Global Scientific JOURNALS

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

THE PROXIMATE ANALYSIS OF BROWNIES WITH ADDITION OF BONYLIP BARB PROTEIN CONCENTRATE

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KeyWords
Bonylip barb protein concentrate, brownies, proximate analysis

ABSTRACT

This research aims to obtain the composition of proximate brownies with the addition of bonylip barb protein concentrate. Proximate parameters observed were water content, protein content, fat content and ash content using the Association of Official Analytical Chemists (AOAC) method. This research was conducted in March-August 2019 at the Laboratory of Fishery Product Processing, Faculty of Fisheries and Marine Sciences, Univeristas Padjadjaran and Laboratory of Chemistry Research, PPBS, Padjadjaran University. The method used is an experimental method with the treatment of the addition of 10% bonylip barb protein concentrate. The results of the research on the proximate test of bonylip barb protein concentrate showed that brownies contained 17,19% water content, 8,02% protein content, 14,37% fat content and 1,20% ash content.

INTRODUCTION

Currently, food products with the addition of processed fish products have been carried out. One of them is the addition of fish protein concentrate (FPC) to various food products such as biscuits and noodles. Other food products that can increase the nutritional value of protein by adding fish protein concentrate are brownies. Brownies are one of the cakes that are popular among the people and are often used as a snack because it has a delicious and sweet taste.

Fortification of brownie products has been done a lot, but brownies fortified with fishery products, especially fish protein concentrates are still rarely found. Hayati et al. (2014) made brownies fortified with pangas catfish protein concentrate with the aim of increasing the nutritional content of proteins in brownies [6]. More fish protein concentrate fortification with different types of fish should be developed into brownies. The use of different types of fish will certainly affect the protein content of the brownies.

The type of fish protein concentrate that is added to the brownies is the bonylip barb protein concentrate. Bonylip barb has a protein content of 15,99% [8]. Adding fish protein concentrate to the brownies will certainly increase the proximate content of the brownies. However, it is not yet known how much proximate brownies content has been added to the bonylip barb protein concentrate. Therefore, research on proximate analysis brownies with the addition of bonylip barb protein concentrate needs to be done.

MATERIAL AND METHODS

Place and Time

This research was conducted in March - August 2019 at the Laboratory of Fishery Product Processing, Faculty of Fisheries and Marine Sciences, Padjadjaran University for making brownies and at the Laboratory of Chemical Research, PPBS, Univeritas Padjadjaran for proximate analysis.

Materials and Tools

The tools used in this research are knivs, cutting board, blender, food processor, measuring cup, cloth, stove, sieve, scale, oven, mixer, tray and spoon. The materials used in this research are bonylip barb meat, water, hexane, 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. The treatment used was the treatment of adding bonylip barb protein concentrate to the flour-based brownies used.

1. Treatment A (control): without the addition of bonylip barb protein concentrate (0%)
2. Treatment B: addition of 10% bonylip barb protein concentrate

The formulations used in making brownies refers to Setiawati et al. (2015) research with modified. The formulation are follows:

Table 1. Formulation of making brownies

Formulation	0%	10%
Wheat flour (g)	100	100
Bonylip barb protein concentrate (g)	0	10
Sugar (g)	95	95
Egg (item)	2	2
Margarine (g)	70	70
Chocolate bars (g)	90	90
Cocoa powder (g)	30	30

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

The procedure for making brownies based on Setiawati et al. (2015) modified as follows [9]:

- 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

Chemical testing is done by proximate analysis with the aim to determine the nutritional value of brownies. Proximate analysis observed was water content, ash content by the gravimetric method, fat content by the Soxhlet method and protein content by the kjeldahl method [2]. After obtaining the nutritional content of brownies then compared with SNI 01-3840-1995 to determine the nutritional content of brownies control and brownies with addition of 10% bonylip barb protein concentrate.

Water Content

Porcelain dishes are dried in the oven for 1 hour at 105^{o}C then cooled in a desiccator for 30 minutes then weighed to a constant weight. A sample of 2 g was weighed, then put in a porcelain cup and dried in a 105^{o}C oven for 5 hours. The cup containing the sample after drying is then cooled in a desiccator for 30 minutes and weighed to a constant weight. If a constant weight has not been obtained, the porcelain cup is heated again in the oven (105^{o}C) for 30 minutes. The formula for calculating water content is as follows.

$$\text{Water content (\%)} = \frac{initial\ weight - final\ weight\ (g)}{sample\ weight\ (g)}\ x\ 100\%$$

Protein Content

Step in testing the protein content, which consists of: these which consist of: 1) Destruction. The sample was weighed 1-5 g and then put into the kjeldahl flask and added with the selenium kjeldahl tab and 10 ml H_2SO_4. Pumpkin is placed in a heater with a temperature of 400^{o}C in an acid chamber. Destruction is done until the solution becomes clear (1-1.5 hours). The product is then cooled and diluted with distilled water slowly until it reaches 100 ml. 2) Distillation. The result of decstruction is 10 ml pipette and put in distillation flask. Erlenmeyer 125 ml containing 25 ml of H_3BO_3 solution (boric acid) and 2-4 indicator drops (a mixture of 2 parts methyl red 0.1% in alcohol and 1 part Brown Cresol Green (BCG) 0.1% in alcohol) are placed just before distillation begins. The tip of the condenser must be submerged under a solution of boric acid. Destructive samples were added to 8-10 ml NaOH solution then distilled until bluish green. 3) Titration Distillation titration using 0.01 N HCl solution until the solution is pink. The formula for calculating protein content according to is as follows:

$$\text{Nitrogen Content (\%)} = \frac{Titration\ Volume\ x\ N\ HCl\ x\ BM\ N}{mg\ sample}\ x\ 100\%$$

$$\text{Protein Content (\%)} = \text{Nitrogen Content x 6,25}$$

Fat Content

Volumetric flask is dried in the oven at 105^{o}C, then weighed to a constant weight. A sample of 2 g was wrapped in fat-free filter paper and then put into a fat sleeve. The cartridge is inserted into the Soxhlet tube. As much as 150 ml of chloroform is put into the fat flask. The sample is refluxed for eight hours, when the solvent looks clear indicating all the fat has been extracted. The solvent in the fat flask is then evaporated to separate the solvent and fat after it is dried in a 105^{o}C oven for 30 minutes. volumetric flask fat is then weighed until a constant weight is obtained. The formula for calculating fat content is as follows.

$$\text{Fat content (\%)} = \frac{last\ \text{volumetric flask weight} - initial\ \text{volumetric flask weight}\ (g)}{Sample\ weight\ (g)}\ x\ 100\%$$

Ash Content

Porcelain dishes are dried in an oven for one hour at 105^{o}C, cooled for 30 minutes in a desiccator and weighed to a constant weight. The sample was weighed as much as 2 g then put in a porcelain cup and flattened on an electric stove until it became charcoal. Porcelain cup containing sample that has become charcoal is put into a muffle with a temperature of 600^{o}C for 6 hours until it becomes a whitish ash, the muffle is left until it shows room temperature, then just opened the lid. Porcelain plates are cooled by placing them in an oven at 105^{o}C for 1 hour and then put in a desiccator until they cool. Porcelain plates that have been cooled are then weighed. The formula for calculating ash content is as follows.

$$\text{Ash content (\% db)} = \frac{Ash\ weight\ (g)}{Dry\ sample\ weight\ (g)}\ x\ 100\%$$

RESULT AND DISCUSSION

Chemical characteristics analyzed include water content, protein content, fat content and ash content. Chemical characteristics were tested by proximate testing carried out on control brownies and 10% patchouli kpi treatment. Proximate test results can be seen in Figure 1.

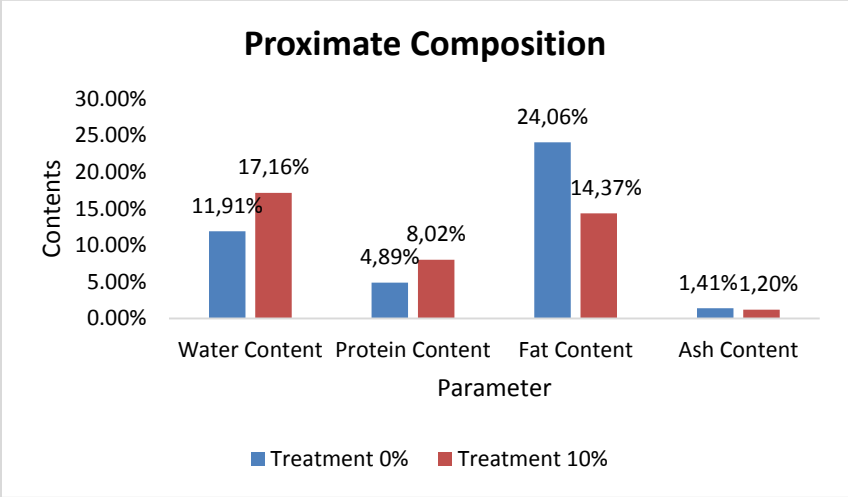

Figure 1. Proximate Composition of Brownies

Water Content

Water content is one of the most important characteristics of food because water can affect the appearance, texture and taste of food [7]. Based on the results of proximate tests that have been carried out, the water content of brownies in the control treatment (without the addition of bonylip barb protein concentrate) and the treatment of the addition of 10% bonylip barb protein concentrate respectively are 11,91% and 17,16%. The water content of the brownie treatment was 10% higher than the control treatment. This can occur because the bonylip barb protein concentrate still contains water content, so that the addition of bonylip barb protein concentrate in making brownies can increase the amount of water content in brownies.

The water content of the brownies still meets the quality requirements based on SNI 01-3840-1995, namely the maximum water content of the brownies is 40%. However, water content of more than 8% in food has less stability in the storage and growth of microorganisms. The food materials with a moisture content of less than 8% can reduce the growth of microorganisms and damage chemical reactions, such as hydrolysis and fat oxidation [12].

Protein Content

The existence of protein is very important for the human body, because protein is a macro nutrient that has a function as a builder, regulator and repair damaged body system [4]. Based on the results of proximate tests that have been carried out, the levels of protein brownies in the control treatment (without the addition of bonylip barb protein concentrate) and the treatment of the addition of 10% bonylip barb protein concentrate are 4,89% and 8,02%, respectively. Brownies with the addition of bonylip barb protein concentrate produce higher protein content than protein brownie levels without the addition of bonylip barb protein concentrate. This is because fish protein concentrate has a high protein content with a protein content reaching 78,24%.

However, based on research that has been done, the protein content of the bonylip barb protein concentrate brownies is not as large as the protein content present in the brownies pangas catfish protein concentrate. Based on research by Hayati et al. (2014) in the treatment of adding 10% pangas catfish protein concentrate, resulting in a protein content in brownies of 19,27%. This can happen because the initial levels of protein in pangas catfish are higher than bonylip barb, so it will affect the nutritional content of the resulting brownie protein. The nutritional content of pangas catfish according to KEPMENKP (2014) is 68,6% [5]. Meanwhile, bonylip barb has a protein content of 15,99% [8].

Fat Content

Fat is usually found in almost all foods with varying contents. The addition of fat into food aims to add calories and improve the texture and flavor of a food [13]. Based on the results of proximate tests that have been carried out, the fat content of brownies in the control treatment (without the addition of bonylip barb protein concentrate) and the treatment of the addition of 10% bonylip barb protein concentrate are 24,06% and 14,37%, respectively. Fat content in brownies comes from margarine and oil used in the manu-

facturing process.

Brownies in the treatment of the addition of 10% bonylip barb protein concentrate contain lower fat content compared to brownies in the control treatment. This can occur because fish protein concentrate contain low fat content. Based on the results of proximate tests on the bonylip barb protein concentrate, the fat content in the bonylip barb protein concentrate is only 0,42%. Meanwhile, according to Dewita et al. (2011), the fat content in the pangas catfish protein concentrate is 2,79% [3].

Ash Content

Ash content is a mixture of inorganic components or minerals that found in a food [1]. A food consists of 96% inorganic material and water, while the rest are mineral elements. Based on the results of proximate tests that have been carried out, the brownies ash content of the control treatment (without the addition of bonylip barb protein concentrate) and the treatment of the addition of 10% bonylip barb protein concentrate are 1,41% and 1,20%, respectively. Ash content in brownies still meets brownies quality requirements based on SNI 01-3840-1995, with a maximum ash content of brownies of 3%.

According to Dewita et al. (2011) ash content can indicate the amount of minerals contained in these foodstuffs [3]. Ash content in food products is very limited in number. If a food contains high ash content, then the food product has a very high potential for human consumption [11].

Conclusion

Brownies with the addition of 10% bonylip barb protein concentrate from 100 grams of wheat flour produce brownies with a value of water content of 17,19%, protein content of 8,02%, fat content of 14,37% and ash content of 1,20%.

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