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THE PROXIMATE ANALYSIS OF ADDITION OF NILEM FISH PROTEIN CONCENTRATES ON BISCUITS

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ABSTRACT

Nilem (*Osteochilus hasselti*) is an endemic fish (native) of Indonesia that lives in fresh waters, such as rivers and swamps. Biscuits with the addition of nilem protein concentrate can be high protein foods, but the addition of nilem fish protein concentrate to biscuits can affect organoleptic quality such as color, aroma, texture, and taste. This research aims to determine the proximate composition of biscuits with the addition of nilem protein concentrate. The design used is a non-factorial Completely Randomized Design (CRD), with four levels of treatment namely without the addition of nilem protein concentrate, addition of nilem protein concentrate 7,5%, addition of nilem protein concentrate 10%, and addition of nilem protein concentrate 12,5%. The parameters tested were proximate analysis including water, ash, protein and fat content. Based on proximate analysis, biscuits with the addition of nilem protein concentrate have a water content of 3.72%, ash content of 1%, protein content of 22.34% and fat content of 20.95%.

Keywords : Biscuits, Nilem Protein Concentrates, Proximate Analysis.

1. INTRODUCTION

Nilem (*Osteochilus hasselti*) is a type of freshwater fish native to Indonesia which is widely available in West Java. Nilem has the advantage that nilem eggs can be used in the field of fisheries processing and this fish is quite popular because of its delicious, chewy and savory meat [5]. Nilem has decreased in population due to lack of use from the community. This is because nilem has many thorns in the flesh and is difficult to remove.

Fish protein concentrate as a form of food for human consumption is made from whole fish or its parts, by removing most of the fat and water so that the protein content of the product is higher than the fresh material [4]. FPC has high protein content making it suitable for adding low-protein food products. One of the low protein products is biscuits.

Biscuits are one type of pastry made from flour and processed by roasting process until the water content of the product is not more than 5% [1]. Biscuits were chosen as an alternative to the product added to the nilem protein concentrate because commercial biscuits had relatively low protein content.

Nutritional value of biscuits added by nilem protein concentrate not yet known by the public. Therefore it is necessary to do proximate testing of biscuits added to the nilem protein concentrate. Proximate testing on biscuits is intended to determine the effect of adding nilem protein concen to the nutritional content of biscuits. Proximate testing on biscuits consists of water, protein, fat and ash content.

2. MATERIALS AND METHODS

2.1 Time and Place

The research was conducted in March-August 2019 at the Laboratory Fisheries Product Processing, Faculty of Fisheries and Marine Science, Padjadjaran University for making biscuits and proximate analysis at the Laboratory of Chemical Research, PPBS, Univeritas Padjadjaran

2.2 Materials and Tools

The tools used in the process of making protein concentrates of nilem fish are : Digital Scales, Knives, Meat Grinder for smoothing fish meat, food processor, spoon, measuring cup capacity of 50 ml, cutting board, glass jars, calico cloth, mixer, oven, sifter (100 mesh), grinder, baking pan. Ingredients used in the process of making protein concentrate for nilem are: fresh nilem fish obtained from Majalaya, hexane, $NaHCO_3$, NaCl, wheat flour, butter, sugar, vanilla, water, eggs, full cream milk, baking powder.

2.3 Research Methods

The level of preference for biscuits was analyzed by Friedman's non-parametric statistical method consisting of 4 treatments and 20 semi-trained panelists as a test. The treatment of adding nilem protein concentrate to biscuits is as follows:

Treatment A (control) : Without the addition of nilem protein concentrate (0%).
Treatment B : 10% addition of nilem protein concentrate.

The formulation for making biscuit can be found in Table 1.

Table 1.Formulation of making Biscuits by Adding Nilem protein concentrate

Material for	Biscuit FPC			
	A	B	C	D
Flour (g)	100	100	100	100
FPC (g)	-	7.5	10	12.5
Butter (g)	35	35	35	35
Sugar (g)	20	20	20	20
Egg Yolk (g)	10	10	10	10
Milk (g)	2.5	2.5	2.5	2.5
Baking Powder (g)	0.2	0.2	0.2	0.2
Vanilla (g)	1	1	1	1
Total	168.7	173.5	178.7	183.5

Source: Soedarmo (1998) which has been modified

The research procedure for making biscuits by adding nilem fish protein concentrate according to Sunaryo (1985) modified by Hiswaty (2002) is as follows: Eggs sugar, margarine, beaten until fluffy for 15 minutes until homogeneous. Wheat flour, vanilla, baking powder, milk are put in the dough. After that it is printed and baked in a 155 ° C oven for 20 minutes then it becomes a biscuit.

2.4 Data Analysis

Obtained in the form of organoleptic data and proximate data. Proximate measurement data were analyzed descriptively. Proximate data were analyzed by comparative descriptive. Comparative descriptive method, namely the results of research and analysis described in a scientific paper in the form of a narrative and then conclusions are drawn from the analysis that has been done.

Water Content

The porcelain cup to be used is dried in an oven at a temperature of 105-110 ° C for 15 minutes, then the cup is placed in a desiccator for 30 minutes and weighed until a constant weight (A) is obtained. A sample of 2 grams was weighed and placed in a dried cup (B), then heated in an oven at 105-110 ° C for 3-4 hours. After completion, the plates are cooled in a desiccator for 30 minutes and after they cool, they are weighed again (C). This stage is repeated until a constant weighting is achieved. Moisture content can be calculated with the following formula:

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

Ash Content

The cup to be used is oven for 30 minutes at 100 to 105ºC, then cooled in a desiccator to remove moisture and weighed (A). The sample was weighed as much as 5 g in a dried cup (B) then burned on the flame of the burner until it was not smoky and continued with ashes in the furnace at 550-600ºC until complete graying. Samples that have been refrigerated are desiccated and weighed (C). The combustion stage in the furnace is repeated until a constant weight is obtained. Ash content is calculated by the formula:

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

Fat Content

The fat flask to be used is roasted for 15 minutes at 105ºC, then cooled in a desiccator to remove moisture for 15 minutes and weighed (A). The sample was weighed as much as 5 grams (B) and then wrapped in lead paper, covered with fat-free cotton and put into a Soxhlet extraction device that had been connected with a flask of fat that had been roasted and known for its weight. The hexane solvent is poured until the sample is submerged and fat reflux or extraction is carried out for 5-6 hours or until the fat solvent is dropped into a clear fat flask. The fat solvent that has been used is distilled and collected after that the fat extract in the fat flask is dried in an oven at 100-105ºC for 10 minutes, then the fat flask is cooled in a desiccator for 15 minutes and weighed (C). The drying step of the fat flask is repeated until a constant weight is obtained. Fat content is calculated by the formula:

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

Protein Content

The method for determining protein content is based on the Kjeldahl method. The principle of protein analysis by the Kjeldahl method includes destruction, distillation and titration. At the digestion stage, the sample was weighed 0.1-0.5 g and then put into the Kjeldahl flask, after that 40 mg HgO, 1.9 mg KSO and 2 ml HSO were also inserted into the flask. The flask containing the solution is placed in a heater with a temperature of 430°C in the acid chamber. Destruction is done until the solution becomes clear (1-1.5 hours). The product is cooled and diluted with 10-20 ml of distilled water slowly. The distillation stage begins with the preparation of the Kieltec system tool. Put the 125 ml erlenmeyer containing 5 ml of HBO (boric acid) solution and 2-4 indicator drops (a mixture of 2 parts red methyl 0.2% in alcohol and 1 part blue methylene 0.2% in alcohol), just before the distillation begins. Add the destruction sample that has been transferred with 8-10 ml of NaOH-NaSO (sodium thiosulfate) solution. then do the distillation until it holds about 15 ml distillate in erlenmeyer. Dilute the erlenmeyer contents to about 50 ml. Next enter the titration stage. Titration was carried out on samples that had been distilled by dripping 0.02 N HCl from a burette. Titration is done until the color of the sample solution turns pink. The HCl volume used is recorded.

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

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

3. RESULTS AND DISCUSSION

Based on test results of organoleptic tests on the color, aroma, taste and texture of biscuits added to the concentration of nilem fish protein from the assessment of 20 rather trained panelists were as follows.

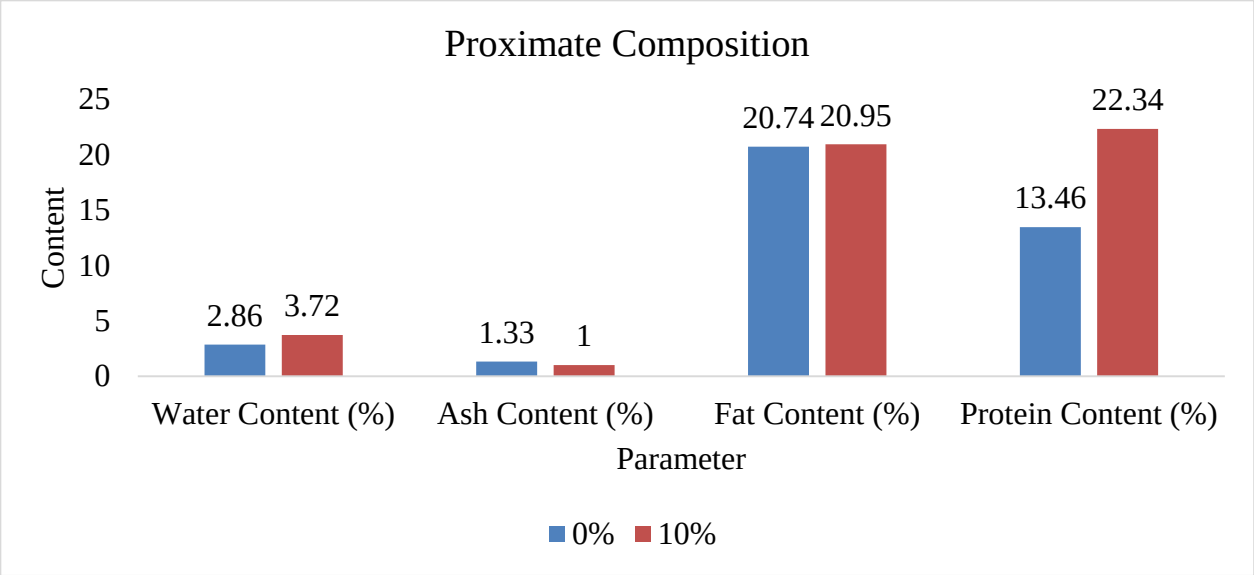

Figure 1. Biscuit Proximate Analysis

3.1 Proximate Analysis

A. Water Content

Water content is very important in determining the durability of food, because it affects physical properties, chemical changes, enzymatic and microbiological food ingredients [2].

Based on observations of the water content of biscuits produced was 2.86% for biscuits without addition of nilem protein concentrate and 3.72% for biscuits with the addition of nilem protein concentrate. The water content of biscuits produced is still below the SNI requirements, so it can be said that the water content of biscuits with the addition of nilem protein concentrate meets the quality requirements of biscuits based on SNI. The water content contained in biscuits with the addition of nilem protein concentrate is caused by the roasting process in the oven causing the water content to decrease. The water content in the biscuits produced tends to increase with the addition of the nilem protein concentrate, this is caused because during the process of making fi nilem protein concentrate there is still water content remaining so that the water content in biscuits with the addition of nilem protein concentrate is higher whereas biscuits without the addition of nilem protein concentrate have lower water content.

The addition of nilem protein concentrate on biscuits affects the increase in water content, so each additional nilem protein concentrate can increase the water content in the biscuits produced. This is because the reduced starch content (gluten) is replaced by nilem protein concentrate.

B. Protein Content

Protein is a very important part because protein functions as forming new cells, replacing cells in damaged tissue and as a source of energy [8]. The addition of nilem protein concentrate is intended to increase the biscuit protein content so as to produce high nutritious biscuits.

Based on observations of biscuit protein content produced was 13.46% for biscuits without the addition of nilem protein concentrate and 22.34% for biscuits with nilem protein concentrate addition.

Biscuit protein levels increase with the addition of nilem protein concentrate flour. Thus the more addition of FPC flour, the protein content in the biscuits increases. This is in accordance with the research of Ningrum et al (2011), the increased protein content in biscuits is due to the increased addition of catfish flour. The protein content of biscuits produced comes from protein concentrates of nilem fish, eggs and wheat flour. The protein content of the biscuits produced is higher than the minimum protein content requirement of SNI.

C. Fat Content

Texture is one of the factors that influence consumer acceptance of fat, which is one of the nutrients for the body and functions as an energy source. The main function of fat in making biscuits is as an emulsifier, but besides that fat also functions as a flavor maker and gives the texture to the biscuits. The source of fat in the biscuits in this research is margarine.

Based on observations of the fat content of the biscuits produced was 20.74% for biscuits treatment of 0% and 20.95% for biscuits with the addition of nilem protein concentrate increased. When compared with the SNI standard (minimum fat content is 9.5%), the fat content in the biscuits meets the SNI standard. Fatty biscuit levels increase with the addition of nilem protein concentrate. Thus the more addition of the nilem protein concentrate, the higher the fat content in the biscuits. Fat content is still present in nilem protein concentrate so that it will affect the fat content of biscuits so that biscuits with fish protein concentrate as much as 10% higher than biscuits without the addition of nilem protein concentrate.

D. Ash Content

Ash content testing is carried out to determine the content of organic ingredients present in biscuit products. Ash content is the residue that remains when the sample is completely burned. The function of the ash content is to know that the higher the ash content of a food, the worse the quality of the food [7].

Based on observations the resulting ash content of biscuits was 1.33% for biscuits and 1.00% for biscuits with the addition of nilem protein concentrate tended to decrease. When compared with the SNI standard (maximum ash content is 1.5%), the ash content in the biscuits meets the SNI standard. Low water content will increase ash content in the product.

The difference in the treatment of nilem protein concentrate addition had no significant effect on the biscuit ash content. So, the addition of nilem protein concentrate flour does not affect the ash content in the biscuits and the relatively small difference in ash content is thought to be due to the raw material used.

3.2 Summary of Observations

The overall results of observation biscuits nilem protein concentrate are presented in Table 2.

Table 2. Summary of ObservationsNilem Fish Protein Concentrate

Observations	On average treatment Addition Fish Protein Concentrate Nilem			
	0%	**7.50%**	**10%**	**12.50%**
Chemical				
Moisture Content	2.86	-	3.72	-
Ash Content	1.33	-	1	-
Fat	Level 20.74	-	20.95	-
Protein Content	13.46	-	22.34	-

Based on the results of the water content test, the highest water content in biscuits with the addition of 10% nilem protein concentrate is 3,72%. While the highest ash content in biscuits without the addition of nilem protein concentrate is 1,33%. The highest fat content in biscuits with the addition of 10% nilem protein concentrate is 20,95%. The highest protein content in biscuits with the addition of 10% nilem protein concentrate was 22,34%.

4. CONCLUSION

Biscuits with the addition of 10% nilem fish protein concentrate have a moisture content of 3,72%, ash content of 1%, fat content of 20,95% and protein content of 22,34%. This is in accordance with Indonesian National Standards.

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