THE EFFECT OF ADDITION BONYLIP BARB PROTEIN CONCENTRATEON THE PREFERRED LEVEL OF WET NOODLES

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KeyWords

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ABSTRACT

This research aims to determine the concentration of addition bonylip barb protein concentrate on wet noodles to produce the most preferred product. This research was conducted form July to August 2019 at the LaboratoriumPengolahanHasilPerikanan Faculty of Fisheries and Marine Science, UniversitasPadjadjaran. The method used was experimental consisting of four treatments, namely the addition of bonylip barb protein concentrate 0%, 2.5%, 5%, 7.5% with 20 semi-trained panelists as replicates. Based on the results of the research, the panelists' preference test on color, aroma, texture and taste in the control treatment (0%) to 7.5% is still preferred by the panelists. The treatment of adding 5% bonylip barb protein concentrate is preferred compared to other treatments and has a higher alternative value of 7.00.

1. INTRODUCTION

Fish is one source of animal protein whose existence is very needed for human life. Consumption of animal protein in Indonesia is still low. In 2014 vegetable protein consumption was still dominant at 68.9% of total protein, which means animal protein consumption was around 31.1% [1]. The amount of protein content in fish meat reaches 17% - 22%, with an average of 19% [2] in terms of nutrition, protein is a source of energy and amino acids, which are important for human growth. Protein is a material forming new tissues that always occur in the body. The main function of protein for the body is to form new tissue and maintain existing tissue [3].

Bonylip barb or nilem is one of the freshwater fish species native to Indonesia, which is still lacking in use because of its many thorns. Nilem fish meat will be used as fish protein concentrate which is one of the sources of animal protein needed for human life.One processed fishery product whose use is not optimal is fish protein concentrate. Fish protein concentrate is a form of product made by separating fat and water from the body of the fish which is a "*stable protein*" from fish for human consumption and with a more concentrated protein content than the original [4]. Water and fat can be removed by pressing, drying or extracting using non-polar solvents such as ethanol and isopropanol. There are several conditions that must be met in the selection of solvents used to separate proteins, namely: it has a good precipitation effect, is safe (the vapors are harmless) and can be used at cold temperatures [5]. The used of fish protein concentrate as a substitute material or as a fortification material in the manufacture of food products [6]. Bonylip barb protein concentrate can be added to the wet noodles.

Wet noodles have a water content can reach 52% so that its shelf life is relatively short (40 hours at room temperature) [7]. Wet noodles were chosen because it is one of the foods that are much in demand by people in Indonesia. Wet noodles are generally made from wheat flour which has a high carbohydrate content of 50 g in 100 g of noodles [8], so that the addition of bonylip barb protein concentrate flour can increase the protein content in wet noodles.

The addition of bonylip barb fish protein concentrate has the potential to increase the nutritional value of protein in wet noodles. So far, research on adding bonylip barb protein concentrate to wet noodles is still small, therefore research is needed on bonylip barb protein concentrations at the preferred level of wet noodles.

2. MATERIALS AND METHOD

2. 1. Tools and Materials

The tools used in this research are digital scales, blenders, electric ovens, gas stoves, jars, basins, spoons, pans, filters, fabric, blades, knives, pH meters, measuring cups 50 ml, noodle cutters, trays and cutting boards. The materials used in this research are bonylip barb/nilem, hexane, sodium bicarbonate ($NaHCO_3$), salt, fish protein concentrate, wheat flour, vegetable oil, eggs and water.

2. Reasearch Methods

The method used in this research is experimental consisting of four treatments with 20 semi-trained panelists as a test, to determine the level of panelist acceptance of wet noodles. The four treatments of adding nilem protein concentrate flour to wet noodles are as follows:

A = 0% of bonylip barb protein concentrate from wheat flour
B = 2.5% of bonylip barb protein concentrate from wheat flour
C = 5% of bonylip barb protein concentrate from wheat flour
D = 7.5% of bonylip barb protein concentrate from wheat flour

Following is the formulation of making wet noodles with the addition of bonylip barb protein concentrate can be seen in Table 1.

Table 1. Wet Noodles Making

Formulation	0%	2.5%	5%	7.5 %
Wheat flour (g)	150	150	150	150
Bonylip barb protein concentrate (g)	0	3.75	7.5	11.25
Water (ml)	70	70	70	70
Salt (g)	10	10	10	10
Eggs (g)	45	45	45	45
Oil vegetables (ml)	15	15	15	15

Procedures for making modified wet noodles [9] as follows:
1. 150 g wheat flour mixed with 70 ml water, 10 g salt, 45 g eggs and 15 ml vegetable oil added in one container.
2. Bonylipbarp protein concentrate is added according to treatment (0%, and 5%).
3. The mixture is stirred until smooth.
4. The batter is compacted and made with a noodle cutting tool into strands with a width of approximately 0.5 cm.
5. The noodles are boiled for 1 minute at 100°C and vegetable oil is added to prevent the noodles from sticking.
6. Noodles are picked and drained.

2. 3. Observed Parameters

Observed parameters in this research are organoleptic tests. The organoleptic test parameters of the wet noodles tested were preference (hedonics) including several characteristics such as color, aroma, texture and taste using 20 semi-trained panelists consisting of students from the Faculty of Fisheries and Marine Sciences, UniversitasPadjadjaran.

The hedonic test (test of preference) is an impression statement about the good or bad quality of a product. This test is carried out if the test is designed to choose a product among other products directly. The preference test asks panelists to have to choose one choice among the others. Thus, a product that is not selected can indicate that the product is liked or disliked [10].

This method uses a scale of numbers ranging from 1 to 9, namely: 1 (very dislike), 3 (dislike), 5 (neutral / ordinary), 7 (like), 9 (very like). The rejection limit for this product is 3, meaning that if the product being tested gets a value equal to or smaller than number 3 then the product is declared not accepted by panelists / consumers [10].

2. 4. Data Analysis

The *Friedmantest* conducted to determine the effect of adding bonylip barb protein concentrate to the preferred level of noodle. The *Friedman test* defined by the following formula:

$$Xr^2 = \frac{12}{nk\,(k+1)}\sum_{j=1}^{k}(Rj)^2 - 3\,n\,(k+1)$$

Information:
Xr^2 = Friedman Test Statistics
n = Repetition
k = Treatment
Rj = Total ranking of each treatment

If there is an influence between treatments, the analysis was continued with a multiple comparison test (*Multiple Comparison*) to determine the effect between treatments. The multiple test formula is as follows:

$$| \text{Ri - Rj} | \le Z \left[1 \frac{a}{k \, (k-1)} \right] - \sqrt{\frac{nk \, (k+1)}{\epsilon}}$$

Information:

| Ri - Rj | = difference in average ranking
Ri   = average rank of the 1st sample
Rj   = average rank of the jth sample
α   = experimental wise error
n   = number of data or repetition
k   = number of treatments
Z   = value in table Z for *multiple comparison* (α / k (k-1))

Analysis then continue with *Bayes* method to determine the best treatment of the four parameters (color, taste, aroma and texture) tested.

3.   RESULT AND DISCUSSION

3. 1. Preference Level of Color for Wet Noodles

Color is one of the most important indicators of food because food looks first and plays a very important role in determining the quality of food [11]. Color is the first impression that appears and is judged by panelists [12]. Color assessment aims to determine the acceptance of panelists by the color of wet noodles. The results of the average value on the color analysis of wet noodle products can be seen in Figure 1.
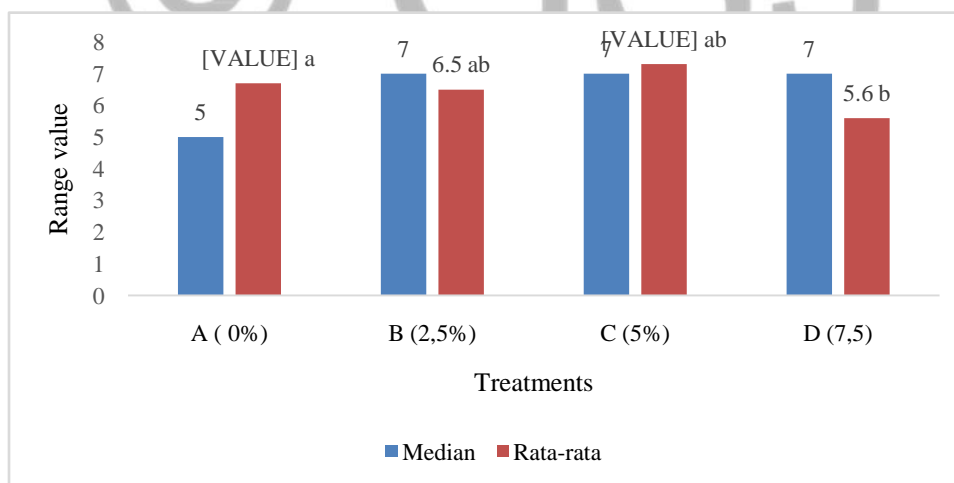

Figure 1. Average Color of Wet Noodles

Based on the results of *Friedman test*, show that the addition of bonylip barb protein concentrate affects the color characteristics of wet noodles. This is similar to the research that has been done that the addition of fish protein concentrate shows a real influence on color preference [13]. Treatment A (0%) was not significantly different from treatment B (2,5%) and C (5%), but significantly different from treatment D (7,5%). Treatment D was not significantly different from treatment. treatment B and C, but significantly different from treatment A.

The median value at the preference level of color for wet noodles ranged from 5.6 (neutral) to 7.3 (likes) which means that the color of wet noodles with the addition of bonylip barb protein concentrate was still preferred by panelists . The highest average color value of 7.3 (likes) was found in the treatment of wet noodles with the addition of bonylip barb protein concentrate by 5% while the lowest average color value was 5.6 (usual) in treatment D (addition of bonylip barb protein concentrate 7,5%).

The most preferred addition of bonylip barb protein concentrate to wet noodles is that the C (5%) has a slightly brownish yellow color. This is in accordance with research [6] making rice noodles with the addition of cork fish protein concentrate of 0%, 5%, 10% and 15%, and treatment 5% is most preferred by panelists. The addition of high fish protein concentrate will cause the color of the noodles to be less bright. This is proved by the 7.5% treatment can reduce the level of preference for wet noodles, because the color in the 7.5% treatment becomes brownish yellow.

3. 2. Preference Level of Aroma for Wet Noodles

Aroma is a gas molecule that is inhaled by the nose so that it can be determined whether the food is tasty or not. The aroma has its own charm, therefore in the food industry, the test of aroma is considered important because it gives a quick response to the products produced [14]. The results of the average value on the observation of the aroma of wet noodle products can be seen in Figure 2.
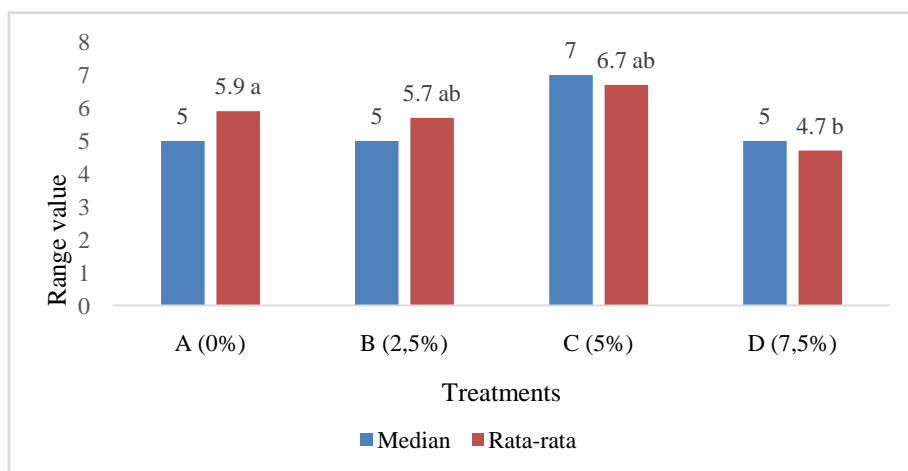

Figure 2. Average Aroma of Wet Noodles

Based on the results of the statistical test *Friedman* showed that the addition of the bornylip barb protein concentrate had an effect on the taste level of the aroma. This is similar to the research that has been carried out that the addition of fish protein concentrate shows a real influence on aroma preferences [13]. The median value of the characteristics of the wet noodle aroma ranges from 4.7 (ordinary) to 6.7 (like) which means that the aroma of wet noodles with the addition of bonylip barb protein concentrate is still preferred by panelists. The highest average aroma value of 6.7 (likes) is found in the treatment of wet noodles with the addition of fish protein concentrate by 5% while the lowest average aroma value of 4.7 (neutral) is found in the treatment of wet noodles with the addition of fish protein concentrate by 7.5%.

The most preferred aroma by panelists is 5% addition of bonylip barb protein concentrate to wet noodles, a distinctive aroma of noodles with a slight fishy aroma is obtained. This is in accordance with research that has been done [6] to make noodles with the addition of cork fish protein concentrate of 0%, 5%, 10% and 15%, the most preferred aroma is the 5% treatment. Adding fish protein concentrate to the wet noodles causes the distinctive aroma of the fish according to the treatment.

The addition of higher fish protein concentrate will make the aroma of wet noodles more and more disliked by panelists. In the treatment of 7.5% it can reduce the level of preference for wet noodles because in the treatment of 7.5% the aroma of fish is felt. The addition of fish protein concentrate can give the product a distinctive aroma of fish, but the higher the concentration of protein concentrate used, causes the original aroma to be lost, and the fish's aroma will be stronger [15].

3. 3. Prefrence Level of Texture for Wet Noodles

Texture is sensing related to touch or touch [11]. Changes in texture can change the taste that arises because it can affect the speed of the stimulation of cells. The results of the average value on the observation of the texture of wet noodle products can be seen in Figure 3.
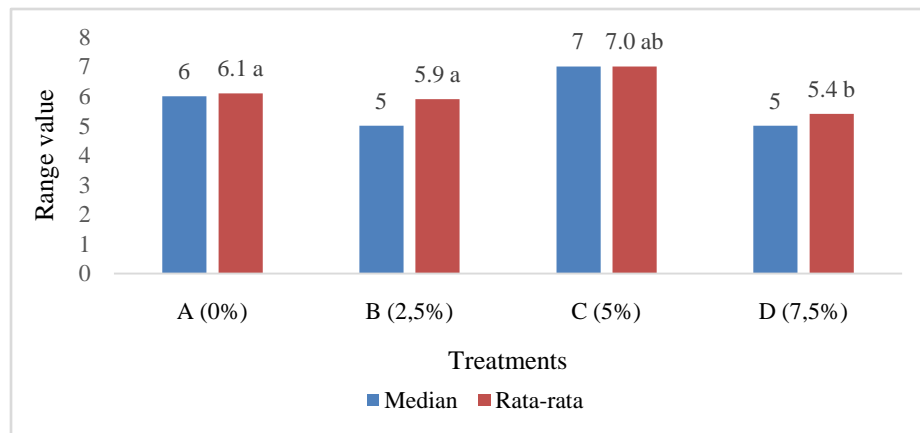
Figure 3. Average Texture of Wet Noodles

Based on Figure 3, it can be seen that the addition of bonylip barb protein concentrate affects the preference level of the texture for wet noodles. This is similar to the research that has been done that the addition of fish protein concentrate shows a real influence on texture preference [13]. Treatment A (0%) was not significantly different from treatment B (2,5%) and C (5%), but significantly different from treatment D (7,5%). Treatment D was not significantly different from treatment C, but significantly different from treatment A and B.

The median value of the preferred level of wet noodles ranged from 5.4 (neutral) up to 7.0 (like) which means that the texture of the wet noodles with the addition of the bonylip barb protein concentrate is still preferred by panelists. The highest average texture value is 7.0 (likes) found in the treatment of wet noodles with the addition of fish protein concentrate of 5% while the lowest average texture value of 5.4 (neutral) is found in the treatment of wet noodles with the addition of fish protein concentrate by 7.5%.

The texture most favored by panelists is the addition 5% of fish protein concentrate to wet noodles. This is in accordance with research that has been done to make rice noodles with the addition of cork fish protein concentrate of 0%, 5%, 10% and 15% and the addition 5% of bonylip barb protein concentrate is most preference by panelists [6]. The addition of bonylip barb protein concentrate with 5% has a wet noodle texture that slightly arises brown spots. This can happen because when sifting bonylip barb protein concentrate is not smooth.

The addition of higher fish protein concentrate will make the panelists' texture less likeable. This is evidenced by the trertment D (7.5%) can reduce the level of preference for wet noodles. In the treatment of 7.5% brown spots occur and the noodles become less elastic. Fish protein concentrate is absorbing water, so the resulting dough is getting thicker and making the wet noodles less elastic [16].

3. 4. Preference Level of Taste for Wet Noodles

Taste is a very determining factor in the final decision of consumers to accept or reject a food product [4]. Taste is something that is received by the tongue [11]. The results of the average value on the observation of the taste of wet noodle products can be seen in Figure 4.
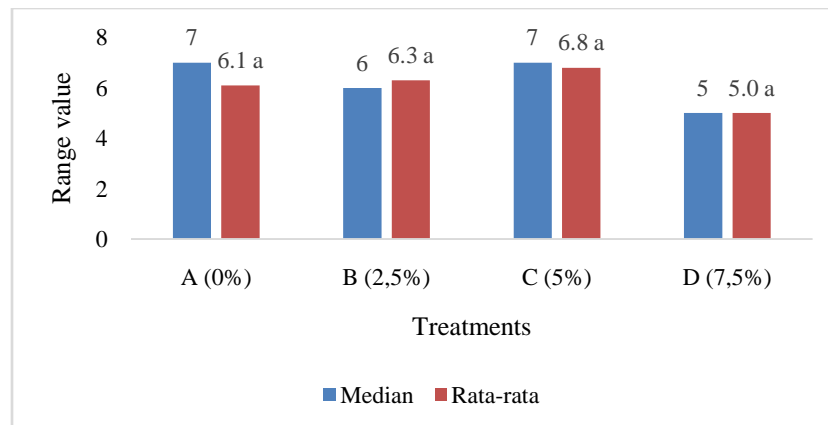

Figure 4. Average Taste of Wet Noodles

Based on Figure 4 it can be seen that the addition of bonylip barb protein concentrate has no effect on flavor characteristics. This is similar to the research that has been done that the addition of fish protein concentrate does not show a significant difference in taste preferences [13]. The taste test obtained the median value of the level of wet noodle preference in organoleptic assessment ranged from 5.0 (neutral) to 6.8 (like) which means that the taste of wet noodles with the addition of nilem fish protein concentrate is still preferred by panelists. The highest average flavor value of 6.8 (likes) is found in the treatment of wet noodles with the addition of fish protein concentrate of 5% while the lowest average taste value of 5.0 (usual) is found in the treatment of wet noodles with the addition of fish protein concentrate by 7.5%.

The flavor most favored by panelists is the addition 5% of fish protein concentrate to wet noodles, a specific flavor of noodles (flour) found with a slight fish taste. This is in accordance with research that has been done to make rice noodles with the addition of cork fish protein concentrate of 0%, 5%, 10% and 15%, and added 5% the most preferred taste by panelists [6]. The addition of higher fish protein concentrate will make the taste of wet noodles more and more disliked by panelists. This is proved by the 7.5% treatment can reduce the level of preference for wet noodles because the resulting fish flavor is getting stronger. The higher the addition of fish protein concentrate, the stronger the fish's taste [17].

The flavor component consists of salty, sweet, bitter and sour [18]. These properties are generally determined by the formulation of the material used and most are not affected by processing. In this research, the taste of wet noodles added to bonylip barb protein concentrate did not significantly affect the control treatment, this is because the number of bonylip barb protein concentrate added did not affect the taste of wet noodles.

3. 5. Decision Making with *Bayes* Method

Bayes Methodis one way to analyze the decision-making the best of several alternatives that aim to produce optimal value. Decision making for alternative priority values and criteria for color, aroma, texture and taste is carried out using a *Multiple Comparison Test*. The assessment decision matrix can be presented in Table 2.

Table 2. The Decision Matrix with the *Bayes* Method

Treatment of	Median				ValuesValues Alternative
	Color	Aroma	Texture	Taste	
0%	7	5	6	7	6.62
2.5%	7	5	5	6	5.88
5%	7	7	7	7	**7.00**
7.5%	7	5	5	5	5.31
Criteria Value	0.16	0.10	0.17	**0.57**	

Based on table 2, it can be seen that taste is the most important criterion in the panelists final decision in choosing wet noodles with a criterion priority of 0.57. Then followed by a texture with a weight of 0.17 criteria then color with a weight of 0.16 criteria and aroma with a weight of 0.10 criteria. This shows the taste criteria are the main consideration in choosing wet noodle products. The taste of wet noodles is the most influential criterion for consumer ratings for wet noodles by adding nilem fish protein concentrate.

Based on calculations using the Bayes method, it was found that the wet noodles with the addition of the bonylip barb protein concentrate, all treatments were still accepted or preferred by the panelists. The highest alternative value is at 5% treatment at 7.00 while the lowest alternative value is at 7.5% treatment obtains an alternative value of 5.31 (neutral). Based on the results of analysts, wet noodles with the addition of 5% fish protein concentrate are preferred by panelists compared to other treatments.

3. 6. Recapitulation of Research Results

Results of research conducted on organoleptic observations include the characteristics of color, aroma, texture and taste, and decision making with the *Bayes* methodcan be seen in Table 3.

Table 3. Recapitulation of Research Results

Observation of	Wet Noodle Treatment with the Addition of Bonylip barb Protein Concentrate (%)			
	0	**2.5**	**5**	**7.5**
Hedonic Test				
Color	6.7 a	6.5ab	7.3ab	5.6 b
Aroma	5.9 a	5.7ab	6.7ab	4.7 b
Texture	6.1 a	5.6 a	7.0ab	5.3 b
Taste	6.1 a	6.3 a	6.8 a	5.0 a
Method *Bayes*				
Alternative Value	6.62	5.88	7.00	5.31

The results of Preferredtes (hedonic) based on four parameters are color, aroma, texture and taste of wet noodles with the addition of bonylip barb protein concentrate has a value range of 7.3 to 4.7. Of the four treatments the panelists most favored were the 5% treatments with the highest average of 7.3 to 6.7. Control treatments (0%) to 7.5% are still accepted and preferred by panelists. Based on the *Bayes* Method the alternative value of preference panelists is the largest value of 7.00 at the addition of 5% fish protein concentrate.

4.   CONCLUSIONS

Based on research results, the most preferred or best treatment is the addition of fish protein concentrate of 5%. The addition of 5% bonylip barb protein concentration gave the greatest average compared to other treatments on organoleptic characteristics. In addition, the resulting alternative value has the highest value of 7.00.

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