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Implementation of GMP and SSOP in Making Fish Chili Sauce

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A B S T R A C T

Chili Sauce is a famous food. Fish Chili Sauce made contains 10% fermented Tuna fish meat, to give a different taste. To get the quality of Fish Chili Sauce. The purpose of this study is to be able to apply the principles of Good Manufacturing Practice (GMP) and Sanitation Standard Operational Procedures (SSOP) in making fish Chili sauce. This study uses a Descriptive Method to see the Implementation of GMP and SSOP in Making Fish Chili Sauce. In each Principle of GMP and SSOP implementation, Objective and Subjective Microbial (TPC) and E.*coli* analysis will be carried out. The results of the study showed that the nutritional value of Fish Chili Sauce is Water 44.735%, Protein 4.595%, Fat 25.72%, Carbohydrate 4.1%, Ash 20.85%, pH 4.50 and TPC 2.4 x 10 4. With an Average Organoleptic Value of Taste 6.1 (Like), Aroma 6.5 (Like), Color 5.8 (Like), Texture and Overall Acceptance 6.2 (Like). The results of the Escherichia coli test from raw materials, equipment and also Fish Sambal showed Qualify.

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INTRODUCTION

The research begins by looking at the research objectives, namely to obtain quality Fish Chili Sauce by implementing Standard Operational Procedures (SSOP) and implementing Good Manufacturing Practices (GMP) properly. The implementation of SSOP and GMP is the basis for making quality food products (Basri and Andiki Yeloveva, 2022). SSOP emphasizes more on the Environmental Sanitation Conditions where the food product is produced, while GMP emphasizes more on the Quality of Use of Raw Materials, Use of Additional Materials, Handling and Processing Methods, Packaging and Storage. The implementation of GMP and SSOP in the Home Industry is often doubted, because it uses minimal equipment, the business is run in a family way, raw materials and additional materials are usually less noticed, therefore it needs to be assisted by implementing good GMP and SSOP (Sri Maryeni, Harry Sya'bandi, 2020).

The implementation of GMP and SSOP is very important for all types of food production because it can prevent contamination that causes food poisoning or foodborne disease (Indriani V. et al., 2021). According to SNI 01-2976-2006, it is stated that Sambal is a processed product with the main ingredient of ripe red chili (Capsicum annum L) which is usually used as a flavoring (BSN, 2006). In this study, there is an addition of flavor from fermented fish to provide a different taste. Fermented products are products that experience changes in their initial properties due to the breakdown of several compounds in food ingredients. It was also stated by Ahillah Ahillah N. dkk, 2017.

Darmadi et al.'s research, 2020, has produced fermented tuna that has a soft texture, including semi-wet products. From the analysis results, it turns out that the product contains organic acids, soluble proteins that increase in content compared to fresh fish, has a fairly low water content, low pH so that it has the potential to be produced in large quantities and stored for a long time.

Various types of chili sauce with different names, formulas, ingredients have been circulating in the community such as peanut sauce, onion chili sauce, anchovy chili sauce, shrimp paste chili sauce. Chili sauce can also be made from vegetables, fruits, spices, fish, other animal meats, seafood, offal (Yunita et al., 2021). According to Government Regulations, every Food Product must include the Expiration Date of the Product to ensure safety for Consumers who consume it. Estimated shelf life can be done using the ASLT (Accelerated Shelf Life Test) method (Asiah N. et al., 2018), (Sepadyawan, 2018). To maintain product stability, packaging materials are needed that can protect the product (Sitoresmi I. et al. 2019). During storage, the storage environment must also be maintained. The higher the suitability of the environment provided, the better the quality of the ingredients (Asiah N. et al., 2018).

THEORETICAL REVIEW

In the research, SSOP has been implemented which must be carried out, namely before production, the environment is conditioned, the related equipment and the personnel working on the product are ensured to be in good and safe condition. Judging from the results of the Swab analysis used in making fish Chili sauce, it has good cleanliness to the naked eye and has a TPC amount that has met the requirements, namely less than 1 x 105 cfu / gr. The personnel who work use equipment such as masks, gloves and aprons to maintain product cleanliness.

The research began on May 3, 2024 by preparing all the ingredients that will be used to make Fish Chili Sauce Products. The implementation of GMP has been fulfilled by purchasing Tuna fish at the 'Nyanggelan' Panjer Denpasar Traditional Market, by choosing fresh fish (According to the Criteria for fresh fish). The level of freshness of the fish greatly affects the price of the fish (Irnawati et al., 2020). Fresh Tuna fish is fermented for four (4) days with the established method, and after that it begins with making the basic ingredients for the chili sauce (According to the Recipe), continued by making fish chili sauce by combining the basic ingredients for the chili sauce with 10% fermented Tuna fish according to weight. The research carried out took the title towards the Implementation of GMP and SSOP, so Chemical, Microbial and Organoleptic tests were carried out for all ingredients that will be used such as: Water, Fresh Tuna Fish, Basic Ingredients for Chili Sauce, Fish Chili Sauce. Chemical, Microbial and Organoleptic Analysis was conducted in two Laboratories, namely the Laboratory of the Faculty of Agriculture for Analysis of Water Content, Fat Content, Carbohydrate Content, Protein Content, Ash Content, pH, TPC, while E.coli Analysis was conducted in the Laboratory of the Marine and Fisheries Product Quality Control and Supervision Agency (BKIPM).

As a comparison in the use of Freshness of Skipjack Tuna used is using the analysis results of preserved Macarel tuna using the Ionization method. Based on Research on Preservation of Macarel Tuna with the Ionization Method for the 0 minute immersion treatment, the Nutritional Value of Macarel Tuna is as follows:

Table 1. Results of analysis of fresh Macarel Tuna.

Mackerel	Organoleptic	Water Content (%)	Fat Content (%	Protein (%)	TPC (%)
Eyes	8,80	74,08	2,31	23,15	$3,50 \times 10^{3}$
Gills	8,40	-	-	-	-
Mucus	8,40	-	-	-	-
Meat	8,50	-	-	-	-
Odor	4,60	-	-	-	--
Texture	8,,40	-	-	-	-

Source : (Diana Melantina, 2022)

When compared to the freshness of the Tuna fish seen from the TPC value, it shows that the condition of the Tuna fish used for the chili sauce is much fresher than the ionized Tuna fish. This means that the researcher used Tuna fish as a research material that was already fresh with a TPC of 8.0 x 10 1 cfu / gr. The basic ingredients of the chili sauce have a TPC content of 5.9 x 10 6 cfu / gr. The basic ingredients of the chili sauce have a fairly high TPC value compared to the general standard, which is 5.0 x 10 5.

The making of a product is very important to be assessed by consumers. Visually, consumers will assess the product using their five senses. In this study, as an extension of consumers, several panelists were used according to the criteria. In this study, the researcher used semi-trained panelists (using students who already knew about the product to be assessed) as many as 10 people.

METHODOLOGY

This study uses a Descriptive Method to see the Implementation of GMP and SSOP in Making Fish Chili Sauce. In each Principle of GMP and SSOP implementation, an Objective and Subjective analysis will be carried out. For Objective Analysis, TPC Test, E.coli Test, Protein, Fat, pH, Water Content, Ash Content are carried out, while Subjective Analysis is carried out on the values of Odor, Taste, Color and Texture of Fish Chili Sauce . The results of both Objective and Subjective Analysis will be tabulated and explained Descriptively.

RESULTS

The implementation of research on the application of GMP and SSOP in making fish Chili sauce has been carried out. This research emphasizes more on the results of the safety of food from fish Chili sauce if consumed by consumers. The results of the parameter test for the presence of microbial contamination that is not visible to the naked eye by consumers are the benchmarks of this study. From the results of the microbial parameter test (TPC sfu/gram sample) it can be seen that the TPC of raw fish is 8.0×10^1 cfu/gr, the TPC of the basic ingredients of the sauce (water, chili, shallots, garlic, etc.) is 5.9×10^6 cfu/gr and the TPC of fish sauce is 2.4×10^4 cfu/gr. The results of the parameter test can be seen in Table 2.

If seen from the table, only the TPC value of the basic ingredients of Chili Sauce is still detected to exceed the standard. This needs to be paid more attention so that the TPC of the raw materials also meets the standard as much as possible. According to Vivi Nuraini, (2020) said that with the cooking process, the TPC value can be reduced because microbes can die with the cooking process. In this study, the process of making Fish Chili sauce also went through several cooking stages such as blanching for raw materials and after that the ingredients were crushed and the cooking stage by frying.

With this process, the TPC of raw materials is expected to reduce the TPC value of Fish Chilinsauce which will ultimately be safe for consumption by consumers. Judging from the results of the Swab analysis used in making fish

Chili sauce, it has good cleanliness to the naked eye and has a TPC amount that has met the requirements, namely less than 1 x 10^5 cfu / gr.

TPC data for equipment can be seen in Table 1. If we look at the results of the Escherichia coli analysis of raw fish, basic ingredients for chili sauce, and fish chili sauce, only tuna does not meet the requirements and after becoming fish chili sauce it becomes eligible.

For the Escherichia coli analysis results data can be seen in Table 6. The equipment used by the personnel can be seen in Figure 1. When viewed from the nutritional content value of fish sauce and also organoleptic assessment, it meets the requirements and is also liked by consumers.

Table 1. TPC Swab Analysis Results of Tools

No	Sample Name	Swab Results (TPC cfu/gr)
1	Knife	1.4 x 10^4
2	Cutting Board	5.2 x 10^4

Figure 1. Equipment for Food Production

The results of the Chemical and TPC Laboratory Analysis can be presented in Table 2. Below:

Table 2. Results of Chemical, Microbial Analysis (TPC)

Sample Type	Water Content (%)	Protein Content (%)	Fat Content (%)	Carbohydrate Content (%)	Ash Content (%)	pH	TPC (cfu/gr)
Fish (Raw)	-	-	-	-	-	-	-
Basic Ingredients for Chili sauce (Raw)	-	-	-	-	-	-	-
Fish Chili Sauce	44,735	4,595	25.72	4.1	20.85	4.50	2.4 x 10^4

The results of the Panelist's assessment of the Fish Sambal Product can be seen in Table 4. And the Image of the Organoleptic Assessment Atmosphere of Fish Sambal can be seen in Figure 2.

Table 4. Organoleptic Results

Panelists' Fish Sauce	Taste	Color	Aroma	Texture	Overall Acceptance
1	7	7	6	6	6
2	6	7	7	5	6
3	6	7	6	6	6
4	6	6	5	5	7
5	6	6	5	6	6
6	6	7	7	5	6
7	6	7	6	6	6
8	6	6	5	4	7
9	6	6	5	6	6
10	6	6	6	6	6
Average	6.1 (Like)	6.5 (Like)	5.8 (Like)	5.5 (Somewhat Like)	6.2 (Like)

Figure 2. Organoleptic Assessment of Fish Chili Sauce

The results of the organoleptic assessment of fish Chili sauce by the panelists were adjusted to the assessment standards of the Hedonic Scale and Numeric Scale, can be seen in the table below.

Table 5. Hedonic Scale and Numeric Scale

Hedonic Scale	Numeric Scale
Very like	7
Like	6
Somewhat like	5
Normal	4
Somewhat dislike	3

Dislike	2
Dislike very much	1

Sumber : Soekarto, (1985).

Judging from the Panelist Organoleptic Results of Fish Chili sauce, it was found that the Average values of Taste, Aroma, Color, Texture and Overall Acceptance were respectively 6.1, 6.5, 5.8, 5.5, and 6.2. This shows that the Fish Chili sauce made is liked by Panelists/consumers using the Hedonic and Numeric scales.

Another concern for food products is contamination by pathogenic bacteria. The pathogenic bacteria that is most feared in food products is Eschericia coli bacteria because this bacteria is an indicator bacteria that can cause illness and even death to consumers. The results of the analysis of Fish Sambal against the E. coli test can be seen in Table 6.

Table 6. Results of E. coli Analysis

No	Sample Nama	Parameters	Result (Unit)	Quality Requirement	Reference Method	Information
1	Tuna Fish (Raw)	E-Coli	9,2	< 3,0 APM/g No.75/KEP - BKIPM/2017	SNI 2332.1-2015	Unqualify
2	Basic Ingredients for Chili sauce (Raw)	E-Coli	< 3,0	< 3,0 APM/g No.75/KEP - BKIPM/2017	SNI 2332.1-2015	Qualify
3	Fish Chili sauce	E-Coli	< 3,0	< 3,0 APM/g No.75/KEP - BKIPM/2017	SNI 2332.1-2015	Qualify

Judging from the test results, only fresh tuna contains E. coli more than 3.0, but after becoming fish sauce, the E. coli content is already in the range of <3.0, which is included in the Qualify criteria

DISCUSSION

In making a food product, the most important thing to consider is the Food Safety of a Product, if consumed by consumers. Hazardous microbial contamination is an important thing because it is related to consumer health. Assessment in terms of Organoleptic and Nutritional value is in second place because it has a subjective assessment depending on consumer needs. The implementation of GMP and SSOP is very important to be implemented to make a food product.

CONCLUSIONS AND RECOMMENDATIONS

Research Results Regarding the Implementation of GMP and SSOP in the manufacture of Fish Sambal have been carried out properly and correctly because the Laboratory Test Results on the Test Parameters show that the Escherichia coli Test Results from raw materials, equipment and also Fish Sambal show Qualify. The TPC value of Fish Sambal is 2.4 x 10 4. (Meets the standard) and the Nutritional value of Fish Sambal is Water 44.735%, Protein 4.595%, Fat 25.72%, Carbohydrate 4.1%, Ash 20.85%, pH 4.50 and With an Average Organoleptic Value of Taste 6.1 (Like), Aroma 6.5 (Like), Color 5.8 (Like), Texture and Overall Acceptance 6.2 (Like). With the results shown, the fish Sambal made can be marketed to consumers. Provide some conclusions and the implementation of the research results**.**

FURTHER STUDY

In this study there are limitations of the test, namely the Testing of E. coli which was only tested on the basic ingredients of making chili sauce in a mixed (raw) manner. In the future, E. coli testing should be carried out for each raw material used such as water elements, large red chilies, tomatoes, small chilies, shallots, garlic and others must be tested one by one to get the most accurate results and we will know which ingredients are actually contaminated by E. coli.

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