



Toddler Biscuit With Addition of Patin Flour and Pandan Leaves Extract Along with Acceptability Test

1st Imelda Telisa
Nutrition Department
Health Polytechnic of Health Ministry
Palembang
Palembang, Indonesia
Imeldatelisa@poltekkespalembang.ac.id

2nd Indriani Ayu Lestari
Nutrition Department
Health Polytechnic of Health
Ministry Palembang
Palembang, Indonesia
lestariindrianiyu@gmail.com

3rd Khusnul Alifia Arrizki
Nutrition Department
Health Polytechnic of Health
Ministry Palembang
Palembang, Indonesia
alifiakhusnul04@gmail.com

4th Suci Prihatinningsih
Nutrition Department
Health Polytechnic of Health
Ministry Palembang
Palembang, Indonesia
suciprihatinningsih@gmail.com

Corresponding author: Imeldatelisa@poltekkespalembang.ac.id

Abstract - Stunting is a major nutritional problem facing Indonesia. Based on Pemantauan Status Data (PSG) for the past three years, stunting has the highest prevalence compared to other nutritional problems such as malnutrition, wasting and obesity. The prevalence of toddlers stunting has increased from 2016 which is 27.5% to 29.6% in 2017. Biscuits can be enjoyed from infants to the elderly with different biscuit compositions according to their needs. Biscuits have a longer shelf life and practically brought as provisions for healthy and nutritious food. Since 2009, wheat flour as a raw material for biscuits was obtained not from within the country (imported), which means it requires a large cost to obtain these raw materials. This study was an experimental study using a Completely Randomized Design (CRD) and friedman non parametric data analysis. Organoleptic test show that there is a relationship between acceptability with the addition of patin flour in terms of biscuits in terms of taste ($p = 0,000$), texture ($p = 0.005$), aroma ($p = 0,000$), and color ($p = 0.005$). The results of physical analysis showed that the biscuits most favored by the panelists were formulas P0 and P1. The formula chosen as a potential biscuit to reduce the risk of stunting is P3 biscuits, which have a nutritional composition of 18.84% protein, 28.02% fat, and 41.25% carbohydrate.

Keywords: stunting, biscuit, patin flour

I. INTRODUCTION

The incidence of stunting (short) children is a major nutritional problem facing Indonesia. Based on *Data Status Monitoring* for the last three years, stunting has the highest prevalence compared to other nutritional problems such as malnutrition, underweight and obesity. The prevalence of stunting under five has increased from 2017 [1] namely 29.6% to 30.8% in 2018[2].

The World Health Organization (WHO) recommends of fish intake at least two servings per week[3]. However, data shows that the level of Indonesian fish consumption tends to be low compared to other countries. The level of Indonesian fish consumption in 2013 was 35.14 kg / cap / year. This has shown an increase compared to previous years, namely 33.89 kg / cap / year (2012), 32.25 kg / cap / year (2011), and 30.48 kg / cap / year (2010)[4] Biscuits are baked products in the form of small pieces and have a dry, crunchy texture or

consistency with a tighter pore texture. Biscuits are a thin product with a relatively low moisture content ($\pm 5\%$), the dough is ground into thin sheets which are then cut or baked. The addition of patin flour is an effort to find other ingredients that can replace some of the wheat flour without reducing the nutritional value of the food, for example is patin flour. The content contained in patin from the analysis has 15 amino acids consisting of 9 essential amino acids, the highest being leucine is 5.92% and 6 nonessential amino acids with the highest value of lysine is 5.58%[5].

Fragrant pandanus is a plant whose leaves are often used as a food additive, generally as a green coloring agent and giving it a distinctive aroma. The content of fragrant pandan leaves which includes flavonoids, alkaloids, saponins, tannins, polyphenols, and dyes which are thought to have a contribution to antibacterial activity[6].

II. RESEARCH METHODOLOGY

Toddler Biscuit With Addition of Patin Flour and Pandan Leaves Extract Along with Acceptability Test This research is a purely experimental study using a non-factorial completely randomized design study (CRD) with 4 (four) treatments. The research was carried out in July to October 2019. Biscuit making was carried out at the Food Laboratory of the Nutrition Department of the Palembang Health Polytechnic, the organoleptic test was carried out at the Palembang Health Polytechnic Nutrition Department, and the proximate content test was carried out at the Chemical and Microbiology Laboratory of the Faculty of Agriculture, Sriwijaya University Palembang.

The samples of this study were biscuits with the addition of patin flour and pandan leaf extract with a predetermined number of substitutions. Biscuit samples to be assessed by panelists were presented with 1 (one) piece for each formula. Samples were taken randomly from the results of the repetition of each formula.

The samples presented to the panelists then assessed for their characteristics including color, aroma, texture and taste, which were product stimuli that could be recognized by the senses (organoleptic)[7]. The biscuit characteristics were assessed using a preference test questionnaire so that it can be seen that the biscuits that received the highest preference level from the panelists were the biscuits that had the highest acceptance. Panelists in this study were

semi-trained panelists, namely 30 students of the Department of Nutrition, Palembang Health Polytechnic.

Table 1. Formula of patin flour and pandan leaves extract biscuits

Composition (g)	Formula			
	F0	F1	F2	F3
Wheat flour	100	100	100	100
Patin flour	0	20	30	40
Margarine	50	50	50	50
Egg yolk	30	30	30	30
Sugar	25	25	25	25
Pandan leaf extract	15	15	15	15

The ingredients used in the biscuits in this study were wheat flour, patin flour, margarine, egg yolk, sugar, and pandan leaf extract. The formulation of patin flour is presented in Table 1. Make the biscuits with the addition of patin flour and pandan leaf extract has begun by mixing the ingredients, namely granulated sugar, egg yolk, wheat flour, patin flour, margarine, and pandan leaf extract, and stirring until blended. The biscuit dough that has been mixed then rolled using a wooden roll to get the optimal thickness of 0.5 cm with a diameter of 3 cm, then printed using a round cake mold. The dough that has been printed then arranged on a baking sheet and baked in an oven at 180°C for around 25 minutes.

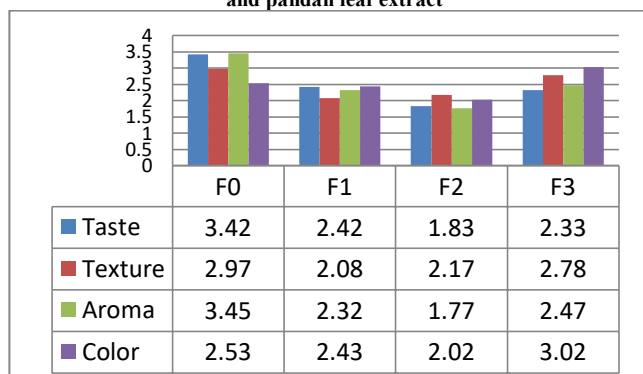
The assessment carried out in this study was the acceptance obtained from the preference level test using a preference test questionnaire. The formula of patin flour and pandan leaf extract biscuits which had the highest acceptance then laboratory tested for their nutrient content.

Organoleptic tests were carried out on the biscuit formula F0 (control biscuit) and the three formulas for patin flour biscuits and pandan leaf extract, namely F1, F2, and F3. Then after the data obtained from the organoleptic test results were analyzed using a non-parametric test (Friedman test) to see the average level of acceptance in the form of ranking and the effect of adding patin leaf and pandan leaf extract to the biscuits.

RESULTS AND DISCUSSION

The results of the acceptability test on 30 semi-trained panelists on the level of preference for the characteristics of patin flour biscuits and pandan leaves extract can be seen in Graph I and Table II.

Graph I. Distribution of acceptance of biscuits with the addition of patin and pandan leaf extract



Based on Graph I, The organoleptic test results showed that the most preferred taste, texture and aroma were F0 biscuit (control biscuit), each of which had an average value of 3.43; 2.97; and 3.45. However in terms of color, the most preferred is F3 biscuit (addition of 40 grams of patin flour). Of the three types of formula for adding patin flour, the biscuit formula P3 was preferred in terms of texture, aroma and color with an average of 2.78; 2.47 and 3.02.

Table II. The relation between biscuit acceptance of the addition of patin flour and pandan leaf extract

Category	p-value
Taste	0,000
Texture	0,005
Aroma	0,000
Color	0,005

The results of the analysis using the Friedman test on the acceptability assessment (color, aroma, texture, and taste) showed a significant difference ($\alpha < 0.05$) on all characteristics.

Next on, Table III showed chemical characteristics were carried out on the control biscuit formula (F0) and the most preferred formula for adding patin meal (F3).

Table III. Chemical analysis of patin flour addition biscuits using proximate test

Cod e	Water Content (%)	Ash Content (%)	Fat Conte nt (%)	Protein Content (%)	Carbohydrat e Content (%)
PO	5,02	0,98	25,87	9,54	58,59
P3	10,47	1,41	28,02	18,84	41,25

Table IV. Nutritional value of F3 biscuits and PMT biscuits for toddlers according to SNI for biscuits (100 g of biscuits)

Nutrient	F3 Biscuit	SNI Biscuit
Energy (kcal)	492,54	450
Protein (g)	18,84	9
Fat (g)	88,02	14
Carbohydrate (g)	41,25	71

Based on table III, known that from two sampling biscuit show that biscuit with addition of patin flour and pandan leaves extract having more nutrition than usual biscuit. Biggest differential show at the content of protein which is P3 biscuit protein as much twice as the P0 biscuit. At table IV, showing about comparison between P3 biscuit with standard nutrition for biscuit in Indonesia.

III. DISCUSSION

The organoleptic test results showed that the most preferred taste, texture and aroma were F0 biscuit (control biscuit), each of which had an average value of 3.43; 2.97; and 3.45. However in terms of color, the most preferred is F3 biscuit (addition of 40 grams of patin flour). Of the three types of formula for adding patin flour, the biscuit formula P3 was preferred in terms of texture, aroma and color with an average of 2.78; 2.47 and 3.02.

Based on the organoleptic test that has been carried out, the more patin flour that is added can increase the color of the biscuits. The most preferred formula for biscuits with added patin flour is F3 biscuit with the most added amount of patin flour, which is 40 grams. The results of research conducted by Ningrum, et al in the manufacture of biscuits that are added with patin flour and ginger extract, the color obtained is brown, the more patin flour is added, the browner the resulting color will be [8].

Aroma is a stimulus from food received by the tongue. Aroma is one of the important characteristics in determining the acceptability of a food product[9]. Graph 1 shows that the average panelist liked the biscuits F0 with a value of 3.45. The aroma of F0 biscuits is typical of margarine with the aroma of biscuits in general, while the aroma of biscuits added with patin flour is typical of fish aroma, although not too sharp, this is probably due to the addition of pandan leaf extract so that it can slightly disguise the aroma of patin flour. The results of the analysis using the Friedman test on the assessment of the acceptability of the biscuit aroma showed that there was a significant difference ($\alpha < 0.05$) the addition of patin flour to the aroma acceptance between the biscuit formulas. This is suitable to Winarno statement, that addition of foodstuffs can be influence aroma of biscuits [10]. Aroma has an important role in odor testing because it can provide an assessment of whether the product is liked or not.

Graph 1 shows that the most preferred biscuit texture characteristic is that among the formulas added with patin meal is F3 biscuit with an average value of 2.78. The texture of the biscuits is crunchy but the difference in the level of coolness between the biscuits is due to the difference in the amount of adding patin flour to the biscuit processing, the more patin flour that is added can affect the texture of the biscuits. Crunchiness or texture is one of the determinants of biscuit quality that needs to be considered, because it is closely related to the degree of consumer acceptance. In general, biscuits that are considered good are those that have a brittle texture, that is, if the biscuits are pressed with a finger they will break easily[11]. The more use of patin flour, the harder the texture will be obtained so that the biscuits are not easily crushed or broken. However, it resulted in the biscuit dough not expanding properly.

Taste is the most important characteristic in determining the acceptability of biscuits. Taste can arise due to the food ingredient itself or due to the addition of other substances [10]. Graph 1 shows that the biscuit flavor characteristic that the panelists most likes is F0 biscuit with an average of 3.42. Among the formulas for adding patin flour, the most preferred is F1 with the least amount of adding patin flour, which is 20 grams. With the addition of more and more patin flour, it will make the taste stronger, so it is not liked by the panelists. Mahmudah also mentioned that the addition of fish meal to biscuits will affect the taste of the biscuits, the addition of a strong flavoring ingredient (flavoring or spices) can be used as an alternative in reducing the strong taste of biscuits modified with patin flour [12]. The results of the analysis using the Friedman test on the acceptability assessment (color, aroma, texture, and taste) showed a significant difference ($\alpha < 0.05$) on all characteristics.

Chemical characteristics were carried out on the control biscuit formula (F0) and the most preferred formula for adding patin meal (F3). Based on Table 3, the water content of F3 biscuits was higher than F0, which was 10.47%. These results indicate that the addition of patin flour to the biscuit formula will affect the water content of the biscuits. The more fish flour added to the biscuit formula, the more water content in the biscuits will increase. The highest protein

content was F3 biscuit, which was 18.84% with the addition of 40 grams of patin meal. The amount of protein SNI criteria for biscuits is at least 5 g per 100 g of product. The high or low value of the measured protein can be influenced by the amount of water lost (dehydration) of the material. The measured protein value will be greater if the amount of water lost is greater. According to Sebranek, the measured protein content depends on the amount of ingredients added and is largely influenced by the water content [13].

Biscuits with the addition of patin flour and pandan leaf extract as an alternative to supplemental food (PMT) for toddlers, especially those with stunting nutritional status, in addition to having high acceptance, they must also be able to meet the nutritional intake needs, especially energy and protein for toddlers. Table 4. Shows that the energy, protein and fat content for patin flour biscuits is higher than the SNI standard biscuits. This means that biscuits with the addition of patin meal and pandan leaf extract are suitable as an alternative to PMT for toddlers.

IV. CONCLUSION

The addition of patin flour and pandan leaf extract in the manufacture of PMT biscuits for toddlers with different proportions in each treatment could significantly affect the acceptability of the biscuits to taste, color, aroma and texture. Toddlers are encouraged to consume biscuits with the addition of patin flour and pandan leaf extract as PMT because it can meet the energy and protein needs of toddlers so that they can increase their body weight.

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