



The Effect of Adding Tilapia Protein Concentrate on the Level of Preference for Bubble Pearls

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This research aims to determine the percentage of addition of tilapia protein concentrate in the manufacture of bubble pearls to the level of preference of the resulting product. One of the source materials that can be used in the formulation for making bubble pearls is tilapia protein concentrate. With the addition of tilapia protein concentrate, it can add nutritional value such as protein. The method used in this research is an experimental method with 4 additional treatments of tilapia protein concentrate, that is 0%, 2.5%, 5%, 7.5% involving 15 semi-trained panelists as replicates. Parameters observed were hedonic tests (preferred level) based on organoleptic characteristics including appearance, aroma, texture, and taste as well as a proximate test (water content, protein content, and fat content) of bubble pearls. Based on the research results, it can be concluded that the 5% tilapia protein concentrate treatment was the most preferred treatment by the panelists with a value of 56.71% water content, 3.79% protein content and 3.54% fat content. because with the addition of tilapia protein concentrate of 5% gave the preferred results of texture, taste, appearance and aroma that were not specific. The resulting texture is chewy with a more attractive taste and appearance.

Keywords: Fish protein concentrate; tilapia; bubble pearls; level of preference.

1. INTRODUCTION

The millennial generation is a hot topic discussed among the public. The millennial generation is a term that is familiar to hear, millennials or often called generation Y is a group of people born after generation X. The habits and lifestyles of the millennial generation are happy to eat and drink or just spend time outside the home. Currently, the population of productive age (15–24 years) in Indonesia is projected at 44.09 million people [1], which shows that the target market for beverage producers is more millennials.

One form of drink that is a choice for millennials is ready to drinks [2]. Lately, urbanites enjoy serving drinks that are formulated with various flavors and other complementary ingredients to make them more delicious. Currently, various brands and types of contemporary drinks continue to appear in Indonesian society. One type of contemporary drink is a boba drink. Boba drink is a drink from Taiwan that has now become a popular drink throughout the world, including in Indonesia and is especially popular with teenagers and young adults. This type of drink is categorized as a bubble drink.

Bubble or commonly called boba is usually served cold and refreshing with a pile of boba that settles at the bottom of the glass, so that it makes many people like this drink. Boba is made from tapioca flour and made in various colors such as black, purple, and brown. In serving bubble drinks, boba plays an important role because it is the main attraction of the drink. Boba is usually added to juices, teas and other sugary drinks. Even in some outlets, boba is a mixture of ramen and cake. The chewy taste of boba is indeed the main attraction for fans of sweet drinks. The main ingredient in making boba is tapioca flour which has no taste, so the sweet taste in boba comes from honey or sugar-soaked before serving. Bubble pearls are high in carbohydrates and low in protein, so it is important to add protein source ingredients in the formulation for making bubble pearls.

One of the protein sources that can be used in the formulation of boba is fish protein concentrate. Fish protein concentrate is a form of product made by separating fat and water from the fish body which is a "stable protein" from fish for consumption with the protein being more concentrated than the original [3]. The use of fish protein concentrate powder as a substitute or as

a fortification material in the manufacture of food products is a promising alternative, especially in terms of the quality of the nutrients produced [4].

Fish that can be used as an ingredient for protein concentrate is tilapia. Tilapia is widely cultivated in Indonesia and used as the main commodity of freshwater cultured fish. The flesh is white, thick and slightly thorny so it is very suitable as an ingredient for making protein concentrates [5].

With the addition of tilapia protein concentrated in bubble pearls, it can increase its nutritional value, namely protein. However, the addition fish protein concentrate will have an impact on the level of preference for bubble pearls. Therefore, it is important to research the level of preference for bubble pearls from various treatments for adding fish protein.

2. RESEARCH AND METHODS

2.1 Time and Place of Research

The research was carried out at the Fishery Product Processing Laboratory, Faculty of Fisheries and Marine Sciences, Padjadjaran University and the proximate test was carried out at the Ruminant Animal Nutrition Laboratory, Faculty of Animal Science, Padjadjaran University. The research was carried out in November 2021.

2.2 Materials and Methods

The tools and materials used in this research are analytical balance, beaker glass, spatula, measuring cup, calico cloth, knife, pH meter, oven, blender, food processor, pan, cutting board, basin, scale, plate, sieve, tapioca flour, sugar, water, chocolate, ice cubes.

3. RESEARCH PROCEDURE

3.1 Tilapia Protein Concentrate Manufacture

Fish fillets are made without skin after that they are pulverized using a meat grinder. The filtered mashed fish meat is made into a paste by adding 1.5% sodium bicarbonate (NaHCO_3). The pH level of the meat is adjusted to 7.4-7.8, then sodium chloride (NaCl) is added to as much as 2% of the weight of the mashed meat. The pasta which has been mixed with NaHCO_3 and NaCl is

then extracted in 95% food-grade ethanol so that the water content and water activity are low. The paste that has been formed is ground again so that the mixing is more even. Next, the extraction process was carried out at a temperature of 5°C for 30 minutes to remove fat from the fish paste. The ratio of ethanol with extracted fish paste is 3:1. After extraction, it was filtered and pressed using a calico cloth to separate the ethanol from the fish paste, then ground using a food processor. The drying process in the oven was carried out at 45°C for 12 hours. The final stage of the fish protein concentrate manufacturing process is to reduce the size of the powder using a sieve [6].

3.2 Bubble Pearl Production

All dry ingredients such as tapioca flour, sucrose sugar and tilapia concentrate are mixed, Add boiling water to the dry ingredients mixture and knead until smooth, The smooth dough is then formed into small balls, next the dough that has been shaped into small balls is boiled for about 5 minutes until cooked, the bubbles that have been removed are then drained and watered again with ice water so they don't stick to each other, then the bubbles are stored in a closed container filled with enough water [7].

3.3 Research Methods

The method used in this research is experimental. Research activities include the preparation of tools and materials, preliminary tests, hedonic tests, and analysis of research results. The research consisted of 4 (four) treatments and 15 semi-trained panelists as replicates. The percentage addition of tilapia protein concentrates with the ratio of tapioca flour used. The following are the treatments in the research: (A) Without adding tilapia protein concentrate, (B) Addition of 2.5% tilapia protein concentrate, (C) Addition of 5% tilapia protein concentrate, (D) Addition of tilapia protein concentrate by 7.5%. The data obtained from the organoleptic characteristics (aroma, taste, texture, color) were analyzed by Friedman's test, if it had an effect, the analysis was continued with the multiple comparison test. To determine the best treatment based on the level of preference, the method used is the Bayes method. Data obtained from Chemical Analysis (moisture content, protein content, fat content, namely in the control treatment and the best treatment were analyzed comparatively.

4. RESULT AND DISCUSSIONS

4.1 Organoleptic Characteristics of Bubble Pearls

The parameters that will be observed in this research are hedonic tests on organoleptic characteristics which include the appearance, color, aroma, texture and taste of bubble pearls obtained from each treatment. obtained from the most preferred treatment by the panelists (the best) and without the addition of tilapia protein concentrate (control).

4.2 Appearance

Appearance is one of the most important attributes to consider with other sensory attributes aside to select the best and most preferred bubble pearls. This is because the appearance of a good product will usually be considered to have good quality and good taste [8]. The results of observing the appearance of bubble pearls with the addition of tilapia protein concentrate powder are shown in Fig. 1.

Based on Friedman's analysis, the addition of tilapia protein concentrate on the appearance of bubble pearls did not have a significant effect and was still favored by panelists with the highest average value of 7.8 in treatment C with the addition of tilapia protein concentrate of 5% and the lowest average value. is 6.1 contained in treatment A, namely with the addition of 0% tilapia protein concentrate. The appearances produced in all treatments were not significantly different because the added protein concentrate was obscured by the addition of cocoa and the fish protein concentrate size that had been mashed. The results of this study were the same as those of [9], which did not give a significantly different effect on the addition of torbangun leaf flour on the appearance of bubble pearls. This is significantly different from research [10] which showed that there were color differences in each Bubble pearl produced by adding chicken claw flour to the manufacture of bubble pearls.

4.3 Aroma

Aroma is the smell of a food product. While the smell itself is a response that exists when volatile compounds from a portion of food enter the nose when breathing or inhaling it [11]. The average aroma of bubble pearls with the addition of tilapia protein concentrate powder is presented in Fig. 2.

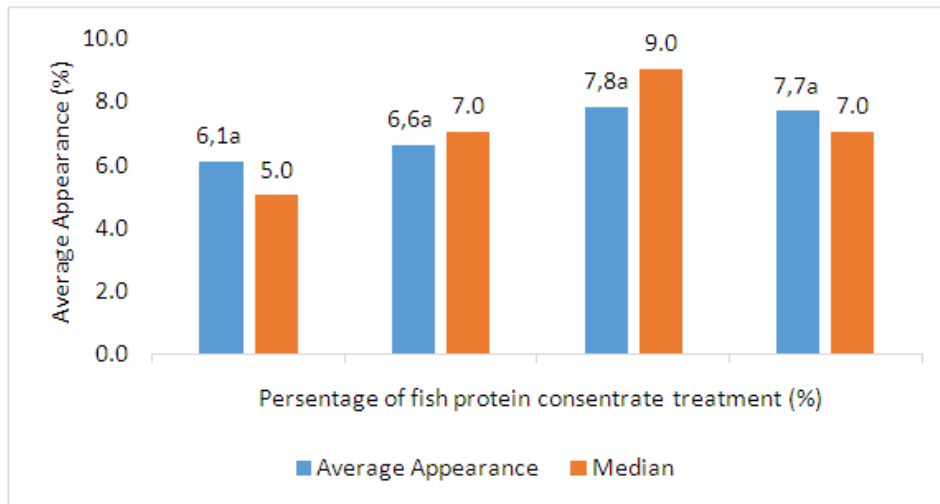


Fig. 1. Average likeness level of bubble pearls Aroma Aroma

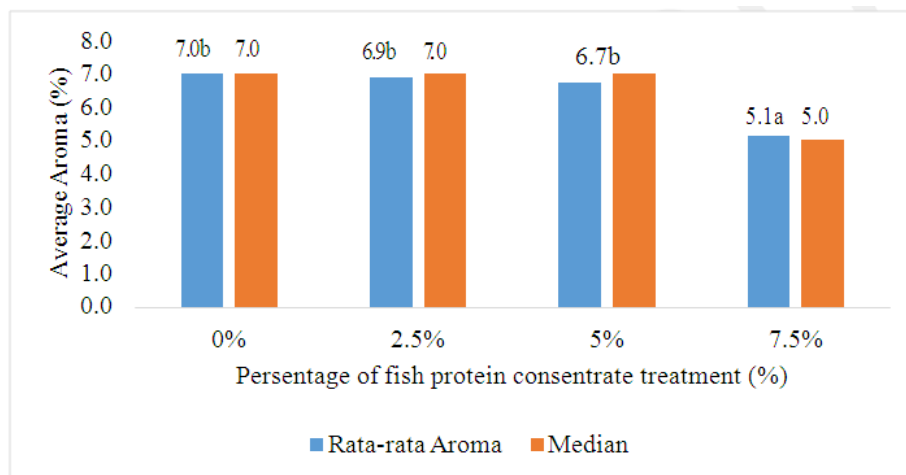


Fig. 2. Average rating of bubble pearls texture preference

Based on the Friedman test, the addition of tilapia protein concentrate had a significant effect on the texture of bubble pearls with the highest average value in treatment A of 7.0 with the addition of tilapia protein concentrate of 0%, and the lowest average value was in treatment D of 5.1 with the addition of tilapia protein concentrate of 7.5%. The addition of fish protein concentrate of 7.5% has an aroma that is less liked by the panelists. The aroma in treatment D was less favorable because it still smelled like the distinctive aroma of fish in the boba product so it was not liked by the panelists. This is in line with the statement [12], namely, the more fish protein concentrate added to a product, the more foreign the aroma of the product produced (typical fish aroma). In the manufacture of bubble pearls, the addition of chocolate can disguise the distinctive aroma of fish up to a concentration of only 5%,

for treatment of 7.5% the distinctive aroma of fish can no longer be disguised by the distinctive aroma of chocolate.

4.4 Textur

Food texture is the result of a tactile sense response to the form of physical stimulation when there is contact between the inside of the oral cavity and food. The average results of the bubble peals texture are shown in Fig. 3.

Based on Friedman's analysis, the addition of tilapia protein concentrate did not significantly affect the texture of bubble pearls and was still favored by the panelists. The highest average value was found in treatment C at 7.5 with the addition of tilapia protein concentrate of 5% and the lowest average value of 6.2 in treatment D

with the addition of fish protein concentrate of 7.5%. The resulting texture was not significantly different between all treatments because tilapia protein did not contain and absorb excess water during boiling so the resulting texture was chewy and not significantly different. The results of this study are the same as [13], namely adding chicken claw flour to the manufacture of bubble pearls, it shows that there is no difference in texture in each of the resulting bubble pearls. Then this is different from the statement [14] that the addition of black rice flour to the boba causes the texture of the boba to become more easily crushed and not chewy. This is due to the high amylose content.

4.5 Taste

Taste is one of the properties of food, drink and seasoning which can be defined as a collection of perceptions resulting from sensory stimulation combined with digestive stimulation in the form of impressions received from a product in the mouth. The average results of the bubble pearls texture are shown in Fig. 4.

Based on Friedman's test, the addition of tilapia protein concentrate had a significant effect on the taste of the bubble pearls produced and the level of preference of the panelists. The highest average value was 7.9 which was found in treatment C with the addition of tilapia protein concentrate of 5% and the lowest average value was in treatment A with the addition of 0% tilapia fish protein concentrate. Bubble pearls with the addition of 5% had a taste that the panelists liked because of the sweet and unique taste while the added flavor of the tilapia protein concentrate was not too strong. Based on statistical tests, the addition of tilapia protein concentrate to bubble pearls had a significant effect on the level of taste preference. The addition of tilapia protein concentrate of up to 5% can increase the taste

preferences of boba, but further additions such as in the 7.5% treatment will reduce the level of taste preference on bubble pearls. The results of this study are the same as a research [15] which states that this is because chicken feet contain fat, so the more concentration of chicken claw flour is added, the more savory the tapioca pearls will taste because the claws contain fat. This eliminates the distinctive taste of bubble pearls, which is sweet and chewy.

4.6 Decision Making Method Using Bayes

Based on the results of the calculation of the appearance, aroma, texture and taste parameters of bubble pearls, the highest number of weight criteria obtained is the taste parameter of 0.53, meaning that the taste parameter is the most important assessment or the main consideration according to the panelists in choosing bubble pearls products with the addition of fish protein concentrate. indigo. The second most important parameter is texture, followed by aroma, and appearance, respectively, with a criterion weight value of 0.32; 0.12; 0.03. Based on this, it can be concluded that the taste has the highest criterion weight value, if the taste of tilapia protein concentrate boba is not liked by the panelists, the product will not be accepted or rejected by the panelists even though other assessments are good. Taste is influenced by several factors, namely chemical compounds, temperature, concentration and interactions with other flavor components [16]. The savory taste can be caused by the presence of flavor-forming free amino acids such as glycine, alanine, lysine, and especially glutamic acid, which can cause a delicious taste [17]. The results of calculations in determining the best treatment using the Bayes method by considering the criteria for color, aroma, texture and taste of boba with the addition of tilapia protein concentrate are shown in Table 1.

Table 1. Decision matrix of bubble pearls protein concentrate tilapia fish protein concentrate using bayes method

Treatment (%)	Criteria				Alternative Value	Priority Value
	Appearance	Aroma	Texture	Taste		
0	7,10	7,20	5,60	7,30	6.73	0.25
2,5	7,10	6.40	7.00	6.50	6.67	0.25
5	8,10	7.30	7.10	7.20	7.20	0.27
7,5	8,30	6,30	7,90	6,20	6.82	0.26
Criteria Value	0.12	0.32	0.53	1.00	24,7	1.04

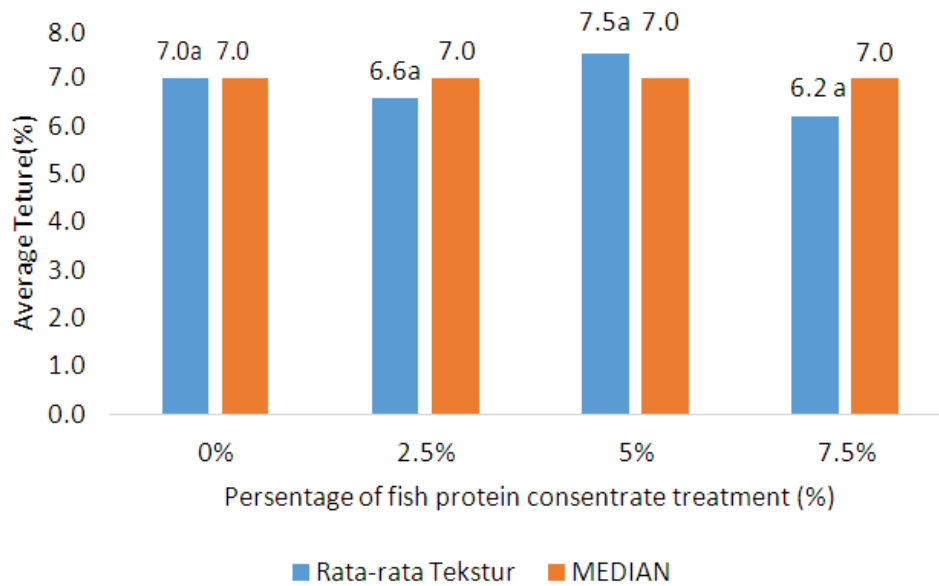


Fig. 3. Average rating of bubble pearls texture preference

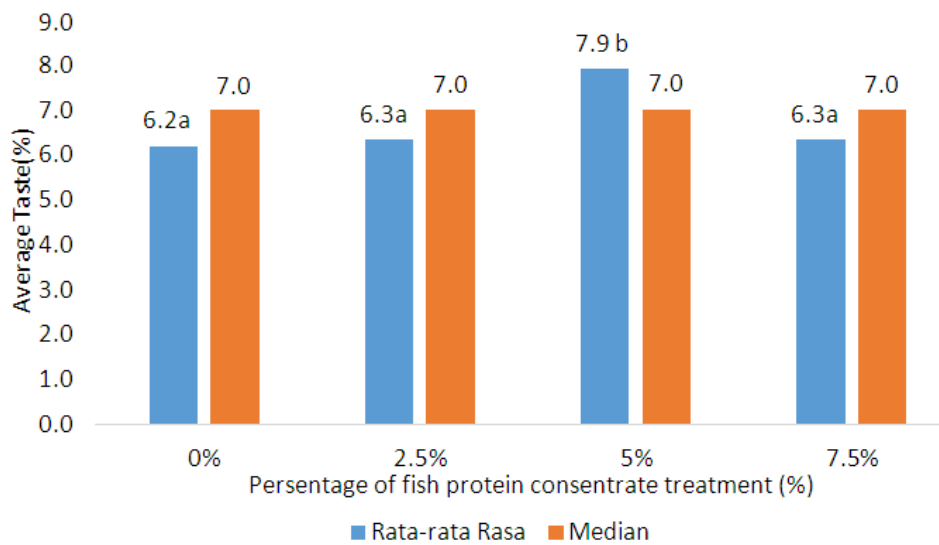


Fig. 4. The average value of the bubble pearls taste level of preference

Based on the calculation of the Bayes method, it was found that bubble pearls with the addition of 5% tilapia protein concentrate were the most preferred treatment by the panelists based on the hedonic test because of their better appearance, intact and homogeneous shape and not too sticky with one another, the distinctive aroma of fish. not significant, the chewy texture and taste were favored by the panelists by having alternative values and the highest priority values of 7.20 and 0.27. However, bubble pearls with the addition of tilapia protein concentrate up to 7.5% treatment were still acceptable to the panelists.

5.CONCLUSION

Based on the research results, it can be concluded that the appropriate addition of tilapia protein concentrate in the manufacture of bubble pearls and the most preferred by the panelists is treatment C with the addition of tilapia protein concentrate by 5%. The highest value of Bubble pearls proximate test from the best treatment was 5% and the comparison treatment was 0%, namely the water content was 56.71%, the protein content was 3.97% and the fat content was 3.54%.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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