

Characteristics of Dumpling Wrapper from Orange Sweet Potato (*Ipomoea Batatas L.*) Puree Addition and Composite Flour (Wheat and Mocaf Flour)

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Keywords: Dumpling Wrapper, Orange Sweet Potato Puree, Mocaf.

Abstract: Dumpling is a food products originating from China that usually have filling in it. The dumpling wrapper is usually made from wheat flour, tapioca flour, margarine, and egg. The efforts to reduce wheat flour import in Indonesia is the use of mocaf as wheat flour substitute and the addition of orange sweet potato puree to improve nutritional value. This study treatment were ratio of wheat flour and mocaf of 100:0, 75:25, 50:50, 25:75 and the addition of orange sweet potato puree of 10%, 20%, 30%. The addition of orange sweet potato puree of 10% (P1), 20% (P2), and 30% (P3) gave rise to significant differences ($p < 0.01$) in regard to the water, ash, and carbohydrate contents, there was no significant difference ($p > 0.05$) was found in terms of fat, protein, and carbohydrate levels.

1 INTRODUCTION

One of the food products with pasta as their main ingredients is dumpling. Dumpling is a Chinese food product that is commonly called as wonton (Hou, 2010). Indonesians have high rates of wheat flour-based products consumption that result in an increase in the rates of wheat flour import annually. Meanwhile, in North Sumatera, the production of cassava is overflowing and it can proceed into mocaf flour in order to reduce the use of wheat flour for making any kinds of food products. The *modified cassava flour* (mocaf) flour is cassava-based flour that has been modified through fermentation (Salim, 2011).

The researcher intended to increase the fiber contents of the flour so that the addition of other ingredients that contain a high amount of fiber is necessary and local ingredients, such as puree of orange sweet potato, are preferred. Orange sweet potato contains a higher amount of vitamin C and B as well as beta-carotene compared to white sweet potato (Suismono, 2001). Aside from increasing its nutritional value, the addition of orange sweet potato puree also affects the color of dumpling wrapper and makes it more attractive.

2 MATERIAL AND METHOD

The main ingredients used in this study are wheat flour, tapioca flour, orange sweet potatoes, eggs, margarine, salt, and water that were originated from Modern Market in Setiabudi-Medan. While, the mocaf flour was made at the laboratory of Faculty of Agriculture, Universitas Sumatera Utara, Medan. The reagents used in this experiment include NaOH, H₂SO₄ and aquadest. The process of making the mocaf flour started with selecting the main ingredient which is cassava, followed by washing, chopping, and soaking the cassava in an enzyme or starter for 24 hours, drying, seiging or grinding, sifting, and packaging. Until then, the mocaf (modified cassava flour) was obtained. The processing of sweet potato into a puree was done by blanching it for 5-7 minutes at initial temperature of less than 100° C to prevent browning reaction when the ingredient is blended, and was subsequently sliced and mashed up using blender (Ferawati 2009). As for making the dumpling wrappers, the wheat flour and the mocaf flour were weighed followed by sifting using 80 mesh. Both were mixed with 50 g eggs that had been stirred and 3 g salt. Around 20 mL of water was added and all was mixed evenly. Around 10%, 20% and 30% of orange sweet potato

puree were added into the mixture and it was all stirred and stored for 10 minutes. The dough was flattened into a layer with 0.5 mm thickness. Furthermore, it was cut into square-shape pieces measuring 8 cm x 8 cm. The dumpling wrappers were packed inside a polyethylene plastic bag and were further analyzed (AOAC, 1995). This study was conducted using completely randomized design factorial that consisted of two factors, namely factor I that represents the ratio of wheat flour/mocaf flour (T) of 100:0, 75:25, 50:50, 25:75 and factor II (K) 10%, 20%, 30%.

3 THE EFFECT OF ORANGE SWEET POTATO (*IPOMOEAE BATATAS L.*) PUREE ADDITION AND SUBSTITUTION OF MOCAF (*MODIFIED CASSAVA FLOUR*) ON THE QUALITY OF DUMPLING WRAPPER

This study showed that substitution of wheat flour by using mocaf flour in the making of dumpling wrappers affected the water content and protein level. The influences of substituting wheat flour into mocaf flour for making dumpling wrappers on the observed parameters are presented in Table 1.

Table 1: The effects of wheat/mocaf flour ratio on quality of dumpling wrapper.

Parameters	Wheat/mocaf flour ratio			
	T1	T2	T3	T4
Water content (%)**	40.353	37.110	36.919	36.364
Ash content (%) ^{ln}	1.989	1.968	1.966	1.861
Protein content (%)**	9.267	8.115	7.501	6.336
Fat content (%) ^{ln}	15.475	15.617	15.584	15.557
Carbs content (%) ^{ln}	36.935	37.348	37.782	35.903

Table 2: The effects of orange sweet potato puree on the quality of dumpling wrapper.

Parameters	Orange sweet potato puree addition		
	P1 (10%)	P2 (20%)	P3 (30%)
Water content (%)**	34.999	38.003	40.058
Ash content (%)**	1.787	1.934	2.118
Protein content (%) ^{ln}	7.764	7.805	7.845
Fat content (%) ^{ln}	15.490	15.539	15.645
Carbs content (%)**	39.983	36.692	34.302

This study showed that the addition of orange sweet potato puree for making dumpling wrappers affected the water content, ash content, and carbohydrate level of the wrappers. The influences of substitute wheat flour into mocaf flour for making dumpling wrappers on the observed parameters are presented in Table 2.

3.1 Water Content

The substitution ratio of the two flour types resulted in a significant influence ($P < 0.01$) on the water content of the dumpling wrappers. According to the results presented in Table 1, the lowest water content was 36.364% which was obtained from the dumpling wrappers made using 25:75 (T4) wheat/mocaf flour ratio and the highest water content (40.353%) was found in those wrappers made using 100:0 (T1) wheat/mocaf flour ratio. The more puree added to the dumpling dough, the higher water content found within the dumpling wrappers (Wahyuni et al., 2015).

Table 2 shows that orange sweet potato puree addition results in a significant ($p < 0.01$) influence on the water content of the dumpling wrappers. The highest water content was 40.058% which was obtained from the dumpling wrappers made using 30% (P3) sweet potato puree, while the lowest water content (34.999%) was found in those wrappers made using 10% (P1) sweet potato puree. When the puree was made, a specific amount of water was added to increase the water content of the orange sweet potato puree. The more puree added to the dumpling dough, the higher water content found within the dumpling wrappers. Sweet potato flour had dietary fiber content about 3,78% meanwhile in wheat flour about 2-2,5%. Dietary fiber had effect on moisture content. There were many free hydroxyl group that had ability to binding water (Santoso, 1999).

3.2 Ash Content

According to Table 1, the substitution ratio of the two flour types did not result in a significant influence ($P > 0.05$) on the ash content of the dumpling wrappers. The ash content was similar across the different substitution ratios, ranging from 1.861% - 1.989% and thus the LSR (Least Significant Range) test was discontinued.

In contrast, the addition of orange sweet potato puree gave rise to a significant influence ($p < 0.01$) on the ash content of the dumpling wrappers. Table 2 shows the highest ash content (2.118%) was found

in the dumpling wrappers containing 30% (P3) orange sweet potato puree, while the addition of 10% (P1) puree resulted in the lowest ash content (1.787%). The influence of puree addition on the ash content could result from the ash level contained in the orange sweet potato. Orange sweet potato generally contains high amount of calcium and iron which are 86.62 ppm and 19.18 ppm, respectively, according to (Kurniasih and Munarti, 2015). The ash content of purple flesh sweet potato flour contain about 2% (Antarlina and Utomo, 1999). National Standarization of Indonesia ash content of wheat flour about 0,7%. It showed that the higher purple flesh sweet potato flour the higher ash content of egg roll (Badan Standarisasi Nasional, 2009).

3.3 Protein Content

The substitution ratio of the two flour types also resulted in a significant influence ($P < 0.01$) on the protein content of the dumpling wrappers. According to the results presented in Table 1, the lowest water content was 6.336% which was obtained from the dumpling wrappers made using 25:75 (T4) wheat/mocaf flour ratio and the highest water content (9.267%) was found in those wrappers made using 100:0 (T1) wheat/mocaf flour ratio. According to Nursasminto (2012), the lesser the proportion of wheat flour used, the lower the protein content would be. The addition of mocaf flour reduces the protein content owing to the low protein level contained in the mocaf flour that account for only 1%. Salim (2011) also reported that mocaf flour has lower level of protein compared to wheat flour as it does not contain any gluten, while gluten is abundant in the wheat flour. Wheat flour is made of wheat seeds and contains high amount of Gluten. Gluten is a type of protein naturally found in all types of cereals or seeds that is insoluble in water (Ihromi, 2018). The addition of orange sweet potato puree did not result in a significant change ($p > 0.05$) on the protein content. The protein content was similar across the different puree concentrations, ranging from 7.764% - 7.845% and thus the LSR (Least Significant Range) test was discontinued.

3.4 Fat Content

The substitution ratio of wheat and mocaf flour did not significantly affect ($p > 0.05$) the fat content of the dumpling wrappers. The fat content was similar across the different substitution ratios, ranging from 13.710% - 15.650% and thus the LSR (Least Significant Range) test was discontinued. The

addition of orange sweet potato puree did not result in a significant change ($p > 0.05$) on the fat content. The fat content was similar across the different puree concentrations, ranging from 13.710% - 15.650% and thus the LSR (Least Significant Range) test was discontinued.

3.5 Carbohydrate Content

The substitution ratio of wheat and mocaf flour did not significantly affect ($p > 0.05$) the carbohydrate content of the dumpling wrappers. The carbohydrate content was similar across the different substitution ratios, ranging from 35.903% - 37.782% and thus the LSR (Least Significant Range) test was discontinued.

Conversely, the addition of orange sweet potato puree gave rise to a significant influence ($p < 0.01$) on the carbohydrate content of the dumpling wrappers. The highest carbohydrate content (39.983%) was found in the dumpling wrappers containing 10% (P1) orange sweet potato puree, while the addition of 30% (P3) puree resulted in the lowest carbohydrate content (34.302%). The more puree that we added, carbohydrate will higher of the dumpling wrappers. The level of carbohydrate tends to rise with the addition of orange sweet potato puree (Retnaningtyas and Widya, 2014). Levels of carbohydrate are influenced by other nutritional components. The other nutritional components were lower, so levels of carbohydrate were higher. The lower water content in foodstuffs, the other component like carbohydrate and mineral higher (Muchtadi et al, 2010).

4 CONCLUSIONS

Substitution of wheat flour into mocaf flour using a wide variety of wheat/mocaf flour ratios of 100:1 (T1), 75:25 (T2), 50:50 (T3), and 25:75 (T4) resulted in significant differences ($P < 0.01$) in terms of water and protein contents, however no such difference was found ($p > 0.05$) in regard to the ash, fat, and carbohydrate contents. The addition of orange sweet potato puree of 10% (P1), 20% (P2), and 30% (P3) gave rise to significant differences ($p < 0.01$) in regard to the water, ash, and carbohydrate contents yet no significant difference ($p > 0.05$) was found in terms of fat, protein, and carbohydrate levels.

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