

## **The Substitution of Wheat Flour with Yellow Sweet Potato and Egg Yolk in The Produces of Wet Noodles**

*Substitusi Tepung Terigu Dengan Ubi Jalar Kuning Dan Kuning Telur Pada Pembuatan Mi Basah*

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### **ABSTRACT**

Most of the noodles are made from wheat flour. The study used a factorial completely randomized design (CRD), which consisted of two factors, namely: substitution of wheat flour with yellow sweet potato with the code "U" consisting of 4 levels; U<sub>1</sub> = 10 %; U<sub>2</sub> = 20 %; U<sub>3</sub> = 30 %; U<sub>4</sub> = 40 %. Egg yolk amount, and with code "T" which consists of 4 levels; T<sub>1</sub> = 5 %, T<sub>2</sub> = 10 %, T<sub>3</sub> = 15 %, and T<sub>4</sub> = 20 %. Parameters observed were yield, protein content, moisture content, stretchability, and organoleptic test of texture, color, and taste. The research was carried out at the UISU Faculty of Agriculture laboratory, Medan. The main ingredient used in this research is yellow sweet potato. The results of statistical analysis on each parameter concluded that the substitution of wheat flour with yellow sweet potato had a very significant effect ( $P < 0.01$ ) on the yield, protein content, water content, tensile strength value, organoleptic texture, color, and taste of noodles. Wet. The amount of yolk dose had a very significant effect ( $P < 0.01$ ) on protein content, moisture content, tensile strength value, organoleptic texture, color, and taste of wet noodles. The two treatment factors did not show any interaction. To produce wet noodles with the best quality, you can substitute up to 30% wheat flour with yellow sweet potato and use 20% egg yolk.

Keywords: egg yolk, wet noodles, substitution, flour, yam.

### **ABSTRAK**

Sebagian besar mie dibuat dari tepung terigu. Penelitian ini bertujuan untuk mengetahui pengaruh substitusi tepung terigu dengan ubi jalar kuning dan jumlah kuning telur dalam pembuatan mie basah. Penelitian menggunakan rancangan acak lengkap (RAL) faktorial, yang terdiri dari dua faktor yaitu : substitusi tepung terigu dengan ubi jalar kuning dengan sandi "U" yang terdiri dari 4 taraf ; U<sub>1</sub> = 10 % , U<sub>2</sub> = 20 % , U<sub>3</sub> = 30 % , U<sub>4</sub> = 40 % . Dosis kuning telur dengan sandi "T" yang terdiri dari 4 taraf; T<sub>1</sub>= 5 % , T<sub>2</sub> = 10 % , T<sub>3</sub> = 15 % , T<sub>4</sub> = 20 % . Parameter yang diamati adalah rendemen, kadar protein, kadar air, daya renggang, dan uji organoleptik tekstur, warna dan rasa. Pelaksanaan penelitian dilakukan di laboratorium Fakultas Pertanian UISU, Medan. Bahan utama yang digunakan dalam penelitian ini adalah ubi jalar kuning. Hasil analisis secara statistik pada masing-masing parameter memberi kesimpulan bahwa Substitusi tepung terigu dengan ubi jalar kuning berpengaruh sangat nyata ( $P < 0,01$ ) terhadap rendemen, kadar protein, kadar air, nilai daya regang, organoleptik tekstur, warna, dan rasa mie basah. Jumlah kuning telur berpengaruh sangat nyata ( $P < 0,01$ ) terhadap kadar protein, kadar air, nilai daya regang, organoleptik tekstur, warna, dan rasa mie basah. Kedua faktor perlakuan tidak memperlihatkan adanya interaksi. Untuk memproduksi mie basah dengan kualitas terbaik dapat mensubstitusi tepung terigu dengan ubi jalar kuning sampai dengan 30 % dan penggunaan kuning telur 20%.

Kata kunci: kuning telur, mie basah, substitusi, terigu, ubi rambat.

## INTRODUCTION

Noodles have been used as an alternative food to replace rice. This is very beneficial from the point of view of diversifying food consumption. This is supported by the various advantages possessed by noodles, especially in terms of texture, taste, appearance, and practical use (Salma *et al.* 2018).

Most noodles are made from wheat flour, some are also made from rice flour, mung bean flour, or wheat flour. The famous noodles are noodles made from wheat flour, rice flour, and mung bean flour. From wheat flour comes egg noodles, so called because the dough is mixed with egg yolks. Egg noodles are the most popular and are sold dry or fresh. Egg noodles can be made into fried noodles, noodle soup, or dry fried noodle salad (Aptindo 2018).

The making noodles, the use of wheat can be reduced by substituting it with other ingredients, such as tapioca flour, cassava flour, pumpkin meat, sweet potato meat, and others. The production of noodles is more nutritious, the protein content can be increased by adding protein sources, both vegetable, and animal, (Ariani *et al* 2018).

Sweet potato is used in making wet noodles because sweet potato is an agricultural commodity and is a source of carbohydrates with high sugar content. In addition to being cheaper, sweet potatoes are easy to obtain in the market, and because sweet potatoes are less attractive to the public for direct consumption, to increase and utilize sweet potato production modifications are made to their use. For example, it is used in making wet noodles which will also reduce the use of wheat flour which is an imported material so it does not reduce the country's foreign exchange (Hidayah 2011).

Based on the information above, the authors examine the substitution of yellow sweet potato and the amount of egg yolk in making wet noodles.

## MATERIALS AND METHODS

This research was carried out at the Agricultural Product Technology Laboratory, Faculty of Agriculture, UISU Medan. The ingredients used are wheat flour, yellow sweet potato, egg yolk, salt, soda ash, sodium carbonate, and water. The tools used include a noodle printing machine, oven, filter, water bath, Erlenmeyer and beaker glass, and scales.

The design model used in this study was a factorial complete randomized design (CRD), which consisted of two factors, namely factor I: substitution of wheat flour with yellow sweet potato (S1 = 10%, S2 = 20%, S3 = 30% and S4 = 40% Factor II: the amount of egg yolk (T1 = 5%, T2 = 10%, J3 = 15% and T4 = 20%) The number of treatment combinations was 16 with 2 replications.

The research was carried out by peeling the yellow sweet potato skin, cutting it, washing it, then steam it for 30 minutes. After chilling, grind it and substitute it into wheat flour according to the dough weighing 200 gr/sample. To form the dough, add 4 ml of soda ash and 50 ml of water, and egg yolks according to treatment (added 2 g of salt first, 0.1 g of sodium carbonate, and shake). Then the dough is stirred until it is tough and elastic. The dough is printed with a noodle printing machine. Noodle-shaped molds are dipped in boiling water, removed, drained, and after cooling, greased with cooking oil so the noodles don't stick.

Parameters observed were yield (final yield weighing method), moisture content (oven method), protein content (AOAC 2005), tensile strength (gravity method), and organoleptic test for color, taste, and aroma. (method n hedonic and numeric scales Soekarno 1982).

Statistical analysis of data using ANOVA (Analysis of variance). Treatments that show an effect on the parameters are

further tested with Duncan's Multiple Range Test (DMRT).

## RESULTS AND DISCUSSION

The results of the analysis of variance (ANOVA) showed that the substitution of wheat flour with yellow sweet potato and the amount of egg yolk had significantly different ( $p < 0.05$ ) effects on yield, water content, protein content, stretchability and organoleptic (taste, aroma, and texture). The average observed results for the effect of the substitution of wheat flour with yellow sweet potato and the amount of egg yolk on the parameters can be seen in Table 1.

From Table 1 it can be seen that the greater the substitution of wheat flour with yellow sweet potato, the yield, water content, organoleptic color, and taste increased (higher), but decreased protein content, stretchability, and texture. The same thing happened to the number of egg yolks which increased in number indicating that all the tested parameters were getting higher in value. The greater

the substitution of wheat flour with yellow sweet potato, the higher the yield, water content, color, and taste. This happens because yellow sweet potato has a higher water binding capacity than wheat flour, panelists prefer the taste of sweet potato combined with wheat flour, and of course, the color of the resulting wet noodles is more attractive with the increasing amount of yellow sweet potato which replaces some of the flour and causes the color of the wet noodles to become more natural yellow. However, the reduction in wheat flour due to substitution causes the protein content, tensile strength, and texture to decrease. This is because wheat flour contains high protein, resulting in a dough that is more elastic and chewy and has a more stable texture when compared to yellow sweet potatoes, which are more porous and low in protein. (Safriani *et al* 2013; Kurniawati *et al* 2015; ..Maleta *et al.* 2018; Juliana *et al* 2019).

Table 1. The Substitution of Wheat Flour with Yellow Sweet Potato and the Amount of Egg Yolks

Treatment	Yield (%)	Protein Content (%)	Moisture Content (%)	Powerstretch (N)	Organoleptic Value		
					Texture	Color	Flavor
Sweet Potato Substitutions							
S <sub>1</sub> = 10 %	159.500 <sup>d</sup>	11.447 <sup>a</sup>	56.375 <sup>d</sup>	0.147 <sup>a</sup>	3.050 <sup>a</sup>	2.838 <sup>c</sup>	2.809 <sup>b</sup>
S <sub>2</sub> = 20 %	164.763 <sup>c</sup>	10.250 <sup>b</sup>	58.075 <sup>c</sup>	0.131 <sup>b</sup>	2.775 <sup>b</sup>	2.938 <sup>b</sup>	2.823 <sup>b</sup>
S <sub>3</sub> = 30 %	167.372 <sup>b</sup>	8.852 <sup>c</sup>	59.400 <sup>b</sup>	0.118 <sup>c</sup>	2.650 <sup>c</sup>	3.125 <sup>a</sup>	3.196 <sup>a</sup>
S <sub>4</sub> = 40 %	169.936 <sup>a</sup>	7.487 <sup>d</sup>	61.200 <sup>a</sup>	0.107 <sup>d</sup>	2.325 <sup>d</sup>	3.363 <sup>a</sup>	3.245 <sup>a</sup>
Amount of Egg Yolks							
T <sub>1</sub> = 5 %	163.499 <sup>b</sup>	8.164 <sup>d</sup>	58.200 <sup>b</sup>	0.121 <sup>d</sup>	2.513 <sup>b</sup>	2.838 <sup>b</sup>	2.859 <sup>c</sup>
T <sub>2</sub> = 10 %	163.981 <sup>b</sup>	9.075 <sup>c</sup>	58.625 <sup>b</sup>	0.122 <sup>c</sup>	2.588 <sup>b</sup>	3.088 <sup>b</sup>	2.975 <sup>b</sup>
T <sub>3</sub> = 15 %	167.009 <sup>a</sup>	9.980 <sup>b</sup>	58.850 <sup>ab</sup>	0.128 <sup>b</sup>	2.688 <sup>a</sup>	3.150 <sup>b</sup>	3.111 <sup>a</sup>
T <sub>4</sub> = 20 %	167.081 <sup>a</sup>	10.819 <sup>a</sup>	59.375 <sup>a</sup>	0.132 <sup>a</sup>	3.013 <sup>a</sup>	3.188 <sup>a</sup>	3.128 <sup>a</sup>

Note: Different letters in the same notation column indicate significantly different effects at the 5% level.

The number of egg yolks showed a significant effect on all parameters tested.

This can be explained that the yolk naturally has molecular weight and

binding capacity, high water content, and protein content so that with the increasing amount used it produces wet noodles that are more elastic (stretch power) and have a high texture, yellow color, and better taste and are preferred by the panelists (Risti and Rahayuni 2013).

### CONCLUSION

The results of the study can be concluded that the substitution of wheat flour with yellow sweet potatoes is up to 30% and the use of egg yolks is 20%. produce wet noodles with good yield, protein content, moisture content, stretchability, and organoleptic tests (texture, color, and taste).

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