

Characteristics of Fish Meal Meat of Catfish (*Clarias gariepinus*, Burch.)

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Abstract— This research aims to analyze the characteristics of African catfish meat flour which is obtained from the process of steaming, boiling and without heating before the African catfish meat is dried. This research starts from March 10 2023 to April 20 2023 at the Fisheries Product Processing Technology Laboratory, Faculty of Fisheries and Marine Sciences-Padjadjaran University, Jalan Raya Jatinangor KM 21, Sumedang-Indonesia. The method used was experimental with three treatments, the method of heating African catfish meat before the drying process in the manufacture of African catfish meat flour. The obtained African catfish meat meal was then observed or measured for its yield, water content, water absorption, pH and organoleptic properties (aroma, texture and color). Observations were made three times (triplo). The data obtained were analyzed descriptively. Based on the results of research on the characteristics of African catfish meat flour obtained from the steaming process on fish meat before drying are as follows: flour yield 12.20%, water content 5.33%, water absorption 1.77%, pH 5.9 and organoleptic description of dark yellow color, slightly fishy aroma and smooth texture. The characteristics of African catfish meal obtained from the boiling process of the fish meat before drying are as follows: 11.39%, moisture content 4.87%, water absorption 1.97%, pH 6.05 and organoleptic description of brownish yellow color, fishy aroma and slightly rough texture. The characteristics of African catfish meal obtained from the process without heating the fish meat before drying are as follows: 12.37%, water content 5.74%, water absorption 1.62%, pH 5.95 and organoleptic description of pale yellow color, fishy aroma and slightly rough texture.

Keywords— Quality, Descriptive, Moisture content, Heating, Texture.

I. INTRODUCTION

Fishery resources are one of the most important resources for humans (Akoit and Nalle, 2018). Indonesia is a country that has large fishery resources in the Asian continent. Fishery resources in Indonesia can come from sea waters and inland waters. One of the inland water commodities that has quite high economic value is the African catfish (*Clarias gariepinus*) (Sri and Kamiasi, 2022).

African catfish are widely cultivated in Indonesia because they have several advantages. According to Su'udi and Wathon (2018), some of the advantages of the African catfish are that it does not require special land for its cultivation, the capital is not too large, it does not require large amounts of water, it is easy to maintain and it grows fast. Dumbo catfish meat has a delicious and savory taste. Based on the advantages it has, it makes the African catfish farming business a business opportunity that is quite promising for profits.

The production of African catfish in Indonesia is relatively large compared to catfish. The African catfish farming technology applied in Indonesia varies from traditional systems to biotechnology systems such as biofloc. According to Dahliana et al., (2023), catfish production in Indonesia in 2021 will be 1.06 million tons with a value of IDR 18.93 trillion. Based on the support from the cultivation technology system used and the total production, African catfish is very suitable as a raw material for the food industry.

African catfish meat meal is more likely to be used as a raw material for the food industry than fresh meat. The advantages in flour form compared to its fresh form are that it lasts longer, is more practical in application and is easier to package and distribute (Rismaya et al., 2018). According to Mervina (2012) fish meat meal for food is still rarely used compared to fish meal for feed.

The application of flour including catfish meat meal is greatly influenced by its properties physicochemistry and functional (Sukma et al., 2019). These properties are highly dependent among others influenced by the method or process of making flour. Therefore, this research aims to analyze the characteristics of African catfish meat flour which is obtained from the process of steaming, boiling and without heating before the African catfish meat is dried.

II. RESEARCH METHOD

This research starts from March 10 2023 to April 20 2023 at the Fisheries Product Processing Technology Laboratory, Faculty of Fisheries and Marine Sciences-Padjadjaran University, Jalan Raya Jatinangor KM 21, Sumedang-Indonesia. The method used was experimental with three treatments, the method of heating African catfish meat before the drying process in the manufacture of African catfish meat flour.

The materials used were African catfish obtained from the Jatinangor traditional market. The research procedure was as follows: The African catfish was weeded, that is, the entrails, gills and fins were removed, then cleaned and filleted. Next, 300 grams of fillets were weighed for each treatment which consisted of three treatments, namely steaming, boiling and without heating before drying. After that, the fillets for the steaming treatment were steamed in boiling water (100°C) for 15 minutes, and the fillets for the boiling treatment were carried out by boiling in boiling water (100°C) for 15 minutes and the fillets for the treatment without direct heating were cut

into small pieces to expand surface. next stage, After the fillets are steamed or boiled they are then cut into small pieces to increase their surface area. Filets from each treatment were dried in a blower oven at 60°C for 5 hours after which they were ground using a grinder and then filtered through a 100 mesh sieve.

The obtained African catfish meat meal was then observed or measured for its yield, water content, water absorption, pH and organoleptic properties (aroma, texture and color). Observations were made three times (triplo). The data obtained were analyzed descriptively.

III. RESULTS AND DISCUSSION

Yield

The yield of fish meat meal is the ratio of the dry weight of the flour produced to the weight of fresh fillets before being treated, in units of percent (Waode et al., 2020). The yield value of fish meat meal indicates the efficiency of the flour manufacturing process used. The yield of African catfish meal obtained from various heating methods applied before the drying process is shown in Table 1.

TABLE 1. Yield of African catfish meal from the heating method different before drying

No	Treatment	Average Yield
1	Steaming	12.20 % ± 0.21
2	Boiling	11.39 % ± 0.50
3	No Warm Up (Control)	12.37 % ± 0.33

Based on Table 1 above, the highest yield value of African catfish meal was obtained from the treatment without heating (control). This shows that the treatment without heating given to African catfish meat has fewer compounds lost or wasted during the process of making flour compared to heating treatment, either by boiling or steaming. According to Purwaningsih et al (2013), heating given to fish meat either by boiling or steaming causes a decrease in protein, fat and mineral.

Water content

According to Prasetyo et al (2019), the importance of analyzing the water content in a food ingredient includes 1) The water content in food greatly affects the quality and shelf life of the food. 2) the moisture content of a food ingredient is very important so that in the processing and distribution process it gets the right handling, if it is wrong then there will be damage to the food which can be harmful to health. Moisture content of African catfish meat obtained from the treatment of different heating methods before drying are shown in Table 2.

TABLE 2. Moisture content (%) of lamb catfish meal from different heating methods before drying

No	Treatment	Water content (%)
1	Steaming	5.33 ± 0.5
2	Boiling	4.87 ± 0.5
3	No Warm Up (Control)	5.74 ± 0.5

According to Pratiwi and Wahida (2021), the Indonesian National Standard classifies the quality of fish meat meal into

3 standards based on its water content. Standard 1, with a moisture content of 6 – 10% and standard II with a moisture content of 10 – 12%, and standard 3, with a moisture content of more than 12%. Based on Table 2, the water content of African catfish meal obtained from all treatments is below 10%, so it is included in standard 1. According to Orlan (2019), if the water content of fish meat meal is more than 10%, it will reduce the quality of fish meat flour because can increase the activity of microorganisms, especially Salmonella bacteria. Although the water content is at standard I however during storage, monitoring of the water content of fish meal needs to be done, Because there may be an increase in water content.

Water Absorbency

Water absorption is defined as the ability of flour to hold the added water and absorbed water has an important role in the formation of the viscoelasticity of the dough (Rauf and Sarbini, 2015). The biggest component in fish meal is protein, and this protein has the ability to absorb water but not as big carbohydrate. Power absorb the water obtained from the dumbo catfish meat meal of the different heating methods before drying are shown in Table 3.

TABLE 3. Water absorption (%) of African catfish meal from different heating methods before drying

No	Treatment	Average Absorption (%)
1	Steaming	1.77 ± 0.06
2	Boiling	1.97 ± 0.09
3	No Warm Up (Control)	1.62 ± 0.05

Based on Table 3, it shows that the highest average water absorption capacity is in African catfish meal obtained from in the boiling treatment and the lowest absorption in the treatment without heating (control) is equal to 1.62%. According to Tampubolon et al (2018), the water absorption capacity of flour is inversely proportional to its water content, the lower the water content of flour, the higher its absorption power. Heating the lamb catfish meat before drying causes the breaking or breaking of the hydrogen bonds in the protein. The impact of breaking this hydrogen bond causes the protein's ability to absorb water to be higher.

pH

Mark pH a product states acidity or alkalinity level the product (Sahril & Lekahena, 2015). pH African catfish meat flour obtained of the different heating methods before drying are shown in Table 4.

TABLE 4. The pH of African catfish meal from different heating methods before drying

No	Treatment	pH average (%)
1	steaming	5.90 ± 0.08
2	boiling	6.05 ± 0.04
3	No Warm Up (Control)	5.95 ± 0.05

Based on Table 4, the pH of African catfish meat meal obtained from different heating treatments is relatively the same. This is because there is no effect of cooking on raw materials and because the initial raw materials used are the same. According to Rahman et al (2015), basically the pH is

not affected by heat or high temperature but is influenced by the media which is decomposed by high temperature which produces acids or bases.

Organoleptic

The organoleptic of food products is very important to analyze because it is the first determinant of whether the product is accepted or rejected by consumers. Organoleptic assessment, also known as sensory testing or sensory testing, is a method of testing using the human senses as the main tool for measuring product acceptance (Gusnadi, et al., 2021). The senses used in the organoleptic test are sight/eye, smell/nose, taste/tongue, touch/hand. Organoleptic descriptive African catfish meat flour obtained from the treatment of different heating methods before drying are shown in Table 5

TABLE 5. Organoleptic description of African catfish meal from different treatments before drying.

Treatment	Color	Aroma	Texture
steaming	Dark yellow	A little fishy	Fine
boiling	Brownish yellow	Fishy	Bit rough
No Heating (control)	Pale yellow	Fishy	Bit rough

Based on Table 5, it shows that catfish meat meal obtained from various treatments gave the same basic color, namely yellow, but different levels, from dark to pale. This is influenced by the differences in the treatment of each flour, where the dark or brown color of the material processed by the heating process will occur non-enzymatic browning reactions, namely carbohydrates will react with proteins when there is heat (Fatmawati And Mardiana, 2014). Browning reaction (browning reaction) can occur in fish meal which contains a high protein content which is heated at a temperature of more than 35°C.

The aroma of food determines the delicacy of food and the taste of a food. The results of the research on catfish flour with 3 treatments, namely steaming, boiling and aroma control, produced the same as the fishy smell of fish. Stench This is due to the interaction of trimethylamine oxide with the double bonds of unsaturated fats (Hasanah et al., 2017). According to the 1991 National Standardization Agency for good quality fish meal, which has a fragrant aroma and is specific to fish meal, which has a fishy flavor (National Standardization Agency, 1991).

The results showed that the African catfish meat meal with the steamed treatment had a fine texture while the African catfish meat flour with the boiled treatment had a slightly coarser texture when compared to the African catfish meat flour with the steam treatment and the African catfish meat flour with the control texture was similar to flour. boiled catfish. According to Sundari et al (2015), the main objective of food processing using heating is to obtain a better taste, better aroma, and better texture soft.

IV. CONCLUSION

Based on the results of research on the characteristics of African catfish meat flour obtained from the steaming process on fish meat before drying are as follows: flour yield 12.20%, water content 5.33%, water absorption 1.77%, pH 5.9 and

organoleptic description of dark yellow color, slightly fishy aroma and smooth texture. The characteristics of African catfish meal obtained from the boiling process of the fish meat before drying are as follows: 11.39%, moisture content 4.87%, water absorption 1.97%, pH 6.05 and organoleptic description of brownish yellow color, fishy aroma and slightly rough texture. The characteristics of African catfish meal obtained from the process without heating the fish meat before drying are as follows: 12.37%; water content 5.74%, water absorption 1.62%, pH 5.95 and organoleptic description of pale yellow color, fishy aroma and slightly rough texture.

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