The Effect of Stabilizers Type and the Comparison of Wheat Flour with Orange Sweet Potato Flour on Dry Noodles Quality

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Keywords: noodles, stabilizers, wheat flour, orange sweet flour

Abstract: Indonesia spend much money to import wheat flour from abroad to make noodles. Based on this we are interested in applying orange sweet potato to substitute wheat flour for making noodles. The purposes of this research were to find out how much orange sweet potato was able to substitute wheat flour to making noodles, to increase using local commodity and increase added value. This research deals two treatments the type of stabilizers and the ratio of composite flour (orange sweet potato and wheat flour). The orange sweet potato flour can substitute wheat flour about 20-30%.

1 INTRODUCTION

The popularity of noodles as food for the people in Indonesia is an opportunity to establish a small, medium or large scale industries. The problem in noodles industry was wheat flour that Indonesia must import from other countries. If we want to reduce dependence on imports of wheat flour and reduce noodles production costs, the use of wheat flour can be reduced by using other flour derived from domestic production. Substitution of wheat flour with local ingredients is expected to ensure the sustainability of noodles production, while empowering the potential of local resources and realizing national food security. The use of tubers in Indonesia is currently low, this can be seen from the consumption pattern of the general public, where the processing is only in a simple form, such as boiled yams and fried yams, meanwhile for industrial scale, tubers can be developed for flour and chips. Utilization of tuber can be develop again into a variety of processed and interesting product like bakery, noodles and cookies, tubers like sweet potato that contain high nutrients, like betacarotene. With the use of raw materials originating from tubers like sweet potato, we hope the farmers will be more interested to plant tubers, because the market is very open and sustainability to be marketed to processing industries like noodles and pastry factory.

Today, food products are generally wheat flour based ingredient that contains gluten. Kusumayanti (2011) stated that gluten was a contributor toward the complain of diarrhea, movement and emotion hyperactivity and sleep disorder. Production noodles from non wheat flour (does not contain glutein) requires a modification process, like gelatinization process (Astawan, 2004). Variety of sweet potato consist white or pale yellow flesh taste sweet compared to red meat, pink, pink and orange (Aguoru et al, 2015). Sweet potatoes are the first rank (super food) in nutrition among vegetables (Milind and Monica, 2015) and great potential as a source of antioxidants as well as bitter taste (Miguel, 2011). The purposes of this research were to find out how much orange sweet potato was able to substitute wheat flour to making noodles, to increase using local commodity and increase added value. This research deals two treatments, the type of stabilizers and the ratio of composite flour (orange sweet potato and wheat flour).

2 MATERIAL AND METHOD

This research was conducted at Analisa Kimia Bahan Pangan Laboratory, University of Sumatera Utara. Orange sweet potatoes were originated from farmer at District Saribudolok, Simalungun, Indonesia Regency. The process of making of

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orange sweet potato flour ithrough: the sweet potato was peeled with 0.2 cm thick sliced knife, placed in a baking sheet and dried in an oven with temperature 50°C about 24 hours, then milled and sifted with 80 mesh sieve. The making of noodles: Mixed sweeat and orange sweet potato flour with formulation 10%:90%; 20%:80%; 30%:70%, 40:60% and 50%:50% with total treatment about 100 gr. Mixed 5 treatment with 4 stabilizer (non stabilizer, arab gum, CMC, and Tween 20). Added salt (0,2 %), egg (14%), and Na_2CO_3. Kneaded about 15 minutes, made sheet shape and made noodles using ampia machine, steamed at temperature 100°C about 12 minutes and dried in the oven at 50°C about 24 hours. Analysis consists of moisture content analysis by using oven method (AOAC, 1995), ash content using dry ashing method (), organoleptic test (7). The data analysis using a randomized design were analyzed using SPSS version 22 for windows. The results reported in all tables are average of triplicate observation subjected to one-way analysis of variance (ANNOVA). Different among the ranges of the properties were determinate using the method of Least Significant Differences (LSD) tests at 95% confidence level (P<0.01). The best treatment was then compared with the control treatment T-test De Garmo was used in determining the best treatment method.

3 RESULTS AND DISCUSSIONS

3.1 Moisture Content

We can see from table 1 and table 2, the composite flour and stabilizers had no significant difference in the moisture content. Dry noodles had moisture content about 2%. The moisture content of our dry noodles about 2 %, meanwhile SNI (Standard Nasional Indonesia/Indonesia National Standard) (SNI 01-3551-2000) about 4% for instant noodles from non wheat flour and about 8% from wheat flour. SNI for dry noodles (SNI 01-2974-1999), for moisture content about 8% (quality number 1) and about 10% (quality number 2). The dry noodle had lower moisture content than SNI. Moisture content affects the shelf life of food. The lower moisture content, the longer storability. The higher of moisture content, the more damaged easily, because microbes can grow easily in food. The heating causes the particles to become more porous, thus increasing the ability to absorb water after drying, which in turn can increase the moisture content contained in the material (Pangastuti et al, 2013). Moisture content in dry noodles was influenced by orange sweet potato flour of moisture content. This was because the increase of the moisture content took place linearly with the increase of PFSP flour amount (Srivastava et al, 2012).

Table 1: The effect composite flour (orange sweet flour and wheat flour) on the moisture content of noodle.

Sample (orange sweet potato:wheat flour)	Moisture Content
T1 (10%:90%)	2.023
T2 (20%:80%)	2.138
T3 (30%:70%)	2.188
T4 (40%:60%)	2.200
T5 (50%:50%)	2.207

Table 2: The effect stabilizers on the moisture content of noodle.

Stabilizers	Moisture Content
P = Non-stabilizers	2.040
P = Gum Arab	1.941
P = CMC	2.065
P = Tween 20	2.469

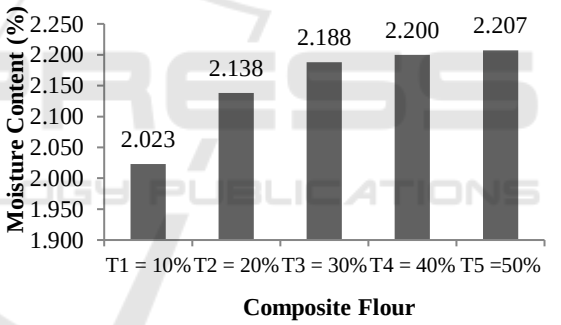

Figure 1: The Effect of composite flour (orange sweet potato flour and wheat flour) on moisture content.

The heating causes the particles to become more porous, thus increasing the ability to absorb water after drying, which in turn can increase the moisture content contained in the material (Pangastuti et al, 2013).

3.2 Ash Content

We can see from table 3 composite flour had significant difference in the ash content at the level 5 %, but there was no significant difference on stabilizer. Table 3 showed that ash content about 1-2%. There was an increase in ash content with the increasing number of orange sweet potato flour. Orange sweet potato have carotene which is almost equal to carrots and high vitamin and high mineral.

Lingga (1984) stated that sweet potato consists vitamin A, ascorbic acid, fosfor, Ferrum and calcium. This dry noodles from orange sweet potato flour had an advantage that can be sold, which is having high carotene and mineral.

Table 3: The effect composite flour (orange sweet flour and wheat flour) on ash content of noodle.

Sample (orange sweet potato:wheat flour)	Ash Content
T1 (10%:90%)	1.564 a
T2 (20%:80%)	1.978 ab
T3 (30%:70%)	2.172 ab
T4 (40%:60%)	2.720 a
T5 (50%:50%)	2.580 ab

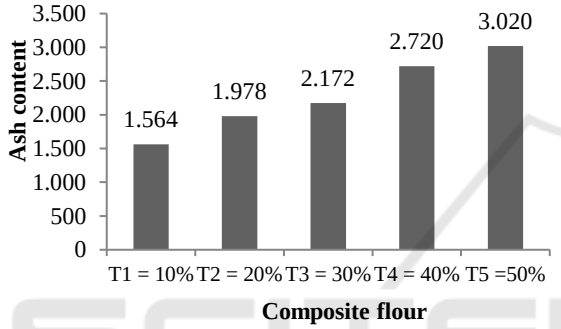

Figure 2: The Effect of composite flour (orange sweet potato flour and wheat flour) on ash content.

3.3 Taste Value

Table 4 showed an organoleptic taste test about 2-3 (rather like it). K2 (orange sweet potato flour 20% and sweat flour 80%) had higher content of taste. It showed that addition of orange sweet flour could is accepted by the panelist

Table 4: The effect composite flour (orange sweet flour and wheat flour) on taste value of noodle.

Sample (orange sweet potato:wheat flour)	Taste Value	Taste Value
T1 (10%:90%)	3.280	3.280
T2 (20%:80%)	3.070	3.070
T3 (30%:70%)	2.846	2.846
T4 (40%:60%)	2.840	2.840
T5 (50%:50%)	2.615	2.615

3.4 Colour Value

Table 5 showed that there is a decrease in colour with decreasing amount of orange sweet potato flour. This may be due to the brown colour produced dark and tends to involve fewer panelists. This dark colour is caused because orange sweet potato flour had a process of starch hydrolysis so that the starch decreases and turns into reducing sugar (Utomo dan Antarlina, 2002).

Table 6 showed that the highest colour was Tween 20 about 3. It showed that Tween 20 could maintain the colour of dry noodles. Tween 20 (PEG-20 dehydrate monolaurate sorbt) was a type of stabilizer or nonionic surfactant from sorbitol. Polysorbate can use for food, cosmetic and formation.

The heating causes the particles to become more porous, thus increasing the ability to absorb water after drying, which in turn can increase the moisture content contained in the material (Pangastuti et al, 2013). Betacarotene is increasing with the increasing number of orange sweet potato flour added in making noodles. Orange sweet potato flour has caroteneid pigments which are yellow, red, and orange pigments that serve as precursors of vitamin A and antioxidants (Wahyuni and Widjanarko, 2015).

Table 5: The effect composite flour (orange sweet flour and wheat flour) on color value of noodle.

Sample (orange sweet potato:wheat flour)	Color Value
T1 (10%:90%)	2.910ab
T2 (20%:80%)	3.222a
T3 (30%:70%)	2.886ab
T4 (40%:60%)	2.633ab
T5 (50%:50%)	2.445b

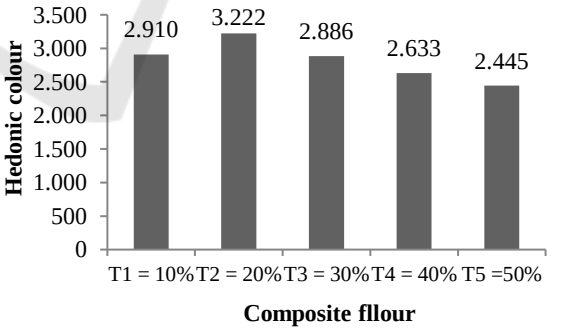

Figure 3: The Effect of composite flour (orange sweet potato flour and wheat flour) on color value of noodles.

Table 5: The effect of stabilizers on the color value of noodle.

Stabilizers	Color Value
P = Non-stabilizers	2.234
P = Gum Arab	2.889
P = CMC	2.992
P = Tween 20	3.163

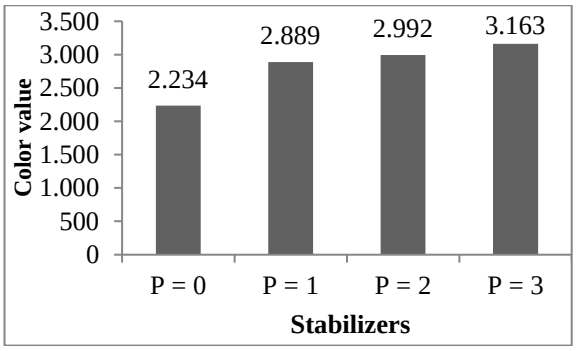

Figure 4: The Effect of stabilizers on color value of noodles.

4 CONCLUSIONS

The orange sweet potato flour can substitute wheat flour about 20-30 percent. The stabilizers had an effect on noodles by maintaining color.

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