The Subtitution of Kluwih Seed Flour (*Artocarpus Communis*) in the Noodle Production

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Abstract

The use of kluwih seed flour in the noodle processing is an effort to diversify food and reduce consumption of wheat flour in Indonesia. This research aimed to examine the physicochemical properties of wet noodles made from kluwih seed flour. The study employed Completely Randomized Design (CRD) non factorial with the treatment of substitution ratios of wheat flour and kluwih seed flour; 10 grams: 90 grams (T1), 20 grams: 80 grams (T2), 30 grams: 70 grams (T3), and 40 grams: 60 grams (T4). The result showed that the best treatment on the composition of the wheat flour substitution with kluwih seed flour 80%: 20% (T2) with an elongation value of 30.68%, elasticity of 7.44% organoleptic test, taste 3.83 (likes), aroma 3.80 (likes) and color 3.97 (likes).

Keywords: *noodle, Kluwih seed flour, organoleptic, elasticity, elongation*

1. Introduction

Kluwih (*Artocarpus communis*) is a fruit similar to breadfruit, except that it has rough skin and seeds. Meanwhile, the breadfruit has smoother skin and no seeds (Novari, 2018). The use of *Kluwih* among the community is still very limited and has not been added ideally into food ingredients though it has high economic quality. Young *Kluwih* are commonly processed into side dishes and old *Kluwih* seeds are often boiled, fried, roasted and consumed as a snack.

Kluwih seeds contain 8.84% protein. The protein content of these seeds is higher than jackfruit seeds and is equivalent to the protein content of 8.7% yellow corn rice. *Kluwih* seeds also contain 5.59% fat, 8.19% fiber, 1.49% ash, 0.06% phenol and 64.96% carbohydrates (Siswiasnisti, 2010). The carbohydrate content which is still quite high in *Kluwih* seeds allows it to be processed into flour.

Noodles are one of the favorite types of food among Indonesian people. It is from flour and usually contain a lot of food additives such as thickening agents, preservatives and coloring agents.

Noodle processed products are not only made from wheat flour, but can also come from other ingredients such as *Kluwih* seed flour, rice flour, corn flour, potato flour, and jackfruit seed flour (Candra, 2018). The use of *Kluwih* seed flour in noodle processing is expected to be one of the food diversification products in an effort to reduce wheat flour consumption in Indonesia.

Based on this, the authors are interested to investigate the use of *Kluwih* in noodle production as a way to increase the economic value of *Kluwih* seeds. In addition, this research also aimed to examined the physicochemical properties of wet noodles made from *Kluwih* seed flour.

2. Method

Tools and materials

Materials used in making *Kluwih* seed flour substitution noodles are *Kluwih* seeds, beetroot extract, water, wheat flour (C*akra Kembar*), salt, cooking oil and eggs. In conducting the analysis, the reasechers applied elongation, elasticity, and organoleptic test. The tools used were: noodle maker (Ampia), plastic basin/container, pot, stove, sifter, knife/scissors, spoon. ovens, analytical balances, porcelain dishes and desiccators.

Design

The study employed Completely Randomized Design (CRD) non factorial with the treatment of substitution ratios of wheat flour and *Kluwih* seed flour; 10 grams: 90 grams (T1), 20 grams: 80 grams (T2), 30 grams: 70 grams (T3), and 40 grams: 60 grams (T4). The data comparison was statistically calculated by using ANOVA, in order to examine the significant level of variables to tested product.

Research procedure

Kluwih Seed Flour Processing

Kluwih seeds that have been thoroughly washed were soaked in water for 2 hours and steamed for 15 minutes. Then, it went into the cooling process. After that, the *Kluwih* seeds were thinly sliced and dried in an oven at 60°C for 8 hours. The dried breadcrumbs were then crushed and sieved using a 100 mesh.

Making Wet Noodles Substitute *Kluwih* Seeds flour

Kluwih seed flour and wheat flour as much as 100 grams (90%: 10%, 80%: 20%, 70%: 30%) were put into the mixer, then mixed with eggs, salt and beetroot extract. The noodle dough that had been thoroughly mixed and smooth was then formed into sheets and put into the Ampia; hence, that the noodles become strands. The noodle strands were then steamed for 15 minutes. Next, the noodles were removed and drained.

3. Results and Discussions

3.1. Elongation

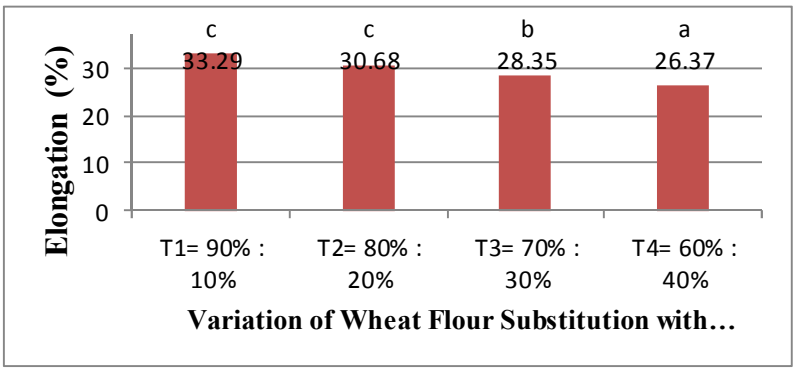

Figure 1. Effect of variations of substitution of wheat flour with *Kluwih* seed flour on noodle elongation

From the figure 1. it can be seen that the lower the addition of wheat flour substitution and the higher the addition of *Kluwih* flour, decreasing elongation. The decrease in the elongation value of the substitution wet noodles was due to the lower gluten content of *Kluwih* seed flour (0.37 gram) than 10 grams wheat flour. Reduced gluten will affect the elasticity of the noodles (Aida et al., 2012).

Gluten is a protein that can agglomerate and expand when mixed with water and is elastic so it can hold air trapped in the dough which causes wet noodles to become sturdy (Subagjo, 2007).

3.2. Elasticity

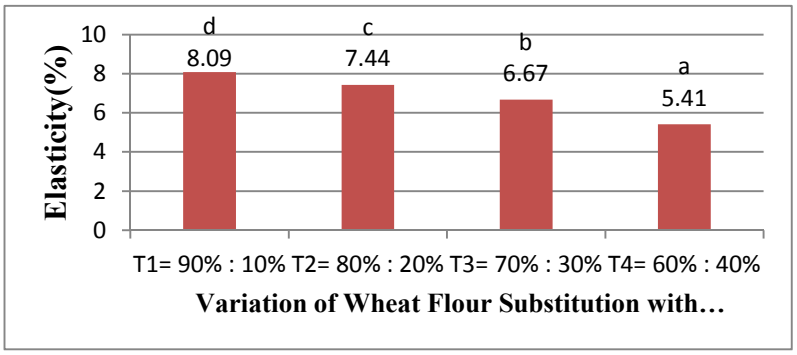

Figure 2. Effect of variations of substitution of wheat flour with *Kluwih* seed flour on noodle elasticity

Figure 2 show that the higher the addition of wheat flour substitution and the lower the *Kluwih* seed flour, the lower the elasticity produced. This is influenced by the very high gluten (protein) content in wheat flour, which causes the wet noodles do not to break easily when pulled. The increasing use of wheat flour in noodle making can affect the elasticity of the resulting noodles (Deanira et al., 2017). In addition, the boiling process of the noodles will also affect the elasticity of the resulting wet noodles. The heating process will affect starch gelatinization and protein coagulation which form the elastic properties of wet noodles (Safitri, 2013).

3.3. Organoleptic Test

Table 1. Preference Level of *Kluwih* flour noodles

Variation of Wheat Flour Substitution with *Kluwih* Seed Flour (T)	Preference Level of Organoleptic Parameter		
	Taste	Odor	Color
T_1= 90%: 10%	3.80	3.65	3.60
T_2= 80%: 20%	3.83	3.80	3.97
T_3= 70%: 30%	3.65	3.85	3.72
T_4= 60%: 40%	3.60	3.80	3.73

Scale: 1=very dislike; 2=dislike; 3=neutral; 4=like; 5=very like

Organoleptic test used in this research were hedonic test. The hedonic test is aimed to assess the preference level of panelists in term of specific parameter. Table 1 presents the number of panelists who prefer *Kluwih* flour noodles with the T2 formulation, according to taste 3.83 (likes), aroma 3 .80 (likes) and color 3.97 (likes).

The variance analysis showed that the variations in the substitution of the wheat flour with *Kluwih* seed flour had no significant effect ($P \geq 0.05$) on the taste and aroma of *Kluwih* flour noodles. The resulting noodles are reddish purple in color. The reddish color of the noodles is influenced by the betcyanin pigment component in the beetroot. According to Sawicki et al. (2016), the betacyanin content in beets is quite high with,

12.79%. The betacyanin is an antioxidant compound that belongs to the class of phenolic compounds. It is widely used because of its use as a dye as well as an antioxidant (Setiawan, 2015).

4. Conclusions

Variations in the substitution of wheat flour with *Kluwih* seed flour had a very significant ($P \leq 0.01$) effect on elasticity and elongation and had no significant effect ($P > 0.05$) on the color, taste and aroma of wet noodles.

The result showed that the best treatment on comparison of the wheat flour substitution with *Kluwih* seed flour 80%: 20% (T2) with an elongation value of 30.68%, elasticity of 7.44% organoleptic test, taste 3.83 (likes), aroma 3.80 (likes) and color 3.97 (likes).

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