ORGANOLEPTIC QUALITY OF NUTRIENT DENSE NOODLESBASED ON LOCAL FOOD AS AN ALTERNATIVE TO EMERGENCY FOOD

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ABSTRACT

Noodles are one of the foods that are accepted not only by adult but also by children. Wet noodles are one type of noodle that contains high carbohydrates but low protein. There is agap in the minimum protein content in the type of wet noodles commonly sold on the market,which is 8,4 grams. Therefore, it is necessary to add a protein source in the form of dry rebonshrimp flour. The purpose of this research was to determine the best treatment and organoleptic quality of nutrient dense noodles substituted with dried rebon shrimp flour. This research is experimental research in the field of food technology with a completely randomized design with one control, three treatment, and two repetitions. The organoleptictest was carried out at the Food Science Laboratory, Department of Nutrition at Polytechnic Health of Padang. The research was conducted from March 2020 to April 2021. Data analysis using the Kruskal Wallis test was followed by the Mann Whitney test if there weresignificant differences. The results of the Kruskal Wallis test showed significant differencesin the colour, scent, flavor, and texture of wet noodles. The result found that the best treatment was a ratio of 75:25 grams. It is recommended to use substitution of 25 grams of dry rebon shrimp flour in making wet noodles.

Keywords: *Wet Noodles ; Rebon Shrimp ; Organoleptic*

Introduction

Indonesian children are still expreriencing double nutritional probles, namely that some are malnourished and some are overweight at the same time. Malnutrition probles include lack of protein energy, anemia, lack of vitamin A and disorders due to lack of iodine.(1). Based on the results of the 2018 Basic Health Research report, children aged 5 – 12 years in Indonesia with indicators of Height/age have very short and short nutritional statusas much 6,7% and 16,7%, respectively. Nutritional status according to BMI/age indicators with very this and thin categories as much as 2,4% and 6,8%, while children with fat and obesity categories as much as 10,8% and 9,2%, respectively.(2)

Schoolchildren need adequate and nutritionally balamced food consumption because they are still experiencing a period of growth and development. One component of balanced nutrition that must be met is the consumption of diverse and nutrient dense foods..(1)
School-age children spend more time on various school activities that are quite dense, so that there is a natural increase in appetite.(3) Snacking is a fun activity for children, and it is difficult to avoid when they reach school age.(4) Frequent snacks will result the school children is not being able to spend a portion of food at home so that it can affect theirnutritional status.(5)

According to the 2019 Nutrient Adequacy Rate, snacks contributed 200 and 190 kcal of energy, 5 and 5,5 gram of protein, 6,5 grams of fat and 30 and 28 grams of carbohydrates for boys and girls in the age group of 10 – 12 years old.(6). Currently, noodles are a food that is highly accepted by all levels of society, not limited to adults, but also children.(7) Besides being filling, it is also relatively cheap, practical, has a taste that is not boring, and has a

variety of type(8). There are various type of noodles sold on the market, one of which is wet noodles. Indonesian Food Security Directory 2019 stated that 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.(9)

The habit of consuming noodles without additional vegetables and protein is inappropriate because not all of the body's nutritional needs are met. In Ratnasari's research (2012) to see the habit of consuming instant noodles in children aged 7 – 12 years, was found that 50 subject (62,5%) consumed instant noodles without the addition of other food ingredients.(3). In the Indonesian Food Composition Table, 100 gram of wet noodles contains 88 kcal energy, 0,6 gram of protein, 3,3 gram of fat, 14 gram of carbohydrates, 14 gram of calcium, 13 mg of phosphorus, 0,8 mg of iron, and 80 gram of water..(10) Based on the National Standardization Agency (2015)(11) regarding the quality standard of wet noodles, in 100 gram wet noodles contain at least 9 gram of protein. Meanwhile, the protein content in wet noodles currently circulating is not up to the standard it should be, with a protein gap of 8,4 gram.

Wet noodles are dominated by flour, which is high in carbohydrates but defecient in other nutrients, so it is necessary to increase the nutrients. Protein is one of the few nutrients found in wet noodles. As a result, high protein source must be included. One of these food ingredients is rebon shrimp. The protein content of dried rebon shrimp is higher than that of 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 gram of carbohydrates, 2306 mg of calcium, 625 mg of phosphorus, 21,4 mg of iron, and 0,06 mg of vitamin B1.(10) In Rollinda (2019) found that the nutritional value of 100 gram of rebon shrimp flour contains 427,14 kcal of energy, 84,85 gram of protein, 5,14gram of fat, 4,57 gram of carbohydrates, and 30,57 mg of iron.(12)

Dried rebon shrimp is an aquatic product that is abundant and easy to obtain, and the price is inexpensive. Based on a report from the Central Statistics Agency, the production of shrimp commodities in Indonesia in 2017 was 400,07 tons. Shrimp production in West Sumatera is 21,43 tons.(13) Meanwhile, shrimp consumption by the Indonesian people in 2018 has increased to 0.67 kg/cap/year, which in 2013 was 0.62 kg/cap/year and 0.54 kg/cap/year in 2014.(9)

Based on Madan research (2018), dried rebon shrimp contains 15 types of amino acids, ten of which are essential amino acids, and the other five are non-essential amino acids.(14) 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. Research by Mukhtia Helfina (2014) regarding the substitution of anchovy flour on the organoleptic quality and protein content of wet noodles found that the protein content of wet noodles produced was 22,52% or 28,1 grams.(15) While research by Candra and Hafni(2018) shows that by adding eel meat to the manufacture of wet noodles, the highest protein content is 5.57%.(16). The purpose of this research was to determine the best treatment and organoleptic quality of nutrient dense noodles substituted with dried rebon shrimp flour.

Methods

This research is experimental research in the field of food technology with a completely randomized design with one control, three treatments, and two repetitions. This research was conducted from March 2020 to April 2021 at the Food Science Laboratory Department of Nutrition Polytechnic Health of Padang. Organoleptic test using a moderately trained panel of 25 panelists.

A. Tools and Materials

Cakra Kembar wheat flour, dried rebon shrimp flour, chicken eggs, baking soda, salt, water, and cooking oil are the main ingredients in wet noodles. One control sample, three treatments samples, a panelist approval letter, an organoleptic test form, and mineral water were utilized in the organoleptic test. The tools used for making wet noodles are 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 orgaboleptic test were 6A-size mica plastic, snack plates, and label paper.

B. Procedure

1. Making Dry Rebon Shrimp Flour

Rollinda Radianti (2019)(12) explains how to make modified dried rebon shrimp flour:

a. Sand and other contaminants are removed from dry rebon shrimp by cleaning and washing them with water
b. The shrimp are then drained to remove excess water and roasted over medium heat for a few minutes until the hot steam has dissipated
c. After blending the flour, it is filtered through a 60 grit sieve.
d. Making Wet Noodles Treatment
e. Preparation and weighting of ingredients
f. Forming a dough from wheat flour, dry rebon shrimp flour, baking soda, salt,chicken eggs, and water.
g. Form the dough into a ball and knead it.
h. Cover the dough with a clean napkin and set aside for 30 minutes.
i. After 30 minutes the dough is divided into smaller portions.
j. The dough is the smoothed to a thickness of 5 mm with ampia and formed intonoodles.
k. Cook for 2 minutes in boiling water with one tablespoon of cooking oil added tokeep the dough from sticking.
l. Flowing drainage and watering.

Results And Discussion

A. Color

The color of the wet noodles produced is yellowish white to brownish yellow.

Table 1. Panelist Acceptance Value of Wet Noodle Color

	F1	F2	F3	F4	P *value*
Median	3.5 a	2.5 b	3.0 b	3.0 b	
Min	2.5	2.0	2.5	2.0	< 0.001
Max	4.	3.5	3.5	3.5	

Note: Values followed by unequal lowercase letters are significantly different according to the Mann Whitneytest.

The results of the Kruskal Wallis test at the 5% level found that the p value < 0.05, i.e. 0.000, means that there is a significant difference in the color of the wet noodles. The results showed that the average color of wet noodles using the resulting median ranged froma scale of 2.5 to 3.5, with categories like to very much like. Based on observations, it is known that the more dried rebon shrimp flour is used, the darker the color of the wet noodlesproduced tends to be. The brownish color produced by wet noodles substituted with dried rebon shrimp flour is thought to be due to the Maillard reaction, which is a non-enzymatic browning reaction that occurs due to a reaction between reducing sugars and free amine groups from amino acids or proteins in the presence of heating.

Maillard reaction on wet noodles substitution of rebon shrimp flour occurs because of the heating process when boiling noodles in boiling water. The Maillard reaction mechanism

is very complex, where the amine sugar will undergo denaturation, cyclization, fragmentation, and polymerization to form a pigment complex called melanoidin.(17) Processed flour when heated at high temperatures (> 35℃) there will be a browning reaction between proteins and carbohydrates that produce a brown color.(18) In addition, thebrownish color produced is also the influence of the basic color of the raw material for rebon shrimp which undergoes a 10-minute roasting process.

The brown hue of rebon shrimp cookies is altered by the substitution of rebon shrimp flour, according to study conducted by Riska Van Gobel et al (2016) on the formulation of rebon shrimp cookies. The more rebon shrimp flour used, the darker the colorbecomes.(19) For the highest value of the hue of the rebon shrimp flour substitute cookies, different results were obtained by as much as 10%. While the organoleptic test yielded the greatest value for the color substitution of dried rebon shrimp flour on wet noodles, up to 25grams.

B. Scent

The scent of the wet noodles produced is typical of noodles to typical of rebon prawns.

Table 2. Acceptance Value of Wet Noodle Scent by Panelists

	F1	F2	F3	F4	P *value*
Median	3.0 a	2.5 b	2.5 b	3.0 b	
Min	2.5	2.0	2.0	2.0	< 0.001
Max	4.0	3.5	3.5	3.5	

Note: Values followed by unequal lowercase letters are significantly different according to the Mann Whitneytest.

The results of the Kruskal Wallis test at the 5% level found that the p value < 0.05, which is 0.000, means that there is a significant difference in the scent of wet noodles. The results showed that the scent of wet noodles produced ranged from a scale of 2.5 to 3.0 witha "like" category. The distinctive scent of rebon shrimp is getting stronger along with the increase in substitution of rebon shrimp flour. The results of the organoleptic test showed that the preference level of the panelists increased along with the increase in the substitutionof dry rebon shrimp flour used.

The distinctive scent of rebon shrimp comes from compounds derived from aldehydes, ketones, amino acids, and volatile fats formed by enzymatic processes and microorganism activity. According to Fatty (2012) in Siregar (2019) states that the use of high heat will produce a strong scent in a material.(20) This occurs during the process of making rebon shrimp flour through the cooking of rebon shrimp with medium heat for 10 minutes.

Another study on the formulation of rebon shrimp cookies by Riska Van Gobel et al. (2016) discovered that the more rebon shrimp flour used, the stronger the shrimp scent of the resulting cookies. The lowest substitution of rebon shrimp flour is 10%. The result of the organoleptic test was that the highest scent value was found in the substitution of rebon shrimp, which was 27.5 grams.(19)

C. Flavor

The flavor of the wet noodles produced is typical of noodles to typical of rebon prawns.

Table 3. Panelist Acceptance Value of Wet Noodle Flavor

	F1	F2	F3	F4	P *value*
Median	3.0 a	2.5 b	2.5 b	2.5 b	
Min	2.0	2.0	2.0	2.0	< 0.001
Max	4.0	3.5	3.5	3.5	

Note: Values followed by unequal lowercase letters are significantly different according to the Mann Whitneytest

The results of the Kruskal Wallis test at the 5% level found that the p value < 0.05, i.e. 0.003, meaning that there was a significant difference in the flavor of wet noodles. The results showed that the flavor of wet noodles produced ranged from a scale of 2.5 to 3.0, with a liking category. From the results of observations, it was found that the more substitutions of dry rebon shrimp flour, the more savory the flavor of rebon shrimp was.

The resulting savory flavor is the influence of the amino acid glutamate present in rebon shrimp. Research conducted by F.A. Karim et al (2014) on the content of glutamic acid in shrimp paste with various raw materials has shown that the highest levels of glutamicacid are found in shrimp paste with rebon shrimp as the raw material. Glutamic acid is an amino acid that makes up protein, which is naturally found in high protein foods. Accordingto Amaliafitri (2010) in F.A. Karim et al (2014) glutamic acid is the most dominant source of umami (savory) flavor and has an impact on the perfection or authenticity of the flavor itself.(21)

Riska Van Gobel, et al (2016) discovered that the higher the concentration of rebon shrimp flour utilized, the stronger the shrimp flavor in the cookies is created. It is caused bythe baking process of cookies, which provide a more bitter taste, in addition to the strong flavor of shrimp. The amino acid lysine, which is also obtained from rebon shrimp, is hydrolyzed, giving it a bitter flavor.(19). The highest value of the flavor of rebon shrimp cookies was found in the formula with the lowest substitution of rebon shrimp flour, namely 10%. Meanwhile, in this study, the organoleptic test results showed that the highest scent value was found in the substitutionof rebon shrimp, amounting to as much as 25 grams.

D. Texture

The resulting wet noodle texture is chewy to less chewy.

Table 4. Panelist Acceptance Value of Wet Noodle Texture

	F1	F2	F3	F4	P *value*
Median	3.0 a	3.0 bc	3.0 b	3.0 c	
Min	2.5	2.0	2.5	2.0	< 0.001
Max	4.0	4.0	4.0	4.0	

Note: Values followed by unequal lowercase letters are significantly different according to the Mann Whitneytest.

The results of the Kruskal Wallis test at the 5% level found that the p value <0.05, i.e. 0.001, means that there is a significant difference in the texture of the wet noodles. The results showed that the texture of wet noodles produced on a scale of 3 was in the “like” category. The texture produced by noodles tends to be less elastic and breaks easily as the percentage of substitution of dry rebon shrimp flour is increased. The wet noodle texture, which is less chewy in the treatment with the addition of dried rebon shrimp flour, is due to the reduced use of wheat flour. Wheat flour contains gluten, which is insoluble in water and can make the dough chewy and expand because it isable to bind air.(22)

Gluten is a protein that is characteristically found in wheat flour and in small amounts in other cereals. Gluten is a protein that clumps, is elastic and will expand when mixed with water. Gluten is a mixture of gliadin and glutenin proteins that collect with starch in the endosperm of wheat. Gluten content can account for up to 80% of the total protein in wheat flour.(22) This is consistent with study undertaken by Riska Van Gobel, et al (2016) on the formulation of Rebon Shrimp Cookies, which found that browned cookies had a soft texture that crumbles readily. This is also induced by the browning reaction that occurs in cookies.(19) even is the cookies have been roasted for a long period, the texture resulting from the substitution od rebon shrimp flour on cookies becomes brittle, crumbles readily, and is less crisp or soft. The highest value of the flavor of rebon shrimp cookies was found in the formula with the lowest substitution of rebon shrimp flour, namely 10%. Meanwhile, in this study, the organoleptic test results showed that the highest texture value was found in the

substitution of rebon shrimp by as much as 25 grams.

E. Best Treatment

The organoleptic quality test findings were used to determine the optimal treatment for the four types of wet noodles.

Table 5. Average Panelist Acceptance Value of Organoleptic Quality

	F1	F2	F3	F4
Color	3.38(	2.680	2.860	2.780
Scent	3.28(	2.580	2.660	2.800
Flavor	3.04(	2.600	2.760	2.660
Texture	3.26(	2.960	3.060	2.780
Total	12.9(	10,82	11.34	11.02
Average	3.24	2.705	2.835	2.755

The color, scent, flavor, and texture of wet noodles are all rated as "like" by the majority of panelists. Wet noodles with up to 25 grams of dried rebon shrimp flour were judged to be the best treatment, with a slightly brownish yellow color, a strong rebon shrimp scent, a strong rebon shrimp flavor, and a somewhat chewy texture.

Riska Van Gobel et al (2016) discovered various things in their research on the flavor, texture, color, and scent of rebon shrimp cookies. Treatment with rebon shrimp flour substitution, up to 10%, with a brown color, a highly fragrant scent specifically for rebon shrimp, a very savory flavor, a dry and compact texture was the treatment with the highest average preferred by panelists.(19)

Nuraini Khodijah et al (2020) study aligns with Riska's research, which examines the impact of different mixing methods on the physical, organoleptic, and protein content of rebon shrimp flour sticks in terms of physical qualities, organoleptic characteristics, and protein content was 30 grams. With the increased combining of rebon shrimp flour, the panelists' liking level lowers.(23). This is in contrast to the findings of this wet noodles trial, which showed that the panellist's preference for wet noodles substituted with dried rebon shrimp flour climbed to 25 grams of substitution treatment before dropping to 27,5 grams of substitution treatment.

Conclusion and Suggestion

A. Conclusion

There was a significant difference in the subsitution of dry rebon shrimp flour on the color, scent, flavor, and texture of wet noodles. The best treatment is a 25-gram substitution, which results in a slightly brownish yellow hue, a strong rebon shrimp scent, a strong rebon shrimp flavor, and a somewhat chewy texture of the noodles. As a result, it can fulfill the nutritional value of wet noodle protein as an alternative to nutrient dense emergency food by substituting 25 grams of dry rebon shrimp flour.

B. Suggestion

1. To make wet noodles, use a 25 gram dry rebon shrimp flour substitute formula and 75 gram of wheat flour.
2. More research is needed to determine the safety of microbiological, chemical, and heavy metals, as well as the product's shelf life.

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