Global Scientific JOURNALS

GSJ: Volume 7, Issue 11, November 2019, Online: ISSN 2320-9186
www.globalscientificjournal.com

EFFECT OF ADDITION BONYLIP BARB PROTEIN CONCENTRATE ON BROWNIES PREFFERED LEVEL

Sandra Amalia[1]*, Junianto[2], Rosidah[2], Iis Rostini[2]

[1]) Student of Faculty of Fisheries and Marine Science, Universitas Padjadjaran, Bandung – Sumedang KM 21 Jatinangor 45363, Indonesia
**Email: amaliasandraa12@gmail.com*
[2]) Lecture of Faculty of Fisheries and Marine Science, Universitas Padjadjaran, Bandung – Sumedang KM 21 Jatinangor 45363, Indonesia
Email: anto_lisc@yahoo.com

KeyWords
Bonylip barb protein concentrate, brownies, preference level

ABSTRACT

Brownies is a cake made from flour, has a blackish brown color with a distinctive sweet taste of chocolate. The addition of bonylip barb protein concentrate (FPC) to brownies is expected to be able to produce brownies with higher protein nutrient content and is preferred by panelists. This study aims to determine the amount of bonylip barb protein concentrate that can be added in to produce the most preferred brownies. This study was conducted in March-August 2019 at the Laboratory of Fisheries Product Processing, Faculty of Fisheries and Marine Science, Padjadjaran University. The method used is an experimental with 4 treatments of bonylip barb protein concentrate addition at 0%, 7,5%, 10% and 12,5%. The parameters observed consisted of organoleptic characteristics which include color, aroma, texture and taste of brownies. The results showed that 10% addition of bonylip barb protein concentrate produces the most preferred brownies with color hedonic mean value 7,6, an aroma 6,9, texture 7,2 and taste 7,8.

INTRODUCTION

The level of protein consumption in Indonesia is generally lower than the level of carbohydrate and fat consumption. Based on the analysis of Basic Health Research data (2010), the range of distribution of macro-nutrient energy from the consumption patterns of the Indonesian population is 9-14% protein energy, 24-36% fat energy and 54-63% carbohydrate energy [2]. Deficiency of protein consumption will have an impact on the decline in the immune system which results in easy pathogenic microorganisms or infections entering the body [10].

Protein needs can be fulfilled by consuming foods that contain protein, one of which is fish. Fish is one source of animal protein which has a protein content of 18 to 20%. One type of fish with a high protein content is bonylip barb. Bonylip barb or nilem fish is an Indonesia native fish that has been widely cultivated. However, the use of these fish is still low because bonylip barb has many thorns so that it is less desirable to be consumed directly.

One of the utilization of bonylip barb is by processing it into fish protein concentrate. Fish protein concentrate (FPC) is a processed fish product in the form of flour made by separating fat and water from the body of the fish for human consumption where the protein content is higher [3]. FPC can be used as a food product fortification as well as an alternative to increase the nutritional value of protein in food products. Brownies were chosen as an alternative product added with bonylip barb protein concentrate because brownies are a popular cake that many people like, ranging from children to adults.

MATERIAL AND METHODS

Place and Time

This study was conducted in March-August 2019 at the Laboratory of Fisheries Product Processing, Faculty of Fisheries and Marine Science, Padjadjaran University.

Materials and Tools

The tools used in this study are knives, cutting boards, blenders, food processors, measuring cups 50 ml, cloth, stove, sieve, digital scales, oven, pan, spoon, and mixer. The materials used in this study are bonylip barb meat, hexane, water, salt, $NaHCO_3$, wheat flour, margarine, eggs, sugar, chocolate bars and cocoa powder.

Research Method

The method used in this research is an experimental method consisting of four treatments. The treatment of adding bonylip barb protein concentrate to brownies is as follows:

Treatment A: Without the addition of bonylip barn protein concentrate - 0%
Treatment B: Bonylip barb protein concentrate addition – as much as 7,5%
Treatment C: Bonylip barb protein concentrate addition – as much as 10%
Treatment D: Bonylip barb protein concentrate addition – as much as 12,5%

The formulation of materials for making brownies can be found in the Table 1.

Table 1. Formulation of Making Brownies

Materials	0%	7,5%	10%	12,5%
Wheat Flour (g)	100	100	100	100
Bonylip Barb Protein Concentrate (g)	0	7,5	10	12,5
Sugar (g)	95	95	95	95
Egg (item)	2	2	2	2
Margarine (g)	70	70	70	70
Chocolate Bars (g)	90	90	90	90
Cocoa Powder (g)	30	30	30	30

Source: Setiawati *et al.* 2015 (modified)

The procedure for making brownies by adding bonylip barb protein concentrate based on Setiawati et al. (2015) modified as follows:

- The materials are weighed according to the formulation

- 95 g of sugar and 2 eggs put in a basin, then stirred using a mixer for 10 minutes until the mixture is homogeneous
- Then 100 g of wheat flour, 30 g of bonylip barb protein concentrate and cocoa powder are added to the basin and stirred again with a mixer until homogeneous
- As much as 90 g chocolate bars that have been melted with 70 g margarine are added, then stirred using a spoon
- Then dough is put into a baking sheet and baked in an oven at 160^{o}C for 35 minutes.
- After cooked, brownies are removed from the oven and then cooled.

Parameter Observed

The parameters observed in this research are the characteristics of organoleptic brownies which include color, aroma, texture and taste. Organoleptic characteristics were tested using a hedonic test with 20 semi-trained panelists consisting of students from the Faculty of Fisheries and Marine Sciences, Universitas Padjadjaran.

Data Analysis

Organoleptic observation data were analyzed using non-parametric statistics, namely two-way variant analysis of Friedman's test. Friedman test was conducted to determine the effect of the treatment of the addition of bonylip barb protein concentrate on the level of preference. Friedman's Test formula is as follows:

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

Description:

X2 : Friedman Test Statistics
N : Repeat
K : Treatment
Rj : Total ranking of each treatment

Then to determine the best treatment by considering the four parameters (color, taste, aroma and texture) the Bayes method was used. The results of Bayes test will show that the element that has the highest priority value is the one most preferred by the panelists. Bayes equation is as follows:

$$XG = \sqrt[n]{\sqcap . Xi}$$

Description:

XG : Geometric average
⊓ : Permutation
N : Number of panelists
Xi : Rating from the 1st panelist

RESULT AND DISCUSSION

Level of Preference for the Color of Brownies

Color is an element of consumer's initial assessment of a food product that is served. The results of the hedonic test analysis using the Friedman test showed that the addition of the bonylip barb protein concentrate had a significant effect on the color of the brownies.

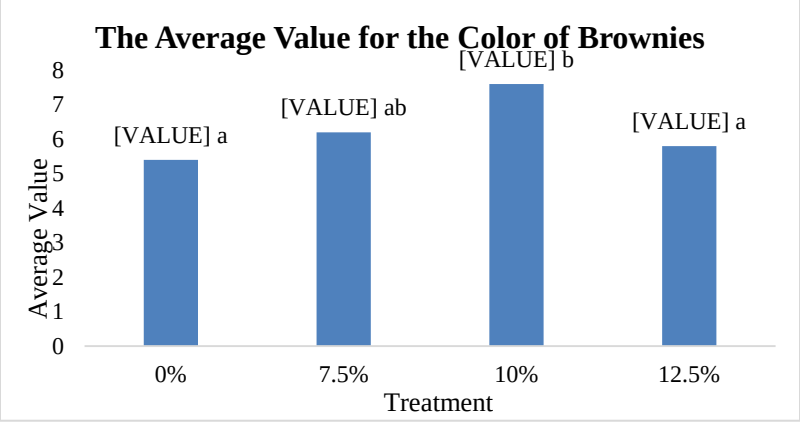

Figure 1. The Average Value for the Color of Brownies

Based on the results of the hedonic test analysis using the Friedman test showed that the addition of the bonylip barb protein concentrate has a significant effect on the level of brownies color preference. The average value of brownies characteristic color level can be seen in Figure 1. The highest average value is found in brownies with the addition of 10% bonylip barb protein concentrate which is 7,6, while the lowest average value is found in brownies without the addition of bonylip barb protein concentrates (control) which is 5,4.

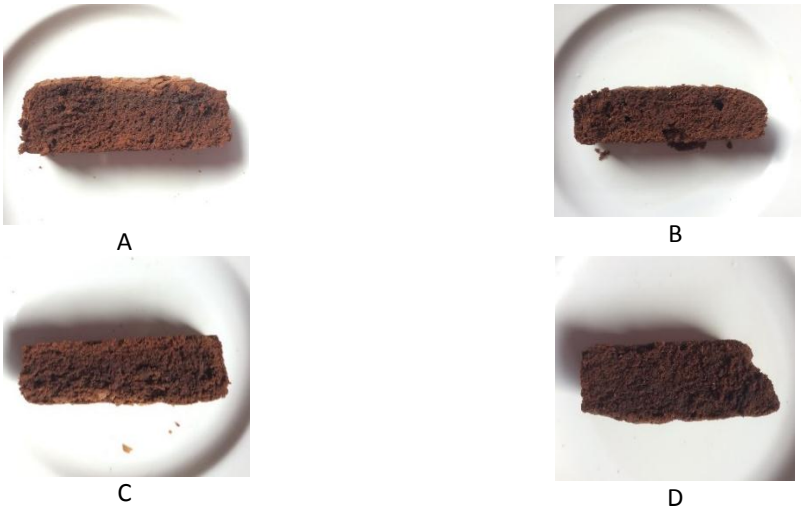

Figure 2. Color of Brownies with the addition of bonylip barb protein concentrate:
A (0%); B (7,5%); C (10%); D (12,5%)

The color of the brownies tended to be darker. The observations showed that the addition of bonylip barb protein concentrate to the brownies can make the brownies turn dark brown. The decrease in the color brightness of the brownies is due to the greater content of the bonylip barb protein concentrate added for each treatment. The treatment with the addition of 10% bonylip barb protein concentrate is the most preferred treatment for panelists because the brownies produced in this treatment have a blackish brown color, while the treatment with the addition of 12,5% bonylip barb protein concentrate shows a decrease in the level of brownies color preference because the brownies produced in the treatment have a blackish color.

The decrease in the level of brightness occurs because high protein levels can increase the risk of maillard reactions [9]. In addition, the roasting process and the use of chocolate can dominate the color of chocolate produced. The difference in color of each treatment can be seen in Figure 2.

Level of Preference for the Aroma of Brownies

Aroma also has important functions that are used in the food industry to improve taste and generally increase the attractiveness of these food products [1]. The results of observations of aroma by panelists can be seen in Figure 3.

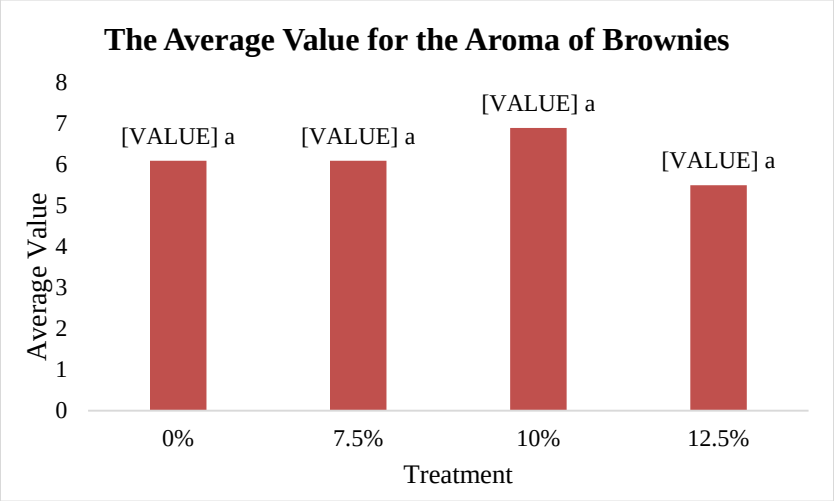

Figure 3. The Average Value for the Aroma of Brownies

Based on the results of the hedonic test analysis using the Friedman test showed that the addition of the bonylip barb protein concentrate did not significantly affect the aroma of the brownies. The highest average aroma value was in the treatment of adding 10%

bonylip barb protein concentrate which is 6,9, while the lowest average aroma value was in the treatment of adding 12,5% bonylip barb protein concentrate which is 5,5 (Figure 3).

The treatment with the addition of 10% bonylip barb protein concentrate produces brownies with a distinctive aroma of brownies that are not mixed with the aroma of fish. While in the treatment with the addition of 12,5% bonylip barb protein concentrate produces a distinctive aroma of brownies with only a slight scent of fish.

This happens because the protein concentrate of the nilem does not give off a fish's unique odor that can affect the aroma of brownies. In addition, the aroma is not only determined by one factor, there are other factors that can cause aroma, one of which is the use of raw materials for making brownies, namely chocolate [4]. Chocolate powder and chocolate bar when melted will cause a sharp chocolate aroma, so that the odor of the protein concentrate patch on the brownies is covered by the aroma of chocolate.

Level of Preference for the Texture of Brownies

Texture is a characteristic of a material as a result of a combination of several physical properties which include size, shape, amount and elements of material formation which can be felt by the sense of touch and taste, including the sense of sight [6]. Texture is also one of the important factors for consumers in giving an assessment of a product.

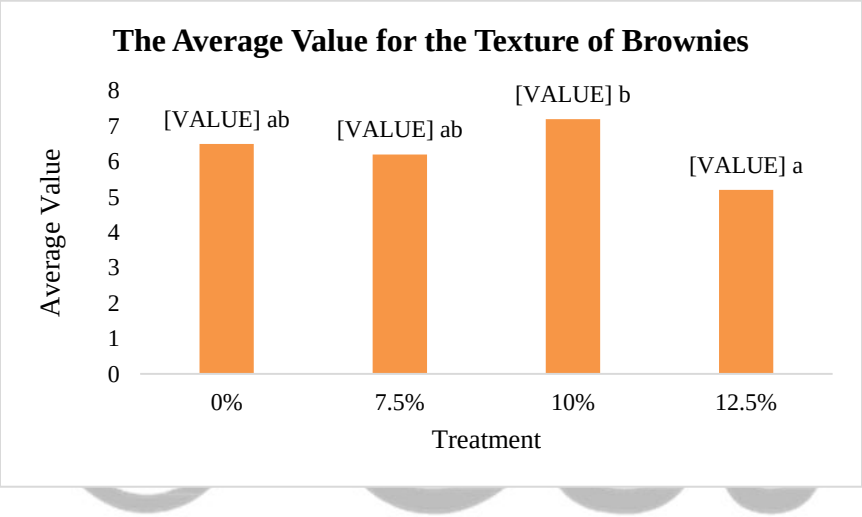

Figure 4. The Average Value for the Texture of Brownies

Friedman statistical test shows that the addition of bonylip barb protein concentrate to brownies has a significant effect on the level of brownie texture preference. The hedonic test analysis results obtained an average value of brownie texture preference level ranged from 5,2 to 7,2 (Figure 4). The highest average value is in the treatment of adding 10% bonylip barb protein concentrate which is 7,2, while the lowest average value is in the treatment of adding 12,5% bonylip barb protein concentrate which is 5,2.

The addition of 10% bonylip barb protein concentrate is the most preferred treatment for panelists because it produces a soft and slightly denser brownie texture. While the addition of 12,5% bonylip barb protein concentrate showed a decrease in the level of panelists' preference because the texture of the brownies produced in the treatment became more dense and harder.

This shows that the more addition of bonylip barb protein concentrate to the brownies will make the texture of the brownies become solid. The texture of brownies is influenced by the amount of flour used, the higher the amount of flour used, the stronger the texture of brownies produced [8].

Level of Preference for the Taste of Brownies

Taste is a parameter that involves the five senses of the tongue and is a factor that determines the final decision of consumers to accept or reject a food product [5]. One factor that determines the quality of a food product is taste. The results of observations of taste by panelists can be seen in Figure 5.

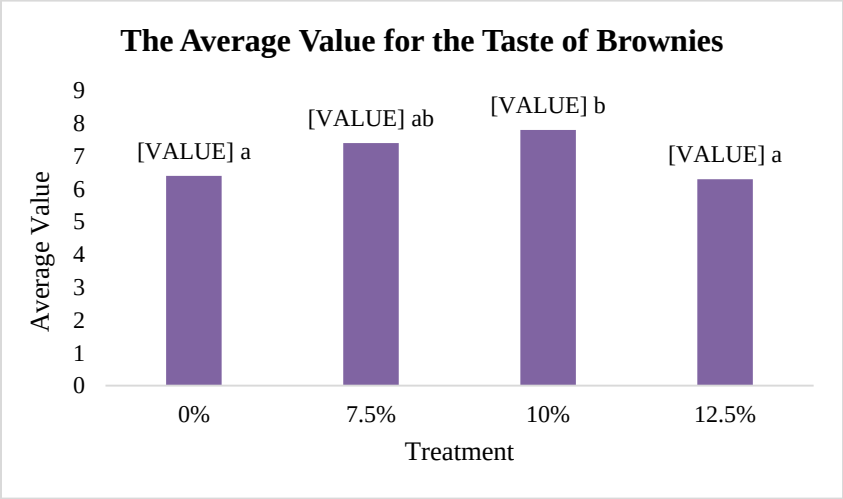

Figure 5. The Average Value for the Taste of Brownies

Friedman statistic test showed that the addition of bonylip barb protein concentrate to brownies significantly affected the taste level of brownies. The hedonic test analysis results obtained an average value of the level of brownies taste preferences ranging from 6,3 to 7,8 (Figure 5). The highest average value was in the treatment of adding 10% of bonylip barb protein concentrate which is 7,8, while the lowest average value was in the treatment of adding 12,5% of bonylip barb protein concentrate which is 6,3.

In the treatment of adding 10% bonylip barb protein concentrate produced brownies with a delicious, sweet taste, specific taste of brownies and no fish taste in brownies. Meanwhile, in the treatment of adding 12,5% bonylip barb protein concentrate produced brownies with a sweet taste, but it was rather dense when eaten and there was little taste of fish thus reducing the level of panelists preference.

In brownies, the taste of bonylip barb is not very strong, this is due to the taste of fish from the bonylip barb protein concentrate in brownies covered with other raw materials from making brownies, one of which is chocolate. The taste produced from brownies is dominant with the sweet taste resulting from the use of chocolate bars and powdered chocolate.

Bayes Test

Table 2. Criteria Value of Brownies with Addition of Bonylip Barb Protein Concentarte

Criteria	Value of Criteria
Color	0,14
Aroma	0,16
Texture	0,17
Taste	0,53

Based on calculation of the value criteria for color, aroma, texture and taste of brownies can be seen in Table 6. Based on the results of the calculation, the highest criterion weight value is found in the flavor parameter that is 0,53, while the lowest criteria weight is color that is 0,14. This shows that the taste parameter is the most important parameter according to panelists in choosing brownies products with the addition of bonylip barb protein concentrate. Furthermore, the assessment decision matrix with the Bayes method can be seen in Table 2.

Table 2. Assessment Decision Matrix via Bayes Method.

Treatment	Criteria				Alternative	Priority
	Color	Aroma	Texture	Taste	Value	Value
0%	5	6	7	7	6,56	0,25
7,5%	7	6	5	7	6,50	0,24
10%	7	7	7	9	**8,06**	**0,30**
12,5%	5	5	5	6	5,53	0,21
Total	0,14	0,16	0,17	**0,53**	26,65	1,00

Based on calculations using the Bayes method, the results showed that brownies with the addition of the bonylip barb protein concentrate in all treatments were still acceptable or preferred by the panelists. The highest alternative value (8,06) was found in the treatment of adding 10% bonylip barb protein concentrate with a weight value of taste criteria (0,53). Data from the Bayes method shows that taste is the most important criterion in the panelists final decision regarding the level of panelist preference in this research.

Conclusion

The most preferred product by panelists was brownies with the addition of a 10% bonylip barb protein concentrate with an average hedonic value of color 7,6, aroma 6,9, texture 7,2 and taste 7,8.

References

[1] Antara, N dan Wartini. 2014. Aroma dan Flavor Compounds. *Tropical Plant Curriculum Project*. Udayana University.

[2] Basic Health Research (RISKESDAS). 2010. Health Research and Development Agency Ministry of Health Republic of Indonesia. Jakarta.

[3] Dewita dan Syahrul. 2010. Quality Study of Catfish Protein Concentrate (*Pangasius* sp.) Processed with Different Methods During Room Temperature Storage.. *Journal Natur Indonesia in press*.

[4] Fatullah, A. 2013. The Difference of Canna Flour Brownies and Wheat Flour Brownies in Terms of Inderawi Quality and Nutrition Content. *Thesis*. Semarang State University. Semarang.

[5] Suprianto, M. Ilza dan Syahrul. 2015. Study of Consumer Acceptance of Malong Fish Meatballs (*Muarenesox talabon*) with Different Binding Materials. *Online Student Journal*.

[6] Midiyanto, D. dan Yuwono. 2014. Determination of Quality Tofu Texture Attributes To Be Recommended as Additional Requirements in Indonesian National Standards. *Journal of Food and Agroindustry*. 2(4): 259-267.

[7] Setiawati, A. Rahimsyah dan Ulyarti. 2015. Study on Making Fiber-Rich Brownies from Coconut Pulp Flour. *Journal of Jambi University Science Research Series*. 17(1): 84-89.

[8] Setyani, S., S. Astuti dan Florentina. 2017. Substitution of Corn Flour in Making Wet Noodles. *Journal of Industrial Technology and Agricultural Product*. 22(1): 1-10.

[9] Sumarna, D. 2008. Effect of the Proportion of Broken Kangaroo Rice and Corn Skin on the Quality of the Puffed Cereals Produced. *Journal of Agricultural Technology*. 4(1): 41-47.

[10] Susanto, H. dan Maslikah. 2011. Nutritional Effects of NTT Moringa Leaf (*Moringa oleifera*) Flour Varieties on Wistar Rats Levels of Protein Energy Less. *Scientific Publication of the 2011 MIFA National Seminar*.