The Substitution 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 (*Cakra Kembar*), salt, cooking oil and eggs. In conducting the analysis, the researchers 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](image)

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](image)

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](image)

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 ≥ 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 betacyanin 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≤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).

References


