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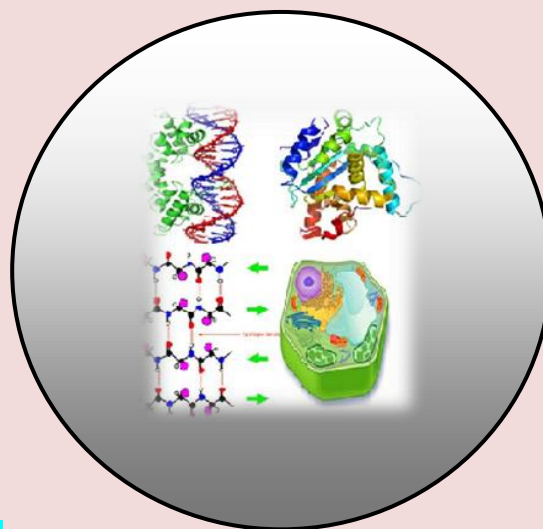
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RESEARCH PAPER

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Substitution of Lindur flour and Addition of Egg Yellows to Cookies Characteristics

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ABSTRACT

Lindur fruit is a suitable fruit explored as a local food because it has a high carbohydrate content, and nutritional content in a complete lindur fruit making it suitable for processing into cakes. This study aims to determine the effect of substitution of lindur flour and the addition of egg yolk to the characteristics of the resulting paint. The design used was Complete Random Design (CRD) with two factors and three replications, namely the first factor is lindur flour substitution and factor two was the addition of egg yolk. Observations are carried out objectively and subjectively. Observation objective, among others: Water content, protein content, carbohydrate levels, fat levels, acidity (pH). Whereas subjective observations include an assessment of Color, Aroma, Taste, Texture, and overall Acceptance. From the results of the study it was found that the best characteristics of lindur flour substitution were obtained from the comparison treatment of lindur flour and 1: 1 wheat flour and the addition of 8 g egg yolk, namely from objective observations (moisture content 7.04%, protein content 3.95%, carbohydrate content 67.61%, grade 20.25% fat and degree of safety (pH) 5.86) whereas from subjective observations (color, aroma, texture, taste, and overall acceptance) 3.26 - 3.60 with criteria rather mild to normal.

Keywords: Lindur, Cookies and Egg Yolk.

INTRODUCTION

Mangroves are a community of trees that live in brackish water and function as a protector of land from large ocean waves (Irwanto, 2006). Among the many types of mangrove fruit in Indonesia that are found among others are fire-fire, mangrove, lindur, and pedada which are the main mangrove plants (Bengen, 2002). *Bruguiera gymnorrhiza* or commonly called lindur fruit is a suitable fruit explored as local food because it has high carbohydrate content (Fortuna, 2005). Bayu (2009) also said that the nutrient content in lindur is complete so it is suitable to be processed into cakes, cakes, mixed with rice or eaten directly with coconut spices. The research conducted by Mamoribo (2003) in the community of Rayori village, Supriyori Selatan district, Biak Numfor district provided information that the community had used mangrove fruit to eat, especially the type of lindur (*Bruguiera gymnorrhiza*) whose fruit was processed into cakes.

However, the processing of lindur as food is still very limited. This is because of the content of HCN and tannin so that it is necessary to do a preliminary treatment to reduce HCN and tannin levels in lindurfruit. The right way to process to reduce or eliminate HCN is by heating and soaking, this is because HCN easily evaporates and permeates in water. According to Yissaprayogo (2010) anti-nutrition ingredient in mangrove fruit can be reduced by soaking in a solution of rice husk ash for a certain time. Sulistyawati (2012) showed that immersion of lindur in a 30% solution of husk ash for 24 hours was able to reduce anti-nutrients to safe limits for consumption.

Flourer is one of the solutions to preserve lindur, because by the process of shedding can break the chain of metabolism so that it becomes more durable because the water content is low and more flexible applied to various types of processed foods so that later it is expected to be more easily introduced to society. From flour can also be processed into various kinds of processed products such as cakes, cakes or other preparations. One of the processed ingredients from lindur flour which was introduced to the community is cookies or commonly called Pastry.

The lindur flour painting is a new processed breakthrough that can increase the use value of lindur which has not been paid much attention. However, as a food that has not been too widely known by the public, in making kernels, lindur flour is still a substitute for wheat flour. So that with this matter it is necessary to do research to see the substitution of lindur flour and the addition of suitable egg yolk so that it gets the characteristics of good paint.

MATERIALS AND METHODS

The raw material used in this study is lindur flour obtained from lindur flour makers that live around mangrove forests in South Denpasar. Additional ingredients used are butter, refined sugar, chicken egg yolks, milk powder. All raw materials have been prepared and then the equipment needed to make lindur flour is prepared. All raw materials and equipment used are prepared in a clean processing room. All equipment must be clean of dirt, dust, and rust.

The equipment used in this study are generally divided into two parts, to make cookies that products basins, scales, spoons, plastic pads, oven, stove, clock, rolling pin, cookie cutters, jar. The tools for analysis are: scales, measuring cups, pumpkin Kjeldahl, Exicator, pumpkin Destilator, burette, drip pipette, petri dish, oven, Erlenmeyer, Sokhlet tube and hand-refractometer.

This study uses a Completely Randomized Design factorial pattern with two factors and 3 replications consisting of:

Factor 1: Comparison of lindur flour with wheat flour

T1: Lindur flour 1: Wheat flour 1 (1: 1)

T2: Lindur flour 1: Wheat flour 2 (1: 2)

T3: Lindur flour 2: Wheat flour 1 (1: 2)

Factor 2 is the addition of egg yolks consisting of 3 levels, namely:

K1: egg yolk (8 g)

K2: egg yolk (16 g)

K3: d egg yolk (24 g)



Figure 1a. Lindur Fresh Fruit.



Figure 1b. Lindur Rice.



Figure 1c. Lindur flour.

Figure 1. Lindur.

Phase study was as follows, namely prepared raw material (lindur flour, wheat flour, and egg yolks). After the ingredients and tools are ready, flour and other ingredients are mixed according to the desired mixture. The dough is ready-molded shape as desired to display devices and arranged in a grill pan. The dough that has been arranged in a baking sheet is ready to be baked in an oven with a temperature of 160 degrees Celsius with a length of roasting 30 minutes. After the cookies are cooked, the pan is removed from the oven and allowed to cool to room temperature. And ready to be analyzed.

RESULTS AND DISCUSSION

Objective Analysis

A. *Water content*

Based on the results of variance analysis showed that the substitution of lindur flour was not significantly different ($P > 0.05$) to the moisture content of the Paints, the addition of eggs to the Paints was significantly different ($P < 0.05$) to the moisture content of Cookies, as well as the interaction of the two different treatments real ($P < 0.05$). The water content of Cookies ranges from 7.04% - 8.73%. the highest water content was obtained from the comparison treatment of lindur flour and wheat flour 1: 2 and the addition of 24 gr egg yolk with a value of 8.73%, while the lowest water content was obtained from the comparison treatment of lindur flour and 1: 1 flour and the addition of 8 gr egg yolk with a value that is equal to 7.04%. The standard water content of the paint is 1% to 5%, while the water content produced by cookies is 7.04% to 8.73%. Water content in food ingredients also determines the level of acceptance, freshness and long-lasting power of the product. Most of the chemical and biochemical changes in food ingredients come from water media in the material (Winarno, 2004). Judging from the range of water content above it can be said that Cookies is dry food. Food which has relatively high water content will tend to experience damage faster than food which has lower water content (Chamdani, 2005).

B. *Protein Levels*

Based on the results of an analysis of variance showed that the number of comparisons of flour and the addition of egg yolks and the interaction of treatment in the Paints was significantly different ($P < 0.05$) on protein content of Cookies. Protein levels in Paints range from 3.34% - 3.95%. the highest protein content was obtained in the comparison treatment of lindur flour and wheat flour 1: 1 and the addition of 8 gr egg yolk with a value of 3.95%, while the lowest protein content was obtained in the comparison treatment of lindur flour and 1: 1 flour and the addition of 16 g egg yolk with a value of 7.04%. It can be said that the number of additions of egg yolk to the ratio of lindur flour and wheat flour to the second treatment increased and then decreased to the treatment of 3 protein contents in Cookies. The high protein content will also determine the quality of the food itself because protein contains elements of nitrogen (N) which neither fat nor carbohydrates have (Winarno, 2004). When viewed from the SNI requirements for the cookies that the protein content of at least 6.5%, the protein content in cookies does not meet the requirements.

C. *Carbohydrate Levels*

Based on the results of variance analysis showed that the number of comparisons of Paint flour was not significantly different ($P > 0.05$) on carbohydrate content of the Painters, the addition of eggs to the Paints was significantly different ($P < 0.05$) on carbohydrate content of the Cookies, and the interaction of the two treatments significantly different ($P < 0.05$). The carbohydrate level of the painting ranges from 65.50% - 68.58%. The highest carbohydrate content was obtained from the comparison treatment of lindur flour and 2: 1 flour and the addition of 16 g egg yolks with a value of 68.58%, while the lowest carbohydrate content was obtained from the comparison treatment of lindur flour and 1: 2 flour and the addition of egg yolk 24 g with a value that is equal to 65.50%. The comparison treatment of lindur flour and the addition of egg yolk did not significantly affect the carbohydrate content of the painting.

D. *Fat level*

Based on the results of variance analysis showed that the ratio of flour and the addition of egg yolk to the paint and the interaction between treatments were significantly different ($P < 0.05$) to the fat content of Kuki s. Fat content in paints ranged from 18.38% - 21.05%.

The highest fat content was obtained in the comparison treatment of lindur flour and wheat flour 1: 1 and the addition of 16 gr egg yolks with a value of 21.05%, while the lowest fat content was obtained in the comparison treatment of lindur flour and 2: 1 flour and the addition of 8 g egg yolk with a value that is equal to 18.38%.

D. Degree of Acidity (pH)

Based on the results of an analysis of variance showed that the ratio of flour and egg added to the paint was not significantly different ($P > 0.05$) while the interaction of the two treatments was significantly different ($P < 0.05$) on the results of the painting, this study ranged from 5.52 - 5.86, the highest pH was obtained in the comparison treatment of lindur flour and 1: 1 flour and the addition of 8 gr egg yolk with a value of 5.86, while the lowest acidity (pH) was obtained in the treatment comparison of lindur flour and 2: 1 flour and the addition of 8 gr egg yolks with a value of 5.52. In general, microorganisms can grow at a value of acidity (pH) of food items ranging from 6.0 - 8.0. But some microorganisms in certain foods such as yeast and mold can grow well in the range of a pH value of 0 - 8.0. Yeast experienced optimum growth at pH 4 - 5 while molds experienced optimum growth at pH 5 - 7 (Buckle et al., 2007).

Subjective Analysis

E. Color

Results of variance analysis showed that the ratio of flour to steaks was not significantly different ($P < 0.05$) and the addition of egg yolks was significantly different ($P < 0.05$) while the interactions of the two treatments were significantly different ($P < 0.05$) on the color of processed Cookies. The score of the color preference for this painting ranged from 3.43 - 3.66 with the rather dislike - usual criteria. The highest level of panelist preference was obtained from the treatment of the ratio of flour 1: 1 and the addition of 16 gr egg yolks with an assessment score of 3, 66 (rather dislike) while the lowest score was obtained from the treatment of 1: 1 flour and 8 gr egg yolks with scoring score 3.43 (somewhat dislike - normal). According to Winarno (2004), visually color factors appear first and sometimes are very decisive. Acceptance of color as a whole there is no difference in a material varies depending on natural factors, and social aspects.

F. Aroma

The ratio of flour to the paints was significantly different ($P < 0.05$) and the addition of egg yolks was significantly different ($P < 0.05$) while the interactions of the two treatments were significantly different ($P > 0.05$) on the aroma of processed Kinds. Scores of aroma preferences for these paints ranged from 3.33 - 3.56 to the rather dislike - usual criteria. The highest level of panelist preference was obtained from the treatment of the ratio of flour 2: 1 and the addition of 24 g egg yolk with a score of 3.56 (somewhat dislike - usual) while the lowest score was obtained from the treatment of 1: 1 flour and 8 g egg yolks with assessment score of 3.33 (somewhat dislike - usual).

G. Texture

The comparison of flour to the paints was significantly different ($P < 0.05$) and the addition of egg yolks was significantly different ($P < 0.05$) while the interactions of the two treatments were significantly different ($P < 0.05$) on the texture of processed kernels. The score of texture preference for paints ranged from 3.6 to 3.40 with the criteria of rather dislike - usual. The level of panelists' preference for the highest texture of the painting was obtained from the treatment of the ratio of flour 1: 2 and the addition of 16 g egg yolks with an assessment score of 3.40 (rather dislike) while the lowest score was obtained from the 1: 1 flour ratio and yellow additions. 24 gr egg with an assessment score of 3.16 (somewhat dislike - usual). The overall treatment affects the texture and the effect between treatments has only a slight difference. The texture of food is determined by the water content in food (Winarno, 1993).

H. Taste

The flour in cookies significantly different ($P < 0.05$) and the addition of egg yolk were significantly different ($P < 0.05$) while the interaction of both treatment also significantly different ($P < 0.05$) on the color of processed cookies. The taste preference score for the paints ranged from 3.26 - 3.60 with the rather unfavorable - usual criteria. The highest level of panelist preference was obtained from the treatment of flour ratio 2: 1 and the addition of 24 g egg yolks with a score of 3.66 (somewhat dislike) while the lowest score was obtained from the treatment of 1: 1 flour ratio and the addition of 24 g egg yolks with scoring score 3.26 (somewhat dislike - usual).

The taste of a material according to Winarno (1993) is also determined by the water content in the material.

I. Acceptance of care

The comparison of flour, the addition of egg yolk and the interaction of the two treatments were not significantly different ($P>0.05$) to the overall acceptance of the processed Kinds. The preference score for the overall acceptance of this painting ranged from 3.23 - 3.33 with the criteria of rather dislike - usual. The highest level of overall panelist acceptance was obtained from the treatment of the ratio of flour 1: 2 and the addition of 16 gr egg yolks with a score of 3 - 40 (some what dislike - usual) while the lowest score was obtained from the treatment of 2: 1 flour and 24 g egg yolk with an assessment score of 3.23 (rather dislike - usual). The overall acceptance of the painting is thought to be influenced by the acceptance of color, aroma, taste, and texture.

CONCLUSIONS

The substitution of lindur flour is a dry food made from flour substituted with lindur flour and the addition of egg yolk. The lindur flour substitution paint produced from this study has characteristics: Water content ranges from 7.04 % - 8.73 %, protein levels range from 3.34 % - 3.95 %, carbohydrate levels 65.50 % - 68.58 % ranged from fat levels ranging from 18.38 % - 21.08 % and acidity degrees ranged from 5.52 to 5.86), whereas from organoleptic assessments obtained results (3.16 - 3.66) with somewhat dislike to normal criteria.

The characteristics of the best lindur flour substitution from the research were obtained from the comparison treatment of lindur flour and 1: 1 flour and the addition of 8 gr egg yolk, namely from objective observation (moisture content 7.04 %, protein content 3.95 %, carbohydrate content 67.61%, fat content 20.25% and the degree of safety (pH) 5.86) whereas from subjective observations (color, aroma, texture, taste, and overall acceptance) the results of the assessment are 3.26 - 3.60 with criteria that somewhat dislike to normal.

Suggestion

From this study, it can be suggested that

Further research needs to be done to reduce water content in substitution lindur flour who are still high so they can meet the Indonesian National Standard (SNI). The research is needed to improve the low protein substitution of lindur flour protein so that it can meet the Indonesian National Standard (SNI). And the research is needed to eliminate the taste of soap in the paint caused by saponins contained in lindur fruit.

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