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THE UTILIZATION OF ORANGE SWEET POTATO FOR MATERIAL MAKERS AS ALTERNATIVE IN SUPPLEMENTARY FEEDING SCHOOL FOR PRIMARY SCHOOL STUDENT IN UJUNG BAWANG VILLAGE DOLOK SILAU SUBDISTRICT SIMALUNGUN DISTRICT

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Abstract: Orange sweet potato commodity was appropriate to consider in supporting the food diversification program for encouraging the national food security based on nutrient content, relatively shorter age and easier to produce in various lands. One of these that can be made based on the orange sweet potato flour was biscuit.

Purpose: The objective of this study was to investigate the use of orange sweet potato as a raw material for biscuit production and their acceptance for the elementary school students at Ujung Bawang Village Dolok Silau Subdistrict Simalungun District.

Methodology: The type of the study was experimental study. Acceptance test would be used in appraisal for the color, taste, flavor and texture. 120 students recruited for the panelist consist of the primary school students in Grade I through Grade VI (each grade consisted of 20 students). Method of data analysis included Percentage Descriptive Analysis.

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Findings: The result of the acceptance test of the elementary students for provision of orange sweet potato biscuit was indicated by the color, taste, flavor and texture and the most preferred was the sample Tu50 with composition of 50% orange sweet potato flour of the total wheat flour.
Research implications: A further and more perfect study is required to improve the quality of the sample Tu50 ; biscuit with the substitution of 50% orange sweet potato flour as the best result of experiment to reach the best quality of the biscuit such as chemical properties of the biscuit and the storage capability of biscuit.

Keywords: *Orange Sweet Potato; Biscuit; Acceptance Test; Primary School Student*

INTRODUCTION

Sweet potato is the fourth source of carbohydrate in Indonesia after rice, maize, and cassava. Commodities sweet potatoes are very worthy to be considered in support of food diversification program to support national food security based on nutrient content, relatively short lifespan, easily planted in various soils with a productivity of 20-40 tons / ha of fresh tubers, cheaply and easily obtained in local market (Zuraida and Supriati, 2001). The main components of carotenoids in sweet potato is ß-carotene (86-90%), that is a provitamin A that could be converted into vitamin A. The food color such as yellow/orange, purple, or red, can be used as an indicator that the material contains more vitamin A than white. As a micronutrients, vitamin A need for the body to boost immunity and health of the eye (Astawan, 2008).

The great potential on sweet potato is in carbohydrate content, where as many as 75-90% dry weight of tubers is a combination of starch, sugars, and fibers such as cellulose, hemicellulose, and pectin (Hartoyo, T, 2004). Carbohydrates in the tuber has been widely treated in the community in the form of local snacks, such as apem cakes, chiffon cakes, pilus, sweet potato chips, and snacks such as biscuits. Biscuits are one type

of cake that currently very favorite for many people from various economic groups and age groups as a snack. Biscuits with affordable price by various economic groups is also one reason why the biscuit much appreciated by the public (Moehji, 2000).

In general, a biscuit made from wheat flour, but these biscuits can also be made from raw materials orange sweet potato flour with the advantages of having good taste and high in fiber (27.9 gr fiber in 100 gr orange potato), however, the orange sweet potato biscuit has a weakness that is not as good as the level evolve flour because cassava orange potato does not contain gluten which gives the effect of bloom on the products processed. Productivity of sweet potato in the District of Simalungun 96.27 tons / ha where the Ujung Bawang village is one of sweet potato production centers in Dolok Silau Subdistrict Simalungun District (North Sumatra Agricultural Office, 2007). Based on the observations of researchers note that the habits of local communities in the processing of sweet potatoes just fried, boiled, and **roasted** that less favored for the children so researchers wanted to know how the orange sweet potatoes when used as materials for the biscuits and their acceptance in primary school students in Dolok Silau Subdistrict Simalungun District

Study Objectives: To make sweet potato biscuits with orange sweet potato flour substitution of 50%, 60% and 70% of the amount of flour and their acceptance of primary school students seen from the indicator color, flavor, odor and texture.

Contribution of Research: As one way in the utilization of local food products and food diversification. Moreover information sources for the public and school health officer about the orange sweet potato biscuits containing high vitamin A as alternative elementary school children for supplementary food.

RESEARCH METHOD

1. Type, Time, and Place of Research

This study is an experiment in making biscuits with orange sweet potato flour substitution of 50%, 60% and 70% of the amount of wheat flour that held on October 2009 at the Laboratory of Public Health Nutrition USU Faculty of Public Health. While the acceptance test conducted in the Public School 097 377 Ujung Bawang Village Dolok Silau Subdistrict Simalungun District.

2. Materials and Equipment

Materials used: orange sweet potato flour, wheat flour in mild protein content, refined sugar, butter, maize, baking powder, egg yolks, salt, water. Equipment such as the scales, dough bowl, mixer, wooden spoon, fork, cake pan, oven, gas stove. All the ingredients are mixed and formed. After it's formed and burned (roasted).

3. Organoleptic Test (Acceptance Test) of Biscuit

Organoleptic test is a test by panelist about their acceptance of biscuit that cover taste, odor, texture and color. This test using a hedonic scale with the three criteria namely very like (score 3), less likely (score 2), and do not like (score 1) with 120 primary school students panelists class I to class VI, i.e. a total of 120 students (each class consist of 20 students).

4. Data Analysis

Data analysis is descriptive analysis to assess the percentage of panelist's reaction to the biscuits. Score values for the

percentage formulated as follows:

$$\% = \frac{nx}{N} 100$$

Description:
% = Percentage score
n = number of scores obtained
N = ideal score (highest score x number of panelists)

Score maximum = 3 x 120 panelists = 360
Score minimum = 1 x 120 panelists = 120
Maximum percentage = 360/360 x 100% = 100%
Minimum percentage = 120/360 x 100% = 33,3%

Hedonic Scale :
Score 3 : Very like
Score 2 : Like
Score 1 : Do not like

Percentage interval = (100% - 33%) : 3 criteria
= 26%

Table 1:
Percentage and Favorite Criteria

Percentage (%)	Favorite Criteria
74.00 – 100	Like
48.00 – 73.99	Less likely
22.00 – 47.99	Do not like

RESULTS AND DISCUSSION

1. The Primary School Student Acceptance of Orange Sweet Potato Biscuit based on Color Indicator

The color of orange sweet potato flour affects the color of biscuit products, which more concentration of orange sweet potato flour, biscuits will be more brownish color and it seems this is less preferred by the panelists. **The use of 70% orange sweet potato flour in biscuit has score 259 and 71% panelist in less likely favorite criteria. Whereas biscuit with 50% orange sweet potato flour has highest favorite score (281 score) and 78% panelist in like favorite category.**

The difference in the number of orange sweet potato flour and wheat flour led to differences in protein content derived from wheat flour and carbohydrates of orange sweet potato flour, which play a role in the maillard reaction. According Winarno (1984), maillard reaction is a reaction between carbohydrates, especially reducing sugars with the NH2 of the protein that produces hidroksimetilfurfural compound which then continues into furfural. Furfural will polimerization to form brown melanoidin compounds. Melanoidin is what gives the biscuits brown color.

According to Puspa Jofi (2002), if more gluten is added causing the resulting melanoidin provide less color intensity, so that the resulting product color to yellow-brown. Therefore, the addition of orange sweet potato flour as much as 50% yield panelists preferred color, as compared to the addition of orange sweet potato flour as much as 70%. The function of color at a food is important, because it can arouse **individual's appetite**. Colors in the food that sold in the market sometimes is not necessarily safe, that is **not safe to consume** too often because of the heavy metal residue in the dye so

harmful to health (Winarno, 1992). Interesting food color can affect consumer tastes and appetizing meals, even the color can be a clue to the quality of food produced **(Barrows, et al, 2003).**

2. The Primary School Student Acceptance of Orange Sweet Potato Biscuit based on Flavor Indicator

Composition biscuit with more orange sweet potato flour could be increasing the intensity of flavor in the sweet potato biscuits. It yield decreases the rate of favorite panelists. Panelists tend still prefer biscuits with flavor and taste that is typical of wheat flour and other supplemental materials. The tongue is very potential in detect a taste. A taste of food could be recognized by a relationship between microvillus in tongue and impulses that sent via nerves to the central nervous system (Winarno,1997). Greatly flavor affected the taste preferences of consumers towards food and be a major determining factor. Recently, the flavor of biscuits in the consumer market are very diverse so that we need the necessary flair and creativity to mix and match flavors to meet the consumer favorite.

3. The Primary School Student Acceptance of Orange Sweet Potato Biscuit based on Smell (Odor) Indicator

Panelists preferred the normal smell of biscuits that are usually consumed, the biscuits are made from wheat

Favorite Test	Sample Tu 50			Sample Tu 60			Sample Tu 70		
	Σ Score	Percentage (%)	Favorite Criteria	Σ Score	Percentage (%)	Favorite Criteria	Σ Score	Percentage (%)	Favorite Criteria
Color Indicator	281	78.06	Like	269	74.72	Like	259	71.94	Less likely
Flavor Indicator	278	77	Like	271	75.28	Like	249	69.17	Less likely
Odor Indicator	299	83.06	Like	279	77.50	Like	263	73.05	Less likely
Texture Indicator	269	74.72	Like	256	71.11	Less likely	249	69.17	Less likely

Table2:
Test Results Passions Biscuits with Orange Sweet Potato Flour Substitution on Indicator Color, Flavor, Odor, and Texture

flour and other supplemental materials that when mixed with the orange sweet potato flour can produce a scent which was considered "weird" (unique) by the panelists. Different numbers of orange sweet potato flour and wheat flour that used in this study led to the different proteins in wheat flour and different carbohydrates in orange sweet potato flour ineach dough. The presence of proteins and carbohydrates causes the maillard reaction during roasting in the oven will produce volatile compounds that emit a distinctive smell of biscuits. According Kartika (1988) scent that is so difficult to measure odor usually cause a different opinion in assessing the quality of its smell. Differences of opinion caused everyone has a difference of smell, although they can distinguish the scent but everyone has different preferences.

4. The Primary School Student Acceptance of Orange Sweet Potato Biscuit based on Texture Indicator

The use of sweet potato flour in the manufacture of biscuits will reduce the amount of flour, so the number gluten will be reduced; resulting in a biscuit when chewed in the mouth is not embedded in the tooth. The use of 70% orange sweet potato flour in biscuit has score 249 and 69% panelist in less likely favorite criteria, biscuit with 60% orange potato flour has 256 score and 71% panelist also in less likely favorite criteria. In other hand, 50% orange sweet potato flour has the highest favorite score (281 score) and 78% panelist in like favorite category.

The existence of the fiber causes the texture of the product becomes harder (Sandri, 2007). Volume biscuits development is closely associated with the number and quality of gluten in the flour. Orange sweet potato flour contains no gluten, so the more the number of orange sweet potato flour is used lead to the development of low volume which indicates an increasingly harsh conditions of biscuits so that less preferred by the panelists.

Texture is influenced by the protein, water content, fat, carbohydrates, temperature, and duration of cooking. Carbohydrates play a role in determining the characteristics of foodstuffs, such as flavor, color and texture. Fat plays a role in giving a certain flavor to the food. Protein serves to control the texture, appearance and flavor of food. In the carbohydrate contained glucose, sucrose, and starch that can enhance the flavor in food (Winarno, 2000). For example, lead to the sweet taste of sucrose, while starch raises a special flavor to foods. Panelists to the overall assessment of organoleptic parameters of color, flavor, smell and texture the treatment of orange sweet potato flour with a ratio of the amount of flour and sweet potato by 50%: 50% is the best treatment.

5. The Potential Use of Research Outcome According to Life Improvement through Food Technology

One effort to improve the quality of life is to improve nutritional status. Improvement of nutritional status is done by increasing the intake of nutrients such as vitamin A. Based on the difficulty of the consumption of vegetables and fruits as a source of vitamin A in children, orange potato biscuit could be an alternative source of vitamin A. The preference of biscuit among children is relatively high, so if children often consume this biscuit increase the vitamin A allowed by the body. So this product can be use as a product for the alleviation of lack of vitamin A consumption.

CONCLUSION

1. The most preferred smell of biscuit is biscuit with the use of 50% sweet potato flour (Tu50) with a score of 281, the percentage of 78.06% with the criteria that is like a favorite.

2. The most preferred flavor biscuits are biscuits with sweet

potato flour using 50% (Tu50) with a score of 278, percentage of 77.22%.

3. The most preferred color is biscuit with the use of 50% sweet potato flour (Tu50) with a score of 299, the percentage of 83.06% with the criteria of joy that is like.

4. Texture is the most preferred biscuit with the use of 50% sweet potato flour (Tu50) with a score of 269, percentage of 74.72%.

BIOGRAPHY

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4) Overview Knowledge and Diet Snacks Junior High School Students Isam Al Fityan School in 2011 (Team Leader).

SUGGESTION

Need further research to improve the quality of the samples with substitution Tu50 namely biscuits orange sweet potato flour by 50% which is the result of experiments such as the chemical properties of biscuits and biscuit power savings.

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