Timah (Sn)	mg/kg	0.01	Maximum 40.0
6.	Chloramphenicol	mcg/kg	Not Detected	There is no
7.	Malachite Green	mcg/kg	Not Detected	There is no

The test results were compared with SNI 2729: 2013 concerning fresh fish. The raw material of WGGS, namely carp, was detected to contain Arsenic and Tin, each of which was 0.04 mg / kg and 0.01 mg / kg. This figure is still within the safe limit according to SNI 2729 of 2013 with a maximum range of 1.0 mg / kg for Arsenic and Timah by 40 mg / kg. Antibiotic residues namely Malachite green and Chloramphenicol were not detected in carp raw material. Overall chemical test values on raw gurame for all parameters are still within safe limits, however in consuming fish need to be considered, because even though the levels of metals and antibiotic residues contained in small fish there is a possibility of accumulation of metals and cause toxic effects in a period of time which is old.

Conclusion

Based on the results of research conducted on the handling unit of WGGS Gurame (Whole, Gilled, Gutted, Scalled) at Kurnia Mitra Makmur Purwakarta, Ltd., it can be concluded that:

1) Research results show the process of handling WGGS Gurame (at PT. Kurnia Mitra Makmur Purwakarta has not implemented

the HACCP system properly based on SNI 01-4851-1998. This shows that each handling process is not in accordance with GMP (Good Manufacturing Practice) and SSOP (Sanitation Standard Operating Procedure). Based on the identification results, the critical control point (CCP) was found at the step of washing II.

2) Microbiological test results for raw materials and final product of WGGS carp using ALT parameters, still meet quality standards. This shows that WGGS carp is acceptable and safe for consumption by the community.
3) The results of organoleptic analysis for WGGS gouram raw materials have been carried out at each receipt of raw materials. Physical appearance, odor and suppleness in good condition / good in accordance with the standards at PT. Kurnia Mitra Makmur so that it can be continued for the next stage of the process.
4) Chemical testing results for WGGS carp raw materials still meet the standard standards and are not polluted by heavy metals or chemical residues. This shows that WGGS carp is acceptable and safe for consumption by the community.

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