CHARACTERISTICS OF TILAPIA FISH NUGGETS WITH THE ADDITION OF DIFFERENT TAPIOCA CONCENTRATIONS

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ABSTRACT

Fish nuggets are one of the diversified products, initially nuggets made from chicken meat, then developed into new products using fish meat. Fish nuggets can be made from various types of fish, both sea fish and freshwater fish. Fresh tilapia tends to be more easily damaged than red meat and experiences a decrease in quality due to a degradation process involving physical, chemical and microbiological aspects. Therefore, it is very important to extend the shelf life of fishery products by processing. The research method used was the addition of different concentrations of tapioca flour. The concentration of tapioca flour added was 20%, 25%, 30%. The raw material used is tilapia fish. The tests carried out were yield tests and organoleptic characteristic tests. The results of the appearance, texture, aroma and taste characteristics of each treatment are different. The higher the concentration of tapioca flour used, the less visible the appearance, texture, aroma and taste will be compared to other concentrations. The addition of tapioca flour concentration in all treatments affected the appearance of the fish nuggets, namely producing the appearance of the nuggets with a layer of dry breadcrumbs, and less bright, specific to the product. The concentration of adding tapioca flour of 20% and 25% produces a dense, compact texture, a strong product-specific aroma, and a strong product-specific taste. Meanwhile, in the treatment of adding a 30% concentration of tapioca flour, the appearance of fish nuggets with a layer of dry bread that was less bright than product specific, and a texture that was rather dense and rather compact.

Keyword : *Tilapia, Organoleptic, Processing, Fish Nuggets, Tapioca Flour*

1. INTRODUCTION

Nuggets are a processed meat product that increases the availability and shelf life of the meat itself. Nuggets are processed meat products that are molded, cooked and frozen from a mixture of ground meat, with or without the addition of other food ingredients and permitted food additives. Nuggets can be made from various types of meat, whether chicken, beef or fish. Fish nuggets are a food diversification product designed to change the appearance of fish to make it more attractive. Consumers prefer fish in other forms rather than fried fish alone [1]. The development of fish as raw material for nuggets here is very important, especially to help increase the economic value of fishery products as a potential marine resource [2].

They are fish *(Oreochromis niloticus)* is a type of freshwater cultured fish that has quite good prospects for development. Tilapia is also a type of freshwater fish that has good self-adaptation qualities, making it a superior commodity for fish cultivation in Indonesia, one of which is Nirvana tilapia [3]. Fresh tilapia tends to be more easily damaged than red meat and chicken, and experiences a reduction in quality due to a degradation process involving physical, chemical and microbiological aspects. The initial loss of freshness is caused by enzymatic and chemical

reactions, while the subsequent spoilage is the result of the activity of microorganisms. Therefore, it is very important to extend the shelf life of fishery products by processing and preserving [4]. However, tilapia meat is considered an ideal ingredient for processing into processed foods, considering its white color and soft texture. Apart from that, tilapia fish is known for its high nutritional value and is a good food choice because of its low fat content. The nutritional value of tilapia can meet the standard animal protein requirements. Tilapia contains 18.70 grams of protein with a calorific value of 89 calories. Tilapia is also rich in important vitamins and minerals such as niacin, vitamin B12, phosphorus, selenium, and potassium, all of which are beneficial for health [5].

Making nuggets can also use fish as raw materials, one of the fish that can be used is tilapia. Tilapia is a source of low-cholesterol animal protein with a nutritional content of 18.7 g protein and 1 g fat per 100 g of material [6]. Tilapia has a bland taste so it is easy to process into processed fish products such as nuggets. The use of tilapia in making nuggets can be used as an alternative to diversify processed fish products. Various methods and variations in taste in fish processing encourage increased fish consumption. So it is important to understand how it is processed. One of the processed fish products is nuggets, which are made from seasoned fish and processed using modern techniques, producing a unique square shape, distinctive aroma, long lasting, and rich in protein [7]. The aim of this research is to determine the effect of adding tapioca flour on the organoleptic characteristics of tilapia fish nuggets, so it is necessary to conduct research on tilapia fish nuggets with the addition of different concentrations of tapioca flour.

2. MATERIALS AND METHODS

Research on making fish nuggets by adding different concentrations of tapioca flour was carried out from July to August 2024. The research was carried out at the Tropical Marine Fisheries Laboratory at the PSDKU UNPAD Pangandaran Campus. The treatment in this research consisted of using different concentrations of tapioca flour. The concentration of tapioca flour used is 20%, 25%, 30% (w/w) of the weight of fish meat. The ingredients used in making fish nuggets are divided into 3, namely raw materials, dough ingredients, and buttermix. The raw material for this research is tilapia fish meat. The dough ingredients used are tapioca flour, garlic, onions, salt, sugar and ice water. Meanwhile, the butter mix ingredients for fish nuggets are wheat flour, egg white, ground pepper and breadcrumbs. The procedure for making tilapia fish nuggets is the process of fileting skinless tilapia fish, grinding the fish meat, adding spices to the meat until it becomes a dough, steaming the mixture for 15 minutes, molding the fish nuggets into 4x4 cm dice, mixing the butter mix, dipping the nuggets in the buttermix and breadcrumbs and Store in the freezer for 1 day then fry the fish nuggets using the pan frying method. The characteristic tests carried out in this research were organoleptic tests and yield tests. Testing was carried out at the Tropical Marine Fisheries Laboratory.

3. RESULTS AND DISCUSSION

Fish nuggets are a ready-to-eat food product made from crushed fish meat and several other additional ingredients which are then molded and coated with flour. Several types of fish can be used for fish nuggets such as mackerel, tuna, tilapia, dori and tilapia. When processing fish, fileting is done, separating the meat from the head, skin, bones and spines which will become waste. Waste and filet meat will be calculated comparing the initial weight of the fish with waste and fillet meat. According to [8], yield is the percentage of product obtained from comparing the initial weight of raw materials with the final weight. In fillet processing, weight changes occur during the process. Yield calculations are carried out to find out how much fish meat can be used [9]. According to [10], calculations and observations of the yield were carried out at three process stages, namely the fileting stage, bone removal and the trimming stage (the trimming yield was combined with the skin removal yield).

Calculation of the yield obtained after removing the skin, head including gills, stomach contents and spines or bones. The yield of fish nuggets obtained by adding different concentrations of tapioca flour resulted in different nugget yields. The flour concentration treatments of 20%, 25% and 30% respectively produced 56.787%, 59.1%, 73.4%. This is thought to be because the higher the concentration of tapioca flour added to the nugget mixture, the more nuggets will be produced. According to [9], fish yield calculations are used to estimate the number of fish body parts that can be used as food. The results of research on the characteristics of fish sausages with the addition of different concentrations of tapioca flour can be seen in Table 1.

Table 1. Characteristics of Fish Sausages with the Addition of Different Tapioca Starch Concentrations

Characteristics	20%	25%	30%
Appearance	A layer of dry bread flour, excellent product specifics	A layer of dry bread flour, excellent product specifics	The bread flour layer is dry, less brilliant product specific
Texture	Solid, compact	Solid, compact	Quite dense, quite compact
Aroma	Strong product specificity	Strong product specificity	Strong product specificity
Taste	Strong product specificity	Strong product specificity	Strong product specificity

Based on the research results, it shows that the organoleptic characteristics of fish nuggets with the addition of different concentrations of tapioca flour produce different physical characteristics. The results of the appearance, texture, aroma and taste characteristics of each treatment are different. The higher the concentration of tapioca flour used, the less visible the appearance, texture, aroma and taste will be compared to other concentrations. The addition of tapioca flour concentration in all treatments affected the appearance of the fish nuggets, namely producing the appearance of the nuggets with a layer of dry breadcrumbs, and less bright, specific to the product. The concentration of adding tapioca flour of 20% and 25% produces a dense, compact texture, a strong product-specific aroma, and a strong product-specific taste. Meanwhile, in the treatment of adding a 30% concentration of tapioca flour, the appearance of fish nuggets with a layer of dry bread that was less bright than product specific, and a texture that was rather dense and rather compact. This is thought to be due to the addition of different concentrations of tapioca flour which affects the appearance and texture of the fish nuggets.

When making nuggets, binders and fillers are used. Binder is a non-meat ingredient high in protein which functions to improve emulsion stability, reduce shrinkage during cooking, give a bright color, increase product elasticity, form a dense texture, and bind water in the dough. Binder for wheat flour and bread flour. Fillers are materials that function to bind water and do not play a role in the formation of emulsification. The filler used is tapioca flour. The process of making fish nuggets includes fileting, grinding and mixing meat and spices, molding and steaming, pre-frying, freezing and frying [11]. The temperature of the ingredients during milling greatly affects the quality of the protein; Too high a temperature can cause protein denaturation, while too low a temperature will make nuggets difficult to print [12]. The aroma of the fish nuggets produced is a typical fish aroma. Tilapia fish nuggets are an innovative food product made from tilapia fish. This product is classified as a new product on the market. The potential for tilapia fish production to be developed into tilapia nuggets is considered from the availability of tilapia fish and the fairly affordable price of tilapia fish [13]. Factors that influence the elasticity of fish nuggets are influenced by the use of flour and the type of fish used as the main ingredient. The use of tapioca flour and wheat flour as binding agents containing gluten, amylose and amylopectin can bind more water and influence the elastic properties of fish nuggets which facilitates the process of water absorption during cooking [14].

4. CONCLUSIONS

Making fish nuggets by adding different concentrations of tapioca flour produces different organoleptic characteristics. Tapioca flour concentrations of 20% and 25% produce the characteristic appearance of a dry, less shiny bread flour layer, a dense, compact texture, and a product-specific strong taste and aroma. The characteristics

of the 30% tapioca flour concentration treatment resulted in the appearance of a layer of dry and less bright bread flour specific to the product, with a slightly dense and somewhat compact texture.

5. REFERENCES

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