

ZINC AND PROTEIN LEVELS IN NUGGETS WITH BLOOD CLAM (*Anadara granosa*) SUBSTITUTION

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ABSTRACT

Nugget is one type of frozen ready-to-eat product, which is a product that has been warmed to half cooked, then frozen. This study aims to determine the analysis of Zinc and Protein nutrients in blood clam nuggets. This research was a pre-experimental study with a Post Test Group design. The results of the nutrient analysis were obtained from laboratory tests. The products were made into four types, namely original 0% (F0), nuggets with blood clam substitution of 30% (F1), nuggets with blood clam substitutes as much as 40% (F2), and nuggets with blood clam substitution by 50% (F3). Blood clam nugget analysis was performed using the Atomic Absorption Spectrophotometry (AAS) Method and for analysis of Zinc and for Proteins using the Kjeldhal Method. The results of the analysis of zinc content per 100 grams of 0.6585 mg, F1 (30%) showed an average of 0.956 mg, F2 (40%) showed an average of 1.1095 mg, and F3 (50%) showed an average of 1.952 mg. Analysis of the nutrient content of control blood clam nugget protein showed an average nutritional value per 100 grams of material as much as 16.54 grams, F1 showed an average of 17.2 grams, F2 showed an average of 17.62 grams, and F3 showed an average of 18.395 grams. It is recommended for the next researcher to carry out a test of acceptance to the community, safety level test, test macronutrients namely fat and carbohydrates and test micronutrients such as other vitamins and minerals.

Keywords: levels, zinc, protein, nugget, and blood clam

INTRODUCTION

Intake of nutrients has a large influence on the development of children from toddlers to teenagers. To support growth and development in infancy, toddlers, and adolescents the role of foods with high nutritional value is very important as in food sources of energy, protein, vitamins (B Complex, C, and A), and minerals (Ca, Fe, Iodine, Phosphorus, and Zn). The lack of sufficient nutrients causes a decrease in nutritional status so that children become malnourished. Data on the nutritional status of children in Indonesia based on poor nutritional status showed that in 2007 there were 5.4%, in 2013 it was 5.7%, and in 2018 it was 3.9%. While poor nutritional status showed that in 2007 as many as 13.0%, in 2013 as many as 13.9% and in 2018 as many as 13.8% (Balitbangkes, 2018).

The one reason malnutrition that occurs in toddlers is the lack of food intake. Especially foods that contain macronutrients and micronutrients. One of the macronutrients is protein. Protein intake in infants is very important for growth and development. Minerals are needed as regulators in oxidation processes, normal functions of nerves and muscles and many other processes that occur in the body, one of which is Zinc. Zinc is an important mineral and cannot be passed by the body because our organs certainly need it most, for example, muscles, skin and hair and other organs. In order for normal body

performance and function, zinc is one of the substances that must be fulfilled according to one's daily needs (Darawati, 2017).

Zinc deficiency is associated with non-optimal growth, diarrhea, and decreased immunity function. Zinc Deficiency can also lead to growth failure, decreased appetite, and slow healing of wounds. Research that has been done shows that giving Zinc supplements can improve the growth of children under five. Zinc deficiency can cause stunting in children because zinc has a major role in protein synthesis, gene replication and cell division which is very important during the period of accelerated growth both before and after birth (Prananingrum, 2016).

Coastal communities generally use clams as food because of the high fat and protein content of vitamins and antioxidant minerals such as Zn, Fe, and Cu. One type of Clams that is often used by the community is blood clams (*Anadara granosa*). Clams contain mineral substances needed by the body, such as iron (Fe), phosphorus (P), flour (F), iodine (I), calcium (Ca), potassium (K), Zinc (Zn), and selenium (Se). Besides that, Clams are a source of animal protein which is classified as complete protein, because the essential amino acid level is high (85-95%) and easily digested by the body. Clams also contain fat-soluble vitamins and B complex (Hidayat, 2011).

The use of blood clams can be maximized by diversifying blood clams processed products which is one of the efforts to increase the usability and economic value of blood clams. Blood clams can be developed into a variety of processed food products. One type of food product that is currently often consumed in the community ranging from children to adults is food that is fast and practical processing, namely nuggets. In addition, utilizing local food into a high nutritional value product that can overcome nutritional problems. Based on this background, the researchers were interested to research the analysis of zinc and protein levels in nuggets with blood clam substitution (*Anadara granosa*).

METODE

This study was an experimental study with a completely randomized design with three blood clam substitution trials (0%, 30%, 40%, 50%). The research design used was Post Test Group Design with repetitions twice (Duplo) to analyze the levels of Zinc and Protein. The study was conducted at the Animal Feed Chemistry Laboratory, Department of Nutrition and Animal Feed, Faculty of Animal Husbandry, Hasanuddin University, from April to May 2019

The materials used in this study were chicken meat, blood clams, chicken eggs, bread crumb, flour, garlic, salt, sugar, and pepper. Whereas the tools used are knives, bowls, plates, silk, slices, pans, food scales, cutting boards, spoon stoves, molds, and trays

First, shake 2 grains of egg white until

evenly mixed, then add the crushed garlic, salt, sugar, pepper. Beat evenly. Pour the flour in the container (bowl), then mix with the first egg whisk. Enter the boiled clam meat first then finely ground. Mix well and add chicken meat. Then form the mixture then steam for 30 minutes. Pour bread crumb in a container, and prepare an empty tray.

Prepared 1 egg then be shaken. Steamed nuggets were left at room temperature for 30 minutes. Put the nugget in the egg, then put it in the bread crumb until it was completely wrapped, then put it on the tray provided. Add the nuggets that have been coated with bread crumb in the refrigerator for 30 minutes so that the bread crumb sticks perfectly. After it had over, heat the cooking oil, fried the nugget until it had golden yellow.

Data were analyzed using the analysis of Zinc and Protein content from nuggets substituted with blood clams processed using the Microsoft word program. Data are presented in tables and narratives description.

RESULTS

Analysis of zinc and protein nutrients in blood clam nuggets conducted at the Livestock Chemistry Laboratory, Department of Nutrition and Animal Feed, Faculty of Animal Husbandry, Hasanuddin University. The zinc test uses the Atomic Absorption Spectrophotometry (AAS) method and for protein, testing using the Micro Kjeldhal method.

Table 01
Analysis of Zinc on Blood Clam Nugget (*Anadara granosa*) per 100 grams

Sample Code	Laboratory Results	Unit	Average
F0 1	0,647	mg	0,6585
F0 1	0,670	mg	
F1 A	0,927	mg	0,956
F1 B	0,985	mg	
F2 A	1,065	mg	1,1095
F2 B	1,154	mg	
F3 A	1,947	mg	1,952
F3 B	1,957	mg	

Source: Primary Data, 2019 Laboratory Test, Animal Feed Chemistry Laboratory, Animal Nutrition, and Food Department, Faculty of Animal Husbandry, Hasanuddin University 2019

Laboratory test results on F0 (original) nuggets were repeated twice which

were 0.647 mg and 0.670 mg respectively, with an average value of two repetitions of 0.6585 mg. F1 (Formula 1) which was repeated two times each 0.927 mg and 0.985 mg with an average value of two repetitions of 0.985 mg. F2 (Formula 2) is

repeated twice which was 1.065 mg and 1.154 mg respectively with a mean value of two repetitions of 1.1095 mg. F3 (Formula 3) is repeated twice which was 1,947 mg and 1,957 mg respectively with an average value of two repetitions of 1,952 mg.

Table 02
Percentage of Zinc on Blood Clam Nugget (*Anadara granosa*) with Daily Value (DV) 2013

Sample Code	Nugget/ 100 g	DV	Contributions to DV
F1	0,956	5	19,12%
F2	1,1095	5	22,19%
F3	1,952	5	39,04%

Source: Daily Value 2013

Based on the table above shows that nugget based on zinc nutritional value in F1 can contribute as much as 19.12%, F2

can contribute as much as 22.19%, and F3 can contribute as much as 39.04%.

Table 03
Analysis of Protein on Blood Clam Nugget (*Anadara granosa*) per 100 grams

Sample Code	Laboratory Results	Unit	Average
F0 1	16,64	grams	16,54
F0 2	16,44	grams	
F1 A	17,22	grams	17,2
F1 B	17,18	grams	
F2 A	17,69	grams	17,62
F2 B	17,55	grams	
F3 A	18,72	grams	18,395
F3 B	18,07	grams	

Source: Primary Data, 2019 Laboratory Test, Animal Feed Chemistry Laboratory, Animal Nutrition, and Food Department, Faculty of Animal Husbandry, Hasanuddin University 2019

Laboratory test results on F0 (original) nuggets were repeated twice which were 16.64 grams and 16.44 grams respectively with a mean value of two repetitions of 16.54 grams. F1 (Formula 1) is repeated twice which was 17.22 grams and 17.18 grams respectively, with an average value of two repetitions of 17.2 grams. F2

(Formula 2) was repeated twice, 17.69 grams and 17.55 grams respectively, with an average value of two repetitions of 17.62 grams. F3 (Formula 3) was repeated twice which was 18.72 grams and 18.07 grams respectively with an average value of two repetitions of 18.395 grams

Table 04

Comparison of Protein on Blood Clam Nugget
(*Anadara granosa*) According to Indonesian National Standards (SNI)

Sample Code	Unit	Nugget/ 100 g	SNI/ 100 gr
F1	Grams	17,2	9
F2	Grams	17,62	9
F3	Grams	18,39	9

Source: Primary Data, Processed, 2019, Note: SNI 01-6683-2014 (Naget Ayam)

The table shows that protein nutrient content in nuggets with blood clams substitution of protein nutritional value in F1 was 17.2 grams, F2 was 17.62 grams and F3 was 18,395 grams. From these results, it

could be concluded that based on SNI 6683 2014 blood clams nuggets met the standards for protein nutritional value which was a minimum of 9% per 100 grams.

Table 05
Percentage of Protein on Blood Clam Nugget
(*Anadara granosa*) with Daily Value (DV) 2013

Sample Code	Nugget/ 100 g	DV	Contributions to DV
F1	17,2	35	49,14%
F2	17,62	35	50,34%
F3	18,39	35	52,54%

Source: Daily Value 2013

Based on the table shows that blood clams nugget per 100 grams based on the nutritional value of protein in F1 can

contribute as much as 49.14%, F2 can contribute as much as 50.34%, and F3 can contribute 52.54% based on DV

Table 06
Distribution of Nutritional Substance Analysis
Results of Blood Clam Nugget (*Anadara granosa*)

Nutrition Substance	Sample Code			
	F0 (Original)	F1 (30%)	F2 (40%)	F3 (50%)
Zinc	0,6585	0,956	1,1095	1,952
Protein	16,54	17,2	17,62	18,395

Source: Primary Data, 2019 Laboratory Test, Animal Feed Chemistry Laboratory, Animal Nutrition, and Food Department, Faculty of Animal Husbandry, Hasanuddin University 2019

Laboratory test results showed that the nugget was analyzed by repeating it twice and then averaging it. F0 or original showed that the nutritional value of protein per 100 grams was 16.54 grams, and the nutritional value of zinc per 100 grams was 0.6585 mg. In F1 formula the nugget with blood clam substitution as much as 30% shows the nutritional value of protein per 100 grams as much as 17.2 grams, and the

nutritional value of zinc per 100 grams as much as 0.956 mg. for F1 formula nugget with blood clam substitution as much as 30% shows the nutritional value of protein per 100 grams as much as 17.2 grams and nutritional value of zinc per 100 grams as much as 0.956 mg. In the formula F2 nugget with blood clam substitution as much as 40% showed the nutritional value of protein per 100 grams as much as 17.62 grams and

nutritional value of Zinc per 100 grams as much as 1.1095 mg. In formula F3, the nugget with blood clam substitution as much as 50% shows that the nutritional value of protein per 100 grams is 18,395 grams, and the nutritional value of Zinc per 100 grams is 1,952 mg.

The Statistical Test Results Of Zinc And Protein Nutrients On Blood Clam Nugget (*Anadara Granosa*) Used The Wallis Kruskall Test.

Table 07
Distribution of Kruskall Wallis Test Results of Zink and Protein Nutrients in Blood clams Nugget (*Anadara granosa*)

Nutrition Substance	p-value
Zink	0.083
Protein	0.083

Source: Primary Data, Processed 2019

Based on the results of the Kruskall Wallis Test on the analysis of zinc nutrition and blood clam nugget protein (*Anadara granosa*), the results showed that the value of zink $p > 0.083$ was significant, meaning that the data contained no difference in nutrient content between the four groups and the protein content with $p > 0.083$, which means that there is no difference in the protein content of each concentration.

DISCUSSION

Zinc is a microelement that is needed by humans. Zinc is a nutrient that plays an important role in many body functions such as cell growth, cell division, is needed in the process of regulating the body's metabolism, immune function, and development. Zinc is a cofactor that can increase more than 70 kinds of enzymes that have special functions in the eyes, liver, kidneys, muscles, skin, and bones. Zinc also plays an important role in the immune system and it is proven that zinc is a potential mediator of the body's defense against infection. Toddlers who lack zinc will be hampered by growth and lack of zinc can also interfere with immunity and inhibit the absorption of iron in the body (Hastuti, 2006).

Based on the results of the study with replications twice the original zinc nugget content obtained an average yield of 0.6585 mg per 100 gram substances, nugget with blood clam substitution 30% namely F1 as much as 0.956 mg per 100 grams of substances, nugget with blood clam

substitution 40%, F2 as much as 1.1095 mg per 100 grams of substances, and nuggets with 50% blood clam substitution, namely F3 of 1.952 mg per 100 gr additions indicate that there was an increase in nutritional value. the number of blood clams added to the zinc levels in the nugget will increase. In one nugget with blood clam F1 substitution (30%) weighing 25 grams, the zinc nutritional value of 0.165 grams was obtained. In the nugget with blood clam substitution F2 (40%) with a weight of 25 grams, the zinc nutritional value of 0.239 grams was obtained. In the nugget with blood clam substitution F3 (50%) weighing 25 grams, the zinc nutritional value of 0.488 grams was obtained. Nugget with blood clam substitution based on DV toddlers in 2013, on F1 nuggets can contribute as much as 19.12%, F2 can contribute as much as 22.19%, and F3 can contribute as much as 39.04%.

Protein is one of the macronutrients which has an important role in the formation of biomolecules. Protein molecules are more complex than carbohydrates and fats. In terms of molecular weight and the diversity of amino acid units that make it up (Mustika, 2011).

Based on the results of the study with replications twice as much as the original nugget protein content obtained an average yield of 16.54 grams, nugget with blood clam substitution 30% namely F1 as much as 17.2 grams, nuggets with blood clams fish substitution 40%, F2 as much as 17.62 grams and nuggets with 50% blood clam substitution, namely F3 of 18,395 grams showed that there was an increase in nutritional value. The more number of blood clams added the protein content in the nugget will increase.

In one nugget with blood clam F1 substitution (30%) weighing 25 grams, the zinc nutritional value of 4.135 grams was obtained. In the nugget with blood clam substitution F2 (40%) weighing 25 grams, the zinc nutritional value of 4.3 grams was obtained. In the nugget with blood clam substitution F3 (50%) with a weight of 25 grams, the zinc nutritional value of 4.598 grams was obtained. Nugget with blood clam substitution based on the quality requirements of SNI 01-6683-2014 nuggets has met the requirements. The SNI standard is a minimum of 9% per 100 gr of nuggets. Nugget with blood clam substitution based

on DV toddlers in 2013, on F1 nuggets, can contribute as much as 49.14%, F2 can contribute as much as 50.34%, and F3 can contribute 52.54%.

CONCLUSION

The results of the analysis of the zinc content of blood clams nugget F0 (original) showed a nutritional value per 100 grams of 0.6585 mg, F1 showed an average of 0.956 mg, F2 showed an average of 1.1095 mg, and F3 showed an average of 1.952 mg. The results of the analysis of the nutrient content of the blood clam nugget protein F0 (original) showed that the nutritional value of protein per 100 grams was 16.54 grams, F1 showed an average of 17.2 grams, F2 showed an average of 17.62 grams, and F3 showed an average of 18,395 gram.

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