

# **CHARACTERISTICS (YIELD, MOISTURE CONTENT, WATER ABSORPTION, pH, AND ORGANOLEPTIC) OF CATFISH FLOUR (*Pangasius hypophthalmus*)**

## **ABSTRACT**

Fish meal is a dry solid product, produced by removing most of the liquid and some or all of the fat contained in the body of the fish. This research aims to analyze the characteristics of catfish flour that is given preliminary treatment, namely steamed and boiled and control (without heating) before the drying process. This research is divided into 2 stages, namely phase I research on making fish meal from Patin Fish (*Pangasius hypophthalmus*) with 3 treatments, namely control, boiling, and steaming and phase II research, namely the test characteristics on catfish meal such as yield tests, organoleptic tests, absorption, water content, and pH. Based on the results of research on the characteristics of catfish flour obtained from the first treatment, control on fish meat before drying is as follows: flour yield  $21.7 \pm 0.54\%$ ; moisture content 5.9 %; absorbency 1.28 %; pH 5.93; and very pungent aromatic organoleptic character, coarse powder and brownish color. The characteristics of catfish flour obtained from the second treatment, namely boiling on fish meat before drying, are as follows: flour yield 12.33%; moisture content 1.8%; absorbency 1.6%; pH 5.8; and fish-scented organoleptic character in general, semi-fine, yellowish in color. The characteristic of catfish flour obtained from the third treatment, namely steaming on fish meat before drying, is as follows: flour yield 13.37%; moisture content 2.2%; absorbency 1.8%; pH 5.5; and organoleptic character of non-pungent aroma, fine powder, and yellowish-white color.

**Keywords :quality, steaming, boiling, characteristics,absorbency.**

## **INTRODUCTION**

Catfish (*Pangasius* sp) is a species of freshwater fish of the Pangasidae type which has general characteristics of not being scaly, not having many spines, relatively fast growth speed, high fecundity and survival (Bokings et al., 2016). Catfish can be mass-produced and have industrial-scale development opportunities (Suhendra et al., 2017). With these many

advantages, this fish has become one of the fishery commodities that has high economic value, both in the hatchery business segment and its enlargement business (Akbar et al., 2018).

According to Wahyuningtyas et al (2020), Cat Fish has a fairly high protein content and contains all essential amino acids and contains higher lysine and arginine than milk and meat protein. The results of the proximate analysis of catfish meat have a water content of 75.75-79.42%; protein content 12.94-17.59%; fat content 1.81-6.57%; and ash content 0.16-0.23%.

Catfish meat is perishable like other fish meat due to bacterial activity. Bacteria will grow well on mediums that have high water and protein content such as fish meat. Thus, it is very important to carry out preservation and processing of this catfish meat. One of the processing or preservation that can be done is catfish meat processed into flour form.

Fish flour is a dry solid product produced by removing most of the liquid and some or all of the fat contained in the body of fish (Fatmawati and Mardiana, 2014). The advantages in the form of flour compared to its fresh form are that it is more durable, more practical in its application and easier to package and distribute (Rismaya et al., 2018). According to Mervina (2012), fish flour for food is still rarely used compared to fish meal for feed.

The application of flour including catfish flour is strongly influenced by its physiochemical and functional properties (Sukma et al., 2019). These properties are very dependent among them influenced by the way or process of making flour. Therefore, this research aims to analyze the characteristics of catfish flour obtained from the process of steaming, boiling and without heating before the catfish meat is dried.

## **RESEARCH METHODS**

This research starts from March 12, 2023 to April 12, 2023 at the Laboratory of Processing Hasil Perikanan, Faculty of Fisheries and Marine Sciences-Padadjaran University, Jalan Raya Jatinangor KM 21, Sumedang-Indonesia. The method used is experimental with three treatments of the method of heating catfish meat before the drying process in making catfish flour.

The material used is catfish obtained from the Jatinangor traditional market, The research procedure is as follows:

1. Catfish that has been rinsed and cleaned is then cut into fillet
2. A fillet of 300 grams was weighed for each treatment consisting of three treatments, namely steamed, boiled and without heating before the drying process.
3. The fillet for steaming treatment is steamed in boiling water (100°C) for 15 minutes, and the fillet for boiling treatment is boiled in boiling water (100°C) for 15 minutes and the fillet for treatment without direct heating is cut into small pieces to expand its surface.
4. After the fillet is steamed or boiled then cut into small pieces to expand its surface.
5. The fillet from each treatment is dried in a blower oven at 60°C for 5 hours after which it is ground using a grinder and then filtered with a sieve.

The catfish flour obtained is then observed or measured yield, moisture content, water absorption, pH and organoleptic properties (aroma, texture and color). Observations were made three times (triplo). The data obtained are analyzed descriptively.

## RESULT AND DISCUSSION

### Yield

Yield is a comparison of the dry weight of the resulting product with the weight of raw materials, and shows the level of efficiency of the process used (Senduk et al., 2020). The higher the yield value, the more efficient the process applied in making the product. The results of the calculation of the yield of catfish meat are found in Figure 1.

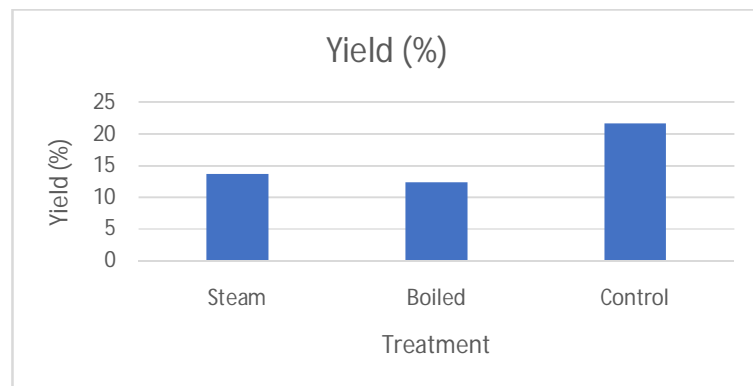
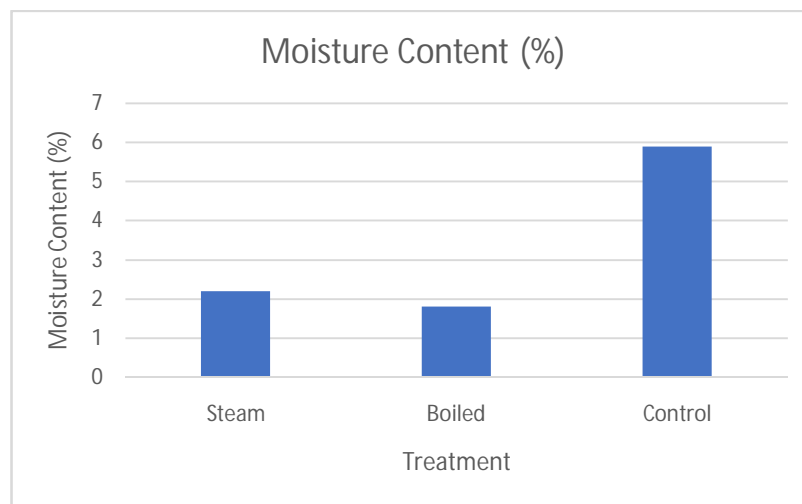


Figure 1. Diagram yield catfish flour from various heating methods before drying

Based on the results of calculating the yield on figure 1, the largest yield obtained from the treatment without heating (control) with a value of  $21.7 \pm 0.54\%$ , and followed by steaming and boiling treatment with values of  $13.73 \pm 0.40\%$  and  $12.33 \pm 0.34\%$ . Based on these values, it shows that the yield value of catfish flour can be influenced by the heating method given to catfish meat before the drying process. According to Ciptawati et al., (2021), the heating given to fish meat causes the protein to denature, so that the protein and derivative compounds are easily soluble in the water used in the boiling or steaming process. The loss or dissolution of this protein causes a low yield of catfish flour which is given heating treatment (boiling or steaming) on catfish meat before the drying process.

### Moisture Content

Moisture content is the water content contained in a material. Moisture content is very important in food because water can have an impact on the appearance, texture, and taste of food ingredients (Harini et al. 2019). Moisture content in food also plays a role in the freshness and shelf life of these foods. The presentation of high moisture content makes it easy for bacteria, molds, and yeasts to multiply. The results of testing the moisture content of catfish flour from various heating methods before the drying process are presented in Figure 2.



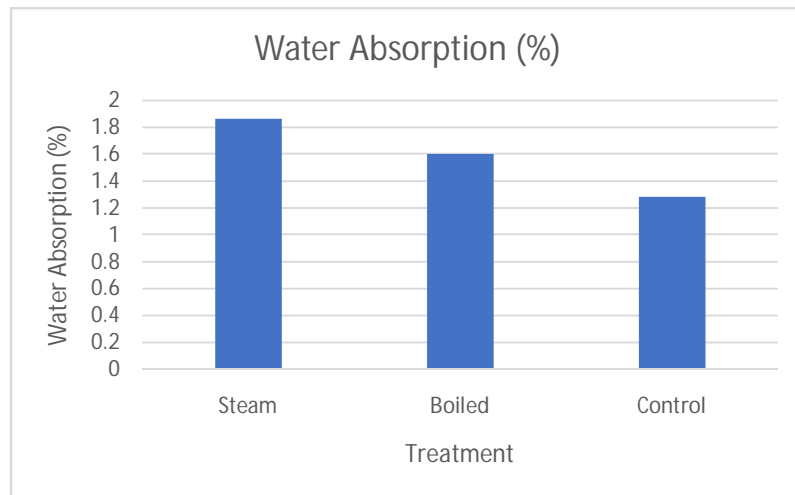
**Figure 2. Diagram of Moisture Content of Cat Fish Flour from Various Heating Methods before the Drying Process**

Figure 2 shows that the results of moisture content analysis in the highest catfish flour were obtained from the treatment without heating (control) which was 5.9%, and the lowest water content of obtained from heating treatment (boiling) which was 1.8%.

Based on Rahman et al. (2017) the low moisture content of fish meal given heating treatment is because during the heating process, the fish body releases a certain amount of water so that there is a decrease in moisture content in the resulting product and decreases during the pressing and ovening process. The low water content in the heating process is due to the process of water coming out of the meat, part of the liquid will experience evaporation in processing (Putra et al. 2017). The moisture content of catfish flour produced from the heating process, both steaming and boiling, meets the quality of the Indonesian National Standard (SNI) No. 01-2175-1992. The standard states that the quality of fishmeal standards has a maximum moisture content requirement of 10%.

### Water Absorption

The ability of food ingredients to absorb water added in the processing process is called water absorption. Water absorption refers to the property of absorbing water when a material is exposed to water (Rahmaniar et al. 2023). Another thing that causes high absorption is due to the broken hydrogen bonds between molecules which results in water more easily entering the flour. Water absorption in catfish flour is shown in figure 3.

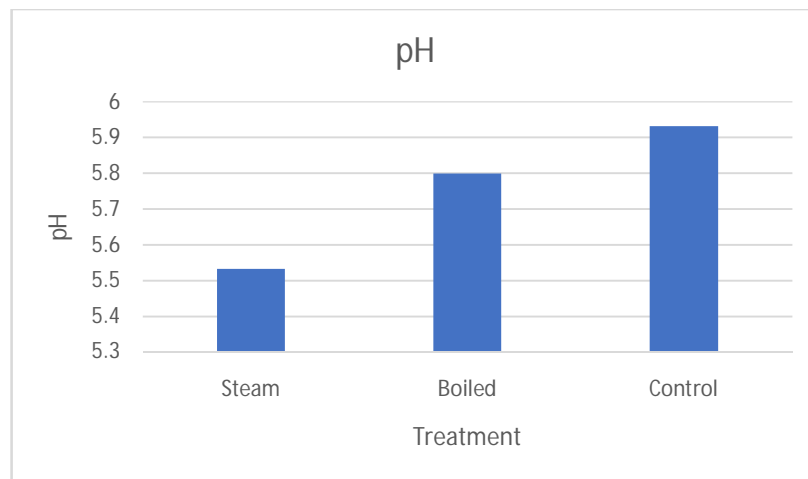


**Figure 3. Water Absorption Diagram of Cat Fish Flour from Various Heating Methods before Drying Process**

Figure 3 shows that the highest water absorption results in catfish meal were found in steaming treatment with a value of 1.87% and the lowest in treatment without heating (control) with a value of 1.28%. Water absorption is inversely proportional to water content. The lower the water content, the more water absorption increases. The ability of flour to absorb water is very dependent on the product to be produced (Rahman et al. 2017). According to Lidia et al. (2006), states that dry materials are hygroscopic. So it can be said that the low water absorption of catfish meal without heating is due to the large amount of water content that exists.

### pH

pH is the degree of acidity used to express the level of acidity or alkalinity of a solution. This pH test is important to measure in inhibiting the emergence of biological contaminants such as bacteria, fungi and other microorganisms that can cause damage to the texture, taste and nutrients contained in products, one of which is flour (Dewi et al. 2022). pH testing of fishmeal to determine the effect of heating on the pH of the resulting fishmeal.



**Figure 4. Diagram pH of Catfish Flour from Various Treatment Methods**

From figure 4, the highest pH was obtained by the control treatment with a pH of 5.93 and the lowest pH was obtained by the steaming treatment with the lowest value of 5.5. From the results of pH measurements, it is found that the pH of each treatment tends to be weakly acidic. The pH value of foodstuffs during storage can change due to the presence of proteins that are broken down by proteolytic enzymes and the help of bacteria into carboxylic acids, sulfide acids, ammonia and other types of acids (Bawinto et al., 2015).

## Organoleptic

Sensory assessment which is also called organoleptic assessment or sensory assessment is a simple method of assessment (Anwar et al (2018)). Sensory assessment is widely used to assess the quality of agricultural and food commodities, including fish flour. Organoleptic assessment of catfish flour obtained from 3 different treatments before drying can be seen in Table 1.

Table 1. Organoleptic descriptive of catfish flour from different treatments before drying.

<b>Treatment</b>	<b>Scent</b>	<b>Texture</b>	<b>Color</b>
Steam	The smell of fish is not pungent	Fine powder	Yellowish white
Boil	The smell of fish in general	Semi powder	Yellow
Control	The smell of fish is very pungent	Coarse powder	Brownish

From the results of organoleptic tests on the color of catfish meal showed a difference. The color difference in catfish meal produced is caused by the heating treatment during the drying process. Drying without heating can cause a non-enzymatic browning reaction so that a brown color is produced, caused by too much oil content in the flour.

Scent catfish flour made by heating treatment either by steaming or boiling was favored by the panelists. The aroma released is savory like the scent of fish meat that has been cooked and not pungent. The steam treatment had a less pungent aroma compared to the aroma of the boiled treatment which was not much different from the control treatment. During the heating process, protein hydrolysis proceeds faster than without heating. Protein hydrolysis is the breakdown of proteins into peptide compounds and amino acids. One amino acid that gives it a savory aroma is glutamic acid.

Organoleptic tests on the texture of fish meal processed in several ways showed different results. Catfish flour processed by steaming and boiling produces a smooth texture of catfish flour. According to Harimurti et al (2021), the purpose of cooking, both boiling and steaming, is to reduce moisture content and maintain the quality of fish meat, namely a dense and compact texture. According to Fatmawati and Mardiana (2014), boiling is the most critical step in fishmeal processing. If the boiling is undercooked, then the liquid is not or is still very difficult to separate. Conversely, if it is too cooked, the fish will become too soft. Conversely, the boiling process is carried out for +15 minutes so that the fish meat is not raw or overcooked so as to produce fish meal that has a good texture (uniform particle size, rather

fine and dry). Texture is very important for the manufacture of products made from fish meal because texture affects the manufacture of advanced products, the finer the flour the better the quality of the product.

## **CONCLUSION**

Based on the results of research on the characteristics of catfish flour obtained from control treatment (without heating) before drying is as follows: flour yield 21.7%,; moisture content 5.9%; absorbency 1.28 %; pH 5.93; and very pungent aromatic organoleptic character, coarse powder and brownish color. The characteristics of catfish flour obtained from boiling treatment on fish meat before drying are as follows: flour yield 12.33%; moisture content 1.8%; absorbency 1.6%; pH 5.8; and organoleptic character of boiled fish in general, semi-fine, yellowish in color. The characteristics of catfish flour obtained from steaming treatment on fish meat before drying are as follows: flour yield 13.37%; moisture content 2.2%; absorbency 1.8%; pH 5.5; and organoleptic character scented non-pungent, fine powder, and yellowish-whiten.

## **SUGGESTION**

It is recommended to use fresh fish meat in making this fish flour, because it will affect the results in the test and if you want to make catfish-based fish meat, it is recommended to use steamed treatment, because high water absorption, stable pH, and good organoleptic so that if it is made further processed, it will not affect the final product too much.

## **THANK YOU SPEECH**

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