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THE PROXIMATE COMPOSITION OF NASTAR NILEM FISH PROTEIN CONCENTRATE

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KeyWords
Nilem, Fish Protein Concentrate, Nastar, Water Content , Fat Content, Ash Content, Protein Content.

ABSTRACT

This research aims to obtained the proximate composition of nastar protein concentrate nilem. This research was conducted in August-November 2019 at the Laboratory of Fisheries Product Processing, Faculty of Fisheries and Marine Sciences, Padjadjaran University for the production of nilem fish protein concentrate ,nastar production; while for the nastar proximate test at the Chemical Research Laboratory of the Science-Based Research Center Building Padjadjaran University. The research method used was an experimental method with two treatments adding nilem fish protein concentrate, namely 0% and 7.5%, based on the weight of wheat flour. The parameters observed in the research are water content, fat content, ash content, protein content. Based on the research results, it can be concluded that the results of the nastar proximate test with the addition of 7.5% nilem fish protein concentrate showed that the nilem fish protein concentrate could increase the nastar water content from 5.68% to 7.27%. The protein content was obtained at 8.67%; fat content of 32.17%; and ash content of 1.51%.

INTRODUCTION

Nastar is a pastry made from flour, egg yolks, refined sugar, margarine, and pineapple jam as its filling. This cookie has a small golden brown shape, crumb texture, and has a sweet taste. According to Agustina (2013) this cake is made from pastry dough which is made with a dry system with stirring so that it resembles particles such as sand and then formed and roasted. This pastry has been popular since long time ago and still survive until now which is still a favorite of people in various ages. This cake is made from flour dough which is usually filled with pineapple jam. But along with the development of the market, nastar cakes are now starting to be varied in various choices of shapes, tastes, and nutritional improvements. Such as basket shape, folding form, combined with the filling of peanut butter, apple jam, strawberry jam, peanut butter, blueberry jam and so forth. The diversification of nastar by increasing nutrition is the making of nastar with yellow sweet potato flour in a research conducted by Putri (2015). In addition, the diversification of nastar by increasing protein nutrition can be done by adding fish protein concentrate.

Fish protein concentrate is a form of product that is made by separating fat and water from the body of fish which is a "stable protein" (Dewita and Syahrul 2010). Diversification of nastar by increasing protein nutrition can be done by adding fish protein concentrate. Nowadays, nastar cake which contains high protein nutrition is very rare, considering that cookies need low protein flour. According to Febrianti (2017) the nutritional content of protein from nastar cakes is 2.42%. Brownies products added with catfish protein concentrate showed an increase in protein content (Hayati 2014). At present there are no nastar products with nilem fish protein enrichment. Enriching fish protein with nilem fish protein concentrate in nastar can be used as an effort to increase fish

consumption in the community, and also increase the value of protein in nastar products.

The addition of concentrated fish protein to nilem fish can increase the nutritional value that can be seen from its closest composition. Thatthe addition of nilem fish protein concentrate to processed nastar products has added value and is highly nutritious than nastar products.So that it can be compared with SNI standards that have been determined. Based on some of the problems outlined above, it is necessary to conduct research on direct analysis of nastar products with the addition of nilem fish protein concentrate.

MATERIALS AND METHODS

Place and Time

This research has been carried out in August-November 2019 at the Laboratory of Fisheries Product Processing, Faculty of Fisheries and Marine Sciences, Padjadjaran University for the production of nilem fish protein concentrate ,nastar manufacturing, hedonic testing; while for the nastar proximate test at the Chemical Research Laboratory of the Science-Based Research Center Building Padjadjaran University.

Materials and Tools

The tools used in this research are digital scales , Blender Cutting plastic, glass measuring capacity of 50 ml, jars of glass, fabrics, Mixer, Stopwatch , bowl plastic, Spoon Solet, Brush , Sieve the flour, baking, oven . The materials used in this research are Nilem ,Hexan , Sodium Chloride (NaCl) , Water , Wheat Flour, Margarine , Refined Sugar, Milk, Egg Yolk, Vanilla extract.

Research Method

The method used in this research is the experimental method. The treatment used is by adding nilem fish protein concentrateto nastarbased on wheat flour, are follows:

1) Treatment A: 0% nilem fish protein concentrate, 100% wheat flour.
2) Treatment B: 7.5 % nilem fish protein concentrate, 100% wheat flour.

Testing of water content in nastarnilem fish protein concentrate was carried out by observing the proximate test. The by-product of the test is water content, ash content, fat content, protein content. The formulation used for making nastar with the addition of modified nilem fish protein concentrates is shown in Table 1.

The formulations used in this research are refer to Handoyo (2016) research with some modified. The formulation are follows:

Table 1. Formulation of Making Nastar

No.	Materials	Treatment	
		0%	7,5%
1.	Wheat Flour (g)	100	100
2.	Nilem Fish Protein Concentrates (g)	0	7,5
3.	Egg Yolk	1	1
4.	Milk Powder (g)	10	10
5.	Refined Sugar(g)	40	40
6.	Pineapple Jam(g)	0,5	0,5

Source :Handoyo (2016) modified

The procedure for making Nastar refers to the research that has been done (Handoyo 2016) with some modified.

1. Mixing refined sugar, margarine, vanilla, nilem protein concentrate and egg yolk using a mixer.
2. Enter the milk powder and flour, stir using a spatula.
3. Leave the mixture for 10 minutes. After 10 minutes, take a little dough then flat and fill with pineapple jam then the mixture is covered with a round shape.
4. Bake the mixture on a baking sheet then put it in the oven with a temperature of 100^{o} and bake for 15 minutes.
5. If it's been 15 minutes, remove the cake from the oven and spread with the ingredients then put it back into the oven.

ParametersObserved

Chemical test in the form of direct analysis with the aim to find out the value of nastar nutrition. Nutrition content consists of water content, ash content, protein content, fat content, and carbohydrate content. The closest data analysis observed was the water

content by gravimetric method (AOAC 2005), ash content and protein content by micro-kjedahl method (AOAC 2005), and lipid content by the soxhlet method (AOAC 2005). Explanation of sample nutrient content is explained after delivery. The theoretical results were obtained, then compared with SNI 01-2973-1992 to determine differences in nutrient content from samples.

Water content

Moisture testing procedures based on the Association of Official Analytical Chemist (2005) for example, the porcelain cup is dried in an oven for 1 hour at 105 °C then cooled in a desiccator for 30 minutes and then weighed to a constant weight. A sample of 2 g was weighed, then put in a porcelain cup and dried in a 105°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 .

$$\text{Water Content } (\%) = \frac{(cup\ \ weig\,ht\ sample\ ) - (cup\ \ weig\,ht\ after\ \ drying\ )\ (g)}{(sampel\ \ weig\,ht)\ (g)}\ x\ 100\%$$

Ash Content

Ash content testing procedures based on the Association of Official Analytical Chemist (2005) include, porcelain cup dried in an oven for one hour at a temperature of 105°C, cooled for 30 minutes in the desiccator and weighed to 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 white ashes, the muffle is left until it shows room temperature, then just opened the lid. The porcelain cup is cooled by placing it in an oven at 105 o C for 1 hour and then put in a desiccator until it cools. Porcelain plates that have been cooled are then weighed. The formula for calculating ash content is as follows.

$$\text{Ash content (\%)} = \frac{(weig\,ht\ ash)\ (g)}{(weig\,ht\ \ dry\ \ sampel\ )\ (g)}\ x\ 100\%$$

Fat Content

Fatty testing procedures based on the Association of Official Analytical Chemist (2005) include, fat pumpkin is dried in the oven with a temperature of 105 ° C, then weighed to constant weight. A sample of 2 g was wrapped in fat-free filter paper then put in a fat sleeve. The cartridge is inserted into the Soxhlet tube. As much as 150 ml of chloroform was put into the fat flask. The sample is refluxed for eight hours, when the solvent looks clear, it means that 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 ° C oven for 30 minutes. Pumpkin fat is then weighed until a constant weight is obtained. The formula for calculating fat content is as follows.

$$\text{Fat content (\%)} = \frac{(weig\,ht\ erlenmeyer\ \ \ with\ fat\ ) - (weig\,ht\ empty\ \ \ erlenmeyer\ \ )}{(sampel\ \ \ weig\,ht)\ (g)}\ x\ 100\%$$

Protein Content

Protein analysis was carried out by micro kjedahl method. A sample of 0.1 g was put into a 30m kjedahl flask. Added K_2SO_4 (1.9 g), HgO (40 mg), H_2SO_4 (2.5 mL) and several kjedahl tablets into the sample. Samples are boiled until they are clear (1-1.5 hours); cooled and transferred to a distillation device. Then rinse with water as much as 5-6 times with distilled water (20 mL). 40% NaOH solution was added to the test tube 20 mL. The liquid in the end of the conseder is accommodated with 125 mL erlenmeyer containing H_3BO_3 solution and indicator drops (0.2% methyl red mixture in alcohol and 0.2% methyl blue in alcohols with ratio of 2:1) which is below the condenser. Distillation is carried out until approximately 200 mL of distillate is mixed with H_3BO_3 and erlenmeyer indicator. Destilat is titrated using 0.1N HCl until the color changes to red. Protein levels can be calculated using the following formula:

$$\text{Nitrogen (\%)} = \frac{Volume\ \ titrasi\ \ x\ N\ HCl\ x\ BM\ N}{mg\ \ sampel}\ x\ 100\%$$

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

Results and Discussion

The chemical characteristics analyzed included water content, ash content, fat content and protein content. Chemical testing is carried out through proximate testing carried out on nastar with the addition of 7.5% nilem fish protein concentrate Proximate test results can be seen in Table 2.

Table 2. Proximate Composition

Parameter	Treatment	SNI 01-2973-1992

	0%	7,5%	
Water Content	5,68%	7,27%	Max 5%
Ash Content	1,51%	1,80%	Max 1,5%
Fat Content	32,17%	30,92%	Max 9,5%
Protein Content	8,67%	12,43%	Min 9%

Water content

Water is one of component of food which must be considered in processing because it has a high enough influence on the

appearance of texture and taste of food (Irwan 2017). Water is an important component in food that has an influence on the durability of a product during the storage process. The following is the result of testing the nastar water content with the addition of nilem fish protein concentrate can be seen in Table 2.

Based on Table 2. nastar water content of treatment A was 5.68%, while nastar with treatment B contained water content of 7.27%. Based on the statement, it can be seen that the water content in treatment nastar A is lower than the treatment requirement B. This might be influenced by the water binding properties of the nilem fish protein concentrate which is easier to bind water. So that the water content will increase with the addition of nilem fish protein concentrate in the dough. According to Nugrahani (2005) fish protein concentrate which has a high protein content has greater water absorption than other starches with low protein. However, the difference in water absorption in each fish protein concentrate depends on the fish product used. Absorption of water in tuna protein concentrate of 5.38 g / ml, while in red snapper protein concentrate has a water absorption of 6.25 g / ml. But there is no research related to water absorption from the protein concentrate of the nilem itself.

Furthermore, the water content of the two treatments still does not meet the requirements of pastries based on SNI 01-2973-1992, namely with a maximum moisture content of pastries by 5%. This might be influenced by the length of the oven during the roasting process, so that the water content does not meet the requirements of the cookies based on SNI 01-2973-1992.

Ash Content

Ash content testing is carried out to determine the content of inorganic ingredients present in the product. According to Winata (2015) ash content is a mixture of inorganic or mineral components found in a food. Food itself consists of 96% inorganic material and water, while the rest is mineral elements. The minerals that are in the foodstuff itself consist of two types of salt including organic salt such as acetate and inorganic salt such as phosphate, sulfate and nitrate (Wahyuningsih 2014). The following are the results of testing the levels of nastar ash with the addition of nilem fish protein concentrate can be seen in Table 2.

Table 2. shows the content of nastar ash of treatment A was 1.51%, while nastar with treatment B (panelists' most preferred treatment) contained ash content of 1.80%. The ash content of nastar with B treatment was higher than the content of nastar ash which was not treated with nilem fish protein concentrate. In research conducted by Nando (2015) the treatment of adding 10% cork fish protein concentrate results has a lower ash content than biscuits with control treatment. So it can be concluded that nastar added to nilem fish protein concentrate can increase the nutritional content of ash in nastar. Furthermore, according to Afriani (2016) this can occur because fish protein concentrate has gone through an extraction process so that there is a reduction in the content of excess fat content and increased protein.

Furthermore, the ash content of the two treatments still does not meet the requirements of pastries based on SNI 01-2973-1992, namely the maximum ash content of pastries by 1.5%. This might be influenced by the duration of the oven and temperature setting during the roasting. According to Kasim (2018) the length of roasting and the temperature difference in snack food bars can affect the difference in ash content in these products. S nack food bars are baked at a higher temperature treatment and with treatment longer roasting will produce content of higher ash content. He further explained that the presence of oxygen could lead to the possibility of several minerals of higher validity. Although there are some components of food damaged in the roasting process but not in the mineral content of food. According to Kasim (2018) generally the mineral salts content did not significantly influence the chemical and physical treatment during processing.

Fat Content

Fat is an important food for the body and functions as an effective source of energy compared to carbohydrates and protein. The addition of fat into food aims to add calories and improve the texture and flavor of a food. Following are the results of testing nastar fat levels with the addition of the nilem protein concentrate in Table 2.

Based on Table 2., the nastar fat content of treatment A is 32.17%, while the nastar with treatment B (panelists' most preferred treatment) contains a fat content of 30.92%. The content of nastar fat with 7.5% treatment is lower than that of nastar fat which is

not treated with nilem fish protein concentrate. So it can be concluded that the nastar added with nilem fish protein concentrate has lower nutritional value of fat compared to nastar with control treatment. This is in line with the research of Hasibuan (2019) which added tilapia protein concentrate to cookies showed that the lowest fat content was in the treatment with the addition of the highest fish protein concentrate , and the highest fat content was in the treatment without fortification of fish protein concentrate . This can be influenced by the content of fat content in fish protein concentrates . Based on the proximate test of Nilem fish protein concentrate has a fat content of 0.42%. So that the content of fat in the protein concentrate of nilem does not have a major effect on the content of nastar fat. Furthermore, the fat content of the treatment both of them meet the requirements of pastries based on SNI 01-2973-1992, namely the maximum fat content of cookies at a minimum of 9.5%.

Protein Content

Protein is a food that is very important for the body. Protein is the biggest component after water. Protein is also a source of amino acids that contain elements C, H, O, and N which are not owned by fats and carbohydrates. The results of the protein content test from nastar with the addition of Nilem fish protein concentrate are presented in Table 2.

Based on Table 2.,the nastar protein content of treatment A was 8.67%, while the nastar with treatment B (panelists' most preferred treatment) contained a protein content of 12.43%. The content of nastar protein content with treatment B is higher than the content of nastar protein content not treated with nilem fish protein concentrate. In research conducted by Nando (2015) the addition of 10% patin treatment results have a lower protein content than biscuits with control treatment. So it can be concluded that nastar added to nilem fish protein concentrate can increase the nutritional content of protein in nastar. According to Afriani (2016) this can occur because fish protein concentrate has gone through an extraction process so that there is a reduction in excess fat content and increased protein.

Furthermore, the requirement for pastries according to SNI 01-2973-1992 is the minimum protein content of pastries by 9%, so that treatment A does not meet SNI standards for cookies, while treatment B has fulfilled SNI standards for cookies. This may be influenced by the duration of the oven and temperature regulation during the roasting. According to (Kasim 2018) shows that the water content of cookies in all types of treatment has a tendency to decrease because the longer the roasting, the less water content. This can occur because the heat channeled through the roasting device will evaporate the water contained in the baked material (Sitoresmi 2012).

Conclusion

From the research that has been done using proximate tests it can be concluded that the addition of 7.5% of nilem fish protein concentrate into nastar obtained the results that nilem fish protein concentrate can increase the content of nastar water content from 5.68% to 7.27%. The protein content was obtained at 8.67%; fat content of 32.17%; and ash content of 1.51%.

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