

# Utilization of Pomfret Fish (*Colossoma macropomum*) as a Nutritional Source of Corn Chips

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## ABSTRACT

Corn chips are a traditional product that has the potential to be developed because it is liked by the community. Development efforts must be followed by improving the nutritional quality of corn chips. Increasing the nutritional quality of corn chips is carried out by adding pomfret meat (*Colossoma macropomum*). This study aims to determine the effect of the rate of adding pomfret meat to the nutritional quality and to determine the percentage of pomfret fish additions to corn chips which panelists like the most. The fish used in the study was pomfret fish (*Colossoma macropomum*) from Cirata Reservoir. The design used in the study was a completely randomized design (CRD) consisting of 4 treatments and 3 replications. The treatments included the addition of 0%, 10%, 20%, and 30% pomfret meat based on the weight of corn. The parameters observed included physical tests (yield), chemical tests (moisture, protein, fat, ash, and fiber content) and hedonic tests (color, crunchiness, aroma, and taste). The results showed that the yield of pomfret fillets was 33.45%, the yield of mashed meat was 33.24% and the yield of chips increased along with the addition of pomfret fish. The addition of pomfret meat to corn chips had a significant effect on moisture, protein, lipid, ash and fiber content. Based on the Kruskal-Wallis test results, the addition of pomfret fish had no significant effect on the color, crispness, aroma, and taste of corn chips. Panelists preferred 20% of pomfret fish meat addition to corn chips with an alternative value of 7.0.

**Keyword:** pomfret fish meat, nutritional content, corn chips, pomfret yield

## 1. INTRODUCTION

Corn is a food ingredient that is easily found in almost all regions in Indonesia. Corn can be processed into processed food. One type of processed food from corn that is often encountered is corn chips. Corn chips are easy snacks to prepare because they are relatively easy to process and affordable. Corn chips are chips made from processed corn that are made thin and then fried until they are crispy with the addition of various spices [1]. The strategy for the development of corn chips can be done through improving the nutritional quality.

Based on the raw materials used, corn chips have an unbalanced nutritional content, which is rich in carbohydrates but poor in protein. Cereals and tubers are widely used as raw material for snacks, but they have low protein content [2] With regard to the imbalance in the nutritional quality of the corn chips, which is poor protein, an effort that can be made is supplementation with fish meat.

The addition of fish meat to corn chips is not only to improve the quality sensory-wise but also to pay attention to its nutritional content. The addition of pomfret fish meat can increase the nutritional value of corn chips, especially protein content. Pomfret fish has good nutritional value because it contains high protein and is beneficial for the body. The nutritional content of pomfret fish is water content of 68.92%, 12.86% protein, 9.26% fat, 0.62% fiber, and 2.21% ash [3]. Freshwater pomfret can be obtained easily because it has been cultivated, including in the

Cirata Reservoir, West Java. The purpose of this study was to determine the effect of pomfret fish supplementation level on nutritional quality and to determine the percentage of addition of pomfret fish meat to corn chips which panelists liked the most.

## 2. MATERIALS AND METHODS

### 2.1 Preparation

The materials used in this study were pomfret fish (*Colossoma macropomum*) from Cirata Reservoir, corn, and spices such as garlic, shallots, and salt (2% each), eggs, wheat flour, and cooking oil. The tools used in the study were a cool box, knife, meat grinder, basin, stove, and equipment for proximate analysis.

Pomfret fish were transported from the Cirata reservoir alive. Then it was acclimatized and aerated for one day in the laboratory. Fish were then putted in a cool box filled with slurry ice for 30 minutes. Furthermore, pomfret fish were filleted and their skin was removed to obtain the meat portion. The fish meat was washed, drained, and minced with a meat grinder to produce mincemeat. The ground meat was then added to the corn chips mixture based on the predetermined treatment. The yield of mashed meat, fillets, and chips was determined. The treatment in this study was the addition of pomfret meat to corn chips with a percentage of fish meat as much as 0%, 10%, 20%, and 30% based on the weight of the corn.

The procedure for making corn chips is that the seeds are separated and mashed in a blender. Combine the spices that have been mashed (2% garlic, 2% shallot, 2% salt), and flour, then add mashed meat based on the treatment. Knead the corn dough until smooth and then grind it. The dough was moulded by cutting it into triangles and then frying it. Corn chips were drained, packaged and analyzed.

### 2.2 Yield Percentage

The yield percentage calculated was the yield of mashed meat, the yield of filets and the yield of corn chips. The yield value is obtained by calculating the ratio of the final weight and initial weight of the object to be determined. The yield formula is as follows:

$$Yield (\%) = \frac{Initial\ weight}{Final\ weight} \times 100\%$$

### 2.2 Proximate Analysis

The proximate analysis carried out on corn chips was an analysis of moisture, protein, fat, carbohydrate, ash, and fiber content based on [4] procedure. Observation data were processed statistically with analysis of variance. If the results of the analysis of variance show a real significant effect, then the Duncan test was carried out.

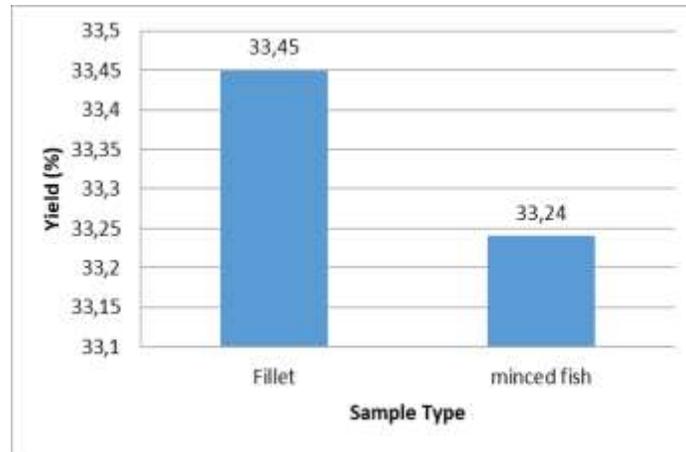
### 2.3 Sensory Analysis

The hedonic test (preference test) was conducted to determine the level of consumer acceptance of corn chips. The parameters observed were color, crispness, aroma, and taste. Sensory measurement was carried out using a hedonic scale with the lowest score of 1 (very dislike) and the highest score of 9 (very like) using 20 semi-trained panelists.

## 3. RESULT AND DISCUSSION

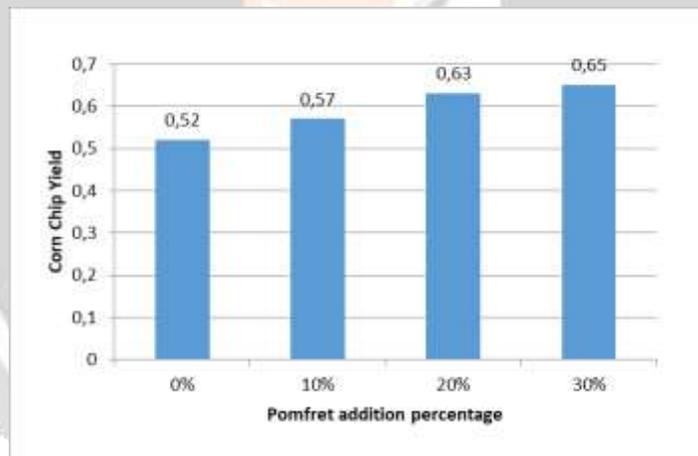
### 3.1 Yield

The yield is the percentage of usable material. The yield is an important parameter because by calculating the yield then it can be seen the economic value and effectiveness of a product or material. The yield of fillets and mashed meat is presented in Chart-1.



**Chart -1:** Percentage yield value of fillets and ground pomfret fish meat

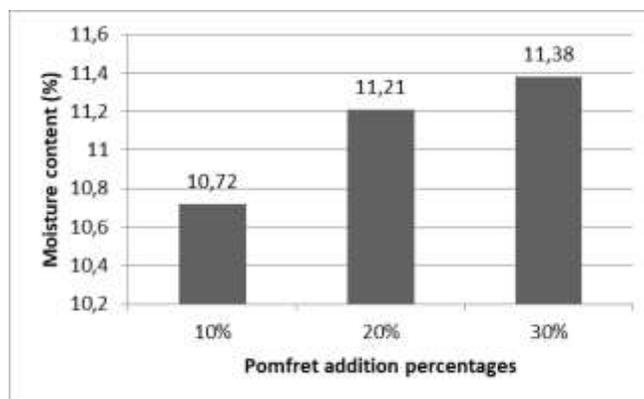
The yield value of pomfret fish fillets was 33.45% and the yield value of mashed meat was 33.24%. The yield value of fillets and mashed meat is influenced by the type of fish, the composition of the meat, and technical factors such as the skills of the researchers. The yield value of corn chips with the addition of pomfret fish is between 0.52% to 0.65%. The higher the percentage of pomfret meat addition, the yield value will increase. This is due to the increasing content of pomfret fish in the corn chip dough formulation.



**Chart -2:** Yield percentage value of corn chips with the addition of pomfret fish

**3.2 Moisture Content**

Moisture content analysis was performed to determine changes in water content in corn chips with the addition of pomfret fish. Water is an important component in food ingredients because it can affect its appearance, texture and taste. The water content in food will determine the level of acceptance, freshness, and shelf life of the material [5]. The water content of the corn chips with the addition of pomfret fish is presented in Chart-3.

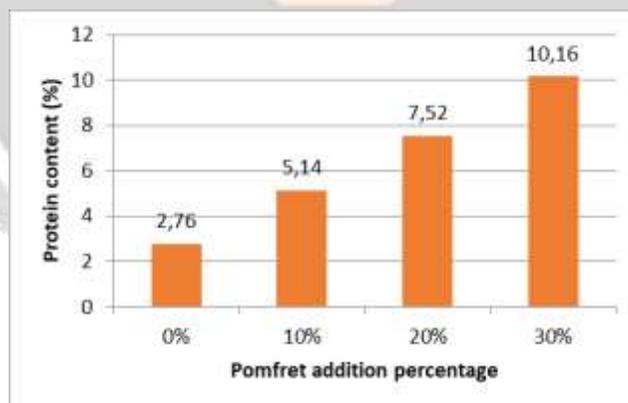


**Chart -3:** Moisture content of corn chips with the addition of pomfret meat

The moisture content of the corn chips tended to increase with the increasing concentration of pomfret meat added. The meat of pomfret contains high water content, hence when it is added to the corn chips mixture it will subsequently increase the moisture content of the corn chips. In accordance with the research results of [6], stated that the water content increased with the addition of snakehead fish meat residue into the cracker mixture. The water content of corn chips is also influenced by the raw material, namely corn. Corn starch contains hydrophilic groups so that it easily binds to water found in fish meat. The results of statistical analysis of variance (ANOVA) showed that the difference in the percentage of pomfret meat added had a significant effect on the moisture content of corn chips.

### 3.3 Protein Content

Protein is an important food substance for the body, because in addition to functioning as a building block and regulator of new tissues that always occur in the body. Protein is used as fuel when energy is needed and it contains nitrogen which is not owned by lipids and carbohydrates [5]. The protein content of corn chips with the addition of pomfret meat is presented in Chart-4.



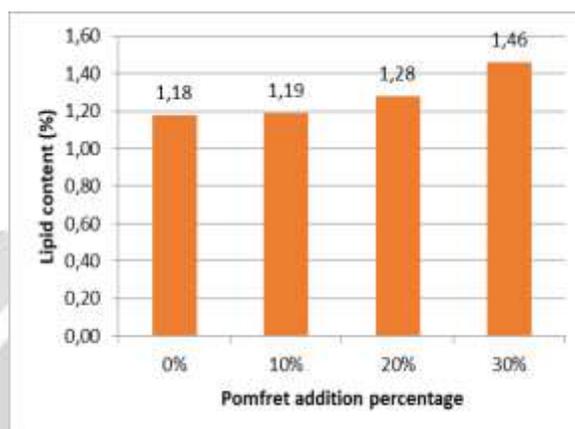
**Chart -4:** Protein content of corn chips with the addition of pomfret meat

Based on Chart-4, it can be seen that with the addition of pomfret meat, the protein content also increased in each treatment. This increase occurs due to differences in the addition of meat, resulting in changes in protein concentration in the dough. The more meat is added, the more protein content in the crackers will increase [6]. The increase in protein content in corn chips is due to the pomfret fish has a high protein content. Fish crackers have the potential to be used as a protein-rich snack [7]. According to (SNI 2713.1-2009), the minimum protein content in crackers is 5%. Then the protein content of corn chips with the addition of pomfret meat as much as 10%, 20% and 30% obtained from the proximate test results has met SNI 2713.1-2009, so that the corn chips with the addition of pomfret fish can be said to be a source of protein. The results of statistical analysis of variance (ANOVA) showed

that the difference in the percentage of pomfret meat added had a significant effect on the protein content of corn chips.

### 3.4 Lipid Content

Lipid is a more effective source of energy than carbohydrates and protein. Lipid functions as a solvent for vitamins A, D, E, and K. Lipid is a food reserve in the body, because excess carbohydrates are converted into fat and stored in adipose tissue [5]. The lipid content of corn chips with the addition of pomfret is presented in Chart-5.

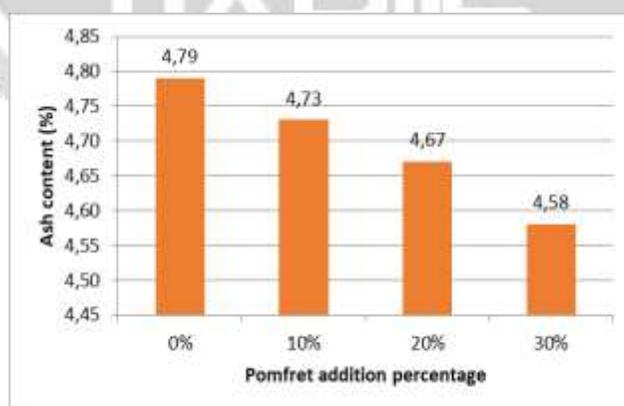


**Chart -5:** Lipid content of corn chips with the addition of pomfret meat

The difference in lipid content is caused by differences in the lipid content of each type of fish used in the study. The more meat that is given, then the lipid content will also increase. The increase in lipid content in the crackers is thought to be caused by a change in water content [6]. The results of statistical analysis of variance (ANOVA) showed that the difference in the percentage of pomfret meat added had a significant effect on the fat content of corn chips.

### 3.5 Ash Content

Ash is an inorganic substance which is the residue from the combustion of an organic material. The ash content and composition depend on the type of material and the method of ashes. Ash content has something to do with the minerals of a material [8].



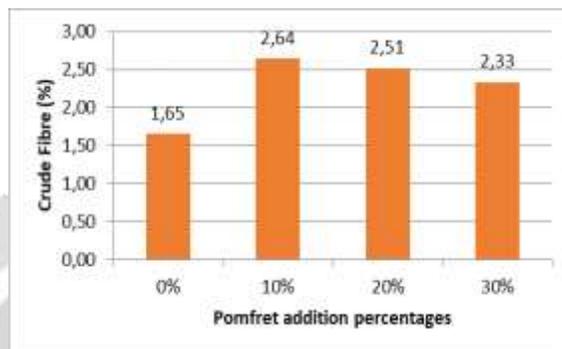
**Chart -6:** the ash content of corn chips with the addition of pomfret meat

Based on Chart-6 above, the ash content of corn chips ranges between 4.79% and 4.58%. The ash content in each treatment was different. The addition of spices did not increase the value of the ash content. This happens because the spices were added in a little portion, namely garlic, onion and salt 2% each. The higher the addition of pomfret meat to the corn chips, the lower the ash content value is. The results of statistical analysis of variance

(ANOVA) showed that the difference in the percentage of pomfret meat added had a significant effect on the ash content of corn chips.

### 3.6 Crude Fiber

Dietary fiber is part of the food that cannot be digested by human digestive enzymes. High dietary fiber intake can reduce the risk of colon cancer [9]. Crude fiber is the remaining component of the hydrolysis of a food ingredient with a strong acid, then it is hydrolyzed with a strong base so that there is about 50% cellulose loss and 85% hemicellulose (Tensiska 2008). The results of the crude fiber content test for corn chips are presented in Chart-7.



**Chart -7:** Crude fiber content of corn chips with the addition of pomfret meat

The main source of fiber found in corn chips is corn. With the addition of pomfret fish, the fiber content of corn chips tends to decrease. This is related to an increase in the amount of water and protein in the corn chips. The fiber contained in corn is water-soluble and some is not water-soluble. Dietary fiber is divided into two groups, namely insoluble dietary fiber and soluble dietary fiber. Pectin is a soluble fiber, while cellulose is insoluble in cold water, hot water and hot acids and hot alkalis (Tensiska 2008). The results of statistical analysis of variance (ANOVA) showed that the difference in the percentage of pomfret meat added had a significant effect on the crude fiber content of corn chips.

### 3.7 Sensory Evaluation

Sensory evaluation were carried out using the hedonic test method (preference test) on parameters such as color, crispness, aroma, and taste. Based on the Kruskal-Wallis test results, the addition of pomfret fish had no significant effect on the color, crunchiness, aroma, and taste of corn chips. The most preferred percentage of pomfret fish additions to cassava corn chips is 20% with an alternative value of 7.0.

## 4. CONCLUSIONS

The yield of corn chips increased along with the addition of pomfret fish. The addition of pomfret meat to corn chips can increase nutritional value (water, protein and lipid content). Panelists preferred 20% of pomfret fish meat addition to corn chips with an alternative value of 7.0.

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