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ANALYSIS OF CALORIE VALUE, FOOD FIBER CONTENT, GLUTEN AND ACCEPTANCE OF WET NOODLES WITH PORANG FLOUR SUBSTITUTION (*Amorphophallus oncopphyllus*) AS A HALAL AND ALTERNATIVE LOW CALORIE FOOD

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ABSTRACT
Noodles are one of the foods that cause obesity due to the low nutritional content contained in them. Alternative ingredients are added to vary and replace wheat flour, so that the nutritional content of the dough is not only high in carbohydrates, but also high in fiber, low in calories and low in gluten. Diversification can be carried out by using alternative regional food components, one of which is the porang plant. This research aims to determine the effect of developing wet noodle products as a substitute for porang flour; find out the panelists' level of preference, calorie value, dietary fiber content and gluten content in the selected wet noodle formula. This research used a Completely Randomized Design (CRD), consisting of 5 treatments, namely F0 (control), F1 (90:10%), F2 (80:20%), F3 (70:30%) and F4 (60:40 %). The acceptability test research was carried out by untrained panelists with a total of 30 panelists. The statistical test used was the One Way ANOVA test.

The test results for the acceptability of wet noodles with the substitution of porang flour, which is the most popular among all parameters, is the F1 formula (90:10). The nutritional value of the selected wet noodles is F0 (calorie value 3.99%, dietary fiber content 4.43%, and gluten content 12.74%), while the selected formula is F1 (calorie value 4.03%, dietary fiber content 7 .49%, and gluten content 8.39%). The results of the nutritional content test showed the effect of porang flour substitution on the nutritional content of the control formula (F0) against the selected formulas (F1 and F2). The substitution of porang flour for wet noodles has an influence on organoleptic properties, calorific value, dietary fiber content and gluten content. The development of wet noodle products as a substitute for porang flour can be used as an alternative for providing staple foods that are high in fiber and low in calories.

Keywords:
acceptability; gluten; calories; wet noodles; dietary fiber; porang flour

Introduction

Indonesian people tend to consume foods rich in carbohydrates, sugar and fat because of their attractive taste. In particular, most people prioritize the enjoyment of taste in food rather than considering the nutritional value and the impact of excess intake on the risk of obesity. According to data from the World Health Organization (WHO) in 2016, more than 1.9 billion adults aged over 18 years experienced obesity problems, with more than 650 million of them being overweight. The results of a study conducted by Kurdanti (2015) identified a number of factors that contribute to obesity. These factors include lifestyle, such as the tendency to increase fast food consumption and lack of physical activity, genetic factors, the influence of

advertising, psychological aspects, economic status, diet programs, as well as age and gender. Noodles are a type of fast food that is often consumed by the general public.

Noodles are a type of food that is very popular in Indonesia, especially those that are made from wheat flour, either with or without the addition of other food ingredients. Wet noodle products that use wheat flour, which is often imported, have a high glycemic index. This opens up opportunities to develop local food products using substitutes for native Indonesian wheat flour which has a lower glycemic index. People love noodles because they are easy and quick to prepare and serve. Some people use noodles as a supplement, distraction, or as a replacement for staple foods. The noodles currently available on the market tend to contain more carbohydrates because the main ingredient is wheat flour and very little protein. However, these noodles have a limited composition of protein, fiber and minerals. Therefore, the nutritional value of noodles will increase by means of food substitution (Rahmi *et al.*, 2019).

Porang is a tropical plant in the Iles-Iles family where the tubers of the porang plant have a relatively high glaucoma content. The porang plant is a herbaceous plant with erect, soft and smooth stems that are green or black with stripes (spots) and white. The stem is divided into three secondary bodies and divides them one by one. In Indonesia, the porang tree (*Amorphophallus*) grows and spreads in the highlands or lowlands up to a height of 800 meters above sea level. This plant, native to tropical Asia, has reached Malaysia, Java, the Philippines and the Pacific Ocean. Porang (*Amorphophallus oncophyllus*) is a potential and opportunistic tuber crop in Indonesia. This plant is not only easy to obtain, but also produces carbohydrates and provides high yields. The porang plant has a neutral taste, is easy to combine with many different ingredients as an ingredient for making traditional and modern cakes (Moh. Syaifudin, 2019).

Porang flour is made from the tubers of various types of plants *Amorphophallus* who belong to the family *Araceae* and native to Southeast Asia. Porang flour is a source of soluble fiber that has been used in China and Japan for more than 2,000 years as an important ingredient in various Middle Eastern dishes. Porang flour from porang tubers (Amorphophallus muelleri Blume) contains soluble dietary fiber whose structure and function are similar to pectin which is also called glucomannan. The glucomannan content in porang tubers is very large, namely 67%. Based on the species, the most likely and most widely used porang is *Amorphophallus muelleri Blume* and *Amorphophallus konjac* (Takigami, 2000). According to the explanation above, researchers are interested in creating a wet noodle product with modified porang flour. Because the use of porang flour is still small, however, if it is used to make food products such as noodles without any additions, the nutritional value is still low. This product must be an alternative food that can be consumed by various groups, especially as an alternative low-calorie food.

The type of research applied is experimental research using a completely randomized design (RAL). There were five treatment variations that showed differences in the concentration of porang flour replacement. For formulations 1 to 4 of wet noodles, the acceptability test was carried out one repetition for each formulation, resulting in three final formulations (one as a control and two best replacement formulations) which were then analyzed three repetitions. The treatment in this research was the substitution of porang flour in making wet noodles with the formulation F0 as a control (100% wheat flour and 0% porang flour), F1 (90% wheat flour and 10% porang flour), F2 (80% wheat flour and 20 % porang flour), F3 (70% wheat flour and 30% porang flour), and F4 (60% wheat flour and 40% porang flour). This research was carried out from September to November 2023. The place where porang noodles were made was in the Culinary Nutrition Laboratory, Faculty of Psychology and Health. Gluten level testing and acceptability tests were carried out in the nutrition laboratory of the Faculty of Psychology and Health. Analysis of food fiber content was carried out at PT. Saraswanti Indo Genetech Bogor and calorific values were carried out at the Central Laboratory of Muhammadiyah University of Malang.

Methods

Making wet noodles by substituting porang flour

The ingredients used in making wet noodles as a substitute for porang flour are presented in Table 1.

Table 1. Standard recipe for ingredients for making wet noodles Substitute Porang Flour in Each Treatment

Manufacturing Materials	Wet Noodle Formulation				
	F1	F2	F3	F4	F5
Flour	100 g	90 g	80 g	70 g	60 g
Porang flour	0 g	10 g	20 g	30 g	40 g
Chicken eggs	20 g	20 g	20 g	20 g	20 g
Salt	5 g	5 g	5 g	5 g	5 g
Water	40 ml	50 ml	55 ml	60 ml	65 ml

The manufacturing process begins with accurately weighing each ingredient, mixing each ingredient and kneading until smooth manually or by hand, forming dough sheets using a press machine, cutting to shape the noodles, boiling, and draining. The flow chart for the procedure for making wet porang flour noodles is presented in Figure 1.

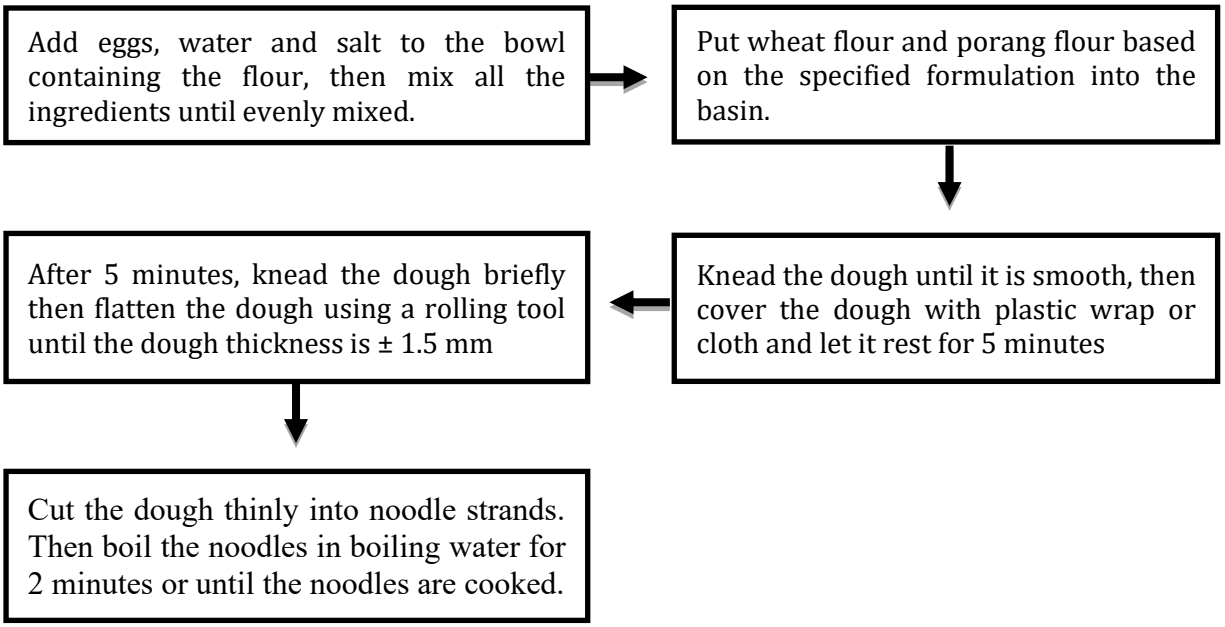


Figure 1. Stages of Making Wet Noodles

Acceptability Test

The second stage, namely the acceptability test, is assessed by testing the organoleptic properties of the sample which includes color, aroma, taste, texture and overall preference. In this research, the acceptability test used 30 untrained panelists, who were students of the Nutrition study program at the Walisongo State Islamic University, Semarang, aged 18-25 years. The method used uses a hedonic test (liking) with five measurement scales, namely 1 = Very like it, 2 = Like it, 3 = Quite like it, 4 = Don't like it, and 5 = Very dislike it.

Calorie Value Analysis

Calorie testing is carried out using a bomb calorimeter to determine the calories contained in the sample. The materials needed when analyzing calorific value using a bomb calorimeter are nickel wire, 1 gram of sample, and blank (benzoate). The first step is to weigh 0.5 grams of the sample and put it in a small cup on the bomb head. Then put 2 liters of water into the bomb calorimeter vessel. Install a 10 cm stake of nickel wire on the bomb head. Insert the bomb head with the wire and sample into the oxygen bomb and then fill it with oxygen. The oxygen bomb is filled with oxygen at a pressure of 30-40 atm. Insert the oxygen bomb into the calorimeter vessel which has been filled with water. After that, insert the calorimeter vessel into the calorimeter then close and turn on the tool then record the initial temperature printed on the thermometer. After the temperature of the thermometer is stable and constant, record the temperature listed to find out the final temperature

Gross energy calculation:

$$\frac{(\Delta t \; x \; benzoate \; standard) - (\Delta l \; x \; 2{,}3 \; kal) - remaining \; ashes}{mass \; of \; test \; material}$$

Information :
Δt = temperature difference
Δl = difference in length of nickel wire
Calorific value of ash = 10 cal/gr

Analysis of Food Fiber Content

Testing for food fiber content is carried out using the enzymatic method. Before testing, the sample must first have its fat content removed using the Soxhlet method. After carrying out the dietary fiber test, the remaining residue is then tested for ash and protein content as a correction value to obtain the total dietary fiber content.

a. Fat Level Test (SNI 01-2891-1992)

Before testing the food fiber content of the sample, the fat content must first be removed, so the fat content test is carried out using the Soxhlet method and in dry conditions. The materials and tools prepared were 1-2 grams of sample, filter paper, fat flask, Soxhlet apparatus, electric heater, oven, analytical balance, fat-free cotton, hexane solvent and desiccator. The stage begins by weighing 1-2 grams of the sample then placing it in a paper sleeve lined with cotton. Then cover the sleeve with cotton then dry the sample with the sleeve in the oven at a temperature < 80°C for ± 1 hour. After drying, put the sample into a soxhlet apparatus that has been connected to a fat flask containing a boiling stone of known weight. Extract the samples with hexane solvent for 6 hours. Distill the Inzeb hexane containing the fat extract then dry the fat extract in an oven at 105°C. Cool using a desiccator and weigh the fat content.

Calculation of fat content:

$$\frac{weight \; of \; fat \; flask \; before \; extraction - weight \; of \; fat \; flask \; after \; extraction}{sample \; weight} \text{ x } 100$$

b. Total Dietary Fiber Test (Adawiyah *et al*., 2022)

The principle of testing total dietary fiber is to add enzymes from termamyl, namely thermostable enzymes-amylase amyloglucosidase and protease, which mimic the state of the digestive process in the body, then carry out gravimetric analysis. The ingredients prepared are 1 g sample, 50 µL α-amylase solution, 100 µL protease enzyme, 200 µL amyloglucosidase enzyme, 50 mL phosphate buffer pH 6, 10 mL NaOH 0.275 N, 10 mL HCL 0.325 N, 280 mL ethanol 95 %, 3x20 mL 78% ethanol, 2x10 mL 95% ethanol and 2x10 mL acetone. The tools needed are digital scales, erlemeyer, dropper pipette, aluminum, water bath, stirring rod, desiccator, Whatman filter paper and oven. The analysis stage begins with weighing 1 g of sample, followed by adding 50 mL of phosphate buffer pH 6.0 and 50 L of teramyl solution. The sample was wrapped in aluminum foil and heated in a water bath

at a temperature of 95-100°C, then left for 15 minutes and stirred gently every 5 minutes, then allowed to cool. The sample pH was adjusted to 7.5 by adding 10 mL of 0.275 N NaOH, then adding 100 L of protease and incubating at 60°C for 30 minutes, then cooling. 10 mL of 0.325 N HCL was added until the pH reached 4.5, after which 200 L of amyloglucosidase enzyme was added, followed by incubation at 60°C for 30 minutes. The sample was then precipitated by adding 280 ml of 95° ethanol at 60°C and leaving for 60 minutes. The resulting precipitate was weighed and filtered using Whatman filter paper, then washed with 3×20 mL of 78% ethanol, 2×10 mL of 95% ethanol, and 2×10 mL of acetone. Dry the precipitate on filter paper in an oven at 105°C for 24 hours, then weigh and calculate the mass of the dried residue. The filter paper obtained is used to analyze the ash content (Wabu residue) and protein residue (Wabu protein residue), so that the weight of the ash and protein residue can be obtained. Fiber analysis in a sample can be calculated with the following formula:

Calculation of Total Dietary Fiber:

$$\frac{W1 - W2 - W3}{sample\ weight} \times 100\%$$

Information :
W1 = residue weight
W2 = protein weight
W3 = ash weight

Gluten Content Analysis (Imran *et al*., 2013)

Gluten content testing is carried out using mechanical methods*hand washing* to get the wet gluten content. The materials needed are 100 grams of sample (wheat flour and porang flour formulation) and 68 ml of water. The tools prepared are a porcelain bowl, spatula, gloves, digital scale, glass plate and 150 mesh gauze or sieve. The steps taken are mixing 100 g of sample (according to the specified recipe) with 68 ml of water and forming a paste. Soak the sample mixture in water for 1 hour. Then rinse the sample mixture under running water continuously until the washing water becomes clear or not cloudy. Cheesecloth or a 150 mesh sieve is placed in the bottom to catch any dough or gluten. After the dough is washed clean, remove the water from the remaining gluten, then weigh it.

Calculation of the percentage of wet gluten content:

$$\frac{weight\ of\ gluten}{weight\ of\ flour\ sample} \times 100\%$$

Data analysis

Data analysis used in the acceptability test used a liking level test for wet noodles substituted for porang flour using SPSS 24 software (*Statistical Package for the Social Sciences*) with test*Kruskal Wallis* to find out the average value at the 5% real level. Furthermore, if there are real differences, continue with*Mann-Whitney* to find out the real difference in treatment. Data analysis of calorific value, food fiber content and gluten content are processed using tests*One Way ANOVA* (*Analysis of Variance*). If there is a significant difference in results or shows a number below 0.05 then proceed with the real difference test using*Duncan Multiple Range Test* (DMRT) with a significance level of 0.05.

Results and Discussions

Acceptability Test

Color

Table 2. Color Acceptability Test Results

Formula	Mean (±) Standard Deviation	P (Value)
F0	4.40 (±) 0.814[b]	<0,001
F1	3.80 (±) 0.887[c]	
F2	3.40 (±) 0.770[a]	
F4	3.27 (±) 0.828[a]	
F3	3.10 (±) 0.885[a]	

Information:
a, b, c = similar letter notation means there is no significant difference at the Mann-Whitney test level which has a value of 5%

The results of the Kruskal Wallis test for color parameters showed P<0.05, H0 was rejected so that there was a real difference in the treatments (F0, F1, F2, F3, and F4) in the color of wet noodles with the substitution of porang flour. To see which groups were different, the Mann-Whitney test was carried out. The results of the Mann-Whitney test showed that the level of preference for the color of wet noodles substituted with porang flour was not significantly different (P>0.05) in F2 and F3, F2 and F4, and F3 and F4. However, there were significant differences (P<0.05) in F0 and F1, F0 and F2, F0 and F3, F0 and F4, F1 and F2, F1 and F3, and F1 and F4 in the level of preference for the color of wet noodles with the substitution of porang flour. The following is a graph of the color acceptability test results for wet noodles substituted for porang flour.

Figure 2. Level of color preference



Figure 2 shows that the panelists really liked the color of the wet noodles substituted with porang flour formulation F0 (100:0) with the highest average value of 4.40. The color that the panelists least liked was the F4 formulation (60:40) with the lowest average value of 3.10.

Feel

Table 3. Taste Acceptability Test Results

Formula	Mean (±) Standard Deviation	P (Value)
F0	4.10 (±) 0.712[a]	<0,001
F1	3.77 (±) 0.817[ab]	
F2	3.47 (±) 0.860[b]	
F4	2.70 (±) 1.022[c]	
F3	2.70 (±) 1.179[c]	

Information:
a, b, c = similar letter notation means there is no significant difference at the Mann-Whitney test level which has a value of 5%

The results of the Kruskal Wallis test for taste parameters showed P<0.05, H0 was rejected so that there was a real difference in the treatments (F0, F1, F2, F3, and F4) in the taste of wet noodles with the substitution of porang flour. To see which groups were different, the Mann-Whitney test was carried out. The results of the Mann-Whitney test showed that the level of preference for the taste of wet noodles with substituted porang flour was not significantly different (P>0.05) in F0 and F1, F1 and F2, and F3 and F4. However, there were significant differences (P<0.05) in F0 and F2, F0 and F3, F0 and F4, F1 and F3, F1 and F4, F2 and F3, and F2 and F4 in the level of preference for the taste of wet noodles with the substitution of porang flour. The following is a graph of the results of the taste acceptability test for wet noodles substituted for porang flour.

Figure 3. Level of taste preference

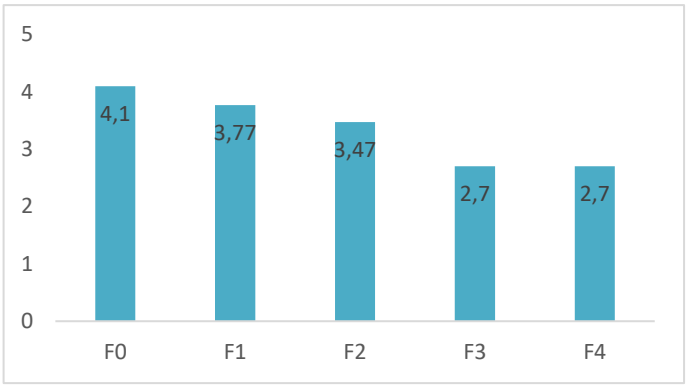


Figure 3 shows that the panelists really liked the taste of wet noodles substituted with porang flour formulation F0 (100:0) with the highest average value of 4.10. The colors that the panelists least liked were formulations F3 (70:30) and F4 (60:40) with the lowest average value of 2.70.

Texture

Table 4. Texture Acceptance Test Results

Formula	Mean (±) Standard Deviation	P (Value)
F0	4.10 (±) 0.759[a]	<0,001
F1	4.03 (±) 0.615[a]	
F2	3.27 (±) 1.112[c]	
F4	2.67 (±) 0.959[b]	
F3	2.50 (±) 1.075[b]	

Information:
a, b, c = similar letter notation means there is no significant difference at the Mann-Whitney test level which has a value of 5%

The results of the Kruskal Wallis test for texture parameters showed P<0.05, H0 was rejected so that there was a real difference in the treatments (F0, F1, F2, F3, and F4) in the color of wet noodles with the substitution of porang flour. To see which groups were different, the Mann-Whitney test was carried out. The results of the Mann-Whitney test showed that the level of preference for the color of wet noodles substituted with porang flour was not significantly different (P>0.05) in F0 and F1, as well as F3 and F4. However, there are significant differences (P<0.05) in F0 and F2, F0 and F3, F0 and F4, F1 and F2, F1 and F3, F1 and F4, F2 and F3, and F2 and F4 in the level of preference for the texture of wet noodles with flour substitution. porang. The following is a graph of the results of the texture acceptability test on wet noodles substituted for porang flour.

Figure 4. Level of texture preference



Figure 4 shows that the panelists really liked the texture of the wet noodles substituted with porang flour formulation F0 (100:0) with the highest average value of 4.10. The color that the panelists least liked was the F4 formulation (60:40) with the lowest average value of 2.50.

Aroma

Table 5. Aroma Reception Test Results

Formula	Mean (±) Standard Deviation	P (Value)
F0	4.03 (±) 0.669[d]	<0,001
F1	3.53 (±) 0.900[a]	
F2	3.33 (±) 0.884[and]	
F4	2.90 (±) 1.062[bc]	
F3	2.87 (±) 1.074[b]	

Information:
a, b, c = similar letter notation means there is no significant difference at the Mann-Whitney test level which has a value of 5%

The results of the Kruskal Wallis test for aroma parameters showed P<0.05, H0 was rejected so that there was a real difference in the treatments (F0, F1, F2, F3, and F4) in the color of wet noodles with the substitution of porang flour. To see which groups were different, the Mann-Whitney test was carried out. The results of the Mann-Whitney test showed that the level of preference for the color of wet noodles substituted with porang flour was not significantly different (P>0.05) in F1 and F2, F2 and F3, and F3 and F4. However, there were significant differences (P<0.05) in F0 and F1, F0 and F2, F0 and F3, F0 and F4, F1 and F3, F1 and F4, and F2 and F4 in the level of preference for the aroma of wet noodles with the substitution of porang flour. The following is a graph of the aroma receptivity test results for wet noodles substituted for porang flour.

Figure 5. Scent Likeability Level



Figure 5 shows that the panelists really liked the aroma of wet noodles substituted with porang flour formulation F0 (100:0) with the highest average value of 4.30. The color that the panelists least liked was the F4 formulation (60:40) with the lowest average value of 2.87.

Favorite

Table 6. Liability Acceptability Test Results

Formula	Mean (±) Standard Deviation	P (Value)
F0	4.00 (±) 0.743[a]	<0,001
F1	3.70 (±) 0.702[a]	
F2	3.23 (±) 0.898[b]	
F4	2.70 (±) 1.088[c]	
F3	2.62 (±) 1.208[c]	

Information:
a, b, c = similar letter notation means there is no significant difference at the Mann-Whitney test level which has a value of 5%

The results of the Kruskal Wallis test for preference parameters showed P<0.05, H0 was rejected so that there was a real difference in treatments (F0, F1, F2, F3, and F4) in the color of wet noodles with the substitution of porang flour. To see which groups were different, the Mann-Whitney test was carried out. The results of the Mann-Whitney test showed that the level of preference for the color of wet noodles substituted with porang flour was not significantly different (P>0.05) in F2 and F3, F2 and F4, and F3 and F4. However, there were significant differences (P<0.05) in F0 and F1, F0 and F2, F0 and F3, F0 and F4, F1 and F2, F1 and F3, and F1 and F4 in the overall level of preference for wet noodles with the substitution of porang flour. The following is a graph of the results of the favorability test for wet noodles substituted for porang flour.

Figure 6. Scent Likeability Level

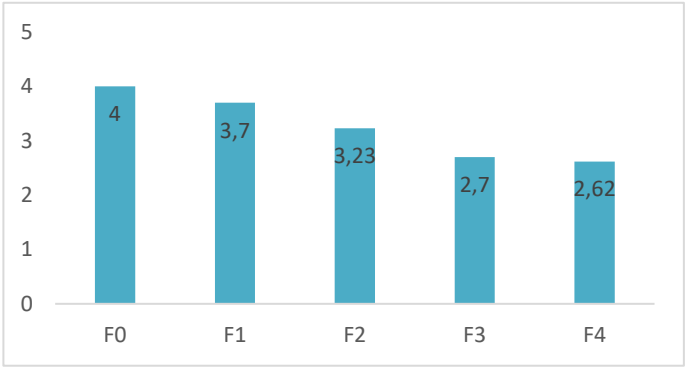


Figure 6 shows that the panelists really liked the overall preference for wet noodles substituted with porang flour formulation F0 (100:0) with the highest average value of 4.00. The color that the panelists least liked was the F4 formulation (60:40) with the lowest average value of 2.62.

Analysis of Calorie Value, Food Fiber Content, and Gluten Content

Calorie Value

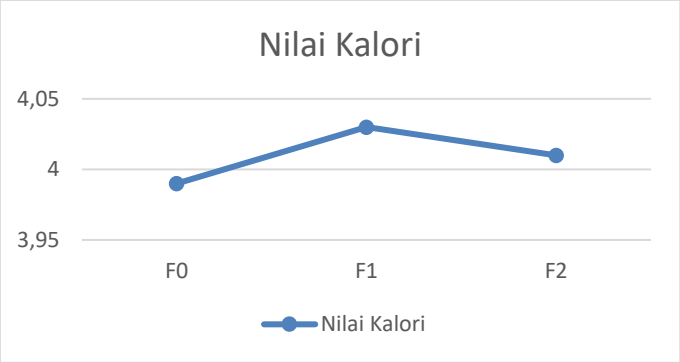
Table 7. Results of Calorie Value Data Analysis

Formula	Mean (±) Standard Deviation	P (Value)
F0	3.99 (±) 0.075[a]	<0,001
F1	4.03 (+) 0.069[a]	
F2	4.01 (+) 0.030[a]	

Information:
a, b, c= similar letter notation means there is no real difference at the Duncan test level which has a value of 5%

The ANOVA test results showed P>0.05, H0 was accepted so there was no significant difference in treatment (F0, F1, and F2) on the calorific value of wet noodles substituted for porang flour. The difference in calorific value in wet noodles with the substitution of porang flour can be seen in Figure 19 below.

Figure 7. Average Calorie Value Analysis Results



Based on the graphic results above, it can be seen that the calorific value produced from wet noodles with the substitution of porang flour is the highest, namely F1 (4.03), F2 (4.01), and F0 (3.99). The more porang flour you add, the higher the calorific value produced, but not too significantly.

Food Fiber Content

Table 8. Data Analysis Results for Food Fiber Levels

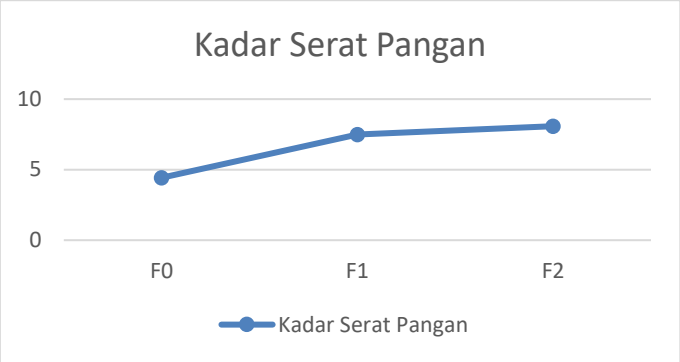
Formula	Mean (±) Standard Deviation	P (Value)
F0	4.43 (±) 0.049[a]	<0,001
F1	7.49 (+) 0.091[b]	
F2	8.08 (+) 0.134[c]	

Information:
a, b, c= similar letter notation means there is no real difference at the Duncan test level which has a value of 5%

The results of the anova test showed P>0.05, H0 was rejected so that there was a real difference in treatment (F0, F1, and F2) in the levels of dietary fiber in wet noodles substituted for porang flour. To further explore which groups were significant, the Duncan

test was carried out. The Duncan Test results showed that the F0 food fiber content was significantly different from the F1 and F2 food fiber content. The F1 dietary fiber content is significantly different from the F0 and F2 dietary fiber content. The F2 dietary fiber content is significantly different from the F0 and F1 dietary fiber content. The Duncan Test results showed that there were differences between all treatments, both F0, F1, and F2. The difference in dietary fiber content in wet noodles with the substitution of porang flour can be seen in Figure 20 below.

Figure 8. Average Results of Food Fiber Content Analysis



In the picture above, it can be seen that the food fiber content produced by wet noodles with the substitution of porang flour is the highest, namely at F2 (8.08), F1 (7.49), and F0 (4.43). The more use of porang flour will result in higher levels of dietary fiber.

Gluten Content

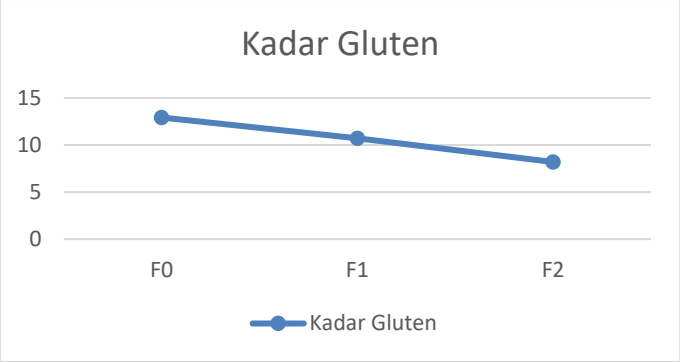
Table 9. Results of Gluten Content Data Analysis

Formula	Mean (±) Standard Deviation	P (Value)
F0	12,74 (±) 1.044[a]	<0,001
F1	10.26 (+) 0.549[b]	
F2	8.28 (+) 0.105[c]	

Information:
a, b, c= similar letter notation means there is no real difference at the Duncan test level has a value of 5%

The results of analysis of variance (ANOVA) show a P value>0.05, so the null hypothesis (H0) cannot be accepted, indicating that there is a significant difference between treatments (F0, F1, and F2) on gluten levels in wet noodles with the substitution of porang flour. To identify differences more specifically between the groups, Duncan's test was carried out. The results of the Duncan test indicated that the gluten content in F0 was significantly different from the gluten content in F1 and F2. Apart from that, the gluten content in F1 was also significantly different from F0 and F2, as well as the gluten content in F2 which was significantly different from F0 and F1. From the Duncan test results, there were significant differences between all treatments (F0, F1, and F2) in terms of gluten content in wet noodles using porang flour substitution. Details of the differences in gluten levels in wet noodles using porang flour can be seen in Figure 24.

Figure 9. Average Gluten Content Analysis Results



In the picture above, it can be seen that the gluten content produced by wet noodles with the substitution of porang flour is the highest, namely at F0 (12.93), F1 (10.72), and F2 (8.20). The more use of porang flour will result in a decrease in the gluten levels produced or less gluten will be produced with the addition of more porang flour.

Conclusion

The development of wet noodle products with the substitution of porang flour is very effective as a staple food that can meet the nutritional needs of the community. The organoleptic test results of wet noodle formulations with the substitution of porang flour showed differences in each formulation. The most preferred formula in terms of color, aroma, texture, taste and preference (overall) is F1 with a formulation of 10% porang and 90% wheat flour and also F2 with a formulation of 20% porang and 80% wheat flour.

The results of the nutritional content test showed the effect of porang flour substitution on the nutritional content of the control formula (F0) against the selected formulas (F1 and F2). The laboratory test results of the control formulation show the calorific value (3.99%), dietary fiber content (4.43%), and gluten content (12.74%), while the selected formula (F1) shows the calorific value (4.03%) , dietary fiber content (7.49%), and gluten content (8.39%), the selected Formula F2 shows the calorific value (4.02%), dietary fiber content (8.08%), and gluten content (8, 28%).

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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