

## **PROTEIN CONTENT AND ACCEPTABILITY OF NUTRIENT DENSE NOODLES BASED ON LOCAL FOOD AS AN ALTERNATIVE TO EMERGENCY FOOD**

**Irma Eva Yani<sup>1</sup>, Vinny Pratiwi<sup>2</sup>, Marni Handayani<sup>3</sup>**

Padang Health Polytechnic Ministry of Health, Department of Nutrition  
Jalan Simpang Pondok Kopi, Siteba, Padang

### **ABSTRACT**

Noodles are foods that are accepted by all levels of society, including adults and children. There are various types of noodles, one of which is wet noodles. Wet noodles are high in carbohydrates, but low in protein. Noodles that are usually sold in the market require 8.4 grams of additional protein to comply with SNI, which is a minimum of 9.0 grams of protein in 100 grams of wet noodles. So it is necessary to add dried rebon shrimp flour as a protein source. The purpose of the study was to determine the protein content and acceptability of wet noodles substituted with dried rebon shrimp flour. The type of research is experimental research in the field of food technology with a completely randomized design (CRD) one control, three treatments, two repetitions. Test of protein content in the Baristand Padang laboratory and acceptance test at SDN 10 Surau Gadang. The study was conducted from March 2020 to April 2021. The best treatment was obtained by organoleptic testing. The results of the organoleptic test obtained the best treatment with a ratio of 75:25 grams, 8.1% protein content and as much as 80% of the target can spend the product. It is recommended to do a acceptability test after a laboratory test, as well as conduct a food safety test.

**Keywords:** *Noodles ; Rebon Shrimp ; Protein ; Acceptance*

### **Introduction**

In Indonesia, especially children, they are still experiencing a double burden of nutrition, namely at the same time some children are malnutrition and some are overweight. Malnutrition problems include Protein Energy Lack, Anemia, Vitamin A Deficiency and Disorders Due to Lack of Iodine.<sup>(1)</sup> Based on data from the Basic Health Research (Riskesdas) in 2018 the nutritional status of children aged 5-12 years in Indonesia with indicators of TB/U with very short and short categories of 6.7% and 16.9%, nutritional status according to BMI/U indicators with very thin and thin categories as much as 2.4% and 6.8%, while children with fat and obese categories as much as 10.8% and 9.2%.<sup>(2)</sup>

School children are still experiencing a period of growth and development, so they need adequate and balanced food consumption. One component of balanced nutrition for school children that must be met is the consumption of diverse foods, which contain carbohydrates, protein, fat, water, vitamins, minerals and fiber.<sup>(1)</sup> School-age children spend more time on activities at school with various school activities that are quite dense, so that there is a natural increase in appetite.<sup>(3)</sup> Snacking habits in children are fun activities and of course difficult to avoid, especially when children are at school age.<sup>(4)</sup> With frequent snacking will result in school children not being able to finish the portion of food available at home, which in turn can affect the nutritional status of the child.<sup>(5)</sup>

According to the 2019 Nutritional Adequacy Rate for the 10-12 year age group, snacks should contribute 200 and 190 kcal of energy, 5 and 5.5 grams of protein, 6.5 grams of fat, and 30 and 28 grams of carbohydrates for boys and girls.<sup>(6)</sup> Currently, noodles are one of the foods that are highly accepted by all levels of society. Its fans are not limited to adults, but also children.<sup>(7)</sup> In addition to being filling, noodle dishes are also relatively inexpensive, practical, have a flavor that is not boring and are of various types.<sup>(8)</sup>

There are various types of noodles sold in the market, one of which is wetnoodles. Based on data from the Indonesian Food Security Directory 2019, the consumption of wet noodles by the Indonesian population in 2017 increased from 1.83 kg/cap/year in 2016 to 1.89 kg/cap/year in 2017.<sup>(9)</sup> The habit of consuming ready-to-eat noodles without additional vegetables and protein becomes inappropriate because not all nutritional needs are met. The results of Ratnasari's research (2012), which saw a description of the habit of consuming instant noodles in children aged 7-12 years, found that 50 subjects (62.5%) consumed instant noodles without the addition of other food ingredients.<sup>(3)</sup>

According to Mahmud et al (2018) in the Indonesian Food Composition Table, 100g of wet noodles contain 88 kcal of energy, 0.6 g of protein, 3.3 g of fat, 14.0 g of carbohydrates, 14.0 g of calcium, 13.0 g mg phosphorus, 0.8 mg iron, and 80 g water.<sup>(10)</sup> Based on the quality standard of wet noodles by the National Standardization Agency (2015)<sup>(11)</sup> the requirement for raw wet noodles in 100 grams contains a minimum of 9 grams of protein. The protein content in wet noodles currently circulating does not match the standard wet noodles with a protein gap of 8.4 grams. Considering that wet noodles are dominated by flour, where the carbohydrate content is very high, but low in other nutrients, it is necessary to increase the nutrients. One of the minimal nutrients contained in wet noodles is protein. So it is necessary to add other food ingredients that contain high protein into the noodles. One of the high protein sources of food is rebon shrimp.

The protein content of dried rebon shrimp is higher than eggs and meat. In 100 gram of dried rebon shrimp contains 299 kcal of energy, 59.4 gram of protein, 3.6 gram of fat, 3.2 carbohydrates, 2306 mg of calcium, 625 mg of phosphorus, 21.4 mg of iron, and 0.06 mg of vitamin B1.<sup>(10)</sup> In Rollinda (2019) the nutritional value of rebon shrimp flour 100 g contains 427.14 kcal of energy, 84.85 g of protein, 5.14 g of fat, 4.57 g of carbohydrates, and 30.57 mg of iron.<sup>(12)</sup> Dried rebon shrimp is one of the abundant and easily available aquatic products, and the price is relatively cheap. Based on data from the Central Statistics Agency, the production of shrimp species in Indonesia in 2017 was 400.07 tons, and shrimp production in West Sumatra was 21.43 tons.<sup>(13)</sup> Meanwhile, shrimp consumption by the Indonesian people in 2018 increased to 0.67 kg/cap/year, which in 2013 was 0.62 kg/cap/year, and 0.54 kg/cap/year in 2014.<sup>(9)</sup>

Dried rebon shrimp contains 15 types of amino acids, 10 of which are essential amino acids, and 5 others are non-essential amino acids that the body needs, as stated by Madan (2018) in his research.<sup>(14)</sup> So with the addition of dried rebon shrimp into wet noodles, will be able to increase the nutritional value in particular protein and other micro minerals such as calcium, phosphorus, and iron. In a previous study, conducted by Mukhtia Helfina (2014) who examined the substitution of anchovy flour on the organoleptic quality and protein content of wet noodles, it was found that the protein content of wet noodles produced was 22.52% or 28.1 grams.<sup>(15)</sup> Candra and Hafni (2018) by adding eel meat to the manufacture of wet noodles, the highest protein content was 5.57%.<sup>(16)</sup> The purpose of this study was to determine the protein content and acceptability of wet noodles substituted with dry rebon shrimp flour in wheat flour.

## Methods

This research is experimental research in the field of food technology with a completely randomized design (CRD) with one control, three treatments, and two repetitions. This research was conducted from March 2020 to April 2021. The research was conducted at the Laboratory of Baristand Padang and SDN 10 Surau Gadang.

### A. Tools and Materials

The main ingredients used in making wet noodles are Cakra Kembar wheat flour, dried rebon

shrimp flour, chicken eggs, baking soda, salt, water, and cooking oil. The materials used for the organoleptic test were one control sample, three treatment samples, panelist approval letter, organoleptic test form and mineral water. The tools used for making wet noodles are a basin, stove, spatula pan, blender, 60 mesh flour sieve, digital scale, spoon, napkin, ampia knife, stew pan, plate, bowl, and spoon. The tools used for the organoleptic test were 6A size mica plastic, snack plates and label paper.

## B. Procedure

### 1. Making Dry Rebon Shrimp Flour

The process of making modified dried rebon shrimp flour from Rollinda Radianti (2019)<sup>(12)</sup> is:

- Dry rebon prawns are cleaned and washed with water so that sand and other impurities can be removed.
- Then the shrimp are drained to reduce the water content and roasted over medium heat for
- Cool briefly until the hot steam is gone.
- Smoothing using a blender, then the flour is sifted with a 60 mesh sieve.

### 2. Making Wet Noodles Treatment

- Ingredients are prepared and weighed
- Mixing wheat flour, dry rebon shrimp flour, baking soda, salt, chicken eggs and water into a dough.
- Knead the dough.
- Rest the dough for 30 minutes and cover with a clean napkin
- After 30 minutes the dough is divided into smaller portions.
- Then the dough is thinned with ampia to a thickness of 5 mm, and molded into noodles.
- Boil with boiling water for 2 minutes with the addition of 1 tablespoon of cooking oil so that the dough does not stick.
- Draining and watering by flowing.

## Results And Discussion

### A. Best Treatment

The best treatment for the 4 treatments of wet noodles was obtained from the results of the organoleptic quality test.

**Table 1. Average Panelist Acceptance Value of Organoleptic Quality**

	F1	F2	F3	F4
Color	3.380	2.680	2.860	2.780
Scent	3.280	2.580	2.660	2.800
Flavor	3.040	2.600	2.760	2.660
Texture	3.260	2.960	3.060	2.780
Total	12.96	10,82	11.34	11.02
Average	3.24	2.705	2.835	2.755

The average level of panelist acceptance of the color, scent, flavor, and texture of wet noodles is in the "like" category. The best treatment was found in wet noodlessubstituted with dry rebon shrimp flour as much as 25 grams, with a slightly brownish yellow color, the distinctive scent of rebon prawns was rather strong, the distinctive flavor of rebon prawns was rather strong, and the texture of the noodles was slightly chewy.

Different things were found in research conducted by Riska Van Gobel et al (2016) regarding the formulation of rebon shrimp cookies in terms of flavor, texture, color, and scent.

The treatment with the highest average preferred by panelists was treatment with rebon shrimp flour substitution, as much as 10%, with a brown color, a very fragrant scent specifically for rebon prawns, a very savory flavor, and a dry and compact texture.<sup>(17)</sup>

Research by Nuraini Khodijah et al (2020) is in line with Riska's research, which is about the effect of variations in mixing rebon shrimp flour on sticks in terms of physical properties, organoleptic properties, and protein content was 30 grams. The panelists' preference level decreases along with the higher mixing of rebon shrimp flour.<sup>(18)</sup> This is different from the results obtained in this wet noodle study, that the panelists' preference for wet noodles substituted with dry rebon shrimp flour increased to 25 grams of substitution treatment and fell back to 27.5 grams of substitution treatment.

## B. Protein content

**Table 2. Protein Content of Wet Noodles in 100 grams**

Perlakuan	Kadar Protein (%)
F1 (control)	4,6
F3 (best)	8,1

Table 2 shows an increase in protein content of 3.5% wet noodles with 25 gram dry rebon shrimp flour substitution compared to wet noodles without substitution of dry rebon shrimp flour. Testing on protein content was carried out on the control treatment and the best treatment, which aimed to see the effect of the substitution of dry rebon shrimp flour on the protein content of wet noodles. After testing at the Baristand Padang Laboratory, it was found that the protein content of wet noodles substituted with dry rebon shrimp flour was 8.1%, while the wet noodles without treatment (control) contained 4.6% protein content. So there was an increase in protein content in wet noodles substituted with dry rebon shrimp flour by 3.5%. Based on calculations using the Nutrisurvey application program, 100 grams of raw wet noodles are expected to contain 12.6% protein, and protein in untreated wet noodles (control) contains 5.28%, with an increase of 7.28%. Different things were found in the results of the protein content test at the Baristand Padang Laboratory, where there was a decrease in protein content of 1%- 4% in cooked wet noodles.

The decrease in protein content occurred due to protein damage during the processing. In the manufacture of wet noodles, there is a process of roasting the rebon shrimp for 10 minutes before turning it into flour, and a process of heating the wet noodles while boiling in boiling water for 2 minutes to ripen the wet noodles. Boiling can reduce protein levels in foodstuffs because processing using high temperatures will cause protein denaturation so that coagulation occurs and reduces solubility. The reaction that occurs when heating the protein can damage the condition of the protein, resulting in decreased protein levels.<sup>(19)</sup>

So, when calculating the nutritional value of raw material protein, it should be increased by 25% or about 3 grams, so that the nutritional value of cooked wet noodle protein can meet the target needs later even though it has been processed. Because in this study, the best treatment for wet noodles for the acceptability test contained a protein content of 8.1% in 100 grams, meaning that it only met 77% of the target protein adequacy. This study is in line with research conducted by Nuraini Khodijah et al (2020) about the effect of variations in mixing rebon shrimp flour on sticks. There is an effect of protein content on stick products, namely mixing 30% rebon shrimp flour contains 9.7% protein content. While the protein content of the control treatment was 6.3%.<sup>(18)</sup>

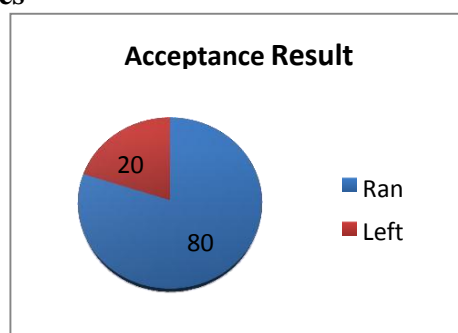
## C. Acceptance Target

An acceptability test of wet noodles substituted with dry rebon shrimp flour was

carried out on children at Elementary School 10 in Surau Gadang, Nanggalo. Observations were made on 30 students in grades V and VI, with an average age of 10 -12 years. Giving wet noodles substituted with dry rebon shrimp flour is the best treatment, namely F3 treatment with substitution of wheat flour and dry rebon shrimp flour as much as 75 grams : 25 grams.

For the acceptability test, wet noodles were processed into fried noodles, which were given as much as 1 portion weighing 50 grams to meet 10% of the protein snack needs of children aged 10 - 12 years. Nutrisurvey's calculation of fried noodles substituted with rebon shrimp flour in the best treatment found an energy content of 121.9 kcal, 6.28 grams of protein, 5.64 grams of fat, and 11.36 grams of carbohydrates. The results of the acceptability test of wet noodles with the substitution of dried rebon shrimp flour from 30 students are as follows:

**Diagram 1. Acceptance Test Results Substitution of Dry Rebon Shrimp Flour for Wet Noodles**



The results of the acceptability test showed that 50 grams of wet noodles substituted with dry rebon shrimp flour could be consumed by 80% of the target, meaning that it could be accepted as a snack food. In addition, according to the target, this product has a savory flavor and a delicious scent. Based on the calculation of the nutritional value of the protein content test results at the Baritand Padang Laboratory, 65 grams of wet noodles should be given for girls and 70 grams for boys so that the protein needs for snacks for both boys and girls aged 10 -12 years can be met. The target acceptance test should be carried out after the results of the protein content test are obtained so that when calculating the nutritional value of protein, it can refer to the results of laboratory tests to meet the nutritional needs of the target. This is a weakness in this study, which uses the nutritional value of Nutrisurvey to calculate the acceptability test.

## Conclusion and Suggestion

### 1. Conclusion

Wet noodles substituted with dry rebon shrimp flour had a protein content of 4.6%, and the best treatment had a protein content of 8.1%, with a 3.5% increase per gram of protein. Acceptability of wet noodles substituted with dry rebon shrimp flour, the best treatment can be accepted by school children. So this noodle can be used as an alternative to emergency food for school children.

### 2. Suggestion

- In making wet noodles, substitution of dry rebon shrimp flour should be done using a formulation of 25 grams of dry rebon shrimp flour substitution.
- An acceptance test should be carried out after laboratory test results are obtained to formulate the calculation of proper protein nutritional value.
- We recommend to giving a 65 grams of wet noodles to girls and 70 grams to boys so

that the protein needs for snacks for both boys and girls aged 10 -12 years can be fulfilled.

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