

Assessing the Organoleptic Properties of Biscuit Products at Various Levels of Addition of Bream Fish (*Nemipterus japonicus*) Meat

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Authors' contributions

This work was carried out in collaboration among all authors. Author Junianto assisted in designing the research, writing the manuscript. Author NK conducted the research and wrote the abstract and introduction. Author RPD conducted the research and wrote the research method. Author SF conducted the research, conducted data analysis, wrote result, discussion and edited the manuscript. Author TT conducted the research, conducted data analysis, wrote result and discussion and edited the manuscript. Author FRJS conducted the research and wrote the conclusion. All authors read and approved the final manuscript.

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ABSTRACT

The research aimed to determine how much bream fish meat flour should be added during biscuit-making in order to achieve the most preferred product. The research method used was experimental, employing four treatments: 0% (no addition, serving as the control), 5%, 7.5%, and 10% of the total wheat flour used in biscuit preparation. The biscuit-making process involved mixing, forming, and baking. Variables observed included the level of liking for the biscuits' color, aroma, texture, and taste. The liking or preference test was conducted through a Hedonic test, employing a scale ranging from "like extremely" (1) to "dislike extremely" (9). Fifteen semi-trained panelists were selected as test subjects. Data obtained from the organoleptic testing of biscuits with varying levels of bream fish meat flour were analyzed descriptively and comparatively. Based on the research findings, it can be concluded that the most preferred biscuits, in terms of organoleptic liking for color, aroma, texture, and taste, were obtained at the addition of 5% bream fish meat flour. The average values for color, aroma, texture, and taste were 7.40, 7.67, 7.53, and 7.30, respectively.

Keywords: Descriptive; panelist; taste; texture; color; aroma.

1. INTRODUCTION

The nutritional intake of fish protein in Indonesia has been below the standard set by the Indonesian government. In 2022, the Indonesian government targeted fish consumption of 58 kg/capita/person but the achievement was only 56.48 kg/capita/person [1]. This figure is still low when compared to the level of fish consumption per capita in developed maritime industrialized countries such as Japan which reaches 100 kg per capita/year, Singapore 90 kg per capita, Malaysia 80 kg per capita, and Norway 75 kg per capita. Therefore, it is very important to increase fish consumption through innovation in the form of supplementation and substitution of fresh fish meat or fish meat flour in a food product.

Biscuits are one of the products that have long been known and favored by the wider community of various circles and ages. Biscuits are a type of food made from wheat flour with the addition of other food ingredients, by heating and molding processes [2]. According to Pertiwi et al. [3], foods that are well recognized by the community such as biscuits can be used as a medium to increase the intake of fish protein nutrients.

Supplementation of fish meat flour in biscuit making is an effort to increase fish protein intake. The protein content in the form of flour is higher than in the form of fresh fish meat. According to Hasnidar et al. [4], the nutritional content of fishmeal is as follows protein 66.02%; fat 10.82%, and ash 21.82%. The amino acid composition consists of arginine 3.44%, cystine 0.49%, histidine 1.42%, isoleucine 2.64%, leucine 3.25%, lysine 4.8%,

methionine 1.62%, phenylalanine 2.59%, threonine 2.91%, tryptophan 0.84%, tyrosine 1.89%, and valine 3.1%.

Bream fish (*Nemipterus japonicus*) is a type of fish that can be used for making flour. This bream fish has thick meat and white meat color so it is very suitable for making flour and surimi [5]. Bream fish commodities are caught in Indonesian waters and are available in the market all the time. The supplementation of bream fish meat flour in the manufacture of these biscuits will be able to affect the level of liking of the resulting product. This research aims to determine the level of addition of bream fish meat flour in the manufacture of biscuits that produces the most preferred product.

2. MATERIALS AND METHODS

The study was carried out at the Laboratory of Fishery Processing Technology, Padjadjaran University's Fisheries Study Program in Indonesia. The tools used in making these biscuits include an oven, cutting board, fork, analytical balance (delta range), mixer, spatula, baking paper, baking sheet, knife, 80 mesh flour sieve, container, and brush. The ingredients used were bream fish meat flour, wheat flour, rice flour, skim milk, sugar, cheese, vanilla, butter and egg yolk.

The research method used was experimental design with 4 treatments, namely the level of addition of bream fish meat flour 0% (without addition, as a control), 5%, 7.5% and 10% of the total wheat flour used in making biscuits.

Biscuit-making generally consists of mixing, forming, and baking. The stages of mixing and stirring the ingredients involved mixing butter, skim milk, powdered sugar, egg yolks, cheese, and vanilla using a mixer. This was done until the dough became flat and fluffy. After mixing, the dough was formed and underwent an aging process for approximately 15 minutes. Aging was needed to allow the developer ingredients to work effectively.

The risen dough was then gradually combined with rice flour, wheat flour, and bream fish meat flour, while gently stirring it with a spatula until the dough became smooth. Next, the forming process was conducted by thinning the dough until it reached the required thickness. To prevent stickiness between the dough and the tool, the dough surface was floured. The formed dough was laid out on a baking sheet that had been thinly and evenly greased with butter, and then baked.

The biscuits were baked in an oven set at 135°C for 35-40 minutes. The baking process was completed when the dough surface was golden brown. They were immediately removed from the oven. The biscuits were cooled for at least 10 minutes before serving. Once cooled, they were topped with melted butter. Finally, the biscuits were ready to be enjoyed by everyone.

Variable observations were made on the level of liking for the biscuits' color, aroma, texture, and taste. The test of the level of the panelists' preferences was carried out by the 9-point Hedonic test hedonic test with the following scale: Like extremely (9), like very much (8), like moderately (7), like slightly (6), neither like nor dislike (5), dislike slightly (4), dislike moderately (3), dislike very much (2), and dislike extremely (1).

The panelists used were 15 semi-trained panelists. Data obtained from organoleptic testing of biscuit from various treatments of the level of addition of mackerel meat flour were analyzed descriptively and comparatively.

3. RESULTS AND DISCUSSION

3.1 Color

According to [6], a food that is considered nutritious and has a very good texture will not be eaten if the appearance or color does not give the impression it should. Color is the first

appearance that greatly influences consumers in choosing a product [7]. Based on the results of the test of liking for the color of the biscuits, it shows that the average value of panelists' liking with the addition of bream fish meat flour ranges from 5.4 to 7.13 (Fig. 1). The highest level of liking for color was found in the addition of 5% bream fishmeal with a value of 7.4 which means "like". The level of addition of more than 5% bream fish meat flour resulted in a decrease in the level of liking for the color of the biscuits produced.

The description of the biscuits produced from the 5% level of addition of bream fish meat flour is slightly brown-yellow. The higher the addition of bream fish meat flour, the biscuit color gets darker and this color is increasingly disliked by panelists. According to Pratama et al. [8], the onset of brown color is due to the Maillard reaction between the amino acid lysine which is high in fish meat flour with reducing sugar groups. Lysine, which is composed of two amine groups, is more reactive to reducing sugars, resulting in a more intense brown color [8].

3.2 Aroma

One of the factors that determine the deliciousness of food is the aroma. Aroma is a response when volatile compounds from food enter the nasal cavity and are perceived by the olfactory system [9]. The results of the aroma test showed that the average value of panelists' preference for the aroma of biscuits from various treatments of bream fish meat flour addition levels ranged from 5.93 to 7.66 (Fig. 2). The highest level of the panelists' preferences of the biscuit's aroma was obtained from the level of addition of 5% bream fish meat flour with a value of 7.66. The description of the aroma is fragrant like the aroma of butter.

The aroma value of biscuits with the addition of bream fish flour decreased with the higher level of bream fish meat flour added. The more bream fish meat flour that is added to the biscuits, the more the biscuits smell of fish. This is in accordance with the statement of Pratama et al. [10], that the aroma generated by a product usually comes from the various ingredients that make up the product.

3.3 Texture

Texture is an organoleptic attribute that can influence the choice of a food product by

consumers. According to [11], texture is the sensation of pressure that can be observed by mouth or by touching the surface of the skin against the thickness, hardness or smoothness of the food surface. Based on the results of the texture preference of biscuits obtained from the level of addition of bream fish meat flour, the range is 6.06-7.53 (Fig. 3). The average value of the highest level of texture preference (7.53) was obtained from biscuits with a 5% addition level, the texture of the biscuits was quite crispy. The lowest mean value of texture preference (6.06) was obtained from biscuits with an addition level of 10%, the texture of the biscuits was not too crunchy.

The texture of different biscuits is influenced by the concentration of fish meal mixed into them caused. The results showed that the higher the rate of addition of fish meat meal by more than 5%, the texture of the resulting biscuits was less preferred. This is in harmony with Dewita et al. [12], where the high protein content can cause the ability to bind water smaller so that it will reduce the development of dough in the product.

3.4 Taste

Taste is a characteristic or character of food that includes appearance, smell, taste, texture, and temperature. Taste is the cooperation of the human senses which include the senses of taste, smell, touch, sight, and hearing [13]. The results

of the taste test showed that biscuits with the addition of bream fish flour had a range of values from 5.8 to 7.26 and descriptively the panelists rated from very dislike to very like, which means that they really felt the bream fish flour in the biscuits until they really did not feel the bream fish flour in the biscuits. The highest level of taste preference was found in biscuits with the addition of curry fish flour at 0% and 5% with a value of 7.3 which means "like" curry fish flour is not too pronounced, and the lowest taste preference was found in biscuits with the addition of curry fish flour at 10% with a value of 5.8 "neutral" which means the addition of curry fish flour feels neutral.

Fig. 4 shows that the taste value of biscuits with the addition of bream fish flour tends to decrease along with the addition of bream fish flour. The greater the concentration of curry fish flour, the taste of the biscuits is dominated by a slightly fishy taste, so the panelists' level of liking for taste decreases. This is in line with research according to Maulid et al. [14], the higher the concentration of tuna fish bone meal addition, the lower the level of liking of the panelists, because the taste of tuna fish bone meal dominates. The highest average value of taste in this study is 6.7, which means it is lower than the average value of the results of research by Arvianto et al. [15], namely the addition of dumbo catfish meat flour (*Clarias gariepinus*) to biscuits with an average value of 6.9.

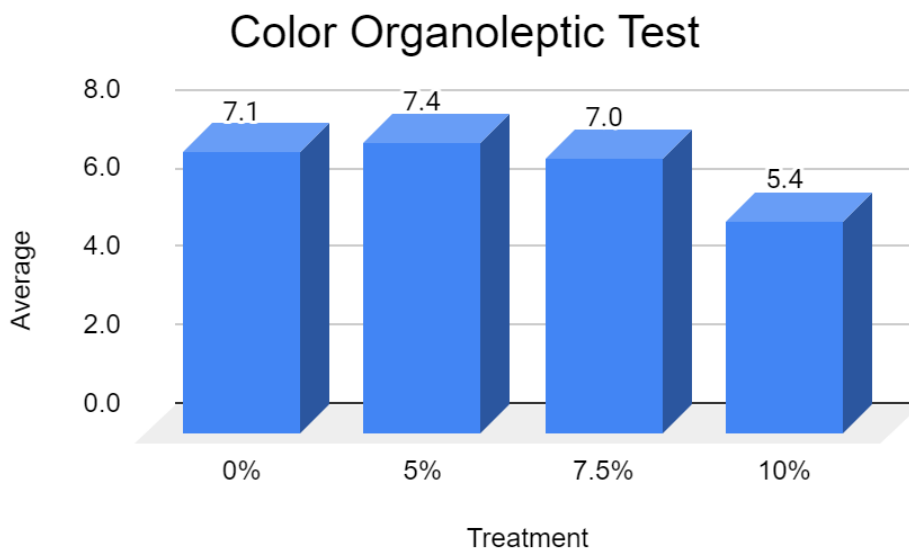


Fig. 1. Average value of biscuit color with the addition of bream fish meat flour

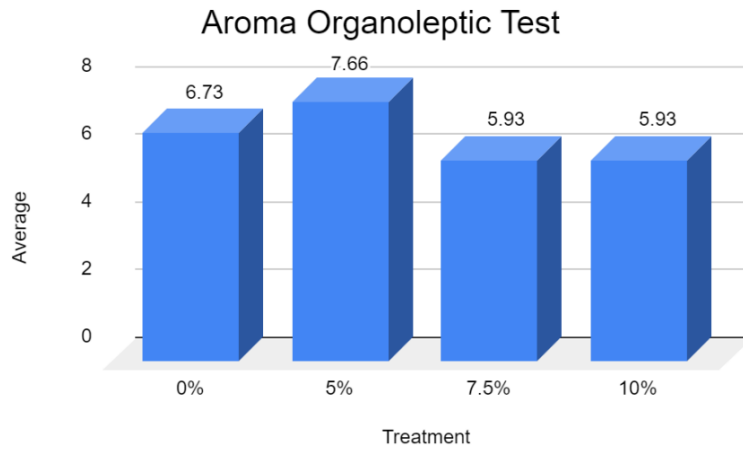


Fig. 2. Average value of aroma of biscuits with the addition of bream fish meat flour

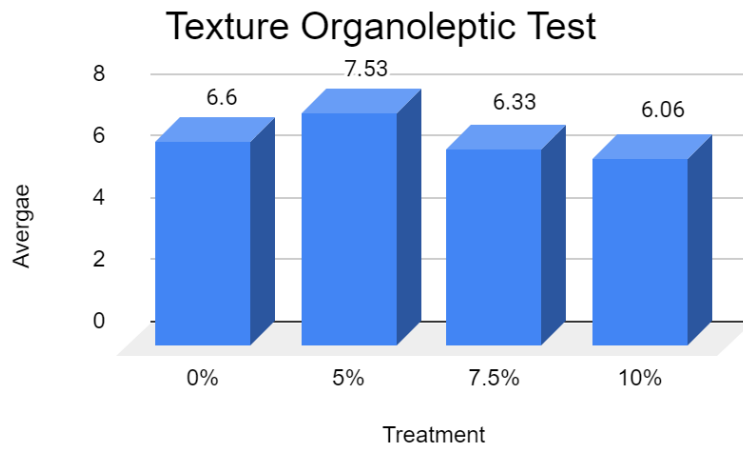


Fig. 3. Average value of biscuit texture with the addition of bream fish meat flour

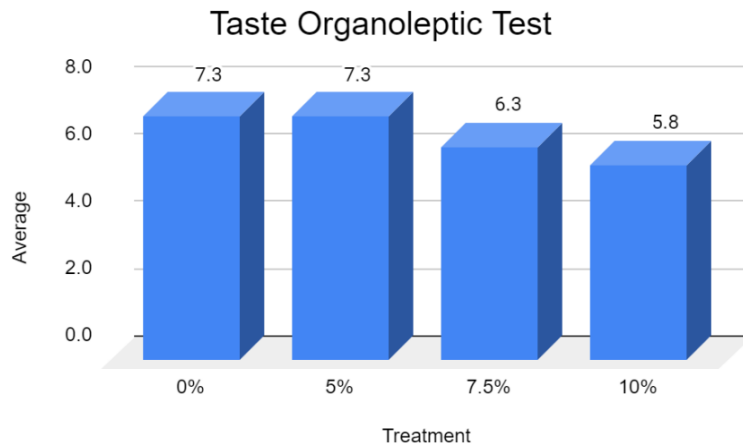


Fig. 4. Average value of biscuit taste with the addition of bream fish meat flour

4. CONCLUSION

Based on the research that has been done, it can be concluded that the level of organoleptic properties including the color, aroma, texture and taste of the most preferred biscuits was obtained from the level of addition of 5% bream fish meat flour. The average values of color, aroma, texture and taste were 7.40, 7.67, 7.53, and 7.30, respectively.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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